



M SERIES REFRIGERANT COIL MODULE

REFRIGERANT COILS for R-22, R-407C, R-410A

Bulletin 20-020.2

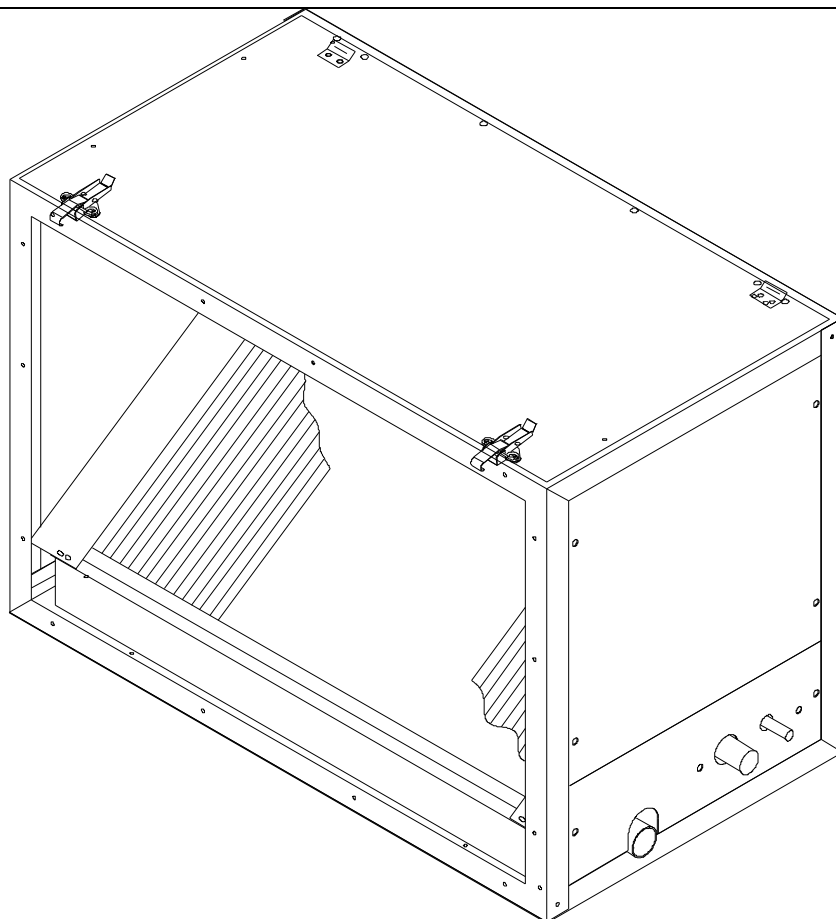


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Certified to UL Standard 1995
Conforms to CAN/CSA Standard C22.2 NO. 236



Unico products comply with the European
regulations that guarantee product safety.

MODEL NUMBER KEY

M 2430 C L 1 - A -
 ① ② ③ ④ ⑤ ⑥ ⑦

- ① Unit Type
M = Modular
- ② Nominal Capacity
1218 = 12000 to 18000 Btu/hr
(3.5 to 5.3 kW)
2430 = 24000 to 30000 Btu/hr
(7.0 to 8.8 kW)
3036 = 30000 to 36000 Btu/hr
(8.8 to 10.5 kW)
3642 = 36000 to 42000 Btu/hr
(10.5 to 12.3 kW)
4860 = 48000 to 60000 Btu/hr
(14.0 to 17.5 kW)
- ③ Module Type
C = Coil
- ④ Configuration
L = Left-hand connection
- ⑤ Revision
1, 2, 3, etc.
- ⑥ Coil Style, TXV Option
A = C style coil without TXV
B = C style coil with R410A TXV
D = H style coil without TXV
E = H style coil with R410A TXV
- ⑦ Paint Color
(blank) = None
1 = White

* A cross-reference chart listing current and past model numbers is available at the end of this bulletin.

PACKING LIST

Package includes:

- (1) – Coil Module
- (1) – Defrost relay
- (1) – Thermostatic expansion valve (–B and –E models only)
- (1) – Liquid Line, 3/8-inch (9.5mm) OD
- (1) – Spacer Module (M4860CL1 only)
- (1) – PVC Condensate Trap

GENERAL INFORMATION

Unico System designed and built evaporator coil modules can be easily installed with the matching *Unico System* blower modules. See coil/blower match-up table below. The evaporator can be matched to most types of remote condensing units and heat pumps. All coils are designed for both heat pump and cooling-only applications. Check the AHRI directory for compatibility, capacity, and efficiency ratings (www.ahrinet.org).



Figure 1. Refrigerant Coil Module with cut-away (H-style shown).

Matching Blower/Heating Modules

Evaporator Coil Prefix	Matching Blower Module Prefix	Matching Hot Water Coil Module Prefix
M1218CL1	M1218BL1	M1218CL1
M2430CL1	M2430BL1	M2430CL1
M3036CL1	M3036BL1	M3036CL1
M3642CL1	M3642BL1	M3642CL1
M4860CL1	M4860BL1	M4860CL1

FEATURES

- Slant coil for M1218, M2430, M3036, M3642 for vertical or horizontal airflow applications. A-coil for M4860.
- Internally mounted TXV easily accessible
- Compatible with R-22/407C/410A refrigerants
- Standard *Unico System* 'latch' system
- High efficiency heat transfer surface
- Temperature limit switch to prevent freezing

TYPICAL APPLICATION

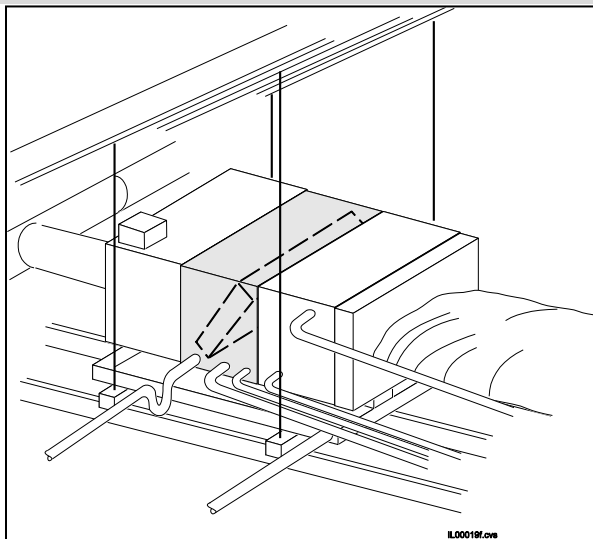


Figure 2. Horizontal installation with *Unico System* Heating Module and Blower Module

CONTROLS

Each coil is supplied with an anti-frost switch mounted directly on the return bends to prevent the formation of ice during cooling operation. For heat pump applications, a 24-volt relay switch is included that bypasses the anti-frost switch during the heating mode. This switch is packed loose inside the module for field installation in the space provided in the control box.

Some models are supplied with an expansion valve (See Model Number Key on page 1). The expansion valves are suitable for both air-conditioning and heat pump applications. They feature an internal check valve for proper operation in the heating mode. In addition, the valves employ mechanical threaded connections (Chatleff style) for easy installation. All cooling-only valves include an inlet strainer.

CABINET CONSTRUCTION

The cabinet is constructed of 22 gauge (0.030 in, 0.76 mm) galvanized steel with removable access panels on both sides for ease of service. All access panels are secured with slotted hex head washer screws and hardened steel U-clip nuts to prevent stripping. The cabinet is fully lined with closed cell insulation and does not contain fiberglass insulation. Easy snap latches are included for quick field assembly with the matching modules. See dimensional drawing below for additional information

COIL CONSTRUCTION

Unico-designed coils are constructed of evenly spaced aluminum fins mechanically bonded to copper tubes. The tubes are 3/8" (9 mm) diameter. Full fin collars provide the greatest tube-fin contact for excellent heat transfer. All coils are slanted, except the M4860 models, which feature an 'A' shaped coil to provide the maximum amount of heat transfer surface.

The coil is pressurized and then factory leak tested. The drain pan is constructed of stainless steel for maximum corrosion protection with a 3/4" (19 mm) FPT drain connection. All refrigerant lines are sweat connections that extend outside of the cabinet.

REFRIGERANT COIL MODULE SPECIFICATIONS FOR: M1218, M2430, M3036, M3642

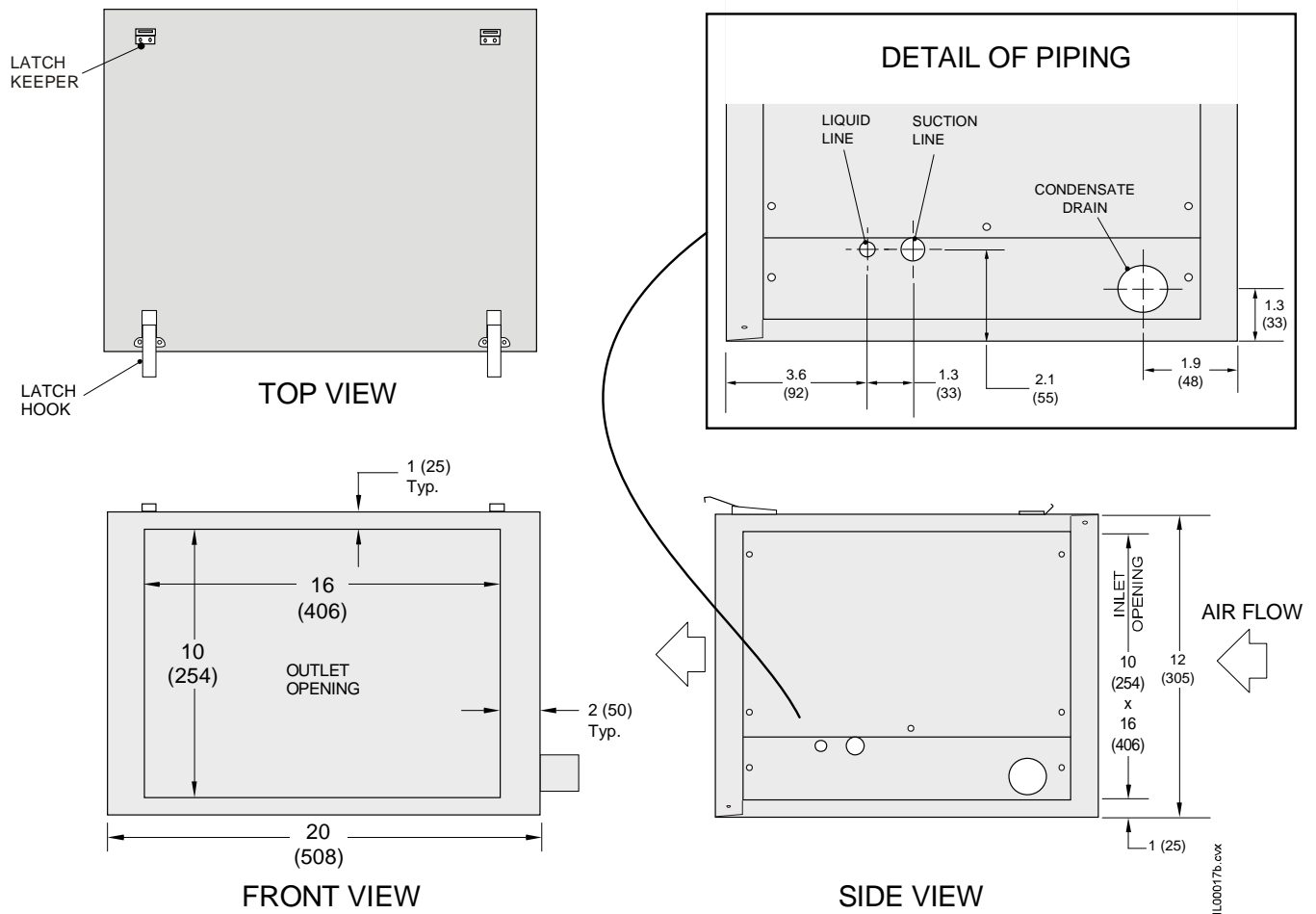
System Type			C Style Coil			
Model No.			M1218CL1-A	M2430CL1-A M2430CL1-B	M3036CL1-A M3036CL1-B	M3642CL1-A M3642CL1-B
Evaporator Coil Properties	Compatible Condenser Size [Ton, (kW)]		1.0-1.5 (3.5-5)	2.0-2.5 (7.0–8.8)	2.5-3.0 (8.8-10.5)	3.0-3.5 (10.5–12.3)
	Net Face Area [ft² (m²)]		1.17 (0.11)	2.13 (0.20)	2.34 (0.22)	3.48 (0.32)
	Tube diameter [in., (mm)]		3.8 (9.5)			
	Fin Density [fins/in., (fins/m)]		15 (590)	14 (551)		
	Number of rows		6	4		
	Design Pressure [psig.(kPa)]		500 (3447)			
	TX Valve Part No.	R-22/R-407C	A00808-001	A00808-002	A00808-004	
		R-410A	A00808-011	A00808-013	A00808-014	
	Suction line O.D. [in., (mm)]	-A	1/2 Male Flare			
		-B	5/8 (15.9)	7/8 (22.2)		
	Liquid line OD [in. (mm)]		3/8 (9.5)			
	Liquid Line Part Number		A00392-002	A01023-001		
	Condensate Connection, FPT [in., (mm)]		1/2 (13)	3/4 (19)		
	Refrigerant Type		R-22, R-407C, R-410A			
Coil Shipping Weight [lbs., (kg)]		33 (15)	60 (28)	70 (32)	78 (36)	
Expansion Device*		None	TXV with internal Check Valve*			
Cabinet Dimensions		A	-	25.0 (635)	30.0 (762)	38.0 (965)
		B	-	23.0 (584)	28.0 (711)	36.0 (915)
		C	-	20.0 (508)	25.0 (635)	33.0 (838)

* TXV shipped loose. Sold separately for -A models.

System Type			H Style Coil			
Model No.			M1218CL1-E	M2430CL1-E	M3036CL1-E	M3642CL1-E
Evaporator Coil Properties	Compatible Condenser Size [Ton, (kW)]		1.0-1.5 (3.5-5)	2.0-2.5 (7.0–8.8)	2.5-3.0 (8.8-10.5)	3.0-3.5 (10.5–12.3)
	Net Face Area [ft² (m²)]		1.17 (0.11)	2.13 (0.20)	2.65 (0.25)	3.48 (0.32)
	Tube diameter [in., (mm)]		3/8 (9.5)			
	Fin Density [fins/in., (fins/m)]		15 (590)	15.5 (610)		
	Number of rows		6			
	Design Pressure [psig.(kPa)]		500 (3447)			
	TX Valve Part No.	R-22/R-407C	A00808-001	A00808-002	A00808-004	
		R-410A	A00808-011	A00808-013	A00808-014	
	Suction line O.D. [in., (mm)]		5/8 (15.9)	7/8 (22.2)		
	Liquid line OD [in. (mm)]		3/8 (9.5)			
	Liquid Line Part Number		A00392-001	A01024-001		
	Condensate Connection, FPT [in., (mm)]		1/2 (13)	3/4 (19)		
	Refrigerant Type		R-22, R-407C, R-410A			
	Coil Shipping Weight [lbs., (kg)]		33 (15)	61 (28)	71 (33)	79 (36)
Expansion Device*		TXV with internal Check Valve*				
Cabinet Dimensions			A	(965)	25.0 (635)	30.0 (762)
			B	(915)	23.0 (584)	28.0 (711)
			C	(838)	20.0 (508)	25.0 (635)
					33.0 (838)	

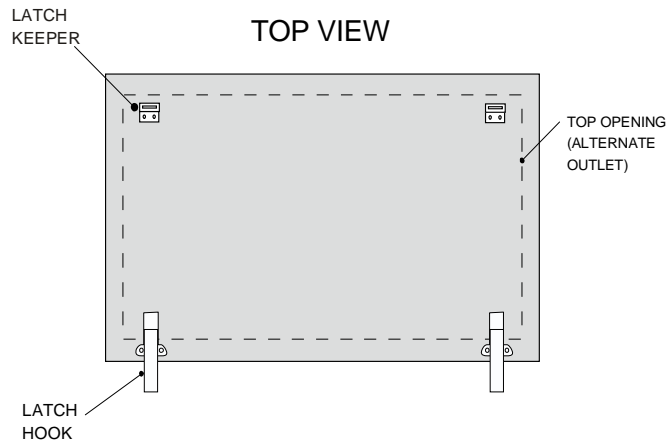
* TXV shipped loose. Sold separately for –A models.

CABINET DIMENSIONS M1218

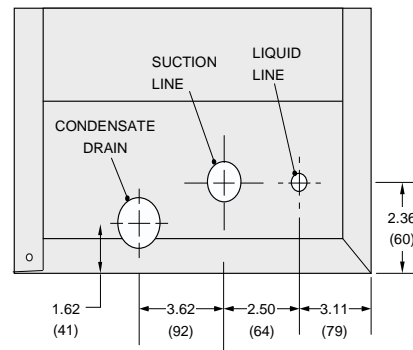


UNIT SHOWN FOR HORIZONTAL AIRFLOW ARRANGEMENT. ALL DIMENSIONS IN INCHES (mm)

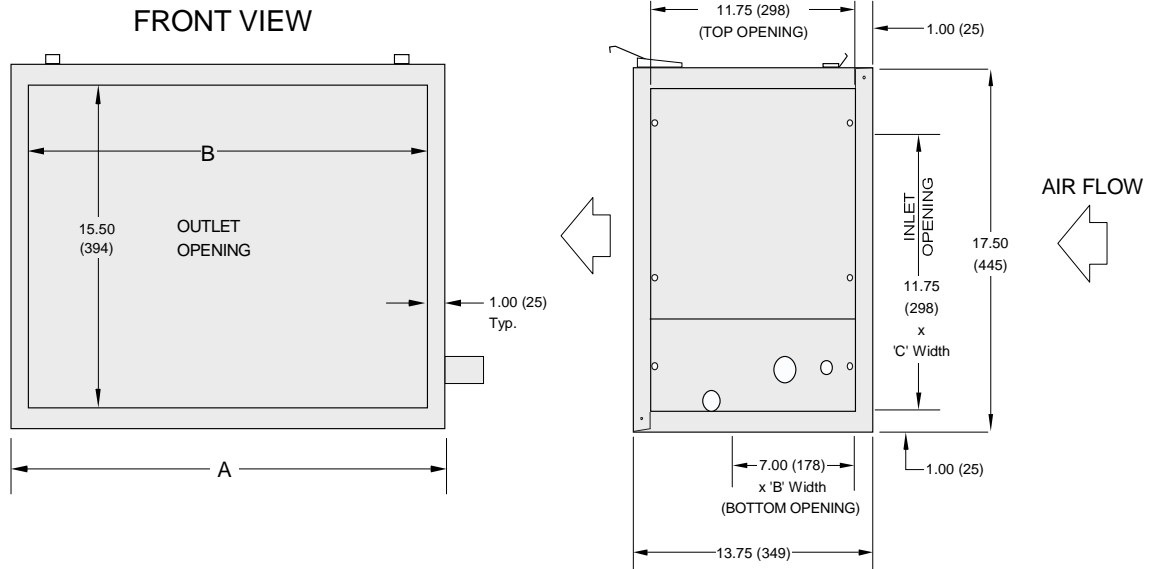
CABINET DIMENSIONS M2430, M3036, M3642



DETAIL OF PIPING



SIDE VIEW



UNIT SHOWN FOR HORIZONTAL AIRFLOW ARRANGEMENT. USE ALTERNATE OPENINGS FOR VERTICAL ARRANGEMENT.
ALL DIMENSIONS IN INCHES (mm)

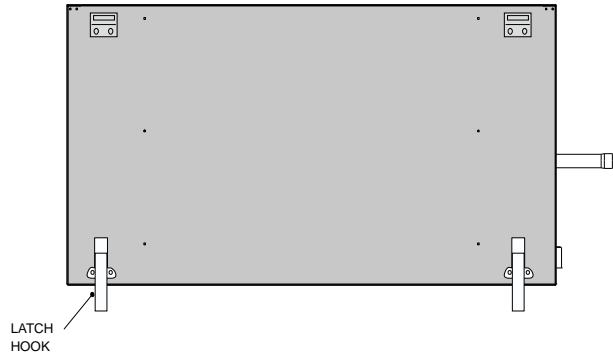
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REFRIGERANT COIL MODULE SPECIFICATIONS FOR: M4860

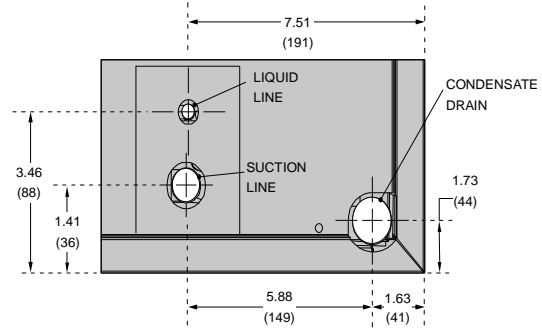
System Type		C Style Coil	H Style Coil
Model No.		M4860CL1-A M4860CL1-B	M4860CL1-E
Evaporator Coil Properties	Compatible Condenser Size [Ton, (kW)]	4.0-5.0 (14.0-17.6)	4.0-5.0 (14.0-17.6)
	Net Face Area [ft ² (m ²)]	7.44 (0.69)	7.44 (0.69)
	Tube diameter [in., (mm)]	3/8 (9.5)	3/8 (9.5)
	Fin Density [fins/in., (fins/m)]	14 (551)	14 (551)
	Number of rows	3	4
	Design Pressure[psig, (kPa)]	500 (3447)	500 (3447)
	TX Valve Part No.	R-22/R-407C	A00808-005
		R-410A	A00808-015
	Suction line O.D. [in., (mm)]	-A	1/2 Male Flare
		-B	7/8 (22.2)
	Liquid line OD [in. (mm)]	3/8 (9.5)	3/8 (9.5)
	Liquid Line Part Number	A01044-001	A01045-001
	Condensate Connection, FPT [in., (mm)]	3/4 (19)	3/4 (19)
	Refrigerant Type	R-22, R-407C, R-410A	R-22, R-407C, R-410A
	Coil Shipping Weight [lbs., (kg)]	88 (40)	89 (41)
	Expansion Device*	TXV with internal Check Valve	TXV with internal Check Valve

* TXV shipped loose.

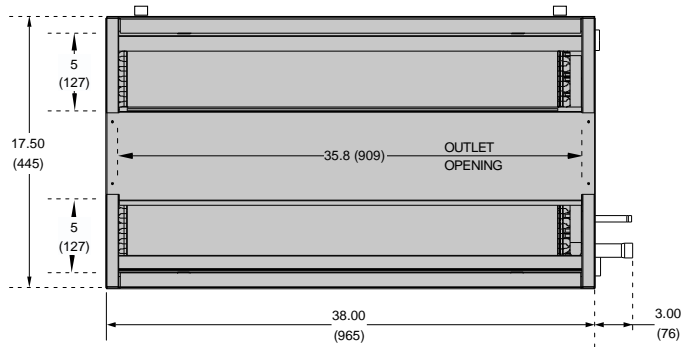
TOP VIEW



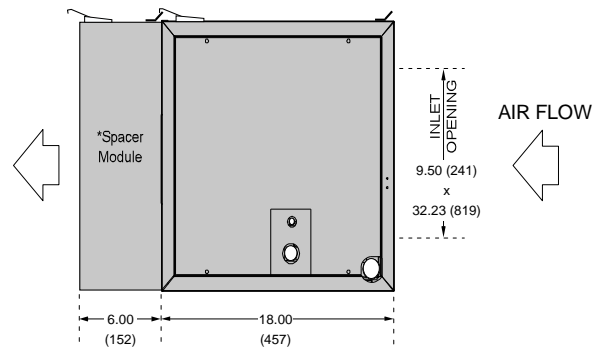
DETAIL OF PIPING



FRONT VIEW



SIDE VIEW



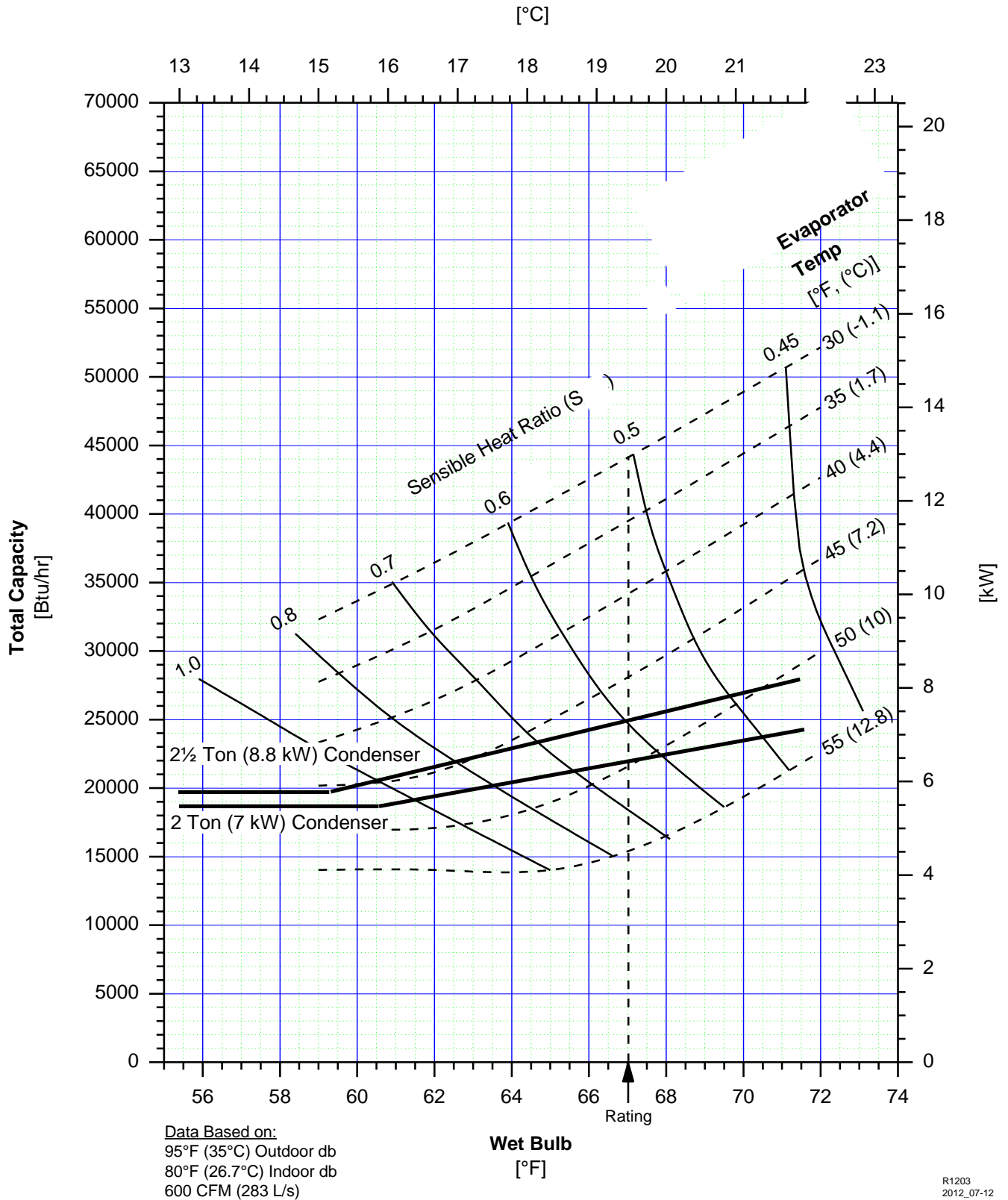
UNIT SHOWN FOR HORIZONTAL AIRFLOW ARRANGEMENT.
ALL DIMENSIONS IN INCHES (mm)

*Spacer Module is shipped with MC4860C/H Cooling Module only.

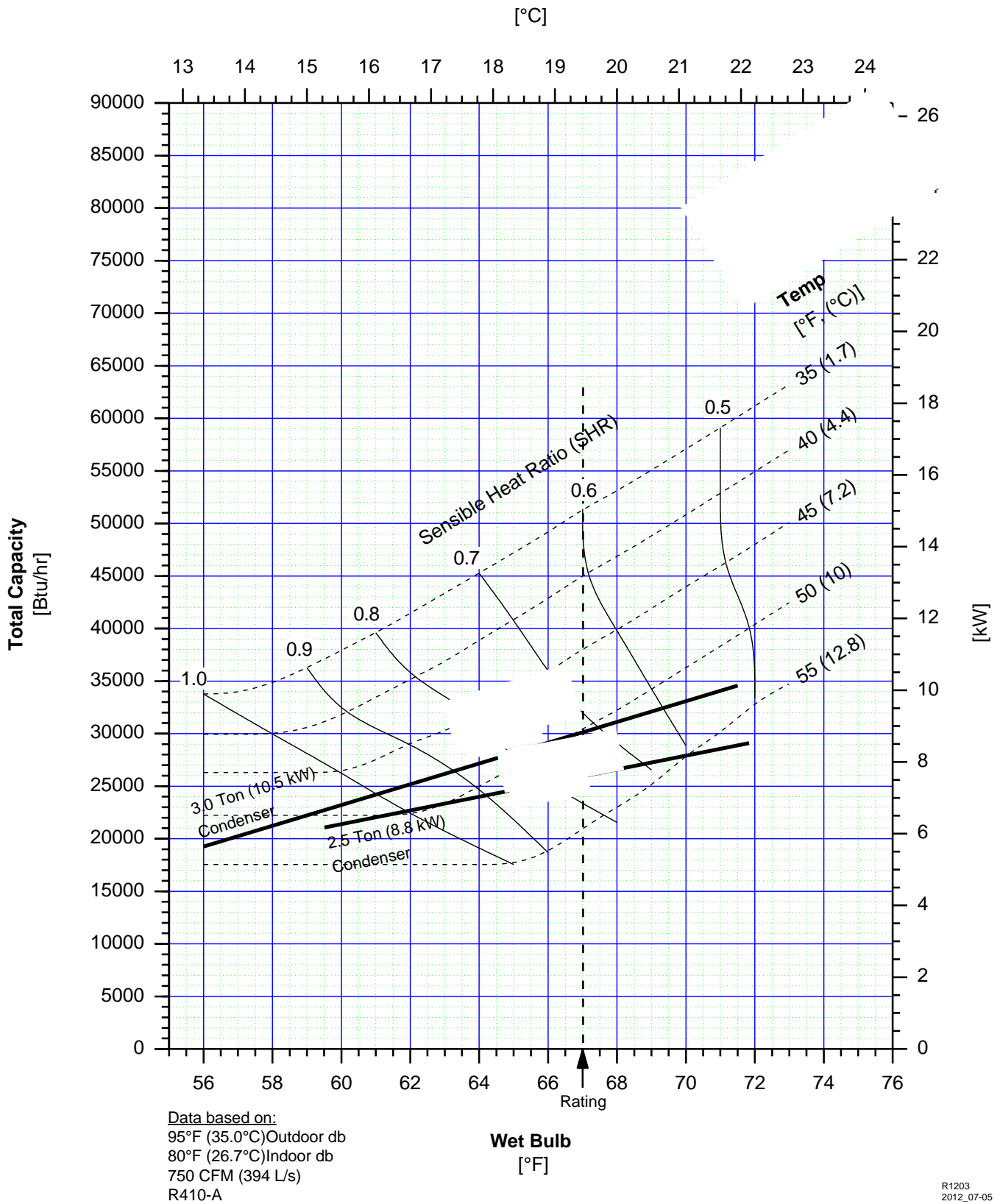
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COOLING CAPACITY

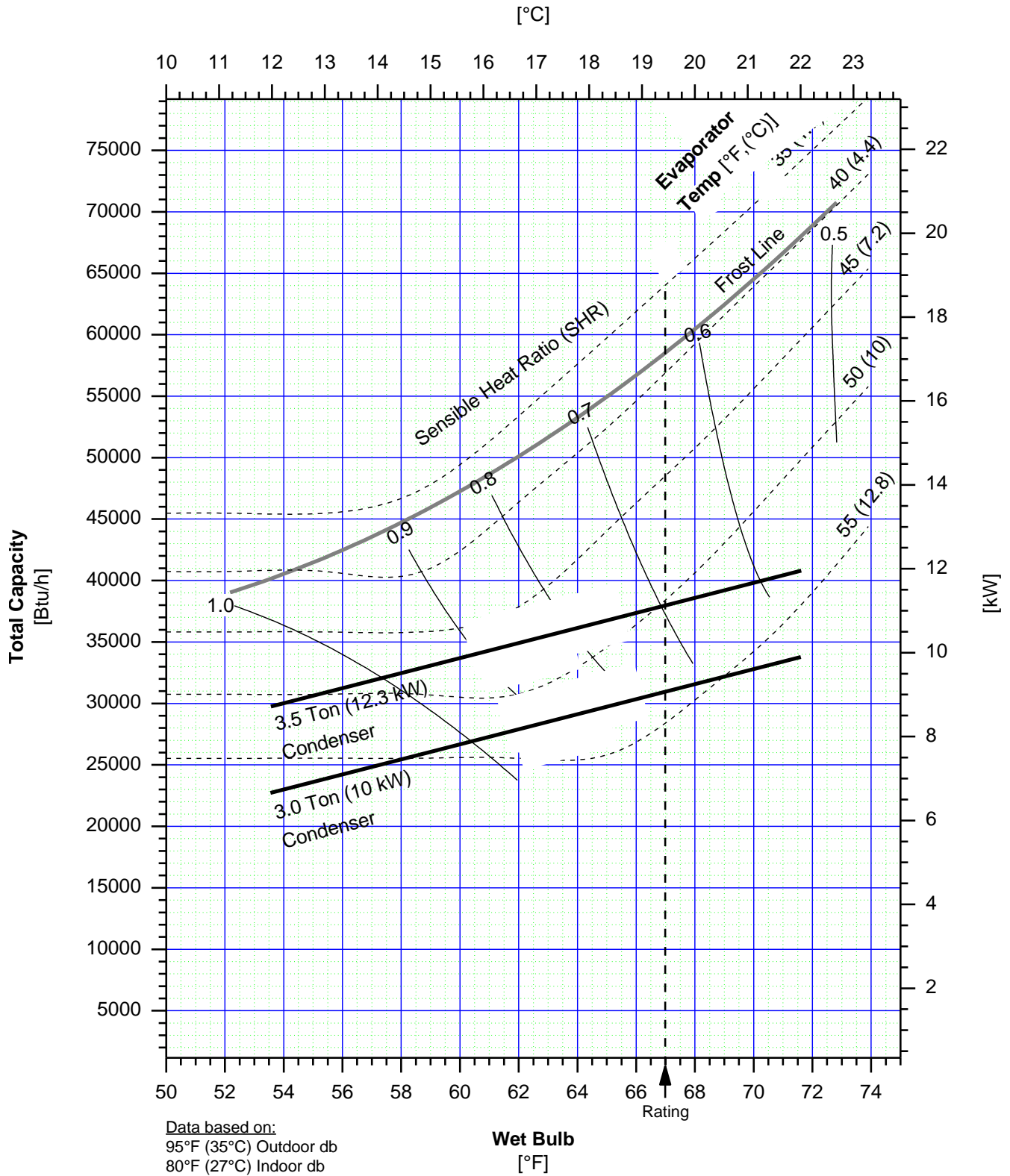
M2430CL1-A/B/D/E



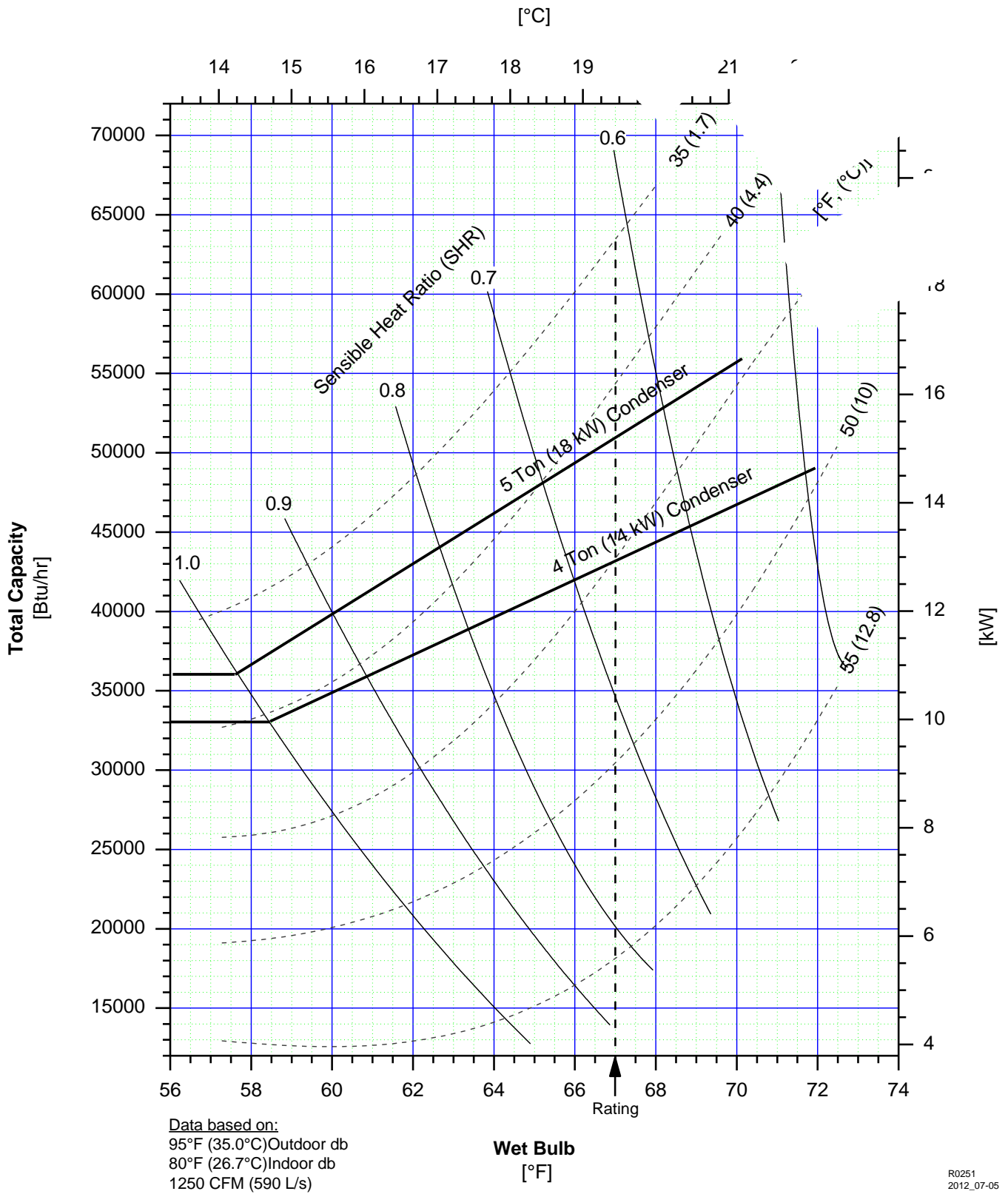
M3036CL1-A/B/D/E



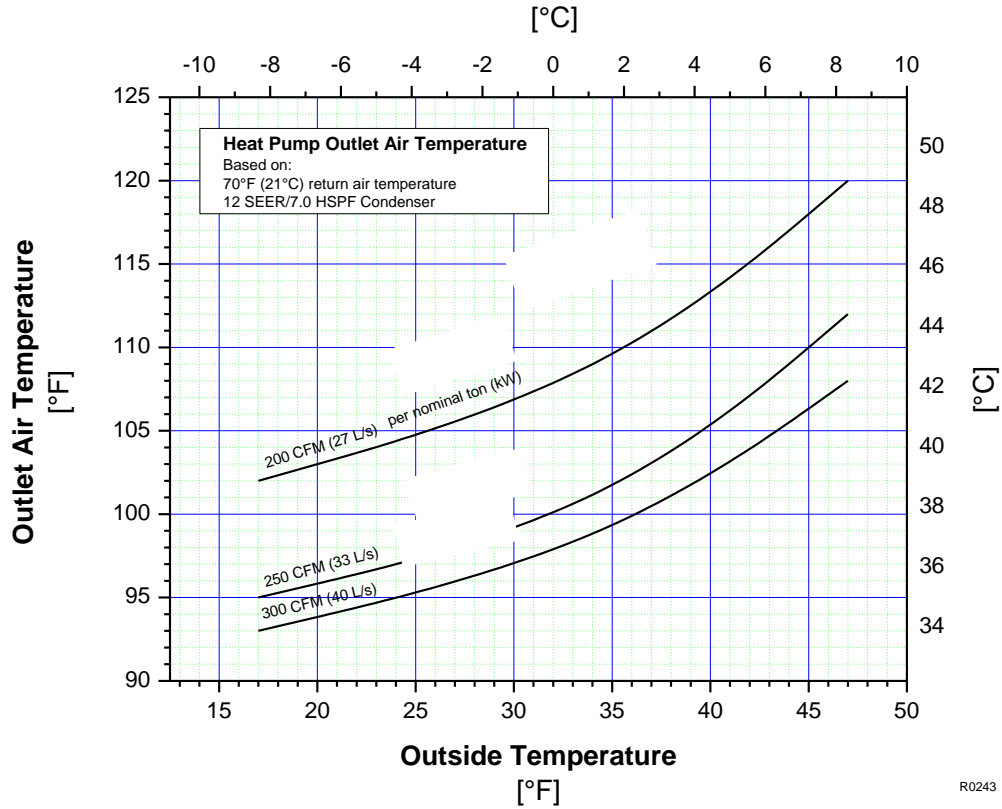
M3642CL1-A/B/D/E

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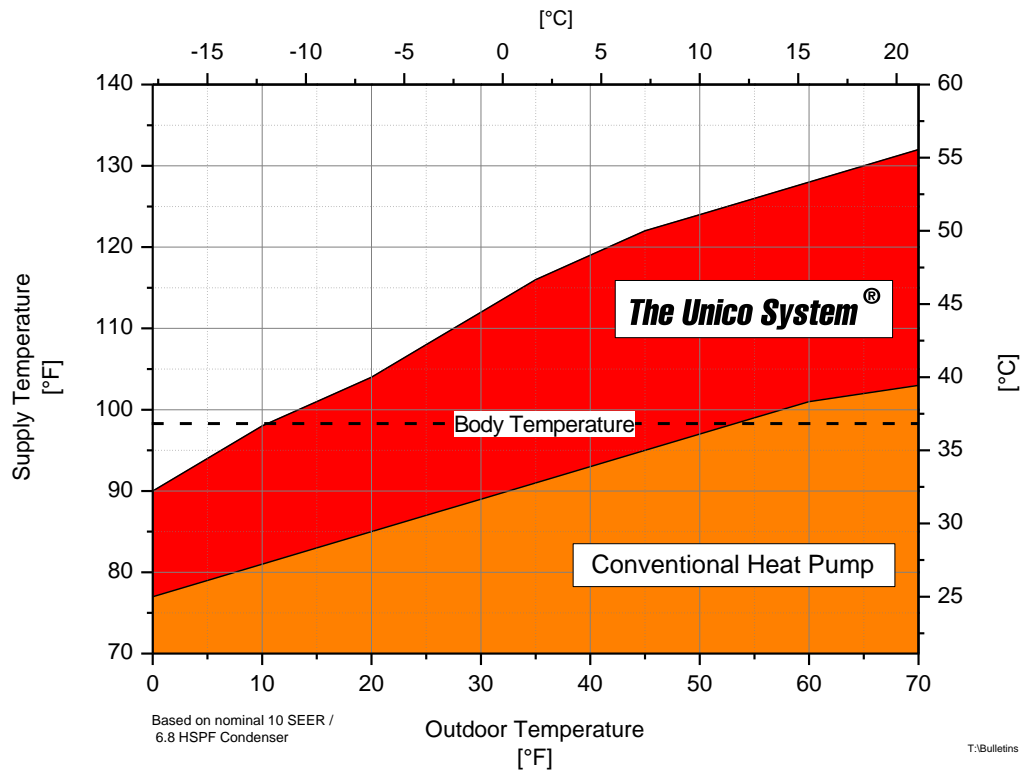
M4860CL1-A/B/D/E



HEATING CAPACITY



The Heat Pump System "That FEELS Warm"



EXAMPLES

Example 1. Find the total sensible heat capacity of a 2.5 Ton (8.8 kW) condenser matched to a 2430 system with indoor temperature of 80°F (27°C) dry bulb / 66°F (19°C) wet bulb.

Solution:

First, determine the total heat capacity, which is defined as the sum of the sensible heat and latent heat. Sensible heat is the energy due to temperature change, whereas latent heat is the energy embodied in a phase change. Latent heat is associated with the amount of moisture removed from the air and sensible heat is associated with the air temperature drop.

To find the total capacity, go to the performance graph of the 2430 coil and trace a line vertically from the 66°F (19°C) mark until it crosses the 2.5 ton (8.8 kW) line. From that intersection, carry a line horizontally until it intersects the Total Capacity axis. You can then read the total capacity directly. In this case:

Total Heat Capacity = 27,000 BTU/hr (7.9 kW)

Next, determine the sensible heat capacity using the Sensible Ratio (SHR) and the total heat capacity from above.

The Sensible Heat Ratio (SHR) is defined as the ratio of the Sensible Heat Capacity to the Total Heat Capacity, where:

$$SHR = \frac{\text{Sensible Heat Capacity}}{\text{Total Heat Capacity}}$$

and

$$\text{Total Heat} = \text{Sensible Heat} + \text{Latent Heat}$$

To determine the sensible heat ratio, find where the wet bulb temperature crosses the selected condensing unit line. There are a series of solid lined curves numbered 1.0 to 0.45. The Sensible Heat Ratio is 0.61

$$\text{Sensible Heat Ratio} = 0.61$$

To determine the sensible heat capacity, take the Total Heat, 27,000 BTU/hr, and multiply it by the Sensible Heat Ratio, 0.61.

$$\text{Sensible Heat Capacity} = 16,470 \text{ BTU/hr (4.8 kW)}$$

Subtracting this from the Total Heat Capacity gives the amount of Latent Heat.

$$\text{Latent Heat Capacity} = 10,530 \text{ BTU/hr (3.1 kW)}$$

Example 2. Find the outlet temperature of a Unico System Heat Pump when the outdoor temperature is 30°F (-1°C) and the flow rate is 200 CFM (27 L/s) per nominal ton (kW).

Solution:

Refer to the Heat Pump Outlet Air Temperature graph. The outlet air temperature can be read directly from this graph by finding the intersection of the point where the 30°F (-1°C) outdoor temperature line intersects the 200 CFM (27 L/s) per nominal ton (kW) line, and a horizontal line passing through the vertical axis, "Outlet Air Temperature".

$$\text{Outlet Air Temperature} = 107^{\circ}\text{F (42}^{\circ}\text{C)}$$

MODEL NUMBER CROSS-REFERENCE CHART

Current Model Number	Past Model Number
M1218CL1-A_	U1218L-1***A**
M1218CL1-E_	U1218L-1***E**
M2430CL1-A_	None
M2430CL1-B_	MC2430CX
M2430CL1-D_	None
M2430CL1-E_	MC2430HX
M3036CL1-A_	None
M3036CL1-B_	None
M3036CL1-D_	None
M3036CL1-E_	None
M3642CL1-A_	None
M3642CL1-B_	MC3642CX
M3642CL1-D_	None
M3642CL1-E_	MC3642HX
M4860CL1-A_	None
M4860CL1-B_	MC4860CX
M4860CL1-D_	None
M4860CL1-E_	MC4860HX