M SERIES HEATING MODULE

Model Number Key

M ① 2430 ② C ③ L ④ 1 ⑤ - X ⑥ - ⑦

① **Unit Type**
M=Modular

② **Nominal Capacity**
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 Module

④ **Configuration**
L=Left-hand connection

⑤ **Revision**
1, 2, 3, etc.

⑥ **Power Supply, Motor Type**
X=Cabinet Only/No Heating Coil
H=Hot Water Coil

⑦ **Paint Color**
1 = White
(blank) = None

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

Packing List

Carton contains:
- (1) – Cabinet
- (1) – Hook Flange
- (2) – Latch keepers
- (2) – Latches
- (1) – Hot water heating coil *(Optional)*
- (4) – Screws
- (1) – Gasketing
- (1) – Bulletin 20.020.4
- (1) – Bulletin 30-30

Applications

Unico System designed and built heating units can be easily installed with the matching blower and cooling modules. For matchups, see table below. The heating module can be matched to a blower module for a heating only system or it can be matched with both a blower and a cooling module for a system that heats and cools. The slide-in hot water/glycol heating coil is supplied separately. If potable water is used, refer to TechNote 112 for disinfection procedures.

Note: Add -H to the corresponding Heating Module Cabinet model number to include the coil. For example M2430CL1-X (cabinet only) becomes M2430CL1-H (coil included).

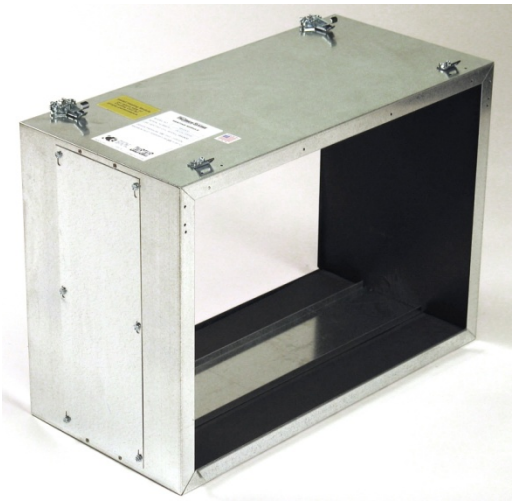
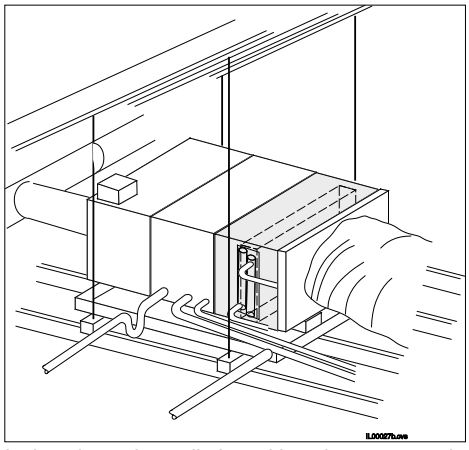


Figure 1. Typical Heating Module



Typical Horizontal Installation with Unico System Blower Module and Cooling Module

Heating Module Cabinet	Matching Unit Blower Module
M2430CL1-X	M2430BL1
M3036CL1-X	M3036BL1
M3642CL1-X*	M3642BL1
M4860CL1-X*	M4860BL1

Table 1. Compatible Modules. Refer to the model number cross-reference chart at the end of this bulletin for more information.

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.

NOTE — Specifications, Ratings, and Dimensions are subject to change without notice.
* The M2642CL1-H and M4860CL1-H are identical units and replace model number HW-3660.

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 for additional information

Coil Construction

Unico designed and fabricated hot water coils are constructed of evenly spaced corrugated aluminum fins mechanically bonded to copper tubes. The tubes are ½-in. diameter on staggered centers. Full-collar fins provide greater tube-fin contact for excellent heat transfer. Each coil is pressure tested at the factory. Bleed and drain valves are provided on the headers outside the cabinet. Matching coils are available separately, or with the cabinet.

Heating Module Specifications

Heating Coil Properties	Heating Module Cabinet Model No.	M2430CL1-X	M3036CL1-X	M3642CL1-X M4860CL1-X
	Heating Coil Model No.	HW2430	HW3036	HW3642* HW4860*
	Net Face Area [ft^2, (m^2)]	2.08 (0.19)	2.60 (0.24)	3.43 (0.32)
	Tube Diameter [in., (mm)]	1/2 (12.7)	1/2 (12.7)	1/2 (12.7)
	Number of Rows	4	4	4
	Fin Density [fins/in., (fins/m)]	12 (472)	12 (472)	12 (472)
	Water Connection Size, ODF Sweat [in., (mm)]	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)
	Design Pressure [psig, (kPa)]	150 (1034)	150 (1034)	150 (1034)
	Coil Water Volume [gal., (L)]	0.9 (3.4)	1.1 (4.2)	1.37 (5.2)
Coil Dimensions [in, (mm)]	A	20.0 (508)	25.0 (635)	33.0 (839)
Cabinet Dimensions [in., (mm)]	A	25 (635)	30 (762)	38 (965)
	B	23 (584)	28 (711)	36 (914)
Shipping Weight	Cabinet Only [lbs, (kg)]	20 (9.1)	25 (11.3)	28 (12.7)
	Coil Only [lbs, (kg)]	33 (15.0)	45 (20.4)	48 (21.8)

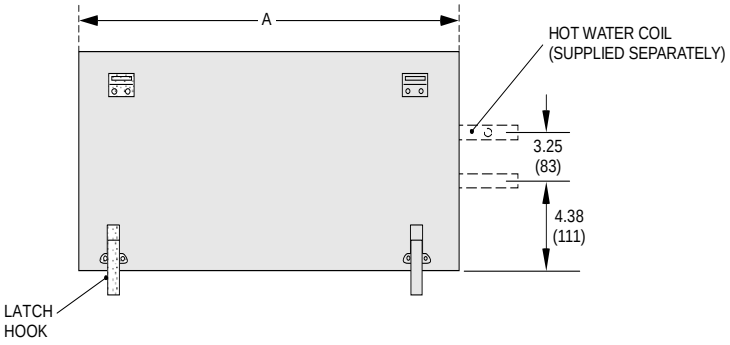
* HW3642 and HW4860 are identical parts and interchangeable. They replace model number HW3660.

Cabinet Dimensions

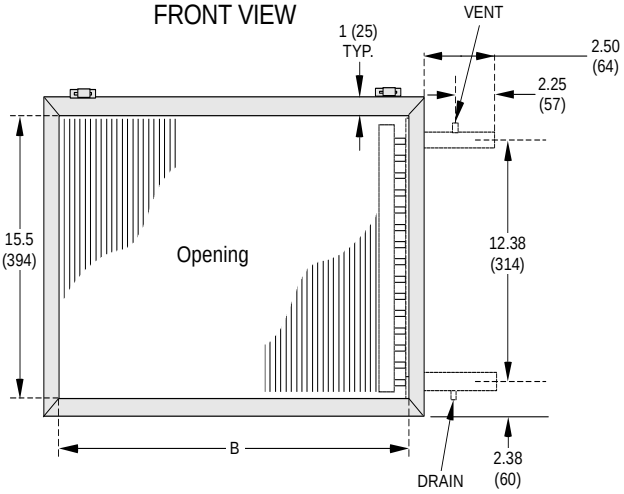
Heating Module Cabinet Dimensions

IL00026c.cvx

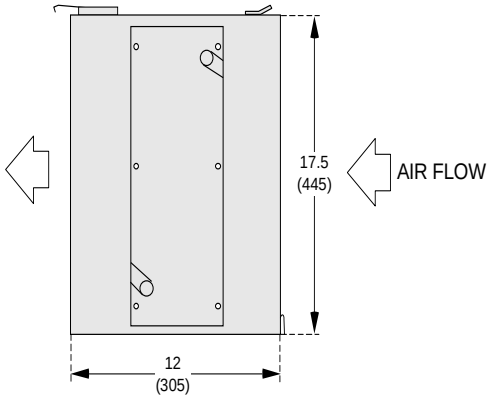
TOP VIEW



FRONT VIEW

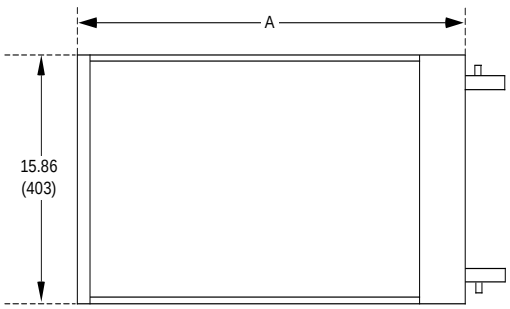


SIDE VIEW

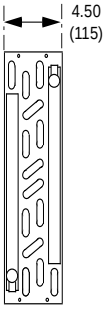


Heating Coil Dimensions

SIDE VIEW



END VIEW



ALL DIMENSIONS IN INCHES (mm)

Hot Water Coil Performance

HW2430													
Entering Water Temp		Water Flow Rate		Airflow								Water Pressure Drop	
				400CFM (189 L/s)		500CFM (236 L/s)		600CFM (283 L/s)		-			
				Total Capacity									
°F	°C	GPM	L/s	MBH	kW	MBH	kW	MBH	kW	MBH	kW	ft. w.c.	kPa
120	48.9	4	0.25	19.3	5.7	23.0	6.7	26.7	7.8	-	-	4.5	13.5
		6	0.38	19.7	5.8	23.8	7.0	27.7	8.1	-	-	9.7	29.0
		8	0.50	19.9	5.8	24.1	7.1	28.2	8.3	-	-	16.8	50.2
140	60.0	4	0.25	27.1	7.9	32.4	9.5	37.5	11.0	-	-	4.3	12.9
		6	0.38	27.7	8.1	33.4	9.8	38.9	11.4	-	-	9.3	27.8
		8	0.50	27.9	8.2	33.8	9.9	39.5	11.6	-	-	16.1	48.1
160	71.1	4	0.25	34.9	10.2	41.8	12.3	48.4	14.2	-	-	4.1	12.3
		6	0.38	35.6	10.4	43.0	12.6	50.1	14.7	-	-	8.9	26.6
		8	0.50	36	10.6	43.6	12.8	50.9	14.9	-	-	15.4	46.0
180	82.2	4	0.25	42.8	12.5	51.2	15.0	59.4	17.4	-	-	3.9	11.7
		6	0.38	43.6	12.8	52.7	15.4	61.4	18.0	-	-	8.6	25.7
		8	0.50	44.0	12.9	53.4	15.6	62.4	18.3	-	-	14.8	44.2
Recommended No. of Outlets				12		15		18		-			

HW3036													
Entering Water Temp		Water Flow Rate		Airflow								Water Pressure Drop	
				500CFM (236 L/s)		600CFM (283 L/s)		700CFM (330 L/s)		800CFM (378 L/s)			
				Total Capacity									
°F	°C	GPM	L/s	MBH	kW	MBH	kW	MBH	kW	MBH	kW	ft. w.c.	kPa
120	48.9	2	0.13	22.0	6.4	25.0	7.3	27.5	8.1	29.8	8.7	2.3	6.9
		4	0.25	22.8	6.7	26.2	7.7	29.2	8.6	32.0	9.4	4.9	14.6
		6	0.38	23.2	6.8	26.8	7.9	30.1	8.8	33.1	9.7	8.4	25.1
		8	0.50	23.4	6.9	27.1	8.0	30.6	9.0	33.7	9.9	12.8	38.2
140	60.0	2	0.13	30.9	9.1	35.1	10.3	38.7	11.4	41.9	12.3	2.3	6.9
		4	0.25	32.0	9.4	36.8	10.8	41.1	12.0	45.0	13.2	4.8	14.3
		6	0.38	32.5	9.5	37.6	11.0	42.2	12.4	46.5	13.6	8.2	24.5
		8	0.50	32.8	9.6	38.1	11.2	42.9	12.6	47.4	13.9	12.5	37.4
160	71.1	2	0.13	39.9	11.7	45.3	13.3	50.0	14.7	54.2	15.9	2.2	6.6
		4	0.25	41.3	12.1	47.5	13.9	53.0	15.5	58.1	17.0	4.7	14.0
		6	0.38	41.9	12.3	48.5	14.2	54.5	16.0	59.9	17.6	8.0	23.9
		8	0.50	42.2	12.4	49.0	14.4	55.3	16.2	61.0	17.9	12.2	36.5
180	82.2	2	0.13	48.9	14.3	55.6	16.3	61.4	18.0	66.5	19.5	2.1	6.3
		4	0.25	50.6	14.8	58.2	17.1	65.0	19.1	71.2	20.9	4.6	13.7
		6	0.38	51.3	15.0	59.4	17.4	66.7	19.6	73.5	21.5	7.9	23.6
		8	0.50	51.6	15.1	60.0	17.6	67.7	19.8	74.8	21.9	11.9	35.6
Recommended No. of Outlets				15		18		21		24			

Capacities are based on 70°F (21°C) return air temperature (T_{in})
Conversion Factors: MBH = 1000 Btu/hr, 1 kW = 3413 Btu/hr

WARNING

To prevent injury or damage from high temperatures, do not install floor outlets when operating in the shaded area. Discharge temperatures in this range can exceed 160°F (71°C)

HW3642 HW4860				Airflow								Water Pressure Drop	
Entering Water Temp		Water Flow Rate		600CFM (283 L/s)		800CFM (378 L/s)		1000CFM (472 L/s)		1250CFM (590 L/s)			
				Total Capacity									
°F	°C	GPM	L/s	MBH	kW	MBH	kW	MBH	kW	MBH	kW	ft. w.c.	kPa
120	48.9	4	0.13	28.8	8.4	35.0	10.3	39.9	11.7	45.0	13.2	2.7	8.1
		6	0.25	30.1	8.8	37.3	10.9	43.4	12.7	49.9	14.6	5.8	17.3
		8	0.38	30.7	9.0	38.5	11.3	45.2	13.2	52.5	15.4	10.0	29.9
		10	0.50	31.0	9.1	39.2	11.5	46.2	13.5	54.1	15.9	15.3	45.7
140	60.0	4	0.13	40.5	11.9	49.3	14.4	56.2	16.5	63.4	18.6	2.6	7.8
		6	0.25	42.2	12.4	52.5	15.4	61.0	17.9	70.2	20.6	5.5	16.4
		8	0.38	43.1	12.6	54.1	15.9	63.4	18.6	73.8	21.6	9.6	28.7
		10	0.50	43.5	12.7	55.0	16.1	64.9	19.0	76.0	22.3	14.6	43.6
160	71.1	4	0.13	52.2	15.3	63.5	18.6	72.5	21.2	81.8	24.0	2.5	7.5
		6	0.25	54.4	15.9	67.6	19.8	78.6	23.0	90.5	26.5	5.3	15.8
		8	0.38	55.4	16.2	69.6	20.4	81.8	24.0	95.2	27.9	9.2	27.5
		10	0.50	56.0	16.4	70.8	20.7	83.6	24.5	98.0	28.7	14.0	41.8
180	82.2	4	0.13	63.9	18.7	77.9	22.8	88.9	26.1	100.4	29.4	2.4	7.2
		6	0.25	66.6	19.5	82.8	24.3	96.3	28.2	111.0	32.5	5.1	15.2
		8	0.38	67.8	19.9	85.3	25.0	100.0	29.3	117.0	34.3	8.8	26.3
		10	0.50	68.5	20.1	86.7	25.4	102.3	30.0	120.0	35.2	13.4	40.0
Recommended No. of Outlets				18		24		30		37			

WARNING

To prevent injury or damage from high temperatures, do not install floor outlets when operating in the shaded area. Discharge temperatures in this range can exceed 160°F (71°C)

Coil Air Pressure Drop				
Air Flow Rate		Pressure Drop [in. w.c., (kPa)]		
CFM	m^3/s	HW2430	HW3036	HW3642 HW4860
400	(0.19)	0.07 (0.017)	0.05 (0.012)	-
500	(0.24)	0.10 (0.025)	0.07 (0.017)	-
600	(0.28)	0.12 (0.030)	0.09 (0.022)	0.06 (0.015)
700	(0.33)	-	0.11 (0.027)	0.08 (0.020)
800	(0.38)	-	0.13 (0.033)	0.09 (0.022)
900	(0.42)	-	0.16 (0.040)	0.11 (0.027)
1000	(0.47)	-	-	0.13 (0.033)
1100	(0.52)	-	-	0.15 (0.037)
1250	(0.59)	-	-	0.18 (0.045)

Note: Evaluated at 70°F db/21°F wb

EQUATIONS

The general equation for the sensible heat capacity, *q*, is:

$$q = \rho \dot{Q} c_p (\Delta T) \qquad (1)$$

Where:

- ρ is density,
- $\dot{Q}$ is the volumetric flow rate,
- c_p is the specific heat capacity constant, and
- ΔT is temperature difference through the coil.

The temperature difference is defined differently depending on whether the fluid is being heated or cooled. It is expressed in the following way:

Heated fluid: $\Delta T = T_{out} - T_{in}$ (2)

Cooled fluid: $\Delta T = T_{in} - T_{out}$ (3)

Where:

- T_{in} is the inlet temperature of the fluid, and
- T_{out} is the outlet temperature of the fluid.

The fluid is either air or water.

Equation (1) can be simplified by assuming standard density and specific heat for the particular fluid. If you are at a high altitude please refer to Tech Note 103, *High Altitude Applications*, for more detailed information about the effects of air density. Otherwise, use the following equations to find the leaving fluid temperature.

For air:

q = 1.08 (CFM) ΔT Btu/hr (ΔT is in °F) (4a)

q = 1.21 (L/s) ΔT Watts (ΔT is in °C) (5a)

For water:

q = 500 (GPM) ΔT Btu/hr (ΔT is in °F) (4b)

q = 4.15 (L/s) ΔT kW (ΔT is in °C) (5b)

Example. Consider a MH2430 with 6 GPM (38 L/s) at 140 °F (60 °C) and 600 CFM (280 L/s). The capacity from the table is 38.9 MBH (11.6 kW). Therefore, the leaving air temperature (LAT) is as follows:

$$\text{LAT} = 70 + \frac{38.9 \times 1000}{1.08 \times 600} = 130 \quad °F$$

$$\text{LAT} = 21 + \frac{11.4 \times 1000}{1.21 \times 280} = 54.6 \quad °C$$

Likewise, determine the Leaving Water Temperature (LWT) by using one of the following equations:

$$\text{LWT} = 140 - \frac{38.9 \times 1000}{500 \times 6} = 127 \quad °F$$

$$\text{LWT} = 60 - \frac{11.4}{4.15 \times .38} = 52.8 \quad °C$$

Model Number Cross-Reference Chart

Current Model Number (Coil Included)	Past Model Number (Cabinet only)	Past Model Number (Coil Included)
M2430CL1-H	MH2430	MH2430HW
M3036CL1-H	None	
M3642CL1-H	MH3660	MH3660HW
M4860CL1-H	MH3660	MH3660HW