

USER'S MANUAL AEROFOIL AXIAL FLOW FAN



LC Series



LCS Series



LCF Series



BN Series

LC | LCS | LCF SERIES BN SERIES



Thank you for choosing aerofoil axial flow 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/or property damage.

1. GENERAL SAFETY INFORMATION

The fans of the LC/LCS/LCF/BN series have been constructed and built whilst taking into account an analysis of the hazards involved and after careful selection of the harmonised standards to be observed, as well as other further technical specifications. They thus correspond to the current level of technology and guarantee a high degree of safety.

ATTENTION!



- Only approved, qualified personnel familiar with the assessment of hazards and risks associated with fans and with the use of tools and test equipment required to service such fans, should install, operate and maintain the product. Improper installation can result in electric shock, possible injury due to coming in contact with moving parts, as well as other potential hazards.
- Before installing, operating and maintenance this fan please read this instructions carefully!
- If the installer or user is unable to understand the information in this manual or has any doubt that a safe and reliable installation, operation and maintenance of the equipment can be assured, Breeze limited should be contacted for advice.
- Warnings and safety information relevant to specific operations are contained at the start of the sections to which they apply.
- When fans are retained in storage, access by unauthorised persons must be prevented with the use of guards, barriers or secure premises such that fan impellers which may be rotating do not present a hazard.
- Follow all local electrical and safety codes, as well as the National Electrical Code, the National Fire Protection Agency, where applicable.
- The rotation of the impeller is critical. It must be free to rotate without striking or rubbing any stationary objects.
- Motor must be securely and adequately grounded.
- The fan' speed is changed, the motor current should be checked to make sure it is not exceeding the motor nameplate amps.
- Do not allow the power cable to kink or come in contact with oil, grease, hot surfaces or chemicals. Replace cord immediately if damaged.
- Verify that the power source is compatible with the equipment.
- Only operate the fan in its enclosed state or with properly assembled protective anti-intrusion fittings or with protective screens.
- The fan must be operated only in accordance with the performance data and the approved medium passing through.
- Never open access doors to a duct while the fan is running.

DANGER



- Always disconnect power before working on or near a fan. Lock and tag the disconnect switch or breaker to prevent accidental power up. Failure to disconnect power source can result in fire, shock or serious injury.

CAUTION



- When servicing the fan, motor may be hot enough to cause pain or injury. Allow motor to cool before servicing.
- Precaution should be taken in explosive atmospheres.

2. PRODUCT OVERVIEW

The **LC/LCS/LCF** and **BN** series of aerofoil axial flow fans is a highly efficiency air movement product. The impellers were developed with advanced technologies of London Fan company, a world famous axial impeller manufacture which was set up in 1928. They are designed to bear the BS and ISO standard for air performance, sound and efficiency which are equivalent to AMCA and DIN standard.

2.1 Construction

Breeze aerofoil axial flow fans are designed and developed on the basis of advanced technology from United Kingdom. It has the features of high efficiency, low noise, excellent performance, easy installation and so on.

Our axial fans have been specially developed for use in modern ventilation and air conditioning systems.

The impellers are statically and dynamically balanced at the factory and manufacture is subject to the strictest intermediate and end checks and is certified in accordance with ISO 9001:2015.

The axial flow fans consists of the following main parts in Fig 1:

1. Tube Casing
2. Mounting Feet
3. Inlet/Outlet Flanges
4. Motor Support
5. Motor Base
6. Motor Frame
7. Impellers
8. Grilles Protection
9. Terminal Electric Box
10. Service Door
11. Inlet Cone

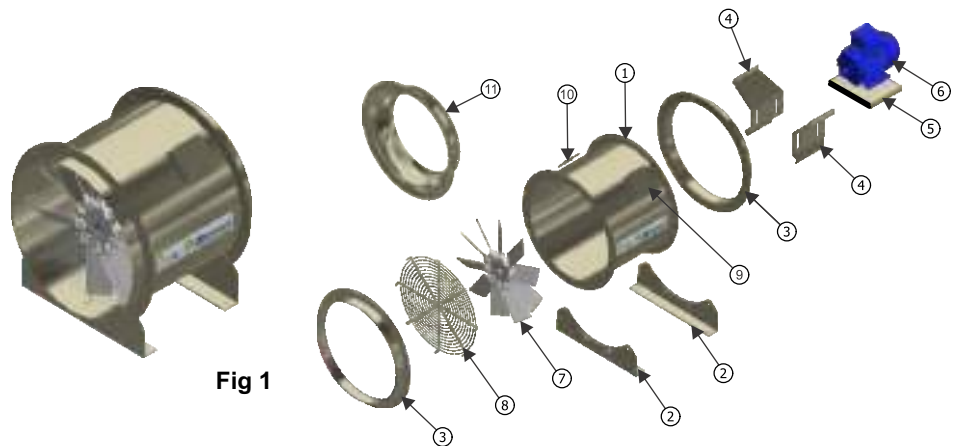


Fig 1

This bifurcated axial fan is designed specifically for extracting contaminated air, operating in corrosive, hot, dusty or hazardous conditions. Standard temperature units up to 100°C continuous operation. High temperature up to 200°C continuous operation.

The bifurcated axial fan consists of the following main parts in Fig 2:

1. Bifurcated Casing
2. Inlet/Outlet Flange
3. Mounting Feet
4. Motor Frame
5. Aluminum Impeller
6. Grilles Protection

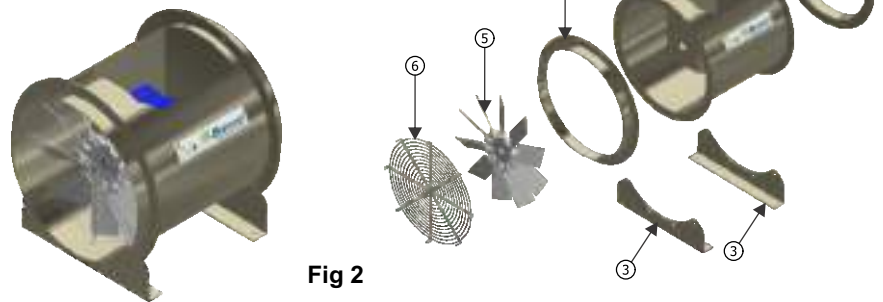


Fig 2

Axial flow fans 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.

2.2 Product Description

Fan type:

- SC Series: Short Cased Axial Flow Fan.
- LC Series: Long Cased Axial Flow Fan.
- LCS Series: Smoke Extract Axial Fan.
- LCF Series: Explosion Proof Axial Fan.
- CRLC Series: Two-stage Axial Fan.
- CRLCS Series: Smoke Extract Two-stage Axial Fan.

Material:

Casing: Fan sizes are from 315mm to 1600mm diameter.

- All casings and motor mounting are made of mild steel, all steel parts are epoxy coated after manufacturing.
- Casing flanges are rolled, the pitch circles of holes are in accordance to BS 6339 and ISO 6580.

Impeller: High efficiency aerofoil type.

- All units are fitted with Breezax Impellers with Aluminum (ALU) blades.
- GRP or GRN blades can be fitted if required.
- Hubs are manufactured from fully die cast aluminum alloy as standard.
- The blades are with adjustable pitch angle to optimize the duty point. The solidity varies for a wider range of performance.

Blade materials are available in:

- ALU: Standard
- GRP: Glass Reinforced Polypropylene
- GRN: Glass Reinforced Nylon
- AST: Anti-static Nylon

Operating temperature:

- ALU: -40°C + 200°C
- GRP: -40°C + 70°C
- GRN: -40°C + 150°C
- AST: -30°C + 110°C

Balance:

The impellers are statically and dynamically balanced on precision machines according to ISO 1940 with G2.5mm/s quality standard.

Mounting and Airflow:

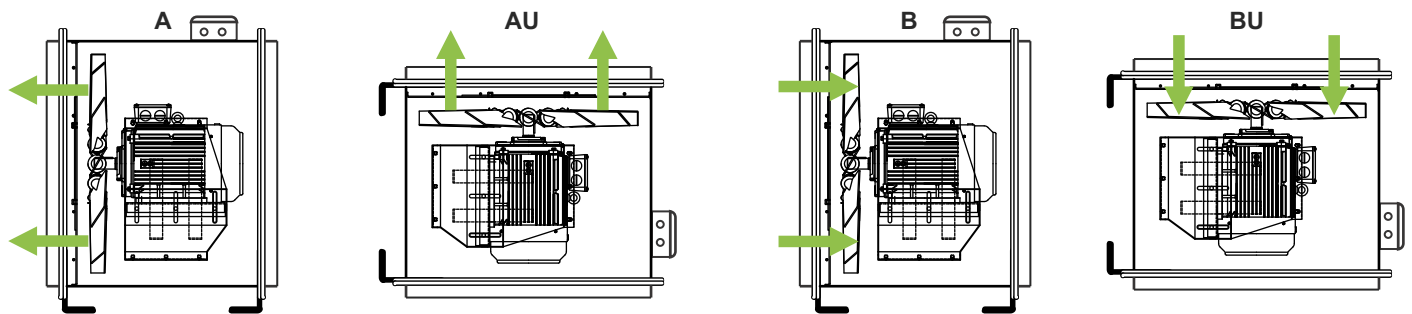
All units are suitable for internal or external operation at any installed angle.

Airflow direction:

- Plan B as standard.
- Plan A can be supplied if required.

Arrows indicating correct rotating and direction of airflow are mounted on the outside of the fan case.

These forms of running are as follows:



Fan Laws

Speed Change - Constant Size - Constant Density

- Air Volume \approx Rotation Speed

$$\frac{V_2}{V_1} = \frac{n_2}{n_1}$$

- Pressure \approx (Rotation Speed)²

$$\frac{\Delta p_1}{\Delta p_2} = \left(\frac{n_1}{n_2}\right)^2 = \left(\frac{V_1}{V_2}\right)^2$$

- Absorbed Power \approx (Rotation Speed)³

$$\frac{P_1}{P_2} = \left(\frac{n_1}{n_2}\right)^3 = \left(\frac{V_1}{V_2}\right)^3$$

Noise:

$$N_2 - N_1 = 50 \log_{10} \left(\frac{D_2}{D_1} + 50 \log_{10} \left(\frac{n_2}{n_1} \right) \right)$$

Pressure

- Dynamic Pressure (Pa)

$$p_d = \frac{\rho}{2} * v^2$$

- Total Pressure (Pa)

$$p_t = p_{st} + p_d$$

- Air Velocity (m/s)

$$v = \frac{V * 4}{\pi D^2}$$

Absorbed Power

$$P = \left(\frac{V \text{ (m}^3\text{/s)} * p_t \text{ (Pa)}}{\eta\% * 10} \right) \text{ kW}$$

Size Change - Constant Speed - Constant Density

- Air Volume \approx (Impeller Diameter)³

$$\frac{V_2}{V_1} = \left(\frac{D_2}{D_1}\right)^3$$

- Pressure \approx (Impeller Diameter)²

$$\frac{\Delta p_1}{\Delta p_2} = \left(\frac{D_1}{D_2}\right)^2$$

- Absorbed Power \approx (Impeller Diameter)⁵

$$\frac{P_1}{P_2} = \left(\frac{D_1}{D_2}\right)^5$$

Density Change - Constant Speed - Constant Size

- Air Volume = No change

$$V = \text{Constant}$$

- Pressure \approx Density

$$\frac{\Delta p_1}{\Delta p_2} = \frac{\rho_1}{\rho_2} = \frac{T_2}{T_1}$$

- Absorbed Power \approx Density

$$\frac{P_1}{P_2} = \frac{\rho_1}{\rho_2} = \frac{T_2}{T_1}$$

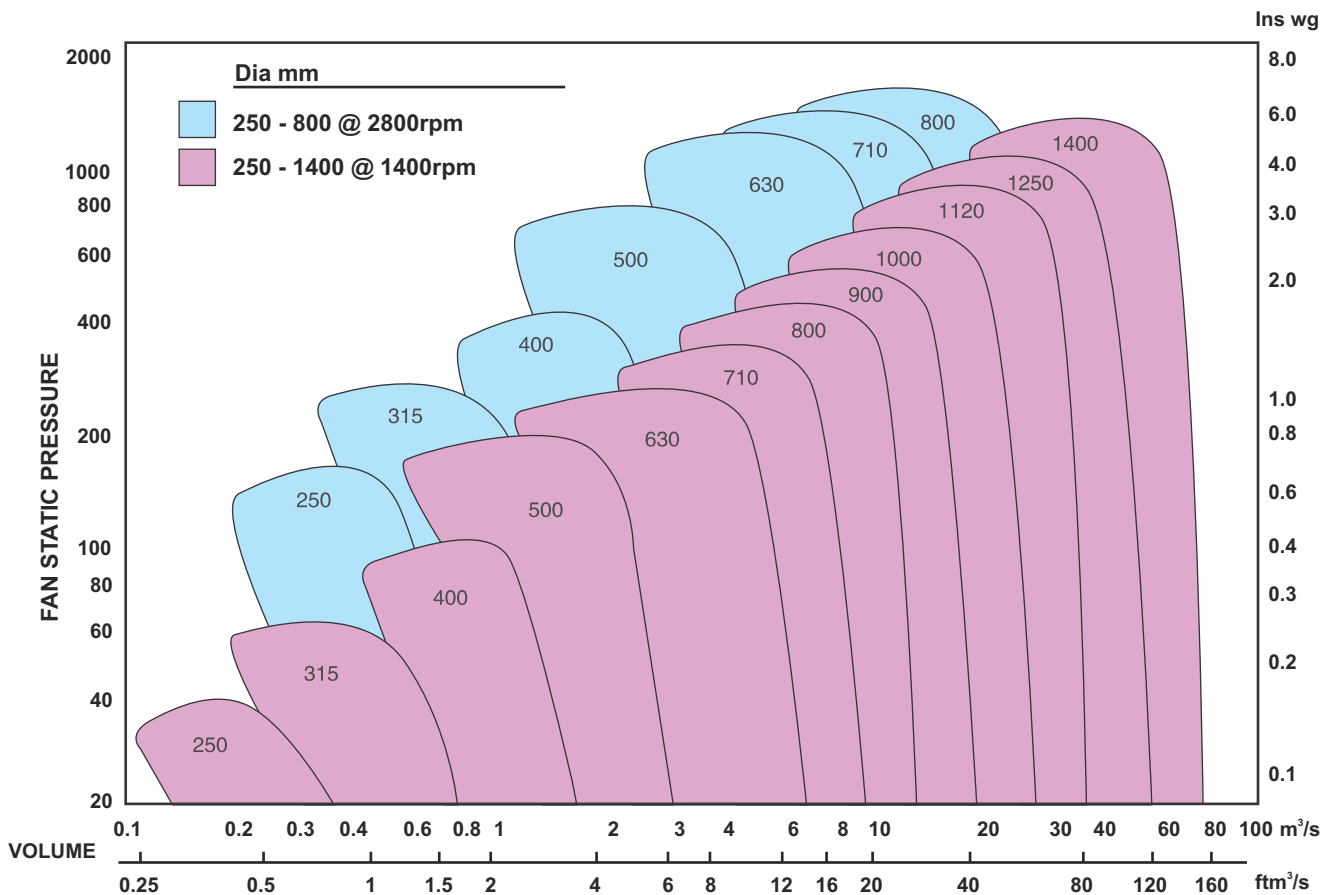
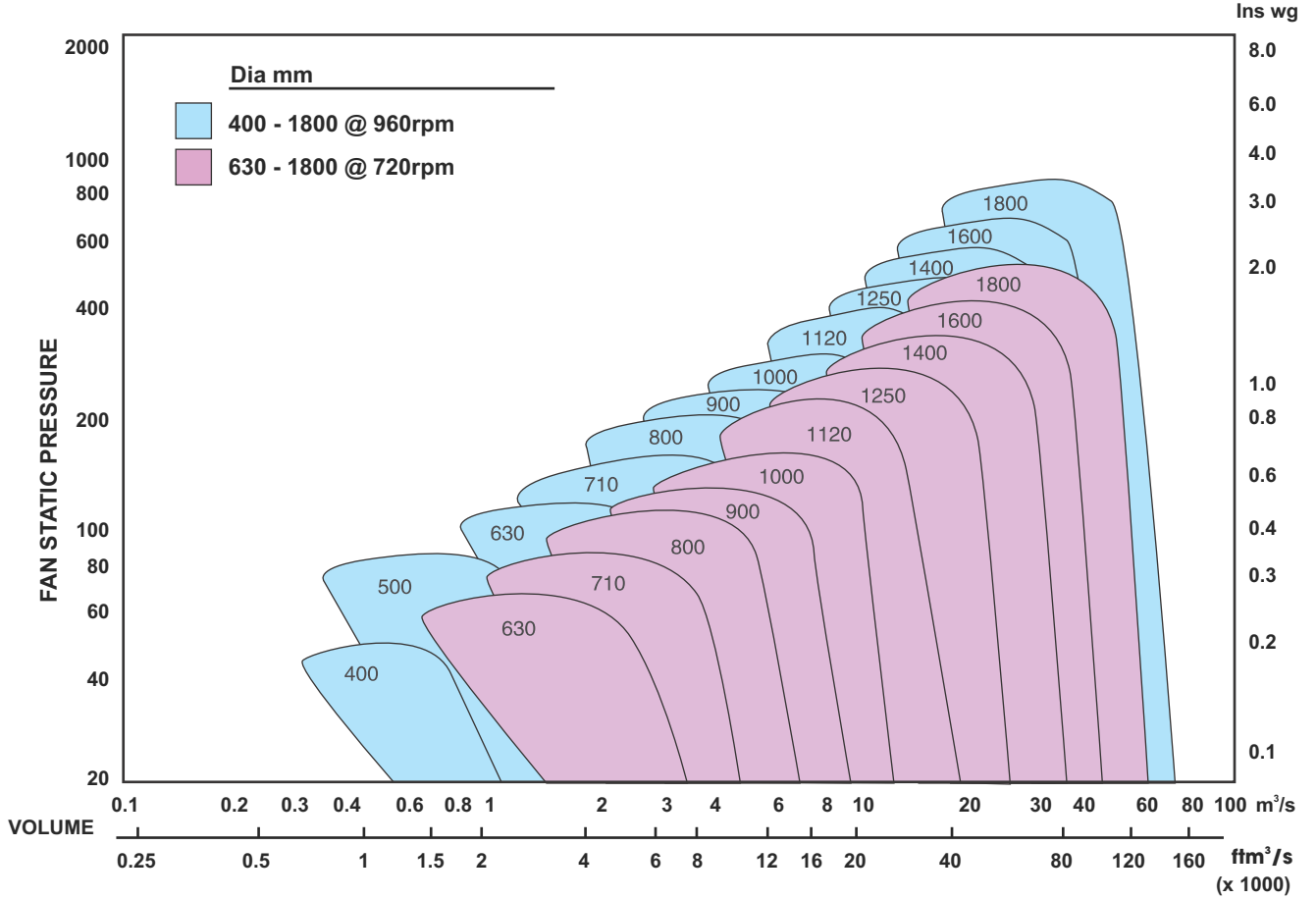
Whereby:

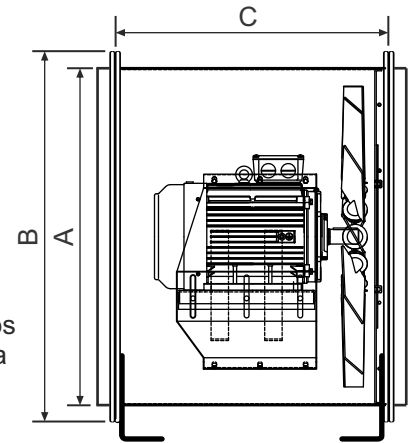
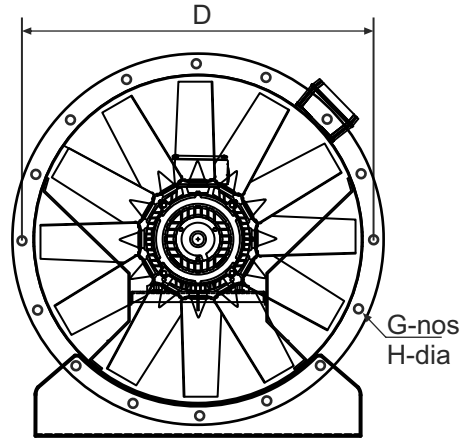
- V = Air Volume (m³/s)
- D = Impeller diameter (mm)
- P = Absorbed power (kW)
- N = Noise
- n = Rotation speed (rpm)
- p_t = Total pressure (Pa)
- p_{st} = Static pressure (Pa)
- p_d = Dynamic pressure (Pa)
- ρ = Air density (kg/m³), standard is 1.2kg/m³
- v = Air velocity (m/s)
- η = Fan Efficiency (%)
- π = 3.14

PERFORMANCE CURVES

MORE DETAILED CURVES AVAILABLE ON REQUEST

Fan tested in accordance with BS848:Part1:1985 and ISO 5801. There is a policy of continuous product improvement and the right is reserved to revise product information without prior notice.

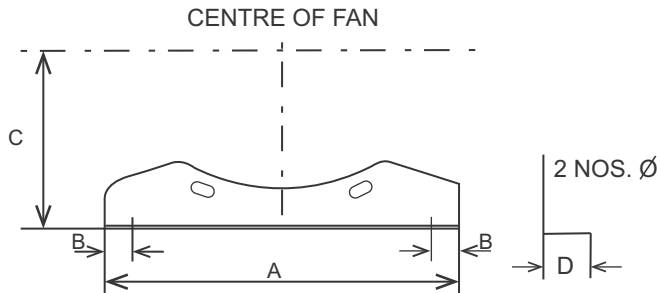


2.3 Dimension


Model	Motor Frame	A	B	C	D	G-nos	H-Dia	Weight (kg)
LC 315	D71-90	315	395	400	366	8	10	45
LC 355	D71-90	355	435	400	405	8	12	50
LC 400	D71-100	400	485	400	450	8	12	55
LC 450	D71-112	450	530	400	497	8	12	80
LC 500	D71-112	500	585	500	550	12	12	90
LC 560	D71-112	560	660	500	629	12	12	100
LC 630	D71-112	630	730	600	698	12	12	120
LC 710	D100-112	710	810	600	775	16	12	150
	D132							190
LC 800	D100-112	800	900	700	861	16	14	180
	D132							220
LC 900	D100-112	900	1000	700	960	16	14	200
	D132-160							250-310
LC 1000	D132	1000	1100	850	1060	16	14	350
	D160-180							420-500
LC 1120	D160-180	1120	1220	1000	1192	20	18	560-670
	D200							750
LC 1250	D160-180	1250	1350	1000	1337	20	18	610-720
	D200							800
LC 1400	D160-200	1400	1500	1000	1474	20	18	750-950
	D225-250			1200				1250-1450
LC 1600	D160-200	1600	1700	1000	1675	24	18	900-1100
	D225-250			1200				1350-1550

2.4 Accessories

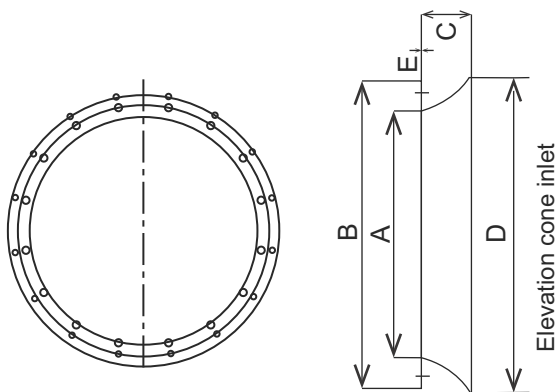
Mounting feet



Size	A	B	C	D	Ø	Wt (kg)
315	365	25	220	50	12	0.5
355	405	25	240	50	12	0.8
400	450	25	260	50	12	1.0
450	500	25	280	50	12	1.2
500	550	25	315	60	12	1.5
560	610	25	345	60	14	2.0
630	680	30	400	75	14	2.5
710	785	30	450	75	14	3.0
800	875	30	500	75	14	5.5
900	975	30	580	75	18	8.0
1000	1075	30	630	75	18	10.0
1120	1220	30	690	75	18	12.0
1250	1350	50	737	95	20	14.0

All dimensions in mm.

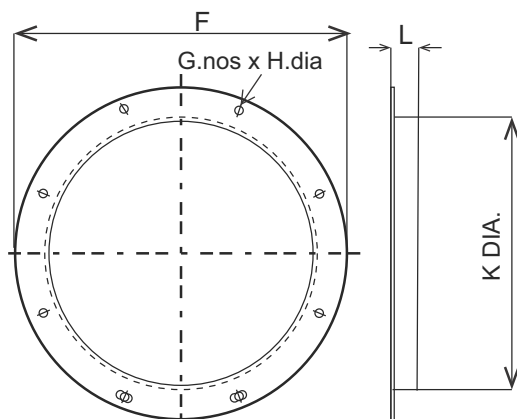
Inlet Cone



Size	A	B	C	D	E	Wt (kg)
315	315	395	125	420	2.0	3.0
355	355	435	125	470	2.0	3.5
400	400	485	135	520	2.0	4.0
450	450	530	135	570	2.0	4.5
500	500	585	150	630	2.0	5.0
560	560	660	150	710	2.0	6.0
630	630	730	150	780	3.0	8.0
710	710	810	200	860	3.0	10.0
800	800	900	200	980	3.0	12.0
900	900	1000	250	1080	3.0	18.0
1000	1000	1100	250	1200	3.0	25.0
1120	1120	1220	300	1320	3.0	30.0
1250	1250	1350	300	1450	3.0	35.0

All dimensions in mm.

Inlet/Outlet Flanges



Size	G.nos	H.Dia	J	F	K	L	Wt (kg)
315	8	10	355	395	315	50	2.0
355	8	12	395	435	355	50	2.5
400	8	12	450	485	400	50	3.0
450	8	12	500	530	450	50	3.5
500	12	12	560	585	500	60	4.0
560	12	12	620	660	560	60	4.5
630	12	12	690	730	630	60	5.0
710	16	12	770	810	710	60	6.0
800	16	14	860	900	800	70	7.0
900	16	14	970	1000	900	70	8.0
1000	16	14	1070	1100	1000	70	9.0
1120	20	18	1190	1220	1120	70	10.0
1250	20	18	1320	1350	1250	70	12.0

All dimensions in mm.

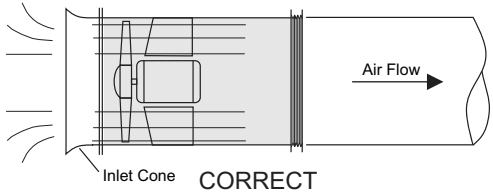
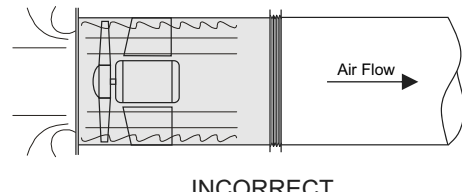
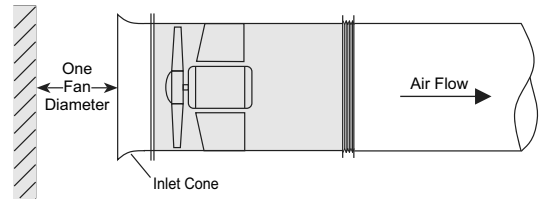
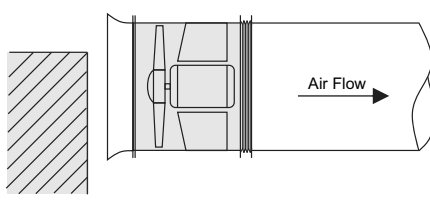
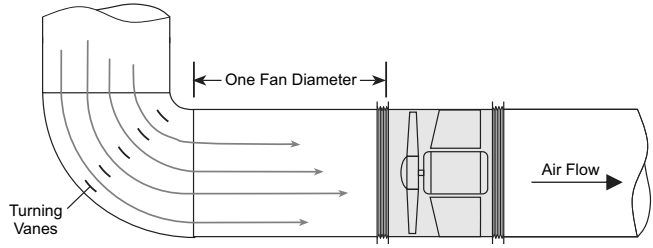
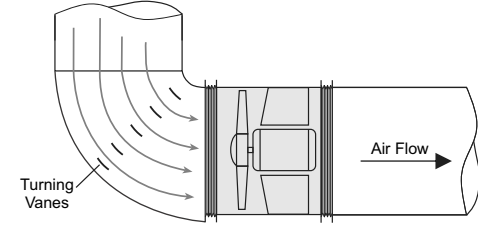
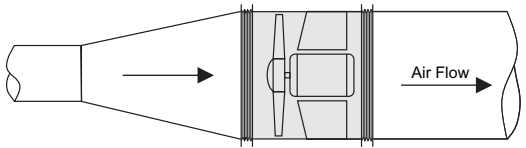
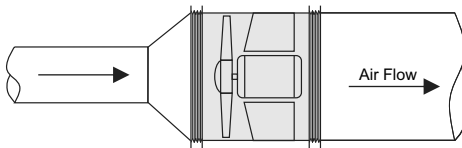
* Dimensions shown are approximate only. The details please contact local sales office for more information.

3. INSTALLATION INSTRUCTION

- Move the fan to the desired location.
- Check and tighten fasteners throughout the unit and then fasten securely through mounting holes provided in the base angles.
- The unit must be set level (shimming may be necessary).
- Flexible duct connections and vibration isolators should be used where noise is a factor.
- The motor voltage and ampere rating must be checked for compatibility with the electrical supply prior to final electrical connection.
- Supply wiring to the fan must be properly fused and conform to local and national electrical codes.

3.1 Installation Guideliness

Inlet Flow Installations:

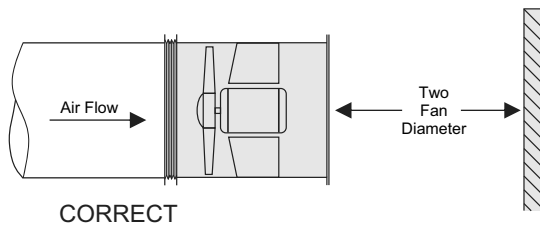
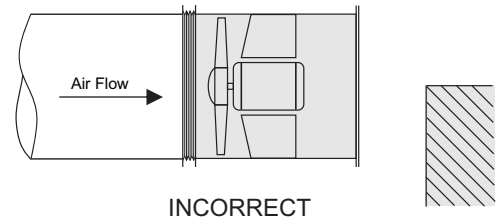
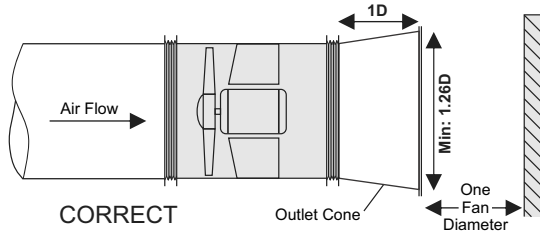
Non-Ducted Inlet Conditions	
<p>No intake nozzle – Result: The vane edges are not in the air flow, the air output is reduced, noise output becomes greater. This can cause permanent damage to the rotor blades.</p>  <p style="text-align: center;">CORRECT</p>	<p>The intake nozzle enables an even flow to be achieved over the whole cross-sectional area.</p>  <p style="text-align: center;">INCORRECT</p>
<p>The distance must be at least as great as the fan diameter</p>  <p style="text-align: center;">CORRECT</p>	<p>The fan output is reduced if an obstacle is situated too close to the intake</p>  <p style="text-align: center;">INCORRECT</p>
Ducted Inlet Conditions	
<p>A quadratic channel corner with short guide vanes is preferred.</p>  <p style="text-align: center;">CORRECT</p>	<p>Bends with a small radius of curvature reduce fan output and increase noise levels if fitted too close in front of the vane.</p>  <p style="text-align: center;">INCORRECT</p>
<p>If possible the angle should be less than 15°.</p>  <p style="text-align: center;">CORRECT</p>	<p>Diffusers or nozzles having an angle greater than 30° should not be used.</p>  <p style="text-align: center;">INCORRECT</p>

Outlet Flow Installations:

Non-Ducted Outlet Conditions

The distance must at least be as great as the fan diameter. An outflow passage having a length of $2xD$ or an outflow diffuser, as shown, both reduce outflow losses

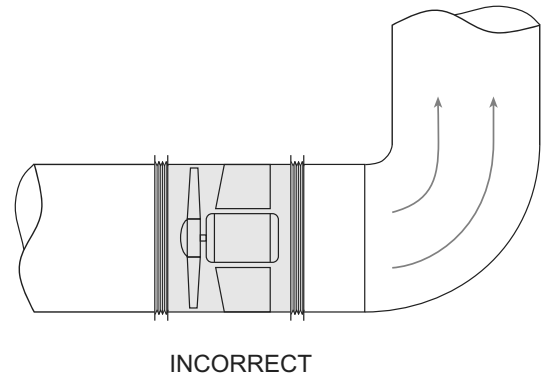
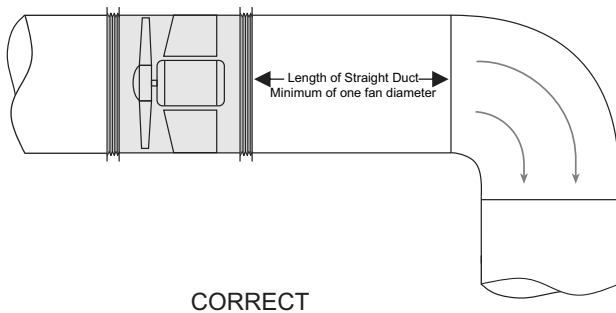
The outflow should not end at the same point as the fan. Any blockage of the outflow must be prevented



Ducted Outlet Conditions

Ducted outlets require a straight, uniform diameter length of ductwork immediately after the fan outlet. Breeze recommends a minimum of one fan diameters between the fan outlet and any duct turn.

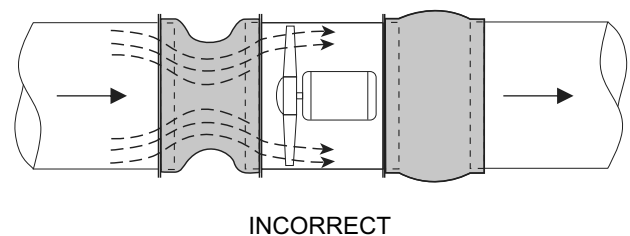
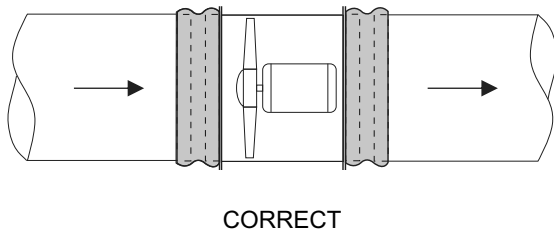
Sharp turns or elbows close to the outlet will create system effect losses and poor air performance.



Flexible Duct Installations

Loose, flexible connections in front of the fan obstruct the available cross-sectional area, fan output is reduced and noise levels increase.

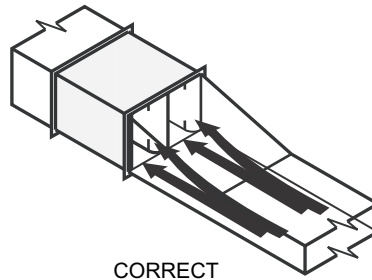
Flexible connections should be tensioned to such a point that they only permit the movement required for insulation.



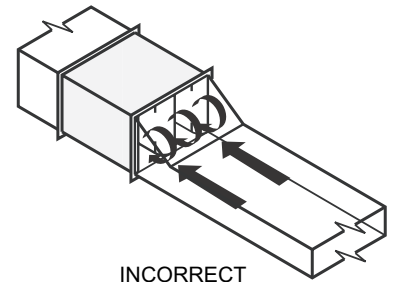
3.2 Guideliness for Noise Control

Transitions: Ensure symmetrical transitions from the duct equipment to fan inlet.

- Ensure transitions close to attenuators are gradual or better still, remote.
- Abrupt transitions immediately adjacent to an attenuator will cause the attenuator pressure to increase.



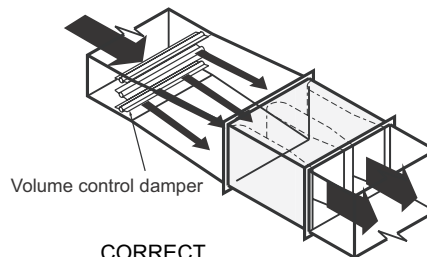
CORRECT



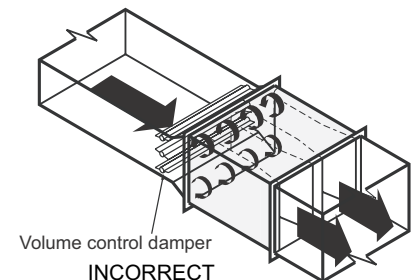
INCORRECT

Volume Control Dampers:

- Allow for a settling duct between volume control dampers and attenuators.
- Don't site volume control dampers or fittings too close to attenuators as they can cause a dramatic increase in attenuator pressure drop.



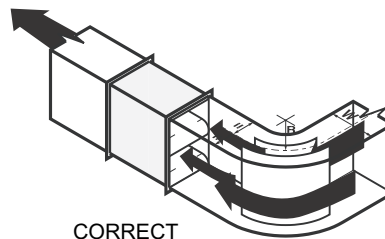
CORRECT



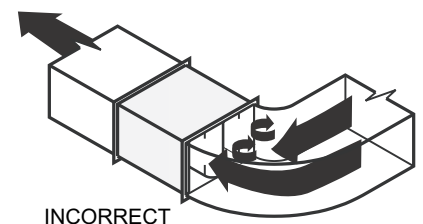
INCORRECT

Attenuators in relation to bends:

- Do ensure attenuator splitters are in the plane of the bend as shown. Fit turning vanes if $R/W < 1.0$
- Don't use attenuator splitters as shown when sited close to a bend as the pressure loss across it will be greater than expected.



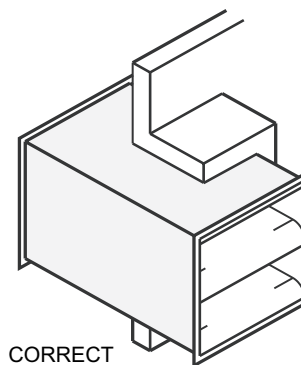
CORRECT



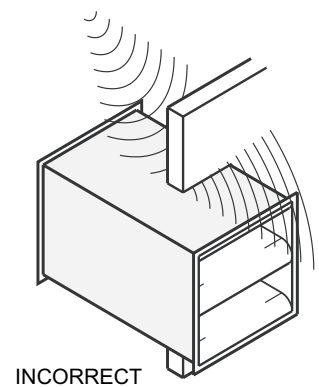
INCORRECT

Acoustic sealing of silencers to achieve low noise levels:

- Place a concrete sleeve around the silencer to increase the acoustic seal between rooms. For less stringent requirements, pack around the silencer with a resilient material to affect a complete seal between the attenuator and the opening.
- When trying to achieve very high attenuation or very low noise levels (e.g.. NR20) do not use an inadequate seal between the silencer and wall opening.



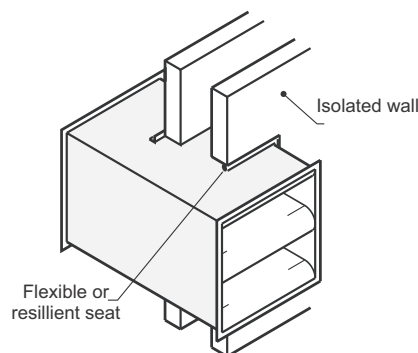
CORRECT



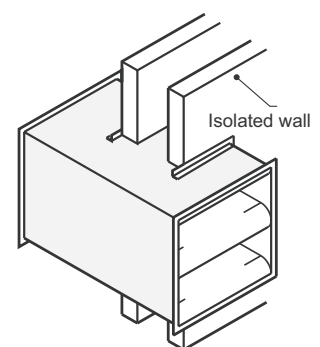
INCORRECT

Isolated walls:

- Do fix the silencer to one wall only and place a flexible or resilient seal on the isolated wall.
- Don't bridge the isolated wall to the non-isolated wall with the silencer fixings.



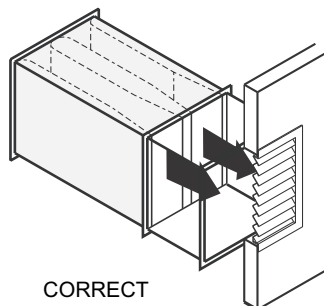
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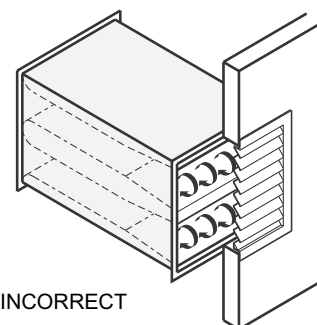
INCORRECT

Louvres on silencer discharge:

- Do ensure that the splitter orientation is at 90° to the louver orientation and place a spacer between the silencer and discharge louver.
- Don't place a silencer immediately in front of a louver.



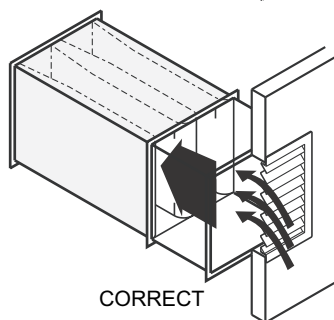
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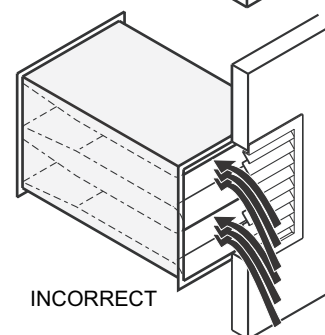
INCORRECT

Louvres on silencer inlet:

- Do place a spacer between the louver and the silencer and ensure that the splitter orientation is at 90° to the louver orientation.
- Don't place a silencer immediately downstream of a louver.



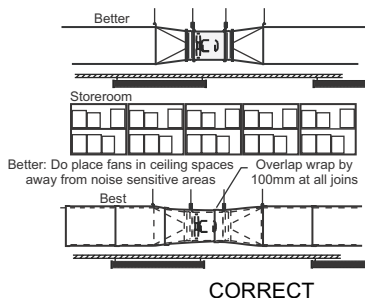
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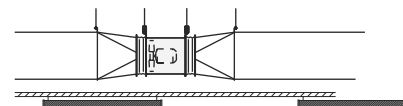
INCORRECT

Fan positions relative to noise sensitive areas:

- Best: If fan cannot be relocated, wrap fan and surrounding ductwork with a noise barrier material (When wrapping fans pay particular attention to ensuring there are no holes at the joins). Allow sufficient overlap in the wrap to ensure adequate coverage. Remember that flexible connections will be the weakest link.
- Do not place fans in ceiling spaces directly above noise sensitive areas.



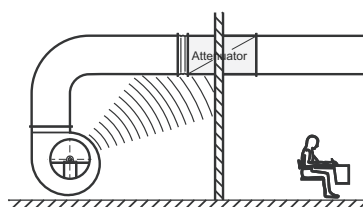
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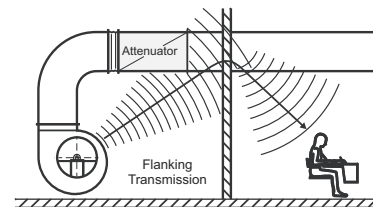
INCORRECT

Flanking transmission:

- Installing the attenuator through or against the wall minimises the chance of flanking transmission via the duct system ensuring the expected performance is achieved.
- If an attenuator is installed as shown, noise from the fan can bypass the attenuator and enter the conditioned space. This is known as flanking transmission and will negatively impact on the expected attenuator performance.



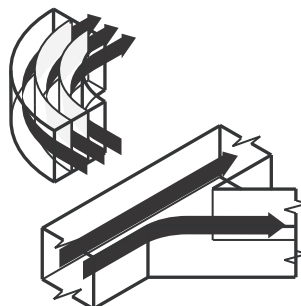
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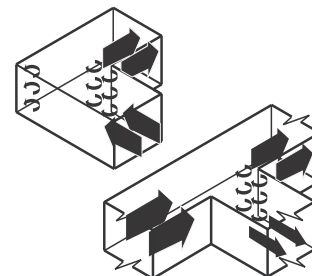
INCORRECT

Changing direction of airflow:

- Do use sweeping bends and take offs. Use long chord turning vanes where possible. Keep velocities low to reduce airflow generated noise levels.
- Don't use sharp bends or take offs.



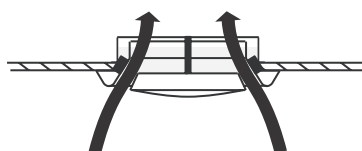
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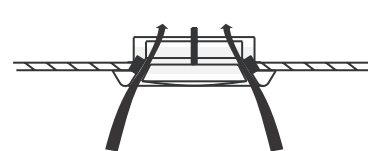
INCORRECT

When noise generated by grilles could cause a problem:

- Do ensure velocities through supply and exhaust grilles are low by increasing the grille size or number of grilles. Size ductwork for constant static pressure to each grille, thus eliminating or minimising the need for balancing damper adjustment (which could / can generate excessive noise).
- Don't allow high velocity air to pass through grilles.

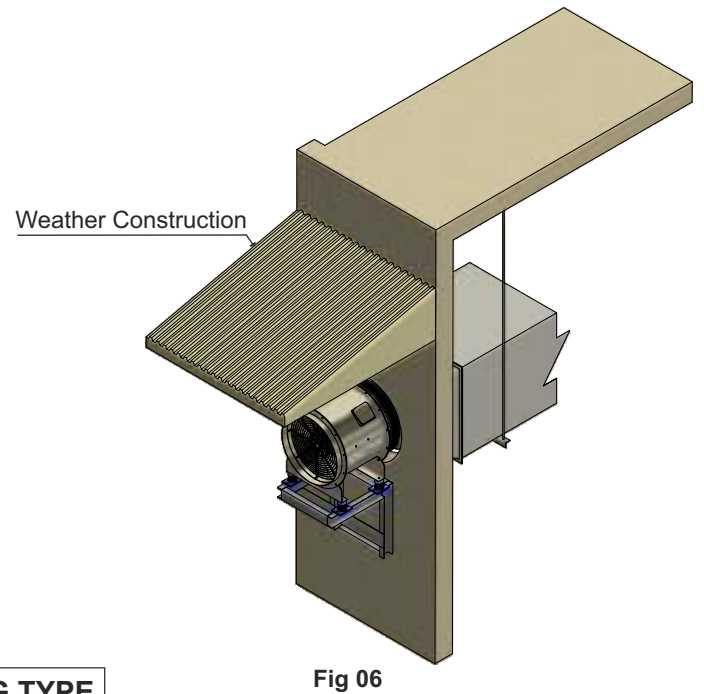
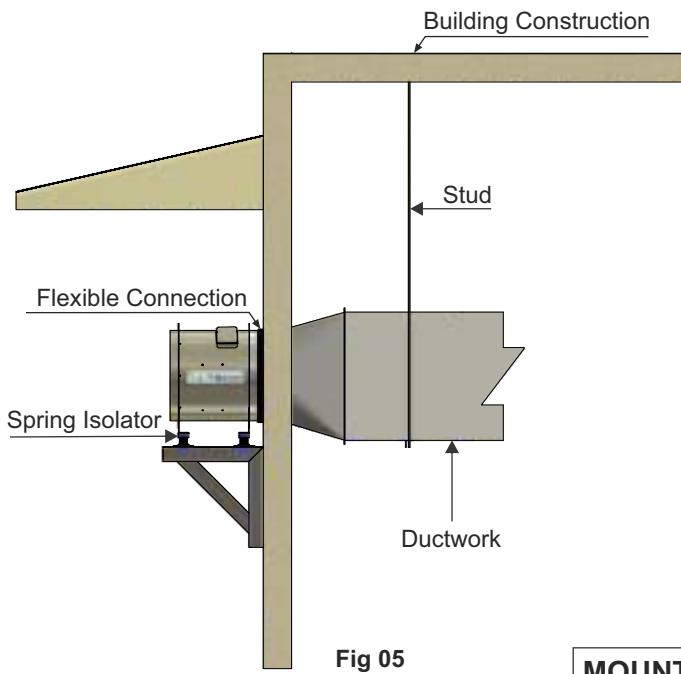
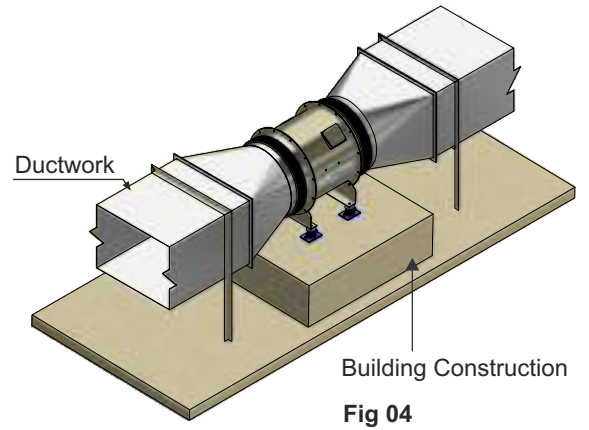
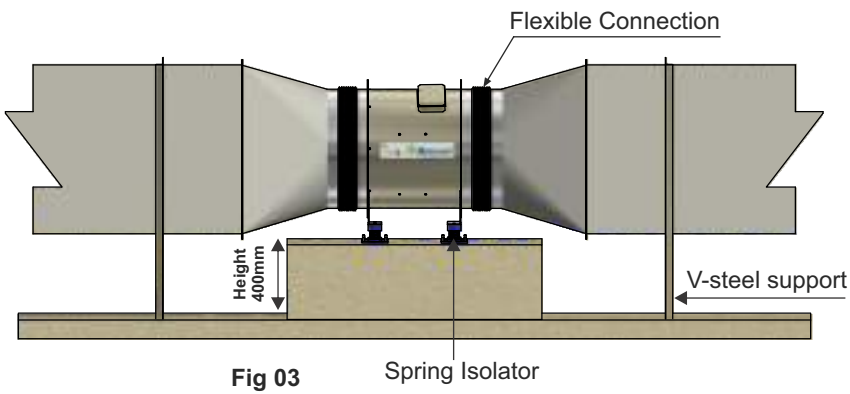


CORRECT

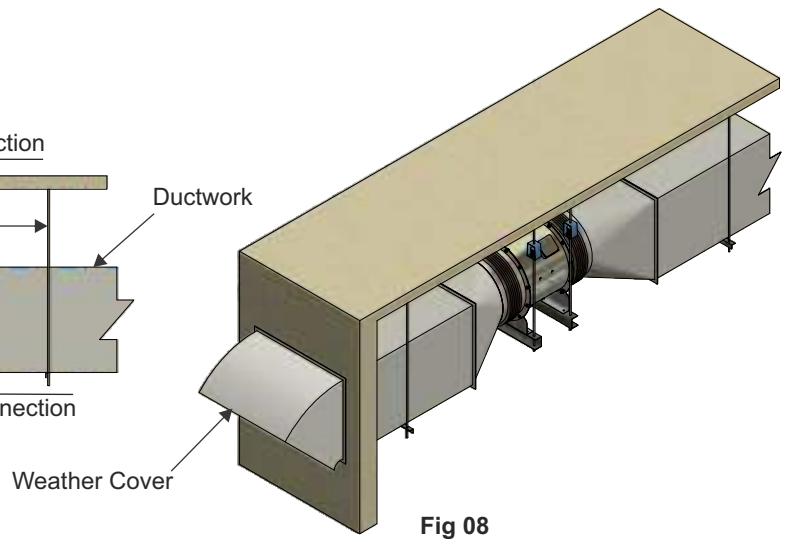
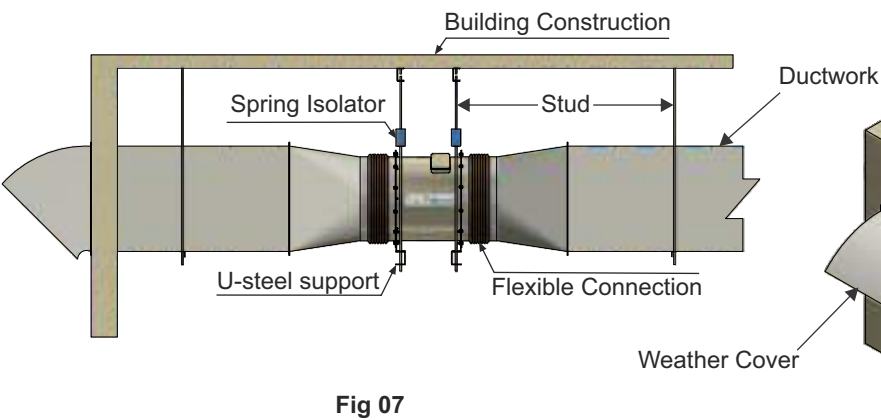


INCORRECT

3.3 Installation Method



MOUNTING TYPE



HANGING TYPE

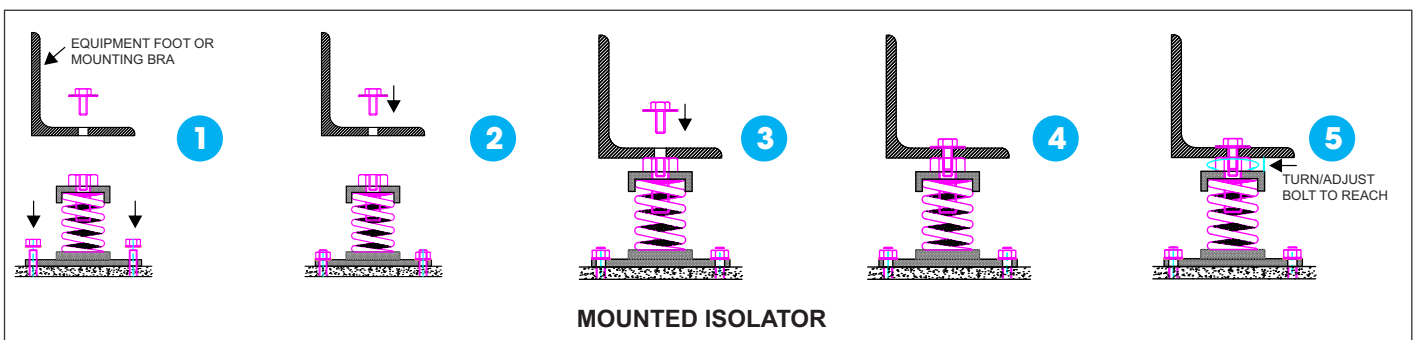
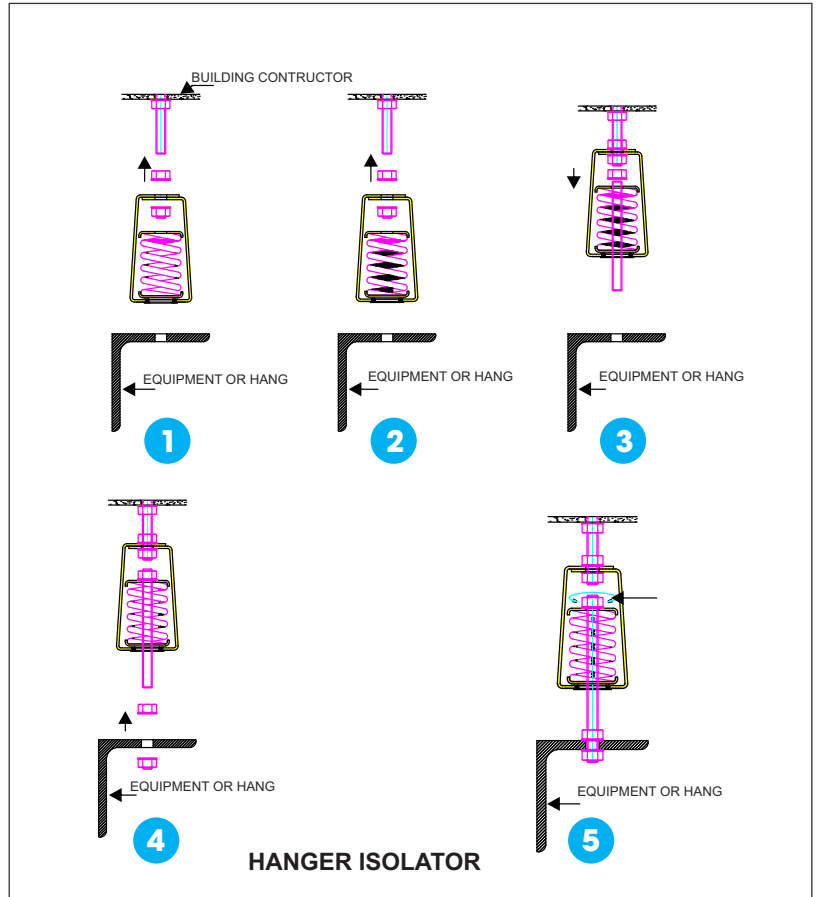
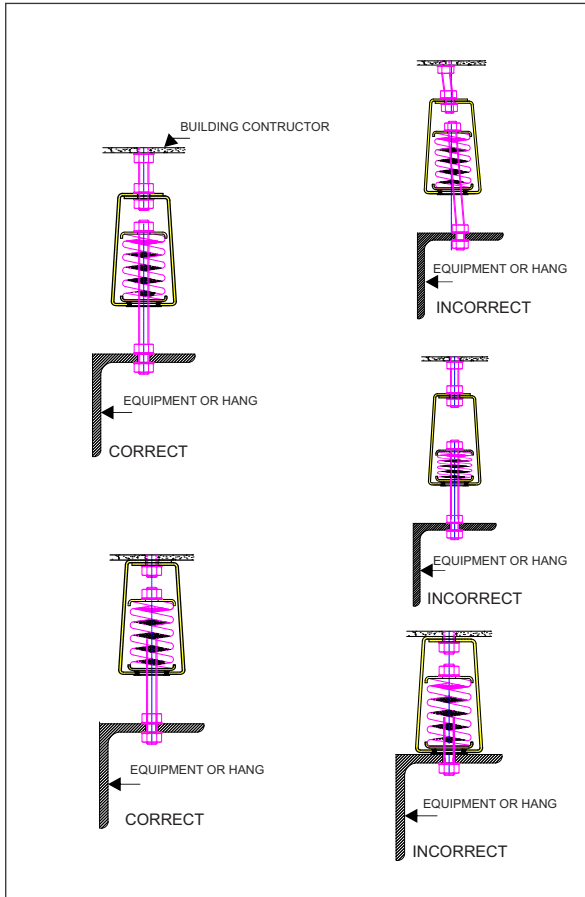
3.4 Vibration

On start-up and during operation, the unit should operate smoothly with minimal vibration. It is possible that a higher degree of vibration may be experienced. Excessive vibration if left unchecked, can cause a multitude of problems, including structural and/or component failure. The most common sources of vibration are listed.

Common Sources of Vibration

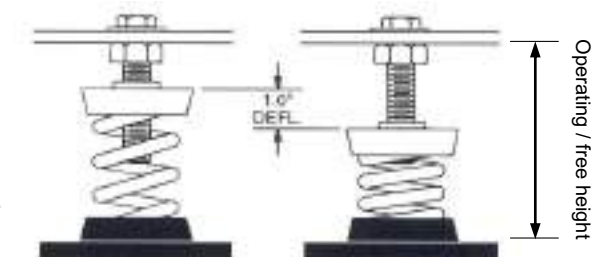
1. Impeller Unbalance
2. Drive Pulley Misalignment
3. Incorrect Belt Tension
4. Bearing Misalignment
5. Mechanical Looseness
6. Faulty Belts
7. Drive Component Unbalance
8. Poor Inlet/Outlet Conditions
9. Foundation Stiffness

Vibration Isolator Guidelines



Vibration Isolator Installation

- Choose proper isolator
- Adjust deflection based on the selected isolator.
- Maintain the operating / free height at the same level through step 2.
(The entire assembly must be levelled)
- Check all the deflection and operating/free height is properly maintained.



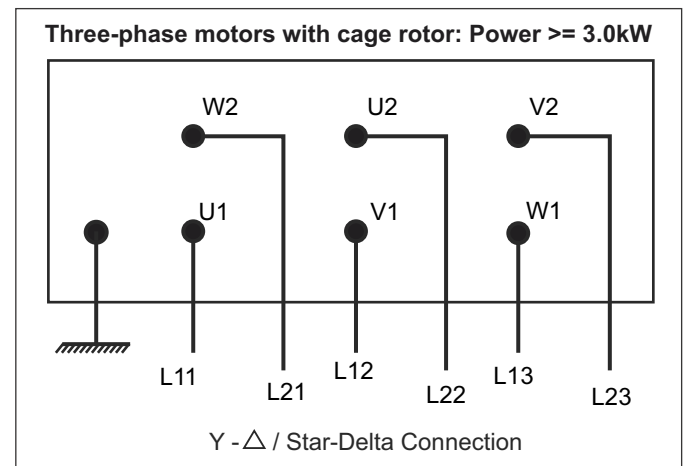
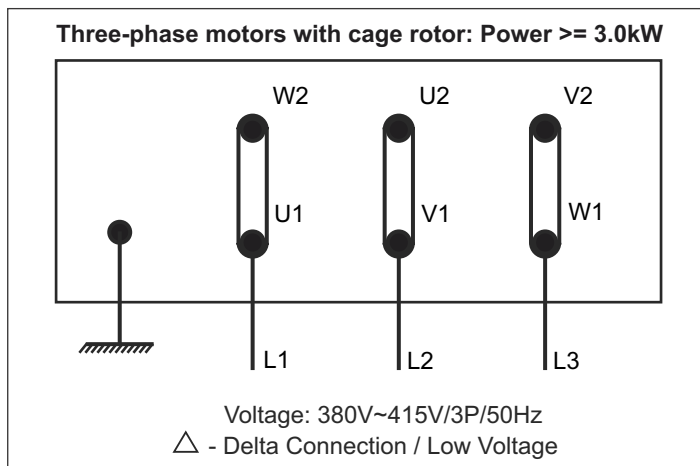
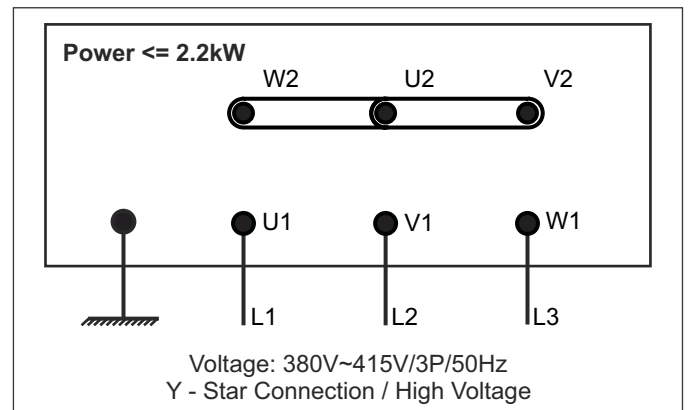
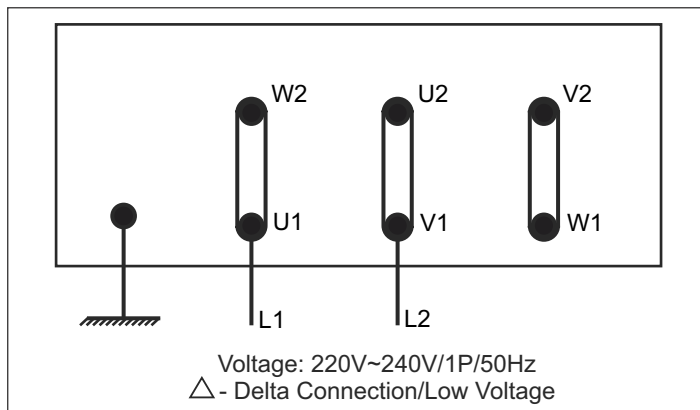
3.5 Electric Installation

Electric Connection

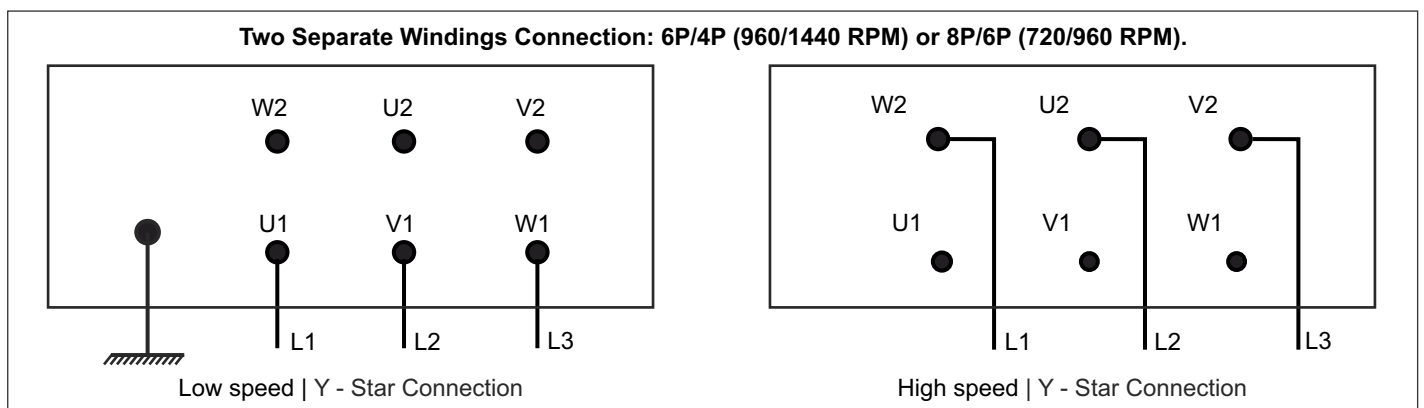
- Before electrical connections are made, the supply voltage, phase and ampere capacity must be checked for compatibility with the fan motor. In addition, the supply wiring must be properly fused and conform to local and national electrical codes. If the unit is supplied with a safety disconnect switch, 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. Single phase motors can be reversed by changing internal connections as described on the motor label or wiring diagram.
- After connecting the wiring, install the terminal cover with screws.

Wiring diagram

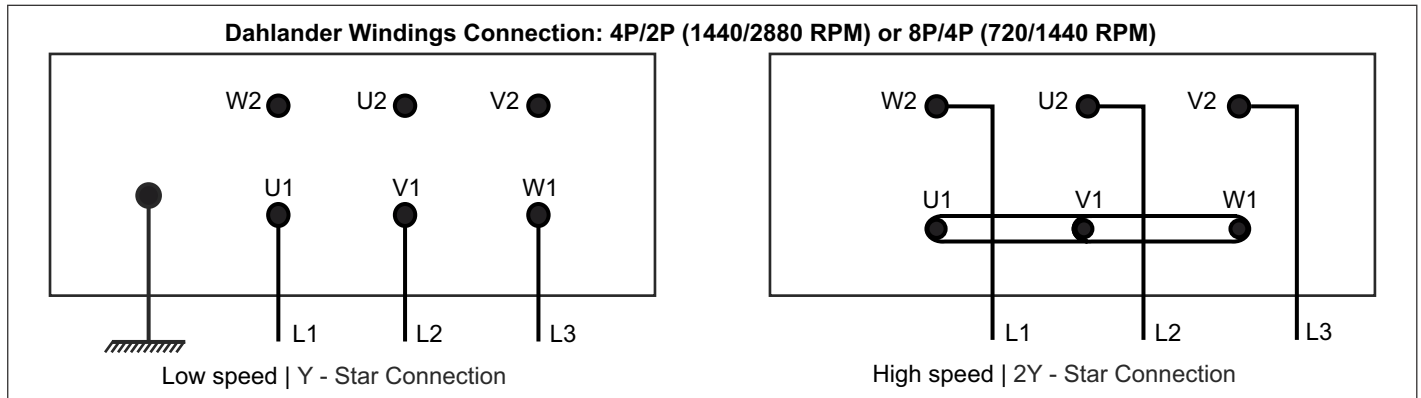
Single-speed Motors:



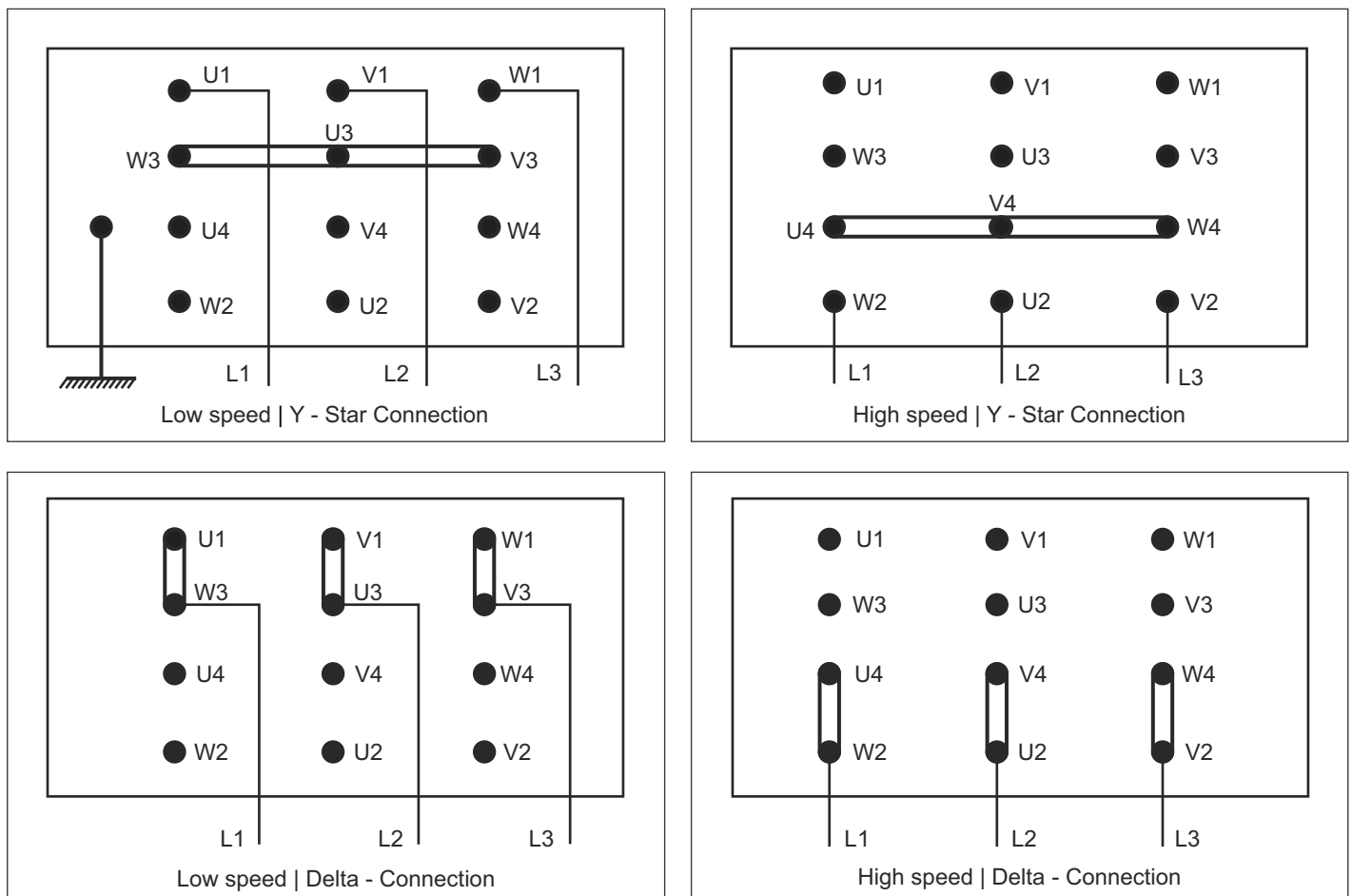
Double-speed Motors with connection: 06 wires.



Double-speed Motors with connection: 06 wires.



Double-speed motors with connection: 12 wires



4. 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).

4.1. 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

4.2 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.

4.3 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.

4.4 Checks after initial start-up

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

5. 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).

5.1 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 pull out grille protection in Fig 09.
- Unscrews among in the motor shaft and impeller . After that pull out impeller outside in Fig 10.
- Remove bolts and nuts in the motor frame and pull out motor frame outside in Fig 11.

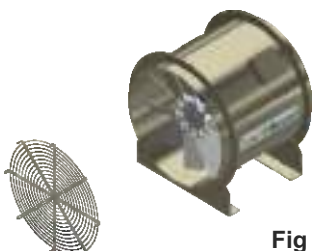


Fig 09

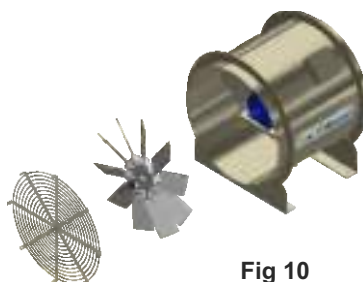


Fig 10

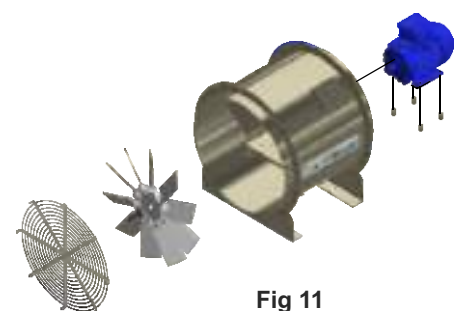
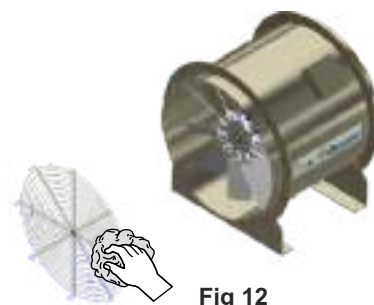
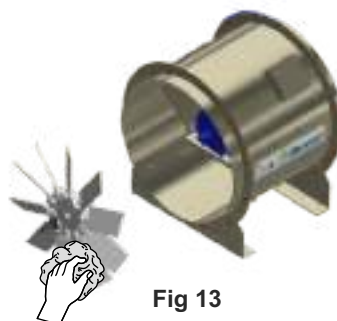
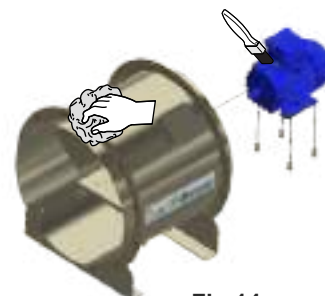


Fig 11

Clean fan:

- Follow by unassembly fan.
- Clean tube casing and grilles protection in Fig 12, 14.
- Use a soft dry brush or a vacuum cleaner to remove dust in motor in Fig 14.
- Clean impeller in Fig 13.
 - 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.


Fig 12

Fig 13

Fig 14
5.2 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 104°F (40°C), 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
56	20000	20000	20000
63	20000	20000	20000
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

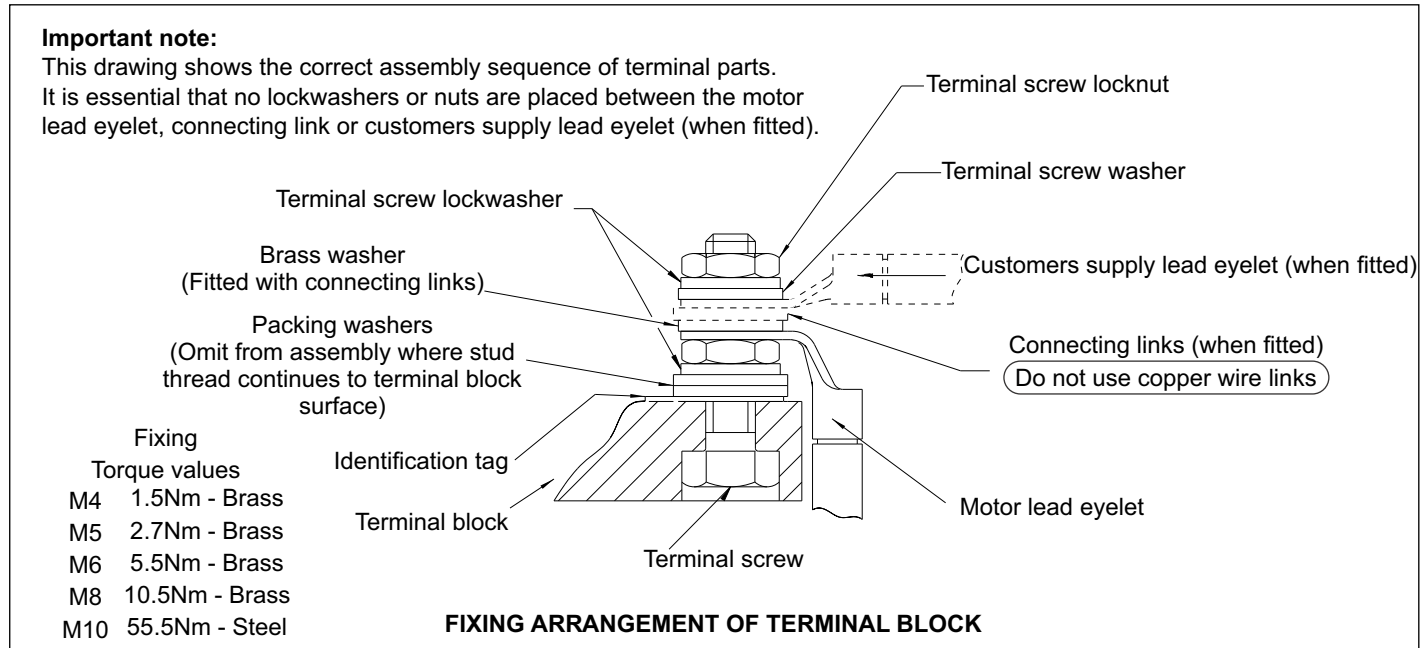
Service intervals for motor bearings.

5.3 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)

5.4 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.



TORQUE SETTINGS FOR FIXINGS

Screw Fixing	Torque setting: +0% / -10% (Nm)											
	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

6. 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 electric supply.
- Pull out of the fan in ductwork.
- Unscrews and pull out grille protection in Fig 15.
- Unscrews among in the motor shaft and impeller . After that pull out impeller outside in Fig 16. if impeller have problem, we replace new impeller.
- Remove bolts and nuts in the motor frame and pull out motor frame outside in Fig 17. if motor frame have problem, we replace new motor.
- 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.

Fig 15

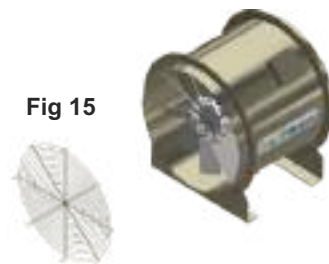


Fig 16

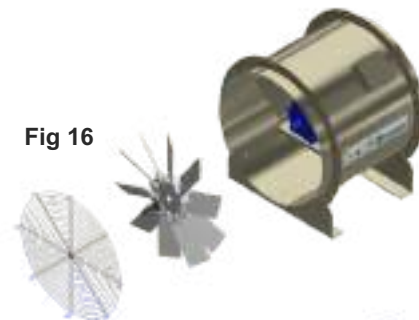


Fig 17



Blade Pitch Adjustment for Impeller

- Disconnect all electrical power to the fan and lock in the “off” position. See warning on front cover of this manual.
- Remove the aluminum nose cone on the impeller assembly. Record the location of all balancing weights located under the nose cone bolts.
- Locate the blade with blade pitch graduations stamped into the blade base and index line on the impeller (Fig 18). This is the master blade.
- Loosen the self-locking nut (Fig 19) attaching the master blade until the blade can be rotated by hand.
- Set the new blade pitch on the master blade by aligning the desired blade pitch number with the index mark. Tighten the self-locking nut slightly to prevent the master blade from moving.
- At the tip of the master blade, use a thin marker pen to scribe the blade profile on the interior of the fan casing from the leading to the trailing edge of the blade tip (Fig 20).
- Loosen the self-locking nuts on the remainder of the blades and set each blade to align with the blade profile scribed on the fan casing. Tighten the self-locking nut slightly to prevent blade from moving.
- After all blades are adjusted to the proper setting, tighten the self-locking nuts of torque. Verify that all the blades tips follow the profile on the fan casing.
- Replace the nose cone and any balancing weights removed earlier. All fasteners and washers must be reinstalled in the exact spot they were removed.
- **IMPORTANT:** Motor load amperes must be checked and compared to the nameplate rating before returning the fan to service. Increasing blade pitch beyond the capacity of the motor will result in motor burn-out and void the warranty.



Fig 18



Fig 19



Fig 20

7. 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.

8. FAULT FINDING

8.1 Electrical

- Check that the electrical connections to the unit are secure.
- Check that the voltage applied at the fan terminals is as specified on the motor nameplate and is balanced.
- Measure the current on each phase (one phase in the case of single-phase motors) of the motor in turn and check that the current consumption is within the full load current specified on the motor nameplate.
- Measure each motor winding to earth and between each winding, using a 500V D.C insulation tester. If the reading is less than ten megohms the reason is likely to be dampness in the motor. To dry the motor place it in a warm (typically 40 degrees centigrade) dry airstream and regularly monitor the motor until the insulation reading is restored to ten megohms or greater. If the reading remains less than ten megohms a break-down in the motor winding insulation could be the reason and a motor rewind/overhaul may be necessary.
- Ensure that there is no smell of burnt insulation in the vicinity of the motor. If this is the case, please seek advice from Breeze Fan (Colchester Office).

8.2 Mechanical

- Check that there are no obstructions to the motor shaft or impeller blades, that the blades are clean and that there are no loose articles or debris in the vicinity.
- Rotate the motor shaft by hand. Investigate any sound of grinding noises, internal chaffing, rubbing or stiffness. Any observed defect may indicate that the bearings require lubrication or replacement.
- Ensure that all fixings are secure.

9. TRANSPORT AND STORAGE

9.1 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.

9.2 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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