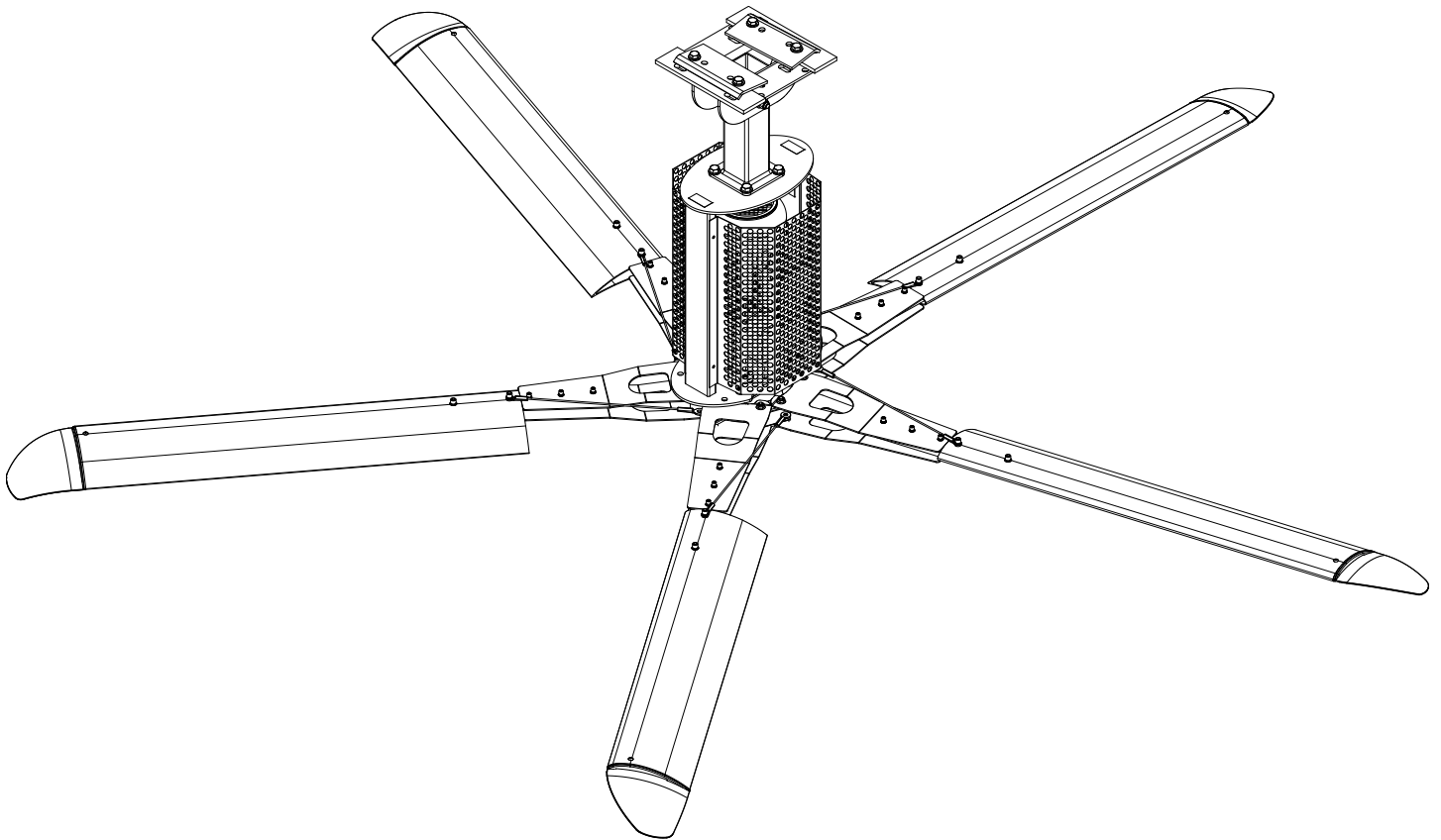


ENTREMAT^{IC}

Industrial HVLS Fan User's Manual



This manual applies to fans
manufactured beginning
November 2016.



▲ WARNING

Do not install, operate or service this product unless you have read and understand the Safety Practices, Warnings, and Installation and Operating Instructions contained in this User's Manual. Failure to do so could result in death or serious injury.

User's Manual

Installation, Operations,
Maintenance and Parts

Part No. 6015653H

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INTRODUCTION

Welcome and thank you for choosing this industrial fan from 4Front Engineered Solutions®

This User's Manual contains information that you need to safely install, operate and maintain the fan. It also contains a complete parts list and information about ordering replacement parts. Please keep and read this User's Manual before using your new fan.

SAFETY SIGNAL WORDS

You may find safety signal words such as DANGER, WARNING, CAUTION or NOTICE throughout this User's Manual. Their use is explained below:



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

▲ DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

▲ WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

▲ CAUTION

Indicates a potentially hazardous situation which, if not avoided may result in minor or moderate injury.

NOTICE

Notice is used to address practices not related to personal injury.

SAFETY PRACTICES

⚠ WARNING

READ AND SAVE THESE INSTRUCTIONS.

READ THESE SAFETY PRACTICES BEFORE INSTALLING, OPERATING OR SERVICING THE FAN. Failure to follow these safety practices could result in death or serious injury.

READ AND FOLLOW THE OPERATING INSTRUCTIONS IN THIS MANUAL BEFORE OPERATING THE FAN. If you do not understand the instructions, ask your supervisor to teach you how to use the fan.

To reduce the risk of personal injury, do not bend the blade brackets when installing the brackets, balancing the blades or cleaning the fan. Do not insert foreign objects in between rotating fan blades.

⚠ DANGER

To reduce the risk of fire, electric shock and injury to persons, HVLS fan motor assemblies must be installed with the blade assemblies that are marked on their cartons to indicate the suitability with this model. Other blade assemblies cannot be substituted.

Be certain to follow the instructions in this manual.

If you do not understand the instructions, ask your supervisor to explain them to you or call your authorized local distributor.

INSTALLATION AND OPERATION:

⚠ WARNING

Installation of the equipment must comply with local and national electrical codes and must be in accordance with ANSI/NFPA 70-1999.

Do not use this industrial fan until you have received proper training. Improper use could result in property damage, bodily injury and/or death. Read and follow the complete OPERATING INSTRUCTIONS on pages 21-27 before use. If you do not understand the instructions, ask your supervisor to explain them to you or call your local distributor.

DO NOT USE THE FAN IF IT APPEARS DAMAGED OR DOES NOT OPERATE PROPERLY. Inform your supervisor immediately.

Do not operate the fan until all personnel, building structure and moveable equipment are clear of all moving parts. Install guards as required.

To reduce the risk of electric shock, do not expose to water or rain.

Support directly from building structure. Do not install the fan unit onto structure of insufficient strength. Consult a professional engineer or registered architect. Improper installation of the fan could result in death or serious injury.

⚠ CAUTION

To reduce the risk of injury to persons, install fan so that the blade is at least 3.05m (10') above the floor.

MAINTENANCE AND SERVICE:

⚠ DANGER

Before service, inspection, or cleaning make certain that the power is disconnected and properly locked out.

If the fan does not operate properly using the procedures in this manual, **BE CERTAIN TO REMOVE POWER FROM THE UNIT AND LOCK-OUT THE DISCONNECT ON THE POWER CIRCUIT.** Call your local distributor for service.

Keep your body clear of moving parts at all times.

All electrical troubleshooting and repair must be done by a qualified technician and meet all applicable codes.

If it is necessary to make troubleshooting checks inside the VFD box with the power on, **USE EXTREME CAUTION.** Do not place fingers or un-insulated tools inside the enclosure. Touching wires or other parts inside the enclosure could result in electrical shock, death or serious injury.

⚠ WARNING

Variable Frequency Drive (VFD) fan controllers contain high voltage capacitors. Before working on the fan controller, ensure isolation of the main voltage supply and verify voltage has bled off prior to beginning work. Failure to do so may result in death or serious injury.

If you have problems or questions, contact your local distributor for assistance.

OWNER'S RESPONSIBILITIES

The owner's responsibilities include the following:

The owner should recognize the inherent danger of the interface between the industrial fan and shop worker. The owner should, therefore, train and instruct operators in the safe use of the industrial fan.

Nameplates, cautions, instructions and posted warnings shall not be obscured from the view of operating or maintenance personnel for whom such warnings are intended. Warnings which are worn or non-legible should be replaced.

Manufacturer's recommended periodic maintenance and inspection procedures in effect at date of shipment shall be followed, and written records of the performance of these procedures should be kept.

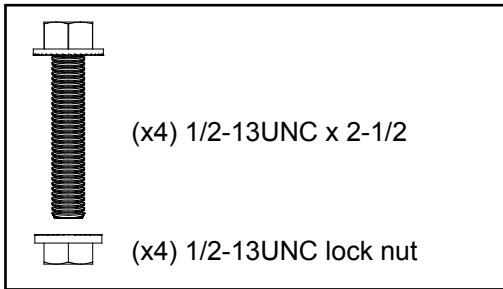
Industrial fans that are structurally damaged or have experienced impacts from external sources, shall be removed from service, inspected by the manufacturer's authorized representative, and repaired as needed before being placed back in service.

The owner shall see that all nameplates and caution and instruction markings or labels are in place and that the appropriate operating and maintenance manuals are provided to users.

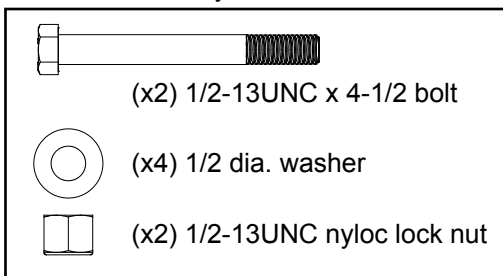
Modifications or alterations of industrial fans shall be made only with written permission of the original manufacturer.

HARDWARE

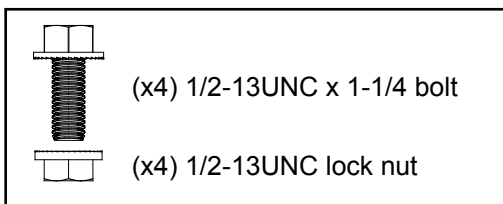
Mount – Building



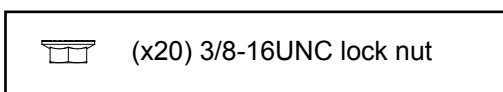
Mount – Assembly



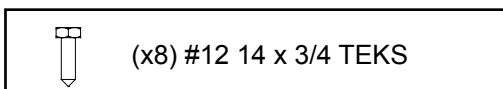
Mount – Motor frame



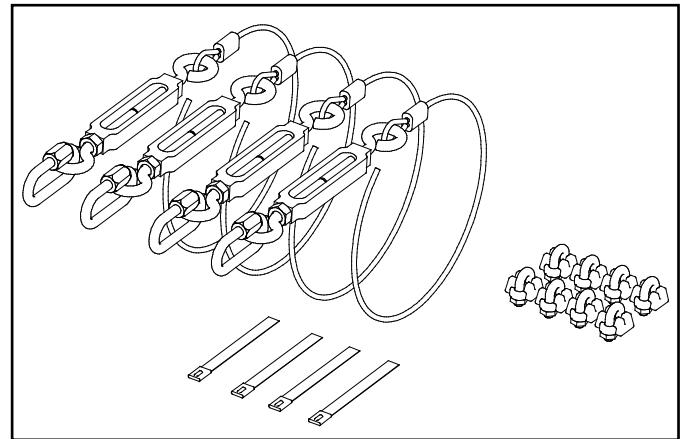
Mount – Blade



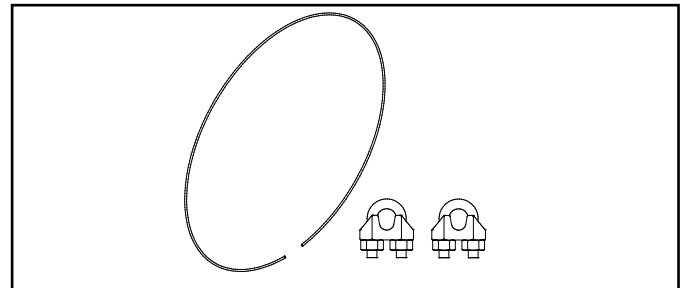
Mount – Fan cover



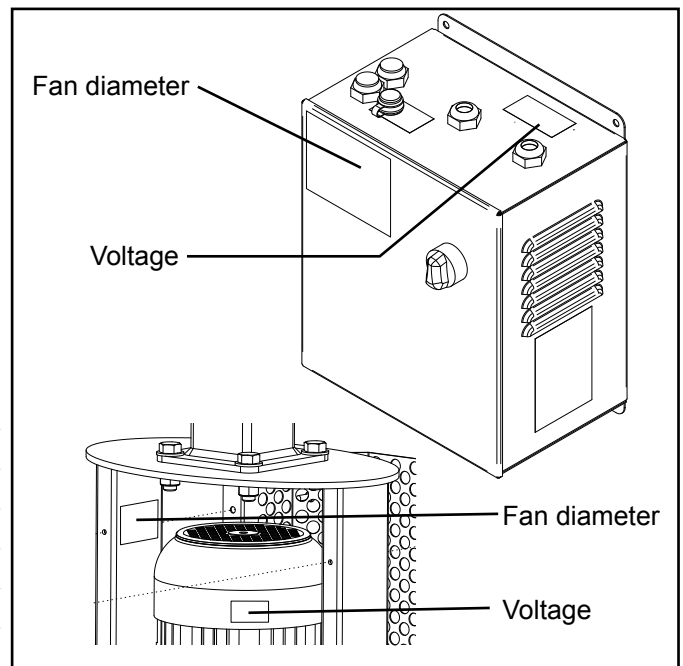
Guy wire assembly



Safety cable



Identification labels



Fastener torque requirements

| Description | Torque | Wrench size |
|---------------------------------|---------------|-----------------|
| 1/2 dia mount hardware | 44-48 ft-lbs. | 3/4 hex |
| 3/8 dia blade mount hardware | 24-28 ft-lbs. | 9/16 hex |
| 3/8 dia safety bracket hardware | 24-28 ft-lbs. | 9/16 hex |
| 1-3/4 dia hub retaining nut | 125 ft-lbs. | 1-3/4 hex |
| 1/2 dia hub cover fastener | 44-48 ft-lbs. | 3/4 hex |
| Cable clamp, guy wire | Secure tight | 1/4 nut driver |
| Cable clamp, safety cable | Secure tight | 5/16 nut driver |
| Motor cover fastener | Secure tight | 5/16 nut driver |

NOTE:

Additional spare hardware is provided as a courtesy.

FAN KIT

PACKING KIT (Standard)

1. Blade Box – 5 each
2. Fan Motor Box
 - a. Motor/gearbox assembly with covers.
 - b. Remote control panel with junction box.
 - c. Category 5e cable – 100 ft (blue)
 - d. Mounting hardware. See page 5.
 - e. VFD box.

PACKING KIT — iFAN (Networked)

See iFAN user's manual 6015948.

REQUIRED TOOLS

- Wrenches: 7/16, 9/16, 3/4 (x2), 1/2
- Sockets: 7/16, 1/2, 9/16, 3/4, 1-3/4
- Nut drivers: 1/4, 5/16
- Torque wrench: 15-60 Ft-lbs (for use with sockets)
- Wire strippers
- 1/4" cable cutter
- Tape measure
- Spirit level, short
- Gloves
- **For laminated wood beam installs, a drill and 1/2" dia. drill bit are required.**

NOTICE

PRIOR TO FAN INSTALLATION:

1. Ensure that the supplied voltage matches the fan voltage. A label containing voltage information specific to the individual fan is located on top of the VFD box.
2. Ensure blade length matches fan model size. See Fig. 1. Consult fan model designation located on the side of the fan powerhead frame.
3. Ensure all mounting hardware shown on page 5 is present.

FOR OPTIONAL IFAN NETWORK FANS ONLY

Ensure fan number matches network layout. Consult the round, network ID number label on shipping box.

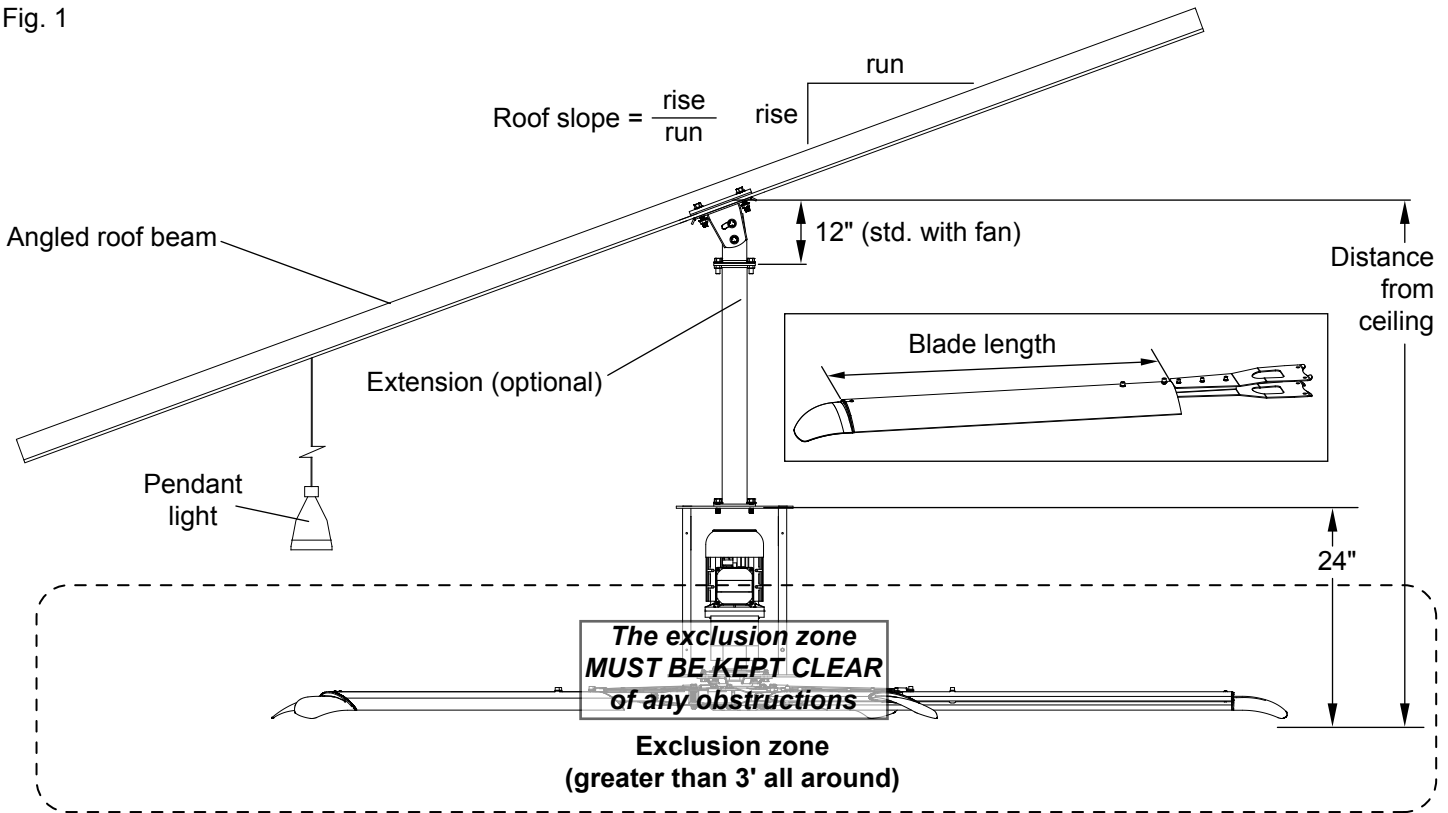
NATIONAL FIRE PROTECTION ASSOCIATION STANDARD

In accordance with NFPA 13 Standard from the National Fire Prevention Association as referenced in sections 12.1.4 and 11.1.7: High Volume Low Speed (HVLS) Fans: The installation of HVLS fans in buildings equipped with sprinklers, including ESFR sprinklers, shall comply with the following:

- The maximum fan diameter shall be 24 feet (7.3 m).
- The fan shall be approximately centered between four adjacent sprinklers.
- The vertical clearance from the fan to sprinkler deflector shall be a minimum of 3 feet (0.9 m).
- All fans shall be interlocked to shut down immediately upon receiving a water flow signal from the alarm system in accordance with the requirements of NFPA 72- National Fire Alarm and Signaling Code.

INSTALLATION CONSIDERATIONS

Fig. 1



ROOF SLOPE

| Roof Slope* | 0 | 2/12 | 3/12 | 4/12 | Hanging Weight (Lb) | Maximum Torque (Ft. Lb) | Blade length (In.) |
|-------------------|----------------------------|------|-------|-------|---------------------|-------------------------|--------------------|
| Roof Angle* | 0 | 9.5° | 14.0° | 18.4° | | | |
| Fan Diameter (Ft) | Distance from ceiling (Ft) | | | | | | |
| 6 | 4 | 4 | 4 | 4 | 140 | 300 | 25.0 |
| 8 | 4 | 4 | 4 | 4 | 160 | 300 | 27.5 |
| 10 | 4 | 4 | 5 | 6 | 181 | 300 | 39.5 |
| 12 | 5 | 5 | 6 | 7 | 190 | 300 | 51.5 |
| 14 | 5 | 7 | 7 | 8 | 194 | 300 | 63.5 |
| 16 | 6 | 8 | 9 | 10 | 208 | 300 | 75.5 |
| 18 | 6 | 9 | 10 | 10 | 203 | 300 | 87.5 |
| 20 | 7 | 10 | 11 | 12 | 220 | 300 | 99.5 |
| 24 | 7 | 11 | 12 | 13 | 258 | 300 | 123.5 |

*Consult factory for assistance with fan placement and extension selection.

NOTE:

For roof angles in excess of 20°, consult factory. The extension lengths shown are minimum recommendations only, based solely of roof pitch and fan diameter. Other considerations must be evaluated when determining extension requirements, such as placement of lights, sprinkler systems, HVAC systems, etc. In addition, OSHA requirements state that fan blades must be a minimum of 10' above the floor.

NOTE:

All fan blade parts must be greater than 3' from all obstructions including lights, cables, sprinklers and other building components and greater than one (1) fan diameter from any wall to center of fan.

INSTALLATION CONSIDERATIONS, continued

CLEARANCE FROM HVAC EQUIPMENT

For applications near HVAC equipment (diffusers, radiant heaters, exhaust fans, louvers, etc.), the HVLS fan must be installed at minimum distances.

- Fans located at or above HVAC equipment must have a minimum clearance of greater than or equal to 1 fan diameter. See Fig. 2.
- Fans located below HVAC equipment must have a minimum clearance of greater than or equal to 2 fan diameters. See Fig. 3.

Fig. 2

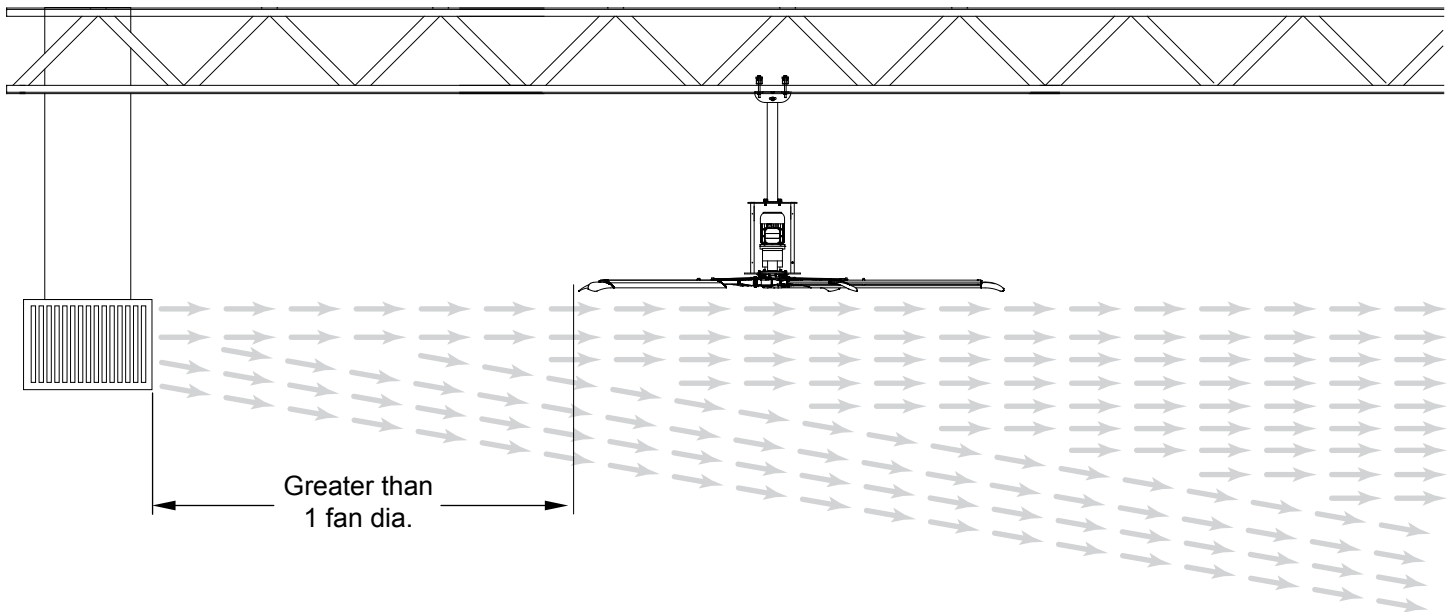
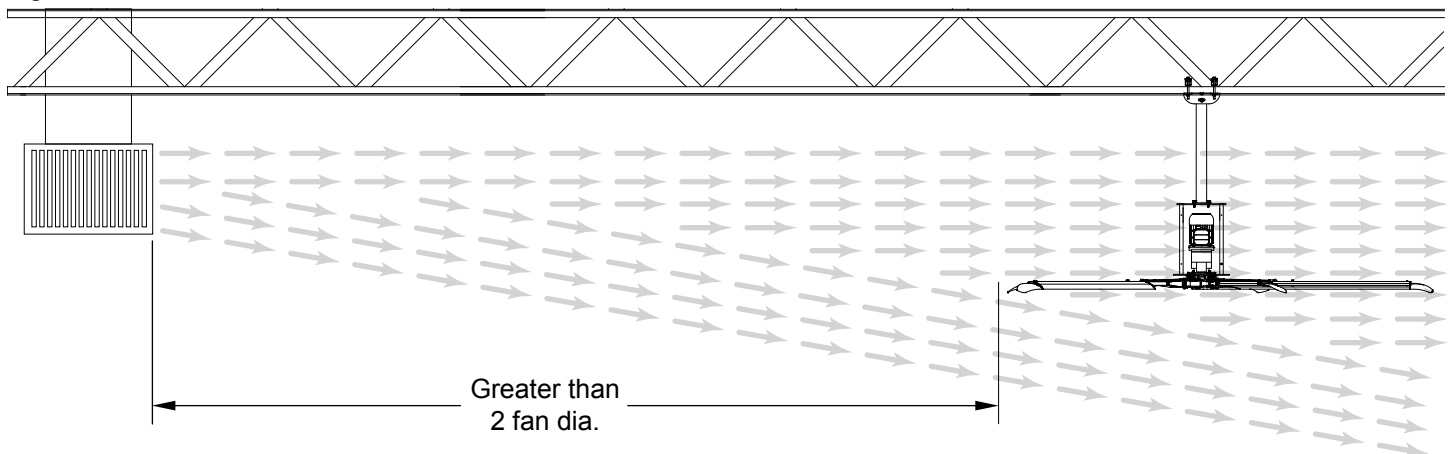


Fig. 3



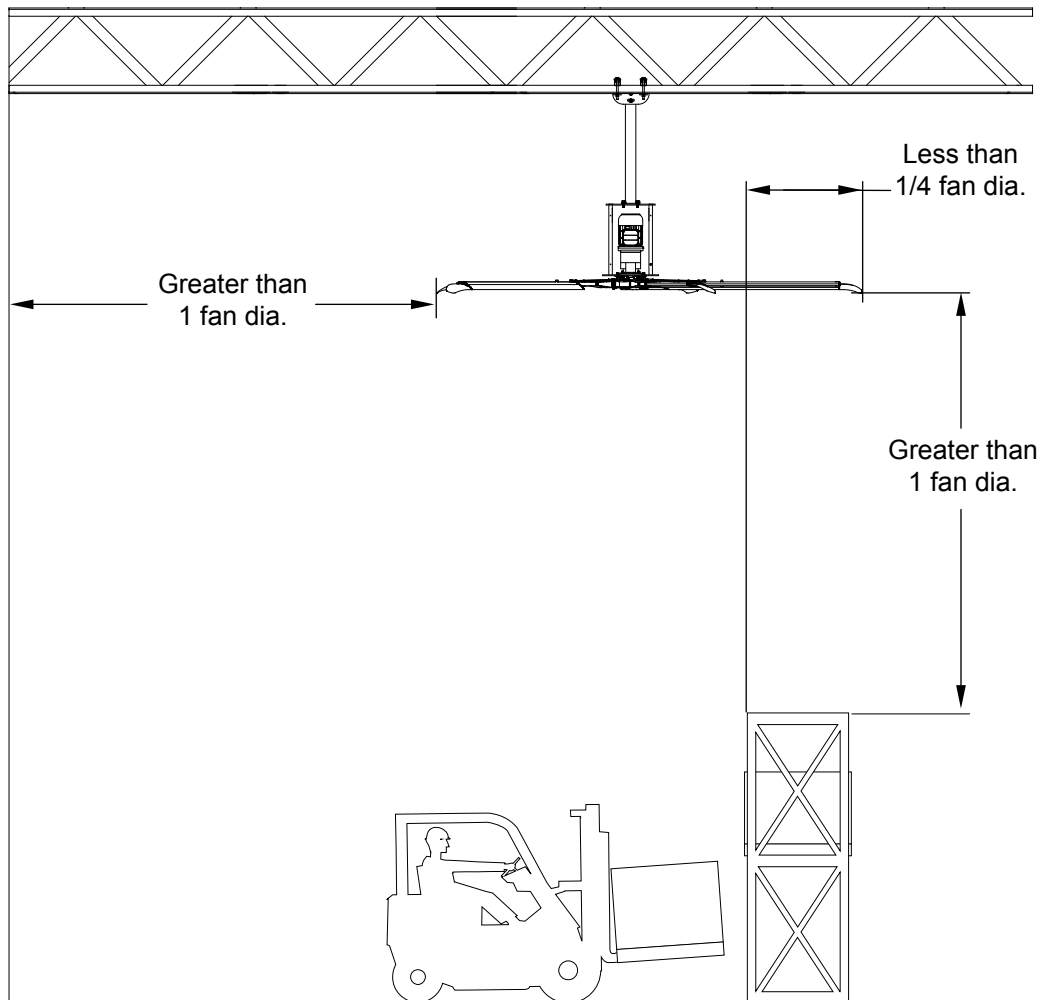
INSTALLATION CONSIDERATIONS, continued

CLEARANCE FROM SOLID OBSTRUCTIONS

For applications near solid obstructions the HVLS fan must be installed at minimum distances.

- Fans located above solid obstructions such as racks, walls, etc. must have a minimum vertical clearance of greater than or equal to 1 fan diameter above and less than or equal to 1/4 fan diameter inside the fan blade arc. See Fig. 3.

Fig. 4



INSTALLATION CONSIDERATIONS, continued

BUILDING STRUCTURE

For open structure roof designs, the fan should only be hung from either I-beam or angle iron. Do not hang from purlins, joists or truss structure.

For solid beam or laminated wood beam mounting, use the laminated wood beam mounting kit available from 4Front.

Consult a professional engineer or registered architect for specific mounting concerns.

Ensure fan blade clearance meets the requirements. See Fig. 1-4.

PLACEMENT AND SPACING

Consult your local distributor to help you plan the most efficient installation of your fans.

Ensure fan placement is such that the fans blades are a minimum of 10' from any manned working surface (floor or mezzanine)

Ensure fan blade does not extend into exclusion zone. Extensions are available if required. See Fig. 1.

Avoid mounting fans directly under lights or skylights to avoid visual strobing affect.

NOTE:

If the fan is part of a networked system, ensure placement is in accordance with the building layout. Fan network identification number is located on the front panel of the VFD box.

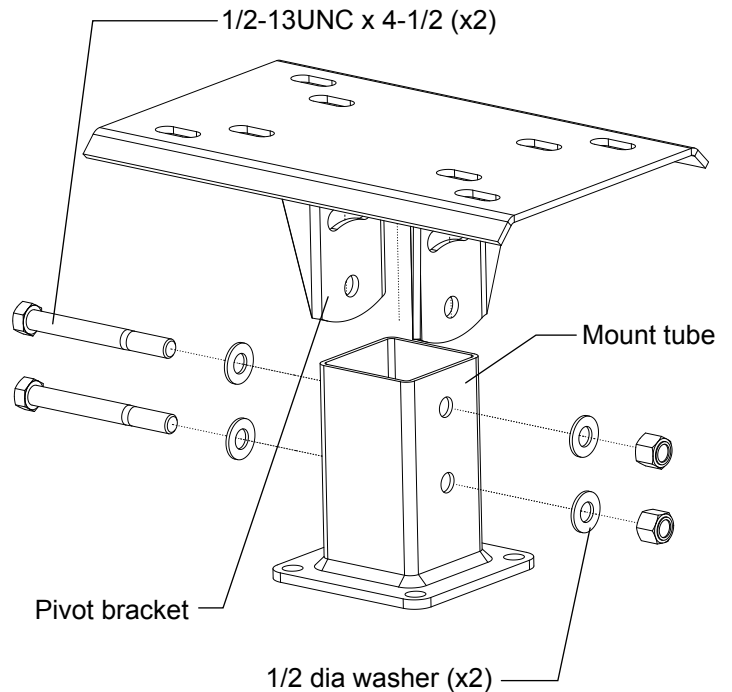
NOTE:

Be certain to comply with all local and national codes during installation.

NOTICE

For fans that will be subjected to high cross winds (open bay doors or air conditioning diffuser ducts) the fan must be at least one fan diameter (as measured from the end of the winglet) from open bays or A/C ducts mounted below the blade plane or there must be at least two fan diameters (as measured from the end of the winglet) for A/C ducts mounted at or above the blade plane.

Fig. 5



INSTALLATION

▲DANGER

Before installation, make certain that the power is disconnected and properly locked out.

FAN MOUNT ASSEMBLY

1. Fasten pivot brackets to the extension tube with ears outboard. Leave the 1/2" dia. x 4-1/2" bolts and nylock nuts finger tight. See Fig. 5.

INSTALL FAN MOUNT

STANDARD I-BEAM

1. Locate fan mount assembly on bottom of building support beam. Align mount assembly so that it is centered and square to the beam. Orient mount such that the pivoting axis is aligned with the building slope if required. See Fig. 3.
2. Install clamps. For thick flange I-beams add shims as required. Fasten using the supplied 1/2" dia x 2-1/2" screws, lock nuts and washers. Torque to 44-48 ft-lbs. See Fig. 7.

Fig. 6

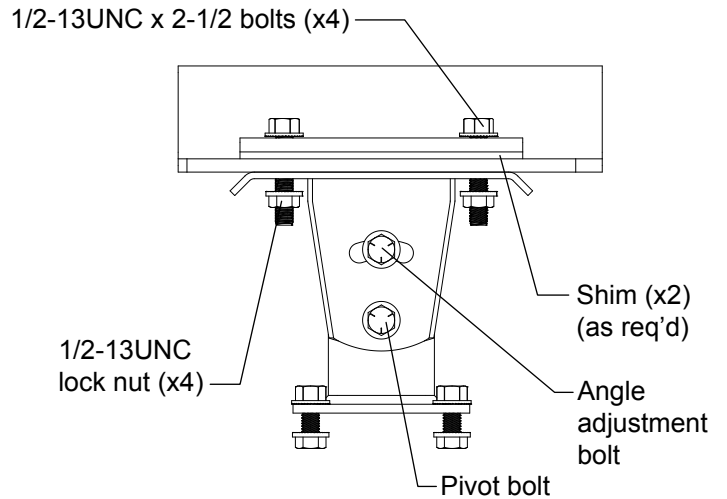
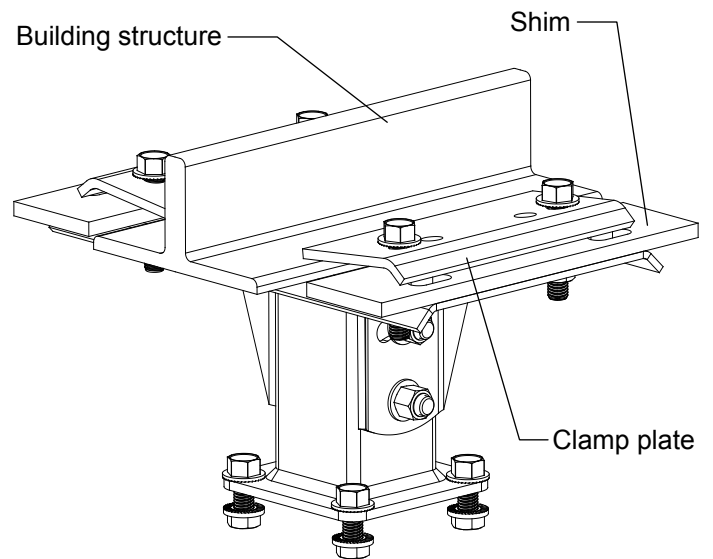


Fig. 7



INSTALLATION, continued

NOTICE

If building support beam is not level, ensure proper fan clearance using the mounting information shown on pages 7-9 or add mounting extensions as required to ensure clearance. See Fig. 1.

LAMINATED WOOD BEAM MOUNTING — (OPTIONAL KIT 6014915)

1. Attach laminated wood beam brackets to the wooden beam using a minimum of four 1/2" dia. grade 5 thru bolts and self-locking nuts (not supplied). Ensure brackets are square to the bottom of the beam.
2. Attach mount assembly to the laminated wood beam brackets using the supplied 1/2" dia x 2-1/2" screws, nylock lock nuts and washers. Torque to 44-48 ft-lbs. See Fig. 8.

TRUSS MOUNT

NOTE:

Do not span gaps longer than 72".

To span two trusses or purlins with a gap of 72" or less, span the gap using two 12 gage steel 1-5/8" x 1-5/8" strut channel. This will require additional hardware not included with the fan. Do not use strut channel clamps for any connections when mounting the fan.

Consult a professional engineer or registered architect for specific mounting concerns.

Fig. 8

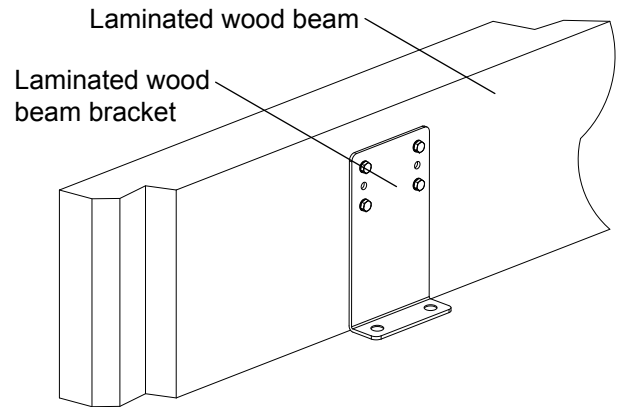


Fig. 9

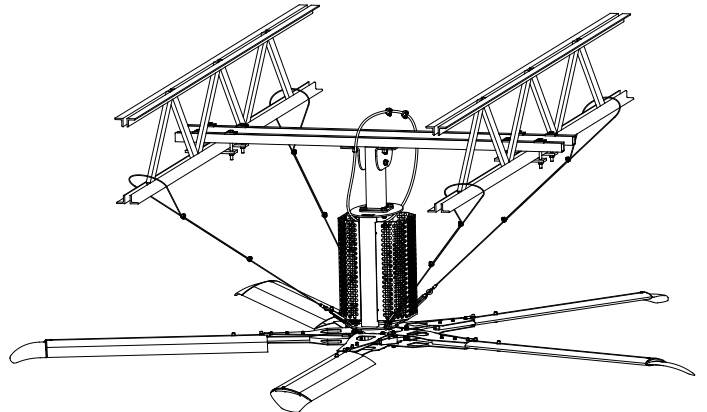
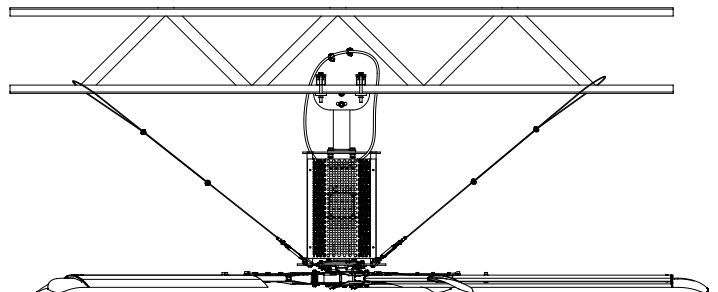


Fig. 10



INSTALLATION, continued

INSTALL POWERHEAD (MOTOR/GEARBOX ASSY)

1. Using a powered lift, orient the powerhead with the blade hub down. Block motor as required for installation using the bottom of the frame assembly. Do not support using the hub or hub cap.

NOTE:

Fan powerhead may be oriented as required for aesthetics or commonality.

2. Raise the powerhead up until it contacts the bottom of the fan mount assembly. See Fig. 1.
3. Immediately attach safety cable. See Fig. 13.
 - a. Slide two of the supplied 1/4" dia cable clamps over each end of the cable spaced 6" apart.
 - b. Slide the ends through the cable clamps.
 - c. Make sure that the cable goes through the motor frame. See Fig. 13.
 - e. Securely tighten the clamp fasteners. Make sure the u-bolts are over the free ends of the cable.
 - f. Ensure assembly does not interfere with fan motor housing.
4. Fasten the powerhead to the mount assembly using the supplied 1/2" dia x 1-1/4" bolts, self-locking nuts and washers. Torque to 44-48 ft-lbs. See Fig. 12.

NOTICE

If a mounting extension has been used, it may be necessary to obtain a longer cable from a local supplier.

Fig. 11

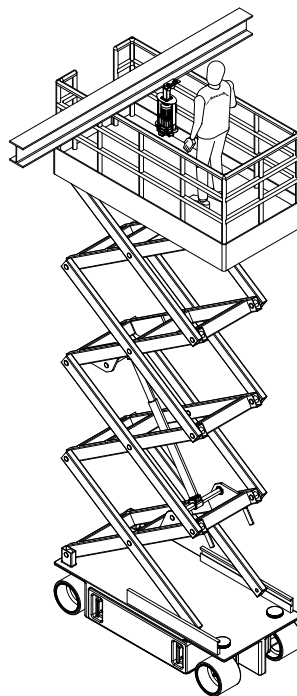


Fig. 12

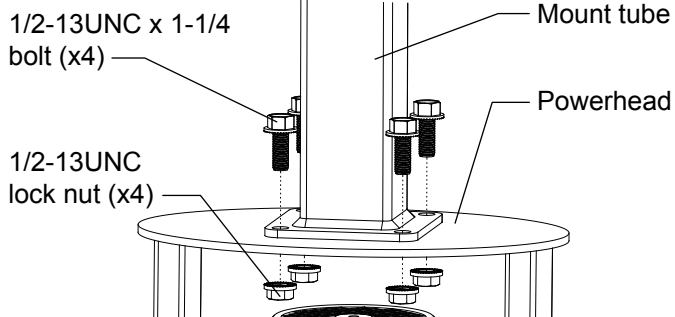
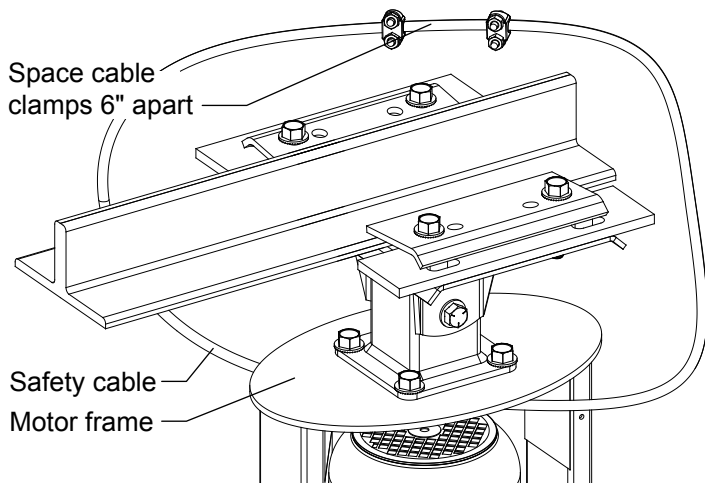


Fig. 13



INSTALLATION, continued

INSTALL GUY WIRES

Guy wires are designed to constrain lateral movement of the fan in operation. This movement may be due to impacts on the fan or winds impinging on the blades that would cause the fan to sway.

NOTICE

Failure to attach guy wires may result in loss of warranty.

⚠ WARNING

If a mounting extension has been used, ensure that the longer guy wires accompanying the extension are used. Ensure that the angle formed by the guy wire with the roof structure is less than 45°. See Fig. 15. Avoid any sharp edges or corners to reduce fatiguing and fraying of the guy wires. Failure to attach guy wires may result in severe injury or death.

1. Adjust turnbuckles to their longest position.
2. Attach the quick link with attached turnbuckle to the fan as shown. Repeat for all four quick links.
3. Attach one end of the guy wire to the building structure. Ensure the structure has sufficient strength to withstand the wire tension. Repeat for all four guy wires.
 - a. Slide two of the supplied 1/8" dia cable clamps over one end of the wire.
 - b. Feed that end of the wire through the building structure and back through the clamp fasteners.
 - c. Securely tighten the clamp fasteners so that it cannot slip. Make sure the u-bolts are over the free end of the cable.
4. Individually tighten the turn buckle on each cable until each cable is taut and the powerhead unit hangs plumb. Use a spirit level to verify powerhead unit hangs plumb.
5. Tighten pivot and angle adjustment bolts on fan mount. Torque to 44-48 ft-lbs. See Fig. 6.

Fig. 14

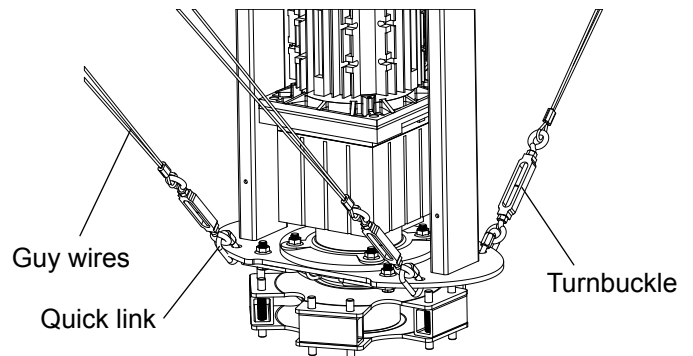
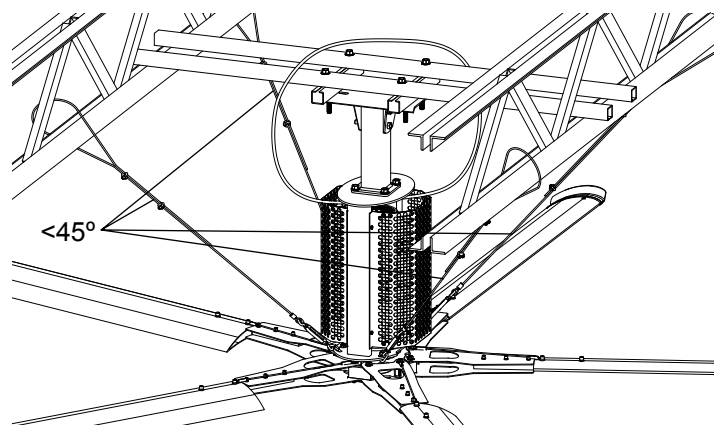


Fig. 15



INSTALLATION, continued

INSTALL BLADES

WARNING

To reduce the risk of personal injury, do not bend the blade brackets when installing the brackets or cleaning the fan. Do not insert foreign objects in between rotating fan blades.

NOTE:

Blade assemblies come pre-assembled from the factory. Do not attempt to disassemble.

1. The hub assembly has special blade retention lock nuts pre-assembled to it. Remove them now and use them to mount the blade assemblies in the steps below. Use only the factory supplied lock nuts provided for blade mounting.
2. With the blade oriented such that the blade retention lanyard is on top and positioned so that the lanyard ends are aligned toward one another, support the blade assembly from below, orient and guide the assembly onto the top attachment studs on the hub assembly. Spread the strut arms slightly onto the upper studs as shown. Angle the blade upward as needed to slide blade onto studs. See Fig. 16.
3. Still supporting the blade assembly, rotate the blade assembly down as shown and allow the bottom blade strut to ride up and over the bottom attachment studs on the hub assembly. See Fig. 17.

NOTICE

Do not lean on blade. Damage to strut may occur.

4. Install blade retention lock nuts. Ensure blade lanyard is assembled onto trailing edge stud. Hand tighten nuts ensuring strut arms are firmly pressing against hub. Torque blade retention nuts to 24-28 ft-lbs. See Fig. 18.
5. Repeat for each blade assembly.

GEARBOX VENT PLUG

1. Locate ventilation plug on gearbox. See Fig. 19.
2. Pull and remove plastic shipping brace and discard.

Fig. 16

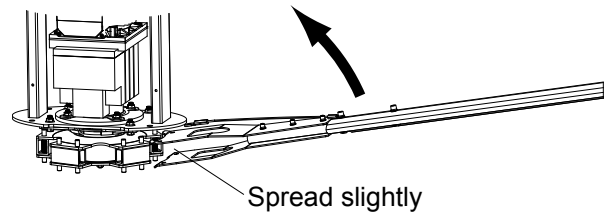


Fig. 17

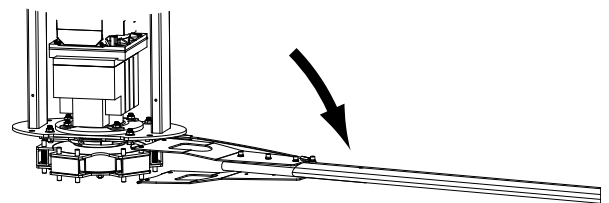


Fig. 18

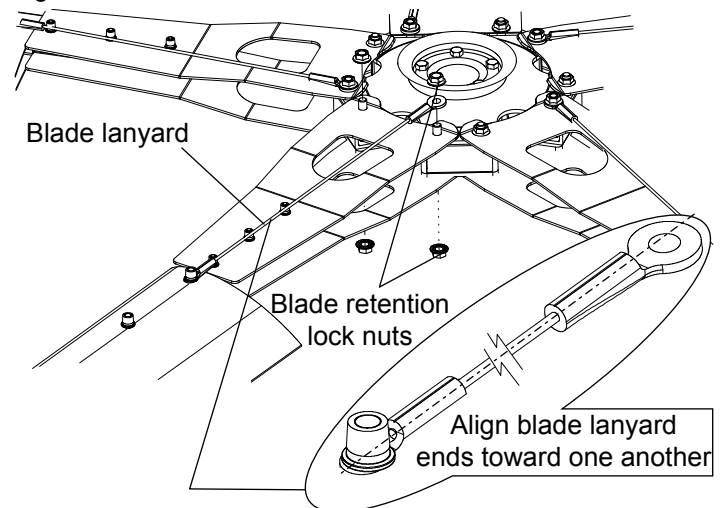
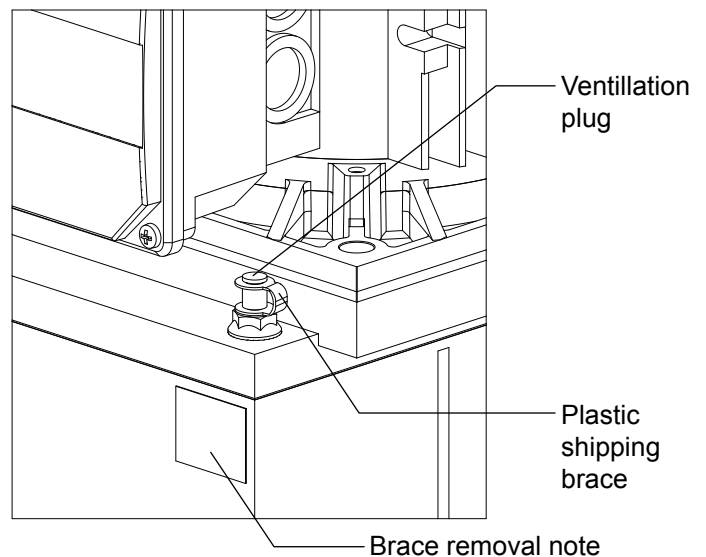


Fig. 19



INSTALLATION, continued

3. Remove orange brace removal note and discard.

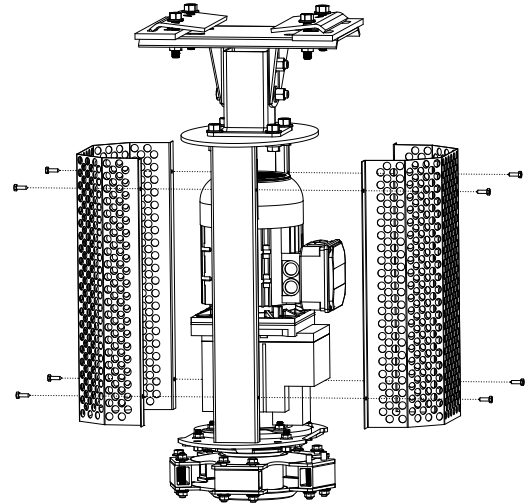
Fig. 20

INSTALL MOTOR COVER

1. Ensure that the motor SO cable has been routed to VFD box and is secured. See electrical installation instructions.
2. Locate each motor cover and install the cover fasteners. Do not overtighten. See Fig. 20.

VERIFY CLEARANCE AND CABLE TENSION

1. Rotate fan by hand and observe clearance of each blade with closest obstruction. If necessary, reposition fan. Blade tips droop when not in operation and rise when in operation. Reference chart on page 7 for min. clearance.
2. Verify guy wire tension by attempting to move powerhead in any horizontal direction. If movement is detected, re-tension guy wires.
3. Lock the individual turnbuckles using the stop nut on each and secure it with the turnbuckle strap. See Fig. 21.

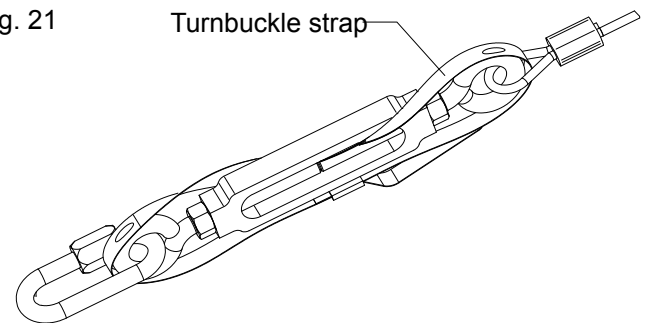


ELECTRICAL INSTALLATION

⚠ DANGER

Before doing any electrical work, make certain the power is disconnected and properly locked or tagged off. Failure to do so may result in death or serious injury. All electrical troubleshooting and repair must be done by a qualified technician and meet all applicable codes. Do not route control wiring for any other device through the control box. Ensure that the voltage and phase of the incoming power agrees with the label located on top of the VFD box and fan. Be certain power is off when wiring to the control box. Failure to do so could result in electrical shock, death or serious injury.

Fig. 21



STANDARD UNITS

NOTE:

Reference wiring diagrams on pages 35-39 for all field connections.

NOTICE

Do not over-torque mounting screws. Damage to display screen may occur if mounting screws are over-torqued. It is the installer's responsibility to torque properly.

INSTALL VFD BOX

⚠ WARNING

The VFD box must be installed outside and a safe distance from the blade diameter for service purposes.

NOTICE

Verify voltage and phase before mounting. Ensure voltage shown on VFD box is correct.

- Mount VFD box outside the fan blade arc. Orient box such that front panel is accessible and visible with the connectors on top of the panel.
- Route the fan S.O. cable from the fan to the VFD box. Ensure the cable is supported throughout its routing.
- Route supply power from the building source to the VFD box.
- Wire VFD box in accordance with electrical schematics located on pages 35-37.
- Attach remote signal (blue) CAT5e cable.

INSTALL REMOTE CONTROL

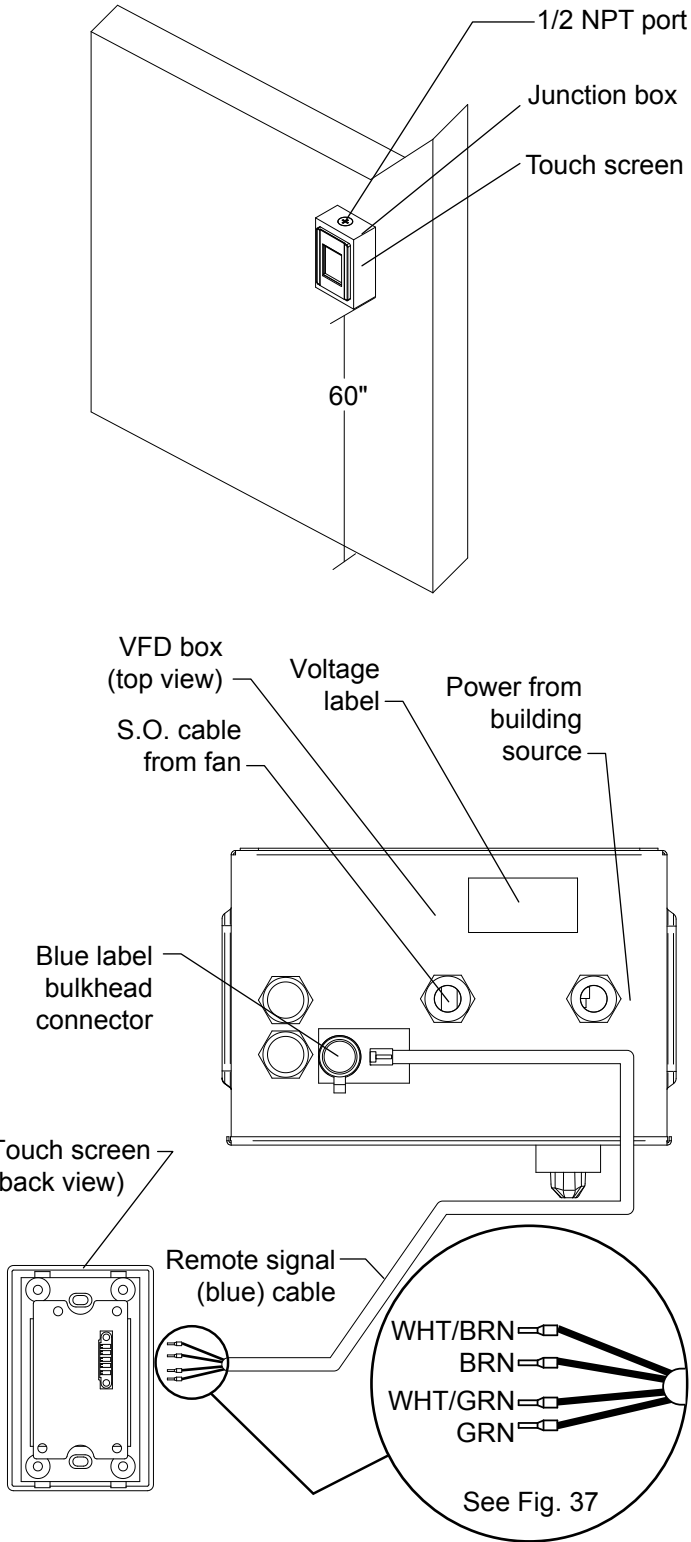
- Mount touch screen remote to factory supplied junction box inside building 60" above the floor as close to the fan assembly as practical. Direct line of sight is preferred. See Fig 22.

NOTE:

Blue CAT5e cable has terminated ferrules at the remote end. PROTECT these ferrules during cable routing.

- Route the remote signal (blue) cable (6015651) from the top of the VFD box, through the hole in the factory supplied junction box and wire the 4 leads of the remote signal (blue) cable to the orange connector of the touch screen remote control. Excess blue cable length should be neatly coiled and secured near VFD box.

Fig. 22



INSTALLATION, continued

3. Mount the touch screen to the junction box using the fasteners provided.

NOTE:

DO NOT over-torque the mounting screws. Damage to the display screen is possible. It is the installer's responsibility to torque properly.

NOTE:

For cable runs exceeding 1000', consult factory.

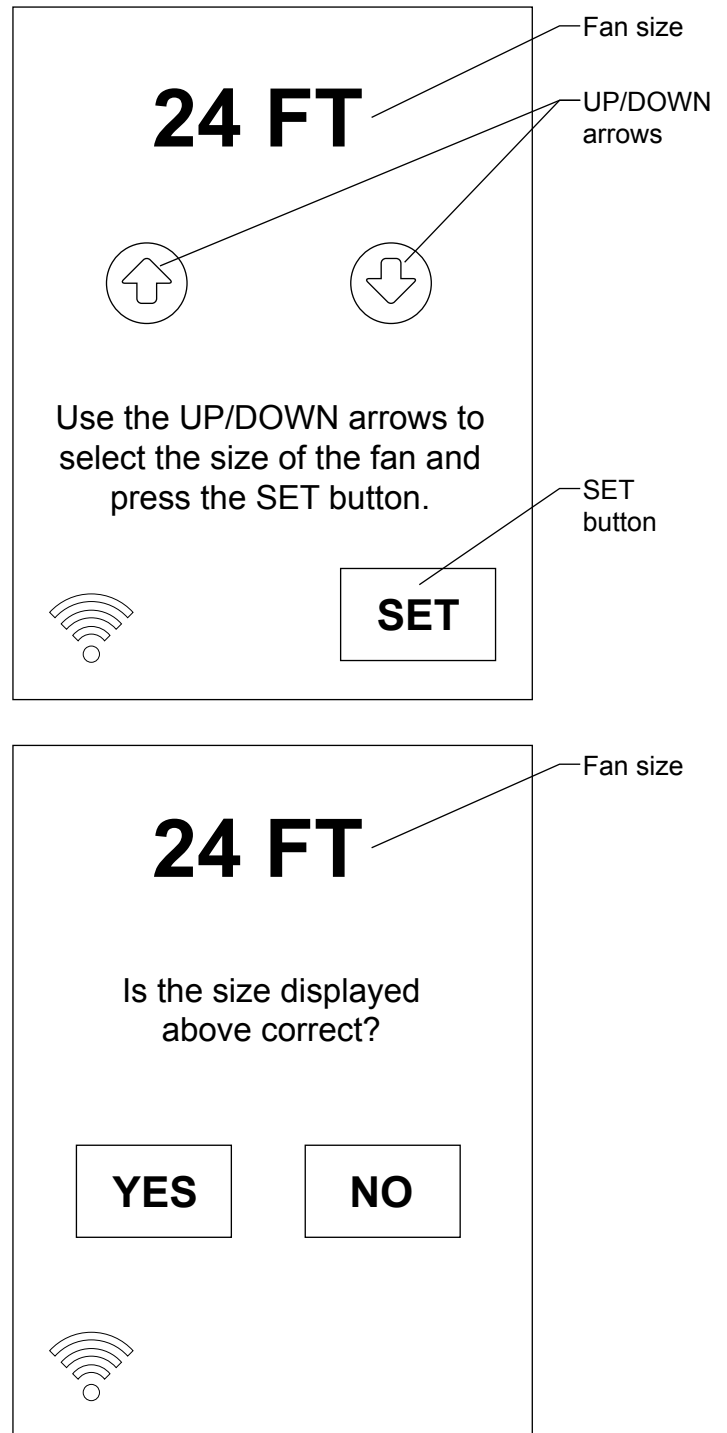
VERIFY OPERATION — STANDARD INSTALLATION

Once installation is complete, the initial view of the touchscreen control will prompt the installer to set and confirm the fan size. Use the **UP/DOWN** arrows to select the size of the fan and press the **SET** button. Ensure selected size matches the size specified on the label on the front of the VFD box. If it matches select the **YES** button on the following confirmation screen, if it differs, select the **NO** button and try again. See Fig. 23.

Operate the industrial fan following the operating instructions beginning on page 21. Check for proper rotation direction, stability and noise level.

Train authorized personnel how to use the industrial fan using the operating procedures located on pages 21-27 in this manual.

Fig. 23



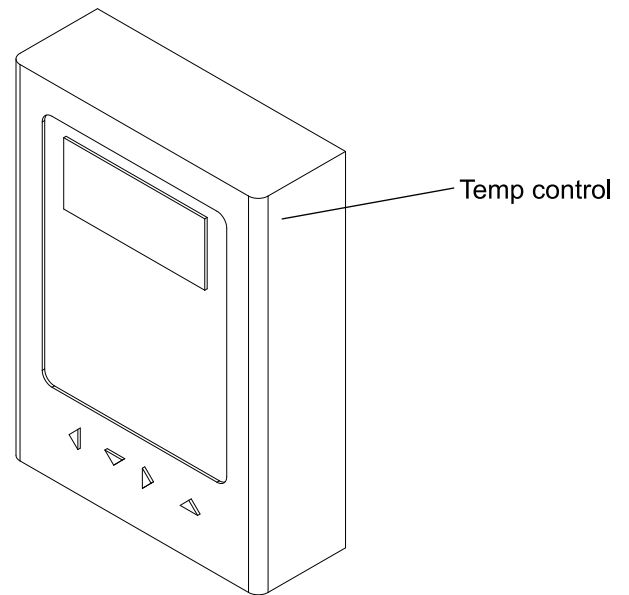
TEMPERATURE CONTROL — OPTIONAL

1. Mount temperature control unit to the factory supplied junction box inside building 60" above the floor and within 1000' of the fan touch screen remote. See Fig. 22 and wiring details on page 38.

NOTE:

FOR OPTIONAL NETWORKED UNITS, SEE SEPARATE MANUAL 6015948.

Fig. 24



COMPONENTS AND SPECIFICATIONS

VFD BOX – NEMA 1, Solid State VFD (Variable Frequency Drive), 120VAC 1PH, 208-240VAC 1PH, 208–480 VAC, 3PH, line reactor (where required), Class CC fuses, UL and UL-C listed panel and components. Power disconnect.

MOTOR

NEMA standard T.E.F.C., 1-2 HP, continuous duty single or three phase

GEARBOX

Double helical gear reduced, sealed lubrication.

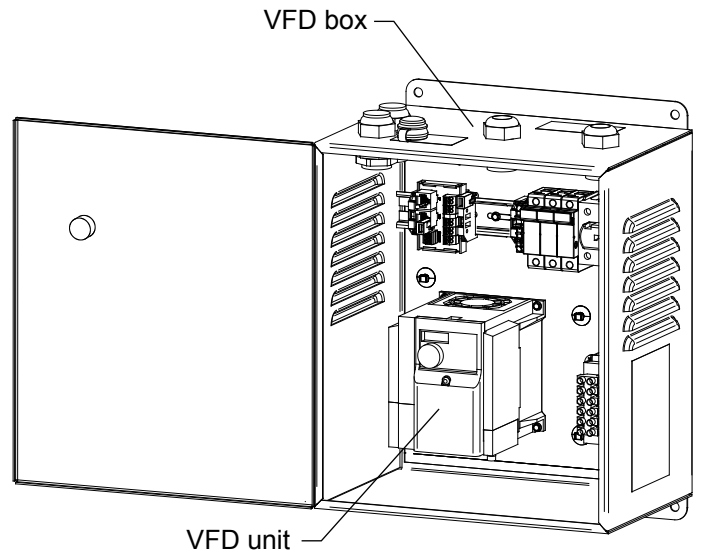
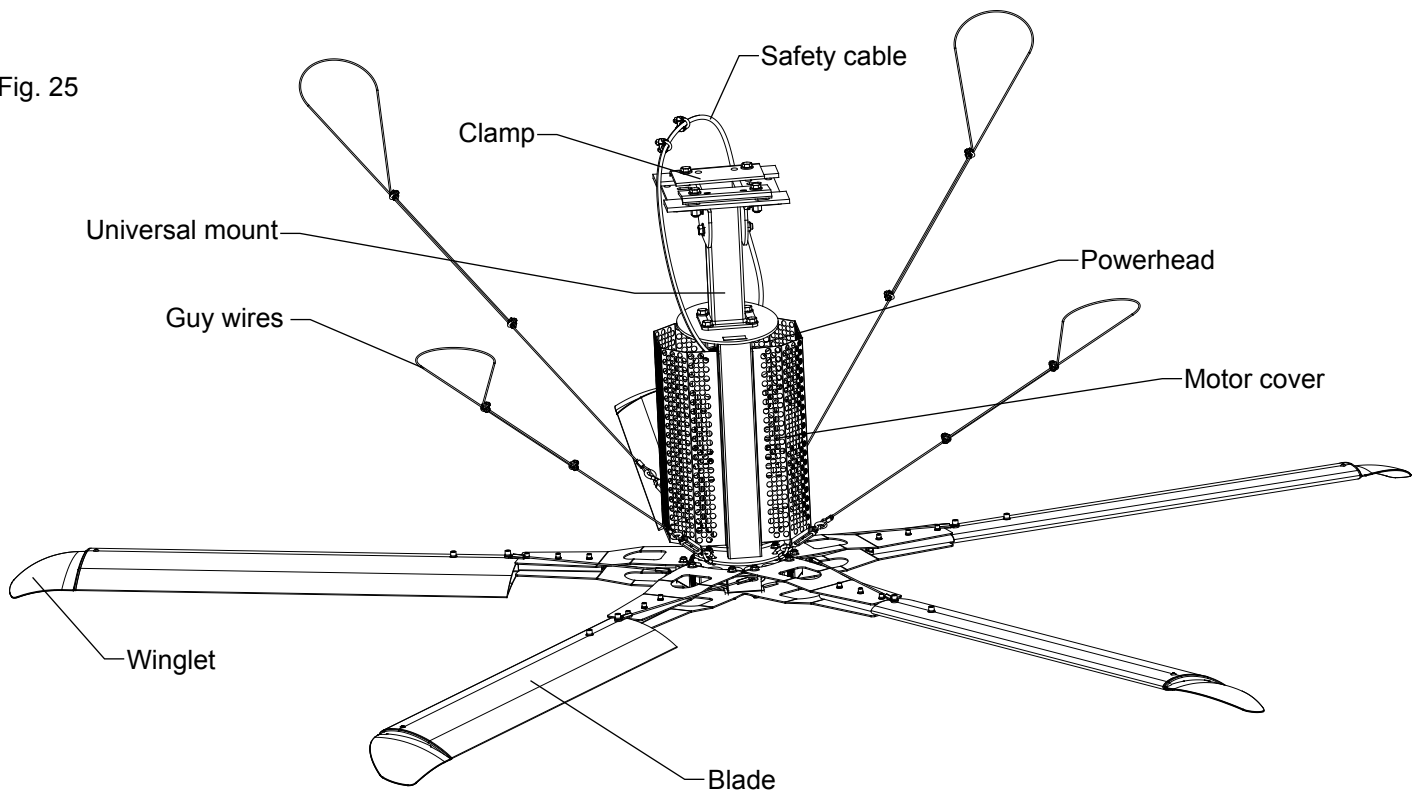


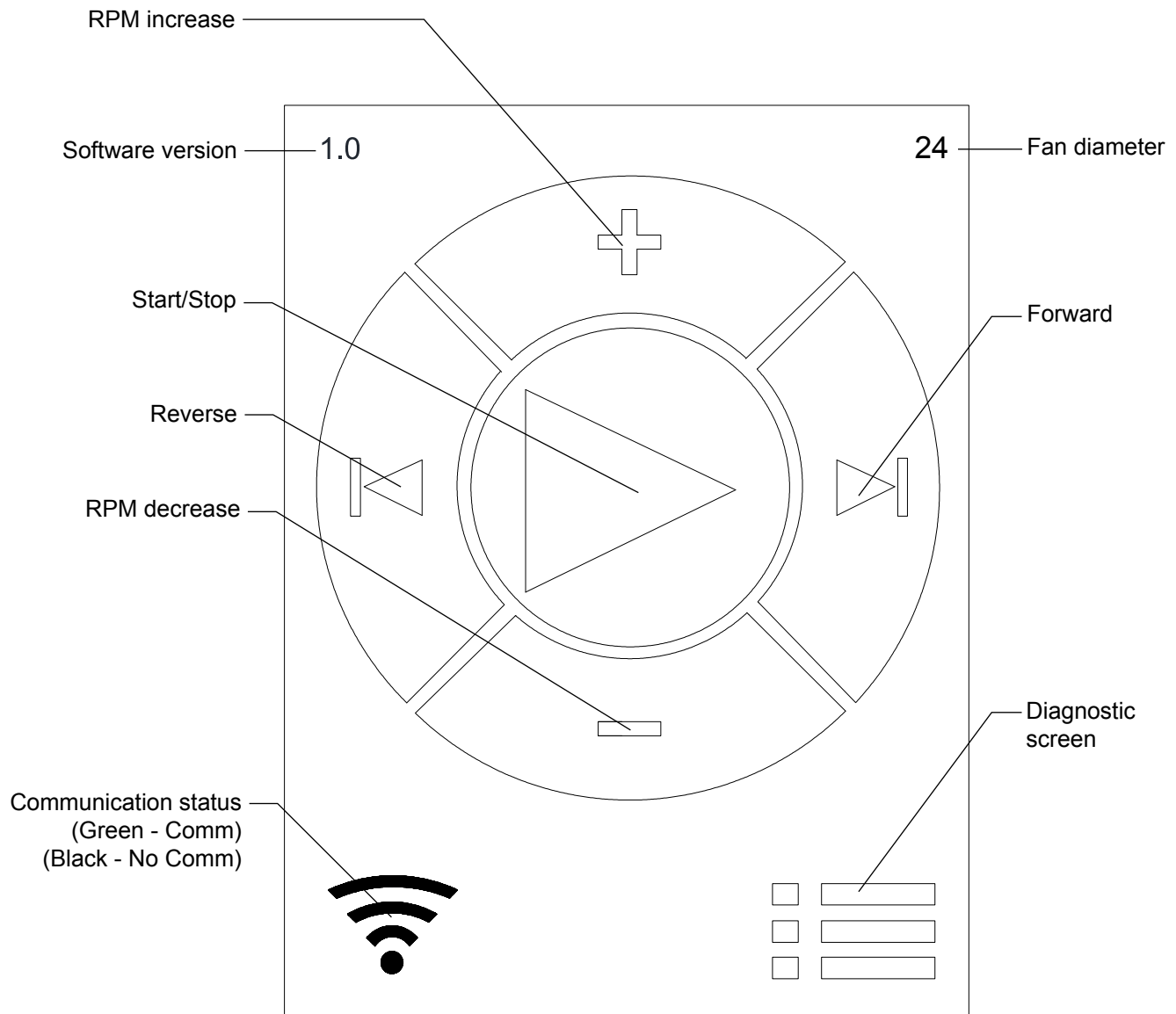
Fig. 25



OPERATING INSTRUCTIONS

Fig. 26

FAN CONTROL SCREEN



OPERATING INSTRUCTIONS, continued

⚠ WARNING

Before operating the industrial fan, read and follow the Safety Practices, Warnings and Operating Instructions in this manual. Use by untrained personnel could result in death or serious injury.

VERIFY PRIOR TO OPERATION

1. Voltage/phase.
2. Obstruction clearance.
3. Safety cables present and properly installed.
4. All fasteners are properly torqued.

STARTING THE FAN

Visually inspect the fan to ensure that there are no obstructions or personnel in the movement area.

LOGIN SCREEN

If the password has been enabled, you must log in before operating the fan.

NOTE:

Default password: 1111

NORMAL OPERATION

1. Verify normal communication — the communication status symbol in bottom lefthand corner will be green.
2. Set desired speed by pressing either **RPM increase** or **RPM decrease** until desired speed is displayed. Maximum speed is 10, minimum speed is 1. See Fig. 27.
3. Select fan direction by selecting either **Forward** or **Reverse**.

CHANGING DIRECTION

1. Select either **Forward** or **Reverse**. It is not necessary to stop the fan first.

DIAGNOSTIC SCREEN

The diagnostic screen (see Fig. 28) contains:

Service Provider information. Contact this provider for all fan service issues.

Fan Information:

- VFD serial number
- Fan power/voltage
- Motor Speed (x10)
- Motor Current (x10)
- Drive Status

Password Protection

Fig. 27

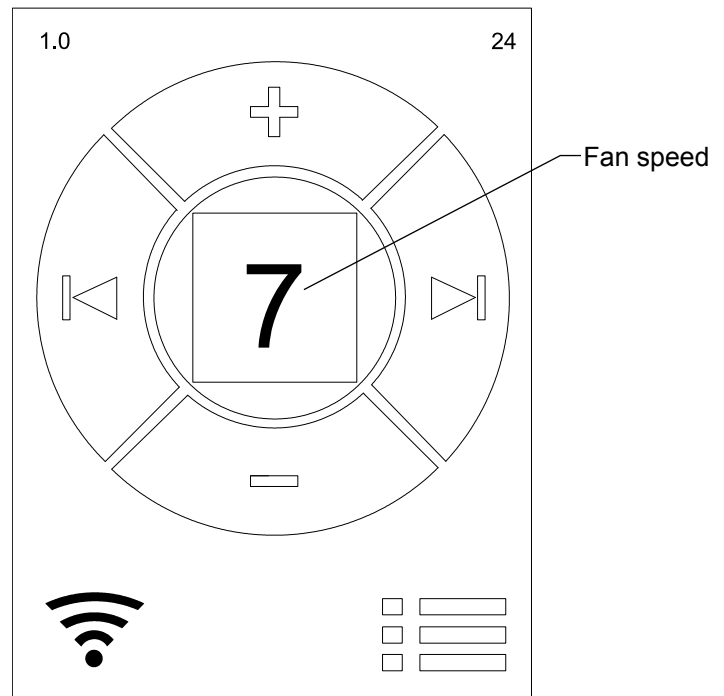
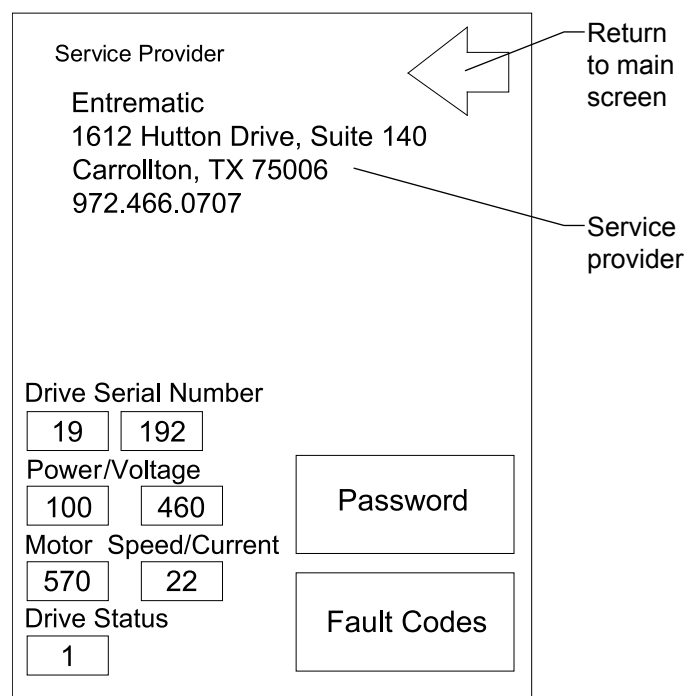


Fig. 28



OPERATING INSTRUCTIONS, continued

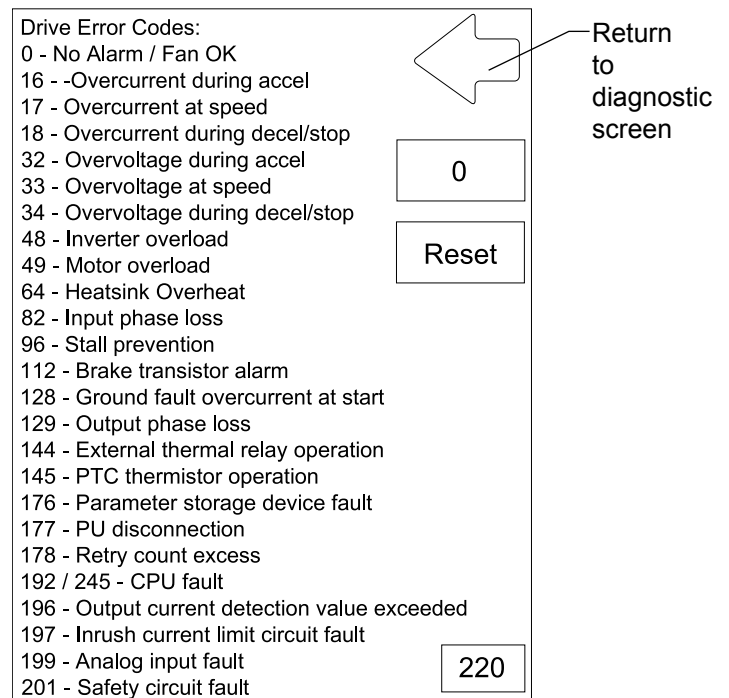
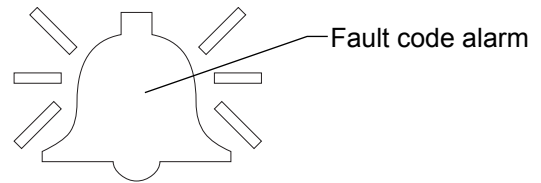
FAULT CODES

If a fault code alarm appears, select the **Fault Codes** button to display the fault codes,.

To navigate back to the main screen, Select the green return arrow.

The fault code screen will display the current fault code number and gives a description of each fault code. If the fan is currently under fault, the error code being displayed in the box under the green arrow will be displaying a number that caused the fault. Match the number with the error codes and remove the fault condition. Once the condition has been removed, pressing the reset button will reset the fan and allow operation again. Note that the error code will still be displayed in the box as it will continue to display the most recent fault. Finally, the green arrow in the upper right corner will navigate back to the diagnostic screen. See Fig. 29.

Fig. 29



Drive Error Codes:

- 0 - No Alarm / Fan OK
- 16 - -Overcurrent during accel
- 17 - Overcurrent at speed
- 18 - Overcurrent during decel/stop
- 32 - Overvoltage during accel
- 33 - Overvoltage at speed
- 34 - Overvoltage during decel/stop
- 48 - Inverter overload
- 49 - Motor overload
- 64 - Heatsink Overheat
- 82 - Input phase loss
- 96 - Stall prevention
- 112 - Brake transistor alarm
- 128 - Ground fault overcurrent at start
- 129 - Output phase loss
- 144 - External thermal relay operation
- 145 - PTC thermistor operation
- 176 - Parameter storage device fault
- 177 - PU disconnection
- 178 - Retry count excess
- 192 / 245 - CPU fault
- 196 - Output current detection value exceeded
- 197 - Inrush current limit circuit fault
- 199 - Analog input fault
- 201 - Safety circuit fault

Return to diagnostic screen

0

Reset

220

OPERATING INSTRUCTIONS, continued

PASSWORD PROTECTION

The remote is capable of password protection to prevent unauthorized use.

1. Press the **diagnostic screen** button from the main screen.
2. Press the **Password** button on the diagnostic screen.

NOTE:

If the password has already been previously customized, enter it now. If not, the default password: 1111

On the password screen, the options are to enable the password, disable the password and change the password. By default, the password is not enabled.

To enable password, ensure the **Password On** box is checked.

To disable password, ensure the **Password On** box is unchecked.

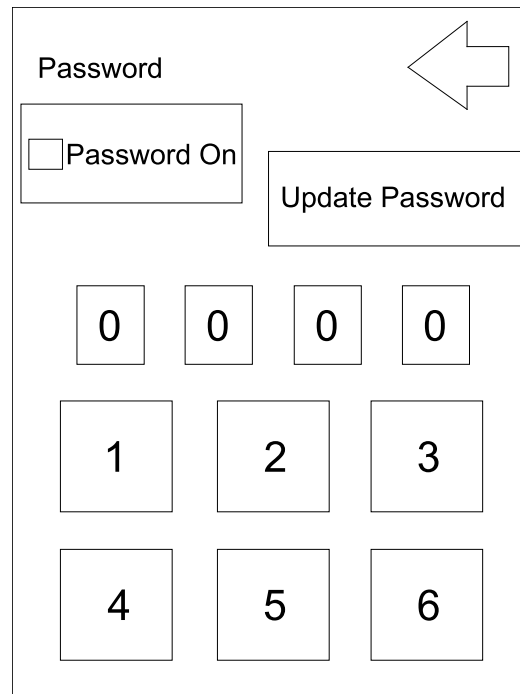
UPDATING PASSWORD

1. Enter the desired password using the numeric keypad.
2. Press the **Update Password** button. See Fig. 30.

NOTE:

When the password is enabled, the unit will automatically log out after 2 minutes. To return to diagnostic screen, select green return arrow.

Fig. 30



OPERATING INSTRUCTIONS, continued

TEMPERATURE CONTROL (OPTIONAL)

1. To enable the temperature control, cycle through START/STOP/TEMP control and check the box for temp control. When in temp control mode, a thermometer icon will appear on the display. See Fig. 31.
2. Enter a temperature at which to start the fan automatically. At this value the fan will start at speed 2.
3. Enter a value to increment the temperature for the next speed setting. This value is added to the start temperature from step 2 to set the temperature at which the fan will switch to speed 4, 6 and 8. For example: if 70° is entered for the start temperature and 3 is entered for the increment then the fan will start at speed 2 at 70° degrees and switch to speed 4 at 73° degrees and switch to speed 6 at 76° degrees and so on.
4. The fan will decrease in speed as the temperature decreases until it goes below the start point. Once the temperature is below the start temperature minus the increment temperature the fan will stop on its own.
5. To disable the temperature control, cycle through START/STOP/TEMP control and uncheck the box for temp control. Disabling temperature control will allow the fan to be controlled from the keypad on the main screen.
6. The user can select between fahrenheit and celsius units by checking or unchecking the celsius check box. See Fig. 32.

Fig. 31

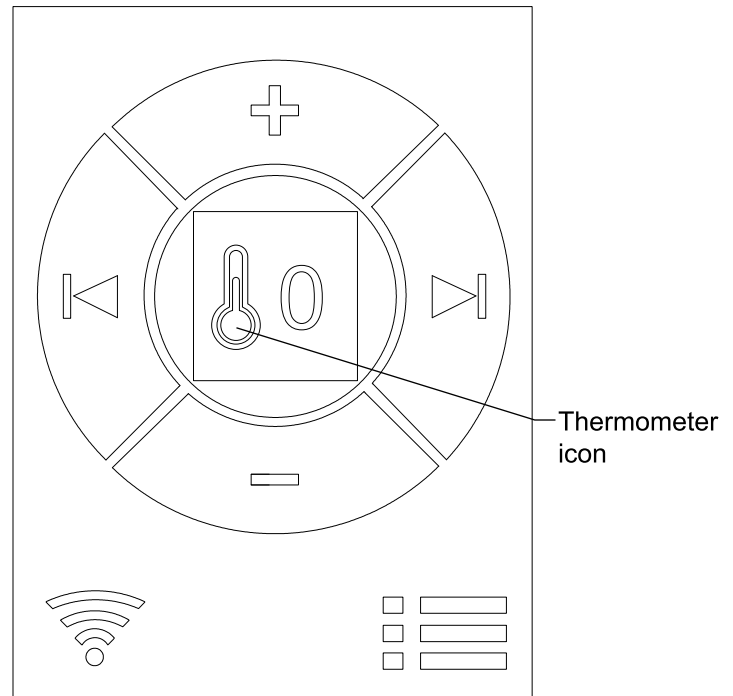
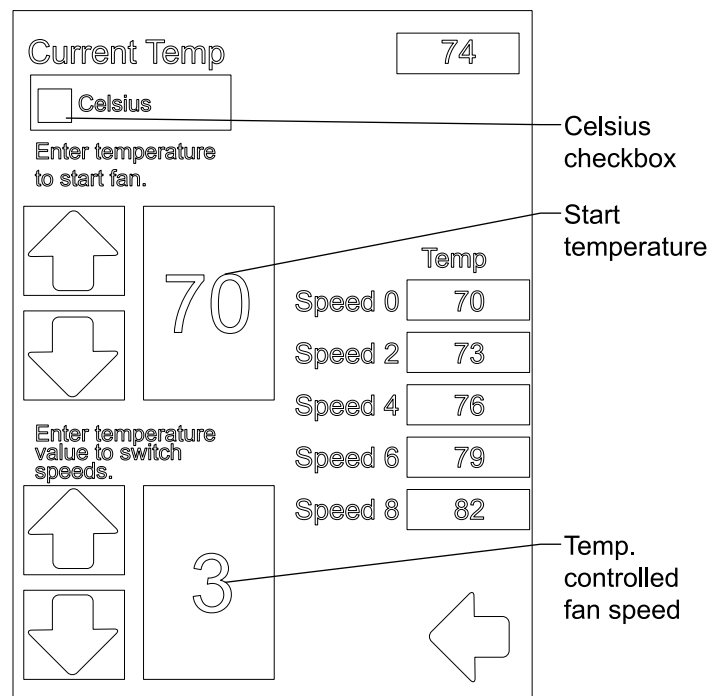


Fig. 32



OPERATING INSTRUCTIONS, continued

MULTI FAN CONTROL — OPTIONAL

MULTI FAN CONTROL SETUP

The multi fan control is a special program that allows user to control 2 to 4 fans with one remote. When the multi fan control touchscreen is installed, the initial setup screen will automatically display on the screen. Perform the following steps:

1. Select the quantity of fans to be controlled by the touchscreen. See Fig. 33.
2. Push SET button to confirm fan quantity to go to the verification screen. See Fig. 33.
3. Verify the fan numbers and press YES to return to the main screen or select NO to try again.

NOTE:

The initial view of the touchscreen control will prompt the installer to set and confirm the fan size for each individual fan. The Fan# is displayed on the top left corner. Use the UP/DOWN arrows to select the size of the fan and press the SET button. See Fig. 34. Ensure selected size matches the size specified on the label on the front of the VFD box. If it matches select the YES button on the following confirmation screen, if it differs, select the NO button and try again. Once the fan size is set, it will return to the main screen. Then click on the Fan# on the bottom of the screen to go to the next Fan number and set the fan size for next fan.

Fig. 33

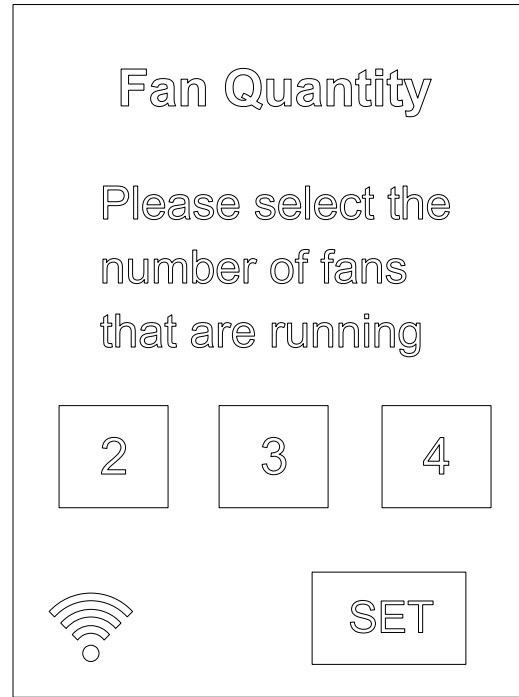
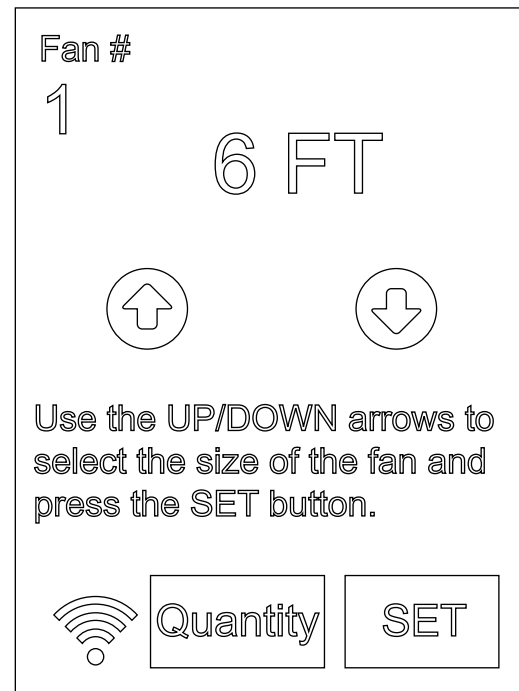


Fig. 34

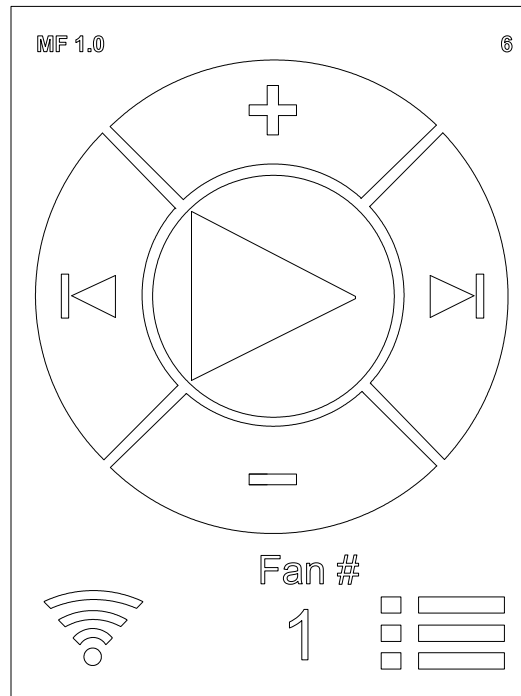


OPERATING INSTRUCTIONS, continued

MULTI FAN CONTROL OPERATION

1. Press Fan# to select the fan that you would like to control.
2. The communication status on the bottom left corner will be Green if the fan is communicating.
3. Depending on the Fan Quantity that was set. The Fan# can be cycled through from 1 to the set fan quantity and then ALL which allows user to control all fans at one time.

Fig. 35



PLANNED MAINTENANCE

⚠ DANGER

Before service, inspection, or cleaning make certain that the power is disconnected and properly locked out.

⚠ WARNING

Before servicing the industrial fan, read and follow the Safety Practices on page 3 and the Operation section in this manual. Failure to do so could result in death or serious injury.

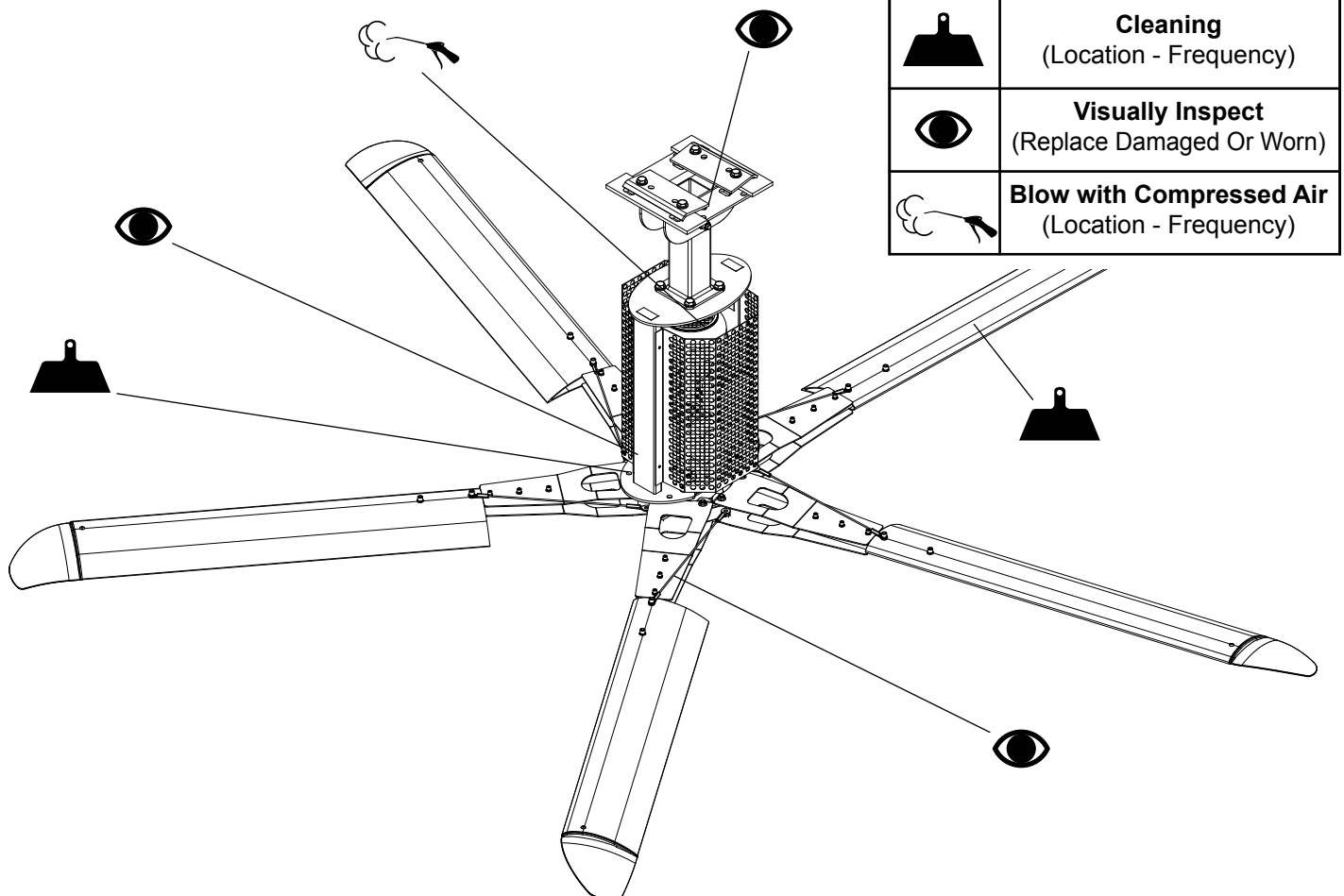
To ensure the continued proper operation of your industrial fan, perform the following planned maintenance procedures.

ANNUALLY

1. Inspect control panel for loose connections. Tighten as required.

2. Using dry air (shop air), blow out debris from fan motor cooling fan as required.
3. Inspect motor/gearbox for oil leaks. If present, consult distributor.
4. Inspect mounting hardware and tighten as required. Torque to 44–48 ft-lbs.
5. Inspect safety and guy wires for chaffing or wear. Ensure turnbuckle nut is secure. Replace as required.
6. Inspect guy wires for tension. Re-tighten as required.
7. Clean fan blades as required. Use a soft dry cloth. If necessary, use a mild detergent to clean surfaces. Do not use harsh cleansers.

Fig. 36



TROUBLESHOOTING GUIDE

⚠ WARNING

Before servicing the industrial fan, read and follow the Safety Practices on page 3 and the Operation section in this manual. Failure to do so could result in death or serious injury.

The functions of the industrial fan are controlled by a VFD (Variable Frequency Drive). Error codes are displayed on the touch screen Fault code screen. See table on page 31 for VFD diagnostics.

Use the Troubleshooting Guide if the industrial fan fails to perform properly. Find the condition that most closely matches your situation and make the recommended adjustments.

⚠ DANGER

Before service, inspection, or cleaning make certain that the power is disconnected and properly locked out. Before doing any electrical work, make certain the power is disconnected and properly locked or tagged off. Failure to do so may result in death or serious injury. All electrical troubleshooting and repair must be done by a qualified technician and meet all applicable codes. Do not route control wiring for any other device through the control box. Ensure that the voltage and phase of the incoming power agrees with the label located on top of the VFD box and fan. Be certain power is off when wiring to the control box. Failure to do so could result in electrical shock, death or serious injury.

| Problem | Possible Cause | Solution |
|---|---|---|
| 1. Fan does not operate. | a) No power to control panel. b) Primary fuse(s) blown. | a) Ensure that the disconnect is in the ON position. Check for primary power at terminals b) Replace fuse(s) |
| 2. Fan does not operate. Control panel has power. | a) Obstructions preventing movement. b) Remote not properly connected c) VFD faulted. d) Faulty fire jumper block. | a) Check fan unit, ensure there are no obstructions preventing movement. b) Check connections between remote/VFD. c) Check for VFD fault. Check fault code action - reset drive. (power OFF/power ON) d) Verify property DRIVE STATUS=64. If not, inspect jumper block on VFD box. |
| 3. Fan operating, but turning in wrong direction. | a) Wire sequence. b) Intermittent connectivity inside remote control panel. | a) Switch two phases of the output wiring from the VFD to the motor. b) Make sure the connections inside the remote control touchscreen are secure. |
| 4. Fan operating, but generating high pitched whine. | a) Incorrect PWM frequency set. | a) Consult authorized 4Front® distributor. |
| 5. Fan operating, but shows excessive wobble. | a) Guy wires not tensioned properly. b) Winglet missing. | a) Re-tension guy wires in accordance with the installation instructions on page 16. b) Replace winglet. |
| 6. Fan generating a ticking noise, tick increases with speed. | a) Blades bolts not properly tightened. b) Fenner nut is loose. (item 21 on page 44) | a) Loosen the the blade nuts. Support the blade level (horizontally) before torquing the bolts to 24-28 ft-lbs. b) Check interference between hub and frame, adjust and re-tighten the fenner nut as required |

TROUBLESHOOTING GUIDE, continued

FAN DIAGNOSTIC TROUBLESHOOTING WITH OPTIONAL DIAGNOSTIC TOOL — 6015747

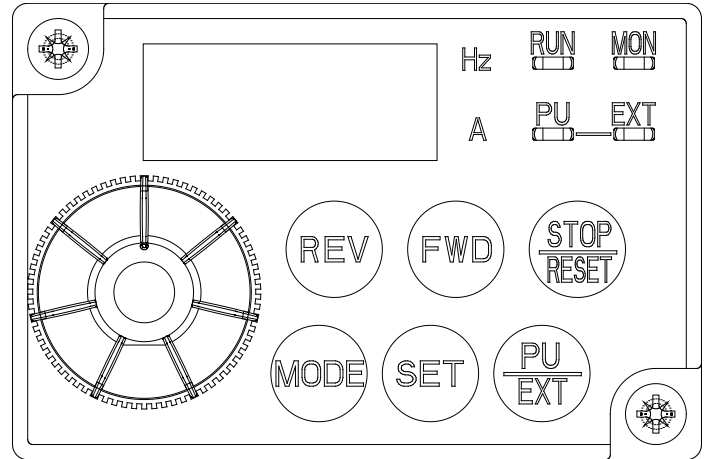
Fig. 37

NOTE:

Touch screen must be disconnected for diagnostic remote to function and a cable must be used to connect the diagnostics tool to the VFD.

If the fan is not running, the current error code will be displayed on the screen. Consult the **VFD Fault Code** section of this manual to identify the issue.

If the fan is running the screen will be in **MONITOR** mode. **MONITOR** mode default display is VFD frequency output. It will also show motor current and motor voltage. Press the **SET** key to switch from one to another.



SERIAL NUMBER

1. Press the **MODE** key to switch from **MONITOR** mode to **PARAMETER** mode.
2. The display should be reading P.888. If it is not, turn the rotary dial until the display reads P.888.
3. Press the **SET** key. The display is now the first 3 digits of the serial number.
4. Press the **SET** key again and the display will show P.889. If it is not, turn the rotary dial until the display reads P.889.
5. Press the **SET** key. The display is now the last 4 digits of the serial number.
6. Press the **MODE** key to switch from **PARAMETER** mode to **MONITOR** mode. A red LED will illuminate under **MON** when in **MONITOR** mode.

ERROR HISTORY

1. Press the **MODE** key to switch from **MONITOR** mode to **ERROR** display. **E---** will be displayed.
2. Turn the rotary dial to scroll the errors. The error displayed with the . after the **E** is the most recent error.
3. Press the **MODE** key to switch from **PARAMETER** mode to **MONITOR** mode. A red LED will illuminate under **MON** when in **MONITOR** mode.

VARIABLE FREQUENCY DRIVE (VFD) – FAULT CODES

These codes will be shown on the VFD diagnostic device screen.

Fig. 38

| Operation Panel Indication | | Name |
|----------------------------|-------------------------|---|
| Error message | <i>E---</i> | E--- Faults history |
| | <i>HOLd</i> | HOLD Operation panel lock |
| | <i>LOCd</i> | LOCD Password locked |
| | <i>Er 1 to Er 4</i> | Er1 to 4 Parameter write error |
| | <i>Err.</i> | Err. Inverter reset |
| Warning | <i>OL</i> | OL Stall prevention (overcurrent) |
| | <i>oL</i> | oL Stall prevention (overvoltage) |
| | <i>rb</i> | RB Regenerative brake pre-alarm |
| | <i>rH</i> | TH Electronic thermal relay function pre-alarm |
| | <i>PS</i> | PS PU stop |
| | <i>MT</i> | MT Maintenance signal output |
| | <i>UV</i> | UV Undervoltage |
| | <i>SA</i> | SA Safety stop |
| | Alarm | <i>F_n</i> |
| Fault | <i>E.O.C1</i> | E.O.C1 Overcurrent trip during acceleration |
| | <i>E.O.C2</i> | E.O.C2 Overcurrent trip during constant speed |
| | <i>E.O.C3</i> | E.O.C3 Overcurrent trip during deceleration or stop |
| | <i>E.O.V1</i> | E.O.V1 Regenerative overvoltage trip during acceleration |
| | <i>E.O.V2</i> | E.O.V2 Regenerative overvoltage trip during constant speed |
| | <i>E.O.V3</i> | E.O.V3 Regenerative overvoltage trip during deceleration or stop |
| | <i>E.T.HT</i> | E.THT Inverter overload trip (electronic thermal O/L relay function) |
| | <i>E.T.HM</i> | E.THM Motor overload trip (electronic thermal O/L relay function) |
| | <i>E.FI_n</i> | E.FIN Heatsink overheat |

| Operation Panel Indication | | Name |
|----------------------------|-----------------|---|
| <i>E.I.LF</i> | E.I.LF * | Input phase loss |
| <i>E.O.LT</i> | E.O.LT | Stall prevention stop |
| <i>E. bE</i> | E. BE | Brake transistor alarm detection |
| <i>E. GF</i> | E.GF | Output side earth (ground) fault overcurrent at start |
| <i>E. LF</i> | E.LF | Output phase loss |
| <i>E.O.HT</i> | E.OHT | External thermal relay operation |
| <i>E.PTC</i> | E.PTC* | PTC thermistor operation |
| <i>E. PE</i> | E.PE | Parameter storage device fault |
| <i>E.PUE</i> | E.PUE | PU disconnection |
| <i>E.r.ET</i> | E.RET | Retry count excess |
| <i>E. S</i> | E.5 | CPU fault |
| <i>E.CPU</i> | E.CPU | |
| <i>E.CDO</i> | E.CDO* | Output current detection value exceeded |
| <i>E.I.OH</i> | E.I.OH * | Inrush current limit circuit fault |
| <i>E.A.IE</i> | E.A.IE * | Analog input fault |
| <i>E.SAF</i> | E.SAF * | Safety circuit fault |

FIRE CONTROL SYSTEM FAN SHUTDOWN — OPTIONAL

This fan includes a fire alarm jumper for a building fire control systems option that allows the fan to be shut-down by the fire control system in case of a fire emergency.

Fig. 39

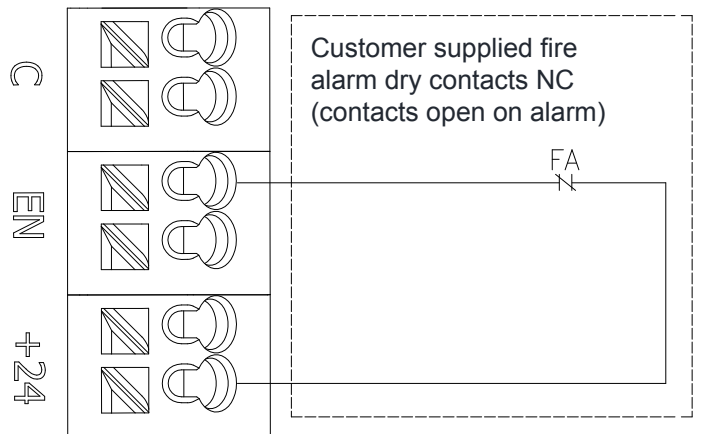
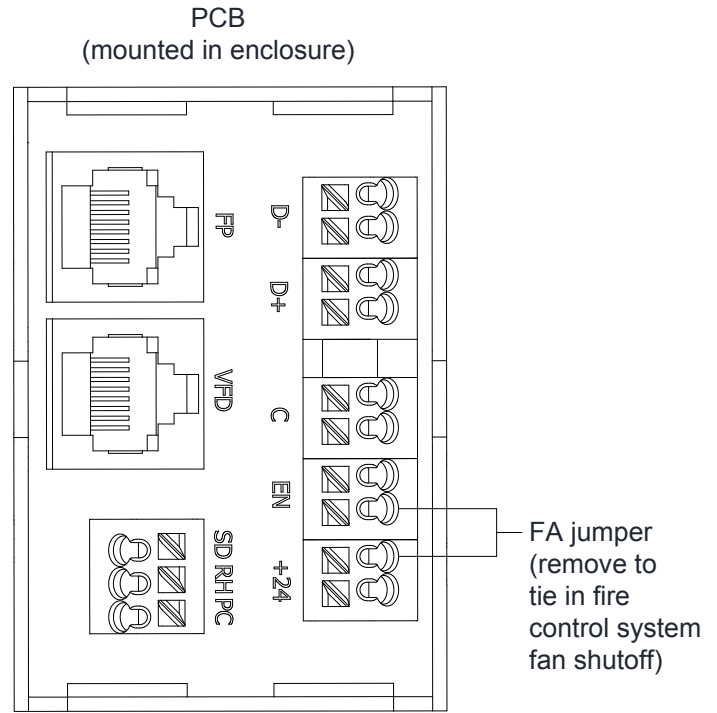
NOTE:

Ensure that the fire alarm jumper is in place or the building fire control system is connected and jumper removed.

1. The normally closed (NC) contacts must be dry contacts. They open in the event of an active fire alarm.
2. The fire control system fan shutdown option is not enabled when shipped. To enable the fire control system fan shutdown option, remove the jumper between enable (EN) and (24) and replace with a set of dry, normally closed contacts. See schematics for optional Fire Control Panels on pages 33 and 34.
3. To test the fire control system fan shutdown operation remove the wire from the NC contact at the building fire control panel. The fan should coast to a stop. See Fig. 39.

NOTICE

If the jumper is left installed the fan will not shut down due to fire control system contacts.



FIRE CONTROL SYSTEM FAN SHUTDOWN — OPTIONAL, continued

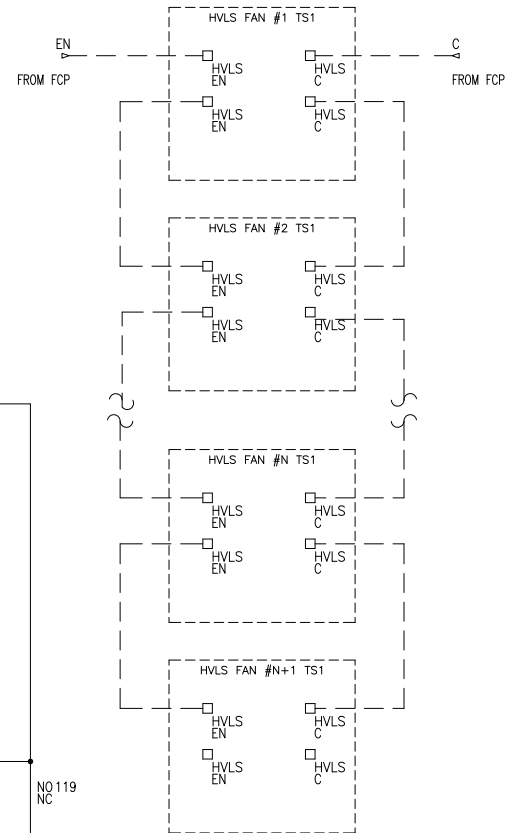
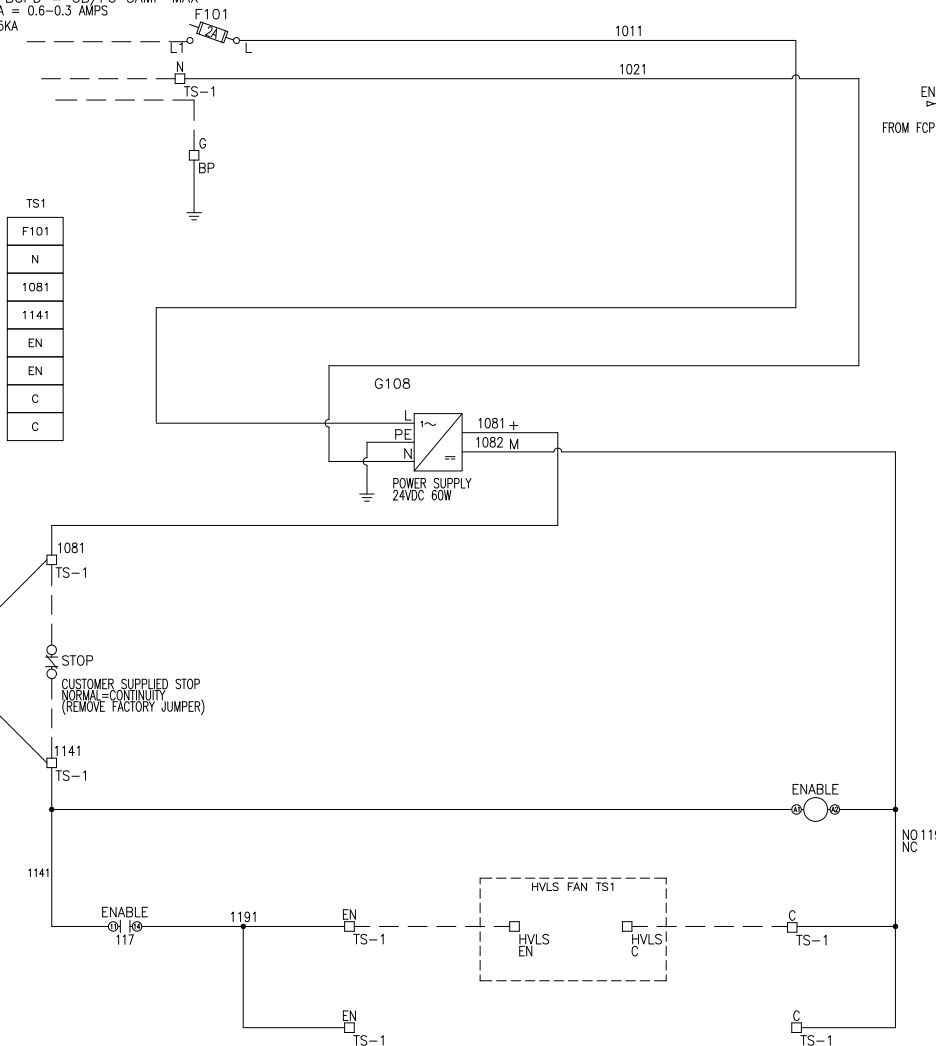
Fig. 40

FIRE CONTROL SYSTEM FAN SHUTDOWN PANEL — STANDARD INSTALLATION (6015291)

100–250V/1PH/60HZ

INCOMING SERVICE TO BE TERMINATED AT DISCONNECT
 CB/FU TO BE SUPPLIED BY OTHERS
 SUPPLY BCPD = CB/FU 5AMP MAX
 PANEL FLA = 0.6–0.3 AMPS
 SCCR = 5KA

TYPICAL INSTALLATION



LEGEND

— PANEL WIRING
 - - - FIELD WIRING (BY OTHERS SEE NOTE 1)

NOTE:
 TERMINALS WILL ACCEPT STRANDED
 WIRE ONLY

WIRE COLOR/GAUGE (NFPA)

(unless otherwise specified)
 208–600VAC: #14, BLK
 120VAC: #16, RED
 24VAC: #16, RED/BLK
 NEUTRAL: #16, WHT
 GROUND: GRN
 24VDC: #18, BLU
 24V COM (OVDC): #18, BLU/WHT
 12VAC/VDC: #18, VIO
 12V COM: #18, VIO/WHT
 DRY (UNPOWERED): #18, YLW

1. FIELD TERMINAL WIRING: 60 / 75 DEGREE WIRE, MIN 16AWG FOR SIGNAL WIRING, MIN 14AWG FOR INCOMING POWER, SEE CHART IN PANEL FOR TORQUE REQUIREMENTS
2. THE CONTACTS SHOULD BE CLOSED WHEN THERE IS NO ALARM (THE RELAY WILL BE ON WHEN NO ALARM).

▲ DANGER

Before doing any electrical work, make certain the power is disconnected and properly locked or tagged off. Failure to do so may result in death or serious injury. All electrical troubleshooting and repair must be done by a qualified technician and meet all applicable codes. Do not route control wiring for any other device through this control box. Ensure that the voltage and phase of the incoming power agrees with the label located on top of the VFD box and fan. Be certain power is off when wiring to the control box. Failure to do so could result in electrical shock, death or serious injury.

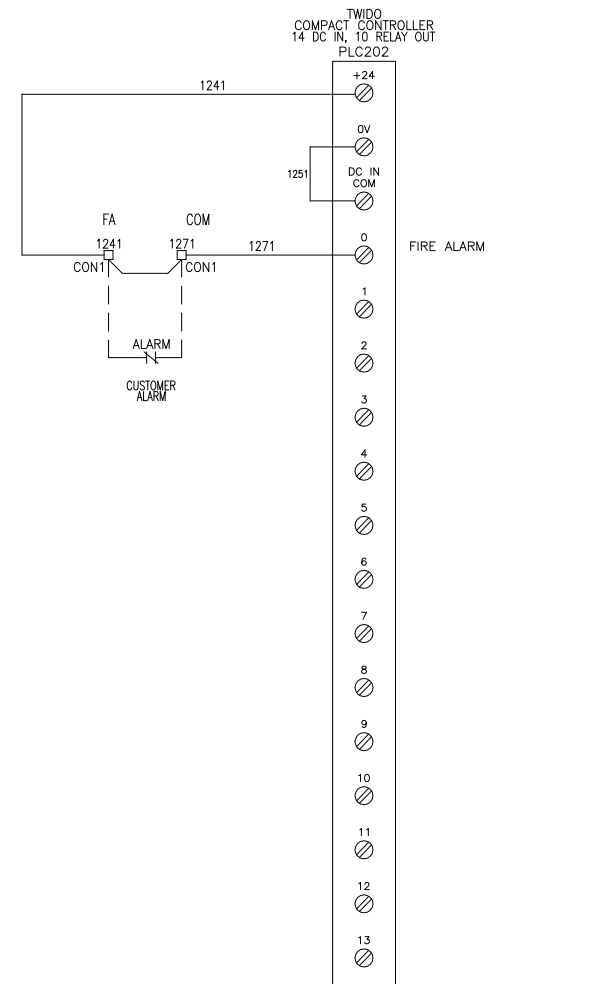
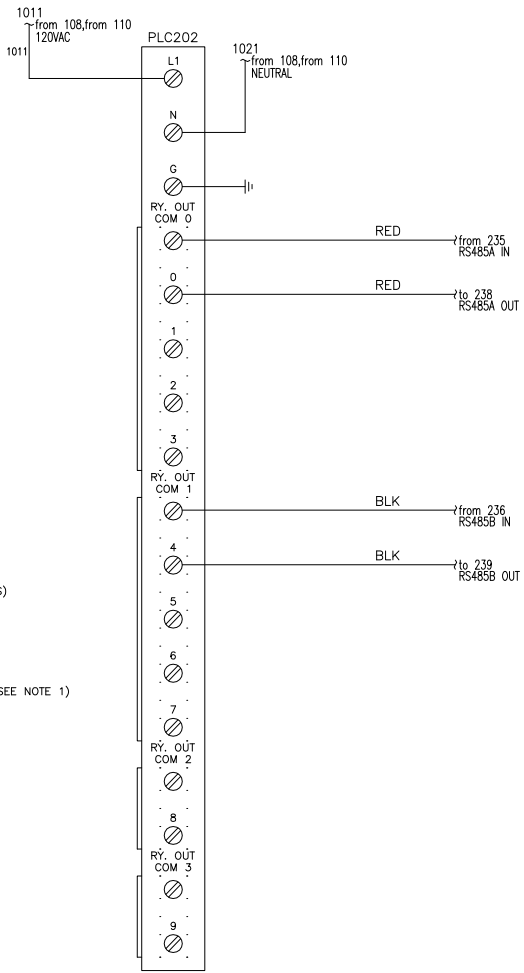
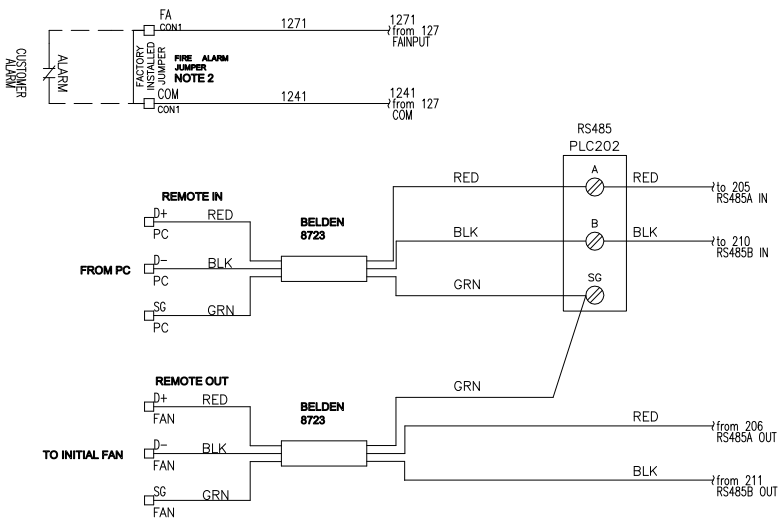
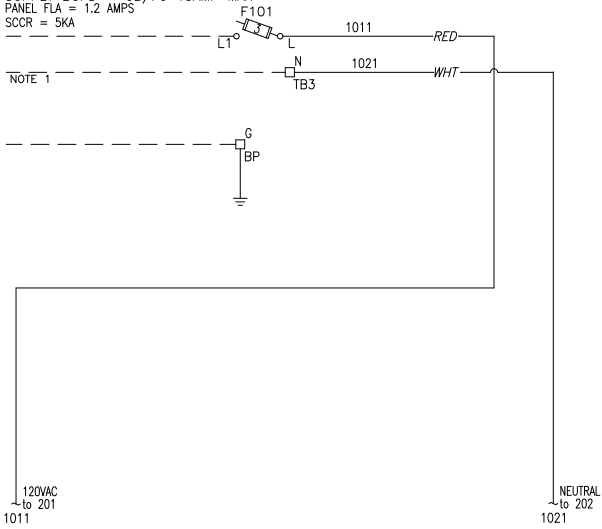
FIRE CONTROL SYSTEM FAN SHUTDOWN — OPTIONAL, continued

Fig. 41

FIRE CONTROL SYSTEM FAN SHUTDOWN PANEL — NETWORK INSTALLATION (6011644)

120V/1PH/60HZ

INCOMING SERVICE TO BE TERMINATED AT DISCONNECT
 CB/FU TO BE SUPPLIED BY OTHERS
 SUPPLY BCPD = CB/FU 15AMP MAX
 PANEL FLA = 1.2 AMPS
 SCCR = 5KA



LEGEND
 ——— PANEL WIRING
 - - - FIELD WIRING (BY OTHERS)

LEGEND
 ——— PANEL WIRING
 - - - FIELD WIRING (BY OTHERS SEE NOTE 1)

NOTE:
 TERMINALS WILL ACCEPT STRANDED
 WIRE ONLY

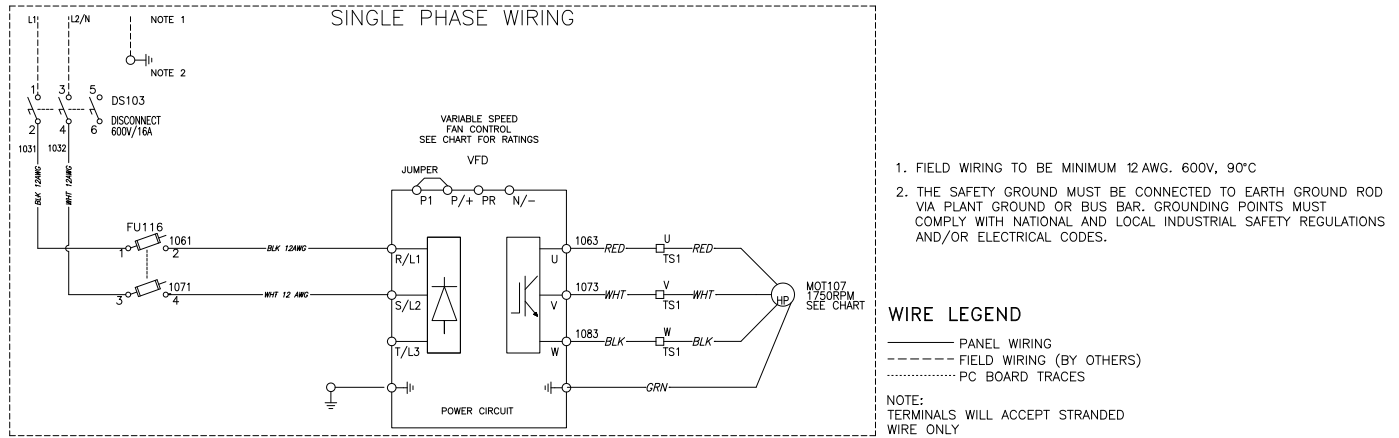
WIRE COLOR/GAUGE (NEPA)
 (unless otherwise specified)
 208-600VAC: #14, BLK
 120VAC: #16, RED
 24VAC: #16, RED/BLK
 NEUTRAL: #16, WHT
 GROUND: GRN
 24VDC: #18, BLU
 24V COM (0VDC): #18, BLU/WHT
 12VAC/VDC, #18, VIO
 12V COM: #18, VIO/WHT
 DRY (UNPOWERED): #18, YLW

ELECTRICAL SCHEMATICS, continued

Fig. 42

1PH WIRING DETAILS

INCOMING SERVICE TERMINATED AT DISCONNECT
 SUPPLY BCPD = SEE CHART
 PANEL FLA = SEE CHART
 SCCR 5KA



| SIZING CHART | | | |
|--------------|-------------------------------|-------------------------------|-------------------------------|
| | 6014870 | 6014871 | 6014872 |
| VOLTAGE | 120/1PH/50/60HZ | 230/1PH/50/60HZ | 230/1PH/50/60HZ |
| FLA | 10.2A | 8A | 14.3 |
| FUSE | KTKR15 | KTKR12 | KTKR20 |
| MOTOR | 1HP, 2.6FLA @ 265V/60HZ | 1HP, 2.6FLA @ 265V/60HZ | 2HP, 5.1FLA @ 265V/60HZ |
| LINE REACTOR | N/A | N/A | N/A |
| VFD | 100 120/1PH 1HP/.75KW/4.2A | 200 230/1PH 1HP/.75KW/4.2A | 200 230/1PH 2HP/1.5KW/7.0A |
| O/L | 3.4 | 3.4 | 6.8 |

⚠ DANGER

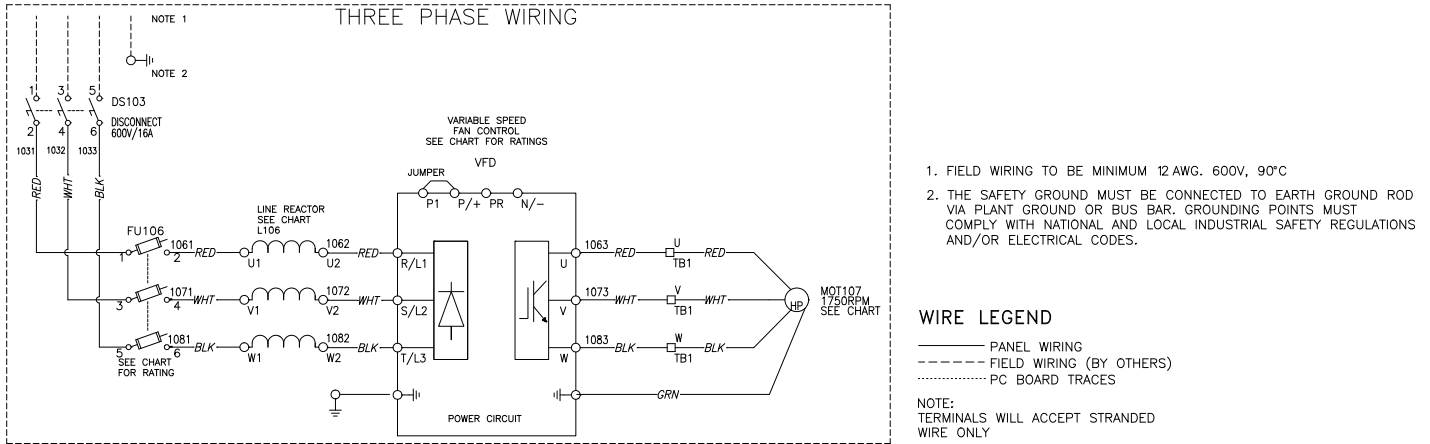
Before doing any electrical work, make certain the power is disconnected and properly locked or tagged off. Failure to do so may result in death or serious injury. All electrical troubleshooting and repair must be done by a qualified technician and meet all applicable codes. Do not route control wiring for any other device through this control box. Ensure that the voltage and phase of the incoming power agrees with the label located on top of the VFD box and fan. Be certain power is off when wiring to the control box. Failure to do so could result in electrical shock, death or serious injury.

ELECTRICAL SCHEMATICS, continued

Fig. 43

3PH WIRING DETAILS

INCOMING SERVICE TERMINATED AT DISCONNECT
 SUPPLY BCPD = SEE CHART
 PANEL FLA = SEE CHART
 SCCR 5KA

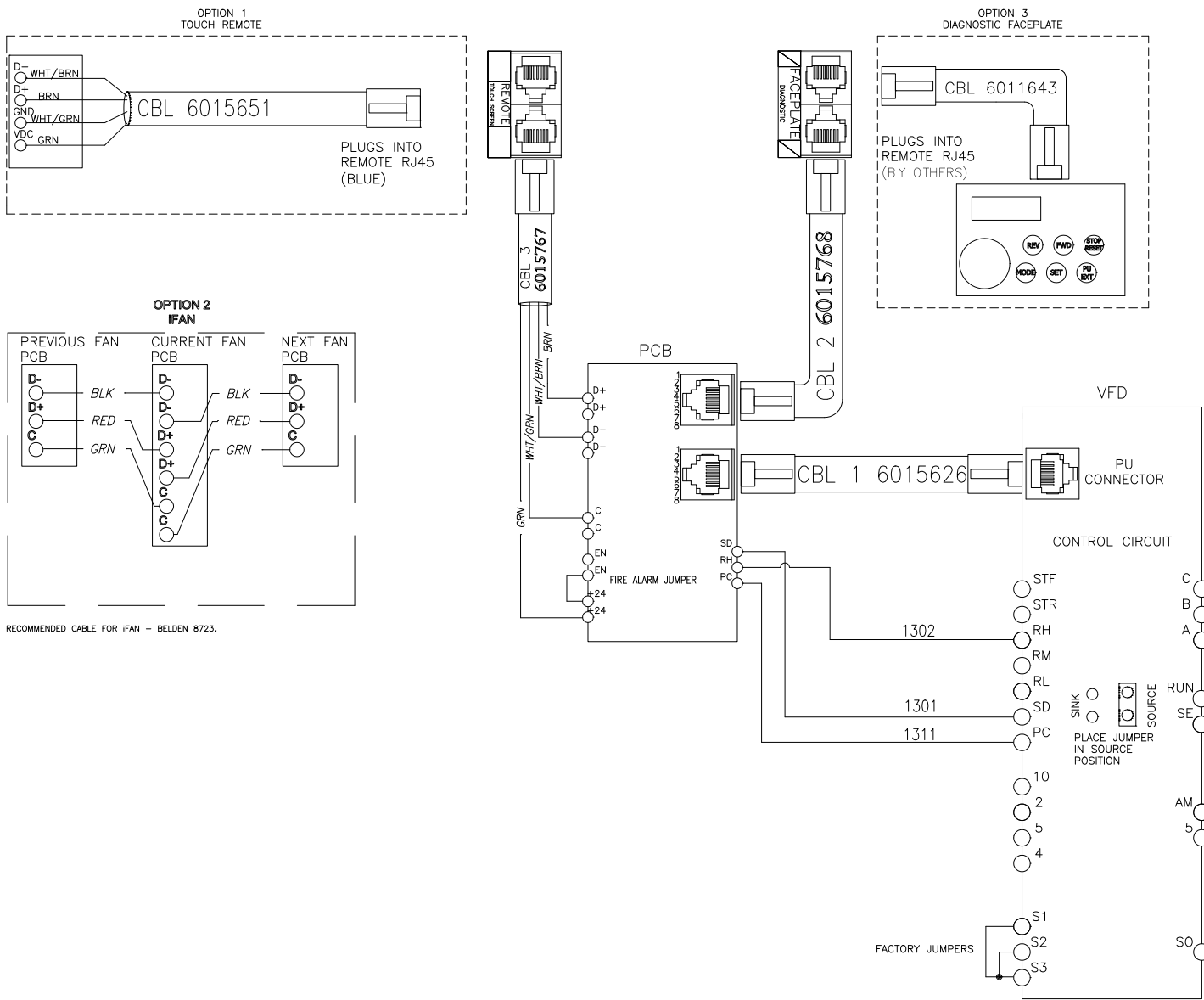


| SIZING CHART | | | | |
|--------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| | 6014873 | 6014874 | 6014875 | 6014876 |
| VOLTAGE | 230/3PH/50/60HZ | 230/3PH/50/60HZ | 460/3PH/50/60HZ | 460/3PH/50/60HZ |
| FLA | 4.2A | 6A | 2.5A | 4.5A |
| FUSE | KTKR5 | KTKR10 | KTKR3 | KTKR5 |
| MOTOR | 1HP, 2.6FLA @ 265V/60HZ | 2HP, 5.1FLA @ 265V/60HZ | 1HP, 1.6FLA @ 460V/60HZ | 2HP, 3.0FLA @ 460V/60HZ |
| LINE REACTOR | 6010719 | 6010720 | 6010722 | 6010718 |
| VFD | 200 230/3PH 1HP/.75KW/4.2A | 200 230/3PH 2HP/1.5KW/7.0A | 360 480/3PH 1HP/.75KW/2.2A | 360 480/3PH 2HP/1.5KW/3.6A |
| O/L | 3.4 | 6.8 | 2 | 3.4 |

ELECTRICAL SCHEMATICS, continued

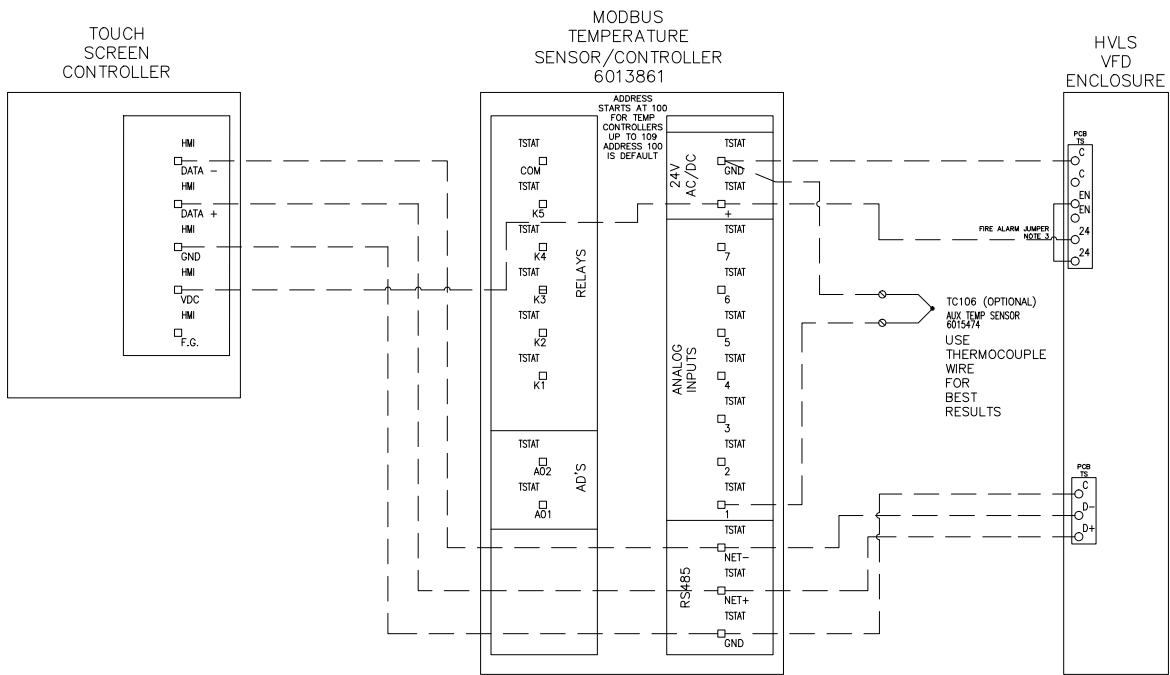
Fig. 44

VARIABLE FREQUENCY DRIVE I/O



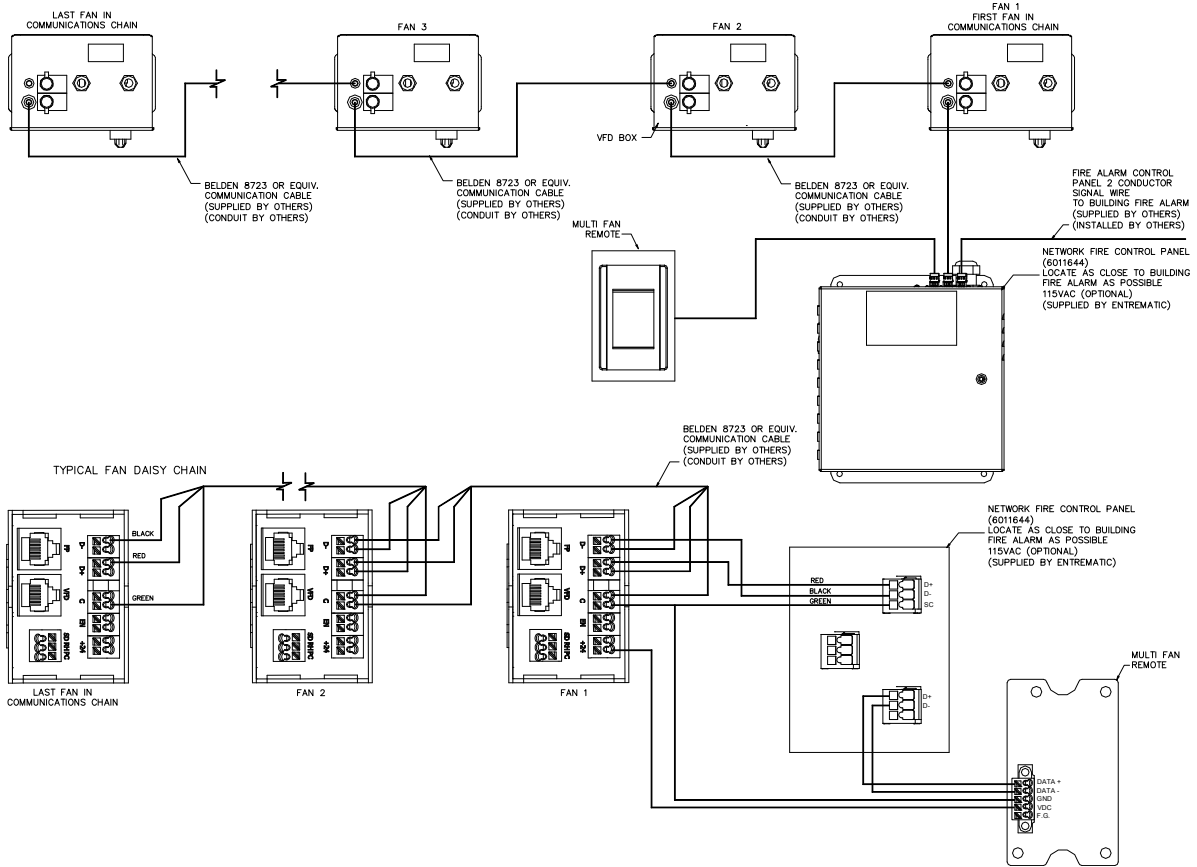
TEMP CONTROL WIRING DETAILS — OPTIONAL

Fig. 45



MULTI FAN WIRING DETAILS — OPTIONAL

Fig. 46



550-600V SUPPLY WIRING DETAILS — OPTIONAL

To connect 480V fan to 550-600V building supply, a step down transformer assembly (6017277) must be installed between power supply and the VFD enclosure. Wiring (by others) must be 600V rated 14 ga. All wiring must be installed in accordance with any national, state or local code requirements.

NOTICE

The transformer assembly is rated for one single fan load only. Each fan must have its own step down transformer assembly (6017277).

1. Locate and mount the step down transformer (6017277) outside the blade arc and near the VFD enclosure.
2. Route supply power from the building source to the step down transformer.
3. Follow VFD installation instructions on page 17 using power from step down transformer (6017277) as the power source.

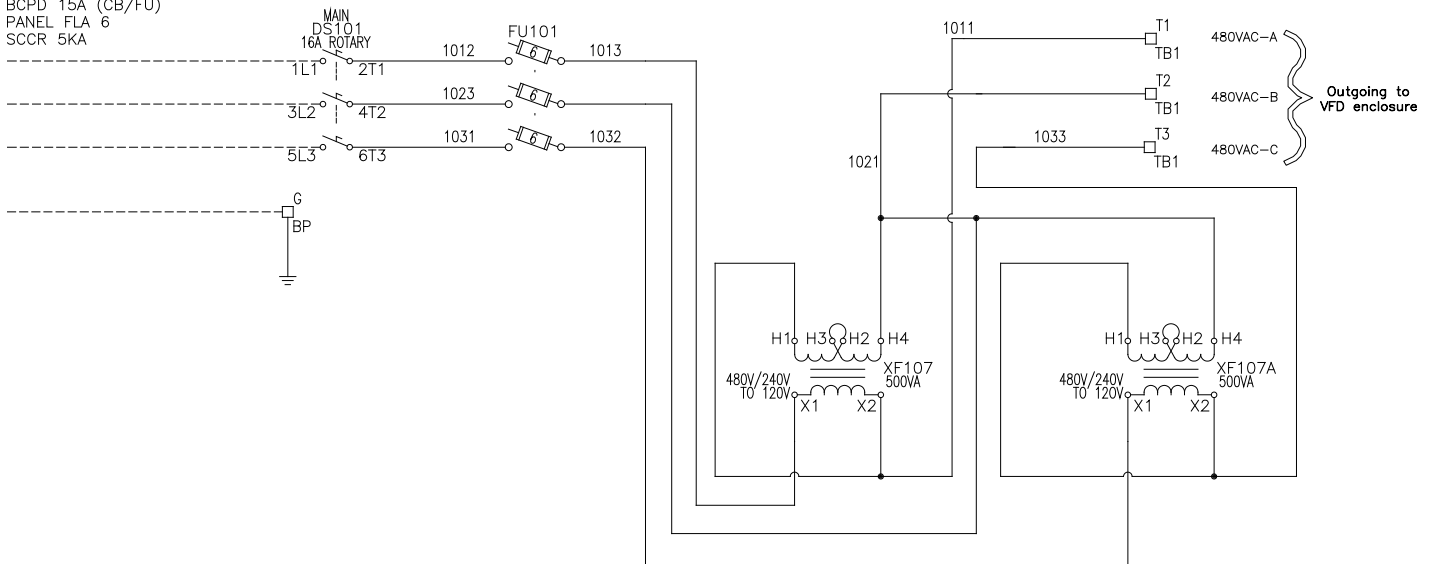
⚠ DANGER

Before doing any electrical work, make certain the power is disconnected and properly locked or tagged off. Failure to do so may result in death or serious injury. All electrical troubleshooting and repair must be done by a qualified technician and meet all applicable codes. Do not route control wiring for any other device through this enclosure. Ensure that the voltage and phase of the incoming power agrees with the label located on top of the VFD box and fan. Be certain power is off when wiring to the control box. Failure to do so could result in electrical shock, death or serious injury.

Fig. 47

575-600V/3 ϕ /60HZ

INCOMING SERVICE TERMINATED AT DISCONNECT
BCPD 15A (CB/FU)
PANEL FLA 6
SCCR 5KA

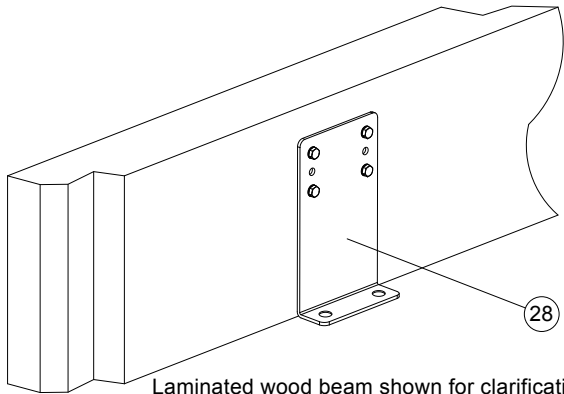


PARTS LIST — FAN

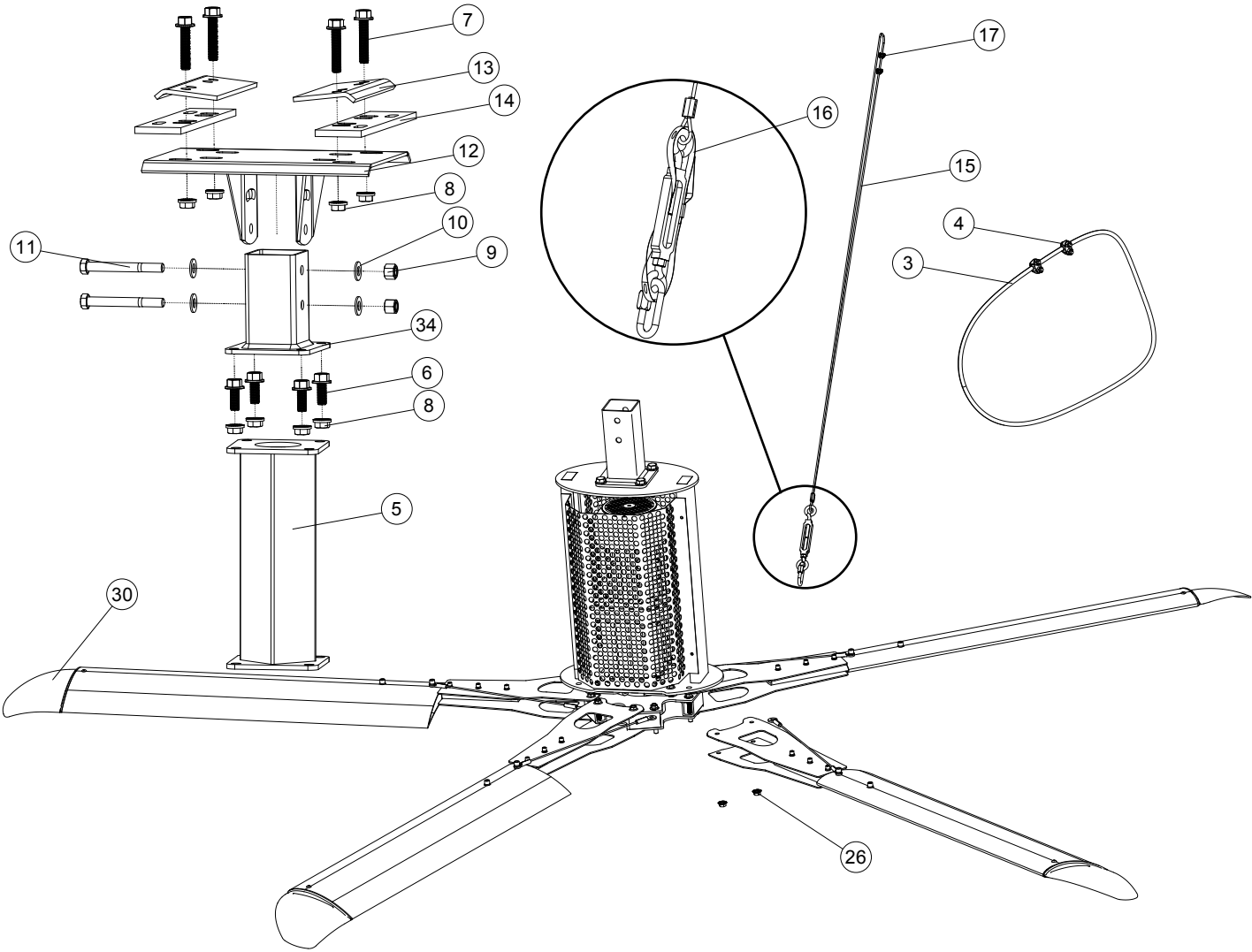
Fig. 48

⚠ WARNING

To ensure proper function, durability and safety of the product, only replacement parts that do not interfere with the safe, normal operation of the product must be used. Incorporation of replacement parts or modifications that weaken the structural integrity of the product, or in any way alter the product from its normal working condition at the time of purchase from 4Front® Engineered Solutions could result in product malfunction, breakdown, premature wear, death or serious injury.

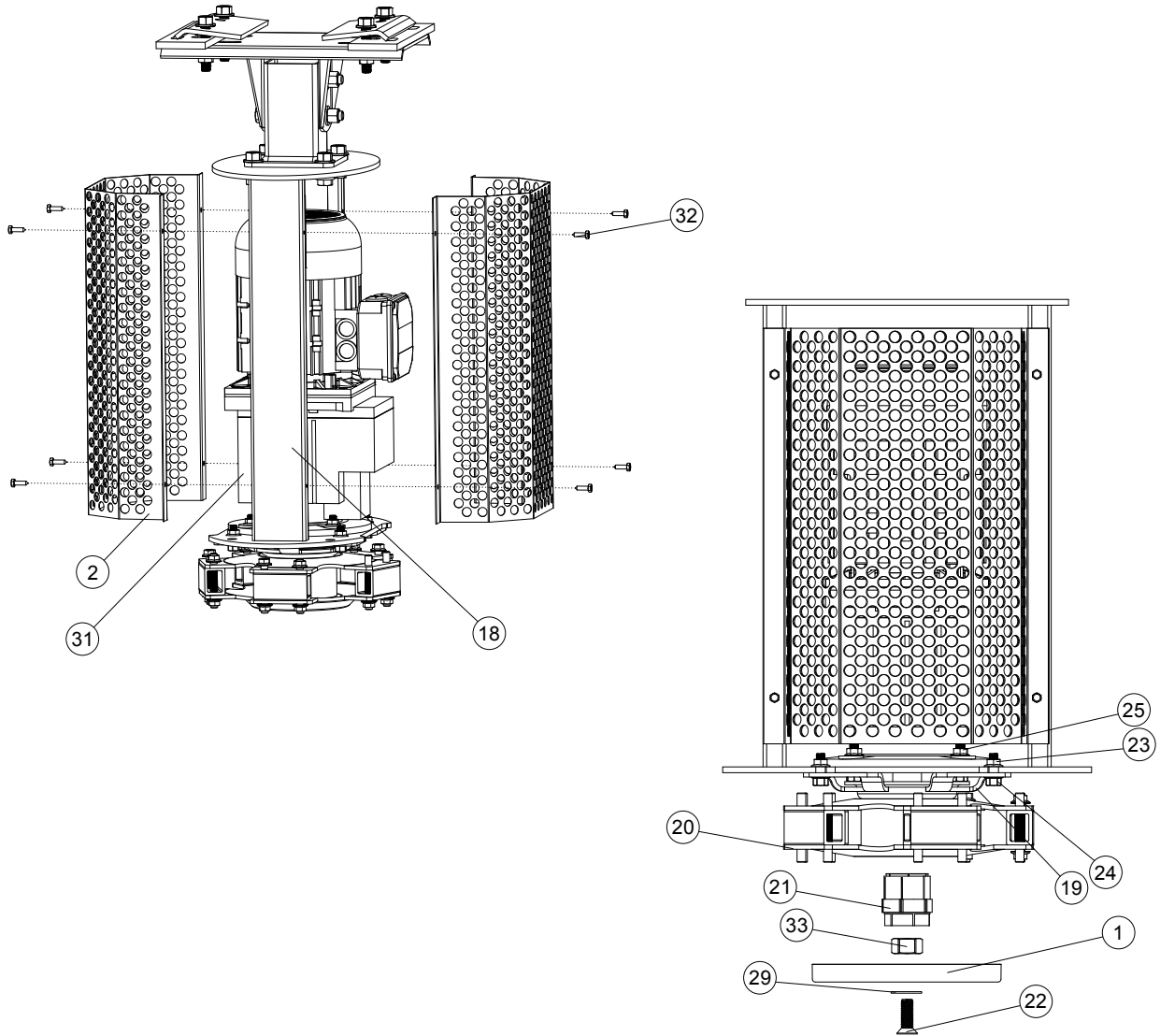


Laminated wood beam shown for clarification



PARTS LIST — FAN, continued

Fig. 49



PARTS LIST — FAN, continued

| Item | Quantity | Description | Part Number |
|------|----------|--|--|
| 1 | 1 | KELLEY BRANDED HUB CAP SERCO BRANDED HUB CAP ENTREMATIc BRANDED HUB CAP | 6015112 6015113 6018639 |
| 2 | 2 | SILVER MOTOR COVER BLACK MOTOR COVER | 6015806 6015820 |
| 3 | 1 | SAFETY CABLE — 170" LONG - 6", 1', 2' EXT SAFETY CABLE — 242" LONG - 3', 4', 5' EXT SAFETY CABLE — 314" LONG - 6', 7', 8' EXT SAFETY CABLE — 386" LONG - 9', 10', 11', 12' EXT | 6014884 6014887 6014890 6015864 |
| 4 | 2 | CABLECLAMP 1/4" PLD | 441103 |
| 5 | 1 | HVLS EXT MNT 12" — OPTIONAL HVLS EXT MNT 24" — OPTIONAL HVLS EXT MNT 36" — OPTIONAL HVLS EXT MNT 48" — OPTIONAL HVLS EXT MNT 60" — OPTIONAL HVLS EXT MNT 72" — OPTIONAL HVLS EXT MNT 84" — OPTIONAL HVLS EXT MNT 96" — OPTIONAL HVLS EXT MNT 108" — OPTIONAL HVLS EXT MNT 120" — OPTIONAL HVLS EXT MNT 132" — OPTIONAL HVLS EXT MNT 144" — OPTIONAL | 6015865 6015866 6015867 6015868 6015869 6015870 6015871 6015872 6015873 6015874 6015875 6015876 |
| 6 | 4 | 1/2-13UNC X 1 1/4" LG SER FLG | 6015851 |
| 7 | 4 | 1/2-13UNC X 2 1/2" LG SER FLG | 6015852 |
| 8 | 8 | NUT, HEX FLG, SER, 1/2-13UNC | 6015853 |
| 9 | 2 | LN 1/2 NYLON INSERT LOCKNUT | 214505 |
| 10 | 4 | PW - 1/2" ID - SAE | 234260 |
| 11 | 2 | HHB 1/2-13UNC X 4 1/2 LG, GRD5 | 6013220 |
| 12 | 2 | PIVOT, HANGER BRACKET MOUNT | 6016400 |
| 13 | 2 | PLATE, HANGER BRACKET CLAMP | 6014953 |
| 14 | 2 | PLATE, CLAMP SPACER | 6014954 |
| 15 | 4 | GUY WIRE KIT - 6FT, 7FT, 8FT EXT GUY WIRE KIT - 9FT, 10FT EXT | 6015676 6015678 |
| 16 | 4 | SECONDARY STRAP TIE, BALL LOCK | 6015265 |
| 17 | 8 | 1/8" WIRE CABLE CLAMP | 6010900 |
| 18 | 1 | HVLS FAN FRAME | 6014980 |
| 19 | 2 | SAFETY BRACKET | 6015056 |

NOTE:

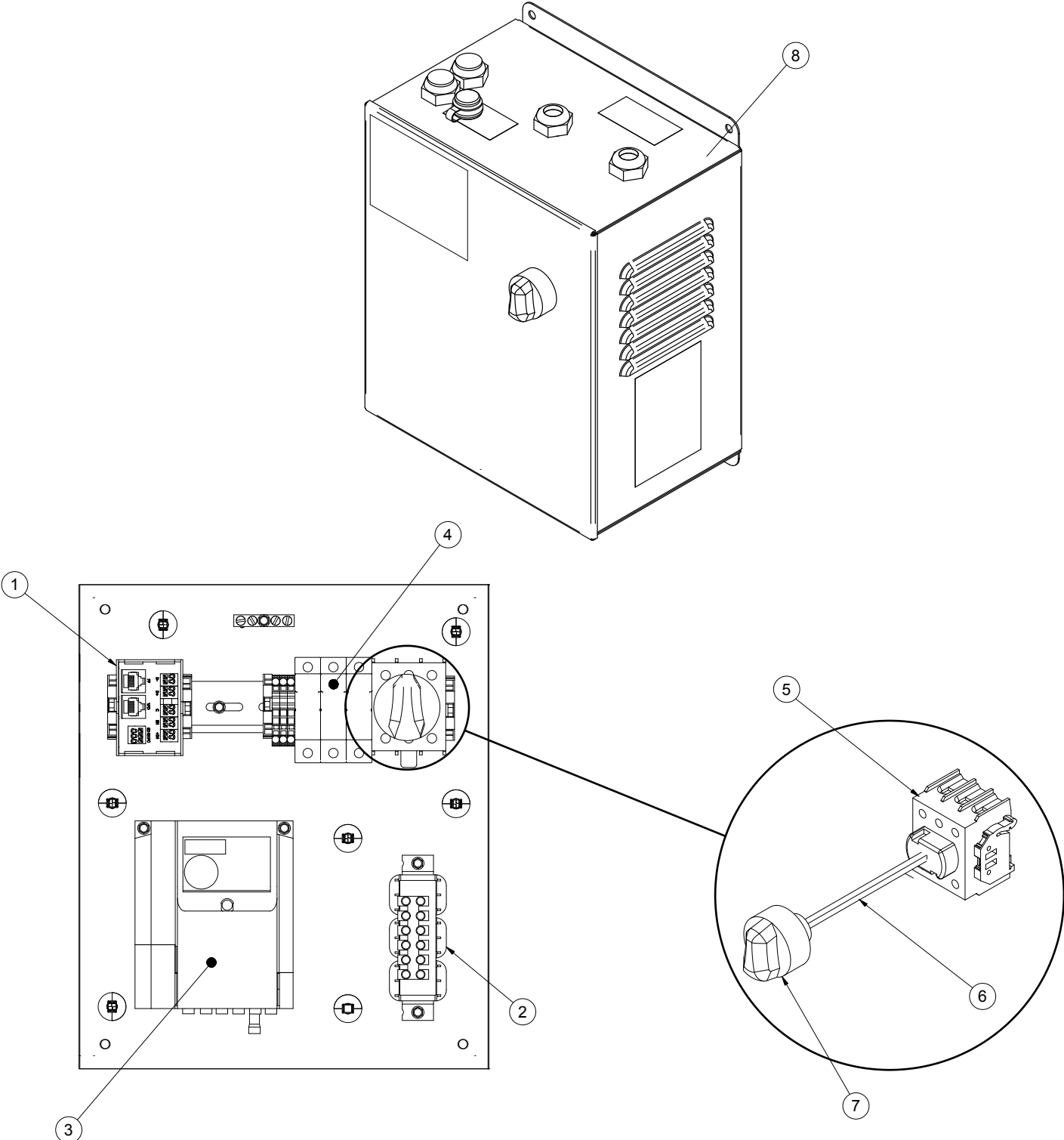
For corrosion resistant or explosion proof fans, consult factory for parts.

PARTS LIST — FAN, continued

| Item | Quantity | Description | Part Number |
|------|----------|--|--|
| 20 | 1 | HUB ASSEMBLY | 6015020 |
| 21 | 1 | FENNER NUT — KEYLESS BUSHING - 1 1/4" I.D. X 2" O.D. | 6013286 |
| 22 | 2 | HUB COVER BOLT LEFT HAND THREAD | 6015097 |
| 23 | 8 | 3/8-16UNC HEX SERRATED FLANGE NUT | 6015118 |
| 24 | 4 | 3/8-16UNC X 1.0 LG SER FLG HEX CAP SCREW | 6015679 |
| 25 | 4 | 3/8-16UNC X 1 1/4 LG SER FLG HEX CAP SCREW | 6009379 |
| 26 | 20 | NUT, HEX FLG, SER, 3/8-16UNF | 6015118 |
| 27 | 1 | CORD GRIP, .354-.709" PG21 — NOT SHOWN | 6010709 |
| 28 | 1 | LAMINATED WOOD BEAM BRACKET ASSEMBLY — OPTIONAL | 6014915 |
| 29 | 1 | WASHER, 2" OD - 1/2" ID THICK SERIES | 6017018 |
| 30 | 5 | 6' BLACK BLADE ASSY - AL TIP 8' BLACK BLADE ASSY - AL TIP 10' BLACK BLADE ASSY - AL TIP 12' BLACK BLADE ASSY - AL TIP 14' BLACK BLADE ASSY - AL TIP 16' BLACK BLADE ASSY - AL TIP 18' BLACK BLADE ASSY - AL TIP 20' BLACK BLADE ASSY - AL TIP 22' BLACK BLADE ASSY - AL TIP 24' BLACK BLADE ASSY - AL TIP 6' CLEAR BLADE ASSY - AL TIP 8' CLEAR BLADE ASSY - AL TIP 10' CLEAR BLADE ASSY - AL TIP 12' CLEAR BLADE ASSY - AL TIP 14' CLEAR BLADE ASSY - AL TIP 16' CLEAR BLADE ASSY - AL TIP 18' CLEAR BLADE ASSY - AL TIP 20' CLEAR BLADE ASSY - AL TIP 22' CLEAR BLADE ASSY - AL TIP 24' CLEAR BLADE ASSY - AL TIP | 6019640 6019641 6019642 6014681 6019644 6019645 6019646 6019647 6019648 6019649 6019650 6019651 6019652 6019653 6019654 6019655 6019656 6019657 6019658 6019659 |
| 31 | 1 | GEAR MOTOR, 1HP, 480/3, 8.16 — 6' AND 8' MODELS GEAR MOTOR, 1HP, 480/3, 14.28 — 10' AND 12' MODELS GEAR MOTOR, 1HP, 480/3, 20.04 — 14' AND 16' MODELS GEAR MOTOR, 1HP, 480/3, 24.93 — 18' AND 20' MODELS GEAR MOTOR, 2HP, 480/3, 24.93 — 24' MODELS | 6015074 6015079 6015084 6015089 6015092 |
| 32 | 8 | FAN COVER FASTENERS | 215702 |
| 33 | 1 | NUT, 3/4-10 UNC | 000043 |
| 34 | 1 | FAN MOUNT EXTENSION — STD | 6014941 |

PARTS LIST — VFD BOX

Fig. 50



PARTS LIST — VFD BOX, continued

6014870 — 120V/1PH/1HP

| Item | Quantity | Part Description | Part Number |
|------|----------|------------------------------------|-------------|
| 1 | 1 | INTERFACE, HVLS DIN RAIL MOUNT PCB | 6015547 |
| 2 | — | — | — |
| 3 | 1 | MISTUBISHI VFD, 120V, 1PH, 1HP | 6014902 |
| 4 | 2 | FUSE 15A, 600V, KTK-R-15 | 6011800 |
| 5 | 1 | ROTARY DISCONNECT | 6015597 |
| 6 | 1 | DISCONNECT SHAFT 150MM | 6015599 |
| 7 | 1 | DISCONNECT HANDLE | 6015598 |
| 8 | 1 | VFD CONTROL BOX ASSY | 6014870 |

6014871 — 230V/1PH/1HP

| Item | Quantity | Part Description | Part Number |
|------|----------|------------------------------------|-------------|
| 1 | 1 | INTERFACE, HVLS DIN RAIL MOUNT PCB | 6015547 |
| 2 | — | — | — |
| 3 | 1 | MISTUBISHI VFD, 230V, 1PH, 2HP | 6014904 |
| 4 | 2 | FUSE 12A, 600V, KTK-R-12 | 6011799 |
| 5 | 1 | ROTARY DISCONNECT | 6015597 |
| 6 | 1 | DISCONNECT SHAFT 150MM | 6015599 |
| 7 | 1 | DISCONNECT HANDLE | 6015598 |
| 8 | 1 | VFD CONTROL BOX ASSY | 6014871 |

6014872 — 230V/1PH/2HP

| Item | Quantity | Part Description | Part Number |
|------|----------|------------------------------------|-------------|
| 1 | 1 | INTERFACE, HVLS DIN RAIL MOUNT PCB | 6015547 |
| 2 | — | — | — |
| 3 | 1 | MISTUBISHI VFD, 230V, 1PH, 2HP | 6014904 |
| 4 | 2 | FUSE 20A, 600V, KTK-R-20 | 6011801 |
| 5 | 1 | ROTARY DISCONNECT | 6015597 |
| 6 | 1 | DISCONNECT SHAFT 150MM | 6015599 |
| 7 | 1 | DISCONNECT HANDLE | 6015598 |
| 8 | 1 | VFD CONTROL BOX ASSY | 6014872 |

PARTS LIST — VFD BOX, continued

6014873 — 230V/3PH/1HP

| Item | Quantity | Part Description | Part Number |
|------|----------|------------------------------------|-------------|
| 1 | 1 | INTERFACE, HVLS DIN RAIL MOUNT PCB | 6015547 |
| 2 | 1 | LINE REACTOR, 600V, 4.8A | 6010719 |
| 3 | 1 | MISTUBISHI VFD, 230V, 3PH, 2HP | 6014907 |
| 4 | 3 | FUSE 5A, 600V, KTK-R-5 | 6011797 |
| 5 | 1 | ROTARY DISCONNECT | 6015597 |
| 6 | 1 | DISCONNECT SHAFT 150MM | 6015599 |
| 7 | 1 | DISCONNECT HANDLE | 6015598 |
| 8 | 1 | VFD CONTROL BOX ASSY | 6014873 |

6014874 — 230V/3PH/2HP

| Item | Quantity | Part Description | Part Number |
|------|----------|------------------------------------|-------------|
| 1 | 1 | INTERFACE, HVLS DIN RAIL MOUNT PCB | 6015547 |
| 2 | 1 | LINE REACTOR, 600V, 7.6A | 6010720 |
| 3 | 1 | MISTUBISHI VFD, 230V, 3PH, 2HP | 6014907 |
| 4 | 3 | FUSE 10A, 600V, KTK-R-10 | 6014015 |
| 5 | 1 | ROTARY DISCONNECT | 6015597 |
| 6 | 1 | DISCONNECT SHAFT 150MM | 6015599 |
| 7 | 1 | DISCONNECT HANDLE | 6015598 |
| 8 | 1 | VFD CONTROL BOX ASSY | 6014874 |

6014875 — 460V/3PH/1HP

| Item | Quantity | Part Description | Part Number |
|------|----------|------------------------------------|-------------|
| 1 | 1 | INTERFACE, HVLS DIN RAIL MOUNT PCB | 6015547 |
| 2 | 1 | LINE REACTOR, 600V, 2.1A | 6010722 |
| 3 | 1 | MISTUBISHI VFD, 480V, 3PH, 2HP | 6014909 |
| 4 | 3 | FUSE 3A, 600V, KTK-R-3 | 6011795 |
| 5 | 1 | ROTARY DISCONNECT | 6015597 |
| 6 | 1 | DISCONNECT SHAFT 150MM | 6015599 |
| 7 | 1 | DISCONNECT HANDLE | 6015598 |
| 8 | 1 | VFD CONTROL BOX ASSY | 6014875 |

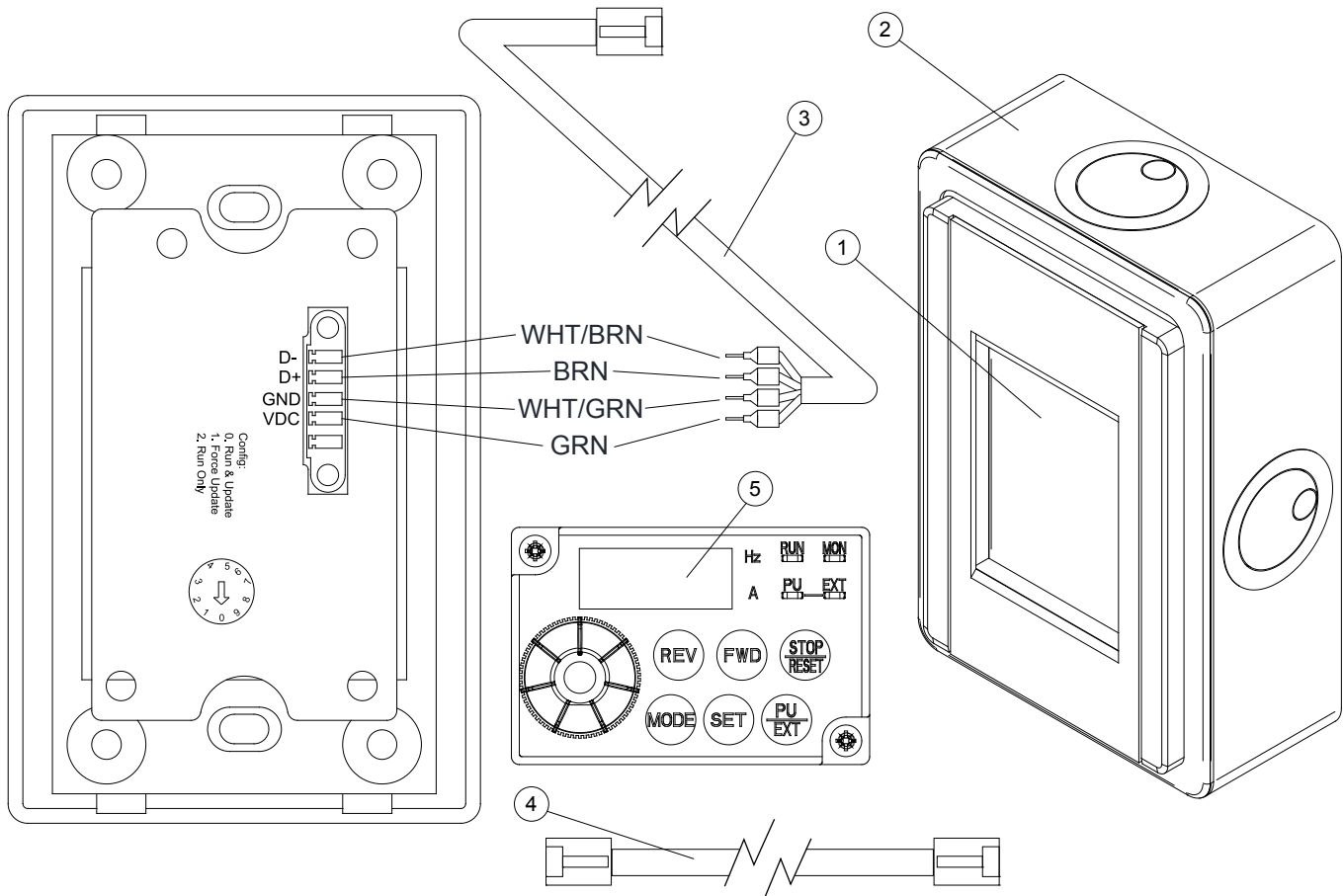
PARTS LIST — VFD BOX, continued

6014876 — 460V/3PH/2HP

| Item | Quantity | Part Description | Part Number |
|------|----------|------------------------------------|-------------|
| 1 | 1 | INTERFACE, HVLS DIN RAIL MOUNT PCB | 6015547 |
| 2 | 1 | LINE REACTOR, 600V, 3.4A | 6010718 |
| 3 | 1 | MISTUBISHI VFD, 480V, 3PH, 2HP | 6014909 |
| 4 | 3 | FUSE 5A, 600V, KTK-R-5 | 6011797 |
| 5 | 1 | ROTARY DISCONNECT | 6015597 |
| 6 | 1 | DISCONNECT SHAFT 150MM | 6015599 |
| 7 | 1 | DISCONNECT HANDLE | 6015598 |
| 8 | 1 | VFD CONTROL BOX ASSY | 6014876 |

PARTS LIST — REMOTE CONTROL PANEL, continued

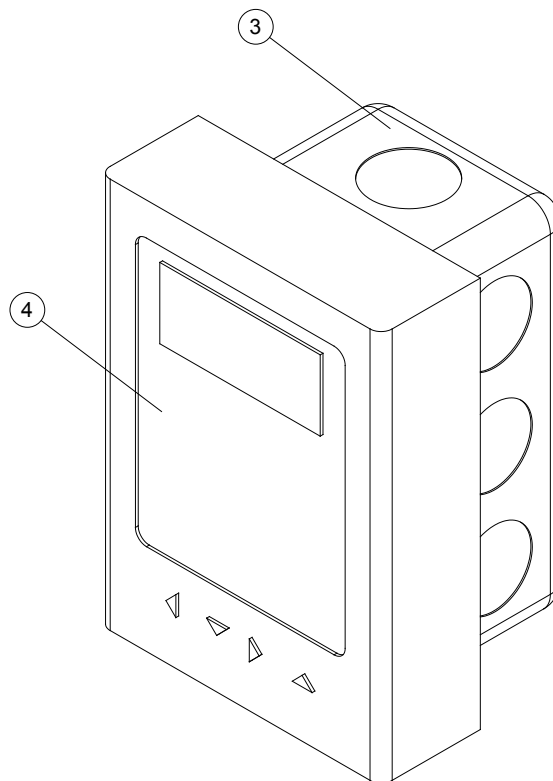
Fig. 51



| Item | Quantity | Part Description | Part Number |
|------|----------|---|--|
| 1 | 1 | TOUCH SCREEN CONTROLLER, KELLEY TOUCH SCREEN CONTROLLER, SERCO TOUCH SCREEN CONTROLLER W/ TEMP CONTROL, KELLEY TOUCH SCREEN CONTROLLER W/ TEMP CONTROL, SERCO TOUCH SCREEN CONTROLLER — MULTI FAN REMOTE, KELLEY TOUCH SCREEN CONTROLLER — MULTI FAN REMOTE, SERCO | 6015758 6015759 6016570 6016571 6016943 6016944 |
| 2 | 1 | J-BOX , PLASTIC, IVORY | 6015648 |
| 3 | 1 | CABLE CAT5, 100' W/ FERRULE (BLUE) | 6015651 |
| 4 | 1 | CABLE CAT5 (GRAY) — (OPTIONAL) | 6011643 |
| 5 | 1 | FAN DIAGNOSTIC TOOL — (OPTIONAL) | 6015647 |
| 6 | 1 | HMI HVLS, MULTI, TEMP (OPTIONAL, NOT SHOWN) | 6018652 |
| 7 | 1 | MULTI FAN CONTROLLER W/TEMP (OPTIONAL, NOT SHOWN) | 6018648 |

PARTS LIST — TEMP CONTROL (OPTIONAL)

Fig. 52



| Item | Quantity | Part Description | Part Number |
|------|----------|--------------------------------|-------------|
| 1 | 1 | TEMP CONTROL ASSEMBLY | 6013862 |
| 2 | 2 | PHILIPS HEAD SCREW (NOT SHOWN) | 6013543 |
| 3 | 1 | 4X2 STEEL J-BOX | 6013415 |
| 4 | 1 | MODBUS TEMP/IO CONTROL | 6013861 |

WARRANTY

THIS LIMITED WARRANTY IS 4FRONT'S (DBA ENTREMATI) SOLE AND EXCLUSIVE WARRANTY WITH RESPECT TO THE HVLS FAN AND IS IN LIEU OF ANY OTHER GUARANTEES OR WARRANTIES, EXPRESS OR IMPLIED. THIS LIMITED WARRANTY APPLIES ONLY TO THE ORIGINAL PURCHASER OF THE HVLS FAN AND CANNOT BE TRANSFERRED.

4FRONT warrants that this HVLS FAN will be free from flaws in material and workmanship under normal use for a period of one (1) year from the earlier of 1) 60 days after the date of initial shipment by 4FRONT, or 2) the date of installation of the HVLS FAN by the original purchaser, provided that the owner maintains and operates the HVLS FAN in accordance with this User's Manual.

In the event that this HVLS FAN proves deficient in material or workmanship within the applicable Limited Warranty period, owner shall so notify 4FRONT, and 4 Front will, at its option:

1. Replace the HVLS FAN, or the deficient portion(s) thereof, without charge to the owner (to include all parts and labor); or
2. Alter or repair the HVLS FAN, on site or elsewhere, without charge to the owner.

In addition, 4FRONT warrants the HVLS FAN for an additional fourteen (14) years for replacement parts only.

Exclusions to the limited warranty: Blades and hub assembly are warranted for the lifetime of the product to a maximum of years seven (7) years after discontinuation of the product as defined by 4Front Engineered Solutions, Inc., but in no event shall this period be less than fifteen (15) years from either; 1) 60 days after the date of initial shipment by 4FRONT, or 2) the date of installation of the HVLS FAN by the original purchaser, provided that the owner maintains and operates the HVLS FAN in accordance with this Owner's Manual.

This Limited Warranty does not cover any failure caused by improper installation including mounting location and exclusion zone violations, abuse, improper operation, negligence, or failure to maintain and adjust the HVLS FAN properly. Parts requiring replacement due to damage resulting from vehicle impact, abuse, or improper operation are not covered by this warranty. 4FRONT DISCLAIMS ANY RESPONSIBILITY OR LIABILITY FOR ANY LOSS OR DAMAGE OF ANY KIND (INCLUDING WITHOUT LIMITATION, DIRECT, INDIRECT, CONSEQUENTIAL OR PUNITIVE DAMAGES, OR LOST PROFITS OR LOST PRODUCTION) arising out of or related to the use, installation or maintenance of the HVLS FAN (including premature product wear, product failure, property damage or bodily injury resulting from use of unauthorized replacement parts or modification of the HVLS FAN). 4FRONT's sole obligation with regard to a HVLS FAN that is claimed to be deficient in material or workmanship shall be as set forth in this Limited Warranty. This Limited Warranty will be null and void if the original purchaser does not notify 4FRONT's warranty department within ninety (90) days after the product deficiency is discovered.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF, INCLUDING, BUT NOT LIMITED TO, A WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, ALL OF WHICH 4FRONT HEREBY DISCLAIMS.

Please direct questions about your fan to your local distributor.

Your local distributor is:

Corporate Office:

1612 Hutton Dr. Suite 140

Carrollton, TX. 75006

Tel. (972) 466-0707

Fax (972) 323-2661

4Front Engineered Solutions®