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INSTALLATION AND OPERATION MANUAL

EV450

c UL us LISTED
DUCTED HEAT RECOVERY VENTILATOR
89S5

ARI AIR-CONDITIONING & REFRIGERATION INSTITUTE

WARNING: TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS, OBSERVE THE FOLLOWING RULES:

1. Use the unit only in the manner intended by the manufacturer. If you have questions, call the manufacturer.
2. Before servicing or cleaning the unit, switch power off at service panel or disconnect switch. Lock-out to prevent power from being switched on accidentally. CAUTION: More than one disconnect switch may be required to de-energize the equipment for servicing.
3. Do not use in cooking area.
4. 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 guidelines and safety standards such as those published by the National Fire Protection Association (NFPA), the American Society for Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), and local code authorities.
5. Do not connect this unit to fume hoods or collection systems for toxic gasses.
6. Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction codes and standards.
7. When cutting or drilling into wall or ceiling, do not damage electrical wiring and other hidden utilities.
8. Ducted fans must always be vented to the outdoors.
9. NEVER place a switch where it can be reached from a tub or shower.
10. This unit must be grounded.

CAUTION

1. For general ventilating use only. Do not use to exhaust hazardous or explosive materials and vapors.
2. To avoid motor bearing damage and noisy and/or unbalanced impellers, keep drywall spray, construction dust, etc., off power unit.
3. This installation manual shows the suggested installation method. Any structural alterations necessary for installation must comply with all applicable building, health, and safety code requirements.

Quick Guide

Units should be installed by properly licensed contractor(s) according to local code requirements.

MOUNTING THE UNIT

Hanger bolts or **threaded rod** must each be capable of carrying the weight of the unit, **and must be no less than 3/8" diameter**.
Note: EV450 weighs approximately 140 pounds.

The EV450 may be secured in its installation position in a variety of ways, using standard Mounting Rail and Hanging Bracket accessory:

Integral Mounting Rail	Used to hang from the ceiling with doors facing down (see Figure E) or to secure to a wall (see Figure F).
Optional Hanging Brackets 45EVHB (2 pieces)	Use to hang from ceiling with doors opening horizontally (see Figure I). Also used for floor mount legs (see Figure H).

PROVIDE ADEQUATE SERVICE ACCESS FOR MAINTENANCE
The EV450 will require regular filter and core inspections. Install the EV450 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.
WARNING: Danger of Electrical Shock when servicing an installed unit. ALWAYS DISCONNECT POWER SOURCE BEFORE WIRING OR SERVICING.

Figure A

The hardware kit (provided) includes four Rubber Isolation Mounts and eight Washers. Figure A shows how to install this mounting hardware. Please note that threaded rod, bolts, nuts or other fasteners are not included.

Figure B

Figure B shows the mounting hardware assembled and ready to mount.

Figure C

Figure C shows the Rubber Door Keeper (included in hardware kit) installed on Motor (large) Door. This Door Keeper disables the quick removal feature of this door.

Figure D

Figure D shows the Rubber Door Keeper (included in hardware kit) installed on Filter (small) Door. This Door Keeper disables the quick removal feature of this door.

Figure E

Figure E shows a unit hung with threaded rod using the Integral Mounting Rail.

MOUNTING THE UNIT CONTINUED

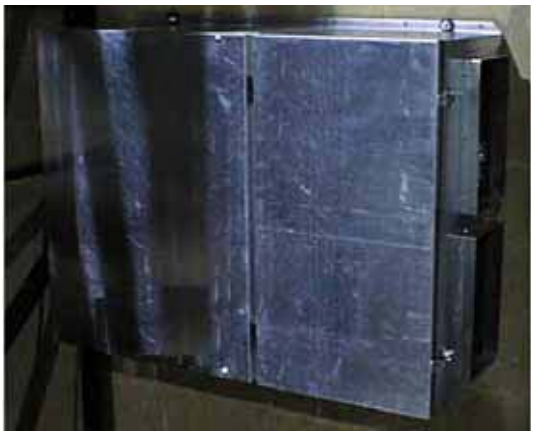


Figure F

Figure F shows a unit mounted to a wall using the Integral Mounting Rail.

Figure I

Figure I shows a unit hung from a ceiling using threaded rod, and optional Hanging Brackets (45EVHB).

Figure G

Figure G shows an installed optional Hanging Bracket (45EVHB). To install, identify the corners of unit you wish to hang it from. Remove four existing screws. Locate hanging bracket, and secure to unit using five screws provided with the Hanging Bracket Kit.

Figure J

Figure J shows a unit hung from a ceiling using threaded rod, and optional Hanging Brackets (45EVHB).

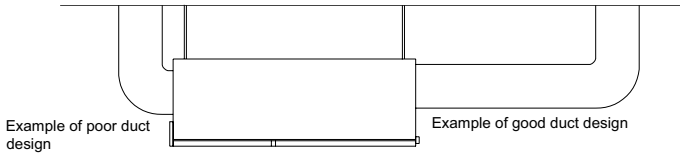
Figure H

Figure H shows a unit secured to floor using an optional Hanging Bracket (45EVHB).

DUCTING

GENERAL

For maximum air performance minimize the number of elbows, and do not place elbows within three feet of the EV450'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.



Points to remember:

EV450 requires **four** ducts — "outside" *and* "inside" 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).

OUTSIDE DUCTS

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 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. Never locate the fresh air inlet inside a structure.

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.

Using Flex Duct to connect EV450 to outside

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

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

Note: 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.

NOTE: 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 10" inside diameter.*
3. *Centerline length along duct from weather hood to unit inlet must be at least 48".*
4. *Inlet duct must pitch downward to the outside; 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 ¼" to the foot.*

INSIDE DUCTS EV450

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 EV450. Make sure appropriate duct sealant or tape is used to provide an air tight seal.

NOTE: If installing the inside ducts in an unheated space, they must be insulated and vapor-sealed like the outside ducts. In a heated space, simply use uninsulated duct and standard good duct practice. Attention to duct sealing will provide better 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 EV450 to a return duct of an existing heating/cooling system. This way, whenever the heating/cooling system is running, fresh air from the EV450 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 EV450 when outside air ventilation is not desired.

If the EV450 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 extremely 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.

AIR FLOW PERFORMANCE

Airflow CFM	ESP in. H_20	Watts-1P	277V	Watts-3P	Temp EFF%	Total EFF% Winter/Summer*
225	1.25	335	300	181	79	70/53
338	1.00	420	370	278	76	68/50
380	0.90	470	405	340	75	67/48
450	0.65	550	470	430	72	64/44
540	0.25	640	560	540	69	60/38
575	0.00	690	600	610	68	58/35
600	-0.25	735	635	664	67	56/32

*At ARI 1060 standard conditions

POWER SUPPLY

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

WIRING

WARNING: Danger of Electrical Shock when servicing an installed unit.
ALWAYS DISCONNECT POWER SOURCE BEFORE SERVICING! More than one disconnect switch may be required.
Proper Wiring Size Selection and Wiring Installation are the Responsibility of the Electrical Contractor.

BRINGING POWER TO UNIT

WARNING! Before Proceeding:

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.

Connect power supply to black power pigtails. In Single Phase Units, one is marked with white tape. If supplying 115V power, connect neutral to pigtail marked with white tape. Otherwise, remove white tape.

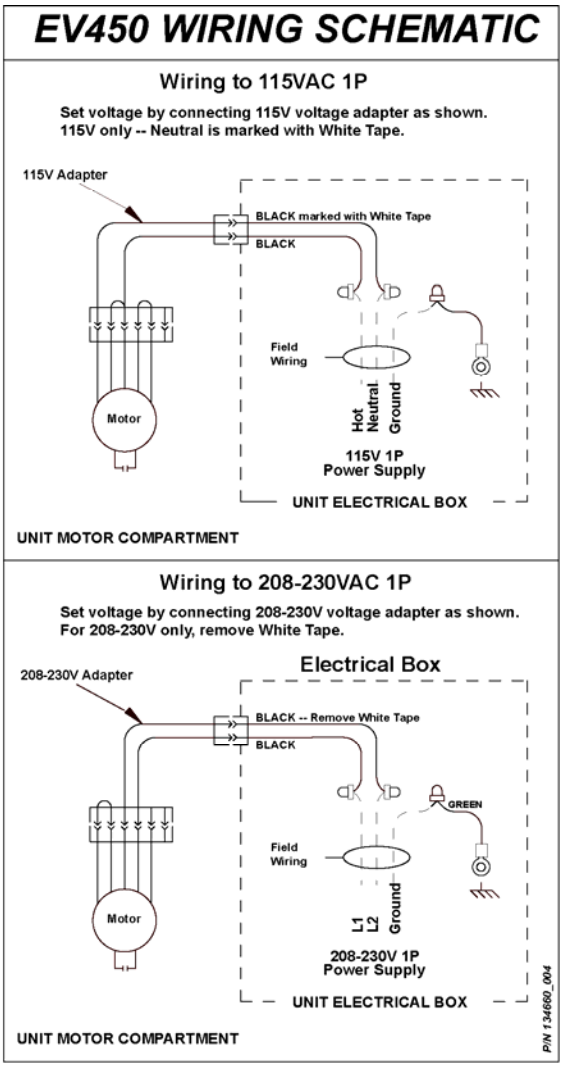
INSTALL VOLTAGE ADAPTER

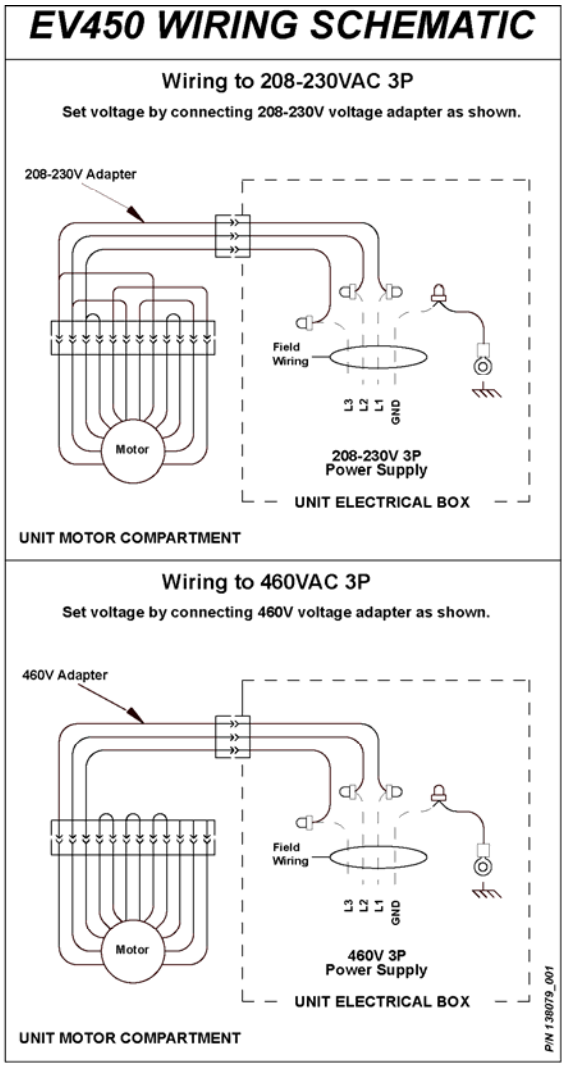
EV450 Units require field-setting of the blower's operating voltage. Follow these steps:

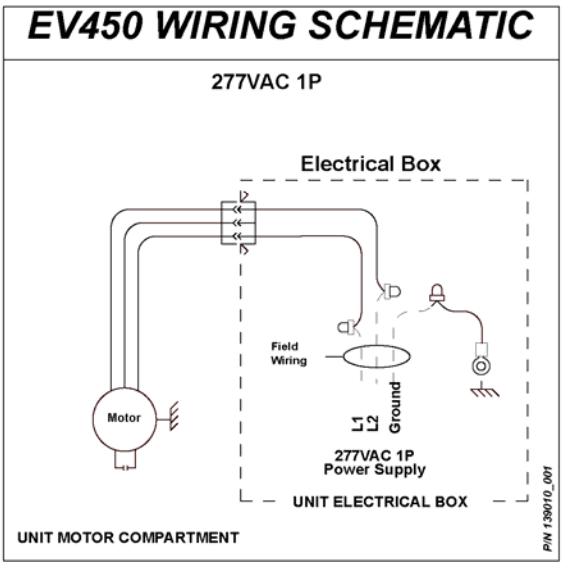
1. Remove both unit access panels.
2. Two loose wiring harnesses are tied to the blower cross-bar. These are the "voltage adapters" (see picture). Remove from cross-bar.
3. Determine voltage of the power supply for the unit.
4. Install the voltage adapter. The adapter connects the motor power pigtail to the plug on the electrical box wall. Discard the other harness.

Install voltage adapter here.

WIRING SCHEMATIC

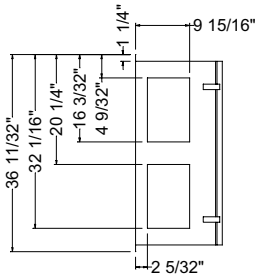


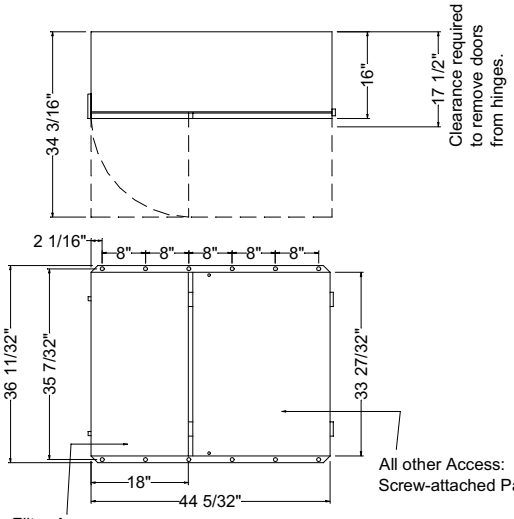


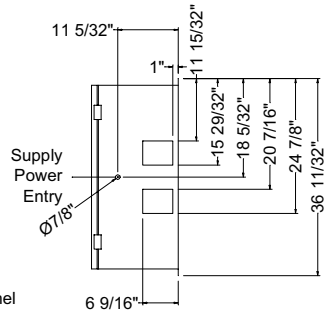


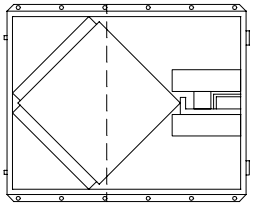
DIMENSIONS

Dimensions for with and without optional Duct Flanges (45EVDF)

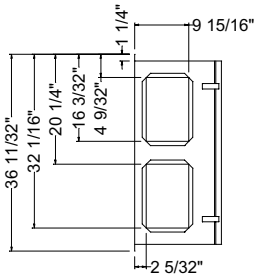


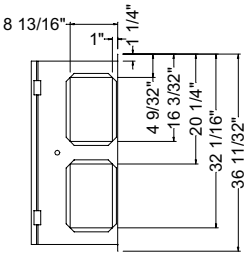




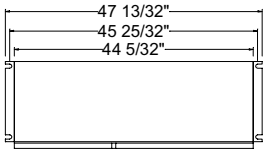


Optional 8" x 12" Duct Flanges (45EVDF) shown

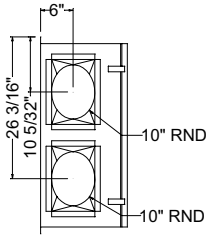


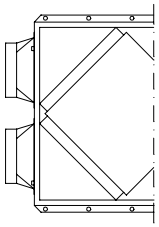


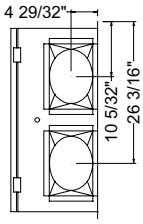
Optional Hanging Bracket (45EVHB) shown

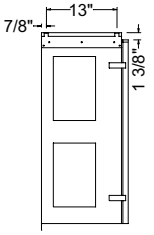


Optional Transitions (45EVT10) shown









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**

MAINTENANCE

REPLACE THE FILTERS REGULARLY

Inspect filters every three months – (or every 2000 operation hours; or more frequently depending on the cleanliness of the incoming air) – inspect and, if necessary, replace filters. Remember, a dirty filter restrict air flow. Filter size is 14" X 20" X 2".

NOTE: **Filters must be used** or the energy exchange element will become blocked by dust (resulting in the EV450 not doing its job)

VACUUM THE FACE OF THE ENERGY EXCHANGE ELEMENT YEARLY.

Once a year – (or every 5000 operation hours) – the faces of the diamond shaped core should be vacuumed with a soft brush attachment to remove particulates that lodge on the surface. Particulate does not accumulate within the core itself**. Do not wash the core with water!** This is unnecessary and may damage the core. Clean the interior of the case and blowers, by vacuuming or with a damp cloth**. Always disconnect power to the unit before servicing.**

INSPECT WEATHERHOODS YEARLY.

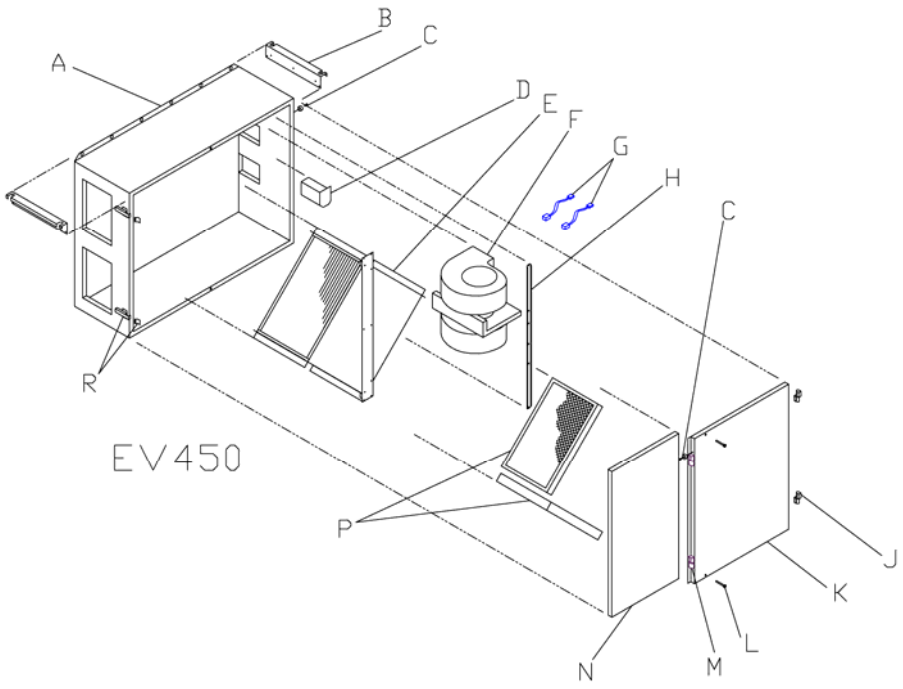
Once a year inspect exhaust and intake hoods for accumulation of particulates and debris. Clean as necessary. Make sure bird screen is in place.

DO NOT OIL MOTOR.

This quality motor is factory lubricated for long service life.

CAUTION: Do not wash the energy exchange element. Always handle the element carefully; keep it away from water or fire to avoid damage.

REPLACEMENT PARTS



Item	Description
A	Case Insulated
B	Hanging Bracket Kit (optional)
C	Door Bumper
D	E Box Assembly (Single Phase)
	E Box Assembly (Three Phase)
E	Core Assembly
F	Blower Assembly (Single Phase)
	Blower Assembly (Three Phase)
G	Wire Harness 115V (Single Phase)
	Wire Harness 208/230V (Single Phase)
	Wire Harness 208/230V (Three Phase)
	Wire Harness 460V (Three Phase)
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 12)
R	Latch Set
S	Hardware Kit (Not Shown)
T	Literature Packet (Not Shown)
U	RenewAire Brand Label (Not Shown)