

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.



AMPLIFY™ 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 universal ceiling mount, 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., 3/4 in. and 17mm Sockets
- 7/16 in., 1/2 in., 9/16 in. and 3/4 in. Wrenches
- Adjustable Wrench
- Torque Wrench (up to 50 ft·lbf)
- Torque Wrench (up to 120 in·lbf)
- Drill and 9/16 in. Drill Bit
- Phillips Screwdriver
- Level
- Impact Driver
- #2 Phillips Bit and Driver
- 3/8 in. Magnetic Nut Driver
- Magnetic Nut Driver Extension

NOTE: AMPLIFY™ Model DS fan components can weigh 90 lbs. or greater depending upon the fan size and accessories that are provided. 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.

Quick Start Guide

General Information

Pre-Installation

Mechanical Installation

Fire System Integration

Electrical Installation

Fan Networking

Operation And Maintenance

Troubleshooting

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Quick Start
Guide

General
Information

Pre-Installation

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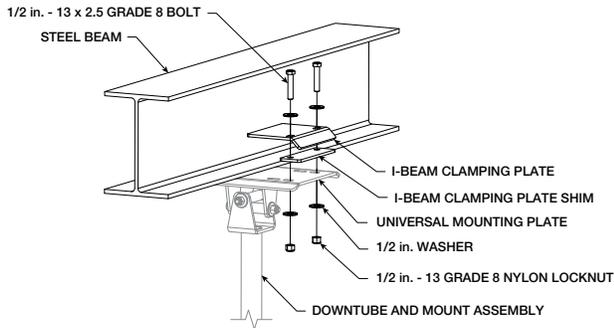
Reference



Quick Start Guide

REFER TO INSTALLATION MANUAL FOR COMPLETE INSTALLATION INSTRUCTIONS.
 QUICK START GUIDE DOES NOT REPLACE INSTALLATION MANUAL INSTRUCTIONS.

STEP #1 - MOUNT INSTALLATION



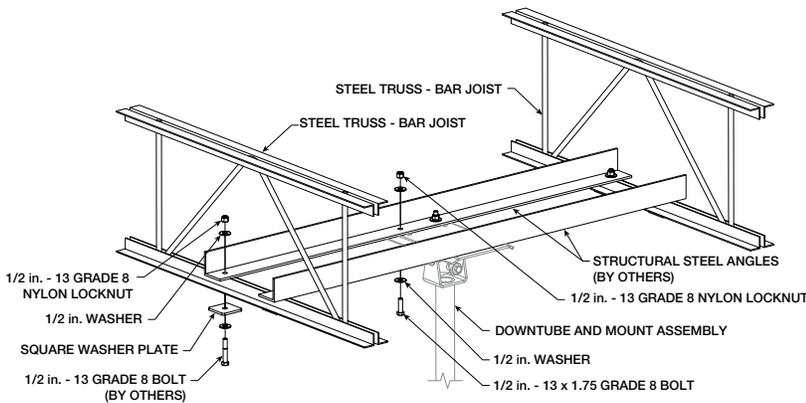
STEEL I-BEAM INSTALLATION

- MANUAL PAGE 17
- FASTENER KIT 915428

IMPORTANT: I-BEAM MUST HAVE MINIMUM 5 IN. FLANGE WIDTH AND 1/2 IN. FLANGE THICKNESS

IMPORTANT: DO NOT INSTALL ON FABRICATED I-BEAMS

IMPORTANT: TORQUE ALL BOLTS TO 45 FT-LBF (61.0 N-m)



STEEL TRUSS INSTALLATION

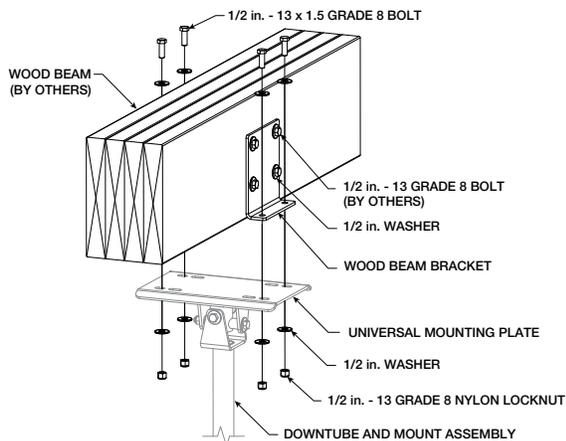
- MANUAL PAGE 18
- FASTENER KIT 915429

IMPORTANT: TRUSSES MUST HAVE MINIMUM 5 IN. CHORD WIDTH

IMPORTANT: STEEL ANGLES MUST BE MINIMUM OF 4 x 4 x 1/4 IN. THICK

IMPORTANT: SPAN LENGTH MUST NOT EXCEED 8 FT.

IMPORTANT: TORQUE ALL BOLTS TO 80 FT-LBF (108.5 N-m)



WOOD BEAM INSTALLATION

- MANUAL PAGE 19
- FASTENER KIT 915429

IMPORTANT: WOOD BEAM MUST BE 4-1/2 TO 8-7/8 IN. WIDE

IMPORTANT: TORQUE ALL BOLTS TO 80 FT-LBF (108.5 N-m)

Z-PURLIN INSTALLATION

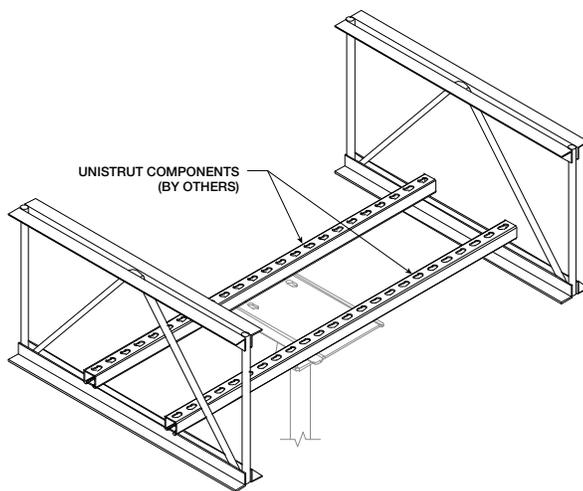
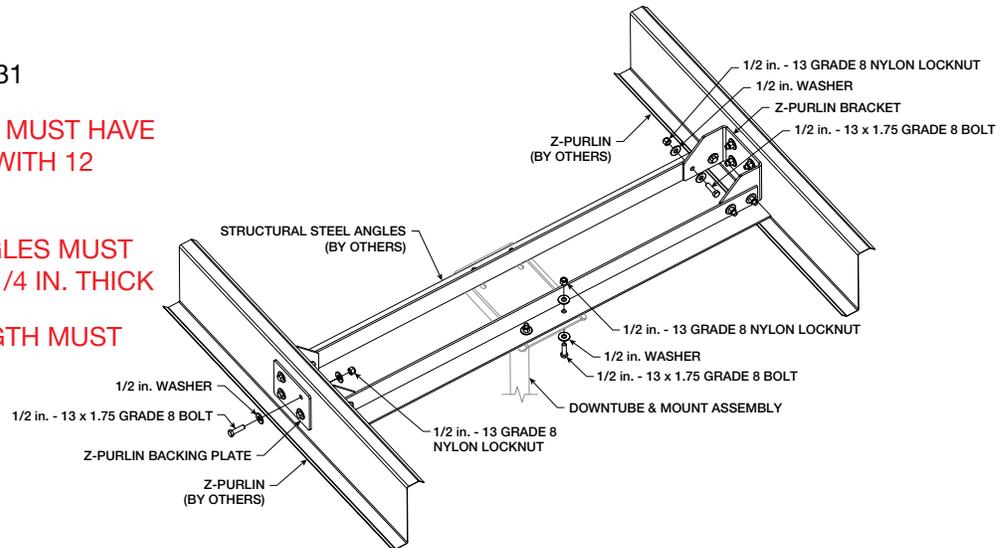
IMPORTANT: TORQUE ALL BOLTS TO 80 FT-LBF (108.5 N-m)

- MANUAL PAGE 20
- FASTENER KIT 915431

IMPORTANT: Z-PURLINS MUST HAVE MINIMUM 2 IN. FLANGE WITH 12 GAUGE THICKNESS

IMPORTANT: STEEL ANGLES MUST BE MINIMUM OF 4 x 4 x 1/4 IN. THICK

IMPORTANT: SPAN LENGTH MUST NOT EXCEED 8 FT.



UNISTRUT INSTALLATION

- MANUAL PAGE 21
- FASTENERS PROVIDED BY OTHERS

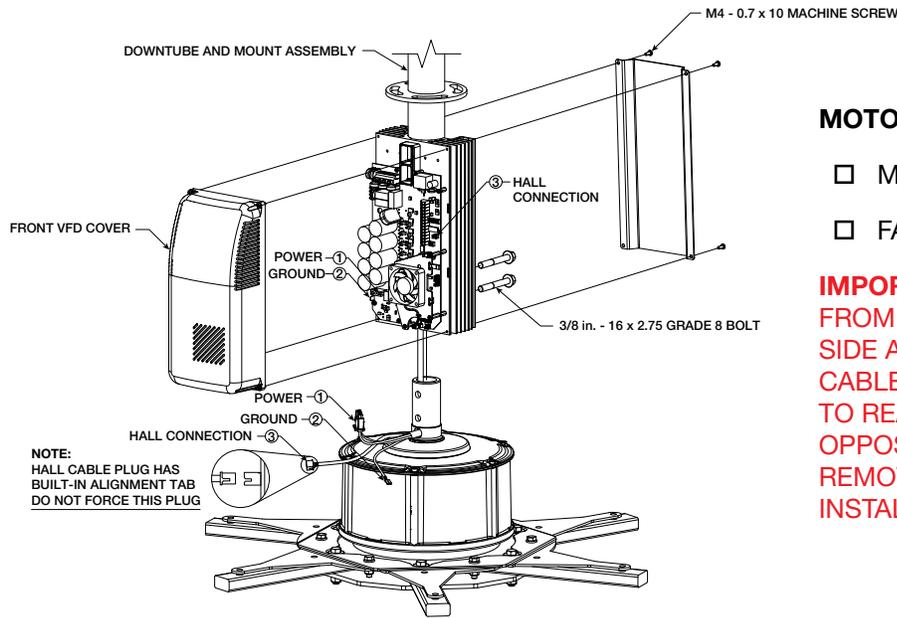
IMPORTANT: UNISTRUT MUST BE MINIMUM OF 1-5/8 x 1-5/8 IN. STEEL WITH 12 GAUGE THICKNESS

IMPORTANT: SPAN LENGTH MUST NOT EXCEED 8 FT.

IMPORTANT: DO NOT HANG OR SUSPEND UNISTRUT FROM STRUCTURE. UNISTRUT MUST REST ON TOP OF STRUCTURE AND BE DIRECTLY FASTENED TO STRUCTURE WITH THREADED CONNECTION. USE LOCKTITE ON FASTENERS.

IMPORTANT: TORQUE ALL BOLTS TO 80 FT-LBF (108.5 N-m)

STEP #2 - MOTOR INSTALLATION



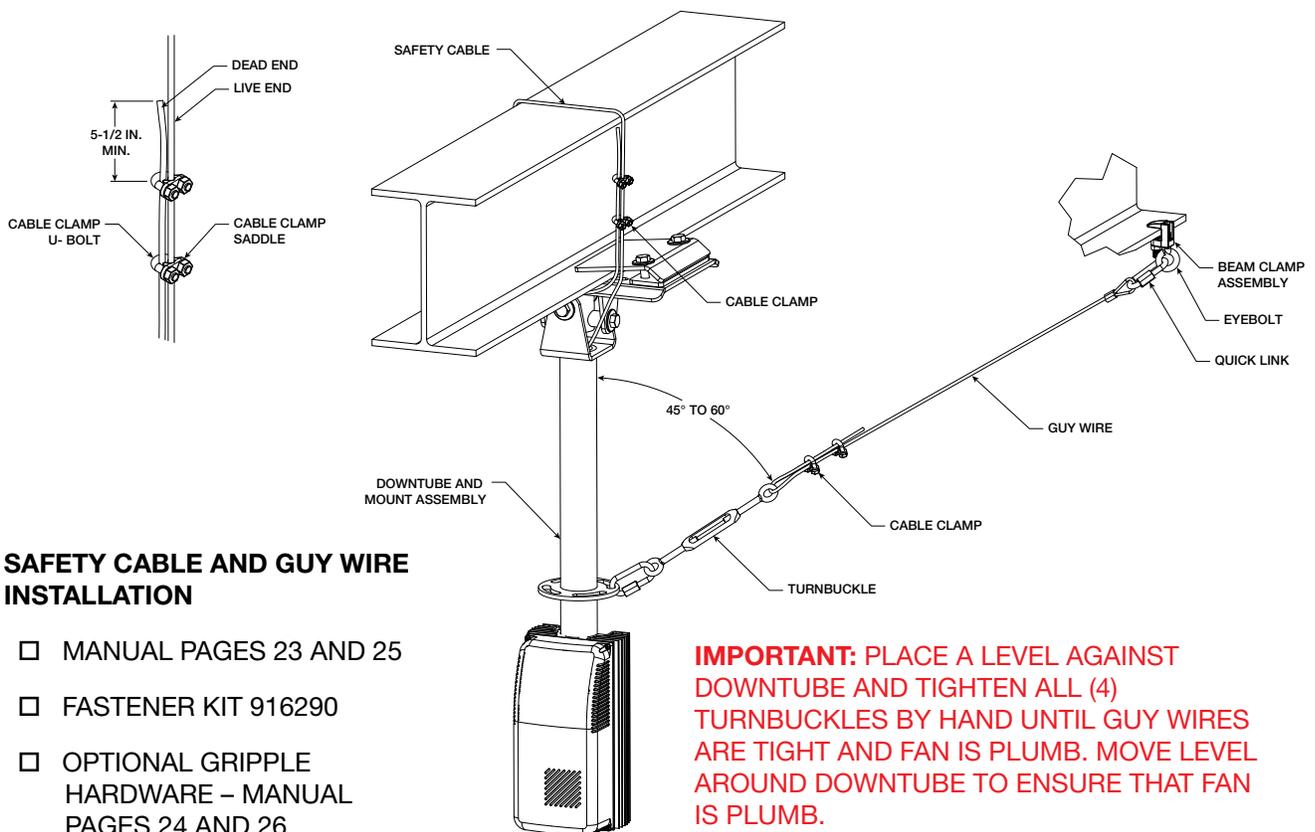
MOTOR INSTALLATION

- MANUAL PAGES 22-23
- FASTENER KIT 915065

IMPORTANT: ELECTRICAL CABLES FROM MOTOR MUST BE ON SAME SIDE AS BLACK PLASTIC VFD COVER. CABLES ARE NOT LONG ENOUGH TO REACH CIRCUIT BOARD FROM OPPOSITE SIDE. MOTOR MUST BE REMOVED AND ROTATED 180° IF INSTALLED INCORRECTLY.

IMPORTANT: TORQUE BOLTS TO 33 FT-LBF (44.75 N-m)

STEP #3 - SAFETY CABLE AND GUY WIRE INSTALLATION

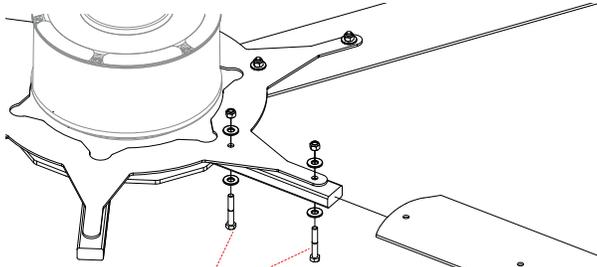


SAFETY CABLE AND GUY WIRE INSTALLATION

- MANUAL PAGES 23 AND 25
- FASTENER KIT 916290
- OPTIONAL GRIPPLE HARDWARE - MANUAL PAGES 24 AND 26

IMPORTANT: PLACE A LEVEL AGAINST DOWNTUBE AND TIGHTEN ALL (4) TURNBUCKLES BY HAND UNTIL GUY WIRES ARE TIGHT AND FAN IS PLUMB. MOVE LEVEL AROUND DOWNTUBE TO ENSURE THAT FAN IS PLUMB.

STEP #4 - AIRFOIL INSTALLATION



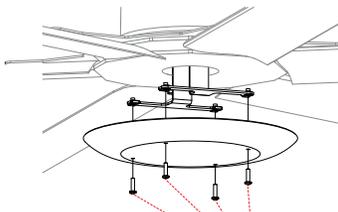
TORQUE TO 25 FT-LBF
(34 N-m)

AIRFOIL INSTALLATION

- MANUAL PAGES 26-27
- FASTENER KIT 854832 (3 AIRFOILS) OR 915066 (6 AIRFOILS)

TORQUE TO 60 IN-LBF
(6.8 N-m)

STEP #5 - HUB PLATE INSTALLATION



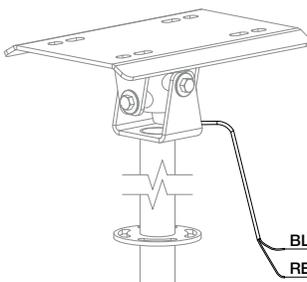
TORQUE TO 96 IN-LBF
(10.8 N-m)

HUB PLATE INSTALLATION

- MANUAL PAGE 27
- OPTIONAL LED LIGHT - MANUAL PAGE 28
- HARDWARE KIT 854832 (3 AIRFOILS) OR 915066 (6 AIRFOILS)

IMPORTANT: ROTATE FAN BY HAND TO ENSURE THAT IT MOVES FREELY AND DOES NOT RUB OR CONTACT ANY OBSTRUCTIONS.

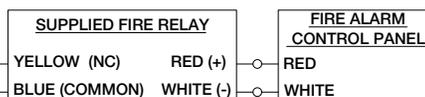
STEP #6 - FIRE ALARM RELAY INSTALLATION



FIRE ALARM RELAY INSTALLATION

- MANUAL PAGE 29

IMPORTANT: MUST USE PROVIDED PAM-1 RELAY OR OTHER APPROVED ELECTROMECHANICAL RELAY



STEP #7 - MOTOR CABLE CONNECTION TO VFD

MOTOR CABLE CONNECTION TO VFD

- MANUAL PAGES 30-32

IMPORTANT: PLUGS MUST BE FULLY SEATED AND IN PROPER ORIENTATION FOR FAN OPERATION

STEP #8 - POWER WIRING

POWER WIRING

- MANUAL PAGE 33
- OPTIONAL LED LIGHT - MANUAL PAGE 34

IMPORTANT: SOURCE POWER MUST COMPLY WITH REQUIRED SPECS

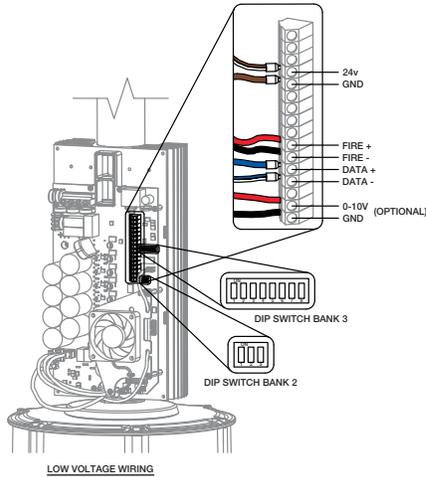
STEP #9 - COMMUNICATION WIRING

COMMUNICATION WIRING

- MANUAL PAGES 34-35

IMPORTANT: MUST USE PROVIDED CAT-5e CABLE OR SHIELDED CABLE THAT COMPLIES WITH REQUIRED SPECS ON PAGE 34

STEP #10 - FAN NETWORKING



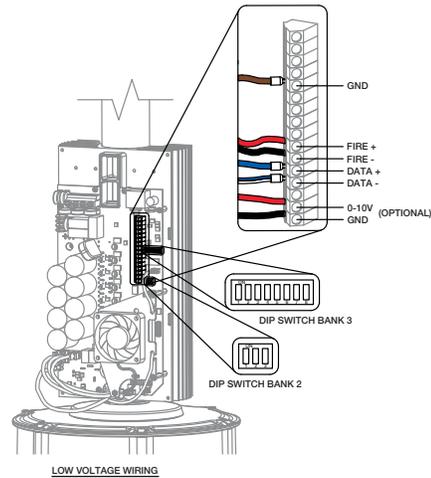
FIRST FAN IN DAISY-CHAIN

- MANUAL PAGES 36-37
- NO VFD WIRING MODIFICATIONS REQUIRED
- VERIFY VFD WIRING MATCHES
- MODIFY DIP SWITCH BANKS 2 AND 3 AS SHOWN

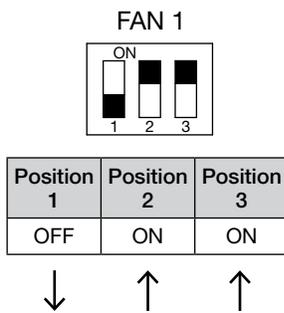
ALL REMAINING FANS IN DAISY-CHAIN

- MANUAL PAGES 38-39
- REMOVE WHITE/BROWN 24V WIRE AND CAP
- VERIFY VFD WIRING MATCHES
- MODIFY DIP SWITCH BANKS 2 AND 3 AS SHOWN

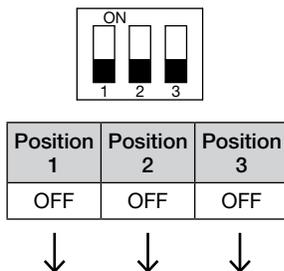
IMPORTANT: DO NOT REMOVE BROWN GND WIRE



DIPSWITCH BANK 2 SETTINGS



ALL OTHER FANS IN SERIES



DIPSWITCH BANK 3 SETTINGS

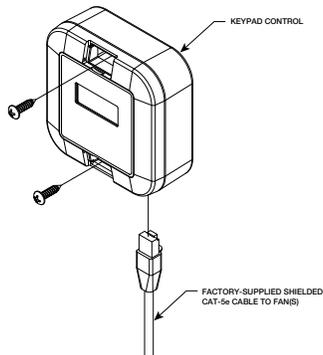
Fan Number	Modbus Address	Position 1	Position 2	Position 3	Position 4	Position 5	Position 6, 7, 8
N/A	1	Reserved for HVLS Fan Control					Do Not Modify
1	2	On	Off	Off	Off	Off	
2	3	Off	On	Off	Off	Off	
3	4	On	On	Off	Off	Off	
4	5	Off	Off	On	Off	Off	
5	6	On	Off	On	Off	Off	
6	7	Off	On	On	Off	Off	
7	8	On	On	On	Off	Off	
8	9	Off	Off	Off	On	Off	
9	10	On	Off	Off	On	Off	
10	11	Off	On	Off	On	Off	

IMPORTANT: DO NOT MODIFY POSITIONS 6, 7, AND 8 ON DIPSWITCH BANK 3. DEFAULT SETTINGS ARE ON, OFF, OFF (UP, DOWN, DOWN)

STEP #11 - CONTROLS INSTALLATION

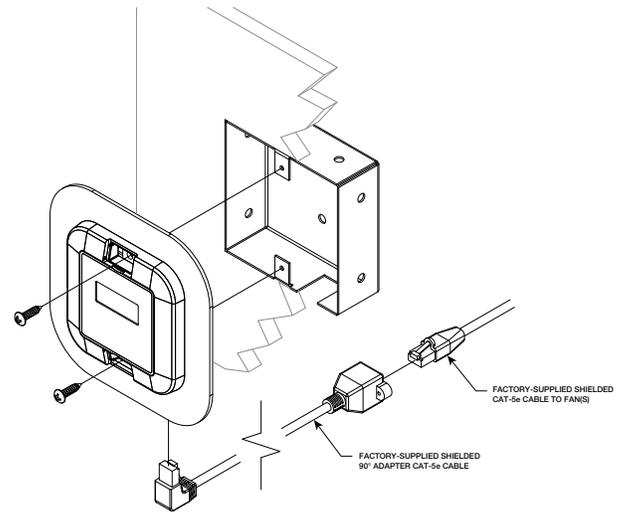
SURFACE MOUNT KEYPAD CONTROL

☐ REFER TO CONTROL MANUAL PAGE 2



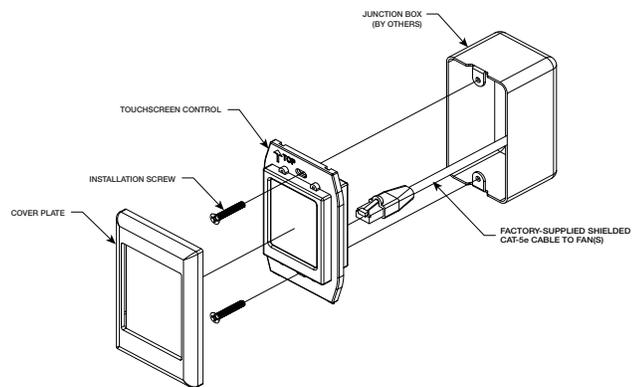
RECESSED MOUNT KEYPAD CONTROL

☐ REFER TO CONTROL MANUAL PAGES 2-3



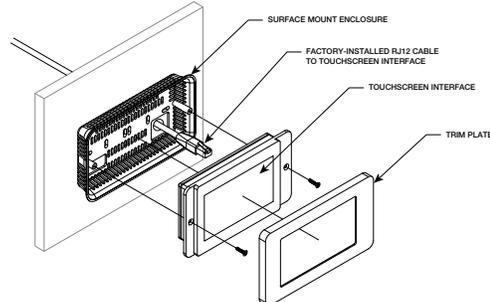
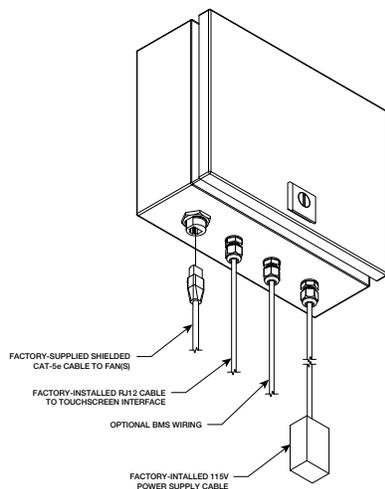
STANDARD TOUCHSCREEN CONTROL

☐ REFER TO CONTROL MANUAL PAGE 2



SURFACE MOUNT ADV TOUCHSCREEN CONTROL

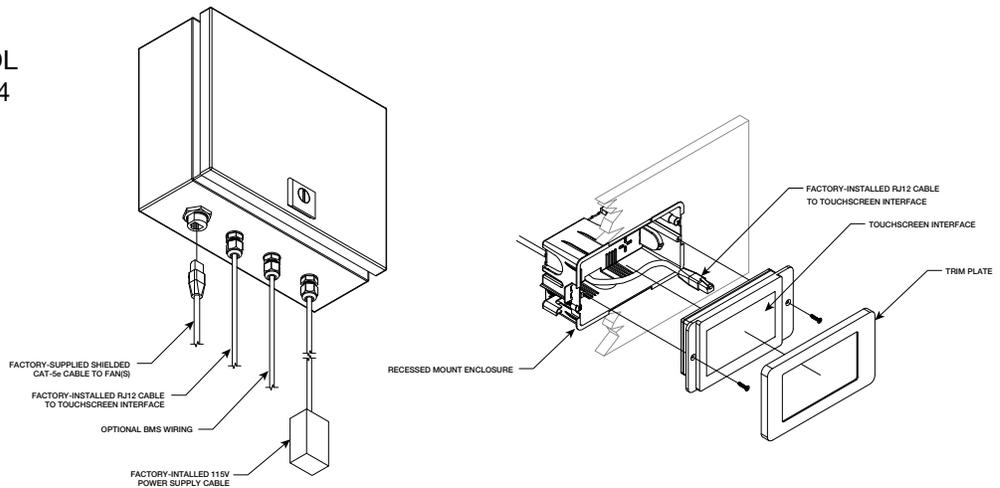
☐ REFER TO CONTROL MANUAL PAGE 3



STEP #11 - CONTROLS INSTALLATION (CONTINUED)

RECESSED MOUNT ADVANCED TOUCHSCREEN CONTROL

- ❑ REFER TO CONTROL MANUAL PAGES 3-4



STEP #12 - FAN START-UP

FAN START-UP

- ❑ KEYPAD - REFER TO CONTROL MANUAL PAGE 5-7
- ❑ STD TOUCHSCREEN - REFER TO CONTROL MANUAL PAGES 5-6
- ❑ ADV TOUCHSCREEN - REFER TO CONTROL MANUAL PAGES 7-8

IMPORTANT: BLADE COUNT AND FAN SIZE MUST BE SET APPROPRIATELY IN CONTROL MENUS FOR PROPER FAN OPERATION.

General Information

General Safety Information

IMPORTANT: To reduce the risk of fire, electric shock, or injury to persons, Model DS fans must be installed with a mount assembly, motor 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 (NFPA), 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.

WARNING

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

1. Use this unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.
2. 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.

WARNING

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

1. Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction.
2. 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 :

1. Utiliser cet appareil exclusivement comme prévu par le fabricant. En cas de questions, communiquer avec le fabricant.
2. 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.

AVERTISSEMENT

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

1. 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.
2. 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 note 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, contact your local representative immediately. 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 13-14. If any items are missing, report shortages to your local representative to arrange for obtaining missing parts. Sometimes it is not possible that all items for the unit be shipped together due to availability of transportation and truck space. 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.

Indoor - 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. (89 mm) 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.

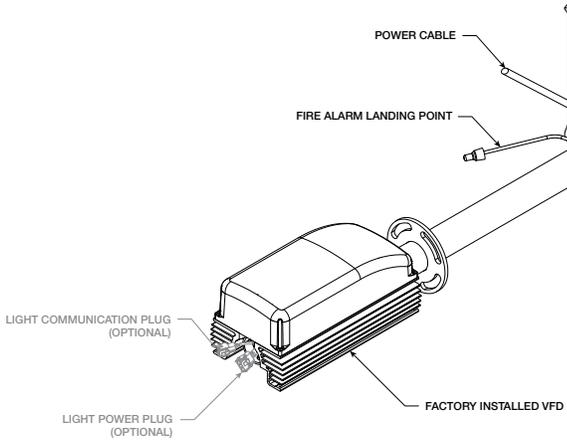


Fan Components

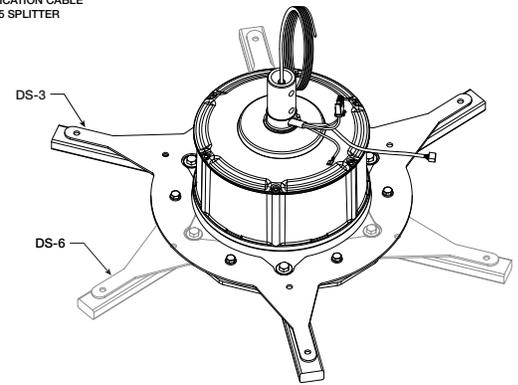
Verify that all of the following parts and hardware have been received prior to beginning installation. Contact your local representative or the manufacturer if replacement parts are required.

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 below indicate what is required to complete installation. Hardware kits may include extra fasteners as a convenience.

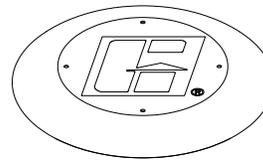


Downtube and Mount Assembly (1)



Motor/Hub Assembly (1)

Guy Wire Fastener Kit Bag # 916290	
U-Bolt Steel Cable Clamps (10)	Turnbuckle (4)
Guy Wire Clamps (4)	Quick Link (8)
Motor/Hub Fastener Kit Bag # 915065	
3/8 in. – 16 x 2-3/4 in. Grade 8, Hex Bolt (2)	
M4 – 0.7 x 10 Machine Screw (4)	
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)	



Hub Plate (1)



Rear VFD Cover (1)



Shielded CAT-5e Control Cable (1)



20 Ft. Guy Wire (4)



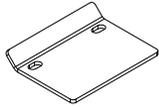
Winglet (3 OR 6)



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 (16)

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

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

Gripple® Installation Kit (Optional)



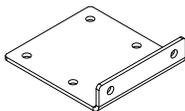
20 Ft. Guy Wire (4)

Gripple® Fastener Kit (Optional) Bag # 916290



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

Wood Beam Mounting Kit (Optional)



Wood Beam Bracket (2)

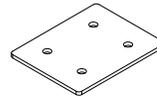
Wood Beam Fastener Kit (Optional) Bag # 915429

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

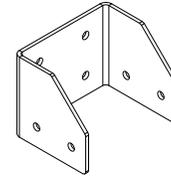
1/2 in. – 13 Grade 8, Nylon Locknut (8)

1/2 in. Washer (16)

Z-Purlin Mounting Kit (Optional)



Z-Purlin Backing Plate (2)



Z-Purlin Mounting Bracket (2)

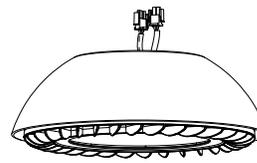
Z-Purlin Fastener Kit (Optional) Bag # 915431

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 Assembly (1)



LED Light Mounting Bracket (1)



Hub Covering Plate (1)

LED Light Fastener Kit (Optional) Bag # 915436

1/4 in. – 20 x 3/4 in. Grade 5 Hex Bolt (6)

M10 – 1.5 x 20 in. Grade 8.8 Hex Bolt (1)

3/8 in. Washer (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:

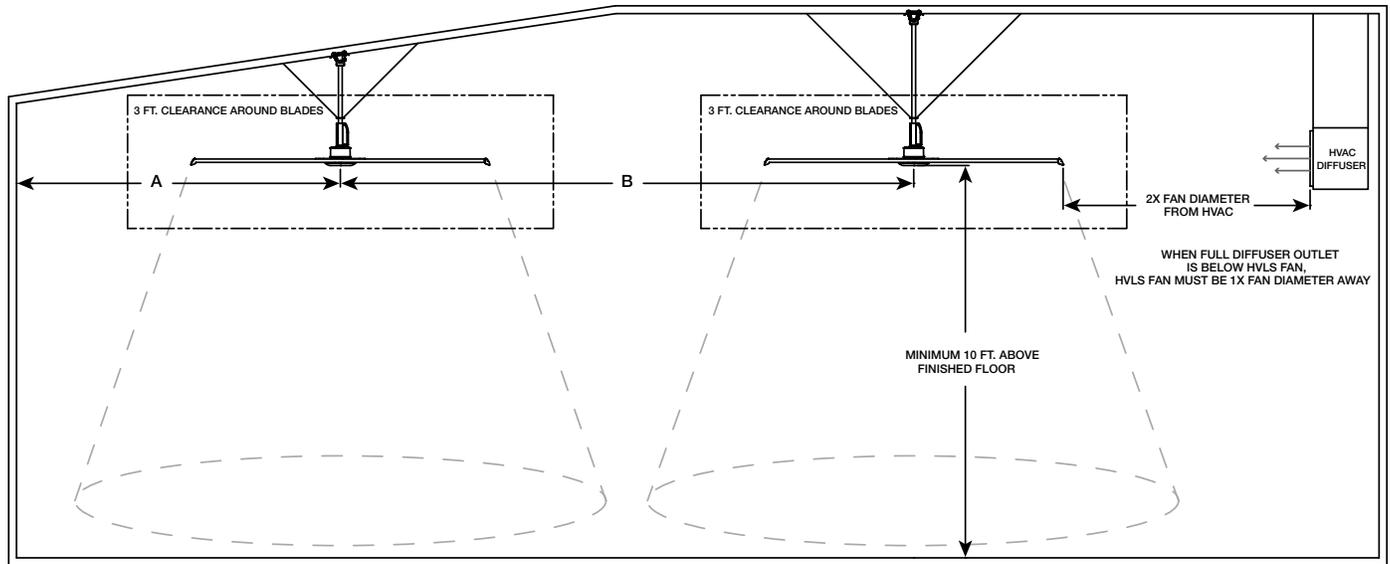
1. Verify that fan components are undamaged. Do not install or operate any damaged fan components, fans, or fan accessories. Failure to comply with this instruction may result in property damage, personal injury and/or death.
2. Verify that the fan is to be installed in a location where the airfoils 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.

Fan Size (ft.)	DS-3		DS-6	
	*Max. Fan Weight (lbs)	Max Torque (ft-lbf)	*Max. Fan Weight (lbs)	Max. Torque (ft-lbf)
8	170	5.4	195	9.6
10	175	12.8	204	20.8
12	181	23.0	213	31.8
14	187	30.6	222	40.4
16	192	36.7	231	48.4
18	196	43.1	240	55.4
20	201	50.6	270	122
24	210	54.0	287	125.3

*Maximum weight is shown in pounds and includes all available options, actual fan weight may be less.

Minimum Spacing Requirements



Pre-Installation

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 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 (page 14), locate the appropriate installation within this manual.

- I-Beam Mounting Kit (page 17)
- Steel Truss Mounting Kit (page 18)
- Wood Beam Mounting Kit (page 19)
- Z-Purlin Mounting Kit (page 20)
- Unistrut® Mounting Kit (by others, page 21)

I-Beam Mounting Kit (For Flanges up to 10 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)

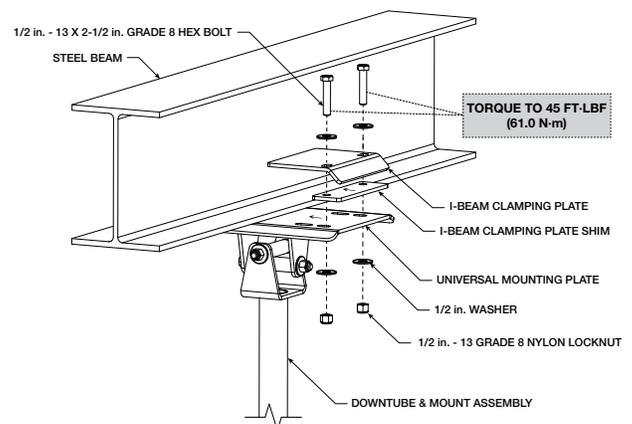
Required Components from Bag # 915428:

- 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, raise the downtube and mount assembly until the universal mounting plate is positioned on the bottom of the I-beam.
 2. Using the universal mounting plate as a guide, identify the appropriate set of mounting slots to use for installation. The universal mounting plate can accommodate I-beams with a flange width up to 10 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 universal mounting 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 universal mounting 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 universal mounting plate and I-beam. Hand tighten hardware.
5. Center the universal mounting 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 22 to continue with Motor/Hub to Downtube Installation.

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 excitation during fan operation (120 RPM; +/- 20%).

Required Loose Components (Included):

- Square Washer Plate (4)

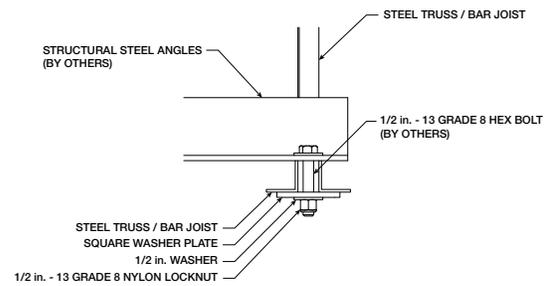
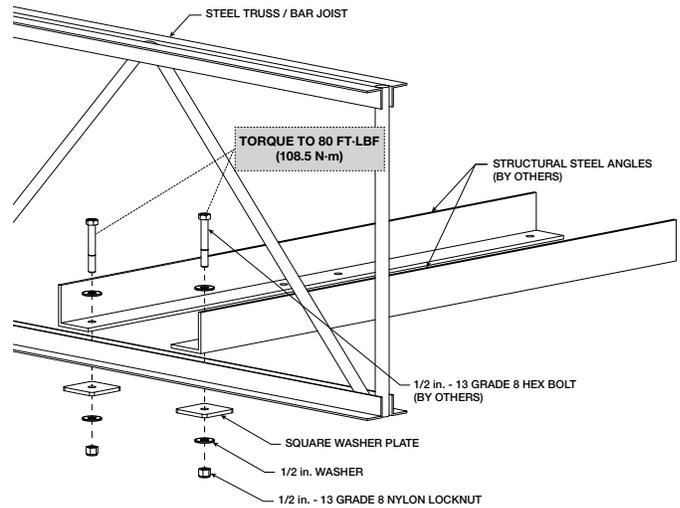
Required Components from Bag # 915429:

- 1/2 in. – 13 x 1-1/2 in. Grade 8 Hex Bolt (4)
- 1/2 in. – 13 Grade 8 Nylon Locknut (8)
- 1/2 in. Washer (16)

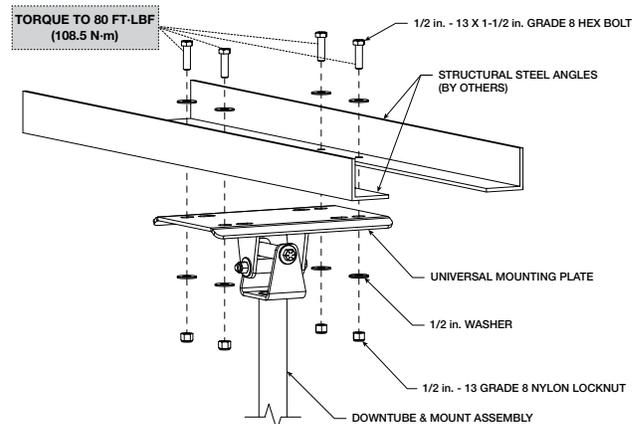
Hardware/Tools Needed (Not Included):

- Structural Steel Angles (2)
- 1/2 in. – 13 Grade 8 Hex Bolt (4), *length determined by truss and steel angle material thickness*
- 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 supplied (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 universal mounting plate into place using supplied (4) 1/2 in. – 13 x 1-1/2 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 22 to continue with Motor/Hub to Downtube Installation.

Wood Beam Mounting Kit (For Beams 4-1/2 - 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 4-1/2 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)

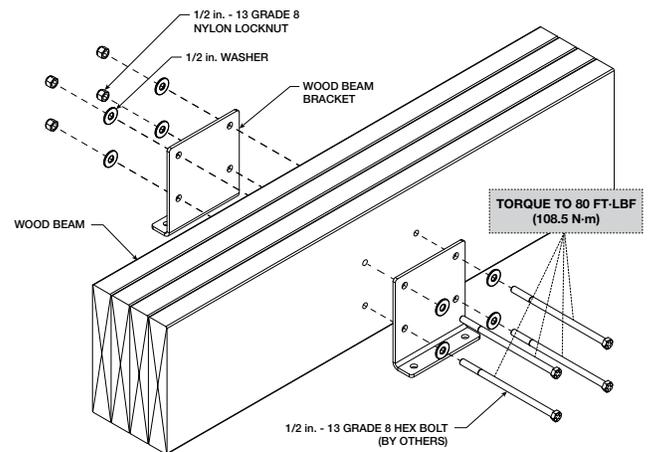
Required Components from Bag # 915429:

- 1/2 in. – 13 x 1-1/2 in. Grade 8 Hex Bolt (4)
- 1/2 in. – 13 Grade 8 Nylon Locknut (8)
- 1/2 in. Washer (16)

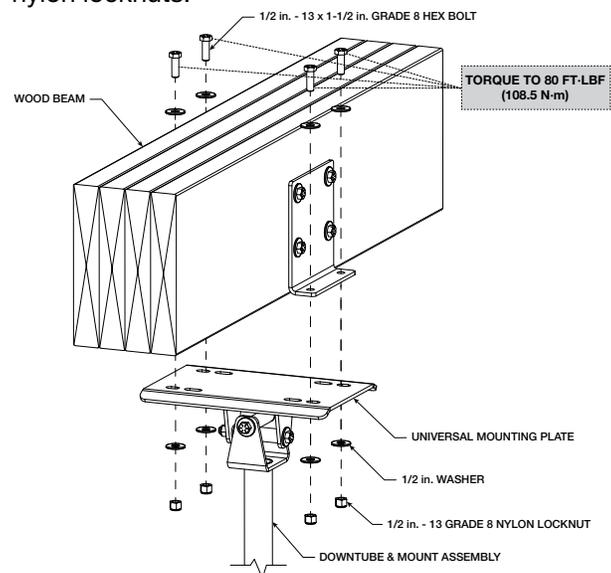
Hardware/Tools Needed (Not Included):

- 1/2 in. – 13 Grade 8 Hex Bolt (4), *length determined by wood beam thickness*
- 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 4-1/2 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 supplied (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 universal mounting plate and bolt into wood beam brackets using supplied (4) 1/2 in. – 13 x 1-1/2 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 22 to continue with Motor/Hub to Downtube Installation.

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 excitation during fan operation (120 RPM; +/- 20%).

Required Loose Components (Included):

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

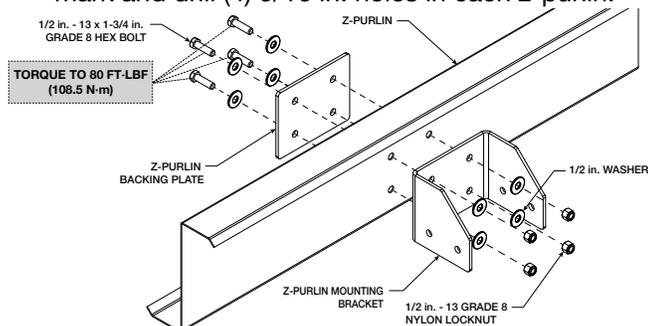
Required Components from Bag # 915431:

- 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)

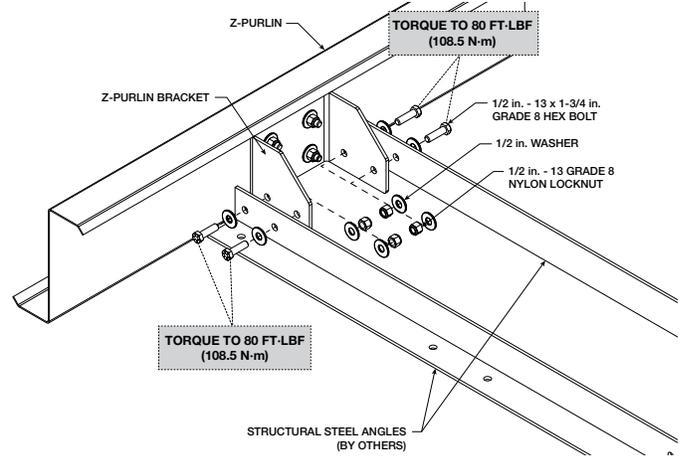
Hardware/Tools Needed (Not Included):

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

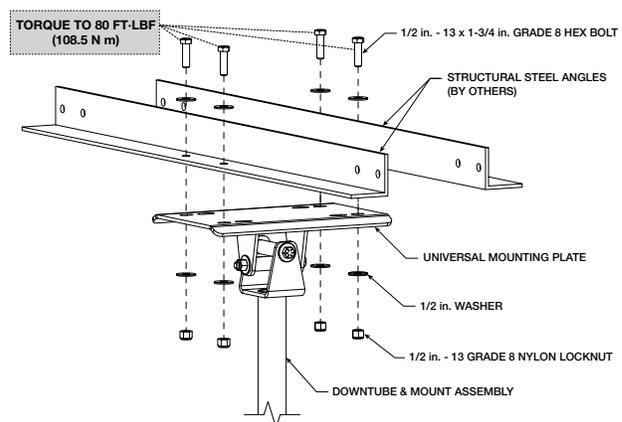
1. Locate desired fan hanging location. Using the supplied z-purlin mounting brackets as templates, mark and drill (4) 9/16 in. holes in each z-purlin.



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 universal mounting plate as a template, mark and drill (4) 9/16 in. holes in structural steel angles.
6. Align the universal mounting 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 22 to continue with Motor/Hub to Downtube Installation.

Unistrut® Mounting Kit (By Others)

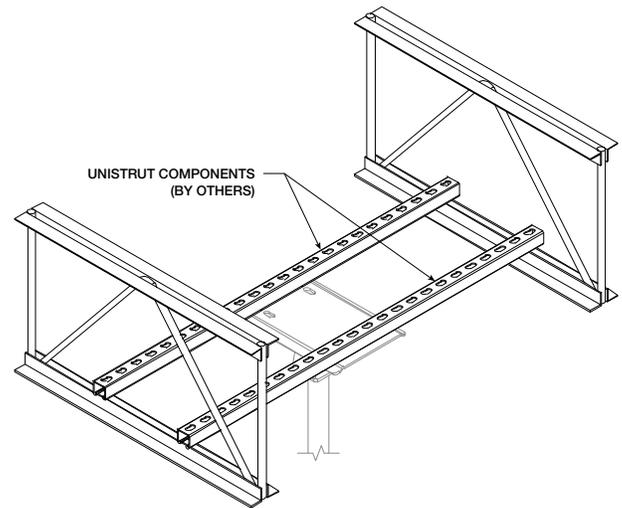
IMPORTANT: Structural Engineer of Record (SEOR) must perform thorough evaluation of mounting structure and determine final mounting requirements before fan is installed. Manufacturer is not liable for any problems that arise as the result of insufficient structure, including (but not limited to) vibration, 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 8 ft. For span lengths up to 8 ft., a minimum of 2 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 excitation during fan operation (120 RPM; +/- 20%).

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 universal mounting plate to Unistrut channels with the appropriate hardware as identified by structural engineer. Torque to 80 ft·lbf (108.5 N·m).



Motor/Hub to Downtube Installation

Required Loose Components (Included):

- Motor/Hub Assembly (1)
- Rear VFD Cover (1)

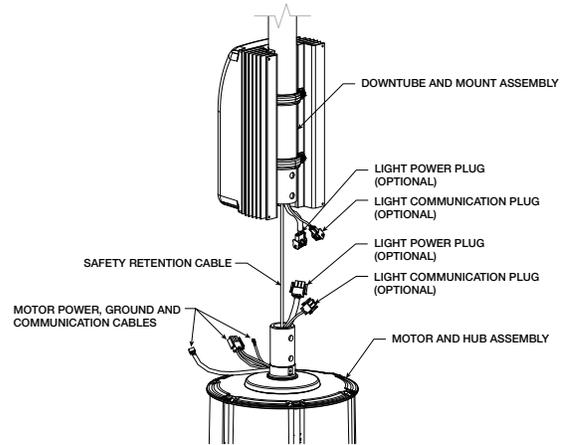
Required Components from Bag # 915065:

- 3/8 in. – 16 x 2-3/4 in. Grade 8 Hex Bolt (2)
- M4 – 0.7 x 10 Machine Screw (4)

Hardware/Tools Needed (Not Included):

- 9/16 in. Socket
- Socket Wrench
- Torque Wrench
- Phillips Screwdriver
- Lifting Equipment
- Cribbing (optional)
- Awl (optional)

3. If fan was supplied with the optional LED light assembly, connect the male light power (3 pin) and light communication (2 pin) plugs in the motor/hub assembly to their corresponding female connectors in the downtube.

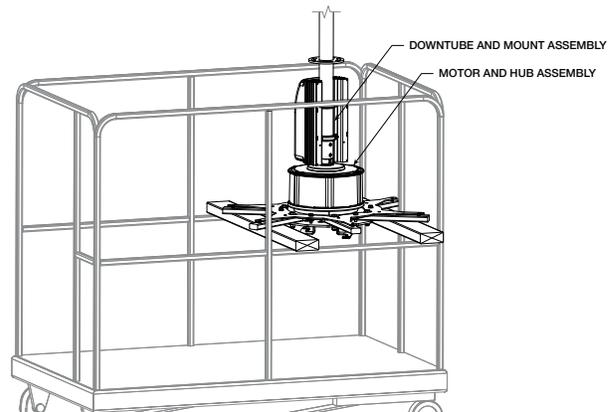


4. Carefully align the motor axle with the downtube opening, making sure that the electrical cables protruding from the motor axle are on the same side as the black plastic VFD cover.

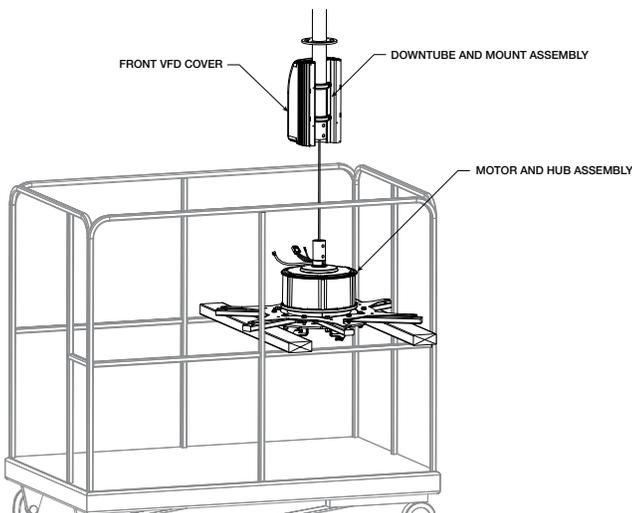
IMPORTANT: Electrical cables from motor must be on same side as black plastic VFD cover. Cables are not long enough to reach circuit board from opposite side. Motor must be removed and rotated 180° if installed incorrectly.

5. Slowly lift the motor/hub assembly until the motor axle is nested inside the downtube. Take care to align the motor axle holes with the downtube holes.

IMPORTANT: Do not crush safety cable or wiring while lifting the motor/hub assembly into the downtube. If the safety cable or the wiring are damaged during installation, contact your local rep or the manufacturer.



1. Using a scissor lift or other suitable lifting device, lift the motor/hub assembly by resting the struts on the lift structure or cribbing.



2. Feed the safety retention cable that is attached to the motor/hub assembly up through the bottom of the downtube until the loose end of the safety cable is accessible at the top of the downtube. Pull the loose end of the safety retention cable from the top of the downtube until all of the slack is pulled through.

DANGER

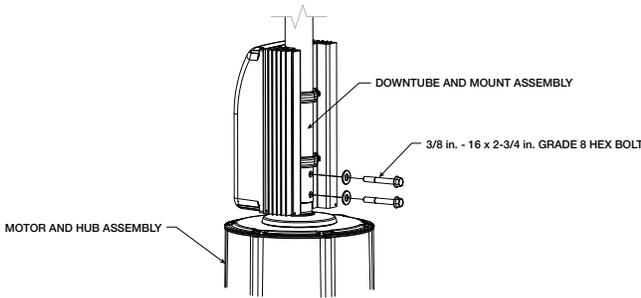
Always disconnect, lock and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury.

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.

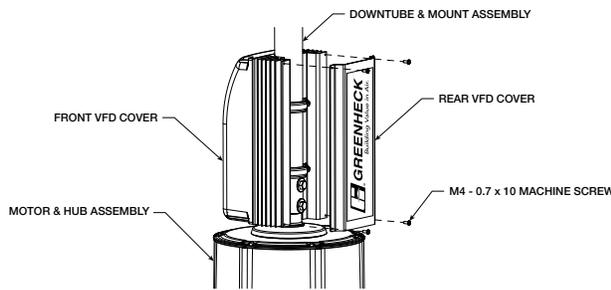
- Install the supplied (2) 3/8 in. – 16 x 2-3/4 in. grade 8 hex bolts into the locknuts attached to the downtube. Torque the bolts to a value of 33 ft-lbf (44.75 N·m).

NOTE: The attached locknuts are not visible while the VFD is installed on the downtube of the fan.



- Install rear VFD cover to the back of the VFD using (4) M4-0.7 x 10mm machine screws.

NOTE: The rear VFD cover should be installed with the “G” on the Greenheck logo closest to the motor (not critical for fan operation).



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. For fans that were supplied with optional Gripple® hardware, refer to the instructions on page 24.

Required Components from Bag # 916290:

- U-Bolt Steel Cable Clamp (2)

Hardware/Tools Needed (Not Included):

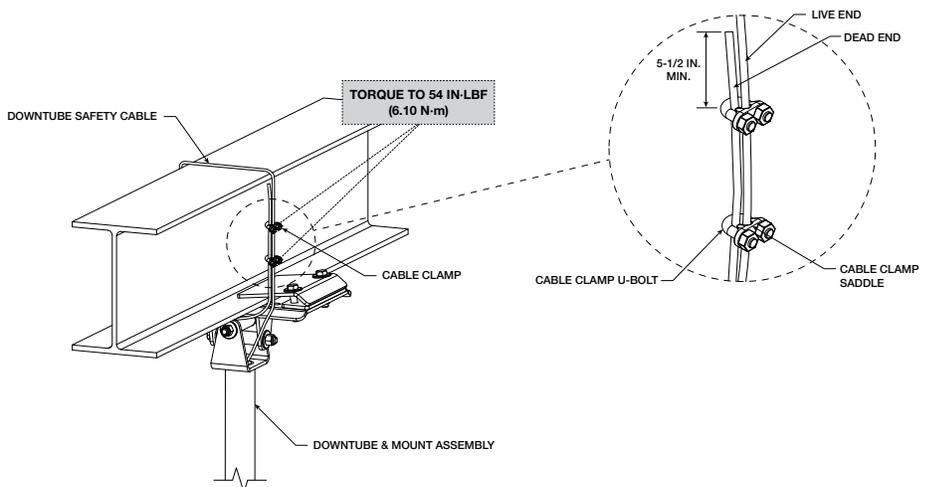
- Torque Wrench
- 7/16 in. Socket and Wrench
- Cable Cutters (optional)

- From the top of the downtube, pull the safety retention cable until it is taut inside the downtube.
- 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.
- 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).
- Attach the dead-end of the safety cable to the live-end using the supplied 0.188 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.

- 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.
- 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.
- 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.



Gripple® Hardware (Optional)

Components required from Bag # 915067:

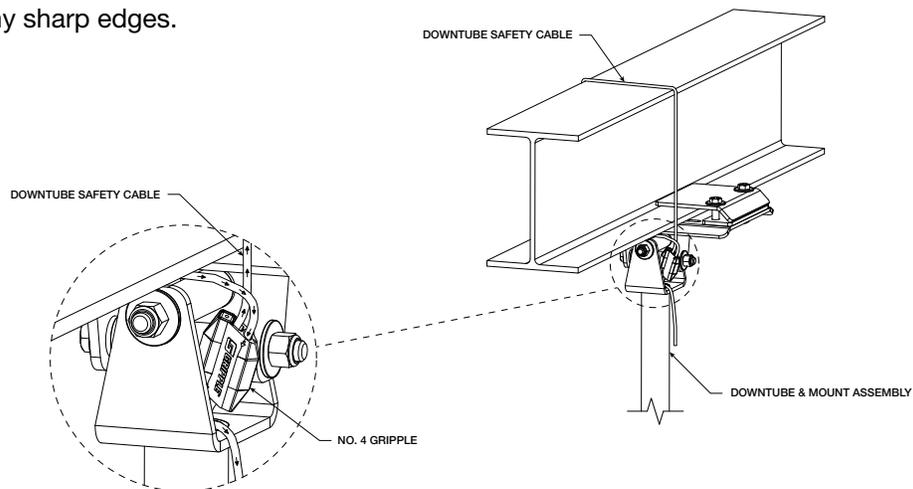
- No. 4 Gripple® Connector (1)

Hardware/Tools (Not Included):

- 1/16 in. Allen Wrench (optional)
 - Cable Cutters (optional)
1. From the top of the downtube, pull the safety retention cable until the cable is taut inside the downtube.
 2. Insert the loose end of the safety cable into the No. 4 Gripple connector. Note that the cable will only feed through the Gripple connector in one direction (marked on the Gripple connector with an arrow).
 3. Slide the No. 4 Gripple connector down the safety cable until it is located near the opening at the top of the downtube.
 4. Wrap the loose end of the safety cable around the mounting structure. Do not allow the cable to come in contact with any sharp edges.

5. Insert the loose end of the safety cable into the open hole of the No. 4 Gripple connector. Note that the cable will only feed through the Gripple connector in one direction (marked on the Gripple connector with an arrow).
6. Pull the loose end of the safety cable through the Gripple connector to tighten the cable. The cable should be pulled taut, leaving only a small amount of slack in the cable to ensure proper functioning.
7. Cut or organize excess safety cable to ensure it does not interfere with fan rotation.

NOTE: If necessary, the safety cable can be loosened by inserting the long end of a 1/16 in. allen wrench into either of the pin holes on the No. 4 Gripple connector and pulling the cable in the opposite direction of the arrow marked on the Gripple connector.



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)

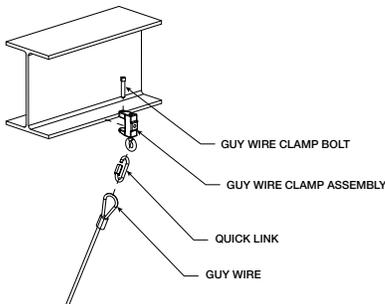
Required Components from Bag # 916290:

- 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
- Adjustable Wrench
- Cable Cutters (optional)

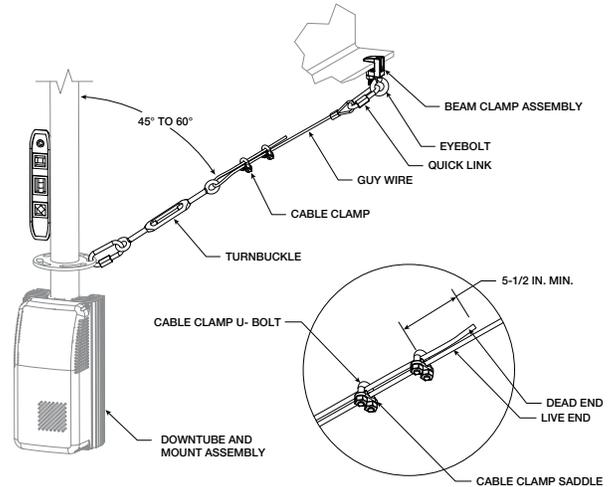
1. Secure guy wire clamps to the building structure using the guy wire clamp bolts and an adjustable wrench. Attach guy wires to the eyelets on the guy wire clamp assemblies using (4) supplied quick links.



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 0.094 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 circumference 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.

Gripple® Hardware (Optional)

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

Required Loose Components (Included):

- 20 ft. Guy Wire (4)
- No. 4 Gripple® Connector (4)

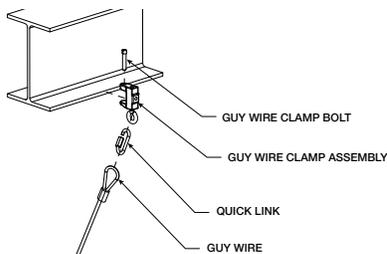
Components required from Bag # 915067:

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

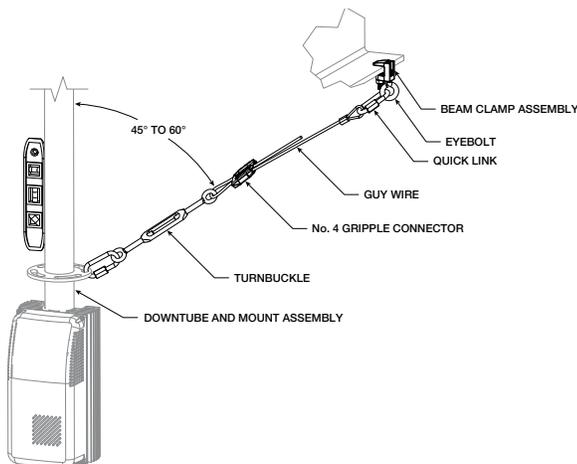
Hardware/Tools Needed (Not Included):

- Adjustable Wrench
- Level
- 1/16 in. Allen Wrench (optional)

1. Secure guy wire clamps to the building structure using the guy wire clamp bolts. 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 into a No. 4 Gripple connector until a length of wire is pushed through the connector. Insert the loose end of the guy wire through the end of the turnbuckle and push back through the No. 4 Gripple connector to close the loop.
3. Attach all (4) turnbuckles to the guy wire attachment ring located on the downtube using (4) supplied quick links. Pull the loose end of each guy wire through the No. 4 Gripple connector until each guy wire is taut.



4. 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 circumference of the downtube periodically to ensure that the fan is level in all directions.

5. Cut or organize excess guy wires to ensure that they do not interfere with fan rotation.

NOTE: If necessary, the guy wires can be loosened by inserting the long end of a 1/16 in. allen wrench into either of the pin holes on the No. 4 Gripple connector and pulling the cable in the opposite direction of the arrow marked on the Gripple connector.

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)

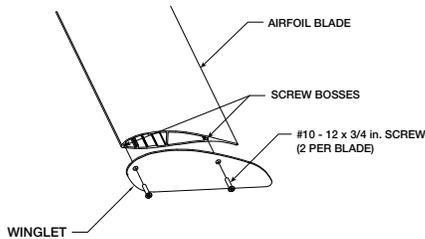
Required Components from Bag # 915066 OR 854832:

- #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):

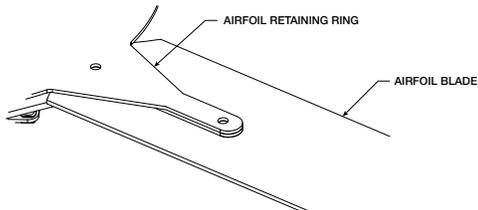
- 1/2 in. Socket and Socket Wrench
- 1/2 in. Wrench
- Torque Wrench
- #2 Phillips Bit and Driver

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 60 in-lbf (6.8 N·m).

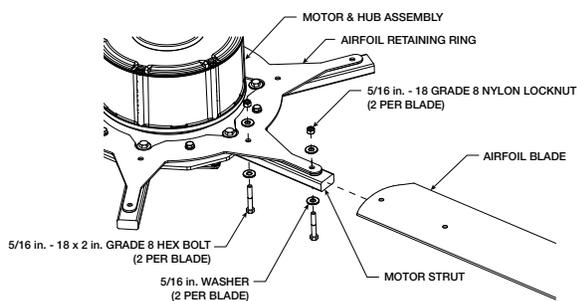


NOTE: Improperly fastened winglets may result in unwanted noise.

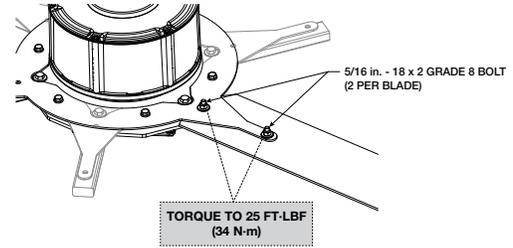
2. Lift the first blade into place, and slide over the motor strut allowing the airfoil retaining ring to rest on top of the airfoil blade. It might be necessary to use two people for this step.



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)

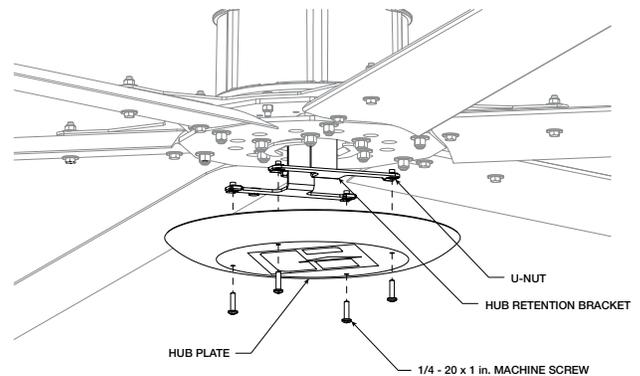
Required Components from Bag # 915066 OR 854832:

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

Hardware/Tools Needed (Not Included):

- Torque Wrench

1. Align (4) holes in the faceplate with the (4) U-nuts on the hub retention bracket.
2. Insert (1) 1/4-20 x 1 machine screw per hole and hand tighten to ensure all fasteners will engage the U-nuts.
3. Torque fasteners to 96 in·lbf (10.8 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: Use only with light kits marked suitable for use in damp locations.

Required Loose Components (Included):

- Hub Covering Plate (1)
- LED Light Assembly (1)
- LED Light Mounting Bracket (1)

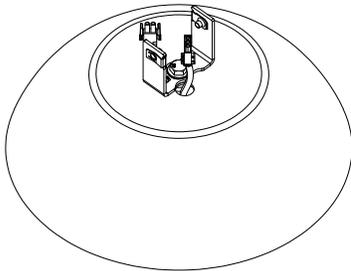
Required Components from Bag # 915436:

- 1/4 in. – 20 x 3/4 in. Grade 5 Hex Bolt (6)
- M10 – 1.5 x 20 in. Grade 8.8 Hex Bolt (1)
- 3/8 in. Washer (1)

Hardware/Tools Needed (Not Included):

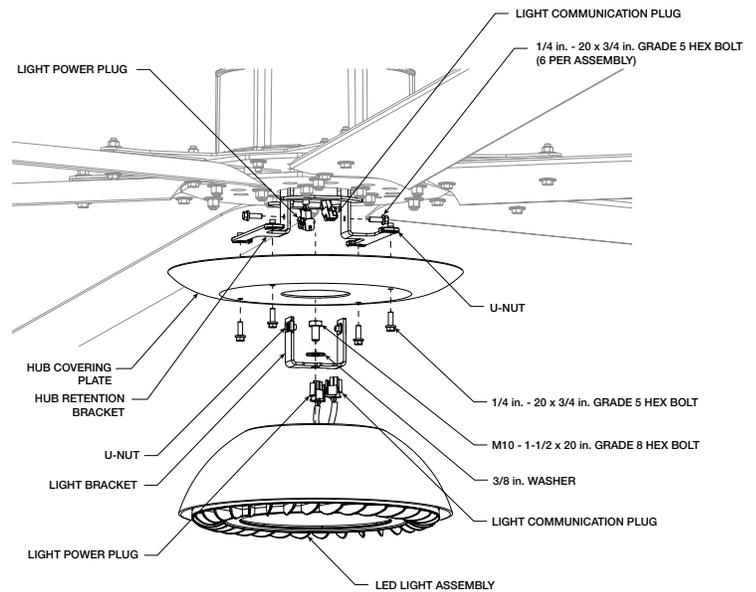
- Torque Wrench
- 17mm Socket
- 3/8 in. Magnetic Nut Driver
- Magnetic Nut Driver Extension
- Impact Driver

1. Use the supplied M10 – 1.5 x 20 in. grade 8.8 hex bolt and 3/8 in. washer to attach the LED light mounting bracket and light shroud to the light.
2. Insert the LED light mounting bracket into the cut-out of the hub covering plate. Allow the hub covering plate to sit on the top of the LED light assembly.
3. Lift the LED light assembly and hub covering plate until the u-nuts on the LED light mounting bracket are aligned with the mounting holes in the hub retention bracket. Install (2) 1/4 in. – 20 x 3/4 in. grade 5 hex bolts into the u-nuts using a magnetic nut driver extension and impact driver. Torque to 120 in-lbf (13.6 N·m).
4. Connect the male light power (3 pin) and light communication (2 pin) plugs from the LED light assembly to their corresponding female connectors in the motor.



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

5. Raise the hub covering plate until the holes in the plate are aligned with the u-nuts on the hub retention bracket. Install (4) 1/4 in. – 20 x 3/4 in. grade 5 hex bolts into the u-nuts. Torque to 96 in-lbf (10.8 N·m).



Fire System Integration

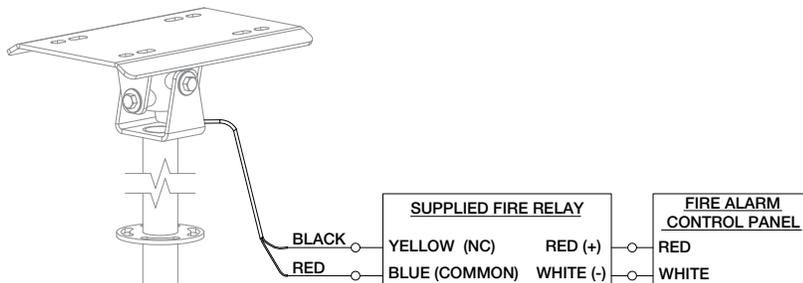
Fire System Integration (Optional)

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.

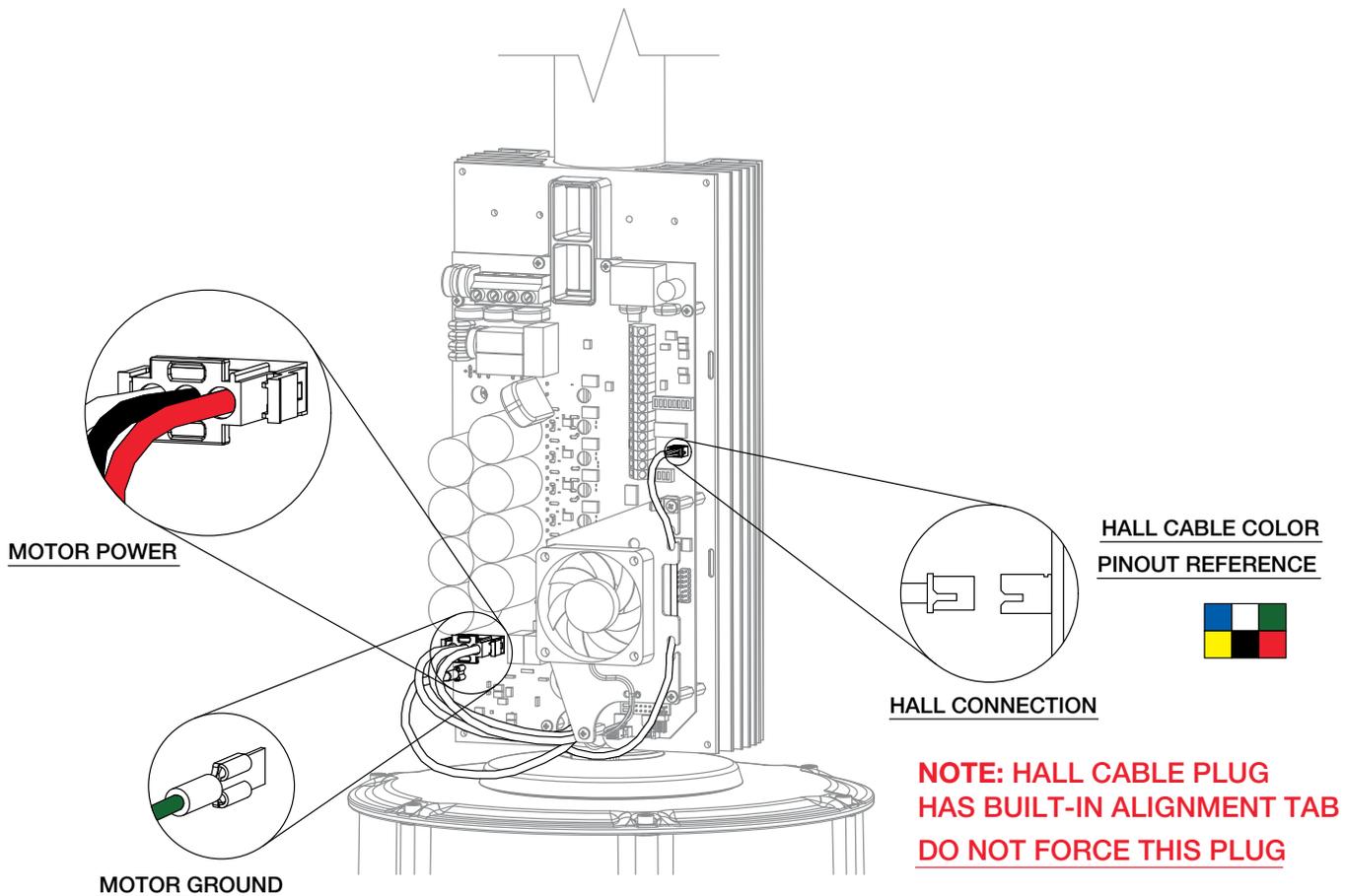


Electrical Installation

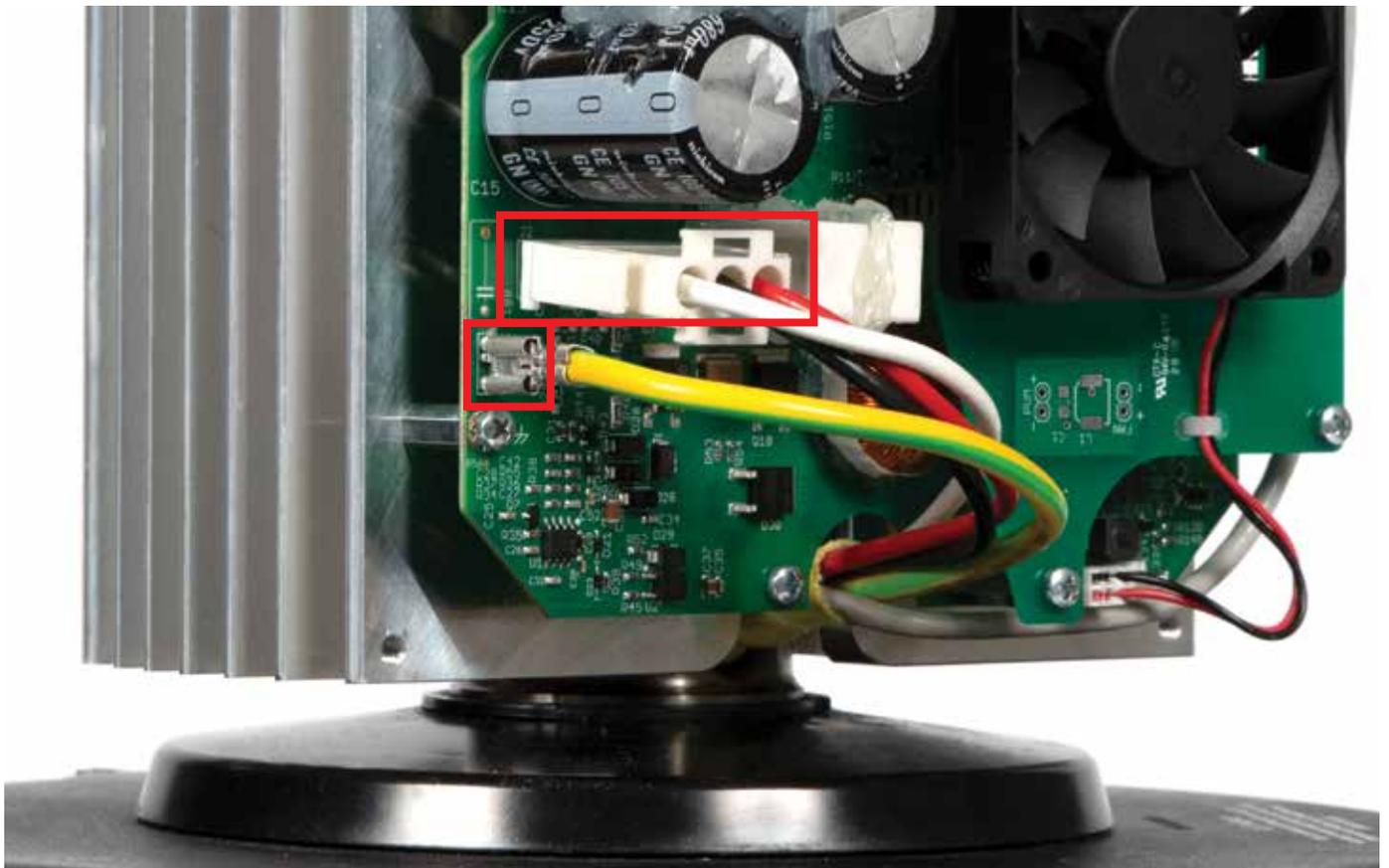
Motor Cable Connection

1. Using a phillips screwdriver, remove the black plastic cover on the front side of the VFD and set aside.
2. Locate the motor power, motor ground, and hall sensor cables that protrude from the top side of the motor. These cables should have been routed to the front of the VFD during mechanical installation.
3. Plug the motor power, motor ground, and hall sensor cables into the VFD circuit board as shown below. The motor power and hall sensor cables are designed to only fit in one orientation. Use the wire color references below and photos on the next two pages to identify the proper orientation. Do not force these plugs.

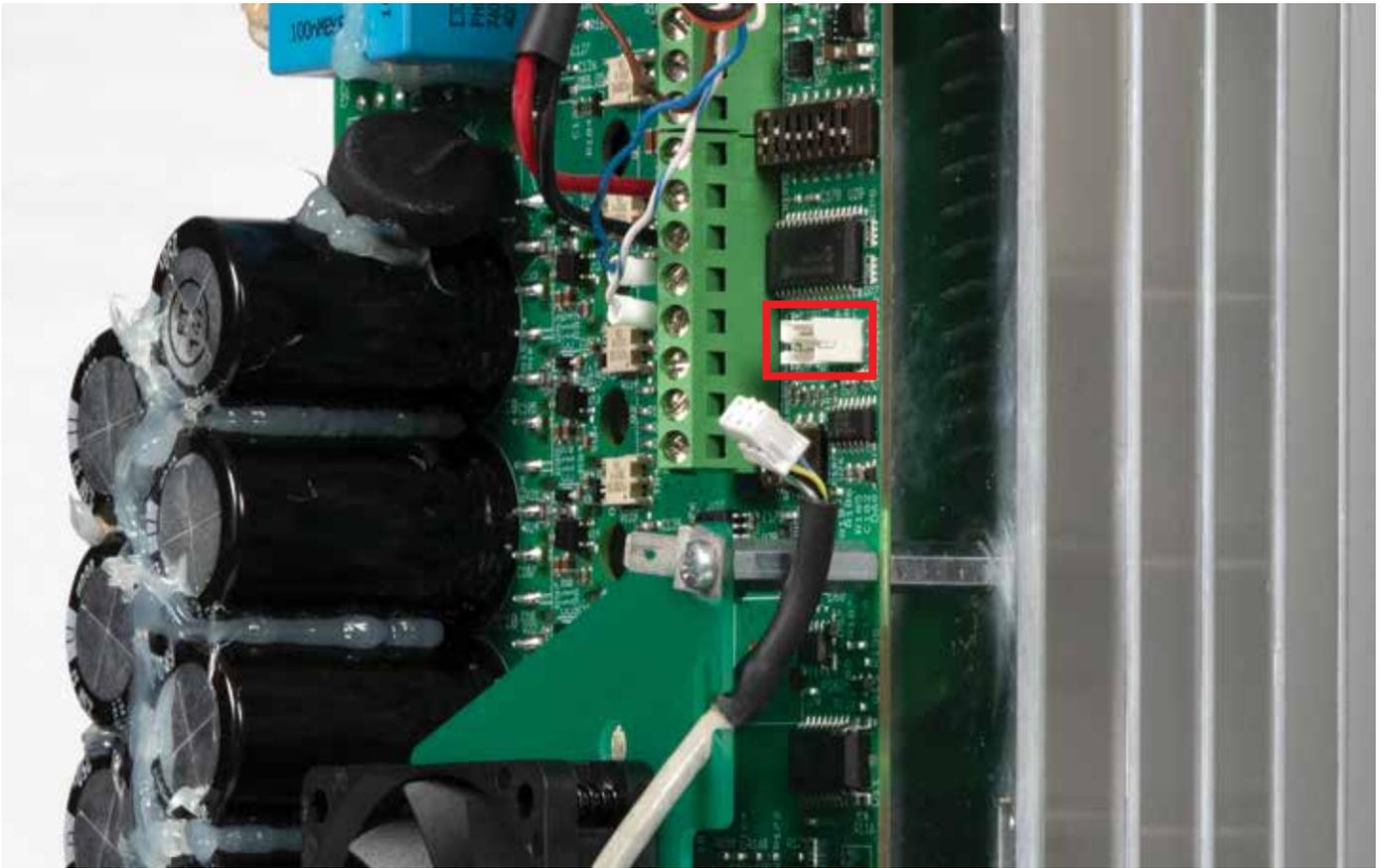
IMPORTANT: The motor power, motor ground, and hall sensor cables are not long enough to reach the VFD circuit board from the rear side. If the cables are not properly routed to the front of the VFD, the motor must be uninstalled and rotated 180° so that the cables can be connected.



Motor Power and Ground Cable Connection



Hall Sensor Cable Connection



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	+/- 10% of nominal
Allowable Frequency Fluctuation	+/- 5% of nominal (47-63 Hz)
Area of Use	Do not install fans in electrical environments with Pollution higher than Degree 2 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):

- Phillips Screwdriver

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

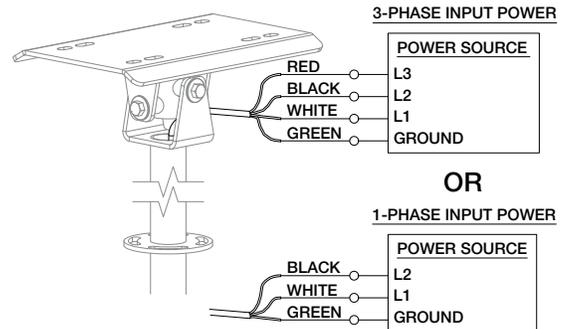
*NOTE: Plugs are available from manufacturer. Receptacles must be provided by others.

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. 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 24 ft.) and DS-6 (8 to 18 ft.) 500W Motor			
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-6 (20 and 24 ft.) 1100W Motor			
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	3.3A
Fuse Required**	FRN-R-15	FRS-R-15	FRS-R-5

*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.



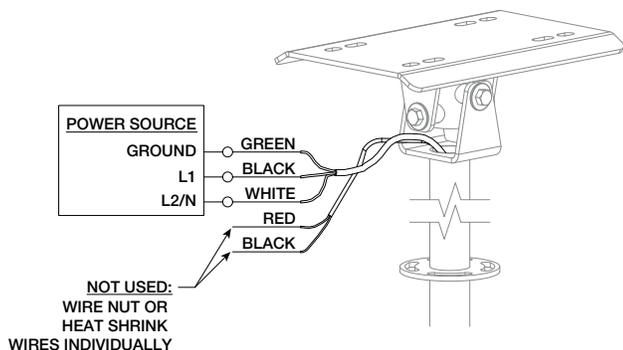
LED Light Wiring (Optional)

Power On/Off By Building Light Grid

Use the following instructions to wire fan-mounted LED lights for power on/off control via high-voltage from the building's light grid.

Hardware/Tools Needed (Not Included):

- Wire Strippers
1. Using the wiring diagram below, connect the factory-installed LED light power cable located at the top of the downtube to a 115V power supply from the building's light grid. Be sure to follow all national and local codes for electrical installation.
 2. Do not connect the factory-installed 0-10VDC communication cable located at the top of the downtube to the building's light grid. This cable will not be used.



Power On/Off By Fan Control

Use the following instructions to wire fan-mounted LED lights for power on/off control via low-voltage signal from the fan control.

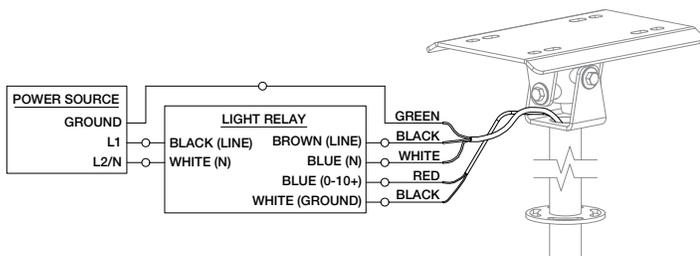
Required Loose Components (Included):

- LED Light Relay (1)

Hardware/Tools Needed (Not Included):

- Wire Strippers
- Standard Screwdriver

1. Using the wiring diagram below, connect the factory-installed LED light power cable and 0-10VDC communication cable located at the top of the downtube to the supplied LED light relay.
2. Connect the LED light relay to a 115V power supply from the building's light grid as shown in the wiring diagram below. Be sure to follow all national and local codes for electrical installation.



Communication Wiring

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.

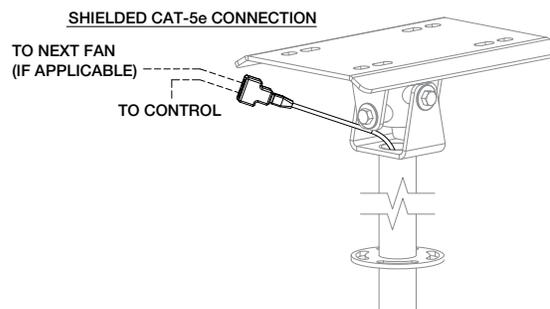
NOTE: All communication wiring must be installed in compliance with NEC 800-52 or similar. All communication wiring needs a minimum separation of 2 inches from high voltage unless installed in separate raceways/conduit. When possible, maintain 24 inches of separation.

With Pre-Built CAT-5e Cable

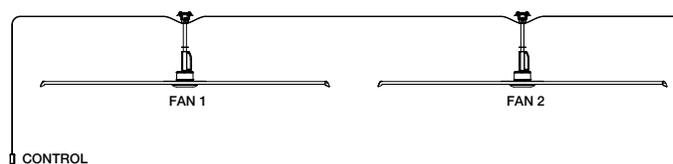
Required Loose Components (Included):

- 100 – 200 ft. CAT-5e Control Cable (1)

1. Plug one end of the shielded CAT-5e control cable into the 2-way RJ45 splitter located at the top of the downtube. The cable can be plugged into any open receptacle on the splitter.



2. Identify the desired location for installation of the fan control and run the remainder of the CAT-5e control cable to this location.
3. Secure the CAT-5e control cable to the building structure to ensure it does not interfere with fan performance. To prevent communication issues, do not coil excess control cable or route control cable with power wiring.
4. If one control source will be used to operate multiple fans, the fans can be daisy-chained together to create a network using the following instructions.



- a. Connect a shielded CAT-5e control cable to the first fan in the daisy-chain using steps 1-3 above.

- b. Plug an additional CAT-5e control cable into the 2-way RJ45 splitter located at the top of the downtube on the first fan. Connect the other end of this CAT-5e cable into the 2-way splitter on the next fan.
- c. Repeat step 4b. for subsequent fans until all fans in the chain are connected in series.
- d. Follow the “Fan Networking” instructions on pages 36-39 to complete network setup for the fans.

With Optional 1,000 ft. Bulk Spool of CAT-5e Cable

Required Loose Components (Included):

- 1,000 ft. Bulk Spool of CAT-5e Control Cable (1)
- Shielded, Pass-Through RJ45 Connectors (25)

Hardware/Tools Needed (Not Included):

- Fan Control (1, optional)
- CAT-5e Termination Tool

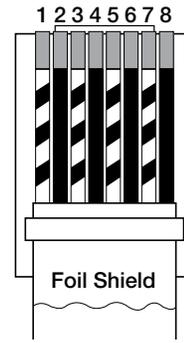
1. Determine required length of CAT-5e cable run. Unspool appropriate amount of cable and cut to length.

IMPORTANT: Individual CAT-5e cable lengths must not exceed 200 ft. in order to prevent network communication issues.

2. Strip and remove 2 in. of CAT-5e cable jacket leaving the foil shield intact.



3. Fold foil shield back over cable jacket and trim foil so that 1/4 in. remains.
4. Untwist conductor pairs, straighten and align wires according to EIA/TIA T568B wiring pinout.



1. White/Orange
2. Orange
3. White/Green
4. Blue
5. White/Blue
6. Green
7. White/Brown
8. Brown

NOTE: RJ45 connector in this image is shown with clip pointed away from installer.

5. Trim conductor ends flush leaving 1 in. exposed.



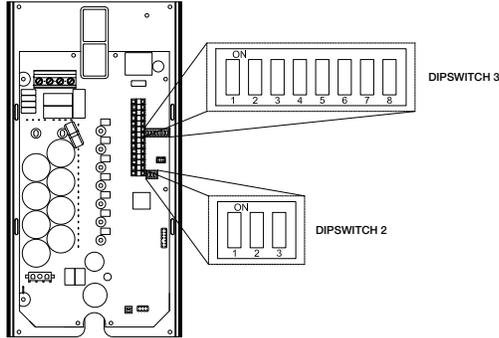
6. Fully insert cable into shielded, pass-through RJ45 connectors until foil enters back end of connector. Use only the provided RJ45 connectors.
7. Verify that conductors are in the correct wiring scheme order.
8. Crimp RJ45 connector with CAT-5e termination tool (not included).
9. Repeat on opposite end of CAT-5e cable to complete cable construction.



10. Follow the “With Pre-Built CAT-5e Cable” instructions to complete communication wiring.

Fan Networking

If networking multiple fans to run using a single control source, the dipswitch settings and wiring on each fan's VFD circuit board will need to be adjusted using the following instructions.



First Fan

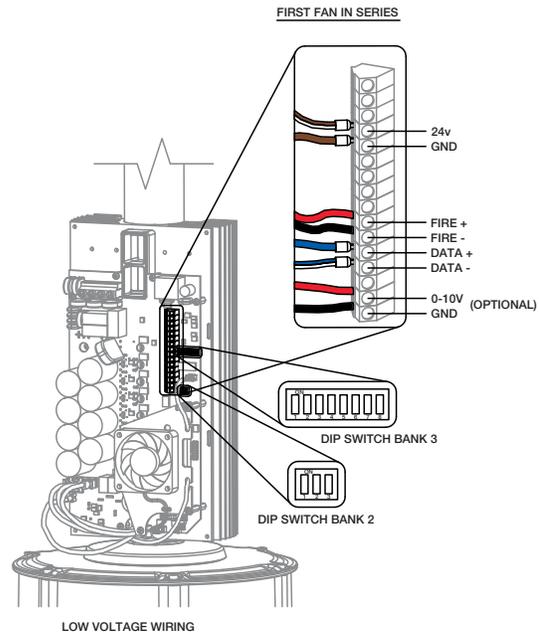
1. Determine the first fan in the network daisy-chain by identifying the fan that will be directly connected to the control source.
2. Dipswitch 2 is used to set parameters that improve network function. Verify that each of the switches on dipswitch 2 are set as follows:
 - Position 1 – Off
 - Position 2 – On
 - Position 3 – On
3. Dipswitch 3 is used to set unique Modbus addresses for each fan in the daisy-chain. Adjust positions 1-5 on dipswitch 3 to set the desired Modbus address. A table with all possible Modbus addresses is shown to the right.

IMPORTANT: Positions 6 - 8 are used to set parameters needed for fan operation and should not be adjusted. Default settings are as follows:

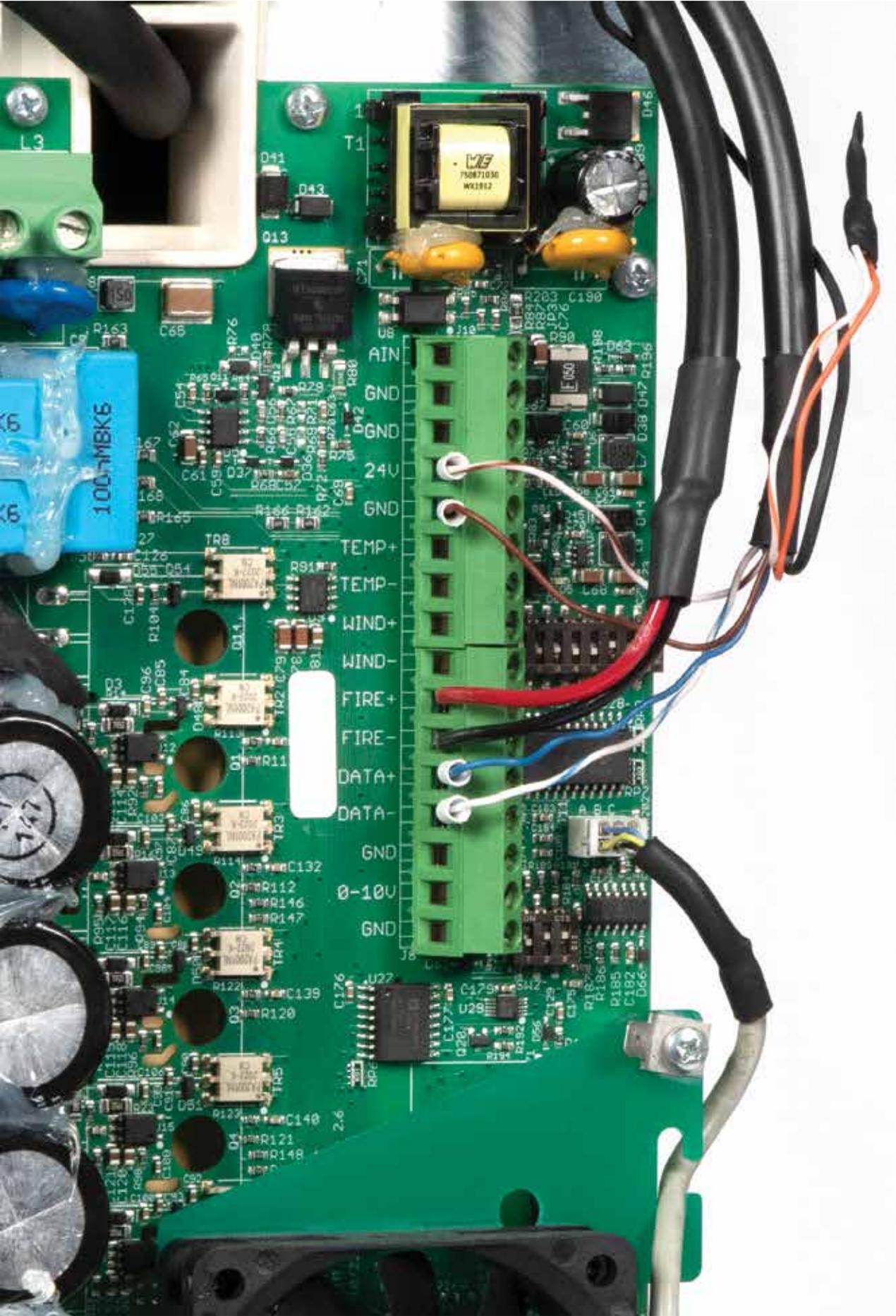
- Position 6 – On
- Position 7 – Off
- Position 8 – Off

4. Verify that the low voltage wiring terminal strip on the VFD circuit board is wired as shown in the diagram and picture on this pages 36-37. Reinstall the black plastic cover that was previously set aside on the front of the VFD.

Modbus Address Settings - Dipswitch 3								
Fan Number	Modbus Address	Position 1	Position 2	Position 3	Position 4	Position 5	Position 6, 7, 8	
N/A	1	RESERVED FOR HVLS FAN CONTROLS						Do Not Modify
1	2	On	Off	Off	Off	Off		
2	3	Off	On	Off	Off	Off		
3	4	On	On	Off	Off	Off		
4	5	Off	Off	On	Off	Off		
5	6	On	Off	On	Off	Off		
6	7	Off	On	On	Off	Off		
7	8	On	On	On	Off	Off		
8	9	Off	Off	Off	On	Off		
9	10	On	Off	Off	On	Off		
10	11	Off	On	Off	On	Off		
11	12	On	On	Off	On	Off		
12	13	Off	Off	On	On	Off		
13	14	On	Off	On	On	Off		
14	15	Off	On	On	On	Off		
15	16	On	On	On	On	Off		
16	17	Off	Off	Off	Off	On		
17	18	On	Off	Off	Off	On		
18	19	Off	On	Off	Off	On		
19	20	On	On	Off	Off	On		
20	21	Off	Off	On	Off	On		
21	22	On	Off	On	Off	On		
22	23	Off	On	On	Off	On		
23	24	On	On	On	Off	On		
24	25	Off	Off	Off	On	On		
25	26	On	Off	Off	On	On		
26	27	Off	On	Off	On	On		
27	28	On	On	Off	On	On		



First Fan



All Remaining Fans

- Set dipswitch 2 as shown below. Dipswitch 2 is used to set parameters that improve network function and will need to be adjusted for all fans in the network except for the first fan.

Position 1 – Off

Position 2 – Off

Position 3 – Off

- Adjust positions 1 – 5 on dipswitch 3 so that each successive fan has a unique Modbus address. A table with all possible Modbus addresses is shown to the right.

IMPORTANT: Positions 6 - 8 are used to set parameters needed for fan operation and should not be adjusted.

Default settings are as follows:

Position 6 – On

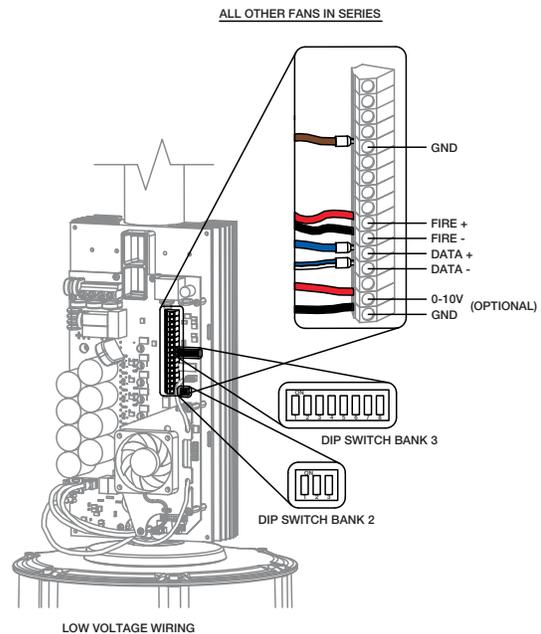
Position 7 – Off

Position 8 – Off

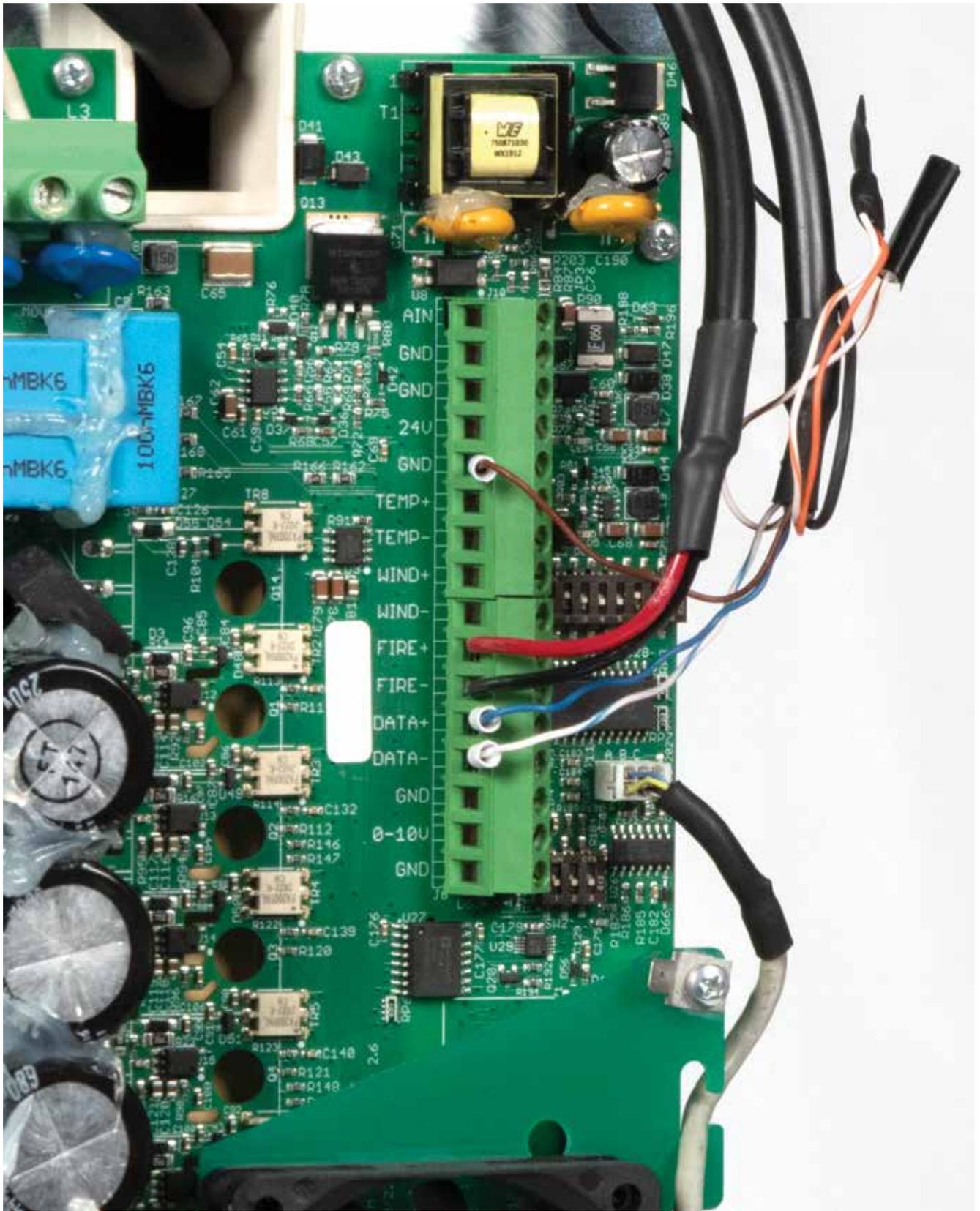
NOTE: It is good practice to use successive Modbus addresses for networked fans, but this is not necessary for proper functioning of the network.

- On the low voltage wiring terminal strip, remove the 24V (white-brown) wire and cap with a wire nut or heat shrink. When complete, verify that the low voltage wiring terminal strip on the VFD circuit board is wired as shown in the diagram and picture on pages 38-39.
- Reinstall the black plastic cover that was previously set aside on the front of the VFD.

Modbus Address Settings - Dipswitch 3								
Fan Number	Modbus Address	Position 1	Position 2	Position 3	Position 4	Position 5	Position 6, 7, 8	
N/A	1	RESERVED FOR HVLS FAN CONTROLS						Do Not Modify
1	2	On	Off	Off	Off	Off		
2	3	Off	On	Off	Off	Off		
3	4	On	On	Off	Off	Off		
4	5	Off	Off	On	Off	Off		
5	6	On	Off	On	Off	Off		
6	7	Off	On	On	Off	Off		
7	8	On	On	On	Off	Off		
8	9	Off	Off	Off	On	Off		
9	10	On	Off	Off	On	Off		
10	11	Off	On	Off	On	Off		
11	12	On	On	Off	On	Off		
12	13	Off	Off	On	On	Off		
13	14	On	Off	On	On	Off		
14	15	Off	On	On	On	Off		
15	16	On	On	On	On	Off		
16	17	Off	Off	Off	Off	On		
17	18	On	Off	Off	Off	On		
18	19	Off	On	Off	Off	On		
19	20	On	On	Off	Off	On		
20	21	Off	Off	On	Off	On		
21	22	On	Off	On	Off	On		
22	23	Off	On	On	Off	On		
23	24	On	On	On	Off	On		
24	25	Off	Off	Off	On	On		
25	26	On	Off	Off	On	On		
26	27	Off	On	Off	On	On		
27	28	On	On	Off	On	On		



All Remaining Fans



Operation And Maintenance

Pre-Start-Up Checks

1. Disconnect and lock-out all power switches to fan.
2. Check all fasteners on the ceiling mount, mounting kit, blades, VFD, motor and accessories for tightness.
3. Rotate the fan impeller by hand to ensure that it rotates freely and does not come into contact with any obstructions.
4. Check all electrical connections for proper attachment.
5. Verify that the fan is hanging so that the airfoils and downtube are level and the fan is plumb to the floor. Adjust guy wire tension as necessary (if applicable).

Fan Operation

IMPORTANT: If unusual vibration or oscillating movement is observed during fan operation, immediately discontinue use of the fan and contact the manufacturer or a suitably qualified maintenance/repair technician.

1. When the fan is started, observe the operation and check for any unusual noise, vibration or overheating. Refer to the Troubleshooting section of this manual if a problem develops.
2. With the system in full operation, measure current input to the VFD and compare with the FLA ratings in the table above to determine if the motor/VFD system is operating under safe load conditions.
3. Keep approaches to fan clean and free from obstruction.

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.

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 there line voltage across L1 and L2, L2 and L3, L1 and L3 on VFD power terminals?	Yes ⬇	No ⬆	Supply power wiring not connected or fuses damaged/missing. Connect proper power supply to fan and confirm that fuses are installed/functional. Test and replace fuses if necessary. Refer to wiring diagram and fuse sizing table on page 33.
3	Are line voltage measurements within +/- 10% of nominal voltage across L1 and L2, L2 and L3, L1 and L3 on VFD power terminals?	Yes ⬇	No ⬆	Phase imbalance or incorrect supply power applied to fan. Correct supply power wiring to fan.
4	Were fans and controls installed using only the provided networking components (green shielded CAT-5e cables, black shielded 3-way RJ45 splitters) or components that comply with specifications on page 34?	Yes ⬇	No ⬆	Networking components may be defective, incorrectly wired, or do not meet required specifications. Replace with provided components or components that comply with specifications on page 34.
5	Are 3-way RJ45 splitters installed with the single-port side connected to black cable inside fan downtube?	Yes ⬇	No ⬆	Incorrect splitter orientation. Unplug splitter and reconnect in the proper orientation.
6	Have all CAT-5e cable connections been unplugged and reconnected to ensure that cables are fully seated (will hear a "click" when fully seated)?	Yes ⬇	No ⬆	Loose or misaligned CAT-5e cable connection. Unplug and reconnect all CAT-5e cable connections.
7	Are the dipswitches on all fan VFDs set as shown on pages 36-39?	Yes ⬇	No ⬆	Incorrect dipswitch settings on one or multiple VFDs. Adjust dipswitches as shown on pages 36-39. All fans must have a unique Modbus address setting on dipswitch bank 3.
8	Are motor power, motor ground, and hall cables connected to all VFDs?	Yes ⬇	No ⬆	No connection between motor and VFD. Connect motor power, motor ground, and hall cable to VFDs. Refer to instructions on pages 30-32.
9	Have motor power and hall cables been unplugged and reconnected to ensure that they are connected in the proper orientation and fully seated on all VFDs (will hear a "click" when fully seated)?	Yes ⬇	No ⬆	Loose or misaligned motor power or hall cable connection. Unplug and reconnect motor power and hall cables. Refer to pages 30-32 for correct orientation.
10	Does communication wiring on VFD of fan 1 (directly connected to control via shielded CAT-5e cable) match the wiring diagram for fan 1 on pages 36-37?	Yes ⬇	No ⬆	Communication wiring on fan 1 is incorrect. Turn off supply power to fan and correct wiring as shown in wiring diagram on pages 36-37. Then turn supply power on.
11	Does communication wiring on VFDs of all remaining fans match the wiring diagram for all remaining fans on pages 38-39?	Yes ⬇	No ⬆	Communication wiring on one or multiple fans is incorrect. Turn off supply power to fans and correct wiring as shown in wiring diagram on pages 38-39. Then turn supply power on.
12	Do fans operate as expected?	Yes ⬇	No ⬆	Check detailed troubleshooting steps on the following pages or contact the factory.
Everything is working properly.				

Controls Troubleshooting

Problem: Keypad or Standard Touchscreen control will not turn on.				
1	Is the 24V wire (white-brown) connected on VFD circuit board of fan 1 (directly connected to control via shielded CAT-5e cable)?	Yes ⬇️	No ⬇️	No supply power to control. Controls are powered by VFD on fan 1 (directly connected to control via shielded CAT-5e cable). Connect the 24V wire (white-brown) to the VFD circuit board of fan 1. Refer to instructions on pages 36-37.
2	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.
3	Were fans and controls installed using only the provided networking components (green shielded CAT-5e cables, black shielded 3-way RJ45 splitters) or components that comply with specifications on page 34?	Yes ⬇️	No ⬇️	Networking components may be defective, incorrectly wired, or do not meet required specifications. Replace with provided components or components that comply with specifications on page 34.
4	Are 3-way RJ45 splitters installed with the single-port side connected to black cable inside fan downtube?	Yes ⬇️	No ⬇️	Incorrect splitter orientation. Unplug splitter and reconnect in the proper orientation.
5	Have all CAT-5e cable connections been unplugged and reconnected to ensure that cables are fully seated (will hear a “click” when fully seated)?	Yes ⬇️	No ⬇️	Loose or misaligned CAT-5e cable connection. Unplug and reconnect all CAT-5e cable connections.
6	Does the screen on the control light up?	Yes ⬇️	No ⬇️	Contact factory.
Everything is working properly.				

Problem: Advanced Touchscreen control will not turn on.				
1	Is the power adapter cable wired into the control panel?	Yes ⬇️	No ⬇️	No supply power to control panel. Wire the power adapter cable into the control panel as shown in the wiring diagram in the control manual.
2	Is the power adapter connected to a 115V electrical outlet?	Yes ⬇️	No ⬇️	No supply power to control panel. Connect the power adapter to a 115V electrical outlet.
3	Is supply power turned on at the circuit breaker for 115V electrical outlet?	Yes ⬇️	No ⬇️	No supply power to control panel. Turn circuit breaker to “on” position.
4	Is the shielded RJ12 cable wired into the control panel?	Yes ⬇️	No ⬇️	No supply power or communications to touchscreen interface. Wire the shielded RJ12 cable into the control panel as shown in the wiring diagram in the control manual.
5	Is the shielded RJ12 cable connected to the touchscreen interface?	Yes ⬇️	No ⬇️	No supply power or communications to touchscreen interface. Connect the shielded RJ12 cable to the open port on the back of the touchscreen interface.
6	Has the shielded RJ12 cable been unplugged and reconnected to the touchscreen interface to ensure that it is fully seated (will hear a “click” when fully seated)?	Yes ⬇️	No ⬇️	Loose or misaligned RJ12 cable connection. Unplug and reconnect shielded RJ12 cable to the open port on the back of the touchscreen interface.
7	Does the screen on the touchscreen interface light up?	Yes ⬇️	No ⬇️	Contact factory.
Everything is working properly.				

Problem: One or more fans not found by control.				
1	Were fans and controls installed using only the provided networking components (green shielded CAT-5e cables, black shielded 3-way RJ45 splitters) or components that comply with specifications on page 34?	Yes ⬇️	No ⬇️	Networking components may be defective, incorrectly wired, or do not meet required specifications. Replace with provided components or components that comply with specifications on page 34.
2	Does communication wiring on VFD of fan 1 (directly connected to control via shielded CAT-5e cable) match the wiring diagram for fan 1 on pages 36-37?	Yes ⬇️	No ⬇️	Communication wiring on fan 1 is incorrect. Turn off supply power to fan and correct wiring as shown in wiring diagram on pages 36-37. Then turn supply power on.
3	Are the dipswitches on VFD of fan 1 (directly connected to control via shielded CAT-5e cable) set as shown for fan 1 on pages 36-37?	Yes ⬇️	No ⬇️	Incorrect dipswitch settings on fan 1. Adjust dipswitches as shown on pages 36-37. All fans must have a unique Modbus address setting on dipswitch bank 3.
4	Is LED 8 on the bottom right side of the VFD on fan 1 blinking?	Yes ⬇️	No ⬇️	Solid light indicates need to restart VFD. Cycle power to VFD. If solid light persists, contact factory.
5	Is LED 8 on the bottom right side of the VFD on fan 1 blinking approximately one time per second?	Yes ⬇️	No ⬇️	Blinking faster than one time per second indicates no communication with control. Unplug and reconnect shielded CAT-5e cable connections between control and fan 1 to ensure that cables are fully seated (will hear a “click” when fully seated). If rapid blinking persists, test shielded CAT-5e cables for functionality and replace faulty cables (if applicable). Otherwise, contact factory.
6	Does communication wiring on VFD of fan 2 (directly connected to fan 1 via shielded CAT-5e) match the wiring diagram for “all remaining fans” on pages 38-39?	Yes ⬇️	No ⬇️	Communication wiring on fan 2 is incorrect. Turn off supply power to fan and correct wiring as shown in wiring diagram on pages 38-39. Then turn supply power on.
7	Are the dipswitches on VFD of fan 2 (directly connected to fan 1 via shielded CAT-5e cable) set as shown for “all remaining fans” on pages 38-39?	Yes ⬇️	No ⬇️	Incorrect dipswitch settings on fan 2. Adjust dipswitches as shown on pages 38-39. All fans must have a unique Modbus address setting on dipswitch bank 3.
8	Is LED 8 on the bottom right side of the VFD on fan 2 blinking?	Yes ⬇️	No ⬇️	Solid light indicates need to restart VFD. Cycle power to VFD. If solid light persists, contact factory.
9	Is LED 8 on the bottom right side of the VFD on fan 2 blinking approximately one time per second?	Yes ⬇️	No ⬇️	Blinking faster than one time per second indicates no communication with control. Unplug and reconnect shielded CAT-5e cable connections between fan 1 and fan 2 to ensure that cables are fully seated (will hear a “click” when fully seated). If rapid blinking persists, test shielded CAT-5e cables for functionality and replace faulty cables (if applicable). Otherwise, contact factory.
10	After repeating steps 6-9 for all remaining fans, can all fans be found using autodetect feature on control?	Yes ⬇️	No ⬇️	Contact factory.
Everything is working properly.				

Fan Troubleshooting

Problem: One or more fans found by control but will not run.				
1	Have all fault codes been acknowledged and reset on fan control?	Yes ⬆	No ⬇	One or more fans may have experienced a fault. Refer to list of fault codes on page 50 for detailed descriptions. Acknowledge and reset all faults, then cycle power to fans. Fans will only operate when Op Status code is equal to 0. Refer to instructions in the appropriate control manual for accessing Op Status code.
2	Is the control set to a speed greater than 0 and have the fans been turned on via the control's power button?	Yes ⬆	No ⬇	Control is not sending a run command to fans. Set speed to a value between 1-10 and press the control's power button to turn fans on. Control will indicate that fans are on by displaying a green power icon or stating "On".
3	Are motor power, motor ground, and hall cables connected to all VFDs?	Yes ⬆	No ⬇	No connection between motor and VFD. Connect motor power, motor ground, and hall cable to VFDs. Refer to instructions on pages 30-32.
4	Have motor power and hall cables been unplugged and reconnected to ensure that they are connected in the proper orientation and fully seated on all VFDs (will hear a "click" when fully seated)?	Yes ⬆	No ⬇	Loose or misaligned motor power or hall cable connection. Unplug and reconnect motor power and hall cables. Refer to pages 30-32 for correct orientation.
5	Are resistance measurements across L1 & L2, L2 & L3, L1 & L3 on the pins of the motor power cable approximately equal?	Yes ⬆	No ⬇	Defective motor. Contact factory/sales representative.
6	Are resistance measurements across L1 & GND, L2 & GND, L3 & GND on the pins of the motor power cable open (no resistance)?	Yes ⬆	No ⬇	Defective motor. Contact factory/sales representative.
7	Do fans operate as expected?	Yes ⬆	No ⬇	Contact factory.
Everything is working properly.				

Problem: One or more fans attempt to run, but do not rotate completely.				
1	Are fan size and blade count set appropriately in the control for all installed fans?	Yes ⬆	No ⬇	Incorrect torque/speed command to fans. Set fan size and blade count using instructions in the appropriate control manual. Fan size and blade count must be set to match physical product.
2	Turn off power and rotate all fans by hand. Can fans rotate freely without any audible rubbing, scraping, or grinding noise?	Yes ⬆	No ⬇	Rubbing components on the fan hub and/or airfoils. Correct any issues that are found.
3	Are motor power, motor ground, and hall cables connected to all VFDs?	Yes ⬆	No ⬇	No connection between motor and VFD. Connect motor power, motor ground, and hall cable to VFDs. Refer to instructions on pages 30-32.
4	Have motor power and hall cables been unplugged and reconnected to ensure that they are connected in the proper orientation and fully seated on all VFDs (will hear a "click" when fully seated)?	Yes ⬆	No ⬇	Loose or misaligned motor power or hall cable connection. Unplug and reconnect motor power and hall cables. Refer to pages 30-32 for correct orientation.
5	Is dipswitch bank 1 on fan VFD set appropriately for all installed fans?	Yes ⬆	No ⬇	Incorrect dipswitch setting. Set dipswitch bank 1 as indicated below: If model name on fan nameplate includes "-70LV" or "-70HV", set dipswitch 1 position 1 to OFF and dipswitch 1 position 2 to OFF. If model name on fan nameplate includes "-170LV" or "-170HV", set dipswitch 1 position 1 to ON and dipswitch 1 position 2 to OFF.
6	Are resistance measurements across L1 & L2, L2 & L3, L1 & L3 on the pins of the motor power cable approximately equal?	Yes ⬆	No ⬇	Defective motor. Contact factory/sales representative.
7	Are resistance measurements across L1 & GND, L2 & GND, L3 & GND on the pins of the motor power cable open (no resistance)?	Yes ⬆	No ⬇	Defective motor. Contact factory/sales representative.
8	Do fans operate as expected?	Yes ⬆	No ⬇	Contact factory.
Everything is working properly.				

Problem: One or more fans run intermittently, but will not run consistently.				
1	Have all fault codes been acknowledged and reset on fan control?	Yes ⬇️	No ➡️	One or more fans may have experienced a fault. Refer to list of fault codes on page 50 for detailed descriptions. Acknowledge and reset all faults, then cycle power to fans. Fans will only operate when Op Status code is equal to 0. Refer to instructions in the appropriate control manual for accessing Op Status code.
2	Are line voltage measurements within +/- 10% of nominal voltage across L1 and L2, L2 and L3, L1 and L3 on VFD power terminals?	Yes ⬇️	No ➡️	Phase imbalance or incorrect supply power applied to fan. Correct supply power wiring to fan.
3	Were fans and controls installed using only the provided networking components (green shielded CAT-5e cables, black shielded 3-way RJ45 splitters) or components that comply with specifications on page 34?	Yes ⬇️	No ➡️	Networking components may be defective, incorrectly wired, or do not meet required specifications. Replace with provided components or components that comply with specifications on page 34.
4	Have all CAT-5e cable connections been unplugged and reconnected to ensure that cables are fully seated (will hear a "click" when fully seated)?	Yes ⬇️	No ➡️	Loose or misaligned CAT-5e cable connection. Unplug and reconnect all CAT-5e cable connections.
5	Are the dipswitches on all fan VFDs set as shown on pages 36-39?	Yes ⬇️	No ➡️	Incorrect dipswitch settings on one or multiple VFDs. Adjust dipswitches as shown on pages 36-39. All fans must have a unique Modbus address setting on dipswitch bank 3.
6	Do fans operate as expected?	Yes ⬇️	No ➡️	Contact factory.
Everything is working properly.				

Problem: One or more fans run, but are making excessive noise/vibrating.				
1	Have all fasteners been torqued to the appropriate values listed in the IOM?	Yes ⬇️	No ➡️	Loose fasteners. Torque all fasteners to the appropriate values. Refer to pages 17-27 for torque specifications of each fastener.
2	Have the factory-provided guy wires been installed on all fans (if applicable)?	Yes ⬇️	No ➡️	Guy wires are not installed. Refer to pages 25-26 for guy wire installation instructions.
3	Have the guy wires on all fans been tightened?	Yes ⬇️	No ➡️	Loose guy wires. Refer to pages 25-26 for guy wire installation instructions.
4	Is the downtube level on all sides for all installed fans?	Yes ⬇️	No ➡️	Fans not installed level. Refer to pages 25-26 for guy wire installation and fan levelling instructions.
5	Remove the black plastic covers from all fan VFDs and operate fans using the control. Does the noise/vibration continue?	Yes ⬇️	No ➡️	Misaligned VFD cover. Reinstall the black plastic cover on the fan VFD, making sure to align the tabs on the cover with the slots in the VFD heatsink. Plastic cover can make noise when improperly aligned.
6	Turn off power and rotate all fans by hand. Can fans rotate freely without any audible rubbing, scraping, or grinding noise?	Yes ⬇️	No ➡️	Rubbing components on the fan hub and/or airfoils. Correct any issues that are found.
7	Has noise/vibration ceased?	Yes ⬇️	No ➡️	Contact factory.
Everything is working properly.				

Problem: One or more fans run, but I don't feel much airflow.				
1	Are fans installed with a minimum of 3 feet of clearance to ceiling structure?	Yes ⬆️	No ➡️	Fan is starved for air. Correct installation to maintain minimum clearance requirements.
2	Are fan size and blade count set appropriately in the control for all installed fans?	Yes ⬆️	No ➡️	Incorrect torque/speed command to fans. Set fan size and blade count using instructions in the appropriate control manual. Fan size and blade count must be set to match physical product.
3	Is the control set to the maximum fan speed (speed setting of 10)?	Yes ⬆️	No ➡️	Fan speed too low. Increase fan speed until desired airflow is achieved. Refer to instructions in the appropriate control manual to increase speed.
4	Is the control set to forward (downward airflow) operation?	Yes ⬆️	No ➡️	Fan operating in reverse (upward airflow). Refer to instructions in the appropriate control manual to change direction of operation.
5	Have motor power and hall cables been unplugged and reconnected to ensure that they are connected in the proper orientation and fully seated on all VFDs (will hear a "click" when fully seated)?	Yes ⬆️	No ➡️	Loose or misaligned motor power or hall cable connection. Unplug and reconnect motor power and hall cables. Refer to pages 30-32 for correct orientation.
6	Is dipswitch bank 1 on fan VFD set appropriately for all installed fans?	Yes ⬆️	No ➡️	Incorrect dipswitch setting. Set dipswitch bank 1 as indicated below: If model name on fan nameplate includes "-70LV" or "-70HV", set dipswitch 1 position 1 to OFF and dipswitch 1 position 2 to OFF. If model name on fan nameplate includes "-170LV" or "-170HV", set dipswitch 1 position 1 to ON and dipswitch 1 position 2 to OFF.
7	Do fans operate as expected?	Yes ⬆️	No ➡️	Contact factory.
Everything is working properly.				

Problem: One or more fans not operating at expected RPM (too fast or too slow).				
1	Are fan size and blade count set appropriately in the control for all installed fans?	Yes ⬆️	No ➡️	Incorrect torque/speed command to fans. Set fan size and blade count using instructions in the appropriate control manual. Fan size and blade count must be set to match physical product.
2	Turn off power and rotate all fans by hand. Can fans rotate freely without any audible rubbing, scraping, or grinding noise?	Yes ⬆️	No ➡️	Rubbing components on the fan hub and/or airfoils. Correct any issues that are found.
3	Have motor power and hall cables been unplugged and reconnected to ensure that they are connected in the proper orientation and fully seated on all VFDs (will hear a "click" when fully seated)?	Yes ⬆️	No ➡️	Loose or misaligned motor power or hall cable connection. Unplug and reconnect motor power and hall cables. Refer to pages 30-32 for correct orientation.
4	Is dipswitch bank 1 on fan VFD set appropriately for all installed fans?	Yes ⬆️	No ➡️	Incorrect dipswitch setting. Set dipswitch bank 1 as indicated below: If model name on fan nameplate includes "-70LV" or "-70HV", set dipswitch 1 position 1 to OFF and dipswitch 1 position 2 to OFF. If model name on fan nameplate includes "-170LV" or "-170HV", set dipswitch 1 position 1 to ON and dipswitch 1 position 2 to OFF.
5	Do fans operate as expected?	Yes ⬆️	No ➡️	Contact factory.
Everything is working properly.				

Problem: One or more fans not operating after fire suppression system testing.				
1	Has fire alarm been cleared and reset in the building?	Yes ⬇️	No ➡️	Fans are shutdown due to fire alarm. Clear fire alarm and reset fire suppression system. Fans will not operate during fire alarm as required by NFPA 13.
2	Have all fault codes been acknowledged and reset on fan control?	Yes ⬇️	No ➡️	One or more fans may have experienced a fault. Refer to list of fault codes on page 50 for detailed descriptions. Acknowledge and reset all faults, then cycle power to fans. Fans will not operate when Op Status code 5 or "Fire Relay" alarms are active. Refer to instructions in the appropriate control manual for accessing Op Status code.
3	Were fans installed using only the provided fire alarm relays or other electromechanical relays approved by fan manufacturer?	Yes ⬇️	No ➡️	Fire alarm relays may be defective, incorrectly wired, or do not meet required specifications. Replace fire alarm relays with factory-provided or other approved electromechanical relays. Solid state relays cannot be used.
4	Disconnect fire alarm relay wiring and install jumper wire between FIRE+ and FIRE- terminals on all fan VFDs. Turn fans on using control. Do fans operate as expected?	Yes ⬇️	No ➡️	Contact factory.
5	Remove jumper wire from FIRE+ and FIRE- terminals on all fan VFDs and reconnect fire alarm relay wiring. Turn fans on using control. Do fans operate as expected?	Yes ⬇️	No ➡️	Fire alarm relays and/or fire alarm relay wiring are defective. Replace defective components.
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 fan control?	Yes ⬇️	No ➡️	One or more fans may have experienced a fault. Refer to list of fault codes on page 50 for detailed descriptions. Acknowledge and reset all faults, then cycle power to fans. Fans will only operate when Op Status code is equal to 0. Refer to instructions in the appropriate control manual for accessing Op Status code.
2	Is supply power turned on at all circuit breakers and fan disconnects? Are fuses installed and functional?	Yes ⬇️	No ➡️	No supply power to fans. Turn circuit breakers and disconnects to "on" position. Test and replace fuses if necessary.
3	Are there visible signs of damage on VFD circuit boards (black marks, damaged components, etc.)?	Yes ⬇️	No ➡️	Damaged or defective VFDs. Contact factory.
4	Are all LED lights 1-6 on the VFD circuit board lit with a solid light for all fans?	Yes ⬇️	No ➡️	Contact factory.
5	Do fans operate as expected?	Yes ⬇️	No ➡️	Contact factory.
Everything is working properly.				

LED Light Troubleshooting

Problem: LED Light will not turn on.				
1	Is supply power turned on at all circuit breakers and LED light disconnects?	Yes ⬆️	No ⬇️	No supply power to LED light. LED light requires a separate 115V power source (light is not powered by HVLS fans). Turn circuit breakers and disconnects to “on” position.
2	Has an LED light been selected in the fan control for the appropriate fan?	Yes ⬆️	No ⬇️	Control is not sending commands to LED light. Refer to the appropriate control manual for instructions on selecting LED light in the control.
3	Is the control set to a dimming value greater than 0 and has the LED light been turned on via the control's power button?	Yes ⬆️	No ⬇️	Control is not sending commands to LED light. Set dimming control to a value between 1-10 and press the control's power button to turn LED light on. Control will indicate that LED light is on by displaying a green power icon or stating “On”.
4	Is there line voltage across black and white LED power wires at the top of the fan downtube?	Yes ⬆️	No ⬇️	Supply power wiring not connected, LED light relay wired incorrectly (if applicable), or defective LED light relay (if applicable). Correct wiring or replace defective component. Refer to wiring diagram on page 34.
5	Are the LED light power (3 pin) and communication (2 pin) plugs connected between the downtube and motor/hub assembly of the fan? Note: plugs are hidden inside downtube when motor/hub assembly is installed on the fan.	Yes ⬆️	No ⬇️	Power and/or communication wiring to LED light is not continuous. Refer to instructions on page 28. Remove motor/hub assembly from affected fans to access LED light power (3 pin) and communication (2 pin) plugs. Connect the male plugs in the motor/hub assembly to their corresponding female plugs in the downtube. Reconnect the motor/hub assembly. 7
6	Are the LED light power (3 pin) and communication (2 pin) plugs connected between the motor/hub assembly and the LED light assembly of the fan? Note: plugs are hidden inside motor/hub assembly when LED light assembly is installed on the fan.	Yes ⬆️	No ⬇️	Power and/or communication wiring to LED light is not continuous. Refer to instructions on page 28. Remove LED light assembly from affected fans to access LED light power (3 pin) and communication (2 pin) plugs. Connect the male plugs in the LED light assembly to their corresponding female plugs in the motor/hub assembly. Reconnect the LED light assembly.
7	Does LED light operate as expected?	Yes ⬆️	No ⬇️	Contact factory.
Everything is working properly.				

Problem: LED light will not turn off completely.				
1	Was the optional LED light relay installed?	Yes ⬆️	No ⬇️	LED light power is being controlled via high voltage from building's light grid. Install the optional LED light relay using the instructions on page 34 to allow LED light power on/off from fan control.
2	Is LED light relay wired as shown in the wiring diagram on page 34?	Yes ⬆️	No ⬇️	LED light relay wiring is incorrect. Refer to LED light relay installation instructions on page 34.
3	Has an LED light been selected in the fan control for the appropriate fan?	Yes ⬆️	No ⬇️	Control is not sending commands to LED light. Refer to the appropriate control manual for instructions on selecting LED light in the control.
4	Has the LED light been turned off via the control's power button?	Yes ⬆️	No ⬇️	Control is not sending an off command to LED light. Press the control's power button to turn LED light off. Control will indicate that LED light is on by displaying a gray/black power icon or stating “Off”.
5	Disconnect blue and white 0-10VDC LED communication wires on the LED light relay. Does LED light turn off as expected?	Yes ⬆️	No ⬇️	Defective LED light relay. Replace defective component.
6	Reconnect blue and white 0-10VDC LED communication wires on the LED light relay. Does LED light turn off as expected?	Yes ⬆️	No ⬇️	Contact factory.
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 ➡️	Control is not sending commands to LED light. Refer to the appropriate control manual for instructions on selecting LED light in the control.
2	Is the control set to a dimming value less than 10?	Yes ⬇️	No ➡️	Control is not sending dimming commands to LED light. Set dimming control to a value between 1-9 to dim LED light. Control will indicate current dimming control value.
3	Are the LED light communication (2 pin) plugs connected between the downtube and motor/hub assembly of the fan? NOTE: Plugs are hidden inside downtube when motor/hub assembly is installed on the fan.	Yes ⬇️	No ➡️	Communication wiring to LED light is not continuous. Refer to instructions on page 28. Remove motor/hub assembly from affected fans to access LED light communication (2 pin) plugs. Connect the male plugs in the motor/hub assembly to their corresponding female plugs in the downtube. Reconnect the motor/hub assembly.
4	Are the LED light communication (2 pin) plugs connected between the motor/hub assembly and the LED light assembly of the fan? NOTE: Plugs are hidden inside motor/hub assembly when LED light assembly is installed on the fan.	Yes ⬇️	No ➡️	Communication wiring to LED light is not continuous. Refer to instructions on page 28. Remove LED light assembly from affected fans to access LED light communication (2 pin) plugs. Connect the male plugs in the LED light assembly to their corresponding female plugs in the motor/hub assembly. Reconnect the LED light assembly.
5	Is 0-10VDC wiring on fan VFD installed as shown in the wiring diagram on pages 36-39?	Yes ⬇️	No ➡️	0-10VDC wiring is incorrect. Adjust 0-10VDC wiring on the fan VFD as shown in the wiring diagram on pages 36-39.
6	Does LED light operate as expected?	Yes ⬇️	No ➡️	Contact factory.
Everything is working properly.				

Problem: LED light is flickering.				
1	Are the LED light power (3 pin) and communication (2 pin) plugs securely connected between the downtube and motor/hub assembly of the fan? NOTE: Plugs are hidden inside downtube when motor/hub assembly is installed on the fan.	Yes ⬇️	No ➡️	Power and/or communications wiring to LED light is not continuous. Refer to instructions on page 28. Remove motor/hub assembly from affected fans to access LED light power (3 pin) and communication (2 pin) plugs. Connect the male plugs in the motor/hub assembly to their corresponding female plugs in the downtube so that the connectors are fully seated. Reconnect the motor/hub assembly.
2	Are the LED light power (3 pin) and communication (2 pin) plugs securely connected between the motor/hub assembly and the LED light assembly of the fan? NOTE: Plugs are hidden inside motor/hub assembly when LED light assembly is installed on the fan.	Yes ⬇️	No ➡️	Power and/or communications wiring to LED light is not continuous. Refer to instructions on page 28. Remove LED light assembly from affected fans to access LED light power (3 pin) and communication (2 pin) plugs. Connect the male plugs in the LED light assembly to their corresponding female plugs in the motor/hub assembly so that the connectors are fully seated. Reconnect the LED light assembly.
3	Is 0-10VDC wiring on fan VFD installed as shown in the wiring diagram on pages 36-39?	Yes ⬇️	No ➡️	0-10VDC wiring is incorrect. Adjust 0-10VDC wiring on the fan VFD as shown in the wiring diagram on pages 36-39.
4	Does LED light operate as expected?	Yes ⬇️	No ➡️	Contact factory.
Everything is working properly.				

Reference

Fault Code Causes and Possible Solutions

Code	Fault	Description	Possible Cause(s)	Solution
0	No Fault	Fan is operating as expected	-	-
1	Modbus Timeout	Inconsistent Modbus RTU communication between control and drive resulting in incorrect fan operation	<ol style="list-style-type: none"> 1. Loose CAT-5e cable connections 2. Unshielded or damaged CAT-5e cables and RJ45 splitters 3. Incorrect network biasing settings 4. Incorrect low voltage wiring on euro connector 5. Incorrect supply power applied to VFD 6. Supply power phase imbalance 	<ol style="list-style-type: none"> 1. Verify that all CAT-5e cable connections are fully seated and secure 2. Replace cables with the provided networking components (green shielded CAT-5e cables and black shielded 3-way RJ45 splitters) or components that comply with specifications on page 34 3. Refer to Fan Networking instructions on pages 36-39 4. Refer to Fan Networking instructions on pages 36-39 5. Verify that supply voltage is within +/- 10% of the VFD's rated voltage 6. Verify that current is consistent across all phases of supply power
2	Impact Detection	Unexpected change in fan speed and/or motor torque resulting in fan shutdown	<ol style="list-style-type: none"> 1. Fan blades and/or hub are obstructed 2. Motor power and/or hall cables not connected to VFD, not fully seated, or connected in incorrect orientation 3. Incorrect blade count and/or fan size selected in control 4. Fan operating without blades installed 	<ol style="list-style-type: none"> 1. Remove any obstructions preventing fan rotation 2. Unplug and reconnect motor power and hall cables, refer to pages 30-32 for proper orientation 3. Set fan size and blade count to match physical product using instructions on in appropriate control manual 4. Install blades on fan
3	Motor Over Temperature	Internal motor temperature exceeds maximum value resulting in reduced fan speed or shutdown	Ambient temperature too high at the ceiling	Allow motor to cool before increasing speed or restarting fan
4	Drive Over Temperature	Internal VFD temperature exceeds maximum value resulting in reduced fan speed or shutdown	Ambient temperature too high at the ceiling	Allow VFD to cool before increasing speed or restarting fan
5	Bus Over Voltage	Internal VFD voltage is higher than expected resulting in fan shutdown	Incorrect supply voltage	Verify that supply voltage is within +/- 10% of the VFD's rated voltage
6	Bus Under Voltage	Internal VFD voltage is lower than expected resulting in fan shutdown	<ol style="list-style-type: none"> 1. Incorrect supply voltage 2. Rapid power-cycling at circuit breaker 	<ol style="list-style-type: none"> 1. Verify that supply voltage is within +/- 10% of the drive's rated voltage 2. After turning power off, wait 30-60 seconds before turning power back on
7	Phase Over Current	Current is higher than expected on at least one phase of supply power resulting in fan shutdown	<ol style="list-style-type: none"> 1. Incorrect supply power 2. Supply power phase imbalance 	<ol style="list-style-type: none"> 1. Verify that supply power meets all power quality requirements on page 33 and that supply voltage is within +/- 10% of the drive's rated voltage 2. Verify that current is consistent across all phases of supply power
8	Microcontroller High Temp	Microcontroller temperature exceeds maximum value resulting in reduced fan speed or shutdown	Ambient temperature too high at the ceiling	Allow VFD to cool before increasing speed or restarting fan
9	Overspeed Fault	Motor speed is greater than maximum allowable speed resulting in reduced fan speed or shutdown	<ol style="list-style-type: none"> 1. Incorrect blade count and/or fan size selected in control 2. Wind gusts in building 	<ol style="list-style-type: none"> 1. Set fan size and blade count to match physical product using instructions in the control manual 2. Close overhead doors, etc. or relocate fan

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.
- Motor Cables** – The motor power, motor ground, and hall cables have been plugged into the VFD circuit board as shown in the IOM.
- 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.
- CAT-5e Cable Functionality** – All CAT-5e 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 dipswitch 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 at the top of the fan’s downtube.
 2. Adjust dipswitches on dipswitch bank 2 to OFF - ON - ON (down - up - up).
 3. Measure DC voltage across DATA+ and DATA- terminals on fan’s VFD. Measured voltage should be 4.5 – 5.5V.
 4. Reset dipswitches on dipswitch bank 2 as shown in the IOM and reconnect the fan to the RJ45 splitter 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.

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 CAT-5e Cable** – I have taken a photo showing that fans were installed using only Greenheck-supplied CAT-5e cable or shielded CAT-5e 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

Date

Maintenance Log

Date _____ Time _____ AM/PM

Notes: _____

Date _____ Time _____ AM/PM

Notes: _____

Date _____ Time _____ AM/PM

Notes: _____

Date _____ Time _____ AM/PM

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Date _____ Time _____ AM/PM

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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.

AMCA Publication 410-96, Safety Practices for Users and Installers of Industrial and Commercial Fans, provides additional safety information. This publication can be obtained from AMCA International, Inc. at www.amca.org.

