Continue











Colour Signal Name Red Red Phase A White Yellow Phase B Blue Blue Phase C Grey Grey Neutral D Use ONLY their supplied flash cards If using the supplied flash cards If using the supplied clamps they only last 5 days on 2x AA batteries Only use slot2 for the memory card (Slot1 is for firmware upgrades) Great care must be taken to NOT confuse the different voltage and current measurements. All the current clamps must be pointed in the same direction Getting Going Press Start Select the Wizard Select the wizard Select the appropriate clamps and scaling for each phase. (The standard supplied clamps are RR3035A. These DO NOT do dc measurements) The scale factors are all left as one Select for the appropriate wiring configuration Set the appropriate frequency and voltage (Star 240 V, Delta 415 V etc...) Delta Wiring when a delta wired connection is made great care must be taken to get the correct orientation with the wiring in order to make the subsequent phase calculations relevant Different transformers will be wired differently so care must be taken when each is wired In the 'Circuit Type Selection' select '3 Phase Delta' Click the 'Phaser' button Connect the A phase and confirm they are the following angles: A Phase Voltage approximately 240 Degrees C Phase Voltage approximately 120 Degrees Check the manufacturers plate, on that a phase angle is for example 30 degrees on the phase angle is for example 30 degrees on the phase diagram the angle of each current will be 30 degrees i.e. A Phase Current approximately 30 Degrees B Phase Voltage approximately 270 Degrees C Phase Voltage approximately 150 Degrees Triggering on nearly every cycle) cases the meter can lock-up. When data transfer is complete the home page text line 'Monitoring Status' says 'Done' and this is when the card can be removed without loss of data. For applications, the Setup Wizard step 'Choose Monitoring Mode' it is best to select 'Long Term Timed recording' as all triggered events are disabled. If triggered events are required then great care must be taken with the setup starting with setting the nominal values (voltage, frequency, and perhaps current triggering is to be used) in the Setup Wizard step 'Nominal Values'. Monitoring Mode would be Standard PQ and the settings in Wizard 'Advanced Options' tabs for 'Transients' and 'RMS Variations' must be carefully thought about. Once monitoring is active the home page text line 'Cycles saved' MUST be observed to ensure that the number of cycles saved' is increasing at a greater rate than expected, STOP monitoring, review the stored events and adjust the trigger limits accordingly. Restart and repeat. Of course this will not prevent something happening later but at least the start is OK. In situations where access to the meter is not possible once the equipment is operational, the RS232 or Ethernet remote comms options that you have can be of assistance, Additional Resources User Manual (pdf) Page 1 PowerGuide 4400 ® USER'S GUIDE DRANETZ 1000 New Durham Road Edison, NI 08818-4019 USA Telephone: 1-800-372-6832 or 732-287-3680 Fax: 732-248-1834 Web site: www.dranetz.com Copyright © 2003, 2004, 2005 Dranetz All rights reserved. No part of this book may be reproduced, stored in a retrieval system, or transcribed in any form or by any means—electronic, mechanical, photocopying, recording,... Page 3 ADVERTENCIA na 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 instrumento a un sistema eléctrico se debe realizar en conformidad con el Código Eléctrico Nacional (ANSI/NFPA 70-2005) de los E.E.U.U., además de cualquier otra norma de seguridad correspondiente a su establecimiento. Safety Summary WARNING statements inform the user that certain conditions or practices that could harm the 4400, its data, other equipment, or property. NOTE statements call attention to specific information. The following International Electrotechnical Commission (IEC) symbols are marked Symbols on the top and rear panel in the immediate vicinity of the referenced terminal or device:... Page 5 Safety Summary, Continued Les messages d'AVERTISSEMENT préviennent l'utilisateur que certaines conditions Définitions ou pratiques pourraient entraîner la mort ou des lésions corporelles. Les messages de MISE EN GARDE signalent des conditions ou pratiques pourraient entraîner la mort ou des lésions corporelles. Les messages de MISE EN GARDE signalent des conditions ou pratiques pourraient entraîner la mort ou des lésions corporelles. Les messages de MISE EN GARDE signalent des conditions ou pratiques pourraient entraîner la mort ou des lésions corporelles. Les messages NOTA attirent l'attention sur certains renseignements spécifiques. Page 6 Safety Summary, Continued The following safety precautions must be followed whenever any type of voltage or Safety precautions current connection is being made to the 4400. • Wear proper Personal Protective Equipment, including safety glasses and insulated gloves when making connections to power circuits. •... Statement of warranty material and workmanship for a period of one year from the date of delivery. Dranetz 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. Page 8 Dranetz, 1000 New Durham Road, Edison, New Jersey 08818. Copyright © 2003, 2004, 2005 Dranetz All Rights Reserved. Table of Contents Safety SummaryCHAPTER 1 - Getting Started OverviewStatements and Notices..... ...Unpacking the 4400...... . Standard Accessories......4400 Controls, Indicators, and Connectors .Upgrading Firmware from a Data Card.. . Page 10 Table of Contents. Continued CHAPTER 4 - Instrument Settings OverviewRear View .. .Front View .Access Instrument Settings Menu. ..Top and Side ViewsBottom ViewTime and Date ... Turn Threshold Beeper On/Off4-12 Reset to Factory Configurations . . Page 11 Table of Contents, Continued RMS Variation Settings. .Select Language.. .Set Display PreferencesTouch Screen Calibration Communications.4-10 Data Card..

Pacific Test Equipment Unit 27, 7 Anella Ave Castle Hill NSW 2154 Alternative Rental Solutions This is a precision instrument with the advantage of being able to measure ac, so if you need to do ac/dc measurements you should include the Hioki 3285 Clamps. Notes: Phase Colour Instrument

..6-18 EN50160 Power Quality (for strict EN50160 monitoring only) 6-15 Journal Interval for Timed Readings 6-20 CHAPTER 7 - View Event Data Overview . Limit. .Waveform Capture . 6-13 Characterizer Options6-14 Journal Limit. . Page 12 Table of Contents, .Software Accessories List . . APPENDIX B - Technical Specifications Overview . ..General.. Continued APPENDIX A - Optional Accessories Overview. .Hardware Accessories List & Descriptions.. . Interfaces .Measured Parameters. .Computed ..TR2500 Current Probe.. Parameter Settings in Each Monitoring Mode Page 13 Dranetz PowerGuide 4400 ® xiii 1.800.561.8187 information@itm.com www. .com... Page 14 1.800.561.8187 information@itm.com www. .com... Dranetz software applications such as NodeLink and DranView ® ® This manual contains instructions for operating the Dranetz PowerGuide 4400. This manual 1.800.561.8187 information@itm.com www..com... Page 16 Overview, continued The following topics are covered in this chapter. In this chapter Topic See Page Unpacking the 4400 Standard Accessories 4400 Controls, Indicators and Connectors Upgrading Firmware from a Data Card 1-10 4400 Features 1-12 Basic Operation 1-14 1.800.561.8187 information@itm.com www. NOT return the 4400 without prior instructions from Dranetz Customer Service Department. Dranetz for service or repair, wrap the unit securely Repacking for return shipment in heavy packaging material and place in a well padded box or crate to prevent damage. 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 Repair Department. (If this form is missing, ask the Dranetz Customer Service Department for a replacement.) 1.800.561.8187... CH 1/ Getting Started 4400 Controls, Indicators, and Connectors 4400 is a self-contained, portable instrument weighing less than 4 pounds and Dimensions measuring 8" (20.3 cm) wide by 2.5" (6.4 cm) high. This section identifies and describes the controls, indicators, and connectors on all panels of the 4400 shown with rubber boot installed. 4400 Controls, Indicators, and Connectors, continued The top (circuit connectors, continued The top (circuit connectors, and connectors, continued The top (circuit connectors, and connectors) view features the input voltage and current connectors. connector. Both sides have rings for attaching the supplied carrying strap. See below for descriptions of the top and side connectors. CH 1/ Getting Started The front view primarily shows the color touch screen LCD. See below for descriptions of the top and side connectors. CH 1/ Getting Started The front view primarily shows the color touch screen LCD. See below for descriptions of the top and side connectors. Liquid Crystal Display (LCD). Provides 3.75 x 4.75 inches display consisting of 1/4 VGA size screen of text and graphic information. 4400 Controls, Indicators, and Connectors, continued The bottom view horters are display consisting of 1/4 VGA size screen of text and graphic information. 4400 Controls, Indicators, and Connectors, continued The bottom view horters. slot will be used for future communications options. CH 1/ Getting Started The rear view shows the battery compartment and the easel study to mount the unit to Rear view desired angular position for use on a flat surface or to hang from a panel. 1,800.561.8187 information@itm.com www..com... 4400 internal memory. Refer to the instructions below on how to upgrade the 4400 firmware upgrades for the 4400 firmware upgrades for the 4400 firmware upgrades for the branetz website. Log on to www.dranetz.com for the latest information on 4400 firmware upgrades for the 4400 firmware upgrades display "Booting from program card". If not, call Dranetz Technical Support for assistance. The instrument will prompt the user to verify whether or not to upgrade the firmware. 4400 Features All 4400 functions described below are operable using a color LCD touch screen function technology. Users may use a finger and/or a PDA stylus to apply pressure to the LCD screen to result in touch screen display is also workable with lineman gloves on. Page 27 CH 1/ Getting Started The 4400 can monitor the following power configurations: Monitoring capacity • Single Phase • 3 Phase 2-Watt Meter Delta • Split Phase • Generic • 3 Phase Delta • 2 1/2 Element without V • 3 Phase Wye • ... Basic Operation Basic Operation The normal power source for the 4400 is its internal battery fully before use. The 4400 will always operate on the charger and is designed to do so, regardless of the state of charge of the battery. CH 1/ Getting Started Follow these steps to turn on the 4400 and display the Home screen. Power on sequence Step Action Connect ac adapter into an ac power source. Press the 4400 On/Off power button to turn the unit on. Basic Operation, continued Home screen contains the following icons used to access various 4400 functions: Home screen icons 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. C H A P T E R Voltage M easurem ent Cable and Current Probe Connections Overview, continued 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. Page 33 CH 2/ Voltage Measurement Cable and Current Probe Connections The following safety precautions must be followed whenever any type of voltage or Safety precautions current connection is being made to the 4400. • Wear proper Personal Protective Equipment, including safety glasses and insulated gloves when making connections to power circuits. Connecting Voltage Measurement Cables Connecting Voltage Measurement Cables Description: Voltage measurement cable set provided as standard accessories and are Measurement cable set stored in a cable pouch as part of the measurement cables are provided as standard accessories and are Measurement cable set stored in a cable pouch as part of the measurement cables are rated at 600 are measurement cables are provided as standard accessories and are Measurement cables are rated at 600 are measurement cables are provided as standard accessories and are Measurement cables are provided as standard accessories and are Measurement cables are provided as standard accessories and are Measurement cables are provided as standard accessories and are Measurement cables are provided as standard accessories and are Measurement cables are provided as standard accessories and are Measurement cables are provided as standard accessories and are Measurement cables are provided as standard accessories and are Measurement cables are provided as standard accessories and are Measurement cables are provided as standard accessories and are Measurement cables are provided as standard accessories and are Measurement cables are provided as standard accessories and are Measurement cables are provided as standard accessories and are Measurement cables are provided as standard accessories and are measurement cables are provided as standard accessories and are measurement cables are provided as standard accessories and are measurement cables are provided as standard accessories and are measurement cables are provided as standard accessories and are measurement cables are provided as standard accessories and are measurement cables are provided as standard accessories and are measurement cables are provided as standard accessories and are measurement cables are provided as standard accessories and are measurement cables are provided as a standard accessories and are measurement accessories and are measurement accessories and accessories are provided accessories are measurement accessories and accessorie Vrms max. Page 35 Refer condition to a qualified technician. Contact Dranetz Information on the fused voltage Adapter, P/N 899107. 1.800.561.8187 information@itm.com... Page 36 Connecting Voltage Measurement Cables, continued Follow these guidelines when making voltage connections. Connection guidelines • Refer to the measurement cable set figure for color coding of probes that connect to input channel input has plus (+) and minus (-) differential inputs of 1 to 600 Vrms max. Page 37 CH 2/ Voltage Measurement Cable and Current Probe Connections The following figure shows a voltage connection using channel D as a differential input Example: Neutral to ground wye configurations. Page 38 Connections are identical for split phase and ground wye configurations. current probe connections in addition to Safety precautions those safety precautions the safety precautions those safety precautions the safety precaution the safety precaution th Probes Several Dranetz current probes can be used with the 4400. Typical current probes and adapter cables. Page 40 Connecting Current probes are illustrated on page 2-10. Refer to Appendix A for descriptions and part numbers of probes and adapter cables. 116310-G1 PX5-14.vsd NOTE: Current probes TR2500 can be used interchangeably with TR2500A, TR2510 with TR2520A. Continued on next page 2-10 1.800.561.8187 information@itm.com... Page 41 CH 2/ Voltage Measurement Cable and Current Probe Connections Actual photos of TR series probes and part numbers are shown below to aid users in Typical current probes, pricing and availability. P/N TR-2500... Page 42 Connecting Current Probes, continued The following figure shows how to connect a current probe to channel A for current Single phase current probe monitoring of a single phase line. connection example The current probe may be connected to the return line if desired to measure the return current when checking for load current probe may be connected to the return line if desired to measure the return line if desired to measure the return line if desired to measure the return current when checking for load current probe may be connected to the return line if desired to measure the return line if desired

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phenomena as it happens, when it Introduction 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. Overview Section A Scope mode, Meter mode, Harmonics, and Phasor display.
 eight channels simultaneously. The Scope mode screen can be displayed by pressing the Scope mode screen can be displayed by pressing the Scope mode screen. CH 3/ View Real Time Data Turning Channels to display MARK202 Any of the following will turn
channels on/off: • Press the desired Volts/Amps channel to turn it on/off. •... Checking Input Range Screen is displayed by pressing the CkRng key on the Scope mode Input Range screen is displayed by pressing the CkRng key on the Scope mode Input Range screen.
instrument's full range. MARK205 The input range can only be viewed, not changed. CH 3/ View Real Time Data Section B Meter Mode Overview Meter mode allows you to view real-time meter data. The metered parameters available Introduction are logically separated into Standard and Distortion tabs. Meter screens are displayed in tabular form.
NOTE: Meter mode operation does not interfere with any of 4400's other monitoring or recording functions. Standard Meter Tab St
available. The standard metering properties include Voltage, Computed Basic, Power, Demand Active Power Demand Active Power Demand Apparent Power Demand P
Demand Reactive Power Demand RMS Current Demand Phase A RMS Current Demand Phase A RMS Current Demand Phase B RMS Current Demand Phase C... Distortion Meter Tab Distortion Meter Tab Distortion
meter list original signals. Distortion calculations measure the deviation of complex waveshapes from pure sine waves are measured in accordance with IEC 61000-4-7 Class I. Page 51 CH 3/ View Real Time Data Distortion meter list (continued) Distortion Tab Parameter Name Label Voltage Telephone Influence Factor V TIF fund (for A, B, B, C) and the continued of th
C, D) Fundamental Current Telephone Influence Factor I TIF RMS... Overview Section C Harmonics Overview The 4400 allows users to view voltage and current harmonics/interharmonics in Harmonics display 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. CH 3/ View Real Time Data Harmonic graph display 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 harmonic Detail Harmonic Deta
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 harmonics.
and/or interharmonics for each phase channel can Harmonic Options data plots apply when harmonic Options data is viewed in either graph or list form. Properties under Show Harmonic Options, continued Harmonic
Computation for 60 Hz Harmonic/ Interharmonic data plots 3.0% (continued) 2.5% 2.0% 1.5% 1.0% 0.5% 0.0% .... 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 ...... CH 3/ View Real Time Data Harmonic List To view the harmonic smagnitude text display, press List from the Harmonic graph Harmonic text display
screen on page 3-11. The harmonic parameters displayed on list include: (from leftmost column) the harmonic frequency in Hz, frequency in harmonic parameter selected), percent amplitude of harmonic parameters displayed on list include: (from leftmost column) the harmonic frequency in harmonic frequency in harmonic parameters displayed on list include: (from leftmost column) the harmonic frequency in harmonic freque
Phasor Overview The phasor screen displays a graph that indicates the phasor screen shows eight phasors autoscaled with zero degrees to the right (normally channel A voltage) for clockwise rotation and
with synchronized channels. CH 3/ View Real Time Data Phasor screen is displayed by pressing Phasor screen displayed by pressing Phasor screen shows eight phasor screen shows eight phasor screen shows rms values for Volts/Ampsor screen is displayed by pressing Phasor screen shows eight phasor screen shows rms values for Volts/Ampsor screen shows eight phasor screen shows eight ph
for channels A, B, C and D;... Phasor Rotation Phasor Rotation For the Sine wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation four wire wave graph of a Animated phasor rotation for a Animated phaso
been viewed. Page 61 CH 3/ View Real Time Data The following diagrams describe the positive phase rotation of voltage and current Sample 3-Phase, three wire rotation delta connection. An arrow head on the line indicates direction pointing toward the
(continued) load. Phasor Parameter/Channel Selection The Param
single channel for both Volts and Amps. C H A P T E R Instrument Settings Overview This chapter describes the miscellaneous tasks that users might perform only occasionally. The following topics are covered in this chapter. In this chapter Topic See Page..
Access Instrument Settings Menu Access Instrument Settings Menu Access Instrument Settings menu Screen these steps to display the Instrument Settings menu S
Time and Date Settings Users have the option not only to set the exact time and date, but also to select the Time and Date Settings, continued Time and Date Display Action... Result... (continued) 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: 14:00:00 for 2:00 PM). CH 4/ Instrument Settings Select Language The 4400 menu screens appear in the English language by default. Users have the option to set screen display to any of the
following languages: English, Swedish, German, French, Italian, Simplified Chinese, Traditional Chinese, Finnish, Japanese, or Korean. Set Display Preferences Set Display Pre
calibration. Action... Result... STEP 1: From the Instrument Settings 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 Action... Result... (continued) STEP 2: 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 3. MARK167 STEP 3: Test if touch screen recognition operates properly by... CH 4/ Instrument Settings Turn Threshold Beeper On/Off When set to ON, the unit will beep when threshold limits are crossed and other event Audible alarm triggers
occur. The beep that provides audible feedback to pressing touch screen key is not affected by this setting. Press Change to modify the modem initialization string. The string must begin with "AT". Dranetz recommends using the same brand and model of modem at both ends of the communications link. See Chapter 9 Downloading Events for
instructions on modem connections. Page 73 CH 4/ Instrument Settings Communication interface setup Action... Result... (continued) STEP 2: Entering the IP setttings, make sure that the 4400 is connected to the computer network via the Fiber
optic to Ethernet Adapter (P/N COMM- OEA). Data Card Including the amount of total space, available space, available space, and used space in card screen displays information on the card inserted in the data card slot, Format/View data card inserted in the data card inserted in the data card slot, Format/View data card slot, Format/View data card inserted in the data card slot, Format/View d
for monitoring and writing of data. Page 75 CH 4/ Instrument Settings Format/View data card Action... Result... (continued) STEP 2: All data and setups stored in data card format or not. Reset to Factory Configuration Reset to
Factory Configuration Factory configuration Factory configuration as it left the factory. Follow these steps to reset the 4400 to its factory configuration. Procedure Action... Page 77 CH 4/ Instrument Settings Dranetz has set the default values for the various parameters of the 4400 to its factory.
Factory default settings 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... Page 78 4-16 1.800.561.8187 information@itm.com www..com... C H A P T E R Start Menu Overview The Start Menu Overview The Start Menu Overview The following: set up the 4400 for monitoring Start menu
options of an electrical system, load previously saved setups from card, and load data from card, and load data from card. Page 80 Overview, continued Follow these steps to displayed. MARK001b STEP 2: Press
Start/Setup. The Start Menu will be displayed. CH 5/ Start Menu Section A Automatic Setup process using pre-defined settings, change probe types if current will be monitored, and/or proceed
directly with data monitoring. Follow these steps to perform Automatic Setup. Page 82 Overview, continued Automatic Setup Action... Result... procedure (continued) STEP 3: Summary displays the list of auto-configured parameter settings for Smart Start. 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. Page 83 CH 5/ Start Menu Automatic Setup Action... Result... procedure (continued) STEP 5: Select your desired probe type. NOTE: Use the same probes for the following: TR2500A, TR2510 for TR2520A. • If the current probe that you are using is not on
the list, select Other. Overview Section B Wizard Setup Overview Wizard Setup guides the circuit to be monitored. The unit automatically turns on the correct channels, sets the parameter thresholds and waveform capture settings
depending on the detected circuit type, nominal voltage and current values, and monitoring mode specified by the user. Page 85 It is also designed to be left unattended in the field, recording statistically representative data for long-term analysis. Using the Dranetz lockable portable case option or other available enclosures, power quality studies can
be carried out in harsh weather environments. Current Probe Selection Current Probe Selection Current and select probe type. Selection Follow these steps to monitor current will not be monitored, press Next. Go to page 5-10. Page 87 Refer to Appendix A for
descriptions and part numbers of probes and adapter cables. Refer to Appendix B for Dranetz current probes technical specifications. 1.800.561.8187 information@itm.com www. Scale factors must be entered for the following conditions: When to use • A Dranetz current probe is connected to a permanently installed CT. • The current connections are descriptions and part numbers of probes and adapter cables. Refer to Appendix B for Dranetz current probes technical specifications.
made using a Dranetz ISO box. • The voltage connections are made using a PT. Page 89 CH 5/ Start Menu After setting up current probe Selection screen, press Next to displayed. Scale Factor setup screen Action... Result... STEP 1: From the Current Probe Selection screen, press Next to displayed.
current connections are made without using any current or potential transformer devices, the scale... Circuit Type Selection The 4400 is able to display wiring diagrams from which users can select the circuit type Selection The 4400 is able to display wiring diagrams from which users can select the circuit type Selection The 4400 is able to display wiring diagrams from which users can select the circuit type Selection The 4400 is able to display wiring diagrams from which users can select the circuit type Selection The 4400 is able to display wiring diagrams from which users can select the circuit type Selection The 4400 is able to display wiring diagrams from which users can select the circuit type Selection The 4400 is able to display wiring diagrams from which users can select the circuit type Selection The 4400 is able to display wiring diagrams from which users can select the circuit type Selection The 4400 is able to display wiring diagrams from which users can select the circuit type Selection The 4400 is able to display wiring diagrams from which users can select the circuit type Selection The 4400 is able to display wiring diagrams from which users can select the circuit type Selection The 4400 is able to display wiring diagrams from which users can select the circuit type Selection The 4400 is able to display wiring diagrams from the 4400 is able to display wiring diagrams from the 4400 is able to display wiring diagrams from the 4400 is able to display wiring diagrams from the 4400 is able to display wiring diagrams from the 4400 is able to display wiring diagrams from the 4400 is able to display wiring diagrams from the 4400 is able to display wiring diagrams from the 4400 is able to display wiring diagrams from the 4400 is able to display wiring diagrams from the 4400 is able to display wiring diagrams from the 4400 is able to display wiring diagrams from the 4400 is able to display wiring diagrams from the 4400 is able to display wiring diagrams from the 4400 is able to display wiring diagram wiri
compare the detected voltages, currents, and phase sequence (if applicable) to the selected circuit type. Page 91 CH 5/ Start Menu 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. Nominal Values Screen allows users to enter values for frequency, voltage and current, or use the computed nominal values screen allows users to enter values for frequency, voltage and current, or use the computed nominal values screen allows users to enter values for frequency, voltage and current, or use the computed nominal values screen allows users to enter values for frequency nominal values screen allows users to enter values for frequency nominal values screen allows users to enter values for frequency nominal values screen allows users to enter values for frequency nominal values screen allows users to enter values for frequency nominal values screen allows users to enter values for frequency nominal values screen allows users to enter values for frequency nominal values screen allows users to enter values for frequency nominal values screen allows users to enter values for frequency nominal values frequency nominal values for frequency nominal values frequency nominal val
appears as users prepare the instrument to record data. Page 93 CH 5/ Start Menu Frequency, voltage and Action... Result... current settings (continued) STEP 3: Tracking allows users to set parameters to monitor changes in frequency, voltage and Action... Result... current settings (continued) STEP 3: Tracking allows users to set parameters to monitor changes in frequency.
system. Page 94 Nominal Values, continued Normal frequency synchronization (sync) of the 4400 analog signal processing circuits Frequency synchronization is controlled by analyzing the external sync causes the 4400 to poll other valid voltage channels (A, B, or C) for an alternate external sync
CH 5/ Start Menu Mode of Operation After entering the correct nominal values for circuit monitoring, users have the option Basic meter setup to set the instrument to record data or use the instrument to record data or use 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. Monitoring Mode
Monitoring Mode The 4400 provides six monitoring modes of operation from which to monitoring amount to user application. Result... STEP 1: From the Basic Meter screen, press Next to display the different Monitoring modes of operation from which to monitoring amount and Choose a monitoring modes of operation from which to monitoring amount and Choose a monitoring modes of operation from which to monitoring modes of operation from the following modes of oper
mode, the system is now ready to begin monitoring and to Advanced setup options record data in card. Prior to accept the default threshold settings and proceed with monitoring, or to review and/or modify monitoring, settings. Slot 1 or Slot 2 in order to record data. NOTE: Although 4400 is able to detect
availability of data card in either slot, Dranetz strongly recommends the use of only one card slot (one data card) at a time. Page 99 CH 5/ Start Menu Data card status Status Message Description messages Fragmented A fragmented FAT was detected. Monitoring cannot proceed with (continued) 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. Page 100 Site Name/Memory Card, continued Data card is not formatted. Format the data card or replace with a different card to continue. Page 100 Site Name/Memory Card, continue. Page 100 Site Name/Memory Card, continued Data card or replace with a different card to continue.
enter a character in uppercase. • Press CAPS to enter all characters in uppercase. Page 101 CH 5/ Start Menu The 4400 treats the Compact Flash card like a hard disk storing files in DOS format. Guidelines on file data transfer For successful card data transfer, keep the following points in mind: • 4400 supports a maximum DOS directory size of
128MB. Minimum required Compact Flash data card size is 32MB. Overview Section C Monitor Same Circuit Overview Menu options for monitoring become available only after setting up the instrument or Introduction 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. Users have the option to begin monitoring immediately or at a specified time and date. CH 5/ Start Menu Turning Monitoring Start/Stop monitoring Start Menu Turning Monitoring Start Menu Turning Monitoring On/Off Follow these steps to start monitoring (see page 5-3). The Monitoring Start/Stop monitoring Start/Stop monitoring Start/Stop monitoring Start Menu Turning Monitoring On/Off Follow these steps to start monitoring (see page 5-3). The Monitoring Start/Stop monitoring Start/Stop monitoring Start/Stop monitoring Start/Stop monitoring Start Menu Turning Monitoring Start Menu Turning Monitoring Start/Stop monitoring Start/S
Menu screen will be displayed. Page 104 Turning Monitoring On/Off, continued Start/Stop Action... Result... monitoring (continued) 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. Page 105 CH 5/ Start Menu Start/Stop monitoring Action... Result... (continued) STEP 4: When monitoring ends, the message MONITORING STATUS: DONE appears on screen (see NOTES).
will be displayed. Monitoring at a Specified Time and Date Monitoring at a Specified Time and Date Follow these steps to set monitoring at a specified time and date. Schedule monitoring (see page 5-3). Page 107 CH 5/ Start Menu You can specify the date and
time when the unit will begin and end monitoring using start & end time Action... Result... STEP 1: When monitoring using the Start & End time and Date, continued Monitoring using start & Action... Result...
end time (continued) 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. Page 109 CH 5/ Start Menu Monitoring using start & Action... Result... end time (continued) 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, continued Monitoring at You can specify the date and time when the unit will begin monitoring, and choose
scheduled from the following interval cycles when the unit will end recording and start a new file: intervals Advanced setups The Modify Trigger Parameters and Intervals screen allows users to turn on any available parameters and
enter new threshold limits. Advanced Setup provides users wider control over all setup functions. Action... Overview Section D Load Setup template from the data card. Introduction NOTE: Loading a setup template from the card will overwrite your existing setup.
Loading saved Action... CH 5/ Start Menu Section E Load Data from Card Overview Data files (.ddb) consist of events that are saved to the data card while monitoring is on. Introduction The 4400 allows users to load stored data directly from card. The following topics are covered in this section. Card Error Messages Card Error Messages The
following error messages may be displayed. Error messages Error Message Description Card not inserted improperly. Card not ready The Compact Flash data card controller is not ready. Try reinserted improperly. Card not inserted improperly. Card not ready The Compact Flash data card controller is not ready. Try reinserted improperly. Card not inserted improperly.
users with applications that require Introduction advanced Options Menu Advanced Options
modification. Advanced menu settings The 4400 allows users to customize threshold settings according to their task applications. Action... Result... STEP 1: From the Choose The following screen will appear if the selected Monitoring mode is non-EN50160:... CH 6/ Advanced Setup Options Transient Limit Dranetz
instruments label rms voltage or current variations as either sags (voltage Transient detection or current increases above high limit) as per IEEE 1159. Voltage disturbances which are shorter in duration than typical sags and swells are classified as transients. Page 118 Transient Limit,
continued The 4400 uses three different algorithms to detect and record transients: Procedure to record transient • Peak or Instantaneous trigger magnitude or tolerance Action... Result... STEP 1: From the Advanced Options screen, press Transient Limit
Page 119 CH 6/ Advanced Setup Options Procedure to record transient Action... Result... disturbance (continued) STEP 2: 4400 shows the "floating window" algorithm used for waveshape fault detection. • Press limit field under Threshold to change limit. Use the keypad to enter the threshold limit or tolerance. Page 120 Transient Limit, continued
Procedure to record transient Action... Result... disturbance (continued) STEP 3: 4400 allows users to set rms distortion waveshape limit. • Press the limit field to change limit. Use the keypad to enter the treshold limit beyond which rms voltage variations occur. Page 121 CH 6/ Advanced Setup Options Procedure to record transient Action... Result...
 disturbance (continued) STEP 4: Select how you want to specify the number of waveform cycles to record before (Pre-) and after (Post-) the trigger cycle. • Enable Use Default if you want to use the default waveform trigger cycle. • Enable Use Default if you want to use the default waveform trigger cycle.
mathematical formula used to compute the RMS variation setup properties equivalent value of the voltage and current. Voltage and current changes are measured and checked against the programmed limit). Page 123 CH resholds are set as high limits (threshold above the programmed limit) and low limits (threshold above the programmed limit).
6/ Advanced Setup Options The following parameters are required to define how an rms variation is triggered: Procedure to record rms • Low Limit variation Limit. Page 124 RMS Variation Limit, continued Procedure to record rms • Low Limit variation Limit.
record rms Action... Result... variation (continued) STEP 2: Press the High limit, Low Limit field to display the numeric keypad to enter limits for the corresponding phase in the High limit, Low Limit, and Very Low Limit fields. Page 125 CH 6/ Advanced Setup Options Procedure to
record rms Action... Result... variation (continued) STEP 3: Users can define the number of rms summary and waveform cycles to be saved before the start (post-start), and after the end (post-end) of the event. Page 126 RMS Variation Limit, continued Procedure to record rms Action... Result... variation (continued) STEP 3:
(continued): Screen below shows sample changes in cycle Waveform Capture (Cycles): settings: These values can also be used for transient waveform cycles. CH 6/ Advanced Setup Options Waveform Capture The 4400 allows users to set the trigger
channels/parameters for waveform capture. Trigger channel setup Action... Result... STEP 1: The checked fields show the channels that will have waveforms recorded should a trigger occur. This cross-trigger function prevents will be
characterized according to the measurement standard selected under the Event characterizer mode. Setup Action... Result... STEP 1: From the Advanced Options screen, press Characterizer options. The 4400 measures event data in compliance with the criteria set by IEEE 1159 or IEC 61000-4-30 Class A. CH 6/ Advanced Setup Options
Standard List to display the parameters under it. Page 131 CH 6/ Advanced Setup Options The following parameters are available for trending under the Journal Limit Setup. Journal Parameters are available for trending under the Journal Parameters.
Energy Harmonics Flicker Basic Vector... Journal Interval for Timed Readings The Journ
values are based upon all cycles during a one second interval. Page 133 CH 6/ Advanced Options The intervals for timed readings are user programmable. Timed settings menu Action... Result... STEP 1: From the Advanced Options The interval menu will be displayed. Press the parameter that you want to
change. EN50160 Power Quality EN50160 Power Quality EN50160 monitoring only) EN50160 is a statistical analysis of power quality data based on the EN standard. The Advanced setup protocols set to determine
voltage measurement compliance required for EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 CH 6/ Advanced Setup Options EN50160 Monitoring. Page 135 C
the status of each of the defined frequencies. Page 136 6-22 1.800.561.8187 information-packed, and easy to navigate display of event Types of data display data. The firmware architecture of the 4400 is designed to engage in various stages of data display data.
 acquisition, characterization, communication, and visualization of event data and journalled data. Page 138 See Chapter 9 - Downloading Events for more information on NodeLink and DranView applications. ® ® NodeLink and DranView are owned and distributed by Dranetz. For pricing and ® ® availability, contact Dranetz Customer Service
Department at (732) 287-3680 or 1-800-372-6832. 1.800.561.8187 information@itm.com www. .com... Page 139 CH 7/ View Event Data Follow these steps to display event data will be available for display while
monitoring or upon reading a stored file from the data card. Overview Section A Events Overview The event screen displays actual voltage or current waveforms that occurred when a What is display, and time plots are visually interfaced
showing event patterns and behaviors over threshold limits and time. CH 7/ View Event Data Event Data Event Data Event Screen Will display an event activity graph, waveform detail, and buttons to view previous/next event, and
RMS/Waveform toggle. From the Home screen, press Events for voltage channels are displayed above the grid and
current channels are displayed below the grid. CH 7/ View Event Data Event List Event list description Each event list description Each event contains a general heading indicating the time and date when the disturbance occurred, the disturbance category, disturbance classification, and
number of cycles of duration. Page 144 Event List, continued Follow these steps to access the event list. Note that event data is displayed only while View event list (continued) monitoring or upon reading a file from the data card. Action... Result... STEP 2: The highlighted field indicates that the particular event entry has been selected. CH 7/ View
Event Data Event Detail The 4400 allows users to view events in graphic waveform/rms display. The Detail Event details screen features zoom buttons to magnify event cycles, and a zoom box that users can resize via touch and drag. The Detail Event Detail Screen features zoom buttons to magnify event cycles, and a zoom box that users can resize via touch and drag. The Detail Event 
detail Action... Result... (continued) STEP 2: Once the magnify button is pressed, a blue box showing the default zoomed area appears. The touch screen zoom in. Page 147 CH 7/ View Event Data View event detail Action... Result... (continued) STEP 3: 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 the event cycles in greater detail. Page 148 Event Detail, continued The 4400 firmware V2.0 and higher is equipped with the algorithm that determines the Event text detail. Page 148 Event Detail, continued The 4400 firmware V2.0 and higher is equipped with the algorithm that determines the Event text detail.
phase voltage sag event. The sag origin or directivity can be Upstream or Directivity Downstream from the monitoring point. The directivity, the new algorithm in 4400 firmware V2.0 is also Event text detail: able to detect if 3-phase
 voltage and current waveforms experience a capacitor Capacitor Switching event. The result of the analysis is displayed in the Event Text Detail screen. Switch Analysis Action... Event Options Event Options A time plot is a graph of the value of one parameter and channel over time. The 4400 is Voltage and Current able to display time plots for
individual Voltage and Current channels (Va, Vb, Vc, Vd, channels to plot Ia, Ib, Ic, Id) or phase-to-phase Voltage and the selected circuit type. Page 151 CH 7/ View Event Data Follow these steps to access event Options. View event options Action... Result... STEP 1: From the
event screen, press Options. Plot #s appear on the left side of the screen. Users have the option to enable, disable channels for any of the Plot #. Page 152 Event Options, continued View event options, continued Vie
Channel A-B Volts, in addition to Channel A Volts for Plot #1. •... CH 7/ View Event Data Section B Trend Overview Trend categories: Standard: Parameters include basic volts and amps, displacement power factor, residual and net current, energy, harmonics,
standard demand, and standard flicker. 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. Trend Display A trend consists of the timed and threshold waveforms for the parameter on display. What is displayed on a trend? Users have the
option to enable/disable a trend or plot display, wherein display area will resize according to the number of plots enable/disable channels to trend in a select parameter. CH 7/ View Event Data Trend Setup Follow these steps to view data trends. The same procedure applies even when you Trend
settings 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. Page 156 Trend Setup, continued Trend settings (continued Trend settings).
display. • Press Disable to clear the parameter display in Plot #2 (from Example in Step 2). Proceed to Step 4. •... Page 157 CH 7/ View Event Data The 4400 provides setup options to measure rms data per cycle or per second. RMS settings The RMS Voltage and RMS Current parameters are available under Journal Categories - Standard List.
MARK436 MARK514 Cyclic RMS: RMS values are computed over 1 power frequency cycle (16.67 msec @ 60 Hz) in 1/2 cycle steps (every 8.33 msec). Page 158 7-22 1.800.561.8187 information@itm.com www..com... C H A P T E R Reports Overview Users have the option to view QOS compliance reports in two ways: via EN50160 or Report types
Status. Each report has their own method of presenting compliance data. Each also differs on the length of evaluation period to monitor compliance. From the Home screen, press Reports. Overview EN50160 expected in
public distribution networks. The QOS functionality is equipped with monitoring and setup protocols to meet the measurements required for EN50160 monitoring. CH 8/ Reports EN50160 monitoring and setup protocols to meet the measurement required for EN50160 monitoring and setup protocols to meet the measurement required for EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to meet the measurement required by EN50160 monitoring and setup protocols to measurement required by EN50160 monitoring and setup protocols to measurement required by EN50160 monitoring and setup protocols to measurement required by EN50160 monitoring and s
 4400 displays the parameters in the form of a Compliance Statistical Bar Chart. From the Reports screen, press EN50160. MARK471 The bar chart indicates the percentage of the intervals passing the specified compliance criteria. Page 162 EN50160 Measurement Parameters, continued pumps, compressors, etc.) is used. Flickers display a cluster of
bars, one for each phase. EN50160 parameters The color of each bar indicates that the parameter does not comply with EN50160. CH 8/ Reports EN50160 Compliance Limits The table below indicates the limit
numbers or range of values required for each Compliance limits parameter to pass QOS compliance and satisfy EN50160 standard. Parameter Limits for QOS Compliance to Pass Un = Low Voltage (MV) Supply nominal voltage, range 1kV to 35kV Power frequency
with Mean value over 10 seconds... Page 164 EN50160 Compliance Limits, continued The table below indicates the limit numbers or range of values required for each Compliance Limits for QOS Compliance Limits, continued The table below indicates the limit numbers or range of values required for each Compliance Limits, continued The table below indicates the limit numbers or range of values required for each Compliance Limits for QOS Compliance Limits, continued The table below indicates the limit numbers or range of values required for each Compliance Limits, continued The table below indicates the limit numbers or range of values required for each Compliance Limits, continued The table below indicates the limit numbers or range of values required for each Compliance Limits, continued The table below indicates the limit numbers or range of values required for each Compliance Limits, continued The table below indicates the limit numbers or range of values required for each Compliance Limits, continued The table below indicates the limit numbers or range of values required for each Compliance Limits, continued The table below indicates the limit numbers or range of values required for each Compliance Limits, continued The table below indicates the limit numbers or range of values required for each Compliance Limits for QOS compliance Limits, continued The table below indicates the limit numbers or range of values required for each Compliance Limits for QOS compliance Limits, continued The table below indicates the limit numbers or range of values required for each Compliance Limits for QOS compliance Limits, continued The table below indicates the limit numbers or range of values required for each Compliance Limits for QOS compliance L
voltage, upper limit 1kV Uc = Medium Voltage (MV) Supply Characteristics - declared voltage or declared voltage, range 1kV to 35kV Harmonic voltage (MV) Supply Characteristics by reference Interharmonic compliance limit to the nominal voltage or declared voltage,
as appropriate. The table below indicates values in relation to the nominal voltage. Interharmonic Group Number Limit DC-1... Compliance Statistical Bar Chart description
determining QOS compliance. See pages 8-3 to 8-4 for the description of each of the EN50160 parameters. The bar chart indicates the percentage of the interval passing the specified compliance Statistics bar Action... Result... chart STEP 1 (continued): (continued): (continued) • Press DISDIP to view the Event
Statistics. Go to page 8-13. • Press Min/Max to view the min/max values for Power Frequency and RMS Voltage. Go to page 8-15. Page 168 Compliance Statistics bar Action... Result... chart STEP 4: The Interharmonic graph (continued) displays the status of each individual Interharmonic and TID for
each phase. The bar chart indicates the percentage of intervals passing the specified compliance evaluations made. The QOS status Summary standard monitoring period is one week, usually beginning Sunday at 00:00 (midnight). Any compliance
evaluation performed in less than one week will receive an Evaluation Status marked as Incomplete, and Compliance History, continued Evaluation Period: Displays the date and time of the beginning of the evaluation period. Compliance History table Each evaluation period is independent of each
other. The default length of evaluation (continued) period is a 7-day week period by which the unit calculates information in strict compliance with the EN50160 DISDIP (distribution of dips) table is based upon the event statistics EN50160 DISDIP calculated by EN50160. It includes the UNIPEDI
DISDIP Statistics and the table for Transient Overvoltages. UNIPEDE DISDIP data is collected and saved on a weekly basis with the counts reset as the final save occurs. Page 172 Event Statistics, continued The DISDIP table also includes those events of Transient type. Scroll down the next UNIPEDE DISDIP page of the UNIPEDE DISDIP Statistics
table to display data for Transient Statistics table Overvoltage as shown below. (continued) MARK474 Display table for RMS Voltage along
with the time and date of occurrence. Maximum phase values of Rapid Voltage Change, Flicker, Supply Voltage Unbalance, and Harmonic are also displayed along with time and date of occurrence. Waximum phase values of Rapid Voltage Unbalance, and Harmonic are also displayed along with time and date of occurrence. Waximum phase values of Rapid Voltage Unbalance, and Harmonic are also displayed along with time and date of occurrence. Waximum phase values of Rapid Voltage Unbalance, and Harmonic are also displayed along with time and date of occurrence.
Annunciator panel can be displayed via the annunciator panel. Real time data, event count, or user- specified calculated data is available in the matrix display of the annunciator panel. When monitoring is on, the annunciator panel displayed via the annunciator panel. When monitoring is on, the annunciator panel displayed via the annunciator panel.
Preset parameters and/or Panel Size to display. Setup options Presets provide a set of default parameters that will be displayed in the annunciator panel. The screen matrix size can also be customized (Small, Medium or Large) according to user application. Page 176 Panel Setup Options, continued Preset The table below shows the default
parameters on display in the annunciator panel. Note parameters between that you can edit and change the parameter settings using the Edit Panel function The annunciator panel displays metered data for the selected parameter. The metered
Annunciator panel color data is updated once per second. This is the same data that appears in the meter screen, scheme and used in calculating journals. If the selected parameter is not journalled, the rms event or transient event count can be selected to appear in the panel instead of journalled data. Page 178 Panel Operation, continued The
following procedure describes how to view parameter data plot panel. Action... Result... STEP 1: From the annunciator panel. FOR EXAMPLE: The summary report type described here is for Motor... Page 179 CH 8/ Reports Parameter
data plot (continued) Action... Result... FOR EXAMPLE: Once View Graph is selected, coordinates for V RMS Imbalance event are displayed on screen. NOTE: Imbalance is the rms deviation per channel if the instrument is in Standard PQ Mode. Page 180 Panel Operation, continued Parameter data plot (continued) Action... Result... Once
View Limits is selected, threshold values crossed that cause the V RMS Imbalance event are displayed on screen. MARK612 Once Edit panel is selected, the window where you can select Metered Data journal categories to plot is displayed. C H A P T E R Downloading Events Overview In this chapter The 4400 allows users to download, archive and
view event data in a computer This section discusses the external Communication Interface External Communication Interface To download events from the 4400 through the
optical port, you must have the Isolated Communications following: a personal computer or laptop with Windows operating system with either ® Module RS232 serial port or network adapter, NodeLink, and the appropriate Isolated ®... DC power input is not required. Otherwise, COMM-RS232 requires that an external power source be connected
For external power supply, use the optional accessory Battery Charger/UPS (P/N XBC-PX5) available from Dranetz. Connect the DC plug from the battery charger/UPS to the 12V, 3W max input jack on the RS232 adapter. External Communication Interface, continued The following procedure and diagram describe how to connect the 4400 to a
computer Connection setup via USB via USB. Once the physical connection is done, see Chapter 4 Instrument Settings - Communicate with external devices. 230V AC for Euro, UK or Australia type plug. NOTE: For battery backup operation, replace the AC adapter
with the optional accessory Battery Charger/UPS (P/N XBC-PX5) available from Dranetz. 4. Set the IP configuration of the Ethernet Communication Interface, continued When configuring both the 4400 and NodeLink for
modem communications, keep in Connection ® setup via mind that the 4400 uses a fiber optic serial port in order to maintain electrical isolation. Modem This means that there are no control signals available to a modem to use for handshaking and flow control. CH 9/ Downloading Events NodeLink uses Windows TAPI when accessing modem
communications resources. Connection ® ® setup via The assumption is that the Windows modem to be used for 4400 communications has ® Modem been properly installed prior to executing this procedure. (continued) If the modem is not on, or was not on when Windows was started, it may be necessary... Page 188 External Communications
Interface, continued Back at the 4400, the last step in configuring the modem communications is to modify Connection setup via the modem initialization string to match the modem initialization string to match the modem communications is to modify Connection setup via the modem initialization string to match the modem initialization string the modem initialization string
string for a modem using the Agere (Lucent) Modem initialization chipset: string command (continued) AT&F;S0=2;&K0;%E0;S30=6 Where AT is the modem attention command. &F instructs the modem to restore factory configuration.
keep their NodeLink and 4400 programs current ® with the latest version released by Dranetz. NodeLink V2.6 or higher is required to download events from PowerGuide 4400 firmware version. DranView ® Users are strongly advised to always
keep their DranView and 4400 programs current ® with the latest version released by Dranetz. DranView with HASP) and in hard key version (without HASP) are well as a without (without HASP) and without (without HASP) are well as a without (without HASP)
are shown below. Users are strongly advised to follow the recommended requirements specifications for optimal DranView operation. The recommended specifications are 8... Page 193 Keep the HASP in the port while using the DranView operation. The recommended specifications are 8... Page 193 Keep the HASP in the port while using the DranView operation.
table below lists the HASP ID labels that go with the corresponding Dranetz product. Page 194 DranView with HASP, continued Installation procedure Supports the following ID Label (continued) Dranetz products HASP for USB Port DRAN-VIEW ENTERPRISE PQDIF (Sig), Comtrade, TEXT DVE-PQDIF (Sig), Comtrade, TEXT, 4400, PX5, PX5-
400 DVE-PX PQDIF (Sig), Comtrade, TEXT, 4300, PP1, 658... Page 195 As part of our continuing quality development effort, and in the event of finding serious bugs, Dranetz may occassionally post a self-installing upgrade patch which users can download for free. The patch may be found at the Dranetz website www.dranetz.com under "Software
Packages and Updates". The upgrades are available to users who are registered owners of DranView . Page 196 9-16 1.800.561.8187 information@itm.com www. .com... Optional Accessories Introduction available for use with the 4400 and the Dranetz
 software applications used to download and view event data in a computer. Topic See Page Hardware Accessories List &... Hardware Accessories List on Descriptions Hardware Accessories List and Descriptions Hardware Accessories List on Descri
500 A TR-2500A Current Probe, 1 to 10 A RMS TR-2510 Current Probe, 1 to 10 A RMS TR-2510 Current Probe, 1 to 10 A RMS TR-2510 Current Probe, 1 to 10 A RMS TR-2510A... Page 199 APPENDIX A/ Optional Accessories List Accessories List Accessories List Accessories List Accessories List Accessories Part Number (continued) AC/DC Current Probe, 1 to 10 A RMS TR-2510A... Page 199 APPENDIX A/ Optional Accessories List Accessories List Accessories List Accessories List Accessories List Accessories List Accessories Marketing Powered List Accessories List A
PR150/SP2 AC/DC Current Probe, 1500A, Without AC Adapter PR1500/SP8 Current Probe Adapter Cables LF-PSP External Battery Charger with DRANFLEX Probe Power DF-
PSP Adapter Isolated Current Transformer 0.1A to 5A ISO-65X-5 Dranetz Reference Publications Field Handbook for Power Quality Analysis HB114414-S 1.800.561.8187 information@itm.com www. Page 201 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, TR20123: These four probes are made for the Dranetz model 658 but can be used with the 4400 by using an adapter cable (part number CA-4300). Page 202 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 probes. Isolated Current transformers to Dranetz equipment. Page 203 APPENDIX A/ Optional Accessories Field Handbook for Electrical Energy
Management: This reference handbook provides Dranetz reference a comprehensive guide for information related to conducting a thorough energy management. V5.x or higher with PX5 and 4400 driver ® 5PK-DV5DRANTOPX [5-User Package]
DVPXHASP supports PX5, PX5-400, 4400 5PK-DVPXHASP [5-User Package] DVDRANHASP supports PX5, 4400, 658, PP1 and PP4300 5PK-DVPXALLHASP ... Page 205. Dranetz strongly advises ® users to always
keep their 4400 program current with the latest firmware version released by Dranetz. Log on to the Dranetz website, www.dranetz.com, to download the latest firmware upgrade version. DranView is a Windows -based program that is used to archive, view and analyze ®... Page 206 A-10 1.800.561.8187 information@itm.com www..com... A P F
ENDIX Technical Specifications Overview In this appendix. Topic See Page General Interfaces Measured Parameters Computed Parameters 
2.5" Height x 8" Depth (30 x 6.4 x 20.3 cm) Dimensions Weight: 3.8 pounds Operating: 0 to 50 °C (32 to 122 °F) Environmental Storage: -20 to 55 °C (4 to 131 °F) Humidity: 0 to 95% non-condensing;... Page 209 APPENDIX B/ Technical Specifications Interfaces Mains supply: Installation Category II, Pollution Degree 2 Installation Categories
Measurement inputs: Installation Category III, Pollution Degree 2 Type: 1/4 VGA color graphic, touch screen Liquid Crystal Display (LCD) with Display compact fluorescent (CCFL) backlight time-out to reduce power consumption. Page 210 CMRR: -80 db typical Type: 4 full differential, DC coupled. Current Channels A, B,
C, D Input Range: 10 - 200% of Rated Probe Input (Dranetz probes) RMS Accuracy: ±0.1% of Reading ±0.05% Full Scale plus Probe Accuracy, 3KHz bandwidth (1 second rms readings) Each voltage/current pair (i.e. Page 211 APPENDIX B/ Technical Specifications Computed Parameters The computations below apply to single channel parameters.
Single Channel Parameters Note that 0 = Phase Angle of Current. Average Power samples taken as the product of voltage and current True Average Power samples. Page 212 Computed Parameters, continued Calculated using the True Average Power divided by the Apparent Power. See Note
True Power Factor below for sign information. WATT Calculated using cosine of the phase angle between the fundamental frequency Displacement Power Factor components of voltage with respect to current (0 = 0). Page 213 APPENDIX B/ Technical Specifications The computations below apply to three phase wye configuration. Totals Totals for
page B-7 for sign information. True Power Factor, Vector Total WATT Vector-Tot Vector Total WATT Vector-Tot Vector Total WATT Vector Total
                          parameters monitoring mode. Standard Current Fault Long-term Continuous EN50160 Parameters Power Inrush Recorder Timed Data Quality Recording table lists the default settings for the threshold parameters in each Setup
parameters monitoring mode. (continued) Standard Current Fault Long-term Continuous EN50160 Parameters Power Inrush Recorder Timed Data Quality Recording Logging Waveform Capture Trigger Response When Volts All Active... APPENDIX B/ Technical Specifications TR2500 Current Probe To achieve the rated accuracies, follow these
guidelines: 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. Range: 1 to 500 Arms Specifications Accuracy:... TR2510 Current Probe TR2510 Current Prob
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. Range: 0.1 to 10 Arms Specifications Accuracy (at 60 Hz): 0.1 to 10A, ±1% reading ±0.01A... A P P E N D I X Battery Specifications and Replacement Procedure
Overview The internal battery pack used in the 4400 functions as the primary power source and Introduction UPS. Always charge the battery fully before using the unit. The 4400 will fully charge its internal battery in six (6) hours. Page 220 Battery Specifications Battery Specifications Type: Sealed, rechargeable NiMH (Nickel Metal Hydride) cells
Battery pack Location: Battery compartment on the rear of the unit. Number of batteries in pack: 6 Voltage: 7.2 V dc Capacity: 2.7 Ah Charging: A depleted battery pack can be recharged in approximately six (6) hours. Length of operation: More than two (2) hours when fully charged and with backlight on. Page 221 La 4400 esta equipada con un
circuito interno cargador de baterlas. No intente cargar las baterlas con un cargador externo que no sea el cargador de baterias Dranetz, puesto que la carga indebida podrla hacer que explote la bateria. The XBC-PX5 External Battery Charger allows the charging of a battery pack(s) that Description can be used for Dranetz models PowerXplorer
PX5, PowerGuide 4400, and Power Platform 4300. It is especially useful when monitoring for short durations where no standard 115 or 230 VAC power is available. Having multiple charged battery packs can provide unit power for several hours, allowing users to perform monitoring analysis of AC power quality issues in remote locations. Page 223
APPENDIX C/ Battery Specifications and Replacement Procedure The following procedure describes the basic operation and its applications, 1. Insert the BP-PX5 battery charger operation and its applications and Replacement Procedure describes the basic operation and its applications, 1. Insert the BP-PX5 battery charger operation and its applications and Replacement Procedure describes the basic operation and its applications.
applicable Information Sheets and User's Guide on how to connect current probes and follow the proper safety procedures before proceeding. Battery Pack Replacement The 4400 contains an easily replaceable internal battery pack BP-PX5 only.
WARNING ADVERTENCIA Reemplace con batería Dranetz NiMH BP-PX5 solamente. AVERTISSEMENT Remplacer par la batterie Dranetz NiMH BP-PX5 exclusivement. Page 225 APPENDIX C/ Battery Specifications and Replacement Procedure Battery removal diagram 1.800.561.8187 information@itm.com www..com... Page 226 1.800.561.8187
information@itm.com www..com... Page 227 The following parts are easily replaced by the operator and do not require special tools Introduction or access to the interior of the unit. Call Dranetz Customer Service at (732) 287-3680 or 1-800-372-6832 to order any To order parts of the following parts. Page 228 1.800.561.8187 information@itm.com
www. .com... A P P E N D I X Common Circuit Connections Overview If you are making power measurements, follow these diagrams so that your ABC Who should result from improper connection of this instrument. Page 230 Overview, continued
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 connecté, la mort, des blessures graves, ou un danger d'instrument. Lorsque vous utilisez l'instrument, suivez toutes les instructions d'installation et de service. Cet instrument doit être connecté... Page 231 APPENDIX E/
Common Circuit Connections To avoid the risk of electric shock or burns, always connect the safety (or earth) WARNING ground before making any other connections. To reduce the risk of fire, electrical shock, or physical injury it is strongly WARNING ground before making any other connections. To reduce the risk of fire, electrical shock, or physical injury it is strongly WARNING ground before making any other connections.
contains diagrams of both voltage and current probe connections that are Voltage and current probe connections 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. APPENDIX E/
Common Circuit Connections Verifying Voltage and Current Connections Correct voltage and current connection of single phase, split phase, or polyphase Introduction connections that show the magnitude and angular relationship of voltage and current for each
phase of a monitored connection. Page 234 Verifying Voltage and Current phasor reconnections, continued Phasor displays that show incorrect current probe so that the arrow on the probe handle points toward the load. diagram The 4400 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 on page 5-11). APPENDIX E/ Common Circuit type appropriate for their application inputs as shown
below. The figure also shows voltage connection using channel D as a differential input for measurements, use both channels A and B for voltage and Introduction 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 and current probes. The neutral is Introduction 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. 3 Phase (Floating or Grounded) Delta 4 Phase (Floating or Grounded) Delta 5 Phase (Floating or Grounded) Delta 5 Phase (Floating or Grounded) Delta 6 Phase (Floating or Grounded) Delta 6 Phase (Floating or Grounded) Delta 7 Phase (Floating or Grounded) Delta 7 Phase (Floating or Grounded) Delta 8 Phase (Floating or G
inputs with channel A using source voltage A-B, channel B using B-C, and channel B using B-C, and channels A and B. Neutral to ground
measurements are important but optional. Connection diagram PX5-905... Generic Circuit Generic Circuit In the Generic circuit connected to channels A, B, C, and D. Connection diagram PX5-906 E-12 1.800.561.8187
information@itm.com www. APPENDIX E/ Common Circuit Connected to channels Introduction A, B and C are connected to channels Introduction A, B and C are connected to common and is the reference for the three channels Introduction A, B and C are connected to common and is the reference for the three channels. 2 1/2 Element Without Voltage Channels Introduction A, B and C are connected to common and is the reference for the three channels.
1/2 Element Without Voltage Channel C Channels A and B are connected to voltage. Current probes are connected to common and is the reference for the three channels. Follow the safety precautions listed on page E-3 when making all potential transformer Safety Precautions
connections. Potential Transformers are not manufactured by Dranetz and are discussed here NOTE for informational purposes only. A potential transformer Procedure Follow these steps to connect voltage probes to a potential transformer
Step Action Turn off power to the PT. Connect the colored voltage probes to the PT's connections in accordance with the manufacturer's instructions. WARNUNG Sie bitte den Anleitungen des Herstellers (siehe Stromumwandler). Die Grenzwerte des Herstellers sollten
nicht überschritten werden. Current Transformers, also known as instrument transformers, reduce high level Description currents to low level currents so they can be safely monitored. Low current monitoring devices made by
Dranetz are called isolated current Introduction transformers or ISO box connections in addition to those Safety precautions safety precautions stated on page E-3. Page 247 • connecting them to the secondary of CTs for metering by the 4400. •
inserting them in series with the load current to measure low current to measure low current transformer, continued DO NOT exceed current limits of the ISO box, CAUTION PRECAUCION NO exceed los
límites de corriente de la caja del ISO. NE PAS dépasser les limites d'intensité du transformateur ISO. ATTENTION Die aktuellen Grenzwerte für den ISO-Kasten sollten NICHT überschritten VORSICHT werden. Events characterization implemented in the 4400 adheres to the IEEE 1159 and IEC Variations as per 61000-4-30 Class A measurement
standards. The range of variations as per IEEE and IEEE, IEC, and IEC standards are featured below, along with quality test measurements developed by Dranetz. IEEE 1159 IEC 61000-4-30 Dranetz Dranetz (deviations as per IEEE, IEC, and IEEE 1159 IEC 61000-4-30 Dranetz Dra
from IEEE (continued) 1159 only are noted) Transients Impulsive no more than one IEC classification for Peak - absolute transition in each... Page 251 APPENDIX G/ Event Classification from IEEE (continued) 1159 only are noted) Waveform Distortion
(measured as steady state values from 10/12 cycle calculations) DC Offset frequency range magnitude 0 - 0.1%... Page 253 A P P E N D I X PG4400 Menu Structure The 4400 menu screen maps are shown in the following pages. Use the Level number Menu structure description and
Heading as guide to navigate through the different menu screens. Each screen to Level 200 MARK301pg MARK21 To Level 200 MARK301pg MARK21 To Level 200 MARK301pg MARK21 To Level 200 MARK301pg MARK431 To Level 430 MARK301pg MARK431 To Level 430 MARK301pg MARK431 To Level 430 MARK431 T
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Setup To Level 001 MARK101 MARK101 MARK101 MARK105 MARK105 MARK102 MARK102 MARK103 MARK103 MARK103 MARK103 MARK101 To Level 108 G-4/a 1.800.561.8187 information@itm.com cont. next page www..com... Page 257 LEVEL 100/2(b) Start Menu - Wizard Setup MARK101 MARK111 MARK111 MARK111 MARK1112 To Level 112 MARK114pg
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MARK129 MARK124bpg 1.800.561.8187 information@itm.com www..com... Page 259 LEVEL 100/4 Load Setup Template from Card MARK100 MARK139pg LEVEL 100/5 Load Data from Card MARK100 MARK139pg LEVEL 100/5 Load Data from Card MARK100 MARK139pg LEVEL 100/5 Load Data from Card MARK100 MARK150 MAR
MARK155 MARK159 MARK156 MARK160 MARK108 To Level 200 MARK108 To Level 200 MARK108 To Level 240 MARK108 To Level 24
MARK201 MARK202 MARK205 1.800.561.8187 information@itm.com www..com... LEVEL 300/1 Meter Mode - Distortion MARK311PG MARK302PG MARK305PG G-10 1.800.561.8187 information@itm.com www..com... LEVEL 300/2 Meter Mode - Distortion MARK311PG MARK312PG
MARK316PG MARK313PG MARK313PG MARK313PG MARK314PG G-11 1.800.561.8187 information@itm.com www..com... LEVEL 220 Harmonics MARK224 switch to V, I, or W set vertical scale display to 10%, 20%, 50%, 100%, 200%, 500% or 1000% MARK225
MARK226 toggle between Normalized and UnNormalized phase values G-12 1.800.561.8187... 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 MARK243 Start/Stop demo plot waveforms as
rotate phasors switch demo between Resistive, Inductive and Capacitive load effects MARK112 101 MARK112 102 MARK112 107 MARK112 107 MARK112 107 MARK112 107 MARK112 107 MARK112 107 MARK112 108 MARK112 107 MARK112 108 MARK11
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