

Installation, Operation and Maintenance Manual

Please read and save these instructions for future reference. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with these instructions will result in voiding of the product warranty and may result in personal injury and/or property damage.

⚠ IMPORTANT: DS fans must be installed with the supplied CAT-5e communication cable or shielded CAT-5e (by others) that complies with the following specifications. Cable must be twisted pair, shielded 26 ga. CAT-5e cable with a drain wire and must be compliant with ISO 11801. Cable must use shielded RJ45 connectors with a soldered drain and wiring configuration must follow EIA/TIA T568B wiring pinout. Individual CAT-5e cable lengths must not exceed 200 ft. in order to prevent network communication issues.



Models DS-3 and DS-6 are the ideal choice for providing year-round comfort in air circulation and destratification applications. Featuring an aerodynamic, extruded aluminum airfoil design and a high efficiency direct drive motor, model DS delivers maximum airflow at a fraction of the operating cost of other HVLS fans. And, with its factory assembled motor and drive package, the DS fan is the easiest HVLS fan to install in the market!

Required Tools

The following tools will be required to complete the installation of every DS fan. Additional tools may be required depending on the application and installation location of the fan.

- Socket Wrench with 7/16 in., 1/2 in., 9/16 in., and 3/4 in. Sockets
- 7/16 in., 1/2 in., 9/16 in. and 3/4 in. Wrenches
- Torque Wrench (up to 50 ft·lbf)
- Torque Wrench (up to 120 in·lbf)
- Drill and 9/16 in. Drill Bit
- Phillips Screwdriver
- 1/2 in. Hex Drive
- Level

- Impact Driver
- # 2 Phillips Bit and Driver
- 3/8 in. Nut Driver
- Nut Driver Extension

NOTE: Reference the table on page 7 for all model DS fan weights. A suitable means for lifting the weight of the fan to the mounting point, such as a scissor lift, should be used for all DS fan installations.

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General Information

IMPORTANT SAFETY INSTRUCTIONS

IMPORTANT: To reduce the risk of fire, electric shock, or injury to persons, Model DS fans must be installed with a mount assembly, motor and drive assembly and airfoils that are marked (on their cartons) to indicate suitability with this model. Other mounts, motors, and airfoils cannot be substituted.

Only qualified personnel should install this fan. Personnel should have a clear understanding of these instructions and should be aware of general safety precautions. Improper installation can result in electric shock, possible injury due to coming in contact with moving parts, as well as other potential hazards. Other considerations may be required if high winds or seismic activity are present. If more information is needed, contact a licensed professional engineer before moving forward.

1. Follow all local electrical and safety codes, as well as the National Electrical Code (NEC) and the National Fire Protection Agency (ANSI/NFPA 70), where applicable. Follow the Canadian Electric Code (CEC) in Canada.
2. The rotation of the impeller is critical. It must be free to rotate without striking or rubbing any stationary objects.
3. Motor must be securely and adequately grounded.
4. Do not allow the power cable to kink or come in contact with oil, grease, hot surfaces or chemicals. Replace cord immediately if damaged.
5. Verify that the power source is compatible with the equipment.
6. Suitable for use with solid state speed controls.
7. Suitable for use in wet locations when installed in a GFCI protected branch circuit.

WARNING

To reduce the risk of fire, electric shock, or injury to persons, observe the following:

- a. Use this unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.
- b. Before servicing or cleaning unit, switch power off at service panel and lock the service disconnecting means to prevent power from being switched on accidentally. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.
- c. Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction.
- d. When cutting or drilling into wall or ceiling, do not damage electrical wiring and other hidden utilities.

WARNING

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

AVERTISSEMENT

Pour réduire le risque d'incendie, de choc électrique ou de blessure corporelle, respecter ce qui suit :

- a. Utiliser cet appareil exclusivement comme prévu par le fabricant. En cas de questions, communiquer avec le fabricant.
- b. Avant tout entretien ou nettoyage de l'appareil, couper l'alimentation sur le tableau de commande et verrouiller le dispositif de sectionnement pour empêcher toute mise sous tension accidentelle. Si le dispositif de sectionnement ne peut pas être verrouillé, attacher un moyen de mise en garde bien visible, tel qu'un panneau, au tableau de commande.
- c. La pose et le câblage électrique doivent être effectués par des personnes qualifiées en conformité avec les codes et normes en vigueur, y compris pour la résistance au feu du bâtiment.
- d. Lors de la découpe ou du perçage de murs ou plafonds, ne pas endommager les câbles électriques et autres conduites masquées.

AVERTISSEMENT

Cet appareil peut être utilisé par des enfants âgés de 8 ans et plus et par des personnes aux capacités physiques, sensorielles ou mentales réduites ou qui manquent d'expérience et de connaissances s'ils sont surveillés ou ont reçu des instructions concernant l'utilisation sécuritaire de l'appareil et comprennent les risques encourus. Les enfants ne doivent pas jouer avec l'appareil. Le nettoyage et l'entretien par l'utilisateur ne doivent pas être effectués par des enfants sans surveillance.

DANGER
Always disconnect, lock, and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury.
CAUTION
When servicing the fan, motor may be hot enough to cause pain or injury. Allow motor to cool before servicing.
CAUTION
Precaution should be taken in explosive atmospheres.
DANGER
Pour écarter les risques d'incendie, de choc électrique ou de blessure grave, veiller à toujours débrancher, verrouiller et étiqueter la source de courant avant l'installation ou l'entretien.
ATTENTION
Lors de toute intervention sur la soufflante, le moteur peut être suffisamment chaud pour provoquer une douleur voire une blessure. Laisser le moteur refroidir avant toute maintenance.
ATTENTION
Faire preuve de précaution dans les atmosphères explosives.

Receiving

Upon receiving the product, check to ensure all items are accounted for by referencing the delivery receipt or packing list. Inspect each crate or carton for shipping damage before accepting delivery. Alert the carrier of any damage detected. The customer will make a notation of damage (or shortage of items) on the delivery receipt and all copies of the bill of lading which is countersigned by the delivering carrier. If damaged, immediately contact your local representative. Any physical damage to the unit after acceptance is not the responsibility of the manufacturer.

Unpacking

Verify that all required parts and the correct quantity of each item have been received using the component list on pages 5-6. If any items are missing, report shortages to your local representative to arrange for obtaining missing parts. Due to availability of transportation and truck space all items for the unit may not be shipped together. Confirmation of shipment(s) must be limited to only items on the bill of lading.

Storage

Fans are protected against damage during shipment. If the unit cannot be installed and operated immediately, precautions need to be taken to prevent deterioration of the unit during storage. The user assumes responsibility of the fan and accessories while in storage. The manufacturer will not be responsible for damage during storage. These suggestions are provided solely as a convenience to the user.

The ideal environment for the storage of fans and accessories is indoors, above grade, in a low humidity atmosphere that is sealed to prevent the entry of blowing dust, rain or snow. Temperatures should be evenly maintained between 30° to 110°F (-1° to 43°C). Wide temperature swings may cause condensation and “sweating” of metal parts. All accessories must be stored indoors in a clean, dry atmosphere.

Remove any accumulations of dirt, water, ice or snow and wipe dry before moving to indoor storage. To avoid “sweating” of metal parts, allow cold parts to reach room temperature. To dry parts and packages, use a portable electric heater to get rid of any moisture build up. Leave coverings loose to permit air circulation and to allow for periodic inspection.

The unit should be stored at least 3-1/2 in. off the floor on wooden blocks covered with moisture proof paper or polyethylene sheathing. Aisles between parts and along all walls should be provided to permit air circulation and space for inspection.

Inspection and Maintenance During Storage

While in storage, inspect fans once per month. Keep a record of inspection and maintenance performed.

If moisture or dirt accumulations are found on parts, the source should be located and eliminated. If paint deterioration begins, consideration should be given to touch-up or repainting. Fans with special coatings may require special techniques for touch-up or repair.

Machined parts coated with rust preventive should be restored to good condition promptly if signs of rust occur. Immediately remove the original rust preventive coating with petroleum solvent and clean with lint free cloths. Polish any remaining rust from surface with crocus cloth or fine emery paper and oil. Do not destroy the continuity of the surfaces. Thoroughly wipe clean with Tectyl® 506 (Ashland Inc.) or the equivalent. For hard to reach internal surfaces or for occasional use, consider using Tectyl® 511M Rust Preventive, WD-40® or the equivalent.

Removing from Storage

As fans are removed from storage to be installed in their final location, they should be protected and maintained in a similar fashion until the fan equipment goes into operation.

Fan Components

Verify that all of the following parts and hardware have been received prior to beginning installation. Contact your local representative or the manufacturer if replacement parts are required.

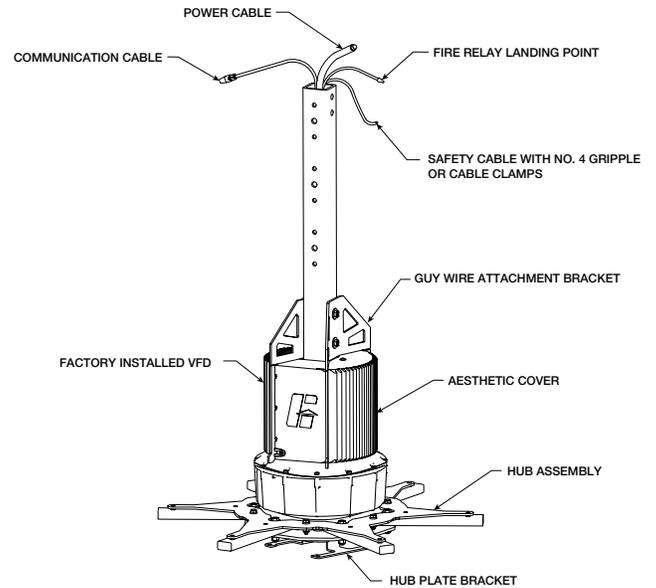
NOTE: Additional parts (provided by others) may be required to complete the fan installation, including additional wiring, steel angle or Unistrut® channel, and hardware for connecting the fan mount to the building structure.

NOTE: Hardware quantities listed indicate what is required to complete installation. Hardware kits may include extra fasteners as a convenience.

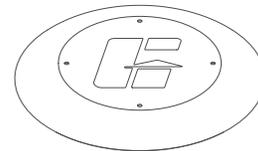
Guy Wire Fastener Kit Bag # 916290	
	
U-Bolt Steel Cable Clamps (10)	Turnbuckle (4)
	
Guy Wire Clamps (4)	Quick Link (8)
Downtube and Ceiling Mount Fastener Bag # 920984	
1/2 in. – 13 x 5 inch Grade 8 Bolt (2)	
1/2 in. Washer (4)	
1/2 in. – 13 Grade 8 Nylon Locknut (2)	
Airfoil Blade and Hub Plate Fastener Kit Bag # 915066 OR 854832	
5/16 in. Washer (12 OR 24)	
5/16 in. – 18 Grade 8, Nylon Locknut (6 OR 12)	
5/16 in. – 18 x 2 in. Grade 8, Hex Bolt (6 OR 12)	
#10 – 12 x 3/4 in. Screw (6 OR 12)	
1/4 in. – 20 x 1 in. Machine Screw (4)	



Ceiling Mount (1)



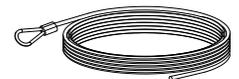
Downtube and Motor and Drive Assembly (1)



Hub Plate (1)



Shielded CAT-5e Control Cable (1)



20 Ft. Guy Wire (4)



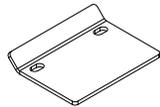
Winglet (3 OR 6)



Airfoil Blade (3 OR 6)

Optional Fan Components

I-Beam Mounting Kit (Optional)



I-Beam Clamping Plate (2)



I-Beam Clamping Plate Shim (2)

I-Beam Fastener Kit (Optional) Bag # 915428

1/2 in. Washer (8)

1/2 in. – 13 Grade 8, Nylon Locknut (4)

1/2 in. – 13 x 2-1/2 in. Grade 8, Hex Bolt (4)

Steel Truss Mounting Kit (Optional)



Square Washer Plate (4)

Steel Truss Fastener Kit (Optional) Bag # 915428

1/2 in. Washer (8)

1/2 in. – 13 Grade 8, Nylon Locknut (4)

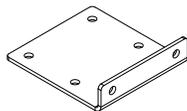
1/2 in. – 13 x 2-1/2 in. Grade 8, Hex Bolt (4)

Gripple® Fastener Kit (Optional) Bag # 916290



No. 4 Gripple® (5) Quick Link (8) Turnbuckle (4)

Wood Beam Mounting Kit (Optional)



Wood Beam Bracket (2)

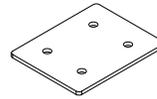
Wood Beam Fastener Kit (Optional) Bag # 915428

1/2 in. Washer (8)

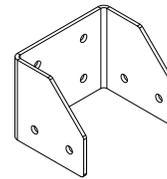
1/2 in. – 13 Grade 8, Nylon Locknut (4)

1/2 in. – 13 x 2-1/2 in. Grade 8, Hex Bolt (4)

Z-Purlin Mounting Kit (Optional)



Z-Purlin Backing Plate (2)



Z-Purlin Mounting Bracket (2)

Z-Purlin Fastener Kit (Optional) Bag # 915431

1/2 in. – 13 x 1-3/4 in. Grade 8, Hex Bolt (20)

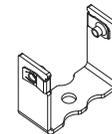
1/2 in. – 13 Grade 8, Nylon Locknut (20)

1/2 in. Washer (40)

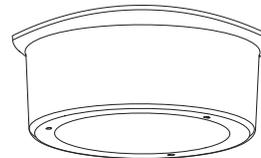
LED Light Kit (Optional)



LED Light (1)



LED Light Mounting Bracket (1)



LED Light Shroud (1)

LED Light Fastener Kit (Optional)

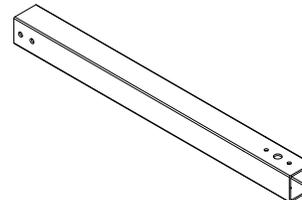
1/4 in. – 20 x 3/4 in. Grade 5 Hex Bolt (2)

M10 – 1-1/2 x 20 mm Grade 8 Hex Bolt (1)

3/8 in. Washer (1)

M4 – 0.7 x 10 mm Bolt (3)

Extension Tube Kit (Optional)



Extension Tube (1)

Extension Tube Fastener Kit (Optional) Bag # 920998

3/8 in. – 16 x 3-3/4 in. Grade 8 Bolt (2)

3/8 in. Washer (4)

3/8 in. – 16 Grade 8 Nylon Locknut (2)

Socket Head 1/2 in. – 13 x 3-1/2 in. Bolt (1)

1/2 in. Washer (1)

1/2 in. – 13 Grade 8 Nylon Locknut (1)

Pre-Installation

Pre-Installation Checks

IMPORTANT: Consult all applicable national, state and local codes to ensure that all necessary code requirements are met. It is the sole responsibility of the installer to ensure compliance with applicable codes.

Prior to installing the fan, perform each of the following checks:

1. Verify that fan components are undamaged. Do not install or operate any damaged fan components, fans, or fan accessories. Failure to comply with this instruction may result in property damage, personal injury and/or death.
2. Verify that the fan is to be installed in a location where the airfoils will be a minimum of 10 ft. above the finished floor with a minimum of 3 ft. of horizontal and vertical clearance to any obstructions.
3. Verify that the fan is to be installed in a location where the center of the fan is a minimum of 1.5 fan diameters away from building walls and corners.
4. For best performance, the fan must be installed with a two fan diameter minimum clearance to radiant heaters and HVAC system discharges or intakes.
5. Check that the fan will not be mounted in a location near overhead doors or other building openings where gusts of wind may occur. Fan should not be installed or operated in locations where wind is present.
6. If the building is equipped with a fire sprinkler system, verify that the placement of the fan will not interfere with correct sprinkler operation and that the fan installation complies with all national, state and local codes. For NFPA 13 compliance, fan must be installed in the center of four adjacent sprinklers with at least 3 ft. of vertical clearance between the fan and sprinkler deflectors. Fan must also be interlocked to shut down upon receiving a waterflow signal from the building's alarm system.
7. Check to see if the intended placement of the fan is directly below any building lights or skylights. If possible, avoid installing fan directly below a light source to prevent a strobing effect that can be caused by fan rotation.
8. If the building has a mezzanine or other elevated spaces that may be occupied by people, verify that no component of the fan can be reached from the highest level or deck. The fan must be positioned so that the tips of the airfoils are a minimum of 3 ft. away from the furthest point that a person could reach or otherwise come in contact, to prevent injury.

9. If the fan is to be mounted in an area where materials or equipment may be elevated into its path, ensure that the floor is marked or painted to alert personnel of the overhead location of the fan(s).
10. Before installation, it is important to verify that the mounting surface will bear the operating weight and maximum torque (twisting force) of the unit. The Structural Engineer of Record (SEOR) must perform a thorough evaluation of the mounting structure and determine all final mounting requirements before the fan is installed. It is the sole responsibility of the installer to ensure that the mounting structure and fan installation method are adequate for safe operation of the fan.

Base Fan Weight

Fan Size (ft.)	DS-3		DS-6	
	*Max. Fan Weight (lbs)	Max Torque (ft-lbf)	*Max. Fan Weight (lbs)	Max. Torque (ft-lbf)
8	141	15.3	157	19.8
10	146	19.0	166	38.4
12	150	33.4	175	52.6
14	155	47.6	184	75.0
16	159	54.7	207	93.7
18	164	75.6	216	114.0
20	183	90.6	225	141.0
24	192	92.2	244	215.7

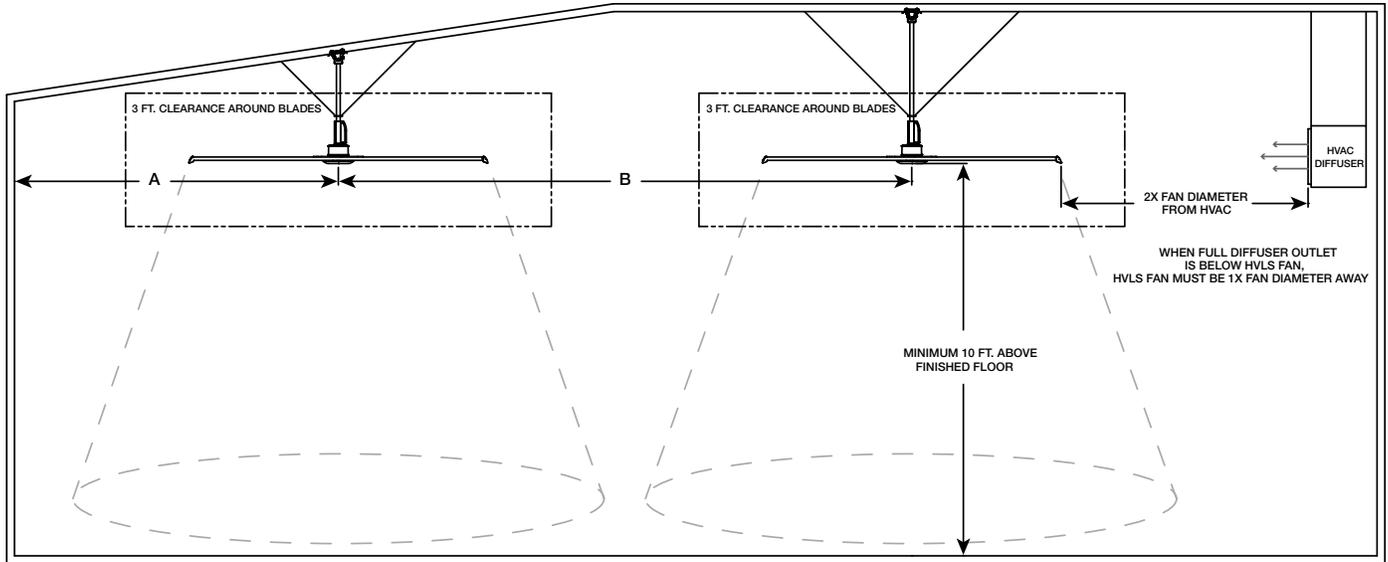
*Maximum weight is shown in pounds and includes all components in a base fan model.

Option and Accessory Weight

Fan Option/Accessory	**Weight (lbs)
I-Beam Mounting Kit	13.3
Steel Truss Mounting Kit	By Others
Wood Beam Mounting Kit	16
Z-Purlin Mounting Kit	By Others
Unistrut Mounting Kit	By Others
24 in. Extension Tube	14.8
36 in. Extension Tube	22
48 in. Extension Tube	29.2
60 in. Extension Tube	36.3
72 in. Extension Tube	43.5
84 in. Extension Tube	50.7
LED Light Kit	10.3

**Weight is shown in pounds for all substantial fan options and accessories. These options and accessories add additional weight to the Base Fan Weight table above.

Minimum Spacing Requirements



Fan Size (ft.)	Minimum Spacing From Center of Fan (ft.)	
	A	B
8	12	24
10	15	30
12	18	36
14	21	42
16	24	48
18	27	54
20	30	60
24	36	72

Mechanical Installation

Mounting Kit Installation

DANGER

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

DANGER

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

The following mounting installations are covered in this manual. Identify the supplied mounting kit on page 6, locate the appropriate installation within this manual.

- I-Beam Mounting Kit
- Steel Truss Mounting Kit
- Wood Beam Mounting Kit
- Z-Purlin Mounting Kit
- Unistrut® Mounting Kit (by others)

I-Beam Mounting Kit (For Flanges up to 13 in. Wide)

IMPORTANT: Structural Engineer of Record (SEOR) must perform thorough evaluation of mounting structure and determine final mounting requirements before fan is installed. Manufacturer is not liable for any problems that arise as the result of insufficient structure, including (but not limited to) vibration, noise, or safety hazards. Product warranty will be voided at manufacturer's discretion if structure is deemed insufficient.

Installations must comply with the following requirements at a minimum, but SEOR may require more stringent specifications at their discretion:

- Do not install HVLS fans on fabricated I-beams.
- HVLS fans should only be installed on I-beams that are part of the existing building structure.
- I-beam must have a minimum flange width of 5 inch and a minimum flange thickness of 1/2 inch.
- Do not weld HVLS fans to I-beams.
- Do not use I-beam mounting kit on any other type of structure (steel trusses, steel angles, etc.).

Required Loose Components (Included):

- I-Beam Clamping Plate (2)
- I-Beam Clamping Plate Shim (2)

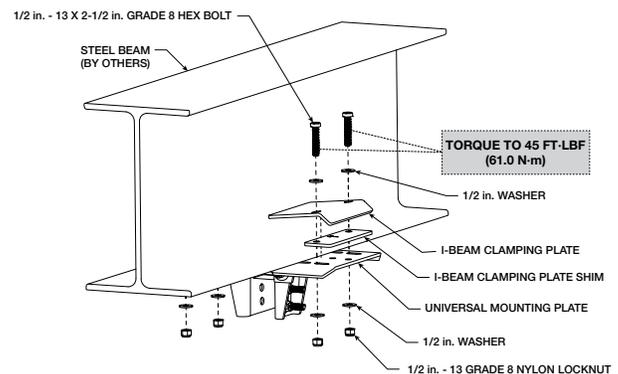
Required Components from Bag # 915428:

- 1/2 in. – 13 x 2-1/2 in. Grade 8 Hex Bolt (4)
- 1/2 in. – 13 Grade 8 Nylon Locknut (4)
- 1/2 in. Washer (8)

Hardware/Tools Needed (Not Included):

- Torque Wrench
 - 3/4 in. Socket and Ratchet
 - 3/4 in. Wrench
1. Using appropriate lifting equipment to safely access the ceiling workspace.
 2. Using the ceiling mount plate as a guide, identify the appropriate set of mounting slots to use for installation. The ceiling mountplate can accommodate I-beams with a flange width up to 13 in., a flange thickness up to 1 in., and a vertical web thickness up to 2-3/4 in.
 3. Attach (1) I-beam clamping plate shim and (1) I-beam clamping plate to the ceiling mount plate using (2) 1/2 in. – 13 x 2-1/2 in. grade 8 hex bolts, (4) 1/2 in. washers, and (2) 1/2 in. – 13 grade 8 nylon locknuts. Hook the I-beam clamping plate onto one side of the I-beam and tighten hardware until the ceiling mount plate is snug against the beam but can still be moved (approximately 1/4 in. of the bolt threads exposed below the nylon locknut).

IMPORTANT: I-beam clamping plate shims and I-beam clamping plates must be installed so that the laser-cut arrows are pointing towards the I-beam. Ensure that the narrowest possible set of mounting holes is used on the universal mounting plate to ensure maximum engagement with the I-beam.



4. Attach the opposing I-beam clamp plate shim and I-beam clamp plate on to the ceiling mount plate and I-beam. Hand tighten hardware.
5. Center the ceiling mount plate under the I-beam. Ensure the I-beam clamp plates have maximum engagement on both sides and tighten hardware evenly to 45 ft-lbf (61.0 N·m).
6. Turn to page 14 to install the motor and drive assembly.

Steel Truss Mounting Kit

IMPORTANT: Structural Engineer of Record (SEOR) must perform thorough evaluation of mounting structure and determine final mounting requirements before fan is installed. Manufacturer is not liable for any problems that arise as the result of insufficient structure, including (but not limited to) vibration, noise, or safety hazards. Product warranty will be voided at manufacturer's discretion if structure is deemed insufficient.

Installations must comply with the following requirements at a minimum, but SEOR may require more stringent specifications at their discretion:

- ❑ Do not install HVLS fans on a single steel truss. Structural steel angles must be used to span a minimum of 2 trusses.
- ❑ Steel trusses must have a minimum chord width of 5 inches.
- ❑ Structural steel angle span lengths must not exceed 8 feet. For span lengths up to 8 feet, a minimum of 2 structural steel angles are required.
- ❑ Size of structural steel angles must be specified by a structural engineer. Angles must be a minimum of 4 x 4 x 1/4 inch thick. Larger angles may be required for span lengths up to 8 feet. Angles shall be sufficiently stiff to avoid harmonic resonance.

Required Loose Components (Included):

- Square Washer Plate (4)

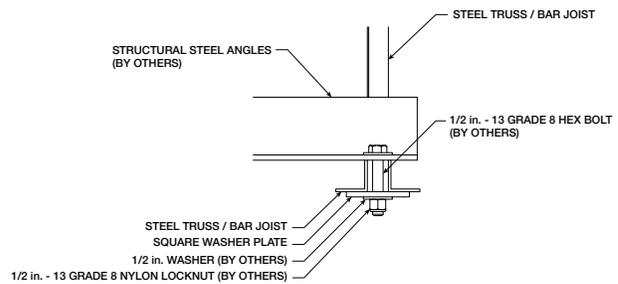
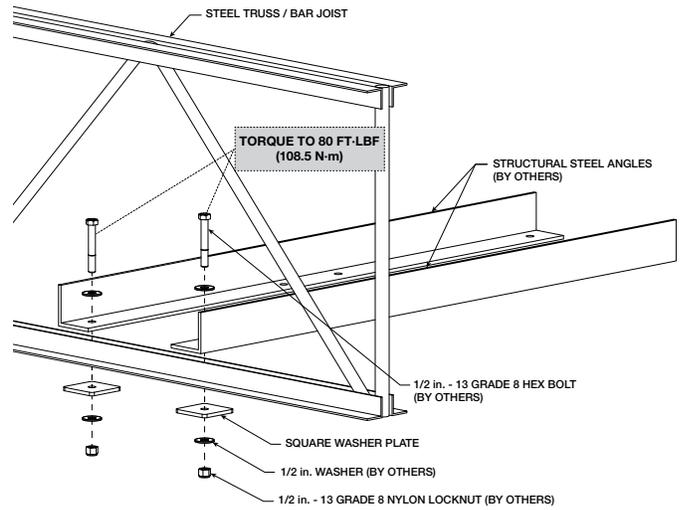
Required Components from Bag # 915428:

- 1/2 in. – 13 x 2-1/2 in. Grade 8 Hex Bolt (4)
- 1/2 in. – 13 Grade 8 Nylon Locknut (4)
- 1/2 in. Washer (8)

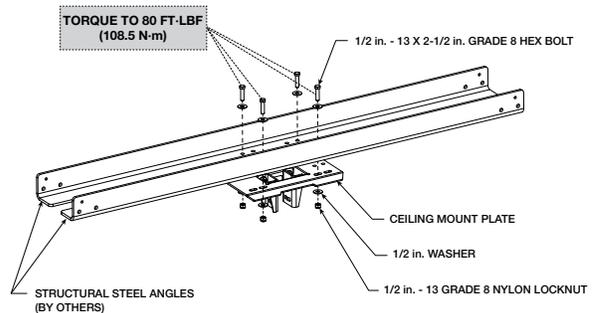
Hardware/Tools Needed (Not Included):

- Structural Steel Angles (2)
- 1/2 in. – 13 Grade 8 Hex Bolt (4), *length determined by truss and steel angle material thickness*
- 1/2 in. – 13 Grade 8 Nylon Locknut (4)
- 1/2 in. Washer (8)
- Torque Wrench
- 3/4 in. Socket and Wrench
- 3/4 in. Wrench
- Drill and 9/16 in. Drill Bit

1. Size structural steel angles (by others) to fit within steel trusses/bar joists. Size of steel angle to be determined by structural engineer.
2. Mount structural steel angles to steel trusses/bar joists using (4) grade 8, 1/2 in. – 13 bolts (by others to accommodate varying material thickness), and (8) 1/2 in. washers, (4) square washer plates, and (4) 1/2 in. – 13 nylon locknuts. Note that the hardware should be installed through the gap in the bottom chord of the steel trusses/bar joists (reference drawing on to the right). Torque hardware to 80 ft·lbf (108.5 N·m).



3. Locate desired fan hanging location. Using the universal mounting plate as a template, mark and drill (4) 9/16 in. holes in structural steel angles.
4. Bolt ceiling mount plate into place using supplied (4) 1/2 in. – 13 x 2-1/2 in. grade 8 hex bolts, (8) 1/2 in. washers and (4) 1/2 in. – 13 grade 8 nylon locknuts. Torque to 80 ft·lbf (108.5 N·m).



5. Turn to page 14 to install the motor and drive assembly.

Wood Beam Mounting Kit (For Beams 6-1/2 - 8-7/8 in. Wide)

IMPORTANT: Structural Engineer of Record (SEOR) must perform thorough evaluation of mounting structure and determine final mounting requirements before fan is installed. Manufacturer is not liable for any problems that arise as the result of insufficient structure, including (but not limited to) vibration, noise, or safety hazards. Product warranty will be voided at manufacturer's discretion if structure is deemed insufficient.

Installations must comply with the following requirements at a minimum, but SEOR may require more stringent specifications at their discretion:

- Do not use the wood beam mounting kit on wood beams that are less than 6-1/2 inch wide. For thinner wood beams, span two or more beams using structural steel angles or unistrut. Refer to steel truss or unistrut mounting kit instructions.

Required Loose Components (Included):

- Wood Beam Bracket (2)

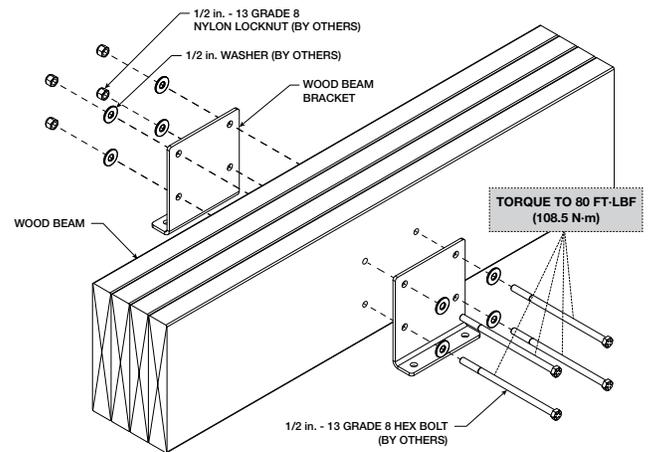
Required Components from Bag # 915428:

- 1/2 in. – 13 x 2-1/2 in. Grade 8 Hex Bolt (4)
- 1/2 in. – 13 Grade 8 Nylon Locknut (4)
- 1/2 in. Washer (8)

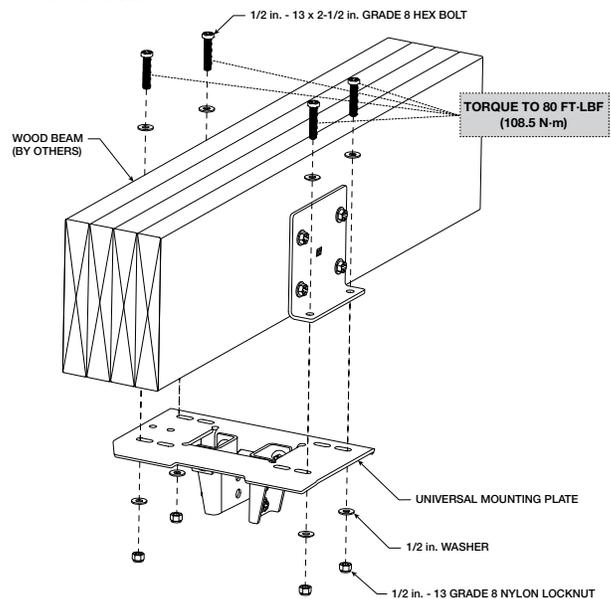
Hardware/Tools Needed (Not Included):

- 1/2 in. – 13 Grade 8 Hex Bolt (4), *length determined by wood beam thickness*
- 1/2 in. – 13 Grade 8 Nylon Locknut (4)
- 1/2 in. Washer (8)
- Torque Wrench
- 3/4 in. Socket and Wrench
- 3/4 in. Wrench
- Drill and 9/16 in. Drill Bit

1. Locate desired fan hanging location. Using the supplied wood beam brackets as a template, mark and drill (4) 9/16 in. holes in the wood beam. Be sure bottom of brackets are flush or slightly below bottom of wood beam to effectively connect to the universal mounting plate. Note that the universal mounting plate can accommodate beam widths between 6-1/2 in. and 8-7/8 in.
2. Bolt wood beam brackets into place using (4) grade 8, 1/2 in. – 13 bolts (by others to accommodate varying material thickness), and (4) 1/2 in. – 13 nylon locknuts, and (8) 1/2 in. washers. Torque hardware to 80 ft·lbf (108.5 N·m).



3. With wood beam brackets installed, line up ceiling mount plate and bolt into wood beam brackets using supplied (4) 1/2 in. – 13 x 2-1/2 in. hex bolts, (8) 1/2 in. washers, and (4) 1/2 in. – 13 nylon locknuts.



4. Torque hardware to 80 ft·lbf (108.5 N·m).
5. Turn to page 14 to install the motor and drive assembly.

Z-Purlin Mounting Kit

IMPORTANT: Structural Engineer of Record (SEOR) must perform thorough evaluation of mounting structure and determine final mounting requirements before fan is installed. Manufacturer is not liable for any problems that arise as the result of insufficient structure, including (but not limited to) vibration, noise, or safety hazards. Product warranty will be voided at manufacturer's discretion if structure is deemed insufficient.

Installations must comply with the following requirements at a minimum, but SEOR may require more stringent specifications at their discretion:

- ❑ Do not install HVLS fans on a single z-purlin. Structural steel angles must be used to span a minimum of (2) z-purlins.
- ❑ Z-purlins must have a minimum flange width of 2 inch and a minimum material thickness of 12 gauge steel.
- ❑ Structural steel angle span lengths must not exceed 8 feet. For span lengths up to 8 feet, a minimum of 2 structural steel angles are required.
- ❑ Size of structural steel angles must be specified by a structural engineer. Angles must be a minimum of 4 x 4 x 1/4 inch thick. Larger angles may be required for span lengths up to 8 feet. Angles shall be sufficiently stiff to avoid harmonic resonance.

Required Loose Components (Included):

- Z-Purlin Backing Plate (2)
- Z-Purlin Mounting Bracket (2)

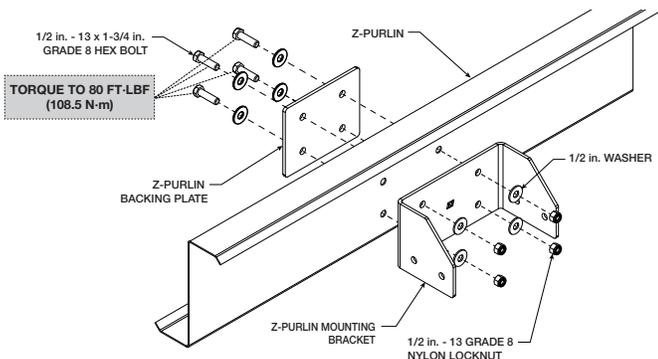
Required Components from Bag # 915431:

- 1/2 in. – 13 x 1-3/4 in. Grade 8 Hex Bolt (20)
- 1/2 in. – 13 Grade 8 Nylon Locknut (20)
- 1/2 in. Washer (40)

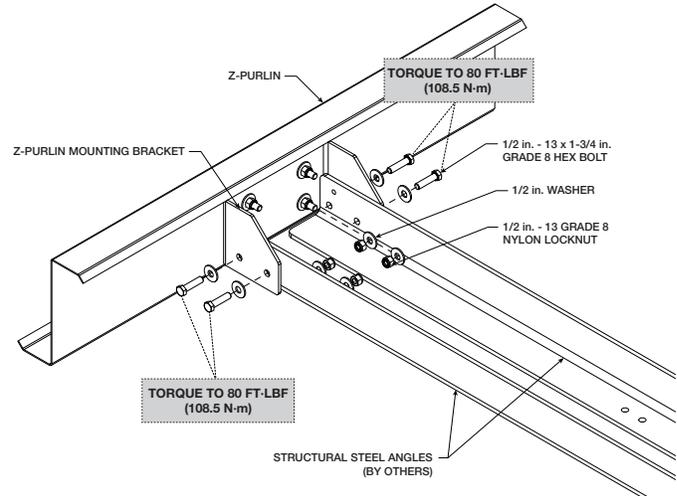
Hardware/Tools Needed (Not Included):

- Structural Steel Angles (2)
- Torque Wrench
- 3/4 in. Socket and Ratchet
- 3/4 in. Wrench
- Drill and 9/16 in. Drill Bit

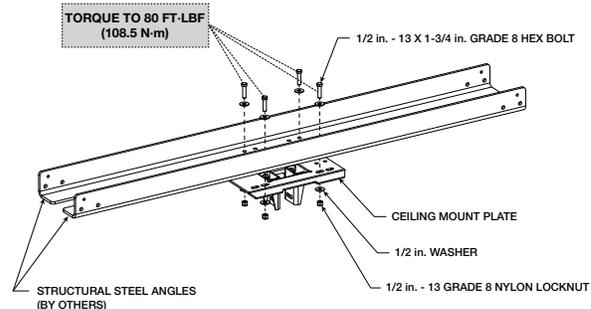
1. Locate desired fan hanging location. Using the supplied z-purlin mounting brackets as templates, mark and drill (4) 9/16 in. holes in each z-purlin.



2. Mount z-purlin mounting brackets and backing plates using supplied (8) 1/2 in. – 13 x 1-3/4 in. grade 8 hex bolts, (16) 1/2 in. washers, and (8) 1/2 in. – 13 grade 8 nylon locknuts. Torque hardware to 80 ft-lbf (108.5 N-m).
3. Size structural steel angles (by others) to fit within z-purlins and installed z-purlin mounting brackets. Size of angle to be determined by structural engineer.
4. Bolt structural steel angles in place using supplied (8) 1/2 in. – 13 x 1-3/4 in. grade 8 hex bolts, (16) 1/2 in. washers, and (8) 1/2 in. – 13 grade 8 nylon locknuts. Torque hardware to 80 ft-lbf (108.5 N-m).



5. Using the ceiling mount plate as a template, mark and drill (4) 9/16 in. holes in structural steel angles.
6. Align the ceiling mount plate and bolt into place using (4) 1/2 in. – 13 x 1-3/4 in. grade 8 hex bolts, (8) 1/2 in. washers, and (4) 1/2 in. – 13 grade 8 nylon locknuts. Torque hardware to 80 ft-lbf (108.5 N-m).



7. Turn to page 14 to install the motor and drive assembly.

Unistrut® Mounting Kit (By Others)

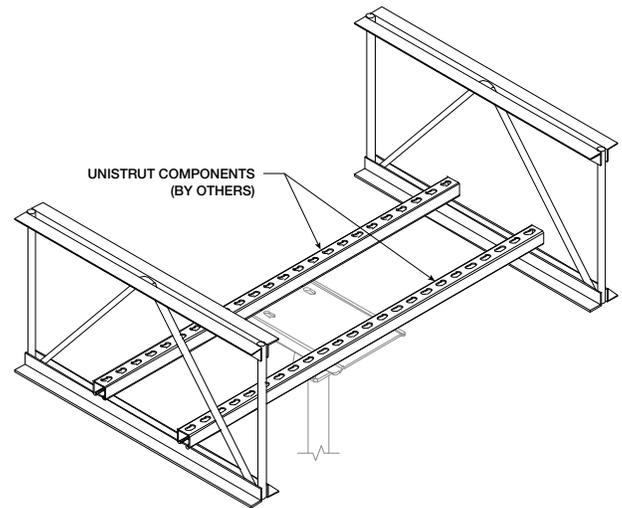
IMPORTANT: Structural Engineer of Record (SEOR) must perform thorough evaluation of mounting structure and determine final mounting requirements before fan is installed. Manufacturer is not liable for any problems that arise as the result of insufficient structure, including (but not limited to) vibration, noise, or safety hazards. Product warranty will be voided at manufacturer's discretion if structure is deemed insufficient.

Installations must comply with the following requirements at a minimum, but SEOR may require more stringent specifications at their discretion:

- ❑ Do not install Unistrut channels using Unistrut clamps. Unistrut channels must be directly fastened to the building structure with a threaded nut and bolt connection. Apply Loctite adhesive to all hardware connections.
- ❑ Do not hang or suspend Unistrut channels from threaded rod or other hanging hardware. Unistrut channels must rest on top of building structure and be directly fastened to the structure with a threaded nut and bolt connection. Apply Loctite adhesive to all hardware connections.
- ❑ Unistrut channel span lengths must not exceed 6 ft. For span lengths up to 8 ft., a minimum of 4 Unistrut channels are required.
- ❑ Size of Unistrut channels must be specified by a structural engineer. Unistrut channels must be a minimum of 1-5/8 x 1-5/8 in. with a minimum material thickness of 12 gauge steel. Unistrut channels shall be sufficiently stiff to avoid harmonic resonance.

Hardware/Tools Needed (Not Included):

- Unistrut® Channels
 - Unistrut® and Fan Installation Hardware
1. Size Unistrut channels (by others) to span the required distance between structural members of the building. Size of Unistrut channels and appropriate installation hardware to be determined by structural engineer. Contact Unistrut customer support (www.unistrut.us) for product recommendations and detailed installation instructions for Unistrut products.
 2. Install Unistrut channels per the manufacturer's recommendations.
 3. Locate desired hanging location for the fan.
 4. Bolt ceiling mount plate to Unistrut channels with the appropriate hardware as identified by structural engineer. Torque to 55 ft·lbf (74.6 N·m).



Downtube to Ceiling Mount Installation

Required Loose Components (Included):

- Ceiling Mount (1)
- Motor and Drive Assembly (1)

Required Components from Bag # 920984:

- 1/2 in. – 13 x 5 in. Grade 8 Bolt (2)
- 1/2 in. Washer (4)
- 1/2 in. – 13 Grade 8 Nylon Locknut (2)

Hardware/Tools Needed (Not Included):

- Torque Wrench or Impact Drill
- 3/4 in. Socket Set and Ratchet
- 3/4 in. Wrench
- Level

DANGER

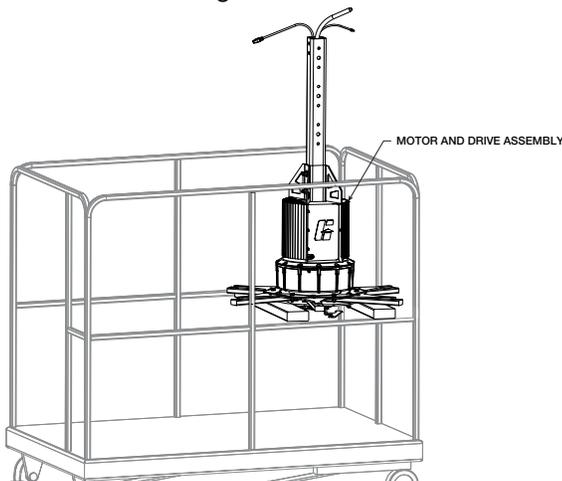
Always disconnect, lock and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury.

DANGER

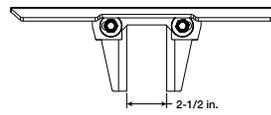
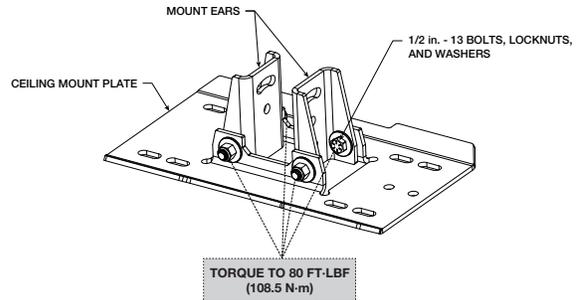
Pour écarter les risques d'incendie, de choc électrique ou de blessure grave, veiller à toujours débrancher, verrouiller et étiqueter la source de courant avant l'installation ou l'entretien.

NOTE: Motor and drive assembly can weigh as much as 115lbs. Lift responsibly.

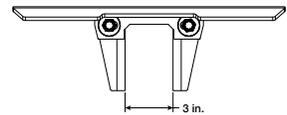
1. Use a scissor lift or other suitable lifting device to lift the motor and drive assembly into place. When loading the assembly into the scissor lift, carefully lift the unit with a fork lift if available or manually with one person lifting from the floor and another on the scissor lift. Use two wooden 2x4s for 3/4 in. tubes as cribbing to wrest the assembly on as shown in the image below.



2. While the mount ears are still loose, open the two parts so that the motor and drive assembly will fit nicely between the two parts. There should be a 2-1/2 in. gap for when the mount is connecting directly to a downtube and a 3 in. gap when the mount is connected to an optional Extension Tube. See Extension Tube Kit Installation section for more information on an extension tube assembly.

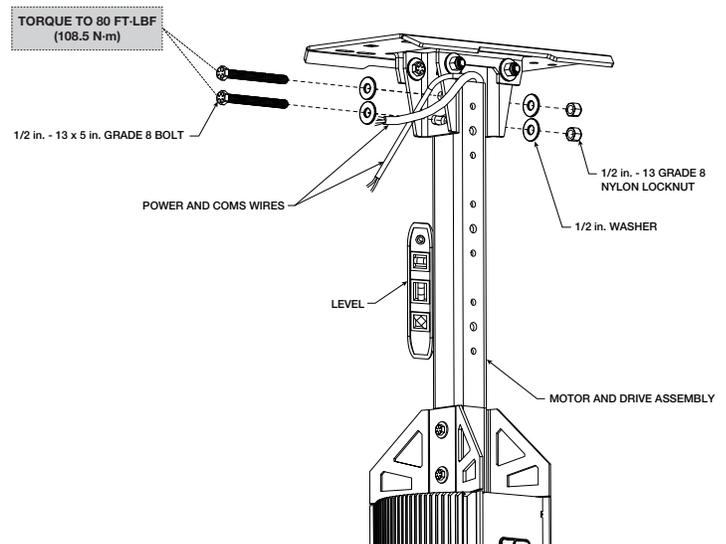


2-1/2 in. APART FOR MOUNT TO DOWNTUBE



3 in. APART FOR MOUNT TO EXTENSION TUBE

3. Raise the scissor lift until the downtube slides between the two mount ears and aligns with the 1/2 inch holes. Guide the factory assembled wires between the 7/8 inch slot out the side of the mount assembly and make sure the wires are not pinched. Now, install the motor and drive assembly to the ceiling mount, use the 1/2 in. – 13 in. bolts, washers and locknuts.
4. Use the level to ensure the tube hangs straight down before tightening all 6 bolted connections on the ceiling mount. Torque hardware to 80 ft·lb (108.5 N·m).



Extension Tube Kit Installation (Optional) (For any drop length between 4 - 10 ft)

Required Loose Components (Included):

- Extension Tube (1), ranging from 24 to 84 in. long, see *Extension Tube Lengths* table below.
- Motor and Drive Assembly (1)

Required Components from Bag # 920998:

- 3/8 in. – 16 x 3-3/4 in. Grade 8 Bolt (2)
- 3/8 in. Washer (4)
- 3/8 in. – 16 Grade 8 Nylon Locknut (2)
- 1/2 in. – 13 x 3-1/2 in. Socket Head Compression Bolt (1)
- 1/2 in. Washer (4)
- 1/2 in. – 13 Grade 8 Nylon Locknut (2)

Hardware/Tools Needed (Not Included):

- Torque Wrench or Impact Drill
- 7/16 in., 3/8 in., 3/4 in. Socket Set and Ratchet
- 7/16 in., 3/8 in., 3/4 in. Wrench
- 1/2 in. Hex Drive
- Level

Recommended Tools for Field Modifying the Extension Tube: (If Necessary):

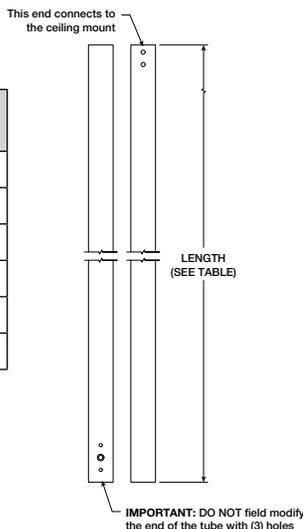
- Compact Band Saw, or Reciprocated Saw, or Grinding/Cutting Wheel, or Metal High Tension Hand Saw
- Clamps
- 1/8 in, 1/4 in. and 1/2 in. Drill Bit
- Impact Drill

1. If a drop length longer than 3-1/2 ft is specified, the fan assembly will ship with an extension tube which will be mounted between the downtube and ceiling mount. Reference the table showing the correlation between specified drop length of the fan and the length of extension tube.

IMPORTANT: Do NOT modify the end of the extension tube with (3) holes used to connect to the downtube assembly.

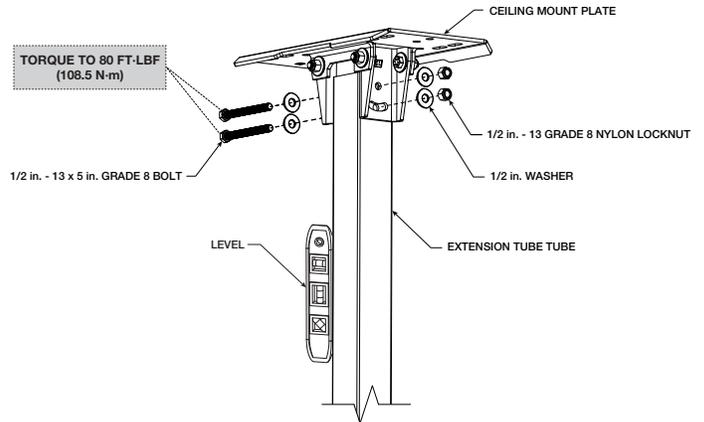
Extension Tube Lengths

Drop Length (ft.)	Extension Tube Length (in.)
4	24
5	36
6	48
7	60
8	72
9-10	84

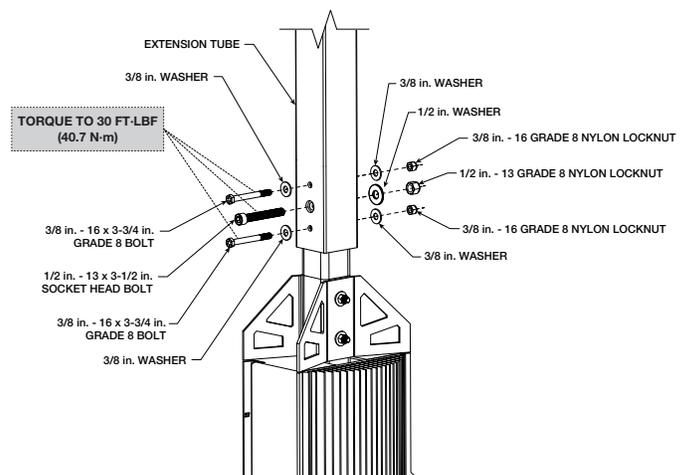


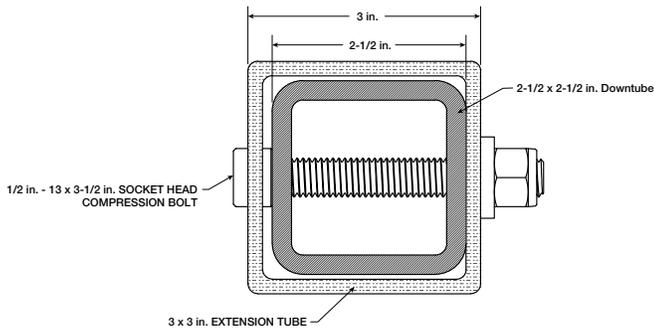
2. Install the extension tube to the ceiling mount plate using the 1/2 in. – 13 x 5 in. bolts, washers and locknuts.

Raise the scissor lift until the extension tube can be slide between the two mount ears and aligns with the 1/2 in. holes. Install the motor and drive assembly to the ceiling mount, use the 1/2 in. – 13 x 5 in. bolts, washers and locknuts.

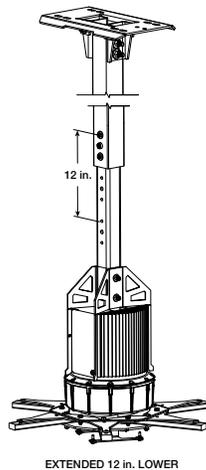
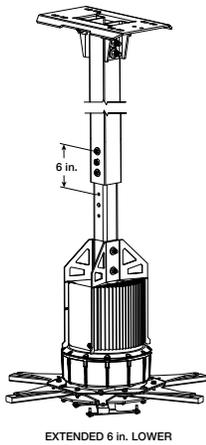
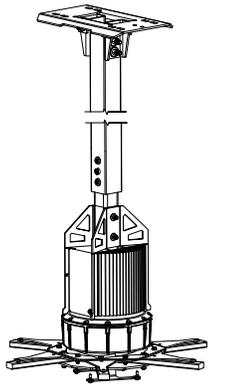


3. Align the downtube assembly directly under the extension tube and guide the power wire, control wire and safety cable up through the extension tube and out of the top. Raise the scissor lift until the motor and drive assembly downtube aligns with the lowest three holes on the extension tube (standard position).
4. Locate the (3) specified bolts in Bag # 920998. Align the top and bottom holes to allow the 3/8 in. – 16 x 3-3/4 in. bolt to slide through. Loosely install the 3/8 in. – 16 x 3-3/4 in. grade 8 bolt with the 3/8 in. washer and 3/8 in. – 16 grade 8 nylon locknut. Insert the larger 1/2 in. – 13 x 3-1/2 in. socket head compression bolt through the center hole of the extension tube. The head of the 1/2 in. bolt should fit through the center hole in the extension tube and pin the downtube tightly to the opposite side. Using a washer on the locknut on the other side of the extension tube will provide compression between the tubes. Once the center bolt is tightened, tighten to the other (2) 3/8 in. bolts. Torque hardware to 30 ft-lbf (40.7 N-m).





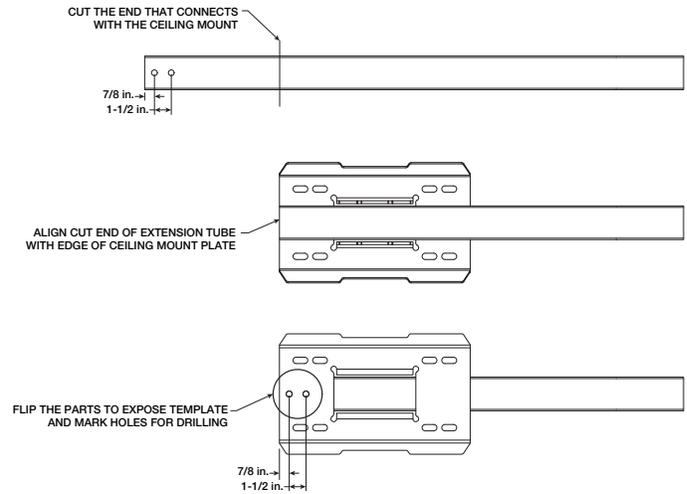
5. If it appears the fan will be too close to an obstruction in the ceiling above, the downtube can be mounted 6 inches or 12 inches lower than the standard height. If 1 foot of adjustment is insufficient, contact your local sales representative.



6. To shorten the extension tube, make a clean cut using one of the recommended cutting tools at the desired length on the end of the tube that would connect to the ceiling mount plate.

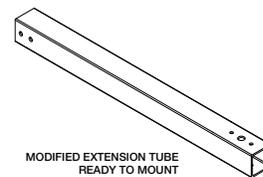
IMPORTANT: Do NOT modify the end of the extension tube with (3) holes used to connect to the downtube assembly.

Debur the edges of the cut piece with a file.



7. Drill two 1/2 in. holes on the cut end of the extension tube. Using the drill template on the mount plate, align the edge of the tube with the edge of the plate and clamp the pieces together. Mark and drill through the backside of the mounting plate into the extension tube so that your top hole is 7/8 in. from the end of the tube, and 1-1/2 in. from hole to hole.

IMPORTANT: When modifying the tube, follow the critical dimensions shown to achieve proper assembly.



8. Return to Step 2 to install the extension tube to the ceiling mount.

Safety Retention Cable Installation

IMPORTANT: Do not put excessive tension on the safety retention cable during installation. Safety retention cable should be taut with only a small amount of slack in the cable to ensure proper functioning. Do not allow safety retention cable to contact any sharp edges.

IMPORTANT: Failure to install the safety retention cable will result in voiding of the fan warranty.

Standard Steel Cable Clamp

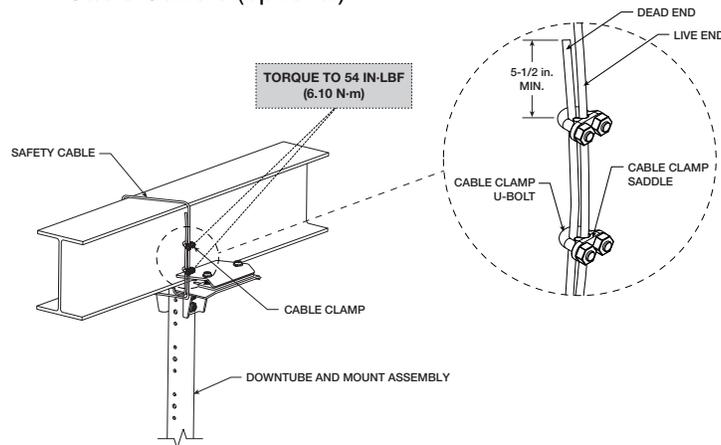
The following instructions apply to standard fan installations.

Required Components from Bag # 916290:

- U-Bolt Steel Cable Clamp (2)

Hardware/Tools Needed (Not Included):

- Torque Wrench
- 7/16 in. Socket and Wrench
- Cable Cutters (optional)



1. From the top of the downtube, pull the safety retention cable until it is taut inside the downtube.
2. Wrap the loose end of the safety cable around the mounting structure. Cable may be wrapped around structure multiple times if length allows. Do not allow the cable to come in contact with any sharp edges.
3. Align the loose end of the safety cable (referred to as the dead-end) with the length of cable that is wrapped around the mounting structure (referred to as the live-end).
4. Attach the dead-end of the safety cable to the live-end using the supplied 3/16 in. u-bolt steel cable.

IMPORTANT: The first steel cable clamp must be installed a minimum of 5-1/2 in. away from the dead-end of the safety cable to ensure proper functioning.

IMPORTANT: Steel cable clamps are composed of two parts: the u-bolt and the saddle. Steel cable clamps must be installed with the u-bolt over the dead-end of the safety retention cable and the saddle over the live-end of the safety cable. Failure to install steel cable clamps in this manner may result in unsafe operating conditions. Refer to drawing below for correct orientation.

5. Pull the dead-end of the safety cable through the steel cable clamps to tighten the cable. The cable should be pulled taut, leaving only a small amount of slack in the cable to ensure proper functioning.
6. Tighten the nuts on the steel cable clamps using a 7/16 in. socket and torque to 54 in-lbf (6.10 N·m), alternating between nuts until reaching proper torque.
7. Cut or organize excess safety cable to ensure it does not interfere with fan performance. Make sure to leave at least 5-1/2 in. of cable between the dead-end of the cable and the first steel cable clamp to ensure proper functioning.

Guy Wire Installation

IMPORTANT: Guy wires must be installed 45° to 60° from vertical to ensure proper functioning.

Standard Steel Cable Clamp

Required Loose Components (Included):

- 20 ft. Guy Wire (4)

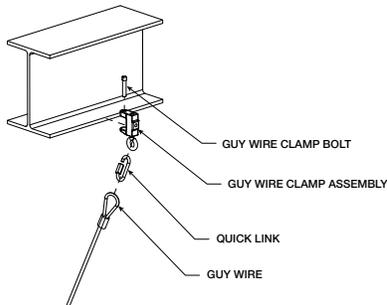
Required Components from Bag # 916290:

- Guy Wire Clamp Assembly (4)
- Guy Wire Clamp Bolt (4)
- Quick Link (8)
- U-Bolt Steel Cable Clamp (8)
- Turnbuckle (4)

Hardware/Tools Needed (Not Included):

- Level
- Torque Wrench
- 7/16 in. Socket and Wrench
- 5/16 in. Socket and Wrench
- Cable Cutters (optional)

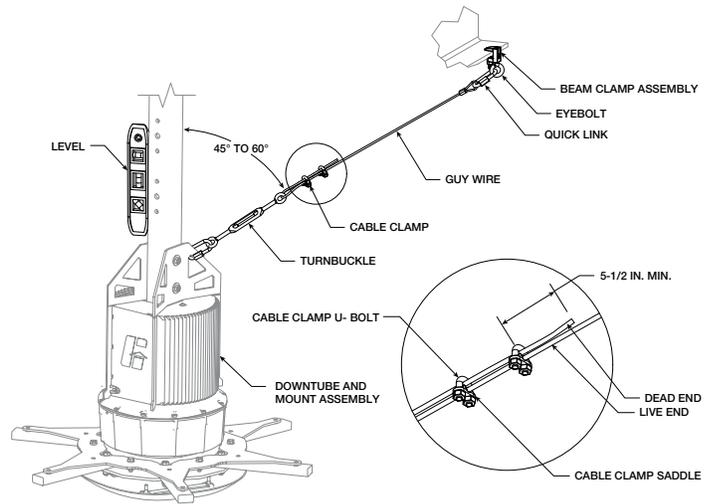
1. Secure guy wire clamps to the building structure using the guy wire clamp bolts and a 7/16 in. wrench. Attach guy wire clamp to the building structure on the opposite side of the fan as shown in the I-beam drawing below. Attach guy wires to the eyelets on the guy wire clamp assemblies using (4) supplied quick links.



2. Insert the loose end of each guy wire through the eyebolt on a turnbuckle. Turn the guy wire back onto itself and align the loose end of the guy wire (referred to as the dead-end) with the length of guy wire that is attached to the building structure (referred to as the live-end).
3. Attach the dead-end of each guy wire to the live-end using (2) of the supplied 3/16 in. u-bolt steel cable clamps. Loosely tighten the nuts on the steel cable clamps, leaving enough room for the guy wire to slide through the steel cable clamps.

IMPORTANT: The first steel cable clamp must be installed a minimum of 5-1/2 in. away from the dead-end of the guy wire to ensure proper functioning.

IMPORTANT: Steel cable clamps consist of two parts: the u-bolt and the saddle. Steel cable clamps must be installed with the u-bolt over the dead-end of the guy wire and the saddle over the live-end of the guy wire. Failure to install steel cable clamps in this manner may result in unsafe operating conditions. Refer to drawing below for correct orientation.



4. Attach all (4) turnbuckles to the guy wire attachment ring located on the downtube using (4) supplied quick links.
5. Pull the dead-end of each guy wire through the steel cable clamps until taut.
6. Tighten the nuts on the steel cable clamps using a 7/16 in. socket and torque to 54 in-lbf (6.10 N·m), alternating between nuts until reaching proper torque.
7. Place a level against the downtube and tighten all (4) turnbuckles by hand in a crisscross pattern until the guy wires are tight and the fan is level.

NOTE: When leveling the fan, place the level against the downtube in-between two neighboring guy wires to simplify the leveling process. The level should also be moved around the parameter of the downtube periodically to ensure that the fan is level in all directions.

8. Cut or organize excess guy wires to ensure that they do not interfere with fan performance. Make sure to leave at least 5-1/2 in. of wire between the dead-end of the guy wire and the first wire rope clip to ensure proper functioning.

Airfoil Blade and Winglet Installation

IMPORTANT: Do not operate fans without the airfoil blades. Failure to comply with this warning will result in voiding of the product warranty and may result in permanent damage to the VFD and motor.

WARNING

To reduce the risk of personal injury, do not bend motor struts, airfoil blades, or airfoil retaining links when installing the airfoil blades, balancing the blades, or cleaning the fan. Damage to these components may result in unsafe operation of the fan, which can lead to property damage, personal injury or death. Contact your local representative or the factory if replacement parts are needed.

WARNING

To reduce the risk of personal injury, do not insert foreign objects in between rotating fan blades.

AVERTISSEMENT

Pour réduire le risque de blessure, ne pliez pas les entretoises moteurs, ailerons ou aile en conservant des liens lors de l'installation des aubes, équilibrez, ou nettoyez le ventilateur. Ces composants peuvent endommager en utilisation dangereuse du ventilateur, qui peut conduire à des dommages matériels, des blessures ou la mort. Ces composants peuvent endommager en utilisation dangereuse du ventilateur, qui peut conduire à des dommages matériels, des blessures ou la mort.

AVERTISSEMENT

Ces composants peuvent endommager en utilisation dangereuse du ventilateur, qui peut conduire à des dommages matériels, des blessures ou la mort.

Required Loose Components (Included):

- Airfoil Blade (3 OR 6)
- Winglet (3 OR 6)

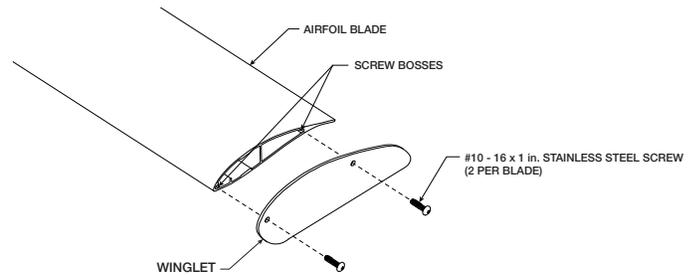
Required Components from Bag # 915066 OR 854832:

- #10 – 12 x 3/4 in. Screw (6 OR 12)
- 5/16 in. Washers (12 OR 24)
- 5/16 in. – 18 Grade 8 Nylon Locknut (6 OR 12)
- 5/16 in. – 18 x 2 in. Grade 8 Hex Bolt (6 OR 12)

Hardware/Tools Needed (Not Included):

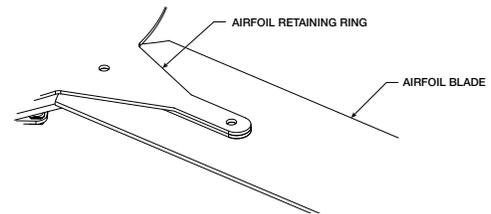
- 1/2 in. Socket and Socket Wrench
- 1/2 in. Wrench
- Torque Wrench
- # 2 Phillips Bit and Driver

1. Install one winglet per airfoil blade using the screw bosses located in each blade on the opposite end from the mounting holes. Use a # 2 Phillips bit to install (2) #10 – 12 x 3/4 in. screws per winglet. Torque screws to 5 ft-lbf (6.8 N·m).

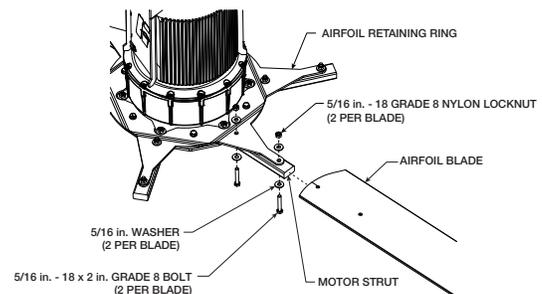


NOTE: Improperly fastened winglets may result in unwanted noise.

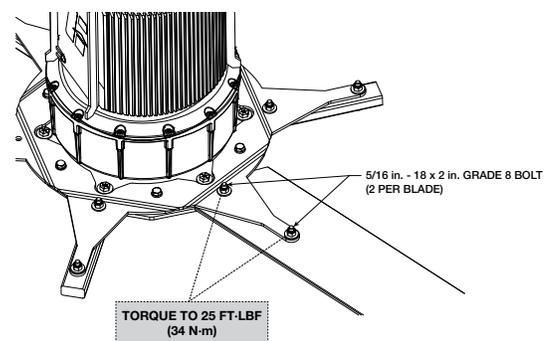
2. Lift the first blade into place, and slide over the motor strut allowing the airfoil retaining ring to rest on top of the airfoil blade. It might be necessary to use two people for this step.



3. With the blade in position on the motor strut, install (2) 5/16 in. 18 x 2 in. hex bolts, (4) 5/16 in. washers, and (2) 5/16 in. – 18 nylon locknuts per blade as shown below. Hand tighten hardware.



4. Repeat steps 1 through 3 on remaining airfoil blades. Torque the installed bolts to 25 ft-lbf (34 N·m).



IMPORTANT: If airfoils must be removed and reinstalled for any reason, do not re-use the supplied nylon locknuts. Re-use increases the risk of locknuts loosening during operation, which may result in unwanted noise and/or unsafe operation of the fan. Contact your local representative or the factory if replacement parts are needed.

Hub Plate Installation

Required Loose Components (Included):

- Hub Plate (1)

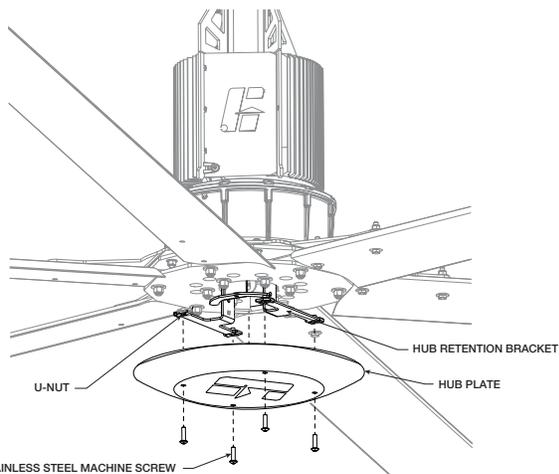
Required Components from Bag # 915066 OR 854832:

- 1/4 in. – 20 x 1 in. Machine Screw (4)

Hardware/Tools Needed (Not Included):

- Torque Wrench

1. Align (4) holes on the face of the hub plate with the (4) u-nuts on the hub retention bracket.
2. Insert (1) 1/4 – 20 x 1 in. machine screw per hole and hand tighten to ensure all fasteners engage the u-nuts.
3. Torque fasteners to 12 ft·lbf (16.25 N·m).



IMPORTANT: Rotate fan impeller by hand to ensure that it rotates freely and does not rub on hub plate or come into contact with any obstructions.

LED Light Installation (Optional)

IMPORTANT: Suitable for use in wet locations when installed in a GFCI protected branch circuit.

CAUTION

To reduce the risk of fire and electric shock, this light kit should be used only with the fan model DS, manufactured by Greenheck.

ATTENTION

Afin de réduire les risques d'incendie et de choc électrique, ce nécessaire d'éclairage ne doit être utilisé qu'avec le modèle de ventilateur DS, fabriqué par Greenheck.

Required Loose Components (Included):

- LED Light Shroud (1)
- LED Light (1)
- LED Light Mounting Bracket (1)

Required Components from Bag # 915436:

- 1/4 in. – 20 x 3/4 in. Grade 5 Hex Bolt (2)
- M10 – 1-1/2 x 20 in. Grade 8.8 Hex Bolt (1)
- 3/8 in. Washer (1)
- M4 – 0.7 x 10 mm Bolt (3)

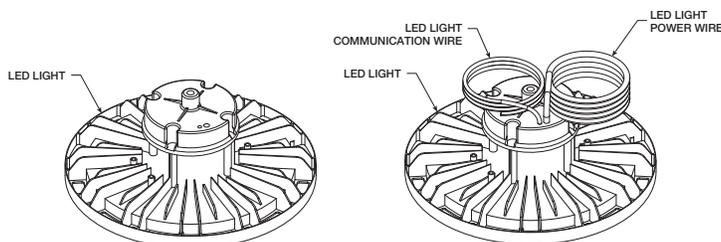
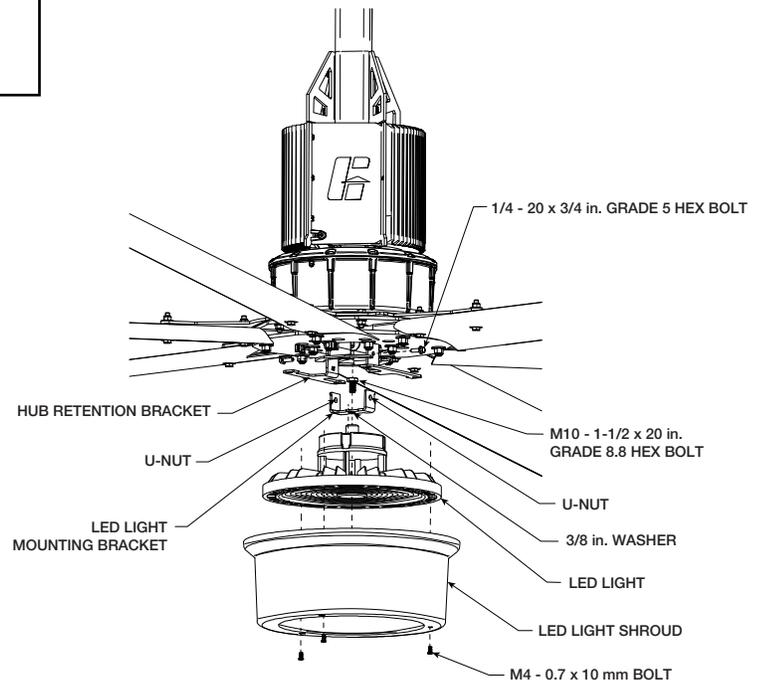
Hardware/Tools Needed (Not Included):

- Philips Screwdriver
- Torque Wrench
- 17mm Socket
- 3/8 in. Nut Driver
- Nut Driver Extension
- Impact Driver

1. Use the supplied M10 – 1-1/2 x 20 in. grade 8.8 hex bolt and 3/8 in. washer to attach the LED light mounting bracket to the light.
2. Insert the LED light mounting bracket between the hub retention bracket. Install (2) 1/4 in. – 20 x 3/4 in. grade 5 hex bolts into the u-nuts using a nut driver extension and impact driver. Torque to 120 in·lbf (13.6 N·m).
4. Use a Philips screwdriver to remove the aesthetic cover allowing access to the drive. Run the power up through the axle and out the side of the ceiling mount at the top of the fan. Terminate the 0-10v communications cable by feeding the wire up through the axle and back out through the rectangular access hole in the downtube.

NOTE: The LED light assembly can be pivoted out of the way to simplify connection of the light power and light communication plugs.

5. To install the LED light shroud, insert (3) M4 – 0.7 x 10 mm bolts in the face of the LED light leaving a 3/16 in. gap of exposed threads. Raise the LED light shroud against the front face of the LED light, align with the M4 – 0.7 x 10 mm bolt head and twist until the bolt heads capture the LED light shroud. Tighten the M4 – 0.7 x 10 mm bolts by hand with a Philips screwdriver.



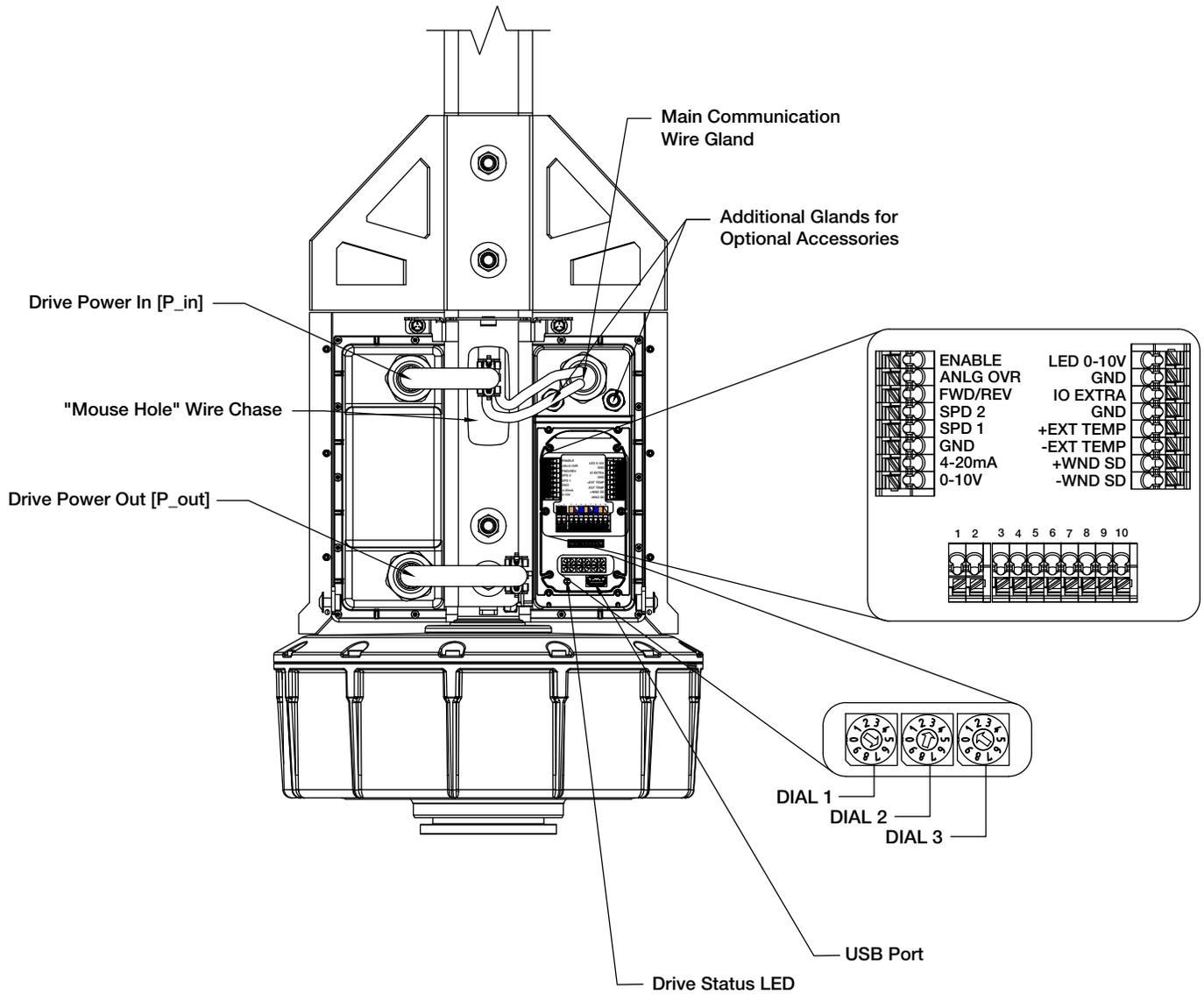
Factory Drive Wiring

Power Wiring Side

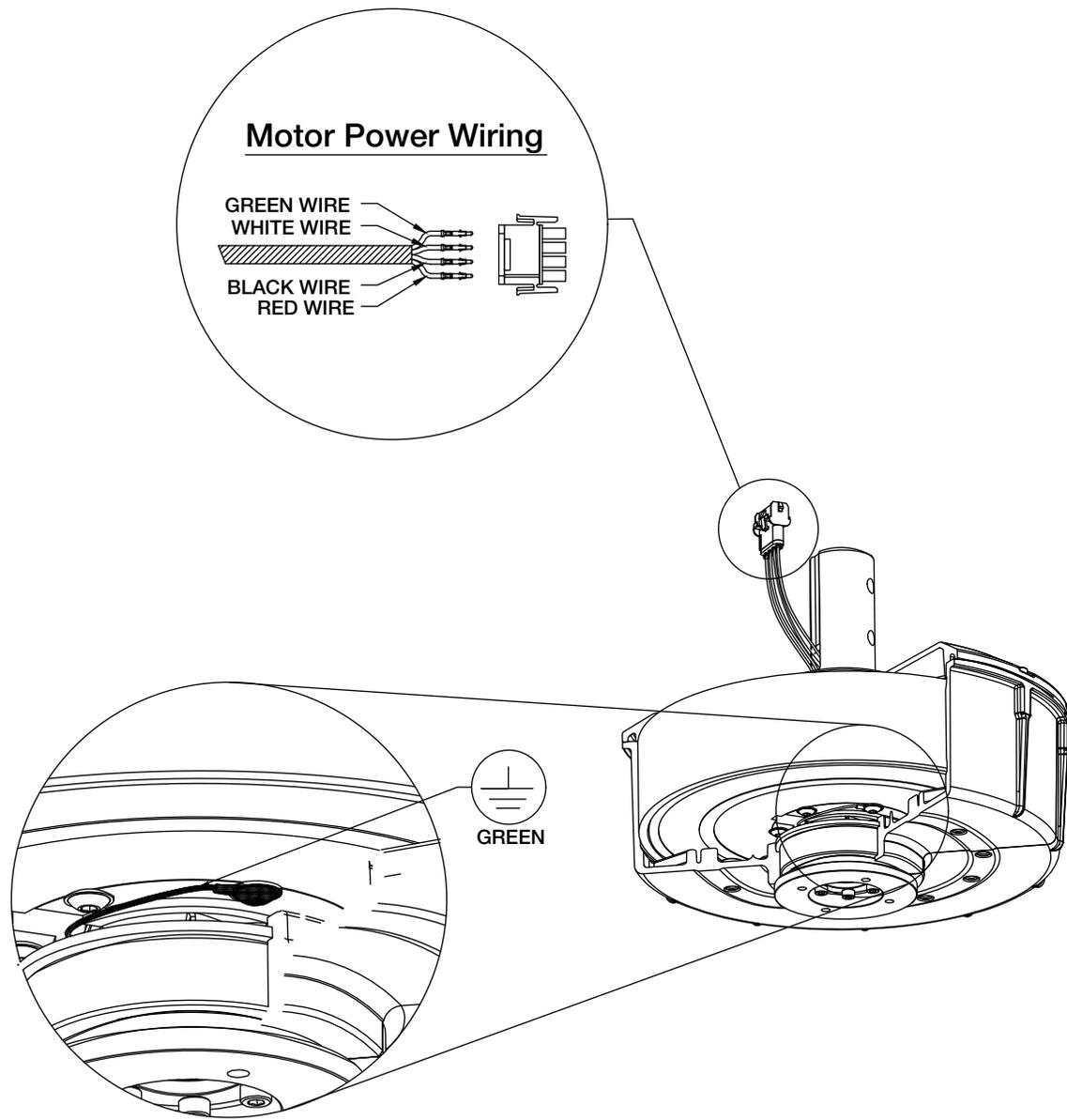
Factory Wired, High Voltage

Communication Wiring Side

Low Voltage Terminations



Factory Motor Wiring



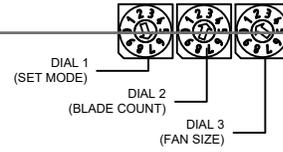
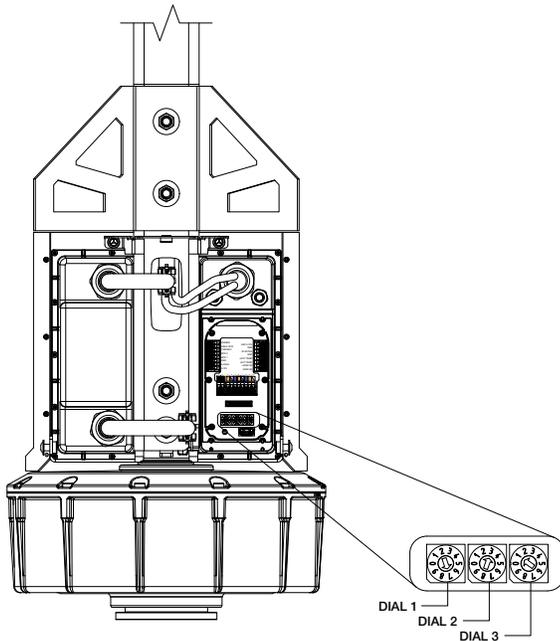
Commissioning Mode

For Standalone Mechanical Validation

Commissioning Mode is an automated start up sequence use for mechanical commissioning. The intended use of this feature is to validate the mechanical assembly of the fan independently, isolated from the final electrical and network control integration plan. Commissioning can be carried out prior to installing a control as long as supplemental power can be applied using appropriate electrical standards (e.g. portable generators, step-up transformer, etc.). If sufficient power cannot be supplied to the fan at this stage of installation, follow the appropriate control IOM for guidance through manual commissioning and start-up.

Set-Up Commissioning Mode

1. Set the rotary dials to the appropriate positions on the drive.
2. Provide a power source to the drive.
3. Switch on the power to initiate commissioning mode.



Model	Dial 1	Dial 2	Dial 3
DS-3-8	7	3	1
DS-3-10	7	3	2
DS-3-12	7	3	3
DS-3-14	7	3	4
DS-3-16	7	3	5
DS-3-18	7	3	6
DS-3-20	7	3	7
DS-3-24	7	3	8

Model	Dial 1	Dial 2	Dial 3
DS-6-8	7	6	1
DS-6-10	7	6	2
DS-6-12	7	6	3
DS-6-14	7	6	4
DS-6-16	7	6	5
DS-6-18	7	6	6
DS-6-20	7	6	7
DS-6-24	7	6	8

NOTE: Power On and Power Off is the only method of fan control during commissioning mode.

Commissioning Mode Sequence

1. A static pre-run diagnostic test (winding check, sensor calibration, input and output voltages).
2. Spinning the fan in the forward direction at a low speed (25 RPM) and a medium speed (50 RPM).
3. Spinning the fan in the reverse direction at a low speed (25 RPM) and a medium speed (50 RPM).
4. The fan will then enter a controlled stop sequence and indicate PASS with a Solid Green LED or FAIL with a Red LED.

A PASS (Solid Green LED) verifies a proper mechanical installation, and the unit is ready for subsequent Electrical Integration and Network Controls Commissioning.

Electrical Installation

Power Wiring

DANGER
Always disconnect, lock and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury.
DANGER
Pour écarter les risques d'incendie, de choc électrique ou de blessure grave, veiller à toujours débrancher, verrouiller et étiqueter la source de courant avant l'installation ou l'entretien.

IMPORTANT: Do not apply power until mechanical installation, fire alarm relay installation, communication wiring and fan control installation are complete.

IMPORTANT: Do not apply power to the fan above the rated voltage of the variable frequency drive (VFD). Failure to comply with this warning will result in voiding of the product warranty and may result in permanent damage to the VFD and motor.

IMPORTANT: To prevent electrical failures, source power must comply with the following power quality requirements. If source power falls outside of these specified tolerances, an external power line filter will be required (by others). If other power quality issues are present, contact the factory for support.

Allowable Voltage Fluctuation	+/- 15% of nominal
Allowable Frequency Fluctuation	+/- 10% of nominal
Area of Use	Do not install fans in electrical environments with 2nd degree or higher in accordance with UL 61800-5-1
Surge Immunity	Do not install fans in electrical environments above Installation Class 3 in accordance with IEC 61000-4-5

Hardware/Tools Needed (Not Included):

- Standard Screwdriver
- Cable Cutters
- Wire Strippers

With Optional Electrical Plug

1. If the fan is supplied with the optional electrical plug for power wiring, refer to the chart below for the corresponding receptacle that will be needed (provided by others).

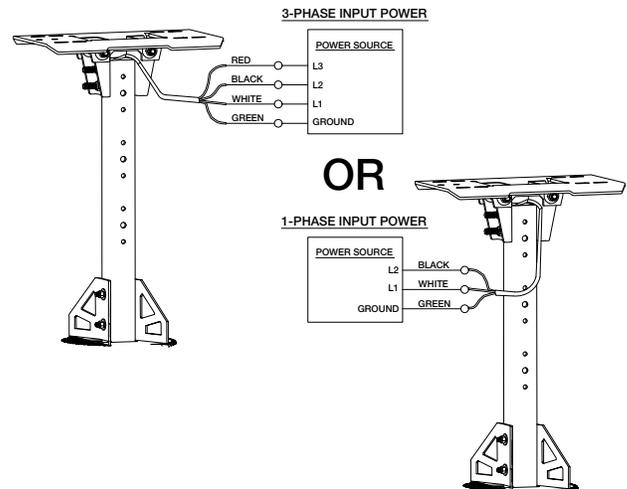
Electrical Plug Reference (Locking)			
Voltage	Phase	Plug*	Receptacle
208-230	1	L6-30P	L6-30R
277	1	L7-30P	L7-30R
208-230	3	L15-30P	L15-30R
460	3	L16-30P	L16-30R

*NOTE: Plugs are available from manufacturer. Receptacles must be provided by others.

2. Install the receptacle according to all national and local codes for electrical wiring.
3. Insert the electrical plug into the receptacle and twist to lock the plug in place.
4. Secure any loose power cable to the building structure to ensure it does not interfere with fan performance.

Without Optional Electrical Plug

1. If the fan is not supplied with the optional electrical plug, refer to the wiring diagrams below to complete power wiring.
2. Connect the spliced wire to building supplied cable. Turn the splices upward and push carefully up into the outlet box (supplied by others). The wires should be spread apart with the grounded conductor and the equipment-grounding conductor on one side and the outlet box and the ungrounded conductor on the other side of the outlet box.
3. Secure any loose power cable to the building structure to ensure it does not interfere with fan performance.



Disconnect and Fuse Installation

1. If provided, mount and wire the optional safety disconnect switch outside of the sweep of the fan's airfoil blades. Installation should be completed per the disconnect manufacturer's recommendation. Be sure to follow all national and local codes for electrical installation.
2. Fusing is required by code unless otherwise specified by local authority having jurisdiction (AHJ). Refer to the fuse sizing chart below and install fuses per the manufacturer's recommendation. If the fan was supplied with the optional fused disconnect, the fuses received will match the models shown. Be sure to follow all national and local codes for electrical installation.

IMPORTANT: Warranty may be voided at manufacturer's discretion if correct fuses are not installed.

Fuse Sizing Chart			
DS-3 (8 to 18 ft.) and DS-6 (8 to 14 ft.) - 1450W Fan			
Motor Voltage	208-230V/1,3 PH/60 HZ	277V/1 PH/60 HZ	460V/3 PH/60 HZ
Motor Full Load Amps (FLA)*	7A	7A	2.5A
Fuse Required**	FRN-R-10	FRS-R-10	FRS-R-5
DS-3 (20 to 24 ft.) and DS-6 (16 and 24 ft.) - 2100W Fan			
Motor Voltage	208-230V/1,3 PH/60 HZ	277V/1 PH/60 HZ	460V/3 PH/60 HZ
Motor Full Load Amps (FLA)*	12A	12A	3.5A
Fuse Required**	FRN-R-15	FRS-R-15	FRS-R-5
(Optional) High Bay Light 240 W LED Accessory			
*FLA is based on worst case system conditions assuming lowest nominal voltage and phase.			
** Fuses shown are available as an optional accessory. Fuses provided by others must meet requirements of all national and local codes.			

Fire System Integration

Fire System Integration (Optional)

The following instructions apply to fans that were supplied with plug-and-play factory wiring.

DANGER
Always disconnect, lock and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury.
DANGER
Pour écarter les risques d'incendie, de choc électrique ou de blessure grave, veiller à toujours débrancher, verrouiller et étiqueter la source de courant avant l'installation ou l'entretien.

NOTE: The following instructions are only applicable to buildings that are equipped with a fire suppression system. If the building does not contain a fire suppression system, leave the crimp connector on the fire alarm landing point (located at the top of the downtube) and continue with the rest of the installation.

IMPORTANT: HVLS fans must be installed with the supplied, normally-closed PAM-1 fire alarm relay or an equivalent electromechanical or reed relay for proper function of the fire alarm emergency stop feature. Solid state relays or other digital switching relays cannot be used.

IMPORTANT: The fire alarm relay should only be installed by qualified personnel who are familiar with the operation of building fire suppression systems. It is the sole responsibility of the installer to ensure correct operation of the fire alarm relay in the event of a fire emergency in the building.

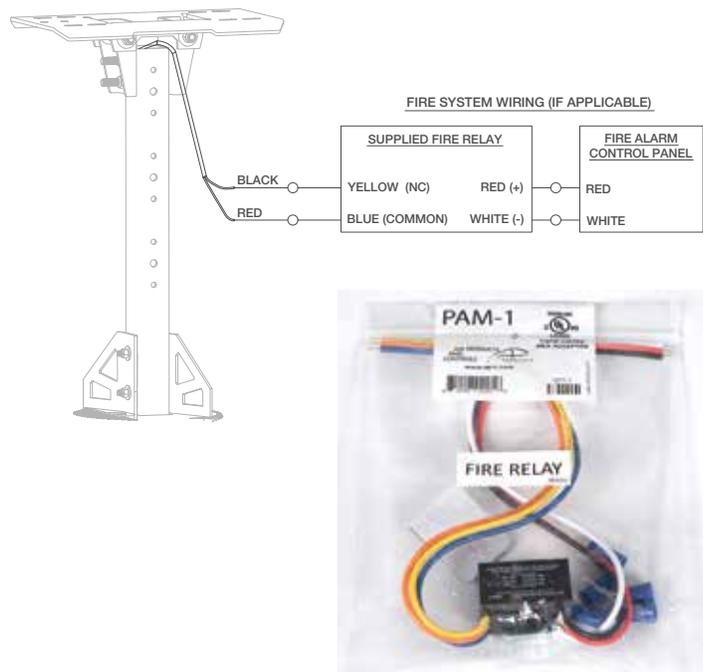
Required Loose Components (Included):

- Low Voltage (24VDC/VAC or 115VAC), Normally Closed Relay (1)

Hardware/Tools Needed (Not Included):

- Standard Screwdriver
- Cable Cutters
- Wire Strippers

1. If the building is equipped with a fire suppression system, remove the crimp connector from the fire alarm emergency stop landing point located at the top of the downtube by snipping the wires directly below the crimp connector.
2. Strip the loose wires and wire the supplied normally-closed relay to the fire alarm emergency stop landing point and the building's fire suppression system using the wiring diagram shown.



Fan Networking And Pre-Start-Up

Types of Fan Communication Wiring

- Multispeed Control (Analog)
- 4-Speed Control (Analog)
- Modbus RTU Control with CAT-5e
- Modbus RTU Control with RS-485
- BACnet Control

IMPORTANT: DS fans must be installed with the supplied CAT-5e communication cable, shielded CAT-5e (By others), or RS-485 cable that complies with the following specifications. Cable must be twisted pair, shielded 24ga. CAT-5e/RS-485 cable with a drain and must be compliant with ISO 11801. Cable must use shielded RJ45 connectors with a soldered drain and wiring configuration must follow EIA/TIA T568B wiring pinout. Individual CAT-5e cable lengths must not exceed 200ft. and individual RS-485 cable lengths must not exceed 1000ft to prevent network communication issues.

NOTE: All communication wiring must be installed in compliance with NEC 800-52 or similar. All communication wiring needs a minimum separation of 2 inches from high voltage unless installed in separate raceways/conduit. When possible, maintain 24 inches of separation.

NOTE: Before connecting control wire to the fan, reference the appropriate control IOM for instructions on installing the control hardware and associated wiring.

A Multispeed or a 4-Speed Analog Control pair with one single fan only. If the analog control is intended to be used in conjunction with a BACnet network in an analog override configuration, contact the manufacturer for assistance. If intended to operate a fan light using an analog control, a separate 0-10v dial control (provided by others) will need to be added alongside the fan control.

Fans using a Modbus control network will be connected using a “daisy-chain” or “point-to-point network topology” where the control is connected to the start/end point of a row of fans with each fan being linked one after another. Reference the instructions in the appropriate Control IOM to install the control. Once the control(s) are in place, follow the next steps to connect to each fan.

Multispeed And 4-Speed Control Wire Connection (Analog Control)

Required Loose Components (Included):

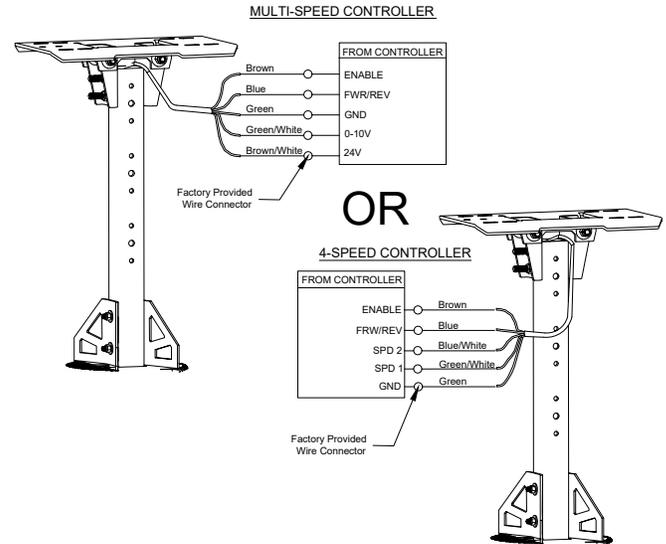
- 1 to 1 Inline Wago Connector (5)

Hardware/Tools Needed (Not Included):

- Electrical Tape

NOTE: When using an analog control to operate the fans, each fan must have its own control (1 fan to 1 analog control).

1. Mount the control in accordance with the appropriate control Installation Operation Manual.
2. Use supplied Wago connectors to connect communication wires at the top of the down tube. Match each wire to its corresponding color as shown below.



3. In harsh, damp or wet environments, protect wire connections by applying electrical tape.

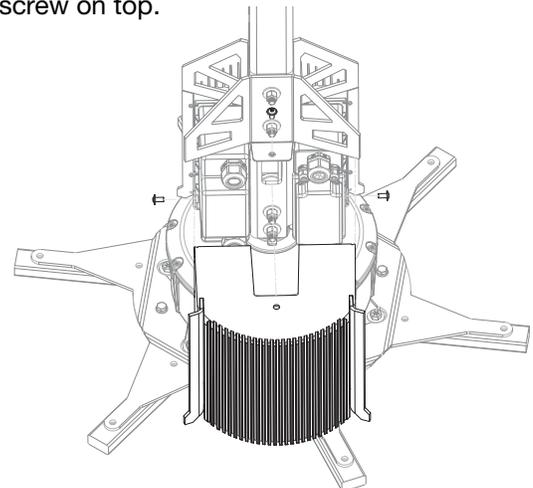
Multispeed And 4-Speed Control Pre-Start-Up (Analog Control)

Hardware/Tools Needed (Not Included):

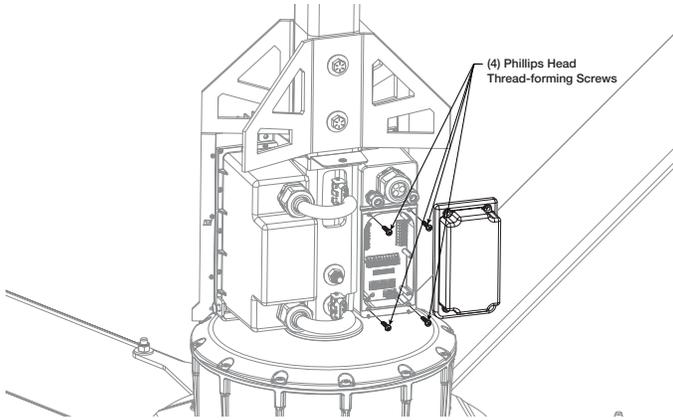
- # 2 Philips Head Screwdriver
- 1/8 in. Philips Head Screwdriver
- 2.0 mm Flathead Screwdriver

NOTE: The fan will arrive pre-wired with the control wires in the appropriate terminals. Remove the drive cover and aesthetic cover to verify the wiring connections and rotary dial settings on the drive are correct before starting up the unit.

1. Remove the aesthetic cover by loosening the two Philips head screws on the side and removing the screw on top.



2. To access the communication terminal on the drive, remove the drive cover by loosening the 4 screws with a Philips head screwdriver.



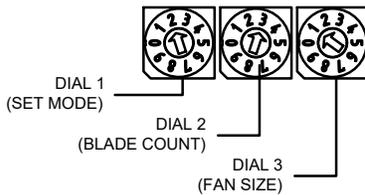
3a. For a Multispeed Control

Confirm the rotary dials are set to the appropriate control mode and fan model. See below for an example of the dial settings for a DS fan operated with a Multispeed Control.

Dial 1 = Control Mode = Multi-Speed Control = Dial Position "2"

Dial 2 = Blade Count = 3 or 6

Dial 3 = Fan Size = 1, 2, 3, 4, 5, 6, 7 or 8



Model	Dial 1	Dial 2	Dial 3
DS-3-8	2	3	1
DS-3-10	2	3	2
DS-3-12	2	3	3
DS-3-14	2	3	4
DS-3-16	2	3	5
DS-3-18	2	3	6
DS-3-20	2	3	7
DS-3-24	2	3	8

Model	Dial 1	Dial 2	Dial 3
DS-6-8	2	6	1
DS-6-10	2	6	2
DS-6-12	2	6	3
DS-6-14	2	6	4
DS-6-16	2	6	5
DS-6-18	2	6	6
DS-6-20	2	6	7
DS-6-24	2	6	8

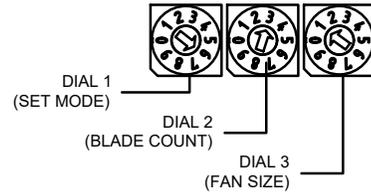
3b. For a 4-Speed Control

Confirm the rotary dials are set to the appropriate control mode and fan model. See below for an example of the dial settings for a DS fan operated using a 4-Speed Control.

Dial 1 = Control Mode = 4-Speed Control = Dial Position "6"

Dial 2 = Blade Count = 3 or 6

Dial 3 = Fan Size = 1, 2, 3, 4, 5, 6, 7 or 8



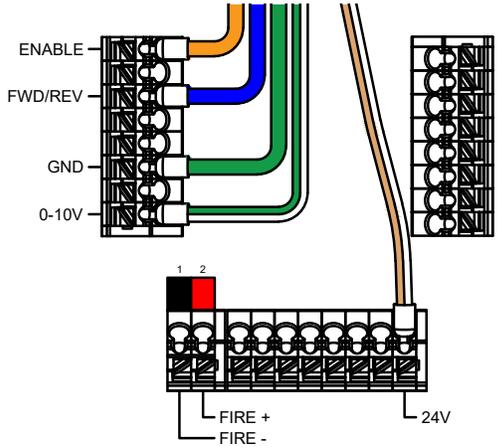
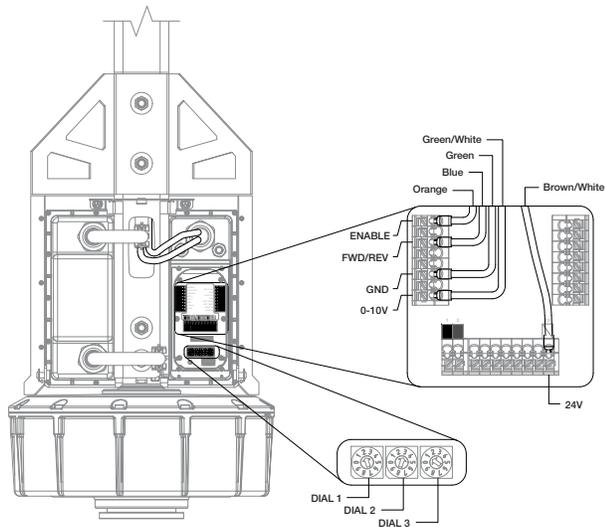
Model	Dial 1	Dial 2	Dial 3
DS-3-8	6	3	1
DS-3-10	6	3	2
DS-3-12	6	3	3
DS-3-14	6	3	4
DS-3-16	6	3	5
DS-3-18	6	3	6
DS-3-20	6	3	7
DS-3-24	6	3	8

Model	Dial 1	Dial 2	Dial 3
DS-6-8	6	6	1
DS-6-10	6	6	2
DS-6-12	6	6	3
DS-6-14	6	6	4
DS-6-16	6	6	5
DS-6-18	6	6	6
DS-6-20	6	6	7
DS-6-24	6	6	8



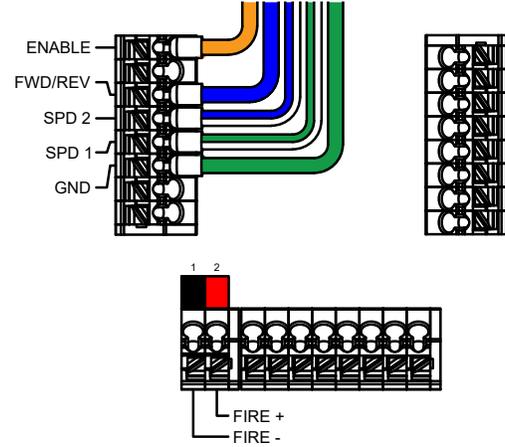
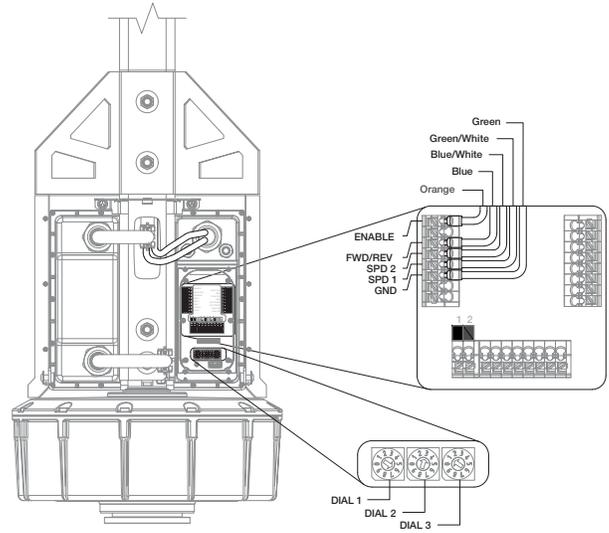
4a. For a Multispeed Control

Verify the wires are connected to the appropriate terminal locations.



4b. For a 4-Speed Control

Verify the wires are connected to the appropriate terminal locations.



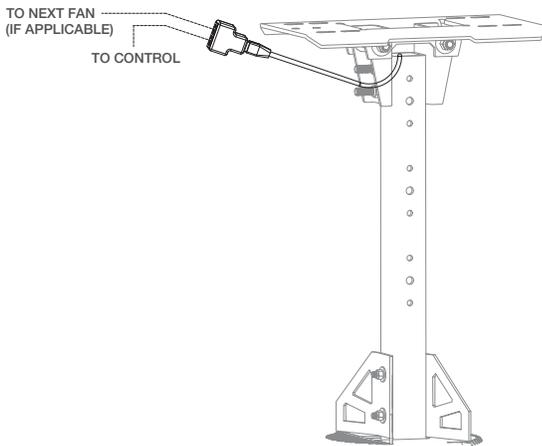
5. Close up the drive by first re-attaching the drive cover, then re-installing the aesthetic cover.
6. Repeat Steps 1-5 in the analog control wire section for each fan in the building until each fan is connected to its own separate control.

Modbus RTU Control Wire Connection (Standard Touchscreen or Advanced Touchscreen control) with shielded CAT-5e

This section defines how to configure multiple fans to a single control using CAT-5e cable.

1. Once the control has been installed and CAT-5e wire has been ran from the control to the fan, plug one end of the communication cable into the 3-way RJ45 splitter located at the top of the downtube.

SHEILED CAT-5e CONNECTION



2. When controlling multiple fans with a single control, plug a shielded CAT-5e cable into the remaining receptacle on the first fan and run the cable to the next closest fan on the line. Repeat this “point-to-point” or “daisy-chain” network connection until all fans are linked together.
3. Secure the CAT-5e control cable to the building structure to ensure it does not interfere with the fan performance. To ensure proper communication, refrain from routing the control cable with power wiring.

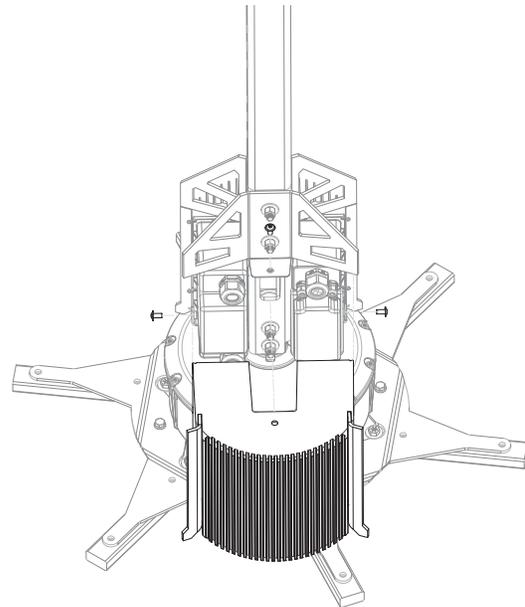
Modbus RTU Network and Pre-Start-Up (Standard Touchscreen or Advanced Touchscreen control) with shielded CAT-5e

Hardware/Tools Needed (Not Included):

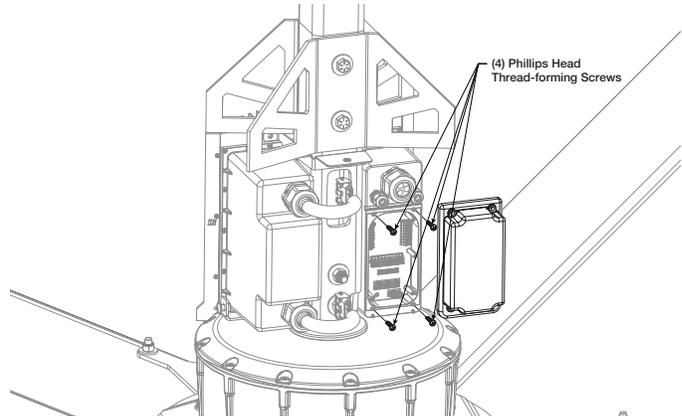
- # 2 Philips Head Screwdriver
- 1/8 in. Philips Head Screwdriver
- 2.0 mm Flathead Screwdriver

NOTE: The fan will arrive pre-wired with the control wires in the appropriate terminals, however the installer should verify the wiring connections are terminated properly. In a modbus fan network, a unique fan address must be set on the rotary dials of each drive after the fans are installed.

1. Remove the Aesthetic cover by loosening the two Phillips head screws on the side and removing the screw on top.



2. To access the communication terminal on the drive, remove the drive cover by loosening the 4 screws with a Philips head screwdriver.

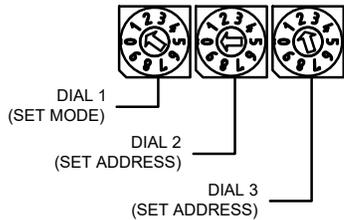


3. In order for the modbus control to differentiate between each fan on the network, each fan will get it's own unique modbus address which is set using 3 rotary dials. The first dial indicates the

Control Mode, the second and third dial identifies the two-digit fan address. Set the rotary dials to the appropriate Control Mode and designate a unique address for each fan. In the first line of the example:

Dial 1 = Control Mode = 1-Modbus Control = Dial Position "1"

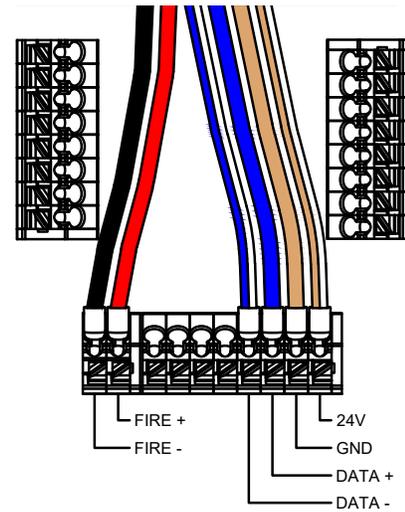
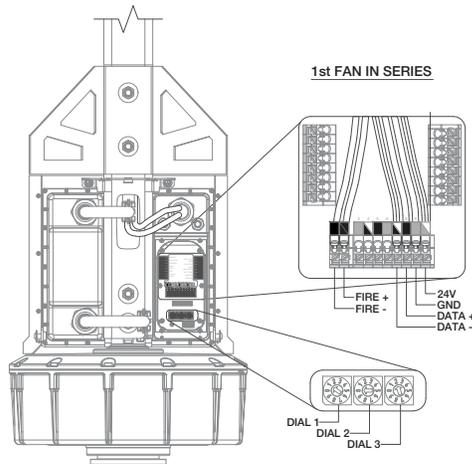
Dial 2 and 3 = Address = Any number between 0 2 and 2 1



test	Address	Dial 1	Dial 2	Dial 3
Fan 1	02	1	0	2
Fan 2	03	1	0	3
Fan 3	04	1	0	4
Fan 4	05	1	0	5
Fan 5	06	1	0	6
Fan 6	07	1	0	7
Fan 7	08	1	0	8
Fan 8	09	1	0	9
Fan 9	10	1	1	0
Fan 10	11	1	1	1

NOTE: Modbus Address 01 is reserved for the control and should not be used on the fan. The first fan gets address 02, fan gets address 03, and so on all the way up to fan 21.

4. Verify the wires are connected to the appropriate terminal locations.



5. Close up the drive by first re-attaching the drive cover, then re-installing the aesthetic cover.
6. Continue on down the line to the next fan in series and follow steps 1 through 4 to set the unique address on each fan.

Modbus RTU Control Wire Connection (Standard Touchscreen or Advanced Touchscreen control) with RS-485 cable

This section defines how to configure multiple fans to a single control using RS-485 cable. RS-485 is the most reliable method of setting up communication wire when spanning across long distances. This connection requires an uninterrupted connection between the fan and control.

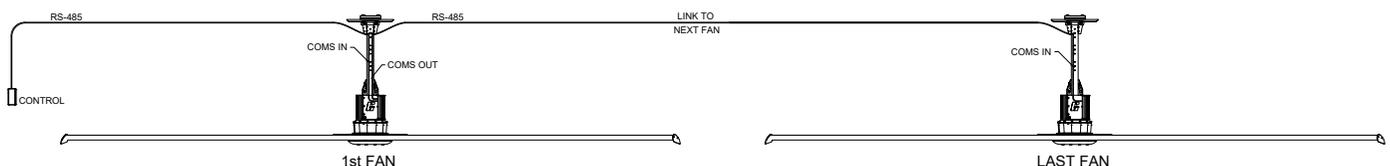
1. If the RS-485 wire is ran before the fan is installed, keep a spool of wire at least 10ft long at the mounting location since the wire will be connected directly to the drive [Communication IN]. Once the fan is installed, run the communication wire down the inside of the downtube.
2. If an additional fan is to be connected in series, a second RS-485 cable must be ran through the downtube as well. [Communication OUT].

Modbus RTU Network and Pre-Start-Up (Standard Touchscreen or Advanced Touchscreen control) with shielded RS-485

Hardware/Tools Needed (Not Included):

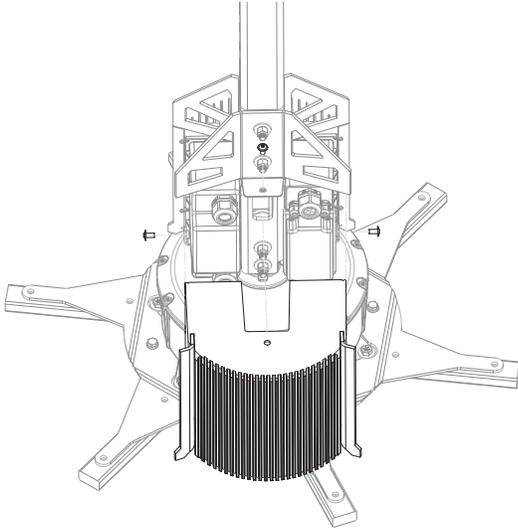
- # 2 Philips Head Screwdriver
- 1/8 in. Philips Head Screwdriver
- 2.0 mm Flathead Screwdriver
- 20 ft. Spool Of Electrician Fish Tape

NOTE: The fan will NOT arrive pre-wired since the RS-485 cable must be terminated directly to the drive

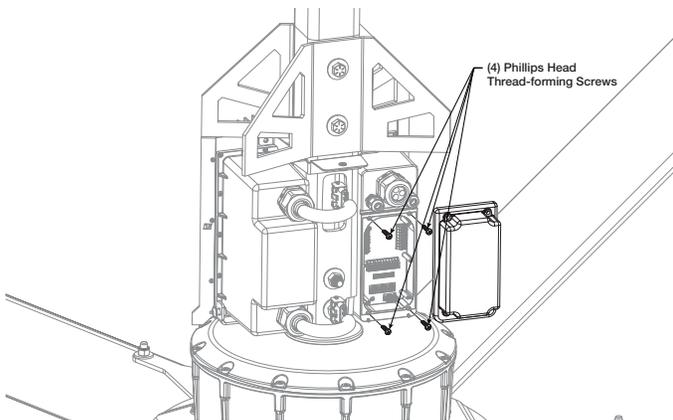


on the fan. Appropriate wire terminations must be secured for both the incoming communication wires and outgoing communication wires. Additionally, the fan address must be set on the rotary dials of on the communication board of the drive.

1. Remove the Aesthetic cover by loosening the two Phillips head screws on the side and removing the screw on top.

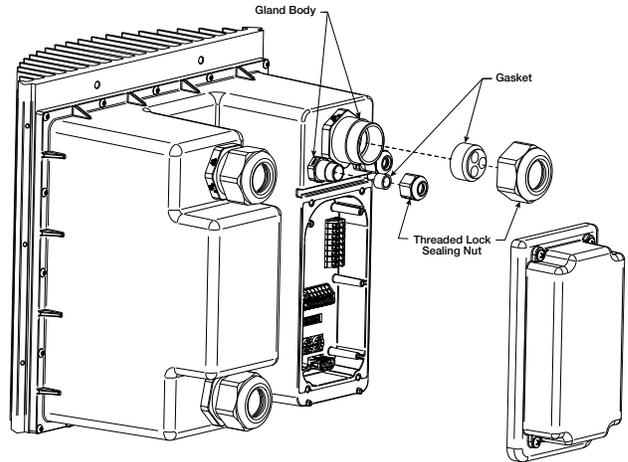


2. To access the communication terminal on the drive, remove the drive cover by loosening the 4 screws with a Phillips head screwdriver.

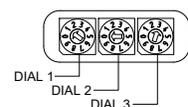
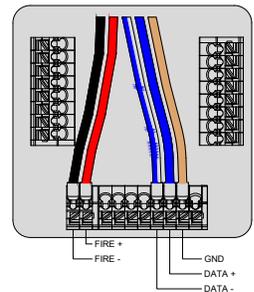
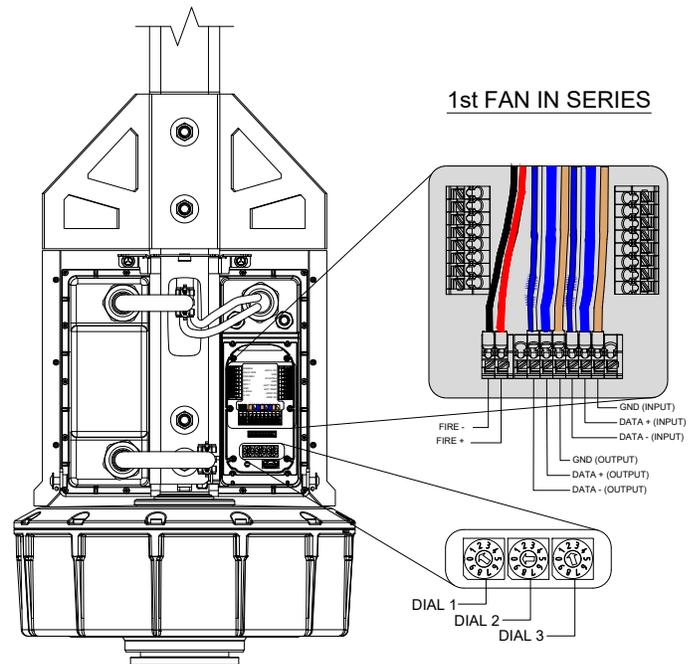


3. Pull the RS-485 cable through the “mouse hole” in the down tube and over to the right side of the drive where there are (3) IP66 rated gland connectors. If an additional fan is to be connected in series, a second RS-485 cable should be ran along the same path. Use electrician fish tape to pull the RS-485 wire through the downtube if necessary.
4. Remove the threaded lock sealing nut on one of the available glands on the right side of the drive. Remove the plug in the gland. Feed the cable through the threaded sealing nut, gasket, and body of the gland and pull the wire carefully down to the COMs board. Do this for both Communication

IN and Communication OUT RS-485 cables when setting up a daisy-chain network.



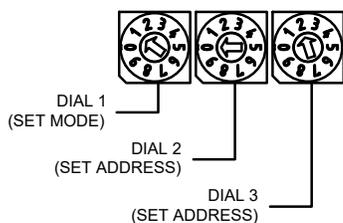
5. Terminate the wires as shown in the image below. Keep the threaded lock sealing nut on the glands loose until the wires have been terminated to the drive.



6. Once the wires are terminated, manage the excess cable by pulling the loose wire through the glands, then tighten down the threaded lock sealing nut on the gland to ensure a tight seal.
7. In order for the modbus control to differentiate between each fan on the network, each fan will get it's own unique modbus address which is set using 3 rotary dials. The first dial indicates the Control Mode, the second and third dial identifies the two-digit fan address. Set the rotary dials to the appropriate Control Mode and designate a unique address for each fan. In the first line of the example:

Dial 1 = Control Mode = 1-Modbus Control = Dial Position "1"

Dial 2 and 3 = Address = Any number between 0 2 and 2 1



test	Address	Dial 1	Dial 2	Dial 3
Fan 1	02	1	0	2
Fan 2	03	1	0	3
Fan 3	04	1	0	4
Fan 4	05	1	0	5
Fan 5	06	1	0	6
Fan 6	07	1	0	7
Fan 7	08	1	0	8
Fan 8	09	1	0	9
Fan 9	10	1	1	0
Fan 10	11	1	1	1

8. Close up the drive by first re-attaching the drive cover, then re-installing the aesthetic cover.
9. Continue on down the line to the next fan in series and follow steps 1 through 7 to set the unique address on each fan.

BACnet Control Wire Connection (Advanced Touchscreen control) with CAT-5e or RS-485 cable

BACnet is only compatible with the advanced touchscreen. The communication wire connections between the control and the fan will be the same as that for a Modbus connection. The BACnet connection will land on the Control Panel of the Advanced Touchscreen package. For more information on how to tie in BACnet to the fan network, reference the Advance Touchscreen IOM.

NOTE: If the analog override control is intended to be used in conjunction with a BACnet network configuration, contact the manufacturer for assistance.

Accessories

CAUTION

To reduce the risk of electric shock, disconnect the electrical supply circuit to the fan before installing light kit.

ATTENTION

Afin de réduire le risque de choc électrique, couper le circuit d'alimentation électrique du ventilateur avant d'installer le nécessaire d'éclairage.

LED Light Power Wiring

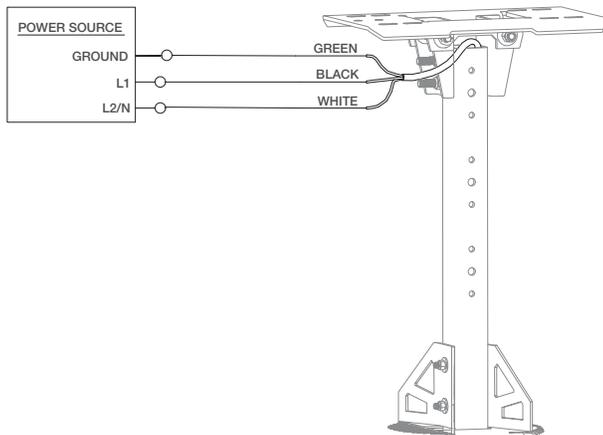
IMPORTANT: Use only with light kits marked 'Suitable for use in wet locations'.

Power will always run directly from the building to the light on a separate power source from the fan.

Use the following instructions to wire the fan-mounted LED light to the building's lighting grid.

Hardware/Tools Needed (Not Included):

- Wire Strippers
1. Reference the mechanical installation of the light on page 21 if the light has yet to be installed. The use of electrician fish tape to pull the power wires up through the downtube is advised. Proceed once the power wires are accessible at the ceiling mount.
 2. Using the wiring diagram below to connect the white and black wires to building supplied power. Be sure to follow all national and local electrical codes during installation.



LED Light Control Wiring

The LED has direct compatibility with the standard and advanced touchscreen through the modbus connection. If a light is installed on a fan controlled with an analog control, a separate 0-10v dial control will need to be provided by others.

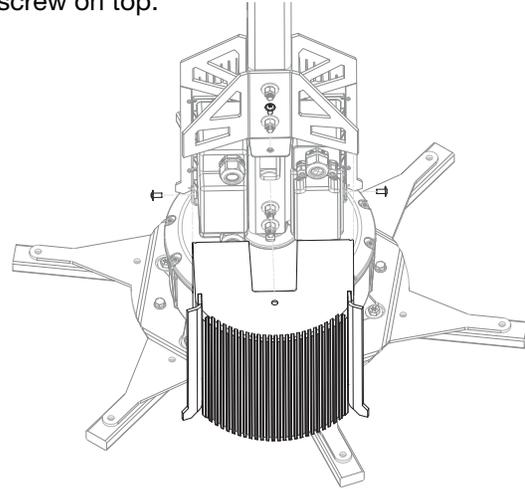
Use the following instructions to wire the fan-mounted LED light controlled through Modbus.

Hardware/Tools Needed (Not Included):

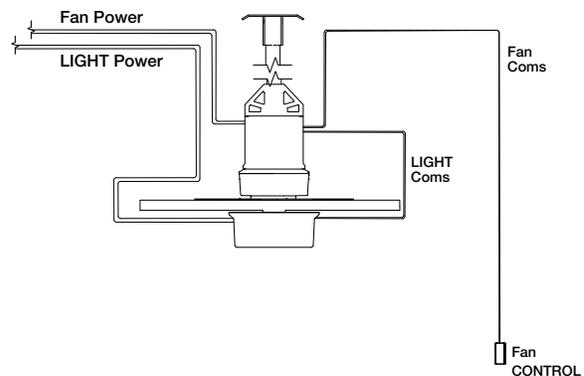
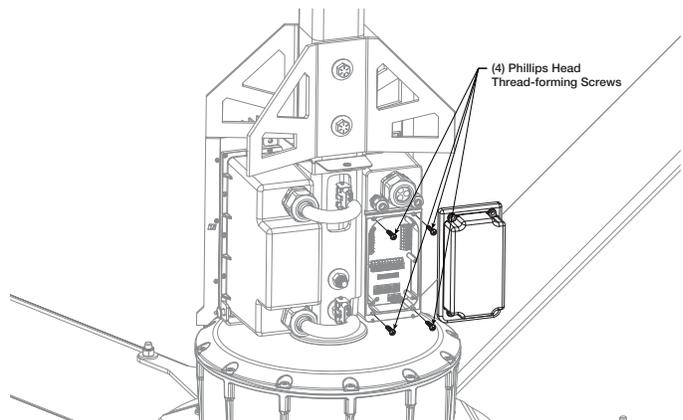
- Wire Strippers
- # 2 Philips Head Screwdriver
- 1/8 in. Philips Head Screwdriver
- 20 ft. Spool Of Electrician Fish Tape

Wiring for Modbus RTU Control

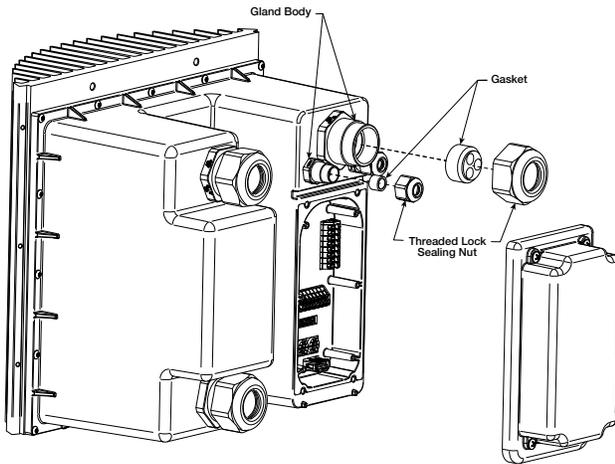
1. Remove the Aesthetic cover by loosening the two Phillips head screws on the side and removing the screw on top.



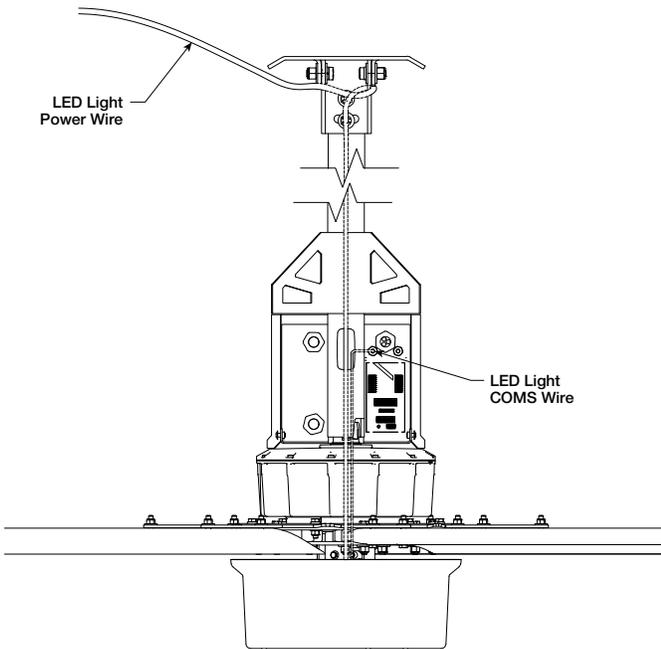
2. To access the communication terminal on the drive, remove the drive cover by loosening the 4 screws with a Philips head screwdriver.



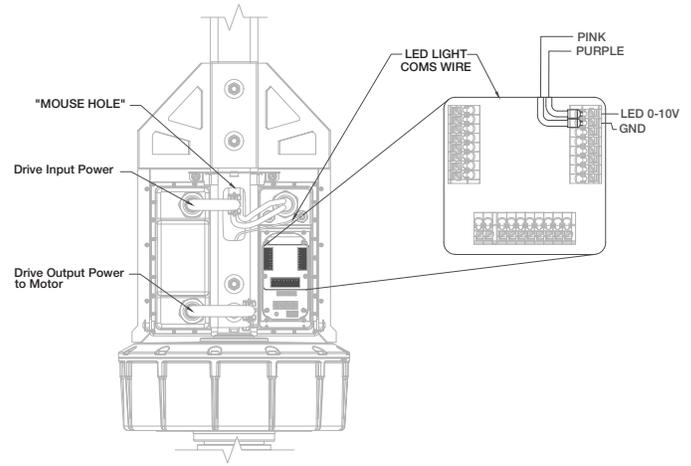
- If not completed already, remove the light shroud by loosening the three M4 screws. Connect the LED light control wire to the drive. Use electrician fish tape to pull the wire from the fan through the axle out of the "mouse hole" and to the drive.



- Remove the threaded lock sealing nut on one of the available glands on the right side of the drive. Remove the plug in the gland. Feed the cable through the threaded sealing nut, gasket, and body of the gland and pull the wire carefully down to the COMs board.



- Terminate the wires as shown in the image below. Once the wires are terminate, tighten down the threaded lock sealing nut on the gland to ensure a tight seal.



- The point-to-point CAT-5e or RS-485 control cable connections between fans will ensure each LED light will receive the same command from the control.
- To adjust the correlated color temperature (CCT), adjust the left hand dip switch on the LED light to Warm-White (WW), Natural-White (NW), or Cool-White (CW).
- To adjust the brightness emitted by the LED light, adjust the right hand dip switch on the side of the LED light to 150W/200W/240W. The corresponding brightness is as follows: 24K/32K/38.4K lumens.



- To adjust the beam angle, rotate the lens on the bottom face of the LED light.
- Re-attach the drive cover, aesthetic cover and light shroud as previously stated (all fasteners to be hand tight).

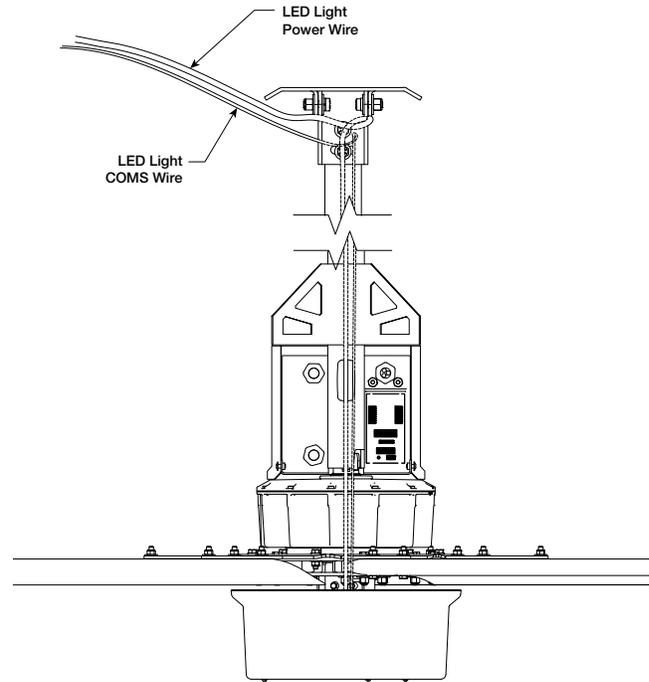
Optional LED Light Wiring for Analog Control

Hardware/Tools Needed (Not Included):

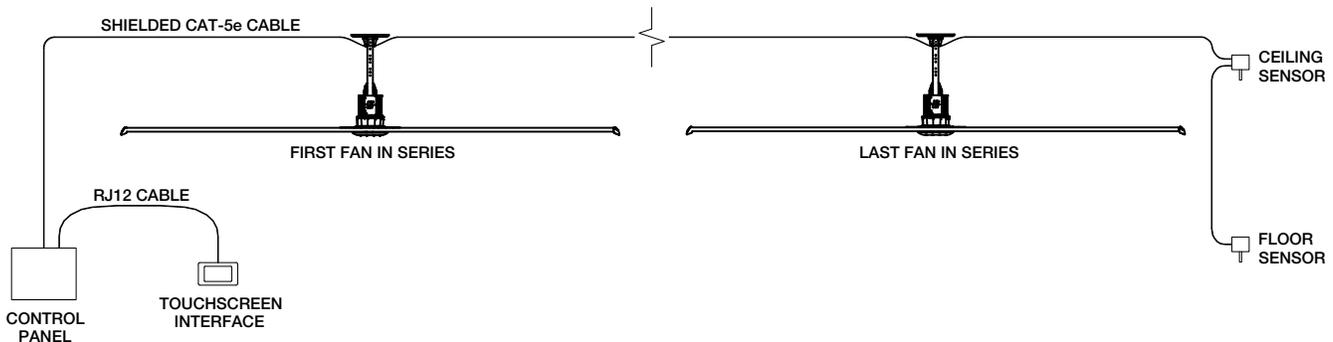
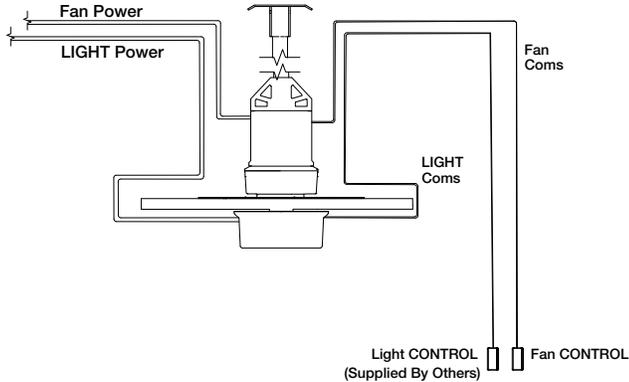
- Wire Strippers
- # 2 Philips Head Screwdriver
- 1/8 in. Philips Head Screwdriver
- 20 ft. Spool Of Electrician Fish Tape
- (2) Wago Connectors or Wire Nuts
- 0-10v Wall Mount Dimming Control

1. Remove the light shroud by loosening the (3) M4 screws and twisting. Feed the control wire from the LED light through the axle and out of the “mouse hole” in the down tube. Use electrician fish tape to help pull the communication wire through axle to the drive.
2. To operate the LED light without the modbus control, a separate power switch or 0-10v potentiometer (supplied by others), will need to be installed next to the analog control. Wire should be ran from the switch or dial to the top of the down tube in parallel with the supplied analog control wire. The LED light control wire will then be fed down through the downtube and out of the “mouse hole” and connected to the LED light control wire directly with wire nuts or wago connectors provided by others.

3. Manage excess wire by pulling slack up through the downtube to the ceiling mount. Secure the communication wire to the building structure to keep clear of the fan blades.



4. Reattach the light shroud as previously stated (all fasteners torqued hand tight).



Temperature/Humidity Sensor (Optional)

The following instructions apply to touchscreen control installations that were provided with the optional temperature/humidity sensor package.

NOTE: Temperature/Humidity Sensor can only be installed with an Advance Touchscreen Control is used to run the fan network.



1. Plug one end of a shielded, twisted pair CAT-5e cable that was provided with the temperature/humidity sensor package into the 2-way RJ45 splitter located at the top of the downtube on the last fan in the daisy-chain. For daisy-chain communication wiring between fans, refer to instructions on page 31.

IMPORTANT: Touchscreen controls, temperature/humidity sensors, and HVLS fans must be installed with the supplied CAT-5e communication cable or shielded, twisted pair CAT-5e (by others) that complies with the following specifications. Cable must be twisted pair, shielded 26 ga. CAT-5e cable with a drain wire and must be compliant with ISO 11801. Cable must use shielded RJ45 connectors with a soldered drain and wiring configuration must follow EIA/TIA T568B wiring pinout. Individual CAT-5e cable lengths must not exceed 200 ft. in order to prevent network communication issues.

2. Plug the other end of the shielded, twisted pair CAT-5e cable into the shielded 2-way RJ45 splitter located on the temperature/humidity sensor labelled “CEILING”.
3. Open the front of the enclosure on the temperature/humidity sensor labelled “CEILING” by turning the slotted screws in the enclosure one quarter turn.
4. Mount the temperature/humidity sensor labelled “CEILING” in the desired mounting location using the three mounting holes on the inside of the enclosure (mounting hardware provided by others to accommodate various mounting surfaces).
5. Close the front of the enclosure on the temperature/humidity sensor labelled “CEILING”.
6. Plug one end of a second shielded, twisted pair CAT-5e cable that was provided with the temperature/humidity sensor package into the shielded 2-way RJ45 splitter on the temperature/humidity sensor labelled “CEILING”.
7. Plug the other end of the shielded, twisted pair CAT-5e cable into the shielded 2-way RJ45 splitter located on the temperature/humidity sensor labelled “ROOM”.
8. Repeat steps 3-5 to mount the temperature/humidity sensor labelled “ROOM” at occupant height.

Operation And Maintenance

Fan Inspection

DANGER

Disconnect and secure to the 'OFF' position all electrical power to the fan prior to inspection or servicing. Failure to comply with this safety precaution could result in serious injury or death.

DANGER

Pour écarter les risques de blessure grave ou de mort, débrancher et verrouiller l'alimentation électrique en position « Arrêt » avant tout contrôle ou entretien.

Inspection of the fan should be conducted at the first 30 minute and 24 hour intervals of satisfactory operation.

- 30 Minute Interval - Check all fasteners for tightness. Adjust and tighten as necessary.
- 24 Hour Interval - Inspect all fan components. Check all fasteners, airfoil retaining ring, the safety cable, and guy wires (if applicable). Adjust and tighten as necessary.

Operational Status Codes (Warnings)

Code	LED Indicator	Description
0	Green	No warning/fault
1	Flashing Green	Communication/watchdog timeout
2	Red	Drive faulted - see fault code table 6-10
3	Flashing Yellow	Motor temperature above allowable tolerance
4	Flashing Yellow	IGBT temperature above allowable tolerance
5	Flashing Red/White	Drive inhibited - fire shutdown activate
6	Flashing White	Wind shutdown active
7	Flashing Yellow	Ambient temperature above allowable tolerance
8	Flashing Yellow	Flyback temperature above allowable tolerance
9	Flashing Yellow	DC link capacitor temperature above allowable tolerance
10	Flashing Yellow	Heat sink temperature above allowable tolerance
11	Flashing Red	Comm link - drive not responding to control
12	Flashing Purple	Invalid input mode
15	Red	Diagnostic/commission mode disabled as drive has fault
16	Flashing Blue to Green	Configuration parameter save/read error

Fan Maintenance

NOTE: Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations and have experience with this type of equipment.

Once the fan has been put into operation, a periodic maintenance program should be set up to ensure reliable fan performance. A proper maintenance program will help deliver years of dependable service. Items to be included in this program are as follows:

1. Verify that all fasteners are tight and properly torqued.
2. Verify that all of the fan's safety systems – safety cable, airfoil retaining ring, and guy wires (if applicable) are properly installed. Inspect for signs of damage or failure. Safety cable and guy wire tension should also be checked. Safety cable should be wrapped around the building structure leaving as little slack as possible. Guy wires should be under enough tension to prevent any lateral movement of the motor and downtube (if applicable).
3. Inspect the fan for signs of fatigue, corrosion, or wear.
4. Impellers require little attention when moving clean air. Occasionally, oil and dust may accumulate causing imbalance. When this occurs, clean the impeller and other fan components to ensure smooth and safe operation. Remove any accumulated dust and dirt using hot water or mild cleaning solutions. Harsh chemicals should not be used to clean the fan as they may damage the fan's finish or motor.

IMPORTANT: Do not allow water or solvents to enter the motor or VFD. Under no circumstances should motors or VFDs be sprayed with steam, water or solvents.

5. Motor maintenance is generally limited to cleaning. Limit cleaning to exterior surfaces only. Removing dust buildup on motor housing ensures proper motor cooling.
6. Prior to restarting unit, check all fasteners for tightness each time maintenance checks are performed.

Troubleshooting

DANGER
Disconnect and secure to the 'OFF' position all electrical power to the fan prior to inspection or servicing. Failure to comply with this safety precaution could result in serious injury or death.
DANGER
Pour écarter les risques de blessure grave ou de mort, débrancher et verrouiller l'alimentation électrique en position « Arrêt » avant tout contrôle ou entretien.

Each fan bears a manufacturer's nameplate with the fan's model number and a unique serial number for identification. This information will assist the local representative and the manufacturer in providing service and replacement parts.

IMPORTANT: Do not remove VFD circuit board from aluminum heatsink under any circumstances. Removal of circuit board will result in voiding of the fan warranty.

General Troubleshooting

Problem: Unknown, Initial Troubleshooting Steps.				
1	Is supply power turned on at all circuit breakers and fan disconnects?	Yes ⬇️	No ⬇️	No supply power to fans. Turn circuit breakers and disconnects to "on" position.
2	Is line voltage present across L1-L2, L2-L3, and L1-L3 at the VFD power terminals?	Yes ⬇️	No ⬇️	Supply power wiring is not connected or fuses are damaged or missing. Connect the proper power supply to the fan and verify that all fuses are installed and functional. Test and replace fuses as required. Refer to the wiring diagram and fuse sizing table on page 26.
3	Are the line voltage measurements within ±10% of nominal voltage across L1-L2, L2-L3, and L1-L3 at the VFD power terminals?	Yes ⬇️	No ⬇️	Phase imbalance or incorrect supply power is applied to the fan. Correct the supply power wiring to the fan.
4	Is the fan and control installed using only the provided networking components?	Yes ⬇️	No ⬇️	Networking components may be defective, incorrectly wired, or do not meet the required specifications. Replace with the provided components or components that comply with the specifications on pages 5-6.
5	If provided, is the 3-way RJ45 splitter installed with the single-port side connected to the black cable inside the fan downtube?	Yes ⬇️	No ⬇️	Splitter is installed in the incorrect orientation. Unplug the splitter and reconnect it in the proper orientation.
6	Have all communication cable connections been unplugged and reconnected to ensure they are fully seated and tight?	Yes ⬇️	No ⬇️	Verify all communication cable connections are properly aligned and tight. Unplug and reconnect as necessary.
7	Are the rotary dials on all fan VFDs set accordingly?	Yes ⬇️	No ⬇️	One or more VFDs have incorrect rotary dial settings. Reference the rotary dial positions on page 43 and in the appropriate control mode section.
8	Have the motor power cables been unplugged and reconnected to ensure they are connected and fully seated on all VFDs (a "click" should be heard when properly connected)?	Yes ⬇️	No ⬇️	Loose or misaligned motor power cable connection. With power removed from the VFD, unplug and reconnect the cables.
9	Is Fan 1 communicating with the controller?	Yes ⬇️	No ⬇️	Confirm wire termination between the controller and Fan 1 are secure. Turn off supply power to the fan and correct the wiring as shown in the communication wiring section of the appropriate controller. After correcting the wiring, restore supply power.
10	Does the communication wiring on the VFDs of all remaining fans match the appropriate wiring diagram?	Yes ⬇️	No ⬇️	Repeat Step 9 for all remaining fans.
11	Do fans operate as expected?	Yes ⬇️	No ⬇️	For additional assistance, contact your local sales representative or the manufacturer directly.
Everything is working properly.				

Fan Troubleshooting

Problem: One or more fans attempt to run, but do not rotate completely.				
1	Verified the controller is capable of controlling multiple fans?	Yes ⬇️	No ⬇️	Multispeed and 4-speed controllers are capable of controlling one fan only. Contact your local sales representative for assistance in acquiring additional controllers or upgrading to a standard touchscreen controller.
2	Is each fan properly addressed individually? Fans must be individually set in order to run in a daisy chain.	Yes ⬇️	No ⬇️	The fans are not configured correctly due to improper initial setup, or the fans were configured correctly during installation but power was not cycled properly. The installer must adjust the Modbus address to ensure proper fan operation. After making this adjustment, cycle power to the fan, allowing at least 30 seconds between shutting down and restoring power to ensure the system resets correctly.
3	Do all fans have the "fan size" and "blade count" set correctly in the fan controller?	Yes ⬇️	No ⬇️	Incorrect torque or speed command to the fans. Set the fan size and blade count using the instructions in the appropriate control or fan manual. Fan size and blade count settings must match the physical product.
4	With power turned off, rotate each fan by hand. Do the fans rotate freely without any audible rubbing, scraping, or grinding noise?	Yes ⬇️	No ⬇️	Rubbing components on the fan hub and/or airfoils. Remove any visual impairments of rotation. If the noise persists, contact your local sales representative or the manufacturer directly.
5	Are the rotary dials on the fan VFDs set appropriately for all installed fans?	Yes ⬇️	No ⬇️	Incorrect rotary dial settings. Set rotary dials 1, 2, and 3 as indicated in the fan networking section of the fan instruction manual.
6	Are resistance measurements across L1 and L2, L2 and L3, L1 and L3 on the pins of the motor power cable approximately equal?			Correct supply power from site.
7	Are resistance measurements across L1-GND, L2-GND, and L3-GND at the motor power cable pins open (no resistance)?			Correct the supply power from the site.
8	Do the fans operate as expected?	Yes ⬇️	No ⬇️	For additional assistance, contact your local sales representative or the manufacturer directly.
Everything is working properly.				

Problem: One or more fans not operating at expected RPM (too fast or too slow).				
1	Are the fan size and blade count set correctly in the control for all installed fans?	Yes ⬇️	No ⬇️	Incorrect torque or speed command to the fans. Set the fan size and blade count using the instructions in the appropriate control manual. Fan size and blade count settings must match the ordered fan.
2	Are the rotary dials on the fan VFDs set appropriately for all installed fans?	Yes ⬇️	No ⬇️	Rotary dial setting is incorrect. Set the dial per the fan instruction manual.
3	With power turned off, rotate all fans by hand. Do the fans rotate freely without any audible rubbing, scraping, or grinding noise?	Yes ⬇️	No ⬇️	Inspect the fan hub and airfoils for rubbing and correct any issues found.
4	Do the fans operate as expected?	Yes ⬇️	No ⬇️	For additional assistance, contact your local sales representative or the manufacturer directly.
Everything is working properly.				

Problem: One or more fans operated normally for a period of time, but have stopped running.				
1	Have all fault codes been acknowledged and reset on the fan control?	Yes ⓪	No Ⓛ	One or more fans may have experienced a fault. Refer to the list of fault codes on pages 44-45 for detailed descriptions. Acknowledge and reset all faults, then cycle power to the fans. Fans will only operate when the Operational Status code equals 0. Refer to the appropriate control manual for instructions on accessing the Operational Status code.
2	Are the fans installed with the factory-supplied communication cable?	Yes ⓪	No Ⓛ	Verify that the factory-supplied cable was used and confirm that all communication connections are properly landed and fully seated.
3	Is supply power turned on at all circuit breakers and fan disconnects, and are all fuses installed and functional?	Yes ⓪	No Ⓛ	No supply power to the fans. Turn all required circuit breakers and disconnects to the “on” position. Test and replace fuses as necessary.
4	Are there visible signs of damage on the VFD communications boards (e.g., black marks, damaged components)?	Yes ⓪	No Ⓛ	VFDs are damaged or defective. Document the findings with photos and contact your local sales representative office.
5	Do the fans operate as expected?	Yes ⓪	No Ⓛ	For additional assistance, contact your local sales representative or the manufacturer directly.
Everything is working properly.				

LED Light Troubleshooting

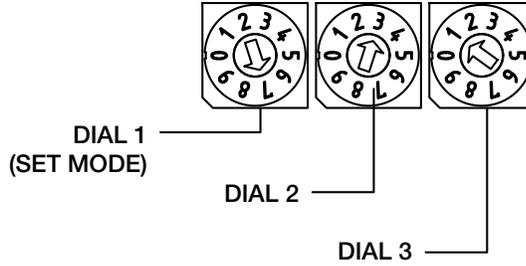
Problem: LED Light will not turn on.				
1	Is the fan being controlled by the Standard Touchscreen control or the Advanced Touchscreen controller?	Yes ⬇️	No ⬇️	If the fan is controlled by a multispeed or 4-speed control, lighting control is not available. Source an appropriate light control device and reference page 36 for communication wiring. Otherwise, contact your local sales representative for assistance in acquiring additional controllers or upgrading to a standard touch screen controller.
2	Is supply power turned "on" at all circuit breakers and LED light disconnects?	Yes ⬇️	No ⬇️	No supply power to the LED light. The LED light requires a separate 115V power source and is not powered by the HVLS fans. Turn all required circuit breakers and disconnects to the "on" position.
3	Has an LED light been selected in the fan control for the appropriate fan?	Yes ⬇️	No ⬇️	The control is not sending commands to the LED light. Refer to the appropriate control manual for instructions on selecting the LED light in the control.
4	Is the control set to a dimming value greater than 0, and has the LED light been turned on using the control's power button?	Yes ⬇️	No ⬇️	The control is not sending commands to the LED light. Set the dimming control to a value between 1 and 10, then press the control's power button to turn the LED light on. The control will indicate that the LED light is on by displaying a green power icon or the status "on".
5	Is line voltage present across the black and white LED power wires?	Yes ⬇️	No ⬇️	Supply power wiring is not connected. Correct the wiring per the wiring diagram on page 34-35.
6	Does the LED light operate as expected?	Yes ⬇️	No ⬇️	For additional assistance, contact your local sales representative or the manufacturer directly.
Everything is working properly.				

Problem: LED light will not turn off completely.				
1	Has an LED light been selected in the fan control for the appropriate fan?	Yes ⬇️	No ⬇️	The control is not sending commands to the correct LED light. Refer to the appropriate control manual for instructions on selecting the LED light in the control.
2	Has the LED light been turned off using the control's power button?	Yes ⬇️	No ⬇️	The control is not sending an OFF command to the LED light. Press the control's power button to turn the LED light off. The control will indicate that the LED light is off by displaying a gray or black power icon or the status OFF.
3	Does the LED light operate as expected?	Yes ⬇️	No ⬇️	For additional assistance, contact your local sales representative or the manufacturer directly.
Everything is working properly.				

Problem: LED light will not dim.				
1	Has an LED light been selected in the fan control for the appropriate fan?	Yes ⬇️	No ⬇️	The control is not sending commands to the correct LED light. Refer to the appropriate control manual for instructions on selecting the LED light in the control.
2	Is the control set to a dimming value less than 10?	Yes ⬇️	No ⬇️	The control is not sending dimming commands to the correct LED light. Set the dimming control to a value between 1 and 9 to dim the correct LED light. The control will display the current dimming value.
3	Is the 0–10 VDC wiring on the fan VFD installed as shown in the wiring diagrams on page 35?	Yes ⬇️	No ⬇️	0–10 VDC wiring is incorrect. Adjust the 0–10 VDC wiring on the fan VFD as shown in the wiring diagrams on pages 34-35.
4	Does the LED light operate as expected?	Yes ⬇️	No ⬇️	For additional assistance, contact your local sales representative or the manufacturer directly.
Everything is working properly.				

Reference

Rotary Dial Positions



Multispeed Mode

Model	Dial 1	Dial 2	Dial 3
DS-3-8	2	3	1
DS-3-10	2	3	2
DS-3-12	2	3	3
DS-3-14	2	3	4
DS-3-16	2	3	5
DS-3-18	2	3	6
DS-3-20	2	3	7
DS-3-24	2	3	8

Model	Dial 1	Dial 2	Dial 3
DS-6-8	2	6	1
DS-6-10	2	6	2
DS-6-12	2	6	3
DS-6-14	2	6	4
DS-6-16	2	6	5
DS-6-18	2	6	6
DS-6-20	2	6	7
DS-6-24	2	6	8

4-Speed Mode

Model	Dial 1	Dial 2	Dial 3
DS-3-8	6	3	1
DS-3-10	6	3	2
DS-3-12	6	3	3
DS-3-14	6	3	4
DS-3-16	6	3	5
DS-3-18	6	3	6
DS-3-20	6	3	7
DS-3-24	6	3	8

Model	Dial 1	Dial 2	Dial 3
DS-6-8	6	6	1
DS-6-10	6	6	2
DS-6-12	6	6	3
DS-6-14	6	6	4
DS-6-16	6	6	5
DS-6-18	6	6	6
DS-6-20	6	6	7
DS-6-24	6	6	8

Modbus RTU Mode

test	Address	Dial 1	Dial 2	Dial 3
Fan 1	02	1	0	2
Fan 2	03	1	0	3
Fan 3	04	1	0	4
Fan 4	05	1	0	5
Fan 5	06	1	0	6
Fan 6	07	1	0	7
Fan 7	08	1	0	8
Fan 8	09	1	0	9
Fan 9	10	1	1	0
Fan 10	11	1	1	1

Commissioning Mode

Model	Dial 1	Dial 2	Dial 3
DS-3-8	7	3	1
DS-3-10	7	3	2
DS-3-12	7	3	3
DS-3-14	7	3	4
DS-3-16	7	3	5
DS-3-18	7	3	6
DS-3-20	7	3	7
DS-3-24	7	3	8

Model	Dial 1	Dial 2	Dial 3
DS-6-8	7	6	1
DS-6-10	7	6	2
DS-6-12	7	6	3
DS-6-14	7	6	4
DS-6-16	7	6	5
DS-6-18	7	6	6
DS-6-20	7	6	7
DS-6-24	7	6	8

Diagnostics Mode

Model	Dial 1	Dial 2	Dial 3
DS-3-8	8	3	1
DS-3-10	8	3	2
DS-3-12	8	3	3
DS-3-14	8	3	4
DS-3-16	8	3	5
DS-3-18	8	3	6
DS-3-20	8	3	7
DS-3-24	8	3	8

Model	Dial 1	Dial 2	Dial 3
DS-6-8	8	6	1
DS-6-10	8	6	2
DS-6-12	8	6	3
DS-6-14	8	6	4
DS-6-16	8	6	5
DS-6-18	8	6	6
DS-6-20	8	6	7
DS-6-24	8	6	8

USB Software Update

Model	Dial 1	Dial 2	Dial 3
DS-3-8	0	3	1
DS-3-10	0	3	2
DS-3-12	0	3	3
DS-3-14	0	3	4
DS-3-16	0	3	5
DS-3-18	0	3	6
DS-3-20	0	3	7
DS-3-24	0	3	8

Model	Dial 1	Dial 2	Dial 3
DS-6-8	0	6	1
DS-6-10	0	6	2
DS-6-12	0	6	3
DS-6-14	0	6	4
DS-6-16	0	6	5
DS-6-18	0	6	6
DS-6-20	0	6	7
DS-6-24	0	6	8

Operational Status Codes (Warnings)

Code	LED Indicator	Description	Troubleshooting
0	Green	No warning/fault	Normal fan operation
1	Flashing Green	Communication/watchdog timeout	Fan has lost communication to control. 1. See Troubleshooting section.
2	Red	Drive faulted - see fault code table 6-10	Connect to modbus system to see fan faults. 1. See Troubleshooting section.
3	Flashing Yellow	Motor temperature above allowable tolerance	High temperature motor alarm. 1. Shut down the fan. 2. Clean VFD heat sink, motor enclosure, and blades. 3. Contact your local sales representative or the manufacturer directly.
4	Flashing Yellow	IGBT temperature above allowable tolerance	
5	Flashing Red/White	Drive inhibited - fire shutdown activate	
6	Flashing White	Wind shutdown active	
7	Flashing Yellow	Ambient temperature above allowable tolerance	High temp VFD alarm. 1. Shut the fan down. 2. Clean VFD heat sink, motor enclosure, and blades. 3. Contact your local sales representative or the manufacturer directly.
8	Flashing Yellow	Flyback temperature above allowable tolerance	
9	Flashing Yellow	DC link capacitor temperature above allowable tolerance	
10	Flashing Yellow	Heat sink temperature above allowable tolerance	
11	Flashing Red	Comm link - drive not responding to control	Communication is broken or disconnected. 1. Verify communication wiring between control and fan. 2. Hardware fault. 3. Contact your local sales representative or the manufacturer directly.
12	Flashing Purple	Invalid input mode	1. Rotary Dial 1 is set incorrectly on VFD. 2. Verify rotary dial setting is set-up for provided control.
15	Red	Diagnostic/commission mode disabled as drive has fault	VFD reporting values outside of expected range. 1. Confirm incoming voltage and phase is correct. 2. See Troubleshooting section.
16	Flashing Blue to Green	Configuration parameter save/read error	Software update/error, firmware update error, retry software or firmware update and 1. Cycle power. 2. Contact your local sales representative or the manufacturer directly.

VFD LED Status Light

Rotary Dial 1		Rotary Dial 2		Rotary Dial 3		LED Light Color	Compatible HVLS Control Model
Position	Function	Position	Function	Position	Function		
0	Unused	Unused	Unused	Unused	Unused	BLUE	N/A
1	Modbus RTU Control Mode	0-9	Modbus Address (First Digit)	0-9	Modbus Address (Second Digit)	GREEN	Standard Touchscreen Advanced Touchscreen
2	Analog 0-10V Control Mode	3 or 6	Fan Blade Count	1-8	Fan Size	YELLOW	Analog Multispeed
3	Analog 0-20mA Control Mode	3 or 6	Fan Blade Count	1-8	Fan Size	WHITE	Control By Others
4	Unused	Unused	Unused	Unused	Unused	YELLOW	N/A
5	Unused	Unused	Unused	Unused	Unused	WHITE	N/A
6	Dry Contact Control Mode	3 or 6	Fan Blade Count	1-8	Fan Size	PURPLE	Analog 4-Speed
7	Commissioning Test Mode	3 or 6	Fan Blade Count	1-8	Fan Size	Blue Yellow Yellow	No Control Required
8	Diagnostic Test Mode	3 or 6	Fan Blade Count	1-8	Fan Size	Green Green Blue	No Control Required
9	Unused	Unused	Unused	Unused	Unused	NO LIGHT	N/A

Modbus Registers List

HVLS fan VFDs are configured for Modbus RTU communication as standard. The Modbus register list is for applications where a building management system (BMS) or field-supplied control are to be used for fan operation. A baud rate of 19200 bps and a device polling delay of 260 ms are recommended for network functionality.

	Register	Name	R/W	Retentive	Signed	Format	Range	Default	Description	Detail	
Control	1	Run Command	R/W			x	0,1,2		0=Stop=clear Fault(s); 1=Reverse; 2=Forward; 99=Reset		
	2	Torque Reference	R/W			xxx	1...100		Percentage of full torque. Torque output determines fan speed.		
	3	Operational Status	R			x	0...6		1=Comm CRC errors, 2=Drive Faulted, , 4=IGBT temp warning, 5=Drive Inhibited (Fire Input)		
	4	Light Control	R/W			xxx	0..100	0	J5 0-10V Output for Optional Light Control (%)	Resets to 0 after power cycle	
	5	External Temperature	R			xxxxx	-400..1100		External Temp (°C) (0.1 unit)	Based off an external 10K @ 25C NTC thermistor	
Fault	6	Last Fault Code	R	R		xxx			Integer code representing fault history	At each fault occurrence, values are shifted to next register and the current fault is displayed in Last Fault Code. Values are retained after power cycle.	
	7	Second Last Fault	R	R		xxx					
	8	Third Last Fault	R	R		xxx					
	9	Fourth Last Fault	R	R		xxx					
	10	Fifth Last Fault	R	R		xxx					
Diagnostics	11	Firmware Version	R	R		xxxxx	1-500		Incremental Version Count		
	12	Operating Hours	R	R		xxxxx	0-65535		Operating hours (driving motor)	MAX 65535	
	13	Motor RPM	R		S	xxx	-300...300		Motor RPM (0.1 rpm)		
	14	Voltage, DC Bus	R			xxx	0...1000		Bus Voltage (Volts) (1 units)		
	15	Voltage, Output RMS	R			xxx	0...1000		RMS Modulated Output Voltage (Volts) (1 units)		
	16	Current, Motor RMS	R			xx.x	0...150		RMS Motor current (Amps) (0.1 units)		
	17	Temperature, Capacitor	R		S	xxx.x	-300...1100		Capacitor Temp (°C) (0.1 units)		
	18	Temperature, Transistor	R		S	xxx.x	-400...1250		Transistor Temp (°C) (0.1 units)	Transistor to Heatsink	
	19	Temperature, Ambient	R		S	xxx.x	-300...1350		Ambient Temp (°C) (0.1 units)		
	20	--Spare--	R					0			
	21	Communication Errors	R			xxx	0-65535		Number of errors since last power cycle	0-65535	
	22	-- Spare --	R/W					0			
	23	-- Spare --	R/W					0			
	24	-- Spare --	R/W					0			
	25	-- Spare --	R					0			
Configuration	26	KEEP ALIVE (WatchDog)	R/W	R		xxxxx	0-65535	30	Seconds; 0 = disable	Any message resets; if a timeout occurs, fan will stop (if running)	
	27	MODBUS Serial Speed	R/W			x	0...9	4	Baud Rate Setting (SW2: Pin 7 ON)	0	1200 bps
										1	2400 bps
										2	4800 bps
										3	9600 bps
										4	19200 bps
5										38400 bps	
6										57600 bps	
7	115200 bps										
28	Motor Type	R				0..2	0	13,70,170	0=13; 1 = 70; 2=170		
29	MODBUS Device ID	R/W	R			1-247	2	New Device ID is set after power cycle			
30	-- Spare --	R/W					0				

NOTE: Registers 1000-1150 are reserved for internal Diagnostics and Testing.



Project Name: _____

Name of Installer's Company: _____

Serial Number(s) of Fan(s): _____

The following checklist provides an overview of typical installation and troubleshooting procedures but is not intended to replace the installation, operation, and maintenance (IOM) manuals provided with the fan and control. To ensure a positive outcome, please read and follow all provided instructions including those found in this checklist, the fan and controls IOMs, and any other written instructions provided by the manufacturer.

Pre-Installation Checks

- Installation, Operation, and Maintenance (IOM) Manual** – I have read the IOM and all other provided instructions before beginning installation.
- Receiving and Inspection** – All fan components have been received and are undamaged.
- Fan Clearances** – The fan will be installed in a location that complies with the following minimum clearances:
 - Airfoils will be installed a minimum of 10 feet above finished floor.
 - Airfoils will be installed with a minimum horizontal and vertical clearance of 3 feet to any obstructions.
 - Center of fan will be a minimum of 1.5 times the fan diameter away from building walls and corners.
 - Center of fan will be a minimum of 3 times the fan diameter away from center of adjacent fan(s).
 - Airfoil tips will be a minimum of 2 times the fan diameter away from radiant heaters and HVAC discharges or intakes.
- NFPA 13 Compliance** – If the building is equipped with a fire suppression system, the fan will be installed in a location that complies with the following:
 - Fan will be installed in the center of four adjacent sprinkler heads.
 - Fan will be installed with at least 3 feet of vertical clearance between airfoils and sprinkler deflectors.
 - Fan will be interlocked with fire suppression system to shut down upon receiving a waterflow signal.
- Structural Suitability** – A structural engineer has verified that the mounting surface will bear the operating weight and maximum torque (twisting force) of the fan as listed in the IOM.

Mechanical Installation

- Fan Mounting** – Fan is mounted in accordance with the instructions found in the IOM.
- Safety Cable and Guy Wires** – Safety cable and guy wires (if provided) are installed in accordance with the instructions found in the IOM.
- Airfoils and Winglets** – Airfoils and winglets are installed in accordance with the instructions found in the IOM.
- Hardware** – Fan is installed using only Greenheck-supplied hardware or hardware (by others) that complies with the specifications indicated for each component in the IOM.
- Torque** – All applicable hardware is torqued to the appropriate value indicated in the IOM.

Electrical Installation

- **Source Power Quality** – An experienced electrician has confirmed that the building’s source power complies with the power quality requirements indicated in the IOM or has installed external power line filters (by others) if required.
- **Source Power Voltage** – An experienced electrician has verified that the source power voltage measured from leg-to-leg and leg-to-ground at the input power terminals on each fan’s VFD are within acceptable tolerances. Measured voltages have also been recorded for future reference.
- **Communication Cables** – The communication cables have been plugged into VFD as shown in the IOM.
- **If using the ordered Shielded CAT-5e Cable** – Fan is installed using only Greenheck-supplied CAT-5e cable or shielded CAT-5e cable that complies with the specifications included in the IOM. Individual CAT-5e cable lengths do not exceed 200 feet.
- **If using the ordered RS-485 Cable** – Fan is installed using only Greenheck-supplied RS-485 Cable or cable that complies with the specifications included in the IOM.
- **CAT-5e and RS-485 Cable Functionality** – Communication cables have been tested for functionality (including continuity of the shield) using a CAT-5e cable tester or multimeter and needle probes.
- **Networking and Wiring** – All required network wiring and rotary dial modifications have been completed on each fan’s VFD as indicated in the “Fan Networking” section of the IOM.
- **Communications Test** – Communications have been tested at each fan’s VFD as indicated below:
 1. Unplug fan from RJ45 splitter (if used) at the top of the fan’s downtube.
 2. Measure DC voltage across DATA+ and DATA- terminals on fan’s VFD. Measured voltage should be 4.5 – 5.5V.
 3. Reset rotary dials as shown in the IOM and reconnect the fan to the RJ45 splitter (if used) to return fan to service.
- **24V Test** – 24V power supply has been tested at each fan’s VFD by measuring DC voltage across 24V and GND terminals. Measured voltage should be 23-24V.
- **Controls** – Controls have been installed in a safe environment for the specific control model.
- **Fire Alarm Relay** – If the building is equipped with a fire suppression system, the Greenheck supplied fire alarm relays have been installed and tested by qualified personnel who are familiar with the operation of building fire suppression systems.
- **If using the ordered Shielded CAT-5e Cable** – Fan is installed using only Greenheck-supplied CAT-5e cable or shielded CAT-5e cable that complies with the specifications included in the IOM. Individual CAT-5e cable lengths do not exceed 200 feet.
- **If using the ordered RS-485 Cable** – Fan is installed using only Greenheck-supplied RS-485 Cable or cable that complies with the specifications included in the IOM.

Start-Up Checks

- Airfoil Rotation** – Rotate airfoils by hand to ensure that the fan rotates freely and there are no rubbing components.
- Fan Operation** – When the fan is operating, ensure that there is no unusual noise or vibration.
- Inspection** – After 30 minutes of operation, inspect all fasteners and guy wires for tightness. Retighten if necessary.
- Controls** – Ensure that controls have identified the correct number of fans and that all fans are operating properly.
- Faults** – Ensure that no faults are being registered on the controls.

Photos

- Overall Fan Installation** – I have taken a photo showing the entire fan (mount, downtube, motor, and airfoils) for at least one representative fan at the jobsite. Photo has been saved for future reference.
- Fan Mounting** – I have taken a photo showing a close-up view of the fan mounting (including connections to the building structure) for at least one representative fan. Photo has been saved for future reference.
- Safety Cable and Guy Wires** - I have taken photos showing close-up views of the installed safety cable and guy wires for at least one representative fan. Photos have been saved for future reference.
- VFD Circuit Boards** – If multiple fans are being operated by a single control, I have taken a photo showing a close-up view of the VFD circuit board for the first and second fans in the daisy-chain. Photos have been saved for future reference.
- Shielded Communication Cable** – I have taken a photo showing that fans were installed using only Greenheck-supplied communication cable or shielded communication cable that complies with the specifications included in the IOM. Photo has been saved for future reference.

By signing this document, I confirm that all HVLS fans have been installed according to the instructions detailed in the IOM and that I have verified all of the above information.

First Name

Last Name

Signature

Phone Number

Date



Maintenance Log

Date _____ Time _____ AM/PM

Notes: _____

Date _____ Time _____ AM/PM

Notes: _____

Date _____ Time _____ AM/PM

Notes: _____

Date _____ Time _____ AM/PM

Notes: _____

Date _____ Time _____ AM/PM

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Maintenance Log

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Date _____ Time _____ AM/PM

Notes: _____



Our Commitment

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

Product warranties can be found online at Greenheck.com, either on the specific product page or in the literature section of the website at Greenheck.com/Resources/Library/Literature.

