REFRIGERATION TRENTON PRODUCTS ®

PRODUCT DATA & INSTALLATION

Part # 1112912

GENERATION E

TTM TWO-WAY EVAPORATOR

Air, Electric or Hot Gas Defrost

Electrical Power:
115/1/60, 208-230/1/60

A2L

AWEF COMPLIANT

CONTENTS

TTM 2 13 C A S1 E

TM = Two Way Medium profile unit cooler

Number of Fans

Nominal Capacity:
X 1000 = Nominal capacity @ 10°F TD, Btu/H

Application Range:
M = Medium temp (10 - 45°F), 6 FPI.
L = Low temp(-20 - 0°F), 6 FPI.

Defrost Type*:
A = Air defrost
E = Electric defrost
G = Reverse Cycle Hot w/ Electric pan heater

Voltage Designation:
S1 = 115/1/60 (air defrost models only)
S2 = 208-230/1/60

Generation:
E = A1 and A2L refrigerant compatable, AWEF Compliant

STANDARD FEATURES

- EC motors with patented SmartSpeed® Technology.
- Compatible with A1 and A2L Refrigerants
- Heavy gauge textured aluminum cabinet construction resists scratches/ corrosion and minimizes weight for shipment, installation and service.
- 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 polythylene fan guards
- Hinged drain pan provides convenient access for cleaning
- Reduced operating charge with 3/8" OD tubing

AVAILABLE OPTIONS

- ESP+ Intuitive Evaporator Control Technology.
- Factory installed expansion valve, solenoid valve and room thermostat on air or electric defrost models
- A2L Refrigerant Detection System (RDS)
- A2L Leak Mitigation System - Safety Shut Off Valve (SSOV), and Check Shut Off Valve (CSOV)
- Corrosion protection: alternate fin materials and coatings
- Wire fan guards
- Insulated drain pan
- Transducer schrader with service isolation valve
- Additional options available, please contact factory

A2L

R454A - R454C - R455A

Medium Temperature - 6 FPI Models

MODEL	Qty Fans	Evaporator Temperature Selection Capacity BTU/H			Air Flow		Refrig. Charge R454A - R454C - R455A	
		20/25°F (-4/-7°F)	15°F (-9°F)	10°F (-12°F)	CFM	L/S	LB.	KG
TTM108M	1	9080	8950	8890	1070	505	1.4	0.6
TTM110M	1	10800	10700	10600	1010	477	1.8	0.8
TTM213M	2	12900	12800	12700	2020	953	2.3	1
TTM215M	2	15400	15200	15100	1900	897	3.1	1.4
TTM318M	3	18300	18100	17900	3030	1430	3.4	1.5
TTM321M	3	20700	20500	20300	2850	1345	4.6	2.1
TTM426M	4	26000	25700	25500	3780	1784	5.7	2.6
TTM531M	5	31300	31000	30700	4630	2185	5.7	2.6

A2L

R454A - R454C - R455A

Low Temperature - 6 FPI Models

MODEL	Qty Fans	Evaporator Temperature Selection Capacity BTU/H			Air Flow		Refrig. Charge R454A - R454C - R455A	
		0°F (-18°)	-10°F (-23°F)	-20°F (-29°F)	CFM	L/S	LB.	KG
TTM 105L	1	5330	5170	5040	1070	505	1.4	0.6
TTM 107L	1	7470	7270	7000	1010	477	1.8	0.8
TTM 210L	2	10660	10350	10080	2020	953	2.3	1
TTM 212L	2	12900	12600	12200	1900	897	3.1	1.4
TTM 315L	3	16100	15700	15200	3030	1430	3.4	1.5
TTM 318L	3	19200	18600	18100	2850	1345	4.6	2.1
TTM 422L	4	23300	22700	22000	3780	1784	5.7	2.6
TTM 526L	5	27500	26700	25900	4630	2185	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.

A1

R448A - R449A - R407A - R407C

Medium Temperature - 6 FPI Models

MODEL	Qty Fans	Evaporator Temperature Selection Capacity BTU/H			Air Flow		Refrig. Charge R407A**	
		20/25°F (-4/-7°F)	15°F (-9°F)	10°F (-12°F)	CFM	L/S	LB.	KG
TTM108M	1	9080	8950	8890	1070	505	1.4	0.6
TTM110M	1	10800	10700	10600	1010	477	1.8	0.8
TTM213M	2	12900	12800	12700	2020	953	2.3	1
TTM215M	2	15400	15200	15100	1900	897	3.1	1.4
TTM318M	3	18300	18100	17900	3030	1430	3.4	1.5
TTM321M	3	20700	20500	20300	2850	1345	4.6	2.1
TTM426M	4	26000	25700	25500	3780	1784	5.7	2.6
TTM531M	5	31300	31000	30700	4630	2185	5.7	2.6

A1

R404A - R507

Medium Temperature - 6 FPI Models

MODEL	Qty Fans	Evaporator Temperature Selection Capacity BTU/H			Air Flow		Refrig. Charge R404A	
		20/25°F (-4/-7°F)	15°F (-9°F)	10°F (-12°F)	CFM	L/S	LB.	KG
TTM108M	1	7360	7270	7220	1070	505	1.3	0.6
TTM110M	1	8780	8680	8610	1010	477	1.7	0.8
TTM213M	2	10500	10400	10300	2020	953	2.2	1
TTM215M	2	12500	12400	12300	1900	897	2.9	1.3
TTM318M	3	14800	14700	14500	3030	1430	3.1	1.4
TTM321M	3	16800	16600	16500	2850	1345	4.2	1.9
TTM426M	4	21100	20900	20700	3780	1784	5.2	2.4
TTM531M	5	25400	25100	24900	4630	2185	5.2	2.4

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.

A1

R407A - R448A - R449A

Low Temperature - 6 FPI Models

MODEL	Qty Fans	Evaporator Temperature Selection Capacity BTU/H			Air Flow		Refrig. Charge R407A**	
		0°F (-18°F)	-10°F (-23°F)	-20°F (-29°F)	CFM	L/S	LB.	KG
TTM 105L	1	5330	5170	5040	1070	505	1.4	0.6
TTM 107L	1	7470	7270	7000	1010	477	1.8	0.8
TTM 210L	2	10660	10350	10080	2020	953	2.3	1
TTM 212L	2	12900	12600	12200	1900	897	3.1	1.4
TTM 315L	3	16100	15700	15200	3030	1430	3.4	1.5
TTM 318L	3	19200	18600	18100	2850	1345	4.6	2.1
TTM 422L	4	23300	22700	22000	3780	1784	5.7	2.6
TTM 526L	5	27500	26700	25900	4630	2185	5.7	2.6

A1

R404A

Low Temperature - 6 FPI Models

Model	Qty Fans	Evaporator Temperature Selection Capacity BTU/H			Air Flow		Refrig. Charge R404A	
		0°F (-18°F)	-10°F (-23°F)	-20°F (-29°F)	CFM	L/S	LB.	KG
TTM 105L	1	4340	4200	4100	1070	505	1.3	0.6
TTM 107L	1	6080	5900	5700	1010	477	1.7	0.8
TTM 210L	2	8680	8400	8200	2020	953	2.2	1
TTM 212L	2	10500	10200	9920	1900	897	2.9	1.3
TTM 315L	3	13100	12800	12400	3030	1430	3.1	1.4
TTM 318L	3	15600	15100	14700	2850	1345	4.2	1.9
TTM 422L	4	19000	18400	17900	3780	1784	5.2	2.4
TTM 526L	5	22400	21700	21100	4630	2185	5.2	2.4

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.

115/1/60

Air Defrost

MODEL	FAN MOTORS				
	QTY.	STANDARD SMART SPEED EC MOTORS			
		FLA TOTAL	WATTS	MCA (A)	MOP (A)
TTM 108MA-S1E	1	1.5	52	1.9	15
TTM 110MA-S1E	1	1.5	52	1.9	15
TTM 213MA-S1E	2	3	104	3.4	15
TTM 215MA-S1E	2	3	104	3.4	15
TTM 318MA-S1E	3	4.5	156	4.9	15
TTM 321MA-S1E	3	4.5	156	4.9	15
TTM 426MA-S1E	4	6	208	6.4	15
TTM 531MA-S1E	5	7.5	260	6.4	15

208-230/1/60

Air Defrost

MODEL	FAN MOTORS				
	QTY.	STANDARD SMART SPEED EC MOTORS			
		FLA TOTAL	WATTS	MCA (A)	MOP (A)
TTM 108MA-S2E	1	1	52	1.3	15
TTM 110MA-S2E	1	1	52	1.3	15
TTM 213MA-S2E	2	2	104	2.3	15
TTM 215MA-S2E	2	2	104	2.3	15
TTM 318MA-S2E	3	3	156	3.3	15
TTM 321MA-S2E	3	3	156	3.3	15
TTM 426MA-S2E	4	4	208	4.3	15
TTM 531MA-S2E	5	5	260	5.3	15

115/1/60

Electric Defrost

MODEL	FAN MOTORS					DEFROST HEATERS			
	QTY.	STANDARD SMART SPEED EC MOTORS				TOTAL WATTS	TOTAL AMPS	MCA (A)	MOP (A)
		FLA TOTAL	WATTS	MCA (A)	MOP (A)				
TTM 108ME-S1E	1	1.5	52	1.9	15	1540	13.4	16.8	20
TTM 110ME-S1E	1	1.5	52	1.9	15	1540	13.4	16.8	20
TTM 213ME-S1E	2	3	104	3.4	15	2600	22.6	28.3	30
TTM 215ME-S1E	2	3	104	3.4	15	2600	22.6	28.3	30
TTM 105LE-S1E	1	1.5	52	1.9	15	1580	13.7	17.2	20
TTM 107LE-S1E	1	1.5	52	1.9	15	1580	13.7	17.2	20
TTM 210LE-S1E	2	3	104	3.4	15	2600	22.6	28.3	30
TTM 212LE-S1E	2	3	104	3.4	15	2600	22.6	28.3	30

208-230/1/60

Electric Defrost

MODEL	FAN MOTORS					DEFROST HEATERS			
	QTY.	STANDARD SMART SPEED EC MOTORS				TOTAL WATTS	TOTAL AMPS	MCA (A)	MOP (A)
		FLA TOTAL	WATTS	MCA (A)	MOP (A)				
TTM 108ME-S2E	1	1	60	1.3	15	1540	6.7	8.4	15
TTM 110ME-S2E	1	1	60	1.3	15	1540	6.7	8.4	15
TTM 213ME-S2E	2	2	90	2.3	15	2600	11.3	14.1	15
TTM 215ME-S2E	2	2	104	2.3	15	2600	11.3	14.1	15
TTM 318ME-S2E	3	3	156	3.3	15	3720	16.2	20.3	25
TTM 321ME-S2E	3	3	156	3.3	15	3720	16.2	20.3	25
TTM 426ME-S2E	4	4	208	4.3	15	3720	16.2	20.3	25
TTM 531ME-S2E	5	5	260	5.3	15	4560	19.8	24.8	25
TTM 105LE-S2E	1	1	60	1.3	15	1540	6.7	8.4	15
TTM 107LE-S2E	1	1	60	1.3	15	1540	6.7	8.4	15
TTM 210LE-S2E	2	2	90	2.3	15	2600	11.3	14.1	15
TTM 212LE-S2E	2	2	104	2.3	15	2600	11.3	14.1	15
TTM 315LE-S2E	3	3	156	3.3	15	3720	16.2	20.3	25
TTM 318LE-S2E	3	3	156	3.3	15	3720	16.2	20.3	25
TTM 422LE-S2E	4	4	208	4.3	15	3720	16.2	20.3	25
TTM 526LE-S2E	5	5	260	5.3	15	4560	19.8	24.8	25

208-230/1/60

Hot Gas Defrost

MODEL	FAN MOTORS					DEFROST HEATERS			
	QTY.	STANDARD SMART SPEED EC MOTORS				TOTAL WATTS	TOTAL AMPS	MCA (A)	MOP (A)
		FLA TOTAL	WATTS	MCA (A)	MOP (A)				
TTM 108MG-S1E	1	1.5	52	1.9	15	1100	9.6	12	15
TTM 110MG-S1E	1	1.5	52	1.9	15	1100	9.6	12	15
TTM 213MG-S1E	2	3	104	3.4	15	1300	11.3	14.1	15
TTM 215MG-S1E	2	3	104	3.4	15	1300	11.3	14.1	15
TTM 318MG-S1E	3	4.5	156	4.9	15	1860	16.2	20.3	25
TTM 321MG-S1E	3	4.5	156	4.9	15	1860	16.2	20.3	25
TTM 426MG-S1E	4	6	208	6.4	15	1860	16.2	20.3	25
TTM 531MG-S1E	5	7.5	260	7.9	15	2280	19.8	24.8	25

208-230/1/60

Hot Gas Defrost

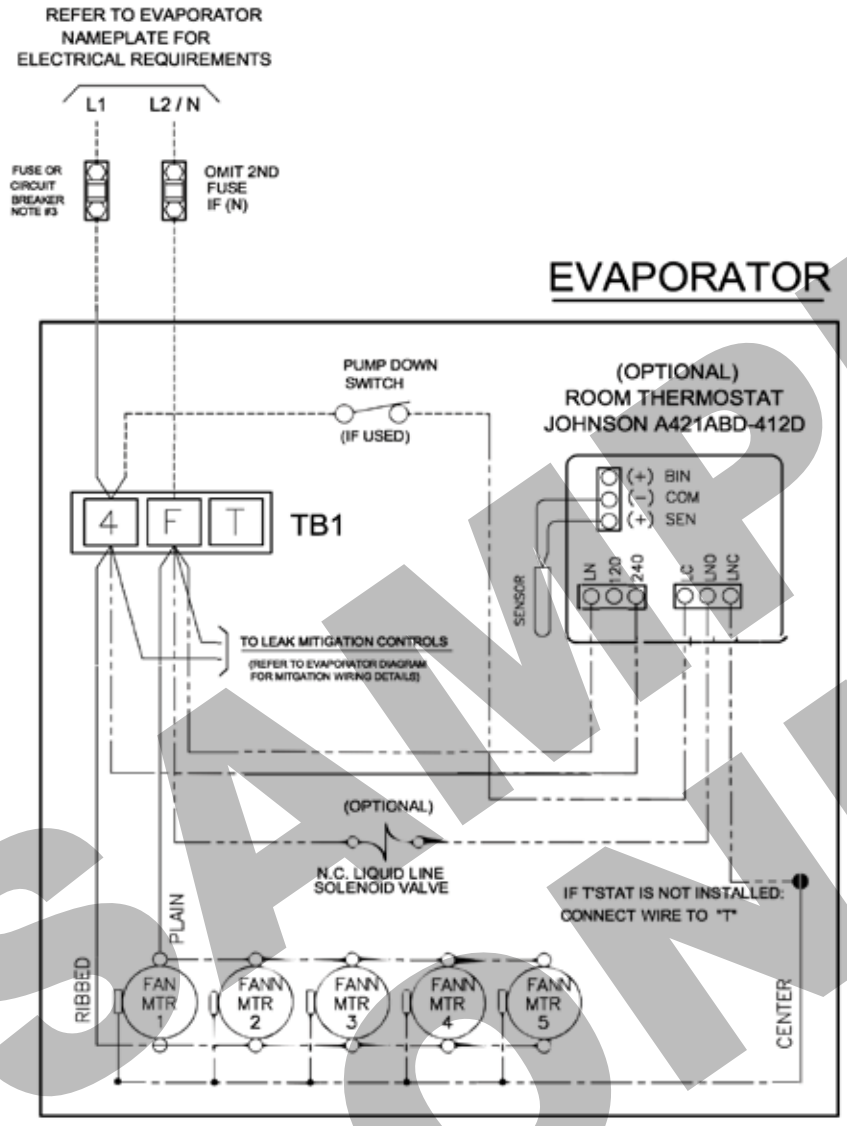
MODEL	FAN MOTORS					DEFROST HEATERS			
	QTY.	STANDARD SMART SPEED EC MOTORS				TOTAL WATTS	TOTAL AMPS	MCA (A)	MOP (A)
		FLA TOTAL	WATTS	MCA (A)	MOP (A)				
TTM108MG-S2E	1	1	52	1.3	15	1100	4.8	6	15
TTM110MG-S2E	1	1	52	1.3	15	1100	4.8	6	15
TTM213MG-S2E	2	2	104	2.3	15	1300	5.7	7.1	15
TTM215MG-S2E	2	2	104	2.25	15	1300	5.7	7.1	15
TTM318MG-S2E	3	3	156	3.25	15	1860	8.1	10.1	15
TTM321MG-S2E	3	3	156	3.25	15	1860	8.1	10.1	15
TTM426MG-S2E	4	4	208	4.25	15	1860	8.1	10.1	15
TTM531MG-S2E	5	5	260	5.25	15	2280	9.9	12.4	15

WIRING DIAGRAM - 208-230/1/60, 115V/1/60

EC MOTORS with **SMART**SPEED™
AIR DEFROST MODELS

LEAK MITIGATION SYSTEM FOR USE WITH A2L REFRIGERANTS

AIR DEF WITHOUT DEFROST TIMECLOCK



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 . MUST BE SPDT TYPE IF TWO SPEED MODE IS REQUIRED.

TERMINALS

○ -COMPONENT TERMINAL

□ -TERMINAL BLOCK TERMINAL

CONDUCTORS/ WIRING

——————— FACTORY WIRING

- - - - - - - - - - WIRING BY OTHERS

——— ——— OPTIONAL FACTORY OR BY OTHERS

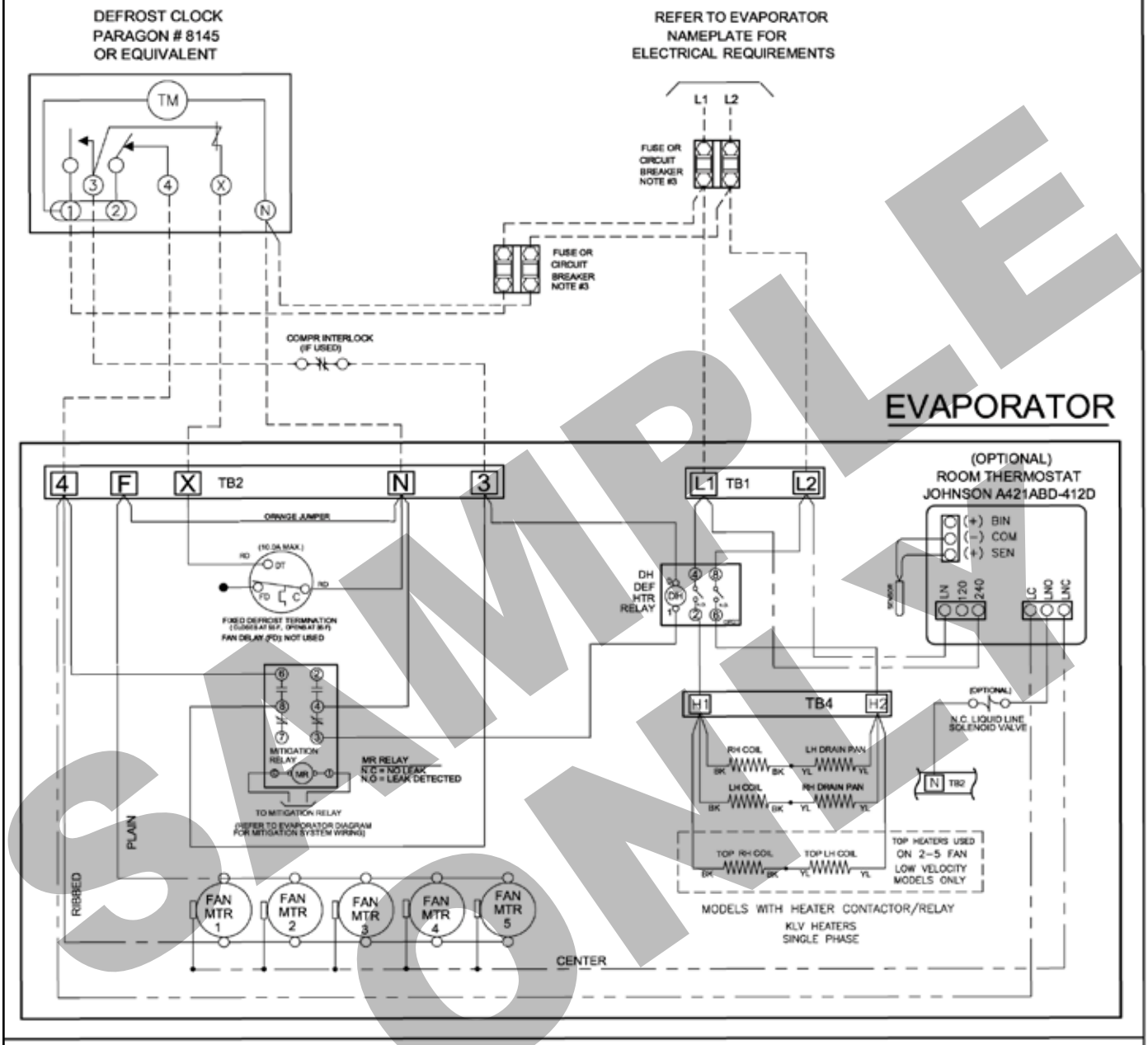
ALL FIELD WIRING MUST BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.

WIRING DIAGRAM - 208-230/1/60

EC MOTORS with **SMART**SPEED™ ELECTRIC DEFROST MODELS

LEAK MITIGATION SYSTEM FOR USE WITH A2L REFRIGERANTS

FOR ALL MODELS USING DEFROST HEATER RELAY INSTALLED AT EVAP



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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.

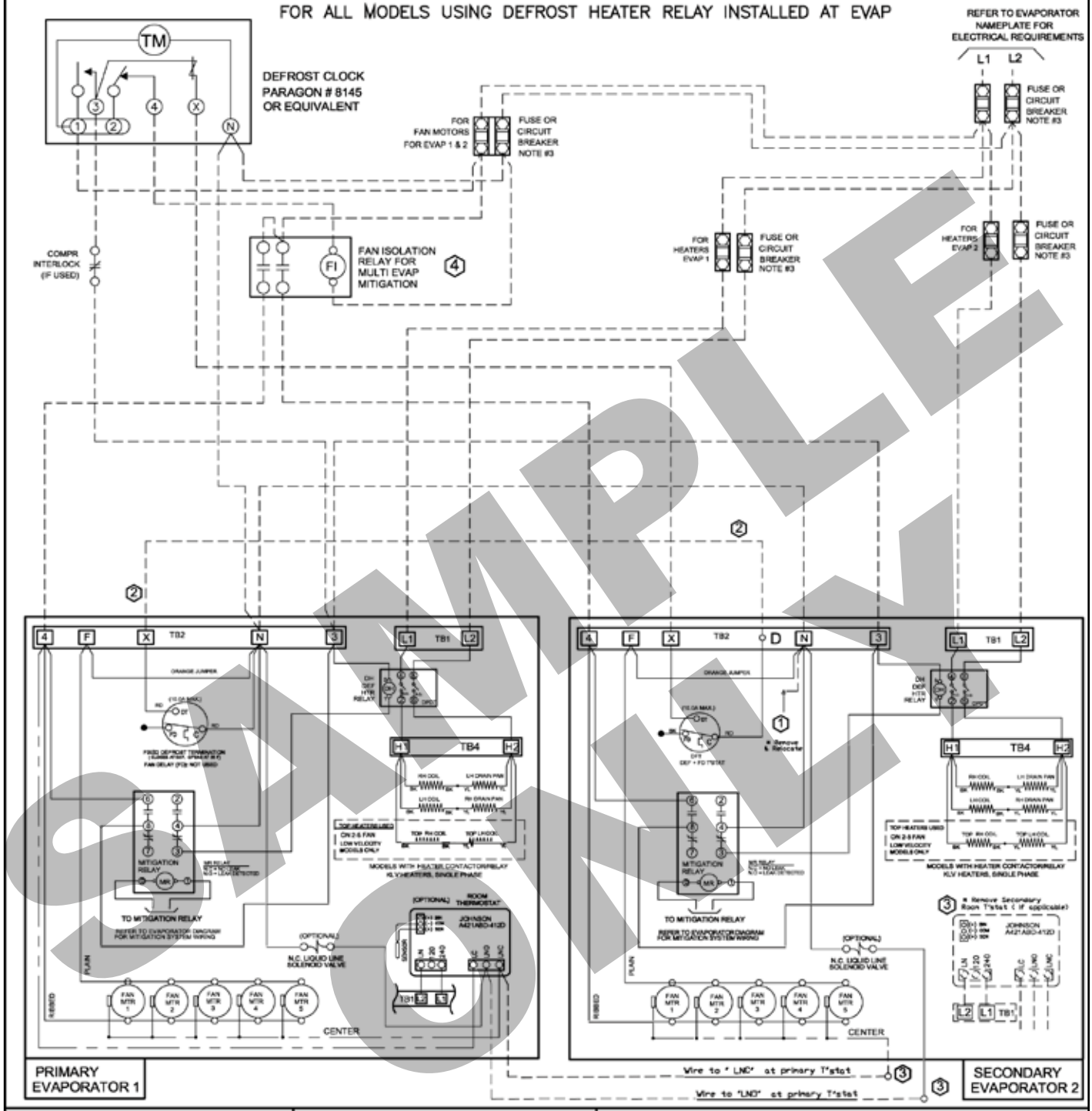
WIRING DIAGRAM - 208-230/1/60

EC MOTORS with **SMART**SPEED™

ELECTRIC DEFROST MODELS - MULTIPLE EVAPORATORS

LEAK MITIGATION SYSTEM FOR USE WITH A2L REFRIGERANTS

FOR ALL MODELS USING DEFROST HEATER RELAY INSTALLED AT EVAP



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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 . MUST BE SPDT TYPE IF TWO SPEED MODE IS REQUIRED.

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.

MULTI EVAP INSTRUCTIONS : (EVAP #2 FIELD MODIFICATION)

1. RELOCATE DFT RED WIRE FROM "N" TO "D".
2. THEN WIRE TO PRIMARY EVAP, AS SHOWN
3. REMOVE THERMOSTAT ON SECONDARY EVAP (IF APPLICABLE)
   RELOCATE CENTER LOW SPD MOTOR TO PRIMARY T'STAT "LNC" AS SHOWN
   RELOCATE SECONDARY LLSV WIRE TO PRIMARY T'STAT "LNO" AS SHOWN
4. FAN ISOLATION RELAY IS REQ'D FOR MULTI EVAP SET UP USING A2L REFRIGERANTS

CAUTION IF EITHER EVAP INITIATES MITIGATION, THE OTHER EVAP WILL CONTINUE COOLING TO MINIMIZE BOX TEMP RISE.
THE ACTIVE EVAP WILL DEFROST.
TIMED DEFROST TERMINATION IS USED UNTIL THE MITIGATING EVAP IS REPAIRED.

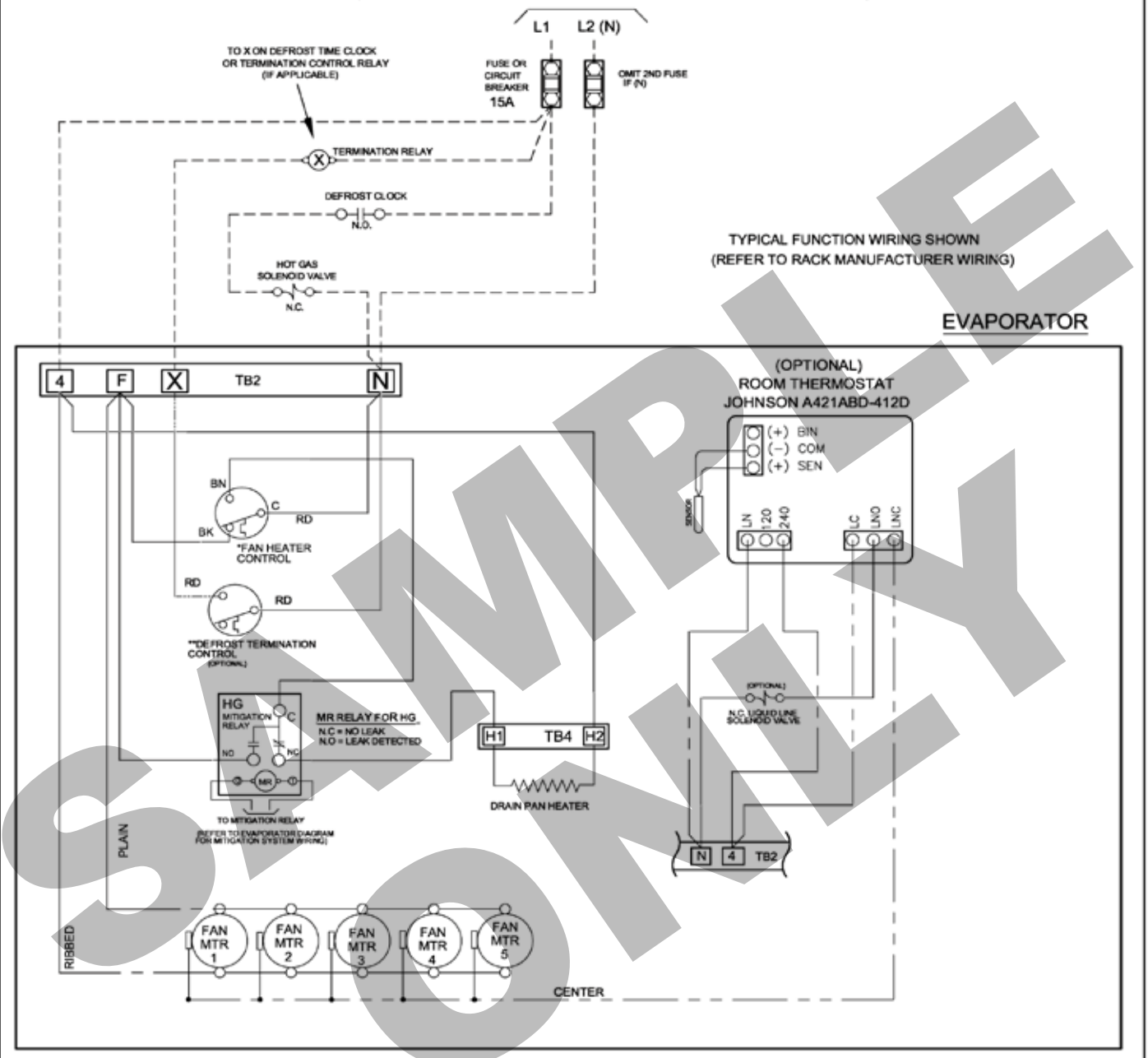
WIRING DIAGRAM - 208-230/1/60

EC MOTORS with **SMART**SPEED™

HOTGAS DEFROST MODELS (REVERSE AND 3-PIPE)

LEAK MITIGATION SYSTEM FOR USE WITH A2L REFRIGERANTS

USING MAXIMUM 15A
DRAIN HEATER OVER CURRENT PROTECTION
(REFER TO EVAPORATOR NAMEPLATE FOR ELECTRICAL REQUIREMENTS)



NOTES

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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 . MUST BE SPDT TYPE IF TWO SPEED MODE IS REQUIRED.

TERMINALS

o -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.

HOT GAS DEFROST CYCLE

DURING THE HOT GAS DEFROST CYCLE, THE FAN/HEATER CONTROL DE-ENERGIZES THE EVAP FANS AND ENERGIZES THE DRAIN PAN HEATER.
(ANYTIME THE TEMPERATURE OF THE INCOMING REFRIGERANT GAS IS ABOVE 50° F).

*FAN HEATER CONTROL: LOCATION

FOR REVERSE CYCLE, INSTALL AT SUCTION LINE.
FOR 3-PIPE HOT GAS DEFROST, INSTALL AT DISTRIBUTOR SIDE PORT LOCATION.
(HIGH EVENT AT 50F, LOW EVENT AT 35F)

**DEFROST TERMINATION CONTROL

OPTIONAL FACTORY WIRED OR BY OTHERS
LOCATED ON RETURN BEND PLATE (ELECTRICAL END)
THE CONTROL CLOSES WHEN REACHES 55° F (20 F DIFF)

ESP+ INTUITIVE EVAPORATOR CONTROL TECHNOLOGY

WHAT IS ESP+?

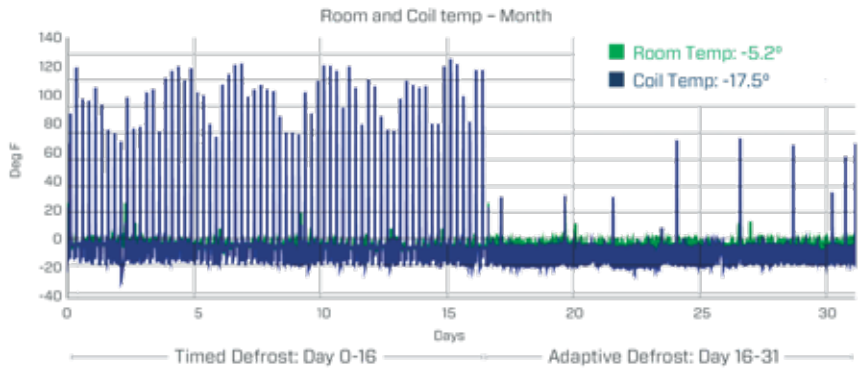
ESP+ intuitive evaporator control technology is engineered to replace conventional electromechanical refrigeration controls commonly found in medium- and low-temperature systems. It integrates award-winning adaptive technology with an electronic expansion valve. With just two pipes and two wires, installation is simple, eliminating the need for interconnecting control wiring between the evaporator and the condensing unit.

- 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 the 30 days
- Remotely view and change system parameters and alarm settings
- Manually control the system
- Easily troubleshoot issues
- Refrigerant Leak Mitigation Strategy Included for A2L units

ESP+ CONTROLS:
- Box Temperature - Superheat - Liquid Line Solenoid
- 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!



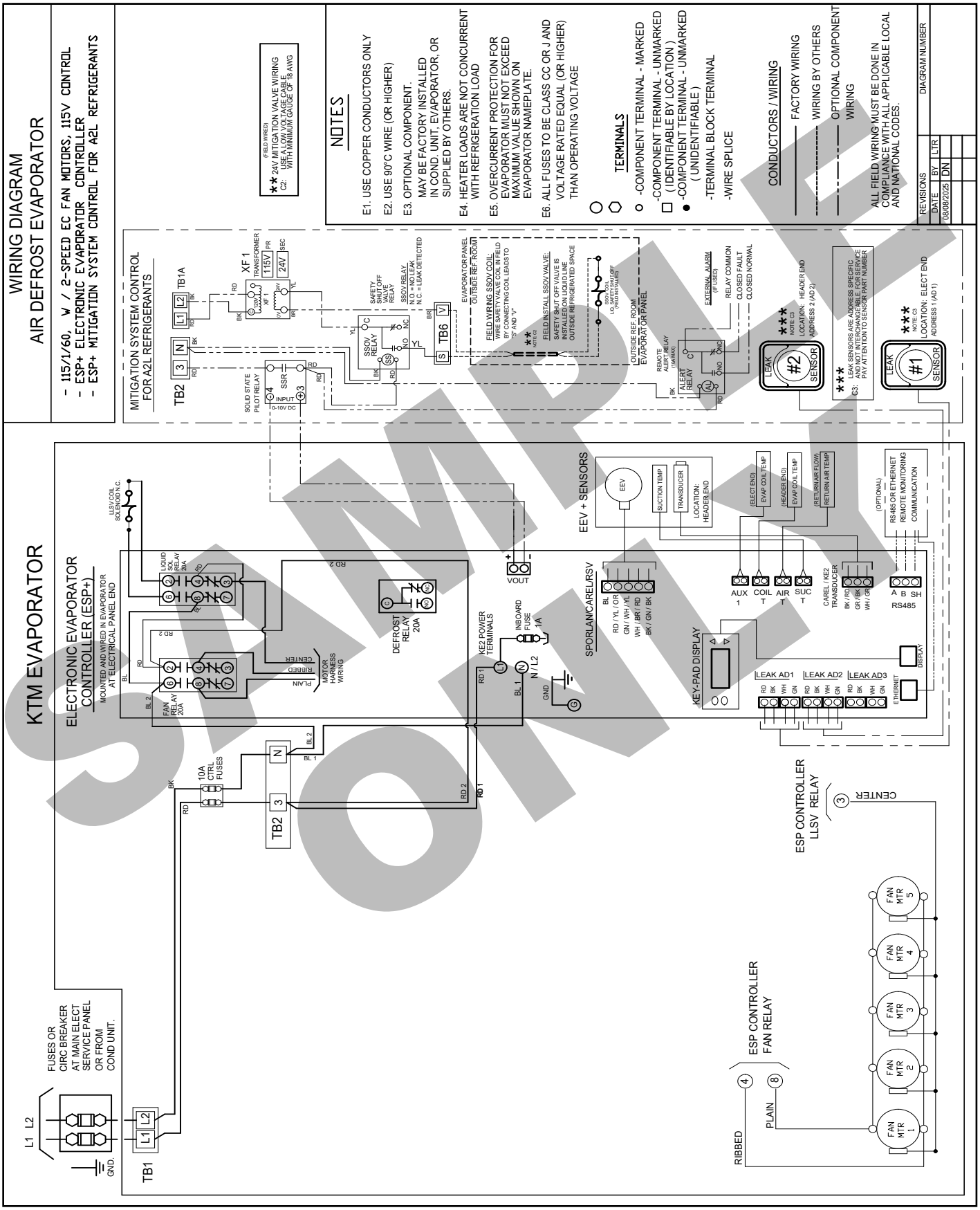
86% FEWER DEFROST CYCLES*

- **Enhanced system performance**
- **Energy savings**
- **Improved product integrity**

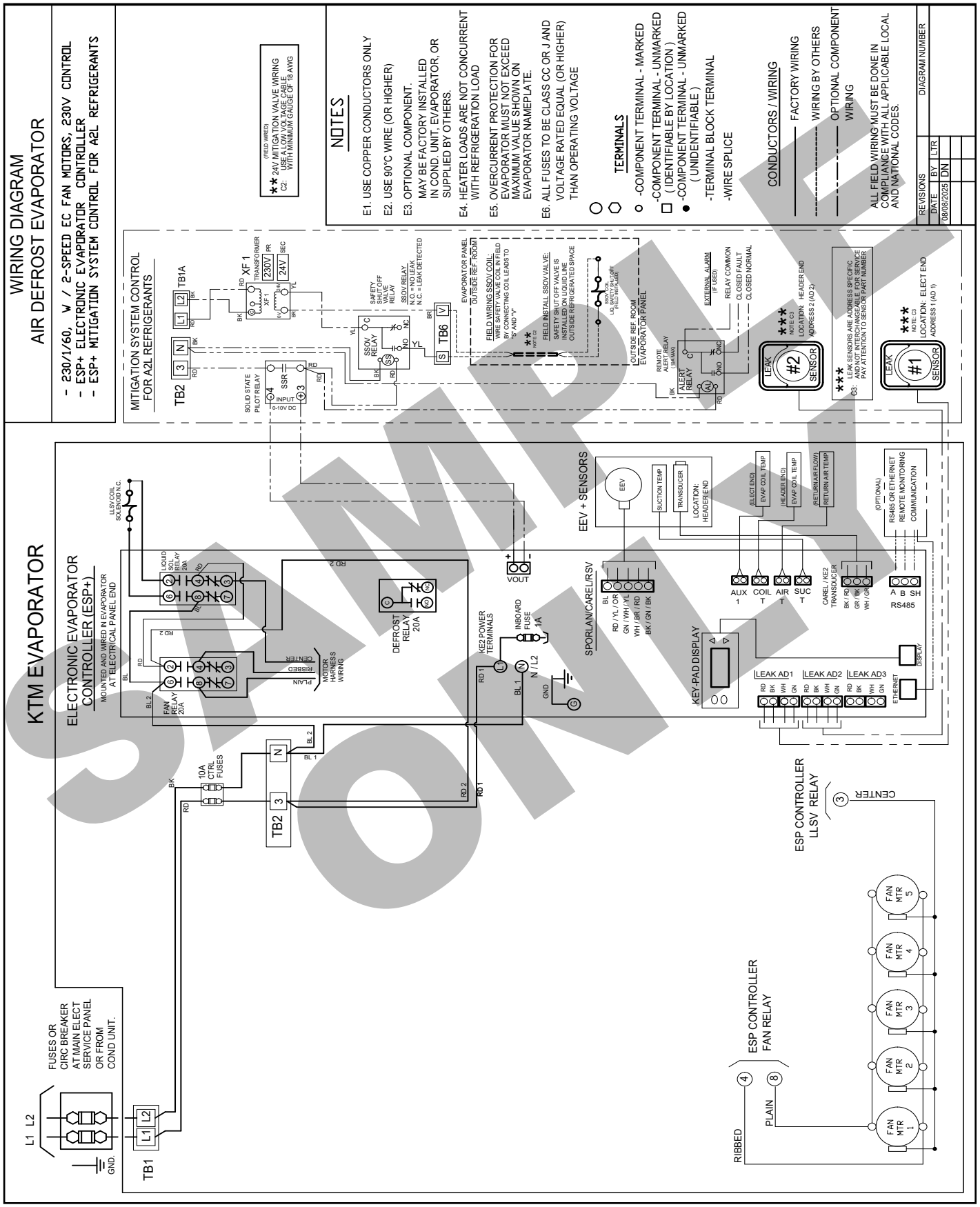
* Data may vary depending on application

VISIT T-RP.COM/ESP FOR DETAILS

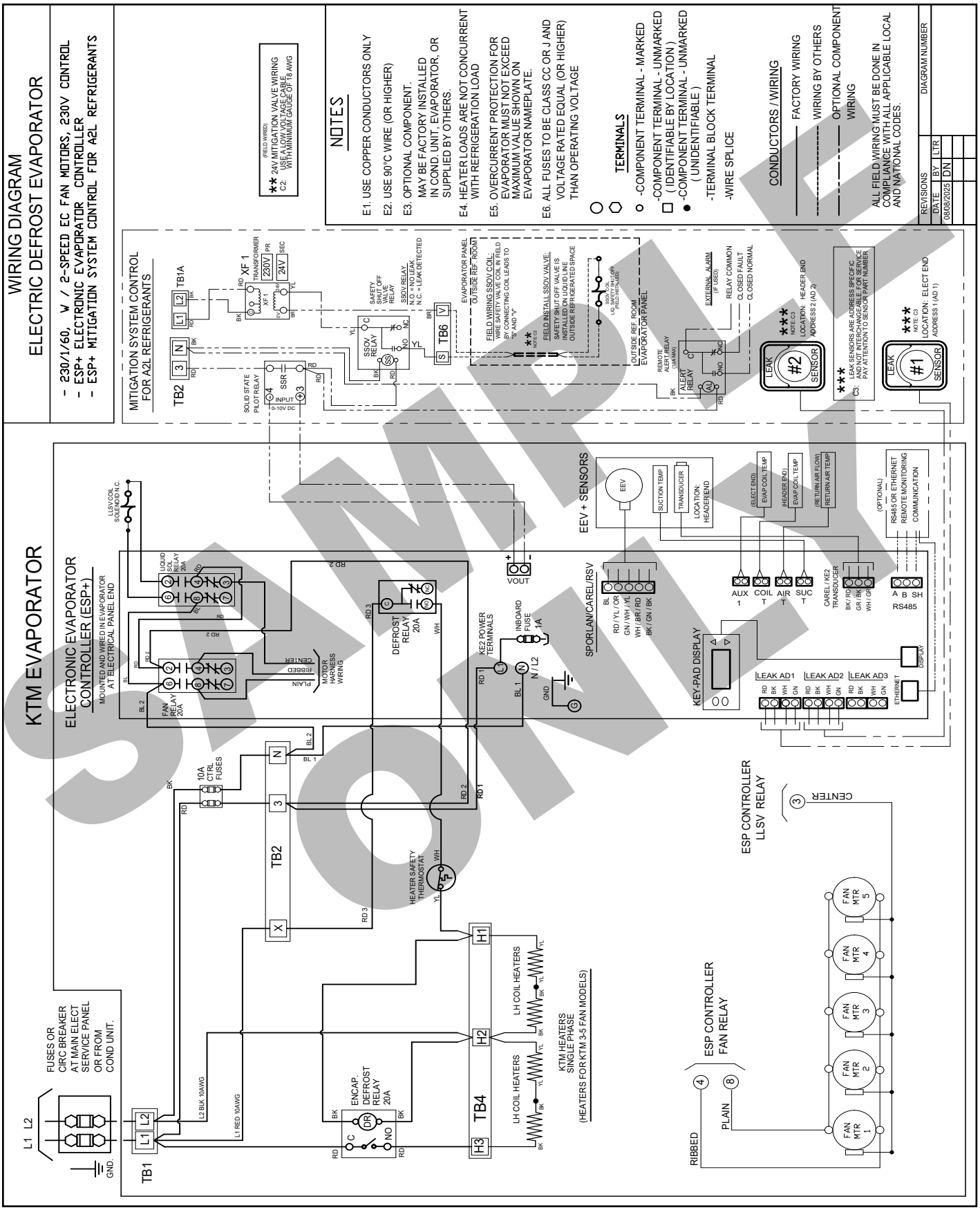
115/1/60: AIR DEFROST MODELS WITH ESP+



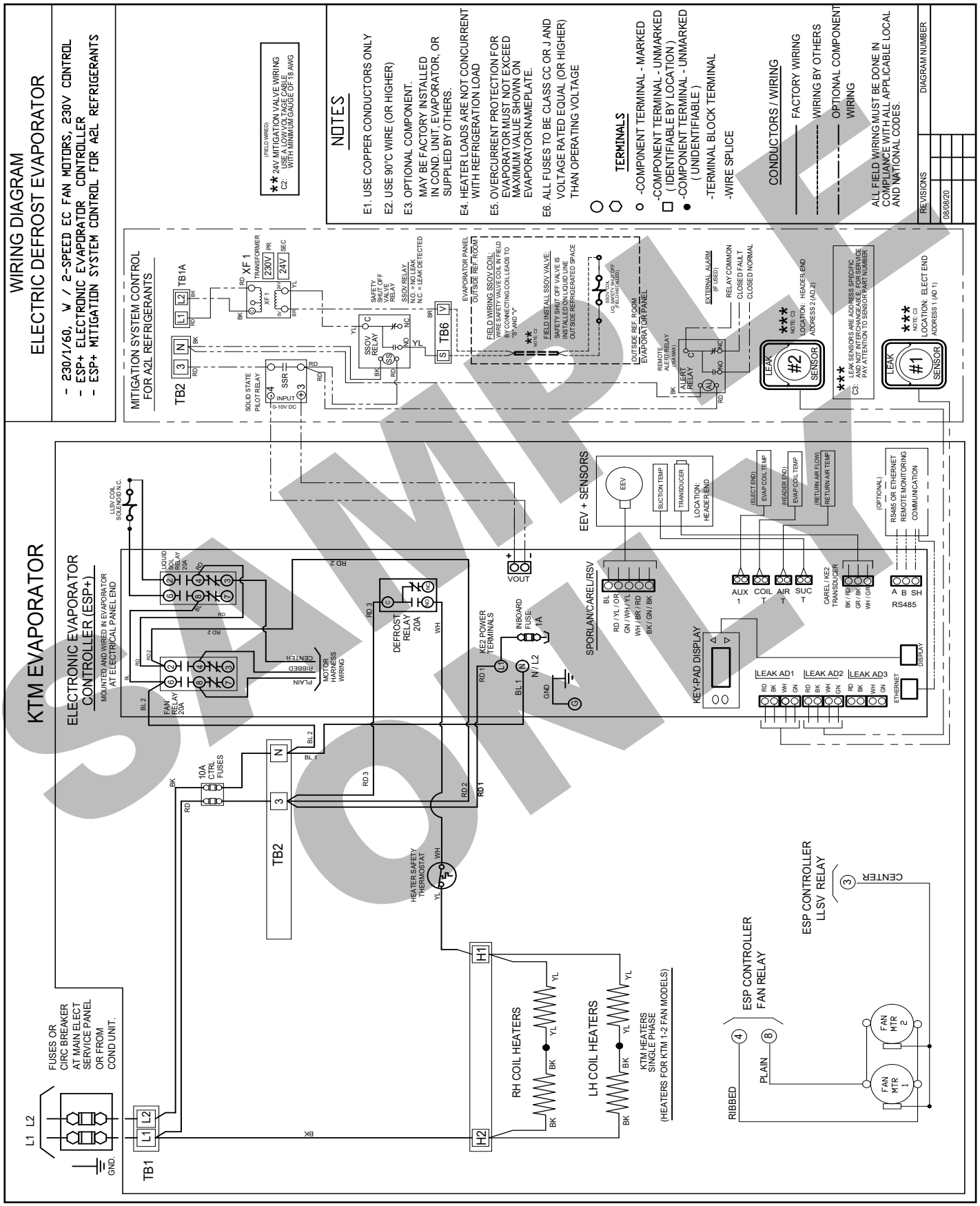
208-230/1/60: AIR DEFROST MODELS WITH ESP+



208-230/1/60: 1-3 FAN ELECTRIC DEFROST MODELS WITH ESP+ MAX.12A



208-230/1/60: 4-5 FAN ELECTRIC DEFROST MODELS WITH ESP+ 16A TO 20A



A2L/A1

MODEL	ALL REFRIGERANTS
	Med temp 6 FPI
TTM 108M	9
TTM 110M	9
TTM 213M	9
TTM 215M	9
TTM 318M	9
TTM 321M	9
TTM 426M	9
TTM 531M	9

A2L/A1

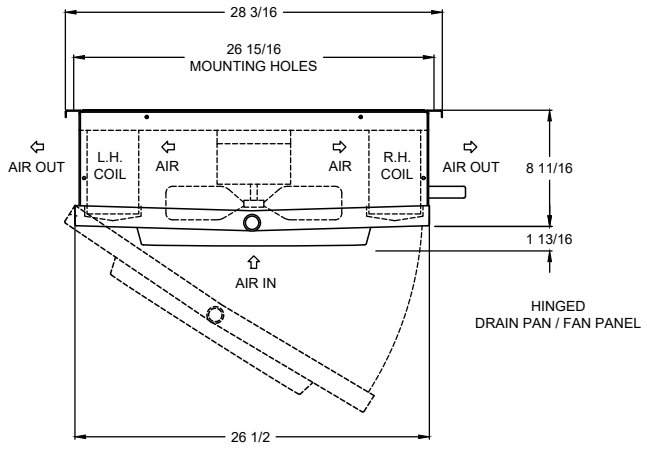
MODEL	ALL REFRIGERANTS
	Low Temp 6 FPI
TTM 105L	3.97
TTM 107L	3.99
TTM 210L	4.03
TTM 212L	4.05
TTM 315L	4.09
TTM 318L	4.12
TTM 422L	4.15
TTM 526L	4.15

Annual Walk-In Energy Factor Ratings

If a numerical value is listed in the table below, the following statement applies to that corresponding model: “This refrigeration system is designed and certified for use in walk-in cooler appications.”

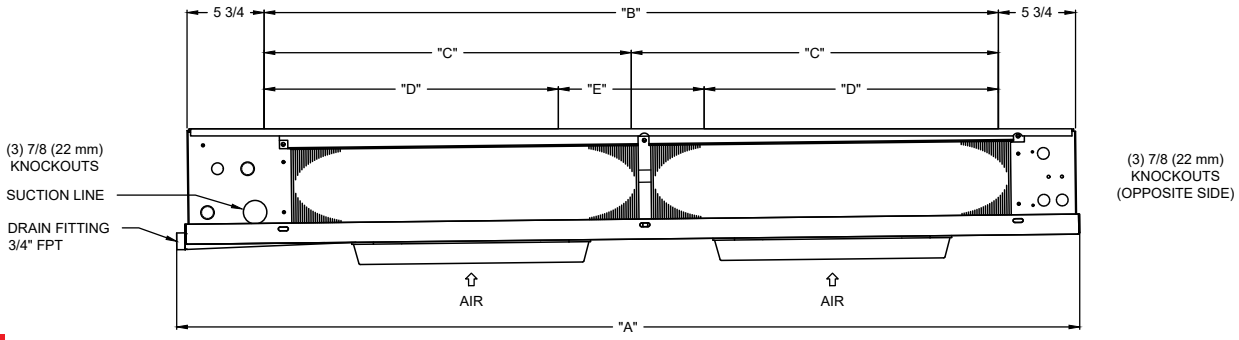
NOTES:
1) DIMENSIONS SHOWN ARE TYPICAL FOR AIR, ELECTRIC, AND HOT GAS DEFROST
2) ELECTRICAL CONNECTION END IS OPPOSITE TO THE PIPING END ON ALL MODELS
3) 1/4" O.D. EXTERNAL EQUALIZER LINE AND SERVICE ACCESS FITTING INCLUDED ON ALL SUCTION HEADERS INSIDE END COMPARTMENT.

END VIEW



SIDE VIEW
MOUNTING HOLSE (3/8" DIA.) & PIPING CONNECTION

UNIT COOLER IS TO BE SUPPORTED AT ALL MOUNTING POINTS



A2L/A1

MODEL	QTY FANS	A		B		C		D		E	
		in	mm	in	mm	in	mm	in	mm	in	mm
TTM 108M	1	45.5	1156	33	838	-	-	-	-	-	-
TTM 110M	1	45.5	1156	33	838						
TTM 213M	2	67.5	1715	55	1397	27.5	699	-	-	-	-
TTM 215M	2	67.5	1715	55	1397	27.5	699				
TTM 318M	3	93.5	2375	81	2057	40.5	1029	-	-	-	-
TTM 321M	3	93.5	2375	81	2057	40.5	1029				
TTM 426M	4	93.5	2375	81	2057	40.5	1029				
TTM 531M	5	113.5	2883	101	2565	-	-	40.5	1029	20	508
TTM 105L	1	45.5	1156	33	838	-	-	-	-	-	-
TTM 107L	1	45.5	1156	33	838						
TTM 210L	2	67.5	1715	55	1397	27.5	699	-	-	-	-
TTM 212L	2	67.5	1715	55	1397	27.5	699				
TTM 315L	3	93.5	2375	81	2057	40.5	1029	-	-	-	-
TTM 318L	3	93.5	2375	81	2057	40.5	1029				
TTM 422L	4	93.5	2375	81	2057	40.5	1029				
TTM 526L	5	113.5	2883	101	2565	-	-	40.5	1029	20	508

A2L/A1

MODEL	TUBE CONNECTIONS						APPROX. SHIPPING WEIGHT	
	SUCTION (OD)		DISTRIBUTOR INLET		HOT GAS SIDE (OD)			
	Inches	mm	Inches	mm	Inches	mm	LBS.	KG
TTM108M	5/8	16	1/2	13	1/2	13	54	24
TTM110M	7/8	22	1/2	13	1/2	13	56	25
TTM213M	7/8	22	1/2	13	1/2	13	98	44
TTM215M	7/8	22	1/2	13	1/2	13	104	47
TTM318M	7/8	22	1/2	13	1/2	13	150	68
TTM321M	1 1/8	29	1/2	13	1/2	13	157	71
TTM426M	1 1/8	29	1/2	13	1/2	13	164	74
TTM531M	1 1/8	29	7/8	22	5/8	16	198	90
TTM 105L	5/8	16	1/2	13	1/2	13	54	24
TTM 107L	7/8	22	1/2	13	1/2	13	56	25
TTM 210L	7/8	22	1/2	13	1/2	13	98	44
TTM 212L	7/8	22	1/2	13	1/2	13	98	44
TTM 315L	1 1/8	29	1/2	13	1/2	13	150	68
TTM 318L	1 1/8	29	7/8	22	5/8	16	157	71
TTM 422L	1 1/8	29	7/8	22	5/8	16	164	74
TTM 526L	1 3/8	35	7/8	22	5/8	16	198	90

A2L MEDIUM TEMPERATURE - 6 FPI MODELS

MODEL	R454A		R448A/R449A/R407A/R407C/ R454C/R455A		R404A/R507	
	SPORLAN	SOLENOID VALVES	SPORLAN	SOLENOID VALVES	SPORLAN	SOLENOID VALVES
TTM108M	SBQTE-A-C	B3	SBQVE-A-C	B3	SBQSE-A-C	B3
TTM110M	SBQTE-A-C	B3	SBQVE-A-C	B3	SBQSE-A-C	B3
TTM213M	SBQTE-A-C	B3	SBQVE-A-C	B3	SBQSE-B-C	B3
TTM215M	SBQTE-B-C	B3	SBQVE-B-C	E5	SBQSE-B-C	E5
TTM318M	SBQTE-B-C	E5	SBQVE-B-C	E5	SBQSE-B-C	E5
TTM321M	SBQTE-B-C	E5	SBQVE-B-C	E5	SBQSE-C-C	E5
TTM426M	SBQTE-C-C	E5	SBQVE-C-C	E5	SBQSE-C-C	E5
TTM531M	SBQTE-C-C	B6	SBQVE-C-C	B6	SBQSE-C-C	B6

A2L LOW TEMPERATURE - 6 FPI MODELS

MODEL	R454A		R448A/R449A/R407A/R407C/ R454C/R455A		R404A/R507	
	SPORLAN	SOLENOID VALVES	SPORLAN	SOLENOID VALVES	SPORLAN	SOLENOID VALVES
TTM 105L	SBQTE-AA-ZP	B3	SBQVE-AA-ZP	B3	SBQSE-AA-ZP	B3
TTM 107L	SBQTE-A-ZP	B3	SBQVE-A-ZP	B3	SBQSE-A-ZP	B3
TTM 210L	SBQTE-A-ZP	B3	SBQVE-A-ZP	B3	SBQSE-A-ZP	B3
TTM 212L	SBQTE-B-ZP	B3	SBQVE-B-ZP	B3	SBQSE-B-ZP	B3
TTM 315L	SBQTE-B-ZP	E5	SBQVE-B-ZP	E5	SBQSE-B-ZP	E5
TTM 318L	SBQTE-C-ZP	E5	SBQVE-C-ZP	E5	SBQSE-C-ZP	E5
TTM 422L	SBQTE-C-ZP	E5	SBQVE-C-ZP	E5	SBQSE-C-ZP	E5
TTM 526L	SBQTE-C-ZP	B6	SBQVE-C-ZP	B6	SBQSE-C-ZP	B6

A2L

R454A - R454C - R455A

Medium Temp Air or Electric Defrost

MODEL	Factory installed Nozzle	Expansion valve	Factroy installed liquid line solenoid valve	ssov	csov
TTM 108M	L3/4	E2V18	B3	SSOV-3	CSOV-5S
TTM 110M	L1	E2V18	B3	SSOV-3	CSOV-7S
TTM 213M	L1	E2V18	B3	SSOV-3	CSOV-7S
TTM 215M	L1-1/2	E2V18	E5	SSOV-3	CSOV-7S
TTM 318M	L1-1/2	E2V18	E5	SSOV-6	CSOV-7S
TTM 321M	L2	E2V18	E5	SSOV-6	CSOV-9S
TTM 426M	G2-1/2	E2V24	E5	SSOV-6	CSOV-9S
TTM 531M	G3	E2V24	B6	SSOV-6	CSOV-9S

A2L

R454A - R454C - R455A

Low Temp Electric Defrost

MODEL	Factory installed Nozzle	Expansion valve	Factroy installed liquid line solenoid valve	ssov	csov
TTM 105L	L1	E2V14	B3	SSOV-3	CSOV-5S
TTM 107L	L1	E2V14	B3	SSOV-3	CSOV-7S
TTM 210L	L1-1/2	E2V14	B3	SSOV-3	CSOV-7S
TTM 212L	L2	E2V18	B3	SSOV-3	CSOV-7S
TTM 315L	J2-1/2	E2V18	E5	SSOV-3	CSOV-9S
TTM 318L	G2-1/2	E2V18	E5	SSOV-6	CSOV-9S
TTM 422L	G3	E2V24	E5	SSOV-6	CSOV-9S
TTM 526L	E4	E2V24	B6	SSOV-6	CSOV-11S

A1

R407A - R407C - R448A - R449A - R404A - R507

Medium Temp Air or Electric Defrost

MODEL	Factory installed Nozzle	Expansion valve	Factroy installed liquid line solenoid valve
TTM 108M	L3/4	E2V14	B3
TTM 110M	L1	E2V14	B3
TTM 213M	L1	E2V14	B3
TTM 215M	L1-1/2	E2V18	E5
TTM 318M	L1-1/2	E2V18	E5
TTM 321M	L2	E2V18	E5
TTM 426M	G2-1/2	E2V24	E5
TTM 531M	G3	E2V24	B6

A1

R407A - R407C - R448A - R449A - R404A - R507

Low Temp Electric Defrost

MODEL	Factory installed Nozzle	Expansion valve	Factroy installed liquid line solenoid valve
TTM 105L	L1	E2V11	B3
TTM 107L	L1	E2V11	B3
TTM 210L	L1-1/2	E2V11	B3
TTM 212L	L2	E2V11	B3
TTM 315L	J2-1/2	E2V14	E5
TTM 318L	G2-1/2	E2V14	E5
TTM 422L	G3	E2V18	E5
TTM 526L	E4	E2V18	B6

INSTALLATION

The installation and start-up of 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

TM evaporators are designed for walker-in cooler and freezer applications used with wide range of refrigerants. For room temperatures above 35°F (2 °C) AND evaporating temperatures above 26°F (-3 °C), positive defrosting means (with electric or hot gas) may not be required, otherwise, electric defrost or hot gas defrost models should be used. Electric defrost models come with defrost termination and fan delay as standard to control the defrost cycle termination and fan delay, while defrost initiation means (e.g. defrost timer) is not included.
The coil must not be exposed to any abnormal atmospheric or acidic environments. This may result in corrosion to the cabinet and possible coil failure (leaks). (Consult manufacturer for optional baked on phenolic protective coatings).

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 product does not obstruct the free circulation of air. Allow a minimum of 24" clearance at each end. Do not locate evaporators over doors. 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

1. 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.
2. Determine actual evaporator capacity. The nominal rating is based at 10°F T.D. (5 .6°C) (Entering Air Temp. minus Evap. Temp.) Note that a higher/lower operating T.D.will increase / decrease this capacity rating by their direct ratio within a range of 8 to 12°F (4 .4 to 8.3°C) T.D.
3. Determine the pressure drop across the valve by subtracting the evaporating pressure and distributor pressure drop from the high side liquid pressure. The distributor pressure drop is typically in the range of 20 to 35 psig (1.4 to 2.4 bar) depending on the type of refrigerant and operating conditions.
4. Estimate entering liquid temperature. Temperatures lower than 100˚F (38 °C) increase valve capacity ratings. Refer to valve manufacturer's specs for details.
5. Select valve from the valve manufacturer selection charts for the appropriate refrigerant, evaporating temp and pressure drop.

For best performance, the outlet of the expansion valve should be installed directly to the distributor body. If this is not possible, a straight tube up to 12 inches may be used for the connection.
Locate the expansion valve bulb on a horizontal length of suction line preferably 3 to 6 inches from the suction header. Locate the bulb at 4 or 8 clock position and insulate with a waterproof type of insulation. Clamp the bulb to ensure 100% contact of the bulb with the suction line.
Ensure appropriate nozzle has been installed in the

distributor before installing valve. 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 6 (3.3 °C) to 8°F (4.4 °C) for a 10 to 12°F T.D (5.6 to 6.7 °C). Too high or low a super heat will result in unsatisfactory system performance and possible compressor problems.

NOZZLE INSTALLATION

The nozzle for all models has been factory installed. For other applications, refer to nozzle manufacturer's selection guide. To replace a nozzle, the nozzle retainer clip (in distributor) must be removed before inserting nozzle. Re-install clip ensuring nozzle is properly in place. A small nozzle can be drilled larger using the drill size listed in table on page 35. Ensure the hole must be accurately centered and smooth. A lathe is preferred for the drilling.

MOUNTING

Refer to dimensional drawing for recommended mounting arrangements. Ensure adequate clearance is provided behind the coil as well as each end. The evaporators may be mounted flush with ceiling with bolts, or hanging down with rod hangers. When using rod hangers, allow adequate space between the top of the unit and the ceiling for cleaning to comply with NSF Standard 7.

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" (25 mm) per foot and should have the size at least as large as the drain connection. A trap in a warm area outside the room must be provided to allow proper draining through the tubing. Connection should be made to proper drainage facilities that comply with local regulations.
To prevent freeze-up when the temperature of the refrigerated space is 35°F (2 °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°C) room and 30 watts per foot for -20°F (-29°C) rooms, is satisfactory. Drain line heaters are not required for constant room temperature above 35°F (2°C).
Always trap evaporator drain line individually to prevent vapor migration.
Ensure that the drain line has sufficient slope for proper drainage (prevention of ice build up/blockage in pan).

PIPING

Refrigeration grade piping must be used for all field refrigeration piping. Refrigerant line sizes are important and may not be the same size as the coil connections. Consult ASHRAE handbook or other similar 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. Also, it should prevent oil logging and minimize refrigerant pressure drop.
Hot gas models, refer to pages 44 - 45 for recommended piping.

WIRING

Wire system in accordance with governing standards and local codes. Refer to data and wiring diagrams on throughout this publication for typical wiring arrangement. Electrical wiring is to be sized in accordance with minimum circuit ampacity rating (MCA). Size fuses used must not exceed the Maximum Fuse Size ratings.
For ease of identifying the proper wiring terminal, unit wiring is color coded and terminal block connections are identified.
When fan delay thermostats (combination fan delay and defrost termination) are installed, on start-up, the fans do not operate until the coil temperature is reduced to approximately 25°F (-4°C). It is normal for the fans to cycle a few times until the room temperature is brought down. At higher evaporating temperatures this control may not close and therefore should either be by-passed temporarily or replaced with an adjustable type. (set for a higher temperature cut-in point).

MAINTENANCE

The unit should be periodically inspected for any dirt or ice 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.

SYSTEM CHECK

Before Start-Up:

1. All wiring should be in accordance with local codes.
2. Refrigerant lines should be properly sized.
3. All systems preferably include a liqud line solenoid valve at immediately up stream of the expansion valve.
4.Thorough evacuation and dehydration has been performed.
5. The suction, discharge, and receiver service valves must be open.
6. The system preferably include a liquid line filter 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 25°F (-4 °C) on the coil. Also, it is normal for the fan to cycle a few times until the room temperature is pulled down.
3. If necessary, temporarily by-pass fan delay control (to run fans until room temp is lowered).
4. Be sure that the expansion valve is properly set to provide the correct amount of superheat.
5. After the box temperature is close to reaching the desired temperature, the evaporator superheat must be checked and adjustment made if necessary. In general, evaporators running with a TD of 10°F (5.6 °C) should have a superheat reading of 6° to 8°F (3.3 °C to 4.4 °C). For evaporators with another T.D., the general rule is that the superheat should be around 60 to 80% of T.D.
6. Heavy moisture loads are usually encountered when starting the system for the first time. This may cause a rapid build-up of frost on the evaporator. During the initial pull down, we suggest that the frost build-up be watched and defrosted manually as required.
7. Observe that the system goes through at least one complete DEFROST CYCLE.

Visit t-rp.com/esp
for Quick Start Guide, Operation Manual, etc.

WARNING
Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
The appliance shall be stored or in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.
Do not pierce or burn.
Be aware that refrigerants may not contain an odor.

MISE EN GARDE
Ne pas utiliser de moyens autres que ceux recommandés par le fabricant pour accélérer le processus de dégivrage ou pour nettoyer l'appareil.
L'appareil doit être entreposé dans un local ne contenant pas de sources d'inflammation permanentes (flammes nues, appareil à gaz ou dispositif de chauffage électrique en fonctionnement, par exemple).
Ne pas percer ou brûler.
Attention, les fluides frigorigènes peuvent ne pas dégager d'odeur.

This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.
This appliance may be installed at an elevation above 6500 ft (2000 m). At higher altitudes, electronic expansion valve controllers may read artificially low superheat due to gauge pressure sensors. Follow the controller manufacturing instructions to calibrate the suction pressure sensor for high altitudes.
Appliance shall be installed in areas not accessible to the general public or at least at a level not less than 99.5” (2.5m).
The evaporator must be wired to a disconnect that breaks all ungrounded conductors. Note that the evaporator may be supplied with a factory installed disconnect.
The evaporator must be connected to a condensing unit designed for the same type of refrigerant.

Additional Installation, Service, and Decommissioning requirements for units charged with A2L refrigerants

GENERAL A2L EQUIPMENT SERVICE REQUIREMENTS

Walk-in cooler or freezer split systems utilizing A2L flammable refrigerants have special requirements for installation, service, and decommissioning. WARNING: To reduce flammability hazards, installation and service may only be performed by qualified service personnel who have been licensed by their local and national authorities to perform work on refrigeration systems. Personnel must be trained on how to service equipment utilizing flammable refrigerant, and how to mitigate the hazards. Installation and service may only be performed as recommended by the manufacturer. When making repairs, only service parts recommended by the manufacturer may be used.
When installing, servicing, or decommissioning this equipment, procedures must be used to minimize the risk of flammable gas or vapor being present while the work is being performed. The area must be checked with an appropriate refrigerant detector prior to and during work to ensure that the technician is aware of potentially flammable atmospheres. Refrigerant detection equipment must be designed and sold for use with A2L refrigerants.

A2L EQUIPMENT SERVICE PROCEDURE

All maintenance staff and others working in the local area must be instructed on the nature of the work being performed.
Ensure that no ignition sources are present in the area, including other appliances or cigarette smoking.
Prior to work taking place, the area around the equipment shall be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed. A dry chemical or CO2 fire extinguisher must be present when any hot work is performed.
Ensure that the area is adequately ventilated before opening the refrigeration system or conducting any hot work. Ventilation must continue for the duration of the work. The ventilation should safely disperse any released refrigerant to the outside atmosphere.

BEFORE STARTING WORK

- Verify that the markings on the equipment are legible.
- Check that refrigerant containing components and tubing are not excessively corroded or installed in a way that they may become corroded.
- Verify that the releasable charge is appropriate for the room size.
- Test the function of electrical systems, and repair if defective.
- Discharge capacitors in a safe manner to prevent sparking.

DURING WORK

- No live electrical components and wiring are exposed during charging, recovering, or purging the system.
- Check for continuity of ground bonding.
- Ensure that wires and cables are not subject to wear, corrosion, excess pressure vibration, or sharp edges.
- Do not attempt to repair any sealed electrical component or intrinsically safe component; these must be replaced.

LEAK DETECTION

When a leak in the refrigerant system is suspected, ensure that all open flames are extinguished. Only a chlorine-free leak detection fluid, or an electronic leak detector designed and sold for use with A2L refrigerants may be used. NEVER USE AN OPEN FLAME TO FIND REFRIGERANT LEAK SOURCES.
If brazing is required to repair a leak, all refrigerant must be recovered from the system or isolated by means of a shutoff valve. The system or the isolated portion of the system must be purged with an inert gas. Ensure that the purging fluid outlet discharges into a well-ventilated area away from any sources of ignition.

SAFETY ISOLATION VALVES FOR FLAMMABLE REFRIGERANT

Walk-in cooler or freezer split systems utilizing A2L flammable refrigerant must be equipped with safety isolation valves to limit the releasable charge in the event of a leak. These safety isolation valves may be either factory installed in the condensing unit or field installed. Both a liquid line solenoid valve and a suction line check valve are required. Additionally, a discharge line solenoid valve is required for external hot gas bypass or hot gas defrost systems. All safety isolation valves must be installed outside of the walk-in box.
Before proceeding with field installation of refrigerant tubing, verify if the system is equipped with safety isolation valves factory installed in the condensing unit or if they are field installed. Field installed valves must be located outside of the walk-in box.
Field installed safety isolation valves shall be Sporlan SSOV series for liquid and discharge and Sporlan CSOV for suction. Valves must be protected from overheating during installation. Solenoid valves shall be installed to avoid hydraulic shock.
Additional information for applying mitigation valves, including systems with multiple evaporators per condensing unit may be found at the end of this manual.

FIELD INSTALLED SAFETY SHUTOFF VALVES

The evaporator may be configured with safety shutoff valves for field installation outside of the walk-in box. A check valve is provided for the suction line and a solenoid is provided for the liquid line. If the evaporator is configured with an external hot gas bypass or a hot gas defrost system, a hot gas solenoid is also provided. If the system is configured with reverse cycle defrost, an additional solenoid and check valve are provided for reverse cycle operation.

In the case of multiple evaporators installed in a common refrigeration circuit, each line must be routed outside the walk-in box before being piped together. Safety shutoff valves are provided with each evaporator, which must be installed in the line between the evaporator and the tee.

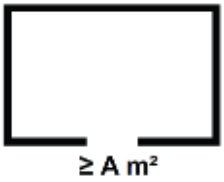
The solenoid valves are provided with 24VAC coils. The solenoid coils are wired to the terminal strip in the evaporator with 18 AWG class 2 cable or equivalent. All valves and coils are shipped in the end compartment near the refrigerant line connections.

Field installed safety isolation valves should be installed as close to the walk-in box as possible. Ensure that the valves are oriented in the correct flow direction. See drawings for details.

SAFETY SHUTOFF VALVES FACTORY INSTALLED IN CONDENSING UNIT

The evaporator may configured to be connected to a condensing unit with factory installed safety shutoff valves. The 24VAC solenoid coil in the condensing unit must be connected to the terminal strip in the evaporator with 18AWG class 2 cable or equivalent.

MINIMUM WALK-IN BOX AREA



Walk-in cooler or freezer split systems utilizing A2L flammable refrigerant are subject to minimum walk-in box floor area to limit the hazard of a refrigerant leak. This minimum room area depends on the size of the evaporator, as well as the length and diameter of the field installed refrigerant tubing between the evaporator and the safety isolation valves. Follow the instructions below to ensure compliance.

- Measure the distance along the planned tubing route from the outlet of the evaporator to the inlet of the liquid line safety isolation valve.
- Determine the diameter of the liquid and suction lines to be used.
- Measure the internal length and width of the walk-in box. Multiply the length x width to determine the area.
- Find the row with the evaporator model number in the table below. Under the MAXIMUM LINE LENGTH heading, pick the column which is greater than the length of the measured tubing route. Verify that the MINIMUM ROOM AREA value is less than the calculated walk- in box area.

If the MINIMUM ROOM AREA value is greater than the calculated walk-in box area, or for tubing runs longer than what is shown in the table, contact the factory for guidance.

Example:

A **TTM313M** evaporator is to be installed in a walk-in cooler.

The length from the outlet of the evaporator to the safety isolation valve is **35 ft (10.6 m)**. Standard **1/2" (13 mm)** liquid line and **5/8" (16 mm)** suction line diameters are used

The internal dimensions of the walk-in box are **12 ft (3.7 m)** wide and **10 ft (3.0 m)** long. The calculated area is **12 ft x 10 ft = 120 ft2 (3.7 m x 3.0 m = 11.1 m²).**

The **TTM313M** is shown in the fifth row down. The **50 ft (15.2 m)** column shows a minimum room area of **81 ft2 (8 m²).** This is less than the calculated room area, so the installation is compliant.

NOTE: If there are multiple evaporators serving the same walk-in box, each evaporator is connected to its own set fieldinstalled safety shutoff valves. Calculate the releasable charge of each evaporator and use the largest releasable charge to evaluate walk-in box area. Do not add the releasable charges together when evaluating walk-in box area.

A2L

Model	LIQUID LINE OD (in)	SUCTION LINE OD (in)	MAXIMUM LINE LENGTH			
			A (10 ft)	B (25 ft)	C (50 ft)	D (100 ft)
			MINIMUM ROOM AREA (ft2)			
TTM 108M	1/2	1/2	23	38	63	112
TTM 110M	1/2	5/8	33	48	73	123
TTM 213M	1/2	5/8	41	56	81	131
TTM 215M	1/2	7/8	39	54	80	131
TTM 318M	1/2	7/8	41	56	82	133
TTM 321M	1/2	1 1/8	49	65	92	145
TTM 426M	1/2	1 1/8	49	65	92	145
TTM 531M	1/2	1 1/8	56	72	99	152
TTM 105L	1/2	5/8	23	38	62	112
TTM 107L	1/2	5/8	33	47	72	121
TTM 210L	1/2	7/8	40	55	80	130
TTM 212L	1/2	7/8	38	53	77	127
TTM 315L	1/2	1 1/8	40	56	81	132
TTM 318L	1/2	1 1/8	47	63	88	139
TTM 422L	1/2	1 1/8	47	63	88	139
TTM 526L	1/2	1 3/8	56	71	97	149

A2L

Model	LIQUID LINE OD (in)	SUCTION LINE OD (in)	MAXIMUM LINE LENGTH			
			3m	7.6m	15.2m	30.5m
			MINIMUM ROOM AREA (m2)			
TTM 108M	13	13	2	4	6	10
TTM 110M	13	16	3	4	7	11
TTM 213M	13	16	4	5	8	12
TTM 215M	13	22	4	5	7	12
TTM 318M	13	22	4	5	8	12
TTM 321M	13	29	5	6	9	13
TTM 426M	13	29	5	6	9	13
TTM 531M	13	29	5	7	9	14
TTM 105L	13	16	2	4	6	10
TTM 107L	13	16	3	4	7	11
TTM 210L	13	22	4	5	7	12
TTM 212L	13	22	3	5	7	12
TTM 315L	13	29	4	5	8	12
TTM 318L	13	29	4	6	8	13
TTM 422L	13	29	4	6	8	13
TTM 526L	13	35	5	7	9	14

REFRIGERANT TUBING INSTALLATION

Refrigerant piping must be installed in accordance with ANSI/ASHRAE 15 and any other applicable local or national codes.

- All equipment, refrigerant tubing, fittings, and protection devices must be securely mounted and protected from physical damage and other adverse environmental effects such as water collecting and freezing, corrosion, and the accumulation of dirt and debris. Tubing inside the walk-in box or routed through other unventilated spaces must be additionally protected from accidental damage when product or furniture is installed or moved
- All tubing joints must be accessible for inspection prior to being covered or enclosed.
- The routing of tubing must be as direct as possible, and the length of tubing kept to a minimum.
- Use only copper tubing. Flexible connections are not allowed. All field connections must be brazed.
- Provisions shall be made for expansion and contraction of long runs of tubing.
- Tubing shall be installed to minimize damaging effects of hydraulic shock.
- Tubing shall be constrained to prevent excess vibration or pulsation
- Insulation shall be suitable for the material being insulated.
- All installed tubing must be pressure tested to 450 PSIG with an inert gas and held for a minimum of 1 hour with no decrease in pressure. The test gauge must have a minimum resolution of 20 PSIG.
- If the pressure test is successful, the refrigerant piping must be evacuated below 500 microns. After isolating the vacuum pump, the system pressure must remain below 1000 microns for 30 minutes. See “Deep Vacuum Method” in the condensing unit installation manual for more details.

CHARGING

After installation of field refrigerant tubing, the system must be charged by weight of refrigerant. See the condensing unit installation manual for charging instructions weight for each condensing unit model.
During charging:

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders must be kept in an appropriate position according to the instructions.
- Ensure that the system is earthed prior to charging the system with refrigerant.
- Extreme care shall be taken not to overfill the system.
- After charging, write the refrigerant number and weight in the blank space on the data label of the condensing unit.

After charging, all brazed tubing joints made indoors shall be tested with a refrigerant detector. The detector must have a sensitivity of 0.2 oz/year (5 g/year) or better under a pressure of at least 150 PSIG. No leak shall be detected.
The system must be leak-free before the system is commissioned or recommissioned after repair. See section “REFRIGERANT TUBING INSTALLATION” for additional details on required leak checks.

REFRIGERANT LEAK MITIGATION SYSTEM

Evaporators designed for A2L refrigerants are equipped with a leak mitigation system to minimize the hazard of refrigerant leaks. The leak mitigation system includes factory installed refrigerant leak sensors, and mitigation controller to initiate mitigation actions in the event of a leak. Mitigation actions include activating fans for circulation, deactivating electric defrost heaters and closing safety isolation valves.

Ventilation of the walk-in box should not be used. Do not connect the evaporator to any ductwork.

Safety isolation solenoid valves must be field wired to the mitigation controller in the evaporator. See unit wiring diagram for additional details.

The mitigation system does not require any periodic maintenance. To test the operation of the mitigation system, disconnect one of the refrigerant leak sensors and verify that the safety isolation solenoid valves close, evaporator fans are energized, and defrost heaters are de-energized.

If a replacement refrigerant leak detector or controller is required, only manufacturer-approved components may be used. Replacement sensors must be installed in the same location as the sensors that were removed.

REFRIGERANT RECOVERY

Local and national regulations must be followed for recovery, transportation, and disposal of A2L refrigerant. It is essential that best practices are followed to minimize the risk of fire

- All recovery cylinders, recovery machines, vacuum pumps, and other refrigeration tools must be designed for use with A2L refrigerants and must be in good working order, with instruction manuals available for reference.
- Cylinders must be labeled with the refrigerant they contain.
- Ensure that the pressure and rating of the recovery cylinders are appropriate for the refrigerant being recovered. Any pressure relief or overfill prevention devices must be in good working order.
- A calibrated refrigerant scale must be used to measure the weight of the recovered refrigerant to prevent overfilling. Do not fill cylinders more than 80% full.
- Recovery cylinders must be of appropriate volume to contain the refrigerant to be recovered. Multiple recovery cylinders should be available if required.
- Empty cylinders must be evacuated prior to filling.
- Do not mix refrigerants. Recovery machines must be purged before changing refrigerants.
- All service hose connections must be equipped with a means to limit the release of refrigerant such as anti-blowback fittings or service valves.

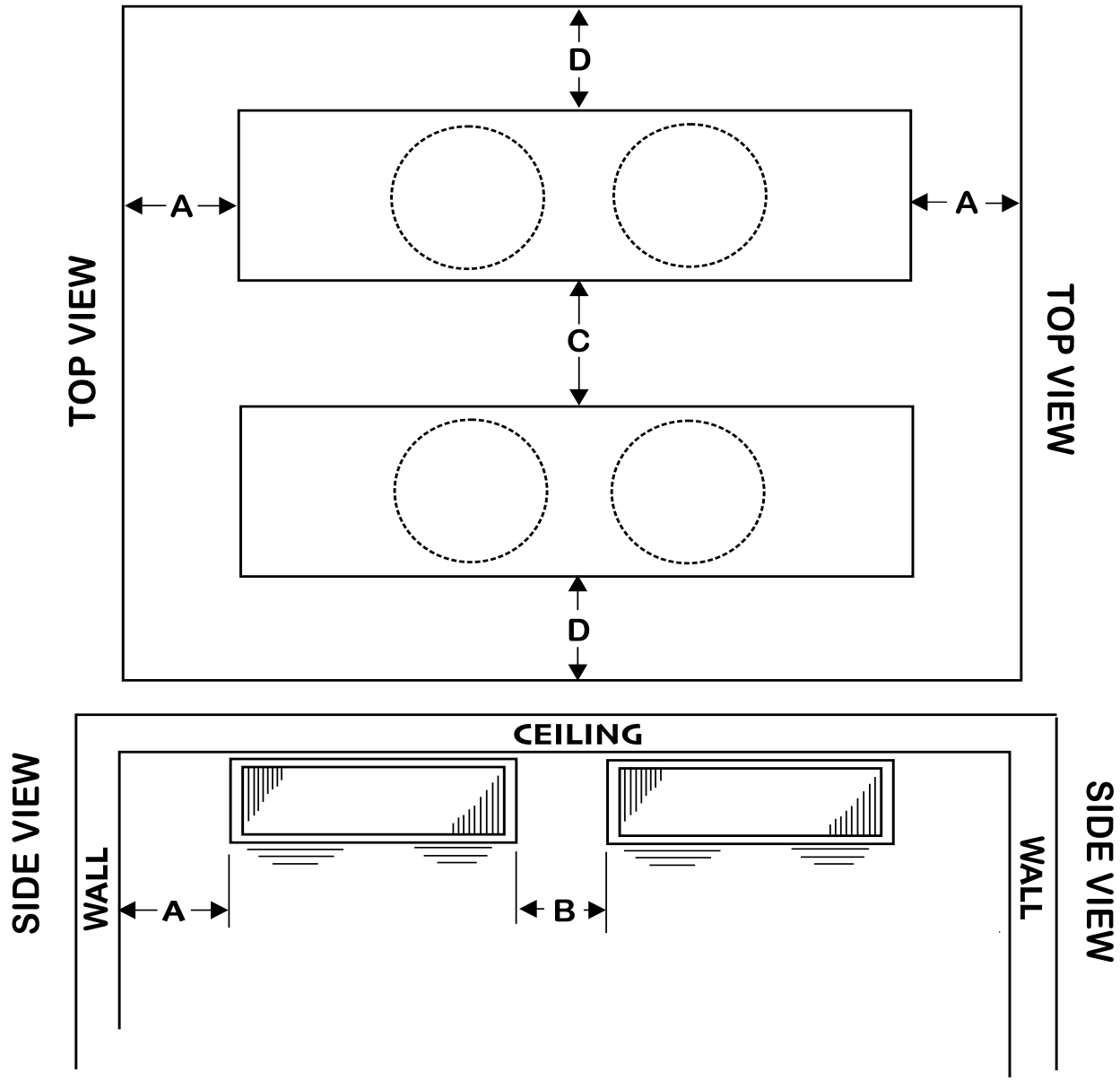
After completing all safety checks, safely remove refrigerant according to local and national regulations:

- Recover refrigerant into an appropriate recovery cylinder.
- After achieving the required recovery level, pressurize the system with inert gas to 450 PSIG.
- Safely release the inert gas, ensuring that there are no sources of ignition near the venting outlet.
- If a compressor or compressor oil is going to be removed, the system must be evacuated to ensure that no refrigerant remains dissolved in the oil.
- The system may now be opened by cutting or brazing.

DECOMMISSIONING

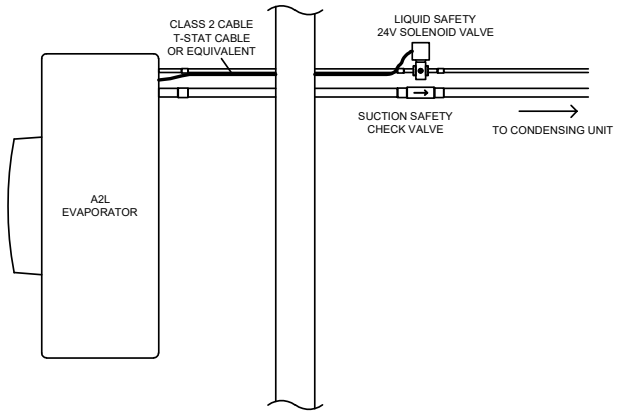
When the system reaches the end of its life, it must be decommissioned. The equipment must be electrically isolated, and all refrigerant must be recovered by competent personnel in accordance with all local and national regulations. See section “REFRIGERANT RECOVERY” for additional details.

The equipment shall be labeled as “DECOMMISSIONED” and marked with the date and signature of the person recovering the refrigerant. The equipment is now ready for disposal.



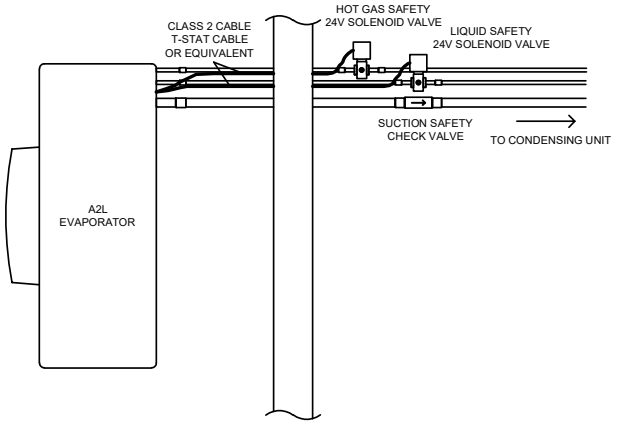
DIMENSION		A	B	C	D
Minimum	ft.	2	2	6	3
	(cm)	*(61)*	*(61)*	*(183)*	*(92)*
Maximum	ft.	-	7	40	20
	(cm)	-	*(210)*	*(1200)*	*(600)*

STANDARD EVAPORATOR



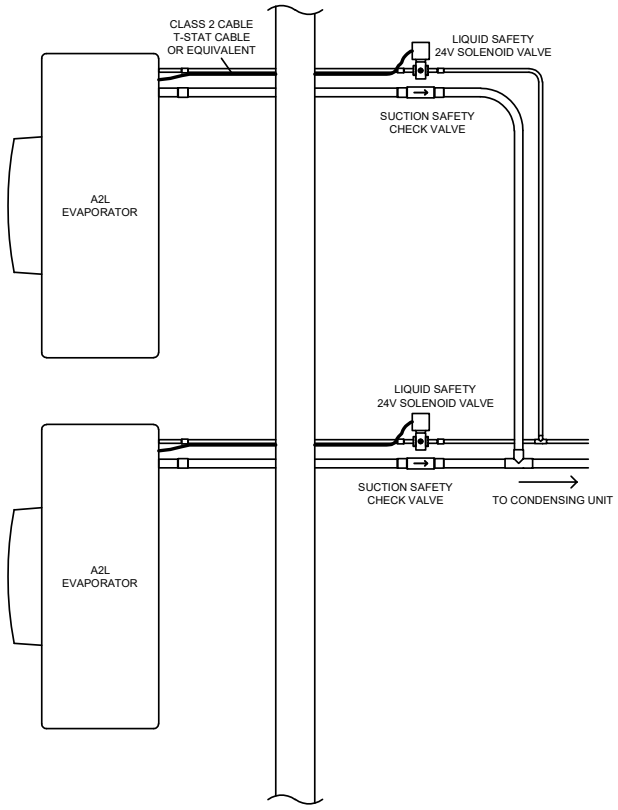
TOP VIEW

HOT GAS BYPASS / 3-PIPE HOT GAS DEFROST



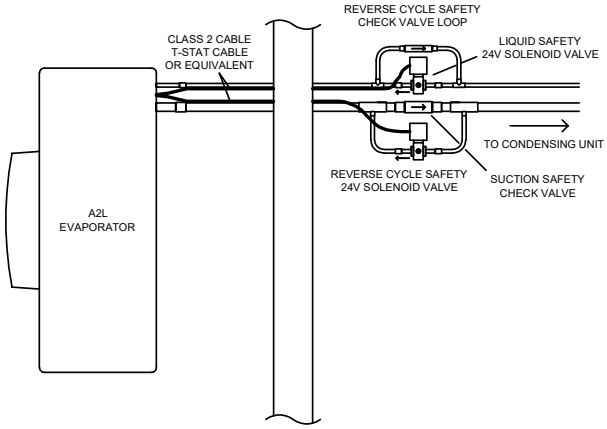
TOP VIEW

TWO OR MORE EVAPORATORS



TOP VIEW

REVERSE CYCLE



TOP VIEW

Follow valve manufacturer mounting instructions.
* Safety Shut-off valve installation in accordance to valve manufacturer requirements.

HOT GAS REVERSE CYCLE PIPING SCHEMATICS

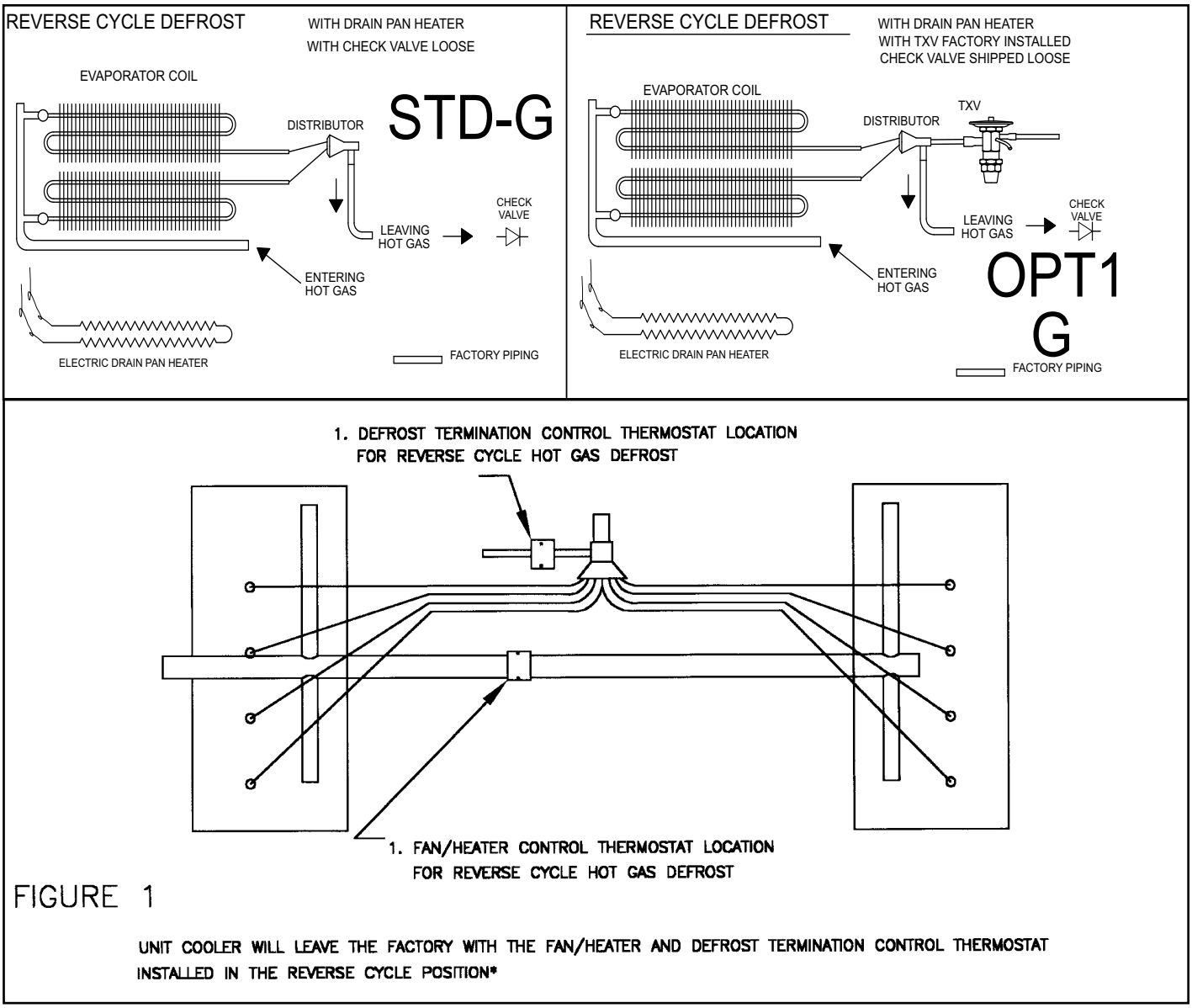


FIGURE 1

UNIT COOLER WILL LEAVE THE FACTORY WITH THE FAN/HEATER AND DEFROST TERMINATION CONTROL THERMOSTAT INSTALLED IN THE REVERSE CYCLE POSITION*

MEDIUM TEMPERATURE

FPI	# of fans	MODEL	Voltage	1x Evaporator		2x Evaporator	
				Defrost Kit	Fuse Package	Defrost Kit	Fuse Package
6	1	TTM 108ME-S1E	115/1/60	TBA			
		TTM 108ME-S2E	208-230/1/60				
		TTM 110ME-S1E	115/1/60				
		TTM 110ME-S2E	208-230/1/60				
	2	TTM 213ME-S1E	115/1/60				
		TTM 213ME-S2E	208-230/1/60				
		TTM 215ME-S1E	115/1/60				
		TTM 215ME-S2E	208-230/1/60				
	3	TTM 318ME-S2E	208-230/1/60				
		TTM 321ME-S2E	208-230/1/60				
	4	TTM 426ME-S2E	208-230/1/60				
	5	TTM 531ME-S2E	208-230/1/60				

LOW TEMPERATURE

FPI	# of fans	MODEL	Voltage	1x Evaporator		2x Evaporator	
				Defrost Kit	Fuse Package	Defrost Kit	Fuse Package
6	1	TTM 105LE-S1E	115/1/60	TBA			
		TTM 105LE-S2E	208-230/1/60				
		TTM 107LE-S1E	115/1/60				
		TTM 107LE-S2E	208-230/1/60				
	2	TTM 210LE-S1E	115/1/60				
		TTM 210LE-S2E	208-230/1/60				
		TTM 212LE-S1E	115/1/60				
		TTM 212LE-S2E	208-230/1/60				
	3	TTM 315LE-S2E	208-230/1/60				
		TTM 318LE-S2E	208-230/1/60				
	4	TTM 422LE-S2E	208-230/1/60				
	5	TTM 526LE-S2E	208-230/1/60				

For info on matched **Trenton** condensing units, visit **t-rp.com/cu**

Defrost Kit & Fuse Package Online Selection Tool: **t-rp.com/dfk**

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

PRODUCT SUPPORT	web: **t-rp.com/ttm** email: **evaps@t-rp.com** call: **1-844-893-322 x520**
TROUBLESHOOTING	email: **troubleshooting@t-rp.com** call: **1-844-893-322 x529**
SERVICE PARTS	web: **t-rp.com/parts** email: **parts@t-rp.com** call: **1-844-893-322 x504**
WARRANTY	web: **t-rp.com/warranty** email: **warranty@t-rp.com** call: **1-844-893-322 x507**
ORDERS	email: **orders@t-rp.com** call: **1-844-893-322 x501**
SHIPPING	email: **shipping@t-rp.com** call: **1-844-893-322 x503**

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Service Parts List Label To Be Attached *HERE*

Brantford, Ontario - Kilgore, Texas
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