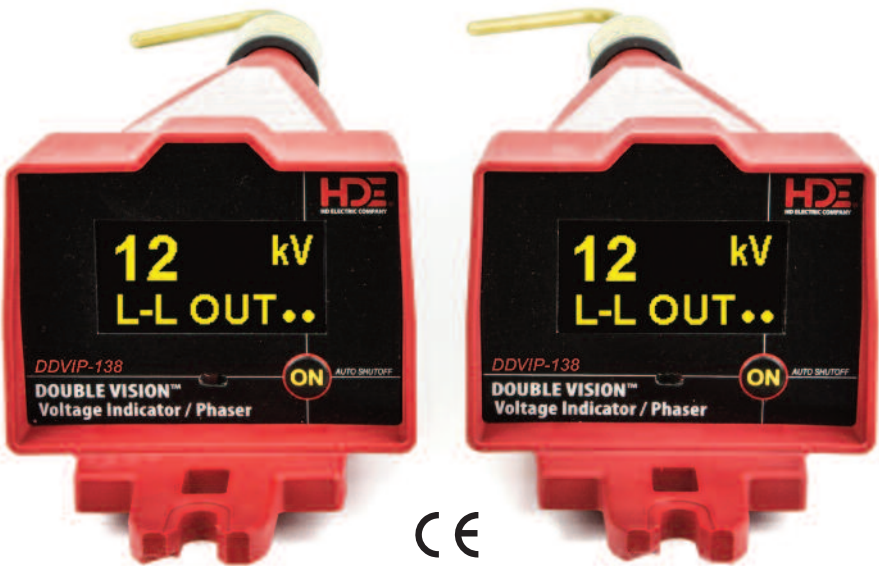


# DOUBLE VISION® DUAL DISPLAY VOLTAGE INDICATING PHASER

*and ACCESSORIES*

Operating & Instruction Manual





# **DOUBLE VISION<sup>®</sup> DUAL DISPLAY VOLTAGE INDICATING PHASER**

## ***and ACCESSORIES***

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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.

**THIS IMPORTANT LABEL IS AFFIXED TO THE PRODUCT. READ AND UNDERSTAND BEFORE PROCEEDING.**

All tools require the use of accessory hot sticks, which may or may not be supplied with the tool. 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.

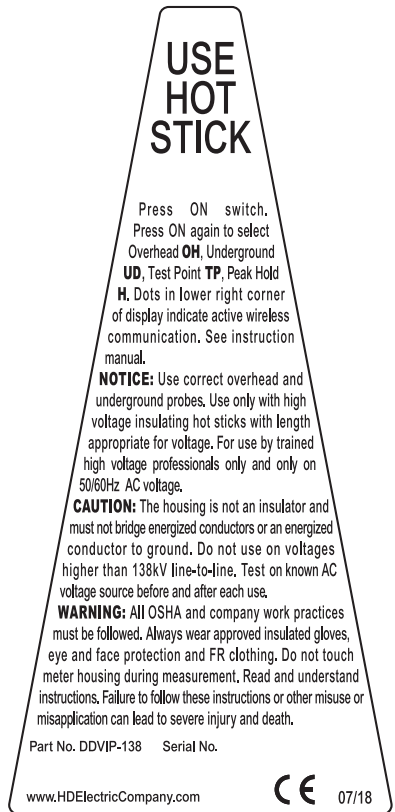
The users of this tool should always be equipped with personal protective equipment including high voltage gloves, flame retardant clothing, eye and face protection. Some applications may require additional protective equipment.

Accessory probes are available for all tools. 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 DDVIP-138 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 Voltage Indicating Phasor includes a pair of single stick line-to-ground voltage indicators that communicate with each other wirelessly. Both units are constructed with high strength molded housings, epoxy encapsulated high voltage resistors and a digital LED display.



Never allow another high voltage or grounded conductor to contact the instrument during use. Keep the DDVIP-138 housing free and clear of all structures at all times. Bridging the DDVIP-138 probe or housing from line-to-ground or line-to-line may cause a fault and arc.



**Hot Stick Connection:  
Shotgun or Universal Spline**

## TECHNICAL SPECIFICATIONS

MODEL NUMBER: DDVIP-138

### **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)
- Weight - (w/o probes): 1.6 lbs. (0.7kg) 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 - 100V-80kV each unit line-to-ground and  
100V-138kV line-to-line
- Frequency - 50/60Hz
- Auto-Ranging - No range selector switch
- Accuracy - Within 15% of reading, dependent upon geometry
- Meter Resolution: 0.10 - 0.90 range with 10 Volt resolution  
1.0 - 9.9 range with 100 Volt resolution  
10 - 80 range with 1,000 Volt resolution
- In phase indication: +/- 20 degrees. Phasing will take place only if the two line-to-ground (L-G) voltages are within 40% of each other.

## OPERATING INSTRUCTIONS

The DDVIP-138 Dual Display Voltage Indicating Phaser measures 50Hz and 60Hz AC RMS voltage from 100V to 80kV line-to-ground and 100V to 138kV line-to-line. The frequency is determined automatically.



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.



Pressing the ON button again will cycle through the available measurement modes: overhead direct contact (OH), underground direct contact (UD), capacitive test point (TP) and peak hold (H). Selecting Underground mode when working with pad mounted equipment allows the tool to adjust the displayed voltage for optimal accuracy.

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 housings. Remove and dispose of the old battery, replacing each 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 tool as follows:

- 1) Make certain the instrument is clean and dry.
- 2) 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.
- 3) Attach the appropriate probes for overhead or underground applications (see page 12) and ensure that the probes are properly installed and tightened (do not overtighten).
- 4) Confirm that the tool is configured for the correct application (normal reading, Peak Hold, Test Point).
- 5) Test each indicator with an indicator tester such as the HD Electric PT-DDVIP Proof Tester® Voltage Indicator Tester (see page 13).

### **Voltage Measurements – Line-to-Ground**

Press the ON button to select the appropriate overhead (OH) or underground (UD) mode. Maintain contact with the probe tip only long enough to read the display. Line-to-ground voltage measurement will be shown on the display. The letters "L-G" will indicate that the tool is displaying a line-to-ground voltage. Always keep the tool housing free and clear of energized phases and conductors.

### **Voltage and Phasing Measurements – Line-to-Line**

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

In order to make line-to-line measurements, each DDVIP-138 must contact an energized line. Be sure that only those probes intended for the particular application are used (see page 12). Always keep the housing free and clear of energized phases and conductors. For phasing applications, the tools 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 tool will indicate "OUT" below the voltage reading.

To check all phases, proceed as follows:

- 1) Check 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 tool will read line-to-line voltage. If they are in-phase, the tool 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 tools are first applied to voltage, they both indicate line-to-ground voltage. This is indicated in the displays by L-G.



Once one tool is applied to line to ground voltage, it begins to wirelessly search for a second meter. Any DDVIP-138 may connect with any other DDVIP-138 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 tools will show line-to-line voltage, indicated in the displays by L-L.



If they are out of phase, both tools will display the word L-L OUT beneath the voltage reading.



If the two tools are in phase, the line-to-line voltage will be near zero and both tools will show L-L IN underneath the voltage reading.



## OPERATING INSTRUCTIONS *continued*

### Overhead Mode Setting

This is the default mode for voltage measurements and appears when the meter is first turned on.

OH mode should be used for all overhead voltage measurements or any other application where the meter is not close to any grounded surfaces.



### Underground Mode Setting

Underground mode should be selected when the meter is used in or on any pad mounted transformers or switchgear or anywhere the DDVIP-138 will be used in close proximity to grounded surfaces such as equipment enclosures. Selecting UD mode improves meter accuracy in these environments.



### 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 push the ON button again to continue cycling through functional modes. When using a DDVIP-138 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 tools will not shut off while a peak reading is displayed.



## OPERATING INSTRUCTIONS *continued*

### Accuracy Guidelines

Best overall accuracy is with a single energized conductor (Fig. 1), midspan with no nearby grounds.

Expected accuracy is +/- 3%.

In a typical overhead three phase system with horizontal spacing, the best accuracy is on the two outside conductors (Fig. 2).

Expected measurement accuracy on the two outside conductors is +/- 5%

On the center conductor, expected accuracy is +/- 10%.

In more complex situations with transmission or other higher voltage overbuild, accessory hardware such as fuses or disconnects or for measurements made on points such as terminations or endpoints, best accuracy is with the DDVIP-138 as far away as possible from other live conductors or grounds, away from points or corners and facing the ground (Fig. 3 & 4).

Expected overall accuracy is +/- 25%.

For measurements made on grounded conductors, keep the DDVIP-138 as far away as possible from energized conductors and face the DDVIP-138 towards ground (Fig. 5).

Readings on grounded conductors with nearby energized conductors may indicate 0.1 to 0.2kV or more.

For best accuracy with readings on pad mount equipment, livefront (shown) or deadfront, keep the DDVIP-138 housing clear of adjacent grounds (Fig. 6).

Expected overall accuracy is +/- 10%.

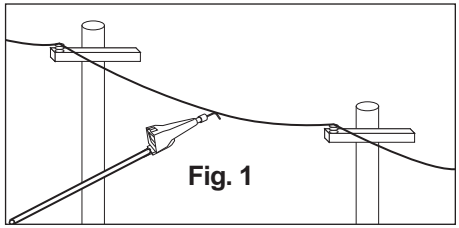


Fig. 1

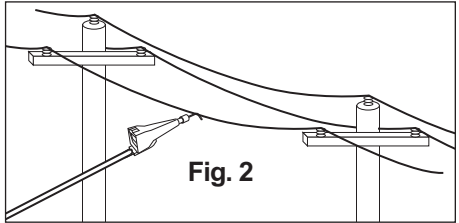


Fig. 2

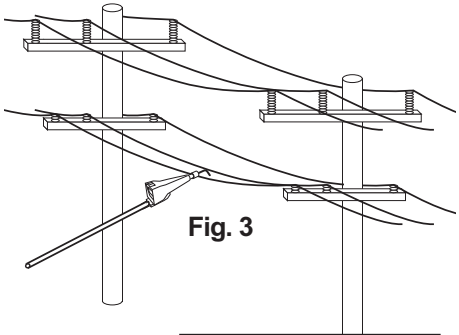


Fig. 3

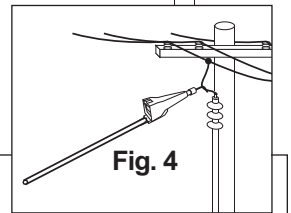


Fig. 4

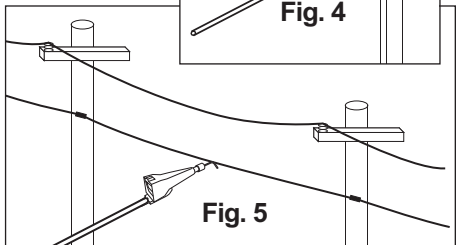


Fig. 5

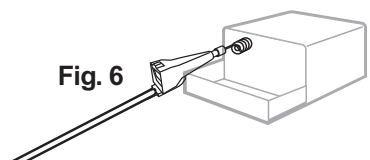


Fig. 6

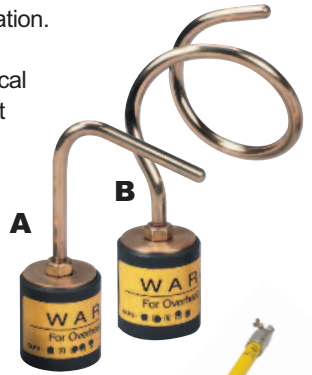
# PROBES AND ACCESSORIES

**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.



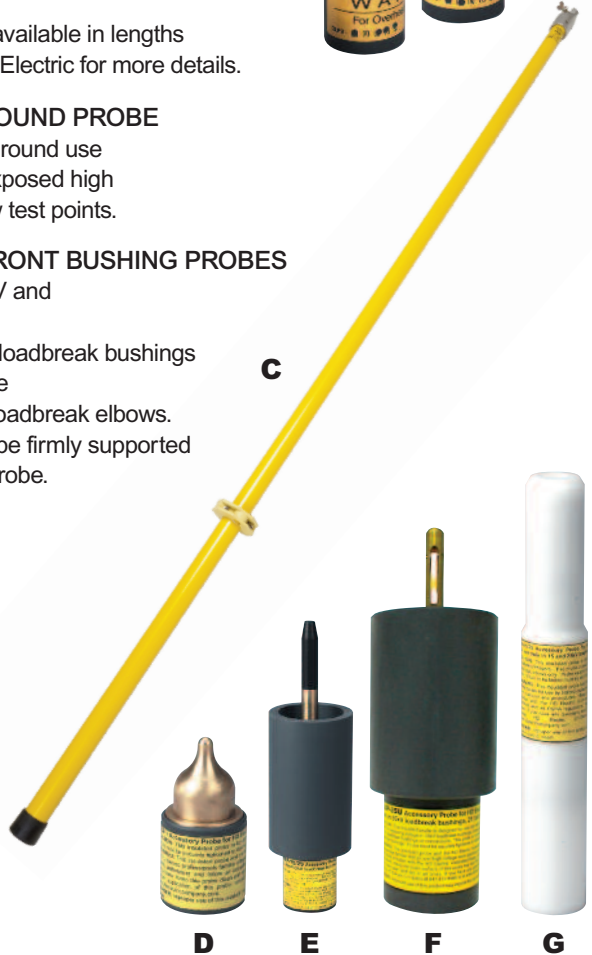
## D. INSULATED UNDERGROUND PROBE

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-35U 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.



## PROBES AND ACCESSORIES *continued*

### **PT-DDVIP Proof Tester®** **Voltage Indicating Phaser Tester**

The PT-DDVIP Proof Tester® Voltage Indicating Phaser Tester is for use only on the DDVIP-138. This tester generates high voltage AC for testing the DDVIP-138.

To use, apply the metal plate on the bottom of the Proof Tester to the metal probe on the end of the DDVIP-138 housing. Press and hold the TEST button on the Proof Tester. A properly operating DDVIP-138 will display voltage of approximately 1-3kV. If the Proof Tester LED does not light, replace the Proof Tester battery with a 9V lithium or alkaline type battery. Perform the same steps on both DDVIP-138 tools.



**CAUTION:** This device generates high voltage AC. There is no danger of electric shock when this Tester is used as directed. Discontinue use and return for service if the housing is cracked or broken, or if the battery cover is lost.

**WARNING:** Do not use this tester except as directed. Do not use to test equipment other than the DDVIP-138. Do not apply to energized circuits or equipment. Do not operate this tester without the battery cover and do not open the housing. Refer all servicing to the factory. Failure to follow these instructions may lead to electric shock, severe injury or death.

**Proof Tester® for HD Electric DDVIP**  
This tester tests DDVIP Voltage Indicators/Wireless Phasers. To use, apply the tip of the DDVIP to the metal end plate on the Tester. Press and hold the Test button on the Tester. A properly operating DDVIP will indicate a voltage of about 1-3kV. If the DDVIP does not indicate, return to factory for service. See instructions. If the Tester LED does not light, replace the Tester battery with a 9V alkaline or lithium type.

**CAUTION:** This device generates 340VAC for testing the DDVIP voltage indicator. There is no danger of electric shock when this tester is used as directed. Discontinue use and return to HD Electric Company for service if the housing is cracked or broken or if the battery cover is lost.

**WARNING:** Do not use this tester except as directed. Do not use to test equipment other than the DDVIP. Do not apply to energized circuits or equipment. Do not operate this Tester without the battery cover and do not open the housing. Refer all servicing to the factory. Failure to follow these instructions may lead to electric shock, severe injury or death.

HD Electric Company  
www.HDElectricCompany.com

CE  
PT-DDVIP 7/18

## CARE AND MAINTENANCE

Periodic regular maintenance is required to keep the voltage indicating phasers in proper operating condition. Digital models will require periodic battery replacement. Keep the voltage indicating phasers clean and dry and always store it in its case. The sticks should be kept clean and free of dirt, contamination and marking. Although we do not specify a calibration cycle, we recommend you test and measure your instrument annually. The Maintenance Log provided can be used to record these events. Contact HD Electric for details.

## CLEANING INSTRUCTIONS

To clean the DDVIP-138 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

**MAINTENANCE LOG**

DATE	CALIBRATED BY



# 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 HDE relevant to the sale of the Goods and all documents incorporated by specific reference therein, constitute the complete and exclusive statement of the terms of the agreement governing the sale of Goods by HDE to Buyer. Buyer's acceptance of the Goods will manifest Buyer's assent to these terms and conditions without variation or addition. Any different or additional terms in Buyer's purchase order or other Buyer documents are hereby objected to. HDE reserves the right in its sole discretion to refuse orders.

**1. PRICES AND TAXES:** Unless a fixed price is quoted, the price at which the order is accepted is subject to adjustment to HDE's price in effect at the time of order. Any current or future tax or governmental charge (or increase in same) affecting Seller's costs or production, sale or delivery at which Seller is otherwise required to pay or collect in connection with the sale, purchase, delivery, storage, processing, use or consumption of Goods (but excluding any tax on Seller's net income or profit) shall be for Buyer's account and shall be added to the price.

**2. TERMS OF PAYMENT:** Terms are stated on HDE's invoice in U.S. currency. HDE shall have the right, among other remedies, either to terminate this agreement or to suspend further performance under this and/or other agreements with the Buyer in the event Buyer fails to make any payment when due, which other agreements Buyer and Seller hereby amend accordingly, or HDE otherwise deems itself insecure. Buyer shall be liable for all expenses, including attorney's fees, relating to the collection of just due amounts. Should Buyer's financial position become unsatisfactory to HDE, cash payments or security satisfactory to HDE may be required by HDE for future deliveries and for the goods thereafter delivered. If such cash payment or security is not provided, in addition to HDE's other rights and remedies, HDE may discontinue deliveries. HDE may apply a finance charge for payments made by credit card.

**3. SHIPMENT AND DELIVERY:** Unless otherwise expressly provided, shipments are made F.O.B. HDE's shipping point. Risk of loss or damage and responsibility shall pass from HDE to Buyer upon delivery to and receipt by common carrier. Any claims for shortages or damages suffered in transit are the responsibility of Buyer and shall be submitted by the Buyer directly to the carrier. Shortages or damages must be acknowledged and signed for at the time of delivery. While HDE will use all reasonable commercial efforts to maintain the delivery dates(s) acknowledged or quoted by HDE, all shipping dates are approximate and not guaranteed. HDE reserves the right to make partial shipments. HDE, at its option, shall not be bound to tender delivery of any Goods to a party which Buyer has not provided shipping instructions. If the shipment of Goods is postponed or delayed for any reason, Buyer agrees to reimburse HDE for any and all handling and storage costs and other additional expenses resulting therefrom. All claims for shipping errors, lost shipments or any other discrepancies must be made within ninety (90) days or they will be disallowed and deemed waived.

**4. HDE LIMITED WARRANTY:** HDE 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. To take advantage of this warranty, the complete product must be delivered prepaid to HDE or any HDE Authorized Service Center. This warranty shall not apply to any Goods including but not limited to products which: (a) Have been repaired or altered outside HDE's factory (or Authorized Service Center) or in any manner so as, in HDE's judgment, to affect its serviceability or proper operation; (b) have been subjected by persons other than HDE (or Authorized Service Center) to improper handling, operation, maintenance, repair or alteration; and, (c) have been subjected to normal wear and tear and misuse, neglect, improper installation, or other causes. The HDE Limited Warranty shall be limited to repairs. HDE shall be limited to repairs or replacement of any allegedly defective Goods or issuance of credit. HDE requires the return of any allegedly defective Goods, transportation prepaid, before honoring any claim. All returned Goods are subject to inspection, and if examination does not disclose any defect covered by this warranty, replacement of such Goods or issuance of credit for same will not be approved. THE FOREGOING CONSTITUTES HDE'S SOLE WARRANTY RESPONSIBILITY AND BUYER'S EXCLUSIVE REMEDY WHETHER SOUNDING IN TORT, CONTRACT, STRICT LIABILITY OR OTHERWISE, EXCEPT AS OTHERWISE EXPRESSLY SET FORTH IN THIS AGREEMENT. THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, WHETHER OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE. No employee, agent, dealer, or other person is authorized to give any warranty on behalf of HDE. This warranty extends only to persons or organizations who purchase the Goods from HDE for resale.

**5. LIMITATION OF REMEDY AND LIABILITY; THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF ANY WARRANTY HEREUNDER SHALL BE LIMITED TO REPAIR, CORRECTION, REPLACEMENT OR CREDIT UNDER SECTION 4. HDE SHALL NOT BE LIABLE FOR DAMAGES CAUSED BY DELAY IN PERFORMANCE, AND IN NO EVENT, REGARDLESS OF THE FORM OF THE CLAIM OR CAUSE OF ACTION (WHETHER BASED IN CONTRACT, INFRINGEMENT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE), SHALL HDE'S LIABILITY TO BUYER AND/OR ITS CUSTOMERS EXCEED THE PRICE PAID BY BUYER FOR THE SPECIFIC GOODS GIVING RISE TO THE CLAIM OR CAUSE OF ACTION, AND BUYER SHALL INDEMNIFY HDE FOR ANY DAMAGES IN EXCESS THEREOF. BUYER AGREES THAT IN NO EVENT SHALL HDE'S LIABILITY TO BUYER AND/OR ITS CUSTOMERS INCLUDE SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES OF ANY CHARACTER IN CONNECTION WITH THE SALE, RESALE OR USE OF THE GOODS, WHICH ARE WAIVED BY BUYER AND AS TO WHICH BUYER SHALL INDEMNIFY HDE. The term "consequential damages" shall include, but not be limited to, loss of anticipated profits, business interruption, loss of use of revenue, cost of capital or loss of or damage to property, equipment, or data, or loss of reputation. Further, Buyer shall indemnify and hold HDE harmless from any liability to Buyer, Buyer's employees, workers, contractors or any other persons arising out of Buyer's, and any other persons', use of the Goods. All instructions and warnings supplied by HDE will be passed on to those persons who use the Goods. HDE's Goods are to be used in their recommended applications and all warning labels adhered to the Goods by HDE shall be left intact. It is impossible to eliminate all risks associated with the use of the Goods. Risks of serious injury or death, including risks associated with electrocution, arc flash and formal burn, are inherent in work in and around energized electrical systems. Such risks arise from the wide variety of electrical systems and equipment to which Goods may be applied, the manner of use or application, weather and environmental conditions or other unknown factors, all of which are beyond the control of HDE. HDE does not agree to be an insurer of these risks, and shall have no liability for any claims arising from such risks. WHEN YOU BUY OR USE THESE PRODUCTS, YOU AGREE TO ACCEPT THESE RISKS.**

**6. EXCUSE OF PERFORMANCE (FORCE MAJEURE):** HDE shall not be liable for delays in performance or for non-performance due to acts of God; acts of Buyer; war; fire; flood; weather; sabotage; strikes, labor disputes, civil disturbances or riots; governmental restrictions, restrictions, allocations, laws, regulations, orders or actions; unavailability of or delays in transportation; default of suppliers; or unforeseen circumstances or events beyond HDE's reasonable control. Deliveries or other performance may be suspended for an appropriate period or cancelled by HDE upon notice to Buyer in the event of any of the foregoing, but the balance of this agreement shall otherwise remain unaffected. If HDE determines that its ability to supply the total demand for the Goods, or to obtain material used directly or indirectly in the manufacture of the Goods, is hindered, limited or made impracticable due to causes set forth herein, HDE may allocate its available supply of the Goods or such material (without obligation to acquire other supplies of any such Goods or materials) among itself and its purchasers on such basis as HDE determines to be equitable without liability for any failure of performance which may result therefrom.

**7. CHANGES:** HDE reserves the right to change designs and specifications for standard Goods without prior notice to Buyer, but not with respect to custom Goods being made for Buyer. HDE shall have no obligation to install or make such change in any Goods manufactured prior to the date of such change.

**8. ASSIGNMENT:** Buyer shall not assign its rights or delegate its duties hereunder or any interest herein without the prior written consent of HDE, and any such assignment, without such consent, shall be void.

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

**10. INSPECTION/TESTING:** Buyer, at its expense, 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 HDE 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, and the extent of such written notice as received by HDE. Buyer shall be deemed conclusively to have inspected and accepted all such Goods unconditionally and to have waived any and all rights and claims, including without limitation any right to reject the Goods or to claim damages in respect thereof. Buyer may not return goods without first advising HDE of the reasons therefor, obtaining from HDE a material authorization number and observing such instructions as HDE may give in authorizing such return. In the event a return is authorized by HDE, a restocking for any Goods requiring repackaging or maintenance a twenty percent (20%) restocking fee shall be assessed to Buyer in the final credit amount.

**11. SERVICES:** If this agreement requires HDE to perform or provide any services, HDE (including without limitation its successors, assigns, agents or any person or entity acting at HDE's direction) shall not be responsible for any damages, claims, liabilities or expenses of any nature arising out of such services.

**12. U.S. EXPORT CONTROL LAWS:** All Goods sold to Buyer by HDE hereunder are subject to U.S. Export Control Laws. Buyer hereby agrees not to re-sell or divert any goods contrary to such laws.

**13. COMPLIANCE:** Seller/Contractor shall comply with all applicable federal, state or local laws, rules, regulations, or orders. Seller/Contractor shall comply with Executive Order 11246, as amended by Executive Order 11375, 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 laws, rules, regulations or orders including but not limited to the Foreign Corrupt Practices Act of 1977, as amended. HDE reserves the right to delay or refuse delivery if requests for reasonable assurances of Buyer's compliance are not tendered as requested.

**14. 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 these terms and conditions shall be binding upon HDE unless made in writing and signed or in its behalf by its duly authorized representative. No conditions, usage or trade, course of dealing or performance, understanding or agreement purporting to modify, vary, explain, or supplement these terms and conditions shall be binding unless hereafter made in writing and signed by Seller. No modification shall be effected by HDE's receipt or acceptance of Buyer's purchase orders, shipping instruction forms, or other documentation containing terms of sale in variance with or in addition to those set forth herein, all of which are objected to by HDE. Any such modifications or additional terms are specifically rejected by HDE. No waiver by HDE with respect to any breach or default of any right or remedy and no course of dealing, shall be deemed to constitute a continuing waiver of any other breach or default of any other right or remedy, unless such waiver be expressed in writing and signed by HDE. All typographical or clerical errors made by HDE in any quotation, acknowledgment or publication are subject to correction. Validity and performance relating to the interpretation and effect of this agreement shall be governed by the laws of the state of Illinois without regard to its conflict of law principles.

**15. DISPUTE RESOLUTION:** In the event of any dispute INCLUDING, BUT NOT LIMITED TO, BREACH OF CONTRACT, BREACH OF WARRANTY, CLAIMS BASED IN 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 IF 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 of Arbitration is not to be 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.

**16. 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:** The binding arbitration shall be administered by the American Arbitration Association ("AAA") in accordance with its Commercial Arbitration Rules and/or Supplemental Procedures for Consumer-Related Disputes (including proceedings to mitigate costs of AAA). This binding arbitration is governed by the Federal Arbitration Act ("FAA") (9 USC §1, et. seq.) and will govern the interpretation and enforcement, and the binding arbitration shall be held at a location determined by AAA or at such other location as mutually agreed. In addition to the terms stated above, the following will apply to the binding arbitration: (1) the arbitrator, and not any 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 void or voidable; (2) the arbitrator shall apply Illinois law consistent with the FAA.

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.

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