

CENTRIFUGAL FAN



Model Number

C15
C18
C22
C24
C27
C30
C33
C36

INSTALLATION & OPERATING MANUAL

P/N 789842 Rev 0

CHIEF 
AGRI/INDUSTRIAL

*We Engineer
Relationships®*

Installation Manual

WARNING: If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- **Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.**
- **WHAT TO DO IF YOU SMELL GAS**
 - **Do not try to light any appliance.**
 - **Extinguish any open flames.**
 - **Do not touch any electrical switch.**
 - **Immediately call your gas supplier. Follow the gas supplier's instructions.**
 - **If you cannot reach your gas supplier, call the fire department.**
- **Installation and service must be performed by a qualified installer, service agency or the gas supplier.**



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.

FOR YOUR SAFETY

The use and storage of gasoline and other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.

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www.agri.chiefind.com

Table of Contents

Introduction	4
Model Number Description.....	4
Packing List.....	5
Before You Begin	6
Safety and Precautions	8
Fan and Control Enclosure Components	12
Accessories:.....	12
Specifications:.....	12
Explanation of Components:	12
Replacement Parts for Specific Models:	15
Conversion Parts:	21
Fan Location and Foundation	23
Fan Installation:.....	24
Electrical Installation	25
Electrical Service Sizing	25
Electrical Connection at the Fan.....	29
Wiring Schematics:	32
Voltage Conversions:	35
Operating Instructions	39
Start-Up Procedure:	39
Shut-Down Procedure:.....	40
Maintenance	40
Off Season Operation:	40
Fan Controls:	40
Fan Motor:.....	40
Fan Blades:.....	41
Servicing the Fan:	41
Condition Specific Faults:.....	42
STANDARD LIMITED WARRANTY	45

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	14	-	1	-	1	-	2
	(a)	(b)	-	(c)	-	(d)	-	(e)
(a)	C = Centrifugal Fan Unit							
(b)	14 = Fan Wheel Diameter							
(c)	1 = Horsepower							
(d)	1 = Motor Phase							
(e)	2 = 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	Warranty Registration Card	Bulletin
1	Manual	Bulletin (441C)
1	Bolt Bag	Assembly
1	Motor	Motor Assembly

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 91A and above, and is effective 5/1/2015.



Before You Begin

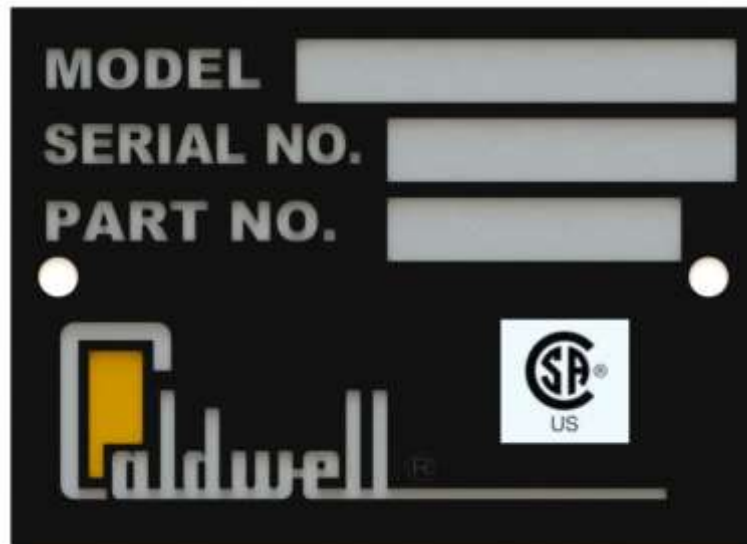
Read this manual thoroughly before operating this fan. Keep this manual in a location for quick access and reference.

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. Fan model number: _____
4. Fan serial number: _____
5. Line Voltage Measured: _____
6. Approximate operating pressure: _____
7. Hours the unit has been in operation: _____
8. Diameter and eave height of bin: _____
9. Grain depth: _____
10. Type of grain stored: _____
11. Moisture content of the grain: _____
12. Dealer purchased from: _____
13. Dealer address and phone number: _____
14. Date purchased: _____
15. 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:

	 DANGER
	HIGH VOLTAGE WILL CAUSE SEVERE INJURY OR DEATH LOCK OUT POWER SUPPLY BEFORE OPENING ENCLOSURE AND SERVICING
	LE CONTACT DU COURANT ÉLECTRIQUE PEUT CAUSER DE GRAVES BLESSURES OU LA MORT VERROUILLER L'ALIMENTATION HORS TENSION AVANT D'OUVRIR L'ENCEINTE ET D'INTERVENIR

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 WARNING

ROTATING BLADE OR WHEEL CAN CAUSE SEVERE INJURY Keep guards in place. Stay clear of fan blade at all times LOCK OUT POWER BEFORE REMOVING GUARD.

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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 99% 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

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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 (#736280) can be used with any fan that has 230 volt magnetic controls.
2. 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.
3. Rain hoods are available to reduce precipitation from entering the fan.
4. 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.
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.

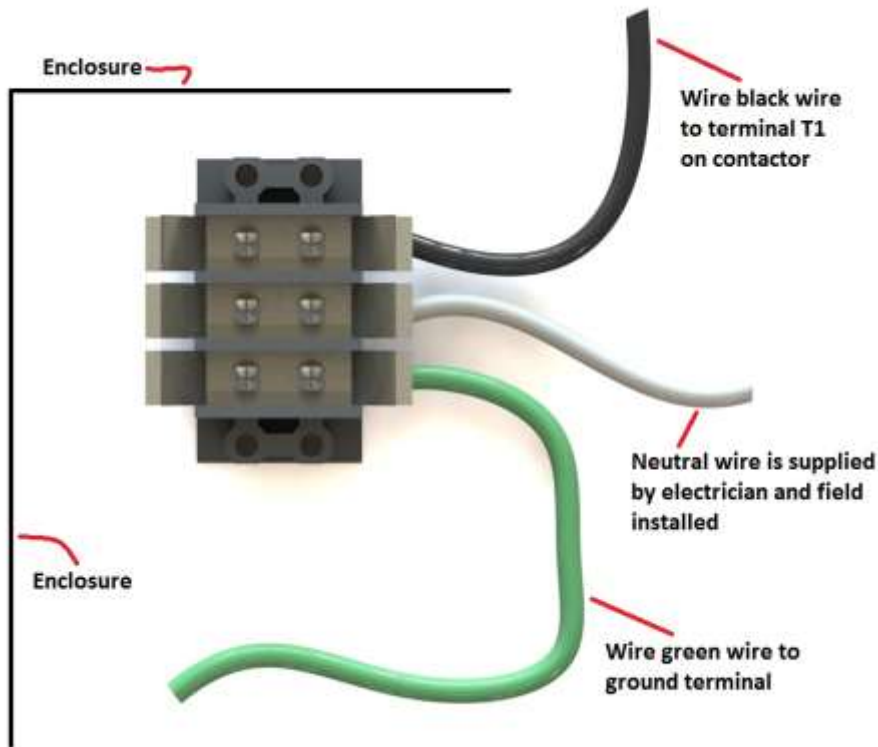
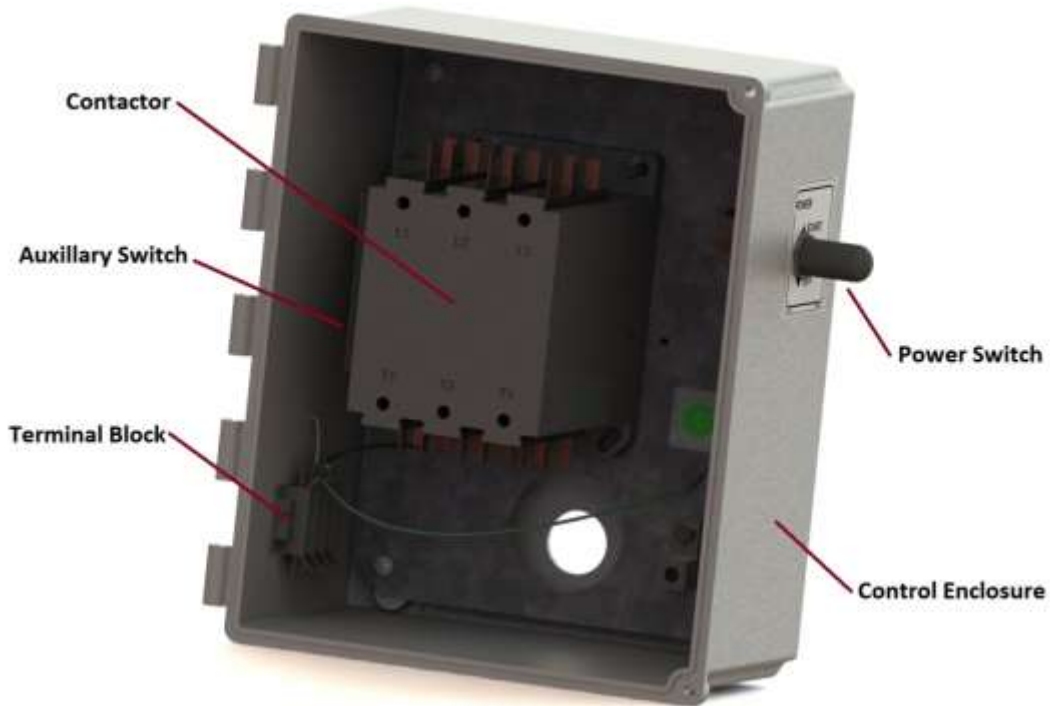
Specifications:

Note: All single phase fan models utilize a permanent split phase capacitor start motor.

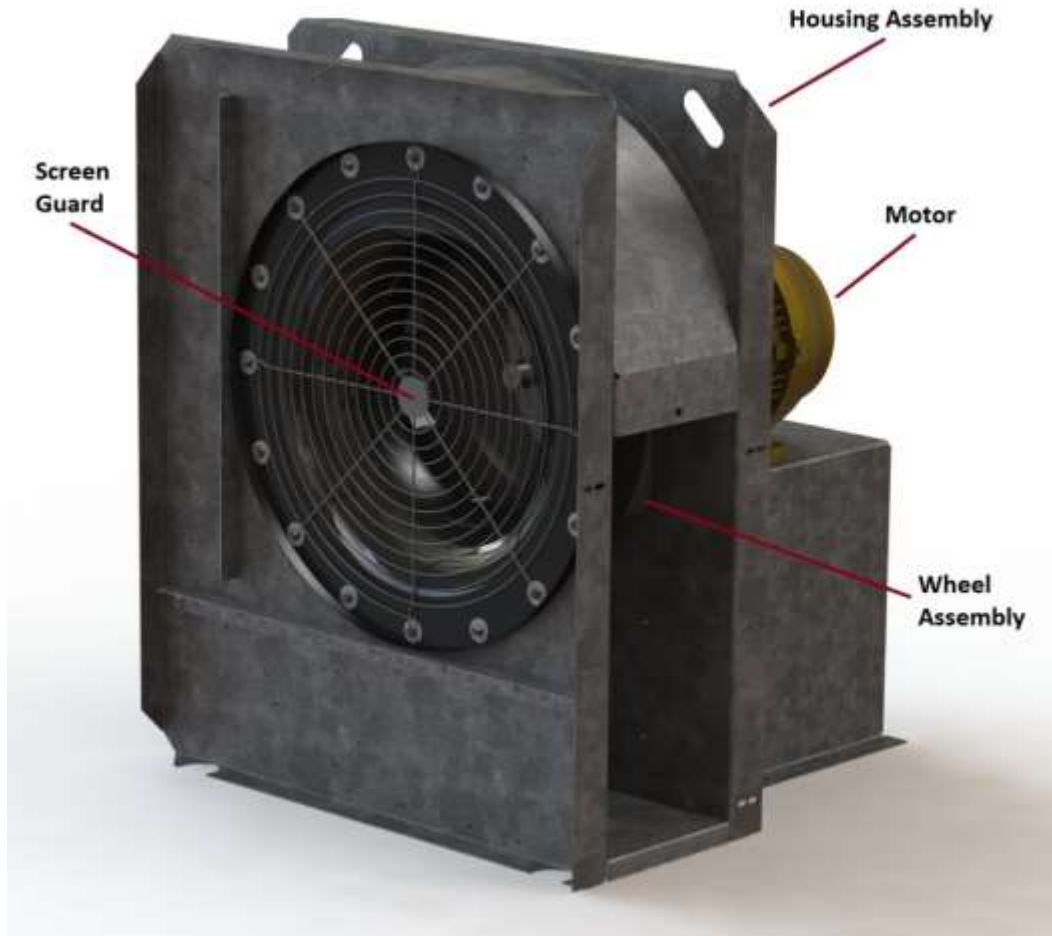
Explanation of Components:

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

Control Enclosure Components:



Fan Body Components:



The balloon callouts shown in the above illustration specify each component of the fan.

1. **Toggle Switch (#710707)** - The toggle switch is the fan "On" and "Off" and "Momentary Start" 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 switch used for switching the power circuits of the drive motor.
5. **Neutral Terminal Block 3 POLE (#850255)** - This terminal block is used as a junction block to establish a common neutral for connection of the neutral leads.

Replacement Parts for Specific Models:

FAN	Motor	HP	Phase	Voltage	Cycle	RPM	Frame	Enclosure
C15-312	759563	3	1	230	60	3500	182T	TEFC
C15-332	757773	3	3	230	60	3500	182T	TEFC
C15-334	757773	3	3	460	60	3500	182T	TEFC
C15-335	772665	3	3	575	60	3500	182T	TEFC
C15-512	759555	5	1	230	60	3500	182T	TEFC
C15-532	757781	5	3	230	60	3500	182T	TEFC
C15-534	757781	5	3	460	60	3500	182T	TEFC
C15-535	720524	5	3	575	60	3500	182T	TEFC
C18-712	760231	7.5	1	230	60	3500	213T	TEFC
C18-732	757799	7.5	3	230	60	3500	213T	TEFC
C18-734	757799	7.5	3	460	60	3500	213T	TEFC
C18-735	772673	7.5	3	575	60	3500	213T	TEFC
C18-1012	742825	10	1	230	60	3500	215T	TEFC
C18-1032	726729	10	3	230	60	3500	215T	TEFC
C18-1034	726729	10	3	460	60	3500	215T	TEFC
C18-1035	720532	10	3	575	60	3500	215T	TEFC
C18-1532	726737	15	3	230	60	3500	254T	TEFC
C18-1534	726737	15	3	460	60	3500	254T	TEFC
C18-1535	720540	15	3	575	60	3500	254T	TEFC
C22-2032	766063	20	3	230	60	3500	256T	TEFC
C22-2034	766063	20	3	460	60	3500	256T	TEFC
C22-2035	772699	20	3	575	60	3500	256T	TEFC
C22-2532	761171	25	3	230	60	3500	284TS	TEFC
C22-2534	761171	25	3	460	60	3500	284TS	TEFC
C22-2535	772707	25	3	575	60	3500	284TS	TEFC
C22-3032	761189	30	3	230	60	3500	286TS	TEFC
C22-3034	761189	30	3	460	60	3500	286TS	TEFC
C22-3035	772715	30	3	575	60	3500	286TS	TEFC
C22-4032	748186	40	3	230	60	3500	324TS	TEFC
C22-4034	748186	40	3	460	60	3500	324TS	TEFC
C22-4035	772723	40	3	575	60	3500	324TS	TEFC
C22-5032	742775	50	3	230	60	3500	326TS	TEFC
C22-5034	742775	50	3	460	60	3500	326TS	TEFC
C22-5035	772202	50	3	575	60	3500	326TS	TEFC

FAN	Motor	HP	Phase	Voltage	Cycle	RPM	Frame	Enclosure
C22-312	765834	3	1	230	60	1750	182T	ODP
C22-332	765842	3	3	230	60	1750	182T	ODP
C22-334	765842	3	3	460	60	1750	182T	ODP
C22-335	772681	3	3	575	60	1750	182T	ODP
C24-512	734673	5	1	230	60	1750	184T	ODP
C24-532	734574	5	3	230	60	1750	184T	ODP
C24-534	734574	5	3	460	60	1750	184T	ODP
C24-535	772731	5	3	575	60	1750	184T	ODP
C24-712	734806	7.5	1	230	60	1750	215T	ODP
C24-732	734681	7.5	3	230	60	1750	215T	ODP
C24-734	734681	7.5	3	460	60	1750	215T	ODP
C24-735	769976	7.5	3	575	60	1750	215T	ODP
C27-1012	852350	10	1	230	60	1750	215T	ODP
C27-1032	852368	10	3	230	60	1750	215T	ODP
C27-1034	852368	10	3	460	60	1750	215T	ODP
C27-1035	720557	10	3	575	60	1750	215T	ODP
C27-1512	721936	15	1	230	60	1750	254T	ODP
C27-1532	852384	15	3	230	60	1750	254T	ODP
C27-1534	852384	15	3	460	60	1750	254T	ODP
C27-1535	720565	15	3	575	60	1750	254T	ODP
C30-2012	766998	20	1	230	60	1750	284TZ	ODP
C30-2032	852400	20	3	230	60	1750	256TZ	ODP
C30-2034	852400	20	3	460	60	1750	256TZ	ODP
C30-2035	740977	20	3	575	60	1750	256T	ODP
C30-2532	719971	25	3	230	60	1750	284T	ODP
C30-2534	719971	25	3	460	60	1750	284T	ODP
C30-2535	753285	25	3	575	60	1750	284T	ODP
C33-3032	745885	30	3	230	60	1750	286T	ODP
C33-3034	745885	30	3	460	60	1750	286T	ODP
C33-3035	772822	30	3	575	60	1750	286T	ODP
C33-4032	766527	40	3	230	60	1750	324T	ODP
C33-4034	766527	40	3	460	60	1750	324T	ODP
C33-4035	772830	40	3	575	60	1750	324T	ODP
C33-5032	748335	50	3	230	60	1750	326T	ODP
C33-5034	748335	50	3	460	60	1750	326T	ODP
C33-5035	760413	50	3	575	60	1750	326T	ODP
C33-6032	766683	60	3	230	60	1750	364T	ODP
C33-6034	766683	60	3	460	60	1750	364T	ODP
C33-6035	772848	60	3	575	60	1750	364T	ODP
C36-7532	767558	75	3	230	60	1750	365T	ODP
C36-7534	767558	75	3	460	60	1750	365T	ODP
C36-7535	769604	75	3	575	60	1750	365T	ODP
C36-10032	767566	100	3	230	60	1750	404T	ODP
C36-10034	767566	100	3	460	60	1750	404T	ODP
C36-10035	772855	100	3	575	60	1750	404T	ODP

FAN	CONTROL ENCLOSURE	CONTROL ENCLOSURE COVER	MAGNETIC STARTER	HOLDING COIL	O.L. HEATER
C15-312	701268	719393	736728	756437	756270
C15-332	701268	719385	763710	756437	768911
C15-334	701268	719401	736710	752659	765875
C15-335	701268	719401	736710	752626	768929
C15-512	701268	719393	736728	756437	773754
C15-532	701268	719385	736710	756437	756312
C15-534	701268	719401	736710	752659	759662
C15-535	701268	719401	736710	752626	752568
C18-712	701268	719393	710996	741124	756213
C18-732	701268	719385	736710	756437	756221
C18-734	701268	719401	736710	752659	759688
C18-735	701268	719401	736710	752626	765883
C18-1012	701268	719393	710996	741124	756338
C18-1032	701268	719385	711002	756437	756197
C18-1034	701268	719401	711002	752659	756205
C18-1035	701268	719401	736710	752626	759688
C18-1532	701268	719385	711010	741124	756213
C18-1534	701268	719401	736710	752659	752576
C18-1535	701268	719401	736710	752626	756312
C22-2032	744169	744201	711028	752634	756338
C22-2034	701268	719401	711002	752659	768531
C22-2035	701268	719401	711002	752626	756247
C22-2532	744169	744201	711028	752634	756320
C22-2534	701268	719401	711002	752659	756304
C22-2535	701268	719401	711002	752626	756197
C22-3032	744169	744201	744177	752634	755835
C22-3034	719450	719401	711010	752667	756213
C22-3035	719450	719401	711010	752642	769141
C22-4032	744169	744201	752360	759126	769018
C22-4034	719450	719401	711010	752667	756296
C22-4035	719450	719401	711010	752642	756262
C22-5032	744169	744201	752360	759126	768986
C22-5034	744169	766873	711028	752675	756353
C22-5035	744169	766873	711028	770909	756338

FAN	HOUSING	BLADE	INLET ORIFICE	SCREEN GUARD
C15-312	757088	760066	757559	850461
C15-332	757088	760066	757559	850461
C15-334	757088	760066	757559	850461
C15-335	757088	760066	757559	850461
C15-512	757070	756924	757559	850461
C15-532	757070	760924	757559	850461
C15-534	757070	760924	757559	850461
C15-535	757070	760924	757559	850461
C18-712	759951	756932	724815	850453
C18-732	759951	756932	724815	850453
C18-734	759951	756932	724815	850453
C18-735	759951	756932	724815	850453
C18-1012	725937	725903	724815	850453
C18-1032	725937	725903	724815	850453
C18-1034	725937	725903	724815	850453
C18-1035	725937	725903	724815	850453
C18-1532	725945	725911	724815	850453
C18-1534	725945	725911	724815	850453
C18-1535	725945	725911	724815	850453
C22-2032	765925	766089	743187	850446
C22-2034	765925	766089	743187	850446
C22-2035	765925	766089	743187	850446
C22-2532	743237	761114	743187	850446
C22-2534	743237	761114	743187	850446
C22-2535	743237	761114	743187	850446
C22-3032	743245	761122	743187	850446
C22-3034	743245	761122	743187	850446
C22-3035	743245	761122	743187	850446
C22-4032	766311	766444	743187	850446
C22-4034	766311	766444	743187	850446
C22-4035	766311	766444	743187	850446
C22-5032	742759	742783	743187	850446
C22-5034	742759	742783	743187	850446
C22-5035	742759	742783	743187	850446

FAN	CONTROL ENCLOSURE	CONTROL ENCLOSURE COVER	MAGNETIC STARTER	HOLDING COIL	O.L. HEATER
C22-312	701268	719393	736728	756437	768945
C22-332	701268	719385	763710	756437	756205
C22-334	701268	719401	736710	752659	752568
C22-335	701268	719401	736710	752626	759654
C24-512	701268	719393	736728	756437	768960
C24-532	701268	719385	736710	756437	756247
C24-534	701268	719401	736710	752659	756254
C24-535	701268	719401	736710	752626	768994
C24-712	701268	719393	710996	741124	756338
C24-732	701268	719385	736710	756437	756288
C24-734	701268	719401	736710	752659	756395
C24-735	701268	719401	736710	752626	768911
C27-1012	701268	719393	710996	741124	756296
C27-1032	701268	719385	711026	756437	756304
C27-1034	701268	719401	711026	752659	756312
C27-1035	701268	719401	736710	752626	756205
C27-1512	744169	744201	725861	752634	756320
C27-1532	701268	719385	711010	741124	756338
C27-1534	701268	719401	736710	752659	756197
C27-1535	701268	719401	736710	752626	752576
C30-2012					
C30-2032	744169	744201	711028	752634	756353
C30-2034	701268	719401	711002	752659	756304
C30-2035	701268	719401	711002	752626	768531
C30-2532	744169	744201	711028	752634	756320
C30-2534	701268	719401	711002	752659	756999
C30-2535	701268	719401	711002	752626	756288
C33-3032	744169	744201	744177	752634	770917
C33-3034	719450	719401	711010	752667	756262
C33-3035	719450	719401	711010	752642	768952
C33-4032	744169	744201	752360	759126	769000
C33-4034	719450	719401	711010	752667	756296
C33-4035	719450	719401	711010	752642	756338
C33-5032	744169	744201	752360	759126	756403
C33-5034	744169	766873	711028	752675	756320
C33-5035	744169	766873	711028	770909	756296
C33-6032	774570	774604	766865		768994
C33-6034	744169	766873	744177	752675	770917
C33-6035	744169	766873	744177	770909	755835
C36-7532	774570	774604	766865		756254
C36-7534	744169	766873	752360	742361	769018
C36-7535	744169	766873	752360	742320	772194
C36-10032	774570	774604	766865		756205
C36-10034	744169	766873	752360	742361	756403
C36-10035	744169	766873	752360	742320	769000

FAN	HOUSING	BLADE	INLET ORIFICE	SCREEN GUARD
C22-312	765768	765867	743187	850446
C22-332	765768	765867	743187	850446
C22-334	765768	765867	743187	850446
C22-335	765768	765867	743187	850446
C24-512	728949	734582	734525	850446
C24-532	728949	734582	734525	850446
C24-534	728949	734582	734525	850446
C24-535	728949	734582	734525	850446
C24-712	728931	743492	734525	850446
C24-732	728931	743492	734525	850446
C24-734	728931	743492	734525	850446
C24-735	728931	743492	734525	850446
C27-1012	701201	715144	701219	850479
C27-1032	701201	715144	701219	850479
C27-1034	701201	715144	701219	850479
C27-1035	701201	715144	701219	850479
C27-1512	701193	715151	701219	850479
C27-1532	701193	715151	701219	850479
C27-1534	701193	715151	701219	850479
C27-1535	701193	715151	701219	850479
C30-2012	766972	715169	701243	850479
C30-2032	701235	715169	701243	850479
C30-2034	701235	715169	701243	850479
C30-2035	701235	715169	701243	850479
C30-2532	728915	725929	701243	850479
C30-2534	728915	725929	701243	850479
C30-2535	728915	725929	701243	850479
C33-3032	744094	745844	745752	745869
C33-3034	744094	745844	745752	745869
C33-3035	744094	745844	745752	745869
C33-4032	766659	766543	745752	745869
C33-4034	766659	766543	745752	745869
C33-4035	766659	766543	745752	745869
C33-5032	748145	748343	745752	745869
C33-5034	748145	748343	745752	745869
C33-5035	748145	748343	745752	745869
C33-6032	766725	766709	745752	745869
C33-6034	766725	766709	745752	745869
C33-6035	766725	766709	745752	745869
C36-7532	767228	767582	767624	745869
C36-7534	767228	767582	767624	745869
C36-7535	767228	767582	767624	745869
C36-10032	767400	767608	767624	745869
C36-10034	767400	767608	767624	745869
C36-10035	767400	767608	767624	745869

Conversion Parts:

Converting 230 Volt 3 Phase Fan to 460 Volt 3 Phase Fan				
Fan	Converted To	Starter	Holding Coil	Overload Heater
C15-332	C15-334		752659	765875
C15-532	C15-534		752659	759662
C18-732	C18-734		752659	759688
C18-1032	C18-1034		752659	756205
C18-1532	C18-1534		752667	768945
C22-2032	C22-2034		752675	756239
C22-2532	C22-2534		752675	769141
C22-3032	C22-3034	711010	752667	756213
C22-4032	C22-4034	711010	752667	756296
C22-5032	C22-5034	711028	752675	756353
C22-332	C22-334		752659	752568
C24-532	C24-534		752659	756254
C24-732	C24-734		752659	756395
C27-1032	C27-1034		752659	756312
C27-1532	C27-1534		752667	756239
C30-2032	C30-2034		752675	768960
C30-2532	C30-2534		752675	769141
C33-3032	C33-3034	711010	752667	756262
C33-4032	C33-4034	711010	752667	756296
C33-5032	C33-5034	711028	752675	756320
C33-6032	C33-6034	744177	752675	770917
C36-7532	C36-7534	752360	742361	769018
C36-10032	C36-10034	752360	742361	756403

Converting 460 Volt 3 Phase Fan to 230 Volt 3 Phase Fan				
Fan	Converted To	Starter	Holding Coil	Overload Heater
C15-334	C15-332		756437	768911
C15-534	C15-532		756437	756312
C18-734	C18-732		756437	756221
C18-1034	C18-1032		756437	756197
C18-1534	C18-1532	711010		756213
C22-2034	C22-2032	711028		756338
C22-2534	C22-2532	711028		756320
C22-3034	C22-3032	744177		755835
C22-4034	C22-4032	752360		769018
C22-5034	C22-5032	752360		768986
C22-334	C22-332		756437	756205
C24-534	C24-532		756437	756247
C24-734	C24-732		756437	756288
C27-1034	C27-1032		756437	756304
C27-1534	C27-1532	711010		756338
C30-2034	C30-2032	711028		756353
C30-2534	C30-2532	711028		756320
C33-3034	C33-3032	744177		770917
C33-4034	C33-4032	752360		769000
C33-5034	C33-5032	752360		756403
C33-6034	C33-6032	766865		768994
C36-7534	C36-7532	766865		756254
C36-10034	C36-10032	766865		756205

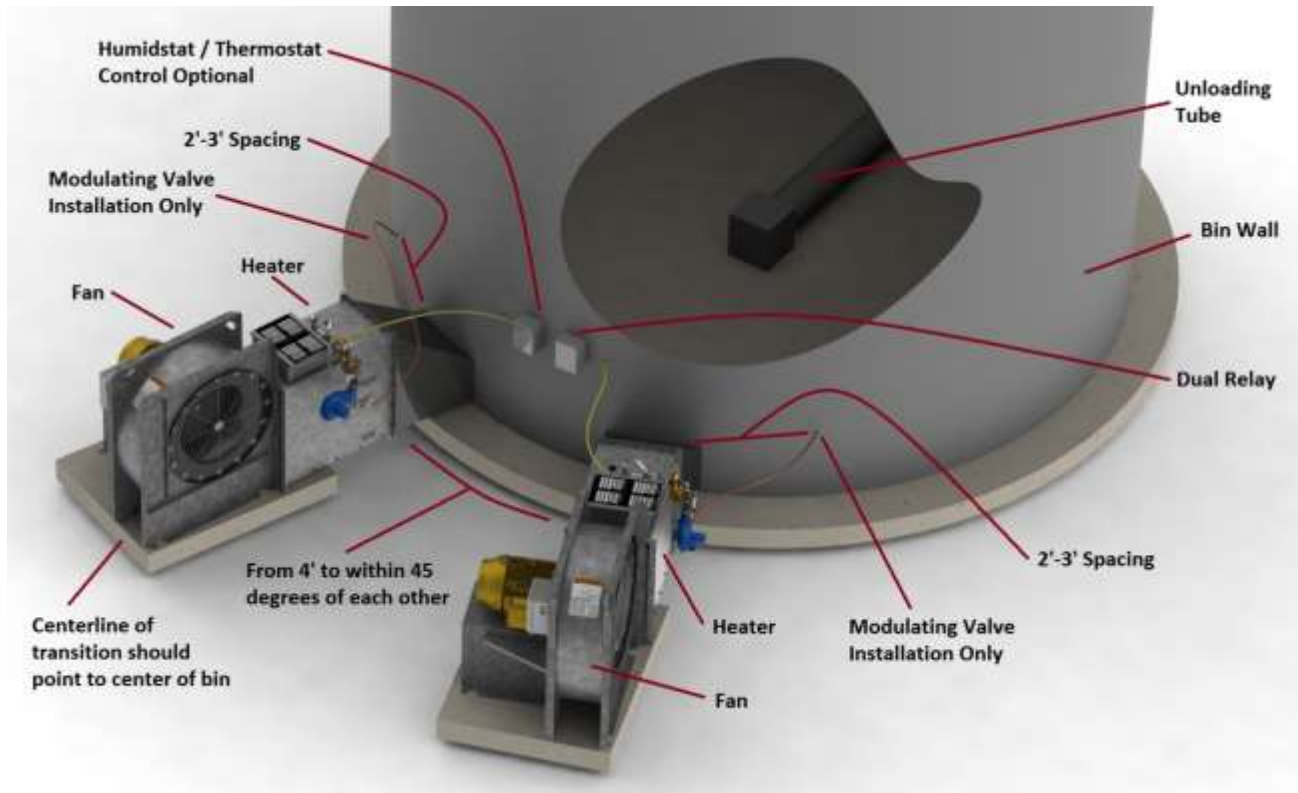
Installation Requirements

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

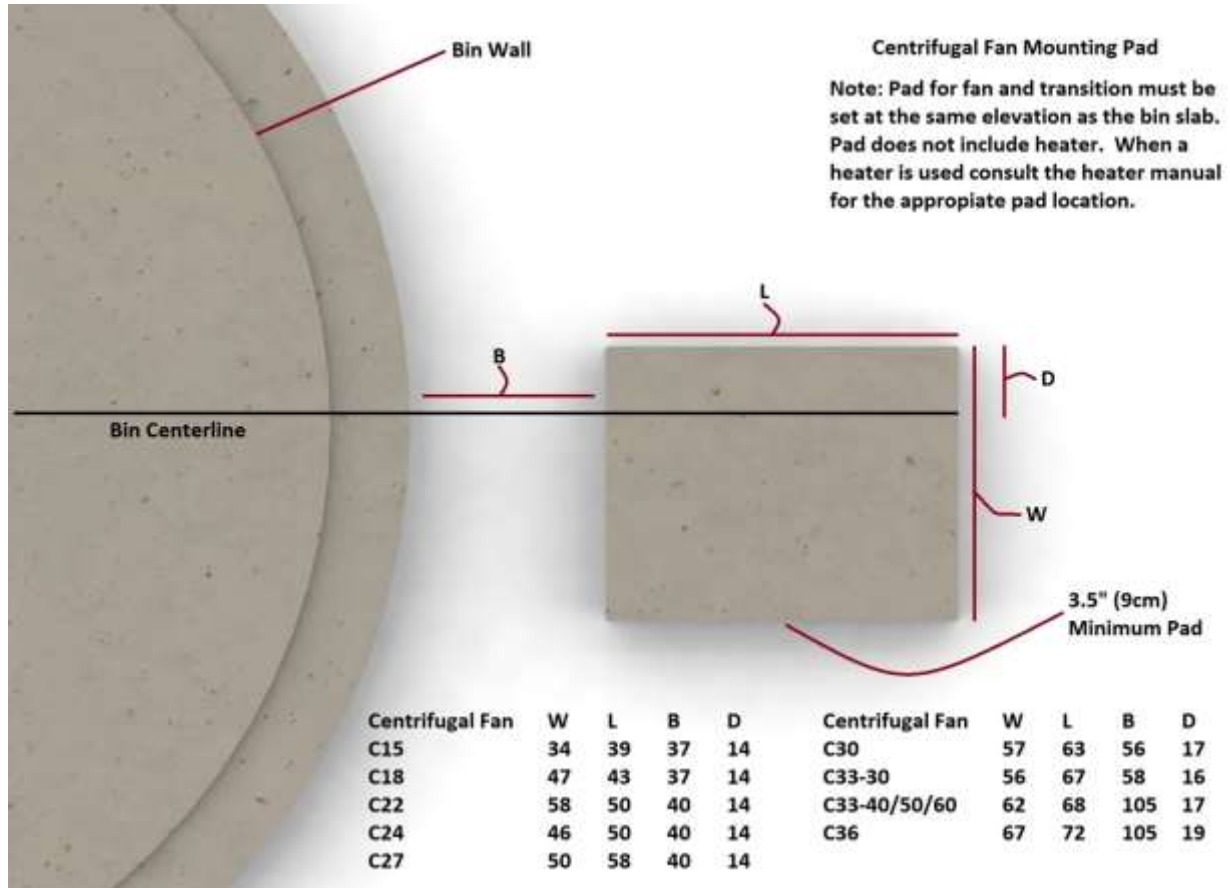


Fan Location and Foundation

The following illustration shows a typical installation of 2 drying units and optional plenum controls. If two drying units are used on the same bin, locate them 4' (1.21m) to within 45° of each other and centered opposite the unloading tube. Locate any humidistat or thermostat control between the two fan units, making sure control senses heat from both units (order kit #9735035).



For proper operation of fan, the units are to be mounted on a level pad. 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 or heater the fan legs should be evenly supported on the concrete pad. If necessary adjust the leveling bolts under the fan legs so that the fan cannot vibrate. Verify the fan weight is distributed properly and is not putting an uneven load on the fan housing. The fan will need to be operated to evaluate the tension required at the leveling foot by torquing the leveling lock nut down on the leveling foot frame.



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. Check air flow decals on the fan to verify it is oriented properly. 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 blade 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

Check the type of electrical service and make sure 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 can be wired / converted for either voltage.

1750 RPM Centrifugal Fan Model Specifications						
	Model Number	Wheel Diameter	HP	Phase	Voltage	Amp Max
Domestic	C30-2012	30	20	1	230	77
	C33-6032	33	60	3	230	149.8
	C36-7532	36	75	3	230	180
	C36-10032	36	100	3	230	250
CSA Listed Units	C22-312	22	3	1	230	15
	C22-332	22	3	3	230	8.6
	C22-334	22	3	3	460	4.3
	C22-335	22	3	3	575	3.8
	C24-512	24	5	1	230	23
	C24-532	24	5	3	230	14.4
	C24-534	24	5	3	460	7.2
	C24-535	24	5	3	575	5.9
	C24-712	24	7	1	230	35.6
	C24-732	24	7	3	230	21
	C24-734	24	7	3	460	10.5
	C24-735	24	7	3	575	8.3
	C27-1012	27	10	1	230	48
	C27-1032	27	10	3	230	27.4
	C27-1034	27	10	3	460	13.7
	C27-1035	27	10	3	575	10.7
	C27-1512	27	15	1	230	60
	C27-1532	27	15	3	230	42.2
	C27-1534	27	15	3	460	21.1
	C27-1535	27	15	3	575	16.5
	C30-2032	30	20	3	230	52.2
	C30-2034	30	20	3	460	26.1
	C30-2035	30	20	3	575	20
	C30-2532	30	25	3	230	63
	C30-2534	30	25	3	460	31.5
	C30-2535	30	25	3	575	26
	C33-3032	33	30	3	230	74.8
	C33-3034	33	30	3	460	37.4
	C33-3035	33	30	3	575	31
	C33-4032	33	40	3	230	100.8
	C33-4034	33	40	3	460	50.4
	C33-4035	33	40	3	575	40
	C33-5032	33	50	3	230	125
	C33-5034	33	50	3	460	62.5
	C33-5035	33	50	3	575	50
	C33-6034	33	60	3	460	74.9
C33-6035	33	60	3	575	61	
C36-7534	36	75	3	460	90	
C36-7535	36	75	3	575	76	
C36-10034	36	100	3	460	125	
C36-10035	36	100	3	575	98	

3500 RPM Centrifugal Fan Model Specifications						
	Model Number	Wheel Diameter	HP	Phase	Voltage	Amp Max
CSA Listed Units	C15-312	15	3	1	230	15.6
	C15-332	15	3	3	230	9.2
	C15-334	15	3	3	460	4.6
	C15-335	15	3	3	575	3.5
	C15-512	15	5	1	230	26
	C15-532	15	5	3	230	13.4
	C15-534	15	5	3	460	6.7
	C15-535	15	5	3	575	5.5
	C18-712	18	7	1	230	36
	C18-732	18	7	3	230	20
	C18-734	18	7	3	460	10
	C18-735	18	7	3	575	8.5
	C18-1012	18	10	1	230	45
	C18-1032	18	10	3	230	25.6
	C18-1034	18	10	3	460	12.8
	C18-1035	18	10	3	575	10
	C18-1532	18	15	3	230	40
	C18-1534	18	15	3	460	20
	C18-1535	18	15	3	575	15
	C22-2032	22	20	3	230	49.2
	C22-2034	22	20	3	460	24.6
	C22-2035	22	20	3	575	20
	C22-2532	22	25	3	230	60
	C22-2534	22	25	3	460	30
	C22-2535	22	25	3	575	25.5
	C22-3032	22	30	3	230	70
	C22-3034	22	30	3	460	35
	C22-3035	22	30	3	575	30.5
	C22-4032	22	40	3	230	99
	C22-4034	22	40	3	460	49.5
	C22-4035	22	40	3	575	40
	C22-5032	22	50	3	230	123
C22-5034	22	50	3	460	61.5	
C22-5035	22	50	3	575	50	

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 and 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 to handle the recommended time delay fuse or circuit breaker size.

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				TIME DELAY FUSE/BREAKER 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								TIME DELAY FUSE/BREAKER 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				TIME DELAY FUSE/BREAKER 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

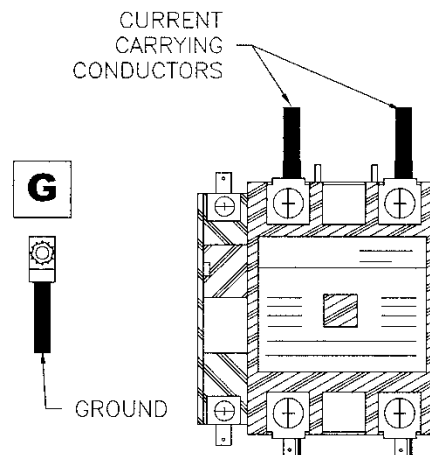
Electrical service examples:

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 / breaker 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 make sure a voltage drop is not developed.

Electrical Connection at the Fan

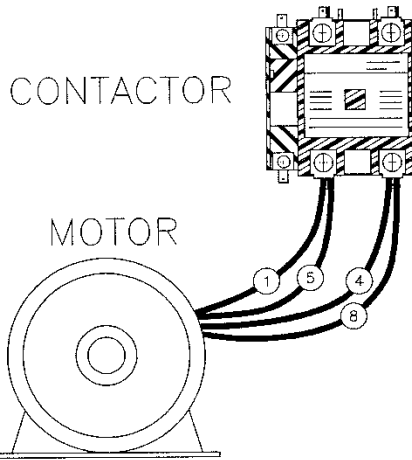
1. Single Phase

- 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".



- i.
 - b. With the power locked out and tagged out at the fan disconnect, the motor lead wires will need to be exchanged and then securely connected to the outlet terminal of the contactor T1 and T2 as shown in the following illustration. 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

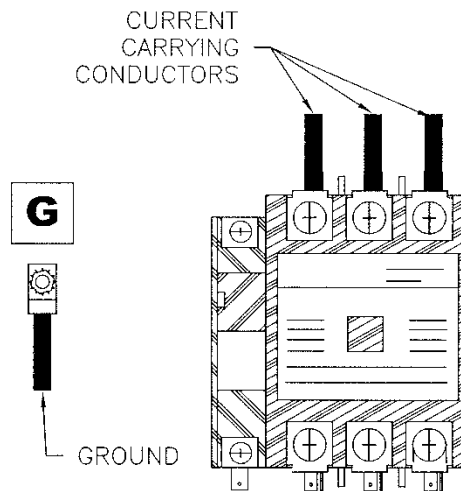
power to the fan controls and start the fan momentarily. Make sure that the blade rotation develops airflow in the direction that the decal on the fan housing illustrates.



i.

2. 3 Phase

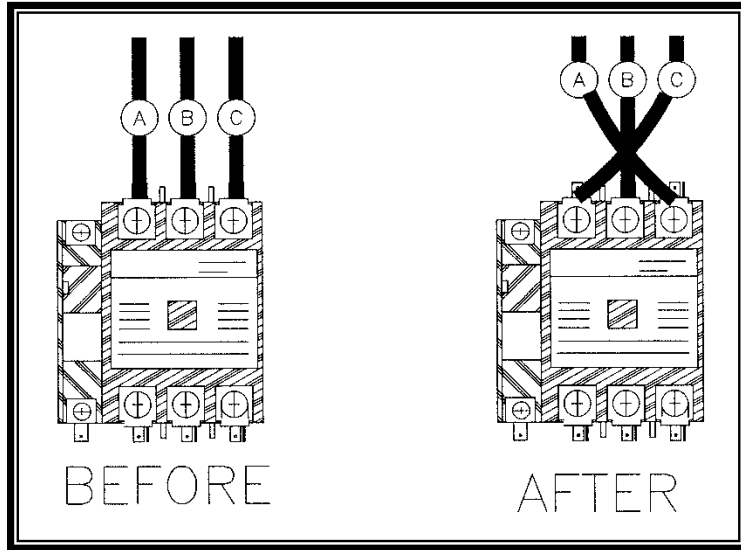
- a. When a 115 volt accessory is to be used with the Centrifugal fan a 5 wire system should be provided for fans operated on 3 phase 230 volt power. The 5 wires consist of 3 current carrying conductors, a grounded neutral and a ground. When 115 volt accessory equipment is not used, or the fan is operated 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".



i.

- b. With the power locked out and tagged out at the fan disconnect, exchange the location of the current carrying conductors at terminals L1 and L3 of the contactor as shown in the following illustration. The unit will then need to be rechecked for proper rotation.

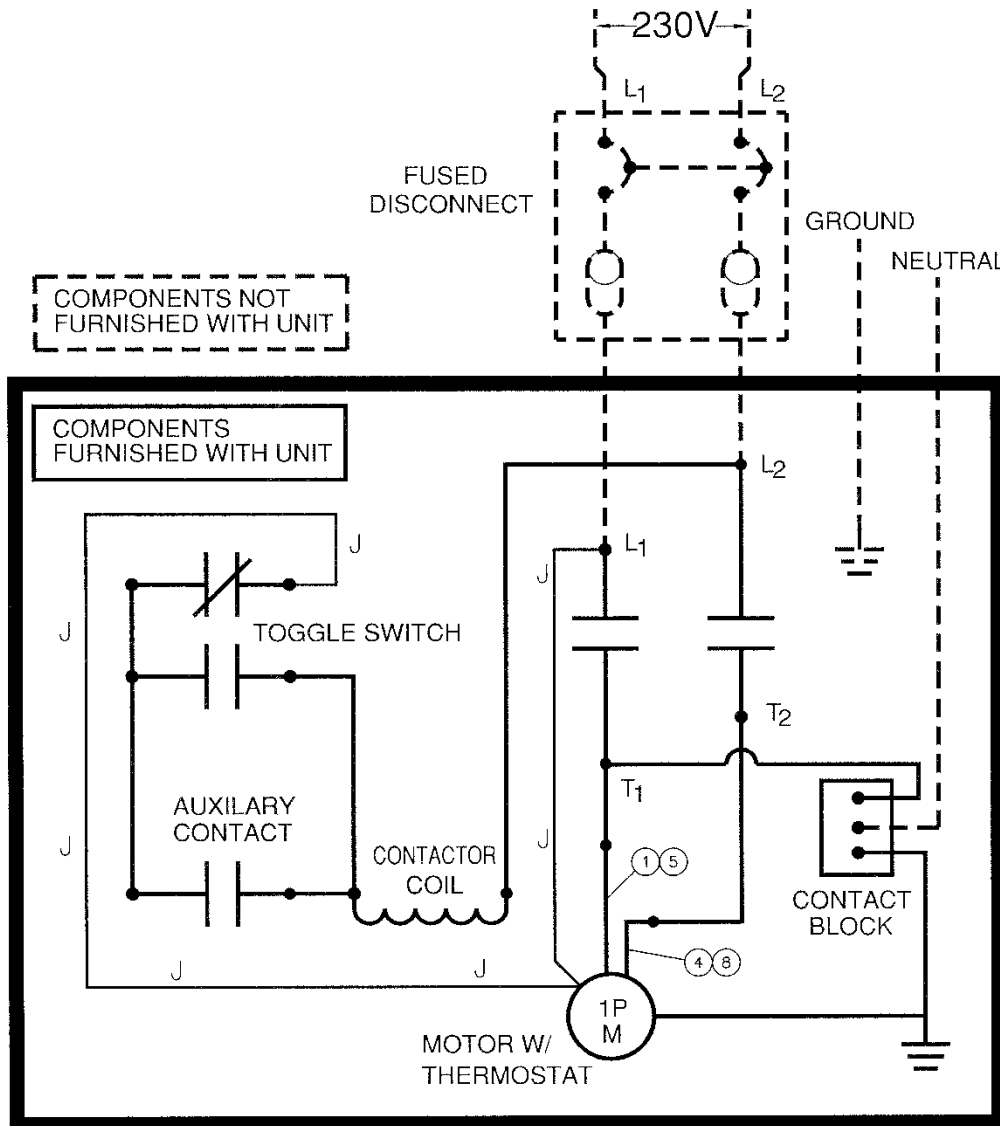
- i. If the blade is rotating in the wrong direction correct as follows: Provide power to the fan controls and start the fan momentarily. Make sure that the blade rotation develops airflow in the direction that the decal on the fan housing illustrates.



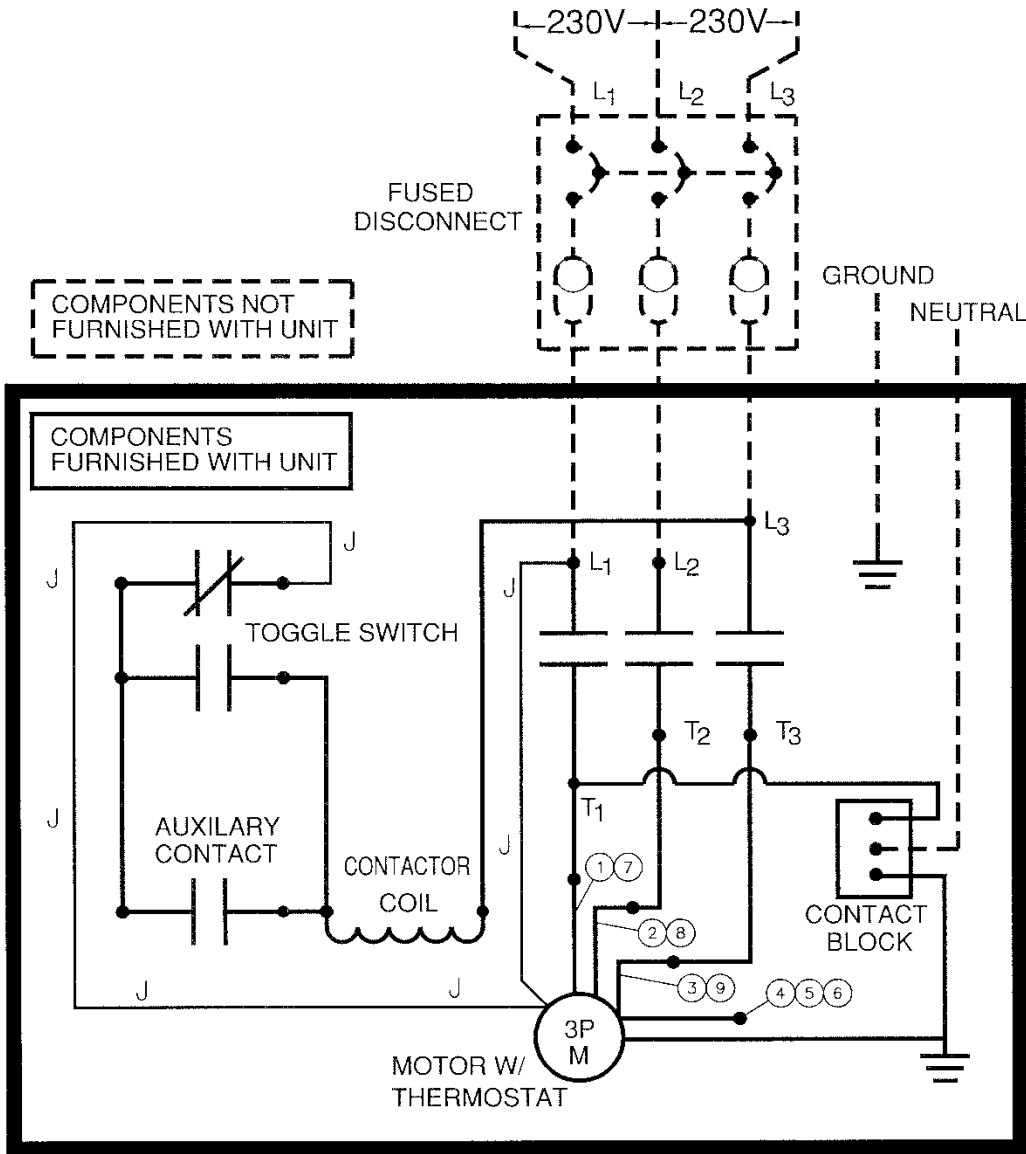
1.

Wiring Schematics:

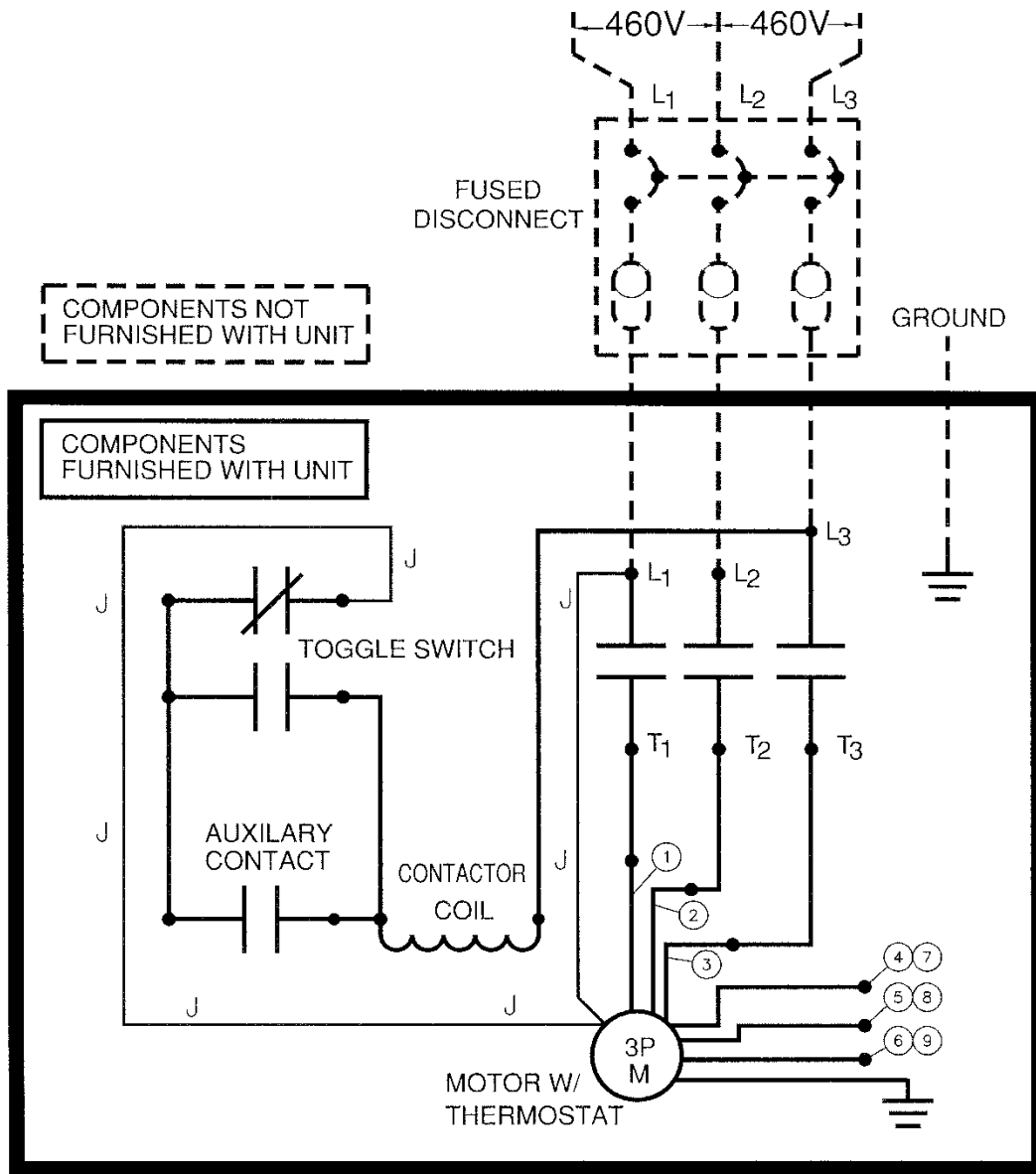
Please note the following wiring diagrams for installation:



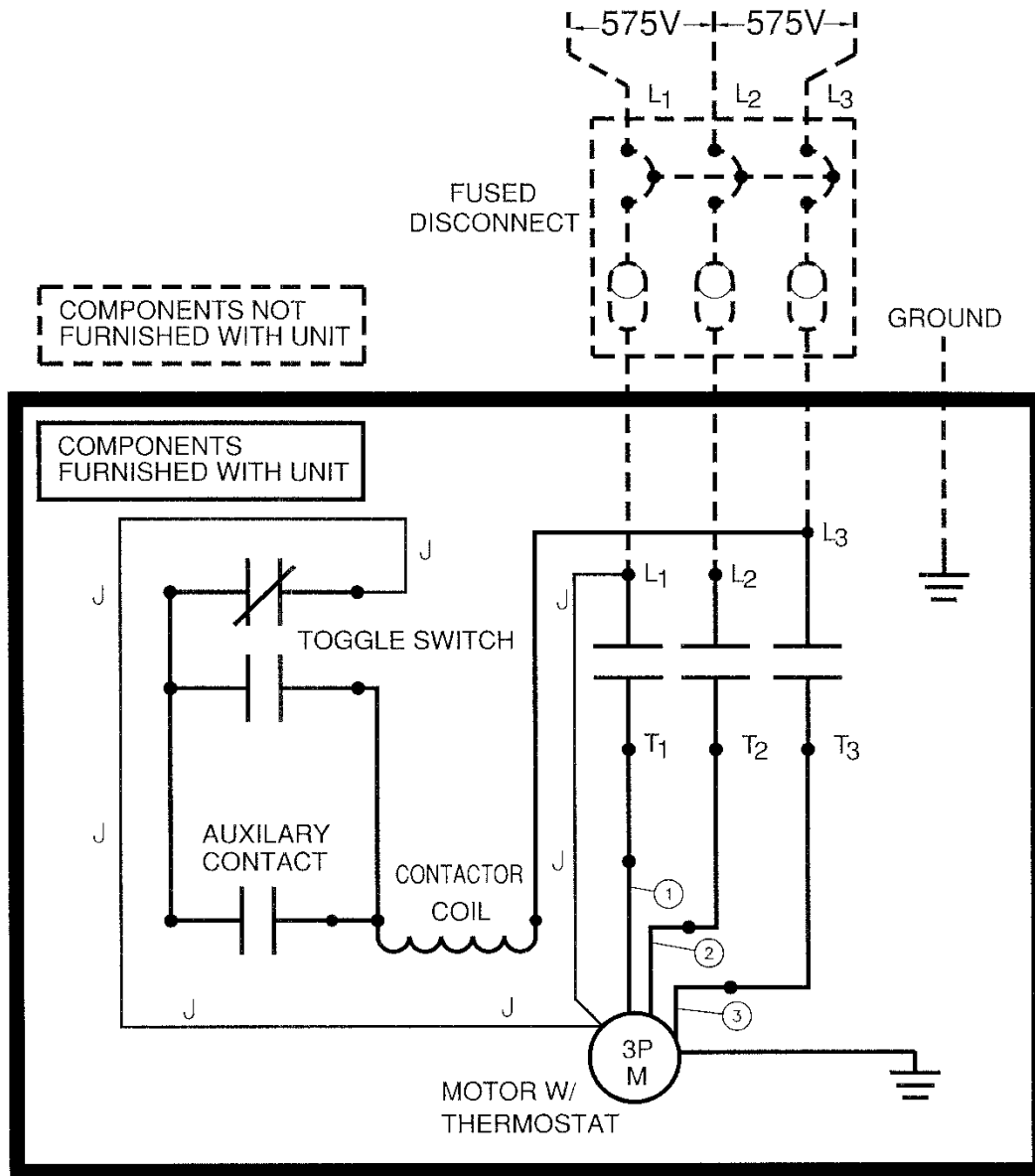
**FAN WIRING DIAGRAM SINGLE PHASE
WITH THERMOSTAT IN MOTOR (230 V COIL)**



FAN WIRING DIAGRAM THREE PHASE WITH THERMOSTAT IN MOTOR (230 V COIL)



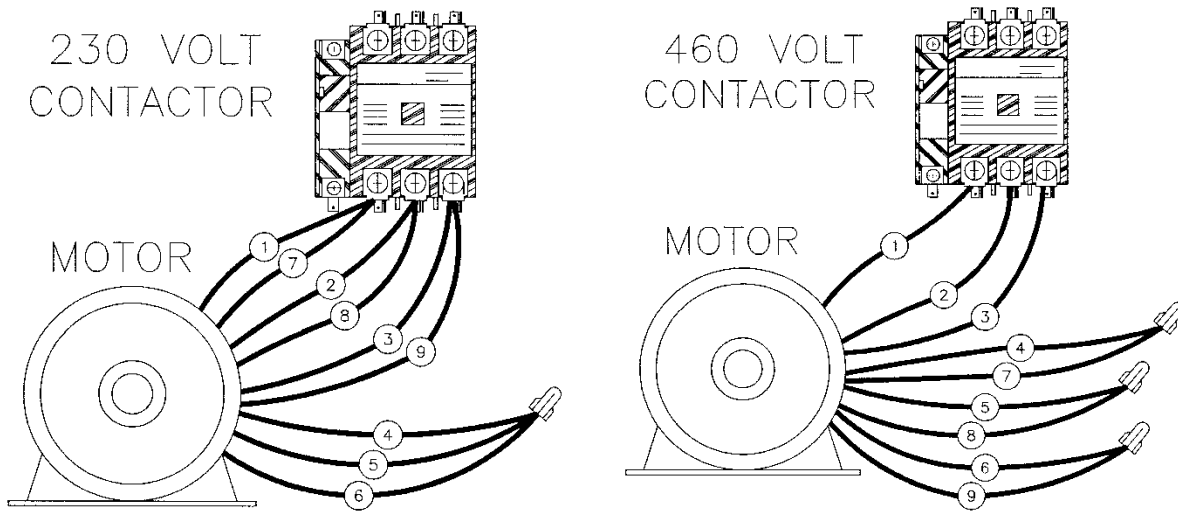
FAN WIRING DIAGRAM THREE PHASE WITH THERMOSTAT IN MOTOR (460 V COIL)



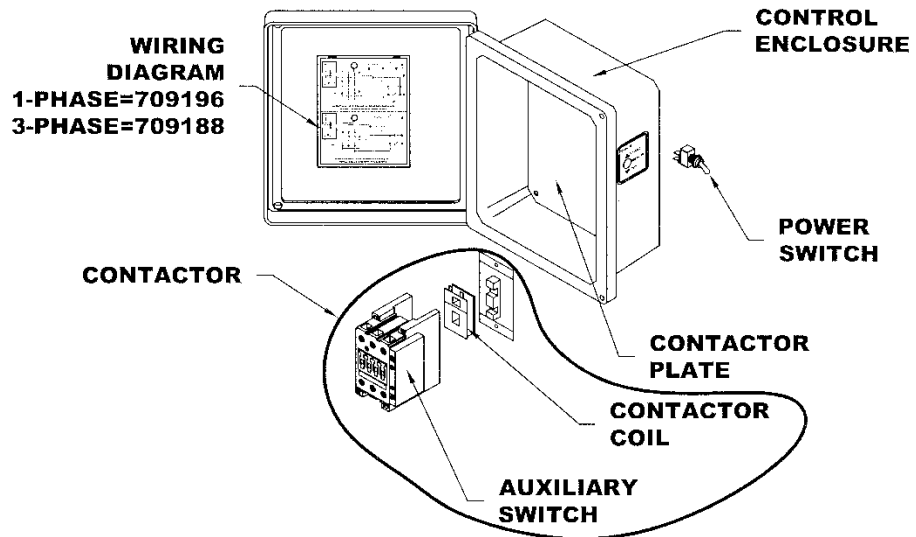
FAN WIRING DIAGRAM THREE PHASE WITH THERMOSTAT IN MOTOR (575 V COIL)

Voltage Conversions:

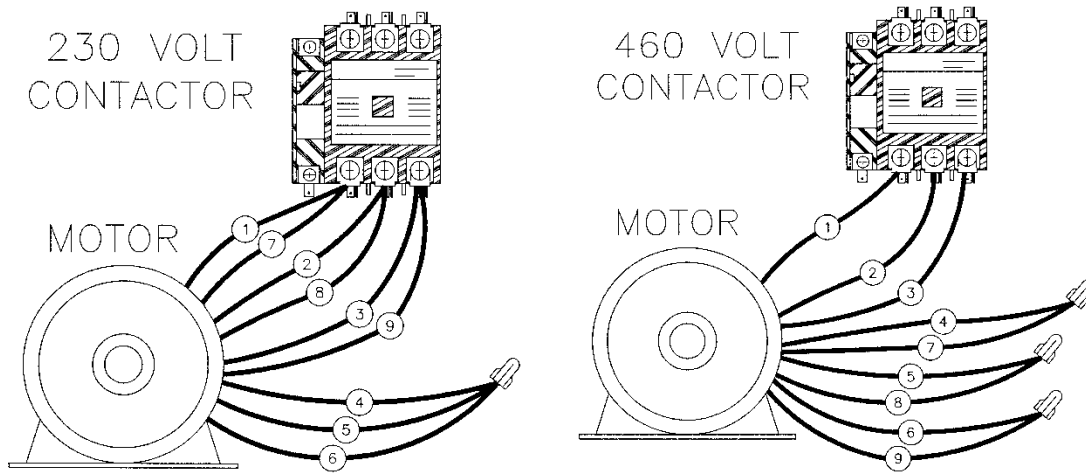
1. Converting a 3 phase dual voltage fan wired for 230 volts to 460 volt service:
 - a. Make sure to lock out and tag out the power to the fan to ensure no power is present when rewiring.
 - b. Disconnect the motor leads attached to the contactor terminals T1, T2 and T3. Break the connection of the motor leads 4, 5 and 6 so that each motor lead is separate.



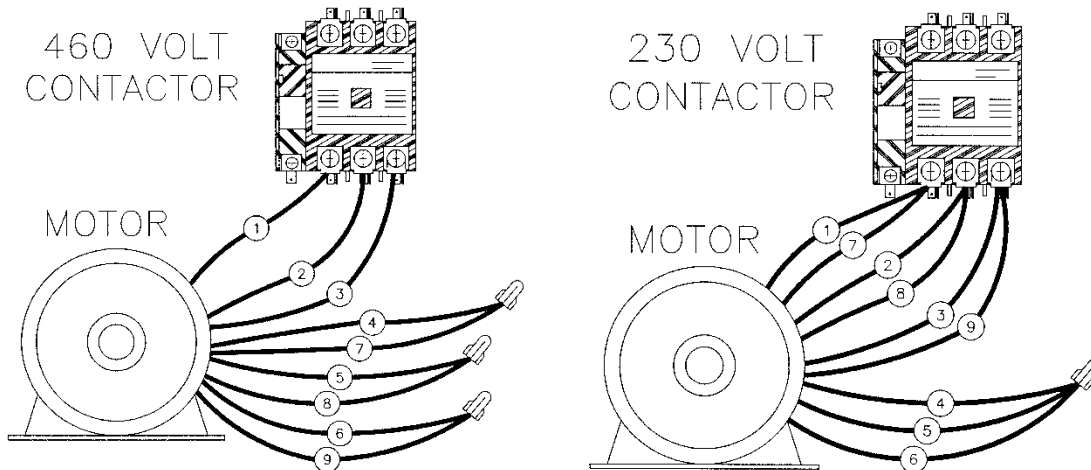
- c. Remove the contactor from the control enclosure and disconnect the wires from the contactor to the push button start switch and to the motor thermal protector. Disassemble the contactor.
- d. The holding coil or complete contactor will need to be replaced. Refer to the [conversion parts table](#) to order the correct 460 volt holding coil or contactor indicated for the fan model being converted. Next reassemble the contactor with the new 460 volt contactor as shown in the following illustration.



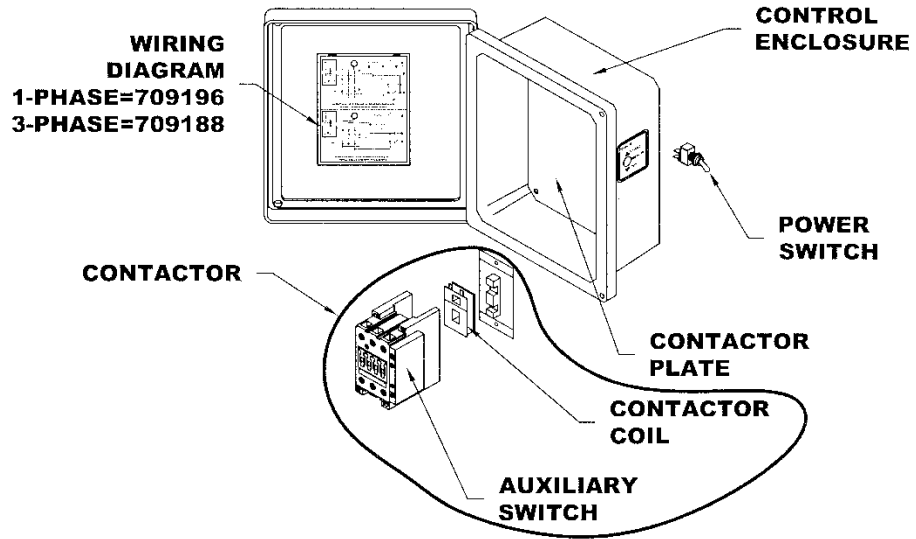
- i.
- e. The contactor is then reinstalled into the control enclosure, and the push button start switch wires and the motor thermal protection are re-wired per the corresponding 460 volt [wiring diagram](#).
- f. Connect the motor leads to the output terminal of the contactor as shown in the following illustration. Note that the motor lead wire pairs (4 and 7), (5 and 8), (6 and 9) are secured together using a wire nut.



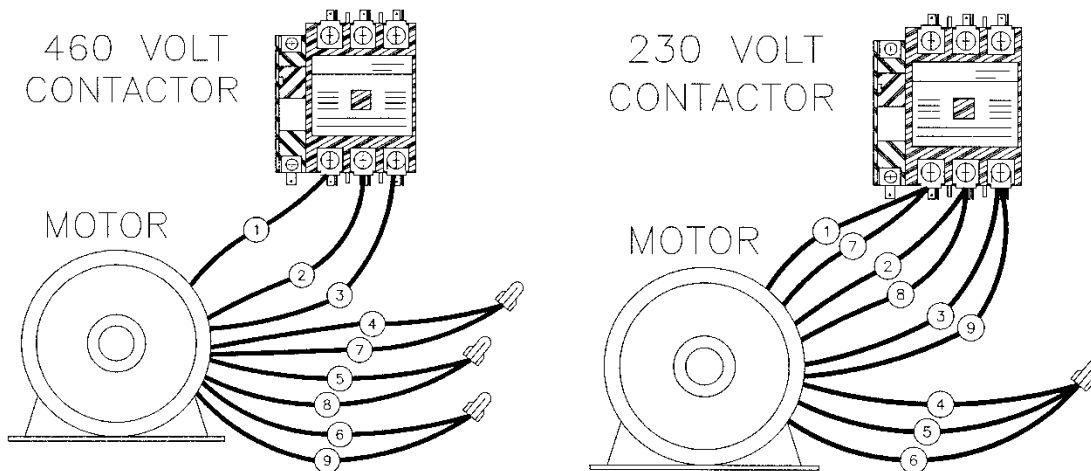
- g. Refer to the previous [electrical service installation instructions](#) for sizing the electrical service on 460 volt 3 phase operations.
2. Converting a 3 phase dual voltage fan wired for 460 volts to new 230 volt service:
- Make sure to lock out and tag out the power to the fan to ensure no power is present when rewiring.
 - 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.



- Remove the contactor from the control enclosure and disconnect the contactor from the push button start switch and the motor thermal protector. Disassemble the contactor.
- The holding coil or complete contactor will need to be replaced. Refer to the [conversion parts table](#) to order the correct 230 volt holding coil or contactor indicated for the fan model being converted. Next reassemble the contactor with the new 230 volt contactor as shown in the following illustration.



- i.
- 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 make sure it revolves easily and does not rub on the orifice.
2. Check all the fasteners to make sure they are tight. If any are loose, check for proper clearance and retighten fasteners. Make sure the screen guard is fastened securely.
3. With power locked out and tagged out at the disconnect switch, check all electrical connections to make sure they are tight. Inspect the current carrying wires to make sure they are not grounded. Make sure the control enclosure cover is secured in place.
4. Refer to the appropriate [wiring diagram](#) to verify the fan is wired correctly.

Start-Up Procedure:

The single phase 230 volt Centrifugal fans listed below use a permanent-split phase capacitor start motor. The start switch and start capacitors have been eliminated for trouble free operation. The permanent-split phase capacitor start motor is referred to as a “slow start” motor because it comes up to speed much slower than a capacitor start single phase motor. When the fan is started, allow the motor time to accelerate to full speed without turning the power off. **Note:** Do not continue short multiple starts as overheating of the motor could result.

<u>Fan Model</u>	<u>Time to Start</u>
F12-751	5 Seconds
F14-11	8 Seconds
F18-112	8 Seconds
F18-312	8 Seconds
F24-512	8 Seconds
F24-712	10 Seconds
F24-1012	10 Seconds
F28-1212	16 Seconds

1. All Centrifugal Fan Units
 - a. Place the fan disconnect switch in the “ON” position. 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 switch is designed to return to the “RUN” position. In this position the fan will continue to operate until the switch button labeled “STOP” is pushed in, or until the internal motor thermal protection interrupts the power by opening the circuit. With the motor thermal protection in the open position the fan cannot be started by pushing the “START” button. When the motor thermal protector 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 motor thermal protector 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, make sure the control enclosure cover is secured to the control enclosure. Before operating, the magnetic contactor should be inspected to make sure 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 life span of the motor is dependent on proper bearing maintenance. Before lubricating the bearings, inspect the bearings to make sure they are still in good condition. If not, the bearings will need to be replaced. The fan motor uses sealed bearings, however, the bearing cavity should still be lubricated. The motor should be lubricated once a year prior to the operating season per the following instructions. **Note:** The lubricants listed below are designed to operate at high temperature and have a rust inhibitor for extended bearing life. Do not mix other grease types with these lubricants. In addition do not over lubricate the bearings as the lubricant will work its way into the motor and cause premature motor failure.

- To lubricate a motor with filler and drain holes, remove both plugs and clean the holes of any hardened lubricants. Approximately three standard pumps of Shell Dolium R or Chevron SRI-2 lubricant should be added. Allow the motor to run for approximately 10 minutes before reinstalling the drain plug.
- To lubricate a motor without filler and drain holes, first clean out any hardened grease, and then add the Shell Dolium R or Chevron SRI-2 lubricant to fill $\frac{3}{4}$ of the cavity of the end bell.

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 make sure 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 make sure 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. 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 turning each fastener 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.

FAN	Dim A	FAN	Dim A
C15-3	2.250" (5.715 cm)	C33-30	9.125" (23.178 cm)
C15-5	3.125" (7.938 cm)	C33-40	9.469" (24.051 cm)
C18-7	2.594" (6.588 cm)	C33-50	11.781" (29.924 cm)
C18-10	3.313" (8.414 cm)	C33-60	12.250" (31.115 cm)
C18-15	4.719" (11.986 cm)	C36-75	11.078" (28.138 cm)
C22-20	3.125" (7.938 cm)	C36-100	13.375" (33.973 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)		
C22-3	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" (28.575 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.
 - 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 toggle switch.
 - 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 top 2 terminals and bottom 2 terminals should have continuity checks to determine if the circuit is open or closed.
 1. In the “STOP” position with the stop button depressed, both the top 2 terminals and the bottom 2 terminals should be open.
 2. In the “RUN” position with neither button depressed, the bottom 2 terminals should be closed and the top 2 terminals should be open.
 3. In the “START” position with the start button depressed, both the top 2 terminals and the bottom 2 terminals 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 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 make sure 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 make sure 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 top two terminals of the toggle switch should be checked. If the circuit is closed between the two terminals, the toggle 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.

FAN TEST SHEET

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

CSA DOM

Part # _____ Rotation: _____

Model # _____ Contactor/Starter mfg. _____ W.O.: _____

Motor Mfg. _____ Date: _____

Motor Mfg. Part# _____ Tunnel # _____

Fan Serial Number (A)	Vibration Engineering Velocity Maximum 1.00001 3450 2.00001 1750 1.50000 1250	Motor Serial Number (C)	Static Pressure Tested At (B)	Rated		Measured		Dielectric Strength Test		Start up Time (H)	Bolt Bag (I)	Manual (J)	Serv. Bulletin (K)	Warranty Card Number (L)	Checked By (M)
				Volt (E)	Amps (E ₁)	Volt (F)	Amps (F)	Rated Voltage KV (G)	Applied Voltage KV (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. (NEED TO RECORD SERVICE AMPS IF APPLICABLE)
- (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)

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.

- 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



Model Number

C15
C18
C22
C24
C27
C30
C33
C36

Should you have any questions concerning assembly instructions, parts or drawings, please feel free to contact us at any of the following.

© Chief Industries, Inc. Inc.
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Kearney, NE 68847
Phone 800.359.7600

For more information about Chief Industries, Inc. and additional products or services visit our website
www.agri.chiefind.com