Better AIR

HVLS FAN

TECHNICAL MANUAL

55001 ROAD 56N, MB R0H 0R0, CANADA

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1. Safety Precautions

General

Some illustrations in the Installation Flow Chart are presented in an exploded view to clarify the installation process. Please ensure you operate the product in accordance with this manual.

⚠ Danger

It is crucial to read this manual thoroughly before beginning installation. To prevent electric shock: Nonprofessionals should not attempt to repair, inspect, or replace any parts. Avoid carrying out wiring work within one minute of turning the power on or off, as this poses a risk of electric shock (the capacitor retains power briefly after the power is switched off). When replacing or relocating the power supply, ensure the power is disconnected and wait for all indicators to turn off for one minute before proceeding.

⚠ Warning

Always use the appropriate controller for your specific product model. Using an incompatible controller may result in damage to the motor or controller. Before operation, verify that the power is connected according to the markings and check for any obstacles within the product's operational range. After starting, confirm that the product is rotating in the correct direction (clockwise when viewed from below). This product should not be operated in freezing, corrosive, explosive, or heavily dusty environments.

⚠ Installation

Installation and maintenance must be performed by qualified personnel with electrician certifications. Wiring should be installed in accordance with the requirements set forth by the relevant authorities.

II. Introduction

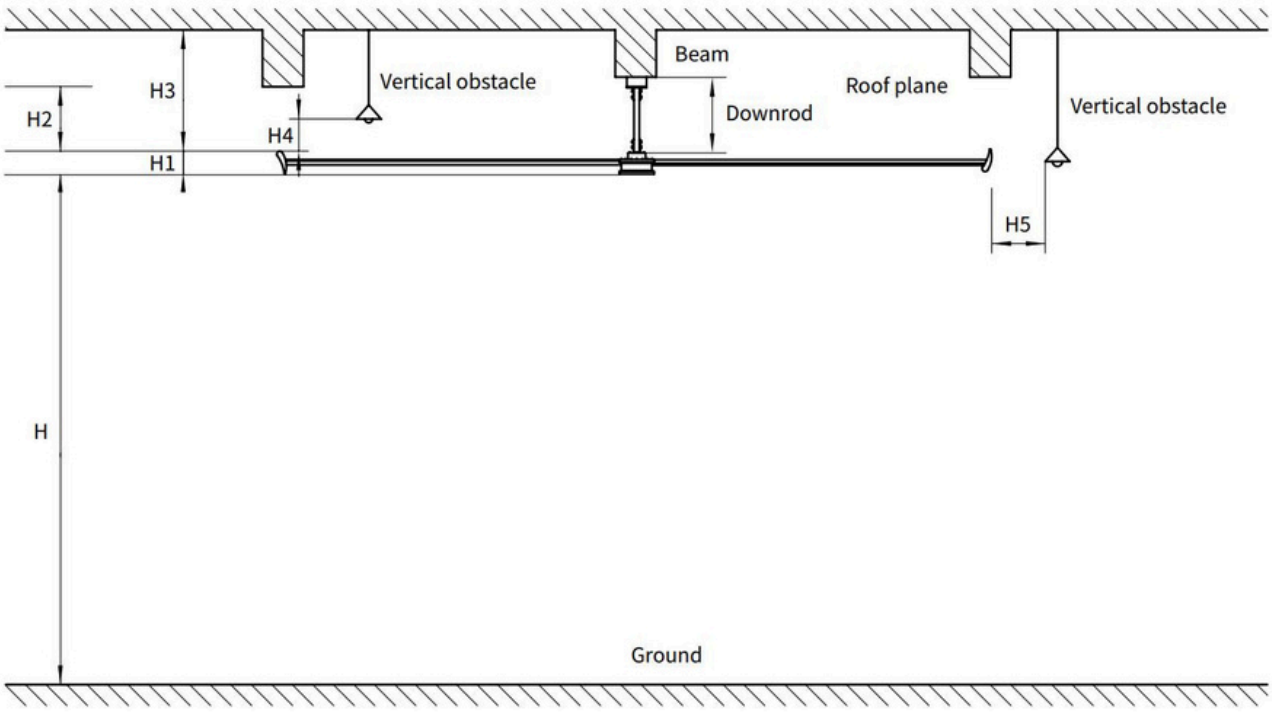
The Better Air series permanent magnet direct drive HVLS ceiling fan is designed to save energy, minimize consumption, and foster a comfortable working environment. This fan features an independently designed permanent magnet motor that is compact, lightweight, highly efficient, and operates quietly. With variable frequency speed regulation and an attractive design, it represents a modern solution for ventilation and cooling. It is ideal for various settings such as industrial plants, logistics warehouses, waiting areas, exhibition halls, gyms, and supermarkets. The fan generates a substantial airflow that creates a specific height of airflow layer, promoting overall air circulation. It mimics a natural breeze, allowing you to enjoy the sensation of fresh, natural wind.

III. Technical Parameters

MODEL	NAP-8	NAP-12	NAP-16	NAP-20	NAP-24
Fan Size (ft)	8	12	16	20	24
Power (kW)	0.37	0.75	0.75	1.1	1.1
Horsepower (HP)	0.5	1	1	1.5	1.5
Voltage (V)	1-Phase230V/3-Phase20 8-230V/3-Pha se460V				
Frequency (Hz)	50/60				
Air Volume (m3/min)	4000	5000	10,000	11,500	13,000
Speed (RPM)	120	100	80	65	50
Blade Number	5	5	5	6	6
Noise (dB)	38	38	38	38	38
Effective Area (m2)	150	230	300	600	700
Cover Area (m2)	250	380	500	1,000	1,500

Other specifications can be customized according to user needs.

IV. Installation Data

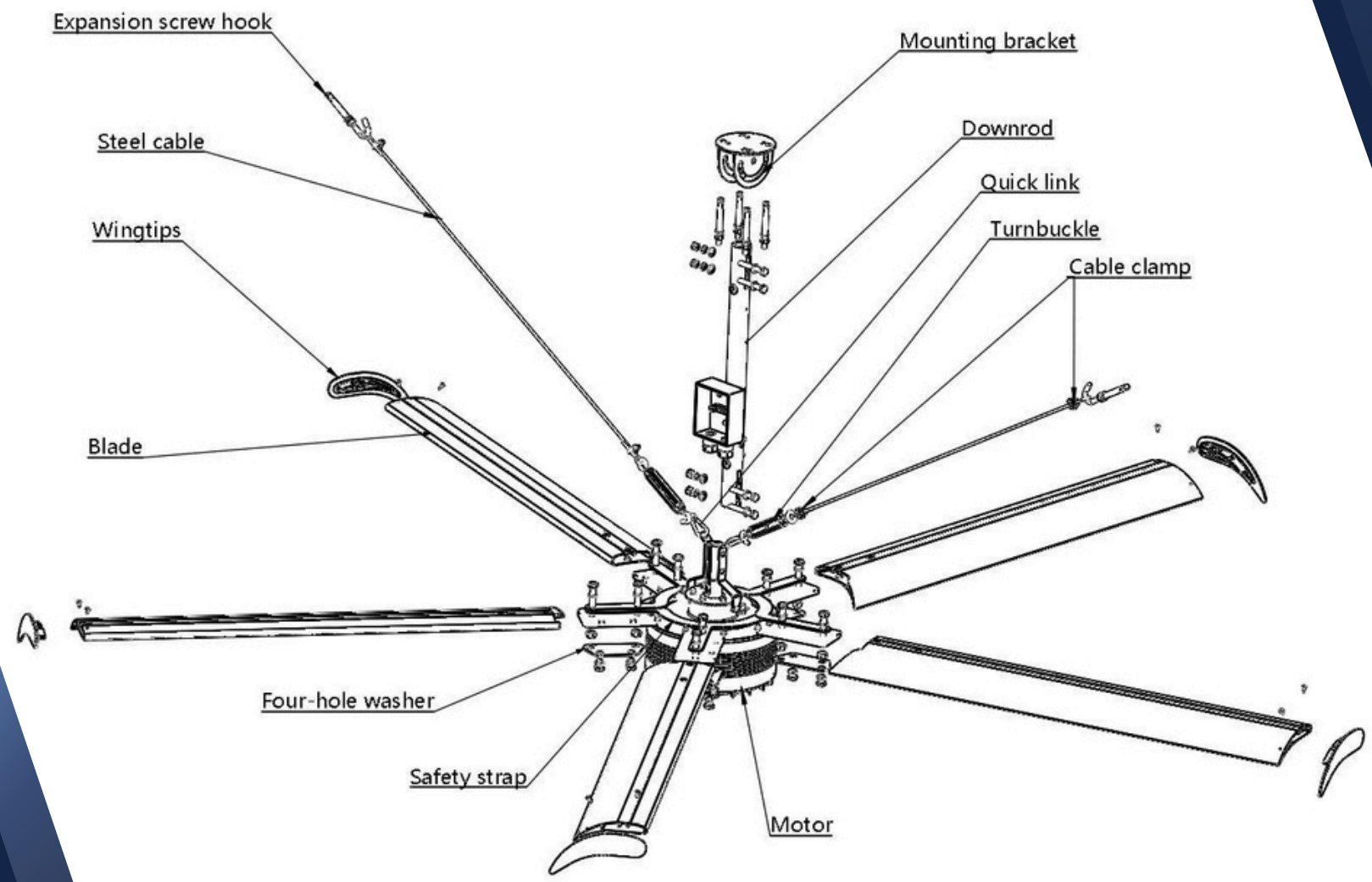


SPECS.	H	H1	H2	H3	H4	DOWN ROD	H5
8FT	2.5-5m	0.15m	≥0.3m	≥0.3m	≥0.3m	0.6-1.5m	≥0.2m
12FT	3-5m	0.15m	≥0.3m	≥0.5m	≥0.3m	0.6-1.5m	≥0.2m
16FT	3.6-6m	0.15m	≥0.3m	≥0.6m	≥0.3m	0.6-2m	≥0.2m
20FT	5-12m	0.2m	≥0.3m	≥0.8m	≥0.3m	0.6-5m	≥0.2m
24FT	5-12m	0.2m	≥0.3m	≥0.3m	≥0.3m	0.6-5m	≥0.2m

V. Installation for 8Ft ,12 Ft and 16Ft HVLS Fan

5.1 Installation steps for concrete structure

8’-16’ModelShown



5.1.1 Unpack the product and check whether the accessories are complete.

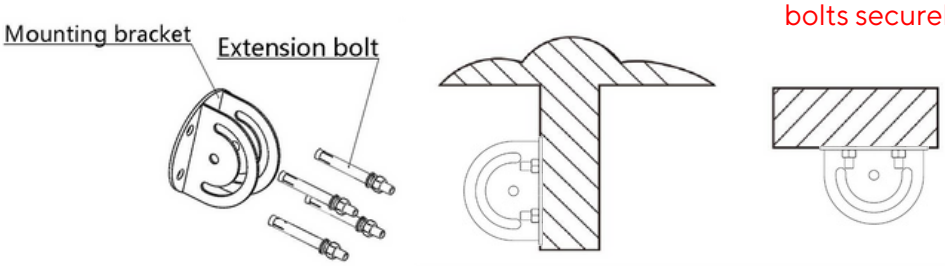
NAME	QTY.	NAME	QTY.	NAME	QTY.
Motor assembly	1	**#S4 Hardware Bag**		**#S10**	
VFD	1	M6 Cable Clamp	8	Downrod Assembly	1
Blade	5	M8 Turnbuckle	4	**#S11**	
#S1 Hardware Bag		Cotter Pin	3	Concrete Structure Mounting Bracket	1
M12x60 Hex bolt	10	M6 Quick link	2		
M12x16 Hex bolt	10	**#S5 Hardware Bag**		**#S12**	
M12 Hex nylon nut	12	M10x150 Hex bolt	4	Square /I-shaped beam mounting bracket	1
12 Standard Spring Washer	12	10 Washer	10	**#S13**	
Four-Hole Washer	22	10 Standard Spring Washer	6	Square /I-shaped beam mounting plate	1
#S2 Hardware Bag		M10 Hex Nylon Nut	6		
M4.8 x13 Self-tapping screw	14	**#S6 Hardware Bag**		**#S14**	
Wingtips	5	M10x100 Expansion bolt	4	I-shaped Beam clamp	2
#S3 Hardware Bag		M10x80 Expansion bolt hook	2	**#S15 Hardware Bag**	
M10x60 Hex bolt	4	**#S7**		M12x16 Hex bolt	2
M10x70 Hex bolt	4	20m Electrical Cable	1		
φ10 Washer	22	**#S8**			
φ10 Standard spring washer	12	8.3m Steel Cable	1		
M10 Hex nylon nut	12	**#S9**			
		Blade Safety strap	5		

5.1.2 Determine the installation position of the fan, mark it with the Concrete structure mounting bracket (#S11), drill the mounting hole with a 12mm drill bit (hole depth>60mm) and then install the M10x100 expansion bolts to fix the mounting bracket.

Accessories Needed:

NAME	QTY.
Concrete structure mounting bracket	1
M10x100 Expansion bolt	4

Attention: Pay attention to safety during the work and install expansion bolts securely.

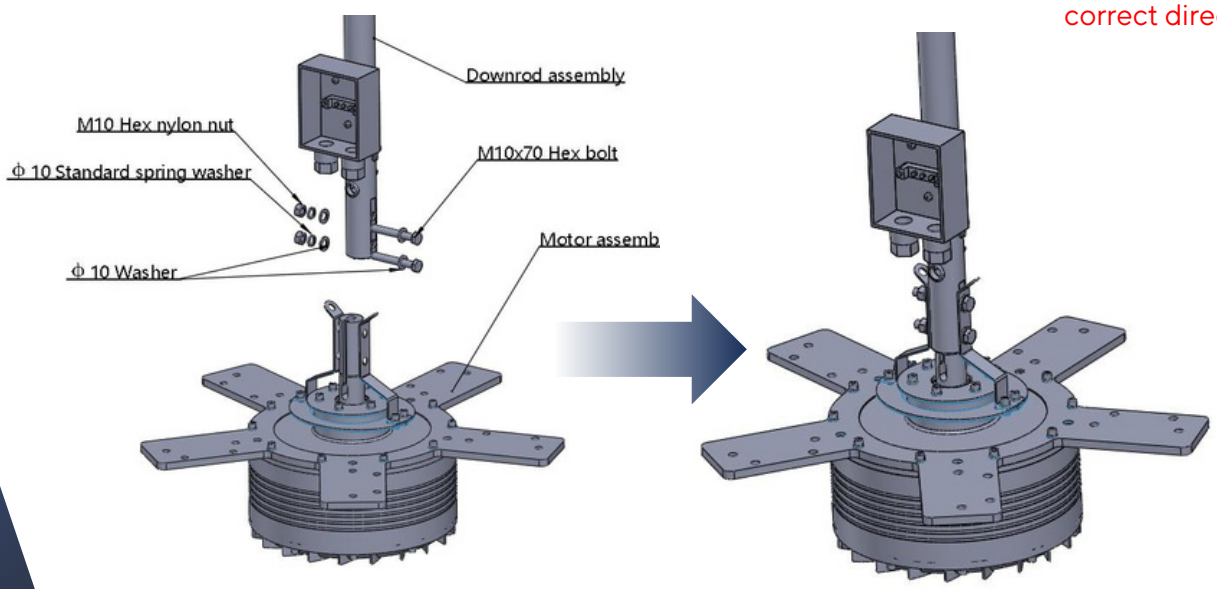


5.1.3 Install the downrod on the motor and screw it without tightening.

Accessories needed:

NAME	QTY.	NAME	QTY.
Motor assembly	1	10 Washer, 10 Standard	4
Downrod assembly	1	Spring Washer	2
M10x70 Hex Bolt	2	M10 Hex Nylon Nut	2

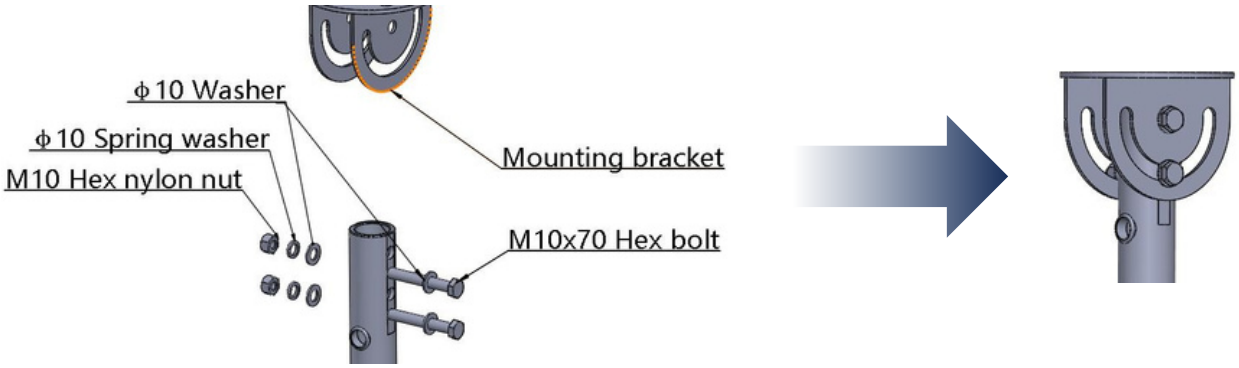
Attention: Check whether the blade bracket on the motor assembly is installed in the correct direction



5.1.4 Install the downrod on the mounting basket and screw it without tightening.

Accessories needed:

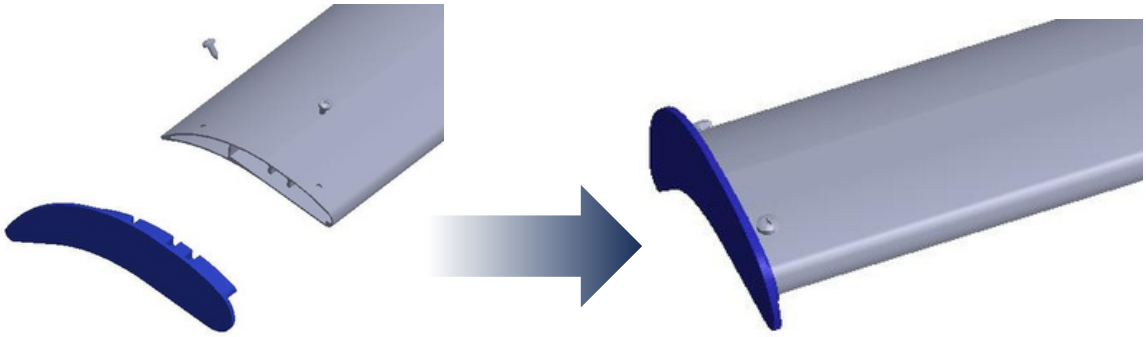
NAME	QTY.	NAME	QTY.
Mounting Bracket	1	10 Washer	4
Downrod Assembly	1	Standard Spring Washer	2
M10x70 Hex Bolt	2	M10 Hex Nylon Nut	2



5.1.5 Install the Wingtips on the blade and lock it.

Accessories needed:

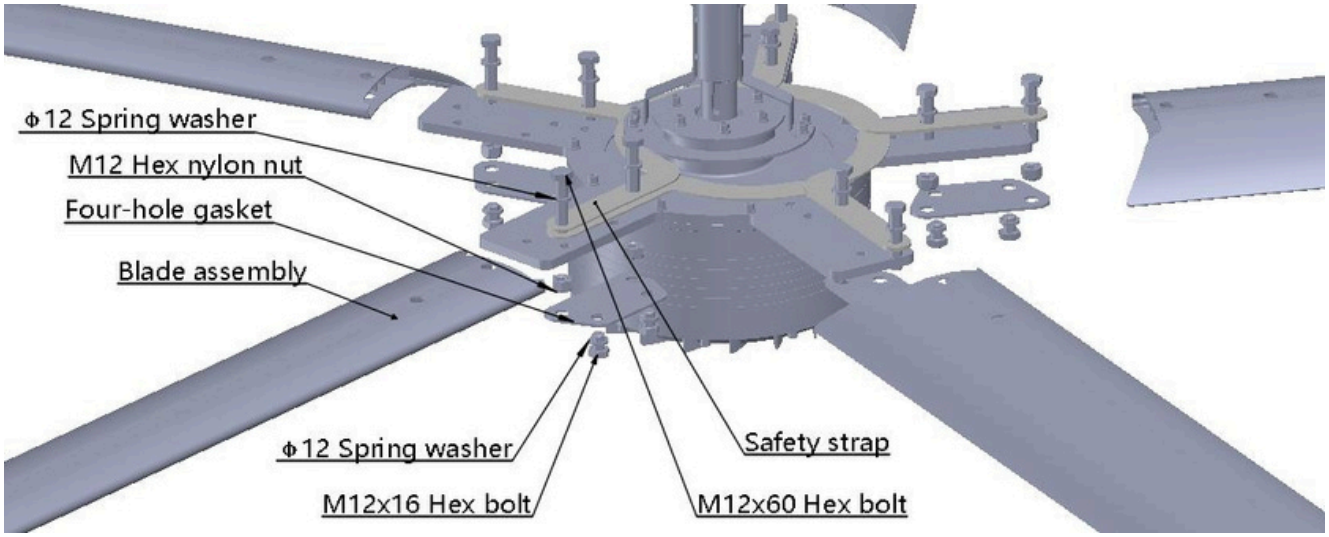
NAME	QTY.	NAME	QTY.
Blade	5	M4.8 x13 Self-tapping screw	10
Wingtips	5		

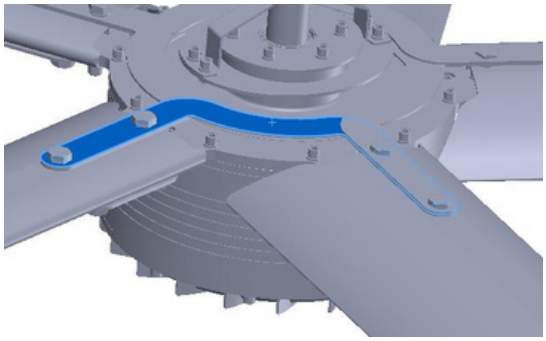


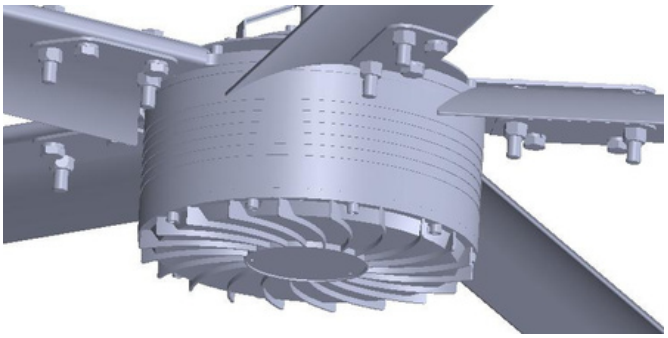
5.1.6 Install the blade assembly on the motor, install the screws and pull the blade outward from the center of the motor. Install the blade screws without tightening.

Accessories needed:

NAME	QTY.	NAME	QTY.
Blade Assembly	5	M12 Hex nylon nut	10
M12x60 Hex Bolt	10	12 Spring washer	20
M12x16 Hex bolt	10	Safety Strap	5

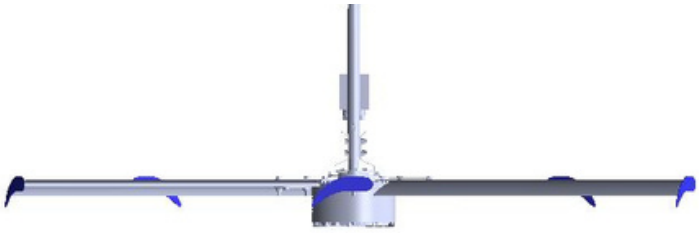






Attention: Before tightening the fan blade screws, pull the blade outward from the center of the motor. Ensure that the motor is level and the downrod is vertical before tightening the screws, and verify that all screws have been properly tightened.

5.1.7 Adjust the levelness of the motor and the vericality of the downrod, then tighten the screws.



5.1.8 Determine the position of the expansion bolt hook, drill the mounting hole with a 12mm drill bit hole (depth > 60mm), install the M10x80 expansion bolt hook with the hook upward and tighten the expansion screw hook.

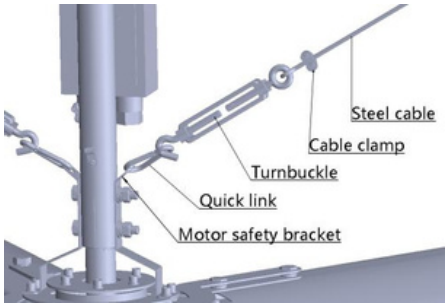
Accessories Needed:

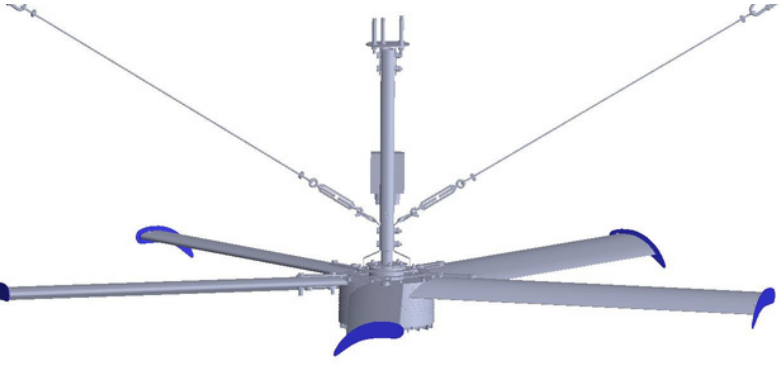
NAME	QTY.
M10x80 Expansion bolt hook	2

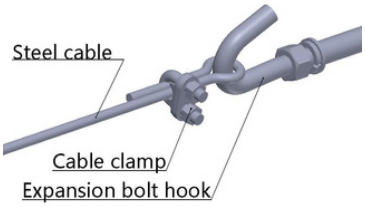
5.1.9 Fix the steel cable on the O end of turnbuckle with the cable clamp and connect the other end with the quick link,, then install the quick link on the safety bracket of the motor. One end of the steel cable is fixed on the expansion bolt hook with the cable clamp and adjust the tension of the steel cable with the turnbuckle (Until the steel cable is just straight) Finally lock the screw of the turnbuckle with the cotter pin.

Accessories needed:

NAME	QTY.	NAME	QTY.
M6 Cable Clamp	4	Cotter Pin	2
M8 Turnbuckle	2	M6 Quick Link	2
8.3m Steel Cable	1		





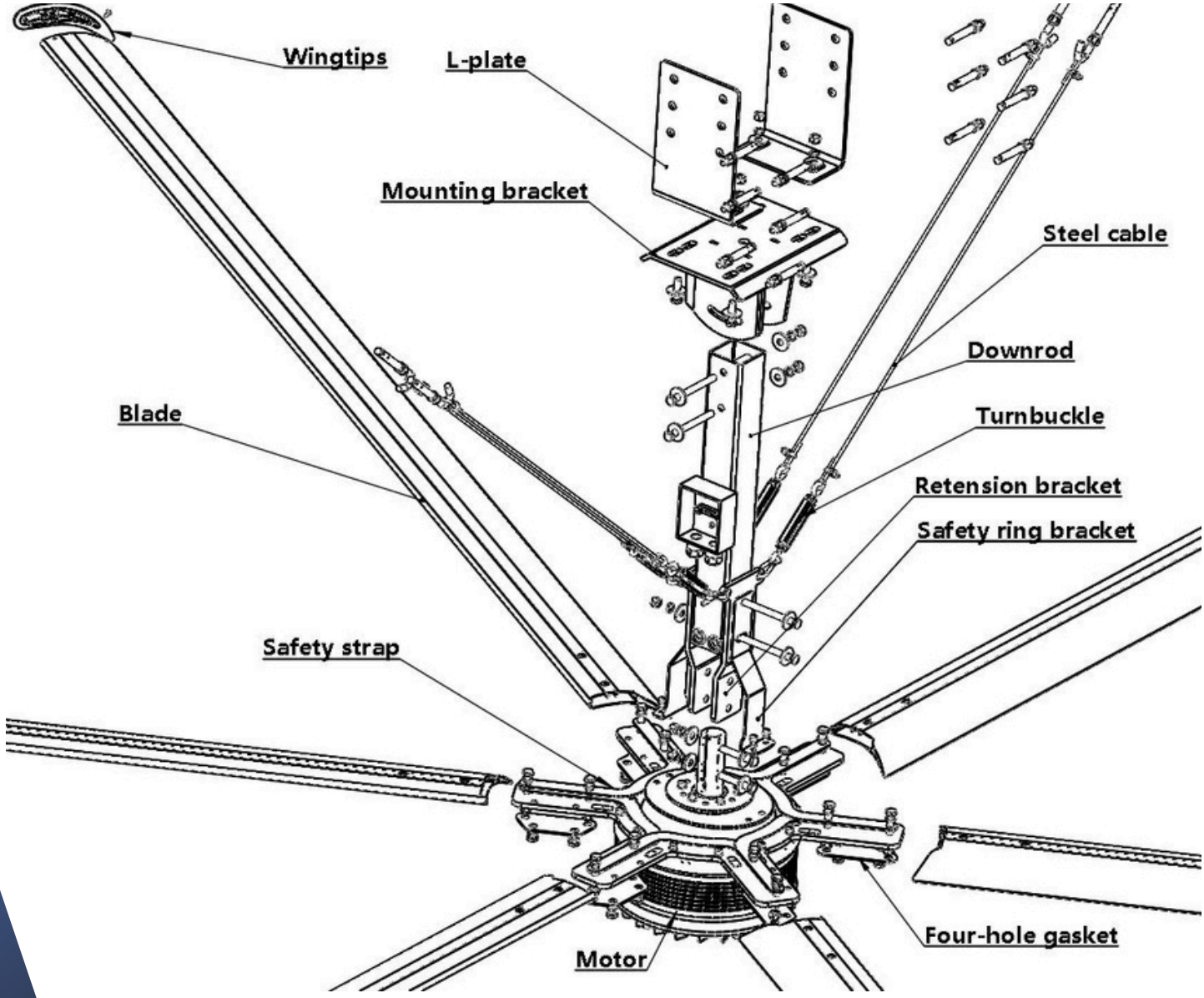


Attention: The included angle between the steel cable and the downrod is greater than 30° and less than 45°. The cable clamp shall be securely installed, and the steel cable can be adjusted by the turnbuckle without being too tight.

VI. Installation for 20Ft and 24Ft HVLS fan

6.1 Installation steps for concrete structure

20'X 24' Model Shown



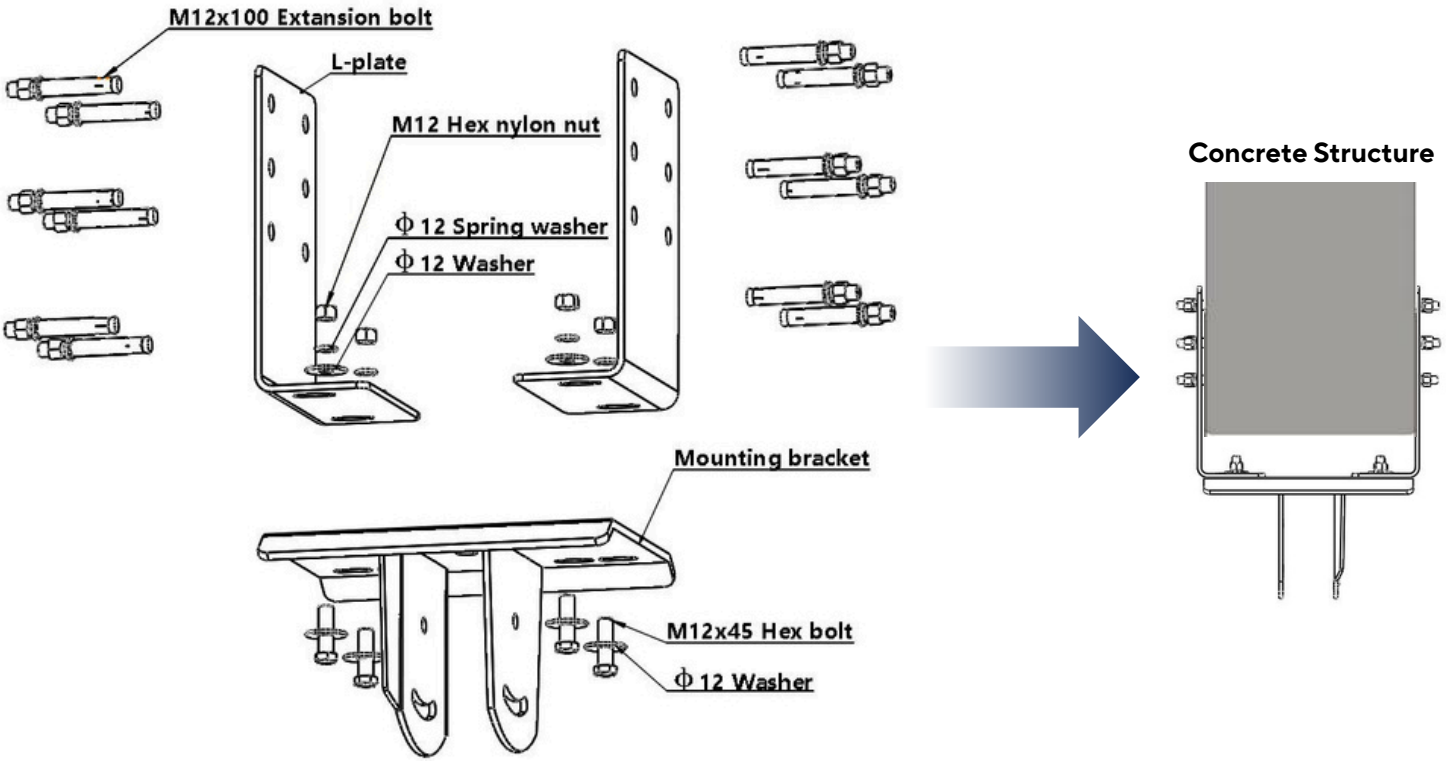
6.1.1 Unpack the product and check whether the accessories are complete.

NAME	QTY.	NAME	QTY.	NAME	QTY.
Motor assembly	1	**#B4 Hardware Bag**		**#B9**	
VFD	1	M6 Cable Clamp	8	33m Steel Cable	1
Blade	6	M8 Turnbuckle	4	**#B10**	
#B1 Hardware Bag		Cotter Pin	6	Blade Safety strap	6
M12x60 Hex bolt	12	M6 Quick link	4	**#B11**	
M12x16 Hex bolt	12	**#B5 Hardware Bag**		Downrod Assembly	1
M12 Hex nylon nut	14	M10x150 Hex bolt	4	**#B12**	
12 Standard Spring Washer	26	12 Washer	10	Retention Bracket	1
Four-Hole Washer	6	12 Standard Spring Washer	6	**#B13**	
#B2 Hardware Bag		M12 Hex Nylon Nut	6	Safety Ring Bracket	1
M4.8 x13 Self-tapping screw	14	**#B6 Hardware Bag**		**#B14**	
Wingtips	6	M12x45 Hex bolt	4	Mounting Bracket	1
#B3 Hardware Bag		M12x160 Hex bolt	4	**#B15**	
M12x150 Hex bolt	2	12 Washer	18	Pressing Plate	1
M12x130 Hex bolt	2	12 Standard Spring Washer	10	**#B16**	
M12x100 Hex bolt	2	M12 Hex nylon nut	10	L-Shaped Plate	2
12 Washer	14	**#B7 Hardware Bag**		**#B17**	
12 Standard spring washer	8	M12x100 Expansion bolt	10	I-Shaped Beam Clamp	2
M12 Hex Nylon Nut	8	M12x100 Expansion bolt hook	4	**#B18 Hardware Bag**	
		#B8		M12x16 Hex bolt	2
		30m Electrical Cable	1	M12x45 Hex bolt	2

6.1.2 Determine the installation position of the ceiling fan, mark it with the L-plate, drill the mounting holes with a 14mm drill bit (hole depth>80mm), install the M12x100 expansion bolt, install the L-plate on the expansion bolt, adjust the levelness of the L -plate, tighten the expansion screw and install the mounting bracket under the L -plate and tighten it.

Accessories needed:

NAME	QTY.	NAME	QTY.
Mounting Bracket	1	12 Washer	4
L-Shape Plate	2	12 Spring Washer	8
M12x100 Expansion bolt	4	M12 Hex Nylon Nut	4
M12x45 Hex Bolt (Full Thread)	4		

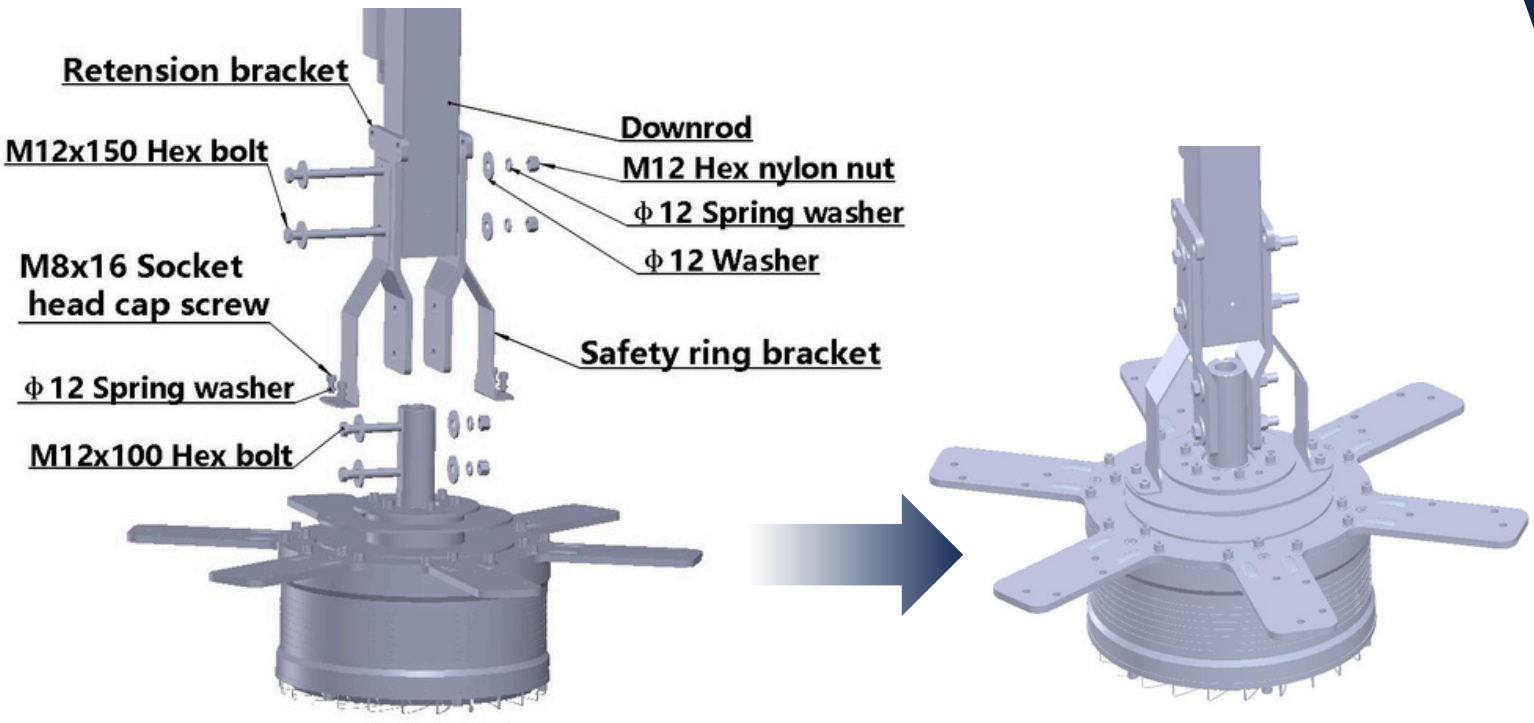


Attention: Both the L-plate and the mounting bracket shall be installed horizontally and symmetrically at both ends.

6.1.3 Install the downrod on the motor, left the screws not being tightened.

Accessories needed:

NAME	QTY.	NAME	QTY.
Downrod Assembly	1	M12 Hex Nylon Nut	4
Safety Ring Basket	2	12 Washer	8
Retension Bracket	2	12 Spring Washer	4
M12x100 Hex Bolt	2	M8x16 Socket Head Cap Screw	4
M12x150 Hex Bolt	2		



6.1.4 Install the downrod assembly on the mounting bracket and screw it without tightening.

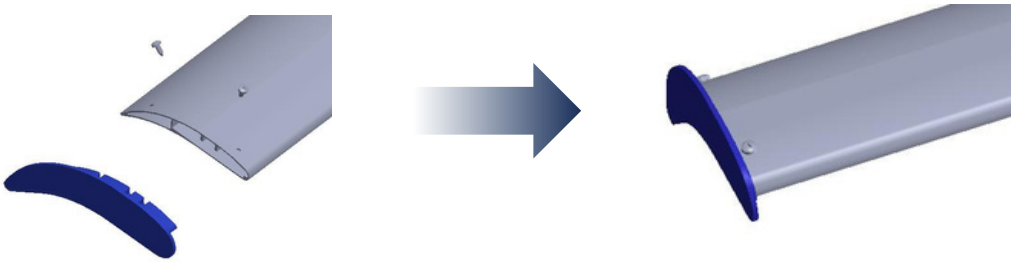
Accessories needed:

NAME	QTY.	NAME	QTY.
M12x130 Hex bolt	2	12 Washer	4
M12 Hex Nylon Nut	2	12 Spring Washer	2

6.1.5 Install the Wingtips on the blade and lock it.

Accessories needed:

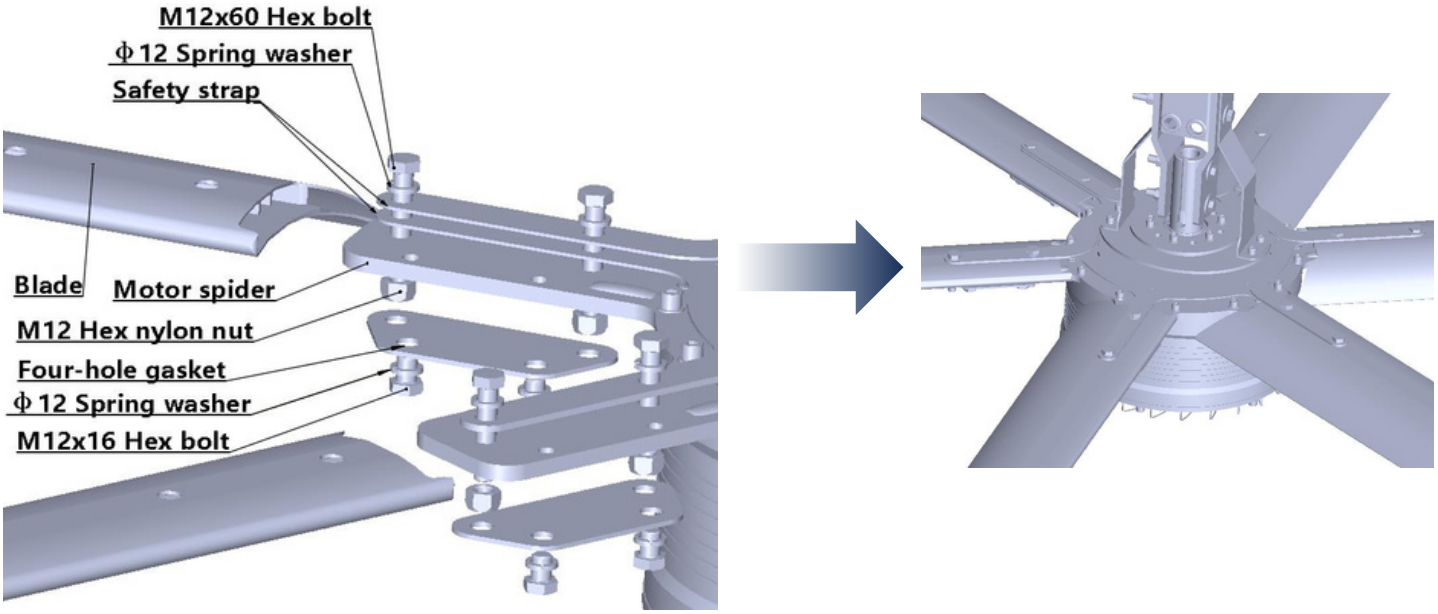
NAME	QTY.	NAME	QTY.
Blade	6	M4.8 x 13 Self-Tapping Screws	12
Wingtips	6		



6.1.6 Install the blade assembly on the motor, install the screws and pull the blade outward from the center of the motor. Screw the blade without tightening.

Accessories needed:

NAME	QTY.	NAME	QTY.
M12x60 Hex bolt	12	12 Spring Washer	24
M12x16 Hex bolt	12	Four-Hole Gasket	6
Safety Strap	6		



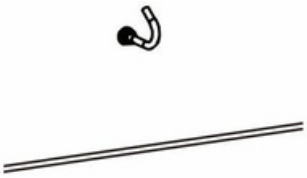
6.1.7 Adjust the levelness of the motor and the verticality of the downrod, tighten the downrod and blade screws.

Attention: Before tightening the blade screws, pull the blade outward from the center of the motor. Adjust the levelness of the motor and the verticality of the downrod before tightening the screws and check whether all the screws are tightened.

6.1.8 Determine the position of the expansion bolt hook, drill the mounting hole with a 14mm drill bit (hole depth>80mm), install the M12X100 expansion bolt hook with the hook upward and tighten it.

Accessories needed:

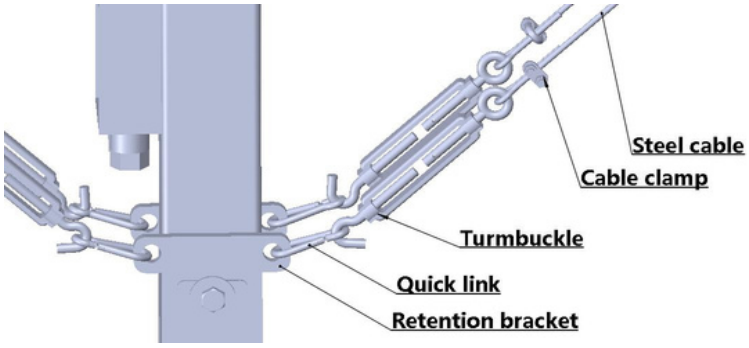
NAME	QTY.
M12x100 Expansion Bolt Hook	4

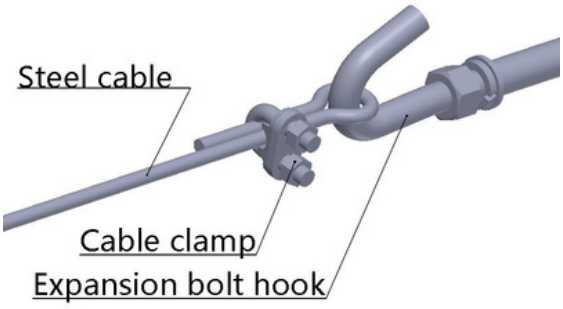


6.1.9 Fix the steel cable on the O end of turnbuckle with the cable clamp and connect the other end with the quick link, then install the quick link on the holes of retention bracket. One end of the steel cable is fixed on the expansion bolt hook with the cable clamp and adjust the tension of the steel cable with the turnbuckle (Until the steel cable is just straight) Finally lock the screw of the turnbuckle with the cotter pin.

Accessories needed:

NAME	QTY.	NAME	QTY.
M6 Cable Clamp	8	Cotter Pin	4
M8 Turnbuckle	4	33m Steel Cable	1
M6 Quick Link	4		



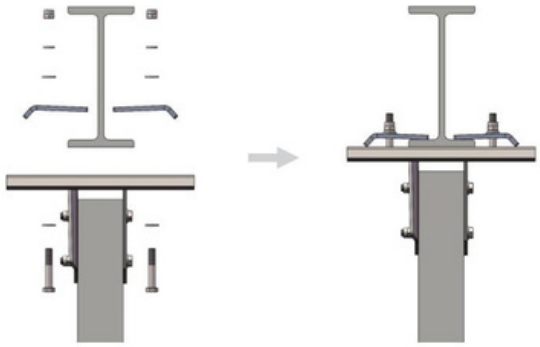


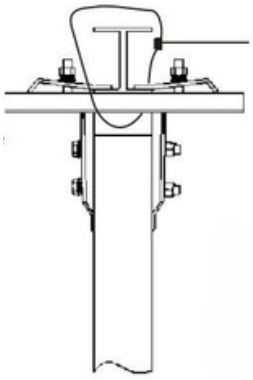
Attention: The angle formed between the steel cable and the downrod should be more than 30° but less than 45°. Ensure that the cable clamp is firmly installed, and the steel cable can be adjusted using the turn hook without being overly tight.

6.2 I-shaped beam hanging installation

Accessories needed:

NAME	QTY.	NAME	QTY.
Mounting Bracket	1	12 Washer	8
I-Shaped Beam Clamp	2	M12 Hex Nylon Nut	4
M12x60 Hex Bolt	4	12 Spring Washer	4



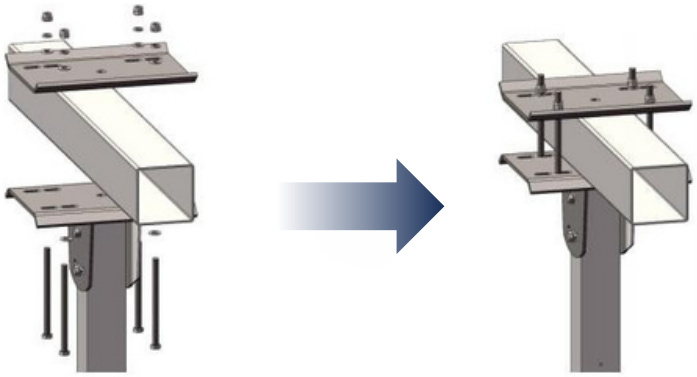


Use the steel cable to tie the L-shaped beam and the mounting bracket together with the cable clamp.

6.3 Square beam hanging installation

Accessories needed:

NAME	QTY.	NAME	QTY.
Mounting Bracket	1	12 Washer	8
Pressing Plate	1	M12 Hex Nylon Nut	4
M12x160 Hex Bolt	4	12 Spring Washer	4



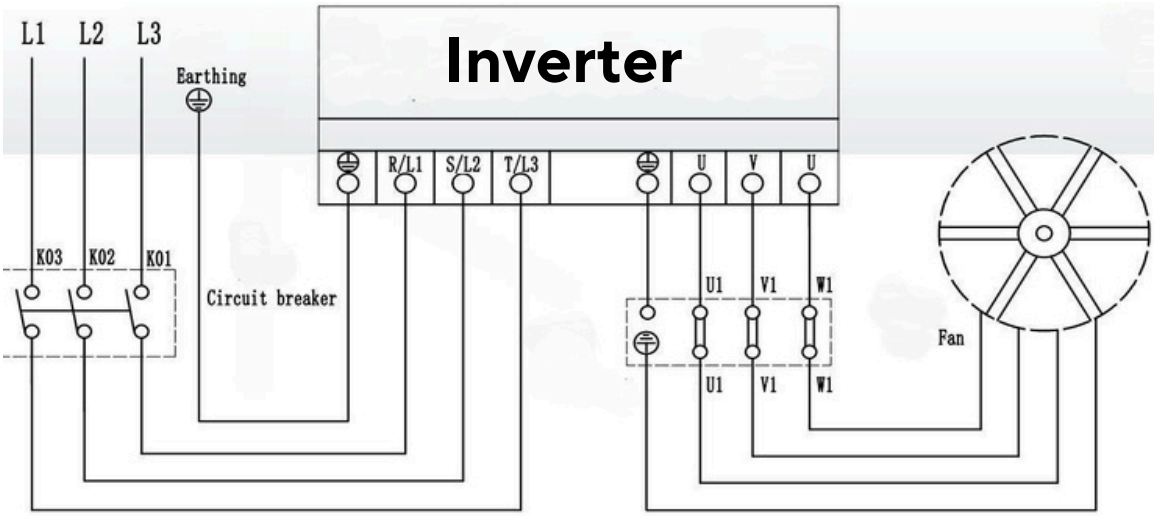
Expansion bolt hook is not available and can use steel cable to tie the square beam and the mounting bracket together with the cable clamp.

VII. Wiring

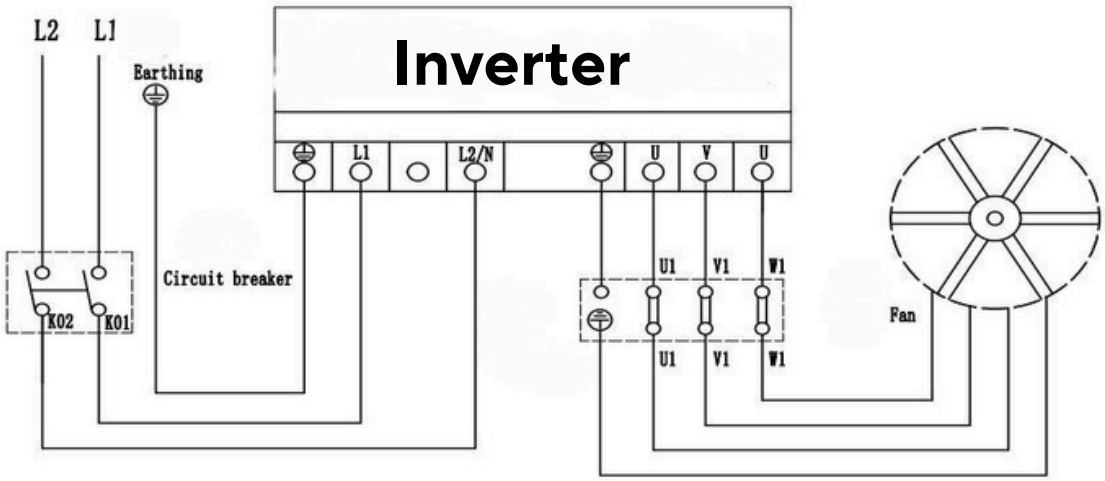
Install the Inverter. Connect the cable from the motor to the junction box and the junction box to the Inverter according to the requirements. Connect the mains supply to the Inverter as required. Check whether there are obstacles around the ceiling fan that affect the operation, and run the ceiling fan according to the instructions.

Wiring installation must comply with the regulations set by the relevant authorities.

7.1 Wiring diagram



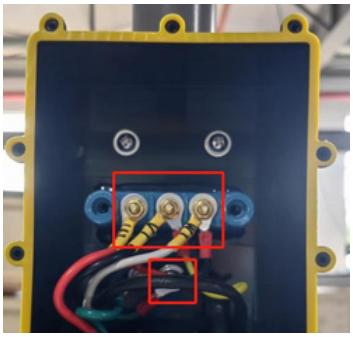
Three-phase input wiring diagram



Single-phase input wiring diagram

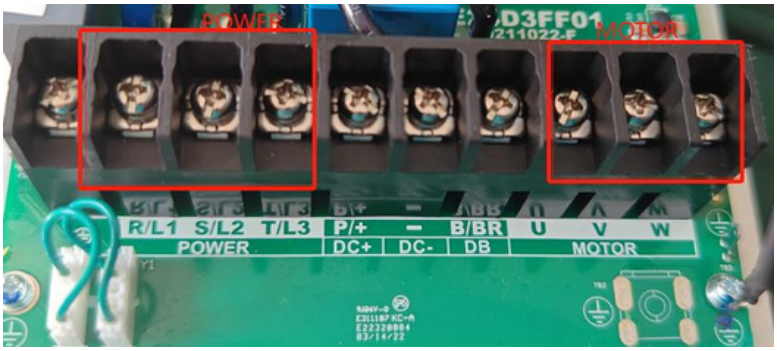
7.2 Wiring for junction box

As shown in the figure, the Inverter lead wire and the motor lead wire are fixed on the terminal post according to the mark. Make sure no short circuit. Secure the ground cable is fixed on the fixing screw of the junction box base, and lock the junction box cover.

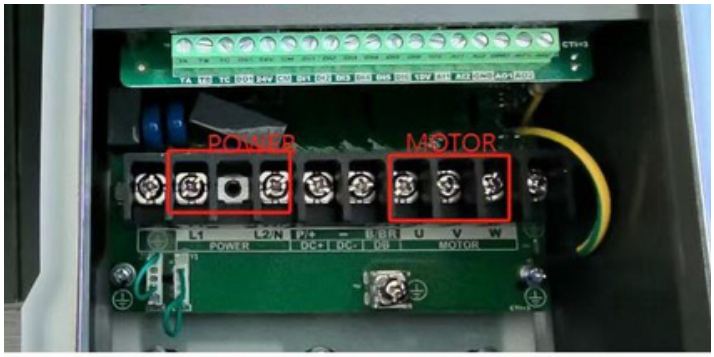


Please be aware: The phase sequence of the motor linked to the inverter must be correct; otherwise, the motor will run in reverse, negatively impacting the product's outcome.

7.3 Wiring for Inverter



Three-phase Inverter



Single-phase Inverter

⚠ Do not connect the mains directly to the ceiling fan. Check whether the power supply voltage matches the controller voltage.

VIII. Control Panel Operation

8.1 Control panel operation

E2400 series Inverter

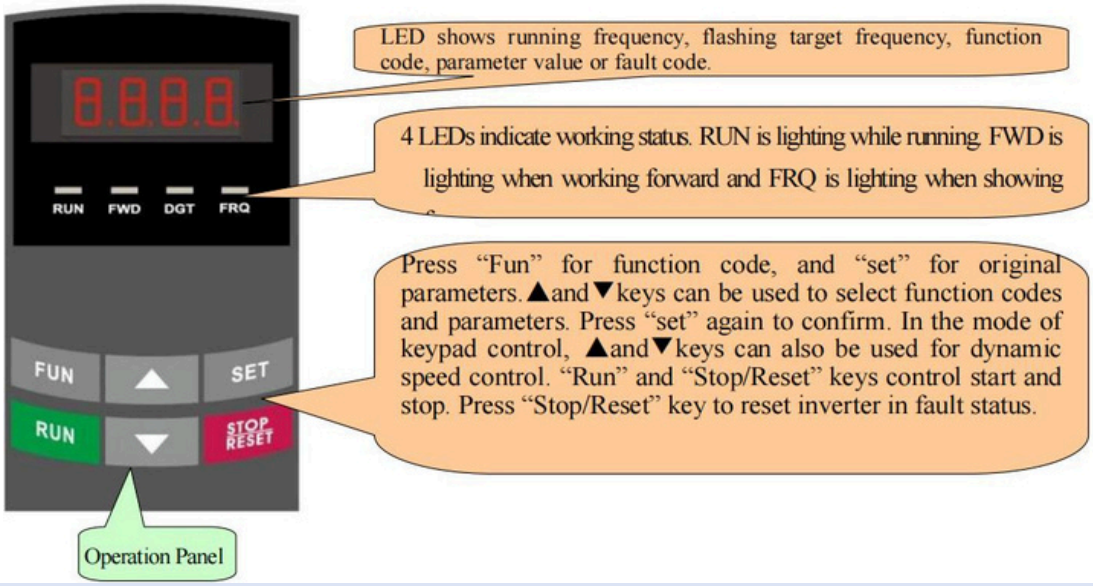
Start------->>> "RUN" key

Stop------->>> "STOP/RESET" key

Accelerate------->>> "△" key

Decelerate ------->>> "▽" key

Check the E2400 USER MANUAL for operation details.



IX. Trouble Shooting

When an inverter malfunctions, avoid the urge to simply reset it right away. First, investigate potential causes and address any issues you find. Refer to this manual for guidance on handling inverter malfunctions. If the problem persists, please reach out to the manufacturer. Do not attempt any repairs without proper authorization.

Inverter Malfunctions & Counter Measures

FAULT	DESCRIPTION	CAUSES	COUNTERMEASURES
Err0	Prohibition modify function code	* Prohibition modify the function code during running process.	* Please modify the function code in stopped status.
Err1	Wrong password	*Enter wrong password when password is valid *Do not enter password when modifying function code.	* Enter the correct password.
2: O.C.	Over-current	* Acceleration time is too short * Short circuit at output side * Locked rotor with motor * Load too heavy * Parameter tuning is not correct.	*Prolong acceleration time *Whether motor cable is broken *Check if motor overloads *Reduce V/F compensation value *Measure parameter correctly
16: OC1	Over-current 1		
67: OC2	Over-current 2		
3: O.E.	DC Over-Voltage	*Supply voltage too high *Load inertia too big *Deceleration time too short *Motor inertia rise again *Bad effect of dynamic braking *Parameter of rotary speed loop PID is set abnormally	*Check if rated voltage is input *Add braking resistance(optional) *Increase deceleration time *Enhancing the dynamic braking effect *Set the parameter of rotary speed loop PID correctly *Change to VF control for centrifugal fan
4: P.F1.	Input Phase loss	*Phase loss with input power	*Check if power input is normal *Check if parameter setting is correct
5: O.L1	Inverter Overload	*Load too heavy	*Reduce load *Check drive ratio *Increase inverter's capacity
6: L.U.	Under-Voltage Protection	*Input voltage on the low side	*Check if supply voltage is normal *Check if parameter setting is correct

Inverter Malfunctions & Counter Measures

FAULT	DESCRIPTION	CAUSES	COUNTERMEASURES
7: O.H.	Radiator Overheat	*Environment temperature too high; *Radiator too dirty *Install place not good for ventilation; *Fan damaged * Carrier wave frequency or compensation curve is too high.	*Improve ventilation *Clean air inlet and outlet and radiator *Install as required *Change fan *Decrease carrier wave frequency or compensation curve
8: O.L2	Motor Overload	* Load too heavy	*Reduce load *Check drive ratio *Increase motor's capacity
11: ESP	External fault	*External emergency-stop terminal is valid	*Check external fault
12: Err3	Current malfunction before running	*Current alarm signal exists before running	*Check if control board is connected with power board well *Ask for help from manufacturer
13: Err2	Parameters tuning wrong	*Do not connect motor when measuring parameters	*Please connect motor correctly
15: Err4	Current zero excursion malfunction	*Flat cable is loosened *Current detector is broken	*Check the flat cable *Ask for help from manufacturer
17: PF0	Output Phase loss	*Motor is broken *Motor wire is loose *Inverter is broken	*Check if wire of motor is loose *Check if motor is broken
18: AErr	Line disconnected	*Analog signal line disconnected *Signal source is broken	*Change the signal line *Change the signal source
19: EP3	Inverter under-load	*Water pump dries up *Belt is broken *Equipment is broken	*Supply water for pump *Change the belt *Repair the equipment
20: EP/EP2			
22: nP	Pressure Control	*Pressure is too high when negative feedback *Pressure is too low when positive feedback *Inverter enters into the dormancy status	*Decrease the min frequency of PID *Reset inverter to normal status

Inverter Malfunctions & Counter Measures

FAULT	DESCRIPTION	CAUSES	COUNTER MEASURES
23: Err5	PID parameters are set wrong	* PID parameters are set wrong	*Set the parameters correctly
24:SLP	Dormancy protection	*Dormancy mode	*When the pressure is normal, it automatically exits dormancy mode
26: GP	Earth fault protection (S2/T2 does not have GP protection)	*Motor cable is damaged, short connected to grounding *Motor isolation is damaged, short connected to grounding *Inverter fault	*Replace with new cable *Repair the motor *Contact manufacturer
27: PG	Encoder fault	*Encoder installation fault *Encoder fault *Encoder line number setting fault	*Check the installation and connection *Check encoder *Set F851 correctly
32: PCE	PMSM distuning fault	*motor parameters measurement is wrong *load is too heavy	*Measure motor parameters correctly *Decrease the load
35: OH1	PTC overheat protection	*External relay protection	*Check external heat protection equipment
44: Er44	Master loses slave's response	*Communication fault between master and slave	*Check if wire of motor is loose *Check if motor is broken
45: CE	Communication timeout error	Communication fault	*PC/PLC does not send command at fixed time *Check whether the communication line is connected properly
47: EEEP	EEPROM read/write fault	*Interference occurring *EEPROM is damaged	*Remove interferences *Contact manufacturer
49: Err6	Watchdog fault	*Watchdog timeout	*Check watchdog signal
53: CE 1	Keypad disconnection protection	*Keypad disconnection	*Check communication line
55:Er55	Drop load protection	*Drop load	*Check external device

Motor Malfunction & Counter Measures

MALFUNCTION	ITEMS TO BE CHECKED	COUNTER MEASURES
Motor not running	Wiring correct? Setting correct? Is load too big? Is motor damaged? Malfunction protection occurs?	Connect to power; Check wiring; Check malfunction; Reduce load; Check against Table 1-1
Motot running in wrong direction	U, V, W wiring correct? Parameters setting correct?	Correct wiring. Set the parameters correctly.
Motor Turning but Speed Change not Possible	Wiring correct for lines with given frequency? Correct running mode setting? Load is too big?	Correct wiring Correct setting Reduce load
Motor Speed Too High or Too Low	Motor's rated value correct? Drive ratio correct? Inverter parameters are set in-corrected? Check if inverter output voltage is abnormal?	Check motor nameplate data; Check drive ratio setting; Check parameters setting; Check V/F characteristic value
Motor Running Unstable	Load too big? Load change too big? Phase loss? Motor malfunction?	Reduce load; reduce load change, increase capacity; correct wiring
Power Trip	Wiring current is too high?	Check input wring; Select matching air switch; Reduce load; checking inverter malfunction.

Attention:

1. Installation and wiring must be performed by qualified professionals in accordance with the Operation Manual to prevent the risk of electric shock.
2. Before operating the ceiling fan, ensure that the surrounding room meets all necessary requirements. When using the product for the first time, verify that the power supply is adequate and that the wiring is correct and secure. The power can only be activated once it is confirmed to be safe.
3. The system is equipped with protection features, including overvoltage, undervoltage, voltage loss regulation, phase loss, overload, collision, overheating, and lightning protection.
4. If the ceiling fan will not be used for an extended period, run it for 10 minutes every two months to help prolong its lifespan.

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