UNIT COOLERS

Air, Electric, and Hot Gas Defrost Models

MEDIUM PROFILE HEAVY DUTY WAREHOUSE





CONTENTS

ORDERS & REPLACEMENT PARTS

parts@htpg.com

TEL: 1-855-HTPARTS (1-855-487-2787)

A FAX: 256-259-7478

- 1. Provide the complete Model Number and Serial Number of the unit.
- 2. Provide a detailed description of the part with any model, diameter, HP, or other markings.
- 3. State the quantity you are ordering.
- 4. Advise special shipping methods, routes, procedures, or instructions with ship to address.
- 5. Provide complete and accurate data to insure prompt and accurate delivery.

WARRANTY

The Seller warrants against defect in materials and workmanship in products which it manufactures for (1) year from the date of installation or up to 18 (eighteen) months from the date of shipment, whichever event occurs first, when properly installed and operated under normal use. This guarantee does not include any labor or other charges made outside of the Seller's factory for replacement or repair of defective parts unless specifically stated in the body of the Sellers invoice. On parts not manufactured by HTPG, such as motors, controls, valves and compressors we extend to the Buyer the same warranties made to us by the manufacturer

The Seller's only liability under this warranty or otherwise shall be the repair or replacement (at Seller's option) of nonconforming goods or parts. Seller assumes no liability for incidental or consequential damages such as injury to persons or property, or lost profits.

Claims must be submitted to our Warranty Group within 90 days of the repair. To submit a claim, visit https://www.htpg.com/submit-a-claim/

INSPECTION

Equipment listed on the bill of lading but not received, along with any equipment damaged in transit, should be reported immediately to the carrier and a claim filed.

Also, check unit nameplates to make sure the voltage is correct before installing.

GENERAL SAFETY INFORMATION

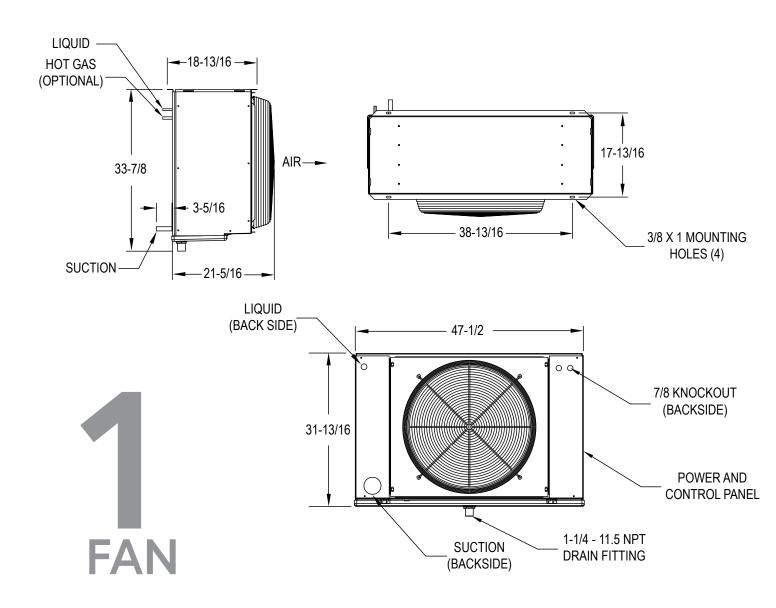
- 1. Installation and maintenance are to be performed by qualified personnel who are familiar with this type of equipment.
- 2. Make sure all field wiring conform to the equipment requirements and all applicable national and local codes.
- 3. Avoid contact with sharp edges and coil surface. They are a potential injury hazard.
- 4. Disconnect all power sources before performing service or maintenance.

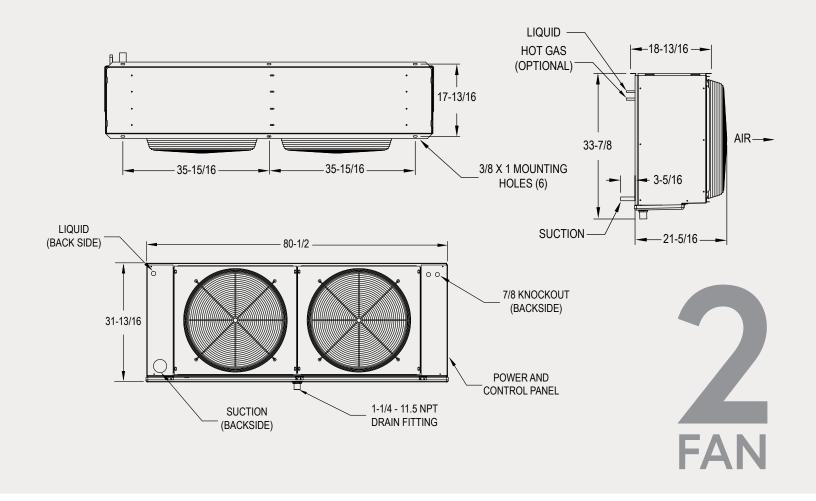
Due to continuing product development, specifications are subject to change without notice.

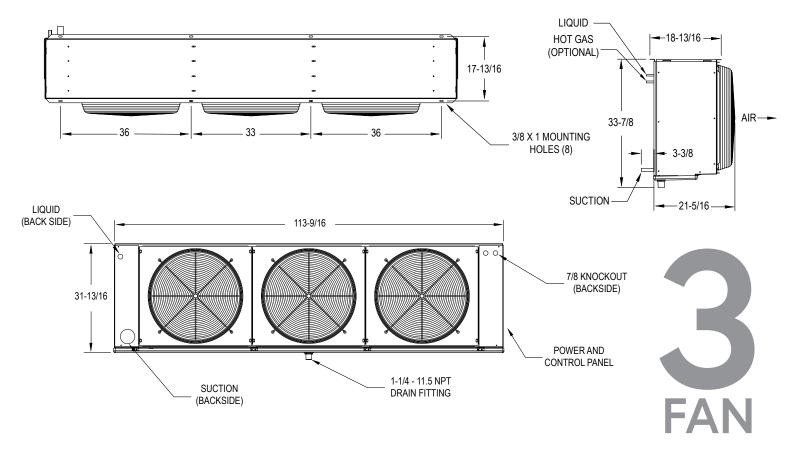
DIMENSIONAL DRAWINGS

MEDIUM PROFILE

- **A** Equipment listed on the bill of lading but not received, along with any equipment damaged in transit, should be reported immediately to the carrier and a claim filed.
- Check unit nameplates to make sure the voltage is correct before installing.



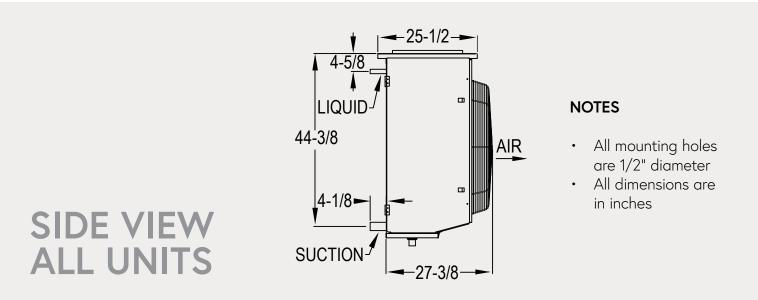


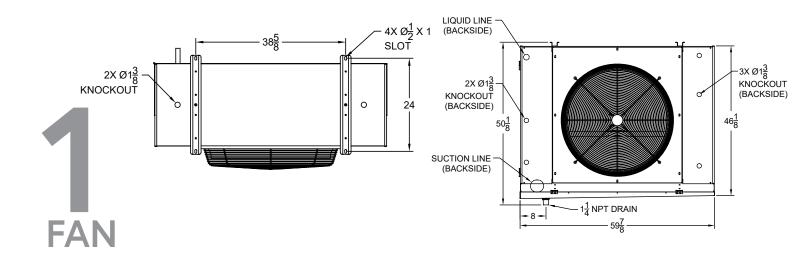


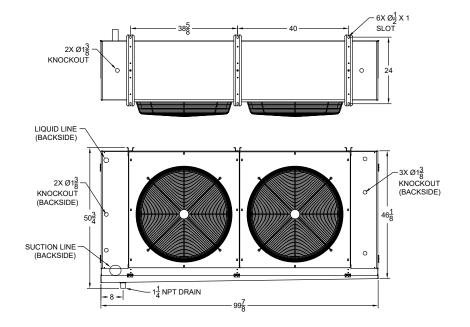
DIMENSIONAL DRAWINGS

HEAVY DUTY AND WAREHOUSE

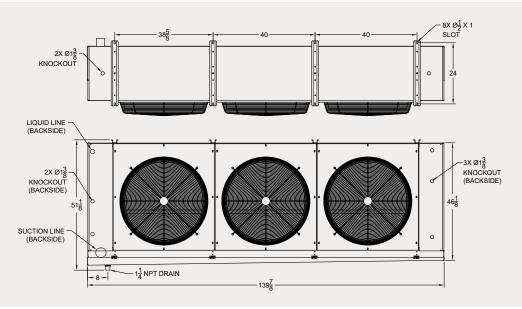
- **A** Equipment listed on the bill of lading but not received, along with any equipment damaged in transit, should be reported immediately to the carrier and a claim filed.
- Check unit nameplates to make sure the voltage is correct before installing.



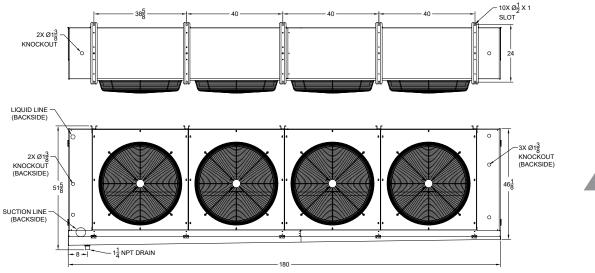








3 FAN



FAN

INSTALLATION

Our unit coolers are designed to draw air in through the coil and discharge it through the fans. For most efficient operation, units should be located so that air from an open door cannot be drawn directly into the coil.

Figure 1 shows the air flow direction and recommended minimum clearances to walls or other obstructions.

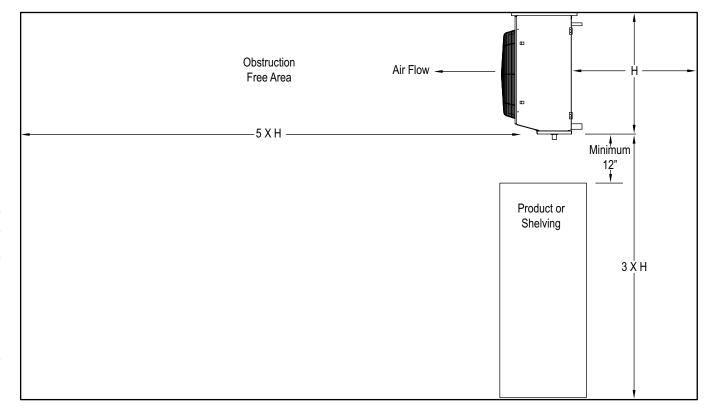
All units are shipped upright as in the mounting position. Remove the top and sides of the crate from the unit leaving the unit sitting on the shipping skid. Using the fastener slot/holes in the unit mounting hangers as a guide, locate the mounting fasteners in the ceiling of the refrigerated room. Recommended threaded rod size is 5/16" for Medium Profile Units and 3/8" for Heavy Duty and Warehouse Units

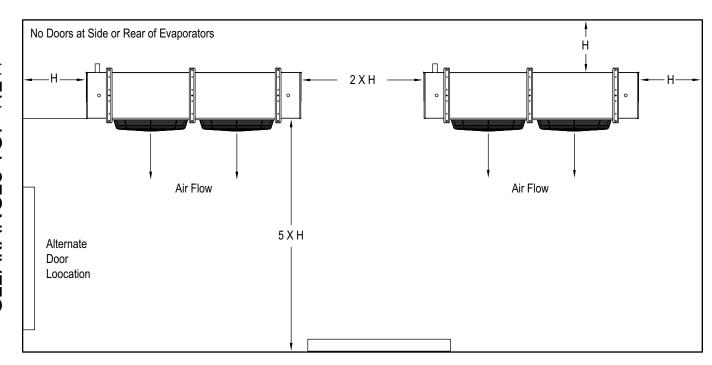
All units can be lifted into place by sliding the forks of a fork lift under the skid to avoid damage to the drain pan.

A IMPORTANT

Medium evaporators have a die formed pan and must be mounted level for proper drainage, and must be mounted flush to the top of the walk-in. Units must be mounted in this method and all gaps properly caulked for NSF compliance.

Large Evaporators have a sloped drain pan that provides a minimum 1/4" per foot slope to the drain fitting to ensure proper drainage. All hangers should be secured to the ceiling at all locations to ensure proper mounting.





INSTALLATION

DRAIN LINE

The condensate drain line should be at least 1-1/4" and should be installed with a minimum of 1/2" of slope per foot of horizontal run. Keep the length of drain line within the refrigerated space as short as possible. Provide a trap in the line outside of the refrigerated space. On freezer units, the drain line within the refrigerated space must be wrapped with heat tape and insulated to prevent water from freezing in the line during the defrost cycle.

REFRIGERANT PIPING

Install refrigeration components in accordance with accepted piping practices. Liquid and suction lines should be sized according to ASHRAE recommendations for the intended conditions of operation and refrigerant.

All horizontal suction lines should be sloped toward the compressor at the rate of 1/8" per foot for good oil return. Vertical suction should be sized for proper oil return. Also, risers of more than five feet should be trapped with a P-Trap at the bottom. Use inverted traps as required when transitioning to horizontal piping.

HOT GAS PIPING

Hot Gas defrost systems can be described as either three-pipe or Reverse Cycle (two-pipe) types. Figures 2 and 3 represent typical piping arrangements for hot gas defrost units. Kramer also ofers a Thermobank hot gas defrost - see Figure 4.

Hot Gas Defrost units may be ordered so that they are capable of operating on either of the two systems mentioned above.

HOT GAS 3-PIPE (Figure 2)

One for the liquid, one for the suction and one for the hot gas. The hot gas is taken from the discharge line between the compressor and the condenser, through a hot gas solenoid valve then to the evaporator drain pan loop. From there enters the distributor at the side inlet then goes through the coil in the same direction as the normal refrigeration flow.

REVERSE CYCLE (Figure 3)

Reverse Cycle is a technique in which the hot gas flows backwards (i.e. opposite to the normal refrigerating flow) through the evaporator. Systems employing the reverse cycle principle are divided into two types:

EXPANSION VALVE INSTALLATION

All units use an externally equalized type mechanical or electronic valve. It may be desirable to use a pressurelimiting type expansion valve on low temperature systems to prevent possible overloading of the compressor on initial start-up or after defrost. Mount the valve directly on the distributor of the unit when possible. Minimize the use of reducing fitting for expansion valve mounting. Locate the expansion valve bulb on a horizontal section of the suction line as close to the suction header as possible. If a P-Trap is installed, locate the expansion valve bulb between the trap and the unit. Make sure the surfaces of the suction line and bulb are clean and make good contact for the full length of the bulb when the bulb is mounted. Insulate the bulb to insure accurate superheat control. Follow all expansion valve manufacturer installation guidelines for proper operation.

ALTERNATING EVAPORATOR SYSTEM

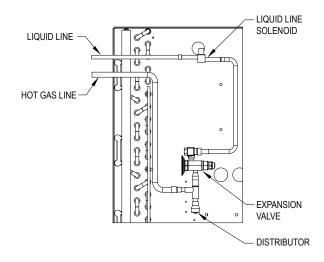
This is the system commonly referred to as "Reverse Cycle Defrost". It must have multiple evaporator coils on the same system to operate. Evaporator coils are defrosted in groups of one or more coils per group. 65% to 75% of the coils will continue to refrigerate while 25% to 35% are on defrost. The defrosting coils produce liquid refrigerant which is used to operate the coils which are still refrigerating. The simplest design is a system with one condensing unit and three evaporator coils. One coil will defrost at a time, while the other two continue to refrigerate.

A hot gas line is run from the discharge line of the compressor close to the junction of the main suction line with the three individual suction lines. There the hot gas line branches into three hot gas lines. Each of these three lines has a hot gas solenoid valve; the leaving side of each solenoid valve is teed into one of the three branch suction lines. Each suction line has a suction stop valve installed between the main suction line and the hot gas tee-in to keep hot gas from entering the main suction line to the compressor. In this way, each evaporator coil has a source for hot gas, controlled by its own defrost solenoid valve. A modular multi-circuit defrost timer is normally employed to synchronize defrosts.

Figure 2

HOT GAS 3-PIPE MODEL

The system uses 3 pipes — 1 for liquid line, 1 for suction line and 1 for hot gas. The hot gas is taken from the discharge line, between the compressor and the condenser, through a hot-gas solenoid valve to the distributor tee then through the coil.



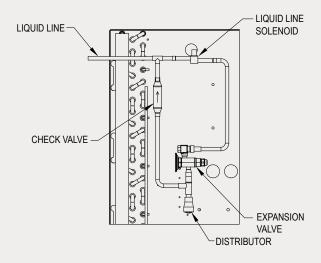


Figure 3

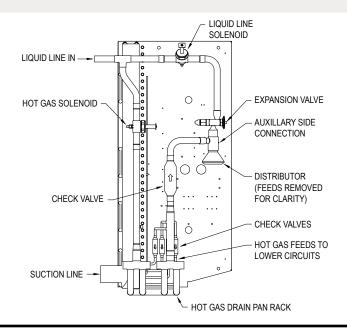
HOT GAS REVERSE CYCLE 2-PIPE MODEL

A changeover valve is located in the discharge suction line of the compressor, so that when defrost is required, the valve changes over from the normal refrigeration flow so that the discharged gas flows into the suction connection and bypasses TX valve.

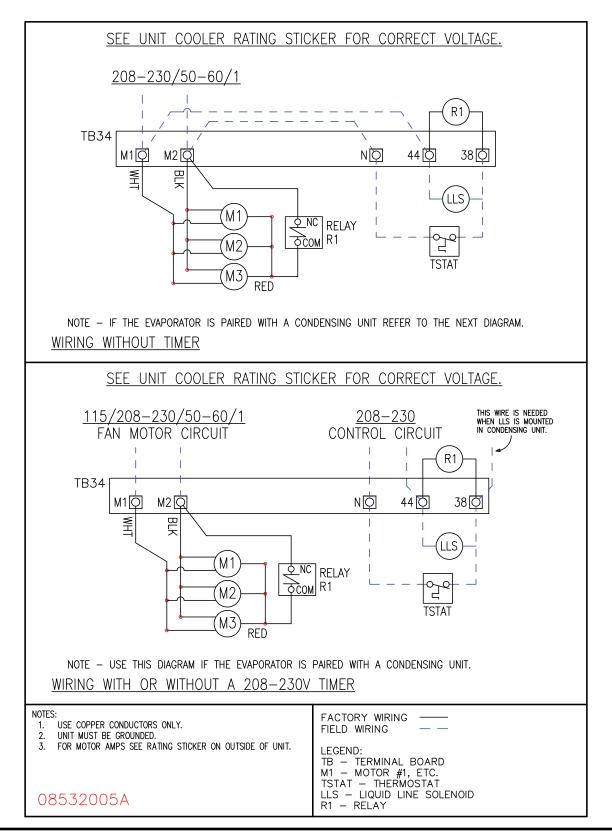


THERMOBANK HOT GAS MODEL

Thermobank coils use unique hot gas design for a fast coil defrost. The new coil designs include all required solenoid and check valves installed at the factory. In refrigeration mode the liquid line solenoid is open to feed the expansion valve and coil. During the defrost the liquid solenoid is closed. The hot gas solenoid opens feeding warm refrigerant to the coil and drain pan to remove frost. When the defrost reaches termination pressure, normal operation resumes

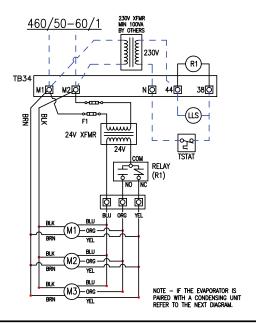


MEDIUM EVAPORATORS // AIR DEFROST

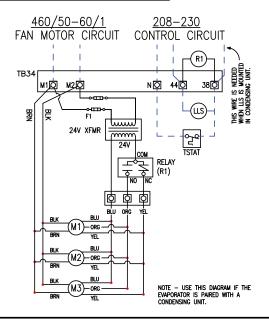


SEE UNIT COOLER RATING STICKER FOR CORRECT VOLTAGE.

WIRING WITHOUT TIMER



SEE UNIT COOLER RATING STICKER FOR CORRECT VOLTAGE. WIRING WITH OR WITHOUT A 208-230V TIMER



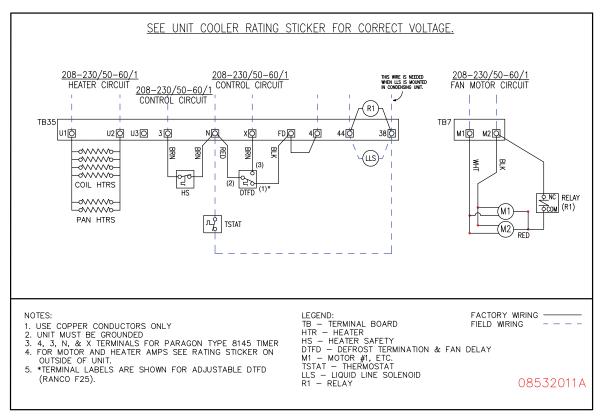
NOTES:

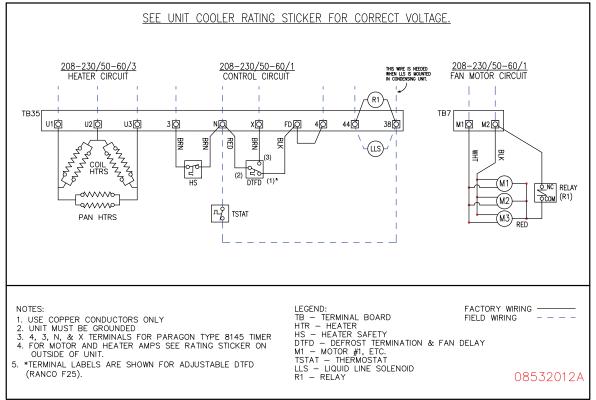
- USE COPPER CONDUCTORS ONLY
 UNIT MUST BE GROUNDED
 FOR MOTOR AMPS SEE RATING STICKER ON OUTSIDE OF UNIT.

LEGEND: LEGEND:
TB — TERMINAL BOARD
M1 — MOTOR #1, ETC.
TSTAT — THERMOSTAT
LLS — LIQUID LINE SOLENOID
R1 — RELAY
XFMR — TRANSFORMER
F1 — TRANSFORMER FUSES FACTORY WIRING -FIELD WIRING

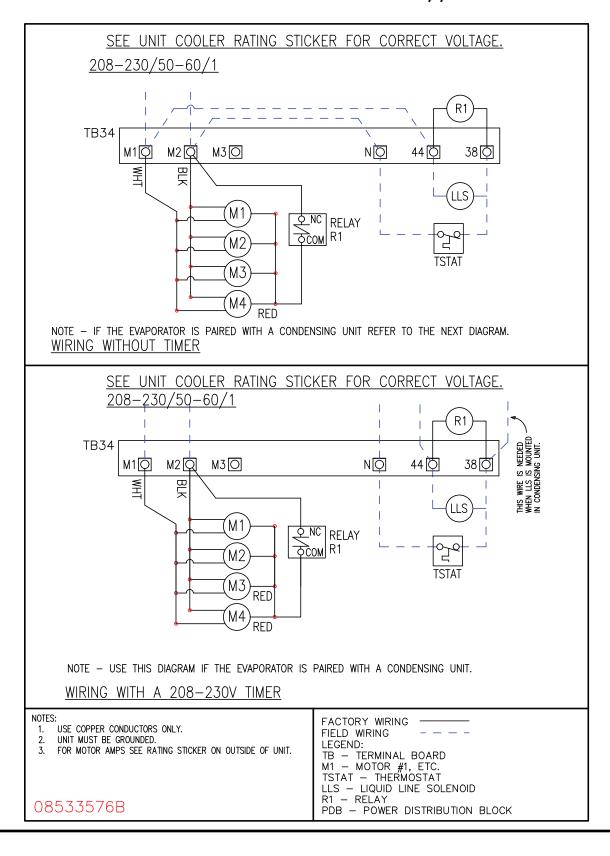
08532006B

MEDIUM EVAPORATORS // ELECTRIC DEFROST

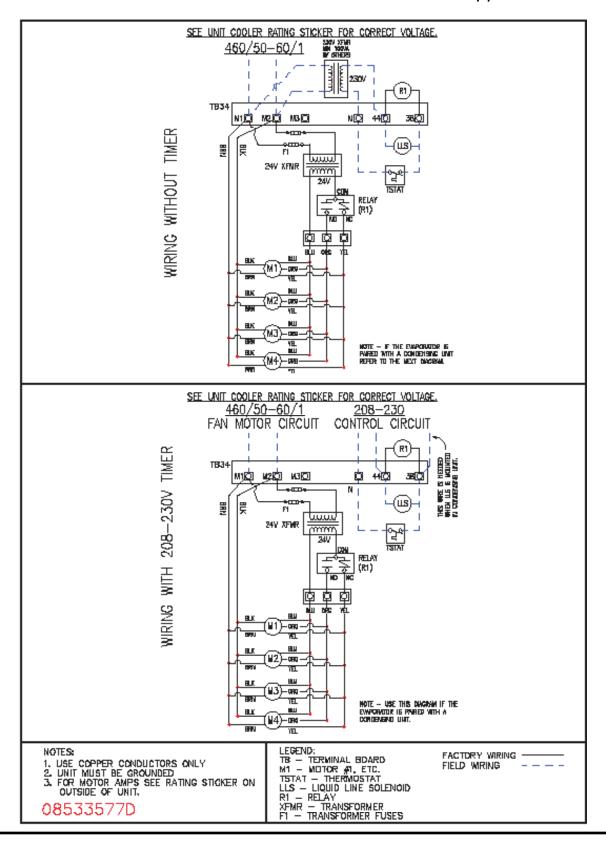




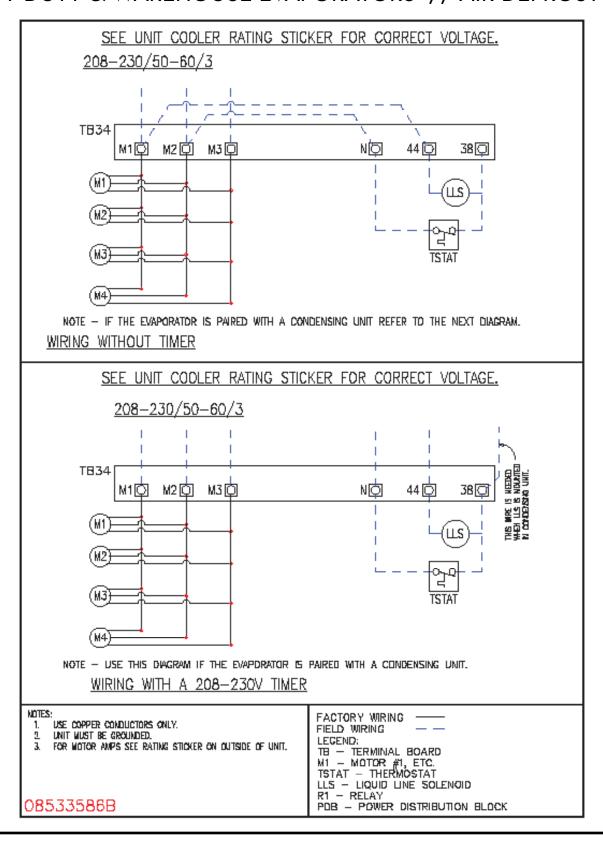
HEAVY DUTY & WAREHOUSE EVAPORATORS // AIR DEFROST



HEAVY DUTY & WAREHOUSE EVAPORATORS // AIR DEFROST



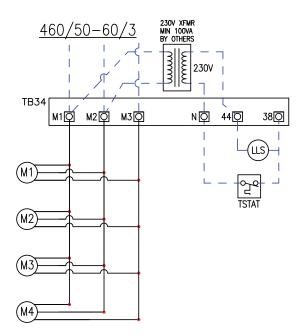
HEAVY DUTY & WAREHOUSE EVAPORATORS // AIR DEFROST



See unit cooler rating sticker for correct voltage WIRING WITHOUT TIMER

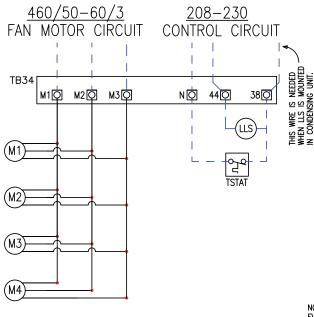
FACTORY STANDARD WIRING DIAGRAMS

HEAVY DUTY & WAREHOUSE EVAPORATORS // AIR DEFROST



NOTE - IF THE EVAPORATOR IS PAIRED WITH A CONDENSING UNIT REFER TO THE NEXT DIAGRAM.

WIRING WITH OR 208-230V WITHOUT TIMER



NOTE - USE THIS DIAGRAM IF THE EVAPORATOR IS PAIRED WITH A CONDENSING UNIT.

NOTES:

- 1. USE COPPER CONDUCTORS ONLY
- 2. UNIT MUST BE GROUNDED

 3. FOR MOTOR AMPS SEE RATING STICKER ON OUTSIDE OF UNIT.

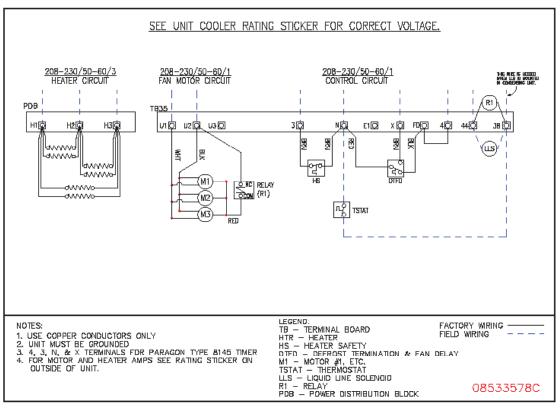
LEGEND: TB - TERMINAL BOARD M1 - MOTOR #1, ETC. TSTAT - THERMOSTAT LLS - LIQUID LINE SOLENOID
R1 - RELAY

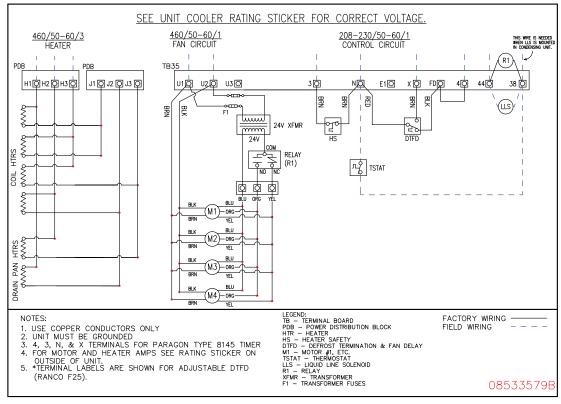
XFMR - TRANSFORMER

FACIORY WIRING FIELD WIRING

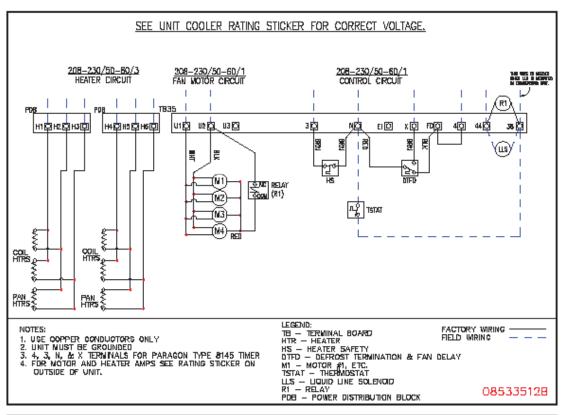
08533587B

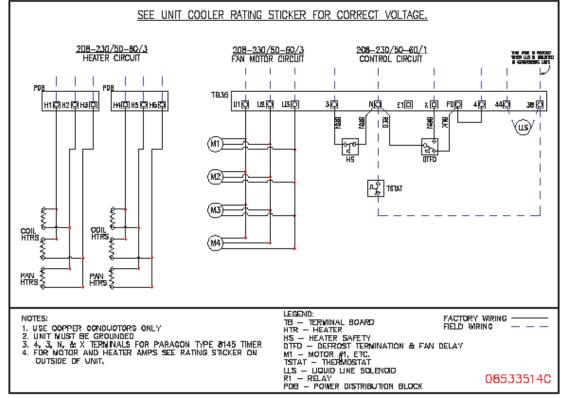
HEAVY DUTY & WAREHOUSE EVAPORATORS // ELECTRIC DEFROST



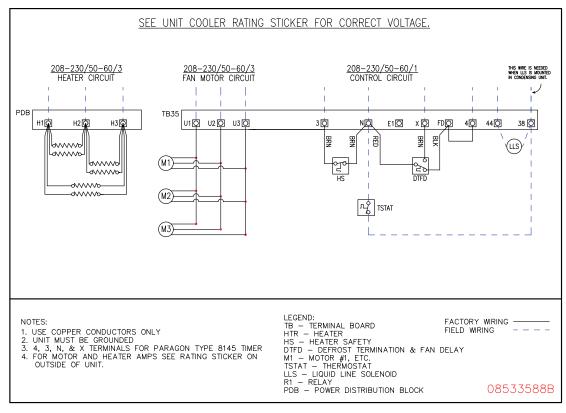


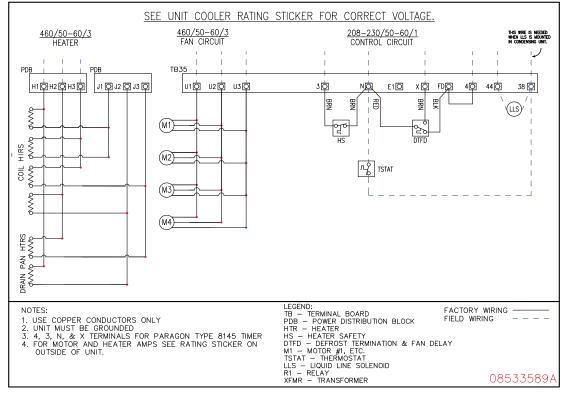
HEAVY DUTY & WAREHOUSE EVAPORATORS // ELECTRIC DEFROST



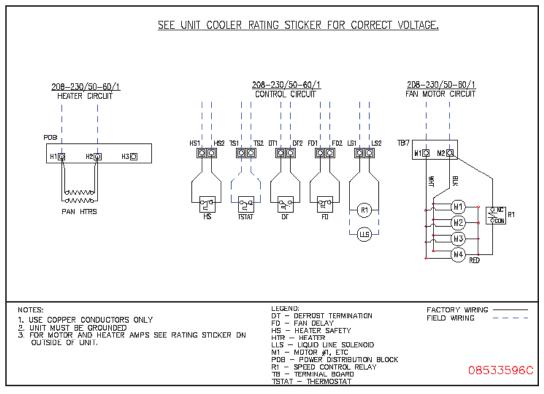


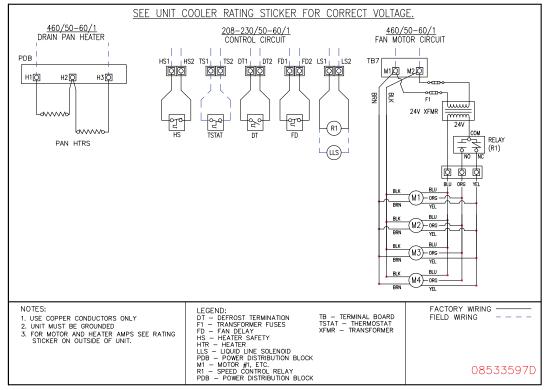
HEAVY DUTY & WAREHOUSE EVAPORATORS // ELECTRIC DEFROST



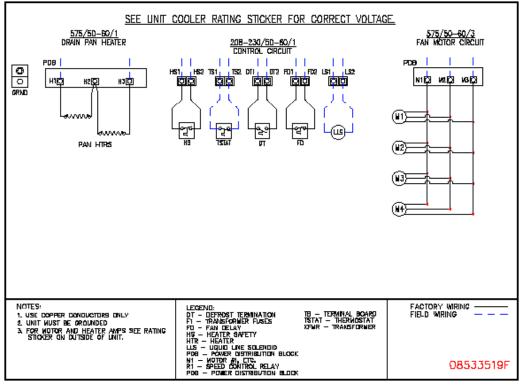


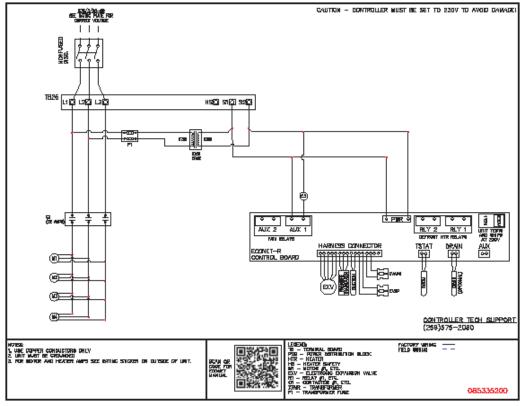
HEAVY DUTY & WAREHOUSE EVAPORATORS // HOT GAS DEFROST WITH ELECTRIC DRAIN PAN



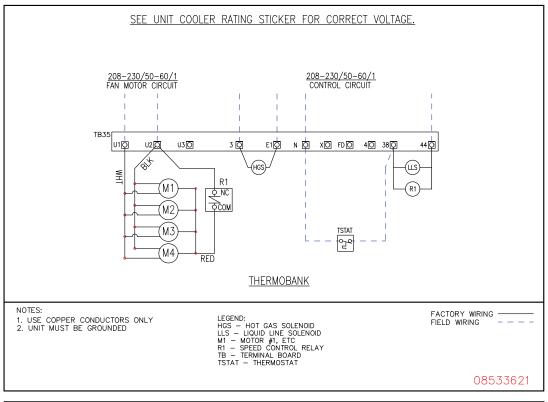


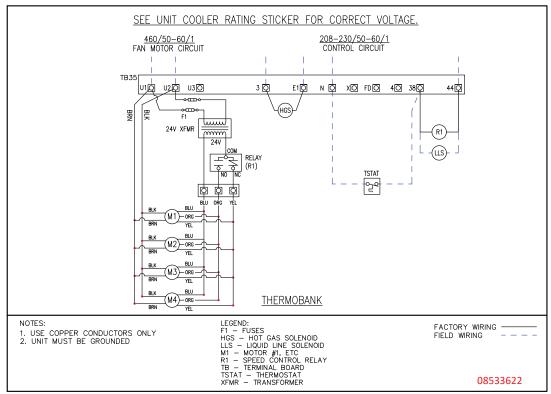
HEAVY DUTY & WAREHOUSE EVAPORATORS // HOT GAS WITH ELECTRIC DEFROST



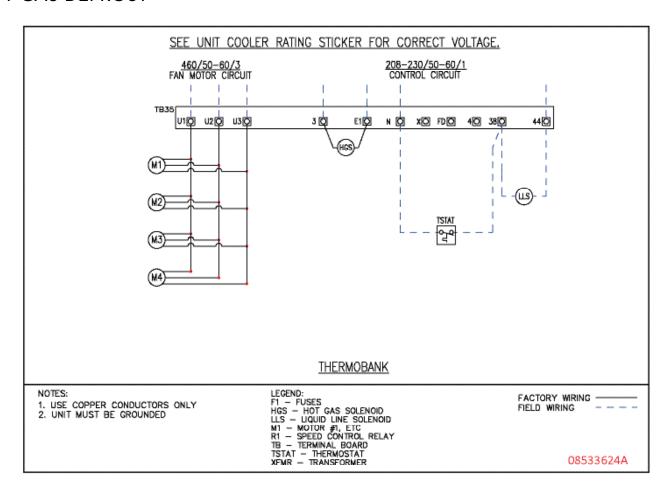


HEAVY DUTY & WAREHOUSE EVAPORATORS // THERMOBANK HOT GAS DEFROST





HEAVY DUTY & WAREHOUSE EVAPORATORS // THERMOBANK HOT GAS DEFROST



START UP PROCEDURE

SYSTEM CHECK

Before starting the system, check the following items:

- 1. The system is properly wired as shown in the diagrams.
- 2. Make sure all electrical connections are tight.
- 3. Check all piping is completed as described in the installation section.
- 4. All fan set screws and motor mounting bolts are tight.
- 5. Make sure the service valves are open.
- 6. The unit is mounted securely and pitched properly. Pour water into drain pan to verify the drain pan and line empty completely.
- 7. Make sure the drain line is trapped and heated and insulated as required.
- 8. Properly evacuate the system.
- 9. Check compressor oil level. Follow proper procedures for handling startup of systems using POE oils.

INITIAL STARTUP

Check the following items after initial startup:

- 1. After the initial startup, the fans will not start until the coil temperature pulls down to about 25°F. The fans may cycle several times until the room temperature pulls down.
- 2. Check the system for charge and oil level.
- 3. erify the expansion valve is receiving a full column of liquid. Set the expansion valve superheat to the correct value. Factory recommendation is 6°F for standard applications.
- 4. Check the drain line heater operation for freezer applications.
- 5. During startup it is not unusual to have very heavy frost load. Manual defrost cycles may be required until the moisture level has dropped.
- 6. Observe the first defrost cycle to ensure all system components are functioning properly. Check the amp draw of the defrost heaters and verify it does not exceed the heater MCA.

MAINTENANCE

GENERAL

Check at least once a month for proper defrosting. The amount and pattern of frosting can vary greatly. It is dependent on room temperature, product type, turnover rate, door usage, and surrounding temperature and humidity. It may be necessary to change the defrost schedule to meet individual cooler/freezer requirements.

At least every six months check the following items.

- 1. Tighten all electrical connections.
- 2. Tighten fan set screws and mounting bolts.
- 3. Clean the coil.
- 4. Check the refrigerant system charge and oil levels.
- 5. Verify defrost controls are operating properly.
- 6. Clean the drain pan and check the drain line for proper operation.

FAN AND MOTOR REPLACEMENT

FAN REMOVAL

- 1. Disconnect all power to unit before service.
- 2. Remove the fan guard or venturi panel from the unit.
- 3. Loosen the fan set screws in the fan blade
- 4. Remove the fan.
- 5. Reverse procedure for installation. Apply adequate torque to fan hub set screws.
- 6. Check blade proper alignment and free rotation. The motor base allows adjustment in the horizontal axis. Vertical adjustment is done with the venturi panel.



MAINTENANCE

FAN AND MOTOR REPLACEMENT

MOTOR REPLACEMENT

- 1. Disconnect all power to unit before service.
- 2. Remove fan blade per instructions above.
- 3. Disconnect motor electrical connections from the wire harness.
- 4. Remove mounting bolts or nuts from the motor mounting rail and base.
- 5. Remove motor.
- 6. Replace using reverse procedure. Use adequate torque on all fasteners.
- 7. Install fan blade using fan blade procedure.



DEFROST HEATER REPLACEMENT

- 1. Disconnect all power to unit before servicing.
- 2. Disconnect electrical leads to the heater to be replaced.
- 3. The coil face heaters are held in place with several spring clips. Carefully remove each clip and save for installing the new heater.
- 4. Slide the heater out of the electrical control panel. The coil tube sheets holes allow the heater to be removed without damaging the coil.
- 5. Slide the new heater into the tube sheet heater holes.
- 6. Press the heater into the fin notches making firm contact the entire coil finned length.
- 7. Install the coil spring clips to firmly hold the heater in place.
- 8. Route heater wires to the required terminals. Secure wires from hot surfaces with wire ties.
- 9. Drain pan heaters are held in place with brackets. Remove the brass nut from the drain pan stud.
- 10. Replace drain heater with the brackets and nuts. Verify condensate line is connected properly.



TROUBLESHOOTING CHART

SYMPTOMS	POSSIBLE CAUSES	CORRECTIVE ACTION
Fans not operating	Main switch open	Close switch
	Blown Fuses	Check for cause. Replace fuses
	Defective Motors	Replace motors as required
	Defective defrost thermostat	Replace defective component
	Unit in defrost cycle	Allow defrost to terminate
	Defrost thermostat not sensing coil temperature	Verify bulb or sensor in properly located.
Room temperature too high	Check thermostat setting	Adjust thermostat
	Superheat too high	Adjust expansion valve
	System low on charge	Add refrigerant
	Coil iced up	Manually defrost coil. Check components
	Main switch open	Close switch
	Blown Fuses	Check for cause. Replace fuses
Defrost heaters not operating	Defective heater(s)	Replace heaters
	Defective timer	Replace timer
	Defective heater safety	Replace heater safety
	Defective heaters	Replace heaters
	Not enough defrost cycles per day	Adjust number of defrost cycles
Coil not clearing during	Defrost cycle too short	Adjust defrost termination temperature
defrost cycle	Defective defrost thermostat	Replace thermostat
	Failsafe on timer too short	Increase failsafe termination time
	Defrost sensor not detecting coil iced area	Relocate sensor
	Defective heater	Replace heater
lee accumulating in drain nan	Unit not pitched properly	Close switch
lce accumulating in drain pan	Drain plugged	Clear drain
	Defective drain line heater	Replace heater
Unit stays in prolonged defrost cycle	Defective time or thermostat	Replace defective component
	Defrost thermostat sensor termination temperature set too high	Adjust thermostat setting
	Failsafe timer setting too long	Decrease failsafe time

REPLACEMENT PARTS

MEDIUM EVAPORATOR

PART #		DESCRIPTION	
08216214		MOTOR,1/3HP,120,825/425,EC RBS	
08216212		MOTOR,1/3HP,230,825/425,EC RBS	
08216213		MOTOR,1/3HP,460,825/425,EC RBS	
08215201		HEATER 2F,230,750W	
08215203	3	HTR,4F,230,1475W	
08215205		HTR,6F,230,2225W	
08248176		FITG,DRAIN,1-1/4-11.5,1.5" AL	
08248176		FITG,DRAIN,1-1/4-11.5,1.5" AL	
08321625)	HTR CLIP,COIL,NEXGEN-LP,.080SS	
08248178		DRN,1.75 HX MTE,1-1/4-11.5,AL	
08248180)	DRN GSKT,1.86 0D X 1.66 ID AL	
08532761		MOTOR HARNESS,EVMD3,1F,230V	
08532762	<u>)</u>	MOTOR HARNESS,EVMD3,2F,230V	
08532763	3	MOTOR HARNESS,EVMD3,3F,230V	
08532764	1	MOTOR HARNESS,EVMD3,1F,460V	
08532765)	MOTOR HARNESS,EVMD3,2F,460V	
08532766	,	MOTOR HARNESS,EVMD3,3F,460V	
20775700)7	TERMINAL BOARD,TB7	
20775703	34	TERMINAL BOARD,TB34,AIR DEF	
20775703	35	TERMINAL BOARD,TB35,EL&HG DEF	
20775702	26	TERMINAL BOARD,TB26,ECONET	
08218563	3	3 POLE TERMINAL BLK,EVMD3 2SPD	
08218564	1	3 POLE TERMINAL BLK,EVMD3 HTRS	
08221244		FAN,PROP.,24-25 X 1/2,CW	
08221245		FAN,PROP.,24-18 X 1/2,CW	
20213600)5	GUARD,FAN,WIRE,BLACK,24"BLADE	
10307900)3	CONTROL, HTR SAFETY	
08219328	}	CNTL,DTFD,SPDT,O35/C55+O55/C35	
08219273		CONTROL, DEFTERM, SPST, O30/C60	
10307900)9	CONTROL, FAN DELAY O45/C35	
10928200)1	STUB,SADDLE,1/2X.035,WHT-375	
2044640	37	CONTROL, DEFR, ADJUSTABLE	

REPLACEMENT PARTS

HEAVY DUTY AND WAREHOUSE

PART #	DESCRIPTION
08532682	MOTOR,3/4HP,230/1,ECM,60/50HZ
08532683	MOTOR,3/4HP,460/1,ECM,60/50HZ
08533523	MOTOR,1 HP,230/460/3,850,INVBAS
08216190	MOTOR,1.5HP,230/460/3,1150,INVBAS
08216217	MOTOR,2HP,575/3,1140BASE (discontinued)
08216198	MOTOR,1HP,575/3,850,INVBAS (discontinued)
08533522	FAN,PROP,30",28DEG,3-BLADE
08221238	FAN,PROP,30",25DEG,3-BLADE
08533511	FAN,PROP, 30", 23DEG, 3-BLADE
08528201	GUARD,FAN,WIRE,BLK,30"BLADE
08532696	ELG HTR,1F,240,1000W
08532697	ELG HTR,2F,240,2000W
08532698	ELG HTR,3F,240,3000W
08532699	ELG HTR,4F,240,4000W
08533687	ELG HTR,1F,287,1000W
08533688	ELG HTR,2F,287,2000W
08533689	ELG HTR,3F,287,3000W
08533690	ELG HTR,4F,287,4000W
08533495	MOTOR HARNESS,ELG, ECM,1 FAN,230, 3WIRE
08533496	MOTOR HARNESS,ELG, ECM,2 FAN,230, 3WIRE
08533497	MOTOR HARNESS,ELG, ECM,3 FAN,230, 3WIRE
08533498	MOTOR HARNESS,ELG, ECM,4 FAN,230, 3WIRE
08533499	MOTOR HARNESS,ELG, ECM,1 FAN,460, 5 WIRE
08533500	MOTOR HARNESS,ELG, ECM,2 FAN,460, 5WIRE
08533501	MOTOR HARNESS,ELG, ECM,3 FAN,460, 5WIRE
08533502	MOTOR HARNESS,ELG, ECM,4 FAN,460, 5WIRE
08533507	MOTOR HARNESS,ELG, 3PH,1 FAN, DAISY CHAIN, 230/460, 3WIRE
08533508	MOTOR HARNESS,ELG, 3PH,2 FAN, DAISY CHAIN, 230/460, 3WIRE
08533509	MOTOR HARNESS,ELG, 3PH,3 FAN, DAISY CHAIN,230/460, 3WIRE
08533510	MOTOR HARNESS,ELG, 3PH,4 FAN, DAISY CHAIN, 230/460, 3WIRE
207757029	TERMINAL BOARD, TB29, ELG ECONET
207757034	TERMINAL BOARD,TB34,AIR DEF
207757035	TERMINAL BOARD,TB35,EL&HG DEF
207757026	TERMINAL BOARD,TB26
08219008	JOHNSON CONTROL MECHANICAL A19, TSTAT
08219588	ELECTRIC THERMOSTAT
08219608	ELECTRIC THERMOSTAT WITH TIMER
204464037	DTFD (ADJUSTABLE)
08219273	CONTROL, DEFTERM, SPST, O3 ₀ /C60
103079009	CONTROL, FAN DELAY 045/C35
103079003	CONTROL, HTR SAFETY



HTPG.com

©2023 Heat Transfer Products Group Published September 2023 HTPG2308_IOM_MP-HD-WH





by scanning this QR code or the one located in the ebox of the unit