

# CapCheck<sup>®</sup> III

DISTRIBUTION & SUBSTATION TYPE

## Capacitor Checker

### Operating & Instruction Manual



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CAP CHECK III INSTRUMENT PANEL .....	3
CAUTION AND SAFETY NOTES .....	4
OPERATING PRINCIPLE .....	5
SET UP PROCEDURE .....	5
SET UP AND TESTING .....	5
DESIGN OF THE PROCEDURE .....	5
PROCEDURE REVIEW .....	5
PREPARATION FOR TESTING .....	6-7
TESTING PROCEDURE .....	7
PASS / FAIL LIMIT RATING .....	8-11
REPAIRS .....	11
TERMS AND CONDITIONS OF SALE .....	12

# CAP CHECK III INSTRUMENT PANEL



1. Current Transformer Size Selection Switch
2. Current Transformer Operation Switch
3. Plug for Current Transformer
4. AC Milliamps Digital Meter
5. Plug for Energizing Leads
6. Test Voltage Range Selection Switch
7. AC Volts Digital Meter
8. ON/OFF Switch
9. Variable Transformer (Variac)



**CAUTION:** Make certain capacitors are shorted and de-energized **COMPLETELY** prior to testing. **ALWAYS** be certain capacitor bank to be tested is out of service. Allow at least 5 minutes for capacitors to fully discharge.



**CAUTION:** Rigorous hot stick work precautions are required when operating the Cap Check III. Insulating gloves as well as hot sticks are strongly suggested.



**CAUTION:** Make certain leads **NEVER** cross phases or drape across bushings, live transformers, etc. Cordage must remain free and clear of all objects, including the human body, **AT ALL TIMES**.



**CAUTION:** Make certain maximum capacitor KVAR and voltage do not exceed the Cap Check III testing limits. Maximum KVAR for the Cap Check III can be noted on the Pass/Fail Limit Rating Chart located at the end of the manual.



**CAUTION:** Make certain the Cap Check III voltage (Variac) is set to zero (0) prior to turning the instrument on and energizing capacitors.



**CAUTION:** Always turn the Variac to zero after testing capacitors and before turning the Cap Check III off. This action will discharge the capacitor.

**NOTE:** Familiarize yourself with the Cap Check III instrument panel layout as diagrammed on the previous page, prior to conducting your first test.

## **ADDITIONAL SAFETY NOTES**

Please note that your Company may have additional safety rules and procedures, which should be employed while using this equipment. You must check to make certain that all safety considerations are properly addressed when using this equipment. These are recommended safety rules and are to be used as guidelines in establishing and integrating your own safe procedures.

## OPERATING PRINCIPLE

The Cap Check operates by measuring the current flowing through the capacitor under test. The operating convenience of this tester comes from the fact that a bank of paralleled capacitors is energized but currents are measured individually without opening any connections. Of course, the current drawn by the paralleled group must not exceed the capacity of the power supply.

## SET UP PROCEDURE

**IMPORTANT:** THE PROCEDURES DESCRIBED ARE GENERAL AND MUST BE REVIEWED AND MODIFIED AS NECESSARY TO CONFORM TO THE USER'S SAFETY RULES, STANDARDS AND REGULATIONS.

ALWAYS REMEMBER THAT THE DISTRIBUTION EQUIPMENT UNDER TEST OPERATES AT HIGH VOLTAGE. THE CAPACITOR BANKS MUST BE DE-ENERGIZED AND COMPLETELY DISCHARGED BEFORE THE TESTING AT THE RELATIVELY LOW VOLTAGE IS PERFORMED.

Every group of paralleled capacitors must be discharged. If these parallel groups are not equipped with shorting switches this must be accomplished in accordance with the user's standard safe operating procedures.

## SET UP AND TESTING

To obtain correct results it is necessary that the Cap Check energizing leads be connected across the single parallel group of capacitors being tested. If shorting switches are installed, these can limit the energized capacitors to those under test. If switches are not available it will be necessary to use jumpers. The energizing leads may then be attached to the phase lead and the neutral. It is also possible to attach the energizing leads to each of the paralleled sections, but this defeats the timesaving feature of the Cap Check.

Other arrangements of jumpers or switching can be devised to suit the network under test.

When the system consists of paralleled series-parallel groups it probably will not be necessary to switch or jumper the parallel leg – as a matter of fact, that leg must not be shorted or too much of it jumped to avoid drawing excessive power from the tester.

After the test of all parallel groups is completed the tester voltage should be turned down to minimum and the supply should be de-energized. This action will discharge the capacitors which were last tested.

## DESIGN OF THE PROCEDURE

The objectives to be considered when establishing a test procedure must put safety first and then consider the convenience and efficiency of the work crew. The basic consideration will be to minimize the number of jumper shifts during the course of testing.

## PROCEDURE REVIEW

HD Electric will be happy to discuss special problem networks or to review proposed test sequences, but the responsibility for the safe design of these procedures and the safe operation of the test set lies with the using authority.

## PREPARATION FOR TESTING

(refer to diagram on page 3)

Remove the top and bottom lids from the Cap Check III case. Set the instrument on a firm, safe and secure surface.

Plug the yellow Energizing Lead with two clamps and a 4-pin connector into the Voltage Output Plug (#5) located on the upper right corner of the instrument panel. Make certain the plug is secure and locked into place.

If the Current Transformer is to be used, plug the Current Transformer Energizing Lead with a 3-pin connector into the Current Input Plug (#3) on the upper left corner of the instrument panel.

Be certain the ON/OFF Switch (#8), located on the middle right side of the panel, is in the OFF position and the Variac (#9) is set to zero (0).

Attach the yellow power cord to the Cap Check III using the twist-lock connection located underneath the base of the Cap Check. Then plug the power cord into a known rated voltage, 60Hz, 2 Amp power source.

Identify the capacitor voltage rating and KVAR to be tested as noted on the capacitor. Locate the capacitor voltage and KVAR on the Cap Check III Pass/Fail Limit Rating Chart located at the end of the manual.

Again, be certain the maximum Cap Check III voltage and KVAR are not being exceeded.

Note the test voltage range on the chart and select the required test voltage range with the Test Voltage Range Selection Switch (#6) located below the Voltage Output Plug on the right side of the instrument panel.

For up to 120 Volts, the switch should be set to the 50-120 setting. For above 120 Volts, the switch should be set to the 240-480 setting.

Be certain the Test Voltage Range Selection Switch is set correctly before proceeding.

If the Current Transformer is to be used, set the Current Transformer Operation Switch (#2), located below the Current Input Plug, to the CT setting on the left.

NOTE: If a single capacitor is to be tested, the test may be conducted without using the current transformer. In this case, set the Current Transformer Operation Switch to the DIRECT setting on the right. In this mode, the energizing lead and clamps will sense current and register a reading on the AC Milliamps Digital Meter (#4).

Be certain the Current Transformer Operation Switch is set correctly before continuing.

If a Current Transformer is used, select the current transformer size on the Current Transformer Size Selection Switch (#1) located on the upper left of the instrument panel. Set to 2 inch or 4 inch Current Transformer size. 2 inch applies to a small current transformer with a 2 inch opening.

**Make certain the Current Transformer Size Selection Switch is at the proper setting.**

**NOTE:** Never switch between the CT setting and DIRECT setting while the Cap Check III is ON. Always turn the Variac to zero (0) and turn the unit OFF before changing the Current Transformer Operation Switch setting.

**NOTE:** Do not attempt to zero the AC Milliamps Digital Meter.

**NOTE:** The Volts Digital Meter has been factory set. Do not attempt to adjust the settings for the meter.

You are now ready to begin testing.

## TESTING PROCEDURE

**NOTE:** Always apply the previously mentioned safety precautions and always make certain the capacitors to be tested are COMPLETELY discharged and removed from service.

**CAUTION:** Always attach one energizing lead clamp to the capacitor at a time. NEVER attach both clamps at the same time.

- Step 1. Attach the Energizing Lead Clamps to the capacitor bushings. If multiple capacitors are being tested, be certain the maximum KVAR of the Cap Check III is not being exceeded and all capacitors under test are being subjected to the applied voltage. Also note that the capacitors will have to be physically disconnected from the circuit so as to be able to apply the Cap Check test voltage to the capacitor and the capacitor ONLY.
- Step 2. If it is being used, apply the Current Transformer to one energizing clamp, lead or bushing. It does not matter which energizing lead is used to sense the current.
- Step 3. Once the Energizing Lead Clamps and Current Transformer are in place, turn the Cap Check ON using the ON/OFF Switch. Using the Variac, apply the test voltage as previously determined using the Cap Check III Pass/Fail Limit Rating Chart located at the end of the manual.
- Step 4. Note the reading on the AC Milliamps Digital Meter and compare it to the current range noted on the Pass/Fail Limit Rating Chart to determine if the capacitor is good or bad.  
If multiple capacitors are being tested, leave the bank of capacitors energized to the test voltage and move the Current Transformer to the next capacitor to obtain the milliamperere reading for each individual capacitor.
- Step 5. When the test is complete, turn the Variac back to zero (0) and turn the Cap Check III OFF.
- Step 6. Remove the Current Transformer from the capacitor and then remove the Energizing Lead Clamps one at a time.

Conduct further testing of other capacitors or capacitor banks following this same procedure.

CAP CHECK III PASS / FAIL LIMIT RATING

V	NAMEPLATE DATA KVAR	DATA V TEST	TEST CURRENT MIN	MAX	MAXIMUM ENERGIZED BANK LOAD, KVAR
2200	15	50	138	186	1050
2200	25	50	232	313	
2200	50	50	467	628	
2200	100	50	937	1260	
2200	150	50	1407	1891	
2400	15	50	115	157	200
2400	25	50	194	263	
2400	50	50	392	528	
2400	100	50	787	1058	
2400	150	50	1182	1588	
2400	200	50	1577	2118	
2400	15	120	284	375	50
2400	25	120	475	625	
2400	50	120	953	1250	
4000	50	50	139	188	550
4000	100	50	281	375	
4000	150	50	424	563	
4000	200	50	566	750	
4000	15	120	99	135	200
4000	25	120	168	225	
4000	50	120	338	450	
4000	100	120	680	900	
4160	50	50	129	173	600
4160	100	50	262	347	
4160	150	50	394	520	
4160	200	50	526	693	
4160	15	120	94	125	250
4160	25	120	156	208	
4160	50	120	315	416	
4160	100	120	632	832	
4800	50	50	96	130	800
4800	100	50	196	260	
4800	150	50	295	391	
4800	200	50	395	521	
4800	15	120	69	94	300
4800	25	120	116	156	
4800	50	120	236	313	
4800	100	120	474	625	
6640	15	300	92	122	250



CAP CHECK III PASS / FAIL LIMIT RATING *continued*

V	NAMEPLATE DATA		TEST CURRENT		MAXIMUM ENERGIZED BANK LOAD, KVAR
	KVAR	V TEST	MIN	MAX	
6640	15	120	37	49	600
6640	25	120	61	82	
6640	50	120	122	163	
6640	100	120	245	327	
6640	150	120	367	490	
6640	200	120	490	653	
7200	15	300	76	104	50
7200	25	120	52	69	750
7200	50	120	104	139	
7200	100	120	208	278	
7200	150	120	313	417	
7200	200	120	417	556	
7200	300	120	625	833	
7200	400	120	833	1111	
7300	100	120	203	270	750
7300	150	120	304	405	
7300	200	120	405	540	
7300	300	120	608	811	
7620	15	300	70	93	50
7620	25	300	116	155	
7620	50	120	93	124	800
7620	100	120	186	248	
7620	150	120	279	372	
7620	200	120	372	496	
7620	300	120	558	744	
7960	15	300	64	85	350
7960	25	300	107	142	
7960	50	120	85	114	900
7960	100	120	170	227	
7960	150	120	256	341	
7960	200	120	341	455	
8320	15	300	59	78	100
8320	25	300	98	130	
8320	50	120	78	104	1000
8320	100	120	156	208	
8320	150	120	234	312	
8320	200	120	312	416	
9960	200	50	91	121	3450
9960	300	50	136	181	

CAP CHECK III PASS / FAIL LIMIT RATING *continued*

V	NAMEPLATE DATA		TEST MIN	CURRENT MAX	MAXIMUM ENERGIZED BANK LOAD, KVAR
	KVAR	V TEST			
9960	100	120	109	145	1400
9960	150	120	163	218	
9960	200	120	218	290	
9960	300	120	327	435	
10300	100	120	102	136	1500
10300	150	120	153	204	
10300	200	120	204	271	
10800	200	120	185	247	1700
13200	25	480	62	83	150
13200	50	480	124	165	
13200	100	480	248	331	
13200	50	300	77	103	250
13200	100	300	155	207	
13200	150	120	93	124	2500
13200	200	120	124	165	
13280	50	300	77	102	250
13280	100	300	153	204	
13280	150	300	230	306	
13280	100	120	61	82	2550
13280	150	120	92	122	
13280	200	120	122	163	
13280	300	120	184	245	
13800	25	480	57	76	150
13800	50	480	113	151	
13800	50	300	71	95	250
13800	100	300	142	189	
13800	100	120	57	76	2750
13800	150	120	85	113	
13800	200	120	113	151	
14400	25	480	52	69	150
14400	50	480	104	139	
14400	100	480	208	278	
14400	50	300	65	87	300
14400	100	300	130	174	

CAP CHECK III PASS / FAIL LIMIT RATING *continued*

V	NAMEPLATE DATA		TEST MIN	CURRENT MAX	MAXIMUM ENERGIZED BANK LOAD, KVAR
	KVAR	V TEST			
14400	100	120	52	69	3000
14400	150	120	78	104	
14400	200	120	104	139	
14400	300	120	156	208	
15200	150	120	70	93	3350
16000	200	120	84	113	3700
17000	300	300	280	374	400
19920	200	120	54	73	5750
19920	300	120	82	109	
19920	50	480	54	73	350
19920	100	480	109	145	
19920	150	300	102	136	550
19920	200	300	136	181	
19920	300	300	204	272	
21600	150	300	87	116	650
21600	200	300	116	154	
21600	50	480	46	62	400
21600	100	480	93	123	
21600	150	480	139	185	
21600	200	480	185	247	
22130	100	480	88	118	400
22130	150	480	132	176	
22130	200	480	176	235	
22500	50	480	43	57	450
22500	100	480	85	114	
22500	150	480	128	171	
22500	200	480	171	228	
25000	100	480	69	92	550
25000	150	480	104	138	
25000	200	480	138	184	

**NOTE:** Maximum Energized Bank Load, KVAR refers to the capacitors which the Cap Check III can energize as a group. The operating manual includes information on load calculations for series-parallel connected banks.

When more than one test voltage is listed for a capacitor nameplate rating, select the highest value while considering the Cap Check bank capacity rating.

**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 with 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 or to provide shipping instructions. If the shipment of Goods is postponed or delayed by HDE 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 or misuse, neglect, fire, flood, theft, or other cause. The HDE Limited Warranty shall be limited to the repair or replacement of the Goods. HDE's obligation to repair or replace 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 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 related 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 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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