



**PRODUCT DATA & INSTALLATION**

Bulletin T30-TTM-PDI-10  
Part # 1087841



PRODUCT SUPPORT  
web: [www.t-rp.com/ttm](http://www.t-rp.com/ttm)  
email: [evaps@t-rp.com](mailto:evaps@t-rp.com)  
call: 1-844-893-3222 x520

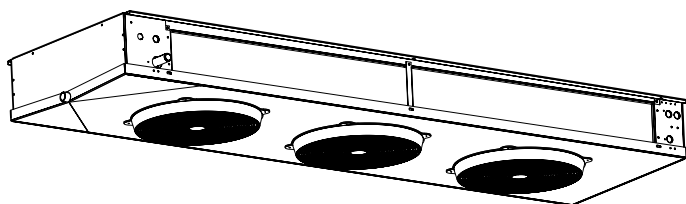


# TTM Two-Way Medium Profile Evaporators

High, Medium and Low Temperature Applications  
-10°F (-23.3 °C) or Above Box Temperature



Air, Electric or Hot Gas Defrost (Reverse Cycle)



**SMARTSPEED™**  
FAN MOTOR TECHNOLOGY

See Page 11 for details

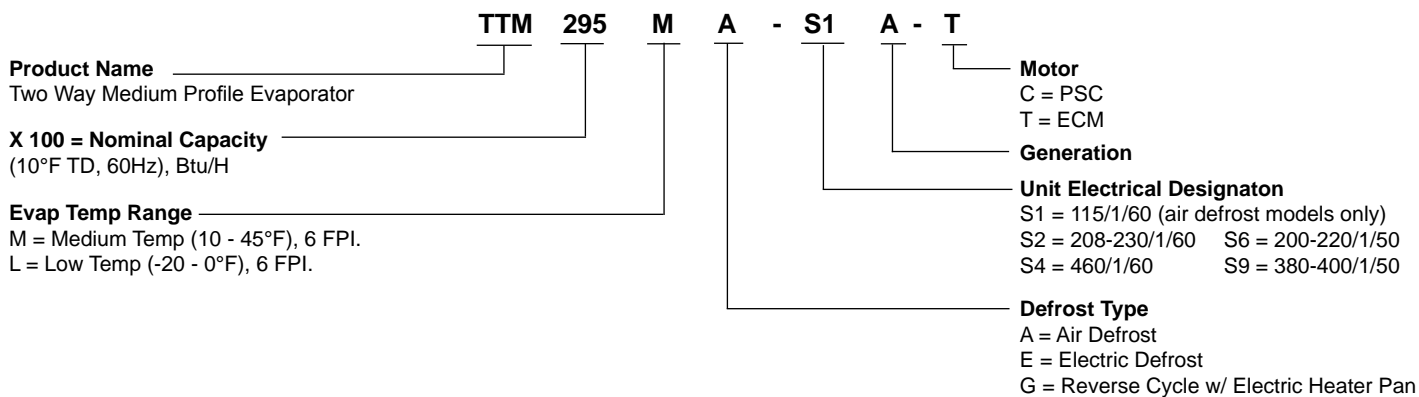
**SMARTVAP ⊕**  
INTUITIVE EVAPORATOR CONTROL TECHNOLOGY

see page 16 for details

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# NOMENCLATURE




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## STANDARD FEATURES

- Compatible with Low GWP Refrigerants
- Heavy gauge textured aluminum cabinet construction resists scratches/corrosion and minimizes weight for shipment, installation and service.
- Capacity up to 29,500 BTUH nominal @ 10F TD.
- Dual refrigeration coils with two-way air distribution reduces air velocities to minimize product dehydration.
- Air enters through fan and discharges two ways out of each coil side.
- Low height compact size usable storage space.
- Internally enhanced tube.
- Attractive and durable high - density polyethylene fan guards.
- Standard PSC motors
- Hinged drain pan provides convenient access for cleaning.
- Terminal board allows for easy electrical connections.
- Reduced operating charge with 3/8" OD tubing

## AVAILABLE OPTIONS

- Factory mounted solenoid valve, TXV and Thermostat on air and electric defrost models.
- EC motors with patented SmartSpeed® Technology. (see page 11 for details)
- **ESP+ Intuitive Evaporator Control Technology.** See page 16
- Corrosion protection: alternate fin materials and coatings
- Additional options available, please consult factory.

**MEDIUM TEMPERATURE MODELS - CAPACITY**

Model TTM		115M	139M	172M	208M	236M	260M	295M	
Number of Fans		2	2	3	3	4	4	5	
Capacity BTUH (WATTS)	Evap Temp. 25°F (-4°C)	R407A	10930	13210	16340	19760	22420	24700	28000
		R448A	(3202)	(3870)	(4789)	(5791)	(6570)	(7239)	(8214)
		R407C	10350	12510	15480	18720	21240	23400	26600
		R404A	(3033)	(3667)	(4537)	(5486)	(6224)	(6858)	(7781)
		R507	11500	13900	17200	20800	23600	26000	29500
			(3370)	(4074)	(5041)	(6096)	(6916)	(7620)	(8646)
	R22	10930	13210	16340	19760	22400	24700	28000	
		(3202)	(3870)	(4789)	(5791)	(6570)	(7239)	(8214)	
	R134a	10350	12510	15480	18720	21240	23400	26550	
		(3033)	(3667)	(4537)	(5486)	(6224)	(6858)	(7781)	
Air Flow	CFM (L/s)	2020 (953)	1900 (897)	3030 (1430)	2850 (1345)	3700 (1746)	3780 (1784)	4630 (2185)	
Refrigerant ** Charge R407A	Lbs (Kg)	2.3 (1.0)	3.1 (1.4)	3.4 (1.5)	4.6 (2.1)	4.6 (2.1)	5.7 (2.6)	5.7 (2.6)	

**LOW TEMPERATURE MODELS - CAPACITY \***

Models		105L	124L	153L	188L	210L	235L	265L	
Number of Fan TTM		2	2	3	3	4	4	5	
Capacity BTUH (WATTS)	Evap Temp. -20°F (-28.9°C)	R407A	9980	11780	14540	17860	19950	22300	25200
		R448A	(2923)	(3452)	(4260)	(5235)	(5846)	(6543)	(7378)
		R407C	9450	11160	13770	16920	18900	21150	23900
		R404A	(2769)	(3271)	(4036)	(4959)	(5539)	(6198)	(6989)
		R507	10500	12400	15300	18800	21000	23500	26500
			(3077)	(3634)	(4484)	(5510)	(6154)	(6887)	(7766)
	R22	9980	11780	14540	17860	20000	22300	25200	
		(2923)	(3452)	(4260)	(5235)	(5846)	(6543)	(7378)	
	R134a	9450	11160	13770	16920	18900	21150	23850	
		(2769)	(3271)	(4036)	(4959)	(5539)	(6198)	(6989)	
Air Flow	CFM (L/s)	2020 (953)	1900 (897)	3030 (1430)	2850 (1345)	3700 (1746)	3780 (1784)	4630 (2185)	
Refrigerant ** Charge R407A	Lbs (Kg)	2.3 (1.0)	3.1 (1.4)	3.4 (1.5)	4.6 (2.1)	4.6 (2.1)	5.7 (2.6)	5.7 (2.6)	

Capacities rated using 10°F (5.6°C) TD & 100°F (38°C) liquid temperature.

Capacities at other TD within a range of 8 to 15 °F (4.4 to 8.3°C) are directly proportional to TD, or use formula: Capacity = Rated capacity ÷ 10 x TD.

For capacities at TD outside of range 8 to 15 °F (4.4 to 8.3°C), or liquid temperature lower than 75°F (24°), consult factory.

Capacities for R448A, R407A and R407C are based on mean temperature. Mean temperature is the average temperature between the saturated suction temperature and the temperature feeding the evaporator. For dew point ratings, consult factory.

For R449A, use R448A data.

**\* CAPACITY CORRECTION FACTORS FOR LOW TEMPERATURE UNITS**

SATURATED SUCTION TEMPERATURE °F (°C)	0 (-17.8)	-10 (23.3)	-20 (-28.9)
FACTOR	1.06	1.03	1.0

**NO CORRECTION FACTOR REQUIRED FOR MEDIUM TEMP. UNITS**

**\*\* REFRIGERANT CHARGE CONVERSION FACTORS**

R448A	R407C	R404A	R507	R22	R134a
0.96	0.99	0.92	0.93	1.02	1.03

**AIR DEFROST**

MODEL TTM	No. of FANS	POWER SUPPLY	FAN MOTOR(S)							
			PSC-Standard				ECM-Optional			
			TOTAL MOTOR FLA	M.C.A.	WATTS	M.O.P	TOTAL MOTOR FLA	M.C.A.	WATTS	M.O.P
115MA-S1	2	115/1/60	2.2	2.5	200	15	3	3.4	104	15
139MA-S1	2	115/1/60	2.2	2.5	200	15	3	3.4	104	15
172MA-S1	3	115/1/60	3.3	3.6	300	15	4.5	4.9	156	15
208MA-S1	3	115/1/60	3.3	3.6	300	15	4.5	4.9	156	15
236MA-S1	4	115/1/60	4.4	4.7	400	15	6	6.4	208	15
260MA-S1	4	115/1/60	4.4	4.7	400	15	6	6.4	208	15
295MA-S1	5	115/1/60	5.5	5.8	500	15	7.5	7.9	260	15
115MA-S2	2	208-230/1/60	1.0	1.1	200	15	2.0	2.3	104	15
139MA-S2	2	208-230/1/60	1.0	1.1	200	15	2.0	2.3	104	15
172MA-S2	3	208-230/1/60	1.5	1.6	300	15	3.0	3.3	156	15
208MA-S2	3	208-230/1/60	1.5	1.6	300	15	3.0	3.3	156	15
236MA-S2	4	208-230/1/60	2.0	2.1	400	15	4.0	4.3	208	15
260MA-S2	4	208-230/1/60	2.0	2.1	400	15	4.0	4.3	208	15
295MA-S2	5	208-230/1/60	2.5	2.6	500	15	5.0	5.3	260	15
115MA-S4	2	460/1/60	0.6	0.7	200	15	-	-	-	-
139MA-S4	2	460/1/60	0.6	0.7	200	15	-	-	-	-
172MA-S4	3	460/1/60	0.9	1.0	300	15	-	-	-	-
208MA-S4	3	460/1/60	0.9	1.0	300	15	-	-	-	-
236MA-S4	4	460/1/60	1.2	1.3	400	15	-	-	-	-
260MA-S4	4	460/1/60	1.2	1.3	400	15	-	-	-	-
295MA-S4	5	460/1/60	1.5	1.6	500	15	-	-	-	-

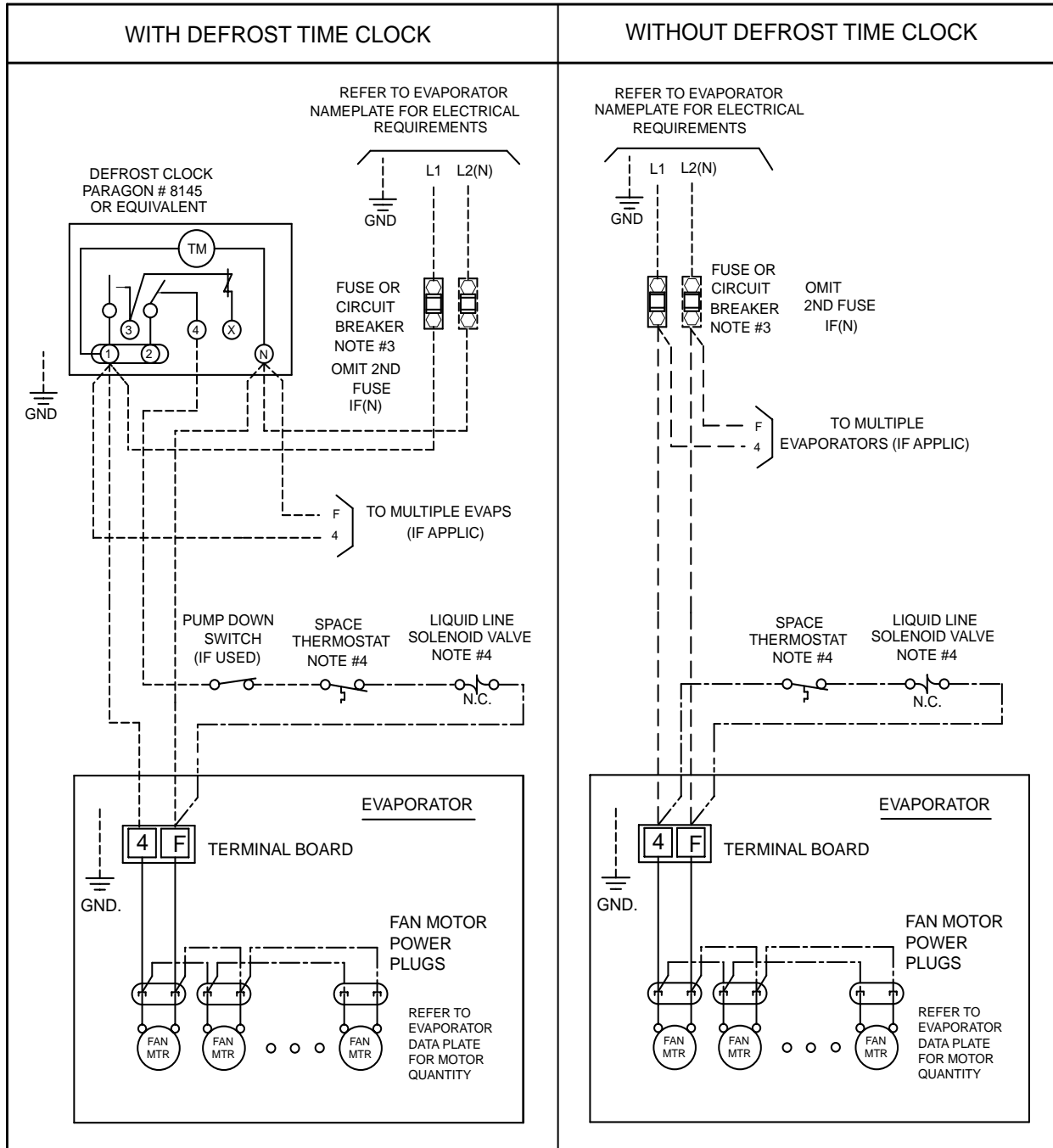
**ELECTRIC DEFROST**

MODEL TTM	No. of FANS	POWER SUPPLY	FAN MOTOR(S)								DEFROST HEATERS				
			PSC-Standard				ECM-Optional				POWER SUPPLY	TOTAL WATTS	TOTAL AMPS	M.C.A.	M.O.P
			TOTAL MOTOR FLA	M.C.A.	WATTS	M.O.P	TOTAL MOTOR FLA	M.C.A.	WATTS	M.O.P					
115ME-S2	2	208-230/1/60	1.0	1.1	200	15	1.4	1.6	150	15	208-230/1/60	2600	11.3	14.1	15
139ME-S2	2	208-230/1/60	1.0	1.1	200	15	1.4	1.6	150	15	208-230/1/60	2600	11.3	14.1	15
172ME-S2	3	208-230/1/60	1.5	1.6	300	15	2.1	2.3	225	15	208-230/1/60	3720	16.2	20.3	25
208ME-S2	3	208-230/1/60	1.5	1.6	300	15	2.1	2.3	225	15	208-230/1/60	3720	16.2	20.3	25
236ME-S2	4	208-230/1/60	2.0	2.1	400	15	2.8	3.0	300	15	208-230/1/60	3720	16.2	20.3	25
260ME-S2	4	208-230/1/60	2.0	2.1	400	15	2.8	3.0	300	15	208-230/1/60	4560	19.8	24.8	25
295ME-S2	5	208-230/1/60	2.5	2.6	500	15	3.5	3.7	375	15	208-230/1/60	4560	19.8	24.8	25
105LE-S2	2	208-230/1/60	1.0	1.1	200	15	1.4	1.6	150	15	208-230/1/60	2600	11.3	14.1	15
124LE-S2	2	208-230/1/60	1.0	1.1	200	15	1.4	1.6	150	15	208-230/1/60	2600	11.3	14.1	15
153LE-S2	3	208-230/1/60	1.5	1.6	300	15	2.1	2.3	225	15	208-230/1/60	3720	16.2	20.3	25
188LE-S2	3	208-230/1/60	1.5	1.6	300	15	2.1	2.3	225	15	208-230/1/60	3720	16.2	20.3	25
210LE-S2	4	208-230/1/60	2.0	2.1	400	15	2.8	3.0	300	15	208-230/1/60	3720	16.2	20.3	25
235LE-S2	4	208-230/1/60	2.0	2.1	400	15	2.8	3.0	300	15	208-230/1/60	4560	19.8	24.8	25
265LE-S2	5	208-230/1/60	2.5	2.6	500	15	3.5	3.7	375	15	208-230/1/60	4560	19.8	24.8	25

**HOT GAS DEFROST**

MODEL TTM	No. of FANS	POWER SUPPLY	FAN MOTOR(S)								DRAIN PAN HEATERS				
			PSC-Standard				ECM-Optional				POWER SUPPLY	TOTAL WATTS	TOTAL AMPS	M.C.A.	M.O.P
			TOTAL AMPS	M.C.A.	WATTS	M.O.P	TOTAL AMPS	M.C.A.	WATTS	M.O.P					
115MG-S1	2	115/1/60	2.2	2.5	200	15	3.0	3.4	104	15	115/1/60	1300	11.3	14.1	15
139MG-S1	2	115/1/60	2.2	2.5	200	15	3.0	3.4	104	15	115/1/60	1300	11.3	14.1	15
172MG-S1	3	115/1/60	3.3	3.6	300	15	4.5	4.9	156	15	115/1/60	1860	16.2	20.3	25
208MG-S1	3	115/1/60	3.3	3.6	300	15	4.5	4.9	156	15	115/1/60	1860	16.2	20.3	25
236MG-S1	4	115/1/60	4.4	4.7	400	15	6.0	6.4	208	15	115/1/60	1860	16.2	20.3	25
260MG-S1	4	115/1/60	4.4	4.7	400	15	6.0	6.4	208	15	115/1/60	2280	19.8	24.8	25
295MG-S1	5	115/1/60	5.5	5.8	500	15	7.5	7.9	260	15	115/1/60	2280	19.8	24.8	25
115MG-S2	2	208-230/1/60	1.0	1.1	200	15	2.0	2.3	104	15	208-230/1/60	1300	5.7	7.1	15
139MG-S2	2	208-230/1/60	1.0	1.1	200	15	2.0	2.3	104	15	208-230/1/60	1300	5.7	7.1	15
172MG-S2	3	208-230/1/60	1.5	1.6	300	15	3.0	3.3	156	15	208-230/1/60	1860	8.1	10.1	15
208MG-S2	3	208-230/1/60	1.5	1.6	300	15	3.0	3.3	156	15	208-230/1/60	1860	8.1	10.1	15
236MG-S2	4	208-230/1/60	2.0	2.1	400	15	4.0	4.3	208	15	208-230/1/60	1860	8.1	10.1	15
260MG-S2	4	208-230/1/60	2.0	2.1	400	15	4.0	4.3	208	15	208-230/1/60	2280	9.9	12.4	15
295MG-S2	5	208-230/1/60	2.5	2.6	500	15	5.0	5.3	260	15	208-230/1/60	2280	9.9	12.4	15

# WIRING DIAGRAM AIR DEFROST - 120V & 208-230V



### NOTES

- 1). USE COPPER CONDUCTORS ONLY
- 2). USE 90°C WIRE (OR HIGHER)
- 3). OVERCURRENT PROTECTION FOR EVAPORATOR FAN MOTORS AND DEFROST HEATERS MUST NOT EXCEED MAXIMUM VALUE SHOWN ON EVAPORATOR NAMEPLATE.
- 4). MAY BE FACTORY INSTALLED-MOUNTED AND WIRED ON EVAPORATOR .

1-TM AD 03/08

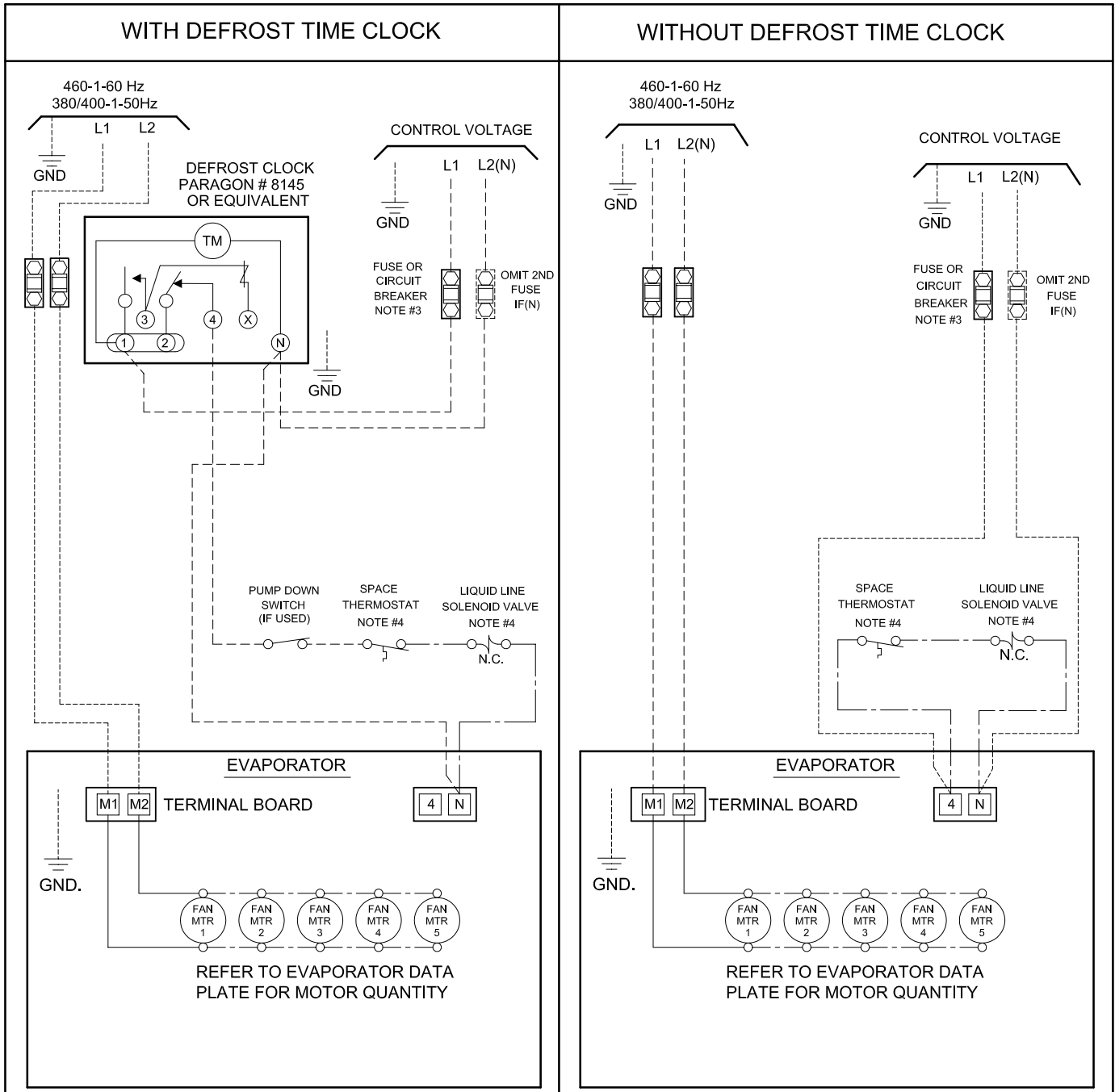
### TERMINALS

- -COMPONENT TERMINAL
- -TERMINAL BLOCK TERMINAL

### CONDUCTORS/WIRING

- FACTORY WIRING
- - - - - WIRING BY OTHERS
- OPTIONAL FACTORY OR BY OTHERS

ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.



**NOTES**

- 1). USE COPPER CONDUCTORS ONLY
- 2). USE 90°C WIRE (OR HIGHER)
- 3). OVERCURRENT PROTECTION FOR EVAPORATOR FAN MOTORS MUST NOT EXCEED MAXIMUM VALUE SHOWN ON EVAPORATOR NAMEPLATE.
- 4). MAY BE FACTORY INSTALLED-MOUNTED AND WIRED ON EVAPORATOR .
- 5). REFER TO EVAPORATOR DATA PLATE FOR MOTOR QUANTITY

**TERMINALS**

- -COMPONENT TERMINAL
- -TERMINAL BLOCK TERMINAL

**CONDUCTORS/WIRING**

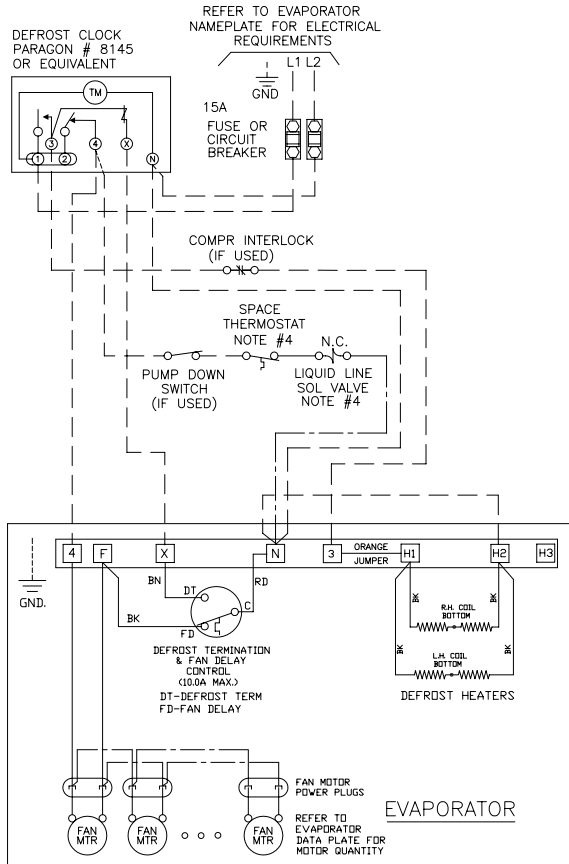
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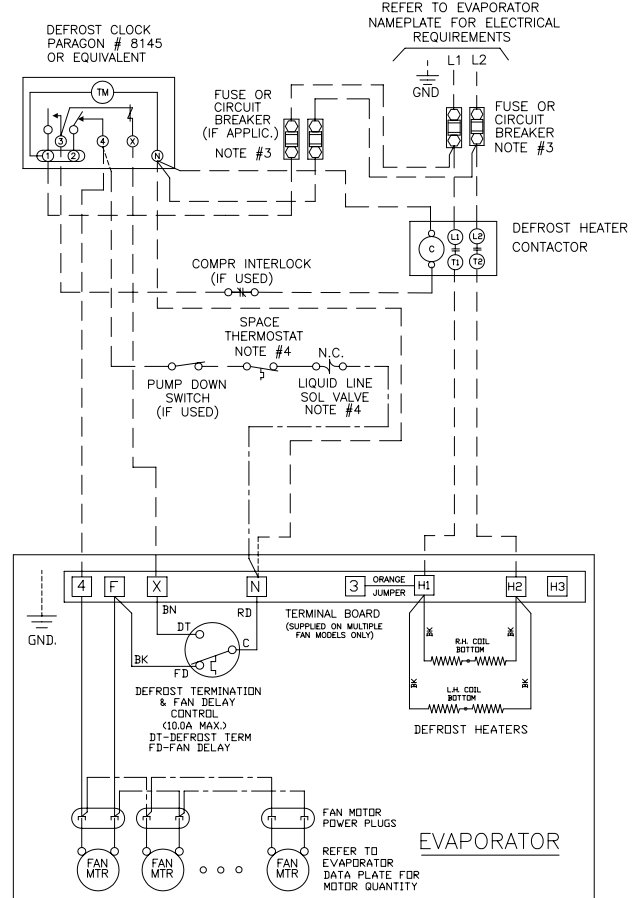
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# WIRING DIAGRAM ELECTRIC DEFROST - 208-230V (SINGLE EVAPORATOR)

FOR ALL MODELS WITHOUT DEFROST HEATER CONTACTOR  
USING MAXIMUM 15A HEATER OVERCURRENT PROTECTION



FOR ALL MODELS USING DEFROST HEATER CONTACTOR



NOTES

- 1.) USE COPPER CONDUCTORS ONLY
- 2.) USE 75°C WIRE (OR HIGHER)
- 3.) OVERCURRENT PROTECTION FOR EVAPORATOR FAN MOTORS AND DEFROST HEATERS MUST NOT EXCEED MAXIMUM VALUE SHOWN ON EVAPORATOR NAMEPLATE.
- 4.) MAY BE FACTORY INSTALLED-MOUNTED AND WIRED ON EVAPORATOR

TERMINALS

- -COMPONENT TERMINAL
- -TERMINAL BLOCK TERMINAL

CONDUCTORS/WIRING

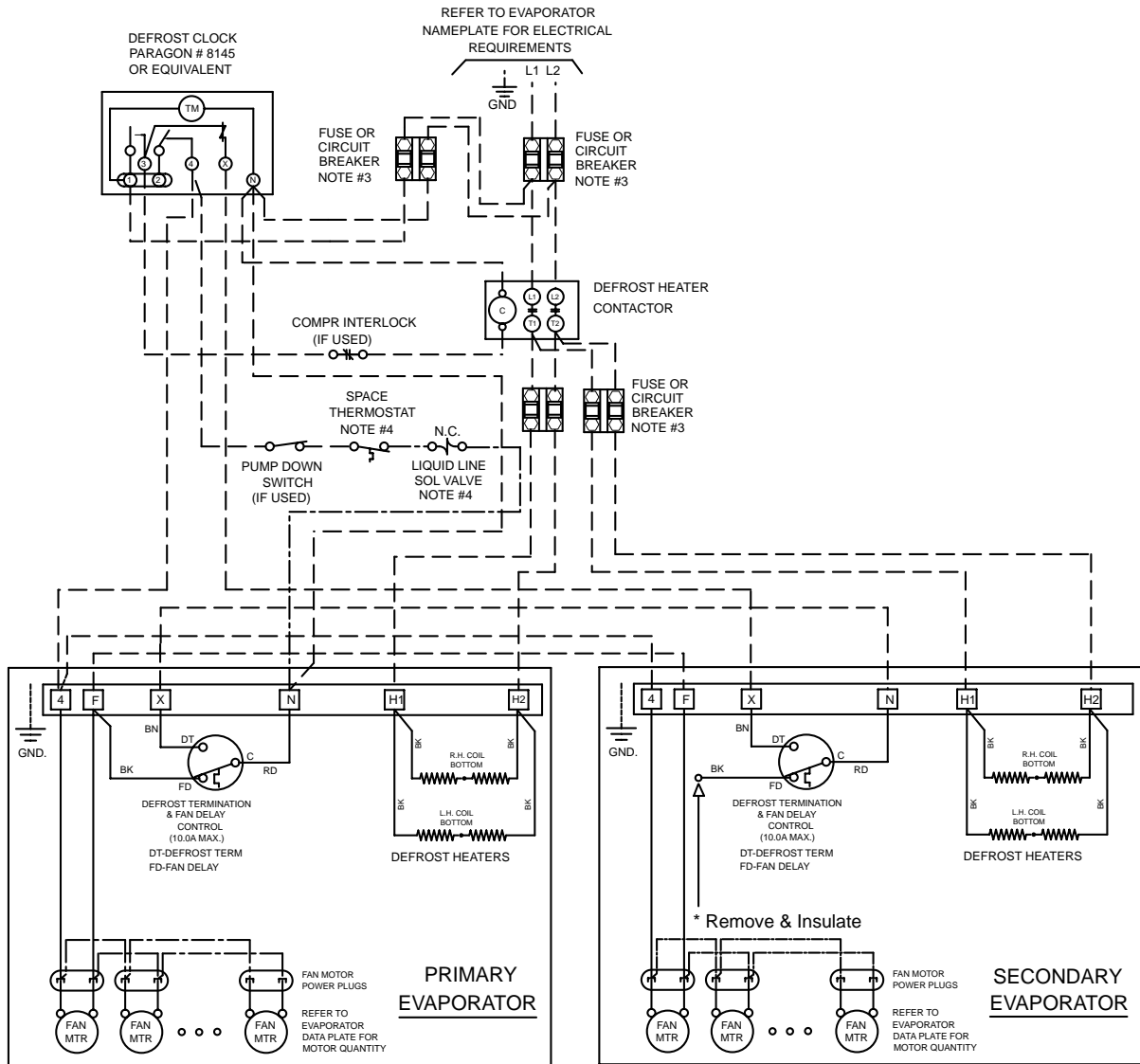
- FACTORY WIRING
- - - - - WIRING BY OTHERS
- OPTIONAL FACTORY OR BY OTHERS

ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.



# WIRING DIAGRAM ELECTRIC DEFROST - 230V (MULTI EVAPORATOR)

FOR ALL MODELS USING DEFROST HEATER CONTACTOR



\* Fan delay not used on second evap / use fan contactor if total fan amps exceeds 10A

**NOTES**

- 1.) USE COPPER CONDUCTORS ONLY
- 2.) USE 90°C WIRE (OR HIGHER)
- 3.) OVERCURRENT PROTECTION FOR EVAPORATOR FAN MOTORS AND DEFROST HEATERS MUST NOT EXCEED MAXIMUM VALUE SHOWN ON EVAPORATOR NAMEPLATE.
- 4.) MAY BE FACTORY INSTALLED-MOUNTED AND WIRED ON EVAPORATOR

3-TM ED CONTACTOR MULTI 03/08

**TERMINALS**

- -COMPONENT TERMINAL
- -TERMINAL BLOCK TERMINAL

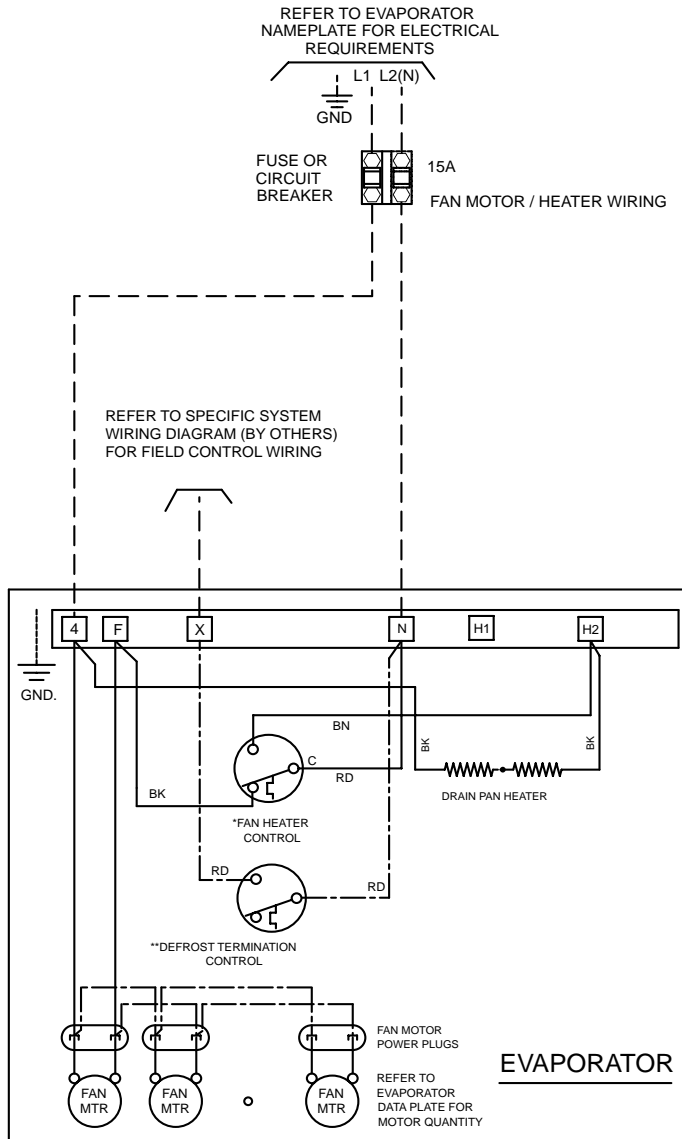
**CONDUCTORS/WIRING**

- FACTORY WIRING
- - - - - WIRING BY OTHERS
- - - - - OPTIONAL FACTORY OR BY OTHERS

ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.

# WIRING DIAGRAM REVERSE CYCLE DEFROST - 230V

USING MAXIMUM 15A HEATER OVERCURRENT PROTECTION



\*FAN HEATER CONTROL ON REVERSE CYCLE LOCATED AT SUCTION LINE.  
NOTE: DURING THE HOT GAS DEFROST CYCLE THE FAN/HEATER CONTROL DE-ENERGIZES THE EVAPORATOR FANS AND ENERGIZES THE DRAIN PAN HEATER.  
(ANYTIME THE TEMPERATURE OF THE INCOMING REFRIGERANT GAS IS ABOVE 50° F).

\*\*DEFROST TERMINATION CONTROL  
OPTIONAL FACTORY WIRED OR BY OTHERS  
LOCATED ON TUBE END SHEET  
THE CONTROL CLOSES WHEN REACHES 55° F (20 F DIFF)

**NOTES**

- 1). USE COPPER CONDUCTORS ONLY
- 2). USE 90°C WIRE (OR HIGHER)
- 3). OVERCURRENT PROTECTION FOR EVAPORATOR FAN MOTORS AND DEFROST HEATERS MUST NOT EXCEED MAXIMUM VALUE SHOWN ON EVAPORATOR NAMEPLATE.
- 4.) MAY BE FACTORY INSTALLED-MOUNTED AND WIRED ON EVAPORATOR

4-TM HG 03/08

**TERMINALS**

- -COMPONENT TERMINAL
- -TERMINAL BLOCK TERMINAL

**CONDUCTORS/WIRING**

- FACTORY WIRING
- - - - - WIRING BY OTHERS
- · · · · OPTIONAL FACTORY OR BY OTHERS

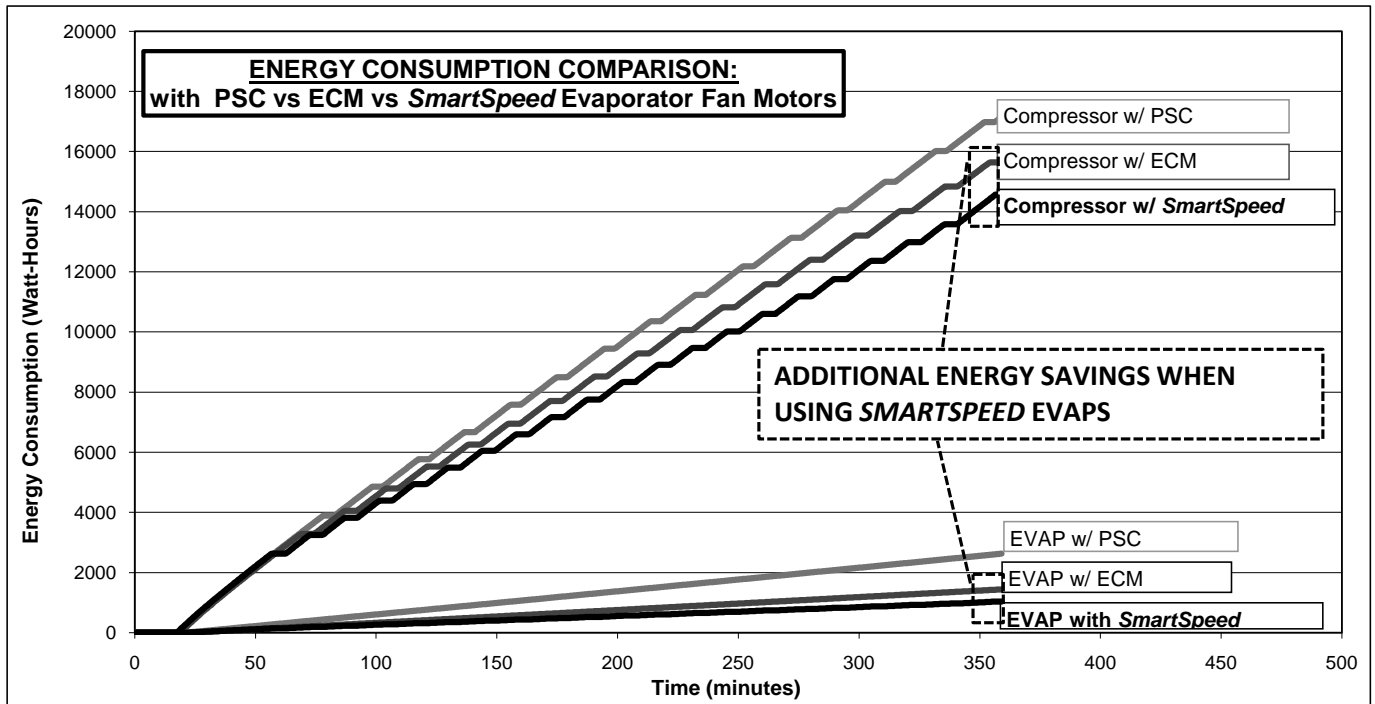
ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.

US Patents  
8,635,883 &  
9,151,525

**DESIGN FEATURES**



- Standard on all EC Motors
- NO special controls required.
- Refrigeration mode – EC motor operates at full speed.  
Consumption 52 W per motor
- Off Cycle mode – EC motor operates at reduced speed.  
Consumption 15 W per motor.
- Energy saving benefit on motor and compressor wattage consumption:



Note: Data collected on a typical freezer application with a 3HP low temp condensing unit and a 4 fan TLP evaporator. Similar results can be expected with TTM evaporators.

**INSTALLATION NOTES**

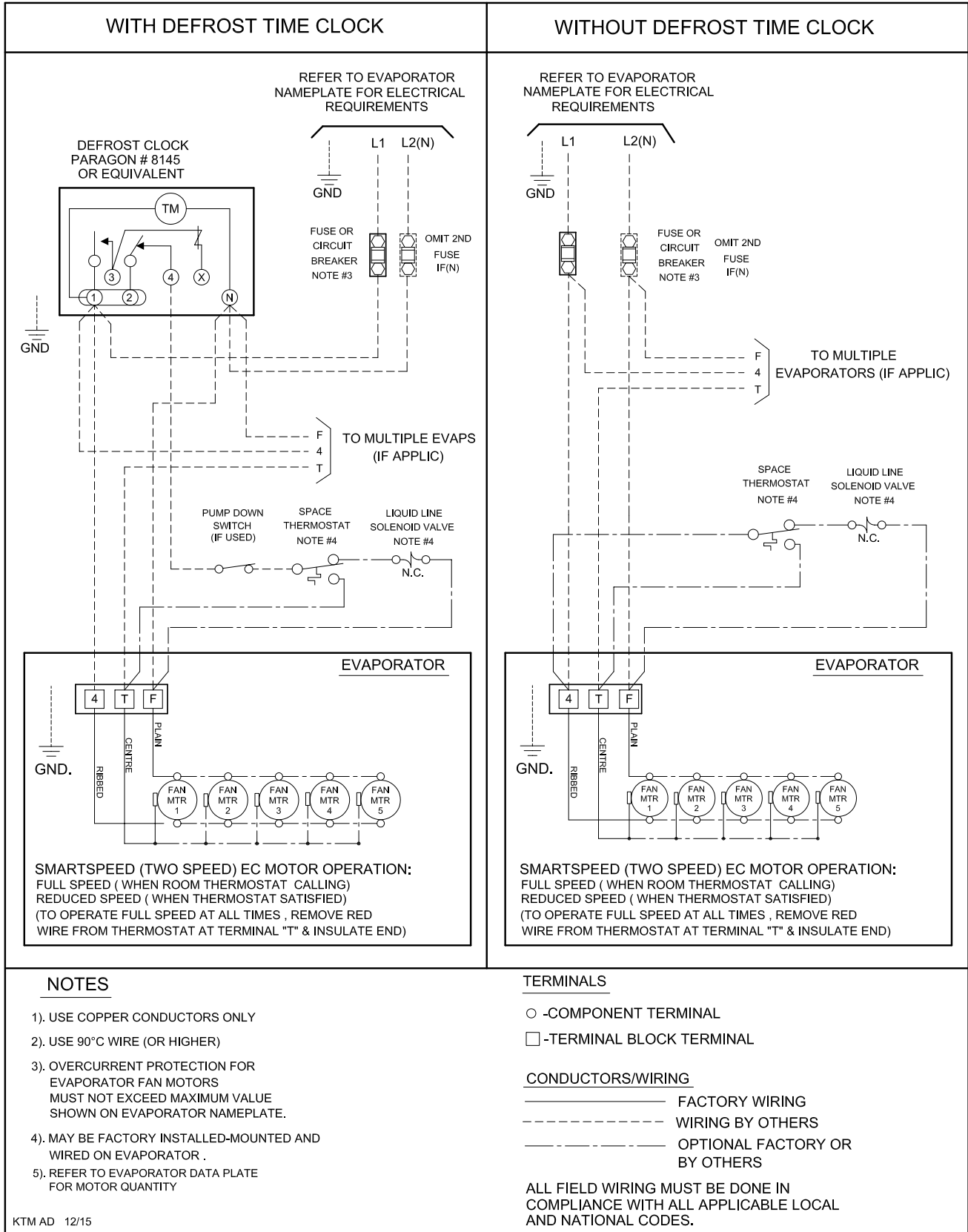
EC motors are factory wired for SmartSpeed operation on evaporators equipped **with** a factory installed thermostat.

For SmartSpeed operation on Evaporators **without** a factory installed thermostat, a field wired SPDT type thermostat is required.

# WIRING DIAGRAM - ALL VOLTAGES

## OPTIONAL EC MOTOR with SMARTSPEED™

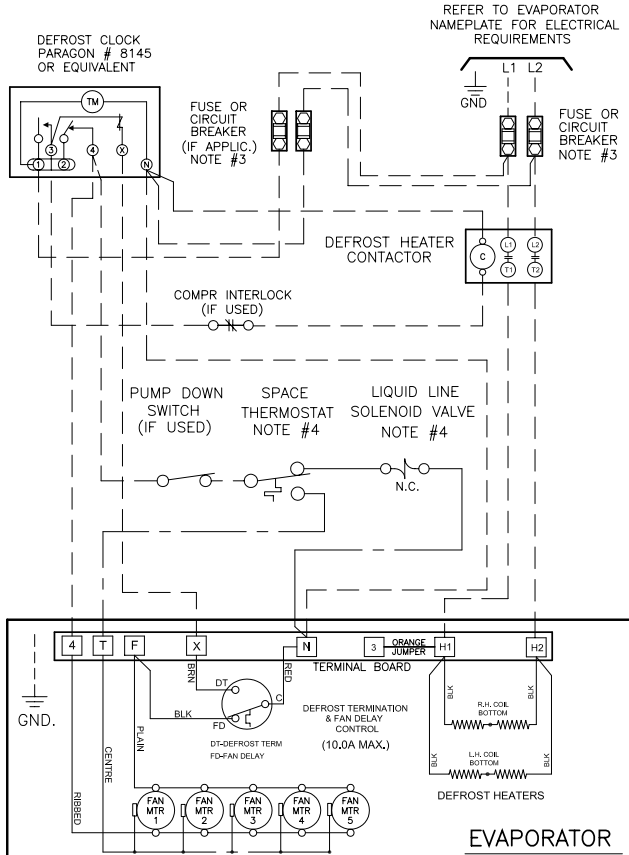
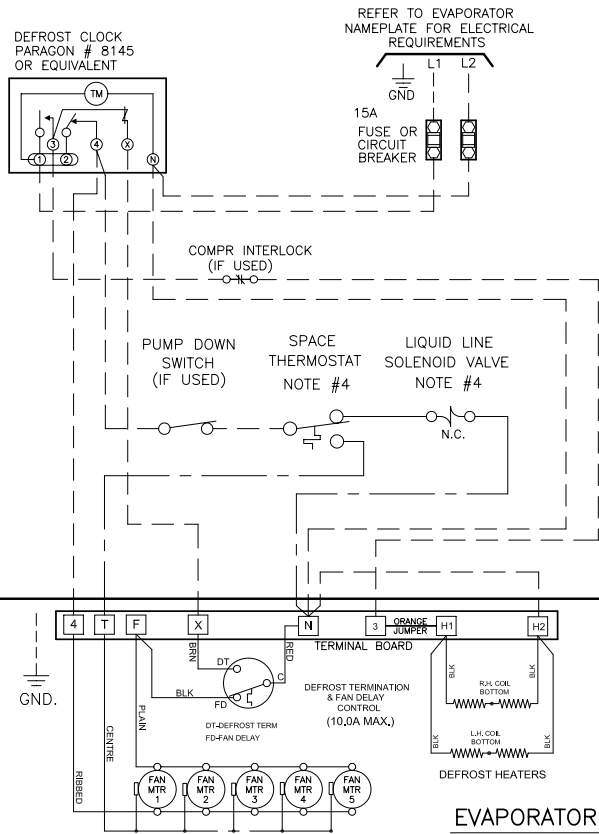
### AIR DEFROST MODELS



# WIRING DIAGRAM - 208-230/1/60 OPTIONAL EC MOTOR with SMARTSPEED™ ELECTRIC DEFROST MODELS - SINGLE EVAPORATOR

FOR ALL MODELS WITHOUT DEFROST HEATER CONTACTOR  
USING MAXIMUM 15A HEATER OVERCURRENT PROTECTION

FOR ALL MODELS USING DEFROST HEATER CONTACTOR



**SMARTSPEED (TWO SPEED) EC MOTOR OPERATION:**  
FULL SPEED ( WHEN ROOM THERMOSTAT CALLING )  
REDUCED SPEED ( WHEN THERMOSTAT SATISFIED )  
( TO OPERATE FULL SPEED AT ALL TIMES , REMOVE RED  
WIRE FROM THERMOSTAT AT TERMINAL "T" & INSULATE END )

**SMARTSPEED (TWO SPEED) EC MOTOR OPERATION:**  
FULL SPEED ( WHEN ROOM THERMOSTAT CALLING )  
REDUCED SPEED ( WHEN THERMOSTAT SATISFIED )  
( TO OPERATE FULL SPEED AT ALL TIMES , REMOVE RED  
WIRE FROM THERMOSTAT AT TERMINAL "T" & INSULATE END )

**NOTES**

- 1). USE COPPER CONDUCTORS ONLY
- 2). USE 90°C WIRE (OR HIGHER)
- 3). OVERCURRENT PROTECTION FOR EVAPORATOR FAN MOTORS AND DEFROST HEATERS MUST NOT EXCEED MAXIMUM VALUE SHOWN ON EVAPORATOR NAMEPLATE.
- 4). MAY BE FACTORY INSTALLED-MOUNTED AND WIRED ON EVAPORATOR
- 5). REFER TO EVAPORATOR DATA PLATE FOR MOTOR QUANTITY

**TERMINALS**

- -COMPONENT TERMINAL
- -TERMINAL BLOCK TERMINAL

**CONDUCTORS/WIRING**

- FACTORY WIRING
- - - - - WIRING BY OTHERS
- OPTIONAL FACTORY OR BY OTHERS

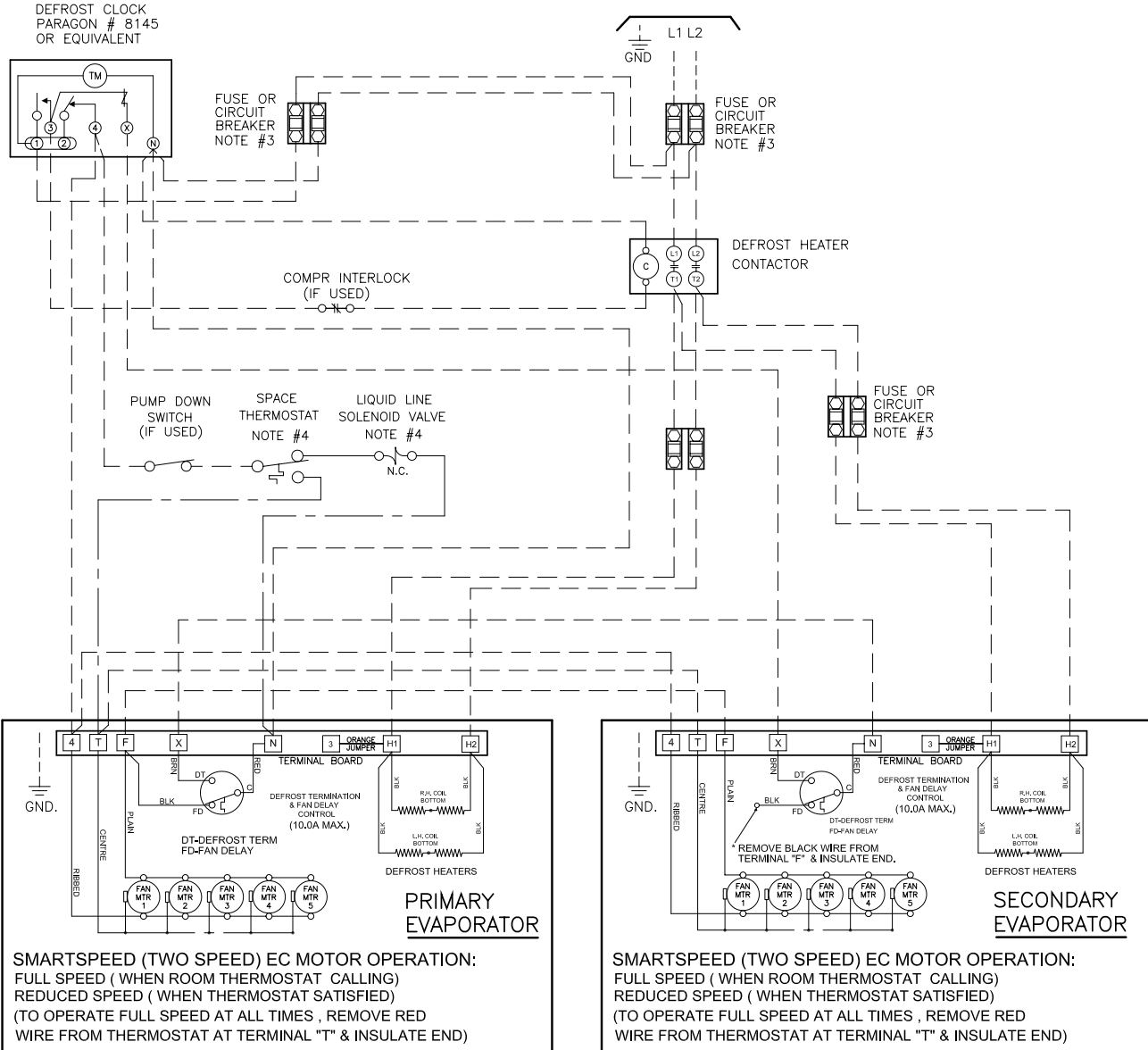
ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.

# WIRING DIAGRAM - 208-230/1/60

## OPTIONAL EC MOTOR with SMARTSPEED™

### ELECTRIC DEFROST MODELS - MULTIPLE EVAPORATOR

FOR ALL MODELS USING DEFROST HEATER CONTACTOR  
REFER TO EVAPORATOR NAMEPLATE FOR ELECTRICAL REQUIREMENTS



\* Fan delay not used on second evap / use fan contactor if total fan amps exceeds 10A

**NOTES**

- 1). USE COPPER CONDUCTORS ONLY
- 2). USE 90°C WIRE (OR HIGHER)
- 3). OVERCURRENT PROTECTION FOR EVAPORATOR FAN MOTORS AND DEFROST HEATERS MUST NOT EXCEED MAXIMUM VALUE SHOWN ON EVAPORATOR NAMEPLATE.
- 4). MAY BE FACTORY INSTALLED-MOUNTED AND WIRED ON EVAPORATOR
- 5). REFER TO EVAPORATOR DATA PLATE FOR MOTOR QUANTITY

KTM ED CONTACTOR MULTI 12/15

**TERMINALS**

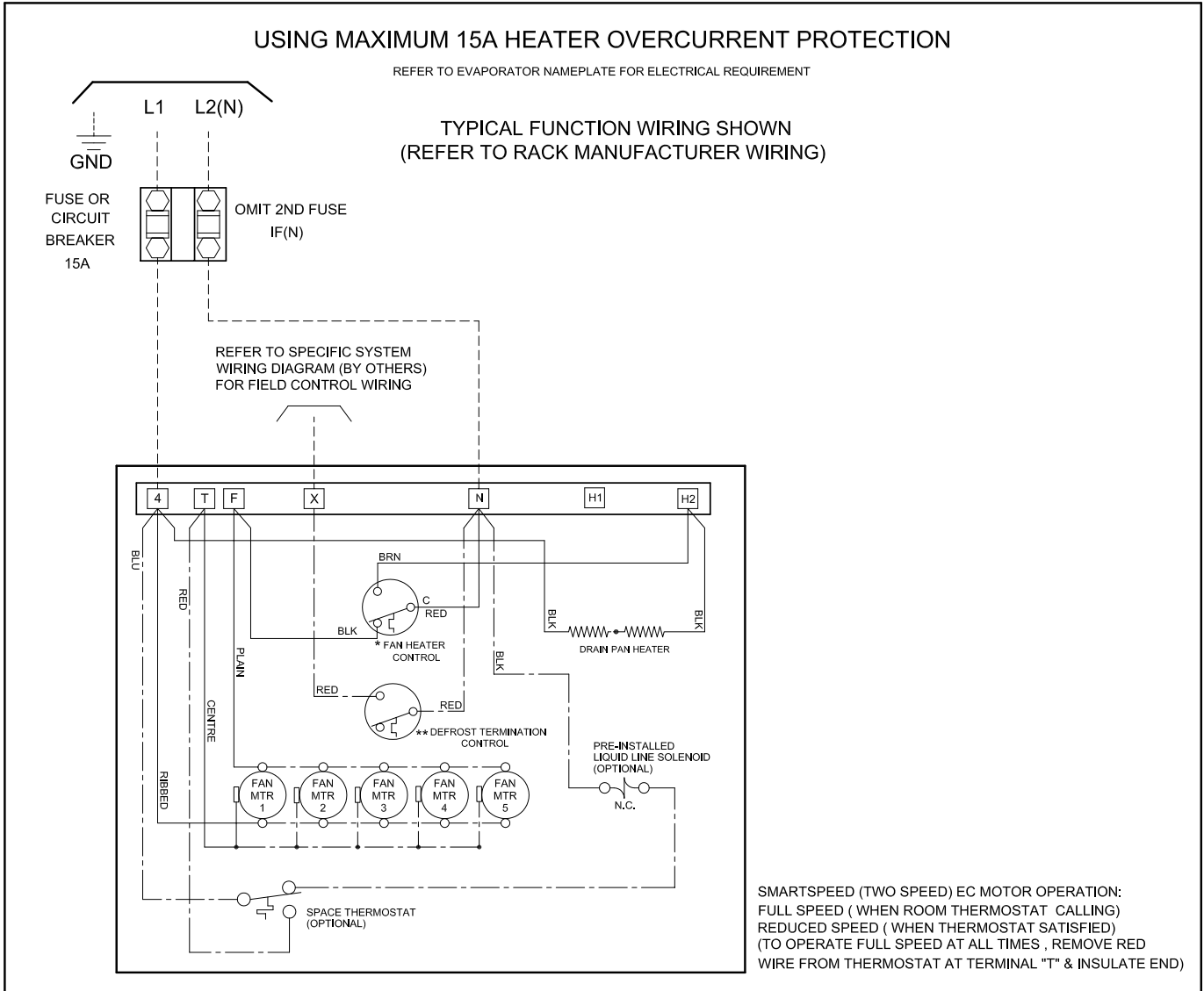
- -COMPONENT TERMINAL
- -TERMINAL BLOCK TERMINAL

**CONDUCTORS/WIRING**

- FACTORY WIRING
- - - - - WIRING BY OTHERS
- OPTIONAL FACTORY OR BY OTHERS

ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.

# WIRING DIAGRAM - 208-230/1/60 OPTIONAL EC MOTOR with SMARTSPEED™ REVERSE CYCLE DEFROST MODELS



<p>* FAN HEATER CONTROL ON REVERSE CYCLE LOCATED AT SUCTION LINE.</p> <p>** DEFROST TERMINATION CONTROL OPTIONAL FACTORY WIRED OR BY OTHERS LOCATED ON TUBE END SHEET THE CONTROL CLOSES WHEN REACHES 55° F (20 F DIFF)</p>	<p>NOTE: DURING THE HOT GAS DEFROST CYCLE THE FAN/HEATER CONTROL DE-ENERGIZES THE EVAPORATOR FANS AND ENERGIZES THE DRAIN PAN HEATER. (ANYTIME THE TEMPERATURE OF THE INCOMING REFRIGERANT GAS IS ABOVE 50° F).</p>
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- |   |  |
|---|--|
| <p><b>NOTES</b></p> <ol style="list-style-type: none"> <li>1). USE COPPER CONDUCTORS ONLY</li> <li>2). USE 90°C WIRE (OR HIGHER)</li> <li>3). OVERCURRENT PROTECTION FOR EVAPORATOR FAN MOTORS AND DEFROST HEATERS MUST NOT EXCEED MAXIMUM VALUE SHOWN ON EVAPORATOR NAMEPLATE.</li> <li>4). MAY BE FACTORY INSTALLED-MOUNTED AND WIRED ON EVAPORATOR</li> <li>5). REFER TO EVAPORATOR DATA PLATE FOR MOTOR QUANTITY</li> </ol> <p>KTM HG 12/15</p> | <p><b>TERMINALS</b></p> <p>○ -COMPONENT TERMINAL</p> <p>□ -TERMINAL BLOCK TERMINAL</p> <p><b>CONDUCTORS/WIRING</b></p> <p>————— FACTORY WIRING</p> <p>----- WIRING BY OTHERS</p> <p>----- OPTIONAL FACTORY OR BY OTHERS</p> <p>ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.</p> |
|---|--|

# INTUITIVE EVAPORATOR CONTROL TECHNOLOGY

## What is ESP+?

Trenton Refrigeration's ESP+ intuitive evaporator control technology is designed to replace traditional electro-mechanical refrigeration controls typically used on medium and low temperature applications. By combining award winning adaptive technology along with an electronic expansion valve, Trenton Refrigeration continues Leading The Way with innovative, state-of-the-art designs.

Installing an evaporator utilizing the ESP+ intuitive evaporator control technology is simple. Two pipes, two wires and you're done. No interconnecting control wiring between the evaporator and the condensing unit is required.

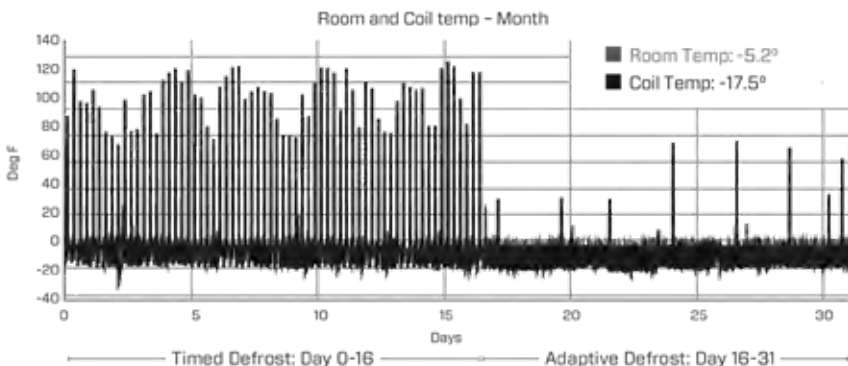
- Quick simple installation
- Improved evaporator performance by minimizing excessive frost on the evaporator
  - Eliminates ice build up on surfaces and product
  - Energy savings through evaporator fan management
- Energy savings with reduction in the number of defrost cycles
  - Defrost heater management
- Improved system diagnostics and service through advanced alarm notification text/email
  - Remote monitoring & system control
  - User friendly interface
  - Precise temperature control for prolonged product shelf life
  - Improved product integrity with less potential for spoilage
  - Downloadable data provides system history for prior 30 days
- Remotely view and change system parameters and alarm settings
  - Manually control system
  - Easily troubleshoot issues

### ESP+ controls:

- Box Temperature    - Superheat
- Defrost Initiation    - Defrost Termination    - Fan Motors
- Defrost Heater (Electric Defrost Models)

*Plus - User can access operating data directly from the system interface*

**15-20% System Energy Savings  
over a Properly Commissioned System!**



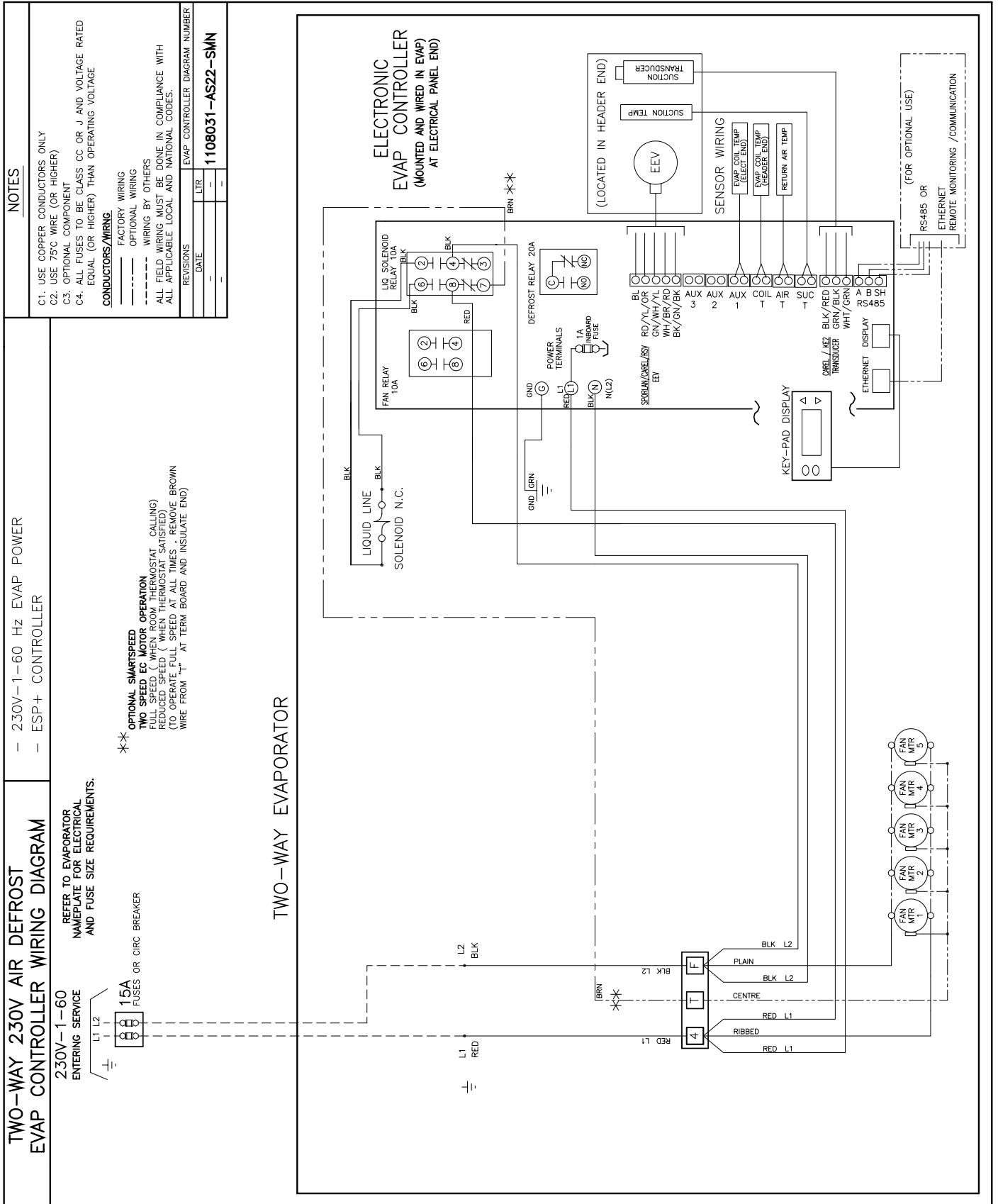
### 86% Fewer Defrost Cycles\*

- Enhanced system performance
- Energy Savings
- Improved product integrity

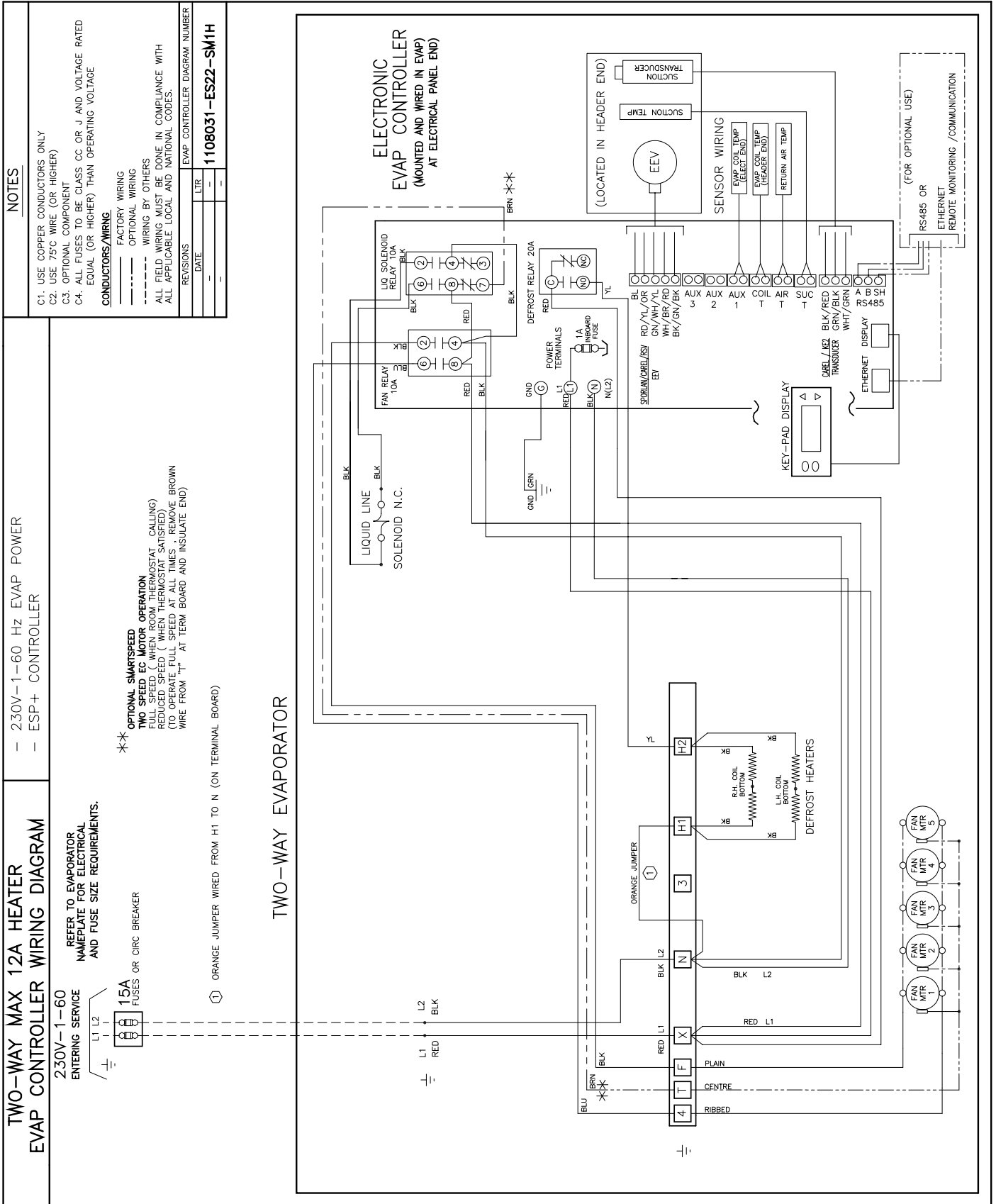
\* Data may vary depending on application

**Visit [www.t-rp.com/esp](http://www.t-rp.com/esp) for details**





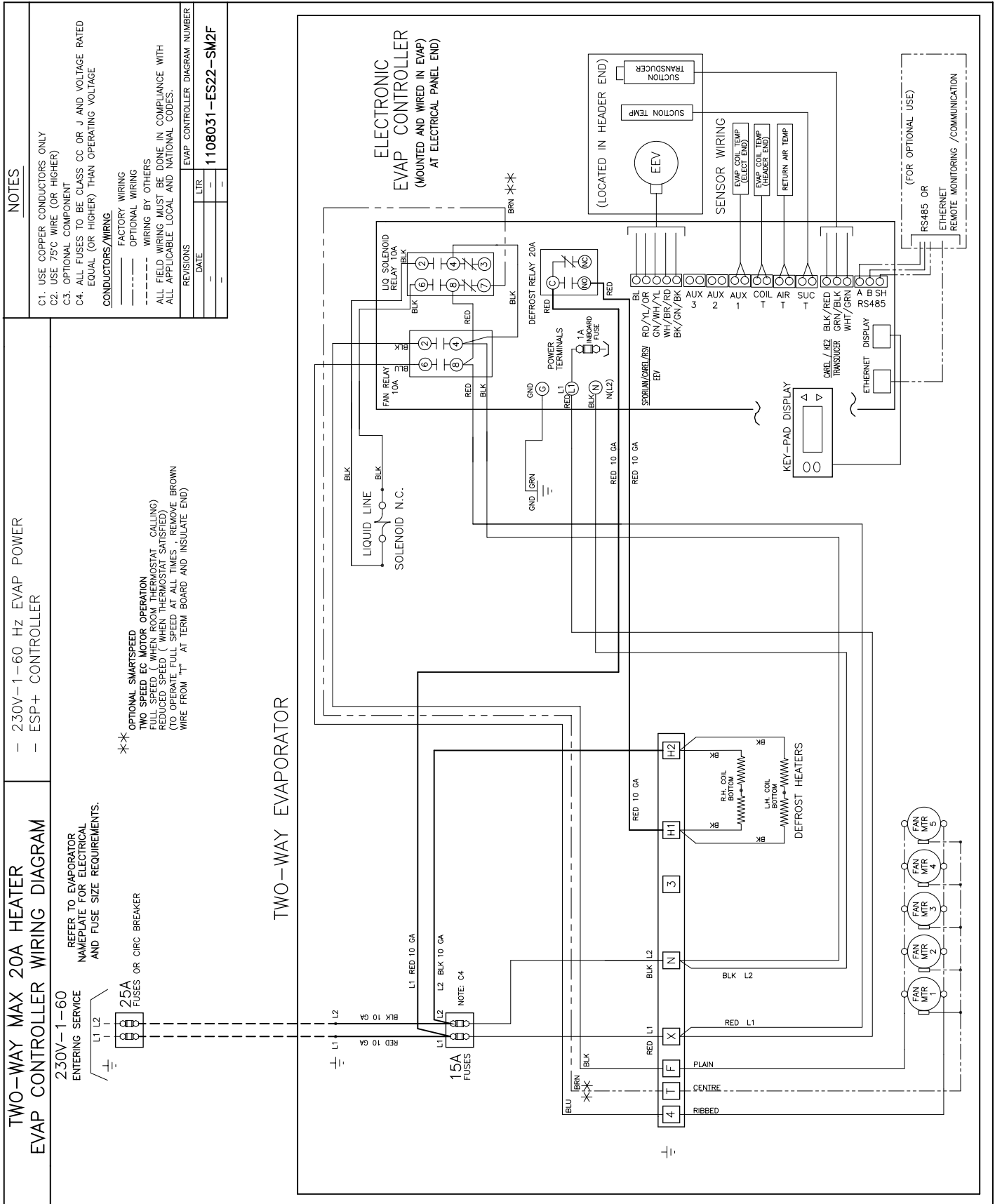
# WIRING DIAGRAM - 230/1/60 ELECTRIC DEFROST - MAX. 12A HEATER MODELS w/ **ESP+**



# WIRING DIAGRAM - 230/1/60

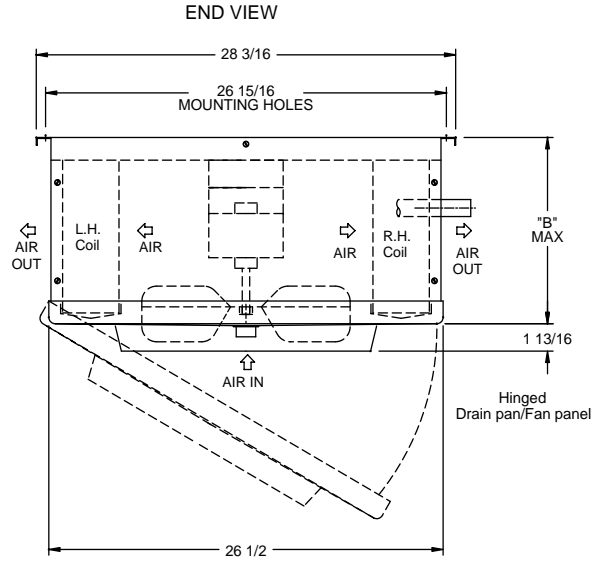
## ELECTRIC DEFROST - MAX 20A HEATER

### MODELS w/ **ESP+**

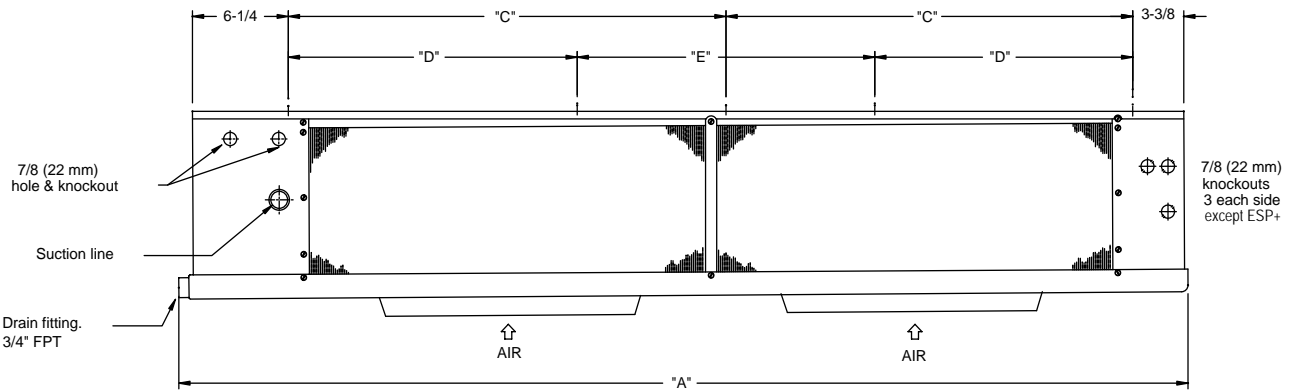


MODEL TTM	TUBE CONNECTIONS						APPROX. SHIPPING WEIGHT	
	SUCTION (OD)		DISTRIBUTOR INLET		HOT GAS SIDE (OD)			
	Inches	mm	Inches	mm	Inches	mm	Lbs.	Kgs
115M	7/8	22	1/2	13	1/2	13	110	50
139M	7/8	22	1/2	13	1/2	13	116	53
172M	7/8	22	1/2	13	1/2	13	150	68
208M	1 1/8	29	1/2	13	1/2	13	157	71
236M	1 1/8	29	1/2	13	1/2	13	164	74
260M	1 1/8	29	7/8	22	5/8	16	191	87
295M	1 1/8	29	7/8	22	5/8	16	198	90
105L	7/8	22	1/2	13	1/2	13	110	50
124L	1 1/8	29	1/2	13	1/2	13	116	53
153L	1 1/8	29	1/2	13	1/2	13	150	68
188L	1 1/8	29	7/8	22	5/8	16	157	71
210L	1 1/8	29	7/8	22	5/8	16	164	74
235L	1 3/8	35	7/8	22	5/8	16	191	87
265L	1 3/8	35	7/8	22	5/8	16	198	90

- NOTES: 1). Dimensions shown are typical for Air defrost, Electric, and Hot Gas defrost
- 2). Electrical connection end is opposite to the piping end on all models.
- 3). 1/4" O.D. external equalizer line and service access fitting included on all suction headers inside end compartment



**SIDE VIEW**  
**MOUNTING HOLES (3/8" DIA.) & PIPING CONNECTION**  
Unit cooler is to be supported at all mounting points

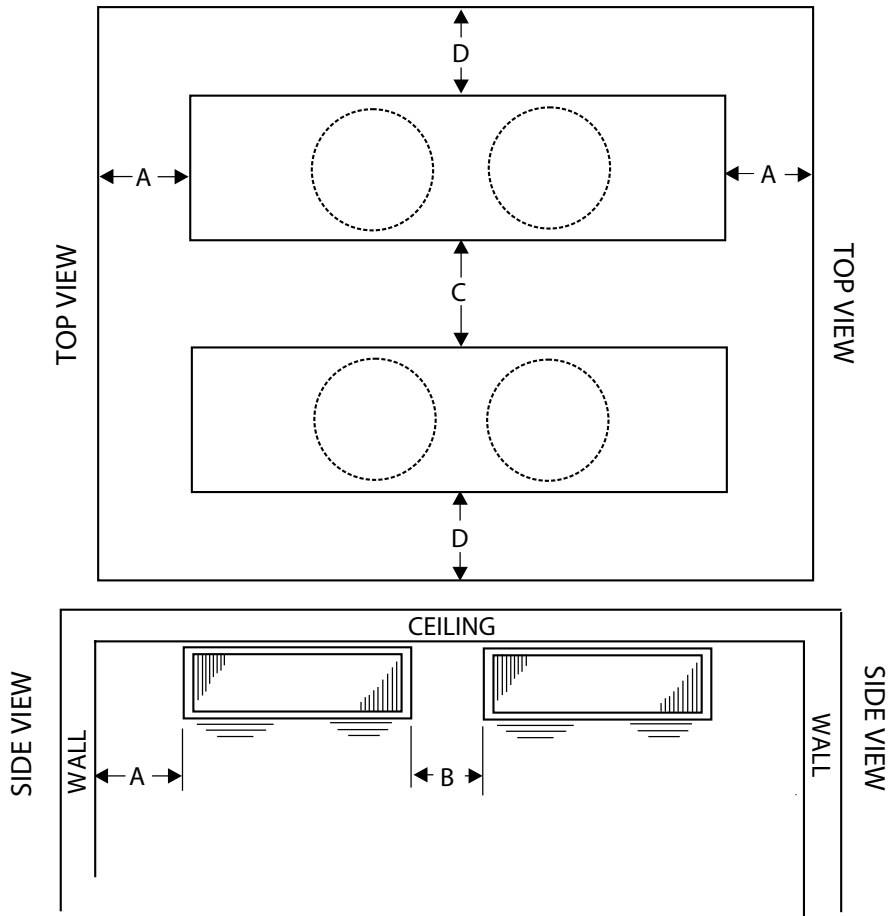


**DIMENSIONS**

MODEL TTM	# FANS	A		B		C		D		E	
		in	mm	in	mm	in	mm	in	mm	in	mm
115M	2	67 1/2	1715	8 11/16	221	27 1/2	699	-	-	-	-
139M	2	67 1/2	1715	8 11/16	221	27 1/2	699	-	-	-	-
172M	3	93 1/2	2375	8 11/16	221	40 1/2	1029	-	-	-	-
208M	3	93 1/2	2375	8 11/16	221	40 1/2	1029	-	-	-	-
236M	4	93 1/2	2375	8 11/16	221	40 1/2	1029	-	-	-	-
260M	4	113 1/2	2883	8 11/16	221	-	-	40 1/2	1029	20	508
295M	5	113 1/2	2883	8 11/16	221	-	-	40 1/2	1029	20	508
105L	2	67 1/2	1715	8 11/16	221	27 1/2	699	-	-	-	-
124L	2	67 1/2	1715	8 11/16	221	27 1/2	699	-	-	-	-
153L	3	93 1/2	2375	8 11/16	221	40 1/2	1029	-	-	-	-
188L	3	93 1/2	2375	8 11/16	221	40 1/2	1029	-	-	-	-
210L	4	93 1/2	2375	8 11/16	221	40 1/2	1029	-	-	-	-
235L	4	113 1/2	2883	8 11/16	221	-	-	40 1/2	1029	20	508
265L	5	113 1/2	2883	8 11/16	221	-	-	40 1/2	1029	20	508

\* Reducer supplied to accommodate 1/2" or 7/8" TXV outlet connection.

**RECOMMENDED INSTALLATION CLEARANCES**



DIMENSION		A	B	C	D
MINIMUM	ft.	2	2	6	3
	cm.	61	61	183	92
Maximum	ft.	-	7	40	20
	cm.	-	210	1200	600

**Nozzle Selections (Factory installed)**  
For all applications and refrigerants

Model TTM	Nozzle
115M	L-1
139M	L-1 1/2
172M	L-1 1/2
208M	L-2
236M	L-2
260M	G-2 1/2
295M	G-3

Model TTM	Nozzle
105L	L-1 1/2
124L	L-2
153L	J-2
188L	G-2 1/2
210L	G-3
235L	E-3
265L	E-4

**MEDIUM TEMP - EXPANSION VALVE SELECTION**

**SPORLAN**

MODEL TTM	TD	R404A	R448A R407A R407C R22
		R507 *	
115M	10	SBFSE-A-C	SSE-3-C
	15	SBFSE-B-C	SBFVE-A-C
139M	10	SBFSE-A-C	SBFVE-A-C
	15	SBFSE-B-C	SBFVE-B-C
172M	10	SBFSE-B-C	SBFVE-A-C
	15	SBFSE-C-C	SBFVE-B-C
208M	10	SBFSE-B-C	SBFVE-B-C
	15	SSE-3-C	SBFVE-B-C
236M	10	SBFSE-B-C	SBFVE-B-C
	15	SSE-3-C	SBFVE-C-C
260M	10	SBFSE-C-C	SBFVE-B-C
	15	SSE-4-C	SBFVE-C-C
295M	10	SSE-3-C	SBFVE-B-C
	15	SSE-4-C	SBFVE-C-C

\* For medium temp. R-507, refrigerant designation changes from 'S' to 'P'.  
For R449A, use R448A data.

ALL TXV Selections based on 90-100°F liquid.

**LOW TEMP - EXPANSION VALVE SELECTION**

**SPORLAN - R407A R448A**

Model TTM	0°F Evap	-10°F Evap	-20°F Evap
105L	SBFVE-A-C	SBFVE-A-ZP40	SBFVE-A-ZP40
124L	SBFVE-A-C	SBFVE-A-ZP40	SBFVE-B-ZP40
153L	SBFVE-A-C	SBFVE-B-ZP40	SBFVE-B-ZP40
188L	SBFVE-B-C	SBFVE-B-ZP40	SBFVE-B-ZP40
210L	SBFVE-B-C	SBFVE-B-ZP40	SVE-3-ZP40
235L	SBFVE-B-C	SVE-3-ZP40	SVE-4-ZP40
265L	SVE-3-C	SVE-4-ZP40	SVE-4-ZP40

For R449A, use R448A data.

**SPORLAN - R404A R507**

Model TTM	0°F Evap	-10°F Evap	-20°F Evap
105L	SBFSE-A-C	SBFSE-A-ZP	SBFSE-A-ZP
124L	SBFSE-A-C	SBFSE-A-ZP	SBFSE-B-ZP
153L	SBFSE-B-C	SBFSE-B-ZP	SBFSE-B-ZP
188L	SBFSE-B-C	SBFSE-B-ZP	SBFSE-C-ZP
210L	SBFSE-C-C	SBFSE-C-ZP	SSE-3-ZP
235L	SBFSE-C-C	SSE-3-ZP	SSE-3-ZP
265L	SSE-3-C	SSE-3-ZP	SSE-4-ZP

\* For low temp. R-507, refrigerant designation changes from 'SE' to 'PE'.

**FACTORY INSTALLED  
EXPANSION VALVE SELECTIONS -  
MODELS w/ ESP **

**MEDIUM TEMPERATURE  
R448A R407A  
AIR OR ELECTRIC DEFROST**

MODEL TTM	FACTORY INSTALLED NOZZLE	FACTORY INSTALLED EXPANSION VALVE	FACTORY INSTALLED LIQUID LINE SOLENOID VALVE
115M***	L1	E2V14	3
139M***	L1-1/2	E2V14	3
172M***	L1-1/2	E2V14	3
208M***	L2	E2V14	3
236M***	L2	E2V14	3
260M***	G2-1/2	E2V14	3
295M***	G3	E2V14	3

\*\*\* Insert defrost type. See nomenclature for details

**MEDIUM TEMPERATURE  
R404A R507  
AIR OR ELECTRIC DEFROST**

MODEL TTM	FACTORY INSTALLED NOZZLE	FACTORY INSTALLED EXPANSION VALVE	FACTORY INSTALLED LIQUID LINE SOLENOID VALVE
115M***	L1	E2V14	3
139M***	L1-1/2	E2V18	5
172M***	L1-1/2	E2V24	5
208M***	L2	E2V24	5
236M***	L2	E2V24	6
260M***	G2-1/2	E2V24	6
295M***	G3	E2V24	6

\*\*\* Insert defrost type. See nomenclature for details

**LOW TEMPERATURE  
R448A R407A  
AIR OR ELECTRIC DEFROST**

MODEL TTM	FACTORY INSTALLED NOZZLE	FACTORY INSTALLED EXPANSION VALVE	FACTORY INSTALLED LIQUID LINE SOLENOID VALVE
105L***	L1-1/2	E2V11	3
124L***	L2	E2V11	3
153L***	J2	E2V14	3
188M***	G2-1/2	E2V14	5
210L***	G3	E2V18	5
235L***	E3	E2V18	5
265L***	E4	E2V18	5

\*\*\* Insert defrost type. See nomenclature for details

**LOW TEMPERATURE  
R404A R507  
AIR OR ELECTRIC DEFROST**

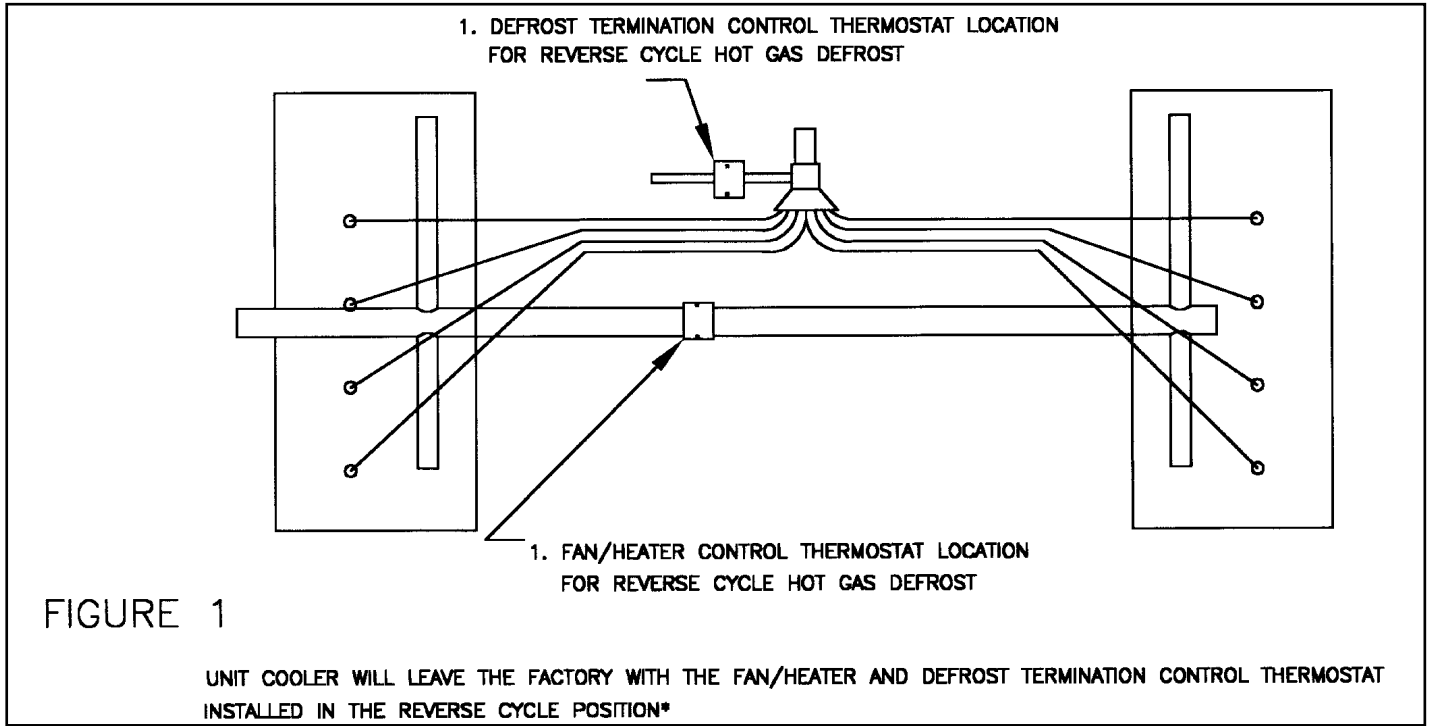
MODEL TTM	FACTORY INSTALLED NOZZLE	FACTORY INSTALLED EXPANSION VALVE	FACTORY INSTALLED LIQUID LINE SOLENOID VALVE
105L***	L1-1/2	E2V14	3
124L***	L2	E2V14	5
153L***	J2	E2V18	5
188M***	G2-1/2	E2V18	5
210L***	G3	E2V24	6
235L***	E3	E2V24	6
265L***	E4	E2V24	6

\*\*\* Insert defrost type. See nomenclature for details

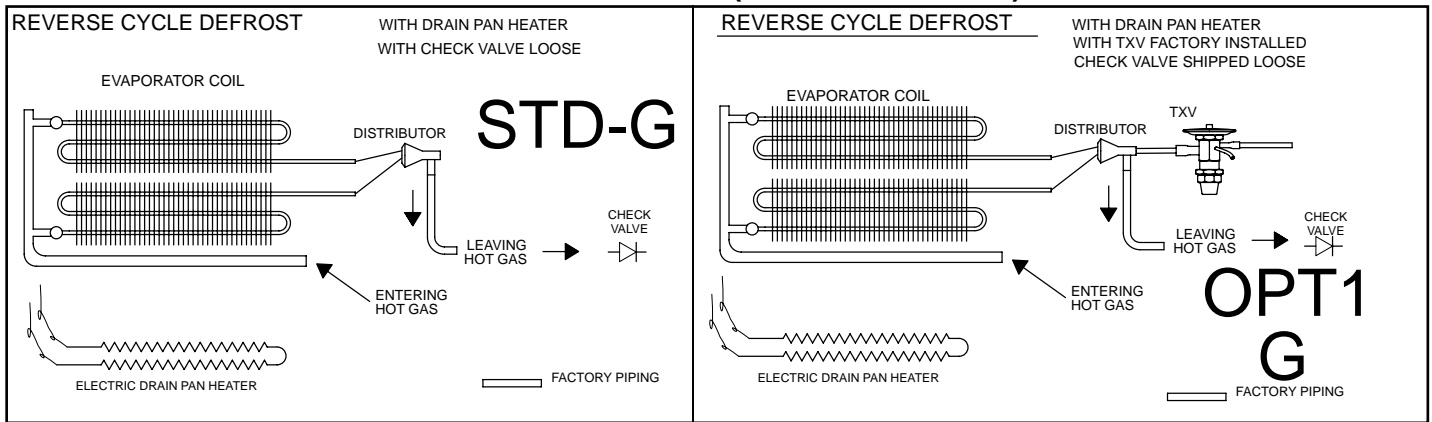


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## HOT GAS DEFROST (REVERSE CYCLE)



## Models with Standard PSC Motors

### Medium Temperature, 6 FPI, with standard PSC Motors

TEMP	FPI	# of Fans	Model TTM	Voltage	1 X EVAPORATOR		2 X EVAPORATOR	
					Defrost Kit	Fuse Package	Defrost Kit	Fuse Package
ME - MEDIUM	6	2	115ME-S2A-C	208-230/1/60	DFK-02	FP-004	DFK-06	FP-008
			139ME-S2A-C	208-230/1/60	DFK-02	FP-004	DFK-06	FP-008
		3	172ME-S2A-C	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010
			208ME-S2A-C	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010
		4	236ME-S2A-C	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010
			260ME-S2A-C	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010
	5	295ME-S2A-C	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010	

### Low Temperature, 6 FPI, with standard PSC Motors

TEMP	FPI	# of Fans	Model TTM	Voltage	1 X EVAPORATOR		2 X EVAPORATOR	
					Defrost Kit	Fuse Package	Defrost Kit	Fuse Package
LE - LOW	6	2	105LE-S2A-C	208-230/1/60	DFK-02	FP-004	DFK-06	FP-008
			124LE-S2A-C	208-230/1/60	DFK-02	FP-004	DFK-06	FP-008
		3	153LE-S2A-C	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010
			188LE-S2A-C	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010
		4	210LE-S2A-C	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010
			235LE-S2A-C	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010
	5	265LE-S2A-C	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010	

## Models with Optional SMARTSPEED™ EC Motors

### Medium Temperature, 6 FPI, with optional SMARTSPEED™ EC Motors

TEMP	FPI	# of Fans	Model TTM	Voltage	1 X EVAPORATOR		2 X EVAPORATOR	
					Defrost Kit	Fuse Package	Defrost Kit	Fuse Package
ME - MEDIUM	6	2	115ME-S2A-T	208-230/1/60	DFK-02	FP-004	DFK-06	FP-008
			139ME-S2A-T	208-230/1/60	DFK-02	FP-004	DFK-06	FP-008
		3	172ME-S2A-T	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010
			208ME-S2A-T	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010
		4	236ME-S2A-T	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010
			260ME-S2A-T	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010
	5	295ME-S2A-T	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010	

### Low Temperature, 6 FPI, with optional SMARTSPEED™ EC Motors

TEMP	FPI	# of Fans	Model TTM	Voltage	1 X EVAPORATOR		2 X EVAPORATOR	
					Defrost Kit	Fuse Package	Defrost Kit	Fuse Package
LE - LOW	6	2	105LE-S2A-T	208-230/1/60	DFK-02	FP-004	DFK-06	FP-008
			124LE-S2A-T	208-230/1/60	DFK-02	FP-004	DFK-06	FP-008
		3	153LE-S2A-T	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010
			188LE-S2A-T	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010
		4	210LE-S2A-T	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010
			235LE-S2A-T	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010
	5	265LE-S2A-T	208-230/1/60	DFK-02	FP-007	DFK-06	FP-010	

**Defrost Kits**

Number of Evaps.	Kit Part Number	Description
1	<b>DFK-01</b>	Time Clock, HtrCont - 1x 40A (3P), FB 1x 30A (1P)
1	<b>DFK-02</b>	Time Clock, HtrCont - 1x 40A (3P), FB 1x 30A (2P)
1	<b>DFK-03</b>	Time Clock, HtrCont - 1x 40A (3P), FB 1x 30A (3P)
1	<b>DFK-04</b>	Time Clock, HtrCont - 1x 40A (3P), FB 1x 60A (2P)
2	<b>DFK-05</b>	Time Clock, HtrCont - 1x 40A (3P), FB 2x 30A (1P)
2	<b>DFK-06</b>	Time Clock, HtrCont - 1x 40A (3P), FB 2x 30A (2P)
2	<b>DFK-07</b>	Time Clock, HtrCont - 1x 40A (3P), FB 2x 30A (3P)
2	<b>DFK-08</b>	Time Clock, HtrCont - 1x 50A (3P), FB 2x 60A (2P)
2	<b>DFK-09</b>	Time Clock, HtrCont - 1x 50A (3P), FB 2x 30A (2P)
1	<b>DFK-10</b>	Time Clock, HtrCont - 1x 40A (3P), FanCont - 1x 40A (3P), FB 2x 30A (2P)
1	<b>DFK-11</b>	Time Clock, HtrCont - 1x 40A (3P), FanCont - 1x 40A (3P), FB 2x 30A (3P)
2	<b>DFK-12</b>	Time Clock, HtrCont - 1x 40A (3P), FanCont - 1x 40A (3P), FB 4x 30A (2P)
2	<b>DFK-13</b>	Time Clock, HtrCont - 1x 40A (3P), FanCont - 1x 40A (3P), FB 4x 30A (3P)
1	<b>DFK-14</b>	Time Clock, HtrCont - 1x 40A (3P), FanCont - 1x 40A (3P), FB 1x 30A (2P), FB 1x 30A (3P)
1	<b>DFK-15</b>	Time Clock, HtrCont - 1x40A (3P), FanCont - 1x 40A (3P), FB 1x 30A (2P), FB 1x 60A (2P)
1	<b>DFK-16</b>	Time Clock, HtrCont - 1x 40A (3P), FanCont - 1x 40A (3P), FB 1x 30A (2P), FB 1x 60A (3P)
1	<b>DFK-17</b>	Time Clock, HtrCont - 1x 40A (3P), FanCont - 1x 40A (3P), FB 1x 30A (3P), FB 1x 60A (3P)
2	<b>DFK-18</b>	Time Clock, HtrCont - 1x 40A (3P), FanCont - 1x 40A (3P), FB 2x 30A (2P), FB 2x 30A (3P)
2	<b>DFK-19</b>	Time Clock, HtrCont - 1x 50A (3P), FanCont - 1x 40A (3P), FB 4x 30A (2P)
2	<b>DFK-20</b>	Time Clock, HtrCont - 1x 50A (3P), FanCont - 1x 40A (3P), FB 4x 30A (3P)
1	<b>DFK-21</b>	Time Clock, HtrCont - 1x 50A (3P), FanCont - 1x 40A (3P), FB 1x 30A (2P), FB 1x 60A (2P)
1	<b>DFK-22</b>	Time Clock, HtrCont - 1x 50A (3P), FanCont - 1x 40A (3P), FB 1x 30A (3P), FB 1x 60A (3P)
2	<b>DFK-23</b>	Time Clock, HtrCont - 1x 50A (3P), FanCont - 1x 40A (3P), FB 2x 30A (2P), FB 2x 30A (3P)
2	<b>DFK-24</b>	Time Clock, HtrCont - 1x 50A (3P), FanCont - 1x 40A (3P), FB 2x 30A (3P), FB 2x 60A (3P)
1	<b>DFK-25</b>	Time Clock, HtrCont - 2x 40A (3P), FanCont - 1x 40A (3P), FB 1x 30A (2P), FB 2x 60A (2P)
1	<b>DFK-26</b>	Time Clock, HtrCont - 2x 40A (3P), FanCont - 1x 40A (3P), FB 1x 30A (3P), FB 2x 60A (3P)
2	<b>DFK-27</b>	Time Clock, HtrCont - 2x 40A (3P), FanCont - 1x 40A (3P), FB 2x 30A (2P), FB 2x 60A (2P)
2	<b>DFK-28</b>	Time Clock, HtrCont - 2x 40A (3P), FanCont - 1x 40A (3P), FB 2x 30A (2P), FB 2x 60A (3P)
2	<b>DFK-29</b>	Time Clock, HtrCont - 2x 40A (3P), FanCont - 1x 40A (3P), FB 2x 30A (3P), FB 2x 60A (3P)
2	<b>DFK-30</b>	Time Clock, HtrCont - 2x 40A (3P), FanCont - 1x 50A (3P), FB 2x 30A (2P), FB 2x 60A (3P)
1	<b>DFK-31</b>	Time Clock, HtrCont - 2x 50A (3P), FanCont - 1x 40A (3P), FB 1x 30A (3P), FB 2x 60A (3P)
2	<b>DFK-32</b>	Time Clock, HtrCont - 2x 50A (3P), FanCont - 1x 40A (3P), FB 2x 30A (2P), FB 2x 60A (2P)
2	<b>DFK-33</b>	Time Clock, HtrCont - 2x 50A (3P), FanCont - 1x 40A (3P), FB 2x 30A (3P), FB 2x 60A (3P)
2	<b>DFK-34</b>	Time Clock, HtrCont - 4x 40A (3P), FanCont - 1x 40A (3P), FB 2x 30A (2P), FB 4x 60A (2P)
2	<b>DFK-35</b>	Time Clock, HtrCont - 4x 40A (3P), FanCont - 1x 40A (3P), FB 2x 30A (3P), FB 4x 60A (3P)
2	<b>DFK-36</b>	Time Clock, HtrCont - 4x 40A (3P), FanCont - 1x 50A (3P), FB 2x 30A (2P), FB 4x 60A (2P)
2	<b>DFK-37</b>	Time Clock, HtrCont - 4x 40A (3P), FanCont - 1x 50A (3P), FB 2x 30A (3P), FB 4x 60A (3P)
2	<b>DFK-38</b>	Time Clock, HtrCont - 4x 50A (3P), FanCont - 1x 50A (3P), FB 2x 30A (3P), FB 4x 60A (3P)
1	<b>DFK-39</b>	Time Clock, HtrCont1 - 1x 40A (3P), HtrCont2 - 2x 50A (3P), FanCont - 1x 40A (3P), FB 4x 60A (3P)

NOTE: HtrCont = Heater Contactor, FanCont = Fan Contactor, FB = Fuse Block, (1P), (2P), (3P) = Number of Poles

(cont'd)

**Fuse Packages**

Package Part Number	Description	Package Part Number	Description
FP-001	FUSES (1) 15AMP	FP-054	FUSES (3)15AMP (6) 35AMP
FP-002	FUSES (1) 20AMP	FP-055	FUSES (2) 15AMP (2) 45AMP
FP-003	FUSES (1) 25AMP	FP-056	FUSES (2) 15AMP (2) 40AMP
FP-004	FUSES (2) 15AMP	FP-057	FUSES (2) 20AMP (3) 50AMP
FP-006	FUSES (2) 20AMP	FP-058	FUSES (2) 15AMP (3) 45AMP
FP-007	FUSES (2) 25AMP	FP-059	FUSES (2) 15AMP (3) 30AMP
FP-008	FUSES (4) 15AMP	FP-060	FUSES (2) 15AMP (2) 35AMP
FP-010	FUSES (4) 25AMP	FP-061	FUSES (2) 15AMP (2) 50AMP
FP-012	FUSES (2) 35AMP	FP-062	FUSES (2) 15AMP (2) 60AMP
FP-013	FUSES (3) 15AMP	FP-063	FUSES (2) 15AMP (3) 25AMP
FP-014	FUSES (3) 20AMP	FP-064	FUSES (2) 15AMP (3) 35AMP
FP-015	FUSES (4) 20AMP	FP-065	FUSES (2) 15AMP (3) 40AMP
FP-016	FUSES (4) 20AMP (6) 45AMP	FP-066	FUSES (2) 15AMP (3) 20AMP
FP-017	FUSES (4) 35AMP	FP-067	FUSES (4) 15AMP (4) 35AMP
FP-018	FUSES (6) 15AMP	FP-068	FUSES (4) 15AMP (4) 50AMP
FP-019	FUSES (6) 20AMP	FP-069	FUSES (4) 15AMP (4) 60AMP
FP-020	FUSES (2) 30AMP	FP-070	FUSES (4) 15AMP (6) 25AMP
FP-021	FUSES (4) 30AMP	FP-071	FUSES (4) 15AMP (6) 35AMP
FP-022	FUSES (8) 15AMP	FP-072	FUSES (4) 15AMP (6) 40AMP
FP-023	FUSES (2) 25AMP (3) 50AMP	FP-073	FUSES (4) 15AMP (6) 20AMP
FP-024	FUSES (2) 20AMP (3) 45AMP	FP-074	FUSES (3) 20AMP (3) 60AMP
FP-025	FUSES (6) 20AMP (6) 60AMP	FP-075	FUSES (3) 20AMP (6) 35AMP
FP-026	FUSES (6) 15AMP (12) 40AMP	FP-076	FUSES (3) 25AMP (6) 50AMP
FP-027	FUSES (6) 15AMP (6) 40AMP	FP-077	FUSES (3) 35AMP (9) 45AMP
FP-028	FUSES (6) 20AMP (12) 40AMP	FP-078	FUSES (3) 15AMP (3) 35AMP
FP-029	FUSES (6)15AMP (6) 50AMP	FP-079	FUSES (3)15AMP (3) 45AMP
FP-030	FUSES (6) 15AMP (6) 45AMP	FP-080	FUSES (3) 15AMP (3) 50AMP
FP-031	FUSES (6) 15AMP (6) 35AMP	FP-081	FUSES (3) 20AMP (6) 40AMP
FP-032	FUSES (6) 15AMP (6) 30AMP	FP-082	FUSES (3) 15AMP (3) 40AMP
FP-033	FUSES (6) 25AMP (12) 50AMP	FP-083	FUSES (3) 15AMP (6) 40AMP
FP-034	FUSES (6) 20AMP (12) 35AMP	FP-084	FUSES (6) 15AMP (6) 60AMP
FP-035	FUSES (4) 25AMP (6) 50AMP	FP-085	FUSES (6) 15AMP (12) 35AMP
FP-036	FUSES (6) 25AMP (12) 60AMP	FP-086	FUSES (3) 35AMP (3) 45AMP (6) 60AMP
FP-037	FUSES (6) 20AMP (12) 60AMP	FP-087	FUSES (4) 20AMP (4) 40AMP (4) 50AMP
FP-038	FUSES (6) 20AMP (12) 50AMP	FP-088	FUSES (4) 15AMP (4) 35AMP (4) 40AMP
FP-039	FUSES (6) 20AMP (12) 45AMP	FP-089	FUSES (2) 20AMP (2) 40AMP (2) 50AMP
FP-040	FUSES (6) 15AMP (12) 45AMP	FP-090	FUSES (2) 15AMP (2) 35AMP (2) 40AMP
FP-041	FUSES (5) 15AMP	FP-091	FUSES (2) 20AMP (2) 35AMP (2) 40AMP
FP-042	FUSES (10) 15AMP	FP-092	FUSES (2) 25AMP (2) 40AMP (2) 50AMP
FP-043	FUSES (3) 25AMP (6) 60AMP	FP-093	FUSES (4) 20AMP (4) 35AMP (4) 40AMP
FP-044	FUSES (3) 20AMP (6) 60AMP	FP-094	FUSES (6) 15AMP (6) 25AMP
FP-045	FUSES (3) 20AMP (6) 50AMP	FP-095	FUSES (3) 15AMP (3) 25AMP
FP-046	FUSES (3) 25AMP (6) 45AMP	FP-096	FUSES (3) 15AMP (3) 30AMP
FP-047	FUSES (3) 15AMP (6) 45AMP	FP-097	FUSES (4) 15AMP (4) 30AMP
FP-048	FUSES (4) 15AMP (4) 45AMP	FP-098	FUSES (4) 15AMP (4) 25AMP
FP-049	FUSES (4) 15AMP (4) 40AMP	FP-099	FUSES (4) 15AMP (4) 20AMP
FP-050	FUSES (3) 15AMP (3) 60AMP	FP-100	FUSES (2) 15AMP (2) 20AMP
FP-051	FUSES (4) 20AMP (6) 50AMP	FP-101	FUSES (2) 15AMP (2) 25AMP
FP-052	FUSES (4) 15AMP (6) 45AMP	FP-102	FUSES (2) 15AMP (2) 30AMP
FP-053	FUSES (4) 15AMP (6) 30AMP	FP-103	FUSES (4) 25AMP (4) 40AMP (4) 50AMP

NOTE: FUSES 30AMP and Below - Class CC Type, FUSES 35AMP and Above - Class J Type

## INSTALLATION

The installation and start-up of Two-Way Evaporators should only be performed by qualified refrigeration mechanics.

This equipment should be installed in accordance with all applicable codes, ordinances and local by-laws.

## INSPECTION

Inspect all equipment before unpacking for visible signs of damage or loss. Check shipping list against material received to ensure shipment is complete.

**IMPORTANT:** Remember, you, the consignee, must make any claim necessary against the transportation company. Shipping damage or missing parts, when discovered at the outset, will prevent later unnecessary and costly delays.

**If damage or loss during transport is evident, make claim to carrier, as this will be their responsibility, not the manufacturer's.**

Should carton be damaged, but damage to equipment is not obvious, a claim should be filed for "concealed damage" with the carrier.

**IMPORTANT:** The electrical characteristics of the unit should be checked at this time to make sure they correspond to those ordered and to electrical power available at the job site.

Save all shipping papers, tags and instruction sheets for reference by installer and owner.

## APPLICATION

Two-Way Evaporators are designed for use in coolers and freezers such as reach in boxes, walk-in rooms and any other cooler applications where a low velocity, uniform air flow is required. The compact and low height unit provides maximum useable product storage space.

At room temperatures above 34°F (**1.1°C**) and evaporating temperatures no lower than 27°F (**-2.8°C**) the air flowing through the coil will accomplish the defrost (Air Defrost).

At room temperatures 34°F and below (to -10°F) positive defrosting is required (Electric defrost). These will require the use of:

1. *Time Clock* (to initiate and terminate the defrost cycle),
2. *Defrost termination thermostat* (to prevent unnecessary prolonged heating and steaming of the coil once all the frost and ice has melted). And if a freezer,
3. *Fan delay thermostat* (to prevent evaporator fans starting up right away and blowing water on to the fan blades, guards and floor).

This evaporator coil must not be exposed to any abnormal environments (acidic or caustic) that can result in coil corrosion and leaks. Consult factory for optional baked on phenolic protective coatings. These unit coolers are for use primarily on R407A, R407C, R404A/R507, R22 and R134a refrigerants and their approved alternatives / replacements.

## LOCATION

The unit location in the room should be selected to ensure uniform air distribution throughout the entire space to be refrigerated. Be sure that the unit does not draw air in, or blow directly out, through an opened door and that the product does not obstruct the free circulation of air. Allow a minimum of 24" clearance at each end. Two-Way Evaporators draw air through the fans and discharge air through both coils.

Consideration should be given to the coil location in order to minimize the piping run length to the condensing unit and floor drain.

## EXPANSION VALVE (TXV) SELECTION

All units require the use of an **externally equalized** expansion valve. (A 1/4" (**6 mm**) O.D. equalizer line has been provided on the coil) TX valves should **not** be selected strictly by their nominal ton rating. (This rating is based at a specific pressure differential and entering liquid temperature). Since applications will differ it is suggested the following selection procedure be followed.

1. Determine actual unit cooler BTUH or KW (thermal). The nominal rating is based at 10°F T.D. (**5.5°C**) (Room Temp. minus Evap. Temp.). Note that a higher / lower operating T.D. will increase / decrease this capacity rating by their direct ratio.
2. Determine the pressure drop across the valve by subtracting the suction (evaporating) pressure from the high side liquid pressure. Note: Also subtract the distributor pressure loss (use approx. 25 psig (**1.1 bar**) for R134a and 35 psig (**2.4 bar**) for R404A/R507/R22/R407A/R448A).
3. Estimate entering liquid temperature. Temperatures lower than 100°F (**37.7°C**) increase valve capacity ratings. Refer to valve manufacturer's specs for details.
4. Select valve from the valve manufacturer selection charts for the appropriate refrigerant, evaporating temp and pressure drop.
5. After following the manufacturer's installation instructions and after the room has reached the desired temperature the valve superheat should be checked. This will confirm that the evaporator is operating properly and performing to maximum efficiency. The superheat should be around 5 to 8°F (**2.7° to 4.4°C**) for a 10 to 12°F (**5.5 to 6.6°C**) T.D. Too high or low a super heat will result in unsatisfactory system performance and possible compressor problems.

## NOZZLE INSTALLATION

All Two-Way Evaporators have nozzles installed at factory. For nozzle selection refer to selection table. In case it is required to install the nozzle at some point in the future, the nozzle retainer clip (in distributor) must be removed before inserting nozzle. Re-install clip ensuring nozzle is properly in place.

## MOUNTING

Refer to dimensional drawing for recommended mounting arrangements. Formed mounting channels are provided for flush mounting to the ceiling. Ensure adequate clearance (at least 24" (**600 mm**)) is provided at each end (to enable access to the electrical and refig. compartments).

**Ensure that the ceiling is level since the drain pan has been sloped for drainage during the defrost cycle.**

## DRAIN LINE

The drain line should be run from the drain connection, sloping at least 1/4" (**6 mm**) per foot. A trap in a warm area outside the room will allow proper draining through the tubing. Connection should be made to proper drainage facilities that comply with local regulations.

**DRAIN LINE (cont'd)**

To prevent freeze-up when the temperature of the refrigerated space is 35°F (1.7°C) or lower, the drain line should be heated along its run inside the cold room. The heated drain line should be insulated. It is recommended that the heater be energized at all times. A heat input of 20 watts per foot in a 28°F (-2.2°C) room, is satisfactory. Drain line heaters are not required for constant room temperature above 35°F (1.6°C).

**Ensure that the drain line has sufficient slope for proper drainage (prevention of ice build up/blockage in pan).**

**PIPING**

Refrigerant line sizes are important and **may not** be the same size as the coil connections. Consult "Recommended refrigerant line sizes" charts in any standard reference book for proper line sizing.

Refrigerant piping and control system should be designed to prevent possible liquid slugging (from oil or refrigerant) of the compressors on start-up after the defrost cycle. On Hot Gas Defrost Systems the suction accumulator should be at least 2.5 times the coils operating charge.

See Dimensional data for line locations. Reverse Cycle models include a check valve (unmounted) packaged along with the nozzle in the refig. connection compartment end panel.

**WIRING**

Wire system in accordance with governing standards and local codes. See data and wiring diagrams on pages 7 to 12 for wiring arrangement. Electrical wiring is to be sized in accordance with minimum circuit ampacity rating (MCA).

For ease of identifying the proper wiring terminal, unit wiring is color coded and terminal block connections are identified.



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**SYSTEM CHECK**

**Before Start-Up:**

1. All wiring should be in accordance with local codes.
2. Refrigerant lines should be properly sized.
3. Off cycle defrost and electric defrost systems preferably must include a liquid line solenoid valve and suction accumulator.
4. Thorough evacuation and, dehydration has been performed.
5. The suction, discharge, and receiver service valves must be open.
6. The system preferably must include a liquid line drier moisture indicator and suction filter.
7. Pour enough water into the drain pan to allow a good check on drainage and seal the trap.

**After Start-Up:**

1. Check the oil level to be sure the oil charge is correct.
2. On initial start up the fans do not start until coil temperature is pulled down to approximately 35°F (1.7 °C) on the hot gas coil. Also, it is normal for the fans to cycle a few times until the room temperature is pulled down.
3. Fan/Heater control and defrost termination control is factory installed for reverse cycle defrost operation.
4. In general, evaporators running with a TD of 10°F should have a superheat reading of 5 to 8°F (2.7°C to 4.4°C). For evaporators with a higher TD, the superheat should be 8 to 12°F (4.4 to 6.6 °C).
5. Heavy moisture loads are usually encountered when starting the system for the first time. This will cause a rapid build-up of frost on the unit cooler. During the initial pull down, we suggest that the frost build-up be watched and defrosted manually as required. This may be done by rotating the inner dial on the timer until the pin in the outer dial is directly opposite the timer pointer. (Paragon 8145-20 Timer by others).
6. Observe that the system goes through at least one complete DEFROST CYCLE.

**MAINTENANCE**

The unit should be periodically inspected for any dirt or build-up on the fin surface and cleaned if necessary with a soft whisk or brush. Also ensure coils inner and outer drain pans do not have any ice build-up from improper defrost operation. When replacing heater elements first remove heater retainer brackets and heater clips.

**PROJECT INFORMATION**

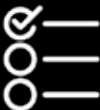
System	
Model Number	Date of Start-Up
Serial Number	Service Contractor
Refrigerant	Phone
Electrical Supply	E-mail

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