

# INSTALLATION INSTRUCTIONS

## APARTMENT FAN COIL UNIT

### FMU4X, FMU4Z

**NOTE:** Read the entire instruction manual before starting installation.

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#### SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying this product. Refer to individual instructions packaged with kits or accessories when installing.

Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Use quenching cloth for brazing operations. Have a fire extinguisher available. Read these instructions thoroughly and follow all warning or cautions included in literature and attached to the unit. Consult local building codes and the current editions of the National Electrical Code (NEC) NFPA 70.

In Canada, refer to the current editions of Canadian Electrical Code CSA C22.1.


Recognize safety information. This is the safety alert symbol . When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand the signal words **DANGER**, **WARNING**, and **CAUTION**. These words are used with the safety alert symbol. **DANGER** identifies the most serious hazards which **will** result in severe personal injury or death. **WARNING** signifies hazards which **could** result in personal injury or death. **CAUTION** is used to identify unsafe practices, which **may** result in minor personal injury or product and property damage. **NOTE** is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

#### INTRODUCTION

FMU4X and FMU4Z Fan Coils are designed for horizontal orientation and are suitable for ceiling installations in conditioned spaces. These units are available with field-installed electric heat, and are used indoors as the fan coil for split-system heat pumps or air conditioners. FMU4X and FMU4Z models all have a factory-installed TXV and are available in 18,000 through 36,000 Btuh nominal cooling capacities. FMU4X units utilize a 3-speed PSC motor. FMU4Z units utilize a 5-speed ECM motor.

Field-installed heaters are available in 3,5,6,7.5 and 10kW sizes. The coil is equipped with sweat-type connections and is vapor-charged with dry nitrogen.


Units are designed for horizontal applications only. Local codes may limit this free-air-return type unit to installation in single-level applications.


 **WARNING**

**ELECTRICAL OPERATION HAZARD**

Failure to follow this warning could result in personal injury or death.

Before installing or servicing unit, always turn off all power to unit. There may be more than 1 disconnect switch. Turn off accessory heater power if applicable. Lock out and tag switch with a suitable warning label.


 **WARNING**



**EXPLOSION HAZARD**

Failure to follow this warning could result in death, serious personal injury, and/or property damage.

Never use air or gases containing oxygen for leak testing or operating refrigerant compressors. Pressurized mixtures of air or gases containing oxygen can lead to an explosion.

 **CAUTION**

**CUT HAZARD**

Failure to follow this caution may result in personal injury.

Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing and gloves when handling parts.

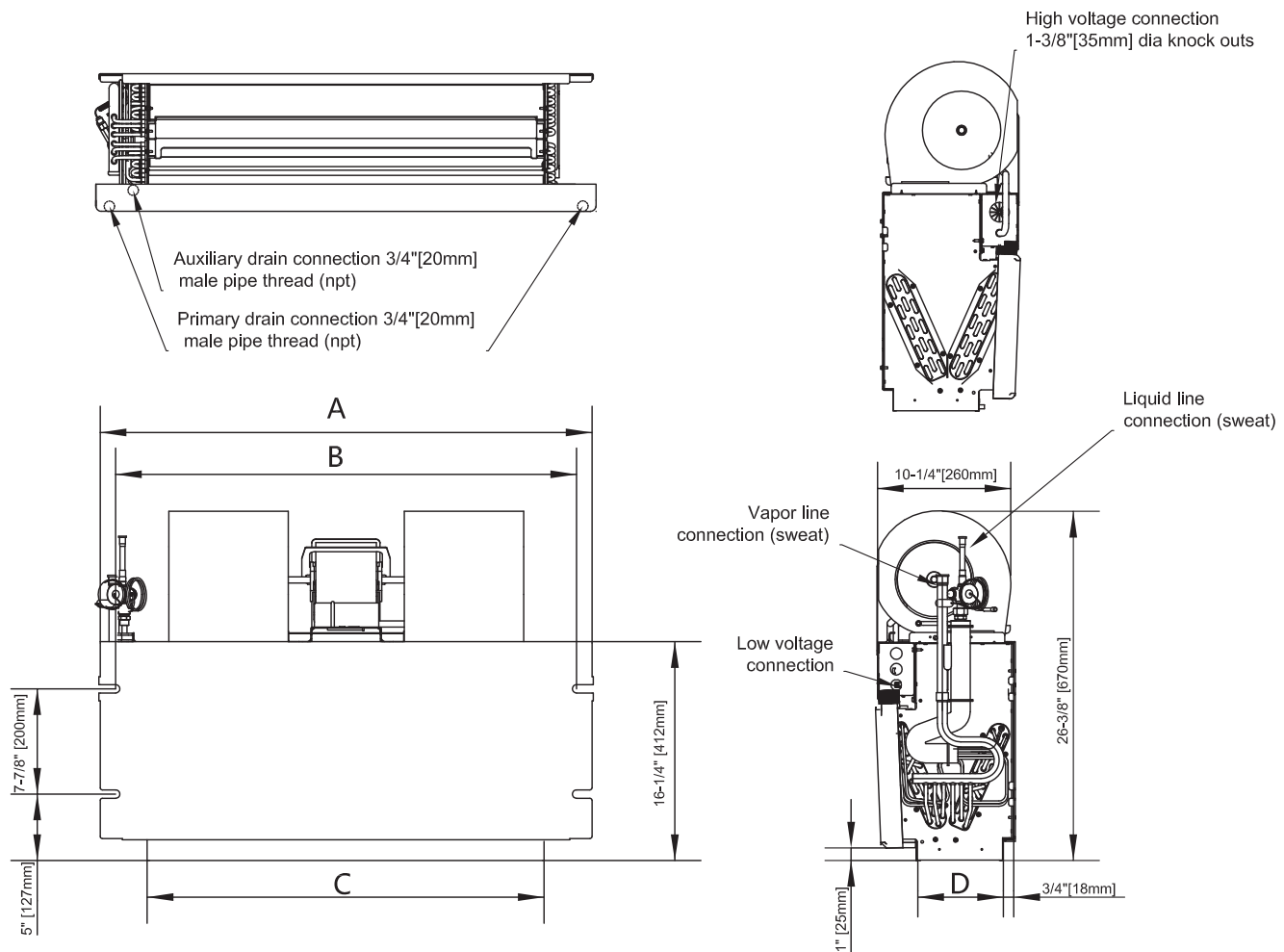


Fig. 1 - Dimensional Drawing

Table 1 - Dimensional Data

Model Size	Dimensions- inches [mm]				Unit Operating Weight lbs (kg)
	A	B	C	D	
18	37-1/4 [946]	34-11/16 [881]	30 [762]	6-1/2 [165]	75 (34)
24	37-1/4 [946]	34-11/16 [881]	30 [762]	6-1/2 [165]	75 (34)
30	49-1/4 [1251]	46-11/16 [1186]	42 [1067]	6-1/2 [165]	90 (41)
36	49-1/4 [1251]	46-11/16 [1186]	42 [1067]	6-1/2 [165]	90 (41)

## INSTALLATION

### Step 1 — Check Equipment

Unpack unit and move to final location. Remove from carton, avoid lifting from blower wheels, taking care not to damage unit. Inspect equipment for damage prior to installation. File claim with shipping company if shipment is damaged or incomplete. Locate rating plate on unit. It contains information needed to properly install unit. Check rating plate to be sure unit matches job specifications.

**NOTE:** Installation clearance from combustible materials is 0" (0 mm) from unit and supply-air duct.

### Step 2 — Mount Fan Coil

#### Fan coil Mounting

Mounting slots on the top of the unit are provided for attachment of the fan coil to supporting structure. The supporting structure must be designed to safely support the full weight of the fan coil. Field supplied washers and bolts capable of supporting the fan coil load should be used to secure the fan coil to the supporting structure at the mounting slots.

The fan coil must be mounted level to ensure proper drainage of condensate. If the supporting structure is not level at the points of fan coil attachment, then spacers must be used to level the fan coil.

#### After mounting unit, install refrigerant tubing as follows:

1. Route tubing to connection points.
2. Remove plugs from liquid and vapor lines.
3. Wrap the TXV with a wet rag to prevent overheating.
4. Braze connections using either silver bearing or non-silver bearing brazing material. Do not use soft solder (materials which melt below 800 °F/ 427 °C). Consult local code requirements. Always flow nitrogen through the system refrigerant lines while brazing.
5. Pressurize system and leak-test. Repeat procedure until leak-free.

⚠ CAUTION

ENVIRONMENTAL HAZARD

Failure to follow this caution may result in environmental damage.

Do not vent refrigerant to atmosphere. Recover during system repair or final unit disposal.

### Step 3 — Supply-Air Connections

When fan coil is equipped with an electric heater, install air ducts in accordance with standards 90A and 90B of National Fire Protection Association (NFPA). Use of flexible connectors between ductwork and unit will prevent transmission of vibration. When electric heater is installed, use heat-resistant material for a flexible connector between ductwork and unit air discharge connection. Ductwork passing through unconditioned space must be insulated and covered with a vapor barrier.

**NOTE:** Local codes may limit this unit to single-level applications.

## ⚠ WARNING

### INJURY HAZARD

Failure to follow this warning could result in personal injury or death.

Do not, under any circumstances, connect return ductwork to any other heat-producing device such as fireplace inserts, stoves, etc. Unauthorized use of such devices may result in fire, carbon monoxide poisoning, explosion, personal injury or property damage.

Design the duct system in accordance with “ACCA” Manual “0” Design for Residential Winter and Summer Conditioning and Equipment Selection. Latest editions are available from : “ACCA” Air Conditioning Contractors of America. If duct system incorporates flexible air duct, be sure pressure drop information (straight length plus all turns) shown in “ACCA” Manual “D” is accounted for in system.

### Return Air

All return air must be filtered. Fan coil can be installed in a duct, cased or free return. When installed as free air return the space housing the fan coil must be fully sealed except for the the return air connection to the conditioned space. Air filters should be located at the return air openings to the fan coil location.

### Step 4 — Condensate Drain

Condensate pan has primary and secondary drain connections to meet FHA requirements. These connections have 3/4” (19 mm) male pipe threads. Tubing for all condensate drains should be a minimum of 7/8” (22 mm) OD. Drain lines from condensate pan to exterior of unit must be plastic pipe. Drain should be pitched downward at a slope of 1” per 10’ (25 mm per 3 m). Additional mounting holes are available if more slope is desired by installer. See figure 2 for drain pan alternate mounting hole locations. If coil is located in or above a living space where damage may result from condensate overflow, a separate 3/4” (19 mm) drain must be provided from secondary drain connection. Run this drain to a place in compliance with local installation codes where it will be noticed when unit is operational.

Condensate flow from secondary drain indicates a plugged primary drain. Install a 2” (51 mm) trap in condensate drain line as close to coil as possible. A factory approved drain trap kit, KFAET0150ETK, is available. Make sure that the top of trap is below connection to drain pan to prevent condensate from overflowing drain pan. Prime all traps, test for leaks, and insulate in areas where sweating of the traps and drain lines could

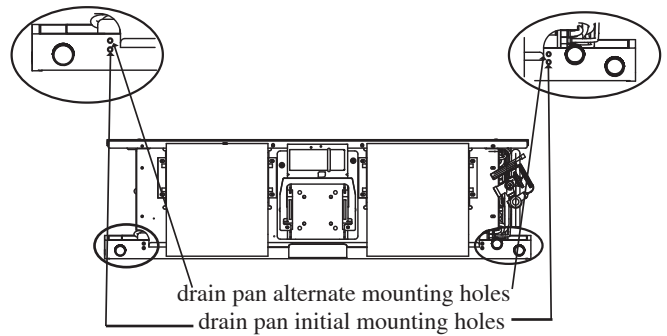
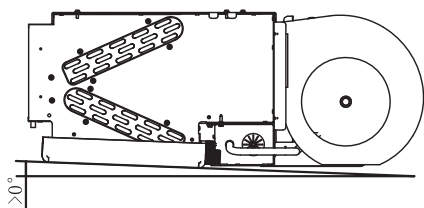


Fig. 2 Alternate condensate pan mounting holes

potentially cause water damage Consult local codes for additional restrictions or precautions.

Accessory UV-C lights are not approved for use with this fan coil.

### Step 5 — Electrical Connections

## ⚠ WARNING

### ELECTRICAL OPERATION HAZARD

Failure to follow this warning could result in personal injury or death.

Before installing or servicing unit, always turn off all power to unit. There may be more than one disconnect switch. Turn off accessory heater power if applicable. Lock out and tag switch with a suitable warning label.

Refer to unit wiring instructions for recommended wiring procedures. Use No. 18 AWG color-coded, insulated (35 °C minimum) wire to make low-voltage connections between thermostat and unit. If thermostat is located more than 100 ft. (30m) from unit as measured along low-voltage wire, use No. 16 AWG color-coded, insulated (35 °C minimum) wire.

**NOTE:** Before proceeding with electrical connections, make certain that voltage, frequency, and phase correspond to that specified on rating plate. Also, check to be sure that the service provided by utility is sufficient to handle additional load imposed by this equipment.

Refer to unit wiring label for proper field high- and low-voltage wiring. Make all electrical connections in accordance with NEC and any local codes or ordinances that might apply. Unit must have a separate branch electrical circuit.

## ⚠ WARNING

### ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Field wires on side of disconnect found in fan coil remain live, even when circuit breaker is off. Service and maintenance to incoming wiring cannot be performed until main disconnect switch (remote to the unit) is turned off. Lock out and tag switch with a suitable warning label.

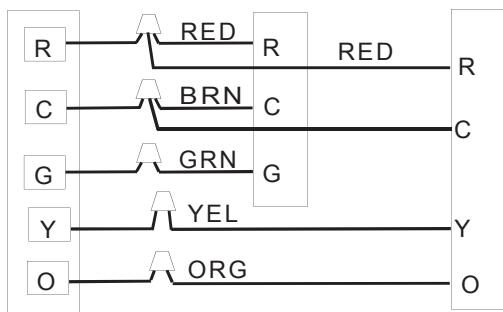
Unit cabinet must have a continuous electrical path to ground in order to minimize potential for personal injury or death if an electrical fault should occur. This ground may consist of electrical wire or approved conduit when installed in accordance with existing codes. (See Step 3. below.)

**NOTE:** All units are shipped from factory wired for 240VAC transformer operation. For 208VAC operation, move primary lead from 240VAC terminal to 208VAC terminal.

See Figs. 3 and 4 for field low-voltage wiring. See Fig. 1 for location of the electrical inlets. For maximum ampacity and over-current protection, see unit rating plate or product data sheet.

1. Provide power supply for unit being installed in accordance with unit wiring diagram and rating plate.
2. Connect line-voltage leads to the harness pigtail or the heat-kit circuit breaker. Use copper wire only.
3. Use UL listed conduit and conduit connector for connecting line-voltage leads to unit and obtaining proper ground. If conduit connection uses reducing washers, a separate ground wire must be used. Grounding can also be accomplished by using the ground lug provided in the control box. Power wiring may be connected to either the right or left side of the control box.
4. Connect low-voltage leads to thermostat and outdoor unit. See Figs. 3 and 4, as well as the outdoor unit wiring label.
5. Connect per Fig. 3 when electric heat is NOT used with a heat pump.
6. Connect per Fig. 4 when electric heat is used with a heat pump.

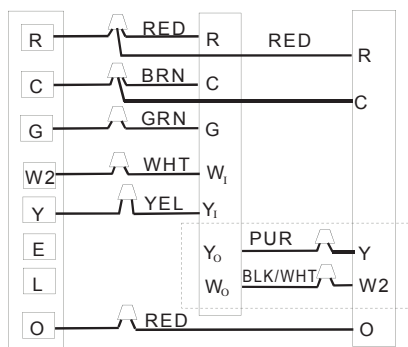
THERMOSTAT      INDOOR UNIT      OUTDOOR UNIT



**Fig. 3 - Wiring Layout Heat Pump Unit (Cooling and 1-Stage Heat)**

A150200

THERMOSTAT      INDOOR UNIT      OUTDOOR UNIT



**Fig. 4 - Wiring Layout Heat Pump Unit (Cooling and 2-Stage Heat)**

A150202

### Step 6 — Select Proper Blower Speed

Before operating unit, be sure that the proper blower speed has been selected. Fan speeds are selected manually.

**To change the fan speed on model FMU4X:**

Fan Motor Speed Taps are: Black – High; Red – Medium; Blue – Low. To select the desired fan speed for cooling operation, and anytime a “G” signal is present;

connect the desired fan motor speed tap wire to Fan Relay Terminal No. 4.

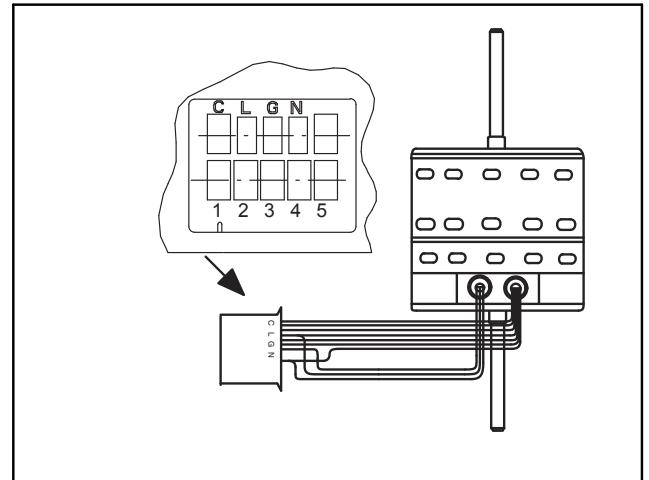
To select the desired fan speed for heating operation, anytime the “G” signal is not present; connect the desired fan motor speed tap wire to Fan Relay Terminal No. 6.

Always connect the unused fan---motor wire to the dummy terminal block.

When selecting the proper airflow, refer to Tables 4 and 5 below to choose proper blower speeds for cooling and heating.

**To change the fan speed on model FMU4Z:**

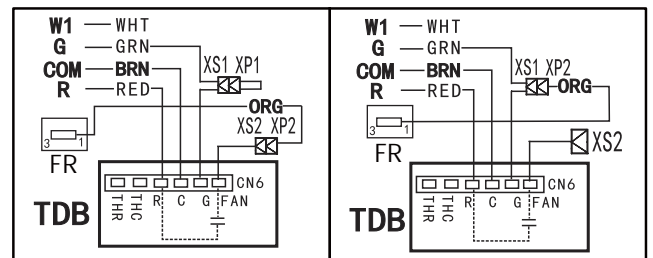
At the motor connection plug connect the green wire to the desired motor tap number indicated on the motor plug. (See Fig. 5) For the electric heat fan speed selection connect the white wire to the desired motor tap number indicated on the motor plug. See Table 2 for factory default settings.



**Fig. 5 - FMU4Z ECM Motor Speed Taps**

**Table 2 – FMU4Z ECM Motor Speed Taps**

Tap	Delay-off Time(s)	18	24	30	36
Tap 1	90	Default	---	---	---
Tap 2	90	---	Default	---	---
Tap 3	90	---	---	Default	---
Tap 4	90	---	---	---	Default
Tap 5	90	---	---	---	---



with TDB

without TDB

**Fig. 6 - Wiring Layout FMU4X PSC Motor disable time delay Step 7 — TXV**

**NOTE:** The TXVs are preset at the factory and do not need adjustment for reliable operation.

### START-UP

Refer to outdoor unit Installation Instructions for system start-up instructions and refrigerant charging method details.

## SEQUENCE OF OPERATION

**NOTE:** The following sequence of operation is based on units installed with ECM/PSC motor and Time Delay Board (TDB). For units with ECM motor, the off-delay is programmed into the motor. Follow Table 2, ECM Motor Speed Taps & the corresponding blower off delays for each speed tap. PSC models are factory wired with TDB active. Follow Fig. 10 to disable blower off time delay. When wired in this configuration no blower off-delay will occur in any mode.

**NOTE:** The following sequence of operation is based on units installed with PSC motor and Time Delay Board (TDB).

### A. CONTINUOUS FAN

Thermostat closes R to G. G energizes and completes circuit to indoor blower motor. When G is de-energized, there is a 90s blower off-delay.

### B. COOLING MODE

Thermostat energizes R to G, R to Y, and R to O (heat pump only). G energizes and completes indoor blower motor. Y energizes outdoor unit (O is energized for heat pump). When cooling call is satisfied, G is de-energized, there is a 90s blower off-delay.

### C. HEAT PUMP HEATING MODE

Thermostat energizes R to G and R to Y. G energizes and completes circuit to indoor blower motor. When heating call is satisfied, G is de-energized, there is a 90s blower off-delay.

### D. HEAT PUMP HEATING WITH AUXILIARY ELECTRIC HEAT

Thermostat energizes R to G, R to Y, and R to W1. G energizes and completes circuit to indoor blower motor. W1 energizes electric heat relay(s) which completes circuit to heater element(s). When W1 is de-energized, electric heat relay(s) open, turning off heater elements. When G is de-energized there is a 90s blower off-delay.

**NOTE:** Due to blow through coil design, simultaneous heat pump and electric heat (auxiliary) operation will not occur. When W1 is energized, Y signal will be removed from outdoor.

### E. ELECTRIC HEAT OR EMERGENCY HEAT MODE

Thermostat closes R to W1. W1 energizes electric heat relay(s) which completes circuit to heater element(s). Blower motor is energized through normally closed contacts on fan relay. When W1 is de-energized, electric heat relay(s) opens, there is no blower off-delay

## CARE AND MAINTENANCE

For continuing high performance and to minimize possible equipment failure, it is essential that periodic maintenance be performed on this equipment. The only required maintenance that may be performed by the consumer is filter maintenance.

The minimum maintenance requirements for this equipment are as follows:

1. Inspect and clean or replace air filter each month or as required.
2. Inspect cooling coil, drain pan, and condensate drain each cooling season for cleanliness. Clean as necessary.
3. Inspect blower motor and wheel for cleanliness each heating and cooling season. Clean as necessary.
4. Inspect electrical connections for tightness and controls for proper operation each heating and cooling season. Service as necessary.

## ⚠ CAUTION

### CUT HAZARD

Failure to follow this caution may result in personal injury.

Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing and gloves when handling parts.

**NOTE:** The installing technician should explain system operation to the consumer with particular emphasis on indoor fan coil operation sounds and filter maintenance.

## ⚠ WARNING

### ELECTRICAL OPERATION HAZARD

Failure to follow this warning could result in personal injury or death.

Disconnect all power to unit before servicing field wires or removing control package. The disconnect (when used) on access panel does not allow safe service to all other parts of unit.

If unit does not have a disconnect, disregard the foregoing. Instead, make sure that a disconnecting means is within sight from, and is readily accessible from, the unit.

Disconnect all electrical power to unit before performing any maintenance or service on it. Lock out and tag switch with a suitable warning label.

Table 3 – Airflow Performance (CFM)

Use for Selecting Heat Pump Speed of ECM Motor (Uncased)

Model	Motor Speed	CFM Wet Coil without Filter or Electric Heat, Uncased							
		External Static Pressure-Inches W.C.[kPa]							
		0[0]	0.1[.025]	0.15[.0375]	0.2[.050]	0.3[0.075]	0.4[0.100]	0.5[0.125]	0.6[0.150]
18	1	741	670	638	612	545	470	403	336
	2	925	860	819	788	727	655	588	500
	3	1069	1005	973	941	886	826	683	550
	4	1193	1140	1106	1071	970	850	700	560
	5	1288	1221	1177	1133	1024	895	745	575
24	1	741	670	638	612	545	470	403	336
	2	925	860	819	788	727	655	588	500
	3	1069	1005	973	941	886	826	683	550
	4	1193	1140	1106	1071	970	850	700	560
	5	1288	1221	1177	1133	1024	895	745	575
30	1	800	691	647	602	530	460	380	300
	2	1025	921	871	820	723	628	536	448
	3	1203	1106	1059	1011	916	822	729	636
	4	1339	1266	1224	1181	1085	978	859	729
	5	1468	1399	1361	1323	1253	1061	900	760
36	1	800	691	647	602	530	460	380	300
	2	1025	921	871	820	723	628	536	448
	3	1203	1106	1059	1011	916	822	729	636
	4	1339	1266	1224	1181	1085	978	859	729
	5	1468	1399	1361	1323	1253	1061	900	760

Use for Selecting Heat Pump Speed of PSC Motor (Uncased)

Model	Motor Speed	CFM Wet Coil without Filter or Electric Heat, Uncased							
		External Static Pressure-Inches W.C.[kPa]							
		0[0]	0.05[.0125]	0.1[.025]	0.15[.0375]	0.2[.050]	0.25[.0625]	0.3[.075]	0.35[.0875]
18	Low	748	716	677	629	573	510	439	360
	Medium	955	910	855	792	719	638	547	448
	High	992	941	884	820	749	672	588	497
24	Low	748	716	677	629	573	510	439	360
	Medium	955	910	855	792	719	638	547	448
	High	992	941	884	820	749	672	588	497
Model	Motor Speed	CFM Wet Coil without Filter or Electric Heat, Uncased							
		External Static Pressure-Inches W.C.[kPa]							
		0[0]	0.1[.025]	0.15[.0375]	0.2[.050]	0.3[.075]	0.4[.100]	0.5[.125]	0.6[.150]
30	Low	1221	1132	1085	1037	936	831	720	603
	Medium	1331	1247	1202	1155	1055	947	831	707
	High	1442	1370	1328	1282	1178	1059	925	775
36	Low	1221	1132	1085	1037	936	831	720	603
	Medium	1331	1247	1202	1155	1055	947	831	707
	High	1442	1370	1328	1282	1178	1059	925	775

■ – Shaded boxes represent airflow outside the required 300-450 cfm/ton.

**NOTES:**

1. Airflow data is without filter or electric heat accessory. Heater adds 0.05-in. static.
2. Use wet coil data for determining cooling airflow.
3. Accessory louver panel adds 0.05-in. Static.
4. When electric heater is working only, 300CFM for each ton is sufficient except 30K work with 10KW heat (≥900SCFM)

Table 4 – Required CFM Range for Heat Pump Operation

Size	CFM	
	Min	Max
18	450	675
24	600	900
30	750	1125
36	900	1350

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