



**Liebert®**

Mini-Mate™ Variable Capacity  
Thermal Management Systems

System Design Catalog

3, 4 and 5 Ton (10.5, 14 and 17.5 kW) Capacity, Ceiling-mounted, 60 Hz

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If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures. Visit <https://www.Vertiv.com/en-us/support/> for additional assistance.

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# 1 NOMENCLATURE AND COMPONENTS

This section describes the model number for Liebert® Mini-Mate units and components.

## 1.1 Mini-Mate Model Number Nomenclature

The tables below describe each digit of the 25-digit configuration number. The 14-digit model number consists of the first 10 digits and last 4 digits of the configuration number.

[Model Number Digit Definitions](#) below describes each digit of the model number.

**Table 1.1 Mini-Mate 25-Digit Configuration Number**

Model Number Digits 1 to 10										Model Details										Model Number Digits 11 to 14				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
M	T	0	6	0	H	E	1	A	0	S	H	2	0	D	0	U	0	P	0	0	A	#	#	#

**Table 1.2 Model Number Digit Definitions**

Digit and Description
Digits 1 and 2 = Unit Family MT = Mini-Mate Ceiling System
Digits 3, 4, 5 = Nominal Cooling Capacity 036 = 36 kBtuh 048 = 48 kBtuh 060 = 60 kBtuh
Digit 6 = Air Direction and Discharge H = Horizontal air flow
Digit 7 = System Type E = Split system evaporator
Digit 8 = Fan Type 1 = Direct drive EC motor (variable speed)
Digit 9 = Supply Power A = 460 V / 3 ph / 60 Hz B = 575 V / 3 ph / 60 Hz (048 and 060 models only) C = 208 V / 3 ph / 60 Hz (048 and 060 models only) D = 230 V / 3 ph / 60 Hz (048 and 060 models only) P = 208-230/1ph/60Hz (036 model only) Y = 208-230/3ph/60Hz (036 model only)
Digit 10 = Evaporator Type 0 = Split system evaporator

**Table 1.2 Model Number Digit Definitions (continued)**

<b>Digit and Description</b>
<p>Digit 11 = Humidifier</p> <p>0 = No humidifier</p> <p>S = Steam-gen canister humidifier</p>
<p>Digit 12 = Display Type</p> <p>H = 9-in. remote display, IntelliSlot-based monitoring (O48 and O60 models only)</p> <p>1 = 9-in. remote display, iCOM-based monitoring (O36 model only)</p>
<p>Digit 13 = Reheat</p> <p>0 = No reheat</p> <p>2 = Electric reheat</p> <p>5 = SCR reheat (O48 and O60 models only)</p>
<p>Digit 14 = Coil, Valve, Pressure</p> <p>0 = Split system evaporator</p>
<p>Digit 15 = High-voltage options</p> <p>D = Non-locking disconnect, 5k SCCR (O48 and O60 models only)</p> <p>L = Locking disconnect, 5kA SCCR (O36 model only)</p> <p>M = Locking disconnect, 65k SCCR (O48 and O60 models only)</p>
<p>Digit 16 = Low Voltage Options</p> <p>0 = None</p> <p>L = Low voltage terminal package (LVTP)</p>
<p>Digit 17 = Monitoring Cards</p> <p>0 = No card, IntelliSlot only (O48 and O60 models only)</p> <p>U = IS-UNITY-DP card, factory installed (O48 and O60 models only)</p> <p>B = BACnet, Modbus, SNMP using iCOM board (O36 model only)</p>
<p>Digit 18 = Sensors</p> <p>0 = None</p> <p>S = Smoke sensor</p> <p>H = High temperature sensor</p> <p>F = Smoke and high temperature sensor</p>
<p>Digit 19 = Packaging</p> <p>P = Domestic</p> <p>C = Wood crate export</p>
<p>Digits 20, 21 = Future Use</p>
<p>Digit 22 = Factory Configuration Code</p> <p>A = No SFA's (Any Alpha letter except S)</p> <p>S = SFA</p>
<p>Digit 23-25 = Factory Configuration Number</p>

## 1.2 PFD Model Number Nomenclature

**Table 14** below describes each digit of the model number.

**Table 1.3 Prop Fan Condensing Unit Model Number Example**

1	2	3	4	5	6	7	8	9	10	11
P	F	D	0	6	7	A	—	A	L	1

**Table 1.4 Model Number Digit Definitions for Outdoor, Prop Fan Condensing Units**

Digit and Description
Digits 1, 2 = The Base Unit PF = Prop fan condensing unit
Digit 3 = Compressor Type D = Digital scroll compressor
Digit 4 = Sound Level O = Standard Z = Quiet-Line (067 models only)
Digits 5 and 6 = Nominal capacity, 1,000 BTU/hr
Digit 7 = Unit type A = Air cooled
Digit 8 = Coil Type — = Standard coil C = Coated coil (epoxy with UV topcoat)
Digit 9 = Supply Power A = 460 V / 3 ph / 60 Hz B = 575 V / 3 ph / 60 Hz (054 and 067 models only) P = 208-230 V / 1 ph / 60 Hz (037 model only) Y = 208-230 V / 3 ph / 60 Hz
Digit 10 = Head Pressure Control L = 95°F Ambient, Liebert® Lee-Temp™ H = 105°F Ambient, Liebert® Lee-Temp™ (not available on 048 model)
Digit 11 = Refrigerant 1 = R-410A, field supplied

### 1.3 Water/Glycol Condensing Unit Model Number Nomenclature

Table 16 below describes each digit of the model number.

Table 1.5 Water/Glycol Condensing Unit Model Number Example

1	2	3	4	5	6	7	8	9	10
M	T	C	3	8	W	D	A	2	1

Table 1.6 Model Number Digit Definitions for Water/Glycol Condensing Units

Digit and Description
Digits 1, 2, 3 = The base unit MTC = Mini-Mate variable capacity condensing unit
Digit 4, 5 = Nominal Capacity 38 = 38 kBtuh, 3 ton, 60 Hz 55 = 55 kBtuh, 4 ton, 60 Hz 69 = 69 kBtuh, 5 ton, 60 Hz
Digit 6 = Cooling type W = Water/Glycol cooled
Digit 7 = Head-pressure control D = 2-way high pressure fluid regulating valve T = 3-way high pressure fluid regulating valve
Digit 8 = Supply power A = 460 V / 3 ph / 60 Hz B = 575 V / 3 ph / 60 Hz (4 and 5 ton only) P = 208/230 V / 1 ph / 60 Hz (3 ton only) X = 277 V / 1 ph / 60 Hz (3 ton only) Y = 208/230 V / 3 ph / 60 Hz
Digit 9 = Compressor type 2 = 2-stage scroll
Digit 10 = Refrigerant 1 = R-410A field supplied and charged

## 1.4 Component Location, Standard Features and Optional Features

The unit component locations, standard features, and optional features are described in the submittal documents included in the [Submittal Drawings](#) on page 29.

The following tables list the relevant documents by number and title.

**Table 1.7 Component Location Drawings**

Document Number	Title
DPN004808	Evaporator Unit, 3 Ton
DPN004179	Evaporator Unit, 4 Ton and 5 Ton
DPN004180	PFD Condensing Unit, 3, 4, and 5 Ton
DPN004989	MTC Condensing Unit, 3, 4, and 5 Ton

**Table 1.8 Standard and Optional Feature Submittals**

Document Number	Title
DPN004798	3 Ton Unit Standard Features
DPN004799	3 Ton DX Fan/Coil Module Optional Features
DPN004052	4 Ton and 5 Ton Unit Standard Features
DPN004053	4 Ton and 5 Ton DX Fan/Coil Module Optional Features
DPN004804	3 Ton PFD - Prop Fan Condensing Module Standard and Optional Features
DPN004325	4 Ton PFD - Prop Fan Condensing Module Standard and Optional Features
DPN004054	5 Ton PFD - Prop Fan Condensing Module Standard and Optional Features
DPN004894	3, 4, and 5 Ton MTC Condensing Module Standard and Optional Features

## 1.5 System Controls

The Liebert® Mini-Mate is controlled by the Liebert® iCOM™ Control System.

The touch screen display wall box is field wired to the iCOM controller inside the unit and may be placed up to 300 ft. (91.4 m) from the evaporator unit. The temperature and humidity sensor is supplied by the factory with a 30-ft. (9.1-m) cable and is field connected to the iCOM controller. A set of common alarm terminals and shut-down terminals is factory wired to the iCOM controller. The unit automatically restarts after a power outage.

The control features are described in the submittal documents included in the [Submittal Drawings](#) on page 29.

The following table lists the relevant documents by number and title.

**Table 1.9 System Control Feature Submittals**

Document Number	Title
DPN004803	3 Ton iCOM Wall Mount Field Connection
DPN004238	4 and 5 Ton iCOM Wall Mount Field Connection
DPN004840	3 Ton iCOM Unit-to-Unit Network Connection
DPN004841	4 and 5 Ton iCOM Unit-to-Unit Network Connection

## 2 SYSTEM DATA

Table 2.1 Air Cooled System Capacity and Physical Data, 60 Hz

Evaporator Model		MT036	MT048	MT060
Condensing Unit		PFD037	PFD054	PFD067
<b>DX Evaporator- Net Capacity Data at 95° (35°C) Outdoor Ambient</b>				
80°F DB, 62.7°F WB, 52°F DP, 38% RH (26.7°C DB, 17.1°C WB)	Total, kw, (BTUH)	9.8 (33,400)	15.0 (51,200)	18.1 (61,800)
	Sensible, kw (BTUH)	9.2 (31,,300)	15.0 (51,200)	18.1 (61,800)
75°F DB, 61°F WB, 52°F DP, 44% RH (23.9°C DB, 16.1°C WB)	Total, kw (BTUH)	9.5 (32,400)	14.4 (49,100)	17.4 (59,300)
	Sensible, kw (BTUH)	8.2 (28,000)	13.4 (45,700)	16.2 (55,300)
72°F DB, 60°F WB, 52°F DP, 50% RH (22.2°C DB, 15.5°C WB)	Total, kw (BTUH)	9.3 (31,900)	14.1 (48,100)	17.1 (58,300)
	Sensible, kw (BTUH)	7.6 (25,800)	12.2 (41,600)	14.9 (50,800)
<b>Fan Data - Evaporator</b>				
Return Air Volume, ACFM (ACMH)		1,350 (2,294)	2,200 (3,738)	2,750 (4,672)
Fan Motor hp (W), operating		0.5 (170)	2.6 (860)	3.4 (1,140)
External Static Pressure, in.w.g. (Pa)		0.2 (50)		
<b>Evaporator Coil - Copper Tube/Aluminum Fin</b>				
Face Area, ft <sup>2</sup> (m <sup>2</sup> )		3.1 (0.3)	5.6 (0.5)	
Coil Rows		3	4	
Max Face Velocity, fpm (m/s)		435 (2.2)	393 (2.0)	482 (2.4)
Unit Operating Weight, lbs, (kg)		328 (149)	498 (226)	498 (226)
<b>Electric Reheat Capacity (Includes Fan Motor), kW (kBtuh)</b>				
All Voltages		7.4 (25.2)	10.8 (36.8)	11.2 (38.2)
<b>SCR Electric Reheat Capacity (Includes Fan Motor), kW (kBtuh)</b>				
208 V, 230 V and 460 V only		—	10.8 (36.8)	16.2 (55.3)
<b>Humidifier Data - Steam Generator Type</b>				
Steam capacity (nominal), lb/hr (kg/hr)		4.3 (2.0)	8 (3.6)	
Electrical Input Power, kW		1.5	2.8	
<b>Evaporator Connection Sizes</b>				
Liquid line Diameter, in		3/8"	1/2"	
Suction Line Diameter, in		7/8"	1-1/8"	
Condensate Drain		3/4" - NPT Female		
<b>Condensing Unit</b>				
Condensing Unit Inlet Air Temperature		95°F (35°C)		
Coil Face Area, ft <sup>2</sup> (m <sup>2</sup> )		7.7 (0.72)	10.5 (1.0)	

**Table 2.1 Air Cooled System Capacity and Physical Data, 60 Hz (continued)**

Evaporator Model	MT036	MT048	MT060
Condensing Unit	PFD037	PFD054	PFD067
Rows of Coil	2	3	
ACFM (ACMH)	3,000 (5,097)	4,200 (7,140)	
Motor, Hp (W)	0.2 (149)	0.5 (373)	
Unit Operating Weight, lb. (kg)	244 (111)	351 (159)	
1. Some options or combinations of options may result in reduced air flow. Consult factory for recommendations. 2. Net capacity data has fan motor heat factored in for all ratings. 3. Consult factory for alternate performance outputs.			

**Table 2.2 Water Cooled System Capacity and Physical Data, 60 Hz**

Evaporator Model	MT036	MT048	MT060	
Condensing Unit	MTC38W	MTC55W	MTC69W	
DX Evaporator - Net Capacity Data with 83°F (28°C) Entering and 95°F (35°C) Leaving Fresh Water Temperatures				
80°F DB, 62.7°F WB, 52°F DP, 38% RH (26.7°C DB, 17.1°C WB)	Total, kW (BTUH)	12.1 (41,300)	17.4 (59,400)	20.2 (68,900)
	Sensible, kW (BTUH)	10.6 (36,200)	16.4 (56,000)	19.4 (66,200)
	Flow Rate, GPM (lps)	8.3 (0.5)	12.8 (0.8)	14.8 (0.9)
	Unit Pressure Drop, ft. of Water (kPa)	14.0 (41.9)	22.0 (65.8)	30.0 (89.7)
	Heat Rejection, kW (BTUH)	14.6 (49,800)	22.4 (76,400)	25.9 (88,400)
75°F DB, 61°F WB, 52°F DP, 44% RH (23.9°C DB, 16.1°C WB)	Total, kW (BTUH)	11.8 (40,300)	16.8 (57,300)	19.5 (66,500)
	Sensible, kW (BTUH)	9.5 (32,400)	14.5 (49,500)	17.2 (58,700)
	Flow Rate, GPM (lps)	8.1 (0.5)	12.4 (0.8)	14.4 (0.9)
	Unit Pressure Drop, ft. of Water (kPa)	13.0 (38.9)	21.0 (62.8)	28.0 (83.7)
	Heat Rejection, kW (BTUH)	14.2 (48,500)	21.7 (74,000)	25.2 (86,000)
72°F DB, 60°F WB, 52°F DP, 50% RH (22.2°C DB, 15.5°C WB)	Total, kW (BTUH)	11.5 (39,200)	16.5 (56,300)	19.0 (64,800)
	Sensible, kW (BTUH)	8.9 (30,400)	13.4 (45,700)	15.9 (54,300)
	Flow Rate, GPM (lps)	8.0 (0.5)	12.2 (0.8)	14.2 (0.9)
	Unit Pressure Drop, ft of Water (kPa)	13.0 (38.9)	20.0 (59.8)	27.0 (80.7)
	Heat Rejection, kW (BTUH)	14.0 (47,800)	21.4 (73,000)	24.8 (84,600)
Fan Data - Evaporator				
Return Air Volume ACFM (ACMH)	1,350 (2,294)	2,200 (3,738)	2,750 (4,672)	

**Table 2.2 Water Cooled System Capacity and Physical Data, 60 Hz (continued)**

Evaporator Model	MT036	MT048	MT060
Condensing Unit	MTC38W	MTC55W	MTC69W
Fan Motor HP (W), Operating	0.5 (170)	2.6 (860)	3.4 (1,140)
External Static Pressure, in.w.g. (Pa)	0.2 (50)		
Evaporator Coil - Copper Tube/Aluminum Fin			
Face Area, ft <sup>2</sup> (m <sup>2</sup> )	3.1 (0.3)	5.6 (0.5)	
Coil Rows	3	4	
Max Face Velocity, fpm (m/s)	435 (2.2)	393 (2.0)	482 (2.4)
Unit Operation Weight, lbs. (kg)	328 (149)	498 (226)	498 (226)
Electric Reheat Capacity (Includes Fan Motor), kw (kBtuh)			
All Voltages	7.4 (25.2)	10.8 (36.8)	11.2 (38.2)
SCR Electric Reheat Capacity (Includes Fan Motor), kw (kBtuh)			
208 V, 230 V and 460 V only	-----	10.8 (36.8)	16.2 (55.3)
Humidifier Data - Steam Generator Type			
Steam Capacity (Nominal), lb/hr (kg/hr)	4.3 (2.0)	8 (3.6)	
Electrical Input Power, kW	1.50	2.80	
Piping Connection Sizes - Water/Glycol Cooled			
Water/Glycol Supply, O.D. Copper	7/8"	1-1/8"	1-1/8"
Water/Glycol Return, O.D. Copper	7/8"	1-1/8"	1-1/8"
Condensate Drain, NPT Female	3/4"	3/4"	3/4"
Fluid Volumes - Water/Glycol Cooled			
Water/Glycol Volume, gal (l)	1.1 (4.1)		
Condensing Unit			
Unit Operating Weight, lb (kg)	237 (107.5)	237 (107.5)	237 (107.5)
<p>1. Some options or combinations of options may result in reduced air flow. Consult factory for recommendations.</p> <p>2. Net capacity data has fan motor heat factored in for all ratings.</p> <p>3. Consult factory for alternate performance outputs.</p>			

**Table 2.3 Glycol Cooled System Capacity and Physical Data, 60 Hz**

Evaporator Model		MT036	MT048	MT060
Condensing Unit		MTC38W	MTC55W	MTC69W
DX Evaporator - Net Capacity Data with 104°F (40°C) Entering and 155°F (68°C) Leaving 40% Propylene Glycol Temperatures				
80°F DB, 62.7°F WB, 52°F DP, 38% RH (26.7°C DB, 17.1°C WB)	Total, kW (BTUH)	10.9 (37,200)	15.5 (52,900)	17.9 (61,100)
	Sensible, kW (BTUH)	9.9 (33,800)	15.3 (52,200)	17.9 (61,100)
	Flow Rate, GPM (lps)	9.5 (0.6)	14.4 (0.9)	16.8 (1.1)
	Unit Pressure Drop, ft. of Water (kPa)	21.0 (62.8)	32.0 (95.7)	43.0 (128.6)
	Heat Rejection, kW (BTUH)	14.3 (48,800)	21.5 (73,400)	25.1 (85,600)
75°F DB, 61°F WB, 52°F DP, 44% RH (23.9°C DB, 16.1°C WB)	Total, kW (BTUH)	10.5 (35,800)	14.8 (50,500)	17.1 (58,300)
	Sensible, kW (BTUH)	8.9 (30,400)	13.6 (46,400)	16.1 (54,900)
	Flow Rate, GPM (lps)	9.3 (0.6)	13.9 (0.9)	16.3 (1.0)
	Unit Pressure Drop, ft. of Water (kPa)	20.0 (59.8)	30.0 (89.7)	40.0 (119.6)
	Heat Rejection, kW (BTUH)	13.9 (47,400)	20.8 (71,000)	24.2 (82,600)
72°F DB, 60°F WB, 52°F DP, 50% RH (22.2°C DB, 15.5°C WB)	Total, kW (BTUH)	10.3 (35,100)	14.5 (49,500)	16.7 (57,000)
	Sensible, kW (BTUH)	8.3 (28,300)	12.5 (42,700)	14.8 (50,500)
	Flow Rate, GPM (lps)	9.2 (0.6)	13.7 (0.9)	16.0 (1.0)
	Unit Pressure Drop, ft. of Water (kPa)	19.0 (56.8)	29.0 (86.7)	39.0 (116.6)
	Heat Rejection, kW (BTUH)	13.7 (46,700)	20.5 (69,900)	23.9 (81,600)
Fan Data - Evaporator				
Return Air Volume ACFM (ACMH)		1,350 (2,294)	2,200 (3,738)	2,750 (4,672)
Fan Motor HP (W), Operating		0.5 (170)	2.6 (860)	3.4 (1,140)
External Static Pressure, in.w.g. (Pa)		0.2 (50)		
Evaporator Coil - Copper Tube/Aluminum Fin				
Face Area, ft <sup>2</sup> (m <sup>2</sup> )		3.1 (0.3)	5.6 (0.5)	
Coil Rows		3	4	
Max Face Velocity, fpm (m/s)		435 (2.2)	393 (2.0)	482 (2.4)
Unit Operation Weight, lbs. (kg)		328 (149)	498 (226)	498 (226)
Electric Reheat Capacity (Includes Fan Motor), kw (kBtuh)				
All Voltages		7.4 (25.2)	10.8 (36.8)	11.2 (38.2)
SCR Electric Reheat Capacity (Includes Fan Motor), kw (kBtuh)				
208 V, 230 V and 460 V only		-----	10.8 (36.8)	16.2 (55.3)

**Table 2.3 Glycol Cooled System Capacity and Physical Data, 60 Hz (continued)**

Evaporator Model	MT036	MT048	MT060
Condensing Unit	MTC38W	MTC55W	MTC69W
Humidifier Data - Steam Generator Type			
Steam Capacity (Nominal), lb/hr (kg/hr)	4.3 (2.0)	8 (3.6)	
Electrical Input Power, kW	1.5	2.8	
Piping Connection Sizes - Water/Glycol Cooled			
Water/Glycol Supply, O.D. Copper	7/8"	1-1/8"	1-1/8"
Water/Glycol Return, O.D. Copper	7/8"	1-1/8"	1-1/8"
Condensate Drain, NPT Female	3/4"	3/4"	3/4"
Fluid Volumes - Water/Glycol-Cooled			
Water/Glycol Volume, gal (l)	1.1 (4.1)		
Condensing Unit			
Unit Operating Weight, lb (kg)	237 (107.5)	237 (107.5)	237 (107.5)
<p>1. Some options or combinations of options may result in reduced air flow. Consult factory for recommendations.</p> <p>2. Net capacity data has fan motor heat factored in for all ratings.</p> <p>3. Consult factory for alternate performance outputs.</p>			

## 2.1 Operating Conditions

The Liebert® Mini-Mate must be operated in a conditioned space within the operating envelope that ASHRAE recommends for data centers. Operating the Mini-Mate outside of this envelope can decrease equipment reliability. Refer to ASHRAE's publication, "Thermal Guidelines for Data Processing Environments."

### 2.1.1 Cooling, Humidification and Dehumidification

For operation in the Cooling, Humidification or Dehumidification modes, the Liebert® Mini-Mate unit's return air requirements for proper unit operation are:

- Maximum dew point of 59°F (15°C)
- Minimum 65°F (20°C) DB
- Maximum 85°F (29.4°C) DB

### 2.1.2 Heating

For operation in the Heating mode, the Liebert® Mini-Mate unit's return air requirements for proper unit operation are:

- Maximum humidity: less than 80% RH and less than 64°F (17.8°C) dew point.
- Maximum dry bulb of 80°F (27°C)

### 3 ELECTRICAL POWER REQUIREMENTS

Table 3.1 Mini-Mate Evaporator Unit MT036, 3 Ton (10.5 kW) Electrical Data

Supply Power:	208/230-1-60	208/230-3-60	460-3-60
<b>Cooling Only</b>			
FLA	6.7	6.7	3.1
WSA	8.4	8.4	3.9
OPD	15	15	15
<b>With Electric Reheat (no humidifier)</b>			
FLA	31.7	23.5	11.5
WSA	39.6	29.4	14.4
OPD	40	30	15
<b>With Humidifier (no reheat)</b>			
FLA	13.1	13.1	6.5
WSA	16.4	16.4	8.1
OPD	20	20	15
<b>With Electric Reheat and Humidifier</b>			
FLA	38.1	29.9	14.9
WSA	47.6	37.4	18.6
OPD	50	35	20

**Table 3.2 Mini-Mate Evaporator Unit MT048, 4 Ton (14 kW) Electrical Data**

<b>Supply Power:</b>	<b>208-3-60</b>	<b>230-3-60</b>	<b>460-3-60</b>	<b>575-3-60</b>
<b>Cooling Only</b>				
FLA	6.1	6.1	3.2	2.6
WSA	7.6	7.6	4.0	3.3
OPD	15	15	15	15
<b>With Electric Reheat (no humidifier)</b>				
FLA	33.9	31.2	15.8	12.6
WSA	42.4	39.0	19.8	15.8
OPD	45	40	20	15
<b>With SCR Electric Reheat (no humidifier)</b>				
FLA	33.9	31.2	15.8	12.6
WSA	42.4	39.0	19.8	15.8
OPD	45	40	20	15
<b>With Humidifier (no reheat)</b>				
FLA	15.0	14.6	7.7	6.0
WSA	18.8	18.3	9.6	7.5
OPD	20	20	15	15
<b>With Electric Reheat and Humidifier</b>				
FLA	42.8	39.7	20.3	16.0
WSA	53.5	49.6	25.4	20.0
OPD	60	50	30	25
<b>With SCR Electric Reheat and Humidifier</b>				
FLA	42.8	39.7	20.3	16.0
WSA	53.5	49.6	25.4	20.0
OPD	60	50	30	25

**Table 3.3 Mini-Mate Evaporator Unit MT060, 5 Ton (17.5 kW) Electrical Data**

Supply Power:	208-3-60	230-3-60	460-3-60	575-3-60
<b>Cooling Only</b>				
FLA	8.1	8.1	3.2	2.6
WSA	10.1	10.1	4.0	3.3
OPD	15	15	15	15
<b>With Electric Reheat (no humidifier)</b>				
FLA	35.9	33.2	15.8	12.6
WSA	44.9	41.5	19.8	15.8
OPD	45	40	20	15
<b>With SCR Electric Reheat (no humidifier)</b>				
FLA	49.7	45.8	22.0	17.7
WSA	62.1	57.3	27.5	22.1
OPD	70	60	30	25
<b>With Humidifier (no reheat)</b>				
FLA	17.0	16.6	7.7	6.0
WSA	21.3	20.8	9.6	7.5
OPD	25	25	15	15
<b>With Electric Reheat and Humidifier</b>				
FLA	44.8	41.7	20.3	16.6
WSA	56.0	52.1	25.4	20.0
OPD	60	60	30	25
<b>With SCR Electric Reheat and Humidifier</b>				
FLA	58.6	54.3	26.5	21.1
WSA	73.3	67.9	33.1	26.4
OPD	80	70	35	30

Table 3.4 PFD Outdoor Condensing Unit Electrical Data

Supply Power:	208/230-1-60	208/230-3-60	460-3-60	575-3-60
<b>PFD037A-*L1, 95° F Ambient Model</b>				
FLA	22.0	14.4	7.6	—
WSA	27.2	17.7	9.3	—
OPD	45	30	15	—
<b>PFD037A-*H1, 105° F Ambient Model</b>				
FLA	24.0	16.4	8.6	—
WSA	29.2	19.7	10.3	—
OPD	45	30	15	—
<b>PFD054A-*L1, 95° F Ambient Model</b>				
FLA	—	23.4	10.3	7.6
WSA	—	28.4	12.5	9.2
OPD	—	45	20	15
<b>PFD067A-*L1, 95° F Ambient Model</b>				
FLA	—	26.1	12.6	9.5
WSA	—	31.8	15.3	11.6
OPD	—	50	25	15
<b>PFD067A-*H1, 105° F Ambient Model</b>				
FLA	—	26.2	12.6	9.7
WSA	—	31.9	15.3	11.8
OPD	—	50	25	15
<b>PFDZ67A-*L1, Quiet-Line Model</b>				
FLA	—	24.5	11.8	9.7
WSA	—	30.2	14.5	11.8
OPD	—	50	25	15

**Table 3.5 MTC Indoor Water/Glycol Cooled Condensing Unit Electrical Data**

Supply Power:	208/230-1-60	277-1-60	208/230-3-60	460-3-60	575-3-60
<b>MTC38W</b>					
FLA	20.0	17.9	15.8	6.9	—
WSA	25.0	22.4	19.8	8.6	—
OPD	45	40	35	15	—
<b>MTC55W</b>					
FLA	—	—	18.4	8.1	6.1
WSA	—	—	23.0	10.1	7.6
OPD	—	—	40	15	15
<b>MTC69W</b>					
FLA	—	—	19.6	9.4	7.1
WSA	—	—	24.5	11.8	8.9
OPD	—	—	40	20	15

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## 4 PLANNING DATA AND GUIDELINES

The unit dimensions, pipe connection locations, and piping schematics are described in the submittal documents included in the [Submittal Drawings](#) on page 29.

- For the indoor evaporator, confirm that the room is properly insulated and has a sealed vapor barrier, and for proper humidity control, keep outside or fresh air to an absolute minimum (less than 5% of total air circulated in the room).
- Allow at least the minimum recommended clearances for maintenance and service. See the appropriate submittal drawings for dimensions.
- We recommend installing a water detection system. Contact your Vertiv representative for information.
- Be mindful of the placement of the outdoor condensing unit in relation to the connected evaporator unit, other outside units, barriers, and walls for air flow clearance, equivalent piping distances, and differences in elevation between the condensing unit and connected evaporator unit.
- When applications do not meet or exceed any of these specifications, contact your Vertiv representative.

### 4.1 Planning Dimensions

The unit dimensions described in the submittal documents included in the [Submittal Drawings](#) on page 29.

The following table lists the relevant documents by number and title.

**Table 4.1 Dimension Planning Drawings**

Document Number	Title
<b>Indoor Evaporator</b>	
DPN004800	Cabinet dimensions, 3 Ton DX Module
DPN004055	Cabinet Dimensions, 4 Ton and 5 Ton DX module
<b>Indoor Evaporator Filter and Ducting Options</b>	
DPN004805	Dimensional Data, Filter Box and Duct Flange, 3 Ton
DPN004807	Dimensional Data, Air Distribution Plenum, 3 Ton
DPN004166	Dimensional Data, Filter box and Duct Flange, 4 and 5 Ton
DPN004842	Dimensional Data, Bottom Discharge Grille, 4 and 5 Ton
<b>Outdoor Condensing Unit</b>	
DPN004058	Cabinet Dimensions, 5 Ton, Top Discharge
DPN004063	Cabinet dimensions, 3, 4, and 5 Ton, Horizontal Discharge
DPN004066	Optional anchoring plan, 3, 4, and 5 Ton, Horizontal Discharge
<b>Indoor Condensing Unit</b>	
DPN004889	Cabinet Dimensions, 3, 4, and 5 Ton Water/Glycol Condensing Unit

## 4.2 Mini-Mate Unit Weights

Table 4.2 Mini-Mate Unit Weights

Model #	Weight, lb (kg)
MT036	328 (149)
MT048*	498 (226)
MT060*	498 (226)
* for 575 V units, add 32 lb. (14.5 kg)	

## 4.3 PFD Unit Weights

Table 4.3 PFD Unit Weights

Model #	Weight, lb (kg)
PFD037A-L	244 (111)
PFD037A-H	351 (159)
PFD054A-L	351 (159)
PFD067A-L	351 (159)
PFD067A-H	488 (222)
PFDZ67A-L	488 (222)

## 4.4 Water/Glycol Condensing Unit Weights

Table 4.4 Water/Glycol Condensing Unit Weights

Model #	Weight, lb. (kg)
MTC38W	237 (107.5)
MTC55W	237 (107.5)
MTC69W	237 (107.5)

## 5 PIPING AND REFRIGERANT REQUIREMENTS

The pipe connection locations, piping general arrangement and schematics are described in the submittal documents included in the [Submittal Drawings](#) on page 29.

The following tables list the relevant documents by number and title.

**Table 5.1 Piping General Arrangement Drawings**

Document Number	Title
<b>Air Cooled System</b>	
DPN004060	Piping Arrangement, 3, 4 and 5 Ton Split System
<b>Water/Glycol-cooled System</b>	
DPN004893	Piping Arrangement, 3, 4 and 5 Ton Split System
<b>Outdoor Condensing Unit</b>	
DPN004062	Piping Arrangement, Air Cooled Condensing Unit
<b>Indoor Condensing Unit</b>	
DPN004893	Piping Arrangement, Water/Glycol Cooled Condensing Unit

**Table 5.2 Piping Connection Drawings**

Document Number	Title
<b>Indoor Evaporator</b>	
DPN004801	Primary Connection Locations, 3 Ton DX Module
DPN004806	Condensate-pump connection locations, 3-ton
DPN004056	Primary Connection Locations, 4 Ton and 5 Ton DX Module
DPN004077	Condensate Pump Connection Locations, 4 Ton and 5 Ton
<b>Outdoor Condensing Unit</b>	
DPN004059	Primary Connection Locations, Top Discharge
DPN004064	Primary Connection Locations, Horizontal Discharge
<b>Indoor Condensing Unit</b>	
DPN004972	Primary Connection Locations, Water/glycol Cooled

## 5.1 Refrigerant Line Sizes and Equivalent Lengths

The following tables list the information required to field install the refrigerant piping for the system.

**Table 5.3 Recommended Refrigerant Line Sizes, O.D. cu by Equivalent Length**

System Models		Equivalent Length, ft. (m)				
		50 (15)	75 (23)	100 (30)	125 (38)	150 (45)
MT036/PFD037A-*L, PFD037A-*H or MTC38W	Suction line, in.	7/8	7/8	7/8	7/8	7/8
	Liquid line, in.	1/2	1/2	1/2	1/2	1/2
MT048/PFD054A-*L or MTC55W	Suction line, in.	7/8	1-1/8 <sup>1</sup>	1-1/8 <sup>1</sup>	1-1/8 <sup>1</sup>	1-1/8 <sup>1</sup>
	Liquid line, in.	1/2	1/2	5/8	5/8	5/8
MT060/PFD067A-*L /PFDZ67A-*L or PFD067A-*H/MTC69W	Suction line, in.	1-1/8	1-1/8	1-1/8	1-1/8	1-1/8
	Liquid line, in.	1/2	5/8	5/8	5/8	5/8
Consult factory for proper line sizing for runs longer than maximum equivalent length shown.						
1. Use one line size smaller on suction lines for vertical risers.						
Source: DPN000788 Rev. 13						

### 5.1.1 Piping when Condensing Unit is Above or Below Evaporator

Refer to [Pipe Length and Condensing Unit Elevation Relative to Evaporator](#) below for the maximum vertical rise/fall between condensing unit and evaporator.

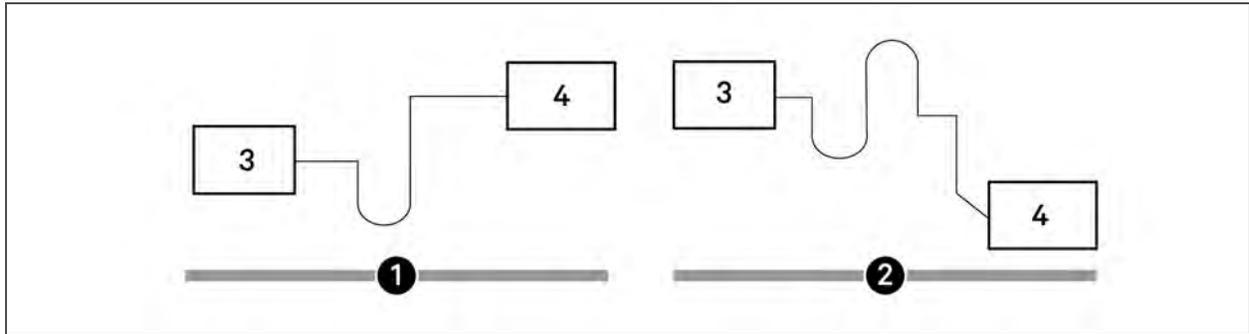
When installing remote condensing units above the evaporator, trap the suction gas line at the evaporator as shown in [Refrigerant Piping Diagram](#) on the facing page. This trap will retain refrigerant oil during the "Off" cycle. When the unit starts, oil in the trap is carried up the vertical riser and returns to the compressor.

When installing remote condensing units below the evaporator, trap the suction gas line with an inverted trap the height of the evaporator as shown in the following figure. This prevents refrigerant migration to the compressor during "Off" cycles.

**Table 5.4 Pipe Length and Condensing Unit Elevation Relative to Evaporator**

Maximum Equivalent Pipe Length, ft (m)	Maximum PFD Level Above Evaporator, ft (m)	Maximum PFD Level Below Evaporator, ft (m)
150 (45)	50 (15)	15 (4.6)

Figure 5.1 Refrigerant Piping Diagram



NOTE: Any horizontal pipe must be pitched down toward the condensing unit at a minimum rate of 1/2 in. (13 mm) per 10 ft. (3 m) to assure oil return to compressor.

Item	Description
1	Condensing unit above evaporator
2	Condensing unit below evaporator
3	Evaporator
4	Condensing unit

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## 6 ELECTRICAL CONNECTION REQUIREMENTS

### NOTICE

All power and control wiring and ground connections must be in accordance with the National Electrical Code and local codes. Refer to the equipment serial tag data for electrical requirements.

A manual electrical disconnect switch should be installed in accordance with local codes and distribution system. Consult local codes for external disconnect requirements.

**NOTE: Input power requirements: For 3-phase units, only 3 power wires and an earth ground are required.**

**NOTE: For 208-VAC, 3 ton applications, the low voltage transformer tap must be changed. Refer to the electrical schematic.**

The electrical connections are described in the submittal documents included in the [Submittal Drawings](#) on page 29.

The following table lists the relevant documents by number and title.

**Table 6.1 Electrical Field Connection Drawings**

Document Number	Title
<b>Indoor Evaporator</b>	
DPN004802	Electrical Field Connections, 3 Ton DX Module
DPN004057	Electrical Field Connections, 4 Ton and 5 Ton DX Module
<b>Outdoor Condensing Unit</b>	
DPN004168	Electrical Field Connections, Top Discharge
DPN004169	Electrical Field Connections, Horizontal Discharge
<b>Indoor Condensing Unit</b>	
DPN004895	Electrical Field Connections, Water/Glycol Condensing Unit

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## APPENDICES

### Appendix A: Technical Support and Contacts

#### A.1 Technical Support/Service in the United States

Vertiv™ Group Corporation

24x7 dispatch of technicians for all products.

1-800-543-2378

Liebert® Thermal Management Products

1-800-543-2778

Liebert® Channel Products

1-800-222-5877

Liebert® AC and DC Power Products

1-800-543-2378

#### A.2 Locations

##### United States

Vertiv Headquarters

1050 Dearborn Drive

Columbus, OH, 43085, USA

##### Europe

Via Leonardo Da Vinci 8 Zona Industriale Tognana

35028 Piove Di Sacco (PD) Italy

##### Asia

7/F, Dah Sing Financial Centre

3108 Gloucester Road

Wanchai, Hong Kong

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## Appendix B: Submittal Drawings

Table B.1 Submittal Drawing Contents

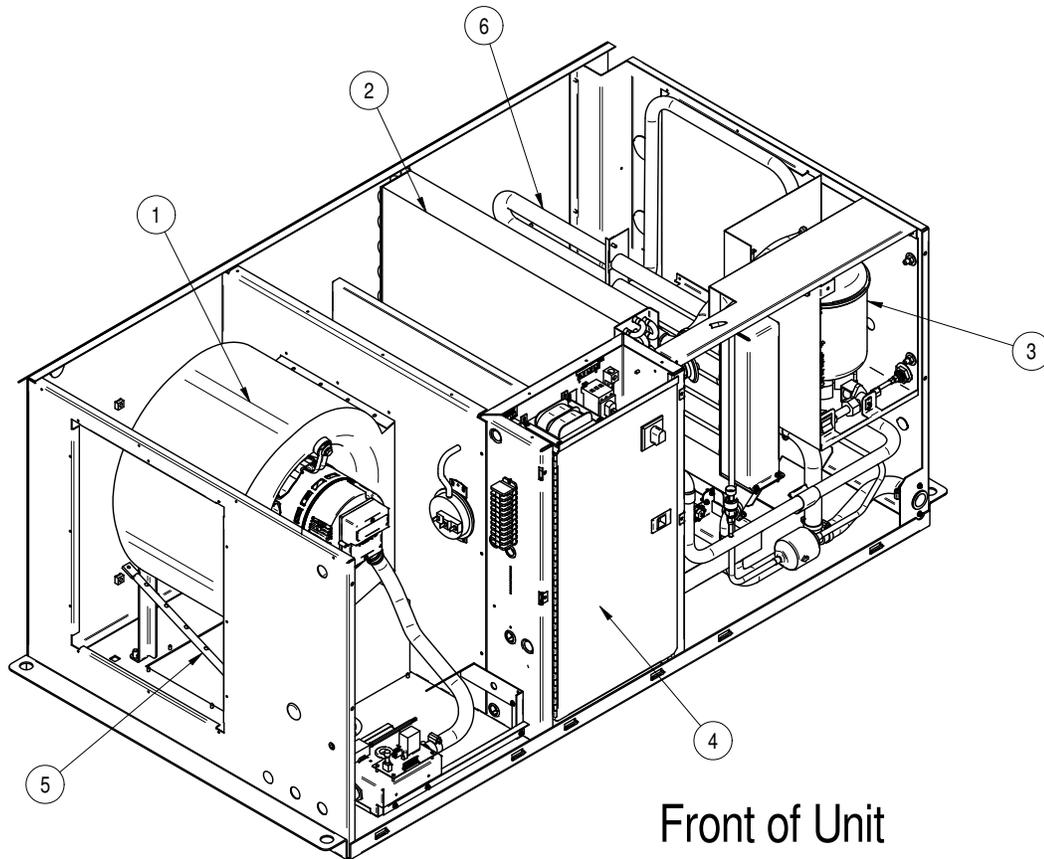
Document Number	Title
<b>Mini-Mate Component Location</b>	
DPN004808	Evaporator Unit, 3 Ton
DPN004179	Evaporator Unit, 4 Ton and 5 Ton
DPN004180	PFD Condensing Unit, 3, 4, and 5 Ton
DPN004989	MTC Condensing Unit, 3, 4, and 5 Ton
<b>Standard and Optional Features</b>	
DPN004798	3 Ton Unit Standard Features
DPN004799	3 Ton DX Fan/Coil Module Optional Features
DPN004052	4 Ton and 5 Ton Unit Standard Features
DPN004053	4 Ton and 5 Ton DX Fan/coil Module Optional Features
DPN004804	3 Ton PFD Prop Fan Condensing Module Standard and Optional Features
DPN004325	4 Ton PFD Prop Fan Condensing Module Standard and Optional Features
DPN004054	5 Ton PFD Prop Fan Condensing Module Standard and Optional Features
DPN004894	3, 4, and 5 Ton MTC Condensing Module Standard and Optional Features
<b>Mini-Mate Planning Dimensions - Split System Evaporators</b>	
DPN004800	Cabinet Dimensions, 3 Ton DX Module
DPN004055	Cabinet Dimensions, 4 Ton and 5 Ton DX Module
<b>Mini-Mate Planning Dimensions - Filter and Ducting Options</b>	
DPN004805	Dimensional Data, Filter Box and Duct Flange, 3 Ton
DPN004807	Dimensional Data, Air Distribution Plenum 3 Ton
DPN004166	Dimensional Data, Filter Box and Duct Flange 4 and 5 Ton
DPN004842	Dimensional Data, Bottom Discharge Grille, 4 and 5 Ton
<b>Outdoor Condensing Units</b>	
DPN004058	Cabinet Dimensions, 5 Ton, Top Discharge
DPN004063	Cabinet Dimensions, 3, 4, and 5 Ton Horizontal Discharge
DPN004066	Optional Anchoring Plan, 3, 4, and 5 Ton, Horizontal Discharge
<b>Indoor Condensing Units</b>	
DPN004889	Cabinet Dimensions, 3, 4, and 5 Ton, Water/Glycol Condensing Unit
<b>Mini-Mate Piping Schematics</b>	
DPN004060	Piping Arrangement, 3, 4 and 5 Ton Split System, Air Cooled
DPN004893	Piping Arrangement, 3, 4, and 5 Ton Split System

**Table B.1 Submittal Drawing Contents (continued)**

<b>Document Number</b>	<b>Title</b>
DPN004062	Piping arrangement, Air Cooled Condensing Unit
DPN004893	Piping Arrangement, Water/Glycol Cooled Condensing Unit
<b>Mini-Mate Piping Connections</b>	
DPN004801	Primary Connection Locations, 3 Ton and DX Module
DPN004806	Condensate Pump Connection Locations, 3 Ton
DPN004054	Primary Connection Locations, 4 Ton and 5 Ton DX Module
DPN004056	Primary Connection Locations, 4 Ton and 5 Ton DX Module
DPN004059	Primary Connection Locations, Top Discharge
DPN004064	Primary Connection Locations, Horizontal Discharge
DPN004972	Primary Connection Locations, Water/Glycol Cooled
DPN004077	Condensate Pump Connection Locations, 4 Ton and 5 Ton
<b>Mini-Mate Electrical Connections</b>	
DPN004802	Electrical Field Connections, 3 Ton DX Module
DPN004057	Electrical Field Connections, 4 Ton and 5 Ton DX Module
DPN004803	3 Ton iCOM Wall Mount Field Connection
DPN004238	4 and 5 Ton iCOM Wall Mount Field Connection
DPN004840	3 Ton iCOM Unit-to-Unit Network Connection
DPN004841	4 and 5 Ton iCOM Unit-to-Unit Network Connection
<b>Outdoor Condensing Unit</b>	
DPN004168	Electrical Field Connections, Top Discharge
DPN004169	Electrical Field Connections, Horizontal Discharge
<b>Indoor Condensing Unit</b>	
DPN004895	Electrical Field Connections, Water/Glycol Condensing Unit

# LIEBERT MINI-MATE VARIABLE CAPACITY

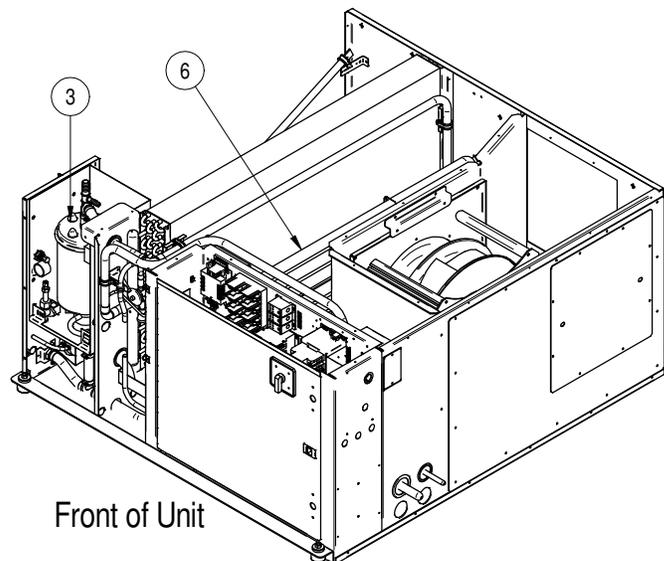
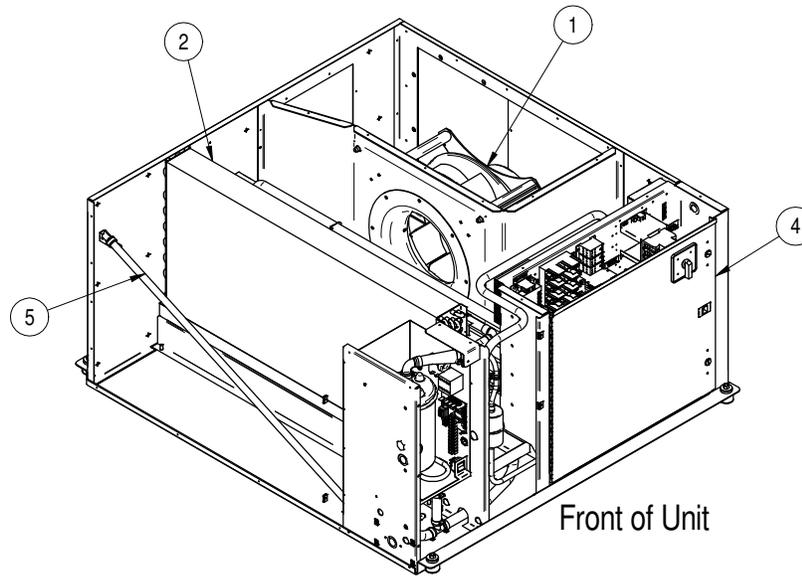
## COMPONENT LOCATION DIAGRAM 3 TON EVAPORATOR UNIT



- 1 Direct Drive Fan with Variable Speed EC Motor
- 2 Evaporator Coil
- 3 Humidifier (optional)
- 4 Electric Box
- 5 Smoke Sensor (optional)
- 6 Electric Reheat (optional)

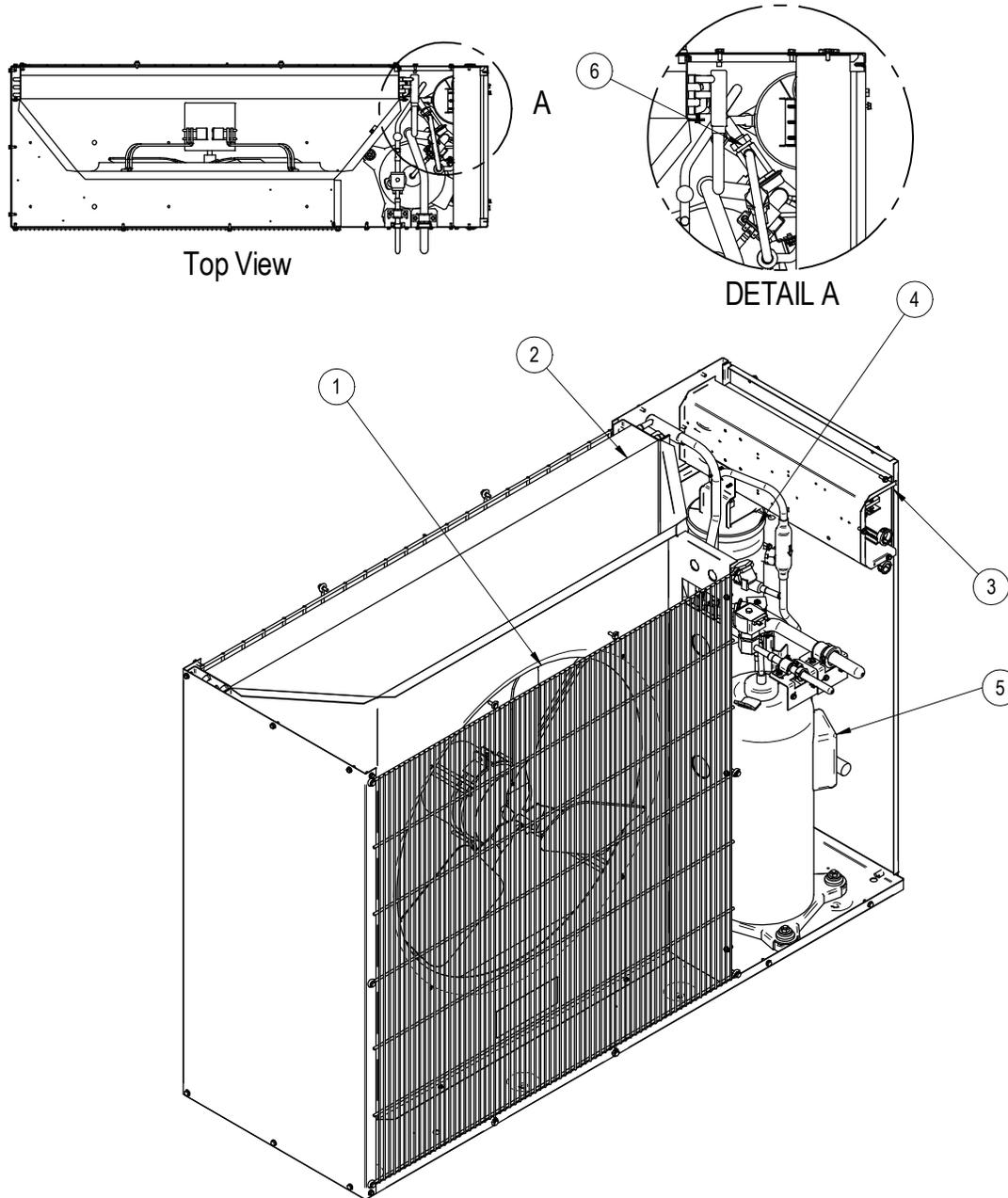
# LIEBERT MINI-MATE VARIABLE CAPACITY

## COMPONENT LOCATION DIAGRAM 4&5 TON EVAPORATOR UNIT



- 1 Variable Speed Direct Drive Fan with EC Motor
- 2 Evaporator Coil
- 3 Humidifier (optional)
- 4 Electric Box
- 5 Smoke Sensor (optional)
- 6 Electric Reheat (optional)

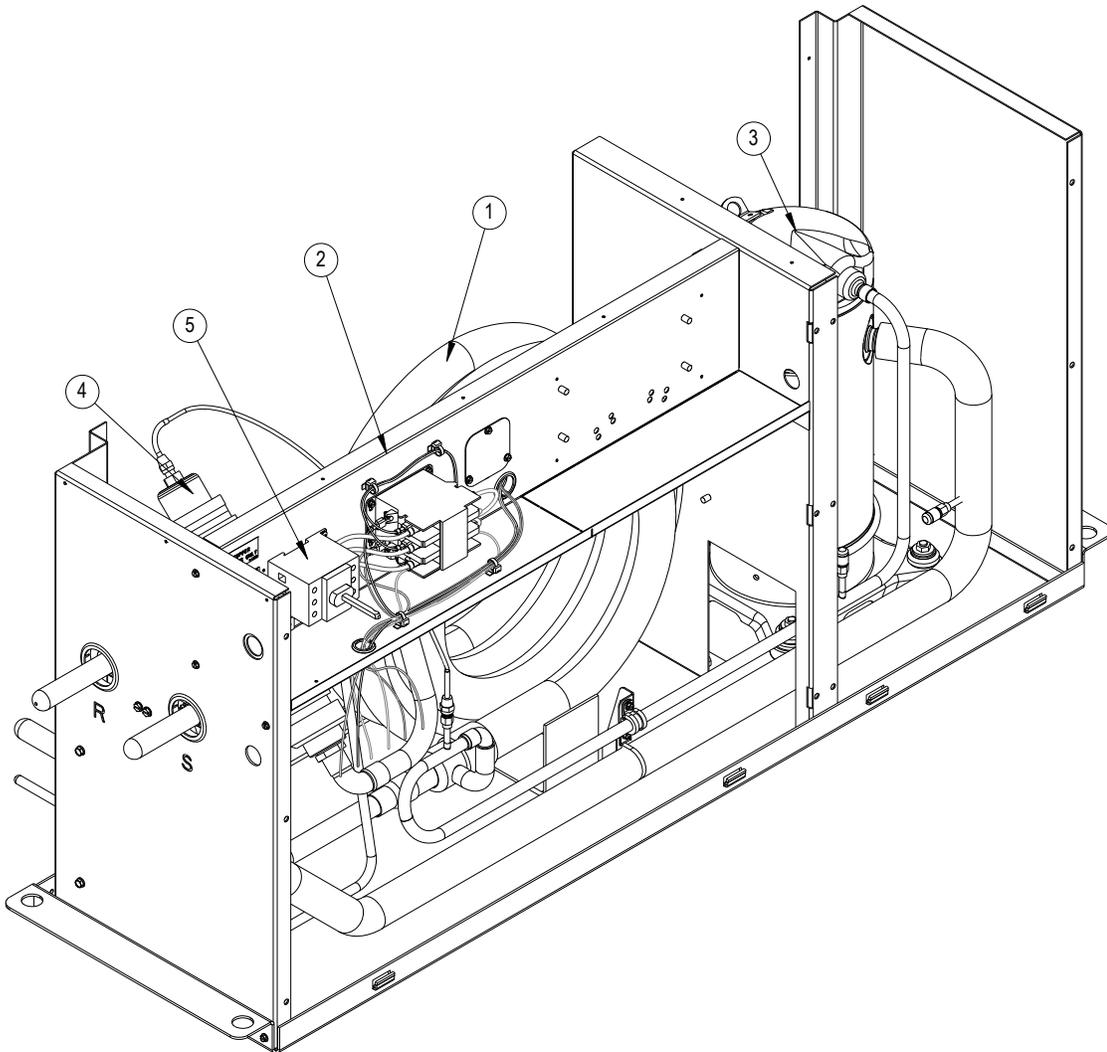
## COMPONENT LOCATION DIAGRAM TYPICAL HORIZONTAL DISCHARGE CONDENSING UNIT



- 1 Fan with Direct-drive motor
- 2 Condenser coil
- 3 Electric box
- 4 Heated Receiver
- 5 Variable-Capacity Digital Scroll Compressor
- 6 Head Pressure Control Valve (Lee-Temp)

## COMPONENT LOCATION DIAGRAM

### 3/4/5 TON WATER/GLYCOL COOLED INDOOR CONDENSING UNIT



1. Condenser coil
2. Electric box
3. Scroll Compressor
4. Water Regulating Valve
5. Disconnect switch



# LIEBERT MINI-MATE VARIABLE CAPACITY

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## STANDARD FEATURES

### 3 TON DIRECT EXPANSION FAN/COIL MODULE

#### STANDARD FEATURES

**EVAPORATOR COIL** Constructed of rifled copper tubes in a staggered tube pattern. Tubes are expanded into continuous high efficiency aluminum lance type fins. Coil is set in condensate drain pan, with float switch for unit shutdown. The evaporator drain is internally trapped.

**REFRIGERATION SYSTEM** Single refrigeration circuit, includes a liquid line filter drier, externally equalized expansion valve, and a suction pressure transducer. The module is pre-charged with nitrogen and sealed. R-410A refrigerant must be field supplied and field charged by others.

**FAN ASSEMBLY** Centrifugal type, double width, double inlet with Electronically Commutated (EC) motor. The fan speed shall be variable and automatically regulated by the Liebert iCOM® control through all modes of operation. The fan shall be located to draw air through the coil to ensure even air distribution and maximum coil performance.

**LIEBERT iCOM® CONTROL SYSTEM** The Liebert iCOM® controls the Liebert Mini-Mate Variable Capacity and enables Unit-to-Unit communication with other Mini-Mate Variable Capacity units. The Liebert iCOM® control provides built-in IS-UNITY-DP functionality for connectivity to Building Management Systems (BMS). Protocols supported for communication to the BMS include BACnet/Modbus IP, BACnet/Modbus 485 and SNMP v1, v2, v3. A dedicated Ethernet and RS485 port for BMS connectivity are available via the iCOM internal control board inside the unit. Field wiring to BMS or the local network is required.

**TOUCH SCREEN DISPLAY** The standard user interface is a remote wall mountable 9 inch color touch screen which presents system information and allows all parameters to be viewed and adjusted. The touch screen display comes in a plastic housing for mounting on the wall and is shipped loose with the unit.

**TEMPERATURE AND HUMIDITY SENSORS** are mounted in an attractive case with 30 ft. (9m) of cable, it is shipped loose and ready to be field mounted on the room wall or in unit return air stream and field wired to the Liebert iCOM® Control board.

**CABINET AND CHASSIS** Constructed of galvanized steel for strength and corrosion resistance with thermal/acoustical insulation to reduce sound levels and prevent condensation. Removable panels allow access to the electric panel or refrigeration components for service or maintenance. Hanging brackets are integral to the chassis with vibration isolators and hardware provided for field supplied 3/8" threaded suspension rods.

**LOCKING UNIT DISCONNECT SWITCH** includes a "Locking-Type" factory-mounted disconnect switch providing unit with a 5,000 Amp short circuit current rating (SCCR). Disconnect switch is mounted internally with locking and lockable handle operational from outside the unit. Access to the high voltage electric panel can only be obtained with the switch in the "off" position, and the handle is lockable to support lockout/tagout safety programs.

**UNIT PROTECTIONS AND CONTACTS** include a filter clog switch, common alarm contact and remote shutdown contacts.

- **Filter clog switch** is provided to activate an iCOM® alarm when the pressure drop across the filter exceeds the customer adjustable level. Switch is adjustable outside the cabinet.
- **Common Alarm Contact** is one set of normally open contacts which close for remote indication of alarms.
- **Remote Shutdown Contact** allows unit shutdown based on external input.



# LIEBERT MINI-MATE VARIABLE CAPACITY

## OPTIONAL FEATURES 3 TON DIRECT EXPANSION FAN/COIL MODULE

### OPTIONAL FEATURES (Split DX Systems)

**ELECTRIC REHEAT** Electric low watt density 304 stainless steel fin tubular reheat element provides one stage of reheat to maintain room dry bulb temperature during dehumidification and is protected by one automatic reset temperature switch and one manual reset temperature safety switch.

**STEAM GENERATING CANISTER HUMIDIFIER** is housed in a steel enclosure and includes a replaceable canister with all supply and drain valves, 1" (25mm) air gap on fill line, inlet strainer, steam distributor and electronic controls, including high water indicator. System automatically fills and drains and maintains the required water level based on conductivity. Humidifier Problem Alarm annunciates touchscreen display.

**HIGH TEMPERATURE SENSOR** senses the return air temperature, shuts down the unit if temperature reaches 125°F (52°C) and is a manual reset device not meant to replace any fire detection system that may be required by local or national codes.

**SMOKE SENSOR** samples the return air, shuts down the unit upon detection, and sends visual and audible alarm. This smoke sensor is not intended to function as or replace any room smoke detection system that may be required by local or national codes.

**LOW VOLTAGE TERMINAL PACKAGE** consists of Two (2) additional remote input shutdown terminals, Two(2) extra common alarm N/O output contacts, One(1) main fan auxiliary N/O output contact, One(1) remote humidifier N/O output contact, and One(1) Liqui-TECT input terminals (Liqui-TECT priced separately)

### SHIP LOOSE OPTIONS

**FILTER BOX** is constructed of galvanized steel, supplied with one nominal 20" (508mm) x 20" (508 mm) x 4" (102 mm) deep pleated MERV 8 filters (based on ASHRAE 52.2-2007). The box is provided with a 3/4" (19 mm) duct flange. The filter is accessible via a removable access door, without shutting the unit down. The filter box option also includes a 3/4" (19 mm) discharge air duct collar.

**CONDENSATE PUMP** has a capacity of 7.5 GPM (28.4 l/m) at 10 ft feet of head for 460V units, and 5.1 GPM (19.3 l/m) for 208/230 volt units at 10 ft. of head. Pump assembly is complete with pump, motor assembly, reservoir, integral float switch, and auxiliary safety float switch to shut unit off in event of pump failure. Pump assembly is designed to mount on the side of the evaporator (indoor) module discharge duct, or other suitable means to allow condensate drainage into the reservoir. The condensate pump is field-wired to the evaporator/fan-coil electric panel for both power supply and float switch interlock. Separate power feed is not necessary.

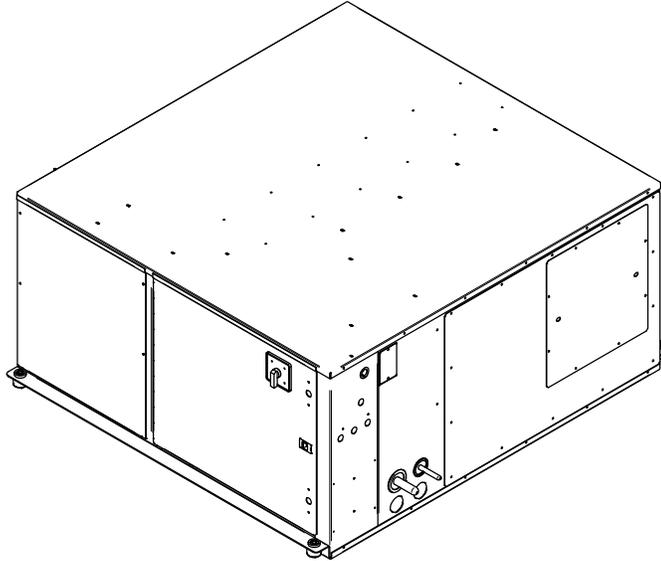
**DISTRIBUTION PLENUM** Easily installed, self-contained air distribution plenum provides air discharge in three directions. The plenum is supplied with a nominal 16" (406mm) x 25" (535mm) x 4" (102mm) deep pleated MERV 8 filter (based on ASHRAE 52.2-2007).

**LT410 POINT LEAK DETECTION** supervised Liqui-TECT sensor with a painted enclosure that senses a leak via two height adjustable probes. The sensor has two common alarm relay outputs that can be unit monitored using the optional Low Voltage Terminal Package. The sensor requires 24VAC power input. Optional wall outlet 24VAC transformer available.



# LIEBERT MINI-MATE VARIABLE CAPACITY

## STANDARD FEATURES 4 & 5 TON DIRECT EXPANSION FAN/COIL MODULE



### STANDARD FEATURES

**EVAPORATOR COIL** Constructed of rifled copper tubes in a staggered tube pattern. Tubes are expanded into continuous high efficiency aluminum lance type fins. Coil is set in condensate drain pan, with float switch for unit shutdown. The evaporator drain is internally trapped.

**REFRIGERATION SYSTEM** Single refrigeration circuit, includes a liquid line filter drier, externally equalized expansion valve, and a suction pressure transducer. The module is pre-charged with nitrogen and sealed. R-410A refrigerant must be field supplied and field charged by others.

**FAN ASSEMBLY** Fan is plug type, with integral direct drive with backward curved blades and Electronically Commutated (EC) motor. The fan speed shall be variable and automatically regulated by the Liebert iCOM® control through all modes of operation. The impeller shall be made of aluminum and is dynamically balanced. The fan shall be located to draw air through the coil to ensure even air distribution and maximum coil performance.

**LIEBERT iCOM® CONTROL SYSTEM** The Liebert iCOM® controls the variable capacity Liebert Mini-Mate and enables Unit-to-Unit communication with other variable capacity Mini-Mate units. One (1) IntelliSlot communication card housing is standard and accessible from outside the unit; IS-UNITY-DP-CMS card is optional.

**TOUCH SCREEN DISPLAY** The standard user interface is a remote wall mountable 9 inch color touch screen which presents system information and allows all parameters to be viewed and adjusted. It comes in a plastic housing for mounting on the wall and is shipped loose with the unit.

**TEMPERATURE AND HUMIDITY SENSORS** are mounted in an attractive case with 30 ft. (9m) of cable, shipped loose and ready to be field-mounted on the room wall or in unit return air stream and field-wired to the Liebert iCOM® Control board.

**CABINET AND CHASSIS** Constructed of galvanized steel for strength and corrosion resistance with thermal/acoustical insulation to reduce sound levels and prevent condensation. Removable panels allow access to the electric panel or refrigeration components for service or maintenance. Hanging brackets are integral to the chassis with vibration isolators and hardware provided for field-supplied 3/8" threaded suspension rods.

**NON-LOCKING UNIT DISCONNECT SWITCH** is a factory-mounted and wired inside the unit. It is a non-automatic molded case circuit interrupter with "non-locking type" mechanism, with handle accessible outside cabinet, and short circuit current rating (SCCR) of 5,000 amps.

**UNIT PROTECTIONS AND CONTACTS** include a filter clog switch, common alarm contact and remote shutdown contacts. **Filter clog switch** is provided to activate an iCOM alarm when the pressure drop across the filters exceed the customer-adjustable level. Switch is adjustable outside the cabinet. **Common Alarm Contact** is one set of normally open contacts which close for remote indication of alarms. **Remote Shutdown Contact** allows unit shutdown based on external input.



# LIEBERT MINI-MATE VARIABLE CAPACITY

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## OPTIONAL FEATURES 4 & 5 TON DIRECT EXPANSION FAN/COIL MODULE

### OPTIONAL FEATURES (Split DX Systems)

**LOCKING UNIT DISCONNECT SWITCH** includes a "Locking-Type" factory-mounted fused disconnect switch providing unit with a 65,000 Amp short-circuit current rating (SCCR). Disconnect switch is mounted internally with locking and lockable handle operational from outside the unit. Access to high voltage electric panel can only be obtained with the switch in the "off" position, and the handle is lockable to support lockout/tagout safety programs.

**ELECTRIC REHEAT** Electric low watt density 304 stainless steel fin tubular reheat element provides one stage of reheat to maintain room dry bulb temperature during dehumidification and is protected by one automatic reset temperature switch and one manual reset temperature safety switch.

**SCR Electric Reheat** option is an electric reheat element controlled by a variable output Silicon Controlled Rectifier (SCR) control. Linked to iCOM and combined with digital scroll compressor, the SCR reheat option provides precise temperature control while minimizes energy input. Reheat capacity is 10kW for 4 Ton and 15 kW for 5 Ton models to closely match and offset the cooling capacity.

**STEAM GENERATING CANISTER HUMIDIFIER** is housed in a steel enclosure and includes a replaceable canister with all supply and drain valves, 1" (25mm) air gap on fill line, inlet strainer, steam distributor and electronic controls, including high water indicator. System automatically fills and drains and maintains the required water level based on conductivity. Humidifier Problem Alarm annunciates touchscreen display.

**HIGH TEMPERATURE SENSOR** senses the return air temperature, shuts down the unit if temperature reaches 125F (52C) and is a manual reset device not meant to replace any fire detection system that may be required by local or national codes.

**SMOKE SENSOR** samples the return air, shuts down the unit upon detection, and sends visual and audible alarm. This smoke sensor is not intended to function as or replace any room smoke detection system that may be required by local or national codes. Smoke sensor trouble connections are available for external monitoring.

**IS-Unity-DP Card** provides CMS mobile cloud access for remote visibility via the CMS mobile application, remote access to the unit level display via a private network by utilizing the world-wide web, and Building Management System (BMS) access via BACnet/Modbus IP, BACnet/Modbus 485 and SNMP v1, v2, v3. Card is factory-installed in the IntelliSlot card housing on outside of cabinet. Field wiring to BMS or Cloud is required.

**LOW VOLTAGE TERMINAL PACKAGE** consists of Two (2) additional remote input shutdown terminals, Two(2) extra common alarm N/O output contacts, One(1) main fan auxiliary N/O output contact, One(1) remote humidifier N/O output contact, and One(1) Liqui-tect input terminals (Liqui-tect priced separately)



# LIEBERT MINI-MATE VARIABLE CAPACITY

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## OPTIONAL FEATURES

### 4 & 5 TON DIRECT EXPANSION FAN/COIL MODULE

#### SHIP LOOSE OPTIONS

**FILTER BOX** is constructed of galvanized steel, supplied with quantity of two nominal 20" (508mm) x 20" (508 mm) x 4" (102 mm) deep pleated MERV 8 filters (based on ASHRAE 52.2-2007). The box is provided with a 1" (25 mm) duct flange. The filters are accessible via a hinged access door, without shutting the unit down. The filter box option also includes a 1" (25 mm) discharge air duct collar.

**BOTTOM DISCHARGE GRILLE** is a 3-way louvered air grille, painted white, added to a T-bar grid assembly for air discharge directly into room from bottom of unit. Kit includes air baffle and rear discharge block-off plates. Use separate filter box kit for filtration and connection to field provided room air return grille and ductwork.

**CONDENSATE PUMP** has a capacity of 7.5 GPM (28.4 l/m) at 10 ft feet of head for 460/575V units, and 5.1 GPM (19.3 l/m) for 208/230 volt units at 10 ft. of head. Pump assembly is complete with pump, motor assembly, reservoir, integral float switch, and auxiliary safety float switch to shut unit off in event of pump failure. Pump assembly is designed to mount on the side of the evaporator (indoor) module, or other suitable means to allow condensate drainage into the reservoir. The condensate pump is field-mounted on the outside of the cabinet, and is field-wired to the evaporator/fan-coil electric panel for both power supply and float switch interlock. Separate power feed is not necessary.

**LT410 POINT LEAK DETECTION** supervised sensor with a painted enclosure that senses a leak via two height adjustable probes. The sensor has two common alarm relay outputs that can be unit monitored using the optional Low Voltage Terminal Package. The sensor requires 24VAC power input. Optional wall outlet 24VAC transformer available.



# LIEBERT PFD

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## STANDARD & OPTIONAL FEATURES

### 3 TON PROP FAN CONDENSING UNIT

#### STANDARD FEATURES

**DIGITAL SCROLL COMPRESSOR** The compressor is an R-410A scroll-type with variable capacity operation from 40-100%. Compressor solenoid valve unloads the compressor to provide variable capacity operation. The compressor has a suction gas cooled motor, EPDM vibration isolators, crankcase heater, internal thermal overloads, and external temperature and pressure sensors.

**CONDENSER COIL** Constructed of copper tubes in a staggered tube pattern. Tubes are expanded into continuous high efficiency aluminum plate type fins. Coil is set in a drain pan for condenser coil wash down.

**REFRIGERATION SYSTEM** Single refrigeration circuit includes digital scroll compressor, condenser coil, liquid line solenoid valve, Lee-Temp head pressure controls with insulated/heated refrigerant receiver, automatic reset high pressure switch and discharge temperature sensor. Switch and sensor inputs are integrated with Liebert iCOM for compressor protection while maintaining system operation, displaying alarms and system shutdown when required. Designed for R-410A refrigerant and is field supplied and charged by others.

**FAN ASSEMBLY** Consists of propeller type blades, constructed of zinc plated steel and aluminum, secured to the motor shaft by a heavy duty hub with set screws. Direct drive fan motors are provided with lifetime lubricated bearings, and internal overload protection.

**CABINET AND CHASSIS** Designed for outdoor use with either roof or ground level mounting. The condensing module is constructed of galvanized and galvaneal painted steel for corrosion resistance. Both inlet and outlet air grilles are heavy duty steel with a durable coating. Removable exterior panels allow access to the electric panel or refrigeration components for service or maintenance.

**HEAD PRESSURE CONTROL** A Liebert Lee-Temp control system is furnished and consists of an insulated heated refrigerant receiver with sightglass, pressure relief valve, pressure balancing valve, check valve, and head pressure operated 3-way valve. This system allows for start-up and operation at ambient conditions as low as -30°F (-34°C).

#### OPTIONAL FEATURES

**HIGH AMBIENT** Oversized horizontal air discharge cabinet, oversized condenser coil, direct drive motor, and Liebert fan blade design combine to achieve increased airflow. Designed for operation at ambient conditions of 105 °F (41°C) with no reduction in evaporator rated performance.

**COIL COATING** Epoxy-coated coils for extended coil life in corrosive environments, such as coastal areas. Coils shall be immersion-coated and baked at the factory to assure complete coverage of coil fins and tubes, with final UV topcoat factory-applied to protect E-coat from solar UV ray degradation. Coil color shall be black.



# LIEBERT PFD

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## STANDARD & OPTIONAL FEATURES

### 4 TON PROP FAN CONDENSING UNIT

#### STANDARD FEATURES

**DIGITAL SCROLL COMPRESSOR** The compressor is an R-410A scroll-type with variable capacity operation from 40-100%. Compressor solenoid valve unloads the compressor to provide variable capacity operation. The compressor has a suction gas cooled motor, EPDM vibration isolators, crankcase heater, internal thermal overloads, and external temperature and pressure sensors.

**CONDENSER COIL** Constructed of copper tubes in a staggered tube pattern. Tubes are expanded into continuous high efficiency aluminum plate type fins. Coil is set in a drain pan for condenser coil wash down.

**REFRIGERATION SYSTEM** Single refrigeration circuit includes digital scroll compressor, condenser coil, liquid line solenoid valve, Lee-Temp head pressure controls with insulated/heated refrigerant receiver, automatic reset high pressure switch and discharge temperature sensor. Switch and sensor inputs are integrated with Liebert iCOM for compressor protection while maintaining system operation, displaying alarms and system shutdown when required. Designed for R-410A refrigerant and is field supplied and charged by others.

**FAN ASSEMBLY** Consists of propeller type blades, constructed of zinc plated steel and aluminum, secured to the motor shaft by a heavy duty hub with set screws. Direct drive fan motors are provided with lifetime lubricated bearings, and internal overload protection.

**CABINET AND CHASSIS** Designed for outdoor use with either roof or ground level mounting. The condensing module is constructed of galvanized and galvaneal painted steel for corrosion resistance. Both inlet and outlet air grilles are heavy duty steel with a durable coating. Removable exterior panels allow access to the electric panel or refrigeration components for service or maintenance.

**HEAD PRESSURE CONTROL A Liebert Lee-Temp control system** is furnished and consists of an insulated heated refrigerant receiver with sightglass, pressure relief valve, pressure balancing valve, check valve, and head pressure operated 3-way valve. This system allows for start-up and operation at ambient conditions as low as -30 °F (-34 °C).

#### OPTIONAL FEATURES

**COIL COATING** Epoxy-coated coils for extended coil life in corrosive environments, such as coastal areas. Coils shall be immersion-coated and baked at the factory to assure complete coverage of coil fins and tubes, with final UV topcoat factory-applied to protect E-coat from solar UV ray degradation. Coil color shall be black.



# LIEBERT PFD

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## STANDARD & OPTIONAL FEATURES

### 5 TON PROP FAN CONDENSING UNIT

#### STANDARD FEATURES

**DIGITAL SCROLL COMPRESSOR** The compressor is an R-410A scroll-type with variable capacity operation from 40-100%. Compressor solenoid valve unloads the compressor to provide variable capacity operation. The compressor has a suction gas cooled motor, EPDM vibration isolators, crankcase heater, internal thermal overloads, and external temperature and pressure sensors.

**CONDENSER COIL** Constructed of copper tubes in a staggered tube pattern. Tubes are expanded into continuous high efficiency aluminum plate type fins. Coil is set in a drain pan for condenser coil wash down.

**REFRIGERATION SYSTEM** Single refrigeration circuit includes digital scroll compressor, condenser coil, liquid line solenoid valve, Lee-Temp head pressure controls with insulated/heated refrigerant receiver, automatic reset high pressure switch and discharge temperature sensor. Switch and sensor inputs are integrated with Liebert iCOM for compressor protection while maintaining system operation, displaying alarms and system shutdown when required. Designed for R-410A refrigerant and is field supplied and charged by others.

**FAN ASSEMBLY** Consists of propeller type blades, constructed of zinc plated steel and aluminum, secured to the motor shaft by a heavy duty hub with set screws. Direct drive fan motors are provided with lifetime lubricated bearings, rain slingers (High Ambient/Quiet-Line only), and internal overload protection.

**CABINET AND CHASSIS** Designed for outdoor use with either roof or ground level mounting. The condensing module is constructed of galvanized and galvaneal painted steel for corrosion resistance. Both inlet and outlet air grilles are heavy duty steel with a durable coating. Removable exterior panels allow access to the electric panel or refrigeration components for service or maintenance.

**HEAD PRESSURE CONTROL** A Liebert Lee-Temp control system is furnished and consists of an insulated heated refrigerant receiver with sightglass, pressure relief valve, pressure balancing valve, check valve, and head pressure operated 3-way valve. This system allows for start-up and operation at ambient conditions as low as -30 °F (-34 °C).

#### OPTIONAL FEATURES

**HIGH AMBIENT** Oversized vertical air discharge cabinet, two condenser coils, direct drive motor with rain slinger, and Liebert fan blade design combine to achieve increased airflow. System is designed for operation at ambient conditions as high as 105°F (41°C). Available on 5-Ton models only.

**QUIET-LINE** Oversized vertical air discharge cabinet, two condenser coils, low speed 6-pole motor with rain slinger, and Liebert fan blade design combine to achieve the quietest unit available (8 to 10 dB(A) below standard models). Available on 5-Ton models only.

**COIL COATING** Epoxy-coated coils for extended coil life in corrosive environments, such as coastal areas. Coils shall be immersion-coated and baked at the factory to assure complete coverage of coil fins and tubes, with final UV topcoat factory-applied to protect E-coat from solar UV ray degradation. Coil color shall be black.



# LIEBERT MTC

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## STANDARD FEATURES

### 3/4/5 TON WATER/GLYCOL COOLED INDOOR CONDENSING UNIT

#### STANDARD FEATURES

**TWO - STAGE COMPRESSOR** The compressor is an R-410A scroll-type. Solenoid valve is controlled by Liebert iCOM to vary compressor capacity in two steps: 67% or 100%. The compressor has a suction gas cooled motor, EPDM vibration isolators, crankcase heater, internal thermal overloads, and external pressure sensors.

**REFRIGERATION SYSTEM** Single refrigeration circuit includes two-stage scroll compressor, coaxial condenser coil and automatic reset high pressure switch. Switch is integrated with Liebert iCOM for compressor protection while maintaining system operation, displaying alarms and system shutdown when required. Designed for R-410A refrigerant and is field supplied and charged by others.

**CABINET AND CHASSIS** Constructed of galvanized steel for strength and corrosion resistance. Removable panels allow access to the electric panel, compressor, water regulating valve and to the water/glycol cooled condenser. Vibration isolators are provided with the chassis for mounting.

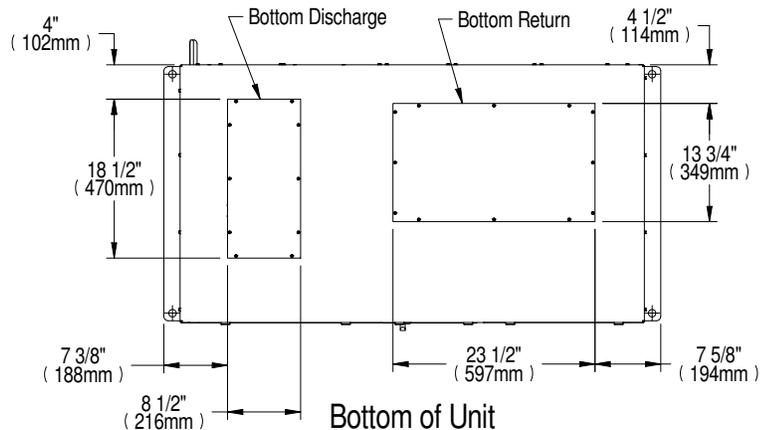
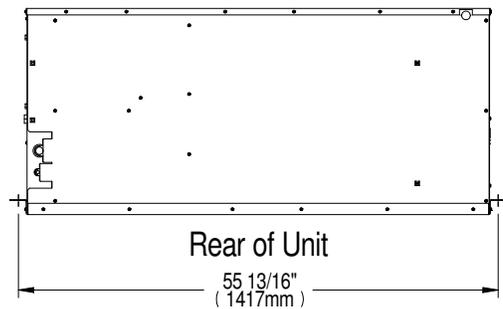
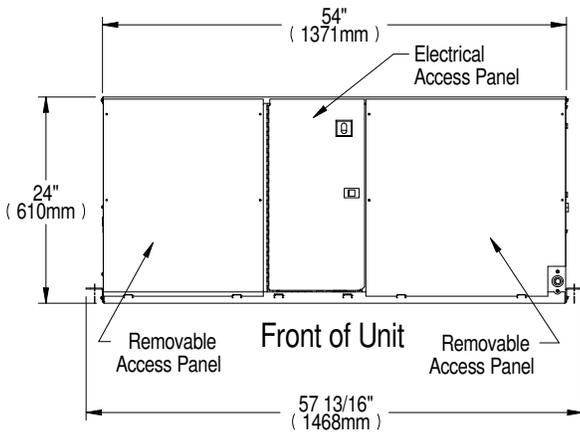
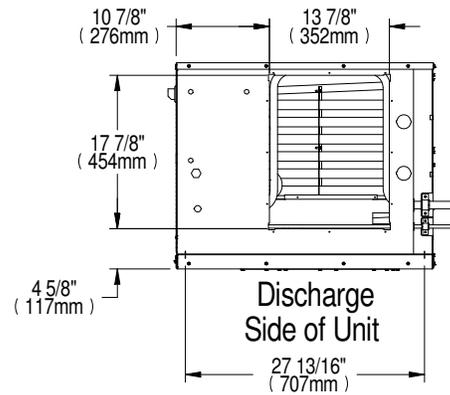
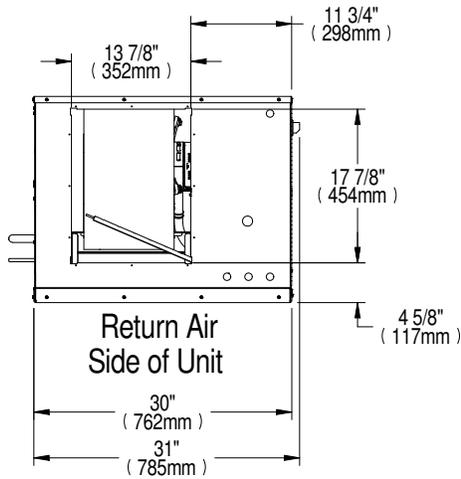
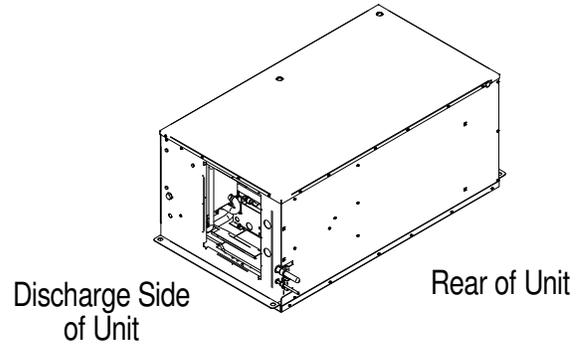
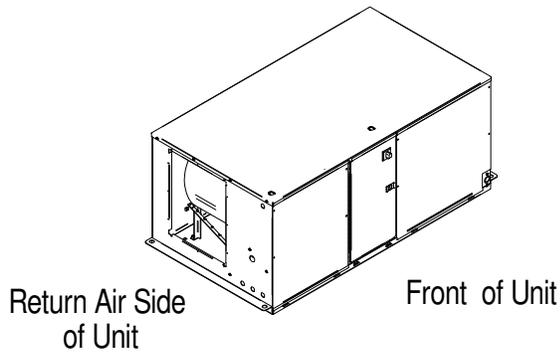
**WATER/GLYCOL MODELS** Water Cooled Condenser is a tube in tube coaxial counter-flow condenser painted with black polyurethane paint. Accurate condensing temperatures for various entering water/glycol flow rates and temperatures is maintained by pressure operated 2-way (or optional 3-way) water regulating valve. The circuit is designed for a maximum system water/glycol pressure of 350 PSIG (2413 kPa).

**UNIT DISCONNECT SWITCH** Consist of a "locking type", non-automatic molded case circuit interrupter mounted inside the unit, with handle accessible from outside the cabinet.



# LIEBERT MINI-MATE VARIABLE CAPACITY

## CABINET DIMENSIONAL DATA 3 TON DIRECT EXPANSION FAN/COIL MODULE

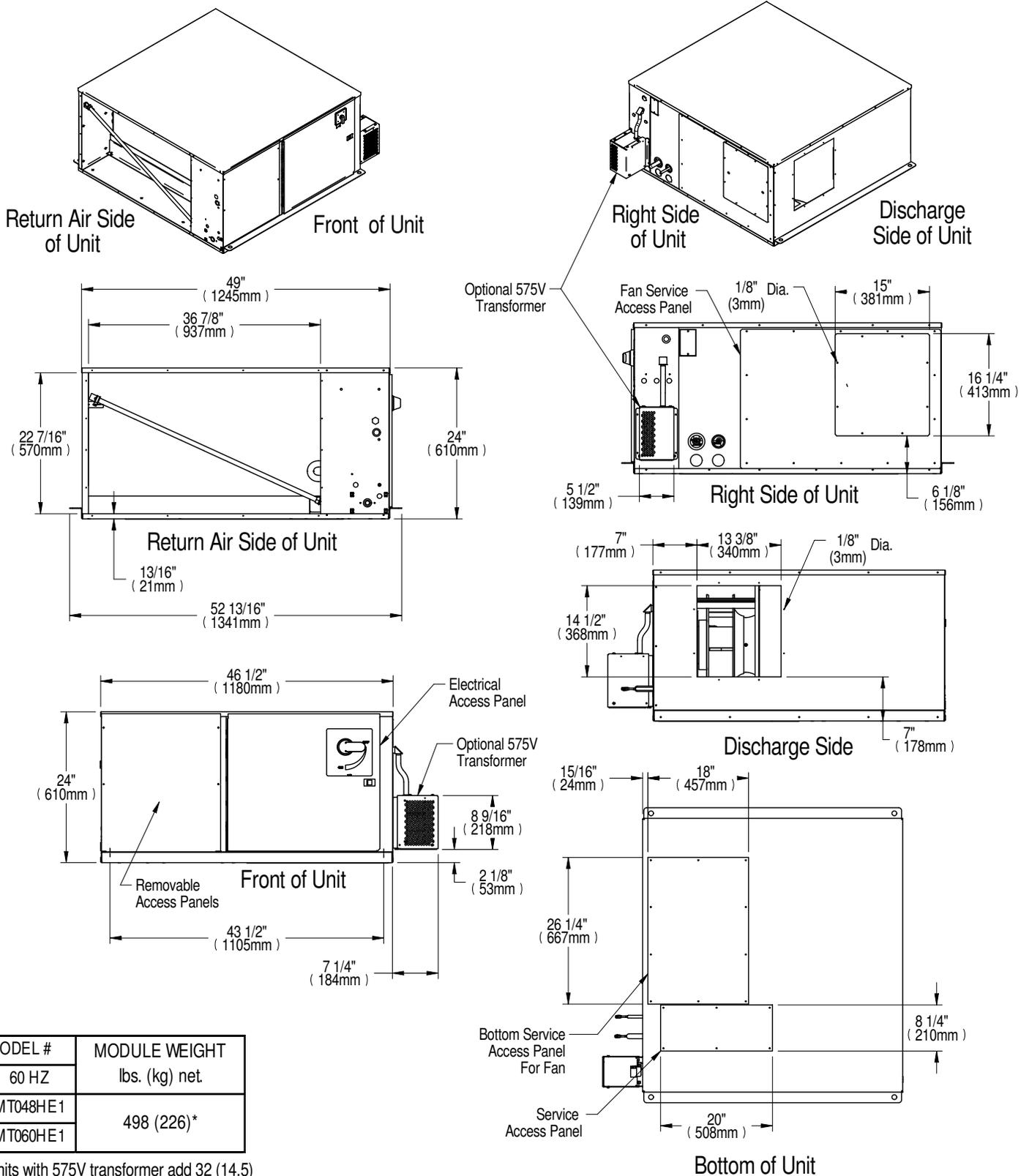


MODEL NUMBER	UNIT NET WEIGHT lbs. (kg)
MT036HE1	328 (149)



# LIEBERT MINI-MATE VARIABLE CAPACITY

## CABINET DIMENSIONAL DATA 4 & 5 TON DIRECT EXPANSION FAN/COIL MODULE

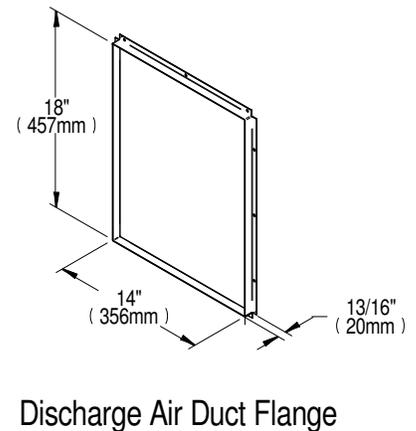
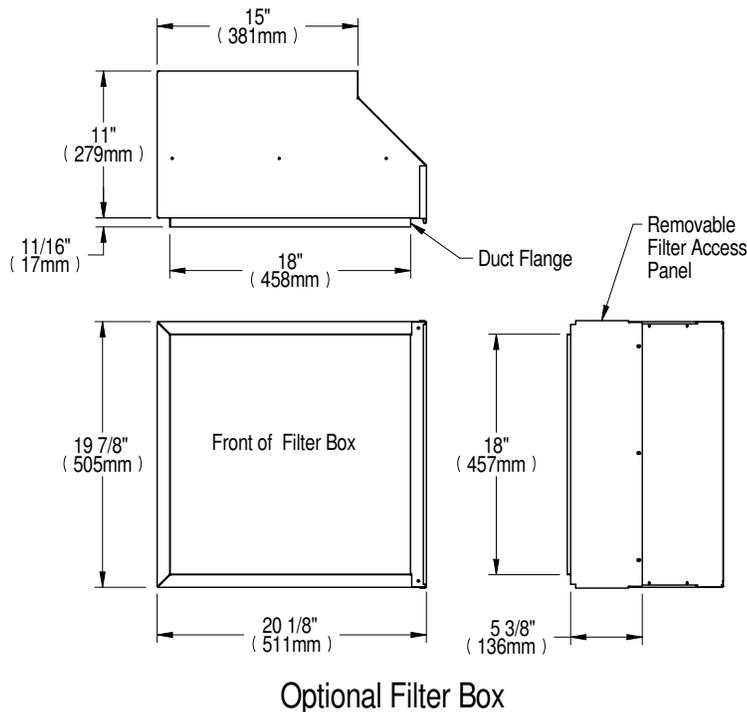
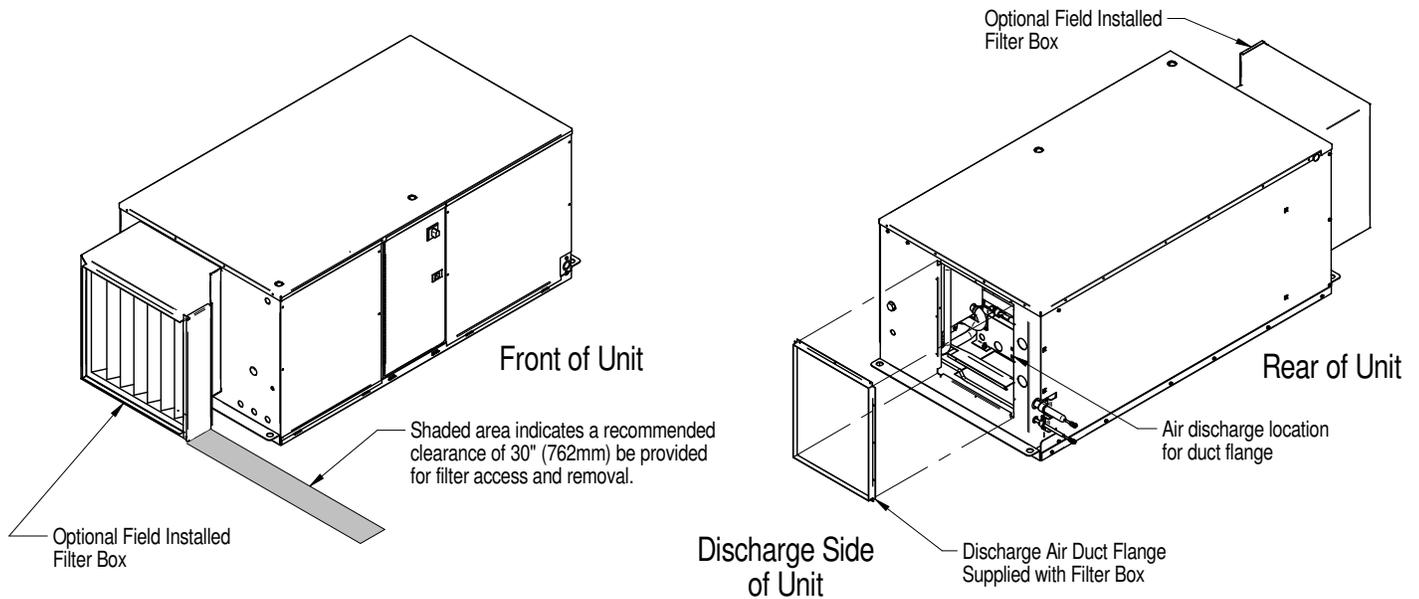


MODEL #	MODULE WEIGHT
60 HZ	lbs. (kg) net.
MT048HE1	498 (226)*
MT060HE1	

\*Units with 575V transformer add 32 (14.5)

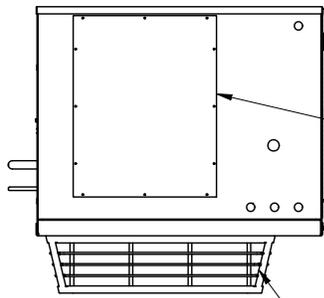
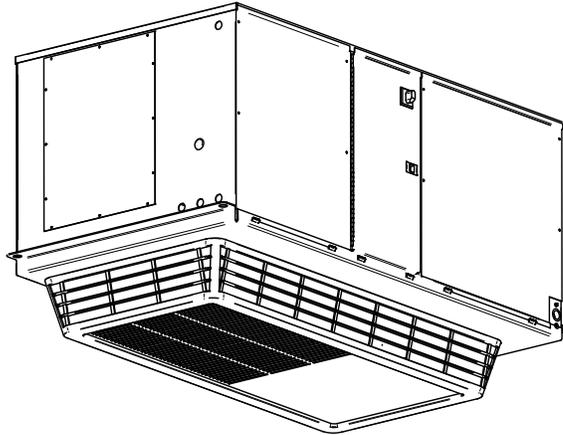
# LIEBERT MINI-MATE VARIABLE CAPACITY

## DIMENSIONAL DATA OPTIONAL FIELD INSTALLED FILTER BOX & DISCHARGE DUCT FLANGE 3 TON MODEL



# LIEBERT MINI-MATE VARIABLE CAPACITY

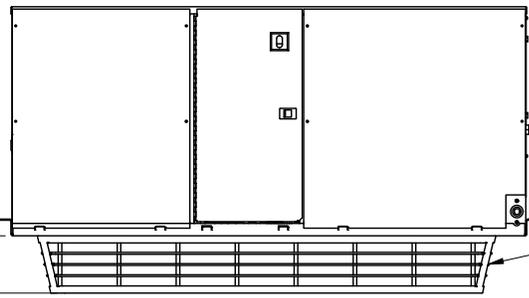
## OPTIONAL FIELD INSTALLED AIR DISTRIBUTION PLENUM 3 TON MODEL



Return Side of Unit

Cover Plate supplied with Plenum

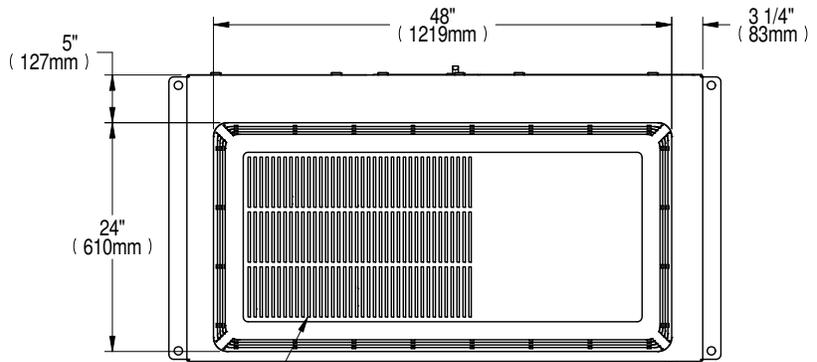
Removable panel on side of plenum. Minimum Clearance 30" (762mm) for filter access and removal.



Front of Unit

Air Discharge out sides of plenum

6"  
(152mm)



Bottom of Unit

Air Inlet through grille in bottom center of plenum

5"  
(127mm)

24"  
(610mm)

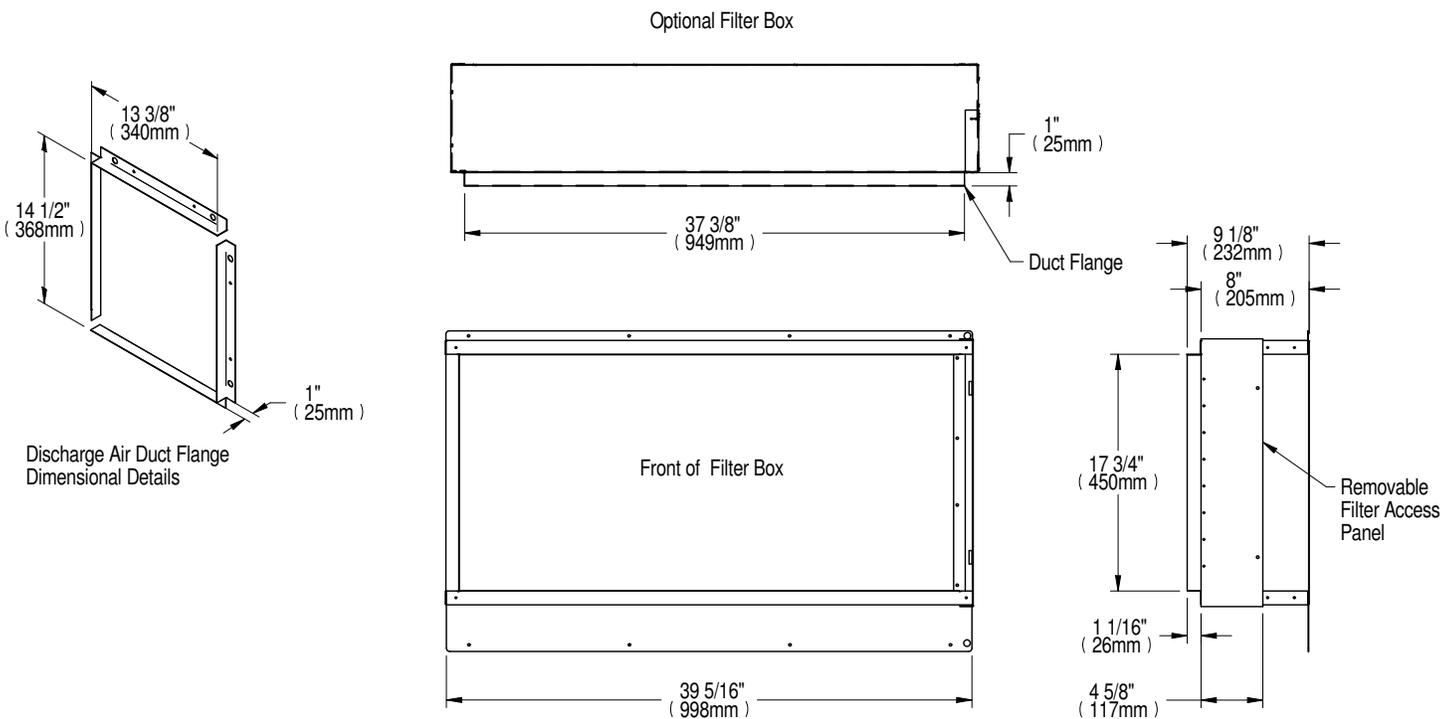
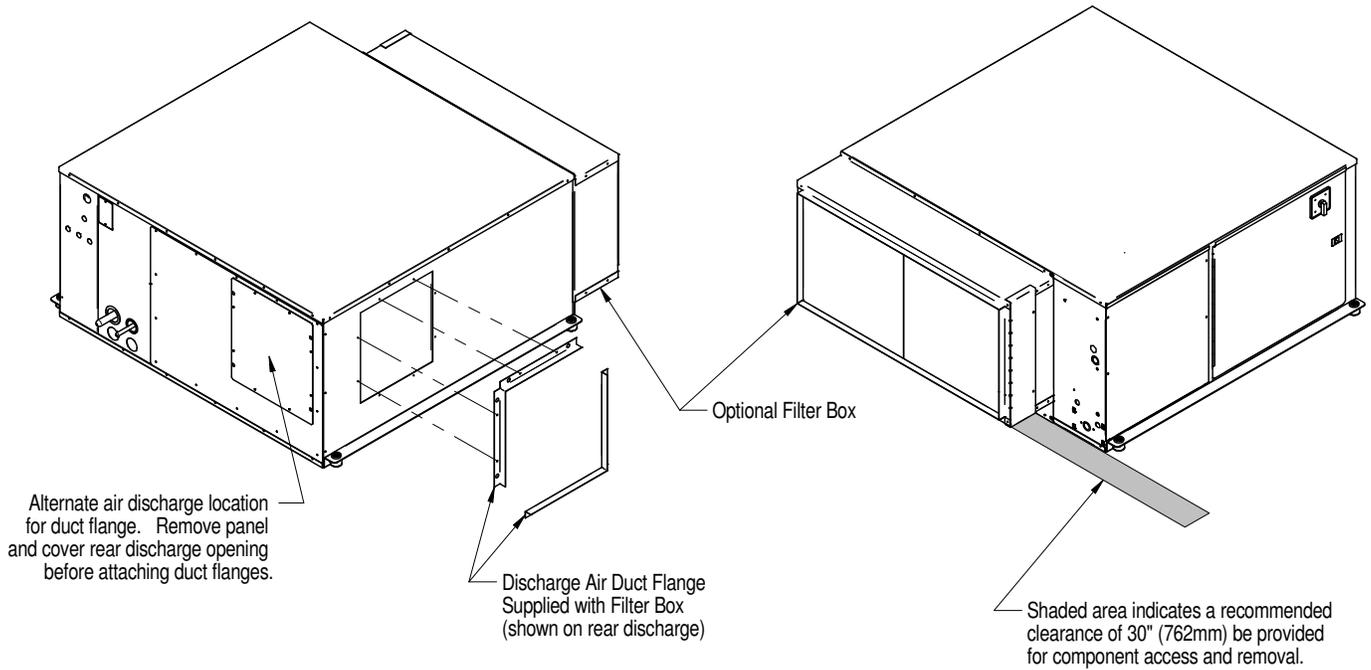
48"  
(1219mm)

3 1/4"  
(83mm)



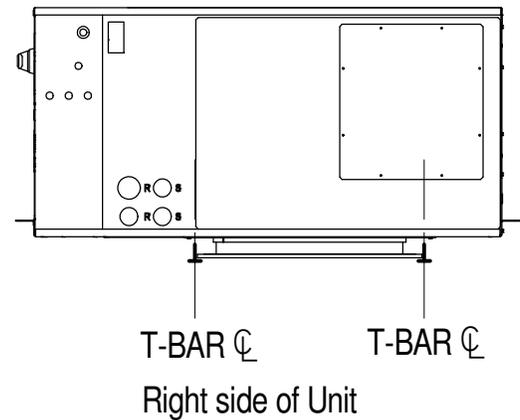
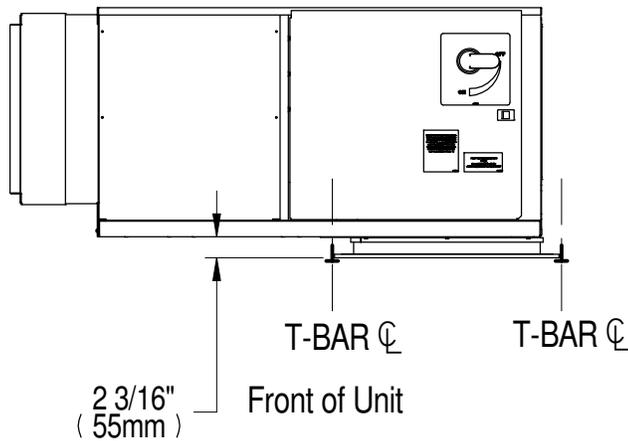
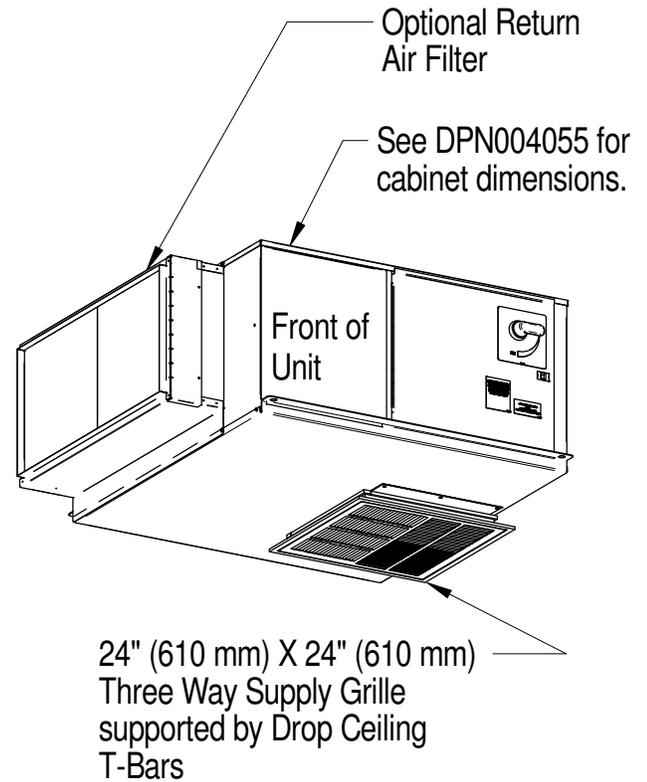
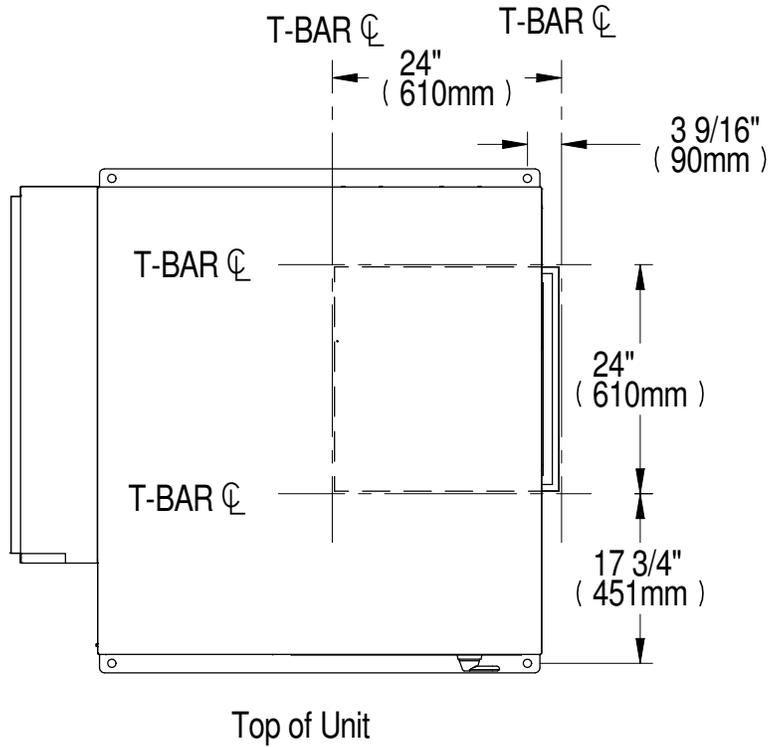
# LIEBERT MINI-MATE VARIABLE CAPACITY

## DIMENSIONAL DATA 4 & 5 TON DIRECT EXPANSION FAN/COIL MODULE OPTIONAL FILTER BOX & DISCHARGE DUCT FLANGE



# LIEBERT MINI-MATE VARIABLE CAPACITY

## 4 & 5 TON OPTIONAL SUPPLY GRILLE DIMENSIONAL DATA

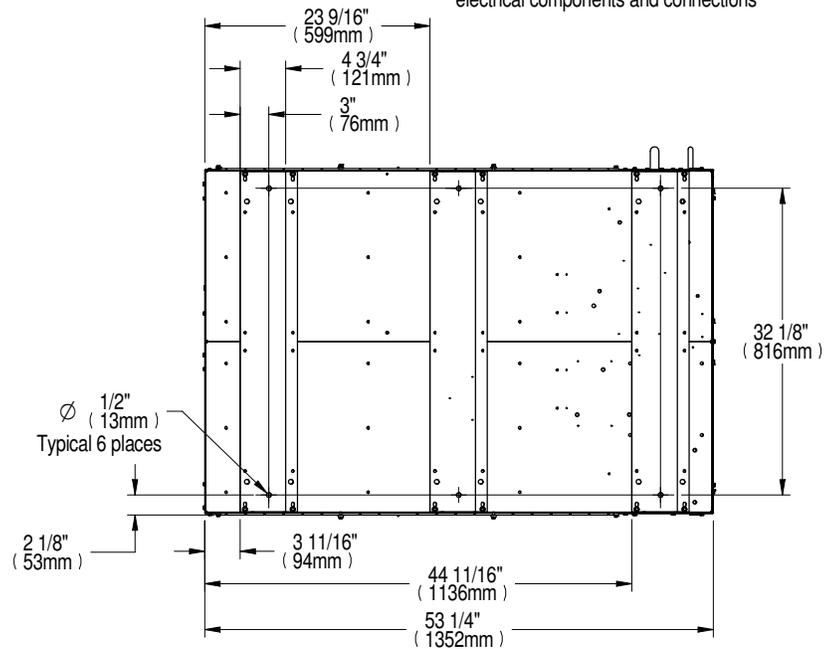
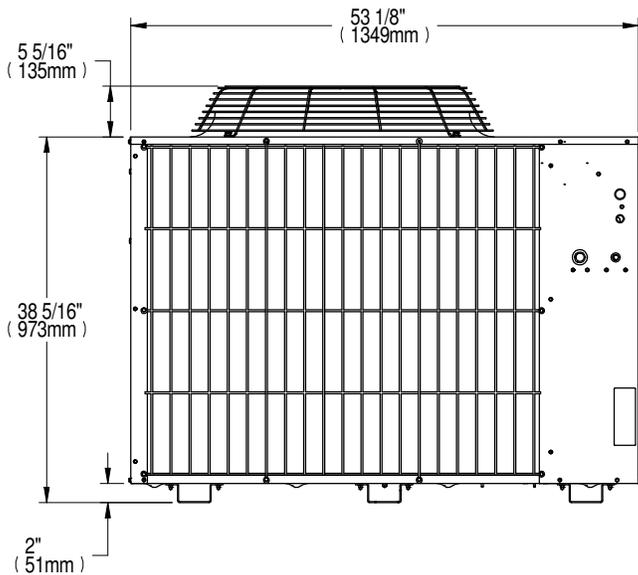
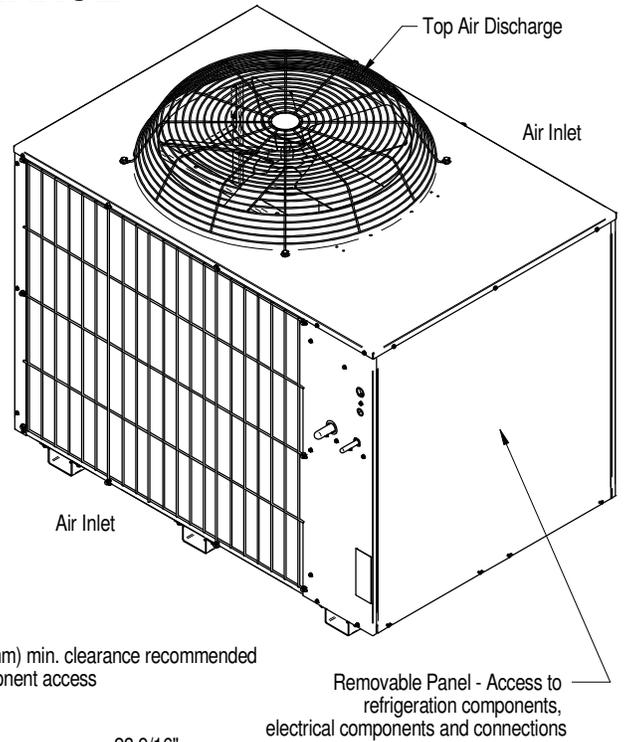
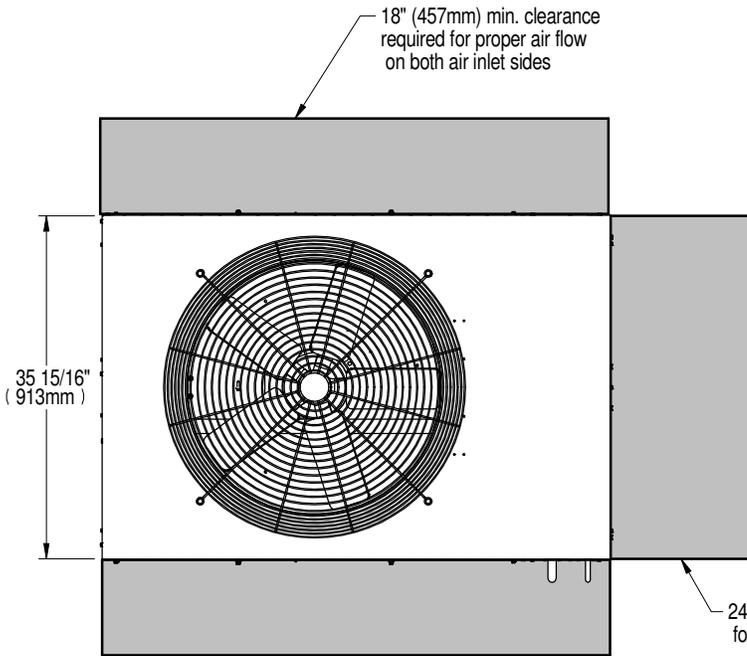




**VERTIV™**

# LIEBERT PFD

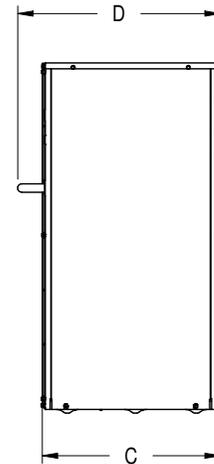
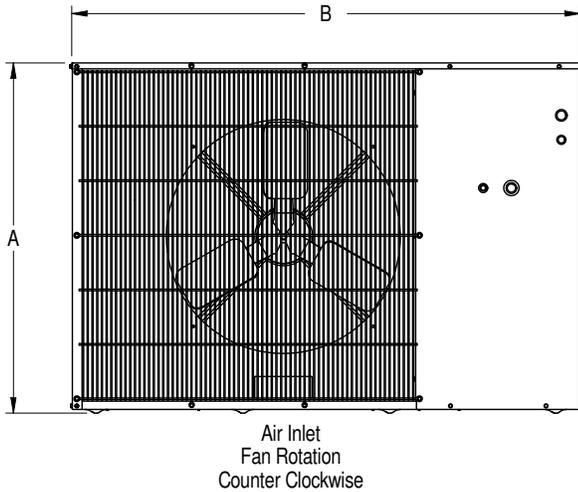
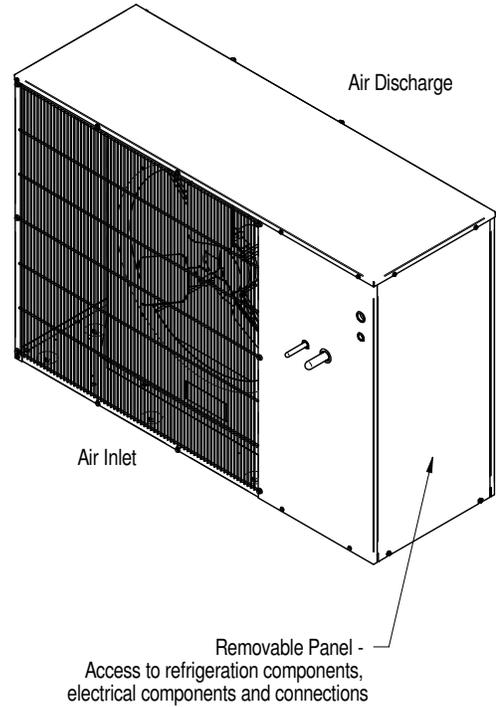
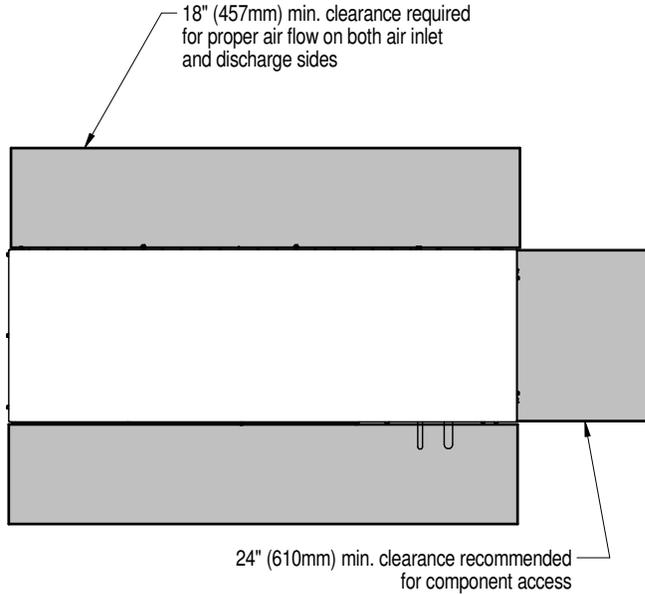
## CABINET DIMENSIONAL DATA 5 TON HIGH AMBIENT/QUIET-LINE OUTDOOR CONDENSING UNIT TOP AIR DISCHARGE



**Anchorage Plan**  
Bottom View of Unit

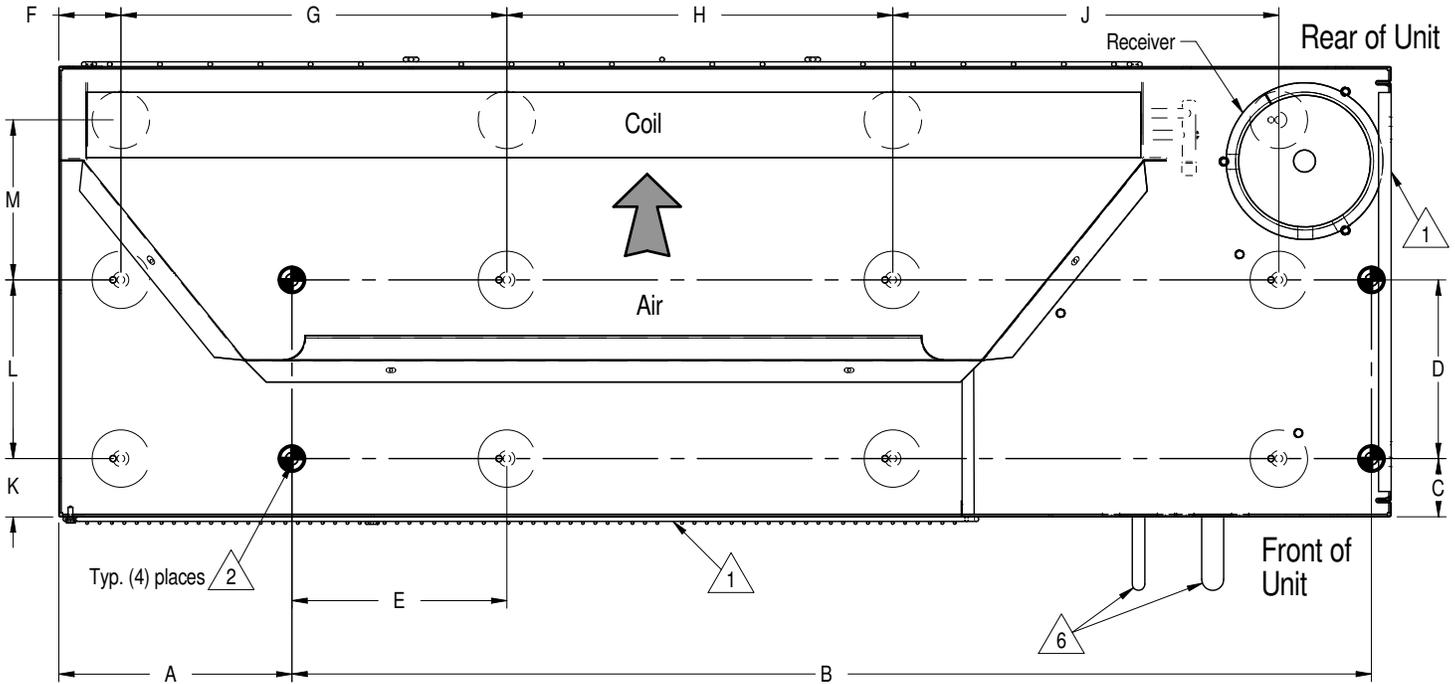
MODEL	MODULE WEIGHT lbs. (kg) net
60Hz	
PFD067A-H	488 (222)
PFDZ67A-L	

## CABINET DIMENSIONAL DATA OUTDOOR CONDENSING UNIT W/ HORIZONTAL AIR DISCHARGE



MODEL NUMBERS	UNIT NET WEIGHT lbs. (kg)	DIMENSIONAL DATA in. (mm)			
		A	B	C	D
PFD037A-L	244 (111)	30-3/4 (781)	48-1/4 (1225)	18-5/8 (473)	21-1/4 (540)
PFD037A-H	351 (159)	36-3/4 (933)	53-1/4 (1352)	18-5/8 (473)	21-1/4 (540)
PFD054A-L					
PFD067A-L					

## OPTIONAL ANCHORAGE PLAN OUTDOOR CONDENSING UNIT WITH HORIZONTAL AIR DISCHARGE

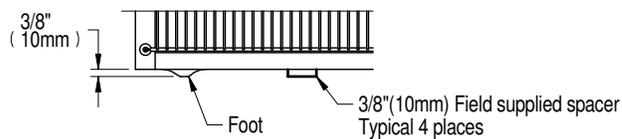


**TOP VIEW**  
Some Parts not Shown for Clarity

MODEL NUMBERS	DIMENSIONAL DATA in. (mm)											
	A	B	C	D	E	F	G	H	J	K	L	M
PFD037A-L	9-9/16 (243)	37-1/8 (943)	2-1/4 (57)	7-1/8 (181)	6-1/8 (156)	2-9/16 (65)	13-1/8 (333)	14-3/4 (375)	13-1/4 (337)	2-1/4 (57)	7-1/8 (181)	6-3/8 (162)
PFD037A-H												
PFD054A-L	9-5/16 (236)	43 (1092)	2-5/16 (58)	7-1/8 (181)	8-19/16 (217)	2-1/2 (63)	15-1/16 (383)	15-11/16 (398)	15-3/8 (391)	2-5/16 (58)	7-1/8 (181)	6-3/8 (162)
PFD067A-L												

Notes:

1. Front Grille and Right End Panel will need to be removed to access anchor holes. Top panel may be removed for additional access. All removed parts must be reinstalled.
2. 1/2" (13mm) Diameter hole, use for unit anchor.
3. All dimensions have a tolerance of  $\pm 1/16"$ .
4. F, G, H, J, K, L and M dimensions are for the foot locations.
5. The use of this anchor plan is optional and installer will assume responsibility for suitable anchorage.
6. Supply and return piping connections.



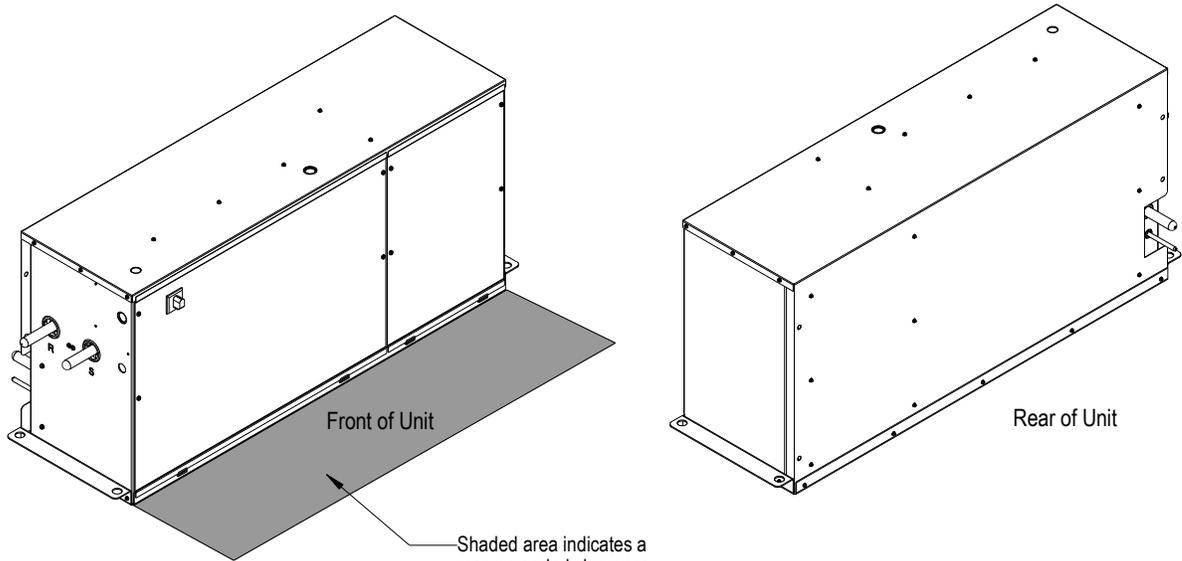
**PARTIAL FRONT VIEW**



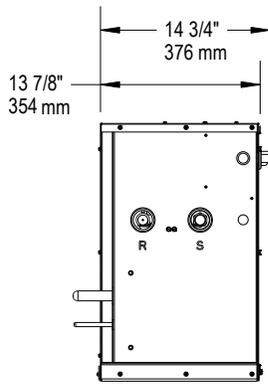
# LIEBERT MTC

## CABINET DIMENSIONAL DATA

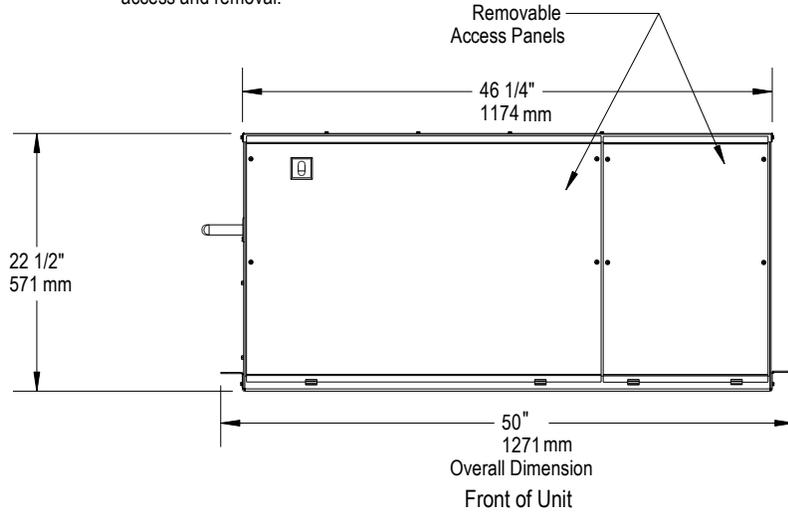
### 3/4/5 TON WATER/GLYCOL COOLED INDOOR CONDENSING UNIT



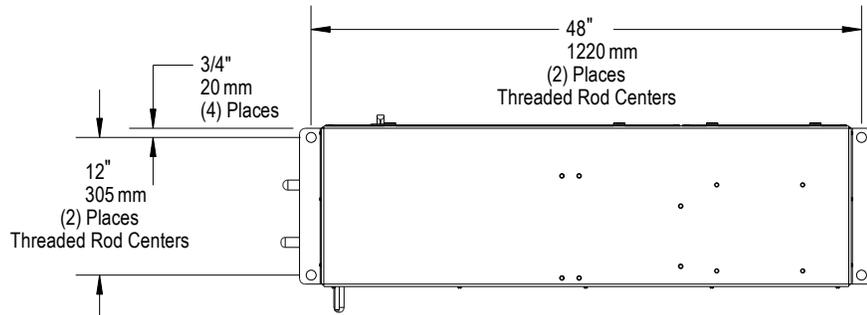
Shaded area indicates a recommended clearance 33" (838 mm) for component access and removal.



Left Side of Unit



Front of Unit



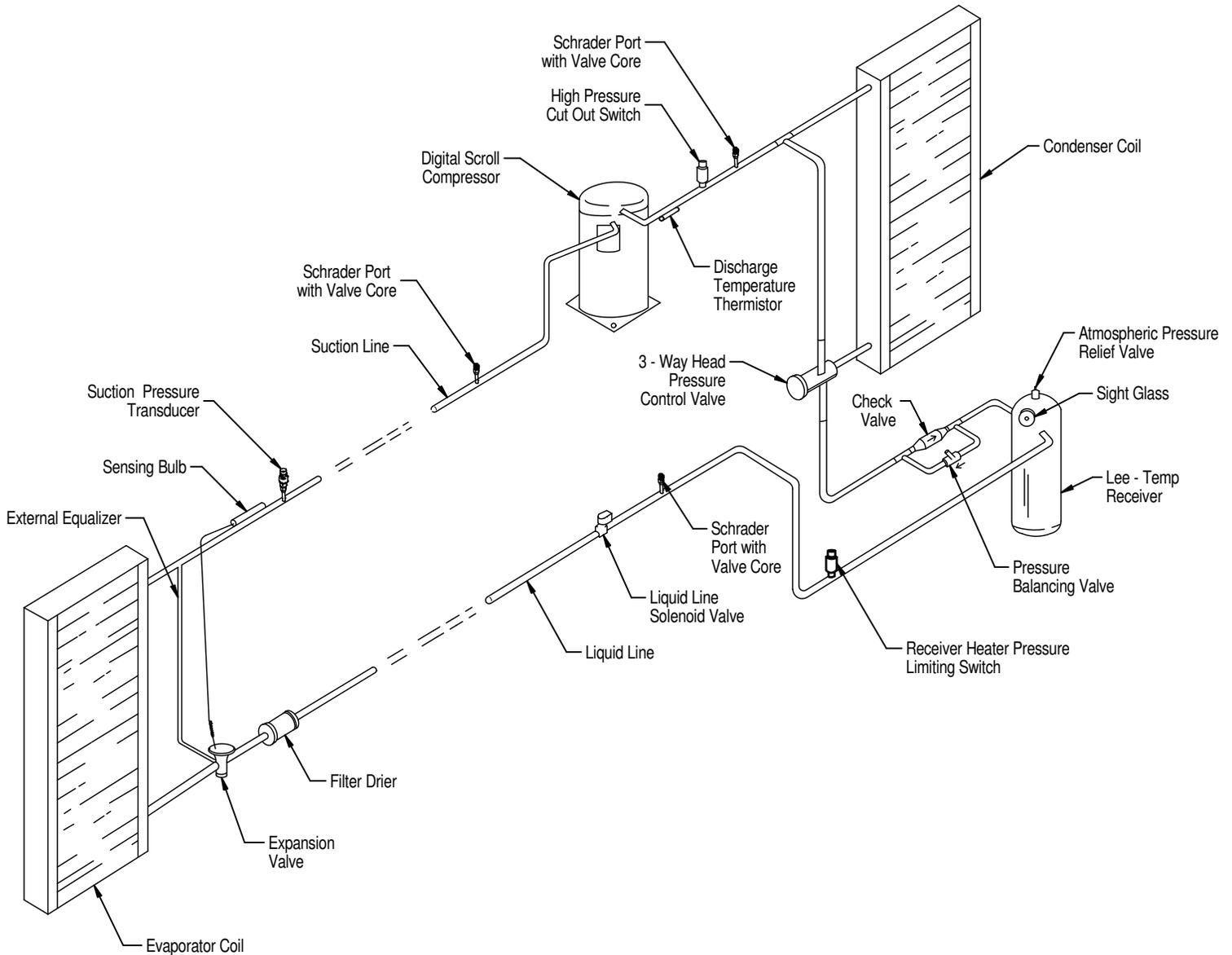
Bottom of Unit

Model #	Unit Net Weight lbs. (kg)
MTC38W	237 (107.5)
MTC55W	
MTC69W	



# LIEBERT MINI-MATE VARIABLE CAPACITY

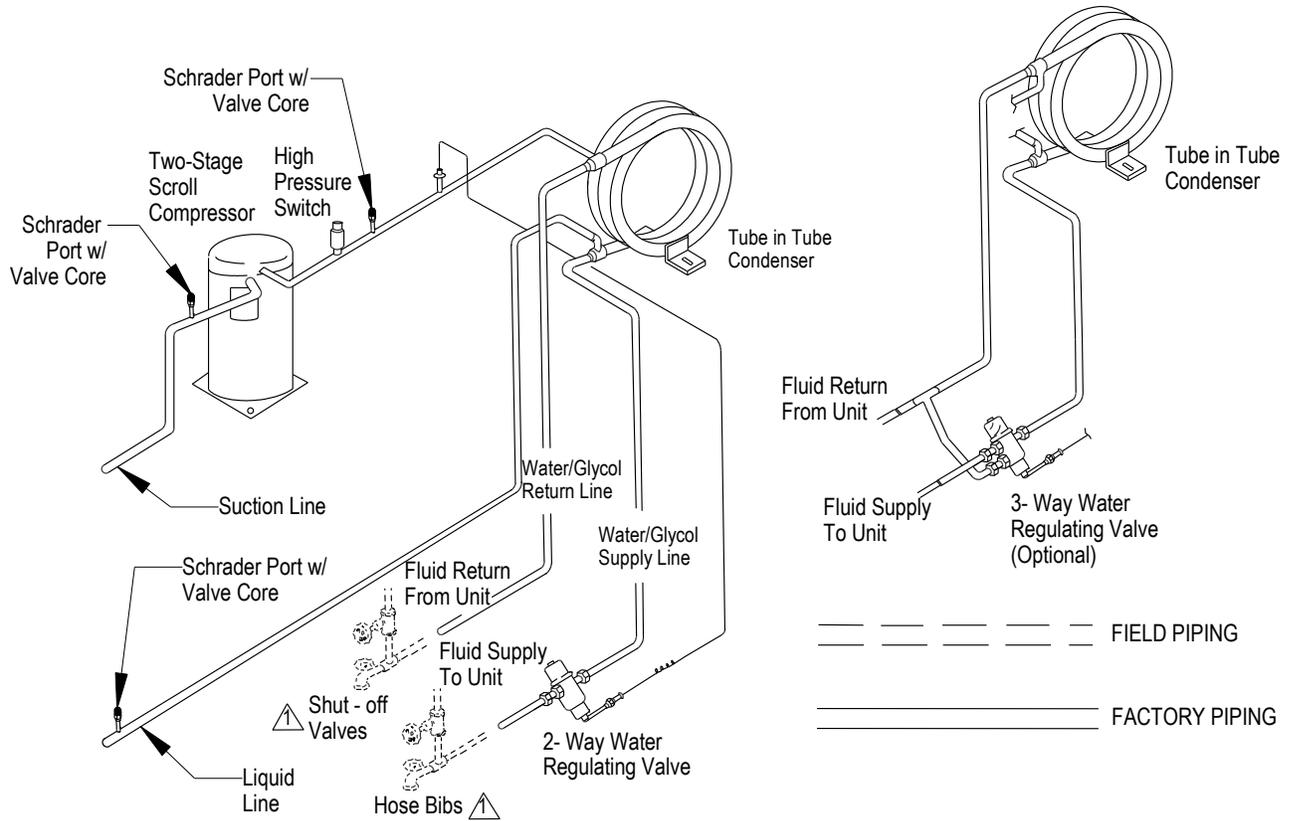
## GENERAL ARRANGEMENT SPLIT SYSTEMS W/ AIR COOLED CONDENSING UNIT



--- FIELD PIPING  
==== FACTORY PIPING

## GENERAL ARRANGEMENT DIAGRAM

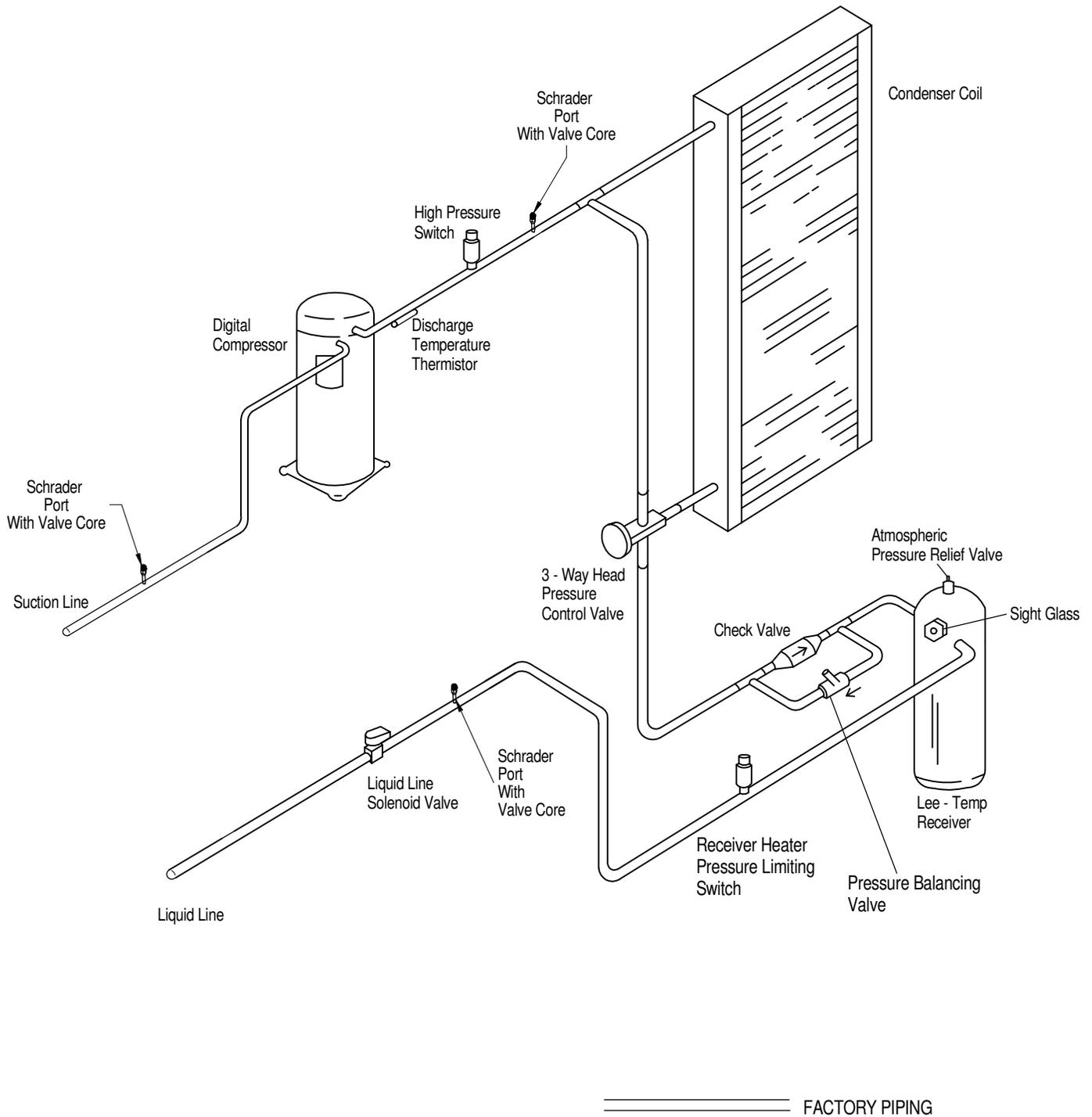
### 3/4/5 TON WATER/GLYCOL COOLED INDOOR CONDENSING UNIT



**Notes:**

⚠ Components are not supplied by Liebert but are required for proper circuit operation and maintenance.

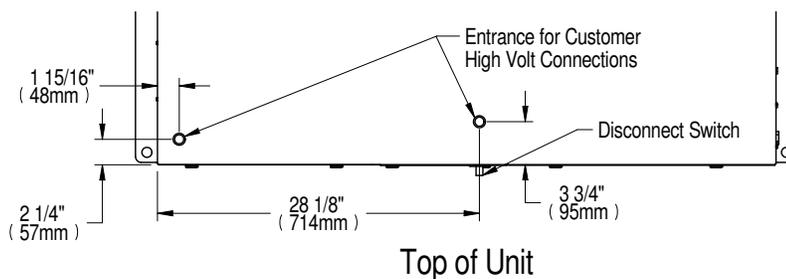
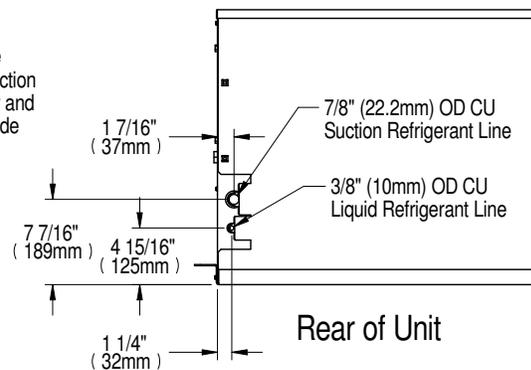
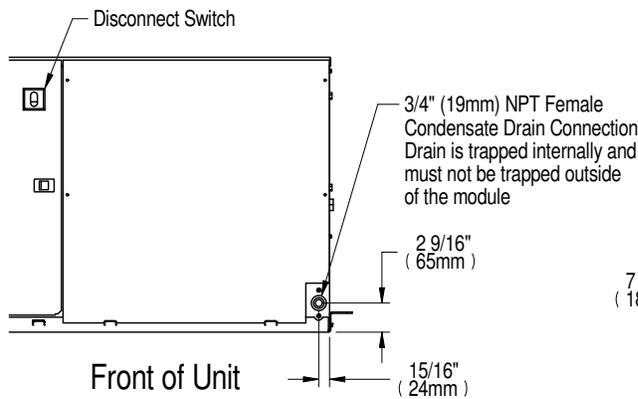
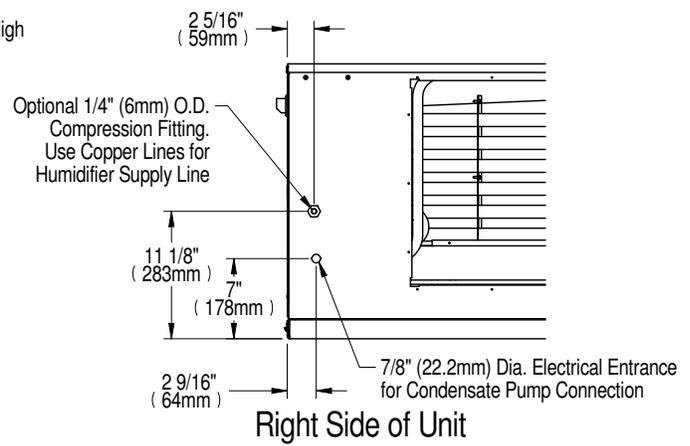
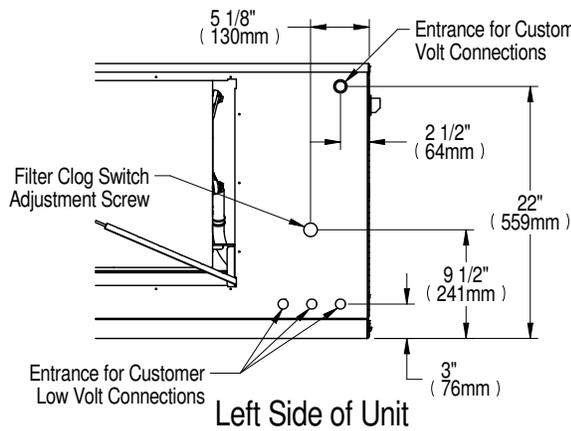
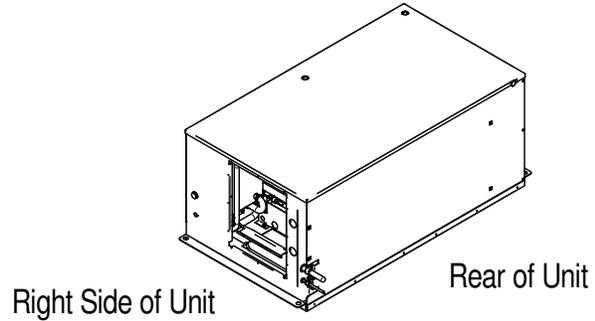
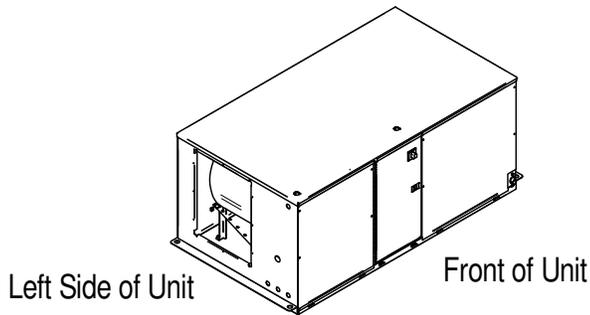
## GENERAL PIPING ARRANGEMENT CONDENSING UNIT





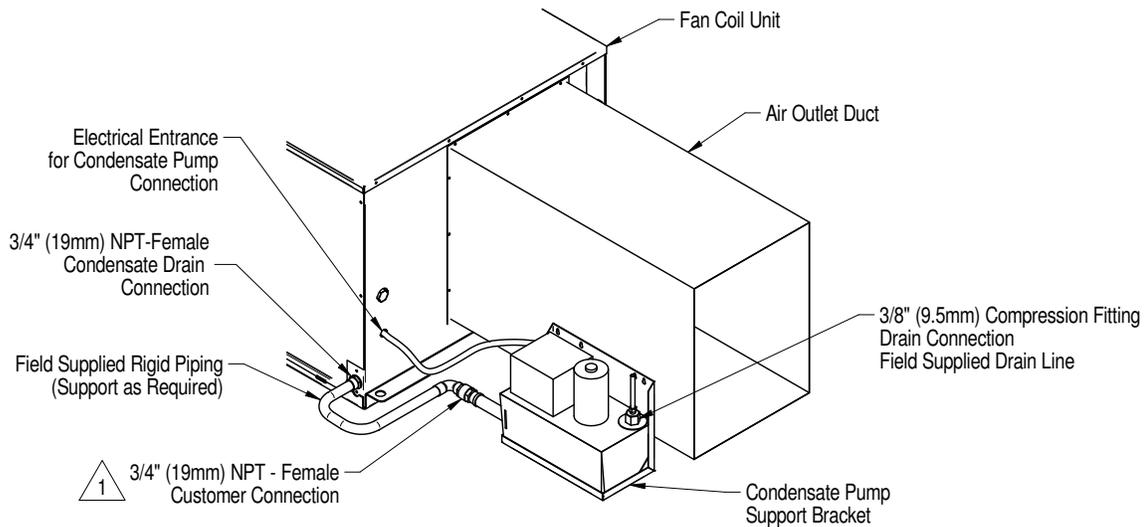
# LIEBERT MINI-MATE VARIABLE CAPACITY

## PRIMARY CONNECTION LOCATIONS 3 TON DIRECT EXPANSION FAN/COIL MODULE

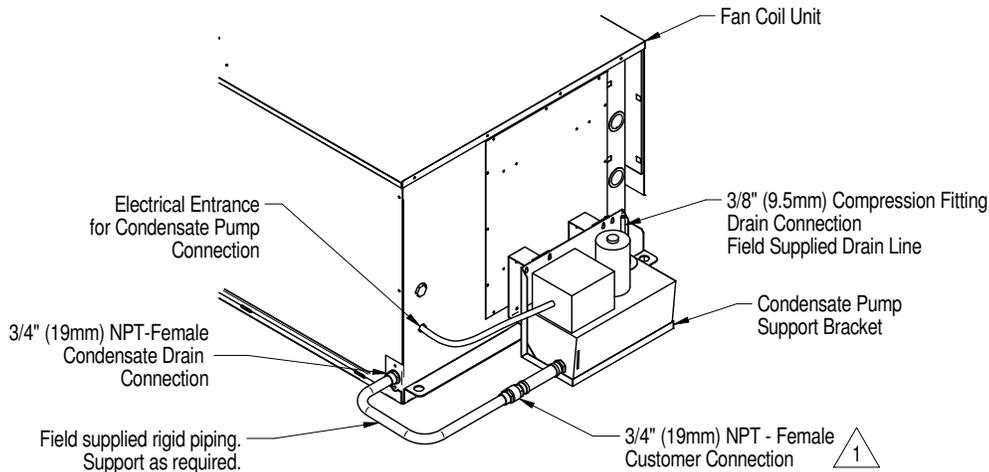


# LIEBERT MINI-MATE VARIABLE CAPACITY

## OPTIONAL FIELD INSTALLED CONDENSATE PUMP CONNECTION LOCATIONS 3 TON MODEL



**CONDENSATE PUMP (FIELD INSTALLED)  
ON UNIT WITH AIR OUTLET DUCTWORK**



**CONDENSATE PUMP (FIELD INSTALLED)  
ON UNIT WITH AIR DISTRIBUTION PLENUM**

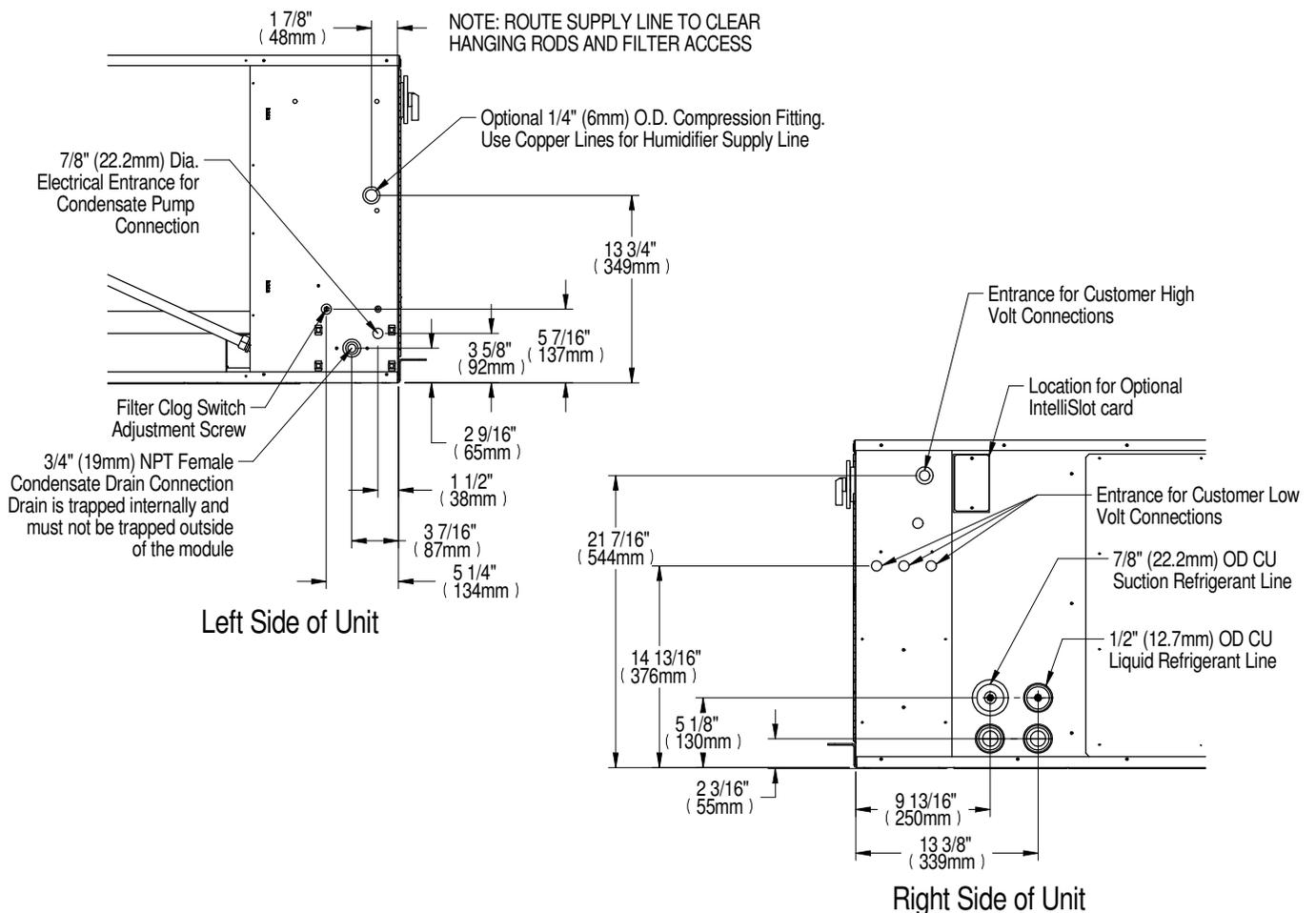
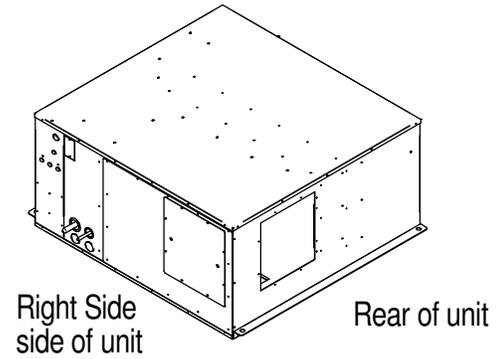
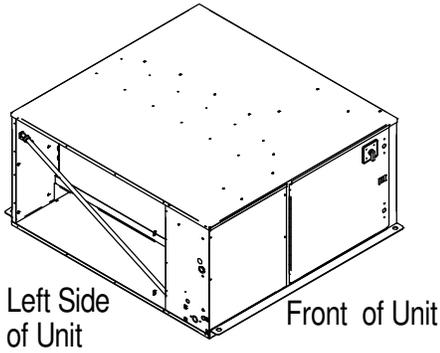
**Notes:**

1.  3/4" NPT-Male to 3/4" (19mm) flexible rubber tubing assembly supplied must be installed between condensate drain and pump inlet fitting and secured.
2. The Auxiliary Float Switch included with pump must be field interlocked with unit control to enable unit shutdown feature. Wire to Mini-Mate terminal per unit schematic.
3. Refer to DPN003401 for installation instructions.
4. Condensate pump is energized through Mini-Mate Module. Separate power supply is not necessary.
5. Condensate pump includes built in drain line check valve.

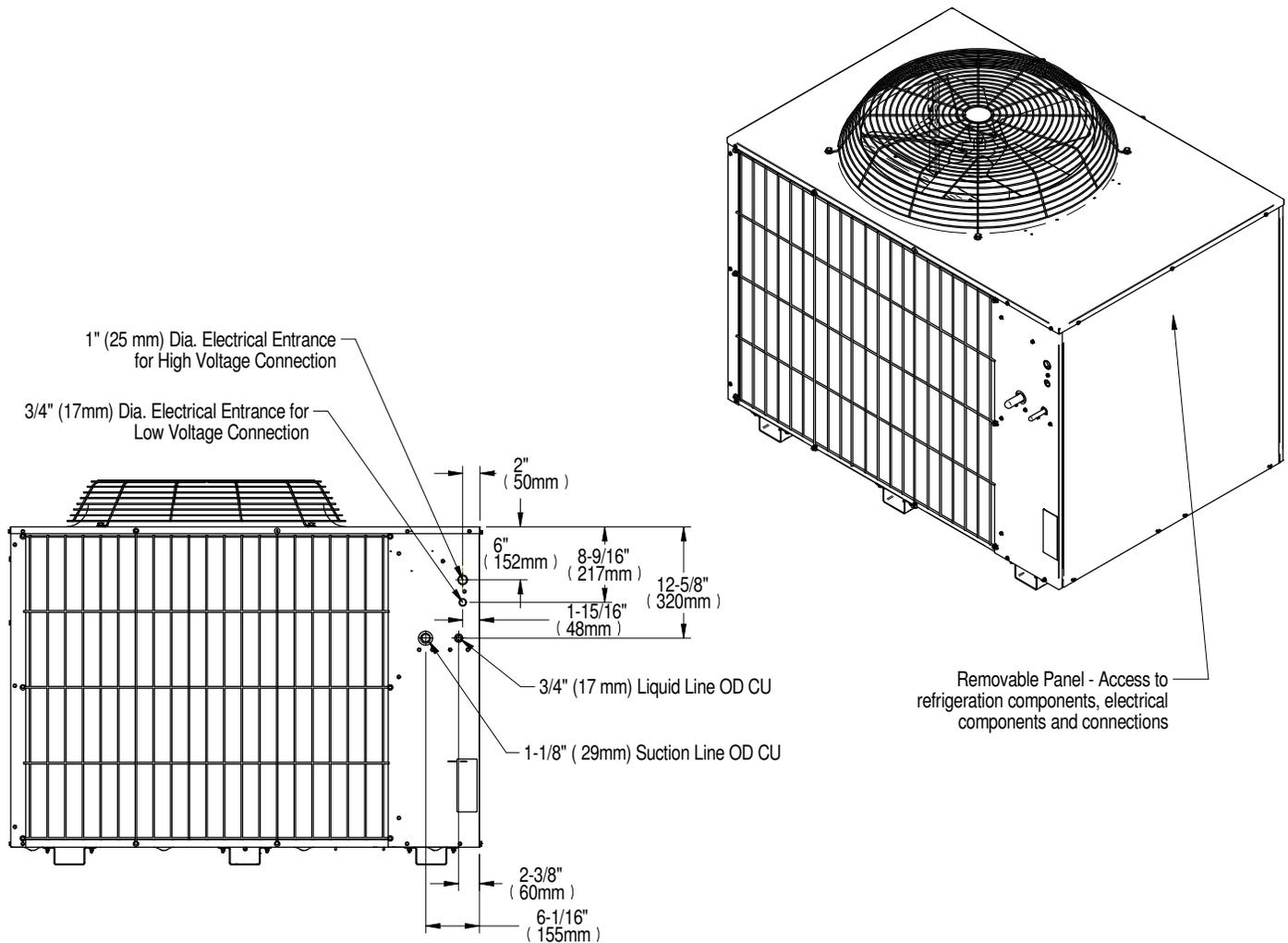


# LIEBERT MINI-MATE VARIABLE CAPACITY

## PRIMARY CONNECTION LOCATIONS 4 & 5 TON DIRECT EXPANSION FAN/COIL MODULE



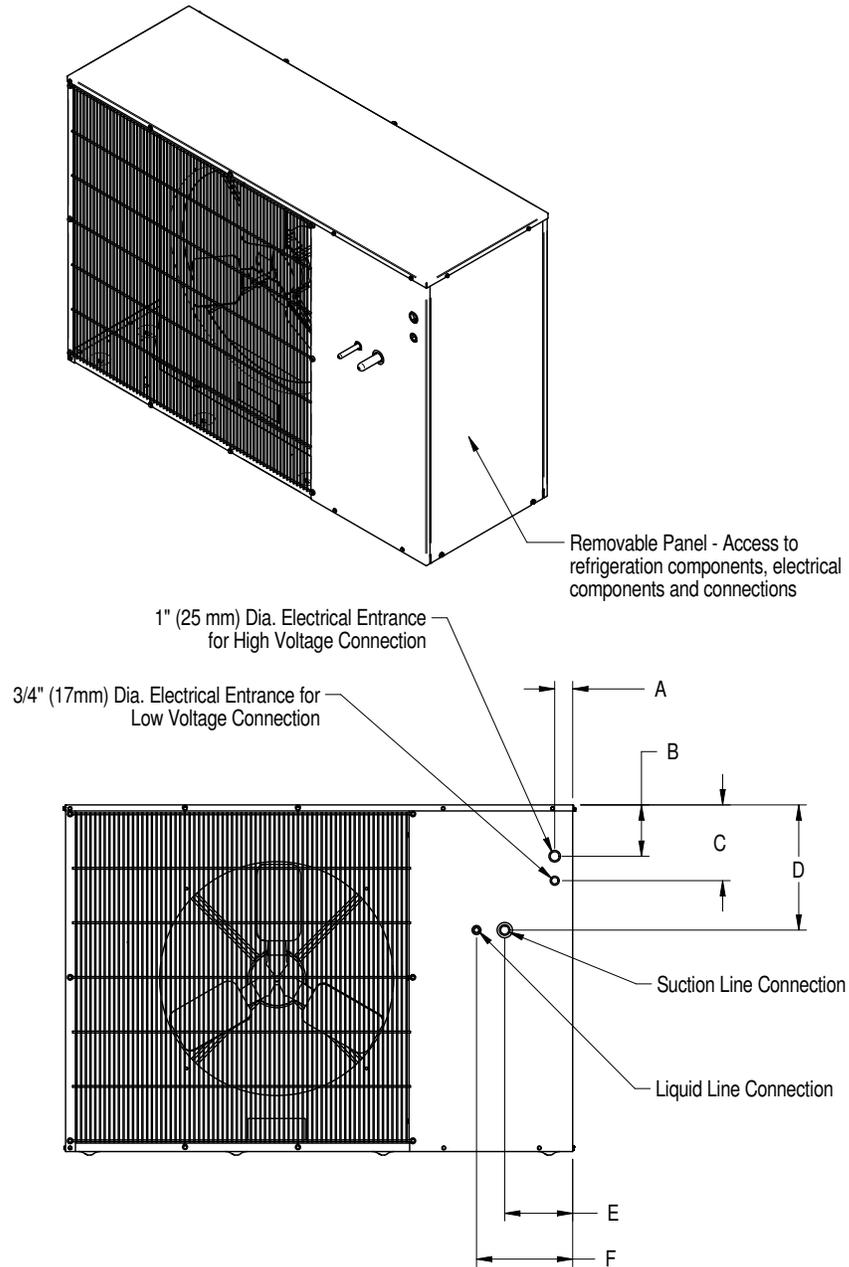
## PRIMARY CONNECTION LOCATIONS 5 TON HIGH AMBIENT/QUIET-LINE OUTDOOR CONDENSING UNIT W/ TOP AIR DISCHARGE



MODEL NUMBERS
60Hz
PFD067A - H
PFDZ67A - L

# LIEBERT PFD

## PRIMARY CONNECTION LOCATIONS CONDENSING UNIT W/ HORIZONTAL AIR DISCHARGE



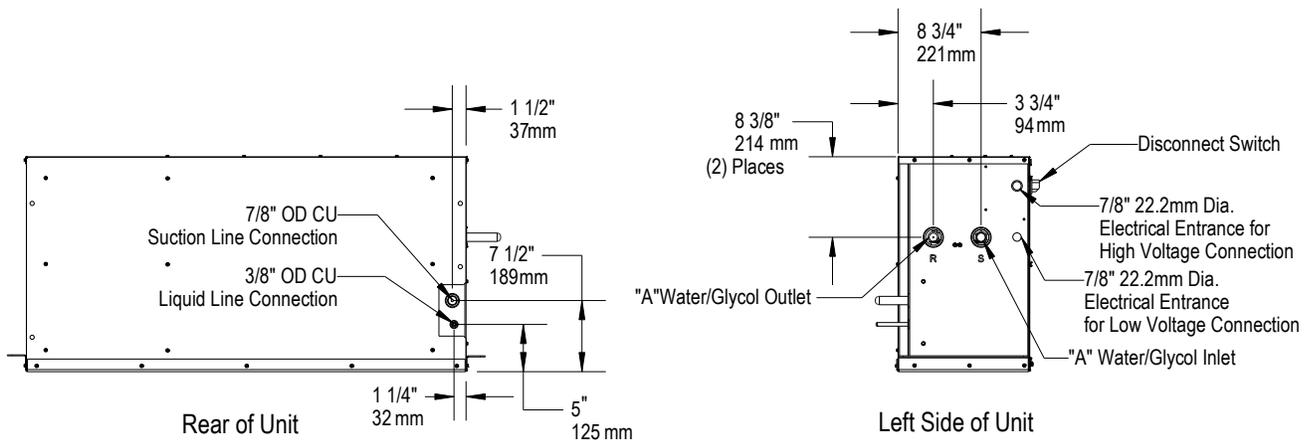
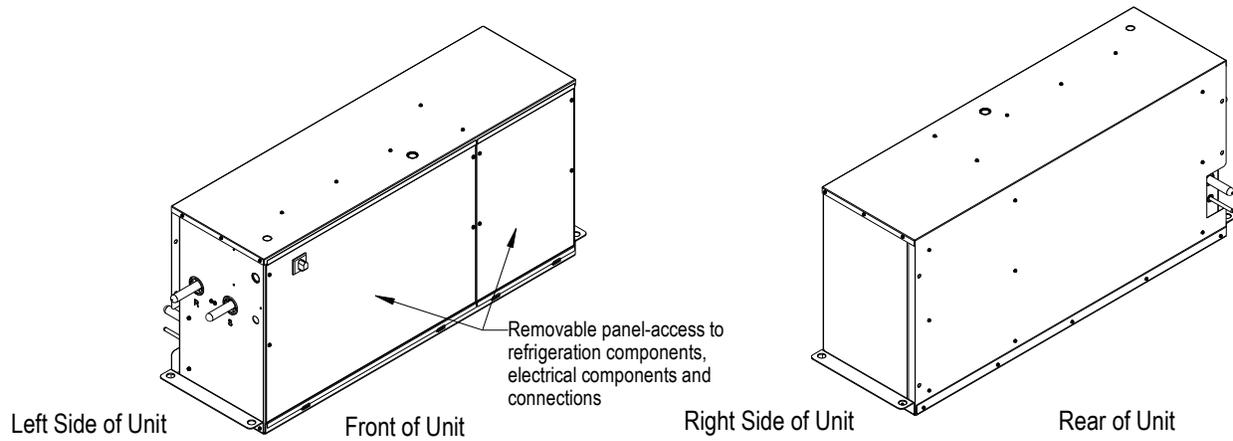
MODEL NUMBERS	ELECTRICAL CONNECTIONS in. (mm)			PIPING CONNECTION LOCATION in. (mm)			PIPING CONNECTION SIZES O.D. CU	
	A	B	C	D	E	F	G	H
PFD037A-L	2 (51)	5-3/4 (146)	8-1/2 (216)	6 (152)	7-1/2 (191)	10-1/2 (267)	3/4"	3/8"
PFD037A-H	2 (51)	5-1/2 (140)	8 (203)	13-1/4 (337)	7-1/4 (184)	10 (254)	7/8"	1/2"
PFD054A-L								
PFD067A-L								



# LIEBERT MTC

## PRIMARY CONNECTION LOCATIONS

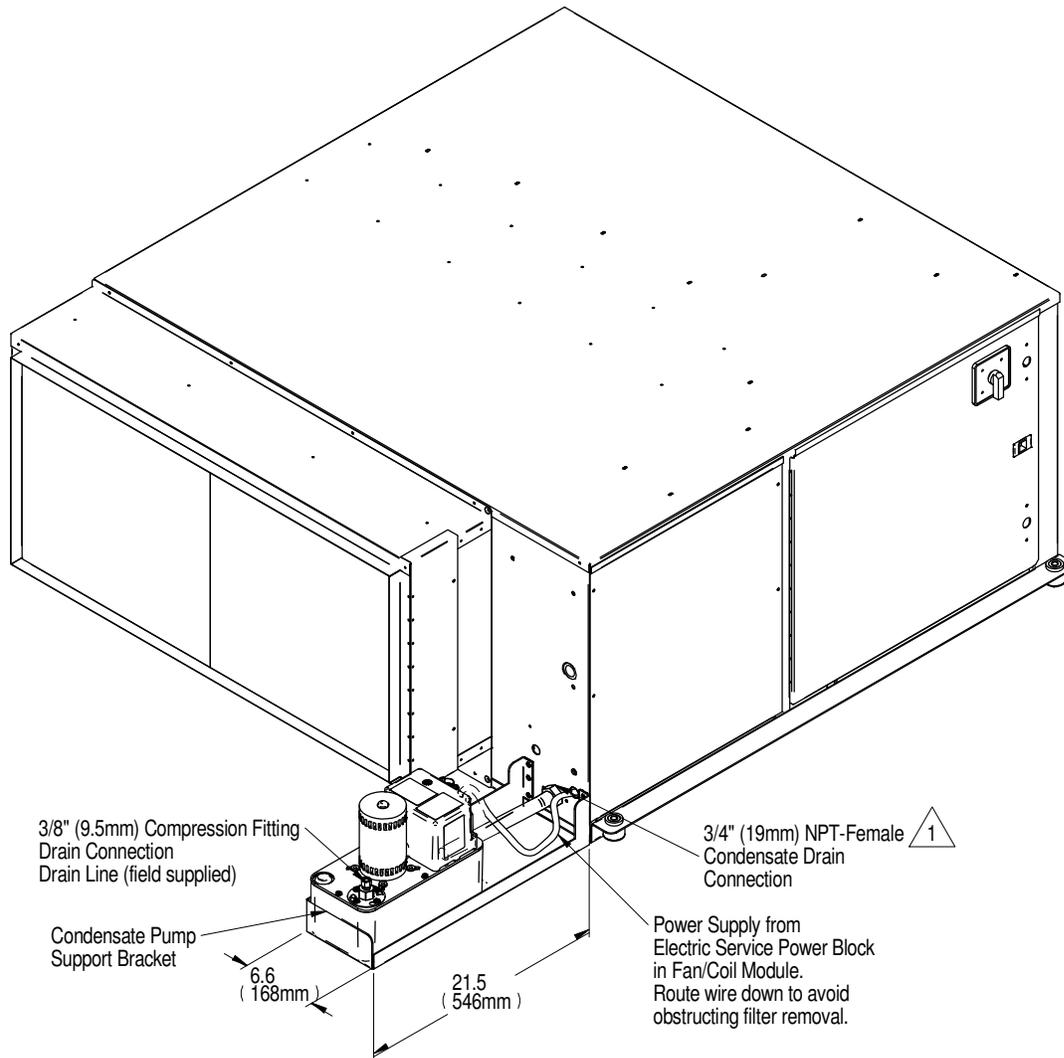
### 3/4/5 TON WATER/GLYCOL COOLED INDOOR CONDENSING UNIT



Model #	"A"
MTC38W	7/8" OD CU
MTC55W	1 1/8" OD CU
MTC69W	

# LIEBERT MINI-MATE VARIABLE CAPACITY

## OPTIONAL FIELD INSTALLED CONDENSATE PUMP CONNECTION LOCATIONS 4 & 5 TON MODELS

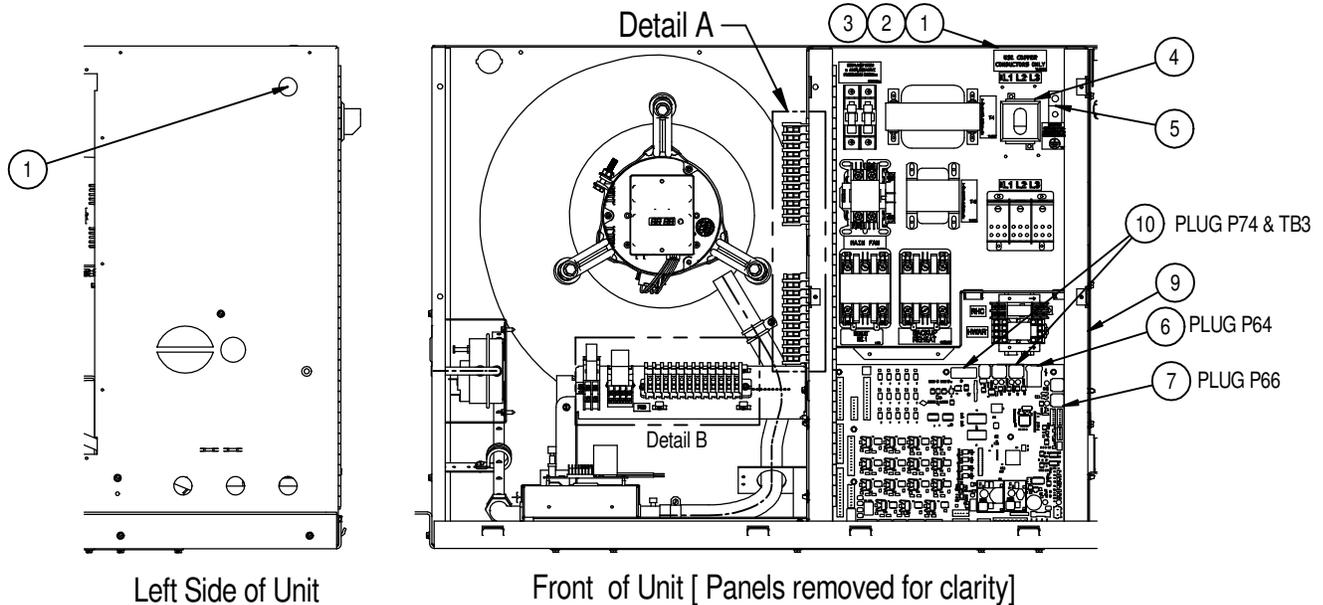


Notes:

1.  3/4" NPT-Male to 3/4" (19mm) flexible rubber tubing assembly supplied must be installed between condensate drain and pump inlet fitting and secured.
2. The Auxiliary Float Switch included with pump must be field interlocked with unit control to enable unit shutdown feature. Wire to Mini-Mate terminal per unit schematic.
3. Refer to DPN003401 for installation instructions.
4. Condensate pump is energized through Mini-Mate Module. Separate power supply is not necessary.
5. Condensate pump includes built in drain line check valve.

# LIEBERT MINI-MATE VARIABLE CAPACITY

## ELECTRICAL FIELD CONNECTIONS 3 TON DIRECT EXPANSION FAN/COIL MODULE



### HIGH VOLTAGE FEATURES:

1. **High Voltage Entrance:** located on top and left side of unit.
2. **Single and three Phase Electric Service and Earth Ground.** Field supplied power and service.
3. **Single and three Phase connection.** Electric service connection terminals on disconnect.
4. **Disconnect Switch:** locking type standard.
5. **Earth ground connection:** Connection terminals for field supplied earth grounding wire.

### CONTROL FEATURES:

6. **iCOM Display Communication:** Field supplied Ethernet wire; Connection to P64 and Ethernet port on iCOM display.
7. **Remote Temperature/Humidity Sensor :** Factory supplied Ethernet wire; Connection to P66 and ETH1 port on Sensor.
8. **iCOM Display Power:** Field supplied Class 1 wiring between unit terminals 13, 14 & 15 and supplied wiring connector at iCOM display (See Detail A, page 2/3).
9. **Low Voltage And Control Wiring Entrance:** located on right side of unit.

### OPTIONAL COMMUNICATION CONNECTIONS

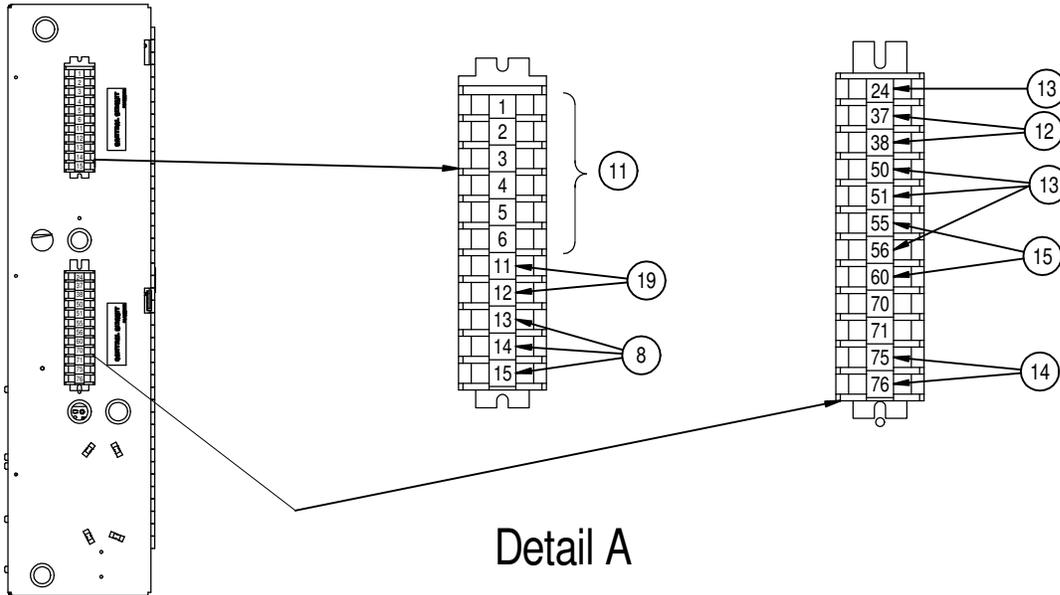
10. **Site and BMS Plug 74 and Terminal Block TB3** are reserved for Site and BMS connections. Plug 74 is an eight (8) pin RJ45 for Cat 5 cable. Terminal Block TB3 is a two (2) position screw terminal block for use with twisted pair wires.

**Unit-to-Unit** See DPN004840 for connections made between ETH2 on iCOM displays.



# LIEBERT MINI-MATE VARIABLE CAPACITY

## ELECTRICAL FIELD CONNECTIONS 3 TON DIRECT EXPANSION FAN/COIL MODULE



### STANDARD LOW VOLTAGE FEATURES: (See Detail A)

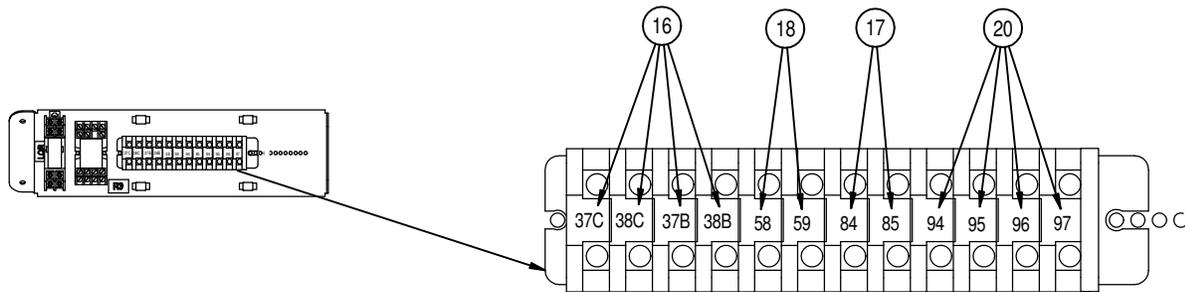
11. **Condensing Unit (DX system only)** : Field supplied Class 1 wiring between Evaporator and Condensing unit. Terminals 1, 2, 3, 4, 5 and 6 used with outdoor air cooled condensing units and terminals 1, 2, 3, 4 and 5 used with indoor water/glycol condensing unit.
12. **Remote Unit Shutdown** Replace existing jumper between terminals 37 & 38 with normally closed switch having a minimum 75VA, 24VAC rating. Use field supplied Class 1 wiring.
13. **Remote Alarm Device (RAD)** Alarm connections may be factory wired or field wired. See schematic RAD1-3 for factory wired alarms. Use Class 1 wiring to connect normally open contacts between terminals 24 & 50, 24 & 51, 24 & 56. Suitable for 24VAC.
14. **Common Alarm Connection** Field supplied Class 1 wiring to common alarm terminals 75 & 76, 1 Amp, 24VAC maximum on common alarm relay (K3).
15. **Optional Condensate Alarm (Dual Float Condensate Pump only).** Relay terminals located on customer connection terminal block for remote indication. Field supplied Class 1 wiring to connections #55 & #60.

#### NOTES:

1. Refer to specification sheet for full load amp. and wire size amp. ratings.
2. Control voltage wiring must be a minimum of 16 GA (1.3mm) for up to 75' (23m) or not to exceed 1 volt drop in control line.

# LIEBERT MINI-MATE VARIABLE CAPACITY

## ELECTRICAL FIELD CONNECTIONS 3 TON DIRECT EXPANSION FAN/COIL MODULE



Detail B

### OPTIONAL LOW VOLTAGE TERMINAL PACKAGE: (See Detail B)

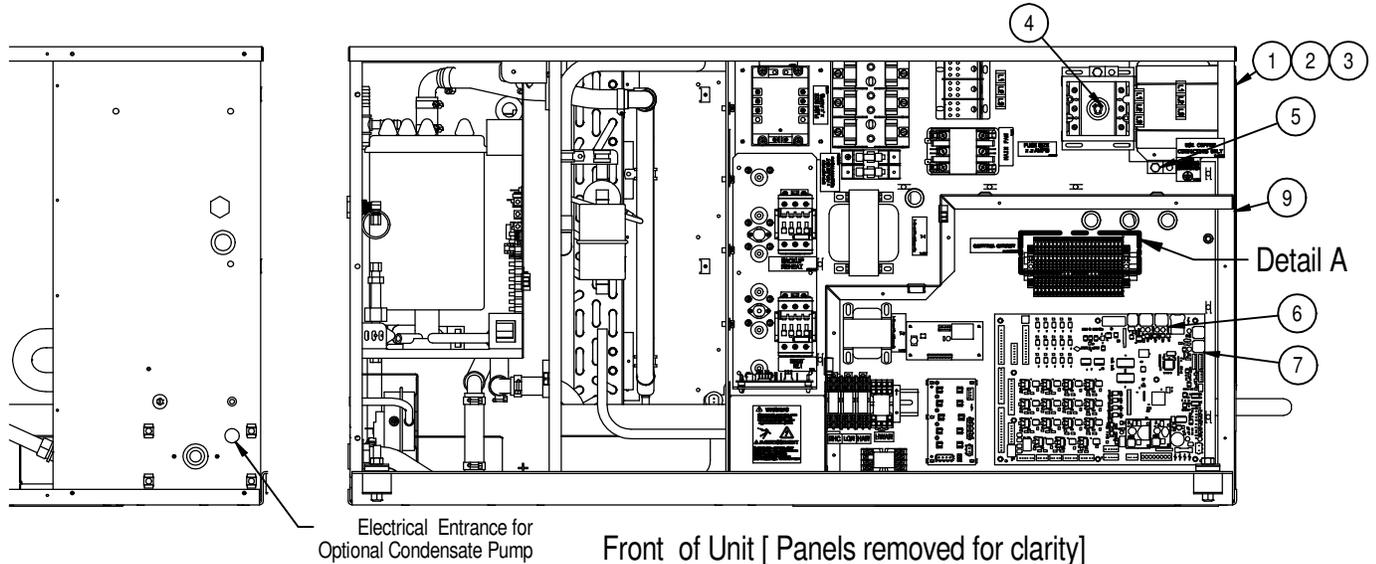
- 16. Remote Unit Shutdown, two additional pairs** Replace existing jumper between terminals 37B & 38B and 37C & 38C with normally closed switch having minimum 75VA, 24VAC rating. Use field supplied Class 1 wiring.
- 17. Main Fan Auxiliary Switch** Optional main fan auxiliary side switch. Terminals located on customer connection terminal block for remote indication that the evaporator fan motor/unit is on. Field connect to 24V maximum, Class1 wiring to connections #84 & #85.
- 18. Unit Shutdown by Liqui-TECT with Remote Indicator** Requires field wiring from optional Liqui-TECT device to Remote Alarm Device terminal 24 & 51 for unit shutdown, and field wiring from connections #58 & #59 for remote indicator of unit shutdown by Liqui-TECT. 24V maximum, Class 1 wiring required.
- 19. Remote Humidifier Control** Field to connect 24V maximum, Class 1 wiring to connections #11 & #12 (See Detail A).
- 20. Common Alarm Connection, two additional connections** Field supplied Class 1 wiring to common alarm terminals 94 & 95 and 96 & 97 which are factory connected to normally open contacts, 1 Amp, 24VAC maximum on common alarm relay (R3).

NOTES:

1. Refer to specification sheet for full load amp. and wire size amp. ratings.
2. Control voltage wiring must be a minimum of 16 GA (1.3mm) for up to 75' (23m) or not to exceed 1 volt drop in control line.

# LIEBERT MINI-MATE VARIABLE CAPACITY

## ELECTRICAL FIELD CONNECTIONS 4 & 5 TON DIRECT EXPANSION FAN/COIL MODULE



### HIGH VOLTAGE FEATURES:

1. **High Voltage Entrance:** located on right side of unit.
2. **Three Phase Electric Service and Earth Ground.** Field supplied power and service.
3. **Three Phase connection.** Electric service connection terminals on disconnect.
4. **Disconnect Switch:** Non-locking type standard (Locking fused disconnect optional).
5. **Earth ground connection:** Connection terminals for field supplied earth grounding wire.

### CONTROL FEATURES:

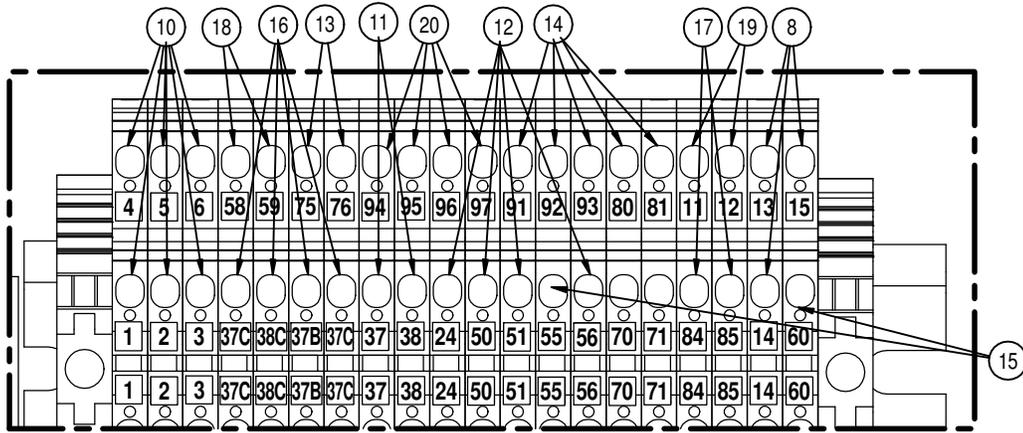
6. **iCOM Display Communication:** Field supplied Ethernet wire; Connection to P64 and Ethernet port on iCOM display.
7. **Remote Temperature/Humidity Sensor :** Factory supplied Ethernet wire; Connection to P66 and Ethernet port on Sensor
8. **iCOM Display Power:** Field supplied Class 1 wiring between unit terminals 13, 14 & 15 and supplied wiring connector at iCOM display
9. **Low Voltage And Control Wiring Entrance:** located on right side of unit.

### STANDARD LOW VOLTAGE FEATURES: (See Detail A – Page 2/2)

10. **Condensing Unit (DX system only) :** Field supplied Class 1 wiring between Evaporator and Condensing unit. Terminals 1, 2, 3, 4, 5 and 6 used with outdoor air cooled condensing units and terminals 1, 2, 3, 4 and 5 used with indoor water/glycol condensing unit.
11. **Remote unit shutdown.** Replace existing jumper between terminals 37 & 38 with normally closed switch having a minimum 75VA, 24VAC rating. Use field supplied Class 1 wiring.
12. **Remote Alarm Device (RAD) .** Alarm connections may be factory wired or field wired. See schematic, RAD1- 3, for factory wired alarms. For field wired alarms, use Class 1 wiring to connect normally open contacts between terminals 24 & 50, 24 & 51, 24 & 56. Suitable for 24VAC.
13. **Common alarm connection.** Field supplied Class 1 wiring to common alarm terminals 75 & 76, 1 Amp, 24VAC maximum on common alarm relay (K3).

# LIEBERT MINI-MATE VARIABLE CAPACITY

## ELECTRICAL FIELD CONNECTIONS 4 & 5 TON DIRECT EXPANSION FAN/COIL MODULE



## DETAIL A CUSTOMER CONNECTIONS

### OPTIONAL LOW VOLTAGE FEATURES:

- 14. **Smoke detector alarm connections.** Field supplied Class 1 wiring to 1 Amp, 24VAC maximum remote alarm circuits. Factory wired contacts from optional smoke detector are #91-Common, #92-NO, and #93-NC. Optional smoke detector trouble (SDT) connections #80 & #81.
- 15. **Optional Condensate Alarm (Dual Float Condensate Pump only).** Relay terminals located on customer connection terminal block for remote indication. Field supplied Class 1 wiring to connections #55 & #60.

### Low Voltage Terminal Package:

- 16. **Remote unit shutdown, two additional pairs.** Replace existing jumper between terminals 37B & 38B and 37C and 38C with normally closed switch having a minimum 75VA, 24VAC rating. Use field supplied Class 1 wiring
- 17. **Main Fan Auxiliary Switch.** Optional main fan auxiliary side switch. Terminals located on customer connection terminal block for remote indication that the evaporator fan motor/unit is on. Field to connect 24V maximum, Class 1 wiring to connections #84 & #85.
- 18. **Unit Shutdown by Liqui-tect with Remote Indicator.** Requires field wiring from optional Liqui-tect device to Remote Alarm Device terminal 24 & 51 for unit shutdown and field wiring from connections #58 & #59 for remote indicator of unit shutdown by Liqui-tect. 24V maximum, Class 1 wiring required.
- 19. **Remote Humidifier Control** Field to connect 24V maximum, Class 1 wiring to connections #11 & #12.
- 20. **Common alarm connection, two additional connections.** Field supplied Class 1 wiring to common alarm terminals 94 & 95, and 96 & 97, which are factory connected to normally open contacts, 1 Amp, 24VAC maximum on common alarm relay (R3).

### NOTES:

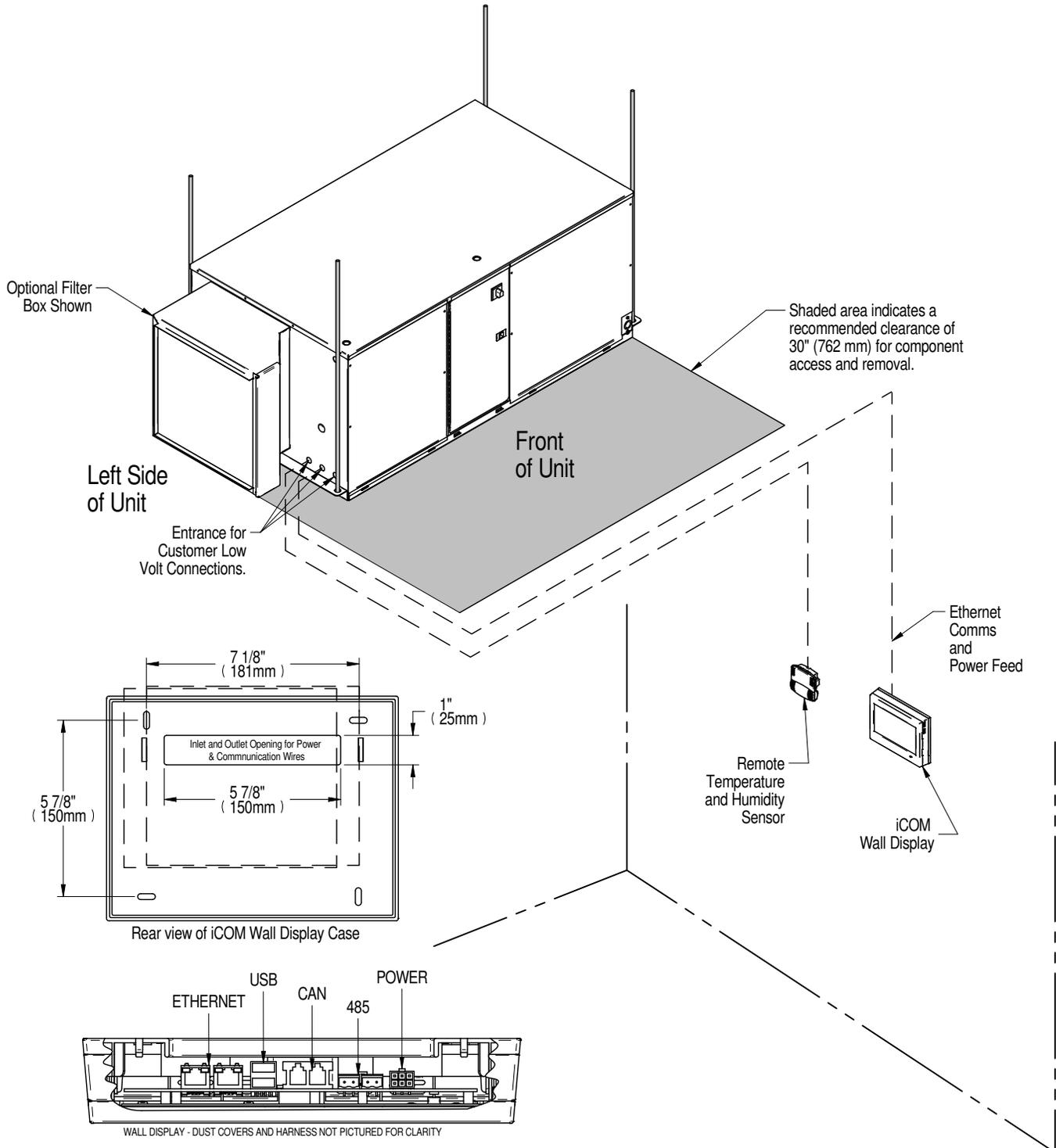
1. Refer to specification sheet for full load amp. and wire size amp. ratings.
2. Control voltage wiring must be a minimum of 16 GA (1.3mm) for up to 75' (23m) or not to exceed 1 volt drop in control line.



# LIEBERT MINI-MATE VARIABLE CAPACITY

## 3 TON GENERAL ARRANGEMENT, DIMENSIONAL DATA & FIELD CONNECTIONS

### LIEBERT iCOM™ WALLMOUNT DISPLAY



Notes:  
1. Refer to DPN004802 for connection points on Liebert Mini-Mate unit.

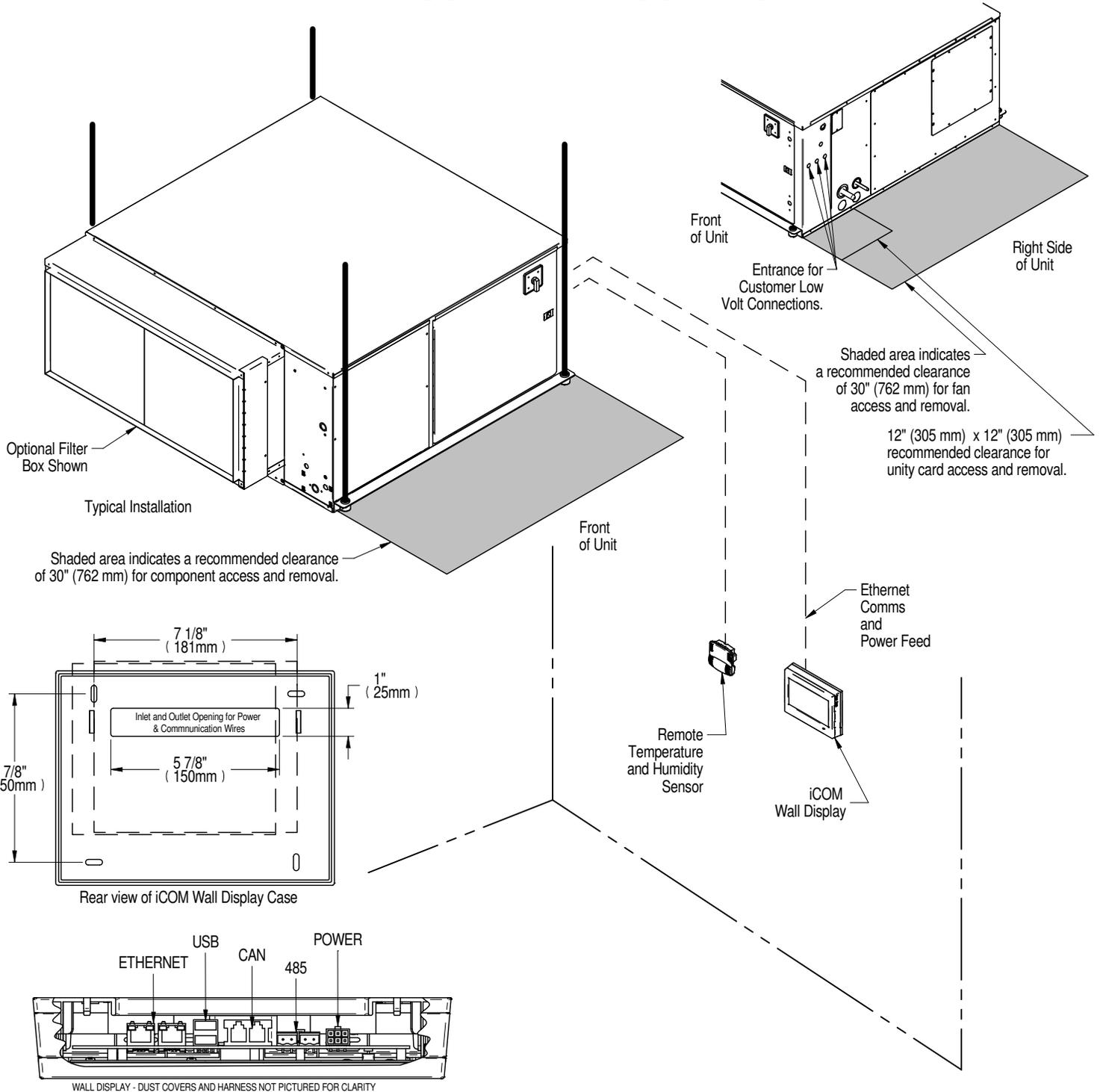
--- Field Provided Wiring  
- - - Wall



# LIEBERT MINI-MATE VARIABLE CAPACITY

## 4 & 5 TON GENERAL ARRANGEMENT, DIMENSIONAL DATA & FIELD CONNECTIONS

### LIEBERT iCOM™ WALLMOUNT DISPLAY

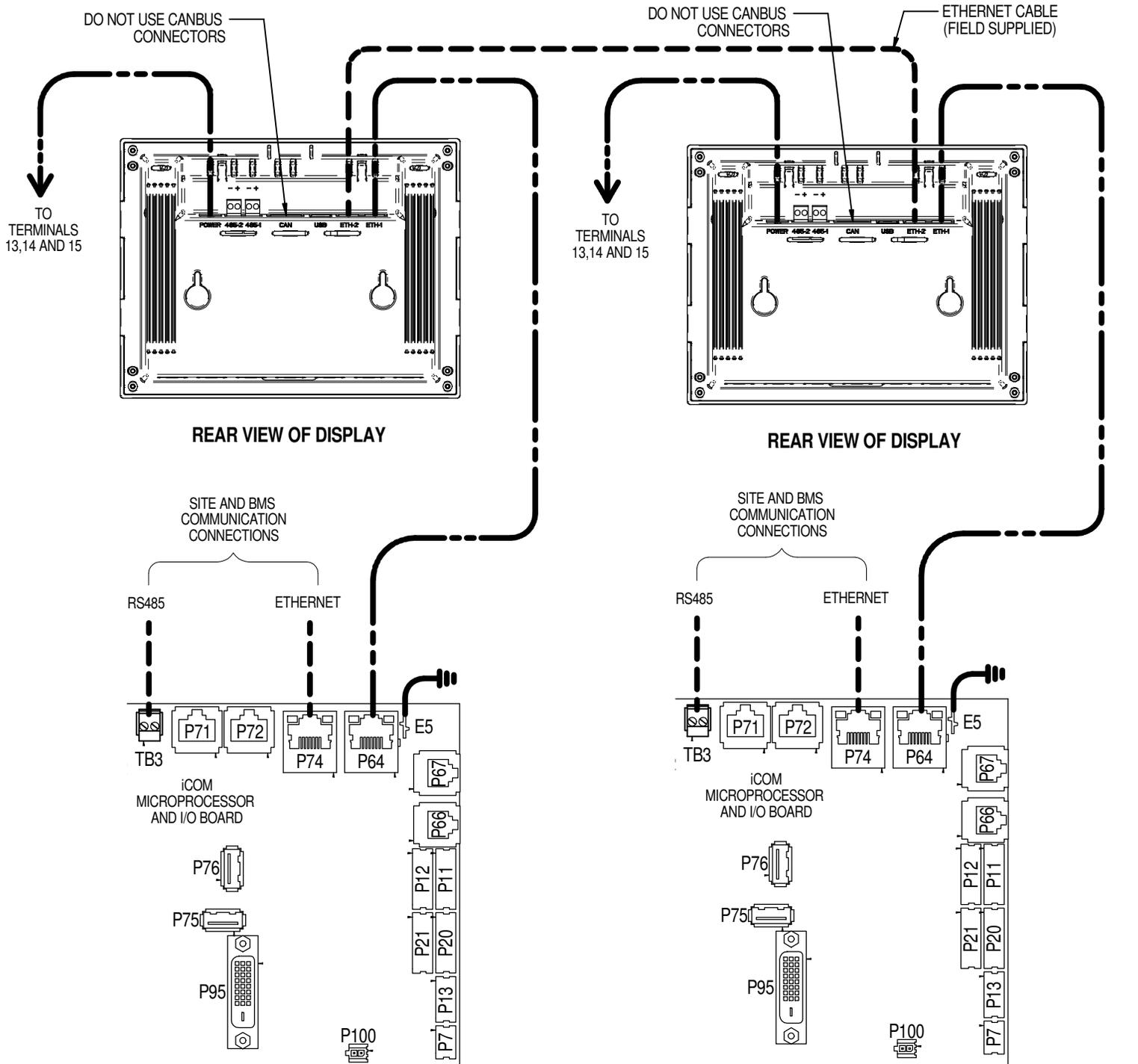


Notes:  
1. Refer to DPN004057 for connection points on Liebert Mini-Mate unit.

--- Field Provided Wiring  
--- Wall

# LIEBERT MINI-MATE VARIABLE CAPACITY

## UNIT TO UNIT NETWORK CONNECTIONS TWO 3 TON UNITS NETWORKED



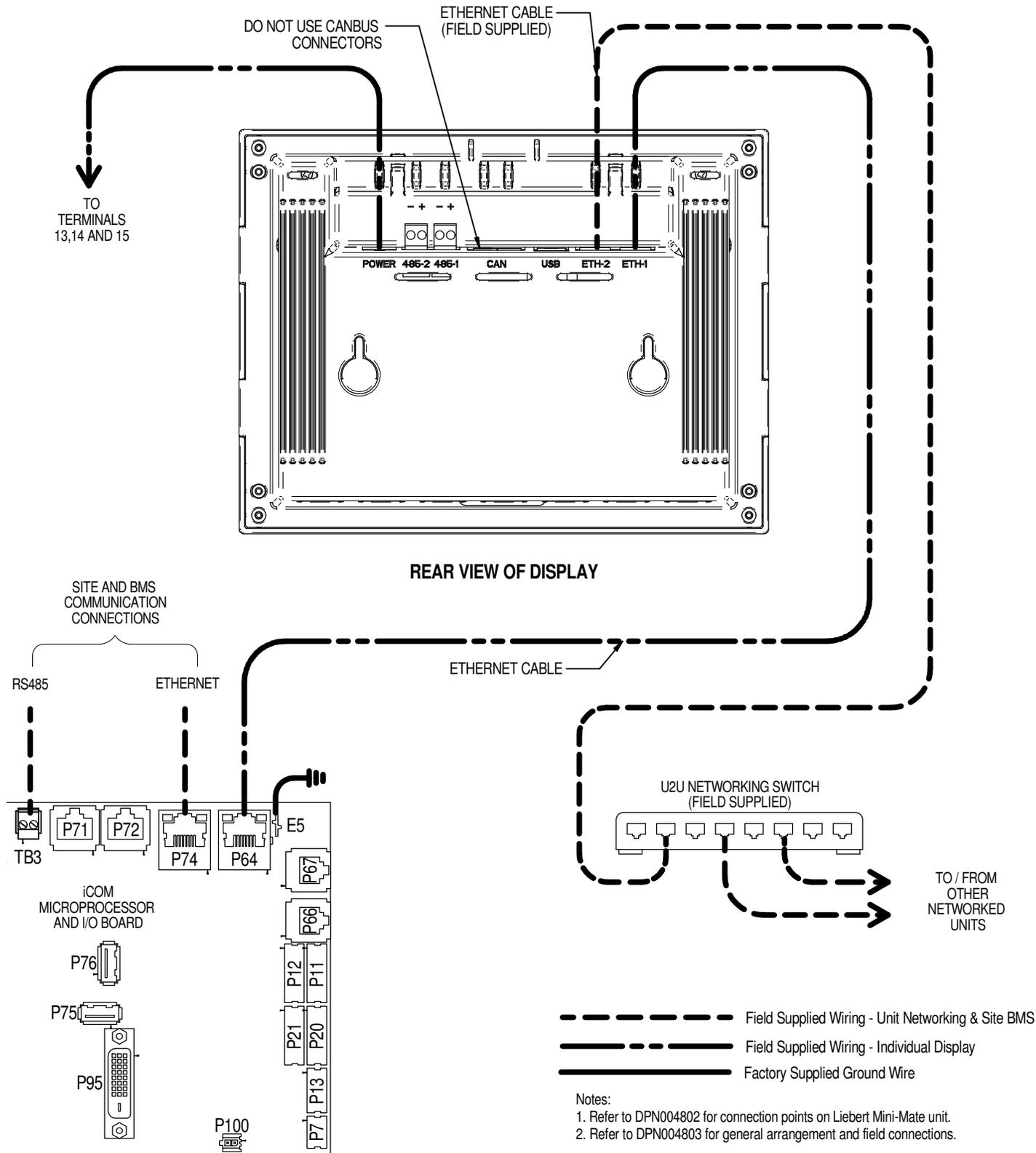
**Notes:**

1. Refer to DPN004802 for connection points on Liebert Mini-Mate unit.
2. Refer to DPN004803 for general arrangement and field connections.

- Field Supplied Wiring - Unit Networking & Site BMS
- . - . - . Field Supplied Wiring - Individual Display
- Factory Supplied Ground Wire

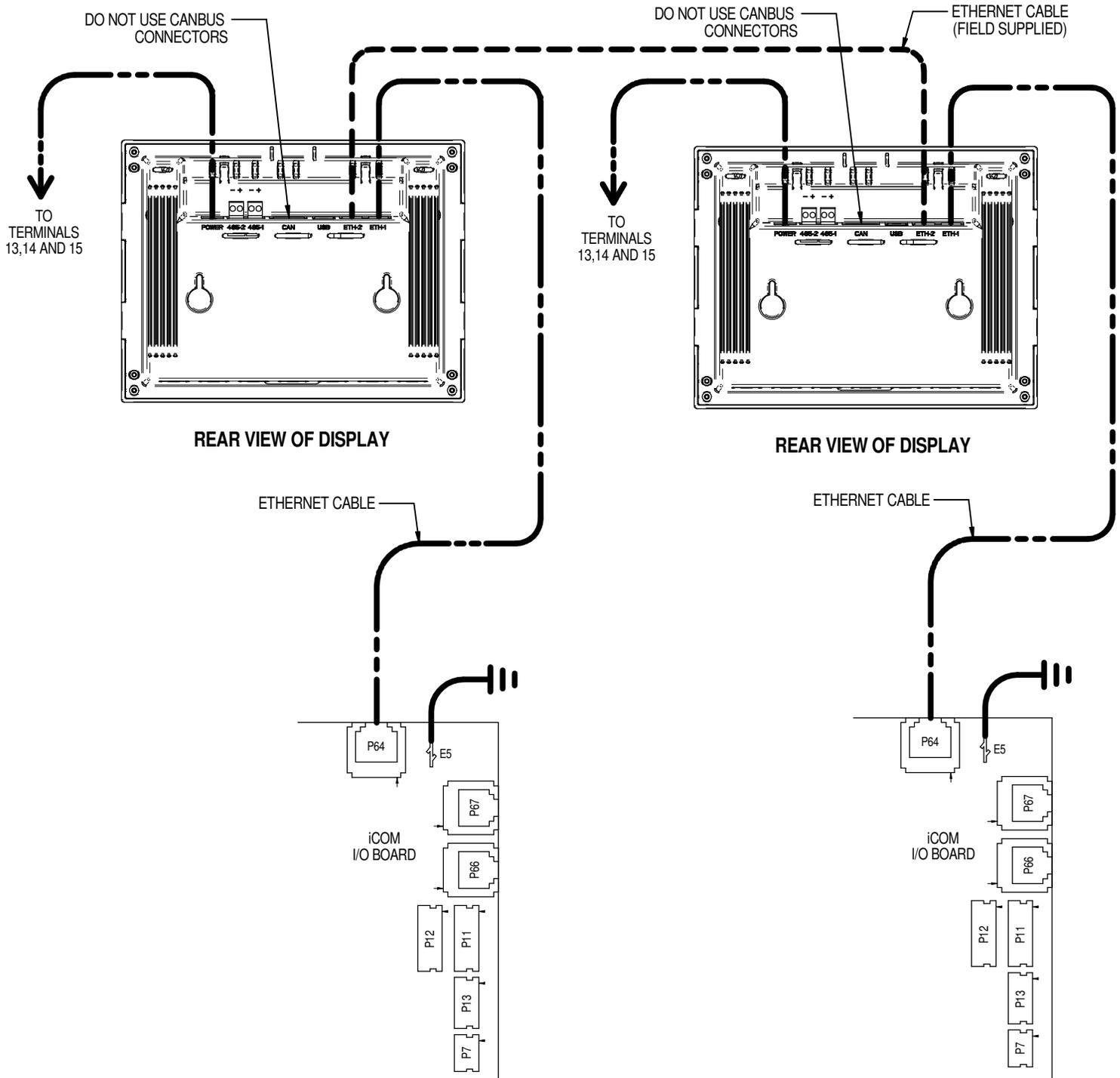
# LIEBERT MINI-MATE VARIABLE CAPACITY

## UNIT TO UNIT NETWORK CONNECTIONS TWO OR MORE 3 TON UNITS NETWORKED USING SWITCH



# LIEBERT MINI-MATE VARIABLE CAPACITY

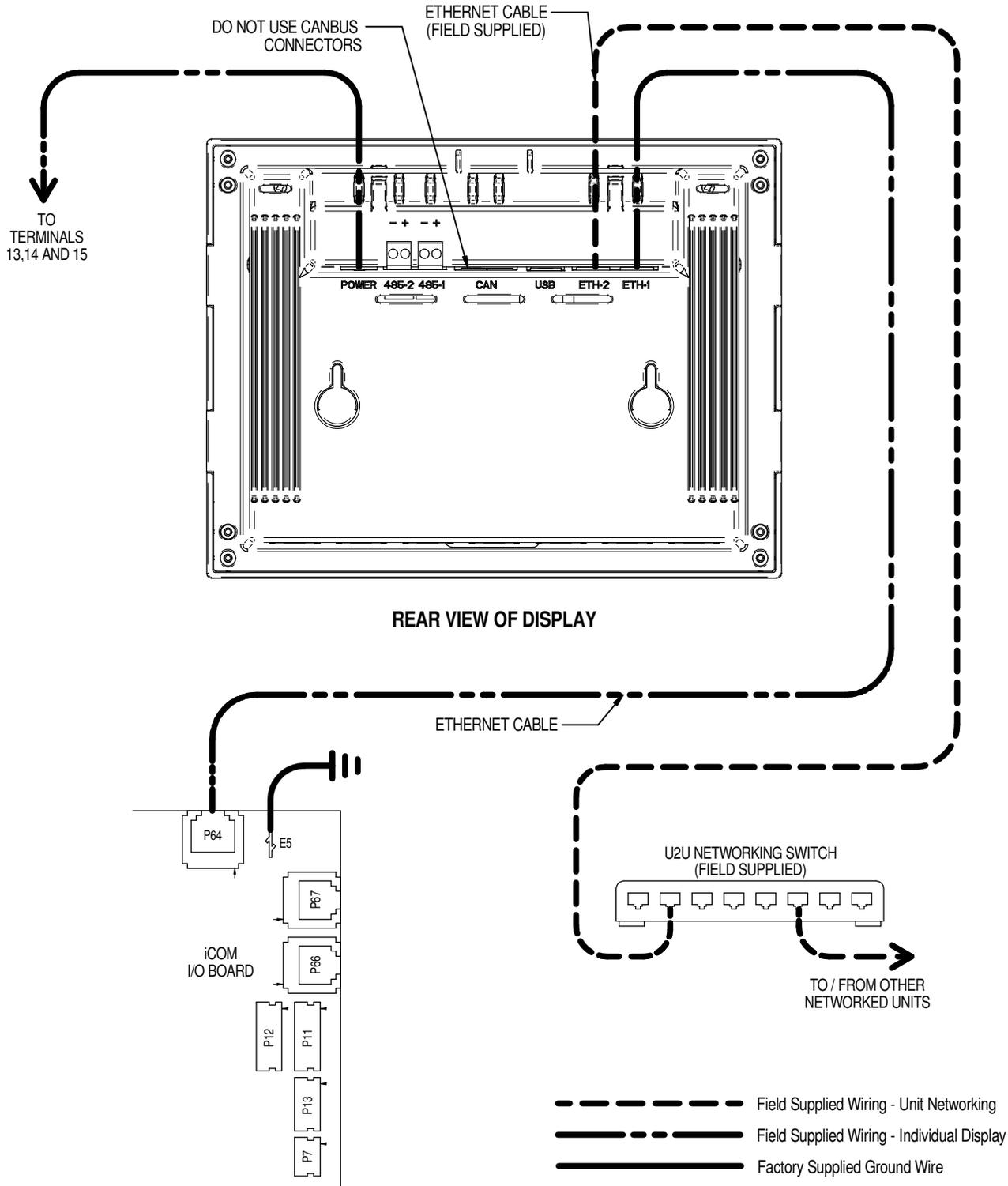
## UNIT TO UNIT NETWORK CONNECTIONS TWO 4-5 TON UNITS NETWORKED



Notes:  
 1. Refer to DPN004057 for connection points on Liebert Mini-Mate unit.  
 2. Refer to DPN004238 for general arrangement and field connections.

# LIEBERT MINI-MATE VARIABLE CAPACITY

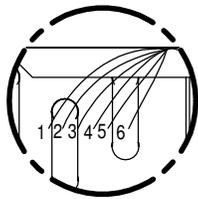
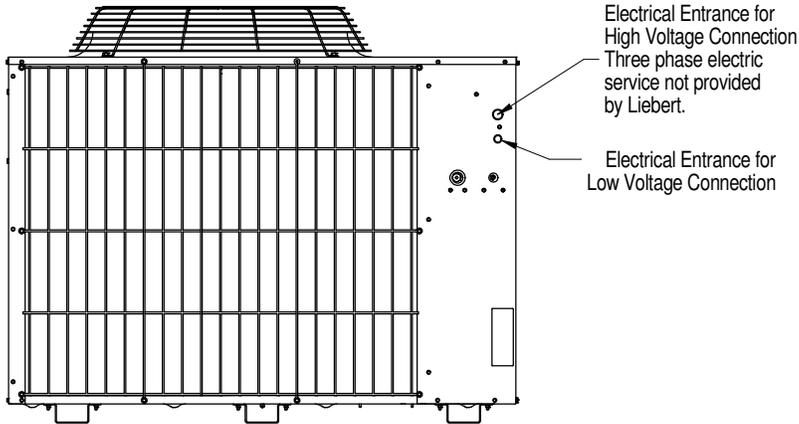
## UNIT TO UNIT NETWORK CONNECTIONS TWO OR MORE 4-5 TON UNITS NETWORKED USING SWITCH



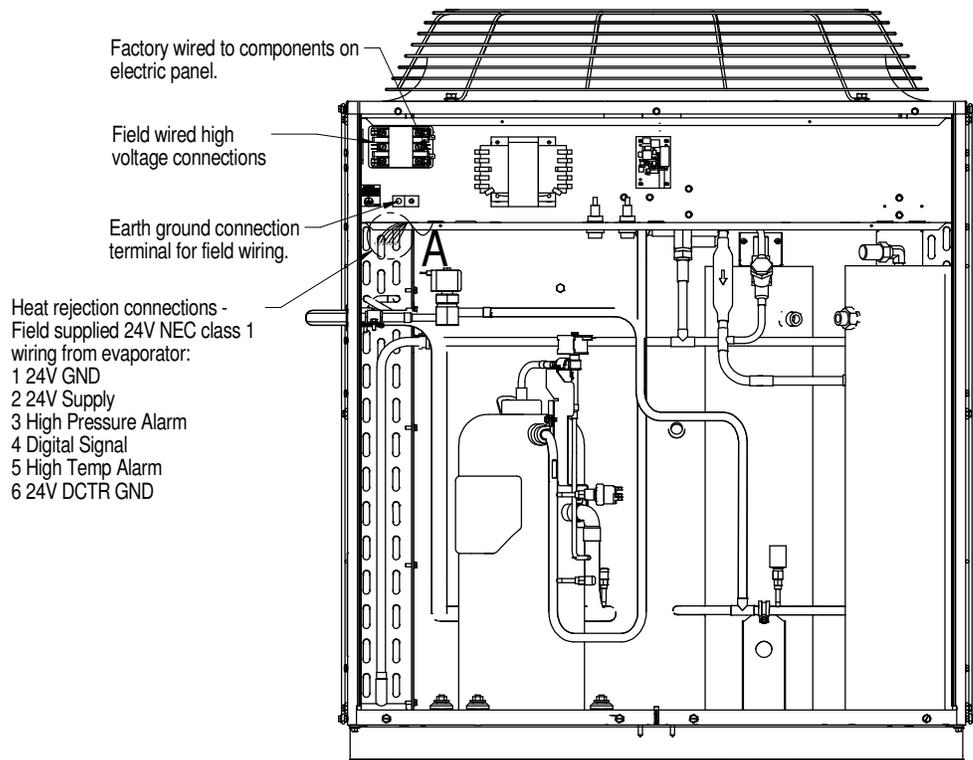
**Notes:**

1. Refer to DPN004057 for connection points on Liebert Mini-Mate unit.
2. Refer to DPN004238 for general arrangement and field connections.

## ELECTRICAL FIELD CONNECTIONS 5 TON HIGH AMBIENT/QUIET-LINE OUTDOOR CONDENSING UNIT W/ TOP AIR DISCHARGE



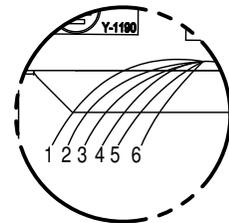
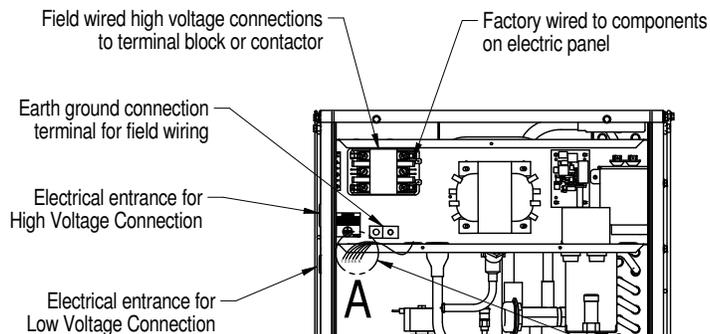
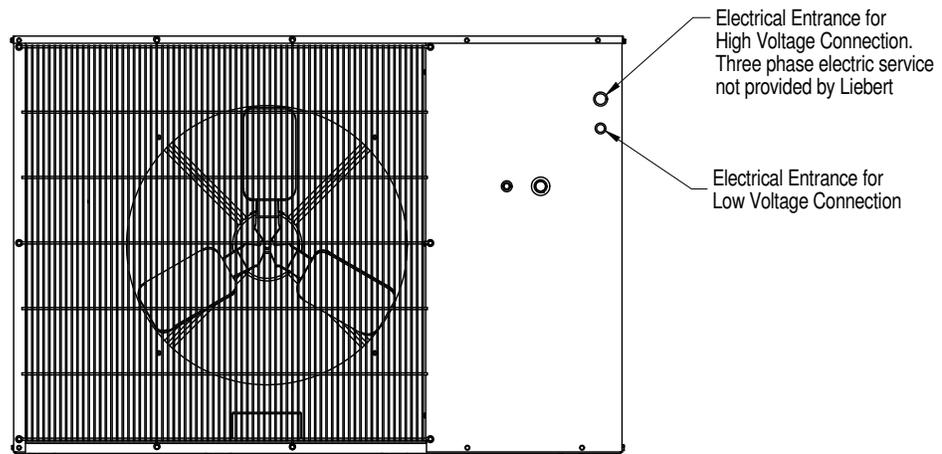
**DETAIL A**



**Note:**

1. Disconnect Switch to be field supplied, wired, and mounted by others per local and national codes
2. Refer to specification sheet for full load amp and wire size amp ratings.

## ELECTRICAL FIELD CONNECTIONS CONDENSING UNIT W/ HORIZONTAL AIR DISCHARGE



**DETAIL A**

Heat rejection connection.  
Field supplied 24V NEC class 1 wiring.  
Wire connections from evaporator module:

- 1 24V GND
- 2 24V Supply
- 3 High Pressure Alarm
- 4 Digital Signal
- 5 High Temp Alarm
- 6 24V DCTR GND

Unit view will vary depending on model size

MODEL NUMBERS
PFD037A-L
PFD037A-H
PFD054A-L
PFD067A-L

**Note:**

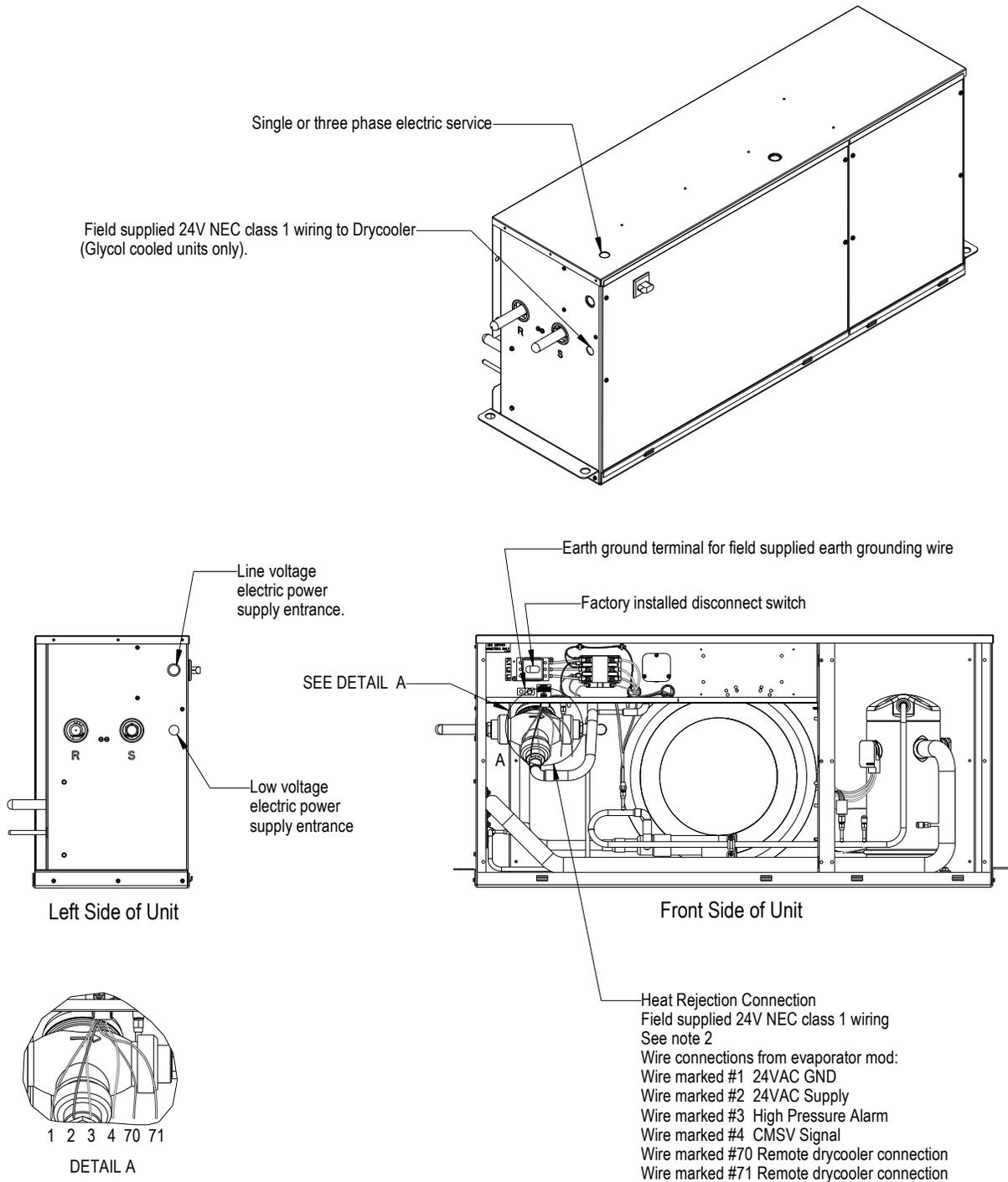
1. Disconnect Switch to be field supplied, wired, and mounted by others per local and national codes.
2. Refer to specification sheet for full load amp and wire size amp ratings.



# LIEBERT MTC

## ELECTRICAL FIELD CONNECTIONS

### 3/4/5 TON WATER/GLYCOL COOLED INDOOR CONDENSING UNIT



**NOTES:**

1. Refer to specification sheet for full load amp and wire size amp ratings.
2. Control voltage wiring must be a minimum of 16GA (1.3mm) for up to 75' (23m) or not to exceed 1 volt drop in control line.

## **Appendix C: Guide Specifications**

The following are the guide specifications for the Liebert® Mini-Mate Variable Capacity Thermal Management Systems.

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# Liebert® Mini-Mate™

## Variable Capacity 3, 4, and 5 Ton Guide Specifications

### 1.0 GENERAL

#### 1.1 SUMMARY

These specifications describe requirements for a ceiling mounted thermal management system. The system shall be designed to control temperature conditions in rooms containing electronic equipment, with good insulation and vapor barrier. The system is also available with an optional humidity control package.

The manufacturer shall design and furnish all equipment in the quantities and configurations shown on the project drawings.

#### 1.2 DESIGN REQUIREMENTS

The thermal management system shall be a Liebert Mini-Mate™ Variable Capacity factory assembled unit. On direct expansion models, the refrigeration system shall be split, with the compressor located in a remote condensing unit.

The evaporator section shall be designed for above dropped ceiling installation. Condensing units shall be designed for outdoor installation. Refer to Section 2.8.2 for condensing unit guide specifications.

The system shall have a net total cooling capacity of \_\_\_\_\_ BTU/hr (kW) and a net sensible cooling capacity of \_\_\_\_\_ BTU/hr (kW), based entering air conditions of \_\_\_\_\_°F (°C) dry bulb and \_\_\_\_\_°F (°C) wet bulb. Net capacities shall include losses due to fan motor heat. The system cooling capacity shall be factory certified per ASHRAE127-2007 testing.

The unit is to be supplied for operation on a \_\_\_\_\_ volt, \_\_\_\_\_ phase, \_\_\_\_\_ Hz power supply.

System shall be supplied with CSA Certification to the harmonized U.S. and Canadian product safety standard CSA C22.2 No 236/UL 1995 for "Heating and Cooling Equipment" and marked with the CSA c-us logo (60 Hz only).

The system model number(s) shall be:

Evaporator \_\_\_\_\_

Condensing Unit \_\_\_\_\_

#### 1.3 SUBMITTALS

Submittals shall be provided after the agreement of the proposal and shall include: single line diagrams; dimensional, electrical and capacity data; piping and electrical connection drawings.

#### 1.4 QUALITY ASSURANCE

The specified system shall be factory tested before shipment. Testing shall include but shall not be limited to: quality control checks, hi-pot test (two times rated voltage plus 1,000 volts, per NRTL agency requirements), and metering calibration tests. The system shall be designed and manufactured according to world class quality standards. The manufacturer shall be ISO 9001 certified.

#### 1.5 ACCEPTABLE ALTERNATIVES

Acceptable alternatives shall be permitted with engineer's prior approval only. Contractor to submit a detailed summary form listing all variations to include size deviations, electrical load differences, functional and component changes and savings to end user.

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## 2.0 PRODUCT

### 2.1 STANDARD FEATURES/ALL SYSTEMS

#### 2.1.1 Evaporator Cabinet Construction

The cabinet and chassis shall be constructed of heavy gauge galvanized steel and shall be serviceable from one side only for routine maintenance. Mounting brackets shall be integral to the cabinet design. Internal cabinet insulation shall meet ASHRAE 62.1 requirements for Mold Growth, Humidity and Erosion, tested per UL 181 and ASTM 1338 standards.

#### 2.1.2 Remote Sensors

The unit shall be supplied with remote temperature and humidity sensors. The sensors shall be factory provided in an aesthetically pleasing housing with a 30 ft. (9 m), shielded cable and shall be field mounted and field wired to the unit electrical panel.

#### 2.1.3 Air Distribution – 4 and 5 Ton Models

The fan shall be plug/plenum type, with motorized impeller, single inlet and dynamically balanced. The drive package shall be direct drive, electronically commutated (EC) and variable speed. The fan speed shall be automatically regulated by the Liebert iCOM control through all modes of operation. The fans shall be located to draw air over the coil to ensure even air distribution and maximum coil performance.

The evaporator system shall be capable of delivering \_\_\_ CFM (CMH) at \_\_\_ inches (mm) of external static pressure. The fan motor shall be \_\_\_ hp (W), maximum rating.

System shall be suitable for ducted supply and return air distribution or bottom supply grille and ducted return air distribution. Supply air location shall be field selectable, configured in one of three outlet locations: back of cabinet, right side, or bottom of cabinet. The bottom supply configuration will require an additional kit (ordered and shipped separately). Refer to 2.10.10 Air Filter Box/Duct Flange – 4 and 5 Ton Models Only, and 2.10.12 Bottom Discharge Grille – 4 Ton and 5 Ton Models Only.

#### 2.1.4 Air Distribution – 3 Ton Models

The fan shall be a centrifugal type, double width, double inlet with electronically commutated (EC) direct drive motor. The fan speed shall be variable and automatically regulated by the Liebert iCOM control through all modes of operation. The fan shall be located to maximize one-side service access.

The evaporator system shall be capable of delivering \_\_\_ CFM (CMH) at \_\_\_ inches (mm) of external static pressure. The fan motor shall be \_\_\_ hp (W), maximum rating.

System shall be suitable for supply and return air plenum or ducted supply and return air distribution. Refer to Air Filter Box/Duct Flange – 3 Ton Models Only, and Air Distribution Plenum – 3 Ton Models Only (ordered and shipped separately).

#### 2.1.5 Disconnect Switch, Non-Locking (5,000 amps SCCR) – 4 and 5 Ton Models

The non-automatic, non-locking, molded case circuit breaker shall be factory mounted in the high voltage section of the electrical panel. The switch handle shall be accessible from the front of the indoor unit. The short circuit current rating for the evaporator unit shall be 5,000 amps.

#### 2.1.6 Disconnect Switch, Locking (5,000 amps SCCR) – 3 Ton Models

The non-automatic, locking, molded case circuit breaker shall be factory mounted in the high voltage section of the electrical panel. The switch handle shall be accessible from the front of the indoor unit. Access to the high voltage electric panel shall only be obtained with the switch in the Off position, and the handle shall be lockable to support lockout/tagout safety programs. The short circuit current rating for the evaporator unit shall be 5,000 amps.

## 2.1.7 Unit Controls, Protections, and Communication Terminals

The Liebert Mini-Mate shall include Liebert iCOM control with remote 9-in. color touchscreen display, a filter clog switch, common alarm contact, and remote shutdown contacts. Filter clog switch shall be adjustable outside the cabinet and shall activate an iCOM alarm when the pressure drop across the filters exceeds the customer adjustable level. Common Alarm Contact shall be one set of normally open contacts which shall close for remote indication of alarms. Remote Shutdown Contact shall enable unit shutdown based on external input.

## 2.2 LIEBERT iCOM® MICROPROCESSOR CONTROL WITH REMOTE 9-IN. COLOR TOUCHSCREEN

The Liebert iCOM shall be microprocessor based with a remote 9-in. color touchscreen display and shall be mounted in an ergonomic, aesthetically pleasing housing. The controls shall be menu driven. The system shall display user menus for active alarms, event log, graphic data, unit view/status overview (including the monitoring of room conditions, operational status in percentage of each function, date and time), total run hours, various sensors, display setup, and service contacts. A password shall be required to make system changes. Service menus shall include setpoints, standby settings (lead/lag), timers/sleep mode, alarm setup, sensor calibration, maintenance/wellness settings, options setup, system/network setup, auxiliary boards, and diagnostics/service mode.

- **Password Protection** - The Liebert iCOM shall contain two unique passwords to protect against unauthorized changes. An auto hide/show feature allows the user to see applicable information based on the login used.
- **Unit Backup and Restore** - The user shall be able to create safe copies of important control parameters. The Liebert iCOM shall have the capacity for the user to automatically back up unit configuration settings to internal memory or USB storage drive. Configuration settings may be transferred to another unit for a more streamlined unit startup.
- **Parameter Download** - The Liebert iCOM shall enable the user to download a report that lists parameter names, factory default settings, and user programmed settings in .csv format for remote reference.
- **Parameter Search** - The Liebert iCOM shall have search fields for efficient navigation and parameter lookup.
- **Setup Wizards** - The Liebert iCOM shall contain step-by-step tutorials or wizards to provide easy setup of the control. This shall be for 4 ton and 5 ton models only.
- **Context Sensitive Help** - The Liebert iCOM shall have an onboard help database. The database shall provide context sensitive help to assist with setup and navigation of the menus.
- **Display Setup** - The user shall have the ability to configure the Liebert iCOM information based on the specific user's preference. Language, units of measure, screen contrast, home screen layout, backlight timer and the hide/show of certain readouts shall be configurable through the display.
- **Additional Readouts** - The Liebert iCOM shall permit the user to configure custom widgets on the main screen. Widget options shall include items such as fan speed, call for cooling, call for free-cooling, maintenance status, call for electric reheat, call for dehumidification, call for humidification, airflow, static pressure, fluid flow rate, and cooling capacity.
- **Status LED's** - The Liebert iCOM shall provide the user with the unit's operating status using an integrated LED. The LED shall indicate if the unit has an active alarm; if the unit has an active alarm that has been acknowledged; or if the unit is On, Off or in standby status.
- **Event Log** - The Liebert iCOM shall automatically store the last 400 unit only events (messages, warnings, and alarms).
- **Service Contact Information** - The Liebert iCOM shall have the ability to store the local service or sales contact information.

- **Upgradeable** - Liebert iCOM upgrades shall be performed through a USB connection.
- **Timers/Sleep Mode** – The menu shall allow various customer settings for turning on/off unit.
- **Menu Layout** - The menus shall be divided into two main menu screens: User and Service. The User screen shall contain the menus to access parameters required for basic unit control and setup. The Service screen shall be designed for service personnel and provides access to advanced control setup features and diagnostic information.
- **Sensor Calibration** – The menus shall allow unit sensors to be calibrated with external sensors.
- **Maintenance/Wellness Settings** - The menus shall allow reporting of potential component problems before they occur.
- **Options Setup** - The menus shall provide operation settings for the installed components.
- **Various Sensors** - The menus shall allow setup and display of optional custom sensors. The control shall include four customer accessible analog inputs for field provided sensors. The analog inputs shall accept a 4 to 20mA signal. The user shall be able to change the input to 0 to 5 VDC or 0 to 10 VDC. The gains for each analog input shall be programmable from the front display. The analog inputs shall be able to be monitored from the front display.
- **Diagnostics/Service Mode** - The Liebert iCOM shall be provided with self-diagnostics to aid in troubleshooting. Control inputs shall be indicated as On or Off at the front display. Control outputs shall be able to be turned On or Off from the front display without using jumpers or a service terminal. Each control output shall be indicated by an LED on a circuit board.
- **Base-Comms for BMS Connectivity** – The Liebert iCOM controller shall provide one Ethernet port and RS-485 port dedicated for BMS connectivity. Provides ground fault isolated RS-485 Modbus, BACnet IP and Modbus IP network connectivity to building management systems for unit monitoring and management. Also, provides ground fault isolated 10/100 baseT Ethernet connectivity for unit monitoring and management. The supported management interfaces include: SNMP for network management systems, HTTP for web page viewing, SMTP for email, and SMS for mobile messaging. The iCOM controller shall support dual IP on one network and one 485 protocol simultaneously. This shall apply to 3 Ton units only.

## 2.3 ALARMS

All unit alarms shall be annunciated through both audio and visual cues, clearly displayed on the screen, automatically recorded in the event log and communicated (4 and 5 ton require optional communication card) to the customer's building management system/building automation system. The Liebert iCOM shall activate an audible and visual alarm in the event of any of the following conditions:

- High Temperature
- Low Temperature
- High Humidity
- Low Humidity
- EC Fan Fault
- Change Filters
- Loss of Air Flow
- Loss of Power
- Humidifier Problem
- High Water (drain pan)
- High Head Pressure
- High Discharge Temperature (Compressor)
- Low Suction Pressure
- Custom Alarms

Custom alarm inputs shall be provided to indicate facility specific events. Custom alarms can be identified with programmable labels. Frequently used alarm inputs shall include:

- Smoke Detected (requires optional smoke sensor)
- Standby Unit On

Each alarm (unit and custom) shall be separately enabled or disabled, selected to activate the common alarm and programmed for a delay of 0 to 255 seconds.

## 2.4 LIEBERT ICOM® CONTROL METHODS AND OPTIONS

The Liebert iCOM shall be factory set to allow precise monitoring and control of the condition of the air entering and leaving the unit. This control shall include predictive methods to control air flow and cooling capacity based control sensors installed. Proportional and tunable PID shall also be user selectable options.

## 2.4.1 Controlling Sensor Options

The Liebert iCOM shall be flexible in the sense that it shall allow controlling the capacity and fan from multiple different sensor selections. The sensor selections shall be:

### Cooling Capacity

- Remote
- Return

### Fan Speed

- Remote
- Return
- Manual (for diagnostics or to receive a signal from the BMS through Liebert remote monitoring devices or analog input)

## 2.4.2 Temperature Compensation

The Liebert iCOM shall have the ability to adjust the capacity output based on return temperature conditions to meet SLA guidelines while operating to highest efficiency.

## 2.4.3 Humidity Control

Dew point and relative humidity control methods shall be available (based on user preference) for humidity control within the space.

## 2.5 MULTI-UNIT COORDINATION

Liebert iCOM teamwork shall save energy by preventing multiple units in an area from operating in opposing modes. Teamwork allows the control to optimize a group of connected units equipped with Liebert iCOM using the U2U (unit-to-unit) network. Field wiring shall be required between units' iCOM display modules. There shall be two modes of teamwork operation:

- Teamwork Mode 1 (Parallel): Is best in small rooms with balanced heat loads. The controlling temperature and humidity sensor readings of all units in operation (fan On) are collected to be used for an average or worst case sensor reading (user selectable). The master unit shall send the operating requirements to all operating units in the group. The control band (temperature, fan and humidity) is divided and shared among the units in the group. Each unit will receive instructions on how to operate from the master unit based on how far the system deviates from the setpoints. Evaporator fans and cooling capacity are ramped in parallel.
- Teamwork Mode 2: The Liebert iCOM calculates the worst case demand for heating, cooling humidification, and dehumidification. Based on the greatest demand within the group, each unit operates independently, meaning that the unit may respond to the thermal load and humidity conditions based on the units controlling sensors.

## 2.6 STANDBY/LEAD-LAG

The Liebert iCOM shall allow planned rotation to keep equal run time on units and provide automated emergency rotation of operating and standby units.

## 2.7 STANDBY UNIT CASCADING

The Liebert iCOM cascade option shall allow the units to turn On and Off based on heat load when utilizing Teamwork Mode 1-Parallel, and remote temperature sensors. Cascade mode shall coordinate the fan speed dynamically to save energy and to meet cooling demands. For instance, with a Liebert iCOM group of six units and only 50% of the heat load, the Liebert iCOM shall operate only four units at 80% fan speed and leave the other two units in standby. As the heat load increases, the Liebert iCOM shall automatically respond to the new load and bring on another unit, increasing the units in operation to five. As the heat load shifts up or down, the control shall meet the needs by cascading units On or putting them back into standby.

## 2.8 REMOTE MONITORING

All alarms shall be communicated to the Liebert® site monitoring system with the following information: date and time of occurrence, unit number and present temperature and humidity. Optional communication card is required on 4 and 5 ton models.

## 2.9 DIRECT EXPANSION SYSTEM COMPONENTS

### 2.9.1 Indoor Evaporator Unit – 4 and 5 Ton Models

The evaporator section shall include evaporator coil, thermostatic expansion valve and filter drier. The evaporator coil shall have 5.6 sq. ft. (0.52 sq. m) face area, four rows deep. It shall be constructed of internally rifled copper tubes and lanced type aluminum fins and have a maximum face velocity of 482 FPM (2.45 m/s) at \_\_\_\_\_ CFM (\_\_\_\_ CMH). An externally equalized thermostatic expansion valve shall control refrigerant flow. The evaporator coil shall be factory charged with nitrogen and sealed. The system shall be field charged with field supplied R-410A refrigerant.

The coil assembly shall be mounted in a condensate drain pan with internally trapped drain line. The evaporator drain pan shall include a factory installed float switch to shut down the evaporator upon high water condition.

### 2.9.2 Indoor Evaporator Unit – 3 Ton Models

The evaporator section shall include evaporator coil, thermostatic expansion valve, and filter drier. The evaporator coil shall have 3.1 sq. ft. (0.29 sq. m) face area, three rows deep. It shall be constructed of internally rifled copper tubes and lanced type aluminum fins and have a maximum face velocity of 408 FPM (2.07 m/s) at \_\_\_\_\_ CFM (\_\_\_\_ CMH). An externally equalized thermostatic expansion valve shall control refrigerant flow. The evaporator coil shall be factory charged with nitrogen and sealed. The system shall be field charged with field supplied R-410A refrigerant.

The coil assembly shall be mounted in a condensate drain pan with internally trapped drain line. The evaporator drain pan shall include a factory installed float switch to shut down the evaporator upon high water condition.

### 2.9.3 Outdoor Air Cooled Prop Fan Condensing Unit

The condensing unit shall be designed for outdoor use with either roof or ground level mounting. The condensing unit is constructed of galvanized and galvaneal painted steel for corrosion resistance. Removable exterior panels shall allow access to the electric panel or refrigeration components for service or maintenance. Both inlet and outlet air grilles shall be heavy duty steel with a durable polyester coating.

Condensing unit components shall include a condenser coil, a direct drive propeller type fan, a variable capacity digital scroll compressor, high pressure switch, high compressor discharge temperature switch, Liebert® Lee-Temp™ insulated receiver with internal heater and head pressure control valve, and liquid line solenoid valve. The condensing coil shall be constructed of copper tubes and aluminum fins.

High head pressure switch shall protect the unit from abnormal refrigerant pressure conditions. Switch and sensor inputs shall be integrated with Liebert iCOM for compressor protection while maintaining system and evaporator blower operation, displaying alarms at the wall display and providing system shutdown when required.

A pressure balancing valve shall be factory installed to reduce the chance of opening the high pressure relief valve due to excessive refrigerant migration to the receiver due to changing outdoor temperatures during off cycles.

All components shall be factory-assembled, charged with nitrogen and sealed. System shall be field charged with field supplied R-410A refrigerant. No internal piping, brazing, or dehydration shall be required. Condensing unit shall be designed for 95°F (35°C) ambient and shall be capable of starting and continuous operation down to -30°F (-34.4°C).

(Option) The condensing unit shall be designed to operate at a sound level less than 58 dBA – 5 ton only.

(Option) The condensing unit shall be designed to provide stated system capacity at 105°F (40.5°C) ambient — 3 ton and 5 ton only.

(Option) The coils shall be epoxy coated for extended coil life in corrosive environments, such as coastal areas. Factory applied E-coat using immersion and baking process shall provide a flexible epoxy coating to all coil surfaces. Coil color shall be black and shall be protected from solar UV ray degradation with a factory applied UV topcoat.

### 2.9.3 Indoor Water/Glycol Cooled Condensing Unit

The water/glycol condensing unit shall include a two-stage scroll compressor, high pressure switch, coaxial condenser, water regulating valve, and liquid line solenoid valve. A non-automatic, non-locking, molded case disconnect switch shall be factory mounted in the high voltage section of the electrical panel. The switch handle shall be accessible from the unit front. The cabinet and chassis shall be constructed of heavy gauge galvanized steel and shall be serviceable from one side. Mounting brackets shall be integral to the cabinet design and be designed for ceiling mounting.

High pressure switch shall protect the unit from abnormal refrigerant pressure conditions and shall deactivate the compressor and announce an alarm at the wall controller. The blower shall continue to circulate air. The wall controller shall be used to manually restart the compressor function after the automatic pressure switch resets. Three high head pressure alarms in a rolling 12-hour period shall lock out the manual restart feature until power is cycled to the evaporator unit.

The refrigerant piping shall be spun-closed and filled with a nitrogen holding charge. Field relief of the Schrader valves shall indicate a leak-free system. Evaporator and condensing unit shall be field piped using copper lines, brazed, evacuated and field charged with field-supplied R-410A refrigerant.

The water/glycol condensing unit shall be equipped with a coaxial condenser having a total system pressure drop of \_\_\_\_\_ ft. of water (kPa) and a flow rate of \_\_\_\_\_ GPM (l/s) with \_\_\_\_\_ °F (°C) entering water/glycol temperature.

The condenser circuit shall be pre-piped with a 2-way or 3-way regulating valve which is head-pressure actuated. The condenser water/glycol circuit shall be designed for a static operating pressure of 350 PSI (2413kPa).

### 2.9.4 Digital Scroll High Temperature Protection

The control shall monitor digital scroll temperature during unit operation. A compressor temperature limit shall be imposed to help prevent damage to the compressor. If the temperature reaches the maximum temperature limit, the compressor shall be locked out and an alarm shall be annunciated on the local display and through remote monitoring. After the initial lockout, the control shall continue to monitor compressor temperature during the off cycle and shall re-enable the circuit once a safe operating temperature is reached (minimum 30-minute lockout). After five high discharge temperature alarms within a rolling 4-hour period, the control shall lock out the compressor until power is cycled to the evaporator unit.

### 2.9.5 Digital Scroll Sensor Failure

The control shall monitor the status of the digital scroll sensor(s). If the control senses the thermistor becomes disconnected, shorted or the reading goes out of range, the user will be notified through an event on the local display and remote monitoring.

## 2.10 FACTORY INSTALLED OPTIONS

### 2.10.1 Steam Generating Humidifier

The Thermal Management system shall be equipped with a steam generating humidifier that is controlled by the microprocessor control system. It shall be complete with disposable canister, all supply and drain valves, 1-in. (25.4mm) air gap on fill line, inlet strainer, steam distributor and electronic controls. The need to change canister shall be annunciated on the wall mounted controller. The humidifier shall have a capacity of \_\_\_\_\_ lb/hr (kg/h). An LED light on the humidifier assembly shall indicate cylinder full, overcurrent detection, fill system fault and end of cylinder life conditions. The canister flush water shall not drain into the coil drain pan due to risk of aggressive corrosion of the evaporator coil. The humidifier wand shall be mounted over the coil drain pan.

### 2.10.2 Electric Reheat

The electric reheat shall be low watt density, 304/304 stainless steel, finned tubular and shall be capable of controlling room dry bulb temperature conditions when the system is calling for dehumidification or heating. The reheat section shall include a UL/CSA recognized safety switch to protect the system from overheating. The capacity of the reheat coils shall be \_\_\_\_\_ BTU/HR (kW), with unit input voltage of \_\_\_\_\_ V, controlled in one stage. A ground current detector shall be factory installed to shut down the entire unit if a ground fault in the reheat system is detected.

### 2.10.3 SCR Electric Reheat – 4 Ton and 5 Ton DX Evaporators Only

SCR Electric Reheat option shall be an electric reheat element controlled by a variable output Silicon Controlled Rectifier (SCR) control. The SCR reheat shall provide precise temperature control while minimizing energy input utilizing iCOM control and digital scroll. Reheat capacity shall be 15 kW to offset the cooling capacity on 5 ton models and 10 kW on 4 ton models.

### 2.10.4 Disconnect Switch, Locking (65,000 amps SCCR) – 4 and 5 Ton Models Only

The non-automatic, locking, molded case circuit breaker shall be factory mounted in the high voltage section of the electrical panel. The switch handle shall be accessible from the front of the indoor unit and shall have a lockable handle to support lockout/tagout safety programs. The short circuit current rating for the evaporator unit shall be 65,000 amps.

### 2.10.5 High Temperature Sensor

The high temperature sensor shall immediately shut down the system when high temperatures are detected. The high temperature sensor shall be mounted with the sensing element in the return air.

### 2.10.6 Smoke Sensor

The smoke sensor shall immediately shut down the environmental control system and activate the alarm system when activated. The sensing element shall sense the return air conditions. This smoke sensor shall not function or replace any room smoke detector that may be required by local or national codes.

### 2.10.7 IS-Unity-DP-CMS Card – 4 and 5 Ton Models Only

The IS-UNITY-DP-CMS card shall provide mobile cloud access, remote access to the unit level display via the world wide web and building management system (BMS) access via BACnet/Modbus IP and BACnet/Modbus 485. Card shall be factory installed in the IntelliSlot card housing on outside of cabinet.

### 2.10.8 Low Voltage Terminal Package

The Low Voltage Terminal Package shall include:

- Two additional remote input shutdown terminals
- Two extra common alarm N/O output contacts
- One main fan auxiliary N/O output contact
- One remote humidifier N/O output contact
- One Liqui-tect input terminals (Liqui-tect priced separately)

### 2.10.9 SHIP LOOSE ACCESSORIES

#### 2.10.10 Air Filter Box/Duct Flange – 4 and 5 Ton Models Only

The evaporator section shall be supplied with an optional air filter box kit for use with ducted installations. Two filters shall be included 4 in. x 20 in. x 20 in. (102 mm x 508 mm x 508 mm) each, pleated type, with a MERV 8 rating, based on ASHRAE 52.2-2007. A duct flange shall be supplied for use on the supply air opening of the unit.

#### 2.10.11 Air Filter Box/Duct Flange – 3 Ton Models Only

The evaporator section shall be supplied with an optional air filter box kit for use with ducted installations. One filter shall be included 4 in. x 2 in. x 20 in. (102 mm x 508 mm x 508 mm), pleated type, with a MERV 8 rating, based on ASHRAE 52.2-2007. A duct flange shall be supplied for use on the supply air opening of the unit.

#### 2.10.12 Bottom Discharge Grille – 4 Ton and 5 Ton Models Only

A 3-way louvered discharge air grille, painted white, shall be added to an independent T-bar ceiling grid assembly for air discharge directly into room from bottom of unit. Kit shall include air baffle and rear discharge block off plate.

#### 2.10.13 Air Distribution Plenum – 3 Ton Models Only

A molded plastic air distribution plenum with integral return air filter shall be provided. The plenum shall be field mounted to the unit bottom and adjusted to completely cover T-bar grid and a standard 24 in. x 48 in. (610 mm x 1219 mm) ceiling grid area. The plenum shall provide 3-way air distribution and bottom return air. Filter size shall be 4 in. x 16 in. x 25 in. (102 mm x 406 mm x 535 mm), deep pleated type with MERV 8 rating, based on ASHRAE 52.2-2007, and shall be removable from plenum side door.

### **2.10.14 Condensate Pump**

The condensate pump shall have the capacity of \_\_\_ GPH (\_\_\_ l/h) at \_\_\_ ft. head (\_\_\_ kPa). It shall be complete with integral float switch, pump, motor assembly, discharge check valve, duct/wall mountable bracket and reservoir. A secondary float switch shall be provided to permit field wiring to the unit control to shut down the evaporator upon a high water level condition.

### **2.10.15 Condensate Pump Bracket – 4 and 5 Ton Models Only**

A condensate pump bracket shall be provided to mount condensate pump directly to the end of the unit, allowing for easier installation and alignment of the condensate pump.

### **2.10.16 Liebert LIQUI-TECT™ 410 Point Leak Detection Sensor**

A total of \_\_\_\_\_ (quantity) solid state water sensor(s) with no moving parts and hermetically sealed to keep out dust and dirt shall be provided. The Liebert Liqui-tect 410 (LT410) shall provide a single point detection of leaks. The point detection sensor shall have two gold plated sensing probes to prevent corrosion resistance and to provide accurate readings. The LT410 shall constantly monitor points for leaks, internal faults, and power failures and warn of any abnormal conditions. Mounting brackets shall allow for sensor height adjustment and leveling. The LT410 shall provide two independent outputs to signal both a local alarm panel and a remote building management system or external equipment. The LT410 shall be rated for 24 VAC, 50/60 Hz and 0.10 amps. Liqui-tect sensor shall be field mounted and field wired to both monitoring contacts and 24 VAC supply power.

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## 3.0 EXECUTION

### 3.1 INSTALLATION OF AIR CONDITIONING UNIT

#### 3.1.1 General

Install air conditioning unit in accordance with manufacturer's installation instructions. Install unit plumb and level, firmly anchored to support the unit's weight in location indicated and maintain manufacturer's recommended clearances. Do not mount units above sensitive electronic equipment to minimize risk of water overflow/leakage damage and improve maintenance/service access.

#### 3.1.2 Electrical Wiring

Install and connect electrical devices furnished by manufacturer but not specified to be factory mounted. Furnish copy of manufacturer's electrical connection diagram submittal to electrical contractor.

#### 3.1.3 Piping Connections

Install and connect devices furnished by manufacturer but not specified to be factory mounted. Furnish copy of manufacturer's piping connection diagram submittal to piping contractor.

#### 3.1.4 Supply and Drain Water Piping

Connect water supply and drains to air conditioning unit. Unit drain shall be trapped internally and shall not be trapped externally.

#### 3.1.5 Field Supplied Pan

A field supplied pan with drain shall be installed beneath cooling units and water/glycol condensing units.

### 3.2 FIELD QUALITY CONTROL

Startup air conditioning unit in accordance with manufacturer's startup instructions. Test controls and demonstrate compliance with requirements.





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