

CENTRIFUGAL FAN



Model Number

C15
C18
C22
C24
C27
C30
C33
C36


INSTALLATION & OPERATION MANUAL

**P/N 789842 Rev 0
EFFECTIVE DATE: 3/22/21**

CHIEF
AGRI

Trusted. Tested. True.

Installation Manual

 **WARNING:** Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

 **WARNING:** NOT SUITABLE FOR USE WITH SOLID-STATE SPEED CONTROLS.

 **AVERTISSEMENT:** NE CONVIENT PAS À DES RÉGULATEURS DE VITESSE À SEMICONDUCTEURS.

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Introduction

Thank you for purchasing a Caldwell Centrifugal Fan. Proper installation will ensure you the best overall experience with your fan and guarantee smooth operation. This manual is for the installation and operation of the Caldwell Centrifugal Fan that has been 100% factory quality control inspected, field simulated and stress tested prior to shipment.

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The technical data contained herein is the most recent available at the time of publication and is subject to modification without notice. Chief Industries, Inc. reserves the right to modify the construction and method of operation of their products at any time without any obligation on their part to modify any equipment previously sold and delivered.

Model Number Description

The fan model nomenclature distinguishes the application of the fan. The information includes a designation of the applicable fan and type of electrical installation utilized. The model number is stamped on the serial number plate and the definition of the model number nomenclature is as follows:

Example:	C	27	-	10	-	1	-	2
	(a)	(b)	-	(c)	-	(d)	-	(e)
(a)	C =	Centrifugal Fan Unit						
(b)	27 =	Fan Wheel Diameter						
(c)	10 =	Horsepower						
(d)	1 =	Motor Phase						
(e)	230 =	Motor Voltage						

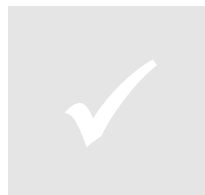
Packing List

The shipment should contain the following items. Verify and inspect all items carefully when unpacking and before installing. In case of any shortage, contact your dealer. In case of damage during shipment, file a claim with the carrier.

Quantity	Component	Description
1	Fan	Fan Assembly
1	Manual	Bulletin (441C)
1	Bolt Bag	Assembly
1	Motor Service	Motor Service Center Bulletin

Note: Before starting the installation of the fan, verify that all items called out on the packing list have been received.

Please note that this manual, part number 789842 includes and references Bulletin 441C. This manual is for the installation, operation and maintenance of fan models with serial numbers 21A and above, and is effective 03/22/2021.



Before You Begin

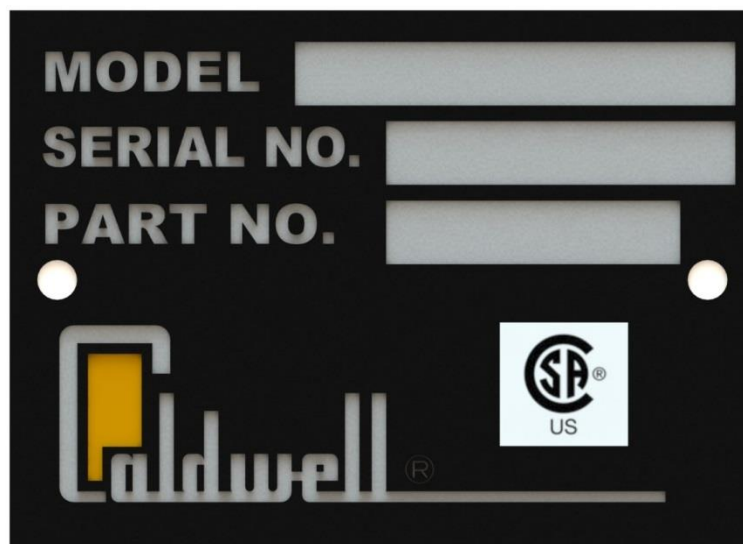
Read this manual thoroughly before operating this fan. Keep this manual in a location for quick access and reference.

Your Caldwell fan is designed for safe and reliable operation when properly installed. However the fan requires electricity, which when improperly installed or when operated improperly, can be potentially dangerous. Anyone who will operate this unit should read the manual before installing or operating this unit. The following table, provided for your convenience, will aid in verifying that these individuals understand the proper operation of the fan. After completely reading the manual, this table should be filled in.

Date	Operator Signature	Owner Signature

Special Service Note: If you are unable to remedy any service problem after thoroughly studying this manual, contact the dealer from whom you purchased the unit. Your dealer is your first line of service. The following information is required for service:

1. Fan model number: _____
2. Fan serial number: _____
3. Line Voltage Measured: _____
4. Approximate operating pressure: _____
5. Hours the unit has been in operation: _____
6. Diameter and eave height of bin: _____
7. Grain depth: _____
8. Type of grain stored: _____
9. Moisture content of the grain: _____
10. Dealer purchased from: _____
11. Dealer address and phone number: _____
12. Date purchased: _____
13. Service contractor:
 - a. Name: _____
 - b. Address: _____
 - c. Phone: _____



Safety and Precautions

Your safety and the safety of others is a primary concern to Chief Industries, Inc. This manual was written to assist in the safe installation and operation of the Caldwell Fan.

It is your responsibility as the owner, builder, operator, or supervisor to know what specific requirements, precautions and hazards exist and to make these known to all personnel working with equipment or on the jobsite so that they can observe any necessary safety precautions.

All personnel, including the installation crew, must read and understand the information contained in this manual before starting construction. Chief Industries, Inc. is not responsible or liable for the misuse of equipment or operation of personnel or equipment in an unsafe manner.

Chief Industries, Inc. assumes no liability with respect to proper construction and inspection, assembly, or use of its products established under applicable laws, all of which is the sole responsibility of the purchaser and those authorized for the installation.

Follow all local and federal safety laws and regulations. Verify that all equipment and personnel conform to any applicable jurisdiction regulations.

Work Area Safety Statement

To ensure the safety of all individuals in the work area, only authorized and trained persons shall install, maintain and use the Caldwell Fan.

Under no circumstances should unauthorized individuals be allowed to trespass or be present in the work area.

It shall be the duty of all operators to ensure that the work area is clean, organized and kept free of all debris and tools that might cause an accidental tripping or falling hazard.

Special care should be taken when working from unsafe heights. Common sense dictates that when conditions such as rain or wind prohibit the safe use of equipment, the installation be discontinued.

Chief Industries, Inc. strongly recommends that equipment meeting the current specifications be used, whether the individual operator is required by law to do so or not. Proper climbing equipment and a secured safety harness should be used at all times when performing operations work, installation or maintenance.

Field modifications without the authorization of the manufacturer may present unknown dangers to the operator and must be avoided.

Auxiliary Equipment Safety

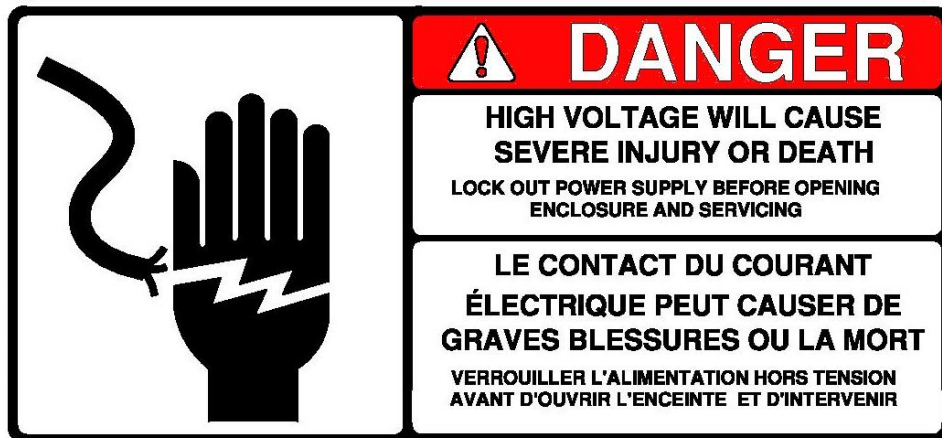
You may decide to purchase and install “auxiliary equipment” made by other manufacturers. Chief Industries, Inc. has no control over the design and manufacture of this equipment. In view of this, at a minimum, we suggest you do the following:

1. Obtain, read and understand the instructions and safety cautions of the auxiliary equipment manufacturer. Be certain that all equipment is installed in agreement with those instructions.
2. Check with Chief Industries, Inc. to verify that your system is designed to support any additional loads supplied by the auxiliary equipment.
3. Obtain any applicable safety decals from the manufacturer and make certain they are displayed in a visible location.
4. Make certain that all electrical equipment is properly installed and grounded by a qualified electrician.
5. Check availability and operation of electrical lock out and emergency stop systems.
6. Be certain that all guards and shields are securely in place.
7. Store all operation / maintenance manuals in a safe place for future use.

Fan Safety

Before operating the unit, perform the following checks:

1. Verify the fan and transition units are bolted securely together. Verify the screen guard is secured in place.
2. Verify the units are wired in compliance with the national electrical code, and the ground wire is of sufficient size to provide lightening protection.
3. Provide sufficient bin exhaust vents or fans, and verify that they are open and operational before starting the drying system. These vents or fans are necessary to provide an exhaust path for moisture laden air (reducing condensation), and also to prevent pressurization of the bin above the grain mass and causing damaging loads on the bin and roof structure. Do not operate units when conditions are such that freezing of the vents could occur.
 - a. Heed the following warnings:

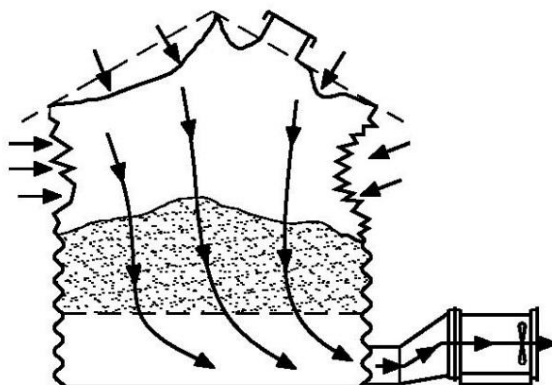


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WARNING



TO PREVENT ROOF AND WALL DAMAGE OF STRUCTURE

- 1.) USE POSITIVE AERATION SYSTEM (PUSH SYSTEM)
- 2.) MAKE SURE ALL ROOF VENTS ARE SIZED PROPERLY, OPEN, AND UNOBSTRUCTED.
- 3.) IF USING ROOF EXHAUST FANS, WIRE ROOF AND SUPPLY FANS TO START SIMULTANEOUSLY OR MAKE SURE ROOF FANS ARE STARTED WHEN SUPPLY FANS ARE STARTED.
- 4.) DO NOT OPERATE YOUR AERATION SYSTEM WHEN CONDITIONS EXIST THAT MAY CAUSE ROOF VENT ICING.

(VENT ICING CAN OCCUR WHEN AMBIENT AIR TEMPERATURE IS BELOW 35° (2°C) AND AIR RELATIVE HUMIDITY IS 90% AND ABOVE. FOR ANY QUESTION AS TO POSSIBLE ICING CONDITIONS, SHUT DOWN THE SYSTEM AND CONTACT YOUR LOCAL WEATHER SERVICE.)

DETERMINE THE AIR FLOW FROM FAN PERFORMANCE CHARTS AT FREE AIR AND PROVIDE VENTS ACCORDING TO CHART (A).

CONSULT YOUR CALDWELL EQUIPMENT DEALER FOR AID IN SIZING POWER EXHAUST FANS AND / OR ROOF VENTS.

CHART (A)	
BIN VENT	CFM
LOW PROF	2670
HGBV - 1.75	2670
BBV - 19	3000

740969

Fan and Control Enclosure Components

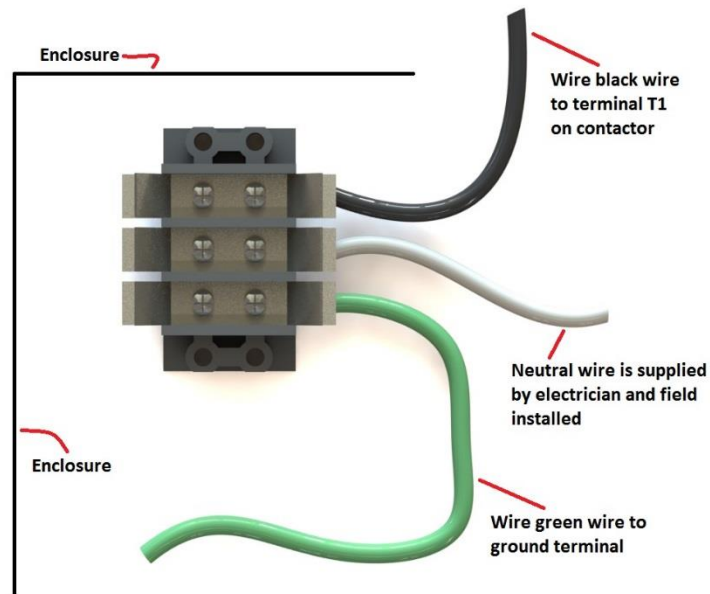
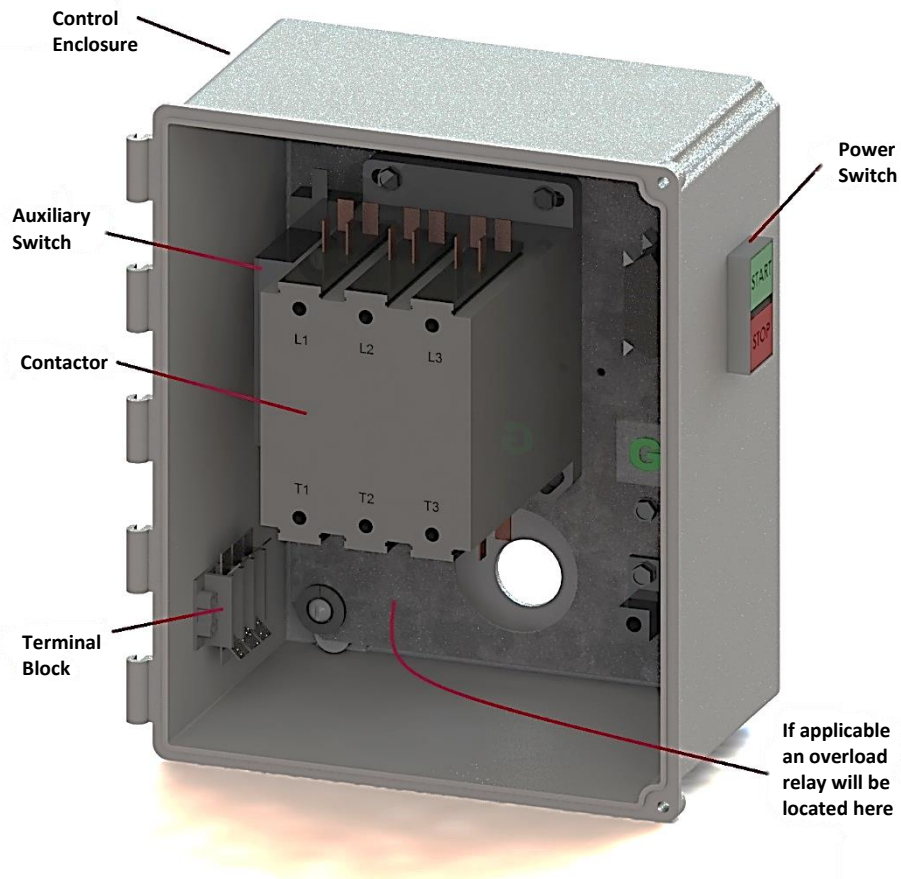
The following outlines the accessories, general components and replacement part numbers for the Caldwell fan models.

Accessories:

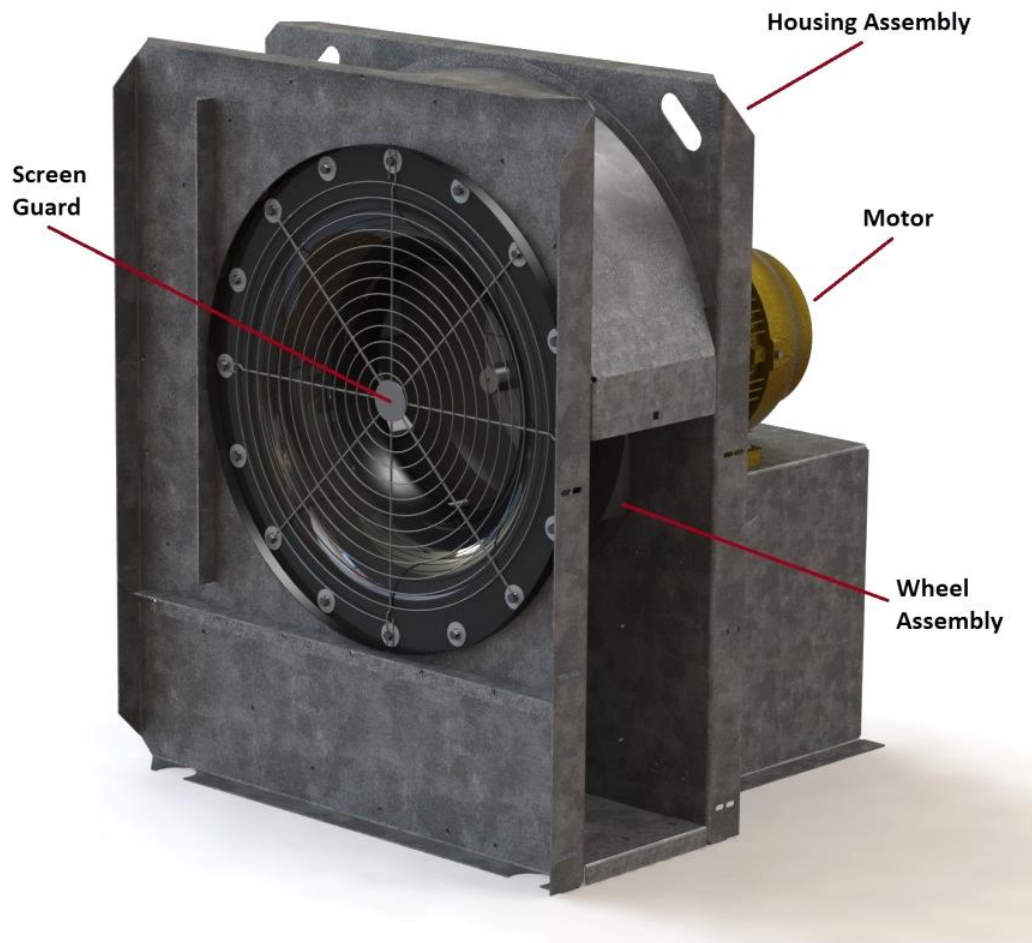
1. A humidistat is available to cycle the fan according to ambient relative humidity conditions. The humidistat (#9736280) can be used with any fan that has 230 volt magnetic controls.
2. A Caldwell heater is available for most fans. The gas fired heater is used when a large temperature rise is required. The gas fired heater is a direct combustion unit and should not be used in inhabited areas.
3. Electric humidity controllers are available for most fans. The humidity controller will supply a small amount of heat to lower the relative humidity of the drying air to aid in conditioning of the grain.
4. Rain hoods are available to reduce precipitation from entering the fan.
5. When centrifugal fans are used in a negative pressure (pull) system, outlet safety guards are available to guard against contact with the centrifugal wheel.

Explanation of Components:

Please note the location and general description of the primary components and their function.

Control Enclosure Components:

Fan Body Components:



An overview of components is as follows:

1. **Push Switch (#710988)** - The push switch is the fan "On" and "Off" switch.
2. **Wheel Assembly** – Components that provide a large volume of airflow. This assembly is composed of rotating blades connected to a hub and shaft and is driven by an electric motor.
3. **Control Enclosure** - The weather proof enclosure to provide protection for the electrical components.
4. **Contactor** - The electrically controlled contactor used for energizing the drive motor.
 - a. **Overload Relay for fans without internal thermal protection included in the fan motor.**

Terminal Block 3 POLE (#850255) - This terminal block is used as a junction block on some 230 volt fans designed to interlock an accessory device with a 115 volt control.

Replacement Parts for Specific Models:

FAN	CONTROL ENCLOSURE	CONTROL ENCLOSURE COVER	MAGNETIC CONTACTOR	OVERLOAD RELAY
1750 RPM Model				
C22-312	700984	-	848420	848787
C22-332	700984	-	848420	848613
C22-334	700984	-	848438	848779
C22-335	700984	-	848404	848688
C24-512	700984	-	848096	-
C24-532	700984	-	848013	-
C24-534	700984	-	848021	-
C24-535	700984	-	848404	-
C24-712	700984	-	848154	-
C24-732	700984	-	848013	-
C24-734	700984	-	848021	-
C24-735	700984	-	848404	848613
C27-1012	700984	-	848195	-
C27-1032	700984	-	848112	-
C27-1034	700984	-	848063	-
C27-1035	700984	-	848404	848639
C27-1512	700984	-	848211	-
C27-1532	700984	-	848203	-
C27-1534	700984	-	848120	-
C27-1535	700984	-	848404	848639
C30-2012	-	-	-	-
C30-2032	700984	-	848203	-
C30-2034	700984	-	848120	-
C30-2035	700984	-	848404	848647
C30-2532	700984	-	848229	-
C30-2534	700984	-	848170	-
C30-2535	700984	-	848412	848761

FAN	CONTROL ENCLOSURE	CONTROL ENCLOSURE COVER	MAGNETIC CONTACTOR	OVERLOAD RELAY
1750 RPM Model (cont'd)				
C33-1532	700984	-	848203	-
C33-1534	700984	-	848120	-
C33-1535	700984	-	848404	848639
C33-2032	700984	-	848203	-
C33-2034	700984	-	848120	-
C33-2035	700984	-	848404	848647
C33-3032	9744169	9744201	848553	848754
C33-3034	9701268	9719401	848503	848670
C33-3035	9701268	9719401	848488	848670
C33-4032	9744169	9744201	848582	848720
C33-4034	9701268	9719401	848537	848662
C33-4035	9701268	9719401	848511	848696
C33-5032	9744169	9744201	848592	848720
C33-5034	9744169	9744201	848561	848738
C33-5035	9701268	9719401	848545	848662
C33-6032	9744169	9744201	851061	850198
C33-6034	9744169	9744201	848561	848754
C33-6035	9744169	9744201	848579	848738
C36-3032	9744169	9744201	848553	848754
C36-3034	9701268	9719401	848503	848670
C36-3035	9701268	9719401	848488	848670
C36-4032	9744169	9744201	848582	848720
C36-4034	9701268	9719401	848537	848662
C36-4035	9701268	9719401	848511	848696
C36-5032	9744169	9744201	848592	848720
C36-5034	9744169	9744201	848561	848738
C36-5035	9701268	9719401	848545	848662
C36-6032	9744169	9744201	851061	850198
C36-6034	9744169	9744201	848561	848754
C36-6035	9744169	9744201	848579	848738
C36-7532	9774570	9774604	766865	-
C36-7534	9744169	9744201	848584	848712
C36-7535	9744169	9744201	848583	848828
C36-10032	9774570	9774604	848597	848811
C36-10034	9744169	9744201	848594	848720
C36-10035	9744169	9744201	848583	848828

FAN	HOUSING	BLADE	INLET ORIFICE	SCREEN GUARD
1750 RPM Model				
C22-312	9102105	765867	9743187	9706133
C22-332	9102105	765867	9743187	9706133
C22-334	9102105	765867	9743187	9706133
C22-335	9102105	765867	9743187	9706133
C24-512	9124020	734582	9734525	9706141
C24-532	9119941	734582	9734525	9706141
C24-534	9119941	734582	9734525	9706141
C24-535	9119941	734582	9734525	9706141
C24-712	9118738	743492	9734525	9706141
C24-732	9118738	743492	9734525	9706141
C24-734	9118738	743492	9734525	9706141
C24-735	9118738	743492	9734525	9706141
C27-1012	9283234	715144	9701219	9706141
C27-1032	9283234	715144	9701219	9706141
C27-1034	9283234	715144	9701219	9706141
C27-1035	9283234	715144	9701219	9706141
C27-1512	9283333	715151	9701219	9706141
C27-1532	9283333	715151	9701219	9706141
C27-1534	9283333	715151	9701219	9706141
C27-1535	9283333	715151	9701219	9706141
C30-2012	9295154	715169	9701243	9706158
C30-2032	9275560	715169	9701243	9706158
C30-2034	9275560	715169	9701243	9706158
C30-2035	9275560	715169	9701243	9706158
C30-2532	9101215	725929	9701243	9706158
C30-2534	9101215	725929	9701243	9706158
C30-2535	9101215	725929	9701243	9706158

FAN	HOUSING	BLADE	INLET ORIFICE	SCREEN GUARD
1750 RPM Model (cont'd)				
C33-1532	9178546	178597	9745752	9706158
C33-1534	9178546	178597	9745752	9706158
C33-1535	9178546	178597	9745752	9706158
C33-2032	9789651	787028	9745752	9706158
C33-2034	9789651	787028	9745752	9706158
C33-2035	9789651	787028	9745752	9706158
C33-3032	9261495	745844	9745752	9706158
C33-3034	9261495	745844	9745752	9706158
C33-3035	9261495	745844	9745752	9706158
C33-4032	9280578	766543	9745752	9706158
C33-4034	9280578	766543	9745752	9706158
C33-4035	9280578	766543	9745752	9706158
C33-5032	9284687	748343	9745752	9706158
C33-5034	9284687	748343	9745752	9706158
C33-5035	9284687	748343	9745752	9706158
C33-6032	9284689	766709	9745752	9706158
C33-6034	9284689	766709	9745752	9706158
C33-6035	9284689	766709	9745752	9706158
C36-3032	9769219	198272	9767624	9706158
C36-3034	9769219	198272	9767624	9706158
C36-3035	9769219	198272	9767624	9706158
C36-4032	9769225	765420	9767624	9706158
C36-4034	9769225	765420	9767624	9706158
C36-4035	9769225	765420	9767624	9706158
C36-5032	9769212	286575	9767624	9706158
C36-5034	9769212	286575	9767624	9706158
C36-5035	9769212	286575	9767624	9706158
C36-6032	9769230	767749	9767624	9706158
C36-6034	9769230	767749	9767624	9706158
C36-6035	9769230	767749	9767624	9706158
C36-7532	9769235	767582	9767624	9706158
C36-7534	9769235	767582	9767624	9706158
C36-7535	9769235	767582	9767624	9706158
C36-10032	9769240	767608	9767624	9706158
C36-10034	9769240	767608	9767624	9706158
C36-10035	9769240	767608	9767624	9706158

FAN	CONTROL ENCLOSURE	CONTROL ENCLOSURE COVER	MAGNETIC CONTACTOR	OVERLOAD RELAY
3500 RPM Model				
C15-312	700984	-	848420	848787
C15-332	700984	-	848420	848613
C15-334	700984	-	848438	848779
C15-335	700984	-	848404	848688
C15-512	700984	-	848446	848795
C15-532	700984	-	848420	848639
C15-534	700984	-	848438	848605
C15-535	700984	-	848404	848605
C18-512	700984	-	848446	848795
C18-532	700984	-	848420	848639
C18-534	700984	-	848438	848605
C18-535	700984	-	848404	848605
C18-712	9701268	9719393	848495	848746
C18-732	700984	-	848420	848647
C18-734	700984	-	848438	848621
C18-735	700984	-	848404	848613
C18-1012	9701268	9719393	848529	848803
C18-1032	700984	-	848446	848761
C18-1034	700984	-	848438	848639
C18-1035	700984	-	848404	848639
C18-1532	9701268	9719401	848495	848696
C18-1534	700984	-	848438	848647
C18-1535	700984	-	848404	848639
C18-2532	9744169	9744201	848553	848738
C18-2534	9701268	9719401	848470	848670
C18-2535	700984	-	848412	848761
C22-712	9701268	9713393	848495	848746
C22-732	700984	-	848420	848647
C22-734	700984	-	848438	848621
C22-735	700984	-	848404	848613
C22-1532	9701268	9719401	848495	848696
C22-1534	700984	-	848438	848647
C22-1535	700984	-	848404	848639
C22-2032	9701268	9719401	848529	848662
C22-2034	700984	-	848454	848761
C22-2035	700984	-	848404	848647
C22-2532	9744169	9744201	848553	848738
C22-2534	9701268	9719401	848470	848670
C22-2535	700984	-	848412	848761
C22-3032	9744169	9744201	848553	848754
C22-3034	9701268	9719401	848503	848670
C22-3035	9701268	0719401	848488	848670

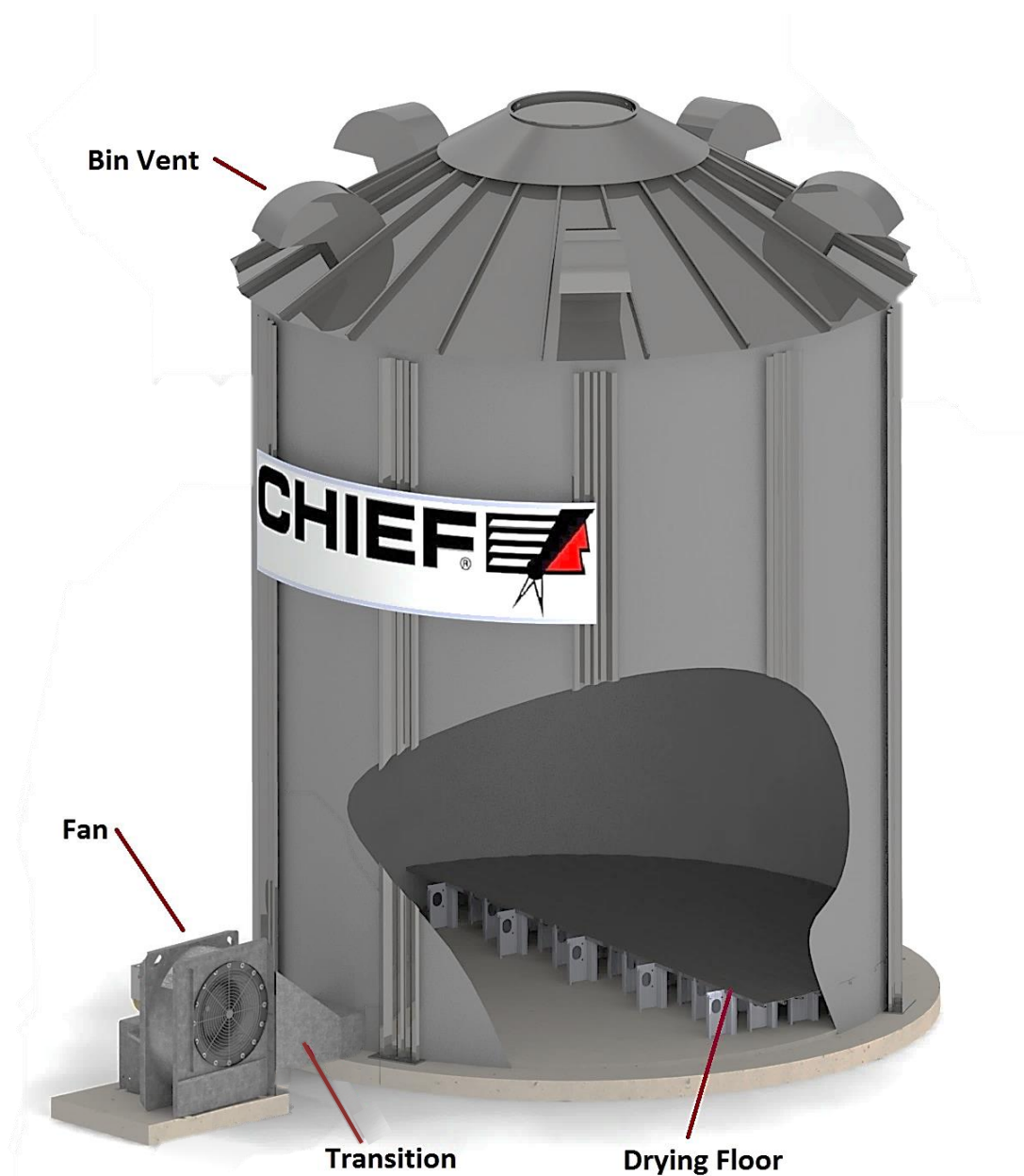
FAN	CONTROL ENCLOSURE	CONTROL ENCLOSURE COVER	MAGNETIC CONTACTOR	OVERLOAD RELAY
3500 RPM Model (cont'd)				
C22-4032	9744169	9744201	848582	848720
C22-4034	9701268	9719401	848537	848662
C22-4035	9701268	9719401	848511	848696
C22-5032	9744169	9744201	848592	848720
C22-5034	9744169	9744201	848561	848738
C22-5035	9701268	9719401	848545	848662
C22-6032	9744169	9744201	851061	850198
C22-6034	9744169	9744201	848561	848754
C22-6035	9744169	9744201	848579	848738
C24-1032	700984	-	848446	848761
C24-1034	700984	-	848438	848639
C24-1035	700984	-	848404	848621
C24-1532	9701268	9719401	848495	848696
C24-1534	700984	-	848438	848647
C24-1535	700984	-	848404	848639
C24-2032	9701268	9719401	848529	848662
C24-2034	700984	-	848454	848761
C24-2035	700984	-	848404	848647
C24-2532	9744169	9744201	848553	848738
C24-2534	9701268	9719401	848470	848670
C24-2535	700984	-	848412	848761
C24-3032	9744169	9744201	848553	848754
C24-3034	9701268	9719401	848503	848670
C24-3035	9701268	9719401	848488	848670
C24-4032	9744169	9744201	848532	848720
C24-4034	9701268	9719401	848537	848662
C24-4035	9701268	9719401	848511	848696
C24-5032	9744169	9744201	848592	848720
C24-5034	9744169	9744201	848561	848738
C24-5035	9701268	9719401	848545	848662
CG27-5032	9744169	9744201	848592	848720
CG27-5034	9744169	9744201	848561	848738
CG27-5035	9701268	9719401	848545	848662
CG27-6032	9744169	9744201	851061	850198
CG27-6034	9744169	9744201	848561	848754
CG27-6035	9744169	9744201	848579	848738
CG27-7532	9774570	9774604	766865	-
CG27-7534	9744169	9744201	848584	848712
CG27-7535	9744169	9744201	848583	848828
CG27-10032	9744570	9774604	848597	848811
CG27-10034	9744169	9774201	848594	848720
CG27-10035	9744169	9774201	848583	848828

FAN	HOUSING	BLADE	INLET ORIFICE	SCREEN GUARD
3500 RPM Model				
C15-312	9115570	760066	9757559	9706086
C15-332	9115570	760066	9757559	9706086
C15-334	9115570	760066	9757559	9706086
C15-335	9115570	760066	9757559	9706086
C15-512	9115588	756924	9757559	9706086
C15-532	9115588	756924	9757559	9706086
C15-534	9115588	756924	9757559	9706086
C15-535	9115588	756924	9757559	9706086
C18-512	9262303	243550	9723288	9706133
C18-532	9262303	243550	9723288	9706133
C18-534	9262303	243550	9723288	9706133
C18-535	9262303	243550	9723288	9706133
C18-712	9115983	756932	9723288	9706133
C18-732	9115983	756932	9723288	9706133
C18-734	9115983	756932	9723288	9706133
C18-735	9115983	756932	9723288	9706133
C18-1012	9115748	725903	9723288	9706133
C18-1032	9115748	725903	9723288	9706133
C18-1034	9115748	725903	9723288	9706133
C18-1035	9115748	725903	9723288	9706133
C18-1532	9115991	725911	9723288	9706133
C18-1534	9115991	725911	9723288	9706133
C18-1535	9115991	725911	9723288	9706133
C18-2532	9115596	112352	9723288	9706133
C18-2534	9115596	112352	9723288	9706133
C18-2535	9115596	112352	9723288	9706133
C22-712	9102098	473462	9743187	9706133
C22-732	9102098	473462	9743187	9706133
C22-734	9102098	473462	9743187	9706133
C22-735	9102098	473462	9743187	9706133
C22-1532	9102093	766428	9743187	9706133
C22-1534	9102093	766428	9743187	9706133
C22-1535	9102093	766428	9743187	9706133
C22-2032	9102061	766089	9743187	9706133
C22-2034	9102061	766089	9743187	9706133
C22-2035	9102061	766089	9743187	9706133
C22-2532	9102068	761114	9743187	9706133
C22-2534	9102068	761114	9743187	9706133
C22-2535	9102068	761114	9743187	9706133
C22-3032	9102022	761122	9743187	9706133
C22-3034	9102022	761122	9743187	9706133
C22-3035	9102022	761122	9743187	9706133

FAN	HOUSING	BLADE	INLET ORIFICE	SCREEN GUARD
3500 RPM Model (cont'd)				
C22-4032	9102073	766444	9743187	9706133
C22-4034	9102073	766444	9743187	9706133
C22-4035	9102073	766444	9743187	9706133
C22-5032	9102080	742783	9743187	9706133
C22-5034	9102080	742783	9743187	9706133
C22-5035	9102080	742783	9743187	9706133
C22-6032	9102086	418426	9743187	9706133
C22-6034	9102086	418426	9743187	9706133
C22-6035	9102086	418426	9743187	9706133
C24-1032	9122040	418921	9734525	9706141
C24-1034	9122040	418921	9734525	9706141
C24-1035	9122040	418921	9734525	9706141
C21-1532	9122059	251363	9734525	9706141
C24-1534	9122059	251363	9734525	9706141
C24-1535	9122059	251363	9734525	9706141
C24-2032	9122059	451443	9734525	9706141
C24-2034	9122059	451443	9734525	9706141
C24-2035	9122059	451443	9734525	9706141
C24-2532	9115609	254466	9734525	9706141
C24-2534	9115609	254466	9734525	9706141
C24-2535	9115609	254466	9734525	9706141
C24-3032	9122120	417550	9734525	9706141
C24-3034	9122120	417550	9734525	9706141
C24-3035	9122120	417550	9734525	9706141
C24-4032	9773416	450627	9734525	9706141
C24-4034	9773416	450627	9734525	9706141
C24-4035	9773416	450627	9734525	9706141
C24-5032	9743352	282525	9734525	9706141
C24-5034	9743352	282525	9734525	9706141
C24-5035	9743352	282525	9734525	9706141
CG27-5032	9770314	715315	9701219	9706141
CG27-5034	9770314	715315	9701219	9706141
CG27-5035	9770314	715315	9701219	9706141
CG27-6032	9770315	715186	9701219	9706141
CG27-6034	9770315	715186	9701219	9706141
CG27-6035	9770315	715186	9701219	9706141
CG27-7532	9770316	715267	9701219	9706141
CG27-7534	9770316	715267	9701219	9706141
CG27-7535	9770316	715267	9701219	9706141
CG27-10032	9770317	715280	9701219	9706141
CG27-10034	9770317	715280	9701219	9706141
CG27-10035	9770317	715280	9701219	9706141

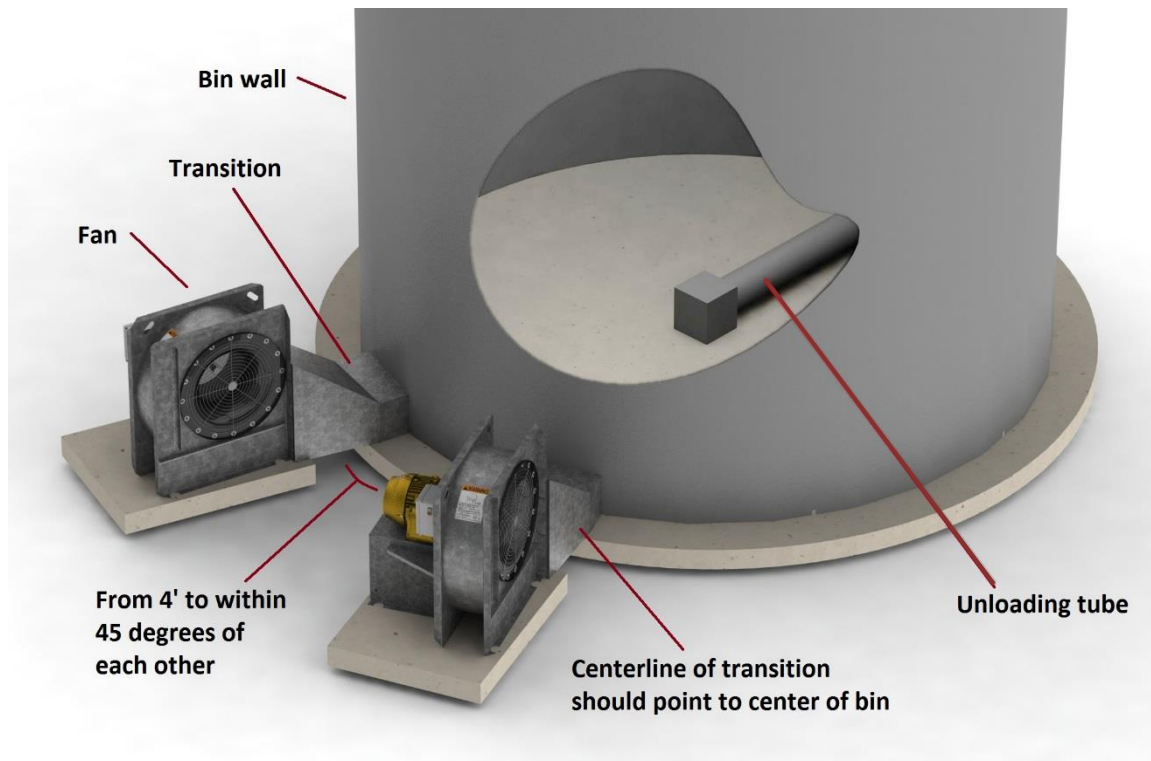
Installation Requirements

The following illustration describes the components necessary for a typical installation. The fan unit (fan and transition) should be located such that the air can enter the bin plenum chamber uniformly. Verify all the components needed for the fan system are present. The fan and transition should be located opposite the unloading tube for best air distribution.



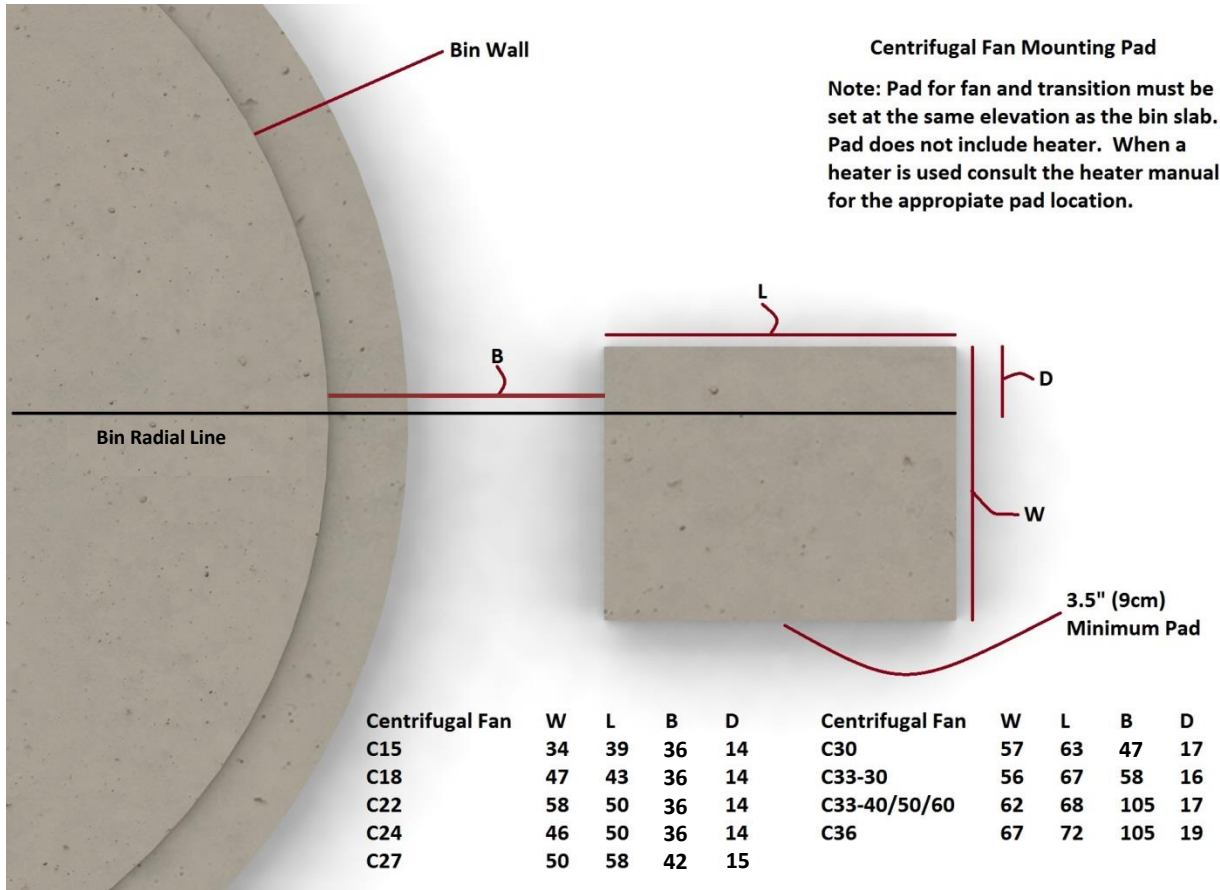
Fan Location and Foundation

The following illustration shows a typical installation of 2 fan units. If two fan units are used on the same bin, locate them 4' (1.21m) to within 45° of each other and centered opposite the unloading tube.



For proper operation of fan, the units are to be mounted on a level pad, however an optional fan support kit is available and eliminates the requirement for a fan pad. The fan support kit incorporates a frame that supports the base of the fan and support cables fastened to the bin wall.

If a concrete fan pad is preferred, the pad should be the same height as the concrete floor. The size of the pad should be as indicated in the following illustration. The fan should not be anchored to the pad but allowed to float on the pad. When the fan is fastened to the transition the fan should be evenly supported on the concrete pad. Verify the fan weight is distributed properly and is not putting an uneven load on the fan housing.



Fan Installation:

Before installing the fan please verify the following:

1. The fan blade revolves freely and does not interfere with the orifice. If there is interference, the orifice will need to be repositioned using the instructions found in the [maintenance section](#) of this manual. Afterwards check all the fasteners on the fan to verify they have the proper clearance and tighten as required.
2. The fan is installed correctly to provide airflow in the proper direction. In most applications fans are installed to force air up through the stored grain. This operating condition is referred to as a “positive” aeration system. For this operation condition the standard wheel rotation is counterclockwise when looking through the inlet orifice into the wheel.
3. Connect the fan to the transition with bolts provided in the fan hardware package.

Electrical Installation

The electrical installation must be performed by a certified electrician, in accordance with the appropriate national and local electrical codes. **Note: Any violation of electrical wiring codes could jeopardize the Caldwell standard limited warranty.**

Electrical Service Sizing

Verify the electrical service and confirm the fan to be wired is manufactured to operate on the appropriate service. The following table “Fan Model Specifications” indicates the electrical service the fan is designed to utilize in the columns labeled “Phase & Voltage”. The electrical service must match this specification. **Note:** the Caldwell 3 Phase 230 volt and 460 volt fans when properly wired can be connected to either voltage.

1750 RPM Centrifugal Fan Model Specifications						
	Model Number	Wheel Diameter (in)	HP	Phase	Voltage	Full Load Amp
Domestic	C30-2012	30	20	1	230	77
	C33-6032	33	60	3	230	135
	C36-7532	36	75	3	230	169
	C36-10032	36	100	3	230	224
CSA Listed Units	C22-312	22	3	1	230	14
	C22-332	22	3	3	230	8.4
	C22-334	22	3	3	460	4.2
	C22-335	22	3	3	575	3.3
	C24-512	24	5	1	230	22
	C24-532	24	5	3	230	12.6
	C24-534	24	5	3	460	6.3
	C24-535	24	5	3	575	5.4
	C24-712	24	7.5	1	230	32
	C24-732	24	7.5	3	230	19.2
	C24-734	24	7.5	3	460	9.6
	C24-735	24	7.5	3	575	7.6
	C27-1012	27	10	1	230	39
	C27-1032	27	10	3	230	24.4
	C27-1034	27	10	3	460	12.2
	C27-1035	27	10	3	575	9.6
	C27-1512	27	15	1	230	58
	C27-1532	27	15	3	230	36.2
	C27-1534	27	15	3	460	18.1
	C27-1535	27	15	3	575	14.6
	C30-2032	30	20	3	230	48
	C30-2034	30	20	3	460	24
	C30-2035	30	20	3	575	19.2
	C30-2532	30	25	3	230	60
	C30-2534	30	25	3	460	30
	C30-2535	30	25	3	575	24
	C33-1532	33	15	3	230	36.2
	C33-1534	33	15	3	460	18.1
	C33-1535	33	15	3	575	14.6

1750 RPM Centrifugal Fan Model Specifications						
	Model Number	Wheel Diameter (in)	HP	Phase	Voltage	Full Load Amp
CSA Listed Units (cont'd)	C33-2032	33	20	3	230	48
	C33-2034	33	20	3	460	24
	C33-2035	33	20	3	575	19.2
	C33-3032	33	30	3	230	76
	C33-3034	33	30	3	460	38
	C33-3035	33	30	3	575	29
	C33-4032	33	40	3	230	96
	C33-4034	33	40	3	460	48
	C33-4035	33	40	3	575	39
	C33-5032	33	50	3	230	116
	C33-5034	33	50	3	460	58
	C33-5035	33	50	3	575	46
	C33-6034	33	60	3	460	67.8
	C33-6035	33	60	3	575	54.4
	C36-3032	36	30	3	230	76
	C36-3034	36	30	3	460	38
	C36-3035	36	30	3	575	29
	C36-4032	36	40	3	230	96
	C36-4034	36	40	3	460	48
	C36-4035	36	40	3	575	39
	C36-5032	36	50	3	230	116
	C36-5034	36	50	3	460	58
	C36-5035	36	50	3	575	46
	C36-6032	36	60	3	230	135
	C36-6034	36	60	3	460	67.8
	C36-6035	36	60	3	575	54.4
	C36-7534	36	75	3	460	84.9
	C36-7535	36	75	3	575	68.7
	C36-10034	36	100	3	460	112
	C36-10035	36	100	3	575	89.6

3500 RPM Centrifugal Fan Model Specifications						
	Model Number	Wheel Diameter (in)	HP	Phase	Voltage	Full Load Amp
CSA Listed Units	C15-312	15	3	1	230	14.5
	C15-332	15	3	3	230	7.2
	C15-334	15	3	3	460	3.6
	C15-335	15	3	3	575	3
	C15-512	15	5	1	230	19.5
	C15-532	15	5	3	230	11.8
	C15-534	15	5	3	460	5.9
	C15-535	15	5	3	575	4.7
	C18-512	18	5	1	230	19.5
	C18-532	18	5	3	230	11.8
	C18-534	18	5	3	460	5.9
	C18-535	18	5	3	575	4.7
	C18-712	18	7	1	230	33
	C18-732	18	7	3	230	18
	C18-734	18	7	3	460	9
	C18-735	18	7	3	575	7
	C18-1012	18	10	1	230	40
	C18-1032	18	10	3	230	23.6
	C18-1034	18	10	3	460	11.8
	C18-1035	18	10	3	575	9.5
	C18-1532	18	15	3	230	35
	C18-1534	18	15	3	460	17.5
	C18-1535	18	15	3	575	14.1
	C18-2532	18	25	3	230	58
	C18-2534	18	25	3	460	29
	C18-2535	18	23	3	575	22
	C22-712	22	7.5	1	230	33
	C22-732	22	7.5	3	230	18
	C22-734	22	7.5	3	460	9
	C22-735	22	7.5	3	575	7
	C22-1532	22	15	3	230	35
	C22-1534	22	15	3	460	17.5
	C22-1535	22	15	3	575	14.1
	C22-2032	22	20	3	230	46
	C22-2034	22	20	3	460	23
	C22-2035	22	20	3	575	18
	C22-2532	22	25	3	230	58
	C22-2534	22	25	3	460	29
	C22-2535	22	25	3	575	22
	C22-3032	22	30	3	230	68
	C22-3034	22	30	3	460	34
	C22-3035	22	30	3	575	26.5

3500 RPM Centrifugal Fan Model Specifications						
	Model Number	Wheel Diameter (in)	HP	Phase	Voltage	Full Load Amp
CSA Listed Units (cont'd.)	C22-4032	22	40	3	230	92
	C22-4034	22	40	3	460	46
	C22-4035	22	40	3	575	37
	C22-5032	22	50	3	230	112
	C22-5034	22	50	3	460	56
	C22-5035	22	50	3	575	45
	C22-6032	22	60	3	230	130
	C22-6034	22	60	3	460	65.1
	C22-6035	22	60	3	575	52.1
	C24-1032	24	10	3	230	23.6
	C24-1034	24	10	3	460	11.8
	C24-1035	24	10	3	575	9
	C24-1532	24	15	3	230	35
	C24-1534	24	15	3	460	17.5
	C24-1535	24	15	3	575	14.1
	C24-2032	24	20	3	230	46
	C24-2034	24	20	3	460	23
	C24-2035	24	20	3	575	18
	C24-2532	24	25	3	230	58
	C24-2534	24	25	3	460	29
	C24-2535	24	25	3	575	22
	C24-3032	24	30	3	230	68
	C24-3034	24	30	3	460	34
	C24-3035	24	30	3	575	26.5
	C24-4032	24	40	3	230	92
	C24-4034	24	40	3	460	46
	C24-4035	24	40	3	575	37
	C24-5032	24	50	3	230	112
	C24-5034	24	50	3	460	56
	C24-5035	24	50	3	575	45
	CG27-5032	27	50	3	230	112
	CG27-5034	27	50	3	460	56
	CG27-5035	27	50	3	575	45
	CG27-6032	27	60	3	230	130
	CG27-6034	27	60	3	460	65.1
	CG27-6035	27	60	3	575	52.1
	CG27-7532	27	75	3	230	161
	CG27-7534	27	75	3	460	80.7
	CG27-7535	27	75	3	575	-
	CG27-10032	27	100	3	230	220
	CG27-10034	27	100	3	460	110
	CG27-10035	27	100	3	575	-

The components to connect the electrical service to the fan need to be sized for the electrical service present. The following tables illustrate the component sizing information for single phase 230 volt, 3 phase 230 volt, 3 phase 460 volt, and 3 phase 575 volt respectively.

- Transformer size is based on current draw from the fan only. Your electrician will need to add the KVA requirements for other components of the system in sizing the transformer.
- Copper wire (rated 75°C) is sized for the fan service. The wire size from the transformer to the disconnect service will be determined from the fan and the other electrical equipment requirements.
- A disconnect for the fan needs to be sized based upon the recommended time delay fuse.

Electrical Service For 1 Phase Operation 230 Volt						
MOTOR H.P.	TRANSFORMER SIZE (NOTE B) (MINIMUM)	COPPER WIRE SIZE DISTANCE MOTOR TO DISCONNECT IN FT. UP TO				CARTRIDGE- TYPE FUSETRON OR EQUIVALENT TIME DELAY FUSE/AMP
		0'-50' (15.2m)	100' (30.4m)	200' (60.9m)	300' (91.4m)	
3	4.0 KVA	12	10	6	4	30
5	6.0 KVA	8	8	4	2	50
7.5	9.0 KVA	6	6	2	1	60
10	11.0 KVA	6	4	2	0	70
15	17.0 KVA	4	2	0	000	80
20	21.0 KVA	2	1	000	250	100

Electrical Service for 3 Phase Operation 230/460 Volt											
MOTOR H.P.	TRANSFORMER SIZE (NOTE B) (MINIMUM)	COPPER WIRE SIZE DISTANCE MOTOR TO DISCONNECT IN FT. UP TO								CARTRIDGE- TYPE FUSETRON OR EQUIVALENT TIME DELAY FUSE/AMP	
		0'-50' (15.2m)		100' (30.4m)		200' (60.9m)		300' (91.4m)		230	460
		230	460	230	460	230	460	230	460		
3	4.0 KVA	14	14	12	14	10	12	8	10	15	10
5	6.0 KVA	12	14	10	12	8	10	6	8	30	15
7.5	9.0 KVA	10	12	8	10	6	8	4	6	40	20
10	11.0 KVA	8	12	8	10	4	8	2	6	50	25
15	17.0 KVA	6	12	6	8	2	6	1	4	60	30
20	21.0 KVA	6	10	4	8	2	4	00	2	70	35
25	26.0 KVA	4	8	4	6	0	4	000	1	80	40
30	31.0 KVA	2	8	2	6	0	2	0000	1	100	50
40	41.0 KVA	1	6	0	4	0000	2	300	0	150	75
50	50.0 KVA	00	4	000	2	250	1	500	000	175	80
60	60.0 KVA	000	2	0000	1	350	0	1000	0000	200	100
75	75.0 KVA	0000	2	250	0	500	000		300	250	125
100	100.0 KVA	350	00	400	0		250		600	300	150

Electrical Service for 3 Phase Operation 575 Volt						
MOTOR H.P.	TRANSFORMER SIZE (NOTE B) (MINIMUM)	COPPER WIRE SIZE DISTANCE MOTOR TO DISCONNECT IN FT. UP TO				CARTRIDGE-TYPE FUSE/TRON OR EQUIVALENT TIME DELAY FUSE/AMP
		0'-50' (15.2m)	100' (30.4m)	200' (60.9m)	300' (91.4m)	
3	4.0 KVA	14	14	12	10	8
5	6.0 KVA	14	14	10	10	10
7.5	9.0 KVA	14	14	10	8	15
10	11.0 KVA	14	10	8	8	20
15	17.0 KVA	12	10	8	4	25
20	21.0 KVA	10	8	6	4	30
25	26.0 KVA	8	6	4	2	40
30	31.0 KVA	8	6	4	2	50
40	41.0 KVA	6	6	2	1	60
50	50.0 KVA	6	4	2	00	75
60	60.0 KVA	4	2	1	000	80
75	75.0 KVA	3	2	00	250	100
100	100.0 KVA	1	0	0000	400	125

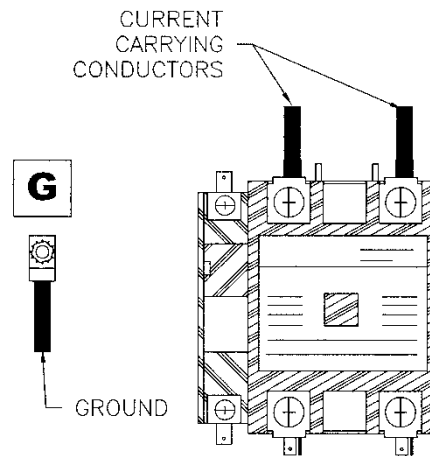
Electrical service examples:

1. Transformer example: For a C22-312 fan, the single phase 230 volt table would be used. The KVA rating for the 3 horsepower motor is 4.0 KVA. This KVA rating is for the fan only. Your electrician will need to add the KVA requirements for the other electrical components of the system in sizing the transformer.
2. Fan disconnect example: For a C22-312 fan, the single phase 230 volt table would be used, and the fuse size is 30 amp. Note that a circuit breaker can be used, however, the circuit breaker or any fuse used, must be a time delay type sized to allow for the initial starting in-rush current to the fan.
3. Conductor size example: The conductor size for the fan needs to be sized according to the distance between the fan and disconnect. For a C22-312 fan located 200' (60.9m) from the disconnect, the single phase 230 volt table would be used. The conductor size should be #6 AWG. The proper sized wiring must be used to verify a voltage drop is not developed.

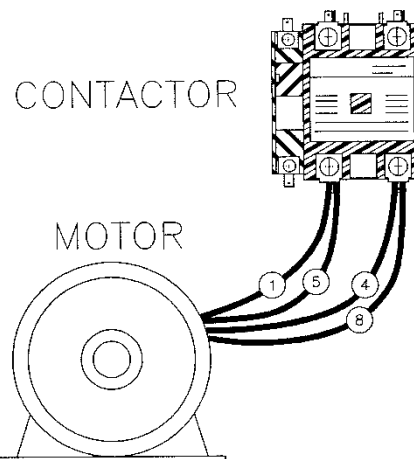
Electrical Connection at the Fan

Note: For fans with controls, the electrical power is connected to the magnetic control on the fan. For fans without controls the electrical power is supplied from the motor control center and is connected directly to the motor.

1. Single Phase (for fans with controls)
 - a. When a 115 volt accessory is to be used with the Centrifugal fan, a 4 wire system should be provided for fans operated on single phase power. The 4 wires consist of the 2 current carrying conductors, a grounded neutral, and a ground. When 115 Volt accessory equipment is not used a 3 wire system can be utilized. In this case the grounded neutral wire is not required. The current carrying conductors are to be connected securely to terminals L1 and L2 of the contactor as shown in the following illustration. The contactor is located in the control enclosure. The ground wire is secured to the terminal in the control enclosure labeled "G".



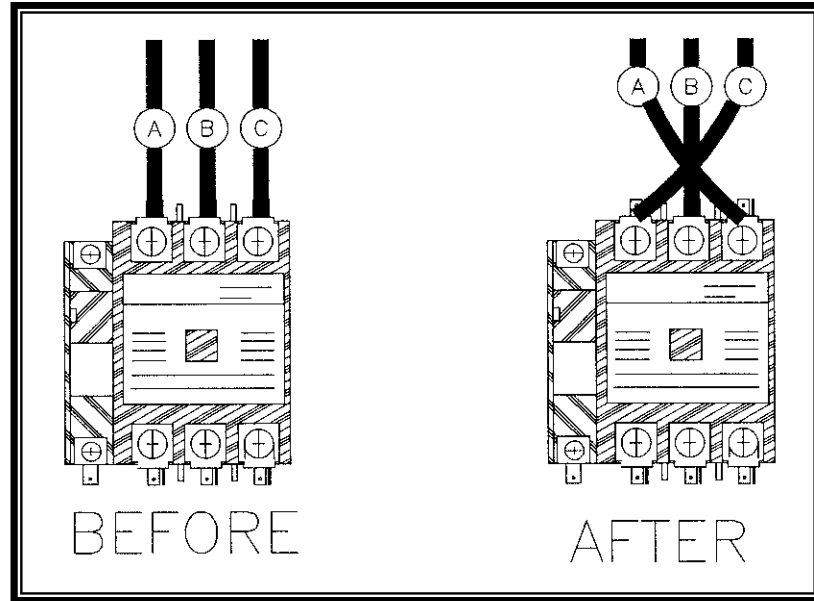
- b. For units with controls the fan motor is factory wired. Note that this figure illustrates the proper connection of the motor lead wires for the counterclockwise rotation of the fan blade. The location of lead wires is based on the lead wire marking for motors labeled per the NEMA standard. Refer to the motor serial plate for the specific wiring connections and which wires are interchanged to reverse rotation direction. The unit will then need to be rechecked for proper rotation. Provide power to the fan controls and start the fan momentarily. Verify that the blade rotation develops airflow in the direction that the decal on the fan housing illustrates.



2. 3 Phase (for fans with controls)

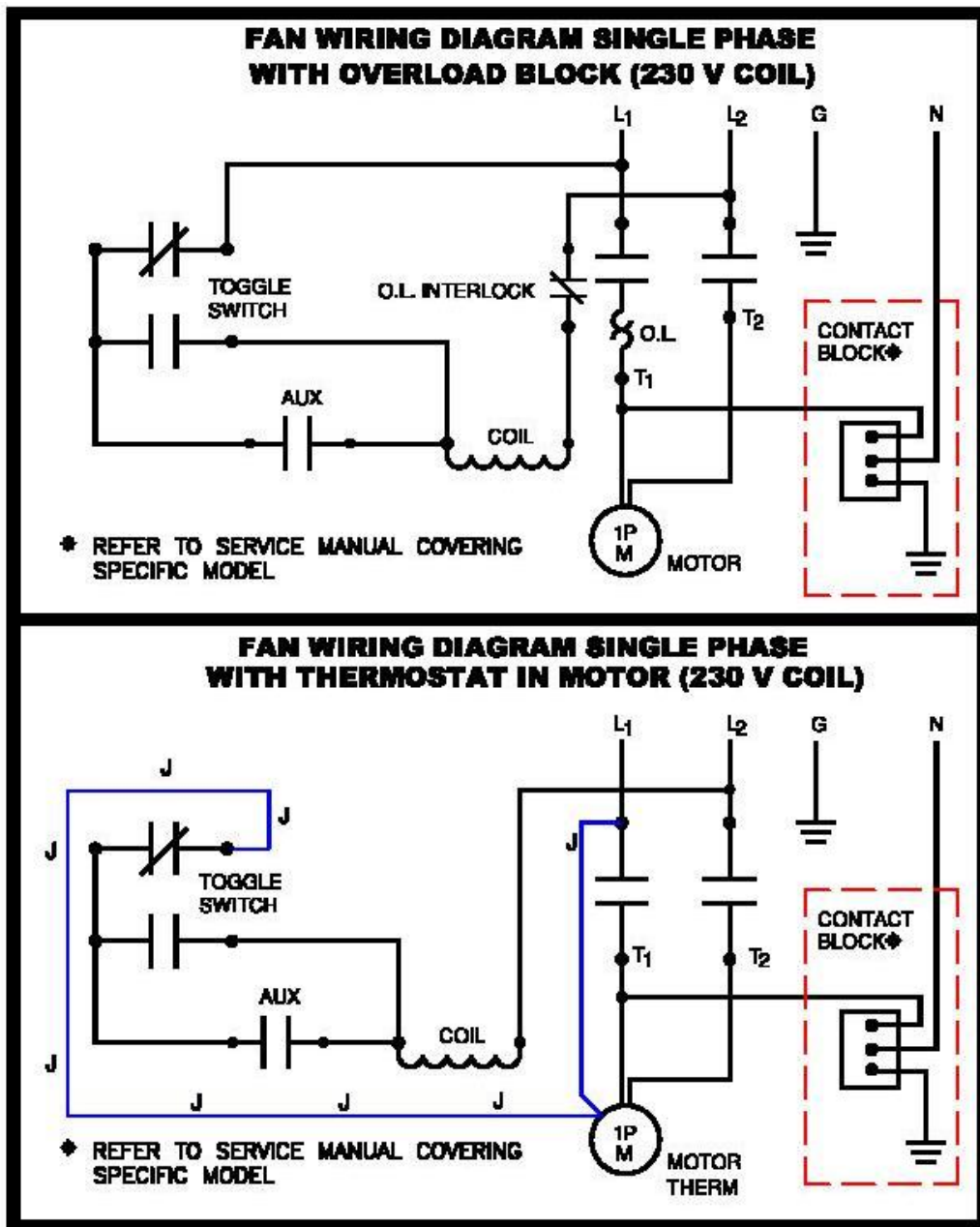
- a. When a 115 volt accessory is to be used with the Centrifugal fan a 5 wire system should be provided for fans operated on 3 phase 230 volt power. The 5 wires consist of 3 current carrying conductors, a grounded neutral and a ground. When 115 volt accessory equipment is not used, or the fan is operated on 460 volt 3 phase power or 575 volt 3 phase power, a 4 wire system can be utilized. The 4 wires consist of 3 current carrying conductors and a ground. In this case the grounded neutral wire is not required. The current carrying conductors are to be connected securely to terminals L1, L2 and L3 of the contactor as shown in the following illustration. The contactor is located in the control enclosure. The ground wire is secured to the terminal in the control enclosure labeled "G".

- b. The unit will need to be checked for proper rotation of the fan wheel. Provide power to the fan controls and start the fan momentarily. Verify that the fan wheel is rotating the proper direction.
- i. If the fan wheel is rotating in the wrong direction, correct by exchanging the current carrying conduction at terminal L1 and L3as shown below.



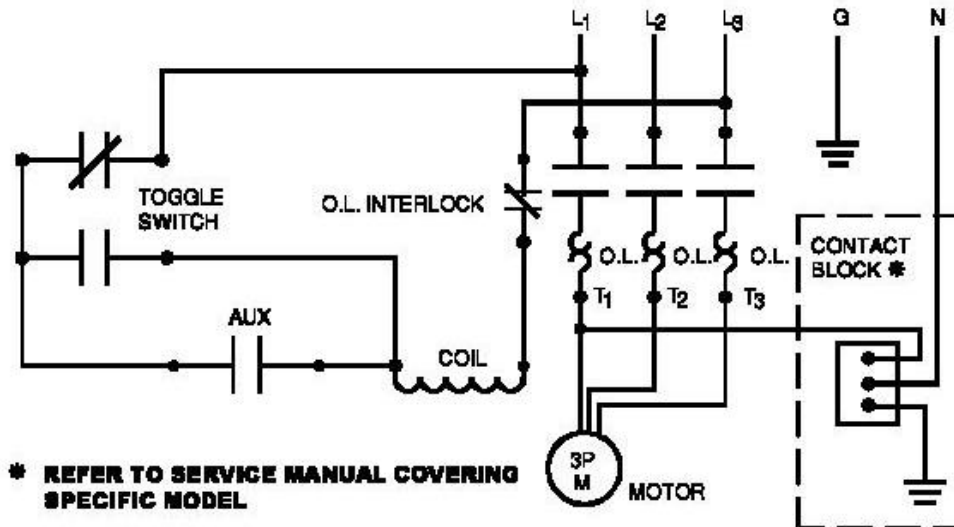
Wiring Schematics:

Please note the following wiring diagrams for installation:

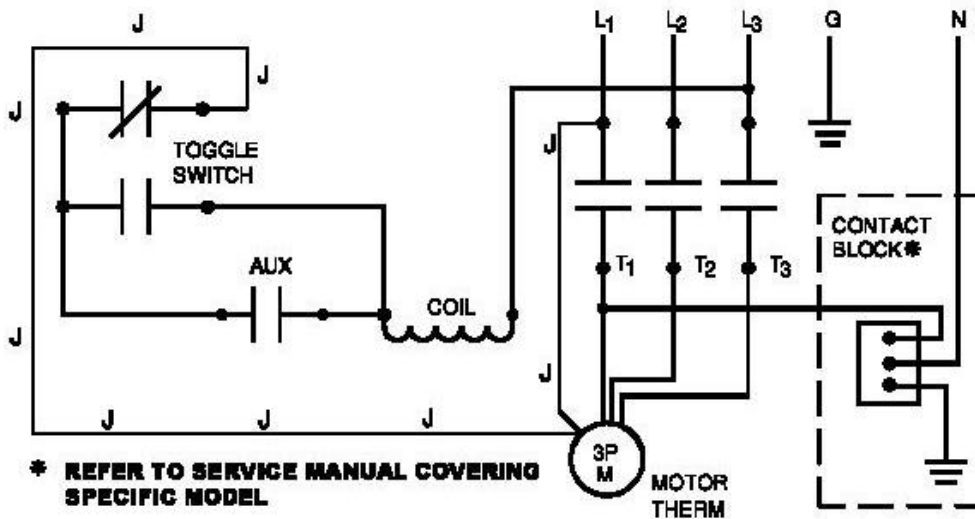


709196

FAN WIRING DIAGRAM THREE PHASE WITH OVERLOAD BLOCK (COIL V = LINE V)



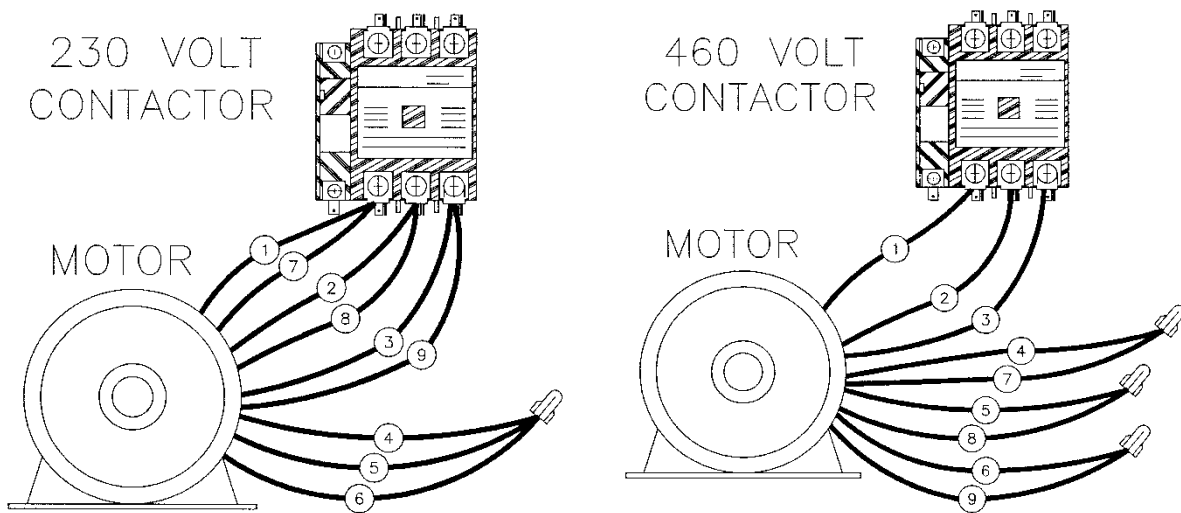
FAN WIRING DIAGRAM THREE PHASE WITH THERMOSTAT IN MOTOR (COIL V = LINE V)



709188

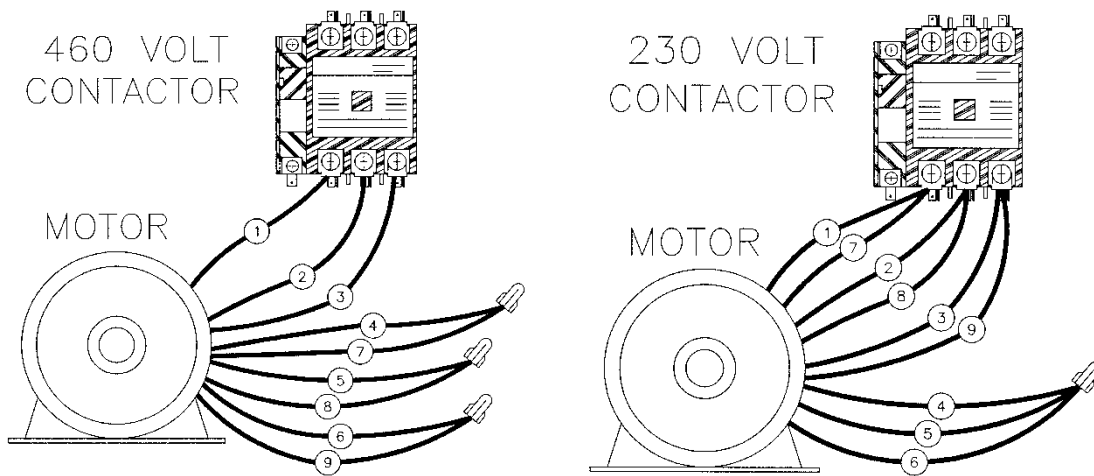
Voltage Conversions:

1. Converting a 3 phase dual voltage fan wired for 230 volts to 460 volt service (for fans utilizing motors with an internal thermostat inside the motor):
 - a. Lock out and tag out the power to the fan to ensure no power is present when rewiring.
 - b. Disconnect the motor leads attached to the contactor terminals T1, T2 and T3. Break the connection of the motor leads 4, 5 and 6 so that each motor lead is separate.



- c. Remove the contactor from the control enclosure and disconnect the wires from the contactor to the push button start switch and to the motor thermal protector.
- d. Replace with a 460 volt contactor.
- e. The contactor is then reinstalled into the control enclosure, and the push button start switch wires and the motor thermal protection are re-wired per the corresponding 460 volt [wiring diagram](#).
- f. Connect the motor leads to the output terminal of the contactor as shown in the following illustration. Note that the motor lead wire pairs (4 and 7), (5 and 8), (6 and 9) are secured together using a wire nut.
- g. Refer to the previous [electrical service installation instructions](#) for sizing the electrical service on 460 volt 3 phase operations.

2. Converting a 3 phase dual voltage fan wired for 460 volts to new 230 volt service:
 - a. Lock out and tag out the power to the fan to ensure no power is present when rewiring.
 - b. Disconnect the motor leads attached to the contactor terminals T1, T2 and T3. Break each of the paired motor lead connections (4 and 7), (5 and 8), and (6 and 9), so that each motor lead is separate.



- c. Remove the contactor from the control enclosure and disconnect the contactor from the push button start switch and the motor thermal protector.
- d. Replace with a 230 volt contactor.
- e. The contactor for the 230 volt control is then reinstalled into the control enclosure, and the push button start switch wires and the motor thermal protection are wired per the corresponding 230 volt [wiring diagram](#).
- f. Connect the motor leads to the output terminal of the contactor as shown in the following illustration. Note that the motor lead wires 4, 5 and 6 are secured together with a wire nut.
- g. Refer to the [electrical service installation instructions](#) for sizing the electrical service on 230 volt 3 phase operation.

Operating Instructions

When the fan is to be started for the first time, or after the fan has been idle for an extended period of time, the following checks should be made prior to starting the fan.

1. With the power locked out and tagged out at the disconnect switch, rotate the fan blade to verify it revolves easily and does not rub on the orifice.
2. Check all the fasteners to verify they are tight. If any are loose, check for proper clearance and retighten fasteners. Verify the screen guard is fastened securely.
3. Refer to the appropriate [wiring diagram](#) to verify the fan is wired correctly.

4. With power locked out and tagged out at the disconnect switch, check all electrical connections to verify they are tight. Inspect the current carrying wires to verify they are not grounded. Verify the control enclosure cover is secured in place.

Start-Up Procedure:

The fan is started by pushing in the switch button on the control enclosure labeled “START”. When the fan begins to start the button should be released. The fan will continue to operate until the switch button labeled “STOP” is pushed in, or until the internal motor thermostat interrupts the power by opening the circuit. With the overload relay in the open position the fan cannot be started by pushing the “START” button. When the overload relay closes, the fan will not restart by itself, the “START” button will need to be pushed in to start the unit again. **Note:** If the overload relay activates to shut off the fan refer to the [service section](#) for determining the cause of the thermal protector activating.

Shut-Down Procedure:

1. When shutting the fan down for the season, shut off the power at the fan disconnect rather than at the fan controls to provide additional protection from unauthorized personnel operating the fan, and potential damage to the fan from a lightning strike. Refer to the [maintenance section](#) for off season operation recommendations.

Maintenance

The following procedures should be followed and maintenance performed before starting the unit at the beginning of every season, and also during operation.

Off Season Operation:

During the off season, the fan blade should be allowed to turn freely. Also, during the off season, operate the fan for approximately 30 minutes every 3 weeks. The operation of the fan keeps the lubricant evenly distributed within the bearing cavity and removes condensation from the motor.

Fan Controls:

During the off season, verify the control enclosure cover is secured to the control enclosure. Before operating, the magnetic contactor should be inspected to verify all contact points are clean and unobstructed. Also, check points for pitting and replace the magnetic contactor if the points are defective.

Fan Motor:

The motor has sealed bearings that do not require lubrication.

Fan Blades:

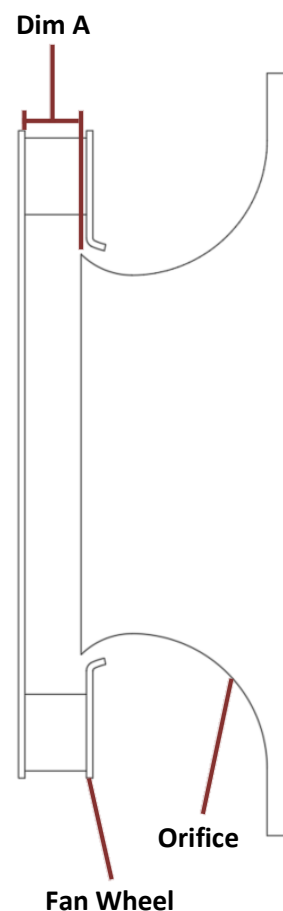
Clean the fan blade so the unit runs smoothly. This should be done once per year or as needed if vibration develops. Also check the fan to verify it is mounted properly. Refer to the previous [installation instructions](#) for instructions on leveling the fan.

If, in servicing the fan, you determine that the fan blade will need to be removed from the motor shaft, refer to the following instructions to verify the reassembled fan will perform properly.

- Before disassembling, mark the position of the motor shaft on the wheel and the position of the motor on the motor mount. Also note the position of the orifice to the inlet of the wheel. **NOTE: DO NOT DISASSEMBLE THE CAST HUB FROM THE WHEEL WELDMENT.** When reassembling position each part according to the location marked.
- If a tapered bushing is used, tighten the bushing hardware gradually by continually working in a circle tightening each bolt slightly. Finally torque all bolts to the required specification.
- When reassembling the orifice verify the orifice is centered in the wheel inlet.
- Hold the dimension between the back plate of the wheel and the orifice at the following dimensions shown below.

1750 RPM	
FAN	Dim A
C22-3	4.875" (12.383 cm)
C24-5	5.844" (14.843 cm)
C24-7	8.438" (21.431 cm)
C27-10	7.250" (18.415 cm)
C27-15	10.188" (25.876 cm)
C30-20	9.188" (23.336 cm)
C30-25	11.250" (25.575 cm)
C33-15	3.6875" (9.366 cm)
C33-20	6.4375" (16.351 cm)
C33-30	9.125" (23.178 cm)
C33-40	9.469" (24.051 cm)
C33-50	11.781" (29.924 cm)
C33-60	12.250" (31.115 cm)
C36-30	4.8125" (12.224 cm)
C36-40	6.250" (15.837 cm)
C36-50	7.625" (19.400 cm)
C36-60	9.0625" (22.962 cm)
C36-75	11.078" (28.138 cm)
C36-100	13.375" (33.973 cm)

3500 RPM	
FAN	Dim A
C15-3	2.250" (5.715 cm)
C15-5	3.125" (7.938 cm)
C18-5	2.0625" (5.239 cm)
C18-7	2.594" (6.588 cm)
C18-10	3.313" (8.414 cm)
C18-15	4.719" (11.986 cm)
C18-25	7.000" (17.780 cm)
C22-7	2.3125" (5.874 cm)
C22-15	2.500" (6.350 cm)
C22-20	3.125" (7.938 cm)
C22-25	3.750" (9.525 cm)
C22-30	4.313" (10.954 cm)
C22-40	5.813" (14.764 cm)
C22-50	7.156" (18.177 cm)
C22-60	8.250" (20.955 cm)
C24-10	1.4375" (2.651 cm)
C24-15	1.875" (4.763 cm)
C24-20	2.4375" (6.191 cm)
C24-25	2.8125" (7.144 cm)
C24-30	3.375" (8.573 cm)
C24-40	4.375" (11.113 cm)
C24-50	4.6875" (11.906 cm)
CG27-50	3.3125" (8.731 cm)
CG27-60	3.8125" (9.970 cm)
CG27-75	4.6875" (12.198 cm)
CG27-100	6.000" (15.665 cm)



Servicing the Fan:

The following will help you find any problems that may occur in the fan unit and includes tips for repair. For servicing of electrical systems, open the control enclosure cover. Inside the cover you will find a wiring schematic to help you service the unit. In the checks shown below, locate the symptoms you are experiencing with your unit and follow the list of corresponding possible causes and remedies:

Note: Unless otherwise indicated, checks are made with the power off using a voltmeter on resistance setting.

Condition Specific Faults:

1. Symptom: Push button start switch does not turn fan on.
 - a. Verify power is available to the fan unit (for fans incorporating an internal thermostat in the motor).
 - b. Check overload protection to determine if the control circuit is open or closed.
 - i. If the thermostat is open, verify the overload device has had a chance to cool if the fan has recently shut off. The overload circuit will automatically close when the unit is cooled. If not, the thermostat will need to be replaced in the motor.
 1. The thermostat wires (J wires) can be traced from the motor to terminal L1 and the push button switch.
 2. For fans with an overload relay, check the continuity of the overload interlock.
 - a. Allow the overload relay to cool.
 - b. If the interlock does not close, replace the overload relay.
 - c. Check the push button start switch. If switch is defective, replace.
 - i. The push button start switch circuit should be checked in the “OFF”, “RUN” and “START” positions. The normally closed (NC) and the normally open (NO) set of contacts should have continuity checks to determine if the circuit is open or closed.
 1. With the stop button depressed, both sets of contacts should be open.
 2. In the “RUN” position with neither button depressed, the normally closed (NC) terminals should be closed and the normally open (NO) terminals should be open.
 3. In the “START” position with the start button depressed, both sets of contacts should be closed.
 - d. Check holding coil. If coil is defective, replace.
 - i. Verify power from L2 on the contactor to the holding coil.
 - ii. Verify power going from L1 through the motor thermostat or the overload relay wires and the push button switch. If power is available at the coil, the coil is defective.
 - e. Verify that the contact set is not restricted from closing.

2. Symptom: Fan motor hums and does not run.
 - a. Check to verify that all leads of your power source have voltage present. If fan unit is not receiving power on all leads, check for a blown fuse, broken wire, or loose connection.
 - b. Check to see that all contact sets are closing. If one leg of the supply voltage is not available to the motor, the motor will hum.
 - i. Remove the front cover from the contactor, turn the fan unit on and watch to see that all contacts close. If all contacts do not close, clean or replace contactor.
 - c. If power is available at all the motor leads and the motor still hums, then the motor should be taken to an authorized Service Center for repair or replacement.
 - i. The power can be hooked directly to the motor leads (for testing), if the motor hums, replace or repair the motor.
3. Symptom: Fan operates when the push button switch is held in the “START” position but shuts off when the push button switch is in the “RUN” position.
 - a. Check steps referenced above in Symptom “Push button start switch does not turn fan on”.
 - b. Check the auxiliary switch; locate on the side of the contactor. (If defective, replace auxiliary switch. Refer to “[replacement parts](#)” to determine the part required.
 - i. With the power supply OFF remove the front plate from the contactor and verify the auxiliary switch is open. Switch should close when the contact sets are pushed in. Circuit is checked by measuring the resistance across the auxiliary switch.
4. Symptom: Fan only operates at half speed.
 - a. Take the motor to an authorized service center for repair or replacement.
5. Symptom: Fan Starts and operates for brief period of time than shuts off.
 - a. Check the supply voltage. Voltage should be within 10% of rated voltage. For example, a motor rated at 230 volts should operate in a voltage range of 207 to 253 Volts.
 - b. Check the [supply wire sizes](#) required for the fan unit.
 - c. Check the load on the main circuit to verify other items on the main circuit are not overloading the fan circuit.
 - d. Check the amperage of the fan, if the unit is pulling amperage above what is specified on the serial plate; take the motor to an Authorized Service Center.
6. Symptom: Fan operates when main power supply is turned on.
 - a. The normally open (NO) set of contacts of the push button should be checked. If the contact is closed between the two terminals, without pushing the start button the push button switch should be replaced.
 - b. Check the contact points by removing the front from the contactor to see if the contacts are locked in or welded in place. If so, the complete contactor should be replaced.

STANDARD LIMITED WARRANTY

Caldwell Aeration Products

1. **Definitions.** The following terms, when they appear in the body of this Standard Limited Warranty for Caldwell Aeration Products in initial capital letters shall have the meaning set forth below:
 - A. Accepted Purchase Order shall mean the Purchase Order identified below.
 - B. Chief shall mean Chief Agri/Industrial, a division of Chief Industries, Inc.
 - C. Original Owner shall mean the original owner identified below.
 - D. Product shall mean the Agri/Industrial Equipment as described in the Accepted Purchase Order.
 - E. Reseller shall mean the authorized Chief Agri/Industrial Equipment dealer identified below.
2. **Limited Product Warranty.** Upon and subject to the terms and conditions set forth below, Chief hereby warrants to the Reseller, and, if different, the Original Owner as follows:
 - A. All new Products delivered to the Reseller or the Original Owner by Chief pursuant to the Accepted Purchase Order will, when delivered, conform to the specifications set forth in the Accepted Purchase Order;
 - B. All new Products delivered pursuant to the Accepted Purchase Order will, in normal use and service, be free from defects in materials or workmanship; and
 - C. Upon delivery, Chief will convey good and marketable title to the Products, free and clear of any liens or encumbrances except for, where applicable, a purchase money security interest in favor of Chief.
3. **Duration of Warranty and Notice Requirements.** Subject to the **Exceptions, Exclusions and Limitations** set forth below, the warranties set forth in Section 2 above shall apply to all covered non-conforming conditions that are discovered within the first twenty-four (24) months following delivery of the Product to the carrier designated by the Reseller and/or the Original Owner at Chief's manufacturing facility in Kearney, Nebraska (the "Warranty Period") and are reported to the Chief as provided in Section 4 below within thirty (30) days following discovery (a "Notice Period").
4. **Notice Procedure.** In order to make a valid warranty claim, the Reseller and/or the Original Owner must provide Chief with a written notice of any nonconforming condition discovered during the Warranty Period within the applicable Notice Period specified in Section 3 above. Said notice must be in writing; be addressed to Chief Industries, Inc., Agri/Industrial Division, Customer Service Department, P.O. Box 848, Kearney, NE 68848; and contain the following information: (a) the Customer's name and address; (b) the Reseller's name and address; (c) the make and model of the Product in question; (d) the current location of the Product; (e) a brief description of the problem with respect to which warranty coverage is claimed; and (f) the date on which the Product was purchased.

5. **Exceptions and Exclusions.** Anything herein to the contrary notwithstanding, the warranties set forth in Section 2 above do ***not*** cover any of the following, each of which are hereby expressly excluded:
- A. Defects that are not discovered during the applicable Warranty Period;
 - B. Defects that are not reported to the Chief Agri/Industrial Division Customer Service Department in conformity with the notice procedure set forth in Section 4 above within the applicable Notice Period specified in Section 3;
 - C. Any used or pre-owned Products;
 - D. Any Chief manufactured parts that are not furnished as a part of the Accepted Purchase Order;
 - E. Any fixtures, equipment, materials, supplies, accessories, parts or components that have been furnished by Chief but are manufactured by a third party;
 - F. Any Products which have been removed from the location at which they were originally installed;
 - G. Any defect, loss, damage, cost or expense incurred by the Reseller or the Original Owner to the extent the same arise out of, relate to or result, in whole or in part, from any one or more of the following:
 - (i) Usual and customary deterioration, wear or tear resulting from normal use, service and exposure;
 - (ii) Theft, vandalism, accident, war, insurrection, fire or other casualty;
 - (iii) Any damage, shortages or missing parts which result during shipping or are otherwise caused by the Reseller, the Original Owner and/or any third party;
 - (iv) Exposure to marine environments, including frequent or sustained salt or fresh water spray;
 - (v) Exposure to corrosive, chemical, ash, smoke, fumes, or the like generated or released either within or outside of the structure on which the Product is installed, regardless of whether or not such facilities are owned or operated by the Reseller, the Original Owner or an unrelated third party;
 - (vi) Exposure to or contact with animals, animal waste and/or decomposition;
 - (vii) The effect or influence the Product may have on surrounding structures, including, without limitation, any loss, damage or expense caused by drifting snow;
 - (viii) Any Product or portion thereof that has been altered, modified or repaired by the Reseller, the Original Owner or any third party without Chief's prior written consent;
 - (ix) Any Product or portion thereof that has been attached to any adjacent structure without Chief's prior written approval;
 - (x) Any Product to which any fixtures, equipment, accessories, materials, parts or components which were not provided as a part of the original Accepted Purchase Order have been attached without Chief's prior written approval;
 - (xi) The failure on the part of the Reseller, the Original Owner or its or their third party contractors to satisfy the requirements of all applicable statutes, laws, ordinances rules, regulations and codes, (including zoning laws and/or building codes);
 - (xii) The use of the Product for any purpose other than the purpose for which it was designed; and/or
 - (xiii) The failure of the Reseller, the Original Owner and/or any third party to:
 - (a) properly handle, transport and/or store the Product or any component part thereof;
 - (b) properly select and prepare a site that is adequate for the installation and/or operation of the Product or any component part thereof;

- (c) properly design and construct a foundation that is adequate for the installation and/or operation of the Product or any component part thereof;
- (d) properly set up, erect, construct or install the Product and/or any component part thereof; and/or
- (e) properly operate, use, service and/or maintain the Product and each component part thereof.

6. **Resolution of Warranty Claims.** In the event any nonconforming condition is discovered within the Warranty Period and Chief is notified of a warranty claim as required by Section 4 prior to the end of the applicable Notice Period set forth in Section 3 above, Chief shall, with the full cooperation of the Reseller and the Original Owner, immediately undertake an investigation of such claim. To the extent Chief shall determine, in its reasonable discretion, that the warranty claim is covered by the foregoing Limited Product Warranty, the following shall apply:

- A. **Warranty Claims With Respect to Covered Non-Conforming Conditions Discovered Within the First Three Hundred Sixty Five (365) Days and Reported to Chief Within Thirty (30) Days of Discovery.** In the case of a warranty claim which relates to a covered non-conforming condition that is discovered during the first three hundred sixty five (365) days of the Warranty Period and is reported to Chief as required by Section 4 within thirty (30) days of discovery as required by Section 3, Chief will, as Chief's sole and exclusive obligation to the Reseller and the Original Owner, and as their sole and exclusive remedy, work in cooperation with the Reseller and the Original Owner to correct such non-conforming condition, and in connection therewith, Chief will ship any required replacement parts to the "ship to address" set forth in the Accepted Purchase Order FOB Chief's facilities in Kearney, Nebraska, and will either provide the labor or reimburse the Reseller or the Original Owner, as may be appropriate in the circumstances, for any out of pocket expense the Original Owner may reasonably and necessarily incur for the labor that is required to correct such non-conforming condition, provided that if work is to be performed by the Reseller or a third party contractor, Chief may require at least two competitive bids to perform the labor required to repair or correct the defect and reserves the right to reject all bids and obtain additional bids. Upon acceptance of a bid by Chief, Chief will authorize the necessary repairs.
- B. **All Other Warranty Claims.** Except as is otherwise provided in subsection 6A above, in the case of all other warranty claims which relate to covered non-conforming conditions that are discovered during the Warranty Period and are reported to Chief as required by Section 4 within thirty (30) days following discovery, Chief will, as Chief's sole and exclusive obligation to the Reseller and the Original Owner, and as the Reseller's and the Original Owner's sole and exclusive remedy, ship any required replacement parts to the Original Owner at the "ship to address" specified in the Accepted Purchase Order FOB Chief's facilities in Kearney, Nebraska; and **in such event, Chief shall have no responsibility or liability to either the Reseller or the Original Owner for the cost of any labor required to repair or correct the defect.**

7. **Warranty Not Transferable.** This Warranty applies only to the Reseller and the Original Owner and is **not transferable**. As such, this Warranty does **not** cover any Product that is sold or otherwise transferred to any third party following its delivery to the Original Owner.
8. **Limitation on Warranties, Liabilities and Damages.** The Reseller and the Original Owner expressly agree that the allocation of the risk, liability, loss, damage, cost and expense arising from any Product that does not conform to the limited warranty given in Section 2 above are fair and reasonable and acknowledge that such allocation was expressly negotiated by the parties and was reflected in the Purchase Price of the Product. Accordingly the Reseller and the Original Owner expressly agree as follows:
- A. **Disclaimer of Implied Warranties.** EXCEPT AS IS OTHERWISE EXPRESSLY SET FORTH HEREIN, CHIEF MAKES NO OTHER REPRESENTATIONS OR WARRANTIES OF ANY KIND WHATSOEVER, WHETHER EXPRESS OR IMPLIED, BY OPERATION OF LAW, COURSE OF DEALING OR OTHERWISE WITH RESPECT TO THE PRODUCT, ANY COMPONENT PART THEREOF OR ANY OTHER GOODS OR SERVICES THAT CHIEF MANUFACTURES, FABRICATES, PRODUCES, SELLS OR PROVIDES TO THE DEALER OR THE ORIGINAL OWNER PURSUANT TO THE TERMS OF ANY ACCEPTED PURCHASE ORDER, INCLUDING WITHOUT LIMITATION ANY REPRESENTATION OR WARRANTY WITH RESPECT TO DESIGN, CONDITION, MERCHANTABILITY OR FITNESS OF THE PRODUCT OR ANY OTHER GOODS OR SERVICES FOR ANY PARTICULAR PURPOSE OR USE.
- B. **Limitation on Liability.** EXCEPT AS IS OTHERWISE EXPRESSLY SET FORTH IN SECTION 6 ABOVE, CHIEF'S LIABILITY TO THE DEALER AND/OR THE ORIGINAL OWNER WITH RESPECT TO ANY DEFECTS IN ANY PRODUCTS OR FOR ANY OTHER GOODS OR SERVICES WHICH DO NOT CONFORM TO THE WARRANTIES SET FORTH ABOVE SHALL NOT, IN ANY EVENT, EXCEED THE ACTUAL COST OF SUCH NON-CONFORMING PRODUCT, GOODS OR SERVICES AS DETERMINED PURSUANT TO THE ACCEPTED PURCHASE ORDER; AND
- C. **Limitation on the Nature of Damages.** EXCEPT AS EXPRESSLY PROVIDED IN SECTION 6 ABOVE, CHIEF SHALL NOT, UNDER ANY CIRCUMSTANCES, BE LIABLE TO THE DEALER, THE ORIGINAL OWNER OR ANY THIRD PARTY FOR ATTORNEY FEES COURT COSTS OR ANY OTHER SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, LIQUIDATED OR PUNITIVE DAMAGES OF ANY NAME, NATURE OR DESCRIPTION AS A RESULT OF THE FAILURE OF ANY PRODUCT OR ANY OTHER GOODS OR SERVICES PURCHASED BY THE DEALER OR THE ORIGINAL OWNER FROM CHIEF PURSUANT TO THE ACCEPTED PURCHASE ORDER TO CONFORM TO THE LIMITED WARRANTIES SET FORTH IN SECTION 2 ABOVE.

**TO THE ACCEPTED PURCHASE ORDER TO CONFORM TO THE LIMITED
WARRANTIES SET FORTH IN SECTION 2 ABOVE.**

8. **Applicable Law.** This Limited Product Warranty has been issued, accepted and entered into by the Reseller, the Original Owner and Chief in the State of Nebraska and shall be governed by, and construed in accordance with, the internal laws of the State of Nebraska. Any legal action or proceeding with respect to any goods or services furnished to the Original Owner by Chief in connection herewith, or any document related hereto shall be brought only in the district courts of Nebraska, or the United States District Court for the District of Nebraska, and, by execution and delivery of this Limited Product Warranty, the undersigned Original Owner hereby accept for themselves and with respect to their property, generally and unconditionally, the jurisdiction of the aforesaid courts. Further, the undersigned Original Owner hereby irrevocably waives any objection, including, without limitation, any *forum non conveniens*, which it may now or hereafter have to the bringing of such action or proceeding in such respective jurisdictions.

ACKNOWLEDGMENT OF RECEIPT

By its signature hereto, the undersigned Reseller represents and warrants to Chief that the Reseller has provided a true, correct and complete copy of this Standard Limited Warranty to the Original Owner at the time the product was purchased.

Reseller Name and Address:

Original Owner Name and Address:

Accepted Purchase Order No.

Original Jobsite Address:

RESELLER:

By: _____
Date

Print name and title

4821-6088-7329, v. 1

FAN TEST SHEET

All fans are tested to Caldwell engineering current standards as follows:

CSA ☐ DOM ☐

Part # _____

Model # _____

Motor Mfg. _____

Motor Mfg. Part# _____

Contactor/Starter mfg. _____

Tunnel # _____

Rotation: _____

W.O.: _____

Date: _____

Fan Serial Number (A)	Vibration		Motor Serial Number (C)	Static Pressure Tested At (D)	Rated		Measured		Dielectric Strength Test			Start up Time (H)	Bolt Bag (I)	Manual (J)	Serv. Bulletin (K)	Warranty Card Number (L)	Checked By (M)
	Displacement Maximum 1.00mil 3450 2.00mil 1750	Velocity 0.3in/sec			Volt (E)	Amps (E ₁)	Volt (F)	Amps (F)	Applied Voltage KV (G)	Length Of Test (G)	Passing (G)						
	(B)	(B ₁)			(E)	(E ₁)	(F)	(F)	(G)	(G)	(G)						

(A) SERIAL NUMBER ASSIGNED TO INDIVIDUAL FAN.

(B) MEASURING THE VIBRATION OF THE FAN

BY RECORDING THE DISTANCE THE FAN

MOVES PEAK TO PEAK IN MILS OR 0.001 OF AN INCH (SEE SINE WAVE CHART).

(B₁) IS THE SPEED THAT THE PART MOVE THROUGH THE ORIGIN OF

VIBRATION CYCLE IN INCHES/SECOND.

(C) SERIAL NUMBER OF MOTOR INSTALLED ON FAN.

(D) ADJUST TEST TUNNEL TO OBTAIN MAXIMUM LOAD OF OPERATION, RECORD STATIC PRESSURE.

(E) VOLTAGE RATING(S) OF THE MOTOR.

(E₁) AMPERAGE RATING(S) AT VOLTAGE RATINGS FOR MOTOR.

(F) VOLTAGE AND AMPERAGE READINGS AT POINT OF OPERATION (MAXIMUM LOAD).

(F) VOLTAGE AND AMPERAGE READINGS AT POINT OF OPERATION (MAXIMUM LOAD).

(G) VOLTAGE APPLICATION WITHOUT BREAKDOWN.

MOTOR VOLTAGE RATING	KV LOAD APPLIED	TIME LENGTH
115	1.50	1 SECOND
230	1.75	1 SECOND
460	2.30	1 SECOND
575	2.15	1 MINUTE

(H) THE TIME FOR FAN TO GET TO FULL SPEED

(I) CONFIRMATION THAT BOLT BAG IS INCLUDED IN FAN PACKAGE.

(J) CONFIRMATION THAT FAN MANUAL IS INCLUDED IN FAN PACKAGE.

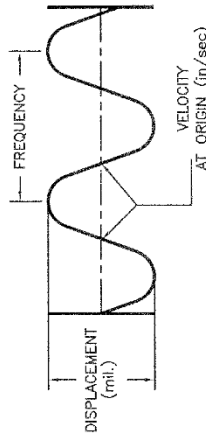
(K) CONFIRMATION THAT MOTOR MANUFACTURER'S SERVICE BULLETIN IS IN FAN PACKAGE.

(L) WARRANTY CARD ASSIGNED TO PARTICULAR FAN.

(M) TESTER INITIALS AND DATE.

(THREE PHASE DUAL VOLTAGE NO CONTROL UNITS ARE TESTED ON 230 VOLT AND 460 VOLT)

VIBRATION SINE WAVE



DISPLACEMENT :

IS THE DISTANCE THE PART
MOVES AS A RESULT OF
THE FORCES CAUSING THE VIBRATION
THE DISTANCE IS IN MILS OR 0.001 OF AN INCH.

VELOCITY :

IS THE SPEED THAT THE PART MOVES
THROUGH THE ORIGIN OF VIBRATION
CYCLE IN INCHES/SECOND

(NOTE: FOR THE SAME DISPLACEMENT THE GREATER THE
FREQUENCY THE HIGHER THE VELOCITY. AS A RESULT THE
DISPLACEMENT SPECIFICATION IS LOWER FOR A HIGHER
FREQUENCY (MOTOR RPM). THE VELOCITY HAS A
COMMON UPPER LIMIT.)