DUAL VISION®
DUAL DISPLAY
PHASING VOLTMETER

and ACCESSORIES

Operating & Instruction Manual

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IMPORTANT SAFETY INFORMATION

Read and understand these instructions prior to use. These operating instructions are not a substitute for proper training in the use of this equipment. High voltage systems present serious hazards, including the risk of death or serious injury due to arcing, thermal burns and electrocution. HD Electric’s products are intended solely for use by professionals with knowledge, training and experience in the use of the equipment and its accessories in and around high voltage systems.

All applicable federal, state, company and OSHA work practices must be followed. If you are unfamiliar with the work practices required, DO NOT PROCEED. Call HD Electric if you have any questions regarding this equipment.

These important labels are affixed to THE PRODUCT. Read and understand each of them before proceeding.

All meters require the use of accessory hot sticks, which may or may not be supplied with the meter. The minimum hot stick length required for safe use depends upon the particular operation; consult federal, state, company and OSHA specifications for the proper hot stick length for the intended operation.

The users of this meter should always be equipped with personal protective equipment including high voltage gloves, flame retardant clothing, eye and face protection. Some applications may require additional protective equipment.

Accessory probes are available for all meters. Always use the proper probe(s) for your application.

Failure to follow these and other warnings and safety precautions may result in severe injury or death.

OPERATIONAL IMPAIRMENT

If the DDPM-40 is used in a manner not described in this instruction manual, the protection and effective operation of this equipment may be impaired.
GENERAL DESCRIPTION

The HD Electric Dual Display Phasing Voltmeter includes a pair of single stick line-to-ground voltmeters that communicate with each other wirelessly. Both units are constructed with high strength molded housings with epoxy encapsulated high voltage resistors, a ground cord and a digital LED display.

The high voltage resistors limit the current through the ground cord to a maximum of less than one milliamp. Although the ground cords are insulated for voltage up to 20kV, they should always be kept free and clear from you and any other conductors.

Hot Stick Connection: Shotgun or Universal Spline
TECHNICAL SPECIFICATIONS
MODEL NUMBER: DDPM-40

ENVIRONMENTAL CONDITIONS
• Conditions - Indoor and outdoor use
• Altitude - Up to 6,566 ft. (2000M)
• Operating Temperature -20°F to +120°F (-29°C to +49°C)
• Humidity - 95% to 49°C (non-condensing)
• Pollution Degree - PD4
• Measurement Category IV – Classification Rating (CAT IV) – Product is intended for use with test and measuring circuits connected to the circuits/wiring outside of a building installation, including transmission lines.
• Overvoltage Category IV
• Enclosure Material - Supertough Nylon UL 94-HB
• Printed Circuit Boards - FR-4 UL94V-0
• IEC Protection Rating - IP64

DIMENSIONS:
• Length 14 in. (36cm), Width 4.6 in. (12cm), Height 4.1 in. (10cm)
• Ground Cord Length - 12’ (3.6m) fully extended, 3.5’ (1.7m) retracted
• Weight - (w/o probes): 2.25 lbs. (1.02kg) each unit
• Battery Life - 8 hours continuous use under normal operating conditions
• Battery - 9V alkaline 1604A, IEC 6LR61 or 9V lithium, ANSI-1604LC
• Digital Meter - Reads in kilovolts
• Voltage Range - 5V-25kV each unit line-to-ground. Indicates up to 43kV line-to-line, AC 25-1000Hz or DC
• Phasing Frequency - 50/60Hz
• Auto-Ranging - No range selector switch
• Accuracy - Within 1% of reading +/- 3 counts (line-to-ground & line-to-line measurements)
• Meter Resolution: 0.005 - 0.999 range with 1 Volt resolution
  1.00 - 9.99 range with 10 Volt resolution
  10.0 - 25.0 range with 100 Volt resolution
OPERATING INSTRUCTIONS

The DDPM-40 Dual Display Phasing Voltmeter measures DC and AC RMS voltage from 5V to 25kV line-to-ground at 25-1000Hz and up to 43kV line-to-line at 50/60Hz.

Press the ON button on both units to turn them on. The initial zero kV indication will be replaced shortly with the display of hollow zeros as a battery saving measure.

A low battery indication in the lower right corner of the screen indicates that the battery will need to be replaced soon. If the battery dies completely, the display will shut off. The battery compartments are on the bottom of each unit. HD Electric recommends using 9V lithium batteries but alkaline batteries may also be used.

Both displays will turn off after two minutes of a zero display.

BATTERY REPLACEMENT INSTRUCTIONS

To replace the battery, open and remove the compartment on the bottom of the meter housing. Remove and dispose of the old battery, replacing it with a fresh, new 9-volt lithium or alkaline battery.

Note battery polarity on the battery compartment. This compartment cannot be reinserted if the battery polarity is reversed.
OPERATING INSTRUCTIONS continued

Pre-Use Inspection

WARNING: Before using the instrument be sure to test and inspect the equipment to ensure that it is functioning properly and is in safe, working condition. Failure to do so may cause serious injury or death and may result in erroneous test measurements.

Before making any high voltage measurements, test and inspect the voltmeter/phaser as follows:

1) Make certain the instrument is clean and dry.
2) Inspect the cord for cracked insulation.
3) Be sure that you are using hot sticks of the appropriate length, and examine each hot stick to ensure that it is clean, dry and waxed to a clear shiny surface.
4) Attach the appropriate probes for overhead or underground applications (see page 11) and ensure that the probes are properly installed and tightened (do not overtighten).
5) Confirm that the meter is configured for the correct application (normal reading, Peak Hold, Test Point).
6) Test each voltmeter with a voltmeter tester such as the HD Electric PT-5000B Proof Tester® Voltmeter Tester (see page 11).

Voltage Measurements – Line-to-Ground

First connect the ground cord to either a ground or system neutral. Maintain contact with the meter probe tip only long enough to read the meter. Always remove the probe from the energized source first before removing the ground connection.

Voltage and Phasing Measurements – Line-to-Line

We recommend that two person crews perform all line-to-line voltage measurements and phasing operations. Since the operation is occurring near two energized conductors, the use of two person crews allows each person to operate one meter stick and maintain high safety standards.

In order to make line-to-line measurements, each meter must contact an energized line. Be sure that only those probes intended for the particular application are used (see page 11). Always keep the ground cord free and clear of energized phases and conductors. For phasing applications, the meters will be placed on opposite sides of an open point, typically a switch. The phasing operation will indicate if two sides of a line are in-phase before closing a switch. If the two phases are out-of-phase, the meter will indicate which is leading and which is lagging.

To check all phases proceed as follows:

1) Measure voltage on each phase from line-to-ground to verify all phases are live and at the same voltage.
2) Place one of the probes on a conductor on one side of the switch.
3) Place the other probe on one of the three phases on the other side of the switch.
4) If the conductors are out-of-phase, the meter will read line-to-line voltage.
   If they are in-phase, the meter will read near zero but may read up to 15% of the line-to-line voltage.
5) Continue this procedure with all three phases on both sides of the switch.

If an intermediate reading is found, the phasing cannot be determined by this method and the switch should not be closed until other means are used for phasing.
When the meters are first applied to voltage, they both measure line-to-ground voltage. This is indicated in the displays by L-G.

Once one meter is applied to line-to-ground voltage, it begins to wirelessly search for a second meter. Any DDPM-40 may connect with any other DDPM-40 applied to voltage in the area. When two meters have established wireless communication, moving dots will appear in the bottom right corner of each display.

After a few seconds, both meters will show line-to-line voltage, indicated in the displays by L-L.

If they are out of phase, one meter will show REF indicating it is the reference phase and the other meter will show the phase angle. Here, the +120° indicates it is leading the reference phase by 120°.

And here the -120° shows this meter lagging the reference phase by 120°.

If the two meters are in phase, the line-to-line voltage will be near zero and one meter will again show REF while the other phase indication will show IN.

As soon as one meter is removed from voltage, the wireless link is shut down until the next time voltage is applied.
OPERATING INSTRUCTIONS continued

Test Point Measurements

To activate Test Point mode simply push the ON button again. Test Point mode is indicated by TP in the display. To turn Test Point mode off, simply press the ON button again to continue cycling through functional modes. When using a DDPM-40 to phase between test points, the important measurement is whether high voltage is present or not. The proper procedure for phasing between elbow test points is as follows:

1) Both elbows must be energized. Follow the proper safety practices for removing the test point protective caps and exposing the live test points. Treat all exposed electrodes as energized high voltage. Measure from both elbow test points to ground. These measurements should show that both elbows are energized and, if both elbows are of the same type and manufacture, should measure the same approximate line voltage.

2) Measure from one elbow test point to the other. This reading will show either a high voltage reading indicating the elbows are out-of-phase or a zero or low voltage reading indicating the elbows are connected to the same phase. The in-phase voltage measurement can be between zero and 15% of the nominal line-to-ground voltage. If both elbows are of different type and manufacture, then the reading may be higher.

Peak Hold

Press the ON button to activate this feature and once again to clear the reading. The H in the display confirms Peak Hold. The display will hold the highest reading while Peak Hold is activated. NOTE: The meter will not shut off while a peak reading is displayed.
PROBES AND ACCESSORIES

WARNING: ALWAYS use probes appropriate to your application. NEVER use overhead probes in underground applications. Failure to use the correct probe can result in arcing or electrical contact and may cause serious injury or death. If you are not trained in the particular operation or are not sure about the appropriate probe for your application do not proceed.

Overhead Probes
A. 025-OLPS-5 brass hook probe
B. 025-OLPS-6 brass pigtail probe
C. Hot Stick
   A range of hot sticks are available in lengths starting at 4’. Contact HD Electric for more details.
D. Insulated Underground Probe
   GCP-1 for general underground use on grounded terminals, exposed high voltage terminals or elbow test points.

Underground Dead Front Bushing Probes
E. ASP-15/25 for use in 15kV and 25kV loadbreak bushings
F. ASP-3SU for use in 35kV loadbreak bushings
G. Underground Elbow Probe
   EA-15/25 for insertion in loadbreak elbows.

NOTE: The elbow must be firmly supported when using this probe.

Proof-Tester® Voltmeter Tester
The PT-5000B Proof Tester Voltmeter Tester will produce 5kVDC at the test leads to confirm proper operation of voltmeters and phasers. This tester should be used only with voltmeters/phasers that measure DC voltage. It will not confirm operation of voltmeters/phasers that measure AC voltage only. The PT-5000B operates from one 9V lithium or alkaline battery and produces approximately 5kVDC at the connecting leads. To use:
1) Connect one tester lead to the meter ground cord and the other lead to the probe tip, typically the overhead brass hook probe.
2) Press and hold both TEST buttons.
3) Confirm a good battery by checking the red light on the Tester. If the red light does not come on, replace the battery with a 9V lithium or alkaline only.
4) Verify the voltmeter/phaser reads approximately 5kV.
5) Release the TEST buttons and disconnect the Tester from the voltmeter/phaser. Perform this test on both units.

WARNING: Do not use the voltmeter/phaser if proper operation is not confirmed.
WARNING: Do not use this tester except as directed. Do not use to test equipment other than voltmeters/phasers. Do not apply to energized circuits or equipment. Refer all servicing to the factory. Failure to follow these instructions may lead to electric shock, severe injury or death.
CARE AND MAINTENANCE
Periodic regular maintenance is required to keep the voltmeter in proper operating condition. Digital models will require periodic battery replacement. Keep the voltmeter clean and dry and always store it in its case. The sticks should be kept clean and free of dirt, contamination and marking. Examine the cord for cracking or other damage prior to each use. Although we do not specify a calibration cycle, we recommend you test, measure and calibrate your instrument annually. The Calibration and Maintenance Log provided can be used to record these events. Contact HD Electric for details.

CLEANING INSTRUCTIONS
To clean the DDPM-40 wipe with a damp cloth with water. Do not use harsh chemicals or solvents.

REPAIRS
If any damage is found please contact us at 800-435-0786 to arrange for service.

MANUFACTURING LOCATION
HD Electric • Southaven, MS, 38672 USA
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TERMS AND CONDITIONS OF SALE

HD Electric Company is herein referred to either as “HDE” or “Seller” and the customer or person or entity purchasing goods or services (hereinafter collectively referred to as “Goods”) is referred to as the “Buyer”. These Terms and Conditions, any price list or schedule, quotation, acknowledgment or invoice from HD Electric relevant to the sale of the Goods and all documents incorporated by specific reference therein, constitute the complete and exclusive agreement between the Buyer and the Seller concerning the sale of the Goods.

1. Exclusive Jurisdiction: The court of federal, state, or local court or agency, will have exclusive authority to resolve any dispute relating to the interpretation, applicability, enforceability or formation of this Agreement including any claim that all or any part of this Agreement is invalid or voidable. The Buyer agrees that any action, suit, or legal proceeding arising out of or relating to this Agreement shall be brought in the Federal or State Court located in the State of Illinois, and the Buyer hereby irrevocably submits to the exclusive jurisdiction and venue in such courts. Nothing in this Agreement shall be construed to preclude the Seller from bringing any suit or other legal proceeding relating to this Agreement in any other court or courts where the Buyer, its property or assets are located.

2. RIGHTS AND REMEDIES: Rights and remedies hereunder may be exercised at any time without waiver of any other breach or default of any other right or remedy. Any such waiver shall be in writing and signed by HDE. HDE may at any time waive any right or remedy, unless such waiver be expressed in writing and signed by HD Electric. In no event shall HD Electric be deemed to have waived any right or remedy, unless such waiver be expressed in writing and signed by HD Electric. No course of dealing or performance or industry of the parties shall constitute a waiver of any right or remedy.

3. TITLE: Title to the Goods shall pass from HDE to Buyer upon delivery of the Goods to Buyer. Risk of loss and/or damage shall pass from HDE to Buyer at the time of delivery to Buyer.

4. TERMS OF PAYMENT: Terms are stated on HDE’s invoice in U.S. currency. HDE will have the right, in its sole discretion, to either terminate this Agreement or suspend further performance under this or other Agreements (including multi-year Agreements) with the Buyer in the event Buyer fails to make any payment when due, which agreements Buyer and Seller hereby amend accordingly, or HD Electric deems necessary in its sole discretion. Buyer shall be liable for all expenses, including attorneys’ fees, costs of collection and any expenses incurred in the collection of delinquent amounts due hereunder. Neither the occurrence of nor any delay in enforcing the collection of any amount due hereunder shall result in a waiver of any other right or remedy. HDE reserves the right to file a claim in any court of competent jurisdiction to collect any amount due from Buyer.

5. LIMITATION OF REMEDY AND LIABILITY: The Buyer agrees to indemnify, defend, and hold harmless HDE from and against any and all claims, losses, actions, suits, damages, liabilities, costs, expenses, or other obligations, including any costs and expenses of defending the claim (including reasonable attorneys’ fees and costs), relating to, or arising directly or indirectly from the Goods, the use or possession of the Goods, or the purchase or sale of any Goods, to the extent caused by Buyer or any of Buyer’s employees, agents, or representatives.

6. EXCUSE OF PERFORMANCE (FORCE MAJEURE): HD Electric shall not be liable for the delivery of the Goods in performance for any non-performance due to acts of God, war, fire, flood, weather: sabotage; strikes, labor disputes, civil disturbances or riots; government requests, restrictions, allocations, laws, regulations, or orders; unavailability of or delays in transportation; default of suppliers; or unforeseen circumstances or events beyond HD Electric’s reasonable control or control of its Independent Contractor. In the event that HD Electric is unable to perform under this Agreement due to a cause described above, HD Electric’s obligations under this Agreement shall be suspended for the period during which such cause continues. In any event, Buyer shall be entitled to receive any Goods that HD Electric has already shipped to Buyer.

7. CHANGES: No changes, modifications, or amendments to the Agreement shall be binding upon HD Electric unless in writing and signed by HD Electric. Any written changes to the Agreement shall become part of the Agreement and shall be treated as a continuation of the Agreement.

8. ASSIGNMENT: Buyer shall have no right to assign its rights under this Agreement, in whole or in part, except to the extent that Buyer is permitted by law to assign rights.

9. INSTALLATION: Buyer will be responsible for receiving, inspecting, testing, storing, installing, starting up and maintaining all Goods.

10. INSPECTION/TESTING: At its expense, Buyer agrees that it will promptly inspect the Goods upon receipt thereof, and in no event later than thirty (30) days from the date of receipt of the Goods. Buyer shall deliver to HD Electric within fifteen (15) days of inspection, but in no event later than forty-five (45) days from the date of receipt of the Goods, written notice of any and all deficiencies, defects, variations from specifications or complaints of any kind with respect to the quantity, quality, condition, shipment, performance, price or appearance of the Goods so received by Buyer. In the event no such written notice is received by HD Electric, Buyer shall be deemed to have accepted the Goods in their received condition and to have waived any and all rights, claims, and remedies then or thereafter accruing. All claims for Goods not in the condition or status as described shall be made within ninety (90) days or they will be deemed and disposed and waived.

11. WARRANTY: HDE Electric covers its products with a manufacturer’s warranty against defects in material or workmanship for a period of ten years in the case of Capacitor Controls and in all other circumstances for a period of one year, unless otherwise stated by HDE in writing. The warranty product must be returned to the factory within the applicable warranty period after which time it will be destroyed. This warranty shall be null and void if the Goods have been altered in any manner or are used other than in accordance with HD Electric’s instructions. HD Electric products receive final assembly and shipment from HD Electric’s production facility at 1375 5th Avenue, and the applicable provisions of the Office of Federal Contract Compliance Programs (OFCCP), 41 CFR Part 60, which are incorporated herein by this reference. Buyer shall comply with all applicable federal, state, or local law, rules, regulations, or orders including but not limited to the Foreign Corrupt Practices Act of 1977, as amended. Buyer reserves the right to delay or refuse delivery if requests for reasonable assurances of Buyer’s compliance are not tendered as requested.

12. MISCELLANEOUS: These terms and conditions supersede all other communications, negotiations and prior oral or written statements regarding the subject matter hereof. No change, modification, rescission, discharge, abandonment, or waiver of any right or remedy shall be made by any party unless in writing and signed by the party from whose duties or obligations such change shall be deemed to have been made or in writing and signed by the appropriate HDE representative. No such modifications or additions to the Terms and Conditions shall be deemed to have been made or in writing and signed by any party unless in writing and signed by HDE. No oral agreement or promise made by any party shall be binding on such party unless in writing and signed by HDE. Any such oral or written agreement or promise made by any party shall be binding on such party.

13. DISPUTE RESOLUTION: In the event of any dispute including, but not limited to, BID DISPUTES, CONTRACT, BID DISPUTES, BID BOXES, CONTRACT BID DISPUTES, WARRANTY, CLAIMS BASED ON TORT, NEGLIGENCE, PRODUCT LIABILITY, FRAUD, MARKETING, STATE OR FEDERAL REGULATIONS, ANY CLAIMS REGARDING THE ENFORCEABILITY OF THIS LIMITED WARRANTY, AND THE WAIVER OF CLASS ACTION TRIALS between Buyer and Seller, either may choose to resolve the dispute by binding arbitration, as described below, instead of in court. THIS MEANS IT EITHER BUYER OR SELLER CHOOSE BINDING ARBITRATION. NEITHER PARTY SHALL HAVE THE RIGHT TO LITIGATE SUCH CLAIM IN COURT OR HAVE A JURY TRIAL. DISCOVERY AND APPEAL RIGHTS ARE LIMITED IN BINDING ARBITRATION. Buyer and Seller agree that the proper venue for arbitration is not chosen by Buyer or Seller of all actions arising in connection herewith shall be only in the State of Illinois and the parties agree to submit to such jurisdiction. No action, regardless of form, arising out of transactions relating to the Agreement, may be brought by either party more than two (2) years after the cause of action has accrued. The U.N. Convention on Contracts for the International Sales of Goods shall not apply to this agreement.

14. CLASS ACTION WAIVER: BINDING ARBITRATION MUST BE ON AN INDIVIDUAL BASIS. THIS MEANS NEITHER BUYER NOR SELLER MAY JOIN OR CONSOLIDATE CLAIMS IN ARBITRATION BY OR AGAINST OTHERS, OR LITIGATE IN COURT OR ARBITRATE ANY CLAIMS AS A REPRESENTATIVE OR MEMBER OF A CLASS OR IN A PRIVATE ATTORNEY GENERAL CAPACITY. ADMINISTRATION OF ARBITRATION UNDER THIS AGREEMENT IS TO BE IN THE MOST EXPEDITIOUS AND COST EFFECTIVE MANNER POSSIBLE. ANY ARBITRAION CONTROVERSY OR DISPUTE DECLARED TO BE IN THE MANNER AND THE FORM THAT ARBITRATION PROCEEDS MUST BE HEARD AND DECIDED BY A SINGLE ARBITRATOR AS SELECTED BY HDE ELECTRIC AND ITS INDEPENDENT CONTRACTORS, EXCEPT AS PROVIDED IN THIS AGREEMENT. All parties agree that any such dispute shall be governed by the Federal Arbitration Act (“FAA”) (9 U.S.C. §§1, 2, 3, 4, 5, 10, 11, 20, and 21) and the laws of the state of Illinois without regard to its conflict of law principles.

15. HD Electric Company is committed to ongoing review and improvement of its product lines, and thus reserves the right to modify product design and specifications without notice.

HD Electric Company products are available through HD Electric’s sales representatives worldwide. HD Electric products receive final assembly and shipment from HD Electric’s production facility without notice at 1375 5th Avenue, Suite 100, 1375 5th Avenue, Drive, Southaven, MS 38672.