

Liebert® Mini-Mate2™ – 2 & 3 Ton (7 & 10.5 kW) Capacity

Technical Data Manual—Air, Water, Glycol, Chilled Water, 50 & 60Hz

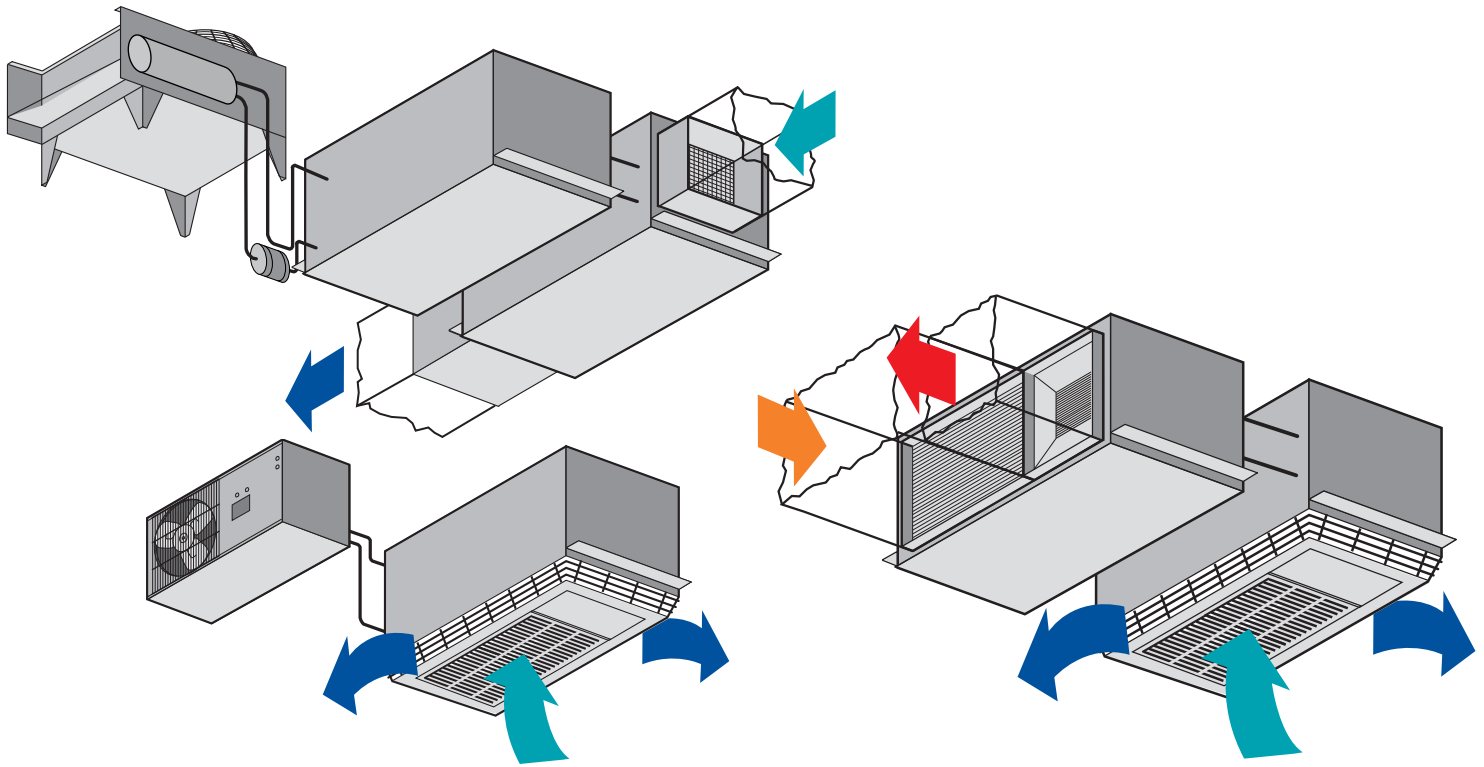


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1.0 INTRODUCTION

1.1 Designed to Match Computer and Electronic Equipment Needs—From Installation to Operation

Installed above the ceiling, Liebert Mini-Mate2 Precision Cooling systems control the cooling, humidity and air distribution required by sensitive electronic equipment. A range of sizes and configurations is available to meet varying sites' needs.

The Liebert Mini-Mate2 is also easy to use. Advanced microprocessor technology allows easy, precise control, and menu-driven monitoring keeps you informed of system operation through the LCD read-out. These features, combined with Emerson quality construction and reliable components, guarantee satisfaction from installation through operation.

Liebert Precision Cooling

Liebert Precision Cooling systems are designed to control the environment required for computers and other sensitive electronic equipment. The Liebert Mini-Mate2 provides complete control on an around-the-clock basis and the high sensible heat ratio required by sensitive electronic equipment.

Easy Installation

The Liebert Mini-Mate2 is a split-system evaporator combined with an air-, water- or glycol-cooled condensing unit or is a self-contained, chilled water unit. Each split system has thermostat-type wiring to controls and condensing unit. System components are pre-charged with refrigerant and can be connected together with optional pre-charged line sets or optional sweat adapters for field refrigerant piping.

Easy to Service

Low-maintenance components are easily accessed through removable front panels. Spare parts are always in Emerson inventory and available on short notice.

Advanced Control Technology

A menu-driven microprocessor control system provides precise temperature and humidity control and accurate alarm setpoints. Using touch-sensitive buttons, the wall-mounted monitor/control panel allows you to select and display temperature and other monitored parameters.

High Efficiency

High sensible heat ratio, scroll compressor and precise microprocessor control allow the system to operate efficiently.

Space Saving Design

All indoor components are installed above the ceiling, so no floor space is required.

Reliable

The Liebert Mini-Mate2 family installed base is a testimony to the system reliability. Components include a rugged scroll compressor, high-efficiency copper tube, aluminum-fin evaporator coil and a double inlet, direct drive fan.

Agency Listed

Standard 60Hz units are CSA certified to the harmonized U.S. and Canadian product safety standard, CSA C22.2 No 236/UL 1995 for "Heating and Cooling Equipment" and are marked with the CSA c-us logo. The units are also MEA listed for New York City applications.

Location

When considering installation locations, consider that these units contain water and that water leaks can cause damage to sensitive equipment below. Do not mount these units above sensitive equipment. A field-supplied pan with drain must be supplied beneath cooling units and water/glycol condensers.

Do not mount units in areas where normal unit operating sound might disturb the working equipment.



2.0 STANDARD FEATURES—2 & 3 TON SYSTEMS

2.1 Evaporator Section - Split Systems

The evaporator section is designed for ceiling installation. The cabinet and chassis are constructed of heavy gauge galvanized steel. The unit can be serviced using only one side increasing its versatility in mounting locations. Mounting brackets are factory-attached to the cabinet. Internal cabinet insulation meets ASHRAE 62.1 requirements for Mold Growth, Humidity & Erosion, tested per UL 181 and ASTM 1338 standards.

The evaporator section includes the evaporator coil, R-407C unit charge, filter-drier, factory-mounted disconnect switch, two-speed direct-drive blower assembly and microprocessor control with wall-mounted control box. The unit is provided with supply and return air openings for field-supplied ducting or supply/return plenum. Evaporators can be configured with canister humidifier and/or reheat. An indoor or outdoor condensing unit must be selected for each evaporator.

2.2 Condensing Unit Section—Split Systems

2.2.1 Indoor Centrifugal Fan Condensing Units

Indoor Air-Cooled Centrifugal Fan Condensing Units include scroll compressor, factory-mounted disconnect switch, condenser coil, R-407C unit charge, belt-driven centrifugal blower assembly, high-pressure switch, Liebert Lee-Temp head pressure control system, hot gas bypass and liquid-line solenoid valve. Unit must be mounted indoors. Condensing unit is designed to use outdoor air with temperatures ranging from -30°F to 95°F (-34°C to 35°C).

2.2.2 Outdoor Prop Fan Condensing Units

Outdoor Prop Fan Condensing Units include scroll compressor, condenser coil, R-407C unit charge, prop fan, liquid-line solenoid valve, high pressure switch, Liebert Lee-Temp head pressure control and hot gas bypass. Condensing unit is designed for outdoor locations with operating ambients ranging from -30°F to 95°F (-34°C to 35°C).

2.2.3 Indoor Water/Glycol Condensing Units

Indoor Water/Glycol Condensing Units includes scroll compressor, R-407C unit charge, factory-mounted disconnect, coaxial condenser, hot gas bypass, high head pressure switch and two-way water regulating valve designed for 150psi (1034.3kPa). Condensing units can be used on either a water or glycol cooling loop.

2.3 Chilled Water Units

Chilled Water Units are designed for ceiling installation. The cabinet and chassis are constructed of heavy gauge galvanized steel. The unit can be serviced using only one side increasing its versatility in mounting locations. Mounting brackets are factory-attached to the cabinet. Internal cabinet insulation meets ASHRAE 62.1 requirements for Mold Growth, Humidity & Erosion, tested per UL 181 and ASTM 1338 standards. Chilled water models are self-contained and include a chilled water coil, two-speed, direct-drive centrifugal blower, factory-mounted disconnect switch and two-way, slow-close motorized valve. Design pressure is 300psi (2068kPa), 60psi (414kPa) close-off differential.

2.4 System Controls

System controls include a microprocessor control board mounted in the evaporator/chilled water unit and a wall-mounted interface with a two-line, 16-character liquid crystal display. An eight-key, membrane keypad for setpoint/program control, unit On/Off, fan speed and alarm silence is below the LCD screen. It provides temperature setpoint and sensitivity adjustment, humidity setpoint and sensitivity adjustment, digital display of temperature, humidity, setpoints, sensitivities, fan speed and alarm conditions.

The wall-box is field-wired to the microprocessor control using standard four-conductor thermostat wire (field-supplied). The temperature and humidity sensors are in the wall box, which can be installed up to 300 feet (91.4m) from the evaporator unit. The unit-mounted control board also includes common alarm terminals and shutdown terminals. The unit automatically restarts after a power outage.

Figure 1 Wall-box



2.4.1 Other Standard Control Features

- Adjustable auto restart
- 5 day/2 day setback
- Password protection
- Alarm enable/disable
- Self-diagnostics
- Calibrate sensors
- Predictive humidity control
- Common alarm output
- Remote shutdown terminals

3.0 OPTIONAL FACTORY-INSTALLED FEATURES—EVAPORATOR/CHILLED WATER UNITS

3.1 Reheat

Electric Reheat includes 304/304 stainless steel finned tubular reheat elements, with high limit safety switch.

SCR Electric Reheat uses an SCR controller and unit control software to provide full cooling with modulating of the electric reheat elements to control air temperatures. Reheat capacity is upsized to offset the cooling capacity. (The SCR Electric Reheat is not available on chilled water, free-cooling or 575V units.)

Hot Water Reheat includes hot water coil, 2-way solenoid valve and Y-strainer. **Note:** This option is available only on Chilled Water units, but not with other reheat options.

3.2 Humidifier

The **Canister Humidifier** includes a steam-generating type humidifier with automatic flushing circuit, inlet strainer, drain, 1" (25.4mm) air gap on fill line and solenoid valves. Humidifier problem alarm annunciates at the wall-mounted display panel.

Remote Humidifier Contact allows the unit's humidity controller to control a humidifier outside the unit. Power to operate the remote humidifier does not come from the Liebert Mini-Mate2. Available on units with or without internal humidifier.

3.3 Sensors

Smoke Sensor checks return air, shuts down the unit upon sensing smoke and activates visual and audible alarms at the wall-box display. This smoke sensor is not intended to function as or replace any smoke sensor system that may be required by local or national codes.

High-Temperature Sensor senses the return air temperature and shuts down unit if the temperature reaches 125°F (52°C). This device is not meant to replace any fire detection system that may be required by local or national codes.

3.4 Switches and Motors

Filter Clog senses pressure drop across the filters and activates visual and audible alarms at the wall-box display. The wall-box display annunciates the alarm and flashes a notification upon reaching a customer setpoint.

A **Factory-Installed Non-Fused Disconnect Switch** allows unit to be turned off for maintenance. A disconnect switch is standard for the evaporators, chilled water units and indoor condensing units, but these units may be specified without the switch.

Direct-Drive blower can be factory-eliminated from the evaporator/chilled water cabinet for high static applications (0.9 to 1.5in. [23 to 38mm] w.g.). See **4.0 - Ship-Loose Accessories—Field-Installed** for the optional, externally mounted high static blower assembly.

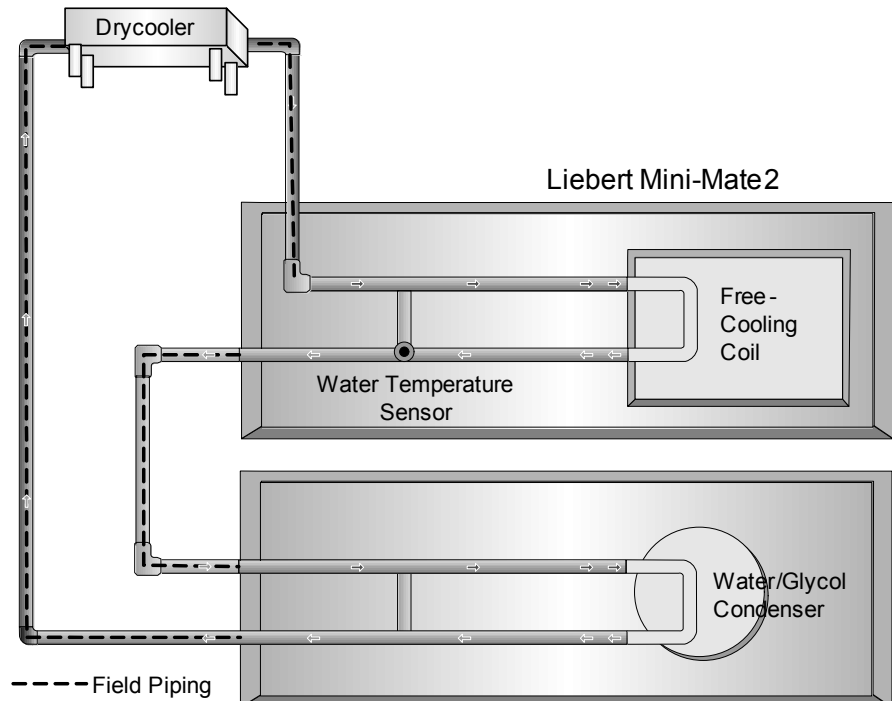
3.5 Free-Cooling

Free-cooling option includes separate cooling coil, three-way slow-close valve and separate supply and return piping. Free-cooling is activated when the water temperature reaches a field-adjustable temperature, typically 45°F (7°C). The valve is rated for 300psi (2068kPa) working pressure.

Air-cooled condensing units can be matched with evaporators using free-cooling coils with chilled water sources to serve as backup cooling. When matched with a water/glycol condensing unit, a three-way water regulating valve is recommended for the condensing unit to simplify piping to the main supply pipes. The coil is designed for closed-loop applications using properly treated and circulated fluid. Not available with SCR reheat options.

Figure 2 Free-cooling arrangement

Free-cooling option: A second cooling coil allows the system to take advantage of colder outdoor temperatures and bypass compressor operation. When the water temperature goes below 45°F (7°C), cooling switches over to free-cooling operation. A separate chilled water source can also be used with air-cooled systems.



NOTE

If free-cooling is applied to an open water tower, an optional cupro-nickel (CuNi) coil is required to prevent premature corrosion, or a heat exchanger must separate the tower water from the free-cooling loop. The cupro-nickel coil requires an extended lead time.

3.6 Optional Configurations—Prop Fan Condensing Units

Outdoor Prop Fan Condensing Units are also available in the following optional configurations:

- High ambient models for providing catalog capacities at ambient temperatures up to 105°F (40°C).
- Quiet-Line models for low noise level conditions (below 56 dBA) and for providing catalog capacities at ambient temperatures up to 95°F (35°C).
- Condenser coils can be phenolic-coated for extended coil life in coastal areas.

3.7 Optional Configurations—Water/Glycol Condensing Units

Indoor Water/Glycol Condensing Units are also available with the following piping options:

- Two-way water reg. valve with 350 psi (2413kPa) design pressure.
- Three-way water reg. valve with 150psi (1034kPa) design pressure.
- Three-way water reg. valve with 350psi (2413kPa) design pressure.

3.8 Optional Configurations—Chilled Water Units

Chilled Water Units are also available with the following valve option:

- Three-way, slow-close, motorized chilled water valve rated for 300 psi (2068 kPa) working pressure. Valve is non-spring return.

4.0 SHIP-LOOSE ACCESSORIES—FIELD-INSTALLED

A **High Static Blower Assembly** can be field-attached to the evaporator to provide up to 2.0" (51mm) of external static pressure on the discharge side of the evaporator. The blower box contains a centrifugal-type double-inlet blower. This blower is equipped with a belt drive and 1.5 hp single speed motor mounted to an adjustable motor base. **Note:** Unit must be ordered without the internal direct drive motor and the high static blower disables the two-speed fan operation feature.

Filter box kit (for ducted applications) includes filter box with duct flange connection, one MERV 8 (ASHRAE 52.2) filter (20"x20"x4" [508mm x 508mm x 102mm]), and a duct flange for use on the supply air opening of the unit

Air Distribution Plenum includes molded plastic three-way discharge plenum, 16"x25"x4" (406mm x 535mm x 102mm) MERV 8 filter (ASHRAE 52.2), and sheet metal block-off plates for covering the duct openings on the evaporator unit. Plenum mounting requires T-bar ceiling grid.

The **Condensate Pump** is field-mounted external to the cabinet, wired to the unit power block and is equipped with a check valve. A secondary float can be field-wired to shut down the unit upon high condensate level.

A **Remote Temperature and Humidity Sensor** package includes sensors in an attractive case with 30 ft. (9 m) of cable. Can be wall or duct mounted. Remote sensors should be used when the wall box is not located in the space to be conditioned.



NOTE

Installing the remote sensors disables the sensors included in the wall box.

Field-Installed Kits available for filter clog, smoke sensor, high-temperature sensor, electric reheat and humidifier. The kits include installation instructions and are designed to be added to the evaporator unit before it is installed in the ceiling. Electric reheat kits cannot be installed in units with free-cooling.

277-to-208V step-down transformer (37.5 amps) allows use of 277-1-60 supply power with a 208-1-60 Prop Fan Condensing unit. The transformer is coated with epoxy and contained in an enclosed, non-ventilated electrical box with adaptable mounting brackets.

Single-Point Power Kit contains the necessary electrical components to interconnect the high-voltage sections of a close-coupled evaporator and an MCD condensing unit.

Pre-Charged Refrigerant Line Set (R-407C) contains an insulated copper suction line and a copper liquid line for interconnection of the indoor and outdoor sections. Available in 15-foot (4.5m) and 30-foot (9m) sections.

The **Refrigerant-Line Sweat Adapter Kit** contains two suction and two liquid line fittings that allow field-supplied refrigerant piping between the evaporator and condensing unit.

4.1 Remote Monitoring, AutocRemote Monitoring, Autochangeover and Leak Detection Equipment

The **Liebert RCM4™** is a four-point, normally open, dry contact monitoring panel. One Form-C, dry contact common alarm relay output (rated at 24 VAC, 3 Amp) is provided. Four red LEDs illuminate on the respective alarm and the alarm buzzer is silenced by a front panel switch. The RCM4 requires a 24VAC or 24VDC power source. Power supply is not included.

The **Liebert AC4™ Autochangeover Controller** provides autochangeover and autosequence control for up to four Liebert Mini-Mate2 units within a room. The Liebert AC4 will enable redundant units in an alarm condition, balance usage and test standby units at programmed intervals. Two common alarm relay outputs are available. A built-in LCD and RS-232 port for direct PC/terminal connection provides two options for configuration and monitoring of the product. The Liebert AC4 requires 24VAC input power.

The **Liebert AC8™** is ideal for coordinated control of systems with redundant units. The Liebert AC8 enables redundant devices during an alarm condition, balances usage of devices and tests standby devices at programmable intervals. Supports four zones and can use the 4-20mA temperature sensor (TW420) for temperature staging in each zone. Two programmable output control relays are available for auxiliary control such as humidity lockout. Emergency power operation input provided for device control during an emergency. Two common alarm relay outputs are available. A built-in LCD and RS-232 port for direct PC/terminal connection provides two options for configuration and monitoring of the product.

The **Liebert ENV-DO™** interface card provides 16 discrete outputs, corresponding to status and major alarm conditions of Environmental units. The Liebert ENV-DO-ENCL1 packages one Environmental DO interface card in its own steel enclosure and the ENV-DO-ENCL2 packages two Environmental DO interface cards in one enclosure for installation external to the Liebert Mini-Mate2. The self-contained kit includes an external 120VAC-to-24VAC power transformer. Wiring harnesses are not provided. Power and communication wiring is field-provided.

The **Liebert Liqui-tect® 410 Point Leak Detection Sensor** detects the presence of conductive liquid using a pair of corrosion-resistant, gold-plated probes mounted in a painted, height-adjustable enclosure. Dual Form-C, dry contact common alarm relays (rated at 24VAC, 3A) signal a leak detected as well as loss of power and cable fault. The Liebert Liqui-tect 410 requires an external 24VAC or 24VDC power source.

Liebert LT460 Zone Leak Detection Kits include one LT460 sensor, a specified length of LT500-xxY cable (maximum length is 100 ft [30.5m]) and a corresponding number of hold-down clips. The Liebert LT460 requires an external 24VAC, 0.12A power source, such as EXT-XFMR or XFMR24.

Liebert SiteScan® is a monitoring solution that gives you decision-making power to effectively manage the equipment critical to your business.

Liebert SiteScan enables communication from Liebert environmental and power units, as well as many other pieces of analog or digital equipment, to a front-end software package that provides real-time status and alarms so you can react quickly to changing situations.

Liebert SiteScan is designed with flexibility for both small systems and large, complex systems such as those in computer rooms, telecommunications facilities or industrial process control rooms. Contact your local Emerson representative for assistance with a Liebert SiteScan system.

5.0 FLEXIBLE CONFIGURATIONS

Figure 3 Air-cooled condensing units—split systems

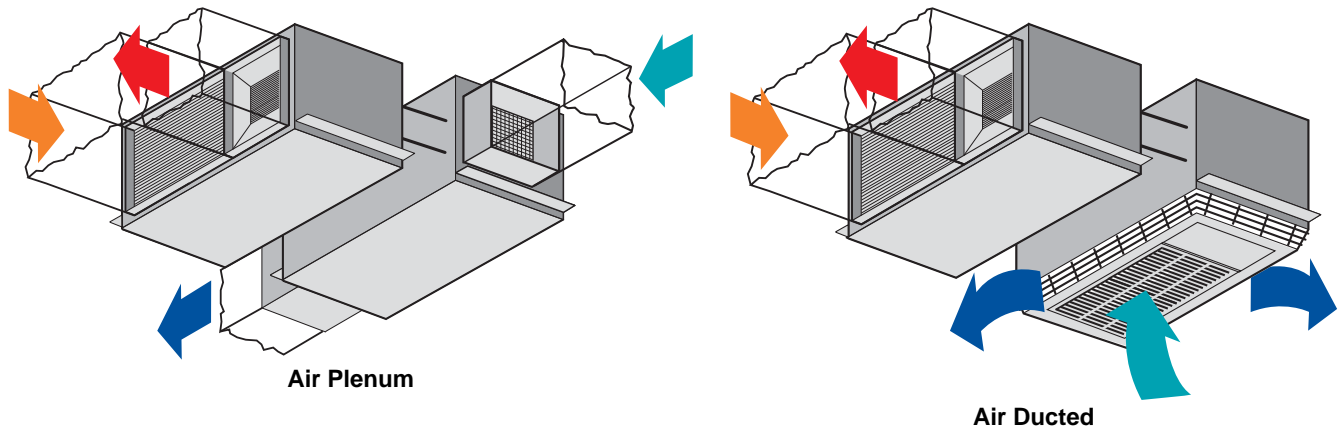


Figure 4 Water/glycol condensing units—split systems

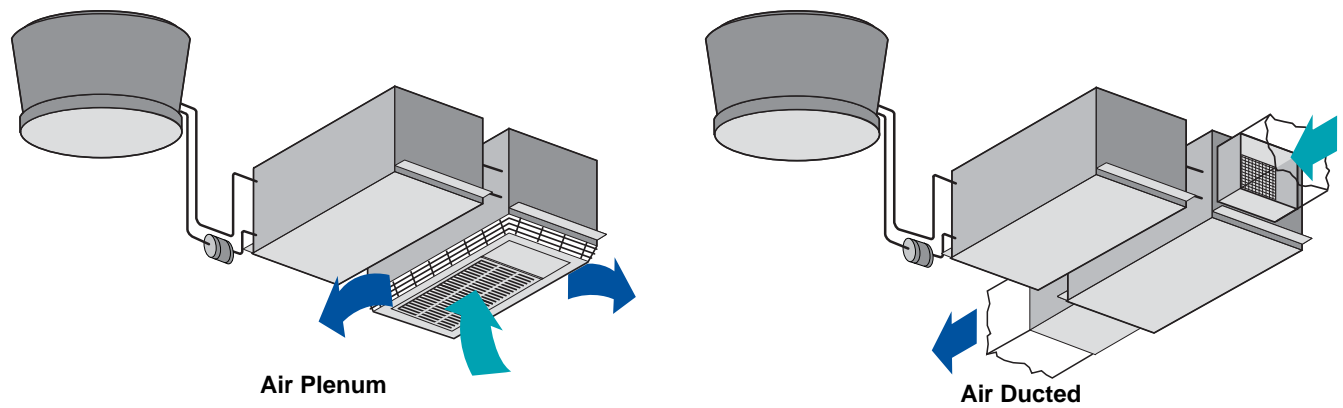
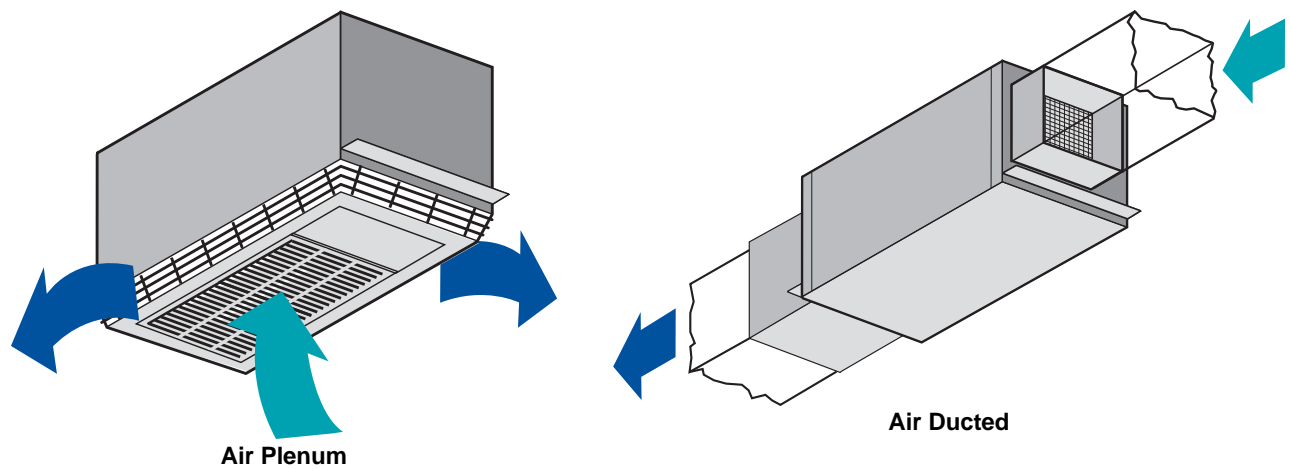


Figure 5 Chilled water units



6.0 AIR-COOLED SYSTEMS—CAPACITIES AND DIMENSIONS

Table 1 Air-cooled data, 60Hz

Evaporator Model		MMD24E or MMD24K		MMD36E or MMD36K	
Condensing Unit Type		PFH - Outdoor	MCD - Indoor	PFH - Outdoor	MCD - Indoor
DX Evaporator- Net Capacity Data - kW (Btuh) @ High Speed CFM					
80°F DB, 62.8°F WB (26.7°C DB, 17.1°C WB) 38 %RH	Total	6.70 (22,900)	6.50 (22,200)	9.90 (33,800)	9.35 (31,900)
	Sensible	6.50 (22,200)	6.35 (21,700)	9.40 (32,100)	9.10 (31,000)
75°F DB, 61°F WB (23.9°C DB, 16.1°C WB) 45 %RH	Total	6.40 (21,800)	6.15 (20,900)	9.55 (32,500)	8.95 (30,600)
	Sensible	5.70 (19,500)	5.60 (19,100)	8.30 (28,400)	8.05 (27,500)
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50 %RH	Total	6.20 (21,200)	5.95 (20,300)	9.30 (31,800)	8.75 (29,900)
	Sensible	5.20 (17,800)	5.10 (17,400)	7.70 (26,200)	7.40 (25,300)
Fan Data - Evaporator					
CFM (CMH) - High Speed		885 (1504)		1250 (2124)	
CFM (CMH) - Low Speed		800 (1359)		1000 (1699)	
Fan Motor, HP (W)		0.5 (0.38)		0.5 (0.38)	
External Static Pressure, in (mm) water gauge		0.3 (8)		0.3 (8)	
Evaporator Coil - Copper Tube/Aluminum Fin					
Face Area, ft ² (m ²)		3.1 (0.29)		3.1 (0.29)	
Coil Rows		3		3	
Max Face Velocity, fpm (m/s)		277 (1.4)		394 (2.0)	
Unit Refrigerant Charge, oz. (kg)		7 (0.20)		7 (0.20)	
Unit Operating Weight		225 (102)		225 (102)	
Electric Reheat Capacity (Includes Fan Motor), kW (Btuh)		Standard	SCR	Standard	SCR
Input Voltage 208-1-60		4.7 (16040)	5.6 (19100)	4.7 (16040)	7.9 (27000)
Input Voltage 230-1-60		5.8 (19800)	6.8 (23200)	5.8 (19800)	9.5 (32400)
Input Voltage 277-1-60		6.3 (21500)	7.3 (24900)	6.3 (21500)	10.3 (35200)
Input Voltage 208-3-60		N/A		5.6 (19100)	7.9 (27000)
Input Voltage 230-3-60				6.8 (23200)	9.5 (32400)
Input Voltage 460-3-60				7.3 (24900)	10.3 (35200)
Humidifier Data - Steam Generator Type					
Steam capacity, lb/hr (kg/hr)		4.3 (2.0)		4.3 (2.0)	
Electrical Input Power, kW		1.5		1.5	
Evaporator Connection Sizes					
Liquid line Diameter - Aeroquip Coupling Size		3/8" - #6 Female		3/8" - #6 Female	
Suction Line Diameter - Aeroquip Coupling Size		7/8" - #11 Female		7/8" - #11 Female	
Humidifier Supply		1/4" OD Copper Compression Fitting			
Evaporator/Condensate Drain		3/4" NPT-Female			
MERV 8 Filter, External Filter Box, qty (1), Nom. Size, in. (mm)		4x20x20 (102x508x508)			
MERV 8 Filter, Air Distribution Plenum, qty (1), Nom. Size-in. (mm)		4x16x25 (102x406x635)			
Condensing Unit Model Number		PFH027A-_L7	MCD24AL_H7	PFH037A-_L7	MCD36AL_H7
Condensing Unit Rating Conditions		95°F (35°C) Ambient			
Coil Face Area ft ² (m ²)		4.1 (0.38)	4.6 (0.43)	7.7 (0.72)	4.6 (0.43)
Rows of Coil		2	4	2	4
CFM (CMH)		2200 (3738)	1000 (1698)	3000 (5097)	1430 (2429)
Motor Hp (W)		0.20 (149)	0.33 (246)	0.20 (149)	0.5 (373)
External Static Pressure, in wg. (mm)		N/A		N/A	
Unit Refrigerant Charge, oz. (kg)		134 (3.8)	134 (3.8)	213 (6.0)	213 (6.0)
Unit Operating Weight, lb. (kg)		351 (159)	449 (204)	351 (159)	449 (204)
Free-Cooling Coil Option Net Capacity Data - kW (Btuh) using 45°F EWT					
80°F DB, 62.8°F WB (26.7°C DB, 17.1°C WB) 38 %RH	Total	7.10 (24,200)		9.50 (32,400)	
	Sensible	6.60 (22,600)		9.05 (30,800)	
75°F DB, 61°F WB (23.9°C DB, 16.1°C WB) 45 %RH	Total	6.15 (20,900)		8.20 (28,000)	
	Sensible	5.55 (18,900)		7.60 (25,900)	
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50 %RH	Total	5.55 (18,900)		7.45 (25,400)	
	Sensible	4.85 (16,600)		6.70 (22,900)	
Flow Rate, GPM (l/m)		4.5 (17.1)		5.9 (22.4)	
Pressure Drop, ft. water (kPa)		5.6 (16.7)		9.1 (27.2)	
Free-Cooling Coil - Copper Tube/Aluminum Fin					
Face Area, ft ² (m ²)		3.1 (0.28)		3.1 (0.28)	
Coil Rows		3		3	
Max Face Velocity, fpm (m/s)		294 (1.5)		394 (2.0)	
Internal Fluid Volume, gal (l)		2.0 (7.6)		2.0 (7.6)	
Water supply/return connections, in (mm) OD		7/8 (22.2)		7/8 (22.2)	

The net capacity data has fan motor heat factored in for all ratings and the entering air conditions of 75°F (23.9°C), 45%RH, is the standard rating condition for ASHRAE 127-2007. All capacities are nominal values; actual performance will be ±5%.

Table 2 Air-cooled data, 50Hz

Evaporator Model	MMD23E or MMD23K		MMD35E or MMD35K		
	PFH - Outdoor	MCD - Indoor	PFH - Outdoor	MCD - Indoor	
Condensing Unit Type					
DX Evaporator- Net Capacity Data - kW (Btuh) @ High Speed CFM					
80°F DB, 62.8°F WB (26.7°C DB, 17.1°C WB) 38 %RH	Total	6.40 (21,900)	6.25 (21,400)	9.95 (34,000)	9.50 (32,400)
	Sensible	6.35 (21,600)	6.25 (21,300)	9.40 (32,100)	9.15 (31,300)
75°F DB, 61°F WB (23.9°C DB, 16.1°C WB) 45 %RH	Total	6.15 (20,900)	6.00 (20,400)	9.60 (32,700)	9.10 (31,100)
	Sensible	5.60 (19,100)	5.50 (18,800)	8.35 (28,500)	8.15 (27,800)
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50 %RH	Total	5.95 (20,300)	5.80 (19,800)	9.35 (31,900)	8.90 (30,400)
	Sensible	5.10 (17,400)	5.05 (17,200)	7.70 (26,200)	7.45 (25,500)
Fan Data - Evaporator					
CFM (CMH) - High Speed	885 (1504)		1250 (2124)		
CFM (CMH) - Low Speed	800 (1359)		1000 (1699)		
Fan Motor HP (W)	0.5 (0.38)		0.5 (0.38)		
External Static Pressure, in (mm) water gauge	0.3 (8)		0.3 (8)		
Evaporator Coil - Copper Tube/Aluminum Fin					
Face Area, ft ² (m ²)	3.1 (0.29)		3.1 (0.29)		
Coil Rows	3		3		
Max Face Velocity, fpm (m/s)	277 (1.4)		394 (2.0)		
Unit Refrigerant Charge, oz. (kg)	7 (0.20)		7 (0.20)		
Unit Operating Weight, lb (kg)	225 (102)		225 (102)		
Electric Reheat Capacity (Includes Fan Motor)-kW (Btuh)					
Input Voltage 220-1-50	5.3 (18090)		5.3 (18090)		
Input Voltage 380-3-50	7.3 (24900)		7.3 (24900)		
SCR Reheat Capacity (Includes Fan Motor)-kW (Btuh)					
Input Voltage 220-1-50	6.2 (21100)		8.7 (29700)		
Input Voltage 380-3-50	7.3 (24900)		10.3 (35100)		
Humidifier Data - Steam Generator Type					
Steam capacity lb/hr (kg/hr)	4.3 (2.0)		4.3 (2.0)		
Electrical Input Power, kW	1.5		1.5		
Evaporator Connection Sizes					
Liquid line Diameter - Aeroquip Coupling Size	3/8" - #6 Female		3/8" - #6 Female		
Suction Line Diameter - Aeroquip Coupling Size	7/8" - #11 Female		7/8" - #11 Female		
Humidifier Supply	1/4" OD Copper Compression Fitting		1/4" OD Copper Compression Fitting		
Evaporator/Condensate Drain	3/4" NPT-Female		3/4" NPT-Female		
MERV 8 Filter, External Filter Box, qty (1), Nom. Size, in. (mm)	4x20x20 (102x508x508)		4x20x20 (102x508x508)		
MERV 8 Filter, Air Distribution Plenum, qty (1), Nom. Size, in. (mm)	4x16x25 (102x406x635)		4x16x25 (102x406x635)		
Condensing Unit Model Number					
	PFH026A- L7	MCD23AL_H7	PFH036A- L7	MCD35AL_H7	
Condensing Unit Rating Conditions	95°F (35°C) Ambient		95°F (35°C) Ambient		
Coil Face Area, ft ² (m ²)	4.1 (0.38)	4.6 (0.43)	7.7 (0.72)	4.6 (0.43)	
Rows of Coil	2	4	2	4	
CFM (CMH)	1800 (3058)	1000 (1698)	2500 (4248)	1430 (2429)	
Motor, Hp (W)	0.20 (149)	0.33 (246)	0.20 (149)	0.5 (373)	
External Static Pressure, in wg. (mm)	N/A	0.50 (13)	N/A	0.50 (13)	
Unit Refrigerant Charge, oz. (kg)	134 (3.8)	134 (3.8)	213 (6.0)	213 (6.0)	
Unit Operating Weight, lb. (kg)	351 (159)	449 (204)	351 (159)	449 (204)	
Free-Cooling Coil Option Net Capacity Data - kW (Btuh) using 45°F EWT					
80°F DB, 62.8°F WB (26.7°C DB, 17.1°C WB) 38 %RH	Total	7.10 (24,200)		9.50 (32,400)	
	Sensible	6.60 (22,600)		9.05 (30,800)	
75°F DB, 61°F WB (23.9°C DB, 16.1°C WB) 45 %RH	Total	6.15 (20,900)		8.20 (28,000)	
	Sensible	5.55 (18,900)		7.60 (25,900)	
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50 %RH	Total	5.55 (18,900)		7.45 (25,400)	
	Sensible	4.85 (16,600)		6.70 (22,900)	
Flow Rate - GPM (l/m)	4.5 (17.1)		5.9 (22.4)		
Pressure Drop - ft. water (kPa)	5.6 (16.7)		9.1 (27.2)		
Free-Cooling Coil - Copper Tube/Aluminum Fin					
Face Area ft ² (m ²)	3.1 (0.28)		3.1 (0.28)		
Coil Rows	3		3		
Max Face Velocity-fpm (m/s)	294 (1.5)		394 (2.0)		
Internal Fluid Volume - gal (l)	2.0 (7.6)		2.0 (7.6)		
Water supply and return connections, in (mm) OD	7/8 (22.2)		7/8 (22.2)		

The net capacity data has fan motor heat factored in for all ratings and the entering air conditions of 75°F (23.9°C), 45%RH, is the standard rating condition for ASHRAE 127-2007. All capacities are nominal values; actual performance will be ±5%.

Figure 6 General arrangement, air-cooled split systems

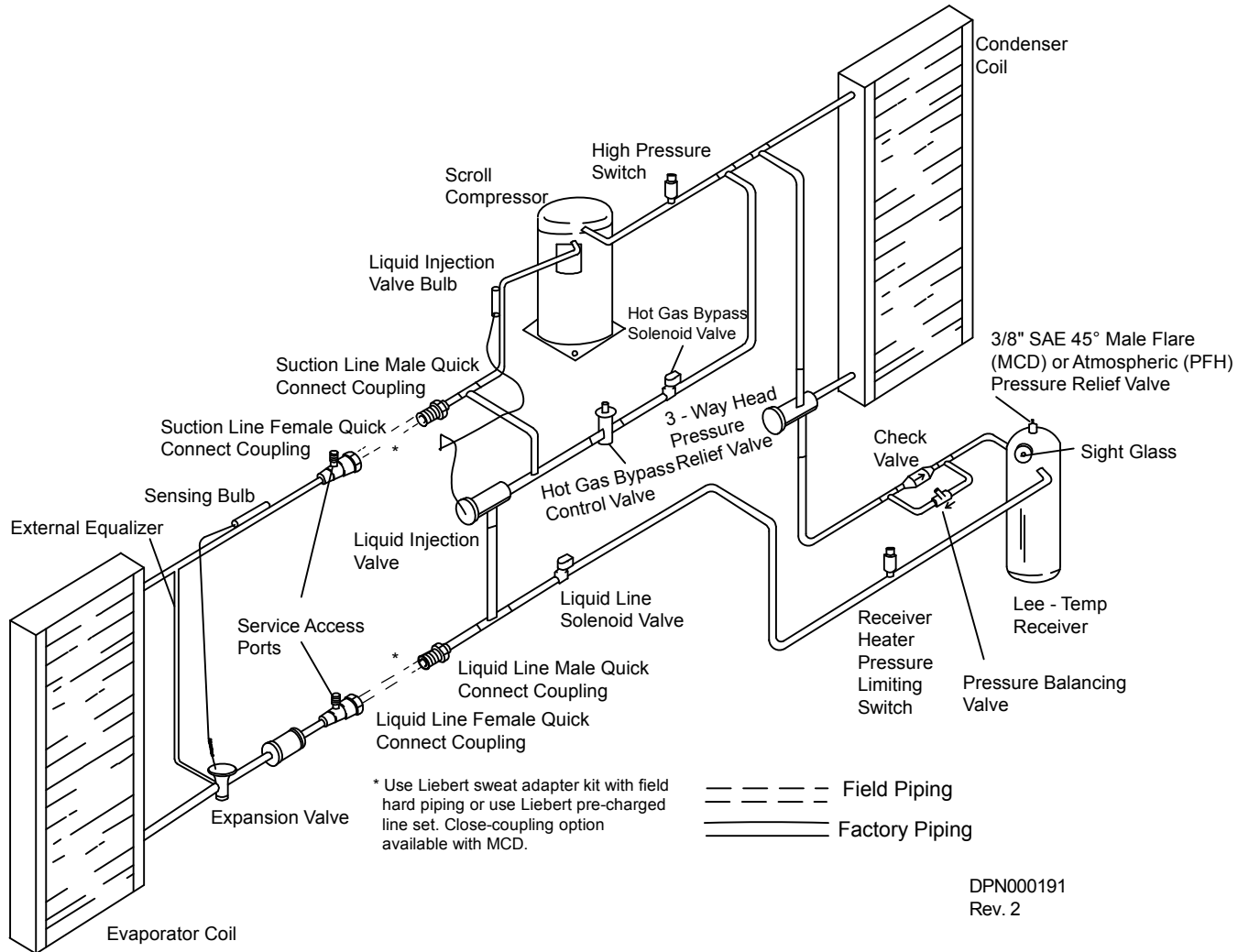
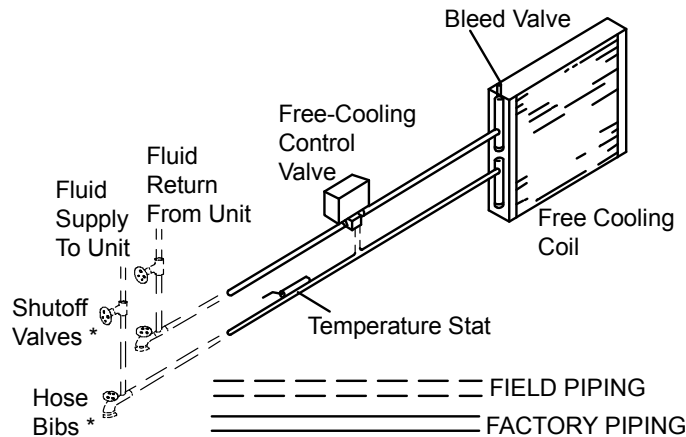


Figure 7 Free-cooling arrangement, air-cooled units



* Components are not supplied by Liebert but are recommended for proper circuit operation and maintenance.

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Figure 8 Dimensions, evaporator units with direct drive blower

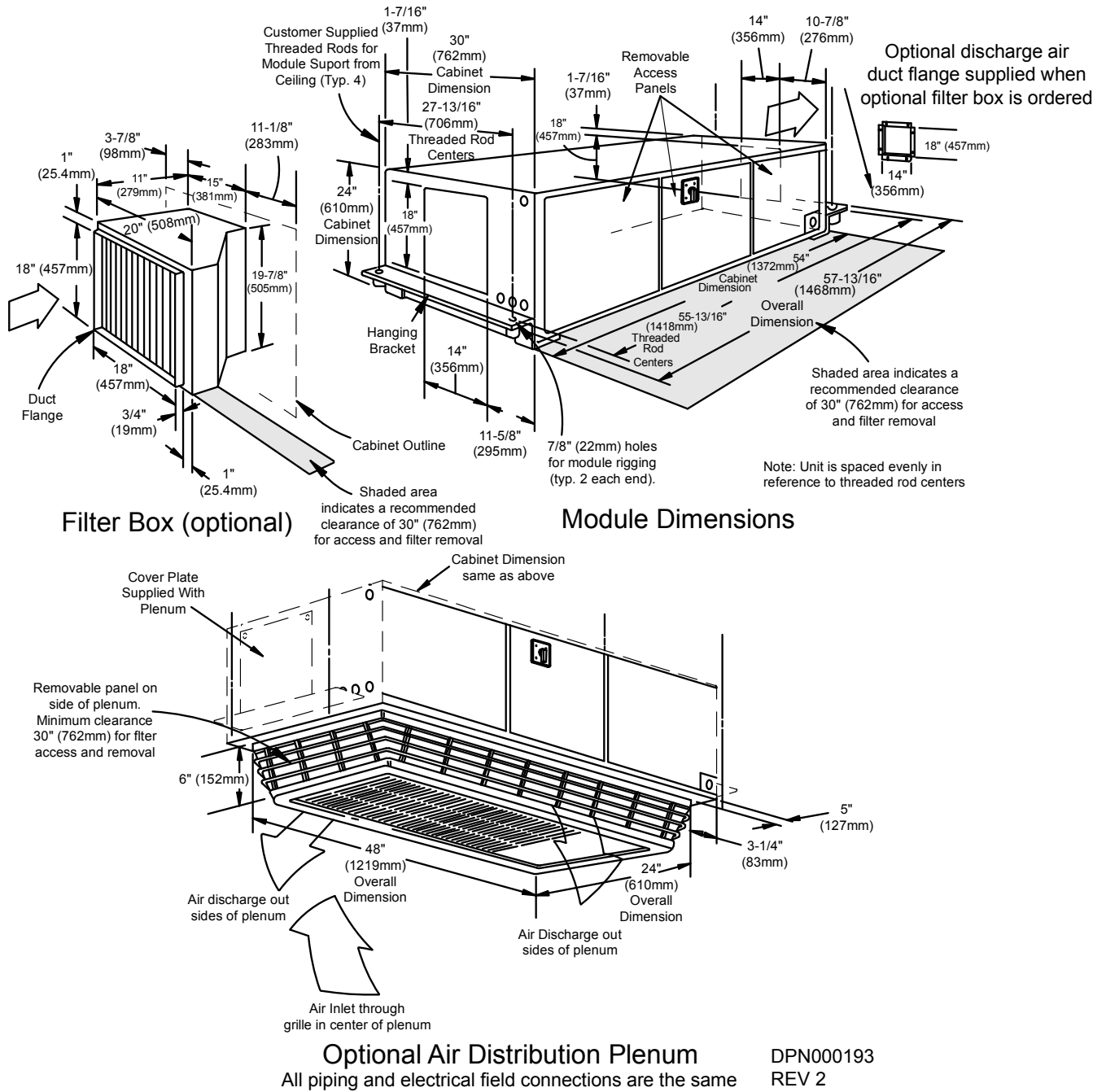


Table 3 Net weights—split system evaporator units

Model #		Weight, lb (kg)
60Hz	50Hz	
MM*24E	MM*23E	225 (102)
MM*24K	MM*23K	245 (111)
MM*36E	MM*35E	225 (102)
MM*36K	MM*35K	245 (111)

Figure 9 Dimensions, evaporator units with optional belt drive blower assembly

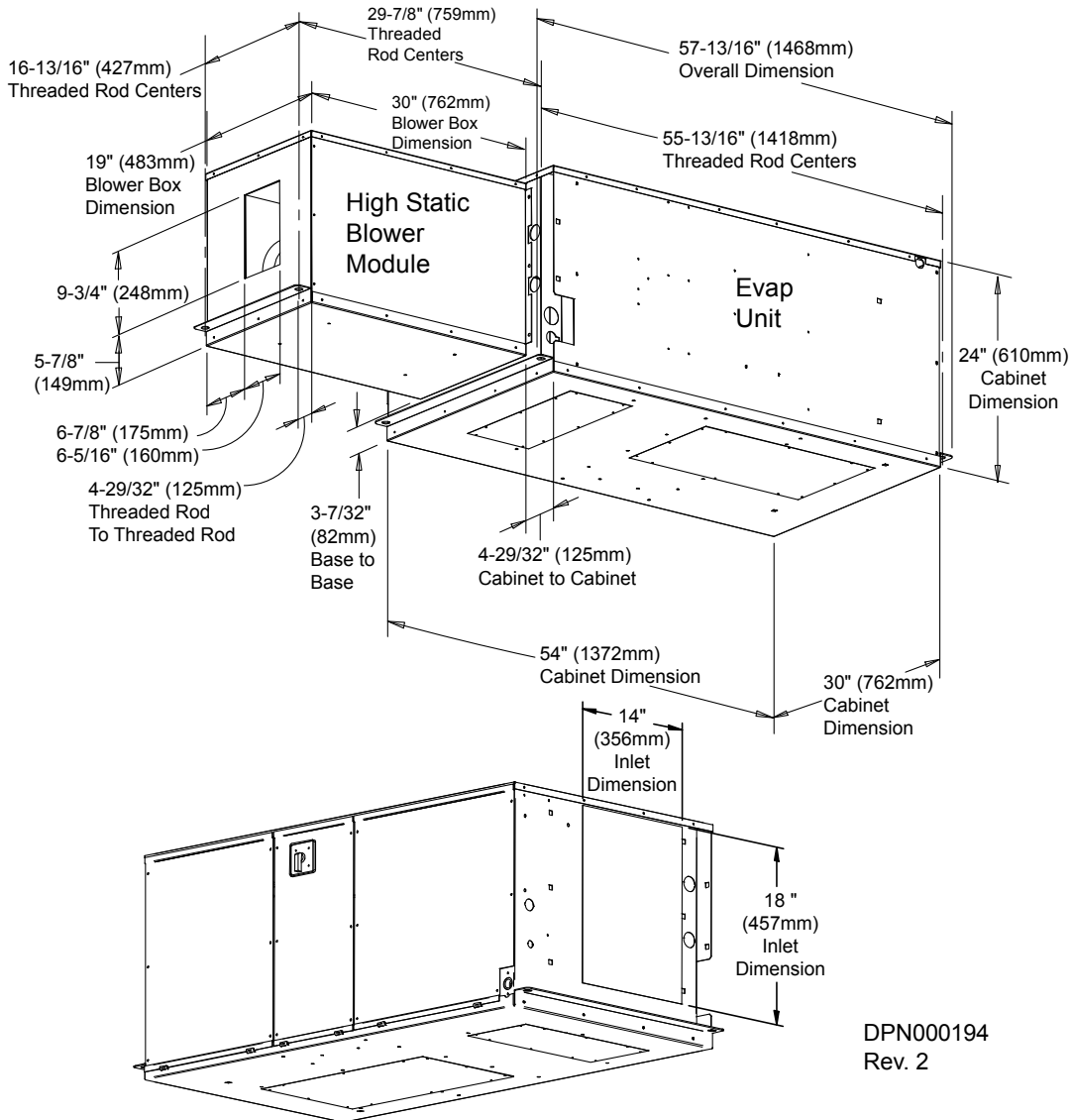
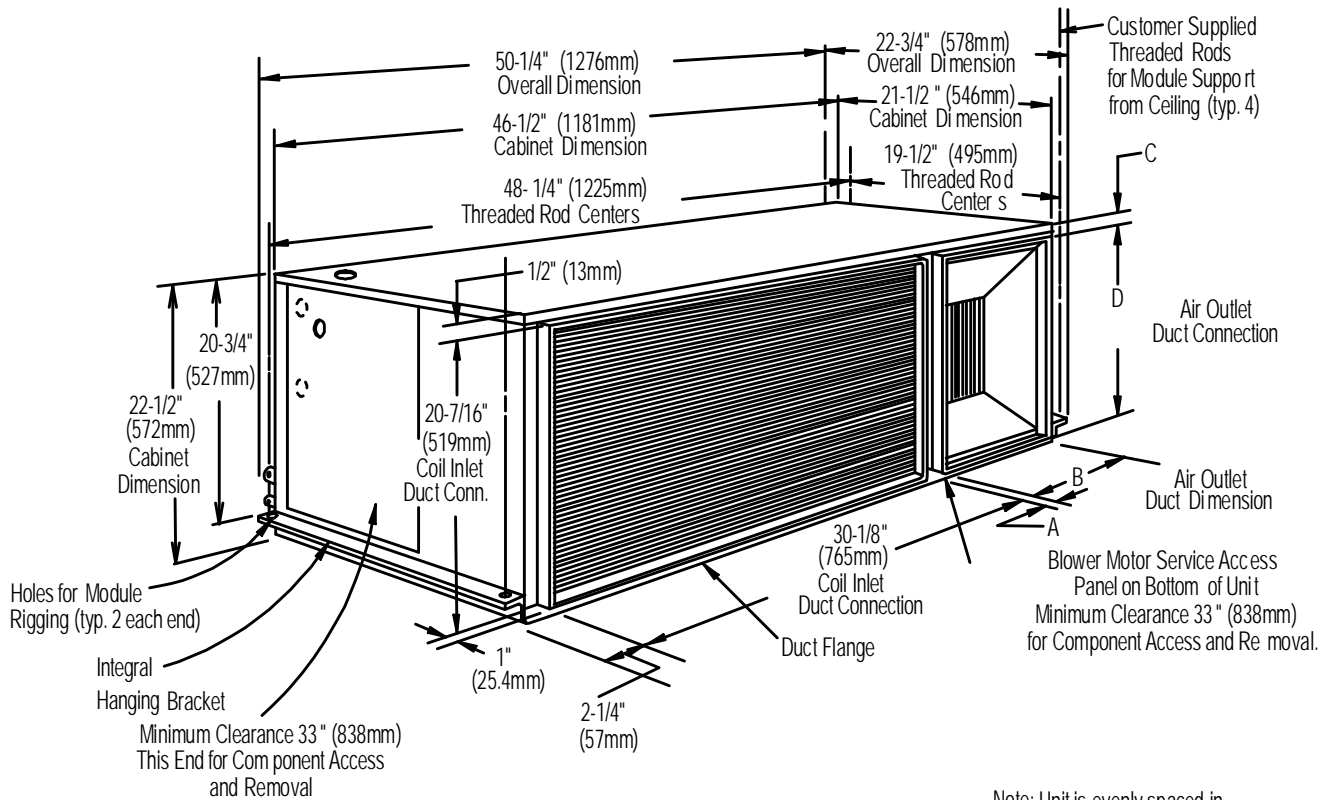


Table 4 Net weight, high static blower module

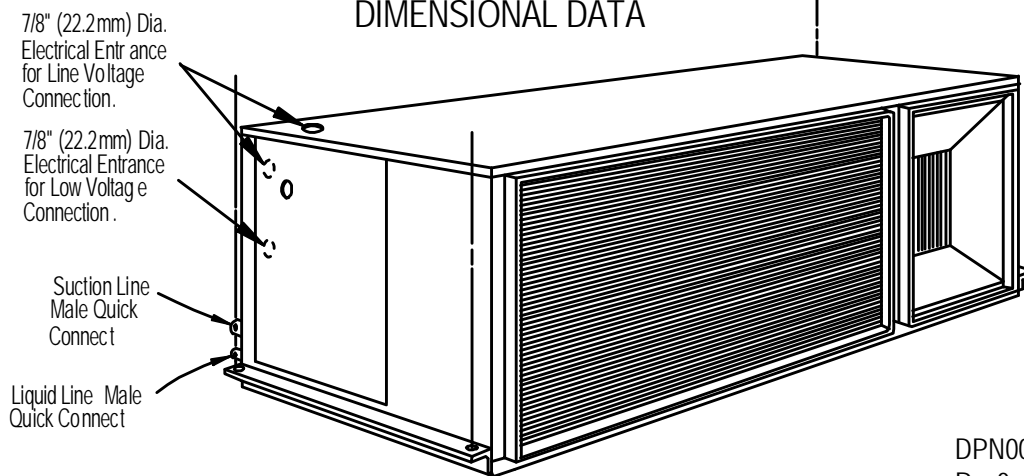
Unit	Net Weight lb (kg)
High Static Blower Module	85 (39)

Figure 10 Dimensions, indoor air-cooled condensing unit



Note: Unit is evenly spaced in reference to threaded rod centers.

DIMENSIONAL DATA

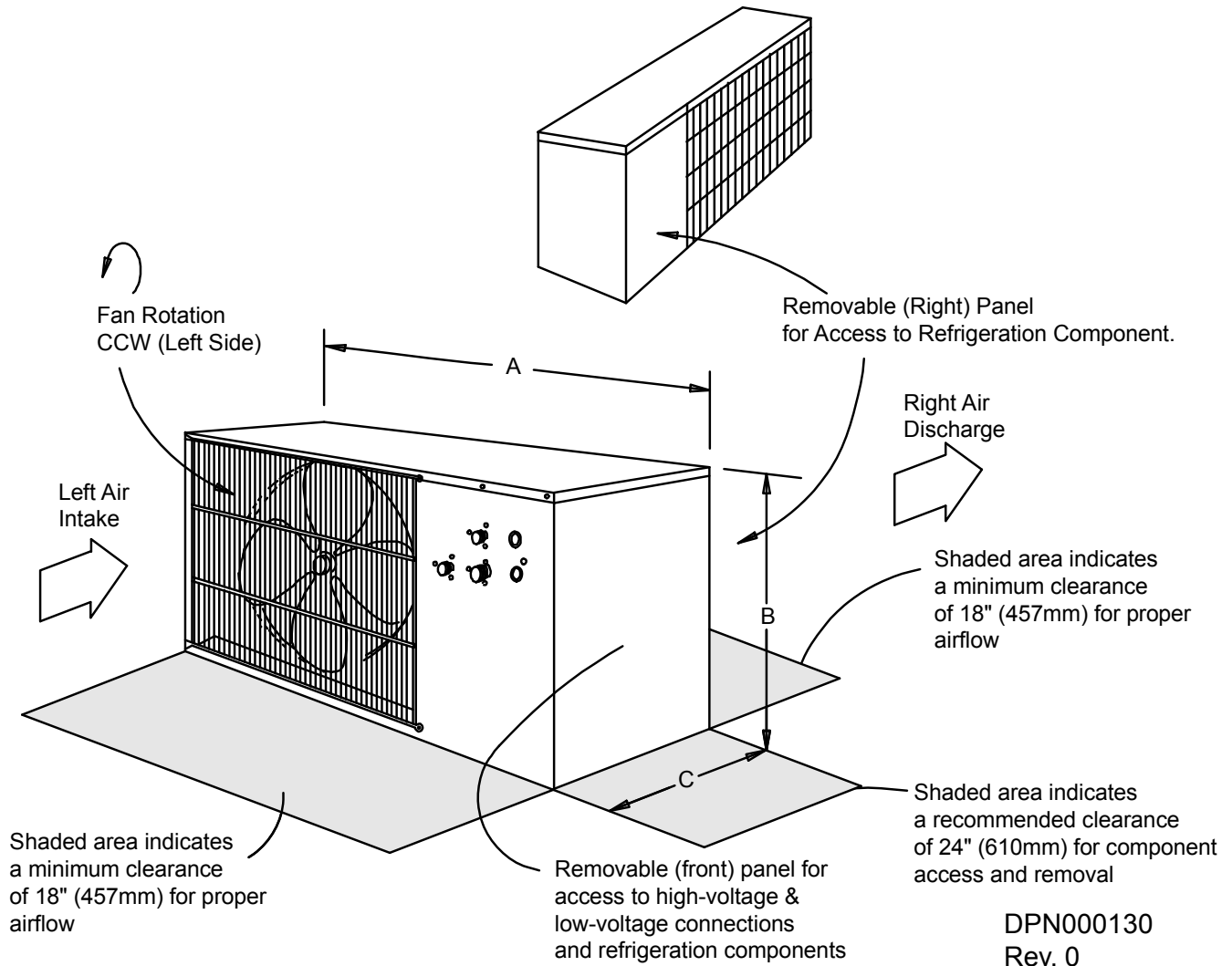


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 Rev0

Table 5 Dimensions and net weights, indoor air-cooled condensing units

Model #	Dimensions, in (mm)				Net Weight lb (kg)
	A	B	C	D	
MC*24A	1- 7/16 (37)	11-7/16 (290)	1/2 (13)	20-7/16 (519)	230 (104)
MC*23A					
MC*36A					240 (109)
MC*35A					

Figure 11 Cabinet and floor planning dimensional data, outdoor condensing unit



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Table 6 Dimensions and net weights—air-cooled outdoor condensing units

Model Numbers		Dimensional Data, inches (mm)			Module Net Weight lb (kg)
60Hz	50Hz	A	B	C	
PFH027A-L	PFH026A-L	40 (1016)	23-1/2 (597)	18 (457)	200 (91)
PFH027A-H	PFH026A-H	48 (1219)	31 (787)	18 (457)	241 (109)
PFHZ27A-L	PFHZ26A-L				
PFH037A-L	PFH036A-L				
PFH037A-H	PFH036A-H	53 (1343)	36-1/4 (918)	18 (457)	351 (159)
PFHZ37A-L	PFHZ36A-L				

7.0 WATER/GLYCOL SYSTEMS—CAPACITIES AND DIMENSIONS

Table 7 Water/glycol data, 60Hz

Evaporator Model	MMD24E or MMD24K		MMD36E or MMD360K		
	Water-Cooled	Glycol-Cooled	Water-Cooled	Glycol-Cooled	
DX Evaporator - Net Capacity Data - kW (Btuh) @ High Speed CFM					
80°F DB, 62.8°F WB (26.7°C DB, 17.1°C WB) 38 %RH	Total	7.60 (26,000)	6.25 (21,300)	11.0 (37,600)	9.05 (30,900)
	Sensible	6.95 (23,700)	6.20 (21,200)	9.95 (33,900)	8.95 (30,500)
75°F DB, 61°F WB (23.9°C DB, 16.1°C WB) 45 %RH	Total	7.30 (24,900)	5.90 (20,200)	10.6 (36,300)	8.70 (29,600)
	Sensible	6.15 (20,900)	5.50 (18,800)	8.85 (30,200)	7.95 (27,100)
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50 %RH	Total	7.10 (24,300)	5.75 (19,700)	10.4 (35,500)	8.45 (28,900)
	Sensible	5.65 (19,300)	5.00 (17,100)	8.20 (27,900)	7.30 (24,900)
Fan Data - Evaporator					
CFM (CMH), High Speed	885 (1504)		1250 (2124)		
CFM (CMH), Low Speed	800 (1359)		1000 (1699)		
Fan Motor, hp (W)	0.5 (0.38)		0.5 (0.38)		
External Static Pressure, in (mm) water gauge	0.3 (8)		0.3 (8)		
Evaporator Coil - Copper Tube/Aluminum Fin					
Face Area, ft ² (m ²)	3.1 (0.29)		3.1 (0.29)		
Coil Rows	3		3		
Max Face Velocity, fpm (m/s)	277 (1.4)		394 (2.0)		
Unit Refrigerant Charge, oz. (kg)	7 (0.20)		7 (0.20)		
Unit Operating Weight, lb (kg)	225 (102)		225 (102)		
Electric Reheat Capacity (Includes Fan Motor), kW (Btuh)					
	Standard	SCR	Standard	SCR	
Input Voltage 208-1-60	4.7 (16040)	5.6 (19100)	4.7 (16040)	7.9 (27000)	
Input Voltage 230-1-60	5.8 (19800)	6.8 (23200)	5.8 (19800)	9.5 (32400)	
Input Voltage 277-1-60	6.3 (21500)	7.3 (36900)	6.3 (21500)	10.3 (35200)	
Input Voltage 208-3-60	N/A	N/A	5.6 (19100)	7.9 (27000)	
Input Voltage 230-3-60			6.8 (23200)	9.5 (32400)	
Input Voltage 460-3-60			7.3 (36900)	10.3 (35200)	
Humidifier Data - Steam Generator Type					
Steam capacity - lbs/hr (kg/hr)	4.3 (2.0)		4.3 (2.0)		
Electrical Input Power, kW	1.5		1.5		
Evaporator Connection Sizes					
Liquid line Diameter - Aeroquip Coupling Size	3/8" - #6 Female		3/8" - #6 Female		
Suction Line Diameter - Aeroquip Coupling Size	7/8" - #11 Female		7/8" - #11 Female		
Humidifier Supply	1/4" OD Copper Compression Fitting		1/4" OD Copper Compression Fitting		
Evaporator/Condensate Drain	3/4" NPT-Female		3/4" NPT-Female		
MERV 8 Filter, External Filter Box, qty (1), Nom. Size, in. (mm)	4x20x20 (102x508x508)		4x20x20 (102x508x508)		
MERV 8 Filter, Air Distribution Plenum, qty (1), Nom. Size, in. (mm)	4x16x25 (102x406x635)		4x16x25 (102x406x635)		
Condensing Unit Model Number					
	MCD26W		MCD38W		
Condenser Fluid Requirements	85°F (29.4°C) EWT	110°F (43.3°C) EGT - 40% PG	85°F (29.4°C) EWT	110°F (43.3°C) EGT - 40% PG	
THR - kW (Btuh) @ 75F/45%RH	9.55 (32,500)	9.05 (30,800)	13.7 (46,700)	13.0 (44,400)	
Flow Rate, GPM (l/m)	8.1 (30.7)	8.5 (32.2)	6.6 (25.0)	10.9 (41.3)	
Pressure Drop, ft. of H ₂ O (kPa)	17.8 (53.2)	23.9 (71.5)	12.3 (36.8)	36.1 (107.9)	
Water-Cooled Condensing Temperature	105°F (40.6°C)	N/A	105°F (40.6°C)	N/A	
Connection Sizes, in. (mm) OD	7/8 (22.2)		7/8 (22.2)		
Unit Volume, Gal (l)	1.2 (4.5)		1.2 (4.5)		
Unit Refrigerant Charge, oz. (kg)	41 (1.16)		54 (1.54)		
Unit Operating Weight, lb. (kg)	175 (79)		220 (100)		
Free-Cooling Coil Option Net Capacity Data - kW (Btuh) using 45°F EWT					
Entering Fluid Conditions	45°F (29.4°C) EWT	45°F EGT - 40 % PG	45°F (29.4°C) EWT	45°F EGT - 40 % PG	
80°F DB, 62.8°F WB (26.7°C DB, 17.1°C WB) 38 %RH	Total	7.10 (24,200)	5.85 (19,900)	9.50 (32,400)	7.90 (26,900)
	Sensible	6.60 (22,600)	5.85 (19,900)	9.05 (30,800)	7.90 (26,900)
75°F DB, 61°F WB (23.9°C DB, 16.1°C WB) 45 %RH	Total	6.15 (20,900)	4.90 (16,800)	8.20 (28,000)	6.70 (22,800)
	Sensible	5.55 (18,900)	4.90 (16,800)	7.60 (25,900)	6.70 (22,800)
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50 %RH	Total	5.55 (18,900)	4.45 (15,100)	7.45 (25,400)	6.00 (20,400)
	Sensible	4.85 (16,600)	4.35 (14,900)	6.70 (22,900)	6.00 (20,400)
Flow Rate - GPM (l/m)	4.5 (17.1)	8.5 (32.2)	5.9 (22.4)	10.9 (41.3)	
Pressure Drop, ft. water (kPa)	5.6 (16.7)	23.9 (71.5)	9.1 (27.2)	36.2 (108.2)	
Free-Cooling Coil - Copper Tube/Aluminum Fin					
Face Area, ft ² (m ²)	3.1 (0.28)		3.1 (0.28)		
Coil Rows	3		3		
Max Face Velocity, fpm (m/s)	294 (1.5)		394 (2.0)		
Internal Fluid Volume, gal (l)	2.0 (7.6)		2.0 (7.6)		
Water supply and return connections, in (mm) OD	7/8 (22.2)		7/8 (22.2)		

The net capacity data has fan motor heat factored in for all ratings and the entering air conditions of 75°F (23.9°C), 45%RH, is the standard rating condition for ASHRAE 127-2007. All capacities are nominal values; actual performance will be ±5%.

Table 8 Water/glycol data, 50Hz

Evaporator Model		MMD23E or MMD23K		MMD35E or MMD35K	
Condensing Unit Fluid		Water-Cooled	Glycol-Cooled	Water-Cooled	Glycol-Cooled
DX Evaporator- Net Capacity Data - kW (Btuh) @ High Speed CFM					
80°F DB, 62.8°F WB (26.7°C DB, 17.1°C WB) 38 %RH	Total	7.50 (25,500)	6.05 (20,700)	11.3 (38,700)	9.20 (31,400)
	Sensible	6.90 (23,500)	6.05 (20,700)	10.1 (34,400)	9.00 (30,700)
75°F DB, 61°F WB (23.9°C DB, 16.1°C WB) 45 %RH	Total	7.20 (24,500)	5.75 (19,600)	11.0 (37,400)	8.80 (30,100)
	Sensible	6.05 (20,700)	5.40 (18,500)	9.00 (30,700)	8.00 (27,300)
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50 %RH	Total	7.00 (23,900)	5.60 (19,100)	10.7 (36,600)	8.60 (29,400)
	Sensible	5.60 (19,100)	4.95 (16,900)	8.30 (28,400)	7.35 (25,100)
Fan Data - Evaporator					
CFM (CMH), High Speed		885 (1504)		1250 (2124)	
CFM (CMH), Low Speed		800 (1359)		1000 (1699)	
Fan Motor HP (W)		0.5 (0.38)		0.5 (0.38)	
External Static Pressure, in (mm) water gauge		0.3 (8)		0.3 (8)	
Evaporator Coil - Copper Tube/Aluminum Fin					
Face Area, ft ² (m ²)		3.1 (0.29)		3.1 (0.29)	
Coil Rows		3		3	
Max Face Velocity, fpm (m/s)		277 (1.4)		394 (2.0)	
Unit Refrigerant Charge, oz. (kg)		7 (0.20)		7 (0.20)	
Unit Operating Weight, lb (kg)		225 (102)		225 (102)	
Electric Reheat Capacity (Includes Fan Motor)-kW (Btuh)					
Input Voltage 220-1-50		5.3 (18090)		5.3 (18090)	
Input Voltage 380-3-50		7.3 (24900)		7.3 (24900)	
SCR Reheat Capacity (Includes Fan Motor)-kW (Btuh)					
Input Voltage 220-1-50		6.2 (21100)		8.7 (29700)	
Input Voltage 380-3-50		7.3 (24900)		10.3 (35100)	
Humidifier Data - Steam Generator Type					
Steam capacity - lbs/hr (kg/hr)		4.3 (2.0)		4.3 (2.0)	
Electrical Input Power, kW		1.5		1.5	
Evaporator Connection Sizes					
Liquid line Diameter - Aeroquip Coupling Size		3/8" - #6 Female		3/8" - #6 Female	
Suction Line Diameter - Aeroquip Coupling Size		7/8" - #11 Female		7/8" - #11 Female	
Humidifier Supply		1/4" OD Copper Compression Fitting		1/4" OD Copper Compression Fitting	
Evaporator/Condensate Drain		3/4" NPT-Female		3/4" NPT-Female	
MERV 8 Filter, External Filter Box, qty (1), Nom. Size, in. (mm)		4x20x20 (102x508x508)		4x20x20 (102x508x508)	
MERV 8 Filter, Air Distribution Plenum, qty (1), Nom. Size, in. (mm)		4x16x25 (102x406x635)		4x16x25 (102x406x635)	
Condensing Unit Model Number		MCD25W		MCD37W	
Condenser Fluid Requirements		85°F (29.4°C) EWT	110°F (43.3°C) EGT - 40% PG	85°F (29.4°C) EWT	110°F (43.3°C) EGT - 40% PG
THR - kW (Btuh) @ 75F/45%RH		9.40 (32,100)	8.80 (30,000)	14.0 (47,800)	13.2 (44,900)
Flow Rate, GPM (l/m)		8.0 (30.3)	8.9 (33.7)	6.6 (25.0)	11.9 (45.1)
Pressure Drop, ft. of H2O (kPa)		17.3 (51.7)	26.2 (78.3)	11.9 (35.6)	43.2 (129.2)
Water-Cooled Condensing Temperature		105°F (40.6°C)	N/A	105°F (40.6°C)	N/A
Connection Sizes, in. (mm) OD		7/8 (22.2)		7/8 (22.2)	
Unit Volume, Gal (l)		1.2 (4.5)		1.2 (4.5)	
Unit Refrigerant Charge, oz. (kg)		41 (1.16)		54 (1.54)	
Unit Operating Weight, lb. (kg)		175 (79)		220 (100)	
Free-Cooling Coil Option Net Capacity Data - kW (Btuh) using 45°F EWT					
Entering Fluid Conditions		45°F (29.4°C) EWT	45°F EGT - 40% PG	45°F (29.4°C) EWT	45°F EGT - 40% PG
80°F DB, 62.8°F WB (26.7°C DB, 17.1°C WB) 38 %RH	Total	7.10 (24,200)	5.90 (20,100)	9.50 (32,400)	8.25 (28,000)
	Sensible	6.60 (22,600)	5.90 (20,100)	9.05 (30,800)	8.25 (28,000)
75°F DB, 61°F WB (23.9°C DB, 16.1°C WB) 45 %RH	Total	6.15 (20,900)	5.00 (17,000)	8.20 (28,000)	7.00 (23,800)
	Sensible	5.55 (18,900)	5.00 (17,000)	7.60 (25,900)	7.00 (23,800)
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50 %RH	Total	5.55 (18,900)	4.50 (15,400)	7.45 (25,400)	6.30 (21,500)
	Sensible	4.85 (16,600)	4.35 (14,900)	6.70 (22,900)	6.30 (21,500)
Flow Rate - GPM (l/m)		4.5 (17.1)	8.9 (33.7)	5.9 (22.4)	11.9 (45.1)
Pressure Drop - ft. water (kPa)		5.6 (16.7)	25.7 (76.8)	9.1 (27.2)	44.3 (132.5)
Free-Cooling Coil - Copper Tube/Aluminum Fin					
Face Area, ft ² (m ²)		3.1 (0.28)		3.1 (0.28)	
Coil Rows		3		3	
Max Face Velocity, fpm (m/s)		294 (1.5)		394 (2.0)	
Internal Fluid Volume, gal (l)		2.0 (7.6)		2.0 (7.6)	
Water supply and return connections, in (mm) OD		7/8 (22.2)		7/8 (22.2)	

The net capacity data has fan motor heat factored in for all ratings and the entering air conditions of 75°F (23.9°C), 45%RH, is the standard rating condition for ASHRAE 127-2007. All capacities are nominal values; actual performance will be ± 5%.

Figure 12 General arrangement, water/glycol split systems

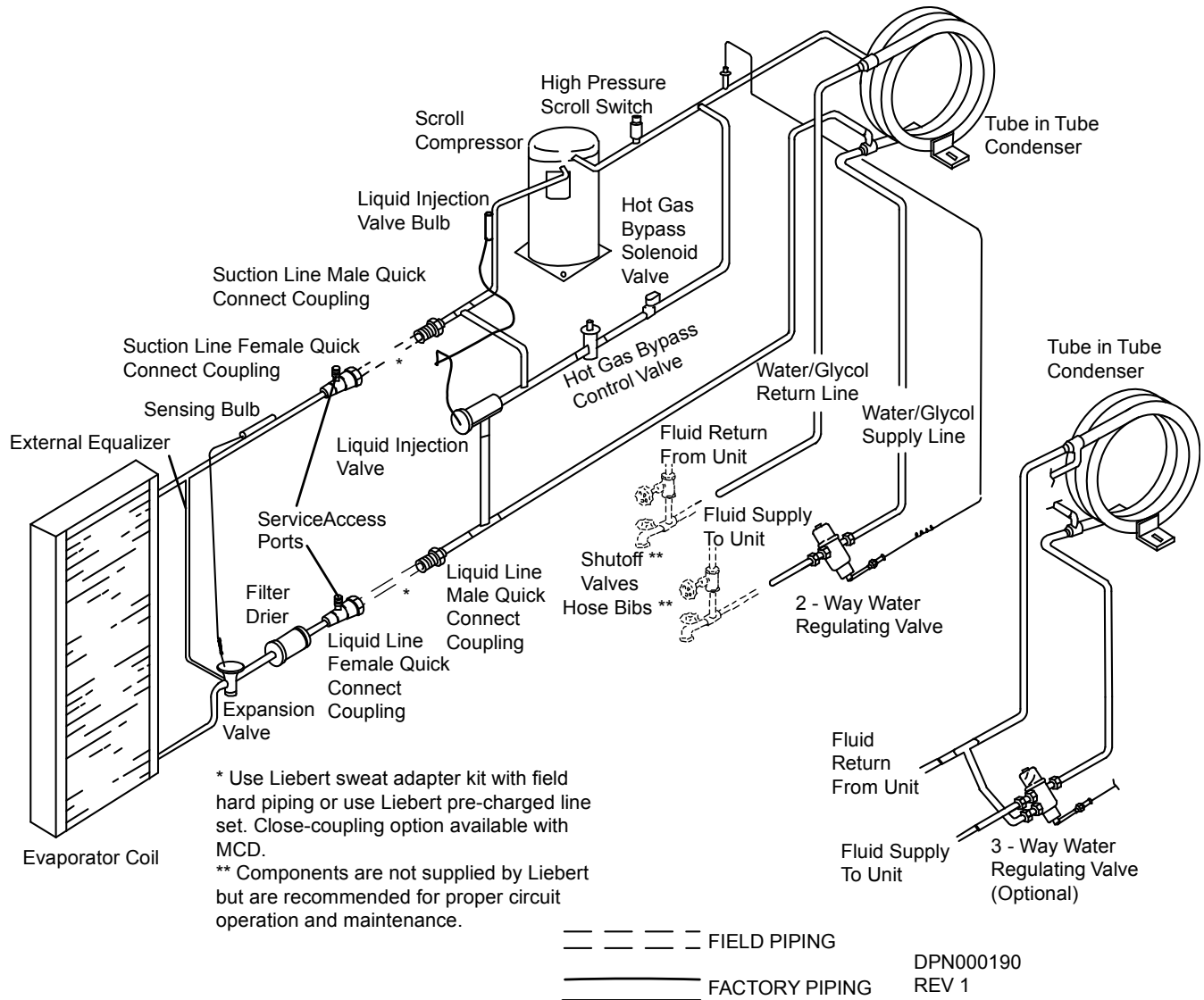


Figure 13 General arrangement, free-cooling coil with water/glycol condensing units

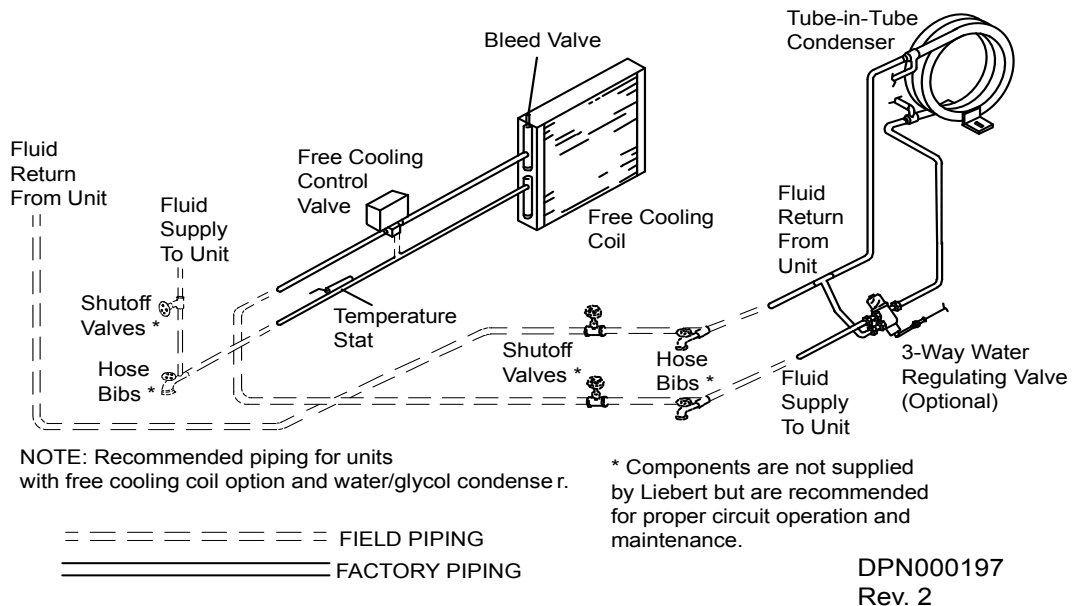
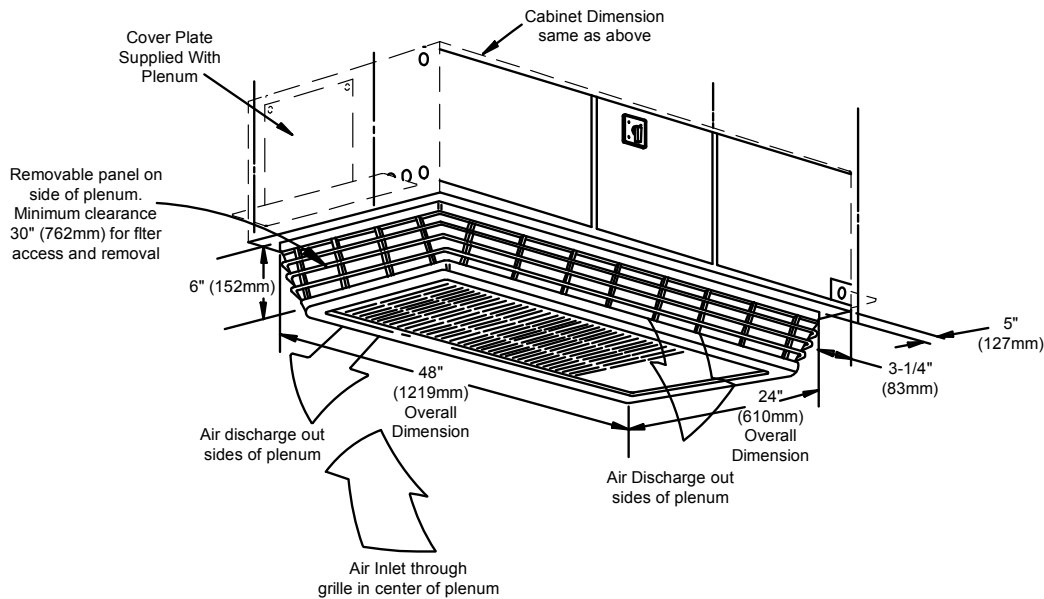
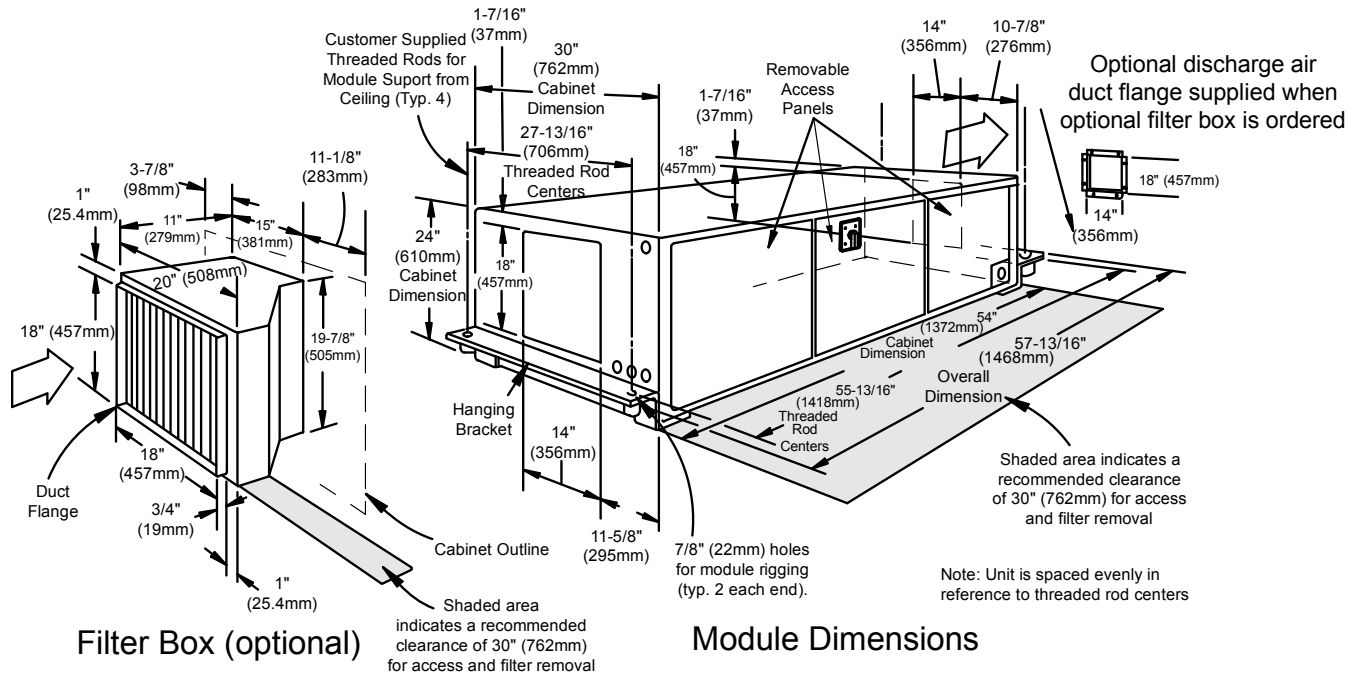


Figure 14 Dimensions, evaporator units with direct drive blower



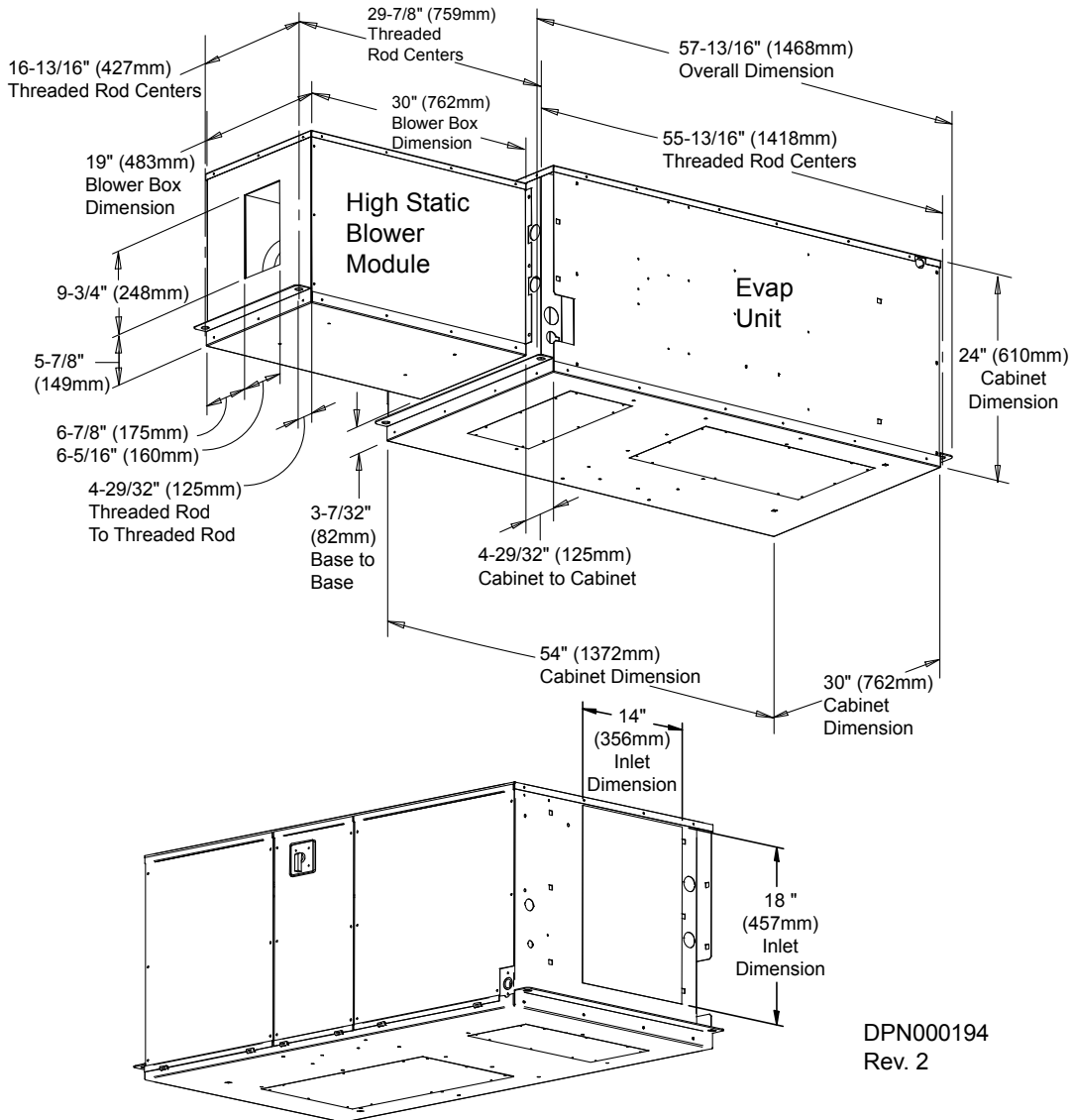
All piping and electrical field connections are the same

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Table 9 Net weights—split system evaporator units

Model #		Weight, lb (kg)
60Hz	50Hz	
MM*24E	MM*23E	225 (102)
MM*24K	MM*23K	245 (111)
MM*36E	MM*35E	225 (102)
MM*36K	MM*35K	245 (111)

Figure 15 Dimensions, evaporator units with optional belt drive blower assembly

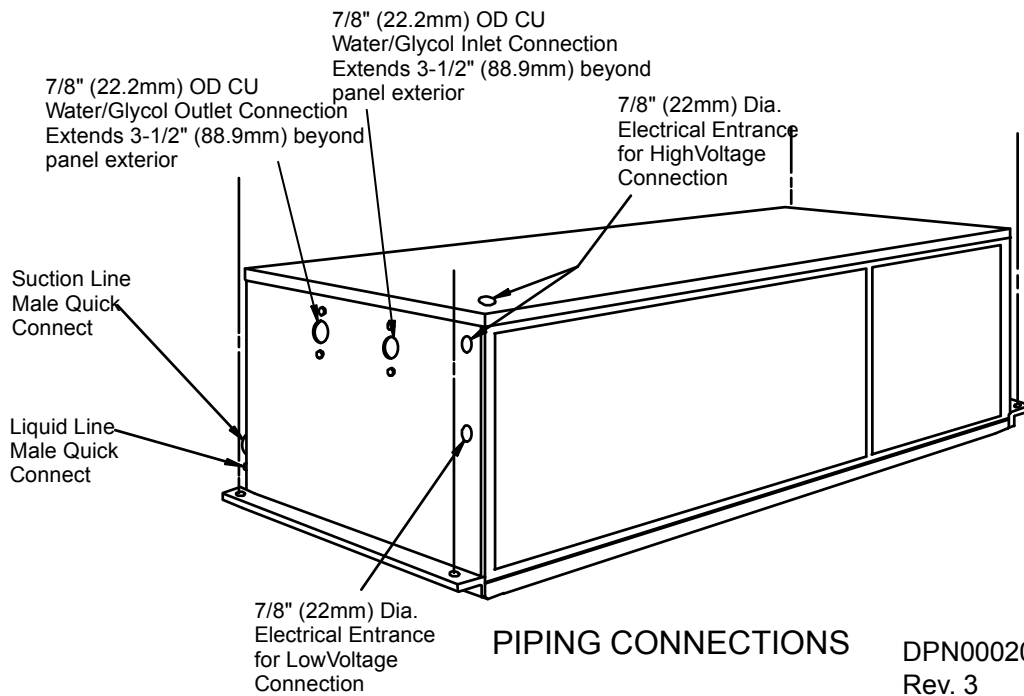
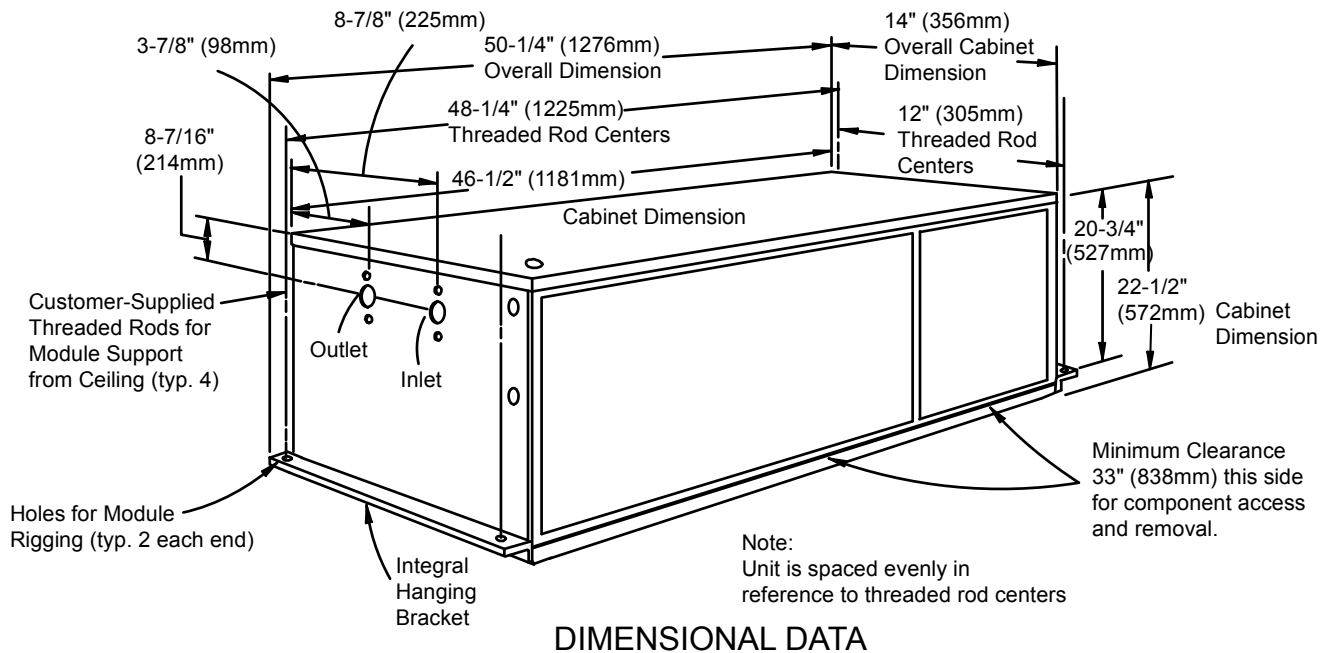


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Table 10 Net weight, high static blower module

Unit	Net Weight lb (kg)
High Static Blower Module	85 (39)

Figure 16 Cabinet dimensions and piping data, water/glycol indoor condensing module



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Table 11 Net weight, indoor water/glycol-cooled condensing unit

Model #		Weight lb (kg)
60Hz	50Hz	
MC*26W	MC*25W	175 (79)
MC*38W	MC*37W	220 (100)

8.0 CHILLED WATER SYSTEMS—CAPACITIES AND DIMENSIONS

Table 12 Chilled water data, 60 and 50Hz

CW Model, 50 & 60 Hz		MMD40C/MMD39C
Net Capacity Data - kW (Btuh) based on 45°F (7.2°C) EWT & 10°F (5.6°C) temperature rise		
80°F DB, 62.8°F WB (26.7°C DB, 17.1°C WB) 38 %RH	Total	10.1 (34,600)
	Sensible	9.40 (32,100)
Flow Rate, GPM (l/m)		7.2 (27.3)
Pressure Drop, ft. water (kPa)		13.1 (39.2)
75°F DB, 61°F WB (23.9°C DB, 16.1°C WB) 45 %RH	Total	8.25 (28,200)
	Sensible	7.60 (26,000)
Flow Rate, GPM (l/m)		5.9 (22.4)
Pressure Drop - ft. water (kPa)		9.3 (27.8)
72°F DB, 60°F WB (22.2°C DB, 15.5°C WB) 50 %RH	Total	7.10 (24,200)
	Sensible	6.50 (22,200)
Flow Rate, GPM (l/m)		5.2 (19.7)
Pressure Drop, ft. water (kPa)		7.2 (21.5)
Fan Data - Evaporator		
CFM (CMH)		1250 (2124)
CFM (CMH), Low Speed		1000 (1699)
Fan Motor, hp (kW)		0.5 (0.38)
External Static Pressure, in (mm) water gauge		0.3 (8)
CW Coil - Copper Tube/Aluminum Fin		
Face Area ft ² (m ²)		3.1 (0.29)
Coil Rows		3
Max Face Velocity, fpm (m/s)		391 (2.0)
Electric Reheat Capacity (Includes Fan Motor)-kW (Btuh)		
Input Voltage 208-1-60		4.7 (16040)
Input Voltage 230-1-60		5.8 (19800)
Input Voltage 277-1-60		6.3 (21500)
Input Voltage 208-3-60		5.6 (19100)
Input Voltage 230-3-60		6.8 (23200)
Input Voltage 460-3-60		7.3 (24900)
Input Voltage-220-1-50		5.3 (18090)
Input Voltage-380-3-50		7.3 (24900)
Hot Water Reheat Coil - Copper Tube/Aluminum Fin		
Capacity (with fan motor heat) using 180°F (82°C) EWT, kW (Btuh)		16.1 (54,900)
Flow Rate - GPM (l/m)		4.0 (15.2)
Pressure Drop, ft. water (kPa)		8.5 (25.4)
Face Area ft ² (m ²)		3.1 (0.29)
Coil Rows		1
HWRH supply and return connections, in (mm) OD		5/8 (15.9)
Humidifier Data - Steam Generator Type		
Steam capacity - lbs/hr (kg/hr)		4.3 (2.0)
Electrical Input Power, kW		1.5
Unit Connection Sizes		
CW supply and return connections, in (mm) OD		7/8 (22.2)
Humidifier Supply		1/4" OD Copper Compression Fitting
Evaporator/Condensate Drain		3/4" NPT-Female
Unit Internal Fluid Volume, gal (l)		2.0 (7.6)
MERV 8 Filter, External Filter Box, qty (1), Nom. Size, in. (mm)		4x20x20 (102x508x508)
MERV 8 Filter, Air Distribution Plenum, qty (1), Nom. Size, in. (mm)		4x16x25 (102x406x635)
Unit Operating Weight		230 (104)
Unit Valve Types		On/Off Slow Close: 2- & 3-Way
Valve Size		1"
Valve Cv		7.0
Max. Static Operating Pressure, psi (kPa)		300 (2068)
Close-Off Pressure, psi (kPa)		60 (414)

The net capacity data has fan motor heat factored in for all ratings and the entering air conditions of 75°F (23.9°C), 45%RH, is the standard rating condition for ASHRAE 127-2007. All capacities are nominal values; actual performance will be ±5%.

Table 13 Capacity Correction Factors (based on 10°F (5.6°C) water rise)

EWT	72°F (22.2°C) /50%		75°F (23.9°C) /45%RH	
	TCC	SCC	TCC	SCC
42°F (5.6°C)	1.25	1.13	1.23	1.12
43°F (6.1°C)	1.15	1.09	1.14	1.08
44°F (6.7°C)	1.07	1.04	1.07	1.04
45°F (7.2°C)	1.00	1.00	1.00	1.00
46°F (7.8°C)	0.92	0.96	0.94	0.96
47°F (8.3°C)	0.85	0.91	0.87	0.92
48°F (8.9°C)	0.78	0.85	0.82	0.88
49°F (9.4°C)	0.74	0.81	0.77	0.83

Figure 17 General arrangement, chilled water split systems

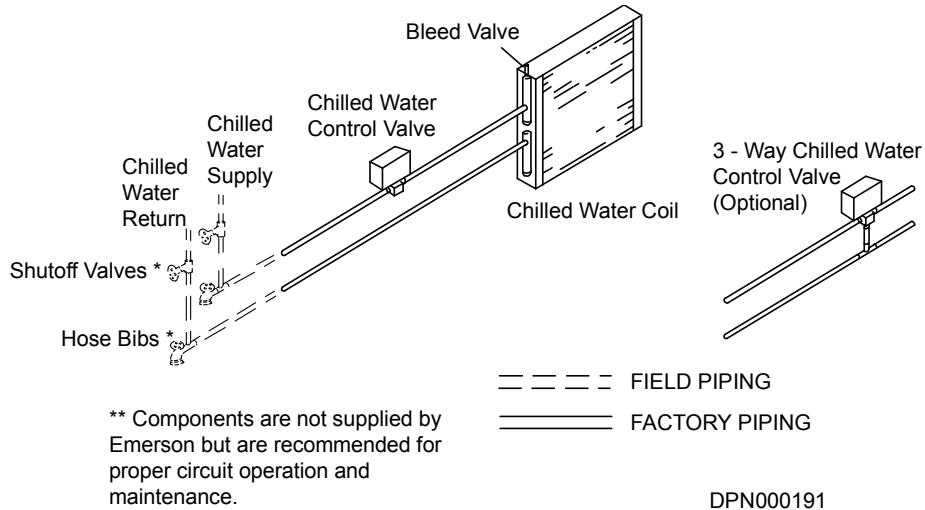


Figure 18 General arrangement, hot water reheat, chilled water units

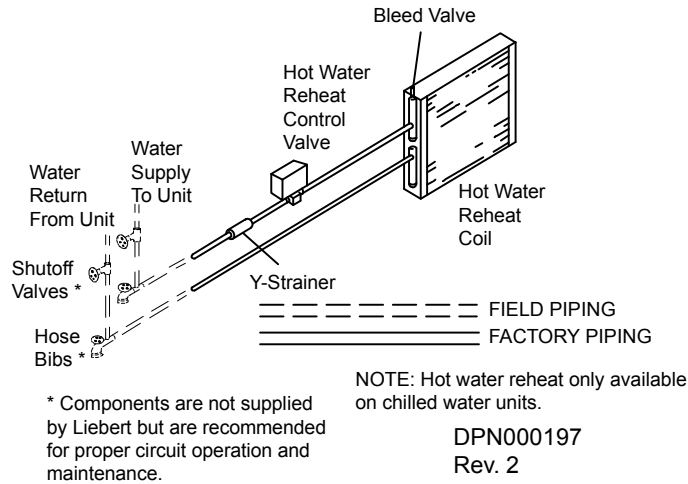
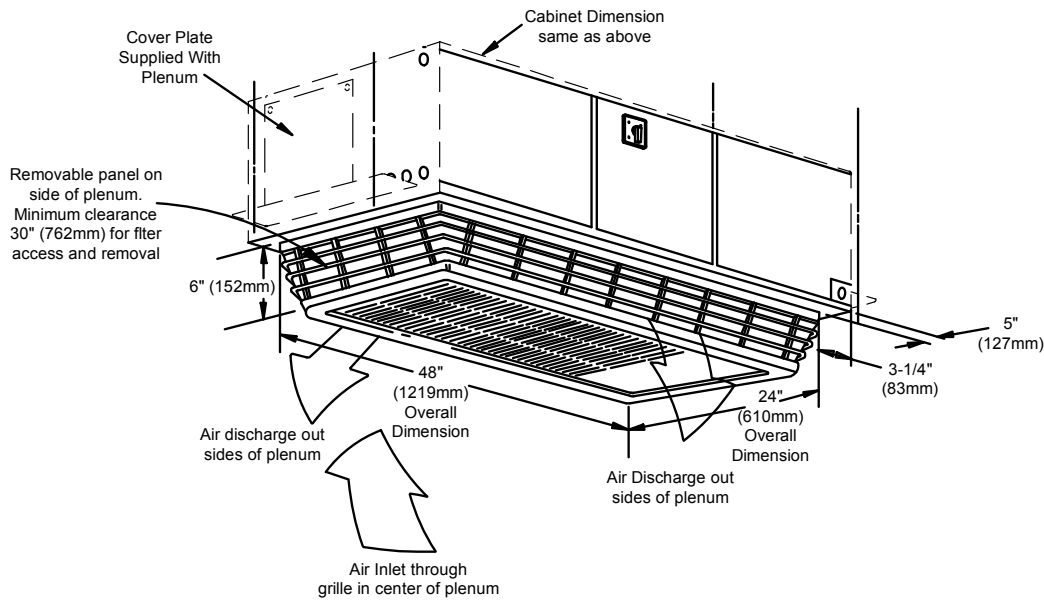
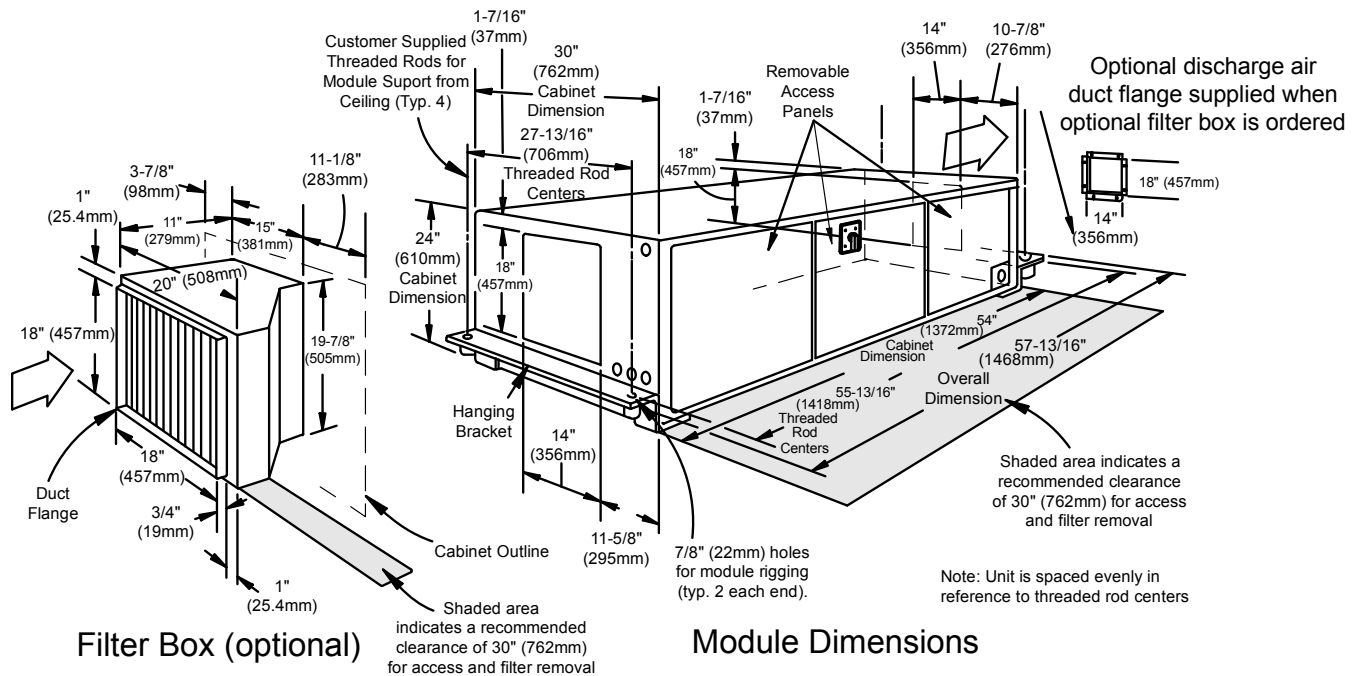


Figure 19 Dimensions, chilled water units with direct drive blower



All piping and electrical field connections are the same

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Table 14 Chilled water units with direct drive blower weights

Model #		Net Weight lb (kg)
60 Hz	50 Hz	
MM*40C	MM*39C	230 (104)

Figure 20 Dimensions, chilled water units with optional belt drive blower assembly

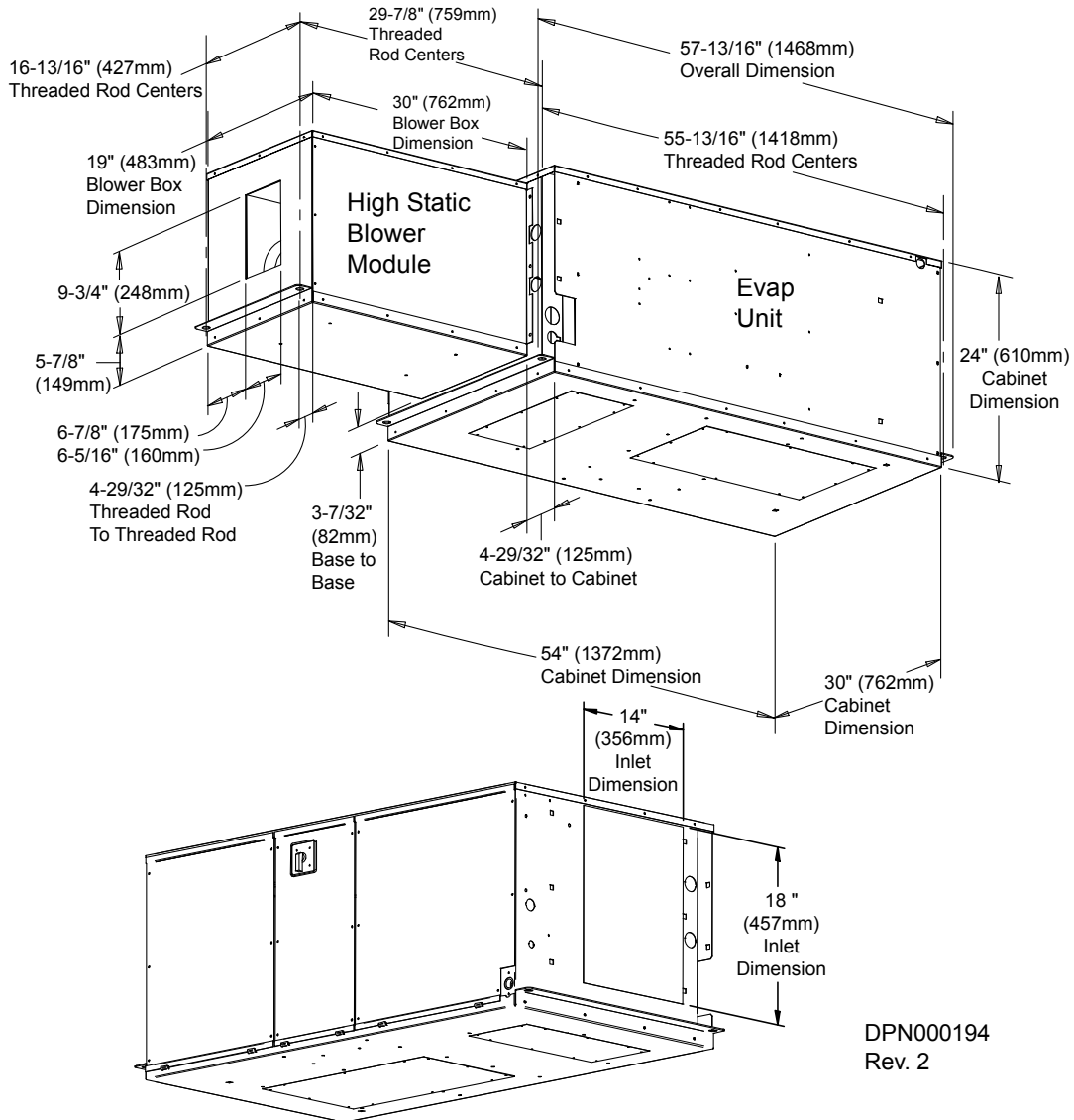


Table 15 Net weight, high static blower module

Unit	Net Weight lb (kg)
High Static Blower Module	85 (39)

9.0 ELECTRICAL DATA

Table 16 Direct drive split system evaporator or chilled water unit electrical data, 60 Hz

Base Evaporator Model Number	208/230 - 1 Ph - 60 Hz		277 - 1 Ph - 60 Hz		208/230 - 3 Ph - 60 Hz		460 - 3 Ph - 60 Hz	
	MM*24E	MM*36E	MM*24E	MM*36E	MM*24E	MM*36E	MM*24E	MM*36E
Cooling Only								
FLA	2.8	2.8	2.3	2.3	n/a	2.8	n/a	1.4
WSA	3.5	3.5	2.9	2.9	n/a	3.5	n/a	1.8
OPD	15	15	15	15	n/a	15	n/a	15
with Electric Reheat								
FLA	27.8	27.8	24.0	24.0	n/a	19.6	n/a	9.8
WSA	34.8	34.8	30.0	30.0	n/a	24.5	n/a	12.3
OPD	35	35	35	35	n/a	25	n/a	15
with SCR Reheat ⁴								
FLA	32.0	44.5	27.6	38.4	n/a	26.9	n/a	13.5
WSA	40.0	55.6	34.5	48.0	n/a	33.6	n/a	16.9
OPD	45	60	35	50	n/a	35	n/a	20
with Humidifier								
FLA	9.2	9.2	8.0	8.0	n/a	9.2	n/a	4.8
WSA	11.5	11.5	10.0	10.0	n/a	11.5	n/a	6.0
OPD	15	15	15	15	n/a	15	n/a	15
with Electric Reheat and Humidifier								
FLA	34.2	34.2	29.7	29.7	n/a	26.0	n/a	13.2
WSA	42.8	42.8	37.1	37.1	n/a	32.5	n/a	16.5
OPD	45	45	40	40	n/a	35	n/a	20
with SCR Reheat ⁴ and Humidifier								
FLA	38.4	50.9	33.3	44.1	n/a	33.3	n/a	16.9
WSA	48.0	63.6	41.6	55.1	n/a	41.6	n/a	21.1
OPD	50	70	45	60	n/a	45	n/a	25

* Specify disconnect or no disconnect

Notes:

1. Use MM*36E electrical data for MM*40C chilled water units
2. For units with Hot Water Reheat (available only on MM*40C units), use appropriate values from "Cooling only" or "with Humidifier" categories.
3. Use MM*24E and MM*36E for MM*24K & MM*36K, respectively, except with SCR reheat.
4. SCR Reheat not available with MM*24K, MM*36K or MM*40C.

Table 17 Belt drive split system evaporator or chilled water electrical data, with high static blower box, 60 Hz

Base Evaporator Model Number	208/230 - 1 Ph - 60 Hz		277 - 1 Ph - 60 Hz		208/230 - 3 Ph - 60 Hz		460 - 3 Ph - 60 Hz		
	MM*24E	MM*36E	MM*24E	MM*36E	MM*24E	MM*36E	MM*24E	MM*36E	
Cooling Only									
FLA	9.2	9.2	6.4	6.4	n/a	4.8	n/a	2.1	
WSA	11.5	11.5	8.0	8.0	n/a	6.0	n/a	2.6	
OPD	20	20	15	15	n/a	15	n/a	15	
with Electric Reheat									
FLA	34.2	34.2	28.1	28.1	n/a	21.6	n/a	10.5	
WSA	42.8	42.8	35.1	35.1	n/a	27.0	n/a	13.1	
OPD	45	45	40	40	n/a	30	n/a	15	
with SCR Reheat ⁵									
FLA	38.4	50.9	31.7	42.5	n/a	28.9	n/a	14.2	
WSA	48.0	63.6	39.6	53.1	n/a	36.1	n/a	17.8	
OPD	50	70	40	60	n/a	40	n/a	20	
with Humidifier									
FLA	15.6	15.6	12.1	12.1	n/a	11.2	n/a	5.5	
WSA	19.5	19.5	15.1	15.1	n/a	14.0	n/a	6.9	
OPD	25	25	20	20	n/a	15	n/a	15	
with Electric Reheat and Humidifier									
FLA	40.6	40.6	33.8	33.8	n/a	28.0	n/a	13.9	
WSA	50.8	50.8	42.3	42.3	n/a	35.0	n/a	17.4	
OPD	60	60	45	45	n/a	40	n/a	20	
with SCR Reheat ⁵ and Humidifier									
FLA	44.8	57.3	37.4	48.2	n/a	35.3	n/a	17.6	
WSA	56.0	71.6	46.8	60.3	n/a	44.1	n/a	22.0	
OPD	60	80	50	70	n/a	45	n/a	25	

* Specify disconnect or no disconnect

Notes:

1. Belt drive data includes externally mounted high static blower box, powered from unit.
2. Use MM*36E electrical data for MM*40C chilled water units.
3. For units with Hot Water Reheat (available only on MM*40C units), use appropriate values from "Cooling only" or "with Humidifier" categories.
4. Use MM*24E and MM*36E for MM*24K & MM*36K, respectively, except with SCR reheat.
5. SCR Reheat not available with MM*24K, MM*36K or MM*40C.

Table 18 Direct drive split system evaporator or chilled water electrical data, 50 Hz

Base Evaporator Model #	220 - 1Ph - 50Hz		380/415 - 3Ph-50 Hz	
	MM*23E	MM*35E	MM*23E	MM*35E
Cooling Only				
FLA	2.8	2.8	1.4	1.4
with Electric Reheat				
FLA	27.8	27.8	11.1	11.1
with SCR Reheat⁴				
FLA	32.0	44.6	11.1	15.3
with Humidifier				
FLA	9.2	9.2	5.1	5.1
with Electric Reheat and Humidifier				
FLA	34.2	34.2	14.8	14.8
with SCR Reheat and Humidifier⁴				
FLA	38.4	50.9	14.8	19.0

* Specify disconnect or no disconnect

Notes:

1. Use MM*35E electrical data for MM*39C chilled water units.
2. For units with Hot Water Reheat (available only on MM*39C units), use appropriate values from "Cooling only" or "with Humidifier" categories.
3. Use MM*23E and MM*35E for MM*23K & MM*35K, respectively, except with SCR reheat.
4. SCR Reheat not available with MM*23K, MM*35K or MM*39C.

Table 19 Belt drive split system evaporator or chilled water electrical data, 50 Hz

Base Evaporator Model Number	220 - 1 Ph - 50 Hz		380/415 - 3 Ph - 50 Hz	
	MM*23E	MM*35E	MM*23E	MM*35E
Cooling Only				
FLA	7.0	7.0	2.6	2.6
with Electric Reheat				
FLA	32.0	32.0	12.3	12.3
with SCR Reheat⁵				
FLA	36.2	48.7	12.3	16.5
with Humidifier				
FLA	13.4	13.4	6.3	6.3
with Electric Reheat and Humidifier				
FLA	38.4	38.4	16.0	16.0
with SCR Reheat and Humidifier⁵				
FLA	42.6	55.1	16.0	20.2

* Specify disconnect or no disconnect

Notes:

1. Belt drive data includes externally mounted high static blower box, powered from unit.
2. Use MM*35E electrical data for MM*39C chilled water units.
3. For units with Hot Water Reheat (available only on MM*39C units), use appropriate values from "Cooling only" or "with Humidifier" categories.
4. Use MM*23E and MM*35E for MM*23K & MM*35K, respectively, except with SCR reheat.
5. SCR Reheat not available with MM*23K, MM*35K or MM*39C.

Table 20 Indoor condensing unit electrical data, 60 and 50 Hz

Model	60 Hz				50 Hz	
	208/230-1ph-60Hz	277-1ph-60Hz	208/230-3ph-60Hz	460-3ph-60Hz	220-1ph-50Hz	380/415-3ph-50Hz
	MC*24A	MC*24A	MC*24A	MC*24A	MC*23A	MC*23A
FLA	13.7	11.9	N/A	N/A	13.2	5.7
WSA	16.6	14.3	N/A	N/A	16.1	6.8
OPD	25	20	N/A	N/A	N/A	N/A
	MC*36A	MC*36A	MC*36A	MC*36A	MC*35A	MC*35A
FLA	19.4	16.6	15.1	7.1	20.1	7.8
WSA	23.3	20.2	18.0	8.5	24.4	9.4
OPD	35	30	25	15	N/A	N/A
	MC*26W	MC*26W	MC*26W	MC*26W	MC*25W	MC*25W
FLA	11.4	9.6	N/A	N/A	11.4	4.3
WSA	14.3	12.0	N/A	N/A	14.3	5.4
OPD	25	20	N/A	N/A	N/A	N/A
	MC*38W	MC*38W	MC*38W	MC*38W	MC*37W	MC*37W
FLA	15.7	14.3	11.4	5.7	17.1	6.4
WSA	19.6	17.9	14.3	7.1	21.4	8.0
OPD	35	30	25	15	N/A	N/A

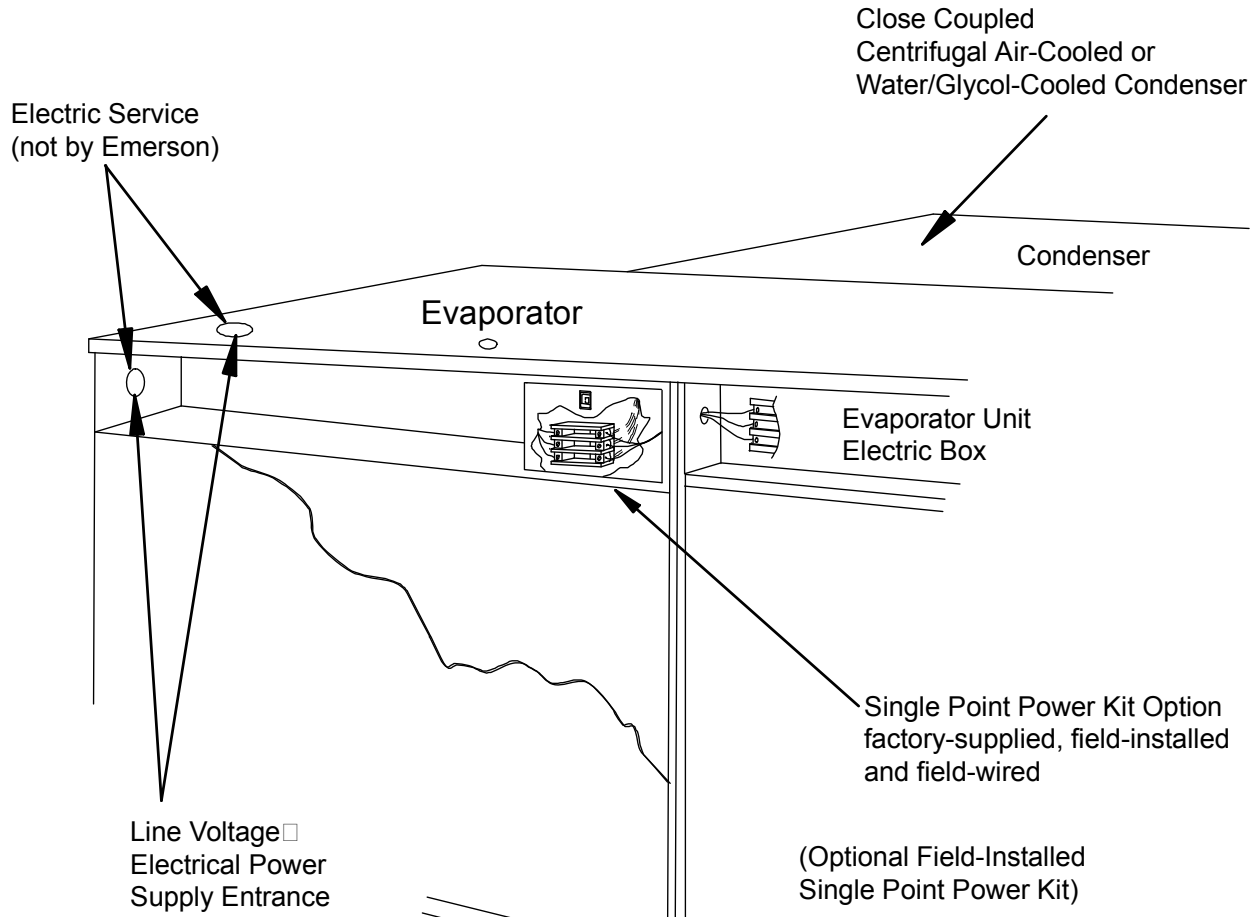
* Specify disconnect or no disconnect

Table 21 Outdoor condensing unit electrical data, 60 and 50 Hz

Model #	Nominal Capacity Tons	* Electrical Characteristic	60 Hz				50 Hz	
			208/230-1-60	208/230-3-60	460-3-60	575-3-60	220-1-50	380/415-3-50
Standard 95°F (35°C) ambient								
PFH027A__L7 PFH026A__L7	2	FLA	13.5	—	—	—	12.7	4.9
		WSA	16.5	—	—	—	—	—
		OPD	25	—	—	—	—	—
PFH037A__L7 PFH036A__L7	3	FLA	19.3	12.8	6.4	5.9	18.4	7.0
		WSA	23.8	15.7	7.8	7.1	—	—
		OPD	40	25	15	15	—	—
High Ambient 105°F (41°C) ambient								
PFH027A__H7 PFH026A__H7	2	FLA	15.5	—	—	—	14.8	6.0
		WSA	18.5	—	—	—	—	—
		OPD	30	—	—	—	—	—
PFH037A__H7 PFH036A__H7	3	FLA	21.3	14.8	7.4	5.9	20.5	13.1
		WSA	25.8	17.7	8.8	7.1	—	—
		OPD	40	25	15	15	—	—
Quiet-Line 95°F (35°C) ambient								
PFHZ27A__L7 PFHZ26A__L7	2	FLA	13.0	—	—	—	12.3	4.8
		WSA	16.0	—	—	—	—	—
		OPD	25	—	—	—	—	—
PFHZ37A__L7 PFHZ36A__L7	3	FLA	18.8	12.3	6.4	—	18.0	6.9
		WSA	23.3	15.2	7.8	—	—	—
		OPD	40	25	15	—	—	—

* Specify disconnect or no disconnect

Figure 21 Single-point power kit - optional



Note: Single point power kit should be mounted inside the evaporator before installing the unit in the ceiling.

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Table 22 Electrical data, 60Hz air-cooled systems using single-point power kit, evaporator with direct-drive blowers and indoor condensing unit

	208/230 - 1 Ph - 60 Hz		277 - 1 Ph - 60 Hz		208/230 - 3 Ph - 60 Hz		460 - 3 Ph - 60 Hz	
Base Evaporator Model Number	MM*24E	MM*36E	MM*24E	MM*36E	MM*24E	MM*36E	MM*24E	MM*36E
Condensing Unit Model Number	MC*24A	MC*36A	MC*24A	MC*36A	MC*24A	MC*36A	MC*24A	MC*36A
Cooling Only								
FLA	16.5	22.2	14.2	18.9	n/a	17.9	n/a	8.5
WSA	19.4	26.1	16.6	22.5	n/a	20.8	n/a	9.9
OPD	30	40	25	35	n/a	30	n/a	15
with Electric Reheat								
FLA	41.5	47.2	35.9	40.6	n/a	34.7	n/a	16.9
WSA	50.6	57.4	43.7	49.6	n/a	41.8	n/a	20.4
OPD	60	60	45	50	n/a	45	n/a	25
with SCR Reheat ²								
FLA	45.7	63.9	39.5	55.0	n/a	42.0	n/a	20.6
WSA	55.9	78.3	48.2	67.6	n/a	50.9	n/a	25.1
OPD	60	80	50	70	n/a	60	n/a	30
with Humidifier								
FLA	22.9	28.6	19.9	24.6	n/a	24.3	n/a	11.9
WSA	25.8	32.5	22.3	28.2	n/a	27.2	n/a	13.3
OPD	35	45	30	40	n/a	35	n/a	15
with Electric Reheat and Humidifier								
FLA	41.5	47.2	35.9	40.6	n/a	34.7	n/a	16.9
WSA	50.6	57.4	43.7	49.6	n/a	41.8	n/a	20.4
OPD	60	60	45	50	n/a	45	n/a	25
with SCR Reheat and Humidifier ²								
FLA	52.1	70.3	45.2	60.7	n/a	48.4	n/a	24.0
WSA	62.3	84.7	53.9	73.3	n/a	57.3	n/a	28.5
OPD	70	90	60	80	n/a	60	n/a	30

* Specify disconnect or no disconnect

Note:

1. Use MM*24E and MM*36E for MM*24K & MM*36K, respectively, except with SCR reheat.
2. SCR Reheat not available with MM*24K or MM*36K.

Table 23 Electrical data, 60Hz air-cooled systems using single-point power kit, evaporator with belt-drive blowers and indoor condensing unit

	208/230 - 1 Ph - 60 Hz		277 - 1 Ph - 60 Hz		208/230 - 3 Ph - 60 Hz		460 - 3 Ph - 60 Hz	
Base Evaporator Model Number	MM*24E	MM*36E	MM*24E	MM*36E	MM*24E	MM*36E	MM*24E	MM*36E
Condensing Unit Model Number	MC*24A	MC*36A	MC*24A	MC*36A	MC*24A	MC*36A	MC*24A	MC*36A
Cooling Only								
FLA	22.9	28.6	18.3	23.0	n/a	19.9	n/a	9.2
WSA	25.8	32.5	20.7	26.6	n/a	22.8	n/a	10.6
OPD	35	45	30	40	n/a	30	n/a	15
with Electric Reheat								
FLA	47.9	53.6	40.0	44.7	n/a	36.7	n/a	17.6
WSA	57.0	63.8	47.8	53.7	n/a	43.8	n/a	21.1
OPD	60	70	50	60	n/a	50	n/a	25
with SCR Reheat³								
FLA	52.1	70.3	43.6	59.1	n/a	60.8	n/a	21.3
WSA	62.3	84.7	52.3	71.7	n/a	67.9	n/a	25.8
OPD	70	90	60	80	n/a	70	n/a	30
with Humidifier								
FLA	29.3	35.0	24.0	28.7	n/a	26.3	n/a	12.6
WSA	32.2	38.9	26.4	32.3	n/a	29.2	n/a	14.0
OPD	40	50	35	45	n/a	40	n/a	15
with Electric Reheat and Humidifier								
FLA	47.9	53.6	40.0	44.7	n/a	36.7	n/a	17.6
WSA	57.0	63.8	47.8	53.7	n/a	43.8	n/a	21.1
OPD	60	70	50	60	n/a	50	n/a	25
with SCR Reheat and Humidifier³								
FLA	58.5	76.7	49.3	64.8	n/a	50.4	n/a	24.7
WSA	68.7	91.1	58.0	77.4	n/a	59.3	n/a	29.2
OPD	70	100	70	80	n/a	60	n/a	30

* Specify disconnect or no disconnect

Notes:

1. Belt drive data includes externally mounted high static blower box, powered from evaporator unit.
2. Use MM*24E and MM*36E for MM*24K & MM*36K, respectively, except with SCR reheat.
3. SCR Reheat not available with MM*24K or MM*36K.

Table 24 Electrical data, 50Hz air-cooled systems using single-point power kit, evaporator with direct-drive blowers and indoor condensing unit

	220/240 - 1 Ph - 50 Hz		380/415 - 3 Ph - 50 Hz	
Base Evaporator Model Number	MM*23E	MM*35E	MM*23E	MM*35E
Condensing Unit Model Number	MC*23A	MC*35A	MC*23A	MC*35A
Cooling Only				
FLA	16.0	22.9	7.1	9.2
with Electric Reheat				
FLA	41.0	47.9	16.8	18.9
with SCR Reheat ²				
FLA	45.2	64.6	16.8	23.1
with Humidifier				
FLA	22.4	29.3	10.8	12.9
with Electric Reheat and Humidifier				
FLA	41.0	47.9	16.8	18.9
with SCR Reheat and Humidifier ²				
FLA	51.6	71.0	20.5	26.8

* Specify disconnect or no disconnect

Notes:

1. Use MM*23E and MM*35E for MM*23K & MM*35K, respectively, except with SCR reheat.
2. SCR Reheat not available with MM*23K or MM*35K.

Table 25 Electrical data, 50Hz air-cooled systems using single-point power kit, evaporator with belt-drive blowers and indoor condensing unit

	220/220 - 1 Ph - 50 Hz		380/415 - 3 Ph - 50 Hz	
Base Unit Model Number	MM*23E	MM*35E	MM*23E	MM*35E
Condensing Unit Model Number	MC*23A	MC*35A	MC*23A	MC*35A
Cooling Only				
FLA	20.2	27.1	8.3	10.4
with Electric Reheat				
FLA	45.2	52.1	18.0	20.1
with SCR Reheat ³				
FLA	49.4	68.8	18.0	24.3
with Humidifier				
FLA	26.6	33.5	12.0	14.1
with Electric Reheat and Humidifier ³				
FLA	45.2	52.1	18.0	20.1
with SCR Reheat and Humidifier				
FLA	55.8	75.2	21.7	28.0

* Specify disconnect or no disconnect

Notes:

1. Belt drive data includes externally mounted high static blower box, powered from evaporator unit.
2. Use MM*23E and MM*35E for MM*23K & MM*35K, respectively, except with SCR reheat.
3. SCR Reheat not available with MM*23K or MM*35K.

Table 26 Electrical data, 60Hz water/glycol-cooled systems using single-point power kit, evaporator with direct-drive blowers and indoor condensing unit

	208/230 - 1 Ph - 60 Hz		277 - 1 Ph - 60 Hz		208/230 - 3 Ph - 60 Hz		460 - 3 Ph - 60 Hz	
Base Unit Model Number	MM*24E	MM*36E	MM*24E	MM*36E	MM*24E	MM*36E	MM*24E	MM*36E
Condensing Unit Model Number	MC*26W	MC*38W	MC*26W	MC*38W	MC*26W	MC*38W	MC*26W	MC*38W
Cooling Only								
FLA	14.2	18.5	11.9	16.6	n/a	14.2	n/a	7.1
WSA	17.1	22.4	14.3	20.2	n/a	17.1	n/a	8.5
OPD	25	35	20	30	n/a	25	n/a	15
with Electric Reheat								
FLA	39.2	43.5	33.6	38.3	n/a	31.0	n/a	15.5
WSA	48.3	53.7	41.4	47.3	n/a	38.1	n/a	19.0
OPD	50	60	45	50	n/a	45	n/a	20
with SCR Reheat ²								
FLA	43.4	60.2	37.2	52.7	n/a	38.3	n/a	19.2
WSA	53.6	74.6	45.9	65.3	n/a	47.2	n/a	23.7
OPD	60	80	50	70	n/a	50	n/a	25
with Humidifier								
FLA	20.6	24.9	17.6	22.3	n/a	20.6	n/a	10.5
WSA	23.5	28.8	20.0	25.9	n/a	23.5	n/a	11.9
OPD	30	40	25	40	n/a	30	n/a	15
with Electric Reheat and Humidifier								
FLA	39.2	43.5	33.6	38.3	n/a	31.0	n/a	15.5
WSA	48.3	53.7	41.4	47.3	n/a	38.1	n/a	19.0
OPD	50	60	45	50	n/a	45	n/a	20
with SCR Reheat and Humidifier ²								
FLA	49.8	66.6	42.9	58.4	n/a	44.7	n/a	22.6
WSA	60.0	81.0	51.6	71.0	n/a	53.6	n/a	27.1
OPD	60	90	60	80	n/a	60	n/a	30

* Specify disconnect or no disconnect

Notes:

1. Use MM*24E and MM*36E for MM*24K & MM*36K, respectively, except with SCR reheat.
2. SCR Reheat not available with MM*24K or MM*36K.

Table 27 Electrical data, 60Hz water/glycol-cooled systems using single-point power kit, evaporator with belt-drive blowers and indoor condensing unit

	208/230 - 1 Ph - 60 Hz		277 - 1 Ph - 60 Hz		208/230 - 3 Ph - 60 Hz		460 - 3 Ph - 60 Hz	
Base Evaporator Model Number	MM*24E	MM*36E	MM*24E	MM*36E	MM*24E	MM*36E	MM*24E	MM*36E
Condensing Unit Model Number	MC*26W	MC*38W	MC*26W	MC*38W	MC*26W	MC*38W	MC*26W	MC*38W
Cooling Only								
FLA	20.6	24.9	16.0	20.7	n/a	16.2	n/a	7.8
WSA	23.5	28.8	18.4	24.3	n/a	19.1	n/a	9.2
OPD	30	40	25	35	n/a	30	n/a	15
with Electric Reheat								
FLA	45.6	49.9	37.7	42.4	n/a	33.0	n/a	16.2
WSA	54.7	60.1	45.5	51.4	n/a	40.1	n/a	19.7
OPD	60	70	50	60	n/a	45	n/a	20
with SCR Reheat³								
FLA	49.8	66.6	41.3	56.8	n/a	40.3	n/a	19.9
WSA	60.0	81.0	50.0	69.4	n/a	49.2	n/a	24.4
OPD	60	90	60	70	n/a	50	n/a	25
with Humidifier								
FLA	27.0	31.3	21.7	26.4	n/a	22.6	n/a	11.2
WSA	29.9	35.2	24.1	30.0	n/a	25.5	n/a	12.6
OPD	40	50	30	40	n/a	35	n/a	15
with Electric Reheat and Humidifier								
FLA	45.6	49.9	37.7	42.4	n/a	33.0	n/a	16.2
WSA	54.7	60.1	45.5	51.4	n/a	40.1	n/a	19.7
OPD	60	70	50	60	n/a	45	n/a	20
with SCR Reheat and Humidifier³								
FLA	56.2	73.0	47.0	62.5	n/a	46.7	n/a	23.3
WSA	66.4	87.4	55.7	75.1	n/a	55.6	n/a	27.8
OPD	70	90	60	80	n/a	60	n/a	30

* Specify disconnect or no disconnect

Notes:

1. Belt drive data includes externally mounted high static blower box, powered from evaporator unit.
2. Use MM*24E and MM*36E for MM*24K & MM*36K, respectively, except with SCR reheat.
3. SCR Reheat not available with MM*24K or MM*36K.

Table 28 Electrical data, 50Hz water/glycol-cooled systems using single-point power kit, evaporator with direct-drive blowers and indoor condensing unit

	220/240 - 1 Ph - 50 Hz		380/415 - 3 Ph - 50 Hz	
Base Evaporator Model Number	MM*23E	MM*35E	MM*23E	MM*35E
Condensing Unit Model Number	MC*25W	MC*37W	MC*25W	MC*37W
Cooling Only				
FLA	14.2	19.9	5.7	7.8
with Electric Reheat				
FLA	39.2	44.9	15.4	17.5
with SCR Reheat ²				
FLA	43.4	61.6	15.4	21.7
with Humidifier				
FLA	20.6	26.3	9.4	11.5
with Electric Reheat and Humidifier				
FLA	39.2	44.9	15.4	17.5
with SCR Reheat and Humidifier ²				
FLA	49.8	68.0	19.1	25.4

* Specify disconnect or no disconnect

Notes:

1. Use MM*23E and MM*35E for MM*23K & MM*35K, respectively, except with SCR reheat.
2. SCR Reheat not available with MM*23K or MM*35K.

Table 29 Electrical data, 50Hz water/glycol-cooled systems using single-point power kit, evaporator with belt-drive blowers and indoor condensing unit

	220/220 - 1 Ph - 50 Hz		380/415 - 3 Ph - 50 Hz	
Base Evaporator Model Number	MM*23E	MM*35E	MM*23E	MM*35E
Condensing Unit Model Number	MC*25W	MC*37W	MC*25W	MC*37W
Cooling Only				
FLA	18.4	24.1	6.9	9.0
with Electric Reheat				
FLA	43.4	49.1	16.6	18.7
with SCR Reheat ³				
FLA	47.6	65.8	16.6	22.9
with Humidifier				
FLA	24.8	30.5	10.6	12.7
with Electric Reheat and Humidifier				
FLA	43.4	49.1	16.6	18.7
with SCR Reheat and Humidifier ³				
FLA	54.0	72.2	20.3	26.6

* Specify disconnect or no disconnect

Notes:

1. Belt drive data includes externally mounted high static blower box, powered from evaporator unit.
2. Use MM*23E and MM*35E for MM*23K & MM*35K, respectively, except with SCR reheat.
3. SCR Reheat not available with MM*23K or MM*35K.

10.0 REFRIGERANT PIPING

Table 30 Refrigerant charge

Model #		Charge R-407C oz (kg)
60Hz	50Hz	
MM*24E/K	MM*23E/K	7 (0.198)
MM*36E/K	MM*35E/K	7 (0.198)
MC*24AL_H7	MC*23AL_H7	134 (3.80)
MC*36AL_H7	MC*35AL_H7	213 (6.04)
MC*26W__H7	MC*25W__H7	41 (1.16)
MC*38W__H7	MC*37W__H7	54 (1.54)
PFH027-_L7	PFH026-_L7	134 (3.80)
PFH027-_H7	PFH026-_H7	213 (6.04)
PFHZ27-_L7	PFHZ26-_L7	213 (6.04)
PFH037-_L7	PFH036-_L7	213 (6.04)
PFH037-_H7	PFH036-_H7	426 (12.08)
PFHZ37-_L7	PFHZ36-_L7	426 (12.08)

Table 31 Recommended refrigerant line sizes

Equivalent Length, ft (m)	2 Ton		3 Ton	
	Suction	Liquid	Suction	Liquid
50 (15.2)	7/8"	3/8"	7/8"	1/2"
100 (30.5)	7/8"	1/2"	1 1/8"	1/2"
150 (45.7)	7/8"	1/2"	1 1/8"	1/2"

Table 32 Pipe length and condenser elevation relative to evaporator

Nominal System Size Tons	Max. Equiv. Pipe Length ft. (m)	Maximum PFH Level Above Evaporator, ft. (m)	Maximum PFH Level Below Evaporator, ft. (m)
2	150 (45)	40 (12)	15 (4.6)
3	150 (45)	50 (15)	15 (4.6)

Maximum recommended total equivalent pipe length is 150 ft (46m). Suction and liquid lines may require additional specialty items when vertical lines exceed 20 ft. (6m) and/or condensing unit installation is more than 15 ft. (4.6m) below the evaporator. Contact Emerson Application Engineering for assistance.

Table 33 Line charges - refrigerant per 100 ft. (30m) of Type L copper tube

Line Size, O.D., in.	R-407C, lb/100 ft. (kg/30m)	
	Liquid Line	Suction Line
3/8	3.7 (1.7)	—
1/2	6.9 (3.1)	—
5/8	11.0 (5.0)	0.4 (0.2)
3/4	15.7 (7.1)	0.6 (0.3)
7/8	23.0 (10.4)	1.0 (0.4)
1-1/8	—	1.7 (0.7)
1-3/8	—	2.7 (1.1)

Table 34 Refrigerant charge in Liebert pre-charged R-407C line sets

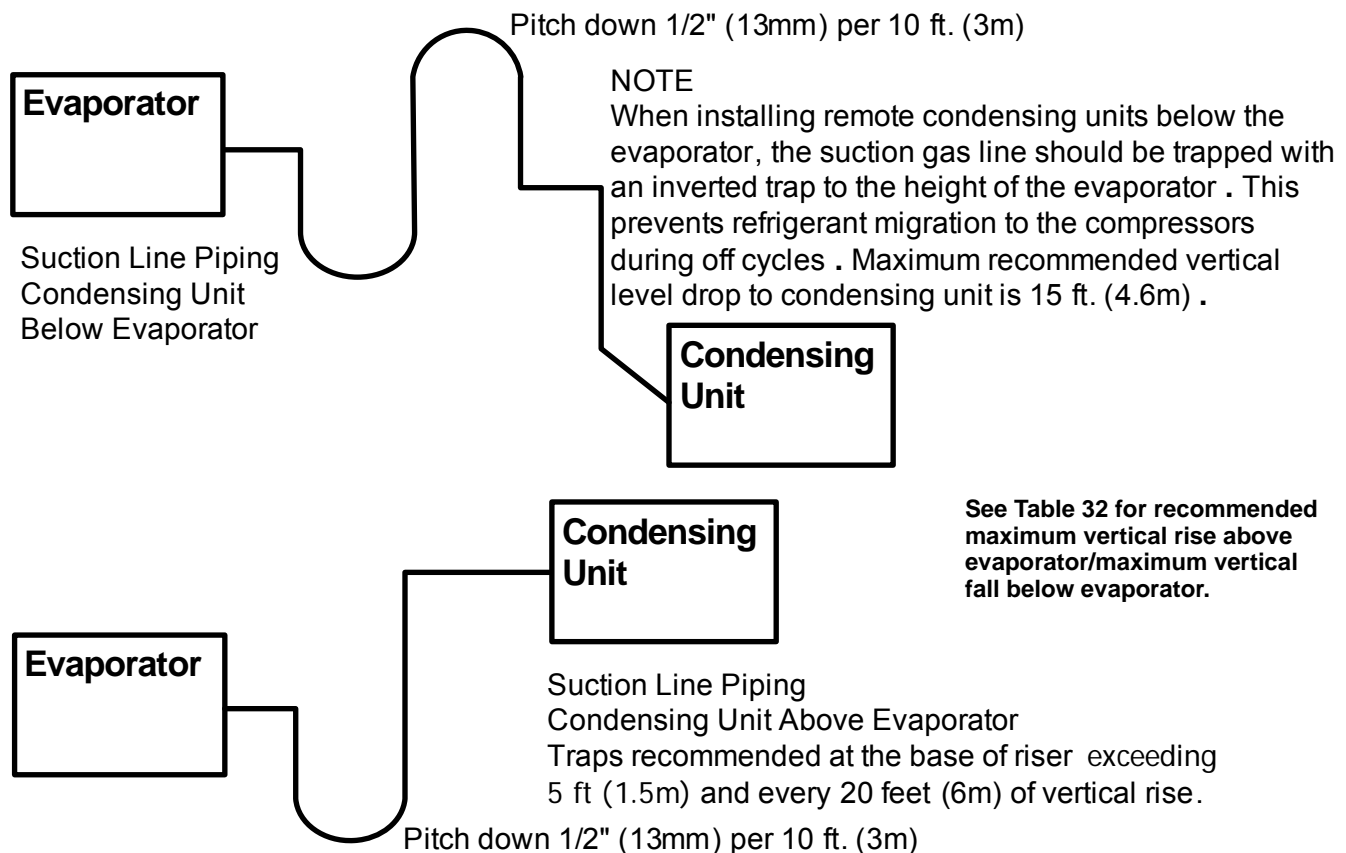
Line Size, in.	Length, ft. (m)	Charge R-407C, oz (kg)
3/8 liquid	15 (4.5)	5 (0.14)
	30 (9)	10 (0.28)
5/8 or 7/8 suction	15 (4.5)	5 (0.14)
	30 (9)	10 (0.28)

Table 35 Equivalent lengths for various pipe fittings, ft (m)

Copper Pipe OD, in.	90 Degree Elbow Copper	90 Degree Elbow Cast	45 Degree Elbow	Tee	Gate Valve	Globe Valve	Angle Valve
1/2	0.8 (0.24)	1.3 (0.39)	0.4 (0.12)	2.5 (0.76)	0.26 (0.07)	7.0 (2.13)	4.0 (1.21)
5/8	0.9 (0.27)	1.4 (0.42)	0.5 (0.15)	2.5 (0.76)	0.28 (0.08)	9.5 (2.89)	5.0 (1.52)
3/4	1.0 (0.3)	1.5 (0.45)	0.6 (0.18)	2.5 (0.76)	0.3 (0.09)	12.0 (3.65)	6.5 (1.98)
7/8	1.45 (0.44)	1.8 (0.54)	0.8 (0.24)	3.6 (1.09)	0.36 (0.1)	17.2 (5.24)	9.5 (2.89)
1-1/8	1.85 (0.56)	2.2 (0.67)	1.0 (0.3)	4.6 (1.4)	0.48 (0.14)	22.5 (6.85)	12.0 (3.65)
1-3/8	2.4 (0.73)	2.9 (0.88)	1.3 (0.39)	6.4 (1.95)	0.65 (0.19)	32.0 (9.75)	16.0 (4.87)
1-5/8	2.9 (0.88)	3.5 (1.06)	1.6 (0.48)	7.2 (2.19)	0.72 (0.21)	36.0 (10.97)	19.5 (5.94)

Refrigerant trap = Four times equivalent length of pipe per this table

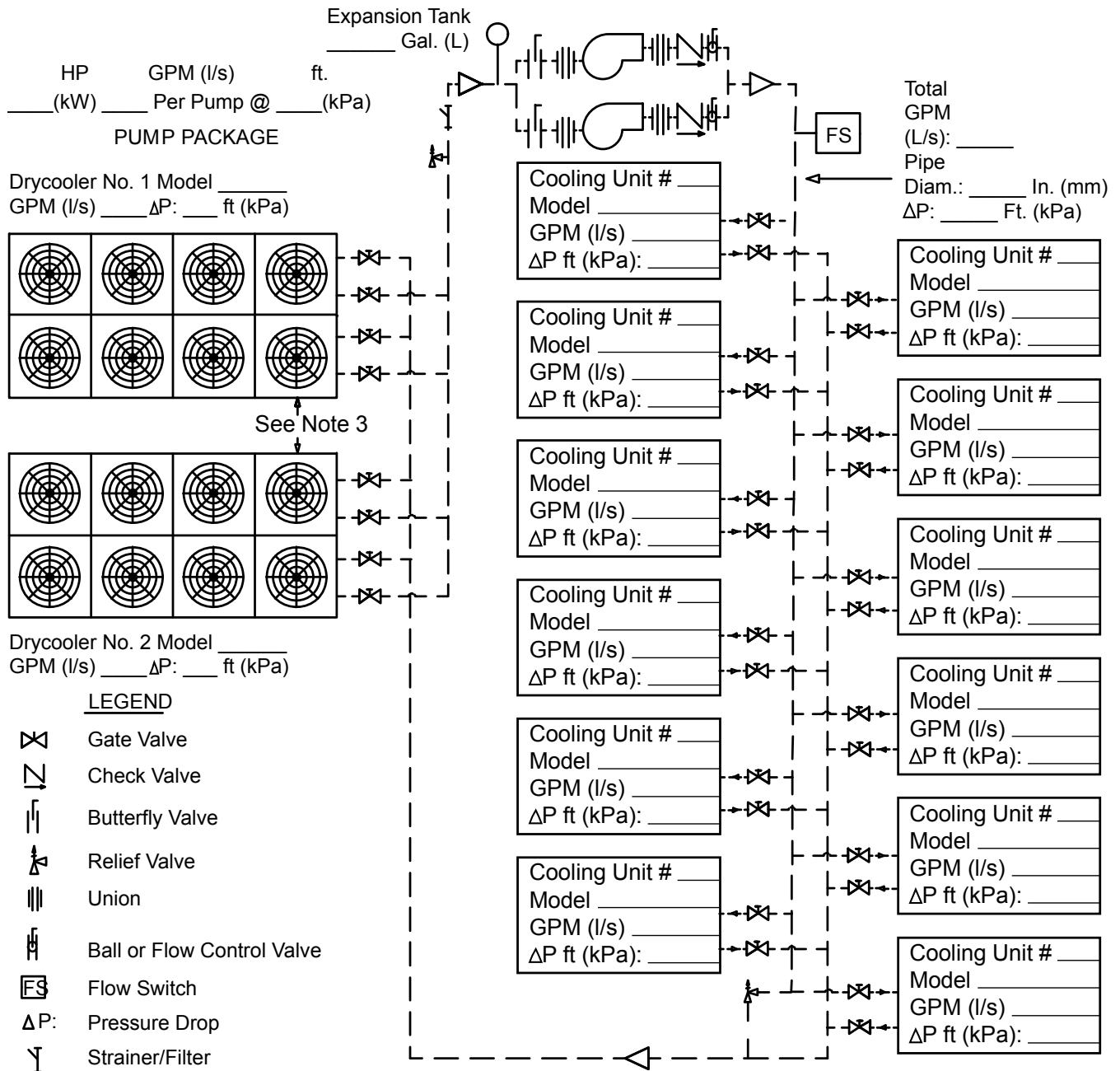
Figure 22 Refrigerant piping diagram



11.0 GLYCOL LOOP PIPING

Contact Emerson Application Engineering for assistance in choosing correct drycooler models. Refer to **Figure 23**.

Figure 23 Heat rejection loop, multiple drycoolers and multiple indoor units



- Notes:
1. Pressure and temperature gauges (or ports for same) are recommended to monitor component pressure drops and performance.
 2. Flow measuring devices, drain and balancing valves to be supplied by others and located as required.
 3. See product literature for installation guidelines and clearance dimensions.
 4. Drawing shows dual pump package. Alternate pump packages with more pumps may be considered; consult supplier

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12.0 MODEL NUMBER NOMENCLATURE—ALL SYSTEMS

Figure 24 Model number nomenclature—Evaporator units

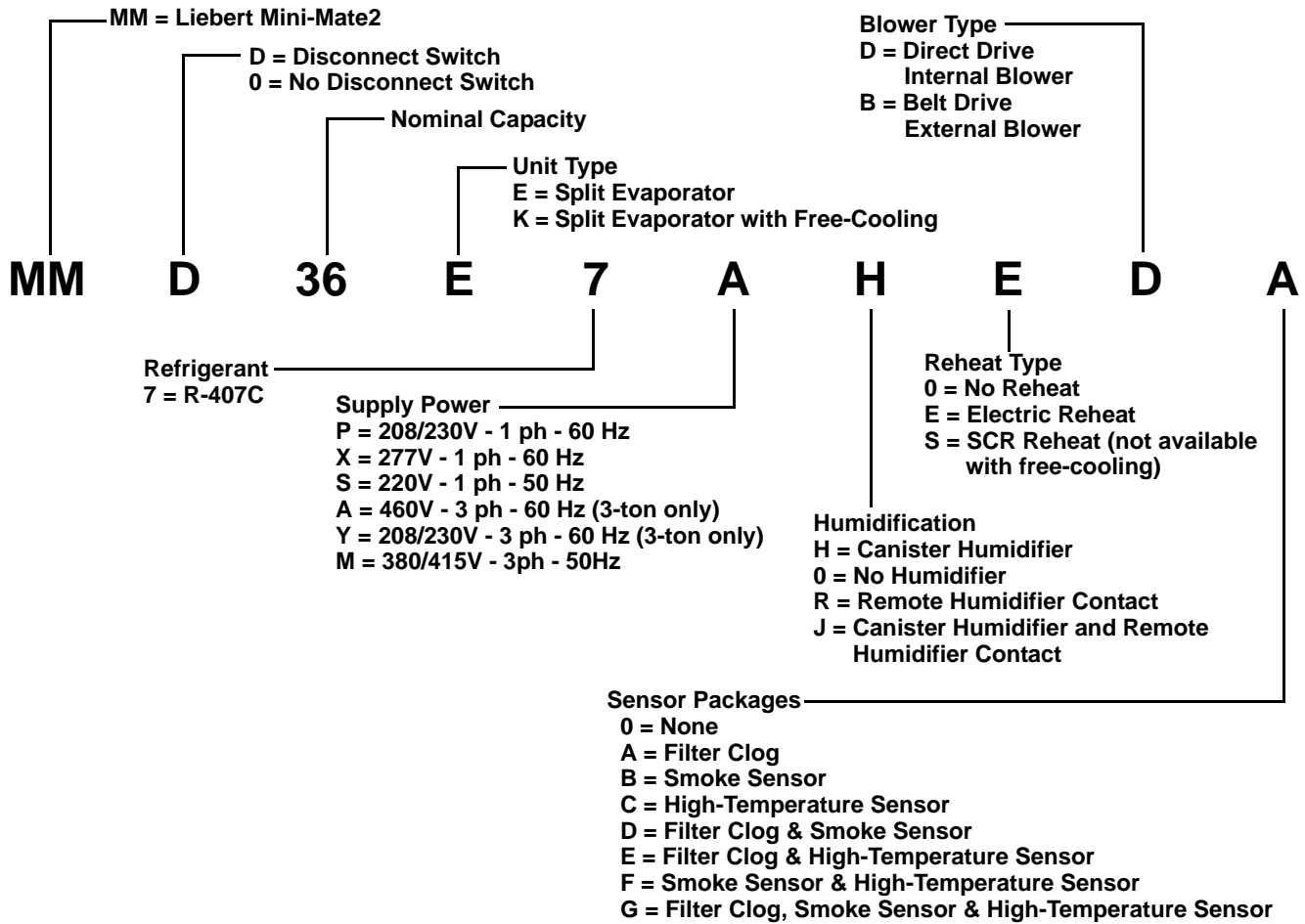


Figure 25 Model number nomenclature—Air-cooled, indoor condensing units

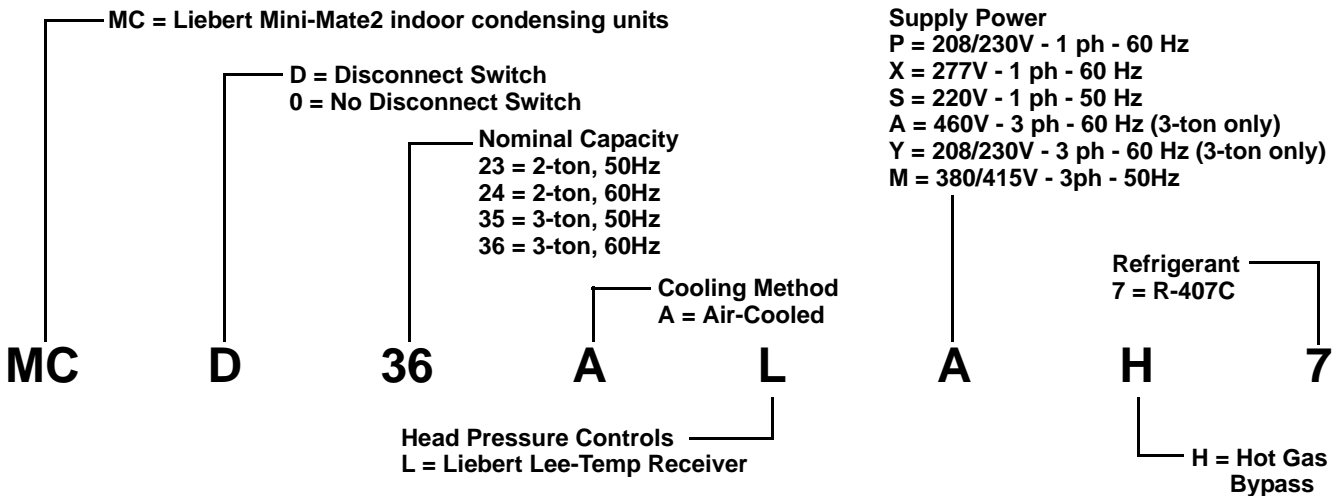


Figure 26 Model number nomenclature—Outdoor air-cooled prop fan condensing units

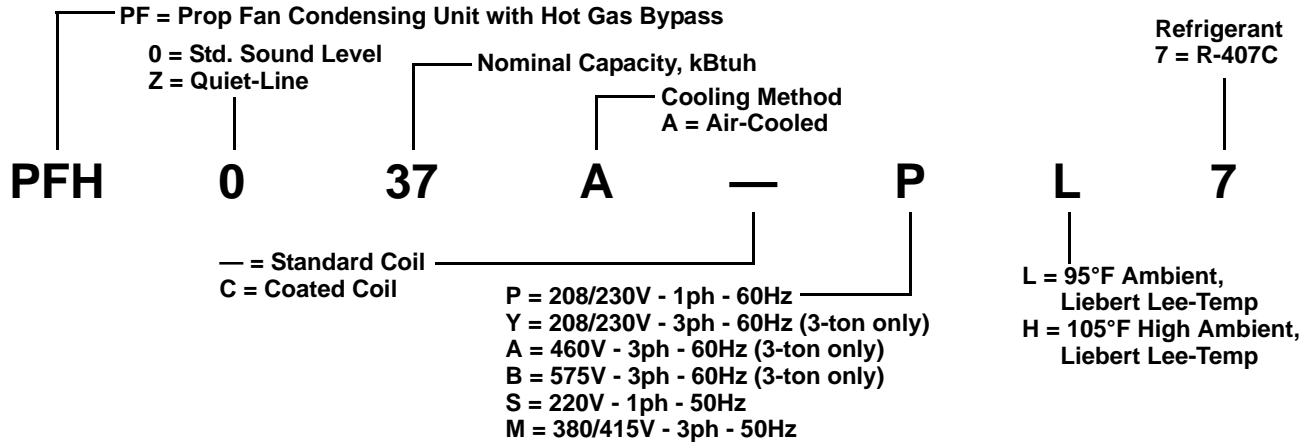


Figure 27 Model number nomenclature—Water/glycol-cooled condensing units

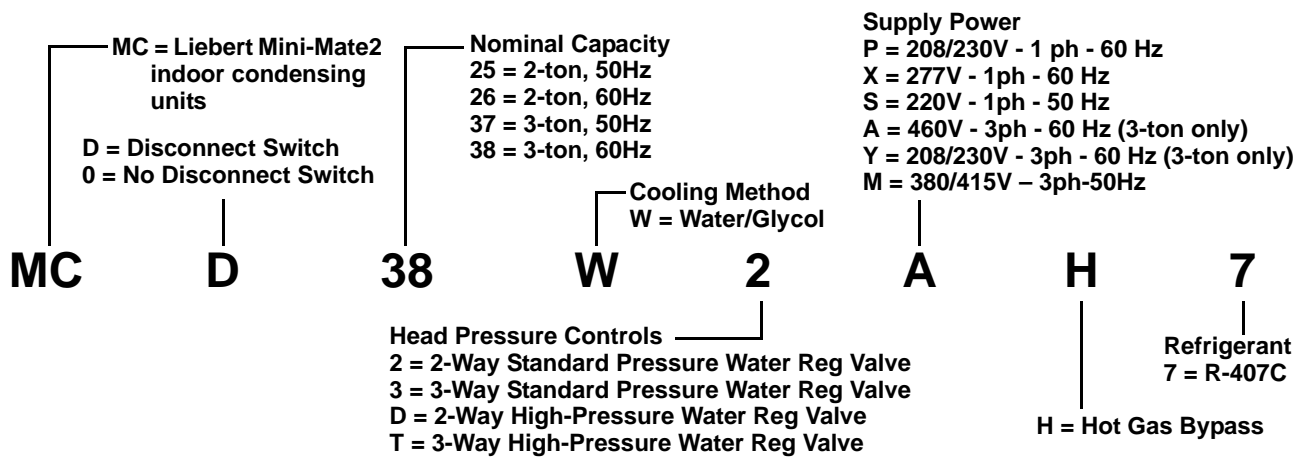
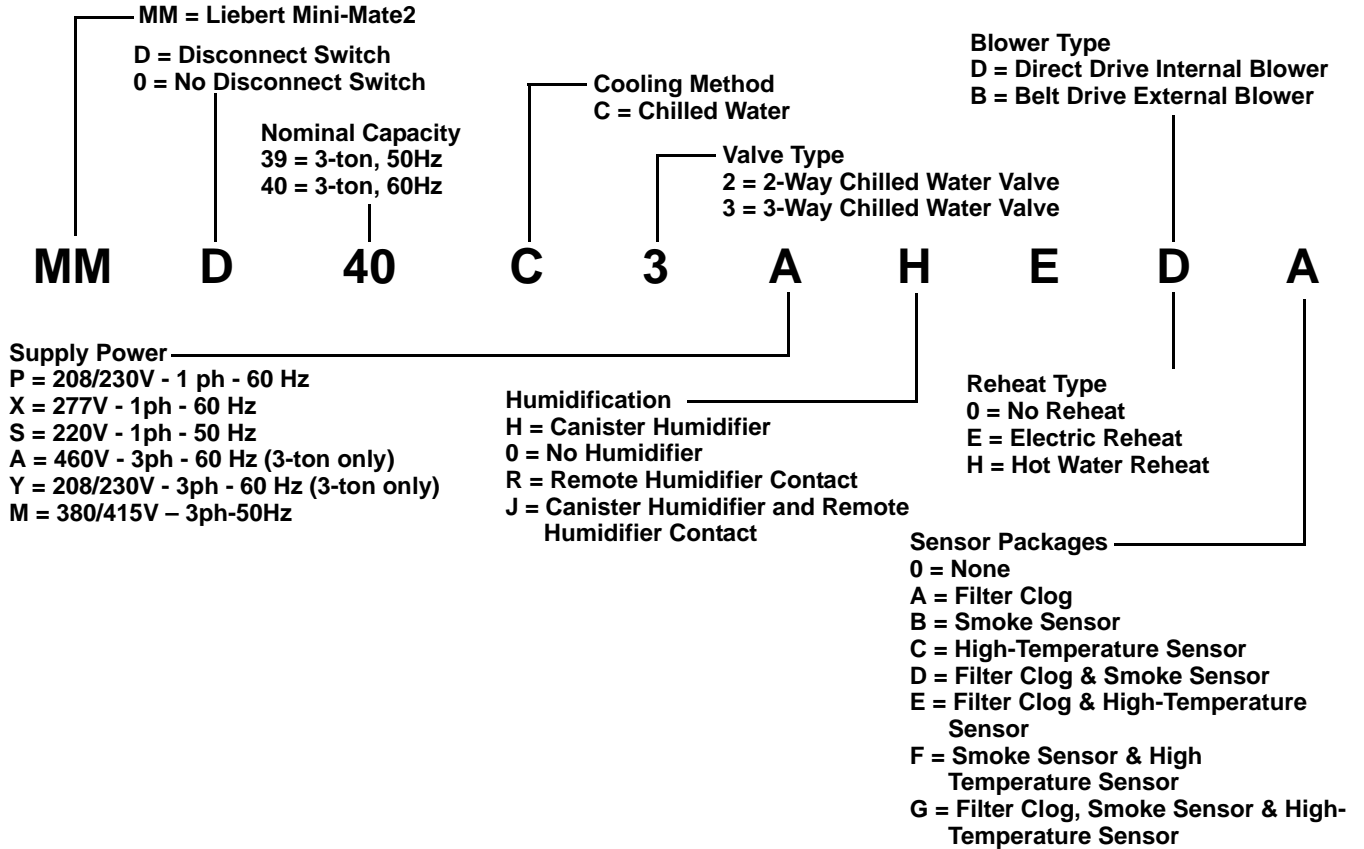


Figure 28 Model number nomenclature—Chilled water units



GUIDE SPECIFICATIONS FOR LIEBERT MINI-MATE2—2- AND 3-TON SYSTEMS

1.0 GENERAL

1.1 Summary

These specifications describe requirements for an environmental control system. The system shall be designed to control temperature and relative humidity conditions within the room.

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

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 (60Hz only).

The system model number(s) shall be:

Evaporator: _____

Condensing Unit: _____

Chilled Water Unit: _____

1.2 Design Requirements

The environmental control system shall be a Liebert Mini-Mate2 factory assembled unit. On direct expansion models, the refrigeration system shall be split, with the compressor located in a remote or close-coupled condensing unit.

The evaporator section shall be designed for above dropped-ceiling installation. Condensing units shall be designed for either outdoor or above-dropped-ceiling installation.

The system shall have a total cooling capacity of _____ BTU/hr (kW) and a sensible cooling capacity of _____ BTU/hr (kW), based on the entering air condition of _____ °F (°C) dry bulb and _____ °F (°C) wet bulb.

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

1.3 Submittals

Submittals shall be provided with the proposal and shall include: Dimensional, Electrical and Capacity data; and 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 1000 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.

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. Mounting brackets shall be factory-attached to the cabinet. Internal cabinet insulation shall meet ASHRAE 62.1 requirements for Mold Growth, Humidity & Erosion, tested per UL 181 and ASTM 1338 standards.

2.1.2 Air Distribution

The air distribution system shall be constructed with a quiet, direct-drive fan assembly equipped with double-inlet blower, self-aligning ball bearings and lifetime lubrication. Fan motor shall be permanent-split capacitor, high-efficiency type, equipped with two speeds for airflow modulation. Dehumidification shall utilize the lower fan speed.

Each system shall be capable of delivering _____ CFM (_____ CMH) at high fan speed. The circulating-air fan shall be two-speed for precise dehumidification control. The fan motor shall be _____ HP (_____ W).

System shall be suitable for plenum or ducted air distribution. Refer to 2.5.2 - Air Filter Box, 2.5.3 - Air Distribution Plenum and 2.5.4 - High Static Blower Assembly.

2.1.3 Microprocessor Control

The control system shall be microprocessor-based, factory-wired into the system and tested prior to shipment. The wall-mounted control enclosure shall include a 2-line by 16-character LCD providing continuous display of operating status and alarm condition. An 8-key membrane keypad for setpoint/program control, fan speed selection and unit On/Off shall be located below the display. The control display shall be field-wired to the control board using 4-conductor field-supplied thermostat wire.

Temperature and humidity sensors shall be located in the wall box, which shall be capable of being located up to 300 ft (91.4m) from the evaporator unit.

2.1.3.1 Monitoring

The LCD shall provide On/Off indication, operating mode indication (cooling, heating, humidifying, dehumidifying), fan speed indication and current day, time, temperature and humidity (if applicable) indication. The monitoring system shall be capable of relaying unit operating parameters and alarms to the Liebert SiteScan monitoring system.

2.1.3.2 Control Setpoint Parameters

- Temp. Setpoint 65-85°F (18-29°C)
- Temp. Sensitivity 1-9.9°F (1-5°C)
- Humidity Setpoint 20-80% RH
- Humidity Sensitivity 1-30% RH

2.1.3.3 Unit Controls

2.1.3.3.1 Compressor Short-Cycle Control

The control system shall prevent compressor short-cycling by a 3-minute timer from compressor stop to the next start.

2.1.3.3.2 Common Alarm and Remote On/Off

A common alarm relay shall provide a contact closure to a remote alarm device. Two (2) terminals shall also be provided for remote On/Off control. Individual alarms shall be “enabled” or “disabled” from reporting to the common alarm.

2.1.3.3.3 Setback Control

The control shall be user-configurable to use a manual setpoint control or a programmable, time-based setback control. The setback control will be based on a 5 day/2 day programmed weekly schedule with capability of accepting 2 events per program day.

2.1.3.3.4 Temperature Calibration

The control shall include the capabilities to calibrate the temperature and humidity sensors and adjust the sensor response delay time from 0 to 90 seconds. The control shall be capable of displaying temperature values in °F or °C.

2.1.3.3.5 System Auto Restart

For startup after power failure, the system shall provide automatic restart with a programmable (up to 9.9 minutes in 6-second increments) time delay. Programming can be performed either at the wall-mounted controller or from the central, site-monitoring system.

2.1.4 Alarms

2.1.4.1 Unit Alarm

The control system shall monitor unit operation and activate an audible and visual alarm in the event of the following factory preset alarm conditions:

- High Temperature
- Low Temperature
- High Humidity
- Low Humidity
- High Water Alarm - Lockout Unit Operation
- High Head Pressure
- Loss of Power
- Compressor Short Cycle

2.1.4.2 Custom Alarms (2x)

- Humidifier Problem
- Filter Clog
- Water Detected
- Smoke Detected

User-customized text can be entered for the two (2) custom alarms.

2.1.4.3 Alarm Controls

Each alarm (unit and custom) shall be separately enabled or disabled, selected to activate the common alarm (except for high head pressure).

2.1.4.4 Audible Alarm

The audible alarm shall annunciate any alarm that is enabled by the operator.

2.1.4.5 Common Alarm

A programmable common alarm shall be provided to interface user selected alarms with a remote alarm device.

2.1.4.6 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.

2.2 Direct Expansion System Evaporator Components

2.2.1 Direct Expansion Coil

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, 3 rows deep. It shall be constructed of copper tubes and aluminum fins and have a maximum face velocity of ____ fpm (m/s) at ____ CFM (CMH). An externally equalized thermostatic expansion valve shall control refrigerant flow. The evaporator coil shall be factory-charged with R-407C refrigerant and sealed. The evaporator unit can be coupled directly with a ceiling mounted condensing unit or mounted remote to the condensing unit.

The coil shall be provided with a stainless steel drain pan, with an internally trapped drain line.

2.2 Chilled Water System Components

2.2.1 Chilled Water Control Valve

The control valve shall be a motorized, slow-close On/Off type to reduce water hammer. Design pressure shall be 300 psig (2068 kPa) static pressure, with a maximum close-off pressure of 60 psig (414 kPa). Valve shall be non-spring return.

2.2.2 Chilled Water Coil

The cooling coil shall have a minimum of 3.1 sq.ft. (0.29 sq.m) face area, 3 rows deep. It shall be constructed of copper tubes and aluminum fins and have a maximum face velocity of 391 fpm (2.0 m/s) at 1250 CFM (2124 CMH). The coil shall be supplied with 45°F (7.2°C) entering water temperature. The coil shall be supplied with _____ GPM (l/s) of chilled water and the pressure drop shall not exceed _____ PSI (kPa). The coil assembly shall be mounted in a stainless steel condensate drain pan.

2.3 Indoor Air-Cooled Centrifugal Fan Condensing Unit

Condensing unit components shall include condenser coil, scroll compressor, high-pressure switch, Liebert Lee-Temp refrigerant receiver, head pressure control valve, hot gas bypass system and liquid line solenoid valve. The hot gas bypass circuit shall be provided to reduce compressor cycling and improve operation under low-load conditions.

All components shall be factory-assembled, charged with R-407C refrigerant and sealed. No internal piping, brazing, dehydration or charging shall be required. Condensing unit shall be designed for 95°F (35°C) ambient and be capable of operation to -30°F (-34°C). The condensing unit can be mounted directly to the evaporator or can be mounted remote to the evaporator.

The condensing coil shall be constructed of copper tubes and aluminum fins. The condenser fan shall be centrifugal type, double inlet, direct drive and shall operate at 1050 RPM (890 RPM @ 50 Hz). The fan and motor shall be mounted on vibration isolators. The condenser fan shall be designed for _____ CFM (CMH) at _____" (mm) w.g. external static pressure.

2.3 Outdoor Air-Cooled Prop Fan Condensing Unit

Condensing unit components shall include a condenser coil, a direct-drive propeller-type fan, a scroll compressor, high-pressure switch, Liebert Lee-Temp receiver and head pressure control valve, hot gas bypass system and liquid line solenoid valve. A hot gas bypass system shall be provided to reduce compressor cycling and improve operation under low load conditions.

All components shall be factory-assembled, charged with R-407C refrigerant and sealed. No internal piping, brazing, dehydration or charging shall be required. Condensing unit shall be designed for 95°F (35°C) ambient and be capable of operation to -30°F (-34.4°C).

The condenser coil shall be constructed of copper tubes and aluminum fins.

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

(Option) The outdoor condensing unit shall be designed for design ambient operation of 105°F (40.6°C).

2.3 Indoor Water/Glycol-Cooled Condensing Unit

The water/glycol condensing unit shall include a scroll compressor, high-pressure switch, coaxial condenser, water-regulating valve, hot gas bypass system and liquid line solenoid valve. A hot gas bypass circuit shall be provided to reduce compressor cycling and improve operation under low-load conditions. All components shall be factory-assembled, charged with R-407C refrigerant and sealed. No internal piping, brazing dehydration or charging shall be required.

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) (3-way)] regulating valve which is head-pressure actuated.

The condenser water/glycol circuit shall be designed for a static operating pressure of [(150 PSI (1034kPa)) (350 PSI (2413 kPa))].

2.4 Factory-Installed Options

2.4.1 Steam Generating Humidifier

The environmental control 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" (25.4mm) air gap on fill line, inlet strainer, steam distributor and electronic controls. The need to change canister shall be annunciated on the microprocessor wall box control panel. The humidifier shall have a capacity of 4.3 lb/hr (2.0 kg/h). An LED light on the humidifier assembly shall indicate cylinder full, overcurrent detection, fill system fault and end of cylinder life conditions.

2.4.2 Electric Reheat

The electric reheat shall be low-watt density, 304/304 stainless steel, finned-tubular and shall be capable of maintaining room dry bulb temperature conditions when the system is calling for dehumidification. The reheat section shall include a UL-approved 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.

2.4.3 Hot Water Reheat

The hot water reheat coil shall have copper tubes and aluminum fins with a capacity of _____ BTU/HR (kW) when supplied with _____ °F (°C) entering water temperature at _____ GPM (l/s) flow rate. Maximum pressure drop shall be _____ PSI (kPa). The control system shall be factory prepiped with a 2-way solenoid valve and cleanable Y-strainer. The hot water reheat coil shall only be available on chilled water units.

2.4.4 SCR Electric Reheat

The electric reheat shall be low-watt density, 304/304 stainless steel, finned-tubular and shall be capable of maintaining room dry bulb conditions when the system is calling for dehumidification. The reheat section shall include a UL-approved safety switch to protect the system from overheating.

The SCR (Silicon Controlled Rectifier) controller shall proportionally control the reheat elements to maintain the selected room temperature. The rapid cycling made possible by the SCR controller provides precise temperature control, and the more constant element temperature improves heater life. The unit microprocessor control shall operate the SCR controller, while cooling is locked on. The capacity of the reheat coils shall be _____ BTU/HR (kW), with input voltage of _____ V. Not available on chilled water or free-cooling units.

2.4.5 Disconnect Switch, Non-Locking

The non-automatic, non-locking, molded case circuit interrupter 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.

2.4.6 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.

2.4.7 Smoke Sensor

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

2.4.8 Filter Clog Switch

The filter clog switch senses pressure drop across the filters and shall annunciate the wall box display upon exceeding the adjustable setpoint.

2.4.9 Free-Cooling/Dual Cooling Coil

A free-cooling coil shall be integral to the evaporator cabinet, and shall be constructed of copper tubes and aluminum fins. The coil shall be rated at _____ BTU/HR (kW) sensible cooling capacity with a 45°F (22°C), ___% glycol solution. The coil shall require _____ GPM (l/s) and the total unit pressure drop shall not exceed _____ feet of water (kPa) when in the free cooling mode. Free-cooling shall be activated by a temperature stat and shall include factory-piped three-way valve and separate supply and return piping.

Coil is designed for closed-loop applications using properly treated and circulated fluid. Not available with SCR reheat. An optional Cu-Ni coil is required to prevent premature corrosion if applied to open water tower loop.

A heat exchanger and pump shall be field-supplied to isolate the open water tower loop from the free-cooling loop.

2.5 Ship-Loose Accessories

2.5.1 Remote Sensors

The unit shall be supplied with remote temperature and humidity sensors. The sensors shall be connected to the unit by a _____ ft. (m) shielded cable.

2.5.2 Air Filter Box

The evaporator section shall be supplied with an air filter box for use with ducted installations. The filter shall be 4" x 20" x 20" (102mm x 508mm x 508mm), deep-pleated type, with a MERV 8 rating based on ASHRAE 52.2.

2.5.3 Air Distribution Plenum

The evaporator section shall be supplied with an air distribution plenum with integral filter. The plenum shall be 24" x 48" (610mm x 1219mm) in size and shall provide 4-way air distribution, for installation into a standard 24" x 48" (610mm x 1219mm) ceiling grid. Filter size shall be 4" x 16" x 25" (102 mm x 406mm x 535 mm), deep pleated type with MERV 8 rating, based on ASHRAE 52.2.

2.5.4 High Static Blower Assembly

A blower box shall be field attached to the evaporator to provide up to 2.0" (51mm) of external static pressure on the discharge side of the evaporator. The blower box shall contain a centrifugal type, double inlet blower, with belt drive and single speed motor, mounted to an adjustable motor base.

2.5.5 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 and reservoir.

2.5.6 Refrigerant Line Sets

Pre-charged refrigerant line sets shall be provided by Emerson in proper lengths for application. Line set length shall be [(15 ft. (4.5m)) (30 ft. (9m))].

2.5.7 Refrigerant Line Sweat Adapter Kit

Provide a sweat adapter kit to permit field brazing of refrigerant line connections.

2.5.8 Single Point Power Kit

A Single Point Power Kit shall be provided for a close-coupled system to allow a single electrical feed to supply power to both the evaporator and condensing unit.

2.5.9 Step-Down Transformer

A step-down transformer shall be provided for Outdoor Condensing Unit needing 277V input power voltage. The transformer shall be coated with epoxy and contained in an enclosed, non-ventilated electrical box with adaptable mounting brackets, suitable for outdoor mounting.

2.5.10 Liebert SiteScan Site Monitoring System

A Liebert SiteScan Site Monitoring System Model _____ shall be provided for remote monitoring of the Mini-Mate2 unit and monitoring of other Liebert support equipment. The Liebert SiteScan shall have the capability to monitor and change (at the user direction) the temperature and humidity setpoints and sensitivities of each unit. The printer shall provide the user with chronological alarm information. It shall also be capable of being programmed to print out environmental conditions or operating modes at each unit.

2.5.11 Drycooler

The Liebert drycooler shall be a low-profile, direct-drive propeller fan-type air-cooled unit. The drycooler shall be constructed with an aluminum cabinet and a copper-tube aluminum fin coil and multiple direct drive fans. All electrical connections and controls shall be enclosed in an integral weather resistant electric control panel section of the drycooler. The unit is quiet and corrosion-resistant.

The drycooler shall be designed for _____°F (°C) ambient.

2.5.12 Glycol Pump Package

The system shall include a centrifugal pump mounted in a weatherproof and vented enclosure. The pump shall be rated for _____ gpm (l/s) at _____ ft. (kPa) of head, and shall operate on _____ volt, _____ phase, _____ Hz.

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 in location indicated, and maintain manufacturer's recommended clearances.

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.

3.1.5 Field-Supplied Pan

A field-supplied pan with drain shall be installed beneath cooling units installed without air distribution plenum and beneath water/glycol condensing units.

3.1.6 Field Quality Control

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

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