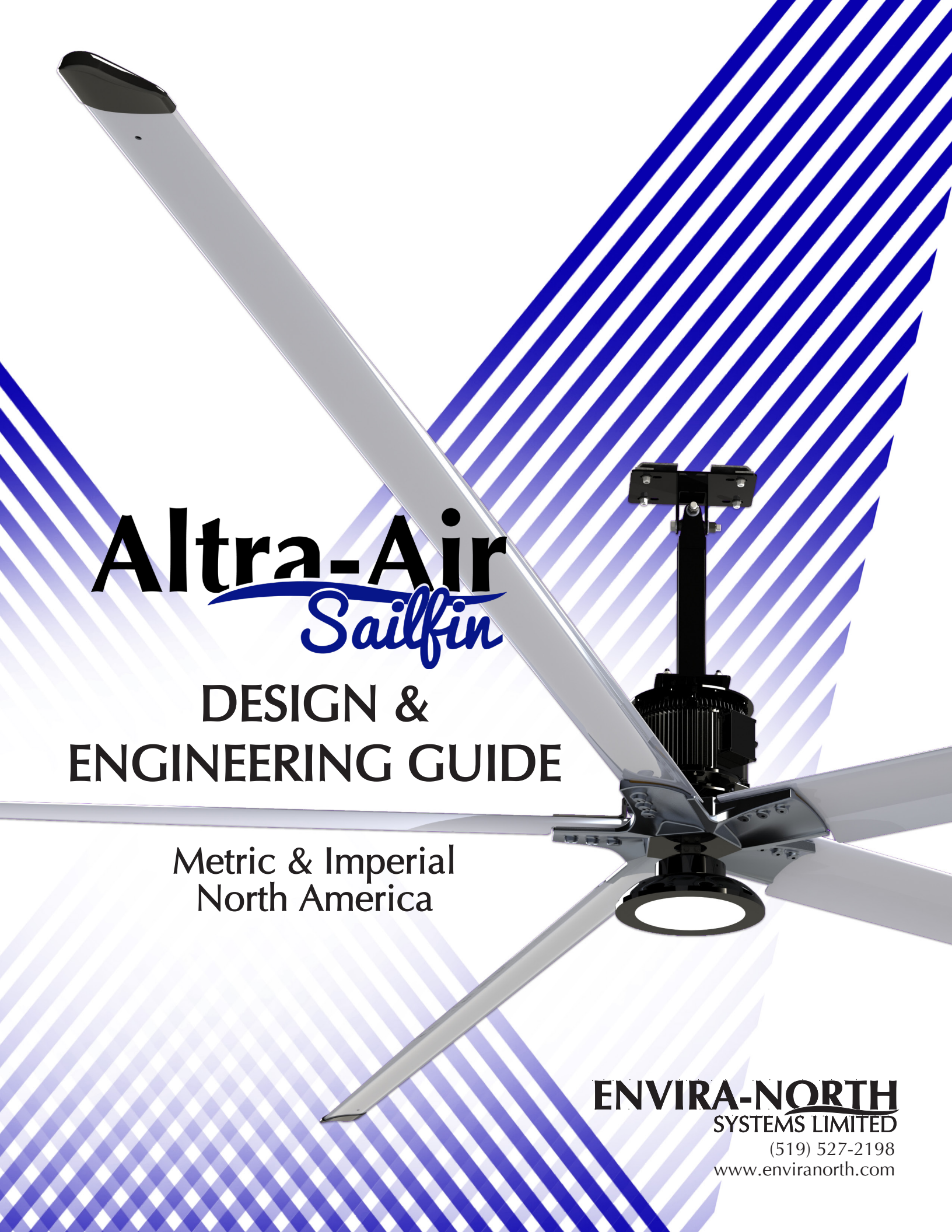




Altra-Air *Sailfin*

DESIGN & ENGINEERING GUIDE

Metric & Imperial
North America

ENVIRA-NORTH
SYSTEMS LIMITED
(519) 527-2198
www.enviranorth.com

ALTRA-AIR SAILFIN FANS

Thank you for incorporating Envira-North System's Altra-Air Sailfin Fans into your project. Envira-North Systems Ltd. recognizes that energy savings is a top priority in today's economic and social environment. Bringing over 50 years of ventilation expertise, we've established ourselves by providing quality products accompanied by the best after-sales service in the industry, while contributing to the effectiveness of heating / cooling and ventilation systems.

Our mission is to continually develop and provide quality, cost efficient ventilation solutions that improve energy consumption and increase comfort levels for the occupants of large structures.

Energy consumption has grown to be a critical factor in business worldwide. Envira-North will continue to develop and provide solutions to improve energy consumption while increasing occupant productivity inside structures around the globe. Ample research is available to show that adequate fresh air exchange is crucial for workers, students, animals and home occupants to perform at their best. A well designed ventilation scheme can:

- Lower temperatures in buildings by cooling roof spaces and removing trapped ceiling heat through ceiling grilles.
- Improve air quality by lowering impurity levels caused by human respiration and toxic chemical emissions.

Altra-Air Sailfin Fans are a green power breakthrough which allows our High Volume Low Speed (HVLS) fans to deliver previously impossible levels of performance. These HVLS fans are simply outstanding when compared to what was previously considered the state-of-the-art fan.

- 5 blades are 25% more aerodynamically efficient (they move more air more smoothly).
- Aerodynamic blade noise (the main source of fan noise) is less than 1/5 of conventional fans.
- Best of all, they consume 20% less power.

We are proud to acknowledge that no other blade can match a Sailfin blade when it comes to generating substantially greater lift while reducing drag.

This Engineering and Design Guide should give you everything you need to successfully include Altra-Air Sailfin fans into your project.

Thank you for giving Envira-North Systems Ltd. the opportunity to be incorporated into your project's design plans. If you have any questions, concerns or comments please do not hesitate to contact the Envira-North office at 1(519)527-2198 or visit our website at www.enviranorth.com.

TABLE OF CONTENTS

INTRODUCTION.....	2 - 7
Why Choose Envira-North.....	4
The Sailfin Blade Advantage.....	4
Benefits of Sailfin.....	4
Warranty Overview.....	5
Sailfin Introduction.....	6
Safety System.....	7
 COMPONENTS.....	 8 - 15
Fan Components Diagram.....	8
Mounting Applications.....	9
Fan Blade Clearance.....	10
1FT Mount.....	11
2FT Mount.....	12
4FT Mount.....	13
1FT Extension.....	14
1FT Extension.....	15
 FAN SPECIFICATIONS.....	 16 - 24
2.4 M (8 FT) Sailfin.....	16 - 17
3.7 M (12 FT) Sailfin.....	18 - 19
4.9 M (16 FT) Sailfin.....	20 - 21
6.1 M (20 FT) Sailfin.....	22 - 23
7.3 M (24 FT) Sailfin.....	24 - 25
Specifications Chart.....	26
Guy Wires.....	27
Packaging / Shipping.....	28
Control Options.....	29
Limitation of Warranty & Liability.....	30-34
Maintenance Schedule.....	35

Engineers requiring AutoCAD or SolidWorks drawings can download them by accessing the Envira-North ‘Dealer Login’ page on our website at www.enviranorth.com/dealerlogin. Please note that an authorised username and password is required to access this secure area of our site. Please contact Envira-North at 1(519)527-2198 to receive a username and password.

**Please note that all dimensions in this engineering and design guide are subject to change without notice. Envira-North Systems Ltd reserves the right to make changes accordingly.

WHY CHOOSE ENVIRA-NORTH SYSTEMS LTD?

We are Canada's largest supplier of industrial/commercial big ceiling (HVLS - High Volume Low Speed) fans and claim 75% of the Canadian market for industrial/commercial destratification and ventilation fans. Applications include hangars, warehouses, hockey rinks, shopping malls, distribution centres, office buildings, dairy farms, or any other facility with high ceilings. Envira-North Systems has been featured on CBC, MSNBC, A Channel, and in Discover Magazine, Toronto Star, Christian Science Monitor and Material Handling Management.

Envira-North Systems Ltd. staff bring to you over 50 years of ventilation expertise. We pride ourselves in providing the best after sales service in the industry. We recognize that energy savings is a top priority in today's environment.

Envira-North Systems Ltd. has recognized a worldwide need to reduce energy consumption by contributing to the effectiveness of heating, cooling and ventilation systems. Our products and systems enable your building to perform better; save on heating, cooling, mechanical operating costs and provide a healthier environment for the occupants of the structure.

THE SAILFIN BLADE ADVANTAGE

Salfin blades outperform all conventional airfoils. They accomplish this by:

- Offering an angle of attack up to 23°.
- Eliminating span-wise pumping; the primary cause of efficiency loss in all rotating systems.
- Eliminating tip stalling; the primary cause of blade noise and damaging vibration.
- Variablevariable pitch modulated trailing-edge airfoil removes the inefficiencies created by differentiating rotational HVLS Fan speeds.

THE BENEFITS OF SAILFIN

- Quiet speed and efficient operation, no annoying high speed circulating and exhaust fans.
- Virtually maintenance free (recommended inspection every 20,000 hours).
- Inexpensive to operate. Costs approximately 6 cents per hour for one fan at 1 HP.
- Greatly reduces "recovery" time when overhead doors are open with a constant air flow throughout.
- Provides a constant, even temperature from floor to ceiling and wall to wall.
- Will minimize the need for expensive duct work in new construction for both heating and air conditioning systems.
- A comfortable workplace environment increases productivity and decreases absenteeism.

INSTALLATION

Altra-Air Sailfin Fans come as a complete system including power unit, mounting hardware, wiring kit (optional) and low voltage controller (optional). Having everything included in this complete package streamlines installation and eliminates the costly search for components and hardware.

WARRANTY

Altra-Air Sailfin fans are of industrial grade construction and should provide many years of virtually maintenance free use. Standard 3 Year Limited Warranty duration is as follows:

Air Foil Shaped Blade	Lifetime Warranty
Aluminum Alloy Hub	Lifetime Warranty
Motor	3 Year Limited Warranty
VFD Control Panel	3 Year Limited Warranty
Labour	1 Year Limited Warranty (pre-approved)
Custom fan wraps/paint	1 Year Limited Warranty

Please see page 28 of this document for complete warranty information including specifics and warranty exclusions. Use the above warranty information as a general guideline only.

ALTRA-AIR SAILFIN FANS

Altra-Air HVLS fans blanket a very large area with constantly moving air to create an expansive comfort zone. As a result, the big ceiling fan can create an evaporative cooling effect of three to four degrees Celsius throughout the facility.

During the heating season, the Altra-Air HVLS fan technology can de-stratify uneven temperatures that can be in excess of fifteen degrees Celsius from ceiling to floor. This results in significant energy savings since the heating system cycles less frequently.

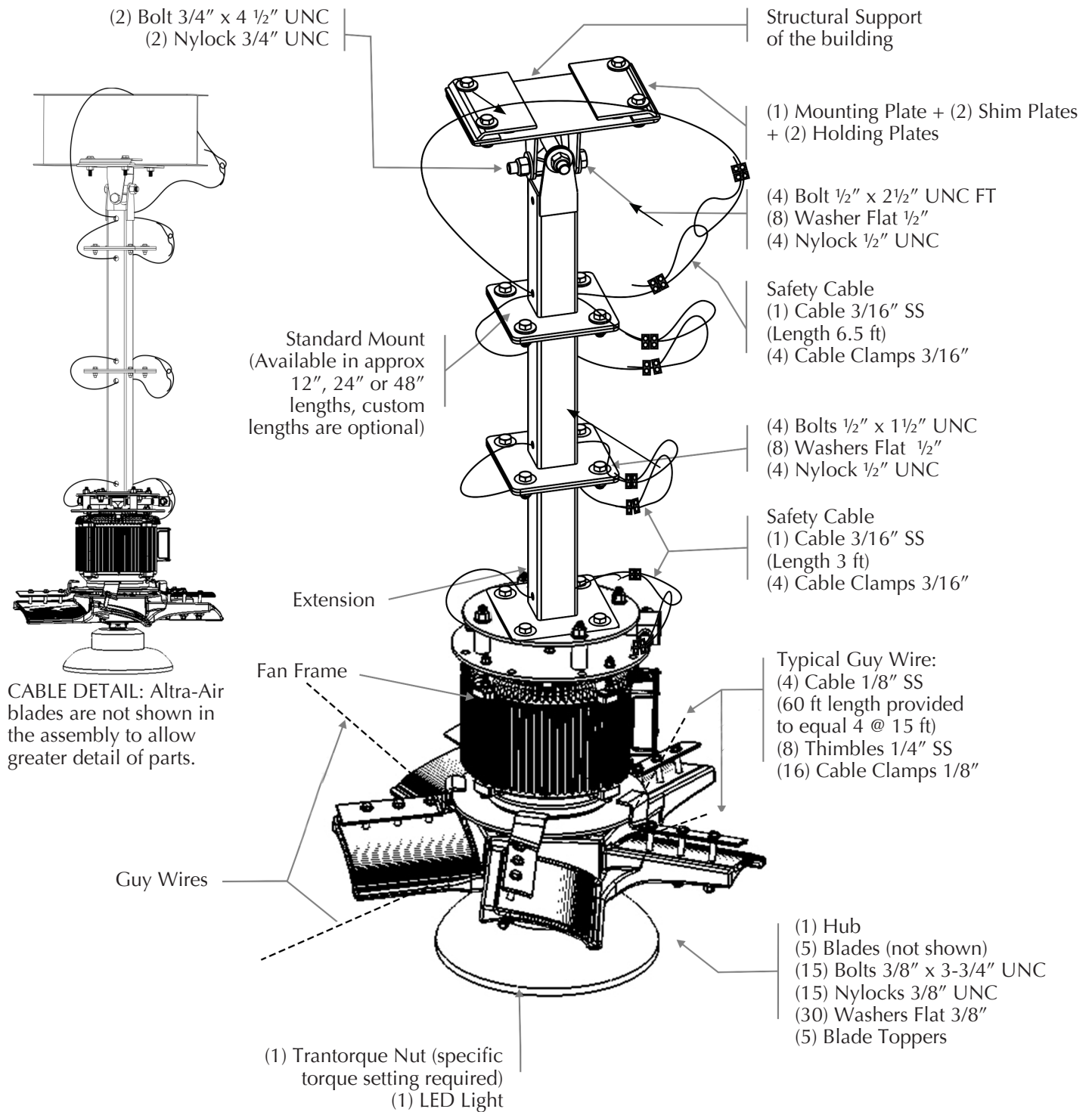


SAFETY SYSTEMS

In regards to safety issues concerning Altra-Air fans we would like to point out the measure we took to ensure the safety of our fans.

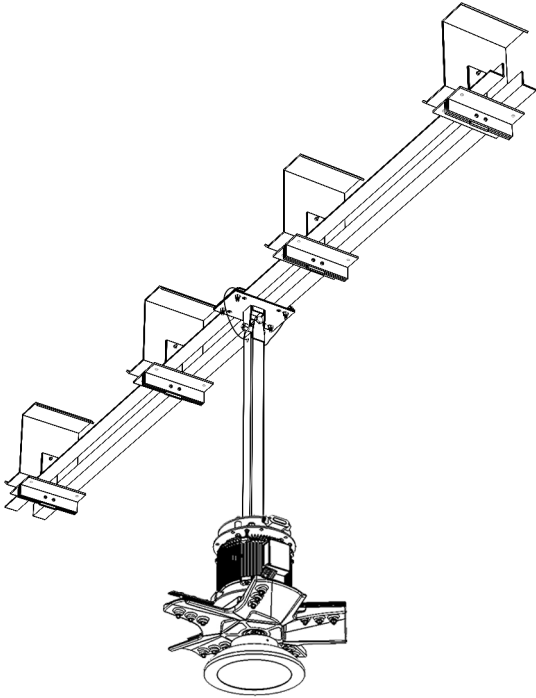
- Safety Cable - This cable ties together the vertical drop and the motor/gear reducer frame to the physical structure of your building.
- Safety Clips - These clips prevent the hub from falling in case of failure of the Fenner drive (nut) that holds the hub to the shaft of the gear reducer.
- Guy Wires - The wires have two functions; first, to avoid unnecessary sway of the fan in case of unbalanced blade(s) and second, to avoid large movements due to wind or draft.
- Mount - The mounting hardware has been designed and engineered to support the weight of the fan and provide a secure connection to the structure.

FAN COMPONENTS DIAGRAM

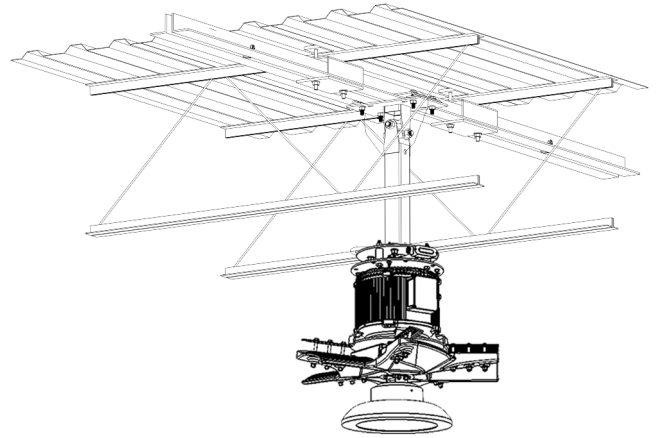


Note: All bolts are "Grade 5 UNO"
FT = Fully Threaded
(#) = Quantity Supplied

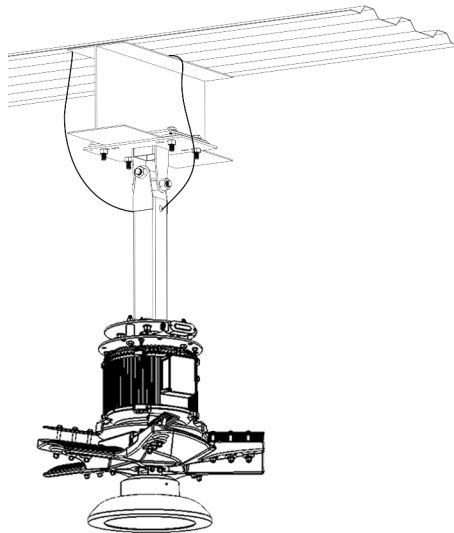
3. DIFFERENT MOUNTING APPLICATIONS



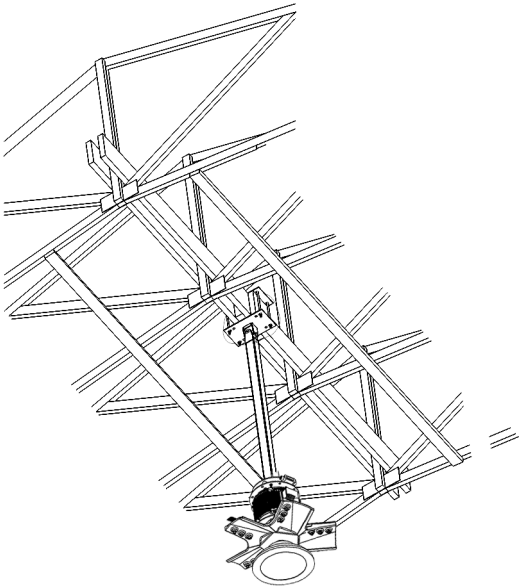
PURLIN Z MOUNT



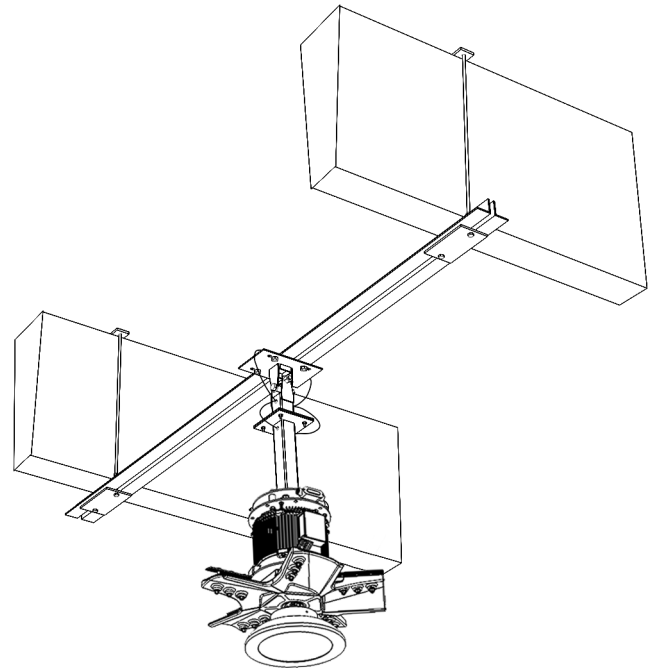
OWSJ MOUNT



I BEAM MOUNT



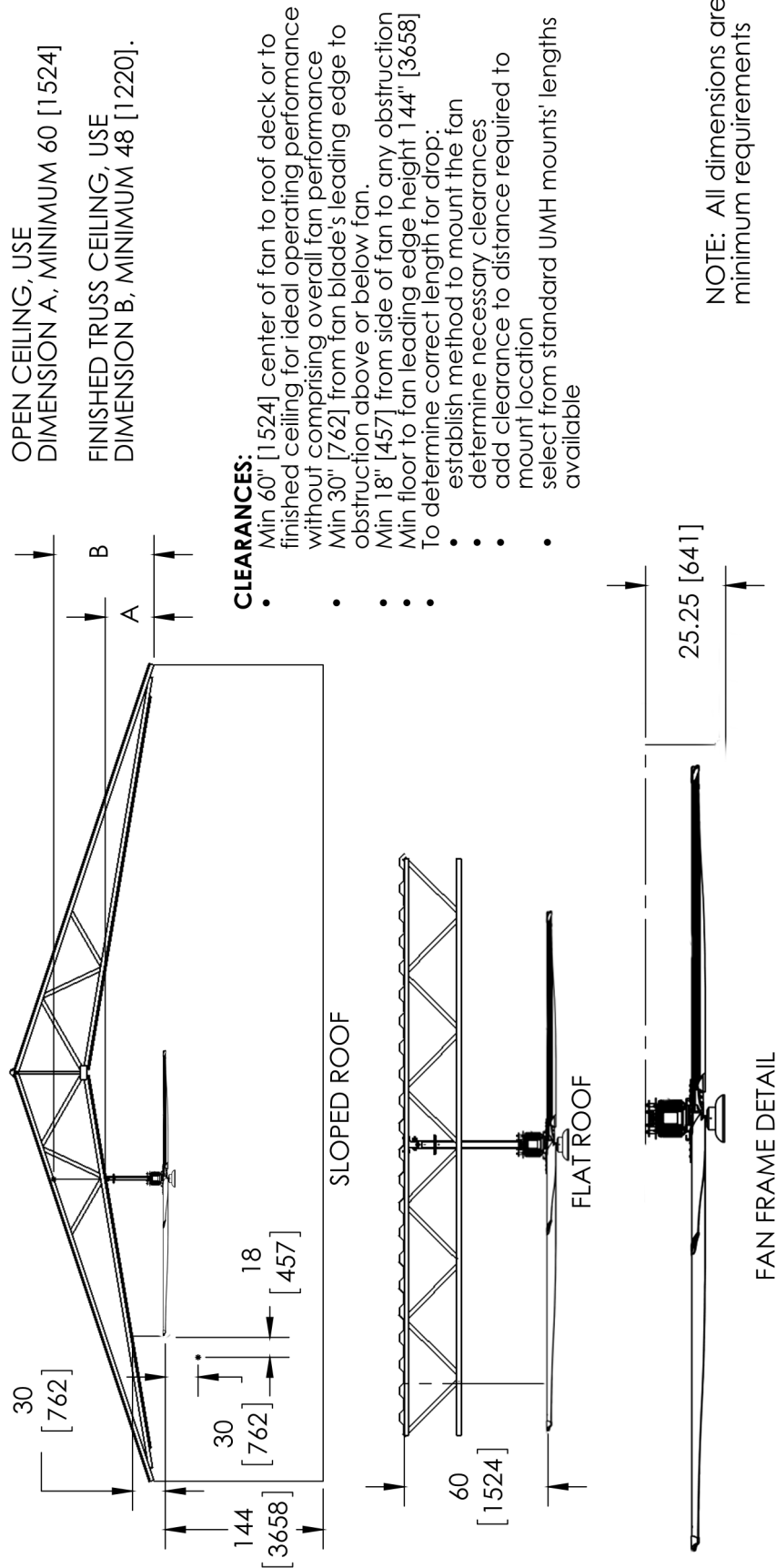
WOOD BEAM MOUNT



CONCRETE BEAM MOUNT

NOTE: The following mounting applications are representations only and are subject to change without notice. Contact your sales representative or the Envira-North office for complete mounting instructions.

FAN BLADE CLEARANCE



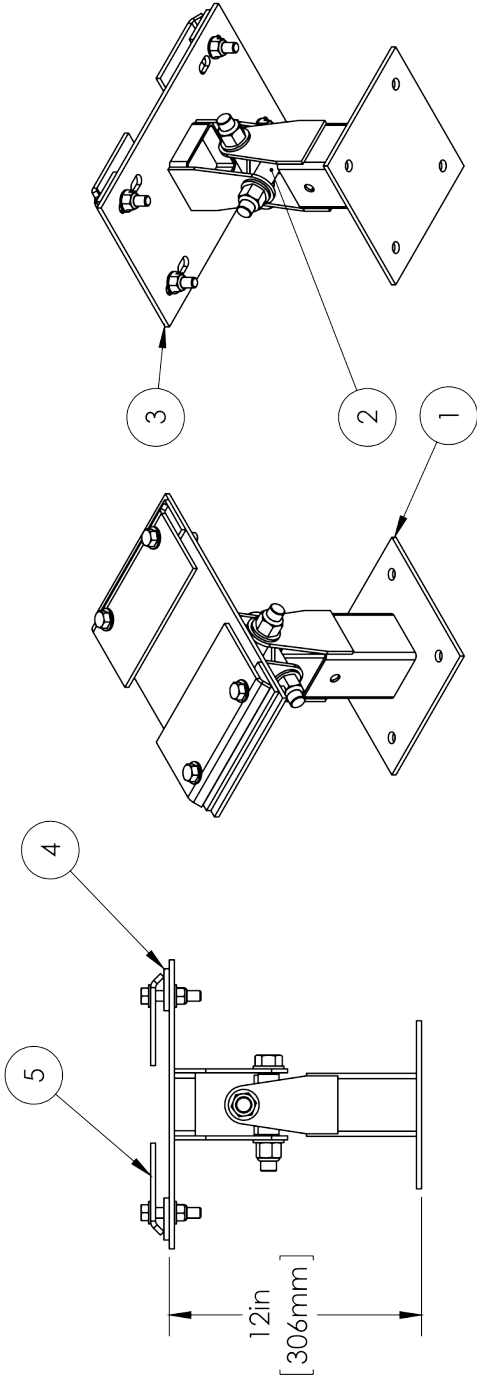
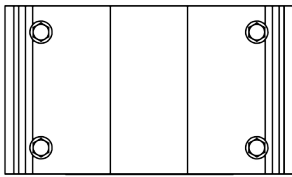
NOTE: All dimensions are minimum requirements

MATERIAL	COMMENTS: MINIMUM DIMENSIONS FOR CLEARANCE	DRAWN	MITCHELL BEERMAN	Drawing Date:	9/27/2011	Envira-North Systems Ltd.	
		G.A.				TITLE:	
		Last Revised Date:		Checked By:	CDV		
		ENG APPR.		Checked Date:	09/27/2011		
FINISH	Note: Contractor is responsible for verifying all site conditions to include field dimensions where applicable. If the contractor disagrees with the dimensions shown on this drawing, the contractor is responsible for the same. All dimensions shown on this drawing are to be used as general architectural intent only and are not to be used for engineering or structural design purposes. Contractor to check all building departments and local authorities are informed in regard to the work and that all permits are obtained commencing the work.	ENG APPR.		MFG APPR.		MINIMUM CLEARANCES	
		ENG APPR. Date:		Last Saved Date:	Tuesday, September 27, 2011 3:19:11 PM	SIZE	DWG. NO.
		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES; TOLERANCES: FRACTIONAL: 1/16 ANGULAR: MACH: 0.1° BEND ± 0.5° TWO PLACE DECIMAL ± 0.060 THREE PLACE DECIMAL ± 0.030		REVISIONS:		A	CONSTRAINTS
				ADJUSTED MIN REQUIREMENTS			SCALE: N.T.S. WEIGHT:
VENDORS NUMBER:	DO NOT SCALE DRAWING PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF ENVIRA-NORTH SYSTEMS LTD. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF ENVIRA-NORTH SYSTEMS LTD. IS PROHIBITED. THIS DRAWING IS THE PROPERTY OF ENVIRA-NORTH SYSTEMS LTD. THIS CONSTRUCTION DRAWING, ENVIRA-NORTH SYSTEMS LTD. SHOULD BE CONTACTED IMMEDIATELY FOR RESPONSE.						

1 FT MOUNT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	EN823X8425	DROP H TYPE 1 FT	1
2	EN823X8418	UMH COUPLER PC	1
3	EN823X8417	UMH UPPER PIVOT PLATE	1
4	EN823X8401	MANUFACTURED I-BEAM SPACER	2
5	EN823X8402	MANUFACTURED I-BEAM CLAMP	2

DIMENSIONS SUBJECT TO
CHANGE WITHOUT NOTICE.

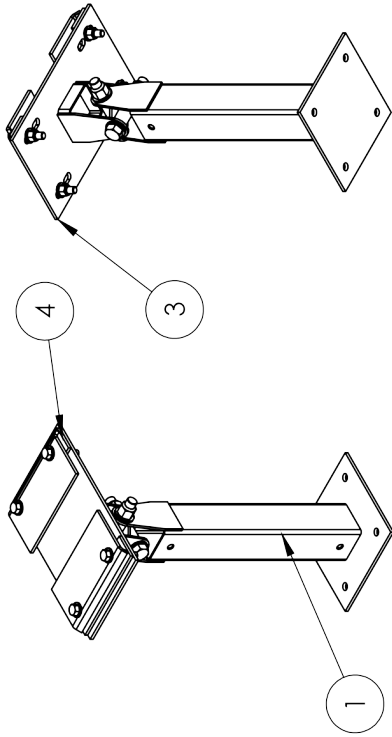
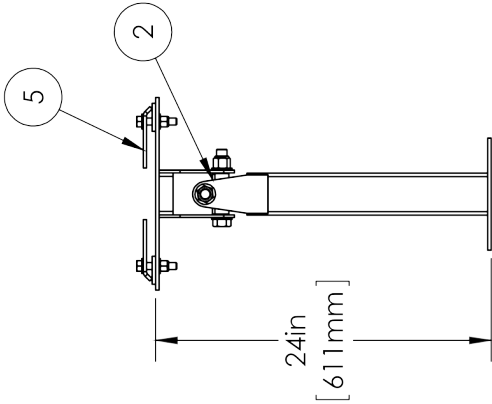
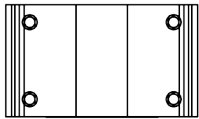


Q:\01_Envira-North\SolidWorks (DWG) EN\EN400X2001

MATERIAL AS SPECIFIED	DRAWN CEO	Envira-North Systems Ltd.	
FINISH AS SPECIFIED	Q.A. Last Revised Date:	TITLE: 1 FT UMH MOUNT	
VENDORS NUMBER: .	ENG APPR. Last Saved Date: Wednesday, October 19, 2011 10:09:50 AM	SIZE A	REV
DO NOT SCALE DRAWING PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF ENVIRA-NORTH SYSTEMS LTD. NO PART OF THIS DRAWING IS TO BE REPRODUCED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF ENVIRA-NORTH SYSTEMS LTD. THIS CONSTRUCTION DRAWING, ENVIRA-NORTH SYSTEMS LTD. SHOULD BE CONTACTED IMMEDIATELY FOR RESPONSE.	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: $\pm$ ANGULAR: MACH $\pm$ BEND $\pm$ THREE PLACE DECIMAL $\pm$	DWG. NO. EN400X2001	SCALE: 1:2 WEIGHT: 24.88
COMMENTS: PART #'S MAY VARY DEPENDING ON MEIRIC OR IMPERIAL HARDWARE REQUIREMENTS	ENG APPR. Date: MFG APPR.	1	2
REVISIONS:		3	4
		5	1

2 FT MOUNT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	EN823X8426	DROP H TYPE 2 FT	1
2	EN823X8418	UMH COUPLER PC	1
3	EN823X8417	UMH UPPER PIVOT PLATE	1
4	EN823X8401	MANUFACTURED I-BEAM SPACER	2
5	EN823X8402	MANUFACTURED I-BEAM CLAMP	2



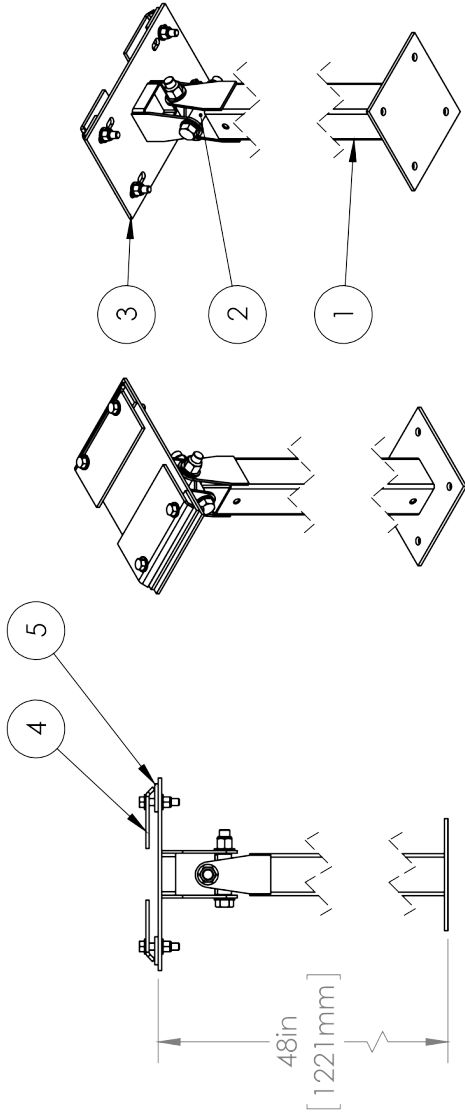
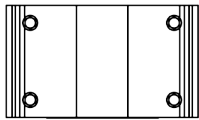
DIMENSIONS SUBJECT TO
CHANGE WITHOUT NOTICE.

Q:\01_Envira-North\SolidWorks (DWG) EN\EN400X2002

MATERIAL AS SPECIFIED	COMMENTS: PART #'S MAY VARY DEPENDING ON METRIC OR IMPERIAL HARDWARE REQUIREMENTS	DRAWN	CEO	Drawing Date: 6/16/2011	Envira-North Systems Ltd.		
		Q.A.		Checked By: CDV	TITLE: 2 FT UMH MOUNT		
FINISH AS SPECIFIED	REVISIONS:	Last Revised Date:		Checked Date: 6/16/2011	SIZE A	DWG. NO. EN400X2002	REV
VENDORS NUMBER:		ENG APPR.		MFG APPR.			
DO NOT SCALE DRAWING	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF ENVIRA-NORTH SYSTEMS LTD. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF ENVIRA-NORTH SYSTEMS LTD IS PROHIBITED. SHOULD THERE BE ANY DISCREPANCIES WITH THIS CONSTRUCTION DRAWING, ENVIRA-NORTH SYSTEMS LTD SHOULD BE CONTACTED IMMEDIATELY FOR RESPONSE.	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±		Last Saved Date: Wednesday, October 19, 2011 12:33:24 PM			
PROPRIETARY AND CONFIDENTIAL							

4 FT MOUNT

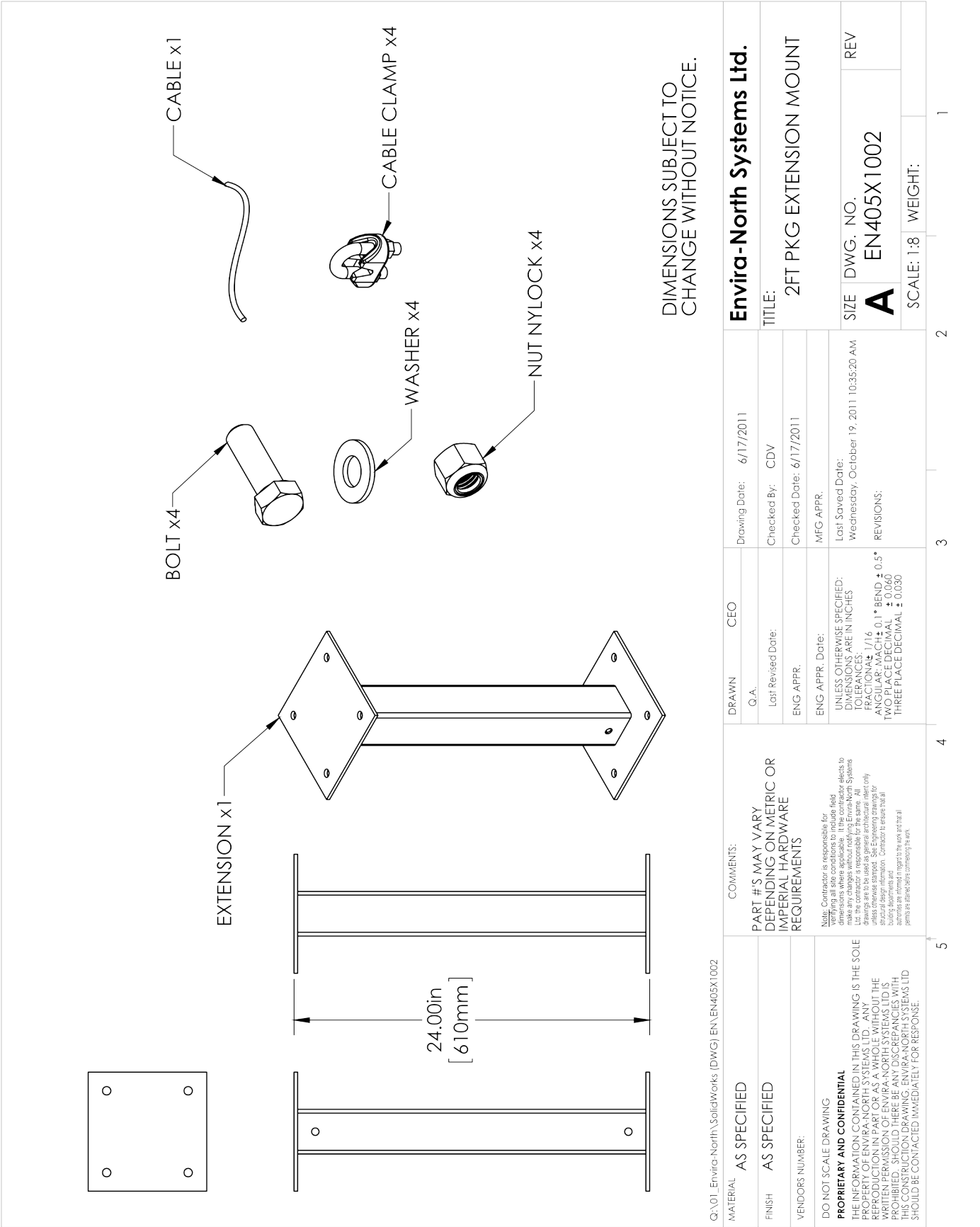
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	EN823X8428	DROP H TYPE 4 FT	1
2	EN823X8418	UMH COUPLER PC	1
3	EN823X8417	UMH UPPER PIVOT PLATE	1
4	EN823X8402	MANUFACTURED I-BEAM CLAMP	2
5	EN823X8401	MANUFACTURED I-BEAM SPACER	2



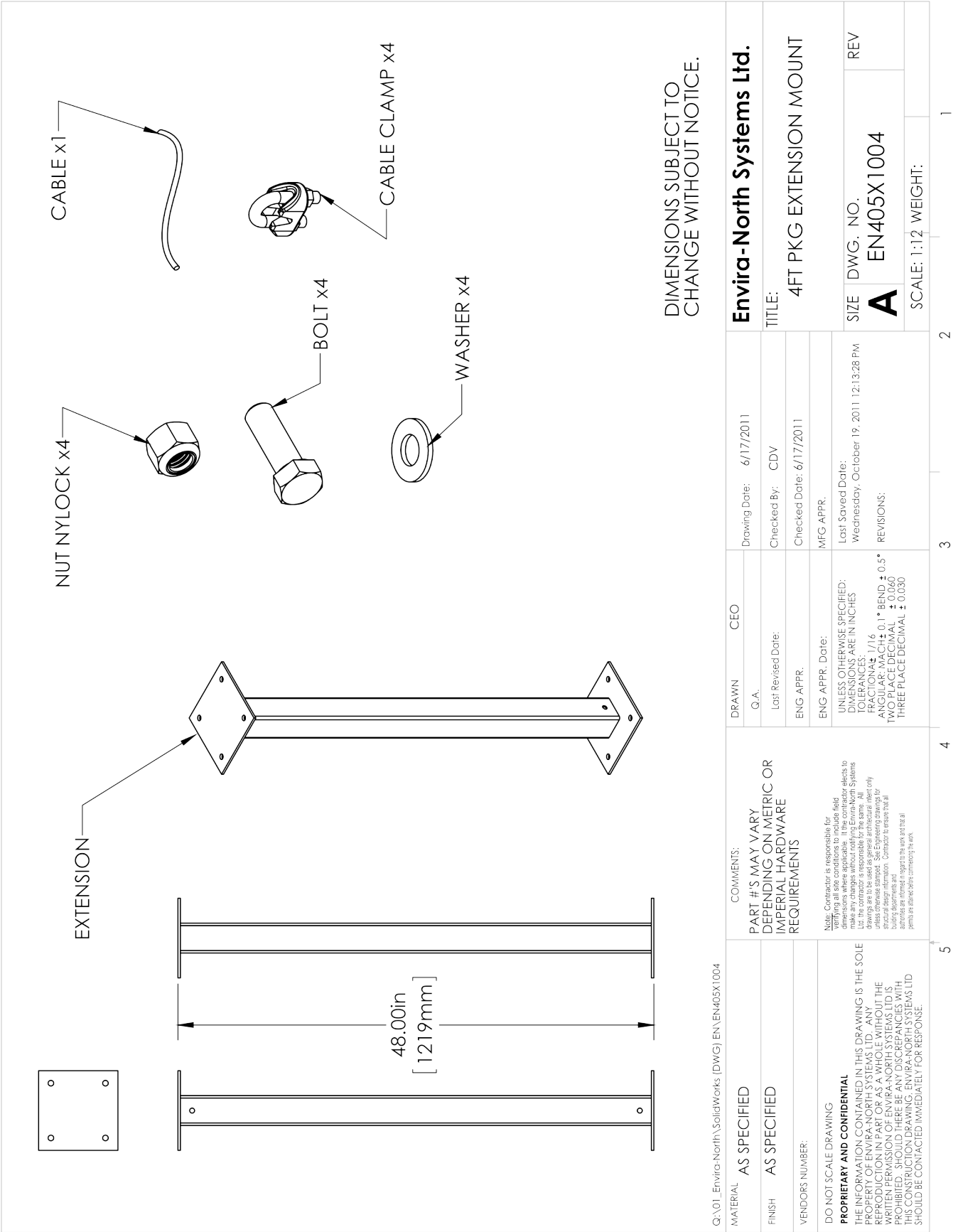
DIMENSIONS SUBJECT TO
CHANGE WITHOUT NOTICE.

Q:\01_Envira-North\SolidWorks (DWG) EN\EN400X2004		COMMENTS:		DRAWN	CEO	Drawing Date: 6/16/2011	Envira-North Systems Ltd.		
MATERIAL	AS SPECIFIED	PART #'S MAY VARY DEPEND ON METRIC OR IMPERIAL HARDWARE REQUIREMENTS		Q.A.					
FINISH	AS SPECIFIED			Last Revised Date:	CDV		TITLE: 4 FT UMH MOUNT		
VENDORS NUMBER:				ENG APPR.		Checked Date: 6/16/2011			
DO NOT SCALE DRAWING		REVISIONS:		ENG APPR. Date:		MFG APPR.			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF ENVIRA-NORTH SYSTEMS LTD. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF ENVIRA-NORTH SYSTEMS LTD IS PROHIBITED. SHOULD THERE BE ANY DISCREPANCIES WITH THIS CONSTRUCTION DRAWING, ENVIRA-NORTH SYSTEMS LTD SHOULD BE CONTACTED IMMEDIATELY FOR RESPONSE.				UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ± ANGULAR: MACH: ± BEND: ± TWO PLACE DECIMAL: ± THREE PLACE DECIMAL: ±			SIZE	DWG. NO.	REV
							A	EN400X2004	
							SCALE: 1:2		WEIGHT: 39.22

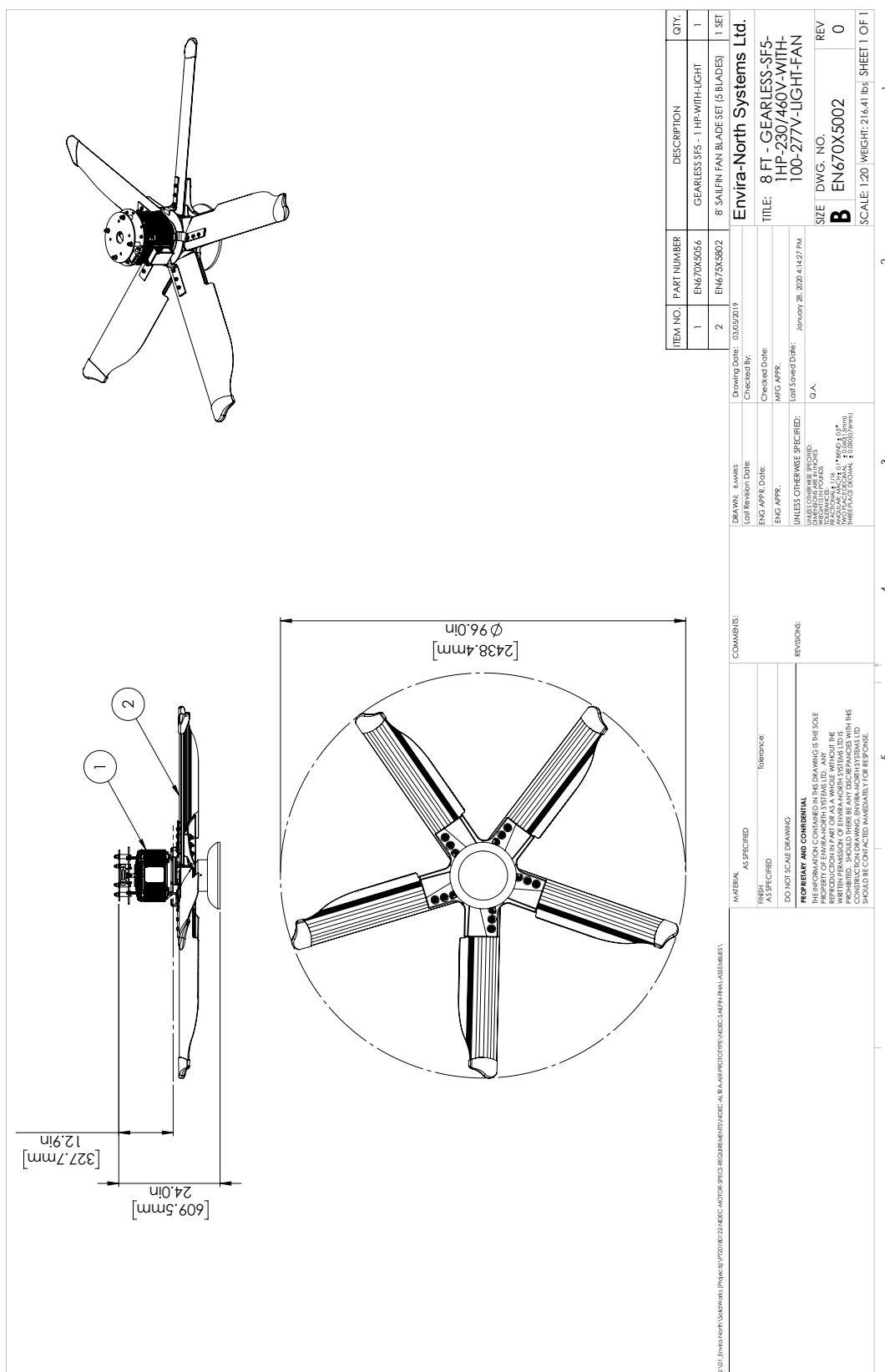
2 FT EXTENSION



4 FT EXTENSION



2.4 M (8 FT) ALTRA-AIR SAILFIN FAN SPEC DRAWING



2.4 M (8 FT) ALTRA-AIR SAILFIN FAN SPECIFICATIONS

General

Model Number.....	EN670X5002
Diameter	2.4 m (8 ft)
Number of Blades	5
Noise Level	45 dBA
Weight (no mount)	99 kgs (220 lbs)
Packaged Fan (30" x 31" x 32").....	115.6 kgs (255 lbs*)
Packaged Blades (11" x 11" x 48").....	39 kgs (86 lbs)

* Mounts, extensions & controls packages separately. Weights may vary.



Performance

Maximum Velocity.....	1.96 m/s (386 ft/min)
Airflow	28,078 l/s (59,494 CFM)
Maximum Speed	105 RPM
Power Usage.....	782 W
Maximum Effective Diameter	18 m (60 ft)

Construction

Hub	713 Cast Aluminum Alloy
Blades	6063 Extruded Anodized Aluminum
Blade End Caps	High Impact Polystyrene

Safety Components

Safety Cables.....	3/16" Stainless Steel
Guy Wires.....	1/8" Stainless Steel
Safety Clips	Zinc Plated Steel

Mounting Hardware

Standard Mount.....	Universal I-Beam Clamp w/ Swivel
Standard Drop	1 ft / 2 ft / 4 ft
Drop Extensions (Optional)	1 ft / 2 ft / 4 ft

Mounting

Open Web Steel Joist (Optional).....	Steel Beam With Brackets
Wood Beam Mount (Optional).....	Steel Machined Mount Plates
Concrete Beam Mount (Optional).....	Steel Beam with Matching Mount Plates
Purlin "Z" Mount (Optional).....	Steel Beam Brackets
Steel Thickness Varies Depending on Beam Span.....	Consult Factory for Specifics

*Please see Altra-Air Installation Guide for more information regarding mounting hardware.

Motor

HP.....	2 HP (50 Hz / 60 Hz)
Volts.....	230 V / 460 V
Amps Consumed.....	5.0 A @ 230 V

Fan Control

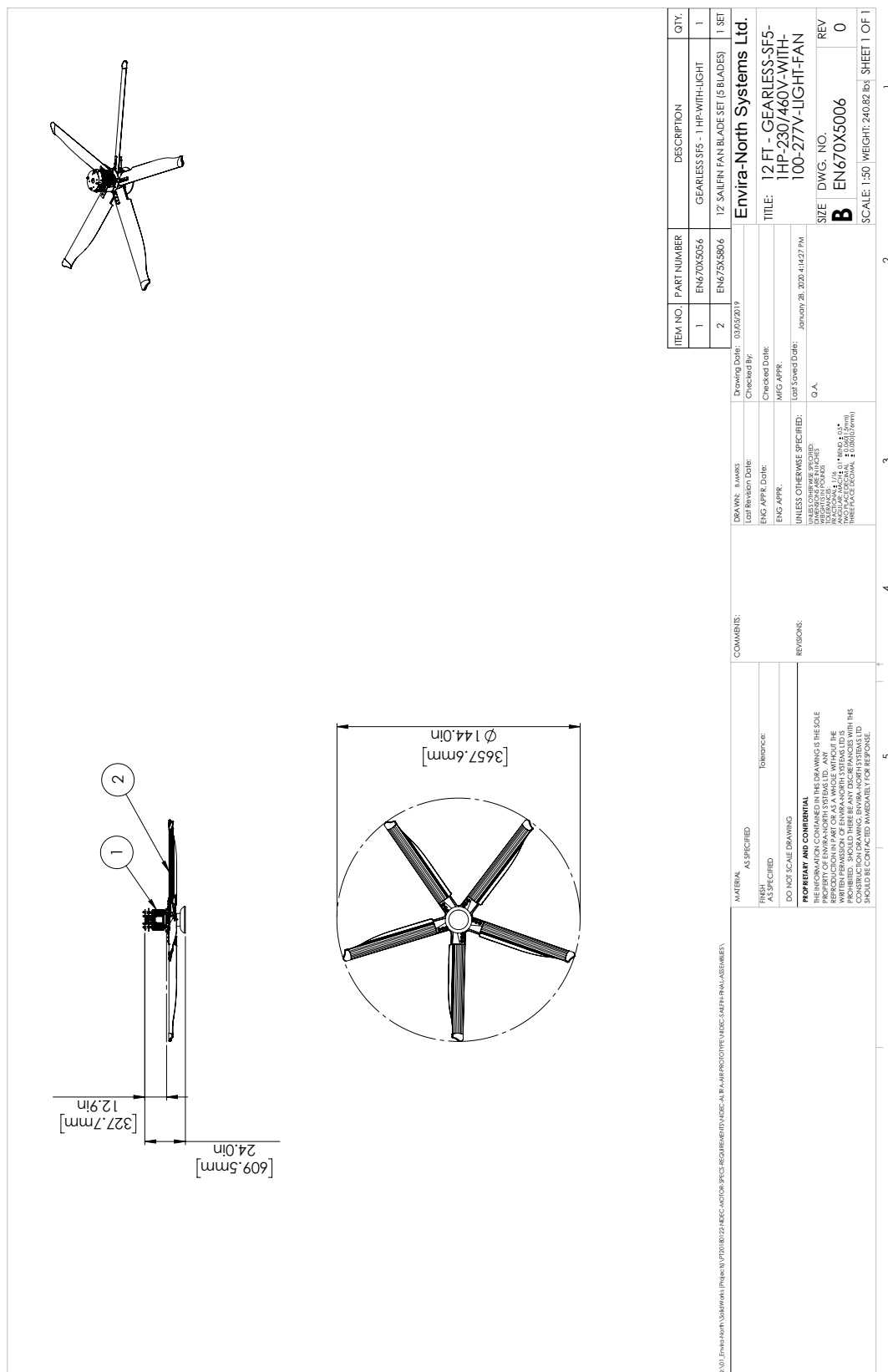
Enclosure	IP66
Operation.....	Key Pad
Standard Power	208 V / 230 V / 400 V / 460 V
Special Wiring (Thermostats, Fire Alarm Interface, Networking Etc.)(Optional).....	Consult Factory
50 / 60 Hz Operation	

Warranty

Motor & Control Panel	3 Years
Blades, Hub & Mounting System	Lifetime

*Please see Altra-Air Installation Guide for warranty specifications and exclusions.

3.7 M (12 FT) ALTRA-AIR SAILFIN FAN SPEC DRAWING



3.7 M (12 FT) ALTRA-AIR SAILFIN FAN SPECIFICATIONS

General

Model Number.....	EN670X5006
Diameter	3.7 m (12 ft)
Number of Blades	5
Noise Level	45 dBA
Weight (no mount)	111 kgs (245 lbs)
Packaged Fan (30" x 31" x 32").....	115.6 kgs (255 lbs*)
Packaged Blades (11" x 11" x 72").....	50.4 kgs (111 lbs)

* Mounts, extensions & controls packages separately. Weights may vary.



Performance

Maximum Velocity.....	1.96 m/s (386 ft/min)
Airflow	33,236 l/s (70,424 CFM)
Maximum Speed	105 RPM
Power Usage.....	782 W
Maximum Effective Diameter	24 m (80 ft)

Construction

Hub	713 Cast Aluminum Alloy
Blades	6063 Extruded Anodized Aluminum
Blade End Caps	High Impact Polystyrene

Safety Components

Safety Cables.....	3/16" Stainless Steel
Guy Wires.....	1/8" Stainless Steel
Safety Clips	Zinc Plated Steel

Mounting Hardware

Standard Mount.....	Universal I-Beam Clamp w/ Swivel
Standard Drop	1 ft / 2 ft / 4 ft
Drop Extensions (Optional)	1 ft / 2 ft / 4 ft

Mounting

Open Web Steel Joist (Optional).....	Steel Beam With Brackets
Wood Beam Mount (Optional)	Steel Machined Mount Plates
Concrete Beam Mount (Optional).....	Steel Beam with Matching Mount Plates
Purlin "Z" Mount (Optional).....	Steel Beam Brackets
Steel Thickness Varies Depending on Beam Span.....	Consult Factory for Specifics

*Please see Altra-Air Installation Guide for more information regarding mounting hardware.

Motor

HP.....	2 HP (50 Hz / 60 Hz)
Volts.....	230 V / 460 V
Amps Consumed.....	5.0 A @ 230 V

Fan Control

Enclosure	IP66
Operation.....	Key Pad
Standard Power	208 V / 230 V / 400 V / 460 V
Special Wiring (Thermostats, Fire Alarm Interface, Networking Etc.)(Optional).....	Consult Factory
50 / 60 Hz Operation	

Warranty

Motor & Control Panel	3 Years
Blades, Hub & Mounting System	Lifetime

*Please see Altra-Air Installation Guide for warranty specifications and exclusions.

20



4.9 M (16 FT) ALTRA-AIR SAILFIN FAN SPECIFICATIONS

General

Model Number.....	EN670X5010
Diameter	4.9 m (16 ft)
Number of Blades	5
Noise Level	45 dBA
Weight (no mount)	125 kgs (275 lbs)
Packaged Fan (30" x 31" x 32").....	115.6 kgs (255 lbs*)
Packaged Blades (11" x 11" x 96").....	60.8 kgs (134 lbs)

* Mounts, extensions & controls packages separately. Weights may vary.



Performance

Maximum Velocity.....	2.79 m/s (550 ft/min)
Airflow	59,953 l/s (127,033 CFM)
Maximum Speed	80 RPM
Power Usage.....	939 W
Maximum Effective Diameter	43 m (140 ft)

Construction

Hub	713 Cast Aluminum Alloy
Blades	6063 Extruded Anodized Aluminum
Blade End Caps	High Impact Polystyrene

Safety Components

Safety Cables.....	3/16" Stainless Steel
Guy Wires.....	1/8" Stainless Steel
Safety Clips	Zinc Plated Steel

Mounting Hardware

Standard Mount.....	Universal I-Beam Clamp w/ Swivel
Standard Drop	1 ft / 2 ft / 4 ft
Drop Extensions (Optional)	1 ft / 2 ft / 4 ft

Mounting

Open Web Steel Joist (Optional).....	Steel Beam With Brackets
Wood Beam Mount (Optional)	Steel Machined Mount Plates
Concrete Beam Mount (Optional).....	Steel Beam with Matching Mount Plates
Purlin "Z" Mount (Optional).....	Steel Beam Brackets
Steel Thickness Varies Depending on Beam Span.....	Consult Factory for Specifics

*Please see Altra-Air Installation Guide for more information regarding mounting hardware.

Motor

HP.....	2 HP (50 Hz / 60 Hz)
Volts.....	230 V / 460 V
Amps Consumed.....	5.0 A @ 230 V

Fan Control

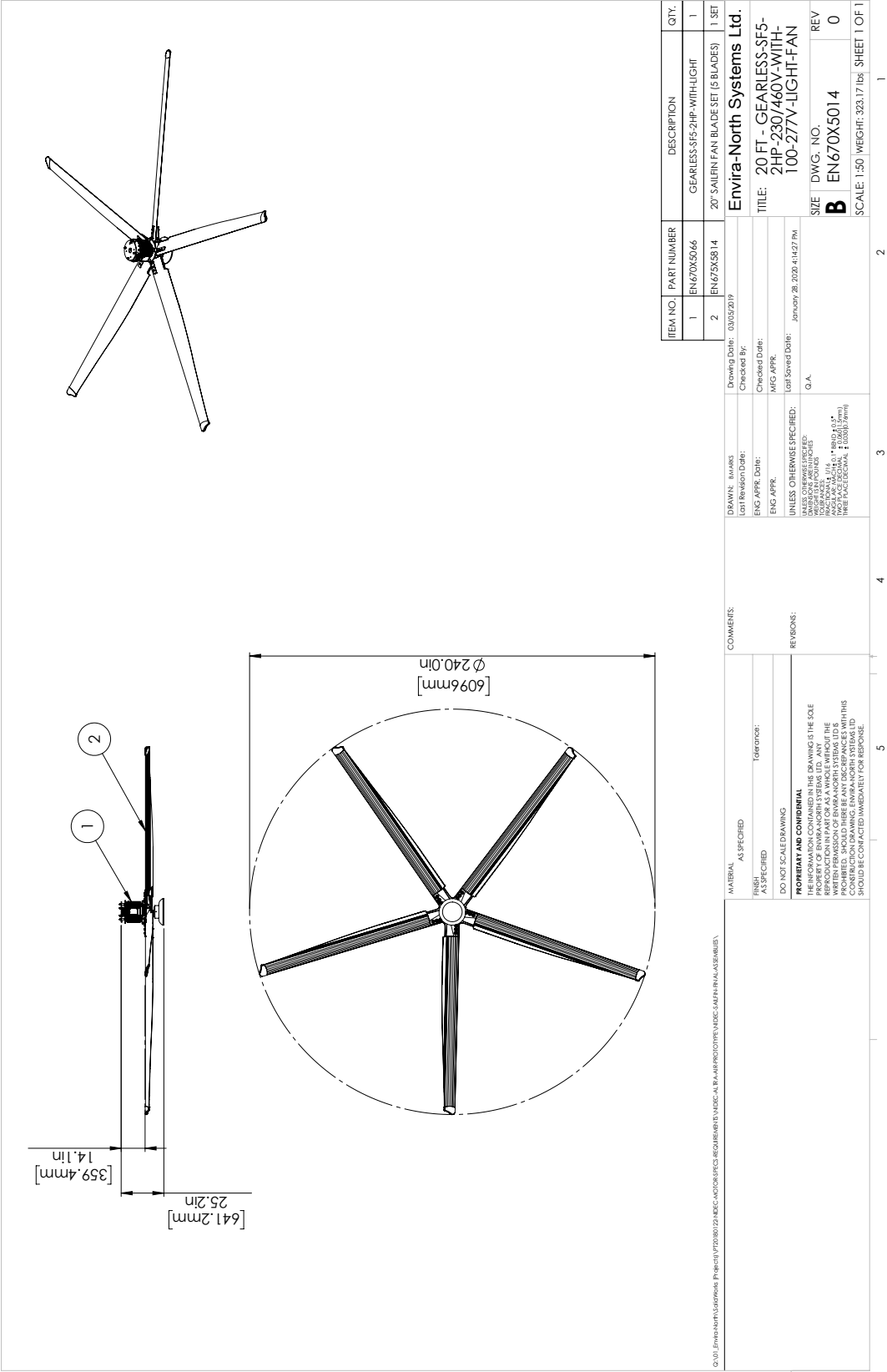
Enclosure	IP66
Operation.....	Key Pad
Standard Power	208 V / 230 V / 400 V / 460 V
Special Wiring (Thermostats, Fire Alarm Interface, Networking Etc.)(Optional).....	Consult Factory
50 / 60 Hz Operation	

Warranty

Motor & Control Panel	3 Years
Blades, Hub & Mounting System	Lifetime

*Please see Altra-Air Installation Guide for warranty specifications and exclusions.

6.1 M (20 FT) ALTRA-AIR SAILFIN FAN SPEC DRAWING



6.1 M (20 FT) ALTRA-AIR SAILFIN FAN SPECIFICATIONS

General

Model Number.....	EN670X5014
Diameter	6.1 m (20 ft)
Number of Blades	5
Noise Level	45 dBA
Weight (no mount)	140 kgs (320 lbs)
Packaged Fan (30" x 31" x 32").....	115.6 kgs (255 lbs*)
Packaged Blades (11" x 11" x 120").....	75.7 kgs (167 lbs)

* Mounts, extensions & controls packages separately. Weights may vary.



Performance

Maximum Velocity.....	2.56 m/s (505 ft/min)
Airflow	83,157 l/s (176,200 CFM)
Maximum Speed	63 RPM
Power Usage.....	1460 W
Maximum Effective Diameter	61 m (200 ft)

Construction

Hub	713 Cast Aluminum Alloy
Blades	6063 Extruded Anodized Aluminum
Blade End Caps	High Impact Polystyrene

Safety Components

Safety Cables.....	3/16" Stainless Steel
Guy Wires.....	1/8" Stainless Steel
Safety Clips	Zinc Plated Steel

Mounting Hardware

Standard Mount.....	Universal I-Beam Clamp w/ Swivel
Standard Drop	1 ft / 2 ft / 4 ft
Drop Extensions (Optional)	1 ft / 2 ft / 4 ft

Mounting

Open Web Steel Joist (Optional).....	Steel Beam With Brackets
Wood Beam Mount (Optional)	Steel Machined Mount Plates
Concrete Beam Mount (Optional).....	Steel Beam with Matching Mount Plates
Purlin "Z" Mount (Optional).....	Steel Beam Brackets
Steel Thickness Varies Depending on Beam Span.....	Consult Factory for Specifics

*Please see Altra-Air Installation Guide for more information regarding mounting hardware.

Motor

HP.....	2 HP (50 Hz / 60 Hz)
Volts.....	230 V / 460 V
Amps Consumed.....	5.0 A @ 230 V

Fan Control

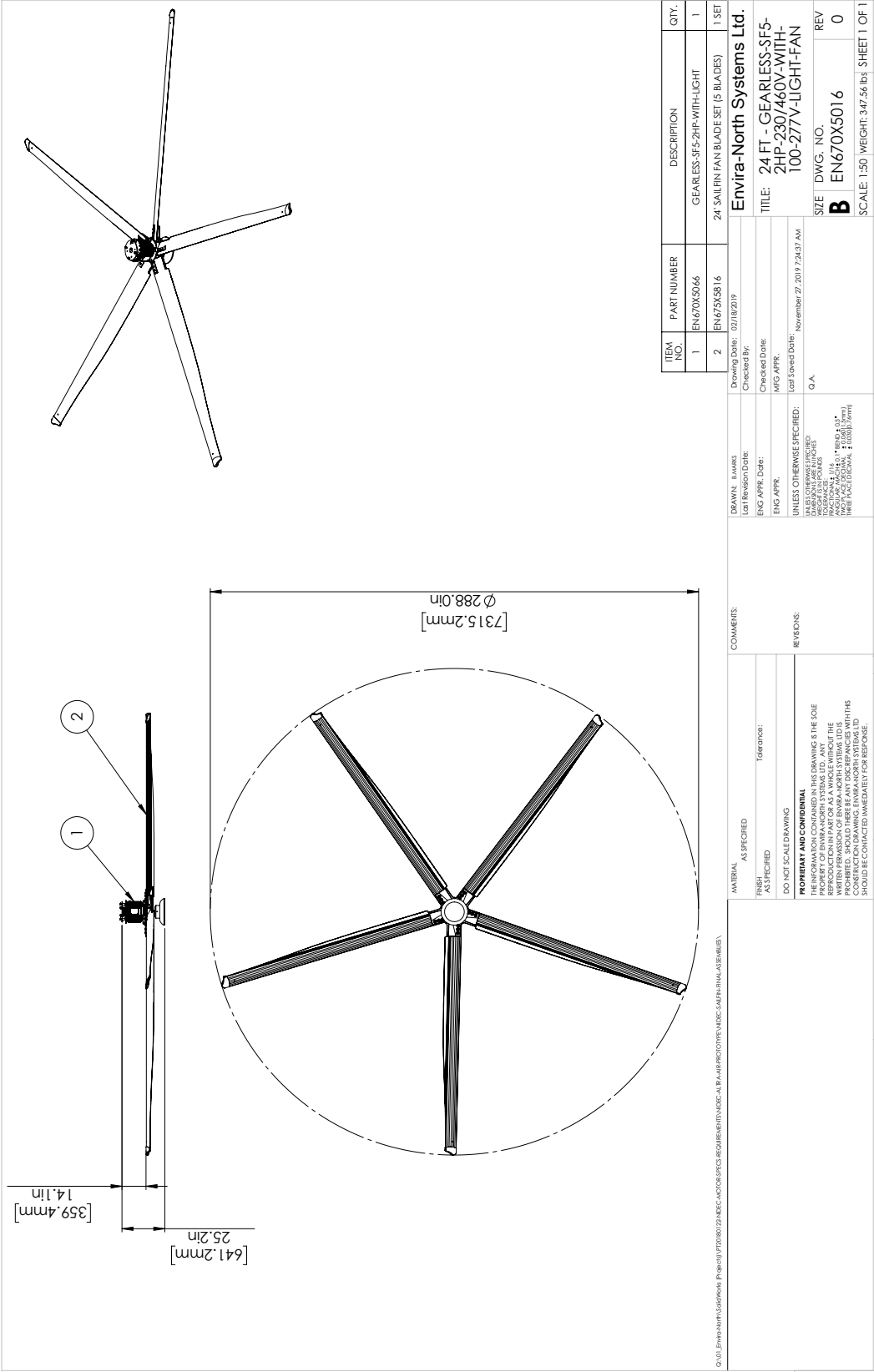
Enclosure	IP66
Operation.....	Key Pad
Standard Power	208 V / 230 V / 400 V / 460 V
Special Wiring (Thermostats, Fire Alarm Interface, Networking Etc.)(Optional).....	Consult Factory
50 / 60 Hz Operation	

Warranty

Motor & Control Panel	3 Years
Blades, Hub & Mounting System	Lifetime

*Please see Altra-Air Installation Guide for warranty specifications and exclusions.

7.3 M (24 FT) ALTRA-AIR SAILFIN FAN SPEC DRAWING



7.3 M (24 FT) ALTRA-AIR SAILFIN FAN SPECIFICATIONS

General

Model Number.....	EN670X5016
Diameter	7.3 m (24 ft)
Number of Blades	5
Noise Level	45 dBA
Weight (no mount)	157 kgs (347 lbs)
Packaged Fan (30" x 31" x 32").....	115.6 kgs (255 lbs*)
Packaged Blades (11" x 11" x 144")	86 kgs (190 lbs)

* Mounts, extensions & controls packaged separately. Weights may vary.



Performance

Maximum Velocity.....	2.52 m/s (497 ft/min)
Airflow	148,676 l/s (315,026 CFM)
Maximum Speed	53 RPM
Power Usage.....	1486 W
Maximum Effective Diameter	(70 m) 230 ft

Construction

Hub	713 Cast Aluminum Alloy
Blades	6063 Extruded Anodized Aluminum
Blade End Caps	High Impact Polystyrene

Safety Components

Safety Cables.....	3/16" Stainless Steel
Guy Wires.....	1/8" Stainless Steel
Safety Clips	Zinc Plated Steel

Mounting Hardware

Standard Mount.....	Universal I-Beam Clamp w/ Swivel
Standard Drop	1 ft / 2 ft / 4 ft
Drop Extensions (Optional)	1 ft / 2 ft / 4 ft

Mounting

Open Web Steel Joist (Optional).....	Steel Beam With Brackets
Wood Beam Mount (Optional)	Steel Machined Mount Plates
Concrete Beam Mount (Optional).....	Steel Beam with Matching Mount Plates
Purlin "Z" Mount (Optional).....	Steel Beam Brackets
Steel Thickness Varies Depending on Beam Span.....	Consult Factory for Specifics

*Please see Altra-Air Installation Guide for more information regarding mounting hardware.

Motor

HP.....	2 HP (50 Hz / 60 Hz)
Volts.....	230 V / 460 V
Amps Consumed.....	5.0 A @ 230 V

Fan Control

Enclosure	IP66
Operation.....	Key Pad
Standard Power	208 V / 230 V / 400 V / 460 V
Special Wiring (Thermostats, Fire Alarm Interface, Networking Etc.)(Optional).....	Consult Factory
50 / 60 Hz Operation	

Warranty

Motor & Control Panel	3 Years
Blades, Hub & Mounting System	Lifetime

*Please see Altra-Air Installation Guide for warranty specifications and exclusions.

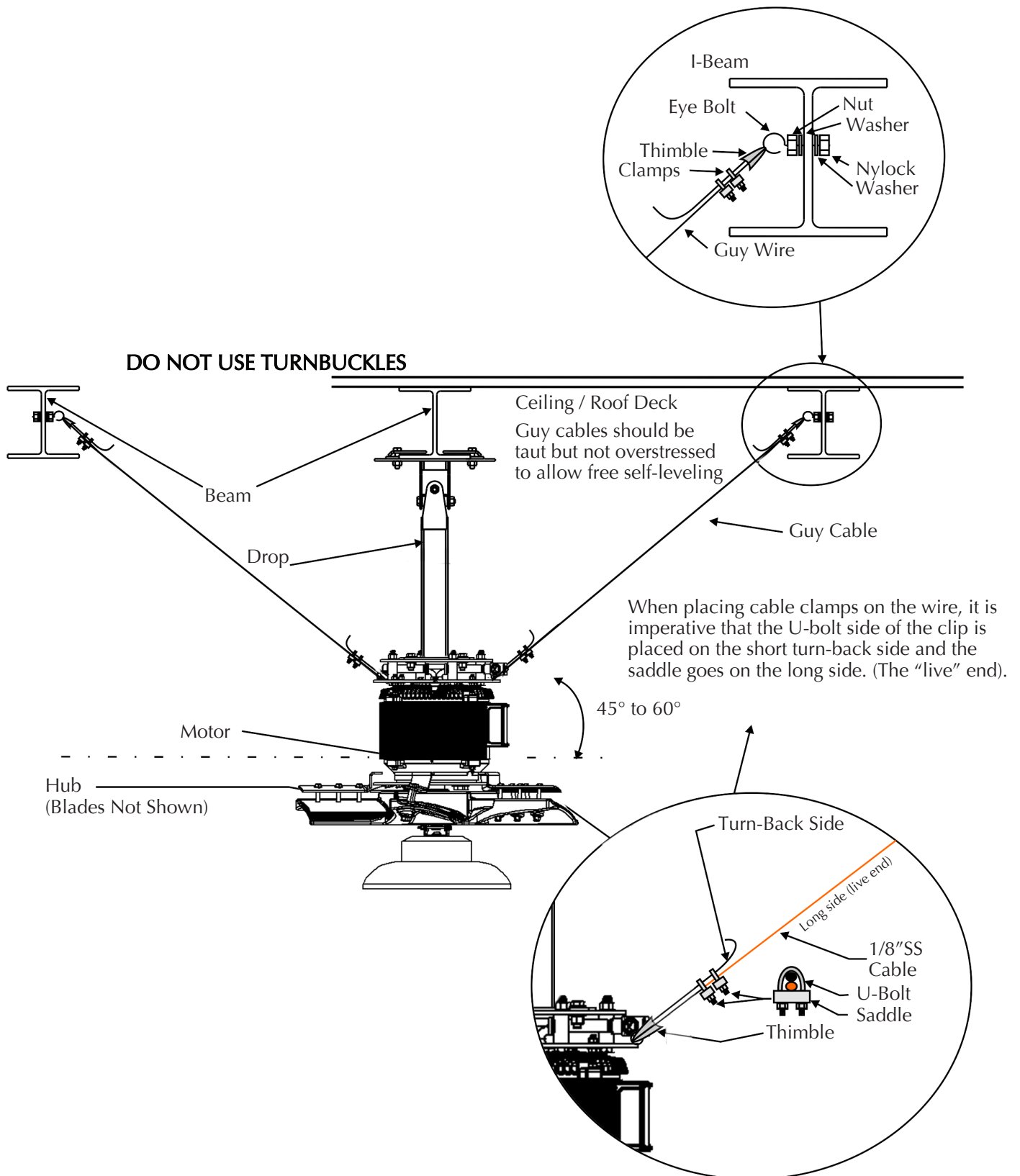
SUMMARIZED FAN SPECIFICATIONS

Altra-Air Sailfin Fans Performance Specifications					
Fan Size in Diameter	8 ft	12 ft	16 ft	20 ft	24 ft
	2.4 m	3.7 m	4.9 m	6.1 m	7.3 m
Motor Power	2 HP	2 HP	2 HP	2 HP	2 HP
	1.5 kW	1.5 kW	1.5 kW	1.5 kW	1.5 kW
Airflow	59,494 cfm	70,424 cfm	127,033 cfm	176,200 cfm	315,026 cfm
	28,078 l/s	33,236 l/s	59,953 l/s	83,157 l/s	148,676 l/s
Maximum Effective Diameter	60 ft	80 ft	140 ft	200 ft	230 ft
	18 m	24 m	43 m	61 m	70 m
Maximum Velocity	386 ft/min	386 ft/min	550 ft/min	505 ft/min	497 ft/min
	1.96 m/s	1.96 m/s	2.79 m/s	2.56 m/s	2.52 m/s
Weight (No Mount)	220 lbs	245 lbs	275 lbs	320 lbs	347 lbs
	99 kgs	111 kgs	125 kgs	145 kgs	157 kgs
Noise Level	45 dBA	45 dBA	45 dBA	45 dBA	45 dBA
	45 dBA	45 dBA	45 dBA	45 dBA	45 dBA

The data in this specification sheet represent the most current data developed by Envira-North Systems or other agencies. Envira-North Systems is constantly seeking to improve its products for the betterment of its customers; we therefore reserve the right to change these specifications as required without notification. Weights are subject to change. Please contact our shipping department for the latest information on shipping container sizes and weights. Maximum effective diameter is where horizontal airspeed at 1.0 ft above floor drops below 0.2 m/s in an empty room.



GUY WIRES



ALTRA-AIR SAILFIN FAN PACKAGING DETAILS

Packaged Fan

30" x 31" x 32" (76.2 cm x 78.74 cm x 81.28 cm)
255 lbs (115.6 kgs)

24 FT (7.3 M) Packaged Blades

11" x 11.5" x 144" (27.9cm x 29.2cm x 365.8cm)
190lbs (86kgs)

20 FT (6.1 M) Packaged Blades

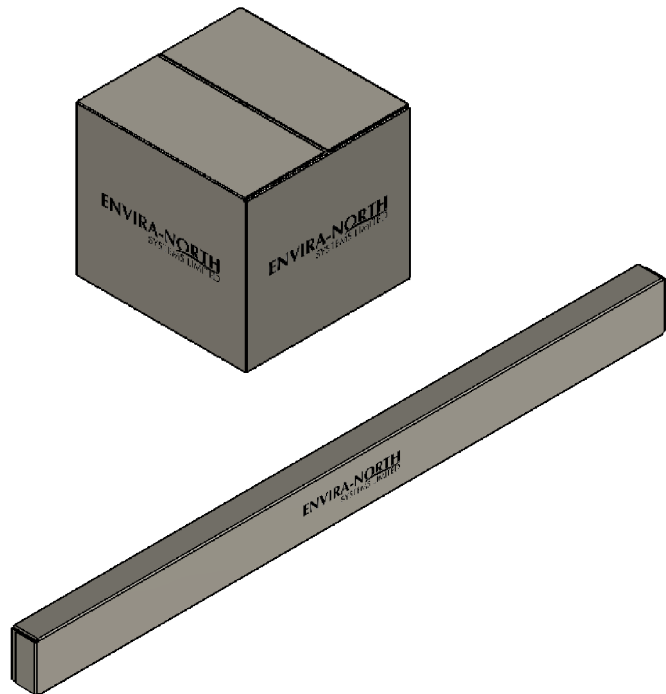
11" x 11.5" x 120" (27.9cm x 29.2cm x 304.8cm)
167lbs (75.7kgs)

16 FT (4.9 M) Packaged Blades

11" x 11.5" x 96" (27.9cm x 29.2cm x 243.8cm)
134lbs (60.8kgs)

12 FT (3.7 M) Packaged Blades

11" x 11.5" x 72" (27.9cm x 29.2cm x 182.9cm)
111lbs (50.4kgs)



MOUNTS & EXTENSIONS PACKAGING DETAILS

These items can be placed inside the packaged fan when ordering with a fan. (Excluding 4 FT (1.22 M) items)
Please add the additional weight to the fan packages above.

1 FT (0.31 M) Packaged UMH Mount

9" x 9" x 15" (22.9 cm x 22.9 cm x 38.1 cm)
22 lbs (9.98 kgs)

2 FT (0.61 M) Packaged UMH Mount

9" x 9" x 28" (22.9 cm x 22.9 cm x 71.1 cm)
33 lbs (14.97 kgs)

4 FT (1.22 M) Packaged UMH Mount

9" x 9" x 51" (22.9 cm x 22.9 cm x 129.5 cm)
47 lbs (21.32 kgs)

2 FT (0.61 M) UMH Extension

9" x 9" x 28" (22.9 cm x 22.9 cm x 71.1cm)
21 lbs (9.53 kgs)

4 FT (1.22 M) UMH Extension

9" x 9" x 49" (22.9 cm x 22.9 cm x 124.5 cm)
31 lbs (14.06 kgs)

CONTROL OPTIONS

VFD & KEYPAD CONTROL



VFD



Keypad Control

- Wall Mounted Variable Frequency Drive (VFD) Configuration
- Minimal Distance Between VFD & HVLS Fan
- One Per Fan Required
- User Friendly, Simplified Installation and Operation

TouchAIR FAN CONTROL



Touch Pad
Control

- Single Point Fan Control
- Controls up to 65 Fans
- CAT-5 Daisy Chain Connections
- Intuitive Operation
- Individual and Group Controlling
- Remote Diagnostics
- Over 500m (1640') of Wire Distance
- Used in Conjunction with ZoneAIR Fan Control

LinkAIR FAN CONTROL



LinkAir
Module

- Single Point Fan Control
- Controls up to 247 Fans
- Uses BACnet Signal
- Works in Conjunction with Building Automation Controls
- Individual Fan and Group Controlling
- Used in Conjunction with ZoneAIR Fan Control

WIND SENSOR



- For Use With Outdoor Applications
- Automatically Turns Off During High Winds
- Compact Design
- Programmable For Customized Applications

LIMITATION OF WARRANTY & LIABILITY

Three Year Limited Warranty

The Altra-Air fans are of industrial grade construction and should provide many years of virtually maintenance-free use. Warranty duration is as follows:

a) Air foil shaped Blade	Lifetime Warranty
b) Aluminum alloy Hub	Lifetime Warranty
c) Motor	3 year Limited Warranty
d) VFD control panel	3 year Limited Warranty
e) Labour	1 year Limited Warranty (pre-approved)
f) Custom fan wraps/paint	1 year Limited Warranty

Envira-North warrants that this Product will under normal use and service as specified by Envira-North, operate properly and be free of defects in materials and workmanship for a period of three years from the date of purchase by customer. The term “operate properly” in this context applies to mechanical, electrical and structural functions only. No guarantee, unless and except by separate written agreement, is made regarding dimensions of air movement generated or the effectiveness of this Product for its intended purpose.

Labour Warranty will cover all reasonable costs paid by the customer to an independent contractor (including dealers) to remove, dismantle, reassemble or reinstall any of the warranted Products during the first year that the Product is in service. All receipts are to be submitted to Envira-North which will be paid upon completion of the installation of the Product and after the return of the failed unit. Envira-North will only issue a credit/ cheque to the customer/dealer and will not be held responsible for paying the independent contractor.

WARRANTY EXCLUSIONS

Please note that the following may or could void any or all of the above listed Warranties.

- Please note that the following may or could void any or all of the above listed Warranties.
- Not following required installation procedures as in installation guide and all other documentation supplied with the fans and related equipment, supplied by manufacturers of individual fan and control components.
- Not following all relevant codes and ordinances, not limited to National Electrical Code, provincial or state and local building codes.
- Not following electrical engineering industry standards regarding approved method of installing solid-state electrical equipment having characteristics of fans and all components included in this product.
- Any modification to installation, product and or controls without written authorization from Envira-North, even if attempting to diagnose and or repair a problem.

- Misuse, abuse, accidents, unreasonable use or Acts of God.
- Incorrect electrical current, voltage or supply.
- Running fans at higher than recommended speeds.
- Re-setting parameters of any control without prior approval from Envira-North.
- Failure to use all installation and mounting hardware supplied by Envira-North.
- Failure to perform periodic maintenance as detailed in the Envira-North installation guide.

Envira-North reserves the right to make the final determination, based on its own evaluation of the components as to whether:

- The problem in question is the result of a defect in design, workmanship or materials and not the result of error, misuse or abuse on the part of the customer as stated above.
- Whether the problem or defect is material and requires action under this Warranty.
- Whether the remedy of repair or replacement is appropriate.

Envira-North will not be responsible for remedial work necessary to correct installation procedures that do not conform to those established by the instructions, codes and standards, regardless of when the installation occurred.

With regard to electrical and electronic components provided by Envira-North that comprise part of the Products, including motors, motor drives and variable frequency drives, Envira-North relies on the determination by the original manufacturer as to whether the failure of such component was the result of a defect. If the manufacturer of such component determines that there was no defect and therefore refuses to cover it under warranty, Envira-North likewise will not warranty such item unless Envira-North determines that the failure of such electrical or electronic component was the result of a defect of design, workmanship or material within some other part of the products.

WARRANTY DURATION

With respect to replacement or repair rendered, Envira-North warrants that the parts replaced or repaired will operate properly and be free from defects in materials and workmanship for a period of 90 days from the shipment date of the replacement products to the customer, or for the remainder of the original Warranty period, whichever is longer.

WARRANTY CLAIM INSTRUCTIONS

1. Contact your original dealer/salesman of the purchase when you first notice problem with the Product.
2. It will be the responsibility of the dealer or salesman to assist the customer in determining what Product is causing the problem.
3. If they cannot diagnose the problem, they are to contact Envira-North with all the necessary information.
4. The appropriate department will then be in contact with the customer to determine the cause of the

problem.

5. Once diagnosed, submit a Purchase Order for a replacement component complete with price.
6. Replacement component will be shipped out upon receipt of the PO. This PO allows for an order to be established in the Envira-North System.
7. Once the units have been changed over, submit all pre-approved costs to Envira-North for payment.
8. No credits or cheques will be issued until all original products are received back at Envira-North or unless Envira-North directs otherwise.

LIMITATION OF WARRANTY & LIABILITY

Fifteen Year Service Life Prorated Warranty

WARRANTOR

The warrantor for the limited warranties set forth herein is Envira-North Systems Ltd ("Company").

LIMITED WARRANTY

This prorated limited warranty (this "Warranty") applies only to the original End-User (the "End-User") of any Envira-North Systems' Altra-Air Fan(s) with WhalePower Technology (Individually and collectively, the "Product") and cannot be transferred. This Warranty applies even in the event that the Product is initially sold by Company for resale to End-User. This Warranty applies to U.S and Canada purchases only. Outside U.S and Canada; standard Three-Year Warranty applies.

WHAT THIS WARRANTY COVERS

In addition to the Lifetime Warranty on blades, hub and frame; and the standard Three-Year Limited Warranty covering all other components, the Warrantor warrants that the Product will have a service life (defined below) of Fifteen Years from the date of purchase (the "Fifteen Year Service Life") when used in accordance with the operation and maintenance procedures prescribed in the Envira-North Systems' Installation Manuals.

If Company finds, in its sole discretion, that any Product has not provided the Fifteen-Year Service Life, Company will, as its sole obligation and the End-User's sole remedy for Company's breach of this Warranty, repair or replace the Product, at its option, F.O.B Company's factory, for a charge, payable to Company prorated on the following basis:

9. The End-User will be allowed a credit against Company's list price of equivalent equipment at the time of return of the Product to Company, in proportion to the percentage of Fifteen-Year Service Life remaining at the time of return of the Product to the Company. The End-User will assume responsibility to pay the balance of the list price; and Company reserves the right to require payment prior to delivery of the repaired or replacement equipment.

For the avoidance of doubt, Company's responsibilities under this Warranty are as follows:

Year 1-3 - Product repaired or replaced pursuant to terms if Limited Warranty applies

Year 4-15 - Unit Credit (\$) = $\frac{\text{Current List Price} \times \text{Years of Unexpired Life}}{15 \text{ Years of Warranted Life}}$

WHAT THIS WARRANTY DOES NOT COVER:

- any defects or damages caused by:
 - (a) failure to properly store the Product before installation;
 - (b) shipping and delivery of the Product if shipping is FOB Factory;
 - (c) neglect, accident, abuse, misuse, misapplication, or incorrect installation;
 - (d) repair or alteration not authorized in writing by Company personnel;
 - (e) improper testing, operation, maintenance, adjustment, or modification of any kind not authorized in writing by Company personnel;
- OR
- (f) use the Product under other than normal operating conditions or in a manner inconsistent with the Product's label or Instructions.
 - controls and or any other external electronic controlling devices.
 - exclusions listed in the standard Three-Year Limited Warranty.
 - any products or components purchased prior to effective date of this Warranty.

THIS WARRANTY IS NOT VALID:

- (a) unless the End-User returns to Company the Warranty Registration Card within thirty (30) days of purchase; OR
- (b) if the Product's serial numbers have been removed or are illegible;
- OR
- (c) if any warranted items repaired or replaced pursuant to this Warranty will be warranted for the remaining portion of the original Warranty subject to all the terms thereof. Company shall not be responsible for any charges for testing, checking, removal or installation of warranted items unless authorized in writing by Company personnel;
- OR
- (d) if failed to submit records at time of performing Recommended Maintenance Schedule, minimum every 18 months.

LIMITATION OF LIABILITY

The remedies of the End-User set forth herein are exclusive and are the sole remedies for any failure of Company to comply with its obligations hereunder. In no event shall Company be liable in contract, in tort (including negligence or strict liability) or otherwise for damage to property or equipment other than the Products, including loss of profits or revenue, loss of use of Products, cost of capital, claims of customers of the End-User or any special, indirect, incidental or consequential damages whatsoever. The total cumulative

liability of Company hereunder whether the claims are based in contract (including indemnity), in tort (including negligence or strict liability) or otherwise, shall not exceed the price of the Product on which such liability is based. Company shall not be responsible for failure to provide service or parts due to causes beyond Company's reasonable control.

END-USER'S OBLIGATIONS

In order to receive the benefits of this Warranty, the End-User must use the Product in a normal way; follow the Product's Installation Manuals; and protect against further damage to the Product if there is a covered defect. Submit records at time of performing Recommended Maintenance Schedule, minimum every 18 months.

OTHER LIMITATIONS

Company's obligations under this Warranty are expressly conditioned upon receipt by Company of all payments due to it, including all applicable interest charges. During such time as Company has not received payment of any amount due to it for the Product, in accordance with the contract terms under which the Product is sold, Company shall have no obligation under this Warranty. Also during such time, the period of this Warranty shall continue to run and the expiration of this Warranty shall not be extended upon payment of any overdue or unpaid amounts.

COSTS NOT RELATED TO WARRANTY

The End-User shall be invoiced for, and shall pay for, all services not expressly provided for by the terms of Warranty, including without limitation, site calls involving an inspection that determines no corrective maintenance is required. Any costs for replacement equipment, installation, materials, freight charges, travel expenses or labor of Company representatives outside the terms of this Warranty will be borne by the End-User.

OBTAIN WARRANTY SERVICE

Call Envira-North Systems Ltd., Service 1-866-771-7766 or 1-519-527-2198. Company will not accept any product for return, credit or exchange unless expressly authorized by Company in writing and delivered FOB Company factory with proper Return Authorization Number attached to the product.

RECOMMENDED MAINTENANCE SCHEDULE

1. No maintenance shall be done on the fan, mount or guy wires while it is in operation or powered.
2. No maintenance shall be done on the fan controller while powered unless the task involves reprogramming or troubleshooting the electrical system.
3. No maintenance shall be done within a 6m horizontal radius of the fan and 4 ft below and none above the blade level while it is in operation.
4. While doing maintenance on the fan, mount, or guy wires, a safety barrier shall be erected at a radius of 6m of the centre of the fan.
5. The fan controller shall be locked out while maintenance is ongoing on the fan, mount, or guy wires.
6. All personnel working on the fan, mount, or guy wires, shall wear the appropriate personal safety equipment as mandated by local, provincial, and national regulations.
7. A risk assessment shall be performed before any maintenance is done on the fan, mount, guy wires and fan controller.
8. A tailboard meeting shall be performed before any work is done. A checklist shall be completed and shall include any emergency contacts for the area.

BLADES

The airfoil blades are designed for maximum efficiency and quietness with a minimum air disruption directly below the fan. All our blade shapes are extruded from 6063-aluminum alloy and heat-treated to T-5 condition. They are anodized to .0004 10 Microns clear for corrosion resistance and ease of cleaning. The blades have a lifetime warranty.

MAINTENANCE SCHEDULE

Initial Six Months

- Ensure blades are intact, level and clean as required

Every Eighteen to Thirty-Six Months Thereafter

DROP / MOUNTING

The drop and mounting system is designed to prevent vibration or horizontal movement from being transferred back into the building structure. The system is easily installed in almost any building and allows fans to hang level from beams.

MAINTENANCE SCHEDULE

Initial Six Months

- Physical check of fan guy wires, re-tightening of clamps if required
- Check all nuts/bolts/clamps (missing/loose/damaged)
- Physical check of safety cable, re-tightening of clamps if required

After Eighteen Months Thereafter

CONTROL PANEL

Altra-Air controls are variable frequency drives which provide soft start/stop, variable speed control and overload protection for the motors. The VFD also allows fan control to be automated and/or integrated with other systems. The controls come with a three year limited warranty.

MAINTENANCE SCHEDULE

Initial Twelve Months

- Check for loose/discoloured wires
- Check for hot spots
- Re-tighten all loose electrical connections

Every Eighteen Months Thereafter

NOTE: Maintenance schedule is based on running 5,000 hrs / year and is a guide line to ensure safe and continuous operation of the fan(s). In case of extreme operating (e.g. high humidity, aggressive environment or large temperature variations), shorter intervals between service is recommended.

Tel: 1-519-527-2198 Fax: 1-519-527-2560
Toll Free: 1-886-771-7766

bigair@enviranorth.com

92 Railway St. P.O Box 668
Seaforth, Ontario
Canada N0K 1W0

enviranorth.com

