



**EVD
Centrifugal Roof Exhauster**

OPERATION & MAINTENANCE

Revised: 08/24/15



IMPORTANT! READ BEFORE PROCEEDING!

The information contained herein is, to the best of our knowledge, accurate and applicable for proper operation and installation of the specified equipment at the time this document entered service. Before proceeding, it is recommended that you check for a more current version of this Installation Operation Manual (IOM) on our website at www.johnsoncontrols.com.

Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

INTRODUCTION & INSPECTION

YORK® by Johnson Controls roof-mounted ventilators are belt-driven centrifugal exhausters designed to meet air delivery requirements where steady exhaust is needed under moderate static pressure. Housings are of spun aluminum construction with built-in bird screen. Ventilators are furnished with self-aligning, pre-lubricated, ball bearing pillow blocks, spark proof aluminum wheels, and aluminum backdraft damper.

RECEIVING AND HANDLING

YORK® by Johnson Controls fans are carefully inspected before leaving the factory. When the unit is received, inspect the carton for any signs of tampering. Inspect the unit for any damage that may have occurred during transit and check for loose, missing or damaged parts. Mishandled units can void the warranty provisions. If units are damaged in transit, it is the responsibility of the receiver to make all claims against the carrier. YORK® by Johnson Controls is not responsible for damages incurred during shipment.

Avoid severe jarring and/or dropping. Handle units with care to prevent damage to components or finishes. If the unit is scratched due to mishandling, the protective coating may be damaged. Incorrect lifting may damage the fan and void the warranty.

STORAGE

Long-term storage requires special attention. Store units on a level, solid surface, preferably indoors. If outside storage is necessary, protect the units against moisture and dirt by encasing the cartons in plastic or in some similar weatherproof material. Periodically inspect units and rotate wheels to spread bearing lubricant. Failure to rotate wheels results in reduced bearing life and may void the manufacturer's warranty. If the unit will be stored for an extended time, remove belts. Belts which remain under tension in a stationary position for extended periods are likely to have a reduced operating life.

UNPACKING

Place the carton in an upright position and remove the staples or use a sharp (knife edge) tool to carefully cut or scribe the sealing tape on both sides at the top of the carton. Open carton flaps. Remove any cardboard and wooden filler pieces, as well as loose components or accessories shipped with the unit.

Carefully remove the unit from the carton. Inspect the unit for any damage that may have occurred during transit and check for loose, missing or damaged parts.

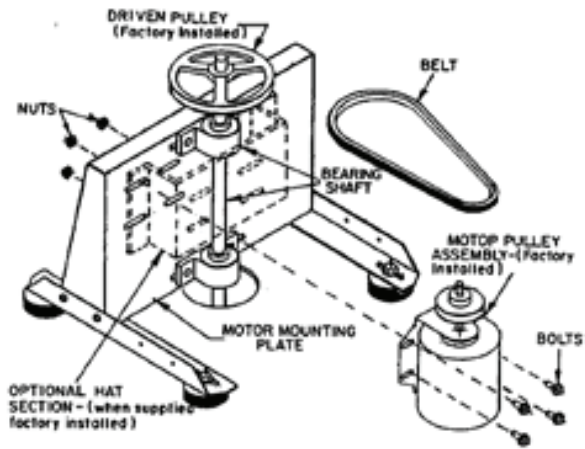


FIGURE 1: MOTOR INSTALLATION, TYPE 1

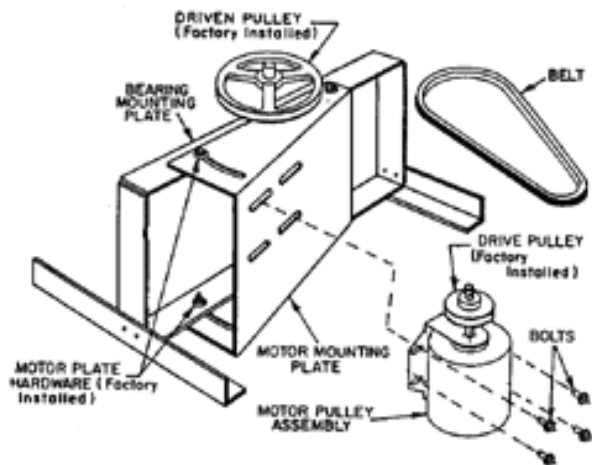


FIGURE 2: MOTOR INSTALLATION, TYPE 2

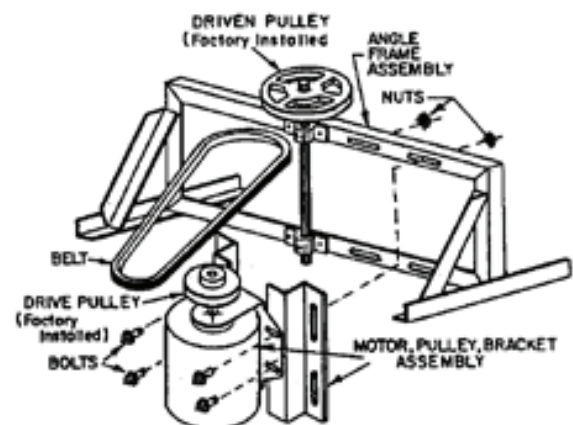


FIGURE 3: MOTOR INSTALLATION, TYPE 3

INSTALLATION



For installation in high velocity Hurricane Zones, unit must be installed per instructions on page 4.

INSTALLATION

Installing Motors

In some instances, large frame motors may be shipped loose and require field mounting. If so, carefully review motor mounting installation procedures per Figure 1, Figure 2 and Figure 3.

Installing the Dampers: Roof Mounting

When required, install dampers prior to mounting the unit on the curb or frame. Secure dampers to the inside of the roof opening (preferred) or curb without undue twisting, which may distort the damper frame. Damper frame must be reasonably level on all sides. Check for free operation. If dampers are motor operated type, ascertain that proper voltage is impressed on motor terminals.

Positioning and Running Power Lines: Roof Mounting

Power is normally brought from within the building through proper conduit lines and placed inside one corner of the curb. Feed power line through the clearance hole provided in the damper, if furnished, and in turn through the ventilator to the disconnect switch, if furnished, and motor.

When power lines are brought up to the unit, provide a generous amount of slack to allow for motor adjustments and to permit movement of motor for belt tension adjustments. Ground motor adequately and securely. Protect power lines from sharp objects. Do not kink power line or permit it to contact hot surfaces, chemi-cals, grease or oil. Use only UL recognized electrical parts, rated for proper voltage, load and environment. Check motor name plate.

Anchoring and Securing the Ventilator: Roof Mounting

Whenever possible, anchor the fan by fastening through the vertical portion of the mounting flange. The type, size and number of fasteners depends upon the unit size and curb construction. If code or specification prescribes fastening through the top (vertical portion) of the mounting flange, use neoprene or lead washers under the head of each fastener.

Guy down large units installed in areas subject to high winds or unusual field conditions. If the installer removes any ventilator parts to facilitate installation or electrical connections, reassemble all parts by replacing all spacers, washers, nuts, bolts, fasteners and components exactly as they were found prior to removal. Draw all fasteners tight and secure. Fasteners should be protected against corrosion.

Motor Installation Procedures

1. Install motor pulley assembly (bracket if provided - type 3) with hardware provided through holes in motor mounting plate/frame. Keep driven pulley and drive pulley in line. (Do not tighten hardware).
2. Install belt over drive and driven pulleys, pull up on motor mounting plate/ bracket until belt is tight. Tighten motor plate hardware.
3. Wire motor or plug harness connector (from motor if equipped) into terminal socket at end of junction box. Unit is now ready to test to check for smooth operation.
4. See belt adjustment label, and Fig. 4, for more details.
5. Check for proper wheel rotation.

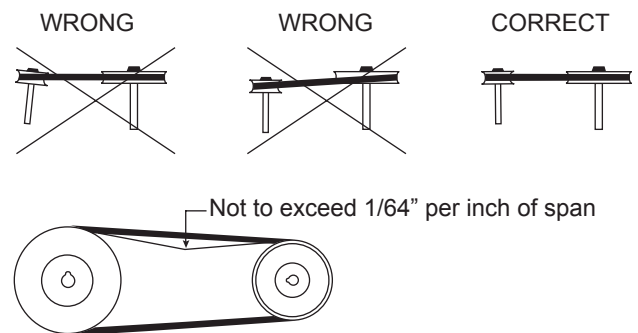
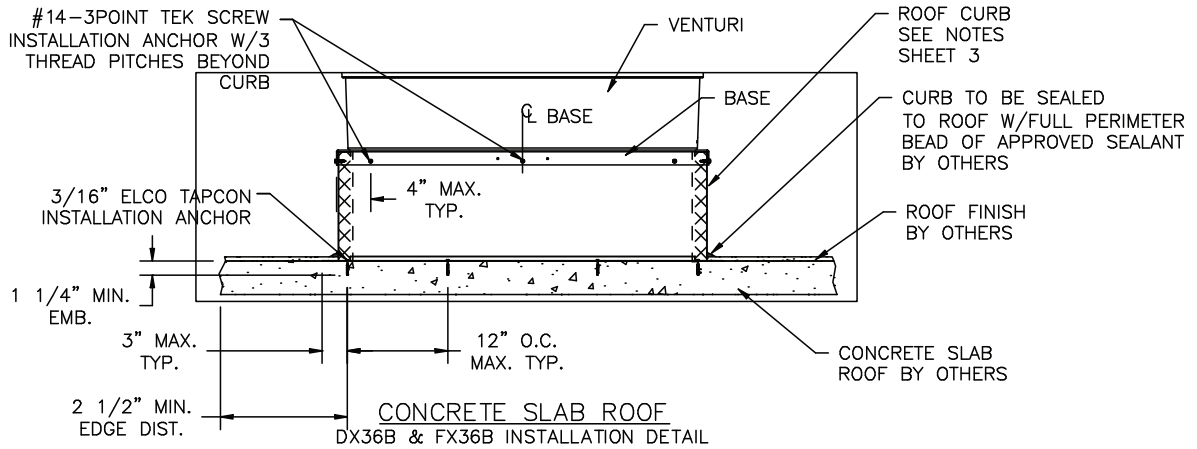


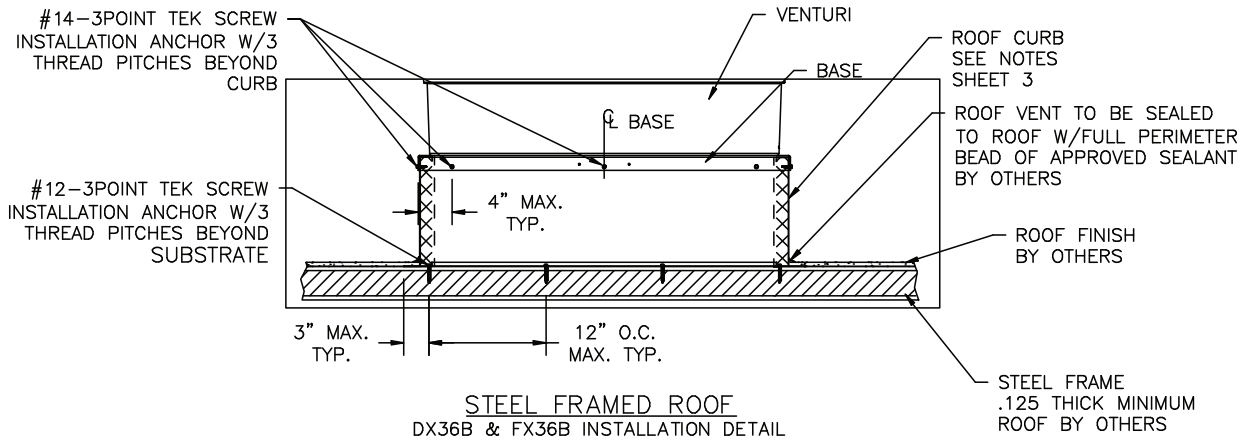
FIGURE 4: PULLEY ALIGNMENT

INSTALLATION (CONTINUED)

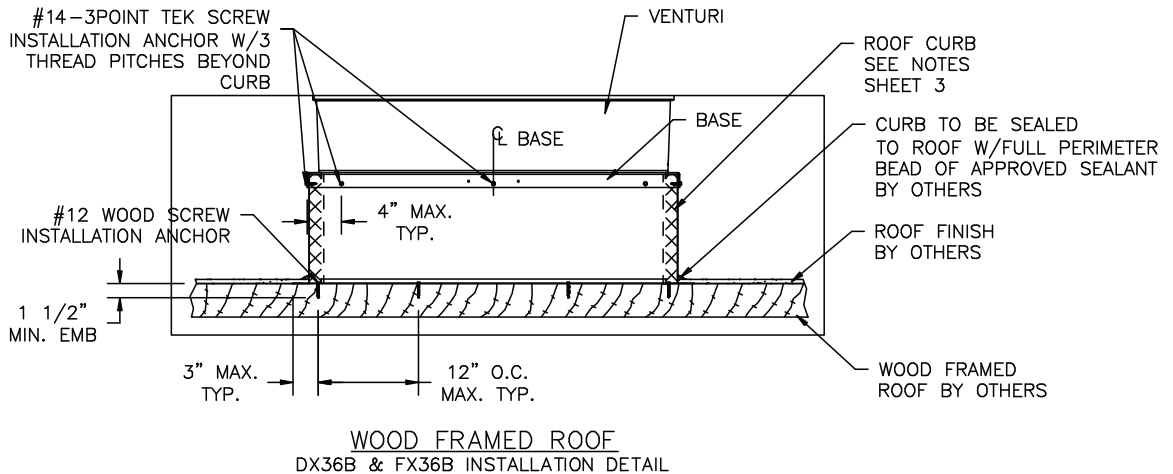
TYPICAL CONCRETE SLAB ROOF INSTALLATION



TYPICAL STEEL FRAMED ROOF INSTALLATION



TYPICAL WOOD FRAMED ROOF INSTALLATION



START-UP & OPERATION

START-UP & OPERATION

Carefully inspect the unit before start-up. All motor bearings should be properly lubricated and all fasteners should be securely tightened. Rotate centrifugal wheel by hand to insure free movement.



Before placing hand on centrifugal wheel or belts, lock out power source.) Check all set-screws and keys. Tighten when necessary.

Check condition of belts and the amount of tension prior to start-up. DO NOT overtighten, as bearing damage will occur. Recommended belt tension should permit deflection of 1/64" per inch of span. Exercise extreme care when adjusting belts as not to misalign the pulleys. Any misalignment will cause a sharp reduction in belt life and produce squeaky, annoying noises. On units equipped with two groove pulleys, adjust all belts with equal tension. Belts must be adjusted after approximately 40 hours of operation.



Whenever belts are removed or installed, never force belts over pulleys without loosening motor first to relieve belt tension.

Make sure inlets and approaches to the unit are free from obstruction. To assure maximum air movement, make sure adequate supply air is available to ventilated space.

Before putting fan into operation, complete the following check list:

1. Turn off and LOCK OUT the power source.
2. Make sure installation is in accordance with manufacturer's instructions.
3. Check and tighten all fasteners.
4. Spin centrifugal wheel to see if rotation is free.
5. Check all set-screws and keys: tighten if necessary.
6. Torqued set screws have a colored Torque Seal mark indicating the correct torque has been applied.
7. Check belt or direct drive coupling for alignment (use recommended belt tension gauges).
8. Check belt for proper sheave selection.
9. Make sure there is no foreign or loose material in ductwork leading to and from fan or in the fan itself.
10. Properly secure all safety guards.
11. Secure all access doors to fan and ductwork.
12. Check line voltage with motor nameplate.
13. Check wiring.



(On single phase motors, the terminal block must be set up in accordance with the nameplate instructions and/or wiring diagram. This set up must match the line voltage. If the motor is multi-speed or multi-voltage, the winding leads must be grouped and connected as shown on the motor wiring diagram. The line voltage must correspond with proper grouping of motor leads. The wiring diagram must be followed explicitly or serious motor or starter damage will occur.) Don't operate at RPM higher than catalog.

The ventilator has been checked at the factory prior to shipment for mechanical noises. If mechanical noises should develop:

1. Check rotating components for adequate clearance (wheel alignment procedures are on page 7) and direction of rotation. CCW looking from drive side.
2. Check proper belt tension and pulley alignment.
3. Check installation and anchoring.
4. Check fan bearings.

Switch on electrical supply and allow fan to reach full speed. Check carefully for correct rotation of the centrifugal wheel.



Incorrect rotation overloads motor severely and results in serious motor damage. To change rotation of three phase units, interchange any 2 of the 3 line leads. On single phase units, change the terminal block set-up following the wiring diagram on the motor.

Check motor and bearing temperatures for excessive heat.

Use care when touching the exterior of an operating motor. Modern motors normally run hot. They are designed to operate at higher temperatures. This is a normal condition but they may be hot enough to be painful or injurious to the touch.

If any problem is indicated, TURN OFF POWER TO UNIT IMMEDIATELY. Lock out the electrical supply, check carefully for the cause of the trouble and correct as needed. Even if the fan appears to be operating satisfactorily, shut down after a brief period and check all fasteners, setscrews and keys for tightness. During the first eight (8) hours of operation, check the fan periodically for excessive vibration or noise. At this time, also check motor input current and motor bearing temperatures to insure that they do not exceed manufacturer's recommendations. After eight hours of satisfactory operation, shut down the fan and lock out the electrical power to check the following items and adjust if necessary:

1. All set-screws, keys and fasteners.
2. Drive coupling alignment.
3. Belt alignment.
4. Belt tension.

MAINTENANCE

MAINTENANCE

Do not attempt maintenance on fan until the electrical supply has been completely disconnected. If a disconnect switch has not been provided, remove all fuses from the circuit and lock the fuse panel so they cannot accidentally be replaced.

Lubrication is a primary maintenance responsibility. Check all bearings periodically. Inspect belts for tightness. If the fan is installed in a corrosive or dirty atmosphere, periodically clean the impeller, inlet and other moving parts.

Fan Shaft Lubrication

Fan shaft bearing pillow blocks are furnished in either the prelubricated sealed for life type or the greasable type depending on what was ordered. The prelubricated type requires no servicing for 7 to 10 years of normal use and the greasable type are factory greased eliminating the need for greasing initially. Follow the lubricating schedule recommended by the factory. When required, apply grease while the shaft is rotating. This practice should not supersede any safety considerations.

Lubrication Schedule

Always follow the bearing manufacturer's recommended lubrication schedule. If none is available use the following general schedule.

1. Under average conditions where ambient temperatures do not exceed 120°F., lubrication is required 1 to 2 times a year.
2. Under dirt laden atmospheres or where there is a temperature range of 120°F to 150°F, lubrication is required from 3 to 6 times a year.
3. Under extreme temperature conditions and extremely dirty atmospheres, lubrication should be at least once or twice a month.

Motor Lubrication

In general, standard motors are furnished with prelubricated, sealed-for-life ball bearings which require no lubrication for 7 to 10 years of normal service. Where motors have been ordered with greasable bearings, these bearings are factory lubricated and require no attention for one year under normal conditions. If grease relief fittings are provided, remove them when performing maintenance to allow grease to flow out. Whenever possible, apply grease while the motor is running. This practice should not supersede any safety considerations. **DO NOT OVER GREASE**, as most lubricants deteriorate motor windings, thereby reducing motor life.



Use low pressure grease guns only. High pressure guns tend to blow out or unseat bearing seals, leaving the bearing open to collect grime, dust and foreign particles.

RECOMMENDED LUBRICANTS

Manufacturer	Product	Temperature Range
BP	LG-#P-1	Below 32°F (0°C)
Gulf	Gulfcrown EP-1	
Imperial Oil	Unirex EP-1	
Shell	Alvania R-1	
BP	Energrease, MPMK11	32°F to 150°F (0°C to 66°C)
Gulf	Gulfcrown EP-2	
Imperial Oil	Unirex EP-2	
Shell	Alvania R-3	
Sun Oil	Sun Prestige 42	
Texaco	Regal AFB2	

HIDDEN DANGERS & GUARDS

HIDDEN DANGERS

In addition to the normal dangers of rotating machinery, fans present an additional hazard in their ability to suck in not only air, but loose material as well. Solid objects can pass through the fan and be discharged by the impeller as potentially dangerous projectiles. Therefore, screen intake to ductwork, whenever possible, to prevent the accidental entrance of solid objects. Never open access doors to a duct system with the fan running.

When starting the fan for the first time, completely inspect the ductwork and interior of the fan (with power locked off), to make certain there is no foreign material which can be sucked into or blown through the ductwork.

GUARDS

All fans have moving parts which require guarding in the same way as other moving machinery.

Where the fan is accessible to untrained personnel or the general public, use maximum safety guards, even at the cost of some performance loss. Unprotected fans located less than 7' above the floor also require guarding as specified in the Occupational Safety and Health Act (OSHA).

YORK® by Johnson Controls recommends the use of guards on all exposed nonducted fans, ceiling and wall mounted.

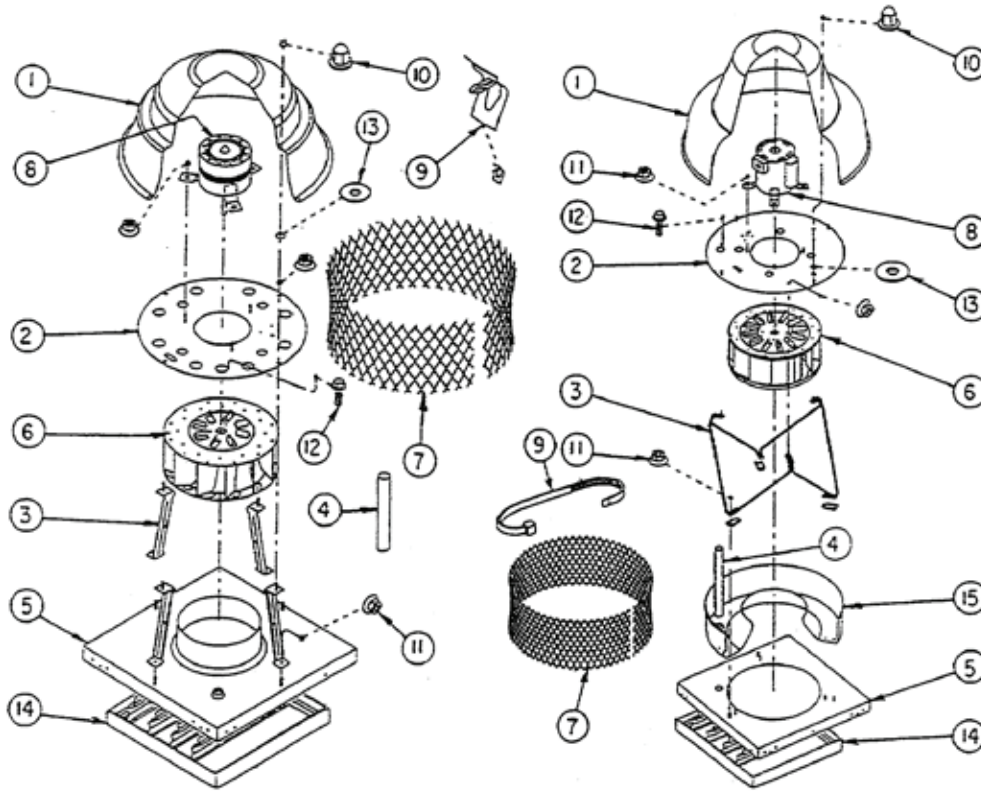
Centrifugal fans may be connected directly to ductwork which will prevent contact with the internal moving parts, but when the inlet or outlet is exposed, install a suitable guard.

PARTS REPLACEMENT: Direct Drive Models

EVD06R, EVD08S/R, EVD10S/R, EVD11S/R, EVD11Q, EVD13V/S/R, EVD13Q, EVD16V/S/R, EVDQ1, & EVDQ2

LEFT IMAGE: EVD06R, EVD08S/R, EVD10S/R, EVD11S/R, EVD11Q, EVD13V/S/R & EVD13Q

RIGHT IMAGE: EVD16V/S/R, EVDQ1 & EVDQ2



Item	Description
1	Hood Apron
2	Top Plate
3	Brace
4	Conduit Pipe
5	Base
6	Wheel
7	Screen
8	Motor
9	Screen Clip
10	Acorn Nut
11	1/4-20 Nut
12	1/4-20 Bolt
13	Washer
14	Backdraft Damper
15	Venturi

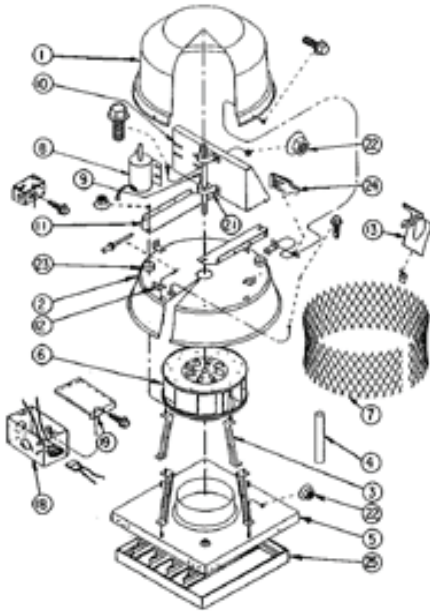
Fan Size	Base Dimension
6	18.5"
8	18.5"
10	18.5"
11	18.5"
13	18.5"
16	20.5"

Fan Base Dimensions (outside curb dimension should be 1" smaller than inside fan base dimension).

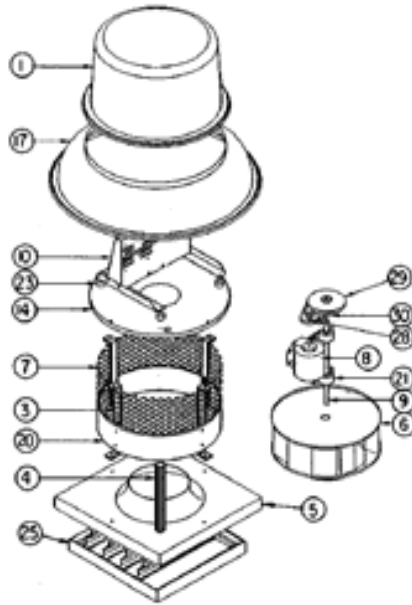
PARTS REPLACEMENT: Belt Drive Models

EVD06B-36B, EVDK, EVDJ, & EVDM

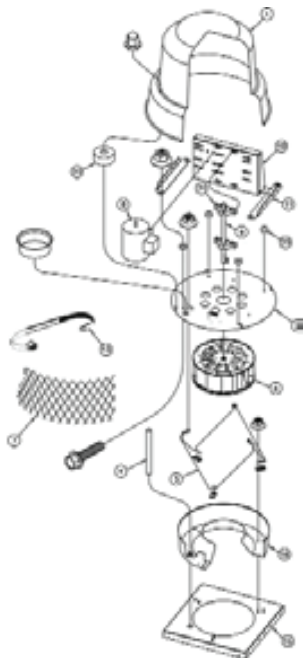
EVD06B, EVD08B



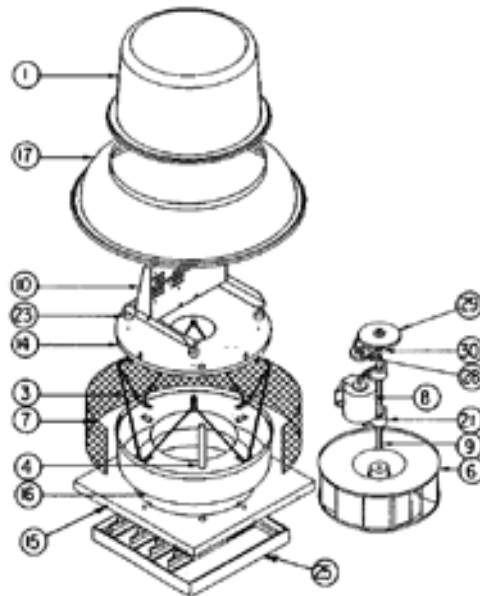
EVDK, EVDJ, & EVDM



EVD11B



EVD11BA - EVD36B



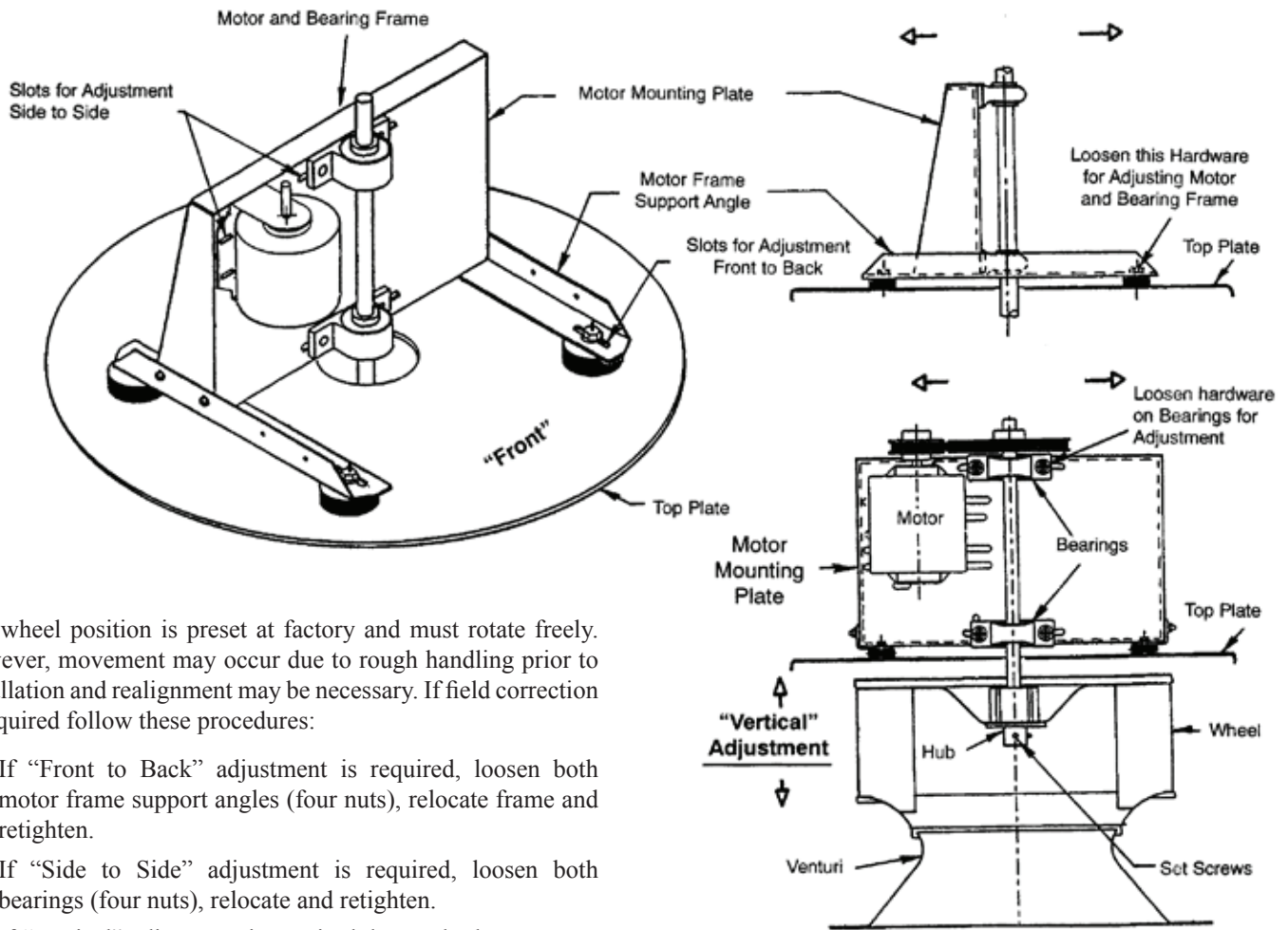
Item	Description
1	Hood
2	Top Plate Apron
3	Vertical Brace
4	Conduit Pipe
5	Base Venturi
6	Centrifugal Wheel
7	Screen
8	Motor
9	Shaft
10	Motor Bearing Frame
11	Motor Frame Support Angle
12	Hood Mounting Lug
13	Screen Clip
14	Top Plate
15	Base
16	Venturi
17	Apron
18	Junction Box
19	Junction Box Cover
20	Baffle
21	Bearings
22	1/4-20 Nut
23	Rubber Bushing
24	Bolt Clip
25	Backdraft Damper
26	Bearing Support Plate
27	Motor Support Plate
28	Motor Pulley
29	Fan Pulley
30	Belt

Fan Size	Base Dimension
06B	18.5"
08B	18.5"
11B(A)	20.5"
12B	24.75"
14B	24.75"
16B	28.5"
18B	28.5"
24B	33.5"
30B	36.5"
36B	44.5"
KB	52.5"
JB	59.0"
MB	63.5"

Maximum Fan RPM and Motor Horsepower Size Belt Drive Models

Fan Size	06B	08B	11B(A)	12B	14B	16B	18B	24B	30B	36B	KB	JB	MB
Max Safe RPM	1437	1437	1575	2007	1793	1631	1326	1275	988	810	600	480	440
Max Motor Frame Size	42	42	56	56	56	145T	145T	184T	184T	213T	213T	215T	254T

PARTS REPLACEMENT: Wheel Alignment Procedures

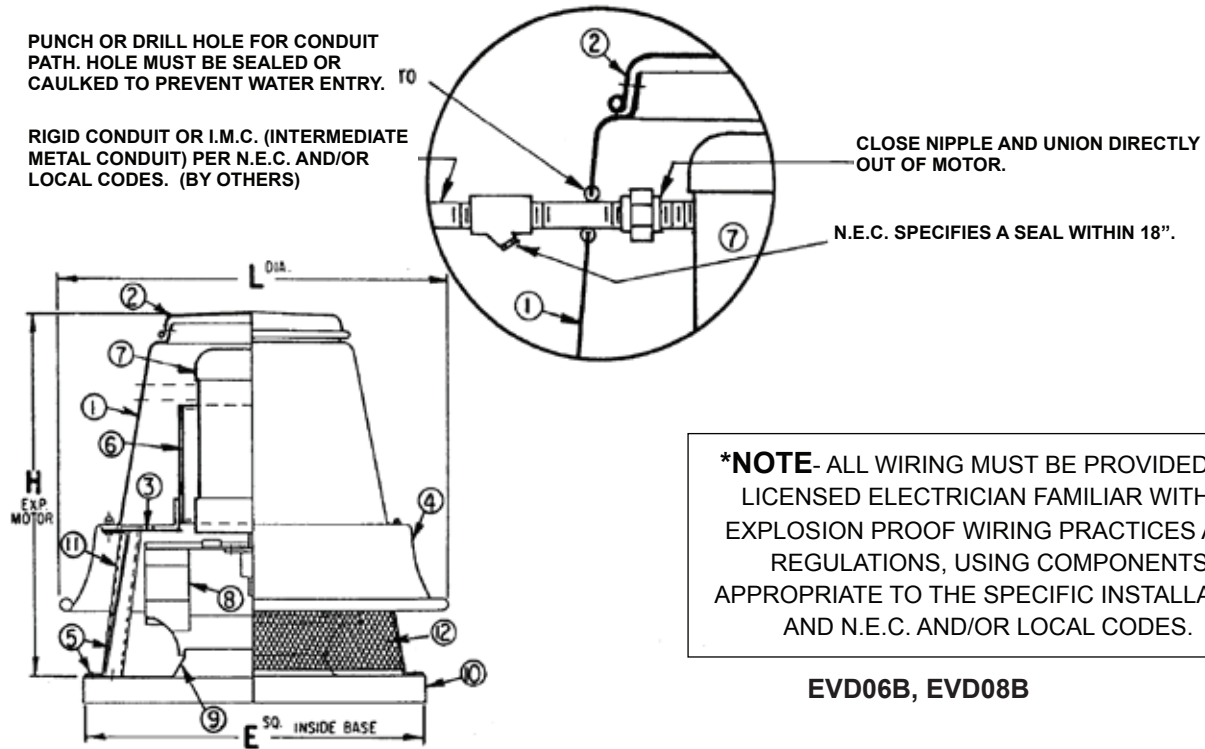


The wheel position is preset at factory and must rotate freely. However, movement may occur due to rough handling prior to installation and realignment may be necessary. If field correction is required follow these procedures:

1. If "Front to Back" adjustment is required, loosen both motor frame support angles (four nuts), relocate frame and retighten.
2. If "Side to Side" adjustment is required, loosen both bearings (four nuts), relocate and retighten.
3. If "Vertical" adjustment is required, loosen both set screws on the wheel hub (accessible from the bottom side of the unit), raise or lower the wheel and retighten.

PARTS REPLACEMENT - Direct Drive - Explosion Proof Motor

SPUN ALUMINUM CENTRIFUGAL ROOF EXHAUSTER



LEGEND

1. Motor Dome	7. Motor (Exp. Motor)
2. Motor Hood Top (For Exp. Motor)	8. Centrifugal Fan Wheel with Cooling Vanes
3. Top Plate	9. Spun Venturi
4. Discharge Apron	10. Mounting Base
5. Structural Support Braces	11. Conduit Guide (Not for Exp. Motor)
6. Motor Mounting Plate	12. Aluminum Bird Screen

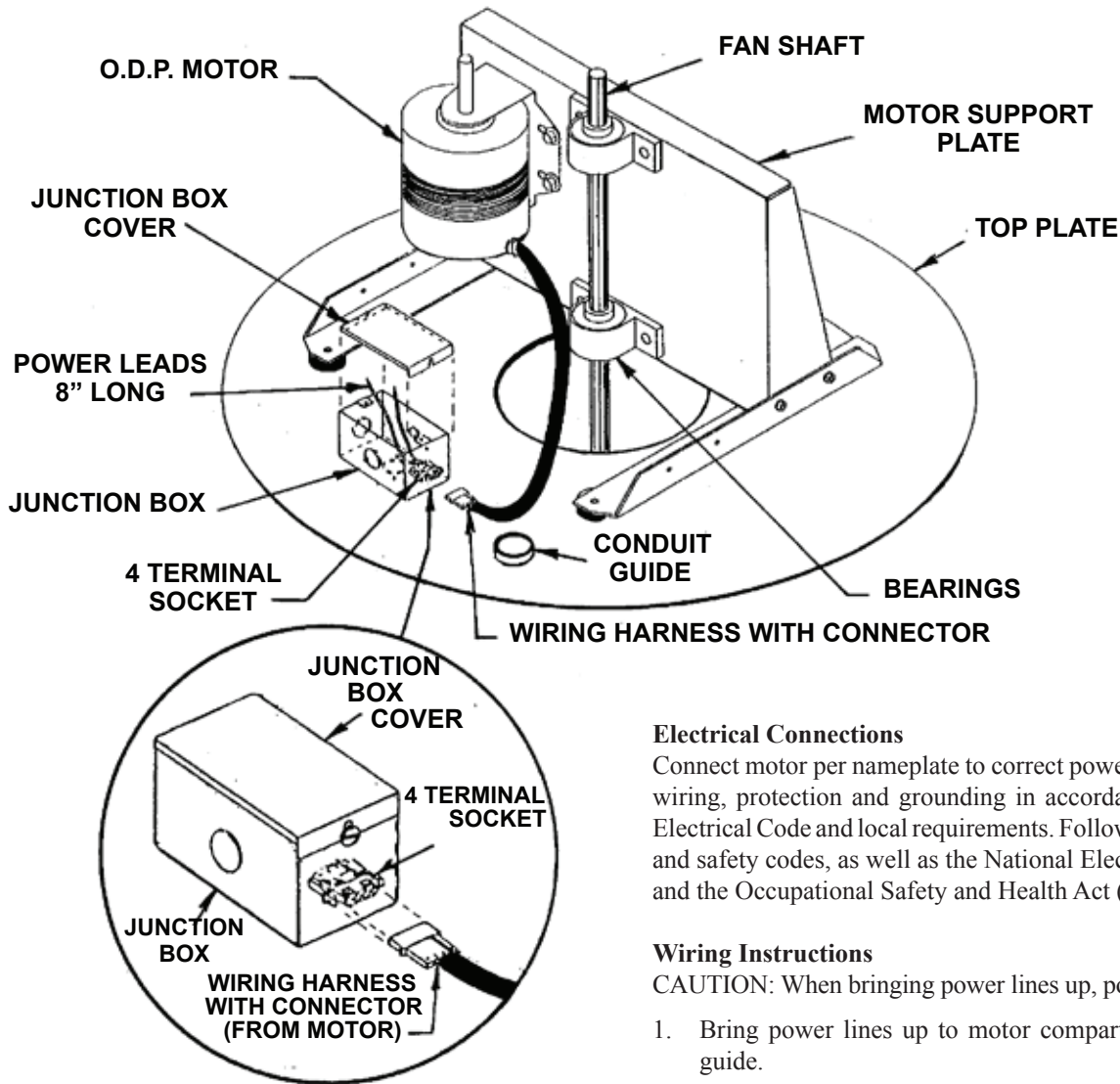
Model	EVD08Q	EVD10Q	EVD11Q	EVD13Q	EVD16Q
L Diameter	20 7/8"	20 7/8"	20 7/8"	21 7/16"	28 1/2"
H Exp. Motor	18	19	19	19	26 11/16

† Outside dimension of curb should be 1 1/2" less than 'E' dimension.

Material: Spun Aluminum Housing

WIRING HARNESS - DISCONNECT DEVICE

O.D.P. MOTORS (ITW HARNESS) 115/220 SINGLE PHASE



Electrical Connections

Connect motor per nameplate to correct power supply. Install all wiring, protection and grounding in accordance with National Electrical Code and local requirements. Follow all local electrical and safety codes, as well as the National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).

Wiring Instructions

CAUTION: When bringing power lines up, power MUST be off.

1. Bring power lines up to motor compartment thru conduit guide.
2. Remove junction box cover so that power leads are exposed.
3. Remove one knock-out, attach connector and run power lines from source into junction box.
4. Terminal socket has two 8" long pigtails already stripped. Make connection to power lines using proper size wire nuts and fold wires back into box.
5. Replace junction box cover and secure in place with screw.
6. Plug harness connector (from motor) into terminal socket at end of junction box. Unit is now ready to test.

TROUBLESHOOTING CHECKLIST

Symptom	Possible Cause(s)	Corrective Action
Excessive Noise	<ol style="list-style-type: none"> 1. Defective or loose motor bearings. 2. Ventilator base not securely anchored. 3. Loose or unbalanced wheel/propeller. 4. Misaligned pulleys or shaft. 5. Loose or damaged wheel/propeller. 6. Wheel running in wrong direction. 	<ol style="list-style-type: none"> 1. Replace motor with same frame size, RPM, HP. 2. Reset properly. 3. Tighten screws, remove build-up, balance wheel/propeller. 4. Correct alignment. 5. Replace wheel/propeller. 6. Reverse direction.
Fan Inoperative	<ol style="list-style-type: none"> 1. Blown fuse or open circuit breaker. 2. Loose or disconnected wiring. 3. Defective motor. 4. Broken belts. 	<ol style="list-style-type: none"> 1. Replace fuses or circuit breaker. 2. Shut off power and check wiring for proper connections. 3. Repair or replace motor. 4. Replace belts.
Insufficient Airflow	<ol style="list-style-type: none"> 1. Open access doors or loose sections of ducts. 2. Clogged filters. 3. Operation in wrong direction. 4. Insufficient make-up air direction. 	<ol style="list-style-type: none"> 1. Check for leakage. 2. Clean filters. 3. Correct rotation of wheel. 4. Add make-up fan or louver opening.
Water Leaking into Ductwork or Collection of Grease Under Fan	<ol style="list-style-type: none"> 1. Fan installed with slope in the wrong direction. 2. Clogged drain spout. 3. Cooling tube or motor dome top removed. 4. Grease container full. 	<ol style="list-style-type: none"> 1. Slope should be fitted in the direction of the drainage opening or grease collection box and drain spout. 2. Clean drain spout. 3. Install new cooling tube with gasket and dome top. 4. Empty grease box.
Motor Overheating	<ol style="list-style-type: none"> 1. Belt slippage 2. Overvoltage or under voltage. 3. Operation in wrong direction. 4. Fan speed too high. 5. Incorrect motor. (service factor 1.0, low ambient temp.) 6. Blocked cooling tube or leaky gasket. 7. Insufficient airflow to kitchen hood fan operating on low speed with kitchen in full operation. 8. Undersized motor. 	<ol style="list-style-type: none"> 1. Adjust tension or replace belts. 2. Contact power supply company. 3. Reverse direction of motor. 4. Slow down fan by opening variable pitch pulley on motor shaft. 5. Replace motor with correct open, NEMA service factors (1.15 or higher) with 40 degrees ambient. 6. Remove blockage and seal cooling tube in place. 7. Check airflow under hood and adjust kitchen equipment output. 8. Check motor ratings with catalog speed and air capacity chart.

Note: Care should be taken to follow all local electrical, safety and building codes. Provisions of the National Electric Code (NEC), as well as the Occupational Safety and Health Act (OSHA) should be followed.

All motors are checked prior to shipment. If motor defects should develop, prompt service can be obtained from the nearest authorized service station of the motor manufacturer while under warranty. Exchange, repair or replacement will be provided on a no charge basis if the motor is defective within the warranty period. The YORK® by Johnson Controls representative in your area will provide a name and address of an authorized service station if requested.

WARNING: Motor guarantee is void unless overload protection is provided in motor wiring circuit.



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