



ADVANCING VENTILATION®

TORNADO HVLS

5-BLADE HIGH VOLUME LOW SPEED



FEATURES:

BLADES

- Equipped with 5 blades
- Extruded anodized aluminum
- High performance E420 design with STOL technology

WINGTIPS

- Equipped with 5 Wingtips
- Constructed of nylon 66
- Redirect outward airflow into downward airflow

CONSTRUCTION

- Mounting is to be 1/4" powder-coated steel and anodized aluminum
- All construction is to be protected from the element
- Stainless steel safety brackets

MOTOR

- Direct drive ECM
- Totally enclosed
- IP65 rating
- Class F insulation
- 1.35HP (1.0 kW) nominal horsepower

VFD

- Onboard, IP65 rating
- Factory assembled & programmed
- Minimum start/stop torque loads

WARRANTY

- 5 YEAR Housing
- 1 YEAR Motor and Control

| MODEL | DESCRIPTION | FAN DIA. | VOLTAGE RANGE | MOTOR FLA | PHASE | HP | AREA COVERED FOR DESTRATIFICATION | MAX EFFECTIVE DIAMETER FOR DESTRATIFICATION | MAX EFFECTIVE DIAMETER FOR COOLING | MAX SPEED | INSTALLED WEIGHT |
|--------------|-----------------------|-------------------|---------------|-----------|-------|--------------------|--|---|------------------------------------|-----------|------------------|
| THVLS5142301 | TORNADO 14FT 230V/1PH | 14 Ft. (4.3 m) | 207-253V | 5.2 | 1 | 1.35 HP (1.0kW) | 15,386 Ft ² (1429.4 m ²) | 140 Ft. (43 m) | 70 Ft. (21.5 m) | 78 RPM | 236 lbs |
| THVLS5142303 | TORNADO 14FT 230V/3PH | | 207-253V | | 3 | | | | | | |
| THVLS5144603 | TORNADO 14FT 460V/3PH | | 414-506V | | 3 | | | | | | |
| THVLS5162301 | TORNADO 16FT 230V/1PH | 16 Ft. (4.9 m) | 207-253V | 5.2 | 1 | 1.35 HP (1.0kW) | 20,096 Ft ² (1866.9 m ²) | 160 Ft. (49 m) | 80 Ft. (24.5 m) | 64 RPM | 249 lbs |
| THVLS5162303 | TORNADO 16FT 230V/3PH | | 207-253V | | 3 | | | | | | |
| THVLS5164603 | TORNADO 16FT 460V/3PH | | 414-506V | | 3 | | | | | | |
| THVLS5182301 | TORNADO 18FT 230V/1PH | 18 Ft. (5.5 m) | 207-253V | 5.2 | 1 | 1.35 HP (1.0kW) | 25,434 Ft ² (2362.8 m ²) | 180 Ft. (55 m) | 90 Ft. (27.5 m) | 55 RPM | 277 lbs |
| THVLS5182303 | TORNADO 18FT 230V/3PH | | 207-253V | | 3 | | | | | | |
| THVLS5184603 | TORNADO 18FT 460V/3PH | | 414-506V | | 3 | | | | | | |
| THVLS5202301 | TORNADO 20FT 230V/1PH | 20 Ft. (6.1 m) | 207-253V | 5.2 | 1 | 1.35 HP (1.0kW) | 31,400 Ft ² (2917.1 m ²) | 200 Ft. (61 m) | 100 Ft. (30.5 m) | 53 RPM | 285 lbs |
| THVLS5202303 | TORNADO 20FT 230V/3PH | | 207-253V | | 3 | | | | | | |
| THVLS5204603 | TORNADO 20FT 460V/3PH | | 414-506V | | 3 | | | | | | |
| THVLS5242301 | TORNADO 24FT 230V/1PH | 24 Ft. (7.3 m) | 207-253V | 5.2 | 1 | 1.35 HP (1.0kW) | 45,216 Ft ² (4200.7 m ²) | 240 Ft. (73 m) | 120 Ft. (36.5 m) | 40 RPM | 306 lbs |
| THVLS5242303 | TORNADO 24FT 230V/3PH | | 207-253V | | 3 | | | | | | |
| THVLS5244603 | TORNADO 24FT 460V/3PH | | 414-506V | | 3 | | | | | | |

- 277V power source is not accepted.
- Estimated values based on typical conditions.



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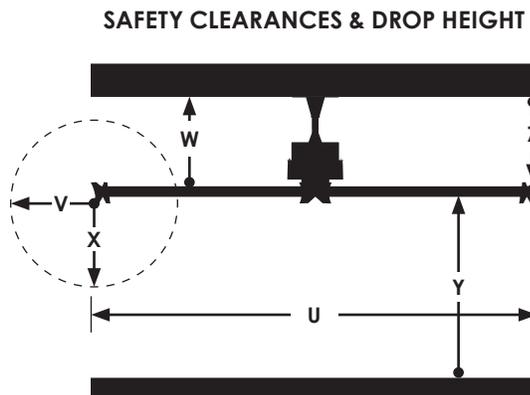
TORNADO HVLS

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SAFETY CLEARANCES AND DROP HEIGHT

| MODEL | DIAMETER [U] | SIDE [V] | ABOVE [W] | BELOW [X] | MIN. BLADE HEIGHT [Y] | BLADE DROP HEIGHT [Z] |
|----------|----------------|----------|-----------|-----------|-----------------------|-----------------------|
| THVLS514 | 14 Ft. (4.3 m) | 26" | 33" | 26" | 10' | 38" |
| THVLS516 | 16 Ft. (4.9 m) | 30" | 33" | 30" | 10' | 40" |
| THVLS518 | 18 Ft. (5.5 m) | 33" | 33" | 33" | 10' | 43" |
| THVLS520 | 20 Ft. (6.1 m) | 36" | 33" | 36" | 10' | 45" |
| THVLS524 | 24 Ft. (7.3 m) | 44" | 33" | 44" | 10' | 49" |

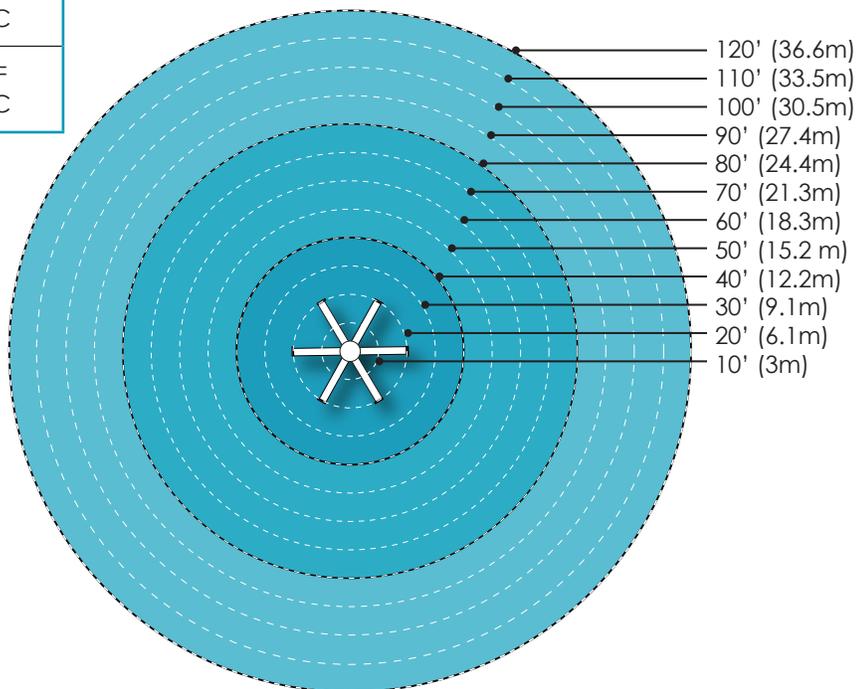
• All dimensions are based on a standard 1' extension bar.



MAX EFFECTIVE DIAMETER FOR COOLING

| DISTANCE FROM CENTER | AIR VELOCITY ³ | COOLING SENSATION ³ |
|--------------------------|------------------------------|--------------------------------|
| 0' - 40' (0 - 12.2m) | 620 - 900 fpm 3 - 4.5 m/s | 14 - 15°F 8 - 10°C |
| 40' - 80' (12.2 - 24.4m) | 340 - 620 fpm 1.7 - 3 m/s | 9 - 15°F 5 - 8°C |
| 80' - 120' (24.4-36.6m) | 0 - 340 fpm 0 - 1.7 m | 0 - 9°F 0 - 5°C |

• Stated values are estimations based on standard installation at maximum power. Values such as building layout, obstructions, ceiling height, and drop ceiling height may effect these numbers.

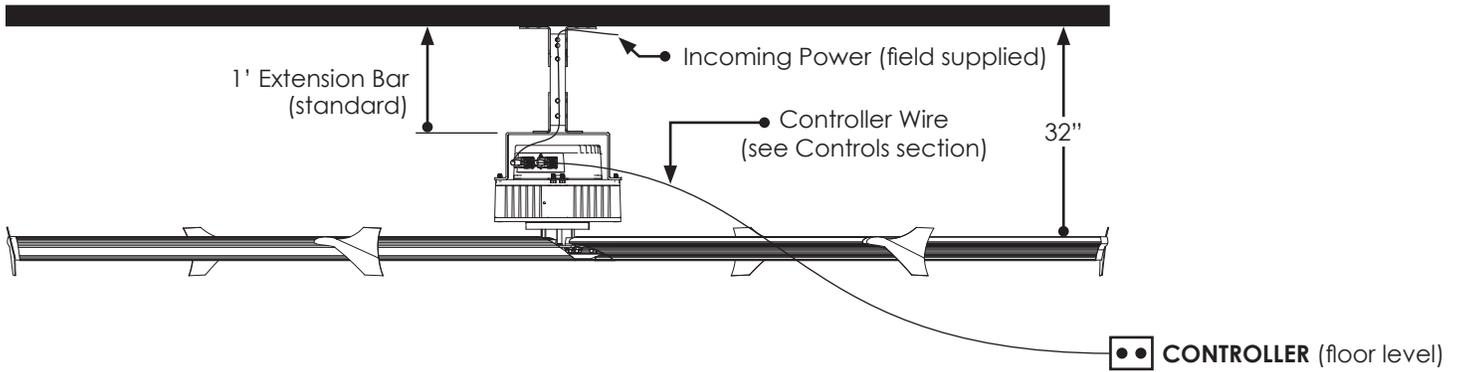




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TORNADO INSTALLATION





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WRITTEN SPECIFICATIONS

- A. Basis-of-design product: Subject to compliance with requirements, provide S&P USA **Tornado** high volume low speed ceiling fans.
- B. Complete Unit: The fan shall be designed to move an effective amount of air for cooling and Destratification in large industrial/commercial applications over an extended life. The fan and components shall be designed specifically for high volume, low speed fans to ensure lower noise operation. The sound levels from the fan operating at maximum speed shall not exceed <35 dBA (measured 20' or 6.1 m below the blades and 20' or 6.1 m horizontally from the center of the fan).
- C. Blades: The fan shall be equipped with five (5) high volume, low speed blades of precision 6005-T5 extruded anodized aluminum alloy. Each blade shall be of the high performance E420 (Short Take-Off and Landing) design. The blades shall be connected by means of two (2) locking bolts per blade. The blades shall be connected to "H-Strut" which is connected to the hub and interlocked with two sets of six stainless steel retainers.
- D. Wingtips: The fan shall be equipped with five (5) Wingtips designed to redirect outward airflow into downward airflow, thereby enhancing the efficiency and effectiveness of the fan. The wingtips shall be molded of Nylon 66 and nominally measure 10"x6-3/8" (25.4 cm x 16.2 cm). The wingtips shall be attached at the tip of each blade by means of a single screw. The standard color of the winglets shall be Red, but may also be offered in black.
- E. Motor: The fan motor shall be an ECM (Electronically Commutated Motor), BLDC (Brushless DC), gearless direct drive 230V, 1-3 Ph and 460V, 3 Ph. The motor shall be totally enclosed with an IP65 NEMA classification. The motor shall be manufactured with Class F insulation. The output shaft of the motor shall be no less than a 3" keyless shaft with bearings that are lubed for life.
- F. Extension Bar: The fan shall be equipped with an extension bar that provides a structural connection between the fan assembly and upper mounting system. The extension bar shall be aluminum 2" x 2" (5.08 cm x 5.08 cm) square tubing and powder-coated for corrosion resistance and appearance. Standard length of extension bar is 1 FT available in 1 FT increments up to 10 FT as specified by the architect or owner.
- G. Hub: The fan hub shall be minimum 1/4" precision press broken stainless steel for high strength and rigidity. The hub shall be secured to the output shaft of the motor by means of a precision cut stainless steel cylinder & interlocking bushing system. Both hub and steel bushing shall be precision machined to achieve a factory balanced and solid rotating assembly. The hub shall incorporate five (5) safety retaining brackets no less than 1/8" made of stainless steel that shall restrain the hub/blade assembly in case of motor output shaft failure.
- H. Mounting System: The fan mounting system shall be designed for quick and secure installation from a structural support beam. All components in the mounting system shall be of welded construction using 1/4" powder-coated steel. All mounting bolts shall be Grade 5 or Grade 8 SAE.
- I. Guy Wire: The fan shall be equipped with a safety cable that provides an additional means of securing the fan assembly to the building structure. The safety cable shall be a four point restraint 3/16" (.47 cm) diameter and fabricated out of 7 x 19 stranded galvanized steel with each cable having a breaking strength of 2,475 lbs. The cable is to be secured with supplied wire rope clips or fasteners. Field construction of safety cables is not permitted.
- J. Safety Cable: The fan shall be equipped with a safety cable that provides an additional means of securing the fan assembly to the building structure. The safety cable shall be 3/16" (.47 cm) diameter and fabricated out of 7 x 19 stranded galvanized steel a break strength of 2,475 lbs. The cable is to be secured with supplied wire rope clips or fasteners. Field construction of safety cables is not permitted.
- K. VFD Enclosure: The fan controller shall be constructed using a Variable Frequency Drive (VFD) that is pre-assembled and factory programmed to communicate a 60 second ramp up/down to the fan, to minimize the starting and braking torques and for smooth and efficient operation. The VFD enclosure shall be pre-assembled and internally wired for ease of installation. The controller shall be onboard with IP65 rating.
- L. Warranty: The Manufacturer shall replace any products or components defective in material or workmanship, free of charge to the customer (including transportation charges within the USA, F.O.B. , pursuant to the complete terms and conditions of the S&P USA Non-Prorated Warranty in accordance to the following schedule:
- Blades - 5 years (Parts)*
 - Hub - 5 years (Parts)*
 - Motor -1 yeas (Parts)*
 - Controller - 1 yeas (Parts)*
- *If factory supplied installation methods are shown not to be valid, S&P USA has right to void warranty. Further Information on the terms and conditions of the standard & purchased warranties can be found in Warranty Card.
- S&P USA is not liable for any voltage disturbances with explicit reference to electronic magnetic interference (EMI). Voltage disturbance refers to transient overvoltage, voltage unbalance, voltage swells, rapid voltage change, flicker, superimposed signals, harmonic voltages, supply voltage variations, voltage dips and frequency/time deviation.