

EFV fan



READ AND SAVE THESE INSTRUCTIONS!



Product information

Chapters 1 + 2



Mechanical installation

Chapter 3



Electrical installation

Chapter 4



Start up and configuration

Chapter 5



Maintenance and troubleshooting

Chapter 6

USA

CAN

Job name: _____

Installer: _____

Installation date: _____

Distributor contact information:
ENERVEX Inc. • T: 800.255.2923
info@enervex.com • www.enervex.com

exodraft

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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.



CAUTION

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



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's distributor 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.

How to use this manual

This installation manual does not contain any system design documentation. System design documentation is available from ENERVEX.

Accessories and variable frequency drives are not covered by this manual. Please refer to these component's individual manuals.

1. Product information

1.1 Function

Description The **exodraft** model EFV fan is intended for use as part of a chimney, stack or venting system. The fan is designed to withstand the high temperatures associated with combustion, and can be used with natural gas, LP-gas and oil-fired heating appliance systems where flue gases do not exceed 575 °F (300 °C) for intermittent operation and 482 °F (250 °C) for continuous operation. It is approved for use with category I, II, III and IV appliances.

Use The EFV fan may be installed on a traditional vertical chimney system, or as part of a side-wall vented system. Always install the fan at the chimney termination point.
The use of a fan is not restricted to any type of chimney, because the fan creates a negative pressure (below atmospheric) in the chimney system. However, always follow the heating appliance manufacturer's instructions regarding specific venting requirements.
The fan is designed to prevent draft problems by creating mechanical draft in chimney and stack systems. It can also be used to increase the capacity and efficiency of such a system.

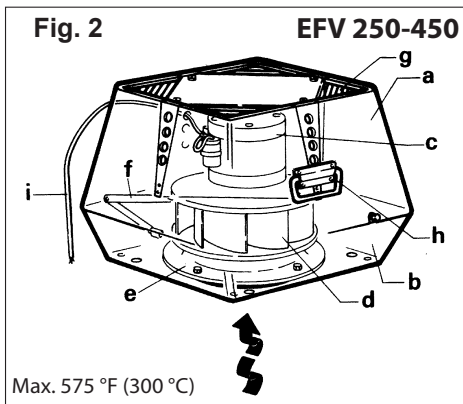
Code Compliance The fan housing is made of heavy cast aluminum and can be opened for easy cleaning. The EFV 250-450 have an backward inclined impeller constructed of aluminum with permanently attached balancing weights. The motor is a direct drive, variable speed, class H insulated, high temperature 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 authority having jurisdiction, the installation must also conform to the NFPA 31, 54 or 211. 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.

Listing The EFV is tested and listed to UL Standard 378 for Draft Equipment and CAN3-B255-M81 for Mechanical Flue-Gas Exhausters (ETL Report 514733).
The fan is approved for use in dryer venting systems as well.

1.2 Components

The **EFV 250-450 Fan** consists of the following components:

- | | |
|-------------------------|--------------------|
| a. Top section | f. Locking hinge |
| b. Bottom section | g. Bird screen |
| c. Motor | h. Carrying handle |
| d. Centrifugal impeller | i. Wiring conduit |
| e. Inlet for impeller | |



1.3 Shipping

The fan is shipped in a corrugated cardboard box. A transport securing device may be attached to the bottom of the fan to hold the motor and impeller in place. Do not remove the device until the fan is at the installation point.

WARNING



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.

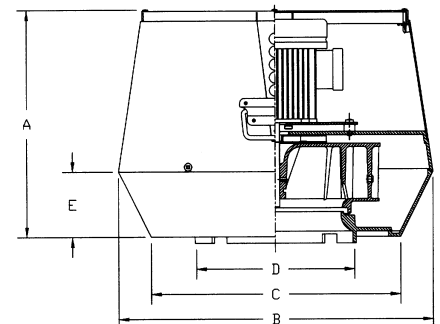
1.4 Warranty

Complete warranty conditions are available at www.enervex.com or request a copy at: info@enervex.com or at tel.: 1-800.255.2923.

2. Specifications

2.1 Dimensions and capacities

exodraft fan model		EFV 250	EFV 315	EFV 400	EFV 450	
Discharge		Vertical				
Fan type		Centrifugal Impeller				
Max. discharge velocity	FPM	2,222	2,771	2,752	4,134	
Actual discharge velocity	FPM	1.9 x CFM	1.2 x CFM	5.9 x CFM	1.03 x CFM	
Voltage	VAC	3 x 208-230	3 x 208-230 / 3 x 380-420			
RPM		1600	1600	1720	1720	
Amps	A	3.3	6.5 / 3.7	6.5 / 3.7	6.5 / 3.7	
Consumption	hp	0.6	1.1	1.1	1.1	
	kW	0.8	1.5	1.5	1.5	
Weight	lbs	60	88	127	155	
	kg	26	35	58	70	
Dimensions	A	in	13.20	14.97	16.94	23.23
		mm	335	380	430	590
	B x B	in	19.11	22.85	25.61	25.61
		mm	485	580	650	650
	C x C	in	15.17	18.32	20.69	20.69
		mm	385	465	525	525
	D Ø	in	9.85	12.41	15.76	15.76
		mm	250	315	400	400
	E	in	3.94	4.53	5.12	8.54
		mm	100	115	130	217
VFD required		Yes	Yes	Yes	Yes	
Variable speed motor		Yes	Yes	Yes	Yes	
Temperature rating	Interm	575 °F/300 °C				
	Cont.	482 °F/250 °C				



3. Mechanical installation

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.

3.1 Transport safety device

- Before mounting the **exodraft** fan make sure the transport safety brackets have been removed (EFV315, 400 and 450 only).

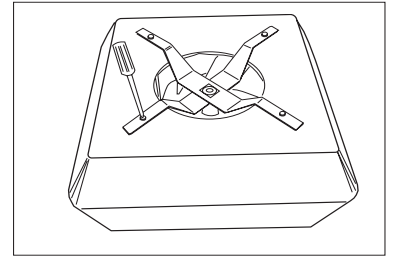


Fig. 3

3.2 Single fan on steel chimney

- Insert the steel chimney adapter (SCA) into the chimney/stack. The long collar engagement ensures safe anchoring (see fig. 4). 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.

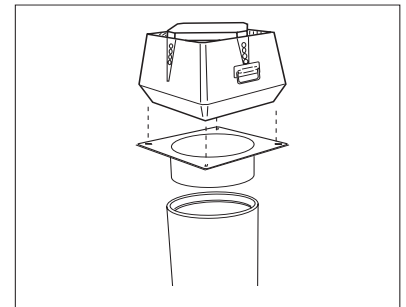


Fig. 4

3.3 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. 5).
- 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.

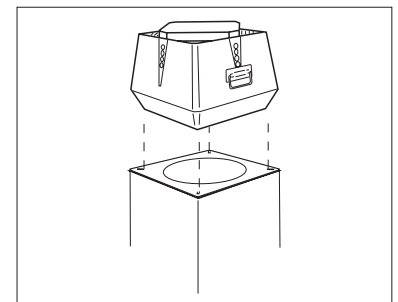


Fig. 5



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

exodraft

3.4 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.

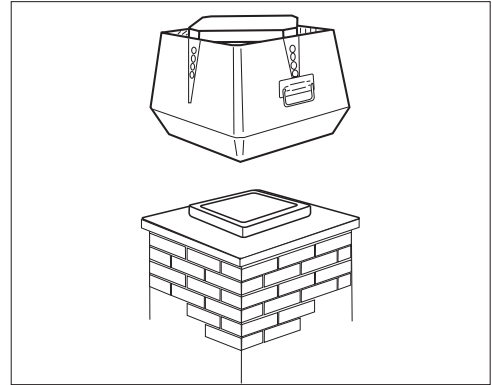


Fig. 6

3.5 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. 7.
- Open the fan and secure it onto the adapter with wall anchors, through the pre-drilled 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.

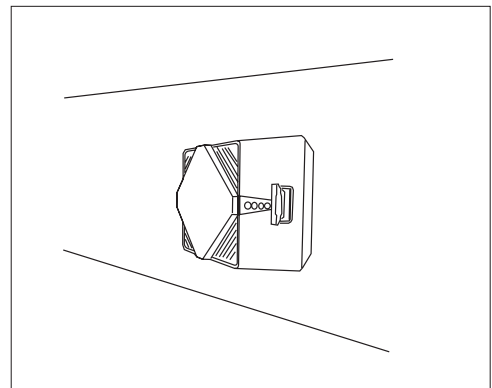


Fig. 7



CAUTION

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

3.6 Multiple fan installations

- It is possible to install multiple fans in parallel. For details, please contact ENERVEX. The fans must be placed so they can be opened for maintenance and chimney access.
- Fig. 8 shows optimal placement.

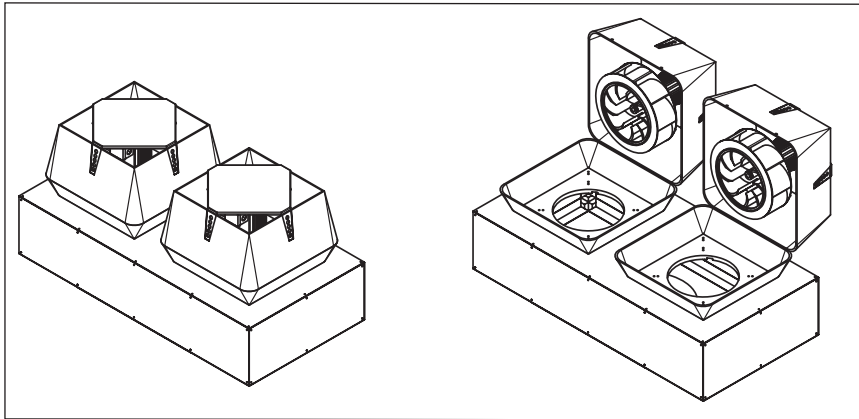


Fig. 8

3.7 Installation for high temperatures

- If the fan is used for applications where the flue gas temperatures exceed 482 °F at the flue exit, dilution air is required. Dilution air allows cool air to dilute the warm flue gases. The best way to introduce dilution air is through a barometric damper or draft hood mounted in the chimney system between the appliance outlet and the fan outlet. When introducing dilution air, the fan capacity is reduced and a larger fan may be required.

3.8 Installation of proven draft switch (PDS)

- A safety system must be interlocked with the appliance(s). The safety system could utilize a Proven Draft Switch, a thermal switch or a flow switch.
- The device must be interlocked with the heating appliance so it shuts down in case of insufficient draft, fan failure or power failure. Please refer to the PDS-1 Installation Manual if this control is used. For more information on alternative safety systems, please contact ENERVEX.
- Fig. 9 shows the location of the stack probe used with the PDS-1. The stack probe should be installed in a location where there is at least 0.05" WC. The tip of the stack probe should be mounted so that it is flush with the inner wall.



NOTICE

A safety device that prevents the heating appliance operation, in case of a power failure or inadequate draft situation, must be installed.

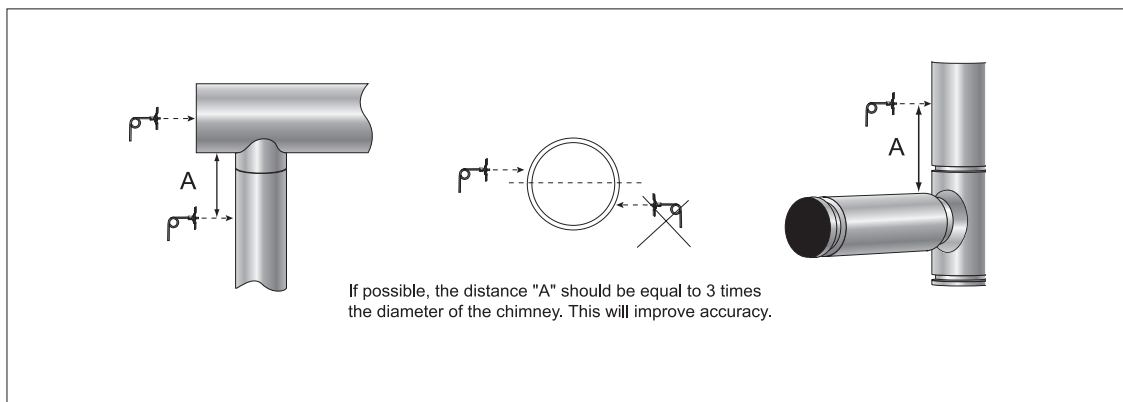


Fig. 9

4. Electrical installation

4.1 Electrical requirements

Power requirements depend on the fan size and they can be found on page 4.



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 250-450

The wiring diagrams below shows a three-phase fan connected to the power source (see fig. 10).

Use a 3-conductor wire of minimum 15 AWG with ground. Wiring must be run outside the chimney/stack in flexible or rigid metal conduit.

Variable speed is required. Wire according to Fig. 10 for systems using the Enerverx Edrive series VFD.

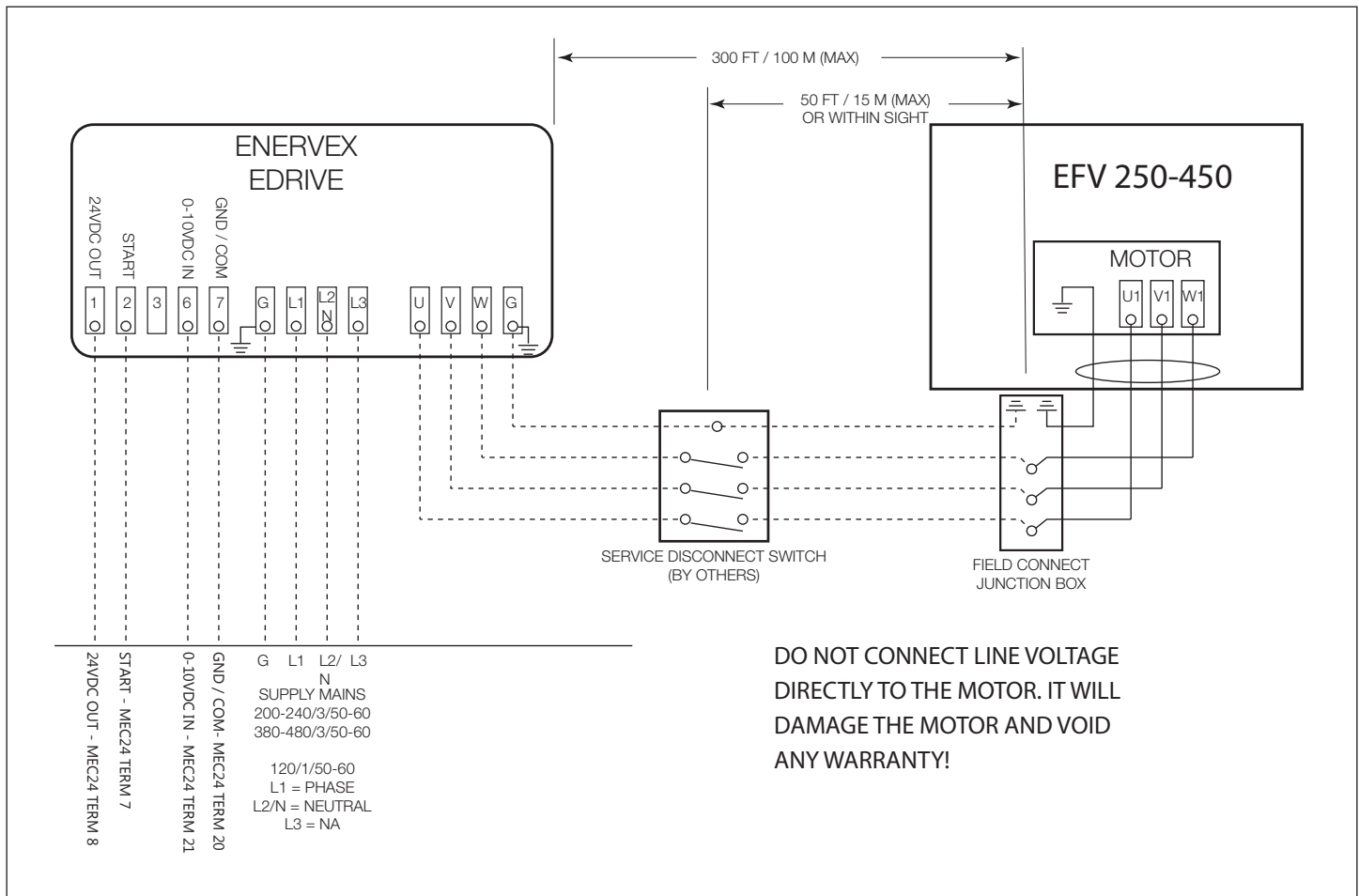


Fig 10

EFV250 to EFV450 requires 3 x 230 V from the factory. EFV315 to EFV450 can be configured for 3 x 400 V using the diagram below. Note: EFV250 is 3 x 230 V only.

The diagram shows the correct wiring in the connection box on the motor.

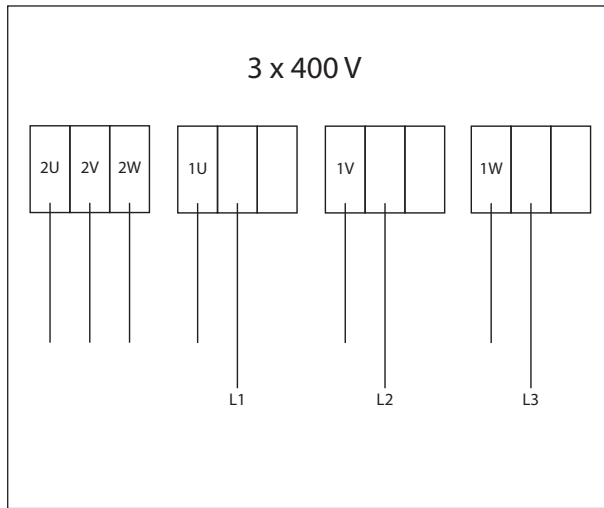


Fig. 11A.

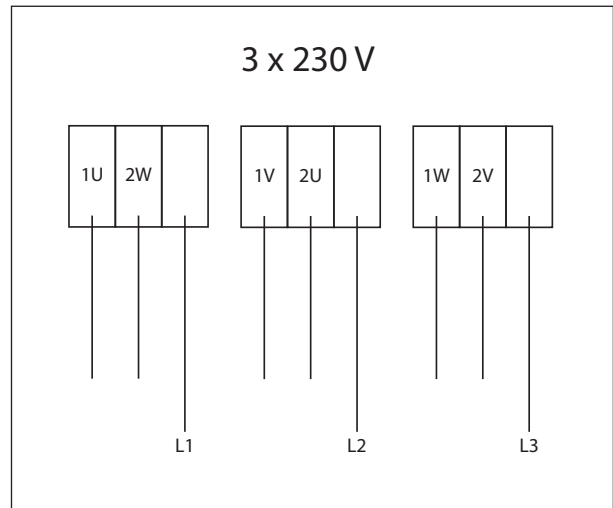


Fig. 11B.

Use cable gland size M16 at the junction box on the motors



5. Startup and configuration

5.1 System testing

- Check the line voltage with the motor nameplate rating.
- Check that the transport securing device holding the motor shaft and impeller in place has been removed.
- Determine if the axial vane or impeller is running free and has not been subject to misalignment in shipping or installation.
- Apply power and check that the axial vane or impeller is rotating in the direction of the arrow on the side of the top motor cover. All **exodraft** fans run in a clockwise direction when viewed from the top.
- Switching any two phases in the junction box will reverse the rotation.

5.2 Adjusting fan speed

- Start all heating appliances connected to the chimney with the fan installed. Set the fan speed control to the speed where no spillage is experienced anywhere in the system.

5.3 Testing safety system

- Adjust the setting of the Proven Draft System or other device.
- Start the heating appliances and the fan to make sure the safety device is functioning. Turn the fan off. After less than 1-2 minutes all appliances should be shut down.



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 expectancy.

6. Maintenance and troubleshooting

6.1 Maintenance intervals

- The **exodraft** fan is designed for continuous use.
- For gas applications, no regular maintenance is required.
- For oil applications, inspect the axial vane or impeller after 3 months and set up a periodic inspection based on these findings. Clean as required.
- The fan motors are equipped with permanently lubricated sealed ball bearings. They do not require lubrication.
- The run capacitor is considered a wear part and will need to be replaced depending on usage.

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 the hinge. Make sure the locking arm holds the top of the fan before letting go.
- If necessary, use a scraper and a brush to clean the impeller and the inside fan base (see fig. 12).



CAUTION

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

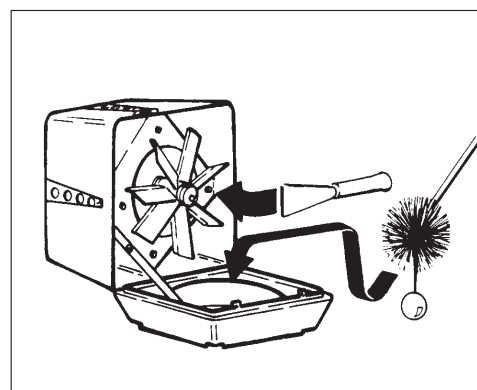


Fig. 12

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. Check the circuit breaker. 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	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. Foreign matter is stuck in the fan.	Turn the power off immediately. Open the fan and check if the shaft is straight. If not, contact ENERVEX at info@enervex.com or at tel.: 1-800.255.2923. Turn off the power and remove the foreign article.
The fan is noisy.	A transportation device has not been removed. Foreign matter is stuck in the fan. A ball bearing is damaged.	Remove the transportation device. Turn off the power and remove the foreign article. 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.
The fan stops in the middle of a firing cycle.	The motor is overheating.	Check the flue gas temperature below the fan. The temperature should not exceed 482°F during continuous operation. Call ENERVEX at tel.: 1-800.255.2923.

Distributor in USA & Canada



ENERVEX Inc.
1685 Bluegrass Lake Parkway
Alpharetta
GA 30004

P: 770.587.3238
F: 770.587.4731
T: 800.255.2923
info@enervex.com
www.enervex.com