

# ENERVEX

## GSV 200-450 GREASE FAN

3001391 12.16

Installation & Operating Manual



**READ AND SAVE THESE INSTRUCTIONS!**



The GSV 200-450 Grease Fan is ETL Listed in the U.S. and Canada.

## 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.

## TO REDUCE THE RISK OF INJURY TO PERSONS IN THE EVENT OF A CHIMNEY FIRE, OBSERVE THE FOLLOWING:

1. Immediately close all dampers and/or air entrance openings to the cooking appliance. This includes doors.
2. Alert your patrons to the possible danger.
3. Inspect your cooking appliance and chimney surroundings for possible fire. If in doubt, alert your fire department.
4. Do not continue to use your appliance until it and your chimney have been thoroughly inspected. Overheating can cause metal parts to expand, buckle and crack. If you are not certain, have a certified chimney sweep disassemble all parts so they can be inspected and cleaned.
5. Do not use salt or water on the fire in the cooking appliance. Salt is corrosive and water will cause a dangerous steam explosion. You might be able to control the fire by using ashes, sand or baking soda, since baking soda is an ingredient used for dry chemical fire extinguishers.
6. After a chimney fire, when it is safe to do so, check internal locations such as an attic and under the roof and keep watching for two or three hours. There may be delayed smoldering and subsequent ignition, even if the fire inside the chimney has been controlled.

## TO REDUCE THE RISK OF A CHIMNEY FIRE:

1. Keep chimney and grease fan clean.
2. Always turn ON fan when using the cooking appliance.
3. Do not leave cooking appliance unattended when in use.

## CAUTION

Please read specification label on product for further information and requirements.

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## 1. PRODUCT INFORMATION

### 1.1 FUNCTION

ENERVEX Model GSV Grease Fan is designed to provide a large exhaust volume at a high discharge velocity. It is intended for use as a part of a restaurant kitchen exhaust system and grease applications according to NFPA 96. The use of the ENERVEX Grease Fan is not restricted to any type of chimney or grease duct. However, always follow the exhaust-hood manufacturer's instructions regarding the venting.

The fan housing is made of heavy cast aluminum and can be opened for easy cleaning. The impeller is of the backward inclined type. It is made of cast aluminum and has 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 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 GSV is tested and listed to UL Standard 705 for Power Ventilators and UL Standard 762 for Power Ventilators for Restaurant Exhaust Ventilators.

The model is also tested and listed to ULC-S645-93, Standard for Power Roof Ventilators for Commercial and Institutional Kitchen Exhaust Systems.

### 1.2 COMPONENTS

The GSV Grease Fan consists of the following components

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

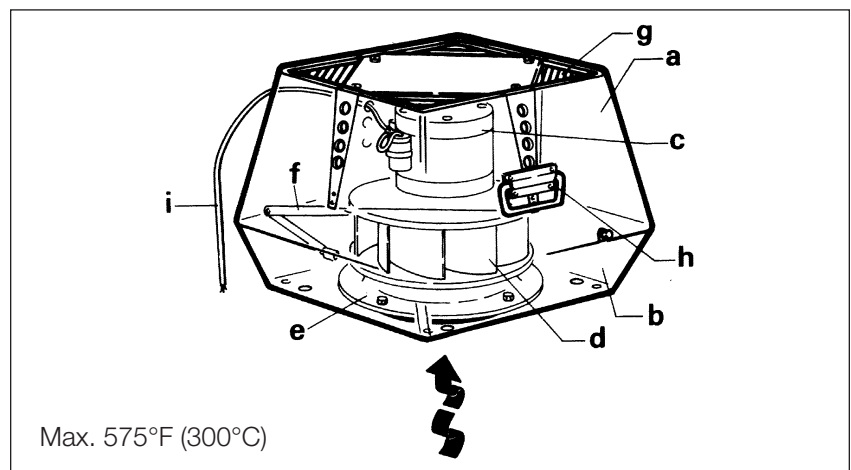


Fig 1

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### 1.3 SHIPPING

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



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 connected via conduit. The capacitor is located INSIDE the junction box. Please do not discard.

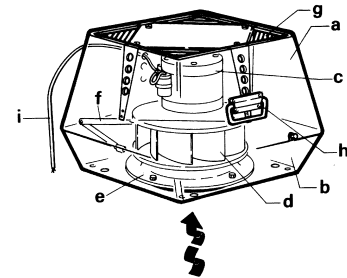
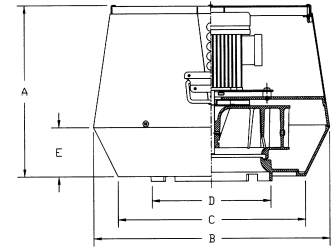
### 1.4 WARRANTY

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

## 2. SPECIFICATIONS AND DIMENSIONS

### 2.1 DIMENSIONS AND CAPACITIES

Model		GSV 200	GSV 250	GSV 315	GSV 400	GSV 450
Discharge		Vertical				
Fan Type		Centrifugal Impeller				
Max. Discharge Velocity	FPM	1,729	2,222	2,771	2,752	4,134
Actual Discharge Velocity	FPM	2.9xCFM	1.9xCFM	1.2xCFM	1.03xCFM	1.03xCFM
Voltage	V AC	1x120			3x208-240/3x380-420	
RPM		1600			1720	1720
Amps	A	1.4	2.9	5.8	3.5 / 1.8	6.5 / 3.8
Power Ratings	kW / HP	0.10 / 0.15	0.16 / 0.2	0.35 / 0.5	0.75 / 1	1.5 / 2
Weight	lbs / kg	47 / 18	60 / 26	92 / 42	127 / 58	155 / 70
Dimensions	A	in / mm	11.03 / 280	13.20 / 335	16.94 / 430	23.23 / 590
	B x B	in / mm	15.37 / 390	19.11 / 485	25.61 / 650	25.61 / 650
	C x C	in / mm	12.22 / 310	15.17 / 385	18.32 / 465	20.69 / 525
	D Ø	in / mm	7.88 / 200	9.85 / 250	15.76 / 400	15.76 / 400
	E	in / mm	3.15 / 80	3.94 / 100	5.12 / 130	8.54 / 217
Soft Start Required		No	No	No	Yes <sup>1)</sup>	Yes <sup>1)</sup>
Variable Speed Motor		Yes	Yes	Yes	Yes	Yes
FA Sones			3.9	6.3	7.8	8.3
Temperature Rating	Interm.	575°F/300°C				
	Cont.	482°F/250°C				

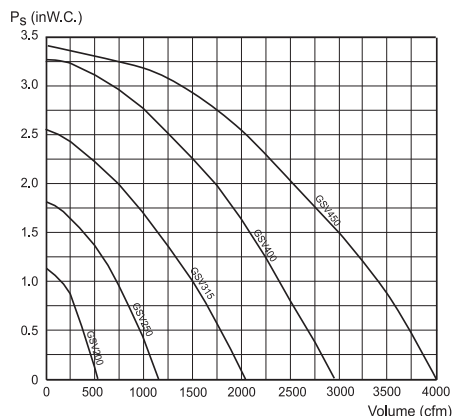


- a** Top Section
- b** Bottom Section
- c** Motor
- d** Centrifugal Impeller
- e** Inlet for Impeller
- f** Locking Hinge
- g** Bird Screen
- h** Carrying Handle
- i** Wiring Conduit

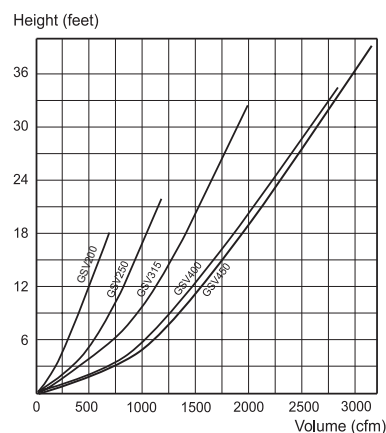
### Sound Diagram

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

### Capacity



### Plume Height



### 3. MECHANICAL INSTALLATION

#### 3.1 POSITIONING

In accordance with NFPA 96, roof mounted fans shall have their discharge outlet at least 40 inches above the roof surface.

#### 3.2 INSTALLATION ON STEEL DUCT

- Insert the adapter (FR) into the grease duct, where the long collar engagement ensures safe anchoring (See Fig. 2). If necessary, the adapter can be secured by means of long self-tapping stainless steel screws into the side of the grease flow. Do not obstruct the grease flow.
- Place the neoprene gasket (sold separately) on top of the adapter.  
Remove the transport securing device (if present) holding the motor shaft and impeller in place.
- Place the fan on the adapter with the fan inlet centered over the chimney outlet.
- Open the fan and secure the fan onto the adapter, through the pre-drilled holes in the bottom, with lag bolts or self-tapping sheet metal screws, one at each corner.
- Check the gasket to insure that it forms a complete seal.

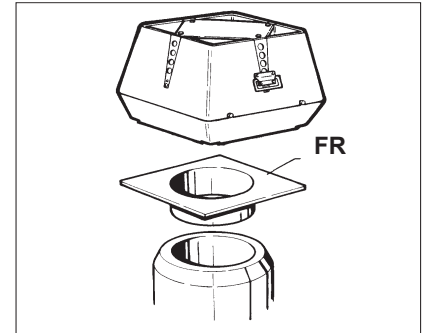


Fig 2



#### CAUTION

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

#### 3.3 INSTALLATION ON ROOF CURB

- If the fan is supplied with a curb cap, secure the cap to the roof curb with self-tapping sheet metal screws (see Fig. 3).
- Place the neoprene gasket on the top of the curb cap with the hole centered over the curb cap opening (sold separately).
- Remove the transport securing device (if present) holding the motor shaft and impeller in place.
- Place the fan on the neoprene gasket centered over the cutout.
- Open the fan and secure the fan onto the roof curb, through the pre-drilled holes in the bottom, with lag bolts or self-tapping sheet metal screws, one at each corner.
- Check the gasket to insure that it forms a complete seal.

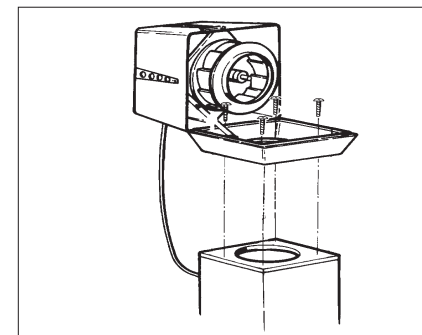


Fig 3

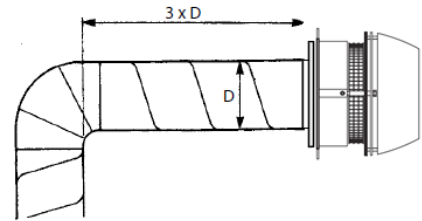


#### CAUTION

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

### 3.4 TERMINATION OF VENTING SYSTEM

In order to achieve optimal performance and energy consumption for the RS Fan or GSV Fan, the duct must be installed as shown below and the distances observed. From the last elbow to the termination point the distance has to be 3 times the diameter of the flue. For example if you using 12in flue ( $12 \times 3 = 36\text{in}$ ). So the distance from the last elbow to the fan termination point should be 36 inches.



### 3.5 INSTALLATION ON SIDE WALL

- Make sure the vent terminates flush with the wall. Insert the steel chimney adapter 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 lay a bead of hi-temp silicone on the base close to the outer edge (not shown).
- Open the fan and secure the fan 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.

### 3.6 HIGH TEMPERATURE APPLICATIONS


- If the fan is used for applications that exceed its temperature rating, dilution bolts must be used.
- Install the dilution bolts in the outer holes of the fan base.
- Adjust the height of the dilution gap by adjusting the dilution bolts, so the temperature of the exhaust going through the fan does not exceed the fan's temperature rating.
- Be aware the dilution bolts will have a negative impact on the fan's actual capacity and a stronger fan model may be required. For more information, please refer to the installation manual accompanying the dilution bolts.



4. ELECTRICAL INSTALLATION


4.1 ELECTRICAL REQUIREMENTS

Power requirements depend on the fan size. They can be found on page 6.



**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 GSV 250-315

The connection diagram below shows how the fan is connected to the fan speed control and the power source (see Fig. 6).

Use 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 shows the wiring of the capacitor in the junction box.

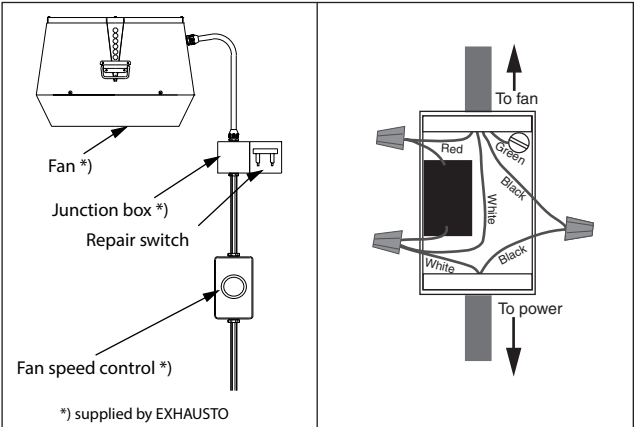


Fig 4

Fig 5

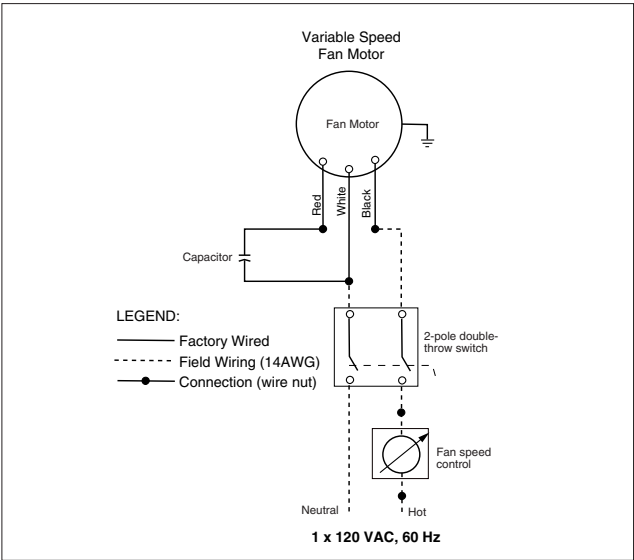


Fig 6

#### 4.3 WIRING DIAGRAM FOR GSV 400-450

The connection diagram below shows how the fan is connected to the power source (see Fig. 7).

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

If variable speed is required, a variable frequency drive (VFD) can be used. This will eliminate the need for a magnetic starter as shown. For installation and wiring, please refer to the instructions shipped with the VFD.

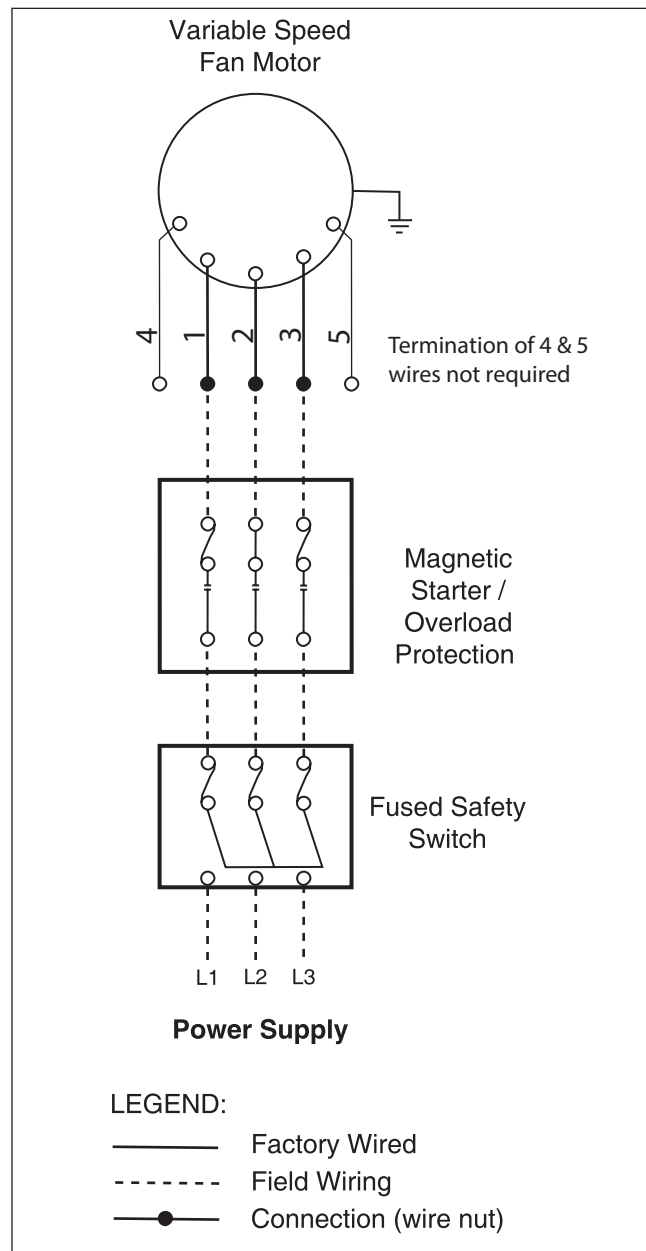


Fig 7

#### 4.4 DUAL VOLTAGE WIRING

GSV 400-450 can operate at either 3x208-230 VAC (default) or 3x440-480 VAC.

The motor wiring terminals in Fig. 8 show default jumper positions for 3x208-230 VAC operation.

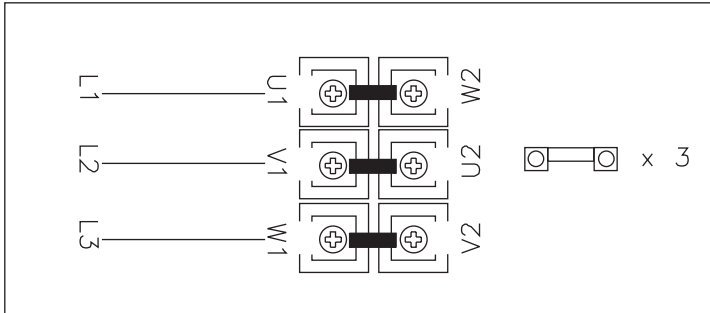


Fig 8

If the application requires 3x440-480 VAC operation, the jumper positions must be changed according to Fig. 9.

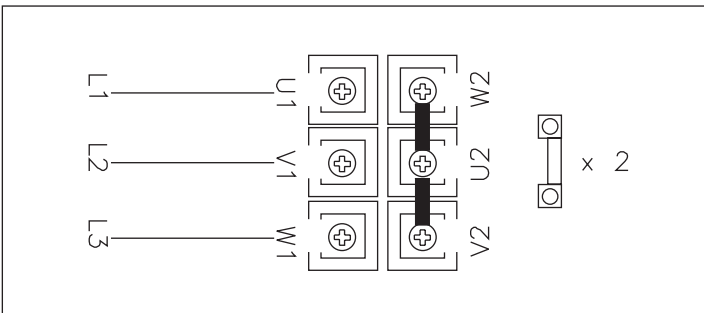


Fig 9

After wiring, make sure the motor is rotating in the proper 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.

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## **5. STARTUP AND CONFIGURATION**

### **5.1 START UP**

- 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.
- Determine if the impeller is free and has not been subject to misalignment in 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.

### **5.2 ADJUSTING THE 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.

## 6. MAINTENANCE AND TROUBLESHOOTING

### 6.1 MAINTENANCE INTERVALS

The ENERVEX Grease Fan is designed for prolonged use. For dirty or grease-laden exhaust, inspect the 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 require no lubrication.

### 6.2 CLEANING



#### WARNING

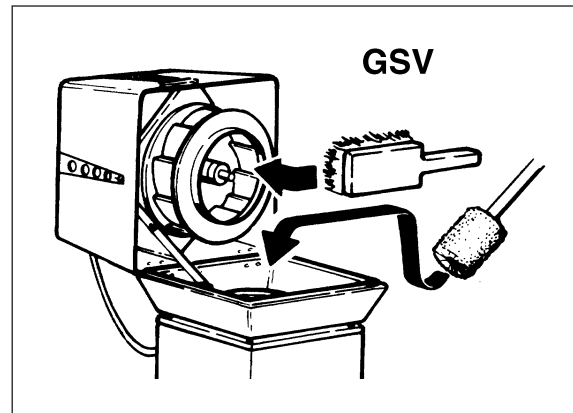
Do not open the motor housing unless power to the grease fan has been disconnected.

- 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 arm holds the top of the fan before letting go.
- If necessary, use grease remover and a high-pressure cleaner to clean the impeller and the inside fan base.
- A scraper may also be used.



#### CAUTION

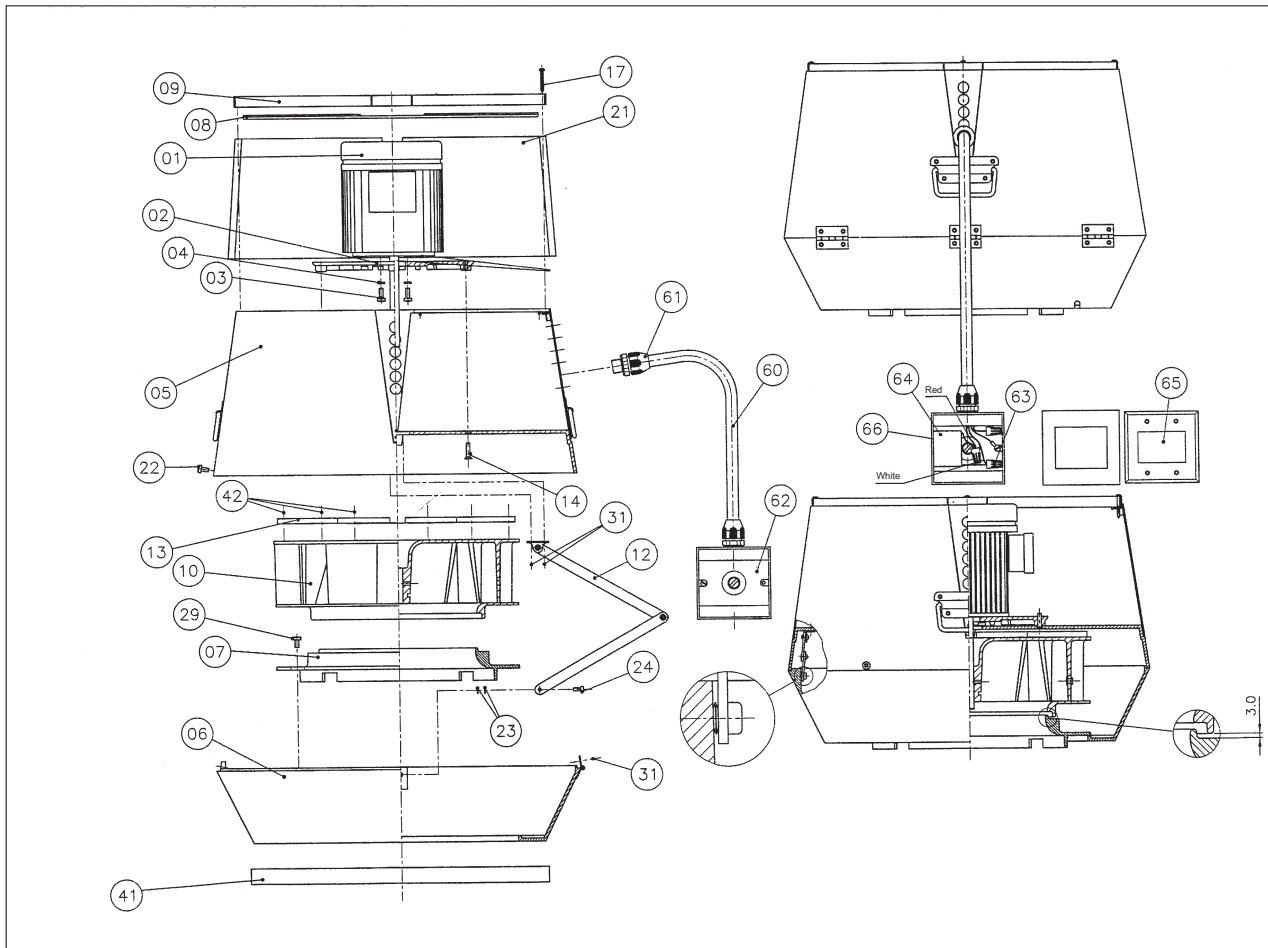
Never place hands or fingers on top of fan base when closing.



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 (RSV 400/450 only.)	Phase sequence in the power to 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. Foreign matter is stuck in the fan. A ball bearing is damaged.	Turn off power and 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 400°F during continuous operation. Call ENERVEX.

### 6.3 SPARE PARTS ORDERING

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



01	Motor	21	Motor housing insulation
02	Motor mounting plate	22	Screw - SS (2)
03	Screw - SS (2)	23	Washer - SS (2)
04	Washer - SS (2)	24	Screw - SS
05	Housing (top)	29	Screw - SS (4)
06	Housing (base)	31	Rivet (2)
07	Impeller seat	41	Neoprene Gasket
08	Bird screen	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)



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