BESB Box Ventilator

USA

CAN

Job Name: _____

Installer: _____

Installation Date: _____

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EXHAUSTO
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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 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 Associations (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 any authorized EXHAUSTO representative.

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

1. Product Information

1.1 Function

Use EXHAUSTO Model BESB is a box ventilator that can be used for the movement of air in exhaust and air supply systems where no explosive gases are present. The ventilator cannot be used for transport of large particles. It is designed to provide a high capacity at a high static pressure.The ventilator can be installed indoors as well as outdoors. No special treatment or preparation is required for weather proofing. Suitable uses include, but are not limited to: comfort ventilation, venting of commercial clothes dryers, exhaust and air supply. The exhaust temperature must be above 10°F(-12°C) but should not exceed 175°F(80°C). The ambient temperature must be within -20°F(-30°C) and 105°F(40°C).

Construction

The ventilator housing is made in galvanized steel and insulated with fiber insulation. The collars are fitted with silicone seals to assure a tight assembly. The blower wheel is made in cast aluminum and the impellers are backward inclined. The motor is a direct drive, variable speed class B insulated type. It has permanently lubricated, sealed ball bearings and is maintenance free.

Listings EXHAUSTO Model BESB is tested and listed to UL 705, Standard for Power Ventilators. It is also tested and listed with special consideration for exhausting of lint-laden air from commercial dryers. The BESB can be used as a component in a MCAS, Modulating Combustion Air System, as well as a MDVS, Mechanical Dryer Venting System. The listings of these systems incorporate the BESB Box Ventilator.

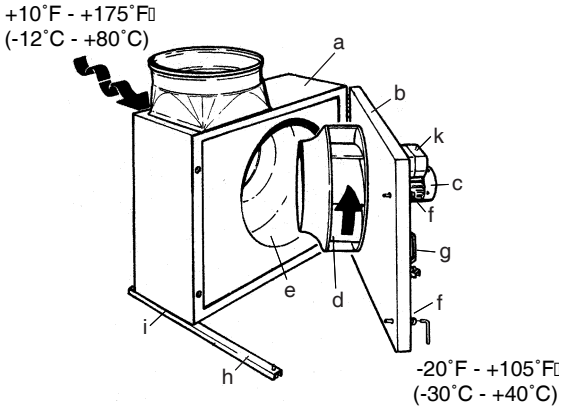
Do not use with explosive gases. Do not use for transport of large particles.

1.2 Components

The box ventilator consists of the following components:

a.	Housing	f.	Locking screw
b.	Access door	g.	Door handle
c.	Motor	h.	Support legs with vibration dampers (2)
d.	Centrifugal impeller	i.	Sheet metal screws (4)
e.	Ventilator housing	k.	Junction box

Fig. 1



1.3 Shipping

Protection

The ventilator is shipped on a pallet and protected by a corrugated box as shown below in Fig. 2.
Do not place other products or items on top of the box.
After unpacking, the product must be handled in a way to prevent damaging the collars and the ventilator housing. The door handle should never be used as a carrying handle. The access door can be removed if necessary as shown below in Fig. 3.

Never use the access door handle as a carrying handle!

Fig. 2

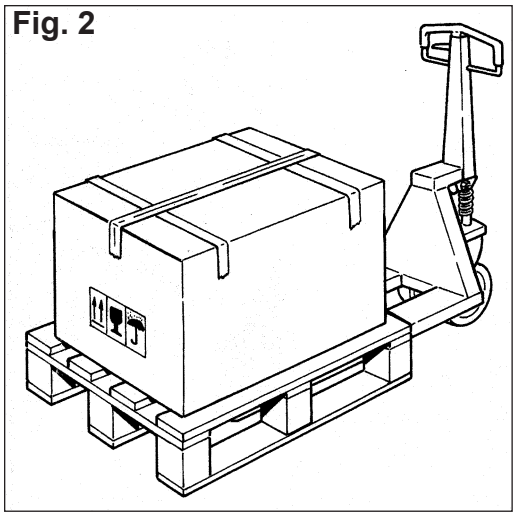
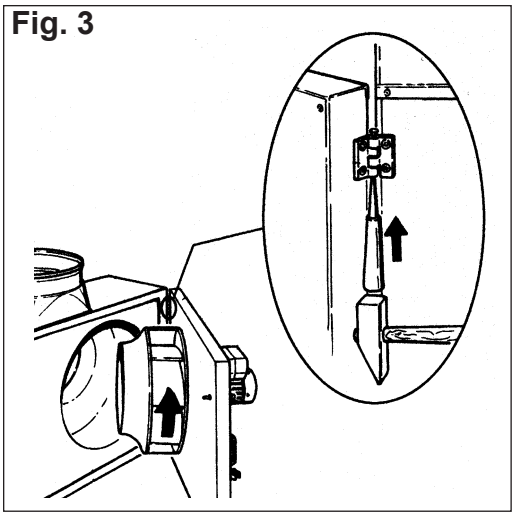


Fig. 3



Never operate the ventilator with the access door open!

Standard The ventilator is shipped with motor installed on the access door.

Packing If other components are shipped, these will appear on the shipment packing list.

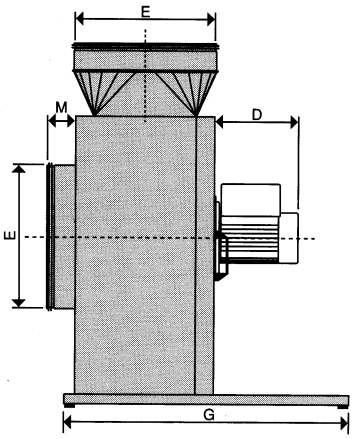
1.4 Warranty

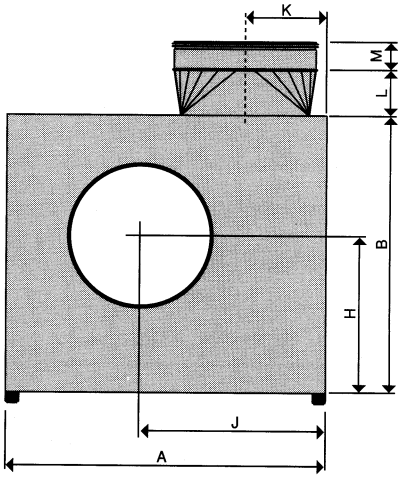
Complete warranty conditions are available from EXHAUSTO.

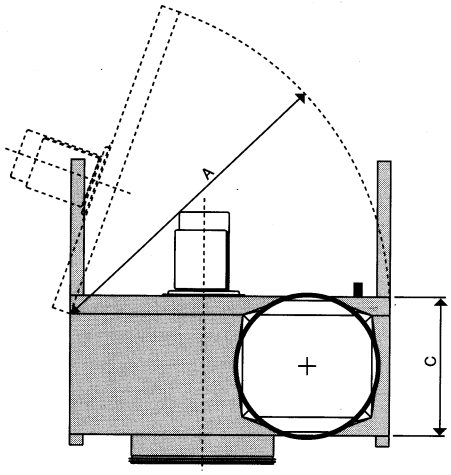
2. Specifications

2.1 Dimensions & Capacities

Model			BESB 250	BESB 315	BESB 400	BESB 500
Fan Type			Centrifugal Impeller (B-Wheel)			
Motor Type			TEFC			
Voltage		V AC	1x120	3 x 200-240/3x460-480		
Amperage		Amps	5.8	3.6/1.7	6.5/2.9	9.0/4.0
Motor Output		HP	0.5	1	2	3
		kW	*0.35*	*0.75*	*1.5*	*2.2*
RPM			1600	1720		
Weight		lbs	110	126	167	227
		kg	*50*	*57*	*76*	*103*
Duct Connection	E	in	10	12	16	20
		mm	*250*	*315*	*400*	*500*
Dimensions	A	in	30.91	30.91	35.24	38.98
		mm	*785*	*785*	*895*	*990*
	B	in	24.61	26.57	30.51	33.86
		mm	*625*	*675*	*775*	*860*
	C	in	12.80	13.98	15.35	16.73
		mm	*325*	*355*	*390*	*425*
	D	in	7.68	7.68	10.24	12.20
		mm	*195*	*195*	*260*	*310*
	G	in	31.50	31.50	31.50	33.46
		mm	*800*	*800*	*800*	*800*
	H	in	13.78	15.16	17.32	19.09
		mm	*350*	*385*	*440*	*485*
	J	in	18.90	17.91	20.67	22.83
		mm	*480*	*455*	*525*	*580*
	K	in	7.28	8.08	9.84	11.81
		mm	*185*	*205*	*250*	*300*
	L	in	4.92	4.92	4.92	6.69
		mm	*125*	*125*	*125*	*170*
	M	in	2.36	3.15	3.15	2.36
		mm	*60*	*80*	*80*	*60*





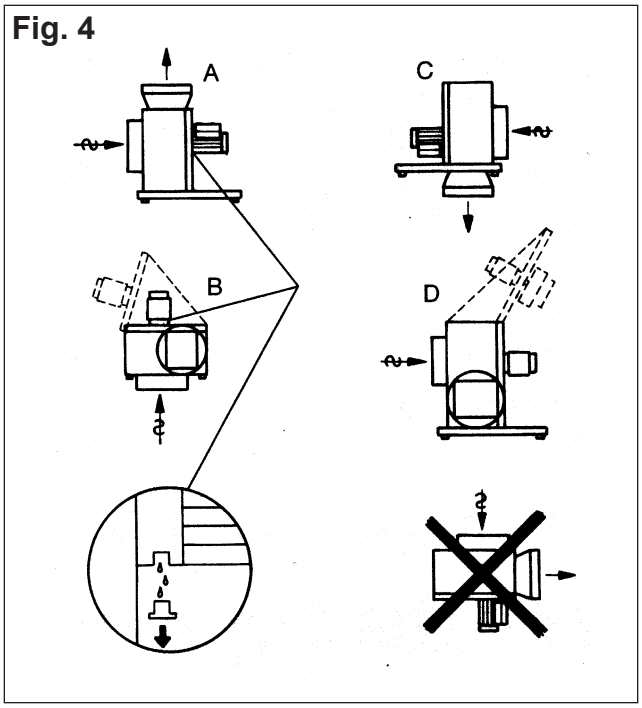


3. Installation

3.1 Positioning

The ventilator can be installed in many different positions. However, it should always be possible to open the access door at least 80 degrees, and the locking bolts should always be accessible. Acceptable ventilator positions are shown below in Fig. 4. Note that the ventilator motor can never point straight down as this could cause condensation build-up around the shaft, which can shorten the product life.

Fig. 4



Never install the ventilator so the motor points down. This will shorten the life.

If mounted according to Fig. B and D, a special locking hinge to keep the access door in an open position should be installed. It is available from EXHAUSTO.

3.2 Floor or Roof Mounting

To minimize the transfer of noise and vibration the ventilator should be placed on a surface that is level, stable and vibration-free. If placed on a wooden surface, a cement tile should be placed on the floor prior to the placement of the ventilator. The ventilator does not need to be secured by any means. See Fig. 5 on page 7. Once the installation location has been selected the support legs must be installed. If at all practical the ventilator should remain on the pallet while the support legs are installed. For the standard position bolt holes are pre-drilled so the legs should just be aligned and secured with the enclosed sheet metal screws.

For all other positions, the legs should be placed in a proper position and holes should be drilled prior to securing the legs to the ventilator by means of the enclosed sheet metal screws.

When placing the ventilator, make sure the access door can open approximately 80°. See Fig. 6.

Fig. 5

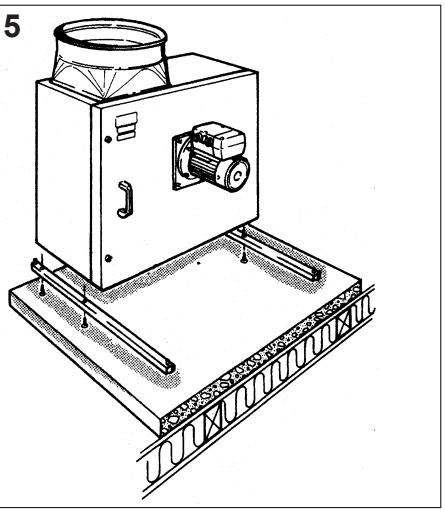
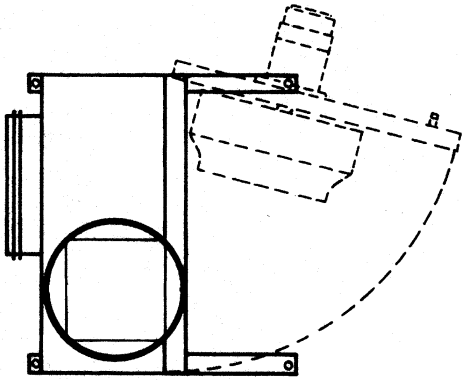


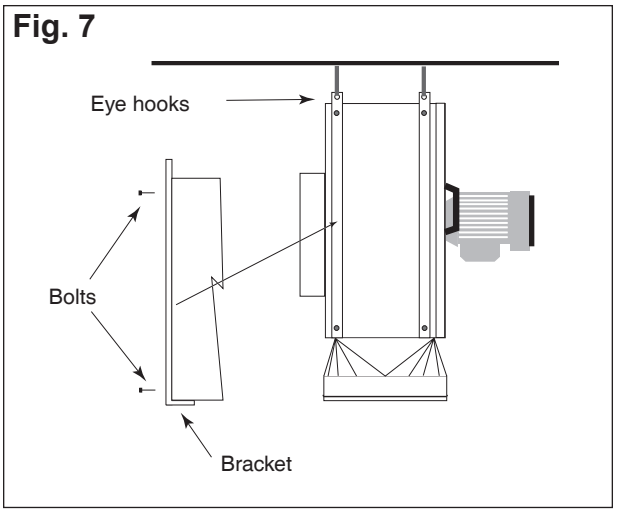
Fig. 6



3.3 Ceiling Mounting

If hung from the ceiling, brackets with eye hooks (not included) must be installed as shown below in Fig. 7.

Fig. 7



Ceiling bolts must be properly sized to be able to safely carry the weight of the ventilator. Please see Sec. 2.1 Dimensions and Capacities on page 5.

Never install the ventilator so the motor points down. This will shorten the life as condensate will enter the bearings.

4. Electrical Installation

4.1 General

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

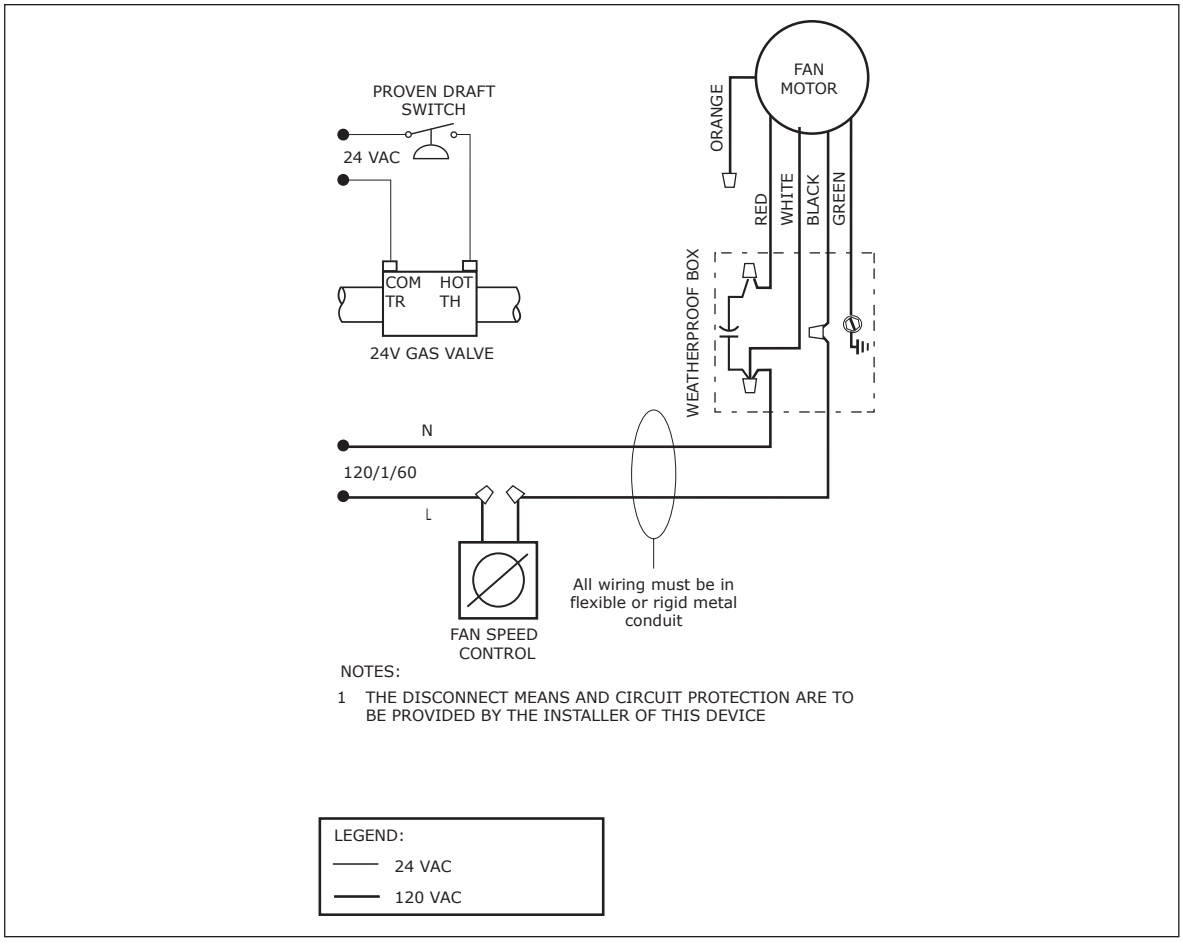
Notice: If any of the original wire supplied with the system must be replaced, use similar wire of the same temperature rating. Otherwise, insulation may melt or degrade, exposing bare wire.

All wiring must be in compliance with the local codes or in their absence, with the National Electric Code, NFPA70. All wiring should be appropriate class 1 wiring as follows: installed in rigid metal conduit, intermediate metal conduit, rigid non-metallic conduit, electrical metallic tubing, or be otherwise suitably protected from physical damage.

BESB models operate at different voltages so it's important to pay attention to the wiring details. BESB 315-500 operates at 1x120VAC while all other models can operate at 3x208-230VAC or 3x440-480VAC.

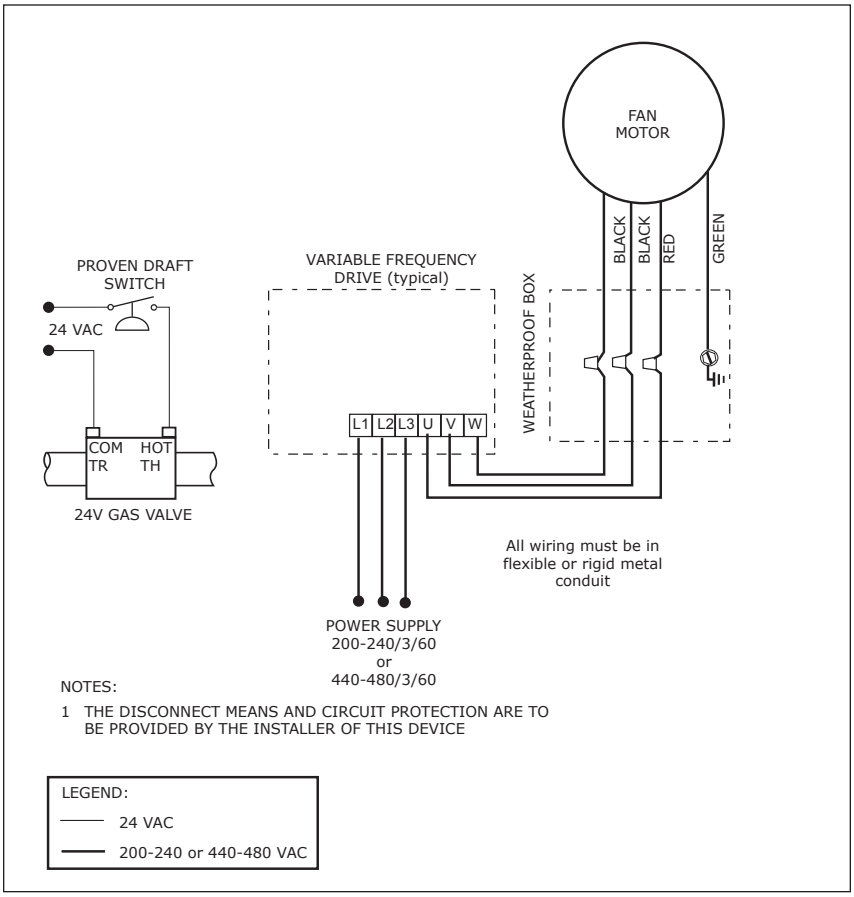
4.2 Wiring Diagram - BESB 250

Power Venter and motor specifications can be found under "Sec. 2.1 Dimensions and Capacities". The power venter is equipped with a variable speed motor. The diagram below shows a typical wiring diagram for a BESB 250 utilizing a Fan Speed Control.

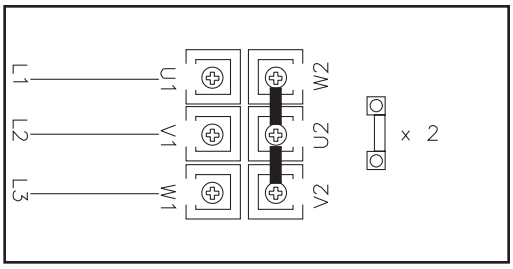


4.3 Wiring Diagram - BESB 315-500

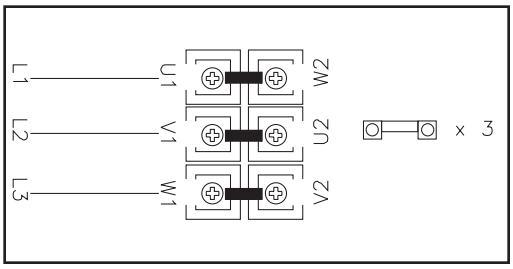
Power Venter and motor specifications can be found under “Sec. 2.1 Dimensions and Capacities”. The power venter is equipped with a variable speed motor. The diagram below shows a typical wiring diagram utilizing a Variable Frequency Drive (adjusting the speed is possible). If it is not a requirement that the speed can be adjusted, a motor starter should be installed in lieu of the VFD, if required by local codes.



BESB 315-500 can operate at either 3x208-230 VAC or 3x440-480 VAC (default). The motor wiring terminals shown in the figure to the right in shows default jumper positions for 3x440-480VAC operation.



If the application requires 3x208-240VAC operation, the jumper positions must be changed according to the figure to the right.



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 as shown in paragraph 4.6.

4.4 Installing a Proven Draft Switch

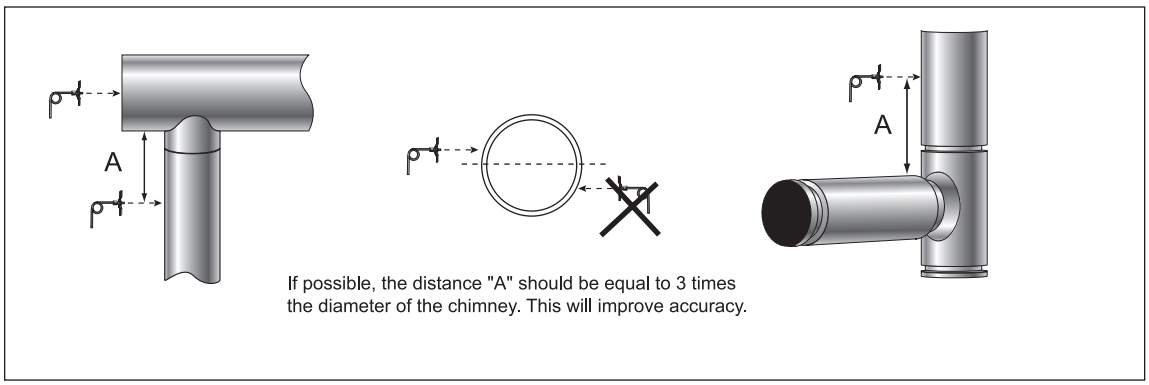
A safety system must be interlocked with the appliance. The safety system could utilize a Proven Draft Switch (PDS), a thermal switch, a flow switch or a sail switch. The device must be interlocked with the heating appliance(s) so it shuts down in case of insufficient draft, fan failure or power failure. Please refer to the PDS Installation Manual for wiring instructions.

If the installation includes an EBC12, EBC14 or EBC 30 Fan Control, a PDS is not required as the function is integrated in the control.

For more information about alternative safety system, please consult EXHAUSTO.

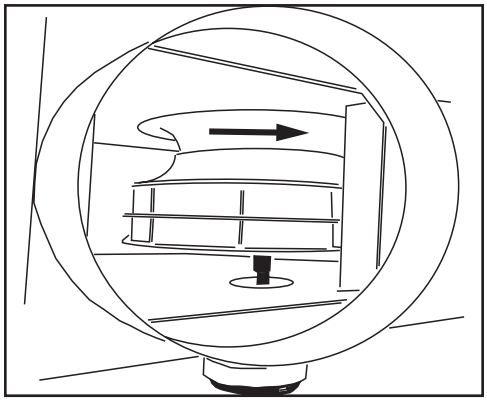
4.5 Installation of Stack Probe for Proven Draft Switch Function

Install the probe for the Proven Draft Switch (PDS) in the vent connector. The probe must be located between the appliance and the power venter. The probe must be located at least 3 vent diameters downstream of the draft hood, draft diverter, or barometric damper. The probe placement should also observe distances from elbows and Tees as shown in figure below. The tip of the probe MUST be flush with the inner chimney wall to get a proper pressure reading.



4.6 Checking and Changing Rotation of BESB 315-500

To check the rotation of the impeller, it is necessary to be able to see the impeller or the rotation of the cooling vanes at the end of the motor housing.

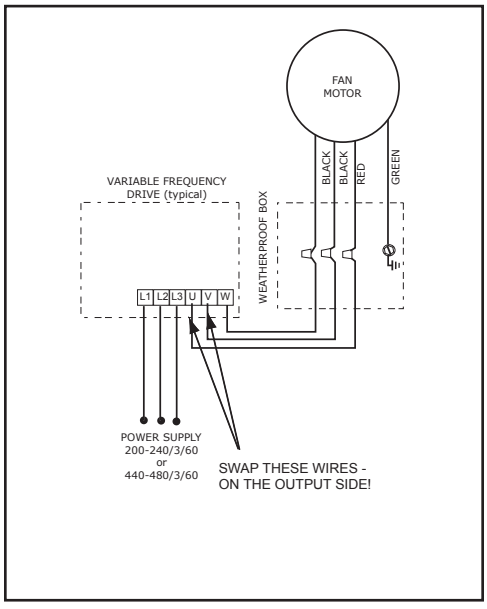


Standing in front of the fan with the motor pointing towards you, the rotation must be clockwise. This is indicated by an arrow on the motor end cover. There are holes in the end cover that allows you to see the cooling vanes, but it is hard to see the rotation unless the fan is running very slowly.

For a more precise determination, you can also see down inside the fan housing as shown on the figure below. The arrow shown (not actually inside fan housing) shows the proper rotation.

It is possible for the fan to operate with improper rotation. However, although some performance can be seen the fan will probably only provide 25-30% of full capacity. Improper rotation wears on motor and cause various electrical faults at the Variable Frequency Drive.

Fan rotation can be changed by swapping the two phase wires as shown on the wiring diagram to the right.



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5. Startup and Configuration

5.1 General

The purpose of this fan is to ensure safe venting for a single appliance or multiple appliances. This can be per formed through a single speed or via modulation. where modulation is not required. This is accomplished by starting a chimney fan/power venter when the appliance calls for heat and stopping the fan when the heat demand has been satisfied.

5.2 System Testing

1. Check the line voltage with the motor name plate rating.
2. Check that the transport securing device (if applicable) holding the motor shaft and impeller in place has been removed.
3. Determine if the impeller is running free and has not be subjected to misalignment in shipping or during installation.
4. Apply power and check the impeller is rotating in the direction of the arrow on the side of the fan housing.

All EXHAUSTO fans run in a clockwise direction when viewed from outside the door.

5. Switching any two phases between the fan and the power source (VFD is the power source if installed) will reverse rotation.

5.3 Adjusting Fan Speed

Start all heating appliances connected to the chimney with the fan installed.

1. If operating with fixed speed, set the fan speed control or the Variable Frequency Drive to the speed where no spillage is experienced anywhere in the system.
2. If operating with variable speed, a modulating control (EBC12, EBC14 or EBC30) is required. Follow the instructions in the control's installation manual.

5.4 Testing Safety System

Adjust the setting of the Proven Draft Switch or other device used.

Start the heating appliance and the fan and make sure the safety device is functioning. Turn the fan off. After less than 2 minutes, the appliance should shut down.

6. Maintenance and Troubleshooting

6.1 Cleaning Intervals

The ventilator is designed for prolonged use. It must be inspected and cleaned at least every 12 months. The need for cleaning is dependent on the type of application and how the ventilator is operated.

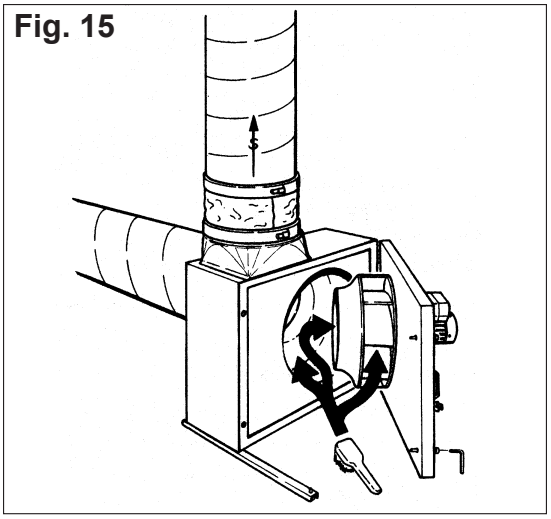
When used in dryer applications periodic cleaning is required and during the first couple months the ventilator should be inspected every two weeks or so to determine at what rate lint builds up. If lint is accumulating it must be removed to prevent a lint fire and to assure efficient operation of the dryers.

6.2 Cleaning

Deposits should be removed from the impellers and the bottom of the ventilator:

1. Turn the fan off at the repair switch.
2. When the blower wheel no longer rotates, open the access door.
3. Clean the inside housing and the wheel with water containing a detergent.
4. Dry all parts with a cloth.
5. Close and secure the access door.
6. Turn the fan on.

Fig. 15



If necessary, the blower wheel can be removed. Prior to removal, mark the position on the shaft. The placement of the wheel is also shown on a label placed on the inside of the access door.

Do not remove the balancing weights on the impellers.

Vibration in the ventilator can be caused by a dirty impeller.

No other maintenance is required.

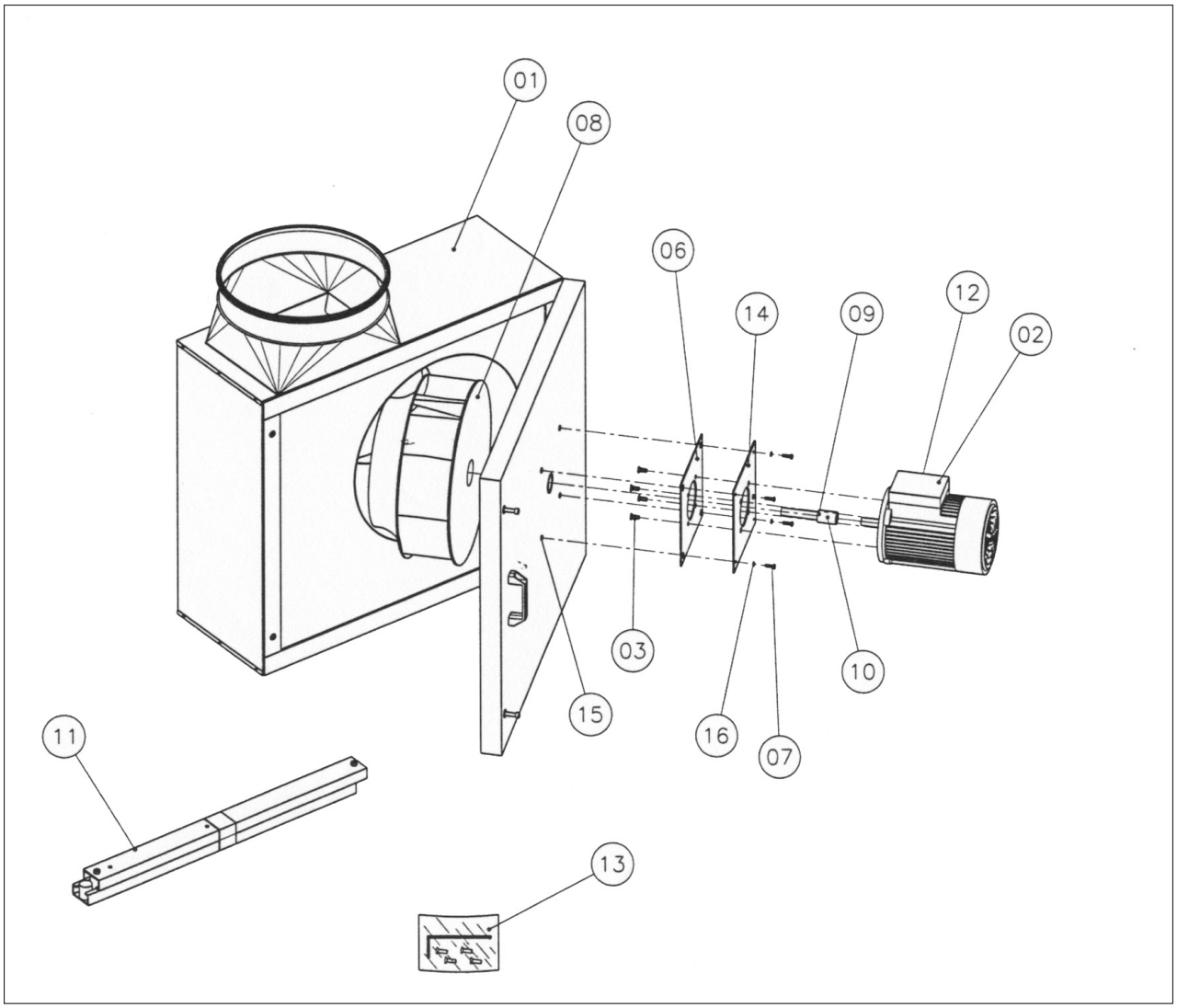
6.3 Service

Available spare parts are shown in Section 6.4 Spare Parts Ordering, Page 14.

The motor has sealed and permanently lubricated bearings. In case bearings need to be replaced, this should be done by EXHAUSTO or an authorized motor repair shop.

6.4 Spare Parts Ordering

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



01	Fan Housing
02	Motor
03	Screw M8x20 (4)
06	Motor mounting plate (inside housing)
07	Screw M6x20 (4)
08	Impeller
09	Shaft extension
10	Allen screw
11	Support legs with vibration dampers (2)
12	Motor junction box with cable fitting
13	Kit with Allen key for door locking screws and (4) sheet metal screws for support legs
14	Motor mounting plate (outside housing)
15	Rivet M6 (4)
16	Washer (4)

Notes

DK: EU-OVERENSSTEMMELSESERKLÆRING **GB: DECLARATION OF CONFORMITY** **D: EU-KONFORMITÄTSERKLÄRUNG** **F: Déclaration de conformité de l'Union Européenne**	**N: EU-OVERENSSTEMMELSESERKLÆRING** **NL: EU-KONFORMITEITS VERKLARING** **S: EU-ÖVERENSSTÄMMELSEDEKLARATION** **SF: EU-VAATIMUSTENMUKAISUUSVAKUUTUS** **IS: ESS-Samræmisstaðfesting**
EXHAUSTO A/S Odensevej 76 DK-5550 Langeskov DANMARK	
erklærer på eget ansvar, at følgende produkter: *declare on own resposibility that the following products:* *Verantwortet, daβ folgende Produkte:* *déclare sous sa propre responsabilité que le produit suivant:*	*erklærer på eget ansvar, at følgende produkter:* *veklaard dat onderstaande produkten:deklarerar på eget ansvar, att följande produkter:* *vastaa siitä, että seuraava tuote:* *Staðfesti à eigin àbyrgð, að eftirfarandi vörur:*
BESB250, BESB315, BESB400, BESB500	
som er omfattet af denne erklæring, er i overensstemmelse med følgende standarder: *covered by this declaration, are in conformity with the following standards:* *mit den folgenden Standardbezeichnungen:* *auquel s'applique cette déclaration est en conformité des normes mentionnées ci-dessous:*	*som er omfattet av denne erklæring, er i overensstemmelse med følgende standarder:* *met de onderstaande standard koderingen:* *som omfattas av denna deklaration, överensstämmer med följende standarder:* *joka koostuu tästä selvityksestä, on seuraavien standardien mukainen:* *sem eru meðtalin i staðfestingu Pessari, eru i fullu samræmi við eftirtalda staðla:*
EN 60 335-1, EN 60 335-2-80, DS/EN ISO 12100-1, DS/EN ISO 12100-2	
i.h.t. bestemmelser i direktiv: *according to conformaty in directive:* *gemäβ folgenden EU-Richtlinien überstimmen:* *suivant les dispositions prévues aux directives:*	*i.h.t. bestemmelser i direktiv:* *voldoen aan de heironder gestelde eisen:* *enlgt bestämmelserna i följende direktiv:* *seuraavien direktiivin määräysten mukaan:* *med tilvisun til àkvarðana eftirlits:*
Maskindirektivet: *Maschinery Directive:* *für Maschinen:* *La directive des machines:*	*Maskindirektivet:* *voor maschines:* *Maskindirektivet:* *Konedirektiivi:* *Vèlaeftirlitið:*
89/392, 91/368, 93/44	
Lavspændingsdirektivet *Low voltage Directive:* *für Niederspannung:* *La directive de la basse tension:*	*Lavspenningsdirektivet* *laagspanning:* *Lågspänningsdirektivet:* *Matalajännitedirektiivi:* *Smáspennueftirlitið:*
73/23	
EMC-direktivet: *EMC Directive:* *für EMC* *La directive de la compatibilité électromagnétique:*	*EMC-direktivet:* *voor EMC:* *EMC-direktivet:* *EMC-direktiivi:* *EMC-eftirlitið:*
89/336, 92/31	
Langeskov, 14.05.2002 Adm. direktør Managing Director Geschäftsführer, Inhaber Président-directeur général Peter Hermansen *Peter Hermansen*	

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