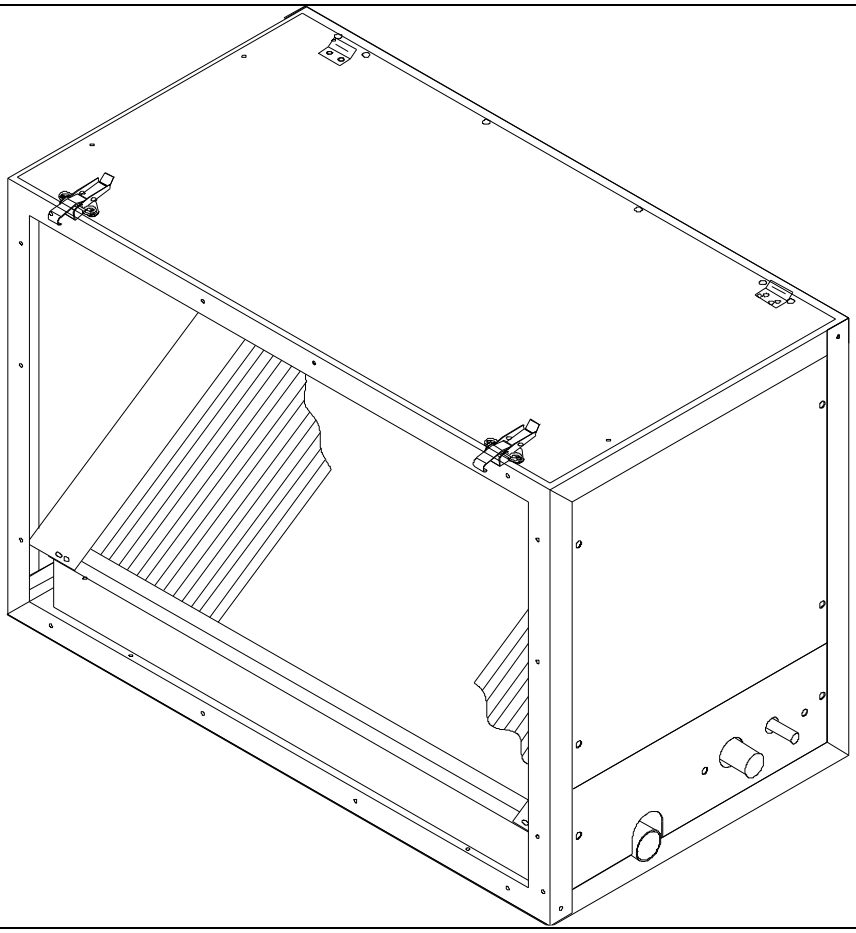
The Unico System®

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 ① 2430 ② C ③ L ④ 1 ⑤ - B ⑥ 1 ⑦ C ⑧

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
R = Right-hand connection

⑤ Revision
1, 2, 3, etc.

⑥ Coil Style, TXV Option
B = B style coil with R410A TXV
E = E style coil with R410A TXV

⑦ Paint Color
0 = None
1 = White

⑧ Coil Coating
(blank) = None
C = E-Coat

* 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) – Thermostatic expansion valve, with internal check valve
- (1) – Liquid line extension, 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 (E-style shown).

Matching Blower/Heating Modules		
Evaporator Coil Prefix	**Matching Blower Module Prefix**	**Matching Hot Water Coil Module Prefix**
M1218CL1/ M1218CL2	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
- (optional) E-Coating for improved corrosion resistance and coil life

TYPICAL APPLICATION

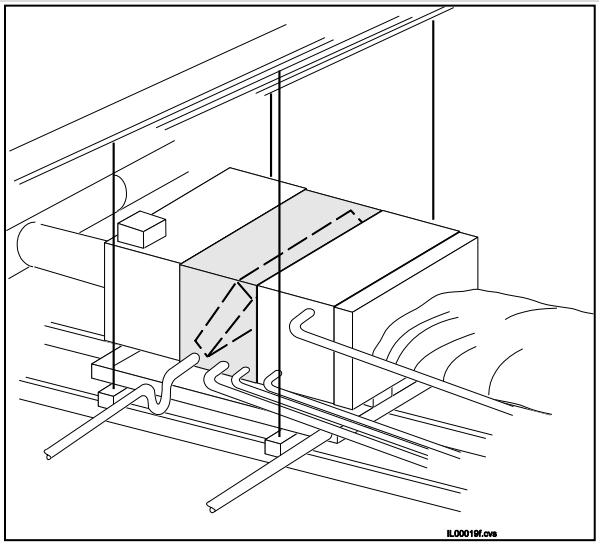


Figure 2. Horizontal installation with *Unico System* Heating Module and Blower Module

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.

COIL CONSTRUCTION

Unico-designed coils are constructed of evenly spaced aluminum fins mechanically bonded to copper tubes. The tubes are 3/8" (9.52 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-inch (19 mm) FPT drain connection. All refrigerant lines are sweat connections that extend outside of the cabinet.

An E-Coated coil option is available for all evaporator coil models. E-Coating improves the life of the coil by reducing the possibility of leaks and coil failures due to chemical attack, particularly formicary corrosion.

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 (included with the control box) must be used that bypasses the anti-frost switch during the heating mode.

All models are supplied with an expansion valve. 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.

TXV INSTALLATION

Each coil comes with two access fittings – one for servicing the unit and one for TXV equalizer line installation. Make sure to install the TXV equalizer line on the fitting without a schraeder core.

REFRIGERANT COIL MODULE SPECIFICATIONS

Model No.		M2430CL1-B	M3036CL1-B	M3642CL1-B	M4860CL1-B
Compatible condenser size, Ton (kW)		2.0-2.5 (7.0–8.8)	2.5-3.0 (8.8-10.5)	3.0-3.5 (10.5–12.3)	4.0-5.0 (14.0-17.6)
Net face area, ft^2 (m^2)		2.13(0.20)	2.34(0.22)	3.48(0.32)	7.44(0.69)
Tube diameter, in. (mm)		3/8 (9.5)			
Fin density, fins/in. (fins/m)		14 (551)			
Number of rows		4			3
Design pressure, psig (kPa)]		500 (3447)			
Suction line O.D., in. (mm)		7/8 (22.2)			
Liquid line OD., in. (mm)		3/8 (9.5)			
P-trap condensate connection, in. (mm)		3/4 FPT(19)			
Refrigerant type		R-22/407C/R-410A			
Expansion device*		TXV with internal Check Valve*			
Expansion valve* nominal size, ton (kW)		2	3		4/5
Cabinet dimensions, in. (mm)	Width	25.0 (635)	30.0 (762)	38.0 (965)	
	Height	17.5 (445)			
	Depth	13.5 (343)			18.0 (457)
Net weight, lbs. (kg)		60 (28)	70 (32)	78 (36)	88 (40)
Shipping weight, lbs. (kg)		60 (28)	70 (32)	78 (36)	88 (40)

* R410A TXV shipped loose. For R-22 or R-407C replacement coils, order TXV separately

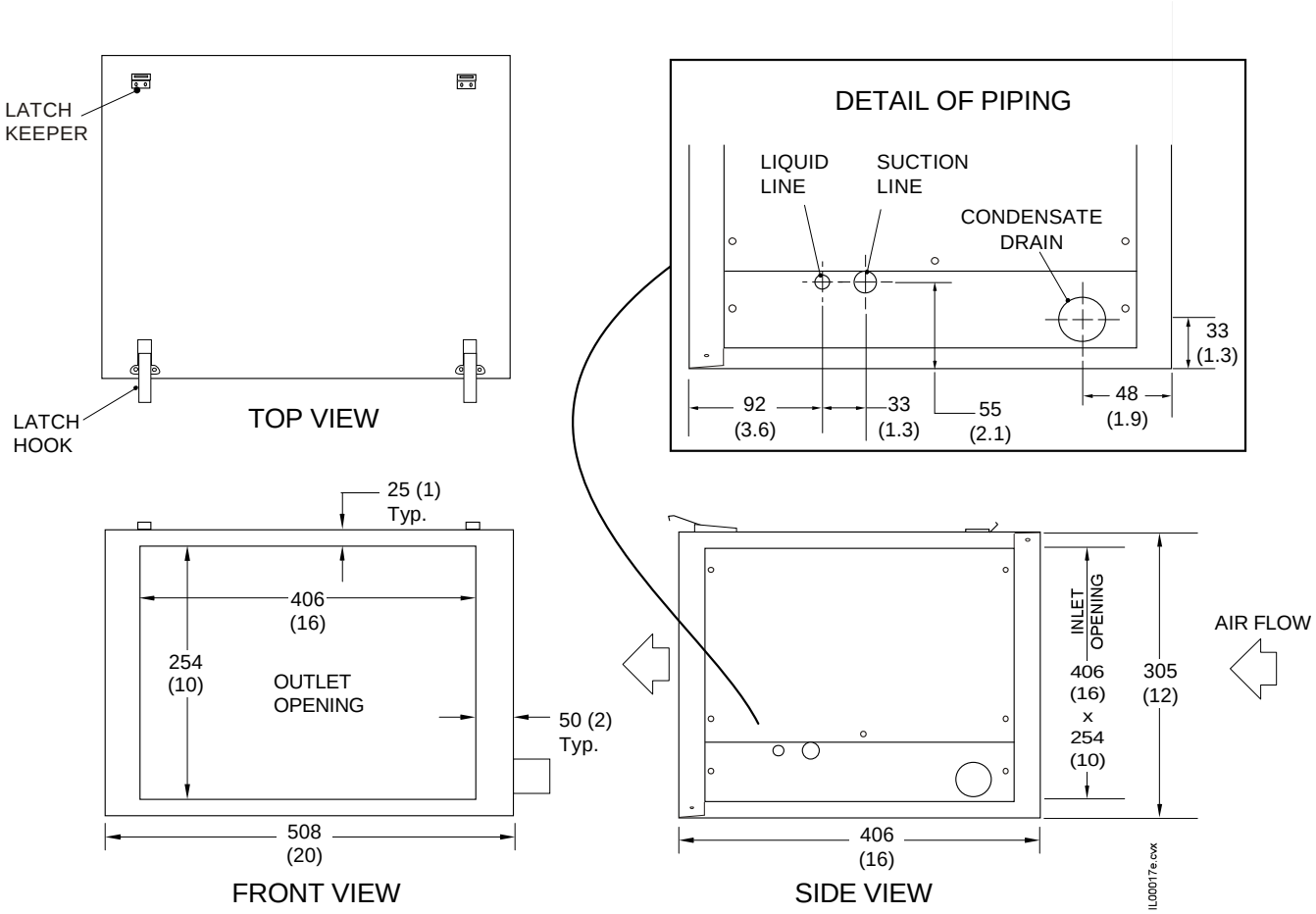
Model No.		M1218CL*-E	M2430CL1-E	M3036CL1-E	M3642CL1-E	M4860CL1-E
Compatible condenser size, Ton (kW)		1.0-1.5 (3.5-5)	2.0-2.5 (7.0–8.8)	2.5-3.0 (8.8-10.5)	3.0-3.5 (10.5–12.3)	4.0-5.0 (14.0-17.6)
Net Face Area, ft^2 (m^2)		1.17 (0.11)	2.13 (0.20)	2.65 (0.25)	3.48 (0.32)	7.44 (0.69)
Tube diameter, in. (mm)		3/8(9.5)				
Fin density, fins/in. (fins/m)		15 (590)	15.5 (610)			14 (551)
Number of rows		6				4
Design pressure, psig (kPa)]		500 (3447)				
Suction line O.D., in. (mm)		5/8 (15.9)	7/8 (22.2)			
Liquid line OD., in. (mm)		3/8 (9.5)				
P-trap condensate connection, in. (mm)		3/4 FPT(19)				
Refrigerant Type		R-22/407C/R-410A				
Expansion device*		TXV with internal Check Valve*				
Expansion valve* nominal size, ton (kW)		CL1: 1.5 CL2: 2	2	3		4/5
Cabinet dimensions, in. (mm)	Width	20.0 (520)	25.0 (635)	30.0 (762)	38.0 (965)	
	Height	12.0 (305)	17.5 (445)			
	Depth	16 (406)	13.5 (343)			18.0 (457)
Net weight, lbs. (kg)		33 (15)	60 (28)	70 (32)	78 (36)	88 (40)
Shipping weight, lbs. (kg)		33 (15)	60 (28)	70 (32)	78 (36)	88 (40)

* R410A TXV shipped loose. For R-22 or R-407C replacement coils, order TXV separately

Spare parts

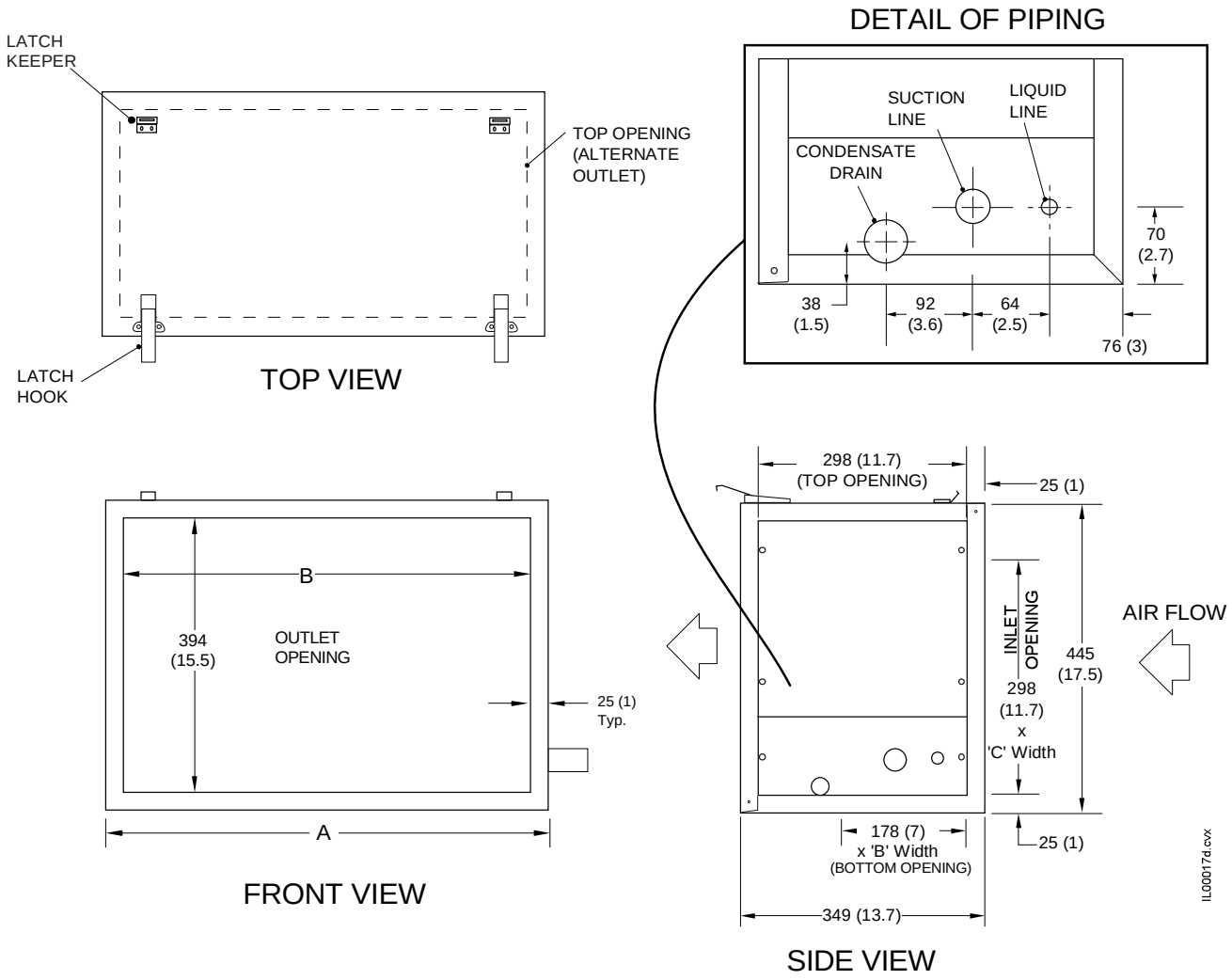
Part No.	Description
A01023-G01	Liquid line extension, 3/8" OD, M2430/3036/3642CL1-B
A01044-G01	Liquid line extension, 3/8" OD, M4860CL1-B
A00392-G01	Liquid line extension, 3/8" OD, Flare, M1218CL1
A02735-G01	Liquid line extension, 3/8" OD, Chatleff, M1218CL2
A01024-G01	Liquid line extension, 3/8" OD, M2430/3036/3642CL1-E
A01045-G01	Liquid line extension, 3/8" OD, M4860CL1-E
A02713-K01	P-trap Kit
A00366-002	TXV, Flare, R410A, 1.5-ton, M1218CL1
A02732-001	HXV, Chatleff, R410A, 2-ton, M1218CL2
A02732-002	HXV, Chatleff, R410A, 2-ton, M3036/3642
A02732-004	HXV, Chatleff, R410A, 5-ton, M4860
A00808-013	TXV, R410A, 2-ton, M2430
A00808-014	TXV, R410A, 3-ton, M3036/3642
A00808-015	TXV, R410A, 4-ton, M4860
A00808-002	TXV, R22/407C, 2-ton, M2430
A00808-004	TXV, R22/407C, 3-ton, M3036/3642
A00808-005	TXV, R22/407C, 4-ton, M4860

M1218



All dimensions are in mm (inches)

M2430/3036/3642

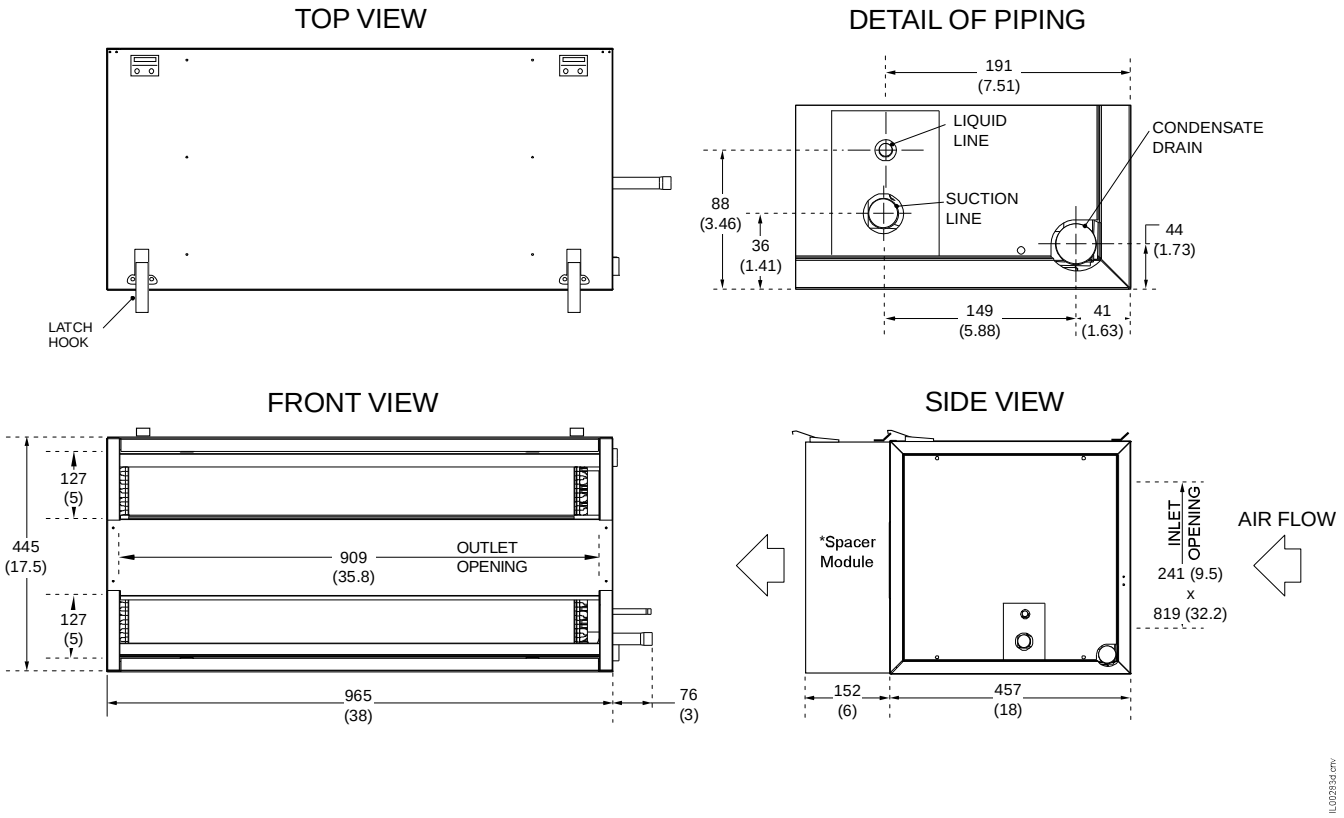


	2430	3036	3642
A	635 (25.0)	762 (30.0)	965 (38.0)
B	584 (23.0)	711 (28.0)	915 (36.0)
C	508 (20.0)	635 (25.0)	838 (33.0)

All dimensions are in mm (inches)

Unit shown for horizontal airflow arrangement. Use alternate openings for vertical arrangement.

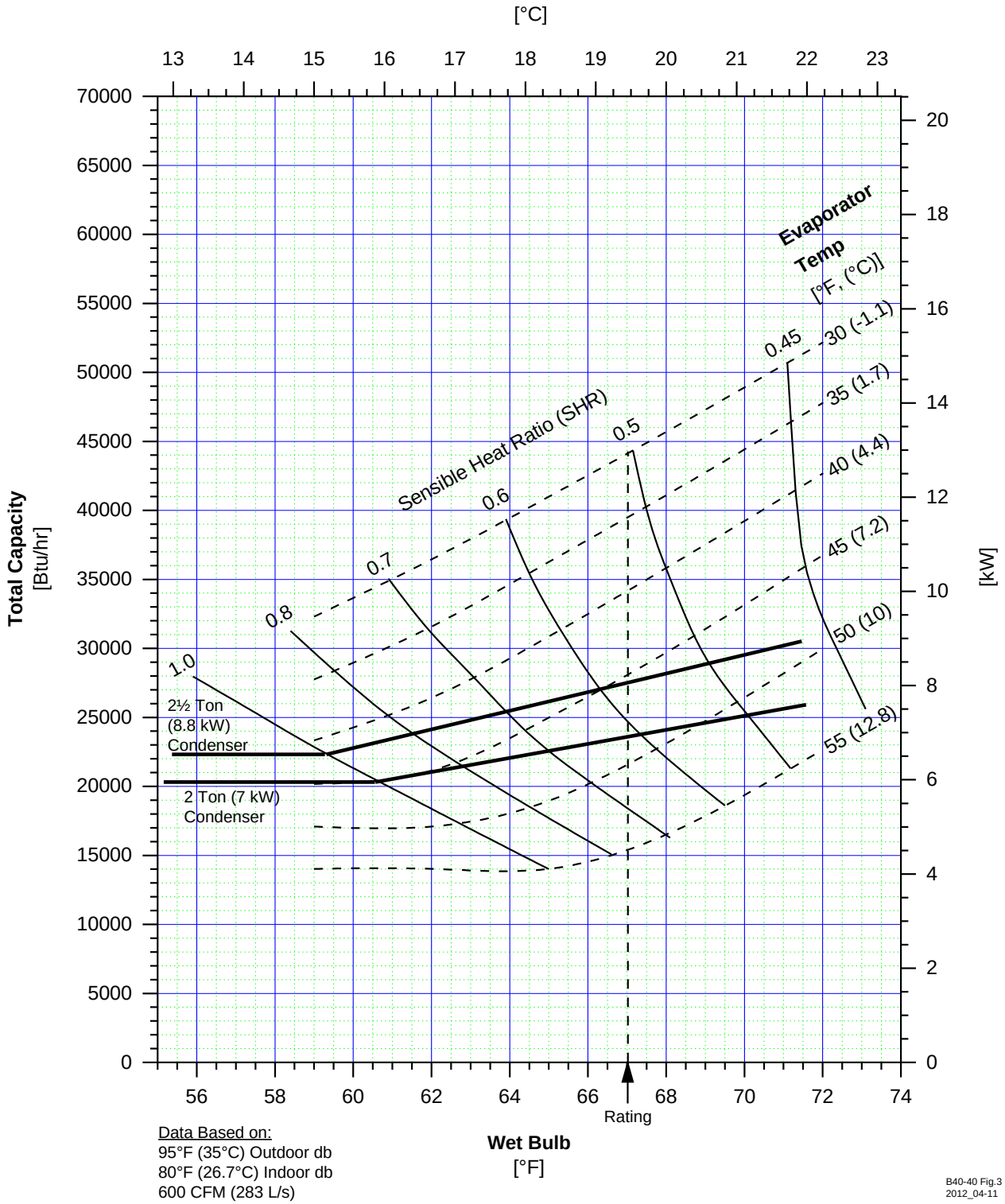
M4860



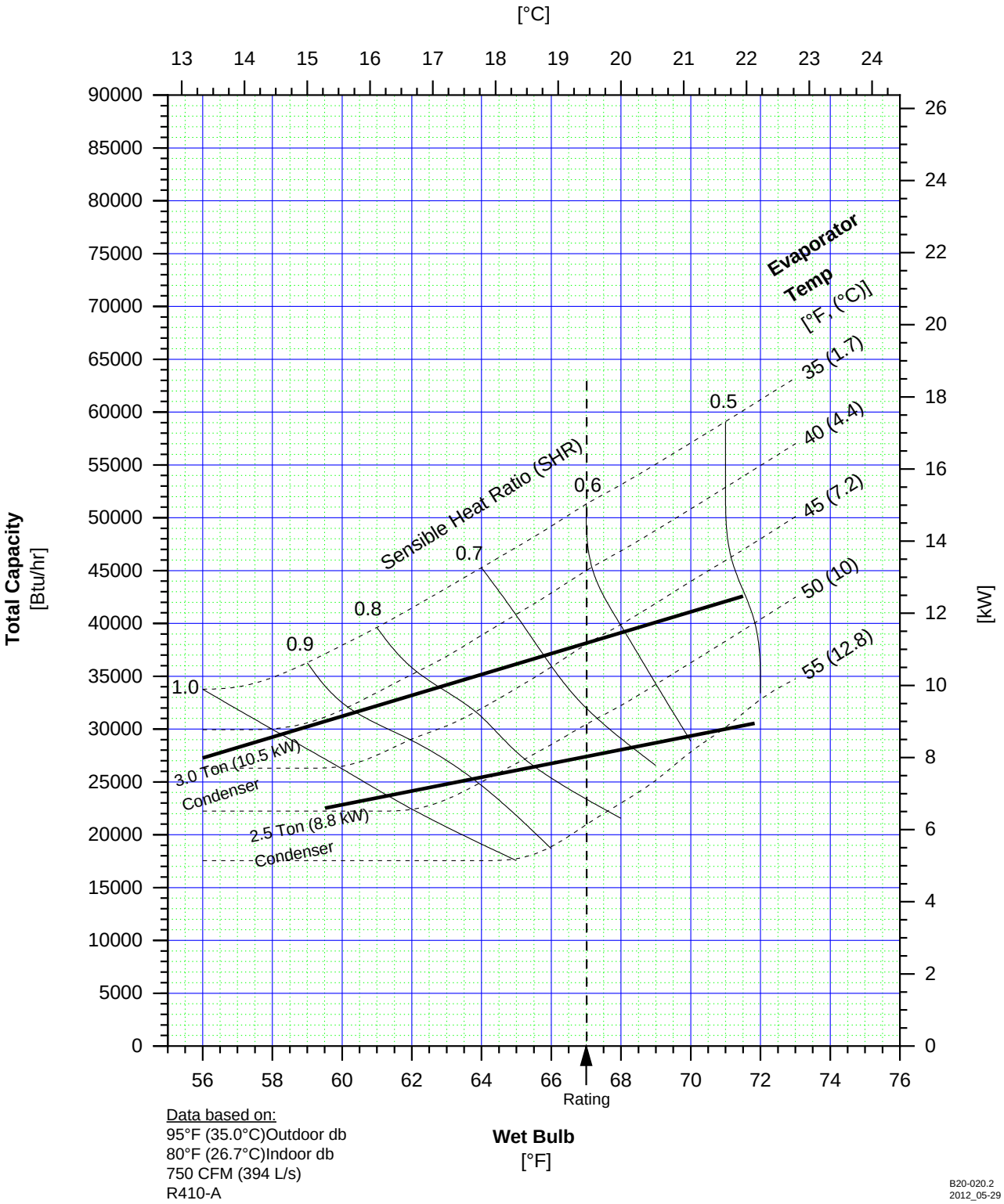
All dimensions are in mm (inches)

COOLING CAPACITY

M2430CL1-A/B/E



M3036CL1-A/B/E



Data based on:
95°F (35.0°C)Outdoor db
80°F (26.7°C)Indoor db
750 CFM (394 L/s)
R410-A

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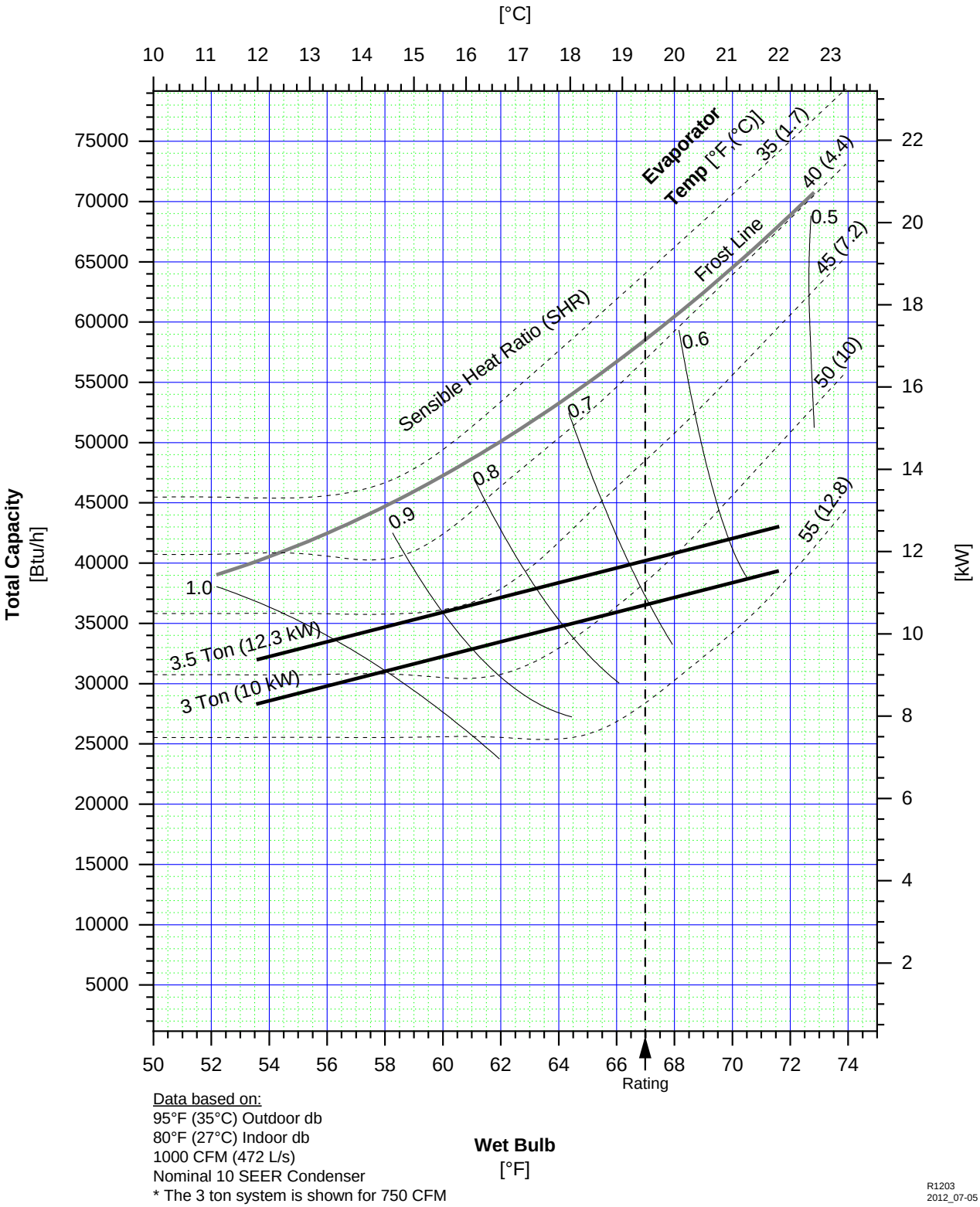
2012_05-29

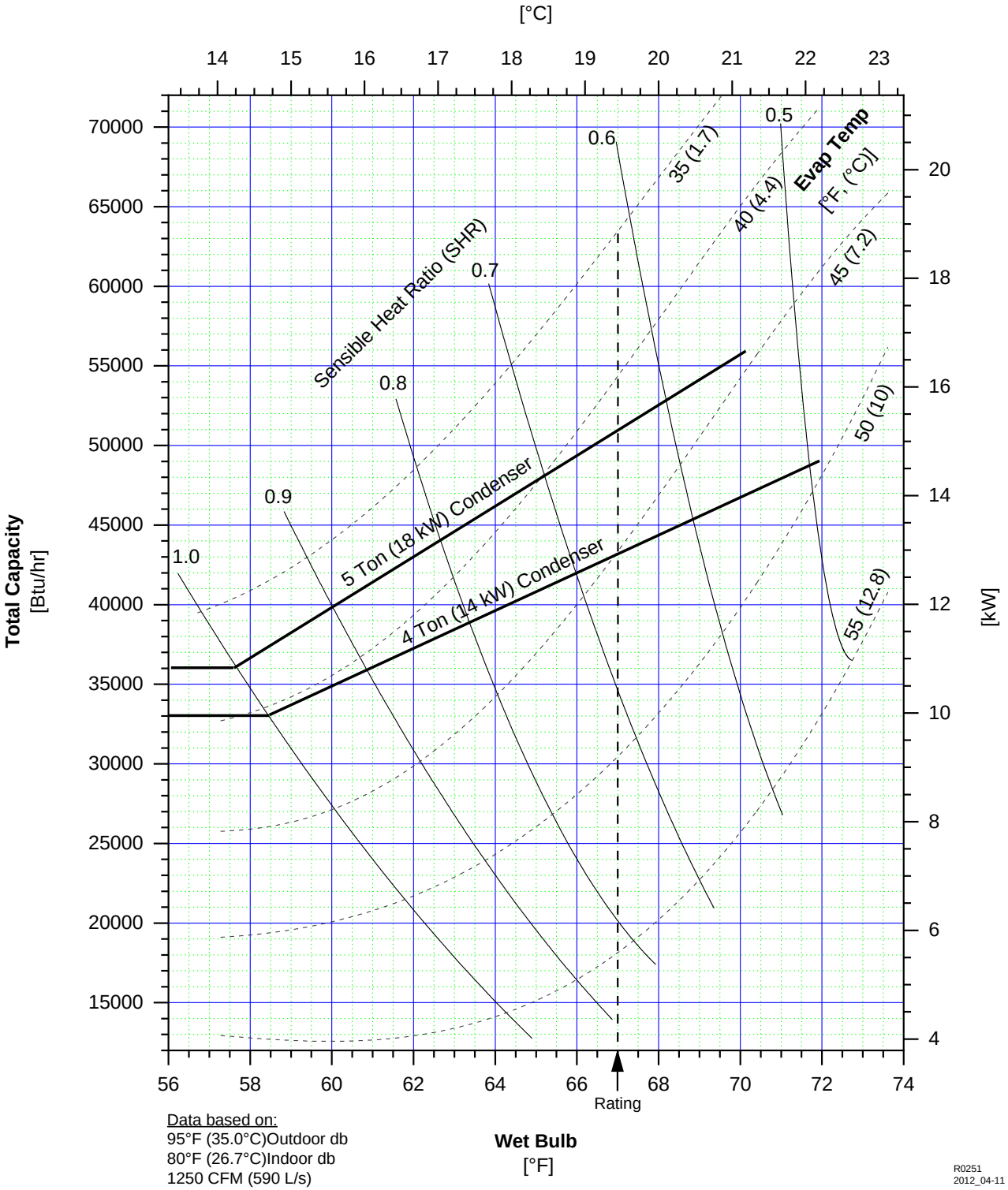
M3642CL1-A/B/E



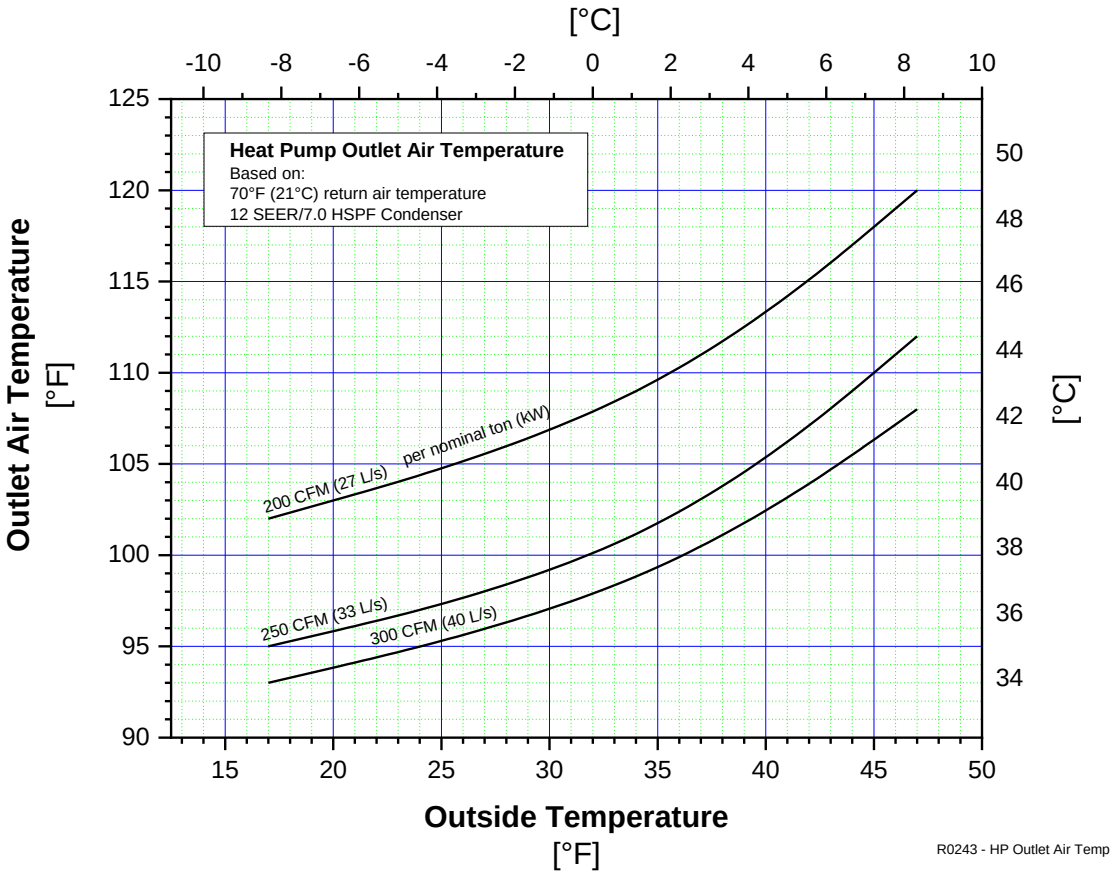
Data based on:
95°F (35°C) Outdoor db
80°F (27°C) Indoor db
1000 CFM (472 L/s)
Nominal 10 SEER Condenser
* The 3 ton system is shown for 750 CFM

R1203
2012_07-05

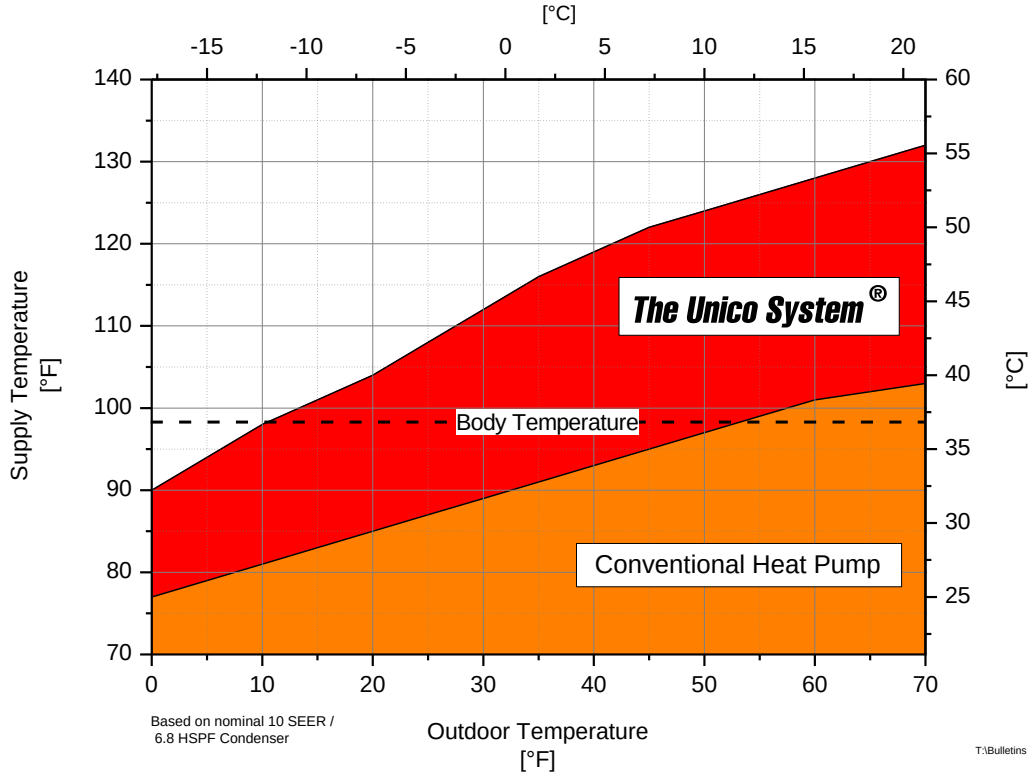
M4860CL1-A/B/E



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 80ºF (27ºC) dry bulb / 66ºF (19ºC) 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 66ºF (19ºC) 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:

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

and

$$Total Heat = Sensible Heat + Latent Heat$$

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

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.

Sensible Heat Capacity = 16,470 BTU/hr (4.8 kW)

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

Latent Heat Capacity = 10,530 BTU/hr (3.1 kW)

Example 2. Find the outlet temperature of a Unico System Heat Pump when the outdoor temperature is 30ºF (-1ºC) and the flow rate is 250 CFM (33 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 30ºF (-1ºC) outdoor temperature line intersects the 250 CFM (33 L/s) per nominal ton (kW) line, and a horizontal line passing through the vertical axis, “Outlet Air Temperature”.

Outlet Air Temperature = 99ºF (37ºC)