



36", 50", 54" Variable Speed V-Fan™ (Fiberglass, Galvanized, and Z) Slant Wall Direct Drive Fans

Installation and Operation Manual

36" Fans

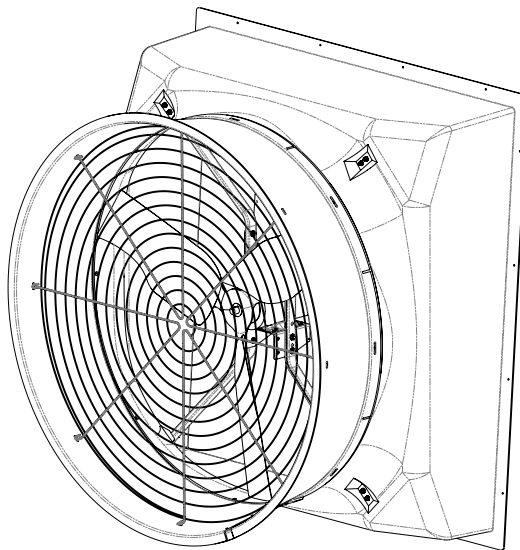
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936260-ZM-1, 936260-ZM-1-Q2, 936260-ZM-3, 936260-ZM-3-Q2,
936600-SC-1, 936600-SC-1-Q2, 936600-SC-3, 936600-SC-3-Q2

50" Fans

950230-1, 950230-3, 950230-34, 950600-SC-1, 950600-SC-3

54" Fans

954230-1, 954230-3, 954230-33, 954230-34, 954230-BW-1, 954230-BW-34,
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954830-SC-3, 954835-1, 954835-3, 954835-33, 954835-34



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VAL PRODUCTS, INC. WARRANTIES

For Warranty claims information, please see the “Manufactured Products Standard Warranty” form QMS101 available from Val Products, Inc. by:

- Phone: 1-800-998-2526
- Email: marcom@val-co.com
- Online: <http://val-co.it/warranty>

Conditions and Limitations:

- Products and Systems involved in a warranty claim under the “Manufactured Products Standard Warranty” shall have been properly installed, maintained and operated under competent supervision, according to the instructions provided by Val Products, Inc.
- Malfunction or failure resulting from misuse, abuse, negligence, alteration, accident or lack of proper installation or maintenance shall not be considered a defect under the Warranty.

Symbols

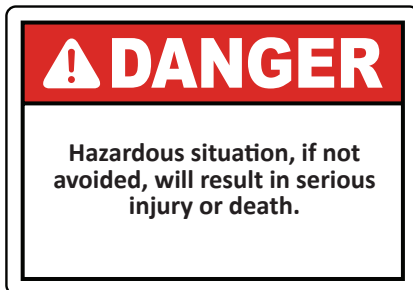
Our concern is for your safety. The safety warnings are included in this manual as a guide to help and encourage the safe operation of your equipment. It is your responsibility to evaluate the hazards of each operation and implement the safest method of protecting yourself as owner and/or operator.



= **NOTICE** - Important information. Be sure to read.



= **WARNING** - The safety alert symbol is used on warning signs that describe the importance of a feature or explain a step that one should pay close attention to avoid problems or personal injury.



Introduction

The V-Fans come pre-assembled (*except for the cone, cone straps and cone screen*). The sheet metal fans can also be ordered as un-assembled/Knock Down.

Please check your shipment for correct parts and condition.

- Read all safety information, instructions and illustrations before starting to assemble your new fan. Please review the complete assembly manual twice before starting and be sure to check your shipment with the packing list for any shortages. Please report shortages promptly.
- Metric measurements are shown in parentheses throughout the manual.
Example: 13” (330mm)



General Description

This manual contains information and instructions essential to the safe installation and use of the V-Fan Variable Speed fans. This manual should be read thoroughly before attempting any installation or use of the fan. Keep this manual in a location that it can be readily accessible. Failure to read the manual and its safety instructions constitutes misuse of the product.

Correct Use of Your V-Fan

1. The fan is designed solely for the purpose of ventilating agricultural buildings. Use of the fan in any other way is a misuse of the equipment and may endanger your or another person's safety and health.
2. In the installation and use of the fan, only genuine VAL-CO parts are to be used. Use of other non-genuine parts is a misuse and may lead to unexpected results.
3. This fan is not designed for use in atmospheres where the risk of explosion is foreseen. Such environments may include enclosed areas of high dust concentrations, gas, vapors and fumes. Use in these environments is prohibited. If in doubt, contact VAL-CO or your dealer.

Tools Required:

- *Small Flat Head Screwdriver and regular Phillips Screwdriver*
- *7/16", 1/2", 9/16", 5/16", 15/16", 1-1/2" Open End Wrenches or Socket Wrench with 7/16", 1/2", 9/16", 5/16", 15/16", 1-1/2" Sockets*
- *Wire Cutters and Strippers*
- *1/8" Hex Key Wrench, and 3/32" Hex Key Wrench for Fiberglass Fans*
- *1/8" Open End Wrench or a 12 Point 3/8" Socket and Ratchet*
- *1/4" Hex Nut Driver*
- *3/16" Pop Rivet Gun (If installing 954705-3-KD)*

Screwdrivers



Open End Wrench Set



Socket Set



Hex Key Wrench Set



Wire Cutter



Nut Driver



Pop Rivet Gun



Regulations (Caution and Warning)

WARNING

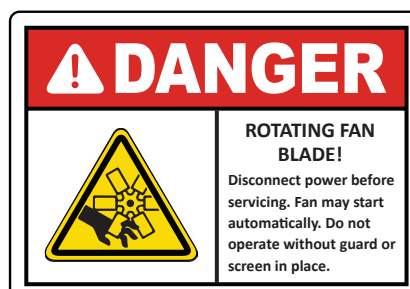
Do not install fan with moving parts within seven feet of floor or grade level without a guard that complies with OSHA Regulations. Do not use unless electrical wiring complies with all applicable codes. Do not wire without providing for power source disconnect at the fan itself. Do not service except by a qualified maintenance technician and only after disconnecting the power source. Do not install in room where flammable material is stored or flammable vapors might build up. Failure to observe all of these precautions can result in serious injury or death.

WARNING

If these ventilation products are used to support life in agricultural structures where failure of the system could result in loss or injury, the user must provide an adequate backup and alarm system. The user must accept all risks of such loss or injury due to the possible failure of the ventilation system.

Wiring Regulations *(Diagram included with motor)*

Be sure power is “OFF” before doing any wiring. All wiring shall be installed in accordance with national, state and local electrical codes. Fans used to ventilate livestock buildings or rooms where continuous air movement is essential should be connected to individual electrical circuits. For electrical connection requirements, refer to diagram on the motor nameplate or the enclosed wiring diagram. A circuit breaker switch or slow blow motor type fuse must be used. Three phase motors do not include overload protection. Specifications are subject to change without notice.



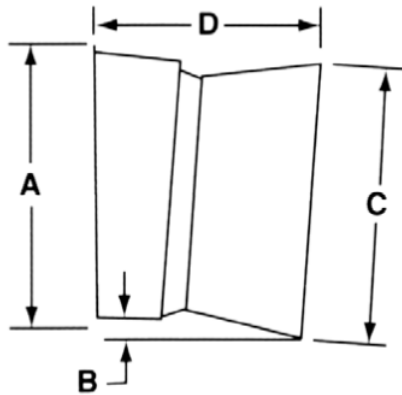
Assembly Instructions

Framing the Wall Opening

- Before installing the fan(s) you MUST have the proper rough opening. Be sure to leave enough space between the framed openings so that the fan flanges do not overlap, allowing room for fan cones. The wall opening must be square, plumb and flat for proper fan installation.

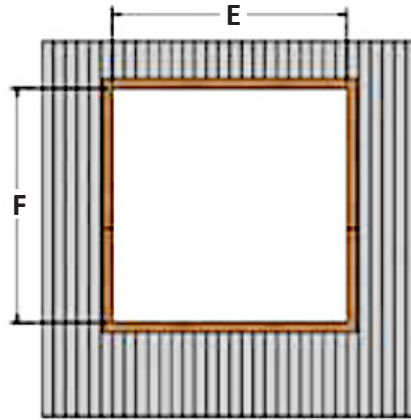
FAN DIMENSIONS

Figure 1



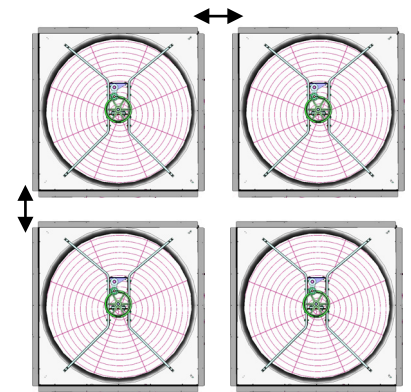
ROUGH OPENING DIMENSIONS

Figure 2



ALLOW FOR CONES IN SPACING

Figure 3



	SLANT WALL FAN SIZE					
	"A"	"B"	"C"	"D"	"E"	"F"
36" FG fan with PC36L (B or W) cone	48.5" (123.2cm)	7" (17.8cm)	50.25" (127.6cm)	47" (119.4cm)	44.5" (113.0cm)	44.5" (113.0cm)
36" FG fan with 936174 cone	48.5" (123.2cm)	3.75" (9.5cm)	44.5" (113.0cm)	47" (119.4cm)	44.5" (113.0cm)	44.5" (113.0cm)
36" Sheet metal slant wall fan	48.5" (123.2cm)	7.5" (19.0cm)	49" (124.5cm)	47" (119.4cm)	43.5" (110.5cm)	44.5" (113.0cm)
50" FG fan with PC50S (B or W) cone	62.25" (158.1cm)	8.5" (21.6cm)	59" (149.9cm)	39.25" (99.7cm)	56" (142.2cm)	58" (147.3cm)
50" FG fan with 950174 cone	62.25" (158.1cm)	2.77" (7.0cm)	58" (147.3cm)	49" (124.5cm)	56" (142.2cm)	58" (147.3cm)
50" FG fan with FC50LW cone	62.25" (158.1cm)	8.5" (21.6cm)	64.5" (163.8cm)	49.25" (125.1cm)	56" (142.2cm)	58" (147.3cm)
54" Interior mount FG fan with long cone	65" (165.1cm)	8.25" (20.95cm)	68.88" (174.95cm)	65.25" (165.73cm)	61.5" (156.21cm)	61.5" (156.21cm)
54" Interior mount FG fan with short cone	65" (165.1cm)	2.5" (6.35cm)	61.25" (155.57cm)	38.87" (98.73cm)	61.5" (156.21cm)	61.5" (156.21cm)
54" Sheet metal slant wall fan with 40" cone	64" (162.6cm)	11" (27.94cm)	69" (175.26cm)	64.5" (163.83cm)	60" (152.4cm)	60.25" (153.03cm)
54" Sheet metal slant wall fan with 26" cone	64" (162.6cm)	9" (22.86cm)	69" (175.26cm)	51.25" (130.17cm)	60" (152.4cm)	60.25" (153.03cm)

Build the fan framing with 2" (38mm) nominal dimension lumber. *(This is not supplied.)* The required rough opening is provided in the table above. Planning the layout on spacing between cone fans is very important. ***If the space is too close together it will cause interference with the cones.***



Protection from snow or ice loads must be provided!

An overhanging roof, or snow guards on the roof, MUST be provided to fully cover the fan. VAL-CO® warranty does not apply for equipment against snow or ice damage. If a 54" fiberglass fan is installed in a region that receives significant snowfall, Valco recommends a 54" short cone fan.

Panel / Housing Assembly

Some fans (with part numbers ending in -KD) arrive partially knocked down, with the bottom, top, and side housing panels in need of assembly to the partially pre-assembled orifice. Follow these instructions to assemble the housing.

1. The motor and VFD are shipped wired together, using braces to hold the components in proper alignment. To attach the mount motor and VFD to X-frame braces that attach to the fan orifice, remove one shipping brace at a time by removing (4) 3/8-16 hex flange nuts and (4) 3/8-16 x 1-1/4" hex bolts from one side, reusing the hardware to attach the X-braces, as shown in Figures 4 and 5.

Figure 4

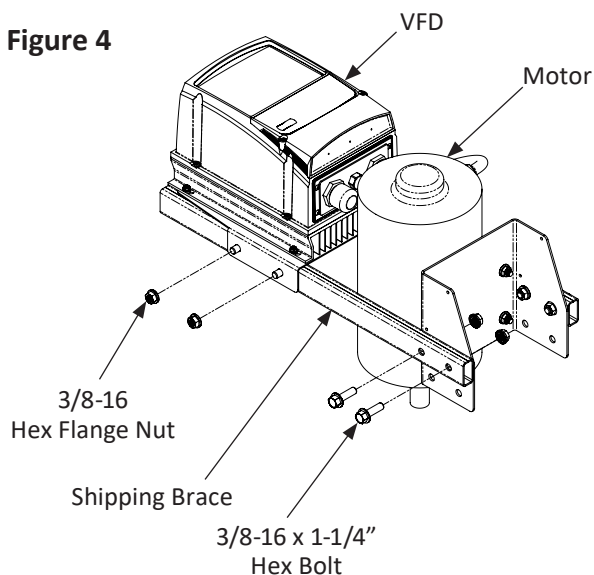


Figure 5

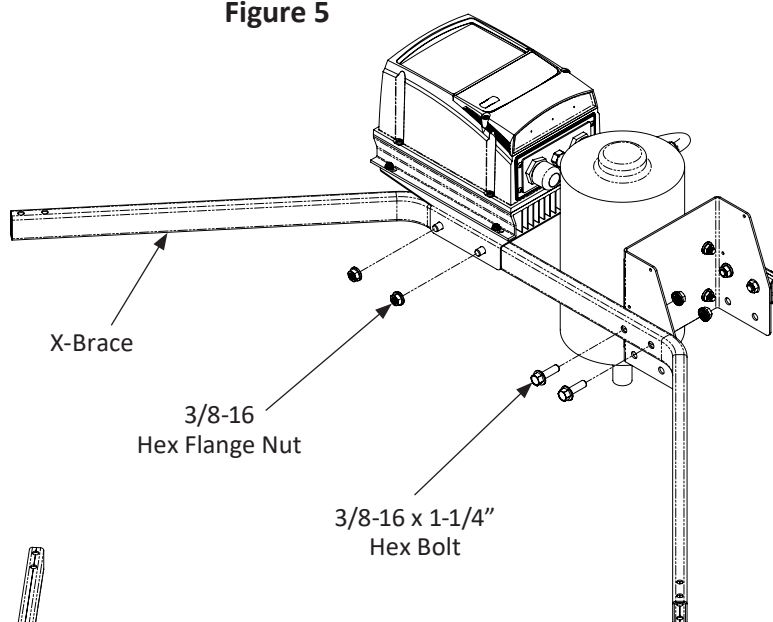
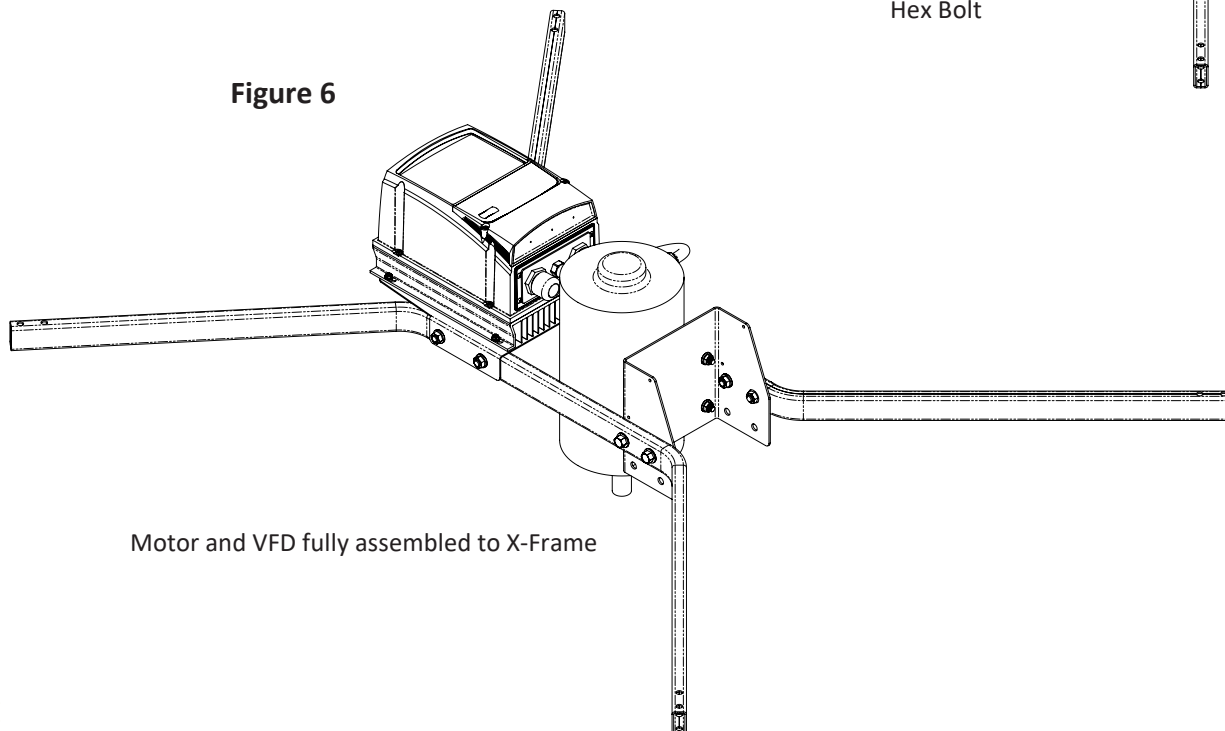


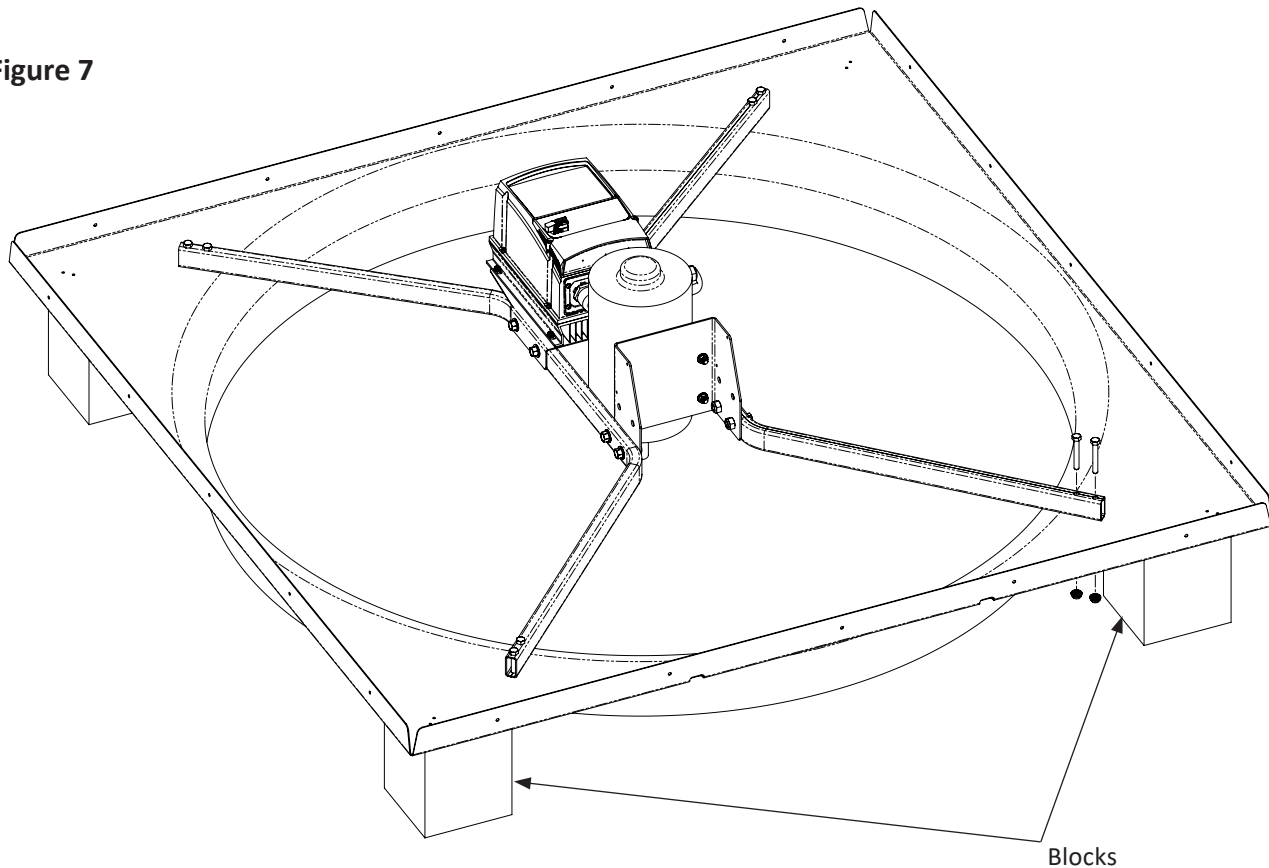
Figure 6



Panel / Housing Assembly - continued

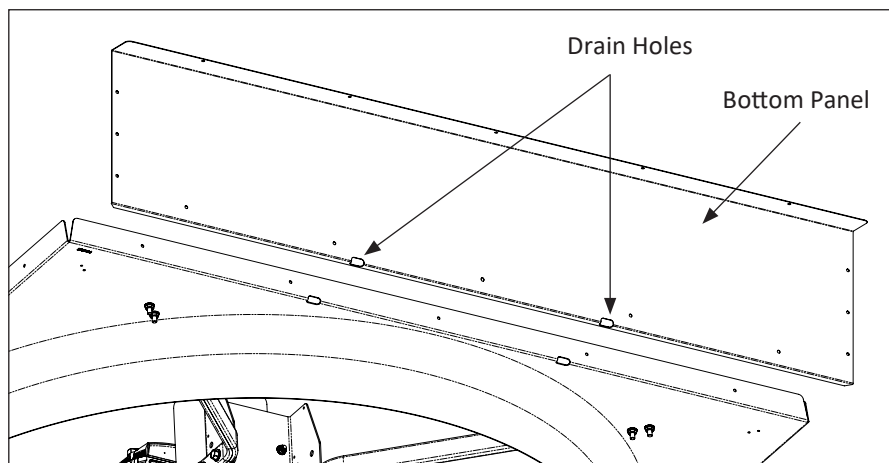
2. Elevate the partially pre-assembled orifice onto blocks, with the housing flanges up, motor shaft down, locating the blocks near the corners of the housing, to support the orifice without allowing the motor shaft to come into contact with the ground, as shown in Figure 7.

Figure 7



3. Assemble the bottom panel first, making sure the outbound drain holes in the orifice are in line with those found in the bottom panel, as shown in Figure 8. Align the holes in the bottom panel with those found in the orifice using an awl or drift pin. Fasten the bottom panel to the orifice using 3/16" rivets (954099).

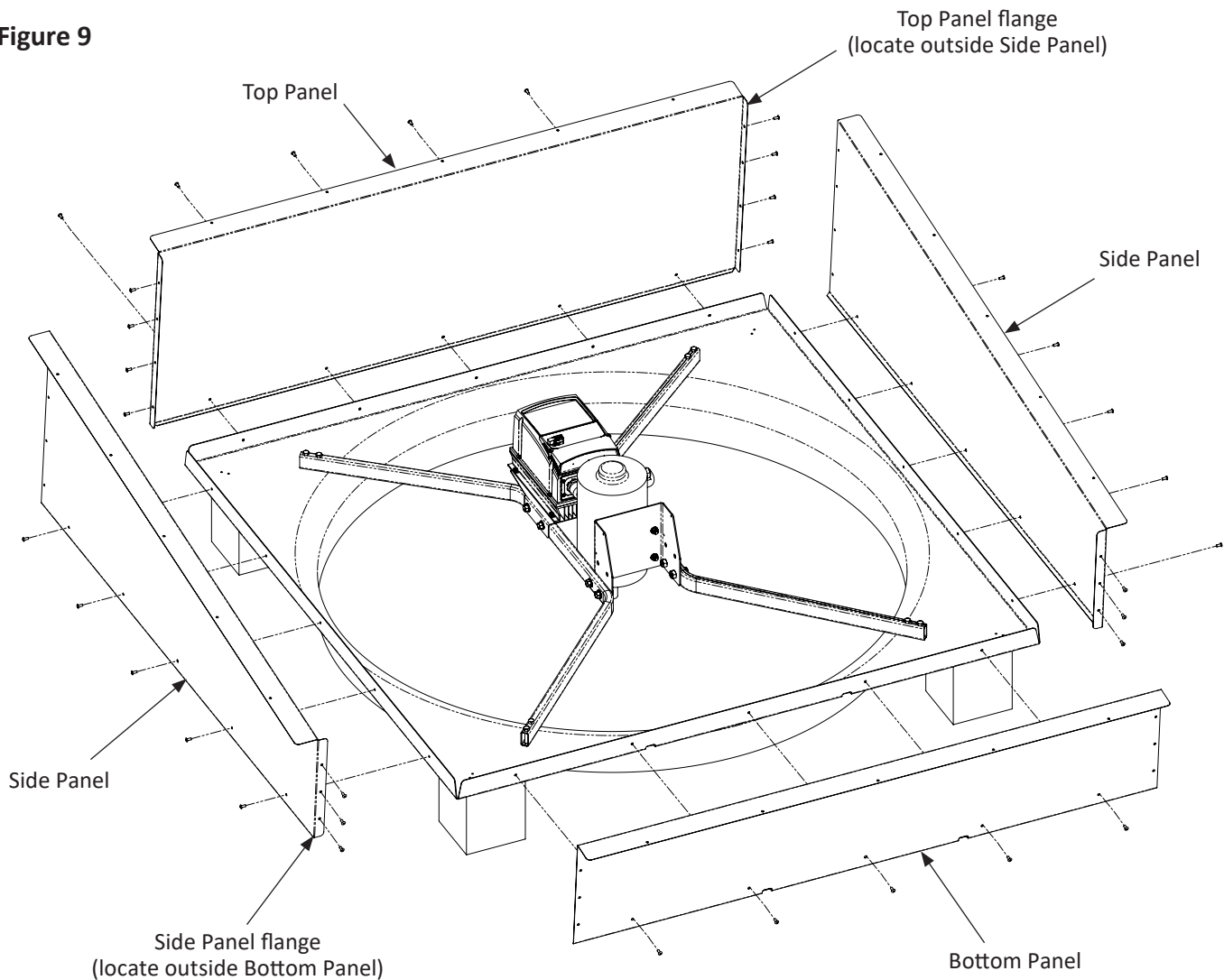
Figure 8



Panel / Housing Assembly - continued

4. Attach the side panels next. Align the holes in the side panels with those found in the orifice using an awl or drift pin. Be sure that the flanges on the side panels are located on the outside of the bottom panel, as shown in Figure 9. Secure using 3/16" rivets on each side of the orifice, and on each bottom flange.
5. Assemble the top panel last. Align the holes in the top panel with those found in the orifice using an awl or drift pin. Make sure the flanges on the top panel are located on the outside of the side panels, as shown in Figure 9. Fasten the top panel to the orifice using 3/16" rivets.
6. To complete the assembly, align the holes on each side flange of the top panel with the side panels using an awl or drift pin. Complete the assembly by fastening with 3/16" rivets per side, as shown in Figure 9.

Figure 9

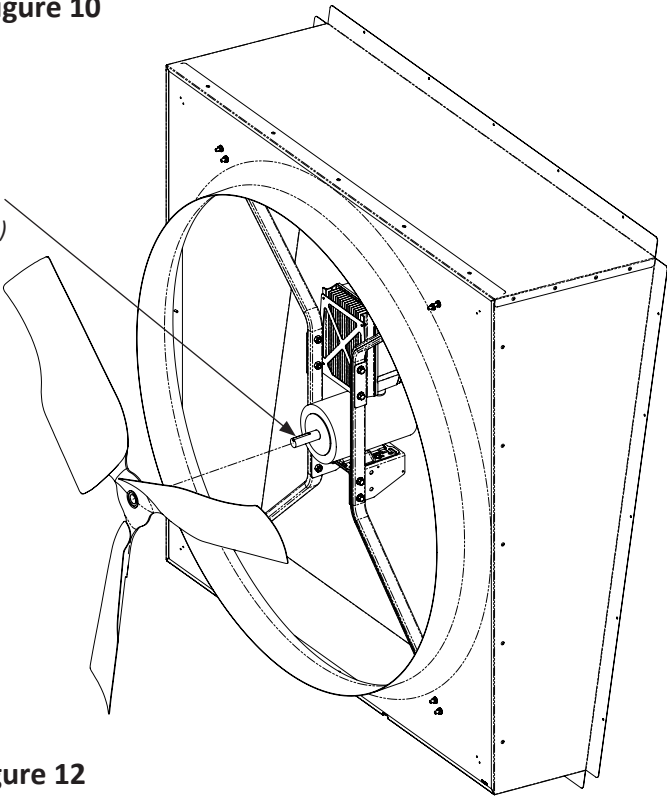


Blade Assembly

1. Rotate fan housing to upright position and slide fan blade onto motor shaft, as shown in Figure 10. Attach fan blade to motor shaft according to the dimensions and torque specifications shown in the table below, and Figures 11 and 12.

NOTE: Do not let the fan blade rest on the ground under the full weight of the pre-assembled orifice, as it can bend and distort the blade, voiding the warranty.

Figure 10

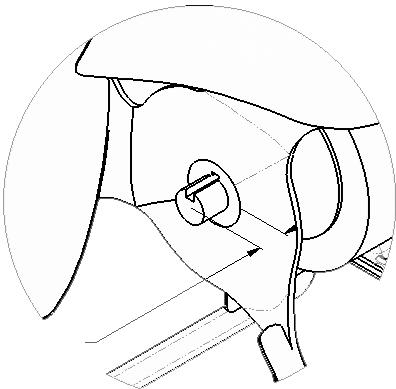


Slide Fan Blade onto Motor Shaft.
(Long end of shaft towards nose of orifice.)

V-Fans			
Size	Housing	Blade Material	Blade Position
36"	Galvanized	Galvanized	5/8" (16mm) back on shaft
36"	Fiberglass	Cast Aluminum	Flush*
36"	Fiberglass	Galvanized	Flush
48"	Fiberglass	Stainless Steel	1/4" (6mm) out past end
54"	Galvanized	Galvanized	1/4" (6mm) back on shaft
54"	Fiberglass	Cast Aluminum	1/4" (6mm) back on shaft
54"	Fiberglass	Galvanized	7/8" (22mm) back on shaft

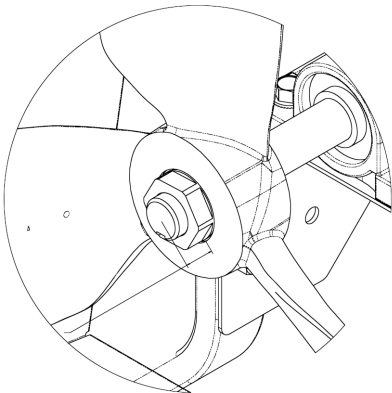
*Face of fan blade hub to be even with small flats on tran torque, end of motor shaft to be even with inner lip of tran torque.

Figure 11



Galvanized Fan Blade

Figure 12



Cast Aluminum Fan Blade

2. **Galvanized Fan Blades:** Once the blade has been positioned properly using a 1/4" x 1/4" x 1-3/4" key (936032), tighten the set screw to approximately 80-85 in lbs (9 Nm). Be sure the blade is centered in the orifice all around. Adjust if necessary.

Cast Aluminum Fan Blades: Secure the blade onto the shaft using 1" I.D. X 1-3/4" O.D. Tran Torque (ZFB302) or 5/8" X 1-3/4" O.D. Tran Torque (ZFB306), depending on shaft size. Once the blade has been positioned properly, tighten the Tran Torque to approximately 125 ft lbs (169 Nm). Be sure the blade is centered in the orifice all around. Adjust if necessary.

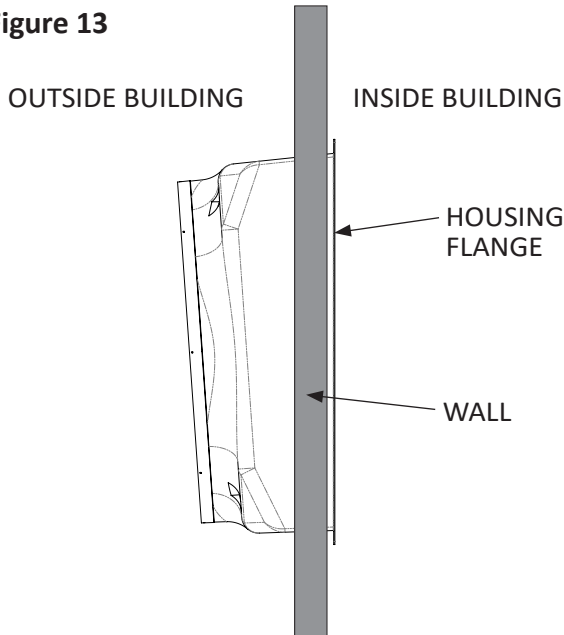


NOTE: Blades and fan shaft *MUST BE CENTERED* in orifice.

Installing the Fan into the Wall Opening - Internal Mount

1. Install the assembled fan into the wall opening (the wall opening must be square, plumb & flat), taking care to ensure the housing slopes downward as shown in Figure 13.

Figure 13



NOTICE

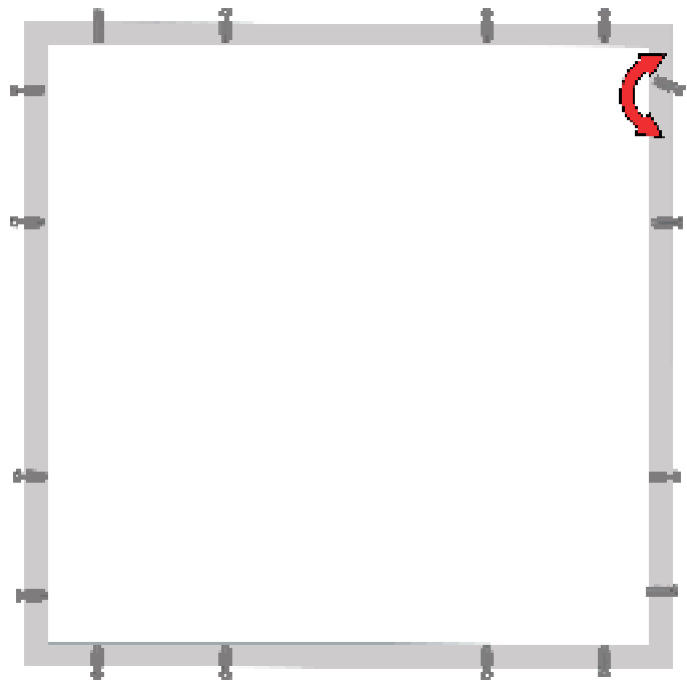
IMPORTANT!

1. **FAN MUST BE INSTALLED WITH DOWNWARD SLOPE.**
2. **It is of the utmost importance to have the opening in the wall square, plumb, and flat (to within 1/8"). These conditions must be verified prior to installing.**

2. Use the appropriate shutter clips and screws at each pre-drilled hole on housing flange, for the material type of your structure, to fasten the fan to the wall.

Number of shutter clips required	
36" Fiberglass Fan	12
36" Sheet Metal Fan	12
50" Fiberglass Fan	12
54" Sheet Metal Fan	16
54" Sheet Metal Fan	16

3. Screw the shutter clips through the predrilled shutter clip holes in the fan housing flanges.
4. Manually rotate the fan blade to check for centering. Adjust if necessary.



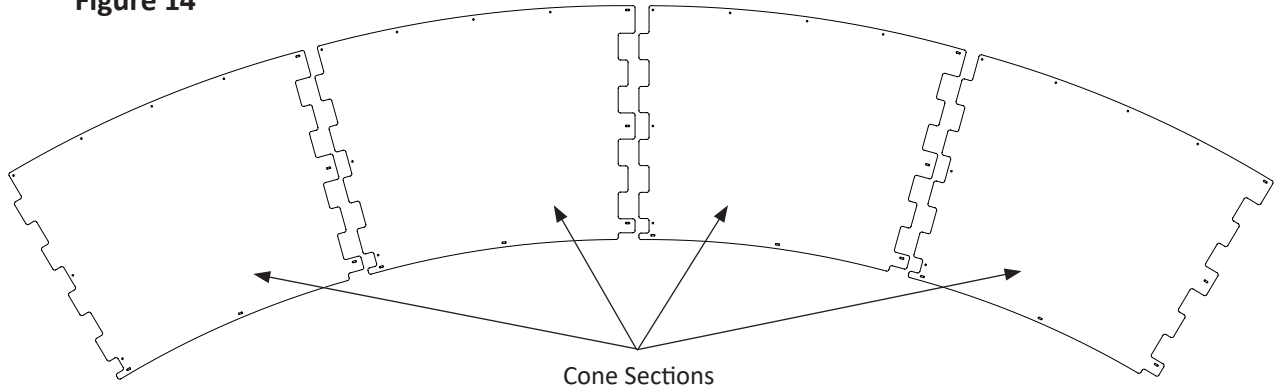
Discharge Cone Assembly - 936174, 950174, and 54" Long Poly Cones



The assembled fan must be installed in the wall prior to mounting the cone to the fan.

1. The cone is flexible and easy to install. Place cone sections on the ground with tabs positioned as shown in Figure 14.

Figure 14



Note: 950174 only has 3 panel sections.

2. Assemble all 4 cone sections loosely using (1) 1/4-20 x 1" hex bolt, (2) 1" OD flat washers, and (1) 1/4-20 nylock nut at each joint. Do not tighten hardware. Note that the innermost and outermost slots do not get any hardware at this point. When assembled properly all tab ends should be on the outside of the cone. See Figures 14 and 15, and detail views in Figures 16 and 17 on the next page.

Figure 15

Leave last hole (furthest from housing) open; to be used to install guard screen.

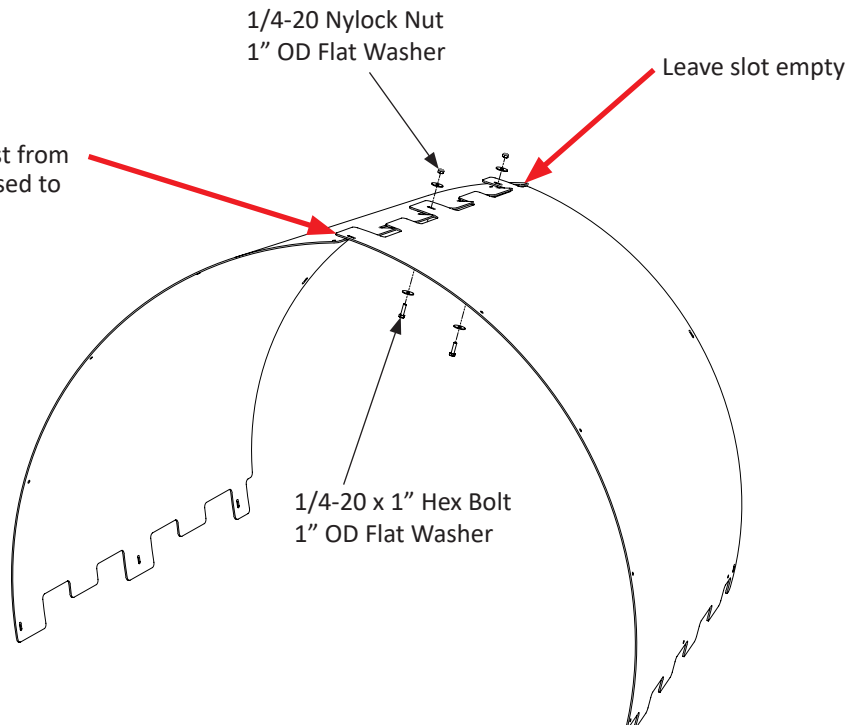


Figure 16

Leave last hole (furthest from housing) open; to be used to install guard screen.

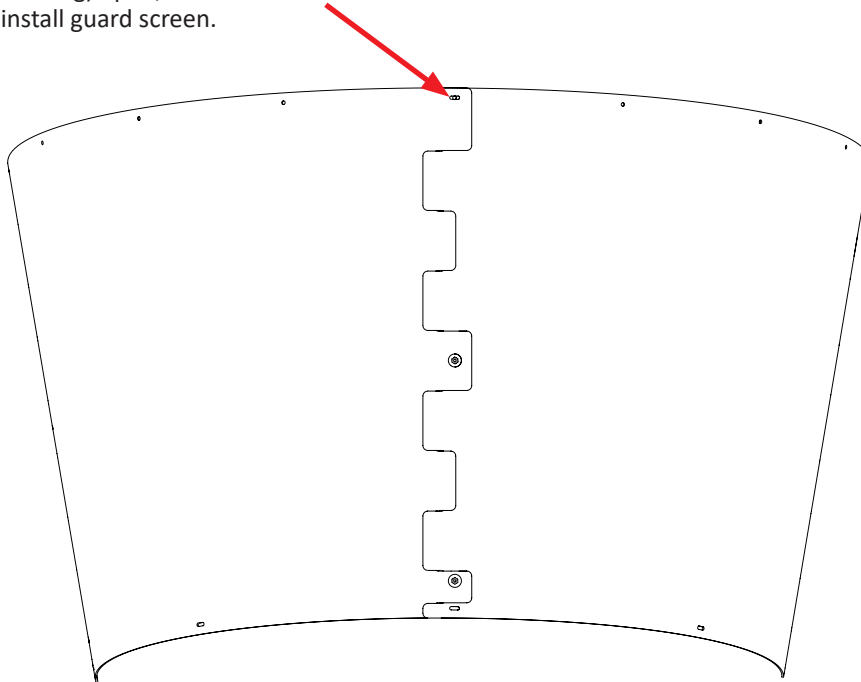


Figure 17

Leave slot empty (this will be used to mount cone on fan).

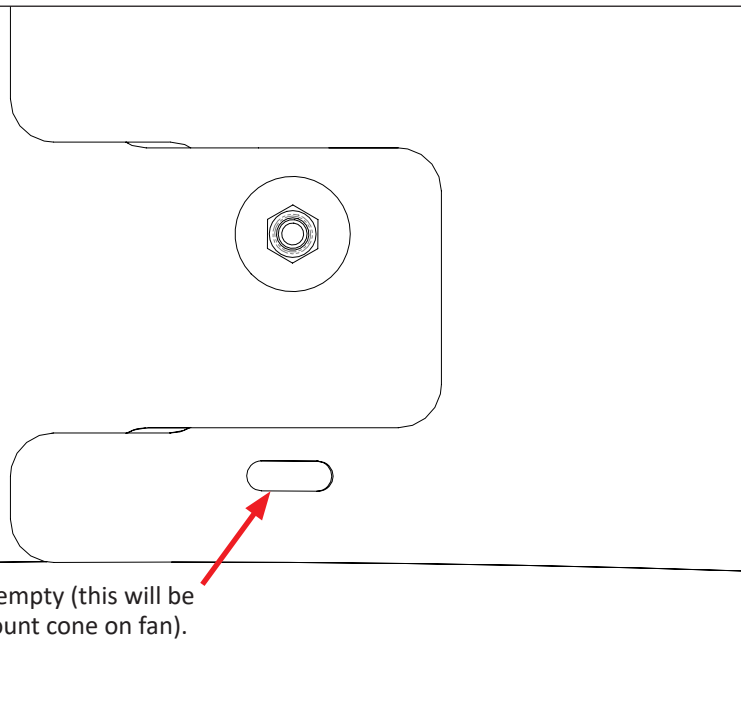
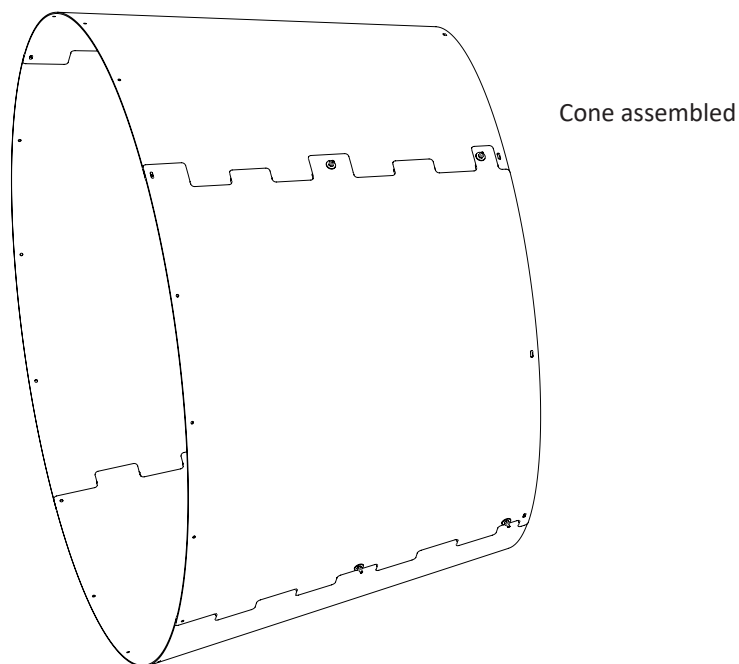
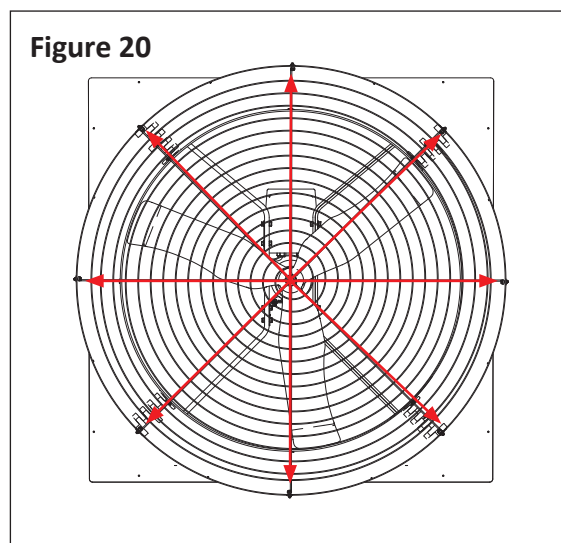
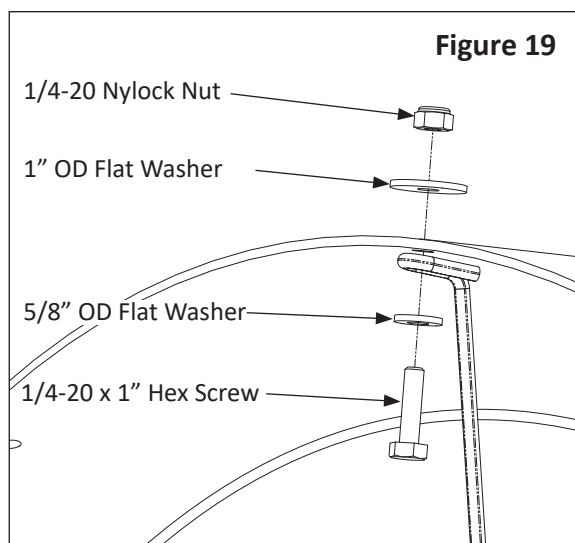


Figure 18



3. Align the bolt loops on the guard screen with the outermost bolt holes in the cone and fasten the guard screen inside the cone using (8) 1/4-20 x 1" hex screws, (8) 5/8" OD flat washers, (8) 1" OD flat washers, and (8) 1/4-20 nylock nuts, with the bolt heads and small washers inside against the guard screen and the large washers and nuts on the outside of the cone assembly. Ensure that the bolt loops on the guard screen are all the way onto the bolts prior to tightening the bolts fully, approximately 80 – 85 in. lbs. (Approx. 9.0 Nm). Detail shown in Figure 19 and hardware locations shown in Figure 20.

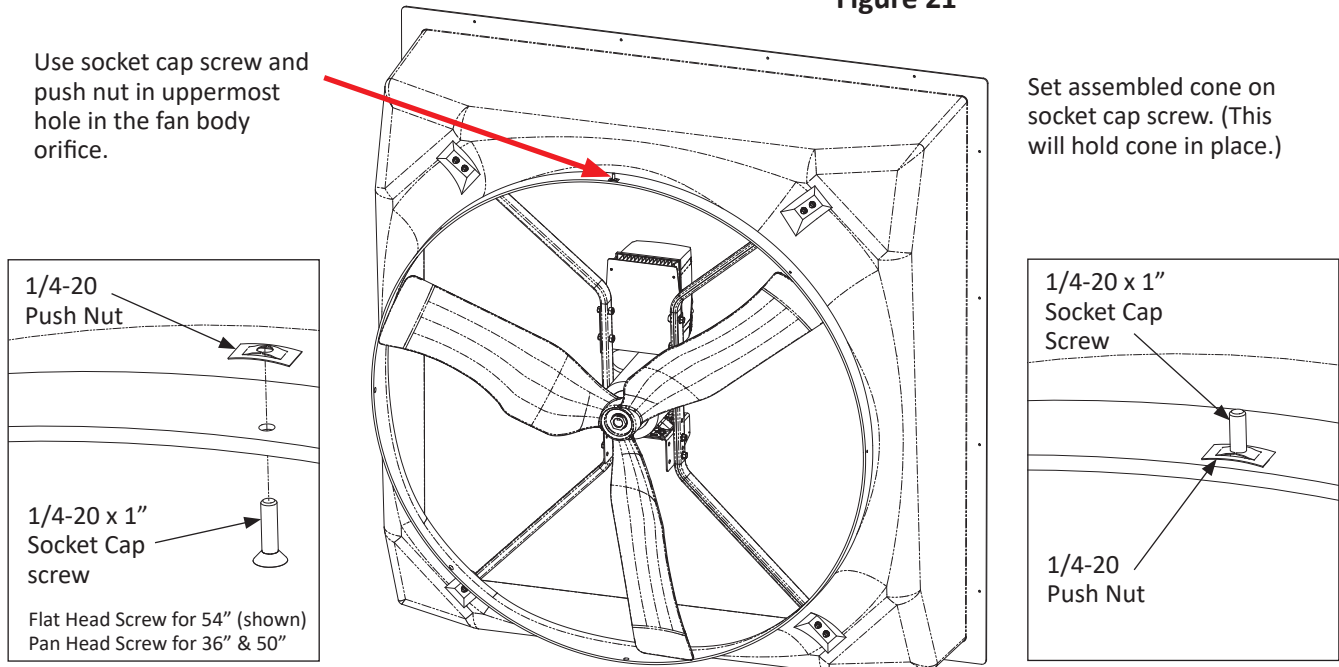
Note: 936174 & 950174 only have (6) bolt loops.



Discharge Cone Assembly - 936174, 950174, and 54" Long Poly Cones - continued

4. Assemble a 1/4-20 x 1" socket cap screw (flat head for 54" - pan head for 36" & 50") and a 1/4-20 push nut in the uppermost hole in the fan body orifice. This screw is used to hold the cone in place when attaching the rest of the hardware. See Figure 21.

Figure 21



5. Position the cone on the 1/4-20 x 1" socket cap screw and hold loosely in place with a 1" OD washer and 1/4-20 nylock nut. Work the rest of the cone around the outside of the fan body orifice. Note the position of the cone joints in relation to the fan body. Joints should be at positions 1:30, 4:30, 7:30, and 10:30 for 36" & 54" fans. See Figures 22 and 23 below.

Figure 22

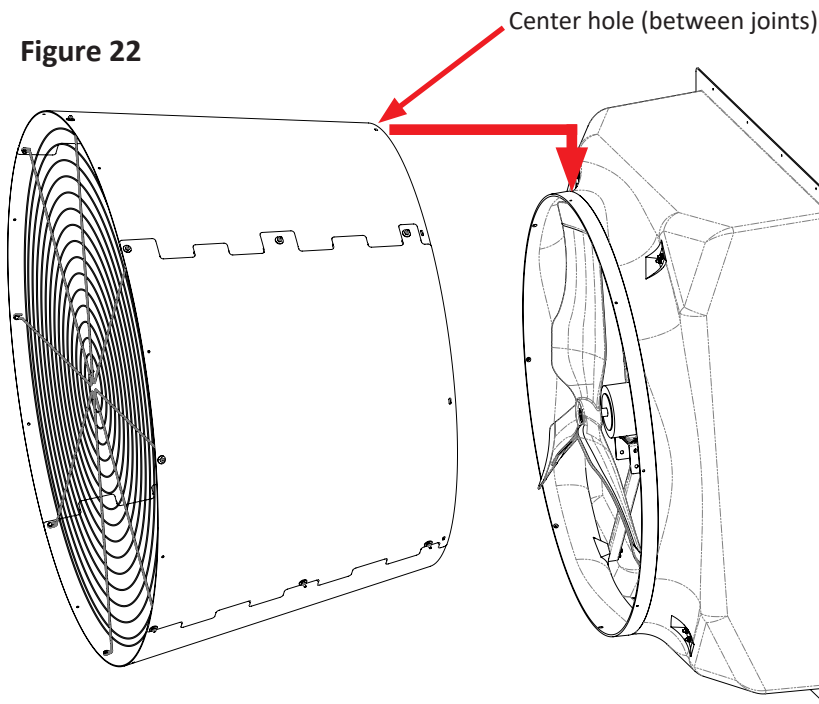
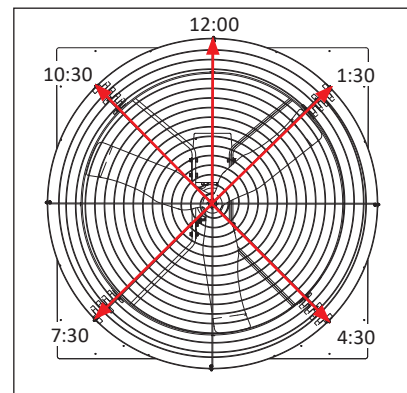
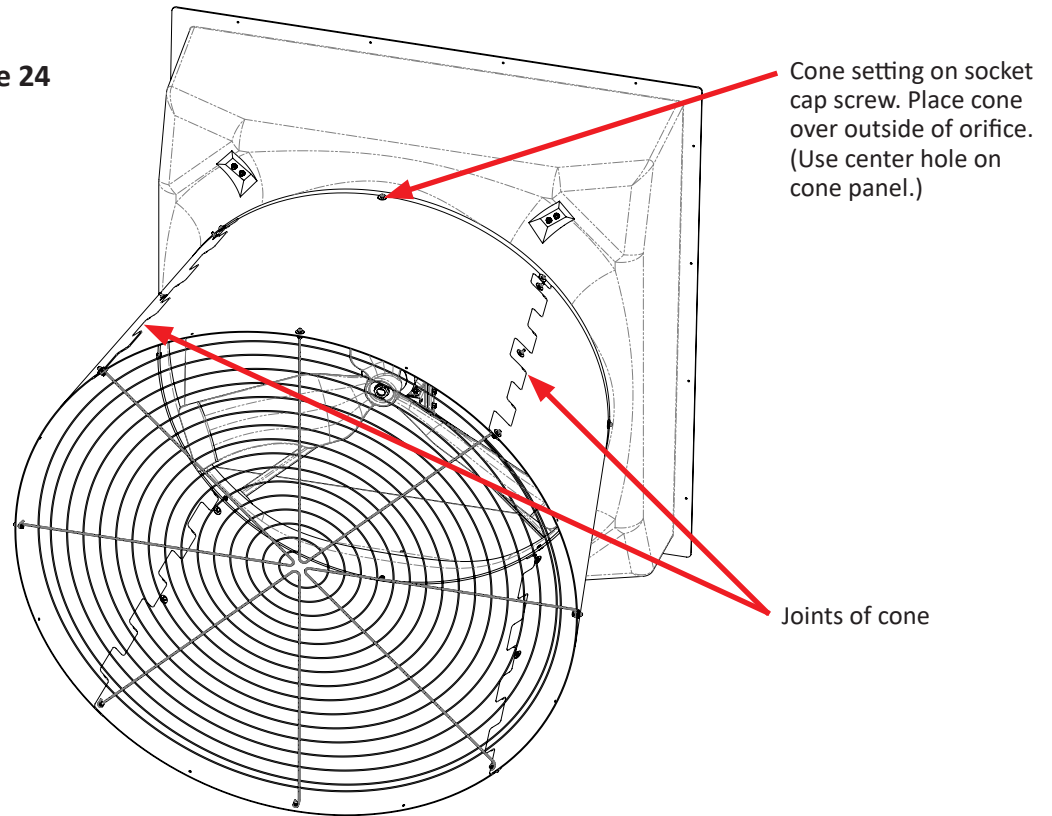


Figure 23



Discharge Cone Assembly - 936174, 950174, and 54" Long Poly Cones - continued

Figure 24



6. Finish attaching the cone to the fan body orifice with (7) more 1/4-20 x 1" socket cap screws, (8) 1" OD flat washers, and (8) 1/4-20 nylock nuts to complete the attachment to the orifice, as shown in Figure 25. Do not tighten hardware. Position a ratchet strap around the cone and orifice at the location indicated and draw the cone tight to the orifice with the strap as shown in Figure 26. Tighten all cone hardware.

Figure 25

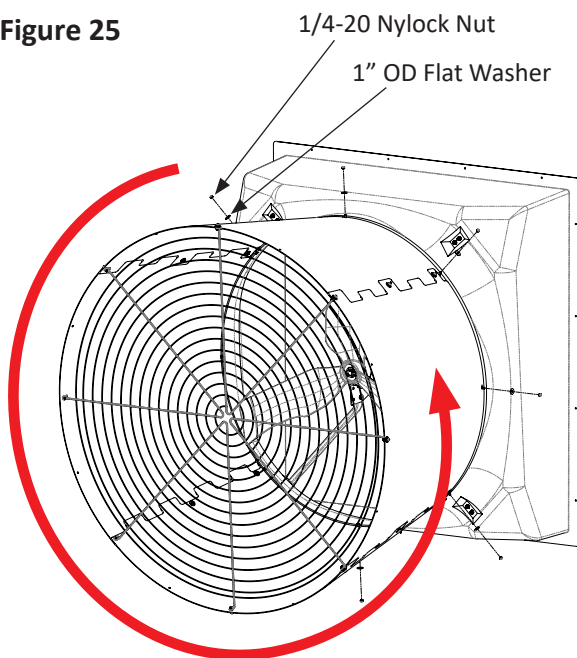
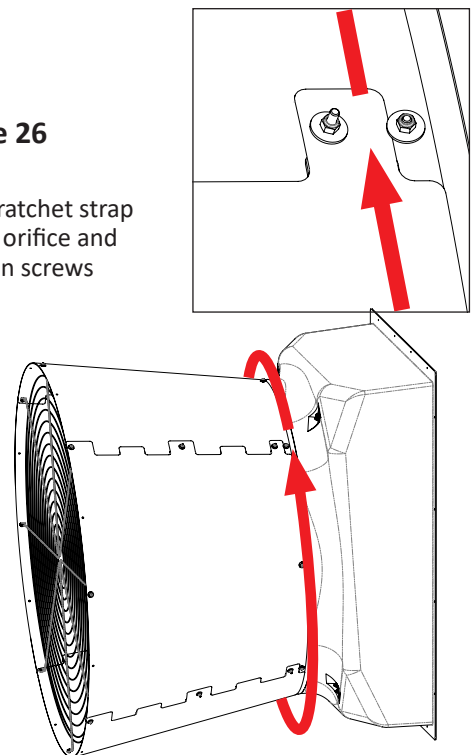


Figure 26

Locate ratchet strap around orifice and between screws



Discharge Cone Assembly - 54" Poly Short Cone, 50" 1-Piece Poly & 36" 2-Piece Poly Cones



54" Poly short cone may be installed on fan orifice before installing fan through rough opening.

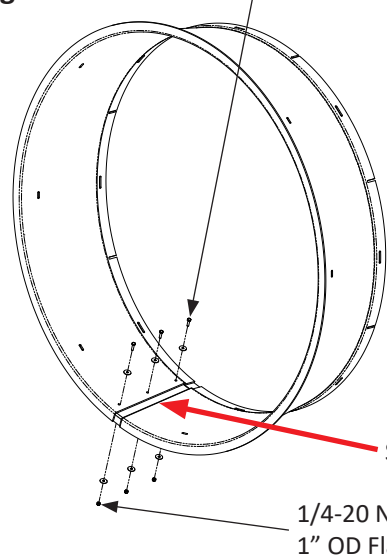
1. Fold up flat, short 54" 1-piece cone panel until ends meet and install hardware in slots to secure, as shown in Figure 27. Do not tighten hardware. 36" Poly Cones (PC36LB, PC36LW) have 2 sections, as shown in Figure 28.

Note: 36" Poly Cones (PC36LB, PC36LW) do not use the same locating hardware for assembly to the orifice. Skip ahead to Step 3.

Note: 50" 1-Piece Poly Cones (PC50SB, PC50SW), shown in Figure 29, do not require pre-assembly or use the same locating hardware for assembly to the orifice. Skip ahead to Step 3.

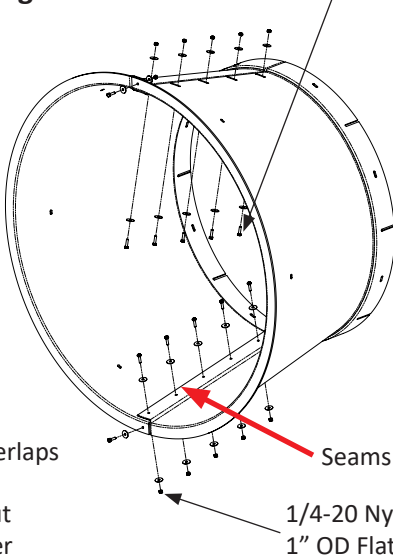
54" Poly Short Cone

Figure 27
1/4-20 x 1" Hex Bolt
1" OD Flat Washer



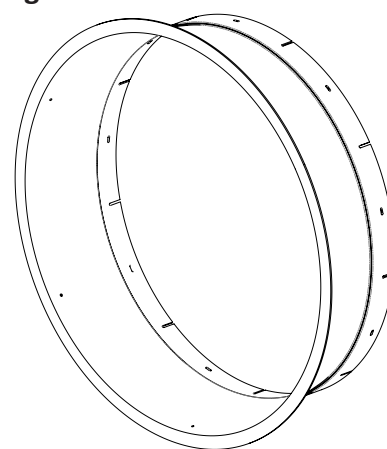
36" 2-Piece Poly Cone

Figure 28
1/4-20 x 1" Hex Bolt
1" OD Flat Washer



50" 1-Piece Poly Cone

Figure 29

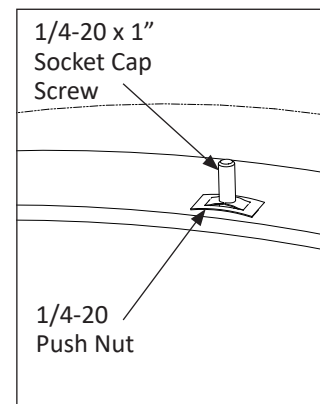
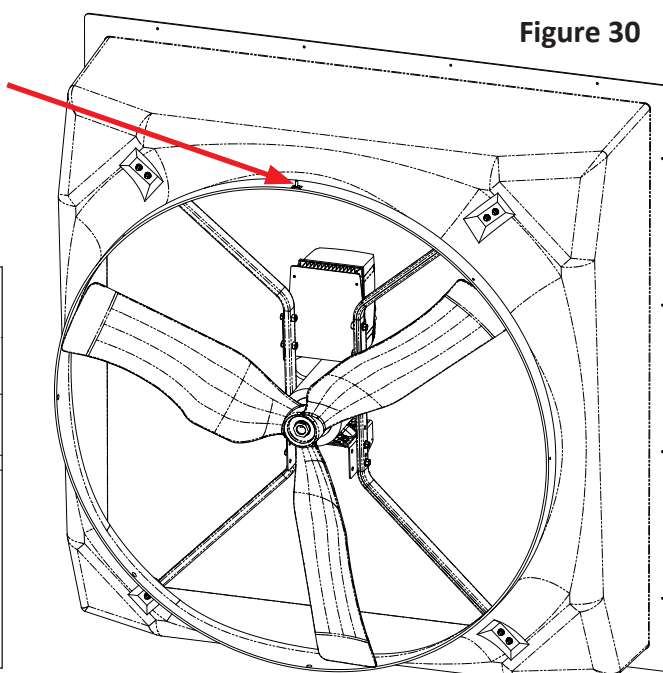
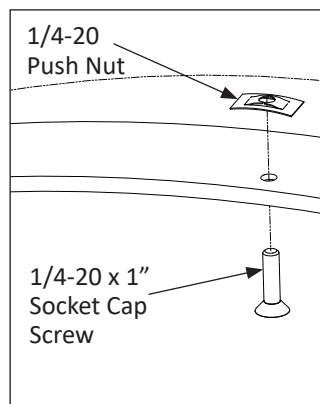


2. Assemble a 1/4-20 x 1" socket cap screw and a 1/4-20 push nut in the uppermost hole in the fan body orifice. This screw is used to hold the cone in place when attaching the rest of the hardware. See Figure 30.

Figure 30

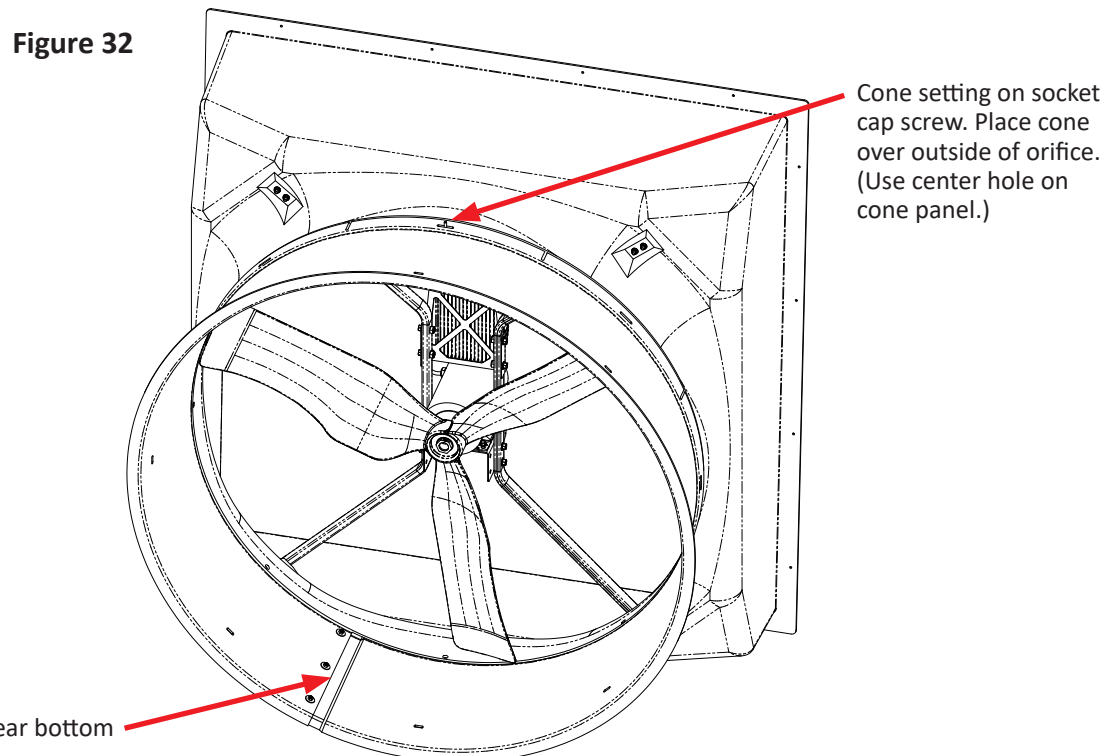
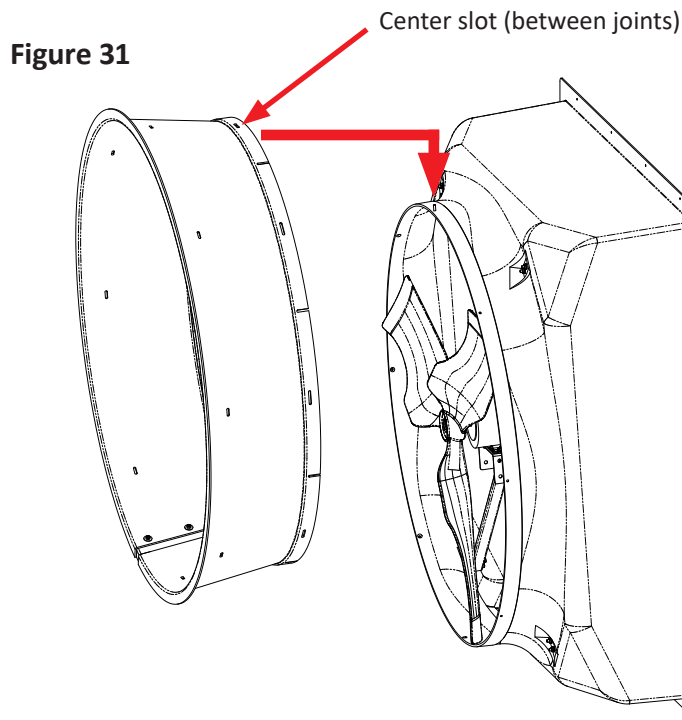
Use socket cap screw and push nut in uppermost hole in the fan body orifice.

Set assembled cone on socket cap screw. (This will hold cone in place.)



Discharge Cone Assembly - 54" Poly short, 50" 1-Piece Poly & 36" 2-Piece Poly - continued

3. Hang assembled cone on fan housing with seam toward bottom. Position the cone on the 1/4-20 x 1" socket cap screw and hold loosely in place with a 1" OD washer and 1/4-20 nylock nut, as shown in Figure 31. Work the rest of the cone around the outside of the fan body orifice. Note the position of the 54" cone seam in relation to the fan body. The 54" cone seam should be located toward the bottom, as shown in Figure 32.



Discharge Cone Assembly - 54" Poly short, 50" 1-Piece Poly & 36" 2-Piece Poly - continued

4. Finish attaching the cone to the fan body orifice with (7) more 1/4-20 x 1" socket cap screws, (8) 1" OD flat washers, and (8) 1/4-20 nylock nuts to complete the attachment to the orifice, as shown in Figure 33. Tighten all cone hardware.

Note: Note: 50" fiberglass fans require 9 mounting bolts.

Figure 33

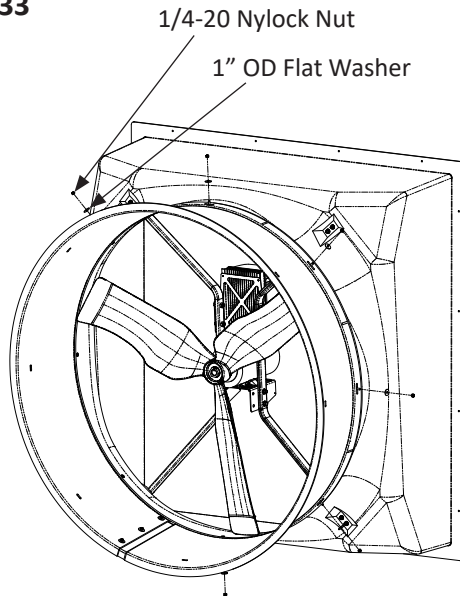
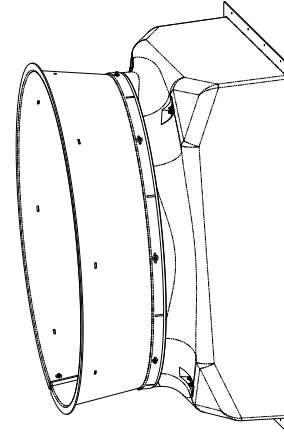


Figure 34

Cone assembled to fan orifice.



5. Align the bolt loops on the guard screen with the outermost bolt holes in the cone and fasten the guard screen inside the cone using (8) 1/4-20 x 1" hex screws, (8) 5/8" OD flat washers, (8) 1" OD flat washers, and (8) 1/4-20 nylock nuts, with the bolt heads and small washers inside against the guard screen and the large washers and nuts on the outside of the cone assembly. Ensure that the bolt loops on the guard screen are all the way onto the bolts prior to tightening the bolts fully, approximately 80 – 85 in. lbs. (Approx. 9.0 Nm). Detail shown in Figure 35 and hardware locations shown in Figure 36.

Note: 50" 1-Piece Poly Cones (PC50SB, PC50SW) & 36" 2-Piece Poly Cones (PC36LB, PC36LW) each only have (6) bolt loops.

Figure 35

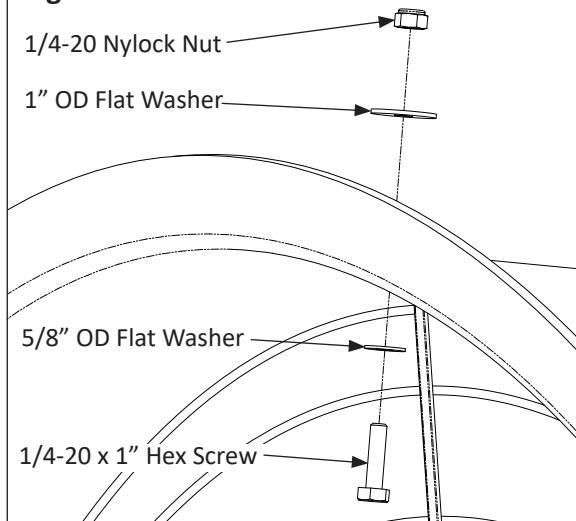
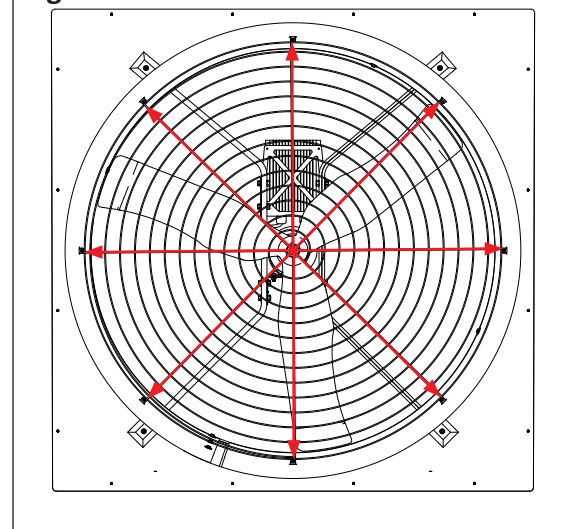


Figure 36



Discharge Cone Assembly - 36" and 54" Galvanized and Z-Fan V-Fans

1. Assemble the four cone sections together using the 1/4-20 x 1/2" hex bolts (010615) and 1/4" hex flange nuts (012792) into the flange ends of each cone section. For 40" long cone panels, position flange as shown in Figure 37. Do not install bolts in outermost holes for the 40" cone panel. Do not tighten hardware.

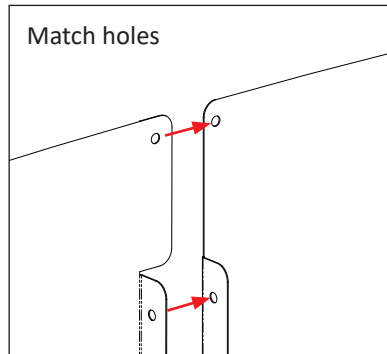
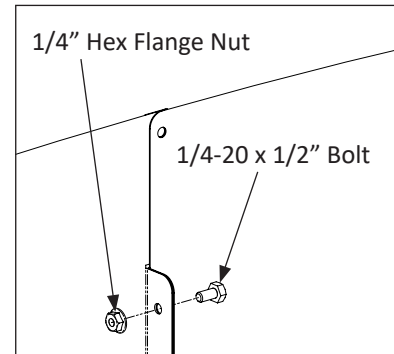


Figure 37



NOTE: Flange is on inside of other cone panel.

2. Insert the cone support straps and bolts to the second set of holes from the narrow end of the cone, as shown in Figures 38 and 39.

Figure 38

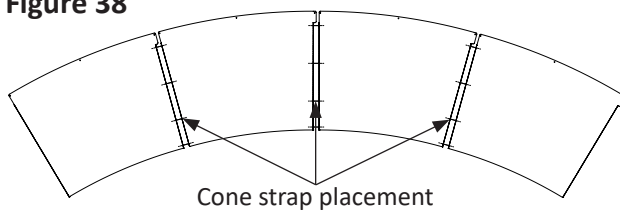
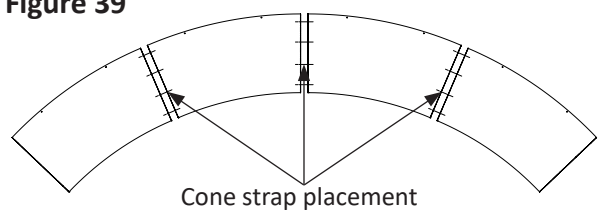


Figure 39



3. Form the cone sections into a cone by joining the ends and using 1/4-20 x 1/2" hex bolts (010615) and 1/4" hex flange nuts (012792) to bolt the two flanges together. As stated in Step 1, install the bolt into the second set of holes from the narrow end of the cone and attach a cone support strap to the outside of the cone panels for support, as detailed in Figures 40 and 41.

Figure 40

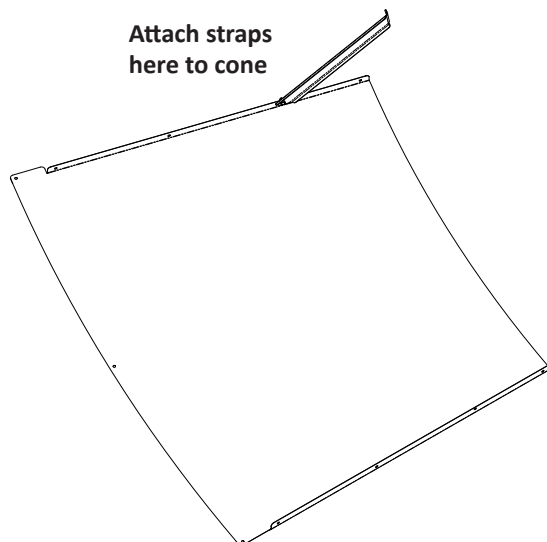
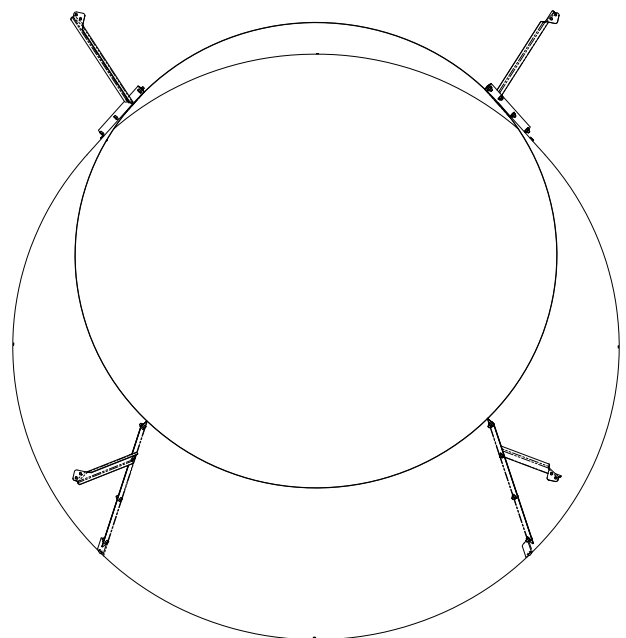


Figure 41

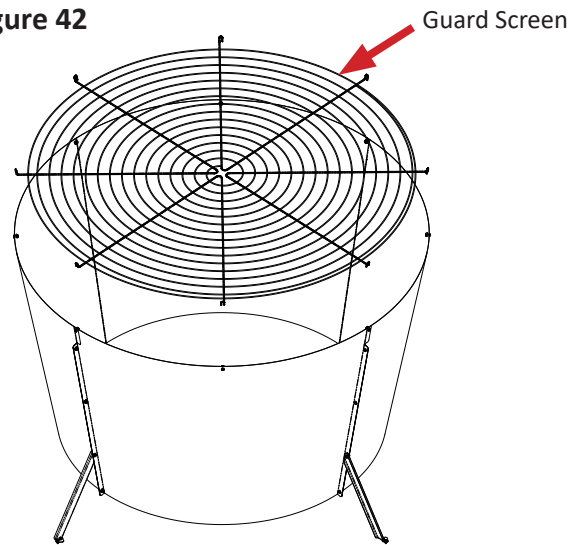
Cone sections joined showing strap placement



Discharge Cone Assembly - 36" and 54" Galvanized and Z-Fan V-Fans - continued

1. With the formed cone on a flat surface (large diameter up), place the guard screen into the cone with bolt loops up, as shown in Figure 42.
2. Align the bolt loops on the guard screen with the bolt holes in the cone and fasten the guard screen inside the cone using 1/4-20 x 1/2" hex bolts (010615) and hex nuts (012792), with the nuts inside against the guard screen and the bolt heads on the outside of the cone assembly. Ensure that the bolt loops on the guard screen are all the way onto the bolts prior to tightening the bolts fully, approximately 80 – 85 in. lbs. (Approx. 9.0 Nm).

Figure 42



Cone to Fan Assembly (attaching the cone)



The assembled fan must be installed in the wall prior to mounting the cone to the fan.

It is recommended to fasten the top two straps first.

1. Slide the narrow end of the cone onto the fan orifice starting at the top of the orifice. Rotate the cone to align the holes on the cone support straps to the holes on the face of the fan orifice. Fasten the cone support straps to the orifice using two #10 x 1/2" hex head sheet metal screws (936053) per strap, as shown in Figure 43 and 44. Tighten all loose hardware.

Figure 43

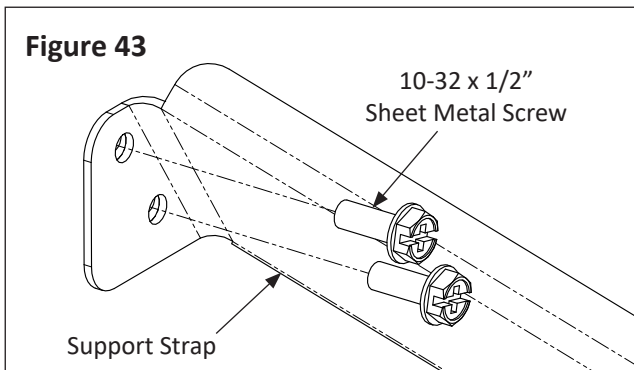
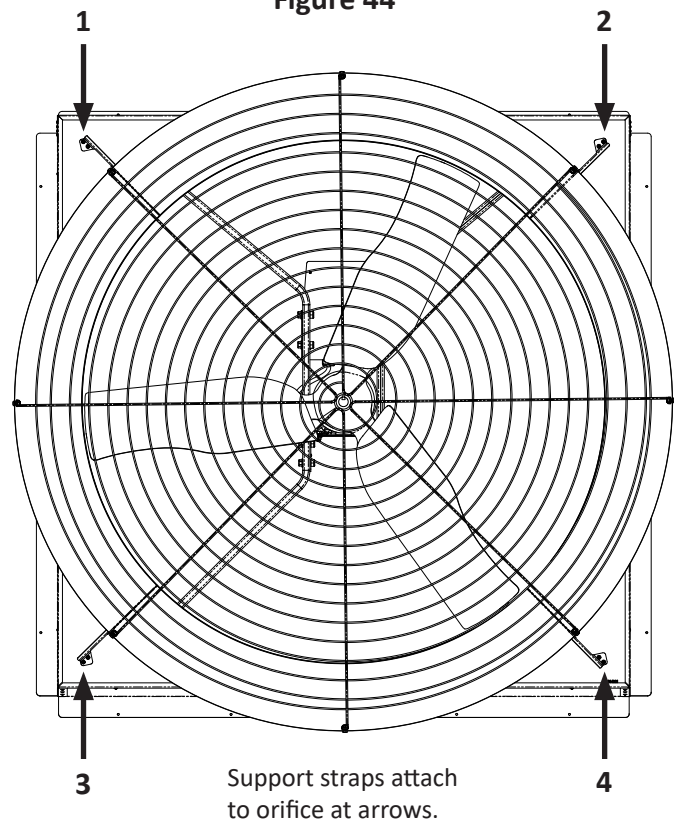


Figure 44



VFD Installation

Drive Safety Considerations

Please read the important safety information below, and all warning and caution information elsewhere.



= WARNING - Indicates a risk of electric shock, which, if not avoided, could result in damage to the equipment and possible injury or death.

This variable speed drive product (Optidrive™) is intended for professional incorporation into complete equipment or systems as part of a fixed installation. If installed incorrectly it may present a safety hazard. The Optidrive uses high voltages and currents, carries a high level of stored electrical energy, and is used to control mechanical parts that may cause injury. Close attention is required to system design and electrical installation to avoid hazards in either normal operation or in the event of equipment malfunction. Only qualified electricians are allowed to install and maintain this product.

System design, installation, commissioning and maintenance must be carried out only by personnel who have the necessary training and experience. They must carefully read this safety information and the instructions in this Guide and follow all information regarding transport, storage, installation and use of the Optidrive, including the specified environmental limitations.

Do not perform any flash test or voltage withstand test on the Optidrive. Any electrical measurements required should be carried out with the Optidrive disconnected.

Electric shock hazard! Disconnect and ISOLATE the Optidrive before attempting any work on it. High voltages are present at the terminals and within the drive for up to 10 minutes after disconnection of the electrical supply. Always ensure by using a suitable multimeter that no voltage is present on any drive power terminals prior to commencing any work.

Where supply to the drive is through a plug and socket connector, do not disconnect until 10 minutes have elapsed after turning off the supply.

Ensure correct earthing connections. The earth cable must be sufficient to carry the maximum supply fault current which normally will be limited by the fuses or MCB. Suitably rated fuses or MCB should be fitted in the mains supply to the drive, according to any local legislation or codes.

Ensure correct earthing connections and cable selection as per defined by local legislation or codes. The drive may have a leakage current of greater than 3.5mA; furthermore the earth cable must be sufficient to carry the maximum supply fault current which normally will be limited by the fuses or MCB. Suitably rated fuses or MCB should be fitted in the mains supply to the drive, according to any local legislation or codes.

Do not carry out any work on the drive control cables whilst power is applied to the drive or to the external control circuits.

Drive Safety Considerations - continued



= WARNING - Indicates a potentially hazardous situation other than electrical, which if not avoided, could result in damage to property.

Within the European Union, all machinery in which this product is used must comply with Directive 2006/42/EC, Safety of Machinery. In particular, the machine manufacturer is responsible for providing a main switch and ensuring the electrical equipment complies with EN60204-1.

The level of integrity offered by the Optidrive control input functions – for example stop/start, forward/reverse and maximum speed is not sufficient for use in safety-critical applications without independent channels of protection. All applications where malfunction could cause injury or loss of life must be subject to a risk assessment and further protection provided where needed.

The driven motor can start at power up if the enable input signal is present.

The STOP function does not remove potentially lethal high voltages. ISOLATE the drive and wait 10 minutes before starting any work on it. Never carry out any work on the Drive, Motor or Motor cable whilst the input power is still applied.

The Optidrive can be programmed to operate the driven motor at speeds above or below the speed achieved when connecting the motor directly to the mains supply. Obtain confirmation from the manufacturers of the motor and the driven machine about suitability for operation over the intended speed range prior to machine start up.

Do not activate the automatic fault reset function on any systems whereby this may cause a potentially dangerous situation.

The entry of conductive or flammable foreign bodies should be prevented. Flammable material should not be placed close to the drive.

Relative humidity must be less than 95% (non-condensing). Ensure that the supply voltage, frequency and no. of phases (1 or 3 phase) correspond to the rating of the Optidrive as delivered.

Never connect the mains power supply to the Output terminals U, V, W.

Do not install any type of automatic switchgear between the drive and the motor.

Wherever control cabling is close to power cabling, maintain a minimum separation of 3-15/16" (100 mm) and arrange crossings at 90 degrees. Ensure that all terminals are tightened to the appropriate torque setting.

Do not attempt to carry out any internal repair of the Optidrive.

Mounting the VFD

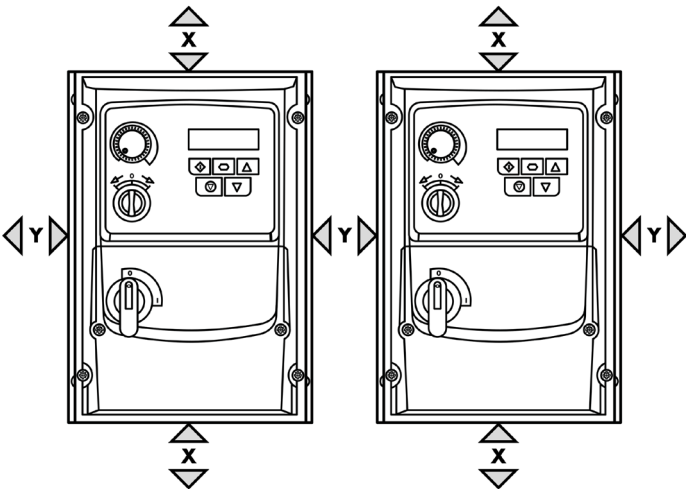
Guidelines for mounting (IP66 Units)

- Before mounting the drive, ensure that the chosen location meets the environmental condition requirements for the drive.
- The drive must be mounted vertically, on a suitable flat surface.
- The minimum mounting clearances shown in Figure 45 and the table below must be observed.
- The mounting site and chosen mountings should be sufficient to support the weight of the drives.
- Using the drive as a template, mark the locations required for drilling.
- The mounting location should be free from vibration.
- Do not mount the drive in any area with excessive humidity, corrosive airborne chemicals or potentially dangerous dust particles.
- Avoid mounting close to high heat sources.
- The drive must not be mounted in direct sunlight. If necessary, install a suitable shade cover.
- Do not restrict the flow of air through the drive heatsink. The drive generates heat which must be naturally allowed to dissipate. Correct air clearance around the drive must be observed.
- If the location is subject to wide ambient temperature and air pressure variation, install a suitable pressure compensation valve in the drive gland plate.

NOTE: If the drive has been in storage for longer than 2 years, the DC link capacitors must be reformed.

Mounting Clearances (Not intended for installation using rigid conduit system.)				
Drive Size	X Above & Below		Y Either Side	
	mm	in	mm	in
1	200	7.87	10	0.39
2	200	7.87	10	0.39
NOTE: Above are guidelines only and the operating ambient temperature of the drive MUST be maintained within the following limits at all times:				
Operational Ambient Temperature Range: 68 ... 104°F (-20 ... 40°C) frost & condensation free				
Maximum Humidity: 95%				
Maximum Altitude: 6,500ft (2000m) : derate above 3,280ft (1000m) : 2.5%/328ft (100m)				

Figure 45

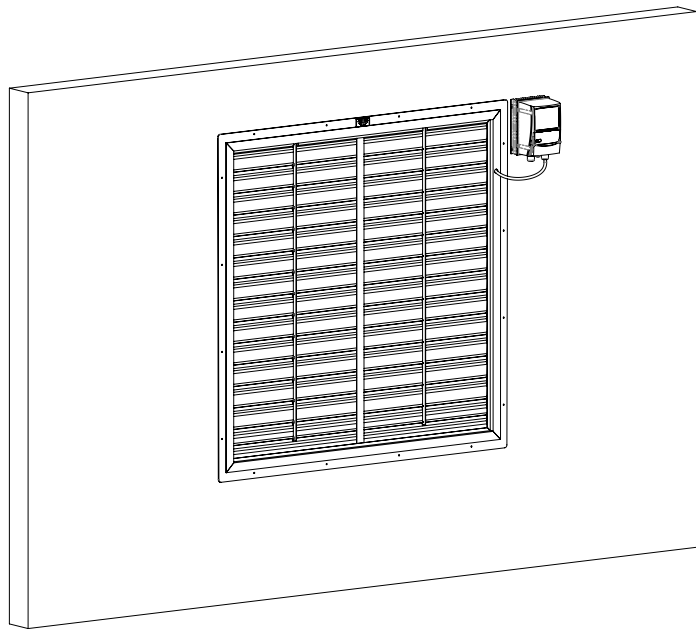


Mounting the VFD - continued

Move VFD out of fan housing to barn interior, as shown in Figures 46 & 47.

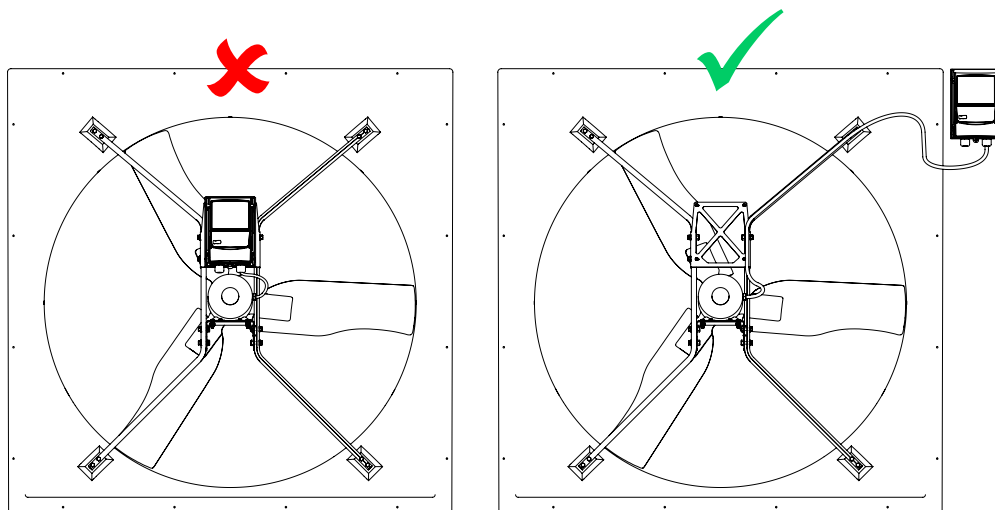
Figure 46

VFD recommended to be within 30m (100ft) of fan.
If located over 100m (330ft), dV/dT filter required to maintain warranty.



NOTE: Notch in shutter is required for cord to pass through, as shown above in Figure 46.

Figure 47



Power Supply Requirements

INPUT POWER SUPPLY REQUIREMENTS				
Supply Voltage	200 – 240 RMS Volts for 230 Volt rated units, 240 Volt RMS Maximum.			
	380 – 480 Volts for 400 Volt rated units, + / - 10% variation allowed, Maximum 500 Volts RMS.			
Imbalance	Maximum 3% voltage variation between phase – phase voltages allowed.			
	All Optidrive E3 units have phase imbalance monitoring. A phase imbalance of > 3% will result in the drive tripping. For input supplies which have supply imbalance greater than 3% (typically the Indian sub-continent & parts of Asia Pacific including China) Invertek Drives recommends the installation of input line reactors.			
Frequency	50 – 60Hz + / - 5% Variation			
Short Circuit Capacity	Voltage Rating	Min kW (HP)	Max kW (HP)	Maximum supply short-circuit current
	230V	0.37 (0.5)	11 (15)	100kA rms (AC)
	400 / 460V	0.75 (1)	22 (30)	100kA rms (AC)
	All the drives in the above table are suitable for use on a circuit capable of delivering not more than the above specified maximum short-circuit Amperes symmetrical with the specified maximum supply voltage when protected by Class J fuses.			

DISCLAIMER: V-Fans ending in -3 or -1 were performance tested and designed to operate with 230V input. Lower input voltages will affect the ability to run at full speed at higher static pressures.

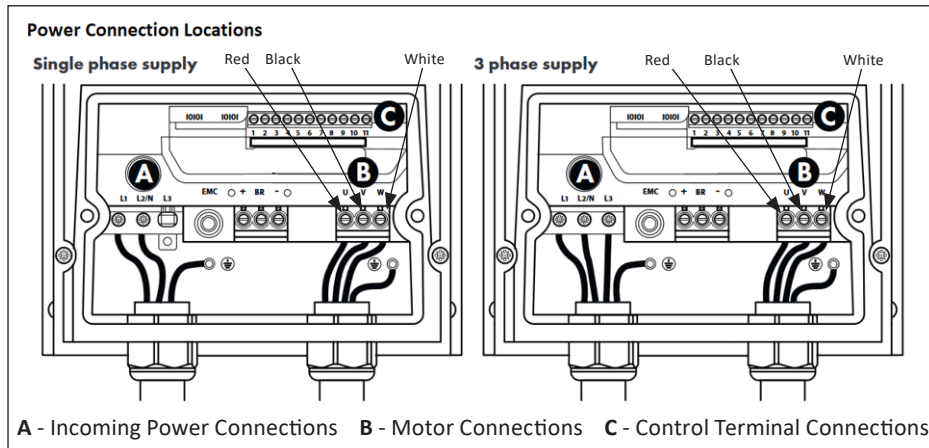
Fuse / Circuit Breaker Selection:

- Suitable fuses to provide wiring protection of the input power cable should be installed in the incoming supply line, as shown in the table below. The fuses must comply with any local codes or regulations in place. In general, type gG (IEC 60269) or UL type J fuses are suitable; however in some cases type aR fuses may be required. The operating time of the fuses must be below 0.5 seconds.
- Where allowed by local regulations, suitably dimensioned type B MCB circuit breakers of equivalent rating may be utilised in place of fuses, providing that the clearing capacity is sufficient for the installation.
- The maximum permissible short circuit current at the Optidrive Power terminals as defined in IEC60439-1 is 100kA.
- The cables should be dimensioned according to any local codes or regulations.

Each V-Fan requires individual branch circuit protection in the form of either a circuit breaker (molded case) or a fused disconnect. The current ratings of these protection devices depend on the model of V-Fan you have purchased. Please reference the table below for guidance on how to size your branch circuit protection. Also, correctly sizing the incoming supply wires to the V-Fan is important. The wire gauge recommendations given in the table are minimum gauge sizes per the National Electric Code, however your local jurisdiction may have differing regulations, and for wire runs greater than 100ft, please consult with a certified electrician for correctly sizing the supply wiring. If a fused disconnect is chosen to protect your V-Fan, use only fuse types gG, J, or aR to maintain UL compliance.

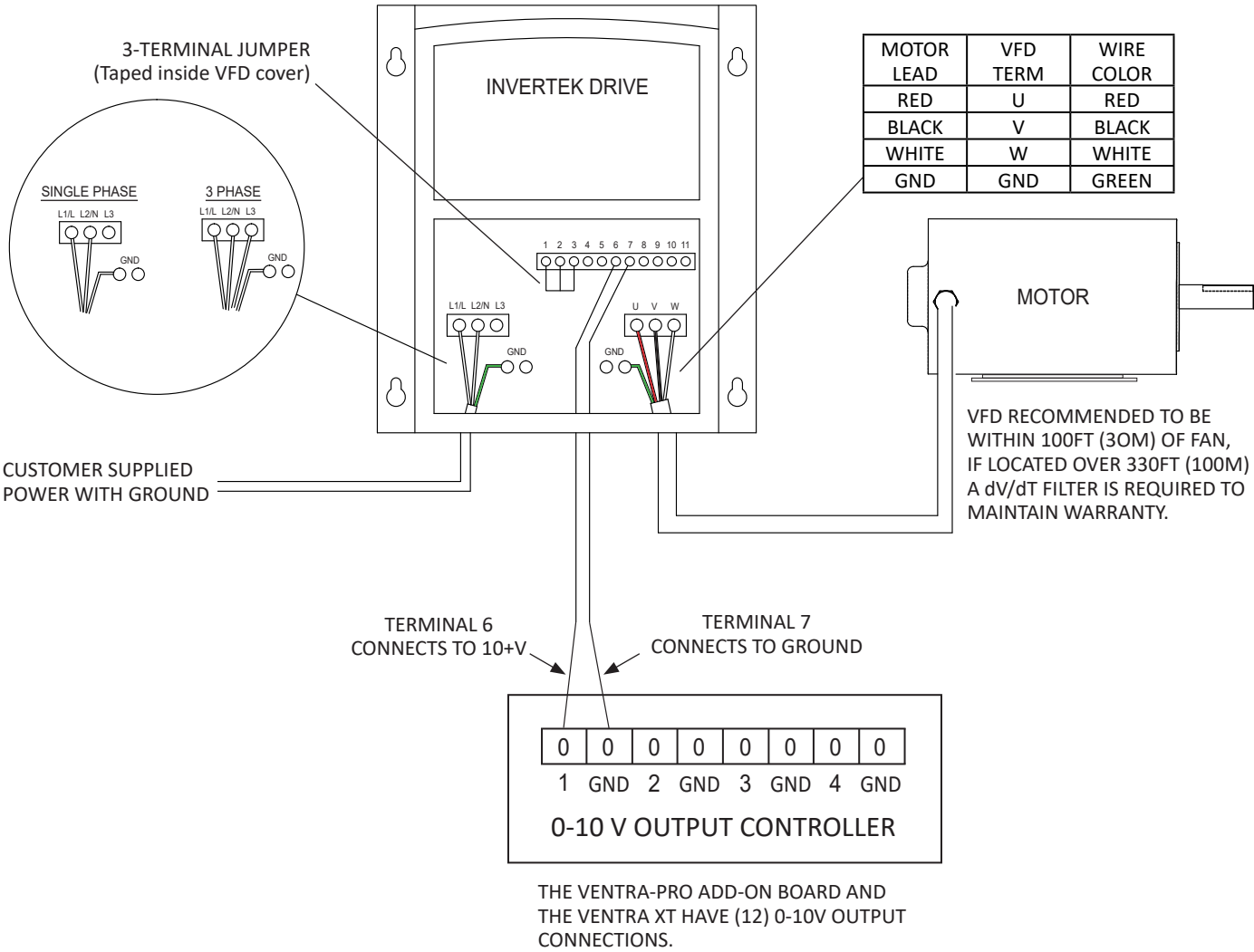
Current Ratings Per V-Fan Part Number				
V-FAN MODEL NUMBERS	DRIVE TYPE (PART NUMBER)	INPUT CURRENT (A)	UL FUSE / CIRCUIT BREAKER RATING (A)	NEC MINIMUM SUPPLY WIRE GAUGE
936XXX-1	921887	7.5	10	8 AWG
936XXX-3	921888	5.6	10	8 AWG
95XXXX-1	921925	12.9	16	8 AWG
95XXXX-3	922136	8.9	16	8 AWG
95XXXX-33	921980	5.6	10	8 AWG
95XXXX-34	921980	5.6	10	8 AWG

Wiring the Drive



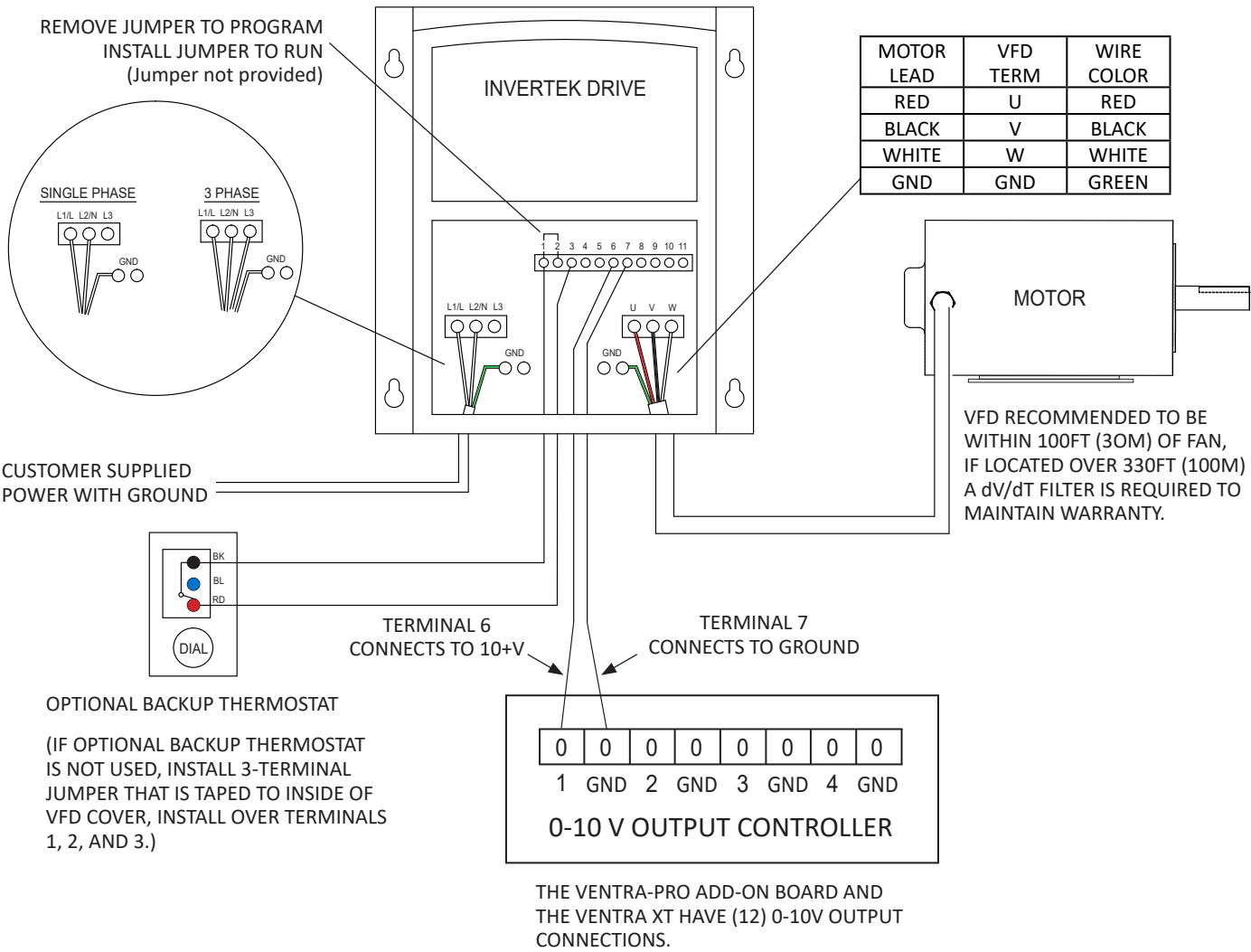
1. Connect the incoming power to L1, L2, L3 and ground for 3 phase (phase sequence is not important) and L1 / L, L2 / N and ground for single phase. Please reference Power Connection Locations Diagram above.
IMPORTANT: Do not exceed 13 inch-pounds (1.5Nm) of torque on the power terminal connections.
Wire gauge not to exceed 8 gauge for power connection terminals.
2. Control Terminal Wiring:
 - All analog signal cables should be suitably shielded. Twisted pair cables are recommended.
 - Power and Control Signal cables should be routed separately where possible, and must not be routed parallel to each other.
 - Signal levels of different voltages e.g. 24 Volt DC and 110 Volt AC, should not be routed in the same cable.
 - Maximum control terminal tightening torque is 0.5Nm.
 - Control Cable entry conductor size: 0.05 – 2.5mm² / 30 – 12 AWG.
3. This drive is programmed to work with a whole house controller that supports VFD fans via an analog output and optionally an additional dry contact output channel (enable). Please reference the Wiring Diagrams on pages 29 and 30. A jumper is provided if your controller doesn't have the optional dry contact enable output. The jumper can be found taped to the inside of the VFD cover.
IMPORTANT: Do not exceed 4.4 inch-pounds (.5Nm) of torque on any control terminal connections.
4. Each Optidrive should be individually connected directly to the site ground.
5. Connect your whole house controller, variable fan output (10 volt DC control), connect the controller variable output to terminals 6 and 7. Please reference Wiring Diagrams on pages 29 and 30. IF YOUR CONTROLLER DOES NOT SUPPORT 0-10v DC OUTPUT CONTROL PLEASE CONTACT YOUR DEALER TO REPROGRAM YOUR DRIVE.
6. Tighten all cord grips when finished wiring the VFD.

Wiring Diagram (without Thermostat Backup)



WARNING: Jumper must be removed while changing parameters.

Wiring Diagram (with Thermostat Backup)




Adjusting Parameters

The following instructions explain how to adjust parameters. The drive comes preprogrammed to run using 0-10V input. To adjust parameters, make sure terminals 1 & 2 are not connected.

Auto-Tune Procedure

To achieve optimal performance, it is recommended that the drive be auto-tuned to the motor. The steps below walk you through how to accomplish this. This is only required if the motor and VFD were not shipped together as the drive was already auto-tuned before shipping.



The Auto-Tune is non-rotating and can be carried out with the load coupled or a motor brake still applied. However, some rotation may still occur and the user should ensure that no risk arises from the possible movement of the motor shaft.

NOTE: Refer to Drive Operation for keypad interface information and operation.

1. Power up the drive, as shown in Figure 48. The screen will display “StoP”.

Figure 48



2. Press and hold the navigate button (A) >2 seconds, as shown in Figure 49. This will enter the parameter menu. The parameter last visited will display. In this case, parameter 1 (P-01).

Figure 49



A	Navigate Button
---	-----------------

Adjusting Parameters - continued

3. Use the up/down arrow buttons (B and C) until the motor parameter Auto-Tune is displayed (P-52), as shown in Figure 50, then press the navigate button (A) once to enter the extended parameter settings, as shown in Figure 51. The screen will display “0”.

Figure 50

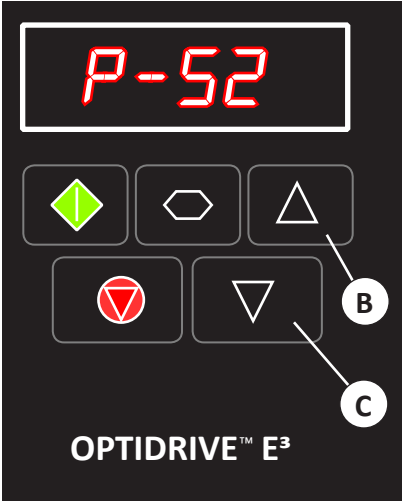
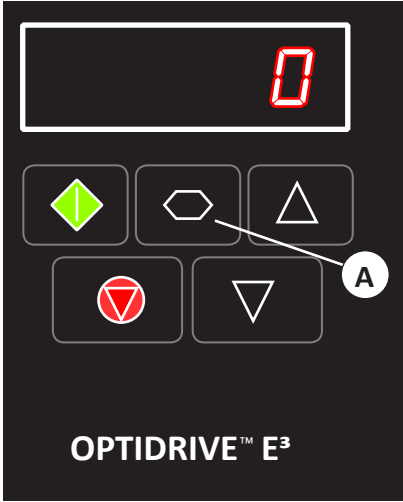


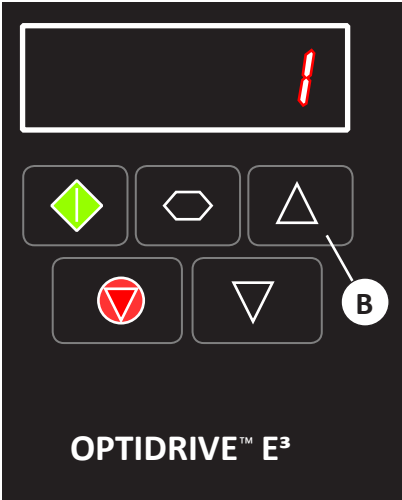
Figure 51



A	Navigate Button
B	Up Arrow Button
C	Down Arrow Button

4. Press the up arrow button (B) to set the value of (P-52) to “1”, as shown in Figure 52.

Figure 52



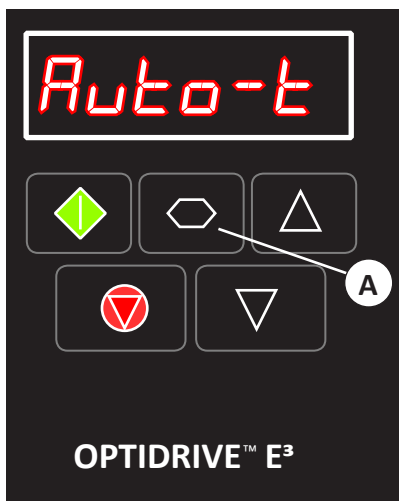
B	Up Arrow Button
---	-----------------

Adjusting Parameters - continued

5. Press the Navigate button (A) for <1 second to select, as shown in Figure 53. The screen will display “Auto-t”, which means the drive is in the Auto-Tune process.

NOTE: The motor will make a slight humming noise and take a few seconds to complete the Auto-Tune process.

Figure 53



A	Navigate Button
---	-----------------

The Drive is programmed to run with 0-10V input. If you want to run using 10-0V input, P16 will need to be changed to 10-0V. It is done similarly to the autotuning process.

	If you are running a 54" fan with an aluminum blade and your incoming voltage is under 215V, adjust P01 to 600 RPM otherwise the fan speed will oscillate due to excessive loading of the motor.
--	--

Operating Displays

If the drive is disabled, STOP should be displayed on the screen.

If the drive is enabled, the drive could say “STANDBY” if it is not running, or it could display the output frequency in Hz, motor current in amps, motor power in kW, or the motor speed in RPM. To flip between these displays, press the Navigate key (A) for <1 second to change to different displays.

Resetting a Fault

If a fault is displayed on the screen, press the Stop Key to reset it.

Fault Code Messages

Display Fault Code	Fault Number	Description	Corrective Action
StoP	00	Drive is healthy and in a stopped condition. The motor is not energized. No enable signal is present to start the drive.	
O-I	03	Instantaneous over current on the drive output. Excess load or shock load on the motor.	Fault occurs immediately on drive enable Check the output wiring connections to the motor and the motor for short circuits phase to phase and phase to earth. Fault occurs during motor starting Check the motor is free to rotate and there are no mechanical blockages. Fault occurs when motor operating at constant speed Investigate overload or malfunction.
l_t-trP	04	Motor thermal overload protection trip. The drive has tripped after delivering >100% of allowable motor current for a period of time to prevent damage to the motor.	Check the load mechanically to ensure it is free, and that no jams, blockages or other mechanical faults exist.
PS-trP	05	Hardware over current.	Check the wiring to motor and the motor for phase to phase and phase to earth short circuits. Disconnect the motor and motor cable and retest. If the drive trips with no motor connected, it must be replaced and the system fully checked and retested before a replacement unit is installed.
O:Vo It	06	Over voltage on DC bus.	Check the supply voltage is within the allowed tolerance for the drive.
U:Vo It	07	Under voltage on DC bus.	The incoming supply voltage is too low. This trip occurs routinely when power is removed from the drive. If it occurs during running, check the incoming power supply voltage and all components in the power feed line to the drive.
O-t	08	Heatsink over temperature.	The drive is too hot. Check the ambient temperature around the drive is within the drive specification. Ensure sufficient cooling air is free to circulate around the drive. Ensure sufficient cooling air can enter the drive, and that the bottom entry and top exit vents are not blocked or obstructed.
U-t	09	Under temperature.	Trip occurs when ambient temperature is less than -20°C. Temperature must be raised over -20°C in order to start the drive.
th-FLt	10	Faulty thermistor on heatsink.	Internal drive fault, consult dealer.
P-LOSS	0E	Input phase loss trip.	Drive intended for use with a 3 phase supply has lost one input phase.
SPI n-F	0F	Spin start failed.	Spin start function failed to detect the motor speed.
dAtA-F	11	Internal memory fault.	Loss of memory, internal fault, consult dealer.
SC-FLt	-	Internal drive fault.	Consult dealer.
FAULTY	-	Internal drive fault.	Consult dealer.

Shutter Installation

1. Install the shutter after making sure the shutter vanes open upward and the shutter clips rotate easily.
2. After positioning all the shutter clips to hold the shutter tightly in place, manually operate the shutter to ensure smooth and uninhibited operation. Adjust if necessary.



Shutter vanes **MUST** be installed to open toward the fan motor and upward as shown in Figure 54. Attach shutter clips to the interior wall with 10-12 x 2" sheet metal screws. Shutter clips can be adjusted as you tighten.

ALL SHUTTER CLIPS PROVIDED SHOULD BE INSTALLED.

Figure 54

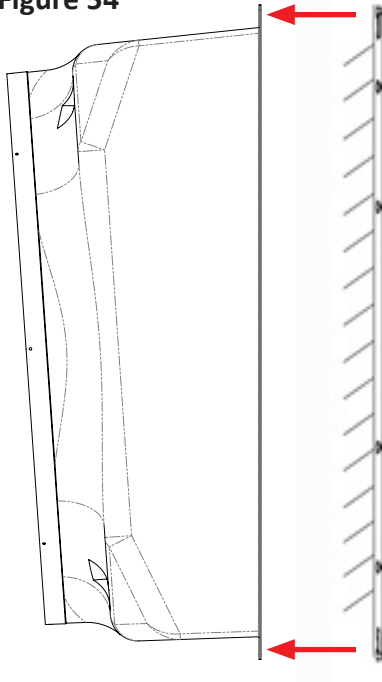
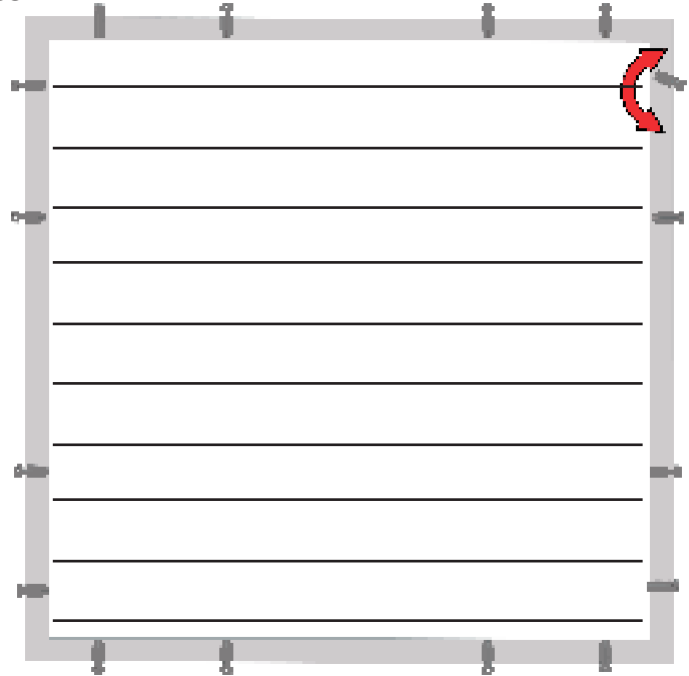


Figure 55



Start-Up Operation



Disconnect and lock out all power sources before servicing equipment.

1. With the fan unpowered, rotate the prop several complete revolutions by turning the fan prop, look for clearance between the prop tip and the housing.
2. Replace all guards and check all fasteners to ensure they are tight.
3. Energize the fan, use controller to run the fan and make note of direction of prop rotation.
NOTE: Make sure the prop turns counterclockwise when viewed from inside the house.
4. If the propeller is turning backwards, de-energize the fan and refer to Power Connections Location and Wiring Diagrams.
5. Re-check the operation and when satisfied the fan is operating properly, turn OFF power and insert the shutters into the housing. Use the shutter clips to lock down the shutters.



Once the fan is fully installed, a test run should be done to be sure that it is operating correctly.
Safety glasses should be worn when testing fans.

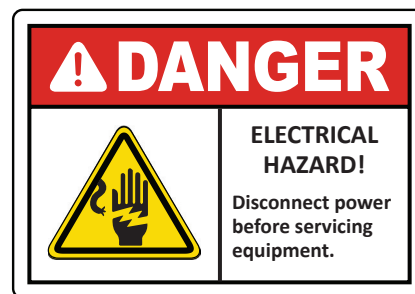
Maintenance

Inspect propeller

Check to see that the propeller is secure on the shaft and that there are no signs of damage.

Fasteners

Retighten nuts and bolts on a quarterly basis. Follow the torque specifications in the chart.



Fastener / Device	Recommended Torque
1/4-20 X 1/2" HX HD BOLT	80 – 85 in. lbs. (Approx. 9.0 Nm)
5/16-18 X 3/4" HX HD BOLT	140 – 150 in. lbs. (Approx. 16.0 Nm)
5/16-18 X 2-1/4" HX HD BOLT	140 – 150 in. lbs. (Approx. 16.0 Nm)
3/8-16 X 1-1/4" HX HD BOLT	15 – 20 ft. lbs. (Approx. 24.0 Nm)
5/16" SETSCREWS (BLADE)	80 – 85 in. lbs. (Approx. 9.0 Nm)
1" I.D. X 1-3/4" O.D. TRAN TORQUE	125 ft. lbs. (Approx. 169.0 Nm)
5/8" X 1-3/4" O.D. TRAN TORQUE	125 ft. lbs. (Approx. 169.0 Nm)

Clean Fan

Motor: Remove any dust accumulation from motor using a brush or cloth (DO NOT USE A PRESSURE WASHER ON THE MOTOR). A clean motor will run cooler and last longer. Check if the motor is secure in its mount.

Shutter: Carefully clean dust from shutter vanes and frame so that shutter opens and closes freely. If shutters are extremely dirty, you can lose up to 20% of your fan capacity.

Guard: Clean any dust or dirt buildup from fan guards using a brush. Dirty guards can also reduce airflow.

Housing

Remove dust and dirt accumulations from housing with a pressure washer. Do not wash or spray motor directly.

If any portion of the fan is cleaned with a power washer or any liquid it is highly recommended to run the fan for a minimum of 15 minutes to allow the fan and motor to dry before it is left idle for any length of time.

Inspect Fan Controls: All controls should be inspected every six months to assure optimum protection of your ventilation system.

- Check all covers for a tight fit.
- Wipe enclosures with a damp rag to remove dirt and dust.
- Clean sensors with a damp rag to remove dirt and dust. Be very careful not to damage sensors.

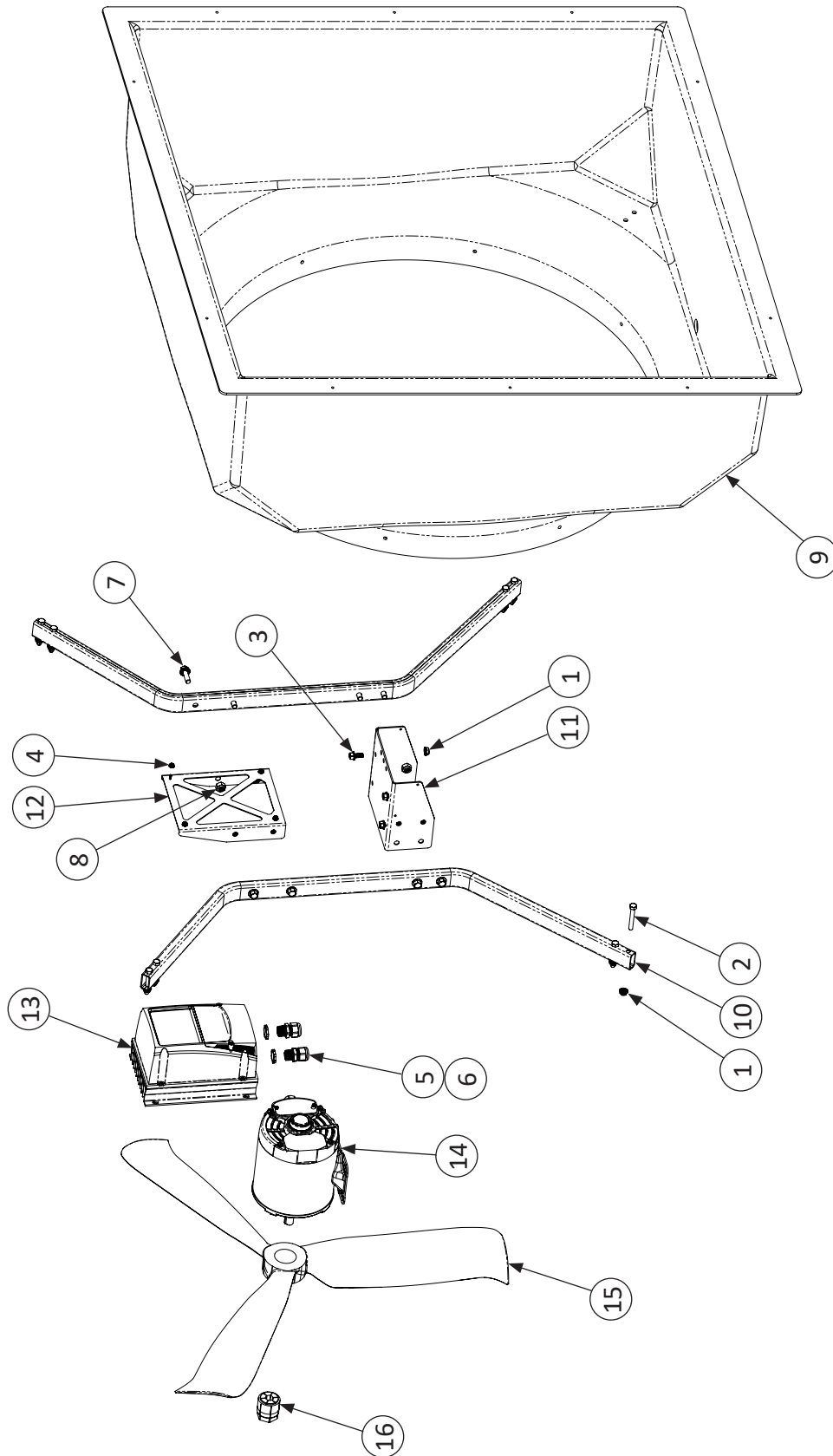


1. **NEVER SPRAY ELECTRICAL EQUIPMENT WITH A POWER WASHER!**
2. **NOTE: A safety cut-off switch should be located adjacent to the fan.**

Troubleshooting Guide

Problem	Possible Cause	Corrective Action
Excessive noise	Defective motor bearing.	Replace.
	Parts are not securely anchored.	Check all bolts, screws and fasteners.
	Damaged fan blade.	De-energize fan. Turn prop and check tip clearance. Do they appear to be approximately the same? NOTE: <i>They can be a little different without any problems.</i> If they are significantly different, contact your dealer for more information.
Fan inoperative	Electricity is turned OFF.	Contact local utility supplier.
	Defective motor.	Replace.
	Open power supply circuit.	Replace fuse or reset circuit breaker. Check for disconnection, cut or damaged power cord.
	Fault in Drive	Refer to page 34 for Fault Codes.
	Signal not present	Ensure proper wiring from house controller and check wiring of terminal strip (refer to pages 28-30).
Insufficient airflow	Intake/exhaust shutter is jammed/clogged.	Repair/replace/clean as necessary.
	Inlet/outlet guards clogged by dirt/debris.	Repair/replace/clean as necessary.
	Voltage supplied is not correct (must be within $\pm 10\%$ of the nominal voltage).	Check line voltage at motor, verify wiring. Check with local utility supplier for possible line problems.
Excessive vibration	Fan blade has excessive dirt build-up.	Clean unit.
	Motor shaft is bent.	Replace motor.
	Fan blade is bent or otherwise damaged.	Replace blade. Apply anti-seize lubricant to the shaft.
Motor overheats and overload trips	Intake/exhaust shutter is jammed/clogged.	Repair/replace/clean as necessary.
	Inlet/outlet guards clogged by dirt/debris.	Repair/replace/clean as necessary.
	Motor has excessive dirt build-up.	Clean unit.
	Fan blade has excessive dirt build-up.	Clean unit.
	Building operating static pressure too high.	Adjust air inlets to lower static pressure.
	Power supply voltage is too low.	Check line voltage at motor; verify wiring is of sufficient gauge for load and length of conductor. Check with local utility supplier for possible line problems.

36" and 50" Fiberglass V-Fans - Exploded View



36" and 50" Fiberglass V-Fans - Parts List

FAN PART #		936230-1(-Q2)	936230-3(-Q2)	936230-BW-1(-Q2)	936230-BW-3(-Q2)	936230-SC-1(-Q2)	936230-SC-3(-Q2)	936235-1(-Q2)	936235-3(-Q2)
KEY	DESCRIPTION	QTY	PART #						
1	5/16-18 FLANGE HEX NUT	12	501441	501441	501441	MH8056	MH8056	501441	501441
2	5/16-18 X 2-1/4" HEX SCREW	8	690257	690257	690257	MH8097	MH8097	690257	690257
3	5/16-18 X 3/4" FLANGE SCREW	4	690389	690389	690389	MH8091	MH8091	690389	690389
4	#6-32 FLANGE NUT	4	690431	690431	690431	690427	690427	690431	690431
5	1/2" CONDUIT NUT	2	420473	420473	420473	420473	420473	420473	420473
6	1/2" NPT CORD GRIP	2	921921	921921	921921	921921	921921	921921	921921
7	3/8-16 X 1-1/4" FLANGE BOLT	8	936026	936026	936026	MH8124	MH8124	936026	936026
8	3/8-16 NUT	8	936054	936054	936054	MH8057	MH8057	936054	936054
9	HOUSING	1	FP348W	FP348W	936065	FP348W	FP348W	FP348W	FP348W
10	MOTOR MOUNT RAILS	2	936234	936234	936234	936238	936238	936234	936234
11	MOTOR MOUNT BRACKET	1	936156	936156	936156	936157	936157	936156	936156
12	VFD PANEL MOUNT	1	936236	936236	936236	936154	936154	936236	936236
13	PROGRAMMED VFD	1	980134	980135	980134	980135	980135	980132	980133
14	MOTOR	1	980117	980117	980117	980117	980117	980117	980117
15	FAN BLADE	1	FP489	FP489	FP489	FP489	FP489	936052	936052
16	TRANSTORQUE	1	ZFB306	ZFB306	ZFB306	ZFB306	ZFB306	-	-

36" & 50" Fiberglass V-Fans - Parts List - continued

FAN PART #		936600-SC-1(-Q2)	936600-SC-3(-Q2)	950230-1	950230-3	950230-34	950600-SC-1	950600-SC-3
KEY	DESCRIPTION	QTY	PART #					
1	5/16-18 FLANGE HEX NUT	12	MH8056	MH8056	501441	501441	MH8056	MH8056
2	5/16-18 X 2-1/4" HEX SCREW	8	MH8097	MH8097	690257	690257	MH8097	MH8097
3	5/16-18 X 3/4" FLANGE SCREW	4	MH8091	MH8091	690389	690389	MH8091	MH8091
4	#6-32 FLANGE NUT	4	690427	690427	690431	690431	690427	690427
5	CONDUIT NUT	2	420473	420473	690369	690369	420473	420473
6	NPT CORD GRIP	2	921921	921921	921240	921240	921921	921921
7	3/8-16 X 1-1/4" FLANGE BOLT	8	MH8124	MH8124	936026	936026	MH8124	MH8124
8	3/8-16 NUT	8	MH8057	MH8057	936054	936054	MH8057	MH8057
9	HOUSING	1	FP348W	FP348W	FP13210W	FP13210W	FP13210W	FP13210W
10	MOTOR MOUNT RAILS	2	936238	936238	954268	954268	954257	954257
11	MOTOR MOUNT BRACKET	1	936157	936157	954264	954264	954258	954258
12	VFD PANEL MOUNT	1	936154	936154	954266	954266	936154	936154
13	PROGRAMMED VFD	1	980132	980133	980190	980191	980129	980130
14	MOTOR	1	980117	980117	980116	980116	980116	980116
15	FAN BLADE	1	936058	936058	B718	B718	B387	B387
16	TRANSTORQUE	1	-	-	ZFB302	ZFB302	-	-





54" Fiberglass Long Cone V-Fans - Parts List

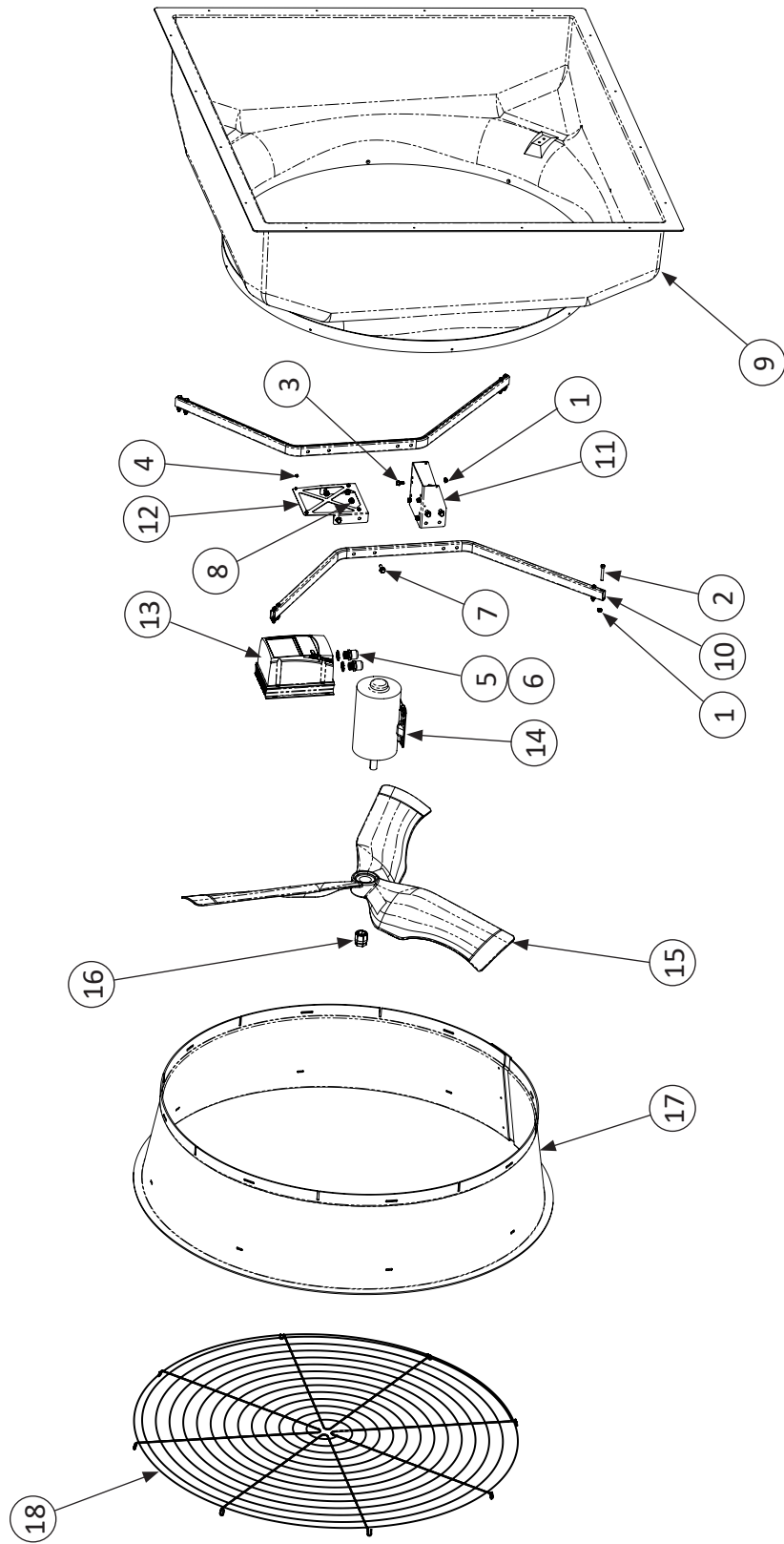
FAN PART #		954230-1	954230-3	954230-33	954230-34	954230-BW-1	954230-BW-34	954230-SC-1
KEY	DESCRIPTION	QTY	PART #					
1	5/16-18 FLANGE HEX NUT	12	501441	501441	501441	501441	501441	MH8056
2	5/16-18 X 2-1/4" HEX SCREW	8	690257	690257	690257	690257	690257	MH8097
3	5/16-18 X 3/4" FLANGE SCREW	4	690389	690389	690389	690389	690389	MH8091
4	#6-32 FLANGE NUT	4	690431	690431	690431	690431	690431	690427
5	3/4" CONDUIT NUT	2	690369	690369	690369	690369	690369	690369
6	3/4" NPT CORD GRIP	2	921240	921240	921240	921240	921240	921240
7	3/8-16 X 1-1/4" FLANGE BOLT	8	936026	936026	936026	936026	936026	MH8124
8	3/8-16 NUT	8	936054	936054	936054	936054	936054	MH8057
9	HOUSING	1	954163	954163	954163	954023	954023	954163
10	MOTOR MOUNT RAILS	2	954268	954268	954268	954268	954268	954257
11	MOTOR MOUNT BRACKET	1	954264	954264	954264	954264	954264	954258
12	VFD PANEL MOUNT	1	954266	954266	954266	954266	954266	954259
13	PROGRAMMED VFD	1	980143	980144	980159	980161	980161	980143
14	MOTOR	1	980116	980116	980145	980128	980128	980116
15	FAN BLADE	1	954060	954060	954060	954060	954060	954060
16	TRANTORQUE	1	ZFB302	ZFB302	ZFB302	ZFB302	ZFB302	ZFB302
17	LONG CONE PANEL	4	954184	954184	954184	954184	954184	954184
18	LONG CONE GRILL	1	954001	954001	954001	954001	954001	954001

54" Fiberglass Long Cone V-Fans - Parts List - continued

FAN PART #		954230-SC-3	954230-SC-33	954230-SC-34	954235-1	954235-3	954235-33	954235-34
KEY	DESCRIPTION	QTY	PART #					
1	5/16-18 FLANGE HEX NUT	12	MH8056	MH8056	MH8056	501441	501441	501441
2	5/16-18 X 2-1/4" HEX SCREW	8	MH8097	MH8097	MH8097	690257	690257	690257
3	5/16-18 X 3/4" FLANGE SCREW	4	MH8091	MH8091	MH8091	690389	690389	690389
4	#6-32 FLANGE NUT	4	690427	690427	690427	690431	690431	690431
5	3/4" CONDUIT NUT	2	690369	690369	690369	690369	690369	690369
6	3/4" NPT CORD GRIP	2	921240	921240	921240	921240	921240	921240
7	3/8-16 X 1-1/4" FLANGE BOLT	8	MH8124	MH8124	MH8124	936026	936026	936026
8	3/8-16 NUT	8	MH8057	MH8057	MH8057	936054	936054	936054
9	HOUSING	1	954163	954163	954163	954163	954163	954163
10	MOTOR MOUNT RAILS	2	954257	954257	954257	954268	954268	954268
11	MOTOR MOUNT BRACKET	1	954258	954258	954258	954264	954264	954264
12	VFD PANEL MOUNT	1	954259	954259	954259	954266	954266	954266
13	PROGRAMMED VFD	1	980144	980159	980161	980142	980158	980160
14	MOTOR	1	980116	980145	980128	980116	980145	980128
15	FAN BLADE	1	954060	954060	954060	954031	954031	954031
16	TRANTORQUE	1	ZFB302	ZFB302	ZFB302	-	-	-
17	LONG CONE PANEL	4	954184	954184	954184	954184	954184	954184
18	LONG CONE GRILL	1	954001	954001	954001	954001	954001	954001



54" Fiberglass Short Cone V-Fans - Exploded View



54” Fiberglass Short Cone V-Fans - Parts List

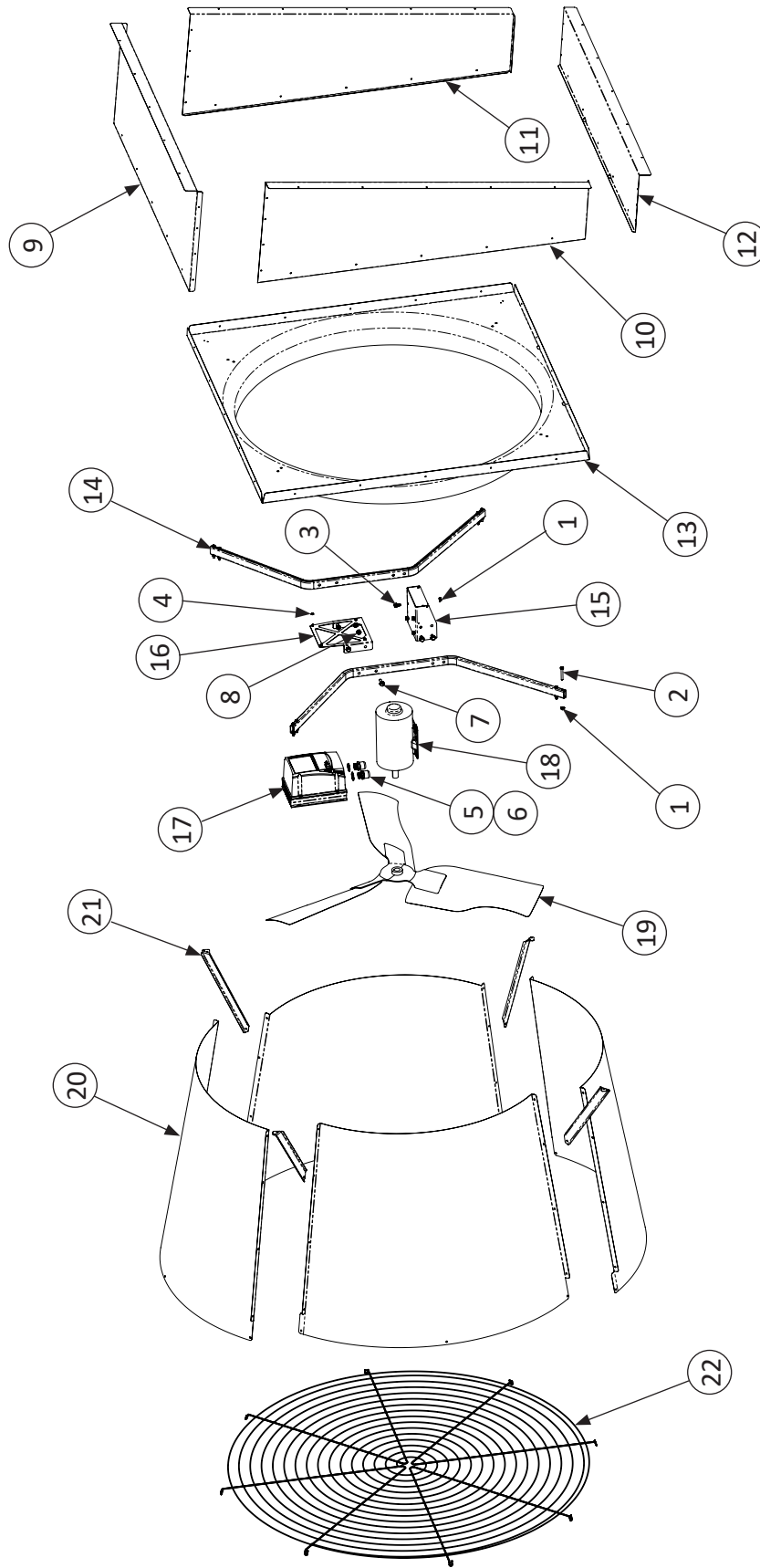
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KEY	DESCRIPTION	QTY	PART #					
1	5/16-18 FLANGE HEX NUT	12	501441	501441	501441	501441	501441	MH8056
2	5/16-18 X 2-1/4" HEX SCREW	8	690257	690257	690257	690257	690257	MH8097
3	5/16-18 X 3/4" FLANGE SCREW	4	690389	690389	690389	690389	690389	MH8091
4	#6-32 FLANGE NUT	4	690431	690431	690431	690431	690431	690427
5	3/4" CONDUIT NUT	2	690369	690369	690369	690369	690369	690369
6	3/4" NPT CORD GRIP	2	921240	921240	921240	921240	921240	921240
7	3/8-16 X 1-1/4" FLANGE BOLT	8	936026	936026	936026	936026	936026	MH8124
8	3/8-16 NUT	8	936054	936054	936054	936054	936054	MH8057
9	HOUSING	1	954163	954163	954163	954163	954023	954023
10	MOTOR MOUNT RAILS	2	954268	954268	954268	954268	954268	954257
11	MOTOR MOUNT BRACKET	1	954264	954264	954264	954264	954264	954258
12	VFD PANEL MOUNT	1	954266	954266	954266	954266	954266	954259
13	PROGRAMMED VFD	1	980143	980144	980159	980161	980143	980144
14	MOTOR	1	980116	980116	980145	980128	980116	980116
15	FAN BLADE	1	954060	954060	954060	954060	954060	954060
16	TRANTORQUE	1	ZFB302	ZFB302	ZFB302	ZFB302	ZFB302	ZFB302
17	SHORT CONE	1	954213W	954213W	954213W	954213W	954213B	954213B
18	SHORT CONE GRILL	1	954039	954039	954039	954039	954039	954039

54” Fiberglass Short Cone V-Fans - Parts List - continued

FAN PART #		954830-SC-1	954830-SC-3	954835-1	954835-3	954835-33	954835-34
KEY	DESCRIPTION	QTY	PART #				
1	5/16-18 FLANGE HEX NUT	12	MH8056	MH8056	501441	501441	501441
2	5/16-18 X 2-1/4" HEX SCREW	8	MH8097	MH8097	690257	690257	690257
3	5/16-18 X 3/4" FLANGE SCREW	4	MH8091	MH8091	690389	690389	690389
4	#6-32 FLANGE NUT	4	690427	690427	690431	690431	690431
5	3/4" CONDUIT NUT	2	690369	690369	690369	690369	690369
6	3/4" NPT CORD GRIP	2	921240	921240	921240	921240	921240
7	3/8-16 X 1-1/4" FLANGE BOLT	8	MH8124	MH8124	936026	936026	936026
8	3/8-16 NUT	8	MH8057	MH8057	936054	936054	936054
9	HOUSING	1	954163	954163	954163	954163	954163
10	MOTOR MOUNT RAILS	2	954257	954257	954268	954268	954268
11	MOTOR MOUNT BRACKET	1	954258	954258	954264	954264	954264
12	VFD PANEL MOUNT	1	954259	954259	954266	954266	954266
13	PROGRAMMED VFD	1	980143	980144	980141	980142	980158
14	MOTOR	1	980116	980116	980116	980116	980128
15	FAN BLADE	1	954060	954060	954031	954031	954031
16	TRANTORQUE	1	ZFB302	ZFB302	-	-	-
17	SHORT CONE	1	954213W	954213W	954213W	954213W	954213W
18	SHORT CONE GRILL	1	954039	954039	954039	954039	954039



36" & 54" Galvanized and Z Fans - Exploded View

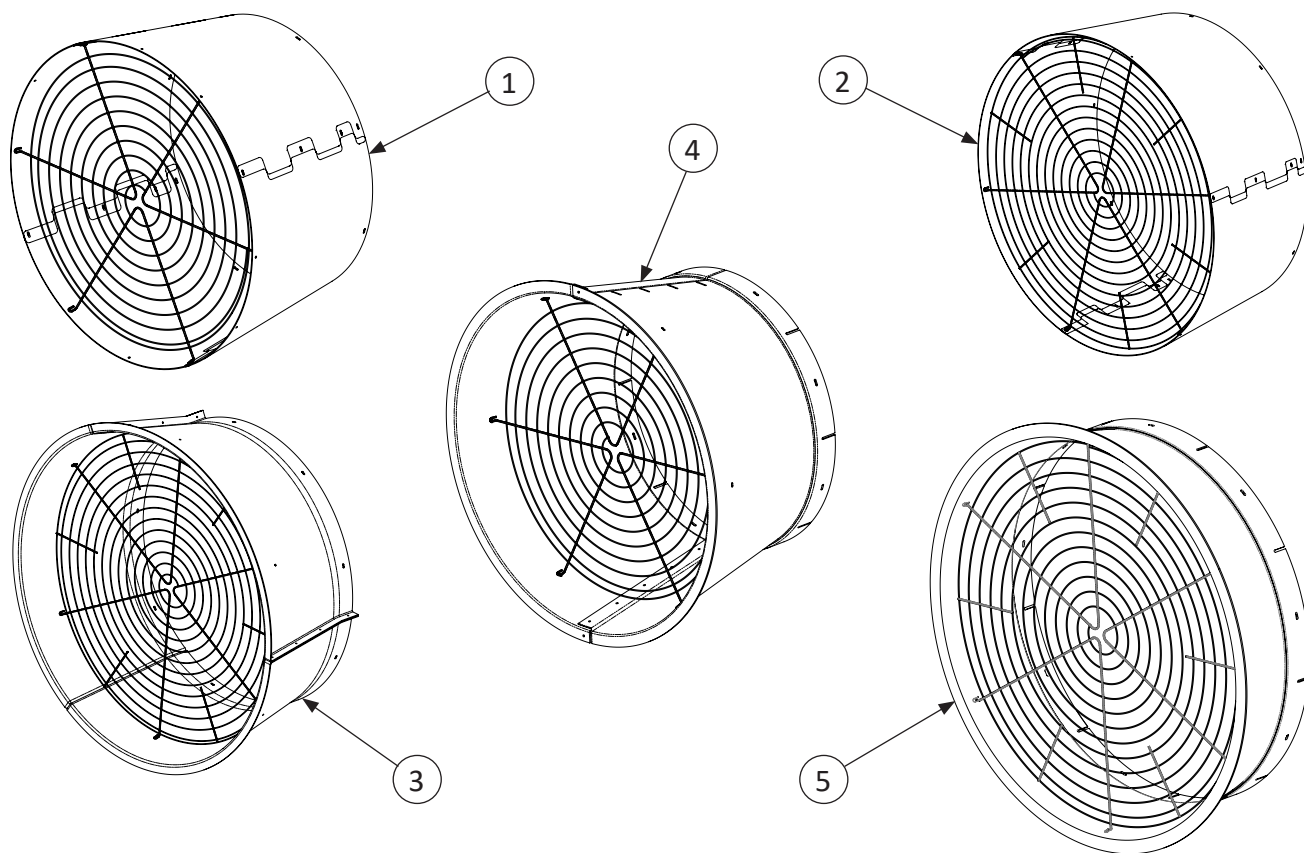


36" & 54" Galvanized and Z Fans - Parts List

FAN PART #			PART #											
KEY	DESCRIPTION	QTY	936260-1(-Q2)	936260-3(-Q2)	936260-ZM-1(-Q2)	936260-ZM-3(-Q2)	954260-1	954260-3	954260-ZM-1	954260-ZM-3	954705-1	954705-3(-KD)	954705-ZM-1	954705-ZM-3
1	5/16-18 FLANGE HEX NUT	12	501441	501441	501441	501441	501441	501441	501441	501441	501441	501441	501441	501441
2	5/16-18 X 2-1/4" HEX SCREW	8	690257	690257	690257	690257	690257	690257	690257	690257	690257	690257	690257	690257
3	5/16-18 X 3/4" FLANGE SCREW	4	690389	690389	690389	690389	690389	690389	690389	690389	690389	690389	690389	690389
4	#6-32 FLANGE NUT	4	690431	690431	690431	690431	690431	690431	690431	690431	690431	690431	690431	690431
5	CONDUIT NUT	2	420473	420473	420473	420473	690369	690369	690369	690369	690369	690369	690369	690369
6	NPT CORD GRIP	2	921921	921921	921921	921921	921240	921240	921240	921240	921240	921240	921240	921240
7	3/8-16 X 1-1/4" FLANGE BOLT	8	936026	936026	936026	936026	936026	936026	936026	936026	936026	936026	936026	936026
8	3/8-16 NUT	8	936054	936054	936054	936054	936054	936054	936054	936054	936054	936054	936054	936054
9	TOP PANEL	1	936010	936010	936010-ZM	936010-ZM	954010	954010	954010-ZM	954010-ZM	954010	954010	954010-ZM	954010-ZM
10	RIGHT PANEL	1	936005	936005	936005-ZM	936005-ZM	954005	954005	954005-ZM	954005-ZM	954005	954005	954005-ZM	954005-ZM
11	LEFT PANEL	1	936011	936011	936011-ZM	936011-ZM	954011	954011	954011-ZM	954011-ZM	954011	954011	954011-ZM	954011-ZM
12	BOTTOM PANEL	1	936003	936003	936003-ZM	936003-ZM	954003	954003	954003-ZM	954003-ZM	954003	954003	954003-ZM	954003-ZM
13	ORIFICE	1	936006	936006	936006-ZM	936006-ZM	954021	954021	954021-ZM	954021-ZM	954021	954021	954021-ZM	954021-ZM
14	MOTOR MOUNT RAILS	2	936234	936234	936234	936234	954268	954268	954268	954268	954268	954268	954268	954268
15	MOTOR MOUNT BRACKET	1	936156	936156	936156	936156	954264	954264	954264	954264	954264	954264	954264	954264
16	VFD PANEL MOUNT	1	936236	936236	936236	936236	954266	954266	954266	954266	954266	954266	954266	954266
17	PROGRAMMED VFD	1	980132	980133	980132	980133	980141	980142	980141	980142	980141	980142	980141	980142
18	MOTOR	1	980117	980117	980117	980117	980116	980116	980116	980116	980116	980116	980116	980116
19	FAN BLADE	1	936052	936052	936052	936052	954031	954031	954031	954031	954031	954031	954031	954031
20	CONE PANEL	4	936002	936002	936002-ZM	936002-ZM	954002	954002	954002-ZM	954002-ZM	954017	954017	954017-ZM	954017-ZM
21	CONE SUPPORT STRAP	4	936004	936004	936018-ZM	936018-ZM	954004	954004	954028-ZM	954028-ZM	954096	954096	954096-ZM	954096-ZM
22	CONE EXHAUST GRILL	1	936001	936001	936001	936001	954001	954001	954001	954001	954001	954001	954001	954001



36" & 50" Poly Cones - Replacement / Repair Part Numbers



KEY	PART #	QTY	DESCRIPTION
36" & 50" POLY CONE KITS & PART NUMBERS			
1	936174		36" PANEL CONE, 4 SECTIONS WITH GRILL - WHITE
	936184	4	CONE SECTION, 36" SLANT WALL
	FP406CH	1	36" PMC GUARD SCREEN
2	950174		50" WHITE PANEL SHORT CONE, 3 SECTIONS W/ GRILL, 26" LONG
	950184	3	CONE SECTION, 50" SLANT WALL
	FP3881CH	1	48" PMC CONE GUARD SCREEN
3	FC50LW		50" WHITE FIBERGLASS CONE, 26" LONG
	FP3881CH	1	48" PMC CONE GUARD SCREEN
	FPN13207W	3	50" WHITE FIBERGLASS CONE
4	PC36LB		36" POLY CONE - BLACK
	FP406CH	1	36" PMC GUARD SCREEN
	FP855B	2	PMC 36" POLY CONE, BLACK, 26-1/2" LONG MOLDED POLY
4	PC36LW		36" POLY CONE - WHITE
	FP406CH	1	36" PMC GUARD SCREEN
	FP855W	2	PMC 36" POLY CONE, WHITE, 26-1/2" LONG MOLDED POLY
5	PC50SB		50" BLACK POLY 1 PIECE CONE, 15" LONG
	FP13235B	1	50" BLACK POLY CONE/SHORT
	FP408CH	1	GUARD SCREEN, 50" PMC SHORT CONE
5	PC50SW		50" WHITE POLY 1 PIECE CONE, 15" LONG
	FP13235A02W	1	50" WHITE POLY CONE/SHORT
	FP408CH	1	GUARD SCREEN, 50" PMC SHORT CONE

Note: If replacing a FC50LW cone, the panels can be pre-assembled using the first step of instructions for **36" and 54" Galvanized and Z-Fan V-Fan cones**, and assembled to the fan orifice using the instructions for **long Fiberglass cones**.

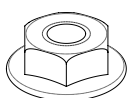
Hardware - Replacement / Repair Part Numbers

Hardware depicted are not actual size or to scale.

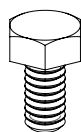
Hardware used to assemble sheet metal cone and to attach fan to wall:



Shutter Clip
936013



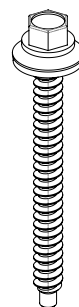
**1/4-20
Flanged Hex Nut**
012792



**1/4-20 x 1/2"
Hex Bolt**
010615



**10-32 x 1/2"
Sheet Metal Screw**
936053



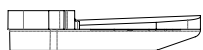
**10-12 x 2"
Sheet Metal Screw**
936057

Hardware shown above can be found in the following Parts Bags:

36" Fans: 980131

54" Fans: 954042

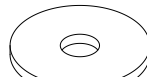
Hardware used to assemble various components to fiberglass housings:



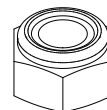
Shutter Clip
936013



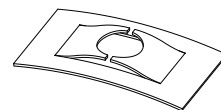
**1/4" ID x 5/8" OD
Flat Washer**
010424 (ZP)
MH8029 (SS)



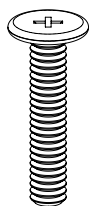
**1/4" ID x 1" OD
Flat Washer**
690294 (ZP)
690413 (SS)



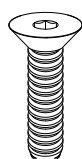
**1/4-20
Nylock Nut**
012793 (ZP)
MH90043 (SS)



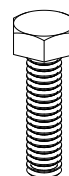
**1/4-20
Push Nut**
690380



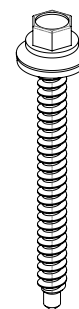
**1/4-20 x 1-1/4"
Flat Head Screw**
MH90429
(SS, 36" & 50" Fans)



**1/4-20 x 1"
Flat Head Screw**
690392 (ZP)
690386 (SS, 54" Fans)



**1/4-20 x 1"
Hex Bolt**
690025 (ZP)
MH90168 (SS)



**10-12 x 2"
Sheet Metal Screw**
936057 (ZP)
MH8206 (SS)

Key:

(SS) = Stainless Steel

(ZP) = Zinc Plated

Hardware shown above can be found in the following Parts Bags:

36" & 50" Fans: 980125 (SS) and 980126 (ZP)

54" Fans: 954262 (SS) and 954267 (ZP)

Customer Service

Dealer Name: _____

Street / PO Box _____

City _____

State / Province _____

Zip / Postal _____

Phone _____

Fax _____

E-mail _____

Website _____

Customer Service
210 E. Main Street
Coldwater, OH 45828
800.998.2526



North America:
Phone: 800.99VALCO (800.998.2526)
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