



Heating and Air Conditioning

## Technical Guide

**CHAMPION®**

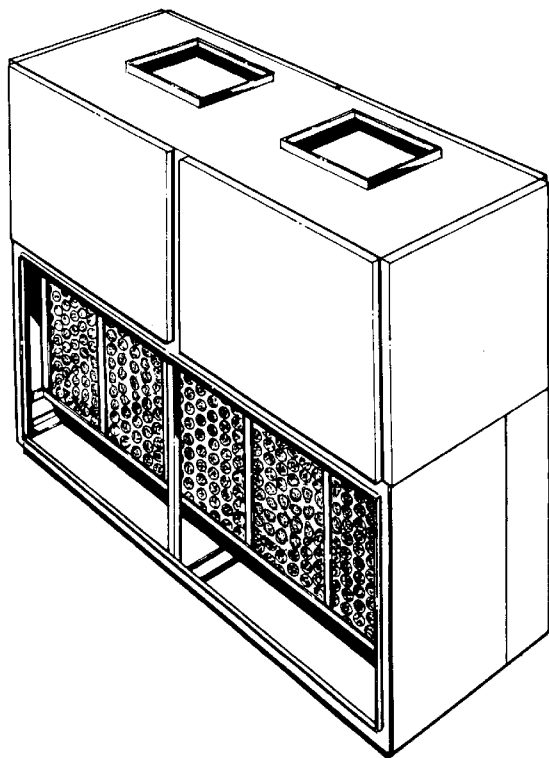
**SPLIT-SYSTEM**

**EVAPORATOR BLOWER**

**L4EU240A**

**20 NOMINAL TONS**

**(WORLD 50 HZ)**



ISO 9001  
Certified Quality  
Management System

## DESCRIPTION

This 20 ton evaporator blower is designed with two distinct modules to provide maximum application flexibility. The units are shipped as single packages with the blower module mounted on top of the coil module. The blower module can be repositioned in the field to meet almost any installation requirement. The unit is manufactured under ISO 9002 Quality System Certification.

The blower module includes the blower wheels and room for a field-mounted motor and drive. The coil module includes direct expansion coils, 25mm (1 in.) throwaway filters, liquid line solenoid valves for both capacity reduction and pumpdown, thermal expansion valves, distributors and a condensate drain pan.

Each evaporator coil is pressurized with air to 2240 kPa (325 psig) and leak tested under water. After the headers are brazed onto the coil and the coil is installed in the unit, the coil is pressurized with a combination of Refrigerant-22 and nitrogen to 1035 kPa (150 psig) for pressure testing and additional leak testing. After the coil is evacuated and dehydrated, it is pressurized with a holding charge of Refrigerant-22 for storage and/or shipping.

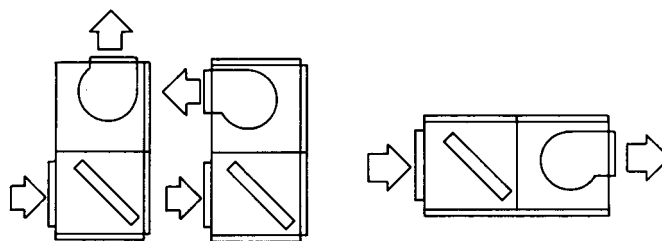
A supply air plenum, return air grille, steam coil, hot water coil, base section, suspension hardware, blower motors and drive accessories are available for field-installation to provide additional application flexibility.

This evaporator blower, applied with a matching condensing unit, will provide years of quiet, efficient and dependable operation.

## FEATURES

**APPLICATION FLEXIBILITY** - This evaporator blower can be arranged for a variety of air discharge patterns in either the horizontal or the vertical position.

The following illustration shows three of the more common installation arrangements. Refer to the unit installation instruction for other possibilities.



The unit can be bottom-supported or ceiling-suspended and can be arranged to meet almost any space or duct requirements. Each unit is available with a choice of blower motors, drive packages plus other accessories to make them suitable for most applications.

**PART LOAD OPERATION** - Each evaporator blower has multiple coils with pre-piped distributors, expansion valves and solenoid valves. They require no field modifications for part load operation. Capacity reduction not only provides economical operation but also maintains more even temperature and humidity levels in the conditioned space.

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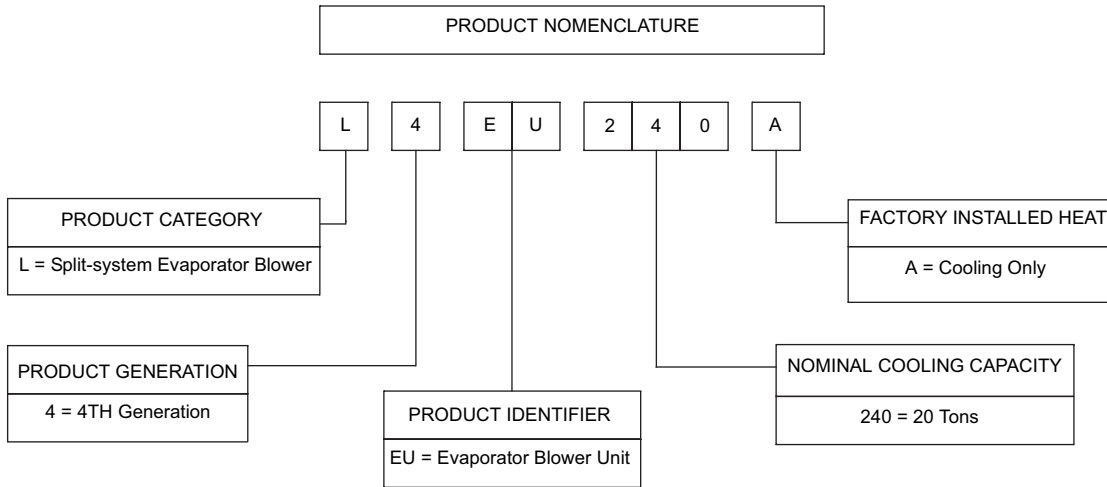
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## FEATURES - CONT.

**EASY SERVICE** - Serviceable expansion valves are provided on every unit. These superior valves are factory-installed to provide many years of trouble-free operation. If service is required, it is not necessary to unbrazed any joints.

**PUMPDOWN** - Each evaporator blower includes a solenoid valve for non-recycling pumpdown. When the cooling requirement in the conditioned space is satisfied, the refrigerant is pumped into the high side of the system.

## ACCESSORIES

**RETURN AIR GRILLE** - This decorative, expanded metal grille enhances the appearance of any unit that has no return air ductwork. It is especially recommended for units located within the conditioned space.

**SUPPLY AIR PLENUM** - This decorative, horizontal discharge plenum enhances the appearance and performance of any unit that does not have supply air ductwork. It has the same durable finish as the evaporator blower, is fully insulated, is shipped ready for mounting on horizontal or vertical units and has grilles which may be adjusted to meet the throw and spread requirements of the conditioned space.

**BASE SECTION** - The base section can be used to elevate units off the floor. If desired, outdoor air may be introduced through these sections by cutting an access opening to accommodate the outdoor air duct connection. The base has a durable finish to match the evaporator blower unit. It may have to be insulated for certain applications.

**SUSPENSION PACKAGE** - This accessory can be used to suspend horizontal units from above without interfering with access to the unit. It can also be used for elevating a floor-mounted unit (either horizontal or vertical) to provide additional height for the installation of a trap at the condensate drain connection. A suspension package can be used with vibration isolators.

**HOT WATER COIL** - A drainable water coil is available for field installation between the blower and the coil modules of both horizontal and vertical units. Since their casings match the dimensions and the finish of the basic units, they become an integral part of the unit after installation. The coil slides out of its casing for easy installation. The coil has copper tubes that have been mechanically expanded into aluminum fins. Both headers are located on the same end of the coil. Each coil is leak-tested at 2240 kPa (325 psig) under water and dried before their connections are capped for storage and shipping.

**STEAM COIL** - A steam coil is available for field installation between the blower and coil modules of both horizontal and vertical units. Since their casings match the dimensions and the finish of the basic units, they become an integral part of the unit after installation. The coil slides out of its casing for easy installation and is pitched in its casing to facilitate condensate drainage. The coil has copper tubes that have been mechanically expanded into aluminum fins. Both headers are located on the same end of the coil. Each coil is leak-tested at 2240 kPa (325 psig) and dried before their connections are capped for storage and shipping.

**BLOWER MOTORS** - Different HP motors are available to meet almost any air delivery requirement. All motors have inherent protection, permanently lubricated ball bearings and get field-mounted within the insulated cabinet of the unit to minimize the transmission of sound to the surrounding space. Power wiring for blower motor is field supplied.

**DRIVE PACKAGES** - Different size pulleys and belts are available to provide a blower RPM range to meet almost any air delivery requirement. Variable pitch motor pulleys can be adjusted to provide the proper blower RPM. All drive packages are rated at least 25% above the nominal HP rating of the blower motor. Two-groove pulleys and two belts are provided on every drive package rated at 5 HP.

**TABLE 1: PHYSICAL DATA - UNIT AND ACCESSORIES**

Component	Description	Model	
		240	
Evaporator Coil	Rows Deep	3	
	Rows High	32	
	Finned Length mm (in.)	2108 (83)	
	Fins per 25mm (1 in.)	13	
	Tube OD (in.)	9.5 3/8	
	Face Area m <sup>2</sup> (sq. ft.)	1.7 (18.4)	
Centrifugal Blowers	Wheel Dia. x Width, mm (in.) (2 Per Unit)	381 x 305 (15 x 12)	
Filters (Throwaway) (8 Req'd)	Size mm (in.)	508 x 559 x 25 (20 x 22 x 1)	
	Face Area m <sup>2</sup> (sq. ft.)	2.2 (24.1)	
Operating Charge	Refrigerant-22 kg (lbs)	3.4 (7.4)	
Drainable, Hot Water Coil Accessory	Rows Deep	2	
	Fins per 25mm (1 in.)	8	
	Tube OD mm (in.)	12.7 (1/2)	
	Face Area m <sup>2</sup> (sq. ft.)	1.35 (14.5)	
	Supply/Return (Copper) OD mm (in.)	34.9 (1-3/8)	
Non-Freeze, Steam Distributing Coil Accessory	Rows Deep	1	
	Fins per 25mm (1 in.)	8	
	Tube OD mm (in.) x ID mm (in.)	25 (1) x 15.9 (5/8)	
	Face Area m <sup>2</sup> (sq. ft.)	1.3 (13.5)	
	Inlet/Outlet (Brass) NPTEmm (in.)	38.1 (1-1/2)	
Weight Kg (Lbs.)	Shipping <sup>1</sup>	313 (690)	
	Operating	363 (800)	
Accessory Operating Weight (Lbs.)	Motor & Drive	3 HP	41 (90)
		5 HP	54 (120)
	Supply Air Plenum	68 (150)	
	Base	54 (120)	
	Return Air Grille	7 (15)	
	Steam Coil	68 (150)	
	Hot Water Coil	68 (150)	

1. Less Motor and Drive.

**TABLE 2: ELECTRICAL DATA**

Motor Rating	Power Supply	Nameplate Amps	MCA	Max. Fuse <sup>1</sup> / Breaker <sup>2</sup> Size (Amps)
3 HP	380-3-50	5.4	6.8	15
	415-3-50	5.2	6.5	15
5 HP	380-3-50	9.0	11.3	25
	415-3-50	8.7	11.0	25


1. Dual element, time delay fuses.

2. HACR type per NEC.

**TABLE 3: SUPPLY AIR BLOWER PERFORMANCE<sup>1</sup>, m<sup>3</sup>/s**

RPM	AIRFLOW														
	3.0 m <sup>3</sup> /s			3.4 m <sup>3</sup> /s			3.8 m <sup>3</sup> /s			4.2 m <sup>3</sup> /s			4.5 m <sup>3</sup> /s		
	ESP <sup>2</sup> (Pa)	Output <sup>3</sup> (kW)	Input (kW)	ESP <sup>2</sup> (Pa)	Output <sup>3</sup> (kW)	Input (kW)	ESP <sup>2</sup> (Pa)	Output <sup>3</sup> (kW)	Input (kW)	ESP <sup>2</sup> (Pa)	Output <sup>3</sup> (kW)	Input (kW)	ESP <sup>2</sup> (Pa)	Output <sup>3</sup> (kW)	Input (kW)
600	62	1.04	1.2	25	1.27	1.5	-	-	-	-	-	-	-	-	-
700	141	1.34	1.8	107	1.56	1.8	64	1.79	2.1	15	2.09	2.4	-	-	-
800	236	1.71	2.0	206	1.94	2.3	166	2.16	2.5	124	2.53	2.9	74	2.98	3.5
900	332	2.09	2.4	305	2.38	2.8	270	2.76	3.2	233	3.20	3.7	186	3.73	4.3
1000	432	2.53	2.9	404	2.98	3.5	374	3.50	4.1	340	4.02	4.7	-	-	-

- Unit resistance is based on a wet evaporator coil and clean filters.
- Available ESP (external static pressure) in kPa/IWG to overcome the resistance of the duct system and any accessories added to the unit. Refer to the blower motor and drive data table and the accessory static resistance table for additional information.
- Motors can be selected to operate into their service factor because they are located in the moving air stream, upstream of any heating device. Units with steam or hot water coils are the only exception. On these units, the kw/BHP must not exceed the nominal HP rating of the motor.


 5 HP Motor Required

**TABLE 4: SUPPLY AIR BLOWER PERFORMANCE<sup>1</sup>, CFM**

RPM*	AIRFLOW														
	6400 CFM			7200 CFM			8000 CFM			8800 CFM			9600 CFM		
	ESP <sup>2</sup> (iwg)	Output <sup>3</sup> (bhp)	Input (kW)	ESP <sup>2</sup> (iwg)	Output <sup>3</sup> (bhp)	Input (kW)	ESP <sup>2</sup> (iwg)	Output <sup>3</sup> (bhp)	Input (kW)	ESP <sup>2</sup> (iwg)	Output <sup>3</sup> (bhp)	Input (kW)	ESP <sup>2</sup> (iwg)	Output <sup>3</sup> (bhp)	Input (kW)
600	0.25	1.4	1.2	0.10	1.7	1.5	-	-	-	-	-	-	-	-	-
700	0.57	1.8	1.6	0.43	2.1	1.8	0.26	2.4	2.1	0.06	2.8	2.4	-	-	-
800	0.95	2.3	2.0	0.83	2.6	2.3	0.67	2.9	2.5	0.50	3.4	2.9	0.30	4.0	3.5
900	1.34	2.8	2.4	1.23	3.2	2.8	1.09	3.7	3.2	0.94	4.3	3.7	0.75	5.0	4.3
1000	1.74	3.4	2.9	1.63	4.0	3.5	1.51	4.7	4.1	1.34	5.4	4.7	-	-	-

- Unit resistance is based on a wet evaporator coil and clean filters.
- Available ESP (external static pressure) in kPa/IWG to overcome the resistance of the duct system and any accessories added to the unit. Refer to the blower motor and drive data table and the accessory static resistance table for additional information.
- Motors can be selected to operate into their service factor because they are located in the moving air stream, upstream of any heating device. Units with steam or hot water coils are the only exception. On these units, the kw/BHP must not exceed the nominal HP rating of the motor.

\*Min./Max. speed for 3 HP drive accessory is 615/795 RPM.  
Min./Max. speed for 5 HP drive accessory is 740/902 RPM.

 5 HP Motor Required

**TABLE 5: BLOWER MOTOR AND DRIVE DATA**

Drive Accessory Model No.	Motor				Belt	Blower Pulley		Motor Pulley	
	RPM Range	HP <sup>1</sup>	Frame	Shaft Size		Mfgs. No.	Size	Mfgs. No.	Size
1LD0451	616 - 798	3	56	7/8	A52	AK84	8 x 1-3/16	1VM50	3.4-4.4 x 7/8
1LD0452	740 - 902	5	184	1-1/8	A57 <sup>2</sup>	AK114	11 x 1-3/16	2VP71	5.2-6.2 x 1-1/8

- All motors are 1450 RPM and have a 1.15 service factor.
- Two matched belts.

**TABLE 6: HOT WATER CAPACITY<sup>1</sup>, kW / MBH**

Hot Water Coil Accessory	Unit Model	Ls / GPM	CFM	Entering Water Temp. Minus Entering Air Temp., °C/°F				
				70	90	110	130	150
1HW0405	240	2.2 / 35	3.0 / 6400	52 / 179	67 / 229	82 / 280	97 / 331	112 / 382
			3.8 / 8000	58 / 199	75 / 255	91 / 312	108 / 369	124 / 425
			4.5 / 9600	64 / 220	83 / 282	101 / 344	122 / 407	137 / 469

- These capacities do not include any blower motor heat.  
NOTE: Water Temperature Drop (°F) = 2 x MBH / GPM.

Hot Water Coil Accessory	Ls / GPM	Pressure Drop <sup>1</sup> PSI	Capacity Correction Factory
1HW0405	.95 / 15	0.2	0.74
	2.2 / 35	0.8	1.00
	3.5 / 55	1.5	1.04
	4.7 / 75	2.5	1.06

- For pressure drop in feet (water), multiply these values by 2.31.

CAUTION: Do NOT operate a supply air blower motor above its nominal HP rating when a unit is equipped with a hot water coil accessory.  
Do NOT use steam in these hot water coils.

**TABLE 7: STEAM COIL CAPACITY<sup>1</sup>, kW @ 14 kPa / MBH @ 2 PSIG<sup>2</sup>**

Steam Coil Model	Unit Model	m <sup>3</sup> /s / CFM	Dry Bulb Temperature Of Air Entering Coil, °F			
			-12 / 10	-1 / 30	10 / 50	21 / 70
1NF0453	240	3.0 / 6400	120 / 402	107 / 364	95 / 325	84 / 286
		3.8 / 8000	136 / 464	123 / 419	110 / 374	97 / 330
		4.5 / 9600	141 / 481	128 / 435	114 / 388	100 / 342

- These capacities do not include any blower motor heat.
- Multiply these capacities by the following factors to correct for higher steam pressures.

Steam pressure, kPa/psig	35 / 5	70 / 10	105 / 15	140 / 20	175 / 25
Capacity correction factor	1.05	1.12	1.19	1.25	1.30

NOTE: Steam rate (lbs./hr) = 1.025 x MBH

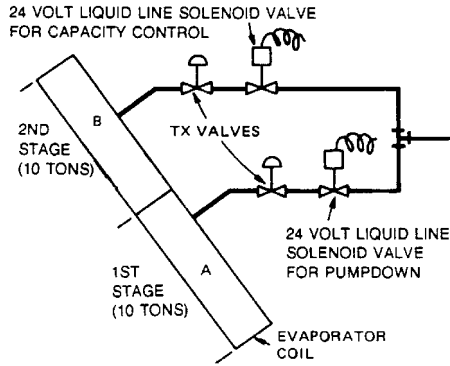
CAUTION: Do NOT operate a motor above its nominal HP rating when a unit is equipped with a hot water coil accessory.  
Although these coils are suitable for much higher pressures, steam above 25 psig will provide too much heat and could damage the blower motor.

**TABLE 8: ACCESSORY STATIC RESISTANCE Pa / IWG**

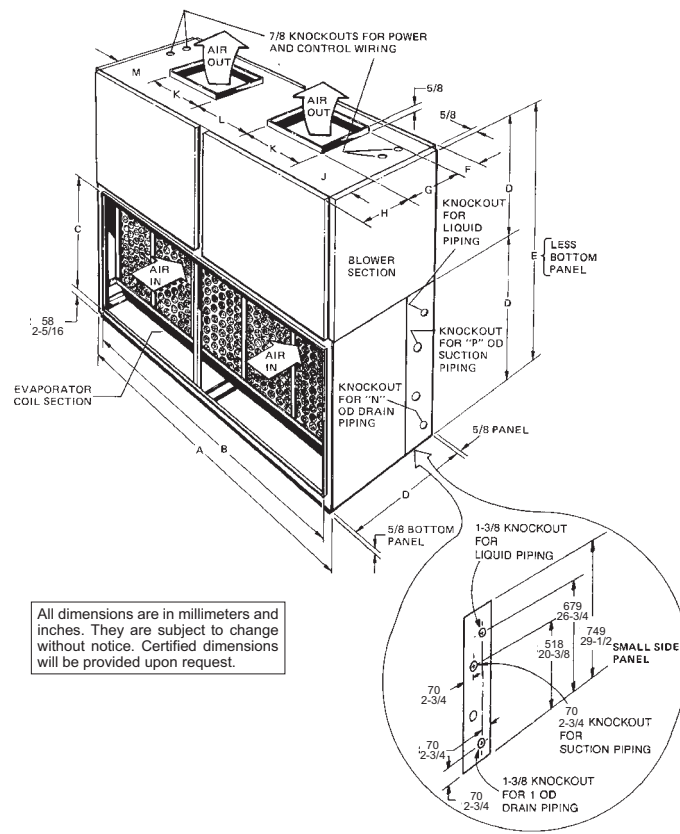
m <sup>3</sup> /s / CFM	Supply Air Plenum	Return Air Grille	Non Freeze Steam Coil	Hot Water Coil
3.0 / 6400	7.4 / .03	9.9 / .04	34.7 / .14	17.4 / .07
3.4 / 7200	7.4 / .03	12.4 / .05	42.2 / .17	19.8 / .08
3.8 / 8000	9.9 / .04	14.9 / .06	52.0 / .21	24.8 / .10
4.2 / 8800	12.4 / .05	17.3 / .07	62.0 / .25	29.8 / .12
4.5 / 9600	14.9 / .06	19.8 / .08	72.0 / .29	34.7 / .14

**TABLE 9: PLENUM PERFORMANCE**

m <sup>3</sup> /s / CFM	Throw, Meters / Feet	
	Minimum	Maximum
3.0 / 6400	24 / 80	44 / 145
3.8 / 8000	30 / 98	50 / 165
4.5 / 9600	35 / 115	56 / 185



**FIGURE 1 - COIL CURCUITING - LIQUID LINE**



**FIGURE 2 - UNIT DIMENSIONS**

A	B	C	D	E	F	G	H	J	K	L	M	N	P
2273/89-1/2	215985	664/26-1/8	749/29-1/2	1499/59	62/2-7/16	403/15-7/8	316/12-7/16	527/20-3/4	406/16	406/16	527/20-3/4	25/1	41/1-5/8

**ACCESSORIES**

- Heating Coil - Add 154mm (6 in.) to overall unit height when used.
- Plenum - Add 625mm (24-5/8 in.) to overall unit height when used.
- Base - Add 594mm (23-3/8 in.) to overall unit height when used.

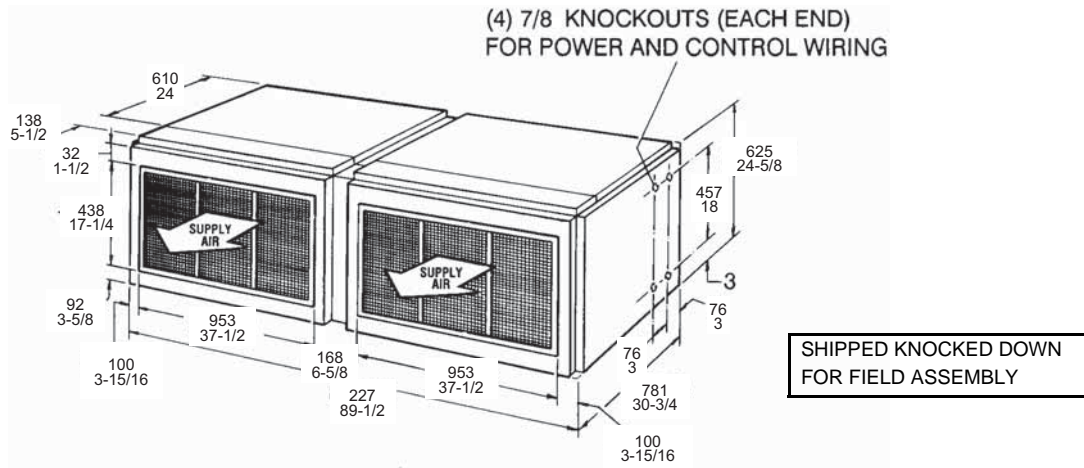
**CLEARANCES**

- 610mm (24 in.) on one side for piping connection and access to blower motor.
- 25mm (1 in.) on opposite side.
- 25mm (1 in.) on rear.

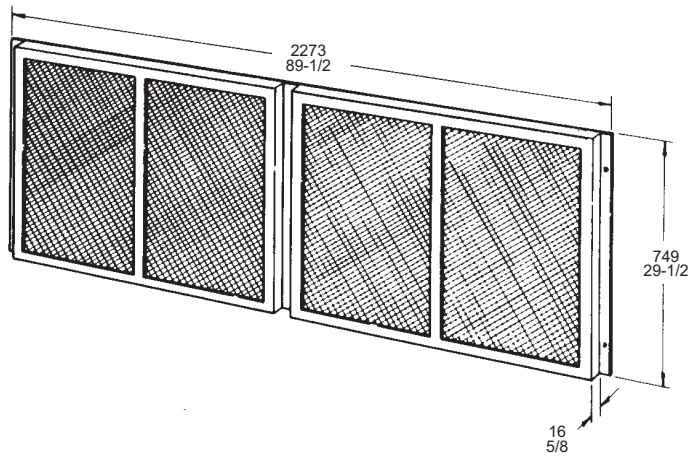
**APPROXIMATE SHIPPING WEIGHT  
(Less Motor and Drive)**

- LEU240 - 363 kg

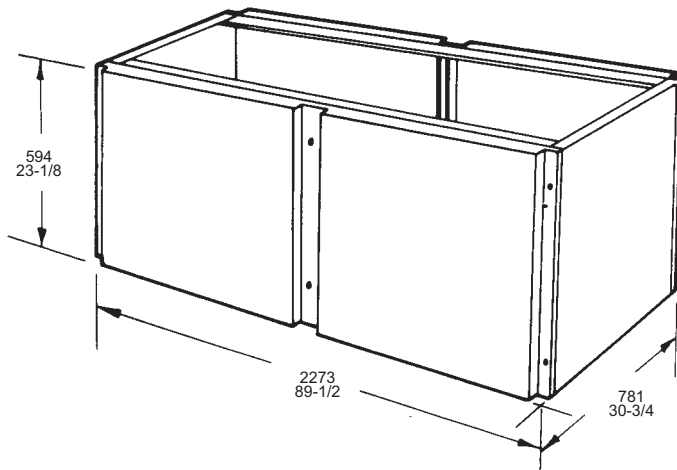
**ACCESSORY DIMENSIONS**



**FIGURE 3 - SUPPLY AIR PLENUM - MODEL 1SP0405**



**FIGURE 4 - RETURN AIR GRILLE - MODEL 1RG0405**

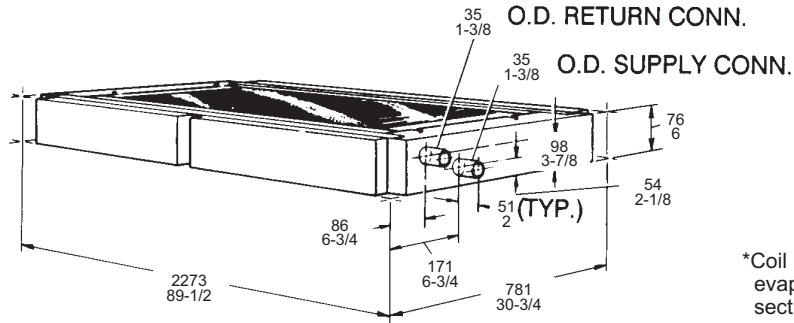


SHIPPED KNOCKED DOWN  
FOR FIELD ASSEMBLY

\*Ventilation air can be brought into the unit through the base section providing the base section is fully insulated in the field.

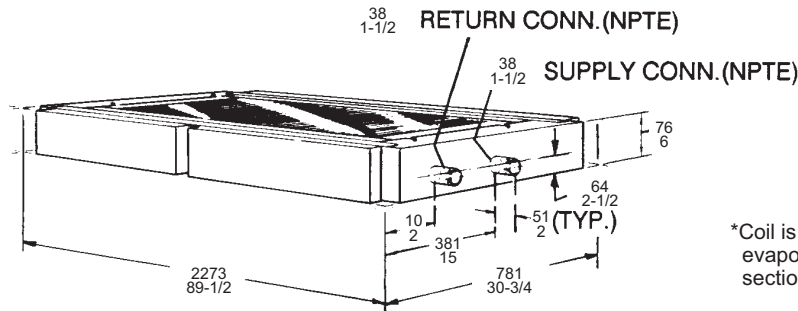
**FIGURE 5 - BASE SECTION\* - MODEL 1BS0405**





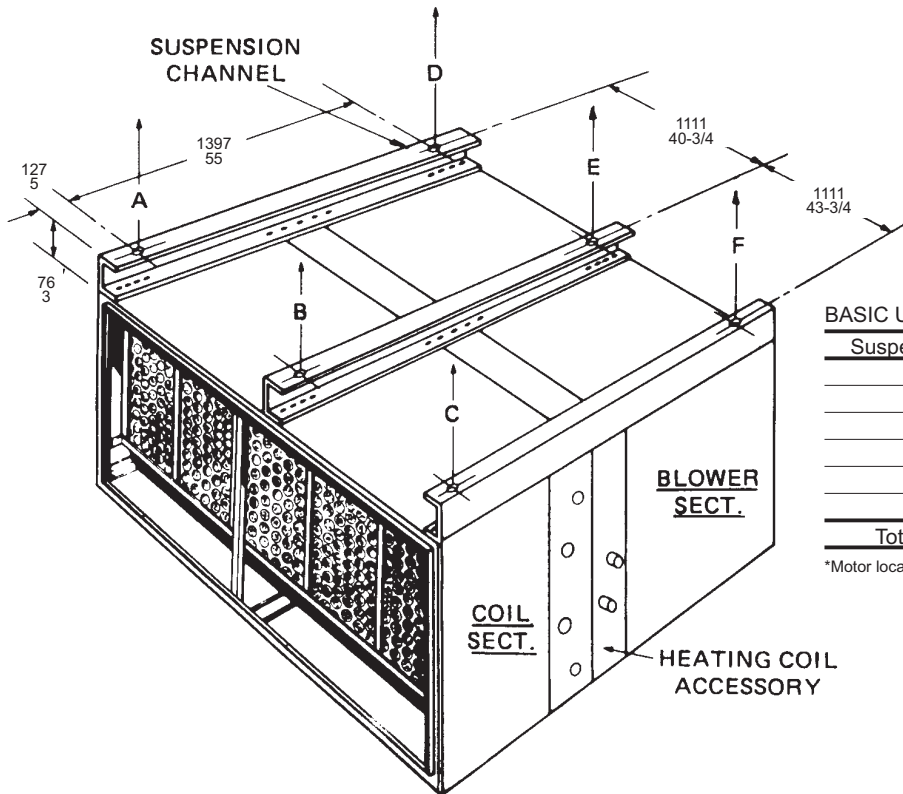
\*Coil is field-installed between the evaporator coil and the blower section of the unit.

**FIGURE 6 - HOT WATER COIL\* - MODEL 1HW0405**



\*Coil is field-installed between the evaporator coil and the blower section of the unit.

**FIGURE 7 - STEAM COIL\* - MODEL 1NF0453**



BASIC UNIT SUSPENSION WGTs, kg/lbs

Suspension Point	w/3 HP Motor*
A	64.4 / 142
B	59.8 / 132
C	68.9/152
D	73.5 / 162
E	56.8 / 132
F	57.6 / 127
<b>Total Weight</b>	<b>38.1 / 847</b>

\*Motor location at suspension point "F".

**FIGURE 8 - SUSPENSION KIT - MODEL 1HH0451**





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