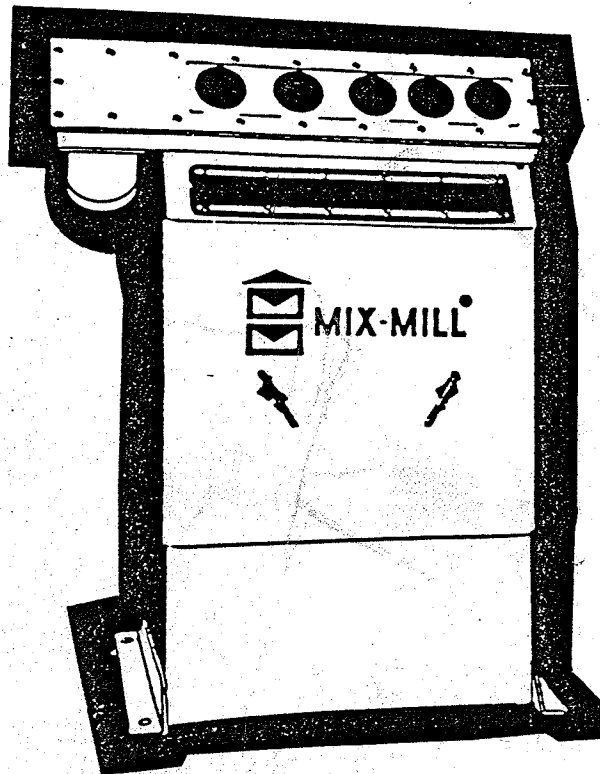


B.A.I.C.
MIX-MILL

INSTRUCTION MANUAL

MODEL "D" MILL

GP Milk



BLUFFTON AGRI/INDUSTRIAL CORP. 99960033

WARRANTY CERTIFICATE

When purchased from an authorized representative, each new product of Mix-Mill Mfg. Co. is warranted for a period of one year from the date of delivery to the Purchaser/User or 1500 hours of operation, whichever occurs first. This warranty shall apply to all parts and workmanship that shall appear to Mix-Mill to have been defective in manufacture. Mix-Mill'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) the part or parts returned for inspection and parts or repair of the returned parts intended to replace those acknowledged by Mix-Mill to be defective. This warranty shall not apply and shall be void under the following conditions:

1. THE PRODUCT IS TRANSPORTED FROM ORIGINAL INSTALLATION SITE.
2. THE PRODUCT IS INSTALLED OR ASSEMBLED BY OTHER THAN FACTORY-TRAINED, AUTHORIZED DISTRIBUTOR SERVICE PERSONNEL.
3. ANY PART OF THE PRODUCT HAS BEEN ALTERED, MODIFIED, OR CHANGED EXCEPT AT MIX-MILL'S FACTORY OR AS AUTHORIZED BY MIX-MILL IN WRITING.
4. ATTACHMENTS OR DEVICES UNSUITABLE TO THE PRODUCT HAVE BEEN USED ON OR IN CONJUNCTION WITH THE PRODUCT.
5. THE PRODUCT HAS NOT BEEN INSTALLED, USED, OPERATED, HANDLED, OR SERVICED IN ACCORDANCE WITH THE APPROPRIATE INSTRUCTION MANUAL.

Mix-Mill reserves the right to make changes in design or improvements in its products without any obligation whatsoever to prior Purchaser/User of such products.

Mix-Mill 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.

This warranty is expressly in lieu of any other express or implied warranties, including any implied warranty of merchantability of fitness and of any other obligation on the part of Mix-Mill, and may not be altered, modified, or changed in any way except in writing by an officer of Mix-Mill.

Mix-Mill shall not be liable for any loss or damage directly or indirectly arising from the use of its products or for any special or consequential damages of any nature.

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

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 can not 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 THOUSAND SERIOUS INJURIES EACH YEAR. THAT RULE IS:

NEVER ATTEMPT TO CLEAN, OIL, OR ADJUST A MACHINE WHILE IT IS IN MOTION!

"NATIONAL SAFETY COUNCIL"

Mix-Mill Mfg. Co. 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 to a ground rod driven eight (8) feet into moist soil.
3. Ground any augers to feeders where livestock might contact either augers or feeders.
4. Keep all shields and covers in place.

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SECTION II

MIX - MILL MODEL "D" MILL

NEW INSTALLATION REQUIREMENTS

The mixer grinder must be located in a weatherproof structure. A Mix-Mill Farm Feed Factory building has been designed for this purpose and is available in sizes ranging from 12 ton through 400 ton of overhead storage capacities. See your Mix-Mill dealer for information regarding one of these all galvanized steel heavy duty structures. Your dealer has been factory trained to help you to determine the best installation of Mix-Mill equipment to handle your present requirements and provide for future growth.

EXISTING INSTALLATIONS:

Some existing farm structures are suitable for mill installation. See your authorized Mix-Mill distributor 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 1/2" auger system with capacities up to 7500 lbs. per hour is available for both vertical and horizontal conveying of ingredients.

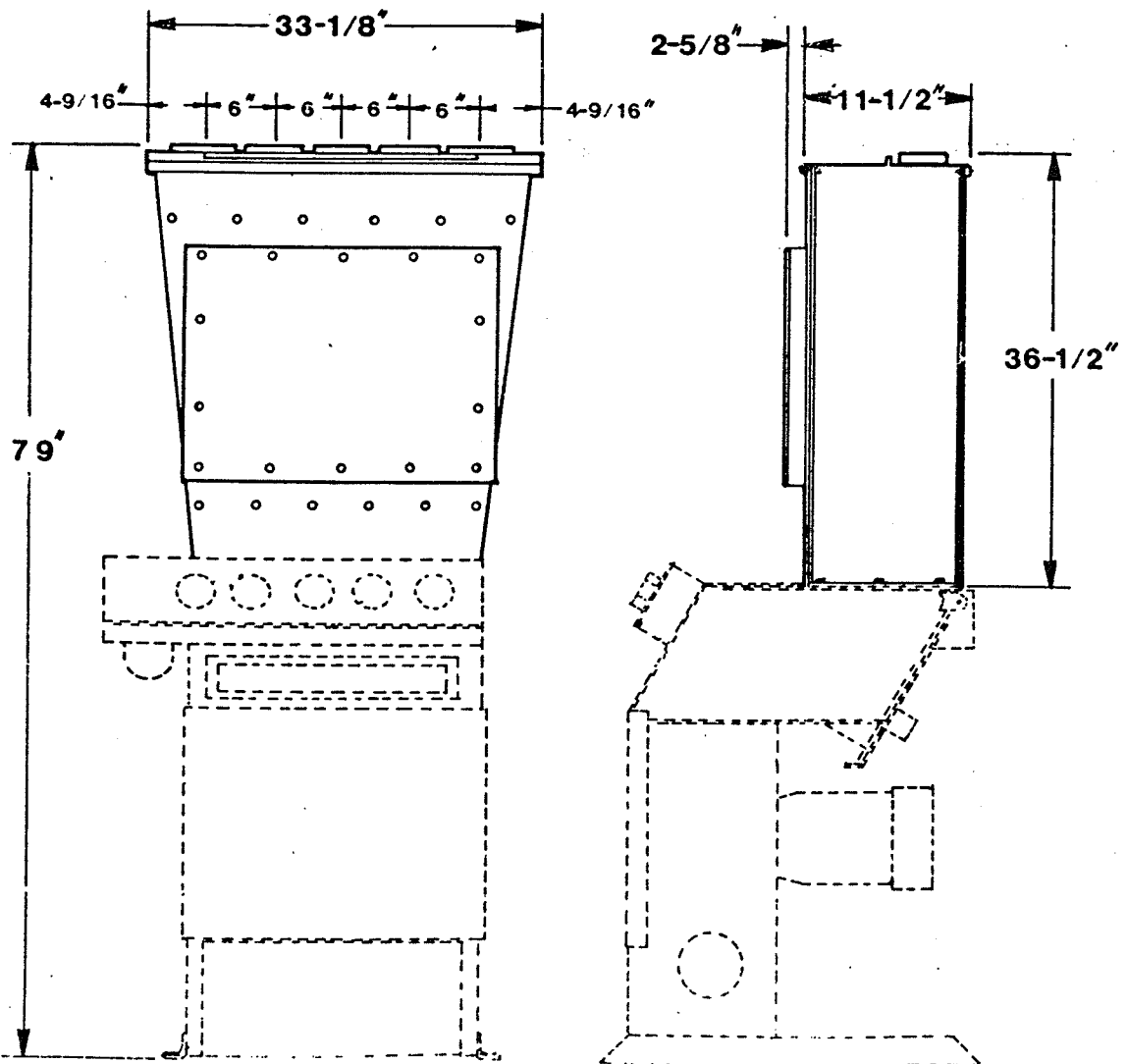
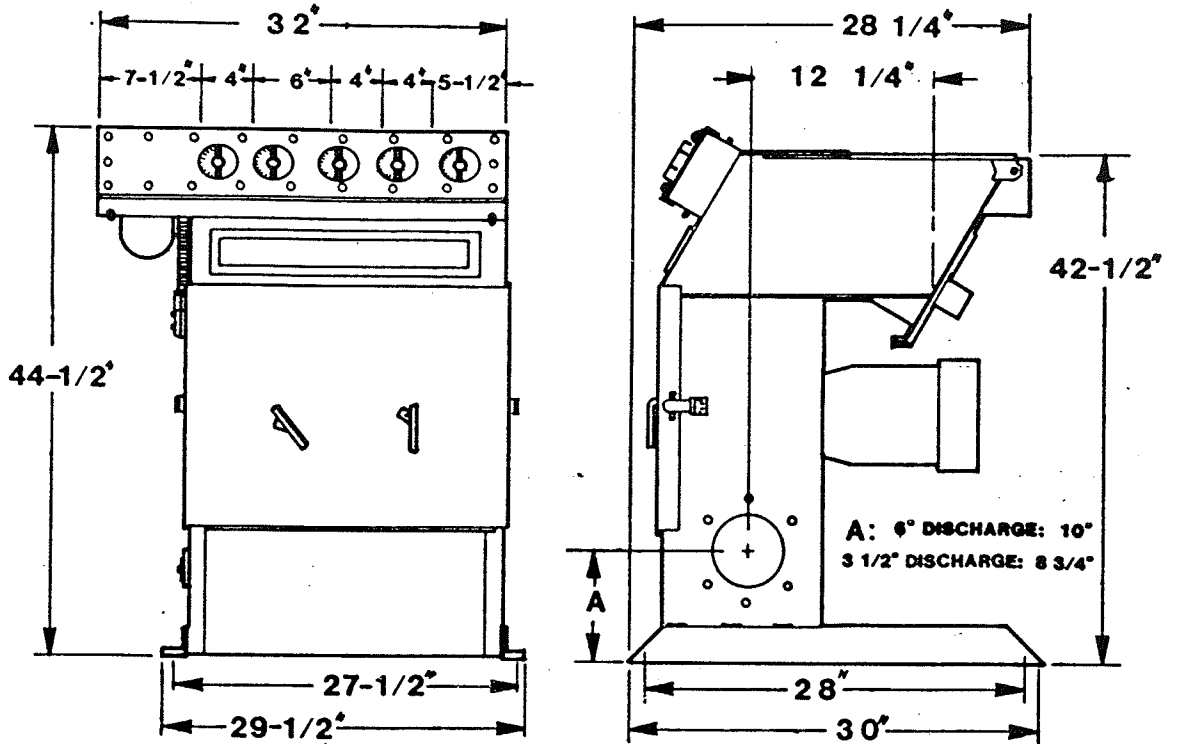
A 6" vertical high capacity auger system is available.

Standard Elevators in a 6" round tube type with capacities of 750 to 800 bushels per hour or square leg models with capacities from 1500 bu. per hour to 5500 bu. per hour are 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.

MAJOR DIMENSIONS D-MILL AND GROUND LEVEL HOPPER



SECTION III

INSTALLATION & OPERATING INSTRUCTIONS

CONTROL PANEL INSTALLATION:

1. Mount control panel in desired location.
2. Install the optional long wire harness #9100-0152 containing 12 color coded wires to the top of the control panel in the second hole from the right when facing panel. The end with the straight connector should be mounted in this position.
3. Connect the color coded wires as follows:
 - A. Blue #24 Wire to Terminal #16 left side push on.
 - B. Yellow #24 Wire to Terminal #15 left side push on.
 - C. Orange #24 Wire to Terminal #14 left side push on.
 - D. Purple #24 Wire to Terminal #13 left side push on.
 - E. Pink #24 Wire to Terminal #12 left side push on.
 - F. Red #24 Wire to Terminal #11 left side push on.The above wiring connections are all wire leads for the ration recorders. The red wire is the common lead for all counters.
 - G. Blue #14 Wire to Terminal #10 left side push on.
 - H. Yellow #14 Wire to Terminal #9 left side push on.The above two wire leads are the DC motor wires. The blue lead is positive and the yellow is negative.
 - I. Purple #16 wire with wire to Terminal #3 left side push on.
(Paddle switch wiring)
 - J. Orange #16 wire with wire to Terminal #4 left side push on.
 - K. Pink #16 Wire to Terminal Block (TB7).
 - L. Brown #16 Wire to Terminal Block (TB8).
4. Connect a conduit with a 90° fitting to the safety switch box through the hole provided. Connect wires as follows:
 - A. Blue #24 to Blue with #5 wire marker from reed switches with a wire nut.
 - B. Yellow #24 to Blue with #4 wire marker from reed switches with a wire nut.
 - C. Orange #24 to Blue with #3 wire marker from reed switches with a wire nut.
 - D. Purple #24 to Blue with #2 wire marker from reed switches with a wire nut.
 - E. Pink #24 to Blue with #1 wire marker from reed switches with a wire nut.
 - F. Red #24 wire (common) connect all 5 white wires from reed switches to this lead with a wire nut.

Note: The above wiring of counters does not pertain to the model "D"-mill with timer.

DC Motor wiring and Safety Circuit in paddle switch electrical box.
 - G. Blue #14 wire to Blue #14 wire form DC motor with wire nut.
 - H. Yellow #14 wire to Yellow #14 wire from DC motor with a wire nut.
 - I. Purple #16 wire connects to the #16 Purple wire on the micro switch. Connect with a wire nut.
 - J. Orange #16 wire connects to the #16 Orange wire lead on the micro switch. Connect with a wire nut.
 - K. Connect the #16 Pink wire to the mill door micro switch to the Pink #16 wire with a wire nut.
 - L. Connect the #16 Brown wire to the mill door micro switch the Brown #16 wire with a wire nut.

DISCHARGE AUGER MOTOR

Since the location of the discharge auger motor is so variable a wire harness is not furnished. The proper size wiring must be furnished for this connection.

Follow the connection diagram of the particular brand of motor for the connection at the motor.

The two (2) wires will be connected to terminals T1 and T2 on the auger relay in the panel.

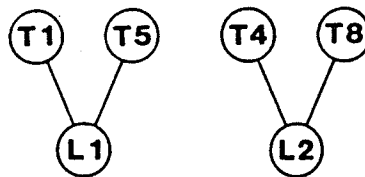
Where a three-phase discharge motor is desired, an additional relay must be used.

MILL MOTOR - 230V - 1Ø - 3 Wire

A wire harness will have to be field supplied containing three leads, two (2) #6 black leads and one (1) #10 green lead. Connect the two black wires to the magnetic starter at terminals T1, T2 and the green wire to the ground screw in the D mill panel. Connect the other end of the two black wires to the two #6 black wires in the junction box and the green wire to the ground screw in the front of the mill junction box.

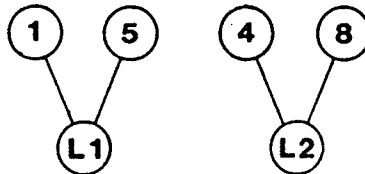
NOTE: Motor connections are here for reference, these connections are prewired at the factory.

DOERR



G.E.

BALDOR

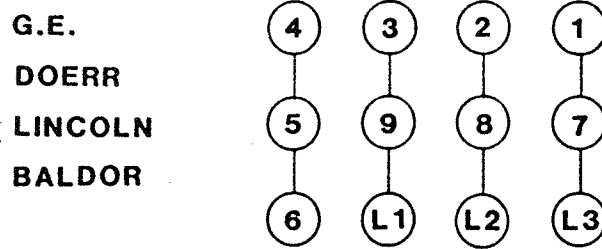


The mill motor may be operated with either CW or CCW rotation. To change rotation, reverse lead numbers five (5) and eight (8).

MILL MOTOR - 230V - 3Ø - 4 Wire

A wire harness will have to be field supplied containing four leads, three (3) #6 black leads and one (1) #10 green lead. Connect the three black wires to the magnetic starter at terminals T1, T2, T3 and the green wire to the ground screw in the D mill panel. Connect the other end of the three black wires to the three #6 black wires in the junction box and the green wire to the ground screw in the front of the mill junction box.

NOTE: Motor connections are here for reference, these connections are prewired at the factory.



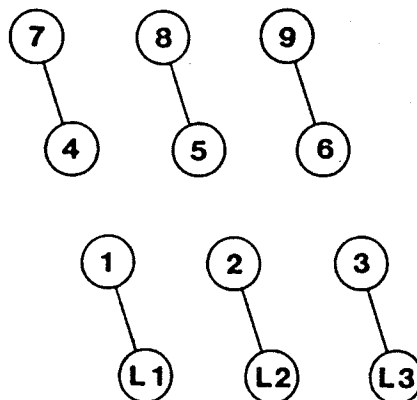
The mill motor may be operated with either CW or CCW rotation. To change rotation, reverse any two (2) of the black leads to the motor.

INCOMING POWER

A wire harness will have to be field supplied containing lines L1, L2, (L3 if 3Ø) and a neutral, which needs to be connected from the circuit breaker box to the D mill panel. These leads should be sized accordingly to the amps on the D mill name plate 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 magnetic starter and wire nut the neutral lead to the white lead wire connected to N1 of terminal block. A ground rod is a must! Drive a ground rod into permanently moist undisturbed earth. Connect a wire, that is equivalent to the incoming wire size, from the rod to the panel and secure the wire to the ground connection in the upper left inside corner of the panel.

SPECIAL ORDER MODELS REQUIRING 460 VOLT 3 PHASE POWER

If you require a mill for 460 volt 3 phase operation, several changes are required in the control panel components and in the wiring procedures. We recommend you special order this mill from the factory. Mill motor wiring connections are as follows:



All 3Ø mill motors can be wired for 230 volt or 460 volt operation. See the specification sheets for 230 volt 3 phase motors for motor part numbers and other information.

If a 230 volt mill is to be converted in the field the other changes required for converting a 230 volt control panel to a 460 volt panel are as follows:

The overload relay must be replaced by one of the correct amperage range.

The control circuit power to the circuit breaker must be disconnected from the L1 and L2 terminals of the mill magnetic motor starter. A separate 120 volt 60 HZ input power line must be connected to the circuit breaker "CB₁". The hot lead connected to the upper left input terminal and the neutral to the control panel neutral terminals on the terminal block. (Two top terminals)

The voltage source for the, "power in light," must also be changed. To do this, proceed as follows:

Reconnect lead that was attached to L2 on magnetic starter to terminal block #1.

A separate (additional) auxiliary relay must be added to the control panel for ground feed auger motor control. This second auxiliary relay should be wired as follows when 460 volt auger motors are being used.

A separate set of wire leads of correct size for motor load should be brought into the panel through a circuit breaker from the main panel. DO NOT Use the Same Input Leads That Are Connected to the Mill Motor Magnetic Starter.

The new 460 volt input lead wires should be connected to the relay contacts #L1, L2 and L3. The external auger motors should be connected to the relay contacts #T1, T2 and T3.

The auxiliary relay must have a 120 volt coil and this coil should be connected in parallel to the existing auxiliary relay coil.

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 sound 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, capacitor type motors.

Installation of Auger Corner & Vertical Auger

1. Unpack the auger corner and miscellaneous parts. Lay out the parts and identify them by referring to figures #1 & #2.
 2. Remove the self tapping screws from the auger corner assembly (Refer to figure #2). Caulk the flange of the long tube and plate assembly with tube stop (Item #1). Assemble this tube and plate to the top of the auger corner welded assembly (Item #2). Repeat the above procedure to install the short horizontal tube and plate welded assembly (Item #3). Place (2) 3 1/2" full clamp rings (Item #4) over the long tube and plate and (1) 3 1/2" full clamp ring over the short tube and plate assembly.
 3. Remove the belt guard (Item #5) from the idler bracket assemblies. Remove bearing (Item #6) from the horizontal side of the auger corner welded assembly. Place the auger corner welded assembly over the flight and shaft (Item #7) from the mill discharge. The mill auger tube should slide into the short split tube (Item #3) of the previously assembled tube and plate on the auger corner. Reinstall the bearing as follows. Place a thrust washer over the end of the auger shaft. Then place a retaining cup, cup seal, flange ring, bearing cartridge and flange ring over the shaft and reassemble to auger corner housing with the three self tapping screws and lockwashers previously removed. The shaft should extend through the bearing 2 3/4". Place the eccentric lock collar over the shaft and onto the eccentric surface of the bearing. Set lock collar with a punch and hammer, then tighten down set screw and the 3 1/2" full clamp on the horizontal tube and plate.
 4. Install the support stand (Item #8) as shown in figure #2. Note that this stand is adjustable both up and down and sideways to permit easy adjustment and leveling of the auger corner assembly. Level the auger corner and then bolt the half clamp (Item #9) to the support stand.
 5. Install the 42104604 5" pulley (Item #10) on end of the horizontal mill discharge auger. This pulley when properly adjusted will measure 2 1/2" from the center line of the pulley to the face of the auger corner welded assembly. See figure #1.
 6. Remove the bottom bearing (Item #11, vertical auger bearing) from the auger corner. Install the vertical discharge auger (Item #12).
- *NOTE: This auger must have a keyway on the end going into the auger corner. If your auger does not have a keyway you will be plagued with continual problems with the step pulley coming loose and wallowing out of the bore of this pulley. This would not be considered a manufacturing defect and would not be covered under warranty.
- The vertical discharge auger should slide into the long split tube of the tube and plate on the top of the auger corner. Make sure the auger tube goes in until it hits the tube stop. Reinstall the bearing as follows. Place a thrust washer over the end of the auger shaft. Then place a retaining cup, cup seal, flange ring, bearing cartridge and flange ring over the shaft and reassemble to auger corner housing with the three self tapping screws, lockwashers previously removed. The shaft should extend through the bearing 3 1/2". Place the eccentric lock collar over the shaft and onto the eccentric surface of the bearing. Set lock collar with a punch and hammer, then tighten down set screw.



Automatic feed processing systems

MIX-MILL® MFG. CO.

Bluffton, IN 46714

Phone (219) 824-3400

Dear Mix-Mill Owner/Operator:

Thank you for purchasing a new Mix-Mill Model D mixer/grinder. More than a quarter century of experience in the manufacture of feed milling equipment and grain handling systems has made Mix-Mill 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 Mix-Mill owners will still be found on your new 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 horse power sizes, 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.

The new ration recorders provide instant visual indication of how much of each ingredient is being augered into the grinding chamber. This gives you precise control and flexibility in making different rations and in accurately controlling the amount of feed ground.

After initial calibration procedures have been completed you will be able to preset your controls, push a button and automatically make your daily feed requirements.

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 mill. Please take a few minutes to read these instructions and keep them for future reference.

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

Sincerely,

MIX-MILL MFG. CO.

7. Install the 40003508 (4" x 8") step pulley (Item #13) on the end of the vertical discharge auger, 8" side out. This pulley when properly adjusted will measure 3" from the center line of the 8" pulley to the bottom face of the welded assembly. Make sure the drive key is in place and tighten the two set screws on the step pulley.
8. Install the round belt as follows: Loosen the mounting bolts for adjusting the angle of the idler pulley brackets. Loosen the bolt and nut holding the idler pulleys. Place the 34.6" round belt part #40000502 (Item #14) over the 4" step pulley (Item #13), over the two idler pulleys (Item #19) and then over the 5" pulley (Item #10). The basic configuration of the belt at this time would be like the figure L. See figure #2.
Round belt adjustment: Place the idler pulley gauge over the 5/8" shaft with the offset toward the inside. Adjust the idler pulley bracket cam so that the idler pulleys just touch the gauge plate. This is an adjustment to get you close, and a slight refinement of the adjustment may be necessary later on. Adjustment of the eccentric cams also provides the proper belt tension for the round belt. If the belt is riding hard on high on one or the other idler bracket pulleys readjust so that the belt tracks properly in the pulley groove.
9. Drive kit installation: Refer to figure #2. Install the two motor mounting rods (Item #15) into the set collars thru the bottom of the auger corner welded assembly. The long end of these rods should be used at this location. Install the square head S.T. screws in the set collars and snug down to hold the rods in the approximate position as shown in the drawing.
Install the motor (Item #16) onto the head plate (Item #17) as shown using the carriage bolts, lockwashers and nuts provided. Next install the key and 41301304 3" pulley (Item #18) onto the motor shaft. Place the motor (Item #16) and mounting plate assembly (Item #17) onto the short ends of the motor mounting rods with the pulley end down towards the bottom of the auger corner. Install screws in the motor mounting plate and tighten after setting this assembly so that the 3" motor pulley (Item #18) and the 8" step pulley (Item #13) are aligned with each other.
10. Because all new belts will stretch when first put in service, the tension on the auger corner belt must be checked periodically after approximately 15 minutes, 1 hour and 5 hours of running time.

INSTALLATION OF AUGER CORNER & VERTICAL AUGER

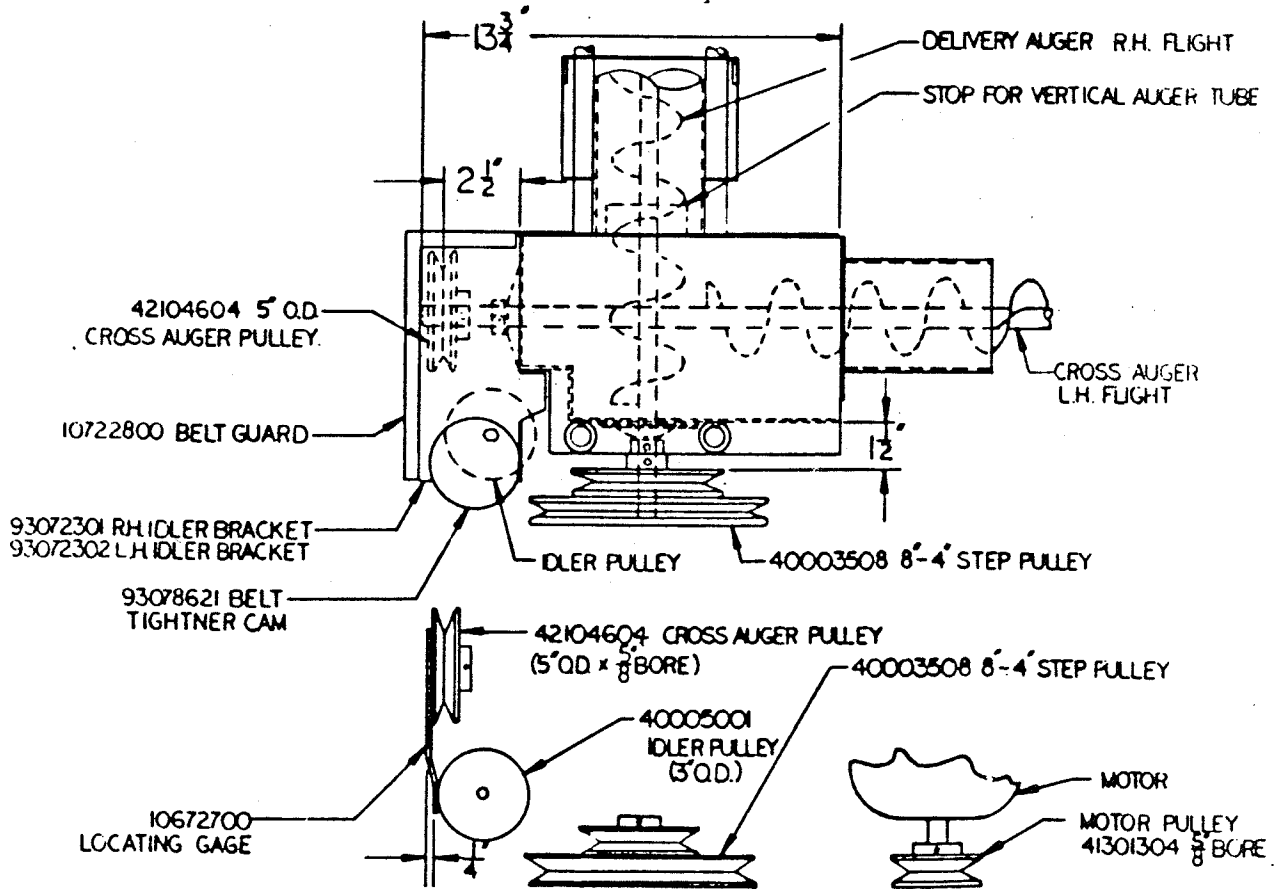


FIG. 1

AUGER CORNER ASSY. FOR INSTALLATION

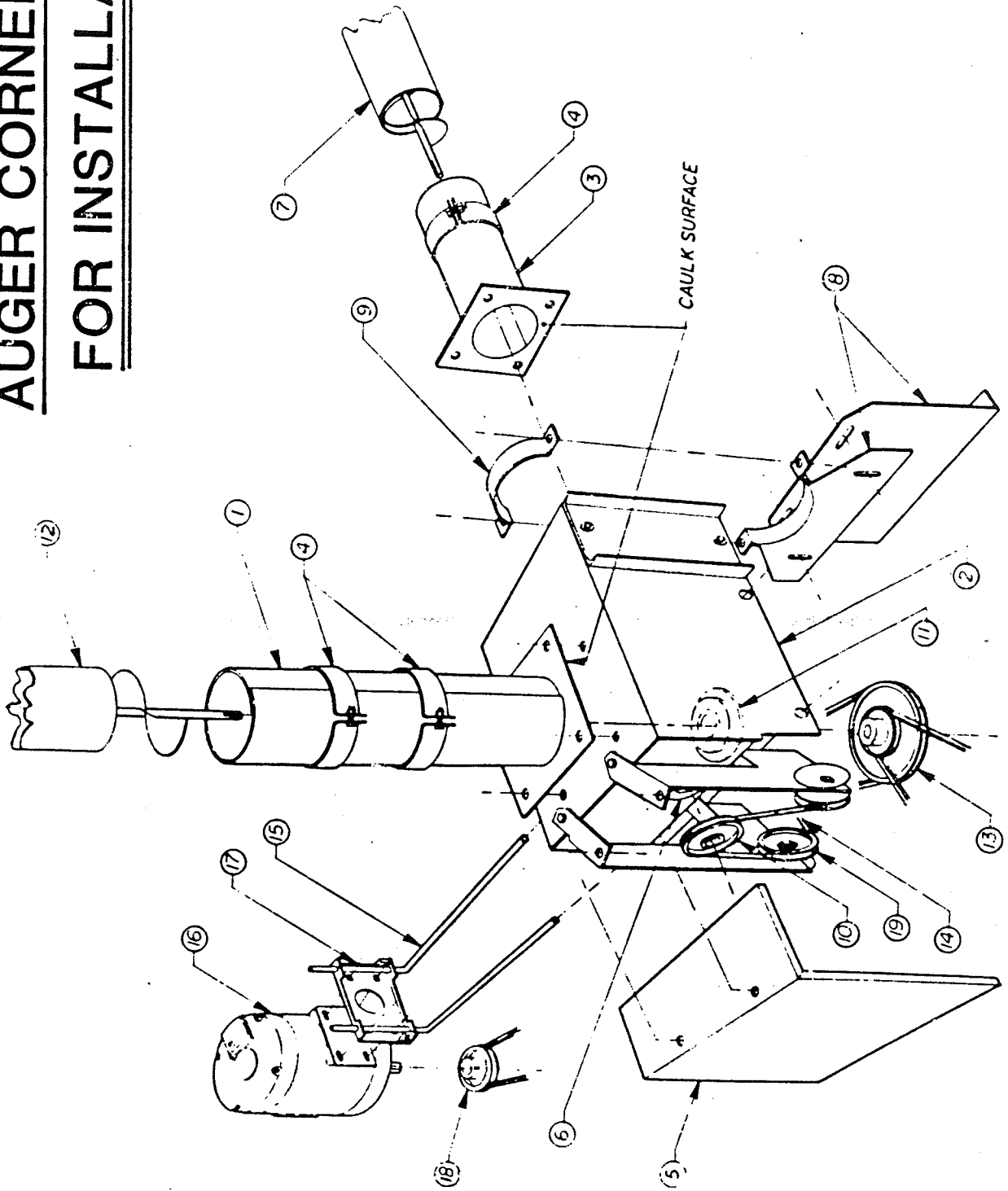


FIGURE #2

COMPONENT FUNCTIONS

Before attempting to operate the Mix-Mill mixer-grinder, the operator should become familiar with the functions of all control elements of this machine.

Each switch, dial, or knob has a specific function which, when properly operated, will produce very satisfactory results.

I. CONTROL PANEL

The control panel is designed for wall mounting. It should be located close to the mill for convenient operation. Operating instructions have been printed at the top of the panel. Each control, recorder or timer (depending on model) switch, meter, and light have been identified to help you to become familiar with the operation of your new mill. Refer to the front control panel figure #3 for locating and identifying the controls and lights.

A. 2 H.R. TIMER NOTE: Corresponds to Model "D"-Mill W/Timer Only

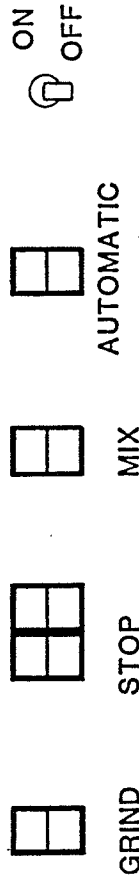
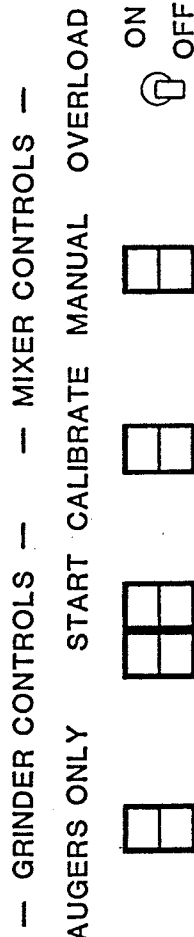
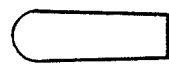
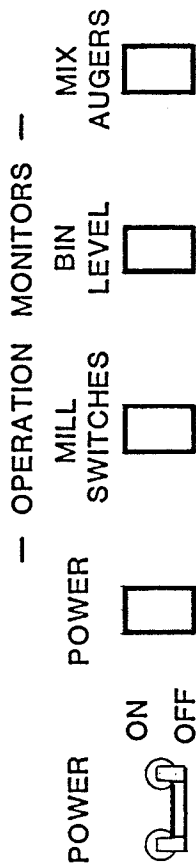
The timer model "D"-Mill utilizes a two hour timer in place of the five ration recorders. The timer works much in the same way as the main counter.

B. INDICATING LIGHTS

1. POWER LIGHT - amber colored light when on indicates 120 volt 60 HZ control circuit voltage is present.
2. MILL SWITCHES LIGHT - A green colored light that monitors the mill safety paddle switches.
3. BIN LEVEL LIGHT - A green colored light that monitors a micro-switch used to indicate a full bin or other safety switch operation.
4. MIXING AUGERS LIGHT - A green colored light that indicates 120 volt 60 HZ power is being applied to the ration recorders circuitry and the proportioner motor control circuit.

MIX-MILL®

AUTOMATIC GRINDER - MIXER



1 2 3 4 5

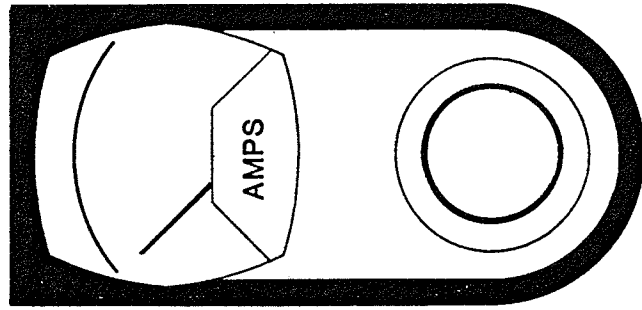


FIG. 3

C. CIRCUIT BREAKER

Labeled, POWER SWITCH, this circuit breaker is a 2 pole 15 amp unit. The left side of the breaker protects the entire control circuit of the mill and one side of the line to the auxiliary relay. The right side breaker protects the other side of the line to the auxiliary relay.

D. AMMETER

The ammeter is used to measure the load current of the mill motor. Full load current will be printed on the mill motor nameplate in amps. (FLA)

The description of the speed control will explain how to obtain full load current for maximum capacity from your mill.

E. GRINDER CONTROLS

There are two sets of switches in the grinder control circuitry. The first is a selector switch marked "AUGERS ONLY - GRIND". The other switch is a "START - STOP" rocker switch combination. These switches are used, when grinding feed, to manually start or stop the feeding system. The start push button must be depressed to start the mill motor or the augers.

To clean out the discharge system, turn selector switch to "AUGERS ONLY", turn mixer control selector switch to "MANUAL", turn D.C. Controller knob to zero, then push "START".

F. MIXER CONTROLS

1. CALIBRATE-MIX-SWITCH - This switch is used as a selector switch. In the "CALIBRATE" position, this switch provides a path for the voltage to operate the proportioner drive circuitry, mill motor and the ration counters. At the same time, it keeps the voltage from being applied to the auxiliary relay circuit.

In the "MIX" position, the circuitry to start the mill motor is present. The mill motor will not start at this time because this is just one of the steps necessary to start the motor.

G. MANUAL - AUTOMATIC SWITCH

1. The MANUAL-AUTOMATIC SWITCH permits the selection of an "AUTOMATIC" shutdown sequence which indicates the following safety switches:

- A. Mill Door Switches
- B. Mill Paddle Switch
- C. Bin Level Switch (or pressure switches)
- D. Main ingredient recorder shutdown switch contacts

In the "MANUAL" position, the switches listed in A, B and C above are still in the circuit. The main ingredient recorder and timer shut down contacts are not in the circuit and this device cannot shut down the system in the manual position.

2. "AUGERS ONLY" - Safety switches B and C are still in the circuit.

H. OVERLOAD SWITCH

The overload switch is a new type, hydraulic operated, protective device to protect the proportioner drive motor and the proportioner drive motor and the proportioner gear train. It is a fast acting device that can be activated by an overload caused by a foreign object, such as a nail, bolt, or rock, lodging in one of the mix augers.

This circuit breaker is a dual control device containing a set of auxiliary contacts that are activated at the same time the overload portion of the switch is activated. The auxiliary contacts are connected in series with the mill motor control circuitry. When activated by an overload condition both switches would open and cause shut down on the entire system.

J. SPEED CONTROL

The speed control knob as seen from the outer panel side of the control box is an adjustable, electronic, A.C. to D.C. converter. This device provides a variable D.C. voltage to the proportioner direct drive motor. The knob is adjustable from 0 to 10 and controls the speed of the mix augers. As a higher number is selected the speed increases and the ingredients are augered into the grinding chamber at a faster rate. DO NOT advance the control too fast when approaching the higher number settings. Due to the reaction time of the proportioner, speed increase, and the time required for the increased amount of ingredients to get into the grinding chamber, an overload condition of the mill motor could develop.

K. RATION RECORDERS

1. MAIN INGREDIENT RATION RECORDER (See Figure #4) controls the automatic shutdown sequencing of the feed making system. It is a predetermining type electric counter. It can be preset to any desired number from 1 to 99999. It is the #2 mix auger counter. To select a predetermined number, depress the black reset button and hold down. The preset buttons beneath each number are now unlocked, and the desired number may be set up by depressing each of the white preset buttons and holding down until the number you want appears on the dials. Release the black reset button and the number you have selected is now locked into the counter. The counter is now ready to accept count pulses from the proportioner auger.

This counter counts backwards from the preset number to 00000. If you have all of your controls set in the automatic grind positions, the counter will automatically shut down the entire feed making system when all zeros are reached.

The counter will reset to this same number each time the black reset button is depressed.

NOTE: The automatic shutdown feature of this counter does not operate during the calibration procedure. To run the proportioner for a desired number of counts you must manually shut off the calibrate switch when the desired count is reached.

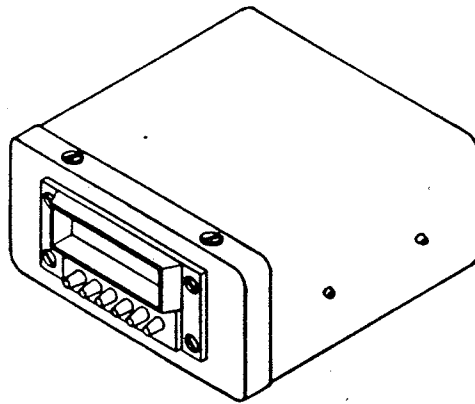


FIGURE #4

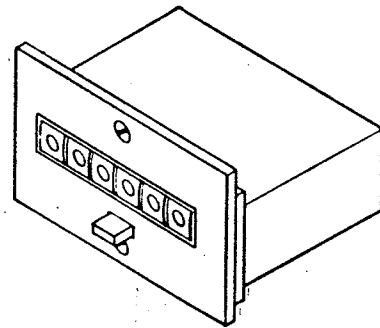


FIGURE #5

There is no field maintenance or service needed for this counter. It is lubricated and adjusted for life at the factory and should not be opened for field service.

2. INDIVIDUAL RATION RECORDERS (See Figure #5) are all identical and are used for mix augers number one, three, four and five. These recorders have one reset button which resets all numbers back to zero when depressed. These counters are energized by the counting switches on the proportioner augers. They count from 00000 until de-energized by a shutdown of the system. These recorders will not count when the 0 to 25 proportioner knob is set on zero.

The speed that these counters turn is determined by the setting of the 0 to 25 proportioner knob.

These counters are used to provide you with a visual indication of the exact number of revolutions of each auger. After calibrating your machine, you will know how many pounds or fractions of a pound of ingredient that is augered into the grinding chamber for each revolution (or count) of the auger. By multiplying the number of counts used times the pounds per count and you will have determined the exact amount of that particular ingredient augered into that particular batch of feed. Repeat the calculation for each mix auger counter and you can check each ingredient in the ration for correct amount. You can then adjust the 0 to 25 knob to make a correction if necessary.

II. PROPORTIONER HOPPER

A. 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 flowback.

B. INGREDIENT FLOW SWITCH:

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

C. 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 is bypassed 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.

III. PROPORTIONER GEAR BOX

A. STANDARD PROPORTIONER:

The new model "D" proportioner is a five auger model. Compartment numbers one, three, four and five are all of equal size with each ingredient feed auger being controlled by an adjustable knob. These knobs are numbered from one to twenty-five.

The number two auger is a double size compartment. This auger is also being controlled by an adjustable knob numbered one to twenty-five.

The fifth auger compartment is geared down internally to provide a one-fourth speed delivery for greater accuracy in adding small quantities per ton of a premix ingredient.

B. 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 A.C. 60 HZ. The output is continuously variable from 0 to 90V-DC.

CAUTION: DO NOT CONNECT AN A.C. VOLTAGE TO THE PROPORTIONER MOTOR.

IV. MILL DOOR

A. BYPASS VALVES:

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

Note: Bypass only materials such as oyster shell or grit, materials that would cause excessive wear on hammers and screens.

MODEL 'D' OPERATING INSTRUCTIONS

TO MIX AND GRIND FEED

1. Mix Auger Dials on Mill (set for desired ration)
2. Power On - Overload On
3. How Much Feed to Make (set main mix auger recorder or timer)
4. Set Grinder Controls to Grind
5. Set Mixer Controls to Automatic
6. Set Mixer Controls to Mix
7. Push Start Button
8. Set Speed Control

AT THE END OF FEED MAKING RUN CLEAR DISCHARGE AUGER OF FEED

1. Set Mixer Control Switch to Manual
2. Set Speed Control to Zero
3. Push Start Button
4. After Feed Delivery System is Cleaned (Approximately One Minute) Push Stop Button

TO MIX FEED ONLY SCREEN MUST BE REMOVED

1. Mix Auger Dials on Mill (set for desired ration)
2. Power On - Overload On
3. How Much Feed to Make (set main mix auger recorder or timer)
4. Set Grinder Controls to Augers Only
5. Set Mixer Controls to Automatic
6. Set Mixer Control to Mix
7. Push Start Button
8. Adjust Speed Control

NOTE: IF MONITOR LIGHTS FAIL TO LIGHT REFER TO THE SECTION ON THE CONTROL PANEL SAFETY CONTROL CIRCUITS AND PANEL LIGHTS.

MODEL 'D' CALIBRATION

WITH COUNTERS

PREPARING TO CALIBRATE

1. The proportioner is designed so that it will operate only when the speed control knob is turned above a setting of one. The auger turns faster as the speed control knob is advanced to a higher number. None of the augers will turn when the speed control knob is set to zero. A slight hum from the motor is normal if the speed control knob is turned to zero.
2. To obtain accurate samples each mix auger compartment must be full of its ingredient and the mix auger must be operated until the ingredient flow is consistent. Do this separately for each mix auger so the ingredients can be kept separate.
3. A container large enough to catch a sample weighing approximately 30 to 50 pounds will be needed. A set of scales will be needed to weigh your samples. Your calibration will only be as accurate as your scales and your following of the calibration procedures.
4. Turn the proportioner speed control knob to a setting of 5. Turn the overload switch to the 'ON' position. Turn the power switch to the 'OFF' position.
5. Remove the mill back by releasing the two side latches. Lift up and over the bottom catch and set to one side. REMOVE MILL SCREEN. Install the sampling back assembly and secure with the two side latches. Check the neoprene seal to insure the top and sides of the sampling chute assembly is sealed so you won't lose any of the ingredient while taking your samples.
6. Turn all proportioner knobs to zero. Turn the power switch to the 'ON' position. Place a container under the number one sampling chute. Turn the number one mix auger knob to the twenty five position. Grinder Control in "GRIND" position. Place the mixer control switch in the 'CALIBRATE' position. When the ingredient flow is consistent place the calibrate switch in the "MIX" position. Dispose of this ingredient. Turn the number one mix auger knob to zero.
7. Run ingredients for mix augers numbers 2, 3, 4 and 5 the same as above. When completed, turn each mix auger knob back to zero.
8. Reset all ration recorders to zero by depressing the black reset button on each recorder. Preset the main mix auger (#2 ration recorder) to a setting of one hundred.
9. NOTE: The switch on the #2 ration recorder will provide automatic shutdown only while grinding feed. Manual shutdown is required during the calibration procedure.

CALIBRATION PROCEDURE

REFER TO THE SAMPLE SHEET ALREADY FILLED OUT WHILE READING THESE INSTRUCTIONS. THIS SHEET IS LOCATED IMMEDIATELY FOLLOWING THESE CALIBRATIONS PROCEDURES.

FILL OUT THE TOP SECTION OF A CALIBRATION DATA SHEET. THEN PROCEED AS FOLLOWS FOR EACH LINE OF THE DATA SHEET.

LINE A - INGREDIENT:

For feeder auger column # one space A₁, write in the ingredient you will be augering thru that compartment. Write in all ingredients in their proper spaces until spaces A₁ thru A₅ have been filled in. XXXX out any column you will not be using.

LINE B - AMOUNT WANTED PER TON OF FEED GROUND:

For feeder auger column # one space B₁ write in the amount of the ingredient you want per ton of feed. Write in the amount wanted per ton in the proper space on line B for each ingredient.

LINE C - PERCENTAGE OF INGREDIENT:

(THIS IS THE RATIO OF EACH MIX AUGER INGREDIENT TO THE MAIN AUGER INGREDIENT.)

C₁ is obtained by dividing B₁ by B₂ x 100 -- Record in C₁ space.
C₂ is obtained by dividing B₂ by B₂ which will always equal 100%.
C₃ is obtained by dividing B₃ by B₂ x 100 -- Record in C₃ space.
C₄ is obtained by dividing B₄ by B₂ x 100 -- Record in C₄ space.
C₅ is obtained by dividing B₅ by B₂ x 100 -- Record in C₅ space.

LINE D - KNOB SETTING FOR CATCHING SAMPLES:

All knobs will be on zero except when running the sample for that feeder. Samples should be run at the twenty-five setting. Reset knob to zero after sample has been taken.

LINE E - GROSS WEIGHT OF SAMPLE:

Run each sample as described under "preparing to calibrate" section of your manual. Run each sample for feed auger numbers 1, 2, 3, 4 and 5 and record weights in the proper space.
TO OBTAIN THE GREATEST ACCURACY RUN ALL SAMPLES FOR A MINIMUM COUNT OF 100 ON EACH INGREDIENTS RATION RECORDER.

LINE F - CONTAINER WEIGHT:

Weigh the empty container and record in the proper spaces on line F.

LINE G - NET WEIGHT OF SAMPLE:

Deduct the container weight from sample gross weight for each ingredient and record in the proper space on line G.

LINE H - NUMBER OF COUNTS PER SAMPLE:

Running your samples for a count of 100 will simplify the calculations on line J. On the one-quarter speed number five mix auger you may want to run the number five counter to 200 or more. Just be sure you record the actual number of counts used when taking the sample. After recording all counts reset each small counter to zero. Failure to follow this procedure could cause an error in your calculations and an incorrect ration.

LINE J - POUNDS OBTAINED PER/COUNT OF THE RATION RECORDERS:

Divide the net weight of the sample (line G) by the actual number of counts used (line H) for each column. Example: if 135 pounds of corn was caught in our sample and we used exactly 100 counts we simply move our decimal point two places to the left: 135.00 lbs. would then equal 1.35 lbs. per count.

LINE K - INGREDIENT KNOB SETTING:

Use the following formulas to obtain knob setting.

Feeder #1, $K_1 = (C_1 \times J_2 \times .015 \text{ divided by } J_1) \times K_2$.

Feeder #2, $K_2 = 24 \text{ or lower.}$

Feeder #3, $K_3 = (C_3 \times J_2 \times .015 \text{ divided by } J_3) \times K_2$.

Feeder #4, $K_4 = (C_4 \times J_2 \times .015 \text{ divided by } J_4) \times K_2$.

Feeder #5, $K_5 = (C_5 \times J_2 \times .060 \text{ divided by } J_5) \times K_2$.

Assume K_2 to be a setting of 24. If any of the four other knob settings are greater than 25 divide 600 by the highest knob setting. Use this figure (whole number) for K_2 and recalculate the other 4 knob settings.

To arrive at the most accurate K value for all knob settings, go through all the calculations for feeder #2 at knob settings from 25 to 10 on the "K" knob setting chart page 29. Pick out the knob settings that are closest to the nearest whole number for feeders #3, #4 and #5. Such as in the example ration, it was found on the K_2 chart that knob setting #21 on the #2 feeder had the closest values to the nearest whole numbers on feeders #3, #4 and #5.

NOTE: FEEDER NUMBER FIVE IS FOR A ONE QUARTER SPEED AUGER.

HALF-SPEED AUGER WOULD USE A .030 MULTIPLIER INSTEAD OF NUMBER .060.

LINE L - COUNTS NEEDED PER TON OF FEED: NOTE IF MORE THAN ONE TON OF FEED IS WANTED YOU MUST MULTIPLY THE FIGURE OBTAINED ON LINE L BY THE NUMBER OF TONS WANTED.

For each feeder column divide the figure you obtained on line B by the figure on line J. (Total lbs. wanted divided by the lbs. per count). Multiply by the number of tons you want to grind. Preset the main mix auger recorder to this figure.

Remove the sampling chute back and install the regular mill back in place. Set the knobs according to your calculations on line K.

LINE M - ACTUAL COUNT CHECK:

You are now ready to grind feed. Set your main panel controls as follows:

GRINDER CONTROL - Set to grind position.

MIXER CONTROL - Set to mix position.

MANUAL/AUTOMATIC - Set to automatic position.

MAIN MIX AUGER COUNTER - Set to desired number (Line L₂ x Tons to be ground).

START/STOP SWITCH - Depress to start. The mill motor, proportioner motor and auger motors will all start. Adjust the speed control knob slowly until the meter registers full load current for the motor. If the speed control knob is advanced too rapidly an overload can occur due to the time required for the ingredients to reach the mill knives after the knob is advanced.

After the initial run of feed is made compare the actual number of counts recorded with the number you calculated you would require on Line L.

NOTE: Should a malfunction of the safety control circuitry occur the system will shut down. Should counts remain on the main ingredient recorder, the machine can be restarted when the malfunction has been corrected. The balance of that batch of feed would then be made and a normal shutdown would occur.

LINE N - INGREDIENT DENSITY:

The ingredient density can be determined by weighing one cubic foot of the ingredient. Use a Mix-Mill calibration box for this procedure. The calibration box holds exactly one cubic foot of material. Use the procedure outlined for catching samples for calibrating when checking densities. Do not bump the box because this can cause settling of the contents and give you a false reading. After the box is run full a straight edge should be used to level off the top of the box. Make only one pass across the box when leveling. If the box is bumped and the contents settle after you have reached this point it will not affect the weight. Weigh this sample and then deduct the weight of the calibration box. Record the density in the proper space on line N. Multiply by 1.25 to convert the density to bushel weight. Repeat this procedure for each ingredient.

WHY INGREDIENT DENSITIES ARE IMPORTANT:

If you have weighed and recorded the density of each material you are using, weighing a new batch will tell you if recalibration is necessary. ANY SIGNIFICANT WEIGHT CHANGE IN AN INGREDIENT CAN AFFECT THE ACCURACY OF YOUR RATION.

NOTE: Failure to follow the above procedures may cause an error in your calculations and an incorrect ration.

Mix-Mill Calibration Data Sheet

Mill Owner: Hogs Inc. Address: Bluffton, In.
 Feed Description: Restation Ration Date: 11-15-82
 Formula Number: ONE Premix Number: GES-1 Speed Knob Setting: _____

LINE	PROCEDURE	FEEDER #1	FEEDER #2	FEEDER #3	FEEDER #4	FEEDER #5
A	INGREDIENT	A1 / X	A2 / CORN	A3 / ALF. PELLETS	A4 / BEAN MEAL	A5 / GES. PREMIX
B	AMOUNT PER TON	B1 / X lbs.	B2 / 1279 lbs.	B3 / 300 lbs.	B4 / 336 lbs.	B5 / 85 lbs.
C	PERCENT OF INGRED. #2	C1 / X %	C2 / 100 %	C3 / 23.46 %	C4 / 26.27 %	C5 / 6.65 %
D	0 TO 25 KNOB SETTING	D1 / 25	D2 / 25	D3 / 25	D4 / 25	D5 / 25
E	GROSS WEIGHT OF SAMPLE	E1 / X lbs.	E2 / 65.75 lbs.	E3 / 61.25 lbs.	E4 / 49.00 lbs.	E5 / 52.25 lbs.
F	CONTAINER WEIGHT	F1 / X lbs.	F2 / 10 lbs.	F3 / 10 lbs.	F4 / 10 lbs.	F5 / 10 lbs.
G	SAMPLE NET WGT.	G1 / X lbs.	G2 / 55.75 lbs.	G3 / 51.25 lbs.	G4 / 39.00 lbs.	G5 / 42.25 lbs.
H	NUMBER OF COUNTS PER SAMPLE	H1 / X cts.	H2 / 100 cts.	H3 / 100 cts.	H4 / 100 cts.	H5 / 100 cts.
J	POUNDS PER COUNT (DIVIDE LINE G/H)	J1 / X lbs.	J2 / .5575 lbs.	J3 / .5125 lbs.	J4 / .3900 lbs.	J5 / .4225 lbs.
K	INGRED. KNOB SETTING (SEE FORMULA BELOW)	K1 / X	K2 / 21	K3 / 8	K4 / 12	K5 / 11
SEE 'K' CHART						
L	COUNTS NEEDED / TON (LINE B DIVIDED / J)	L1 / X cts.	L2 / 2294 cts.	L3 / 585 cts.	L4 / 862 cts.	L5 / 201 cts.
M	ACTUAL COUNT CHECK	M1 / X cts.	M2 / 2294 cts.	M3 / 582 cts.	M4 / 871 cts.	M5 / 200 cts.
N	INGRED. DENSITY	N1 / X lbs.	N2 / 46.25 lbs.	N3 / lbs.	N4 / lbs.	N5 / lbs.

ON STANDARD MILLS THE NUMBER 5 FEEDER AUGER WILL BE A 1/4 SPEED AUGER.

FORMULA FOR FIGURING KNOB SETTINGS IS AS FOLLOWS:

FEEDER #1: $(C_1 \times J_2 \times .015 \text{ DIVIDED BY } J_1) \text{ TIMES } K_2$.

FEEDER #2: 24 OR LOWER

FEEDER #3: $(C_3 \times J_2 \times .015 \text{ DIVIDED BY } J_3) \text{ TIMES } K_2$.

FEEDER #4: $(C_4 \times J_2 \times .015 \text{ DIVIDED BY } J_4) \text{ TIMES } K_2$.

FEEDER #5: $(C_5 \times J_2 \times .060 \text{ DIVIDED BY } J_5) \text{ TIMES } K_2$.

NOTE: A HALF SPEED AUGER WOULD USE A .030 MULTIPLYER.

"K" KNOB SETTING CHART

(FOR MOST ACCURATE "K" VALUES)

FEEDER #1	FEEDER #2	FEEDER #3	FEEDER #4	FEEDER #5
X	25	9.57	14.08	13.16
X	24	9.19	13.52	12.64
X	23	8.80	13.00	12.11
X	22	8.42	12.44	11.58
X	21	8.04	11.87	11.06
X	20	7.66	11.31	10.53
X	19	7.27	10.74	10.00
X	18	6.89	10.18	9.48



MODEL "D" CALIBRATION

WITH TIMER

Line A: Ingredient

Write in the names of the ingredients you will be metering thru each feeder. Draw a line thru any feeders not used.

Line B: Pounds per Ton

Your feed ration should be proportioned in pounds per ton of each ingredient. Put these amounts on line B.

Line C: % of Ingredient #2

Calculate the percentage of the #2 ingredient pounds per ton for each ingredient. Divide line B for each ingredient by line B for feeder #2, and then multiply the result by 100.

(Ex. feeder 1: $(B_1 \div B_2) \times 100 = C_1$)

Line D: Sample Gross Weight

Collect a sample from each feeder by the following procedure:

1. Remove mill door and screen - install calibration chute.
2. Set knob for feeder on 15 - all other knobs on zero. Set D.C. motor speed dial on half speed.
3. Start mill by putting cal/mix switch to calibrate position. Collect ingredient in bucket or tub.
4. When flow of feeder is established, switch to another bucket for two minutes. The samples for each ingredient must all be caught in equal time periods.
5. When the sample time period is over, switch back to the other bucket, and put the cal/mix switch back to the mix position.
6. Weigh the sample and container.
7. Repeat process for other ingredients. Do not change D.C. motor speed dial.

Enter the gross weight of the sample on line D.

Line E: Container Weight

Weigh the sample container empty and put the weight on line E.

Line F: Sample Net Weight

Subtract line E from line D and enter result on line F.

Line G: Percent of Ingredient #2 Delivered

Divide line F of each ingredient by line F for feeder #2, and multiply result by 100.

(Ex. feeder 1: $(F_1 \div F_2) \times 100 = G_1$)

Line H: Initial Knob Setting

For each ingredient multiply line C by 24 (initial knob setting for feeder #2) and divide the result by line G. If this number is larger than 24 for any feeder then use a smaller number for the initial knob setting of feeder #2.

Line K: Knob Setting - Corrected for Premix Accuracy

Multiply line H for each ingredient times the next whole number less than H_5 and divide the result by H_5 .

Example: If $H_5 = 4.32$ and $H_4 = 12.1$

$$\text{Then } K_4 = (12.1 \times 4) \div 4.32$$

D-MILL CALIBRATION SHEET

FOR MILL CONTROL PANEL WITH TIMER

MILL OWNER: _____ ADDRESS: _____

FEED DESCRIPTION: _____ DATE: _____

RATION NUMBER: _____ PREMIX NUMBER: _____

LINE	DESCRIPTION	FEEDER 1	FEEDER 2	FEEDER 3	FEEDER 4	FEEDER 5
A	INGREDIENT	A ₁	A ₂	A ₃	A ₄	A ₅
B	POUNDS PER TON	B ₁	B ₂	B ₃	B ₄	B ₅
C	PERCENT OF INGRED. 2	C ₁	C ₂ 100%	C ₃	C ₄	C ₅
D	SAMPLE GROSS WGT.	D ₁	D ₂	D ₃	D ₄	D ₅
E	CONTAINER WGT.	E ₁	E ₂	E ₃	E ₄	E ₅
F	SAMPLE NET WGT.	F ₁	F ₂	F ₃	F ₄	F ₅
G	PERCENT OF INGRED. 2 DELIVERED (LINE F ÷ F ₂)	G ₁	G ₂ 100%	G ₃	G ₄	G ₅
H	INITIAL KNOB SETTING (LINE C X 24 ÷ LINE G)	H ₁	H ₂	H ₃	H ₄	H ₅
K	CORRECTION FOR PREMIX (LINE H X NEXT WHOLE # LESS THAN H ₅) ÷ H ₅	K ₁	K ₂	K ₃	K ₄	K ₅

SECTION IV

TROUBLESHOOTING

STARTUP CHECK LIST

1. Proportioner compartments full of material
 2. Switch paddles in place
 3. Trip rod set
 4. Power breaker "ON"
 5. Auger only/Grind Switch - in "GRIND" position
 6. Calibrate/Mix Switch - in "MIX" position
 7. Manual/Automatic Switch - in "AUTOMATIC" position
 8. Overload Switch in the "ON" position
 9. Speed Control to 0 setting
 10. Select counts in #2 main counter
 11. Reset #1, #3, #4, #5 counters to 0
 12. Select timer position
- Ready to push start button

TROUBLESHOOTING CHART

No matter how well designed and manufactured equipment is, there may be times when servicing will be required due to normal wear, the need for readjustment, or various external causes. Whenever equipment needs attention, the operator or repairman should be able to locate the cause and correct the trouble quickly. The following Troubleshooting Chart will assist the mechanic in those respects.

PROBLEM	POSSIBLE CAUSES	SOLUTION
Mill will not start when pressing the start button		Check operation monitors
Panel Lights		
Power Light not on	Main Circuit Breaker	Check Main Circuit Breaker
Mill Switch Light not on	Trip Rod	Reset Trip Rod
Bin Level Light not on	Bin or Auger full	Check Bin or Auger to see if full of feed
	Jumper wire removed and no Bin Switch being used	Replace jumper wire on TB4 and TB5
Mix Auger Light not on	No count on Main Counter	Enter counts
	3.0 Amp Breaker "off"	Turn Breaker "on"
	Stop Switch bad	Replace Stop/Start Station
	Auxiliary contactor not pulling in	Replace Contactor (bad coil)
	Auxiliary contactor not completing circuit	Clean Contacts L3 and T3
	Mill Magnetic Starter not completing circuit	Clean Contacts 2 and 3
	Mill Door off	Replace Mill Door
	Mill Motor overload/s tripped	Clean out Grinding Chamber and reset overload/s
	Magnetic Starter Coil bad	Replace Magnetic Starter
Mill does not shut off when Main counter or timer runs down to 0	Main Counter or timer is bad	Replace Main Counter or Timer
Abnormal digital display	Poor neutral connection	Check neutral connection

PROBLEM	POSSIBLE CAUSES	SOLUTION
<u>Proportioner</u> Auger will not turn	Broken Pawls Broken Springs Teeth on Ratchet chipped Reed Switch Magnet too far from Reed Switch Reed Switch is bad Counter is bad Pawls worn out Broken wire on Reed Switch	Replace broken Pawls Replace broken Springs Replace Shaft & Ratchet Adjust Magnet to 1/16" from Reed Switch Replace Reed Switch Replace Counter Replace Pawls Connect Reed Switch to another counter to see if Reed Switch has a broken wire
<u>Inconsistent Counts</u>	Foreign material in Hopper Bushing in Idler Gear worn out Bearing Cap worn out Nylon Bearing worn out	Clean Hopper Replace Bushing Replace Bearing Cap Replace Nylon Bearing
<u>Overload Trips</u>	D.C. Controller is bad D.C. Motor short Short in Reed Switches or connections	Replace D.C. Controller Have Motor checked and/or clean Motor Replace faulty Reed Switch, or connection
<u>D.C. Motor</u> 3.0 Amp overload trips	Wrong rotation of D.C. Motor	Switch Lead 9 and 10
<u>Clicking in Proportioner</u>	Worn Motor Bearings Grinding Chamber overfilled Start winding is bad Worn Motor Bearings Hammers worn out Broken Hammer Worn Hub Bolt Hammers too loose Hammers worn out	Take to Motor Repair Shop Clean out Grinding Chamber Take to Motor Repair Shop Take to Motor Repair Shop Install new Hammer Set Install new Hammer Set Install new Bolts Tighten Hammer Bolt Nut Install new Hammer Set
<u>Mill Motor</u> Magnetic Starter overload trips Vibration Change in capacity Motor not coming up to speed	Low Voltage to Motor Motor not getting out of start winding on 1Ø Motor Loss of 1 phase on 3Ø Motor	Check Voltage with Meter Have Motor checked at Motor Repair Shop Check Heater Strip and check Wire Connections

ELECTRICAL POWER CHECK LIST

1. Check incoming power to magnetic starter.
2. Check power at bottom of 15 Amp breaker with power on.
3. Check the 3 Amp breaker to be sure it is on.
4. Check main counter or timer to see if it is preset.
5. Check between 3 and neutral for continuity. In this circuit you will have mill paddle switch and bin switch, auxiliary contacts on 3 Amp circuit breaker, auxiliary contacts in main counter, stop switch, also coil of auxiliary relay or discharge motor relay.
6. Check between 8 and neutral and you should have continuity. The mill door switch, the motor overloads, and the coil of the motor starter are in this circuit.
7. If you do not get continuity between 3 and neutral, check each switch in the circuit individually. Also the same between 8 and neutral.
8. If you think the D.C. motor is running slow check input voltage, it should be 115 A.C. volts between TB11 and N. Check between TB10 and TB9, you should have 90 D.C. volts going to the D.C. motor when the control knob is set on 10.
9. If the counter or timer is not counting, disconnect from original power supply and touch it to a different 115 A.C. volt power supply. If the counter or timer fails to operate then the counter or timer is bad. If the counter does operate then the problem is in the magnet or reed switch in the back of the mill.
10. To check magnet and reed switch, remove the reed switch cover from back of machine.
The magnet should pass within 1/16" of the reed switch. Take a continuity check on the reed switch with the magnet almost touching the reed switch. If you do not have continuity between the two leads of the reed switch then the reed switch is bad.
11. If the D.C. motor is running backwards reverse the leads between TB9 and TB10.
12. If you have power to the motor starter, but not through the motor starter check the overload to see if it is tripped.

ELECTRIC MOTORS & ELECTRICAL SYSTEMS

FUSES OR CIRCUIT BREAKERS BLOW IMMEDIATELY BEFORE THE MOTORS COME UP TO SPEED.

1. Check for proper voltage coming in. Low voltage can cause this problem. If voltage measures OK you may possibly have a defective mill motor. Refer to a qualified electrician or service technician. If additional motors have recently been added fuses or breakers may be undersized.
2. The fuses are not lag type, such as Fusetrons.
3. A fault (ground or short circuit) is somewhere in the wiring, motor, or some other device. Refer service to a qualified electrician or Mix-Mill trained service technician.

FUSES OR CIRCUIT BREAKERS BLOW AFTER A PERIOD OF OPERATION.

1. The fuse or circuit breaker may be too small for the total load. The fuse or circuit breaker should be approximately 25% greater than the normal maximum operating load. Do not increase the fuse or circuit breaker size without regard to the size of the wire being protected.
2. There may be a poor connection in the fuse box. Poor connections will get hot, raise the temperature of the fuse, and cause it to blow well below its rating. The poor connection can be a loose terminal screw, low pressure between the switch blades and clips, plug fuse not screwed in tight, low pressure between cartridge fuse and clips, or dirty contact surface. Switch and cartridge fuse clips loose their spring tension after they once have been hot. Auxiliary clamps must be used or the switch replaced.
3. Temporary ground or short. It is possible but not very likely for a temporary fault to come and go. This happens so infrequently that it probably can be ignored.

OVERLOAD TRIPS BEFORE THE MILL GETS UP TO SPEED.

This can be caused by too much grain being on the screen when the mill starts. Before restarting the mill, pull the main line switch, remove the mill back, and remove the grain from the screen. If problem still exists a low voltage problem or a motor problem could be the cause.

OVERLOAD TRIPS AFTER A PERIOD OF OPERATION.

Motor is overloaded.

Load meter may be incorrect. Check load current with amp-probe. Adjust load knob to obtain full load amps as listed on motor name plate.

Fan or fan blades are missing.

Air ducts between inner and outer shell are plugged.

Bearings are worn out and rotor is dragging on the stator - makes a loud noise.

Defective (shorted) motor. A motor with a small short circuit in the winding could trip the overload without blowing the fuse. However, a small short circuit will result in a burned-out motor after operating for a short period of time.

A burned-out motor will have a distinct burnt smell. It may growl when energized, may not start at all, or if it does, will not come up to speed. Such a motor must be replaced.

A burned-out motor is always shorted. Sometimes it is also grounded.

NOTE: A grounded motor can present a shock hazard.

NOISY BEARINGS.

It may not be necessary to replace a motor because of noisy bearings unless there is noticeable end play in the shaft. Bearings should be replaced to prolong the life of the motor windings.

Ball bearings eventually wear out, but their life is seriously reduced by operating the motor overloaded, in a hot area (high temperature operation causes the grease to leak out of the bearings). Hammering on the motor shaft can also cause premature bearing failure and will void your warranty.

When bearings are to be replaced, it is recommended that the motor be returned to the motor repair station.

LOW OUTPUT FROM THE MILL.

The complaint is, "The mill formerly operated with a load dial setting of 20, but now it cannot be set higher than 15. What is the matter with the motor?"

There is nothing wrong with the motor. There is almost nothing that can happen to a motor which will cause it to loose power. Dozens of motors have been returned for this reason. In every case, the motor has been found to be in perfect condition. The reduced output could be caused by:

1. Worn screen or hammers.
2. Low voltage.
3. Motor leads connected for 230 volts but connected to a 115-volt line.
4. Change in feed formula (less concentrate).
5. Incorrect load meter.
6. Most likely it is a change in the condition of the grain which may change the capacity by 20%.

LINE VOLTAGE.

Motors are built to operate at 10% over or under the nameplate voltage rating. If the voltage is off more than 10% (usually under), performance suffers and you can burn out a motor winding.

This is of primary importance. No motor will give good service unless it is supplied with good voltage.

The voltage available during starting is also important. Special attention should be given to this condition because the heavy starting current (amps) inrush pulls the voltage down far more than when the motor is running.

BURNED LEAD INSULATION.

Occasionally a panel will have two or three inches of insulation burned off. This is almost always the result of heat caused by a poor connection at a terminal screw.

SECTION V

SERVICE TIPS & ROUTINE MAINTENANCE

1. **SCREEN & WEAR PLATES:** The screen and the wear plate have been designed so that you can get 18 different adjustments per side for extended screen life.
2. **HAMMERS:** The hammers and hammer bolts are replaceable items. The hammers can be reversed 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 unbalance. It is of great importance to inspect the hammers to see if 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 rotate the hammer 180° 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.

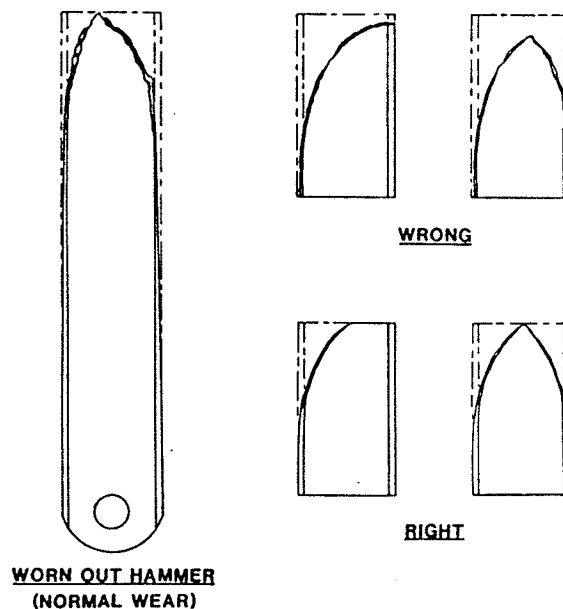


FIG. #6

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

1. Poor quality of ground feed
2. Loss in grinding capacity
3. Motor bearing failure
4. Screen and housing damage due to a broken hammer

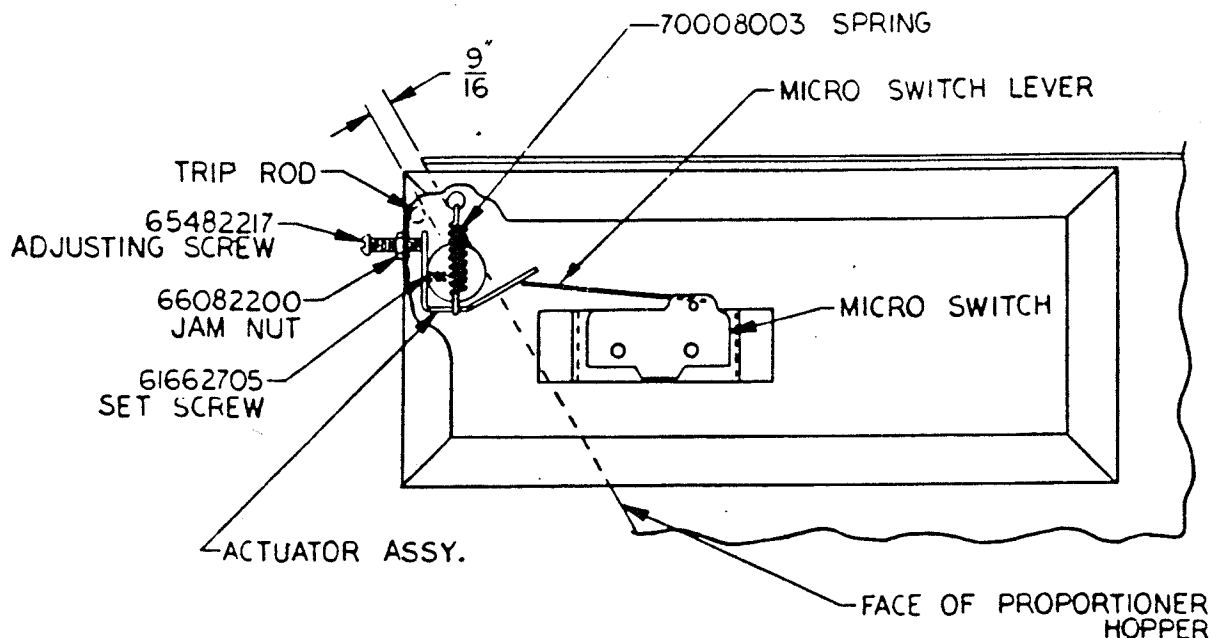
Vibration is hard on the motor bearings and can cause premature failure. An out of balance condition can result from vibrations caused by a broken hammer.

When tightening nuts on the hammer bolts, they should be snugged up enough so that the hammers cannot swing freely.

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

Hammer cost is relatively inexpensive when considering the damage that can be caused by worn hammers.

3. ADJUSTMENT INSTRUCTIONS - PROPORTIONER HOPPER SAFETY SWITCH:



SAFETY SWITCH ASSEMBLY

- a. Back out 65482217 adjusting screw in end of switchbox to clear actuator and remove 70008003 spring.
- b. Position actuator set collar on end of trip rod by inserting Allen wrench through hole in end of switchbox into 61662705 set screw in actuator.

- c. Position trip rod 9/16" from face of proportion hopper as shown, using a spacer (9/16" dia. rod is good). Tighten actuator set screw securing actuator to trip rod.
 - d. Assemble 70008003 spring from hole in switchbox above center line of trip rod to hole in actuator at notch in actuator.
 - e. Screw 65482217 adjusting screw against actuator to hold the trip rod in the 9/16" position as in Step c. Lock in place with 66082200 on adjusting screw.
 - f. If necessary for proper tripping, minor adjustment may be made with adjusting screw. Care must be exercised to make sure the weighted paddle will always actuate the trip rod and not bind or hang up on the rod and that the actuator will have enough travel to trip the micro switch.
4. REPLACEMENT AND ADJUSTMENT INSTRUCTIONS - AUGER CORNER BELT:
- a. Assemble the round belt over the auger pulleys and idler pulleys. To avoid undue belt wear, adjust pulley on vertical auger up or down so that belts from idlers will enter this pulley in a horizontal line. They should not ride "heavy" on either top or bottom of pulley groove.
- Caution: Bolts holding hinged idler brackets to auger corner must be loose enough to allow idlers to find their proper alignment with the belt. After this adjustment is completed retighten the bolts.
- b. Adjust idler pulleys approximately even each side to arrive at proper belt tension. With an approximately three-pound pressure applied midway between idler pulley and vertical auger pulley, belt should deflect no more than 1/16".
 - c. Because all new belts will stretch when first put into service, the tension on the auger corner belt must be checked periodically after approximately fifteen minutes, one hour, and five hours of running time.
5. SERVICING THE PROPORTIONER:
- a. 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 gear box.
 - 3. Remove the 20 washer head cap screws from cover.
 - 4. Do not remove the knobs from cover.
 - 5. Use screw driver 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 and 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.

- b. To rebuild a proportioner complete or to replace a shaft and ratchet, pawl carrier, nylon bearing, or auger then the gear box 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.
- c. To replace a shaft & 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 back side of proportioner.
Note: Clean inside of proportioner gear box thoroughly.
- d. Reassemble gear box:
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 shown on page 47.
 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.

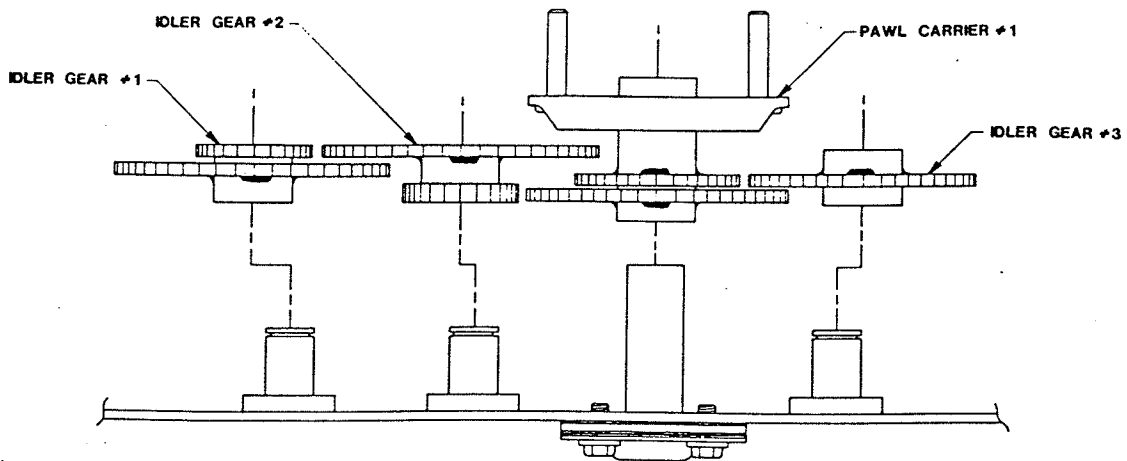


FIGURE # 7

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.
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 with 1/4" bolts and nuts.
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.

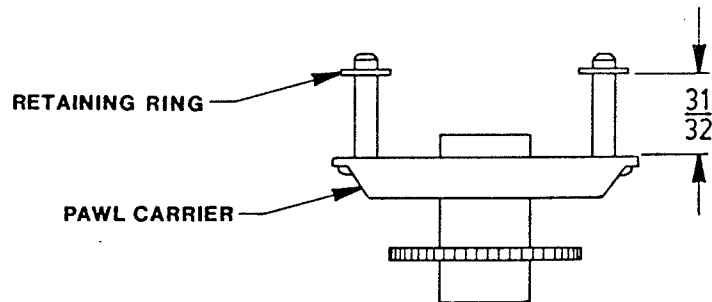


FIGURE #8

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.

ROUTINE MAINTENANCE

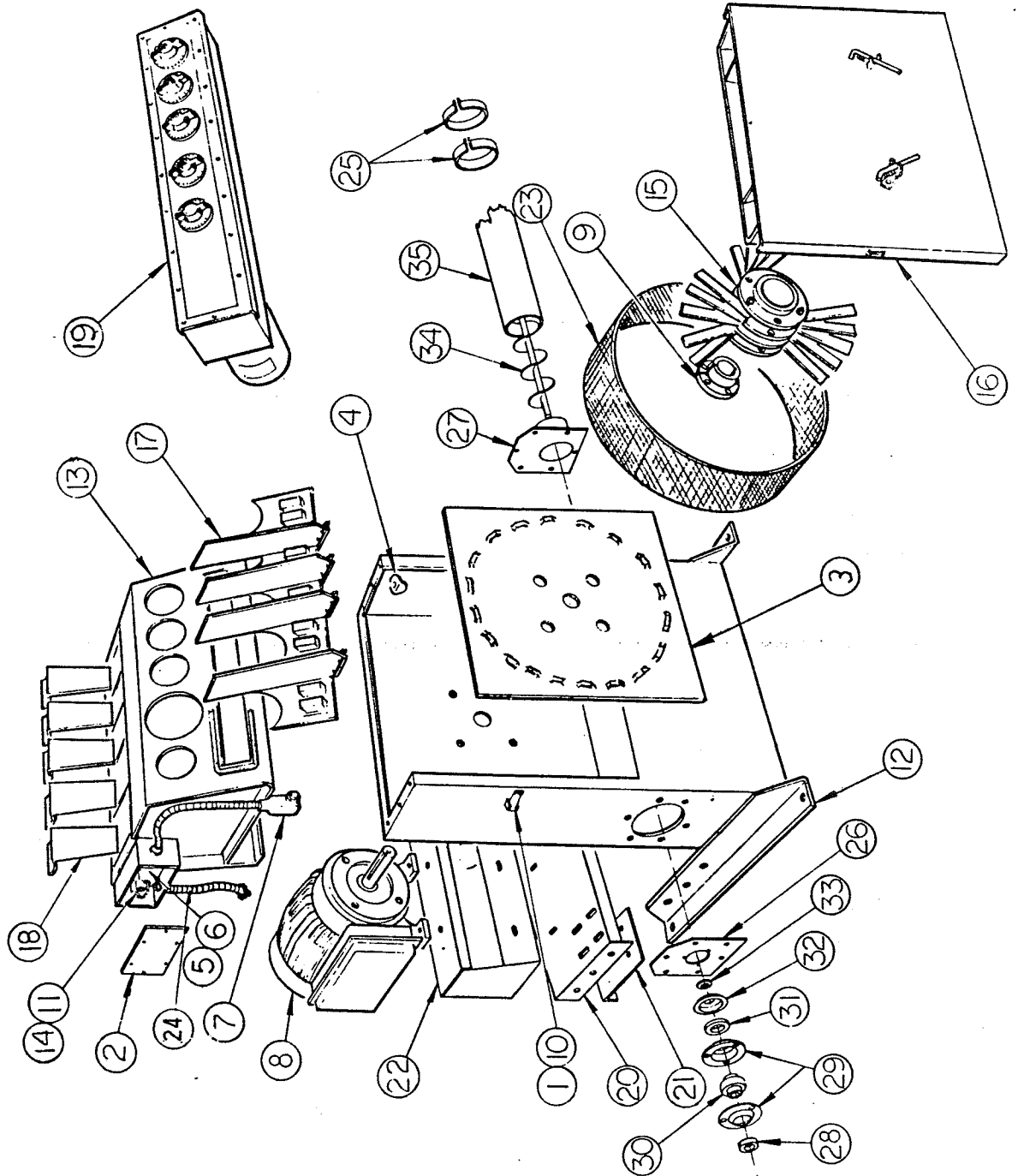
1. Change oil every 500 hours or 6 months - use Texaco preservative oil, 10W.
2. Check hammers for wear weekly.
3. When changing hammers check bolts for wear.
4. Check screen for wear weekly.
5. Check door seals monthly.
6. Check power corner belts for alignment and tension weekly.
7. Inspect proportioner every 2,000 hours.
8. Check mill magnets for tramp iron daily.

Parts Lists and Wiring Diagrams

INPUT POWER WIRING

Electrical input wiring should be done by a qualified electrician following NEC and local standards. Each machine should be grounded to a ground rod driven at least 8 feet into moist soil.

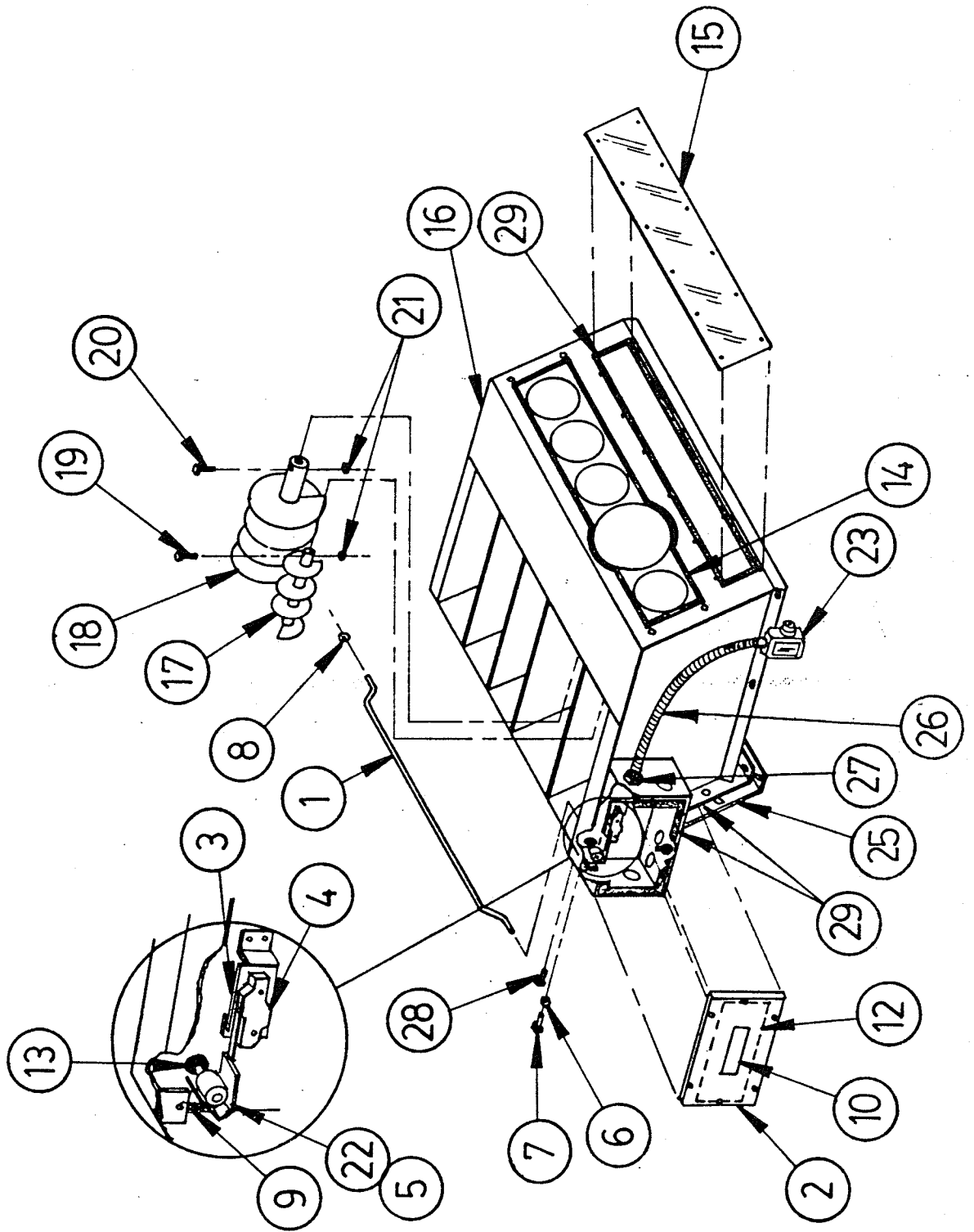
"D" MILL ASSEMBLY



'D' MILL ASSEMBLY

ITEM	PART NO.	DESCRIPTION	QUAN.	ITEM	PART NO.	DESCRIPTION	QUAN.
1	7000-4506	Latches	2	24	9100-0150	Wire Harness - Motor	1
2	1120-6640	Cover, Switch Box	1	or	9100-0137	5 H.P. - 1Ø	1
3	1119-5910	Back Wear Plate	1	or	9100-0151	7 1/2 H.P. and 10 H.P. - 1Ø	1
4	1119-5940	Magnet Clips	2	or	9100-0136	5 H.P. - 3Ø	1
5	1119-5950	Insulation, Switch	1	or	1032-2902	10 H.P. and 20 H.P. - 3Ø	1
6	3100-8001	Micro Switch	1	25	1119-5920	Clamp Ring - 3 1/2" Auger	2
7	3100-8025	Micro Switch, Door	1	26	1119-6500	Offset Bearing Plate-3 1/2" Auger	1
8	3300-0601	Motor 5 H.P.-1Ø	1	or	9000-0122	Bearing Plate - 6" Auger	1
or	3300-0602	Motor 7 1/2 H.P.-1Ø	1	27		Tube & Offset Plate Ass'y. -	
or	3300-0603	Motor 10 H.P.-1Ø	1			3 1/2" Auger	1
or	3300-0701	Motor 5 H.P.-3Ø	1	or	9000-0207	Sleeve & Ring Ass'y.-6" Auger	1
or	3300-0703	Motor 10 H.P.-3Ø	1	28	4000-0018	Lock Collar (5/8") - 3 1/2" Auger	1
or	3300-0705	Motor 20 H.P.-3Ø	1	or	4000-0009	Lock Collar (1 1/16")-6" Auger	1
9	4401-0712	Bushing SD 1-1/8"	1	29	4000-0016	Stamping (5/8") - 3 1/2" Auger	2
or	4401-0716	Bushing SD 1-3/8"	1	or	4000-0005	Stamping (1 1/16") - 6" Auger	2
or	4401-0720	Bushing SD 1-5/8"	1	30	4000-0017	Bearing (5/8") - 3 1/2" Auger	1
10	7000-7001	Pop Rivets	4	or	4000-0012	Bearing (1 1/16") - 6" Auger	1
11	7000-8003	Spring	1	31	8001-1506	Felt Washer (5/8") - 3 1/2" Auger	1
12	9000-0100	Mill Housing - Welded	1	or	8001-1509	Felt Washer (1 1/16")-6" Auger	1
13	9000-0102	Prop Hopper - Welded	1	32	8001-1507	Retaining Cup (5/8")-3 1/2" Auger	1
14	9000-0123	Actuator	1	or	8001-1508	Retaining Cup (1 1/16")-6" Auger	1
15	9200-0234	Beater Hub Ass'y.	1	33	8001-4502	Thrust Washer (5/8")-3 1/2" Auger	1
16	9200 0634	Door & Chute Ass'y.	1	34	9000-2152	Flight & Shaft Ass'y. (52 3/4")	1
17	9200 0237	Magnet Plate	1	or	9000-2153	- 3 1/2" Auger	1
18	9000-0131	Switch Paddle Welded Ass'y.	5			Flight & Shaft Ass'y. (90 3/4")	1
19	9200 0233	Prop. Ass'y.	1	or	9000-1232	- 3 1/2" Auger	1
20	9000-0443	Motor Base	1	or		6" Auger	1
21	9000-0438	Adjustment Plate	1	35	1119-7100	3 1/2" Galv. Tubing (12") -	1
22	1120-6620	Motor Stand (20 H.P. Only)	1	or	1119-7102	3 1/2" Galv. Tubing (50") -	1
23	9000-0142	Screen - 3/16" (See Page 56 for Replacement Numbers)	1	or	1119-5003	3 1/2" Galv. Tubing (44 1/2") -	1
						6" Auger	

PROPORTIONER HOPPER ASSY.

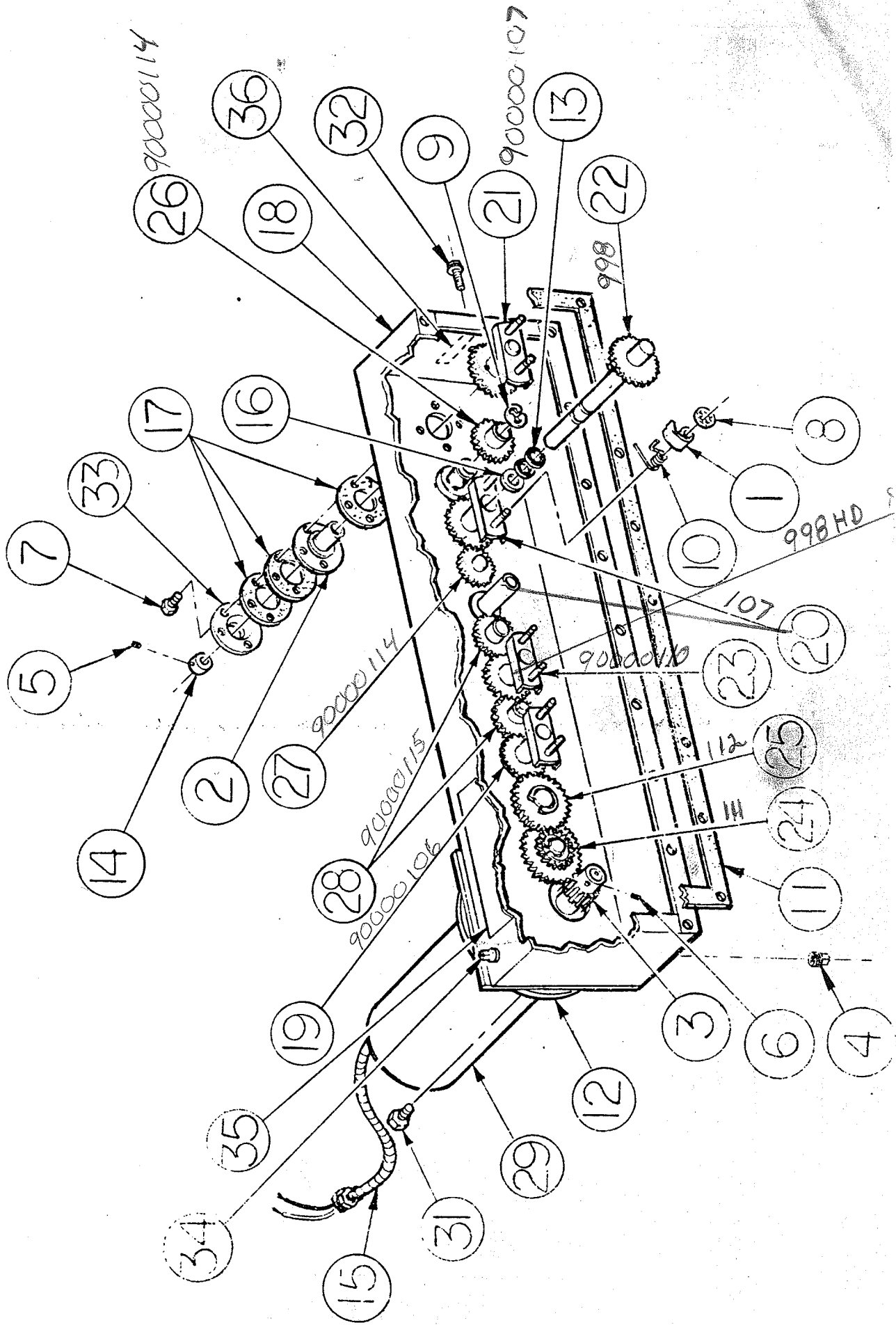


PROPORTIONER HOPPER ASSY

ITEM PART NO.	DESCRIPTION	QUAN	ITEM PART NO.	DESCRIPTION	QUAN
1	Proportioner Hopper - Complete	1	8001-4002	Polyurethane Tape - 3/8"	60"
2	Trip Rod	1	8002-2002	Magnet Window	1
3	Cover - Switch Box	1	9000-0102	Proportioner Welded Assembly	1
4	Insulation - Switch	1	9000-0116	4" Auger Assembly	4
5	Micro Switch	1	9000-0118	6" Auger Ass'y.-Dbl. Full Pitch	1
6	Set Screw	1	6258-3326	Cap Screw - 1/4" - 20 x 1-1/4"	4
7	Nut	1	6258-3330	Cap Screw - 1/4" - 20 x 1-3/4"	1
8	Adjustment Screw - #8 - 32 x 3/4"	1	6674-3300	Nut - 1/4" - 20	5
9	Push-On Fastener	1	9000-0123	Actuator	1
10	Spring	1	3100-8025	Door Switch	1
11	Label - Warning	1	9200-0233	Prop. Gear Box (See Page 47)	1
12	Label - Danger (Not Illustrated)	1	9200-0242	Counterswitch Ass'y (See Page 50)	1
13	Decal - Switch Box Wiring	1	1119-5930	D-Back Hopper Cover Plt. (Timer Model "D"-Mill)	1
	Grommet - 7/64" I.D.	1	1120-6101	3/8" Liquid Tight Conduit - 14"	1
			3100-2611	3/8" Liquid Tight Straight Connector	2
			6548-2205	M.S. Slotted Hex Hd. #8-32 - 1/4"	1
			8001-4001	Polyurethane Tape - 3/16"	90"

* These items are not included in 9200-0247 Proportioner Hopper Assembly Complete.

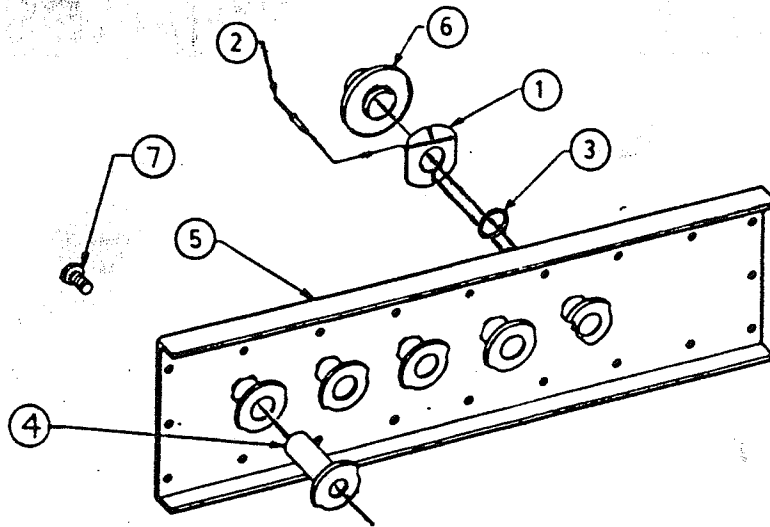
PROPORTIONER GEAR BOX



PROPORTIONER GEAR BOX

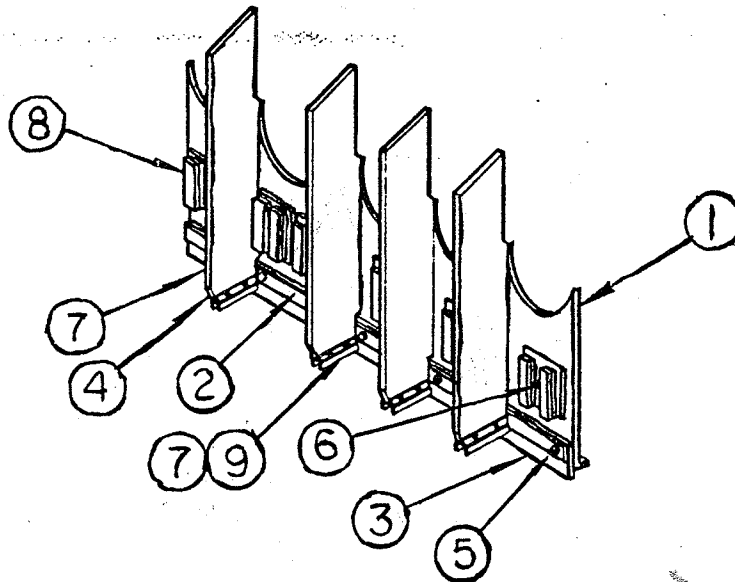
ITEM	PART NO.	DESCRIPTION	QUAN.	ITEM	PART NO.	DESCRIPTION	QUAN.
1	9200-0717	Gear Box (Less Motor & Oil)		23	9000-0110	Pawl Carrier - 32 Teeth	1
2	9200-0233	Gear Box - Complete (Less Oil)	9	24 *	9000-0111	Reducer Gear - 16/42 Teeth	1
3	1119-5820	Drive Pawl	5	25 *	9000-0112	Reducer Gear - Offset	1
4	4000-0014	Bearing - Auger Shaft	1	26 *	9000-0113	Reducer Gear - 16/24 Teeth	1
5	4000-2003	Gear - Motor Drive	1	27 *	9000-0114	Idler Gear - 24 Teeth	1
6	5171-3002	Pipe Plug 1/4"	5	28 *	9000-0115	Idler Gear - 32 Teeth	2
7	6166-2705	Set Screw 10 - 32 x 1/4"	2	29	3300-0100	D.C. Motor 1/4 H.P.	1
8	6166-3305	Set Screw 1/4 - 20 x 1/4"	20	30	9200-0231	Prop Cover (See Page 53)	
9	7000-0502	Washer Head Cap Screw	9	31	7000-0503	Washer Head Bolts	4
10	7000-6002	Push-on Fastener	6	32	7000-0501	Washer Head Bin Bolt	1
11	7000-8002	Retaining Ring	9	33	9200-0232	Bearing Cap	5
12	8000-4503	Spring - Drive Pawl	1	34	5171-8002	Pipe Plug 1/4" - Vented	1
13	8000-4504	Gasket - Cover	1	35	8000-7003	Decal - D Proportioner Oil	1
14	8000-8501	Gasket - Motor	10	36	8000-6521	Decal - Oil Level	1
15	8001-2001	Roto-Seal (O-Ring)	5	37	9200-0243	Oil, (Qt.)	2 Qts
16	9100-0139	Lock-Collar	1	38	9200-0678	Brush Package - D.C. Motor (Not Shown)	1
17	8001-4501	Wire Harness	5	39	8001-1519	Motor Seal - D.C. Motor (Not Shown)	1
18	8000-4502	Thrust Washer	15	*	8000-0501	Bushing - 5/8" I.D. x 3/4" O.D. (Included in Reducer and Idler Gears)	6
19	9000-0101	Gasket - Auger	1				
20	9000-0106	Prop Housing	1				
21	9000-0107	Pawl Carrier - 42/24 Teeth	2				
22	9000-0108	Pawl Carrier - 24 Teeth	1				
	9000-0109	Pawl Carrier - 32 Teeth	1				
		Shaft and Ratchet	5				

PROPORTIONER COVER ASSEMBLY



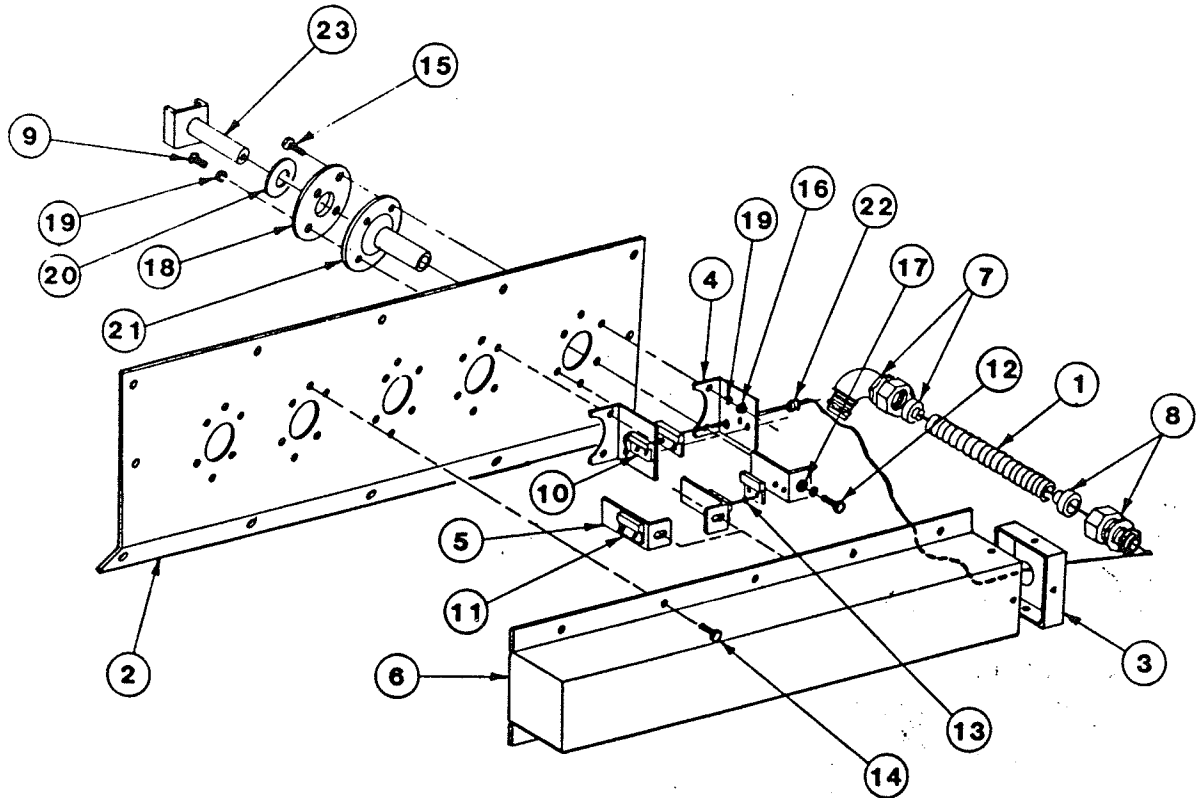
ITEM	PART NO.	DESCRIPTION	QUAN.
	9200-0231	Cover, Proportioner - Complete	
1	1119-5780	Proportioner Knob Spring	5
2	7000-7001	Pop Rivet - 5/32" Diameter - Std.	5
3	8000-8502	"O" Rings	5
4*	9000-0119	Moveable Cam and Sleeve Assembly	5
5	9000-0121	Proportioner cover Welded Assembly	1
6	9200-0235	Knob Assembly (with set screw)	5
7	7000-0502	Washer Head Cap Screw	20
*	8000-0501	Bushing 5/8" I.D. x 3/4" O.D. (Included in Moveable Cam)	5

MAGNET PLATE ASSEMBLY



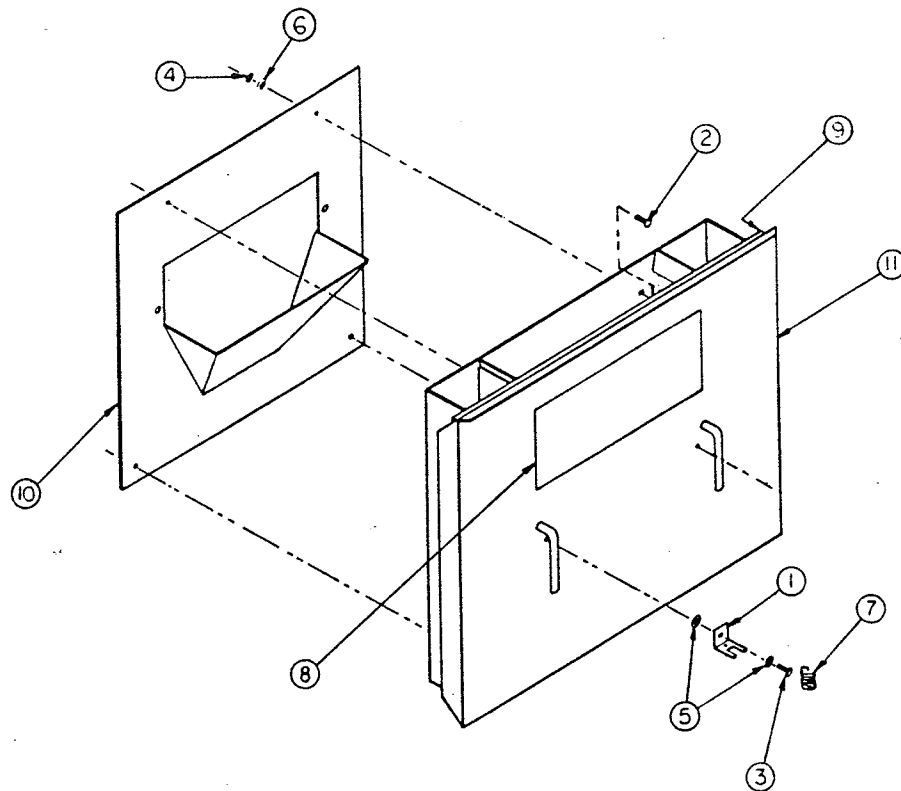
ITEM	PART NO.	DESCRIPTION	QUAN.
	9200-0237	Magnet Plate Assembly - Complete	
1	1119-6050	Magnet Plate	1
2	1119-6060	Strip Magnet Plate	1
3	1120-5300	Neoprene Magnet Plate	1
4	1119-6080	Divider Magnet Plate	4
5	6548-2212	Machine Screw Type D Thread Cutting #8 - 32 x 1/2"	6
6	6568-3812	Machine Screw Thread Forming 5/16" x 1/2"	6
7	7000-7001	Pop Rivets	16
8	8000-8001	Magnet - Mill	6
9	1120-4390	Adapter	4

COUNTER SWITCH ASSEMBLY



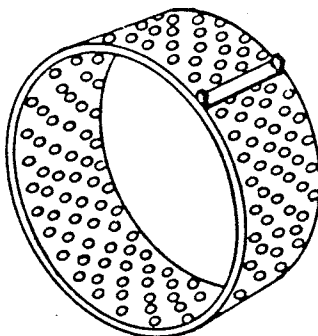
ITEM	PART NO.	DESCRIPTION	QUAN.
	9200-0242	Complete Assembly	
1	1120-6103*	3/8" Liquidtight Conduit --10"	1
2	1119-5931	Counter Hopper Cover Plate	1
3	1119-6020	Cover Switches End	1
4	1119-6120	Reed Switch Plate	5
5	1119-6130	Reed Magnet Plate	6
6	1119-6140	Cover Switches	1
7	3100-2621*	3/8" Liquidtight 90° Connector	1
8	3100-2611	3/8" Liquidtight Straight Connector	1
9	6548-3312	M.S. Slotted Hex Head Type D.T.C. Plated 1/4 - 20 x 1/2"	10
10	3100-8027	Reed Switch	5
11	3100-8028	Reed Switch Magnet	6
12	6258-3312	Cap Screw Hex Head Plated 1/4 - 20 x 1/2"	5
13	7000-7002	Pop Rivet 3/32"	22
14	6548-2205	M.S. Slotted Hex Head Type D.T.C. Plated #8 - 32 x 1/4"	13
15	6548-3317	M.S. Slotted Hex Head Type D.T.C. Plated 1/4 - 20 x 3/4"	10
16	6608-3300	Hex Nut Plated 1/4 - 20	10
17	6640-3300	Flat Washer Plated 1/4"	5
18	9200-0232	Bearing Cap Assembly	5
19	6644-3300	Lock Washer Plated 1/4"	25
20	7001-1503	Rulon Washer	5
21	4000-0014	Bearing Auger Shaft	5
22	8000-5001	Grommet 1/2"	5
23	9000-0128	Drive Shaft Switches Welded Assembly	5
*These items are not included in 9200-0242 Counter Switch Complete Assembly.			

DOOR AND CHUTE ASSY.



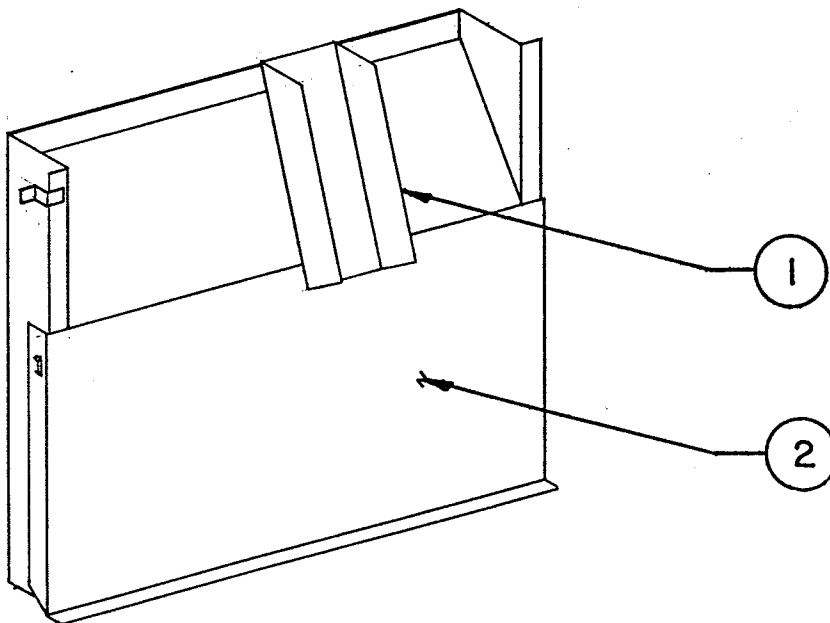
ITEM	PART NO.	DESCRIPTION	QUAN
	9200-0634	Door and Chute Assembly	
1	1119-6270	Bracket - Valve Handle Toggle	2
2	6028-3317	Round Head Square Neck C.B. 1/4" x 3/4"	4
3	6548-3317	Machine Screw - Hex Head - 1/4" - 20 x 3/4"	2
4	6608-3300	Hex Nut - 1/4"	4
5	6640-3300	Flat Washer - 1/4"	4
6	6644-3300	Lock Washer - 1/4"	4
7	7000-8004	Spring	2
8	8000-3519	Decal - Mix-Mill	1
9	8001-4002	Polyurethane Tape - 3/8" x 1/2"	90"
10	9000-0440	Wearplate Assembly	1
11	9000-0441	Door - Welded Assembly	1

"D" MILL SCREENS



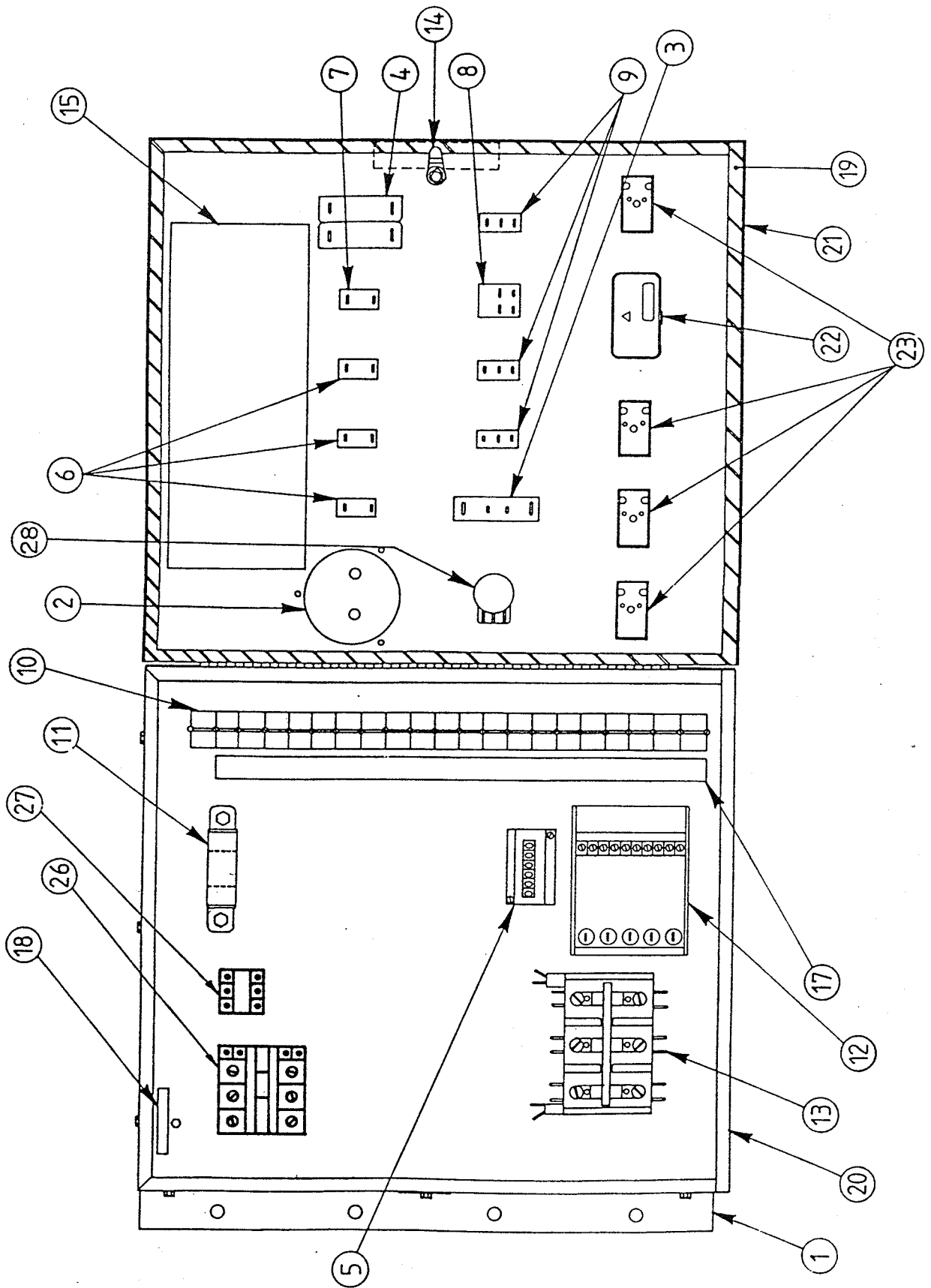
ITEM	PART NO.	DESCRIPTION	QTY.
1	9200-0209	3/32" x 18" Diameter Screen	1
1	9200-0210	1/8" x 18" Diameter Screen	1
1	9200-0211	5/32" x 18" Diameter Screen	1
1	9200-0212	3/16" x 18" Diameter Screen	1
1	9200-0214	1/4" x 18" Diameter Screen	1
1	9200-0215	5/16" x 18" Diameter Screen	1
1	9200-0216	3/8" x 18" Diameter Screen	1
1	9200-0218	1/2" x 18" Diameter Screen	1
1	9200-0219	5/8" x 18" Diameter Screen	1
1	9200-0220	3/4" x 18" Diameter Screen	1

SAMPLING CHUTE ASSEMBLY



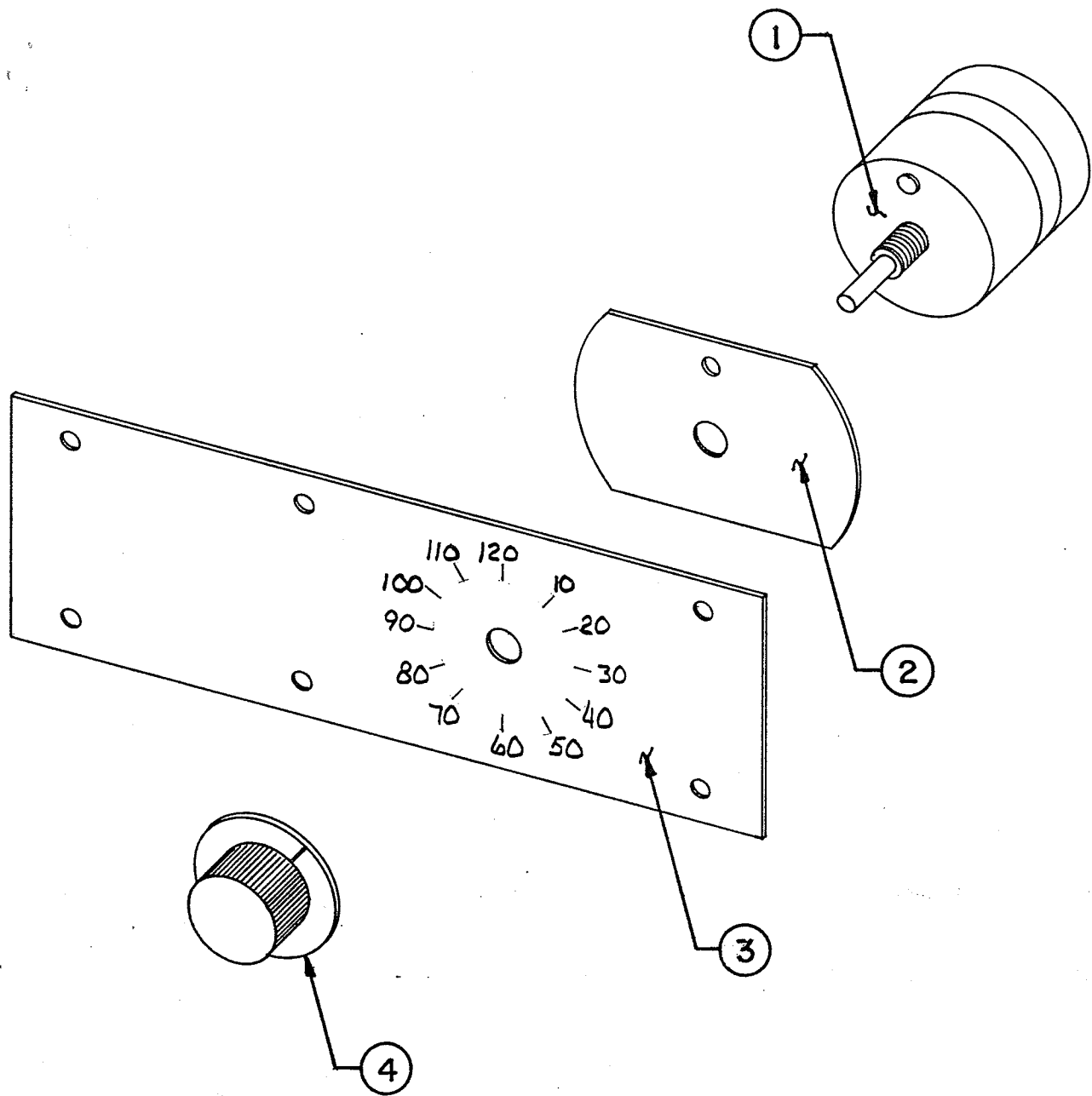
ITEM	PART NO.	DESCRIPTION	QTY.
1	1120-9820	Calibration Chute	1
2	9000-9544	Calibration Door Weldment	1

"D" MILL CONTROL PANEL COMPONENTS



"D"-MILL CONTROL PANEL COMPONENTS

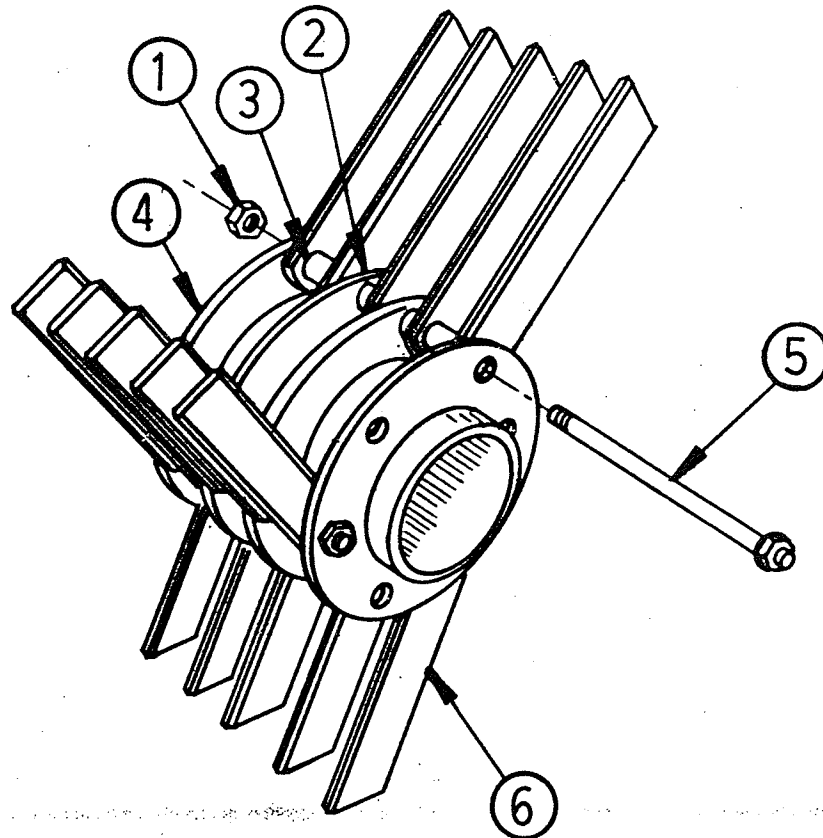
ITEM PART NO.	DESCRIPTION	QUAN	ITEM PART NO.	DESCRIPTION	QUAN
1	Chassis	1	8001-0502	Snap-In Blank (1-1/8" Hole) - Not Shown	2
2	Ammeter	1	See Below	Magnetic Starter	1
3	Circuit Breaker - Single Pole - 3 Amp	1	31016131	50 Amp 5 H.P. 1 ϕ	1
4	Circuit Breaker - Double Pole - 15 Amp	1	31016133	16 Amp 5 H.P. 3 ϕ	1
5	Hour Meter	1	31016131	50 Amp 7-1/2 H.P. 1 ϕ	1
6	Green Light	1	31016130	63 Amp 10 H.P. 1 ϕ	1
7	Amber Light	3	31016131	50 Amp 10 H.P. 3 ϕ	1
8	Switch Mom - On-Off	1	31016130	63 Amp 20 H.P. 3 ϕ	1
9	Switch (SPDT) On-None-On	1	See Below	Overload Relay	1
10	Terminal Block#	3	31016121	5 H.P. 1 ϕ	1
11	Current Transformer	21	31016120	5 H.P. 3 ϕ	1
12	D.C. Controller	1	31016122	7-1/2 H.P. 1 ϕ	1
13	Relay - 3 Pole - 30 Amp - 120 Volt Coil	1	31016123	10 H.P. 1 ϕ	1
14	Door Latch	1	31016122	10 H.P. 3 ϕ	1
15	Schematic Decal	1	31016123	20 H.P. 3 ϕ	1
16	Warning Decal	1	31012010	Speed Pot. Ass'y.	1
17	Terminal Block Decal	1	91000152	10' Wire Harness - Controls (optional equipment)	1
18	Ground Label	1			
19	Polyurethane Tape	83"			
20	Panel Wrapper	1			
21	Panel Front	1			
22	Counter	1			
23	Counter	4			
24	Snap-In Blank (7/8" Hole) - Not Shown	6			



2 HR. TIMER ASS'Y

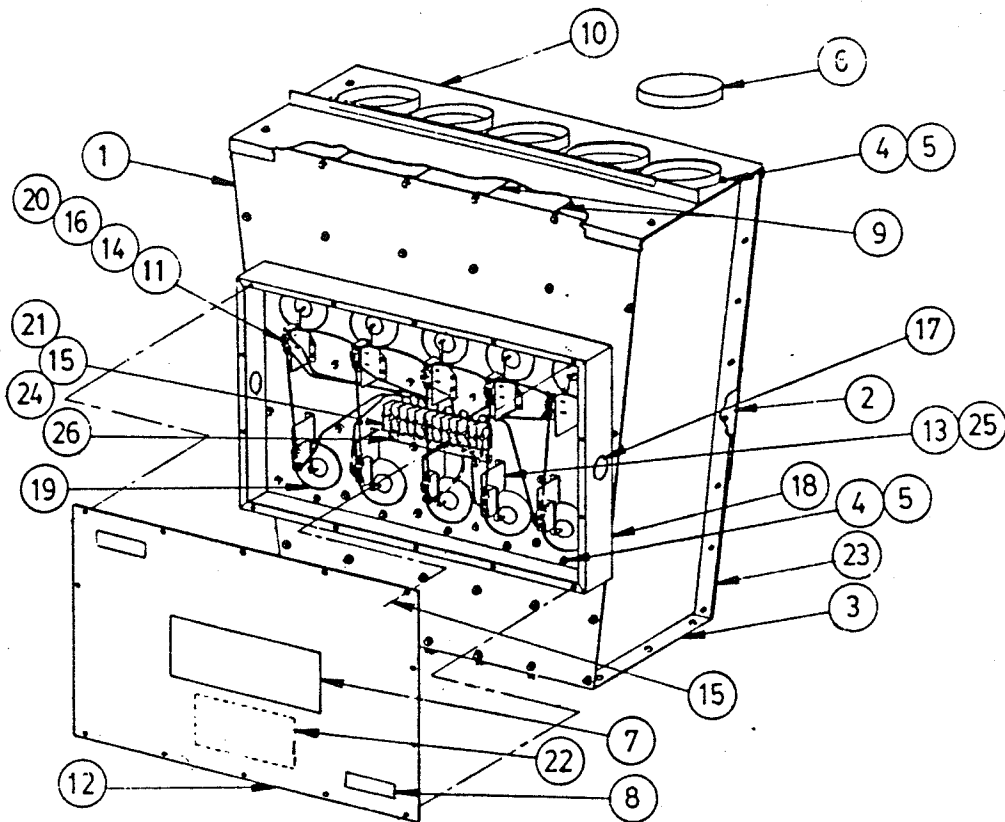
ITEM	PART NO.	DESCRIPTION	QTY
1	31011007	TIMER-2HR	1
2	11196090	TIMER LOCK PLATE	1
3	11196030	MOUNTING PLATE TIMER	1
4	31011009	DIAL - GRIND TIME	1

BEATER HUB ASSY.



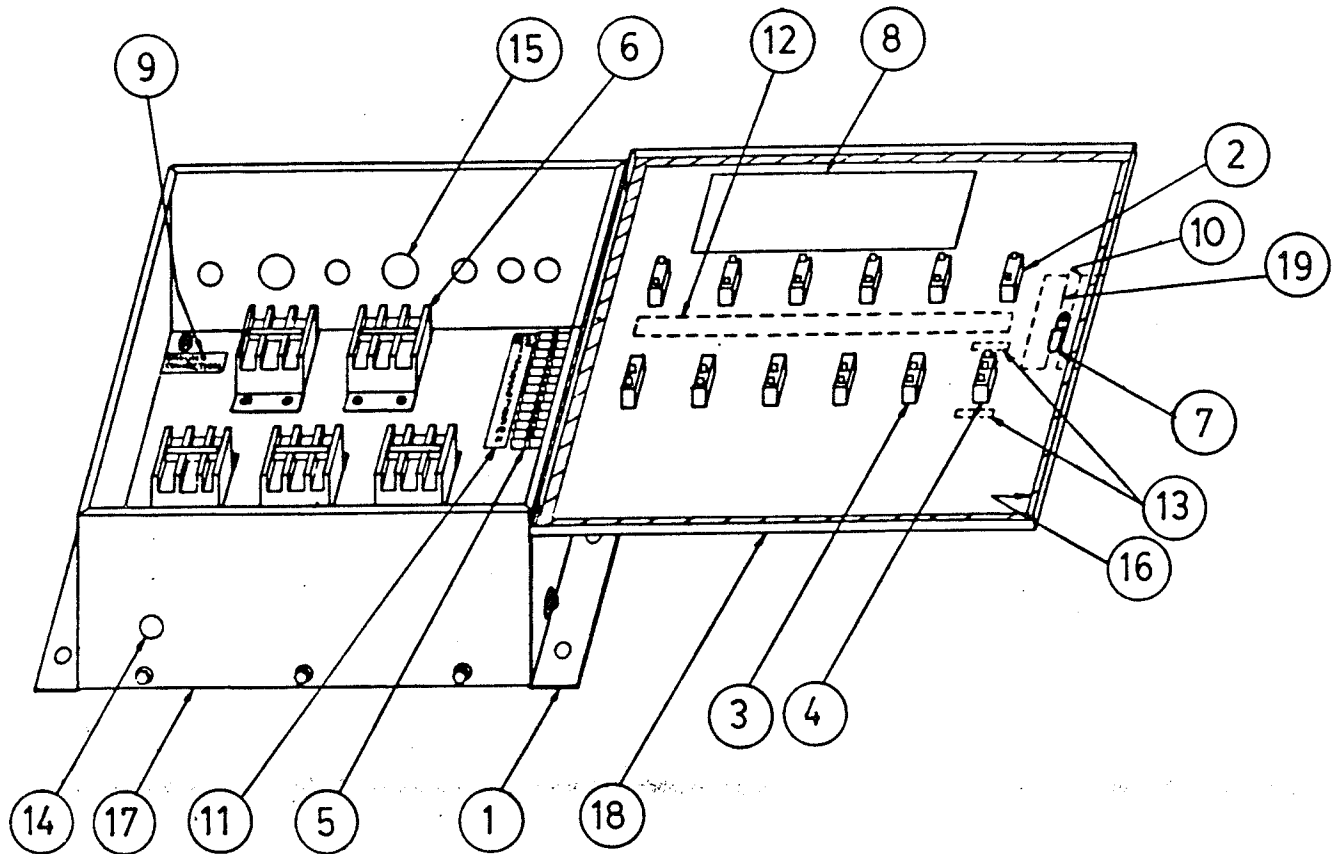
ITEM	PART NO.	DESCRIPTION	QUAN.
	9200-0234	Hub and Hammer Ass'y. (Complete)	1
1	6675-4500	Hex Lock Jam Nut - 3/8-24-NF	3
2	8001-3501	Hub Spacer .40625 Long	12
3	8001-3502	Hub Spacer .8125 Long	6
4	9000-0104	Beater-Hub Welded Assembly	1
5	9000-0297	Stud Assembly	3
6	9200-0278	Hammers (Set of 15)	1

GROUND LEVEL HOPPER



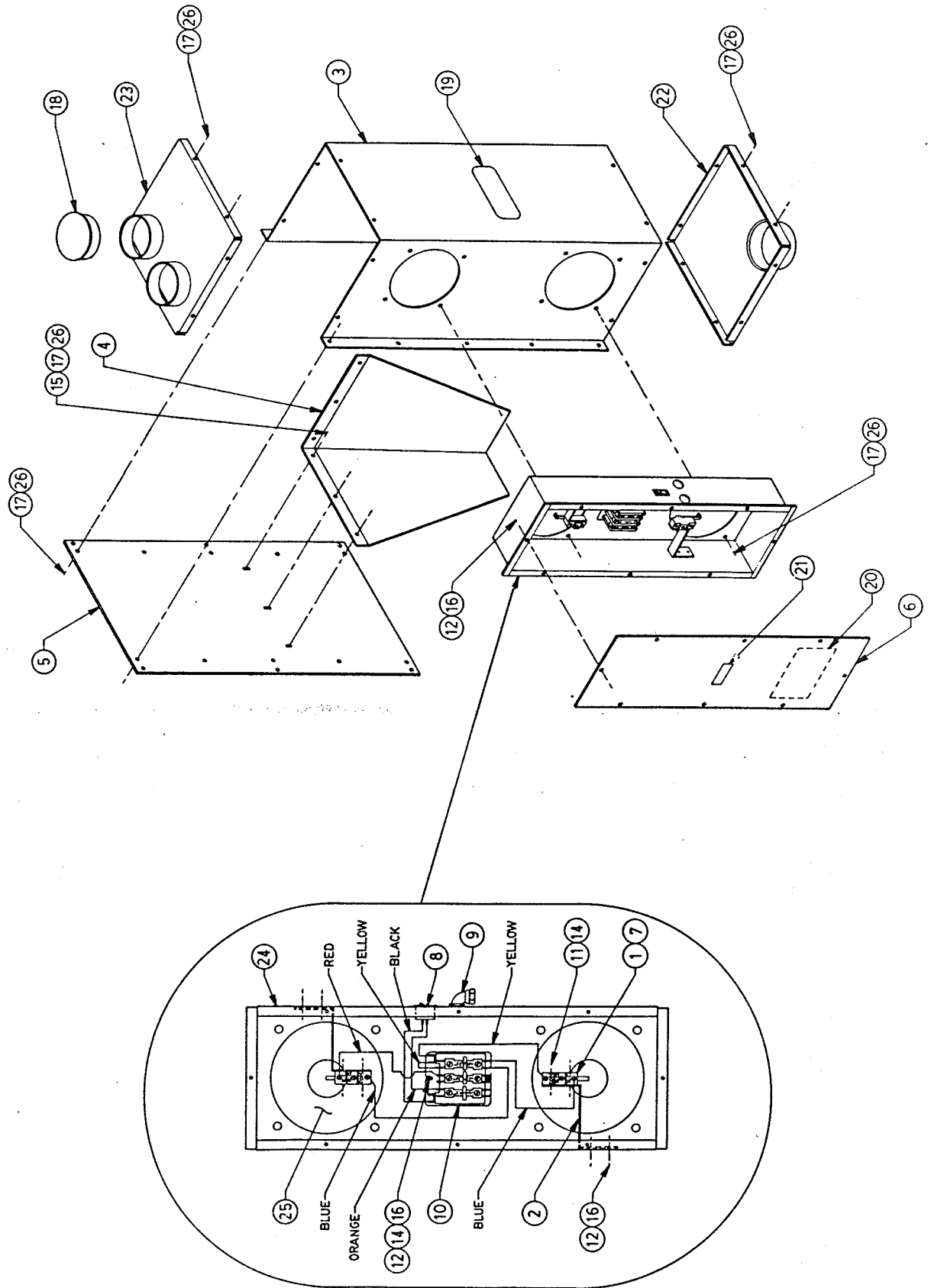
ITEM	PART NO.	DESCRIPTION	QUAN
	9200-0249	Ground Level Hopper - Complete	
1	1119-6420	Ground Level Hopper - Front	1
2	1119-8060	Ground Level Hopper - Rear (Long)	1
3	1119-6440	Ground Level Hopper - End	2
4	6548-3312	1/4" - 20 - Unc. x 1/2 Thd. Cutting Screws	108
5	6644-3300	1/4" Lock Washer	108
6	8000-1001	Cap Plug 4" I.D.	2
7	8000-3514	Decal - Mix-Mill	1
8	8000-6506	Decal - Warning Label	2
9	9000-0038	Ground Level Hopper Divider Welded Assembly	4
10	9000-0132	Ground Level Hopper Cover Welded Assembly	1
11	1119-5950	Insulation - Switch	10
12	1119-6460	Cover Switch Box	1
13	1119-6470	Bracket Switch - Ground Level Hopper	10
14	6468-1822	#6 - 32 x 1" - S.T. Pan Head Screws	20
15	6548-2212	#8 - 32 x 1/2" - S.T. Slotted Hex Screws	15
16	6640-2200	#8 Flat Washer	20
17	8001-0501	Snap in Blank 7/8 Diameter Hole	2
18	1119-6450	Switch Box - Ground Level	1
19	1119-5570	Diaphragm	2
20	1119-6480	Micro Switch 1-oz.	10
21	3100-9005	Terminal Block Section	12
22	8000-3517	Decal - Ground Level Schematic	1
23	1119-8070	Ground Level Hopper - Rear (Short)	1
24	6468-2217	#8 - 32 x 1 1/4" - S.T. Pan Head Screws	4
25	6548-2205	#8 - 32 x 1/4" - S.T. Slotted Hex Screws	20
26	8000-6508	Decal - Terminal Block	1
	9100-0113	Control Panel (See Page 62)	

GROUND LEVEL CONTROL PANEL



ITEM	PART NO.	DESCRIPTION	QUAN
	9100-0113	Panel - Complete	
1	1119-6041	Chassis	1
2	3100-5504	Light - Green	6
3	3100-8018	Switch - SPDT	5
4	3100-8020	Switch - SPDT On-Off-On	1
5	3100-9005	Terminal Block Section	12
6	3243-1140	Relay - 30 A - 3 Pole (120 Volt)	5
7	7000-4501	Door Latch	1
8	8000-3517	Schematic (Ground Level)	1
9	8000-6501	Label - Ground Connection	1
10	8000-6506	Label - Warning	1
11	8000-6508	Decal - Terminal Block	1
12	8000-6512	Decal - Feeder Switches	1
13	8000-6513	Decal - Auto-Manual	1
14	8001-0501	Snap-in Blank 7/8"	6
15	8001-0502	Snap-in Blank 1-1/8"	2
16	8001-4002	Tape	72"
17	9000-0200	Wrapper, Control Panel	1
18	9000-0154	Front Assembly	1
19	8000-6516	Decal - Live Circuits	1

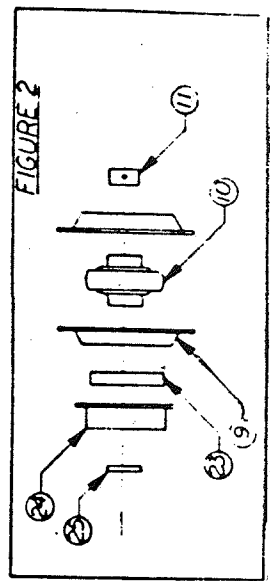
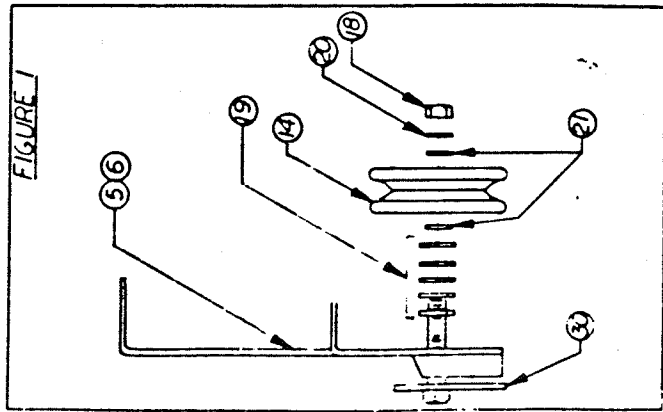
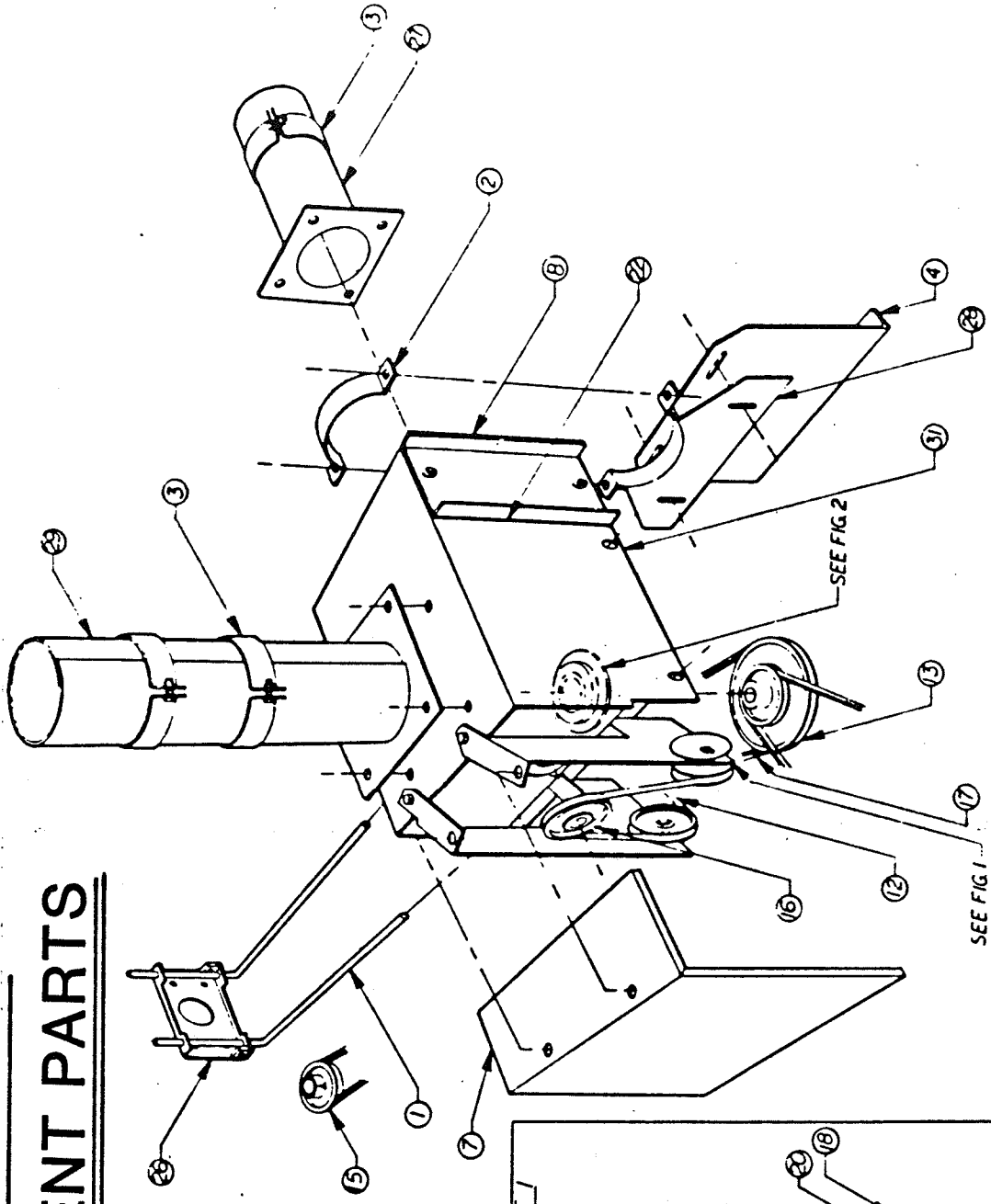
DOUBLE DIAPHRAM CONTROL HOPPER



DOUBLE DIAPHRAM CONTROL HOPPER

ITEM	PART NO.	DESCRIPTION	QUAN.	ITEM	PART NO.	DESCRIPTION	QUAN.
1	9310-4831	Double Diaphragm Control Hopper		21	8000-6506	Decal - Warning Label	1
2	1079-3000	Micro Switch	2	22	9000-0001	End Plate Assy. - Bottom	1
3	1104-7900	Mounting Bracket	2	23	9000-0002	End Plate Assy. - Top	1
4	1119-0010	Wrapper	1	24	9200-0001	Switch Box Assembly	1
5	1119-0020	Transition	1	25	9310-4800	Diaphragm Assembly	2
6	1119-0040	Back Plate	1	26	6548-3312	1/4"-20x1/4" - Thread Cutting Screws	40
7	1119-0050	Cover - Switch Box	1				
8	1119-5950	Insulation	2				
9	3100-8018	On & Off Switch - SPST	1				
10	3100-2621	3/8" 90° Conduit Connector	1				
11	3241-1240	Relay	1				
12	6468-1822	#6-32x1" - S.T. Pan Head Screws	4				
13	6548-2212	#8-32x1/2" - S.T. Slotted Hex Screws	12				
14	6608-2200	#8 - 32 Hex Nut	4				
15	6640-2200	#8 Flat Washer	6				
16	6640-3300	1/4" Flat Washer	6				
17	6644-2200	#8 Lock Washer	14				
18	6644-3300	1/4" Lock Washer	40				
19	8000-1001	Cap Plug 4" I.D.	1				
20	8000-3502	Decal - Mix-Mill	1				
	8000-3513	Decal - Control Hopper	1				

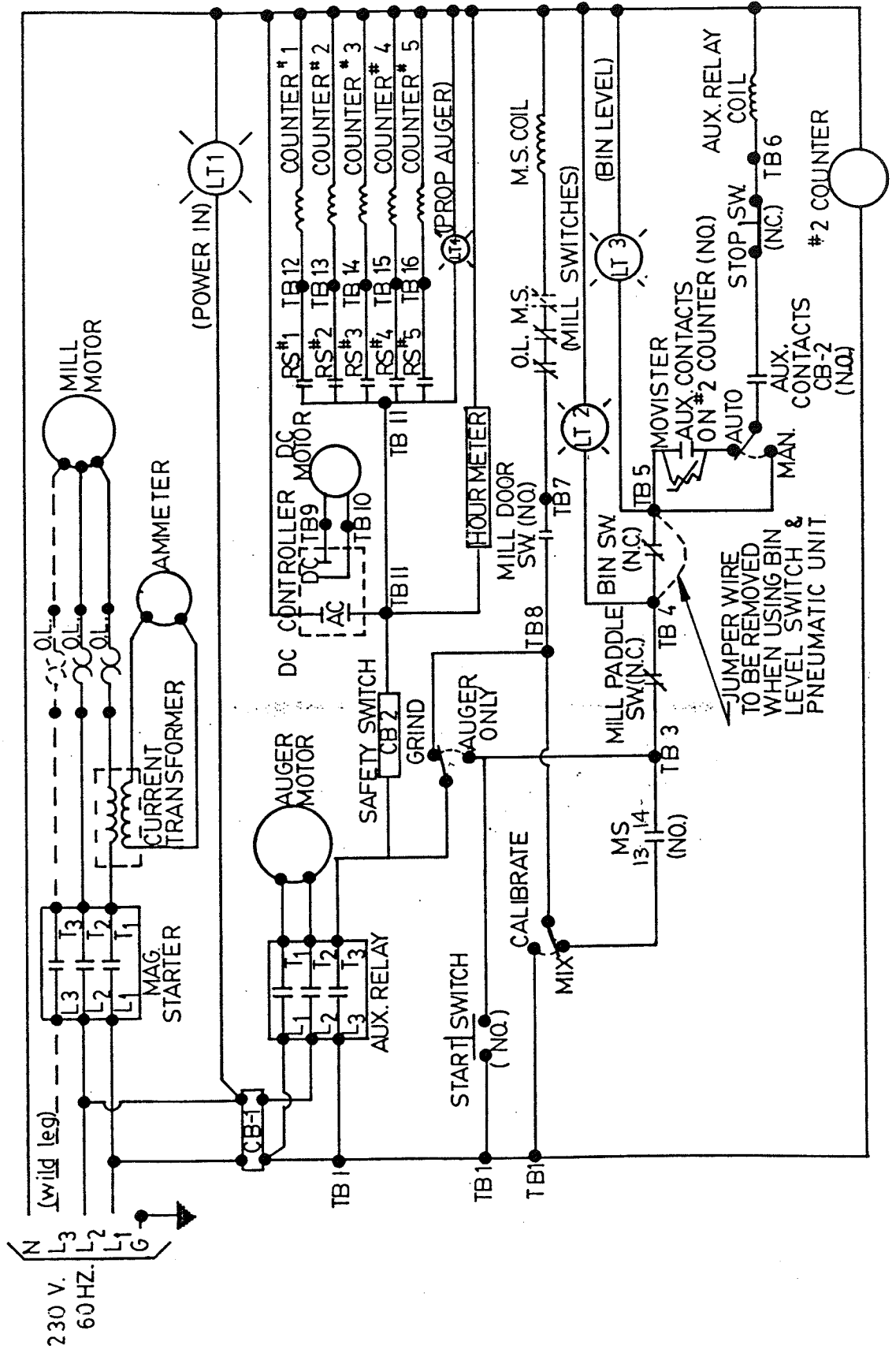
AUGER CORNER REPLACEMENT PARTS

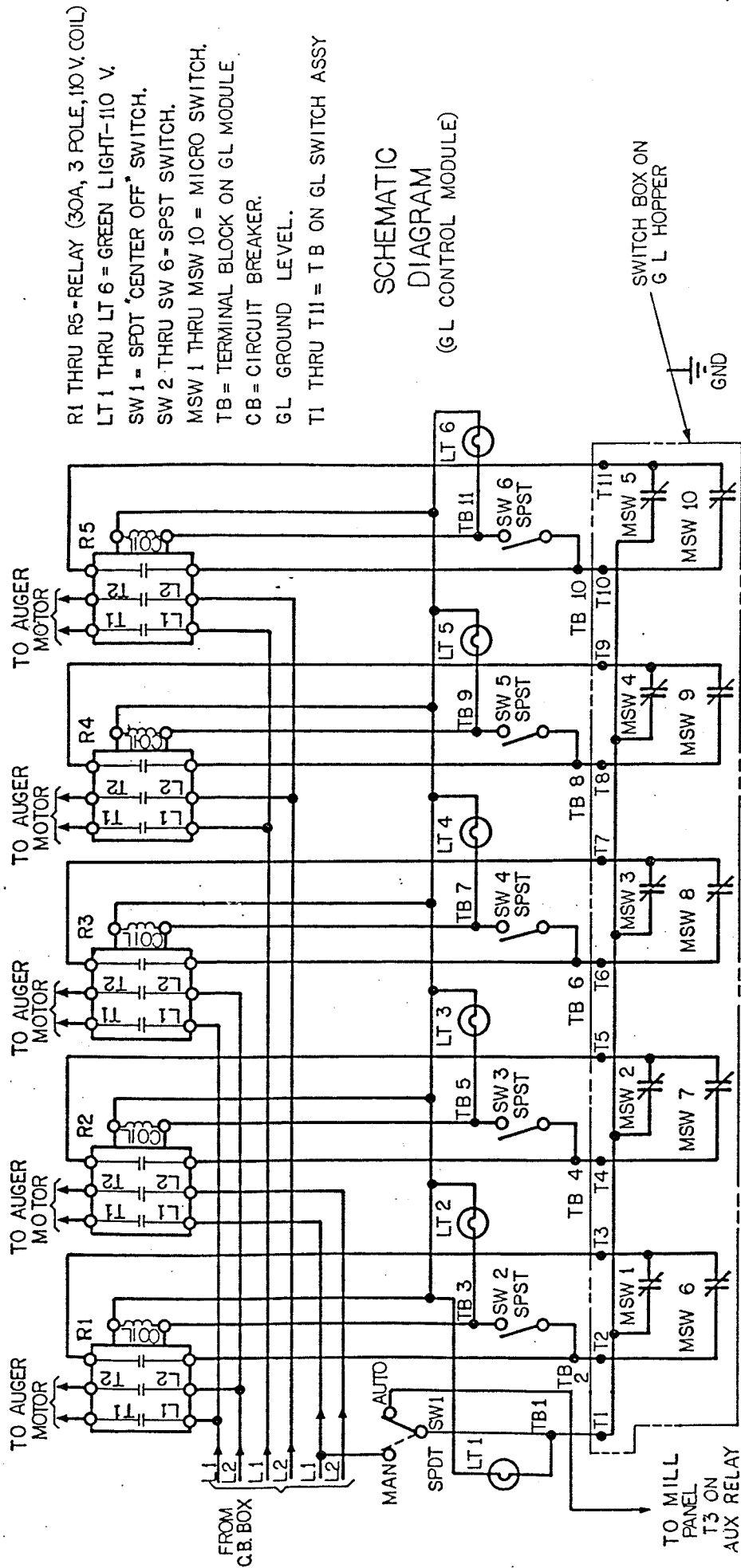


AUGER CORNER

ITEM	PART NO.	DESCRIPTION	QUAN.	ITEM	PART NO.	DESCRIPTION	QUAN.
1	93062876	Auger Corner Complete		17	45001041	Belt - V (41")	1
2	10045800	Motor Mounting Rod	2	18	66084400	Nut - Hex (3/8" - 16)	2
3	10215901	Half Clamp	1	19	66404400	Washer - Flat (3/8")	10
4	10322902	Clamp Ring	3	20	66444400	Washer - Lock (3/8")	2
5	10637900	Plate - Adjustable	1	21	70011501	Washer - Special (3/8")	4
6	10722701	R.H. Idler Bracket	1	22	80004511	Gasket - Clean Out	1
7	10722702	L.H. Idler Bracket	1	23	80011506	Bearing Seal	2
8	10722800	Guard - Belt	1	24	80011507	Seal Retaining Cup	2
9	10971301	Cover - Clean Out	1	25	80014502	Thrust Washer	2
10	40000016	Stamping for 5/8" Bearing	4	26	93004552	Head Plate Assembly	1
11	40000017	Bearing Cartridge - 5/8"	2	27	93030371	Tube & Plate Assembly	1
12	40000018	Lock Collar	2	28	93063801	Support Clamp - Welded	1
13	40000502	Belt - Round (7/16" Dia.)	1	29	93072321	Tube & Plate Assembly w/Stop	1
14	40003508	Sheave - Step (5/8" Bore)	1	30	93078621	Belt Tightener	2
15	40005001	Idler Pulley (3" O.D.)	2	31	93094141	Gearless Auger Corner - Welded	1
16	41301304	Sheave (3"x5/8" Bore) - Motor	1				
	42104604	5" Sheave - 5/8" Bore	1				

SCHEMATIC DIAGRAM D - MILL



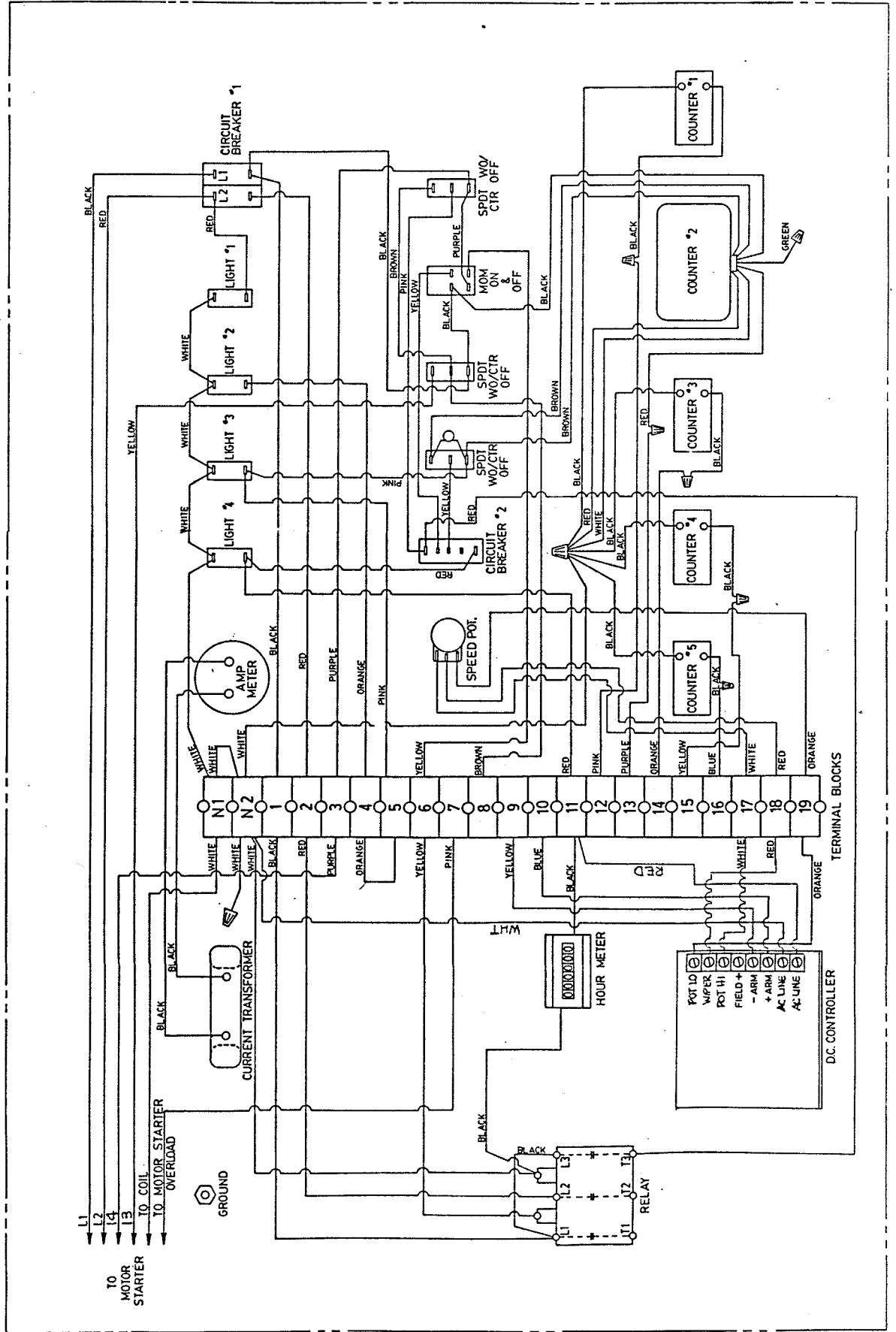


R1 THRU R5 - RELAY (30A, 3 POLE, 110V. COIL)
 LT 1 THRU LT 6 = GREEN LIGHT-110 V.
 SW 1 = SPDT 'CENTER OFF' SWITCH.
 SW 2 THRU SW 6 = SPST SWITCH.
 MSW 1 THRU MSW 10 = MICRO SWITCH.
 TB = TERMINAL BLOCK ON GL MODULE.
 CB = CIRCUIT BREAKER.
 GL = GROUND LEVEL.
 T1 THRU T11 = T B ON GL SWITCH ASSY

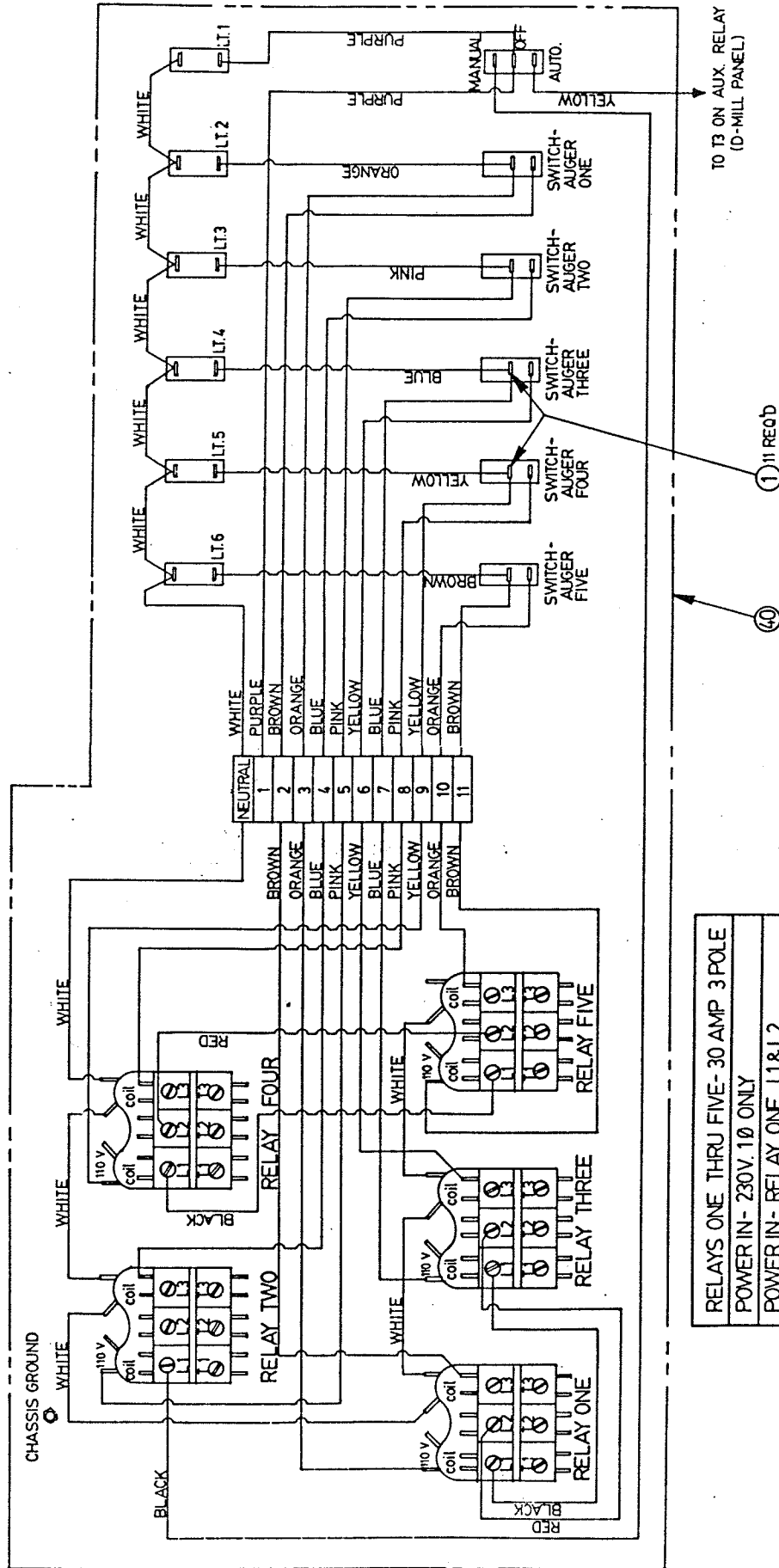
SCHMATIC
 DIAGRAM
 (GL CONTROL MODULE)

SWITCH BOX ON
 G L HOPPER

INTERNAL WIRING DIAGRAM D-MILL CONTROL PANEL

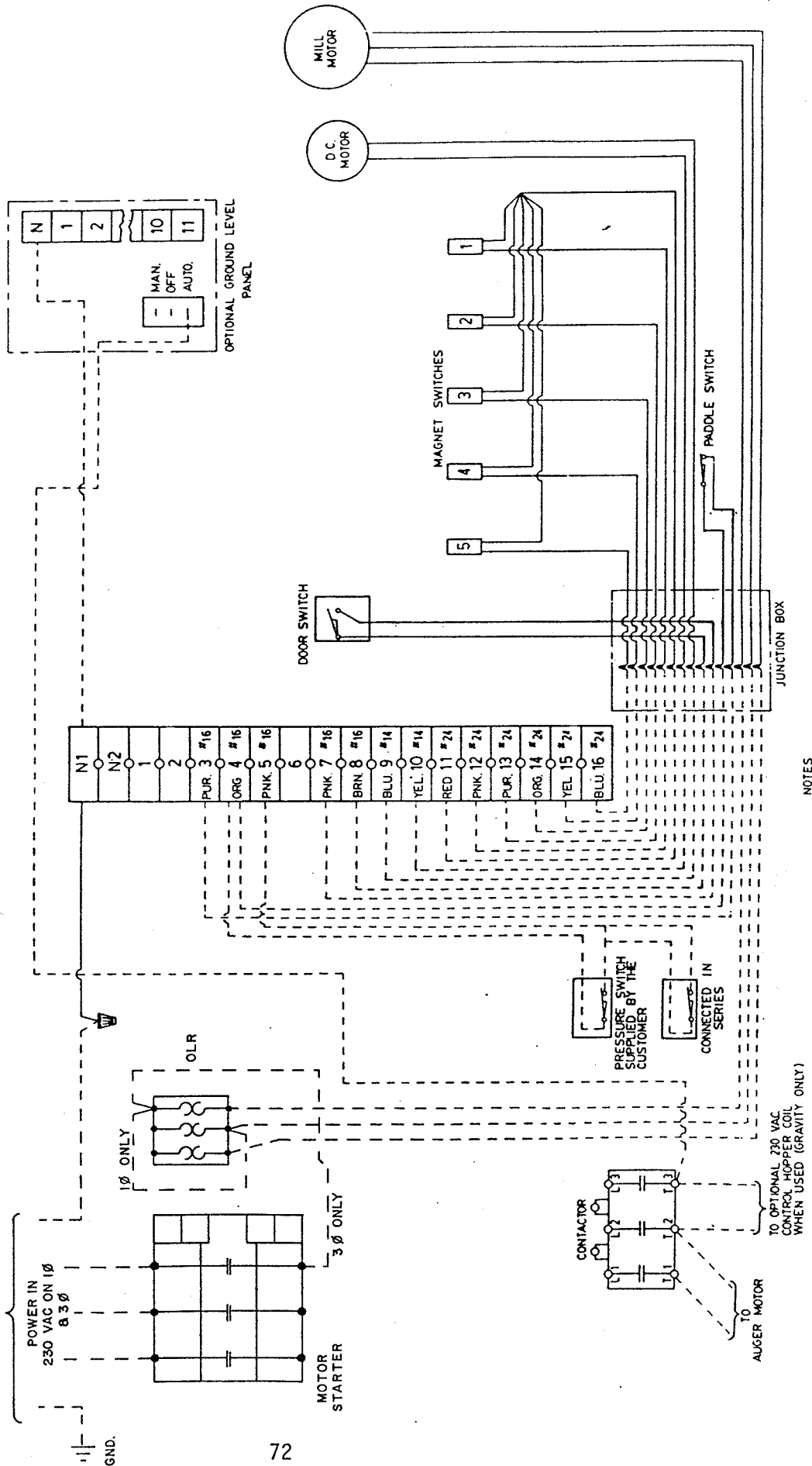


INTERNAL WIRING DIAGRAM GROUND LEVEL CONTROL PANEL



RELAYS ONE THRU FIVE- 30 AMP 3 POLE
POWER IN- 230V. 1Ø ONLY
POWER IN- RELAY ONE, L1&L2
POWER IN- RELAY TWO, L1&L2
POWER IN- RELAY FOUR, L1&L2
230 V. 1Ø - POWER OUT TO AUGER MOTORS FROM T1 & T2 CONTACTS ON EACH RELAY
POWER INTO RELAYS THREE & FIVE IS FACTORY WIRED THRU RELAYS ONE & FOUR

EXTERNAL WIRING DIAGRAM D - MILL 1Ø & 3Ø

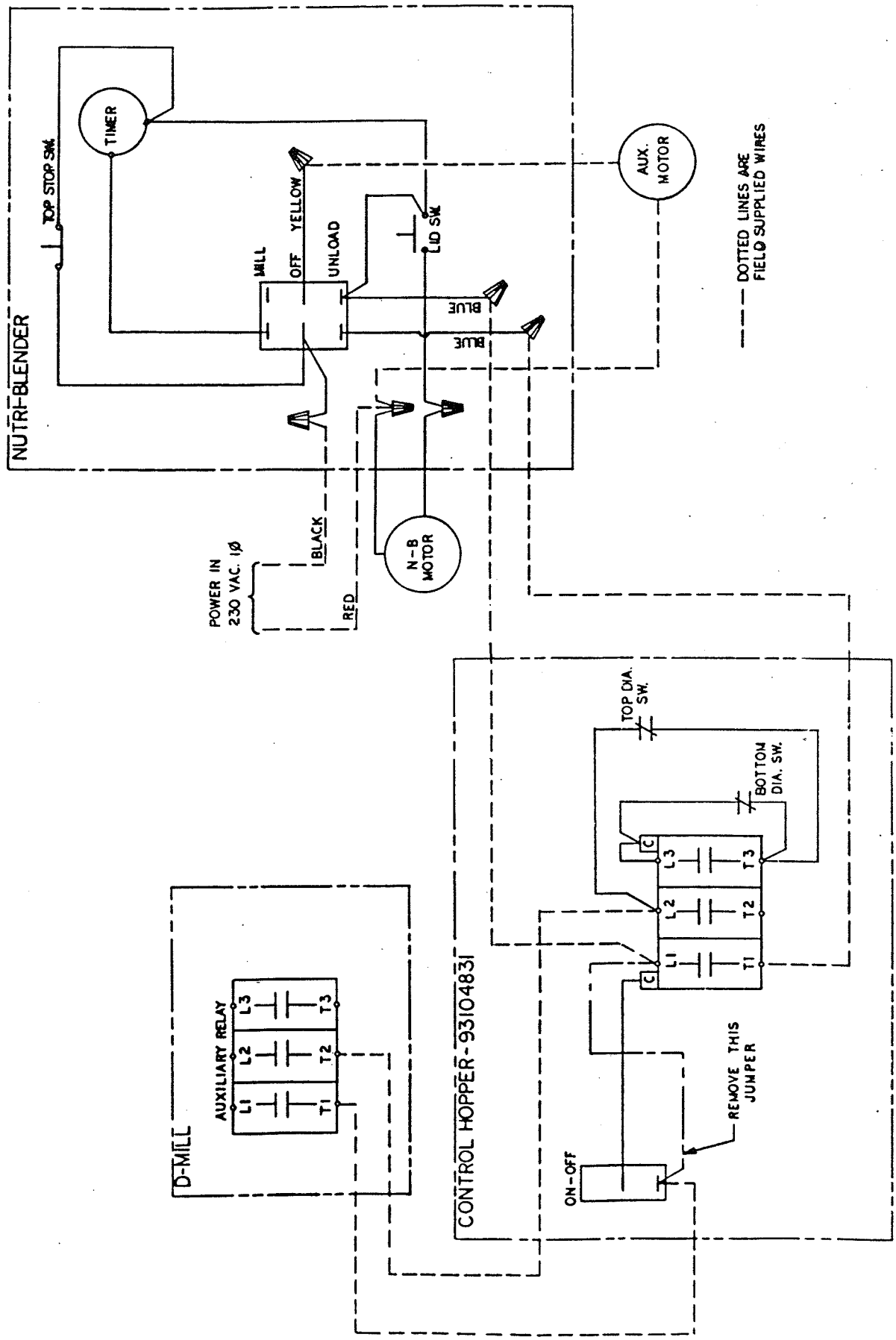


NOTES
 1 WIRES SHOWN DASHED ARE CUSTOMER SUPPLIED (EX. ---)
 2 WIRES SHOWN SOLID ARE FACTORY SUPPLIED (EX. ———)

TO OPTIONAL 230 VAC CONTROL HOPPER COIL WHEN USED (GRAVITY ONLY)

"D" MILL WIRING DIAGRAM

WITH NUTRI-BLENDER & CONTROL HOPPER CONNECTIONS

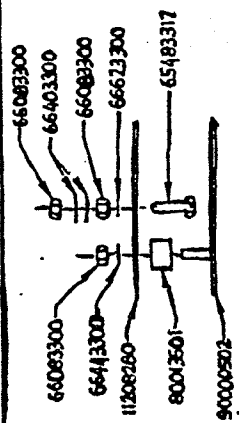




SPECIAL SECTION FOR
ALCOHOL OR "GP"
MILL

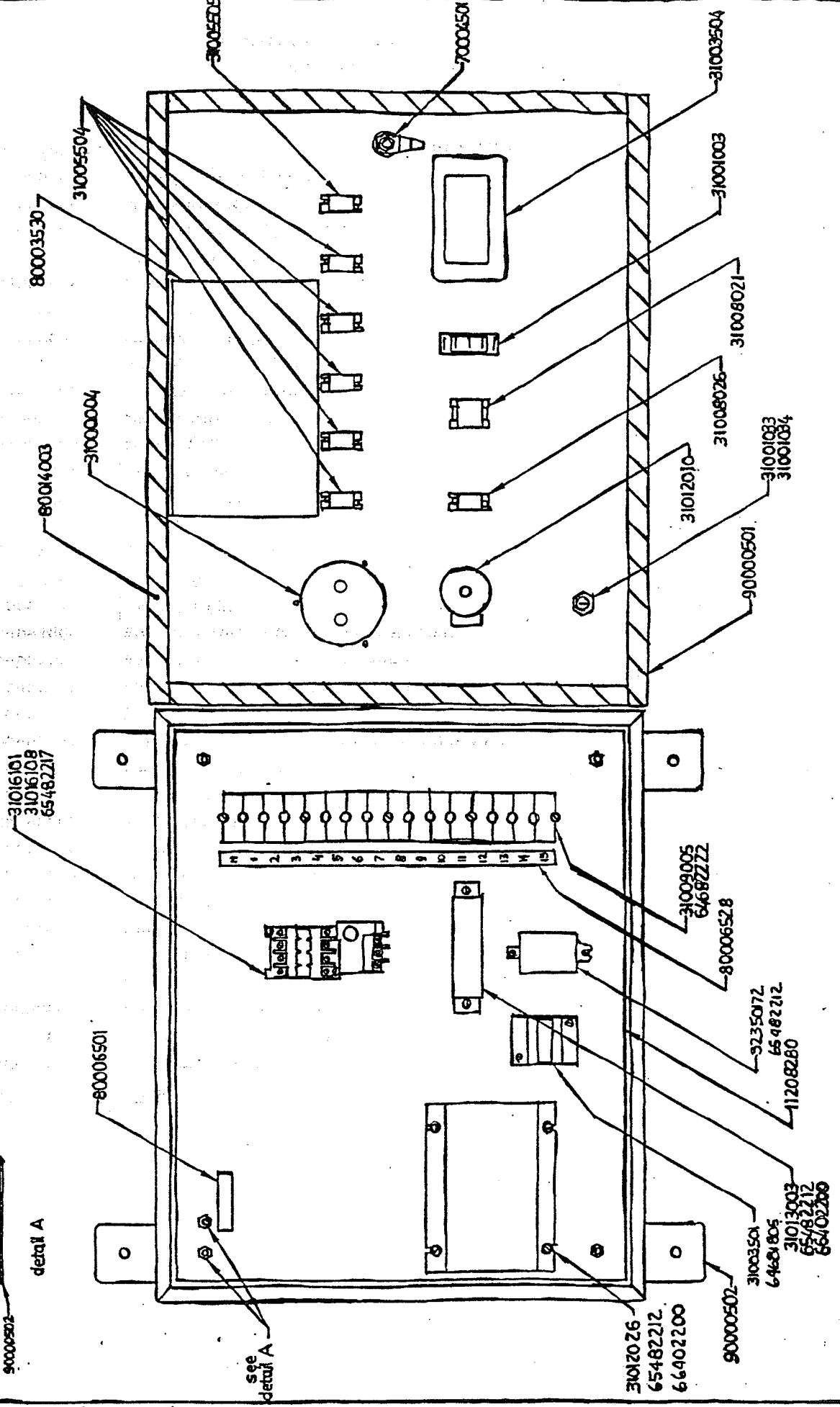
**CONTROL BOX (91000194)
PARTS LIST**

PART NUMBER	DESCRIPTION	QTY
11208280	Auxiliary Panel Insert	1
31000004	Amp Meter (50 A)	1
31001003	Circuit Breaker 110 V. 5 Amp	1
31001033	Panel - Mounted Fuse Holder	1
31001034	Fuse	1
31003501	Hour Meter	1
31003504	Counter - Large	1
31005504	Indicator Light (Green) 110 V.	5
31005505	Indicator Light (Amber) 110 V.	1
31008021	Start & Stop Switch	1
31008026	Switch SPDT	1
31009005	Terminal Block	16
31012031	D.C. Controller	1
31013003	Transformer - 100 Amps	1
31016101	A.C. Contactor 16 Amp	1
31016108	Overload Relay 3.8 - 6 A	1
32350172	Control Relay	1
64681805	#6 - 32 x 1/4" M.S.T.C. Slot Pan Head	2
64682222	#8 - 32 x 1" S.T. Machine Screw	5
65482212	#8 - 32 x 1/2" S.T. Machine Screw	11
65482217	#8 - 32 x 3/4" Machine Screw	2
65483317	1/4" - 20 x 3/4" S.T. Hex Hd. Machine Screw	1
66083300	Hex Nut - 1/4" - 20	6
66402200	#8 Flat Washer	6
66443300	1/4" Lockwasher	4
66623300	Type A External Tooth Lockwasher 1/4"	1
70004501	Door Latch	1
80006501	Ground Label	1
80006528	Decal - Terminal Block	1
80013501	D - Hub Spacer	4
80014003	Sponge Rubber	74"
90000501	Front Panel Welded Assy.	1
90000502	Control Box Welded Assy.	1
66403300	1/4" Flat Washer	1
31012010	Speed Pot Assy	1

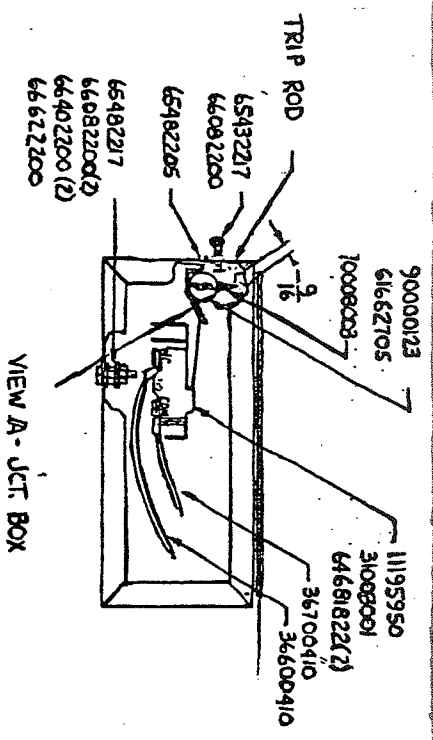


detail A

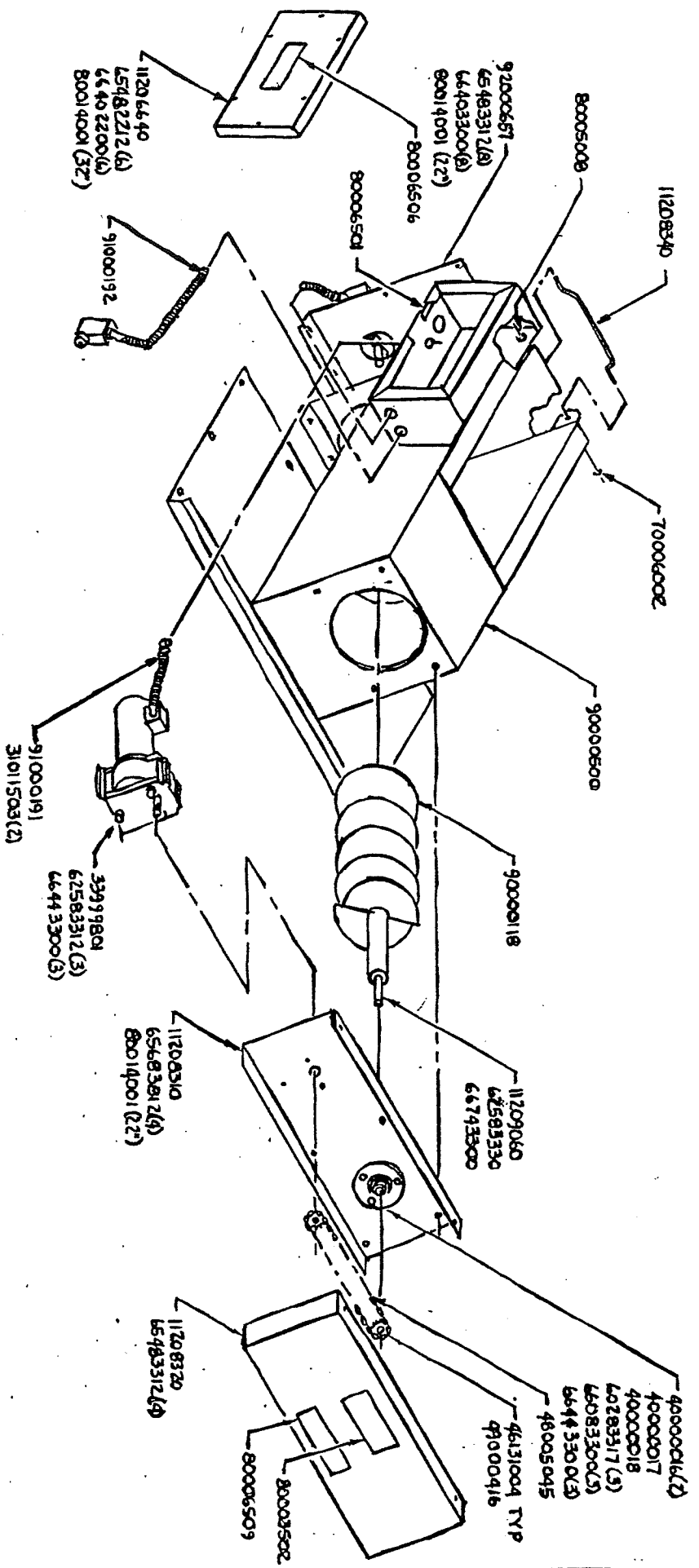
see
detail A



- 66083300
- 66403300
- 66083300
- 66613300
- 66613300
- 80013501
- 65483317
- 9000502
- 31016101
- 31016108
- 65482217
- 80014003
- 31000004
- 80003530
- 31005504
- 31005505
- 70004501
- 31003501E
- 31001003
- 31008026
- 31008027
- 31012010
- 90000501
- 31001033
- 31001034
- 31009005
- 64682222
- 80006528
- 92350172
- 65482212
- 11208280
- 31003501
- 10550005
- 64682212
- 31013003
- 65482212
- 65482212
- 65482212
- 65482212
- 31017026
- 65482212
- 66402200
- 90000502



VIEW A - UCR BOX

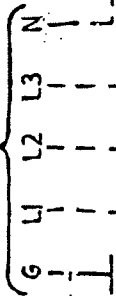


METERING HOPPER ASSEMBLY - SINGLE COMPT. (92000691)

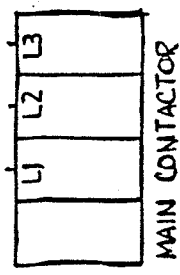
PARTS LIST

PART NUMBER	DESCRIPTION	QTY
11195950	Insulation - Switch	1
11206640	Junction Box Cover	1
11208310	Mount Plate - Gearmotor	1
11208320	Drive Cover	1
11208340	Trip Rod	1
11209060	End Shaft	1
31008001	Microswitch	1
36600410	Lead Ass'y. #16 Orange 1T x 10"	1
36700410	Lead Ass'y. #16 Purple 1T x 10"	1
40000016	Stamping	2
40000017	Roller Bearing	1
40000018	Lockcollar	1
46131004	Sprocket	2
48005045	#40 Roller Chain - 1/2" Pitch x 45 Pitches	1
60283317	Round Hd. Sq. Neck Bolt 1/4" - 20 x 3/4"	3
61662705	Set Screw #10 - 32 x 1/4"	1
62583312	Cap Screw 1/4" - 20 x 1/2"	3
62583330	Cap Screw 1/4" - 20 x 1 3/4"	1
64681822	M.S.T.C. Type D Slot Pan Head #6 - 32 x 1"	2
65482205	M.S.T.C. Type D Slotted H.H. #8 - 32 x 1/4"	1
65482212	M.S.T.C. Type D Slotted H.H. #8 - 32 x 1/2"	6
65482217	M.S.T.C. Type D Slotted H.H. #8 - 32 x 3/4"	2
65483312	M.S.T.C. Type D Slotted H.H. 1/4" - 20 x 1/2"	12
65483812	T.F. Screw Hex. Serr. Wash. Hd. 5/16" x 1/2"	4
66082200	Hex Nut #8 - 32	3
66083300	Hex Nut 1/4" - 20	3
66402200	Flat Washer #8	8
66403300	Flat Washer 1/4"	8
66443300	Lockwasher 1/4"	6
66622200	Lockwasher - Type A Ext. Tooth - #8	1
66743300	Hex Locknut 1/4" - 20	1
70006002	Push - on Fastener	1
70008003	Spring	1
80005008	Grommet	1
80006501	Label - "Ground Connection"	1
80006506	Warning Label	1
80006509	Danger Label	1
80014001	Polyurethane Tape	76"
90000118	6" Auger Assembly	1
90000123	Actuator Assembly	1
90000500	Metering Hopper Welded	1
91000192	Wire Harness - Door Microswitch	1
33999801	Gearmotor	1
92000687	Counter Switch Assembly	1
49000416	Key 3/16 Sq x 1"	1
31011503	Wire Nut	2
91000191	Wire Harness - DC Motor	1
80003502	Label - Mix Mill	1

POWER IN
230 VAC - 3Ø



#16 WHI.

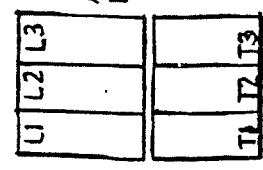


MAIN CONTACTOR

OVERLOAD
RELAY

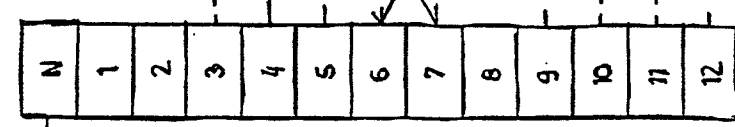


TC
MILL MOTOR



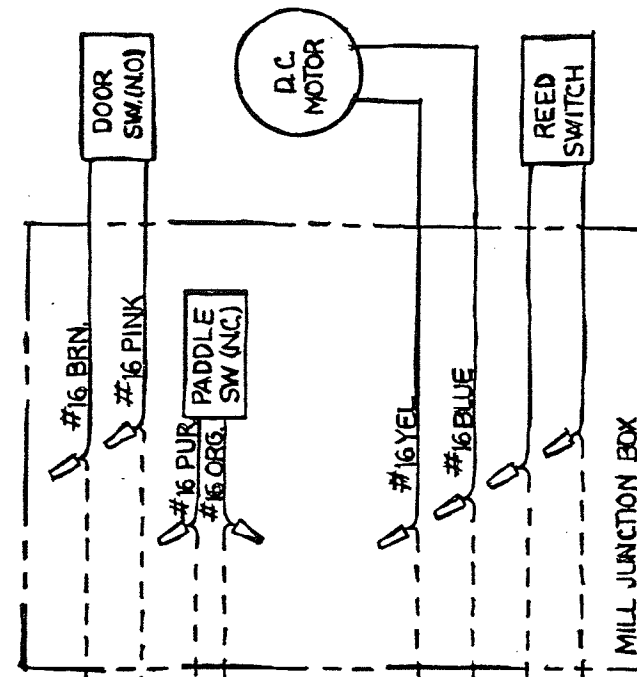
AUXILIARY
MAG STARTER

TO DISCHARGE AUGER
MOTOR



BIN LEVEL
SW (NC)

REMOVE JUMPER WIRE
WHEN BIN LEVEL SW. IS USED
WIRE MULTIPLE SWITCHES
IN SERIES.



DOOR
SW (NO)

D.C.
MOTOR

REED
SWITCH

MILL JUNCTION BOX

NOTE:
ALL WIRES SHOWN DOTTED ARE TO
BE FIELD SUPPLIED.

