# ENERVEX
# EFV 200-450 EXHAUST FAN

**3002601 06.16** **Installation & Operating Manual**

**READ AND SAVE THESE INSTRUCTIONS!**

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VENTING DESIGN SOLUTIONS

The EFV200-450 ontrol is ETL Listed in the U.S. and Canada: under file number 514733.

## Symbol Legend

The following terms are used throughout this manual to bring attention to the presence of potential hazards, or to important information concerning the product.

**DANGER:** Indicates an imminent hazardous situation which, if not avoided, will result in death, serious injury or substantial property damage.

**WARNING:** Indicates an imminent hazardous situation which, if not avoided, may result in personal injury or property damage.

## How to use this manual

This installation manual does not contain any system design documentation. System design documentation is available from any authorized ENERVEX representative. Accessories, fans, and variable frequency drives are not covered by this manual. Please refer to these component's individual manuals.

## TO REDUCE THE RISK OF FIRE, ELECTRICAL SHOCK OR INJURY TO PERSONS, OBSERVE THE FOLLOWING:

1. Use this unit in the manner intended by the manufacturer. If you have questions, contact the manufacturer at the address or telephone number listed on the front of the manual.
2. Before servicing or cleaning the unit, switch off at service panel and lock service panel to prevent power from being switched on accidentally.
3. Installation work and electrical wiring must be done by a qualified person(s) in accordance with applicable codes and standards.
4. Follow the appliance manufacturer's guidelines and safety standards such as those published by the National Fire Protection Association (NFPA), and the American Society for Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), and the local code authorities.
5. This unit must be grounded.

# 1. PRODUCT INFORMATION

## 1.1 FUNCTION

ENERVEX Model EFV Exhaust Fan is designed to provide mechanical exhaust in mulit-story building applications. It is intended for use in dryer, kitchen and other building exhaust systems. The fan is installed at the duct termination point, typically on a roof curb. The EFV is a component in the EN ERVEX MBESV, Modulating Building Exhaust System-Vertical.

The fan housing is made of heavy cast aluminum. It is a hinged clamshell design, allowing it to be opened for easy cleaning and maintenance. The backward inclined impeller is made of cast aluminum. It is dynamically and statically balanced with permanently attached zinc balancing weights. The housing complies with and meets the standard for Type B, Spark Resistant Construction.

The motor is a direct-drive, variable speed, Class H insulated, high temperature motor. It has permanently lubricated and sealed ball bearings and is maintenance free.

Installations must conform to the requirements of the authority having jurisdiction. Where required by the Compliance authority having jurisdiction, the installation must also conform to the NFPA 96. All electrical wiring must be in accordance with the requirements of authority having jurisdiction or, in absence of such requirements, with the National Electrical Code, NFPA 70.

ENERVEX Model EFV is tested and listed to UL Standard 705, the Standard for Power Ventilators

## 1.2 COMPONENTS

a. Top section
b. Bottom section
c. Motor
d. Centrifugal impeller
e. Inlet for impeller
f. Locking hinge
g. Wiring conduit
h. Handle

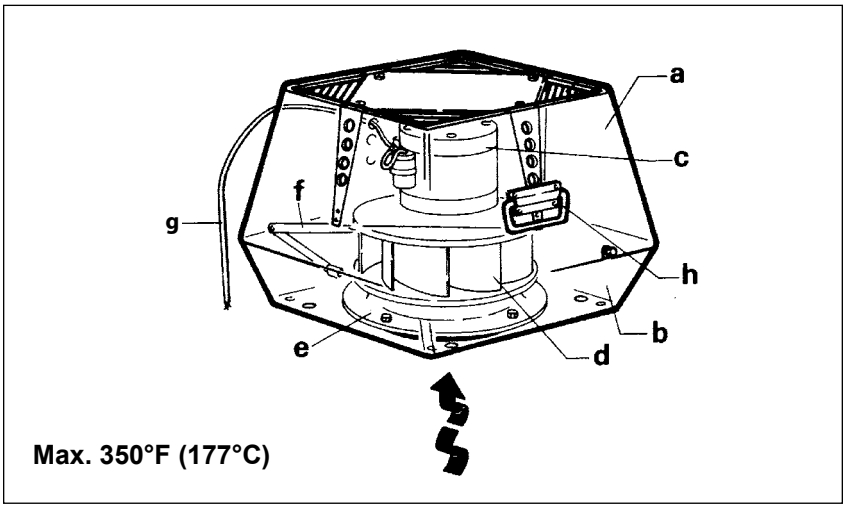



Fig 1

### 1.3 SHIPPING

The fan is shipped in a corrugated cardboard box. If a transport securing device is attached to hte bottom of the fan to hold the motor and impeller in place, do not remove it when unpacking the fan (EFV 400 and 450 only)

Do not remove the transport securing device until the fan is being installed on the duct or the roof curb. The motor shaft could be damaged.

NOTE: All single phase fans are shipped with a capacitor and junction box via conduit. The capacitor is located INSIDE the junction box. Please do not discard.

### 1.4 WARRANTY

2-Year Factory Warranty. Complete warranty conditions are available from ENERVEX, Inc.

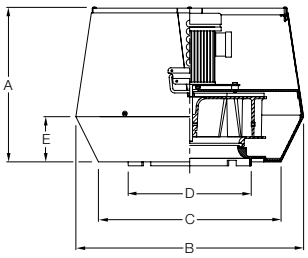
# 2. SPECIFICATIONS AND DIMENSIONS

## 2.1 DIMENSIONS AND CAPACITIES

### Specifications

| Model | | | EFV 200 | EFV 250 | EFV 315 | EFV 400 | EFV 450 |
|---|---|---|---|---|---|---|---|
| Discharge | | | Vertical | | | | |
| Fan Type | | | Centrigual Impeller | | | | |
| Max. Discharge Velocity | | FPM | 1729 | 2222 | 2771 | 2752 | 4134 |
| Actual Discharge Velocity | | FPM | 2.9 x CFM | 1.9 x CFM | 1.2 x CFM | 1.03 x CFM | 1.03 x CFM |
| Voltage | | VAC | 1x120 | | | 3x208-240 / 3x400 | |
| RPM | | | 1600 | | | 1720 | |
| Amps | | A | 1.4 | 2.9 | 5.8 | 3.5/1.8 | 6.5/3.6 |
| Motor Output | | hp / kW | 0.15 / 0.10 | 0.33 / 0.25 | 0.50 / 0.35 | 1.00 / 0.75 | 2.00 / 1.50 |
| Weight | | lbs / kg | 47 / 18 | 60 / 26 | 88 / 35 | 127 / 58 | 155 / 70 |
| Dimensions | A | in / mm | 11.03 / 280 | 13.20 / 325 | 14.97 / 380 | 16.94 / 430 | 23.23 / 590 |
| | B x B | in / mm | 15.37 / 390 | 19.11 / 485 | 22.85 / 580 | 25.61 / 650 | 25.61 / 650 |
| | C x C | in / mm | 12.22 / 310 | 15.17 / 385 | 18.32 / 465 | 20.69 / 525 | 20.69 / 525 |
| | D | in / mm | 7.88 / 200 | 9.85 / 250 | 12.41 / 315 | 15.76 / 400 | 15.76 / 400 |
| | E | in / mm | 3.15 / 80 | 3.94 / 100 | 4.53 / 115 | 5.12 / 130 | 8.54 / 215 |
| Motor Starter Required | | | No | No | No | Yes [1] | Yes [1] |
| Variable Speed Motor | | | Yes | Yes | Yes | Yes | Yes |
| Temperature Rating | | | 350°F / 177°C | | | | |

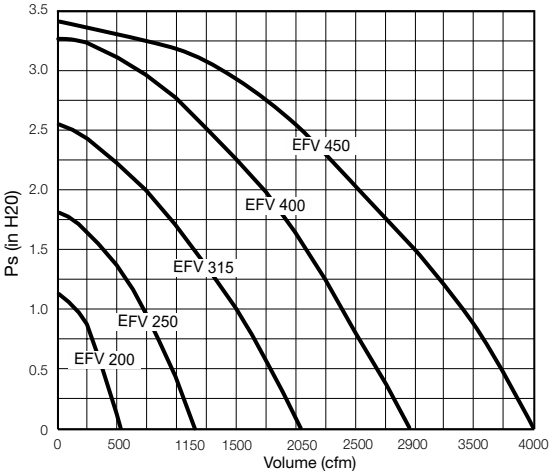
1) NOT required if using a VFD.




### Sound Data

| Model | Lw dB (measured in accordance with ISO 3744) | | | | | | | Lp dB(A) | FA Sones |
|---|---|---|---|---|---|---|---|---|---|
| | 125Hz | 250Hz | 500Hz | 1000Hz | 2000Hz | 4000Hz | 8000Hz | | |
| EFV 200 | 58 | 60 | 62 | 61 | 56 | 44 | 37 | 36 | 3.1 |
| EFV 250 | 64 | 68 | 66 | 65 | 61 | 49 | 45 | 41 | 3.9 |
| EFV 315 | 71 | 75 | 70 | 73 | 68 | 57 | 52 | 48 | 6.3 |
| EFV 400 | 76 | 80 | 75 | 79 | 74 | 62 | 57 | 53 | 7.8 |
| EFV 450 | 79 | 83 | 78 | 78 | 77 | 65 | 60 | 56 | 8.3 |

### Capacity



# 3. MECHANICAL INSTALLATION

## 3.1 GENERAL

The code requirements for a mechanical draft system are different than those for a gravity venting system used with gas or oil-fired applications. Generally, the mechanical draft system must be installed a minimum of 3 feet away from any forced air inlet located within 10 feet and a minimum of 4 feet away from any door or window. For complete information, consult ENERVEX or your local building codes.

## 3.2 TRANSPORT SAFETY DEVICE

Before mounting the fan make sure the transport safety brackets have been removed (EFV 400 and 450 only).

## 3.3 SINGLE FAN ON STEEL CHIMNEY

Insert the steel chimney adapter (SCA) into the chimney/ stack. The long collar engagement ensures safe anchoring (See Fig. 3). If necessary, the adapter can be secured by means of long self-tapping stainless steel screws into the side of the collar through the chimney wall.

Place high-temperature silicone on top of the adapter.

Remove the transport securing device (if present) holding the motor shaft and impeller in place.

Center the fan over the cutout and place on the silicone.

Open the fan housing and secure onto the adapter through the pre-drilled holes in the bottom of each corner. Use lag bolts or self-tapping sheet metal screws.

Do not block the (4) drain holes.

## 3.4 SINGLE FAN ON ROOF CURB

If the fan is installed on a curb cap, secure the roof curb with self-tapping sheet metal screws (see Fig. 4).

Place high-temperature silicone on the top of the curb cap around the curb cap opening.

Remove the transport securing device (if present) holding the motor shaft and impeller in place.

Center the fan on the curb cap and place the fan on the silicone.

Open the fan housing and secure onto the roof curb through the pre-drilled holes in the bottom of each corner. Use lag bolts or self-tapping sheet metal screws.

Do not block the (4) drain holes.

**CAUTION**

Never place hands or fingers on top of fan base when closing.

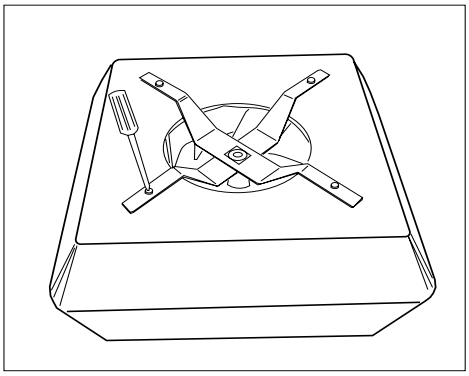


Fig 2

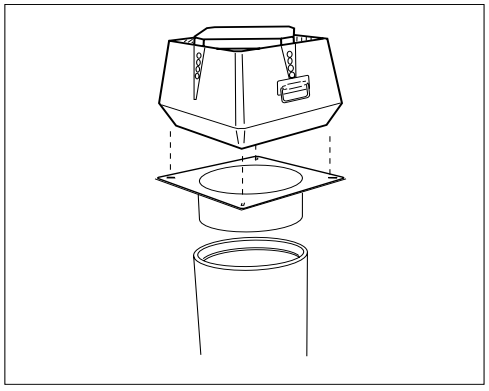


Fig 3

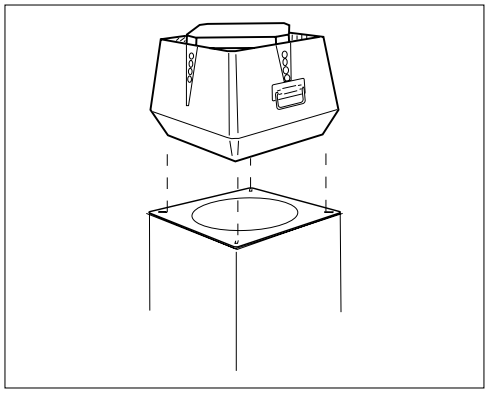


Fig 4

### 3.5 SINGLE FAN ON BRICK CHIMNEY

The installation procedure is the same for round and square flues. If a clay flue liner is installed and extends beyond the chimney, cut it back so it extends no more than 1/2 inch above the chimney crown.

Apply a bead of high-temperature silicone around the edges of the flue tile. Place the fan over the flue and make sure the fan is completely sealed to the clay tile.

Open the top of the fan housing and secure with anchor bolts through the pre-drilled mounting holes.

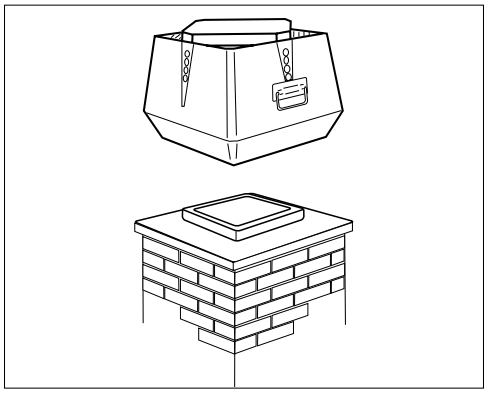


Fig 5

### 3.6 SIDE-WALL MOUNTING THE FAN

Make sure the vent terminates flush with the wall. Insert the steel chimney adapter (SCA) and secure it safely to the wall.

Seal around the edges of the adapter flange.

Mark the locations of the wall anchors and predrill holes for them.

Turn the fan upside-down and apply a bead of high-temperature silicone on the base of the housing, close to the outer edge.

Orient the fan so the motor terminal box is pointed upwards. The hinges on the housing should be on the left-hand side of the installer as shown in Fig. 6.

Open the fan and secure it onto the adapter with wall anchors, through the predrilled holes in the bottom. Make sure the conduit is located on one of the sides, never on the upside or downside.

Seal around the fan base to make sure it is watertight and no water can slip in between the fan and the adapter.

Do not block the (4) drain holes.

Do not side-wall mount the EFV450.

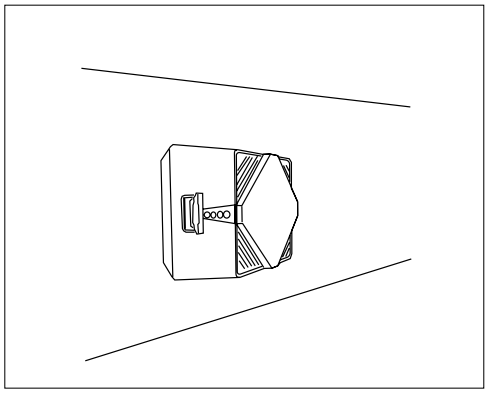


Fig 6

**CAUTION**

Never place hands or fingers on top of fan base when closing.

# 4. ELECTRICAL INSTALLATION

## 4.1 ELECTRICAL REQUIREMENTS

Power requirements depend on the fan size. They can be found on page 5.

**DANGER**

Turn off electrical power before servicing. Contact with live electric components can cause shock or death.

**NOTICE**

If any of the original wire supplied with the system must be replaced, use similar wire of the same temperature rating. Otherwise, insulation may melt or degrade, exposing bare wire.

## 4.2 WIRING DIAGRAM FOR EFV 200-315

The connection diagram below shows how the fan is connected to the fan speed control and the power source. If wired to a MEC 18 Control instead of a fan speed control, refer to the MEC 18 Installation Manual for connection detail.

Use a 2-conductor wire of minimum 14 AWG with ground. Wiring must be run outside the duct, but can be run between the duct and the roof curb.

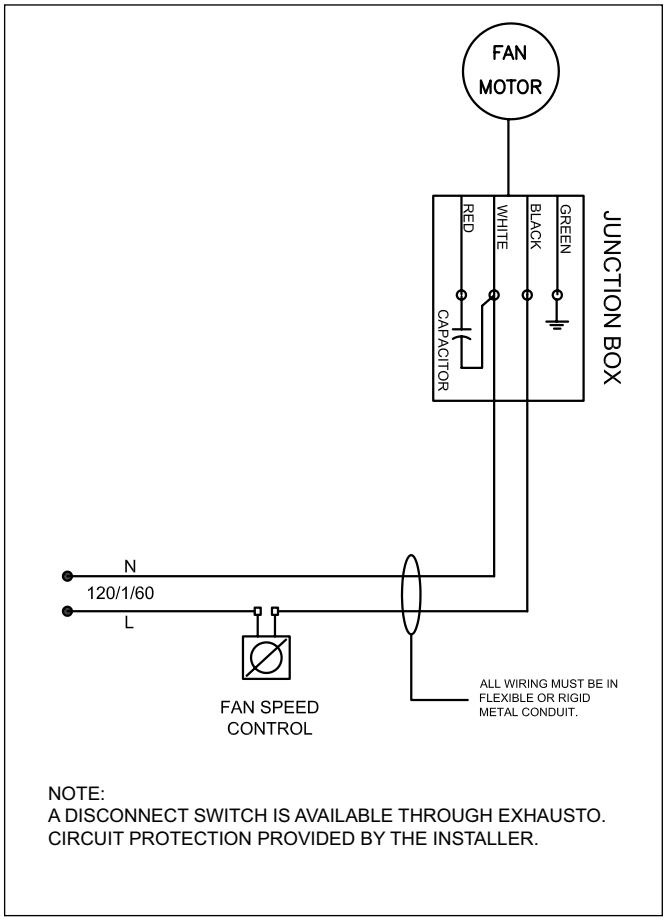



Fig 5

### 4.3 WIRING DIAGRAM FOR EFV 400-450

EFV 400-450 can operate at either 3 x 200-240 VAC or 3 x 440-480 VAC (default).

The motor wiring terminals in Fig. 6 show default jumper positions for 3 x 440-480 VAC operation. If the application requires 3 x 200-240 VAC operation, the jumper positions must be changed according to Fig. 7.

After wiring, verify the motor is rotating in the clockwise direction. This is marked on the motor end cover. If the rotation is incorrect, swap the two wires going to the motor terminals, U1 and W1.

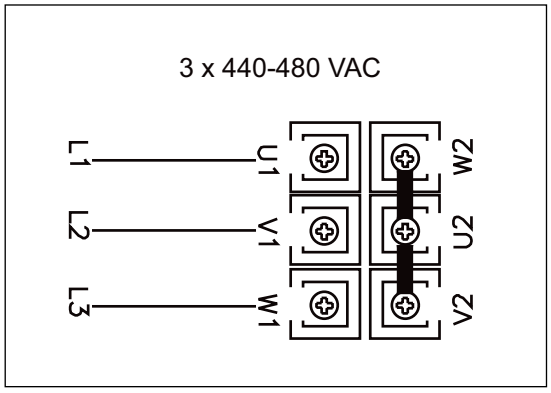



Fig 6

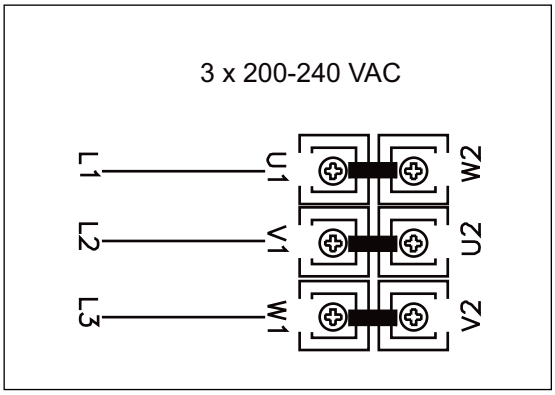



Fig 7

A variable frequency drive (VFD) is required to operate 3-phase fans. For installation and wiring of the VFD itself, please refer to the instructions shipped with the VFD.

The connection diagram below shows how the fan is connected to the VFD and power source.

Use a 3-conductor wire of minimum 14 AWG with ground. Wiring must be run outside the duct, but can run between the duct and the roof curb.

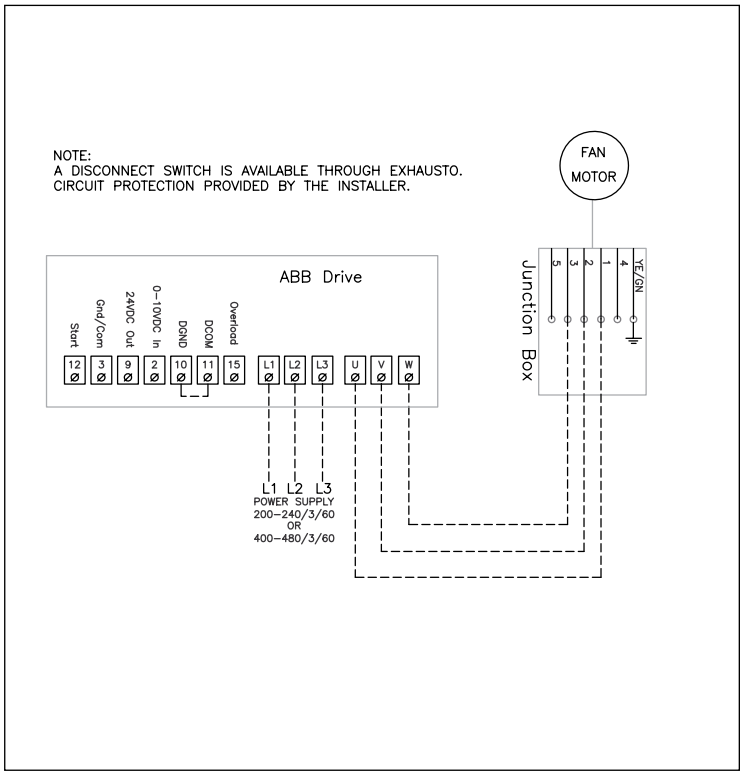



Fig 8

# 5. STARTUP AND CONFIGURATION

## 5.1 SYSTEM TESTING

- Check the voltage with the motor nameplate rating.
- Check that the transport securing device holding the motor shaft and impeller in place has been removed (EFV 400 and 450).
- Verify the impeller rotates freely and has not been subject to misalignment during shipping or installation.
- Apply power and check that the impeller is rotating in the direction of the arrow on the side of the top motor cover. All ENERVEX fans run in a clockwise direction when viewed from the top. Double check if three phase motor is tested on temporary wiring. Switching any two leads will reverse the rotation.

Make sure the fan is running in the correct direction; the fact that the fan blows is no guarantee it is doing so. Running the fan in the wrong direction over a longer period of time will damage the motor.

It is important that the installation, start-up and system testing procedures are followed. Failure to do so may have a major negative impact on motor life expectancy.

# 6. MAINTENANCE AND TROUBLESHOOTING

## 6.1 MAINTENANCE INTERVALS

The ENERVEX EFV fan is designed for prolonged use. For dirty or lint-laden exhaust, inspect the impeller three (3) months after installation and set up a periodic inspection based on these findings. Clean as required.

The fan motors are equipped with permanently lubricated and sealed ball bearings and are maintenance free.

## 6.2 CLEANING

**WARNING**

Do not open the motor housing unless power to the fan has been disconnected.

- Loosen the two Phillips screws in the front of the unit.
- Tilt the top of the fan by lifting on the handle. Make sure the locking arms hold the top of the fan open before letting go.
- Use a brush or scraper to clean the inside of the fan housing and impeller wheel.

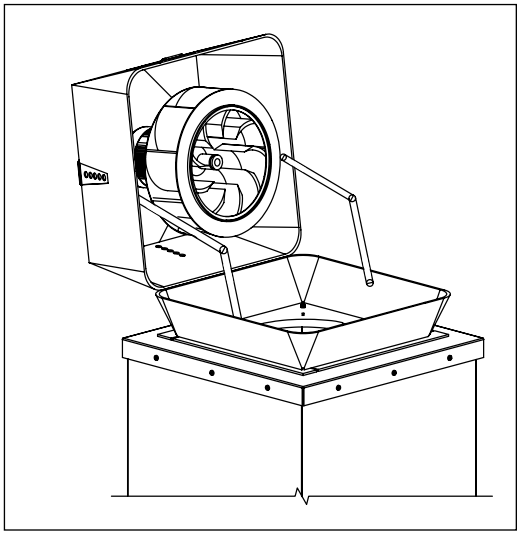


Fig 9

**CAUTION**

Never place hands or fingers on top of fan base when closing.

## 6.3 TROUBLESHOOTING

| Problem | Possible Cause | What to do |
|---|---|---|
| The fan is not operating. | No power to the fan. | Check the power supply wires in the junction box by the fan.<br>Check the circuit breaker.<br>Check that the fan is actually turned ON. |
| The fan is not running at full speed and/or is humming. | The capacitor is improperly connected or not connected at all (single-phase fans only). | Check the connections inside the junction box. The capacitor must be installed according to wiring diagram. |
| The fan is rotating backwards (EFV 400/450 only). | Phase sequence in the power to the fan is reversed. | Swap two phases in the junction box. |
| The fan is vibrating vigorously. | The motor shaft is damaged. | Turn the power off immediately. Open the fan and check if the shaft is straight. If not, contact ENERVEX. |
| The fan is noisy. | A transportation device has not been removed.<br>Foreign matter is stuck in the fan.<br>A ball bearing is damaged. | Turn off power and remove the transportation device.<br>Turn off the power and remove the foreign article.<br>Turn off the power. Wait for the motor to stop revolving. Spin the wheel and listen for any grinding noise from the motor. If necessary, replace bearing. |

## 6.3 SPARE PARTS ORDERING

When ordering spare parts, please have the model number and part description available.

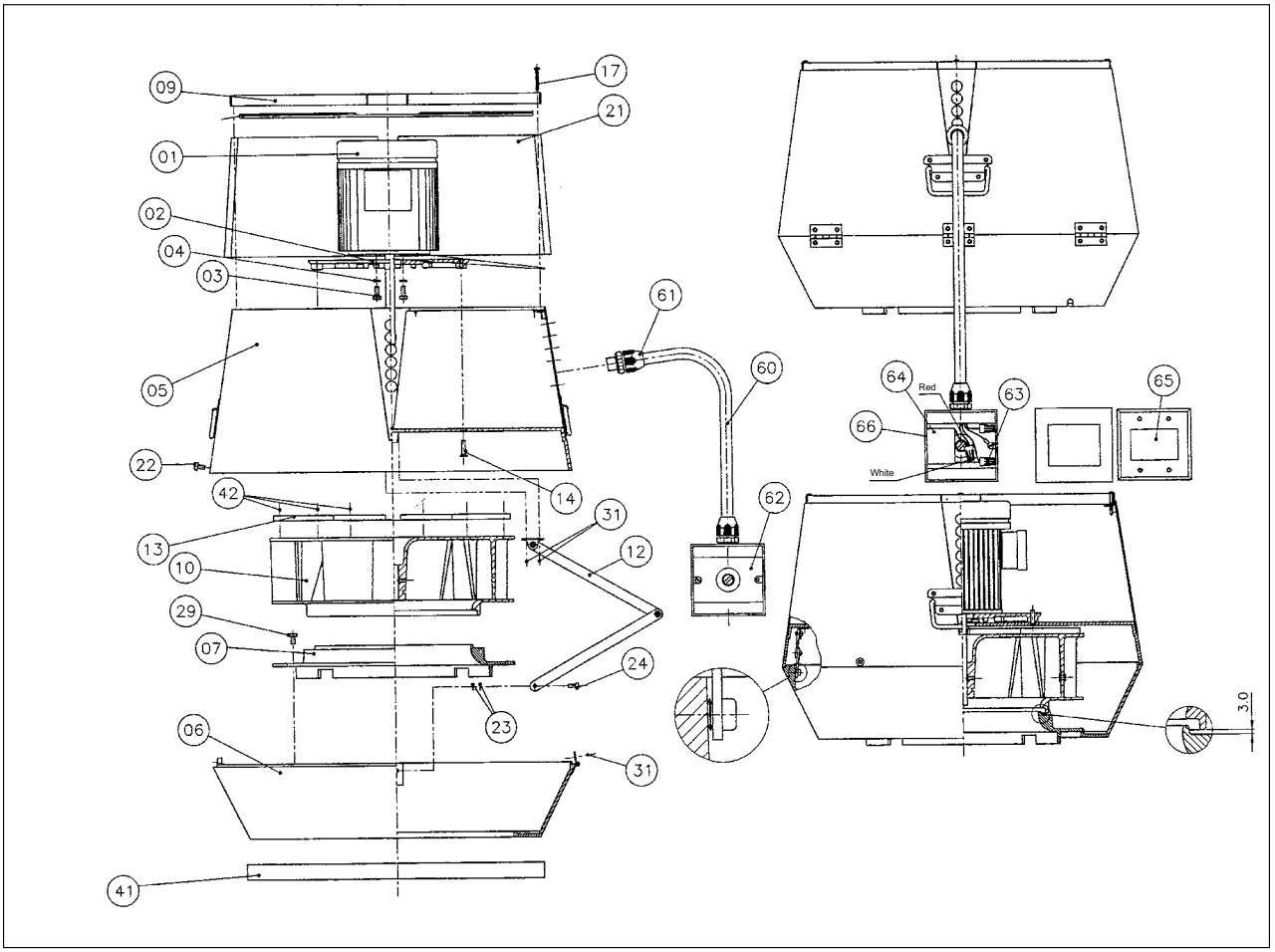



Fig 10

| | | | |
|---|---|---|---|
| 01 | Motor | 22 | Screw - SS (2) |
| 02 | Motor mounting plate | 23 | Washer - SS (2) |
| 03 | Screw - SS (2) | 24 | Screw - SS |
| 04 | Washer - SS (2) | 29 | Screw - SS (4) |
| 05 | Housing (top) | 31 | Rivet (2) |
| 06 | Housing (base) | 41 | Neoprene Gasket |
| 07 | Impeller seat | 42 | Rivet (12) |
| 09 | Top plate | 60 | 3/8” Conduit |
| 10 | Aluminum Impeller | 61 | 3/8” Connector |
| 12 | Locking hinge | 62 | Junction box with blank cover |
| 13 | Cooling vane | 63 | Wire nuts (4) |
| 14 | Screw - SS (4) | 64 | Capacitor (1x120V fans only) |
| 17 | Screw - SS (4) | 65 | Wiring diagram (mounted on inside cover) |
| 21 | Motor housing insulation | | |

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