

INSTALLATION AND OPERATION MANUAL

⚠ WARNING

**RISK OF FIRE, ELECTRIC SHOCK, OR INJURY.
OBSERVE ALL CODES AND THE FOLLOWING:**



1. Before servicing or cleaning the unit, switch power off at service panel and lock service panel to prevent power from being switched on accidentally. More than one disconnect switch may be required to de-energize the equipment for servicing.
2. This installation manual shows the suggested installation method. Additional measures may be required by local codes and standards.
3. Installation work and electrical wiring must be done by qualified professional(s) in accordance with all applicable codes, standards and licensing requirements.
4. Any structural alterations necessary for installation must comply with all applicable building, health, and safety code requirements.
5. This unit must be grounded.
6. Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment that might be installed in the area affected by this equipment. If this unit is exhausting air from a space in which chimney-vented fuel burning equipment is located, take steps to assure that combustion air supply is not affected. Follow the heating equipment manufacturer's requirements and the combustion air supply requirements of applicable codes and standards.
7. Use the unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.
8. This unit is intended for general ventilating only. Do not use to exhaust hazardous or explosive materials and vapors. Do not connect this unit to range hoods, fume hoods or collection systems for toxics.
9. When cutting or drilling into wall or ceiling, do not damage electrical wiring and other hidden utilities.
10. This unit must be properly ducted to the outdoors.

CAUTION

1. UNIT'S OPERATING VOLTAGE MUST BE SET BY INSTALLER! See Wiring Schematics on page 7.
2. To avoid motor bearing damage and noisy and/or unbalanced impellers, keep drywall spray, construction dust, etc., off power unit.

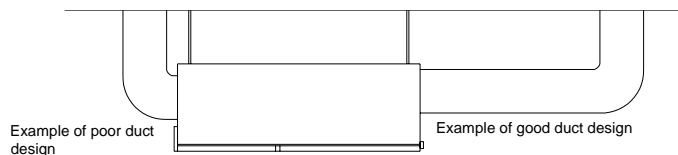


Location of the EV450IN

The EV450IN is designed for installation indoors.

Select a location that is central to the inside duct runs, and close to both the exhaust duct (to the outside) and the fresh air duct (from the outside). The unit can be installed in any orientation but the contractor is responsible for safe installation of the unit.

For maximum air performance minimize the number of elbows, and do not place elbows within three feet of the EV450IN's discharges. For applications where duct noise is a critical issue, use noise attenuating techniques such as duct isolation, insulation, and proper duct design per SMACNA or ASHRAE standards.



Ducts to the Outside

The EV450IN requires **four** ducts:

- Exhaust Air Duct (insulated duct from unit to outside);
- Outside Air Duct (insulated duct from outside to unit);
- Room Air Duct (from room to unit);
- Fresh Air Duct (from unit to room).

Ducts from unit to the outside must be insulated with sealed vapor barrier on both inside and outside of the insulation or with closed-cell foam insulation. We recommend you use either:

- 8" X 12" insulated duct **OR**
- 10" I.D. flexible insulated duct

The **exhaust outlet and fresh air inlet** on the outside of the building should be at least **ten feet apart** to avoid cross-contamination. The exhaust outlet should not dump air into an enclosed space or any other structure. The inlets and outlets should be screened against insects and vermin and shielded from the weather to prevent the entry of rain or snow.

⚠ WARNING

The fresh air inlet should be at least 10' away from any exhaust, such as dryer vents, chimneys, furnace and water heater exhausts, or other sources of contamination or carbon monoxide. Do not locate the fresh air inlet where vehicles may be serviced or left idling. Never locate the fresh air inlet inside a structure.

Using Flex Duct to connect EV450IN to outside

When connecting 10" flexible insulated duct to the Exhaust Air and Outside Air ports on the unit use the optional Duct Adapter Kit (**45EVT10**) (or fabricate equivalent). Duct need not be flexible, but must have continuous vapor barrier on both inner and outer face of insulation. Position the duct adapters over the openings. Install them with supplied self-drilling screws.

Keep insulated duct runs as short and direct as possible. Suspend or support duct per manufacturer's instructions.

CAUTION

Tape both inner and outer vapor barriers of insulated duct to collars on duct adapters and on wall caps. This is critical to prevent migration of moisture into insulation. Build-up of moisture can result in failure of the duct system and/or frost in the insulation. Make sure any tears in the inner and outer vapor barriers are sealed.

CAUTION

Do not vent exhaust duct up through roof. Condensate will form in cold weather and run back into unit. Instead, slope duct slightly downhill to a horizontal-discharge wall cap, which will allow any condensate to drain to the outside.

NOTE: To prevent the entry of rain through the outside air inlet duct, observe the following:

1. velocity at face of inlet hood should not exceed 500 feet per minute (fpm).
2. inlet duct must be at least 12" inside diameter.
3. centerline length along duct from weather hood to unit inlet must be at least 48".
4. centerline of inlet hood must be at least 18" below the centerline of the unit inlet.
5. outlet duct must pitch downward to the outside with a slope of at least 1/4" to the foot.

Mounting the EV450IN

The EV450IN has integral flanges for mounting to a wall (Figure 1) or hanging from a ceiling (Figure 2). An optional hanging bracket kit, 45EVHB, is available for hanging the unit from a ceiling with doors opening horizontally (Figure 3). The 45EVHB kit can also be used for floor mount legs (Figure 4). With all installations, adequate clearance for the filter access door latches must be provided.

The EV450IN unit includes a hardware kit that includes four rubber isolation mounts and eight washers. Figures 5 and 6 show how to install this mounting hardware for different installations. Please note that the threaded rod, bolts, nuts,

or other fasteners are not included. If hanger bolts or threaded rod are used each must be capable of carrying the weight of the unit and must be no less than 3/8" diameter.

▲ CAUTION

The EV450IN weighs approximately 140 lbs. It is the installer's responsibility to make sure that the screws or bolts used for securing the units are properly selected for the loads and substrates involved. Secure the EV450IN so that it cannot fall or tip in the event of accident, structural failure or earthquake.

CAUTION

Do not stand on the unit. Do not stack or store items on the unit when installed.

The hardware kit also includes rubber door keepers. When installed these keepers disable the quick removal feature of the doors. See Figures 7 and 8.

CAUTION

Provide Adequate Service Access for Maintenance

The EV450IN will require regular filter and core inspections. Install the EV450IN where you can remove the doors for cleaning the core and replacing the filters, and where you can get at the wiring for installation and service.

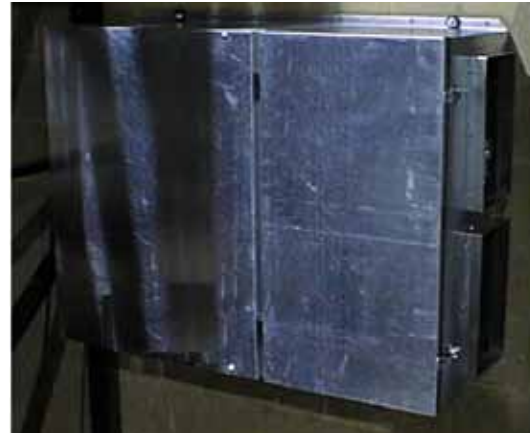


Figure 1. Unit mounted to wall using integral mounting



Figure 2. Unit hung from ceiling using integral mounting flanges.

Service Area EV450IN

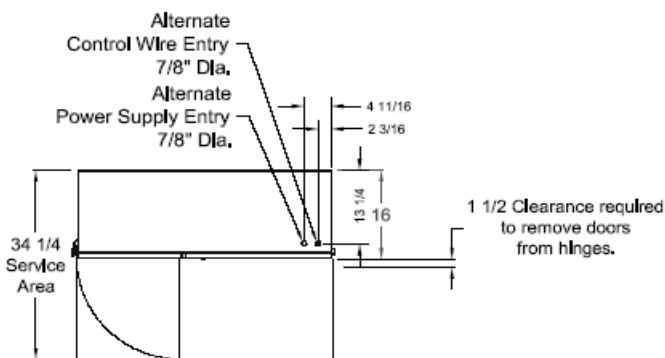


Figure 3. Unit hung from ceiling using optional hanging bracket kit, 45EVHB. To install hanging bracket, identify the corners of unit you wish to hang it from. Remove existing screws from unit pan. Attach hanging bracket to unit using screws provided with the hanging bracket



Figure 4. Unit secured to floor using optional hanging bracket kit, 45EVHB.



Figure 6. Hardware kit shown installed on optional hanging bracket for ceiling installation.



Figure 5. Hardware kit included with unit and installed on integral mounting flange for wall installation. Note: threaded rod, bolts, nuts, and other fasteners are not included in kit.



Figure 7. Rubber Door Keeper installed on Blower Access (large)



Figure 8. Rubber Door Keeper installed on Filter Access (small)

Inside Ductwork System

Use optional 8" X12" to 10" round transitions (**45EVT10**) (or fabricate equivalent) to connect 10" duct to Room Air and Fresh Air Ports on unit. Position duct adapters over openings. Install with supplied self-drilling screws.

OR

Use optional 8" X 12" duct flange (**45EVDF**) to connect 8" X 12" duct to Room Air and Fresh Air Ports on unit. Position duct adapters over openings. Install with supplied screws.

Or fabricate equivalent, by forming a flange on the first duct section and screw it to the EV450IN. Make sure appropriate duct sealant or tape is used to provide an air tight seal.

NOTE: If the inside ducts run through un-conditioned spaces they must be insulated with a sealed vapor barrier on both inside and outside of insulation. In a heated space, uninsulated duct is acceptable, but insulated duct resists break out noise better. Duct sealing improves ventilation performance.

Most installations will not require complicated duct systems to provide good ventilation performance. If ventilating several spaces, evaluate whether the air in the spaces is regularly mixed by the heating/cooling system; if not, provide a room air pick-up and fresh air supply in each space. If air is regularly mixed by the heating/cooling system, one room air pick-up and one fresh air supply may be all that is needed.

Connecting to an existing air-circulation system

It is often convenient and effective to connect the Fresh Air duct from the EV450IN to a return duct of an existing heating/cooling system. This way, whenever the heating/cooling system is running, fresh air from the EV450IN is distributed throughout the area served by the heating/cooling system.

Connect the Fresh Air duct to a branch return duct at some distance from the heating/cooling system's air handler. This minimizes the amount of air that the air handler can pull through the EV450IN when outside air ventilation is not desired.

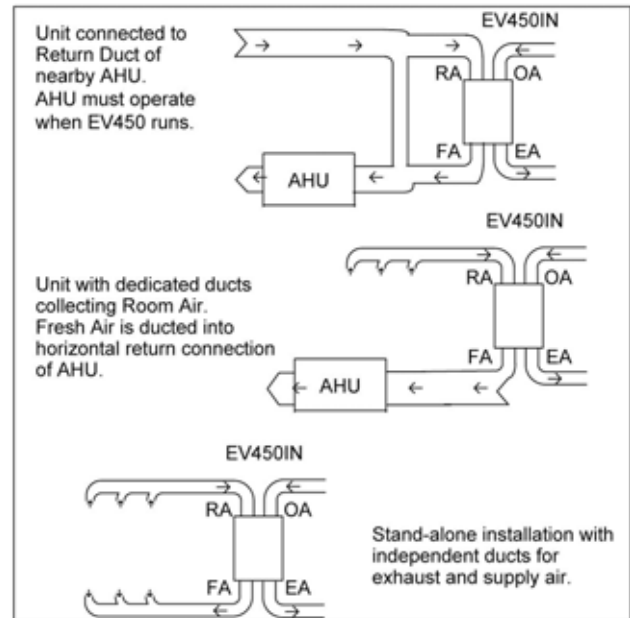
If the EV450IN is running when the main air handler is not, fresh air will flow into the space through the branch's return grille. Choose the return branch for your connection accordingly (see next paragraph).

Ducting Fresh Air Directly into Space

In cold or hot weather, the fresh air will be somewhat cooler or warmer than the room air (though always much closer to

room temperature than the outside air!). Avoid complaints by locating the Fresh Air supplies where they will not blow directly on occupants.

See drawings below for examples of some common installation approaches:



Airflow Performance

EV450IN Performance

Airflow CFM	ESP in. H ₂ O	Watts 1P	Watts 277V	Watts 3P	Temp EFF%	Total EFF% Winter/Summer *
225	1.25	335	300	181	81	73/61
338	1.00	420	370	278	77	69/56
380	0.90	470	405	340	76	68/54
450	0.65	550	470	430	73	65/50
540	0.25	640	560	540	70	62/46
575	0.00	690	600	610	69	61/45
600	-0.25	735	635	664	68	60/43

*ERV component performance at ARI 1060 standard conditions

Electrical Specifications

⚠ WARNING

Danger of Electrical Shock when servicing an installed unit.

ALWAYS DISCONNECT POWER SOURCE BEFORE SERVICING! More than one disconnect switch may be required.

CAUTION

Before bringing power to the unit check unit nameplate to confirm it matches the voltage and phase of the power you are supplying.

Remember that your field connections need to be accessible for inspection.

NOTE: Proper Wiring Size Selection and Wiring Installation are the Responsibility of the Electrical Contractor.

Electrical Options are identified on the Unit Label located near electrical box on the outside of the unit. Find the complete Unit Model Number in the lower left corner of the Unit Label. Use the key below to determine motor power and voltage installed in your EV450IN:

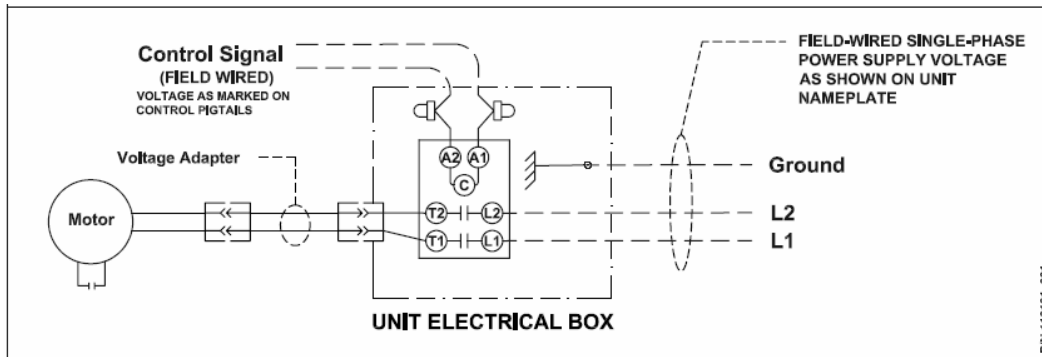
Sample Part Number: EV450_IN_P V A L

Model Number	Motor Phase	Motor Voltage	Contactor Coil Voltage
EV450IN	P1 = 1Ø P3 = 3Ø	V1 = 115V V4 = 460V V5 = 208-230V V6 = 115/208-230 V7 = 208-230/460 V9 = 277	A = 24

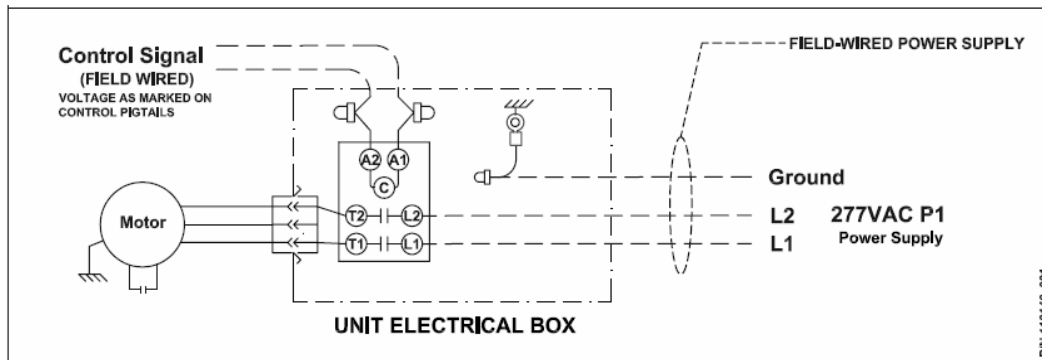
Volts	Hz	Phase	FLA
115	60	Single	7.0
208-230	60	Single	3.5
277	60	Single	2.4
208-230	60	Three	1.7-1.5
460	60	Three	0.8

Use conduit, strain reliefs, etc. as required by code to secure the field wiring. Electrical knockouts are provided for alternate line voltage and voltage control locations for field wiring to the internal electrical box. If the alternate sites are desired for field wiring then carefully remove the knockout plugs and foam insulating plugs from the alternate sites and install them in the open knockout locations.

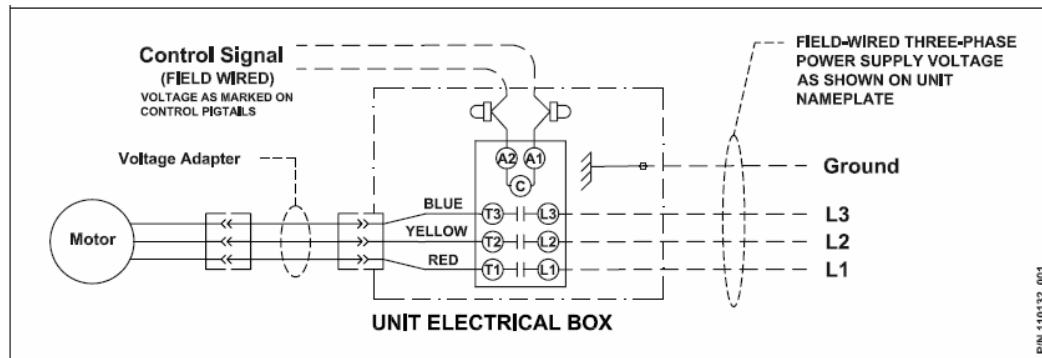
Wiring Schematics



Single Phase 115V, 208-230V Wiring Schematic



Single Phase 277V Wiring Schematic



Three Phase 208-230V, 460V Wiring Schematic

⚠ CAUTION

Those models marked for multi-voltage of 115V/208-230V or 208-230V/460V must be set by installer. Specific voltage adapters must be installed inside the unit.

Units marked for single voltage of 115V, 208-230V, 277V, or 460V come with wiring harnesses installed.

Setting Blower Voltage

Follow these steps:

1. Determine voltage of the power supply for the unit.
2. Remove both unit access panels, i.e., the larger motor door and smaller filter door.
3. Two loose wiring harnesses are tied to the blower cross bar. These are the voltage adapters (see pictures). Remove from cross bar. Select the adapter labeled for the unit's power supply. Set the other aside – it will be discarded.
4. Install the correct voltage adapter. The adapter connects the motor power pigtail to the plug on the electrical box wall (see picture). Discard the other adapter.

⚠ CAUTION

You must make sure to install the correct voltage adapter. Installing the incorrect adapter will destroy the motor and possibly lead to injury!

5. Open the unit's electrical box by removing two screws on the electrical box cover. Connect the unit's power field wiring to the terminals of the contactor in the unit electrical box.
 - a. In three phase units, connect power field wiring to contactor terminals marked L1, L2, and L3.
 - b. In single phase units, connect power field wiring to contactor terminals marked L1 and L2. For 115VAC, L2 is the neutral and is identified with a white tape on the unit wire connected to T2. For 208-230VAC the tape must be removed.
6. Connect ground field wire to ground wire pigtail.
7. Connect the control signal to the pigtails in the control voltage compartment of the unit's electrical box. Make sure you are connecting the correct voltage, 24VAC, to the control pigtails.



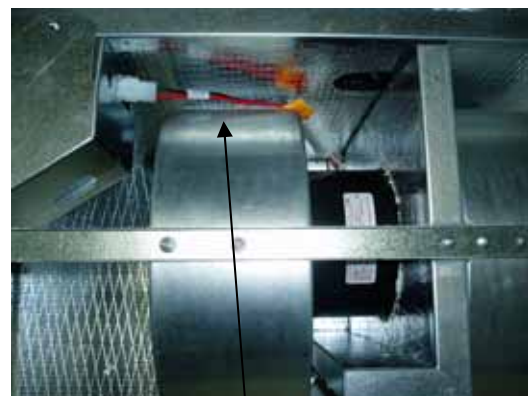
115 V Adapter (1 each) 208-230 V Adapter (1 each)

1 Phase Voltage Adapters (2 with unit)

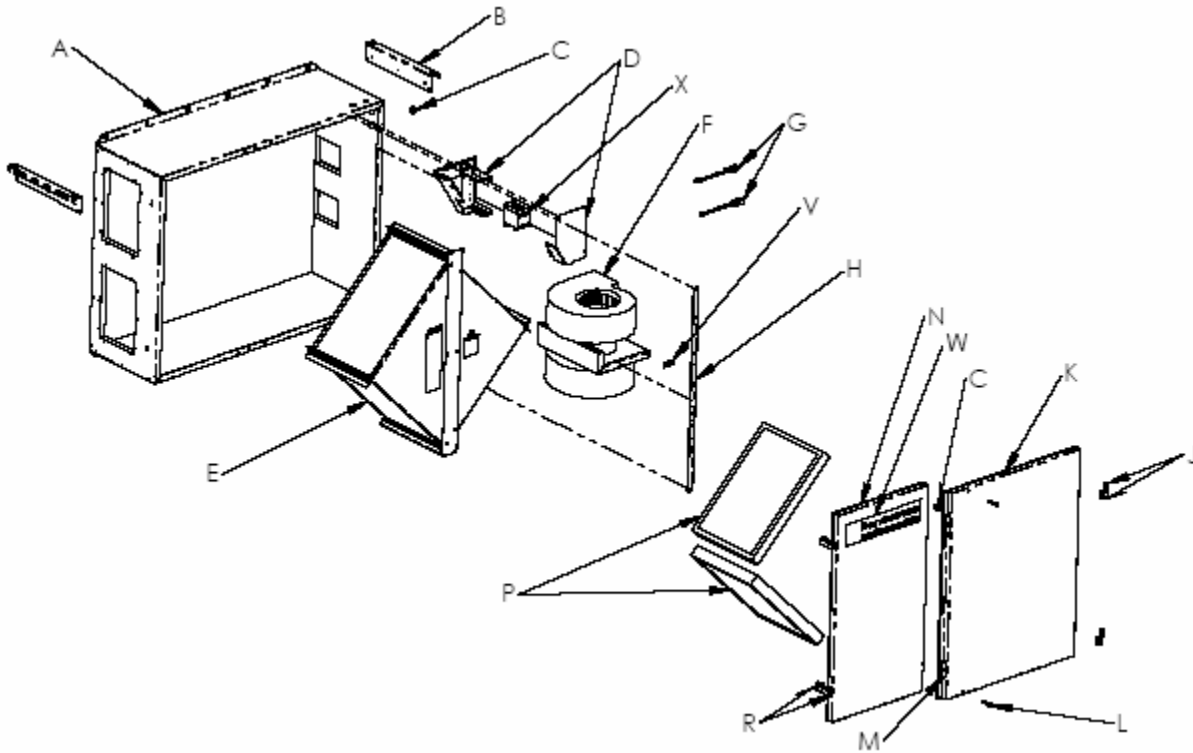


460 V Adapter (1 each) 208-230 V Adapter (1 each)

3 Phase Voltage Adapters (2 with unit)



Voltage Adapter Installed

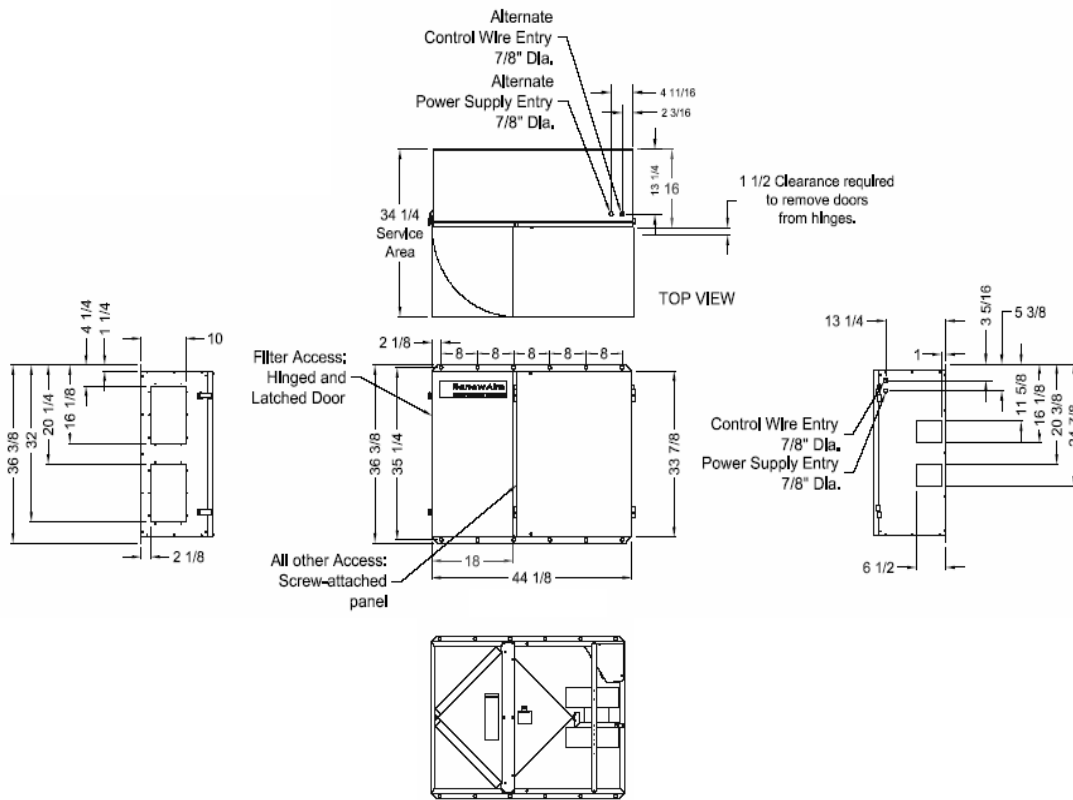
Parts List EV450IN

Description

- A. Case Insulated
- B. Hanging Bracket Kit (optional)
- C. Rubber Door Keeper (set of 2)
- D. E-Box Assembly
- E. Core Assembly
- F. Blower Assembly (Single Phase)
Blower Assembly (Three Phase)
- G. Voltage Adapters
- H. Blower Assembly Strap
- J. Hinge Set (Discharge End)
- K. Door Blower Side
- L. Blower Door Screw
- M. Hinge Set (Center)
- N. Door Filter Side
- P. Filter (set of 2)
Filter (set of 2)
- R. Latch Set
- S. Hardware Kit (not shown)
- T. Literature Packet (not shown)
- V. Divider Support Bracket
- W. RenewAire Label
- X. Contactor 24V (Single Phase)
Contactor 24V (Three Phase)

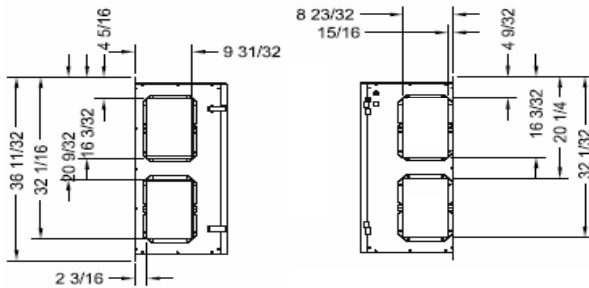
Accessories

- | | |
|---|----------------|
| Hanging Bracket / Floor Mount Legs (2 pieces) | 45EVHB |
| 8" X 12" to 10" Round Transition (2 pieces) | 45EVT10 |
| 8" x 12" Duct Flange (2 pieces) | 45EVDF |

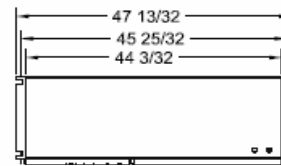
Dimensions



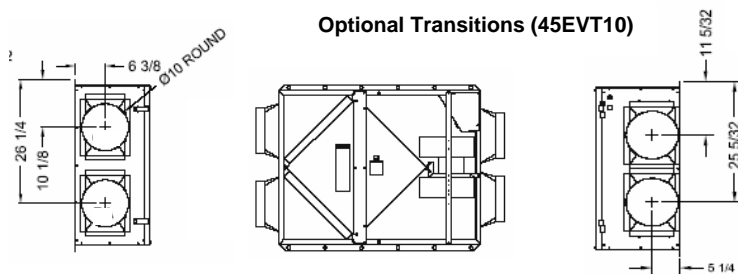
Optional 8" x 12" Duct Flanges (45EVDF)



Optional Hanging Bracket (45EVHB) shown



Optional Transitions (45EVT10)



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Maintenance Requirements

⚠ WARNING

Danger of Electrical Shock when servicing an installed unit.

ALWAYS DISCONNECT POWER SOURCE BEFORE SERVICING.

More than one disconnect switch may be required to de-energize the equipment for servicing.

⚠ CAUTION

Use proper eye protection when servicing unit.

Inspect and change the filters regularly.

Inspect and/or replace filters every three months when the EV450IN is in regular use, or every 2000 operation hours; more frequently depending on the cleanliness of the incoming air.

1. To access the filters unlatch the filter access door. The filter access door may be removed.

⚠ CAUTION

Do not allow the filter access door to drop when unlatched. Injury to personnel or damage to unit may occur.

⚠ CAUTION

Keep fingers away from between the filter access door and the blower access panel when unlatching and opening the filter access door. Potential PINCH POINT.

2. Pull the dirty filters out and replace with new filters.
3. Reinstall the filter access door.

NOTE: Filters must be used or the energy exchange core will become blocked by dust and the unit won't do its job. The filters supplied in the unit are usually able to keep the energy exchange core clear for several months. Finer filters can be used but must be cleaned more often. If using finer filters, their increased resistance to flow must be allowed for in the system design.

Filters	
Exhaust Air Stream Quantity	1
Fresh Air Stream Quantity	1
Nominal Size	14" x 20" x 2"
Type	MERV 7 or 8, Pleated

Vacuum the face of the energy exchange element yearly.

Once a year or every 5000 hours of operation vacuum the faces of the diamond shaped core. Dust collects only on the entering face of the energy exchange element, right where the filter sits. The interior of the energy exchange element stays clean even if the element faces are dust-covered.

TO CLEAN THE ENERGY EXCHANGE ELEMENT:

1. remove the filters (see above)
2. vacuum the exposed faces of the energy exchange element with a soft brush attachment
3. vacuum out dust from the rest of the unit case
4. install new filters.

CAUTION

Do not wash the energy exchange element. Always handle the element carefully. Keep it away from water or fire to avoid damaging it. The energy exchange element can be replaced but is expensive.

Inspect outdoor weatherhoods yearly.

Once a year inspect exhaust and intake hoods for accumulation of particulates and debris. Clean as necessary. Make sure bird screen is in place.

The blower/motor needs no lubrication.

If necessary vacuum clean the blower wheels at the same time you clean the face of the energy exchange element (annually).