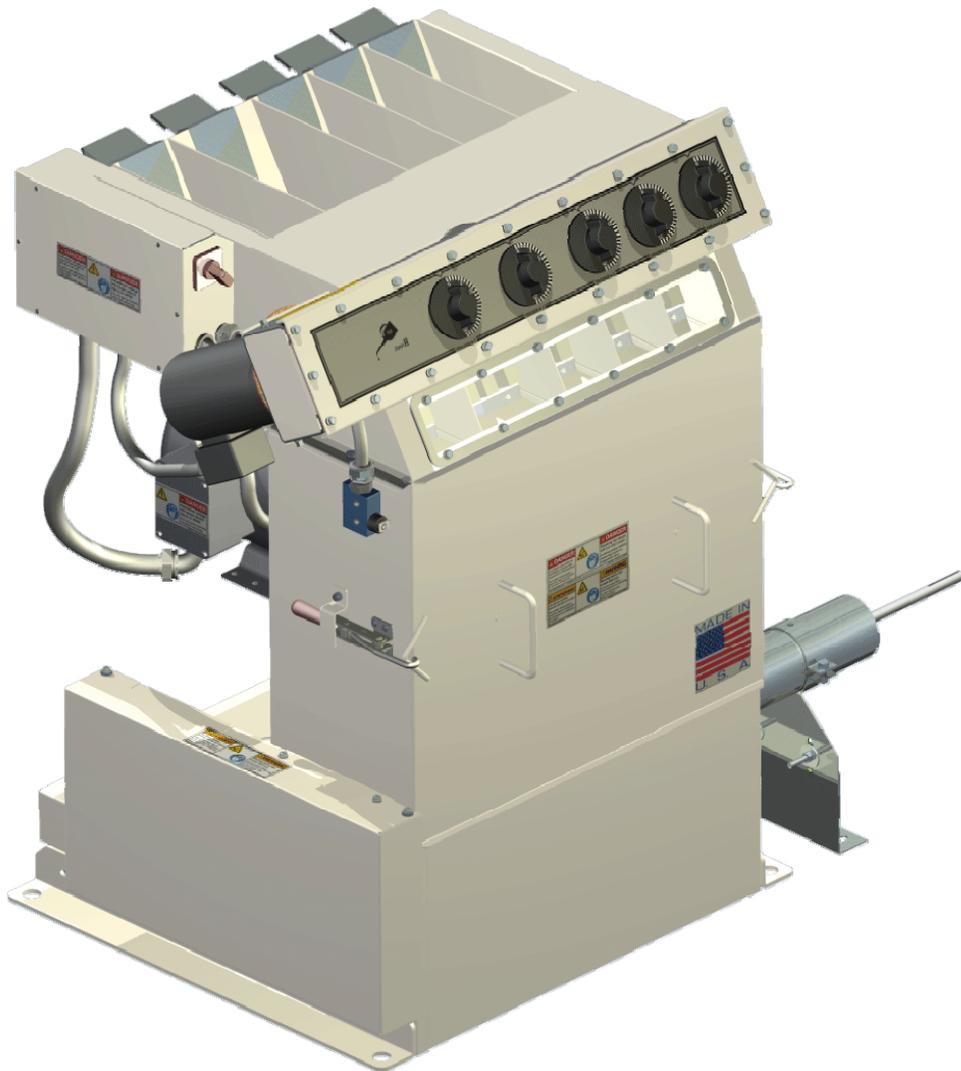


# Mix-Mill

FEED PROCESSING SYSTEMS



## **SENTRY HAMMER MILL** **MODEL 3000** **OPERATIONS / PARTS** **MANUAL**

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# WARRANTY

The A. T. Ferrell Company, Inc. Manufacturer's Warranty for the following product lines:

MIX-MILL/FARMATIC

All Sentry Line Products

Sentry 100, Sentry 1000, Sentry 3000, Sentry 4000

(“MIX-MILL/FARMATIC” IS A REGISTERED TRADEMARK OF THE A. T. FERRELL COMPANY, INC.)

A. T. Ferrell Company, Inc. warrants each new product of its manufacture when purchased from an authorized representative for a period of one year from the date of shipment. This warranty shall apply to all parts and workmanship (except products or components not manufactured by the A. T. Ferrell Company, Inc.), which shall appear to A. T. Ferrell Company to have been defective in manufacture. The A. T. Ferrell Company's sole and entire obligation under such warranty shall be satisfied by shipment to the Purchaser-User, without charge, (except for transportation costs, which shall be paid by Purchaser-User) of the part or parts returned for inspection and parts intended to replace those acknowledged by A. T. Ferrell Company to be defective.

This warranty shall not apply and shall be void under the following conditions:

1. If the product is transported from its original installation site.
2. If any part of the product has been altered, modified or changed, except at A. T. Ferrell Company's factory or is authorized by A. T. Ferrell Company in writing.
3. If attachments or devices unsuitable to the product have been used on or in conjunction with the product.
4. If the product has not been installed, used, operated, handled or serviced in accordance with the appropriate instruction manual.

A.T. Ferrell Company reserves the right to make changes in design or improvements in its products without any obligation whatsoever to prior Purchaser-User of such products.

A.T. Ferrell Company will pass on to a Purchaser-User only such warranty as it shall receive on products or components not of its manufacture from the manufacturer or supplier thereof.

We will not be liable for any consequential damages, loss or expenses arising in connection with the use or inability to use the product for any purpose whatever. Our maximum liability shall not in any case exceed the cost of replacing defective parts if returned to us within one year from date of shipment. No salesman, manufacturer's representative or other person may make or has the authority to make any guarantees or warranties expressed or implied on behalf of A. T. Ferrell Company, Inc. which are inconsistent with these terms and conditions or any catalogue or other publication of A. T. Ferrell Company, Inc.

The Warranty Registration Card must be filled in completely and signed by Purchaser-User and returned to us to validate any warranty claim.

Claims for warranty should be directed to our sales department, 1440 South Adams Street, Bluffton, IN 46714 USA or phone (260) 824-5213. The machine serial number and description of the type of failure is required to file a claim. Contact our sales department before returning warranty items for a RMO (Returned Material Order) which must accompany all returned items. All returned items are to be shipped freight pre-paid and credit will be issued after inspection and acknowledgement of warranty defect. A. T. Ferrell Company, Inc. will pass on to the purchaser/user only such warranty as it shall receive on products or components not of its manufacture from the manufacturer or supplier thereof.

# **BE A SAFE OPERATOR**

## **AVOID ACCIDENTS**

Most accidents, whether they occur in industry, on the farm, at home, or on the highway, are caused by the failure of some individual to follow simple and fundamental safety rules or precautions. For this reason, most accidents can be prevented by recognizing the real cause and doing something about it before the accident occurs.

Regardless of the care used in the design and construction of any type of equipment, there are many conditions that cannot be completely safe guarded against without interfering with reasonable accessibility and efficient operation.

A careful operator is the best insurance against an accident.

The complete observance of one simple rule would prevent many serious injuries each year. That rule is:

**Never attempt to clean, oil, or adjust a machine while it is in motion!**  
**--National Safety Council**

A.T. Ferrell has made every effort to provide safe equipment, however, the following precautions should be carefully observed!

1. Disconnect main service switch before removing any housing covers or electrical boxes or switches.
2. Ground the mill frame according to local electrical codes.
3. Ground any augers or feeders where livestock might contact either augers or feeders.
4. Keep all shields and covers in place.

# BE A SAFE OPERATOR

## AVOID ACCIDENTS

This safety alert symbol identifies important safety messages in this manual. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows. Regardless of the care used in the design and construction of any type of equipment, there are many conditions that cannot be completely safe-guarded against without interfering with reasonable accessibility and efficient machine operation. A careful operator is the best insurance against an accident.



Carefully read and understand the operators' manual before operating the machine. Do not attempt to install, connect power to, operate or service machine without proper instruction and until you have been thoroughly trained in its use by your employer.



Keep children, visitors and all untrained personnel away from machine while in operation.



Make certain all electric motors and control panels are properly grounded.



**Danger** – Do not attempt to work on, clean or service this equipment or open or remove any protective cover, guard, or grate until power has been turned off and mechanically locked out and the machine has come to a complete stop.



**Danger** – Keep hands, feet and clothing clear from rotating belts, pulleys, rolls and gears when machine is operating. Failure to do so will cause severe injury or death.



**Danger** – Never operate machine without protective covers, guards, or grates properly installed.



**Do not** obscure or remove safety decals from the equipment. Replacement decals are available from the manufacturer.



This equipment was manufactured in compliance with existing OSHA regulations. It is the responsibility of the owner/user to maintain OSHA compliance when operating the equipment.



If injured by escaping fluid, see a doctor at once.



Replace all guards and shields after servicing and before starting up the machine.



**Do not** clean, lubricate or adjust equipment while it is in operation.



After servicing, make sure all tools, parts and service equipment are removed from the machine.



**Do not** start the machine until you are sure that everyone is clear.

# TYPICAL SAFETY DECALS

<b>⚠ DANGER</b>		<b>⚠ DANGER</b>
<p>Une tension dangereuse causera des blessures graves ou la mort.</p> <p>Couper l'alimentation et verrouiller avant de faire l'entretien.</p>		<p><b>Hazardous voltage will cause severe injury or death.</b></p> <p>Turn off power and lock out before servicing.</p>
<small>©Clarion Safety Systems, LLC clarionsafety.com xxxxx</small>		<small>80003641 Reorder No. C18609-08</small>

<b>⚠ DANGER</b>		<b>⚠ DANGER</b>
<p>La rotation des pales de ventilateur causera des coupures et l'écrasement.</p> <p>Verrouiller l'alimentation avant de retirer le couvercle ou la porte d'inspection.</p>		<p><b>Rotating fan blade will cut and crush.</b></p> <p>Lockout power before removing cover or inspection door.</p>
<small>©Clarion Safety Systems, LLC clarionsafety.com xxxxx</small>		<small>80003642 Reorder No. C18609-09</small>

<b>⚠ AVERTISSEMENT</b>		<b>⚠ WARNING</b>
<p>Les pièces mobiles peuvent écraser et couper.</p> <p>Verrouiller l'alimentation avant de retirer le dispositif de protection ou d'effectuer l'entretien.</p>		<p><b>Moving parts can crush and cut.</b></p> <p>Lockout power before removing guard or servicing.</p> <p>Do NOT operate with guard removed.</p>
<small>©Clarion Safety Systems, LLC clarionsafety.com xxxxx</small>		<small>80003643 Reorder No. C18609-10</small>

<b>⚠ AVERTISSEMENT</b>		<b>⚠ WARNING</b>
<p>Débrancher le système d'alimentation principal avant l'entretien!</p> <p>Le commutateur d'alimentation de chaque section contrôle uniquement cette section!</p>		<p><b>Disconnect main power before servicing!</b></p> <p>Each section's power switch controls that section only!</p>
<small>©Clarion Safety Systems, LLC clarionsafety.com xxxxx</small>		<small>80006508 Reorder No. C18609-15</small>

<b>⚠ DANGER</b>		<b>⚠ DANGER</b>
<p>Faire attention de ne pas se blesser.</p> <p>Les pièces mobiles peuvent écraser et couper.</p> <p>Garder les mains et les doigts à l'écart des pièces mobiles.</p> <p>Ne pas utiliser si le dispositif de protection a été retiré.</p>		<p><b>Avoid injury.</b></p> <p><b>Moving parts can crush and cut.</b></p> <p>Keep hands and fingers clear of moving parts.</p> <p>Do not operate with guard removed.</p>
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<b>⚠ AVERTISSEMENT</b>		<b>⚠ WARNING</b>
<p>Une installation, un réglage, un entretien ou une maintenance inappropriés peuvent causer des dommages matériels, des blessures corporelles ou la mort.</p> <p>Lire attentivement les instructions d'installation, d'utilisation et d'entretien avant d'installer ou d'effectuer l'entretien de cet équipement.</p>		<p>Improper installation, adjustment, service or maintenance can cause property damage, injury or death.</p> <p>Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.</p>
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# **FORWARD**

Thank you for purchasing a new **Mix-Mill** and/or Farmatic Sentry series mixer/grinder or roller mill. More than 50 years of experience in the manufacture of feed milling equipment and grain handling systems has made Mix-Mill/Farmatic the leader in the field of electric powered, on the farm feed conditioning systems.

Many of the features that have provided trouble free service for thousands of owners will still be found on your new Sentry Hammer Mill. New design technology and new components have also been incorporated in your mill to further increase the reliability and the flexibility needed for today's farming needs.

Some of these features are increased horsepower sizes, state of the art electronics, new type C frame motors, larger screen and grinding chamber size. A new beater hub design, with these other features, gives you more output per hour to get the job done faster and more efficient.

We prepared this booklet for our Sentry Hammer Mill to help you install, operate and maintain your mill to the highest standard and to obtain the greatest efficiency.

If a commercial carrier shipped your mill, ensure that you check all parts carefully to see if there is any damage in the shipping. If damage is found, make a notation of such and make certain that your local agent makes a similar note on your freight bill, before you accept shipment. This is necessary to support your claim. Do not hesitate to accept damaged equipment after the agent has made the notation on the freight bill. You will be reimbursed when you present your claim. We assume no responsibility for loss or damages after the equipment leaves our dock, but we will gladly render our services to assist you in adjusting your claim. Determine the parts you require, submit an order to us and we will prepare an invoice. Upon receiving our invoice you will be in a position to file a claim against the shipping company.

The following pages of this owner's manual will provide you with the correct operating information and answer many of your questions about your new Sentry Hammer Mill. Please take a few minutes to read these instructions and keep them for future references

The parts breakdown will help you to obtain genuine factory parts when needed. Please contact your local authorized dealer any time you need parts or service. He can also provide you with other equipment and help you plan for future growth.

A.T. Ferrell Company, Inc.  
Mix-Mill Division

# Mix-Mill

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Division of A. T. Ferrell Company, Inc.

## PARTS ORDERING INFORMATION

1. Order replacements parts through your local sales representative or direct from Mix-Mill.

A. T. Ferrell Company, Inc.  
1440 S. Adams St.  
Bluffton, IN 46714 U.S.A.  
Phone: (260) 824-5213 (800) 537-6260  
Fax: (260) 824-5463  
Website: [www.mix-mill.com](http://www.mix-mill.com)  
E-Mail: [info@atferrell.com](mailto:info@atferrell.com)

2. To expedite the order process, please have your machine description, model number, and serial number available.
3. Use the part numbers and descriptions furnished in this manual.

# **INSTALLATION AND OPERATION**

## **New Installation Requirements**

The mixer/grinder must be located in a weatherproof structure

## **Existing Installations**

Some existing farm structures are suitable for mill installation. See your authorized dealer and let him work with you to develop the most efficient, most economical system for your needs.

## **Discharge and Feed Handling Systems**

Several systems are available for grain and feed handling.

A heavy gauge-heavy duty 3 ½" auger systems with capacities up to 7500 lbs, per hour is available for both vertical and horizontal conveying of ingredients.

A 6" vertical high capacity auger system is available.

## **Mill Capacities**

Several factors must be considered when figuring mill capacities: the type and amount of each ingredient, the amount of material ground and the amount that is bypassed, mill horsepower and screen size. An undersized discharge system can be a limiting factor on mill capacity. Hardness and variations in the hardness of different grains will have an effect on the mill capacity and in the amount of wear to replaceable parts such as screens, hub and hammers and mill wear plates.

# **BALDOR MOTOR INFORMATION**

## AC & DC Motor Installation & Maintenance NEMA (IEC) Frames to 320 (200)

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Before you install, operate or perform maintenance, become familiar with the following:

- NEMA Publication MG-2, Safety Standard for Construction and guide for Selection, Installation and Use of Electric Motors and Generators.
- IEC 60072-1 Electrical and IEC72-1 Mechanical specifications
- ANSI C51.5, the National Electrical Code (NEC) and local codes and practices.

**Receiving** Each Baldor Electric Motor is thoroughly tested at the factory and carefully packaged for shipment. When you receive your motor, there are several things you should do immediately.

1. Observe the condition of the shipping container and report any damage immediately to the commercial carrier that delivered your motor.
2. Verify that the part number of the motor you received is the same as the part number listed on your purchase order.

**Handling** The weight of the motor and shipping container will vary. Use correct material handling equipment to avoid injury. Use caution when removing the motor from its packaging. Sharp corners may exist on motor shaft, motor key, sheet metal and other surfaces.

### Safety Notice

Only qualified personnel trained in the safe installation and operation of this equipment should install this motor. When improperly installed or used, rotating equipment can cause serious or fatal injury. Equipment must be installed in accordance with the National Electrical Code (NEC), local codes and NEMA MG2 Safety Standards for Construction and Guide for Selection, Installation and Use of Electric Motors and Generators. Observe the following guidelines:

1. Connect Power and Ground to the motor according to NEC or IEC and local codes.
2. Provide a permanent guard to prevent accidental contact of body parts or clothing with rotating or moving parts or burns if motor is hot.
3. Shaft key must be secured before starting motor.
4. Mounting bolts should be high tensile steel. Be sure to use a suitable locking device on each bolt (spring washer or thread lock compound).
5. Do not apply power to the motor until the motor is securely mounted by its mounting holes.
6. This motor must only be connected to the proper line voltage, line frequency and load size.
7. Motors are not to be used for load holding or restraining unless a properly sized brake is installed. If a motor mounted brake is installed, provide proper safeguards in case of brake failure.
8. Disconnect all power services, stop the motor and allow it to cool before servicing.
9. For single phase motors, discharge the start and/or run capacitors before servicing.
10. Do not by-pass or render inoperative any safety device.
11. DC series wound motors must be protected from sudden loss of load causing overspeed damage. DC shunt wound motors must be protected from loss of field voltage which can result in damage.
12. When using AC motors with frequency inverters, be certain that the motors Maximum Speed Rating is not exceeded.

### Guarding

After motor installation is complete, a guard of suitable dimensions must be constructed and installed around the motor/gearmotor. This guard must prevent personnel from coming in contact with any moving parts of the motor or drive assembly but must allow sufficient cooling air to pass over the motor. If a motor mounted brake is installed, provide proper safeguards for personnel in case of brake failure. Brush inspection plates and electrical connection cover plates or lids, must be installed before operating the motor.

**WARNING:** Guards must be installed for rotating parts such as couplings, pulleys, external fans, and unused shaft extensions, should be permanently guarded to prevent accidental contact by personnel. Accidental contact with body parts or clothing can cause serious or fatal injury.

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When this motor is installed according to these instructions, it complies with the EEC Machinery Directive. Electromagnetic Compatibility (EMC) requirements for CE compliance are met when the incoming power is purely sinusoidal. For other power source types, refer to MN1383 "Recommended Practices for Installation for EC Directive 89/336/EEC Relating to EMC".

#### **Motor Enclosure**

ODP, **Open drip proof** motors are intended for use in clean, dry locations with adequate supply of cooling air. These motors should not be used in the presence of flammable or combustible materials. Open motors can emit flame and/or molten metal in the event of insulation failure.

TEFC, **totally enclosed** motors are intended for use where moisture, dirt and/or corrosive materials are present in indoor and outdoor locations.

**Explosion proof** motors, as indicated by the Underwriters Laboratories, Inc. label are intended for use in hazardous areas as specified by the NEC.

#### **Mounting**

**Foot mounted** machines should be mounted to a rigid foundation to prevent excessive vibration. Shims may be used if location is uneven.

**Flange mounted** machines should be properly seated and aligned. Note: If improper rotation direction is detrimental to the load, check rotation direction prior to coupling the load to the motor shaft.

For **V-belt drive**, mount the sheave pulley close to the motor housing. Allow clearance for end to end movement of the motor shaft. Do not overtighten belts as this may cause premature bearing failure or shaft breakage.

**Direct coupled** machines should be carefully aligned and the shaft should rotate freely without binding.

#### **Wiring**

Connect the motor as shown in the connection diagram. If this motor is installed as part of a motor control drive system, connect and protect the motor according to the control manufacturers diagrams. Refer to MN408 for additional details on lead marking (see [http://www.baldor.com/support/product\\_manuals.asp](http://www.baldor.com/support/product_manuals.asp)). The wiring, fusing and grounding must comply with the National Electrical Code or IEC and local codes.

When the motor is connected to the load for proper direction of rotation and started, it should start quickly and run smoothly. If not, stop the motor immediately and determine the cause. Possible causes are: low voltage at the motor, motor connections are not correct or the load is too heavy. Check the motor current after a few minutes of operation and compare the measured current with the nameplate rating.

#### **Grounding**

Ground the motor according to NEC and local codes. In the USA consult the National Electrical Code, Article 430 for information on grounding of motors and generators, and Article 250 for general information on grounding. In making the ground connection, the installer should make certain that there is a solid and permanent metallic connection between the ground point, the motor or generator terminal housing, and the motor or generator frame. In non-USA locations consult the appropriate national or local code applicable.

#### **Adjustment**

The neutral is adjustable on some DC motors. AC motors have no adjustable parts.

#### **Noise**

For specific sound power or pressure level information, contact your local Baldor representative.

#### **Vibration**

This motor is balanced to NEMA MG1, Part 7 standard.

#### **Brushes (DC Motors)**

Periodically, the brushes should be inspected and all brush dust blown out of the motor. If a brush is worn  $\frac{1}{2}$ " (from length specified in renewal parts data), replace the brushes. If the commutator is worn or rough, the armature should be removed. The commutator should be turned in a lathe, the mica recut and the commutator polished. Reassemble and seat the new brushes using a brush seating stone. Be sure the rocker arm is set on the neutral mark.

**Lubrication Information**

This is a ball or roller bearing motor. The bearings have been lubricated at the factory. Motors that do not have regrease capability are factory lubricated for the normal life of the bearings.

**Lubricant**

Baldor motors are pregreased, normally with Polyrex EM (Exxon Mobil). If other greases are preferred, check with a local Baldor Service Center for recommendations.

**Relubrication Intervals (For motors with regrease capability)**

New motors that have been stored for a year or more should be relubricated. Lubrication is also recommended at these intervals:

**Table 1 Relubrication Interval**

NEMA (IEC) Frame Size	Rated Speed (RPM)			
	3600	1800	1200	900
Up to 210 incl. (132)	5500Hrs.	12000Hrs.	18000Hrs.	22000Hrs.
Over 210 to 280 incl. (180)	3600Hrs.	9500Hrs.	15000Hrs.	18000Hrs.
Over 280 to 320 incl. (200)	*2200Hrs.	7400Hrs.	12000Hrs.	15000Hrs.

**Table 2 Service Conditions**

Severity of Service	Ambient Temperature Maximum	Atmospheric Contamination	Type of Bearing
Standard	40° C	Clean, Little Corrosion	Deep Groove Ball Bearing
Severe	50° C	Moderate dirt, Corrosion	Ball Thrust, Roller
Extreme	>50° C* or Class H Insulation	Severe dirt, Abrasive dust, Corrosion	All Bearings
Low Temperature	<-30° C **		

\* Special high temperature grease is recommended.

\*\* Special low temperature grease is recommended.

**Table 3 Lubrication Interval Multiplier**

Severity of Service	Multiplier
Standard	1.0
Severe	0.5
Extreme	0.1
Low Temperature	1.0

**Table 4 Amount of Grease to Add**

Frame Size NEMA (IEC)	Bearing Description (Largest bearing in each frame size)					
	Bearing	OD D mm	Width B mm	Weight of grease to add ounce (gram)	Volume of grease to add	
					inches <sup>3</sup>	teaspoon
Up to 210 incl. (132)	6307	80	21	0.30 (8.4)	0.6	2.0
Over 210 to 280 incl. (180)	6311	120	29	0.61 (17.4)	1.2	3.9
Over 280 to 320 incl. (200)	6313	140	33	0.81 (23.1)	1.5	5.2

Weight in grams = 0.005 DB

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### Maintenance Procedures

**WARNING:** Do not touch electrical connections before you first ensure that power has been disconnected. Electrical shock can cause serious or fatal injury.

**WARNING:** Surface temperatures of motor enclosures may reach temperatures which can cause discomfort or injury to personnel accidentally coming into contact with hot surfaces. Protection should be provided by the user to protect against accidental contact with hot surfaces. Failure to observe this precaution could result in bodily injury.

### Lubrication Procedure

**Caution: Keep grease clean. Mixing dissimilar grease is not recommended.**

1. Relubrication with the shaft stationary and a warm motor is recommended.
2. Remove all dirt and wipe clean the outside of the grease fills and drains.
3. Clean the grease fitting (or area around grease hole, if equipped with slotted grease screws). If motor has a purge plug, remove it. Motors can be regreased while stopped (at less than 80°C) or running.
4. Locate the grease inlet at the top of the bearing hub, clean the area and replace the 1/8-inch pipe plug with a grease fitting if the motor is not equipped with grease fitting.
5. Remove grease drain plug located opposite the grease inlet.
6. Apply grease gun to fitting (or grease hole). Too much grease or injecting grease too quickly can cause premature bearing failure. Slowly apply the recommended amount of grease, taking 1 minute or so to apply.
7. Operate motor for 20 minutes, reinstall purge plug if previously removed.
8. Install grease drain plug located opposite the grease inlet.

### Sample Relubrication Determination

This sample determination is based on a NEMA 286T (IEC 180) motor operating at 1750 RPM driving an exhaust fan in an ambient of 43°C atmosphere that is moderately corrosive.

1. Table 1 list 9500 hours for standard conditions.
2. Table 2 classifies severity of service as "Severe".
3. Table 3 lists a multiplier value of 0.5 for Severe conditions.
4. Table 4 shows that 1.2 in<sup>3</sup> or 3.9 teaspoon of grease is to be added.

Note: Smaller bearings in size category may require reduced amounts of grease.



**World Headquarters**

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[www.baldor.com](http://www.baldor.com)

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LB5040

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5/09

# Control Panel Installation

1. Mount control panel in desired location.
2. Electrician must install a wire harness containing the appropriate wires as per wiring diagram on page 19 and 20.
3. Connect the color-coded wires as indicated by the diagram on page 19 and 20.
4. The discharge auger motor is prewired to junction box. Connect to control panel as shown on page 17-20 by field-installed wiring.
5. Mill motor (230V-1 Phase-3 wire) (230V-3 Phase-4 Wire) (575V-3 Phase-4 Wire) is prewired to the junction box on the mill. Connect to the control panel with field installed wiring to the terminal block that shows mill motor. The mill motor may be operated with either CW or CCW rotation. To change rotation, use the reversing switch supplied in the junction box on the mill 1 phase models only.

## Incoming Power

A wire harness will have to be field supplied containing lines L1, L2, (L3 if 3 Phase) and a neutral, on three phase mills a separate 110V control circuit will also be needed. This harness needs to be connected from the circuit breaker box to the Sentry mill panel. These leads should be sized accordingly to the amps on the mill nameplate and any other additional motors that are added. Connect lines L1, L2, (and L3) of the incoming power to L1, L2, (and L3) of the terminal block. All equipment must be grounded according to local electrical codes.

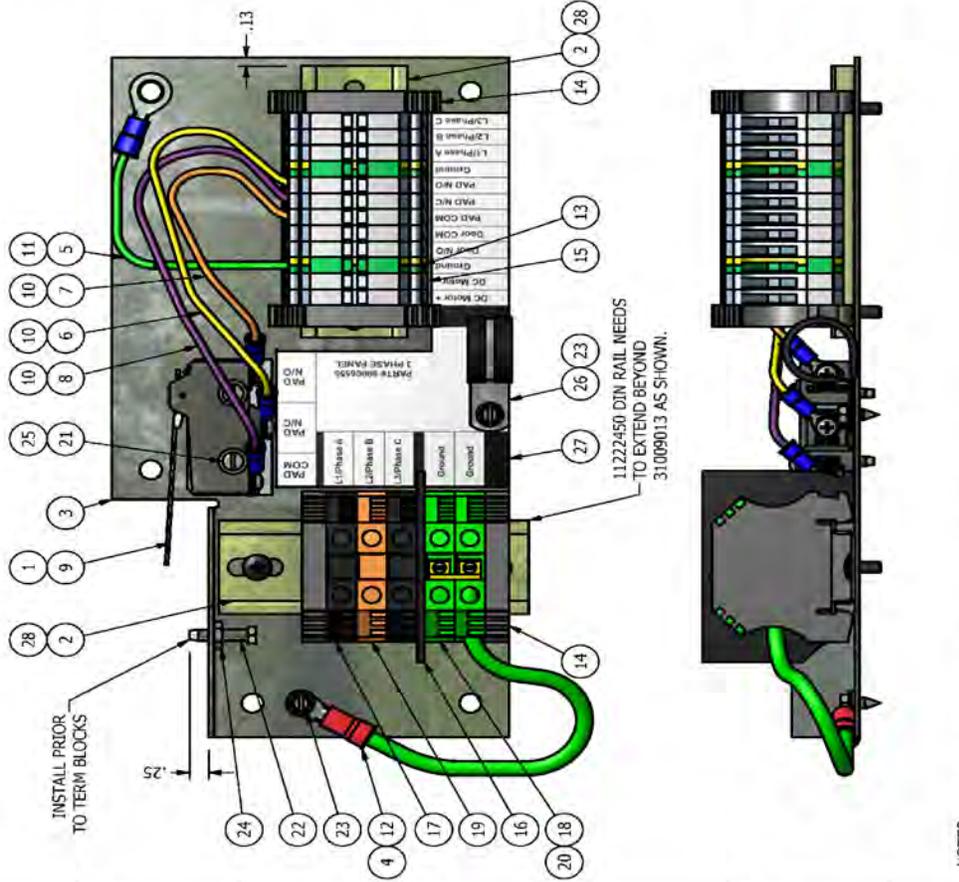
## Installation Procedures

### **WARNING!**

Failure to properly ground this machine could lead to serious injury to animals or persons operating the equipment. Grounding of all equipment is recommended. Grounding should be in accordance with the national electrical code and should be consistent with should local practice.

Before attempting repairs to any equipment, disconnect and “**lock out**” the incoming power to that equipment. An electrical shock can be obtained from an electric motor even though the incoming power is shut off. This could be caused by capacitor discharge in single phase or capacitor type motors.

REV	ECN	DESCRIPTION	DATE	APPROVED
A	100071	RELEASE	3/8/2010	dmpjohnson
B	110181	DIN RAIL WITH TERM BLOCKS WAS TERMINAL STRIPS AND GROUND LUG	8/18/2011	dcdark
C	110271	UPDATED ASSY, CLEANED UP BUILD	11/2/2011	SH



NOTES:  
 1. DO NOT SCALE FROM DRAWING.  
 2. ONE PIECE REQUIRED PER 92000248; HOPPER ASSY, PROPORTIONER 30, SENTRY.

ITEM	PART NUMBER	QTY	DESCRIPTION
1	11195950	2	INSULATOR, SWITCH
2	11222450	2	RAIL, DIN 3, 35 MM X 4.00"
3	11223060	1	INSERT, JUNCTION BOX, SENTRY
4	30330800	1	WIRE, #8 LEAD GREEN X 7"
5	30331400	1	WIRE, STRANDED TFFN 16GA GREEN X 5"
6	30351600	1	WIRE, STRANDED TFFN 16GA YELLOW X 7.50"
7	30361600	1	WIRE, STRANDED TFFN 16GA ORANGE X 7.50"
8	30371600	1	WIRE, STRANDED TFFN 16GA PURPLE X 7.50"
9	31008001	1	SWITCH, MICRO, STR LEVER 2.5 OZ
10	31008504	3	TERMINAL, FORK #8 INSUL, 14-16 AWG
11	31008526	1	TERMINAL, RING #8 INSUL, 14-16 AWG
12	31008530	1	TERMINAL, #10 RING 8GA INSULATED
13	31009010	2	TERM BLK AB1492WG4 MOD GND TERM M 4/6
14	31009013	4	TERM BLOCK AB1492EA135
15	31009014	10	TERM BLOCK AB1392W4
16	31018634	16	END BARRIER (AB1492-N37)
17	31018635	2	CKT FEED (AB149210BL) BLK 10MM
18	31018636	2	CKT FEED (AB149210G) BLK, 10MM
19	31018648	1	CKT FEED (AB149210DR) BLK 10MM
20	31018649	1	JUMPER, SCREW CENTER 2 POLE YELLOW (AB1492-CJ10-2)
21	64681822	2	SCW, MACH PAN SLT HD T/C 6-32 X 1.00"
22	65482217	1	SCW, MACH HK SLT HD T/C 8-32 X 3/4"
23	65502208	2	SCW, HEX WASHER HEAD T/C A, #8-32 X .38"
24	66082200	2	NUT, HEX 8-32
25	66401800	2	WASHER, FLAT #6
26	70001021	1	CLAMP, LOOP, EPDM CUSHION ZINC, 3/4"
27	80006556	1	DECAL, 3 PHASE
28	8A350G1	4	SCREW, 8-32 X 3/8 TRUSS TC

**DIVISION OF**  
**A.T. FERRELL COMPANY**  
 1440 S ADAMS ST  
 BLUFFTON, INDIANA  
 46714 - USA  
 PH: 260-824-3400  
 FAX: 260-824-5463

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DRAWN BY: dmpjohnson  
 APPROVED BY: DMJ  
 DRAWN DATE: 3/5/2010

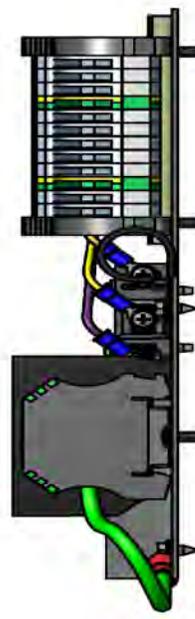
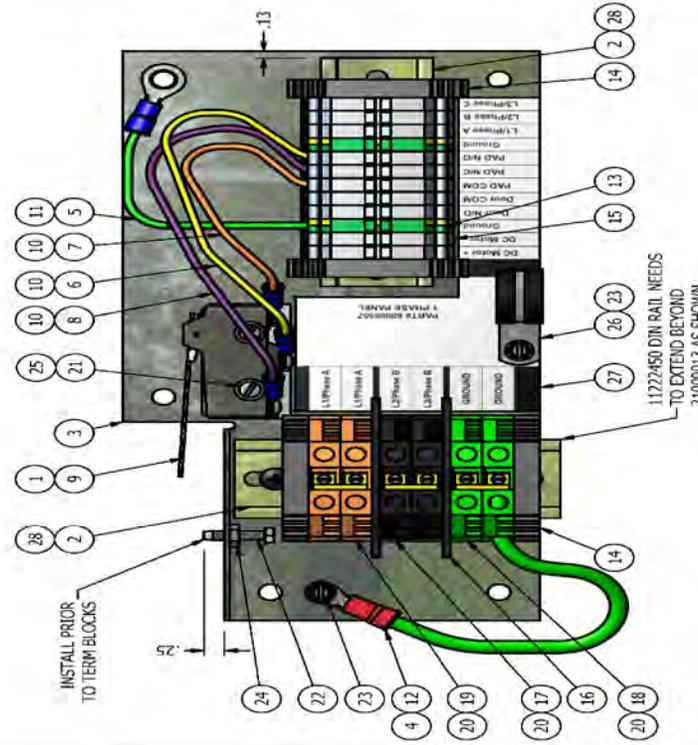
TOLERANCES EXCEPT AS NOTED:  
 DECIMAL: FRACTIONAL: PANEL ASSY, JUNCTION BOX, 3 PHASE, SENTRY  
 XX ± .030 FINISH  
 XXX ± .005 ANGULAR ± 1/2°  
 XXXX ± .001 SCALE: NONE

**CAD NO MANUAL CHANGES** SHEET: 1 OF 1 SIZE: B PART NUMBER: 92000255 REV: C

REVISION HISTORY

REV	ECN	DESCRIPTION	DATE	APPROVED
A	100071	RELEASE	3/8/2010	djohnson
B	110181	DIN RAIL WITH TERM BLOCKS WAS TERMINAL STRIPS AND GROUND LUG UPDATED ASSY, CLEANED UP BUILD	8/18/2011	dcclerk
B	110221		11/2/2011	SH

92000256



ITEM	PART NUMBER	QTY	DESCRIPTION
28	8A35061	4	SCREW, 8-32 X 3/8 TRUSS TC
27	80006557	1	DECAL, 1 PHASE
26	70001021	1	CLAMP, LOOP, EPDM CUSHION ZINC, 3/4"
25	66401800	2	WASHER, FLAT #6
24	66082200	1	NUT, HEX 8-32
23	65502708	2	SCW, HEX WASHER HEAD T/C A, #8-32 X .38"
22	65482217	1	SCW, MACH HX SLT HD T/C 8-32 X 3/4"
21	64681822	2	SCW, MACH PAN SLT HD T/C 6-32 X 1.00"
20	31018649	3	JUMPER, SCREW CENTER 2 POLE YELLOW (AB1492-CJ10-2)
19	31018648	2	CKT FEED (AB149210CR) BLK 10MM
18	31018636	2	CKT FEED (AB149210G) BLK, 10MM
17	31018635	2	CKT FEED (AB149210BL) BLK 10MM
16	31018634	2	END BARRIER (AB1492-N37)
15	31009014	10	TERM BLOCK AB1392W4
14	31009013	4	TERM BLOCK AB1492EA135
13	31009010	2	TERM BLK AB1492WGH MOD GND TERM 1/4"
12	31008530	1	TERMINAL, #10 RING 8GA. INSULATED
11	31008526	1	TERMINAL, RING #8 INSUL, 14-16 AWG
10	31008504	3	TERMINAL, FORK #8 INSUL, 14-16 AWG
9	31008001	1	SWITCH, MICRO, STR LEVER 2.5 OZ
8	30371600	1	WIRE, STRANDED TFFN 16GA PURPLE X 7.50"
7	30361600	1	WIRE, STRANDED TFFN 16GA ORANGE X 7.50"
6	30351600	1	WIRE, STRANDED TFFN 16GA YELLOW X 7.50"
5	30331400	1	WIRE, STRANDED 14GA GREEN X 5"
4	30330800	1	WIRE, #8 LEAD GREEN X 7"
3	11223060	1	INSERT, JUNCTION BOX, SENTRY
2	11224500	2	RAIL, DIN 3, 35 MM X 4.00"
1	11195550	1	INSULATOR, SWITCH



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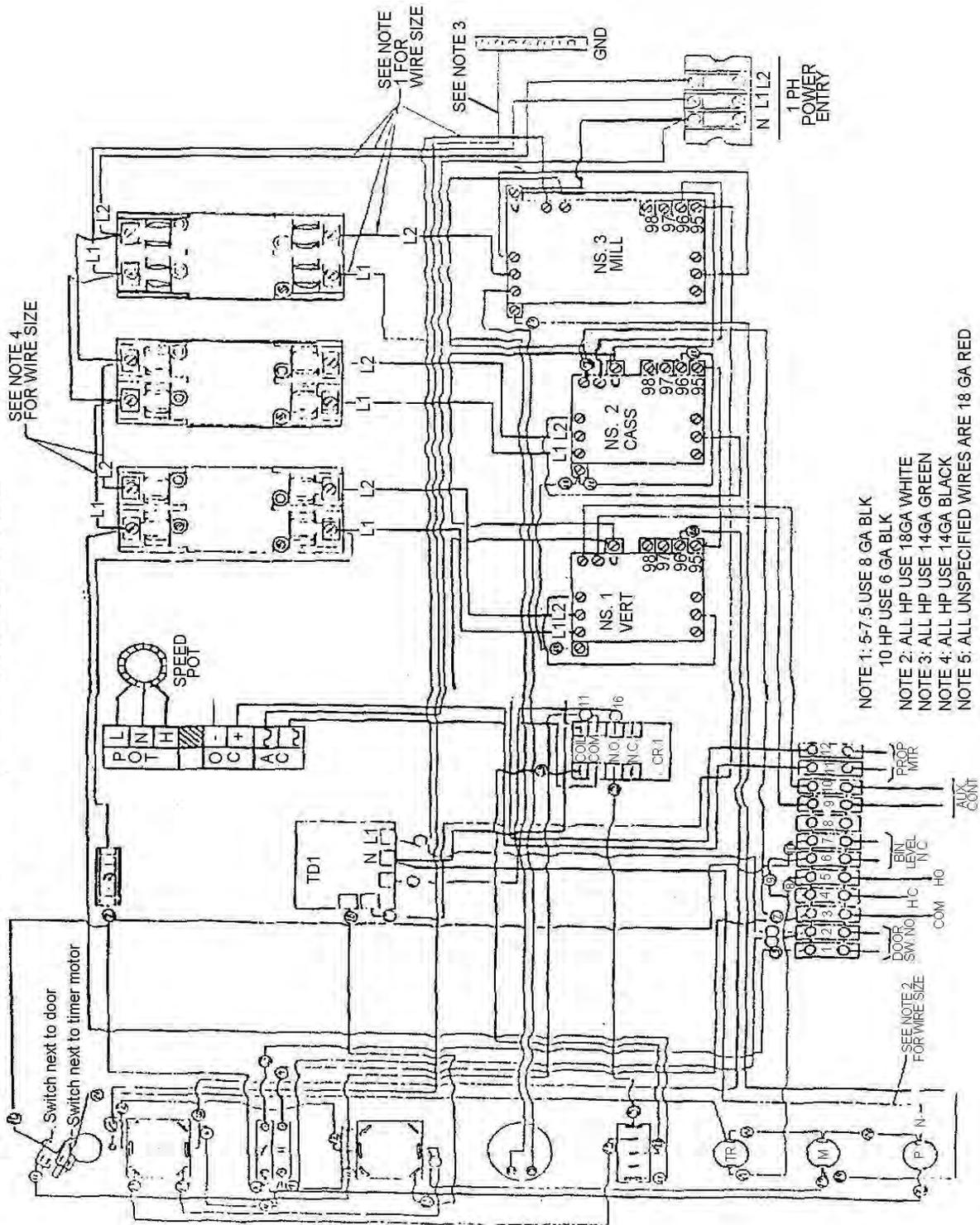
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DRAWN BY: djohnson  
CHECKED BY: DJJ  
DATE: 3/5/2010

TOLERANCES EXCEPT AS NOTED:		TITLE: PANEL ASSY, JUNCTION BOX, 1 PHASE, SENTRY	
DECIMAL	FRACTIONAL:	XX ± .001	FINISH:
		XXX ± .001	ANGULAR:
		XXXX ± .001	SCALE: 1 OF 1
<b>CAD NO MANUAL CHANGES</b>		SHEET: 062.1	PART NUMBER: 92000256
		SIZE: B	REV: B

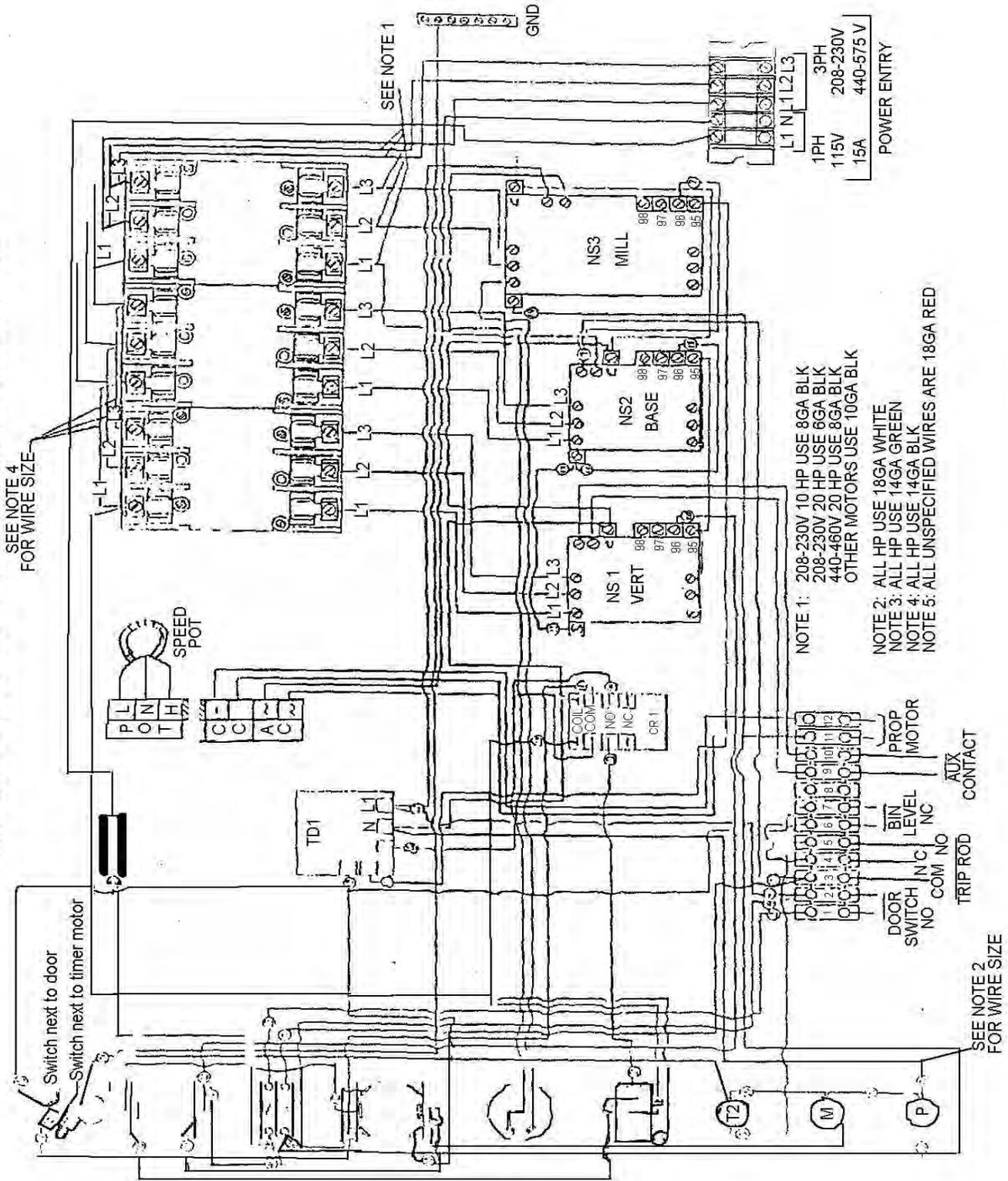
- NOTES:  
1. DO NOT SCALE FROM DRAWING.  
2. ONE PIECE REQUIRED PER 92000251; HOPPER ASSY, PROPORTIONER 10, SENTRY.

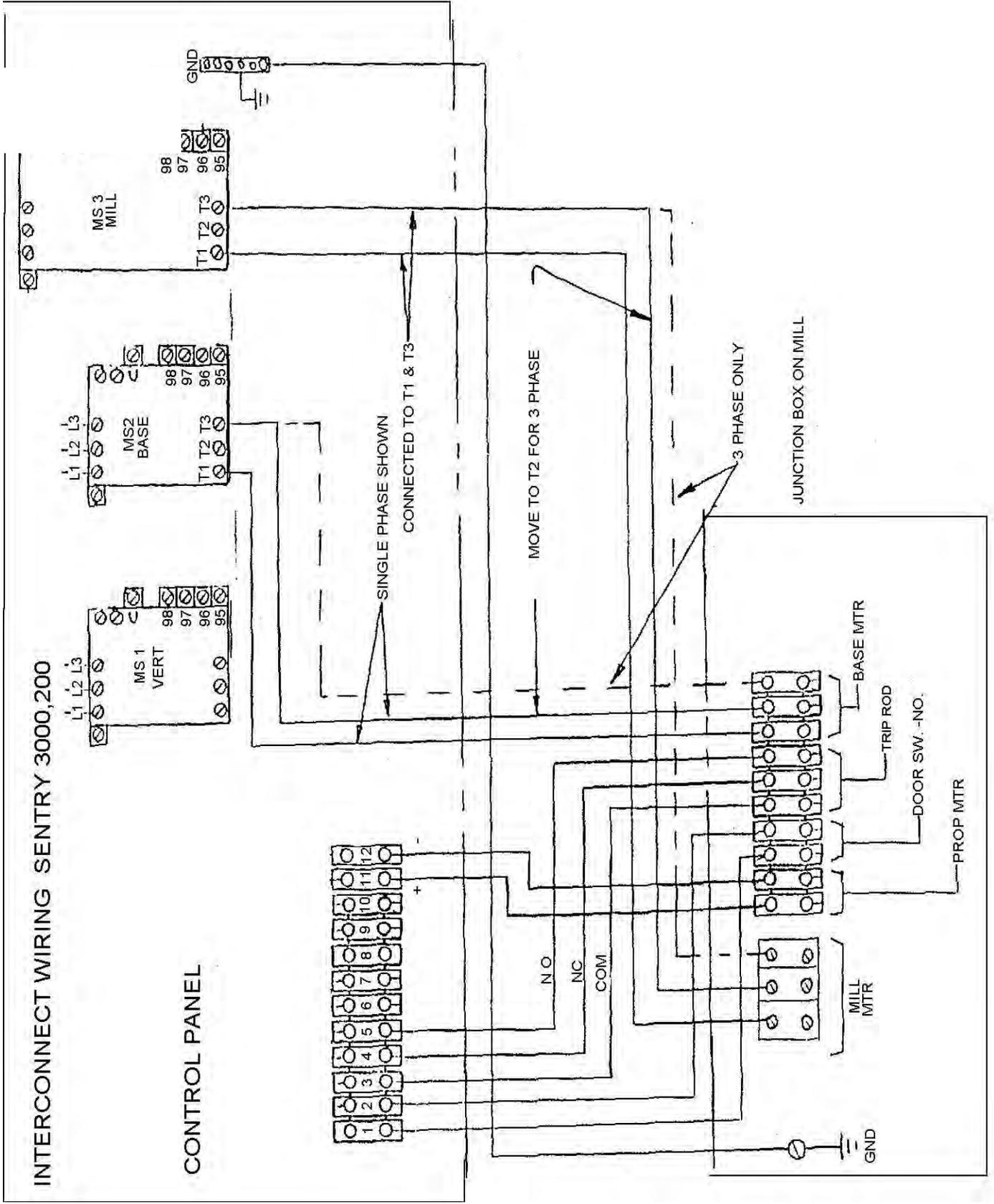
# PANEL WIRING SENTRY 3000, 2000 SINGLE PHASE



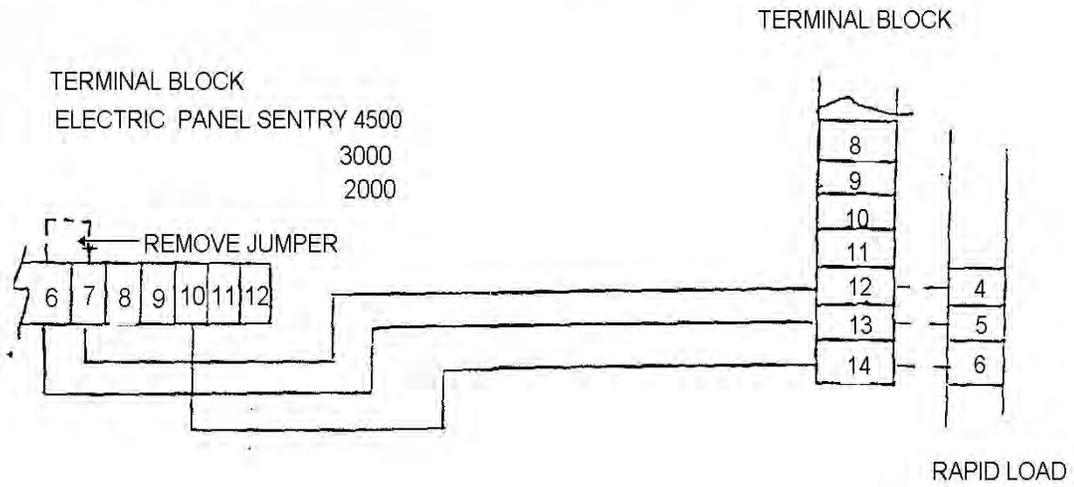
- NOTE 1: 5-7.5 USE 8 GA BLK  
10 HP USE 6 GA BLK
- NOTE 2: ALL HP USE 18GA WHITE
- NOTE 3: ALL HP USE 14GA GREEN
- NOTE 4: ALL HP USE 14GA BLACK
- NOTE 5: ALL UNSPECIFIED WIRES ARE 18 GA RED

# PANEL WIRING SENTRY 3000, 2000 THREE PHASE





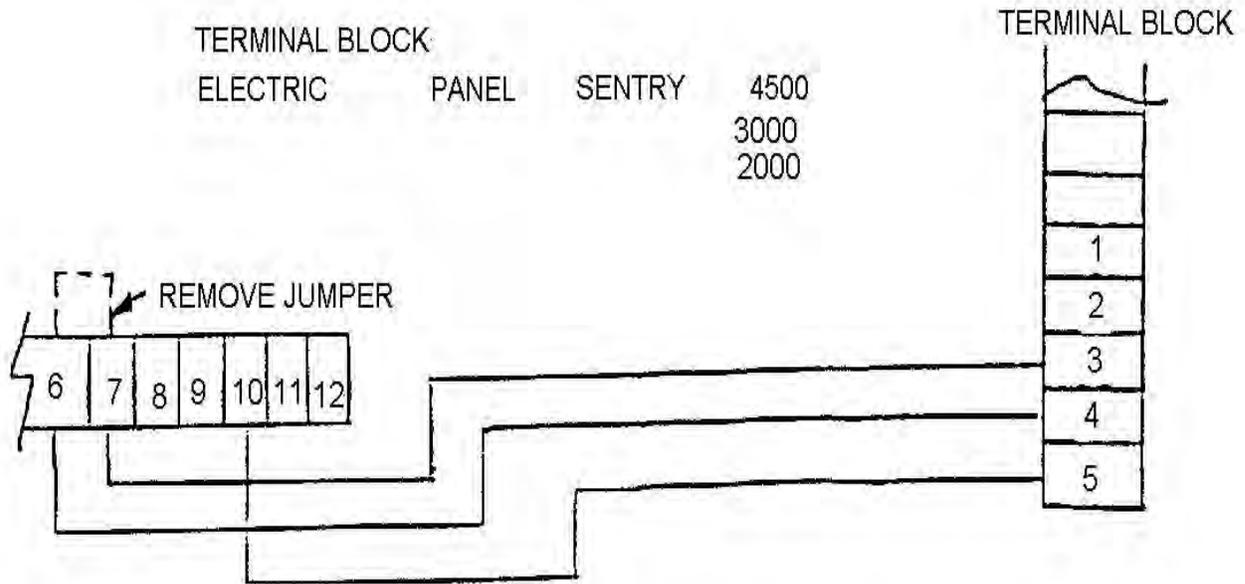
# PNEUMATIC PANEL 2", 3-1/2", OR RAPID LOAD TO ELECTRIC PANEL SENTRY



JUMPER MUST BE INSTALLED BETWEEN 15 amp FUSES LOAD SIDE LINE 1 AND TERMINAL 9 IN MILL PANEL

NOTE: BE CERTAIN THAT L1 OF MILL AND L1 OF AIR CONVEYOR ARE ON THE SAME LINE. DAMAGE TO PANEL COMPONENTS WILL RESULT IF VOLTAGE DIFFERENCE BETWEEN L1 OF MILL AND L1 OF AIR CONVEYOR IS 230 VOLTS.

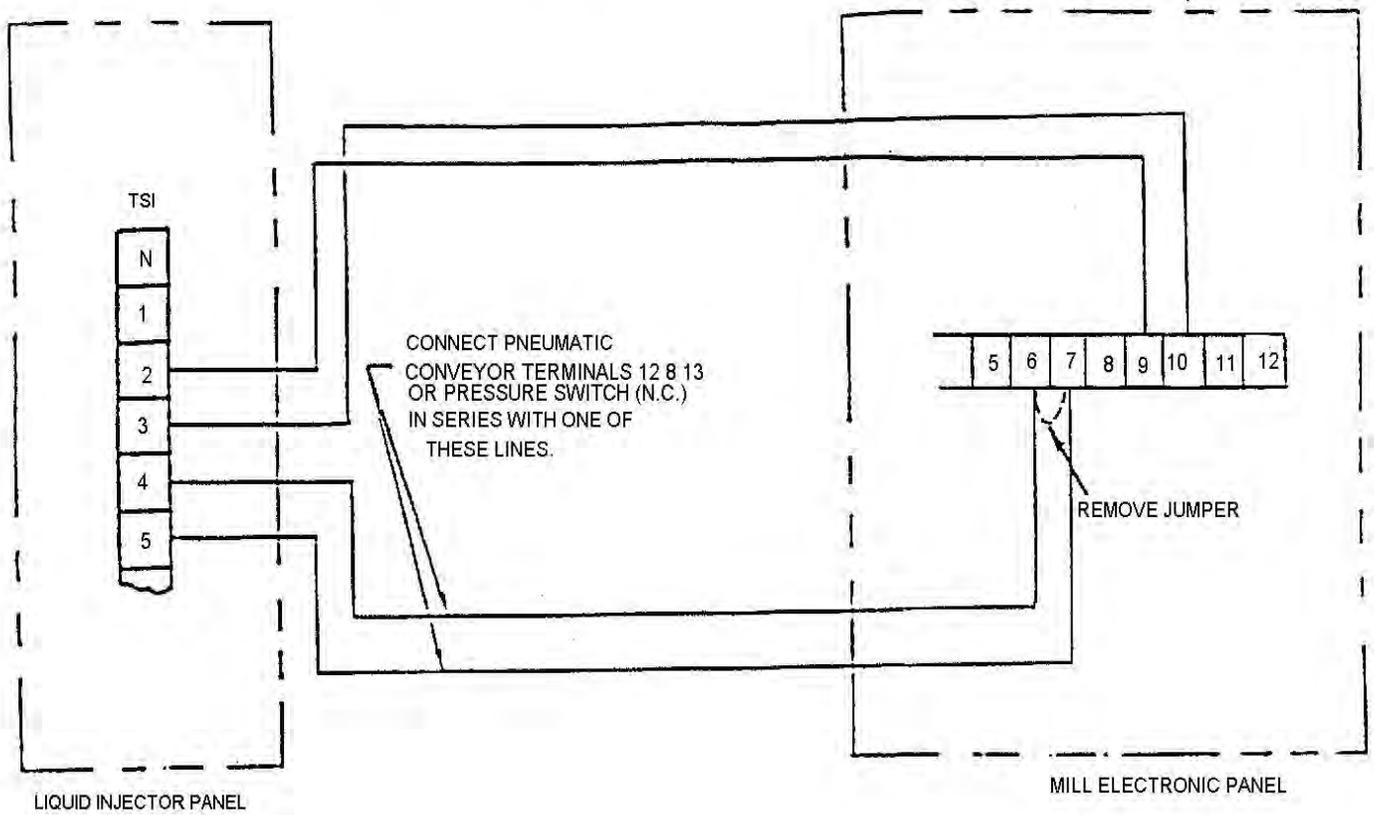
CABINET STYLE PNEUMATIC PANEL 2" TO ELECTRIC PANEL SENTRY



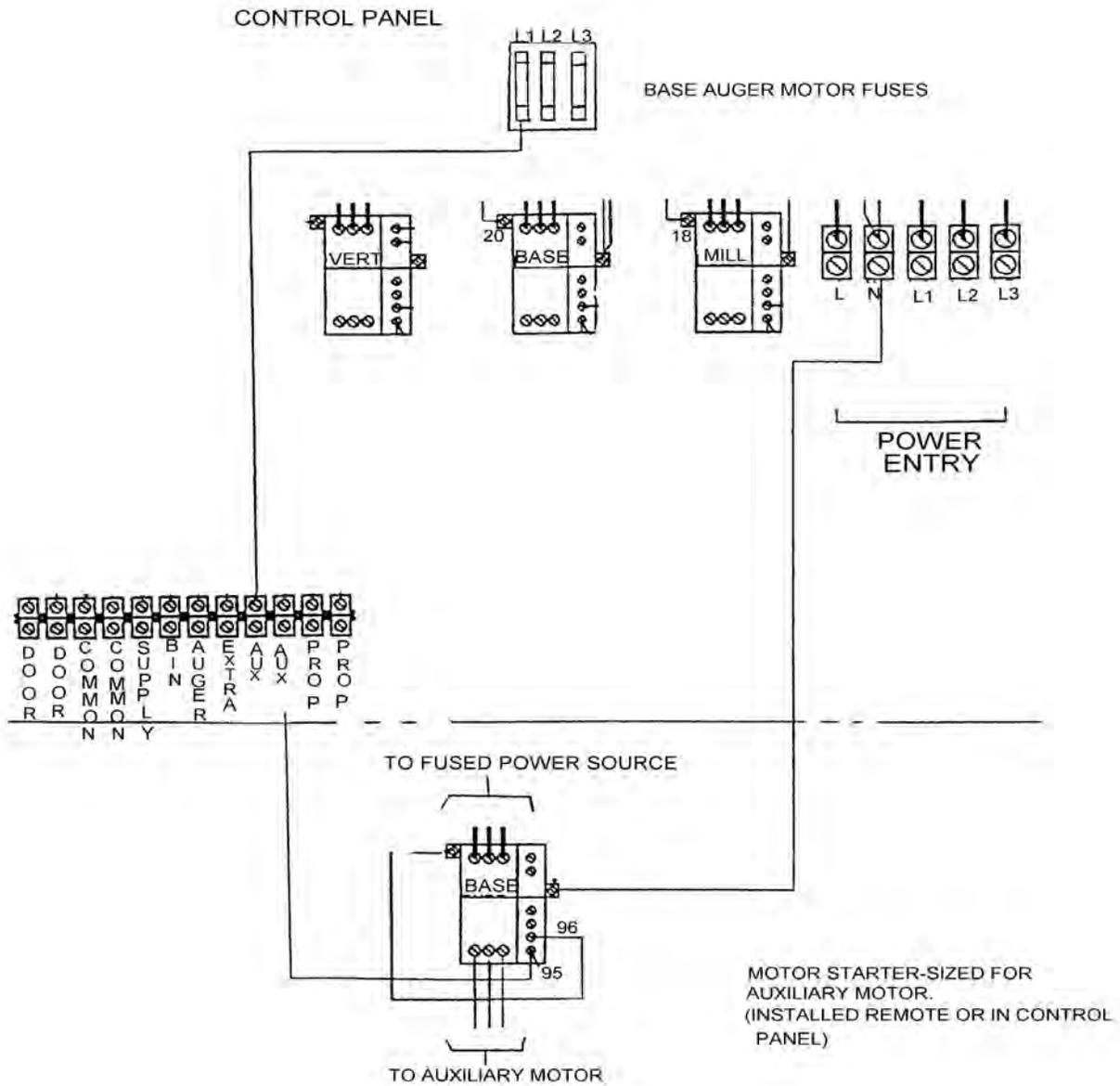
Jumper must be installed between 15 amp  
Fuses load side line 1 and terminal 9  
In mill panel.

Note: Be certain that L1 of mill and L1  
of air conveyor are on the same  
line. Damage to panel  
components  
will result if voltage difference  
between L1 of mill and L1 of air  
conveyor is 230 volts.

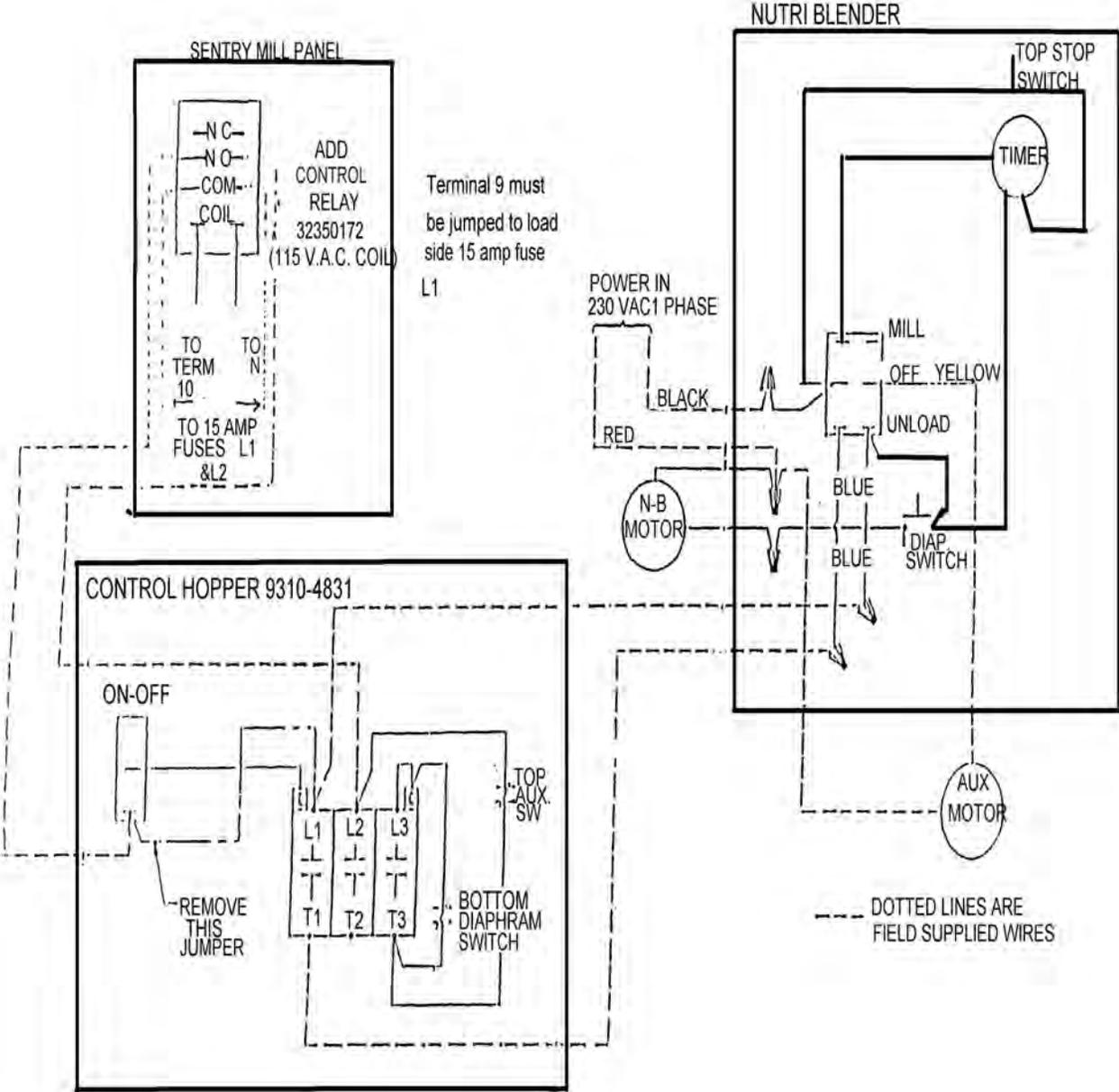
# INJECTOR TO ELECTRIC PANEL SENTRY



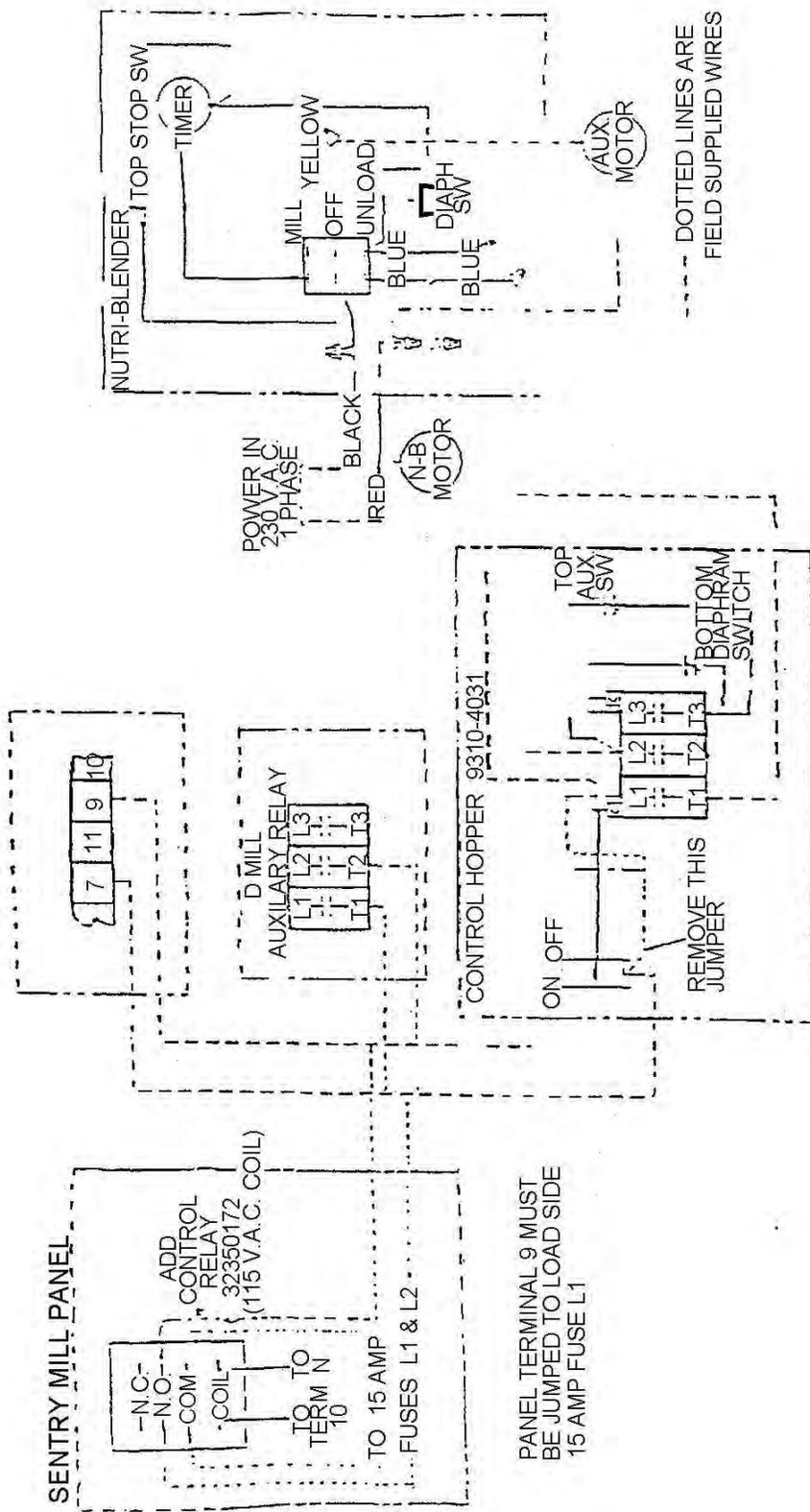
# AUXILLARY AUGERS TO SENTRY PANEL



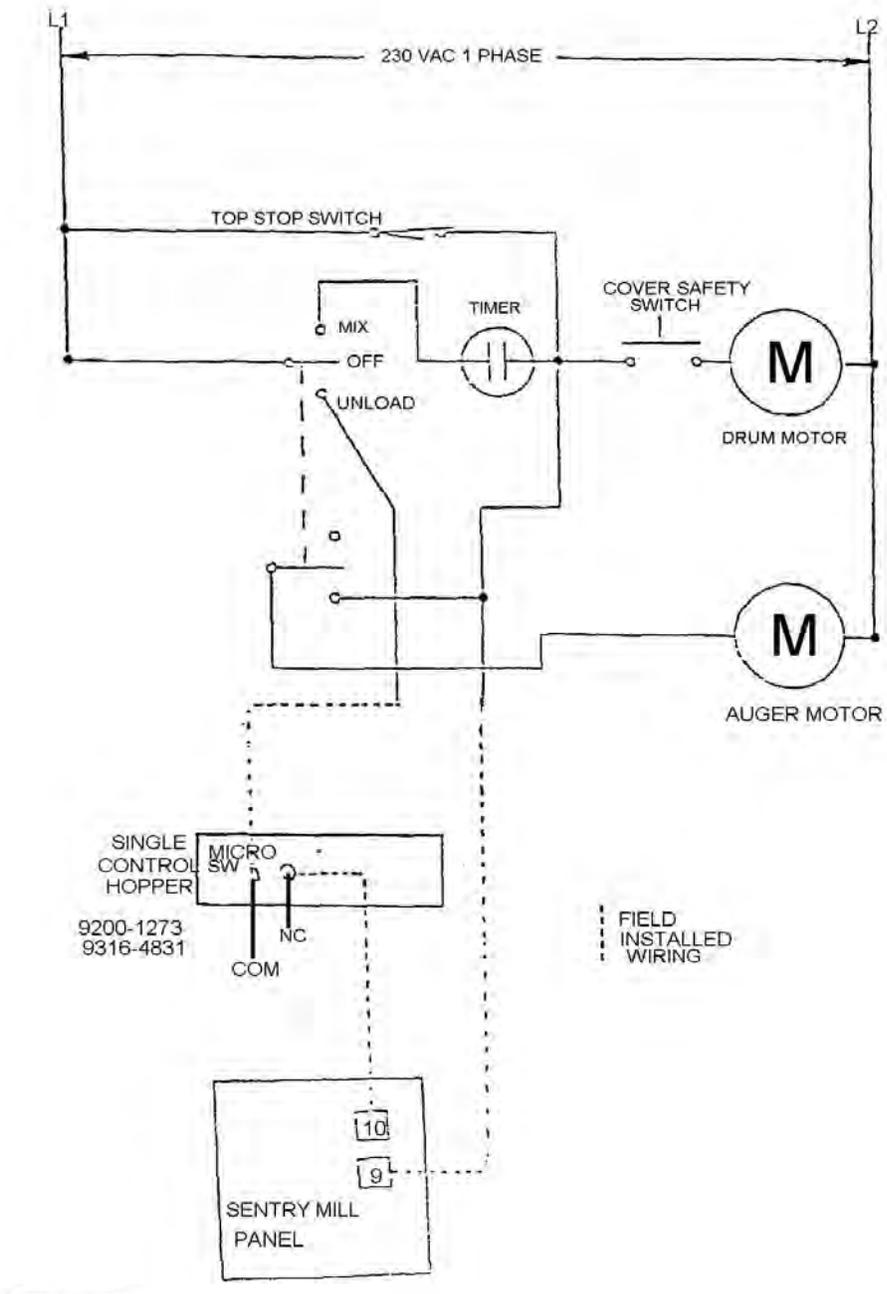
# SENTRY MILL WITH NUTRI-BLENDER AND CONTROL HOPPER CONNECTIONS



# Nutri-blender for gravity mills and double diameter control Hopper



# Nutri-blender for Sentry mill and single control hopper





# PARTS INFORMATION

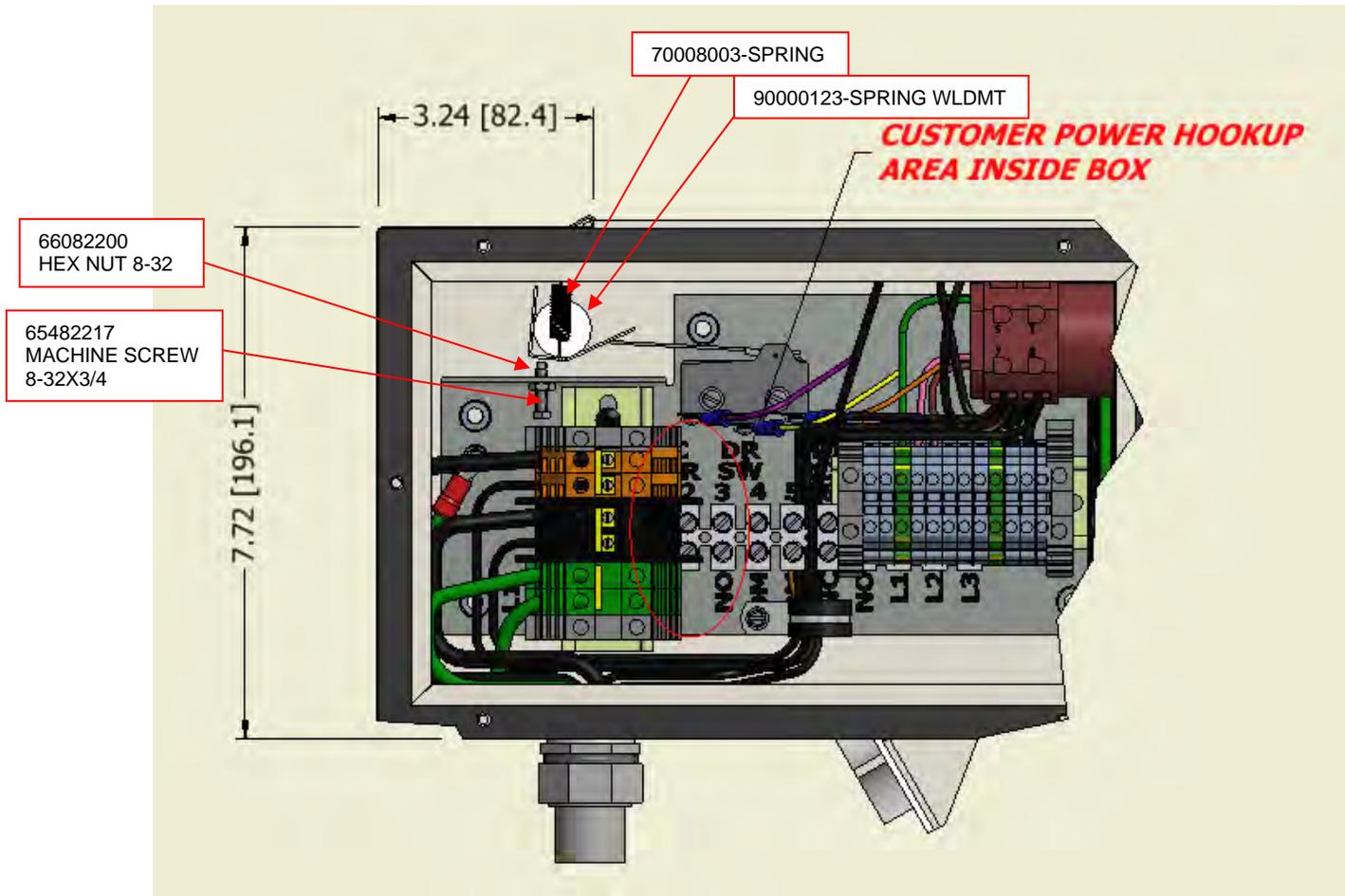
## Common Control Panel Parts

Item #	Part number	Quantity	Description
1	11222490	1	Backplate
2	90001192	1	Control Box
3	90001184	1	Panel Door, Sentry 5000 and 6500, or
	90001185	1	Panel Door, Sentry 4000 and 5500, or
	90001191	1	Panel Door, Sentry 2000,3000 and 4500
4	80014007	98"	Sponge Rubber, 3/16 x 1/2
5	31009027	1	Terminal Strip, 12 Pt.
6	31009026	1	Terminal Block # 222 Modular
7	100711	1	Terminal Block End
8	100715	1	Ground Bar Strip, 6Pt.
9	91000509	1	Speed Pot Assembly
10	91000522	1	DC Controller ( including Speed Pot)
11			Contactors Overload
12			Relay
13			Fuse
14			Fuse Holder
15	100713	1	Fuse, 2 Amp, 1/4 x 1 -1/4
16	100712	1	Fuse Holder, 1/4 x 1-1/4
17	80003655	1	Decal, Farmatic, 5 x 21 or
	80003662	1	Decal, Mix Mill, 5 x 21

## Electric Control Panel Parts Sentry 3000

Item #	Part number	Quantity	Description
18	100699	1	Relay, DPDT, 120 VAC Coil
19	91000327	1	Time Delay Board
20	302012	1	Amber Light 120 VAC
21	302013	1	Red Light, 120 VAC
22	31001004	1	3 Amp Circuit Breaker
23	80011521	1	Dust Seal Boot, 3 Amp Breaker
24	302017	1	Ammeter, 0-50 Amp
25	31008007	1	Switch, DPDT
26	302026	1	Dust Seal Boot, Toggle Switch
27	31008052	1	3 Pos. Sw. Operator, Spring Return Left to Center
28	31008068	1	N. O. Contact Block
29	31008061	1	N. C. Contact Block with Base
30	31011016	1	Interval Timer, 2-1/2 Hour
31	31011009	1	Timer Knob

# Paddle Switch and Actuator Adjustment



1. Back out the 65482217 adjusting screw and remove the 70008003 spring.
2. Position the actuator so that an allen screw may be inserted thru the back of the junction box into the setscrew. Loosen the setscrew.
3. Position the trip rod 9/16" from the back surface of the proportioner hopper. Tighten the setscrew in the actuator and replace the 70008003 spring.
4. Turn the 65482217 adjusting screw back in far enough to hold the out 9/16" out from the proportioner hopper back. Lock the screw in place with the 66082200 jam nut. The micro switch lever may have to be bent to make the switch actuate when the trip rod is pushed in toward the mill by a switch paddle.

# Component Functions

## Proportioner Hopper

### Switch Paddles

A weighted switch paddle is provided for each ingredient hopper. The paddle is inserted into the filled hopper by sliding the paddle blade down inside the sloping hopper on the proportioner side. An alternate method is to hold the paddle in contact with the inside face of the empty hopper and then fill the hopper. As long as there is grain in the hopper, the paddle in the hopper will be held in this position. If the supply of grain is exhausted and the hopper is empty, the paddle blade will swing up; the weighted end will swing down, trip the rod, and cause the mill to stop. A paddle is needed for each hopper being used; switch paddles should be removed if hopper is empty. A full hopper with the gearbox knob set on zero will stop a lot of dust flow back

### Ingredient Flow Switch

The trip rod on the hopper engages an over center actuator finger that trips a micro switch.

### Magnetic Separator

All Mills are provided with magnets that remove tramp iron from the grain being delivered by the proportioner to the grinding chamber. These magnets function whether the material bypasses the grinding chamber or not.

**IMPORTANT** The magnets should be checked every day, if possible, as metal caught by them will eventually work itself off if not removed. If steel parts are forced off of the magnets by the constant flow of grain they will enter the grinding chamber and destroy a screen and a set of hammers. This type of damage is NOT covered by warranty.

## Proportioner Gear Box

### Standard proportioner

A new Sentry proportioner is a five-auger model. Compartment numbers one, three, and four are all of equal size with each ingredient feed auger being controlled by an adjustable knob. Auger five is smaller, and is also controlled by an adjustable knob. These knobs are numbered from one to twenty-five. Augers are available in other sizes to adjust ingredient feed amounts.

The number two auger is a double capacity compartment. An adjustable knob numbered one to twenty-five is also controlling this auger.

Gearbox oil is a non-poisonous lubricant. Contact your local dealer for proper gearbox lubricant. (10W mineral based oil). Change oil every 500 hours or six months.

### **Proportioner Drive Motor**

A variable speed DC motor is used to direct drive the proportioner gear train. This eliminates the need for a belt drive. The DC variable voltage is provided by an electronic control located on the main control panel for the mill. The input voltage into the control is 115V AC 60 HZ. The output is continuously variable from 0 to 90V DC.

## **Mill Door**

### **Bypass Valves**

The built in bypass valves on the mill door give the operator the option of bypassing three ingredients around the grinding chamber. Either the material from the left hand (No. 1) auger, the material from the right hand (No. 4 and 5) augers, or all three can be bypassed.

### **Contactors**

Because all of the motor contactors are equipped with overload relays, all motors are installed without their manual reset overloads. When installing the optional vertical motor, be sure that its manual reset overload has been removed.

The overload current is set by the black dial on the overload relay's top face to match the full load current indicated on the motor's nameplate.

The overload relay has three operating modes, which can be selected by gently turning the gray mode selector switch. The AUTO mode is for normal operation. The overload will trip when the motor current exceeds the dial setting amperage, and will reset automatically within two minutes. In the MAN mode, the overload will trip at the same amperage, but must be reset manually by pressing the blue reset button. In the TEST position, pressing the reset button can simulate an overload.

### **Fuses**

Two 2 amp fast acting fuses protect the control board power supply and the 110-volt control circuit.

A 3 amp fast acting fuse protects the DC controller in the electronic panel. In the electric panel, the DC controller is protected by a circuit breaker mounted in the faceplate.

All motors are independently fused.

All replacement fuses must be identical to the ones supplied with the mill.

# Electrical Troubleshooting

Symptom	Probable Cause	Corrective Action
Motor will not start	Bad connection in display strap	See "Partial Clock/Counter display."
	Failed contactor	Check for contactors not engaging during cycle-up. Test and replace if necessary.
	Blown motor fuse	Check and replace fuses. Inspect motor for cause of overload.
	Loose connection	Tighten all motor wiring.
	Failed motor	Test and replace if necessary.
Frequent motor overload	Mechanical obstruction	Remove obstruction. Check bearings.
	Loose connection	Tighten all motor Wiring.
	Failed contactor	Test and replace if necessary.
	Low overload	Check overload adjustment against motor's full load amperage.
Frequent SHEAR PIN Tripping	Feed restriction	Check back of accuportioner for build-up feed or foreign material
	Internal accuportioner failure	Service accuportioner for seized or broken component.

	<b>PROBABLE CAUSE</b>	<b>CORRECTIVE ACTION</b>
No clock/counter display	No power to mill	Turn all breakers on
	No power to control board	Check and replace 2 amp fuses. Look for possible shorts in 110/120-volt control circuits.
Partial clock/counter display	Bad connection in display strap	Wiggle connectors gently. Display will flicker and become complete
No response to ON/OFF, CALIBRATE or CLEANOUT	Trouble light on	Correct the cause of trouble. Reset light, try again
	Timer reads "0:00"	Set timer to grinding time.
	Damaged Faceplate	Inspect touch pads for scratches and dimples. Replace if necessary.
No response to Clock/counter buttons	See "Partial clock/counter display" above	
	See "Damaged faceplate" above.	
Overload light will not reset	Overload has not reset itself	Wait 2 minutes, try again
	Failed overload	Test overload contacts. Replace if necessary.
Shutoff indicator light will not reset	Switch is still tripped	Reset switch, reset light
	Faulty wiring	Check for open switch circuit

**Note: All connections should be checked one month after installation, six months after installation and one a year thereafter.**

# Calibration Instructions

## **A**

Facing the accuportioner dials, write down the names of the ingredients in Compartments 1 through 5 on the worksheet (next page).

## **B**

Write down the desired amount per tonne/ton of each ingredient to come from each compartment. If an ingredient is in more than one compartment, divide the total amount desired evenly between the compartments.

## **C**

Write down the % protein of each ingredient in the appropriate space. See Appendix A or test figures from your supplier.

## **D**

Write down the dial settings for the present formula or turn all the dials to 20 and write "20" in each space provided.

## **E**

- a) Hang an empty canister (one that you will fill with premix or concentrate) on the calibration scale and set the scale's adjustable needle to "0"
- b) Attach the calibration chute to the mill and set all the canisters under it.
- c) Start the proportioner using the CALIBRATE button. When one of the canisters is filled without spilling, stop the proportioner by pushing the mill's trip rod.

## **F**

Weigh each canister on the scale and write down each net weight in the space provided. Add up all of the canister weights and write this figure in the total weight box at the right hand side of this line.

## **G**

$0.375 = 375$  kg divide each of the weights in step F by the total sample weight and write this "decimal number" under the associated test weight.

The numbers to the right of the decimal point are the kilograms or pounds of each ingredient per tonne/ton (example: /tonne or lbs./ton). If you wish to have your weights in pounds per imperial ton, simply multiply these numbers by 2.

## **H**

For each compartment, multiply the protein figures of step C by the "decimal number" of step G. This gives the % protein contributed to the ration by each compartment. Add these figures up and write the total in the total protein box at the right hand side of this line.

## **I**

To obtain primary dial settings for your desired ration, multiply step B by step D, then divide by step G and finally divide by 1000. Do this calculation for each compartment and write these new settings in the spaces provided. If the settings are too high (If some are higher than 25) or too

low for good accuracy, use the dial multiplier steps J and K. If the settings seem reasonable, go to step F below and then with steps G and H if necessary.

## **J**

Divide the number "23" by the highest dial setting step I. Write this number in the box provided at the right.

## **K**

Multiply the dial multiplier number by each setting in step I and enter these calculated settings in the spaces provided. Remember to round off these figures to the nearest whole number. Use these settings to go through steps F, G and H once more. After that, slightly readjust your dials to "fine tune" the ration if necessary. NOTE It is a good idea to check your rations periodically. Go through steps F, G and H and calculate your rations on a regular basis.

**NOTE:** It is a good idea to check your rations periodically. Go through steps F, G and H and calculate your rations on a regular basis.

# CALIBRATION WORKSHEET

Date: \_\_\_\_\_ Name of ration: \_\_\_\_\_ Desired Protein: \_\_\_\_\_ %

Compartment	1	2	3	4	5	
A Ingredient name						
B Desired amount per ton						Total= 1000Kg or 2000lbs Load Dial Settings
C % Protein of each ingredient						
D Dial Settings						
E Run proportioner						
F Weight of each ingredient (Kg. or lbs.)						Total Weight
G Fraction of a ton(ne) (each ingredient weight/total weight)	_____	_____	_____	_____	_____	Total = 1 ton(ne)
H Protein contribution (step C x step G)						Total protein= _____ %
I Primary dial settings (B x D/G/1000)	_____	_____	_____	_____	_____	
If primary dial settings are too high (greater than 25) or too low for accuracy, use the dial multiplier below to obtain more suitable settings .						
J Dial multiplier	23/ _____ (highest setting from step I)					
K Calculated dial settings (step I x dial multiplier)						
Run proportioner						
F Weight of each ingredient (Kg. or lbs.)						Total Weight
G Fraction of a ton(ne) (each ingredient weight/total weight)	_____	_____	_____	_____	_____	Total= 1 ton(ne)
H Protein contribution (step C x step G)						Total protein=
If the weights per ton(ne) are not close enough to the desired amounts in step B, readjust the appropriate dials						
Recalibration check date.						
F Weight of each ingredient (Kg. or lbs.)						Total Weight
G Fraction of a ton(ne) (each ingredient weight/total weight)	_____	_____	_____	_____	_____	Total= 1 ton(ne)
H Protein contribution (step C x step G)						Total protein=
Recalibration check date.						
F Weight of each ingredient (Kg. or lbs.)						Total Weight
G Fraction of a ton(ne) (each ingredient weight/total weight)	_____	_____	_____	_____	_____	Total= 1 ton(ne)
H Protein contribution (step C x step G)						Total protein=

# **ROUTINE MAINTENANCE**

1. Change proportioner oil every 500 hours or 6 months use 10W mineral based oil.
2. Check hammers for wear weekly or every 15 hours of operation which ever occurs first.
3. When changing hammers check bolts for wear.
4. Check screen for wear weekly or every 15 hours of operation whichever occurs first.
5. Check door seals monthly.
6. Check all belts for alignment and tension weekly.
7. Inspect proportioner every 2,000 hours.
8. Check mill magnets for tramp iron daily.
9. All electrical connections should be checked one month after installation, six months after installation and once a year thereafter.
10. Check proportioner auger for build up weekly and clean as necessary, build up on augers can severely affect calibration.
11. Recalibrate at periodic intervals or any time a new ingredient is brought in.

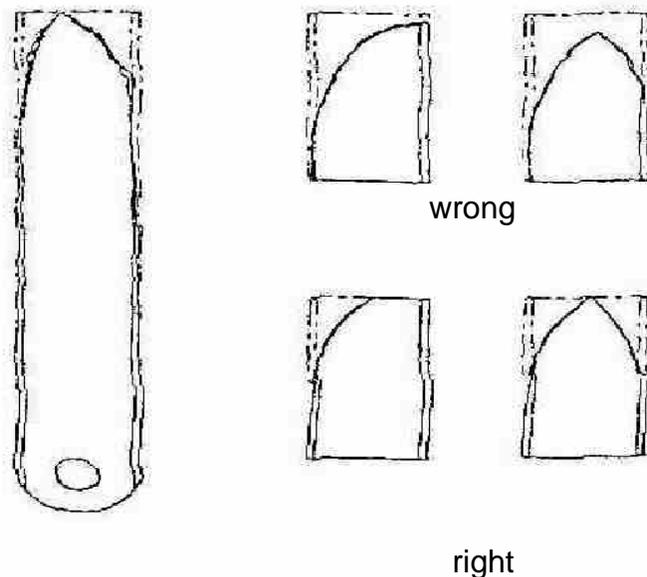
# Service Tips

## Screen and Wear Plates

The screen and wear plates have been designed so that you can get 18 different adjustments per side for extended screen life.

## Hammers

The hammers, spacers and hammer bolts are replaceable items. The hammers can be reversed (using the reversing switch of single phase mills) to double their life. They can also be moved in sets of three from the point of grain entry to the back of the housing for additional life. When changing their location, care must be exercised to keep the hammers in their original sets of three to prevent imbalance. It is of great importance to inspect the hammers to see that they are wearing properly. Figure # 6 illustrates normal wear of a worn out hammer. To get the maximum life out of your hammers you should reverse the direction of travel (with reversing switch on single phase mills) or rotate the hammer 180 degrees when it wears to the middle of the end tip. The other side can be worn down to the same point, but after the length of the hammer has been affected the hammer is then wore out as illustrated in figure # 6.



**Figure 6**

Worn out hammer  
(Normal Wear)

By continually using a worn out hammer it could cause the following:

1. Poor quality of ground feed due to inconsistent particle size.
2. Loss in grinding capacity, therefore causing higher cost per ton to process feed.
3. Motor bearing failure due to vibration.
4. Screen and housing damage due to broken hammer.

Vibration is hard on the motor bearings and can cause premature failure. An out of balance condition can result from vibration caused by a broken hammer.

When tightening nuts on the hammer bolts, they should be tight enough so that the hammers cannot swing freely but can still be moved with hand pressure.

Vibration can be caused by uneven wear of the hammer on the hammer bolts. The wear is not always uniform, in spite of carefully controlled heat-treating of the hammers and bolts. The bolts that wears the fastest permits the hammers to move farther from the center of rotation, causing imbalance. It is important that you carefully examine hammer bolts for wear replacing a set of hammers.

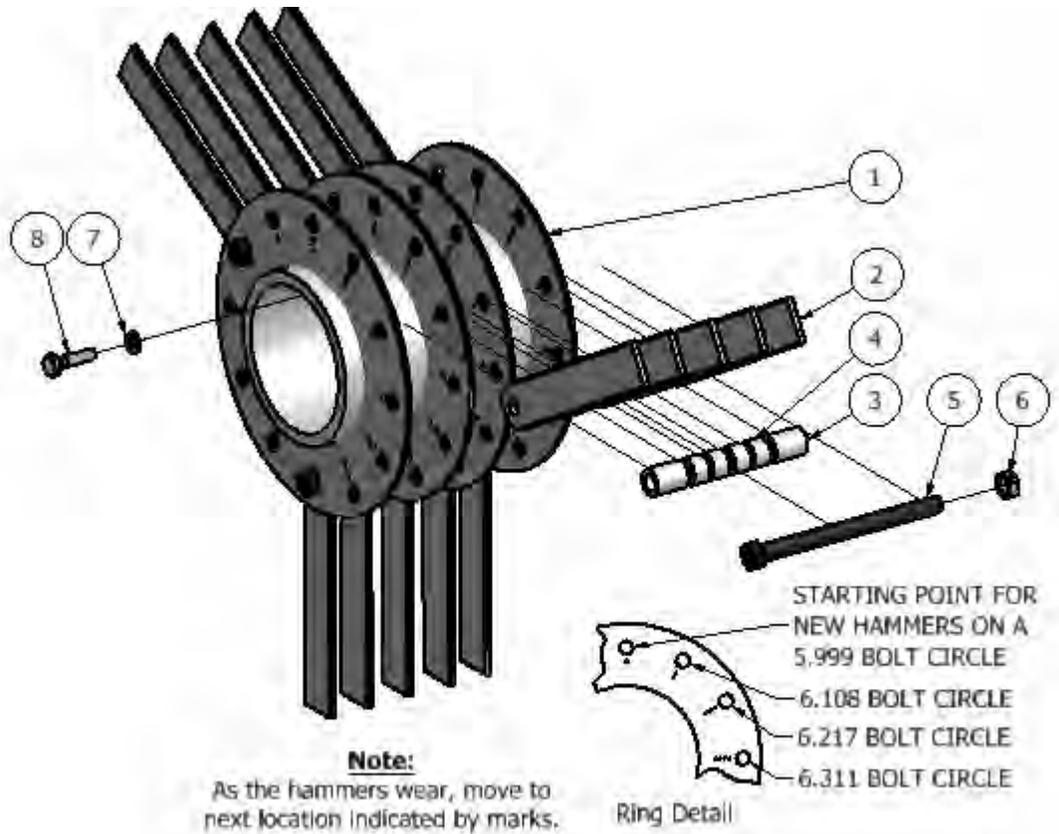
The cost of hammer replacement is inexpensive when compared to the damage that can occur by using worn out hammers.

# Beater hub assembly

Complete part # 92000234

Item #	Part number	Quantity	Description
1	90000104	1	Beater hub welded assembly
2	92000278	1	Hammers (set of 15)
3	80013502	6	Hub spacer
4	80013501	12	Hub spacer
5	70011504	3	3/8-24Hub Stud
6	66754500	3	3/8-24 Jam Nut
7	66443300	3	1/4 lock washer
8	62583322	3	HHCS 1/4-20 x 1

Note: Items # 3 and 4 are packaged together in part number 92000582



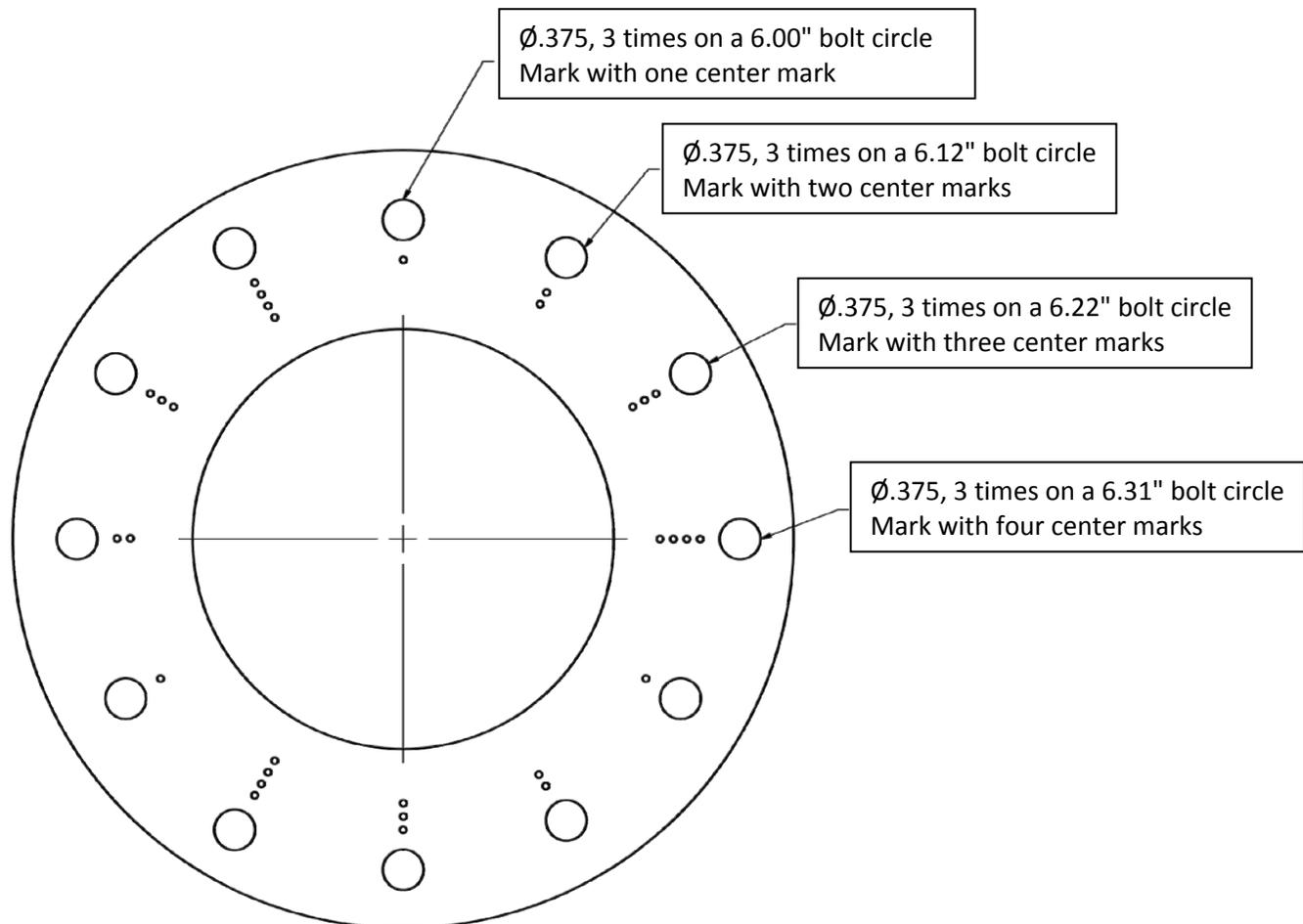
# TECHNICAL BULLETIN

In order to accommodate different grinding requirements and different raw materials we have modified our Sentry Mill hubs to allow the end user to easily adjust the clearance between the tip of the hammers and the screen.

Instead of the original six holes punched in the hub washers the new washers will have twelve holes in four sets of three, each different set is a different diameter. The matching holes marked with one Dot mark is the original diameter of the older hubs. Each successive set of holes marked with two, three, or four Dots; moves the hammers approx 3/32 of an inch closer to the screen.

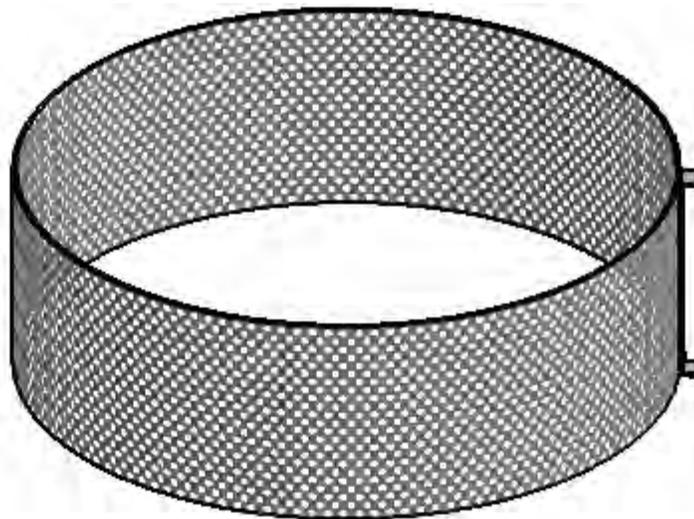
## CAUTION!!

When moving hammers to different sets of holes it is critical to maintain balance by placing the hammers evenly spaced around the hub. To confirm balance, **be sure the hammers are in positions with the same numbers of marks**. Also before starting the mill, rotate hub by hand to ensure that the hammers do not contact the screen at any point.



## Sentry Screen Options

Part number	Quantity	Description
92001071	1	18" diameter screen with 3/32" holes
92000221	1	18" diameter screen with 1/8" holes
92000211	1	18" diameter screen with 5/32" holes
92000212	1	18" diameter screen with 3/16" holes
92000214	1	18" diameter screen with 1/4" holes
92000215	1	18" diameter screen with 5/16" holes
92000216	1	18" diameter screen with 3/8" holes
92000218	1	18" diameter screen with 1/2" holes
92000219	1	18" diameter screen with 5/8" holes
92000220	1	18" diameter screen with 3/4" holes
92000208	1	18" diameter screen with 1/16" holes
92000209	1	18" diameter screen with 7/64" holes
92000217	1	18" diameter screen with 7/16" holes
92001070	1	18" diameter screen with 9/64" holes
92000213	1	18" diameter screen with 7/32" holes



# Servicing the Proportioner

To replace pawl and spring:

1. Make sure power to mill is shut off.
2. Drain oil by removing pipe plug from bottom of proportioner gearbox.
3. Remove the 20 washer head cap screws from cover.
4. Do not remove the knobs from cover
5. Use screwdriver under cover to break seal. Pry up gently and remove cover.
6. Remove push on fasteners.
7. You can now remove and inspect pawls and springs. If pawls are worn or broken replace, if springs are bent replace. If pawls are springs are not worn or bent you can put them back into the proportioner. Always use new push on fasteners.
8. If you only need to inspect or replace a pawl or spring reverse the above steps.

To rebuild a proportioner complete or to replace a shaft and ratchet, pawl carrier, nylon bearing, or auger then the gearbox must be removed from the mill as in the following steps:

1. Seal off grain flow to proportioner hopper.
2. Remove all grain from hopper.
3. Disconnect D.C. motor.
4. Remove nuts from bolts holding proportioner to hopper.
5. Drain Oil
6. Remove washer head screws (20).
7. Do not remove knobs from cover.
8. Remove cover.

To replace a shaft and ratchet, pawl carrier, or nylon bearing:

1. Remove auger from shaft on back of proportioner.
2. Remove set collar from shaft.
3. Clean shaft before removing.
4. Carefully remove shaft and ratchet out of the front of proportioner, twisting slightly as it is removed.
5. Remove pawl carrier from bearing.  
Note: pawl carriers 2,3,4, and 5 can be removed after removing shaft and ratchet. To remove pawl carrier 1, idler gear 1,2 and 3 must be removed at the same time.
6. Inspect nylon bearing for wear or grooves inside and outside. If marked replace.
7. Remove 4 screws holding nylon bearing. Remove bearing cap and gaskets from the backside of proportioner.  
Note: Clean inside of proportioner gearbox thoroughly.

Reassemble gearbox:

1. Using new nylon bearing, bearing cap and gasket reassemble with 4 screws to the proportioner back. NOTE: Assemble nylon bearing, gasket and bearing cap as show on Page 46.
2. Pawl carriers 2, 3, 4 and 5 can be reassembled by replacing them over the nylon bearing in the same way they came off. Pawl carrier 1 and idler gears 1, 2, and 3 must be assembled at the same time as shown in figure 7. NOTE: All idler gear assemblies are assembled with the weld facing the cover.

3. If using any old ratchets make sure that the teeth are not chipped, and replace with 2 new "O" rings. It is necessary to use oil when sliding "O" ring onto the shaft. If installing new shaft and ratchets you need to install 2 new "O" rings on each shaft. The oil on the "O" rings will help to slide the shaft into the bearing also.

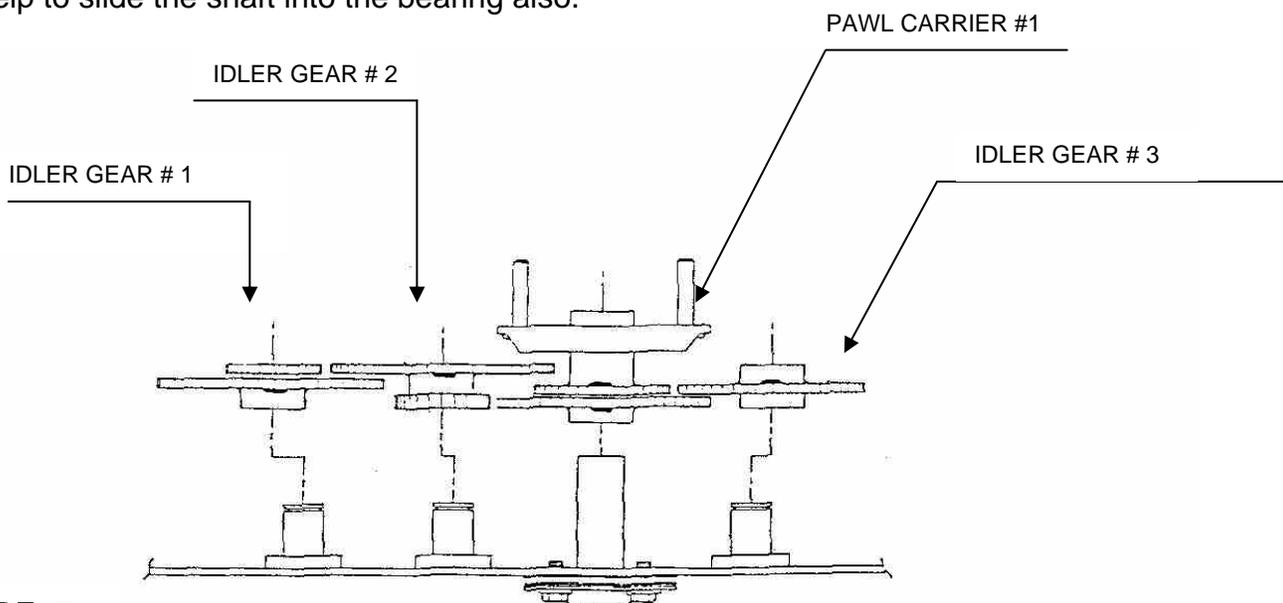


FIGURE 7

4. Replace the set collar on the auger shaft and ratchet at the back of the proportioner allowing only enough end play in the auger shaft and ratchet to let it turn without binding.
5. Replace the augers on the shafts.
6. Assemble the proportioner on the mill—auger must fit over the shaft in the bottom of the proportioner hopper. Starting at left side slide one auger at a time over the shaft until the proportioner is down on the hopper.
7. Install 4 nuts and lock washers on the back side of the proportioner.
8. Rewire the D.C. motor.
9. Install pawls and pawl springs held in place with push on fasteners. The pawl should engage with the full width of the ratchet which would require the push on fastener to be  $\frac{31}{32}$ " from the top of the pawl carrier. See figure # 8

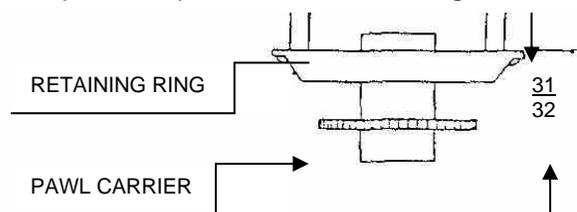


Figure 8

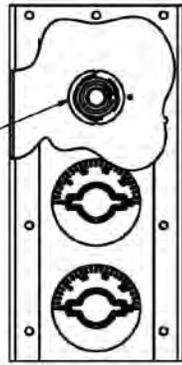
10. Replace cover assembly starting at the left side one at a time turn knob # 1 until cam drops into place on the ratchet. Do this on all knobs until the cover is in place. Replace all 20 washer head screws and tighten.  
Note: DO NOT FORCE THE COVER DOWN it will drop in place with a little care.
11. Replace drain plug in the bottom and put 2 quarts of oil in the proportioner.
12. Replace fill plug.

# REPLACEMENT PARTS & DRAWINGS

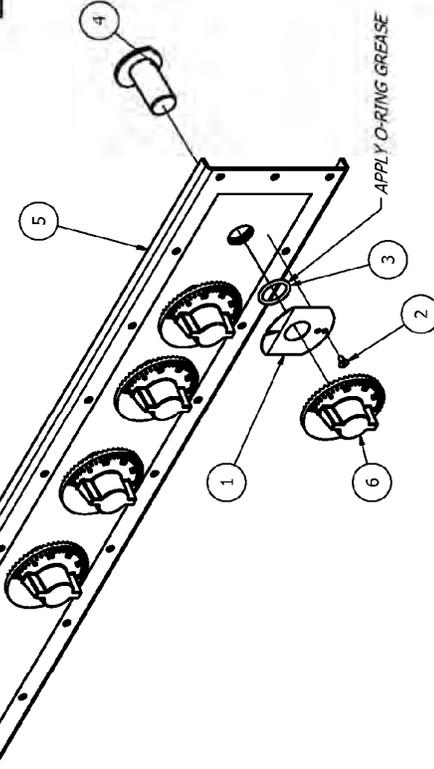
2

REV	ECN	DESCRIPTION	DATE	APPROVED
A		RELEASED	9/7/1974	BOOTH
B	100077	REDRAWN IN INVENTOR	3/15/2010	AUGAGER
C	110221	ADDED ASSY NOTES	12/19/2011	SH

CAMS OPPOSITE EACH OTHER  
 WITH 0 AT 12 O'CLOCK



CAULK INNER FACES AND RIVET



APPLY O-RING GREASE

ITEM	PART NUMBER	QTY	DESCRIPTION
6	92000235	5	KNOB ASSEMBLY
5	90000121	1	D PROP WLDVMT
4	90000119	5	MOVEABLE CAM & SLEEVE ASSY
3	80008502	5	O-RING, 1.00 I.D X 1.25 O.D X .125 THK
2	70007001	5	RIVET, POP SDS54 .156X.13-.38"
1	11195780	5	SPRING, KNOB, PROPORTIONER

Parts List



**DIVISION OF**  
 A. T. FERRELL COMPANY  
 1440 S. ADAMS ST.  
 BLUFFTON, INDIANA  
 46714 - USA  
 PH. 219-624-3400  
 FAX. 219-624-5463

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 without prior written consent of the A. T. Ferrell Company, Inc.

DRAWN BY: alpagar  
 DRAWN DATE: 3/15/2010  
 APPROVED BY: DMJ

TOLERANCES UNLESS NOTED TITLE  
 DECIMAL FRACTIONAL D PROP COVER ASSY  
 .XX ± .000 + .003 FINISH  
 .XXX ± .005 ANGULAR + .02 NONE  
 .XXXX ± .001 + .02

CAD NO MANU/AL SCALE 1:1 SHEET 1 OF 1  
 CHANGES PART NUMBER: 92000231 REV: C

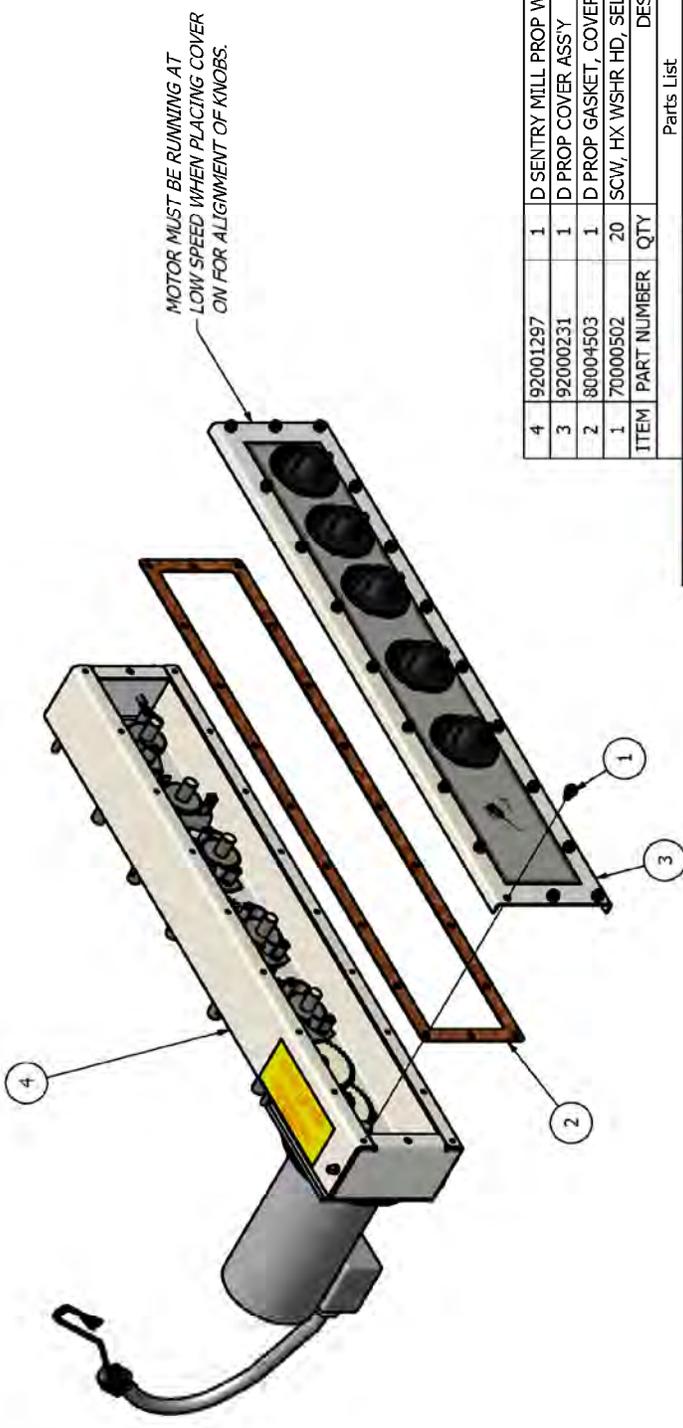
NOTES:  
 1. DO NOT SCALE FROM DRAWING.

Reference File: C:\Products\WorkSpace\Inventor  
 File Path: 400\92001424\92001424.ipt

ECN: 92001424 (1/13/11) (M) User: Srinivas (7) Advantech  
 InvenStamp

REV	ECN	DESCRIPTION	DATE	APPROVED
A	950076	CHANGE IN PART NUMBER 92001297	9/17/1999	JJ
B	100077	REDRAWN IN INVENTOR	5/10/2010	AGAGER
C	100077	UPDATED BUID, ADDED ASSY NOT	12/19/2011	SH

REVISION HISTORY



MOTOR MUST BE RUNNING AT  
 LOW SPEED WHEN PLACING COVER  
 ON FOR ALIGNMENT OF KNOBS.

ITEM	PART NUMBER	QTY	DESCRIPTION
4	92001297	1	D SENTRY MILL PROP W/ MTR ASSY
3	92000231	1	D PROP COVER ASSY
2	80004503	1	D PROP GASKET, COVER
1	70000502	20	SCW, HX WSHR HD, SELF SEALING 1/4-20 X .50"

Parts List



**DIVISION OF**  
 A T FERRELL COMPANY  
 1440 S ADAMS ST  
 BLUFFTON, INDIANA  
 46714 - USA  
 PH: 260-824-3400  
 FAX: 260-824-5483

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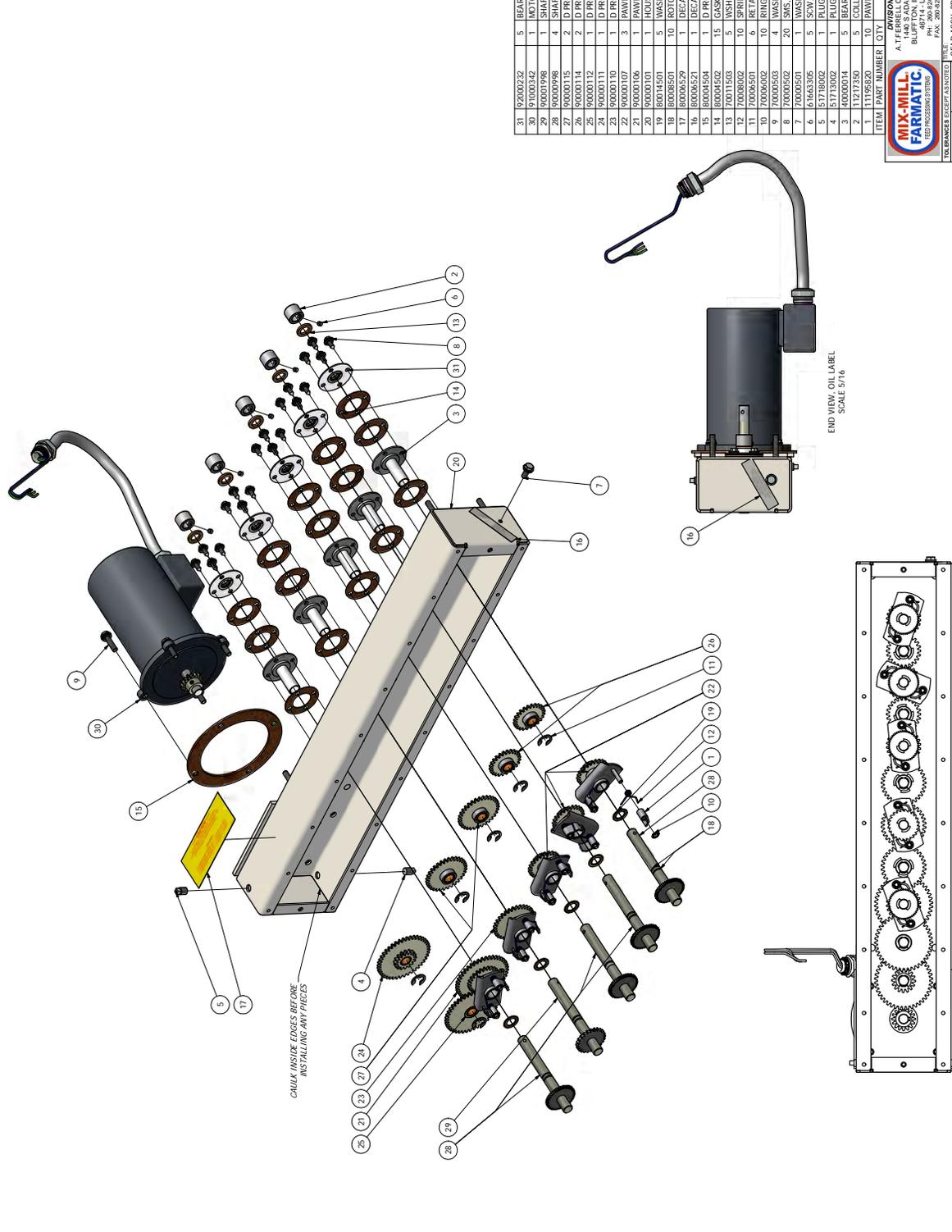
DRAWN BY: Alieng  
 DRAWN DATE: 5/10/2010  
 APPROVED BY: DRU

TOLERANCES EXCEPT AS NOTED	TITLE	SCALE	SHEET	SIZE	PART NUMBER	REV.
DECIMAL: XX ± .030 XXX ± .005 XXXX ± .001	SENTRY PROP W/ MOTOR ASSY	0.19:1	1 OF 1	B	92001424	C
FRACTIONAL: ± .125						
ANGULAR: ± .125°						
FINISH: NONE						

NOTES:  
 I. DO NOT SCALE FROM DRAWING.

REV	ECN	DESCRIPTION	DATE	APPROVED
A	990016	11198820 AND 7000802 CHD FROM 5 PCS TO 10 PCS PER PROPORTIONER	9/19/1999	KJ
B	100077	REDRAWN IN INVENTOR	4/14/2010	AGAGER
C	130011	CHG TITLE: GEAR ASSY, PROPORTIONER W/MOTOR WAS PROPORTIONER ASSY, W/O MOTOR	1/22/2013	I. Gumpenson

REV	DESCRIPTION	DATE	APPROVED
1	REVISION		
2	REVISION		
3	REVISION		



ITEM	PART NUMBER	QTY	DESCRIPTION
31	92000232	5	BEARING CAP ASSY, PROPORTIONER
30	91000342	1	MOTOR ASSY, PROP W/ DIGITAL SENTRY
29	90001998	1	SHAFT & BATCH ASSY HD
28	90000998	4	SHAFT & BATCH ASSY
27	90000115	2	D PROP IDLER GEAR ASSY 32T-12 DP
26	90000115	2	D PROP IDLER GEAR ASSY 32T-12 DP
25	90000112	2	D PROP REDUCER GEAR ASSY 1442 OFF SET
24	90000111	1	D PROP REDUCER GEAR ASSY 1442
23	90000111	1	D PROP 6 DRIVE GEAR ASSY
22	90000107	3	PAWL CARRIER ASSY - 24T
21	90000106	1	PAWL CARRIER ASSY 42T - 24T
20	90000101	1	HOUSING W/DMT, 5 COMP PROP, D MILL
19	80014501	5	WASHER, THRUST BRONZE, .628X.10X.062"
18	80008501	10	ROTOR SEAL, 7/16 ID X .58 OD X .212 THK
17	80008521	1	DEGAL OIL LEVEL HOLE PROPORTIONER
16	80006521	1	DEGAL OIL LEVEL HOLE PROPORTIONER
15	80004504	1	D PROP GASKET, DR MOTOR
14	80004502	15	GASKET
13	70011503	5	WASHER, THRUST 6.25 X 1.00 X .125
12	70008002	10	SPRING - DRIVE PAWL
11	70006501	6	RETAINING RING (6/8 DIA SHAFT)
10	70006002	10	RING, RETAINING, EXT SELF-LOCKING, .250"
9	70005003	4	WASHER HEAD BOLT ASSY 5/16 X 1 1/4
8	70005003	4	WASHER HEAD BOLT ASSY 5/16 X 1 1/4
7	70004501	3	WASHER HEAD BOLT ASSY, #14 X .75
6	61663306	5	SCW, SET 1/4-20 X .25- HEX SKT FLAT PT
5	5178002	1	PLUG, VENTED, ZINC P/LT, 1/4 NPT, .250 SQ HD
4	5173002	1	PLUG, ZINC P/LT, 1/4 NPT, .250 SQ HD
3	40000014	5	BEARING, AUGER SHAFT
2	11217350	5	COLLAR, 5/8"
1	11198820	1	PAWL DRIVE, PROPORTIONER C/D

**MIX-MILL FABRICATION**  
 48714 - USA  
 200-825-5485  
 7/11/2010

AT FERRELL COMPANY  
 48714 - USA  
 200-825-5485  
 7/11/2010

DESCRIPTION: GEAR ASSY, PROPORTIONER W/MOTOR, D MILL

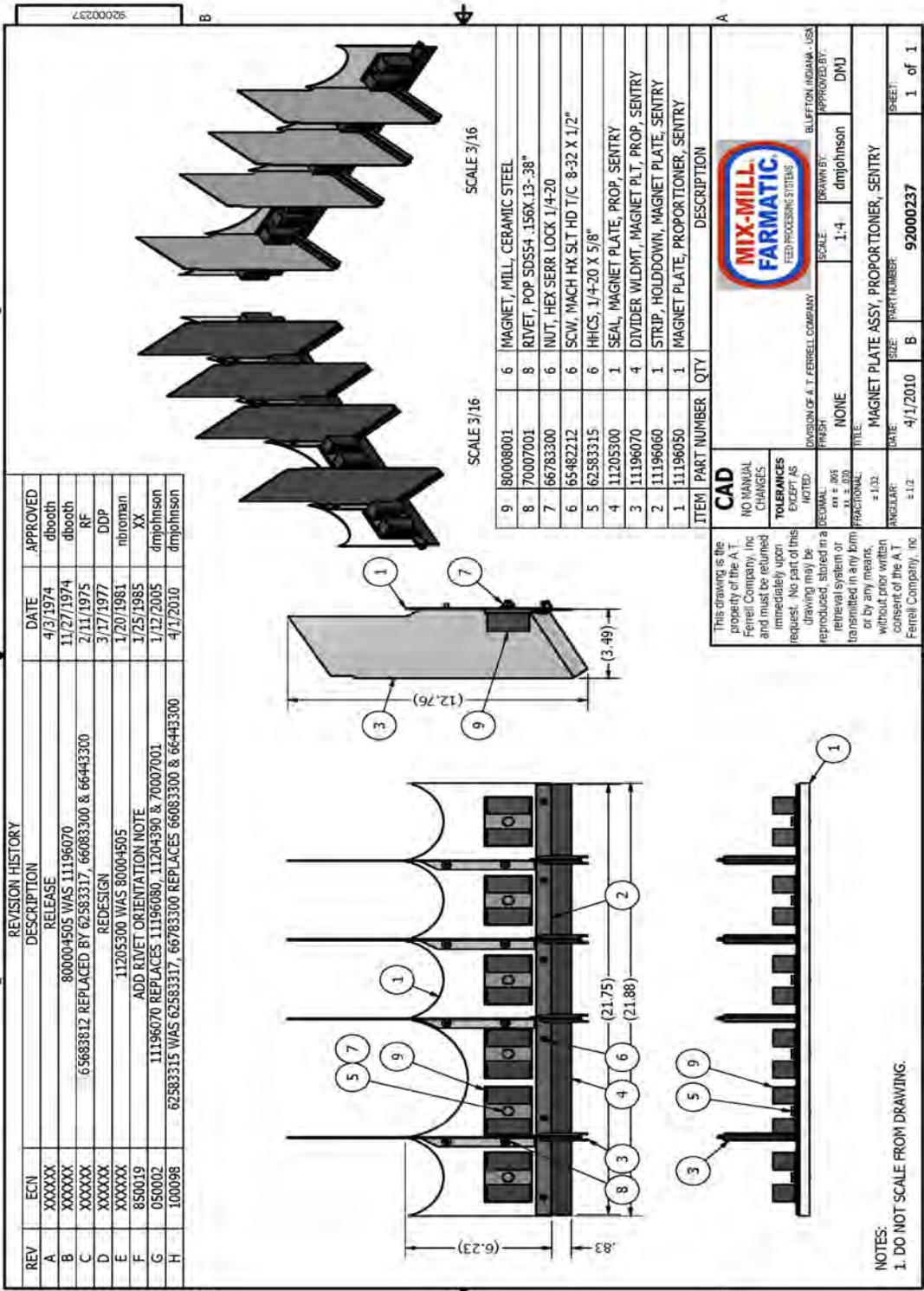
REVISIONS: 1 OF 1

DATE: 9/20/1997

SCALE: 5/16

REV: C

NOTES:  
 1. DO NOT SCALE FROM DRAWING.  
 2. INSTALL 90000114 & 90000115 WELDED SIDE UP.  
 3. ONE PIECE REQUIRED PER 92001424: PROPORTIONER ASSY, W/MOTOR, D MILL.



REV	ECN	REVISION HISTORY	DATE	APPROVED
A	XXXXXX	RELEASE	4/3/1974	dbooth
B	XXXXXX	800004505 WAS 11196070	11/27/1974	dbooth
C	XXXXXX	65683312 REPLACED BY 62583317, 66083300 & 66443300	2/11/1975	RF
D	XXXXXX	REDESIGN	3/17/1977	DDP
E	XXXXXX	11205300 WAS 80004505	1/20/1981	nbroman
F	850019	ADD RIVET ORIENTATION NOTE	1/25/1985	XX
G	050002	11196070 REPLACES 11196080, 11204390 & 70007001	1/12/2005	dmjohnson
H	100098	62583315 WAS 62583317, 66783300 REPLACES 66083300 & 66443300	4/1/2010	dmjohnson

ITEM	PART NUMBER	QTY	DESCRIPTION
9	80008001	6	MAGNET, MILL, CERAMIC STEEL
8	70007001	8	RIVET, POP SD554 .156X.13-.38"
7	66783300	6	NUT, HEX SERR LOCK 1/4-20
6	65482212	6	SCW, MACH HX S/LT HD T/C 8-32 X 1/2"
5	62583315	6	HHCS, 1/4-20 X 5/8"
4	11205300	1	SEAL, MAGNET PLATE, PROP, SENTRY
3	11196070	4	DIVIDER W/DMT, MAGNET PLT, PROP, SENTRY
2	11196060	1	STRIP, HOLDDOWN, MAGNET PLATE, SENTRY
1	11196050	1	MAGNET PLATE, PROPOR TIONER, SENTRY

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**CAD**  
NO MANUAL CHANGES  
TOLERANCES EXCEPT AS NOTED  
DECIMAL .005  
ANG ±.002  
FRACTIONAL ±.002

**MIX-MILL FARMATIC**  
FEED PROCESSING SYSTEMS

DIVISION OF A.T. FERRELL COMPANY  
FINISH: NONE  
SCALE: 1-1  
DRAWN BY: dmjohnson  
APPROVED BY: DMJ

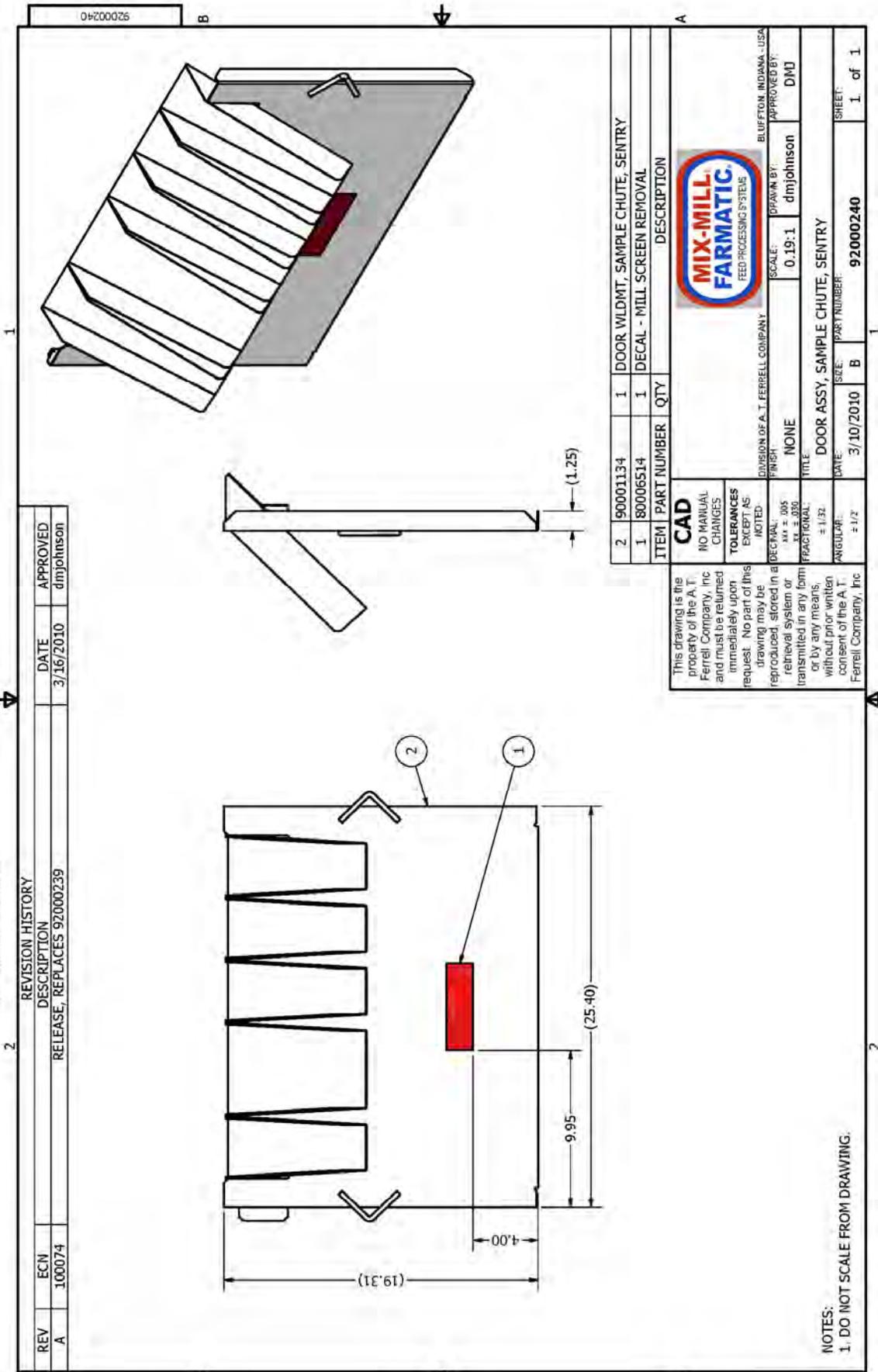
BULETON, INDIANA - USA

DATE: 4/1/2010  
PART NUMBER: 92000237  
SIZE: B  
SHEET: 1 of 1

NOTES:  
1. DO NOT SCALE FROM DRAWING.

Manufactured in China by A.T. Ferrell Company, Inc.  
 http://www.ferrell.com/Products/92000240.htm

W:\P\9200240\1\A\Mill\Sample\92000240.dwg



REV	ECN	DESCRIPTION	DATE	APPROVED
A	100074	RELEASE, REPLACES 92000239	3/15/2010	dmjohnson

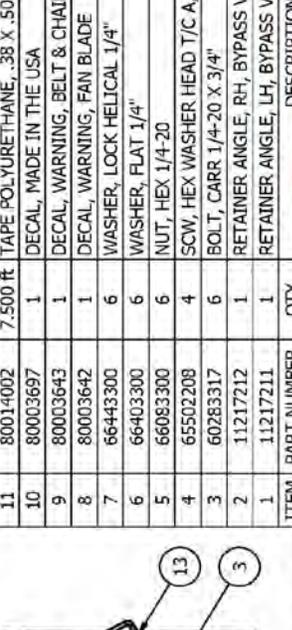
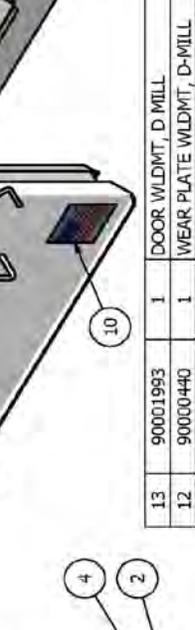
ITEM	PART NUMBER	QTY	DESCRIPTION
2	90001134	1	DOOR W/DMT, SAMPLE CHUTE, SENTRY
1	80006514	1	DECAL - MILL SCREEN REMOVAL

<b>CAD</b>		NO MANUAL CHANGES		TOLERANCES EXCEPT AS NOTED:		DECIMAL: .005		ANGULAR: ± 1.2°	
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MIX-MILL FARMATIC FEED-PROCESSING SYSTEMS		BLUFFTON, INDIANA - USA		DRAWN BY: dmjohnson		DMU		TITLE: DOOR ASSY, SAMPLE CHUTE, SENTRY	
DATE: 3/10/2010		PART NUMBER: 92000240		SIZE: B		SHEET: 1 of 1			

NOTES:  
 1. DO NOT SCALE FROM DRAWING.

REV	ECN	DESCRIPTION	DATE	APPROVED
A	0600058	RELEASE	6/12/2006	dmjohnson
B	100074	REDRAWN CAD	3/11/2010	dmjohnson
C	110221	ADDED 80003642, 80003643 & 80003697	11/18/2011	SAH

ITEM	PART NUMBER	QTY	DESCRIPTION
13	90001993	1	DOOR WLDMT, D MILL
12	90000440	1	WEAR PLATE WLDMT, D-MILL
11	80014002	7.500	TAPE POLYURETHANE, .38 X .50"
10	80003697	1	DECAL, MADE IN THE USA
9	80003643	1	DECAL, WARNING, BELT & CHAIN
8	80003642	1	DECAL, WARNING, FAN BLADE
7	66443300	6	WASHER, LOCK HELICAL 1/4"
6	66403300	6	WASHER, FLAT 1/4"
5	66083300	6	NUT, HEX 1/4-20
4	65502208	4	SCW, HEX WASHER HEAD T/C A, #8-32 X .38"
3	60283317	6	BOLT, CARR 1/4-20 X 3/4"
2	11217212	1	RETAINER ANGLE, RH, BYPASS VALVE
1	11217211	1	RETAINER ANGLE, LH, BYPASS VALVE



**MIX-MILL FARMATIC**  
 FEED PROCESSING SYSTEMS

DIVISION OF A. T. FERRELL COMPANY  
 SCALE: 1:8  
 DRAWN BY: dmjohnson  
 APPROVED BY: DMJ

BUCKETON, INDIANAPOLIS, USA

ITEM	PART NUMBER	QTY	DESCRIPTION
13	90001993	1	DOOR WLDMT, D MILL
12	90000440	1	WEAR PLATE WLDMT, D-MILL
11	80014002	7.500	TAPE POLYURETHANE, .38 X .50"
10	80003697	1	DECAL, MADE IN THE USA
9	80003643	1	DECAL, WARNING, BELT & CHAIN
8	80003642	1	DECAL, WARNING, FAN BLADE
7	66443300	6	WASHER, LOCK HELICAL 1/4"
6	66403300	6	WASHER, FLAT 1/4"
5	66083300	6	NUT, HEX 1/4-20
4	65502208	4	SCW, HEX WASHER HEAD T/C A, #8-32 X .38"
3	60283317	6	BOLT, CARR 1/4-20 X 3/4"
2	11217212	1	RETAINER ANGLE, RH, BYPASS VALVE
1	11217211	1	RETAINER ANGLE, LH, BYPASS VALVE

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NOTES:  
 1. DO NOT SCALE FROM DRAWING.  
 2. REPLACES 92001276: DOOR ASSY, W/LANCES, D MILL.

## DISCHARGE PACKAGES

### 3 1/2" x 12" Discharge package, Sentry hammer mill- Part # 92001447

Item #	Part number	Quantity	Description
1	93048021	1	Support assembly
2	90001105	1	Tube and offset plate, Sentry 12"
3	90002150	1	3-1/2" shaft and flight assembly LH
4	11217670	1	3-1/2" bearing mounting plate
Note: Item # 4 is shipped mounted on the Sentry mill			
5	93022900	1	5/8" bore, dust proof ball bearing assembly
6	42108104	1	Sheave, pressed steel, 10.0", .625" bore w/keyway
7	F91162042	1	V belt, B-42
8	301097	1	Sheave, 3" OD, .625" bore, keyway/2 screws

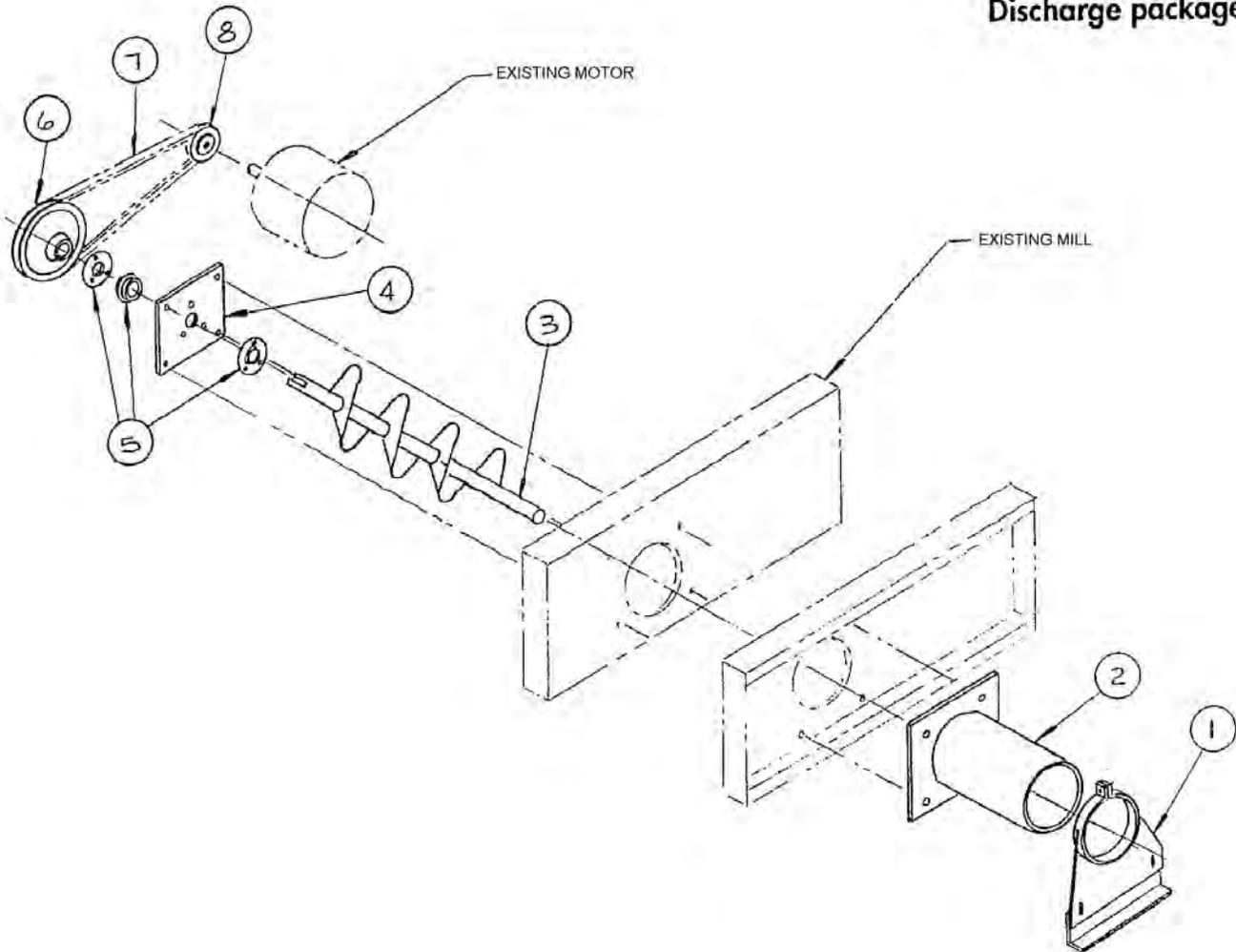
### 3 1/2" x 50" Discharge package, Sentry hammer mill-Part # 92001448

Item #	Part Number	Quantity	Description
1	93048021	1	Support assembly
2	90001106	1	Tube and offset plate, Sentry 12"
3	90002153	1	3-1/2" shaft and flight assembly LH
4	11217670	1	3-1/2" bearing mounting plate
Note: Item # 4 is shipped mounted on the Sentry mill			
5	93022900	1	5/8" bore, dust proof ball bearing assembly
6	42108104	1	Sheave, pressed steel, 10.0", .625" bore w/keyway
7	F91162042	1	V belt, B-42
8	301097	1	Sheave, 3" OD, .625" bore, keyway/2 screws

### 6" x 12" Discharge package, Sentry hammer mill - Part # 92001449

Item #	Part number	Quantity	Description
1	106136	1	6' corner support
2	90001107	1	Tube and offset plate, Sentry 6" x 12"
3	90000943	1	Cross auger 6"
4	11217660	1	6" bearing mounting plate
Note: Item # 4 is shipped mounted on the Sentry mill			
5	93032230	1	1-1/16" bore, dust proof ball bearing assembly
6	301106	1	Sheave, pressed steel, 10.0", 1.063" bore, kw/2scw
7	F91162042	1	V belt, B-42
8	301097	1	Sheave, 3" OD, .625" bore, keyway/2 screws

## Discharge packages



## Appendix A

Book value of common feed stuffs on "as fed" basis

Ingredient	% Protein	% Moisture	% Calcium	% Phosphorus
Corn	8.5	14	0.05	0.25
Corn, High Moisture	7.4	27	0.04	0.22
Oats	11	10	0.1	0.35
Barley	11.5	11	0.08	0.42
Wheat	13.5	12	0.05	0.41
Mixed Grain	11.3	12	0.09	0.39
Brewers Grains, Dried	27	7	0.3	0.6
Soybeans, Raw Full-Fat	37	13	0.25	0.6
Soybeans, Roasted	38	10	0.25	0.6
Soybean Meal, Western	46.5	12	0.3	0.6
Soybean Meal, Lo Protein	44	12	0.25	0.6
Soybean Meal, Hi Protein	48	12	0.2	0.65
Corn Gluten Feed	21	12	0.2	0.9
Corn Gluten Meal	60	10	0.2	0.7
Corn Distillers	27	9	0.35	1.3
Limestone	0	2	38	0
Molasses, Dried	7	9	1.2	0.9

### 50 Amp Ammeter Replacement Kit

Part Number: 91000372

This kit replaces the existing 50 amp meter with a replacement, lower amperage unit that will provide the same readings without the high motor current wiring running directly to the panel door. This kit does require some basic understanding of electrical wiring and the use of basic tools such as a volt meter, wire strippers and terminal connectors. Seek the assistance of a certified electrician if required.

**Improper installation can lead to equipment damage and personal injury or death. Do not wire the replacement meter directly into the original panel wiring as full current will be directed into the meter and destroyed. Seek the assistance of a certified electrician if unsure of proper installation!**

**Kit consists of:**

- Qty. 1 – 91000373 Transformer & Lead assembly
- Qty. 2 – 302017 Amp meter & mounting hardware
- Qty. 2 – 80019006 Adhesive mounting pads
- Qty. 2 – 7 in. tie straps
- Qty. 1 – 99960006 Kit installation instruction

**Installation and operation:**

1. Disconnect all power from the panel and verify that power has been removed by first trying to operate the equipment as normal. If the equipment does not start, open panel door and check for incoming voltages. Multiple voltage inputs may be present due to motors and controls in the system.

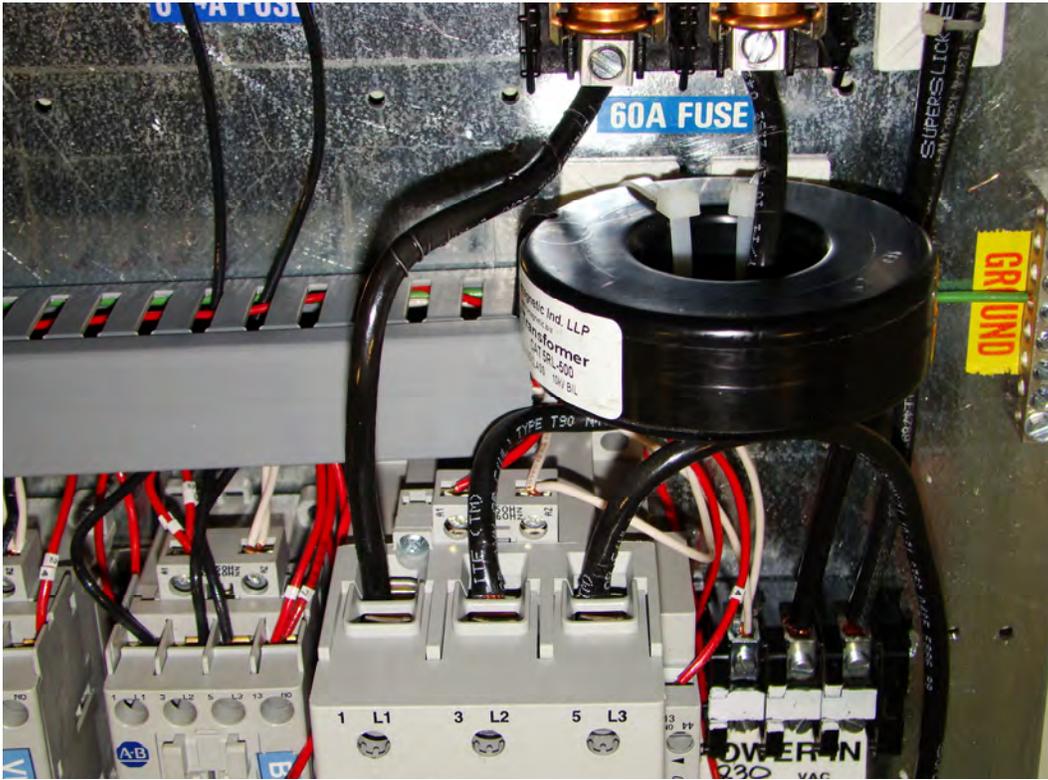
**High Voltage!** - To reduce the risk of electrical shock when servicing, turn off all power to all equipment. In addition to incoming power, AC power can feed back into a shut off panel when other systems or components share a common control or power circuit.

2. Disconnect and remove old amp meter from panel door.
3. Remove heavy gauge wires that were disconnected from old meter and retain.

NOTES:  
1. DO NOT SCALE FROM DRAWING.

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		DRAWN BY: dmjohnson	DRAWN DATE: 3/29/2012	APPROVED BY: DMJ	
TOLERANCES EXCEPT AS NOTED		TITLE: INSTRUCTIONS, 50 AMP AMMETER REPLACEMENT KIT			
DECIMAL: XX ± .030 XXX ± .005 XXXX ± .001	FRACTIONAL: ± 1/32 ANGULAR: ± 1/2°	FINISH: NONE			
<b>CAD</b>	NO MANUAL CHANGES	SCALE: NONE	SHEET: 1 OF 2	SIZE: B	PART NUMBER: 99960006
					REV: A

4. Install new meter with mounting hardware provided. Please note that if filing is required to install new meter into existing hole, ensure that metal filings do not fall into panel or onto components that could result in a short.
5. Install donut transformer in front of main motor fuses as shown in picture. Use adhesive mounts and wire ties to hold the transformer in place.



6. Run wires from transformer through wire ways and connect to new meter. Polarity does not matter.
7. Pieces of the heavy gauge wire removed earlier need to be cut and stripped at both ends to run from motor fuse terminals to starter contractor. One of the two heavy gauge conductors needs to run through the hole in the transformer. This now measures the current running to the motor without full load current running to the meter in the panel. Refer to photo.
8. Inspect all terminals for tightness, remove any tools and components from the panel and close door prior to testing.
9. Restore power to system and verify proper operation.

NOTES:  
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TOLERANCES EXCEPT AS NOTED DECIMAL: XX ± .030 XXX ± .005 XXXX ± .001		FRACTIONAL: ± 1/32 ANGULAR: ± 1/2°		TITLE: <b>INSTRUCTIONS, 50 AMP AMMETER REPLACEMENT KIT</b>							
<b>CAD</b> NO MANUAL CHANGES		SCALE: NONE		SHEET: 2 OF 2		SIZE: B		PART NUMBER: <b>99960006</b>		REV: <b>A</b>	

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