Breeze®
We bring better air to life

USER'S MANUAL

CDF / CDFS Series

CDF/CDFS 200-4 | CDF/CDFS 355-4
CDF/CDFS 225-4 | CDF/CDFS 355-6
CDF/CDFS 250-4 | CDF/CDFS 400-6
CDF/CDFS 280-4 | CDF/CDFS 450-6
CDF/CDFS 315-4 | CDF/CDFS 500-6

Certificate No.: VN18/00293

QC 2264-19

INLINE CENTRIFUGAL FAN

Thank you for choosing inline centrifugal fan. Please read and save this user's manual for future reference. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and property damage.

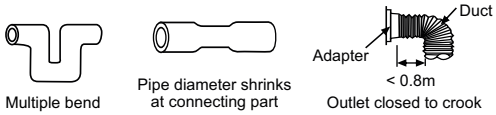
the London Fan company

2020

1. GENERAL SAFETY INFORMATION

- Please read the user's manual carefully prior to installing and operating the unit.
- This user's manual is the primary operating document intended for technical, maintenance and operations staff.
- All user's manual requirements as well as the provisions of all the applicable local and national construction, electrical and technical norms and standards must be observed when installing and operating the unit.
- The warnings contained in the user's manual must be considered most seriously since they contain vital personal safety information.
- Failure to follow the rules and safety precautions noted in this user's manual may result in an injury or unit damage. After a careful reading of the manual, keep it for the entire service life of the unit.
- While transferring the unit control, the user's manual must be turned over to the receiving operator.

UNIT INSTALLATION AND OPERATION SAFETY PRECAUTIONS

	Disconnect the unit from power mains prior to any installation operations.		Unpack the unit with care.
	The unit must be grounded!		While installing the unit, follow the safety regulations specific to the use of electric tools.
	Do not change the power cable length at your own discretion. Do not bend the power cable. Avoid damaging the power cable. Do not put any foreign objects on the power cable.		Do not lay the power cable of the unit in close proximity to heating equipment.
	Do not use damaged equipment or cables when connecting the unit to power mains.		Do not operate the unit outside the temperature range stated in the user's manual. Do not operate the unit in aggressive or explosive environments.
	Do not touch the unit controls with wet hands. Do not carry out the installation and maintenance operations with wet hands.		Do not wash the unit with water. Protect the electric parts of the unit against ingress of water.
	Do not allow children to operate the unit.		Disconnect the unit from power mains prior to any technical maintenance.
	Do not store any explosive or highly flammable substances in close proximity to the unit.		When the unit generates unusual sounds, odour or emits smoke, disconnect it from power supply and contact the Seller.
	Do not open the unit during operation.		Do not direct the air flow produced by the unit towards open flame or ignition sources.
	Do not block the air duct when the unit is switched on.		In case of continuous operation of the unit, periodically check the security of mounting.
	• Before installing this product, ensure that the voltage and frequency consistent with the product nameplate. • When connected to power supply, all-pole power switch with more than 3mm contact separation is necessary to be installed on the power supply circuit. Please do the connection according to the local electrical equipment technical regulations. • Please set up vent and spot inspection. • Installation height should be more than 2.3m. • Should be firmly installed. Gradient installation forbidden.		• Do not disassemble the junction box by yourself, if the power cord is damaged, it should repair by qualified serviceman • Installation on window or outdoor is forbidden. • Places with overmuch lampblack or steam forbidden. • Below connection way of air duct is forbidden. 

 **The product must be disposed separately at the end of its service life. Do not dispose the unit as unsorted municipal waste.**

2. PRODUCTS OVERVIEW

The CDF/CDFS series are built-in double inlet forward curve centrifugal fan. Inline centrifugal fan was especially developed for use in modern ventilation systems. By using external rotor motors there are significant technical advantages in operation. All models are 100% speed controllable and are statically and dynamically balanced as a composite unit in our factory. The fans are also available with motor and impellers to be folded out for maintenance.

Fan type:

- CDF series: Standard fan.
- CDFS series: Silencer box to meet the requirements of low noise.

Material:

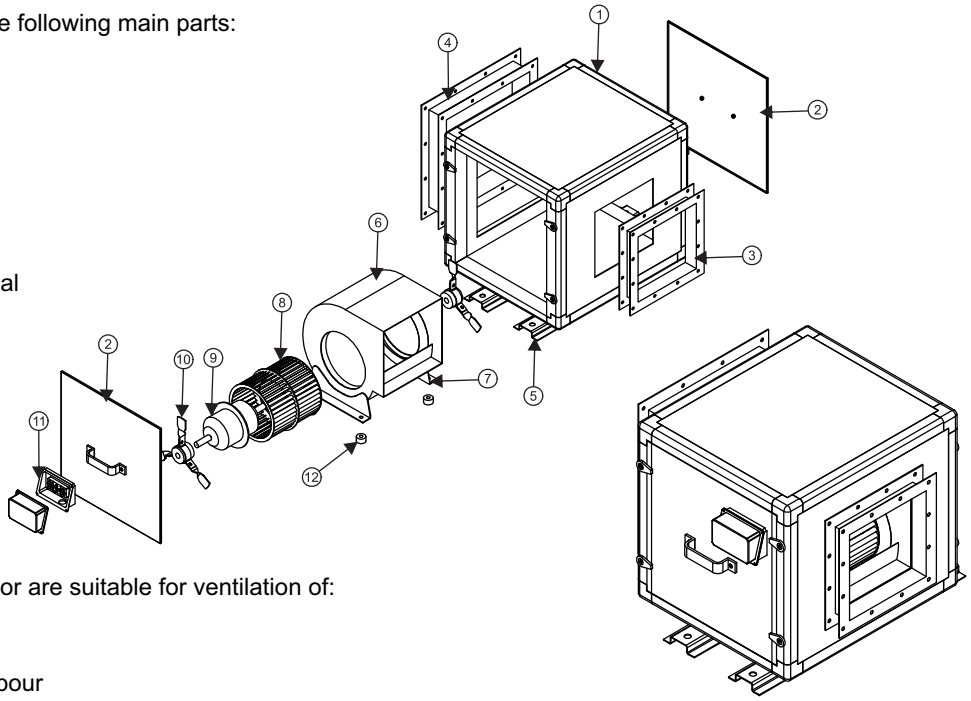
- Cabinet frame: Aluminum square pipe type. The pipe and the air inlet side have a 20mm standard flange.
- Fan Casing: Made of hot galvanized steel type.
- Impeller: Double forward curved impellers. The impeller is balanced by ISO 1940 with G2.5mm/s quality standard..
- Motor: Is designed for double blower fan with outer rotor structure. The characteristic is compact structure, short axial size low noise. It can adjust speed as well as change voltage.
- Standard motors are protected to IP54, class F insulation.

Application: Ventilation of industrial premises, swimming pools, apartment houses, offices, hospitals, restaurants and other premises.

Construction.

The inline centrifugal fan consists of the following main parts:

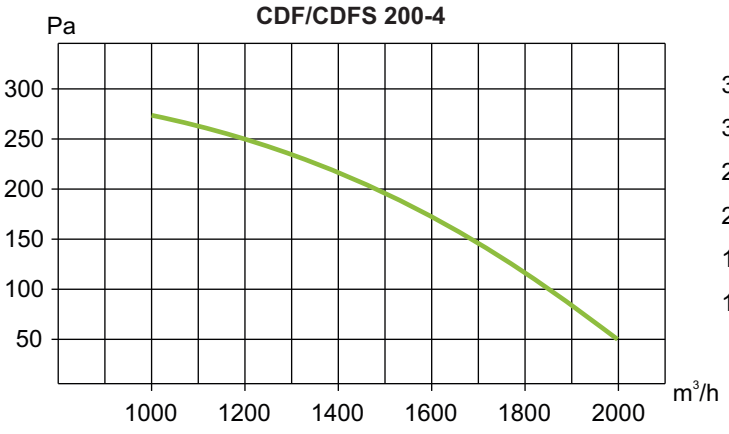
1. Alu Cabinet Frame
2. Plates Steel
3. Inlet Flange
4. Outlet Flange
5. Cabinet Base
6. Centrifugal Casing
7. Fan Base
8. Double Impeller Centrifugal
9. Motor Power
10. Motor Support
11. Terminal Electric Box
12. Vibration

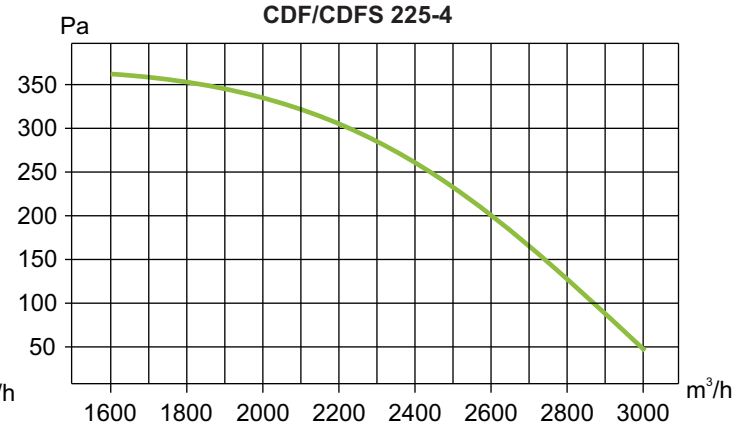


Inline centrifugal fan with standard motor are suitable for ventilation of:

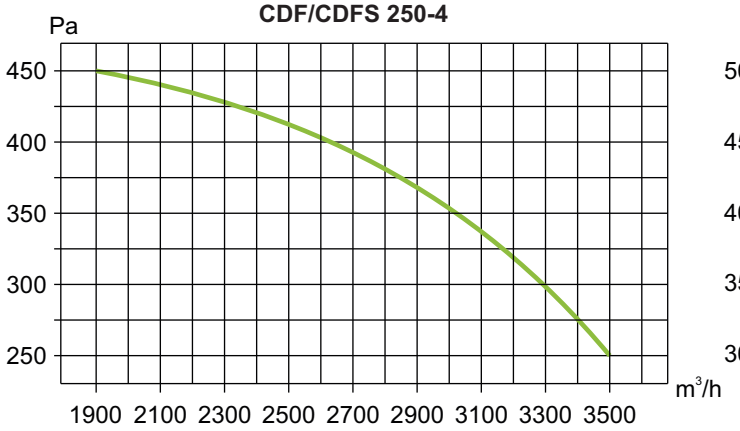
- Clean air
- Slightly dusty and greasy air
- Slightly aggressive gases and vapour
- Mediums up to an atmospheric density of 1.2 kg/m3
- Mediums with a temperature of -20°C up to +40°C
- Mediums up to a max. Humidity of 85%
- The ambient temperature of the motor must be between -20°C and +40°C make sure and adhere to the specifications of the motor manufacturer.

3. PERFORMANCE CURVE





CDF/CDFS 250-4



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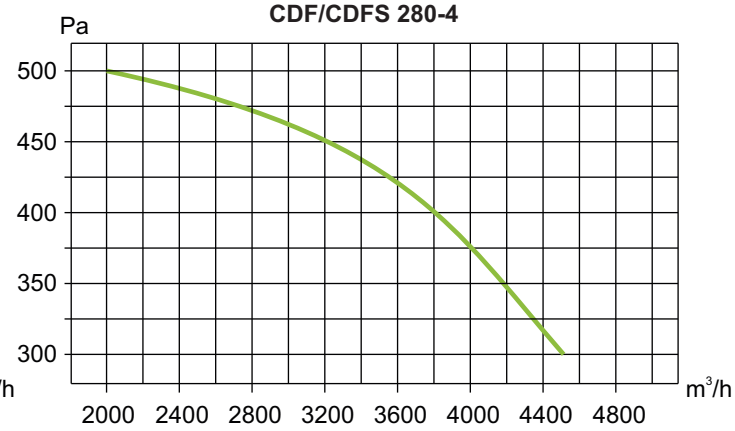
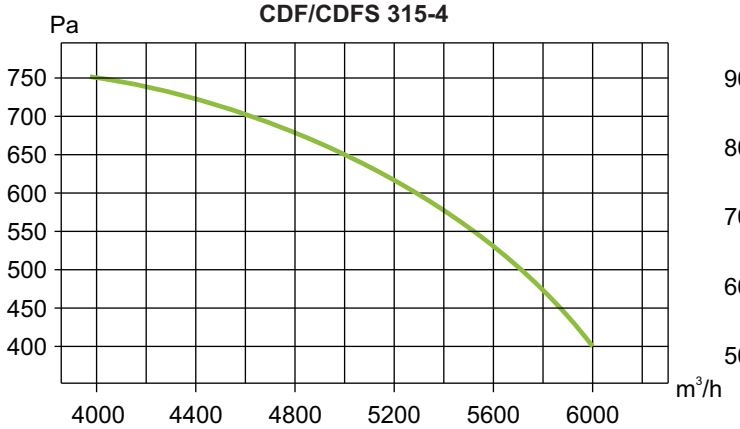


CDF/CDFS 315-4



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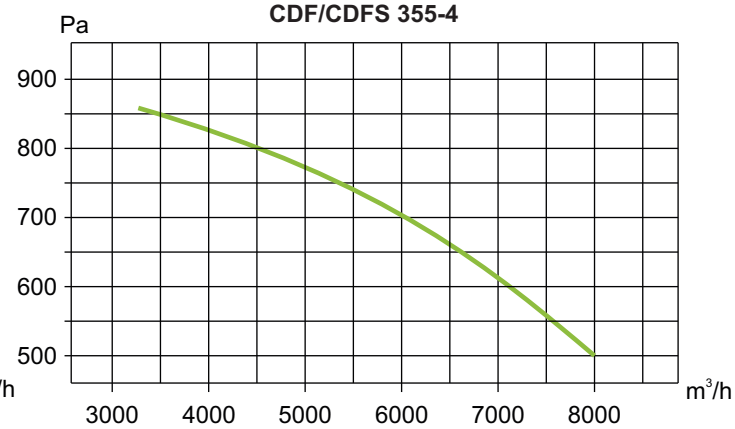

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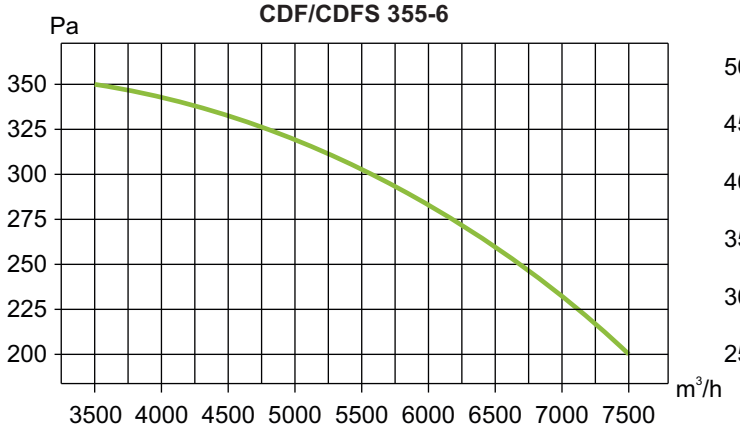
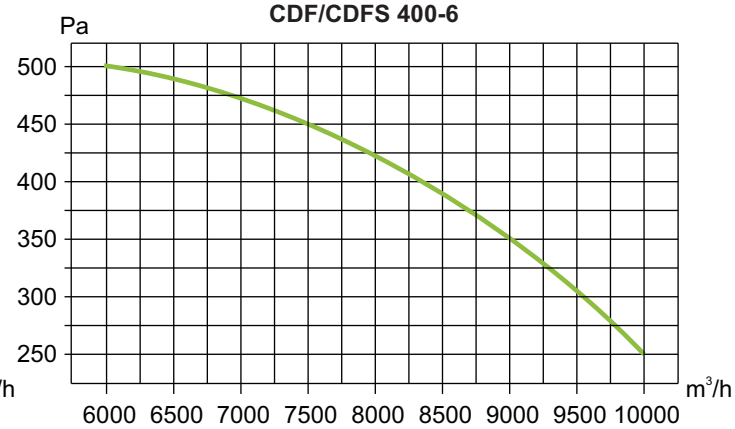


CDF/CDFS 400-6



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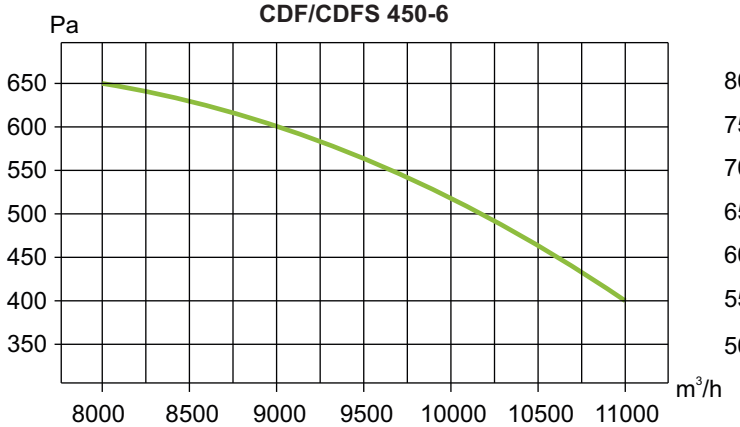
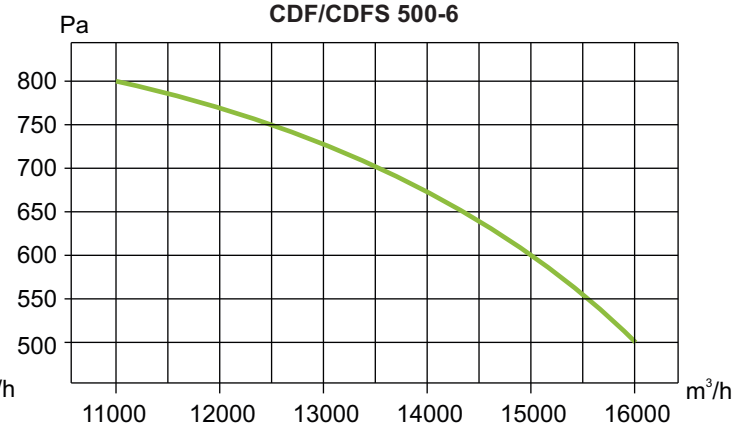


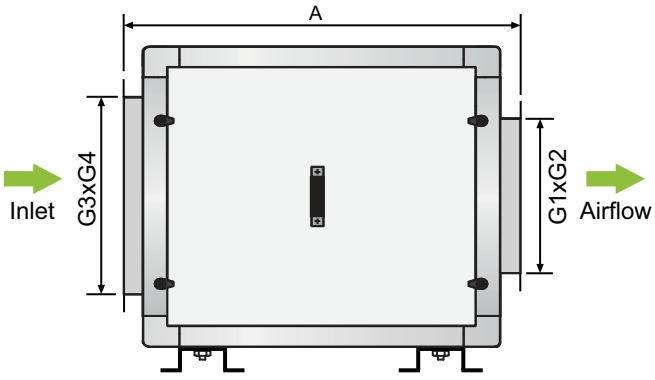
CDF/CDFS 500-6

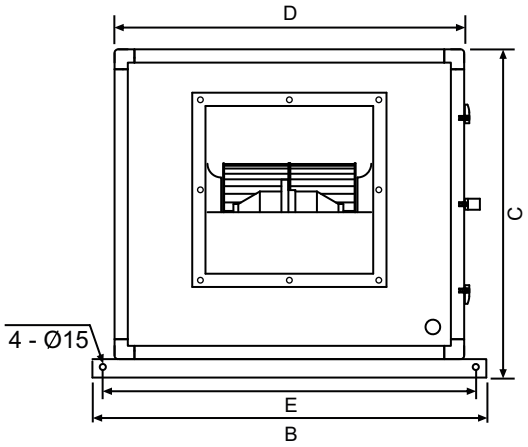


4. PERFORMANCE PARAMETERS

Model	Max. Air Volume (m^3/h)	Max. Pressure (Pa)	Power (kW)	Current (A)	Speed (rpm/min)	Voltage (V/P/Hz)	Noise dBA (@ 3m)
CDF/CDFS 200-4	2000	250	0.25	0.88	1440	380/3/50	53/46
CDF/CDFS 225-4	3000	350	0.45	1.39	1440	380/3/50	55/48
CDF/CDFS 250-4	3500	450	0.8	2.31	1440	380/3/50	56/49
CDF/CDFS 280-4	4500	500	0.8	2.31	1440	380/3/50	57/50
CDF/CDFS 315-4	6500	750	1.8	4.47	1440	380/3/50	59/52
CDF/CDFS 355-4	8000	850	3.0	6.95	1440	380/3/50	65/58
CDF/CDFS 355-6	7500	350	1.8	4.8	960	380/3/50	60/53
CDF/CDFS 400-6	10000	500	3.0	7.5	960	380/3/50	64/57
CDF/CDFS 450-6	11000	650	4.0	9.9	960	380/3/50	67/60
CDF/CDFS 500-6	16000	800	7.5	17.7	960	380/3/50	69/62

5. DIMENSION INFORMATION





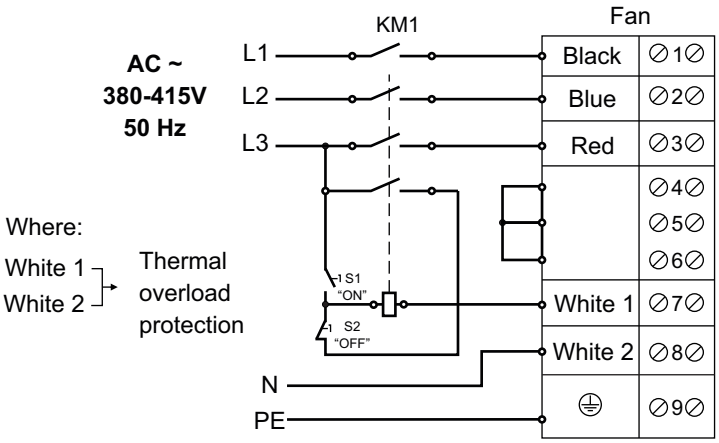
Model	A	B	C	D	E	G1 x G2	G3 x G4	Weight (Kg)
CDF/CDFS 200-4	529	600	460	500	550	223 x 229	318 x 378	22
CDF/CDFS 225-4	569	630	500	530	580	251 x 262	358 x 408	42
CDF/CDFS 250-4	589	650	520	550	600	277 x 285	378 x 428	44
CDF/CDFS 280-4	639	740	570	640	690	309 x 304	428 x 518	50
CDF/CDFS 315-4	749	815	680	715	765	342 x 342	538 x 593	70
CDF/CDFS 355-4/6	789	890	720	790	840	379 x 379	578 x 668	90
CDF/CDFS 400-6	859	960	790	860	910	423 x 423	648 x 738	110
CDF/CDFS 450-6	939	1080	870	980	1030	473 x 473	728 x 858	125
CDF/CDFS 500-6	1019	1200	950	1100	1150	510 x 510	808 x 978	190

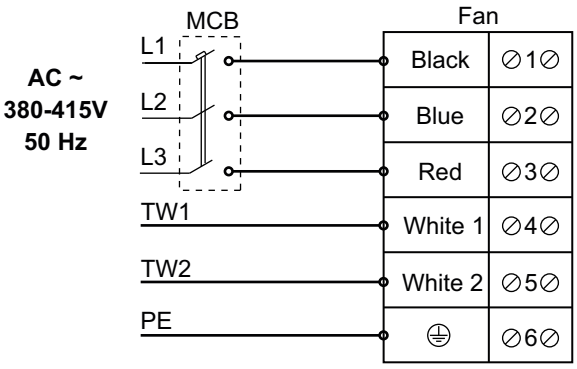
All dimensions in mm.

6. ELECTRIC INSTALLATION

Electric Connection

- Before electrical connections are made, the supply voltage, phase and ampere capacity must be checked for compatibility with the fan motor. In addition, the supply wiring must be properly fused and conform to local and national electrical codes. If the unit is supplied with a safety disconnect switch, ensure proper wiring to the fan motor.
- Be sure the disconnect is switched to the "**OFF**" position before connecting supply wires. If no disconnect is supplied, ensure the supply wire is not live before connection. Supply wires are then connected to the optional safety disconnect switch
- (if supplied) or motor.
- The equipment connected ground for motor protection according to the instructions - Unless the guarantee isn't accepted.
- The most frequently encountered problems are motors that are wired to rotate the impeller in the wrong direction. This is especially true with 3-phase installations where the motor will run in either direction, depending on how it has been wired. To reverse rotation of a 3-phase motor, interchange any two of the three electrical leads.
- After connecting the wiring, install the terminal cover with screws.





7. INSTALLATION METHOD

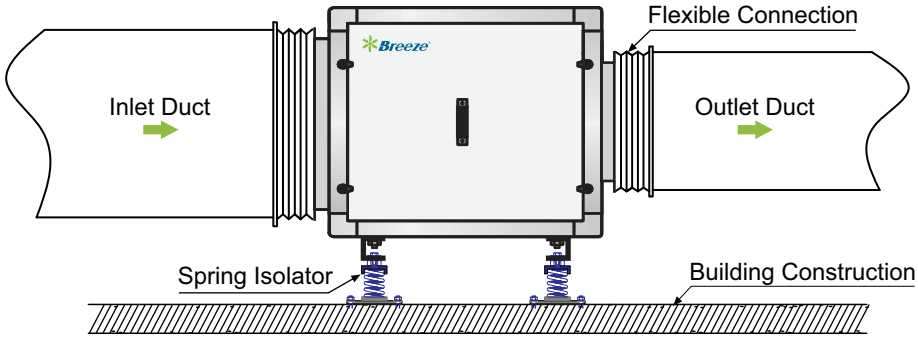


Fig 01. Mounting type

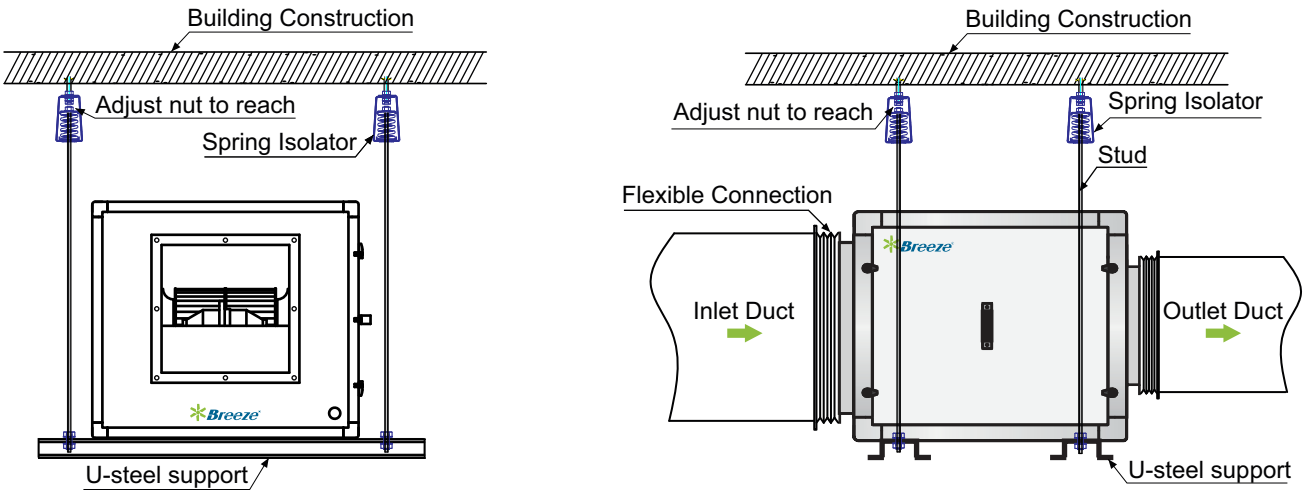


Fig 02. Hanging type

8. OPERATION INSTRUCTION

- Switch on the fan for a short moment to check whether the direction of rotation is correct (See arrows at the fan casing).
- If incorrect, change the direction of rotation by changing the wiring. (Respect the instructions of power supply companies).

8.1. Visual Inspection of Equipment

- The equipment type and arrangement should be verified as ordered at once when it arrives at the jobsite. When a discrepancy is found, the local Breeze Sales Representative must be notified immediately so that corrective action may be investigated, also verify electrical conformance to specifications. Unauthorized alterations and unauthorized backcharges will not be recognized by Breeze Fan.
- After the unit has been assembled, installed and all utilities have been hooked up, the unit is now ready for operation.

Check

Before starting the unit, check the following:

- Confirm that building supply voltage matches the voltage for which the unit is wired.
- Check all piping and wiring penetrations.
- Made by contractors for water tightness. All penetrations must be made watertight to prevent water damage to the unit and building.
- Rotate the fan impeller manually to be sure that it is free to operate. Remove any dirt or debris that may have accumulated during installation.
- Inspect all fasteners to ensure that none have loosened during shipment.
- Check all electrical connections for proper attachment.
- Check casing and ductwork, if accessible, for obstructions and foreign material that may damage the fan impeller.

Vibration Velocity Table:

ACTION	VIBRATION VELOCITY mm/s
Good	0 - 4.4
Check at regular intervals	4.4 - 7.1
Check at regular intervals and re-balance as soon as possible	7.1 - 11.2
Clean and rebalance	11.2 - 18
Stop immediately	18.0
Alarm	**11.0**
Trip	**18.0**

8.2 Checks prior to initial start-up

Proceed with the fan's initial start-up in the following sequence:

- Check that the mechanical assembly has been carried out properly
- Remove foreign bodies located in the suction and outflow areas and in the fan space
- Check that the electrical installation has been completed in accordance with regulations
- Does the mains voltage match the motor voltage specified on the rating plate?
- Is the switchgear used suitable for the motor both with respect to the switching functions to be carried out and also to the switching conditions and switched output of the motor?
- Is the motor protection system set correctly with regard to the motor's nominal current? The setting must be carried out in accordance with the corresponding details contained on the motor output plate.
- Has the motor been connected correctly in accordance with the wiring diagram? The connection schematic supplied by the motor suppliers applies for the connection of the motor. The special connection regulations are to be observed for explosion-protected models.
- Fans with multi-speed motors should be checked on low speed during initial start-up.
- Check for unusual noise, vibration or overheating of bearings. Refer to the "Troubleshooting" section of this manual if a problem develops.

Accident prevention:

- Protective anti-intrusion fittings, protective screens (see accessories) mounted, fan boxed in or assembled out of reach.
- If the fan is assembled for free-suction, the suction aperture must be covered by a protective screen. This is the only way that the accident prevention regulation governing protection from contact can be deemed to have been met.

8.3 Starting up the fan for the first time.

Only put the fan into operation after it has been assembled in accordance with the regulations:

- Put the fan into operation.

- Monitor its correct function (quiet running, vibration, imbalance, power consumption, controllability) Should the required output (volume flow or pressure increase) not be achieved by the fan, e.g. through unforeseen changes in the installation system, the rotor fins can be adjusted up to the maximum fin settings specified both on the rating plate and in the technical documentation. The power consumption must be re-measured in order to avoid any possible motor overload. The thermal-protection system may be activated if the motor power consumption is too high.
- Check the bearing temperature after a lengthy period of operation. Always keep suction openings clear. Check protective screens or protective anti-intrusion fittings for dirt and clean if necessary.

Once the unit has been put into operation, a routine maintenance schedule should be set up to accomplish the following:

- Lubrication of bearings and motor.
- Impeller, casing, bolts and set screws on the entire fan should be checked for tightness.
- Any dirt accumulation on the impeller or in the casing should be removed to prevent unbalance and possible damage.
- Inspect fan impeller and casing looking for fatigue, corrosion or wear.

8.4 Checks after initial start-up

Check the mechanical connections after initial start-up, especially the joints at the fan.

9. ROUTINE MAINTENANCE

- Regular maintenance is needed each year. The impeller blades require thorough cleaning once in 6 months.
- Before any maintenance work is undertaken:
    - Stop fan in accordance to regulations and disconnect all poles from mains supply.
    - Wait until impeller is stationary.
    - Make sure that a restart is not possible.
- Use only original spare parts tested and approved by the manufacturer.
- The following safety notes must be observed when maintaining the machine.
- Replace the ball bearings of the motor whenever the grease utilization period has elapsed in accordance with the maintenance instructions of the manufacturer.
- The technical maintenance includes periodic cleaning of the surfaces from accumulated dust and dirt.
- Use a soft dry brush or a vacuum cleaner to remove dust.
- Only use usual commercial cleaning material paying attention to the prescribed safety measures and do not use any abrasive tools (surface protection will be destroyed).

9.1 Servicing maintenance.

- The impeller and casing are subject to natural wear and tear through the action of dust, acidic and corrosive vapours, as well as the gases which are mixed into the conveyed flow. The type and concentration of the dust, as well as the gases and vapours, can lead to deposits, abrasion and corrosion at the impeller and casing.
- The materials can be attacked so much by this natural wear and tear that they can no longer stand up to the demands made of them. Deposits on the rotor, which have never been evenly distributed, lead to an imbalanced state and thus to noisy running, which in turn can result in damage to the motor bearing. Deposits in the casing lead to a narrowing of the available cross-sectional area or to a roughening of the casing panels and can thus have an unfavourable effect on the fan's output data. Should the checks, the regularity of which depend on the conveyed media and other operating conditions which differ in each individual case, only reveal slight wear and tear, then the individual parts can be cleaned in good time or replaced if necessary.

Prior to all servicing work:

- Bring the fan to a halt in the prescribed manner and completely isolate the fan from the mains supply.
- Wait until the rotor has come to a halt.
- Ensure that the machine cannot be switched on again
- Clean the fan
- Clean the suction apertures
- Clean the rotor (if necessary dismantle the protective anti-intrusion fitting)
- Do not overload the motor
- Do not bend the rotor or vanes
- Assemble the protective anti-intrusion fitting.
- Control whether installation is correct:
    - Impeller must rotate free
    - Annular gap between impeller and wall plate/casing must be regular.
    - Checking direction of rotation is correct.

General Check:

- Too much bearing play?
- Lubricant leaking from the bearings?
- Surface protective coating damaged?
- Attention: Conveyed medium too aggressive?
- Unusual noises during operation
- Fan output still sufficient for possibly extended or shortened ducting system?

Unassembly fan:

- Disconnect electric supply.
- Pull out of the fan in ductwork.
- Unscrews and remove cover of terminal electric box (see Fig 1).
- Remove plate steel in the side (see Fig 2).
- Pull out centrifugal fan in cabinet outside (see Fig 3).
- Unscrews motor support in motor shaft and pull out motor impeller outside (see Fig 4).

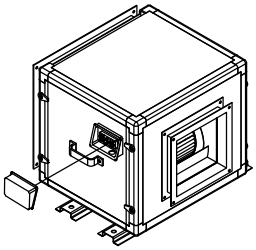


Fig 1

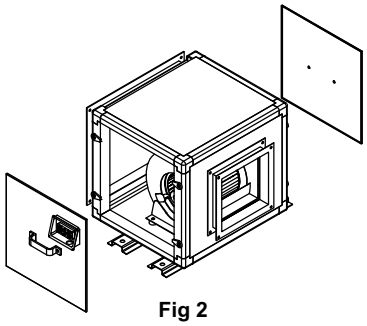


Fig 2

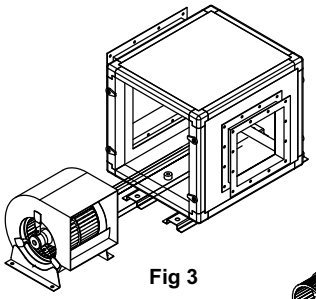


Fig 3

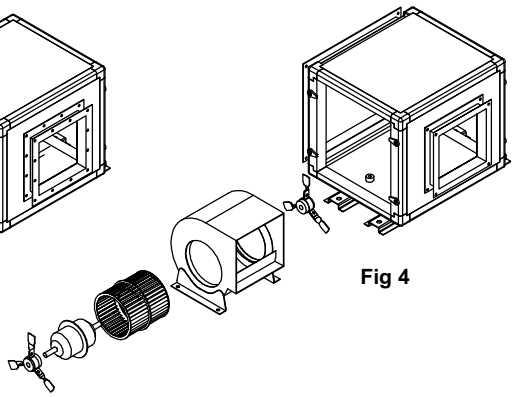


Fig 4

Clean fan:

- Follow by unassembly fan.
- Clean cabinet frame, and plate steel side (see Fig 2).
- Clean fan casing and inlet/outlet flanges (see Fig 4).
- Use a soft dry brush or a vacuum cleaner to remove dust in motor (see Fig 4).
- Clean impeller (see Fig 4).
    - Do not flood motor.
    - Do not bend impeller, blades.
- Assembly fan.
- Control whether installation is correct:
    - Motor impeller must rotate free
    - The gap between impeller and casing must be regular.
    - Checking direction of rotation is correct.
- Install the fan into air duct.
- Push into operation after clean.
- Connect electric supply of motor.

9.2 Motor maintenance

- Motor maintenance is generally limited to cleaning and lubrication.
- Cleaning should be limited to exterior surfaces only.
- Removing dust and grease buildup on the motor casing assists proper motor cooling.
- Never wash-down motor with high pressure spray. Greasing of motors is only intended when fittings are provided. Many fractional motors are permanently lubricated for life and require no further lubrication. Motors supplied with grease fittings should be greased in accordance with the manufacturer's recommendations. When motor temperature does not exceed 104ºF (40ºC), the grease should be replaced after 2000 hours of running time.
- Direct drive systems have extended grease lines to lubricate the motor without removal of any guarding.

Motor bearing service intervals

- The roller bearings of the standard AC motors are basically equipped with a permanently sealed lubrication system consisting of a high-quality, temperature-resistant, lithium-based roller bearing grease (melting point approximately 160°C). The amount of lubricant supplied to the bearing by the motor manufacturer is sufficient for 10,000 to 20,000 operating hours.
- Unfavourable operating conditions, such as permanently lengthy operating periods, changes in bearing loads etc, require that the motor bearings are monitored carefully. The service intervals or lubrication deadlines and amounts depend on the motor's operating conditions, the rotary speed and size of bearing.
- As only the construction size and rotary speed of the motors are usually known, the service intervals specified in the adjacent table should be applied. They refer to a coolant temperature of 40°C in the case of horizontal fitting (construction form B3). The service intervals are to be put back by 1/3 in the case of vertical fitting.

Motor standard.

Single speed:

2 Poles: 2880 rpm
4 Poles: 1440 rpm
6 Poles: 960 rpm
8 Poles: 720 rpm

Double speeds:

2/4 Poles: 2880/1440 rpm
4/8 Poles: 1440/720 rpm
4/6 Poles: 1440/960 rpm
6/8 Poles: 960/720 rpm

Motor Frame	Service intervals in operating hours for		
	2880 rpm	1440 rpm	960 and 720 rpm
71	20000	20000	20000
80	18000	20000	20000
90	16000	20000	20000
100	14000	20000	20000
112	14000	20000	20000
132	11000	20000	20000
160		20000	20000
180		20000	20000
200		18000	20000
225		18000	20000

Service intervals for motor bearings.

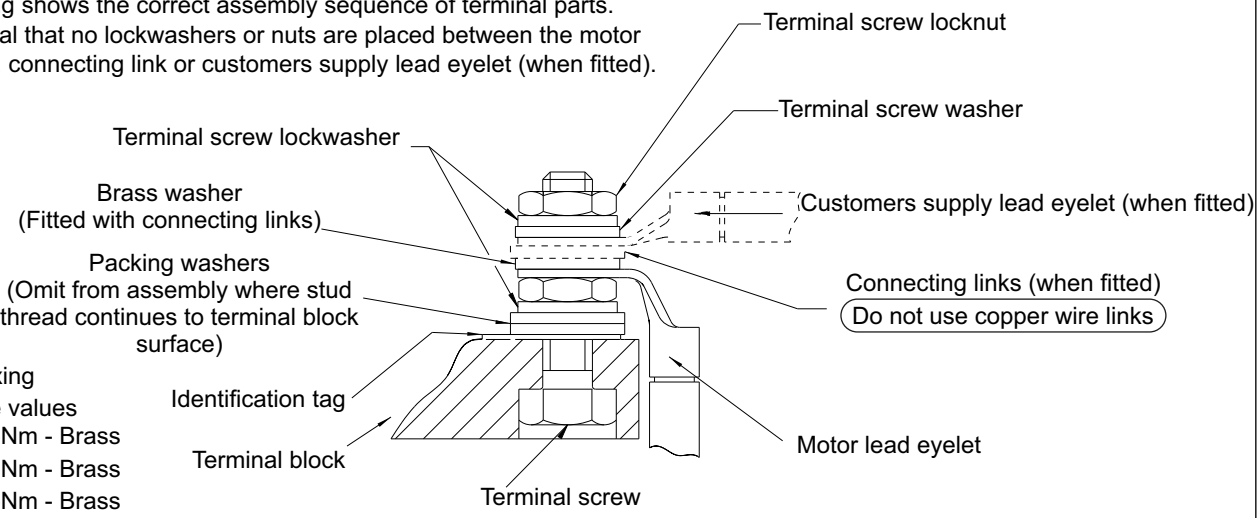
9.3 Maintenance Schedule

Routine Maintenance Description	Every 6 Months	Every 12 Months	Comments
1. Examine the airways in to the fan guards (if fitted)	x		Remove and debris that may have accumulated round the guards
2. Examine motor cooling fins	x		Remove any material / dirt build-up between the motor fins
3. Examine impeller for dirt build-up or any physical damage	x		Remove any build-up of dirt. Ensure impeller is secure. Replace impeller if it is damaged
4. Check condition and tautness of fan safety support chains/harnesses /ropes (if fitted)	x		Clean safety supports. Replace them if there is any deterioration / corrosion
5. Examine and operate vibration sensors (if fitted) and temperature sensors (if fitted)	x		Check operation using built-in sensor test features or dummy signals. Check that the fan is automatically switched off or a warning indication is provided, when the sensors / switches indicates a fault
6. Examine condition of safety guards (if fitted) and their fixings	x		Clean safety guards. Replace them if there are any signs of damage
7. Check operation of anti-condensation heaters (if fitted)	x		Switch off power to the motor. Check that the anti-condensation heater is energised (drawing current)
8. On 'bifurcated' motors remove the impeller and inspect the packing located behind the motor shaft-seal retaining plate	x		Replace the 130mm Duramid seal if it is damaged
9. Examine the clearance between the fan impeller blade tips and the fan duct. Check the angle and the security of the impeller blades		x	Ensure that the gap between the impeller blade ends and the fan duct is even and adequate. If in doubt about the gap contact Breeze Fan for advice. Ensure that the impeller blade is secure. The blade angle must not be changed before contacting Breeze Fan for advice
10. Check torque of fan-to-support fixings		x	It is essential to confirm that all fixings are properly fitted, are tight and are fully driven home. If in doubt about the torque of a fixing contact Breeze Fan for advice
11. Examine motor, fan and ancillary equipment fixings		x	It is essential to confirm that all fixings are properly fitted, are tight and are fully driven home in 5.8 fixing. If in doubt about the torque of a fixing contact Breeze Fan for advice
12. Check movement of vibration isolators (if fitted)		x	Check freedom of movement. Tighten fixings if necessary
13. Check motor voltage and current consumption		x	Ensure voltage and full load current are as specified on the motor nameplate
14. Inspect paintwork / galvanising		x	Treat any areas of damage with suitable anti-corrosion paint
16. Check fan assembly wiring		x	Check security and condition of all wiring (including the earth)

9.4 Fixing

It is essential to ensure that all fixings on the fan assembly are secure. When examining and checking the security of fixings during routine maintenance, those fixings that have locking devices fitted or are painted over, need not be disturbed if they can be seen to be secure. Any locking devices that are disturbed during maintenance must be discarded and replaced with new identical devices. Thread forming screws must have locking compound applied when being reused. Those fixings that have no locking devices fitted and are not painted over, should be checked at 95% of their original setting to ensure no unnecessary disturbance of the fixing. See picture below for torque setting details. If in doubt about the torque of a particular fixing contact Breeze Fan for advice.

Important note:
This drawing shows the correct assembly sequence of terminal parts.
It is essential that no lockwashers or nuts are placed between the motor lead eyelet, connecting link or customers supply lead eyelet (when fitted).



Fixing Torque values

M4	1.5Nm - Brass
M5	2.7Nm - Brass
M6	5.5Nm - Brass
M8	10.5Nm - Brass
M10	55.5Nm - Steel

FIXING ARRANGEMENT OF TERMINAL BLOCK

TORQUE SETTINGS FOR FIXINGS

Torque setting: +0% / -10% (Nm) *Torque settings for screws*

Screw Fixing	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24
Steel 8.8	3.5	7.0	12	28	55	100	155	245	335	475	645	820
Stainless Steel A2, A4 Prop 70	2	4	7	17	33	56	90	135	190	268	365	460
Stainless Steel A2, A4 Prop 80	3	5.5	9.5	22	43	75	120	185	255	355	485	615

Torque settings for taper hubs

Bushes Taper Hubs	Type	1008	1108	1210	1310	1610	2012	2517
	Bore [mm]	12,19,24	19,24,28	16,19,24,32	14,25,35	19,24,38,42	24,38,50	38,48,60
Torque	Tightness [Nm]	6	6	20	20	20	32	49

Base and Foot Mount Torque Settings (Nm)	Motor Frame	D71	D80	D90	D100	D112	D132	D160/180	D200-315
	Screw Fixing	M8	M10	M12	M12	M12	M16	M20	M24
	Motor Base	15	15	35	55	55	135	240	450
	Foot Mount	-	50	85	85	85	180	350	450
Shaft and Fixings	Motor Frame	D71/80	D90	D100	D112	D132	D160/180	D200-250	D280-315
	Screw Fixing	M6	M8	M10	M10	M12	M16	M20	M24
	Torque Value	6	15	30	30	50	120	180	295

10. TROUBLE SHOOTING TABLE

FAILURE	CAUSE	REMEDY
• Motor fails to start	• Blown fuses	• Replace fuses with proper type and rating.
	• Overload trips	• Check and reset overload in starter.
	• Improper power supply	• Check to see that power supplied agrees with motor nameplate and load factor.
	• Improper line connections	• Check connections with diagram supplied with motor.
	• Open circuit in winding or control switch	• Indicated by humming sound when switch is closed. Check for loose wiring connections. Also verify all control contacts are closing.
	• Mechanical failure	• Check to see if motor and drive turn freely. Check bearings and lubrication.
	• Short circuited stator	• Indicated by blown fuses. Motor must be rewound.
	• Poor stator coil connection	• Remove end bells, locate with test lamp.
	• Impeller defective	• Look for broken bars or end rings.
	• Motor may be overloaded	• Reduce load.
• Motor stalls	• One phase may be open	• Check lines for open phase.
	• Wrong application	• Change type or size. Consult manufacturer.
	• Overload motor	• Reduce load.
	• Low motor voltage	• See that nameplate voltage is maintained. Check connection.
	• Open circuit	• Fuses blown, check overload relay, stator and push buttons.
• Motor runs and then dies down	• Power failure	• Check for loose connections to line, to fuses and to control.
• Motor does not come up to speed	• Not applied properly	• Consult supplier for proper type.
	• Voltage too low at motor terminals because of line drop	• Use higher voltage on transformer terminals or reduce load. Check connections. Check conductors for proper size.
	• Starting load too high	• Check what load motor is supposed to carry at start.
	• Broken impeller blade(s) or loose impeller	• Look for cracks near the rings. A new impeller may be required as repairs are usually temporary.
	• Open primary circuit	• Locate fault with testing device and repair.
• Motor takes too long to accelerate	• Excess loading	• Reduce load.
	• Poor circuit	• Check for high resistance.
	• Defective motor	• Replace with new motor.
	• Applied voltage too low	• Get power company to increase power tap.
• Wrong rotation	• Wrong sequence of phases	• Reverse connections at motor or at switchboard.
• Motor overheats while running under load	• Overloaded	• Reduce load.
	• Frame or bracket vents may be clogged with dirt and prevent proper ventilation of motor	• Open vent holes and check for a continuous stream of air from the motor.
	• Motor may have one phase open	• Check to make sure that all leads are well connected.
	• Grounded coil	• Locate and repair.
	• Unbalanced terminal voltage	• Check for faulty leads, connections and transformers.
• Motor vibrates after corrections have been made	• Motor misaligned	• Realign.
	• Weak support	• Strengthen base.
	• Coupling out of balance	• Balance coupling.
	• Driven equipment unbalanced	• Rebalance driven equipment.
	• Defective ball bearing	• Replace bearing.

FAILURE	CAUSE	REMEDY
• Motor vibrates after corrections have been made	• Bearings not in line	• Line up properly.
	• Balancing weights shifted	• Rebalance motor.
	• Polyphase motor running single phase	• Check for open circuit.
	• Excessive end play	• Adjust bearing or add washer.
• Unbalanced line current on polyphase motors during normal operation	• Unequal terminal volts	• Check leads and connections.
	• Single phase operation	• Check for open contacts.
• Scraping noise	• Fan rubbing air shield	• Remove interference.
	• Fan striking insulation	• Clear fan.
	• Loose on bedplate	• Tighten holding bolts.
• Noise operation	• Airgap not uniform	• Check and correct bracket fits or bearing.
	• Impeller unbalanced	• Rebalance.
• Hot bearings general	• Bent or sprung shaft	• Straighten or reshaft.
	• Excessive belt pull	• Decrease belt tension.
	• Pulleys too far away	• Move pulley closer to motor bearing.
	• Pulley diameter too small	• Use larger pulleys.
	• Misalignment	• Correct by realignment of drive.
• Hot ball bearings	• Insufficient grease	• Maintain proper quantity of grease in bearing.
	• Deterioration of grease or lubricant contaminated	• Remove old grease, wash bearings thoroughly in kerosene and replace with new grease.
	• Excess lubricant	• Reduce quantity of grease, bearing should not be more than 1/2 filled.
	• Overloaded bearing	• Check alignment, side and end thrust.
	• Broken ball or rough races	• Replace bearing, first clean casing thoroughly.
• Bearing temperature to high	• Too much grease in bearings • Adjust the lubricant quantity	• Restore the right lubricant quantity. • Check operation of the grease valve (when applicable).
	• Wrong lubricant quality	• Disassemble and clean the bearings. • Relubricate using the correct lubricant.
	• Not enough lubricant	• Top up with lubricant.
	• Not enough radial clearance in the bearings	• Adjust the radial clearance.
	• Cooling disk not in place	• Install the cooling disk.
	• Temperature of the circulated fluid too high	• Check the working conditions. • Adjust the gas temperature to its correct value.
	• Ambient temperature higher than 40°C	• Reduce lubrication intervals by half for each 15°C above 70°C measured on the bearing ring.
• Whistling noise	• The bearings are worn	• Replace the bearings.
• Knocking or rumbling in the bearing	• Presence of foreign bodies in the bearing	• Disassemble, clean and check the bearings.
	• Deterioration of the bearings during installation, marking of the raceways, oxidation or wear	• If necessary, change the bearings and the lubricants. • Replace the bearings.
• Fan vibrations	• Blades are dirty • Wear plate torn off	• Clean the impeller . • Check the wear plates and replace them if necessary.
	• Irregular wear or corrosion of the impeller	• Rebalance the impeller or replace the rotor.
	• Impeller or shaft deformations due to overheating	• Eliminate the causes of overheating. • Replace the rotor.

FAILURE	CAUSE	REMEDY
• Fan vibrations	• Impeller not properly balanced	• Rebalance the impeller.
	• Couplings or transmissions misaligned	• Repeat the alignments in accordance with the particular instructions.
	• Driving machines are badly balanced or defective	• Check the balance and operation of the driving machines. • Recondition or replace when necessary.
	• The motor-fan unit is not properly fixed or not firmly anchored	• Retighten and check anchor bolts in accordance with the instructions.
	• Bearings or bearing caps are not sufficiently tightened	• Tighten assembly fasteners to the recommended torque.
	• The use of badly dimensioned anti-vibration pads (Resonance)	• Replace the anti-vibration pads with correctly sized pads.
	• Speed too high	• Check the motor speed and the transmission ratio and correct the speed.
	• Pumping	• Change the flow setting until an acceptable vibration amplitude is obtained.
• Abnormal noise in the fan	• Presence of a foreign body	• Inspect the fan and remove the foreign body. Turn the rotor by hand.
	• Internal friction	• Check the clearance between the impeller and the intake and between the seal and the shaft crossing, turn the fan by hand.
	• External friction	• Check the position and tightness of the protective guards, turn the fan by hand.
• Premature wear of bearings	• Excessive vibrations	• Check and correct the various causes of vibrations.
	• Incorrect lubrication	• Check and correct the lubrication.
	• Fan held stopped under excitation by external vibrations	• Eliminate vibrations by isolating machines causing excitement and isolate the fan itself.
	• Fan held stopped without taking precautions against corrosive agents	• Take steps made necessary by environmental and usage conditions: • Intermittent operation • Provide protected storage during stoppages • Keep warm during stoppages, etc.
• Impossible or very long to start	• Rotor blocked	• Check that the rotor turns by hand. • Search for the cause of the blockage. • Friction. • Foreign bodies, etc.
	• Voltage at motor terminals too low	• Check the network voltage. • Improve the electrical line, if losses are excessive.
	• Trips	• Check the settings of safety devices.
	• Insufficient motor power	• Replace the motor.
	• Improper starter	• Replace the starter.
	• Excessive power absorbed during start up	• Check that fan regulation devices are closed when starting.
• Excessive power absorbed in service	• Excessive speed	• Check motor speed and transmission ratios and correct if necessary.
	• Network less resistant than expected	• Use the regulation devices to adjust the flow to its design value.
• Performances not obtained	• Speed too low	• Check motor speed and transmission ratio and correct if necessary. • Adjust the belt tension.
	• Poor design of the intake and discharge network	• Change the arrangement and size of the network.
	• Incorrect direction of rotation	• Changeover the motor direction of rotation.
• Performances not obtained	• Impeller installed backwards	• Invert the installation of the impeller on the shaft.
	• Excessive clearances between the impeller and the intake	• Adjust the clearances to comply with the instructions.

11. REPAIR

Before any repairs are undertaken please:

- Stop fan in accordance to regulations and disconnect all poles from mains supply.
- Wait until impeller is stationary.
- Make sure that a restart is not possible.
- Only use original spare parts manufactured and supplied by Breeze Fan.

Change of motor or impeller:

- Disconnect the wiring of the motor.
- Pull out of the fan in ductwork.
- Follow by unassembly fan.
- Replace new motor or centrifugal impeller in the fan.
- Assembly fan.
- Control whether installation is correct:
    - Motor and impeller must rotate freely
    - Control whether direction of rotation is correct.
    - Install maintenance cover if have.
    - The gap between impeller and casing must be regular.
- Install the fan into air duct.
- Push into operation after repaired.
- Connect electric supply of motor.

12. TRANSPORT AND STORAGE

12.1 Transport

- Our products are packed at the factory to suit the respectively agreed mode of transportation. Transport the fan in its original packaging.
- Fans are protected against damage during shipment. If the unit cannot be installed and operated immediately, precautions need to be taken to prevent deterioration of the unit during storage. The user assumes responsibility of the fan and accessories while in storage. The manufacturer will not be responsible for damage during storage. These suggestions are provided solely as a convenience to the user.
- Only use suitable means of transport, such as pallet trucks or fork-lift trucks or hoist machine.
- If the fan is to be transported by hand, ensure that supporting and carrying loads are kept within reasonable limits for the personnel involved.
- The fans must not be dropped or thrown. Avoid scratches or rough handling during loading and unloading.
- Parts which have been stacked too high can collapse.
- Avoid a distortion of casing or blades or other damage.
- Danger ! Do not step under casing loads.

12.2 Storage

- Store the unit in the manufacturer's original packaging box in a dry closed ventilated premise with temperature range from +5˚C up to +40˚C and relative humidity up to 80%.
- Store the fan in a dry, weather-protected location in its original packaging or protect it from the effects of dirt and the weather until final assembly. Storage environment must not contain aggressive vapours and chemical mixtures provoking corrosion, insulation and sealing deformation.
- Rotate fan impeller monthly and purge bearings once every three months.
- If storage of fan is in a humid, dusty or corrosive atmosphere, rotate the fan and purge the bearings once a month. Improper storage which results in damage to the fan will void the warranty.
- Avoid lengthy storage periods (a maximum of one year is recommended) and check that the motor bearing assembly is in good functional order prior to fitting. With storage times of more than 1 year, please check the bearings on soft running before installation (turn by hand).

Thank you for your cooperations!

Applied standard:

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