



# **CE Compliant Low Speed Centrifugal Fan Installation and Operation**

Owner's Manual - Original Instructions

PNEG-1900CE

Date: 08-22-13

G S I G R O U P



PNEG-1900CE



**CE Declaration of Incorporation  
EC MACHINERY DIRECTIVE  
2006/42/EC**

1004 East Illinois Street, Assumption, IL, 62510, USA

+1 217 226 4429

**The GSI Group declares that**

**GSI Low Speed (1450 RPM) Centrifugal Fans**

Part #	Description
CF-5-6G	Fan: 1450 RPM 5 HP 3 Phase 380V
CF-5-7G	Fan: 1450 RPM 5 HP 3 Phase 415V
CF27-7-6G	Fan: 1450 RPM 7.5 HP 3 Phase 380V
CF27-7-7G	Fan: 1450 RPM 5 HP 3 Phase 415V
CF30-10-6G	Fan: 1450 RPM 10 HP 3 Phase 380V
CF30-10-7G	Fan: 1450 RPM 10 HP 3 Phase 415V
CF30-15-6G	Fan: 1450 RPM 15 HP 3 Phase 380V
CF30-15-7G	Fan: 1450 RPM 15 HP 3 Phase 415V
CF33-20-6G	Fan: 1450 RPM 20 HP 3 Phase 380V
CF33-20-7G	Fan: 1450 RPM 20 HP 3 Phase 415V
CF33-25-6G	Fan: 1450 RPM 25 HP 3 Phase 380V
CF33-25-7G	Fan: 1450 RPM 25 HP 3 Phase 415V
CF36-30-6G	Fan: 1450 RPM 30 HP 3 Phase 380V
CF36-30-7G	Fan: 1450 RPM 30 HP 3 Phase 415V
CF36-40-6G	Fan: 1450 RPM 40 HP 3 Phase 380V
CF36-40-7G	Fan: 1450 RPM 40 HP 3 Phase 415V

Meet the following clauses of the Essential Requirements of the Machinery Directive 2006/42/EC

- 1.1.2 and sub-clauses principles of safety integration
- 1.3.2 Risk of break-up during operation
- 1.3.7 Risk related to moving parts
- 1.3.8 Choice of protection against risks arising from moving parts
  - 1.3.8.1 Moving transmission parts
  - 1.3.8.2 Moving parts involved in the process (*Installer has responsibility to ensure complete compliance with this clause, as per manual.*)
- 1.3.9. Risks of uncontrolled movements
- 1.4. Required characteristics of guards and protective devices
  - 1.4.1. General requirements
  - 1.4.2. Special requirements for guards
    - 1.4.2.1 Fixed guards

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- 1.5.4 Errors of fitting
- 1.5.5 Extreme temperatures
- 1.5.6 Fire
- 1.5.7 Explosion
- 1.5.8 Noise
- 1.5.9 Vibrations
- 1.5.13 Emissions of hazardous materials and substances
- 1.6 Maintenance
  - 1.6.1 Machinery maintenance
  - 1.6.4 Operator intervention
- 1.7 Information
  - 1.7.1 Information and warnings on the machinery
    - 1.7.1.1 Information and information devices
  - 1.7.2 Warning of residual risks
  - 1.7.4. Instructions
    - 1.7.4.1 General principles for the drafting of instructions
    - 1.7.4.2 Contents of the instructions but not inclusive of sub-clause (u)
    - 1.7.4.3 Sales literature

This declaration applies only to the mechanical elements of the above machines and does not imply conformity by any other items of equipment fitted to or connected with the above machines.

The equipment above must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of all relevant Directives, nor until these components have been assembled in the manner recommended in the manufacturers instructions.

Signed :

Name: Frank Ward      Director Hennock International Limited      On behalf The GSI Group

Date:

# NOTES

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## 1. Introduction

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READ THIS MANUAL carefully to learn how to properly use and install equipment. Failure to do so could result in personal injury or equipment damage.

INSPECT the shipment immediately upon arrival. The customer is responsible for ensuring that all quantities are correct. The customer should report and note any damage or shortage on the bill of lading to justify their claim to the transport company.

THIS MANUAL SHOULD BE CONSIDERED a permanent part of your equipment and should be easily accessible when needed.

This warranty provides you the assurance that the company will back its products when defects appear within the warranty period. In some circumstances, the company also provides field improvements, often without charge to the customer, even if the product is out of warranty. Should the equipment be abused, or modified to change its performance beyond the factory specifications, the warranty will become void and field improvements may be denied.

## Safety Guidelines

This manual contains information that is important for you, the owner/operator, to know and understand. This information relates to protecting **personal safety** and **preventing equipment problems**. It is the responsibility of the owner/operator to inform anyone operating or working in the area of this equipment of these safety guidelines. To help you recognize this information, we use the symbols that are defined below. Please read the manual and pay attention to these sections. Failure to read this manual and its safety instructions is a misuse of the equipment and may lead to serious injury or death.



**This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.**



**DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.



**WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.



**CAUTION**, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



**NOTICE** is used to address practices not related to personal injury.

## 2. Safety

### Safety Instructions

Our foremost concern is your safety and the safety of others associated with this equipment. We want to keep you as a customer. This manual is to help you understand safe operating procedures and some problems that may be encountered by the operator and other personnel.

As owner and/or operator, it is your responsibility to know what requirements, hazards, and precautions exist, and to inform all personnel associated with the equipment or in the area. Safety precautions may be required from the personnel. Avoid any alterations to the equipment. Such alterations may produce a very dangerous situation where **SERIOUS INJURY** or **DEATH** may occur.

This equipment shall be installed in accordance with the current installation codes and applicable regulations, which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

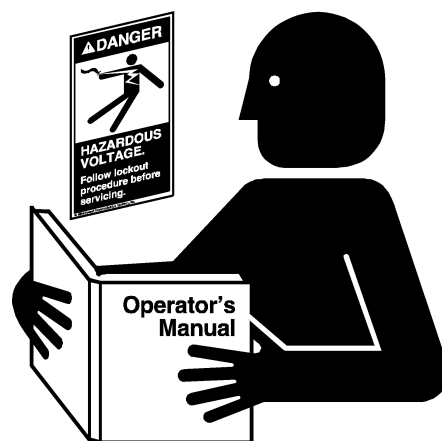
#### Follow Safety Instructions

Carefully read all safety messages in this manual and safety signs on your machine. Keep signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from the manufacturer.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machinery in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.

If you do not understand any part of this manual or need assistance, contact your dealer.



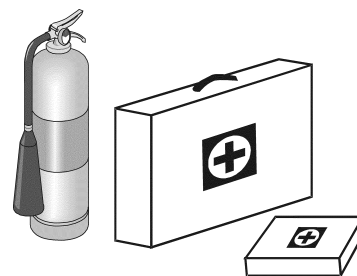
#### Read and Understand Manual

#### Prepare for Emergencies

Be prepared if fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



#### Keep Emergency Equipment Quickly Accessible



**Wear Protective Clothing**

Ear plugs or muffs should be worn at all times to protect ears from high noise levels.

Wear close-fitting clothing and safety equipment appropriate to the job.

Remove all jewelry.

Tie long hair up and back.

Wear safety glasses at all times to protect eyes from debris.

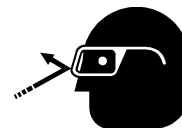
Wear gloves to protect your hands from sharp edges on plastic or steel parts.

Wear steel-toed boots to help protect your feet from falling debris. Tuck in any loose or dangling shoestrings.

A respirator may be needed to prevent breathing potentially toxic fumes and dust.

Wear a hard hat to help protect your head.

Wear appropriate fall protection equipment when working at elevations greater than six feet (6').

**Hearing Protection****Eye Protection****Gloves****Steel-Toed Boots****Respirator****Hard Hat****Fall Protection**

### Minimum Safety Requirements



*Incorrect use of fans can be extremely dangerous. Rotating impellers and shafts can cause serious injury and kill.*

#### Correct Use

1. The fan is for ventilating whole agricultural seeds and grains inside a grain bin or other grain store. Any other use is prohibited and may result in injury or equipment damage.
2. These fans are to be permanently installed and are not designed to be portable.
3. The outlet of the fan is supplied unguarded, being designed to be directly coupled to a transition duct, eliminating scope for personnel access. Never operate the fan with the outlet exposed.
4. If the fan is fitted to a duct into which personnel have access, the user has responsibility to supply and fit a suitable outlet guard. Such a guard should generally be in accordance with EN13857:2008.
5. The installer and operator have responsibility to ensure the final installation is in accordance with all the safety requirements outlined in this manual and fulfils the Essential Requirements of the Machinery Directive 2006/42/EC.
6. Never use the fan with any guards removed.
7. Never enter the grain bin or store unless the power supply to the fan and all other equipment is OFF, TAGGED and LOCKED. (See Figure 2A.)



Figure 2A

8. Never allow an untrained person less or one less than 18 years old to operate the fan.
9. Never allow someone under the influence of alcohol or drugs to operate the equipment.
10. Never modify the fan from it's original specification.
11. The inlet to the fan generates suction. Never work around the inlet to the fan when it is running. Keep loose hair tied back and avoid loose clothing.

## **Electrical Safety Equipment**

Please refer to [Chapter 5 on Page 20](#) for electrical control requirements.

1. All electrical installation and design must be carried out by a qualified electrical engineer and in accordance with EU Directives and standards and in accordance with local laws and codes.
2. The electrical supply must include a properly designed protective earth system (PE).
3. The motor must be connected to protective earth at the terminal provided.
4. The control system must include short circuit protection and over current protection.
5. It is recommended to provide earth leakage protection, such as residual current device (RCD) or residual current circuit breaker (RCCB) to provide automatic disconnection from the power in the event of a fault.

## **Sound**

1. Sound levels generated by the fans can be harmful to hearing.
2. Never work around a fan whilst it is running.
3. If you need to be around the fan whilst it is running, wear suitable ear defenders.

## **Safe Maintenance**

1. The fan must always be LOCKED off to prevent inadvertent re-start when undertaking any maintenance.
2. Even when off, the fan wheel can free-wheel under air movement from outside or other fans attached to the same air space. To prevent injury, use a piece of timber to choc the wheel.
3. Remove wheel choc and replace all guards before re-starting.


### 3. Safety Decals

Below are the safety warning decals that should be fitted to the fan. These warn of residual risks and required safety measures and must remain intact, legible at all times. If any decals have become damaged or unreadable, please contact GSI or your dealer for free replacements.

#### International Decals



International, translated versions of the decals fitted to the equipment are available as part of the Language Pack that was supplied with the product. If you need further copies or a different language, please contact GSI or you dealer.

The international decals have been designed to be placed directly over the USA standard versions. Normally these will be factory fitted, but if you need to change them, please refer to the decal cross reference sheet, provided with the Language Pack and the decal locations given in the user's manual.



GSI Group 217-226-4421 DC-2262

**DC-2262**





GSI Group 217-226-4421 DC-2162

**DC-2162**




DC-2166

**DC-2166**



GSI Group 217-226-4421 DC-2163

**DC-2262 and DC- 2163 (Opposite side adjacent to motor.)**



DC-219

**DC-219**




AIRFLOW

CIRCULATION D'AIR

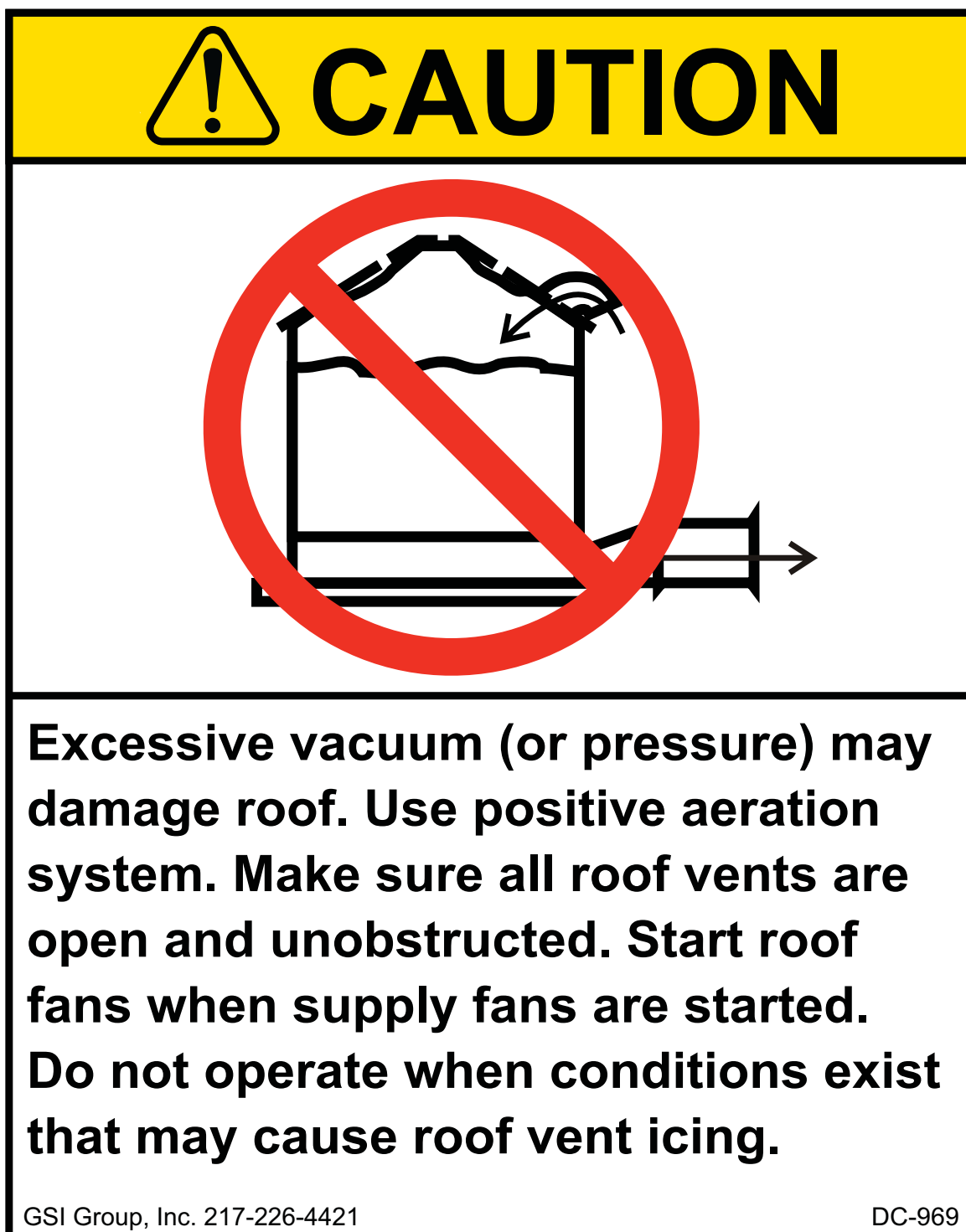
DC-1971

**DC-1971**



## Roof Damage Warning and Disclaimer

The manufacturer does not warrant any roof damage caused by excessive vacuum or internal pressure from fans or other air moving systems. Adequate ventilation and/or “makeup air” devices should be provided for all powered air handling systems. The manufacturer does not recommend the use of downward flow systems (suction). Severe roof damage can result from any blockage of air passages. Running fans during high humidity/cold weather conditions can cause air exhaust or intake ports to freeze.



Airflow

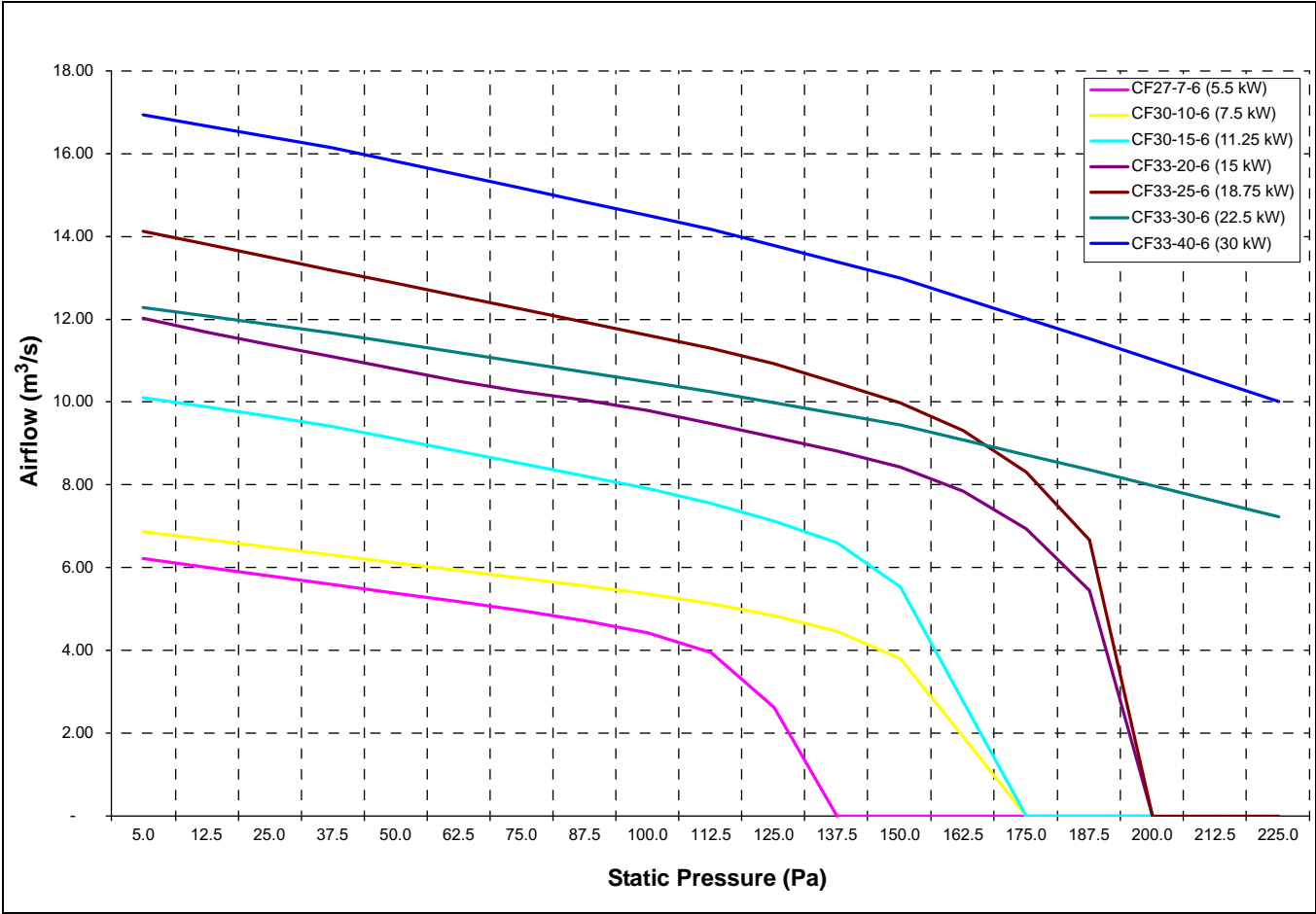
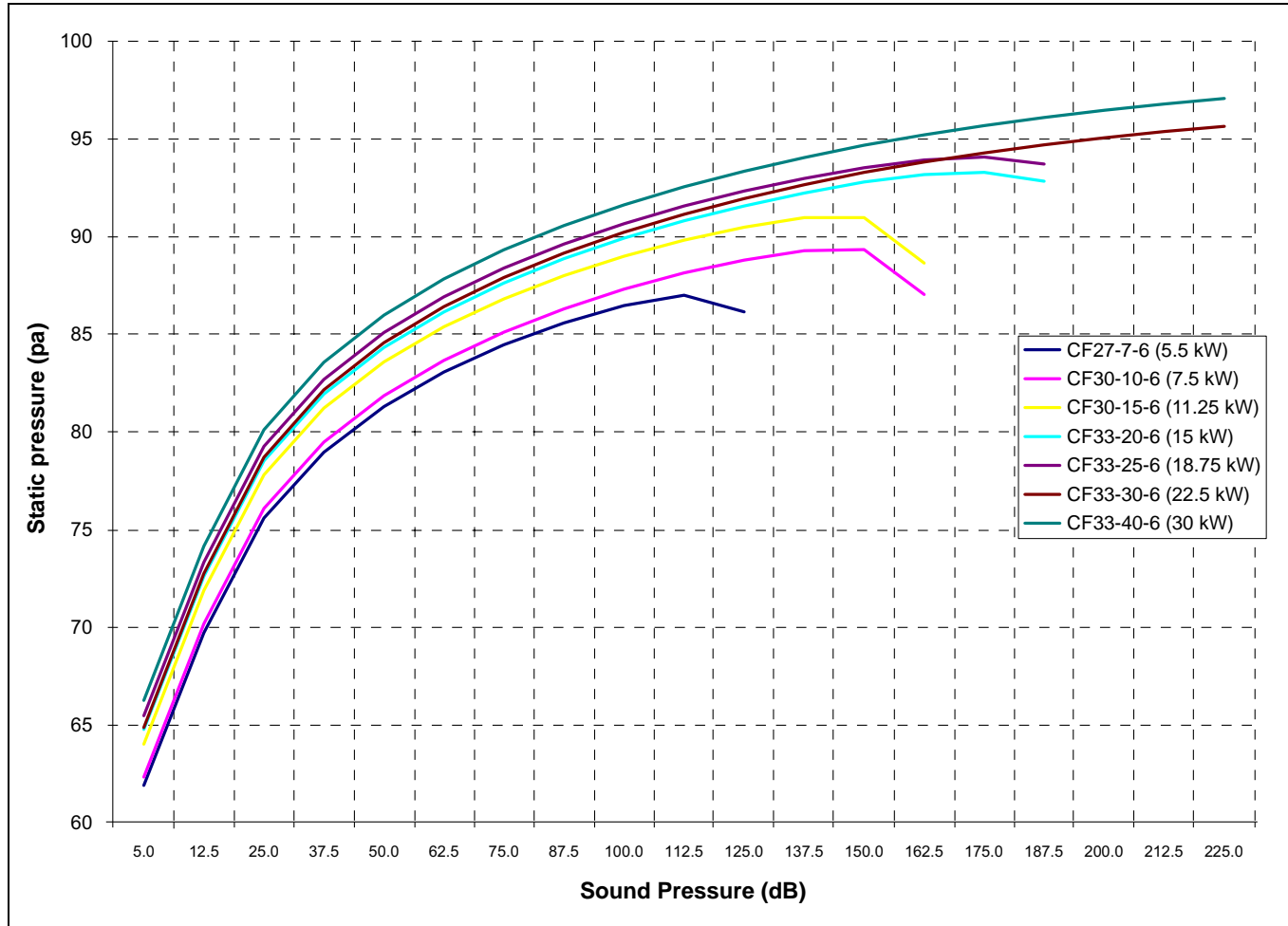


Figure 4A Centrifugal Fan Performance

## Sound



**Figure 4B** Centrifugal Fan Sound Curves (Calculated with Open Outlet)

Use the table [below](#) to determine the number of GSI roof vents (0.16 m<sup>2</sup> free area). Also minimum inlet area, for fans enclosed in a fan house:

### Minimum GSI Roof Vents per Fan

Fan Model	Maximum Airflow (m <sup>3</sup> /s)	Roof Vents	Inlet Area (m <sup>2</sup> )
CF27-7-6 (5.5 kW)	6.22	8	0.78
CF30-10-6 (7.5 kW)	6.87	8	0.86
CF30-15-6 (11.25 kW)	10.10	12	1.26
CF33-20-6 (15 kW)	12.02	15	1.50
CF33-25-6 (18.75 kW)	14.12	17	1.77
CF33-30-6 (22.5 kW)	12.28	15	1.54
CF33-40-6 (30 kW)	16.93	21	2.12

## 4. Fan Specifications

### Dimensions

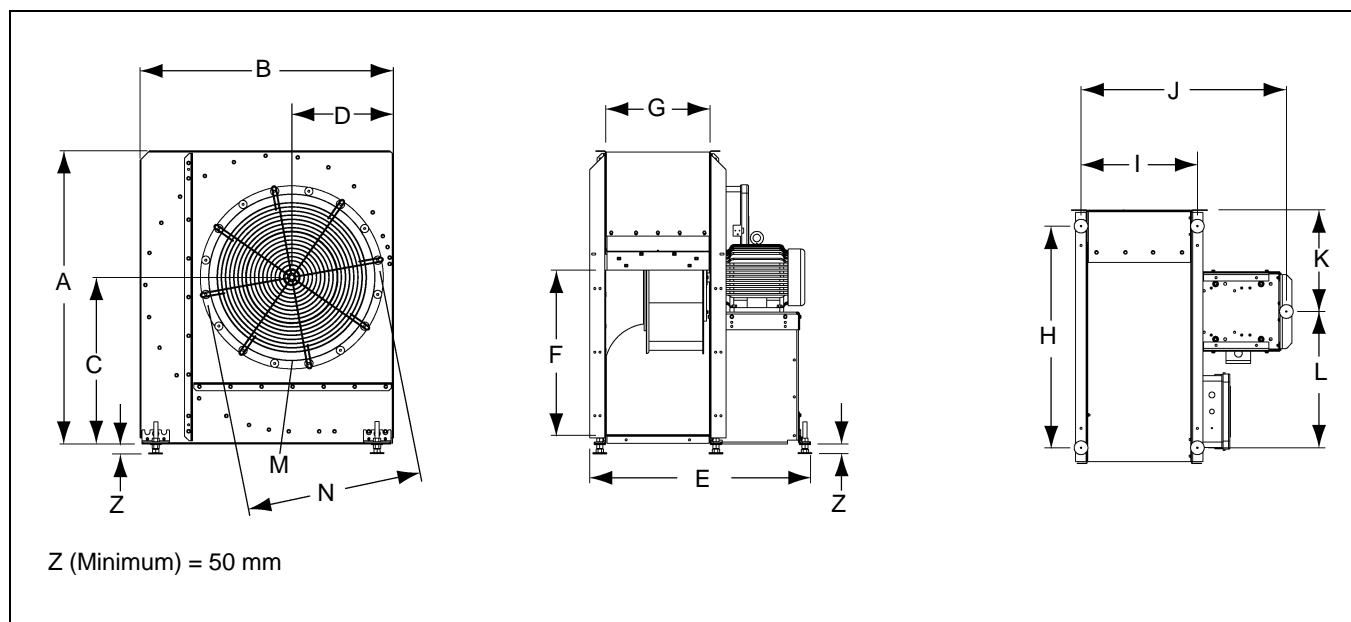


Figure 4C

Fan Dimensions (mm)

Fan	A	B	C	D	E	F	G	H	I	J	K	L	M	N
CF-3	1118	962	637	389	783	599	343	815	398	732	389	499	632	664
CF-5	1234	1067	704	433	881	692	362	918	418	827	433	558	695	740
CF-7.5	1234	1067	704	433	976	692	457	918	513	922	433	558	695	740
CF-10	1346	1167	765	468	981	759	443	1018	502	910	468	626	762	806
CF-15	1346	1167	765	468	1018	759	479	1018	539	947	468	626	762	806
CF-20	1496	1284	847	510	1154	845	497	1129	554	1090	510	693	854	892
CF-25	1496	1284	847	510	1213	845	556	1129	611	1146	510	693	854	892
CF-30	1636	1416	920	565	1211	845	556	1266	613	1149	567	776	927	975
CF-40	1636	1416	920	565	1257	845	602	1266	659	1195	567	776	927	975



## Mounting Flange Drillings

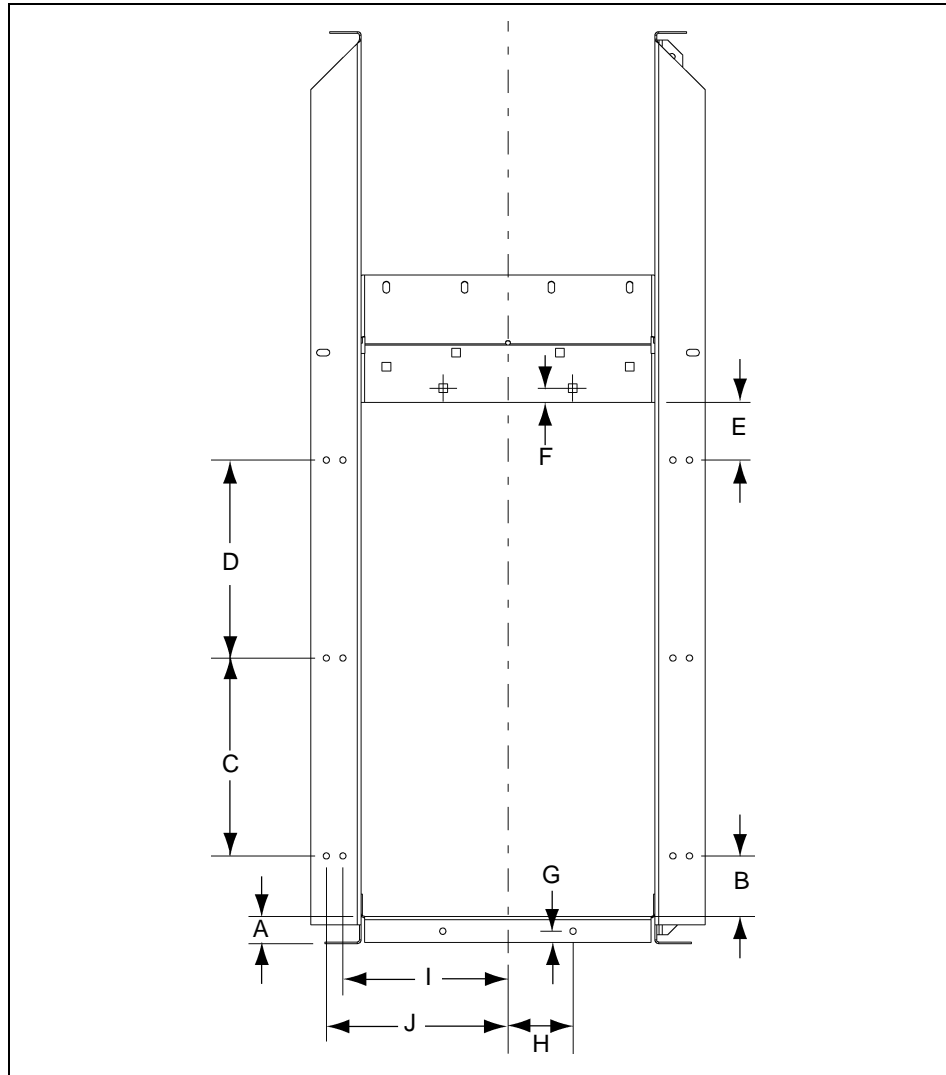


Figure 4D

### Mounting Flange Drillings

Fan	A	B	C	D	E	F	G	H	I	J
CF-3	39	119	150	150	180	28	22	61	199	***
CF-5	46	130	214	214	133	22	19	70	204	***
CF-7.5	46	130	214	214	133	22	19	95	252	***
CF-10	40	89	292	292	85	21	17	95	244	268
CF-15	40	89	292	292	85	21	17	146	262	287
CF-20	42	207	215	215	208	19	19	146	267	296
CF-25	42	207	215	215	208	19	19	146	296	325
CF-30	33	208	214	214	207	19	19	146	296	***
CF-40	33	208	214	214	207	19	19	146	319	***

## Fan Base Requirements

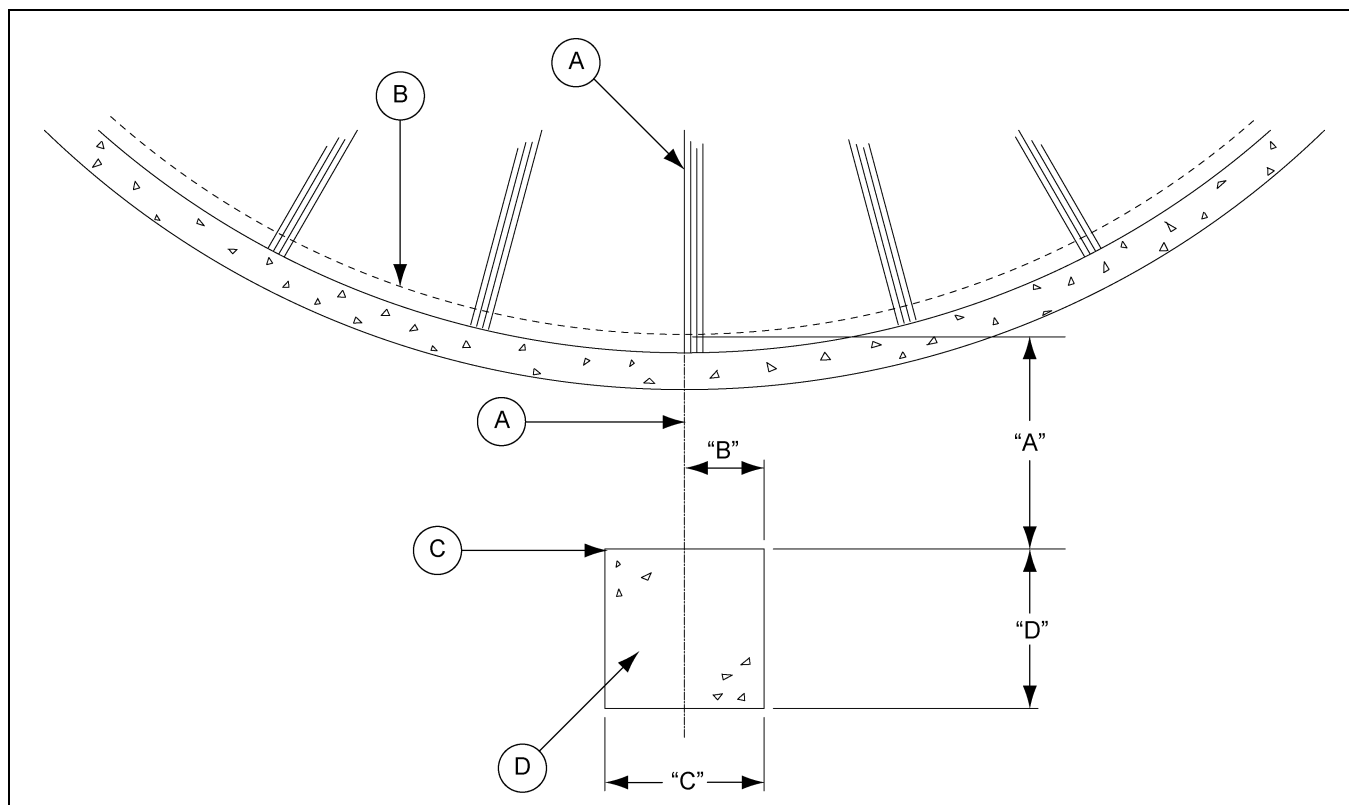


Figure 5A

Ref #	Description
A	Centerline of Bin
B	Bin Wall
C	Dimension from Sidewall
D	Fan Pad

**Fan Base Dimensions and Location per GSI Transition Duct (mm)**

Transition Duct	"A"	A with Heater	"B"	"C"	"D"
TR-4734	508	1118	254	1016	1016
TR-7048	1143	1753	254	1016	1219
TR-6918/TR-6919	813	1651	330	1219	1321
TR-7049	1143	1981	330	1219	1321
TR-6207	1067	1981	330	1219	1524
TR-6958	1397	2159	330	1219	1524
TR-6853	1372	2235	711	2540	1524
TR-4013	914	-	330	1219	1524
TR-6944	1219	-	330	1219	1524

## Fan Placement

1. Fan base must be flat and level to ensure smooth fan operation.
2. To connect the fan to the bin, a steel transition duct is required. Consult GSI or your dealer for the correct duct for the fan and bin.
3. Remove packaging materials and inspect fan for any shipping damages. Report these at once to the shipper.
4. Check all fasteners on the fan to make sure they are tight. (Fasteners may loosen during shipment.)
5. Tighten any loose fasteners, check for proper clearance and re-tighten.
6. Check all electrical connections that may have loosened during shipment.
7. Rotate the fan wheel. Wheel should rotate freely and should not make contact with the housing sides or inlet cone.
8. Place fan in proper location on the fan pad. Attach fan to transition duct and seal connection with caulk.
9. Check all joints and seams around the lower part of the bin. Verify that these are well sealed to prevent air leakage from the bin plenum. Inspect the transition duct as well. Seal any leaks that may be present to prevent air losses that reduce fan efficiency.
10. Level fan front to back and left to right with a spirit level. The legs should be adjusted so that, when level, all five (5) legs touch the pad. Fans not resting on support legs may have excess vibration which can lead to premature wear and tear on fan components.
11. Do not fix the fan to the base. Fix only to the transition duct.

## Electrical Installation

### 3 Phase Power Requirements

Fan Power (kW)	2.3	3.8	5.7	7.5	11.3	15	18.8	22.5	30
Voltage (V)									
380	4.7	7.7	11.6	15.2	22.9	30.4	38.1	45.6	60.8
400	4.5	7.4	11.0	14.5	21.8	28.9	36.2	43.4	57.8
415	4.3	7.1	10.6	14.0	21.0	27.9	34.9	41.8	55.7
440	4.1	6.7	10.0	13.2	19.8	26.3	32.9	39.4	52.5

Motor Current Requirements (A) (Check motor rating plate for precise details.)

**NOTE:** The *above* table does not allow for motor starting currents.

### Electrical Control System

Fans are supplied without any controls. A correctly designed control system is required. In particular:

1. Fan motor starter to minimize starting currents. (Check when ordering fan that the motor supplied is suitable for the chosen method of starting.)
2. For service and maintenance purposes, the equipment can be locked out with no risk if inadvertent re-start.

The following items are the minimum required when making electrical connections to the fan:

1. Main power supply with protective earth, over-current and short circuit protection.

2. Main electrical disconnect.



- a. Wired to disconnect all electrical power to the fan and other associated equipment.
- b. Lockable.

3. Service disconnect.



- a. Wired to break all electrical power to the fan motor.
- b. Lockable.

4. Emergency stop.



- a. Wired to stop the fan motor (and any other associated equipment) immediately when pressed.
- b. Must remain engaged until manually disengaged.

5. Start/Stop controls.



- a. Recessed start push button labelled 1.
- b. Non recessed stop push button labelled 0.
- c. Motor starter, short circuit protection and motor overload.
- d. Control must be designed to default to OFF after a power interruption. (Eg: Self maintained relay.)
- e. The fan MUST NOT be able to immediately re-start following re-establishment of power.

**NOTE:** *Electrical controls located on the side of the bin will be subject to significant water due to run-off from the roof during rain. These controls should be rated for out door use (minimum IP65) and will also benefit from being covered to protect from direct water.*

## Wiring Motor

- The motor may be 3, 6, 9 or 12 wire, with wires bundled loose inside the connection box.  
**NOTE:** 3 and 9 wire motors cannot be started 'star-delta'.
- Each wire is individually numbered.
- Refer to wiring schematic in table [below](#) or provided inside the motor terminal box for correct wiring. This will depend on the chosen starting method.
- Note that motors may be multi-voltage. Check motor rating plate for the required voltage.
- Ensure the motor is correctly connected to the protective earth (PE) system with the power supply. The earth terminal is inside the motor connection box.
- Make connections using connectors approved for use in the region, ensuring the connections are correct for the voltage and starting method.
- Check the full load current for the motor at the supply frequency and voltage and set the motor overload relay at or below this value.

**Motor Connections**

GSI Part #	Baldor Part #	Motor Power	380V 50 Hz "Star" Start Connections	380V 50 Hz "Delta" Run Connections
C-7947	36J719T043H2	5 HP/3.75 kW		
C-7948	37H493Y750H2	7.5 HP/5.6 kW		
C-7949	37H493Y749G1	10 HP/7.5 kW		
C-7950	07J256W746H2	15 HP/11.25 kW		
C-7951	09F388X724H2	20 HP/15 kW		
C-7952	10E978X150H2	25 HP/18.75 kW		
C-7953	10E978X177H2	30 HP/22.5 kW		
C-7954	12T036X152H2	40 HP/30 kW		
Swap any two (2) line connections to reverse motor direction.				

GSI Part #	Baldor Part #	Motor Power	415 V 50 Hz "Star" Start Connections	415 V 50 Hz "Delta" Run Connections
C-8539	10F973W708	30 HP/22.5 kW		
MTR-0138	07M080X657H2	15 HP/11.25 kW		
Swap any two (2) line connections to reverse motor direction.				

### Final Check

Ensure the power to the fan is OFF, LOCKED and TAGGED before final checks.



**Figure 5B**

1. Check the fan wheel can rotate freely and maintains an even gap to the inlet cone.
2. Check to make sure all safety guards are in place and not damaged. Replace damaged parts.
3. Check to make sure all decals are visible and not damaged. Replace damaged decals.
4. Check to make sure all control boxes are closed and no wiring is exposed.
5. With all guards fitted, start the fan to check correct impeller rotation. Check against rotation decal on inlet side of fan. Fan should rotate counterclockwise when viewed through the inlet guard.  
To reverse rotation, switch any 2 phases.

### Start-Up

1. Start the fan and allow it to run, checking for smooth, quiet running.
2. Check each phase with a meter for correct phase voltage and equal phase current.
3. Voltage drop at the motor should be no greater than 5% of nominal voltage.
4. Check the fan legs remain all in contact with the base and the lock nuts are tight.

1. Where the fan is out of use for long periods, GSI recommend running it for 20 minutes per month to help reduce pre-harvest service issues.
2. Do not allow debris to build-up on the impeller. If required, with the power LOCKED OFF remove the inlet guard and cone and clean the impeller.
3. Check the impeller for cracks or damage. A damaged impeller can run out of balance and result in wider damage to the fan, motor and bearings.
4. Check the grille over the cooling fan to the motor to ensure it remains clear.

## Lubrication and Bearings

Type of Annual Usage	1450 RPM - NEMA Frame Size			2900 RPM - NEMA Frame Size		
	Up to 280 incl.	Over 280 to 360 incl.	Over 360	Up to 280 incl.	Over 280 to 360 incl.	Over 360
Continuous Normal Duty *	9500 Hrs	7400 Hrs	3500 Hrs	3600 Hrs	2200 Hrs	2200 Hrs
Continuous Severe Duty **	4750 Hrs	3700 Hrs	1750 Hrs	1800 Hrs	1100 Hrs	1100 Hrs
Seasonal Service Motor (Idle 6 Months)	Grease at the Beginning of Season and then Follow the Interval above.					

- Use suitable high temperature roller bearing grease.
- Clean all grease fittings.

## Fan Wheel Removal and Refitting



***Always disconnect and lock out power before working on or around fan.***

## Fan Wheel Removal and Installation

The fan wheel is secured to the motor shaft by the use of a taper-lock bushing, motor shaft key and cap screws. The size, quantity and torque of cap screws required will depend on the model of the fan.



***Although the taper-lock method of retaining the wheel onto the motor shaft is very simple and obvious, it is essential that the following points be read carefully and fully understood, as improper installation can result in serious or fatal injury caused by a loose, fast flying wheel.***

***THREADED BUSHING HOLES: The threaded holes within the bushing are provided for disassembly purposes only. Do not attempt to use these holes for re-assembly, as they will not allow the parts to become locked onto the shaft, thereby causing an extremely hazardous operating condition.***

***CLEARANCE HOLES: When re-assembling parts, the cap screws must be installed through the UNTAPPED CLEARANCE HOLES to cause the wheel to be pulled forward onto the tapered bushing, thus locking the parts securely onto the motor shaft. Refer to [Step 4 on Page 24](#) (under installation section) for assembly details.***

### Removal

1. LOCK OUT THE MAIN POWER SUPPLY and remove the fan guard and inlet cone.
2. Remove the three (3) cap screws from the clearance holes in taper-lock bushing. Inspect for thread damage and set aside for later re-installation. (Do not use these bolts for [Step 3](#), bushing removal.)
3. Install two (2) grade 5 (or better) cap screws into the THREADED HOLES in the bushing and turn them in by hand until they bottom against the front surface of the wheel. These cap screws should not be used for re-assembly, as some thread distortion could occur during the removal operation. Grade 5 screws are marked with three (3) 120° spokes on the head and are more durable than low strength unmarked bolts.

**NOTE:** *Do not attempt to use low strength (unmarked) bolts to remove the bushing, as the bolts may break off.*

4. Block wheel to prevent it from turning and GRADUALLY TURN IN THE CAP SCREWS (up to 1/4 turn at time), until the wheel breaks loose from the bushing and motor shaft. Carefully remove bushing and wheel. (With the wheel free from the bushing, a wheel puller can be used to pull the bushing off of motor shaft, if required.) Re-attach bushing onto wheel to prevent the loss of parts and also to maintain the original alignment of bushing to wheel. Inspect wheel and bushing at this time, looking for any cracks, thread or bolt damage, warpage, etc. Consult the dealer or the factory for any questions concerning damage.

### Installation

1. Carefully clean motor shaft, key, bushing and bore of wheel. MAKE SURE MAIN POWER IS LOCKED OUT and that shaft and key are completely free of rust and burrs. DO NOT lubricate the bushing or cap screws. CHECK AND MAKE SURE ALL MOTOR MOUNT BOLTS ARE PROPERLY TIGHTENED. Before installing the wheel, check the following:
  - a. All foreign material should be removed from the wheel.
  - b. Carefully inspect the wheel weldment and hub casting for damage, cracks or other defects. Contact the factory if there is any question regarding the structural integrity of the wheel.
2. Slide wheel over motor shaft and locate it as far onto the motor shaft as possible.
3. Align the keyway in the bushing with the key and SLIDE bushing onto motor shaft. Do not attempt to drive the bushing onto the shaft, as it may damage the motor bearings.
4. Rotate the bushing and wheel so their key slots are in line and loosely attach the wheel to the bushing. MAKE SURE THE CAP SCREWS ARE INSERTED INTO THE UNTHREADED CLEARANCE HOLES IN THE BUSHING. Refer to previous CAUTION note [on Page 23](#). Locate the bushing so it is approximately flush with the end of motor shaft. Make certain that the proper cap screws are used for re-assembly and no damage has occurred to these screws during disassembly. Use only the special type bolts supplied with the original wheel.
5. Install inlet cone, checking clearance between fan wheel and inlet cone. Shift the location of inlet cone as required to center it in relation to the fan wheel, providing equal clearance completely around the fan wheel. Tighten inlet cone bolts.



- Slide the wheel forward onto the taper-lock bushing and turn the cap screws in by hand as far as possible.

**NOTE:** *The bushing must be located far enough forward so the wheel weldment does not strike cone as it rotates. Blade will move toward cone as it is tightened.*

- Use an INCH-POUNDS torque wrench and GRADUALLY TIGHTEN the three (3) cap screws (1/4 turn at a time) until the taper bushing becomes fully seated. Refer to [below](#) chart for recommended cap screw tightening torques. DO NOT EXCESSIVELY OVERTIGHTEN THE BUSHING.
- Turn wheel by hand and check it for freedom of rotation and uniform clearance around inlet cone before re-installing the fan guard.

## Fan Wheel Inspection and Maintenance

Pre-season inspections should be done on the fan wheel to look for the following.

- Any debris (stalks, bees wings, mud, insects and insect nests) accumulated on the surfaces of the fan wheel. Remove these items as they will likely disrupt airflow over the fan airfoils and can potentially cause vibration problems.
- Inspect the fan wheel for any broken, cracked or loose parts. Blade should NOT be operated with broken or loose parts. Contact dealer for determination of the repairs required.



***Do not attempt to pull the flange of the bushing flush with the wheel hub. A clearance of 1/8" to 1/4" must be maintained between bushing flange and wheel hub surface. Wheel will loosen and cause damage or injury.***

## Taper-Lock Bushing Torque Requirements

### Browning Taper-Lock Bushing Bolt Tightening Torque

Bushing Size	Hex Bolt Size	Torque (inch-lbs.)
P	5/16"-18 x 1-1/4"	192
Q	3/8"-16 x 1-1/2"	348

### Fan Motor Removal and Installation

In the event of motor failure, remove the motor, as described and take it to the nearest authorized service station. AUTHORIZED SERVICE STATIONS ARE THE ONLY PLACES THAT CAN PROVIDE MOTOR WARRANTY. Motor service and repair at other places will be at owner's expense. If service station determines motor failure to be caused by faulty material or workmanship, repair will be under warranty when within the warranty period. Motor failure because of external causes will result in a charge to the owner for repair.

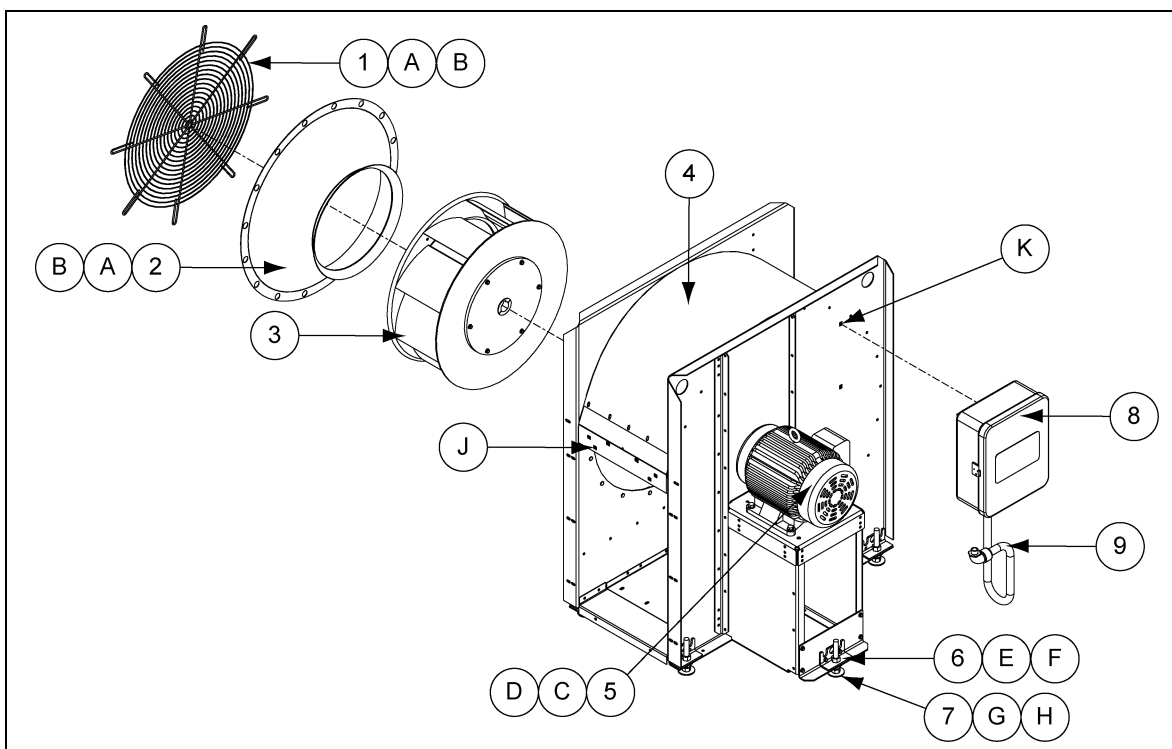
1. LOCK OUT THE MAIN POWER SUPPLY, then remove fan guard, inlet cone and wheel as outlined earlier.
2. Open motor junction box cover and disconnect the motor lead wires from within the box.

**NOTE:** *Tag, or otherwise identify wires for ease of reassembly.*

3. Remove motor mount bolts. If there are any shims between the motor and its base, note their locations so they can be properly installed during re-assembly.
4. Disconnect the motor end of the motor conduit, if required, then carefully pull conduit and wires through hole in the motor junction box. Remove motor. If motor requires service, take it to an authorized service station.
5. To re-install motor, slide onto motor base plate and replace shims (if required) between motor and base plate. Re-install motor mount bolts and washers and fully tighten them at this time. Re-install conduit and wires and carefully remake all electrical wiring connections.

**NOTE:** *Make sure to install and tighten the wheel in accordance with earlier instructions.*

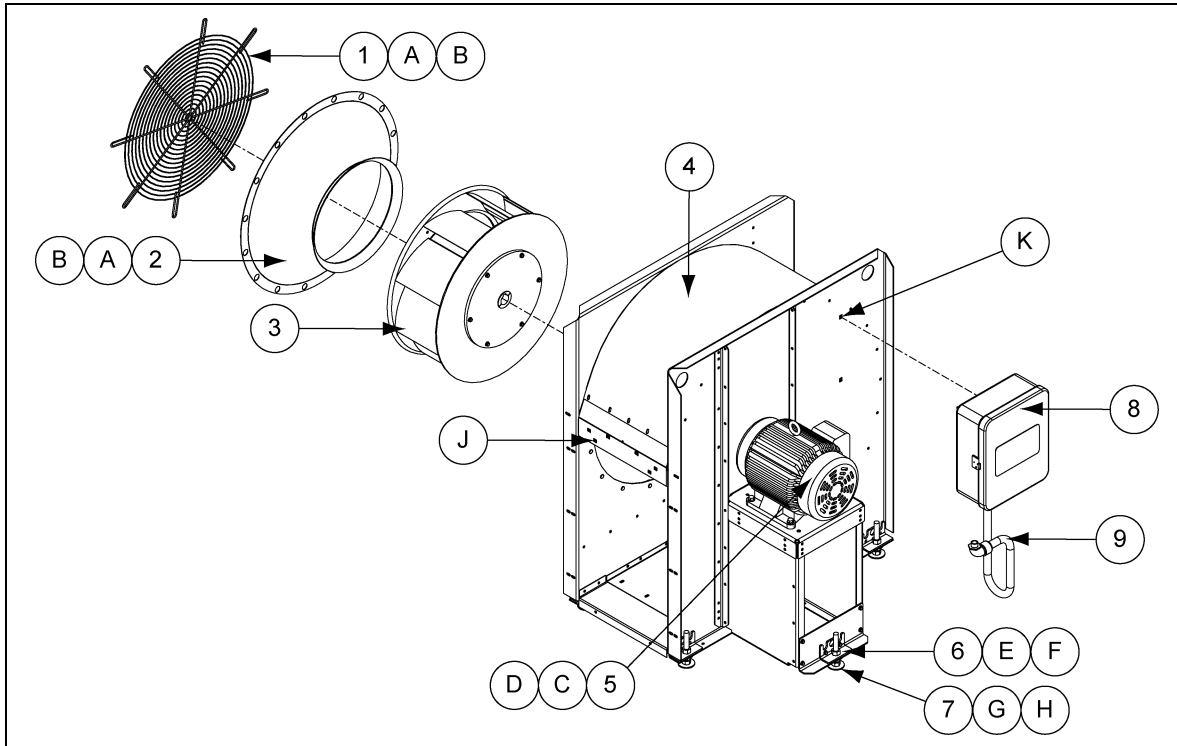
## 1450 RPM Centrifugal Fan Parts



CF-5-*G			
Ref #	Part #	Description	Qty
1	C-7747	Grill Guard	1
2	C-7749-Y	Inlet Cone - Painted	1
3	C-956	Blade and Hub Assembly	1
4	C-8114	Housing Assembly	1
5	C-7947	Motor - 3 Phase 380 Volt	1
5	NA	Motor - 3 Phase 415 Volt	-
6	C-8322	Leveling Leg Bracket	5
7	C-7519	Leveling Leg	5
8	NA	Control Box Assembly	-
9	NA	Conduit Assembly	-
A	S-968	Flange Nut 3/8"-16 ZN Grade 5	16
B	S-3671	Fender Washer 25/64" x 1-1/2" ZN	24
C	S-9064	Flange Bolt 3/8"-16 x 1-1/2" ZN Grade 5	4
D	S-968	Flange Nut 3/8"-16 ZN Grade 5	4
E	S-6606	Flange Bolt 5/16"-18 x 3/4" ZN Grade 5	10
F	S-3611	Flange Nut 5/16"-18 ZN YDP Grade 2	10
G	S-866	Flat Washer 3/4" USS ZN Grade 2	5
H	S-234	Hex Nut 3/4"-10 ZN Grade 5	10
J	090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN	2
K	090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN	2

CF27-7-*G			
Ref #	Part #	Description	Qty
1	C-7750	Grill Guard	1
2	C-7751-Y	Inlet Cone - Painted	1
3	C-8031	Blade and Hub Assembly	1
4	C-8093	Housing Assembly	1
5	C-7948	Motor - 3 Phase 380 Volt	1
5	NA	Motor - 3 Phase 415 Volt	-
6	C-8322	Leveling Leg Bracket	5
7	C-7519	Leveling Leg	5
8	NA	Control Box Assembly	-
9	NA	Conduit Assembly	-
A	S-968	Flange Nut 3/8"-16 ZN Grade 5	16
B	S-3671	Fender Washer 25/64" x 1-1/2" ZN	24
C	S-9064	Flange Bolt 3/8"-16 x 1-1/2" ZN Grade 5	4
D	S-968	Flange Nut 3/8"-16 ZN Grade 5	4
E	S-6606	Flange Bolt 5/16"-18 x 3/4" ZN Grade 5	10
F	S-3611	Flange Nut 5/16"-18 ZN YDP Grade 2	10
G	S-866	Flat Washer 3/4" USS ZN Grade 2	5
H	S-234	Hex Nut 3/4"-10 ZN Grade 5	10
J	090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN	2
K	090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN	2

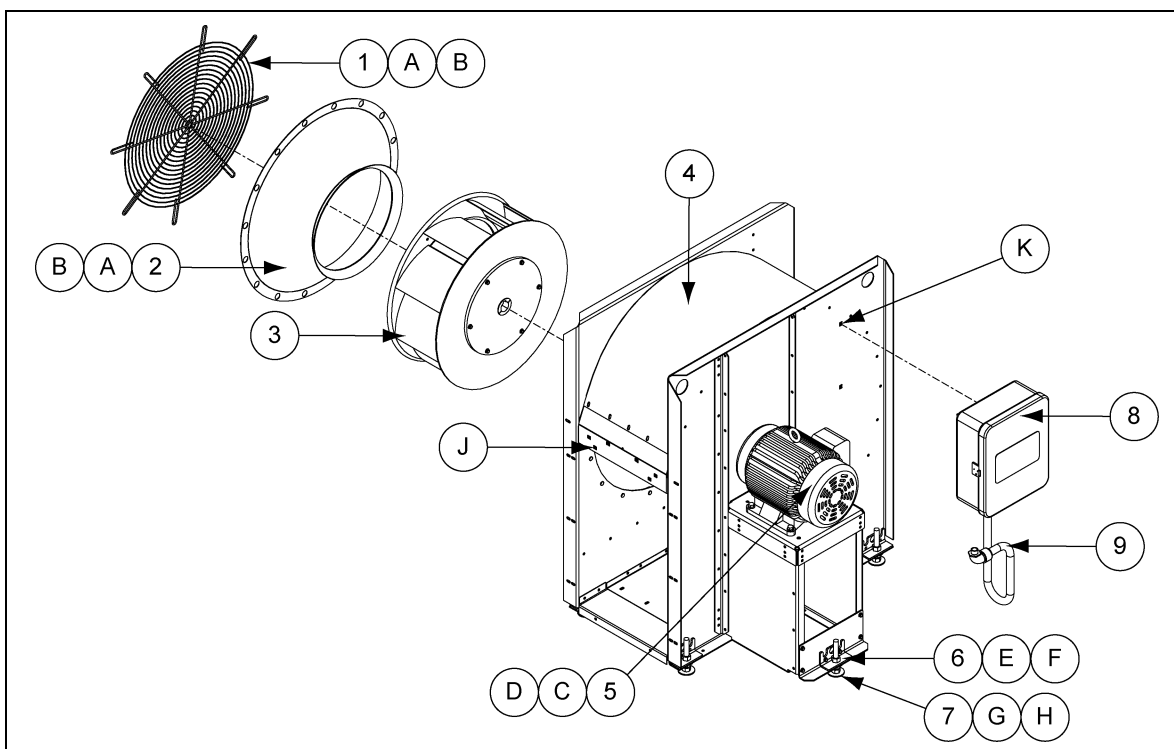
# 1450 RPM Centrifugal Fan Parts (Continued)



CF30-10-*G			
Ref #	Part #	Description	Qty
1	C-7752	Grill Guard	1
2	C-7753-Y	Inlet Cone - Painted	1
3	C-8032	Blade and Hub Assembly	1
4	C-8097	Housing Assembly	1
5	C-7949	Motor - 3 Phase 380 Volt	1
5	MTR-0137	Motor - 3 Phase 415 Volt	1
6	C-8322	Leveling Leg Bracket	5
7	C-7519	Leveling Leg	5
8	NA	Control Box Assembly	-
9	NA	Conduit Assembly	-
A	S-968	Flange Nut 3/8"-16 ZN Grade 5	16
B	S-3671s	Fender Washer 25/64" x 1-1/2" ZN	24
C	S-9064	Flange Bolt 3/8"-16 x 1-1/2" ZN Grade 5	4
D	S-968	Flange Nut 3/8"-16 ZN Grade 5	4
E	S-6606	Flange Bolt 5/16"-18 x 3/4" ZN Grade 5	10
F	S-3611	Flange Nut 5/16"-18 ZN YDP Grade 2	10
G	S-866	Flat Washer 3/4" USS ZN Grade 2	5
H	S-234	Hex Nut 3/4"-10 ZN Grade 5	10
J	090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN	2
K	090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN	2

CF30-15-*G			
Ref #	Part #	Description	Qty
1	C-7752	Grill Guard	1
2	C-7753-Y	Inlet Cone - Painted	1
3	C-7763	Blade and Hub Assembly	1
4	C-8096	Housing Assembly	1
5	C-7950	Motor - 3 Phase 380 Volt	1
5	MTR-0138	Motor - 3 Phase 415 Volt	1
6	C-8322	Leveling Leg Bracket	5
7	C-7519	Leveling Leg	5
8	NA	Control Box Assembly	-
9	NA	Conduit Assembly	-
A	S-968	Flange Nut 3/8"-16 ZN Grade 5	16
B	S-3671	Fender Washer 25/64" x 1-1/2" ZN	24
C	S-9064	Flange Bolt 3/8"-16 x 1-1/2" ZN Grade 5	4
D	S-968	Flange Nut 3/8"-16 ZN Grade 5	4
E	S-6606	Flange Bolt 5/16"-18 x 3/4" ZN Grade 5	10
F	S-3611	Flange Nut 5/16"-18 ZN YDP Grade 2	10
G	S-866	Flat Washer 3/4" USS ZN Grade 2	5
H	S-234	Hex Nut 3/4"-10 ZN Grade 5	10
J	090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN	2
K	090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN	2

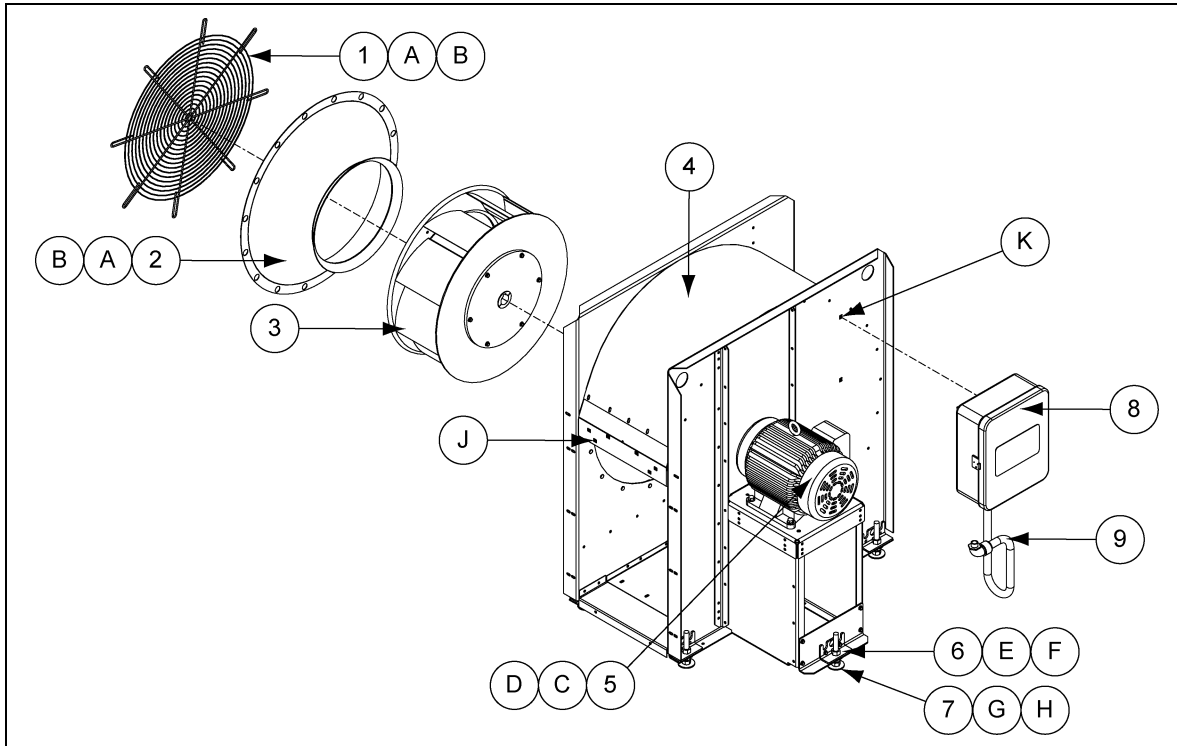
## 1450 RPM Centrifugal Fan Parts (Continued)



CF33-20-*G			
Ref #	Part #	Description	Qty
1	C-7752	Grill Guard	1
2	C-7754-Y	Inlet Cone - Painted	1
3	C-7818	Blade and Hub Assembly	1
4	C-8463	Housing Assembly	1
5	C-7951	Motor - 3 Phase 380 Volt	1
5	C-8460	Motor - 3 Phase 415 Volt	1
6	C-8322	Leveling Leg Bracket	5
7	C-7519	Leveling Leg	5
8	NA	Control Box Assembly	-
9	NA	Conduit Assembly	-
A	S-968	Flange Nut 3/8"-16 ZN Grade 5	16
B	S-3671	Fender Washer 25/64" x 1-1/2" ZN	24
C	S-9064	Flange Bolt 3/8"-16 x 1-1/2" ZN Grade 5	4
D	S-968	Flange Nut 3/8"-16 ZN Grade 5	4
E	S-6606	Flange Bolt 5/16"-18 x 3/4" ZN Grade 5	10
F	S-3611	Flange Nut 5/16"-18 ZN YDP Grade 2	10
G	S-866	Flat Washer 3/4" USS ZN Grade 2	5
H	S-234	Hex Nut 3/4"-10 ZN Grade 5	10
J	090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN	2
K	090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN	2

CF33-25-*G			
Ref #	Part #	Description	Qty
1	C-7752	Grill Guard	1
2	C-7754-Y	Inlet Cone - Painted	1
3	C-7827	Blade and Hub Assembly	1
4	C-8467	Housing Assembly	1
5	C-7952	Motor - 3 Phase 380 Volt	1
5	MTR-0139	Motor - 3 Phase 415 Volt	1
6	C-8322	Leveling Leg Bracket	5
7	C-7519	Leveling Leg	5
8	NA	Control Box Assembly	-
9	NA	Conduit Assembly	-
A	S-968	Flange Nut 3/8"-16 ZN Grade 5	16
B	S-3671	Fender Washer 25/64" x 1-1/2" ZN	24
C	S-9064	Flange Bolt 3/8"-16 x 1-1/2" ZN Grade 5	4
D	S-968	Flange Nut 3/8"-16 ZN Grade 5	4
E	S-6606	Flange Bolt 5/16"-18 x 3/4" ZN Grade 5	10
F	S-3611	Flange Nut 5/16"-18 ZN YDP Grade 2	10
G	S-866	Flat Washer 3/4" USS ZN Grade 2	5
H	S-234	Hex Nut 3/4"-10 ZN Grade 5	10
J	090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN	2
K	090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN	2

# 1450 RPM Centrifugal Fan Parts (Continued)



CF36-30-*G			
Ref #	Part #	Description	Qty
1	C-8318	Grill Guard	1
2	C-7927-Y	Inlet Cone - Painted	1
3	C-7928	Blade and Hub Assembly	1
4	C-8337	Housing Assembly	1
5	C-7953	Motor - 3 Phase 380 Volt	1
5	C-8539	Motor - 3 Phase 415 Volt	1
6	C-8322	Leveling Leg Bracket	5
7	C-7519	Leveling Leg	5
8	NA	Control Box Assembly	-
9	NA	Conduit Assembly	-
A	S-968	Flange Nut 3/8"-16 ZN Grade 5	16
B	S-3671	Fender Washer 25/64" x 1-1/2" ZN	24
C	S-9064	Flange Bolt 3/8"-16 x 1-1/2" ZN Grade 5	4
D	S-968	Flange Nut 3/8"-16 ZN Grade 5	4
E	S-6606	Flange Bolt 5/16"-18 x 3/4" ZN Grade 5	10
F	S-3611	Flange Nut 5/16"-18 ZN YDP Grade 2	10
G	S-866	Flat Washer 3/4" USS ZN Grade 2	5
H	S-234	Hex Nut 3/4"-10 ZN Grade 5	10
J	090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN	2
K	090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN	2

CF36-40-*G			
Ref #	Part #	Description	Qty
1	C-8318	Grill Guard	1
2	C-7927-Y	Inlet Cone - Painted	1
3	C-7929	Blade and Hub Assembly	1
4	C-8356	Housing Assembly	1
5	C-7954	Motor - 3 Phase 380 Volt	1
5	MTR-0140	Motor - 3 Phase 415 Volt	1
6	C-8322	Leveling Leg Bracket	5
7	C-7519	Leveling Leg	5
8	NA	Control Box Assembly	-
9	NA	Conduit Assembly	-
A	S-968	Flange Nut 3/8"-16 ZN Grade 5	16
B	S-3671	Fender Washer 25/64" x 1-1/2" ZN	24
C	S-9064	Flange Bolt 3/8"-16 x 1-1/2" ZN Grade 5	4
D	S-968	Flange Nut 3/8"-16 ZN Grade 5	4
E	S-6606	Flange Bolt 5/16"-18 x 3/4" ZN Grade 5	10
F	S-3611	Flange Nut 5/16"-18 ZN YDP Grade 2	10
G	S-866	Flat Washer 3/4" USS ZN Grade 2	5
H	S-234	Hex Nut 3/4"-10 ZN Grade 5	10
J	090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN	2
K	090-1709-6	Retainer Nut 5/16"-18 x 0.120" ZN	2

## GSI Group, LLC Limited Warranty

The GSI Group, LLC ("GSI") warrants products which it manufactures to be free of defects in materials and workmanship under normal usage and conditions for a period of 12 months after sale to the original end-user or if a foreign sale, 14 months from arrival at port of discharge, whichever is earlier. The end-user's sole remedy (and GSI's only obligation) is to repair or replace, at GSI's option and expense, products that in GSI's judgment, contain a material defect in materials or workmanship. Expenses incurred by or on behalf of the end-user without prior written authorization from the GSI Warranty Group shall be the sole responsibility of the end-user.

### Warranty Extensions:

The Limited Warranty period is extended for the following products:

	Product	Warranty Period	
<b>AP Fans and Flooring</b>	Performer Series Direct Drive Fan Motor	3 Years	* Warranty prorated from list price: 0 to 3 years - no cost to end-user 3 to 5 years - end-user pays 25% 5 to 7 years - end-user pays 50% 7 to 10 years - end-user pays 75%
	All Fiberglass Housings	Lifetime	
	All Fiberglass Propellers	Lifetime	
<b>Cumberland Feeding/Watering Systems</b>	Feeder System Pan Assemblies	5 Years **	** Warranty prorated from list price: 0 to 3 years - no cost to end-user 3 to 5 years - end-user pays 50%
	Feed Tubes (1-3/4" and 2.00")	10 Years *	
	Centerless Augers	10 Years *	
	Watering Nipples	10 Years *	
<b>Grain Systems</b>	Grain Bin Structural Design	5 Years	† Motors, burner components and moving parts not included. Portable dryer screens included. Tower dryer screens not included.
<b>Grain Systems Farm Fans Zimmerman</b>	Portable and Tower Dryers	2 Years	
	Portable and Tower Dryer Frames and Internal Infrastructure †	5 Years	

GSI further warrants that the portable and tower dryer frame and basket, excluding all auger and auger drive components, shall be free from defects in materials for a period of time beginning on the twelfth (12<sup>th</sup>) month from the date of purchase and continuing until the sixtieth (60<sup>th</sup>) month from the date of purchase (extended warranty period). During the extended warranty period, GSI will replace the frame or basket components that prove to be defective under normal conditions of use without charge, excluding the labor, transportation, and/or shipping costs incurred in the performance of this extended warranty.

### Conditions and Limitations:

THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE LIMITED WARRANTY DESCRIPTION SET FORTH ABOVE. SPECIFICALLY, GSI MAKES NO FURTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE IN CONNECTION WITH: (I) PRODUCT MANUFACTURED OR SOLD BY GSI OR (II) ANY ADVICE, INSTRUCTION, RECOMMENDATION OR SUGGESTION PROVIDED BY AN AGENT, REPRESENTATIVE OR EMPLOYEE OF GSI REGARDING OR RELATED TO THE CONFIGURATION, INSTALLATION, LAYOUT, SUITABILITY FOR A PARTICULAR PURPOSE, OR DESIGN OF SUCH PRODUCTS.

GSI shall not be liable for any direct, indirect, incidental or consequential damages, including, without limitation, loss of anticipated profits or benefits. The sole and exclusive remedy is set forth in the Limited Warranty, which shall not exceed the amount paid for the product purchased. This warranty is not transferable and applies only to the original end-user. GSI shall have no obligation or responsibility for any representations or warranties made by or on behalf of any dealer, agent or distributor.

GSI assumes no responsibility for claims resulting from construction defects or unauthorized modifications to products which it manufactured. Modifications to products not specifically delineated in the manual accompanying the equipment at initial sale will void the Limited Warranty.

This Limited Warranty shall not extend to products or parts which have been damaged by negligent use, misuse, alteration, accident or which have been improperly/inadequately maintained. This Limited Warranty extends solely to products manufactured by GSI.

Prior to installation, the end-user has the responsibility to comply with federal, state and local codes which apply to the location and installation of products manufactured or sold by GSI.

This equipment shall be installed in accordance with the current installation codes and applicable regulations, which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

G S I G R O U P



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