



# **TAG<sup>®</sup>-5000**

## **WIRELESS PHASER**

### ***and ACCESSORIES***

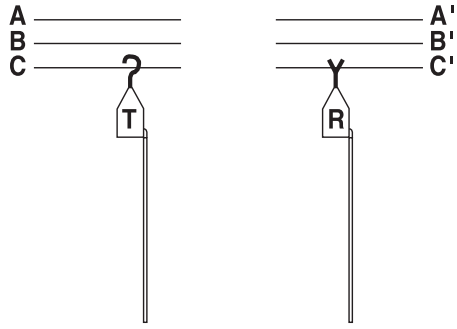
## **Operating & Instruction Manual**

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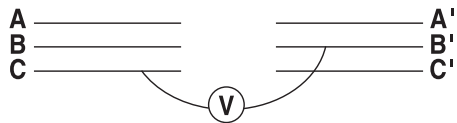
## DESCRIPTION

The TAG-5000 Wireless Phaser is a two unit system used to verify an in-phase condition between any two phases of a three phase power system. The TAG-5000 can be used anywhere a typical phasing voltmeter is used and many places where phasing voltmeters cannot be used due to distance or higher voltages. The standard TAG-5000 is supplied with a carrying case, the receiver and transmitter units and two probes (one hook and one "Y" probe) designed for overhead use. The probes are interchangeable between the two units, and can be selected based on preferred placement and company procedures. Each unit has a universal spline hot stick attachment built into the housing.

Extension hot sticks should always be used. Both units are powered by 9V lithium or alkaline batteries. Optional underground probes are available for underground or pad mount applications or for any application where the TAG-5000 will be used in close proximity to grounded conductors or surfaces.



**WIRELESS PHASING SET**



**CONVENTIONAL PHASING EQUIPMENT**

## SAFETY

- Only trained, professional operating personnel should use the TAG-5000. The voltages this instrument operates at are dangerous and lethal. Severe injury or death can occur if improperly used.
- Risk of electrocution is inherent in or around high voltage.
- Always use proper high voltage procedures, including personal protective equipment, when working near or around high voltage equipment or conductors.
- Do not use on voltages less than the minimum voltage on the device label and do not exceed the TAG-5000 maximum voltage rating of 230kV line-to-line.
- Always assemble the TAG-5000 with the proper contact probe for your application.

- Always use a hot stick with length appropriate for the voltage being measured per your company and OSHA published requirements.
- Do not touch the TAG-5000 during measurements. The TAG-5000 housing should be considered to be at the same voltage as the conductor under test.
- Prior to using, inspect the instrument for cleanliness, any physical damage and check for proper working order by pressing and holding the All-Check™ buttons on each unit. Do not proceed if the units are not operating properly.
- Never allow another high voltage or grounded conductor to contact the instrument during use. Keep the TAG-5000 housing free and clear of all structures at all times.
- If the TAG-5000 does not indicate the presence of voltage it does not mean that the line is dead or grounded. The TAG-5000 may not indicate voltages below the minimum voltage on the device label. Always use proper grounding procedures.
- The TAG-5000 units are direct contact devices. The metal portion of the TAG-5000 probe must contact the metal conductor to be tested. Voltage and phasing indication on insulated conductors such as tree wire or spacer wire will be unreliable.
- The TAG-5000 is sensitive to geometry. Read and understand this entire manual before using the TAG-5000.
- The TAG-5000 is for three phase 50Hz and 60Hz systems. It does not work on other poly-phase systems.

**Do not use the TAG-5000 to phase or synchronize connections to generators**

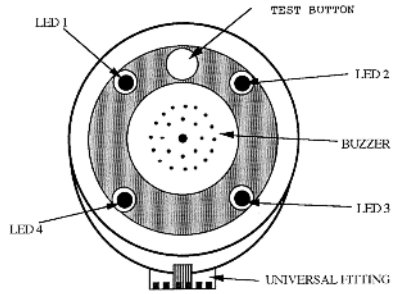
## HOW TO USE IT

### Testing

Install the probes on both the transmitter and receiver. For overhead applications the hook probe is generally placed on the transmitter while the Y probe is placed on the receiver. Test the units by holding one in each hand and pressing and holding the All-Check button on each unit. The transmitter will begin a series of beeps and flashing lights lasting about 5 seconds. The receiver will emit a single short beep. When the transmitter stops beeping, it will start transmitting a radio signal to the receiver and the receiver will respond with a series of beeps and flashing lights indicating proper reception of the signal from the transmitter.



If the transmitter or receiver do not operate properly, replace the batteries in both units and repeat the test. Do not use the TAG-5000 until it successfully passes this test. Install the TAG-5000 transmitter and receiver on hot sticks with length appropriate for the voltage to be tested by way of the built-in universal spline, making certain it is securely attached. The transmitter and receiver can also be tested on an energized line within the voltage range on the device label by simply placing each unit on the same line. The transmitter should begin beeping as described above and when it stops the receiver should start a steady tone indicating an in-phase condition.



**VIEW OF TRANSMITTER**

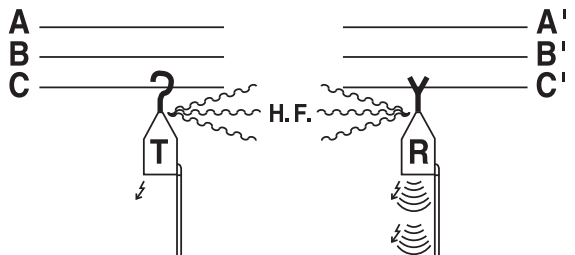
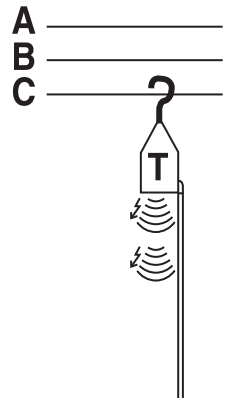
**Phasing**

Many companies have their own operating rules concerning phasing in conductors at a switch point. The following procedure is intended to be one example of proper use of the TAG-5000 but is not the only acceptable procedure.

1) Place the transmitter on each of the 6 conductors to verify the presence of voltage on each conductor. The transmitter will begin beeping when voltage is detected. On higher voltage systems the transmitter may begin beeping before the conductor is contacted, but always make sure that metal to metal contact is made between the transmitter probe and the live conductor.

2) Place the transmitter on the first conductor to be phased. When the transmitter stops beeping, one light remains on indicating the unit is transmitting.

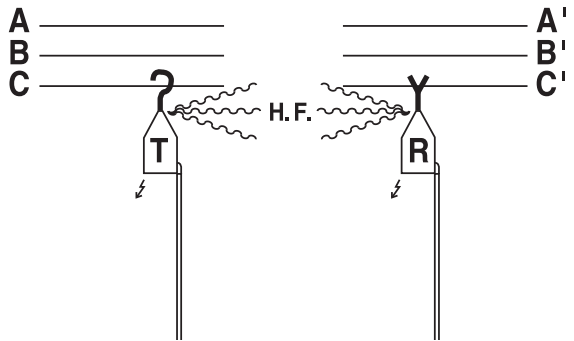
3) Place the receiver on the proper conductor on the opposite side of the open point (e.g. switch) to determine if the two conductors are in-phase. When placed on an energized conductor the unit will beep once when voltage is detected and one LED light of the receiver will turn on to signal that the unit is operating in the receive mode.



**On higher voltage systems the receiver may beep before the conductor is contacted, but always make sure that metal to metal contact is made between the receiver probe and the live conductor.**

If the two conductors are in-phase the other three receiver lights will turn on and the unit will emit a steady tone. The TAG-5000 receiver is signaling that this phase of the system is in-phase with the transmitter.

If the conductors are out of phase, the receiver will supply a brief burst of all lights and a single short beep of the beeper but will not emit a steady tone.



4) Test all phases for an in-phase indication from the TAG-5000 to make certain that each phase is lined up correctly prior to closing in a switch. When an in-phase condition is shown for all three phases, the phasing operation is complete.

5) Test the TAG-5000 units using the procedures in the Testing section above to make certain that the units operated properly throughout the phasing procedure. If the testing procedure indicates that the units are not operating properly, DO NOT ASSUME that the phasing procedure just completed is correct. Remove the TAG-5000 units from service and re-phase the line using different phasing equipment.

**WARNING:** Use of the TAG-5000 units at a distance greater than allowed on page 10 may not provide proper operation due to loss of radio signal between the two units. Also, mobile communication devices may cause interference in transmission of the radio signal and can cause false signals. Care should be taken in operating other radio generating devices near the TAG-5000 units during operation.

## SITUATIONS TO AVOID

Electrical field interference can affect the operation of the TAG-5000.

For best performance avoid the following:

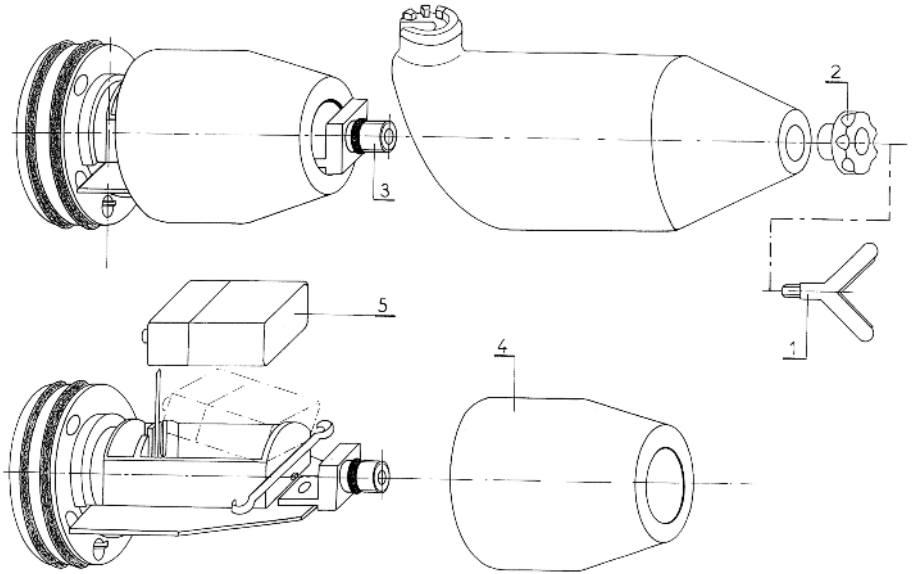
1. **90° CORNER CONFIGURATIONS:** Position the TAG-5000 at least three feet (1 meter) away from any inside or outside corner. Any 90° inside corner configuration may cause field cancellation, causing the TAG-5000 not to operate correctly.
2. **SAME PHASE INTERFERENCE:** When two conductors of the same phase are in close proximity to one another, the field generated could shield the TAG-5000, causing it to not operate. Reposition the TAG-5000 to areas which will remove it from these situations.

## BATTERY REPLACEMENT

The battery is tested each time the All-Check button is depressed and battery replacement should be the first step taken if the All-Check button does not provide the signal described in the Testing section. The battery in the transmitter and receiver should be replaced at the same time to ensure proper operation. Change out the batteries of the units by performing the following steps (see Figure 1 - TAG Components on the next page):

- 1) Remove the probe and the retaining nut from the top of the units.
- 2) Push out the electronic housing from within the polycarbonate casing by using the probe. Press firmly and slowly to remove the housing since the gaskets that protect the unit will provide resistance.
- 3) Carefully remove the metal shield from the electronic housing to get access to the battery. Make certain that the ground lead which is connected from the PC board to the inside of the metal shield is intact. If it is broken, or breaks, return the TAG-5000 to HD Electric for repair.
- 4) Remove the existing battery from its compartment by gently prying the battery from the bottom of the unit. Take care not to damage the circuit board that the battery is mounted on.
- 5) Replace the old battery with a fresh alkaline 9V DC battery, Duracell #MN1604 or equivalent. Again, take care in installing the new battery not to damage the circuit board. In addition, make certain that polarity is correct when the battery is installed by matching the plus of the battery to the plus sign indicated on the battery holder.
- 6) Replace the metal shield, place the housing back in the casing, and re-install the retaining nut and probe.
- 7) Press the All-Check button to confirm that the new battery is allowing the units to operate correctly.

**Figure 1 - TAG Components**



1 - "Y" Probe, 2 - Retaining Nut, 3 - Electronic Housing, 4 - Metal Shield, 5 - Battery

## ACCESSORIES

### **IEP-UD/C Underground Bushing Probe**

The IEP-UD/C Underground Bushing Probe is designed for direct insertion into exposed 15, 25 or 35kV loadbreak bushings (after connecting elbows have been removed and properly stored). The probe must be inserted directly into the bushing and remain free and clear of all surrounding surfaces. It is rated for use up to 21kV phase-to-ground. This probe should also be used in metal clad switchgear or any other applications where grounded or other live conductors may be in close proximity to the conductor being tested.

#### **TO ASSEMBLE THE IEP-UD/C PROBE ON THE TAG-5000:**

1. Inspect the IEP-UD/C probe for any mechanical defects and make certain it is clean and dry.
2. Remove the overhead probe and screw the IEP-UD/C onto each TAG-5000. Make certain it is snug by hand tightening, but **DO NOT OVERTIGHTEN**.
3. Test the fully assembled TAG-5000 on a known voltage source prior to using.





## IEP-EA/C UNDERGROUND ELBOW PROBE

The IEP-EA/C Underground Elbow Probe is designed for insertion onto 15, 25 and 35kV loadbreak elbow probes. The probe must be inserted directly onto the elbow probe and remain free and clear of all surrounding surfaces. It is rated for use up to 21kV phase to ground.

### TO ASSEMBLE THE IEP PROBE ON THE TAG-5000:

1. Inspect the IEP probe for any mechanical defects and make certain it is clean and dry.
2. Remove the overhead probe and screw the IEP onto each TAG-5000. Make certain it is snug by hand tightening, but **DO NOT OVER TIGHTEN**.
3. Test the fully assembled TAG-5000 on a known voltage source prior to use.



## OTHER ACCESSORIES

Adapter for Shotgun Stick (HSA-2500)

**HSA-2500**



## HOT STICKS

A range of hot sticks are available in lengths starting at 4'. Contact HD Electric for more details.

**HOT STICKS**



## SPECIFICATIONS

**MODEL NUMBER:** TAG-5000

**OPERATING VOLTAGE RANGE:** 4 - 230kV line-to-line

**OPERATING FREQUENCY & PHASING:** Can be used on 50Hz and 60Hz systems  
In phase indication for phase angle shift  $\leq 10^\circ$   
No in phase indication for phase angle  $\geq 30^\circ$

**TRANSMISSION:** Radio frequency: 433.9MHz  
Transmission power: < 10mW  
Range: Over 33 feet through the air, over 1000 feet along overhead conductors and underground cables with polyethylene insulation; range is substantially reduced in underground conductors with rubber insulation.

**OPERATING TEMPERATURE RANGE:** -20F to +120F

**WEIGHT:** 1.2 lb. each unit with overhead probe

## MAINTENANCE AND CARE

**BATTERY** - The batteries require checking prior to each use. Use the All-Check button to confirm proper operation. The All-Check button tests the battery voltage in addition to the electronic circuitry, so it is a good test of battery strength. If the All-Check button does not cause the lights to flash and the alarm to sound, replace the batteries with lithium or alkaline types only.

**STORAGE** - It is recommended for protection of the TAG-5000 that you always store it and its accessories in the carrying case provided.

**CLEANLINESS** - The molded housings are very rugged but should be kept clean and free of dirt, grease and any other foreign materials. If the housings' surface integrity has been compromised in any way, remove from service and return to factory for repair or replacement.

**WARNING:** DO NOT USE SOLVENTS OF ANY KIND FOR CLEANING.

**DAMAGE** - If you suspect any mechanical or electrical damage, do not use the TAG-5000 and arrange for repair by returning to the factory.

**CALIBRATION & TESTING** - Regular calibration of the TAG-5000 is not required. There is no accessible calibration adjustment.

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



# 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 date(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 or to provide shipping instructions. If the shipment of Goods is postponed or delayed by 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 or misuse, neglect, improper installation, or other causes. The HDE Limited Warranty shall be limited to repairs. HDE shall be limited to repairs of the type of repair 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 only 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 have no applicability, 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, 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 on 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 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 Supplementary Procedures for Consumer-Related Disputes (including proceedings to mitigate costs of travel). 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.

HD Electric Company® products are available through HDE® sales representatives worldwide.

HD Electric products receive final assembly and shipment from HDE's production facility at

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