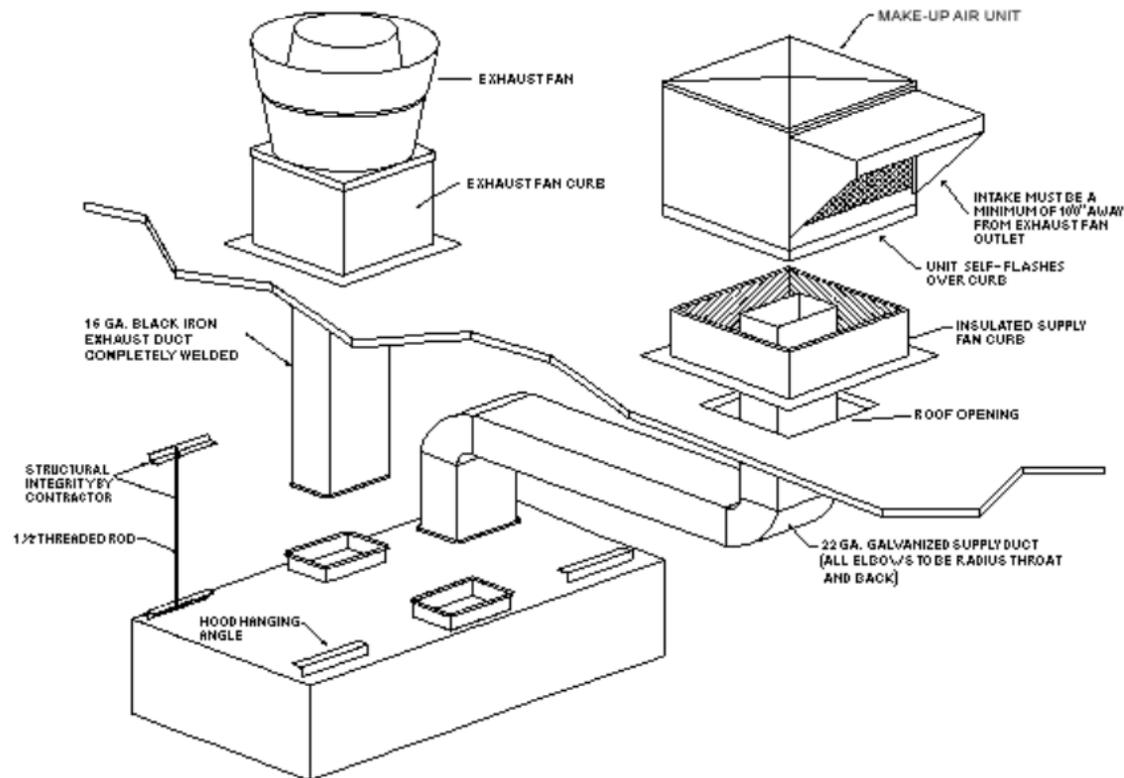


HOODZ  
Mechanical/Ventilation  
Training - Exhaust Units  
In association with AAIS



# Understanding Static Pressure & CFM

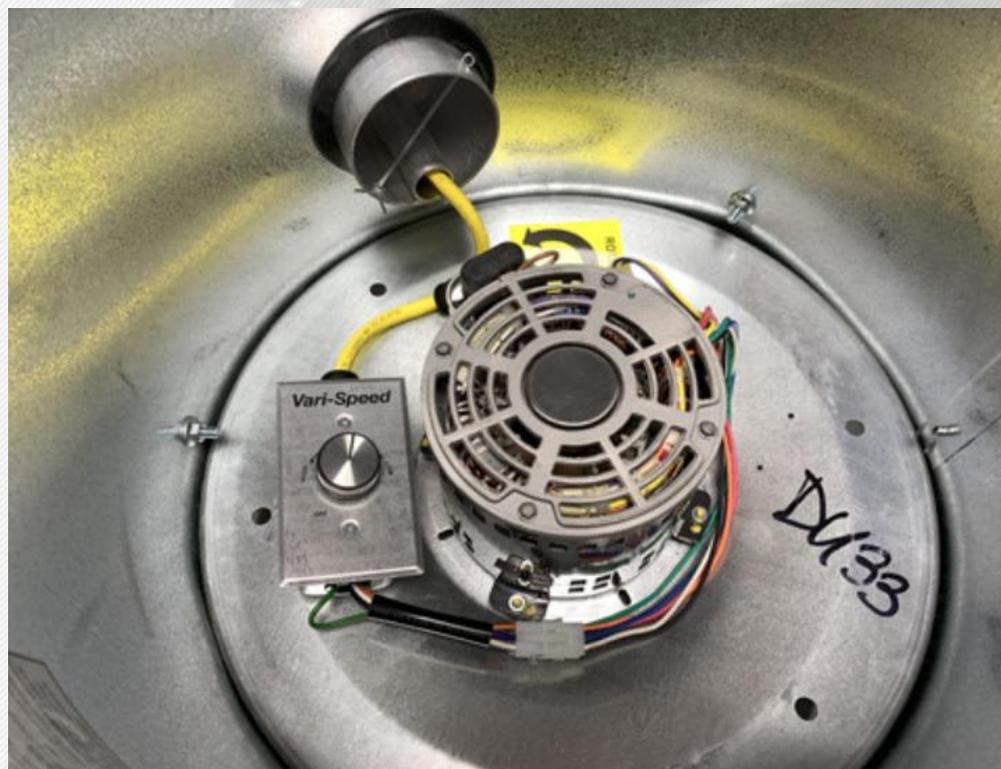


The Hood With Separate Fans

- CFM - Cubic Feet per Minute = Airflow rate
- Static Pressure = Resistance
  - Resistance is caused by: Duct Diameter, Duct Length, Duct turns, and blockage (filters)
- Calculate CFM
  - 200 CFM per Linear ft
    - Ex: 10ft hood needs 2000 CFM minimum
- Calculate Static Pressure
  - Duct Length = .0025" per linear ft
  - Duct Turns = 90 degree turns (.25") & 45 degree turns (.125")
  - Blockage = .5" for filters

# Direct Drive vs. Belt Drive

Direct Drive



Belt Drive



# Upblast & Downblast Exhaust Fans

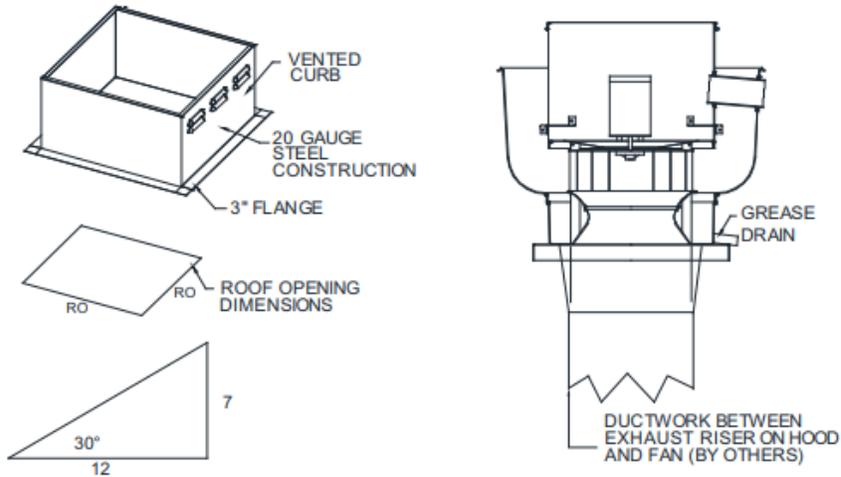
## Up-blast Roof Mount Installation

**Normal temperature test** – The exhaust fan must operate continuously while exhausting air at 300°F (149°C) until all fan parts have reached thermal equilibrium, and without any deteriorating effects to the fan which would cause unsafe operation.

**Abnormal flare-up test** – The exhaust fan must operate continuously while exhausting burning grease vapors at 600°F (316°C) for a period of 15 minutes without the fan becoming damaged to any extent that could cause an unsafe condition.

Pitched curbs are available. Specify pitch when ordering, for example: 7/12 Pitch = 30° Slope

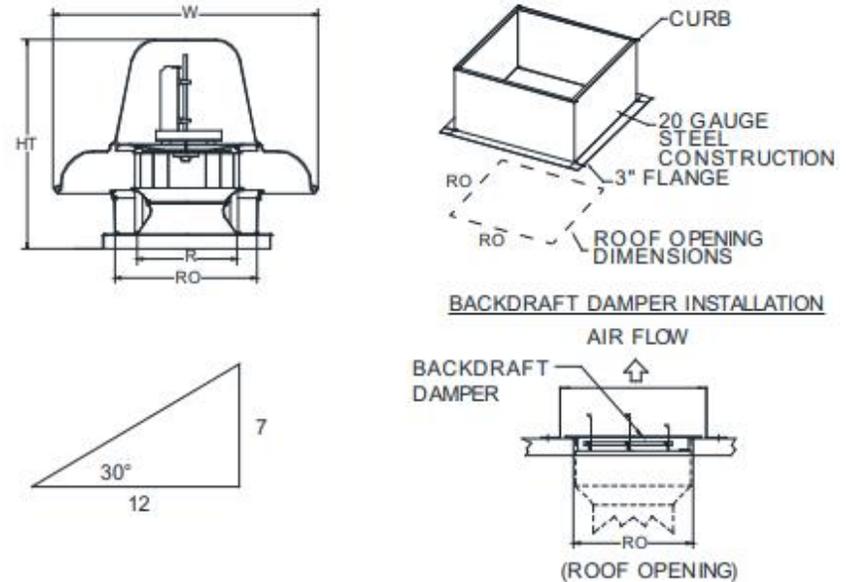
**Figure 7 - Up-blast Roof Mount Details**



## Down-blast Installation

Pitched curbs are available. Specify pitch when ordering, for example: 7/12 Pitch = 30° Slope

**Figure 8 - Down-Blast Details**



# Wall Mount Installation

## Up-blast Wall Mount Details

Drill pilot holes into the bracket.

Secure wall mount bracket to the wall. Refer to **Table 1** for hardware details

Use at least (3) suitable fasteners (not furnished) per side.

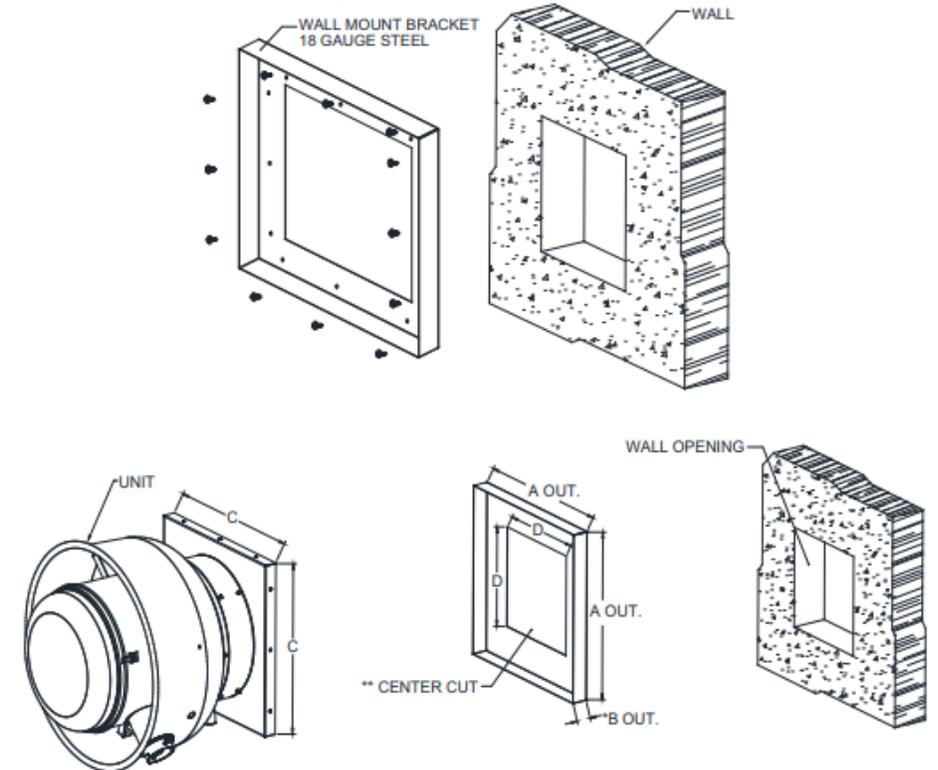
Wall bracket fits into base of fan.

Use self-drilling screws to attach unit to the wall mount bracket.

\* "B" dimension = 5" when used with damper.

\*\* Centered in wall mount.

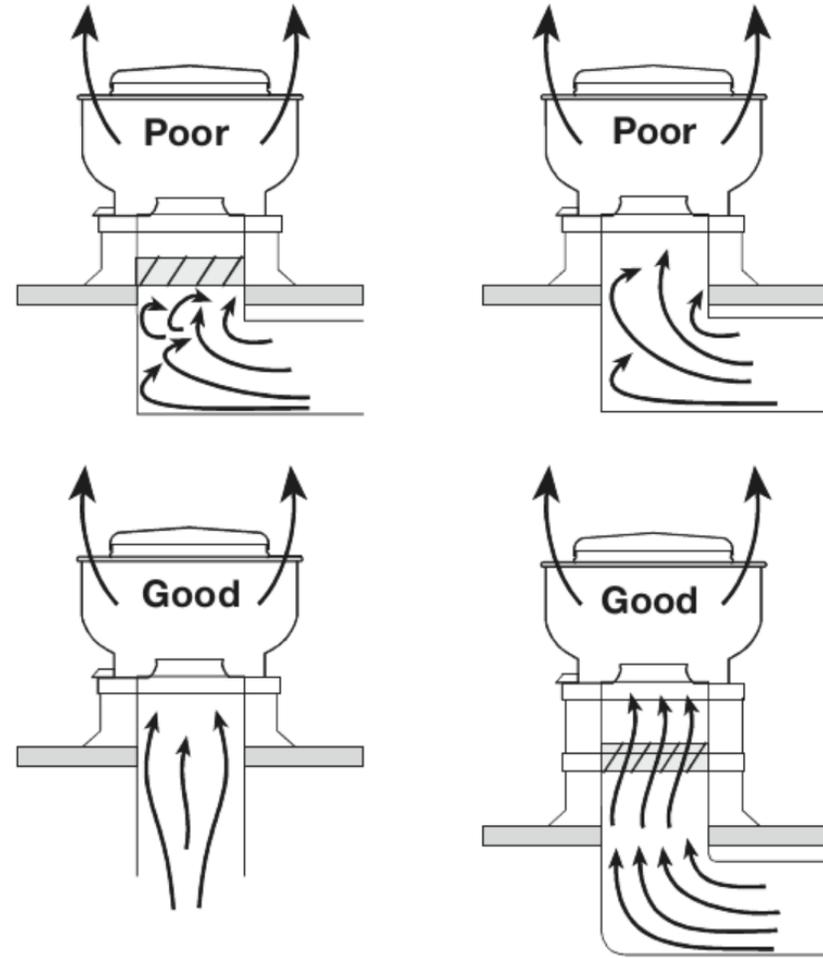
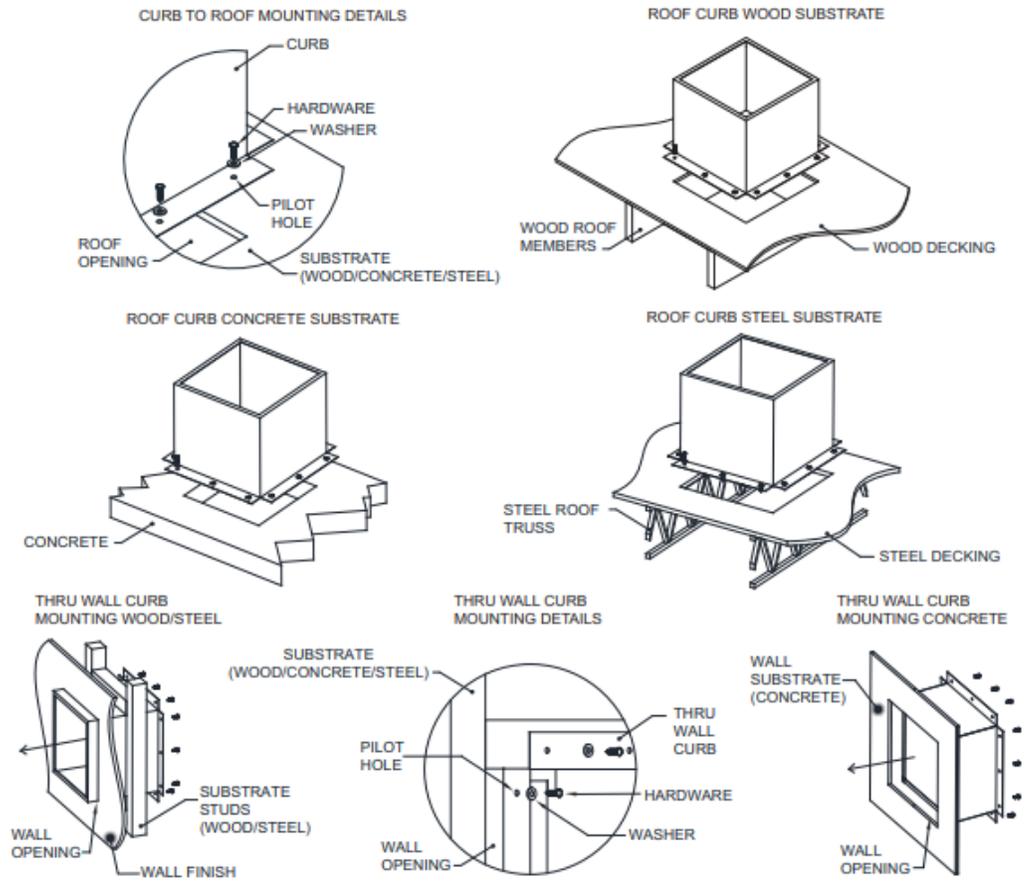
Figure 5 - Wall Mount Bracket



\*Use weatherproof sealant around fan casing to prevent water from entering\*

\*Generally you will need support on wall mounted fans over 150lbs\*

# Curbs and Duct Work



# Roof Curbs and Adapters



Adapters

ADAPTER roof curbs are typically made of 18 gauge galvanized metal for structural support.

There is typically a 1-2" Lip at the top turning in for a foundation for the exhaust/supply unit to sit flush and have the support needing for fastening or hinging.

The adapters can be made level or at a pitch. The reducer is made to adapt a current jobsites curb to a different



Reducers

REDUCER curbs are typically made of 18 galvanized metal for structural support.

There is typically a 1-2" Lip at the top turning in for a foundation for the exhaust/supply unit to sit flush and have the support needing for fastening or hinging.

The reducers can be made level or at a pitch. The reducer is made to adapt a current jobsites curb to a different



Pitched

PITCHED roof curbs are typically made of 18 gauge galvanized metal for structural support.

There is typically a 1-2" Lip at the top turning in for a foundation for the exhaust/supply unit to sit flush and have the support needing for fastening or hinging.

The pitch or angle can be determined with a rise over run formula.



Flat

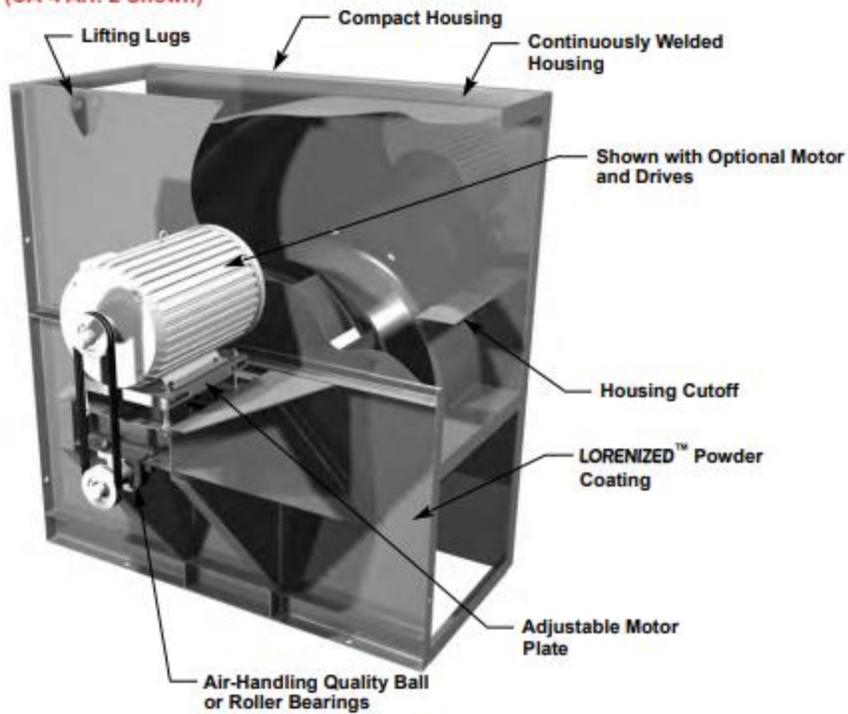
FLAT roof curbs are typically made of 18 gauge galvanized metal for structural support.

There is typically a 1-2" Lip at the top turning in for a foundation for the exhaust/supply unit to sit flush and have the support needing for fastening or hinging.

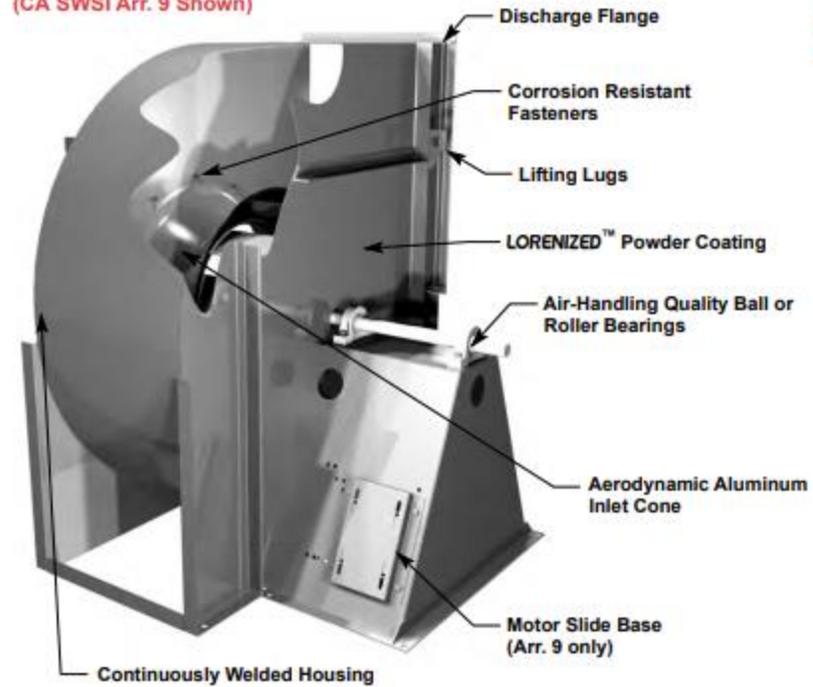
The bottom of the curb is typically turned/flanged out with a 3"-6" Flat flash mount turn out for mounting and flashing installations.

# Utility Sets

**CA-4**  
(CA-4 Arr. 2 Shown)



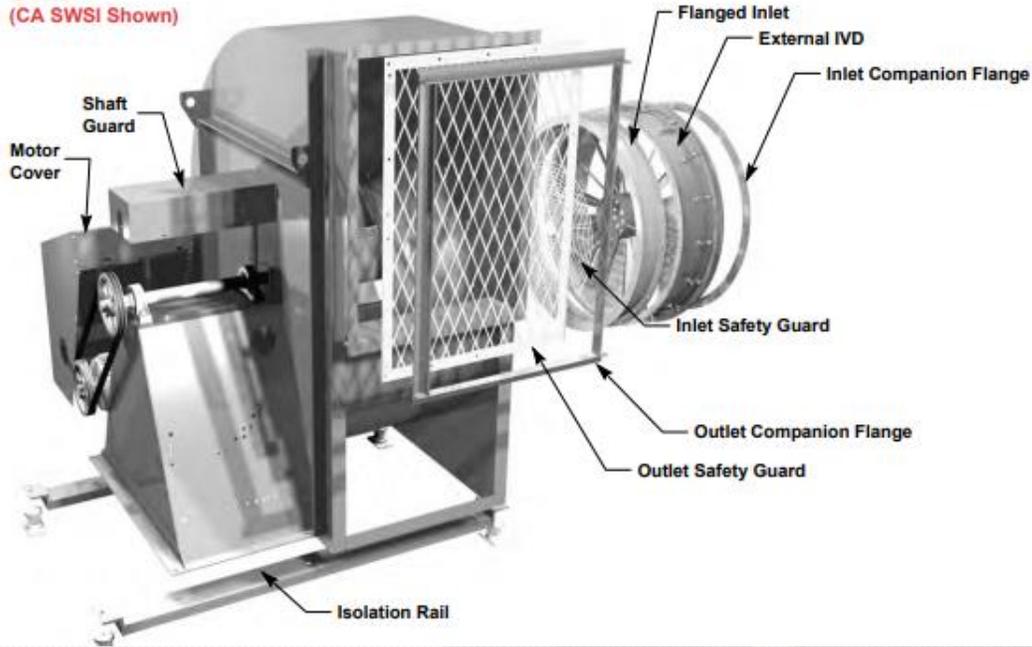
**SWSI Arr. 1, 9**  
(CA SWSI Arr. 9 Shown)



**Standard Features Not Shown**  
Housing Cutoff  
Inlet Collar  
Engraved Aluminum Nameplate

# Utility Sets

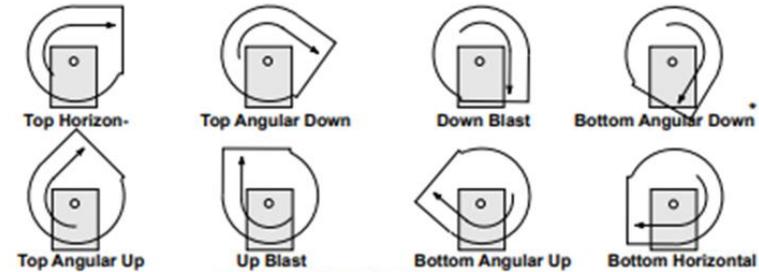
SWSI  
(CA SWSI Shown)



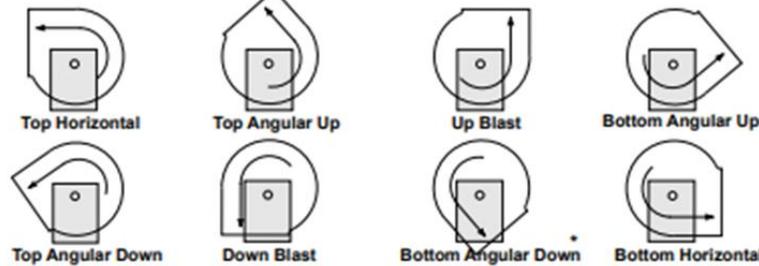
## Rotation and Discharge

The direction of rotation is determined from the drive side of the fan. On single inlet fans, drive side is always considered as the side opposite the fan inlet. The angle of the discharge is based on the horizontal axis of the fan and is designated in degrees (45° standard) above or below the standard reference axis.

### Clockwise Rotation

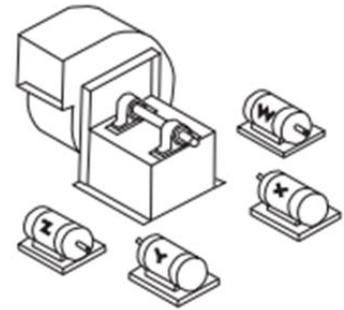


### Counter Clockwise Rotation



## Motor Positions for Belt Drive Centrifugal Fans

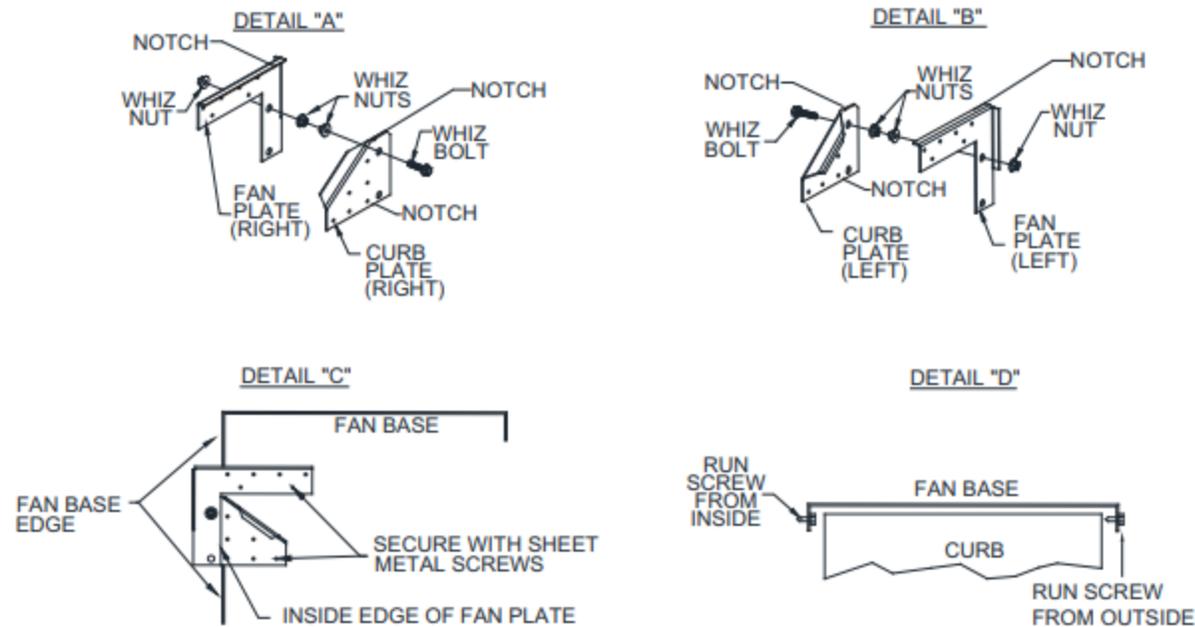
To determine the location of the motor, face the drive side of the fan and pick the proper motor position designated by the letters W, X, Y or Z as shown in the drawing.



\*Consult factory for availability

# Hinge Kit Installation

Figure 9 - Typical Hinge Kit Fan Plate and Curb Plate Details



## Typical Hinge Kit - Centrifugal Up-blast

### Hinge Kit Field Installation

**Attention: Installer Must Supply Enough Electrical Cord to Allow the Fan to Swing Open.**

1. If parts are not already assembled, refer to **Figure 9** for assembly instructions. Assemble the fan plate and curb plate with hardware, as shown in **Figure 9** Detail "A" and Detail "B".
2. Line up fan base edge to inside edge of fan plate, as shown in **Figure 9** Detail "C". Refer to **Figure 10** for positioning fan plate on fan base. Use provided notches.
3. Secure the fan plate to the fan base using sheet metal screws (#14 x 3/4" – qty 12). **If the screws interfere with the curb, run the screws from the inside of the fan base. Refer to Figure 9 Detail "D". Verify hardware does not interfere with curb when fan swings open or closed.**
4. Secure the curb plate to the curb using sheet metal screws (#14 x 3/4" – qty 12), **Figure 9** Detail "C". Verify all parts and hardware are secure and tight. Verify that the fan and base swings open properly, see **Figure 10**.

### Parts List

- Left/Right Fan Plates - Qty 2
- Whiz Nuts - Qty 6
- Sheet Metal Screws (#14 x 3/4") - Qty 24
- Left/Right Curb Plates - Qty 2
- Whiz Bolts - Qty 2



# Motor Speed Controller (MSC) Installation

## Wiring the Speed Controller

- Identify the Wires: The speed controller will typically have three wires: one for the incoming power (often black or red), one for the outgoing power to the fan (often red), and a ground wire (often green or bare copper).
- Disconnect Old Switch: Once the old switch is pulled out from the wall box slightly, use the screwdriver to disconnect the wires from the old switch.
- Connect the Controller:
  - Connect the ground wire from the controller to the ground wire in the wall box.
  - Connect the incoming power wire from the controller to the power source wire in the wall box.
  - Connect the outgoing power wire from the controller to the wire leading to the fan.
- Secure Connections: Use wire nuts or connectors to secure all connections.
- Ensure there are no exposed wire strands.



General Rule: Run fan at 50% or more. We run them at 75%

# Site Preparation and Lifting

## Assessment, Planning, and Lifting:

Measure and determine the size of the exhaust fan to ensure it's appropriate for the space. Check local building codes. Some jurisdictions have specific requirements for the installation of commercial exhaust fans.

Lifting heavy equipment like a commercial exhaust fan onto a roof requires specialized equipment to ensure safety and precision. The specific equipment you'd use largely depends on the size and weight of the exhaust fan, the height of the building, and access conditions. Here are some common lifting methods and equipment used: crane, boom lift, etc.

Always check the weight of the exhaust fan and ensure the chosen lifting method can comfortably handle it.

Clear the area below the lifting zone to ensure no one is at risk in case of any mishaps.

Use safety equipment such as helmets, safety harnesses, and gloves.

Ensure all equipment undergoes regular maintenance checks and is in good working condition.

Always have an experienced and trained operator handle the machinery.

Before the operation, conduct a safety briefing for all involved to be aware of the process and potential hazards.

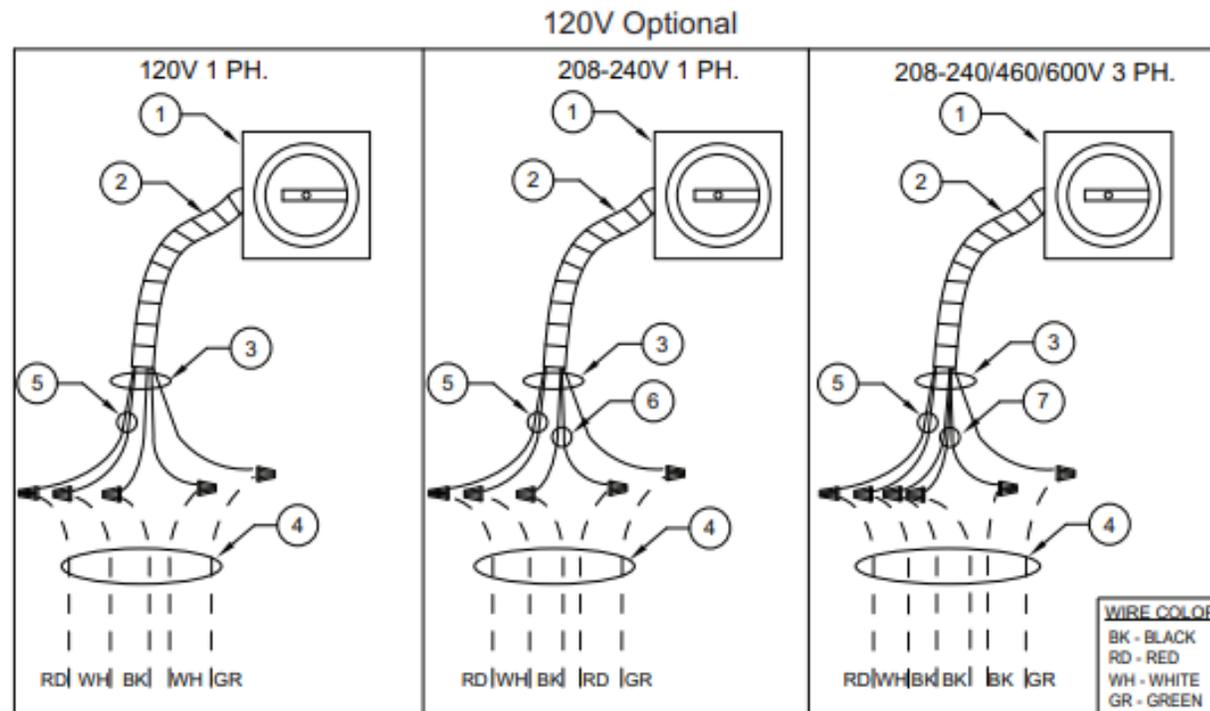


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# Fan to Building Wiring

## Fan to Building Wiring Connection

Figure 35 - Wiring Connection Details

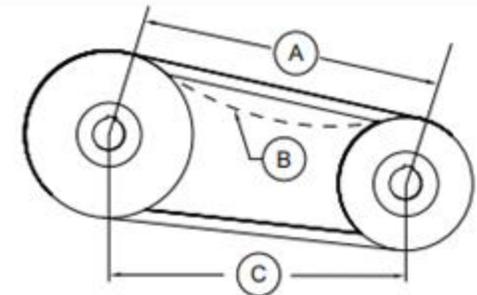


1. Disconnect Switch
2. Galflex Conduit (In Unit)
3. Factory Wiring
4. Field Supplied Wiring - From building power or pre-wired control panel.
5. 120V Single Phase Standing Power
6. 208-240 Single Phase
7. Three Phase

# Pulley Alignment/Proper Belt Tension

Figure 41 - Pulley Alignment/Belt Tension

- A. Belt Span Length
- B. Deflection
- C. Center Distance



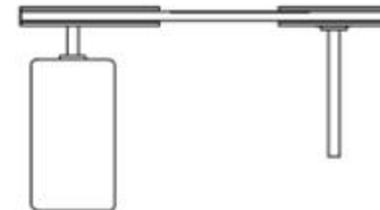
## Pulley Alignment/Proper Belt Tension

1. Belts tend to stretch and settle into pulleys after an initial start-up sequence. **Do not tension belts by changing the setting of the motor pulley**, this will change the fan speed and may damage the motor.
  - To re-tension belts, turn OFF power to the fan motor.
  - Loosen all fasteners that hold the blower motor plate to the blower housing.
  - Rotate the motor to the left or right to adjust the belt tension. Belt tension should be adjusted to allow 1/64" of deflection per inch of belt span. Use extreme care when adjusting V-belts as not to misalign pulleys. Any misalignment will cause a sharp reduction in belt life and produce squeaky noises. Over-tightening will cause excessive belt and bearing wear as well as noise. Too little tension will cause slippage at start-up and uneven wear.
  - **Whenever belts are removed or installed, never force belts over pulleys without loosening motor first to relieve belt tension.** When replacing belts, use the same type as supplied by the manufacturer. On units shipped with double groove pulleys, matched belts should always be used.
2. All fasteners should be checked for tightness each time maintenance checks are performed before restarting unit.

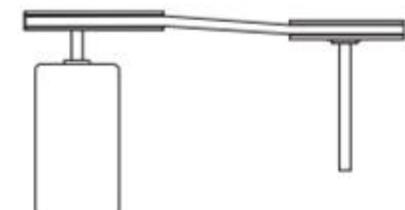
### Belt tension examples:

- Belt span 12" = 3/16" deflection
- Belt span 32" = 1/2" deflection

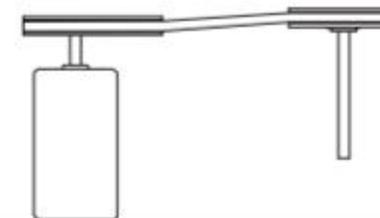
Correct



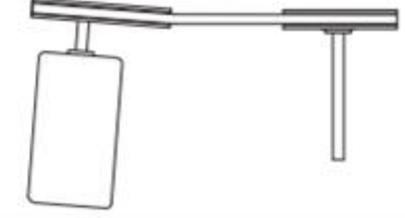
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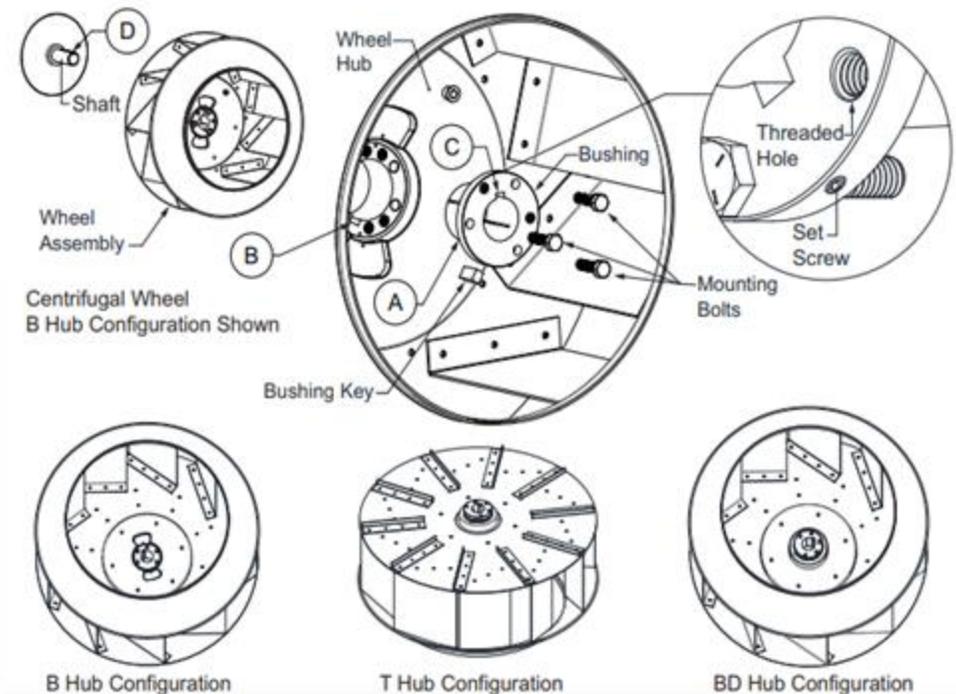


# Installing/Replacing Fan Wheels

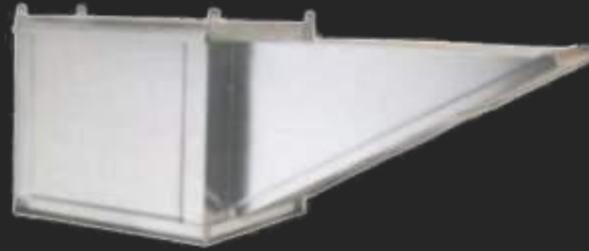
## Installing Fan Wheel

Refer to **Figure 43** for fan bushing assembly details. **Bushing type is stamped on the face of the bushing.**

1. Place bushing key into bushing slot **(A)**, excludes H bushing.
2. Install bushing into wheel hub. Align bushing key with hub keyway **(B)**.
3. Use blue Loctite on the mounting bolts.
4. Install wheel assembly so that the bushing keyway **(C)** is aligned with the motor's shaft key **(D)**.
5. For Direct Drive motors, make sure the bushing is flush to the tip of the motor shaft.
6. For Belt Drive motors, make sure the wheel is properly aligned to the inlet.
7. Tighten set screw to lock shaft key in place. Install bolts and torque to proper setting listed in **Table 7**.



# Supply / MUA Fans



**Make-up Air Fans:** Ventilation systems designed to introduce fresh, conditioned, or unconditioned air into a space or building to compensate for air that is being exhausted, ensuring balanced air pressure and improving indoor air quality.

Make-up air fans are essential for maintaining a balanced indoor environment, especially in spaces with significant exhaust. There are several types of fans that can be used as make-up air fans, depending on the application, volume of air needed, and specific environmental conditions. Here are some common types:

**Axial Fans:**

**Inline Fans:**

**Roof-mounted Fans:**

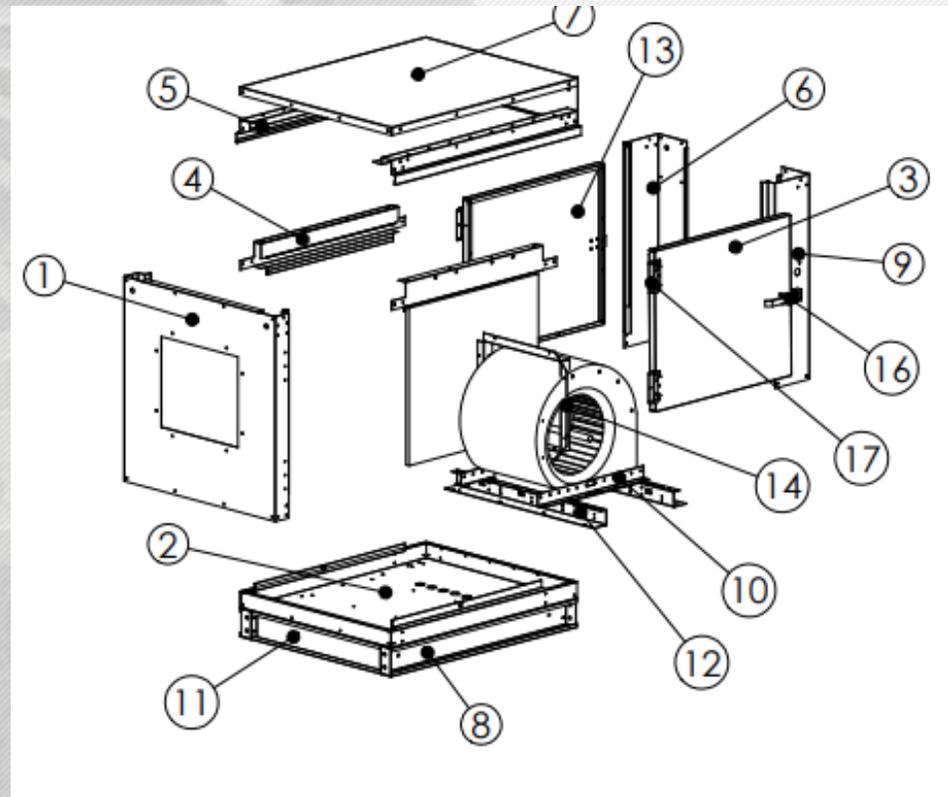
**Wall-mounted Fans:**

**Filtered Make-up Air Fans:**

**Heated or Cooled Make-up Air Fans:**

To satisfy a variety of installation and climatic requirements, packages are available in a number of configurations. Possible configurations include the addition of either a v-bank or an evaporative cooler intake module and a direct fired or indirect fired heating module. All modules bolt together to form a rigid common base structure that mount onto a single curb structure or can be hung for indoor applications.

Combination packages that include both exhaust and supply fans mounted on a single roof curb are also available, please contact your sales representative for more information.



# Crossing Fans

Cross-referencing exhaust fans is essential when looking for a replacement or equivalent fan from a different manufacturer or when seeking an upgrade. It ensures that the new fan will fit the application and perform adequately. Here are the most important aspects to consider during exhaust fan cross-referencing:

**Airflow Capacity (CFM):** The cubic feet per minute (CFM) rating tells you how much air the fan can move. It's essential to match or exceed the CFM rating of the original fan to ensure adequate ventilation.

**Static Pressure:**

**Fan Diameter and Dimensions:** Ensuring that the new fan fits within the existing space is crucial. Note the diameter of the fan wheel and the overall dimensions of the unit.

**Mounting Type:** Whether it's a roof-mounted, wall-mounted, inline, or any other type, the mounting style is essential to match for ease of installation and compatibility with the system.

**Motor Specifications:**

Consider the motor's horsepower (HP), speed (RPM), phase (single or three-phase), and voltage. Ensure the replacement fan's motor matches or exceeds the original's requirements, especially in horsepower.

**Drive Type:** Determine if the fan is direct-driven (where the motor directly drives the fan blade) or belt-driven (where belts and pulleys connect the motor to the fan blade).



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