GOSSEN METRAWATT

MAVOWATT 20
ENERGY PLATFORM

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MAVO**WATT** | **20**
ENERGY | PLATFORM

Energy Platform™

USER GUIDE

GOSSEN METRAWATT

DRANETZ BMI

WARNING

Death, serious injury, or fire hazard could result from improper connection of this instrument. Read and understand this manual before connecting this instrument. Follow all installation and operating instructions while using this instrument.

Connection of this instrument must be performed in compliance with the National Electrical Code (ANSI/NFPA 70-2008) of USA 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 who has the skills and knowledge related to the construction and operation of the electrical equipment and installations, and who has received safety training on the hazards involved."

Qualified personnel who work on or near exposed energized electrical conductors must follow applicable safety related work practices and procedures including appropriate personal protective equipment in compliance with the Standard for Electrical Safety Requirements for Employee Workplaces (ANSI/NFPA 70E-2009) of USA and any additional workplace safety requirements applicable to your installation.

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ADVERTENCIA

Una conexión incorrecta de este instrumento puede producir la muerte, lesiones graves y riesgo de incendio. Lea y entienda este manual antes de conectar. Observe todas las instrucciones de instalación y operación durante el uso de este instrumento.

La conexión de este instrumento a un sistema eléctrico se debe realizar en conformidad con el Código Eléctrico Nacional (ANSI/NFPA 70-2008) de los E.E.U.U., además de cualquier otra norma de seguridad correspondiente a su establecimiento.

La instalación, operación y mantenimiento de este instrumento debe ser realizada por personal calificado solamente. El Código Eléctrico Nacional define a una persona calificada como "una que esté familiarizada con la construcción y operación del equipo y con los riesgos involucrados."

El personal cualificado que trabaja encendido o acerca a los conductores eléctricos energizados expuestos debe seguir prácticas y procedimientos relacionados seguridad aplicable del trabajo incluyendo el equipo protector personal apropiado en conformidad con el estándar para los requisitos de seguridad eléctricos para los lugares de trabajo del empleado (ANSI/NFPA 70E-2009) de los E.E.U.U. y cualquier requisito de seguridad adicional del lugar de trabajo aplicable a su instalación.

AVERTISSEMENT

Si l'instrument est mal connecté, la mort, des blessures graves, ou un danger d'incendie peuvent s'en suivre. Lisez attentivement ce manuel avant de connecter l'instrument. Lorsque vous utilisez l'instrument, suivez toutes les instructions d'installation et de service.

Cet instrument doit être connecté conformément au National Electrical Code (ANSI/NFPA 70-2008) des Etats-Unis et à toutes les exigences de sécurité applicables à votre installation.

Cet instrument doit être installé, utilisé et entretenu uniquement par un personnel qualifié. Selon le National Electrical Code, une personne est qualifiée si "elle connaît bien la construction et l'utilisation de l'équipement, ainsi que les dangers que cela implique."

Le personnel qualifié qui travaillent dessus ou s'approchent des conducteurs électriques activés exposés doit suivre des pratiques en matière et des procédures reliées par sûreté applicable de travail comprenant le matériel de protection personnel approprié conformément à la norme pour des conditions de sûreté électriques pour les lieux de travail des employés (ANSI/NFPA 70E-2009) des Etats-Unis et toutes les conditions de sûreté additionnelles de lieu de travail applicables à votre installation.

WARNUNG

Der falsche Anschluß dieses Gerätes kann Tod, schwere Verletzungen oder Feuer verursachen. Bevor Sie dieses Instrument anschließen, müssen Sie die Anleitung lesen und verstanden haben. Bei der Verwendung dieses Instruments müssen alle Installation- und Betriebsanweisungen beachtet werden.

Der Anschluß dieses Instruments muß in Übereinstimmung mit den nationalen Bestimmungen für Elektrizität (ANSI/NFPA 70-2008) der Vereinigten Staaten, sowie allen weiteren, in Ihrem Fall anwendbaren Sicherheitsbestimmungen, vorgenommen werden.

Installation, Betrieb und Wartung dieses Instruments dürfen nur von Fachpersonal durchgeführt werden. In dem nationalen Bestimmungen für Elektrizität wird ein Fachmann als eine Person bezeichnet, welche "mit der Bauweise und dem Betrieb des Gerätes sowie den dazugehörigen Gefahren vertraut ist."

Qualifiziertes Personal, das an bearbeiten oder herausgestellte angezogene elektrische Leiter sich nähern, muß anwendbare Sicherheit bezogener Arbeit Praxis und Verfahren einschließlich passende persönliche schützende Ausrüstung gemäß dem Standard für elektrische Sicherheitsauflagen für Angestellt-Arbeitsplätze (ANSI/NFPA 70E-2009) der Vereinigten Staaten und alle zusätzlichen Arbeitsplatzsicherheitsauflagen folgen, die auf Ihre Installation anwendbar sind.

Safety Summary

Definitions

WARNING statements inform the user that certain conditions or practices could result in loss of life or physical harm.

CAUTION statements identify conditions or practices that could harm the Energy Platform, its data, other equipment, or property.

NOTE statements call attention to specific information.

Symbols

The following International Electrotechnical Commission (IEC) symbols are marked on the top and rear panel in the immediate vicinity of the referenced terminal or device:

 Caution, refer to accompanying documents (this manual).

 Direct current (DC) operation of the terminal or device.

 Power Switch

Definiciones

Las ADVERTENCIAS informan al usuario de ciertas condiciones o prácticas que podrían producir lesiones mortales o daño físico.

Las PRECAUCIONES identifican condiciones o prácticas que podrían dañar la Energy Platform, sus datos, otros equipos o propiedad.

Las NOTAS llaman la atención hacia la información específica.

Símbolos

Los siguientes símbolos de la Comisión Internacional Electrotécnica (IEC) aparecen marcados en el panel superior y el posterior inmediatos al terminal o dispositivo en referencia:

 Precaución, consulte los documentos adjuntos (este manual).

 Operación de corriente continua (CC) del terminal o dispositivo.

 Interruptor de encendido

Continued on next page

Définitions

Les messages d'AVERTISSEMENT préviennent l'utilisateur que certaines conditions ou pratiques pourraient entraîner la mort ou des lésions corporelles.

Les messages de MISE EN GARDE signalent des conditions ou pratiques susceptibles d'endommager "Energy Platform", ses données, d'autres équipements ou biens matériels.

Les messages NOTA attirent l'attention sur certains renseignements spécifiques.

Symboles

Les symboles suivants de la Commission électrotechnique internationale (CEI) figurent sur le panneau arrière supérieur situé à proximité du terminal ou de l'unité cité:

 Mise en garde, consultez les documents d'accompagnement (ce manual).

 Fonctionnement du terminal ou de l'unité en courant continu (CC).

 Interrupteur de tension

Definitionen

WARNUNGEN informieren den Benutzer darüber, daß bestimmte Bedingungen oder Vorgehensweisen körperliche oder tödliche Verletzungen zur Folge haben können.

VORSICHTSHINWEISE kennzeichnen Bedingungen oder Vorgehensweisen, die zu einer Beschädigung von Energy Platform, seiner Daten oder anderer Geräte bzw. von Eigentum führen können.

HINWEISE machen auf bestimmte Informationen aufmerksam.

Symbole

Die folgenden Symbole der Internationalen Elektrotechnischen Kommission (International Electrotechnical Commission; IEC) befinden sich auf der Abdeck- und Seitenplatte unmittelbar am betreffenden Terminal oder Gerät.

 Vorsichtshinweis, siehe Begleitdokumente (dieses Handbuch).

 Gleichstrombetrieb im Terminal oder Gerät.

 Netzschalter

Continued on next page

Safety precautions

The following safety precautions must be followed whenever any type of voltage or current connection is being made to the Energy Platform.

- Wear proper Personal Protective Equipment, including safety glasses and insulated gloves when making connections to power circuits.
- Hands, shoes and floor must be dry when making any connection to a power line.
- Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.
- Set the Energy Platform power switch to Off.
- Before connecting to electric circuits to be monitored, open their related circuit breakers or disconnects. DO NOT install any connection of the Energy Platform to live power lines.
- Connections must be made to the Energy Platform first, then connect to the circuit to be monitored.
- If the equipment is used in a manner not specified in this user's guide, the protection provided by the equipment may be impaired. These safety precautions are repeated where appropriate throughout this manual.

These safety precautions are repeated where appropriate throughout this manual.

Statements and Notices

Statement of warranty

All products of Dranetz-BMI are warranted to the original purchaser against defective material and workmanship for a period of one year from the date of delivery. Dranetz-BMI will repair or replace, at its option, all defective equipment that is returned, freight prepaid, during the warranty period. There will be no charge for repair provided there is no evidence that the equipment has been mishandled or abused. This warranty shall not apply to any defects resulting from improper or inadequate maintenance, buyer-supplied hardware/software interfacing, unauthorized modification or misuse of the equipment, operation outside of environmental specifications, or improper site preparation or maintenance.

Statement of reliability

The information in this manual has been reviewed and is believed to be entirely reliable, however, no responsibility is assumed for any inaccuracies. All material is for informational purposes only and is subject to change without prior notice.

Notice regarding FCC compliance

This device has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

Notice regarding proprietary rights

This publication contains information proprietary to Dranetz-BMI. By accepting and using this manual, you agree that the information contained herein will be used solely for the purpose of operating equipment of Dranetz-BMI.

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Copyright

Trademarks

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ENERGY | PLATFORM

(Dranetz-BMI Energy Platform™)

CHAPTER 1

Getting Started

Overview

Energy Platform description

The Dranetz-BMI Energy Platform™ is a portable, hand-held, eight-channel demand and energy meter/monitor. This advanced power instrument is designed with a color liquid crystal display (LCD) 1/4 VGA, using touch screen technology. It can monitor, record and display data on four voltage channels and four current channels simultaneously.

The Energy Platform is designed to allow the user to easily conduct a complete demand and energy audit of a facility, a distribution circuit, or an individual piece of equipment. In addition, it simultaneously provides basic power quality (PQ) information about the system being monitored.

Energy Platform firmware

The firmware for the Energy Platform is contained on internal FLASH memory. It has an operating system capable of performing multiple applications. When an updated version of the firmware is released, the user can upgrade the internal program by putting the latest Energy Platform firmware program card in the appropriate slot of the mainframe. **See page 1-10 for instructions on how to upgrade the Energy Platform firmware from a data card.**

The Energy Platform firmware can monitor demand and energy parameters for energy audits, efficiency studies and cost reduction programs. It can carry out long-term statistical studies to establish performance baselines, and perform field-based equipment testing and evaluation for commissioning and maintenance. The firmware integrates an intuitive instrument setup procedure to ensure the capture of all relevant data for additional post process analysis, report writing, and data archiving using other compatible Dranetz-BMI software applications such as the Energy Platform™ Report Writer and DranView®.

This manual

This manual contains instructions for operating the Dranetz-BMI Energy Platform.

In this chapter The following topics are covered in this chapter.

Unpacking the Energy Platform

Introduction

For maximum protection against possible shipping damage, the Energy Platform has been sealed in a two-piece, plastic suspension pack, enclosed within a durable shipping carton. After opening the carton, inspect the contents for possible shipping damage and check the carton inventory.

Unpacking

Unpack the Energy Platform from the carton as follows:

Step	Action
1	Remove any remaining literature inside the top of the carton.
2	Carefully remove the Energy Platform from its shipping carton.
3	Remove all accessories inside the carton. Check that all of the standard accessories (see page 1-4) are included.

Shipping damage inspection

Visually inspect the Energy Platform for possible shipping damage. If any damage exists, first notify and file an insurance claim with your carrier or underwriter or both. Then notify Dranetz-BMI Customer Service Department of your intentions to return the unit. DO NOT return the Energy Platform without prior instructions from Dranetz-BMI Customer Service Department. Dranetz-BMI Customer Service Department can be reached at (732) 287-3680 or 1-800-372-6832.

Repacking for return shipment

If the unit must be returned to Dranetz-BMI for service or repair, wrap the unit securely in heavy packaging material and place in a well padded box or crate to prevent damage. Do not return the Energy Platform in an unpacked box. Dranetz-BMI will not be responsible for damage incurred during transit due to inadequate packing on your part.

Return notice

Notify Dranetz-BMI Customer Service of your intention of returning the unit. Do not return the unit without prior instructions from Dranetz-BMI. Dranetz-BMI Customer Service Department can be reached at (732) 287-3680 or 1-800-372-6832.

Standard Accessories

Standard accessories

The following table lists the Energy Platform's standard accessories.

Description	Part Number
Standard Software Accessories	
Energy Platform™ Report Writer (EPRW)	118070-G1
Standard Hardware Accessories	
Cable Set	116042-G6
Easel	116038-G1
AC Adapter	117029-G1
*US Power Cord	USSTDCORD (900744)
*European Power Cord	EUROSTDCORD (115369-G2)
*United Kingdom Power Cord	UKSTDCORD (115368-G2)
*Australian Power Cord	AUSTDCORD (901347)
Notice: Charge Battery	899156
Energy Platform User Guide (CD)	UG-EP1
Energy Platform Quick Reference Guide	QR-EP1
*User specified, one standard only.	

Optional accessories

Refer to Appendix A for the list of hardware and software optional accessories available for use with Energy Platform.

Batteries

Refer to Appendix C for the description and replacement of the batteries contained in Energy Platform.

Replaceable parts

Refer to Appendix D for the user replaceable parts.

Calibration

The recommended calibration interval for this unit is once every 12 months.

We recommend that you return the unit to the factory for calibration. If you decide to do so, first contact the Dranetz-BMI Customer Service Department to obtain an Authorization Number.

Telephone: (732) 287-3680 or 1-800-372-6832
FAX: (732) 248-9240

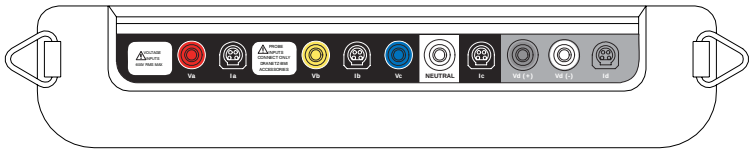
Fill out the Repair/Service Order form enclosed in the shipping carton and ship it along with the unit to the Dranetz-BMI Repair Department. (If this form is missing, ask the Dranetz-BMI Customer Service Department for a replacement.)

Energy Platform Controls, Indicators, and Connectors

Dimensions

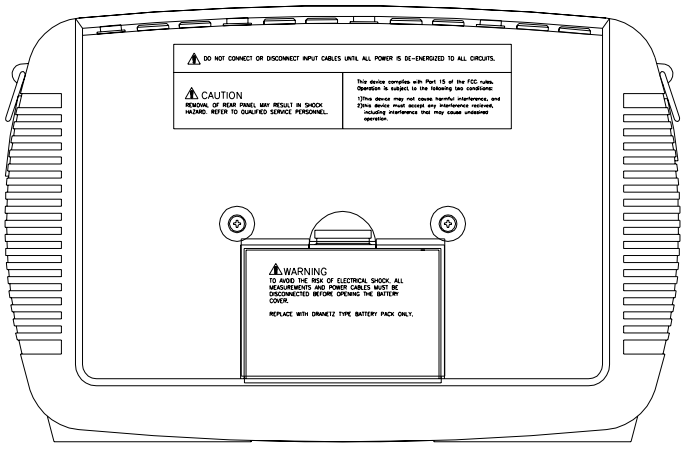
Energy Platform is a self-contained, portable instrument weighing less than 4 pounds and measuring 8" (20.3 cm) deep by 12" (30.5 cm) wide by 2.5" (6.4 cm) high. This section identifies and describes the controls, indicators, and connectors on all panels of the Energy Platform shown with rubber boot installed.

Top View



Front View

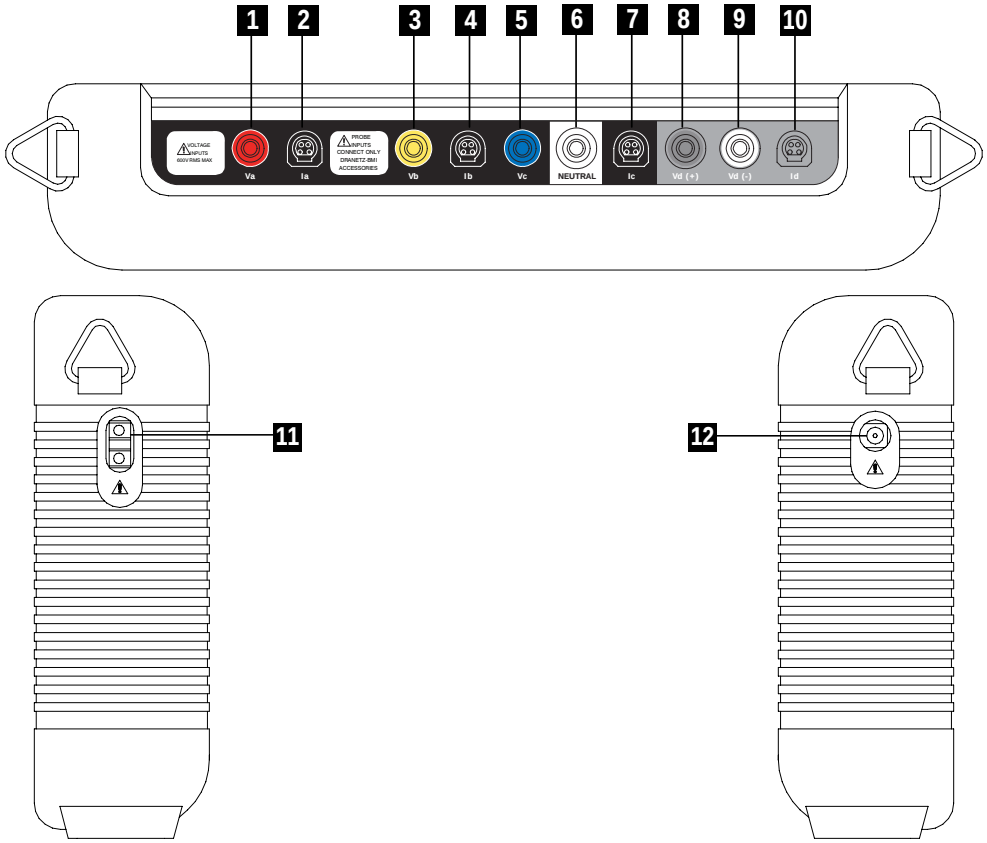
Rear View



Bottom View

Top and Side views

The top (circuit connection) view features the input voltage and current connectors. The left side contains the optical interface port. The right side contains the AC adapter input connector. Both sides have rings for attaching the supplied carrying strap. See below for descriptions of the top and side connectors.

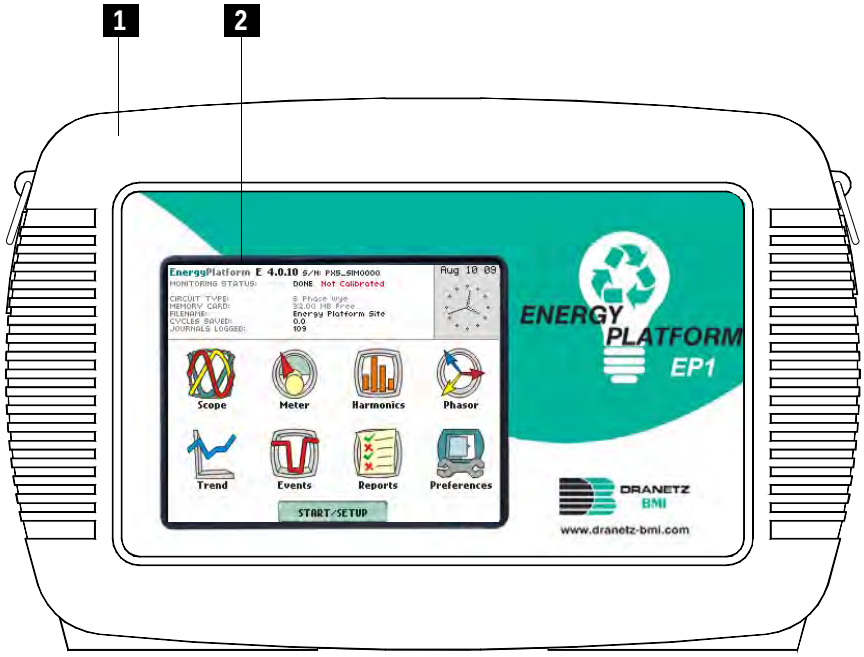


Parts table

Part	Function
1	CH A, Voltage Input Connector; color red.
2	CH A, PROBE, Current Input Connector.
3	CH B, Voltage Input Connector; color yellow.
4	CH B, PROBE, Current Input Connector.
5	CH C, Voltage Input Connector; color blue.
6	Neutral, Voltage Input Connector; color white.
7	CH C, PROBE, Current Input Connector.
8	CH D, + Differential Voltage Input Connector; color grey.
9	CH D, - Differential Voltage Input Connector; color white.
10	CH D, PROBE, Current Input Connector.
11	Optical Serial Data Port
12	AC Adapter/Battery Charger Input Connector.

Front view

The front view primarily shows the color touch screen LCD. See below for descriptions of the Energy Platform front panel.



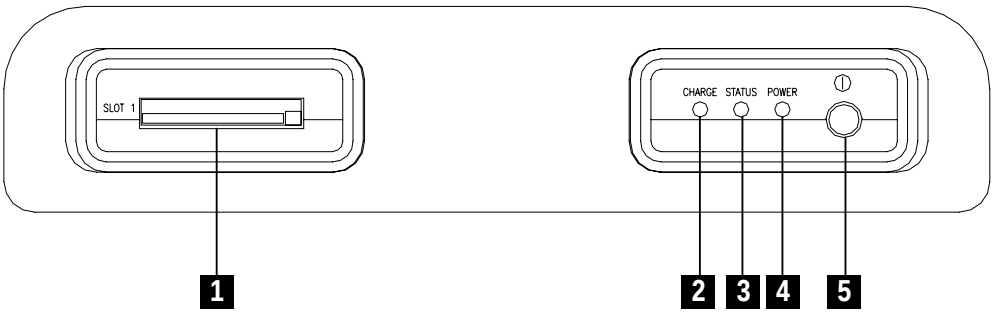
Parts table

Part	Function
1	Mainframe Protective Rubber Boot Enclosure
2	Liquid Crystal Display (LCD). Provides 3.75 x 4.75 inches display consisting of 1/4 VGA size screen of text and graphic information. The color LCD is equipped with touch screen technology, operable using the finger and/or PDA stylus. Touch screen display permits menu selection, alphanumeric data entry, and has a compact fluorescent (CCFL) backlighting that is always on for low light level viewing. The following are some basic care instructions for the LCD monitor: • Use and store the unit within the specified temperature and humidity range. The LCD screen may be adversely affected by exposure to high temperature or humidity. Condensation or moisture produced by sudden temperature changes may also damage the LCD screen. Clean any moisture from surface immediately. • Be careful when cleaning or removing stains on the LCD surface. Gently wipe the surface with a soft cloth or cotton pad. Isopropyl alcohol may be used, but make sure that all solvent residue is removed. • Do not apply excessive force to the LCD surface. The LCD screen contains sensitive electronic components that may be damaged due to strong impact.

Bottom view

The bottom view features a slot to hold the data card.

The bottom also features LED indicators and the On/Off power button. See below for descriptions of the data card slot, indicators, and power button.

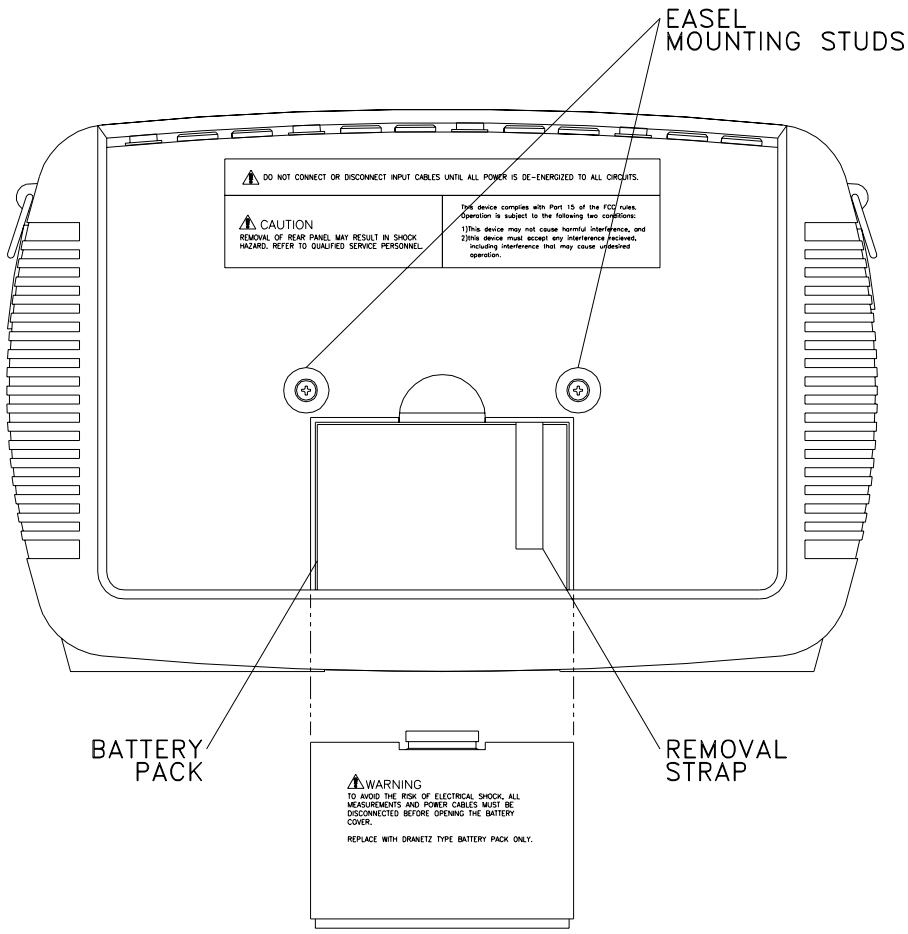


Parts table

Part	Function
1	Data Card Slot. Holds and connects data card to internal circuitry. Eject data card by pushing data card release.
2	Battery Charge Indicator. LED will light steadily while battery is fast charging and blink when fully charged.
3	Status Indicator. LED will light steadily when abnormal condition is detected. The unit is operating normally when light is off.
4	Power Indicator. LED will blink in a heartbeat fashion (once per second) when the unit is operating normally.
5	On/Off Power Button. Push for on, push for off.

Rear view

The rear view shows the battery compartment and the easel studs to mount the unit to desired angular position for use on a flat surface or to hang from a panel.



Upgrading Firmware from a Data Card

Energy Platform firmware web upgrade

Users can upgrade the Energy Platform internal program by downloading the latest firmware update release from the web and installing it into the Energy Platform internal memory. Refer to the instructions below on how to upgrade the Energy Platform firmware.

Firmware upgrades for the Energy Platform can be downloaded from the Dranetz-BMI website. Log on to www.dranetz-bmi.com for the latest information on Energy Platform firmware update releases.

Copy firmware program in data card

The procedure below specifies how to download the latest Energy Platform firmware from the web and copy it into a data card.

Step	Action
1	Locate the latest version of the firmware upgrade (in data file format "hostcode.bin") from the Dranetz-BMI website www.dranetz-bmi.com. Dranetz-BMI regularly posts the latest information and instructions regarding Energy Platform firmware upgrade releases.
2	Format the Compact Flash data card using the Memory Card options in Energy Platform. The card must be formatted before it can be written to. Refer to Chapter 5 Start Menu - Site Name/Memory Card for instructions on how to format data card. NOTE: All data and setups stored in card will be lost when you format the data card. Copy any files that you want to save to a computer first before formatting card.
3	Insert the Compact Flash data card into the appropriate slot in the computer. If the computer does not accommodate a Compact Flash card in its native format, use a compatible PC card adapter to be able to read/ write data into the card.
4	Download and copy the latest version of the Energy Platform firmware upgrade program (data file "hostcode.bin") from the Dranetz-BMI website to the data card. Refer to page 1-11 for instructions on how to install the data card containing the latest firmware upgrade to the Energy Platform.

Install data card to Energy Platform

The procedure below specifies how to install the data card containing the latest firmware upgrade to the Energy Platform.

Step	Action
1	Make sure that the unit is off. If not, press the Energy Platform On/Off power button to turn unit off.
2	Remove the data card from its protective holder and check that the plug end of card is clean and free of any obstruction. NOTE: If plug end of card is dirty, clean with static-free, dry, low pressure air to remove any foreign material causing obstruction of the plug holes.
3	At the bottom of the unit, position the data card with the label facing up and the plug end facing the Data Card Slot.
4	Insert the card fully into the data card slot until resistance is felt, then press firmly until card engagement is felt. NOTE: Do not force the card further into the slot if no card engagement is felt. Remove card and check if there is foreign object on or in the plug end of the card. Remove any obstruction. Reinsert program card and repeat card engagement. If card cannot be engaged, STOP all further action and call Dranetz-BMI Technical Support at 1-800-372-6832 for assistance.
5	Turn the unit on by pushing the on/off button. The loader should display “Booting from program card”. If not, call Dranetz-BMI Technical Support for assistance.
6	The instrument will prompt the user to verify whether or not to upgrade the firmware. Press Yes and the upgrade procedure will commence. Do not turn the power off nor remove the data card while firmware upgrade is in progress.
7	If no errors were detected, a window displaying “Installation Complete” will pop up. Remove the data card from the unit.

Energy Platform Features

Touch screen function	All Energy Platform functions described below are operable using a color LCD touch screen technology. Users may use a finger and/or a PDA stylus to apply pressure to the LCD screen to result in touch screen recognition. The touch screen display is also workable with lineman gloves on. Touch screen buttons will appear in reverse-video to show visual feedback of contact along with audible feedback. In order to reduce power consumption, the backlight of the LCD screen times-out after a specified programmable time of no user activity. The backlight reactivates by touching any part of the screen.
Scope mode	Scope mode functions as an oscilloscope, displaying real-time waveforms of voltage and current for up to eight channels simultaneously, with one second update rate. The colors of waveform display are user programmable. Scope mode also provides a textual display of rms values, division for axis values, and frequency.
Meter mode	Meter mode functions as a true rms voltmeter and a true rms clamp-on ammeter. Voltage and current measurements, along with other calculated parameters, are displayed on the Meter mode screens in both textual and graphical format.
Harmonics	Harmonics display the amplitude and phase of each harmonic to the 63rd harmonic in both graphical and textual format.
Phasor diagram	The phasor screen displays a graph that indicates phase relations between voltage and current based upon the angles at the fundamental frequency, as determined by Fourier analysis. Phasor diagram displays voltage and current phasors for all channels. Functioning as a phase angle meter, the unit can display system imbalance conditions and provides such information in textual form also. The phase angle display can also verify if monitoring connections have been made correctly. Animated phasor demo rotations demonstrating resistive, inductive and capacitive loads can be displayed.
Event	Energy Platform features an Event List screen which shows a summary of all captured events in the order that they occurred. An event occurs when a programmed threshold limit is crossed. Energy Platform is able to record three types of events namely sag, swell or aggregate snapshot.

Continued on next page

Monitoring capacity

The Energy Platform can monitor the following power configurations:

- Single Phase
- Split Phase
- 3 Phase Wye
- 3 Phase 2-Watt Meter Delta
- 2 1/2 Element without V_B
- 2 1/2 Element without V_C

While monitoring any of the above configurations, the Energy Platform can also be connected to monitor neutral to ground voltage and neutral or ground current, where applicable.

Automatic setup, Wizard setup, or Advanced setup

Setup is a configuration of parameter thresholds that control the data recorded by the Energy Platform. Users may perform instrument setup in three ways: via Automatic Setup which utilizes auto-configured settings and allows users to proceed directly with data monitoring; via Wizard Setup which follows a step-by-step sequence where users go through a series of circuit setup screens; or via Advanced setup which allows users to modify trigger parameters and intervals or tweak threshold settings under the Advanced Options.

Trend

Users can generate plots for all journalled data combined with min/max recordings of that parameter. Most journal parameters have multiple channels to plot.

Reports

Energy Platform features a summary report for Demand and Energy parameters in easy to read format. The data is displayed via the report panels. The panel is color coded such that green indicates the parameter is within limits, yellow means parameter is moderately out of limits, while red means parameter severely exceeds the monitoring limits.

Data Card

Energy Platform supports the use of Compact Flash data card with part number CFDATA-DB. The user replaceable data card is used as primary storage for data. Data monitoring CANNOT proceed without the data card. The Energy Platform is designed to accommodate the Compact Flash card in its native format, and does not require the use of a PC card adapter. However, a PC card adapter can be used to read the data into a laptop or other computer with a PC card slot.

Basic Operation

Introduction

The normal power source for the Energy Platform is its internal battery pack. The AC Adapter/Battery Charger is used to charge the battery. Always charge the battery fully before use. The Energy Platform will always operate on the charger and is designed to do so, regardless of the state of charge of the battery.

Battery pack

Type: Sealed, rechargeable NiMH (Nickel Metal Hydride) cells.

Length of operation: The Energy Platform can operate on a fully charged battery pack for more than two (2) hours with the backlight on. When the backlight is turned off, the unit can operate for more than three (3) hours. For information on how to turn backlight on or off, see Chapter 4 Instrument Settings - Set Display Preferences.

Charging: The battery pack can be charged by connecting the AC Adapter/Battery Charger to the Energy Platform. A screen warning will appear during operation when battery charge is low. A depleted battery pack can be recharged in six (6) hours whether the unit is on or off. The Battery Charge Indicator glows steadily while charging, and flashes when fully charged.

NOTE: The Battery Charge Indicator functions whenever the AC Adapter/Battery Charger is properly connected.

AC power source

The Energy Platform can be operated from a 50/60 Hz 120/230V AC power source with or without the battery pack installed.

Connect the AC Adapter output cable to the Input Connector on the right side of the Energy Platform. Connect the AC Adapter power cord to an appropriate outlet.

Refer to Appendix C for the specifications and replacement of the batteries contained in Energy Platform.

Power on sequence

Follow these steps to turn on the Energy Platform and display the Home screen.

Step	Action
1	Connect ac adapter/battery charger plug into the right side of Energy Platform.
2	Plug the ac adapter into an ac power source.
3	Press the Energy Platform On/Off power button to turn the unit on. Result: The Home screen will be displayed.  EP001

Home screen features

Home screen is frequently referenced as the starting point for all major functionalities of the Energy Platform.

The date and time appear on the top right corner of the Home screen. Both can be configured to appear in a different format. See page 4-3 for the procedure on how to set and reformat time and date.

The unit name and model, Energy Platform program revision level, and status messages appear in the upper portion of the Home screen. Pertinent information that appear in the status message area are the monitoring status, circuit configuration, percentage of data card used while monitoring, site/file name, number of event cycles saved, and number of timed intervals saved.

> MONITORING STATUS: OFF indicates that the instrument is not actively monitoring data. The monitoring status message will change to ON, DONE or ARMED, depending upon the state of data monitoring. See page 5-25 for the procedure on how to turn monitoring on/off.

Home screen contains the icons used to access the various Energy Platform functions. See page 1-16 for the description of each icon found in Home screen.

Home screen icons

Home screen contains the following icons used to access various Energy Platform functions:

Scope - Scope mode shows real-time voltage and current waveforms of the signals on the measuring inputs. See Chapter 3 View Real Time Data - Section A Scope Mode.

Meter - Meter mode displays voltage and current measurements, along with other calculated parameters. See Chapter 3 View Real Time Data - Section B Meter Mode.

Harmonics - Harmonic screen displays a spectral graph and textual matrix featuring the amplitude and phase of each voltage and current harmonic to the 63rd harmonic. See Chapter 3 View Real Time Data - Section C Harmonics.

Phasor - Phasor diagrams indicate phase relations between voltage and current based upon the angles of the fundamental. See Chapter 3 View Real Time Data - Section D Voltage and Current Phasor.

Preferences - Users can set instrument preferences like time and date, threshold alarm feedback, language selection, communications, LCD display, and data card operation. See Chapter 4 Instrument Settings.

Events - Events are displayed only after monitoring has been turned on or upon reading a stored file from the data card. See Chapter 7 View Event Data - Section A Event List.

Trend - Trend allows users to view plots of journalled data along with min/max measurements over the interval. See Chapter 7 View Event Data - Section B Trend.

Reports - The Energy Platform allows users to view Demand or Energy status via the report panels. The color coded panel indicates whether or not a parameter is within limits. See Chapter 8 Reports.

Start/Setup - Users have the option to use Automatic Setup and proceed directly with data monitoring or they can configure the instrument step-by-step using the Wizard Setup. Users can also do advanced setups to modify trigger parameters and intervals or tweak threshold settings under the Advanced Setup Options. See Chapter 5 Start Menu and Chapter 6 Advanced Setup Options.

CHAPTER 2

Voltage Measurement Cable and Current Probe Connections

Overview

Introduction

This section describes how to connect the Energy Platform to make basic single phase voltage measurements. For multi-phase connection diagrams, refer to Appendix E.

In this chapter

The following topics are covered in this chapter.

WARNING

Death, serious injury, or fire hazard could result from improper connection of this instrument. Read and understand this manual before connecting this instrument. Follow all installation and operating instructions while using this instrument.

Connection of this instrument must be performed in compliance with the National Electrical Code (ANSI/NFPA 70-2008) 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 who has the skills and knowledge related to the construction and operation of the electrical equipment and installations, and who has received safety training on the hazards involved."

Qualified personnel who work on or near exposed energized electrical conductors must follow applicable safety related work practices and procedures including appropriate personal protective equipment in compliance with the Standard for Electrical Safety Requirements for Employee Workplaces (ANSI/NFPA 70E-2009) of USA and any additional workplace safety requirements applicable to your installation.

Continued on next page

ADVERTENCIA **Una conexión incorrecta de este instrumento puede producir la muerte, lesiones graves y riesgo de incendio. Lea y entienda este manual antes de conectar. Observe todas las instrucciones de instalación y operación durante el uso de este instrumento.**

La conexión de este instrumento debe ser hecha de acuerdo con las normas del Código Eléctrico Nacional (ANSI/NFPA 70-2008) de EE. UU., además de cualquier otra norma de seguridad correspondiente a su establecimiento.

La instalación, operación y mantenimiento de este instrumento debe ser realizada por personal calificado solamente. El Código Eléctrico Nacional define a una persona calificada como “una que esté familiarizada con la construcción y operación del equipo y con los riesgos involucrados.”

El personal cualificado que trabaja encendido o acerca a los conductores eléctricos energizados expuestos debe seguir prácticas y procedimientos relacionados seguridad aplicable del trabajo incluyendo el equipo protector personal apropiado en conformidad con el estándar para los requisitos de seguridad eléctricos para los lugares de trabajo del empleado (ANSI/NFPA 70E-2009) de los E.E.U.U. y cualquier requisito de seguridad adicional del lugar de trabajo aplicable a su instalación.

AVERTISSEMENT **Si l'instrument est mal connecté, la mort, des blessures graves, ou un danger d'incendie peuvent s'en suivre. Lisez attentivement ce manuel avant de connecter l'instrument. Lorsque vous utilisez l'instrument, suivez toutes les instructions d'installation et de service.**

Cet instrument doit être connecté conformément au National Electrical Code (ANSI/NFPA 70-2008) des Etats-Unis et à toutes les exigences de sécurité applicables à votre installation.

Cet instrument doit être installé, utilisé et entretenu uniquement par un personnel qualifié. Selon le National Electrical Code, une personne est qualifiée si “elle connaît bien la construction et l'utilisation de l'équipement, ainsi que les dangers que cela implique.”

Le personnel qualifié qui travaillent dessus ou s'approchent des conducteurs électriques activés exposés doit suivre des pratiques en matière et des procédures reliées par sûreté applicable de travail comprenant le matériel de protection personnel approprié conformément à la norme pour des conditions de sûreté électriques pour les lieux de travail des employés (ANSI/NFPA 70E-2009) des Etats-Unis et toutes les conditions de sûreté additionnelles de lieu de travail applicables à votre installation.

WARNUNG

Der falsche Anschluß dieses Gerätes kann Tod, schwere Verletzungen oder Feuer verursachen. Bevor Sie dieses Instrument anschließen, müssen Sie die Anleitung lesen und verstanden haben. Bei der Verwendung dieses Instruments müssen alle Installation- und Betriebsanweisungen beachtet werden.

Der Anschluß dieses Instruments muß in Übereinstimmung mit den nationalen Bestimmungen für Elektrizität (ANSI/NFPA 70-2008) der Vereinigten Staaten, sowie allen weiteren, in Ihrem Fall anwendbaren Sicherheitsbestimmungen, vorgenommen werden.

Installation, Betrieb und Wartung dieses Instruments dürfen nur von Fachpersonal durchgeführt werden. In dem nationalen Bestimmungen für Elektrizität wird ein Fachmann als eine Person bezeichnet, welche "mit der Bauweise und dem Betrieb des Gerätes sowie den dazugehörigen Gefahren vertraut ist."

Qualifiziertes Personal, das an bearbeiten oder herausgestellte angezogene elektrische Leiter sich nähern, muß anwendbare Sicherheit bezogener Arbeit Praxis und Verfahren einschließlich passende persönliche schützende Ausrüstung gemäß dem Standard für elektrische Sicherheitsauflagen für Angestellt-Arbeitsplätze (ANSI/NFPA 70E-2009) der Vereinigten Staaten und alle zusätzlichen Arbeitsplatzsicherheitsauflagen folgen, die auf Ihre Installation anwendbar sind.

Safety precautions

The following safety precautions must be followed whenever any type of voltage or current connection is being made to the Energy Platform.

- Wear proper Personal Protective Equipment, including safety glasses and insulated gloves when making connections to power circuits.
- Hands, shoes and floor must be dry when making any connection to a power line.
- Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.
- Set the Energy Platform On/Off power button to Off.
- Before connecting to electric circuits to be monitored, open their related circuit breakers or disconnects. DO NOT install any connection of the Energy Platform to live power lines.
- Connections must be made to the Energy Platform first, then connect to the circuit to be monitored.
- If the equipment is used in a manner not specified in this user's guide, the protection provided by the equipment may be impaired. These safety precautions are repeated where appropriate throughout this manual.

Continued on next page

Connecting Voltage Measurement Cables

Measurement cable set

Description: Voltage measurement cables are provided as standard accessories and are stored in a cable pouch as part of the measurement cable set, P/N 116042-G6. Each cable set consists of a cable and alligator clip.

Voltage Rating: Direct connection of all voltage measurement cables are rated at 600 Vrms max. For measuring voltages greater than 600 Vrms, potential transformers (PTs) must be used.

Contents: The voltage measurement cables are shown on page 2-5 (positioned relative to their actual use). A cable set consists of six, 6-foot channel measurement cable assemblies (probes), each with a detachable, alligator jaw, safety clip assembly (maximum jaw opening, 3/4 in (20 mm)). The safety clip assemblies are red (+) and black (-) for each of the four channels. One cable each of red (channel A), yellow (channel B), blue (channel C), and grey (channel D), and two each of white are provided.

A pouch for storage of the cables and the AC adapter/battery charger is included in the contents of the measurement cable set, but is not shown in the figure.

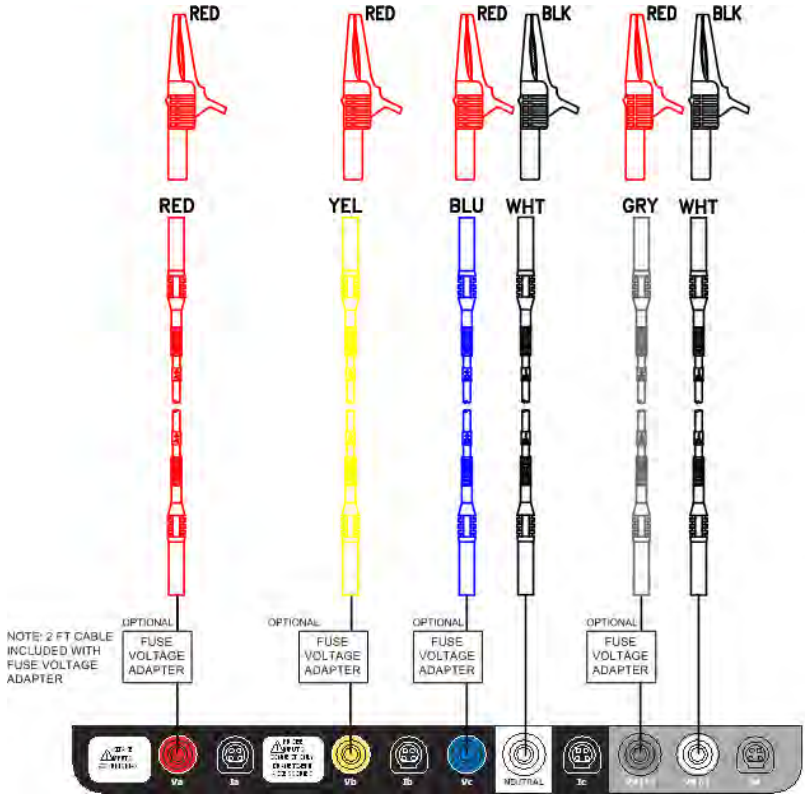
Optional fused voltage adapter

There are two optional fuse accessory kits available for use with the measurement cables. One kit (P/N FVA-1) contains one fused voltage adapter and one measurement connecting Red cable 50 cm in length. The other kit (P/N FVA-4) contains four voltage adapters and four measurement connecting cables 50 cm in length (one Red, one Yellow, one Blue, and one Grey).

The single fuse voltage adapter kit is used for one single voltage measurement input. While the four fuse voltage adapter kit is used for a three phase and neutral voltage measurement inputs.

Continued on next page

Measurement cable set with optional fuse diagram



EP-11.vsd

WARNING **To avoid the risk of electric shock or burns, always connect the safety (or earth) ground before making any other connections.**

WARNING **To reduce the risk of fire, electrical shock, or physical injury it is strongly recommended to fuse the voltage measurement inputs.**
Fuses must be located as close to the load as possible to maximize protection.

WARNING **For continued protection against risk of fire or shock hazard replace only with same type and rating of recommended fuse.**
Use only fast blow type fuse which is rated 600V. Recommended fuse type is Littelfuse, part number KLKD0.30 rated 600V AC/DC, 0.3A fast blow.

WARNING **Do not replace fuse again if failure is repeated. Repeated failure indicates a defective condition that will not clear with replacement of the fuse. Refer condition to a qualified technician.**

Contact Dranetz-BMI Customer Service for more information on the fused voltage adapter. Refer to Dranetz-BMI Information Sheet titled Model FVA - Fuse Voltage Adapter, P/N 899107.

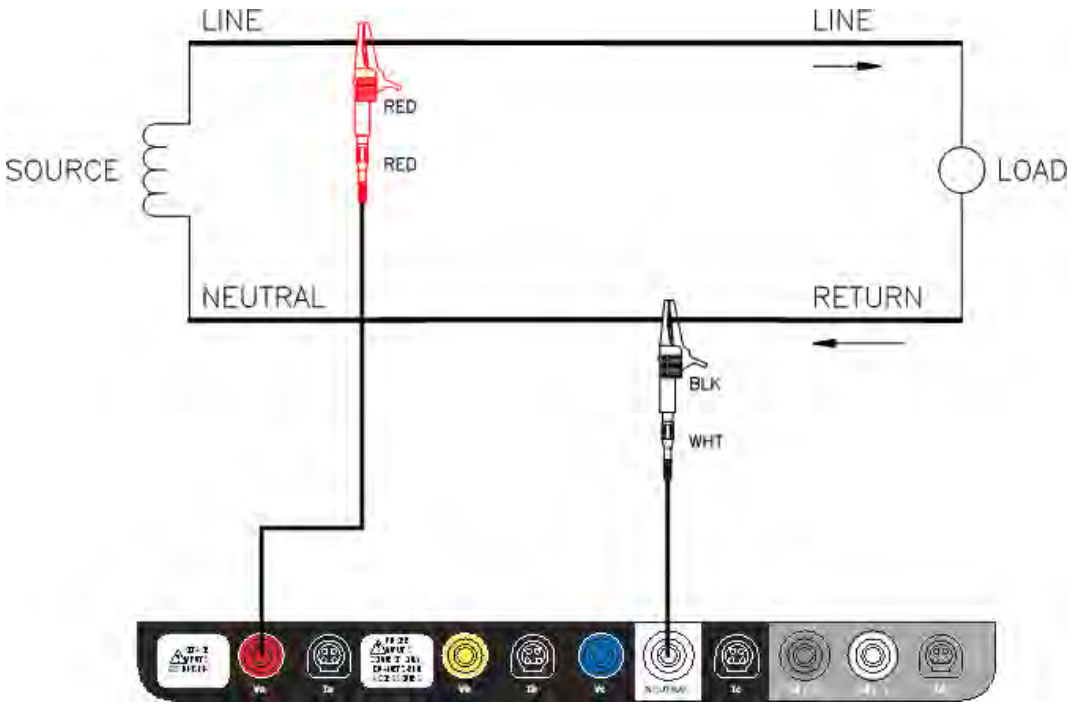
Connection guidelines

Follow these guidelines when making voltage connections.

- Refer to the measurement cable set figure for color coding of probes that connect to input channel connectors A, B, C, and D.
- Channel D input has plus (+) and minus (-) differential inputs. All voltage inputs have a range of 1 to 600 Vrms max.

Example: Single phase connection

The following figure shows a voltage connection to a single phase circuit for channel A.

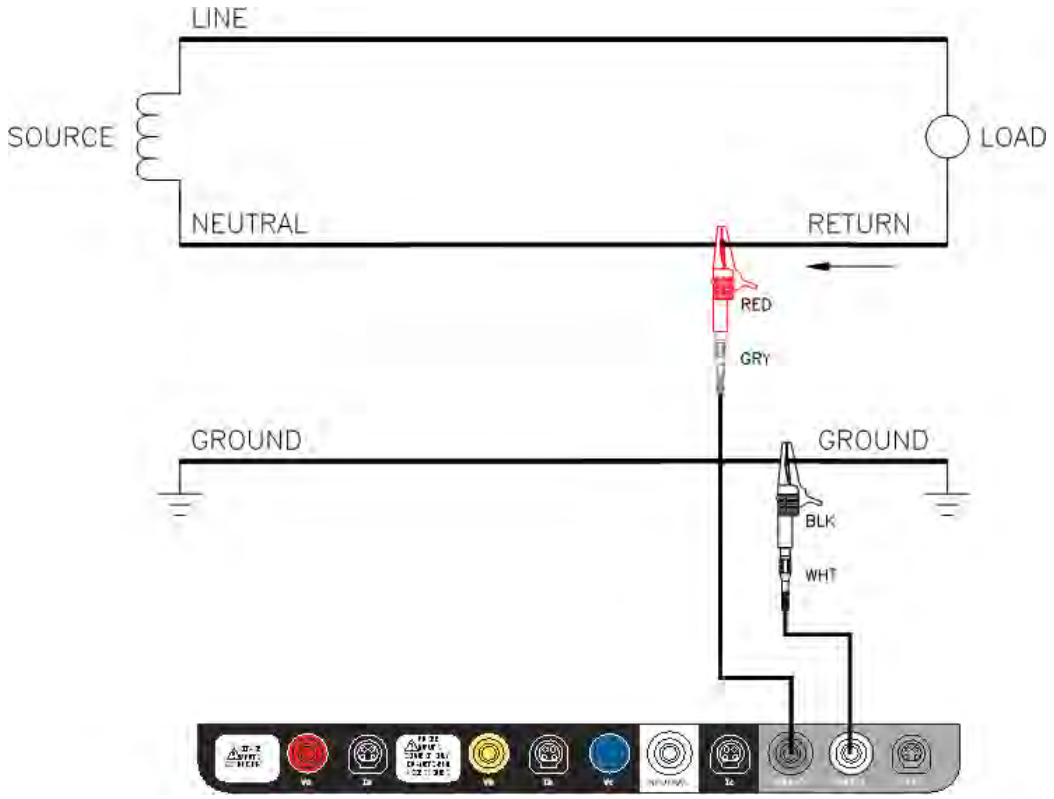


EP-12.vsd

Continued on next page

Example: Neutral to ground connection

The following figure shows a voltage connection using channel D as a differential input for measuring neutral to ground voltage. Connections are identical for split phase and wye configurations. One probe connects the source neutral line to the D+ input. Another probe connects the ground to the D- input.



EP-13.vsd

Safety precautions

The following safety precautions apply to current probe connections in addition to those safety precautions stated on page 2-3.

- DO NOT attempt to measure current in any circuit in which the circuit to ground voltage exceeds the insulation rating of the current probe (600 Vrms max).
- Make sure the jaws of the current probe are tightly closed. Keep mating surfaces clean and free from foreign matter.

WARNING **DO NOT USE non-insulated current probe cores around a non-insulated wire. Probes of this type are designed for use around insulated wires only. Use only completely insulated probe cores with no exposed conductive areas of the core around non-insulated wires.**

ADVERTENCIA **NO UTILIZAR transformadores de corriente sin material aislante al rededor de conductores sin material aislante. Los Transformadores de corriente de este tipo están diseñados para ser utilizados solamente con conductores con aislamiento eléctrico. Utilizar transformadores de corriente completamente aislados alrededor de conductores sin aislamiento.**

AVERTISSEMENT **N'EMPLOYEZ PAS les noyaux courants non-isolés de sonde autour d'un fil non-isolé. Des sondes de ce type sont concues pour l'usage autour des fils isolés seulement. L'utilisation seulement a complétement isolé des noyaux de sonde sans des secteurs conducteurs exposés du noyau autour des fils non-isolés.**

WARNUNG **VERWENDEN Sie keine Stromzangen mit nicht isolierten Ferritkernen bei Messungen an nicht isolierten Leitungen. Stromzangen dieses Typs sind nur für Messungen an isolierten Leitern geeignet. Bitte verwenden Sie zur Messung an nicht isolierten Leitungen Stromzangen mit vollständig isoliertem Kernmaterial.**

Continued on next page

Connecting Current Probes

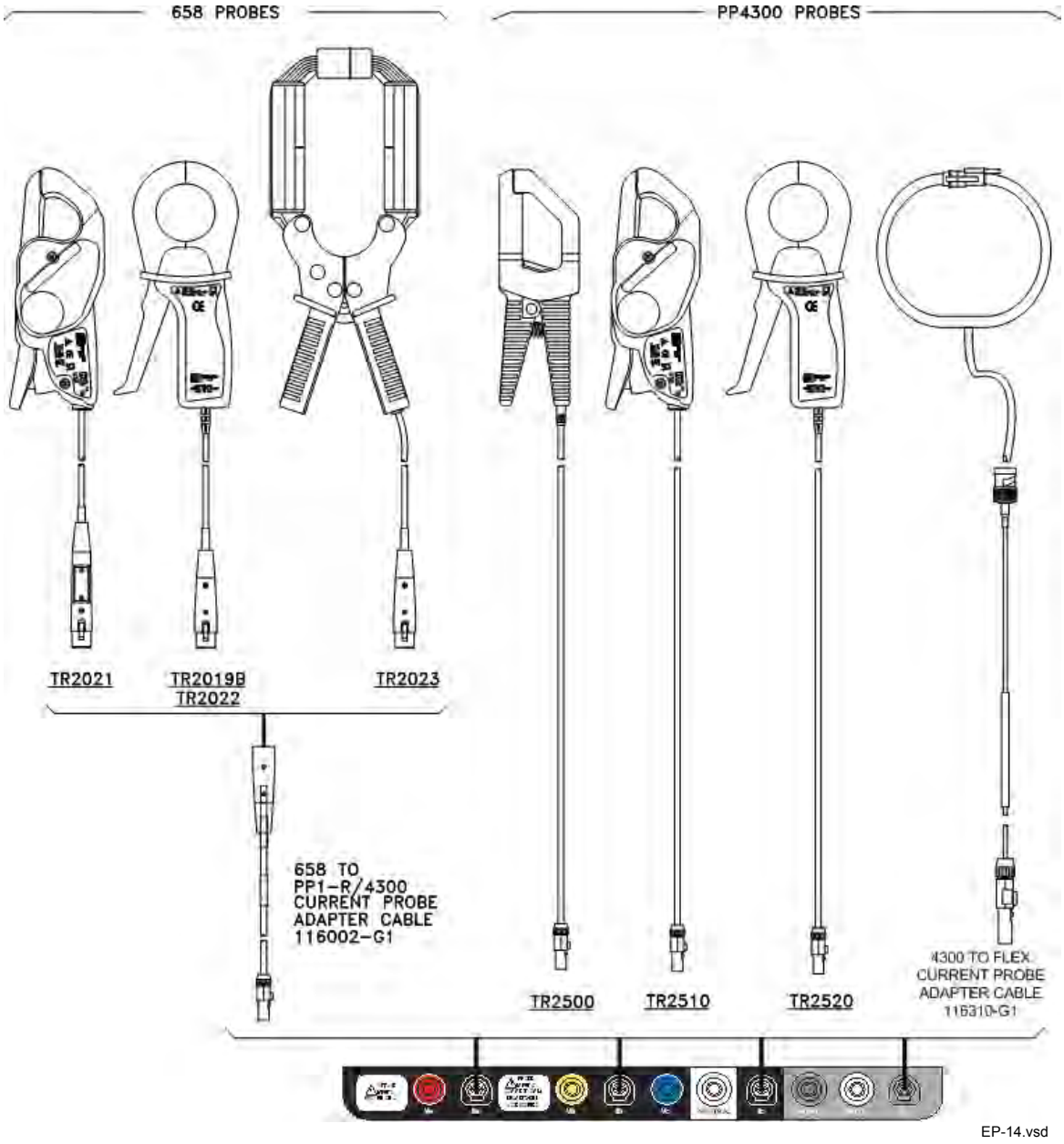
Current probes

Several Dranetz-BMI current probes can be used with the Energy Platform. Typical current probes are illustrated on page 2-10. Refer to Appendix A for descriptions and part numbers of probes and adapter cables. Refer to Appendix B for specifications of current probe models TR2500, TR2510, DRANFLEX 3000XL/6000XL, and DRANFLEX 3003XL/6003XL.

Probe positioning: An arrow marking on the handle is a guide to ensure that you position the probe with the arrow pointing towards the load when monitoring the line conductor. Correct position of the probe is necessary for correct power measurements, where in-phase voltage and current measurements are necessary. A positive watts reading indicates that the probe is pointed towards the load, and a negative reading indicates that the probe is pointed towards the source.

Continued on next page

Typical current probes



NOTE: Current probes TR2500 can be used interchangeably with TR2500A, TR2510 with TR2510A, and TR2520 with TR2520A.

Continued on next page

Typical current probes (continued)

Actual photos of TR series probes and part numbers are shown below to aid users in probe identification. Contact Dranetz-BMI Customer Service Department for more information on current probes, pricing and availability.

P/N TR-2500

P/N TR-2510

P/N TR-2520

P/N TR-2500A

P/N TR-2510A

P/N TR-2520A

Continued on next page

Typical current probes (continued)

Photos of DRANFLEX probes are also shown below. These types of probes are available in lengths of 24, 36 and 48 inches and in two maximum ranges of 3000A RMS and 6000A RMS. Contact Dranetz-BMI Customer Service Department for more information on current probes, pricing and availability.

DRANFLEX Current Probes
DRANFLEX 3000XL/6000XL current probes allow current measurements in the range of 0.5 to 3000 A full scale, or 0.5 to 6000 A full scale. Available in three sizes: 24” probe length - conductor(s) up to 8” diameter; 36” probe length - conductor(s) up to 11” diameter; 48” probe length - conductor(s) up to 17” diameter.

P/N 3000XL/24 (24” probe length)

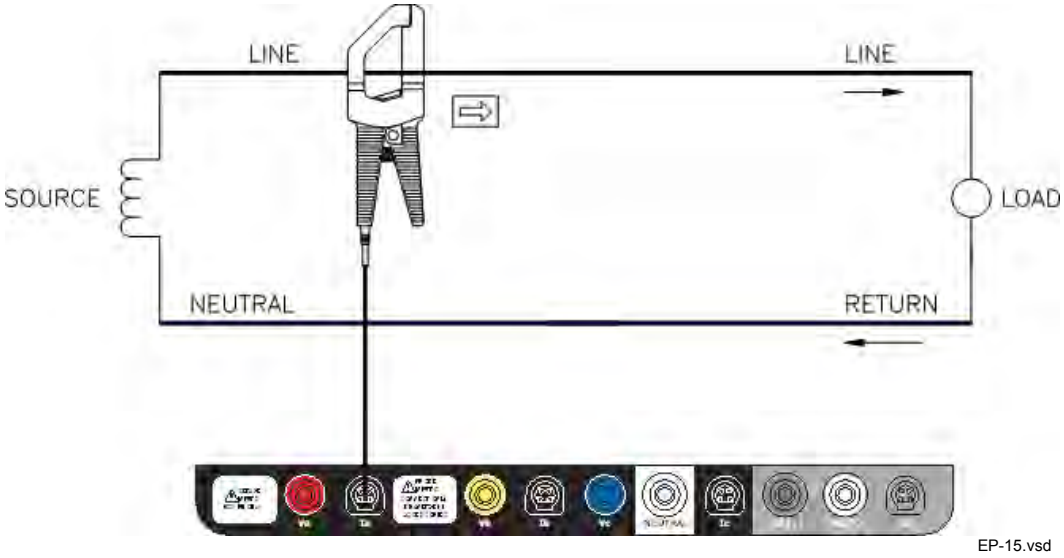
DRANFLEX 3-Phase Current Probes
DRANFLEX 3003XL/6003XL are 3-Phase current probes that allow current measurements in 3 Phase circuits in the range of 0.5 to 3000 A full scale, or 0.5 to 6000 A full scale. Available in three sizes: 24” probe length - conductor(s) up to 8” diameter; 36” probe length - conductor(s) up to 11” diameter; 48” probe length - conductor(s) up to 17” diameter.

P/N 3003XL/24 (24” probe length)

Single phase current probe connection example

The following figure shows how to connect a current probe to channel A for current monitoring of a single phase line.

The current probe may be connected to the return line if desired to measure the return current when checking for load current leakage, loop current relationships, etc. If measuring power, position the probe with the arrow pointing towards the load.



NOTE: The connection shown above is not recommended without a voltage connection to ensure frequency synchronization. If this configuration is used, then an internal frequency reference must be entered. Refer to pages 5-14 to 5-16.

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CHAPTER 3

View Real Time Data

Overview

Introduction

The Energy Platform allows users to view demand/energy quality phenomena as it happens, when it happens. The instrument is able to capture and process data in real time, and allows users to view it in Scope mode, Meter mode, Harmonics, and Phasor display.

Access to real time data

Icons for Scope mode, Meter mode, Harmonics and Phasor display are available in the Home screen. Follow these steps to display the Home screen.

Action...	Result...
STEP 1: Press the Energy Platform On/Off power button to turn the unit on. The Home screen will be displayed.	 EP001

In this chapter

This chapter is divided into four sections.

Section A

Scope Mode

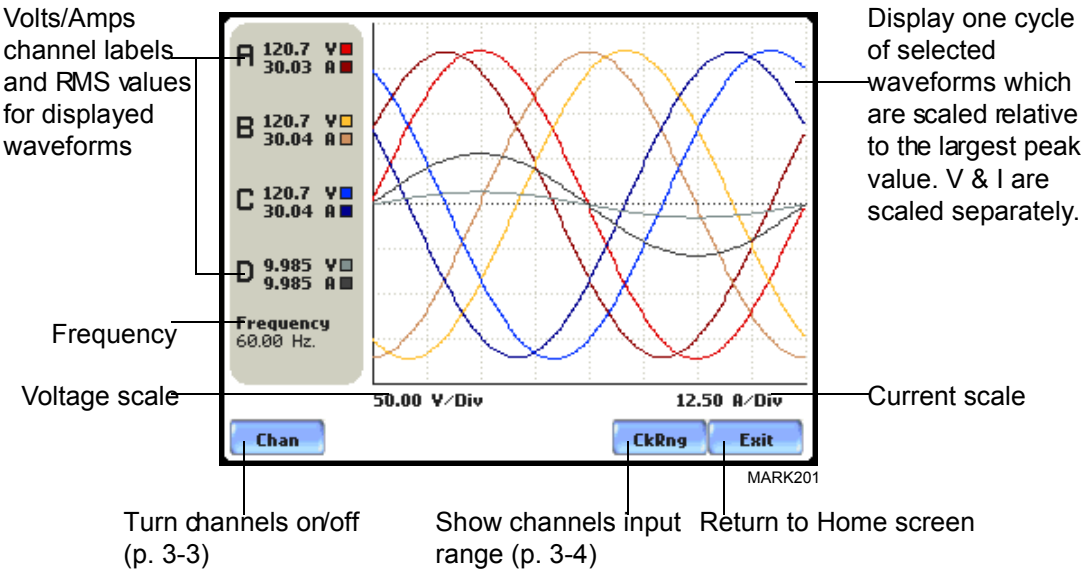
Overview

Introduction

Scope mode allows you to view real-time voltage and current waveforms for up to eight channels simultaneously.

Scope mode screen

The Scope mode screen can be displayed by pressing the Scope key on the Home screen.



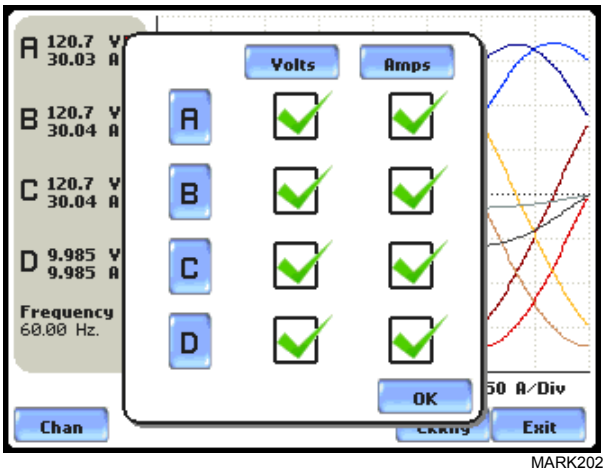
In this section

The following topics are covered in this section.

Turning Channels On/Off

Select channels to display

From the Scope mode screen, press Chan to turn Volts/Amps channel selection on/off.



MARK202

Any of the following will turn channels on/off:

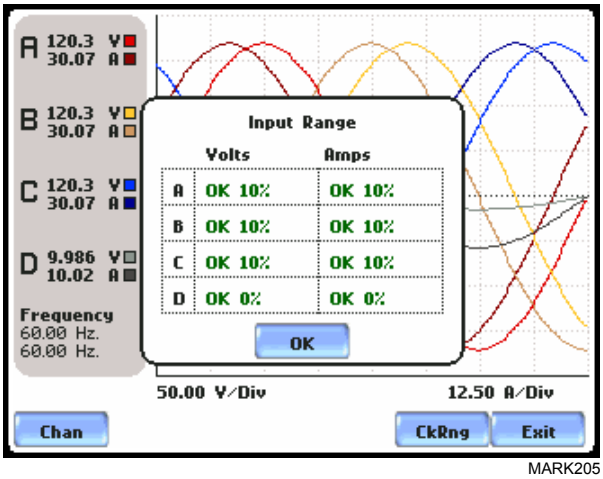
- Press the desired Volts/Amps channel to turn it on/off.
- Press Volts or Amps button to turn on/off all channels of that parameter.
- Press A, B, C, D to turn on/off both the Volts and Amps for that channel.

Press OK to accept channel selection.

Checking Input Range

Input range

The Input Range screen is displayed by pressing the CkRng key on the Scope mode screen. Input Range shows the detected range for all channels. The number after the status shows the percentage of the input of the instrument's full range.



MARK205

The input range can only be viewed, not changed. Press OK when done viewing the input range.

Input range description

The following table describes the messages that may register on the Input Range screen. The instrument is able to detect the input range for voltage and current channels A, B, C, and D.

Input Range	Description
OK	Within Range
OVER	Over Range
UNDER	Under Range
N/A	Channel Disabled
CLIP	Clipping

If input range is OVER, UNDER, or CLIP, then the rms readings will not be accurate. Using CTs below 10% of Full Scale may also cause inaccuracies in amplitude, phase and harmonic distortion readings.

Section B

Meter Mode

Overview

Introduction

Meter mode allows you to view real-time meter data. The metered parameters available are logically separated into Standard, Distortion and Advanced tabs. Meter screens are displayed in tabular form.

NOTE**:** Meter mode operation does not interfere with any of Energy Platform's other monitoring or recording functions. The individual voltage and current channel meter readings are not affected by the monitoring setup. Turning monitoring of individual channels off does not affect meter readings. Meter and Scope data is NOT available if you are viewing a stored file from the data card.

Metered parameters display

The Energy Platform is designed to provide setup as well as data display. Metered parameters are available for display regardless if they are being journalled under Setup New Circuit > Advanced Options > Journal Limit Setup. Users can trend journal entries by limits (Very High, High, Low, Very Low) or by time (users can set the time interval of how often rms and waveform snapshots will be recorded even when no disturbances occur). For the procedure on how to set entries under journal parameters, go to Chapter 6 Advanced Setup Options - Journal Limit.

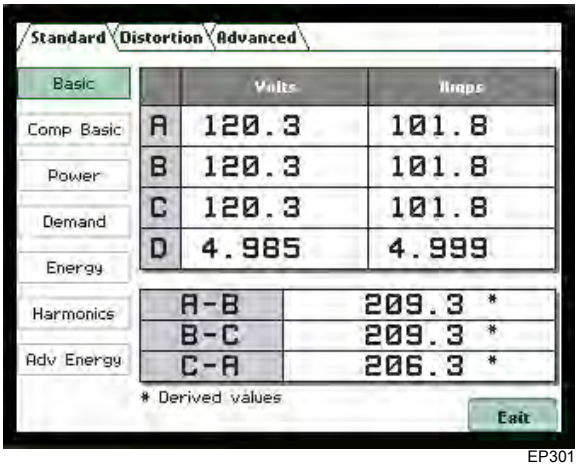
In this section

The following topics are covered in this section.

Standard Meter Tab

Standard meter list

Meter mode can be displayed by pressing the Meter icon on the Home screen. At start-up, meter mode defaults in the Standard tab featuring the basic power quality parameters available. The standard metering properties include Basic Voltage & Amps, Computed Basic, Power, Demand, Energy, Harmonics, and Advanced Energy as shown below.



EP301

Standard Tab	Parameter Name	Label
Basic (for A, B, C, D)	Volts NOTE: Some voltage channel meter values are derived based on the circuit type selection. The values will change depending on the wiring configuration setup.	Volts
	Ampere	Amps
Computed Basic	Vector Displacement Power Factor	Vector Displacement PF
	Arithmetic Displacement Power Factor	Arithmetic Displacement PF
	Residual Current	Residual Current
	Net Current	Net Current
Power (for A, B, C, D, Total)	Watts	W
	Volts Ampere	VA
	Volts Ampere Reactive	VAR
	True Power Factor	TPF
	Displacement Power Factor	DPF

NOTE: See Appendix B Technical Specifications - Computed Parameters for definition of parameters.

Continued on next page

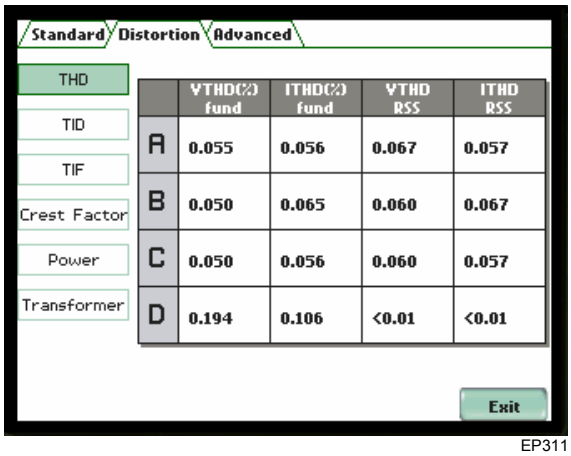
Standard meter list (continued)

Standard Tab	Parameter Name	Label
Demand	Active Power Demand	Active Power Demand
	Apparent Power Demand	Apparent Power Demand
	Reactive Power Demand	Reactive Power Demand
	RMS Current Demand Phase A	RMS Current Demand Ph A
	RMS Current Demand Phase B	RMS Current Demand Ph B
	RMS Current Demand Phase C	RMS Current Demand Ph C
	RMS Current Demand Average	RMS Current Demand Avg
Energy (for A, B, C, D, Total)	Watt Hours	Watt Hrs
	Volts Ampere Hours	VA Hrs
	Volts Ampere Reactive Hours	VAR Hrs
Harmonics (for A, B, C, D)	Voltage Total Harmonic Distortion	V THD
	Current Total Harmonic Distortion	I THD
	Harmonic Power Unsigned	Harm Pwr Unsigned
Advanced Energy (for A, B, C, D, Total)	Forward Fundamental Frequency Watt Hours	Fwd Whr
	Forward Fundamental Frequency Volts Ampere Reactive Hours	Fwd VAR Hr
	Reverse Fundamental Frequency Watt Hours	Rev Whr
	Reverse Fundamental Frequency Volts Ampere Reactive Hours	Rev VAR Hr

Distortion Meter Tab

Distortion meter list

The Energy Platform is able to meter distortions or uncharacteristic changes in the waveform of original signals. Distortion calculations measure the deviation of complex waveshapes from pure sine waves. Harmonics are measured in accordance with IEC 61000-4-7 Class I.



EP311

Distortion Tab	Parameter Name	Label
THD (for A, B, C, D)	Voltage Total Harmonic Distortion Fundamental	V THD fund
	Current Total Harmonic Distortion Fundamental	I THD fund
	Voltage Total Harmonic Distortion Root Sum of Square	V THD RSS
	Current Total Harmonic Distortion Root Sum of Square	I THD RSS
TID (for A, B, C, D)	Voltage Total Interharmonic Distortion Fundamental	V TID fund
	Current Total Interharmonic Distortion Fundamental	I TID fund
	Voltage Total Interharmonic Distortion Root Sum of Square	V TID RSS
	Current Total Interharmonic Distortion Root Sum of Square	I TID RSS

Continued on next page

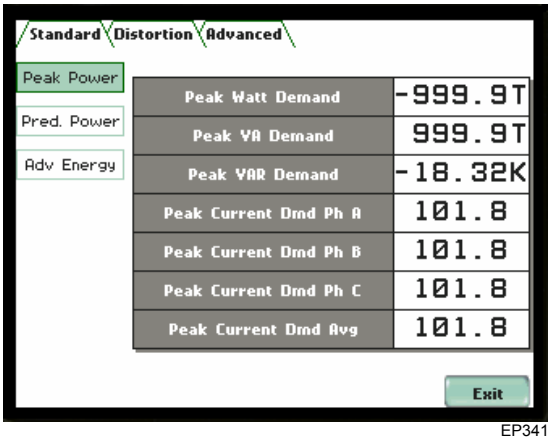
Distortion meter list (continued)

Distortion Tab	Parameter Name	Label
TIF (for A, B, C, D)	Voltage Telephone Influence Factor Fundamental	V TIF fund
	Current Telephone Influence Factor Fundamental	I TIF fund
	Voltage Telephone Influence Factor RMS	V TIF RMS
	Current Telephone Influence Factor RMS	I TIF RMS
	Telephone Influence Factor Product	TIF Prod
Crest Factor (for A, B, C, D)	Voltage Crest Factor	Volts Crest Factor
	Current Crest Factor	Amps Crest Factor
Power (for A, B, C, D)	Signed Phase Harmonic Power	Signed
	Unsigned Phase Harmonic Power	Unsigned
Transformer (for A, B, C, D)	Transformer Derating Factor	Derating Factor
	K Factor	K Factor

Advanced Meter Tab

Advanced meter list

Advanced Energy/Demand include various energy parameters on per phase and total basis as well as in forward and reverse mode.



EP341

Advanced Tab	Parameter Name	Label
Peak Power	Peak Watt Demand	Peak Watt Demand
	Peak Volts Ampere Demand	Peak VA Demand
	Peak Volts Ampere Reactive Demand	Peak VAR Demand
	Peak Current Demand Phase A	Peak Current Dmd Ph A
	Peak Current Demand Phase B	Peak Current Dmd Ph B
	Peak Current Demand Phase C	Peak Current Dmd Ph C
	Peak Current Demand Average	Peak Current Demand Avg
Predicted Power	Predicted Watt Demand	Predicted W Demand
	Predicted Volts Ampere Demand	Predicted VA Demand
	Predicted Volts Ampere Reactive Demand	Predicted VAR Demand

Continued on next page

Advanced meter list (continued)

Advanced Tab	Parameter Name	Label
Advanced Energy (for A, B, C, D, Total)	Forward Fundamental Frequency Watt Hours	Fwd Whr
	Forward Fundamental Frequency Volts Ampere Reactive Hours	Fwd VAR Hr
	Reverse Fundamental Frequency Watt Hours	Rev Whr
	Reverse Fundamental Frequency Volts Ampere Reactive Hours	Rev VAR Hr

Section C

Harmonics

Overview

Harmonics display

The Energy Platform allows users to view voltage and current harmonics/ interharmonics in graphical or in list form. Harmonics are waveform distortion, a steady-state deviation from an ideal power frequency sinusoid and is characterized by the spectral content of the waveform. Interharmonics are frequency components between the harmonic frequencies. The IEC 61000-4-7 Standard dictates that harmonic analysis is done using a synchronous window of 10 cycles for 50 Hz, or 12 cycles for 60 Hz. This results in bins which are nominally 5 Hz wide. The actual width of the bins is equal to the actual frequency divided by 10 if the nominal frequency is 50 Hz, and 12 if 60 Hz. For example, if actually operating at 49.9 Hz, the bin is 4.99 Hz, but is labelled “5 Hz” as specified by the standard.

Use the respective touch screen buttons to display the next Channel (Channels A, B, C, D) and the next Parameter (V, I, W) of harmonic data. The number of harmonics/ interharmonics displayed is up to the 60th. Summary values of odd, even and total distortion are displayed. A summary of harmonic distortion as well as interharmonic distortion values per phase/parameter are also available on display.

Users can determine the number or range of harmonic frequencies to trend and view in detail. There is also the option to select how to plot harmonic/interharmonic data and specify the units of measure by which harmonic data is calculated.

Harmonic Graph: Harmonics are measured in accordance with IEC 61000-4-7 Class 1. Users can choose the unit of measure by which harmonic data is calculated and graphed, based on a Percentage of the fundamental value or in Engineering units (volts and amps). Frequency components of harmonic graphs can be displayed either in Hertz or in Harmonic Number. The graphs can be zoomed and rescaled.

Harmonic List: The list gives a textual display of the following for each of the measured values: frequency and harmonic number; magnitude in Engineering units and percent of fundamental; phase in degrees (for harmonics only). This list is displayed in order of ascending frequency, and can also be sorted in order of descending magnitude.

In this section

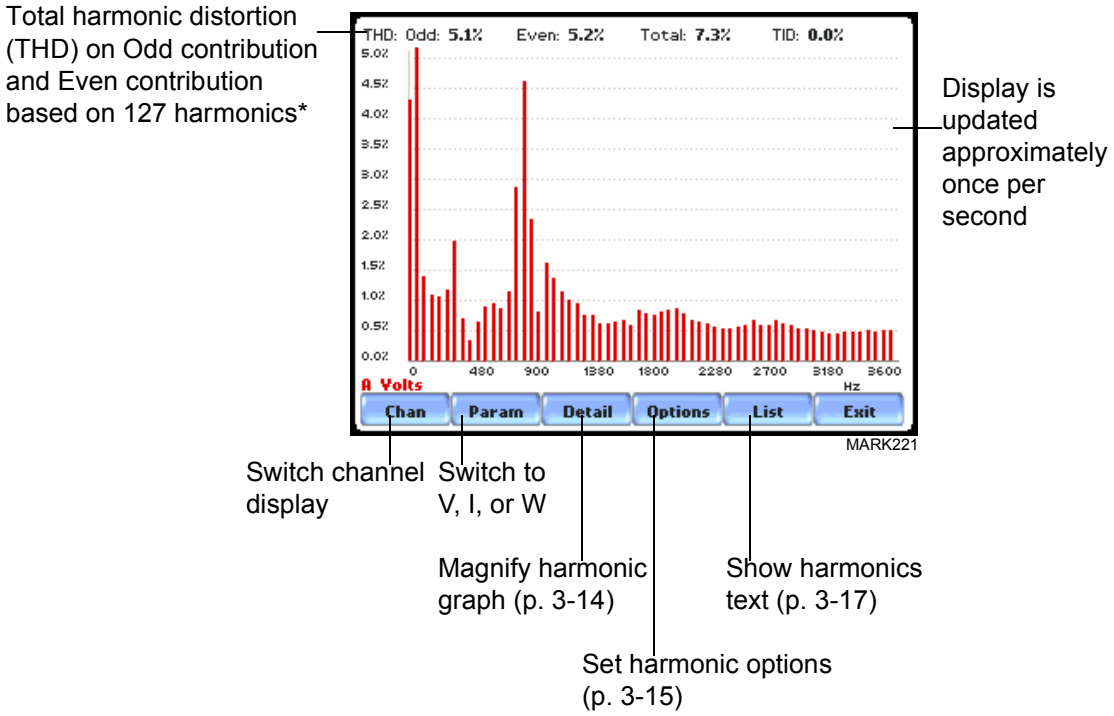
The following topics are covered in this section.

Harmonic Graph

Harmonic graph display

The harmonic graph can be displayed by pressing Harmonics on the Home screen. The screen defaults to a graphical spectrum display, although users have the option to choose between the graph and list form. The screen will show a spectral graph featuring the amplitude of the harmonics relative to the fundamental frequency.

Use the properties under the Options button to select the vertical and horizontal measurement scale. The percent magnitude of the first 60 harmonics are graphed relative to the fundamental.



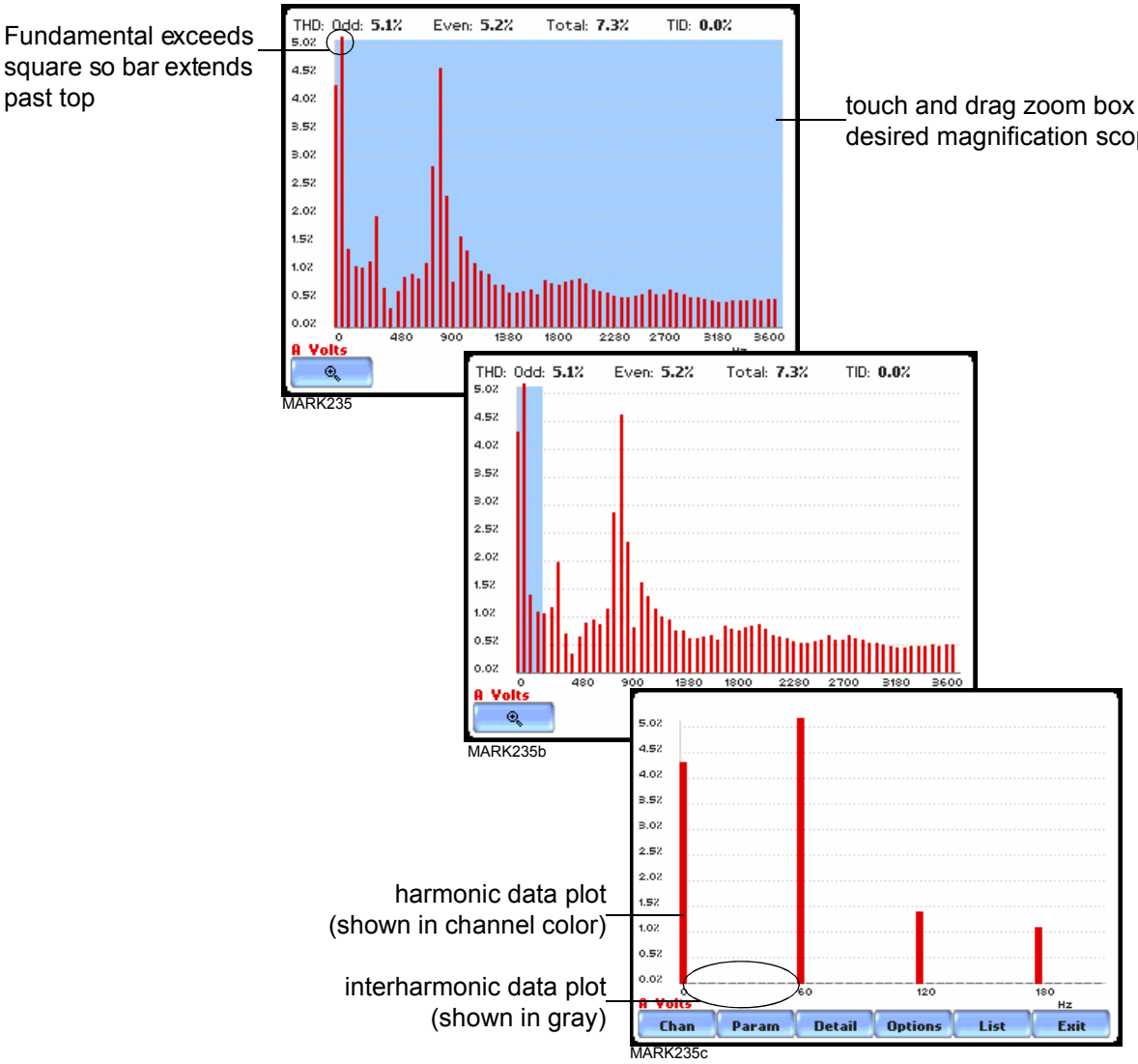
**The odd contribution is the square root of the sum of the squares of the relative amplitudes of harmonics 3, 5, and 7 through N-1, where N is a function of sampling frequency. The even contribution is similar for harmonics 2, 4, and 6 through N. Total value is the square root of the sum of the squares of the odd and even distortions.*

Harmonic Detail

Harmonic detail display

The Energy Platform allows users to determine the numbers or the range of harmonic frequencies to trend. A blue box showing the default zoomed area appears once the Detail button is pressed. Touch any side of the zoom box to activate the drag function. Touch and drag the sides of the zoom box to expand or narrow in on a select number of harmonic/interharmonic graphs. The zoom box moves horizontally only. The vertical scale will autoscale when zoomed.

NOTE: To select whether the vertical is scaled to the fundamental or the greatest harmonic, use the Options key (see page 3-15).



The magnify buttons serve as zoom function keys, each of which feature a plus sign or a minus sign within. Press **Zoom+** to display the zoomed area and view harmonic graphs in greater detail. Users may repeatedly zoom in on a plot for up to seven (7) levels. Press **Zoom-(n)** to unzoom graph display one increment at a time, where n is the counter of how many times the harmonic graphs have been magnified.

Harmonic Options

Harmonic/ Interharmonic data plots

The voltage and current harmonics and/or interharmonics for each phase channel can be trended using the Options button. The properties specified under Harmonic Options apply when harmonic/interharmonic data is viewed in either graph or list form.

Properties under **Show Harmonics...** pertain to both the graph and the list, and determine how the harmonics and interharmonics are used.

If **Show Harmonics... only** is enabled, then only the actual harmonics are shown.

If **Show Harmonics... and Interharmonics** is enabled, the spectrum will include all the (nominal) 5 Hz bins, which includes the actual interharmonics as well. On the graph, the harmonics are shown in the channel color, while interharmonics are shown in gray color. On the text, the harmonics are shown in boldface.

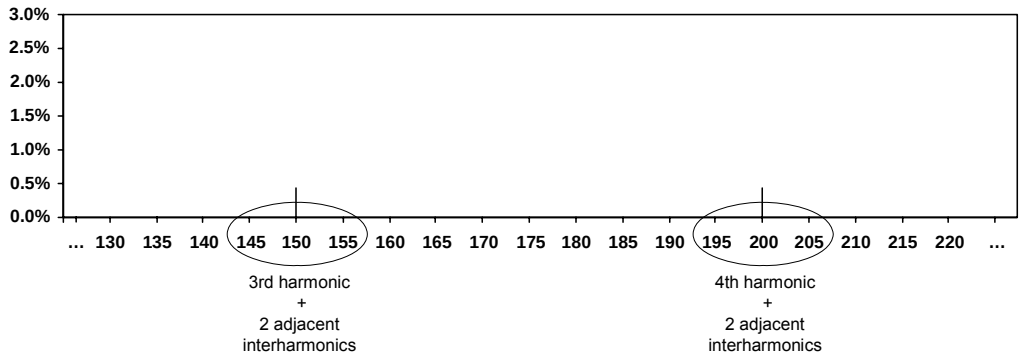
If **Show Harmonics... calculated including adjacent interharmonics** is enabled, the interharmonics are not explicitly shown but the harmonic values include the adjacent interharmonic values in their calculation, as specified by IEC 61000-4-7.

The IEC 61000-4-7 Standard specifies that the interharmonic bins adjacent to the harmonic be included in the computation of that harmonic. For example, if there was a 3rd harmonic (150 Hz) of 10%, and the value of the 145 Hz bin was 1%, and the value of the 155 Hz bin was 2%, then the value reported in the bin labelled “150 Hz” would also include contributions from the 145 Hz and 155 Hz bins. This would give

$\sqrt{10^2 + 1^2 + 2^2} =$ 10.2%, not 10%.

The following graphs illustrate harmonic computation as per IEC 61000-4-7 Standard.

Harmonic Computation for 50 Hz

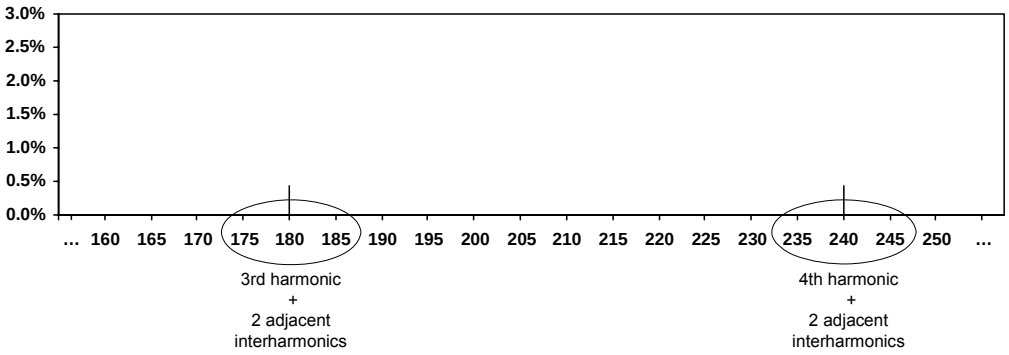


Continued on next page

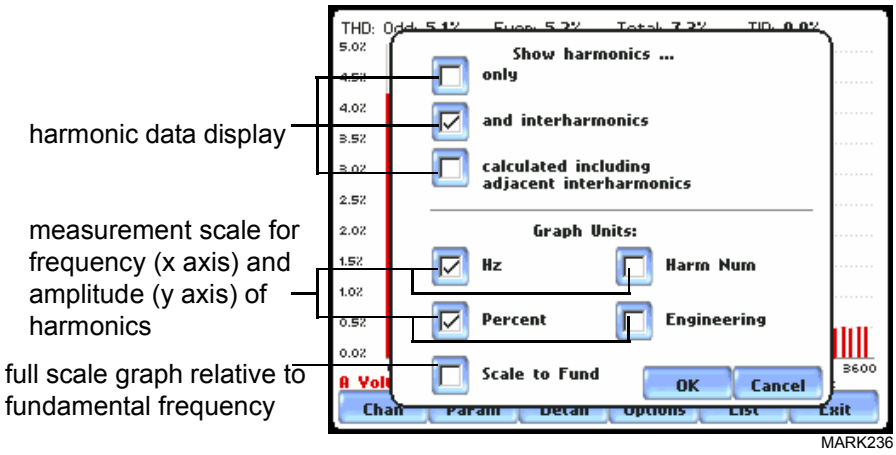
Harmonic/ Interharmonic data plots (continued)

Harmonic Computation for 60 Hz

The 5 Hz bins adjacent to the harmonic bin are grouped together for the harmonic magnitude. For example, at 60 Hz, 175+180+185 bins form the 3rd harmonic. All of the rest of the 5 Hz bins in between such are used to compute the interharmonic magnitude.



Properties under **Graph Units** pertain to the way the graph (not the list) is labelled. The vertical scale can be in **Percent** or **Engineering** units, and **Scale to Fund** (full scale) can be chosen to be the fundamental at 100% or the largest component. The engineering unit for voltage is volts and for current is amperes. The horizontal axis can be in **Hz** or **Harmonic Number**.



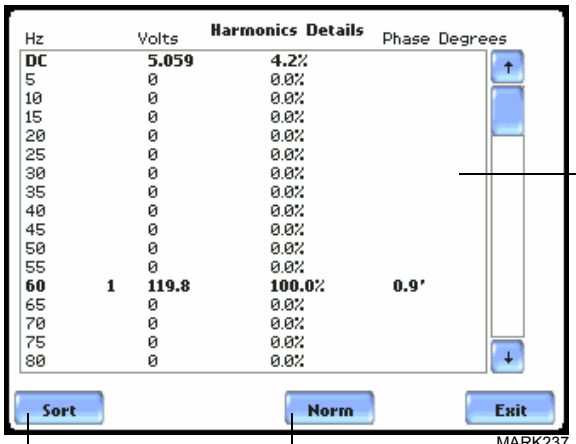
Harmonic List

Harmonic text display

To view the harmonics magnitude text display, press List from the Harmonic graph screen on page 3-14. The harmonic parameters displayed on list include: (from leftmost column) the harmonic/interharmonic frequency in Hz, frequency in number, voltage rms or maximum load of current (depending on parameter selected), percent amplitude of harmonics, and harmonic phase angle value.

By default, harmonic and interharmonic frequency values are arranged per increment of 5Hz. Use the Sort button to organize harmonic text display according to percent magnitude of the first 63 harmonics relative to the fundamental, followed by the interharmonic values.

Harmonic phase degree values from 1 to 63 are displayed for voltage and current; while phase degree values from 1 to 50 are displayed for harmonic watts. Harmonic phase angle values can be normalized to the phase of the fundamental of the displayed channel. Use the Norm button to show the normalized phase angle values.



MARK237

MARK237b

Section D

Voltage and Current Phasor

Overview

Phasor display

The phasor screen displays a graph that indicates the phase relations between the voltage and current based upon the angles of the fundamentals, as determined by Fourier analysis.

Phasor screen shows eight phasors autoscaled with zero degrees to the right (normally channel A voltage) for clockwise rotation and with synchronized channels. Users are allowed to display up to four channels at any one time for either volts or amps, or a single channel for both volts and amps, depending on the phases being monitored.

A touch screen Demo button presents an animated phasor demo rotation for resistive, capacitive and inductive loads.

In this section

The following topics are covered in this section.

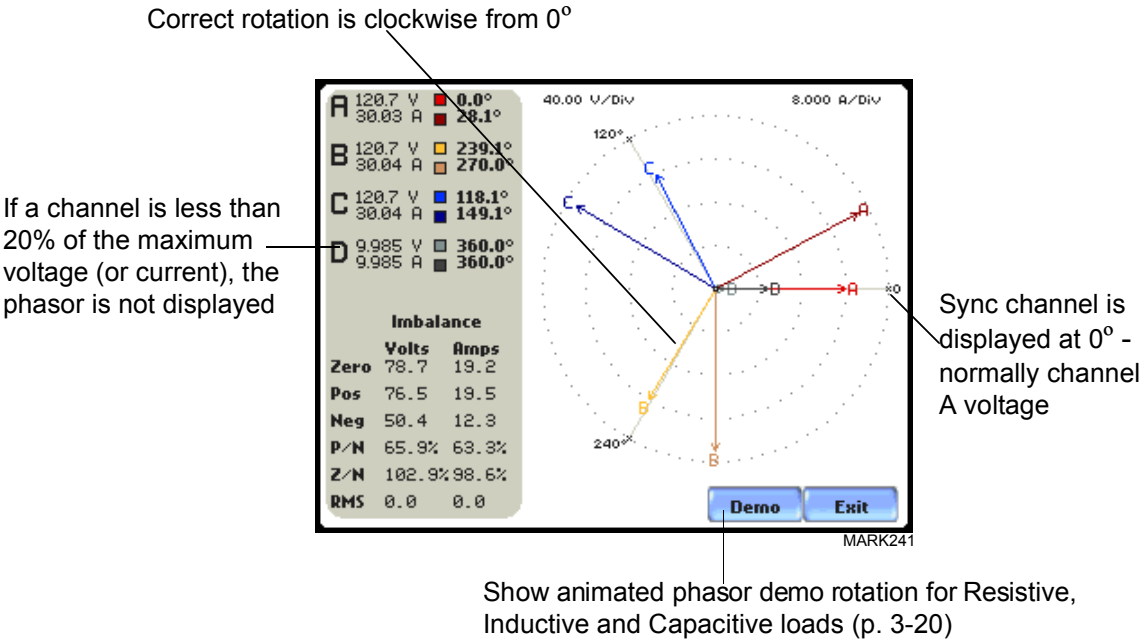
Phasor Screen

Phasor screen display

The Phasor screen is displayed by pressing Phasor on the Home screen.

The Phasor screen shows eight phasors autoscaled with zero degree to the right for clockwise rotation and with synchronized channels. The left sidebar shows rms values for Volts/Amps for channels A, B, C and D; zero, positive and negative values for Volts/Amps; zero, positive and negative sequence component values for Volts/Amps.

Depending on the phases being monitored, up to four channels may be displayed at any one time for either Volts or Amps, or a single channel for both Volts and Amps. An arrow head and channel label are displayed on the vector.



Phasor Rotation

Animated phasor rotation

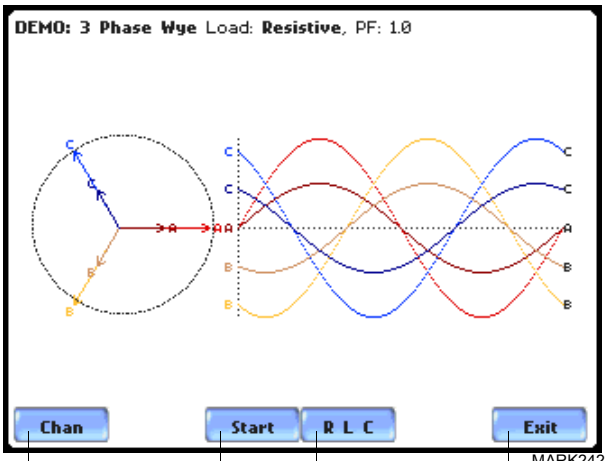
Graphic illustration in the form of rotating phasors relative to the sine wave graph of a four wire wye circuit is available by pressing the Demo button on the Phasor screen (see page 3-19). The Demo button will be replaced by Start/Stop once phasor rotation has been viewed. Press Start to replay animated phasor rotation. Users can choose to Stop the phasor demo rotation at any time.

Phasor vectors are displayed using a clockwise rotation from the zero degrees reference. Animated phasor demo for Resistive, Inductive and Capacitive loads is available for viewing.

Sample 3-Phase, three wire wye rotation

The following diagrams describe the positive phase rotation of voltage and current phasors (for Resistive, Inductive and Capacitive loads) for a three phase, three wire wye connection. An arrow head on the line indicates direction pointing toward the load.

Three phase vectors are displayed as three lines, 120 degrees apart in a Resistive load



Display parameter/channel selection (p. 3-22)

Start/Stop demo plot waveforms as rotate phasors; press any time

Switch phasor demo rotation between Resistive, Inductive and Capacitive load effects; press any time (p. 3-21)

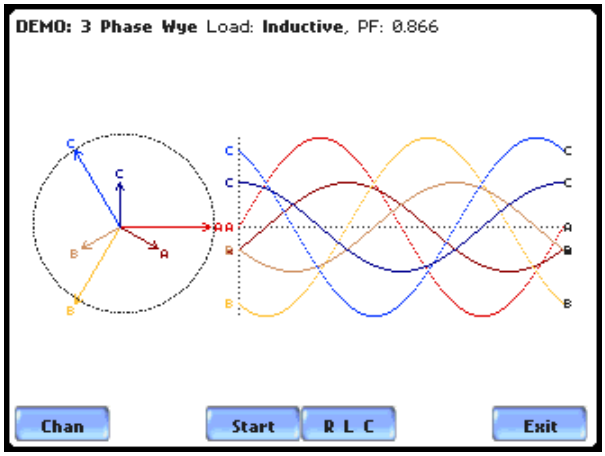
Return to Phasor screen

Continued on next page

Sample 3-Phase, three wire wye rotation (continued)

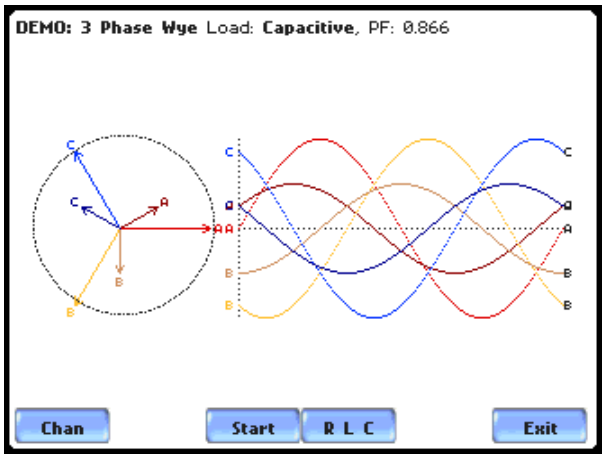
The following diagrams describe the positive phase rotation of voltage and current phasors (for Resistive, Inductive and Capacitive loads) for a three phase, three wire wye connection. An arrow head on the line indicates direction pointing toward the load.

Three phase vectors are displayed as three lines, 120 degrees apart in an Inductive load



MARK243

Three phase vectors are displayed as three lines, 120 degrees apart in a Capacitive load



MARK244

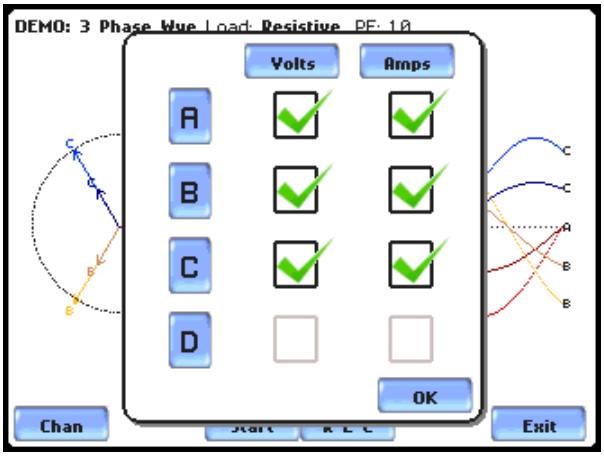
Phasor diagrams

Refer to Appendix E for the diagrams that describe the voltage and current phasors for the standard type of power connections.

Phasor Parameter/Channel Selection

Parameter/ Channel display

The Parameter/Channel selection screen is displayed by pressing Chan on the phasor Demo screen. Depending on the phases being monitored, up to four channels may be displayed at any one time for either Volts or Amps, or a single channel for both Volts and Amps.



MARK245

Press to enable/disable the parameter/channel for display in the animated phasor rotation. Any of the following will turn channels on/off:

- Press the desired Volts/Amps channel to turn it on/off.
- Press Volts or Amps button to turn on/off all channels of that parameter.
- Press A, B, C, D to turn on/off both the Volts and Amps for that channel.

Press OK to accept channel selection. The phasor Demo rotations will display the parameters/channels enabled.

CHAPTER 4

Instrument Settings

Overview

Introduction

This chapter describes the miscellaneous tasks that users can perform to keep the Energy Platform running efficiently. These are tasks that users might perform only occasionally.

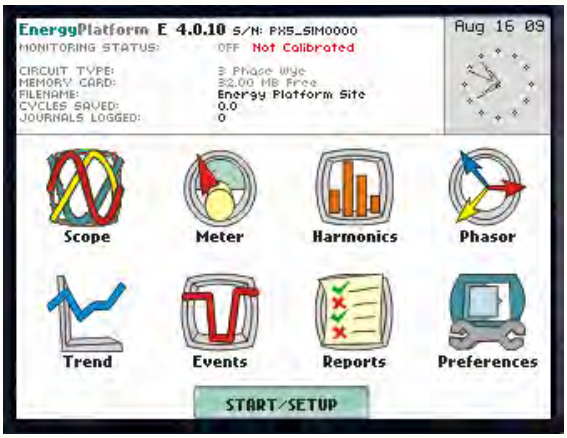
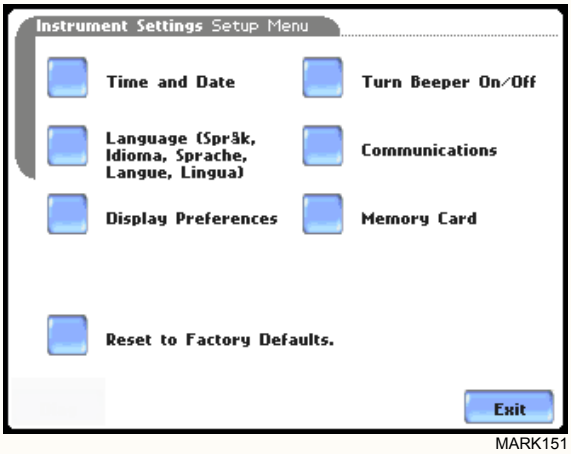
In this chapter

The following topics are covered in this chapter.

Access Instrument Settings Menu

Preferences menu screen

All functions in this chapter are found under the Instrument Settings menu. Follow these steps to display the Instrument Settings menu screen.

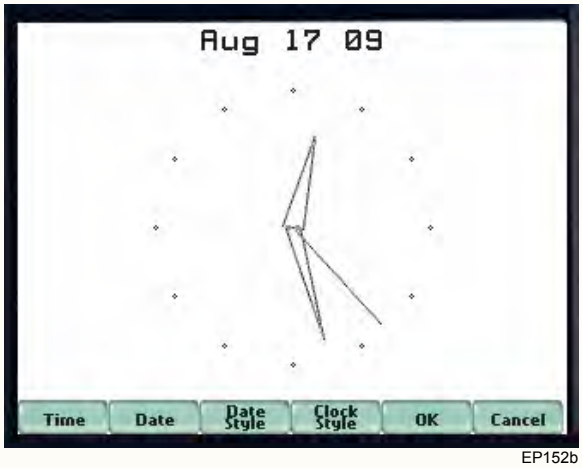
Action...	Result...
STEP 1: Press the Energy Platform On/Off power button to turn the unit on. The Home screen will be displayed.	 EP001
STEP 2: Press **Preferences**. The Instrument Settings Setup Menu will be displayed.	 MARK151

Time and Date Settings

Time and Date display

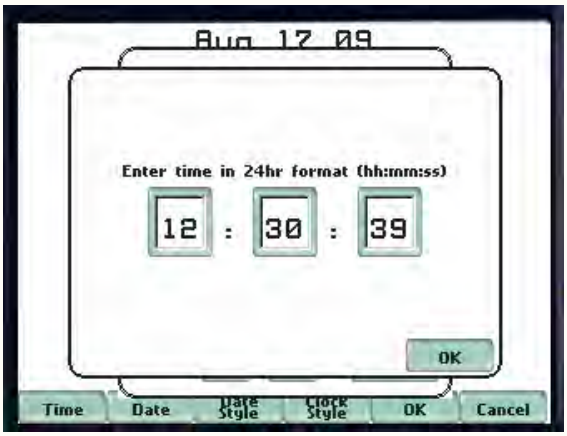
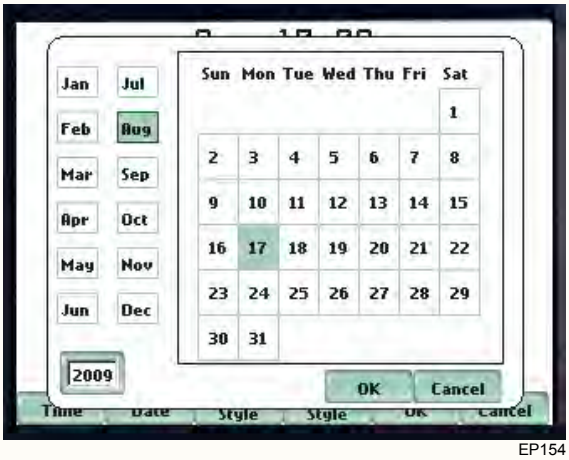
Users have the option not only to set the exact time and date, but also to select the format of how time and date will appear on screen.

Action...	Result...

STEP 1: From the Instrument Settings Setup Menu screen, press Time and Date.
 	
• Press **Time** if you want to change the time settings. Proceed to Step 2 on page 4-4.
 	
• Press **Date** if you want to change the date settings. Proceed to Step 3 on page 4-4.
 	
• Press **Date Style** to select the format in which you want date displayed on screen. View the three different date format selections each time you press Date Style.
  • mm/dd/yy format
  • dd/mm/yy format
  • yy/mm/dd format
 	
• Press **Clock Style** to select the format in which you want time displayed on screen. View the three different time format selections each time you press Clock Style.
  • analog
  • digital using 1 to 12 hr format (AM/PM)
  • digital using 1 to 24 hr format
 	
• Press **OK** to accept new time/ date settings and return to Instrument Settings menu.
 	
• Press **Cancel** to discard changes in time/date settings and return to Instrument Settings menu.
	
	EP152b

Continued on next page

Time and Date Display (continued)

Action...	Result...
STEP 2: Press the field representing hours, minutes, and seconds to change time settings. Use the numeric keypad to enter new time settings. Time should be entered in a 24-hour format (example: 13:00:00 for 1:00 PM). • Press **OK** to accept changes in time settings. • Press **Cancel** to discard changes in time settings. NOTE: Clock time and format can be changed anytime following this same procedure.	 EP153
STEP 3: Press to select the month, day, and year. Enter the year using numbers from the keypad. • Press **OK** to accept changes in date settings. • Press **Cancel** to discard changes in date settings. NOTE: Date settings and format can be changed anytime following this same procedure.	 EP154

Select Language

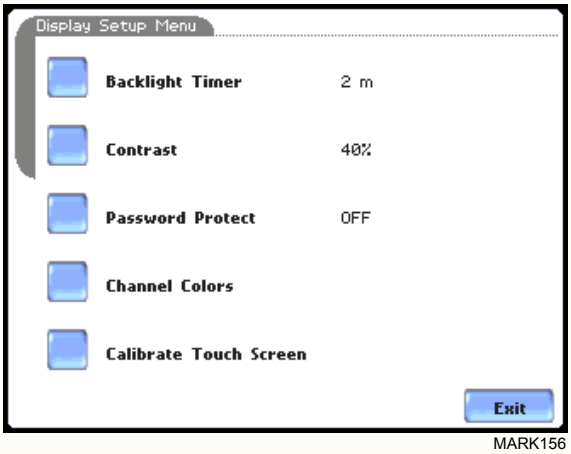
Select Language The Energy Platform menu screens appear in the English language by default.

Action...	Result...
STEP 1: From the Instrument Settings Setup Menu screen, press Language. • Check to select the desired language in which you want display screens to appear. NOTE: Language options vary depending on unit model. US/Euro model: English, Swedish, Spanish, German, French, Italian, Finnish Asian model: English, Chinese (Simplified and Traditional), Japanese, Korean, Thai • Press **OK** to accept language selection. The screen will return to Instrument Settings menu. • Press **Cancel** to retain present language.	 EP155  EP155b

Set Display Preferences

LCD settings

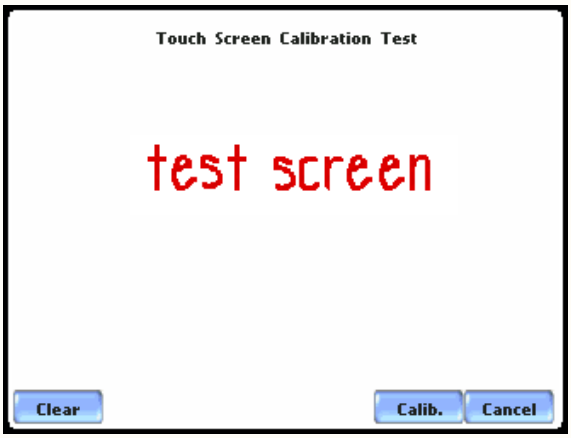
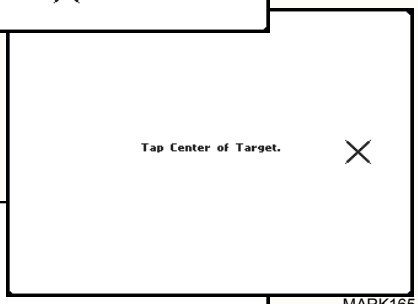
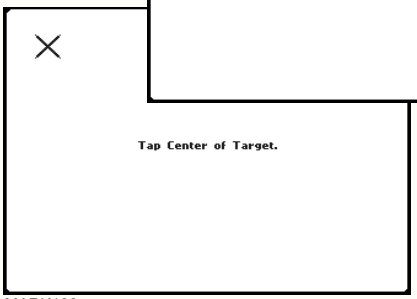
User programmable settings for the LCD screen include the backlight timer, contrast, password protect, parameter/channel colors, and touch screen calibration.

Action...	Result...
STEP 1: From the Instrument Settings Setup Menu screen, press Display Preferences. • Automatic backlight shutoff timer is provided for the LCD display. Press **Backlight Timer** to automatically turn off backlight after 1, 2, 5, 10 or 15 minutes of no user activity. Set the Backlight Timer to Always On if you do not want the backlight to shut off. NOTE: The auto-shutoff feature extends the life of the battery and should be duly considered. • Press **Contrast** to brighten/dim screen display to preferred percentage. • Press **Password Protect** to enable/disable password log in code to the Energy Platform. When password protect is enabled and the user reactivates the unit from auto-shutoff, the keypad screen used to enter the password will appear. The user will have to enter the correct password to continue using the Energy Platform. A message will appear when an incorrect password is entered. • Press **Channel Colors** to change the color of the parameter display. Select desired color from a 28 color selection grid. • Press **Calibrate Touch Screen** to calibrate the unit's touch screen functionalities. Proceed to page 4-7. • Press **Exit** to return to Instrument Settings menu.	 MARK156

Touch Screen Calibration

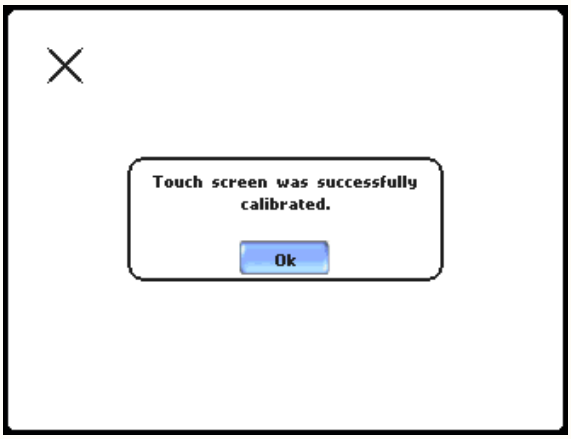
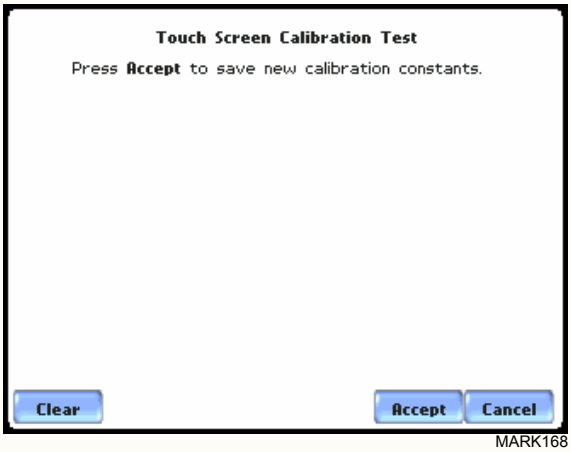
Calibration procedure

The Energy Platform is able to perform calibration to ensure the proper operation of the unit's touch screen functionalities. The calibration procedure will correct the problem of out of tolerance touch screen malfunction. Note that errors corrected by this calibration procedure are specific only to touch screen operation.

Action...	Result...
STEP 1: From the Display Setup Menu (see page 4-6) screen, press Calibrate Touch Screen.Test if touch screen recognition operates properly by applying pressure on the LCD screen. • Press **Clear** to reset LCD screen and delete display markings. • Press **Calib** to begin touch screen calibration procedure. Proceed to Step 2. • Press **Cancel** to end calibration test and return to Display Setup.	 MARK164b
STEP 2: Follow the instruction **Tap Center of Target** to begin calibration**.** Target object **X** is initially located in the lower middle section of the screen. • A series of screens will flash showing movement of the target object: from the lower middle section to mid-right and finally to upper left section of the screen. • To end touch screen calibration, tap the center of the target object X now located in the upper left section of the screen. Proceed to Step 3 on page 4-8.	 MARK164  MARK165  MARK166

Continued on next page

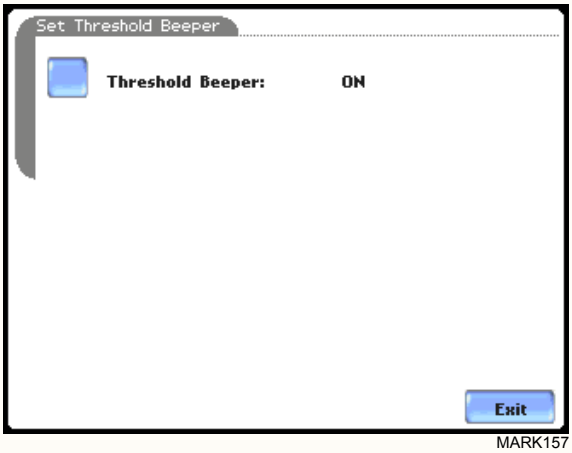
Calibration procedure (continued)

Action...	Result...
STEP 3: Once touch screen calibration is done, a message will appear to indicate **Touch screen was successfully calibrated.** • Press **OK** to continue on with calibration test verification. Proceed to Step 4.	 MARK167
STEP 4: Test if touch screen recognition operates properly by applying pressure on the LCD screen. • Press **Clear** to reset LCD screen and delete display markings. • Press **Accept** to complete the touch screen calibration procedure. Accepting will save and store new touch screen calibration data in memory. Once the new data is stored, the old touch screen calibration data is lost. The screen will return to the Display Setup Menu. • Press **Cancel** to discontinue the touch screen calibration procedure. Pressing Cancel will retain the previous touch screen calibration constants, no new calibration data will be stored in memory. The screen will return to the Display Setup menu.	 MARK168

Turn Threshold Beeper On/Off

Audible alarm

When set to ON, the unit will beep when threshold limits are crossed and other event triggers occur. The beep that provides audible feedback to pressing touch screen key is not affected by this setting.

Action...	Result...
STEP 1: From the Instrument Settings Setup Menu screen, press Turn Beeper On/Off. • The unit can provide audible alarm signals when triggered. Press **Threshold Beeper** to turn the alarm On or Off. • Press **Exit** to return to Instrument Settings menu.	 MARK157

Communications

Communication interface setup

Communications Settings is where instrument-specific information is entered to allow the Energy Platform to communicate to external devices using the optional Isolated Communications Module assemblies or modem.

Features are not available at this time

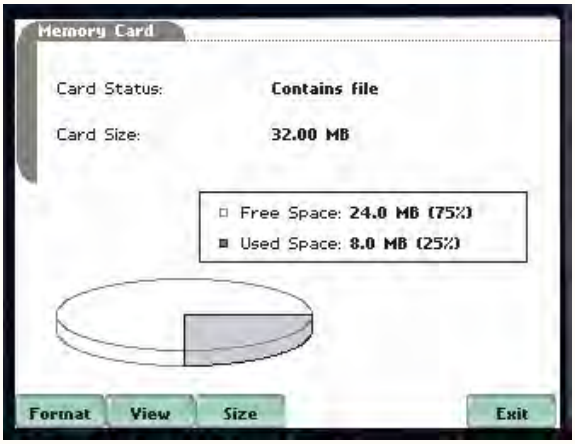
Page intentionally left blank

Data Card

Format/View data card

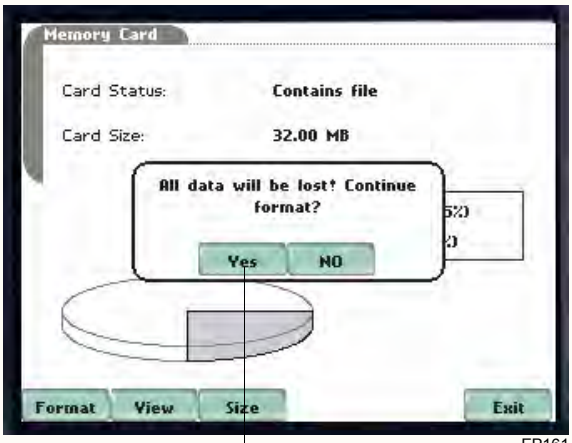
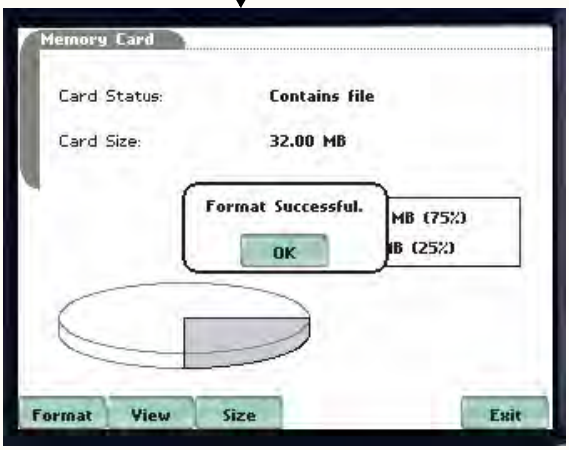
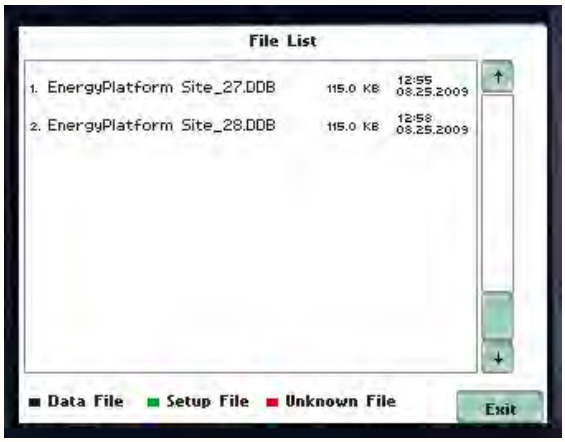
The Memory Card screen displays information on the card inserted in the data card slot, including the amount of total space, available space, and used space in card. This screen also prompts users to set filename and format card in preparation for monitoring and writing of data.

Action...	Result...

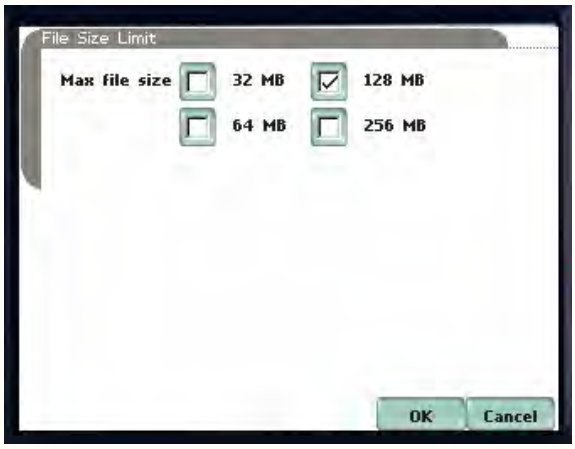
STEP 1: From the Instrument Settings Setup Menu screen, press Memory Card.
• **Card Status** indicates status condition of the card inserted in the data card slot. The following messages may appear under Card Status (refer to pages 5-20 to 5-21 for a detailed description of each card status message):
  • Not Inserted
  • Contains File
  • Empty
  • Fragmented
  • Unformatted
  • Invalid Card
• **Card size** indicates the full storage capacity of the data card. The amount of remaining space and used space in data card are also displayed on screen.
• Press **Format** to format the data card. Proceed to Step 2 on page 4-13.
• Press **View** to display files stored in data card. Proceed to Step 3 on page 4-13.
• Press **Size** to select the file size increment by which you want data saved in card. Proceed to Step 4 on page 4-14.
• Press **Exit** to discard changes and return to Instrument Settings menu.
	
	EP160
	
	NOTE 1: The Energy Platform does not support file fragmentation. When creating a file, it will take the largest continuous block and use that size block for data storage. Deleting files from data card is not recommended. Whenever possible, transfer the files to a computer and then reformat the card using the Energy Platform when there is no more space available to begin new data storage.
	
	NOTE 2: Refer to Chapter 5 Start Menu - Site Name/Memory Card for more information on data card operation.

Continued on next page

Format/View data card (continued)

Action...	Result...
STEP 2: All data and setups stored in data card will be lost when you format the card. • A confirmation message verifies whether you want to continue with data card format or not. Press **Yes** to continue data card format. Press **No** to cancel data card format. • The message Format Successful! indicates that data card format has been completed. Press **OK** to exit card format procedure and return to the Memory Card screen.	 EP161  EP162
STEP 3: The Energy Platform lists data file names stored in card, along with file size, time and date when data was recorded. The text color indicates the type of file: black is for data file (.ddb), green is for setup file (.set), and red is for an unknown file. • Press **Up/Down** arrow keys to scroll the page up or down by one line. • Press and drag the scroll bar to move the page up or down. • Press **Exit** to quit and return to Memory Card screen.	 EP163

Format/View data card (continued)

Action...	Result...
STEP 4: For better memory management operation, Energy Platform allows you to segment data into maximum file size limits of 32 MB, 64 MB, 128 MB or 256 MB. Select the file size increment by which you want your data stored in card. • Press **OK** to accept changes in file size limit settings. • Press **Cancel** to discard changes in file size settings.	 EP164

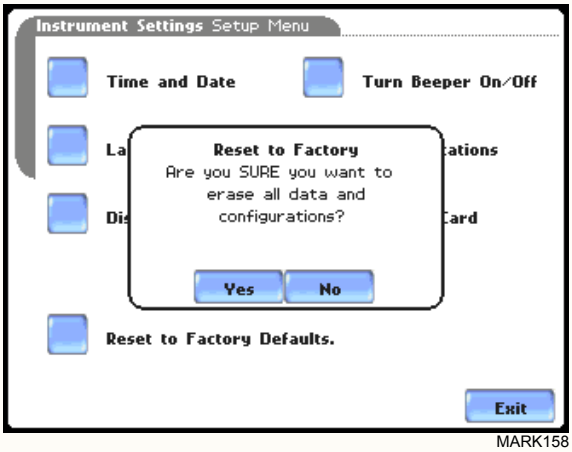
Reset to Factory Configuration

Definition

Factory configurations are the default settings of all programmable features of the Energy Platform as it left the factory.

Procedure

Follow these steps to reset the Energy Platform to its factory configuration.

Action...	Result...
STEP 1: From the Instrument Settings Setup Menu screen, press Reset to Factory Defaults. A confirmation message verifies if you want to reset the instrument to factory configuration and lose all new data and settings. • Press **Yes** to erase existing settings and reset the instrument to factory-configured setups. The screen will return to the Instrument Settings menu. • Press **No** to cancel.	 MARK158

Factory default settings

Dranetz-BMI has set the default values for the various parameters of the Energy Platform.

Current Probes: *TR2500/TR2500A for A, B, C; TR2510/TR2510A for D*
Scale Factors: *1:1 for V and I, channels A, B, C, D*
Circuit Type: *three phase wye*
Mode of Operation: *monitor*
Nominal Value: *measured V, I, frequency*
Monitoring Mode: *Long Term Timed Recording*
Advanced Operations: *individual limit setups*
RMS Variation Limits: *10% Very Low, 90% Low, 110% High for voltage; none for current*
Journal Limit: *journalling By Time for the various parameters*
Triggers: *all V triggers off*
Journal Interval
- Power Values:
- Power Values Interval: *15 minutes*
- Waveform Snapshot: *On*
- Demand and Energy:
- Demand Sub-Interval: *5 minutes*
- Sub-Intervals per Interval: 3
- Harmonics Journal Interval: *15 minutes*

Site Name: *Energy Platform Site*
Size Increment by which Data is Saved in Card: *128 MB*
Clock Type: *Analog*
Date: *mm/dd/yy*
Language: varies depending on unit model
- *NOTE: Units shipped within North America are factory set using the English/ European language group version.*

Display
- Backlight Timer: *1 minute*
- Contrast: *70%*
- Password Protect: *OFF*

CHAPTER 5

Start Menu

Overview

Start menu options

The Start Menu allows users to perform the following: set up the Energy Platform for monitoring of an electrical system, load previously saved setups from card, and load data from card.

There are three ways to set up the instrument for monitoring. The length of time to monitor a circuit can vary from a few hours to a few weeks depending on the user application.

- Automatic Setup automatically configures the instrument's circuit type, voltage and current channels, and parameter thresholds. The auto-configured setup enables users to proceed directly with data monitoring.

- Wizard Setup takes the user through a series of screens prompting for information about the circuit to be monitored. The unit automatically turns on the correct voltage and current channels when user selects a circuit type. Parameter thresholds are automatically set based on the line voltage and current values that the user enters. Threshold limits for capturing events are also set according to the monitoring mode selected.

- Advanced setup options (see Chapter 6) allow the user to modify trigger parameters and intervals that were previously set up through Automatic or Wizard setups. Under advanced setup, each channel must be turned on individually, but any combination can be used. The user can turn on any available parameter. Users have wider control over all setup functions when using advanced setup options.

Selection of setup method typically depend on user application and extent of familiarity with the operation of the intrument.

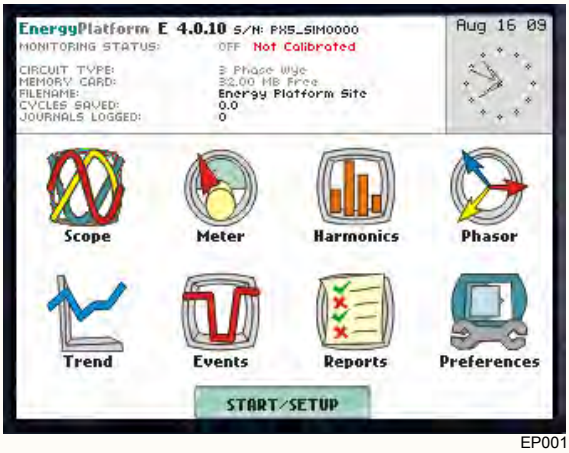
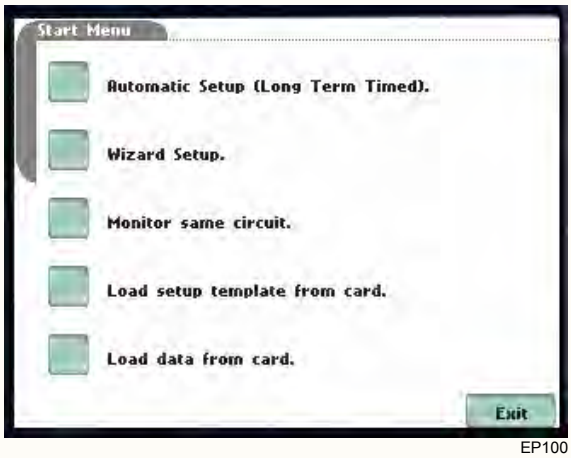
Monitor same circuit makes use of the existing setup for monitoring. If a template of setups has been previously saved to the card, you may load it using the menu below.

Load setup template from card enables you to use previously saved setups. If you wish to load a previously saved data file from the card, use the menu below.

Load data from card allows you to transfer saved events from data card to the Energy Platform.

Displaying Start Menu

Follow these steps to display the Start Menu.

Action...	Result...
STEP 1: Press the Energy Platform On/Off power button to turn the unit on. The Home screen will be displayed.	 EP001
STEP 2: Press **Start/Setup**. The Start Menu will be displayed.	 EP100

In this chapter

This chapter is divided into five sections:

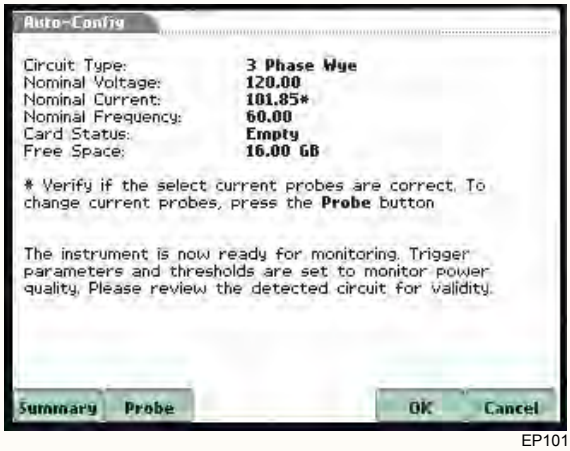
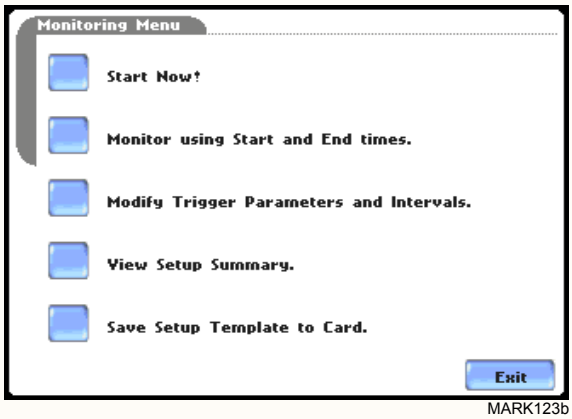
Section A

Automatic Setup

Overview

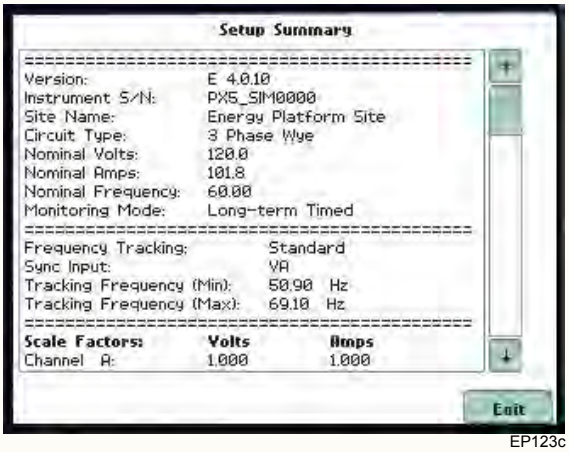
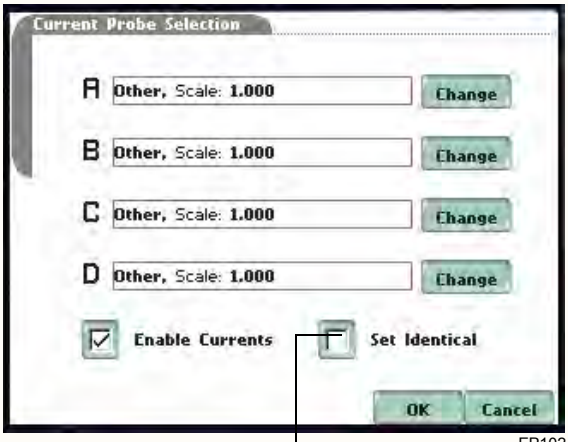
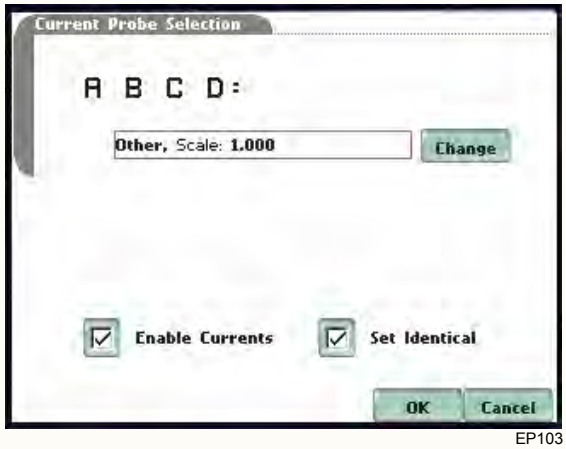
Automatic Setup procedure

Automatic Setup is a one-stop process using pre-defined settings to set the unit automatically. Users have the option to view the list of parameter settings, change probe types if current will be monitored, and/or proceed directly with data monitoring. Follow these steps to perform Automatic Setup.

Action...	Result...
STEP 1: From the Start Menu, press Automatic Setup. The auto-configured circuit type, nominal voltage, current and frequency values appear on screen. Data card status and available space in card are also displayed. • To continue Automatic Setup and begin data monitoring, press **OK**. Proceed to Step 2. • To view the list of parameter settings for Automatic Setup, press **Summary**. Proceed to Step 3 on page 5-4. • To display/change probe types for current monitoring, press **Probe**. Proceed to Step 4 on page 5-4. • Press **Cancel** to quit and return to Start Menu.	 EP101
STEP 2: The Monitoring Menu screen allows users to begin monitoring immediately or at a specified time and date. • To start monitoring, press **Start Now!** Proceed to Section C Monitor Same Circuit - Turning Monitoring On/Off on page 5-24.	 MARK123b

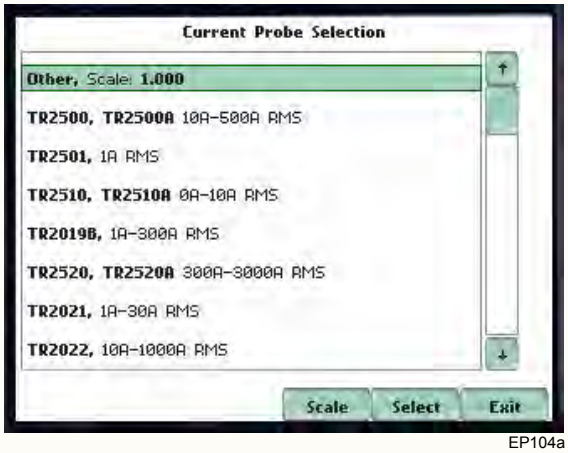
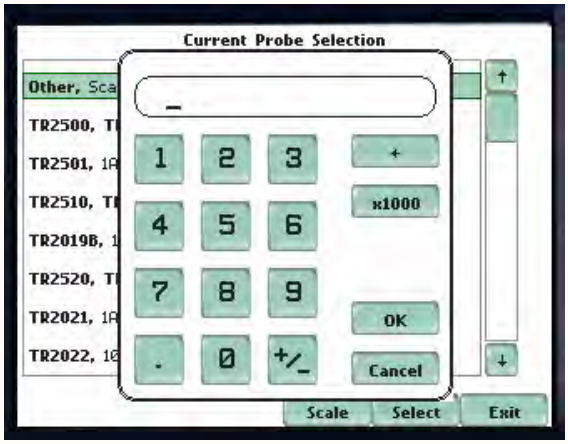
Continued on next page

Automatic Setup procedure (continued)

Action...	Result...
STEP 3: Summary displays the list of auto-configured parameter settings for auto setup. The setup summary is available for review before, during and after monitoring. • Press **Up/Down** arrow keys to scroll the page up or down by one line. • Press and drag the scroll bar to move the page up or down. • When done reviewing the Setup Summary, press **Exit**. The screen will return to Auto-Config.	 EP123c
STEP 4: Various probe types are available for each channel for current monitoring. • Press **Change** to display the probe types available for each channel. Proceed to Step 5 on page 5-5. • If using identical probe type for all Channels, press to enable **Set Identical**. The display will change to show only one probe selection for all channels. Press **Change** to display the probe types available. Proceed to Step 5 on page 5-5. • Press **OK** to accept probe selection and return to Auto-config screen. • Press **Cancel** to disregard probe selection and return to Auto-config screen.	 EP102  EP103

Continued on next page

Automatic Setup procedure (continued)

Action...	Result...
STEP 5: Select your desired probe type. NOTE: Use the same probes for the following: TR2500 for TR2500A, TR2510 for TR2510A, TR2520 for TR2520A. • If the current probe that you are using is not on the list, select **Other**. Then press **Scale** to define the CT scale factor on the current probe. Proceed to Step 6. • Press **OK** to accept probe selection and monitor current. • Press **Cancel** to retain previous probe settings and return to previous screen.	 EP104a
STEP 6: You need to set the CT scale factor when using a current probe that is not on the list. Pressing Scale will show the numeric window to enter the CT scale factor on the current probe. Use the keypad to set the CT scale factor. See sample scale factor calculation on page 5-10. • Press **OK** to accept the CT scale factor value. The Current Probe Selection screen will be displayed. • Press ◄— if you want to clear and retype numeric values. • Press **x1000** to multiply the value by 1000. • Press **Cancel** to discard changes and return to the previous screen (screen shown on Step 5).	 EP104d

Section B

Wizard Setup

Overview

Introduction

Wizard Setup guides the user through the circuit setup step-by-step, via a series of screens prompting for information about the circuit to be monitored. The unit automatically turns on the correct channels and sets the parameter thresholds depending on the detected circuit type, nominal voltage and current values, and monitoring mode specified by the user.

Monitoring modes

The Energy Platform allows users to monitor events in the following setup categories: Long-term Timed Recording and Long-term Timed Recording with RMS Triggers mode. Selecting any setup category automatically sets trigger and capture conditions. Advanced users are free to mix and match settings (see Chapter 6 Advanced Setup Options).

Long-term Timed Recording, Demand, Energy: Performing a statistically valid power quality energy survey requires the capture of a set of basic data over an extended period of time. The Energy Platform is designed to facilitate long-term monitoring by collecting min/max/avg data at each pre-determined interval in order to perform post-process harmonic and other events analysis. It is also designed to be left unattended in the field, recording statistically representative data for long-term analysis. Using the Dranetz-BMI lockable portable case option or other available enclosures, demand/ energy studies can be carried out in harsh weather environments.

Long-term Timed Recording, Demand, Energy with RMS Triggers: This mode is the same as above except that snapshots and rms event triggers are active.

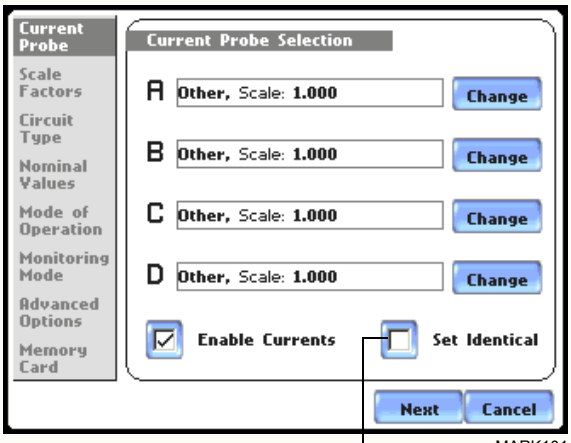
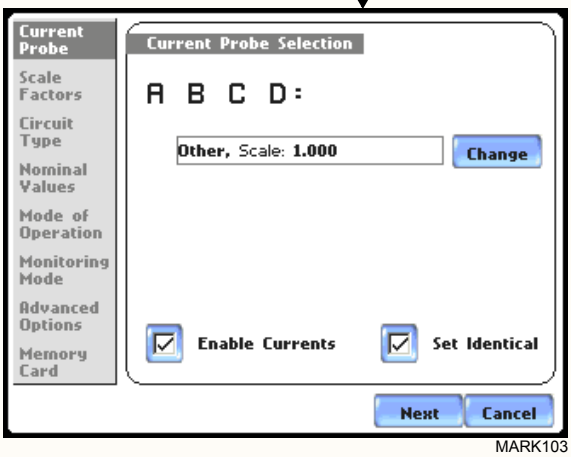
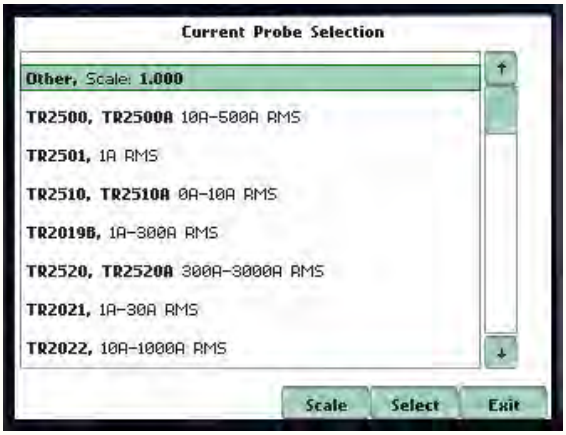
In this section

The following topics are covered in this section.

Current Probe Selection

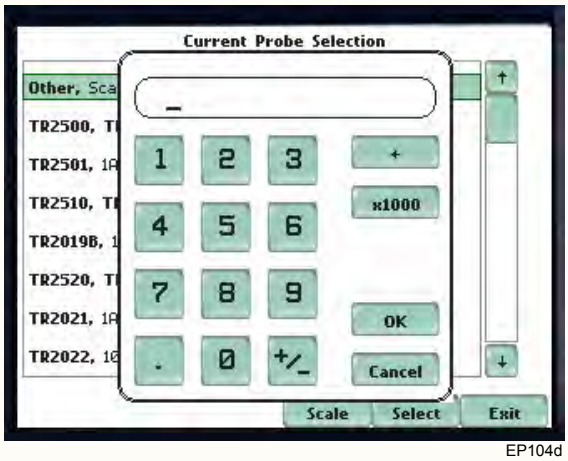
Selecting current probe

Follow these steps to monitor current and select probe type.

Action...	Result...
STEP 1: From the Start Menu, press Wizard Setup. • If current will not be monitored, press **Next**. Go to page 5-10. • If current will be monitored, press **Change** to display the probe types available for each channel. Proceed to Step 2. • If using identical probe type for all channels, press to enable **Set Identical**. The display will change to show only one probe selection. Press **Change** to display the probe types available. Proceed to Step 2. • If you want to enable/disable current channels, press to select/deselect **Enable Currents**. • Press **Cancel** to quit and return to Start menu.	 MARK101  MARK103
STEP 2: Select your desired probe type. NOTE: Use the same probes for the following: TR2500 for TR2500A, TR2510 for TR2510A, TR2520 for TR2520A. • If the current probe that you are using is not on the list, select **Other**. Then press **Scale** to define the CT scale factor on the current probe. Proceed to Step 3 on page 5-9.	 EP104a

Continued on next page

Selecting current probe (continued)

Action...	Result...
STEP 2: (continued) • Press **OK** to accept probe selection and monitor current. • Press **Cancel** to retain previous probe settings and return to previous screen.	
STEP 3: You need to set the CT scale factor when using a current probe that is not on the list. Pressing Scale will show the numeric window to enter the CT scale factor on the current probe. Use the keypad to set the CT scale factor. See sample scale factor calculation on page 5-10. • Press **OK** to accept the CT scale factor value. The screen shown in Step 2 will be displayed. • Press ◄— if you want to clear and retype numeric values. • Press **x1000** to multiply the value by 1000. • Press **Cancel** to discard changes and return to the previous screen (screen shown on Step 2).	 EP104d

Other relevant information on current probes

Refer to Chapter 2 Voltage Measurement Cable and Current Probe Connections for illustrations of typical current probes and for guidelines on how to connect current probes.

Refer to Appendix A for descriptions and part numbers of probes and adapter cables.

Refer to Appendix B for Dranetz-BMI current probes technical specifications.

Scale Factor Setup

What is a scale factor?

A scale factor is the ratio of the input to output for a particular current transformer (CT) or potential transformer (PT). A scale factor is entered in the Energy Platform and then multiplied automatically by the measured voltage or current so the unit displays the correct values, as referenced to the primary side, rather than the secondary side of the PT or CT.

NOTE: If voltage and current connections are made without using any of the above named devices, the scale factor should be set to 1.

When to use

Scale factors must be entered for the following conditions:

- A Dranetz-BMI current probe is connected to a permanently installed CT.
- The current connections are made using a Dranetz-BMI ISO box.
- The voltage connections are made using a PT.

Non-Dranetz equipment

Refer to the CT name plate or to the manufacturer's literature to determine the scale factor.

Sample calculation

The scale factor for a single CT or PT is calculated from its step-up or step-down ratio.

Example of step-down ratio

If a current transformer has a step-down ratio of 1000A:5A, therefore:

Scale Factor = 1000/5 = 200

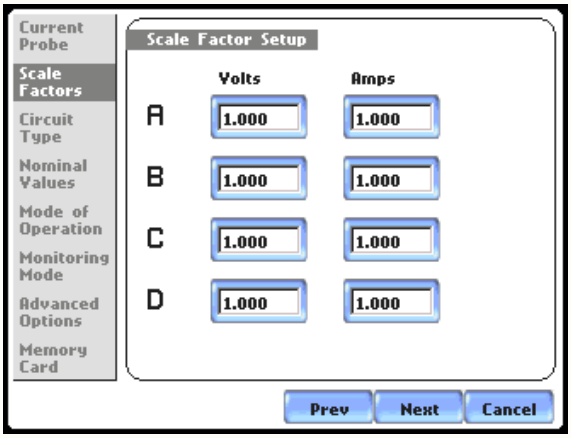
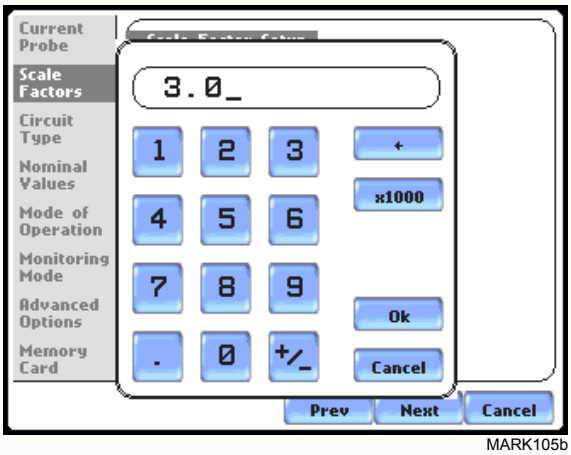
Example of step-up ratio

If a potential transformer has a step-up ratio of 1V:10V, therefore:

Scale Factor = 1/10 = 0.1

Scale factor setup screen

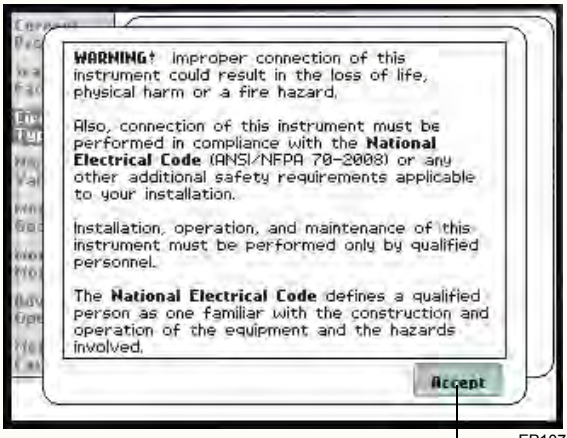
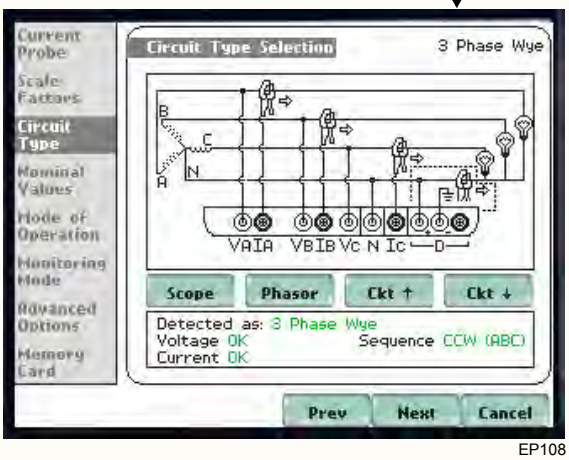
After setting up current probe configurations, the Scale Factor screen is displayed.

Action...	Result...
STEP 1: From the Current Probe Selection screen, press Next to display the Scale Factor Setup. • If voltage and current connections are made without using any current or potential transformer devices, the scale factor is set to the default value of 1. Press **Next** and go to page 5-12. • To enter new scale factors, press the numeric field of the Volts/Amps channel where you want to enter new scale factors. Proceed to Step 2. • Press **Cancel** to quit and return to Start menu.	 MARK105
STEP 2: Enter a new scale factor value using the numeric keypad. Press **OK** to accept the new scale factor. • Press ← to clear and retype numeric values. • Press **x1000** to multiply the value by 1000. • Press **Cancel** to discard changes and retain previous scale factor value, and return to Scale Factor Setup screen.	 MARK105b

Circuit Type Selection

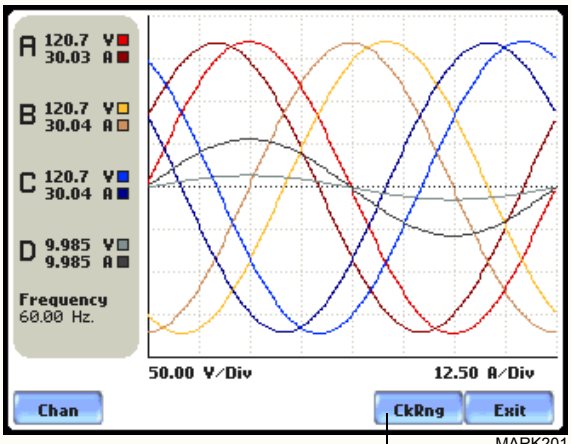
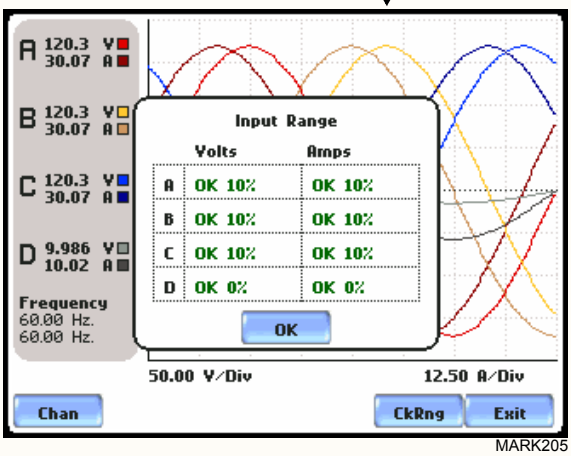
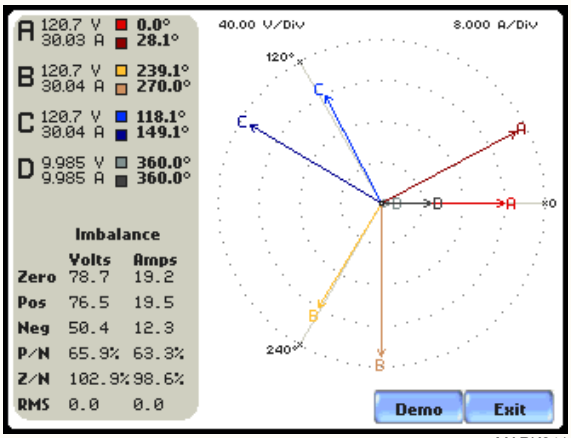
Circuit setup

The Energy Platform is able to display wiring diagrams from which users can select the circuit type appropriate to their application. The instrument will display the detected circuit configuration and compare the detected voltages, currents, and phase sequence (if applicable) to the selected circuit type. Refer to Appendix E for the descriptions of common circuit connections.

Action...	Result...
STEP 1: From the Scale Factor Setup screen, press Next to display Circuit Type Selection. Read the Warning advisory, then press **Accept** to display the menus for circuit selection. • To select a circuit configuration, press the **Ckt** arrow keys until the desired configuration is displayed. An auto circuit detection window is displayed to show if selected circuit type and the detected voltages, currents, and phase sequence match (text in green) or do not match (text in red). When done with Circuit setup, press **Next**. Go to page 5-14. • Real-time Scope and Phasor screens are available. These functions help verify if the wiring configuration matches the circuit being monitored. Press **Scope** to check if the waveforms look correct for the specified wiring setup. Proceed to Step 2 on page 5-13. Press **Phasor** to view if phasor display match those expected from the specified wiring diagram. Proceed to Step 3 on page 5-13. • Press **Cancel** to discard changes and return to Start menu.	 EP107  EP108

Continued on next page

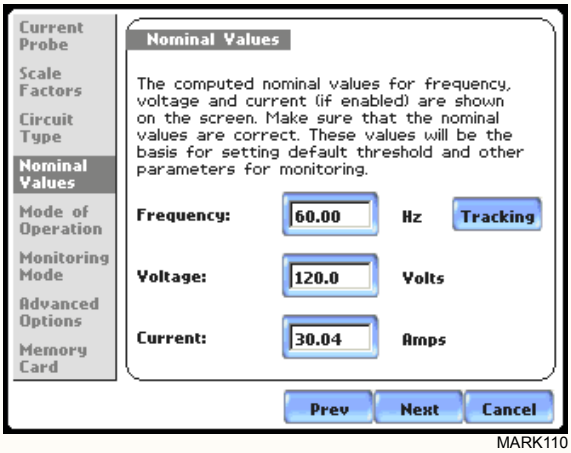
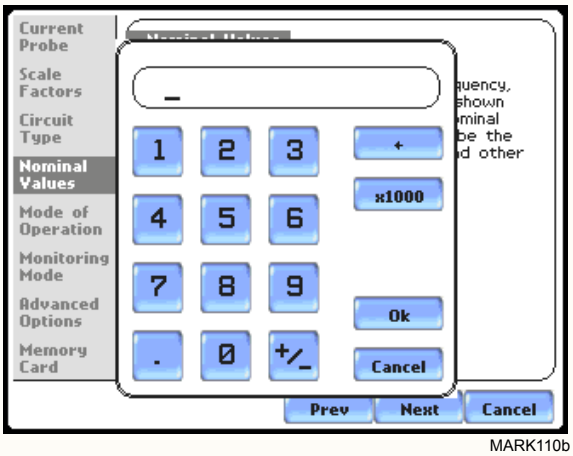
Circuit Setup (continued)

Action...	Result...
STEP 2: Scope mode allows users to verify if waveforms look correct for the specified wiring setup. • To check input range, press **CkRng**. The Input Range screen displays the detected range for voltage and current channels A, B, C, and D. • The instrument registers a message on the Input Range screen that corresponds to the detected input range for each channel: Input Range — Description OK — Within Range OVER — Over Range UNDER — Under Range N/A — Channel Disabled CLIP — Clipping • When done checking the input range, press **OK** to return to the Scope mode screen. Once in Scope mode screen, press **Exit** to return to Circuit Type Selection screen.	 MARK201  MARK205
STEP 3: Phasor display shows a graph that indicates phase relations between voltage and current. For more information on phasors, refer to Chapter 3 View Real Time Data - Section D Voltage and Current Phasor. • Press **Demo** to show animated phasor rotations. • Press **Exit** to return to Circuit Type Selection screen.	 MARK241

Nominal Values

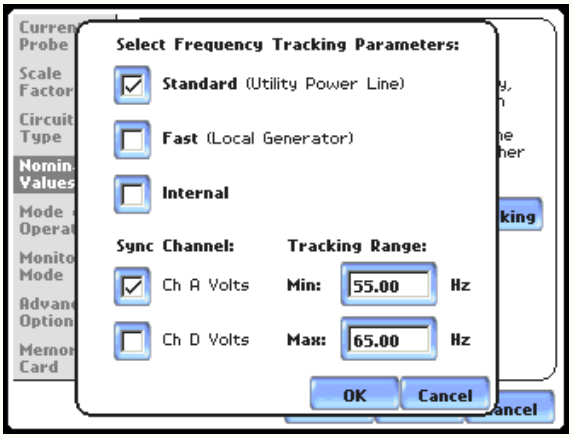
Frequency, voltage and current settings

The Nominal Values screen allows users to enter values for frequency nominal line voltage and current, or use the computed nominal values displayed on screen.

Action...	Result...
STEP 1: Nominal Values screen appears as users prepare the instrument to record data. From the Circuit Type Selection screen, press Next to display Nominal Values. • If the computed nominal values are accepted without change, press **Next**. Go to page 5-17. • To enter a new nominal Frequency, Voltage and/or Current value, press the corresponding button and proceed to Step 2. • To set the properties to track frequency of a monitored system, press **Tracking**. Proceed to Step 3 on page 5-15. • Press **Cancel** to quit and return to Start menu.	 MARK110 NOTE: Make sure that the nominal values computed by the Energy Platform are correct. Nominal values are used as basis for setting default thresholds and other parameters for circuit monitoring.
STEP 2: Enter a new nominal Frequency/Voltage/Current value using the numeric keypad. Press **OK** to accept the new value. • Press ◄— to clear and retype numeric values. • Press **x1000** to multiply the value by 1000. • Press **Cancel** to retain previous nominal values and return to Nominal Values screen.	 MARK110b

Continued on next page

Frequency, voltage and current settings (continued)

Action...	Result...
STEP 3: Tracking allows users to set parameters to monitor changes in frequency. Frequency Class: Check to select the power system that define the frequency range of distribution of the monitored system. • **Standard** frequency range is 16 Hz. • **Fast** frequency range is 16-65 Hz. • **Internal** uses the nominal frequency when making measurements where no reference signal is available. NOTE: Always enter a nominal frequency that matches your line frequency. This ensures that if the Energy Platform loses external sync, it will have a corresponding internal sync. Sync Channel: Check to specify the external sync mode to show which channel the signal is connected to. See page 5-16 for more details on frequency synchronization. • **Ch A Volts**: When set to Ch A, the unit attempts to sync to an incoming voltage signal. • **Ch D Volts**: When set to Ch D, the unit only attempts to sync to voltage Ch D. Tracking Range: The **Min** and **Max** refer to the range of frequencies that the phase locked loop will "hunt" if sync is lost. See page 5-16 for more details on frequency tracking. • Press **OK** to accept new frequency tracking settings. • Press **Cancel** to quit and return to Nominal Values screen.	 MARK110c

Frequency synchronization

Normal frequency synchronization (sync) of the Energy Platform analog signal processing circuits is controlled by analyzing the external AC voltage signal input on channel A. If sync is lost, then internal sync is automatically selected. The frequency used for internal is entered under Frequency on the Nominal Values screen (see page 5-14).

Typically, external sync on Ch D is specified if it is known that signal on A is inappropriate for use as a sync source (i.e. the frequency is unstable or DC). A low distortion 50, 60 or 400 Hz signal can be input to Ch D and used as a sync signal.

NOTE: Failure to connect an external sync or to select an internal sync during current monitoring will result in erroneous data being collected and displayed.

Frequency tracking

Tracking determines how the phase locked loop circuitry responds to sudden changes in frequency.

Standard mode: On a normal power quality application [Standard], the system is designed to “ride through” voltage changes to keep tracking the fundamental frequency even in the absence of voltage.

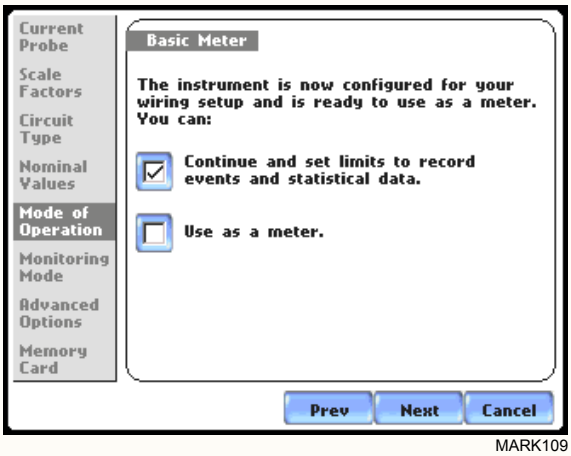
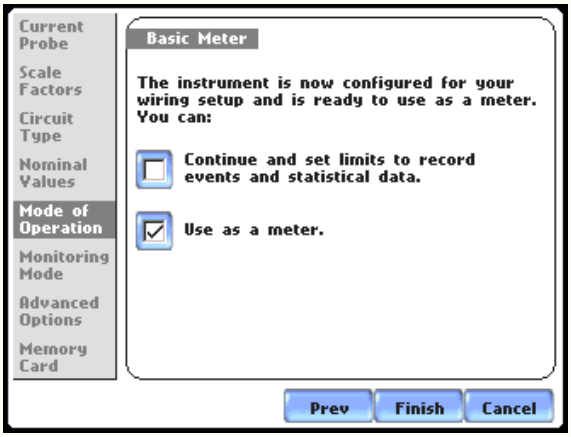
Fast mode: When operating on a local generator [Fast], the frequency will vary more as loading changes occur. The Fast mode allows the instrument to follow these changes more closely.

Internal mode: In cases where no reference signal is available (such as DC monitoring), the Internal setting is used to set the sample rate.

Mode of Operation

Basic meter setup

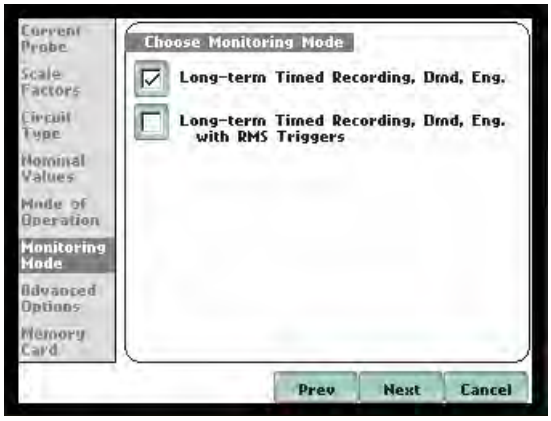
After entering the correct nominal values for circuit monitoring, users have the option to set the instrument to record data or use the instrument as a meter.

Action...	Result...
STEP 1: From the Frequency Tracking screen, press Next to display the Mode of Operation. • To set up the instrument to record data, press to enable **Continue and set limits to record events and statistical data**. Press **Next** and go to page 5-18. • To use the instrument as a meter, press to enable **Use as a meter**. Proceed to Step 2. • Press **Cancel** to discard changes and return to Start menu.	 MARK109
STEP 2: The instrument is now configured for your specified wiring setup and is ready to use as a meter. • Press **Finish** to begin using instrument as a meter and return to Home screen. • Press **Cancel** to discard meter mode operation and return to Start menu.	 MARK109b

Monitoring Mode

Choose a monitoring mode

The Energy Platform provides two monitoring modes of operation from which to monitor and capture data relevant to user application.

Action...	Result...
STEP 1: From the Basic Meter screen, press Next to display the different Monitoring Mode setups. • Check to select your desired monitoring mode setup. Press **Next** and go to page 5-19. • Press **Cancel** to quit and return to Start menu.	 EP111

Monitoring mode descriptions

Long-term Timed Recording, Demand, Energy sets the instrument to use periodic measurements only. This setting is used for long-term statistical studies and benchmarking field-based equipment testing and evaluation. No triggers are set so only trended values are available.

Long-term Timed Recording, Demand, Energy with RMS Triggers is the same as above except that snapshots and rms event triggers are active.

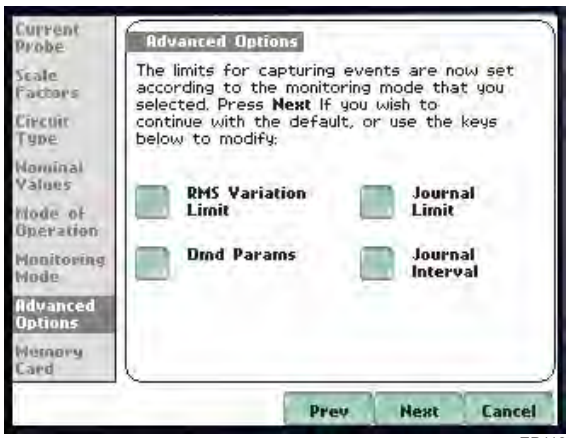
NOTE

Users can override the default settings to customize the instrument to their application. For the default settings of parameters in each monitoring mode, see Appendix B Technical Specifications - Parameter Settings in Each Monitoring Mode.

Advanced Options

Advanced setup options

After selecting a monitoring mode, the system is now ready to begin monitoring and to record data in card. Prior to actual monitoring, users have the option to accept the default threshold settings and proceed with monitoring, or to review and/or modify monitoring settings.

Action...	Result...
STEP 1: From the Choose Monitoring Mode screen, select monitoring mode, then press Next to display Advanced Options. • If the default settings for the specified monitoring mode are acceptable without change, press **Next**. Go to page 5-20. • To review and/or modify default threshold settings, press the desired parameter on screen. Go to Chapter 6 Advanced Setup Options. • Press **Cancel** to quit and return to Start menu.	 EP112

See Chapter 6 Advanced Setup Options for a detailed discussion of each threshold parameter displayed in the Advanced Options screen.

Site Name/Memory Card

Where you can save data

The Energy Platform uses the Compact Flash data card as primary storage for data. It automatically saves data in the card when monitoring is on. The Compact Flash card must be loaded in the data card slot in order to record data.

Data card size

The Energy Platform supports Compact Flash data card with part number CFDATA-DB which at minimum has a usable memory space of 4GB. Note that the actual card size is displayed in the unit's memory card format screen.

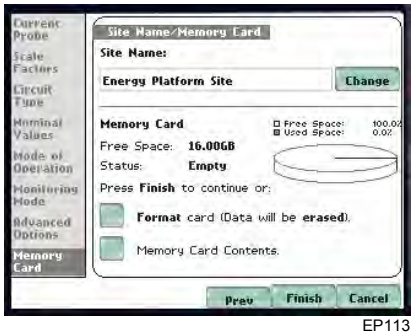
NOTE: Dranetz-BMI Compact Flash data cards have been tested to work properly with the Energy Platform. Non-Dranetz-BMI Compact Flash cards may not be compatible with the instrument and cannot be supported by Dranetz-BMI Customer Service in case problems arise. Users are advised to use only Dranetz-BMI parts and accessories. See Appendix A Optional Accessories for Compact Flash cards supplied by Dranetz-BMI.

Filename

The following files are created on the data card: *filename*.set for setups template and *filename*.ddb for saved events. The maximum allowable length for a site/file name is 32 characters.

Data card screen

Before monitoring begins, the Site Name/Memory Card screen is displayed. The screen reports the current operational status of the data card.



EP113

Data card status messages

The following messages may appear in the data card status line.

Status Message	Description
Not Inserted	Data card not inserted or not detected. Insert a valid data card to proceed.
Empty	Data card is empty.
Contains File	Data card presently contains files.

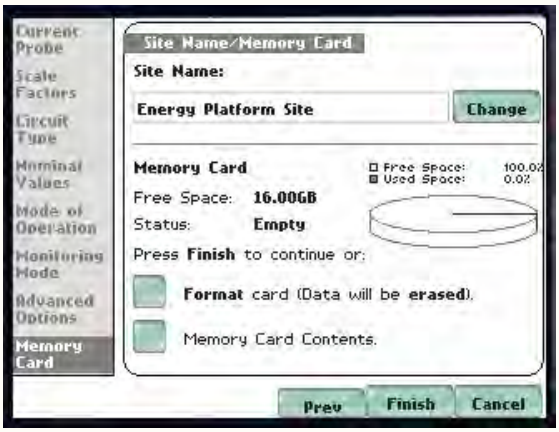
Continued on next page

Data card status messages (continued)

Status Message	Description
Fragmented	A fragmented FAT was detected. Monitoring cannot proceed with a fragmented data card. Either change the data card or format to continue.
Unformatted	Data card is not formatted. Format the data card or replace with a different card to continue.
Invalid Card	Data card is not valid for monitoring. Change the data card to proceed.

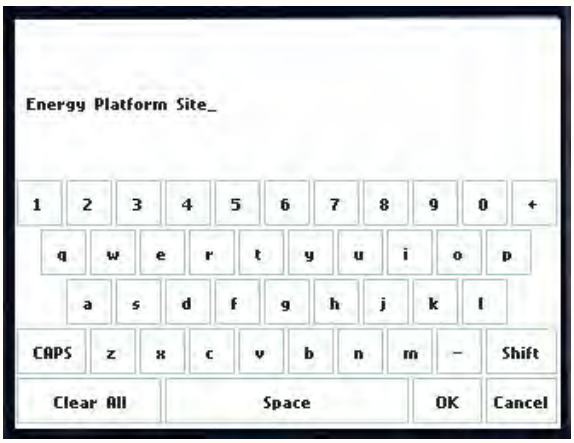
Data card operation

The data card screen prompts users to set filename and format card in preparation for monitoring and writing of data.

Action...	Result...
STEP 1: From the Advanced Options screen, press Next to display data card status. • If the default filename is acceptable without change, and if the card is formatted to save data, press **Finish**. The sytem is ready to begin monitoring. Go to Section B Monitor Same Circuit - Turning Monitoring On/Off on page 5-24. • Press **Change** to enter a new site/file name. Proceed to Step 2 on page 5-22. • Press **Format card** to format the data card. NOTE: All data and setups stored in data card will be lost when you format the card. Copy any files that you want to save to a computer first before formatting card. • Press **Memory Card Contents** to view list of data files stored in card. • Press **Cancel** to discard changes and return to Start Menu.	 EP113

Continued on next page

Data card operation (continued)

Action...	Result...
STEP 2: Enter a new site/file name using the onscreen keyboard. Press **OK** to accept the new site/file name. • Press **Shift** to enter a character in uppercase. • Press **CAPS** to enter all characters in uppercase. • Press **Space** to enter a space in between characters. • Press **Clear All** to delete the entire name on the space provided. • Press ◄— to erase a character. • Press **Cancel** to retain the default site/file name and return to Site Name/Memory Card screen.	 EP114

Writing setup template to data card

Saving setups template means writing current configurations and threshold setups to the data card. Configurations and setups include the following:

- Present circuit type
- Present scale factors
- Thresholds
- Interval for timed readings
- Site name

NOTE: The filename extension for the setup template is SET, i.e. *filename*.set.

Guidelines on file data transfer

The Energy Platform treats the Compact Flash card like a hard disk storing files in DOS format. For successful card data transfer, keep the following points in mind:

- Compact Flash cards allow users to store multiple files in one card. The Site name will be used as the filename for record files (i.e. if the site name is Energy Platform Site, the filename will be Energy Platform Site 00.DDB). A number is automatically appended to the name such that filenames are automatically incremented every time the user starts monitoring with that same filename.

- Energy Platform does not support file fragmentation. When creating a file, it will take the largest contiguous block and use that size block for data storage. Deleting files from the memory card is NOT RECOMMENDED. When there is no more space available to begin new data storage, reformat the card using the Energy Platform, after transferring data files to a computer.

Section C

Monitor Same Circuit

Overview

Introduction

Menu options for monitoring become available only after setting up the instrument or from reading a setup template from the data card. Users can monitor the same circuit, and configure combinations of setups unique to their task applications.

Monitoring options

Users have the option to begin monitoring immediately or at a specified time and date. The Monitoring Menu also allows users to do Advanced setups via the Modify Trigger Parameters and Intervals option. Unlike the Automatic and Wizard setup procedures, Advanced setup allows users to change parameters and enter new limits to capture events. A full discussion on modifying threshold settings is found in Chapter 6 Advanced Setup Options.

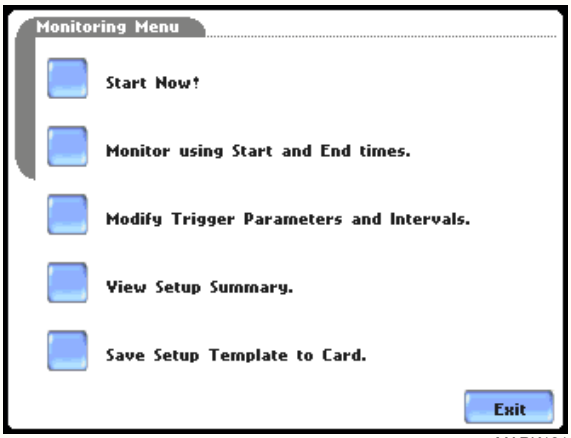
In this section

The following topics are covered in this section.

Turning Monitoring On/Off

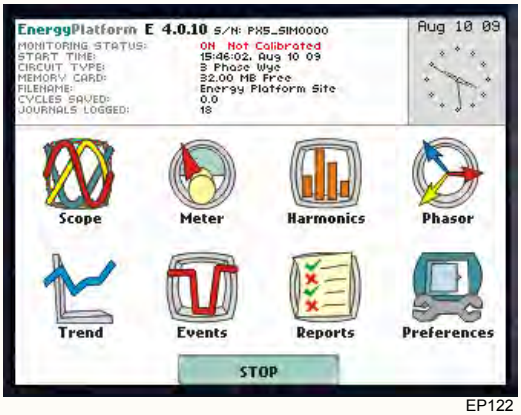
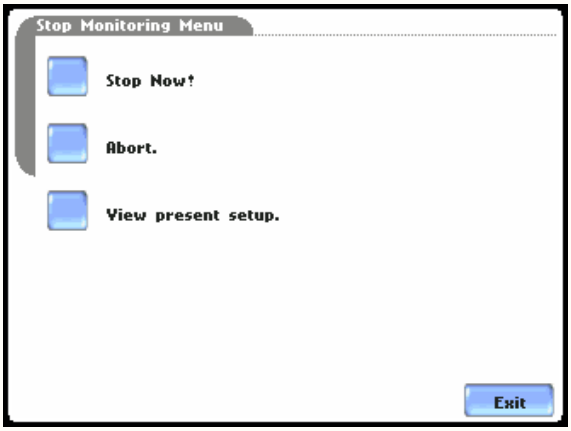
Start/Stop monitoring

Follow these steps to start and end monitoring.

Action...	Result...
STEP 1: From the Automatic Setup screen, press OK to start monitoring (see page 5-3). The Monitoring Menu screen will be displayed. OR STEP 1: From the Start Menu screen (see page 5-2), press Monitor Same Circuit. NOTE: Monitoring Menu screen will only be available after setting up the instrument or from reading a setup template from card. OR STEP 1: At the end of the Wizard Setup, the Site Name/Memory Card screen prompts users to press Finish so as to start monitoring (see page 5-21). The Monitoring Menu screen will be displayed. • To start monitoring, press **Start Now!** Proceed to Step 2 on page 5-26. • To set monitoring at a specified date and time, press **Monitor using Start and End times**. Go to page 5-28. • To modify parameter settings, press **Modify Trigger Parameters and Intervals.** Proceed to page 5-33. • To review the present setups, press **View Setup Summary**. Proceed to Step 5 on page 5-27. • Press **Save Setup Template to Card** to write setups to card as template for future use. • Press **Exit** to cancel and return to Home screen.	 MARK121

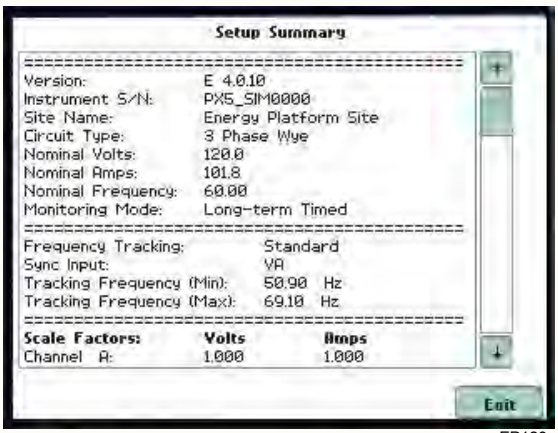
Continued on next page

Start/Stop monitoring (continued)

Action...	Result...
STEP 2: While the instrument is actively monitoring data, the message MONITORING STATUS: ON appears on the top section of the Home screen (see NOTE). Users cannot change the time and date nor perform data card operations while the instrument is actively monitoring data. However, the rest of the function keys, including date style and clock style, are operable even while monitoring status is ON. • To end monitoring, press **Stop**. Proceed to Step 3.	 EP122 NOTE: The following status messages are displayed after monitoring is turned on. MONITORING STATUS: ON (monitoring will continue until Stop is pressed or when specified end time is reached; START TIME and date are displayed while monitoring is on) CIRCUIT TYPE: xxxxxx (default or user specified) MEMORY CARD: x MB (remaining space in the data card in MB units) FILENAME: User specified or Energy Platform Site xx..ddb (where xx increments every time data is saved using the same file name) EVENTS SAVED: xx (counter on the number of events saved to the data card) JOURNALS LOGGED: xx (counter on the number of timed readings recorded)
STEP 3: Stop Monitoring Menu confirms whether users want to end monitoring, cancel monitoring, or view present setups. • To turn monitoring off, press **Stop Now!** This will save any pending data and close the file. Proceed to Step 4 on page 5-27. • To cancel monitoring, press **Abort**. All data collected will be lost when monitoring is aborted. • To view setups, press **View present setup**. This will not save any monitoring parameters. Proceed to Step 5 on page 5-27. • To continue monitoring, press **Exit**.	 MARK123

Continued on next page

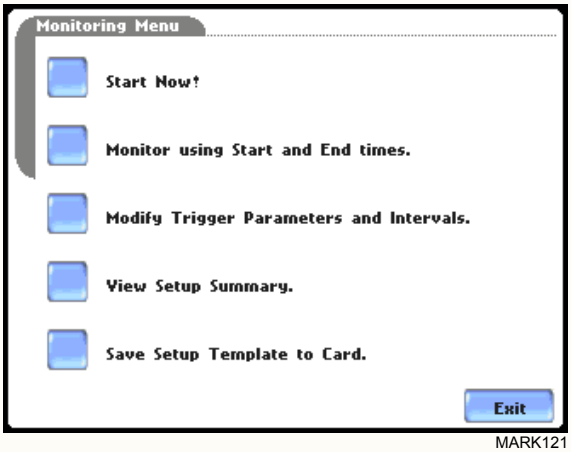
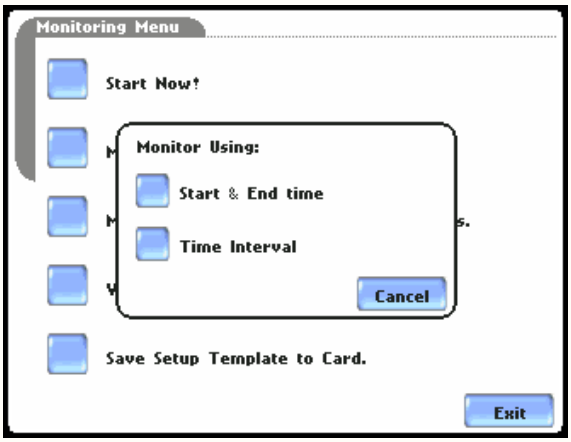
Start/Stop monitoring (continued)

Action...	Result...
STEP 4: When monitoring ends, the message MONITORING STATUS: DONE appears on screen (see NOTES). • To capture a new set of data or to edit threshold settings, press **Start.** The Start Menu screen will be displayed. Go to page 5-2. • To view recorded data, press **Trend**, **Events**, or **Reports**. Go to Chapter 7 View Event Data.	 EP124 NOTE 1: The message MONITORING STATUS: DONE appears to indicate that monitoring is completed and active recording is disabled. NOTE 2: The Events button will display an event data record if periodic measurements at regular intervals are available or if thresholds have been crossed. See Chapter 7 View Event Data.
STEP 5: Press View present setup to dislay the parameter settings in effect. Setup summary is available for review before, during, and after monitoring. • Press **Up/Down** arrow keys to scroll the page up or down by one line. • Press and drag the scroll bar to move the page up or down. • When done reviewing the Setup Summary, press **Exit**. The screen will return to the Stop Monitoring Menu options on page 5-26.	 EP123c

Monitoring at a Specified Time and Date

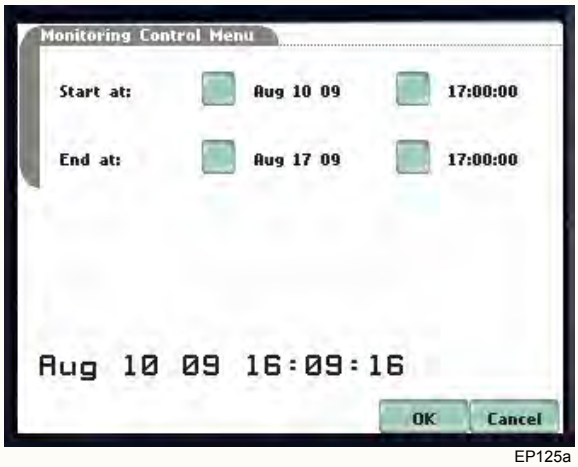
Schedule monitoring

Follow these steps to set monitoring at a specified time and date.

Action...	Result...
STEP 1: From the Automatic Setup screen, press OK to start monitoring (see page 5-3). The Monitoring Menu screen will be displayed. OR STEP 1: From the Start Menu screen (see page 5-2), press Monitor Same Circuit. NOTE: The Monitoring Menu screen will only be available after setting up the instrument or from reading a setup template from the memory card. OR STEP 1: At the end of the Wizard Setup, the Site Name/Memory Card screen prompts users to press Finish so as to start monitoring (see page 5-21). The Monitoring Menu screen will be displayed. • To set monitoring at a specified date and time, press **Monitor using Start and End times**. Proceed to Step 2. For functional descriptions of the other buttons, refer to Section C Monitor Same Circuit - Turning Monitoring On/Off on page 5-25.	 MARK121
STEP 2: The Energy Platform will monitor and collect data using either of the following monitoring schedules: • Press **Start & End time** to specify the date/time when the unit will begin and end monitoring. See page 5-29. • Press **Time Interval** to specify the length of the recording interval for each file, and the time/date to start monitoring interval. See page 5-32. • Press **Cancel** to quit and return to the monitoring menu.	 MARK125a

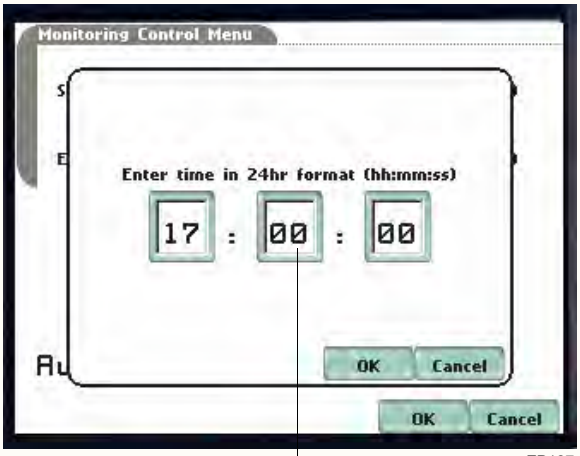
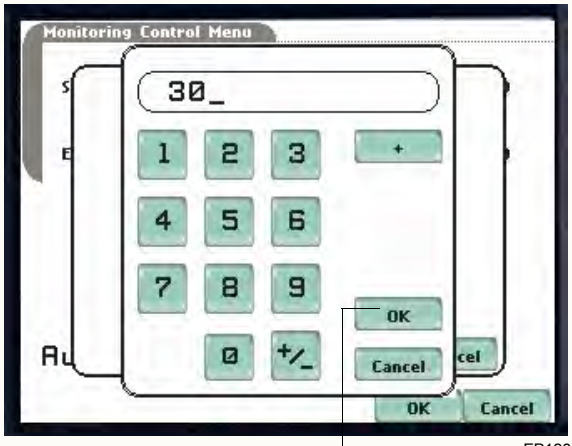
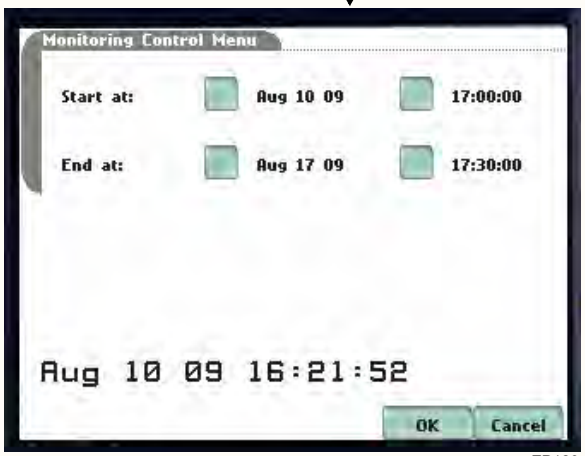
Monitoring using start & end time

You can specify the date and time when the unit will begin and end monitoring.

Action...	Result...
STEP 1: When monitoring using the **Start & End time** schedule, the current date and time (set to the next full hour) are displayed on screen. • **Start at:** indicates the date and time when the unit will begin data monitoring. • **End at:** indicates the date and time when the unit will stop data monitoring. By default, the system will automatically end monitoring one week from the time/date monitoring starts. However, users are allowed to specify their own time/date when they want to stop monitoring. For example: Set monitoring to - **Start at:**Aug. 10, 2009; 17:00:00 **End at:** Aug. 17, 2009; 17:30:00 Press the End at: Date and Time keys and proceed to Step 2. • Press **OK** to accept the settings and return to Home screen. • Press **Cancel** to retain previous monitoring settings and return to Home screen.	 EP125a
STEP 2: Use the Date and Time function keys to set when monitoring will start and end. • Press **Date** to enter desired month-day-year to start/end monitoring. Use the numeric keypad to enter the year. • Press **OK** to accept changes in date settings. Continue with Step 2 on page 5-30. • Press **Cancel** to discard changes in date and return to Monitoring Control Menu.	 EP126

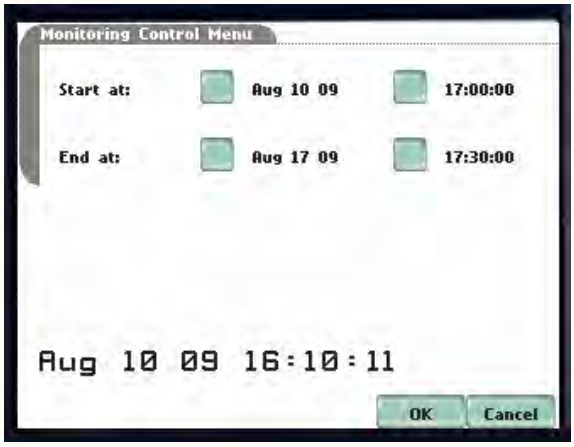
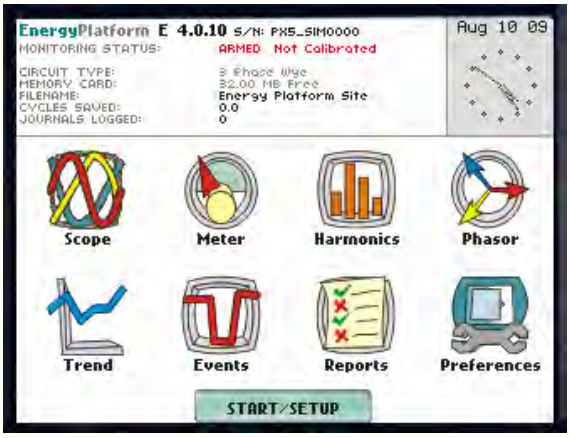
Continued on next page

Monitoring using start & end time (continued)

Action...	Result...
STEP 2 (continued): • Press **Time** to enter desired hour-minute-second to start/ end monitoring. Press to select the hour/minute/second field to display the numeric keypad. Use the keypad to enter time settings. • Press **OK** to accept changes in time settings. Proceed to Step 3 on page 5-31. • Press **Cancel** to discard changes in time and return to Monitoring Control Menu.	 EP127  EP128  EP129

Continued on next page

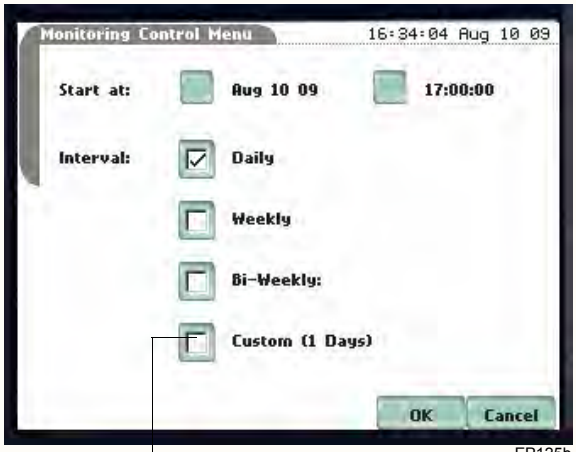
Monitoring using start & end time (continued)

Action...	Result...
STEP 3: The screen will display the new settings once the monitoring Start time/date and End time/date have been set. • Press the time and date function keys when you want to change time/date monitoring settings. Refer back to Step 2 on page 5-29. • Press **OK** when done setting the Start and End monitoring time/date. Proceed to Step 5. • Press **Cancel** to discard the changes in time/date monitoring settings and return to Monitoring Menu.	 EP129b
STEP 4: After specifying the Start and End time/date of monitoring, the message MONITORING STATUS: ARMED appears on screen. **Armed** means that the system will automatically begin monitoring at the specified Start time and date. Once monitoring status is ON, follow the Start/Stop monitoring procedure found on page 5-26.	 EP130

Monitoring at scheduled intervals

You can specify the date and time when the unit will begin monitoring, and choose from the following interval cycles when the unit will end recording and start a new file: daily, weekly, bi-weekly, or a customized number of days. Data monitoring will end when memory is full or when monitoring is stopped manually.

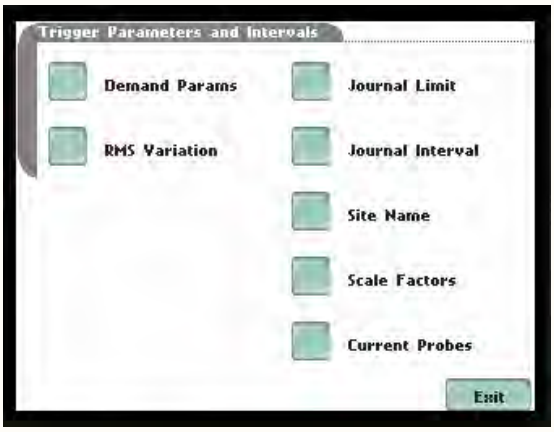
Action...	Result...

STEP 1: When monitoring using **Time Interval**, the current date and time (set to the next full hour) are displayed on screen. Select the interval schedule on how often you want the unit to automatically end and start a new data file.
• **Start at:** Indicates the date and time when the unit will begin monitoring.
• **Interval:** Indicates the time period when the unit will automatically collect and download event data.
  • **Daily:** Monitors data in 24-hour cycle and then starts a new file. The unit will append the filename for data collected every 24 hours.
  • **Weekly:** Monitors data in 7-day cycle and then starts a new file. The unit will append the filename for data collected every 7 days.
  • **Bi-Weekly:** Monitors data in 14-day cycle and then starts a new file. The unit will append the filename for data collected every 14 days.
  • **Custom:** The user specifies the time period (in days) when the unit will end recording interval. Press **Change** to set new time interval.
• Press **OK** to accept the settings and return to Home screen. The message MONITORING STATUS: ARMED appears on screen.
Armed means that the system will automatically begin monitoring at the specified Start time and date.
• Press **Cancel** to retain previous monitoring settings and return to Home screen.
	
	EP125b
	 
	EP125c

Modify Trigger Parameters and Intervals

Advanced setups

The Modify Trigger Parameters and Intervals screen allows users to turn on/off any available parameters and threshold limits. Advanced Setup provides users wider control over all setup functions.

Action...	Result...
STEP 1: From the Monitoring Menu screen, press Modify Trigger Parameters and Intervals. • Press the parameter whose default threshold settings you want to review and/or enable/ disable. Go to Chapter 6 Advanced Setup Options. Press **Site Name** to set new filename prior to data monitoring. The onscreen keyboard will appear (see page 5-22 for instructions on how to use the keyboard). • Press **Scale Factors** to enter new scale factor values for Volts/Amps channels. The Scale Factor Setup screen will appear (see page 5-11 for instructions on how to enter a new scale factor value). • Press **Exit** to quit and return to Monitoring Menu.	 EP136

Refer to Chapter 6 Advanced Setup Options for a detailed discussion on modifying trigger parameters and intervals.

Section D

Load Setup Template from Card

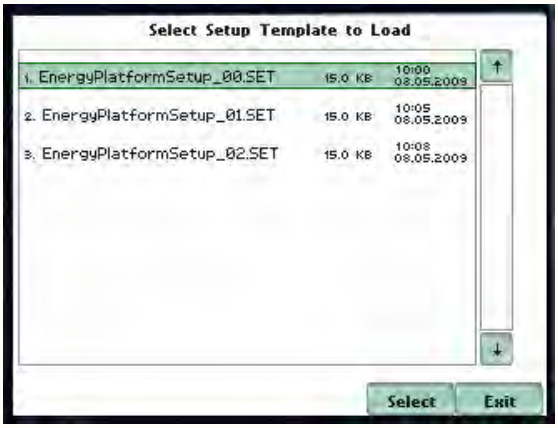
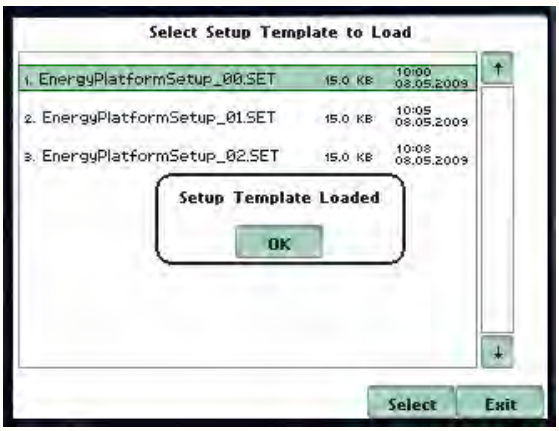
Overview

Introduction

The Energy Platform enables users to load saved setup template files (.set) from the data card.

NOTE: Loading a setup template from the card will overwrite your existing setup.

Loading saved setups

Action...	Result...
STEP 1: From the Start Menu, press Load setup template from card. The Energy Platform lists the setup template files (.set) stored in data card, along with file size, time and date when the setup files were recorded. Setup files are arranged in the order of date and time they were recorded. • Press **Up/Down** arrow keys to scroll the page up or down by one line. • Press to select (highlight) the desired setup template file. • Press **OK** to load setup template from card to the Energy Platform. Proceed to Step 2. • Press **Cancel** to quit and return to Start Menu.	 EP138
STEP 2: The message Setup Template Loaded appears once the setup is successfully loaded from the data card to the Energy Platform. • Press **OK** to exit. The Monitoring Menu screen will appear and users can begin monitoring.	 EP139

Section E

Load Data from Card

Overview

Introduction

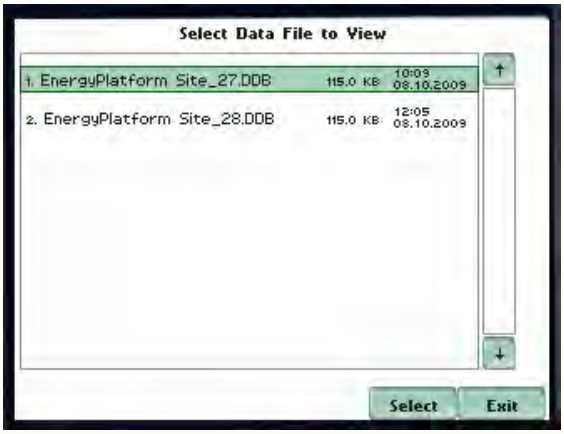
Data files (.ddb) consist of events that are saved to the data card while monitoring is on. The Energy Platform allows users to load stored data directly from card.

In this section

The following topics are covered in this section.

Loading data from card

Follow these steps to load data from card.

Action...	Result...
STEP 1: From the Start Menu, press Load data from card. The Energy Platform lists the data files (.ddb) stored in card, along with file size, time and date when the data files were recorded. Data files are arranged in the order of date and time they were recorded. • Press **Up/Down** arrow keys to scroll the page up or down by one line. • Press to select (highlight) the desired data file. • Press **OK** to load data from card to the Energy Platform and return to Home screen. • Press **Cancel** to quit and return to Start Menu.	 EP140

NOTE

If an error message is displayed, refer to Card Error Messages on page 5-36.

Card Error Messages

Error messages The following error messages may be displayed.

Error Message	Description
Card not inserted	No data card inserted or inserted improperly.
Card not ready	The Compact Flash data card controller is not ready. Try reinserting the data card.
Card read error	The data contains errors or the file has an invalid version.
No files on card	No valid data file on card.

CHAPTER 6

Advanced Setup Options

Overview

Introduction

This chapter describes the options available to users with applications that require advanced setups. Although the Energy Platform is designed to capture data no matter what the setup is, users are able to configure combinations of setups unique to their task applications.

Definitions

Setup: A fixed condition of parameter thresholds based on IEEE 1159 rms voltage variation, that determines what will constitute an event. In addition, other parameters such as demand or harmonic distortion, have preset thresholds that the user can modify.

Event: The Energy Platform can record three types of events namely sag, swell or aggregate snapshot. A sag or swell event is detected when the rms threshold limits are exceeded by +/- 10% of the nominal input. Aggregate snapshot is a timed snapshot for which a trend plot can be viewed over a user selected time interval. For each type of event, the min and max values and time stamp are displayed for analysis.

Parameter threshold: A value that the Energy Platform compares to a measurement to decide if an event occurs. Also called a limit. For example, if the input voltage is measured as 135 Vrms, and the parameter threshold for voltage is 132 Vrms, Energy Platform saves this limit crossing to memory as an event.

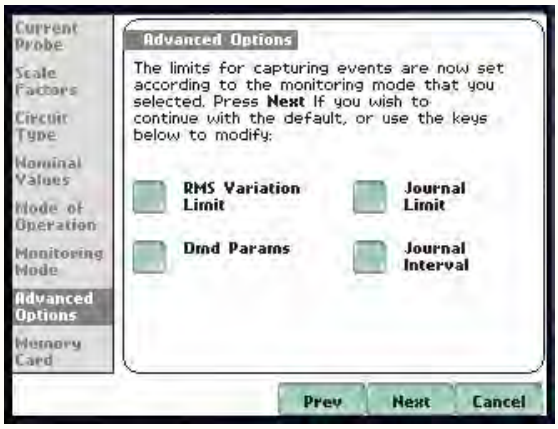
In this chapter

This chapter covers the following topics:

Advanced Options Menu

Advanced menu settings

Advanced Options lists the threshold parameters available for review or modification. The Energy Platform allows users to customize threshold settings according to their task applications.

Action...	Result...
STEP 1: From the Choose Monitoring Mode screen (see page 5-15), select monitoring mode, then press Next to display Advanced Options. • To enable/disable limits for rms variations, press **RMS Variation Limit**. Go to page 6-3. • To review/modify limits for demand parameters, press **Dmd Params**. Go to page 6-5. • To review/modify journal limit setups, press **Journal Limit**. Go to page 6-8. • To review/modify journal interval settings, press **Journal Interval**. Go to page 6-12. • Press **Next** to accept settings for advanced setups and to display memory card screen. Go to page 5-20. • Press **Prev** to return to the Monitoring Mode screen. Go to page 5-18. • Press **Cancel** to quit and return to Start Menu.	 EP112

RMS Variation Limit

RMS variation setup properties

RMS stands for root mean square, a mathematical formula used to compute the equivalent value of the voltage and current. Voltage and current changes are measured and checked against the programmed limits. Thresholds are preset as high limits (threshold above the programmed limit) and low limits (threshold below the programmed limit). RMS variations result whenever voltage or current rms value rise above or fall below the threshold limits.

The Energy Platform limits are fixed at IEEE 1159 standard default values of 90% of normal for sag (dip), 110% for swell, and 10% for interrupts. However the user has the option to enable/disable rms variations.

RMS trigger parameters

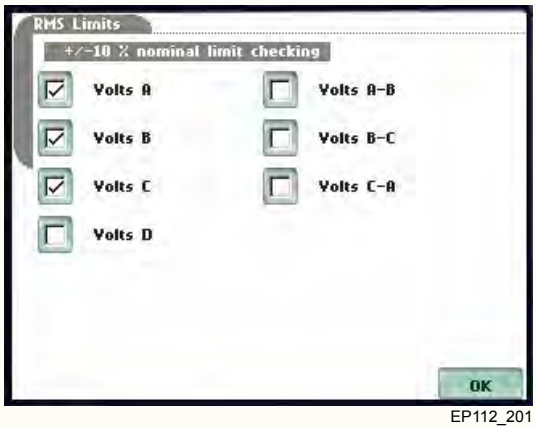
In order for the instrument to trigger on rms variation, any one of the measured quantities for which a trigger is enabled must go above the High Limit or below the Low Limit for a period of at least one rms sample point (which are taken twice per cycle with a one cycle sliding integration window).

The disturbance end point is defined as the cycle when all channels for which triggers are enabled have come back within limits (plus hysteresis). Until this criteria is met, any subsequent excursions beyond the thresholds are considered part of the original disturbance. To minimize the number of triggers recorded for a sequence of closely spaced disturbances, hysteresis is employed in both voltage and time for the begin-event and end-event thresholds.

NOTE: Hysteresis values assigned to limits are set by the system and not programmable by the user.

Procedure to record rms variation

Energy Platform allows users to enable/disable the trigger channels/parameters for rms variations.

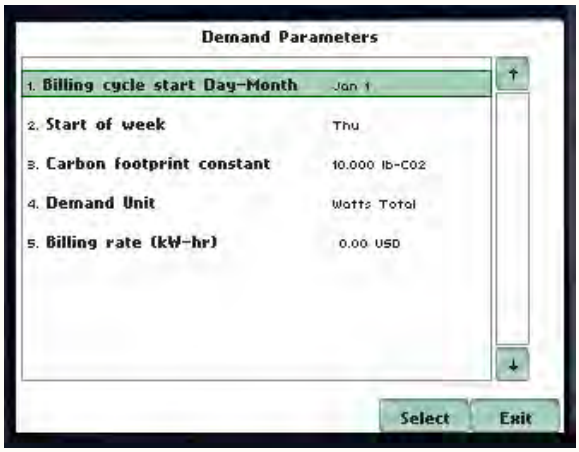
Action...	Result...
STEP 1: From the Advanced Options screen, press RMS Variation Limit. The rms limits are set by the system and not programmable by the user. • Users have the option to **Enable/Disable** the trigger channels/parameters set for rms variation recording at +/- 10% of nominal. The enabled (checked) fields show the channels that will have data recorded should a trigger occur. This prevents recording of meaningless data from unused (disabled) channels. • Press **OK** to accept changes in the triggers set for rms variation recording.	 EP112_201

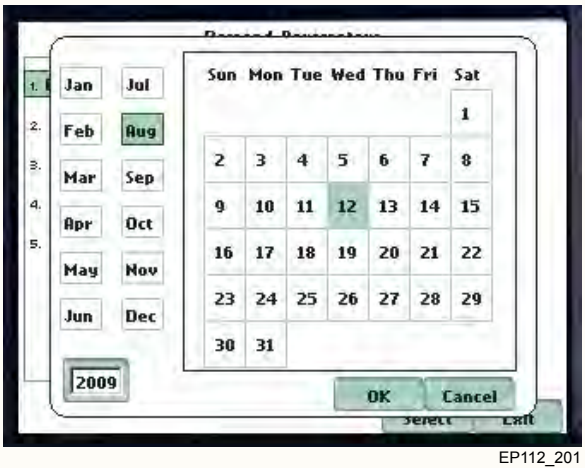
Demand Parameters

Demand parameter setup

The Energy Platform provides an interface to help users monitor and manage energy consumption including utility costs and the ability to determine carbon footprint.

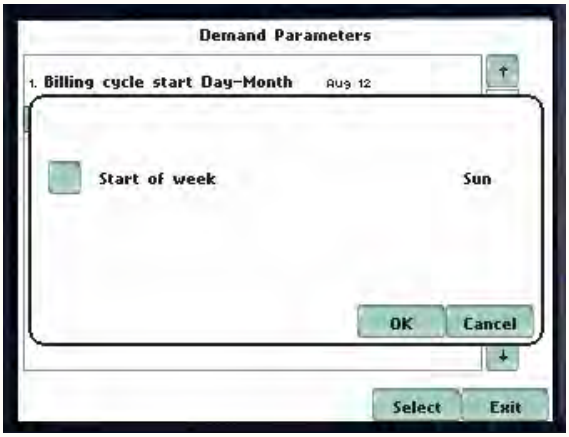
Action...	Result...

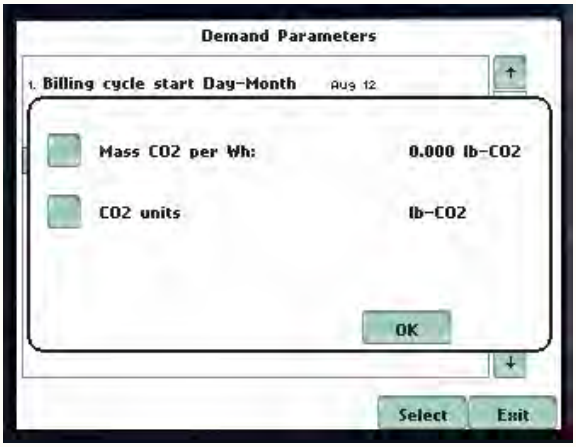
STEP 1: From the Advanced Options screen, press Dmd Params.
• Choose the category you want to set and then click on **Select**.
  • To set the **Billing cycle start Day-Month**, proceed to Step 2 below.
  • To set the **Start of Week** when the weekly billing begins, proceed to Step 3, page 6-6.
  • To set the **Carbon fotprint constant**, proceed to Step 4, page 6-6.
  • To set the **Demand Unit**, of measure, proceed to Step 5, page 6-7.
  • To set the **Billing rate** and currency, proceed to Step 6, page 6-7.
• Press **Exit** to return to Advanced Options menu.
	
	EP112_200

STEP 2: Select your desired date when you want the billing cycle to start. • Press **OK** to accept changes in the date settings. • Press **Cancel** to retain previous setting and return to Demand Parameters screen.	 EP112_201

Continued on next page

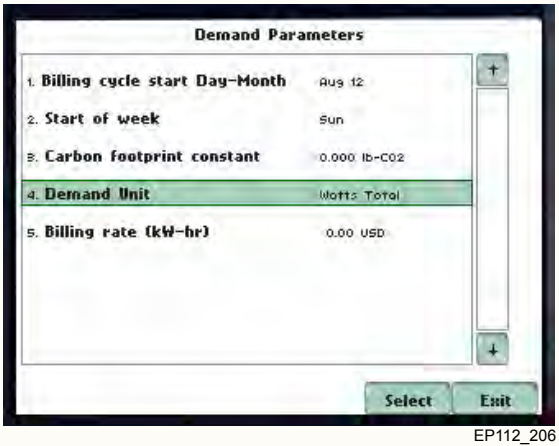
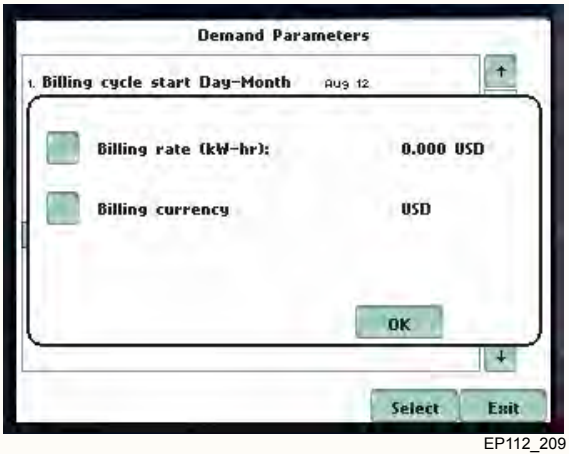
Demand parameter setup (continued)

Action...	Result...
STEP 3: Use **Start of week** to determine the exact day when the weekly reporting will start. • Press the **Start of week** button repeatedly to display the following selection values: **Mon, Tue, Wed, Thu, Fri, Sat or Sun.** • Press **OK** to accept changes in the day of week setting . • Press **Cancel** to retain previous setting and return to Demand Parameters screen.	 EP112_203

STEP 4: Use **Carbon footprint constant** to enter the constant value that the instrument will use to calculate the amount in lbs/kg of CO2 produced for every kW-hr of electricity generated.
 	
• Press **Mass CO2 per Wh** to display the numeric pad to use to enter constant value. Below are suggested constant values for:
  • coal or oil generated electricity = 1 kg/kWhr
  • solar generated electricity = .050 kg/kWhr
  • hydro or wind generated electricity = .010 kg/kWhr
NOTE: 1kg = 1000g = 2.2 lbs
 	
• Press the **CO2 units** button repeatedly to display selections for unit of measure: **Lb-CO2, Kg-CO2**
 	
• Press **OK** when done.
	
	EP112_205

Continued on next page

Demand parameter setup (continued)

Action...	Result...
STEP 5: Use **Demand Unit** to set the unit of measure for demand energy. • Press **Demand Unit** to display the following selection values: **Watts Total, VA Total, VAR Total.** • Press **OK** to accept changes in parameter settings. • Press **Cancel** to retain previous setting and return to Demand Parameters screen.	 EP112_206
STEP 6: Use **Billing Rate** to determine the rate and currency that the instrument will use to calculate utility costs. • Press **Billing Rate** to calculate the amount it costs to consume electricity measured in kW-hr. • Press the **Currency** button repeatedly to display the following selection values: **US dollar, Euro dollar**. • Press **OK** to accept changes in billing rate settings. • Press **Cancel** to retain previous setting and return to Demand Parameters screen.	 EP112_209

Journal Limit

Journal entry settings

Energy Platform allows power parameters to be trended using periodic readings that are stored in a journal. Statistical information is always captured regardless of the limit settings, so users will never be without a trend even if he/she did not set the limits correctly. The system collects data even when no disturbances occur by recording periodical statistical data (By Time).

Page 6-9 shows one example of how to set entries under the Standard - Basic parameter. The same procedure applies when setting entries under other journal parameters.

Page 6-10 features the list of journal parameters that can be trended.

Logging data by limits

Limit methods allow users to set the threshold units by which high and low limits of voltage trigger and current trigger are calculated. Thresholds are set in ranges with high limit (threshold above the normal range) and low limit (threshold below the normal range). The following threshold limits are used to trend journal parameters:

Very High: specifies an absolute limit for comparison that is higher than the high limit
High: specifies an absolute limit for comparison that is higher than the low limit
Low: specifies an absolute limit for comparison that is lower than the high limit
Very Low: specifies an absolute limit for comparison that is lower than the low limit
Deadband: specifies how much a value can change before another event is recorded

The Very high must be greater than High, Very low less than Low. Deadbands or sensitivity is used to record incremental changes in the parameter besides when limits are crossed. The hysteresis values assigned to limits are fixed and not programmable by the user. All limit values are used to determine if corresponding reporting or logging action should take place.

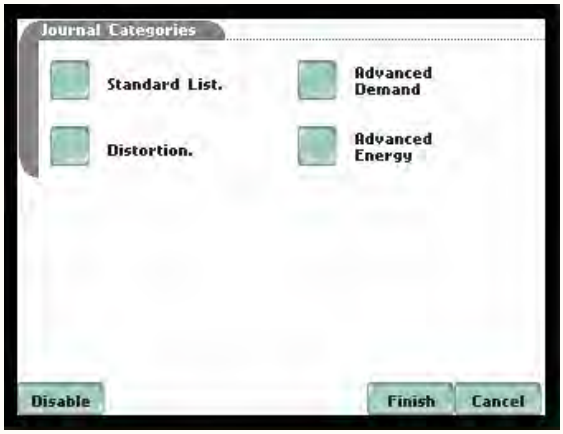
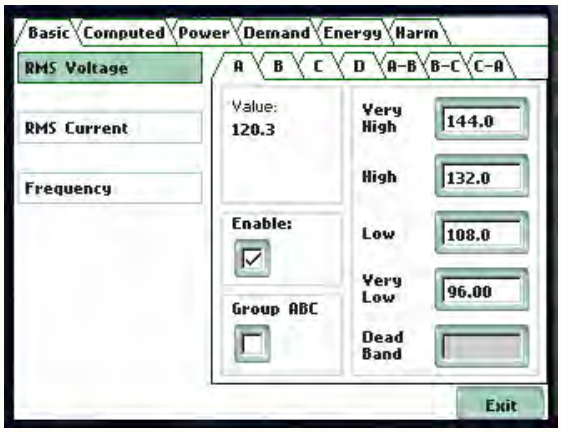
Logging data by time

Energy Platform is able to measure periodic samples as well as take snapshots of the voltage and/or current waveform. The Journal Interval menu (see page 6-12) allows users to set the time of how often the instrument will record power parameter values, demand and energy, and harmonics.

NOTE

Users can record data simultaneously by limits and by time. Make sure to enable the parameters to trend under Journal Limit and Journal Interval.

Sample journal parameter setup

Action...	Result...
STEP 1: From the Advanced Options screen, press Journal Limit. The Journal Categories screen will be displayed. Press a category to display journal parameters and the limit setup menu. For example, press **Standard List** to display the parameters under it. Proceed to Step 2.	 EP112_300
STEP 2: Press to select the journal parameter you want to set up. • Press to select the applicable phase (**A, B, C, D**) or phase-to-phase setting (**A-B, B-C, C-A**) where you want to set threshold limits. • If you want to set threshold limits to capture data, press to check **Enable**. The limit fields will be activated to allow you to enter threshold values. Press the limit field (**Very High, High, Low, Very Low, Dead Band**) to display the numeric keypad. Use the keypad to enter the limits for the corresponding phase. • Press **Exit** to accept the new threshold limits for the journal entry. • If you want to record periodical statistical data by time interval, select Journal Interval under Advanced Options screen. Refer to pages 6-13 to 6-14.	 EP112_310

NOTE Repeat the same procedure to set entries for other journal parameters.

Journal Parameter List

The following parameters are available for trending under the Journal Limit Setup. Refer to Appendix B Technical Specifications - Computed Parameters for the definition of parameters.

Standard List					
Basic	**Computed Basic**	**Power**	**Demand**	**Energy**	**Harmonics**
RMS Voltage	Vector Displacement Power Factor	Active Power	Active Power Demand	Watt Hrs	Voltage THD
RMS Current	Arithmetic Displacement Power Factor	Apparent Power	Apparent Power Demand	VA Hrs	Current THD
Frequency	Residual Current	Reactive Power	Reactive Power Demand	VAR Hrs	Harmonic Power Unsigned
	Net Current	True Power Factor	RMS Current Demand		
		Displacement Power Factor			

Distortion					
Total Harmonic Distortion	**Total Interharmonic Distortion**	**Telephone Influence Factor**	**Crest Factor**	**Power**	**Transformer**
Voltage THD (Fund)	Voltage TID (Fund)	Voltage TIF (Fund)	Volts Crest Factor	Harmonic Power Signed	Transformer Derating Factor
Current THD (Fund)	Current TID (Fund)	Current TIF (Fund)	Amps Crest Factor	Harmonic Power Unsigned	Transformer K Factor
Voltage THD (RSS)	Voltage TID - (RSS)	Voltage TIF (RMS)			
Curernt THD (RSS)	Current TID - (RSS)	Current TIF (RMS)			
		TIF Current Product			

Journal Parameter List (continued)

The following parameters are available for trending under the Journal Limit Setup. Refer to Appendix B Technical Specifications - Computed Parameters for the definition of parameters.

Advanced Demand	
Peak Power	**Predicted Demand**
Peak Active Power Demand	Predicted W Demand
Peak Apparent Power Demand	Predicted VA Demand
Peak Reactive Power Demand	Predicted VAR Demand
Peak Demand Current	

Advanced Energy
Forward Fundamental Frequency WHrs
Forward Fundamental Frequency VAR Hr
Reverse Fundamental Frequency WHrs
Reverse Fundamental Frequency VAR Hrs

Journal Interval for Timed Readings

Introduction

The Journal Interval screen allows users to define how often the Energy Platform saves data periodically, regardless of power quality disturbances and journal limits.

Definitions

Power Values

Power Values Interval - Power parameter values are based upon all cycles during a one second interval. Data is aggregated or summarized into min, max and avg values over the averaging period and stored at the end of the interval. Data measured include watts, power factors, as well as the one-second rms.

Aggregate Snapshot - Contains properties that measure periodic sample or snapshot of the voltage and/or current waveform. Users are able to determine how often the instrument will record waveform snapshots by turning the function on or off.

Demand and Energy

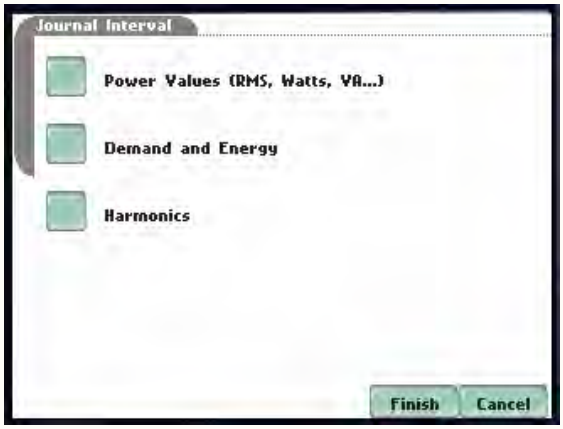
Demand Sub-Interval and *Sub-Intervals per Interval* - Refer to the time interval used in calculating power demand values. Demand calculations are made every sub-interval on the values that occurred during the most recent Demand Interval. Values set for Demand Sub-Interval must be an integer-divisor of the Demand Interval since the former applies when updating certain parameters of the latter.

Harmonics

Harmonics Journal Interval - Various harmonic parameters such as total harmonic distortion (THD), total interharmonic distortion (TID), and telephone influence factor (TIF) can be trended using periodic readings that are stored in the journal. Depending on the harmonic journal interval set, the instrument records a sampling of the waveform synchronized to the fundamental frequency, to ensure accurate calculation of harmonic phase angles.

Timed settings menu

The intervals for timed readings are user programmable.

Action...	Result...
STEP 1: From the Advanced Options screen, press Journal Interval. The Journal Interval menu will be displayed. Press the parameter that you want to change. Each journal interval must be pressed repeatedly to display the available selection values. • Selections for **Power Values**: Power Values Interval: 1 MIN, 2 MINS, 3 MINS, 5 MINS, 10 MINS, 15 MINS, 1 HR Aggregate Snapshot: OFF, ON • Selections for **Demand and Energy**: Demand Sub-Interval: OFF, 1 MIN, 3 MINS, 5 MINS, 10 MINS, 15 MINS, 30 MINS, 1 HR Sub-Intervals per Interval: 1, 2, 3, 4, 5, 6 • Selections for **Harmonics**: Harmonics Journal Interval: OFF, 1 MIN, 2 MINS, 3 MINS, 5 MINS, 10 MINS, 15 MINS, 1 HR • Press **Finish** to accept the new timed settings. • Press **Cancel** to retain previous timed settings and return to Advanced Options menu.	 EP114

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CHAPTER 7

View Event Data

Overview

Types of data display

Energy Platform offers a graphical and easy to navigate display of event list and trend data. The firmware architecture of the Energy Platform is designed to engage in various stages of acquisition, communication, and visualization of event list and journalled data.

Event List: Event List displays a summary of all captured events in the order that they occurred. Energy Platform is able to record three types of events namely sag, swell or aggregate snapshot. A sag or swell event is detected when the rms threshold limits are exceeded by +/- 10% of the nominal input. Aggregate snapshot is a timed snapshot for which a trend plot can be viewed over a user selected time interval. For each type of event, the min and max values and time stamp are displayed for analysis.

Trend: A trend is a graph of the value of one parameter and channel over time. Trends aim to show a macro view interface of timespan, trigger conditions, and channels of waveforms and rms that were recorded. Users can zoom in on trends for a more detailed view.

View data icons

The Events and Trend icons are used to view event data. Both icons are accessible at the Home page.

Event data becomes available while the instrument is monitoring or by loading a previously saved file from the data card. Otherwise, a status message appears indicating that there are no event data available to view.

The Trend button displays time plots or trend visualizations of journalled data. The parameters to plot consist of journal entries under the Journal Limit Setup (see pages 6-10 to 6-11). The Trend screen can display up to four plots, with a maximum of two parameters per plot. One parameter can have multiple channels to plot. Users have the option to enable/disable plot display, where display area will resize according to the number of plots enabled for display. The Trend screen also features a Zoom box, where users can expand or narrow the zoomed area via touch and drag. Users can select the trend coordinates to view in detail.

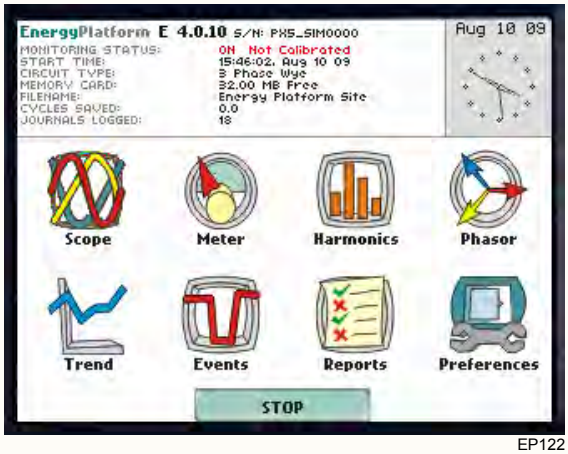
Downloading and viewing data on a computer

Event files stored in data card can also be viewed on the computer. Insert the card to a Compact Flash card reader connected to the computer. No communication software protocol between the Energy Platform and computer is necessary.

The Energy Platform™ Report Writer or DranView® program is required to retrieve event and trend data in the computer. See Chapter 9 - Downloading Events for more information on these applications.

View data using Events, Trend

Follow these steps to display event data.

Action...	Result...
STEP 1: Events and Trend are accessible from the Home screen. Note that event data will be available for display while monitoring or upon reading a stored file from the data card. A monitoring status message appears on the top section of the screen. Refer to Chapter 5 Start Menu - Section C Monitor Same Circuit for the procedure on how to capture events by turning monitoring on. • Press **Events** to view event list display. Proceed to Section A - Event List on page 7-4. • Press **Trend** to trend journal data and view time plots. Proceed to Section B - Trend on page 7-5.	 EP122

In this chapter

This chapter covers the following topics.

Section	Topics	See Page
A	Event List	7-4
B	Trend	7-5

Section A

Event List

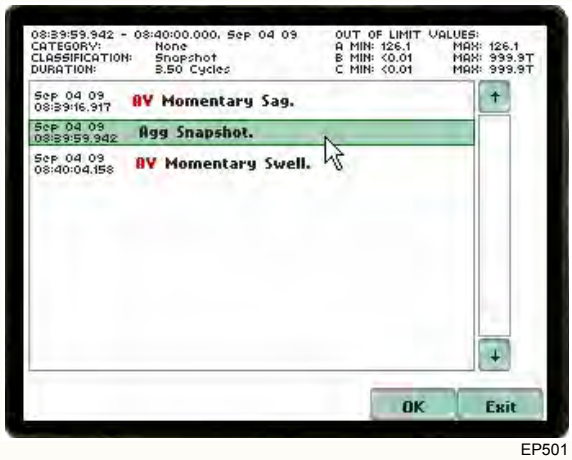
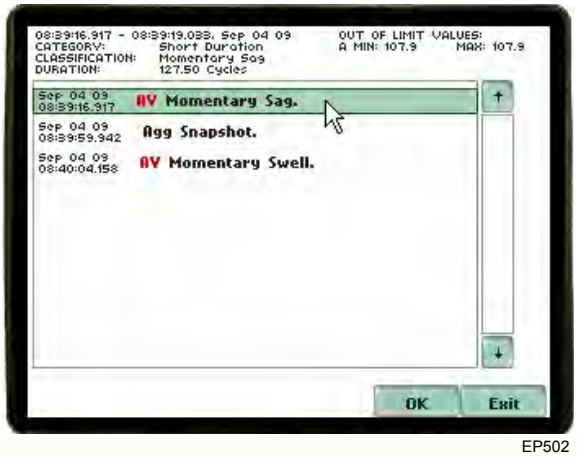
Overview

Event list description

Event list presents a summary of all captured events in the order that they occurred. Each event contains a general heading indicating the time and date when the disturbance occured, the disturbance category, disturbance classification, and number of cycles of duration.

View event list

Follow these steps to access the event list. Note that event data becomes available only after monitoring has been turned on or upon reading a file from the data card.

Action...	Result...
STEP 1: From the Home screen, press Events. The Event List is displayed. The top section of the screen features a summary description of the selected event (in highlight). Each entry is identified by the time and date when the event was captured, the color coded channel/ parameter of captured event, and the event classification. • Press **Up/Down** arrow keys to scroll the page up or down by one line or press and drag the scroll bar to move the page up or down. • Press **OK**/**Exit** to return to the Home screen.	Sample Aggregate Snapshot Event Detail  EP501 Sample Momentary Sag Event Detail  EP502

Section B
Trend

Overview

Trend categories

Energy Platform is able to display statistical trends or plots for the following parameter categories:

Standard: Parameters include basic volts and amps, displacement power factor, residual and net current, standard demand, energy, and harmonics. These power parameters are measured more accurately using a one (1) second interval, summarized by min, max and avg at the end of the interval.

Distortion RMS, THD, Frequency: Parameters include voltage and current THD, voltage and current TID, crest factor, signed and unsigned harmonic, and transformer factor.

Advanced Demand: Parameters include peak power and predicted demand. These parameters measure the ratio of maximum demand of the power distribution system to the total connected load of the system.

Advanced Energy: Parameters include energy on per phase and total basis as well as in forward and reverse mode.

NOTE: See page 6-10 for the detailed list of parameters available for trending.

In this section

The following topics are covered in this section.

Trend Display

What is displayed on a trend?

A trend consists of the timed and threshold waveforms for the parameter on display.

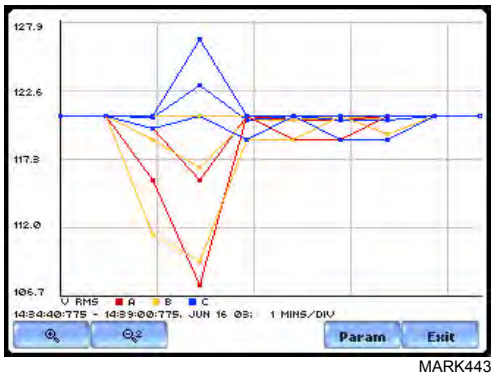
Users have the option to enable/disable a trend or plot display, wherein display area will resize according to the number of plots enabled for display. In addition, users have the option to enable/disable channels to trend in a select parameter. Each parameter can have one or multiple channels to plot.

The trend screen also features a Zoom box, wherein users can expand or narrow the size of a zoomed area via touch and drag. The zoom feature allows users to view trend coordinates of min, max and avg values in greater detail.

Sample trend screens

Sample screens below feature the same Voltage RMS parameter.

Example 1 - One Parameter, Multiple Channels plot: Voltage RMS parameter with enabled channels A (in red), B (in yellow), and C (in blue). The plot below has been zoomed in three times.



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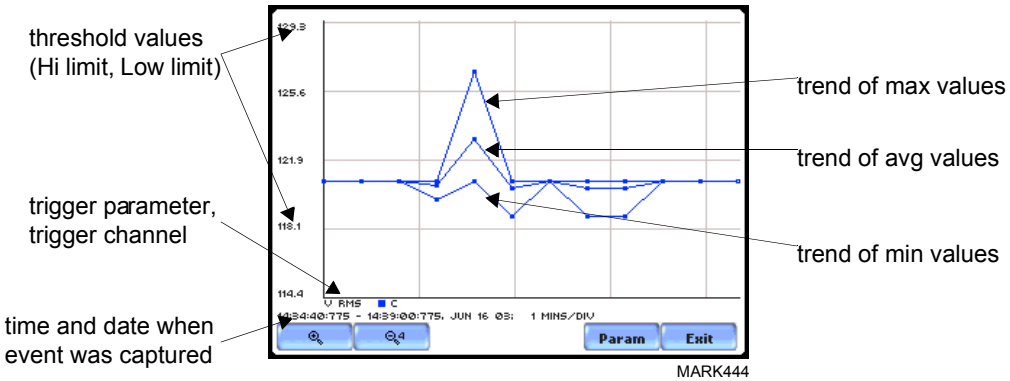
Example 2 - One Parameter, One Channel plot: Voltage RMS parameter with enabled channel C (in blue). The plot below has been zoomed in five times.



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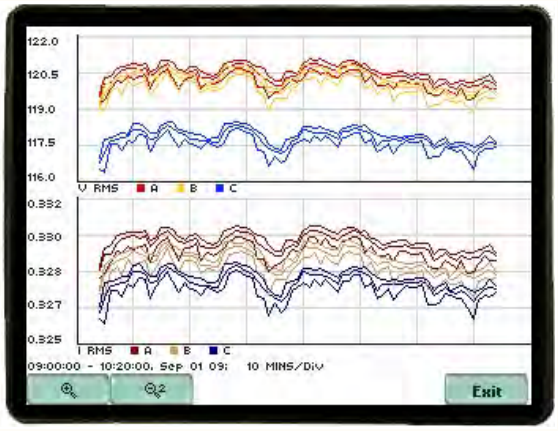
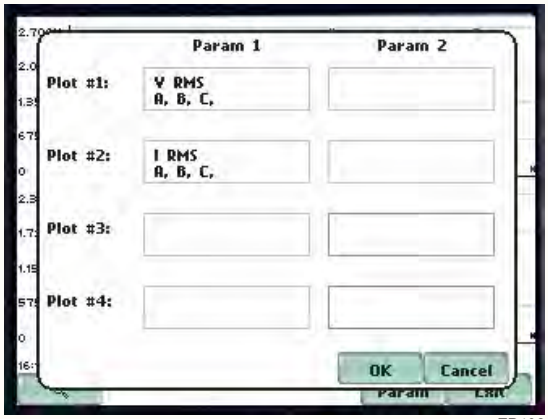
Trend Setup

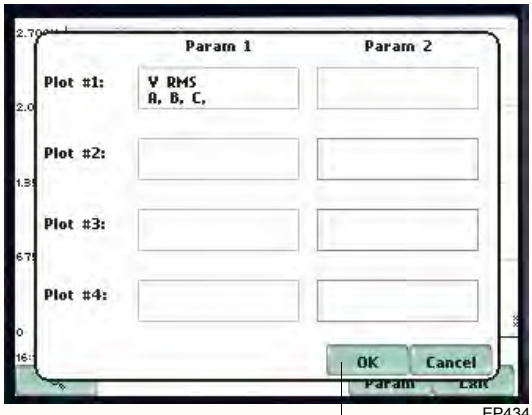
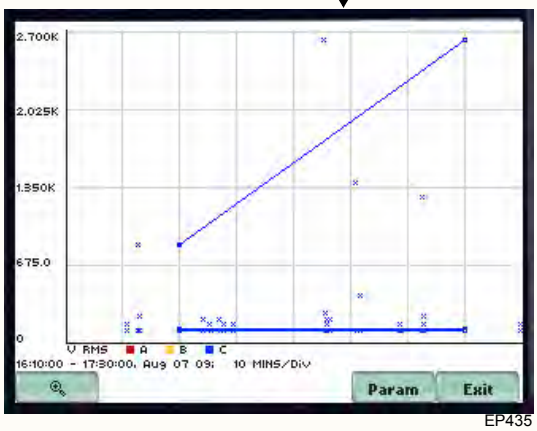
Trend settings

Follow these steps to view data trends. The same procedure applies even when you select different journal categories to plot.

Action...	Result...
STEP 1: From the Home screen, press Trend. • The default number of plots displayed in the trend screen is two. Press **Param** to show the current parameters and channels displayed on screen. Proceed to Step 2. • Press the **Magnify** button to use the zoom features and to view plot coordinates in detail. • Press **Exit** to quit and return to Home screen.	 EP431b
STEP 2: Individual plot numbers appear on the left hand section of the screen. Users have the option to change and/or add parameters/ channels to display. • Press the **parameter field** that you want to change. For example: Press to change Plot #2 - Parameter 1. Proceed to Step 3 on page 7-8. • Press **OK** to accept changes and view plot display. • Press **Cancel** to ignore parameter/channel changes and return to the screen containing the original plot.	 EP432

Continued on next page

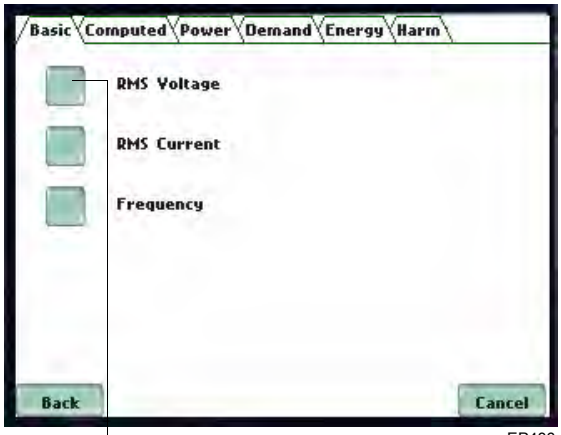
Trend settings (continued)

Action...	Result...
STEP 3: The Journal Categories allow users to select parameters/ channels to trend for display. • Press **Disable** to clear the parameter display in Plot #2 (from Example in Step 2). Proceed to Step 4. • Users have the option to choose a journal category from which to select parameters/channels to plot. For **Standard List - RMS parameters,** see RMS Settings on page 7-9. • Press **Cancel** to ignore changes and return to the previous screen.	 EP433
STEP 4: Parameter/channels on Plot #2 were disabled. • Press **OK** to accept changes and view new plot display. The plot area will resize according to the plot numbers enabled for display. (Whereas the original plot in Step 1 shows Plot #1 and Plot #2 on display, the screen auto-adjusts when parameters in Plot #2 were disabled.) • Press **Cancel** to ignore parameter/channel changes and return to the screen containing the original plot.	 EP434  EP435

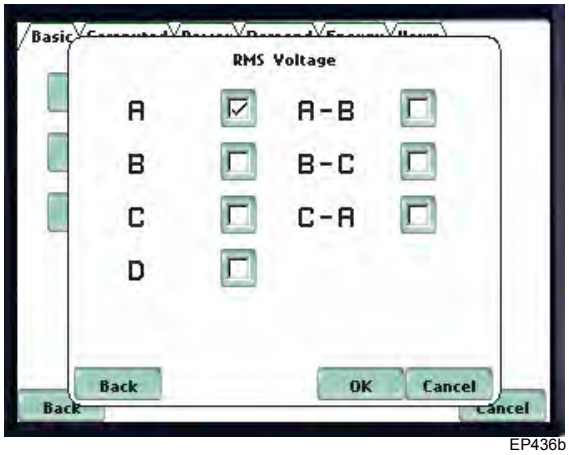
RMS settings

The Energy Platform provides setup options to measure rms data per second.

The RMS Voltage and RMS Current parameters are available under Journal Categories - Standard List.



EP436



EP436b

1-Sec RMS: Each rms value is computed over 1 second's worth of data points (which is 1/60th of a second @ 60 Hz).

NOTE: Data for 1-Sec sampling rates apply only to rms parameters.

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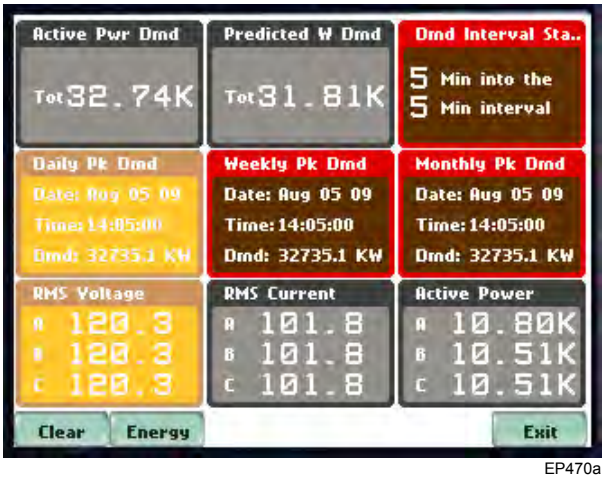
CHAPTER 8

Reports

Overview

Report types

Users have the option to view demand and energy reports. Each report has their own method of presenting data status. Each also differs on the length of evaluation period to monitor compliance. From the Home screen, press Reports.



EP470a

NOTE: Where applicable, the values reported within a parameter in the panel refer to measurements on channels A, B, C, and D respectively. The measurement values for each channel are updated approximately once per second while monitoring is on.

Panel description

Real time data or user-specified calculated data is available in the matrix display of the report panel. The panel displays meter data in a 3x3 matrix. The panel is color coded to indicate whether monitoring is disabled or enabled for a particular parameter. If monitoring is on, the panel shows if the parameter is within limits or moderately or severely out of limits.

In this chapter

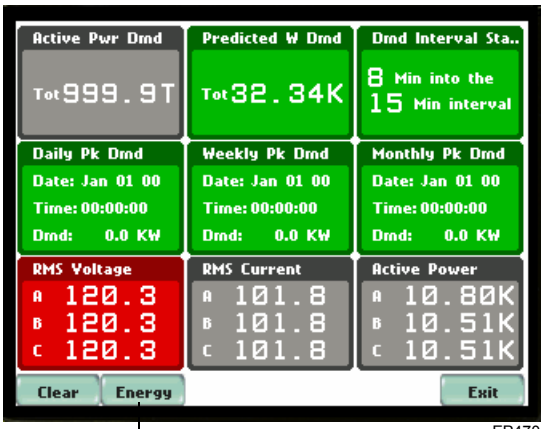
This chapter covers the following topics.

Demand and Energy Report

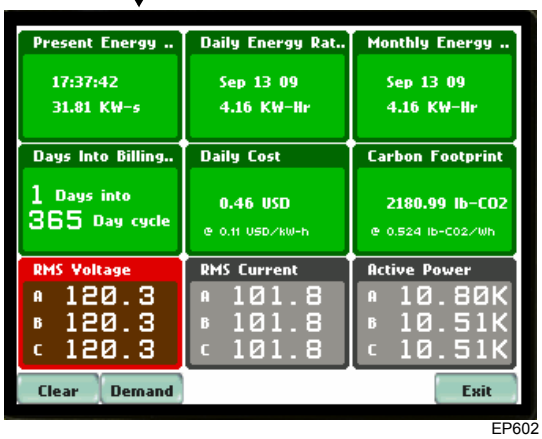
Setup options

The report panel allows you to toggle between Demand or Energy parameters.

By default, the Demand parameters are first shown on screen. Click on the Energy button to show preset parameters for Energy setup.



EP470



EP602

The following are the two presets available:

Demand includes basic power parameters such as volts, amps, watts, event counters, and THD.

Energy displays parameters that help users track electrical consumption, manage utility costs, improve energy efficiency, and determine carbon footprint.

Preset parameters

The table below shows the default parameters on display in the report panel.

Setup	Parameters		
Demand	Active Power Demand Daily Peak Demand RMS Voltage	Predicted Watt Demand Weekly Peak Demand RMS Current	Demand Interval Status Monthly Peak Demand Active Power
Energy	Present Energy Rate Days into Billing Cycle RMS Voltage	Daily Energy Rate Daily Cost RMS Current	Monthly Energy Rate Carbon Footprint Active Power

Report panel color scheme

The report panels display metered data for the selected parameter. The metered data is updated once per second. This is the same data that appears in the meter screen, and used in calculating journals. If the selected parameter is not journalled, the rms event count can be selected to appear in the panel instead of journalled data.

The panel for parameters that are disabled for monitoring appear in grey.

Enabled parameters, on the other hand, are color-coded. A panel is active while the instrument is monitoring or by loading a previously saved file from the data card. An active panel can have two or three states (Normal, Moderate, or Severe). When monitoring, parameters that are within limits are shown in green (indicates Normal state). Those that are moderately out of limits, exceeding the Low or High threshold limits, are shown in yellow (indicates Moderate state). Parameters that are extremely out of limits, exceeding the Very Low or Low threshold limits, are shown in blinking red (indicates Severe state).

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CHAPTER 9

Downloading Events

Overview

In this chapter

The Energy Platform allows users to download, archive and view event data in a computer. This section describes the standard and optional software applications that allow users to transfer and store Energy Platform data files to a computer.

Viewing Events via EPRW

EPRW program

Energy Platform™ Report Writer (EPRW) is a standard accessory included with every Energy Platform unit shipped. EPRW summarizes your survey, producing easy to read reports including: rms voltage and current, harmonics, demand and energy, time of use and energy cost calculations using your energy rates. Reports are created in RTF (rich text format) for easy use with any text editor. Data can also be exported to a .CSV file format for use in Microsoft® Excel or other software packages that read CSV files.

Viewing Events via DranView®

DranView® with Energy Platform driver

For more advanced applications, Energy Platform is fully compatible with the full DranView software that provides advanced analysis in an easy to use program. DranView also has advanced features such as bookmarks, zooming, rubber banding, balloon annotations, and math functions.

DranView® is an optional viewer and data analysis software. Data collected by the Energy Platform must first be transferred to a computer by removing the memory card from the instrument (after disabling monitoring) and putting it into an appropriate card reader connected or internal to the PC so that they can be archived and/or viewed using DranView.

Users are strongly advised to always keep their DranView® and Energy Platform programs current with the latest version released by Dranetz-BMI. DranView® V6.9 or higher with Energy Platform driver is required when using Energy Platform firmware in the computer:

DranView® is available in soft key version (without HASP) and in hard key version (with HASP).

DranView® soft key version does not require a hardware lock or HASP in order to work properly in a computer.

DranView® hard key version can be installed in multiple computers, but can only be used in a computer where a HASP driver is properly installed. A HASP is available for installation to the USB port.

IMPORTANT: BEFORE ATTEMPTING TO INSTALL DRANVIEW WITH HASP, READ THE INSTRUCTIONS FOUND ON PAGE 9-4 AND/OR THE INSTALLATION GUIDE THAT CAME WITH YOUR DRANVIEW® SOFTWARE PACKAGE.

DranView® with HASP

DranView® system requirements

The minimum system specifications for proper installation and operation of DranView® are shown below. Users are strongly advised to follow the **recommended** specifications for optimal DranView® operation. The recommended specifications are especially encouraged for use with instruments that allow generation of very large databases i.e. Energy Platform, PX5, and PowerVisa. The Compact Flash storage media in these instruments are able to handle very large files.

Operating System	MS Windows® 95, 98 SE, NT 4.0, ME; Win 2000 or Win XP recommended
Processor	Pentium class or higher
Clock Speed	133 MHz or higher
Memory	128 MB or higher; 512 MB or higher recommended
Disk Requirements	12 MB disk space for installation 128 MB disk free space for file conversion; 512 MB disk free space for file conversion recommended
Monitor	VGA or better; Hi-color 800x600 or higher recommended

Installation procedure

The DranView® with HASP software package includes the HASP and the CD-ROM containing the DranView® program and the User's Guide.

WARNING: DO NOT insert the HASP before installing DranView®. Otherwise, MS Windows® will fail to find the proper driver for the HASP but may still add a non-working HASP driver to the Device Manager (Control Panel System). In this case, the HASP driver needs to be manually removed from the Device Manager. When done, restart the computer and reinstall DranView® from the CD-ROM.

NOTE: If you are running MS Windows® NT, ME, 2000 or XP, you must have administrator privileges to do a proper install.

STEP 1: Install the DranView® program from the CD-ROM. Follow the instructions below to install DranView.

- Insert the CD-ROM with the DranView® program in the disc drive.
- Auto Run will automatically start to install DranView®.
  If not, click the START button and select RUN. Type d:\setup (or whatever disc drive DranView is inserted), and press ENTER.
- Follow the on-screen instructions to continue installing DranView®.

Continued on next page

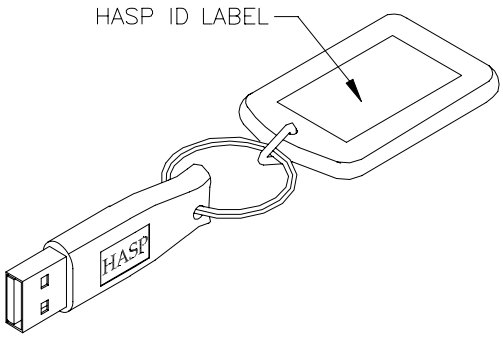
Installation procedure (continued)

STEP 2: A HASP that can be keyed to the USB port (see figure below) is available. To use the HASP, insert in the appropriate USB port in the computer, align the HASP to the keyed port and push gently to lock it in place. Keep the HASP in the port while using the DranView® application.

The HASP is programmed to allow DranView® to work with a specific Dranetz-BMI product. The table below lists the HASP ID labels that go with the corresponding Dranetz-BMI product.

NOTE: Make sure to write down the serial number of your HASP and keep this information in a secure place. The serial number is required to replace HASP in case it gets lost or destroyed.

HASP for USB Port



The table below shows the HASP ID labels that go with the corresponding Dranetz-BMI product.

Supports the following Dranetz-BMI products	**ID Label**
	HASP for USB Port
All Dranetz-BMI products including Energy Platform, PX5, PowerVisa and PowerGuia with MATH, PQDIF driver	DVE-ALL
Energy Platform; PX5; PowerVisa; PowerGuia	DVP-PX
Energy Platform; PX5; PowerVisa; PowerGuia with MATH, PQDIF driver	DVE-PX

Continued on next page

Installation procedure (continued)

STEP 3: Start DranView®. Double-click the DranView® icon at any time to start DranView®.

For additional information, refer to the on-line Help documentation included in the DranView® application or the DranView® User's Guide. The Getting Started section of the User's Guide provides a complete description of how to use DranView®.

NOTE: If the HASP is not inserted (or is not detected), DranView® will operate in DEMO mode only.

Customer service and support

If any item is missing, or for installation or operating assistance with the DranView® software package, please contact the Dranetz-BMI Customer Support at (732) 287-3680 or 1-800-372-6832.

As part of our continuing quality development effort, and in the event of finding serious bugs, Dranetz-BMI may occassionally post a self-installing upgrade patch which users can download for free. The patch may be found at the Dranetz-BMI website www.dranetz-bmi.com under "Software Packages and Updates". The upgrades are available to users who are registered owners of DranView®. They will not work for demo or unregistered installations of DranView®.

APPENDIX A

Optional Accessories

Overview

Introduction

This appendix lists the optional accessories for Energy Platform. It covers the hardware accessories available for use with the Energy Platform and the Dranetz-BMI software application used to download and view event data in a computer.

Ordering information

To order accessories, contact Dranetz-BMI Customer Service Department at:

Dranetz-BMI
1000 New Durham Road
Edison, NJ 08818-4019 USA
Attention: Customer Service

Tel: (732) 287-3680
Tel: 1-800-372-6832
FAX: (732) 248-1834
www.dranetz-bmi.com

Hardware Accessories List & Descriptions

Hardware Accessories List

Accessory	Part Number
Current Probes	
Current Probe Assembly, 10 to 500 A RMS	TR-2500
Current Probe, 10 to 500 A RMS	TR-2500A
Current Probe, 100m A to 1.2 A RMS	TR-2501
Current Probe Assembly, 1 to 10 A RMS	TR-2510
Current Probe, 1 to 10 A RMS	TR-2510A
Current Probe, 100 to 3000 A RMS	TR-2520A
Current Probe, 20 to 300 A RMS	TR-2530A
Current Probe, 10 to 1000 A	TR-2540A
Current Probe, 1 to 100 A RMS	TR-2550A
Current Probe Assembly, 50 to 300 A	TR-2019B
Current Probe Assembly, 1 to 30 A	TR-2021
Current Probe Assembly, 10 to 1000 A	TR-2022A
Current Probe Assembly, 200 to 3000 A	TR-2023
DRANFLEX Probes FLEX Current Probe, 30A/300A/3000A, 24” FLEX Current Probe, 30A/300A/3000A, 36” FLEX Current Probe, 30A/300A/3000A, 48” FLEX Current Probe, 60A/600A/6000A, 24” FLEX Current Probe, 60A/600A/6000A, 36” FLEX Current Probe, 60A/600A/6000A, 48”	 3000XL/24 3000XL/36 3000XL/48 6000XL/24 6000XL/36 6000XL/48
DRANFLEX Probes - 3 Phase Circuits FLEX Current Probe, 30A/300A/3000A, 24” FLEX Current Probe, 30A/300A/3000A, 36” FLEX Current Probe, 30A/300A/3000A, 48” FLEX Current Probe, 60A/600A/6000A, 24” FLEX Current Probe, 60A/600A/6000A, 36” FLEX Current Probe, 60A/600A/6000A, 48”	 3003XL/24 3003XL/36 3003XL/48 6003XL/24 6003XL/36 6003XL/48
FLEXIBLE Probes FLEX Current Probe, 30A/300A/3000A, 24” FLEX Current Probe, 30A/300A/3000A, 36” FLEX Current Probe, 30A/300A/3000A, 48”	 RR3035A/24 RR3035A/36 RR3035A/48
FLEX Current Probe, 60A/600A/6000A, 24” FLEX Current Probe, 60A/600A/6000A, 36” FLEX Current Probe, 60A/600A/6000A, 48”	RR6035A/24 RR6035A/36 RR6035A/48

Continued on next page

Hardware Accessories List (continued)

Accessory	Part Number
AC/DC Current Probes	
AC/DC Current Probe, 150A, Without AC Adapter	PR150/SP1
AC/DC Current Probe, 150A, Battery Powered	PR150/SP2
AC/DC Current Probe, 1500A, Without AC Adapter	PR1500/SP7
AC/DC Current Probe, 1500A, Battery Powered	PR1500/SP8
Current Probe Adapter Cables	
Adapter Cable, 658 Current Probe to 4300	CA4300
Adapter Cable, 4300/FLEX	CA4300FLEX
Adapter Cable, for RR3035A or RR6035A Probes	CA4300BNC
AC Adapter with 4 Phase Adapter Cable for FLEX Probes	RR/PS/4P
Probe Adapter Cable for FLEX , Hypertronics to Redel	TRTOREDEL
For Use with Current Probes PR150/SP1 and PR150/SP2	
AC Adapter, 9 VDC 200 mA, US	ACADP-PR9V-US
AC Adapter, 9 VDC 500 mA, EURO	ACADP-PR9V-EU
AC Adapter, 9 VDC 500 mA, UK	ACADP-PR9V-UK
Voltage Probes	
Fuse Voltage Adapter, for single phase connection	FVA-1
Fuse Voltage Adapter, for three phase connection	FVA-4
Single Phase Measurement Cord, 115V, US	SPMEASCORD-US
Single Phase Measurement Cord, 250V, Europe	SPMEASCORD-EURO
Single Phase Measurement Cord, 250V, UK	SPMEASCORD-UK
Single Phase Measurement Cord, 250V, Australia	SPMEASCORD-AUST
Data Card	
Compact Flash Data Card	CFDATA-DB
Compact Flash Card Reader, Parallel	FLASHREADER-P
Compact Flash Card Reader, USB	FLASHREADER-USB
Miscellaneous Hardware	
Weather Resistant Enclosure	ENCL-HH
Soft Carrying Case	SCC-4300
Reusable Shipping Container	RSC-4300

Continued on next page

Hardware Accessories List (continued)

Accessory	Part Number
Miscellaneous Hardware (continued)	
Battery Pack, 7.2V, 2.7Ah	BP-PX5
External Battery Charger/UPS	XBC-PX5
External Battery Charger with FLEX Adapter Cables	LF-PSP
External Battery Charger with DRANFLEX Probe Power Adapter	DF-PSP
Isolated Current Transformer 0.1A to 5A	ISO-65X-5
Dranetz-BMI Reference Publications	
Field Handbook for Electrical Energy Management	HB114415
Field Handbook for Power Quality Analysis	HB114414-S

Current probes

Several Dranetz-BMI current probes can be used with Energy Platform: models TR2500/A, TR2510, TR2520/A, TR2530/A, TR2540/A, TR2550/A, TR2019B, TR2021, TR2022A, TR2023. The Energy Platform supports both DRANFLEX and FLEXIBLE current probes. Typical current probes are illustrated in Chapter 2.

TR2500, TR2510, TR2520 (TR2500A, TR2510A, TR2520A): These models will measure rms currents from 10 to 500 A, 0.1 to 500 A, 300 to 3000 A, respectively. They plug directly into any of the current inputs on the rear panel. These probes are not recommended for measuring medium or high frequency transients.

TR2021, TR2019B, TR2022, TR2023: These four probes are made for the Dranetz-BMI model 658 but can be used with the Energy Platform by using an adapter cable (part number CA4300). They can measure rms currents in ranges of 1 to 30 A, 1 to 300 A, 10 to 1000 A, and 10 to 3000 A, respectively, and are needed to accurately measure medium and high frequency transients.

DRANFLEX Current Probes: DRANFLEX 3000XL/6000XL current probes allow current measurements in the range of 0.5 to 3000 A full scale, or 0.5 to 6000 A full scale. These probes are available in three sizes: 24” probe length - conductor(s) up to 8” diameter; 36” probe length - conductor(s) up to 11” diameter; 48” probe length - conductor(s) up to 17” diameter.

DRANFLEX 3 Phase Current Probes: DRANFLEX 3003XL/6003XL are 3 Phase current probes that allow current measurements in 3 Phase circuits in the range of 0.5 to 3000 A full scale, or 0.5 to 6000 A full scale. These probes are available in three sizes: 24” probe length - conductor(s) up to 8” diameter; 36” probe length - conductor(s) up to 11” diameter; 48” probe length - conductor(s) up to 17” diameter.

FLEXIBLE Current Probes: RR3035A and RR6035A flexible optional current probes allow current measurements in the range of 3 to 3000 A full scale, or 6 to 6000 A full scale. These probes are available in three sizes: 24” probe length - conductor(s) up to 8” diameter; 36” probe length - conductor(s) up to 11” diameter; 48” probe length - conductor(s) up to 17” diameter.

Voltage probes

Fuse Voltage Adapter: Two accessory kits available: FVA-1 and FVA-4. FVA-1 is used for a single voltage measurement input. It contains one fused voltage adapter and one measurement connecting cable (Red) 50 cm in length. FVA-4 is used for a three phase and neutral voltage measurement inputs. It contains four voltage adapters and four measurement connecting cables 50 cm in length (one Red, one Yellow, one Blue, one Grey).

Single Phase Measurement Cord: Allows measurement of a single phase circuit using a standard AC outlet 115V for US and 250V for European, UK, and Australian countries.

Continued on next page

Data card

Compact Flash Data Card: The Energy Platform supports the use of Compact Flash cards in its native format, without the need for PC card adapter. The CFDATA-DB has a minimum of 4GB of usable memory space.

Compact Flash Card Readers: Two types of card readers are available for easy data manipulation and data transfer from the Compact Flash card to the computer: via USB port (FLASHREADER-USB) or via parallel port (FLASHREADER-P).

Miscellaneous hardware

Weather Resistant Enclosure: This weatherproof enclosure is designed to keep the Energy Platform and its cable connections in place. It is made of fiber glass and is intended for indoor and outdoor use. This enclosure is sturdy, lightweight, corrosion-resistant. It is able to withstand windblown dust, rain, splashing water, and ice formation.

Soft Carrying Case: Heavy-duty, padded, nylon carrying case. Includes pockets for cable set, current probes, and other accessories.

Reusable Shipping Container: Lockable, high-impact plastic case with foam insulation for protecting the instrument during shipping.

Battery Pack: NiMH (Nickel Metal Hydride) battery cells are used in Energy Platform. See Appendix C Battery Specifications and Replacement Procedure.

External Battery Charger: The XBC-PX5 charges a battery pack while the instrument is in use and may be used to power specified Dranetz-BMI probes.

Isolated Current Transformer: Allows the connection of other industry-standard 0.1A to 5A output current transformers to Dranetz-BMI equipment.

Dranetz-BMI reference publications

Field Handbook for Electrical Energy Management: This reference handbook provides a comprehensive guide for information related to conducting a thorough energy audit, power distribution analysis, and methods of remedying inefficiencies of energy management.

Field Handbook for Power Quality Analysis: This handbook is divided into six sections containing step-by-step instructions for discovering and solving complex power quality problems. Example waveforms and case studies are included.

Software Accessories List

Accessories List

Accessory	Part Number
DranView	
DranView® Software Package with HASP for USB Port: supports all Dranetz-BMI products including Energy Platform, PX5, PowerVisa and PowerGuia with MATH, PQDIF driver	DVE-ALL
supports Energy Platform; PX5; PowerVisa; PowerGuia	DVP-PX
supports Energy Platform; PX5; PowerVisa; PowerGuia with MATH, PQDIF driver	DVE-PX
Replacement Hasp for Energy Platform, PX5 and PowerVisa	HASP-DVPX

DranView® application

DranView® is a Windows®-based program that is used to archive, view and analyze event data downloaded in the computer. Energy Platform firmware requires DranView® V6.9 or higher with Energy Platform driver.

DranView® is available in soft key version (without HASP) and in hard key version (with HASP). DranView® soft key version does not require a hardware lock or HASP in order to work properly in a computer. The DranView® hard key version can be installed in multiple computers, but can only be used in a computer where a HASP driver is properly installed. A HASP is available for installation to the USB port.

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APPENDIX B

Technical Specifications

Overview

In this appendix The following specifications are covered in this appendix.

General

Dimensions	Size: 12” Width x 2.5” Height x 8” Depth (30 x 6.4 x 20.3 cm) Weight: 3.8 pounds
Environmental	Operating: 0 to 50 °C (32 to 122 °F) Storage: -20 to 55 °C (4 to 131 °F) Humidity: 0 to 95% non-condensing; indoor use Altitude: 2000 m (6560 ft) maximum
System Time Clock	Crystal controlled; 1 second resolution Event time clock displays to 1 msec resolution Time displayed in analog or digital (12 or 24 hour) format Accurate to 60 seconds per month
Power Requirements	Use ONLY the external power supply provided with the unit for operation and battery charging. Use of any other power supply is not recommended. Voltage: 90-264V AC, 45-66 Hz Consumption: 20 watts maximum Field replaceable batteries: More than 2 hours run-time (3 hours typical) when fully charged.
Input resistance	Voltage input: 16 MΩ Line to Line Current input: 400 kΩ

Interfaces

Installation Categories

Mains supply: Installation Category II, Pollution Degree 2

Measurement inputs: Installation Category III, Pollution Degree 2

Display

Type: 1/4 VGA color graphic, touch screen Liquid Crystal Display (LCD) with compact fluorescent (CCFL) backlighting. Programmable backlight time-out to reduce power consumption. Reactivates with touch.

Resolution: 360 x 240 dot matrix

Size: 3.75 x 4.75 inches

Alarm

Audible alarm of short (approximately 0.1 second) or long (approximately 1 second) duration to call attention to an error condition or event trigger, respectively.

Communication

Connect to the Energy Platform mainframe using either of the following external interface:

- RS232 - Fiber Optic adapter
- USB - Fiber Optic adapter
- LAN - Fiber Optic adapter
- Modem

Measured Parameters

Voltage

Type: 3 single ended (A, B, C), DC coupled; 1 differential (D)

Channels A, B, C, D Input Range: 10 - 600 Vrms

Input impedance: 16 MΩ, minimum, Input to Input

RMS Accuracy: ±0.1% of Reading, ±0.05% Full Scale, over 7KHz bandwidth (1 second rms readings)

CMRR: -80 db typical

Current

Type: 4 full differential, DC coupled.

Channels A, B, C, D Input Range: 10 - 200% of Rated Probe Input (Dranetz-BMI probes)

RMS Accuracy:
±0.1% of Reading ±0.05% Full Scale plus Probe Accuracy, 3KHz bandwidth (1 second rms readings)

Phase

Each voltage/current pair (i.e. Channel A voltage, Channel A current) are sampled simultaneously to preserve phase relationship.

Frequency

Two ranges, user selectable.

For Energy Platform:
- 30 - 70 Hz default, with up to 25% Vthd
- 15 - 30 Hz

Accuracy: ±0.2% of reading

Computed Parameters

Single Channel Parameters

The computations below apply to single channel parameters.
Note that θ_V = *Phase Angle of Voltage*, while θ_I = *Phase Angle of Current*.

True Average Power

Average of the instantaneous power samples taken as the product of voltage and current samples. Includes sign to indicate direction of power flow: positive (+) from source to load, negative (-) from load to source.

$$WATT = \frac{1}{N}\sum_{n=1}^{N} V_n I_n$$

where N = number of samples
Vn = Voltage at sample n
In = Current at sample n

Apparent Power

Unsigned value calculated using the product of the rms values of the voltage and current.

$$VA = V_{RMS}\, I_{RMS}$$

Fundamental Apparent Power

Unsigned value calculated using the product of the fundamental rms values of the voltage and current.

$$VA_{fund} = V_{fund}\, I_{fund}$$

Fundamental Power

Signed value calculated using the product of the fundamental apparent power and the cosine of the phase angle between the fundamental frequency components of voltage with respect to current ($\theta = \theta_V - \theta_I$).

$$WATT_{fund} = VA_{fund} \cos\theta$$

Volt Ampere Reactive

Signed value calculated using the product of the fundamental apparent power and the sine of the phase angle between the fundamental frequency components of voltage with respect to current ($\theta = \theta_V - \theta_I$).

$$VAR_{fund} = VA_{fund} \sin\theta$$

Continued on next page

True Power Factor

Calculated using the True Average Power divided by the Apparent Power. See Note below for sign information.

$$TPF = \left| \frac{WATT}{VA} \right|$$

Displacement Power Factor

Calculated using cosine of the phase angle between the fundamental frequency components of voltage with respect to current ($\theta = \theta_V - \theta_I$). See Note below for sign information.

$$DPF = |\cos \theta|$$

NOTE

The sign is the exclusive OR of the sign of the Watts and Vars. Note that for Power Factor, the words “Lead” and “Lag” are definitive. As far as the signs go, it is assumed that Lag (inductive) is plus and Lead (capacitive) is minus when energy is delivered to the load.

Quad	**2**	**Quad**	**1**
PF Lead	-	PF Lag	+
Watts	-	Watts	+
Vars	+	Vars	+
Quad	**3**	**Quad**	**4**
PF Lag	+	PF Lead	-
Watts	-	Watts	+
Vars	-	Vars	-

In the code, this is implemented as:
Signum Watts: cosine θ
Signum Vars: sine θ
Signum PF: (Signum Watts) * (Signum Vars)

where signum denotes the positive or negative sign.

Source: The diagram above matches *Figure 9-26 Relationships Between Watts, Vars, and Volt-Amperes* found on page 228 of the Handbook for Electricity Metering, Ninth Edition, ©1992, Edison Electric Institute, Washington, D.C., USA.

Continued on next page

Totals

The computations below apply to three phase wye configuration.

Totals for split phase can be determined by eliminating phase C (i.e. split phase $WATT_{Tot} = WATT_A + WATT_B$)

Power Total

$$WATT_{Tot} = WATT_A + WATT_B + WATT_C$$

Fundamental Power Total

$$WATT_{Tot\ fund} = WATT_{A\ fund} + WATT_{B\ fund} + WATT_{C\ fund}$$

Fundamental Reactive Power Total

$$VAR_{Tot\ fund} = VAR_{A\ fund} + VAR_{B\ fund} + VAR_{C\ fund}$$

Apparent Power, Arithmetic Total

$$VA_{Arithmetic\ \ Tot} = VA_A + VA_B + VA_C$$

Apparent Power, Vector Total

$$VA_{Vector\ \ Tot} = \sqrt{WATT_{Tot}^2 + VAR_{Tot\ fund}^2}$$

Fundamental Apparent Power, Arithmetic Total

$$VA_{Arithmetic\ \ Tot\ fund} = VA_{A\ fund} + VA_{B\ fund} + VA_{C\ fund}$$

Fundamental Apparent Power, Vector Total

$$VA_{Vector\ \ Tot\ fund} = \sqrt{WATT_{Tot\ fund}^2 + VAR_{Tot\ fund}^2}$$

Continued on next page

True Power Factor, Arithmetic Total

See Note on page B-6 for sign information.

$$TPF_{Arithmetic\ Tot} = \left| \frac{WATT_{Tot}}{VA_{Arithmetic\ Tot}} \right|$$

True Power Factor, Vector Total

See Note on page B-6 for sign information.

$$TPF_{Vector\text{-}Tot} = \left| \frac{WATT_{Tot}}{VA_{Vector\ Tot}} \right|$$

Displacement Power Factor, Arithmetic Total

See Note on page B-6 for sign information.

$$DPF_{Arithmetic\ Tot} = \left| \frac{WATT_{Tot}}{VA_{Arithmetic\ Tot\ fund}} \right|$$

Displacement Power Factor, Vector Total

See Note on page B-6 for sign information.

$$DPF_{Vector\ Tot} = \left| \frac{WATT_{Tot\ fund}}{VA_{Vector\ Tot\ fund}} \right|$$

Parameter Settings in Each Monitoring Mode

Setup parameters

The following table lists the default settings for the threshold parameters in each monitoring mode.

Parameters	Long-term Timed Recording, Demand, Energy	Long-term Timed Recording, Demand, Energy with RMS Triggers
RMS Variation		
High Limit	Off	On
Low Limit	Off	On
Very Low Limit	Off	On
Journal Intervals		
Volts	10 minutes	10 minutes
Amps	10 minutes	10 minutes
Power	10 minutes	10 minutes
Demand	15 minutes	15 minutes
Energy	10 minutes	10 minutes
Harmonics	10 minutes	10 minutes

TR2500 Current Probe

Guidelines

To achieve the rated accuracies, follow these guidelines:
- The conductor must be at a right angle to the probe.
- The conductor must be centered in the probe core.
- The jaw contact surfaces must be clean and properly aligned.

Specifications

Range: 1 to 500 Arms

Accuracy:
48 to 400 Hz: ±1.5% reading ±0.6A
400 to 3000 Hz: ±3% reading ±0.8A

Working voltage: 600 V max.

Frequency range: 48 to 3000 Hz

Output signal: 3 mV/A

Maximum conductor size: 1.18" (30 mm)

Maximum bus bar size: 2.5 x 0.20" (63 x 5 mm)

Phase shift (45 to 1000 Hz): Less than 4º

Operating temperature: 14 to 122 ºF (-10 to 50 ºC)

Storage temperature: -40 to 158 ºF (-40 to 70 ºC)

Dimensions: 2.60 x 7.68 x 1.34” (66 x 195 x 34 mm)

Weight: 14.82 oz. (420 g)

NOTE

Current probe TR2500 can be used interchangeably with TR2500A.

TR2510 Current Probe

Guidelines

To achieve the rated accuracies, follow these guidelines:
- The conductor must be at a right angle to the probe.
- The conductor must be centered in the probe core.
- The jaw contact surfaces must be clean and properly aligned.

Specifications

Range: 0.1 to 10 Arms

Accuracy (at 60 Hz): 0.1 to 10A, ±1% reading ±0.01A

Working voltage: 600 V max.

Frequency range: 40 to 3000 Hz

Output signal: 150 mV/A

Maximum conductor size: 0.78" (20 mm)

Phase shift (at 60 Hz):
1 to 5A less than 1º
5 to 10A less than 1.5º

Operating temperature: 14 to 131 ºF (-10 to 55 ºC)

Storage temperature: -40 to 158 ºF (-40 to 70 ºC)

Dimensions: 5.47 x 2.00 x 1.18” (139 x 51 x 30 mm)

Weight: 6.5 oz. (180 g)

NOTE

Current probe TR2510 can be used interchangeably with TR2510A.

DRANFLEX 3000XL and 6000XL Current Probes

Guidelines

DRANFLEX 3000XL/6000XL current probes allow current measurements in the range of 0.5 to 3000 A full scale, or 0.5 to 6000 A full scale. Available in three sizes: 24" probe length - conductor(s) up to 8" diameter; 36" probe length - conductor(s) up to 11" diameter; 48" probe length - conductor(s) up to 17" diameter.

Specifications

Range:
30 / 300 A Range: ±1% of reading ± 0.1A
3000 A Range: ±1% of reading ± 1A
60 / 600 A Range: ±1% of reading ± 0.1A
6000 A Range: ±1% of reading ± 1A

Amplitude: 10%-100% of full scale of probe range

Accuracy: 50 to 60Hz:

Note: Overall measurement accuracy is the probe accuracy plus the instrument accuracy. Refer to the applicable Dranetz-BMI instrument user's guide for measurement accuracy for the instrument you are using

Phase shift (45 to 65 Hz): ±1 degree

Working voltage: 1000 V Maximum

Frequency range: 10 to 10kHz (-1dB)

Output signal:
Ranges 30 / 300 or 3000A: 1.5VRMS
Ranges 60 / 600 or 6000A: 1.5VRMS

Maximum conductor size:
24 inch probe length conductor(s) up to 8 inch diameter
36 inch probe length conductor(s) up to 11 inch diameter
48 inch probe length conductor(s) up to 17 inch diameter

Operating temperature:
-20°C to + 65°C
0-90% Relative Humidity (non-condensing)

Storage temperature: -40 ºC to 75 ºC

Altitude: 2000m (6560ft) maximum

DRANFLEX 3003XL and 6003XL Current Probes

Guidelines

DRANFLEX 3003XL/6003XL are 3-Phase Current probes comprising of 3 Rogowski probes and a 3 channel integrator. These probes allow current measurements in 3-Phase circuits in the range of 0.5 to 3000 A full scale, or 0.5 to 6000 A full scale. Available in three sizes: 24” probe length - conductor(s) up to 8” diameter; 36” probe length - conductor(s) up to 11” diameter; 48” probe length - conductor(s) up to 17” diameter.

Specifications

Range:
30 / 300 A Range: ±1% of reading ± 0.1A
3000 A Range: ±1% of reading ± 1A
60 / 600 A Range: ±1% of reading ± 0.1A
6000 A Range: ±1% of reading ± 1A

Amplitude: 10%-100% of full scale of probe range

Accuracy: 50 to 60Hz:

Note: Overall measurement accuracy is the probe accuracy plus the instrument accuracy. Refer to the applicable Dranetz-BMI instrument user's guide for measurement accuracy for the instrument you are using

Phase shift (45 to 65 Hz): ±1 degree

Working voltage: 1000 V Maximum

Frequency range: 10 to 10kHz (-1dB)

Output signal:
Ranges 30 / 300 or 3000A: 1.5VRMS
Ranges 60 / 600 or 6000A: 1.5VRMS

Maximum conductor size:
24 inch probe length conductor(s) up to 8 inch diameter
36 inch probe length conductor(s) up to 11 inch diameter
48 inch probe length conductor(s) up to 17 inch diameter

Operating temperature:
-20°C to + 65°C
15-85% Relative Humidity (non-condensing)

Storage temperature: -40 ºC to 75 ºC

Altitude: 2000m (6560ft) maximum

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A P P E N D I X C

Battery Specifications and Replacement Procedure

Overview

Introduction

The internal battery pack used in Energy Platform functions as the primary power source and UPS. Always charge the battery fully before using the unit. The Energy Platform will fully charge its internal battery in six (6) hours.

Energy Platform uses a non-volatile flash memory for backup that is not operator replaceable. The flash memory will store data temporarily.

In this appendix

The following topics are covered in this appendix.

Battery Specifications

Battery pack

Location: Battery compartment on the rear of the unit.

Number of batteries in pack: 6

Type: Sealed, rechargeable NiMH (Nickel Metal Hydride) cells

Voltage: 7.2 V dc

Capacity: 2.7 Ah

Length of operation: More than two (2) hours when fully charged and with backlight on. When backlight is turned off, the unit can run continuously for more than three (3) hours.

Suggested replacement interval: Two years

Part Number: BP-PX5

NOTE: The length of time that the Energy Platform can operate on the battery pack degrades over the life of the batteries and the number of charge/discharge cycles.

Memory backup

Energy Platform uses a non-volatile flash memory for data storage. Data will not be lost if the battery pack is removed.

Battery Pack Safety Precautions

WARNING **DO NOT intentionally short circuit the battery pack. The batteries are capable of providing hazardous output currents if short circuited. The Energy Platform is equipped with an internal battery charger circuit. Do not attempt to charge the batteries with an external charger other than the Dranetz-BMI battery charger, since improper charging could cause battery explosion.**

ADVERTENCIA **NO ponga intencionalmente la baterÌa en cortocircuito. Las baterÌas son capaces de proporcionar corrientes de salida peligrosas si est·n en cortocircuito. La Energy Platform est· equipada con un circuito interno cargador de baterÌas. No intente cargar las baterÌas con un cargador externo que no sea el cargador de baterÌas Dranetz-BMI, puesto que la carga indebida podrÌa hacer que explote la baterÌa.**

AVERTISSEMENT **NE PAS court-circuiter délibérément le bloc-batterie. Lors díun court-circuit, les batteries risquent díémettre des courants effectifs dangereux. Energy Platform posséde un circuit de chargeur de batterie intégré. Ne pas tenter de charger les batteries au moyen díun chargeur externe autre que le chargeur de batterie Dranetz-BMI, car un rechargement fautif pourrait entraÓner líexplosion de la batterie.**

WARNUNG **Die Batterien dürfen NICHT kurzgeschlossen werden. Im Falle eines Kurzschlusses kˆnnen die Batterien lebensgefährliche Ausgangsstrˆme leiten. Energy Platform ist mit einem internen Batterieladegerät ausgestattet. Die Batterien sollten nur mit dem Ladegerät von Dranetz-BMI geladen werden. Die Verwendung eines externen Ladegeräts kann zu einer Explosion der Batterien führen.**

Battery safety precautions

Observe the following precautions when inspecting or replacing the battery pack:

- Do not attempt to replace individual batteries of the pack or substitute other battery types.
- Do not dispose of battery in fire.
- Dispose of a used battery promptly in accordance with local Environmental Protection Agency (EPA) regulations.
- Visually inspect the battery pack for corrosion.

  The batteries have a safety pressure vent to prevent excessive gas build-up and corrosion indicates that venting has occurred. Possible causes of venting are: a defective charger, excessive temperature, excessive discharge rate, or a defective cell.

  If corrosion is excessive, the battery pack may require replacement (contact Dranetz-BMI Customer Service Department).

Battery Pack Replacement

Introduction The Energy Platform contains an easily replaceable internal battery pack. See Appendix D for ordering information.

WARNING **Replace with Dranetz-BMI NiMH battery pack BP-PX5 only.**

ADVERTENCIA **Reemplace con batería Dranetz-BMI NiMH BP-PX5 solamente.**

AVERTISSEMENT **Remplacer par la batterie Dranetz-BMI NiMH BP-PX5 exclusivement.**

WARNUNG **Nur mit Dranetz-BMI NiMH BP-PX5 Batteriesatz auswechseln.**

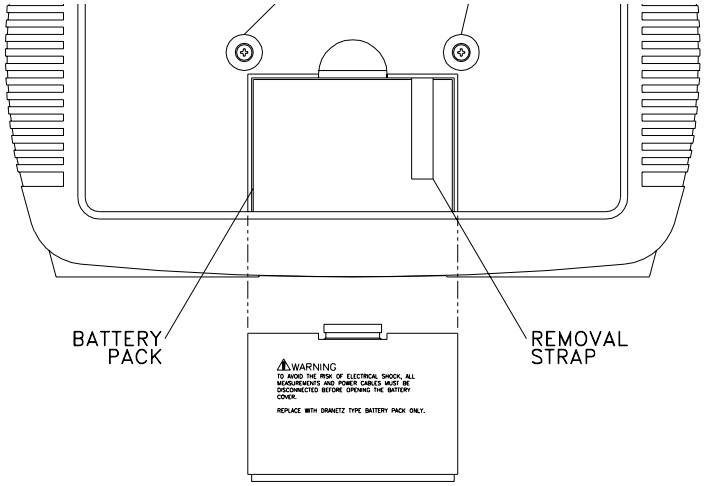
NOTE During normal operation, the battery pack will be slightly warm to the touch.

Procedure Follow these steps to replace the battery pack.

Step	Action
1	Press the Energy Platform power button to off.
2	Turn off power to the circuit being measured.
3	Disconnect voltage and current probes from the circuit and the Energy Platform's rear panel.
4	On the bottom of the Energy Platform, push the tab to release the battery cover. Refer to the diagram shown on page C-5.
5	Remove the cover.
6	Pull up on removal strap and remove battery pack.
7	Insert the new pack into the compartment making sure to observe polarity markings.
8	Replace the cover and press down until it latches closed.
9	Discard the old battery pack in accordance with Environmental Protection Agency (EPA) regulations.
10	Press the Energy Platform power button to on.

Continued on next page

Battery removal diagram



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APPENDIX D

User Replaceable Parts List

Introduction

The following parts are easily replaced by the operator and do not require special tools or access to the interior of the unit.

To order parts

Call Dranetz-BMI Customer Service at (732) 287-3680 or 1-800-372-6832 to order any of the following parts.

Parts List

Part Description	Part Number
AC Adapter/Battery Charger	XBC-PX5
Battery Door	116037-G1
Battery Pack	BP-PX5
Rubber Skin for Energy Platform	116035-G4
Voltage Cable Assembly, 4 Pair w/ Alligator Probes (See below for separate parts)	116042-G6

Measurement cable set, parts list

Part Description	Quantity	Part Number
Interconnect Measurement Channel Cable Assembly	1	114013-G1
Carry Strap	1	116040-G1
Cable Pouch, PP4300	1	116043-G1
Red Silicone Cable, 4MM Plug, 1000V	1	900366
Yellow Silicone Cable, 4MM Plug, 1000V	1	900367
Blue Silicone Cable, 4MM Plug, 1000V	1	900368
Grey Silicone Cable, 4MM Plug, 1000V	1	900369
White Silicone Cable, 4MM Plug, 1000V	2	900370
Alligator Clip, 4MM Plug-on, Red	4	900371
Alligator Clip, 4MM Plug-on, Black	2	900372

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APPENDIX E

Common Circuit Connections

Overview

Who should read this section

If you are making power measurements, follow these diagrams so that your ABC values are calculated correctly.

WARNING

Death, serious injury, or fire hazard could result from improper connection of this instrument. Read and understand this manual before connecting this instrument. Follow all installation and operating instructions while using this instrument.

Connection of this instrument must be performed in compliance with the National Electrical Code (ANSI/NFPA 70-2008) 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 who has the skills and knowledge related to the construction and operation of the electrical equipment and installations, and who has received safety training on the hazards involved."

Qualified personnel who work on or near exposed energized electrical conductors must follow applicable safety related work practices and procedures including appropriate personal protective equipment in compliance with the Standard for Electrical Safety Requirements for Employee Workplaces (ANSI/NFPA 70E-2009) of USA and any additional workplace safety requirements applicable to your installation.

ADVERTENCIA

Una conexión incorrecta de este instrumento puede producir la muerte, lesiones graves y riesgo de incendio. Lea y entienda este manual antes de conectar. Observe todas las instrucciones de instalación y operación durante el uso de este instrumento.

La conexión de este instrumento debe ser hecha de acuerdo con las normas del Código Eléctrico Nacional (ANSI/NFPA 70-2008) de EE. UU., además de cualquier otra norma de seguridad correspondiente a su establecimiento.

La instalación, operación y mantenimiento de este instrumento debe ser realizada por personal calificado solamente. El Código Eléctrico Nacional define a una persona calificada como "una que esté familiarizada con la construcción y operación del equipo y con los riesgos involucrados."

El personal cualificado que trabaja encendido o acerca a los conductores eléctricos energizados expuestos debe seguir prácticas y procedimientos relacionados seguridad aplicable del trabajo incluyendo el equipo protector personal apropiado en conformidad con el estándar para los requisitos de seguridad eléctricos para los lugares de trabajo del empleado (ANSI/NFPA 70E-2009) de los E.E.U.U. y cualquier requisito de seguridad adicional del lugar de trabajo aplicable a su instalación.

AVERTISSEMENT **Si l'instrument est mal connecté, la mort, des blessures graves, ou un danger d'incendie peuvent s'en suivre. Lisez attentivement ce manuel avant de connecter l'instrument. Lorsque vous utilisez l'instrument, suivez toutes les instructions d'installation et de service.**

Cet instrument doit être connecté conformément au National Electrical Code (ANSI/NFPA 70-2008) des Etats-Unis et à toutes les exigences de sécurité applicables à votre installation.

Cet instrument doit être installé, utilisé et entretenu uniquement par un personnel qualifié. Selon le National Electrical Code, une personne est qualifiée si "elle connaît bien la construction et l'utilisation de l'équipement, ainsi que les dangers que cela implique".

Le personnel qualifié qui travaillent dessus ou s'approchent des conducteurs électriques activés exposés doit suivre des pratiques en matière et des procédures reliées par sûreté applicable de travail comprenant le matériel de protection personnel approprié conformément à la norme pour des conditions de sûreté électriques pour les lieux de travail des employés (ANSI/NFPA 70E-2009) des Etats-Unis et toutes les conditions de sûreté additionnelles de lieu de travail applicables à votre installation.

WARNUNG **Der falsche Anschluß dieses Gerätes kann Tod, schwere Verletzungen oder Feuer verursachen. Bevor Sie dieses Instrument anschließen, müssen Sie die Anleitung lesen und verstanden haben. Bei der Verwendung dieses Instruments müssen alle Installation- und Betriebsanweisungen beachtet werden.**

Der Anschluß dieses Instruments muß in Übereinstimmung mit den nationalen Bestimmungen für Elektrizität (ANSI/NFPA 70-2008) der Vereinigten Staaten, sowie allen weiteren, in Ihrem Fall anwendbaren Sicherheitsbestimmungen, vorgenommen werden.

Installation, Betrieb und Wartung dieses Instruments dürfen nur von Fachpersonal durchgeführt werden. In dem nationalen Bestimmungen für Elektrizität wird ein Fachmann als eine Person bezeichnet, welche "mit der Bauweise und dem Betrieb des Gerätes sowie den dazugehörigen Gefahren vertraut ist."

Qualifiziertes Personal, das an bearbeiten oder herausgestellte angezogene elektrische Leiter sich nähern, muß anwendbare Sicherheit bezogener Arbeit Praxis und Verfahren einschließlich passende persönliche schützende Ausrüstung gemäß dem Standard für elektrische Sicherheitsauflagen für Angestellt-Arbeitsplätze (ANSI/NFPA 70E-2009) der Vereinigten Staaten und alle zusätzlichen Arbeitsplatzsicherheitsauflagen folgen, die auf Ihre Installation anwendbar sind.

Continued on next page

WARNING **To avoid the risk of electric shock or burns, always connect the safety (or earth) ground before making any other connections.**

WARNING **To reduce the risk of fire, electrical shock, or physical injury it is strongly recommended to fuse the voltage measurement inputs.**
Fuses must be located as close to the load as possible to maximize protection.

WARNING **For continued protection against risk of fire or shock hazard replace only with same type and rating of recommended fuse.**
Use only fast blow type fuse which is rated 600V. Recommended fuse type is Littelfuse, part number KLKD.300 rated 600V AC/DC, 0.3A fast blow.

WARNING **Do not replace fuse again if failure is repeated. Repeated failure indicates a defective condition that will not clear with replacement of the fuse. Refer condition to a qualified technician.**

Safety precautions

The following safety precautions must be followed whenever any type of voltage or current connection is being made to the Energy Platform.

- Wear proper Personal Protective Equipment, including safety glasses and insulated gloves when making connections to power circuits.
- Hands, shoes and floor must be dry when making any connection to a power line.
- Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.
- Set the Energy Platform power switch to Off.
- Before connecting to electric circuits to be monitored, open their related circuit breakers or disconnects. DO NOT install any connection of the Energy Platform to live power lines.
- Connections must be made to the Energy Platform first, then connect to the circuit to be monitored.
- If the equipment is used in a manner not specified in this user's guide, the protection provided by the equipment may be impaired. These safety precautions are repeated where appropriate throughout this manual.

Continued on next page

Voltage and current connections

This section contains diagrams of both voltage and current probe connections that are required when power measurements are to be made.

Voltage: Voltage probes are connected to the individual source or load line and are referenced to the return (common) line voltage probe connection for greatest accuracy.

Current: Current probes are connected to each line and positioned to measure currents with reference to the voltage probe. Incorrectly positioned current probes may produce erroneous power measurement. Current probes are always oriented with the arrow pointing to the load.

Phasor diagrams

Correct phasor diagrams (for resistive loads) are shown for each connection.

In this appendix

The following connections are shown in this appendix.

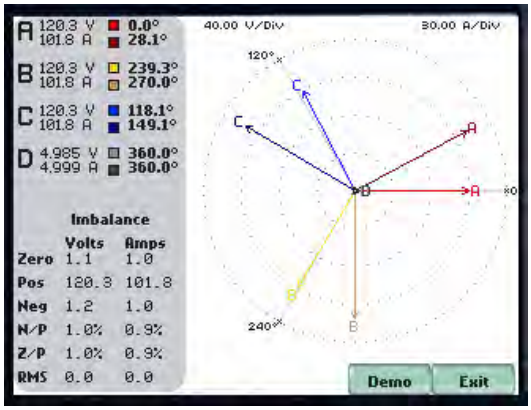
Verifying Voltage and Current Connections

Introduction

Correct voltage and current connection of single phase, split phase, or polyphase connections can be verified using phasor diagrams. Phasor diagrams are graphic representations that show the magnitude and angular relationship of voltage and current for each phase of a monitored connection. Each connection diagram on the following pages shows the correct voltage and current phasor diagrams (for resistive loads) for that circuit.

Displaying the screen

To display the Voltage and Current Phasor screen, from the Home screen press Phasor. The following screen depicting Positive Sequence 3 Phase Wye resistive load will appear.



EP241

The touch screen Demo button presents an animated phasor demo rotation for resistive, capacitive and inductive loads.

Single Phase resistive load

A single phase voltage or current phasor is displayed as a single line showing a channel reference at 0 degrees and a magnitude relative to its measured value. An arrow head on the line indicates direction.

Split phase

Split phase vectors are displayed as dual lines showing channel references and magnitudes and opposite (180 degrees) directions.

Three phase

Three phase vectors are displayed as three lines, 120 degrees apart in a resistive load (unity power factor). Phase displacement will occur in a reactive or capacitive load.

Continued on next page

Incorrect current phasor diagram

Phasor displays that show incorrect current probe connection can be corrected by reconnecting the probe so that the arrow on the probe handle points toward the load.

The Energy Platform is able to display diagrams of the various wiring configurations to assist users in the selection of circuit type appropriate for their application (see Chapter 5 Start Menu - Circuit Type Selection). The instrument compares the detected voltages, currents, and phase sequence (if applicable) to the selected circuit type. The Energy Platform issues a message if the specified circuit type and the actual voltage/current connections match.

The next pages describe and illustrate the wiring configurations available for set up in Energy Platform.

WARNING

Interconnect Jumpers bearing part number 114013-G1 supplied with the standard cable set can be used to bond the same conductor points together. To reduce the risk of fire, electric shock, or physical injury, it is strongly recommended that connections be made with all circuits de-energized and current carrying conductors fused. If it is necessary to make connections on energized circuits, these must be performed by Qualified Personnel ONLY with Proper Personal Protective Equipment.

Single Phase

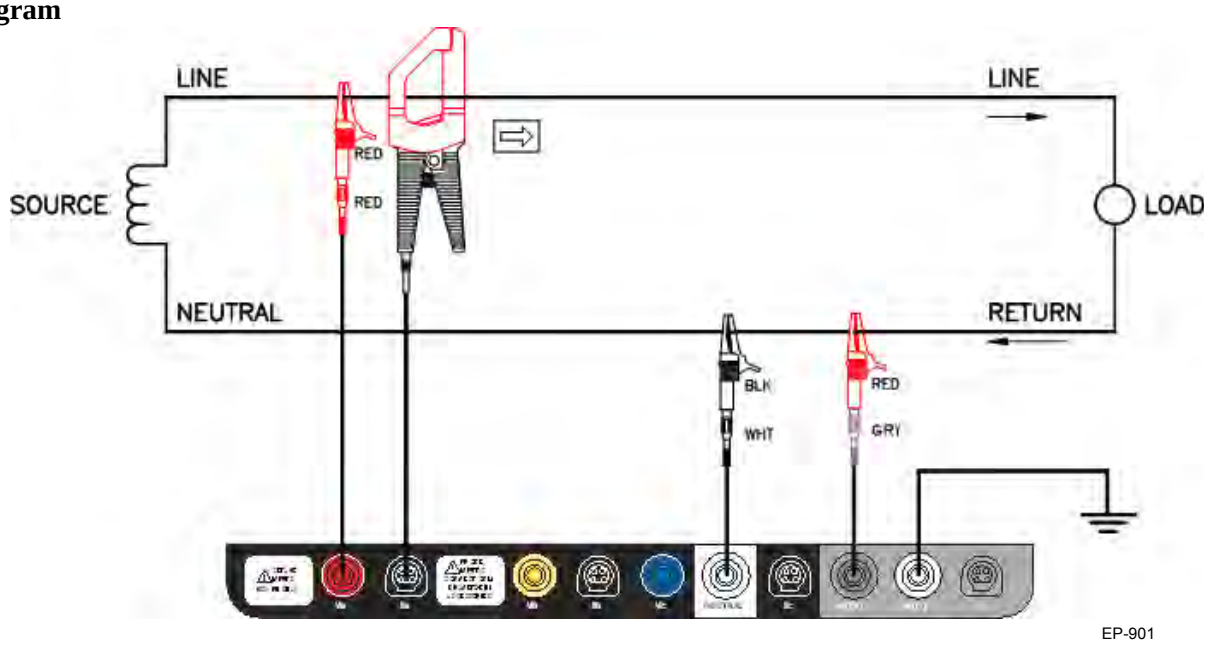
Introduction

When making voltage connections to a single phase circuit use channel A differential inputs as shown below. The figure also shows voltage connection using channel D as a differential input for measuring neutral to ground voltage.

NOTE

Be sure to connect the current probe with the arrow on the handle pointing towards the load or an erroneous power reading will result.

Connection diagram



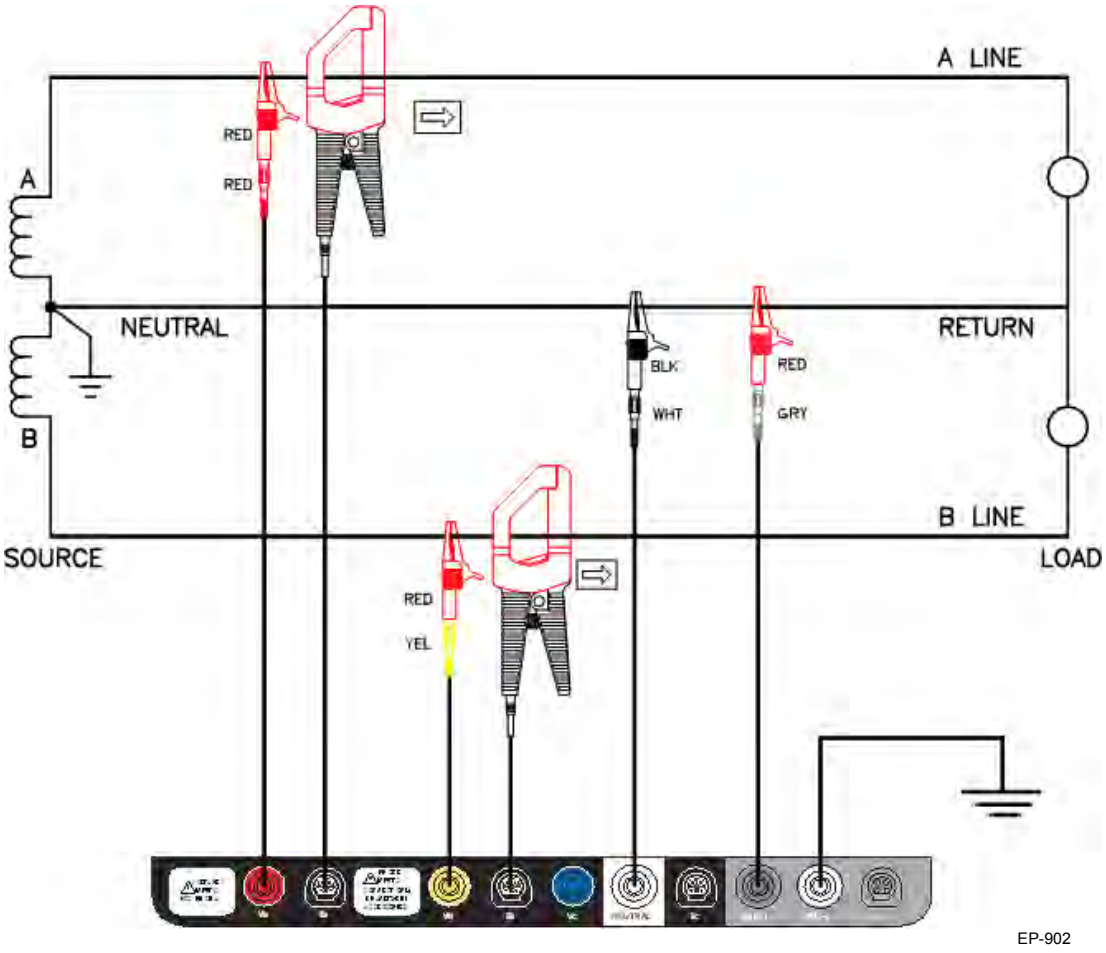
Phasor diagrams

Split Phase

Introduction

When making split phase measurements, use both channels A and B for voltage and current connections. The neutral is chosen as the reference for measurement purposes. The figure also shows voltage connection using channel D as a differential input for measuring neutral to ground voltage.

Connection diagram



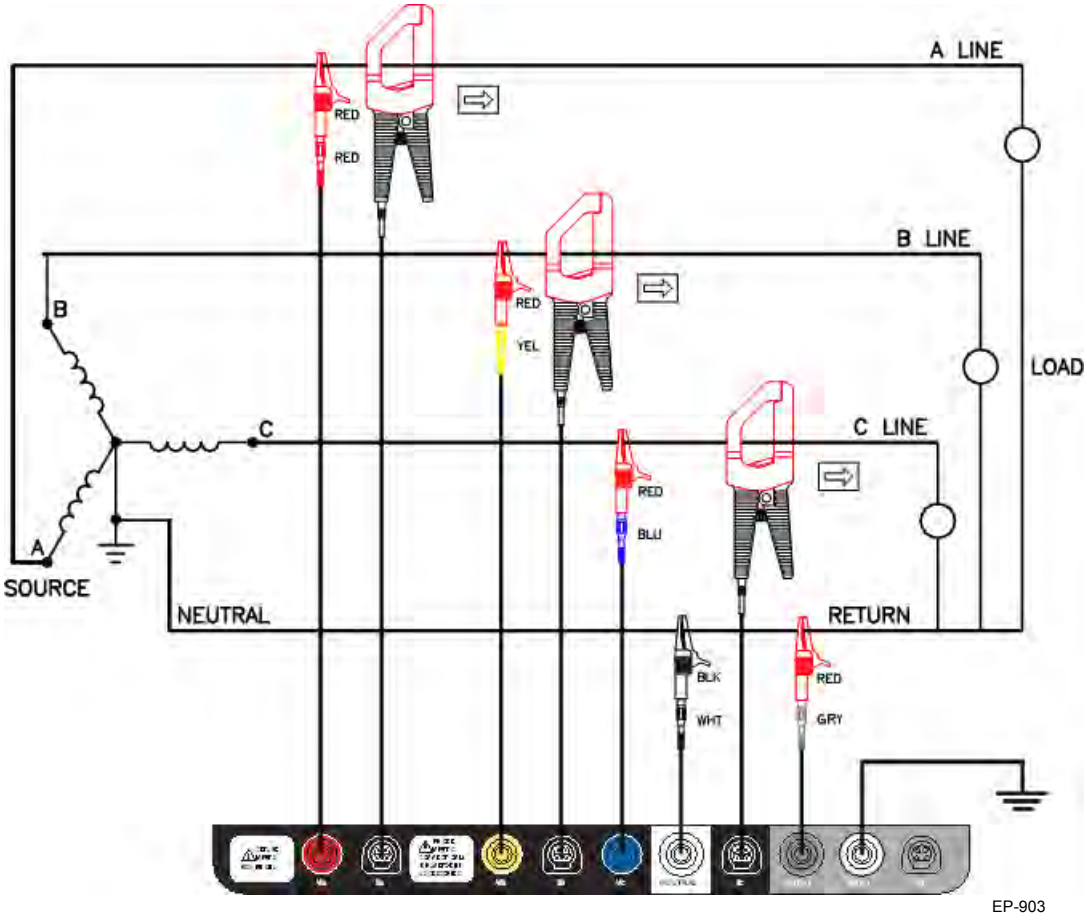
Phasor diagrams

3 Phase, Four Wire Wye

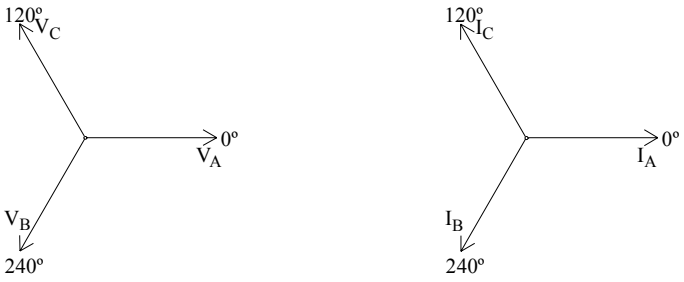
Introduction

Channels A, B, and C are connected to voltage and current probes. The neutral is connected to common and is the reference for the three channels. The figure also shows voltage connection using channel D as a differential input for measuring neutral to ground voltage.

Connection diagram



Phasor diagrams

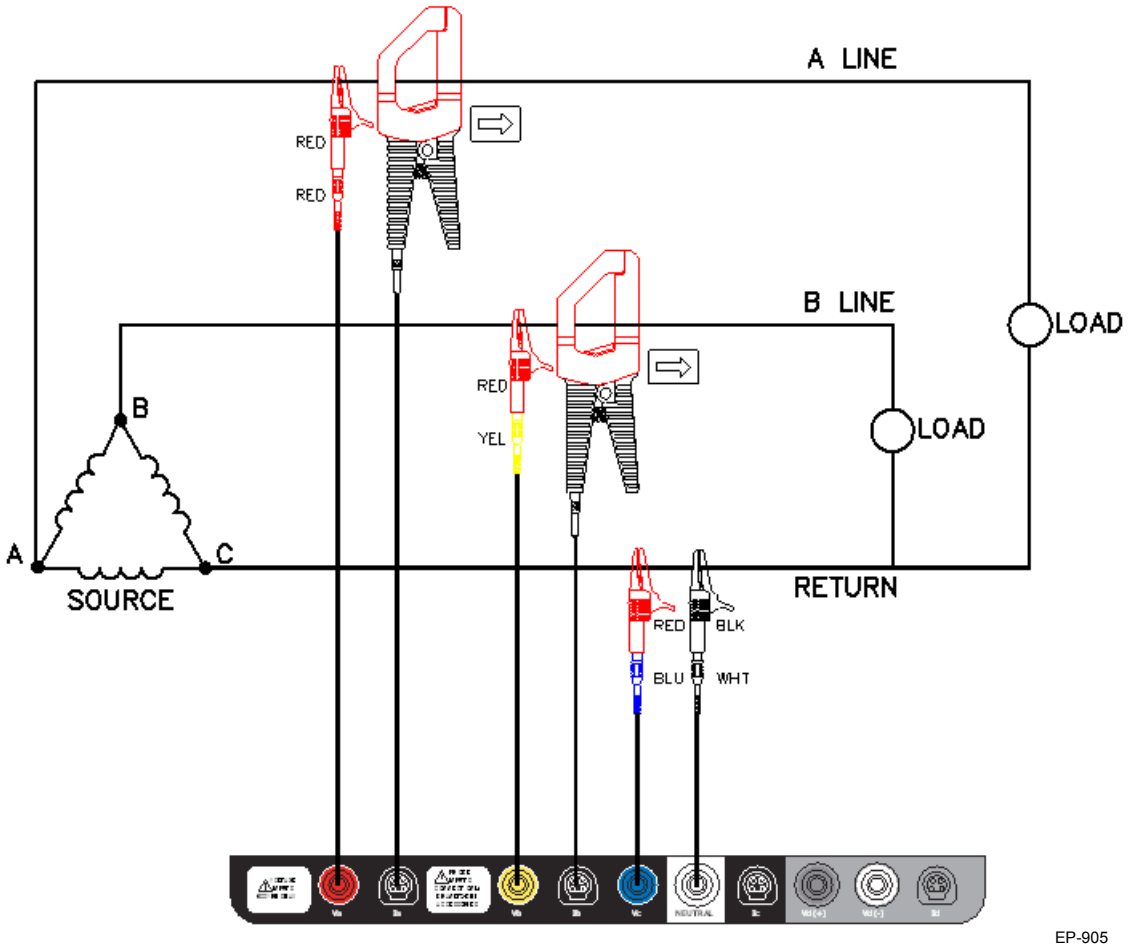


3 Phase 2-Watt Delta

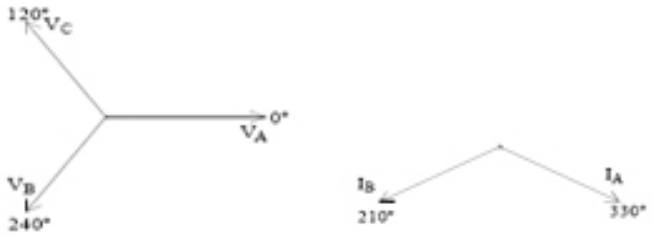
Introduction

The figure below shows the 3 Phase 2-Watt delta connection using phase channels A-B-C. Current probes are connected to channels A and B.

Connection diagram



Phasor diagrams

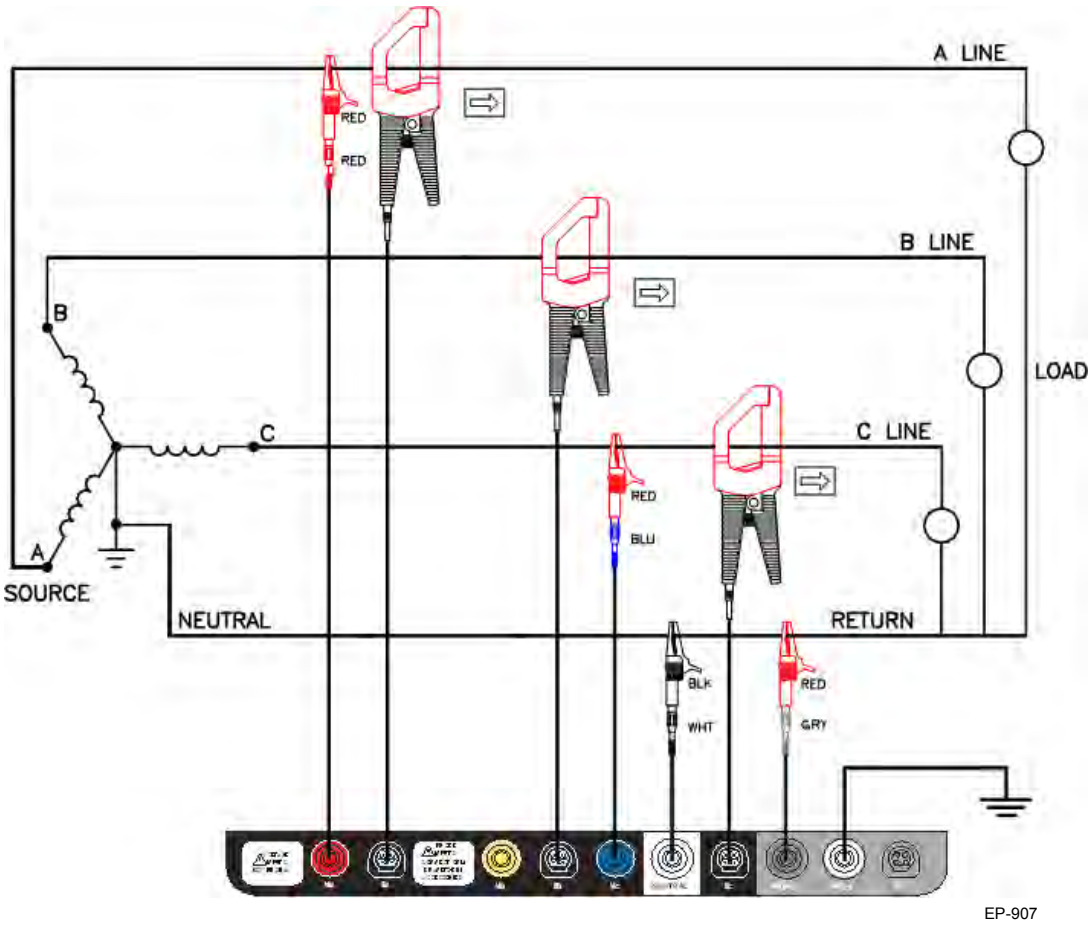


2 1/2 Element Without Voltage Channel B

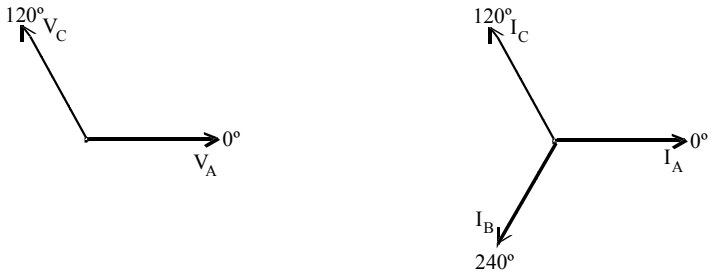
Introduction

Channels A and C are connected to voltage. Current probes are connected to channels A, B and C. The neutral is connected to common and is the reference for the three channels. The figure also shows voltage connection using channel D as a differential input for measuring neutral to ground voltage.

Connection diagram



Phasor diagrams

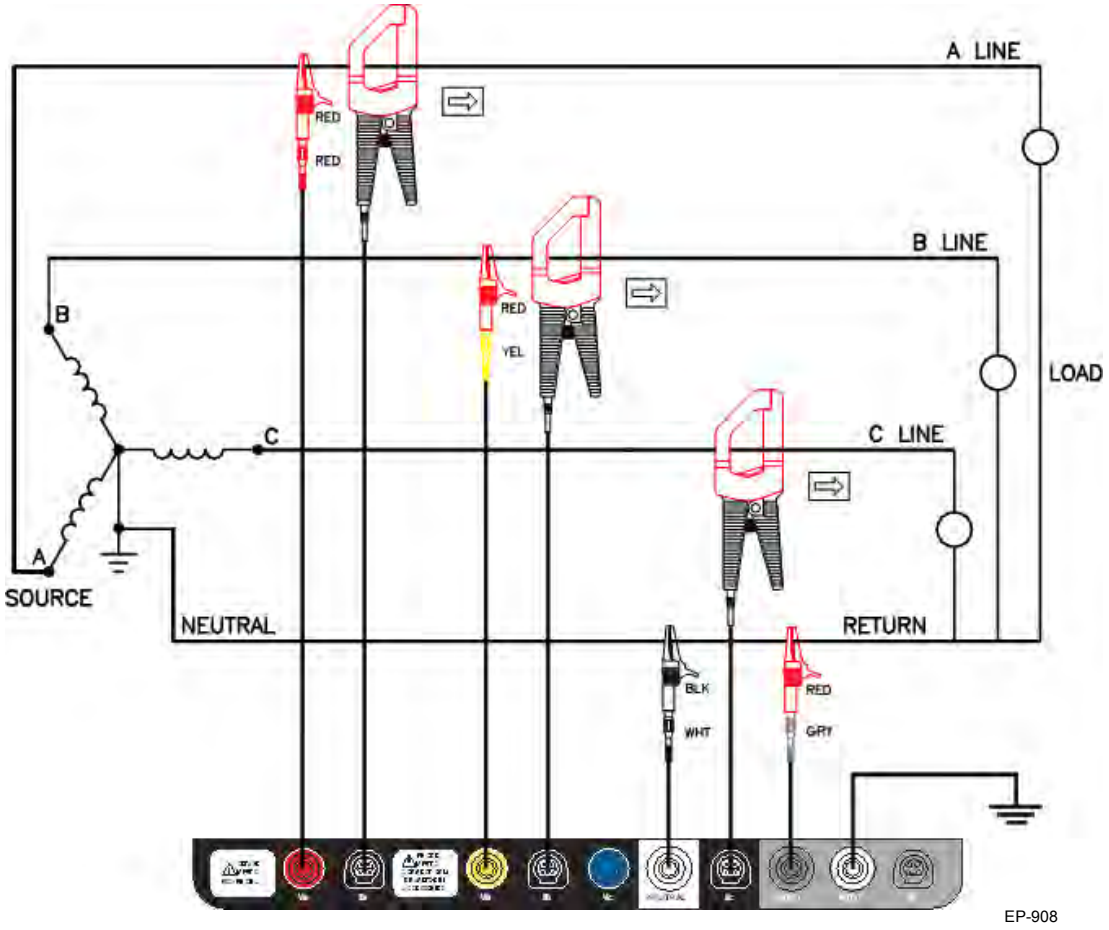


2 1/2 Element Without Voltage Channel C

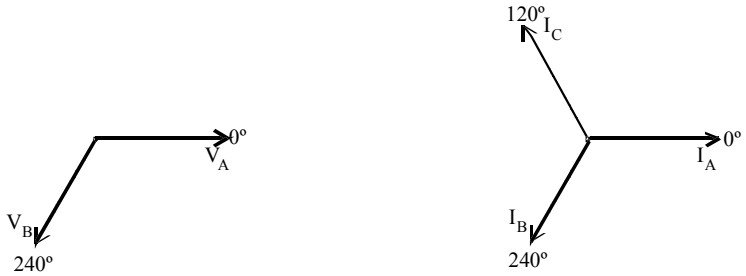
Introduction

Channels A and B are connected to voltage. Current probes are connected to channels A, B and C. The neutral is connected to common and is the reference for the three channels. The figure also shows voltage connection using channel D as a differential input for measuring neutral to ground voltage.

Connection diagram



Phasor diagrams



Connecting to a Potential Transformer

Safety Precautions	Follow the safety precautions listed on page E-3 when making all potential transformer connections.
NOTE	Potential Transformers are not manufactured by Dranetz-BMI and are discussed here for informational purposes only.
Definition	A potential transformer (PT), also referred to as a voltage instrument transformer, provides the necessary step-down ratio to reduce the high voltage of circuits above 600 Vrms to a level for safe measurement. A PT also provides isolation and proper connections for instrument attachment.
Connections	PTs are usually fixed in position and require that the voltage probe(s) be connected to their terminal connections.
WARNING	**Refer to the manufacturer's instructions, related to the PT, for exact information for probe connection for voltage monitoring. Do not exceed 600 Vrms input to the Energy Platform voltage inputs**.
ADVERTENCIA	**Consulte las instrucciones del fabricante referentes a TP (transformador potencial), para la información exacta de la conexión de sonda a fin de monitorear el voltaje. No supere la entrada de 600 Vrms a las entradas de voltaje de Energy Platform**.
AVERTISSEMENT	**Se reporter aux instructions du fabricant relatives au transformateur de tension (Potential Transformer - PT) pour obtenir les renseignements exacts sur la connexion de sonde utilisée pour la surveillance du courant. Ne pas dépasser l'entrée de tension efficace de 600 RMS dans les entrées de tension de Energy Platform volts**.
WARNUNG	**Genaue Informationen zur Meßfühlerverbindung für die Spannungsüberwachung entnehmen Sie bitte den Anleitungen des Herstellers (siehe Spannungsteilertransformator). Die Eingangsspannung von 600 V (Effektivwert) in die Energy Platform Spannungseingänge sollte nicht überschritten werden.**

Procedure

Follow these steps to connect voltage probes to a potential transformer.

Step	Action
1	Turn off power to the PT.
2	Connect the colored voltage probes to the channel inputs on the Energy Platform top panel.
3	Connect the colored voltage probes to the PT's connections in accordance with the manufacturer's instructions.
4	Turn on power to the PT.

Scale factor

The scale factor of the PT must be accounted for in making accurate voltage measurements. Because the monitored output voltage of the PT is stepped-down (divided) from the original voltage, this ratio must be stepped-up (multiplied) by the Energy Platform when voltage computations are performed. The PT scale factor is usually mounted on the PT assembly and is entered into the Energy Platform on the scale factors screen (refer to page 5-10). Refer to the PT manufacturer's literature for the scale factor for the device you are using.

Connecting to a Current Transformer (CT)

Safety precautions

The following safety precautions apply to current transformer (CT) connections in addition to those safety precautions stated on page E-3.

- Never energize a CT with the secondary open.
- Never disconnect the secondary of a CT with primary energized.

WARNING

Refer to the manufacturer's instructions related to the CT for exact information for connections for current monitoring. Do not exceed manufacturer's ratings.

ADVERTENCIA

Consulte las instrucciones del fabricante referentes a TC (transformador de corriente) para la información exacta de las conexiones a fin de monitorear la corriente. No exceda las capacidades nominales del fabricante.

AVERTISSEMENT

Se reporter aux instructions du fabricant relatives au transformateur de courant (Current Transformer - CT) pour obtenir les renseignements exacts sur les connexions utilisées pour la surveillance du courant. Ne pas dépasser la puissance recommandée par le fabricant.

WARNUNG

Genaue Informationen zu Verbindungen für die Stromüberwachung entnehmen Sie bitte den Anleitungen des Herstellers (siehe Stromumwandler). Die Grenzwerte des Herstellers sollten nicht überschritten werden.

NOTE

Current Transformers are not manufactured by Dranetz-BMI and are discussed here for informational purposes only.

Description

Current transformers, also known as instrument transformers, reduce high level currents to low level currents so they can be safely monitored. These devices are similar to PTs used for voltage measurements in that both reduce values for safe measurement. The reduction, or step-down ratio, is stated as a scale factor that is used by the Energy Platform to step-up the measured value to its original value.

Types of CTs

There are single-phase CTs and polyphase CTs dependent on the source transformer used. Current reduction ratios vary widely and are also dependent on the source transformer used. Rating plates attached to the CT provide information as to the ratio and current limitations.

Connecting to an Isolated Current Transformer (ISO)

Introduction

Low current monitoring devices made by Dranetz are called isolated current transformers or ISO boxes. The Dranetz-BMI ISO box has a 5 A current range.

Safety precautions

The following safety precautions apply to ISO box connections in addition to those safety precautions stated on page E-3.

- Never energize an ISO box with the secondary open.
- Never disconnect the secondary of an ISO box with primary energized.

WARNING

Physical injury or equipment damage could result if ISO boxes are improperly connected. Do not connect an ISO box between two conductors which are at different voltage potentials.

ADVERTENCIA

Podrían producirse lesiones físicas o daños al equipo si se conectan indebidamente las cajas del transformador aislado de corriente (ISO). No conecte una caja del ISO entre dos conductores que tengan distintos potenciales de voltaje.

AVERTISSEMENT

Une mauvaise connexion des transformateurs d'intensité isolés (ISO) peut provoquer des blessures corporelles ou des dégâts matériels. Ne pas relier les transformateurs ISO entre deux conducteurs de tensions différentes.

WARNUNG

Falsch angeschlossene ISO-Kästen (Isolierte Stromumwandler) können zu körperlichen Verletzungen oder Geräteschäden fuehren. Schliessen Sie einen ISO-Kasten nicht zwischen zwei Leiter mit unterschiedlichem Spannungspotential.

Connections to ISO box

The ISO box has terminal posts labeled X1 and X2 that are connected in series only with an ac current source. In normal connections, where phasing of current and voltages are important for power measurements, the X1 terminal is connected towards the source input line.

Continued on next page

Connections to ISO box (continued)

When connecting to CTs, the X1 terminal is normally connected to the H1 terminal of the device for correct reference phasing.

Where power measurements or voltage/current phase relationships are not important, the X1 and X2 terminals may be connected in series with the output device in any line (hot or return) or in any relationship of X1/X2.

Applications

ISO boxes can be used in a number of ways. These methods include:

- connecting them to the secondary of CTs for metering by the Energy Platform.
- inserting them in series with the load current to measure low current values.
- connecting them to a non-Dranetz clamp-on current transformer and using that CT to monitor current with the Energy Platform.

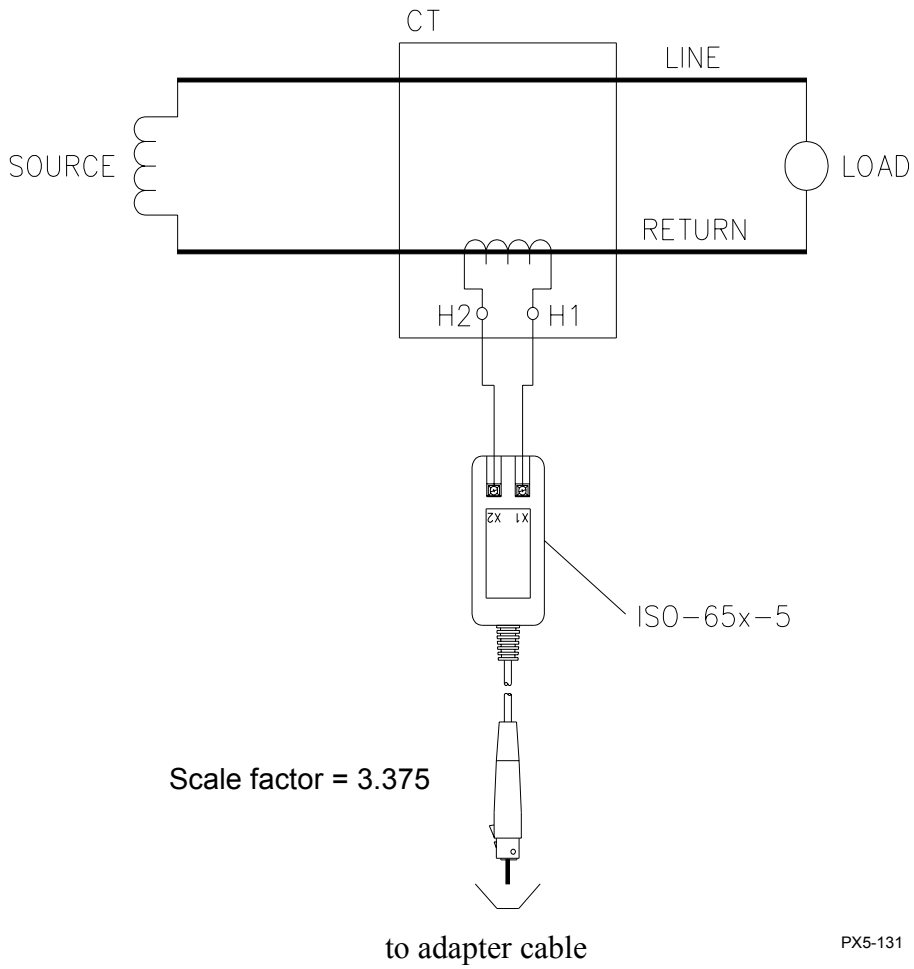
ISO box connection to a current transformer

The figure on the next page shows an ISO box connected from any current channel input to a permanently installed CT. The connection shown is made in the load return line for current monitoring only. Polarities of the ISO box and CT are kept in-phase by matching markings of X1 to H1. Scale factors of both devices must be multiplied together to get the resultant scale factor. The scale factor value calculated for a CT is 3.375.

Continued on next page

CAUTION	**DO NOT exceed current limits of the ISO box.**
PRECAUCION	**NO exceda los límites de corriente de la caja del ISO.**
ATTENTION	**NE PAS dépasser les limites d'intensité du transformateur ISO.**
VORSICHT	**Die aktuellen Grenzwerte für den ISO-Kasten sollten NICHT überschritten werden.**

ISO box connection to a CT



A P P E N D I X F

Event Classification

Range of Variations per IEEE standard

Events characterization implemented in the Energy Platform adheres to the IEEE 1159 measurement standards. The range of variations as per IEEE standards are featured below.

	IEEE 1159
Short Duration Variations	
Magnitudes	
Sag/Dip	(Sag) Vrms Below 90% (or Low limit) to 10% of nominal
Swell	Vrms Above 110% (or High limit) to 180% of nominal
Interruption	Vrms Below 10% (or Very Low limit) of nominal
Temporal	
Instantaneous	0.5 - 30 cycles
Momentary	0.5 - 30 seconds
Temporary	3 - 60 seconds
Duration	begins when any one phase is Out of Limits; ends when all phases are Within Limits
Long Duration Variations	
Magnitudes	
Sag	same magnitude values as Short Duration Variations (see above)
Swell	
Interruption	
Duration	
Sustained	> 1 minute
Cold Load Pickup is return from sustained	

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A P P E N D I X G

Energy Platform Menu Structure

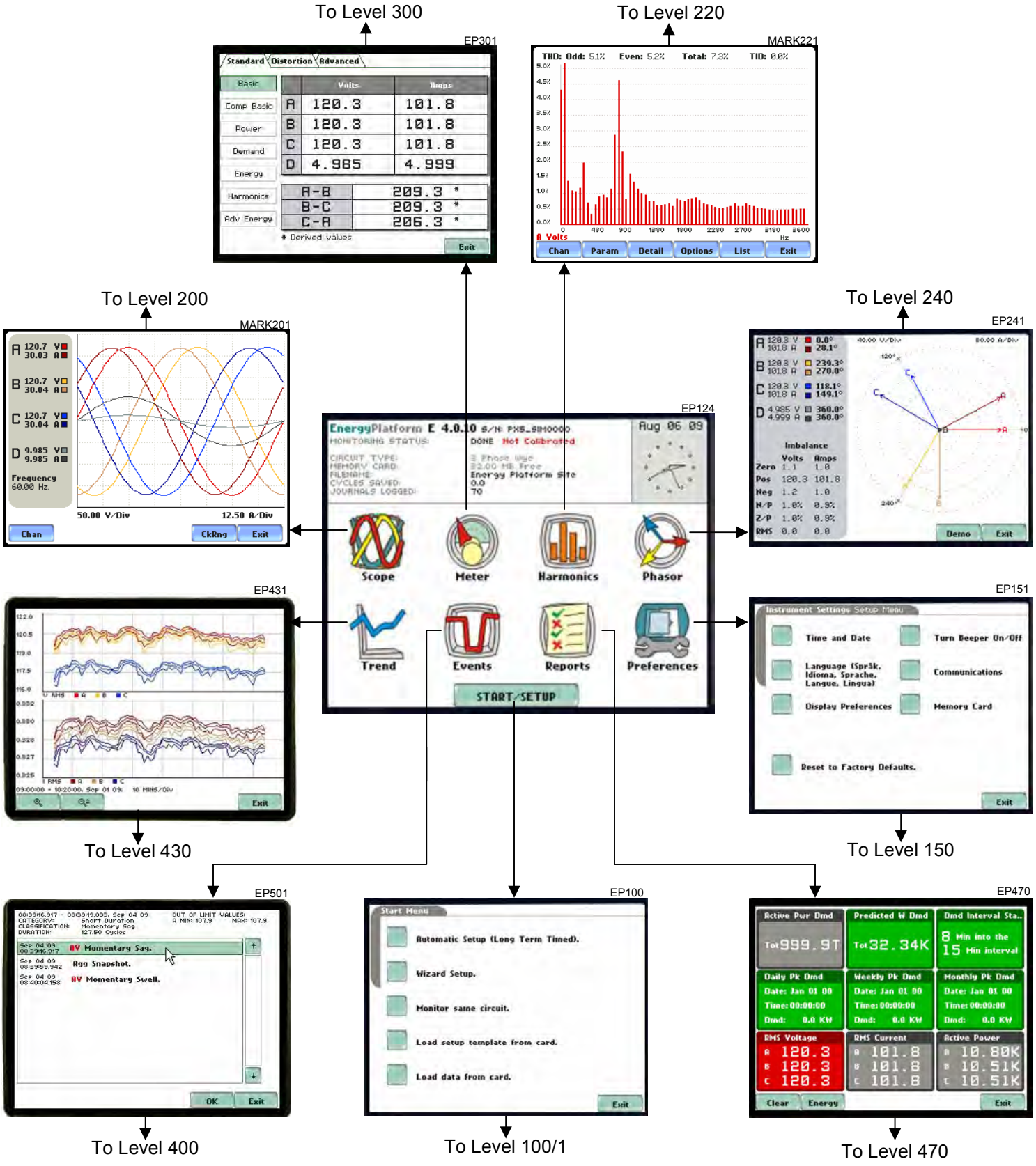
Menu structure description

The Energy Platform menu screen maps are shown in the following pages. Use the Level number and Heading as guide to navigate through the different menu screens. Each screen contains touch screen buttons which lead to related functions.

In this appendix

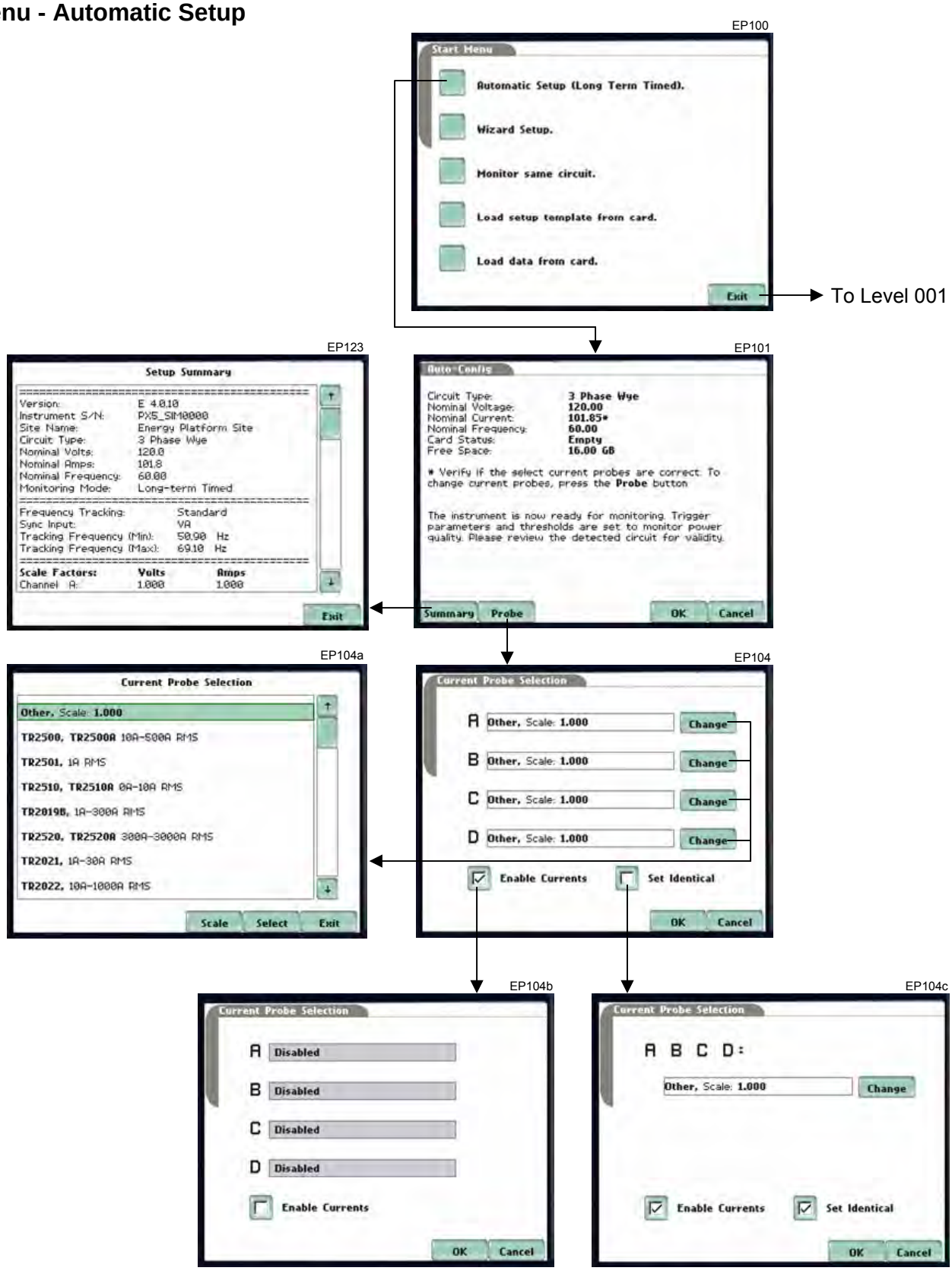
The following screen maps are shown in this appendix.

LEVEL 001
Home Screen



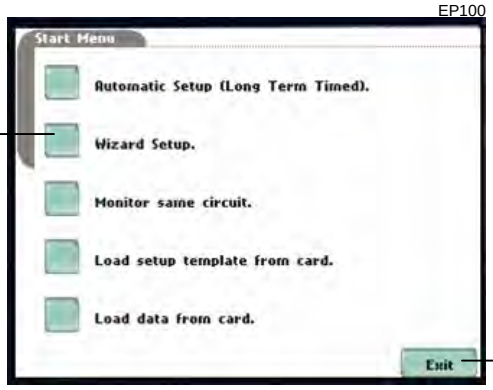
LEVEL 100/1

Start Menu - Automatic Setup



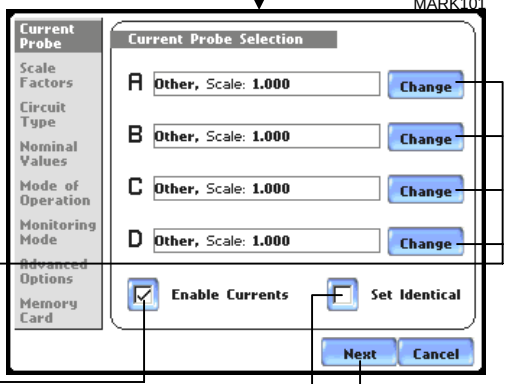
LEVEL 100/2(a)
Start Menu - Wizard Setup

EP100

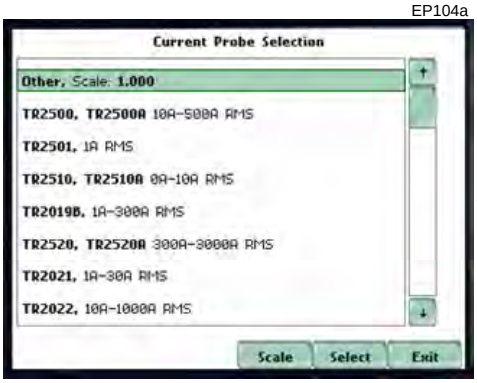


→ To Level 001

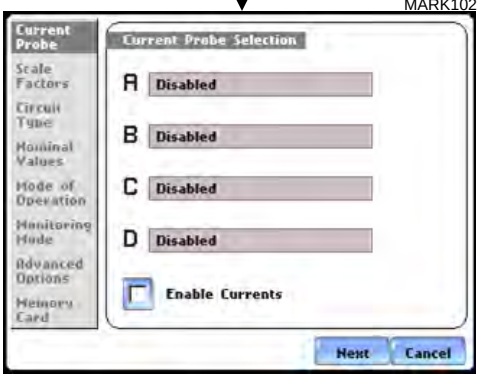
MARK101



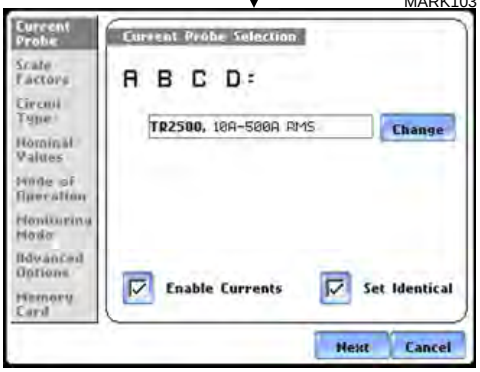
EP104a



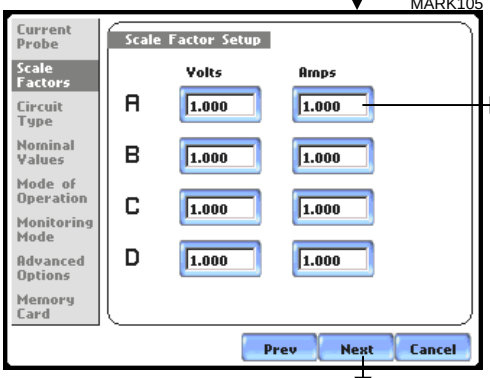
MARK102



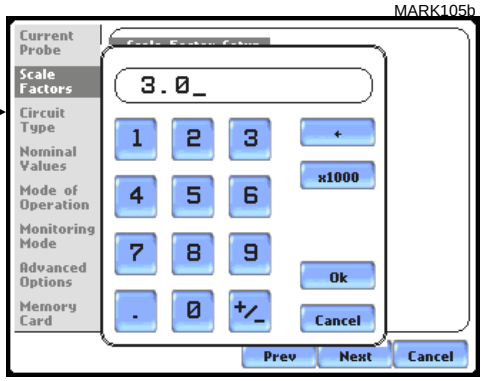
MARK103



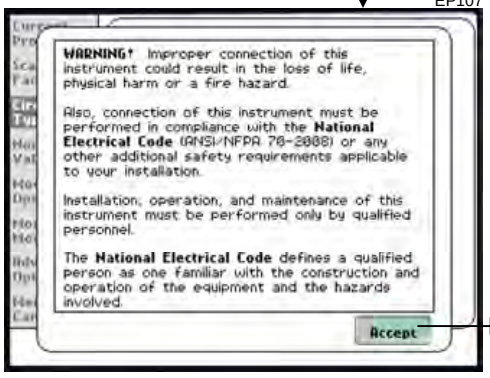
MARK105



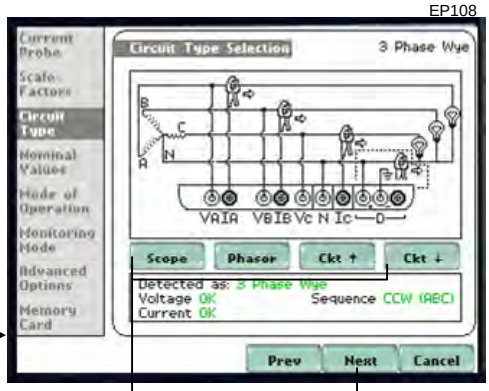
MARK105b



EP107

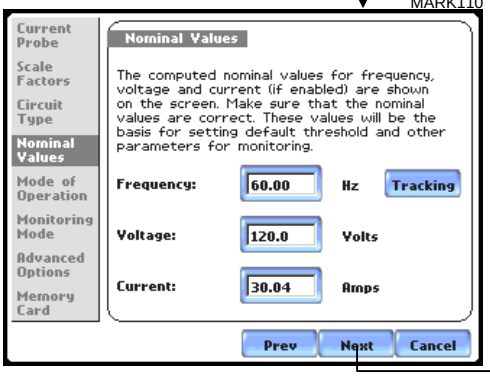


EP108



→ To Level 108

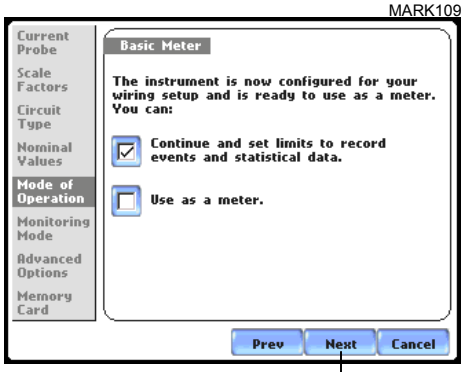
MARK110



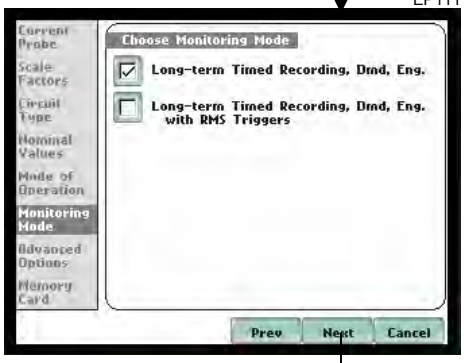
cont. next page

LEVEL 100/2(b)
Start Menu - Wizard Setup

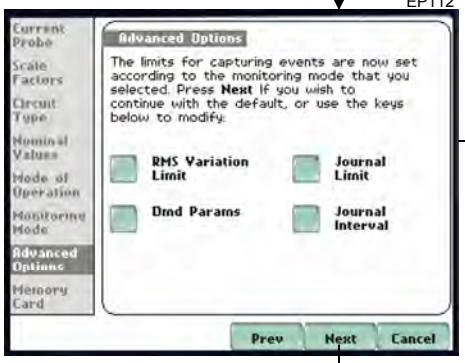
MARK109



EP111

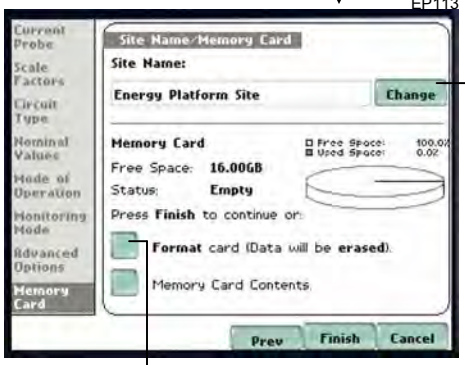


EP112

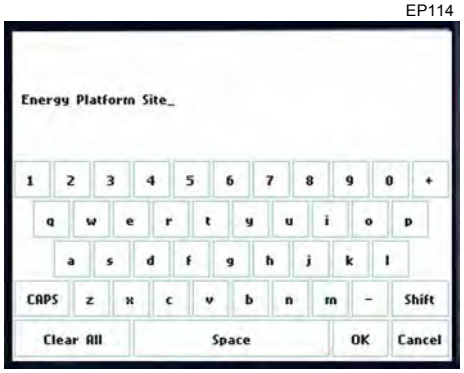


→ To Level 112

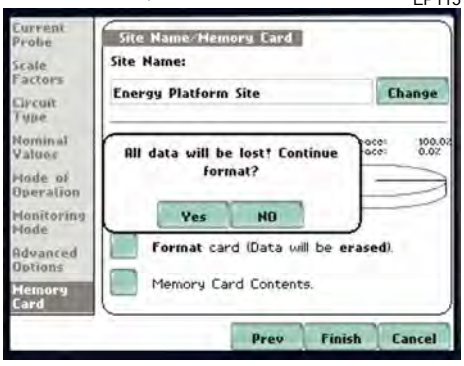
EP113



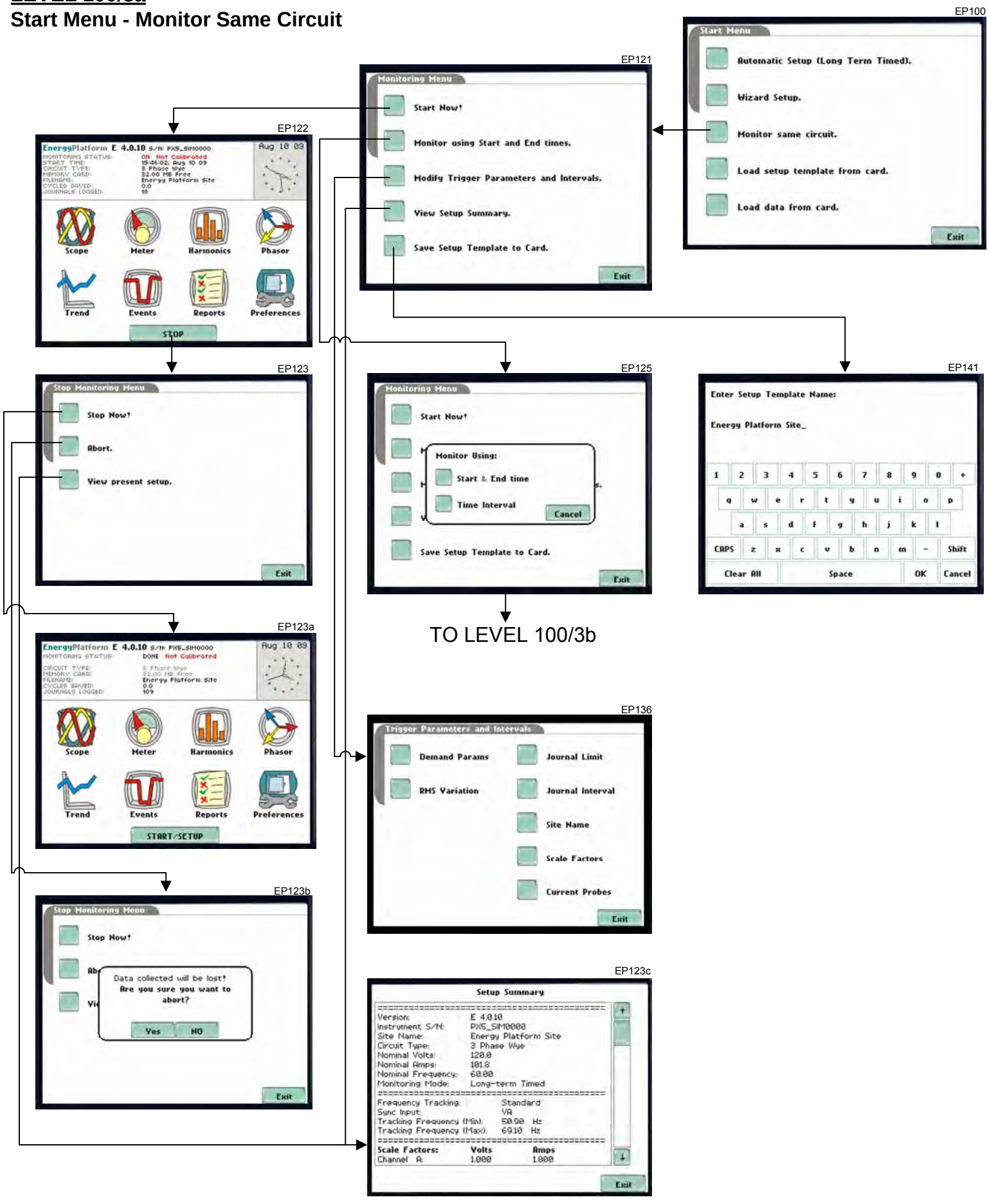
EP114



EP115

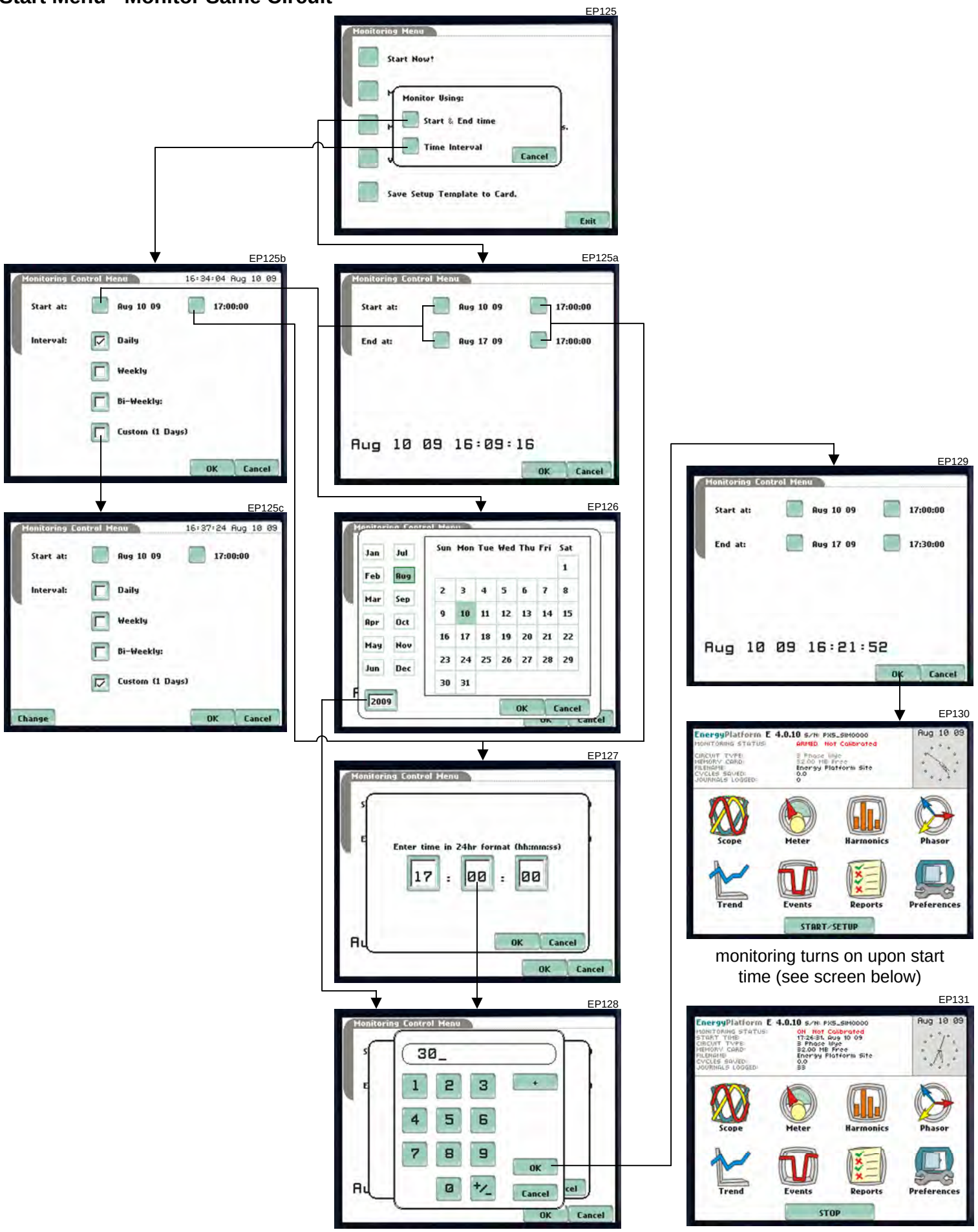


LEVEL 100/3a
Start Menu - Monitor Same Circuit



LEVEL 100/3b

Start Menu - Monitor Same Circuit

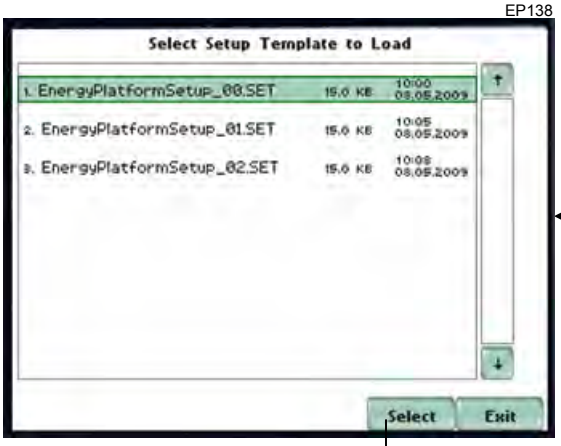


monitoring turns on upon start time (see screen below)

LEVEL 100/4
Start Menu - Load Setup Template from Card

EP100

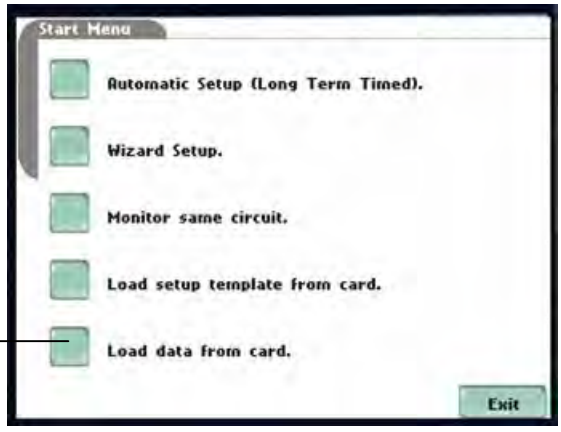
EP138



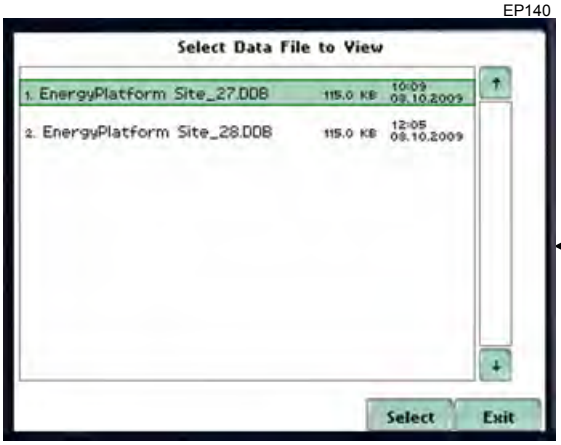
EP139

LEVEL 100/5
Start Menu - Load Data from Card

EP100



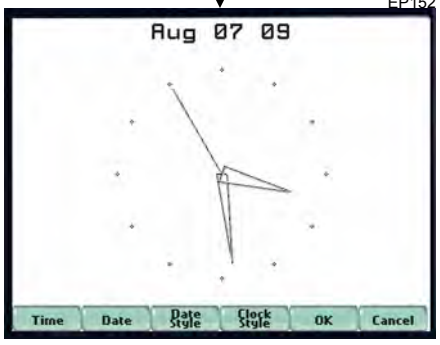
EP140



LEVEL 150
Instrument Settings

EP151

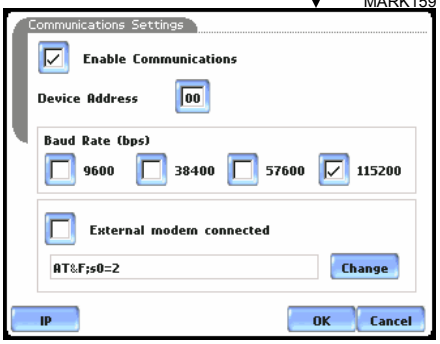
EP152



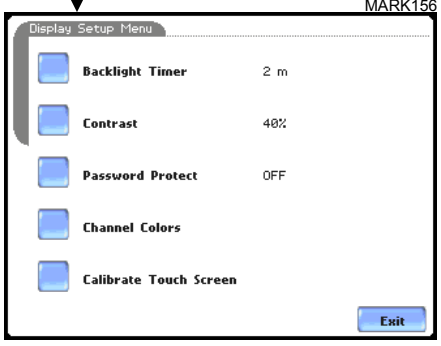
MARK157

EP155

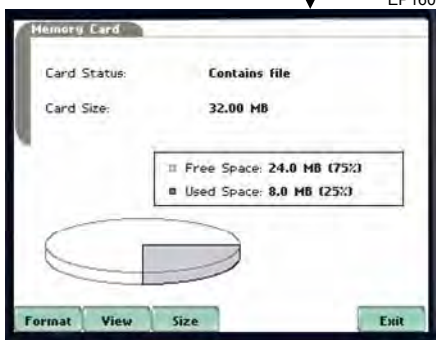
MARK159



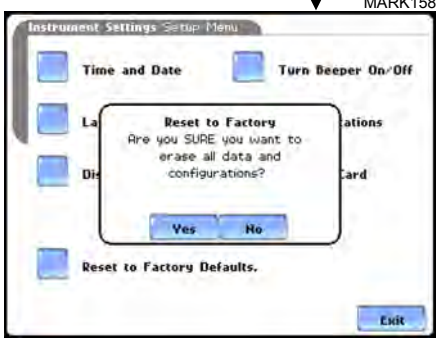
MARK156



EP160

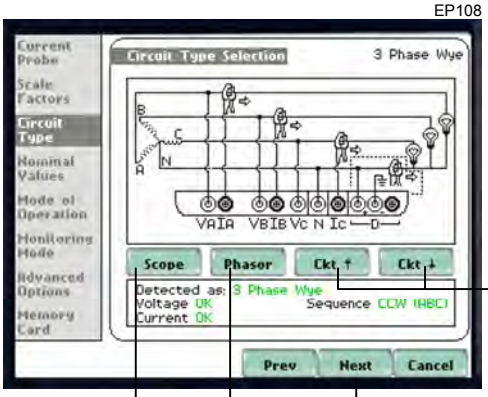


MARK158



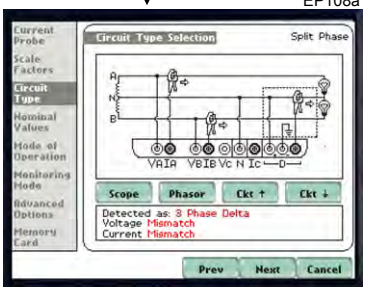
LEVEL 108
Circuit Type Selection

EP108

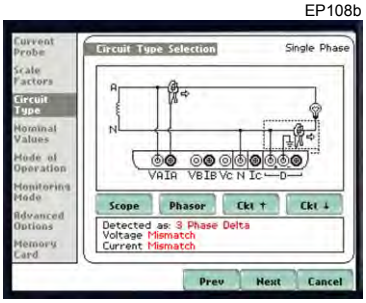


See Level 100/1

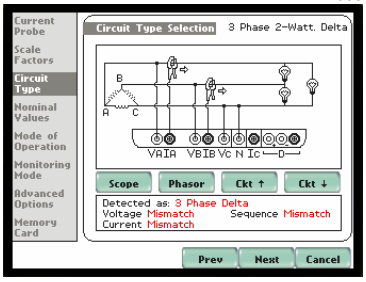
EP108a



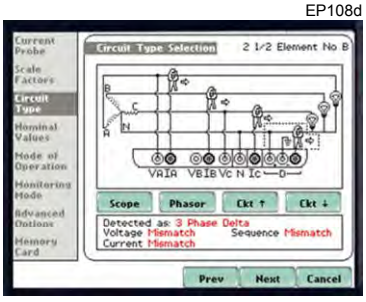
EP108b



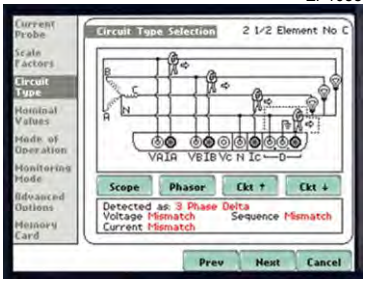
EP108c



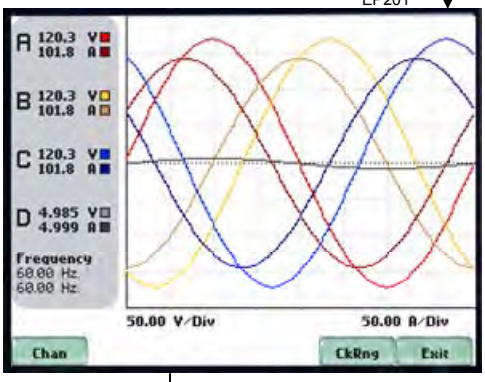
EP108d



EP108e

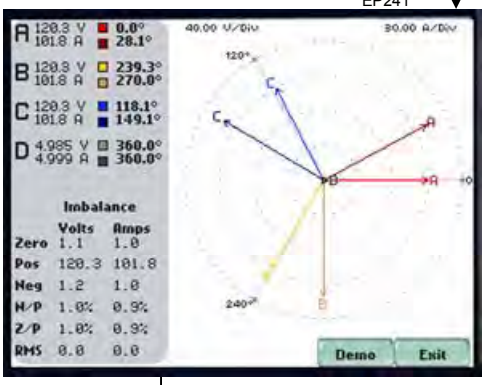


EP201



To Level 200

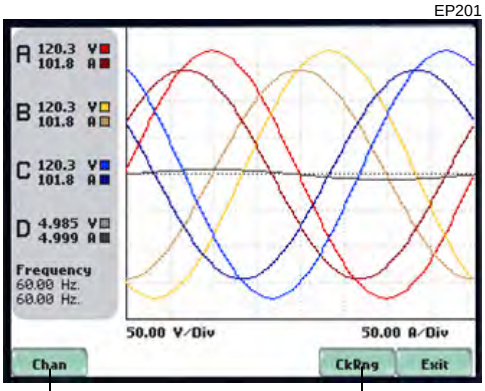
EP241



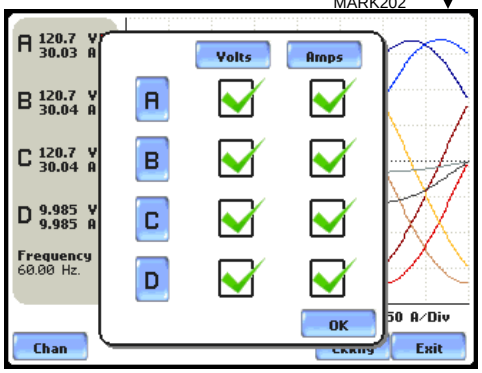
To Level 240

LEVEL 200
Scope Mode

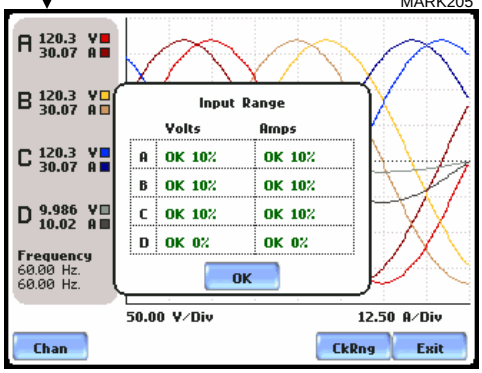
EP201



MARK202



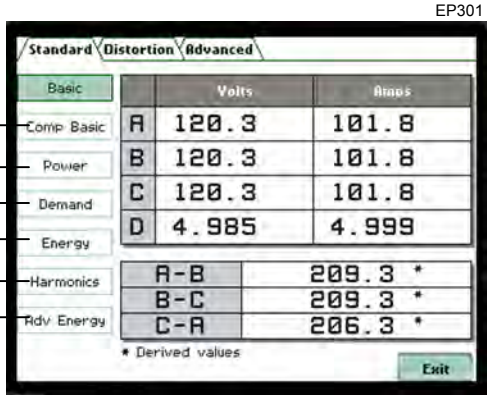
MARK205



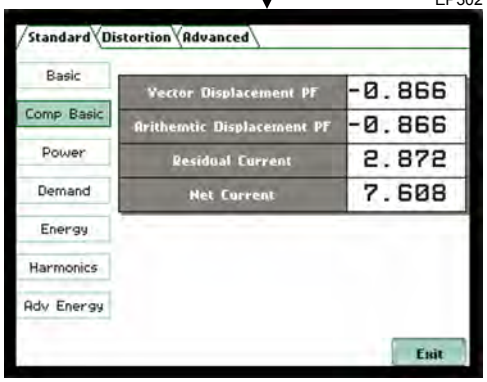
LEVEL 300/1

Meter Mode - Standard

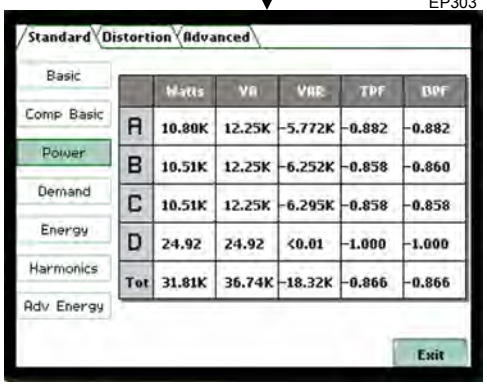
EP301



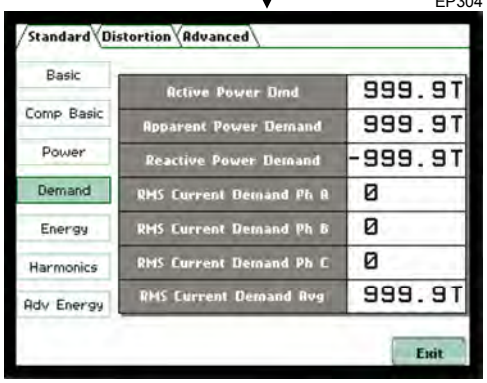
EP302



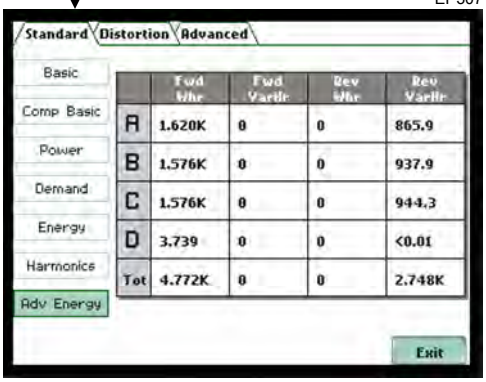
EP303



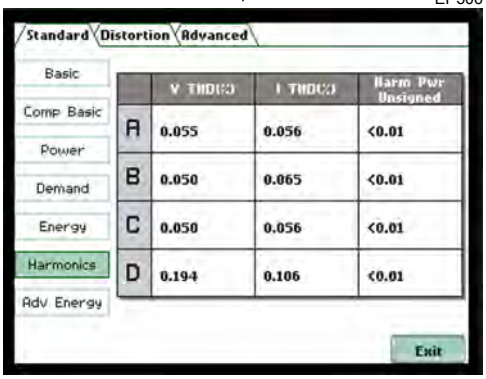
EP304



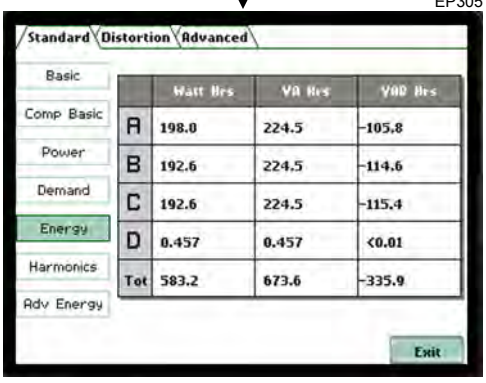
EP307



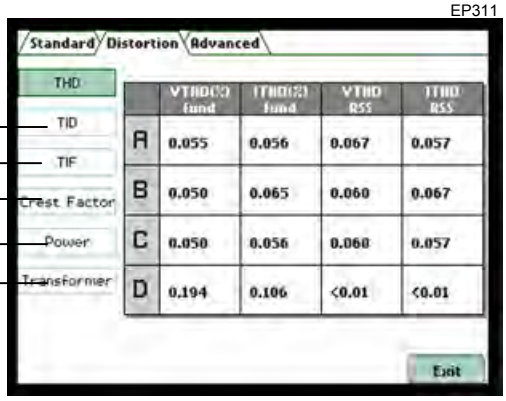
EP306



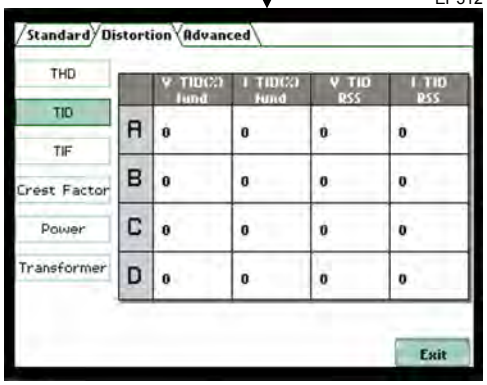
EP305



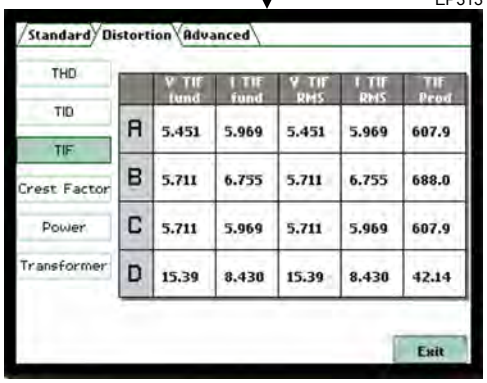
EP311



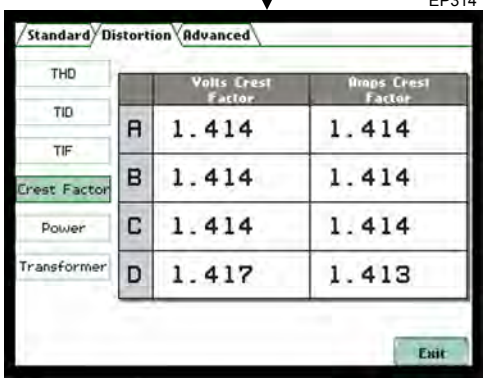
EP312



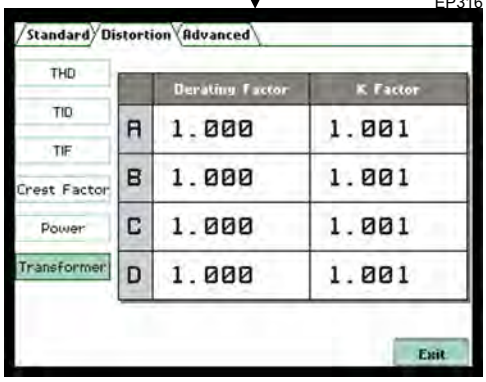
EP313



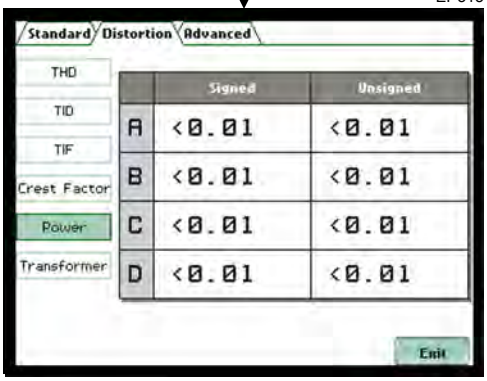
EP314



EP316



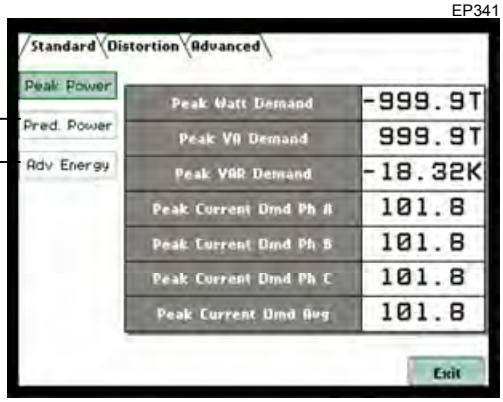
EP315



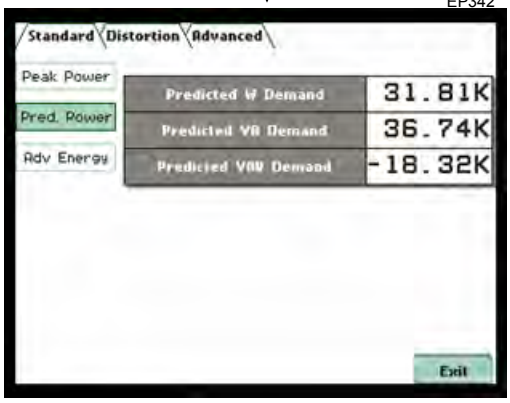
LEVEL 300/3

Meter Mode - Advanced

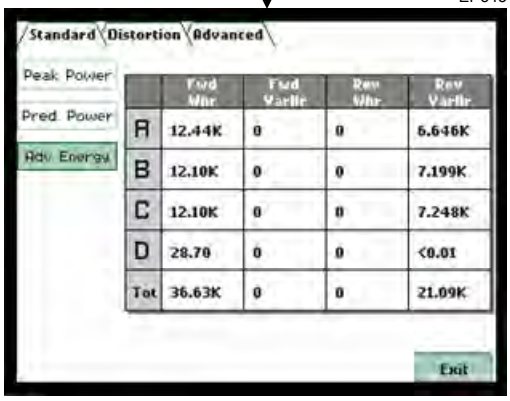
EP341



EP342

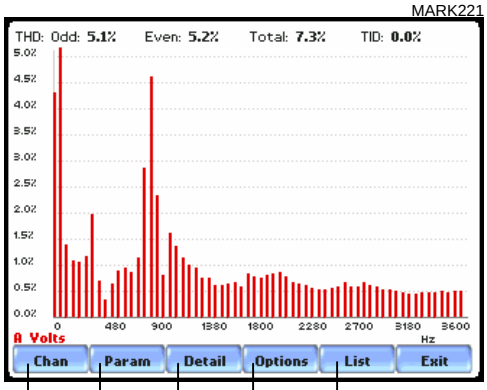


EP343



LEVEL 220
Harmonics

MARK221

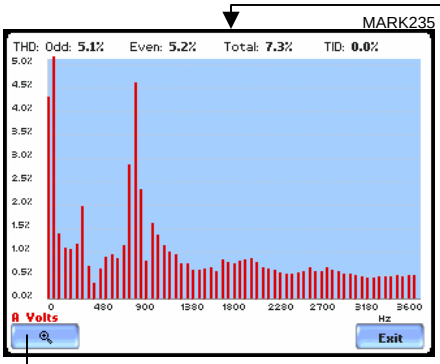


switch channel display

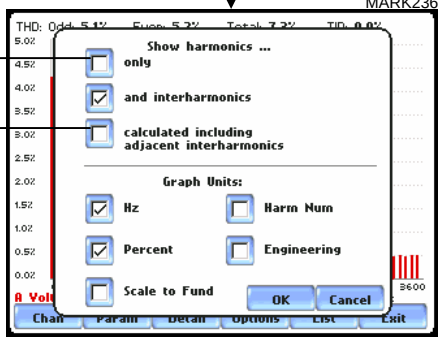
switch to V, I, or W

toggle between graphical harmonics and list of harmonics

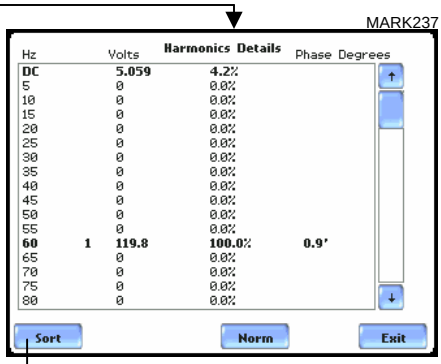
MARK235



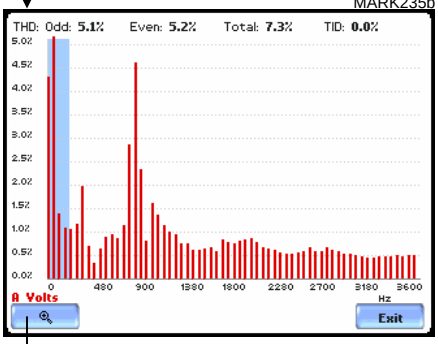
MARK236



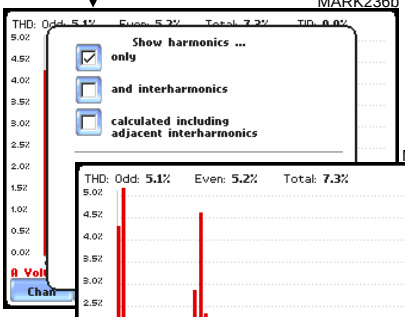
MARK237



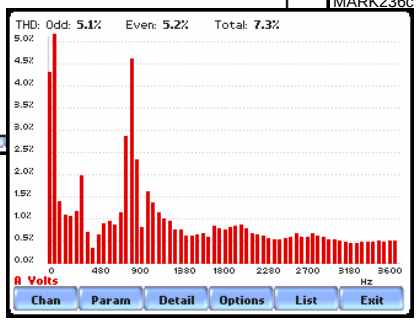
MARK235b



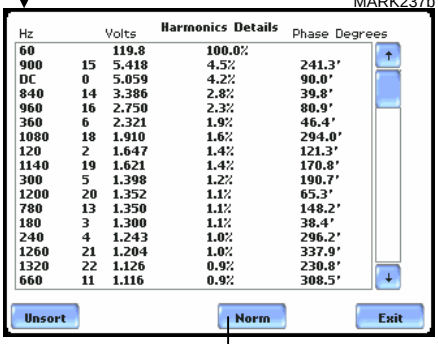
MARK236b



MARK236c

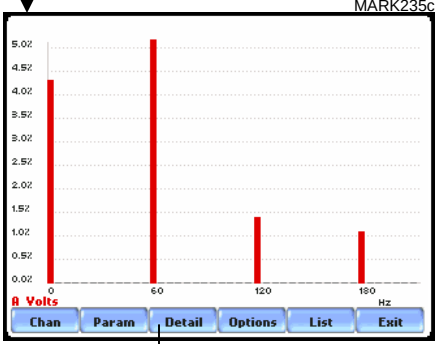


MARK237b

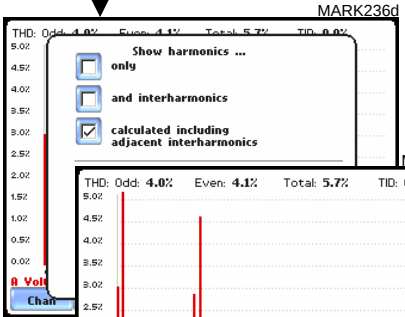


toggle between Normalized and UnNormalized phase values

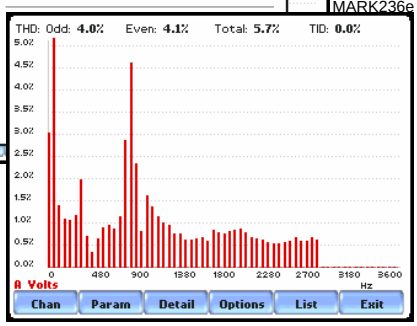
MARK235c



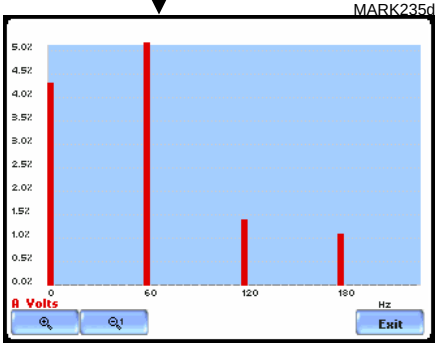
MARK236d



MARK236e

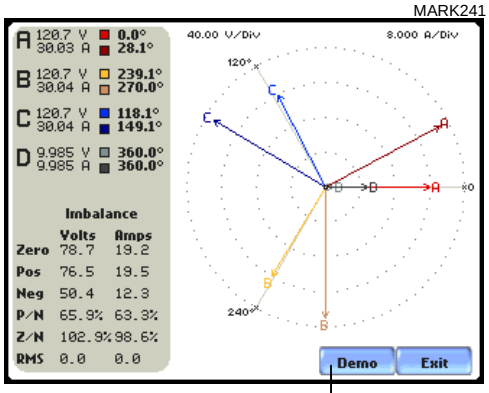


MARK235d



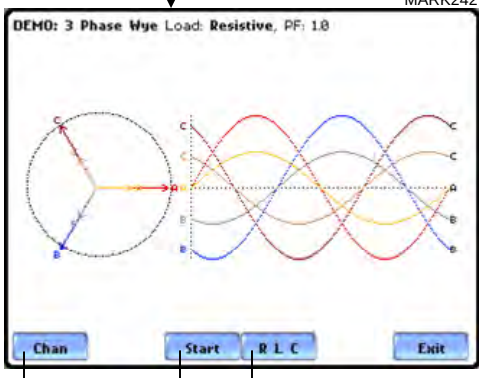
LEVEL 240
Phasor Display

MARK241



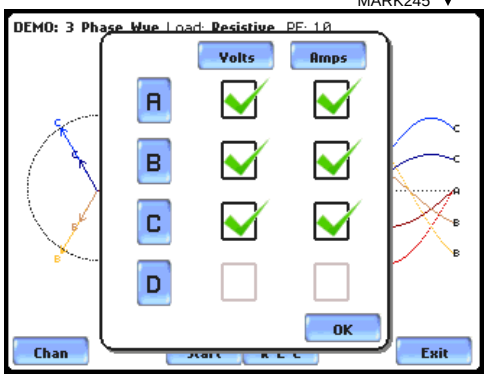
run demo to show rotating phasor relative to sine wave graph of 4 Wire Wye

MARK242



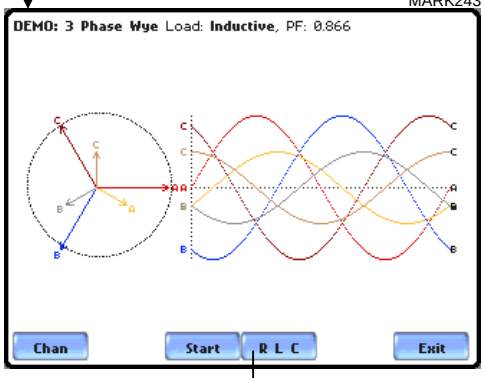
switch demo between Resistive, Inductive and Capacitive load effects

MARK245



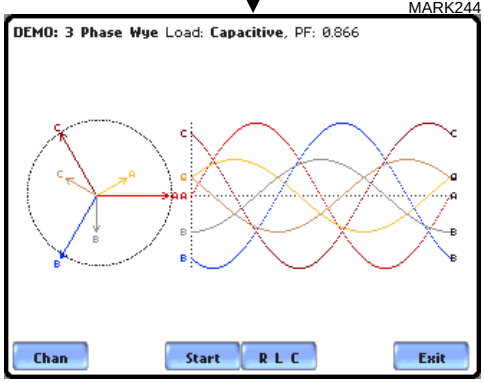
Start/Stop demo plot waveforms as rotate phasors

MARK243



switch demo between Resistive, Inductive and Capacitive load effects

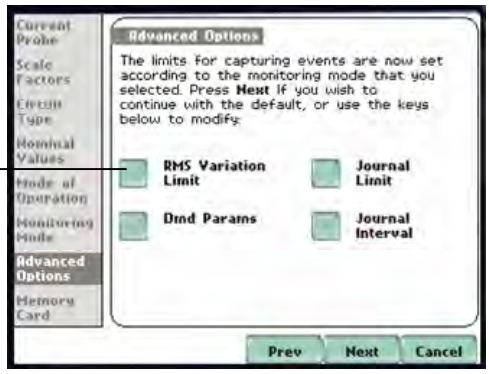
MARK244



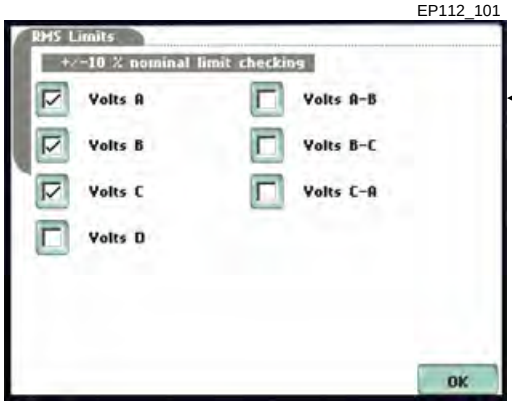
LEVEL 112_101

Advanced Options -
RMS Variation Limit

EP112



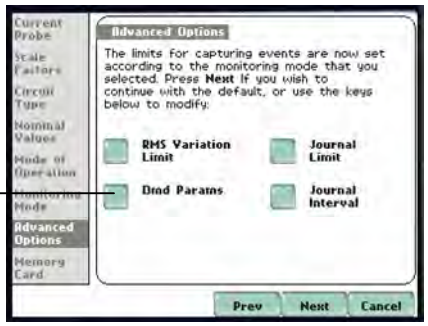
EP112_101



LEVEL 112_201

Advanced Options - Demand Parameters

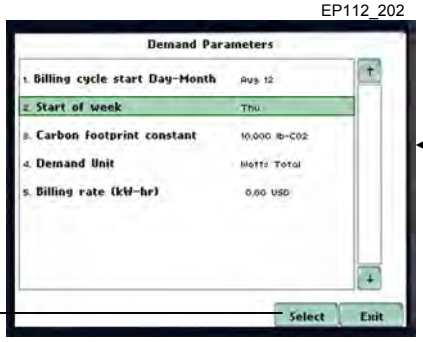
EP112



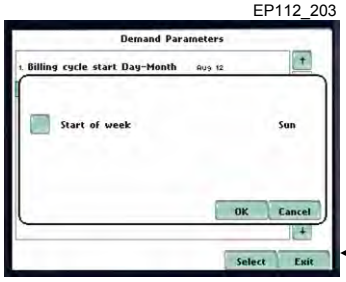
EP112_200

EP112_201

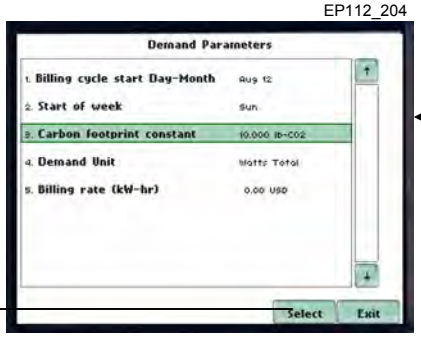
EP112_202



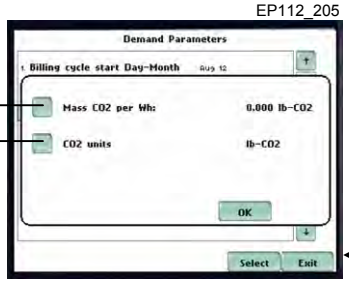
EP112_203



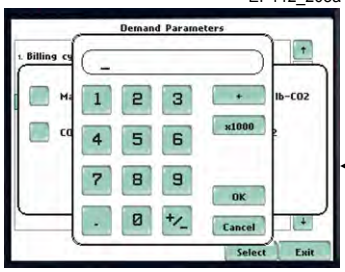
EP112_204



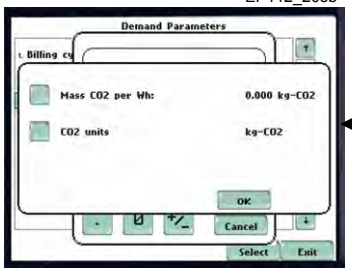
EP112_205



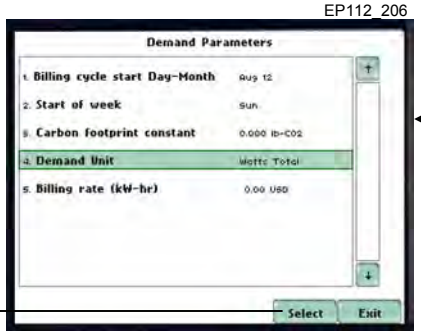
EP112_205a



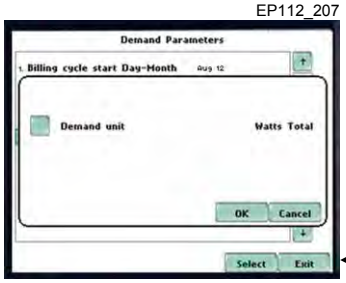
EP112_205b



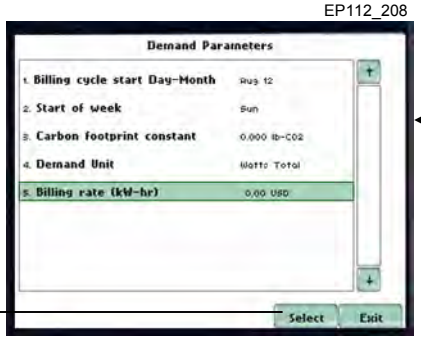
EP112_206



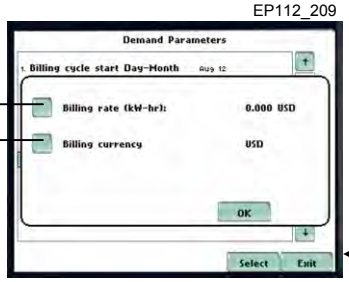
EP112_207



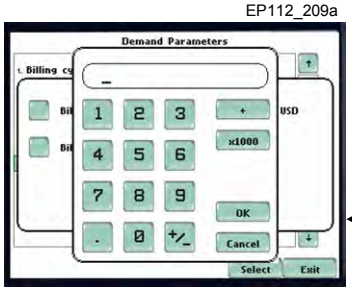
EP112_208



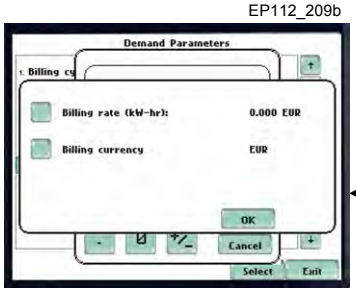
EP112_209



EP112_209a

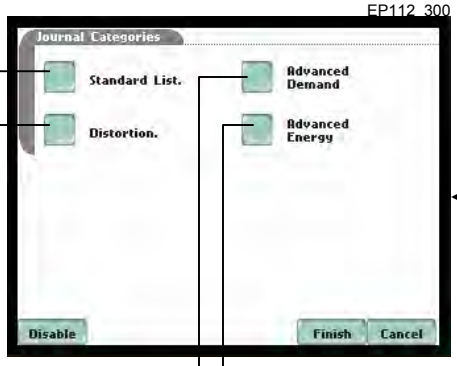


EP112_209b

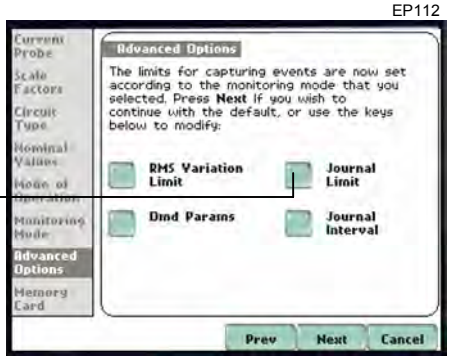


LEVEL 112_301
Advanced Options - Journal Limit

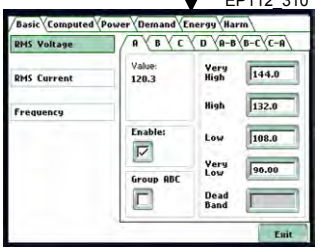
EP112_300



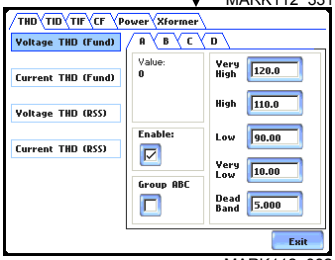
EP112



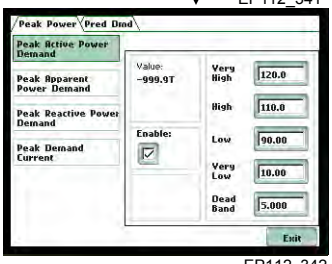
EP112_310



MARK112_331



EP112_341



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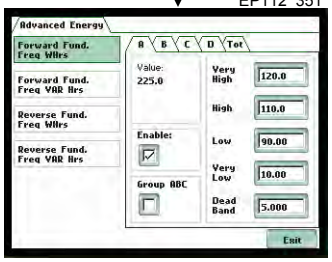

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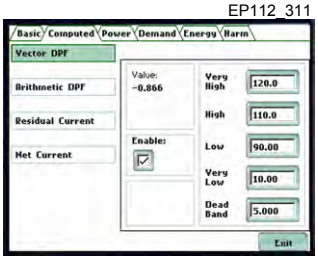

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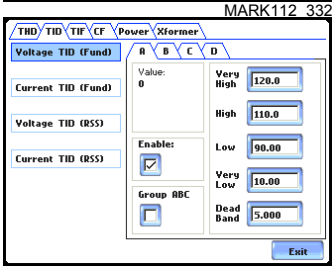
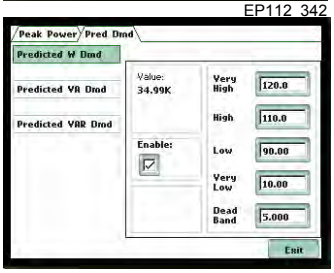


EP112_342



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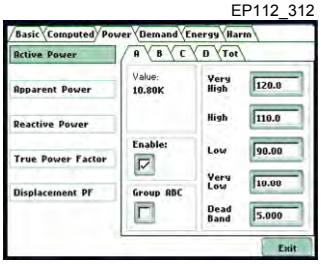
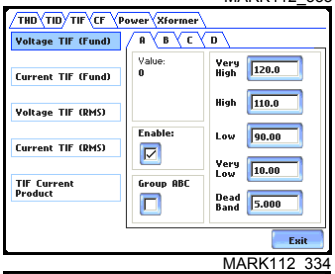
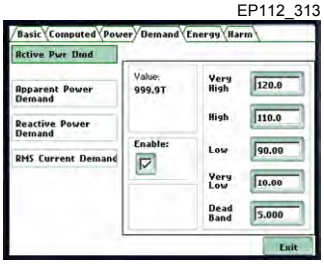


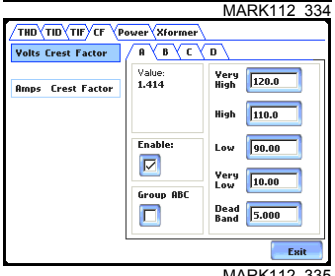
MARK112_333



EP112_313



MARK112_334



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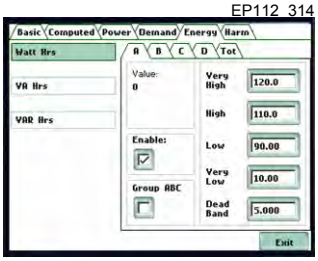
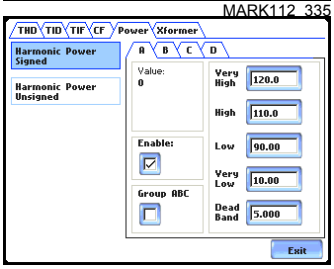


MARK112_335



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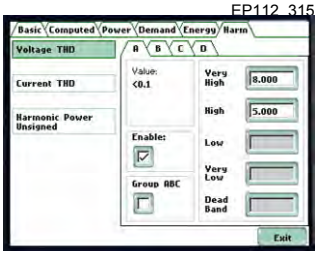

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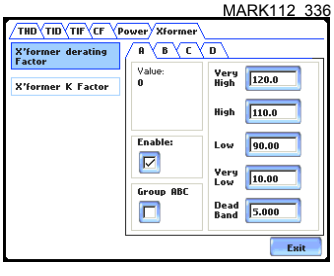
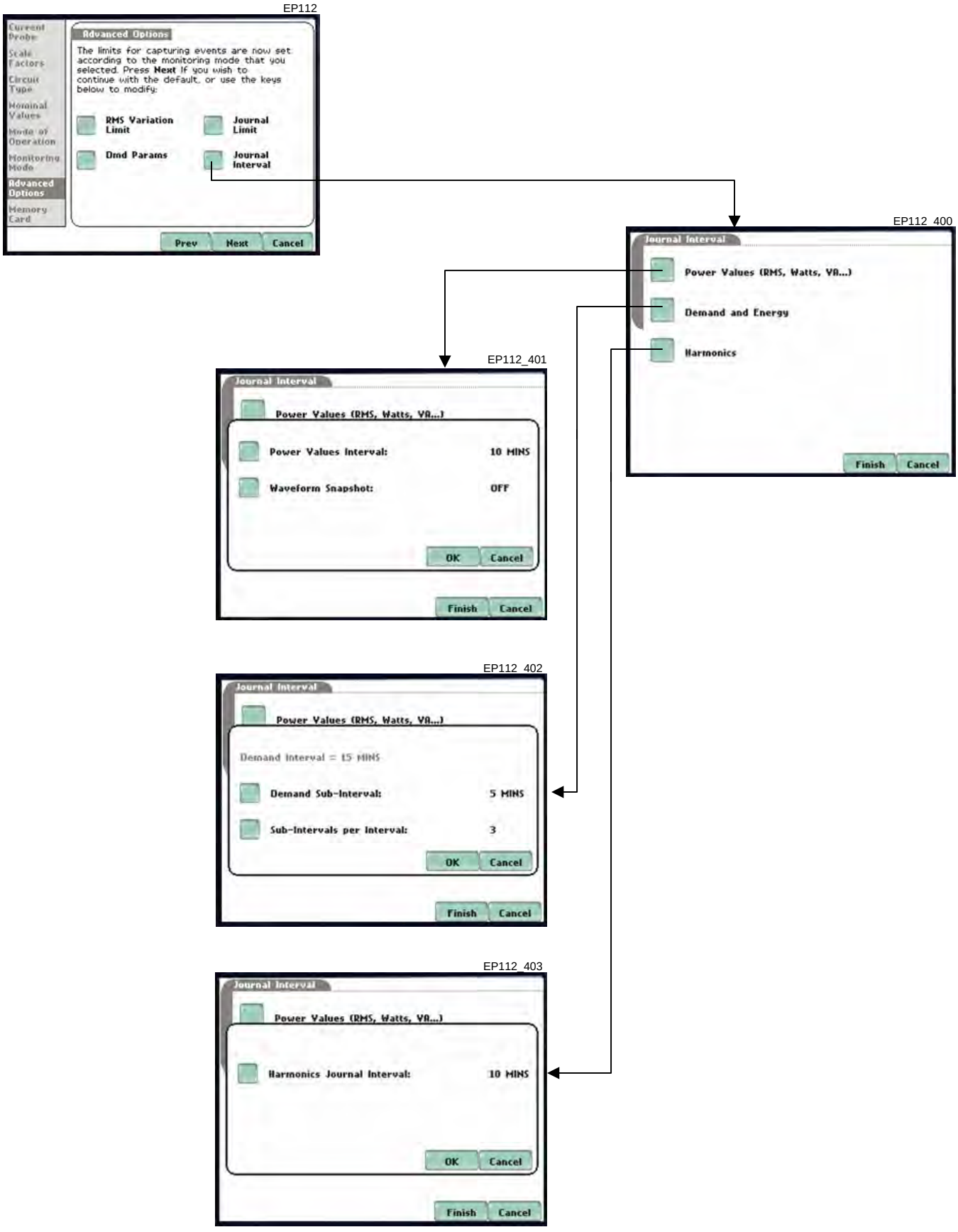


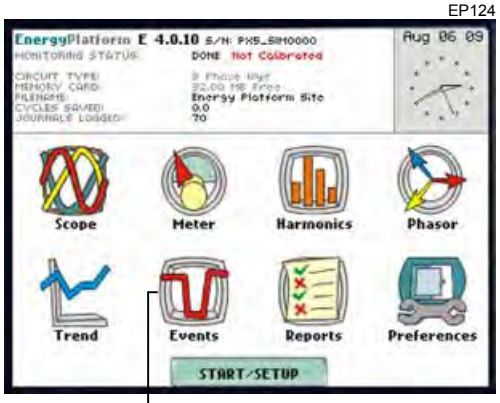
Level 112_401

Advanced Options -
Journal Interval

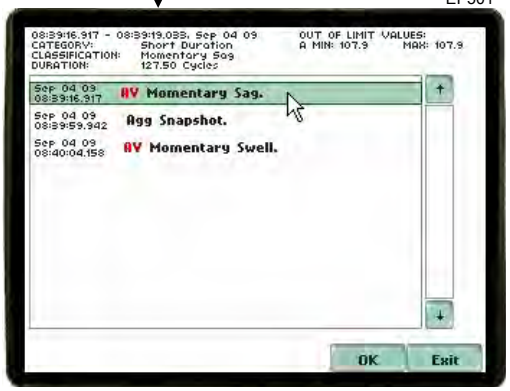


LEVEL 400
Events

EP124

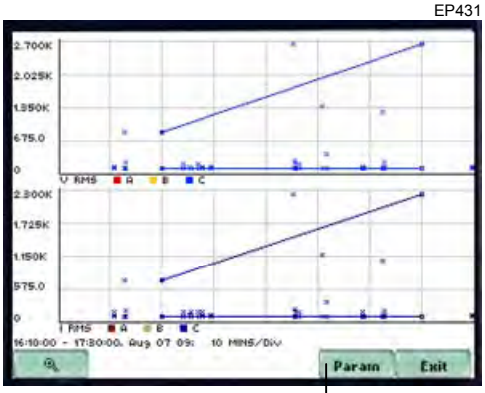


EP501

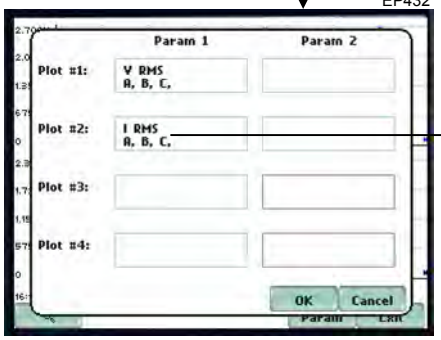


LEVEL 430
Trend

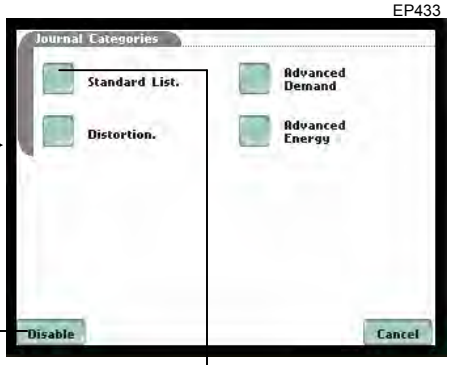
EP431



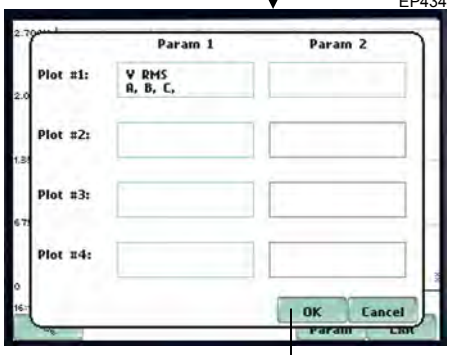
EP432



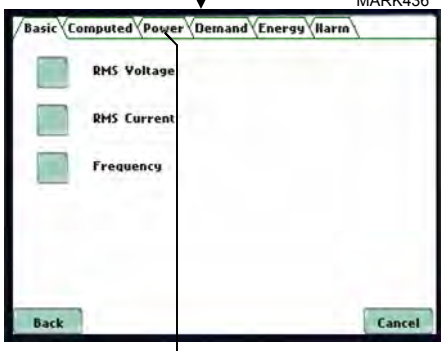
EP433



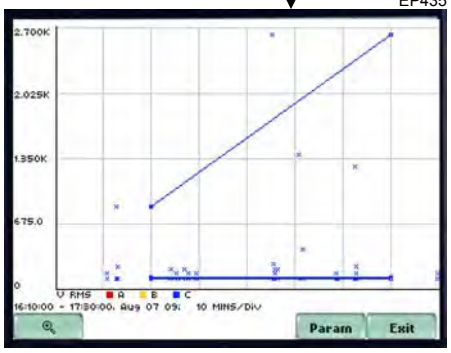
EP434



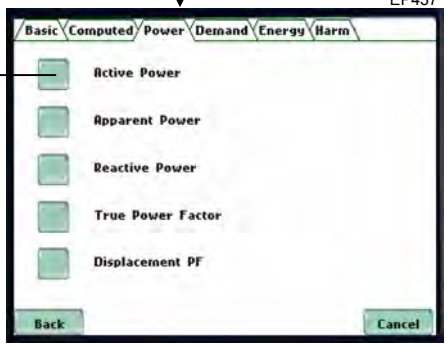
MARK436



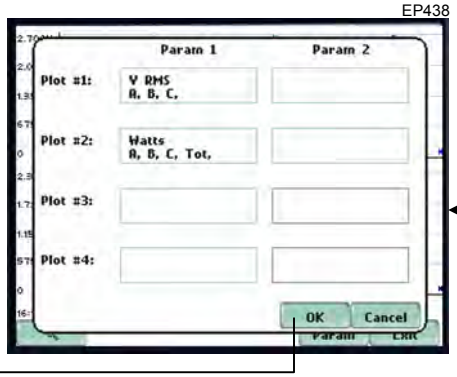
EP435



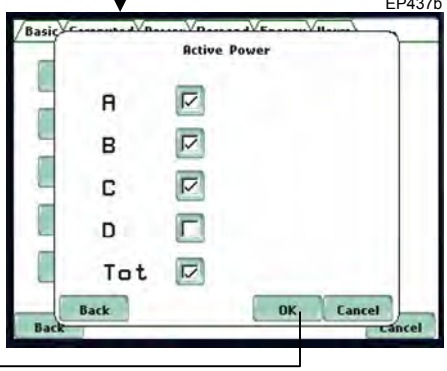
EP437



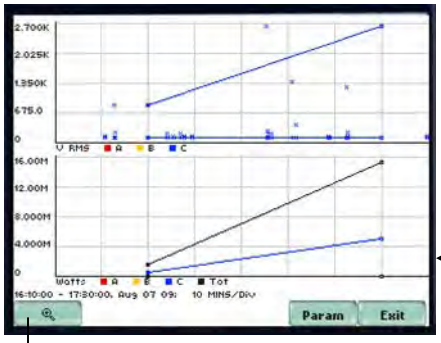
EP438



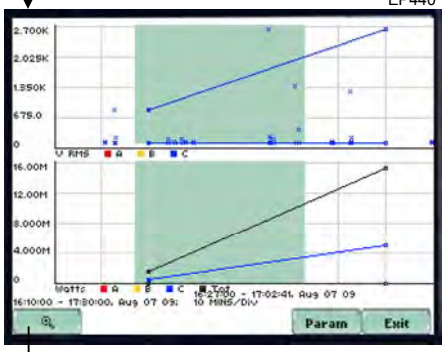
EP437b



EP439



EP440



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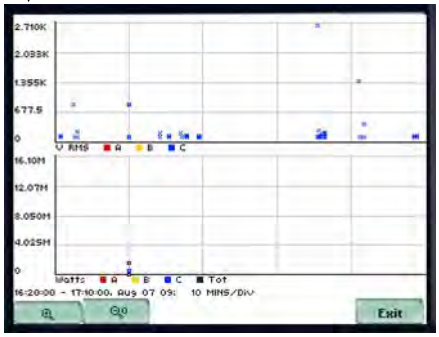
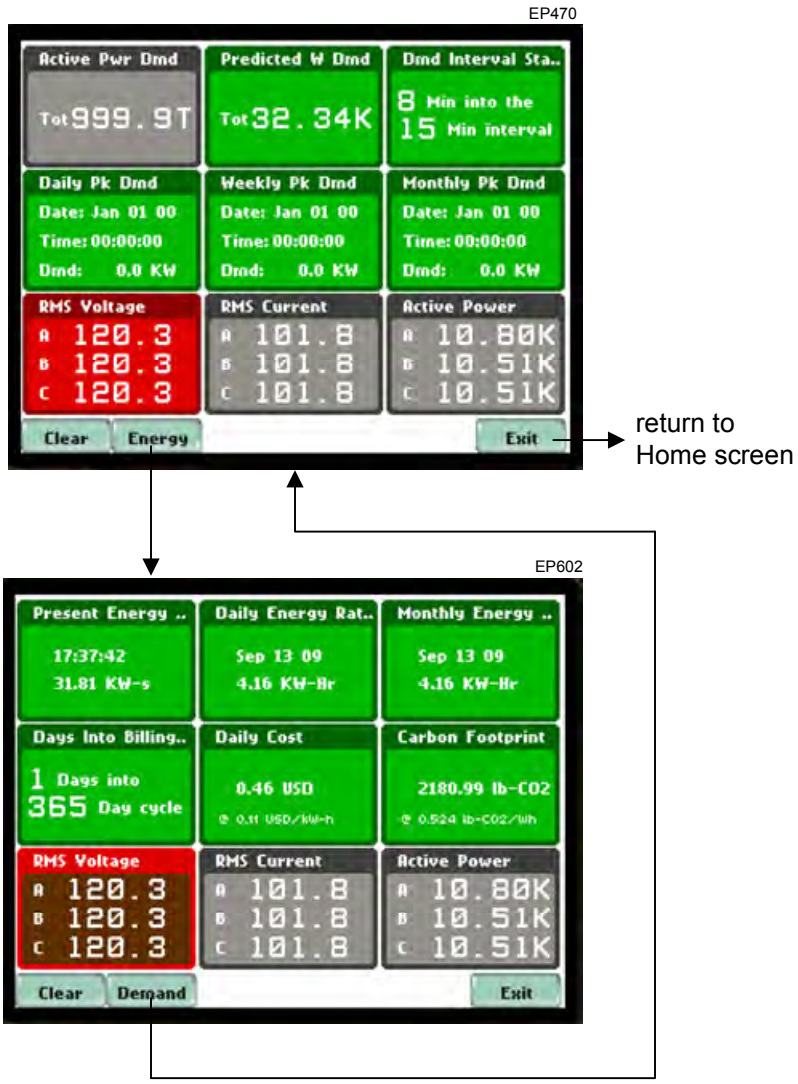


LEVEL 470
Reports – Demand & Energy



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