



Quality People. Building Solutions.

Comfort Systems USA (Arkansas), Inc.
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Phone 501-834-3320
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Date: 5/2/2024

Return Request: 5/12/2024

Project: Little Rock West High School

Supplier: Airetech

Manufacturer: Greenheck

Submittal: HVAC Fans (HVLS)

Submittal Number: 23 00 00-06

Drawing # and Installation: Mechanical Drawings

ARCHITECT

Lewis Architects Engineers
11225 Huron Lane, Suite 104
Little Rock, AR 72211
501-223-9302

ENGINEER

Lewis Architects Engineers
11225 Huron Lane, Suite 104
Little Rock, AR 72211
501-223-9302

GENERAL CONTRACTOR

Baldwin & Shell
1000 W. Capitol Ave.
Little Rock, AR 72201
501-374-8677

MECHANICAL SUBCONTRACTOR

Comfort Systems USA (Arkansas), Inc.
9924 Landers Rd.
N. Little Rock, AR 72117
501-834-3320

Notes:

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chowell@comfortar.com

9924 Landers Rd.
No. Little Rock, AR 72117



SUBMITTAL DATA

EQUIPMENT: Greenheck HVLS Fans

SPEC SECTION:

TAGS: HVLS-1,2,3

PROJECT: Little Rock West High School

LOCATION: Little Rock, AR

ENGINEER: **LEWIS
ARCHITECTS
ENGINEERS** 

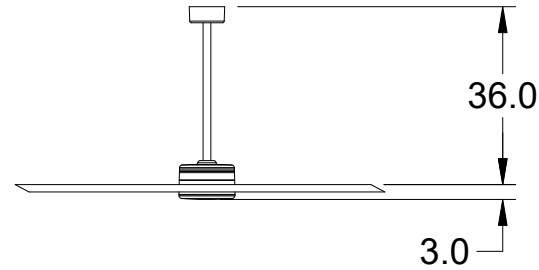
CONTRACTOR: **COMFORT
SYSTEMS USA**
A R K A N S A S

DATE: 4/15/2024

SUBMITTED BY: Nick Moore
nick.moore@airetechcorp.com

Model: DC-5-6-3MV

High Volume, Low Speed Ceiling Fan



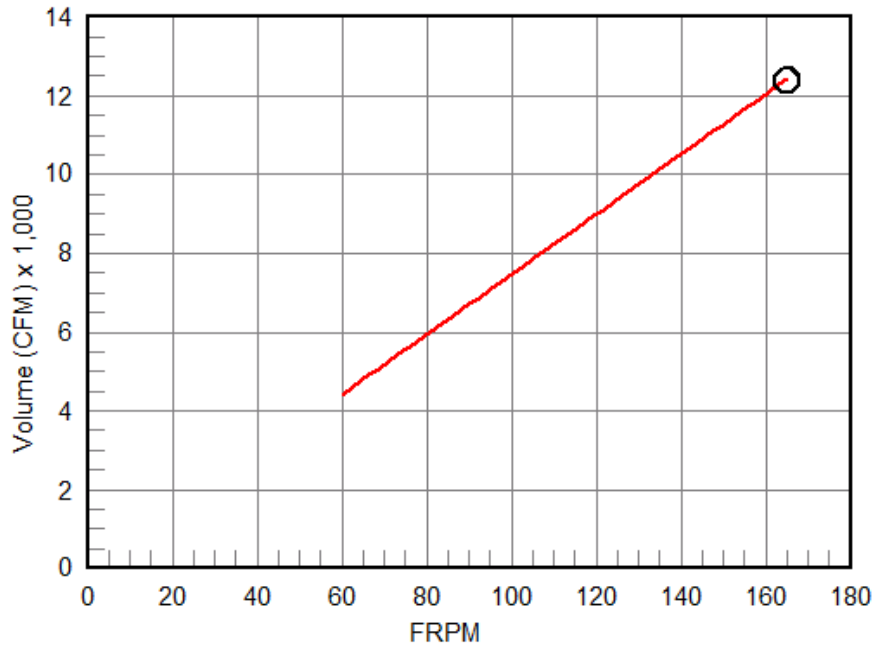
Dimensional	
Impeller Diameter (ft)	6
Impeller Diameter (in.)	72
Quantity	3
Weight w/o Acc's (lb)	26
Weight w/ Acc's (lb)	33

Installation Clearances	
Minimum Fan Spacing (ft)	18
Clearance to Wall (ft)	9
Blade Tip Clearance (ft)	3
Vertical Blade Clearance (ft)	3
Standby Blade Deflection (in.)	0.2

Performance Per Fan	
*Tested Direction of Operation	Forward
Actual Volume (CFM)	12,424
Coverage Area (ft ²)	2,600
Max Coverage Area (ft ²)	2,600
Avg. Air Speed (ft/min)	114
Max Avg. Air Speed (ft/min)	114
Fan RPM	165
Max Fan RPM	165
**CFEI at 40% Speed	-
**CFEI at 100% Speed	-
***Integrated Efficiency (CFM/W)	195.00
Total Sound Pressure (dBA)	39

Fan Operation	
Direction of Operation Capability	Forward or Reverse
Communication Protocol	Modbus RTU

Motor	
Size (W)	50
Voltage/Cycle/Phase	115/60/1
Enclosure	IP40
Max Motor RPM	165
***System FLA (Amps)	1.6
**Standby Power (W)	3
**Input Power (W)	61



○ Operating point
— Fan curve

Notes:

All dimensions shown are in units of in. (unless specified otherwise)

Dimensions shown may vary with fan speed. Consult installation manual for clearance requirements.

dBA – A weighted sound pressure level measured 5 ft off the ground at 20 ft from the center of the fan – dBA levels are not licensed by Energy Star

*Cataloged performance data tested using forward direction of operation per 10 CFR Part 430.

**Based on 115/60/1 testing per 10 CFR 430

***FLA is based on worst case system voltage and phase combination



Model: DC-5-6-3MV

High Volume, Low Speed Ceiling Fan

Tags: HVLS-1 HVLS-2 HVLS-3

Standard Construction Features:

Heavy duty frame with protective finish - Extruded aluminum airfoils - High efficiency direct drive motor designed for either forward or reverse operation - Factory mounted and wired variable frequency drive - Factory installed plug and play wiring - Universal ceiling mount - Heavy duty safety restraint cable - Airfoil retaining systems - Energy Star Certified

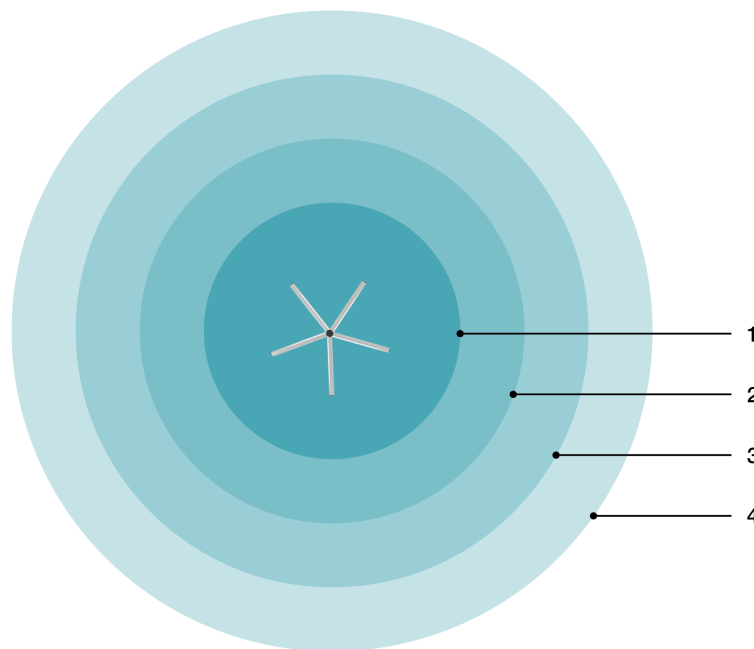
Selected Options & Accessories:

5 Blade Airfoil Kit
Extruded Aluminum Airfoil; Mill Finish, No Color
Aluminum Winglet; Hi-Pro Polyester Finish, Flat Black (044) Color
Universal Mounting Kit; Hi-Pro Polyester Finish, Flat Black (044) Color
3 ft Drop Length; Hi-Pro Polyester Finish, Flat Black (044) Color
Hub Plate and Impeller Hub; Hi-Pro Polyester Finish, Flat Black (044) Color
Power Wiring with Quick-Connect Terminals, Internal, General
Plug-and-Play Network Communication Wiring, Internal
100 ft of Shielded, Twisted Pair (STP) CAT-5e Control Cable
Braided Galvanized Steel Safety Cable
Cable Clamp Hardware for Safety Cable
Electrical Warranty: 3 Yrs (Standard)
Mechanical Warranty: 10 Yrs (Standard)

Model: DC-5-6-3MV

High Volume, Low Speed Ceiling Fan

Fan Coverage Data

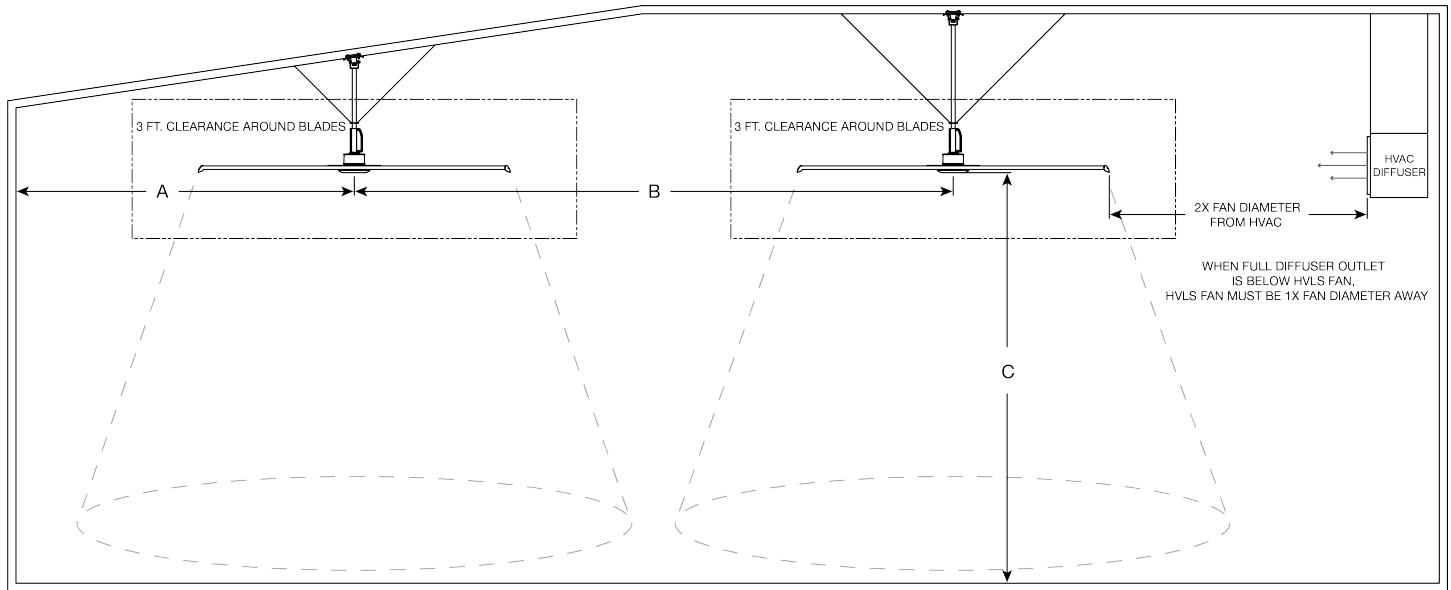


	Fan Speed (RPM)	Zone 1 375+ FPM Air Speed Radius (ft)	Zone 2 230+ FPM Air Speed Radius (ft)	Zone 3 105+ FPM Air Speed Radius (ft)	Zone 4 <105 FPM Air Speed Radius (ft)	Recommended Coverage Radius Per Fan (ft)
Selected	165	0	0	10	46	29
Maximum	165	0	0	10	46	29

Model: DC-5-6-3MV

High Volume, Low Speed Ceiling Fan

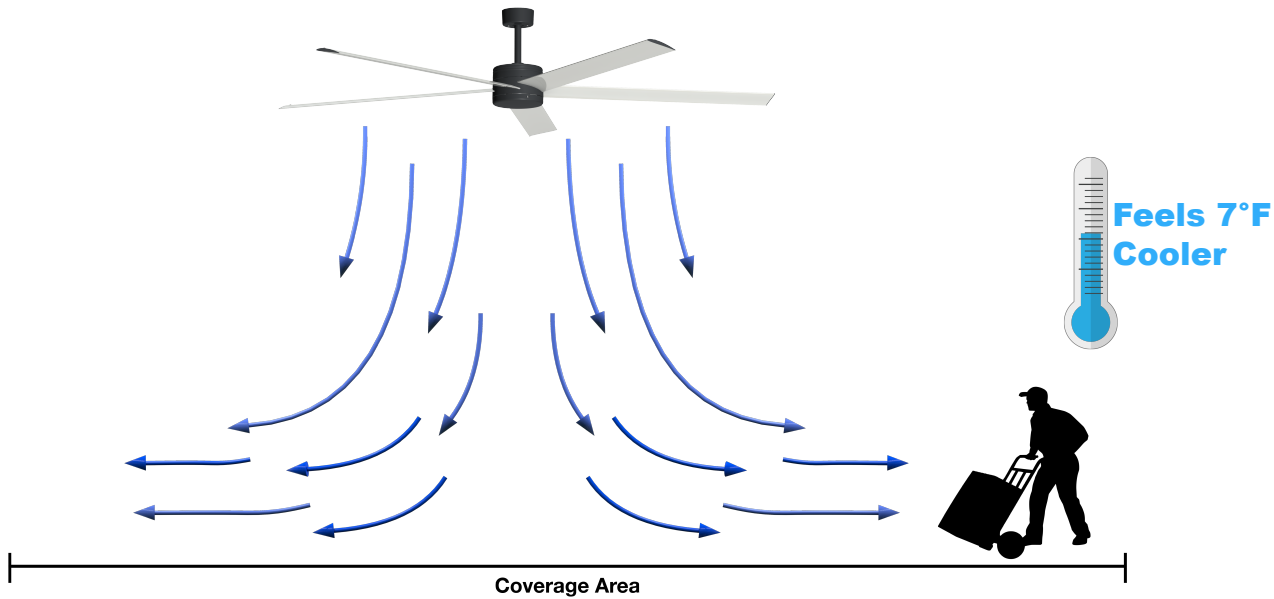
Fan Spacing & Clearances



	A - Clearance to Wall (ft)	B - Fan Spacing (ft)	C - Clearance to Floor (ft)
Minimum	9	18	7

Additional Requirements

Perceived Cooling Effect



Perceived Cooling Effect Based on ASHRAE 55-2017

Coverage Area Per Fan (ft ²)	Operative Temp. (F)	Relative Humidity (%)	Metabolic Rate	Clothing Level	Avg. Air Speed (ft/min)	Perceived Cooling Effect (F)
2,600	77	60	1.7 Walking	0.57 Pants, Short Sleeves	114	7

Payback Analysis

Payback Inputs			
Operating Time	Electric Cost (USD/ KwH)	Heat Source	Heating Cost (USD/ therm)
24 hours/day, 7 days/week	0.08	Gas	0.80

Winter Destratification Energy Savings				
Estimated Heating Load		Annual Energy Cost Savings (USD)	HVLS Energy Cost (USD)	Net Energy Cost Savings (USD)
Without HVLS	With HVLS			
58,274.0	41,448.0	620	22	597

Summer Cooling Energy Savings				
Estimated Cooling Load		Annual Energy Cost Savings (USD)	HVLS Energy Cost (USD)	Net Energy Cost Savings (USD)
Without HVLS	With HVLS			
0.0	0.0	0	0	0

Equipment Cost		
Estimated HVLS Equipment First Cost (USD)	Avoided A/C Equipment Cost (USD)	Net First Cost (USD)
8,925	0	8,925

Payback	
Net Operating Savings Per Year (USD)	Payback Period (Years)
597	14.9

Model: DC-5-6-3MV

Finish Selection

Selected Frame Finish	
Finish Type	Hi-Pro Polyester
Mount Finish Color	Flat Black (044)
Downtube Finish Color	Flat Black (044)
Hub/Hub Plate Finish Color	Flat Black (044)
Winglet Finish Color	Flat Black (044)



Selected Airfoil Finish	
Finish Type	Mill
Finish Color	None

Available Finish Options (Additional Charges May Apply):

Safety Orange	Safety Yellow	Signal Violet	Utility Red
Signal Blue	Equipment Green	Bone White	Ivory
Telegray 4	Concrete Grey	Hampton Brown	Medium Bronze
Flat Black	Cinnamon Cherry	Dark Oak	Golden Knotty Pine
Honey Knotty Pine	Natural Cherry	<p>*Color is for reference only and is not to be used for final color matching. Wood grain finishes available on airfoils only. Anodized finishes not shown.</p>	

Model: DC-5-6-3MV

High Volume, Low Speed Ceiling Fan

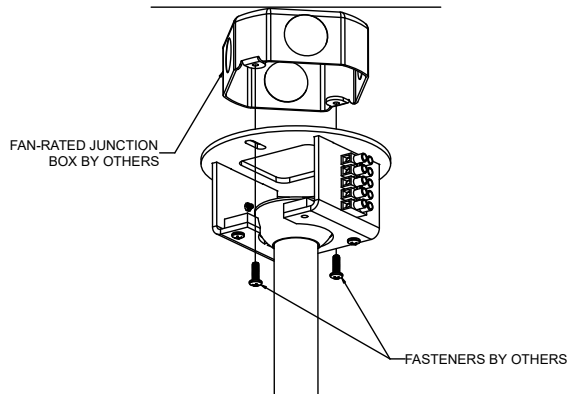
Mechanical Installation Requirements

Selected Mounting Kit: Universal

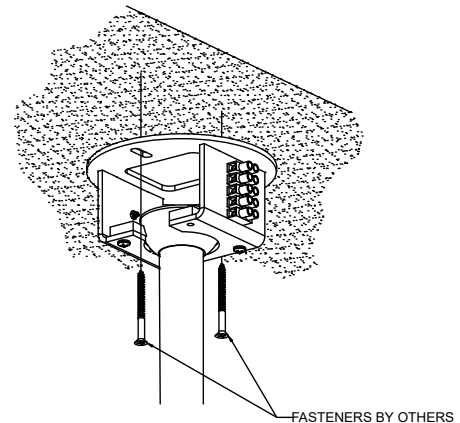
⚠ IMPORTANT: HVLS fans must be mounted to building structure as shown in one of the mounting details on this page. Other mounting methods are not acceptable unless approved by Structural Engineer of Record (SEOR). For complete installation instructions, refer to the installation, operation and maintenance manual (IOM).

⚠ IMPORTANT: Failure to install the fan's safety retention cable and guy wires (if provided) will result in voiding of the fan warranty.

FAN-RATED JUNCTION BOX INSTALLATION



ALTERNATE STRUCTURE INSTALLATION

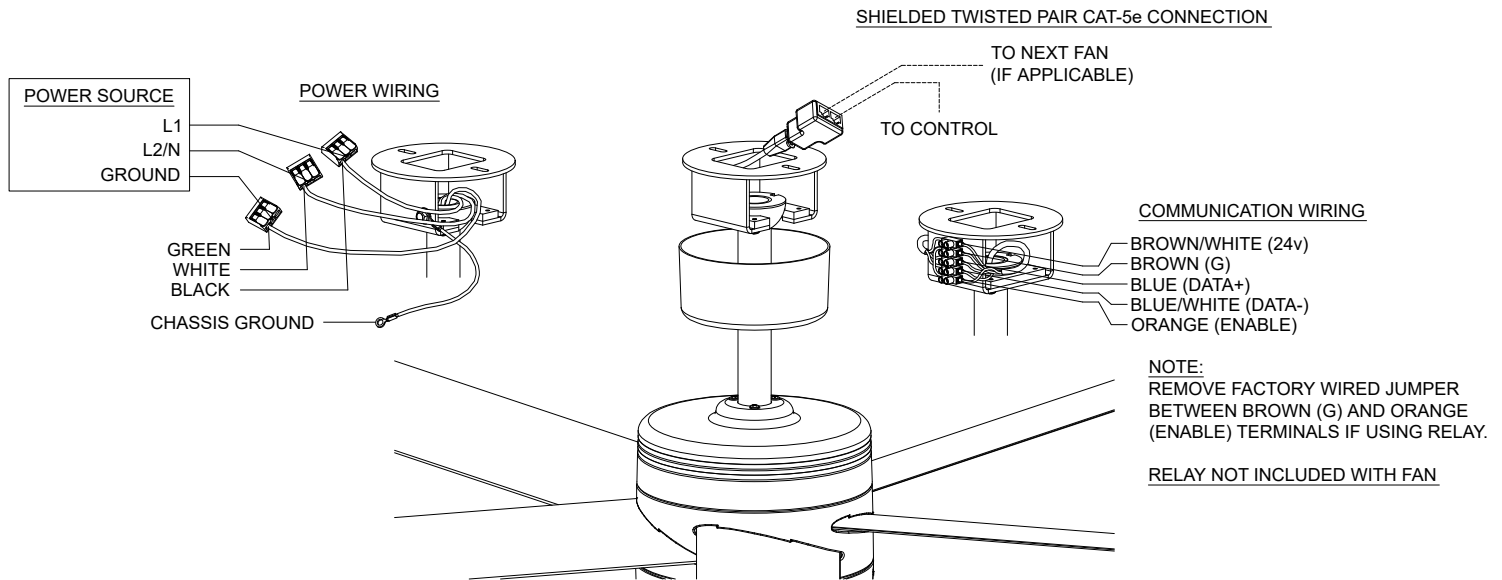


Model: DC-5-6-3MV

High Volume, Low Speed Ceiling Fan

Electrical Installation Requirements

⚠ IMPORTANT: HVLS fans must be installed with the supplied CAT-5e communication cable or shielded, twisted pair (STP) 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: If networking multiple HVLS fans to run using a single control source, additional wiring and network modification may be required. Please refer to the fans's installation, operation and maintenance manual (IOM)

Model: DC-5-6-3MV

High Volume, Low Speed Ceiling Fan

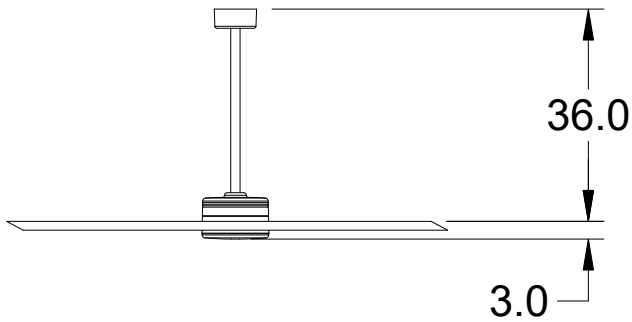
HVLS Fan Compliance

Department of Energy (DOE) 10 CFR Part 430 Compliance						
DOE Min. CFEI at 40% Speed	Calculated CFEI at 40% Speed	DOE Min. CFEI at 100% Speed	Calculated CFEI at 100% Speed	DOE Min. Efficiency (CFM/W)	Calculated Efficiency (CFM/W)	Compliance
-	-	-	-	85	195.00	Yes

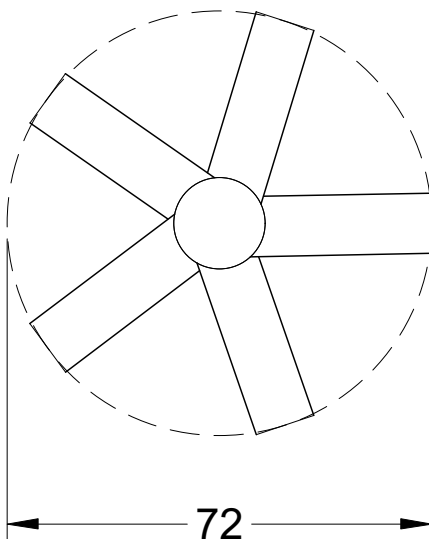
ASHRAE 55-2017 Compliance									
Operative Temp. (F)	Relative Humidity (%)	Metabolic Rate	Clothing Level	Avg. Air Speed (ft/min)	Perceived Cooling Effect (F)	Acceptable Predicted Mean Vote (PMV)	Calculated Predicted Mean Vote (PMV)	Thermal Sensation	Compliance
77	60	1.7 Walking	0.57 Pants, Short Sleeves	114	7	-0.5 ≤ PMV ≤ 0.5	0.15	Neutral	Yes

Assembly Drawing

Type: High Volume, Low Speed Ceiling Fan



SIDE VIEW



BOTTOM VIEW

Notes: All dimensions shown are in units of in..

Mechanical Warranty

10 Yrs (Standard)

WARRANTY AND LIABILITY: SELLER warrants to Buyer that the mechanical components of HVLS products manufactured are free from defects in material and workmanship for a period of 10 Yrs (Standard) from the date of shipment. SELLER's obligations and liabilities under this warranty are limited to furnishing FOB factory or warehouse at SELLER's designated shipping point, freight allowed to Buyer's city, (or point of export for shipments outside the conterminous United States) replacement equipment (or at the option of SELLER parts therefore) for all Seller's products not conforming to this warranty and which have been returned to the manufacturer. No liability whatever shall attach to SELLER until said products have been paid for and such liability shall be strictly limited to the purchase price of the equipment shown to be defective. SELLER will not be responsible for any labor, removal, or installation costs. Electrical components are warranted separately as described in the product's electrical warranty statement. The legal remedies described in this Warranty are the sole exclusive remedy of Buyer. SELLER MAKES NO OTHER WARRANTY, EITHER EXPRESS OR IMPLIED, REGARDING ITS PRODUCTS, OR ITS SELECTION AND APPLICATION, INCLUDING, BUT NOT LIMITED TO, COMPLIANCE WITH BUILDING CODES, SAFETY CODES, LAWS, MERCHANTABILITY OR FITNESS OR A PARTICULAR PURPOSE. This warranty is extended solely to the Buyer. It is nontransferable and non-assignable, and the Buyer shall not permit or authorize its employees, agents, representatives or customers to claim, represent or imply that this limited warranty extends or is available to anyone other than the Buyer. This warranty only applies to the first installation location of the product and terminates if the product is moved or reinstalled in a new location. ANY MISUSE, NEGLECT, FAILURE TO FOLLOW INSTRUCTIONS OR MANUALS OF INSTALLATION OF MAINTENANCE REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE PRODUCTS PERFORMED BY ANY PERSON OR ENTITY OTHER THAN SELLER WITHOUT SELLER'S PRIOR WRITTEN APPROVAL OR ANY USE OF REPLACEMENT PARTS NOT SUPPLIED BY SELLER, SHALL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE AFFECTED PRODUCTS. SELLER RESERVES THE RIGHT TO MAKE FINAL DETERMINATION ON WARRANTY CLAIMS, BASED ON ITS OWN EVALUATION, AS TO WHETHER THE PROBLEM IN QUESTION IS THE RESULT OF A DEFECT AND NOT A RESULT OF ERROR, MISUSE, AN ACT OF GOD, OR ABUSE ON THE PART OF THE CUSTOMER WHICH WOULD MAKE THE WARRANTY VOID. CONDITIONS THAT WOULD MAKE THE WARRANTY VOID INCLUDE BUT ARE NOT LIMITED TO: NOISE HEARD DURING OPERATION THAT IS WITHIN NORMAL OPERATING LEVELS, IMPROPER APPLICATION, IMPROPER INSTALLATION, OR ADVERSE SITE CONDITIONS (INCLUDING, BUT NOT LIMITED TO, EXCESSIVE DUST, HEAT, HUMIDITY, UNSTABLE ELECTRICAL SERVICE, OR ANY OTHER UNKNOWN OR UNFORESEEN CONDITION THAT AFFECTS THE PROPER OPERATION OF THE PRODUCT). THE WARRANTY AND LIABILITY SET FORTH HEREIN ARE IN LIEU OF ALL OTHER WARRANTIES AND LIABILITIES WHETHER IN CONTRACT OR IN NEGLIGENCE, EXPRESSED OR IMPLIED, IN LAW OR IN FACT, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE. SELLER PROVIDES NO INDEPENDENT WARRANTY FOR THIRD PARTY PRODUCTS OR COMPONENTS SOLD TOGETHER OR INCORPORATED WITH SELLER'S PRODUCT(S). THE SELLER HAS THE RIGHT TO SETTLE ANY AND ALL DISPUTES REGARDING THE WARRANTY.

Electrical Warranty

3 Yrs (Standard)

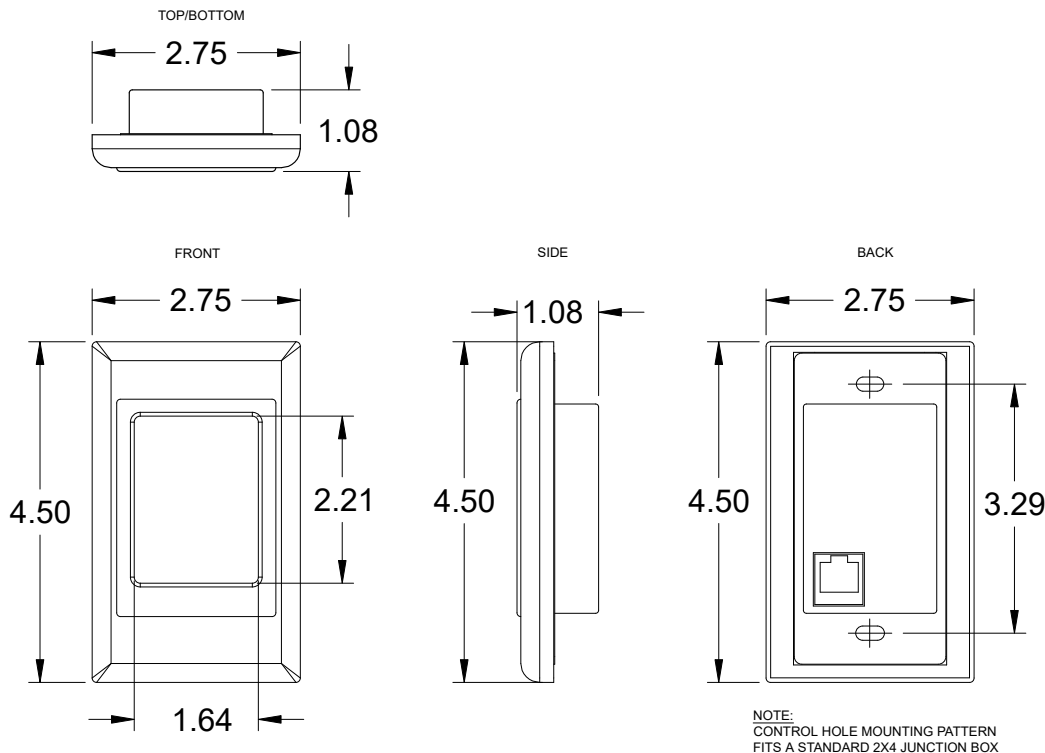
WARRANTY AND LIABILITY: SELLER warrants to Buyer that the electrical components (including motors, variable frequency drives, and factory-supplied wiring; excluding UV-C lightbulbs and ballasts) of HVLS products manufactured are free from defects in material and workmanship for a period of 3 Yrs (Standard) from the date of shipment. SELLER's obligations and liabilities under this warranty are limited to furnishing FOB factory or warehouse at SELLER's designated shipping point, freight allowed to Buyer's city, (or point of export for shipments outside the conterminous United States) replacement equipment (or at the option of SELLER parts therefore) for all Seller's products not conforming to this warranty and which have been returned to the manufacturer. No liability whatever shall attach to SELLER until said products have been paid for and such liability shall be strictly limited to the purchase price of the equipment shown to be defective. SELLER will not be responsible for any labor, removal, or installation costs. Mechanical components are warranted separately as described in the product's mechanical warranty statement. To the extent that SELLER is entitled to pass through a warranty of the original equipment manufacturer of the electrical goods sold, SELLER will pass through such warranty to Buyer. The legal remedies described in this Warranty are the sole exclusive remedy of Buyer. SELLER MAKES NO OTHER WARRANTY, EITHER EXPRESS OR IMPLIED, REGARDING ITS PRODUCTS, OR ITS SELECTION AND APPLICATION, INCLUDING, BUT NOT LIMITED TO, COMPLIANCE WITH BUILDING CODES, SAFETY CODES, LAWS, MERCHANTABILITY OR FITNESS OR A PARTICULAR PURPOSE. This warranty is extended solely to the Buyer. It is nontransferable and non-assignable, and the Buyer shall not permit or authorize its employees, agents, representatives or customers to claim, represent or imply that this limited warranty extends or is available to anyone other than the Buyer. This warranty only applies to the first installation location of the product and terminates if the product is moved or reinstalled in a new location. ANY MISUSE, NEGLECT, FAILURE TO FOLLOW INSTRUCTIONS OR MANUALS OF INSTALLATION OF MAINTENANCE REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE PRODUCTS PERFORMED BY ANY PERSON OR ENTITY OTHER THAN SELLER WITHOUT SELLER'S PRIOR WRITTEN APPROVAL OR ANY USE OF REPLACEMENT PARTS NOT SUPPLIED BY SELLER, SHALL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE AFFECTED PRODUCTS. SELLER RESERVES THE RIGHT TO MAKE FINAL DETERMINATION ON WARRANTY CLAIMS, BASED ON ITS OWN EVALUATION, AS TO WHETHER THE PROBLEM IN QUESTION IS THE RESULT OF A DEFECT AND NOT A RESULT OF ERROR, MISUSE, AN ACT OF GOD, OR ABUSE ON THE PART OF THE CUSTOMER WHICH WOULD MAKE THE WARRANTY VOID. CONDITIONS THAT WOULD MAKE THE WARRANTY VOID INCLUDE BUT ARE NOT LIMITED TO: NOISE HEARD DURING OPERATION THAT IS WITHIN NORMAL OPERATING LEVELS, IMPROPER APPLICATION, IMPROPER INSTALLATION, OR ADVERSE SITE CONDITIONS (INCLUDING, BUT NOT LIMITED TO, EXCESSIVE DUST, HEAT, HUMIDITY, UNSTABLE ELECTRICAL SERVICE, OR ANY OTHER UNKNOWN OR UNFORESEEN CONDITION THAT AFFECTS THE PROPER OPERATION OF THE PRODUCT). THE WARRANTY AND LIABILITY SET FORTH HEREIN ARE IN LIEU OF ALL OTHER WARRANTIES AND LIABILITIES WHETHER IN CONTRACT OR IN NEGLIGENCE, EXPRESSED OR IMPLIED, IN LAW OR IN FACT, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE. SELLER PROVIDES NO INDEPENDENT WARRANTY FOR THIRD PARTY PRODUCTS OR COMPONENTS SOLD TOGETHER OR INCORPORATED WITH SELLER'S PRODUCT(S). THE SELLER HAS THE RIGHT TO SETTLE ANY AND ALL DISPUTES REGARDING THE WARRANTY.

HVLS Fan Controls

Standard Construction Features:

HVLS fan controls are designed for use with Greenheck's high volume, low speed (HVLS) ceiling fan products. Each control is configured for communication with one or multiple HVLS fans via the included RJ45 connector.

Control Type:	Std. Touchscreen
Control Quantity:	1
Fans Per Control:	3
Installation Kit:	N/A
Control Enclosure:	Touchscreen interface with IP40 Front enclosure
Power Supply:	Requires 24V power from fan via shielded, twisted pair (STP) CAT-5e cable
Communications:	Configured for Modbus RTU Communication with HVLS Fan(s) Included RJ45 Receptacle for Plug-and-Play Communication Wiring to HVLS Fans via Shielded CAT-5e Cable (CAT-5e Cable Provided with HVLS Fans)
Fan Operation:	Capable of Operating Up to 3 HVLS Fans with Any Combination of Models and Sizes Fans Operate Individually with Unique Speed Settings and Directions of Rotation



Notes: All dimensions shown are in units of in.