

Part Number	259085
Bulletin	1155
Effective	4/1/99

# CALDWELL HUMIDITY CONTROLLER INSTALLATION AND OPERATION MANUAL

THIS MANUAL IS FOR THE OPERATION AND MAINTENANCE OF  
HUMIDITY CONTROLLER MODELS HC18-3.3KW, HC18-5.0KW,  
HC18-6.6KW, HC24-7.5KW, HC24-15KW, HC28-7.5KW, HC28-15KW

**WARNING!**  
READ MANUAL THOROUGHLY BEFORE INSTALLING  
OR OPERATING HUMIDITY CONTROLLER.



A DIVISION OF CHIEF INDUSTRIES, INC.

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### STANDARD TERMS AND CONDITIONS OF SALE

#### **CALDWELL STANDARD LIMITED WARRANTY**

**STANDARD LIMITED WARRANTY: DEALERS HAVE THE RESPONSIBILITY OF CALLING TO THE ATTENTION OF THEIR CUSTOMER THE FOLLOWING CALDWELL STANDARD LIMITED WARRANTY, PRIOR TO ACCEPTANCE OF AN ORDER FROM THE CUSTOMER FOR ANY CALDWELL PRODUCTS.** Chief Industries, Inc., Agri/Industrial Division warrants to the purchaser for use that if any part of the product is proven to be defective in material or workmanship within 2 years from date of original invoice from factory, and Chief Agri/Industrial Division is notified within 15 days after such defect is discovered, Chief will (at company option) either replace or repair said part. This Standard Limited Warranty does not apply to damage resulting from misuse, neglect, material wear, accident or improper installation or maintenance. Said part will not be considered defective if it substantially fulfills performance specifications. **THE FOREGOING STANDARD LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OR MERCHANTABILITY, FITNESS FOR PURPOSE AND OF ANY OTHER TYPE, WHETHER EXPRESSED OR IMPLIED.** Chief Industries, Inc., Agri/Industrial Division neither assumes nor authorizes anyone to assume for it any other obligation or liability in connection with said part and will not be liable for incidental or consequential damages. **THE REMEDIES STATED HEREIN SHALL BE THE EXCLUSIVE REMEDIES AVAILABLE UNDER THIS STANDARD LIMITED WARRANTY. CLAIMS UNDER THIS STANDARD LIMITED WARRANTY SHALL BE HANDLED UNDER THE CALDWELL STANDARD SERVICE POLICY.**

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HC18-6.6KW, HC24-7.5KW, HC24-15KW, HC28-7.5KW, HC28-15KW

**PACKING LIST**

<u>QUANTITY</u>	<u>COMPONENTS</u>	<u>DESCRIPTION</u>
1	HC18-3.3KW HC18-5.0KW HC18-6.6KW HC24-7.5KW HC24-15KW HC28-7.5KW HC28-15KW	Electric Humidity Controller
1	Manual (Bulletin 1155)	Caldwell Humidity Controller Instruction and Operation Manual
1	Bolt Bag	5/16" Capscrew, Nuts and Washers
(OPTIONAL)	Humidistat Assembly	Caldwell Nylon Humidistat

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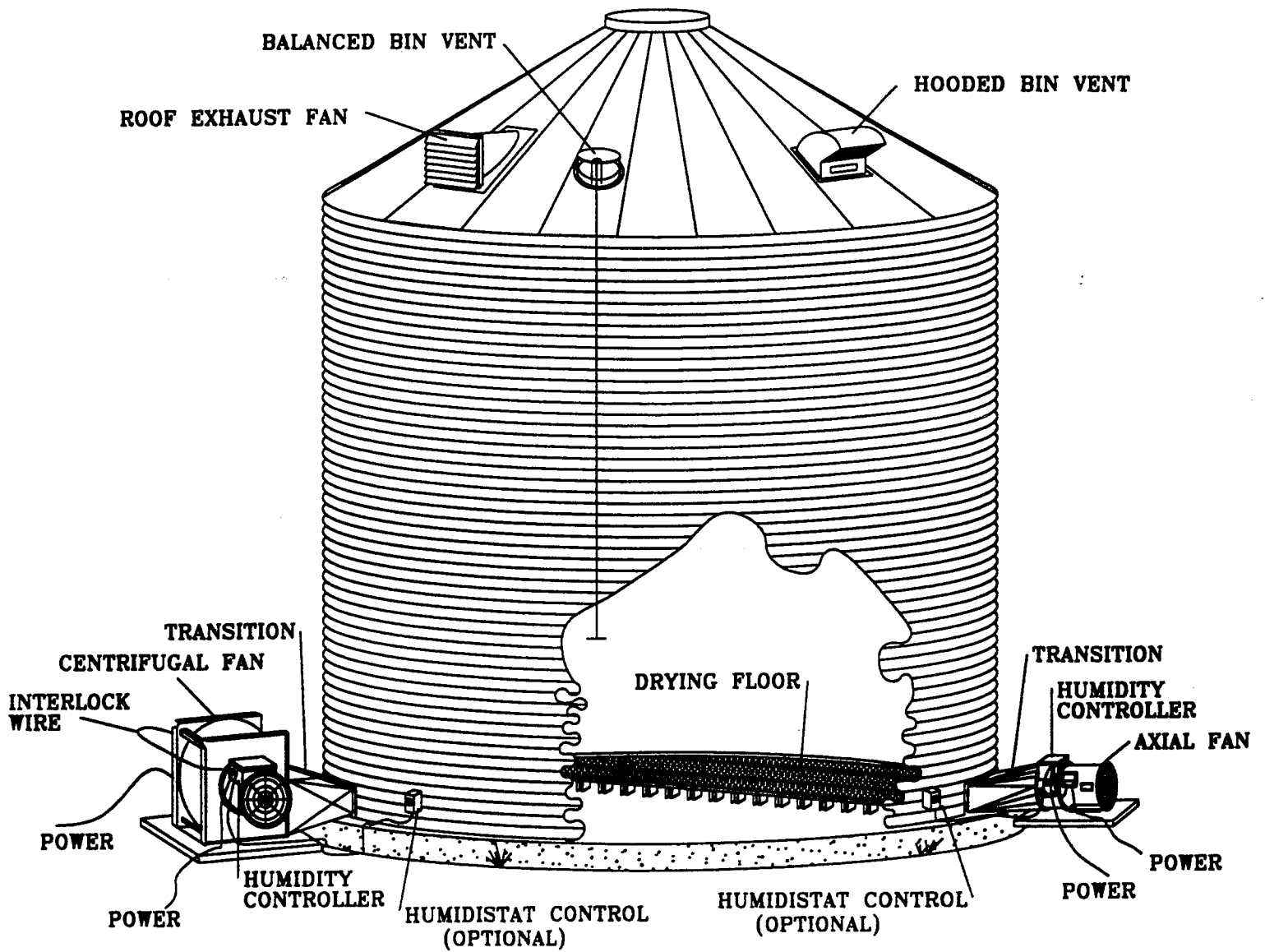
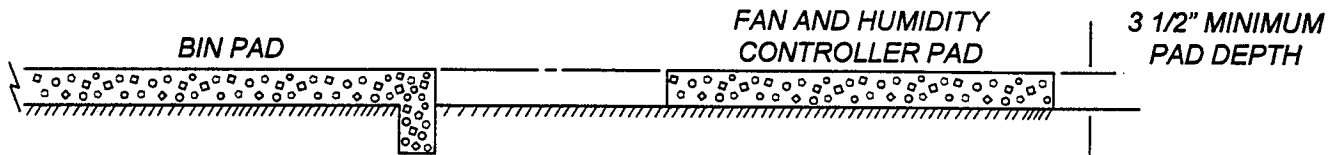
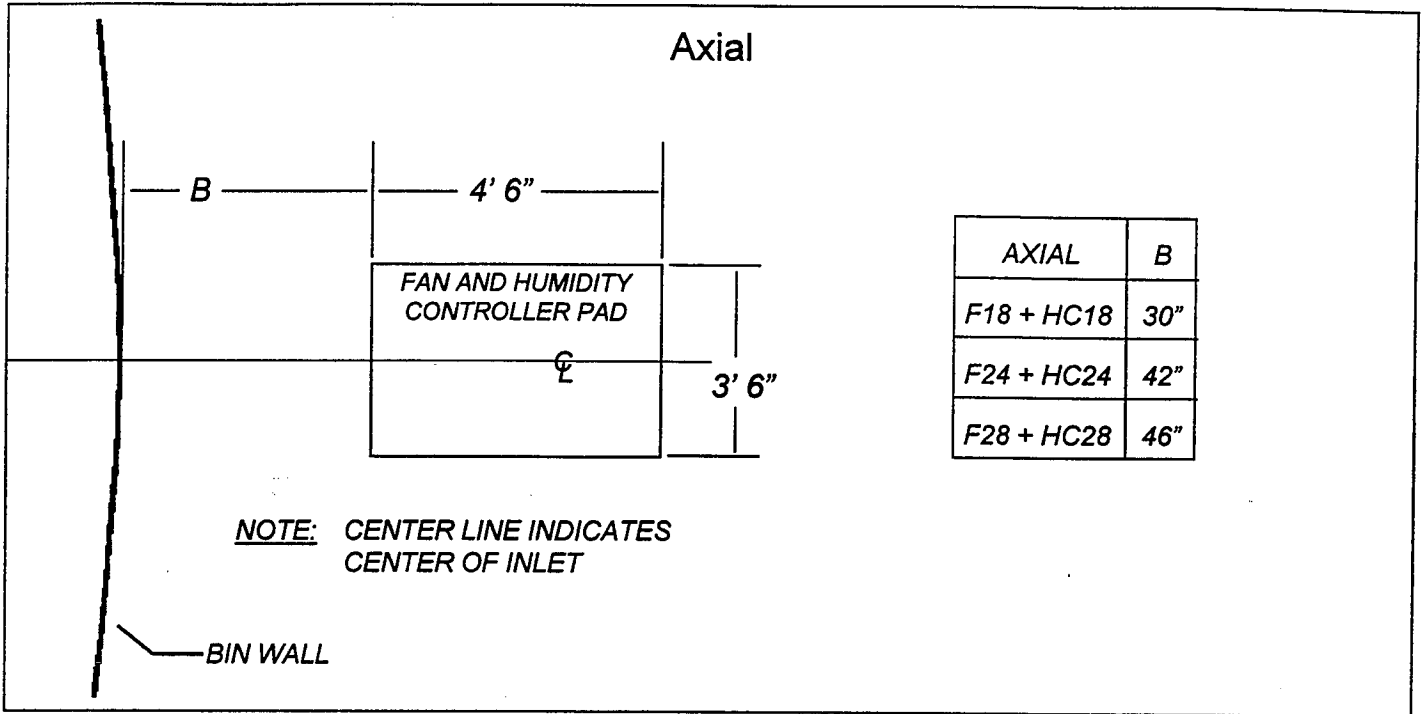


Figure 1. Typical Installation

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**NOTE:** PAD FOR FAN & HUMIDITY CONTROLLER MUST BE SAME ELEVATION AS THE BIN SLAB.

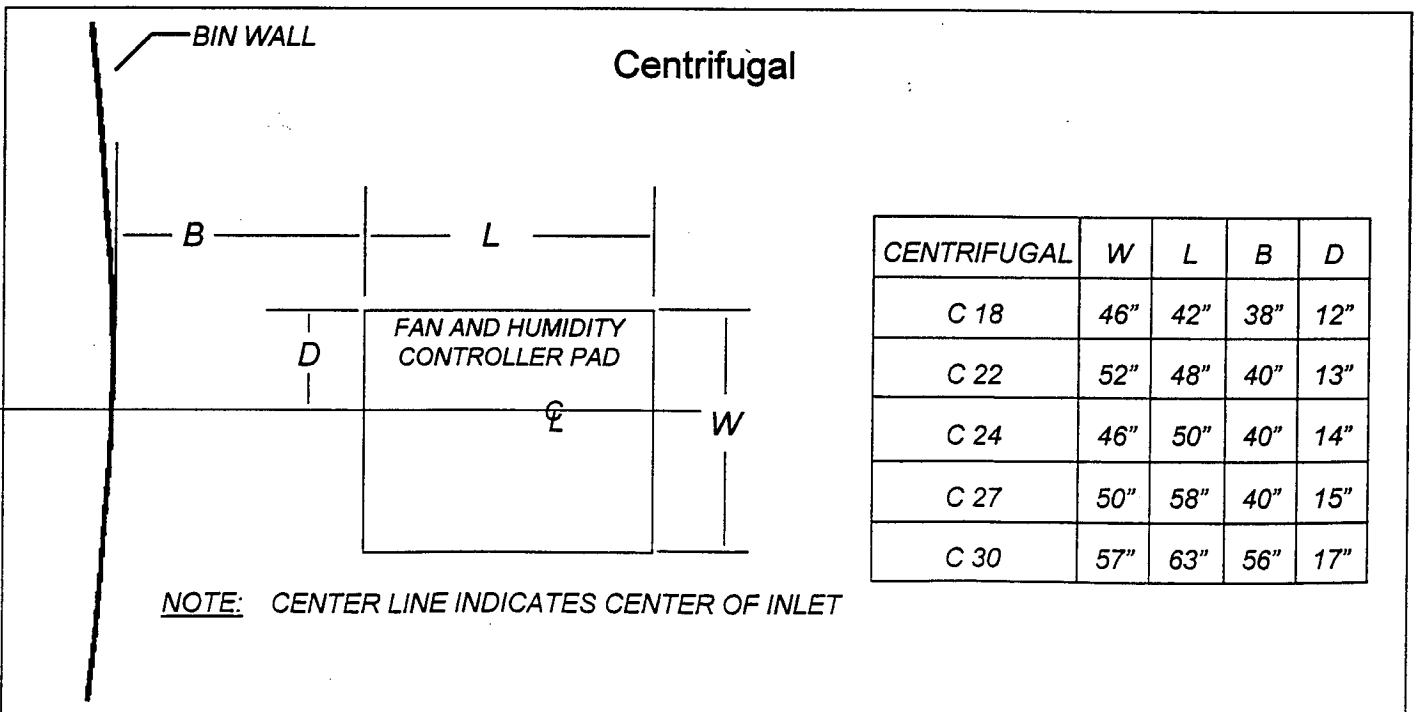


Figure 2. Fan-Humidity Controller Mounting Pads

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## INSTALLATION INSTRUCTIONS

### LOCATION AND FASTENING OF HUMIDITY CONTROLLER

- 1) The drying units (fan, humidity controller, and transition) should be located such that the heated air can enter the bin plenum chamber uniformly. The fan and humidity controller should be located opposite the withdrawal tube for best air distribution.
- 2) For proper operation of humidity controller, the fan and humidity controller are to be mounted on a level pad. The fan will rest on the pad with the humidity controller supported by the fan. The pad should be the same height as the concrete floor of the bin. Check the mounting pad illustration on page 6 Figure 2, for proper location of the pad for axial and centrifugal fans. Note that centrifugal pad specifications are for a clockwise (wheel rotation viewed from the motor side) rotating unit.
- 3) On axial fan units, the humidity controller is installed on the air discharge end of the fan. Locate the humidity controller so the control box of the humidity controller is on the top of the humidity controller.
- 4) On centrifugal fans the humidity controller is mounted on the inlet side of the fan. Remove the screen guard from the centrifugal fan and attach the screen guard to the humidity controller such that the humidity controller control box will be located on the top of the humidity controller.
- 5) Connect the fan and humidity controller together using the 5/16" bolts provided in the humidity controller bolt bag.
- 6) Install the (optional) humidistat, if ordered, according to the instructions in the humidistat control box. Upon completion the installation should appear as illustrated on page 5.

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## ELECTRICAL INSTALLATION

- 1) DISCONNECT ALL SOURCES OF POWER BEFORE WORKING ON THE EQUIPMENT
- 2) All electrical service must be performed by a certified electrician and the installation must be in accordance with the "National Electrical Code" and any local codes.
- 3) All humidity controllers identified in this Bulletin can be operated on single phase, 230 Volt power. The humidity controllers require a separate fused power source (See Table 1) from the fan, however, the humidity controller control circuit is interlocked into the fan control circuit.
- 4) Wiring Instructions - Single Phase Operation
  - a. Control Circuit Interlock

Interlock the humidity controller into the fan circuitry, so that the fan must be operating before the humidity controller can be operated. Consult the wiring diagrams on pages 13 to 16, Figures 4, 5, 6 and 7. Connect the pole labeled T1 on the fan contactor to the fan's terminal block, to the fuse in the humidity controller as shown in the diagrams on pages 13 to 16, Figures 4, 5, 6 and 7.
  - b. Power For Tubular Heating Elements

On all models in this bulletin, connect one pole of the power source to the first terminal on the power terminal block which has leads on the other side that leads to the magnetic contactor. The other pole should be hooked to the terminal block with leads coming from the heater elements. Follow diagrams on pages 13 to 16, Figures 4, 5, 6 and 7, to ensure accuracy. Use the tables on page 9 to determine wire size required.



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## CALDWELL HUMIDITY CONTROLLER ELECTRICAL INSTALLATION INSTRUCTIONS

TABLE 1. ELECTRICAL SERVICE FOR SINGLE PHASE OPERATION

HUMIDITY CONTROLLER MODEL	AMPERAGE AT 230 Volt	TRANSFORMER* SIZE KVA	COPPERWIRE (rated 75°C) SIZE FOR VARIOUS DISTANCES OF HUMIDITY CONTROLLER TO DISCONNECT**				FUSE SIZE
			0' - 50'	100'	200'	300'	
HC18-3.3KW	14.4	3.3	12	12	10	8	20
HC18-5.0KW	21.8	5.0	10	10	8	6	25
HC18-6.6KW	29.0	6.7	8	8	6	4	35
HC24-7.5KW	32.6	7.5	8	8	6	4	35
HC24-15.0KW	65.2	15.0	4	4	2	0	70
HC28-7.5KW	32.6	7.5	8	8	6	4	35
HC28-15.0KW	65.2	15.0	4	4	2	0	70

\* Transformer Size is based on the current draw from the humidity controller only. Your electrician will need to consult the fan manual and add the KVA requirement for the fan to determine the KVA requirement for the system. Other equipment that requires electrical power will need to be included in sizing the transformer.


\*\* Copper Wire (rated 75°C) size is for the humidity controller service only. Your electrician will need to consult the fan manual to determine amperage draw of the fan. The wire size from the transformer to the disconnect service will be determined from the fan, humidity controller, and other electrical equipment current requirements.

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## SAFETY

Before operating unit, perform the following checks:

1. Make sure the fan, humidity controller, and transition units are bolted securely together. Make sure the screen guard is secured in place.
2. Make sure the units are wired in compliance with the National Electric Code, and the ground wire is sized large enough to provide lightning protection.
3. Provide sufficient bin exhaust vents or fans, and make sure they are open or operational, before starting the drying system. The vents are necessary to provide an exhaust for moisture laden air (to reduce condensation), and to prevent pressurization of the bin above the grain mass, causing added load on the bin.

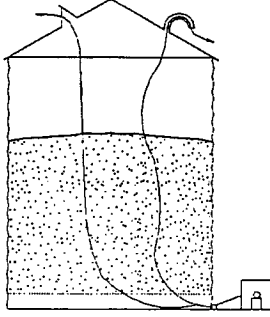


# WARNING

**TO PREVENT EXCESSIVE PRESSURE ON THE STRUCTURE:**

(1) MAKE SURE ALL ROOF VENTS ARE OPEN AND UNOBSTRUCTED.

(2) IF USING ROOF EXHAUST FANS, WIRE ROOF AND SUPPLY FANS TO START SIMULTANEOUSLY OR MAKE SURE ROOF FANS ARE STARTED WHEN SUPPLY FANS ARE STARTED.



**CHART (A)**

<u>BIN VENT</u>	<u>CFM</u>
CBBV-16	2100
1.75 CHBV	2670
CBBV-19	3000

DETERMINE THE AIR FLOW FROM FAN PERFORMANCE CHARTS AND PROVIDE VENTS ACCORDING TO CHART (A).

CONSULT YOUR CALDWELL EQUIPMENT DEALER FOR AID IN SIZING POWER EXHAUST FANS AND/OR ROOF VENTS.

Figure 3. Roof Vent Requirement

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## **OPERATION INSTRUCTIONS**

### **START-UP PROCEDURE**

1. Make sure all roof vents are open and unobstructed.
2. Make sure all controls are installed correctly, and that all electrical and mechanical connections are secure.
3. Make sure there are no obstructions to airflow in the fan, humidity controller, or transition.
4. Set the humidistat (if applicable) at the relative humidity point such that the humidity controller will cycle "ON" if the relative humidity is above the point of setting. Typical setting point for grain is 60% relative humidity.
5. Place the switch at the main electrical service box in the "ON" position.
6. Start the fan unit and allow it to come up to full speed.
7. Energize the humidity controller by turning the toggle switch "ON" for a single stage unit, or one or both of the toggle switches "ON" for a two stage unit.

### **HUMIDITY CONTROLLER MAINTENANCE**

The following procedures should be followed, and maintenance performed, before starting the unit at the beginning of every season, and also during operation.

1. Periodically check the screen guard and remove any dirt or debris which may have accumulated.
2. If applicable, the humidistat should be inspected and cleaned every three (3) days during operation.
3. If applicable, when the humidity controller is not going to be used for a period of time, remove the humidistat from the bin and store in a clean, dry place.
4. Make sure all electrical and mechanical connections are tight.

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TABLE 2. REPLACEMENT PARTS LIST

Refer to the wiring diagrams on pages 13 - 16, Figures 4, 5, 6 and 7, to identify the item number. Then use the item number to identify the part.

ITEM NO.	PART DESCRIPTION	MODELS USED ON (RATED IN KW)	PART NUMBER
A	Toggle Switch	All	710970
B	Power Terminal Block	All	746503
C	Control Terminal Block	All	850255
D	Pilot Light	All	785709
E	Magnetic Contactor (2 Pole)	All	556290
F	Fuse Holder	All	711168
	Fuse	All	850412
G	High Limit	All	553925
H	Tubular Heating Elements	HC18-3.3KW 230V (2 Req'd)	251728
		HC18-5.0KW 230V (3 Req'd)	251728
		HC18-6.6KW 2 Stage(4 Req'd)	251728
		HC24-7.5KW 230V (2 Req'd)	550293
		HC24-15 KW 230V (4 Req'd)	550293
		HC24-15 KW 2 Stage(4 Req'd)	550293
		HC28-7.5KW 230V (2 Req'd)	550301
		HC28-15 KW 2 Stage(4 Req'd)	550301
		HC28-15 KW 230V (4 Req'd)	550301

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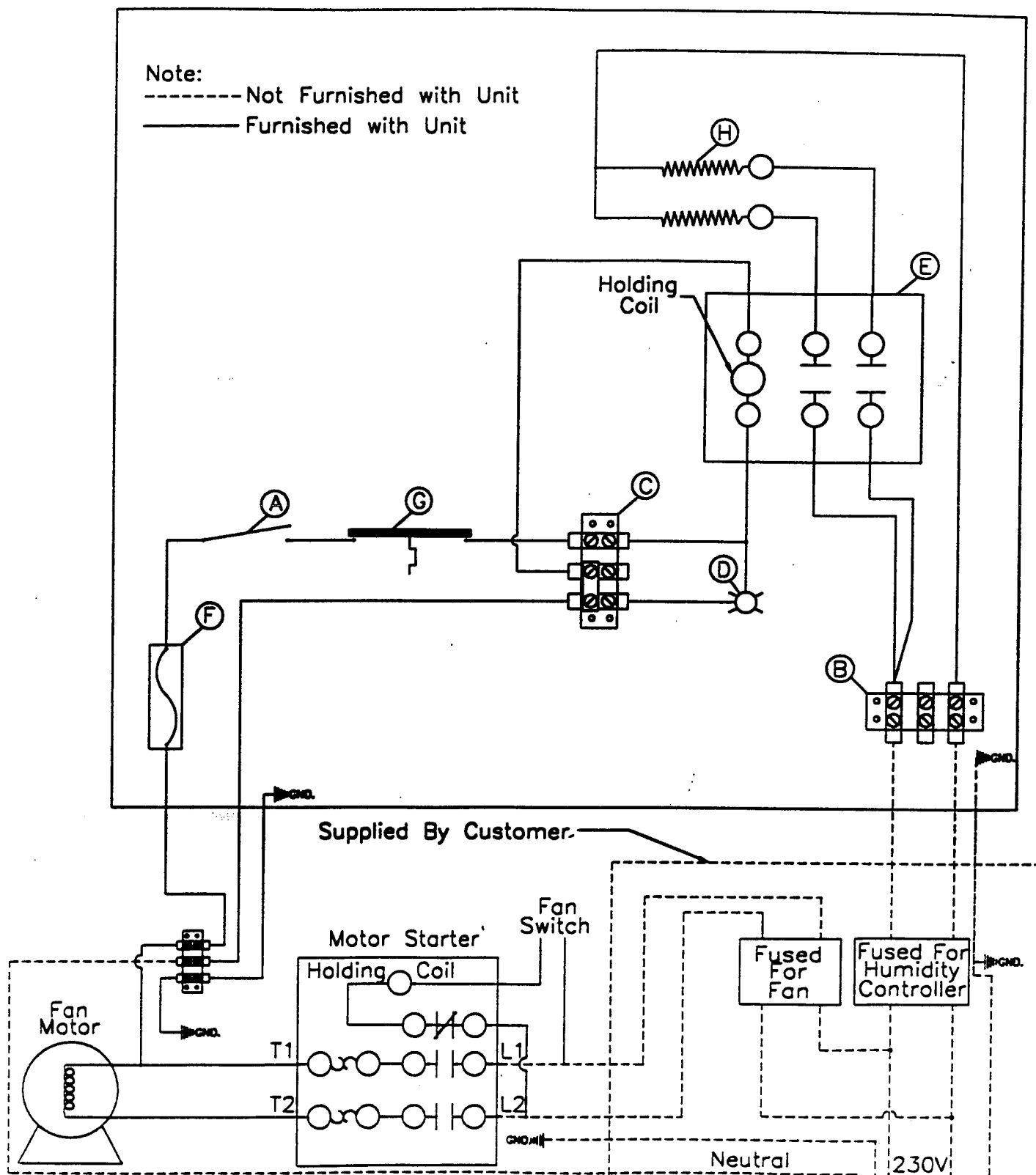


Figure 4. Single Stage-Single Phase (HC18-3.3KW, HC24-7.5KW, HC28-7.5KW)

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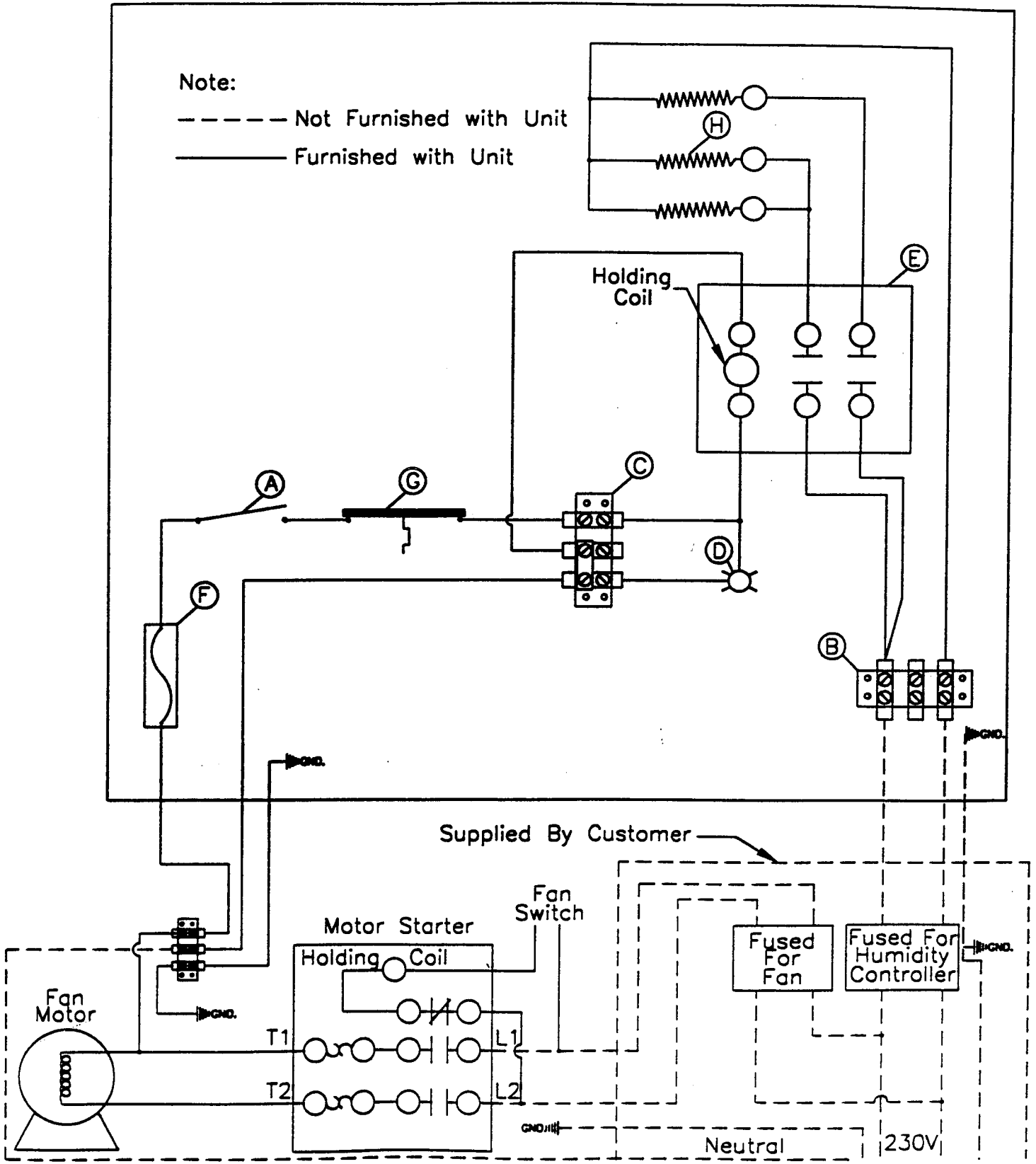


Figure 5. Single Stage-Single Phase (HC18-5KW)

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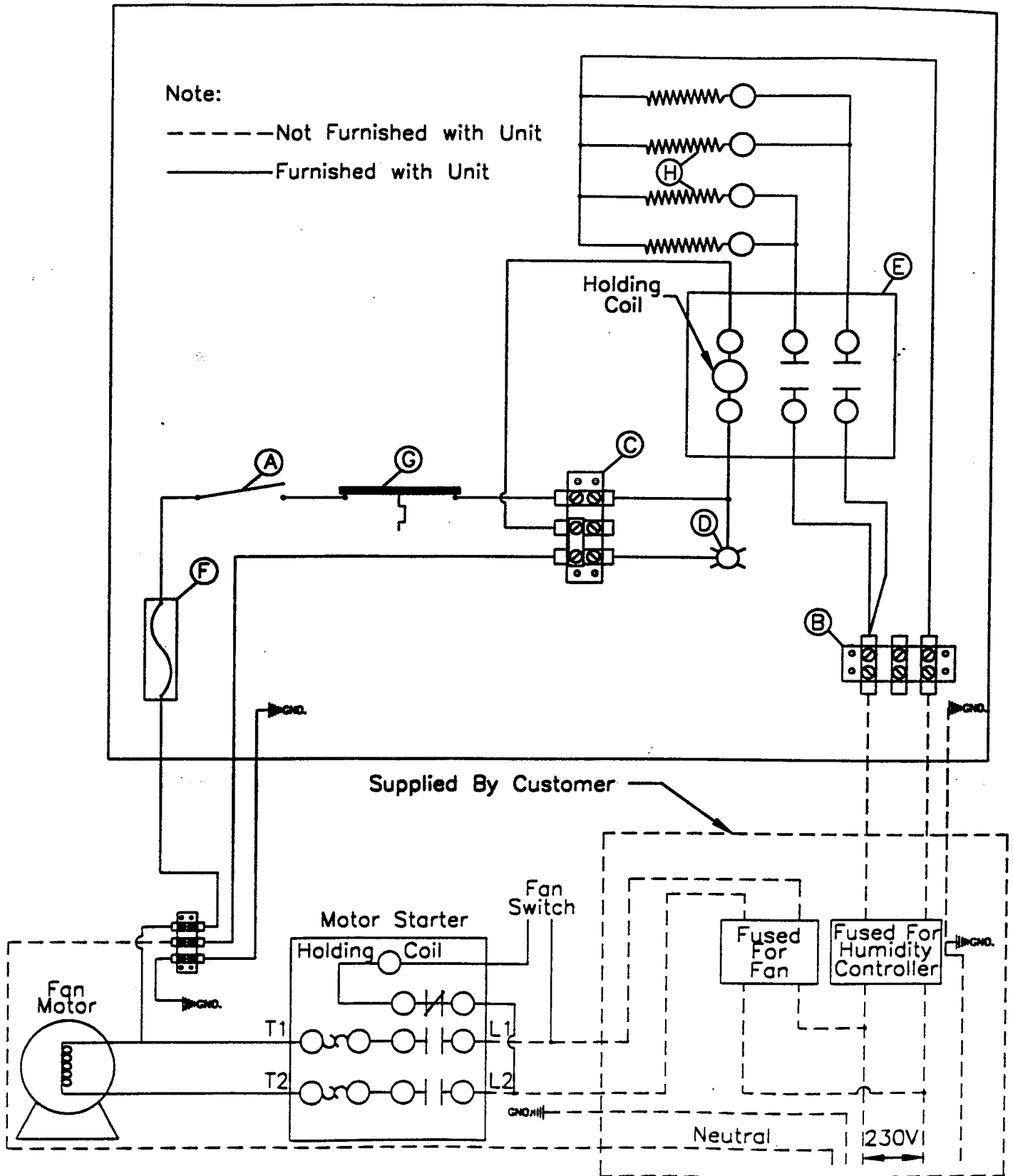


Figure 6. Single Stage-Single Phase (HC24-15KW, HC28-15KW)

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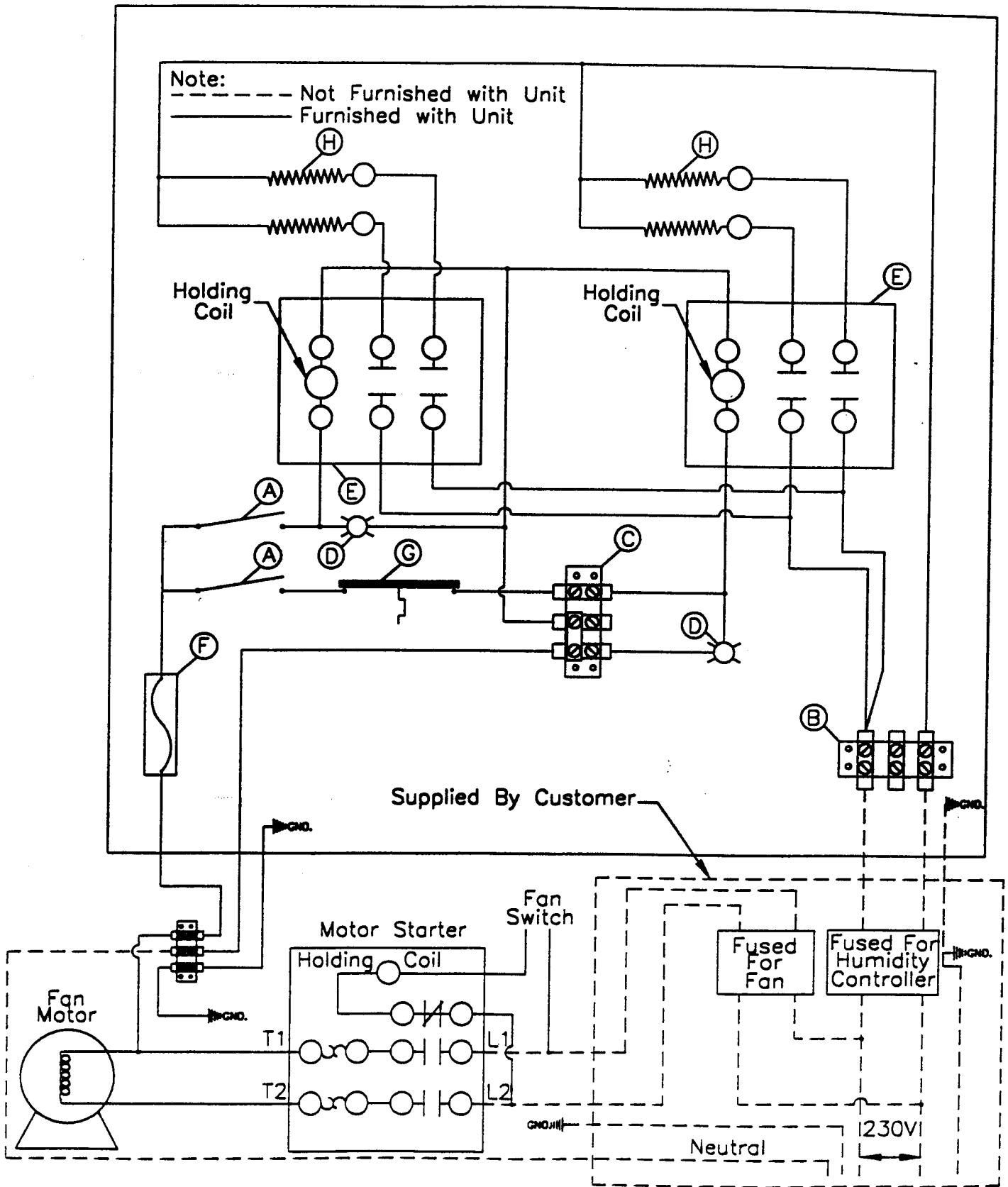


Figure 7. Two Stage-Single Phase (HC18-6.6KW, HC24-15KW, HC28-15KW)



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## SERVICE SECTION

The following information is provided to help you find any problems that may occur and provide tips for repairing the humidity controller. For servicing the electrical controls, remove the control box cover. Use the wiring diagrams in this manual for reference.

**WARNING! ALL TESTS ARE TO BE MADE WITH A VOLTMETER WITH THE POWER ON. BE CAREFUL IN CHECKING ELECTRICAL CIRCUITRY.**

**Definition:**

Continuity - The ability to move electricity from one point to another, a completed circuit.

**SYMPTOM: TURN POWER SWITCH ON AND HUMIDITY CONTROLLER DOES NOT OPERATE**

1. If applicable, humidistat on the bin plenum shows an open circuit.
  - A. Adjust the humidity setting to a lower level to see if humidity controller will operate. If the unit will operate, readjust setting to desired. If the unit still does not operate, replace humidistat.
2. Manual high limit shows an open circuit.
  - A. Reset the button on the manual high limit after tubular heating elements have had a chance to cool. If manual high limit still shows an open circuit, replace manual high limit.
3. Toggle switch shows an open circuit.
  - A. Place the toggle switch in the "ON" position. If the toggle switch still does not close the circuit, replace the toggle switch.
4. Contactor does not allow circuit to close.
  - A. Check the holding coil (115 Volt control voltage) and make sure 115 Volt power is present at one of the coil's terminals and a clean neutral at the other terminal. When power is to the holding coil and coil does not engage contact points, replace coil.
  - B. Make sure the contactor points are not obstructed. If the coil is operating properly, but contactor still generates an open circuit, replace contactor.

**SYMPTOM: CONTROL CIRCUITRY OPERATES PROPERLY, BUT NO HEAT IS GENERATED.**

1. No power is provided to the humidity controller.
  - A. Check the fuses at the electrical service. Replace if blown. Consult the wiring instructions on page 9, Table 1, to make sure the fuse is properly sized.
  - B. Make sure the connections at the terminal block are secured and power is present. Make sure there is 230 Volt power across tubular heating elements. If still no heat is generated, replace the tubular heating element.

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**PRODUCT SERVICE:** Our top priority is to assure customer satisfaction on all Caldwell products. If a dealer requires assistance from Chief, contact our Service Department. The dealer purchasing a product from Chief Industries, Inc., Agri/Industrial Division will be responsible for the installation, operation and service, in accordance with the Service Policy shown below. The dealer will also be responsible for all Standard Limited Warranty procedures in accordance with Chief Industries, Inc., Agri/Industrial Division.

## **WARRANTY/SERVICE POLICY**

**STANDARD LIMITED WARRANTY:** *DEALERS HAVE THE RESPONSIBILITY OF CALLING TO THE ATTENTION OF THEIR CUSTOMER THE FOLLOWING LIMITED WARRANTY, PRIOR TO ACCEPTANCE OF AN ORDER FROM THE CUSTOMER FOR ANY CHIEF INDUSTRIES, INC., AGRI/INDUSTRIAL DIVISION PRODUCTS.*

Chief Industries warrants to the purchaser for use that is any part of the product is proven to be defective in material or workmanship within **2 years** from date of original invoice from factory, and Chief Industries is notified within 15 days after such defect is discovered, Chief will (at company option) either replace or repair said part. This standard limited warranty does not apply to damage resulting from misuse, neglect, material wear, accident or improper installation or maintenance. Said part will not be considered defective if it substantially fulfills performance specifications. ***THE FOREGOING LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY, FITNESS FOR PURPOSE AND OF ANY OTHER TYPE, WHETHER EXPRESSED OR IMPLIED.*** Chief Industries neither assumes nor authorizes anyone to assume for it any other obligation or liability in connection with said part and will not be liable for incidental or consequential damages. ***THE REMEDIES STATED HEREIN SHALL BE THE EXCLUSIVE REMEDIES AVAILABLE UNDER THIS STANDARD LIMITED WARRANTY. CLAIMS UNDER THIS STANDARD LIMITED WARRANTY SHALL BE HANDLED UNDER THE STANDARD SERVICE POLICY.*** Chief will not be responsible for any charges incurred in repairing or servicing any Caldwell products except as such repairs are made at Chief or by Chief Field Service Personnel or as approved in writing from Chief Customer Service.

**IN WARRANTY REPLACEMENT:** The Standard Limited Warranty Policy will cover any defective part of the product covered by the Standard Limited Warranty. Equipment involved in a warranty claim under the above Standard Limited Warranty shall have the ORIGINAL WARRANTY REGISTRATION CARD on file in Kearney, Nebraska, and have been properly installed, maintained and operated according to the instructions provided by Chief Industries, Inc., Agri/Industrial Division.

**WARRANTY CLAIM PROCEDURES:** When a part failure occurs, that in your judgment meets the conditions of the above Standard Limited Warranty, contact your dealer to make arrangements for the shipment of a replacement item and the return of the defective equipment.

**ELECTRIC MOTOR WARRANTY:** The manufacturers of all electric motors used on Caldwell products carry a warranty for these items. If the motor fails under the conditions of the Standard Limited Warranty, and provided it was protected by the proper protective device, the motor manufacturer's nearest authorized service center will repair it. See catalog for motor manufacturers service centers. Any in warranty replacement motors not satisfactorily handled by motor manufacturer service centers and within the Standard Limited Warranty period and policy will be covered by Chief Industries, Inc., Agri/Industrial Division, Kearney, Nebraska. Contact Chief if you have any problems or questions.

**OUT OF WARRANTY SERVICE:** Products requiring Chief repair work will be repaired at the standard repair charge plus hourly charges after the first hour. Field service work will require a field service charge plus travel expenses. The repaired part will carry a 30 day limited warranty.

Your dealer will be responsible for warranty procedures in accordance with Chief Industries, Inc. (See Dealer Policy)