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General Instructions ***KVS Series*** Diameter 3,700mm ~ 7,300mm



IGB057.E1/2201

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1. Summary



1.1 Product Features

- Large and wide space ventilation to improves human comfort
- High volume, low noise, energy saving
- Safe operation and easy installation

1.2 Product Applications

Manufacturing plants, warehouses, shopping malls, dairy farms, churches, railway platforms, stadiums and etc.

1.3 Product Models

Model	Dia. mm	Power kW	Spd. rpm	Weight kg
KVS 7300	7300	1.5	54	138
KVS 6400	6400	1.5	60	130
KVS 5500	5500	1.5	70	121
KVS 4600	4600	1.5	81	112
KVS 5300	5300	0.6	56	80
KVS 4600	4600	0.6	70	75
KVS 3700	3700	0.6	81	70

Table 1-1

1.4 Working Condition

- Indoors, no corrosive gas, flammable gas, oil mist, water vapor, dripping water or salty air
- Working temperature: $-35^{\circ}\text{C} \sim +50^{\circ}\text{C}$
- Relative humidity: 0%~95%
- Altitude: <2000m
- Power input: AC 220V (range 200V-240V) or 380V (range 380-440V)



Cautions

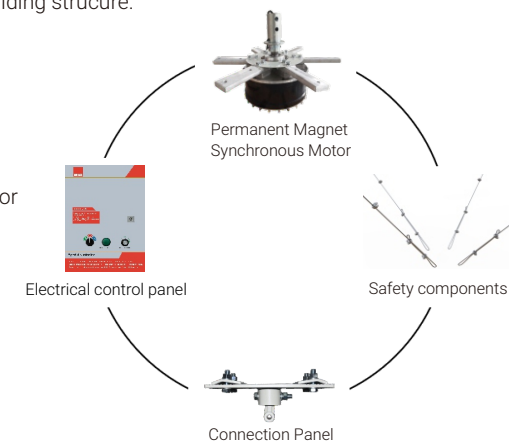
- **Make sure the KVS fan system is grounded.**
- **Control box output & input connection mixed is strictly prohibited.**
- **Power outage during operation is strictly prohibited.**

2. Structure

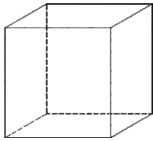
- Maintenance free permanent magnet IP65 motor with full load and partial load efficiency.
- High efficiency aircraft-grade aluminum blade with internal steel reinforcement.
- Anti slip slot and locknut design mounting structure.
- Fasteners with anti-loose self-locking nut and toothed anti-fall pad.
- Alloy cast steel universal joint mounted between fan and ceiling.
- L-shaped safety buckle built in each fan blade.
- Safety steel wire hold the fan with building structure.

Main Components

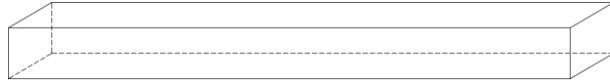
1. Permanent Magnet Synchronous Motor
2. Electrical control panel
3. Connecting structure
4. Safety components



3. Packing



78*70*70cm
Motor Carton



370*41*33cm
Blade Carton



Motor



Control Box



Blades



M16X60 Bolt Kit



M16X130 Bolt Kit



Galvanized Pipes



M10X50 Bolt Kit



M5X16 Screws



Extension Pipe



Steel Wire



Cable



Waved Plastic Pipe



Wire Rope Clamp



Mounting Plate & Clips



Bottom Cover



Heat Sink Kit



Winglet & Safety Strip



Control Box Screw



Clip Kit



Galvanized Pipe Connector



Universal Joint

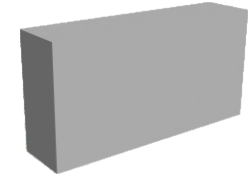
4. Installation

4.1 Technical Requirement

4.1.1 Ceiling Structure



I-BEAM / H-BEAM

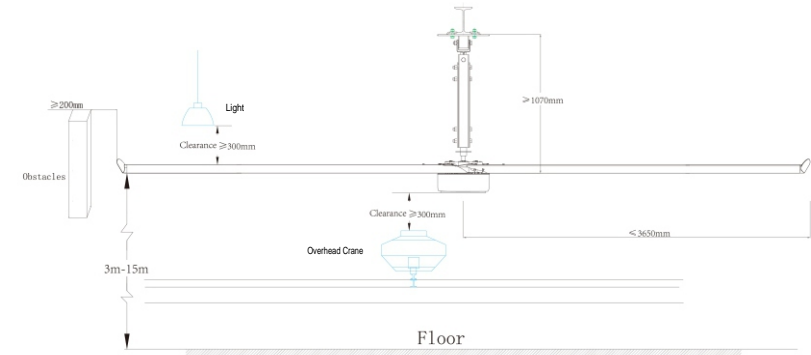


CONCRETE BEAM

4.1.2 Ensure building structure supports fan weight as shown in table 1-1

4.1.3 Ensure input voltage in accordance with product rated voltage

4.1.4 Locate Installation Spot



4.2 Equipment

4.2.1 Safety Equipment



Safety Helmets



Safety Belts



Labor Gloves

4.2.2 Installation equipment



Wire Cutter



Wire Stripper



Screwdriver



Wire Tightener



Wrench Kit



Level Meter



Range finder/tapeline



Multimeter

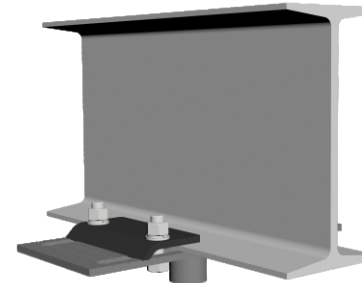


Scissor Lift

4.3 Installation Guide

4.3.1 Mounting

Generally KVS Fan supports I-beam and concrete beam mounting only, for other structures, please consult KVS Fan for details components.

I Beam Bottom Mounting

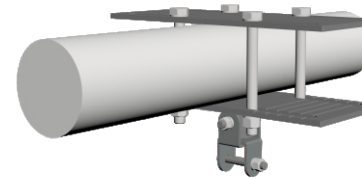
Locate the installation position.

Place mounting plate onto bottom beam.

Fix clips with M16*60 bolt kits.

* Ensure the mounting plate is levelled and aligned with the beam.

* Ensure the connection point (for universal joint) is at the middle of the I-beam.

Round Beam Mounting

Locate the installation position.

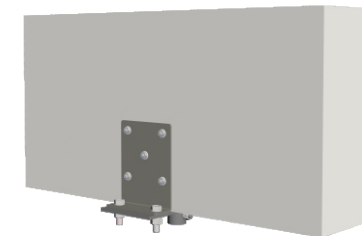
Place mounting plate on top of the round beam.

Place mounting plate with "drop" at the bottom of the round beam.

Fix both mounting plate with M16*130 or longer bolt kits.

* Ensure the mounting plates are securely fixed to the beam.

* Ensure the connection point (for universal joint) is at the middle of the beam.

Concrete Beam Mounting

Locate the installation position.

Mark and punch holes (for mounting plates) on the beam.

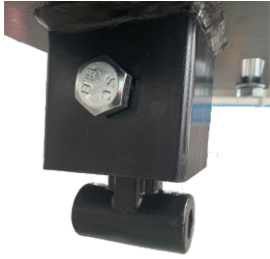
Fix L panel with M14*50 expansion bolt kits.

Place the mounting plate at the bottom of the beam. Fix with M16*60 bolt kits.

* Ensure at least 3 bolts for each L panel.

* Ensure mounting plate is levelled and aligned with the beam.

* Ensure the connection point (for universal joint) is at the middle of the beam.



4.3.2 Install Universal Joint

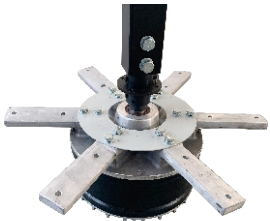
Fix the universal joint with M16X130 bolt kit.



4.3.3 Install Extension Pipe & Beam Wire

Find the upper direction of the extension pipe.

- * All walls reserve holes, fix the pipe to bottom part of universal joint with M16x130 bolt kit.
- * Ensure the pipe is plumb (using a level meter). Surround the steel wire to the beam and through the reserved holes on the pipe.



4.3.4 Install Motor

Fix motor to extension pipe with M16x130 bolt kit.

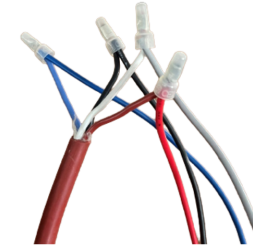
- * Ensure the motor component is plumb (straight upright).



4.3.5 Cable Wire Placement

Allocate a proper position for the cable and reserve sufficient cable length for motor wiring.

- * recommended 50cm + length of extension pipe.
- Get the cable through galvanized pipe and fix with clips.
- * Pass the cable through reserved hole on extension pipe.



Motor

Control Box

4.3.6 Motor Wiring

Connect ground - ground, live - live wiring respectively.

- * Red - U
- * White - V
- * Blue - W
- * BLACK- PE



4.3.7 Install Steel Wires

Locate proper positions for 4 steel wires.

Cut wires in proper length & fix at the positions. Get the other end of wire through reserved rings. Ensure the angles between 4 wires and level are the same.

- * Recommend angle > 45°, fix cables with wire rope clamps.
- * Ensure each 4 clamps are in the same level.



4.3.8 Level Adjustment

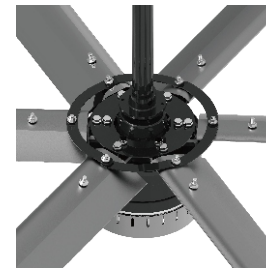
Use wire rope tool to tighten the steel wires.

Ensure the extension pipe is plumb (straight upright).

Ensure the clamps are tightened.

Ensure the motor part is leveled.

- * Recommend to check the above with a level meter.



4.3.9 Install Blades & Safety Strips

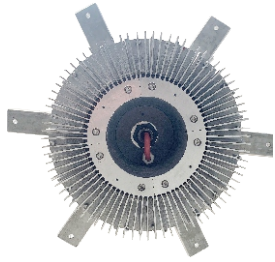
Install winglets into blades with M5*16 screws.

Install blades to plug-in connectors one by one.

Install safety strips, there are round & oval in each edge, place the round on next strip's oval, fixed with M10*50 bolt kit.

Fix the blades via the hole further from the motor with M10*50 bolt kit.

- * Bolt kits should be inserted from bottom to top.



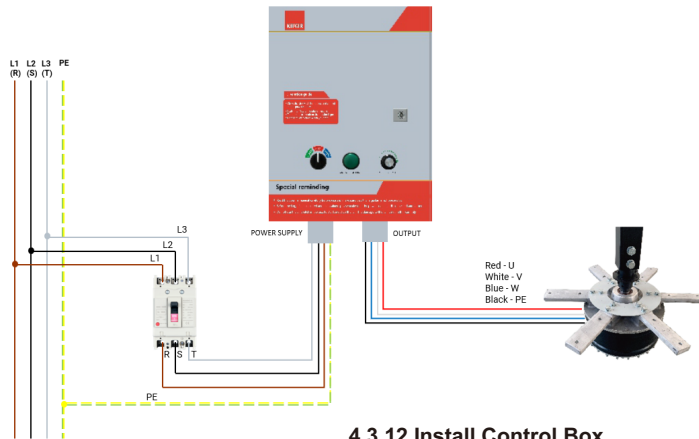
4.3.10 Install Heat Sink

Fix heat sink with 8 pieces of M6*20 screws.



4.3.11 Install Bottom Cover

Fix bottom cover with 4 pieces of M5*10 screws.



4.3.12 Install Control Box

Install control box and fix control box with long screw.

* Recommend to install at the side of I beam for better heat dissipation.

* Ensure bottom panel is levelled.

* Control box should be installed upright.

4.4 Debug

4.4.1 Push the isolation switch upwards to connect the power supply.

4.4.2 Turn selector switch to "Run" position and start the fan.

4.4.3 Slowly increase the speed control to 1/3 position and observe the fan's rotating direction.

- a) If the direction is counter-clockwise when lookup from ground, the fan wiring is correct.
- b) If the direction is clockwise when lookup from ground, the fan wiring is wrong.
 - i. Turn speed control to minimum setting.
 - ii. Turn selector switch to "OFF" to stop the fan.
 - iii. Push the isolation switch downwards to disconnect the power supply, then hold for 3-5 minutes.
 - iv. Switch any TWO out of THREE pairs of live wires.



Cautions

- Wiring connection must only be done after power is completely disconnected.
- Even if the power is disconnected, the capacitors of the inverter's DC circuit may still be charged. After cutting off the power supply, please wait 3-5 minutes for the capacitor to discharge completely before performing maintenance or repair work, otherwise it may cause serious injury or death.

4.5 Trial

4.5.1 Push the isolation switch upwards to connect the power supply.

4.5.2 Turn selector switch to "Run" position and start the fan.

4.5.3 Slowly increase the speed control to maximum speed.

4.5.4 Observe if there are any abnormal noise or vibration for 15 minutes.

5. Operation

5.1 Inspection Before Operation

- Check power supply voltage meets the fan's requirement.
- Check the speed control in minimum position.
- Check the obstacles are beyond clearance area.

5.2 Cautions



- Please do not change the fan structure and installation position without permission.
- Do not open the electric control box with power connected to avoid electric shock.
- Do not carry out maintenance work with power connected to avoid electric shock.
- Before switching on the power supply, make sure the power supply voltage is correct.
- It is strictly prohibited to run the fan with insufficient safety space / clearance.
- It is strictly prohibited to work back and forth in the fan operating space, and confirm whether there are obstacles before starting.
- Please do not operate the damaged equipment that might cause serious injury.
- It is strictly prohibited to make structural or parameter changes to the electric control box, otherwise it will cause equipment damage or personal injury due to improper settings.
- Please do not bend the fan blades during installation, adjustment and cleaning, otherwise it will damage the equipment.
- Even if the power is disconnected, the capacitors of the inverter's DC circuit may still be charged. After cutting off the power supply, please wait until at least 3-5 minutes so the capacitor is completely discharged before performing maintenance or repair work. Otherwise, it may cause serious injury or death.

5.3 Start

- Turn selector switch to Run position and start the fan.
- Slowly increase the speed control to desired speed

5.4 Stop

- Turn the speed control to minimum speed.
- Turn selector switch to OFF position and stop the fan.

6. Trouble Shooting

If the product fails during the product warranty period, please contact manufacturer or local distributor.

Please do not try to troubleshoot without the presence of professional or the warranty might be voided.

Alert	Error	Fault	Description	Trouble shooting
A.02	E.02		Disconnection fault	Check terminal V1 or AI wiring
A.03	E.03		Motor missing	1. Check motor wiring 2. Inverter power and motor power match
A.04	E.04		Input phase loss	1. Check and eliminate the problems in the peripheral circuit 2. Seek technical support
A.07	E.07		Overvoltage	1. Extend acceleration time 2. Install braking resistor
A.08	E.08		Undervoltage	Check whether the power supply is normal
A.09	E.09		Inverter overload	1. Check if the load increases or changes suddenly 2. Set the appropriate parameters
A.10	E.10		Motor overload	1. Check if the load increases or changes suddenly 2. Set the appropriate parameters
	E.11		Motor temperature too high	1. Refer to the motor overload handling countermeasures 2. Check temperature sensor connection
A.12	E.12		Over torque	1. Check if the motor is blocked 2. Extend acceleration and deceleration time 3. Set the appropriate parameters
A.13	E.13*		Overcurrent	Reference over torque
A.14	E.14*		Ground Fault	1. Reduce carrier frequency 2. Replace cable or motor
	E.16*		Output short circuit	Check the motor wiring, check the motor wire and the insulation of the motor
A.17	E.17		Communication timeout	Check whether the communication control is normal
A.20	E.20		Power supply voltage too low	Check the grid voltage
	E.21		Undervoltage and overcurrent	Check whether the grid voltage drops instantly
A.24	E.24		Fan failure	1. Clean the fan 2. Replace the fan
	E.25*		Brake failure	Check the braking resistor
	E.27		Brake failure	Check the braking resistor
	E.28		Brake failure	Check the braking resistor
	E.30* E.31* E.32*		Motor phase loss	1. Replace the motor 2. Check motor wiring
A.36	E.36		Main power failure	Check whether the power supply voltage is normal
	E.38*		Inverter internal fault	Please contact the dealer or inverter manufacturer
	E.47*		Power card 24V failure	Please contact the dealer or inverter manufacturer
	E.48*		VDD pin voltage is low	Please contact the dealer or inverter manufacturer
	E.51-58		AMA failure	Set the motor parameters correctly
A.59	E.59		Current limit	Set the motor parameters correctly or follow E. 13 inverter overcurrent countermeasures
	E.63		Mechanical braking current too low	Correctly set according to the actual situation
A.69	E.69*		IGBT temperature too high	1. Clean up the air duct 2. Replace the fan
	E.80		Parameter reset to factory value	Press OFF to reset
		Er.84	Connection between the panel and the inverter failed	
		Er.85	Button disabled	
		Er.89	Parameter read-only	This parameter cannot be modified
		Er.91	Parameters cannot be modified in current mode	Parameters cannot be modified in the current mode
A.96			Inverter timing stop time arrives	Please contact the equipment manufacturer
A.102			External fault	
A.103			Eccentricity failure	
		Err	Parameters cannot be changed	

Note: The faults marked with * are trip-locking faults.

7. Safety Protection & Accident Handling

Kruger KVS Fans are produced in strict accordance with the quality of international, national and industry standards, and have passed international certification and testing. At the same time, the product adopts a frequency conversion control unit with safety protection.

In case of an emergency, the frequency converter stops operation and sends warning or alarm signal and displays the relevant code.

Please contact the manufacturer or local distributor and provide error code for a solution in time.

8. Maintenance

Maintenance items	1st year 6th year	2nd year 7th year	3rd year 8th year	4th year 9th year	5th year 10th year
Check running direction of the fan	daily				
Check running noise and vibration	daily				
Check control box working status					
Check deformation of blades					
Check tightness of steel wires					
Check guy wire					
Check connection of blade and connector					
Check connection of blade safety strip					
Check anti-detachment of motor and hub					
Check mounting plate bolts					
Check extension pipe and plate bolts					
Check extension pipe and motor frame bolts					
Check motor frame bolts					
Check welding parts					
Check bottom cover					
Check wiring					
Clean dust & dirt of motor, blade, control box					

Routine Maintenance for fan not in operation

- Ensure power supply is disconnected.
- Clean dusts and dirt before re-connecting power supply and operation.

9. Warranty & After Sales

This product enjoys 2 year full warranty since the date of shipment.

If the product fails during the product warranty period, please contact the manufacturer or local distributor for a solution in time.

Please don't try to troubleshoot by yourself so as not to be unable to enjoy the warranty.

Please do not try to troubleshoot without the presence of professional or the warranty might be voided.

- Faults/damage caused by improper operation.
- Faults/damage caused by power outage during operation.
- Failure/damage caused by changing the structure or position of the product without permission.
- Failure/damage due to force majeure factors such as floods, fires, earthquakes, droughts, wars, etc.

Maintenance Records

	Maintenance Record
1st year	
2nd year	
3rd year	
4th year	
5th year	
6th year	
7th year	
8th year	
9th year	
10th year	