

# ENERVEX BEF 200-800 BOX VENTILATOR

3001807 08.18

Installation & Operating Manual



**READ AND SAVE THESE INSTRUCTIONS!**



UL File E479840

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**ENERVEX®**   
VENTING DESIGN SOLUTIONS



This symbol shows that ENERVEX BEF Box Ventilators are listed under Category Code ZACT.

## 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.

 **DANGER:** Indicates an imminent electrical shock hazard which, if not avoided, will result in death, serious injury or substantial 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.

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#### WARNING

This product is equipped with an electronically commutated (EC-motor) and can not be connected directly to ac mains. Motor must be connected to approved motor controller to ensure proper function. Failure to use approved motor controller may result in damage to the motor.

#### ATTENTION

Ce produit est équipé d'un commutateur électronique (moteur EC) et ne peut pas être connecté directement au secteur. Le moteur doit être connecté au contrôleur de moteur approuvé pour assurer un fonctionnement correct. Ne pas utiliser le contrôleur de moteur approuvé peut endommager le moteur.

## 1. GENERAL INFORMATION

### 1.1 introduction

These instructions provide both general guidelines and special requirements for all parts in the BEF Ventilator Fan product line. Before specifying a design or beginning an installation please carefully review these instructions. Contact local building or fire officials about restrictions and installation inspection in your area.

### 1.2 Features

The BEF is a highly efficient box ventilator that uses a backward curved centrifugal impeller for the movement of air in exhaust and air supply systems by providing high capacity at high static pressure. It is designed to exhaust lint-laden air from multiple Type I and Type II residential and commercial clothes dryers, exhaust commercial hoods, or to provide make-up air for laundry or mechanical rooms. The ventilator cannot be used for transport of large particles. Suitable uses include, but are not limited to: comfort ventilation, make-up air for laundry and mechanical rooms, and exhaust and air supply in kitchens/bathrooms in multi-story, multi-family buildings. The BEF box ventilator can be installed indoors as well as outdoors and used in both intake and exhaust applications.

The BEF ventilator housing is made in galvanized steel (BEF 500, 600 and 800 are also available in 316L stainless steel option), while the impeller is welded aluminum. The design is Type B, Spark Resistant Construction, completely insulated against fire, noise, condensation and heat with 2" fiberglass insulation. A service door is provided to allow easy access to the motor and impeller. The welded aluminum impeller is statically and dynamically balanced with permanently attached balancing weights. The BEF is equipped with an extremely energy-efficient, totally enclosed, permanent-magnet motor of class NEMA Super Premium EISA (IE4). IP54 Protection Class. Sealed ball bearings. The motor is protected from overloading, blocking, over and under voltage, and over-heating by a factory programmed EDrive motor controller by ENERVEX for optimal operation of the ventilator.

The BEF Box Ventilator is a component in the MCAS Modulating Combustion Air System™, MDVS Mechanical Dryer Venting System™ and MBES Modulating Building Exhaust System™.

Exhaust temperature must be above 10°F (-12°C) but should not exceed 400°F (200°C). The ambient temperature must be within -20°F (-30°C) and 105°F (40°C).

|   |  |
|---|--|
|  | <p><b>WARNING</b></p> <p>The ventilator is not to be used to transport solid particles, nor in areas where there is a risk of explosive gases.</p> |
|---|--|

### 1.3 Components

The box ventilator comes with the components shown in Fig. 1.

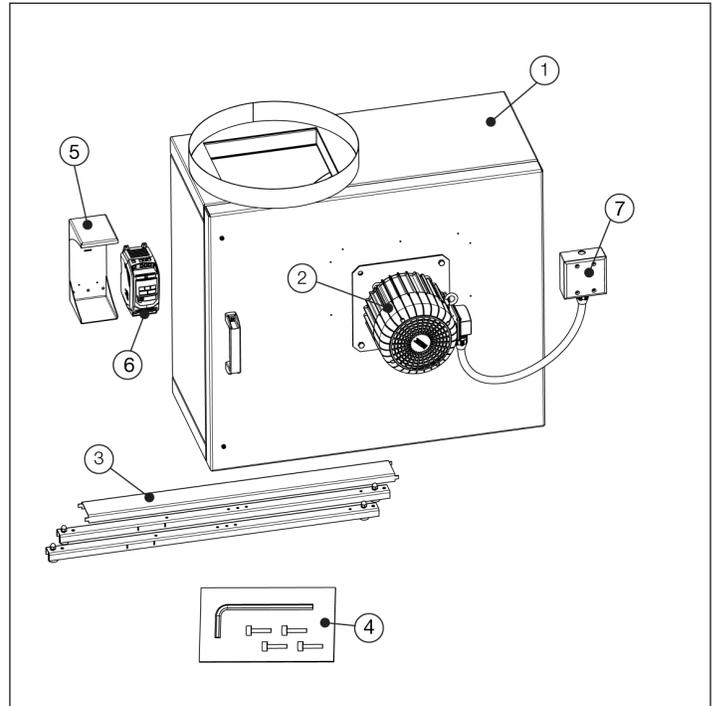


Fig 1

1. Housing
2. Motor
3. Support legs with vibration dampers (2)
4. Kit with Allen key for door locking screws and (4 sheet metal screws for support legs)
5. Mounting bracket for EDrive
6. EDrive
7. Field Junction Box

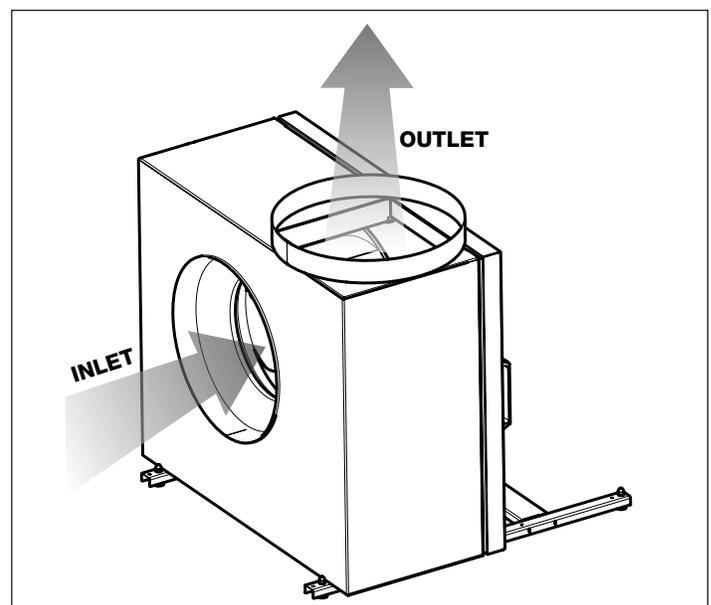


Fig 2

#### 1.4 Shipping

BEF ventilator fan units are shipped on a pallet and protected by a corrugated box.

Do not place other products or items on top of the box.

After unpacking, the product must be handled in a way to prevent damage to the collars and the ventilator housing.

The door handle should never be used to lift or carry the fan.

If necessary, the access door can be removed to facilitate transport.

|   |  |
|---|--|
|  | <b>WARNING</b>   |
|   | Never use access door handle as a carrying handle.                           |
|   | <b>AVERTISSEMENT</b>   |
|   | N'utilisez jamais la poignée de la porte d'accès comme poignée de transport. |

|   |   |
|---|---|
|  | <b>WARNING</b>  |
|   | This duct fan shall be installed a minimum of one meter from any accessible opening of the duct.      |
|   | <b>AVERTISSEMENT</b>  |
|   | Ce ventilateur de conduit doit être installé au moins un mètre d'une ouverture accessible du conduit. |

The ventilator is shipped with the motor installed on the access door with a dedicated motor controller.

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

NOTE: All fans are shipped with a Field Junction Box connected via flexible conduit.

#### 1.5 Accessories (Optional)

- MEC 18 Exhaust Control
- EBC 30/31 Modulating Pressure Control
- Proven Draft Switch PDS

#### 1.6 Listings

UL705, Standard for Power Ventilators with special consideration for venting lint-laden air from single or multiple dryers and CSA 22.2 No. 113, Standard for Fans and Ventilators.

CSA C22.2 NO. 113-12 Fans and Ventilators Edition 9 - Revision Date 2012/10/01

UL 705 Standard for Power Ventilators Edition 6 - Revision Date 2013/12/17

Complies with and meets Type B, Spark Resistant Construction per AMCA standard 99-0401 classifications of Spark Resistant Construction.

#### 1.7 Warranty

2-year factory warranty (see back cover). Complete warranty conditions are available from ENERVEX Inc.

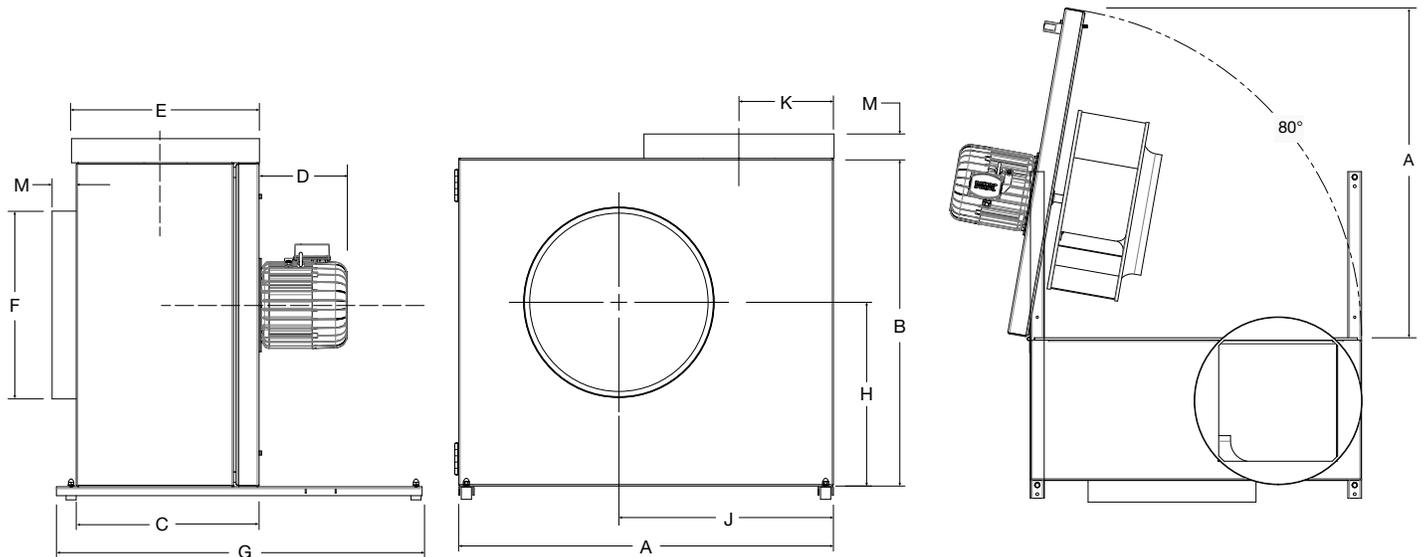
## 2. SPECIFICATIONS AND DIMENSIONS

### 2.1 Specifications

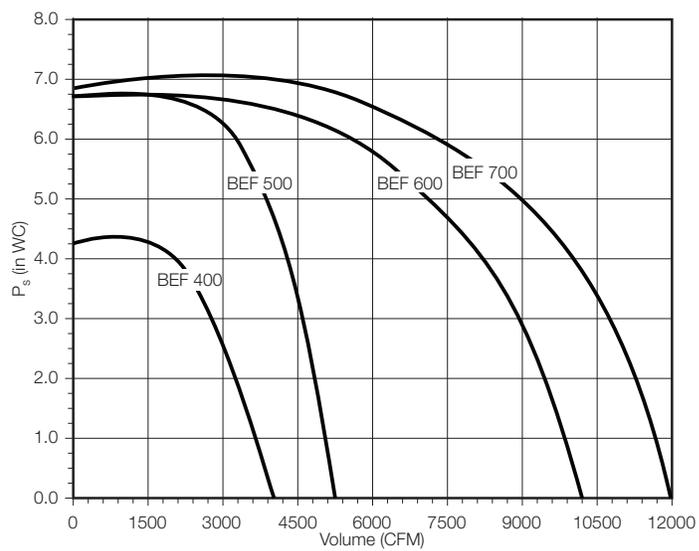
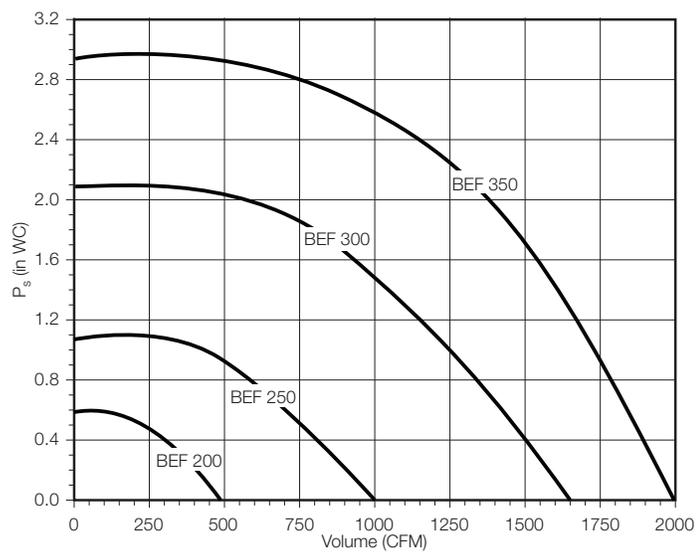
| Model                    | BEF 200                        | BEF 250                       | BEF 300         | BEF 350         | BEF 400               | BEF 500    | BEF 600    | BEF 700    | BEF 800     |             |
|--------------------------|--------------------------------|-------------------------------|-----------------|-----------------|-----------------------|------------|------------|------------|-------------|-------------|
| Fan Type                 | Centrifugal Impeller (B-Wheel) |                               |                 |                 |                       |            |            |            |             |             |
| Motor Type               | ECM, Permanent Magnet          |                               |                 |                 |                       |            |            |            |             |             |
| Voltage *)               | VAC                            | 1x120 / 3x208-240 / 3x400-480 |                 |                 | 3x208-240 / 3x400-480 |            |            | 3x400-480  |             |             |
| Max. Amperage - EDrive A |                                | 2.3 / 2.3 / 2.2               | 2.3 / 2.3 / 2.2 | 4.3 / 4.3 / 2.2 | 5.8 / 7.0 / 4.1       | 10.5 / 5.8 | 10.5 / 5.8 | 18.0 / 9.5 | 18.0        | 24.0        |
| Motor Output             | HP                             | 0.5 / 0.5 / 1                 | 0.5 / 0.5 / 1   | 1               | 2                     | 3          | 3          | 5          | 10          | 15          |
|                          | kW                             | 0.38                          | 0.38            | 0.76            | 1.5                   | 2.2        | 2.6        | 3.7        | 7.5         | 11.25       |
| RPM (see note below)     |                                | 1740                          | 1740            | 2000            | 2300                  | 2300       | 1740       | 1740       | 1740        | 1740        |
| Weight                   | lbs / kg                       | 98 / 44                       | 110 / 50        | 126 / 57        | 150 / 68              | 167 / 76   | 227 / 103  | 310 / 141  | 320 / 145   | 390 / 145   |
| Duct Connection          | in / mm                        | 8.0 / 203                     | 12.0 / 305      | 14.0 / 356      | 16.0 / 406            | 16.0 / 406 | 18.0 / 456 | 20.0 / 508 | 22.0 / 558  | 22.0 / 558  |
| Dimensions               | A in / mm                      | 20.1 / 510                    | 24.6 / 625      | 27.2 / 690      | 30.3 / 770            | 30.3 / 770 | 36.3 / 921 | 38.5 / 978 | 41.0 / 1041 | 43.3 / 1041 |
|                          | B in / mm                      | 17.5 / 445                    | 21.0 / 537      | 23.6 / 600      | 25.8 / 655            | 25.8 / 655 | 31.6 / 803 | 34.0 / 864 | 36.5 / 927  | 39.0 / 927  |
|                          | C in / mm                      | 9.2 / 234                     | 11.5 / 293      | 12.2 / 309      | 13.1 / 333            | 13.1 / 333 | 16.6 / 422 | 18.6 / 473 | 20.5 / 521  | 21.6 / 521  |
|                          | D in / mm                      | 7.8 / 198                     | 7.8 / 198       | 7.8 / 198       | 7.6 / 193             | 7.6 / 193  | 8.6 / 218  | 9.2 / 234  | 10.9 / 277  | 10.9 / 277  |
|                          | E in / mm                      | 7.9 / 201                     | 11.9 / 302      | 13.9 / 353      | 15.9 / 404            | 15.9 / 404 | 17.9 / 454 | 19.9 / 505 | 21.9 / 555  | 23.9 / 555  |
|                          | F in / mm                      | 7.9 / 201                     | 11.9 / 302      | 13.9 / 353      | 15.9 / 404            | 15.9 / 404 | 17.9 / 454 | 19.9 / 505 | 21.9 / 555  | 23.9 / 555  |
|                          | G in / mm                      | 18.5 / 470                    | 24.4 / 620      | 32.3 / 820      | 32.3 / 820            | 32.3 / 820 | 35.8 / 909 | 38.8 / 986 | 41.8 / 1061 | 48.3 / 1061 |
|                          | H in / mm                      | 9.8 / 248                     | 11.5 / 292      | 13.3 / 338      | 11.0 / 279            | 11.0 / 279 | 17.8 / 452 | 18.7 / 475 | 20.1 / 510  | 19.5 / 510  |
|                          | J in / mm                      | 11.5 / 292                    | 14.3 / 362      | 16.3 / 414      | 17.8 / 452            | 17.8 / 452 | 20.8 / 528 | 22.0 / 559 | 24.6 / 625  | 21.7 / 625  |
|                          | K in / mm                      | 5.8 / 147                     | 6.8 / 173       | 7.3 / 185       | 8.0 / 203             | 8.0 / 203  | 9.1 / 231  | 10.3 / 262 | 11.0 / 279  | 11.0 / 279  |
|                          | M in / mm                      | 2.0 / 50                      | 2.0 / 50        | 2.0 / 50        | 2.0 / 50              | 2.0 / 50   | 2.0 / 50   | 2.0 / 50   | 2.0 / 50    | 2.0 / 50    |

NOTE: Our ECM motor is a synchronous motor that is UL-listed to operate at speeds up to 4000RPM. The shown RPM and motor output data is the standard setup based on the standard control selection. RPM can be increased to provide higher performance, but a different EDrive model may be required. Please contact ENERVEX for assistance.

\*) Select when ordering



## 2.2 Capacities



### 3. MECHANICAL INSTALLATION

#### 3.1 Positioning

The ventilator can be oriented in multiple positions. Acceptable ventilator orientations are shown in Fig 3.

The BEF can be installed indoors and outdoors without any modifications.

Wherever the ventilator is installed, make sure there is space enough to be able to open the access door to an angle of approximately 80°, as shown in Fig 4, and to access the locking screws.



**WARNING**

The ventilator motor should never hang downward. This can cause condensation build-up around the shaft, and can shorten the product life.

**AVERTISSEMENT**

Le moteur du ventilateur ne doit jamais pendre vers le bas. Cela peut provoquer une accumulation de condensation autour de l'arbre et réduire la durée de vie du produit.



**CAUTION**

Never operate the ventilator with open access door

**MISE EN GARDE**

Ne jamais utiliser le ventilateur avec la porte d'accès ouverte.

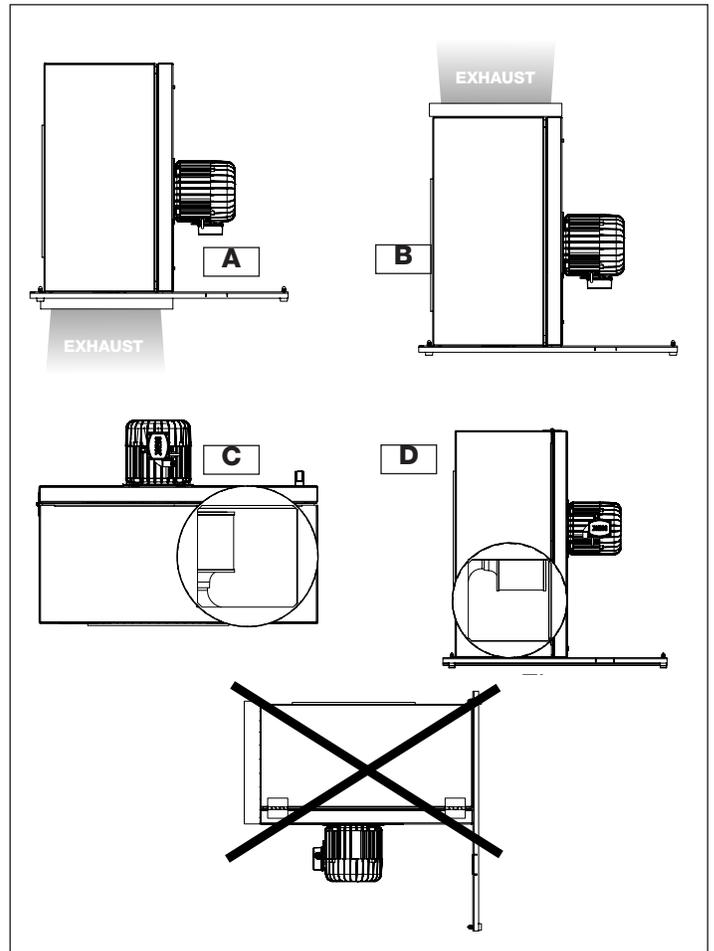


Fig 3

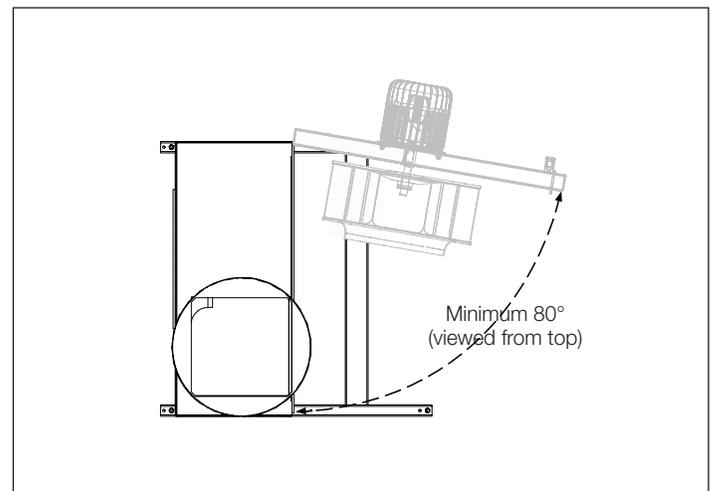


Fig 4

### 3.2 Floor Or Roof Mounting

To minimize transfer of noise and vibration, the ventilator unit should be mounted on a level, stable and vibration-free surface. If mounting on a wooden surface, a cement tile should be placed on the floor prior to mounting as shown in Fig 5.

Once the installation location is selected the support legs must be installed. To facilitate support leg installation, keep ventilator unit on pallet.

For the standard position (Fig 5), bolt holes are pre-drilled and support legs should be aligned and secured with the enclosed screws.

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

**DO NOT FASTEN THE VENTILATOR TO THE BASE.**

The ventilator is fitted with sound dampers suited to the requirements of the operating area.

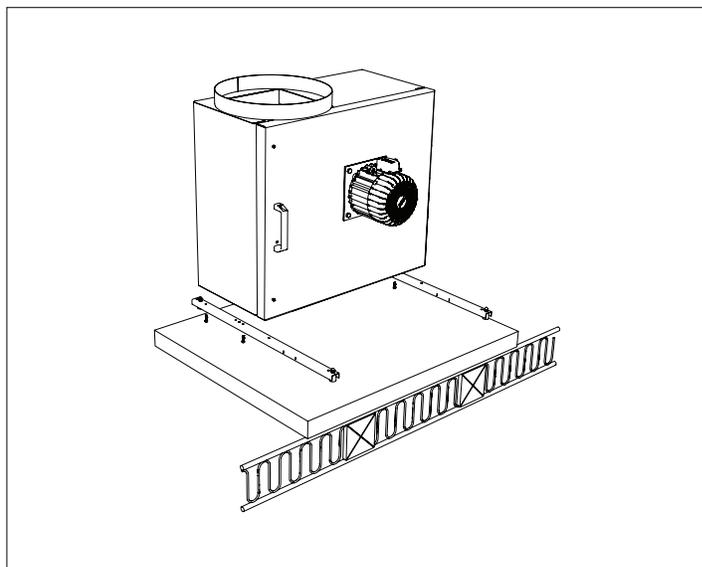


Fig 5

### 3.3 Ceiling Mounting

If hung from the ceiling, brackets with eye hooks (not included) must be installed as shown in Fig. 6..

Ceiling bolts must be properly sized to safely carry weight of the ventilator unit.

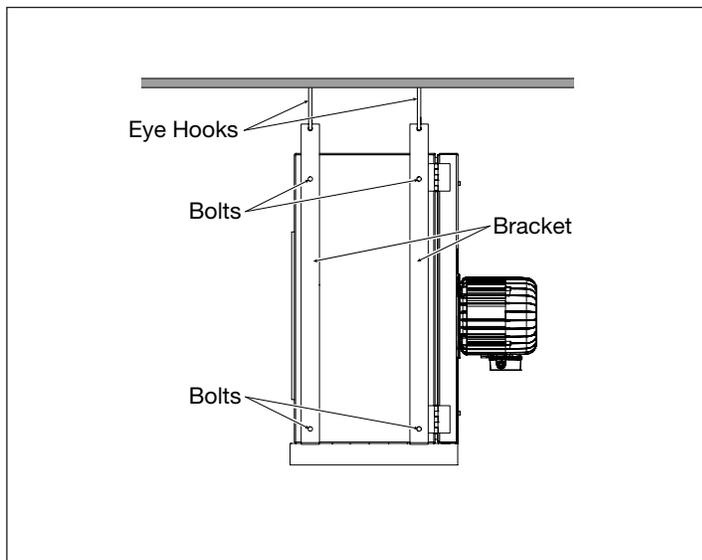


Fig 6

### 3.4 Connection To Duct

The ventilator can be connected to a duct. To achieve maximum performance with minimal energy consumption, the ventilator should be connected to the duct system with the specified lengths of duct before and after the ventilator.

NOTE: The distance “3 x D” is not a requirement. It is a recommendation that will help achieve maximum performance with minimal energy consumption

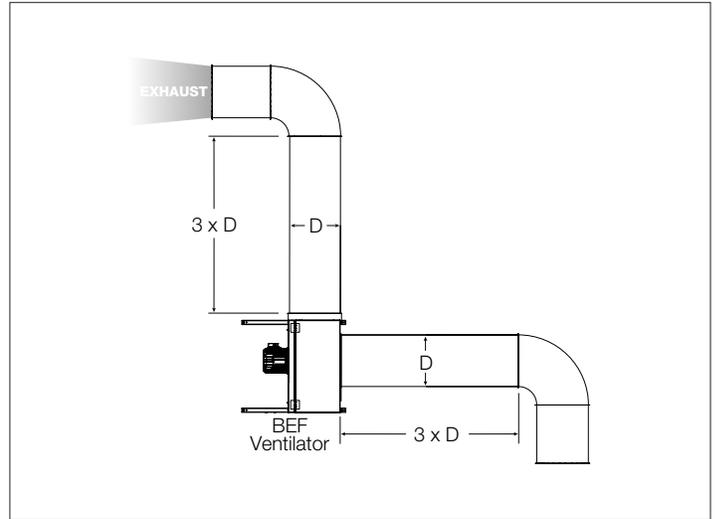


Fig 7

### 3.5 Connection To Flexible Duct

Flexible duct sections can be used to reduce vibrations in the duct system. If used, the FLF should be connected between the fan inlet/outlet and the main duct as shown in Fig 8. This will decrease system vibration and prevent fan housing deflection.

NOTE: The distance “3 x D” is not a requirement. It is a recommendation that will help achieve maximum performance with minimal energy consumption

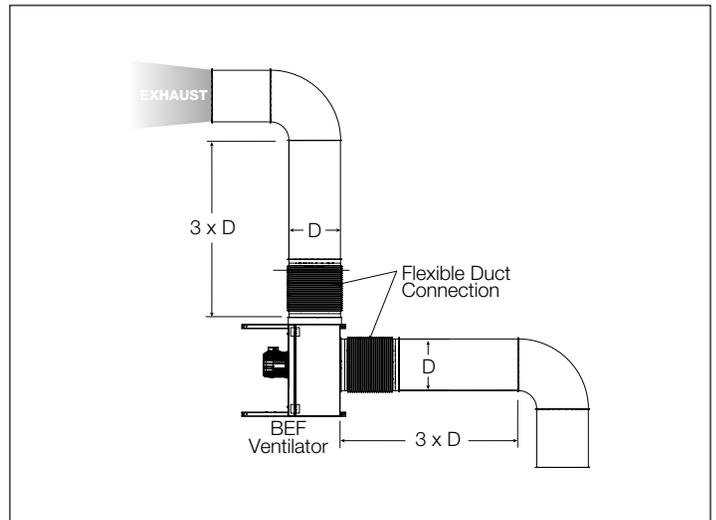


Fig 8

### 3.6 Outdoor Termination

The BEF box ventilator is suitable for outdoor installations. It can mount directly to the roof or on a roof curb as shown in Fig. 9 and Fig. 10. When the ventilator is used at an exhaust termination point, local codes may require a gooseneck to be installed at the outlet, preventing rain entering into the ventilator. See Fig. 9.

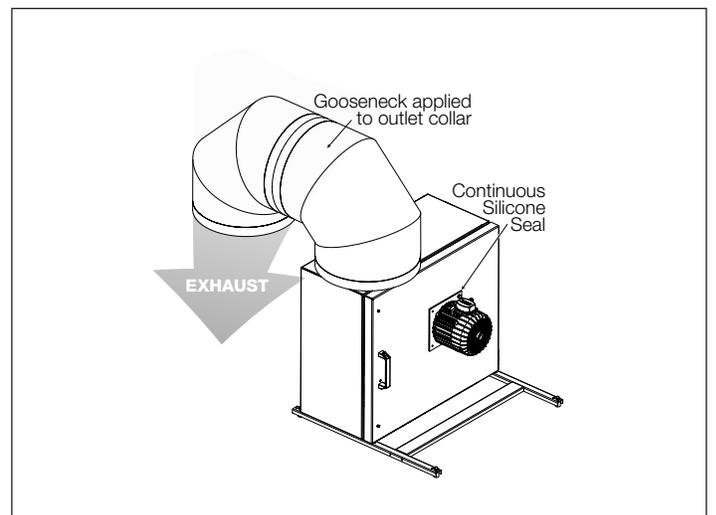


Fig 9

Attach the gooseneck directly to the outlet collar of the fan unit.

DO NOT use sheet metal screws or other fasteners that will penetrate the gooseneck and obstruct airflow. Building code prohibits the placement of mesh screens on the ventilator outlet because of the potential fire hazard from lint build-up.

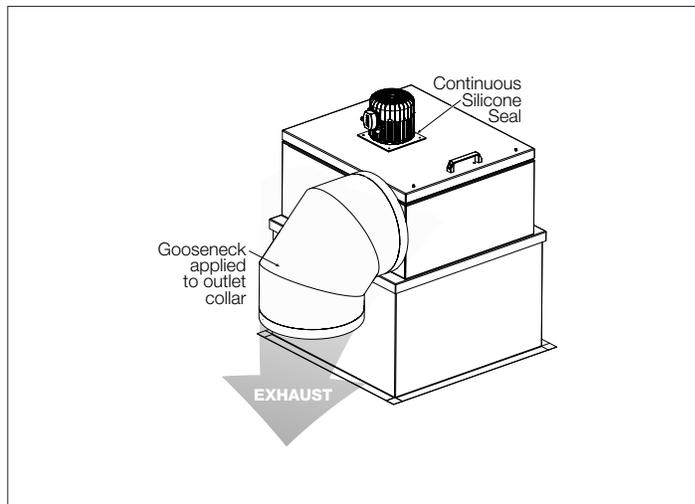


Fig 10

### 3.7 Field Junction Box

The BEF ventilator comes with a field junction box that is attached to the motor via a flexible conduit.

After mounting the BEF in its proper location and orientation, the Field Junction Box **MUST** be permanently attached to the fan housing with the supplied sheet metal screws. Orient the the Field Junction Box in a manner that will minimize water ingress, and verify the BEF access door can open without straining, or kinking the flexible conduit.

FAILURE TO FOLLOW THIS PROCEDURE VOIDS THE UL LISTING AND CAN DAMAGE THE MOTOR.

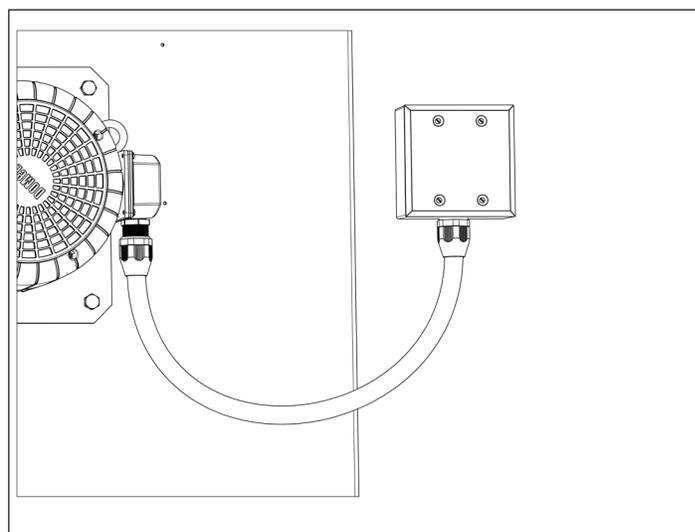


Fig 11

|   |  |
|---|--|
|  | <b>WARNING</b>   |
|   | Do not install the Field Junction Box on the service door. |
|   | <b>AVERTISSEMENT</b>                                       |

N'installez pas la boîte de jonction Field sur la porte de service.

Fig 11

## 4. ELECTRICAL INSTALLATION

### 4.1 General

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. All BEF units are equipped with an EC-motor and operate at different voltages so it's important to pay attention to the wiring details.



#### WARNING

This product is equipped with an electronically commutated (EC-motor) and can not be connected directly to ac mains. Motor must be connected to approved motor controller to ensure proper function. Failure to use approved motor controller may result in damage to the motor.

#### AVERTISSEMENT

Ce produit est équipé d'un commutateur électronique (moteur EC) et ne peut pas être connecté directement au secteur. Le moteur doit être connecté au contrôleur de moteur approuvé pour assurer un fonctionnement correct. Ne pas utiliser le contrôleur de moteur approuvé peut endommager le moteur.

Note: 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.



#### WARNING

All BEF models must be operated with the approved factory-programmed motor drive.  
**DO NOT CONNECT DIRECTLY TO LINE VOLTAGE!**

#### AVERTISSEMENT

Tous les modèles BEF doivent être utilisés avec l'entraînement motorisé approuvé en usine.  
**NE PAS CONNECTER DIRECTEMENT À LA TENSION DE LIGNE!**



#### DANGER

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

#### DANGER

Éteignez l'alimentation électrique avant de procéder à l'entretien. Le contact avec des composants électriques sous tension peut provoquer un choc ou la mort.

### 4.2 Motor Controller

All ENERVEX BEF fans come with, and must use, a factory programmed EDrive motor controller with an enclosure rated to NEMA 1/IP20.

The EDrive motor controller must be mounted indoors, within 300 feet of the BEF Fan. This distance can be increased up to 600 feet with the addition of a line filter (Contact ENERVEX for details).

If the EDrive motor controller must be mounted outdoors or in an unprotected area, it must be installed in a minimum NEMA 3R enclosure. A motor disconnect switch must be installed between the motor controller and the BEF Fan, either within sight of the BEF Fan, or within 50 feet of the BEF Fan.

Do not activate the motor service disconnect switch while the BEF motor is running - damage could occur to the motor controller.

#### ABOUT SHAFT GROUNDING

Bearing currents are very common problem of Variable Frequency Drives (VFD/Motor Controller) and electronic commutated motors. The electric-discharge machining (EDM) bearing currents are generated in motors because of unbalanced modulated voltage from drive to the motor. Because of stray capacitances in motor, bearing currents are generated in rotor and there is usually no other way to discharge except through bearings. This drastically lowers the life time of the bearings.

The BEF's EC-motor integrates an insulated rotor system, which means that electrical insulation is inserted between rotor and motor shaft. This system provide up to 80% lower shaft voltages and very low bearing current values which eliminates bearing damage.



#### DANGER

The motor speed drive is suitable for use in a circuit capable of receiving not more than 100 KA RMS symmetrical Amperes at the maximum rated voltage.

#### DANGER

Le variateur de vitesse peut être utilisé dans un circuit capable de recevoir des ampères symétriques de plus de 100 KA à la tension maximale.

### 4.3 Mounting of EDrive Motor Controller

Mount the EDrive motor controller in a location that is only accessible to qualified personal.

The EDrive must be installed within 300 ft of the BEF Fan.

Use the included mounting bracket to provide conduit landing and to provide a degree of protection from falling dirt.

Mount the EDrive to the bracket on the center DIN rail.

Secure drive using included #6 sheet metal screws.

See Fig 12.

### 4.4 Grounding Guidelines

The ground terminal of an EDrive must be individually connected DIRECTLY to the site ground bus bar (through the filter if installed). EDrive ground connections should not loop from one drive to another, or to, or from any other equipment.

Ground loop impedance must conform to local codes. To meet UL regulations, UL approved ring crimp terminals should be used for all ground wiring connections.

The drive Safety Ground must be connected to system ground. Ground impedance must conform to the requirements of local codes.

#### Protective Earth Conductor

The Cross sectional area of the ground conductor must be at least equal to that of the incoming supply conductor.

#### Safety Ground

This is the safety ground for the drive that is required by code. One of these points must be connected to adjacent building steel (girder, joist), a floor ground rod, or bus bar. Grounding points must comply with local codes.

#### Motor Ground

The motor ground must be connected to one of the ground terminals on the drive.

#### Ground Fault Monitoring

As with all inverters, a leakage current to earth can exist. The EDrive is designed to produce the minimum possible leakage current while complying with worldwide standards. The level of current is affected by motor cable length and type, the effective switching frequency, the ground connections used and the type of RFI filter installed.

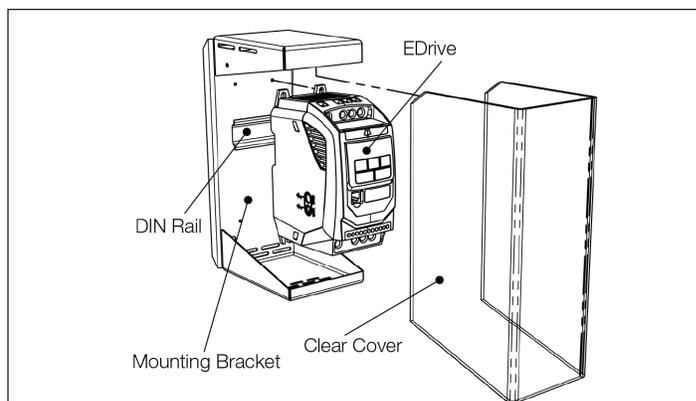


Fig 12



#### WARNING

For installation in the United States, branch circuit protection must be provided in accordance with the National Electrical Code (NEC).



#### AVERTISSEMENT

For installation in Canada, branch circuit protection must be provided in accordance with the Canadian Electrical code

Pour l'installation au Canada, la protection de circuit de branche doit être fournie conformément au Le code canadien de l'électricité.



#### DANGER

Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment. Read and understand this manual and other applicable manuals in their entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or loss of life.

Seul un personnel qualifié en électricité, familiarisé avec la construction et le fonctionnement de cet équipement et les risques encourus, doit installer, ajuster, utiliser ou entretenir cet équipement. Lire et comprendre ce manuel et les autres manuels applicables dans leur intégralité avant de continuer. Le non-respect de cette précaution peut entraîner des blessures graves ou la mort.

#### 4.5 EMC Filter Disconnect

Drives with an EMC filter have an inherently higher leakage current to Ground. For applications where tripping occurs, the EMC filter can be disconnected by completely removing the EMC screw on the side of the product.

The EDrive product range has input supply voltage surge suppression components fitted to protect the drive from line voltage transients, typically originating from lightning strikes or switching of high power equipment on the same supply.

When carrying out a HiPot (Flash) test on an installation in which the drive is built, the voltage surge suppression components may cause the test to fail.

#### 4.6 Electrical Connection of the motor and EDrive

The motor should be connected to the EDrive U, V, and W terminals using a suitable 3 or 4 conductor cable. Where a 3 conductor cable is used, with the shield operating as an earth conductor, the shield must have a cross sectional area at least equal to the phase conductors when they are made from the same material. Where a 4 conductor cable is used, the earth conductor must be of at least equal cross sectional area.

The motor ground must be connected to one of the EDrive ground terminals.

For compliance with the EMC directive, a suitable shielded cable should be used. Braided or twisted type shielded cable where the shield covers at least 85% of the cable surface area, designed with low impedance to HF signals, are recommended as a minimum. Installation within a suitable steel or copper tube is generally also acceptable. The cable shield should be terminated at the motor end using an EMC type fitting allowing connection to the motor body through the largest possible surface area. .

The BEF Fan sizes 200-500 require four (4) 14AWG conductors between the EDrive and the Fan motor. (Three (3) Power lines, and one (1) dedicated Ground wire.)

The BEF Fan Sizes 600-800 require four (4) 12AWG conductors between the EDrive and the Fan motor. (Three (3) Power lines, and one (1) dedicated Ground wire.)

Make all necessary connections to the power and low-voltage terminals (see wiring diagram).

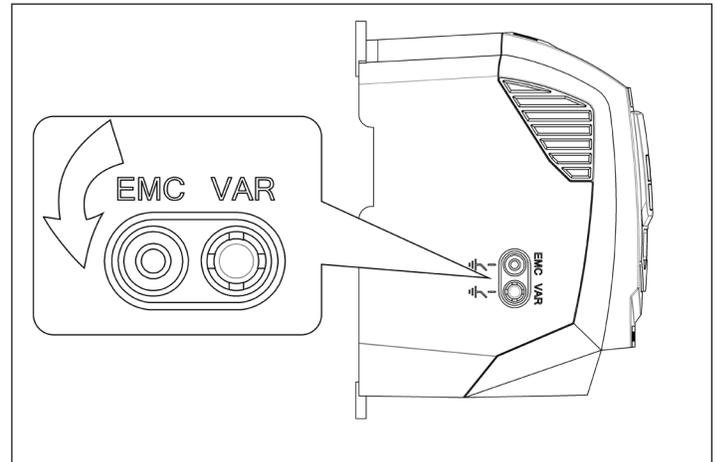


Fig 13



#### DANGER

This EDrive contains high voltage capacitors that take time to discharge after removal of the main supply. Before working on the drive, ensure isolation of the main supply from line inputs. Wait ten (10) minutes for the capacitors to discharge to safe voltage levels. Failure to observe this precaution could result in severe bodily injury or loss of life.

Cette EDrive contient des condensateurs à haute tension qui mettent du temps à se décharger après le retrait de l'alimentation principale. Avant de travailler sur le variateur, veuillez à isoler l'alimentation principale des entrées de ligne. Attendez dix (10) minutes que les condensateurs se déchargent à des niveaux de tension sûrs. Le non-respect de cette précaution peut entraîner des blessures graves ou la mort.

#### 4.7 Wiring Diagram - BEF 200-350 / 1X120V

NOTE: All published voltages relate to power supplied to the EDrive and NOT the motor.

BEF 200-350 fans operate at 1x120 VAC.

The wiring diagram in Fig. 14 is a typical wiring diagram for a BEF 200-350 with 120V supply voltage to the motor drive.

The BEF is listed with an EDrive motor controller which is shipped with the fan. The wiring diagram reflects the use of this controller.

Fan rotation can be changed on the EDrive by switching the attachment position of any two power leads.

#### 4.8 Wiring Diagram - BEF 200-800 / 3X208-480V

NOTE: All published voltages relate to power supplied to the EDrive and NOT the motor.

The BEF 400-600 fans operate at 3x208-240 VAC or 3 x 400-480 VAC. The BEF 700 can only operate at 3x400-480 VAC.

The BEFs are listed with an EDrive motor controller which is shipped with the fan. The wiring diagram in Fig. 14 reflects the use of this controller.

**DANGER**

Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment. Read and understand this manual and other applicable manuals in their entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or loss of life.

Seul un personnel qualifié en électricité, familiarisé avec la construction et le fonctionnement de cet équipement et les risques encourus, doit installer, ajuster, utiliser ou entretenir cet équipement. Lire et comprendre ce manuel et les autres manuels applicables dans leur intégralité avant de continuer. Le non-respect de cette précaution peut entraîner des blessures graves ou la mort.

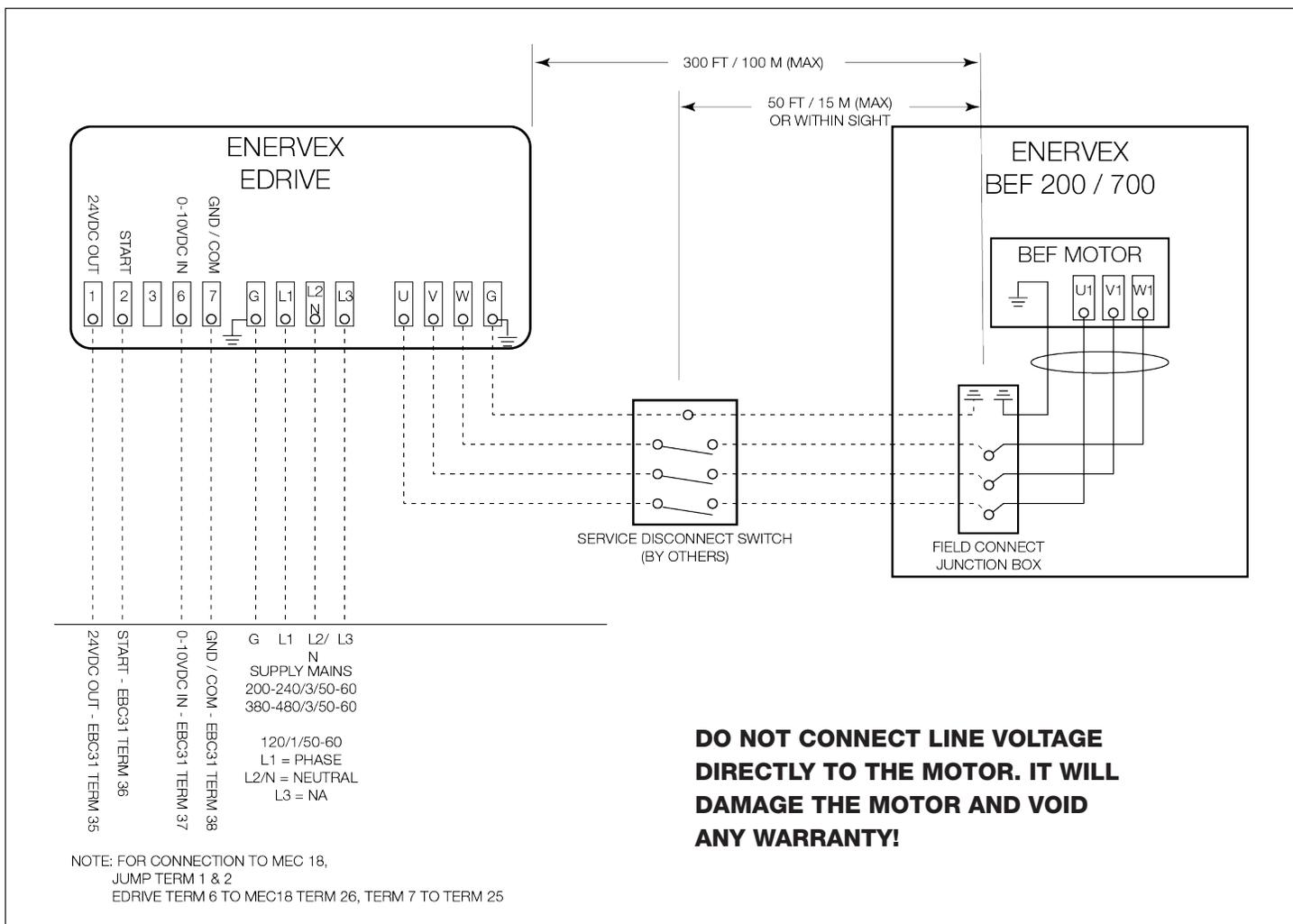


Fig 14

#### 4.9 CHECKING AND CHANGING ROTATION OF IMPELLER

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 allow 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 look inside the fan housing as shown in Fig. 15. The arrow shown (not actually inside fan housing) shows the proper rotation. It is possible for the fan to operate with improper rotation. However, the fan will only provide 25–30% of full capacity, will cause damage to components and should be avoided.

Fan rotation can be changed on the EDrive by switching the attachment position of any two power leads.

#### 4.10 INSTALLING A PROVEN FLOW SYSTEM

If required by local codes, a safety system can be interlocked with the appliance(s) to prove fan operation. 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 appliance(s) so it shuts down in case of fan failure or power failure.

Please refer to the PDS Installation Manual for wiring instructions.

If the installation includes a MEC18 Exhaust Control or EBC 30/31 Modulating Pressure Fan Control, a PDS is not required as the function is integrated into the control.

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

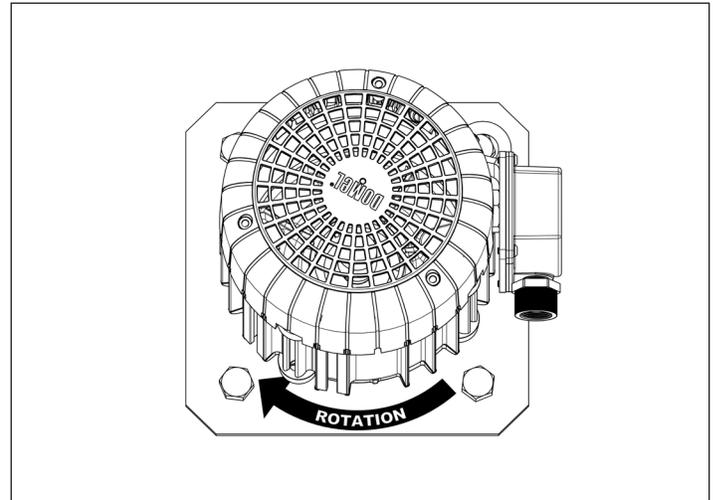


Fig 15



#### WARNING

Correct direction of wheel rotation is critical. Reversed rotation will result in poor air performance, motor overloading and possible burnout.



#### AVERTISSEMENT

La turbine doit impérativement tourner dans le bon sens. Une rotation en sens inverse entraînerait de mauvaises performances de soufflage, une surcharge du moteur voire un grillage du moteur.

## 5. STARTUP AND CONFIGURATION

### 5.1 GENERAL

Before commissioning the system, make sure the EDrive is properly wired to the Fan motor. Failure to do this will prevent proper commissioning.

### 5.2 SYSTEM TESTING

1. Check the line voltage with the motor name plate rating.
2. Check to ensure transport securing device (if applicable) holding the motor shaft and impeller in place has been removed.
3. Determine if impeller is running free and properly aligned.

### 5.3 EDrive Commissioning

1. Disconnect Low Voltage Terminal (1)
2. Apply power to the EDrive
3. Make sure the EDrive is set for Auto-tuning. Check the following Parameters (see Fig 16 for keypad management) to make for the proper values:

P-53 = 100

P-52 = 1

P-38 = 1

P-14 = 1700

Follow the steps in Fig 17:

|   |              |   |
|---|--------------|---|
|  |              |   |
|    | NAVIGATE     | Used to display real-time information, to access and exit parameter edit mode and to store parameter changes                        |
|    | UP           | Used to increase speed in real-time mode or to increase parameter values in parameter edit mode                                     |
|    | DOWN         | Used to decrease speed in real-time mode or to decrease parameter values in parameter edit mode                                     |
|    | RESET / STOP | Used to reset a tripped drive.<br>When in Keypad mode is used to Stop a running drive.  |
|    | START        | When in keypad mode, used to Start a stopped drive or to reverse the direction of rotation if bi-directional keypad mode is enabled |

Fig 16

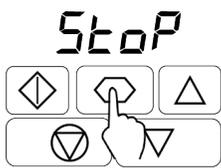
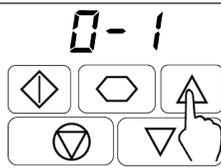
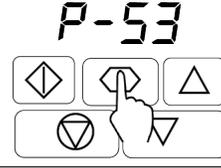
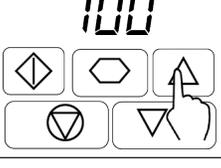
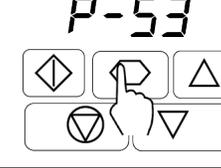
|  |  |
|--|--|
|   | Press and hold the Navigate button >2 seconds                  |
|  | Use the UP and DOWN buttons to selected the required parameter |
|  | Press the Navigate button for <1 second                        |
|  | Adjust the value using the UP and DOWN buttons                 |
|  | Press for <1 seconds to return to the parameter menu           |

Fig 17

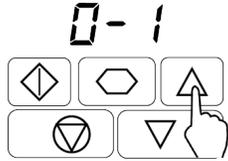
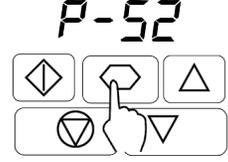
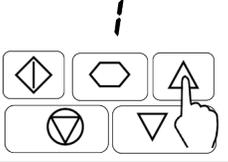
|  |   |
|--|---|
|  | <p>Use the UP and DOWN buttons to selected the required parameter</p> |
|  | <p>Press the Navigate button for &lt;1 second</p>                     |
|  | <p>Adjust the value using the UP and DOWN buttons</p>                 |
|  | <p>Press for &lt;1 seconds to return to the parameter menu</p>        |

Fig 18

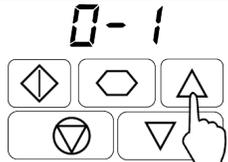
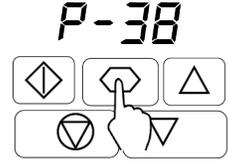
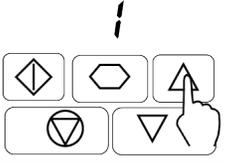
|  |   |
|--|---|
|   | <p>Use the UP and DOWN buttons to selected the required parameter</p> |
|  | <p>Press the Navigate button for &lt;1 second</p>                     |
|  | <p>Adjust the value using the UP and DOWN buttons</p>                 |
|  | <p>Press for &lt;1 seconds to return to the parameter menu</p>        |

Fig 19

4. Re-connect Low Voltage terminals and apply power to the EDrive. Drive is operational in terminal connection mode.
5. Use the NAVIGATION button to scroll through the display options - Set on [Hz].
6. Apply power and check impeller rotation in direction of arrow on side of fan housing.

NOTE: All ENERVEX fans run in a clockwise direction when viewed from outside the door. Refer to Section 4.7 for changing rotation.

#### 5.4 RESETTING THE EDRIVE TO FACTORY DEFAULT

To reset the EDrive to the Factory Default Settings, see Fig 21 below .

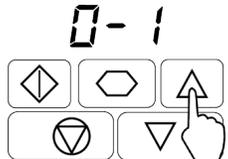
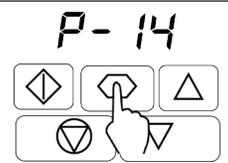
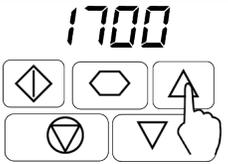
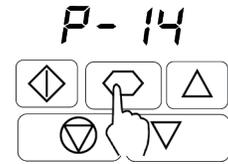
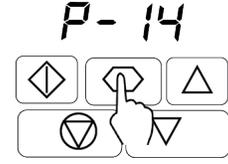
|   |  |
|---|--|
|   | <p>Use the UP and DOWN buttons to selected the required parameter</p>  |
|   | <p>Press the Navigate button for &lt;1 second</p>  |
|   | <p>Adjust the value using the UP and DOWN buttons</p>  |
|   | <p>Press for &lt;1 seconds to return to the parameter menu</p>   |
|  | <p>Press for &gt;2 seconds to return to the operating display.<br/>Display will show <b>Auto-t</b> for a few moments</p> |

Fig 20

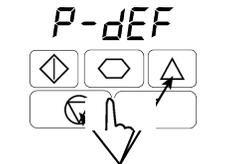
|  |   |
|--|---|
|  | <p>Press and hold UP, DOWN and STOP buttons for &gt;2 seconds. The display will show "<b>P-def</b>". The press the STOP button.</p> |
|--|---|

Fig 21

## 6. MAINTENANCE AND TROUBLESHOOTING

### 6.1 CLEANING INTERVALS

The BEF ventilator is designed for prolonged use. It must be inspected and cleaned at least every 12 months. The need for cleaning is dependent on application type and ventilator operation. In dryer applications, periodic cleaning is required and during the first couple months the ventilator should be inspected every two weeks to determine lint build up rate. If lint accumulates, it must be removed to prevent a lint fire and to ensure efficient operation of the dryers.



#### DANGER

Always disconnect, lock and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury.



#### DANGER

Pour écarter les risques d'incendie, de choc électrique ou de blessure grave, veiller à toujours débrancher, verrouiller et étiqueter la source de courant avant l'installation ou l'entretien

### 6.2 CLEANING

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

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

Vibrations can be caused by a dirty impeller. If necessary, the impeller wheel can be removed. Prior to removal, mark the impeller position on the shaft. Do not remove balancing weight(s) on the impellers. No other maintenance is required.

### 6.3 SERVICE

Available spare parts are shown in Section 6.4 Replacement Parts Ordering.

The motor has sealed and permanently lubricated bearings. Bearing replacement should only be done by ENERVEX or an authorized motor repair shop.

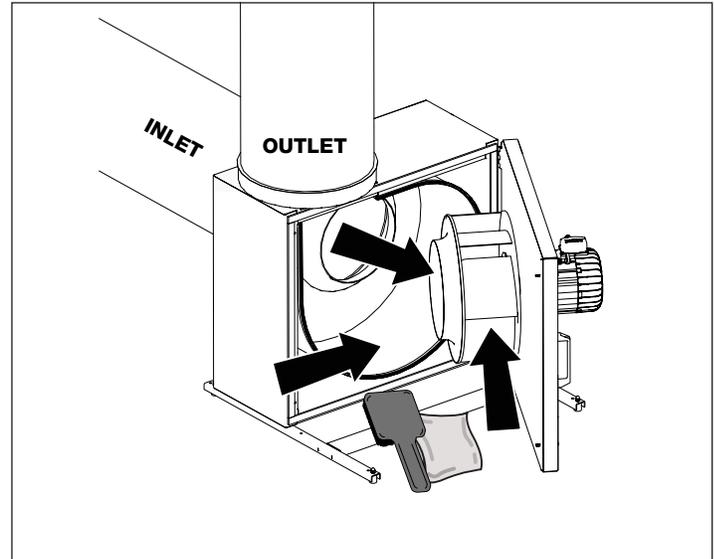


Fig 22



#### WARNING

This unit should be made non-functional when cleaning the wheel or housing (fuses removed, disconnect locked off).

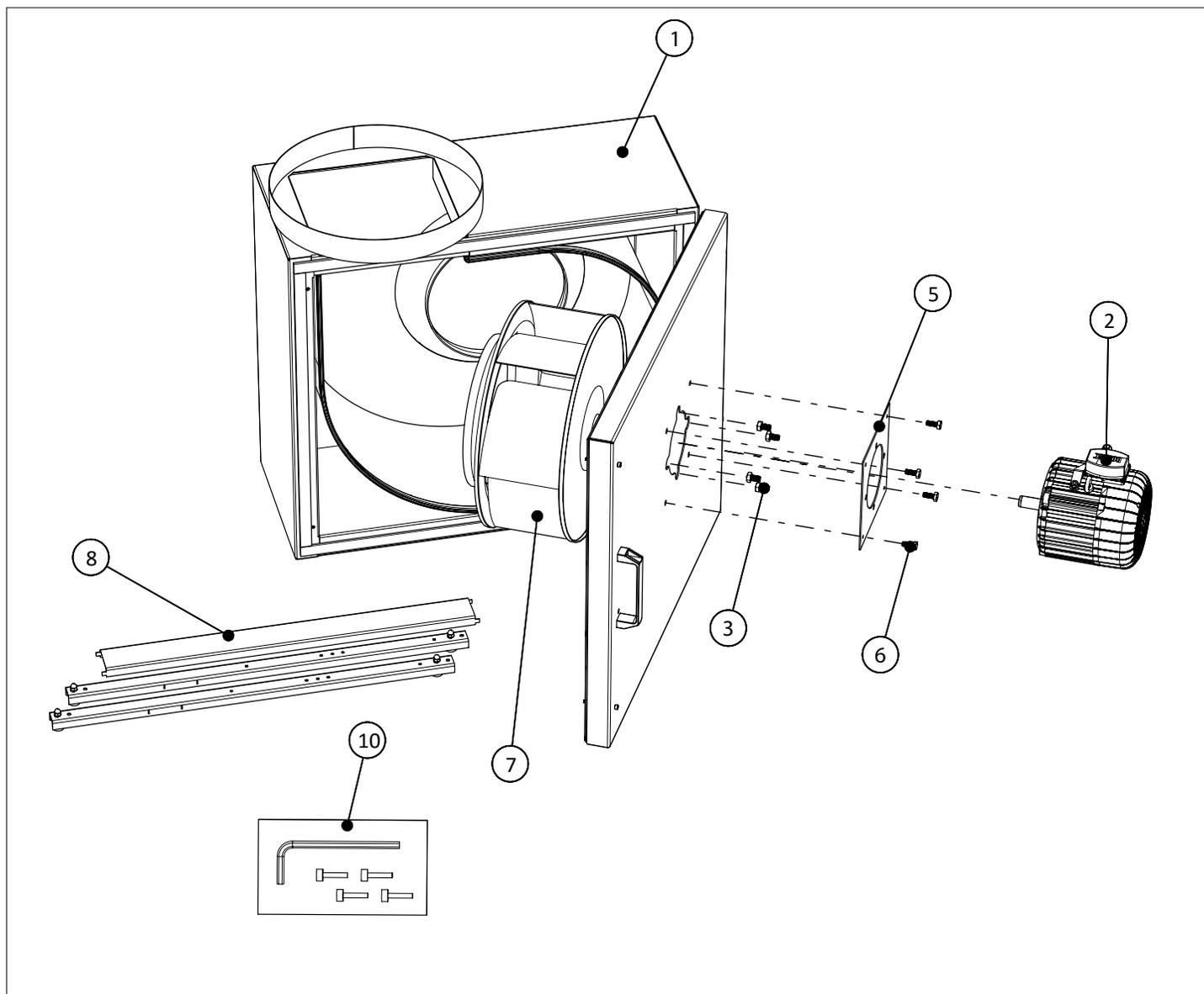


#### AVERTISSEMENT

L'appareil doit être rendu non opérationnel lors du nettoyage de la turbine ou du caisson (fusibles, retirés, sectionneur verrouillé).

## 6.4 REPLACEMENT PARTS ORDERING

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



- 1 Fan Housing
- 2 Motor
- 3 Motor Mount Bolts M8x20 (4)
- 5 Motor mounting plate (outside housing)
- 6 Mounting Bolts M6x20 (4)
- 7 Impeller
- 8 Support legs with vibration dampers (2)
- 10 Kit with Allen key for door locking screws and 4 sheet metal screws for support legs

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## 7. WARRANTY TERMS – BEF

ENERVEX warrants the BEF Ventilator Fan against functional failure due to defects in material and workmanship for a period of two (2) years from date of delivery to the construction site. Functional failure is defined as any failure of the fan to perform its intended function of exhausting grease-laden and creosote-laden exhaust. During this period, any BEF Ventilator Fan supplied by ENERVEX failing to perform its intended function will be repaired or replaced, at the manufacturer's option, following determination by a factory authorized inspector that a functional failure has occurred.

This warranty is limited to repair or replacement of the product (including, but not limited to, motor and housing) plus shipping cost to the failure location. This warranty does not cover any labor cost for removal or replacement of the defective product nor does this warranty cover any component not furnished by ENERVEX and installed as part of the system.

This warranty is a two-way agreement. ENERVEX promises to supply free replacements as stated, but the user agrees that, except for our obligation to make good on this promise, ENERVEX shall not be responsible for any expense or inconvenience which the user might incur or experience with respect to the product, nor shall ENERVEX be liable for defects, damage or failures, caused by unauthorized alterations, unreasonable use, accident or abuse, including failure to provide

reasonable and necessary maintenance, after the product has been delivered. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

ENERVEX assumes no liability for incidental or consequential damages of any kind or for any damages resulting in whole or in part from misuse, improper installation, or inadequate maintenance of the system or any component part thereof. This warranty is in lieu of all other express warranties or guarantees of any kind. All implied warranties, including merchantability and fitness, are limited to the duration of the express warranty contained herein. ENERVEX neither assumes nor does it authorize any other person to assume on its behalf any other liability in connection with the sale of its product.

In addition, we promise the original user that we will replace or repair as we may elect, any parts or parts of the ENERVEX chimney fan which are perforated due to corrosion without charge for parts or labor (not including dismantling, installation, freight, etc.) during the first 10 years following the date of installation.

For prompt warranty service, contact the ENERVEX Customer Service Department, 1685 Bluegrass Lakes Parkway, Alpharetta, GA 30004.



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