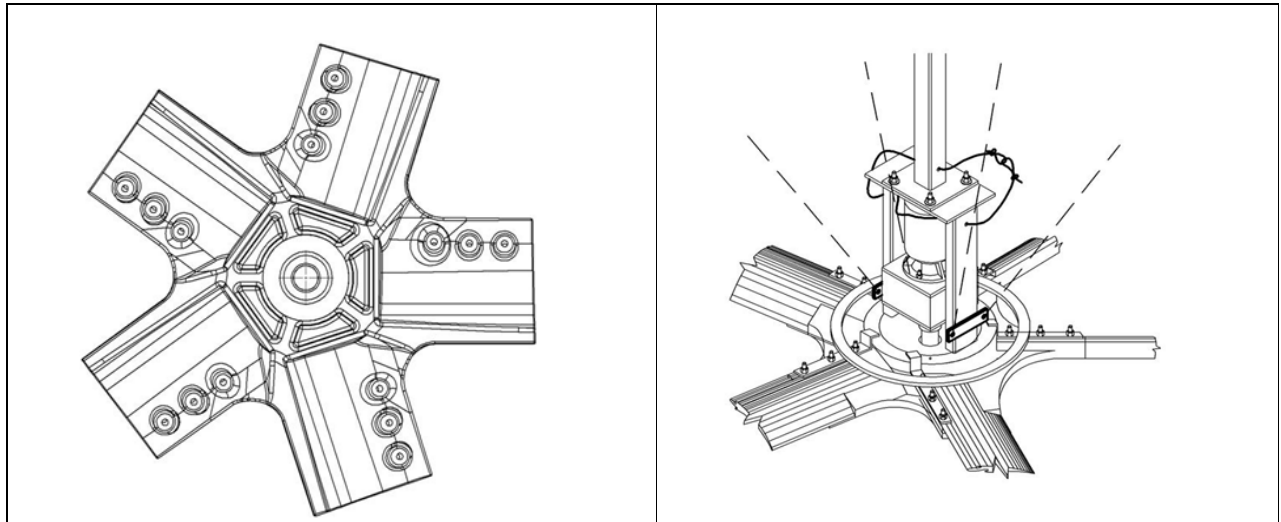


INSTALLATION MAINTENANCE MANUALLVLS FAN



CARYAIRE EQUIPMENTS INDIA PVT. LTD.

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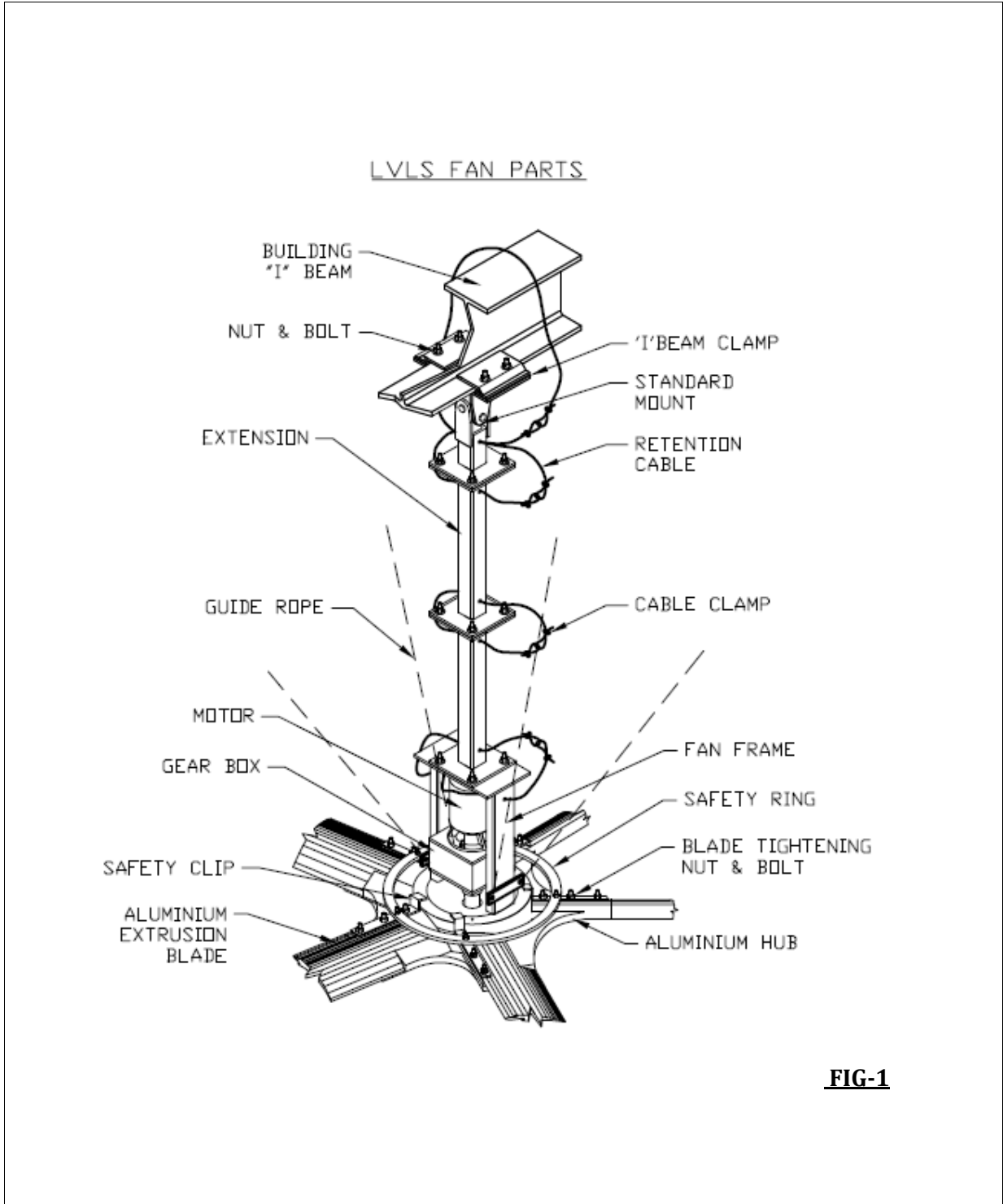


FIG-1

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Technical Information

Fan size in Diameter	8 Ft.	10 Ft.	12 Ft.	16 Ft.	20 Ft.	24 Ft.
	2.4M	3.0M	3.7M	4.9M	6.1M	7.3M
Motor Power	1.5 HP	1.5 HP	1.5 HP	2 HP	2 HP	2 HP
	1.1 KW	1.1 KW	1.1 KW	1.5 KW	1.5 KW	1.5 KW
Ampere At 400 volt	2.42 A	2.42 A	2.42 A	3.35 A	3.35 A	3.35 A
Speed (RPM)	154	140	123	73	63	56
Air flow CMH(Approx.)	64,500	1,56,000	2,06,000	2,80,500	5,04,900	612000
Maximum Coverage Diameter	9.4M/30.8Ft	15.8M/51.8Ft	21.3M/69.9Ft	36M/118Ft	42M/138Ft	50M/164Ft
Weight (Kg)	98	104	108	124	132	140

Important information:-

- **Fan for use warehouses, Auto Plants, Distribution Centers, Manufacturing units, Gyms, Banquet Halls, Retail Stores and Worship Centers and all areas where air ventilation and air circulation require.**
- **This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.**
- **Use CE certify cable for better performance and better safety.**
- **If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.**

Tools Required For Installation

- **Level indicator**
- **Cable Cutters(for stainless steel aircraft cables)**
- **Ratchet or Impact gun**
- **Basic Metric socket set**
- **Basic metric wrench set**
- **Lifting Device or Scaffolding**

Pre-Installation Item Check List

Hardware

- 1) VFD controller received is as per rated Voltage and Phase
- 2) Motor & gear Box assembly received are as per rated voltage & Phase
- 3) VFD controller is placed within the desired distance from the Fan
- 4) Check for any damage or loss during transit.
- 5) Has the Installation site been decided?

Installation site Clearances

- 6) Ensure that fan blades are a minimum 10ft or more from floor level.
- 7) Ensure that any obstructions are at least 2ft away horizontally from the fan blade tip.
- 8) Ensure that Fan is installed so that minimum clearance from ceiling is as per Table -1

Parts List:

- 9) Packing list of Fan parts & Hardware
- 10) Mounting Extension Kit (If ordered)
- 11) Installation Tools Kit

FAN PLACEMENT & TECHNICAL DETAILS:

Placement of Fan is important in order to achieve optimal performance of the Fan. Both Minimum horizontal and vertical clearances from the Fan are to be observed strictly.

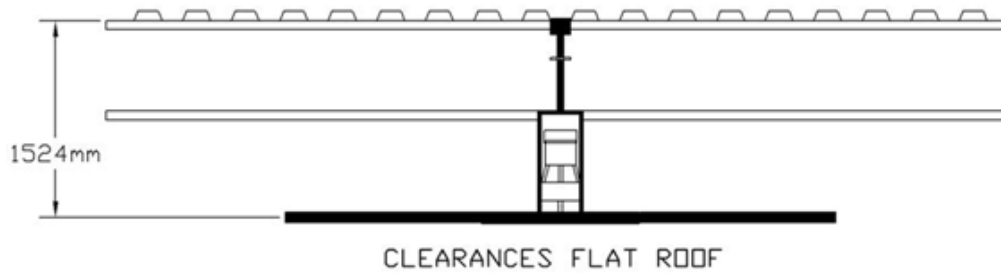
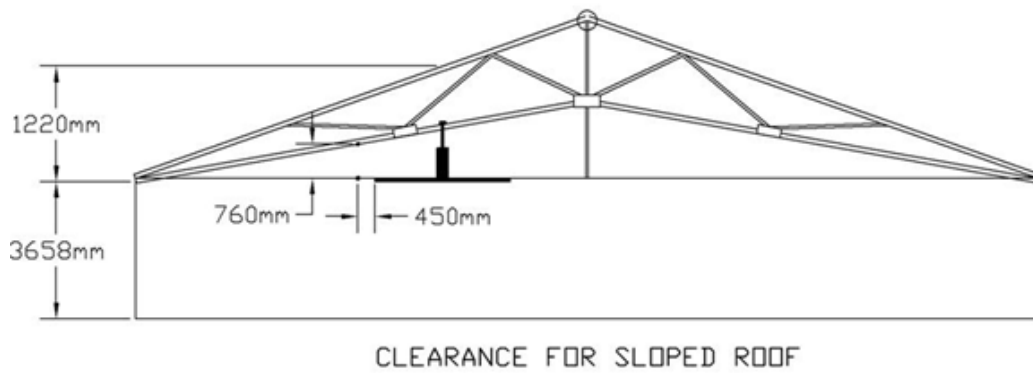
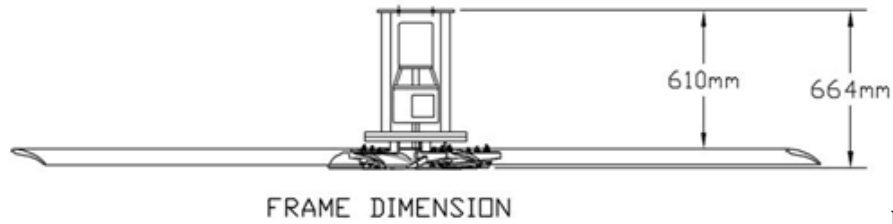


TABLE-1

FAN DIAMETER (Mt)	MOTOR (KW.)	MOTOR VOLTAGE (V)	MOTOR CURRENT (AMPS.)	MOTOR OUTPUT RPM	MINIMUM CLEARANCE FROM CEILING (mm.)	MINIMUM HORIZONTAL CLEARANCE FROM BLADE TIP (mm.)
2.4	1.1	415	2.42	154	1500 mm.	600 mm
3.0	1.1	415	2.42	140	1500 mm.	600 mm
3.7	1.1	415	2.42	123	1500 mm.	600 mm
4.9	1.5	415	3.35	73	1500 mm.	600 mm

6.1	1.5	415	3.35	63	1500 mm.	600 mm
7.3	1.5	415	3.35	56	1500 mm.	600 mm

VFD INSTALLATION

VFD CONTROLLER :

Generally Electrical installation is done before installing the Fan. Number of wires to be used will depend on whether the VFD is single or three phase. Wire Size should adhere to the Local electrical codes. However, connection between VFD & Fan will need 4 wires. Whether the Input to VFD is Single phase or three phase ,power to the fan will always be three phase.

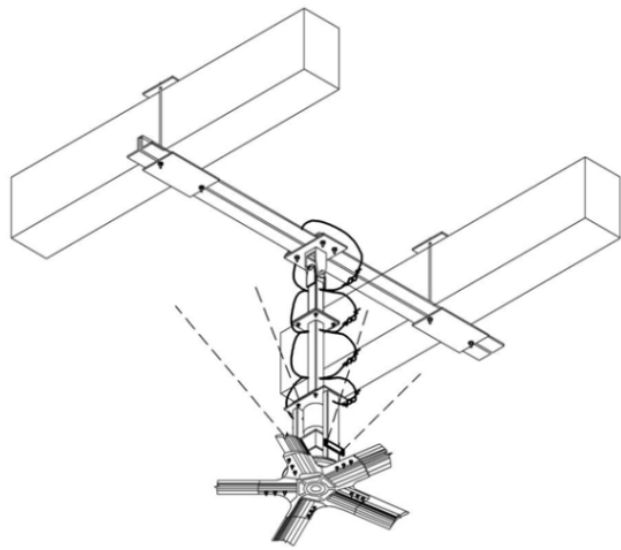


FIG-5

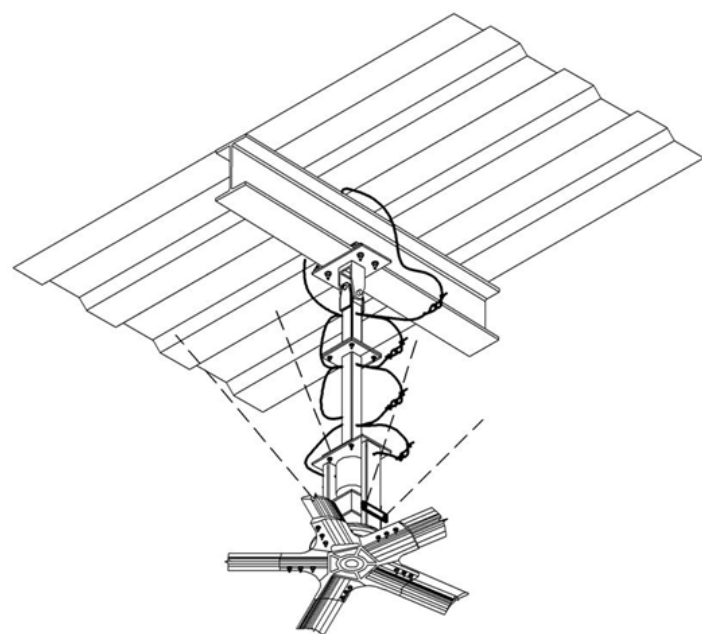
Rated motor power:	1.5 Kw & 1.1 Kw
Input voltage	3AC, 380...480V -20%/+10%,47...63Hz
Rated current:	5.6 A
Output voltage	3 Phase DC link Volts
Rated output current:	4 A & 2.49A
Output frequency	0 Hz ...400 Hz
Enclosure:	IP20
Ambient temperature	0°C ... +40°C (S1)
Approximate weight	2 kg
Specifications:	<ul style="list-style-type: none"> • four parameter sets, selectable on-line • Sensor less vector control • Automatic motor identification • 5 Digital inputs, 2 Analog inputs • 2 Relay outputs, 1 Analog output • Integrated brake chopper and dynamic brake control • RS232 and RS485 compatibility via RJ12 connector

Different mountig Applications :

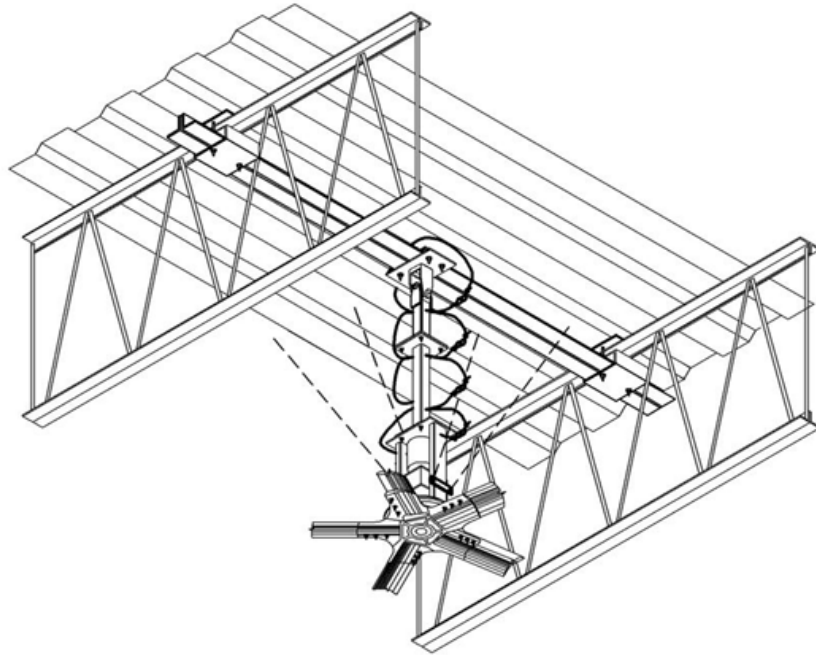
Mounting applications shown below are representative only



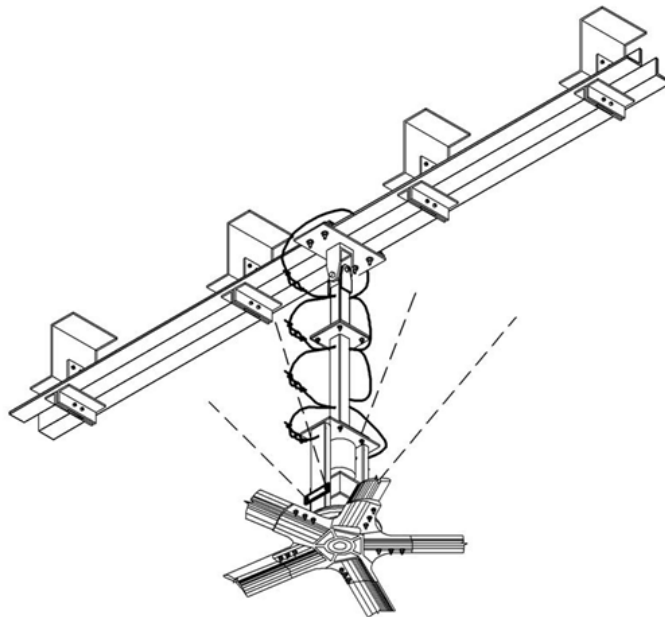
CONCRETE BEAM MOUNT (FIG-6)



I BEAM MOUNTING (FIG-7)



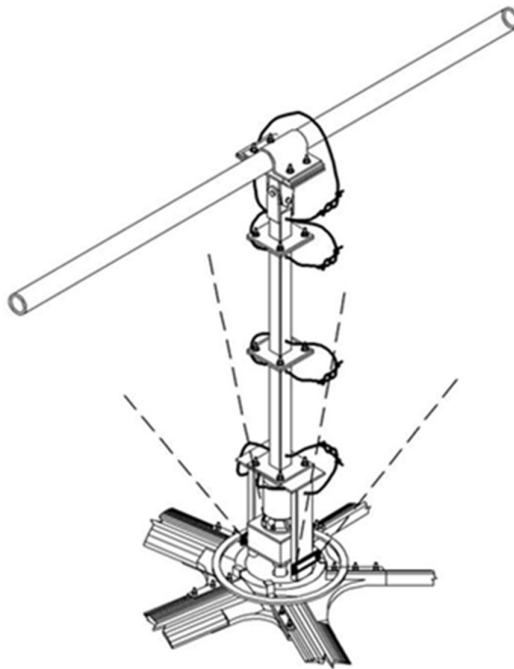
OWSJ MOUNTING (FIG-8)



PURLIN MOUNTING (FIG-9)

Installing the Sta

- Insert the I between the...
- Insert Nuts...
- Place the s...
- Cable clam...
- Main safety saddle and...



PIPE MOUNTING (FIG-10)

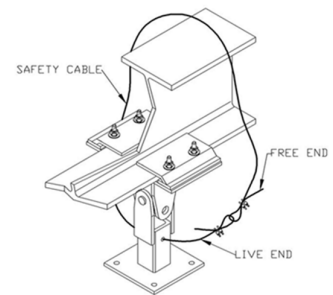


FIG-12

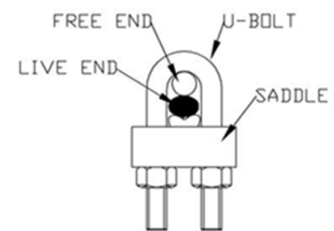


FIG-13

STEP -2 STANDARD MOUNT

Following items are included in the standard mount Kit.

- I-Beam Clamps
- Spacers (requirement depends on Support structure thickness)
- Mounting Plate
- Standard Mount (300mm & 600mm)
- Safety Cables
- Nuts & Bolts

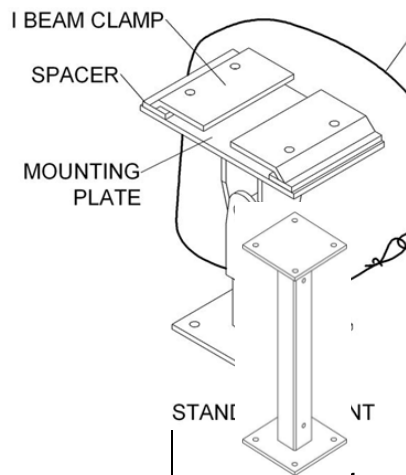


FIG-14

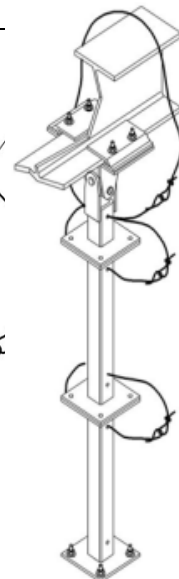


FIG-15

STEP -3 EXTENSIONS

Following items are part of the Extension Kit(fig-14, fig-15)

- Extensions (Standard 600mm & 1200mm)
- Nuts Bolts & washers
- Safety Cables

Requirement of extension depends on place we have to mount the fan . The length of extension along with the standard mount will determine the drop length of the Fan. Custom length extension can be provided if a non standard drop length is desired. We can use a maximum of two extensions per assembly.

Installing an Extension(fig-16)

- Fasten top plate of extension to bottom plate of standard mount using nuts ,bolts & washers provided.
- Position the safety cables as per figure, and fasten the safety cable loops with the U-Clamps.
- For greater safety fasten two U-clamps at each loop of the safety cable.
- Safety cables must always be used between fan components. (Extensions,Mounts, Fan Frame etc.)

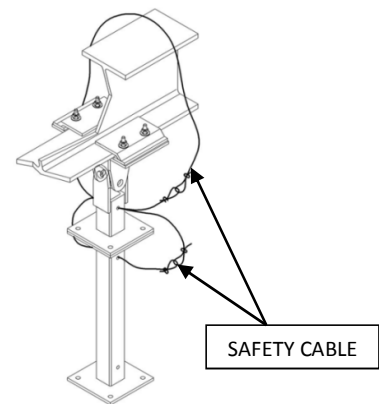
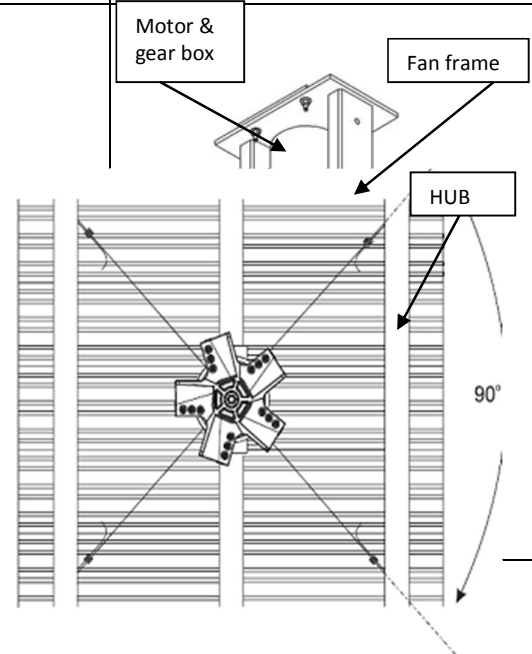


FIG-16

STEP-4 Main Hub & Drive Assembly(fig-17)

Following items form part of the main Hub & Drive Assembly

- Hub
- Fan Frame
- Motor & Gear Box
- Trantorque nut
(All above parts are shipped assembled)
- Safety Cables
- Nuts Bolts & washers



Installing Main Hub & Drive Assembly

- Raise the Fan & align its mounting plate with the bottom plate of standard mount or the bottom plate of extension if used.
- Fasten the two plates using Nuts, bolts & washers provided.
- Position the safety cables as per the figure
- and fasten safety cable loops using two
- U-Clamps on each safety cable loop.
- Verify fan level by checking both directions
- on the fan frame vertical post.

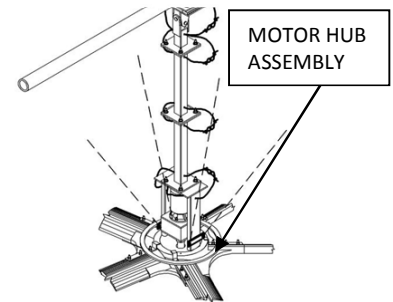


FIG-18

STEP -5 Guy Wires (Guide Rope)

- Guy Cables must be fastened to the Building structure at angles as shown(FIG-20).
- Guy Wires should be tight enough to allow free self levelling and should not be over tightened.
- Main safety cable should be inserted on the saddle side and the safety cable loop side has to be on the U-bolt side(FIG-13).

Following items are included in the Kit

- Cable
- Cable Clamps

- Thimbles
- Eye Bolts
- Nuts, washers, Bolts

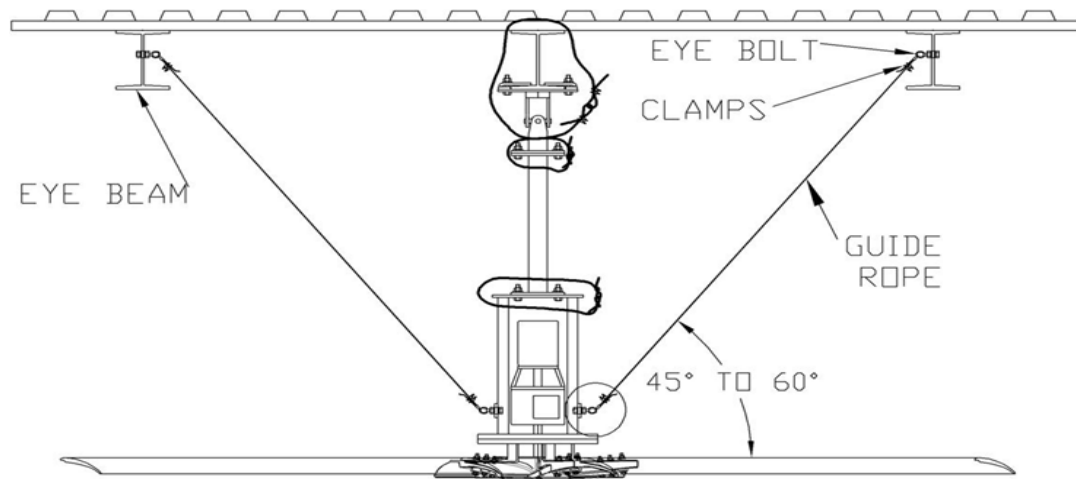
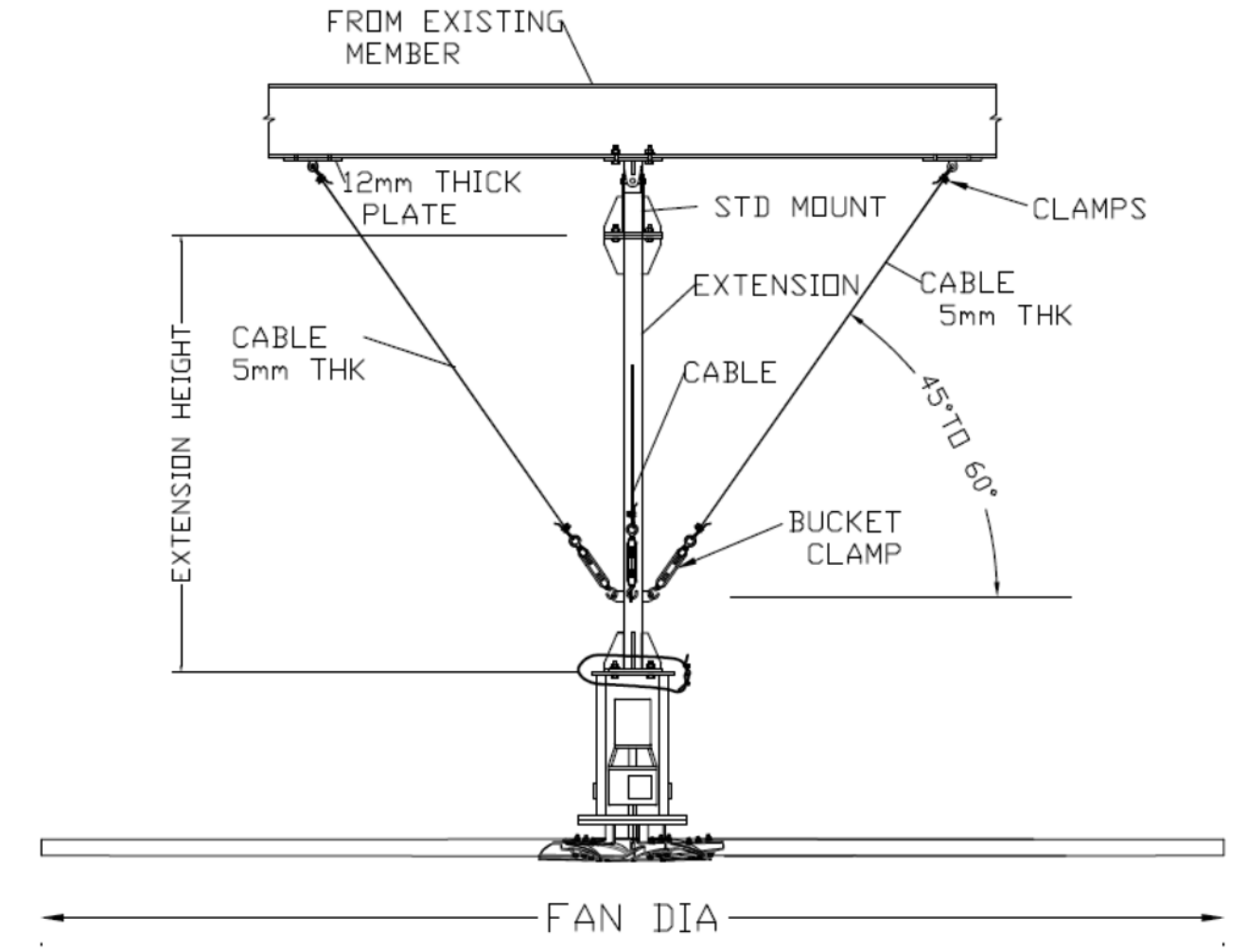


FIG-20



LVLS FAN MOUNTING WITH EXTENSION FRAME

FIG-20A

Installing Guy Wires (Guide Ropes)

- First determine the location on ceiling to mount the Guy Wire so that it makes an angle of 45-60(FIG-20)
- Install the Eye Bolt and tighten with Nuts & Bolts using washers(FIG- 21).
- Measure the cable required and cut keeping about 0.5 mt. extra. If the cable requirement is more than 4mt. extra hardware is required .
- Secure one end with thimble and 2 cable clamps(FIG-22).
- Repeat the process for the other 3 Guy Ropes.
- Guy ropes should be about 90 degree apart(FIG- 19).
- Check the fan level by placing the level vertically on the fan frame. Adjust Guy Ropes if required.
- Once levelled, tighten hardware and again verify Fan level.

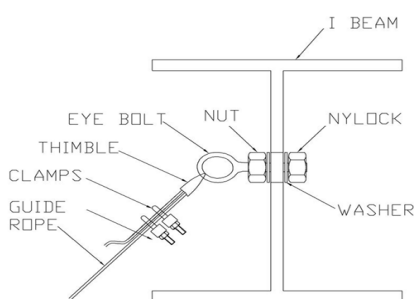


FIG-21

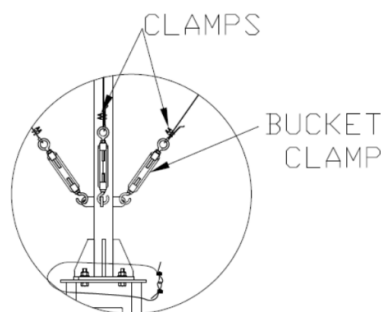


FIG-22

STEP -6: Connect Motor Terminal

Once the Fan Motor & Hub assembly are installed we may connect the motor terminal leads to the electric supply

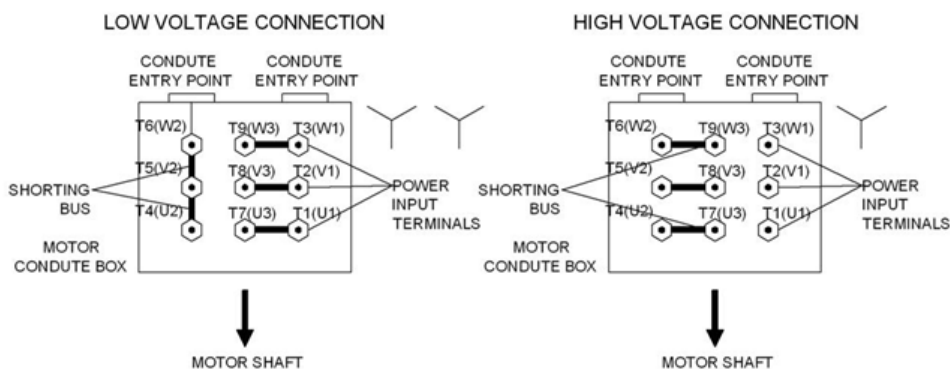


FIG-23

STEP-7 : Check Motor Rotation

- Do not turn on the Power before double checking the Installation and electric connections.
- Turn on Power and slowly increase frequency .
- Check the fan rotation . Observing from below fan rotation should be counter-clockwise.
- If the fan rotates clockwise disconnect power supply and interchange output leads.Fan should now rotate counter clockwise
- Disconnect Power supply and proceed to install fan blades.

STEP-8 : Blade Assembly

Blade kit includes the following Items

- Blades
- Blade Toppers
- Nuts ,Bolts & washers

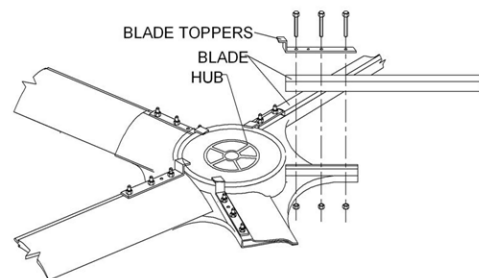


FIG-24

STEP-9 : Safety Ring

- Safety Ring kit includes the following items.
- Safety ring (5 Pieces)
- Bolts & washers

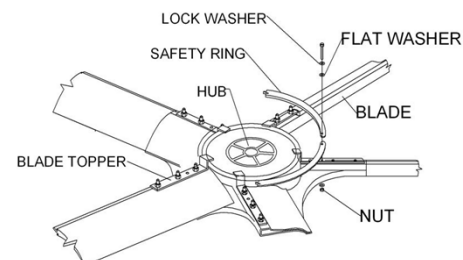


FIG-26

Installing Safety Ring

- Take two pieces of safety ring ,match the hole of one with the slot of the other. tighten slightly the piece on appropriate place using bolts and washers.
- Continue as above till all pieces are installed. Now tighten all bolts properly.Check level once again as per procedure mentioned Earlier

STEP-10 : Full Startup

- Activate Power to the Fan at power Distribution Board.
- Determine preferred speed for fan and set that speed.

General Notes :-

- Avoid blocking areas where people will benefit from it. Move obstructions or change orientation to get maximum advantage.
- Minimize interaction between path of fan blades and direction of local area lighting.
- In summer it is advantageous to run the fan at the highest speed as it balances comfort and work environments air speed tolerance. In winter maximum benefit is achieved by running the fan at a speed just below that which produces a noticeable breeze.

FAN MAINTENANCE:

- Before carrying out any maintenance cut power supply to fan and ensure no one energizes the system while maintenance is going on.
- No maintenance is to be carried out on the Controller while the power supply is on unless required for the job to be performed.
- A safety zone of 6mt. radius should be created, while doing maintenance on the fan, safety wire and guy wires.
- Personal safety items are to be used by persons carrying maintenance work on the fan.
- Risk assessment should be done before any maintenance work is carried out on Fan , Safety cables, Guy wires etc.
- Before starting maintenance work a check list shall be prepared.

To ensure longevity of Caryaire LVLS fan, following checks need to be done annually.

- Check torque of all mounting fasteners. Do not loosen or Re-Torque but check torque in tightening direction with a calibrated torque wrench.
- Check gear motor for leaks.
- Check tightness of electrical leads of motor and controller
- Check if all safety cables are in place and also are not slack
- Remove dust accumulation to prevent fan from becoming unbalanced.

Maintenance Schedule: (Motor & Gear Reducer)

- Caryaire LVLS fan is driven by Helical Gear reducer motors. These motors are best suited for this application. These motors are known for precision, durability, efficiency, reliability and quiet operation.

Motor (First six-months)

- Check Hot Spots
- Tighten loose electric connections if any.
- Repeat every year.

Gear Reducer: (Yearly)

Check for any oil leakage. Plug leakage if any and top up oil.

Change oil after 20,000 hours of normal working.

- | Fan size | Oil quantity |
|--------------------------|---------------|
| • 2.4Mt, 3.0Mt & 3.7Mt. | 1.1 liters |
| • 4.9Mt, 6.1Mt & 7.3Mt. | 3.1 liters |
| • Recommended Lubricant: | Synthatic oil |

Blades:

The blades are designed for maximum efficiency and quiet operation, allowing minimum air disruption directly below the fan. The airfoil blades are extruded from 6063 aluminium alloy and heat treated to T-6 Temper condition. In addition, blades are also powder coated for corrosion resistance and ease of cleaning.

Maintenance Schedule: (First Six Months)

- Check tightness of Blades
- Ensure Blades are Level and Clean
- Repeat yearly.

Drop/ Mounting:

The drop /mounting system helps prevent vibration or horizontal movement from being transmitted to the building structure. Mounting system can be easily installed in any building structure and allows Fan to hang level from the structure beams.

Maintenance Schedule: (First Six Months)

- Physical check of safety cables, tightening of clamps if required.
- Physical check of Guy wires, tightening of clamps if required.
- Check all nuts ,bolts & clamps.
- Repeat yearly

Safety Check List:

- Disconnect all power at source before attempting Installation, servicing, or cleaning.
- Installation to be done by certified electricians and contractors conversant with local & National electric codes. If not complied by owners, all warranty obligations of Caryaire will stand Null & void.
- Wrong connection of Input and output terminals of controller will result in damage to Controller (VFD). Faulty wiring is not covered by warranty.
- VFD parameters have been pre-set by manufacturer. These should not be altered without consulting the Caryaire team.
- All safety devices removed during maintenance should be re installed before
- applying power to the fan.

Do's and Don'ts:

- Check visually abnormal noise and vibration.
- Disconnect all power at source before attempting Installation, servicing, or cleaning.
- Check oil leakage during internal checkup.
- Check all electrical points once in the month.
- Oil change to be done in motor after 20000 running Hours/3years.
- Use Synthetic oil – CLP 220 (3.3 ltrs/fan)
- Minimum distance to be maintained 2 meter from fan in running condition.
- Don't change any parameter of VFD without consulting with Caryaire engineer.
- Don't do any service related activity in running condition.
- VFD parameters have been pre-set by manufacturer. These should not be altered
- without consulting the Caryaire team.
- All safety devices removed during maintenance should be re installed before applying power to the fan.
- Wrong connection of Input and output terminals of controller (VFD) will result in damage to Controller (VFD). Faulty wiring is not covered by warranty.

Critical & Recommended Spare parts:

- Gear Motor - Qty-1/Fan
- VFD Drive- Qty-1/Fan

Service Escalation Matrix:

Name	Designation	Cont. No.	Mail ID
Mr. Dinesh Gupta	Business Head	9818682723	dgupta@caryaire.com
Mr. Dipankar Joshi	Asst. Manager Sales	9818660518	djoshi@caryaire.com
Mr. Surendra Pal Singh	India Head Services	9818379932	spsingh@caryaire.com
Mr. Arvind Kumar	Service Engineer (North East)	9818689352	service@caryaire.com
Mr. Suresh Chand	Service Engineer (West)	9004301386	csdwest@caryaire.com
Mr. Joseph	Service Engineer (South)	9739944344	csdsouth@caryaire.com

Packing List

CARYAIRE EQUIPMENTS (I) PVT. LTD.		
PACKING LIST OF LVLS FAN (8FT, 10FT, 12FT, 16ft, 20ft, 24Ft)		
SL.NO.	ITEM DETAILS	QTY.
1	Motor with Hub Assembly	1 no
2	Standard Extension Frame	1 no
3	Mounting Plate	1 no
4	VFD Panel	1 no
5	Hardware Box	1 set
6	Alu.Blades	5 nos