



PowerMaster[®]
Automated Meter Tester
4 Series

Firmware Version 1.1.0.8

Product Manual

Revision 1.5

Copyright © by TEC, 2016. All rights reserved.

Disclaimer

This documentation is provided for information purposes. TEC makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. TEC shall not be liable for errors, omissions, or inconsistencies which may be contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of the material. Information in this document is subject to change without notice and does not represent a commitment on the part of TEC.

Table of Contents

| | |
|---|-----------|
| Contacting Powermetrix | 5 |
| Warranty | 6 |
| Safety | 7 |
| Product Manual Release Notes | 8 |
| 1 Product Description | 11 |
| 1.1 Keypad | 11 |
| 1.1.1 Keypad and USB Keyboard Use Table..... | 14 |
| 1.2 Screen | 15 |
| 1.3 Connector Panel | 16 |
| 1.4 Communication Ports..... | 16 |
| 1.5 Standard Accessories | 17 |
| 2 Inserting Meter and Making Connections | 19 |
| 2.1 Making Voltage Connections to a Metering Service | 20 |
| 2.2 Making Voltage Connections with the AC Adapter | 21 |
| 2.3 Testing Mechanical Meters | 21 |
| 2.4 Using the KYZ Pulse Input (Form C) | 22 |
| 3 Graphical User Interface..... | 23 |
| 3.1 Controls | 23 |
| 4 Main Menu (Pre Site Selection) | 25 |
| 4.1.1 Main Menu (After Site Selection) | 26 |
| 5 Site Selection and Editing | 27 |
| 5.1.1 Details on Creating a New Site..... | 28 |
| 5.1.2 Site Editor Page 2 | 29 |
| 5.1.3 Site Editor Page 3 | 29 |
| 6 Test Meter | 30 |
| 6.1 Test Meter Procedure | 30 |
| 7 Demand Test | 32 |
| 7.1 Demand Test Procedure | 33 |
| 8 Creep Test | 34 |
| 9 Utilities..... | 35 |
| 9.1 Calibration Verification | 36 |
| 9.1.1 Using a Single Phase Standard with the PowerMaster® | 37 |
| 9.1.2 Using a Three Phase Standard with the PowerMaster® | 38 |

| | | |
|-----------|--|-----------|
| 9.1.3 | Application Procedure:..... | 39 |
| 9.2 | Save a Database Backup | 41 |
| 9.3 | Quick Edit | 42 |
| 9.3.1 | Phantom Load Setup | 42 |
| 9.3.2 | Meter Editor | 43 |
| 9.4 | Remote..... | 44 |
| 9.5 | System | 45 |
| 9.5.1 | Status | 45 |
| 9.5.2 | Install a System Upgrade | 46 |
| 9.5.3 | Set System Time | 46 |
| 9.6 | User Preferences..... | 47 |
| 9.6.1 | General Settings, Error Limits, & Warm-up Times..... | 47 |
| 9.6.2 | Custom Fields for Test Session Notes | 48 |
| 9.6.3 | Load Box Labels | 48 |
| 10 | Recall Data..... | 49 |
| 11 | Detailed Specifications | 50 |

Contacting Powermetrix

Technical Support

For technical support, please contact the factory at (865) 218-5838 (877-966-5851 toll free) and ask for “Powermetrix Technical Support.” You may alternatively email Powermetrix at help@powermetrix.com. The support staff will answer questions about the operation and care of your equipment, assist you in troubleshooting a problem, and help you overcome common application difficulties whenever possible. If it becomes necessary for your equipment to be returned to us for any reason, you will be issued an RMA number during the technical support contact.

Feedback

Powermetrix depends on information from our customers to continue the attributes of quality, dependability, and simplicity associated with our products. We invite you to contact our Technical Support office.

Calibration and Certification

Your Powermetrix equipment is calibrated and certified effective the date of shipment. Powermetrix requires the unit to be calibrated by Powermetrix or a Powermetrix authorized service facility on an annual basis to insure accuracy and currency of installed electronic components. In addition, current and voltage probes are also required calibration on an annual basis or when dropped, damaged or suspect of improper operation. The unit is identified as calibrated by a sticker stating the date of calibration and next due date of calibration. A certificate of calibration is provided to you to verify compliance to inspectors. A permanent record of your calibration is maintained by Powermetrix. For information on calibration services, contact Powermetrix Technical Support.

Additional services to be included at no additional charge during annual calibration:

1. Inspection of probes, cables, and internal circuit boards
2. Proper maintenance and/or prevention to any suspect components
3. ECN's (Engineering Change Notices)
4. Manual cleaning of unit, cables, probes, and case
5. Update firmware
6. Reproducibility report for clamp-on probes
7. Service Report for all work completed

NOTE:

The annual calibration is required in order to comply with the terms of the PowerMaster® warranty. See “Warranty” in the next section for details.

Warranty

PowerMaster® 4 Series Warranty

TEC/Powermetrix Division warrants the POWERMASTER® product to be free of defects in material and workmanship for a period of two (2) years following the purchase date. Note that there are no user serviceable parts in the unit. The warranty covers the POWERMASTER® provided it is properly used, stored and maintained in accordance with provisions in the User Manual. Items not covered under the warranty policy include (but not limited to) cracked or broken LCD, water damage, and connecting auxiliary leads to voltages above 530V AC.

Annual calibration at the Knoxville TN factory is required to maintain the validity and terms of this warranty. Please call TEC-Powermetrix Division at (865)218-5837 to obtain an RMA number and form prior to any return of equipment for service or recalibration. Your PowerMaster® unit will alarm you when it is time for a recalibration. Please send your unit in at this time. If an annual calibration is not maintained for over one (1) year from either the purchase date or the last calibration date (within a maximum of two (2) years from purchase date), the warranty is null and void. To re-enter the warranty period, the customer must send the POWERMASTER® in for calibration cost. At this time the warranty period is valid for one (1) year from calibration date, as long as the two (2) year time period has not exceeded the purchase date. If a repair is required while the POWERMASTER® is within two (2) years from purchase date, but outside one (1) year of last calibration, the customer has the option of paying for the repair cost or paying for the annual calibration cost to be re-instated into the warranty period (within a maximum of two (2) years from purchase date). If the POWERMASTER® is outside the purchase date of two (2) years, the cost of the calibration and/or repair service will be at the customer's expense.

Safety

Operation of the PowerMaster® and the supplied accessories and adapters can present the user to potentially hazardous conditions. Please follow all required safety procedures set forth by the user's safety organization within the company. If no safety organization exists, please follow all applicable OSHA rules and standards for PPE (Person Protective Equipment) when working in high voltage and low voltage environments. This equipment should be used by trained and qualified personnel ONLY.

Making Connections to a Metering Service

1. Verify the Auxiliary Power switch is in the OFF position.
2. Verify all voltage leads are disconnected from the metering service.
3. Connect the Auxiliary Power leads (AUX PWR, AUX NEU) to an AC source.
4. Turn the Auxiliary Power switch ON, and confirm the fan turns on as well.
5. Press the PowerMaster® ON key, and wait until the Main Menu is displayed.
6. Connect the voltage leads to the metering service.
7. Proceed with testing.

Safety Tips for Testing:

1. Connect the green safety ground to a true earth ground before testing begins. Remove the green safety ground last after testing is complete.

Product Manual Release Notes

Product: PowerMaster® 4 Series

Release Date: 2/22/2016

Manual Version: 1.5

What's New: 1.1.0.8

1. Fixed CT Burden ratio retest function to avoid crashing during 5S test.
2. Fixed CT Ratio/Burden to avoid crashing during 8S or 9S test.
3. Fixed graphical bug in CT ratio test while using integrated site test on the 3 series.
4. Fixed navigational function keys while in harmonic details hot screen to move correctly.
5. Fixed hot screen to display the correct gain range after running a burden measurement test on 3 series.
6. Fixed PT Ratio test phase error reporting.
7. Fixed label for Qt and Qa in user preferences.
8. Fixed 5S 4W-Wye service type labels for CT testing to be more consistent.
9. Added improvements for better load box/phantom load operation.
10. Added ability for the CT/PT ratio on the hot screen to include PT NPR.
11. Added new battery levels for 7 series.
12. Added new calculations for voltage and current differences on the meter screen.
13. Added enable/disable ratios to recall data.
14. Verified VA always unsigned, regardless of VARS.
15. Adjusted sign convention to make VAR testing more similar to conventional meters.
16. Created and added new handlers to better display potential error codes.
17. Made THD thresholds minimum 5%.
18. Removed unused code and adjusted database for more stability.

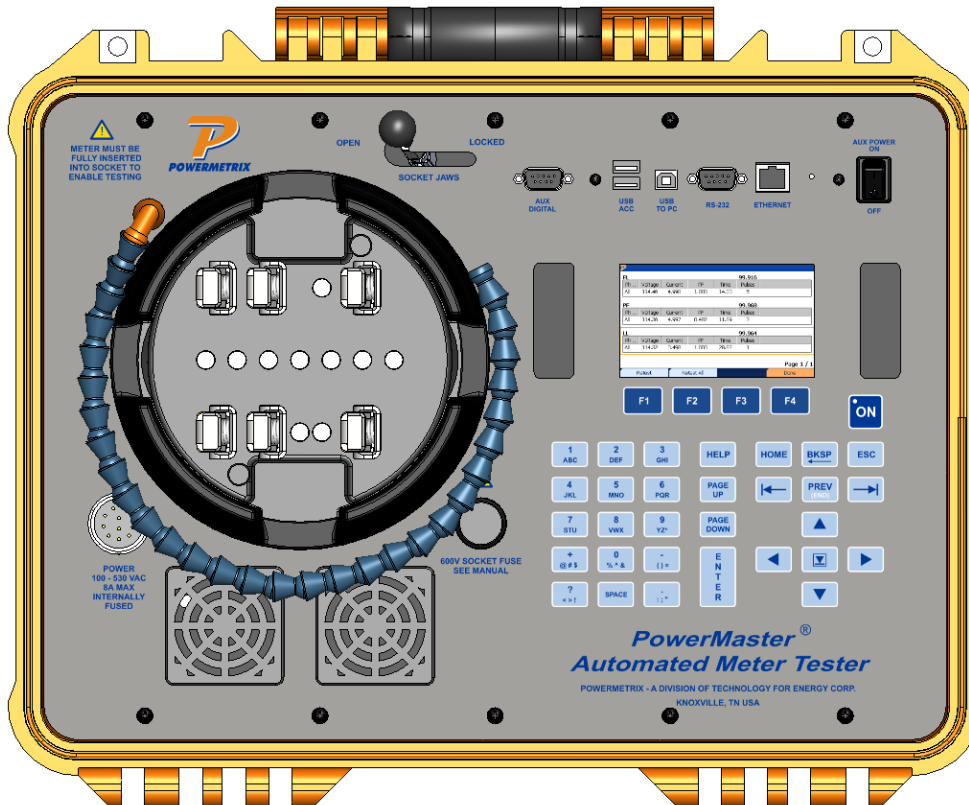
What's New: 1.0.3.5

1. Fixed mislabeled string in Preference page.
2. Fix for saving waveforms. Needs to save correction values only for the power pairs.
3. Fix status screen to come up when aux power is off.
4. New database 2.4 adds columns for saving wire length and gauge for Burden Measurement
5. Added new wire length and gauge to the Burden Measurement.
6. Added option to change the IR pickup choice on the 4 series when doing a meter test.
7. Added the fix that save the Serial Number and Manufacturing Serial number entered in the dialog if the user chooses to Prev out of the blinking screen.

8. Load box now takes less time to adjust
9. Load box error message to indicate THD error. A user seeing this consistently needs to send the unit back for service as the power supply is probably dying.
10. Forced default Service Type choice for 2S in ANSI mode to be the 1Ph 3W non-IEC.
11. Fixed decision making of phantom load threshold for maximum amps allowed in test. First criteria is 50/30/20 amp unit; second self-contained vs. transformer rated; third meter class.
12. Added Schlumberger 5S meter to default database.
 - a. Added 35S Service Types.
 - b. S004F05M,35,3W-NETWORK
 - c. S004F05,35,3W-NETWORK
 - d. S005F05,35,3W-DELTA
 - e. S006F05,35,4W-DELTA C HI
 - f. S006F05A,35,4W-DELTA C HI
 - g. S014F05,35,3W-DELTA
 - h. S008F05,35,4W-WYE
 - i. S008F05A,35,4W-WYE
13. Added option to determine the THD threshold for stabilizing the WFG.
14. Added 5S 4W-Wye 2v,2c,3CT service type.
15. Fix for issue where a user can attempt to do a burden only PT test which is not allowed.
16. Conditioned out VSM drive when on a 4 series.
17. Added error code and message to user for WFG Overdrive Error.

1 Product Description

This section gives the user a brief tour of the PowerMaster®. It describes the various keys and their functions, the input and output ports, and the standard accessories supplied with the PowerMaster®. Optional accessories are discussed later in [Section 1.50](#).



1.1 Keypad

Descriptions of all keys are discussed below:



The AUX POWER switch controls the AC auxiliary power to the PowerMaster®. Terminate the 1-Phase Voltage Cable from POWER to an AC source from 100-530VAC.



After the AUX POWER is switched on, press and hold down the ON key located at the right side of the PowerMaster® keypad until the green LED embedded in the key turns green. Once powered pressing the ON button again turns the system OFF. The PowerMaster® incorporates a power conservation function. If no activity (keystroke) occurs within 1 minute following the ON

keystroke, the PowerMaster® will go into “sleep” mode in which the display is turned off. Any tests in process will not be affected. To restore the display press any key.



The Function keys (F1 – F4) are located directly below the PowerMaster® display. Four rectangular boxes on the display directly above the function keys define their use as it corresponds to each screen. The purpose of each key may change from screen to screen. If any of the screen boxes are blank, the box’s corresponding key has no function in that screen.



The TAB key moves the cursor from one field to the next field.



The BACK TAB key moves the cursor from one field to the previous field.



The DROP-DOWN key enters the drop-down box menu once the cursor is focused on that field. All available selections are displayed at the time of keystroke. This key also checks and un-checks checkboxes. Press the key a second time to select an item and close the dropdown list.



The PREVIOUS key is used to allow the user to go back to the previous screen. Continually pressing this key will always take the user back to the Main Menu.



The DIRECTIONAL keys are used to move the cursor up or down in a menu selection. Also, the keys are used to make selections in a drop-down box. These keys can be used alternatively to view selections in a drop-down box without having to press the DROP-DOWN key.



The HOME key is used to quickly go back to the Main Menu in the PowerMaster®. This key can be pressed at any time. (Function currently in development; firmware update coming soon).



The HELP key will be used to enter the troubleshooting mode when the PowerMaster® detects possible errors. It is also used to launch an electronic version of this User Manual. (Function currently in development; firmware update coming soon).



The ESCAPE key is an “undo” key when entering text. Pressing ESC again “re-does” the previous text before edits were made. Also, check boxes will highlight/un-highlight when pressing the ESC key.



The BACKSPACE key will delete one character at a time in a reverse direction OR delete the text in the field entry all together if highlighted



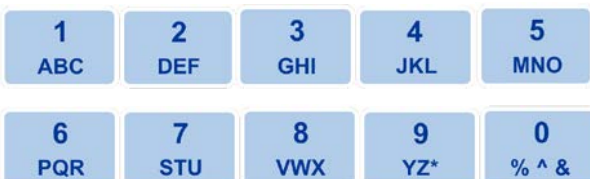
PAGE UP and PAGE DOWN keys are used to move the screen either up or down one page. This function is available if information exceeds the first page of the screen.



The ENTER key is used to accept data or a menu selection.



The SPACE key is used to place a space in between text fields and can also be used to check/uncheck checkboxes.



























The ten alphanumeric keys (0 through 9 / A through &) are used to input alphanumeric values into the PowerMaster®. A single press followed by a one-second delay returns the numeric value (first character of the key). Two rapid presses followed by a one second delay returns the second character (first of the three alpha characters) of the key. Three or four rapid presses followed by a one-second delay returns the third or fourth (second or third alpha) characters of the key, respectively. For example, if you want to type the letter “N” which is the third character on its corresponding key, press the key three times rapidly, and then stop for one second. The letter “N” will appear on the screen.



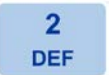
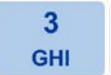
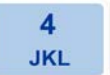
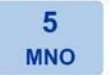
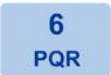





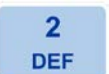
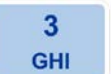
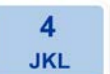
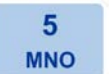



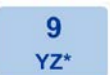
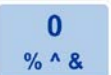
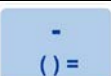





The symbols keys operate the same as the alphanumeric keys. These keys will normally be used when entering notes and comments in the PowerMaster®. Note the “period” key (second from left) is used to help enter the Kt value of the meter (ex. 1.8 Kt).

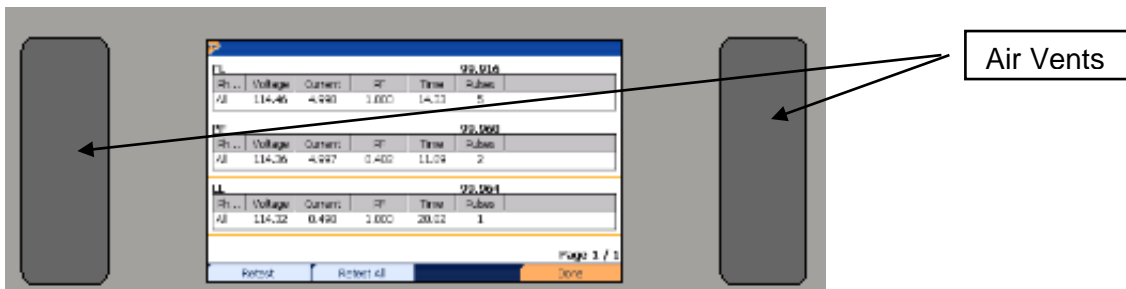
1.1.1 Keypad and USB Keyboard Use Table

The PowerMaster® allows the user to input a USB keyboard & mouse to alternatively operate the analyzer. The USB keyboard & mouse is used by connecting to one of the USB ports labeled “USB PERIPHERALS.” The following table is an explanation for each corresponding key on the PowerMaster® keypad.

| Label | PowerMaster® Key | USB Keyboard & Mouse Key |
|--------------------|---|--|
| On |  | N/A |
| Function keys |     | F1 – F4 |
| Tab key |  | Tab |
| Back Tab key |  | Shift, Tab |
| Drop-Down key |  | Num Lock, 5 |
| Previous key |  | End |
| Directional keys |     |     |
| Home key |  | Home |
| Help key |  | N/A |
| Escape key |  | Esc |
| Backspace key |  | Backspace |
| Page Up, Page Down |   | Page Up, Page Down |
| Enter key |  | Enter |

| | | |
|--------------------------------|--|---|
| Space key |  | Space bar |
| Alphanumeric keys (Numbers) |           | 1 - 0 |
| Alphanumeric keys (Letters) |           | A - Z |
| Symbol keys |     | -, (,), =, ., :, ;, ", +, @, #, \$, ?, <, >, ! |

1.2 Screen



The full graphics Liquid Crystal Display (LCD) screen is how the PowerMaster® communicates with the user. In computer technology, the screen is the “graphical user interface.” The screen displays messages, menus, selection lists, and graphic illustrations.

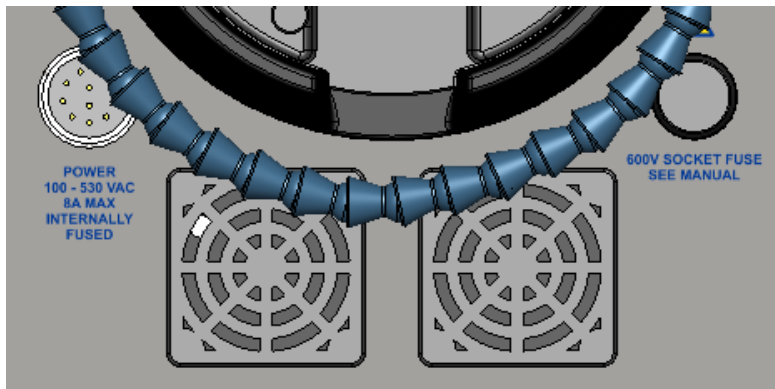
The display is 4.3” in diameter. It is a color WQVGA (wide quarter video graphics array) with a resolution of 480 x 272 pixels. It is a transfective display, which means that the screen is readable in any lighting situation. The display can be read in full darkness as well as full sunlight. A thin piece of tempered glass is used to protect the screen and is mounted on top of the display.

Air Vents

The air vents (mounted on the left and right of the LCD) are used to vent the heat from the internal system during testing. **DO NOT OBSTRUCT THE VENT IN ANY WAY.**

The audible speaker is also mounted behind the right air vent for maximum volume.

1.3 Connector Panel



POWER 100-530VAC 8A MAX INTERNALLY FUSED

This connector is for the 1-Phase Voltage + Auxiliary Power (part 10-340-0100). The connector is a military-grade, 12-pin receptacle that locks the cable into place once inserted. This connection is to provide power to the PowerMaster® with an AC source between 100-530VAC with an over current protection of 8A max. This input can be controlled by the AUX POWER switch located on the top right of the front panel. This connection will also supply the PowerMaster® with a single phase voltage input for synchronization of the current source.

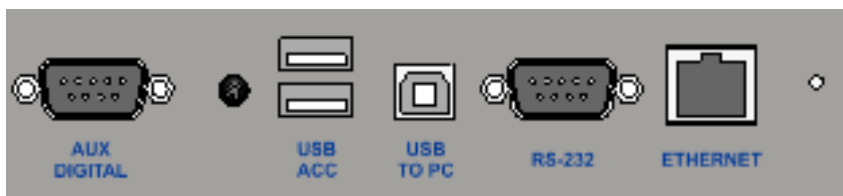
Fans

The fans are used to circulate cool air through the internal system during testing. When auxiliary power is connected to a voltage source (100-530Vac) and turned on, the fan automatically powers on. The fans operate at a variable speed. The speed is controlled by the internal temperature. If environmental conditions combined with the heat generated from the voltage and current drives exceeds the ability of the fan to maintain acceptable internal temperatures a warning is displayed. If the temperature exceeds absolute maximum rating the system will automatically shut back operation.

600V SOCKET FUSE

This fuse holder contains a 600V, 0.5A slow acting fuse (Bussmann KLKR 1/2). This fuse protects the PowerMaster® from a voltage overload or prevents damage from an incorrect selection of a meter under test.

1.4 Communication Ports



AUX DIGITAL

This port is used with external meter testing pickups. All pickups are terminated with the 9-pin connector.

USB ACC

These two USB ports are used for external USB devices. Examples of these devices are a keyboard, mouse, barcode reader, memory storage device, etc.

USB TO PC

This port is for a Type B USB cable (standard accessory) for connectivity to a host computer. This port is used to communicate with the PowerMaster® PC software Meter Site Manager 2.

RS-232


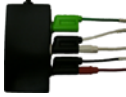

This port is for legacy devices that may use the RS-232 connectivity. It can also be used to connect an ANSI C12.18 meter communication interface (currently in development).

ETHERNET

This port is for a high speed connection including internet.

1.5 Standard Accessories

The PowerMaster® base unit comes with the following standard accessories:

| | Part Number | Product | Notes |
|---|-------------|--|---|
| | 10-340-0100 | 1-Phase Voltage Cable + Auxiliary Power | 100 - 530V. Terminated with banana jacks to allow user customization |
|  | 75-800-4005 | USB Communication Cable | Type B USB cable for communication to a computer |
|  | 10-340-0045 | Auxiliary Power AC Adapter (North America) | For plugging the PowerMaster® AUX power directly into a wall outlet. |
|  | N/A | Meter Site Manager 2 | Software to be used on a PC or laptop; Used for communicating with the PowerMaster® |

SPARE PARTS

| | |
|--------------------|-----------------------------|
| 75-800-4005 | USB Cable |
| 50-950-0001 | White Alligator Clip |
| 50-950-0002 | Black Alligator Clip |
| 50-950-0003 | Red Alligator Clip |
| 50-950-0006 | Green Alligator Clip |

METER TESTING PICKUPS

10-100-3309 Suction Cup Infrared Pulse Pickup

Infrared pulse detector with suction cup mount for attachment to electronic meter face.

10-120-0005 Isolated KYZ Contact Pickup

Rated for use on dry contacts or powered contacts up to 480 Vac. Connected to terminal blocks via rugged mini clips.

10-100-3326 Photo Disk Detector with Flexible Arm Mount

Sensor detects meter revolutions using a reflective mode optical pickup. For mechanical meters.

10-100-3311 Manual Pushbutton Switch

This pushbutton provides a manual pulse input to verify meter accuracy for any meter (6' lead).

OTHER ACCESSORIES**10-340-4301 Test Jack Adapter**

This adapter allows the user to connect directly to a test switch at the metering service for the purposes of a 9S or 5S meter test using the PowerMaster®'s current source. Both current and voltage cables are terminated with banana jacks and include color-coded alligator clips. When supplying current to a test switch directly, current isolators are required (separate accessory).

22-241-0070 Test Switch Current Isolators

Used to isolate currents between test switches

CALIBRATION CHECK ACCESSORIES**10-340-0046 External Digital Cable (STD OUT, STD IN only)**

Condensed version of 10-340-0031 where the measurement of the standard's energy pulse output or the PowerMaster®'s pulse input are only required

10-340-4302 Series Current Test Cable Adapter

Socket adapter terminated with 6mm current plugs and 4mm voltage connectors for connection to a single or three-phase AC reference standard.

10-340-0052 Calibration Check Adapter Cables (Voltage)

These cables have 4mm female receptacles terminated with small ring terminal connections that adapt to the voltage connections on a single phase AC reference standard. These cables are used in tandem with the Series Current Test Cable Adapter.

10-340-4101K Stackable Jumper Cable

Two of these cables are used to jumper the potential neutrals together during a calibration check on a 3-phase reference standard. A quantity of two is required.

10-340-4096G Safety Ground Cable

This 3' cable is used to terminate the standard to a true earth ground. One alligator clip is included.

CALIBRATION PACKAGES

Pre-paid discounted calibrations for five years from the last calibration date.

ED-5YR-RECAL-4134 Five Year Annual Calibration Package 4134

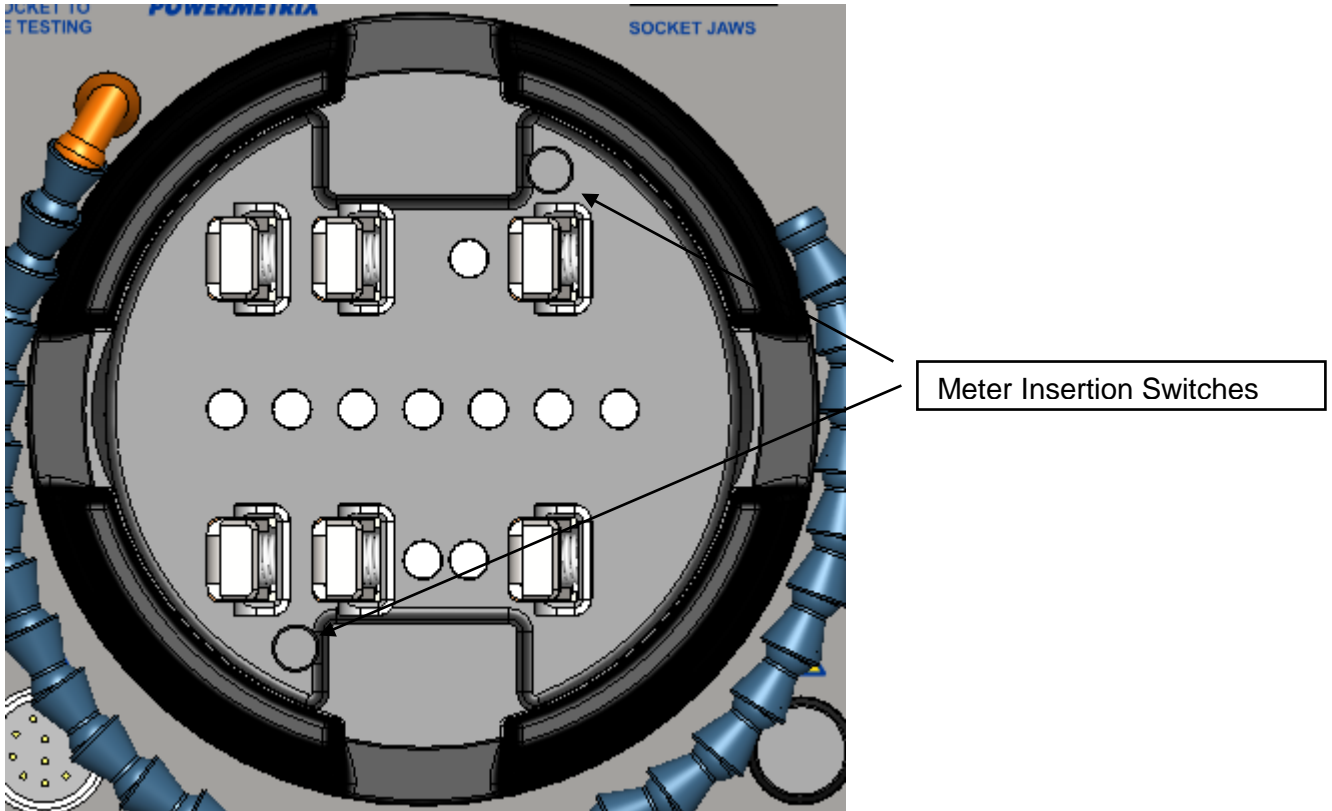
ED-5YR-RECAL-4154 Five Year Annual Calibration Package 4154

SINGLE CALIBRATIONS

ES-RECAL-4134 Single Calibration 4134

ES-RECAL-4154 Single Calibration 4154

2 Inserting Meter and Making Connections

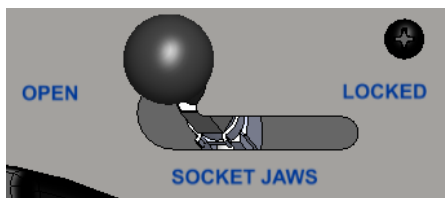


With the ZIF (Zero Insertion Force) adapter, the user can insert and remove any S-based meter into the socket without any additional force required. It also has a built-in infrared pulse indicator for solid state meters.

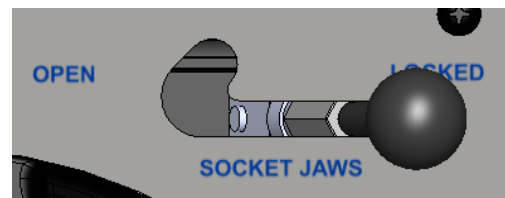
When the meter is correctly inserted, two Meter Insertion Switches that are mounted on the adapter are depressed. When these switches are up, this signals the PowerMaster® to stop any voltage and/or current driving to the meter socket. This will prevent electrical shock to the user.

Inserting & Removing Meter

To insert a meter, slide the lever for SOCKET JAWS to OPEN. Carefully insert the meter, then slide the lever to the LOCKED position. To remove the meter, slide the lever back to OPEN.



OPEN (ready for insertion or removal)

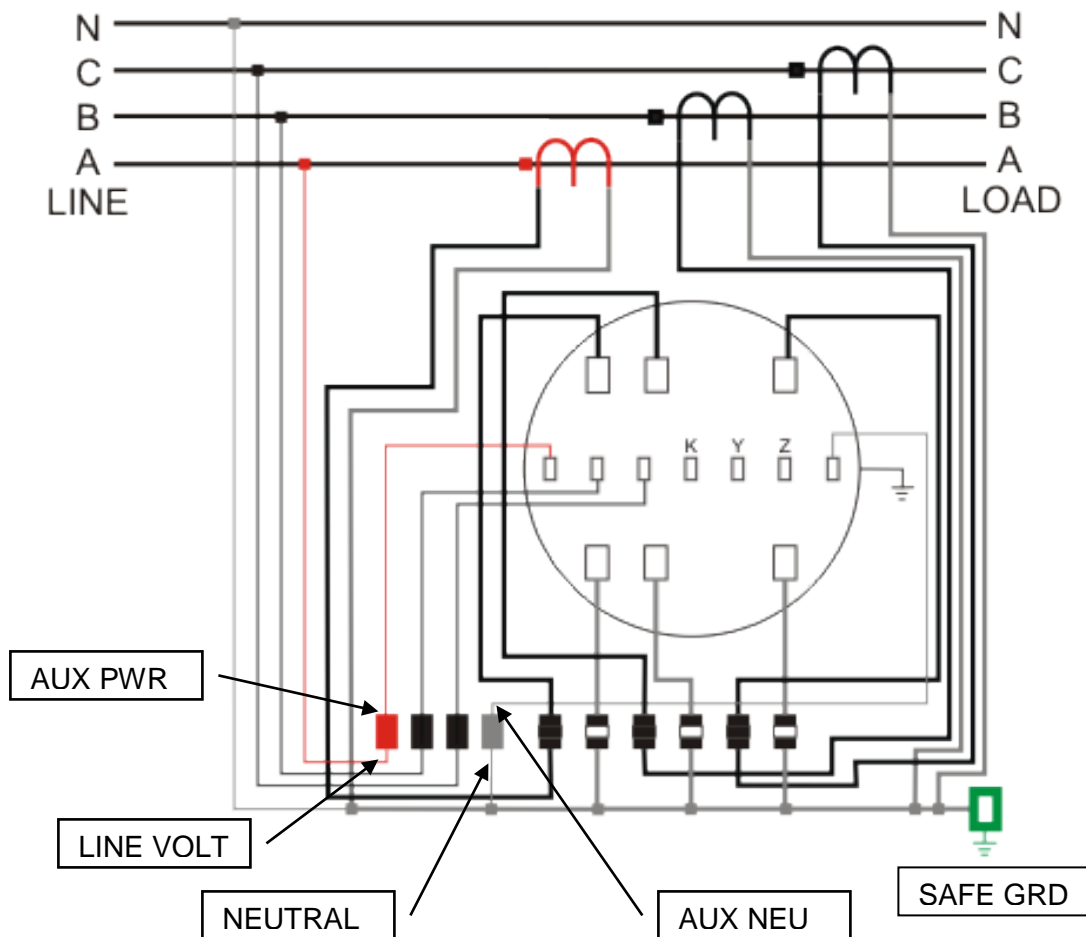


LOCKED

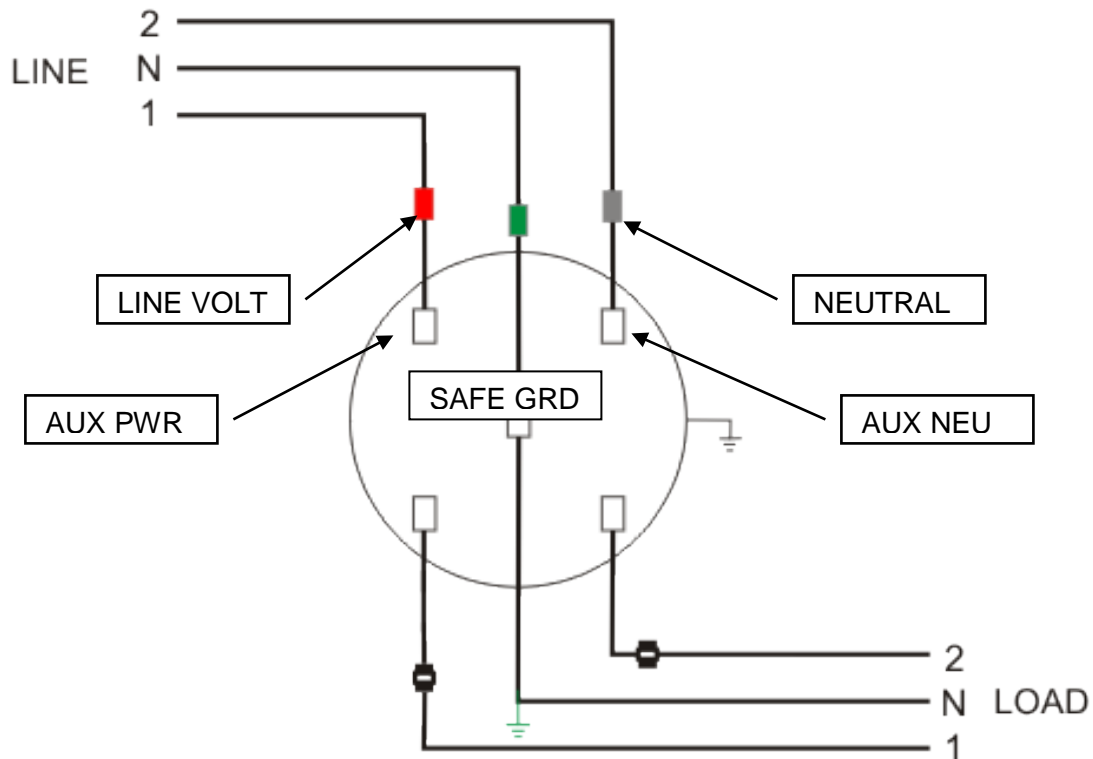
2.1 Making Voltage Connections to a Metering Service

1. Verify the Auxiliary Power switch is in the OFF position.
2. Connect the Auxiliary Power leads (AUX PWR, AUX NEU) to an AC source (phase-neutral or phase-phase up to 530VAC).
3. Turn the Auxiliary Power switch ON, and confirm the fan turns on as well.
4. Press the PowerMaster® ON key, and wait until the Main Menu is displayed.
5. Connect the voltage leads to the metering service (A=red, Neutral=white).
6. Proceed with testing.

**Transformer Rated Metering Service
(3-Phase, 4-Wire shown)**



Self-Contained Metering Service (1-Phase, 3-Wire shown)



2.2 Making Voltage Connections with the AC Adapter

1. Verify the PowerMaster® is off, and the Auxiliary Power switch is in the OFF position.
2. With the AC Adapter, insert AUX PWR into the black receptacle. Insert AUX NEU into the white receptacle. Insert SAFE GRD into the green receptacle.
3. Insert the LINE VOLT into the stackable connector for AUX PWR. Insert NEUTRAL into the stackable connector for AUX NEU.
4. Plug the AC Adapter into a wall outlet.

2.3 Testing Mechanical Meters

Setting up the Analyzer

1. Open the PowerMaster® lid.
2. At the lid hinge, remove the two pull pins.
3. Remove the lid and place it aside.
4. Insert meter into the ZIF socket.



5. Rotate the PowerMaster® in a vertical position.

Setting up the Input

1. Once the meter is inserted into the ZIF socket, go to the Main Menu.
2. At the Main Menu, enter Utilities (option 5).
3. From the Utilities menu, enter User Preferences (option 7)
4. In User Preferences, tab to Meter Pickup.
5. Change the setting to “Aux Digital”.
6. Press F6 to save.
7. Insert the Photo Disk Detector or the Manual Pushbutton into AUX DIGITAL.
8. Test as normal.

2.4 Using the KYZ Pulse Input (Form C)

The user has the option of measuring the KYZ output from the pins on the meter. When the meter is seated in the PowerMaster®'s ZIF socket, designated voltage pins measure the relay open and closure during a revolution. The following meters have supported KYZ outputs: 6S, 8S, 9S, 11S, 26S, 29S, 36S, 39S, 46S, 56S, 66S, and 76S.

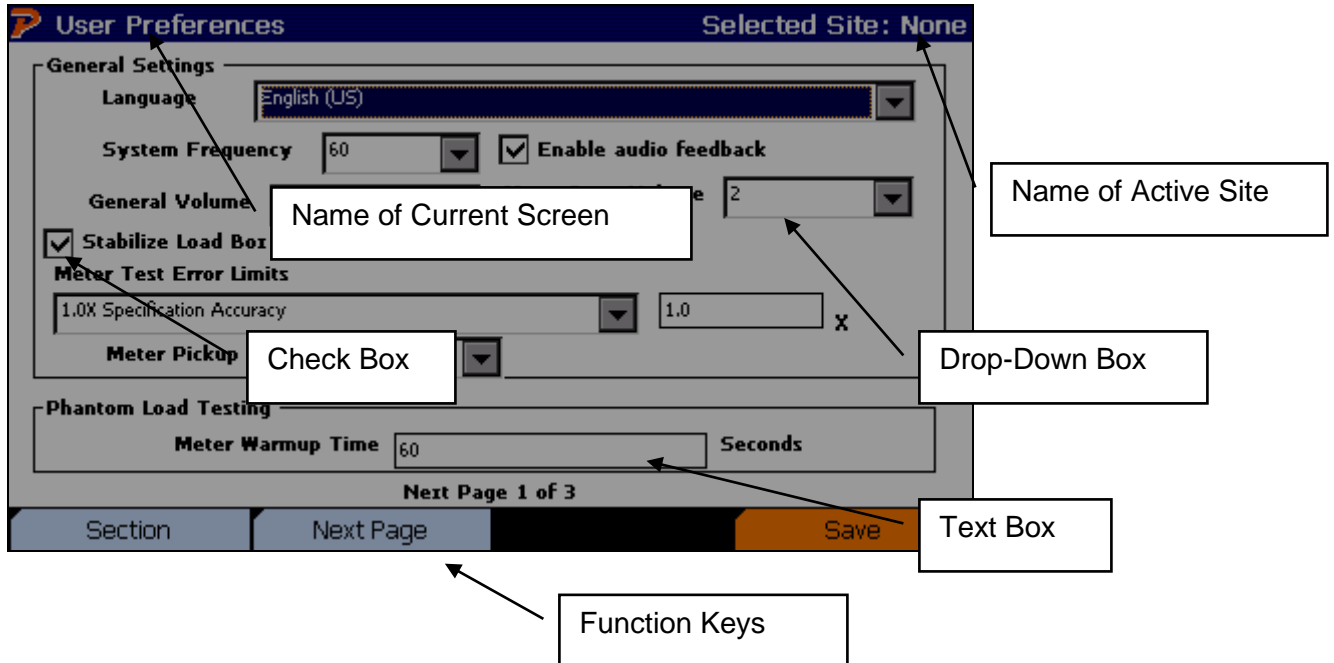
Setting up the Input

1. Once the meter is inserted into the ZIF socket, go to the Main Menu.
2. At the Main Menu, enter Utilities (option 5).
3. From the Utilities menu, enter User Preferences (option 7)
4. In User Preferences, tab to Meter Pickup
5. Change the setting to “KYZ”

The screenshot shows the 'User Preferences' screen with a blue header bar. The title 'User Preferences' is on the left, and 'Selected Site: None' is on the right. The main content area is divided into sections. The 'General Settings' section includes 'Language' (English (US)), 'System Frequency' (60), 'General Volume' (7), and 'Meter Beep Volume' (2). There is a checkbox for 'Enable audio feedback' which is checked. Below this is a checkbox for 'Stabilize Load Box Phases' which is also checked. The 'Meter Test Error Limits' section shows '1.0X Specification Accuracy' and a multiplier of '1.0 x'. The 'Meter Pickup' dropdown menu is open, showing options: 'Internal', 'Aux Digital', and 'KYZ'. An arrow points to the 'KYZ' option. Below this is the 'Phantom Load Test' section with a 'Meter Pickup' dropdown set to 'KYZ' and a 'Seconds' field set to '60'. At the bottom, there is a navigation bar with 'Section', 'Next Page', and 'Save' buttons. The text 'Next Page 1 of 3' is visible above the buttons.

1. Press F6 to save.
2. Test meter as normal.

3 Graphical User Interface



3.1 Controls

The PowerMaster® human interface uses familiar Windows style controls. The behavior of many of the controls have been enhanced to eliminate the need for a pointing device such as a mouse.

Text Boxes Meter kHz

Text boxes are entered by or . When the cursor enters the control, any data in the text box is highlighted. Typing at this point will replace the information currently in the text box. If the text box is colored yellow, it is a required field. If the text box is colored gray, the field cannot be edited. This is typically data from the master database which is presented for reference only.

Drop-down boxes

Once the user tabs (or) into a dropdown list box, they can change the selection in one of two ways:

1. Press or to move to the previous or next selection in the list, press to accept and continue.
2. Press to cause the selection list to drop down, then press or to make a selection, press again or ENTER to accept the selection. Note: focus remains on the drop down box. The user must press to go to the next field.

In drop-down boxes, the user can also enter text as long as an item is not presently selected.





Required Fields

Meter kWh

These tagged fields (yellow background) require entry before continuing to the next screen. If the user continues with no entry, a pop-up window states, "These fields are required: x,x,x" "Enter to continue" The cursor returns to the first required field if not entered.









Check Boxes

☐ Va


When the user tabs ( or ) into a check box, the label highlights in orange. The user can then press  or  key to change the state of the check box.

| Tes | Phase | Label | Voltage |
|-----|-------|-------|---------|
| 1 | | | |
| 2 | | | |
| 3 | | | |


Grid Control


The  and  keys allow the user to enter the grid. Once in the grid, the user can press , , ,  to navigate the cells (denoted by an orange cursor). Once the user selects a cell to edit, the user presses the  key to edit or drop down a combo box. Once the user has edited the cell, the user presses the  key to accept the change.


ESCAPE key


The  key is an "undo" key when entering text. It returns the contents of the control to their previous edit value.

Every text box and combo box remembers two things: The old text (info that was there when you first entered the field or after the last Undo/Redo) and the new text (whatever the user last changed it to).

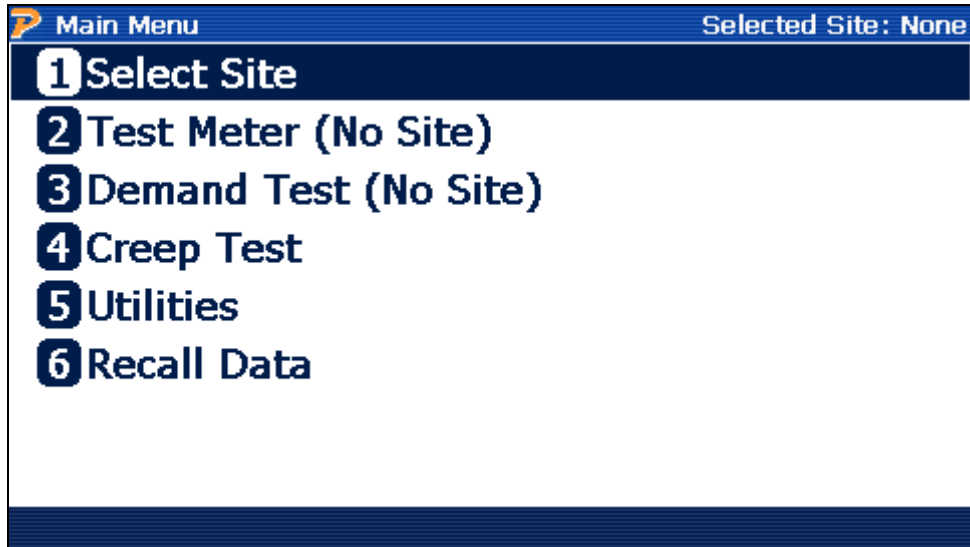
Pressing  after changing the info in a text box or drop-down box causes it to *undo* (put back the old text).

Pressing  again causes it to *redo* (swap back to the new text).

As long as the user keeps hitting , it will continue to swap back and forth between old text and new text




Check boxes will check/un-check when pressing 

4 Main Menu (Pre Site Selection)



Description:

All menus in the system operate in the same manner. A menu entry may be selected by using

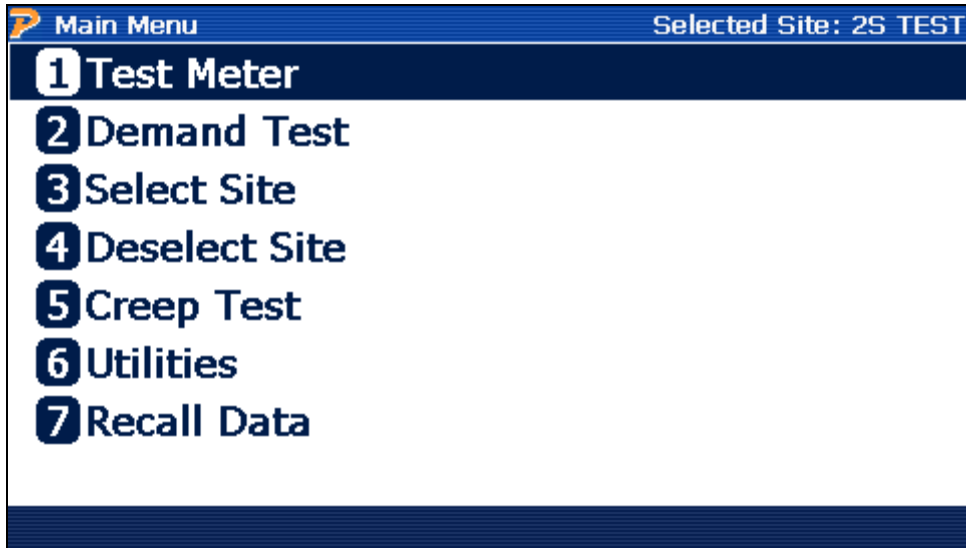
the  and  keys may be used to move up and down between items. Pressing the  key then causes the selected item to be executed.

Alternately pressing the numeric key of the label next to the menu item executes it immediately.

Prior to selecting a site for testing from the database only a limited number of menu items are selectable. These are:

- 1) Select Site (select a site for analysis or access the site manager database editor)
- 2) Test Meter (No Site) (takes the user to the meter testing setup form)
- 3) Demand Test (No Site) (takes the user to the demand testing setup form)
- 4) Creep Test (apply test voltage only)
- 5) Utilities (view or edit user preferences, other applications)
- 6) Recall Data (view previously saved data).

4.1.1 Main Menu (After Site Selection)




Description:

Once a site is selected all system test capabilities are selectable. These are:

- 1) Test Meter (takes the user to the meter testing setup form)
- 2) Demand Test (takes the user to the demand testing setup form)
- 3) Select Site (select a site for analysis or access the site manager database editor)
- 4) Deselect Site (sets selected site to NONE)
- 5) Creep Test (apply test voltage only)
- 6) Utilities (view or edit user preferences, other applications)
- 7) Recall Data (view previously saved data).

5 Site Selection and Editing

 **Select Site** Selected Site: None

Select Site

| SITE ID | CUSTOMER | ACCOUNT NO | MANUF SN | LAST TEST |
|---------|------------------|------------------|---------------|----------------|
| 16S | customer | account no | teg0886219... | 10/7/2011 9... |
| 2S TEST | TEC | 123456ABCD | 5911244Z | None |
| 5S | | | Vectron 123 | 10/6/2011 1... |
| 6S | | | vectron | 10/6/2011 1... |
| 6S M-90 | this is custo... | this is accou... | 62039262 | 10/6/2011 4... |
| 9S | | | Landis 123 | None |

New SiteEdit SiteDelete SiteSelect

Description:

This screen allows the user to

- **F1** create a new site
- **F2** edit a site's information,
- **F3** delete a site from the database
- **F4** select a site

Note that only sites without saved test data can be deleted. Otherwise, all sites and data can be deleted using Meter Site Manager 2 software.

All information related to a site is contained in the PowerMaster® database. This information can also be synchronized to a PC database using Meter Site Manager 2 (see user manual).

5.1.1 Details on Creating a New Site

The screenshot shows a software window titled "Site Editor" with a status bar at the top right indicating "Selected Site: None". The main area contains several input fields: "Site ID" (a long text box), "Kt" (a small text box), "Meter Form" (a dropdown menu showing "1"), "Service" (a dropdown menu showing "1PH"), "Service Type" (a dropdown menu showing "1PH - S001F01"), and "Next Test" (a date picker showing "2014 Jan 18"). A note next to the "Kt" field states: "Note: Enter Kt here to override the value from meter selection on Page 2." At the bottom, there are two buttons: "Section" and "Next Page".

Description:

1. From the main menu enter Select Site (option 1)
2. From the select site menu, select New Site (F1)

This screen (1 of 3) allows the user to enter technical information about the site. Information that must be entered on this page is the site ID. If no other information is needed, enter the Kt factor as well to turn on the option to save the file. Entering Kt on this screen will override any other Kt factor in the file, including any added with a meter. Pressing F1 skips to the next section, and F2 enters the next page. When complete, press F4 to save and exit.

Required Fields:

Site ID: This field is the site identifier. This field is 30 characters long and accepts both numerical and alphabetical characters. Normally, an identifier must be chosen which is unique for the site. It is also helpful if the identifier is easily recognized by the technician. Powermetrix does not recommend the use of the meter serial number, because the meter can always be changed.

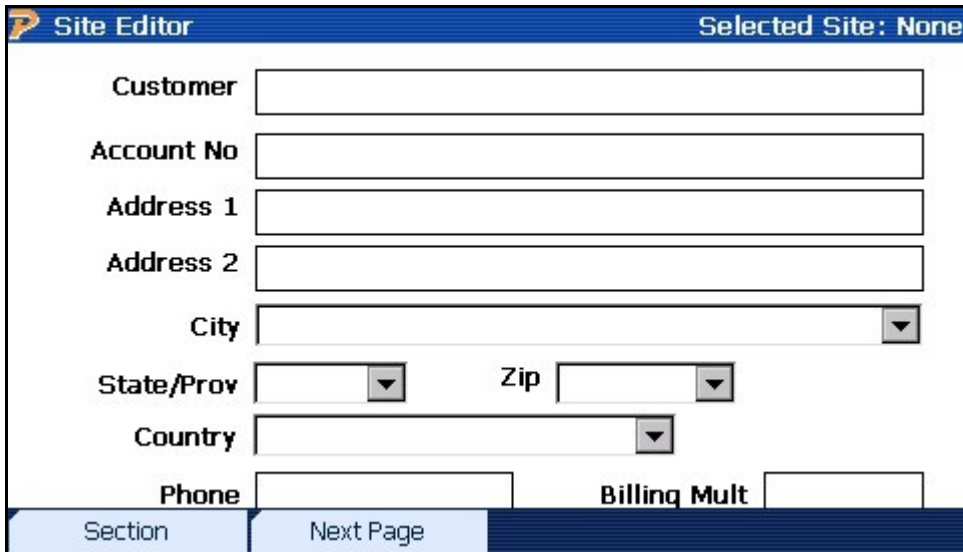
Meter Form: This field is for the meter form that is to be tested. Entering the drop-down box will display all available meters in the PowerMaster® database. **WARNING:** Please note that the selection of an incorrect meter form may overload the PowerMaster® during a test and cause the 600V, 0.5A fuse to blow. Take care to select the appropriate form that is currently in the socket.

Service: This field is the configuration the meter operates at the site. Depending on the Meter Form selected, various options may be available.

Service Type: This is the file that refers to the wiring configuration and the meter being used at the site. It includes the type of service (such as 4-wire Wye or 3-wire delta), It identifies the instrument transformer configuration of the site using primary current ("PC") probes (such as 2PC or 3PC). It also identifies whether a self contained or transformer rated meter is being used (SC or TR respectively).

Kt: This field is required ONLY if a meter is NOT selected from page 2. Otherwise, the Kt (test constant) will be automatically populated using the Kt value from the selected meter in the database.

5.1.2 Site Editor Page 2

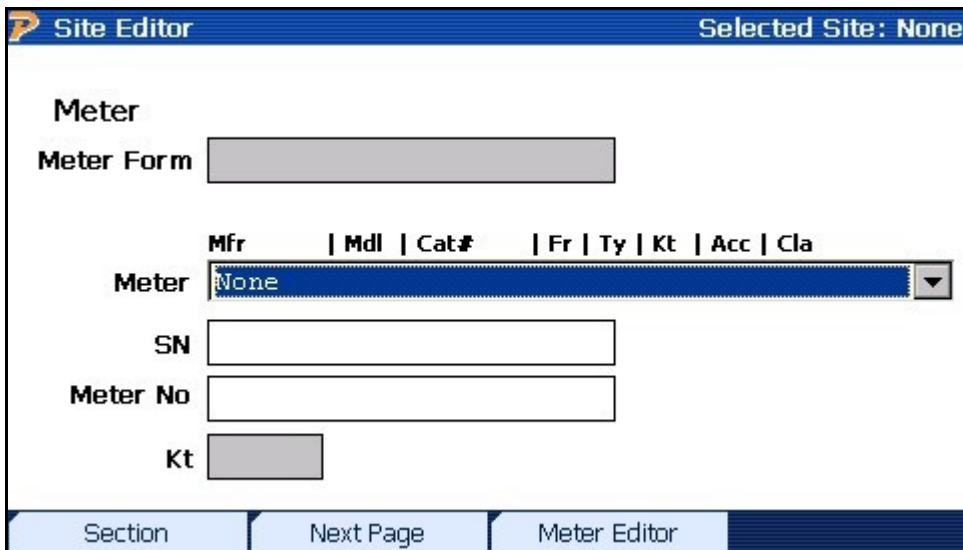


The screenshot shows the 'Site Editor' window with a blue header bar containing a 'P' icon, the text 'Site Editor', and 'Selected Site: None'. The main area contains several input fields: 'Customer' (text), 'Account No' (text), 'Address 1' (text), 'Address 2' (text), 'City' (text with a dropdown arrow), 'State/Prov' (dropdown), 'Zip' (text with a dropdown arrow), 'Country' (text with a dropdown arrow), 'Phone' (text), and 'Billing Mult' (text). At the bottom, there is a dark blue bar with three buttons: 'Section', 'Next Page', and 'Billing Mult'.

Description:

If desired, customer information can be entered on this screen. Pressing F1 skips to the next section, and F2 enters the next page. When complete, press F4 to save and exit.

5.1.3 Site Editor Page 3



The screenshot shows the 'Site Editor' window with a blue header bar containing a 'P' icon, the text 'Site Editor', and 'Selected Site: None'. The main area contains several input fields: 'Meter Form' (text), 'Mfr' (text), 'Mdl' (text), 'Cat#' (text), 'Fr' (text), 'Ty' (text), 'Kt' (text), 'Acc' (text), 'Cla' (text), 'Meter' (dropdown menu showing 'None'), 'SN' (text), 'Meter No' (text), and 'Kt' (text). At the bottom, there is a dark blue bar with three buttons: 'Section', 'Next Page', and 'Meter Editor'.

Description:

Detailed information about the meter, such as brand, serial number and accuracy can be entered on this page. If the desired meter is not located in the database, it can be created by pressing F3 and entering the meter editor. Pressing F1 skips to the next section, and F2 enters the next page. When complete, press F4 to save and exit.

6 Test Meter

Setup with Site Selected

Setup with No Site Selected

Description:

Setup with Site Selected

If site is selected, press option 1 on the main menu “Test Meter”. When a site is selected, all fields are considered to be “read only”. This form is to confirm all values are correct.

Press F4 to confirm and continue the meter test.

Setup with No Site Selected

When a site is not selected, the user must manually enter values. “Mfr. SN” is required (noted in yellow). If a meter is not found in the drop down menu for “Meter Model”, the user can press F3 (Meter Editor) to create a new meter (see [Section 9.3.2](#)).

Press F4 to confirm and continue the meter test.

6.1 Test Meter Procedure

Step 1

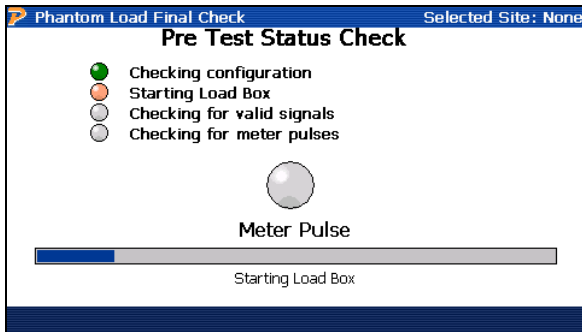
Press F4 to continue

Step 2

| Test | Phase | Label | Mode | Current | PF | Lead/Lag | Flow | Pulses | Time |
|------|-------|-------|------|---------|-----|----------|------|--------|------|
| 1 | All | FL | Wh | 30 | 1 | Lag | DLV | 10 | 30 |
| 2 | All | PF | Wh | 30 | 0.5 | Lag | DLV | 10 | 30 |
| 3 | All | LL | Wh | 3 | 1 | Lag | DLV | 10 | 30 |

Change or confirm setup, press F4

Step 3



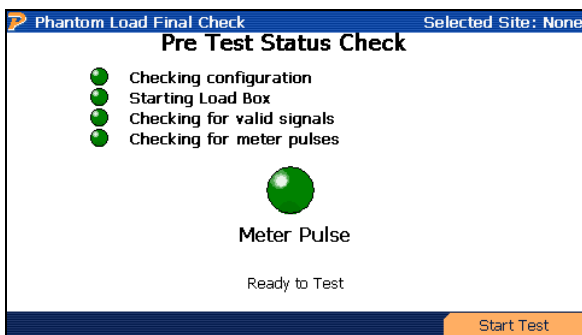
Stabilizing current source

Step 4



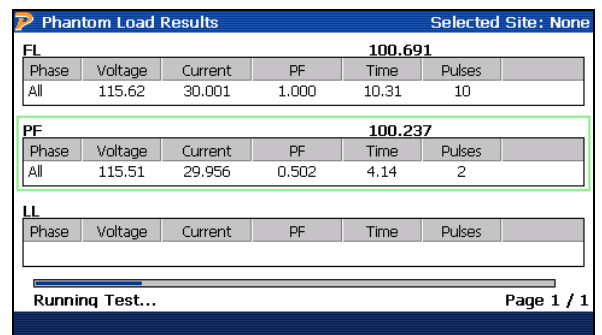
Align meter pickup

Step 5



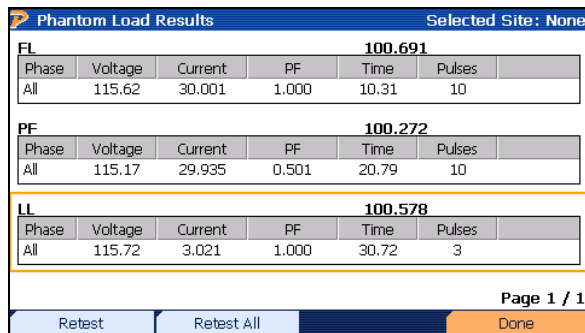
When pulses detected, press F4

Step 6



Test proceeds automatically

Step 7



Press F4 to complete

At the end of the test, the orange cursor can be moved up or down. Once the cursor is set, the user can press F1 (Retest) to repeat the individual test again. The user can also press F2 (Retest All) to repeat all test points again. Once the user presses F6 (Done), the voltage and current shut down, and the data is saved.

7 Demand Test

The screenshot shows the 'Demand Test' form with the title bar 'Selected Site: 2S TEST'. The form contains the following fields: 'Form' (value 2), 'Meter Model' (CENTRON), 'Mfg SN' (59112442), 'Meter No' (11838575), 'Test Mode' (Wh), 'Demand Period' (15), 'Test Amps' (5.0), and 'Load Box Status' (Off). At the bottom are two buttons: 'Start Drive' and 'Meter Editor'.

Setup with Site Selected

The screenshot shows the 'Demand Test' form with the title bar 'Selected Site: None'. The form contains the following fields: 'Form' (dropdown menu), 'Meter Model' (dropdown menu showing 'Itron', 'CENTRON C1S', 'G980181', '2S', 'SC'), 'Mfg SN' (highlighted in yellow), 'Meter No' (empty), 'Test Mode' (Wh), 'Demand Period' (1), 'Test Amps' (5.0), and 'Load Box Status' (Off). At the bottom are two buttons: 'Start Drive' and 'Meter Editor'.

Setup with No Site Selected

Description:

Setup with Site Selected

When a site is selected, all fields are considered to be “read only”. This form is to confirm all values are correct.

Press F1 to confirm and begin the demand test.

Setup with No Site Selected

When a site is not selected, the user must manually enter values. “Mfr. SN” is required (noted in yellow). If a meter is not found in the drop down menu for “Meter Model”, the user can press F3 (Meter Editor) to create a new meter (see [Section 9.3.2](#)).

Press F1 to confirm and begin the demand test.

Test Procedure Overview

The demand test determines the correct maximum use of power based on the test interval for the meter. This test also verifies the meter programming is correct.

Select the “Demand Period” based on the programmed test interval. Once selected, the demand test runs the entire test period. Once time has expired, the PowerMaster® stops the current drive, but voltage remains constant. The user has the ability to view the accumulated energy and enter the values into the PowerMaster® for registration results.

7.1 Demand Test Procedure

Step 1

Press F1 to start load box

Step 2

When load box ready, press F4 to continue

Step 3

Reset demand register on meter & press F4

Step 4

Test runs automatically

Step 5

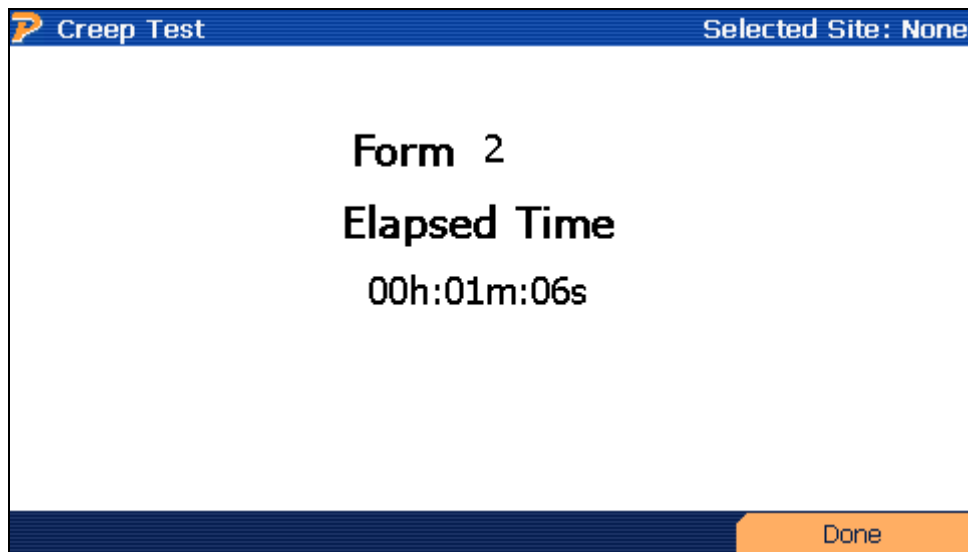


When test completes, note the accumulated KW on meter

Step 6

Enter KW reading, and then press F2 to calculate. Press F4 to save.

8 Creep Test



Creep Test Selected Site: None

Form 2

Elapsed Time

00h:01m:06s

Done

Description:

The Creep Test allows the user to verify when the disk on mechanical meters incorrectly rotates when no current is applied. This test also allows the user to warm up meters before testing for accuracy purposes.

The user selects the appropriate meter form, and then presses F4 to begin the test. The PowerMaster® applies voltage to the appropriate pins on the meter, and the test will run continuously until the user presses F4 to stop.

9 Utilities



Description:

The menu allows the user to change the PowerMaster® settings and other various tasks and applications.

- 1) Connect to Meter Site Manager (sets the PowerMaster® in communications mode)
- 2) Calibration Verification (cross check against a reference standard)
- 3) Save Database Snapshot (Backup) (saves a backup of the database)
- 4) Quick Edit (create, edit, or delete a meter and/or phantom load setup)
- 5) Remote (puts the unit in remote status for calibration purposes only)
- 6) System (view status, install a system upgrade, and set the date/time)
- 7) User Preferences (custom settings for the user)

9.1 Calibration Verification

Calibration Check Selected Site: None

Compare to Standard

Standard (Kt)

Energy Test Mode

WFG Test Setup

☐ Delay Between Each Page

Start Test

Description:

This feature can perform an automatic cross-check against the user's shop standard to verify the accuracy. Enter the Kh value of the shop standard into the field for "Standard (Kt)". The user can also select the desired energy test mode (Whr, VAhr, VARhr). Please note that selection of the desired energy test mode DOES NOT adjust the phase angle for the test point. It simply corresponds to the PowerMaster®'s energy algorithm. The tests will be performed by either "Timed" or "Pulse to Pulse". "Timed" is an automated process that will stop at the time designated for each test point. "Pulse to Pulse" is a manual operation using a Manual Pushbutton Switch (separate accessory) to stop and start each individual test point. Powermetrix recommends using the "Timed" option.

WFG Test Setups:

The user can select many types of WFG Test Setups, one at a time. Default setups are included, but the user can create their own for special calibration checks. The setups are saved in a .txt file (created using Notepad) using a specific format. An example format can be seen below:

Wh-1v-3c-0.1-30A

0,0,0,0,0,0,1,1,1,0,0,0,1065
0,0,0,0,0,0,1,1,1,60,60,60,2128
0,0,0,0,0,0,25,25,25,0,0,0,420
0,0,0,0,0,0,25,25,25,60,60,60,840
0,0,0,0,0,0,5,5,5,0,0,0,210
0,0,0,0,0,0,5,5,5,60,60,60,420
0,0,0,0,0,0,1,1,1,0,0,0,105
0,0,0,0,0,0,1,1,1,60,60,60,210
0,0,0,0,0,0,2.5,2.5,2.5,0,0,0,42
0,0,0,0,0,0,2.5,2.5,2.5,60,60,60,84

0,0,0,0,0,0,5,5,5,0,0,0,30
 0,0,0,0,0,0,5,5,5,60,60,60,60
 0,0,0,0,0,0,10,10,10,0,0,0,20
 0,0,0,0,0,0,10,10,10,60,60,60,40
 0,0,0,0,0,0,15,15,15,0,0,0,20
 0,0,0,0,0,0,15,15,15,60,60,60,40
 0,0,0,0,0,0,20,20,20,0,0,0,10
 0,0,0,0,0,0,20,20,20,60,60,60,20
 0,0,0,0,0,0,30,30,30,0,0,0,10
 0,0,0,0,0,0,30,30,30,60,60,60,10
 -1

The name of the file must always be noted in the first line of the text document. Also, the name of the file and the first line must always be equal. The second line and beyond are used for each individual test point (unlimited). The required notation of “-1” is used to tell the PowerMaster® to end the test. This is always the last line in the text document.

Each test point has a specific format as well. There are 13 data points each separated with a comma and no spaces. An explanation of the 13 data points is below:

Va, Vb, Vc, VaΦ, VbΦ, VcΦ, Ia, Ib, Ic, IaΦ, IbΦ, IcΦ, Time (seconds)

For example, “Va” signifies the amplitude for A phase voltage. “VaΦ” signifies the phase angle for A phase voltage (expressed in degrees). The last data point is Time, which is always expressed in seconds.

After the test setup is complete and saved, below are instructions on how to save the setup(s) into the PowerMaster®’s flash memory:

1. Power up the PowerMaster®
2. From the PC, plug in the USB cable to "USB TO HOST" on the PowerMaster®.
3. At the bottom right tray on the PC, double click the ActiveSync icon (green)
4. Click Explore
5. In Mobile Device, double click "Flash"
6. Double click "PowerMaster"
7. Double click "Calibration Tests"
8. Copy and paste the .txt file(s) into this directory
9. Power off, then power on the PowerMaster®.

9.1.1 Using a Single Phase Standard with the PowerMaster®

What Do I Need?

1. PowerMaster® unit
2. Standard Voltage lead (10-340-0100)
3. Auxiliary Power Adapter (10-340-0045)
4. Series Current Test Cable Adapter (CALL FOR PART#, separate accessory)

5. External Digital Cable (STD OUT, STD IN only) (10-340-0046, separate accessory)
6. Calibration Check Adapter Cables (Voltage) (10-340-0052, separate accessory)
7. Single-phase Whr/VAhr/VARhr standard
8. AC adapter with a “pigtail” termination (line & neutral bare wires)

Hookup Instructions:

1. From the AC adapter with a “pigtail” termination, connect the line and neutral to “Auxiliary Power” of the single phase standard. Plug into an AC source.
2. From the Single phase Whr/VAhr/VARhr standard, connect the Calibration Check Adapter Cables to the potential taps. Connect the Red, Blue, and Yellow lead to the hot potential (O). Connect the Green and White lead to the common potential.
3. From the PowerMaster®, insert the Series Current Test Cable Adapter into the ZIF socket. Verify jaws are closed and locked.
4. From the Series Current Test Cable Adapter, connect the VOLTAGE leads to the corresponding colors of the Series Current Test Cable Adapter attached to the single phase standard (A=red, B=yellow, C=blue). Likewise, connect the Green (ground) and White (neutral) lead to the corresponding colors of the Green and White lead connected to the common potential on the single phase standard.
5. From the Series Current Test Cable Adapter, insert the CURRENT leads for A phase drive (red) to phase A and A phase return (white) to phase A return on the single phase standard. Repeat this for phase B and C taps on the single phase standard.
6. From the PowerMaster®, connect the External Digital Cable’s “STD IN” to the Output of the single phase standard.
7. From the PowerMaster®, connect the auxiliary power leads from the Standard Voltage lead to the Auxiliary Power Adapter. Plug into an AC source. Note that fans will run on the PowerMaster® at power up.

9.1.2 Using a Three Phase Standard with the PowerMaster®

What Do I Need?

1. PowerMaster® unit
2. Standard Voltage lead (10-340-0100)
3. Auxiliary Power Adapter (10-340-0045)
4. Series Current Test Cable Adapter (CALL FOR PART#, separate accessory)
5. External Digital Cable (STD OUT, STD IN only) (10-340-0046, separate accessory)
6. Stackable Jumper Cables (qty. 2) (10-340-4101K, separate accessories)
7. Three-phase Whr/VAhr/VARhr standard

Hookup Instructions:

1. From the three phase Whr/VAhr/VARhr standard, plug the auxiliary power lead into an AC source. Unit will automatically power on.

2. From the three phase Whr/VAhr/VARhr standard, select service type “3-Ph, 4-Wire WYE” and enter the desired Kh (default = 0.00001).
3. From the three phase Whr/VAhr/VARhr standard, insert the Stackable Jumper Cables to jumper the neutrals (Vn) together.
4. From the PowerMaster®, insert the Series Current Test Cable Adapter into the ZIF socket. Verify jaws are closed and locked.
5. From the Series Current Test Cable Adapter, insert the VOLTAGE leads to the corresponding colors of the three phase Whr/VAhr/VARhr standard (red=V1, yellow=V2, blue=V3). Insert the white (neutral) into any Vn receptacle. Insert the green (ground) lead into the Auxiliary Power Adapter.
6. From the Series Current Test Cable Adapter, insert the CURRENT leads for A phase drive (red) to phase A and A phase return (white) to phase A return on the three phase standard. Repeat this for phase B and C taps on the single phase standard.
7. From the PowerMaster®, connect the External Digital Cable’s “STD IN” to the “Pulse Outputs 1” of the three phase standard.
8. From the PowerMaster®, connect the auxiliary power leads to the Auxiliary Power Adapter. Plug into an AC source. Note that fans will run on the PowerMaster® at power up.

9.1.3 Application Procedure:

Step 1

Press F4 to continue

Step 2

Allow stabilization to occur

Step 3

| Ph | V | ΦV | I | ΦI | PF | ΦPF | Wh | VAh | VARh |
|-----|-------|------|------|------|------|------|-------|-------|-------|
| Sys | 115.3 | 0.00 | 2.50 | 0.00 | 0.50 | 0.00 | 10.12 | 20.18 | 17.46 |

| Ph | V | ΦV | I | ΦI | PF | ΦPF | Wh | VAh | VARh |
|-----|-------|------|------|------|------|------|------|------|------|
| Sys | 115.2 | 0.00 | 5.00 | 0.00 | 1.00 | 0.00 | 9.60 | 9.60 | 0.02 |

| Ph | V | ΦV | I | ΦI | PF | ΦPF | Wh | VAh | VARh |
|-----|-------|------|------|------|------|------|------|-------|------|
| Sys | 114.7 | 0.00 | 5.00 | 0.00 | 0.50 | 0.00 | 5.75 | 11.47 | 9.93 |

After warm up, test runs automatically

Step 4

| Ph | V | ΦV | I | ΦI | PF | ΦPF | Wh | VAh | VARh |
|-----|-------|------|-------|------|------|------|-------|-------|-------|
| Sys | 115.0 | 0.00 | 49.21 | 0.00 | 0.49 | 0.00 | 22.74 | 46.81 | 40.92 |

View results. Press F4 to complete

After the calibration verification is complete, the load box automatically shuts down. When F4 is pressed, the data is stored (.csv format) in flash memory.

Retrieving Saved Calibration Data

The data can be accessed through ActiveSync (or Windows Mobile Device Center for Windows 7 users) by viewing the “My Device\Flash\Powermaster” directory.

1. Power up the PowerMaster®
2. From the PC, plug in the USB cable to "USB TO HOST" on the PowerMaster®.
3. *For Windows XP:*
 - a. At the bottom right tray on the PC, double click the ActiveSync icon (green)
 - b. Click “Explore”
4. *For Windows 7:*
 - a. Open Windows Mobile Device Center (click Start, All Programs)
 - b. Click “File Management”
 - c. Click “Browse the contents of your device”
5. In Mobile Device, double click "Flash"
6. Double click "PowerMaster"
7. Copy the calibration test (.csv) and paste to the desired directory.
8. Open the .csv file with Microsoft Excel.

9.2 Save a Database Backup

Install Upgrade Selected Site: None

- * Plug in an SD Memory Card or USB flash drive with plenty of free space, and press the RESCAN button.
- * If the memory storage device has sufficient free space to store a snapshot of the PowerMaster data files, it will appear in the list below. Select it and press CONTINUE.
- * The information will be copied to a subdirectory on the storage device.

WARNING: Do not remove the memory storage device while the backup procedure is in progress, or while the device's write activity light (if any) flashes. Doing so will interrupt the backup and may corrupt data.

Select the desired destination device and press CONTINUE when ready

USB Storage Device

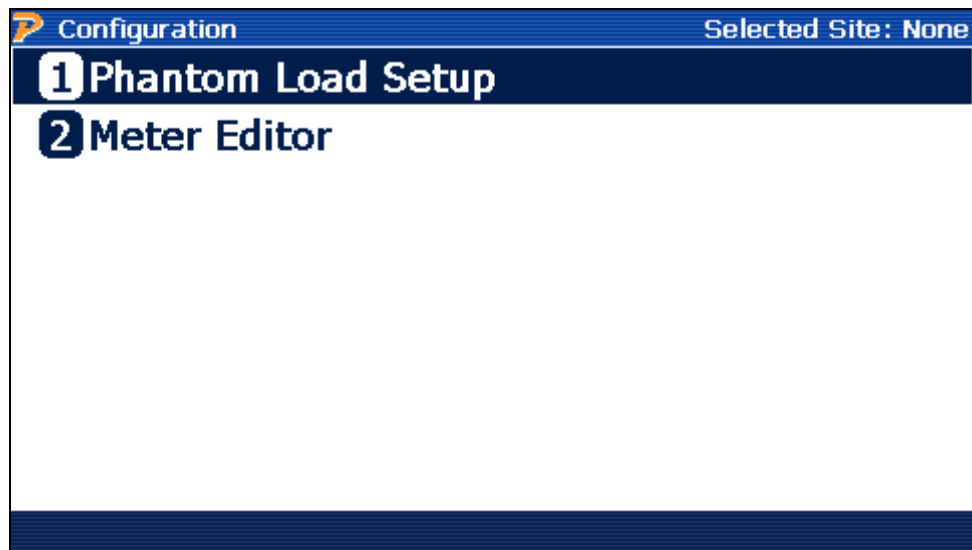
Go Back Continue

Description:

When the user may want to backup the PowerMaster® database for security purposes, place a USB flash drive into one of the PowerMaster®'s USB peripheral ports. Next, press F3 to scan the USB flash drive to verify enough space is required to save the database.

As an alternative, the user can run this process instead of downloading the database using Meter Site Manager 2. Refer to the Meter Site Manager 2 Instruction Manual for further details.

9.3 Quick Edit



Description:

This menu allows the user to quickly enter a form for the purposes of editing or deleting. New meters and setups can be created here as well.

9.3.1 Phantom Load Setup

The screenshot shows the 'Phantom Load Setup' window. At the top, there is a blue header with 'Phantom Load Setup' and 'Selected Site: None'. Below the header, there is a 'Setup Name' field with a dropdown menu showing 'ANSI 5 AMP + ELE 4W'. Below this is a table with 10 columns: Test, Phase, Label, Mode, Current, PF, Lead/Lag, Flow, Pulses, and Time. The table contains 6 rows of data. At the bottom of the window, there are three buttons: 'New', 'Edit', and 'Done'.

| Test | Phase | Label | Mode | Current | PF | Lead/Lag | Flow | Pulses | Time |
|------|-------|-------|------|---------|-----|----------|------|--------|------|
| 1 | All | FL | Wh | 5 | 1 | Lag | DLV | 5 | 30 |
| 2 | All | PF | Wh | 5 | 0.5 | Lag | DLV | 5 | 30 |
| 3 | All | LL | Wh | 0.5 | 1 | Lag | DLV | 5 | 30 |
| 4 | A | FL | Wh | 5 | 1 | Lag | DLV | 5 | 30 |
| 5 | B | FL | Wh | 5 | 1 | Lag | DLV | 5 | 30 |
| 6 | C | FL | Wh | 5 | 1 | Lag | DLV | 5 | 30 |

Description:

The Phantom Load Setup is used to select a setup, create a new setup, or edit an existing setup. Two default setups are included and cannot be edited. To view all setups, verify check box for "Phantom Load" is selected first. Refer to [Section 3.1](#) for instructions on how to use the grid control in the Phantom Load Setups.

For VAhr and VARhr tests, selecting mode does not automatically reflect in the Power Factor (PF) value. For example, with a Mode of "VARh" and a lagging 90 degree phase angle, the user will enter a PF of "0" ($\cos 90$).

Phase: This corresponds to the particular phase(s) to be tested. Selections are A, B, C, or All. "All" applies to all active phase measurements. When a 1 or 2 element meter is testing, "All" will still apply. When testing single elements, the user will select only the appropriate phase that corresponds to the particular meter.

Label: This generates a label for the test. Selections are FL, PF, LL, FL PF, and LL PF. Labels can be edited and created in the User Preferences menu (see [Section 9.6.3](#)).

Mode: This corresponds to the energy calculation for each test. Selections are Whr, VARhr, and VAhr. Note that selections for VARhr and VAhr will not automatically set the required phase shift. These values must be manually entered in the “PF” field.

Current: This corresponds to the desired generated current for all active phases. The user may enter a value between 0.1 to 30A for Model 4134, and a value between 0.1 to 50A for Model 4154.

PF: This corresponds to the cosine of the phase angle for the current for all active phases. The voltage phase angles are set by the selected service type. The user may enter a value between 0 to 1.00 for the desired power factor, positive or negative.

Lead/Lag: This corresponds to the desired phase shift for all active current phases.

Flow: This corresponds to the desired energy flow for all active phases. Selections are Delivered or Received. When “Received” is selected, all active current phases will automatically shift 180°.

Pulses: This corresponds to the desired number of pulses to measure during each test.

Time: This corresponds to the desired time to measure during each test. If both Pulses and Time are selected, the test completes when either selection is first exceeded.

9.3.2 Meter Editor

Meter Editor - Showing Enabled Meter Selected Site: None

| Manufacturer | Model | Cat # | Acc | Fo... | T... | Cl... | T... | T... |
|------------------|---------------|-------|-----|-------|------|-------|------|------|
| ABB | E331CLC... | | 0.5 | 16S | SC | 200 | 30 | 3 |
| General Electric | KV 744X100... | | 0.2 | 12S | SC | 320 | 30 | 3 |
| General Electric | KV 744X400... | | 0.2 | 16S | SC | 200 | 30 | 3 |
| General Electric | KV 744X400... | | 0.2 | 16S | SC | 320 | 30 | 3 |
| General Electric | KV 744X300... | | 0.2 | 3S | TR | 20 | 2.5 | 0.25 |
| General Electric | KV 744X300... | | 0.2 | 4S | TR | 20 | 2.5 | 0.25 |
| General Electric | KV 744X600... | | 0.2 | 9S | TR | 20 | 2.5 | 0.25 |
| General Electric | KV 744X600... | | 0.2 | 36S | TR | 20 | 2.5 | 0.25 |
| General Electric | KV 744X500... | | 0.2 | 45S | TR | 20 | 2.5 | 0.25 |
| General Electric | KV 745X300... | | 0.5 | 13A | SC | 150 | 30 | 3 |
| General Electric | KV 745X400... | | 0.5 | 16A | SC | 150 | 30 | 3 |
| General Electric | KV 745X000... | | 0.5 | 10A | TR | 20 | 2.5 | 0.25 |
| General Electric | KV 745X600... | | 0.5 | 36A | TR | 20 | 2.5 | 0.25 |
| General Electric | KV 745X500... | | 0.5 | 45A | TR | 20 | 2.5 | 0.25 |
| General Electric | KV 745X800... | | 0.5 | 48A | TR | 20 | 2.5 | 0.25 |
| General Electric | KV 744X200... | | 0.2 | 1S | SC | 200 | 30 | 3 |
| General Electric | KV 744X200... | | 0.2 | 2S | SC | 200 | 30 | 3 |

New Edit Delete Done

Meter Editor - Showing Enabled Meter Selected Site: None

| Manufacturer | Model | Cat # | Acc | Fo... | T... | Cl... | T... | T... |
|------------------|---------------|-------|-----|-------|------|-------|------|------|
| ABB | E331CLC... | | 0.5 | 16S | SC | 200 | 30 | 3 |
| General Electric | KV 744X100... | | 0.2 | 12S | SC | 320 | 30 | 3 |
| General Electric | KV 744X400... | | 0.2 | 16S | SC | 200 | 30 | 3 |
| General Electric | KV 744X400... | | 0.2 | 16S | SC | 320 | 30 | 3 |

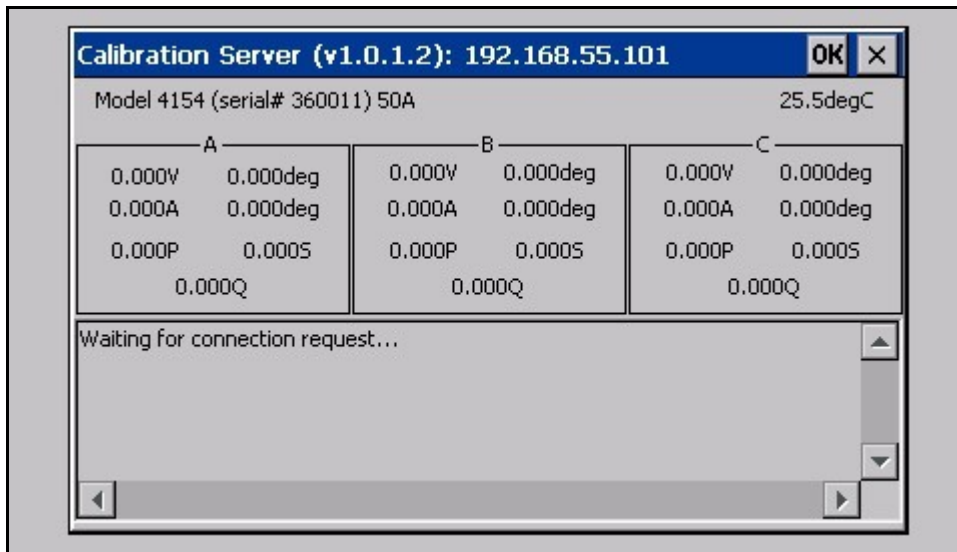
Manufacturer: Itron Model: CENTRON C15
 Cat #: G980181 TA-Hi: 30 TA-Li: 3
 Accuracy Class: 0.5 Voltage: 240V
 Form: 2S Type: SC Current Class: 200
 Kt: 1 Frequency: 60 Demand Period: 15
 Style: ANSI Enabled: Yes

Save

Description:

These forms allow the user to either make changes to an existing meter in the database, or create a new meter in the database.

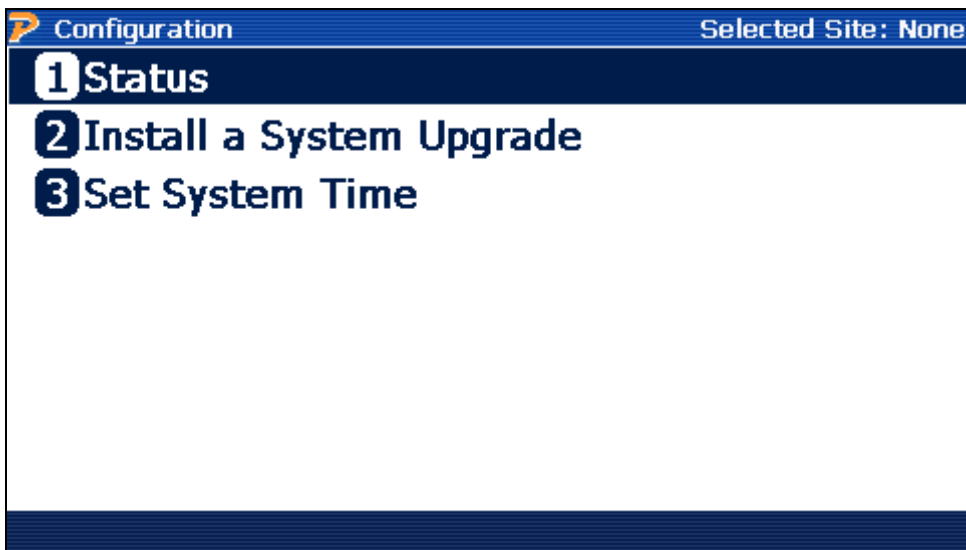
9.4 Remote



Description:

The remote menu place the PowerMaster® into a remote state, waiting for a signal from the calibration system. If this screen is accidentally entered, a reboot of the PowerMaster® will be required.

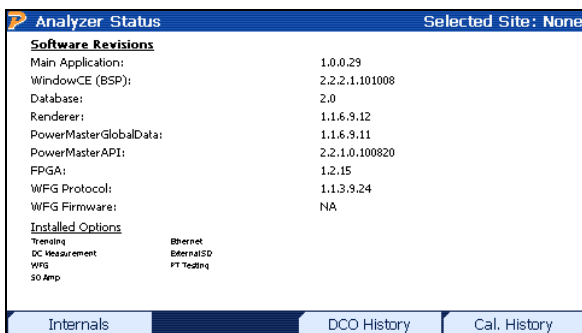
9.5 System



Description:

The System menu is based on functions directly related to the PowerMaster®'s internal status and time settings. This menu also allows the user to install updated software for the PowerMaster®.

9.5.1 Status



Description:

The Status form's default display is for the **Software Revisions** that are currently installed in the PowerMaster®.

Internals displays the real-time status of the installed circuit boards and internal temperature. If an error occurs, the component is identified in red.

DCO History displays the Design Change Orders installed by Powermetrix during the PowerMaster®'s service history.

Cal. History displays the history of calibrations performed.

System Configuration displays the serial numbers and revision levels of all installed circuit boards. It also displays the manufactured date of the PowerMaster®.

9.5.2 Install a System Upgrade

Install Upgrade Selected Site: None

- * Plug a USB flash drive containing a PowerMaster upgrade PMX file into the USB port, then press the SCAN key to find the PMX file.
- * When the list of possible upgrade files appears, use the arrow keys to select the one you wish to install, then press the INSTALL key.
- * When the screen asks you to do so, reset the PowerMaster Analyzer, leaving the USB flash drive plugged in.
- * When the PowerMaster Analyzer reboots, it will find the upgrade file and attempt to install the upgrade.

WARNING: If you remove the USB flash drive before the upgrade process finishes, you may have to plug it back in and reset again in order for the process to complete.

Select the desired upgrade file and press INSTALL when ready

PowerMaster.1.0.0.29.pm4

Go Back INSTALL

Description:

When new software updates are available, Powermetrix will contact the user of its availability. The upgrade file package (.PM4 extension) must be moved to a USB flash drive. Once the file package is on the USB flash drive, the user will connect it to one of the PowerMaster®'s USB peripheral ports.

Once the USB flash drive is inserted, press F3 to scan. Select the .PM4 upgrade file, then press F4 to install. After recognition, reset the PowerMaster® by turning the analyzer off, then on again. After power up, the install will occur automatically. After installation is complete, reset the analyzer again.

9.5.3 Set System Time

System Date and Time Selected Site: None

The System Time Zone is:
(GMT-08:00) Pacific Time (US and Canada)
IMPORTANT! If the time zone is incorrect, press F3 to correct it now!

Time
Your analyzer is configured to use a 12-hour clock
Hour Minute Second
11 36 35 AM
☒ Automatically Adjust for Daylight Saving Time

Date
Year Month Day
2011 October 10 Monday

Formats TimeZone Save Settings

Description:

This form allows the user to set the time and date of the analyzer. Also, international date/time functions can be set by pressing F1 (Formats). By pressing F3, the user can set their current time zone. Please note that setting the Time Zone will require a reboot of the analyzer.

9.6 User Preferences

9.6.1 General Settings, Error Limits, & Warm-up Times

User Preferences Selected Site: None

General Settings

Language: English (US)

System Frequency: 60 ☒ Enable audio feedback

General Volume: 7 Meter Beep Volume: 2

☒ Stabilize Load Box Phases

Meter Test Error Limits

1.0X Specification Accuracy 1.0 x

Meter Pickup: Internal

Phantom Load Testing

Meter Warmup Time: 30 Seconds Calibration Warmup: 10 Minutes

Next Page 1 of 3

Section Next Page Save

Description:

This screen allows the user to set general settings in the PowerMaster®.

Language, Enable Audio Feedback, Volume

These selections allow the user to turn the audio off (unchecked) and on (checked). The volume can be increased or decreased for both the general audio and the meter pulse (1 lowest, 7 highest). "Language" allows the user to select the language preference for text displayed.

System Frequency

This setting is for the AC frequency transmitted in the region where the analyzer will be used. Selections are either 50 or 60, expressed in hertz (Hz).

Stabilize Load Box Phases

If this selection is checked, the PowerMaster® will use a correction to accurately stabilize the phase angles when performing a phantom load test. If this selection is un-checked it will ignore the correction.

Meter Test Error Limits

The error limit is based on the accuracy class of the meter. For example, if the meter has an accuracy class of 0.2% and an error limit set to "2.0x Specification Accuracy," the PowerMaster® will only display an error if the registration is outside of 99.60% and 100.40%.

Accuracy class = 0.2%

Error Limit = 2.0x Specification Accuracy

$0.2 \times 2 = \pm 0.4\%$

Optionally, the user selects "User Defined Accuracy" to set a custom error limit.

Meter Pickup

This selection is for the user to change the style of pulse measurements for the analyzer. Selections are:

1. Internal: used for the built-in infrared pickup attached to the front panel
2. External: any other pickup connected to AUX DIGITAL
3. KYZ: measurement of the contact closures

Phantom Load Meter Testing

This selection allows the user to adjust the meter warm up period before verification begins. The minimum time period is 30 seconds, and the maximum is 1,800 seconds. The user can also adjust the warm up period before the auto calibration process begins.

9.6.2 Custom Fields for Test Session Notes

User Preferences

Selected Site: None

Custom Fields for Test Session

UTS11

UTS12

UTS13

UTS21

UTS22

UTS23

UTS31

UTS32

UTS33

UTS41

UTS42

UTS43

Next Page 2 of 3

Section

Next Page

Save

Description:

This form allows the user to change the default labels for the custom fields in the Test Session Notes to be more specific. The labels are directly saved into the UtsFieldNames table in the database. These fields are limited to 32 characters.

9.6.3 Load Box Labels

User Preferences

Selected Site: None

Load Box Codes

| Code | Description |
|-------|---------------------------|
| FL | Full Load |
| FL PF | Full Load / Power Factor |
| LL | Light Load |
| LL PF | Light Load / Power Factor |
| PF | Power Factor |

Next Page 3 of 3

Delete Row

Next Page

New Row

Save

Description:

This form allows the user to add, edit, or delete new labels for individual test points.

10 Recall Data

The screenshot shows a software window titled "Select Test" with a status bar indicating "Selected Site: None". Below the title bar, the instruction "Select the Data to Review" is displayed. A list of test data items is shown, each preceded by a plus sign in a square box. The items are: "10262011 - HOME", "10262011B - TEST", "10994029 - VINO", "16S - customer", "5S", "6S", "6S M-90 - this is customer", and "Meter". The "6S" item is currently selected and highlighted with a blue background. At the bottom right of the window, there is a button labeled "Expand".

| Test Data Item |
|----------------------------|
| 10262011 - HOME |
| 10262011B - TEST |
| 10994029 - VINO |
| 16S - customer |
| 5S |
| 6S |
| 6S M-90 - this is customer |
| Meter |

Description:

From the main menu, select Recall data (option 6) to pull up all the test data that has been saved. Tab down to the desired test and press F6 to expand the data. Repeat the process until the desired data has been found. Press Select, "F4" to view the data.

11 Detailed Specifications

Overview

| | |
|-----------------|--------------------------------|
| System Power | Active & Reactive per IEEE1459 |
| Auxiliary Power | 100 to 530 VAC |

AC Current Direct Channels

| | |
|---------------|--|
| Channels | 1 input, 0 to 30 A |
| Accuracy 4134 | *(R1) 0.08A to 0.4A , $\pm 0.1\%$, Phase Error $< 0.02^\circ$ *(R2) 0.4 to 30A, $\pm 0.04\%$, Phase Error $< 0.006^\circ$ |
| Accuracy 4154 | *(R1) 0.08A to 0.4A , $\pm 0.1\%$, Phase Error $< 0.02^\circ$ *(R2) 0.4 to 50A, $\pm 0.04\%$, Phase Error $< 0.006^\circ$ |
| Resolution | 0.001A |

AC Voltage Channels

| | |
|---------------------|--|
| Channels | 2 inputs, 10 to 600 Vrms |
| Accuracy 4134, 4154 | *(R1) 10 to 55 V , $\pm 0.04\%$, Phase Error $< 0.002^\circ$ *(R2) 55 to 600 V, $\pm 0.02\%$, Phase Error $< 0.002^\circ$ |
| Resolution | 0.001V |

Measurements

| | |
|-------------------------|---|
| Frequency | 45-65 Hz, 10 μ Hz resolution, 50ppm accuracy |
| Energy Quantities | Whr, VAhr, VARhr (multiple user selectable calculations) Note: There is no US standard definition for VARhrs. We certify that our measurements of VARhrs match the definitions in our documentation to the specified accuracy. |
| Whr Accuracy 4134, 4154 | *(R1) $\pm 0.1\%^{**}$ *(R2) $\pm 0.04\%^{**}$ |
| Power Factor | -1.00 to 1.00 |

Current Source (Model 4134)

| | |
|---------------------------|--|
| Current Output | 0.1 to 30 amps |
| Current Output Resolution | $I < 5.0A$, 1% of value $I > 5.0A$, 0.2% of value |
| Phase adjustability | 0 to 359.9° in 0.1° steps each phase |
| Total Harmonic Distortion | $< 1.0\%$, fundamental only |
| Compliance Voltage | TBD |

| | |
|------------------|--|
| Current Accuracy | TBD |
| Drive Capability | TBD |
| Stability | TBD |
| Operating Modes | Passive: Current source is phase locked and synchronized to user voltage. Lock error typically less than 0.005°. |

Current Source (Model 4154)

| | |
|---------------------------|--|
| Current Output | 0.1 to 50 amps |
| Current Output Resolution | I < 5.0A, 1% of value I > 5.0A, 0.2% of value |
| Phase adjustability | 0 to 359.9° in 0.1° steps each phase |
| Total Harmonic Distortion | < 1.0%, fundamental only |
| Compliance Voltage | TBD |
| Current Accuracy | TBD |
| Drive Capability | TBD |
| Stability | TBD |
| Max Temperature | +40°C ambient at 50A +50°C ambient at 40A |
| Operating Modes | Passive: Current source is phase locked and synchronized to user voltage. Lock error typically less than 0.005°. |

Communication

| | |
|---------------------------|---|
| Meter Pulse Input | 1 (for meter pulse pickups) |
| USB to PC Port | 1 (for connectivity to PC/Laptop) |
| USB Ports for Peripherals | 2 (for keyboard, mouse, barcode reader, memory devices, etc.) |
| Ethernet Port | 1 (for high speed connectivity including internet) |
| RS232 Port | 1 (for legacy devices) |

Environmental

| | |
|-------------------------|--------------------------------|
| Temperature (Operating) | -20°C to +50°C (-7°F to 122°F) |
| Temperature (Storage) | -20°C to +80°C (-7°F to 176°F) |
| Humidity | 0% to 95% non-condensing |

Physical

| | |
|--------------------|------------------------------|
| Display Resolution | Full color WQVGA (480 x 272) |
| Display Size | 4.3 inch |

| | |
|------------------------|---|
| Dimensions (H x W x D) | 19.78 x 15.77 x 7.41 in. |
| Weight | 27.0 lbs (not including cables & accessories) |
| Case | Pelican 1520 |

*All amplitude errors are expressed as percent of measurement. All phase errors are expressed in degrees at 60 Hz. R1 = Range 1, R2 = Range 2

** All accuracy specifications are over the "Standard Operating Range" (10°C to 35°C). Performance over the "Extended Operating Range" (-20°C to 50°C) are reduced by 10ppm/°C outside the Stand Operating Range. Measurements made using the AC Current Direct and AC Voltage channels.