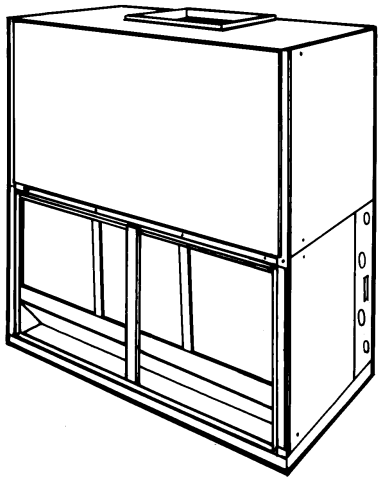
SUNLINE™ SPLIT-SYSTEM EVAPORATOR BLOWER (AIR COOLED)

INSTALLATION INSTRUCTION

Supersedes: 550.39-N5YI (894)

035-12124-000 Rev. A (0501)

MODEL K3EU180A50
(WORLD 50 HZ)



GENERAL

This completely assembled blower unit is manufactured under ISO 9002 Quality System Certification and includes a well-insulated cabinet, a DX cooling coil with copper tubes and aluminum fins, an expansion valve, a distributor, throwaway filters, a centrifugal blower, a blower motor, a blower motor contactor, an adjustable belt drive and a small holding charge of Refrigerant-22.

The unit is shipped in the vertical position with a vertical air discharge. The blower section can be repositioned as shown in Figure1 for horizontal applications.

REFERENCE

This instruction covers the installation of the evaporator blower unit. For information on the installation and operation of the matching condensing unit refer to Form 035-17263-000.

Additional information for the accessories on this equipment is available in the following instructions:

- Electric Heater - 550.13-N10.1V
- Supply Air Plenum - 550.13-N10.2V
- Return Air Grille - 550.13-N10.3V
- Base - 550.13-N10.4V
- Hot Water & Steam Coil - 550.13-N10.7V
- Suspension Mounting - 550.13-N7.1

Renewal Parts:

- Refer to Parts Manual for complete listing of replacement parts on this equipment.

All forms may be ordered from:

Standard Register
2101 West Tecumseh Road
Norman, OK 73069

INSPECTION

As soon as a unit is received, it should be inspected for possible damage during transit. If damage is evident, the extent of the damage should be noted on the carrier's delivery receipt. A separate request for inspection by the carrier's agent should be made in writing. See Local Distributor for additional information.

NOMENCLATURE

K 3 EU 180 A 50

Product Category
K = Split-System Evaporator Blower

Product Generation
1,2,3 = Design Level

Product Identifier
EU = Evaporator Blower Unit

Nominal Cooling Capacity
180 = 180Mbh (52.7kW)

Refrigerant Line Connections
A = Cooling Only

Voltage Code
50 = 380/415-3-50

CAUTION

THIS PRODUCT MUST BE INSTALLED IN STRICT COMPLIANCE WITH THE ENCLOSED INSTALLATION INSTRUCTIONS AND ANY APPLICABLE LOCAL, STATE, AND NATIONAL CODES INCLUDING, BUT NOT LIMITED TO, BUILDING, ELECTRICAL, AND MECHANICAL CODES.

WARNING

INCORRECT INSTALLATION MAY CREATE A CONDITION WHERE THE OPERATION OF THE PRODUCT COULD CAUSE PERSONAL INJURY OR PROPERTY DAMAGE.

Installer should pay particular attention to the words: *NOTE, CAUTION* and *WARNING*. Notes are intended to clarify or make the installation easier. Cautions are given to prevent equipment damage. Warnings are given to alert installer that personal injury and/or equipment damage may result if installation procedure is not

INSTALLATION

LIMITATIONS

These units must be installed in accordance with applicable national, local and municipal safety codes.

If components are to be added to a unit to meet local codes, they are to be installed at the dealer's and/or the customer's expense. Refer to Table 2 for Unit Application Data.

LOCATION

This blower unit is not designed for outdoor installation. It must be located within the building structure, either inside or outside the conditioned space.

The unit should be located as close to the condensing unit as practical and positioned to minimize bends in the refrigerant piping.

Units being installed vertically or horizontally can be set directly on a floor or platform, or they can be supported by metal or wooden beams.

Units being installed horizontally can also be suspended from above. Refer to the suspension accessory instruction installation procedures.

CLEARANCES

The clearances listed on the unit dimension drawing (Figure 7) are required for the proper service and operation of the unit.

RIGGING AND HANDLING

Be careful when moving the unit. Do not remove any packaging until the unit is near its final location.

The packaging consists of a bottom wooden skid that can be lifted with a fork truck from any direction, a clear heavy mil bag that covers the entire unit, and strapping that secures the clear bag to the bottom of the skid.

These units can be rigged with slings under the bottom skid.

CAUTION: Spreader bars should be used to prevent slings from crushing the unit panels and frame.

Before rigging any unit, determine its weight from Table 1. Before rigging a unit for horizontal installation, make sure that its weight will be distributed equally.

Table 1 - PHYSICAL DATA

Evaporator Coil	Rows Deep		4
	Rows High		26
	Finned Length (in./mm)		54.5/1384
	Fin/Inch		13
	Tube O.D. (in./mm)		3/8/9.6
	Face Area (Ft^2/m^2)		12.4/1.15
Centrifugal Blower[1]	Wheel Dia. x Width	inches	18 x 18
		mm	457 x 457
Filters[2] (6 Req'd)	Size	inches	20 x 20 x1
		mm	508 x 508 x 25
	Face Area ($Ft.^2/m^2$)		16.7/1.5
Operating Charge (Refrigerant 22) (Lbs/Kg)			5.5/2.5
Weight (Lbs/Kg)	Shipping		480/218
	Operating		440/200
Accessory Weights(Lbs/Kg)	Electric Heaters	10 kW	63/28.5
		16 kW	66/29.9
		26 kW	71/32.2
		36 kW	74/33.5
	Supply Air Plenum		144/65
	Base		65/29
	Return Air Grille		19/9
	Horizontal Suspension		68/31
	Steam Coil		149/68
	Hot Water Coil		135/61

[1]Refer to data in Table 7 for complete motor specifications.

[2]Filters are throwaway type. Two inch (50mm) filters may be used, if required by removing the 1" (25mm) filter retaining angles provided in the filter rack.

TABLE 2 - UNIT APPLICATION DATA

Power Supply	Voltage Variation*		Supply Air Range CFM/m^3s		Entering Air Temperature, °F(°C)			
					Cooling-db/wb		Heating-db	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
380/415-3-50	342	457	4800/2.26	7200/3.40	68/57 (20/14)	86/72 (30/22)	-	77 (25)

*Utilization Range “A” in accordance with ARI Standard 110.

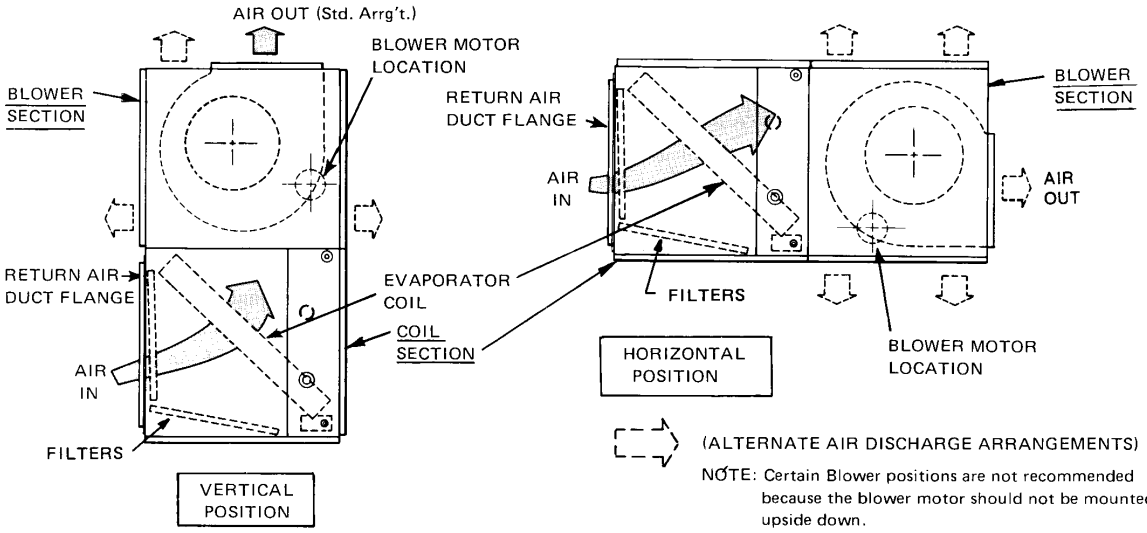


FIG 1 - VERTICAL AND HORIZONTAL APPLICATION

VERTICAL/HORIZONTAL INSTALLATION

The unit is shipped for vertical installation with a vertical air discharge as shown in Figure 1, but may be converted to other arrangements per the following instructions.

1. Remove the panels from the blower section.
2. Remove the four Phillips machine bolts that hold the coil and blower sections together. A bolt is located near each corner.
3. Move the blower section to the proper location.
4. Attach the blower section to the coil section with the machine bolts removed in Step 2.
5. Before replacing the panel, see Duct Connection and Drain Connection.
6. Replace the panels.

DUCT CONNECTIONS

All ducts should be designed and installed in accordance with applicable national and/or local codes.

Ducts should be sized no smaller than the duct flanges on the unit or the accessory electric heater (if used). Refer to the unit dimensions (Figure 7) and the heater detail (Figure 2) for these sizes.

The field installed air plenum and return air grille accessories should be used in place of ductwork only when a free blow/free return application is practical.

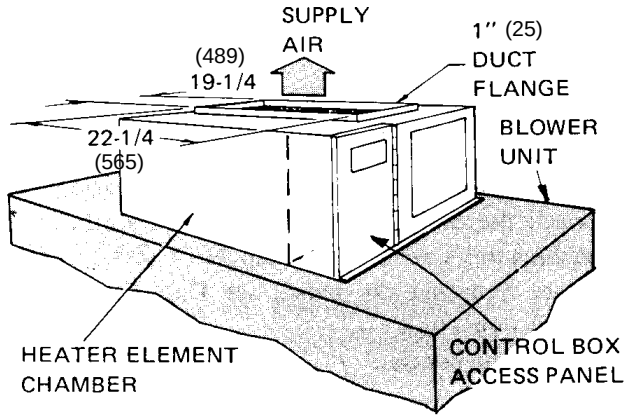


FIG. 2 - ELECTRIC HEATER ACCESSORY

REFRIGERANT MAINS

Many service problems can be avoided by taking adequate precautions to provide an internally clean and dry system, and by using procedures and materials that conform with established standards.

Hard drawn copper tubing should be used where no appreciable amount of bending around pipes or other obstructions in necessary. Use long radius ells wherever possible. If soft copper is used, care should be taken to avoid sharp bends which may cause a restriction.

Pack fiber glass insulation and a sealing material such as Permagum around refrigerant lines where they penetrate a wall to reduce vibration and to retain some flexibility.

Support all refrigerant lines at minimum intervals with suitable hangers, brackets or clamps.

Braze all copper to copper joints witH Sil-Fos 5 or equivalent brazing material. **Do not use soft solder.**

Never braze or solder liquid and suction lines together. The complete suction line should be insulated with no less the ½" (12mm) ARMAFLEX or equivalent.

If it is desirable to tape or wire the liquid and suction lines together for support purposes, they must be completely insulated from each other.

INSTALLING REFRIGERANT MAINS

The units are evacuated and dehydrated at the factory and shipped with a holding charge of Refrigerant-22. The suction and liquid connections are sealed with copper disks.

WARNING: Provisions for recovering refrigerant releases must be available during all phases of installation, leak testing and charging. Do NOT release refrigerant into the atmosphere. A Schrader valve is provided on the coil header for recovering refrigerant holding charge.

If the unit has already lost its holding charge, it should be leak tested and the necessary repairs should be made. If the unit has maintained its holding charge, you can assume that it has no leaks and proceed with the installation.

Make sure the refrigerant in the lines has been recovered, then drill a small hole through the discs to prevent any internal pressure from blowing them off and to allow the flow of dry nitrogen through the connections when unbrazing the closures.

NOTE: To minimize the possibility of system failure due to dirt and moisture, a filter-drier must be installed in each liquid line as close to the evaporator as possible. Filter-driers are not supplied with the evaporator blowers. They are supplied with the matching condensing sections.

The temperature required to make or break a brazed joint is sufficiently high to cause oxidation of the copper unless an inert atmosphere is provide.

CAUTION: Dry nitrogen should flow through a brazed joint at all times when heat is being applied and until the joint has cooled.

The liquid, suction and drain connections inside the unit must be piped to the outside. Refer to Unit Dimensions for locations of the access openings in the unit panel.

Protective grommets are supplied by the factory for field placement into these access openings.

The blower units are shipped with the coil section side panels suitable for right hand piping connections when viewed from the return air side of the unit.

The refrigerant piping and the condensate drain connection may be routed through either side of the unit.

If left hand piping is required, the two panels on the right side of the coil section can be interchanged with the single panel on the left hand side of the coil section.

When left hand piping connections are installed, the suction line must be insulated to prevent moisture from condensing and being carried into the blower section.

EXPANSION VALVE BULB

The expansion valve bulb must be fastened in a 4 o'clock position to the suction line outside the cabinet after the piping connections have been made. Use the clamps supplied with the valve.

DRAIN CONNECTION

The drain line **MUST** be trapped because the coil is located on the negative side of the supply air blower. It must also be protected from freezing temperatures.

A ⅞" (22.2mm) OD stub connection is provided within the cabinet on both ends of the condensate drain pan for either left hand or right hand piping connections. Refer to Figure 3 for recommended drain piping.

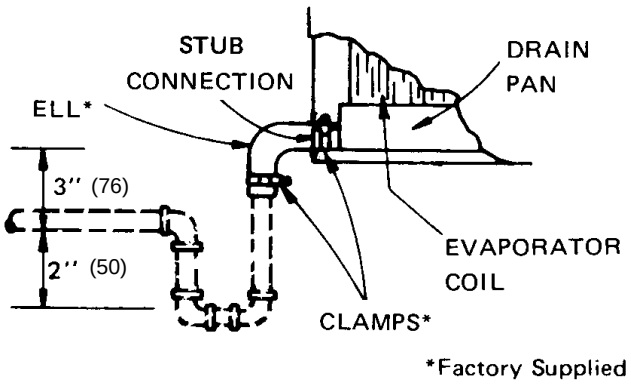


FIG 3 - RECOMMENDED DRAIN PIPING

The drain line is usually located on the same end of the coil section as the refrigerant connections. The line should be insulated where moisture drippage will be objectionable or cause damage to the area. Seal the unused drain connection with a suitable mastic.

The 3" (76mm) dimension must equal or exceed the negative static pressure developed by the supply air blower. If it does not, condensate will not drain properly and may overflow the drain pan. The trap must be at least 2" (50mm) deep to maintain a water seal under all operating conditions, especially during blower start-up.

SUPPLY AIR BLOWER ADJUSTMENT

The RPM of the supply air blower will depend on the required airflow, the unit accessories and the static resistances of both the supply and the return air duct systems. With this information, the RPM for the supply air blower can be determined from the blower performance in Table 5

Knowing the required blower RPM and the blower motor HP, the setting (turns open) for the supply air motor pulley can be determined from Table 3..

TABLE 3 - SUPPLY AIR BLOWER MOTOR PULLEY ADJUSTMENT

TURNS OPEN*	BLOWER DRIVE RANGE (RPM)
	615-800
5	615
4	652
3	689
2	726
1	763
0	800

* Pulleys can be adjusted in half-turn increments.

Each motor pulley has:

1. A threaded barrel with two flats (or notched recesses) 180 degrees apart.
2. A movable flange with one set screw.

After the movable flange has been rotated to the proper number of “turns open”, the set screw should be tightened against the flat on the barrel to lock the movable flange in place. If the pulley includes a locking collar, the locking collar must be loosened to adjust the setting of the movable flange.

Note the following:

1. The supply airflow must be within the limitations shown in Table 2.
2. All pulleys can be adjusted in half-turn increments.
3. The tension on the belt should be adjusted for a deflection of 3/16" (5mm) per foot (305mm) of belt span with an applied force of approximately 3 lbs (1.4kg). This adjustment is made by moving the blower motor mounting plate. Refer to Figure 4. Turning the adjustment bolt (B) moves the motor mounting plate up or down. Note - Never loosen the two nuts (C). Four hex nuts (A) have to be loosed to move the mounting plate and retightened after the mounting plate has been moved to the proper position.

4. All pulleys are factory aligned.

5. All supply air motor pulleys are factory set at two “turns open.”

After the supply air blower motor is operating, adjust the resistances in both the supply and the return duct systems to balance the air distribution throughout the conditioned space. The job specifications may require that this balancing be done by someone other than the equipment installer.

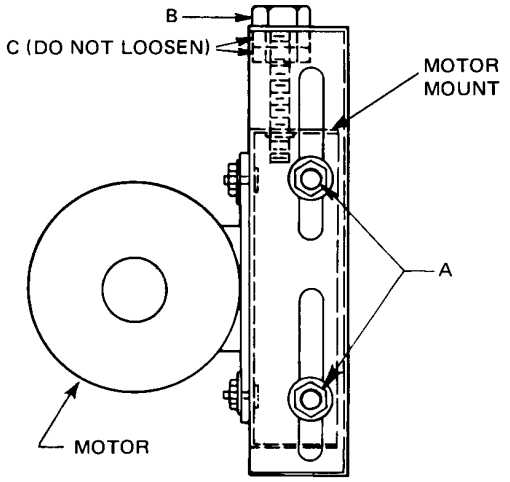


FIG 4 - TYPICAL MOTOR MOUNTING ASSEMBLY

To check the supply air airflow after the the initial balancing has been completed:

1. Drill two holes 5/16" (8mm) dia. in the side panel as shown in Figure 5.

2. Insert at least 8" (200mm) of 1/4" (6.3mm) O.D. tubing into each of these holes for sufficient penetration into the air flow on both sides of the evaporator coil.

NOTE: The tubes must be inserted and held in a position perpendicular to the air flow so that velocity pressure will not affect the static pressure reading.

3. Using an inclined manometer, determine the pressure drop across a dry evaporator coil. Since the moisture on an evaporator coil may vary greatly, measuring the pressure drop across a wet coil under field conditions would be inaccurate. To assure a dry coil, the refrigerant system should be de-energized while the test is being run.

4. Knowing the pressure drop across a dry coil, the actual airflow through the unit can be determined from the curve in Figure 6.

If the airflow is above or below the specified valve, the supply air motor pulley may have to be readjusted. After one hour of operation, check the belt and pulleys for tightness and alignment.

WARNING: Failure to properly adjust the total system air quantity can result in extensive blower damage.

After readings have been obtained, remove the tubes and seal up the drilled holes in the side panel with 5/16" (8mm) dia. dot plugs (P/N 029-13880) available through normal parts ordering procedure.

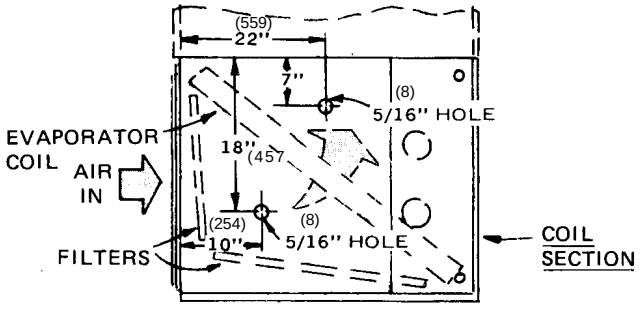


FIG 5 - HOLE LOCATIONS
TO DETERMINE PRESSURE DROP READINGS
ACROSS THE DRY EVAPORATOR

NOTE; SHUT DOWN THE REFRIGERANT SYSTEM BEFORE TAKING ANY TEST MEASUREMENTS TO ASSURE A DRY EVAPORATOR COIL

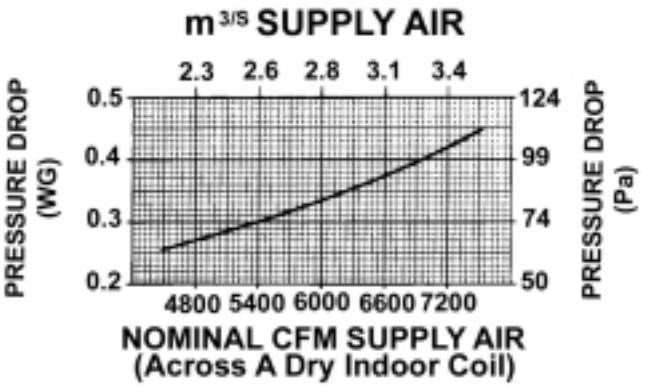


FIG 6 - PRESSURE DROP VS SUPPLY AIRFLOW

TABLE 4 - ELECTRICAL DATA

Blower Motor HP/kW	Power Supply	FLA	LRA	Maximum Fuse Size* Amps	Maximum Wire Length* * Ft.(m)
3 / 2.2	380/415-3-50	5.2	37.0	10	400 (122)

* Dual element, time delay fuses.

** Based on three 60° C, 14 AWG, insulated copper conductors in steel conduit and a 3% voltage drop.

TABLE 5 - BLOWER PERFORMANCE

SUPPLY AIR BLOWER PERFORMANCE[1] - (CFM)

BLOWER SPEED RPM	AIRFLOW														
	ESP[2] (IWG)	OUTPUT (BHP)	INPUT (kW)	ESP[2] (IWG)	OUTPUT (BHP)	INPUT (KW)	ESP[2] (IWG)	OUTPUT (BHP)	INPUT (kW)	ESP[2] (IWG)	OUTPUT (BHP)	INPUT (kW)	ESP[2] (IWG)	OUTPUT (BHP)	INPUT (kW
	4800 CFM			5400 CFM			6000 CFM			6600 CFM			7200 CFM		
600	0.46	1.44	1.34	0.30	1.68	1.56	0.11	1.96	1.80	-	-	-	-	-	-
625	0.55	1.54	1.43	0.40	1.79	1.64	0.22	2.08	1.90	0.01	2.41	2.20	-	-	-
700	0.84	1.83	1.68	0.70	2.12	1.94	0.54	2.43	2.22	0.36	2.77	2.54	0.12	3.12	2.82
800	1.26	2.38	2.17	1.15	2.70	2.47	1.00	3.03	2.74	0.83	3.37	3.05	0.62	3.75	-
900	1.70	2.95	2.68	1.63	3.30	2.99	1.52	3.67	-	-	-	-	-	-	-

SUPPLY AIR BLOWER PERFORMANCE[1] - (m^3/s)

BLOWER SPEED RPM	AIRFLOW														
	ESP[2] (Pa)	OUTPUT (kW)	INPUT (kW)	ESP[2] (Pa)	OUTPUT (kW)	INPUT (kW)	ESP[2] (Pa)	OUTPUT (kW)	INPUT (kW)	ESP[2] (Pa)	OUTPUT (kW)	INPUT (kW)	ESP[2] (Pa)	OUTPUT (kW)	INPUT (kW)
	2.26 m^3/s			2.55 m^3/s			2.83 m^3/s			3.11 m^3/s			3.40 m^3/s		
600	114	1.07	1.34	74	1.25	1.56	27	1.46	1.80	-	-	-	-	-	-
625	136	1.15	1.43	99	1.33	1.64	55	1.55	1.90	3	1.08	2.20	-	-	-
700	208	1.36	1.68	174	1.58	1.94	134	1.81	2.22	89	2.06	2.54	30	2.32	2.82
800	312	1.77	2.17	285	2.01	2.47	248	2.26	2.74	206	2.51	3.05	154	2.79	-
900	422	2.20	2.68	404	2.46	2.99	311	2.73	-	-	-	-	-	-	-

[1] Unit resistance is based on a wet evaporator coil and clean filters.

[2] Available static pressure in IWG (Pa) to overcome the resistance of the duct system and any accessories added to the unit. Refer to Table 6 for the resistance of these accessories and to Table 7 for additional motor and drive data

NOTE: Motors can be selected to operate into the service factor because they are located in the moving air stream, upstream of any heating device.

LEGEND:

RPM range for standard factory-mounted drive components.

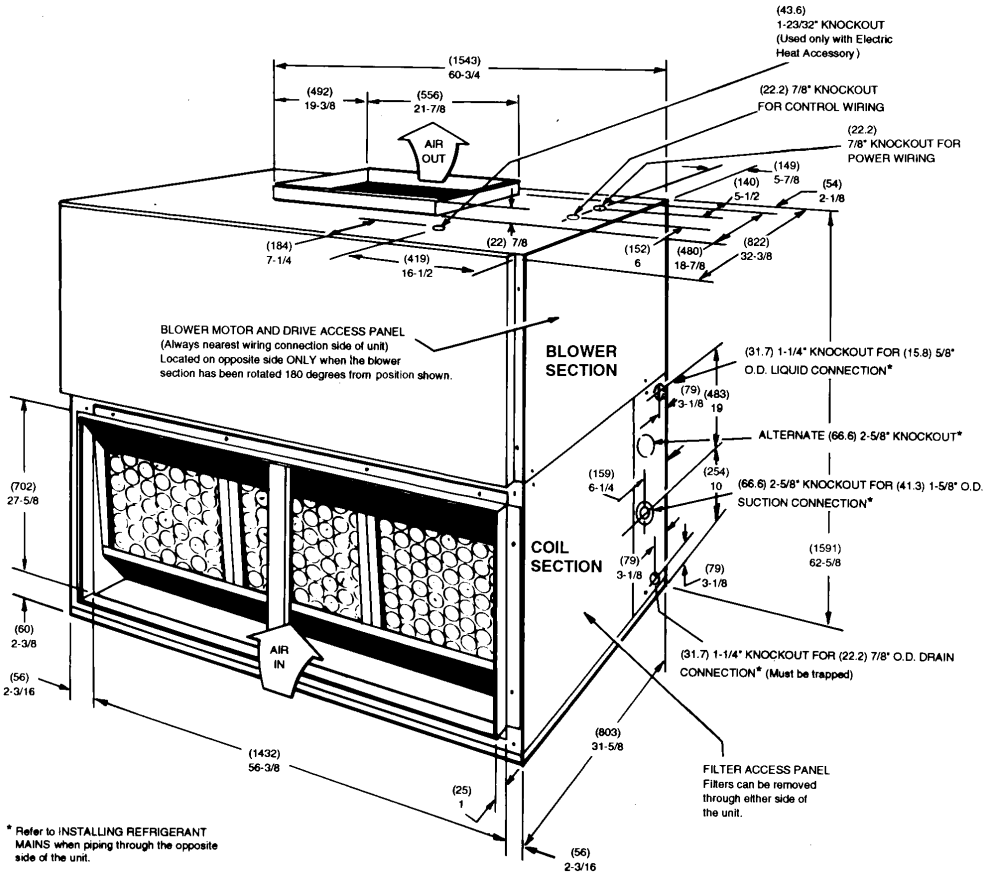
Exceeds the output limitation of the standard factory-mounted blower motor.

TABLE 6 - ACCESSORY STATIC RESISTANCE (IWG)

ACCESSORY		EXTERNAL STATIC PRESSURE DROP RESISTANCE IWG/pA				
BLOWER CFM/m^3/s		4800 / 2.26	5400 / 2.55	6000 / 2.83	6600 / 3.11	7200 / 3.40
Electric Heat	10kW	0.04 / 10	0.05 / 12	0.06 / 15	0.08 / 20	0.10 / 25
	16kW	0.07 / 18	0.09 / 21	0.11 / 27	0.14 / 35	0.17 / 42
	26kW	0.13 / 32	0.16 / 40	0.20 / 50	0.24 / 60	0.29 / 72
	36kW	0.20 / 50	0.24 / 60	0.29 / 72	0.35 / 87	0.42 / 106
Supply Air Plenum		0.03 / 8	0.04 / 10	0.05 / 12	0.06 / 15	0.07 / 18
Return Air Grille		0.04 / 10	0.05 / 12	0.06 / 15	0.07 / 18	0.08 / 20
Hot Water Coil		0.18 / 45	0.22 / 55	0.26 / 64	0.30 / 74	0.34 / 84
Steam Coil		0.15 / 37	0.18 / 45	0.22 / 55	0.26 / 64	0.30 / 74

* Add these pressures to the ESP values in the respective blower performance table.

UNIT



All dimensions are in millimeters and inches. They are subject to change without notice. Certified dimensions will be provided upon request.

FIG 7 - UNIT DIMENSIONS AND CLEARANCES

ACCESSORIES

•ELECTRIC HEATER
Add 15" (381mm) to Unit Height when using 10, 16, 26 or 36kW Heater
•SUPPLY AIR PLENUM
Add 27" (686mm) to Unit Height when used
•BASE
Add 24" (610mm) to Unit Height when used

MINIMUM CLEARANCES (in./mm)

Side with RETURN AIR opening - 24 / 610
Side with SUPPLY AIR opening - 24 / 610[1]
Side with PIPING CONNECTIONS - 61 / 1549[2]
Side opposite PIPING CONNECTIONS - 26 / 660[3]
Bottom - [4]

NOTES:

[1] Overall dimension of the unit will vary if an electric heater, a supply air plenum or a base is used.

[2] This dimension is required for removal of the DX coil. Only 26" (660mm) is required for normal servicing.

[3] If the DX coil has to be removed, this dimension is required to loosen screws that secure the coil to the unit frame. This dimension will also be required for blower motor access if the piping connections are made on the opposite side of the unit.

[4] Allow enough clearance to trap the condensate drain line.

TABLE 7 - BLOWER MOTOR AND DRIVE DATA

Motor (HP/kW)	Blower Range (RPM)	Adjustable Motor Pulley		Fixed Blower Pulley		Belt	
		Pitch Dia (In./mm)	Bore (In./mm)	Pitch Dia. (In./mm)	Bore (In./mm)	Designation	Pitch Lg. (In./mm)
3 / 2.2	615/800	3.4 - 4.4 / 86 - 112	⅞ / 22.2	8.0 / 203	1 / 25	A54	55.3 / 1405

MOTOR SPECIFICATIONS
•1450 RPM
•380/415-3-50
•Solid base
•56 Frame
•Inherently protected
•Permanently lubricated ball bearings

POWER AND CONTROL WIRING

Install electrical wiring in accordance with applicable national, local and municipal codes. The unit should be grounded in accordance with these codes.

Route the power wires into the unit through one of the ⅞" (22.2mm) dia.knockouts in the panel with the supply air opening and connect them to the terminals on blower motor contactor 10M. Route the control wires into the unit through the other ⅞" (22.2mm) dia.knockout and connect them to the terminals on block 4TB. Refer to the unit drawing in Figure 7 for the locations of these knockouts.

If the unit includes an electric heat accessory, route the power wires into heater control box instead of the unit. Refer to the electric heat instructions for additional installation information.

Refer to Table 4 to size the disconnect switch, the power wiring and the fuses. Refer to Figure 8 for typical field wiring.

NOTE: Three phase motor rotation may be incorrect when the unit is first started up. Reverse phase (leads L1 and L2) at contactor to obtain the correct rotation.

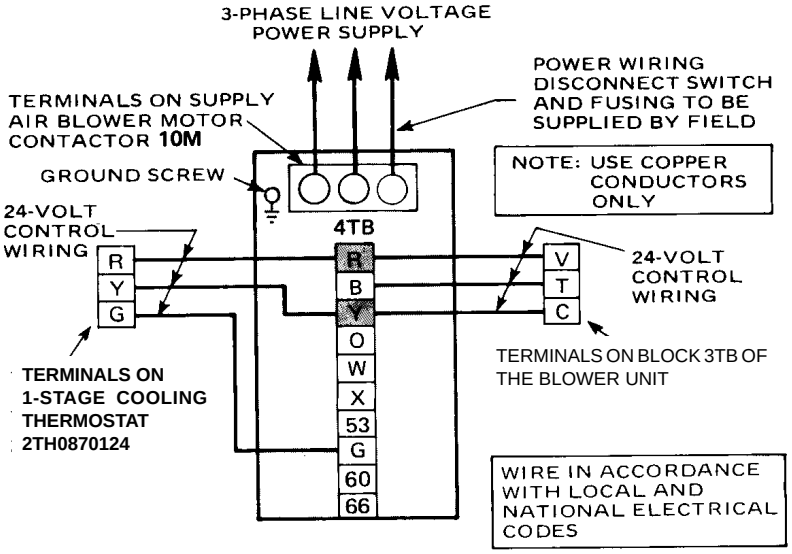


FIG 8 - TYPICAL FIELD WIRING (Cooling only)

MAINTENANCE

FILTERS — The filters must be replaced as often as necessary to assure good air flow and filtering action.

EVAPORATOR COIL — Do not allow dirt to accumulate on the evaporator coil or other parts of the evaporator air circuit. Clean as often as necessary to assure good system performance. Use a brush, vacuum cleaner attachment or other suitable means.

LUBRICATION — The bearings for the blower shaft and the blower motors are permanently lubricated and should not require additional lubricant.

DRAIN PAN — The drain pan should be inspected regularly to assure proper drainage.

BELTS — Maintain belt tension to extend belt life. Replace when signs of failure begin to appear.

YORK®
Heating and Air Conditioning

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