

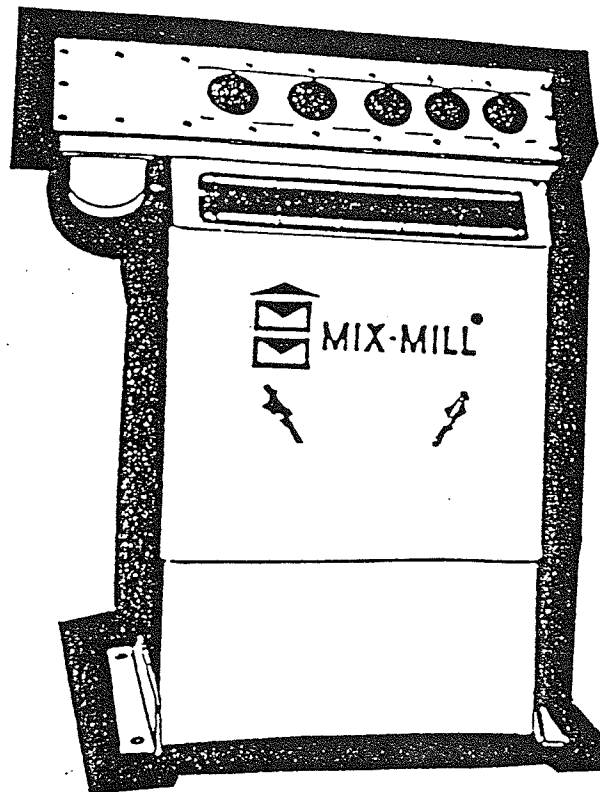
MIX-MILL<sup>®</sup>

BLOUNT AGRI/INDUSTRIAL CORP.

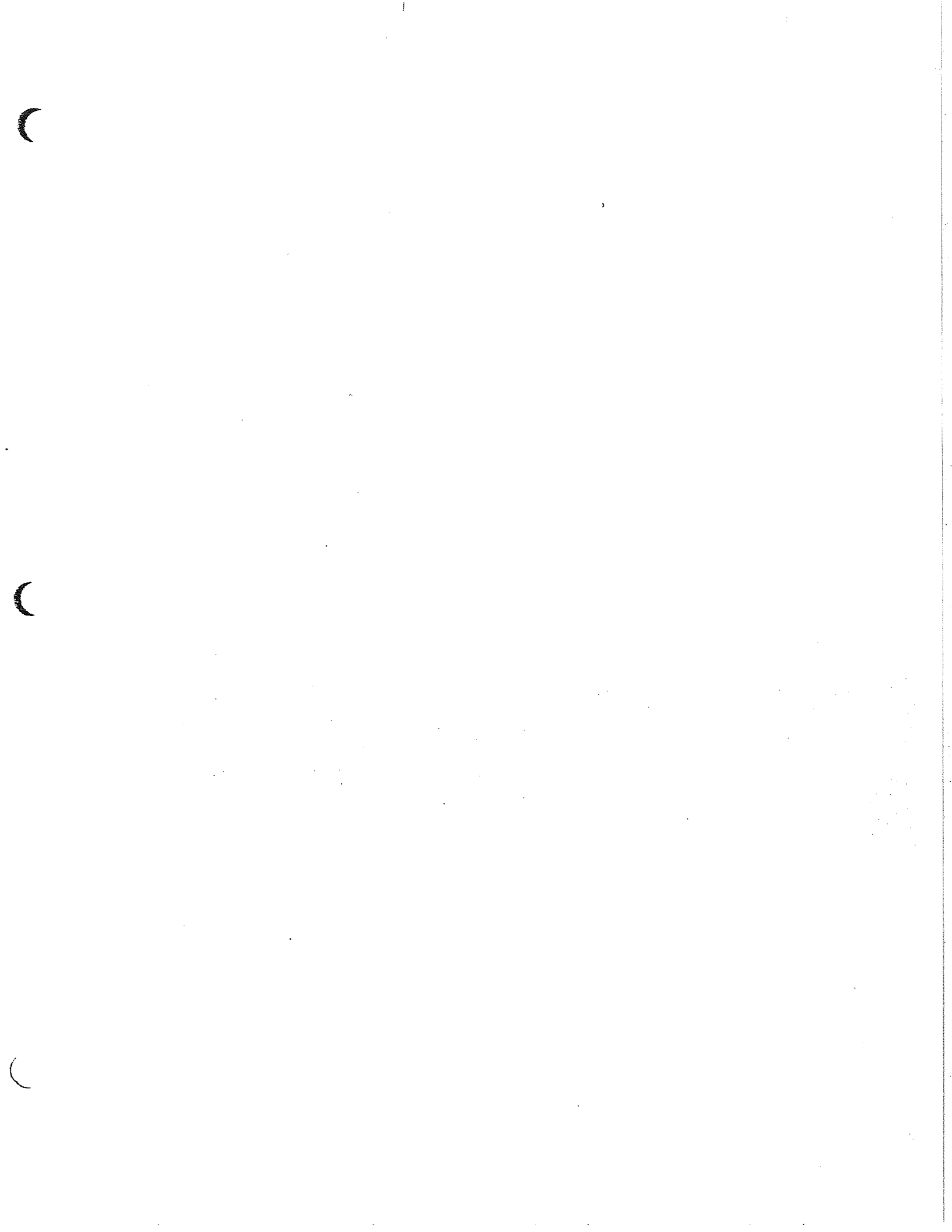
INSTRUCTION MANUAL

MODEL D MILL

W/ CONVERSION FROM SOLID STATE TO STD. D CONTROL PANEL



99960155



## WARRANTY CERTIFICATE

Blount Agri/Industrial Corp. warrants each new product of its manufacture when purchased from an authorized representative for a period of one year from the date of shipment. This warranty shall apply to all parts and workmanship (except products or components not manufactured by Blount Agri/Industrial Corp.) which shall appear to Blount Agri/Industrial Corp. to have been defective in manufacture. Blount Agri/Industrial Corp.'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 (upon request) for inspection and parts intended to replace those acknowledged by Blount Agri/Industrial Corp. to be defective. This warranty shall not apply and shall be void under the following conditions:

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

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

Blount Agri/Industrial Corp. 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 Blount Agri/Industrial Corp., and may not be altered, modified or changed in any way except in writing.

Blount Agri/Industrial Corp. will not be liable for any consequential damages, loss, or expenses arising in connection with the use or the inability to use the product for any purpose whatever. Our maximum liability shall not in any case exceed the cost of replacing defective parts if returned to us within one year from date of shipment.

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

## WARRANTY CLAIMS

Claims for warranty should be directed to our Sales Department, 805 South Decker Drive, Bluffton, IN 46714 or phone (219) 824-3400. The machine serial number, part number and description of the failed product or component and a brief description of the type of failure is required to file a warranty claim.

Contact our Sales Department before returning warranty items for a RMO (Returned Material Order) which must accompany all returned items. All returned items are to be shipped freight pre-paid and credit will be issued after inspection and acknowledgement of warranty defect by the manufacturer. Blount will pass on to the purchaser/ user only such warranty as it shall receive on products or components not of its manufacture from the manufacturer or supplier thereof.

# BE A SAFE OPERATOR

## AVOID ACCIDENTS



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



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



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



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



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



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



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



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



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

TYPICAL SAFETY DECALS

 **DANGER**

KEEP COVER SECURED  
AT ALL TIMES

LE COUVERCLE DOIT ETRE  
ASSUJETTI EN TOUT TEMPS


DISCONNECT POWER BEFORE  
WORKING ON EQUIPMENT


COUPER LE COURANT AVANT  
DE TRAVAILLER SUR L'APPAREIL

80003568

**OPERATOR**  
**WARNING**

TO PREVENT SERIOUS BODILY INJURY



 **READ CAREFULLY!**

1. Do not attempt to install, connect power to, operate or service machine without proper instruction and until you have been thoroughly trained in its use by your employer.
2. Do not attempt to work on, clean or service this equipment or open or remove any protective cover, guard, grate or maintenance panel until the POWER has been TURNED OFF and LOCKED OUT, and the machine has come to a COMPLETE STOP.

**DO NOT REMOVE OR OBSCURE  
THIS WARNING SIGN**

F80003538

**CAUTION**

**BE SURE DRUM  
DOOR IS LATCHED  
BEFORE OPERATING**

**WARNING**

**OPEN MAIN SWITCH BEFORE  
WORKING ON EQUIPMENT**

**DANGER!**

**KEEP HANDS CLEAR**

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## SECTION I - INTRODUCTION AND SPECIAL INSTRUCTIONS

Conversion of the Solid State control to a D mill control panel will cause the loss of some functions and may even require some minor physical changes.

The following functions of the Solid State D mill control panel will not be available after the panel is converted to a D mill panel:

1. Automatic calibration calculations - Knob settings must now be calculated by the user. See SECTION III of this manual for calibration instructions.
2. Automatic start with the low level bin switch - The low level bin level switch is disabled, and the mill is started manually.
3. Automatic control of mill motor load - The D.C. motor speed is controlled manually.
4. Ingredient usage display in pounds - The counters used in the standard D panel display only auger revolutions (or 'counts'). The counts on the counters must be manually converted to pounds. See SECTION III of this manual for conversion of 'counts' to pounds.

Minor physical changes are required in some cases in order to install the conversion package.

1. Solid State panels interlocked with the MIX-MILL Liquid Injector Control panel must be changed. This interlock uses the auxiliary contacts on both magnetic starters. The interlock wiring must be changed so that the auxiliary contacts may be used for the converted D mill circuitry. See SECTION VII of this manual for the new wiring interlock diagram.

2. The Solid State D control panel was supplied with one auxiliary magnetic starter for the cross auger motor. Space was allowed for additional auxiliary starters in the upper right hand corner of the control panel. Any additional auxiliary starters must now be moved out of the control panel to make room for the D.C. motor control. Mount the additional starters in a separate enclosure and make any wiring connections the same as before the starters were moved.

Some components and wire routing will not be identical to the standard D mill control panel. Always identify the mill as a 'D mill converted from a Solid State mill' in any correspondence for service or replacement parts.



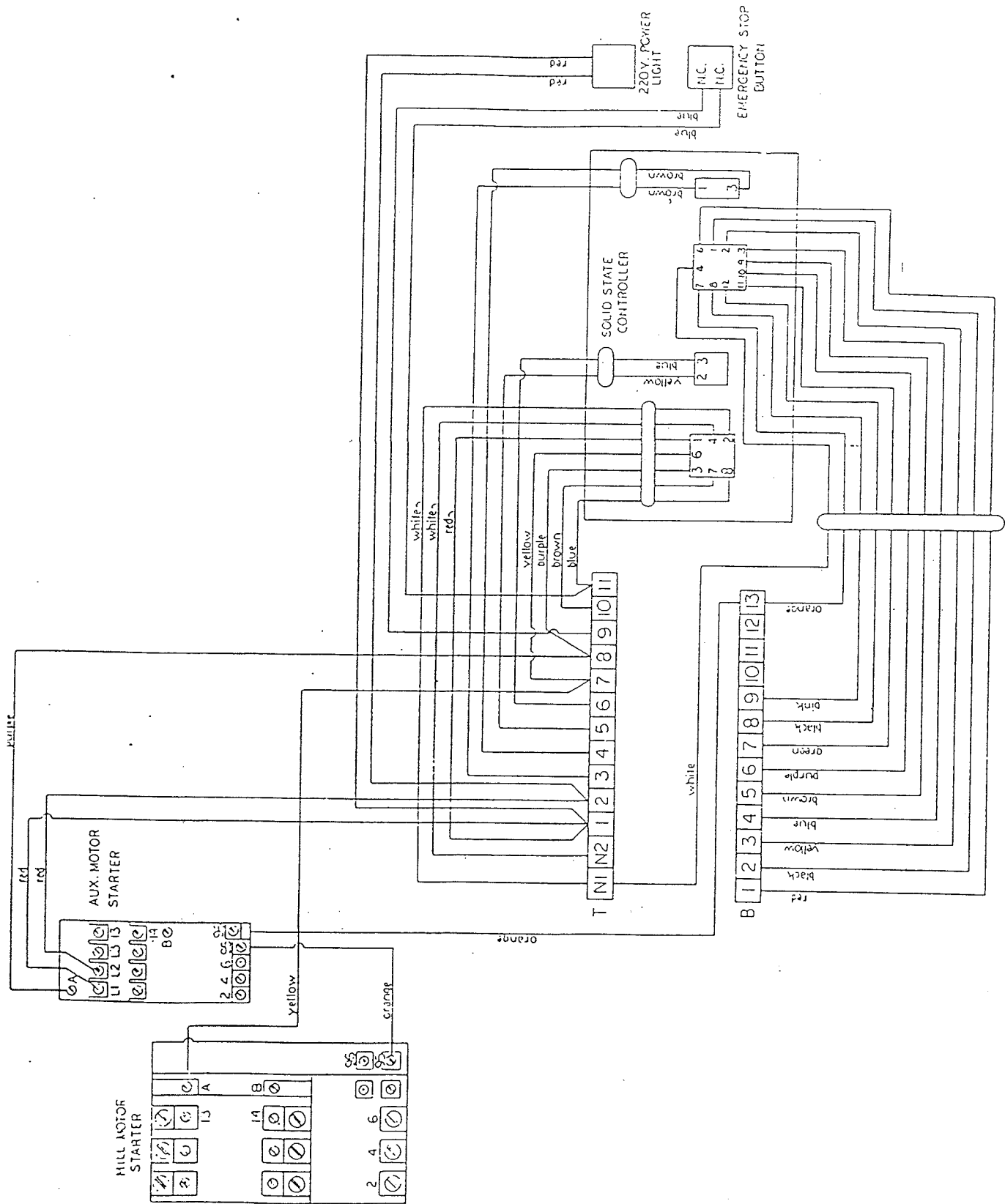


Figure 1 - Wires to remove in steps 1 and 2

## SECTION II - INSTALLATION OF THE CONVERSION PACKAGE

The Solid State Conversion Package contains three major parts/assemblies:

1. A front door assembly complete with all components and wiring.
2. A D.C. Controller (part no. 31012031)
3. A plastic bag containing 13 lead wires, four #8-32x1/2" screws, and four #8 flat washers.

The following installation instructions are divided into five steps. Illustrations are provided to go along with each step.

STEP 1 - Refer to the drawing on page 2.

Disconnect the 26 wires which connect the original front door assembly to the control box chassis. This includes all wires connected to the solid state controller, power light, and the stop button on the door. All 26 wires are connected to the terminal blocks on the chassis. Remove the original front door (save the hinge screws for the new door).

STEP 2 - Refer to the drawing on page 2.

Remove the following six wires from the control box:

1. Orange wire connected to terminal 95 on the mill motor starter and terminal 95 on the auxiliary motor starter.
2. Yellow wire connected to terminal A (coil) on the mill motor starter and terminal 7 on the top terminal strip (T7).
3. Orange wire connected to terminal 96 on the auxiliary motor starter and terminal 13 on the bottom terminal strip (B13).
4. Purple wire connected to terminal A (coil) on the auxiliary motor starter and terminal 8 on the top terminal strip (T8).
5. Red wire connected to terminal L1 on the auxiliary motor starter and terminal 1 on the top terminal strip (T1).
6. Red wire connected to terminal L2 on the auxiliary motor starter and terminal 2 on the top terminal strip (T2).

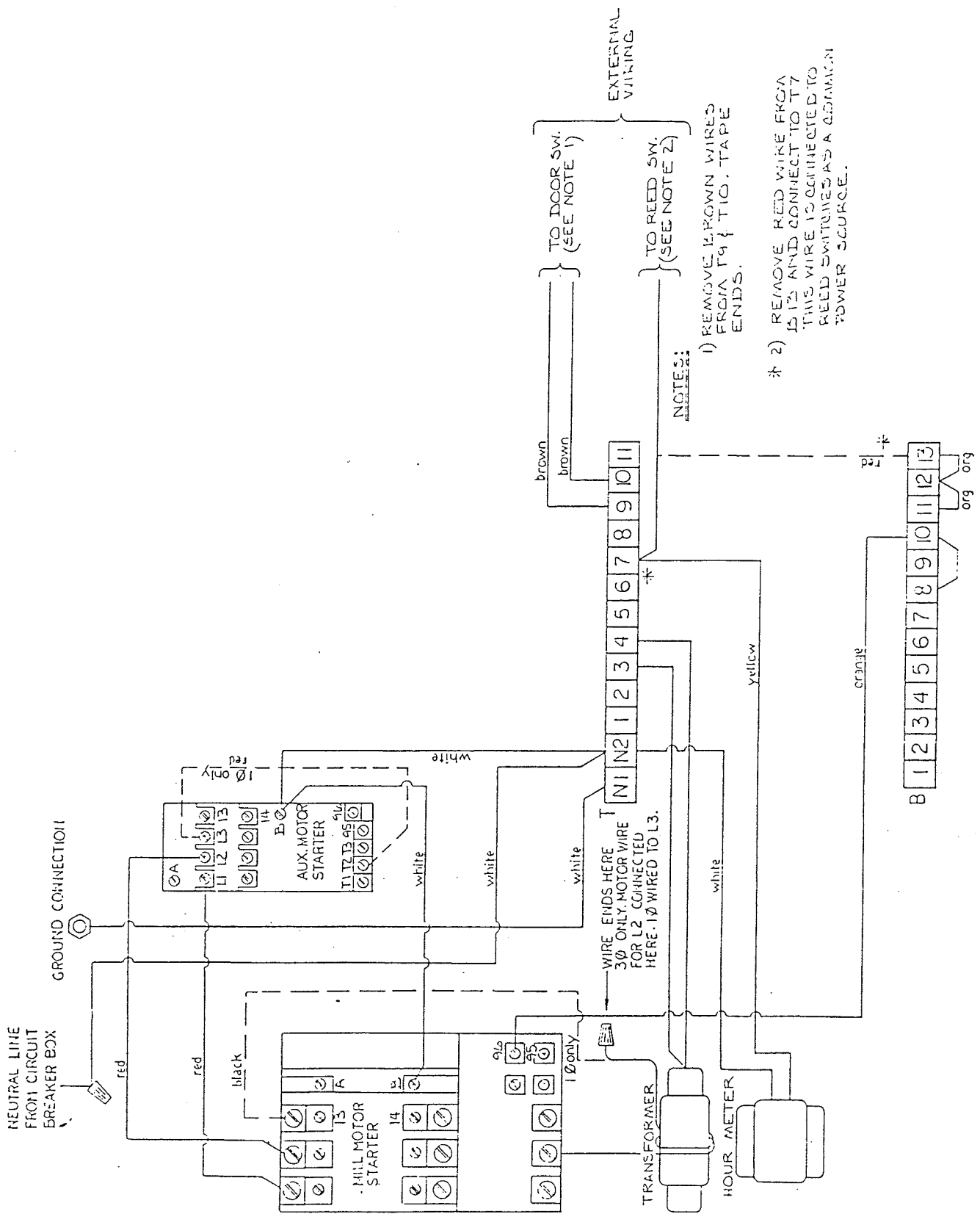


Figure 2 - Wires to move in step 3 (and wires remaining)

STEP 3 - Refer to the drawing on page 4.

Wires which connect or interlock some external devices to the control panel must now be moved or disconnected.

A single wire connected to terminal 13 on the bottom terminal strip (B13) supplies power to all the counter switches on the back of the mill. Disconnect this wire and reconnect it to terminal 7 on the top terminal strip (T7).

One pole of a double pole mill door switch is connected to terminals 9 and 10 on the top terminal strip (T9 & T10). This half of the switch will not be used by the converted panel, and the terminal blocks are needed for the conversion. Remove the two wires and tape them together to insulate them from live voltage sources in the panel.

A low level bin level switch may be connected to terminals 7 and 12 on the bottom terminal strip (B7 & B12). This switch would have been used to automatically start the mill when the feed tank was empty. This function will not be available with the converted panel and the terminal blocks are needed for the conversion. Remove the two wires and tape them together to insulate them from live voltage sources in the panel.

If the control panel is interlocked with a Mix-Mill Liquid Injector, the interlock wiring must be modified. Five wires would have been used for the original interlock wiring. One wire connects terminal 2 in the Liquid Injector panel to terminal 13 on the mill motor starter. Disconnect the wire from the motor starter and tape the end until it can be reconnected. Another wire connects terminal 3 in the Liquid Injector panel to terminal 14 on the auxiliary motor starter. Disconnect the wire from the motor starter and tape the end until it can be reconnected. A third wire would connect terminal 14 on the mill motor starter to terminal 13 on the auxiliary motor starter. Remove this wire and discard it. The fourth and fifth wires are not changed. Refer to the diagram on page 55 to reconnect the wires which were removed from the motor starters.

#### STEP 4

The original solid state control was supplied with one auxiliary motor starter. Additional space was provided in the panel to the right of this starter for additional auxiliary starters. This space is now required for the D.C. controller provided with the conversion package. Remove any additional auxiliary starters, mount them in an enclosure adjacent to the control panel, and make all wiring connections the same as before the starters were moved.

STEP 4 (continued)

Locate four mounting holes for the D.C. controller in the upper right hand corner of the control box chassis using the template provided on page 7. Drill the mounting holes using a 9/64" diameter drill. Mount the D.C. controller with the #8 screws and flat washers provided in the conversion package.

STEP 5 - Refer to the drawing on page 9.

Thirteen lead wires are provided with the conversion package to complete step 5. Each wire has number markers on at least one end to aid in making the connections. Make the following connections:

1. 12" orange wire from terminal A (coil) on the mill motor starter to terminal 95 on the same starter.
2. 18" purple wire from terminal 14 on the mill motor starter to terminal 6 on the bottom terminal strip (B6).
3. 9" brown wire (bare ends) from terminal A (coil) on the auxiliary motor starter to terminal 95 on the same starter.
4. 12" black wire from terminal 13 on the auxiliary motor starter to terminal 1 on the top terminal strip (T1).
5. 9" brown wire from terminal 96 on the auxiliary starter to terminal 8 on the top terminal strip (T8).
6. 4" white wire from terminal N1 on the top terminal strip (TN1) to terminal N2 on the same strip (TN2).
7. 6" orange wire from 'FOT LO' on the D.C. controller to terminal 9 on the top terminal strip (T9).
8. 7" red wire from 'WIPER' on the D.C. controller to terminal 10 on the top terminal strip (T10).
9. 7" white wire from 'FOT HI' on the D.C. controller to terminal 11 on the top terminal strip (T11).
10. 5" yellow wire from '+ ARM' on the D.C. controller to terminal 6 on the top terminal strip (T6).
11. 5" blue wire from '- ARM' on the D.C. controller to terminal 5 on the top terminal strip (T5).
12. 5" red wire from 'AC LINE' on the D.C. controller to terminal 7 on the top terminal strip (T7).
13. 10" white wire from 'AC LINE' on the D.C. controller to terminal N1 on the top terminal strip (TN1).

LINE UP WITH TOP OF INSERT PANEL

1. REMOVE PAGE FROM MANUAL.
2. CUT OUT TEMPLATE ALONG HEAVY BLACK LINE.
3. CUT OUT TOP RH CORNER OF TEMPLATE (TO CLEAR MOUNTING HDW. OF CONTROL PANEL INSERT).
4. TAPE TEMPLATE TO UPPER RH CORNER OF CONTROL PANEL INSERT.
5. CENTER PUNCH FOUR HOLE CENTERS
6. DRILL FOUR HOLES  $9/64"$  DIA.

CUT OUT  
CORNER

$3 \frac{1}{8}"$

$3 \frac{3}{4}"$

LINE UP WITH RIGHTSIDE OF INSERT PANEL

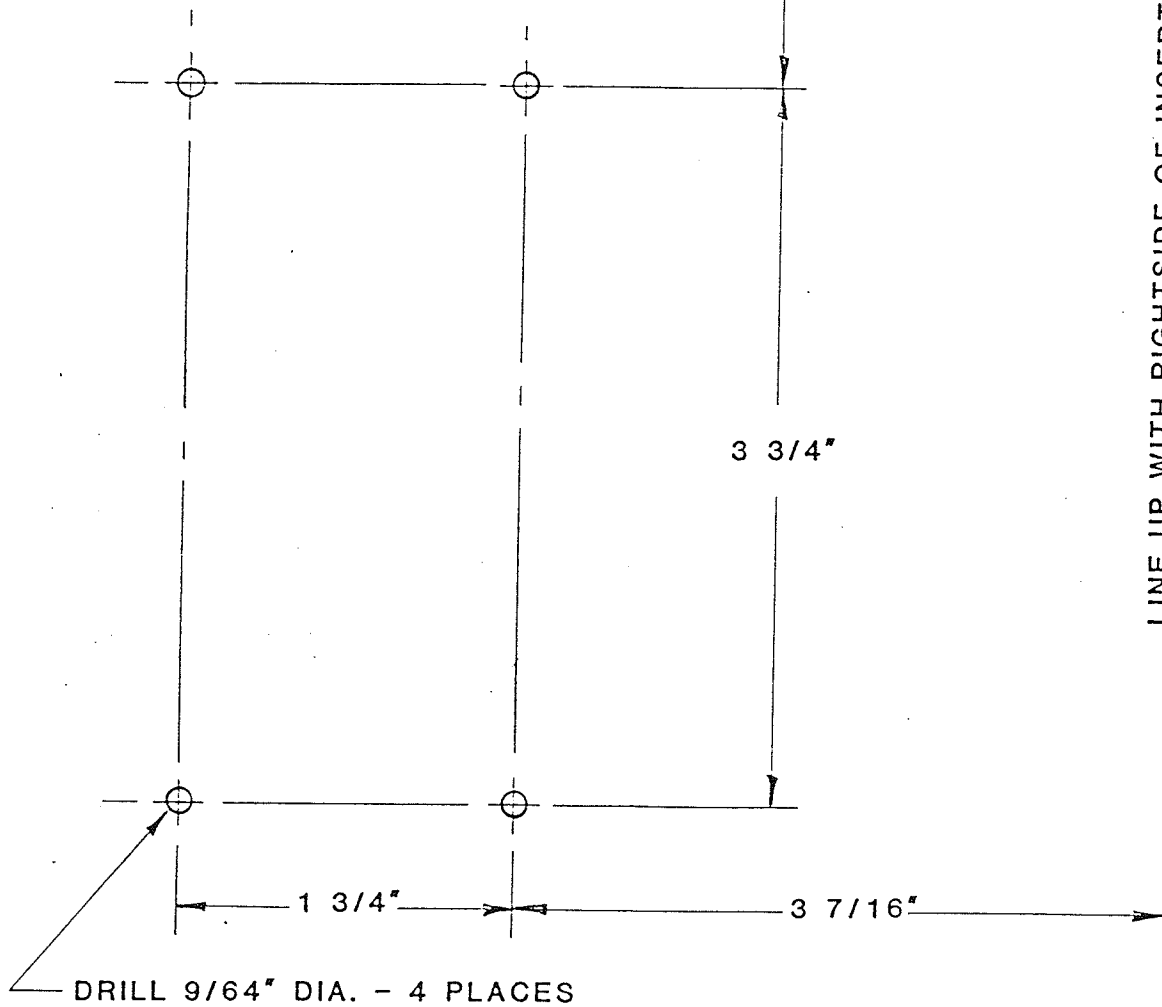


FIGURE 3 - Template for D.C. Controller Location



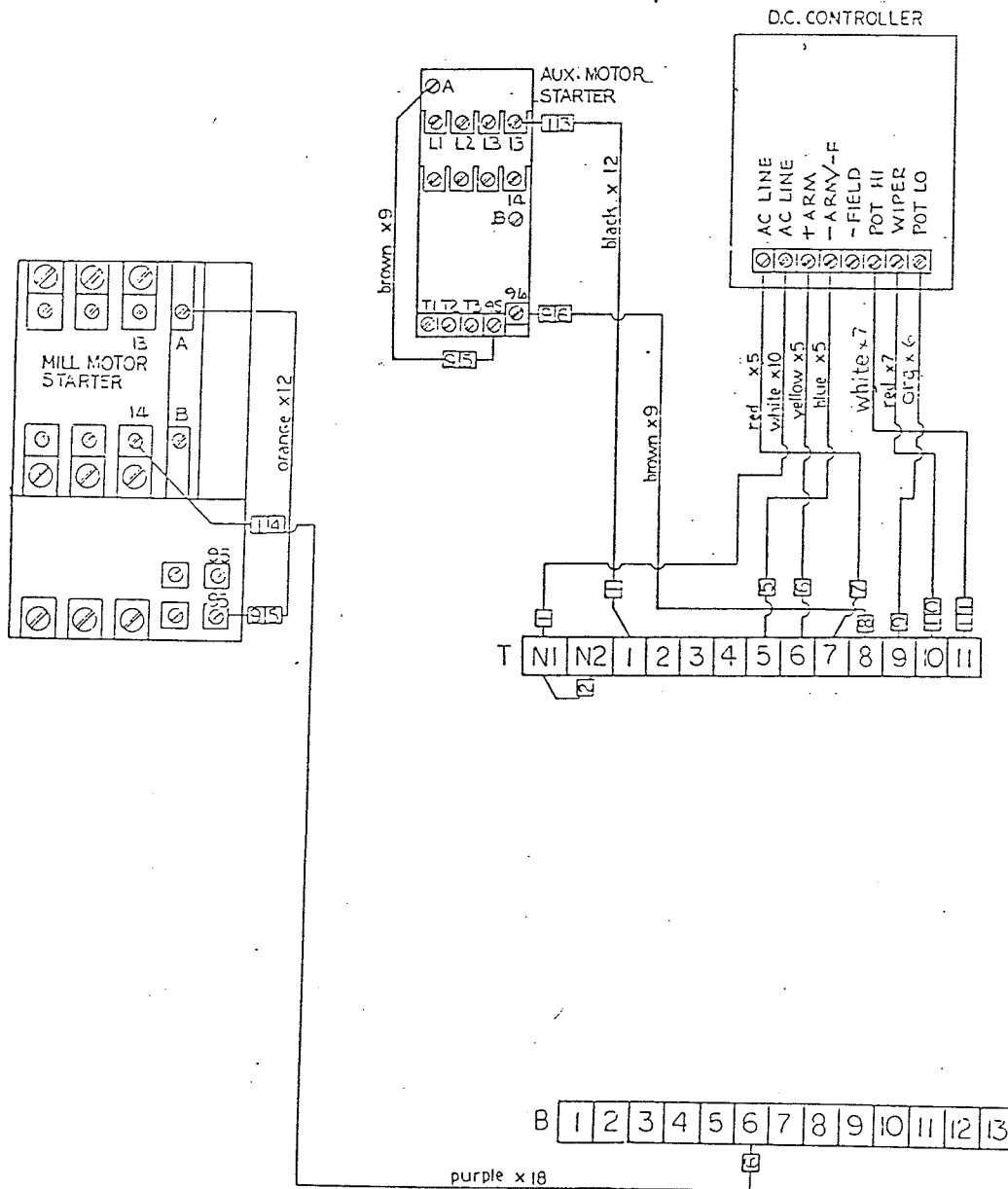


Figure 4 - Wires to add in step 6



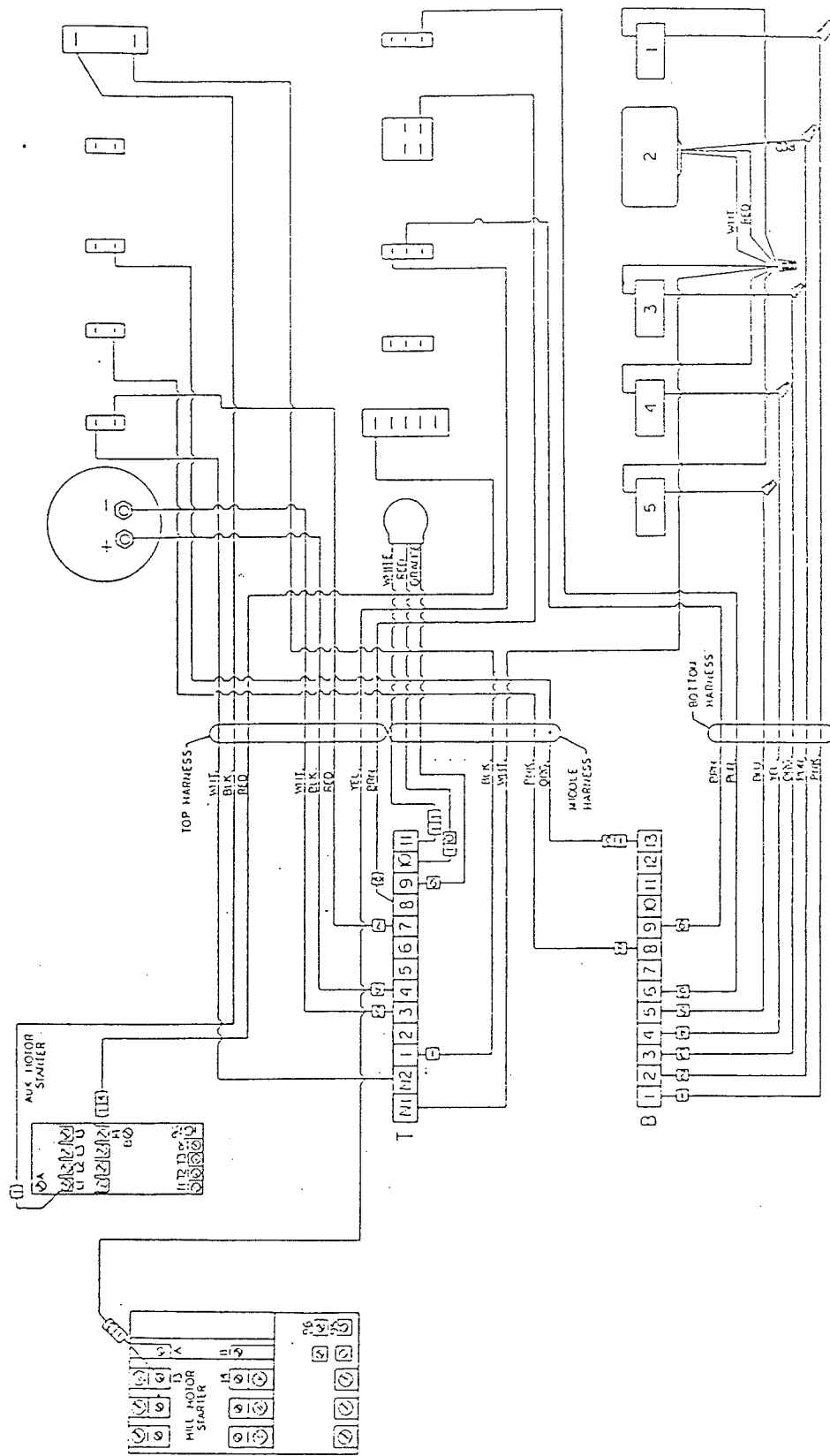


Figure 5 - Wire harness connection in step 6

Step 6 - Refer to the drawing on page 10.

Fasten the door assembly from the conversion pkg. on the control panel chassis using the screws removed with the original door.

The new door assembly has three wire harnesses which will extend into the control box. Every wire except for two white wires have number markers which correspond to the terminals they are connected to. Terminal block designations will be abbreviated in this section for simplicity. (Example: 'T6' for terminal 6 on the top terminal strip, or 'B9' for terminal 9 on the bottom terminal strip.)

Make the following wire connections:

Bottom harness

1. Pink wire on terminal block B1
2. Long purple wire on terminal block B2
3. Orange wire on terminal block B3
4. Yellow wire on terminal block B4
5. Blue wire on terminal block B5
6. Short purple wire on terminal block B6
7. Brown wire on terminal block B9

Middle harness

8. Long orange wire on terminal block B13
9. Pink wire on terminal block B8
10. Long white wire on terminal block TN1
11. Black wire on terminal block T1
12. Short orange wire on terminal block T9
13. Red wire on terminal block T10
14. Short white wire on terminal block T11

Top harness

15. Brown wire on terminal block T8
16. Yellow wire on terminal 13 of mill motor starter

STEP 6 (continued)

17. Short red wire (with terminal) on terminal block T7
18. Short black wire (with term.) on terminal block T4
19. Short white wire on terminal block T3
20. Long red wire (no term) on terminal 14 of auxiliary motor starter
21. Long black wire (no term) on terminal L1 of auxiliary motor starter
22. Long white wire on terminal block TN2

The conversion of the control panel is now completed.

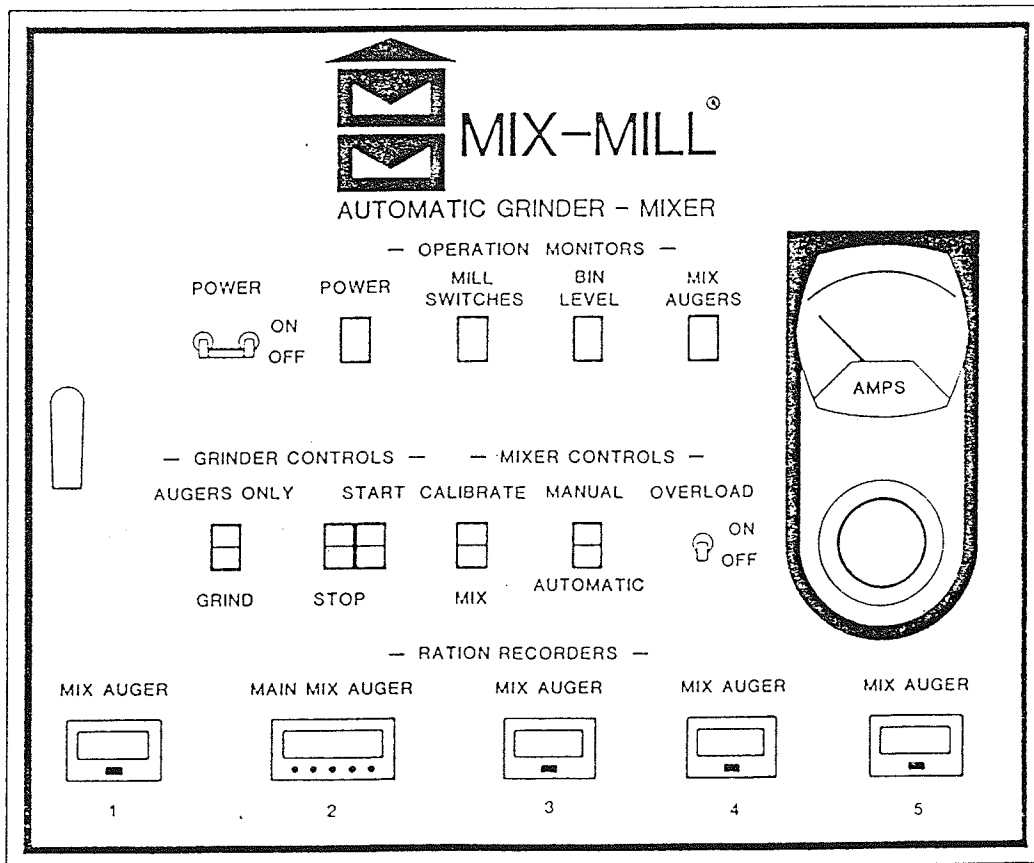


Figure 6 - Control panel front

## SECTION IV - OPERATION INSTRUCTIONS

### A. COMPONENT IDENTIFICATION AND FUNCTIONS

In order to understand the operation of the Mix-Mill, the operator needs to understand the functions of certain components of the system. The following component function descriptions are divided into control panel, mixer, and grinder components.

#### 1. Control Panel Components (refer to dwg. on page 12)

a. Power switch - The power switch is a 5 amp single pole circuit breaker which protects the entire control circuit. This switch does not disconnect all power to the control panel.

b. Indicator lights - The indicator lights are provided for quick troubleshooting when the mill will not start. In many cases a safety switch may be the only reason for the mill not starting. Each light monitors specific safety switches and circuits. If a switch or circuit is open the corresponding light will not come on. See the troubleshooting section in this manual for more information on circuits monitored by the indicator lights.

c. Ammeter - The ammeter monitors the amperage load of the mill motor. Do not operate the mill over the full load amperage (FLA) specified on the motor label.

d. Augers only/grind switch - When this switch is in the 'augers only' position only the discharge auger and proportioner augers will be started with the start switch. The mill motor will not be started. In the 'grind' position the mill motor is also started by the start switch.

e. Start/stop switches - These switches are used to start and manually stop the mill for all operations except calibration.

f. Calibrate/mix switch - This switch is used to start and stop the mill motor and proportioner augers during calibration. When the switch is placed in the 'calibrate' position the motors start without having to use the start switch. (The 'augers only/grind' switch must also be in the 'augers only' position.) When this switch is in the 'mix' position all motor starting is done with the start switch.

## Control panel components (continued)

g. Manual/automatic switch - This switch is used for batch control of the grinding process. When the switch is in the 'automatic' position the mill shuts down when the main counter counts down to zero. In the 'manual' position the mill will run indefinitely until a safety switch causes a 'shut down'.

h. Overload switch - The overload switch is a 3 amp single pole circuit breaker. This breaker protects the D.C. controller, motor and gear train. An auxiliary switch on the breaker will shut down the mill after the breaker trips (in all cases except during calibration).

i. Speed control dial - The speed dial controls the speed of the gearbox drive motor. This directly affects the amperage load of the mill motor. As ingredients are fed into the grinding chamber faster the amperage load goes up.

j. Main ingredient ration recorder (#2 counter) - This counter counts half revolutions of the #2 feeder auger and controls the automatic shutdown of the grinder for preset batch sizes. The counter counts down from a preset value to zero. When the counter reaches zero an electronic 'switch' is opened. This 'switch' is used to shut down the mill when the auto./man. switch is in the 'automatic' position. When the auto./man. switch is on 'manual' (or the cal./mix switch is on 'cal.')

the counter will continue to count down past zero - starting over at 99999. Refer to the section in this manual on calibration to convert counts on the counter to pounds of material delivered.

k. Individual ration recorders (small counters) - The small counters count revolutions of feeder augers 1 and 3 thru 5. These counters count up starting from zero, and are reset manually with the button on the front. Refer to the section in this manual on calibration to convert counts on the counter to pounds of material delivered.

## 2. Mixer components

a. Proportioner gearbox - The D mill gearbox has four 4" augers and one 6" auger. The proportion of ingredients from each auger is controlled by the knobs on the front of the gearbox. The number five auger is geared down in the gearbox to deliver one fourth as much as any other 4" auger set on the same knob setting. The entire geartrain is driven by the variable speed D.C. drive motor mounted on the gearbox.

b. Switch paddles - Each auger compartment has a weighted paddle inserted on the back side of the compartment. When the compartment runs out of material, the paddle swings up and moves the trip rod on the back of the mill. The trip rod actuates the paddle switch inside the junction box on the side of the mixer. If the paddle switch is actuated while the mill is grinding a batch of feed the mill will shut off.

c. Tramp iron magnets - A removable magnet plate assembly is installed in the front of the mixer hopper. The magnets are installed to keep steel objects out of the grinding chamber. A bolt or other large steel object will destroy both the screen and hammers in a mill.

d. Counter switches - A magnetically actuated reed switch is mounted on a bracket at the back of each proportioner auger. The actuating magnet is mounted on a shaft extension on the back end of each proportioner auger. The 6" proportioner auger has two switches and one actuating magnet. All other augers have one switch and one magnet. The magnet revolves with the auger and actuates the reed switch when it comes close.

When these switches close a 110 VAC signal is sent to corresponding ration recorders in the control panel.

### 3. Grinder Components

a. Bypass valves - On each side of the mill door is a valve to direct material flow from the compartment directly above. The valve can be set to send the material directly into the grinding chamber or to bypass the grinding chamber. Bypass abrasive ingredients (oyster shell, limestone, etc...) past the grinding chamber to eliminate unnecessary wear on the hammers and screen.

b. Door switch - A limit switch is mounted on the side of the mill housing. This switch is actuated when the mill door is closed. Any time the door is opened the power will be disconnected from the mill motor.

## B. CALIBRATION INSTRUCTIONS

Calibration of the Mix-Mill is a critical step in the feed making process. Good equipment and a careful operator are important in obtaining good calibration data.

The following equipment will be needed for calibration of the mill: a good weigh scale calibrated in tenths of a pound that will measure at least 60 pounds, a container large enough to hold a bushel of material, calibration data sheets (form no. 99960040), and a calculator.

Make the following preparations for calibration:

1. Turn the control panel power switch to 'off', and remove the mill door.
2. Remove the mill screen. For mills with the newer two piece calibration door, install the the hammer cover (a blank screen).
3. Install the calibration door and chute. Make sure that the back and sides of the door are sealed so that no material is lost when you take samples.
4. Turn the control panel power switch back to 'on' and turn the augers only/grind switch to 'grind'. Turn the speed control dial up halfway (to '5').
5. Reset all small counters to zero. Set the large counter to 100 by the following procedure: press in the black button and hold it in, press in the third white button from the right until '100' appears in the display, release the black button.
6. Weigh the container which you will use to catch samples. Record this 'container weight' in boxes F1 thru F5 on the calibration data sheet.
7. Fill out the top section and lines A and B on the calibration sheet. Fill out line C. Percentages on line C are calculated by dividing amount per ton of an ingredient (line B) by the amount per ton for ingredient #2 (B2), and multiplying the result by 100. For example  $C1 = (B1 \text{ divided by } B2) \times 100$ .

## Calibration Procedure

Refer to the sample calibration data sheet on page 18 while following these instructions.

1. Place the sample container under the number 1 mixer feeder. Set the #1 gearbox knob on 25, and set all other knobs on zero.
2. Set the cal/mix switch on the control panel to 'cal'. When the flow of ingredients becomes consistent set the cal/mix switch back to 'mix'. Empty the sample container and reset the counter to zero.
3. Place the sample container back under the mixer feeder and set the cal/mix switch to 'cal'. Let the feeder run until approximately a bushel of material is caught. Stop the feeder by setting the cal/mix switch back to 'mix'. Stopping the feeder when the counter reaches exactly 100 will make later calculations easier. Record the number on the counter in box H1 of the data sheet as number of counts per sample.
4. Weigh the sample and record the weight on the data sheet in box E1 as gross weight of sample. Empty the sample container.
5. Repeat steps 1 thru 4 for each mixer feeder - recording data in the proper spaces for each ingredient. One bushel of material will be fed thru feeder #2 after about 50 counts on the counter. Although feeder #5 is a quarter speed auger, you will still only need about a 100 count sample (it will just take longer to catch the sample). Catching samples any smaller than specified will affect the accuracy of your calibration.
6. Turn the power switch on the control panel to off, and replace the mill door.
7. Complete the calibration calculations as follows:

Line G - Sample Net Weight:

Subtract the container weight (line F) from the sample gross weight (line E) for each ingredient and record the result in the proper space on line G.



Mill Owner: HOGS, INC. Address: BLUFFTON, INDIANA

Feed Description GESTATION RATION Date 3-17-88

Formula Number 1 Premix Number GES-1 Speed Knob Setting 5

LINE	PROCEDURE	FEEDER #1	FEEDER #2	FEEDER #3	FEEDER #4	FEEDER #5
A	INGREDIENT	A1 BEAN MEAL	A2 CORN	A3 ALF. PELLETS	A4 EMPTY	A5 PREMIX
B	AMOUNT PER TON	B1 336 lbs.	B2 1279 lbs.	B3 300 lbs.	B4 X lbs.	B5 85 lbs.
C	PERCENT OF INGRED. #2	C1 26.27 %	C2 100 %	C3 23.46 %	C4 X %	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 74.0 lbs.	E2 64.0 lbs.	E3 71.2 lbs.	E4 X lbs.	E5 82.5 lbs.
F	CONTAINER WEIGHT	F1 10 lbs.	F2 10 lbs.	F3 10 lbs.	F4 X lbs.	F5 10 lbs.
G	SAMPLE NET WGT.	G1 64.0 lbs.	G2 54.0 lbs.	G3 61.2 lbs.	G4 X lbs.	G5 72.5 lbs.
H	NUMBER OF COUNTS PER SAMPLE	H1 100 cts.	H2 50 cts.	H3 100 cts.	H4 X cts.	H5 100 cts.
J	POUNDS PER COUNT (DIVIDE LINE G/H)	J1 .64 lbs.	J2 1.08 lbs.	J3 .612 lbs.	J4 X lbs.	J5 .725 lbs.
K	INGRED. KNOB SETTING (SEE FORMULA BELOW)	K1 15	K2 22	K3 14	K4 0	K5 13
L	COUNTS NEEDED /TON. LINE B DIVIDED /J	L1 525 cts.	L2 1184 cts.	L3 490 cts.	L4 X cts.	L5 117 cts.
M	ACTUAL COUNT CHECK	M1 538 cts.	M2 1184 cts.	M3 502 cts.	M4 X cts.	M5 116 cts.
N	INGRED. DENSITY	N1 38.6 lbs.	N2 46.2 lbs.	N3 36.9 lbs.	N4 X lbs.	N5 43.8 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.

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 per sample (line H) for each column. Examples: if 64.0 pounds of bean meal was caught in our sample and we used exactly 100 counts we simply move our decimal point two places to the left (division by 100): 64.0 lbs. for 100 counts would be .64 lbs. per count. If 54.0 pounds of corn was caught in a sample with 50 counts on the counter, the pounds per count is 54.0 divided by 50 = 1.08.

Line K - Ingredient Knob Setting:

Make a chart similar to the 'K' chart on page 20 with all the values for feeder 2 filled in as shown. Use the following formulas to obtain knob settings to fill in the rest of the chart. First assume K2 = 25 and make the calculations. Next, assume K2 is 24, calculate the other K values. Continue until the chart is complete.

Feeder #1,  $K1 = (C1 \times J2 \times .015 \text{ divided by } J1) \times K2$ .  
Feeder #2,  $K2 = (24 \text{ or lower})$ .  
Feeder #3,  $K3 = (C3 \times J2 \times .015 \text{ divided by } J3) \times K2$ .  
Feeder #4,  $K4 = (C4 \times J2 \times .015 \text{ divided by } J4) \times K2$ .  
Feeder #5,  $K5 = (C5 \times J2 \times .015 \text{ divided by } J5) \times K2$ .

Pick out the knob settings that are closest to the nearest whole number for feeders #3, #4 and #5. Give the 1/4 speed feeder priority in selection - this is the most expensive ingredient and accuracy will be affected the most on the smallest ingredient. In the example ration, it was found on the 'K' chart that a knob setting of 22 on the #2 feeder resulted in the closest values to the nearest whole numbers on feeders #1, #3 and #5. Although a K2 value of 21 would be best for feeders 1 and 2, feeder 5 is more critical.

NOTE: The formula for feeder number five is for the standard quarter speed auger. A half-speed auger would use a .030 multiplier instead of .060.

Line L - Counts Needed Per Ton of Feed:

For each feeder column divide line B by line J. (Total lbs. per ton divided by the lbs. per count). Enter the result in line L. This value will be used later during the grinding procedure.

Line M - Actual Count Check:

This line is not necessary for calibration. It serves only as an indicator that materials are delivered in the correct proportions. See the section grinding procedure section for more details.

7. The final step is not a part of the calibration process, but will be used later to determine if recalibration is necessary.

Line N - Ingredient Density:

The ingredient density is determined by weighing one cubic foot of the ingredient. The Mix-Mill calibration box holds exactly one cubic foot of material. First weigh the empty calibration box, and then follow the steps outlined previously for catching samples to fill the calibration box. Do not bump the box because this can cause settling of the contents and give you false data. After the box is completely full, use a straight edge (such as a ruler) to level off the top of the box. Make just one pass across the box as you level. If the contents settle after this point it will not affect the density data. Weigh this sample and subtract the weight of the calibration box. Record the result in the proper space on line N as the density. Repeat this procedure for each ingredient.

WHY INGREDIENT DENSITIES ARE IMPORTANT:

Periodic density checks, or density checks on new batches of an ingredient will tell you if recalibration is necessary. ANY SIGNIFICANT CHANGE IN THE DENSITY OF AN INGREDIENT WILL AFFECT THE ACCURACY OF A RATION.

'K' CHART

K1	K2	K3	K4	K5
16.62	25	15.53	X	14.86
15.96	24	14.90	X	14.26
15.29	23	14.28	X	13.67
14.63	22	13.66	X	13.08
13.96	21	13.04	X	12.48
13.30	20	12.42	X	11.89
12.63	19	11.80	X	11.29
11.97	18	11.18	X	10.70

Figure 8 - 'K' Chart example (line k calculations pg. 19)

## C. MILL OPERATION INSTRUCTIONS

To mix and grind feed:

1. Set knobs on gearbox (using 'K' numbers from calibration procedure).
2. Be sure all feeders are full of material, the switch paddles are installed (no paddles in unused feeders, and the trip rod is set. Fill all unused feeders with one of the materials to keep dust from blowing out of the mill.
3. Set power switch and overload switch to 'on'.
4. Set the main counter for the batch size. This number is derived from the calibration data sheet - box M2. The value in M2 is the number you would enter in the main counter for one ton of finished feed. For two tons of feed multiply the M2 value by two and enter the result in the counter.

Example: To make three tons of the example ration from the calibration section of this manual enter 3552 ( $3 \times 1184 = 3552$ ) in the main counter. Press the black button on the counter and hold it in. Press the far right white button until the number 2 appears in the display. Press the second button until the number 5 appears in the second column of the display. Press the third and fourth buttons until the correct numbers appear in the display. Release the black button.

5. Reset all small counters to zero.
6. Set grind/augers only switch to 'grind'.
7. Set the manual/auto switch to 'auto'.
8. Turn the speed dial to zero.
9. Press the start switch. Turn the speed dial up until the ammeter reading matches the motor full load amps listed on the mill motor nameplate.

To clean out the discharge auger after grinding a batch:

1. Set the man/auto switch to 'manual'.
2. Turn the speed dial back to zero.
3. Press the start switch.
4. After the auger is cleaned out press the stop switch.

Mill operation (continued)

To mix feed only:

1. Set the power switch to off.
2. Remove the mill door and screen. Replace the door.
3. Set the power switch back to on.
4. Set the gearbox knobs for the ration required.
5. Set the main counter for the batch size (see step 4 under mixing and grinding).
6. Reset all small counters.
7. Set augers only/grind switch to augers only.
8. Set auto/manual switch to auto.

NOTE: If only the exact amount of premix for a batch is put in the hopper above the mill, the paddle switch will probably shut down the mill before the entire batch is processed. Part of the premix will still be in the hopper. THIS DOES NOT MEAN THAT THE RATION IS NOT PROPORTIONED CORRECTLY. If the rest of the premix could be fed into the mill, the batch could be completed.

## SECTION IV - TROUBLESHOOTING

<u>PROBLEMS AND SYMPTOMS</u>	<u>POSSIBLE CAUSES</u>
Mill does not start when start button pressed	
1. Power light not on	Main circuit breaker off
2. Mill switches light not on	Trip rod not set or start switch bad
3. Bin level light not on	Bin or auger full, or jumper wire between B11 and B13 removed
4. Mix augers light not on	No count preset in main counter, overload switch off, stop switch bad, overload on aux. starter tripped, aux. starter coil bad, aux. starter contacts 13 & 14. dirty
5. Mix augers light stays on only as long as the start switch is pressed in	Main starter contacts 13 & 14 dirty, augers only/grind sw. bad, cal/mix switch bad, mill off or door sw. bad, main starter overload tripped, main starter coil bad
Mill does not shut off when main counter reaches zero	Main counter bad or auto/man sw. set on 'man'
Main starter overload relay trips before motor reaches full speed	Grinding chamber full of grain, or motor damaged
Starter overload trips after motor has been running	Motor overloaded, low voltage, or motor damaged
Power switch trips off	Discharge auger overloaded or jammed
Overload switch trips off	D.C. motor shorted, controller damaged, feeder auger jammed, reed switch shorted, or proportioner gearbox damaged
Counts on one counter are not as expected (within usual tolerance)	Pawl or ratchet in gearbox damaged, reed switch damaged, reed magnet not adjusted close enough to reed sw., counter bad, broken reed sw. wire

PROBLEMS AND SYMPTOMS-----

POSSIBLE CAUSES

Clicking in proportioner  
gearbox; no output

Wrong D.C. motor rotation  
(reverse leads on motor)

Reduced capacity of mill

Worn hammers, low voltage,  
change in feed ration, ammeter  
damaged, change in grain  
moisture or hardness

Excessive vibration in mill

Worn motor bearings, broken or  
damaged hammers, worn hammer  
hub bolt,

Feeder auger doesn't turn

Broken pawl or spring in gearbox

## SECTION V - SERVICE TIPS AND ROUTINE MAINTENANCE

### A. Screen and wear plates

The screen and wear plate are designed so the screen may be rotated a full 360 degrees. The screen may also be turned around. Rotate the screen regularly to avoid wearing thru the screen in one place before the rest of the screen is worn out.

### B. Hammers and bolts

Hammers are expected to wear out, but regular service can extend the life of a set of hammers.

First of all, the hammers can be reversed to allow wear on both sides of the hammer. This can be done by physically turning the hammers around or reversing the rotation of the motor. If the hammers are physically moved on the hub, keep each set of three hammers together so the balance is not affected. The figure below illustrates hammer wear. Reverse the hammers when the wear on one side of the tip reaches the middle of the hammer. After the length of the hammer is affected by the wear, the hammer is worn out. Mill capacity can be expected to decrease.

Secondly, the hammers can be moved from the point of greatest wear at the front of the mill to the back of the hammer hub. Remember to keep the hammers in sets of three.

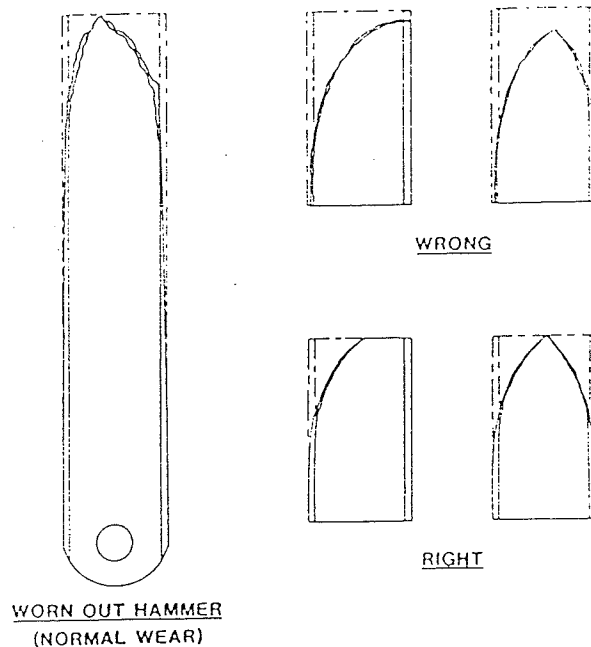


Figure 9 - Hammer wear



## Hammers and bolts (continued)

The hub bolts will also wear out. This wear allows the hammers move out farther from the center of rotation. If only one hammer moves out, the balance of the hub assembly is affected. If the hammer moves out far enough it will contact the screen and damage both. Inspect the bolts for wear each time you change the hammers. Tighten the bolts enough that the hammers do not swing freely.

## C. Proportioner Safety Switch (paddle switch)

The paddle switch may need to be adjusted periodically due to excessive use or excess force applied to the trip rod.

Refer to fig. 10 below for the following instructions:

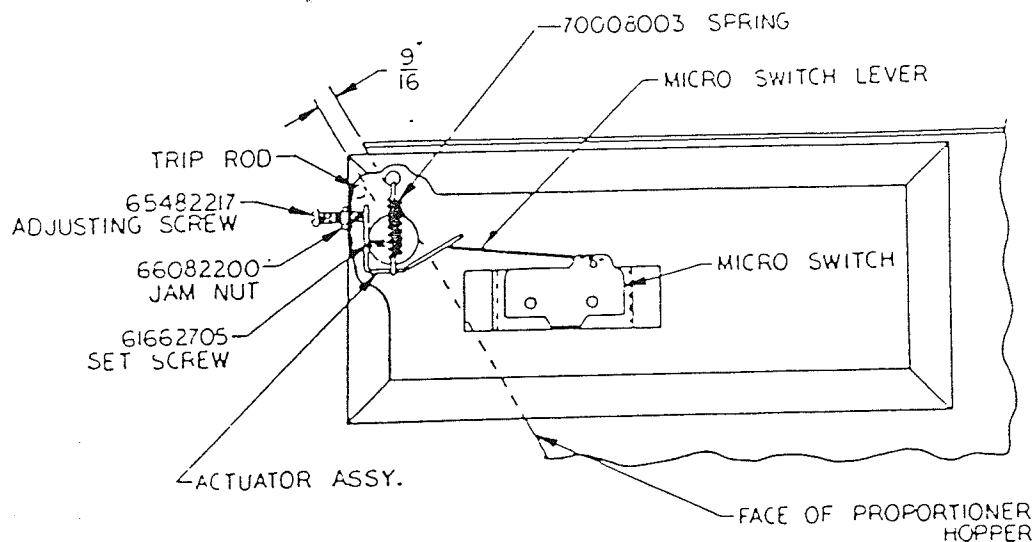


Figure 10 - Paddle switch and actuator

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

#### D. Proportioner Service

1. Gearbox inspection and servicing of the pawls and springs may be done with the gearbox on the mill. Any other service will be greatly simplified by removing the gearbox from the mill:

- a. Shut off electrical power to the control panel.
- b. Seal off grain flow into the proportioner hopper and clean out all feeders.
- c. Drain the oil out of the gearbox. The drain plug is located on the bottom of the gearbox.
- d. Remove the rear cover of the D.C. motor and disconnect the wires.
- e. Remove the four nuts on the back of the gearbox (two on each end). Pull the gearbox away from the mill.

2. To remove the gearbox cover for inspection or service:

- a. Shut off power to the control panel
- b. Drain the oil from the gearbox. The drain plug is located on the bottom of the gearbox.
- c. Remove the screws that hold the gearbox cover on. Do not remove the gearbox knobs.
- d. Gently pry one end of the cover up to break the seal of the gasket. Remove the cover, but do not force it off. You may have to turn the knobs as you pry the cover off (to loosen the cams on the cover from the pawls inside).

3. Pawl and spring inspection/replacement:

Inspect the springs for proper tension while the pawls are still on the carrier. Remove the pawls to inspect for wear. Always use new push-on fasteners to reassemble the pawls to the carrier.

4. Inspection/replacement of pawl carriers, idler gears, ratchet shafts, or nylon bearings.

- a. Remove the auger from the shaft on the back of the gearbox.
- b. Remove the set collar from the shaft on the back of the box. File off any burrs on the shaft (made by the setscrew).
- c. Pull the ratchet shaft out the front of the gearbox - twisting slightly as you pull. Inspect for worn teeth.

## Proportioner service (continued)

d. The idler gears are held in place by a retaining ring. Inspect for wear in the bore of the gear by rocking the gear on the shaft. Remove the retaining ring, and pull the gearbox off the shaft. Inspect for wear on the teeth and the condition of the bronze bushing in the gear.

e. The pawl carrier was held on by the ratchet shaft. Pull the carrier off the nylon bearing and inspect for wear on the gear teeth, condition of the bronze bushing, and wear on the pawl pins.

f. Inspect the nylon bearing for signs of wear inside and outside.

## 5. Reassembling the gearbox

To reassemble the gearbox simply reverse the steps outlined above. Some extra steps are also necessary:

a. Put new O-rings on the ratchet shafts before installing the shafts back in the gearbox. Oil the O-rings (with gearbox oil) to help them slide into the nylon bearing easier.

b. Replace the set collars with only enough end play in the ratchet shaft to prevent binding.

c. Tighten the locknuts down on the auger tube just enough to contact the tube. This allows some looseness in the auger to compensate for any binding.

d. Replace the gearbox cover starting at one end. Rotate the knob on the cover as you press the cams on the cover down between the pawls. Work from one end of the box to the other until all of the cams are seated between the pawls. Do not try to force the cover into place - internal parts may be damaged.

e. Reassemble the gearbox to the mill. Replace the drain plug in the bottom of the box. Remove the fill plug on top and the level plug on the side of the box. Add gearbox oil (92000243 - approximately 2 quarts) until the oil starts to run out of the level hole. Replace the plugs.

SECTION VI - REPLACEMENT PARTS

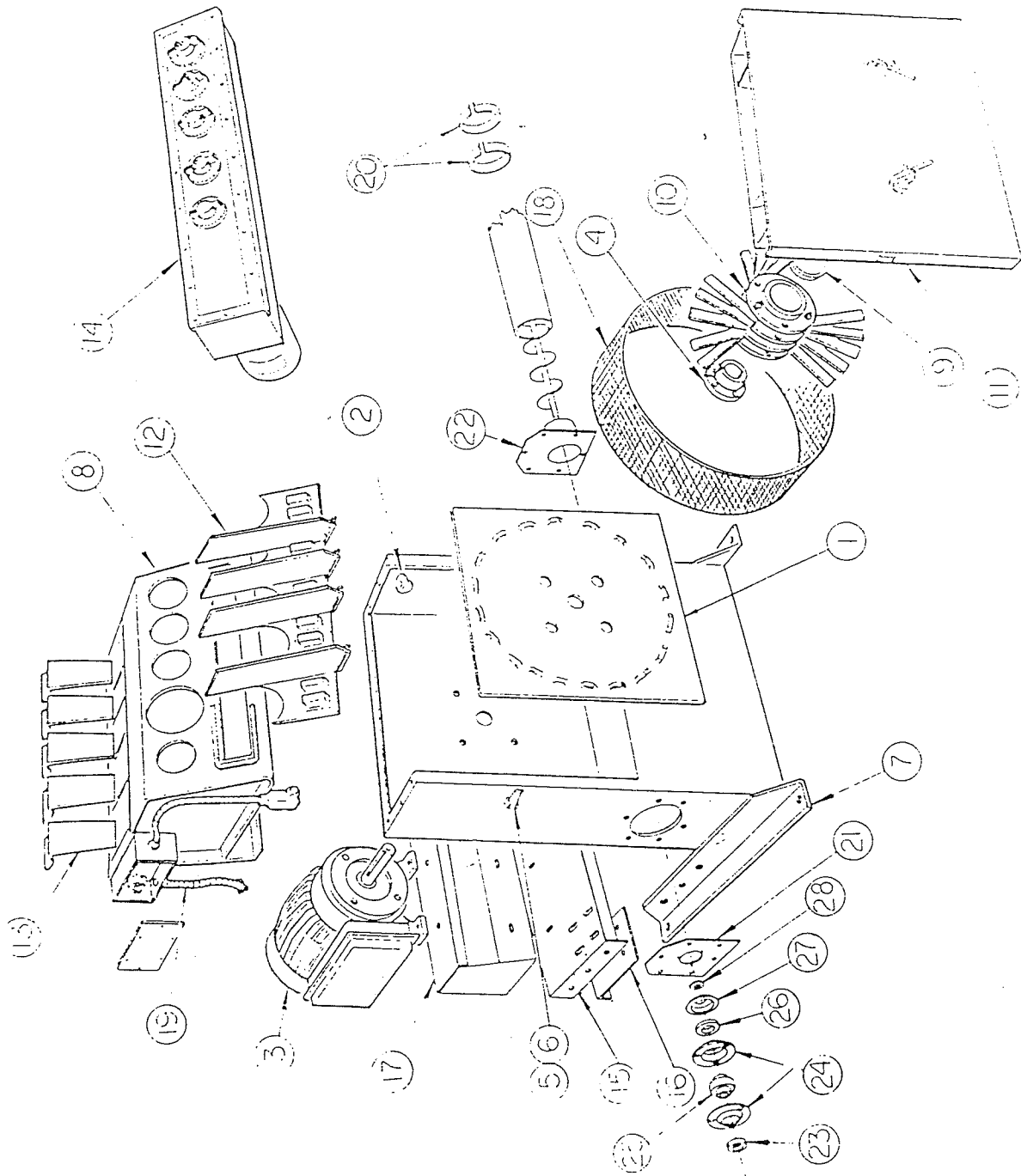
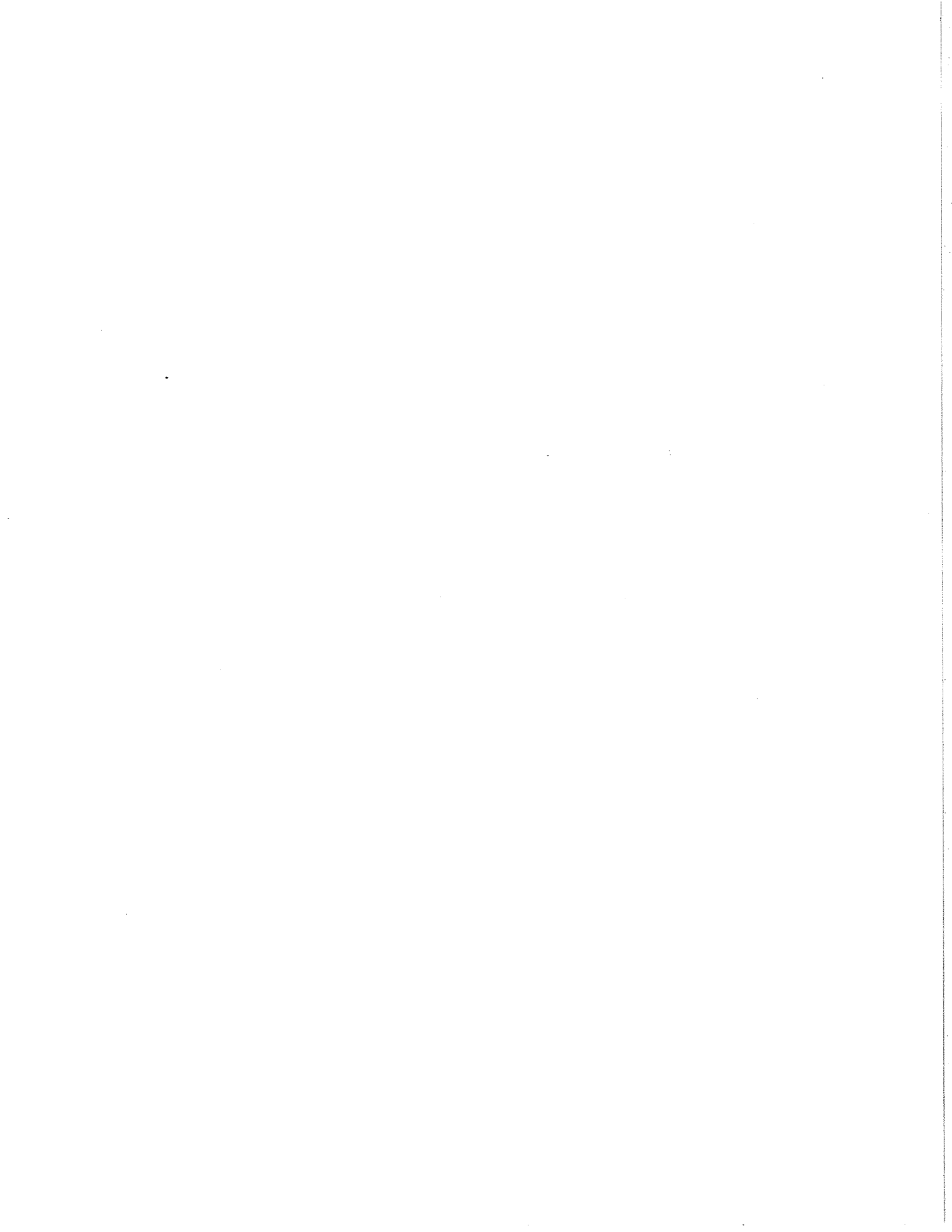


Figure 13 - Mill Assembly



D MILL ASSEMBLY

<u>ITEM</u>	<u>PART NO.</u>	<u>QTY</u>	<u>DESCRIPTION</u>
1	11195910	1	BACK WEAR PLATE
2	11195940	2	MAGNET CLIP
3	33000601	1	MOTOR 5 HP - 1Ø
OR	33000602	1	MOTOR 7 1/2 HP - 1Ø
OR	33000603	1	MOTOR 10 HP - 1Ø
OR	33000701	1	MOTOR 5 HP - 3Ø
OR	33000703	1	MOTOR 10 HP - 3Ø
OR	33000705	1	MOTOR 20 HP - 3Ø
4	44010712	1	BUSHING SD 1-1/8"
OR	44010716	1	BUSHING SD 1-3/8"
OR	44010720	1	BUSHING SD 1-5/8"
5	70007001	4	POP RIVET
6	70004506	2	LATCH
7	90000100	1	MILL HOUSING - WELDED
8	92000247	1	PROP HOPPER ASSY (SEE PG. 32)
9	80010509	1	CAPLUG
10	92000234	1	BEATER HUB ASSY (SEE PG 39)
11	92000634	1	DOOR & CHUTE ASSY (SEE PG. 38)
12	92000237	1	MAGNET PLATE (SEE PG. 36)
13	90000131	5	SWITCH PADDLE WELDED ASSY
14	92000716	1	PROP ASSY W/AUGERS (SEE PG. 34)
15	90000443	1	MOTOR BASE
16	90000438	1	ADJUSTMENT PLATE
17	11206620	1	MOTOR STAND (20 HP ONLY)
18	90000142	1	SCREEN - 3/16" (SEE PAGE 39)
19	91000150	1	WIRE HARNESS - MOTOR 5 HP - 10
OR	91000137	1	7 1/2 HP AND 10 HP - 1Ø
OR	91000151	1	5 HP - 3Ø
OR	91000136	1	10 HP AND 20 HP - 3Ø
20	10322902	2	CLAMP RING - 3 1/2" AUGER
21	11195920	1	OFFSET BEARING PLATE - 3 1/2 " AUGER
OR	11196500	1	BEARING PLATE - 6" AUGER
22	90000122	1	TUBE & OFFSET PLT ASSY - 3.5 AUGER
OR	90000207	1	SLEEVE & RING ASSY - 6" AUGER
23	40000018	1	LOCK COLLAR 5/8" - 3 1/2" AUGER
OR	40000009	1	LOCK COLLAR 1 1/16" - 6" AUGER
24	40000016	2	STAMPING 5/8" - 3 1/2" AUGER
OR	40000005	2	STAMPING 1 1/16" - 6" AUGER
25	40000017	1	BEARING 5/8" - 3 1/2" AUGER
OR	40000012	1	BEARING 1 1/16" - 6" AUGER
26	80011506	1	FELT WASHER 5/8" - 3 1/2" AUGER
OR	80011509	1	FELT WASHER 1 1/16" - 6" AUGER
27	80011507	1	RETAINING CUP 5/8" - 3 1/2" AUGER
OR	80011508	1	RETAINING CUP 1 1/16" - 6" AUGER
28	80014502	1	THRUST WASHER 5/8" - 3 1/2" AUGER
29	90000544	1	CALIBRATION DOOR
30	11209820	1	CALIBRATION DOOR
31	90000546	1	HAMMER COVER (BLANK SCREEN)
32	90000125	1	CALIBRATION BOX (1 CUBIC FT)

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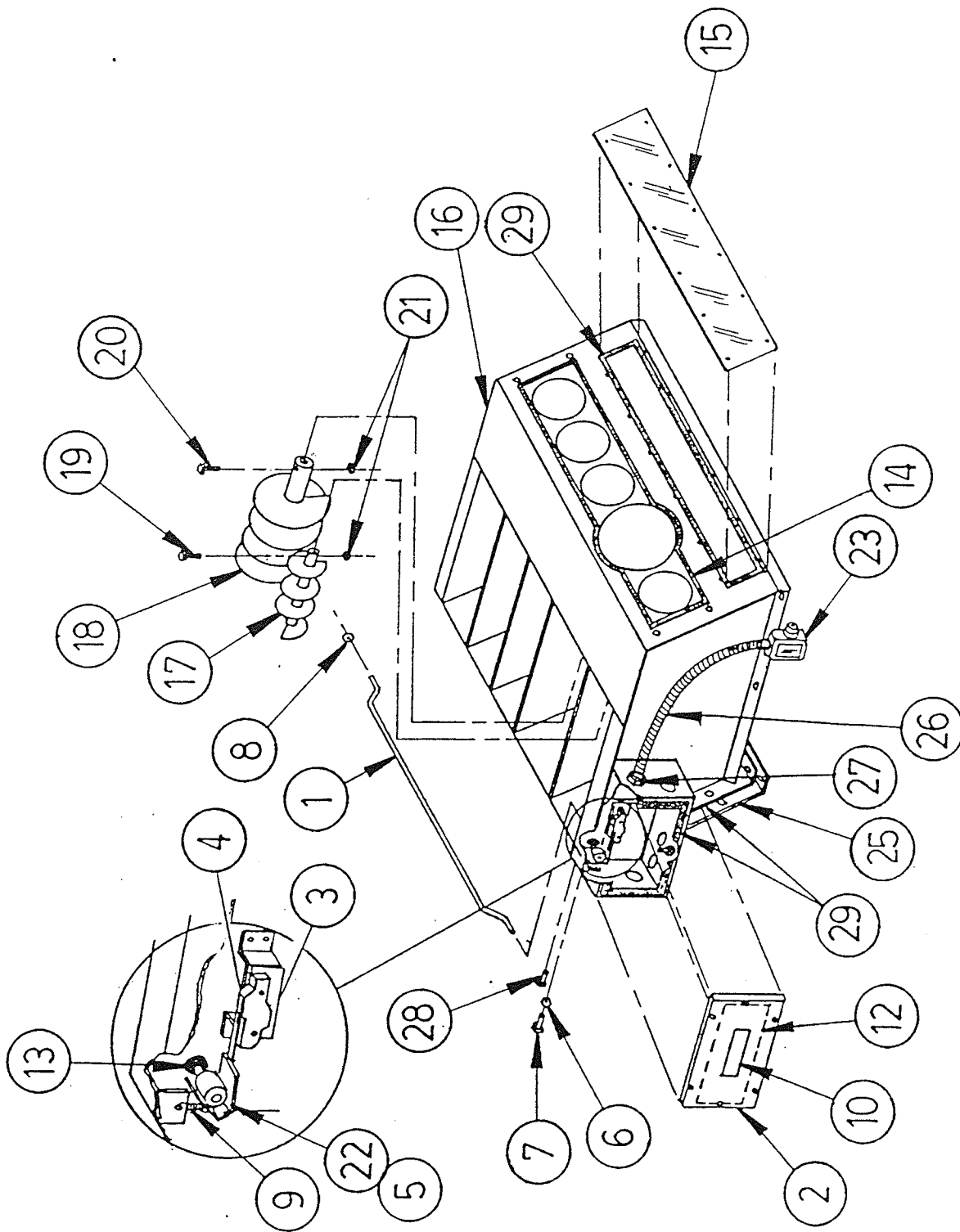


Figure 14 - Proportioner Hopper Assembly



PROPORTIONER HOPPER ASSY - 92000247

<u>ITEM</u>	<u>PART NO.</u>	<u>QTY.</u>	<u>DESCRIPTION</u>
1	11195890	1	TRIP ROD
2	11206640	1	COVER - SWITCH BOX
3	11195950	1	INSULATION - SWITCH
4	31008001	1	MICRO SWITCH
5	61662705	1	SET SCREW #10 X 1/4
6	66082200	1	HEX NUT #8
7	65482217	1	ADJUSTMENT SCREW - #8 X 3/4"
8	70000502	1	PUSH-ON FASTENER
9	70008003	1	SPRING
10	80006506	1	LABEL - WARNING
11	80006509	1	LABEL - DANGER (NOT ILLUSTRATED)
12	80006515	1	DECAL - SWITCH BOX WIRING
13	80005008	1	GROMMET - .7/64" ID
14	80014002	60"	POLYURETHANE TAPE - 3/8"
15	80022002	1	MAGNET WINDOW
16	90000102	1	PROPORTIONER WELDED ASSEMBLY
17*	90000116	4	4" AUGER ASSY
18*	90000118	1	6" AUGER ASSY - DBL FULL PITCH
19*	62583326	4	CAP SCREW - 1/4" X 1 1/4"
20*	62583330	1	CAP SCREW - 1/4" X 1 3/4"
21	66743300	5	HEX NUT - 1/4"
22	90000123	1	ACTUATOR
23	31008025	1	DOOR SWITCH
24	92000716	1	PROP GEAR BOX (SEE PAGE 34)
25	92000242	1	COUNTERSWITCH ASSY (SEE PAGE 37)
26	11206101	1	3/8" LIQUID TIGHT CONDUIT - 14"
27	31002611	2	3/8" LIQUID TIGHT STRAIGHT CONNECTOR
28	65482205	1	MS SLOTTED HEX HD #8 X 1/4"
29	80014001	90"	POLYURETHANE TAPE - 3/16"

\*THESE ITEMS ARE NOT INCLUDED IN 92000247 PROPORTIONER HOPPER ASSEMBLY COMPLETE.

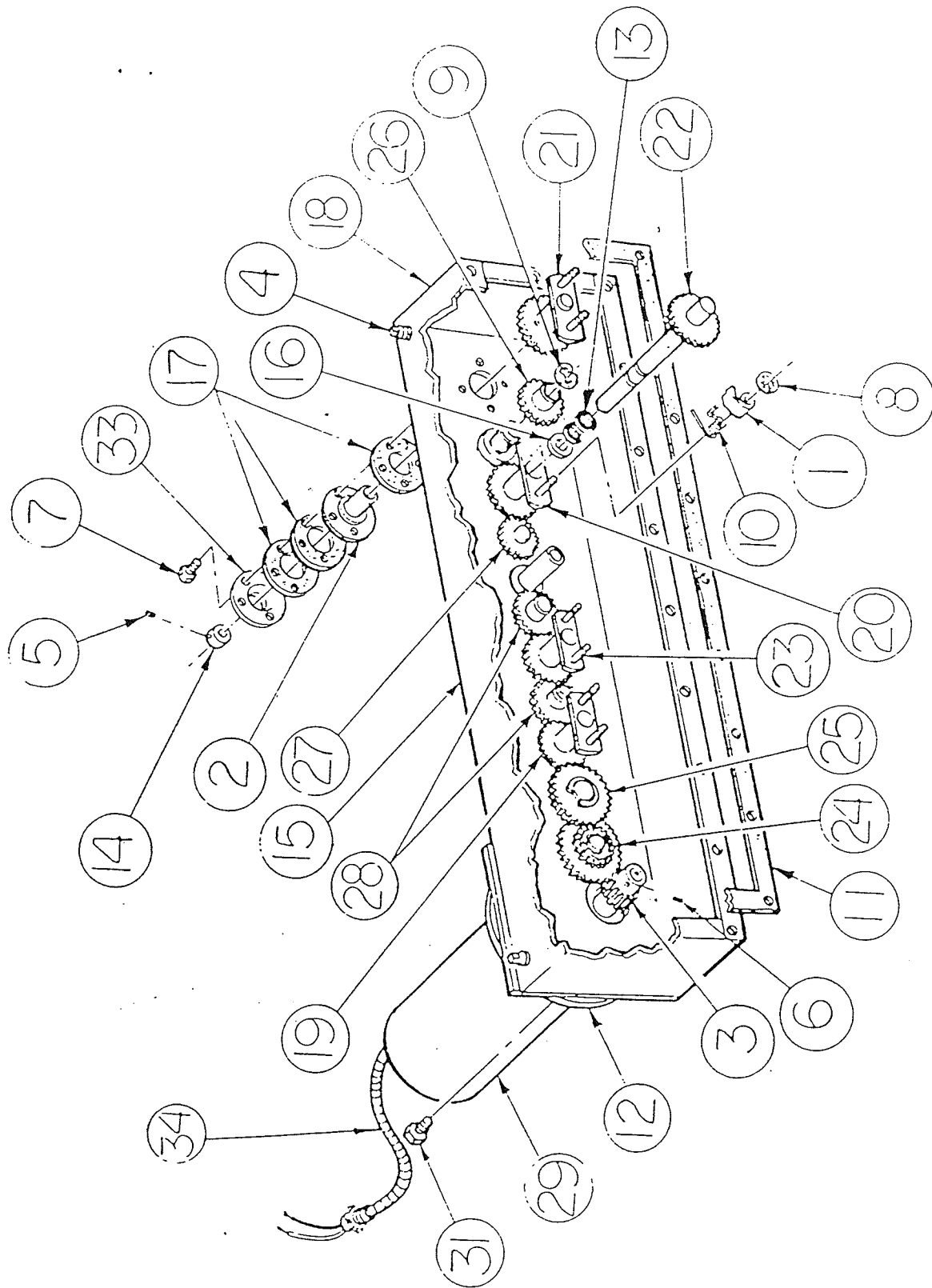


Figure 15 - Proportioner Gearbox - 92000716

PROPORTIONER GEAR BOX - 92000716

ITEM	PART NO.	QTY	DESCRIPTION
	92000717		GEAR BOX (LESS MOTOR & OIL)
1	11195820	9	DRIVE PAWL
2	40000014	5	BEARING - AUGER SHAFT
3	40002003	1	GEAR - MOTOR DRIVE
4	51713002	1	PIPE FLUG 1/4"
5	61662705	5	SET SCREW #10 X 1/4"
6	61663305	2	SET SCREW 1/4 X 1/4"
7	70000502	20	WASHER HEAD CAP SCREW
8	70006092	9	PUSH-ON FASTENER
9	70006501	6	RETAINING RING
10	70008002	9	SPRING - DRIVE PAWL
11	80004503	1	GASKET - COVER
12	80004504	1	GASKET - MOTOR
13	80008501	10	ROTO-SEAL (O-RING)
14	80012001	5	LOCK COLLAR
15	91000139	1	WIRE HARNESS
16	80014501	5	THRUST WASHER
17	80004502	15	GASKET AUGER
18	90000101	1	PROP HOUSING
19	90000106	1	PAWL CARRIER - 42/24 TEETH
20	90000107	2	PAWL CARRIER - 24 TEETH
21	90000108	1	PAWL CARRIER - 32 TEETH
22	90000109	5	SHAFT AND RATCHET
23	90000110	1	PAWL CARRIER - 32 TEETH
24*	90000111	1	REDUCER GEAR - 16/24 TEETH
25*	90000112	1	REDUCER GEAR - OFFSET
26*	90000113	1	REDUCER GEAR - 16/24 TEETH
27*	90000114	1	IDLER GEAR - 24 TEETH
28*	90000115	2	IDLER GEAR - 32 TEETH
29	33000100	1	DC MOTOR 1/4 HP
30	92000231		PROP COVER (SEE PAGE 36)
31	70000503	4	WASHER HEAD BOLT
32	70000501	1	WASHER HEAD BIN BOLT
33	92000232	5	BEARING CAP
34	51718002	1	PIPE FLUG 1/4" - VENTED
35	80007003	1	DECAL - D PROPORTIONER OIL
36	80006521	1	DECAL - OIL LEVEL
37	92000243	2 QTS	OIL
38	92000678	1	BRUSH PACKAGE - DC MOTOR - NOT SHOWN
39	80011519	1	MOTOR SEAL - DC MOTOR - NOT SHOWN
*	80000501	6	BUSHING - 5/8" ID X 3/4 OD NCLUDED IN REDUCER AND IDLER GEARS)

NOTE: SEE PROP HOPPER ASSY PART LIST FOR AUGERS

PROPORTIONER COVER ASSEMBLY - 92000231

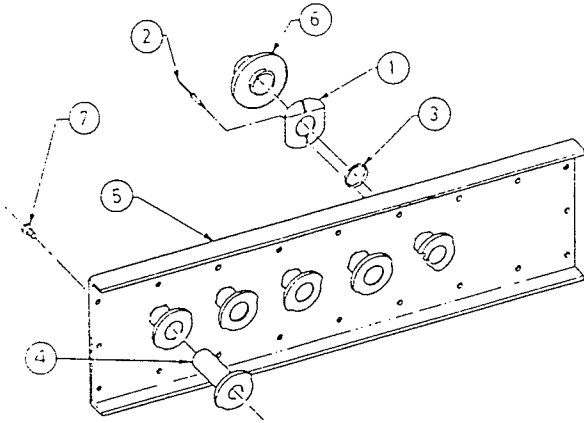


Figure 16 -  
Proportioner Cover

ITEM	PART NO.	QTY.	DESCRIPTION
1	11195780	5	PROPORTIONER KNOB SPRING
2	70007001	5	POP RIVET - 5/32" DIA.
3	80008502	5	O-RING
4	90000119	5	MOVABLE CAM AND SLEEVE ASSEMBLY
5	90000121	1	PROPORTIONER COVER WELDMENT
6	92000235	5	KNOB ASSEMBLY W/SETSCREW
7	70000502	20	WASHER HEAD SCREW ASSEMBLY
*	80000501	5	BUSHING 5/8 X 3/4 OD (INCLUDED IN MOVEABLE CAM

MAGNET PLATE ASSEMBLY - 92000237

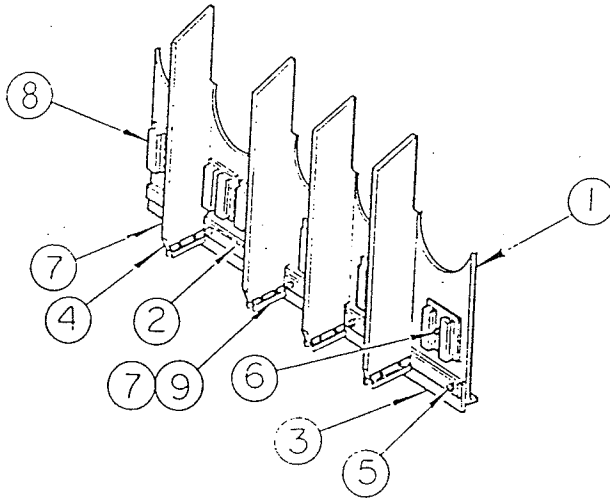
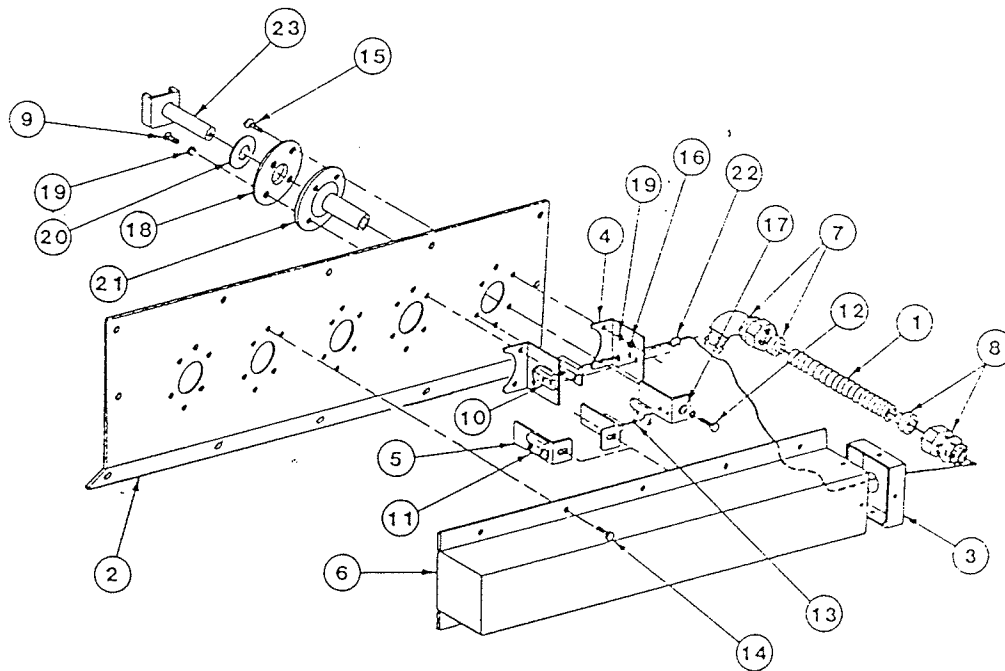


Figure 17 -  
Magnet Plate

ITEM	PART NO.	QTY.	DESCRIPTION
1	11196050	1	MAGNET PLATE
2	11196060	1	STRIP - MAGNET PLATE
3	11205300	1	NEOPRENE - MAGNET PLATE
4	11196080	4	DIVIDER - MAGNET PLATE
7	70007001	16	POP RIVET
8	80008001	6	MILL MAGNET

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COUNTER SWITCH ASSY - 92000242



ITEM	PART NO.	QTY.	DESCRIPTION
	92000242		COMPLETE ASSY
1	11206103*	1	3/8" LIQUID TIGHT CONDUIT - 10"
2	11195931	1	COUNTER HOPPER COVER PLATE
3	11196020	1	COVER SWITCH END
4	11196120	5	REED SWITCH PLATE
5	11196130	6	REED MAGNET PLATE
6	11196140	1	COVER SWITCHES
7	31002621*	1	3/8" LIQUID TIGHT 90 DEG CONNECTOR
8	31002611	1	3/8" LIQUID TIGHT STRAIGHT CONNECTOR
9	65483312	10	MS SLOTTED HEX HD TYPE DTC FLTD 1/4" X 1/2"
10	31008027	5	REED SWITCH
11	31008028	6	REED SWITCH MAGNET
12	62583312	5	CAP SCREW HEX HD FLTD 1/4 X 1/2"
13	70007002	22	POP RIVET 3/32"
14	62582205	13	MS SLOTTED HX HD TYPE DTC PLTD #8 X 1/4"
15	65483317	10	MS SLOTTED HX HD TYPE DTC FLTD 1/4 X 3/4"
16	66083300	10	HEX NUT FLATED 1/4"
17	66403300	5	FLAT WASHER FLATED 1/4"
18	92000232	5	BEARING CAP ASSEMBLY
19	66443300	25	LOCK WASHER FLATED 1/4"
20	70011503	5	RULON WASHER
21	40000014	5	BEARING AUGER SHAFT
22	80005001	5	GROMMET 1/2"
23	90000128	5	DRIVE SHAFT SWITCHES WELDED ASSY

DOOR AND CHUTE ASSEMBLY - 92000634

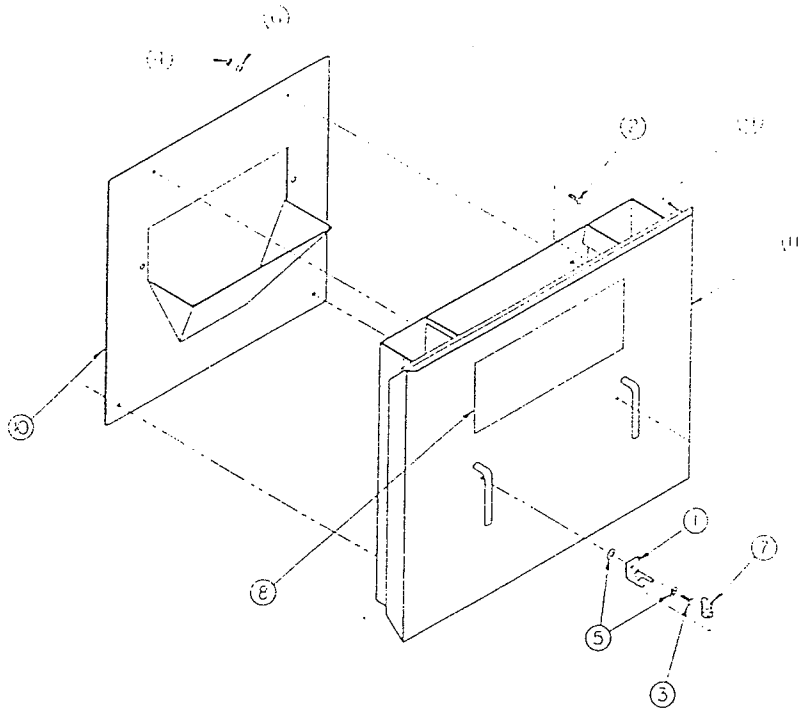
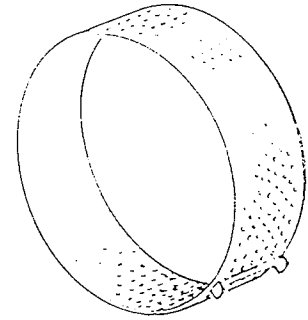


Figure 19 -  
Door and Chute

ITEM	PART NO.	QTY.	DESCRIPTION
1	11196270	2	BRACKET - VALVE HANDLE TOGGLE
2	60283317	4	CARRIAGE BOLT 1/4 X 3/4
3	65483317	2	MACHINE SCREW HH 1/4 X 3/4
4	66083300	4	HEX NUT 1/4
5	66403300	4	FLAT WASHER 1/4
6	66443300	4	LOCK WASHER 1/4
7	70008004	2	SPRING
8	80003519	1	DECAL - MIX MILL
9	80014002	90"	POLYURETHANE TAPE 3/8 X 1/2
10	90000440	1	WEARPLATE ASSEMBLY
11	90000441	1	DOOR WELDMENT

D MILL SCREENS - 18" DIAMETER



<u>ITEM</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	92000209	3/32" SCREEN
2	92000210	1/8" SCREEN
3	92000211	5/32" SCREEN
4	92000212	3/16" SCREEN
5	92000214	1/4" SCREEN
6	92000215	5/16" SCREEN
7	92000216	3/8" SCREEN
8	92000218	1/2" SCREEN
9	92000219	5/8" SCREEN
10	92000220	3/4" SCREEN

*Hammers*

BEATER HUB ASSEMBLY - 92000234

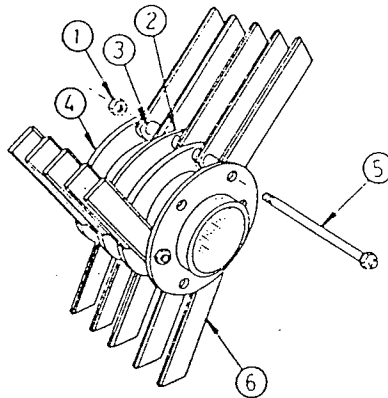


Figure 21 -  
Beater Hub

<u>ITEM</u>	<u>PART NO.</u>	<u>QTY.</u>	<u>DESCRIPTION</u>
1	66754500	3	HEX JAM LOCKNUT 3/8-24 UNF *
2	80013501	12	HUB SPACER .406 LONG
3	80013502	6	HUB SPACER .812 LONG
4	90000104	1	BEATER HUB WELDMENT
5	90000297	3	STUD ASSEMBLY (Set) *
6	92000278	1	SET OF 15 HAMMERS *

*92000582 1*

*Spacers*

\*  
\*  
\*

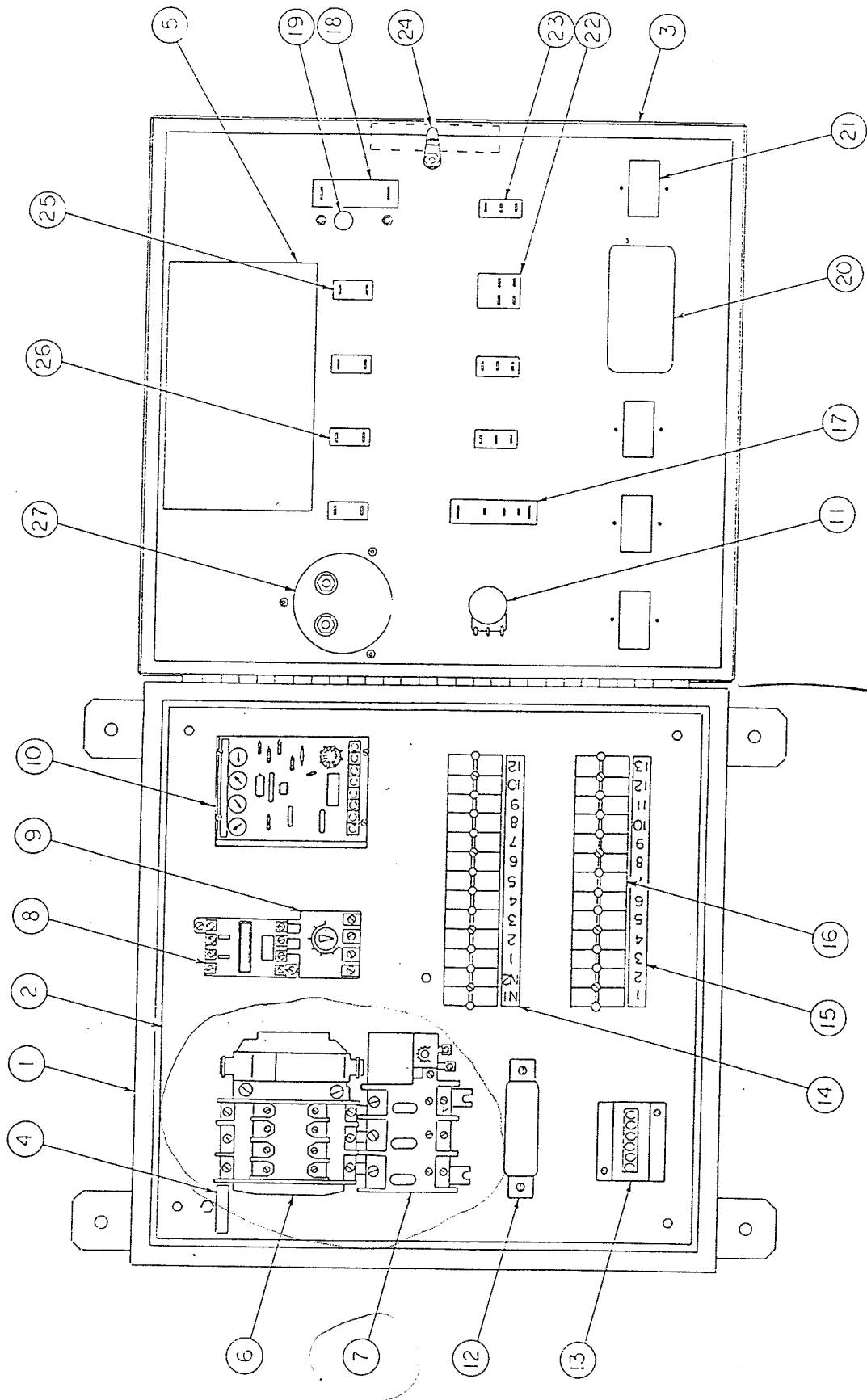
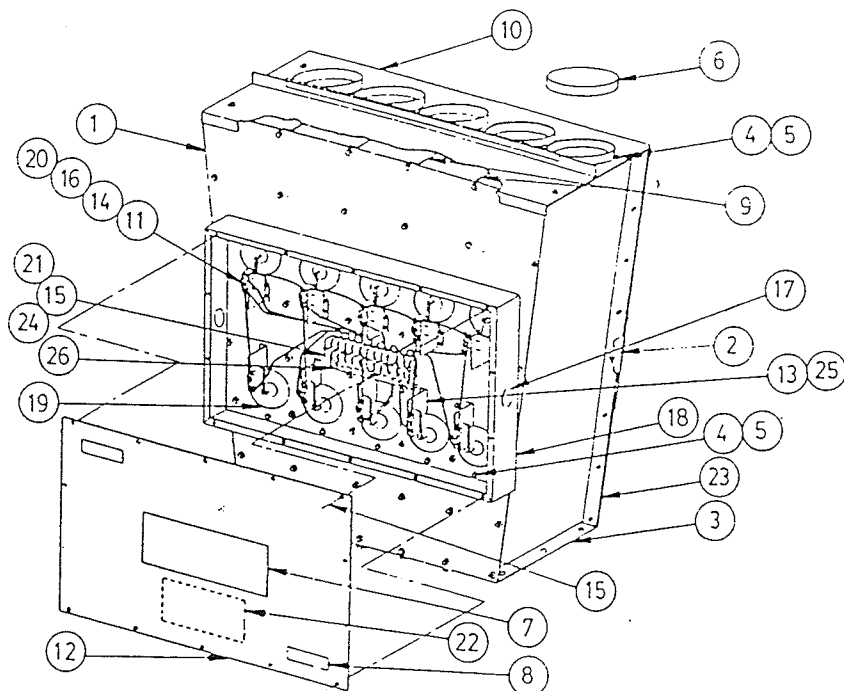


Figure 22 - Converted Control Panel



GROUND LEVEL HOPPER - 92000249



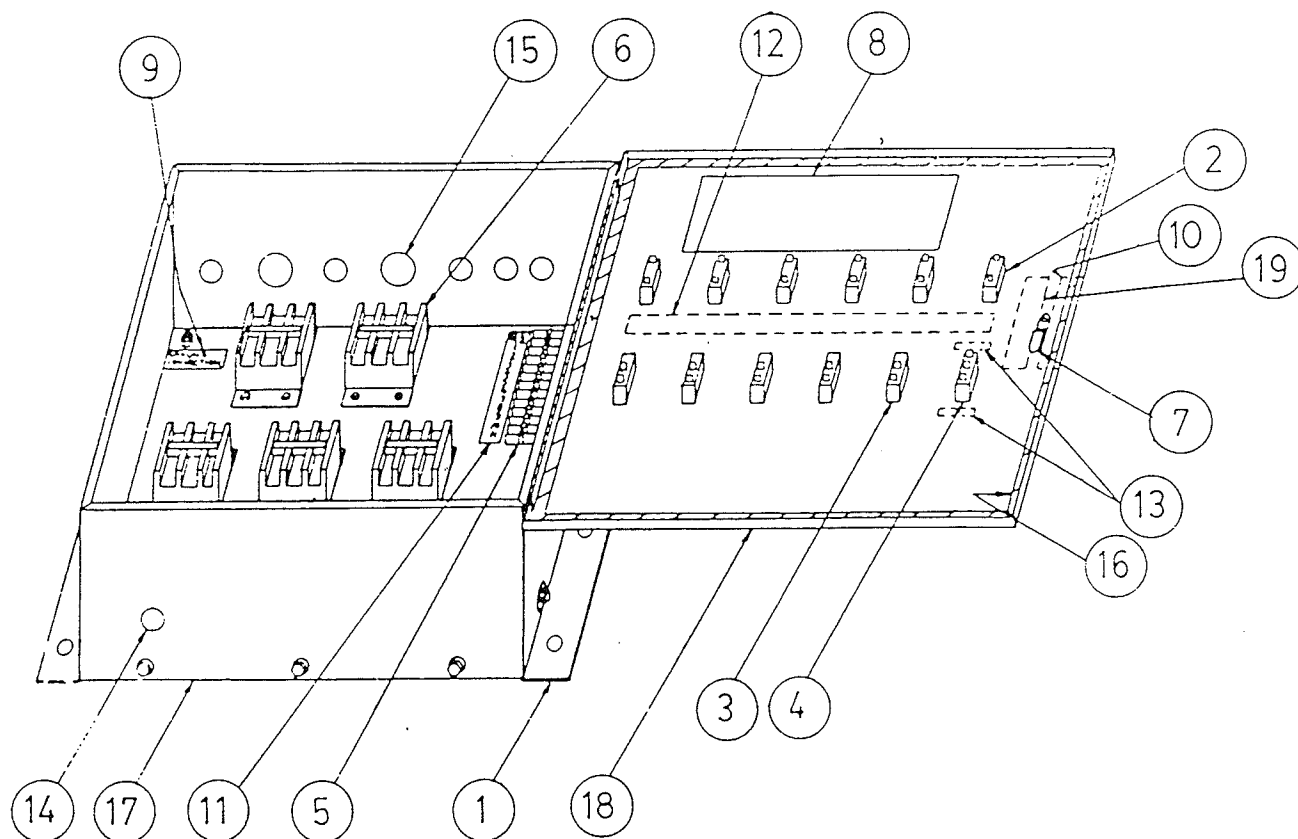
ITEM	PART NO.	QTY.	DESCRIPTION
1	11196420	1	FRONT PANEL - GROUND LEVEL HOPPER
2	11198060	1	REAR PANEL (LONG) - GROUND LEVEL
3	11196440	2	END - GROUND LEVEL HOPPER
4	65483312	108	MACHINE SCREW 1/4 X 1/2
5	66443300	108	LOCKWASHER 1/4
6	80001001	2	CAPLUG 4" ID
7	80003514	1	DECAL MIX-MILL
8	80006506	2	DECAL - WARNING
9	90000038	4	DIVIDER ASSEMBLY - HOPPER
10	90000132	1	COVER ASSEMBLY - HOPPER
11	11195950	10	INSULATION - SWITCH
12	11196460	1	COVER - SWITCH BOX
13	11196470	10	SWITCH BRACKET - HOPPER
14	64681822	20	MACHINE SCREW #6 X 1
15	65482212	15	MACHINE SCREW #8 X 1/2
16	66402200	20	FLAT WASHER #8
17	80010501	2	SNAP IN BLANK 7/8
18	11196450	1	SWITCH BOX - GROUND LEVEL
19	11195570	2	DIAPHRAGM
20	11196480	10	MICROSWITCH 1 OZ.
21	31009005	12	TERMINAL BLOCK - MODULAR
22	80003517	1	DECAL - GROUND LEVEL SCHEMATIC
23	11198070	1	REAR PANEL (SHORT)
24	64682217	4	MACHINE SCREW #8 X 1-1/4
25	65482205	20	MACHINE SCREW 8 X 1/4
26	80006508	1	DECAL - TERMINAL BLOCK

CONTROL PANEL COMPONENTS (AFTER CONVERSION)

<u>ITEM</u>	<u>PART NO.</u>	<u>QTY.</u>	<u>DESCRIPTION</u>
1	90000487	1	CONTROL BOX WELDMENT
2	11209050	1	PANEL INSERT
3	90000582	1	PANEL FRONT
4	80006501	1	GROUND LABEL
5	80003565	1	SCHEMATIC DECAL
6	31016102	1	CONTACTOR 25 AMP-5HP 1Ø 3Ø, 10HP 3Ø
	OR 31016103	1	40 AMP - 7.5HP 1Ø
	OR 31016104	1	63 AMP - 10HP 1Ø, 20HP 3Ø
7	31016110	1	OVERLOAD RELAY 10-16A - 5HP 3Ø
	OR 31016112	1	20-30A - 5HP 1Ø, 10HP 3Ø
	OR 31016113	1	25-42A - 7.5HP 1Ø, 10HP 1Ø
	OR 31016114	1	40-72A - 20HP 3Ø
8	31016101	1	CONTACTOR 16 AMP
9	31016107	1	OVERLOAD RELAY 2.5-4 AMP
	OR 31016108	1	3.8-6 AMP
10	<b>31012031</b>	1	D.C. CONTROLLER
11	31012010	1	SPEED POT ASSY
12	31013003	1	CURRENT TRANSFORMER
13	31003501	1	HOUR METER
14	80006508	1	DECAL - TERMINAL BLOCK
15	80006508	1	DECAL - TERMINAL BLOCK
16	31009005	26	TERMINAL BLOCK - MODULAR
17	31001004	1	CIRCUIT BREAKER 3 AMP W/AUX SW
18	31001040	1	CIRCUIT BREAKER 5 AMP
19	80010510	1	CAFLUG BPF 5/8
20	31003505	1	COUNTER - LARGE
21	31003504	4	COUNTER SMALL
22	31008021	1	SWITCH - START/STOP
23	31008026	3	SWITCH - SPDT
24	70004501	1	DOOR LATCH
25	31005504	1	GREEN LIGHT
26	31005505	1	AMBER LIGHT
27	31000004	1	AMMETER

96-523

GROUND LEVEL CONTROL PANEL - 91000113



ITEM	PART NO.	QTY.	DESCRIPTION
1	11176041	1	CHASSIS
2	31005504	6	GREEN LIGHT
3	31008018	5	SWITCH - SPDT
4	31008020	1	SWITCH - SPDT ON-OFF-ON
5	31009005	12	TERMINAL BLOCK - MODULAR
6	32431140	5	RELAY - 30A, 3P, 120VAC COIL
7	70004501	1	DOOR LATCH
8	80003517	1	DECAL - SCHEMATIC
9	80006501	1	GROUND LABEL
10	80006506	1	WARNING LABEL
11	80006508	1	DANGER LABEL
12	80006512	1	DECAL - FEEDER SWITCHES
13	80006513	1	DECAL - AUTO/MANUAL
14	30010501	6	SNAP IN BLANK 7/8
15	30010502	2	SNAP IN BLANK 1-1/8
16	30014002	72"	POLYURETHANE TAPE
17	30000200	1	WRAPPER - CONTROL BOX
18	30000154	1	FRONT DOOR - CONTROL BOX
19	80006516	1	DECAL - LIVE CIRCUITS

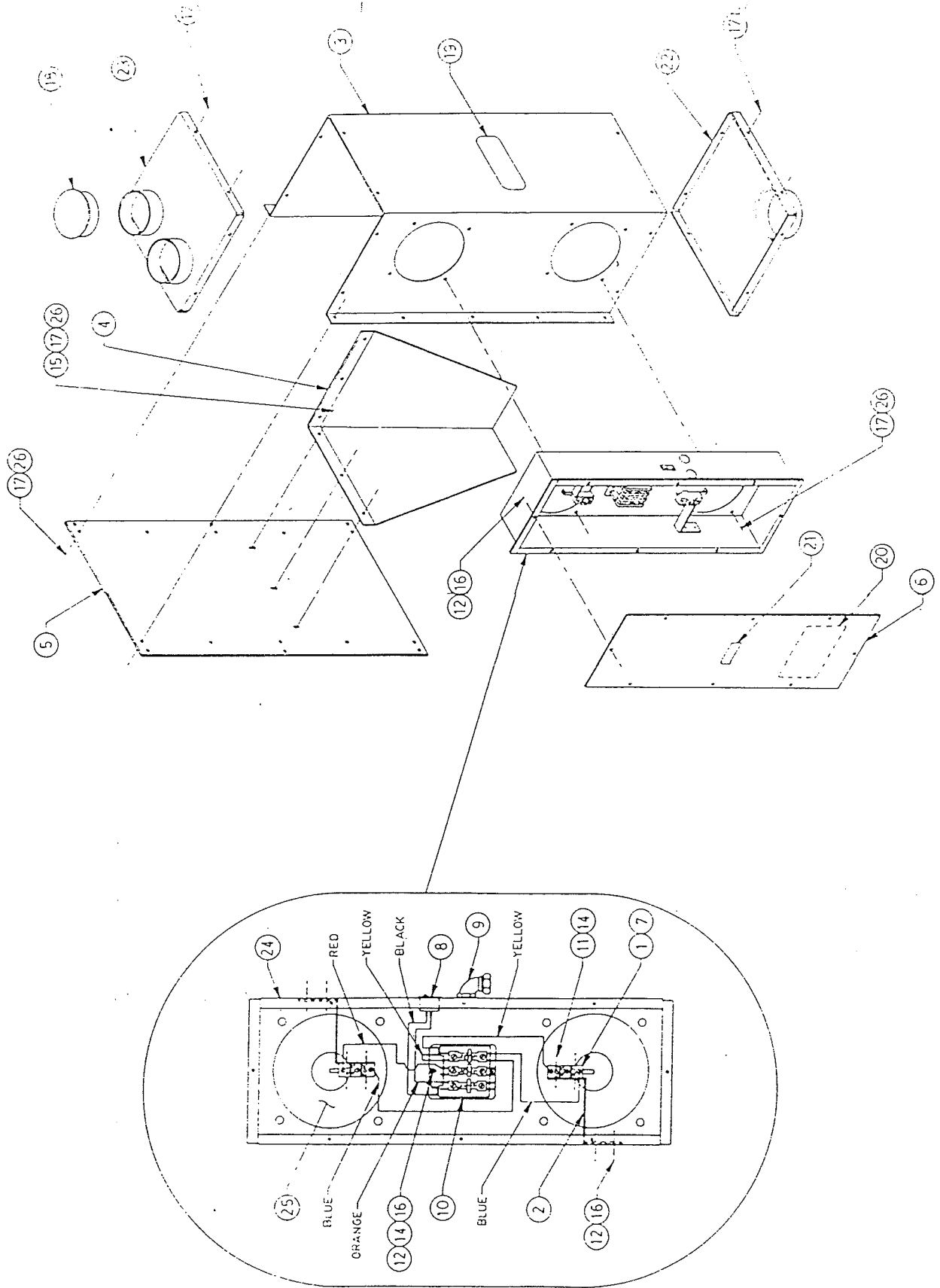


Figure 25 - Double diaphragm control hopper

DOUBLE DIAPHRAGM CONTROL HOPPER - 93104801

ITEM	PART NO.	QTY.	DESCRIPTION
1	10793000	2	MICROSWITCH
2	11047900	2	MOUNTING BRACKET
3	11190010	1	WRAPPER
4	11190020	1	TRANSITION
5	11190040	1	BACK PLATE
6	11190050	1	COVER - SWITCH BOX
7	11195950	2	INSULATIONP
8	31008018	1	SWITCH SPST - ON/OFF
9	31002621	1	CONDUIT FITTING - 90 DEGREE 3/8"
10	32411240	1	RELAY
11	64681822	4	MACHINE SCREW #6 X 1
12	65482212	12	MACHINE SCREW #8 X 1/2
13	66082200	4	HEX NUT #8
14	66402200	6	FLAT WASHER #8
15	66403300	6	FLAT WASHER 1/4
16	66442200	14	LOCKWASHER #8
17	66443300	40	LOCKWASHER 1/4
18	80001001	1	CAPLUG 4" ID
19	80003502	1	DECAL - MIX-MILL
20	80003513	1	DECAL - CONTROL HOPPER
21	80006506	1	WARNING LABEL
22	90000001	1	END PLATE ASSEMBLY - BOTTOM
23	90000002	1	END PLATE ASSEMBLY - TOP
24	92000001	1	SWITCH BOX ASSEMBLY
25	93104800	1	DIAPHRAGM ASSEMBLY
26	65483312	40	MACHINE SCREW 1/4 X 1/2

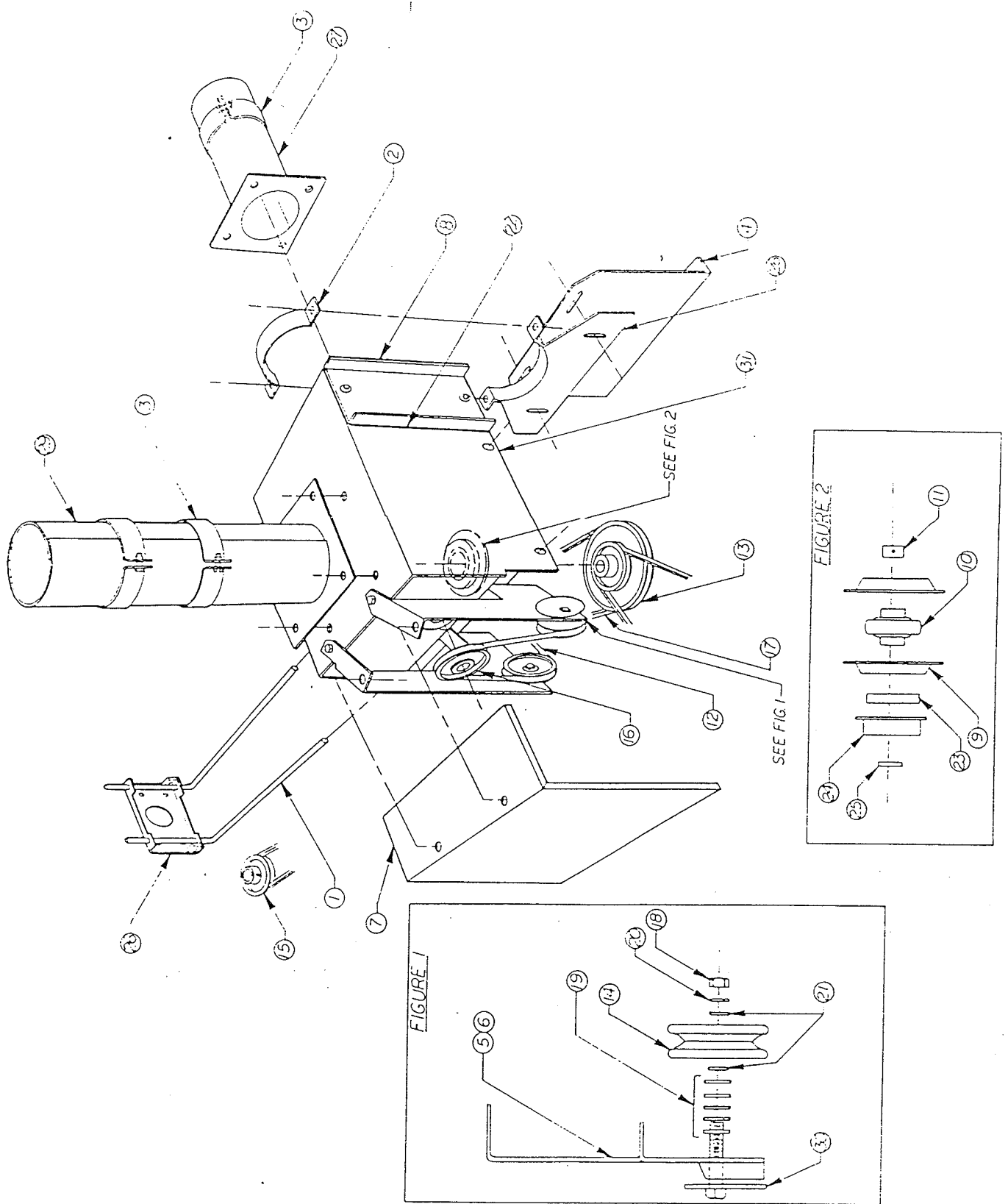


Figure 26 - Auger corner

AUGER CORNER -93062876

ITEM	PART NO.	QTY.	DESCRIPTION
1	10045800	2	MOTOR MOUNTING ROD
2	10215901	1	HALF CLAMP
3	10322902	3	CLAMP RING
4	10637900	1	PLATE - ADJUSTABLE
5	10722701	1	RH IDLER BRACKET
6	10722702	1	LH IDLER BRACKET
7	10722800	1	GUARD - BELT
8	10971301	1	COVER - CLEANOUT
9	40000016	4	STAMPING 5/8 BEARING
10	40000017	2	BEARING 5/8
11	40000018	2	LOCK COLLAR 5/8
12	40000502	1	ROUND BELT
13	40003508	1	STEP SHEAVE
14	40005001	2	IDLER PULLEY 3"
15	41301304	1	SHEAVE 3" X 5/8 BORE
16	42104604	1	SHEAVE 5" X 5/8 BORE
17	45001041	1	V-BELT 41" OUTSIDE
18	66084400	2	HEX NUT 3/8
19	66404400	10	FLAT WASHER 3/8
20	66444400	2	LOCKWASHER 3/8
21	70011501	4	WASHER - SPECIAL 3/8
22	80004511	1	GASKET - CLEANOUT
23	80011506	1	BEARING SEAL
24	80011507	1	SEAL RETAINING CUP
25	80014502	2	THRUST WASHER
26	93004552	1	HEAD PLATE ASSEMBLY
27	93030371	1	TUBE AND PLATE ASSEMBLY
28	93063801	1	SUPPORT CLAMP ASSEMBLY
29	93072321	1	TUBE AND PLATE ASSEMBLY W/STOP
30	93078621	2	BELT TIGHTENER
31	93094141	1	AUGER CORNER WELDMENT

SECTION VII - SCHEMATIC AND WIRING DIAGRAMS

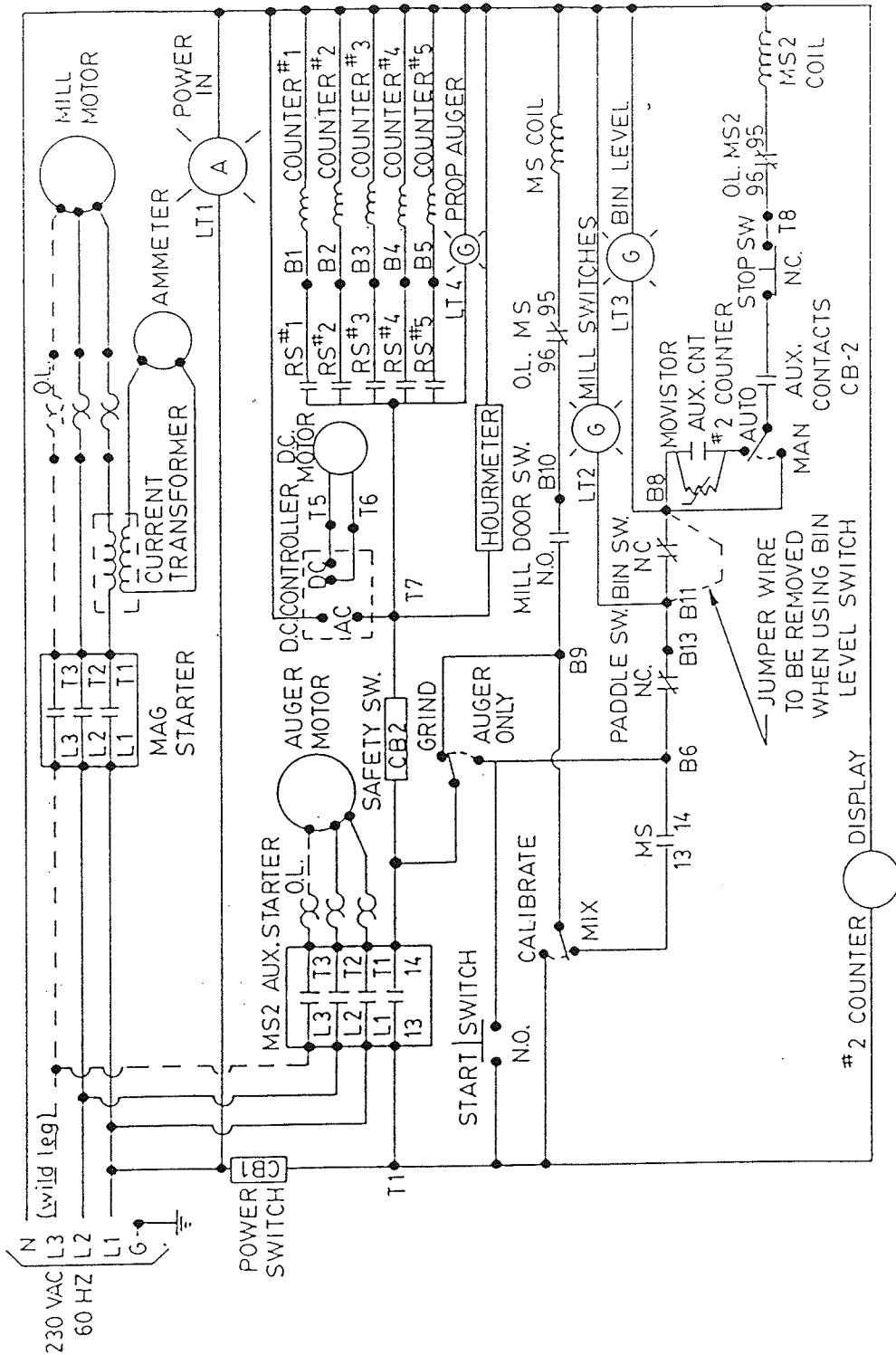


Figure 37 - D Mill Schematic (conversion)







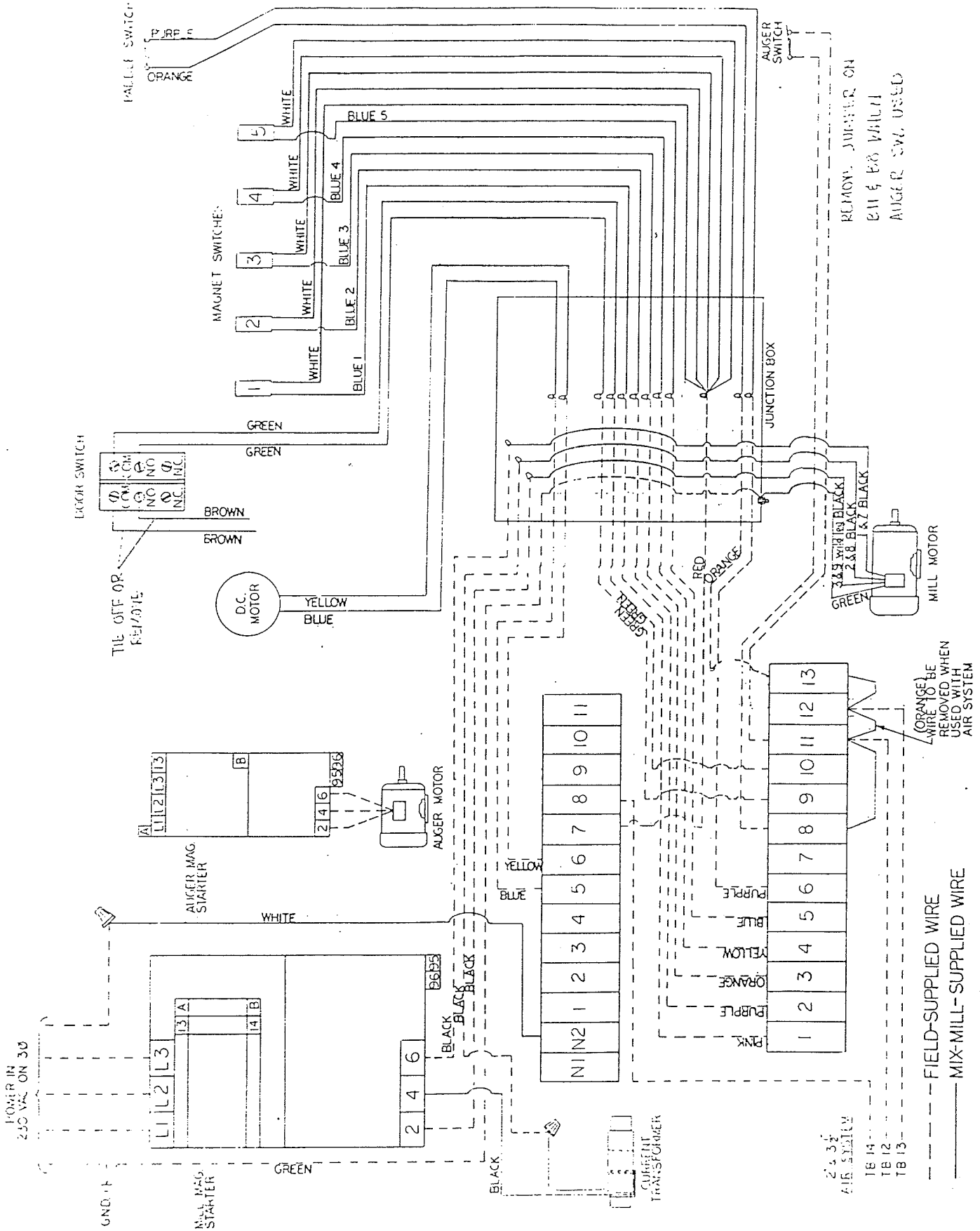
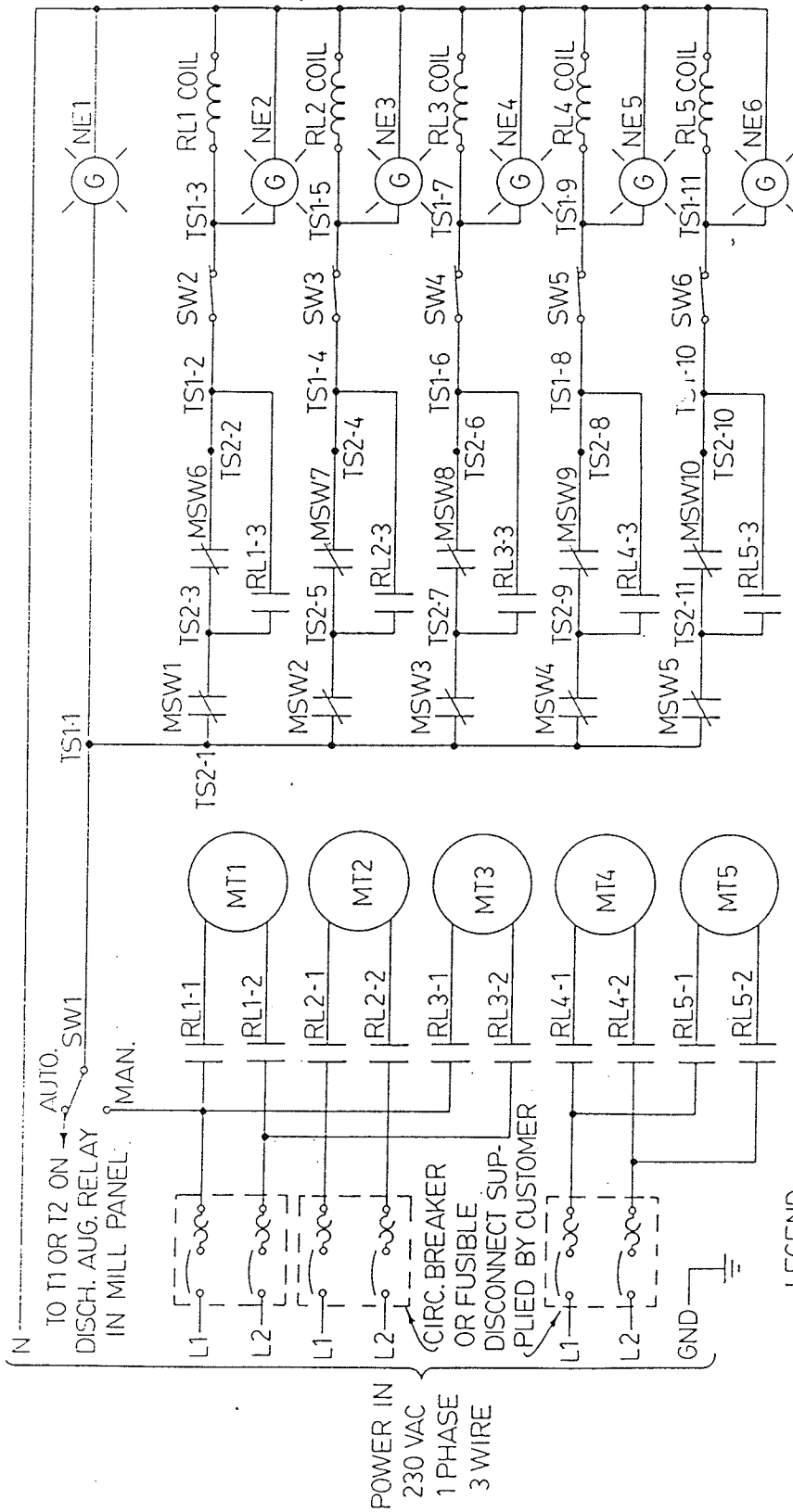


Figure 30 - D Mill External Wiring 3Ø (conversion)



LEGEND

- RL = RELAY
- MT = MOTOR
- SW = SWITCH
- MSW = MICROSWITCH
- NE = NEON LAMP
- G = GREEN
- TS1 = TERMINAL STRIP IN GROUND LEVEL CONTROL PANEL
- TS2 = TERMINAL STRIP IN GROUND LEVEL ATTACHMENT

NOTE: MSW1 THRU MSW5 ARE THE TOP SWITCHES ON THE GROUND LEVEL ATTACHMENT. MSW6 THRU MSW10 ARE THE BOTTOM SWITCHES.

Figure 31 - Schematic, Ground Level Attachment

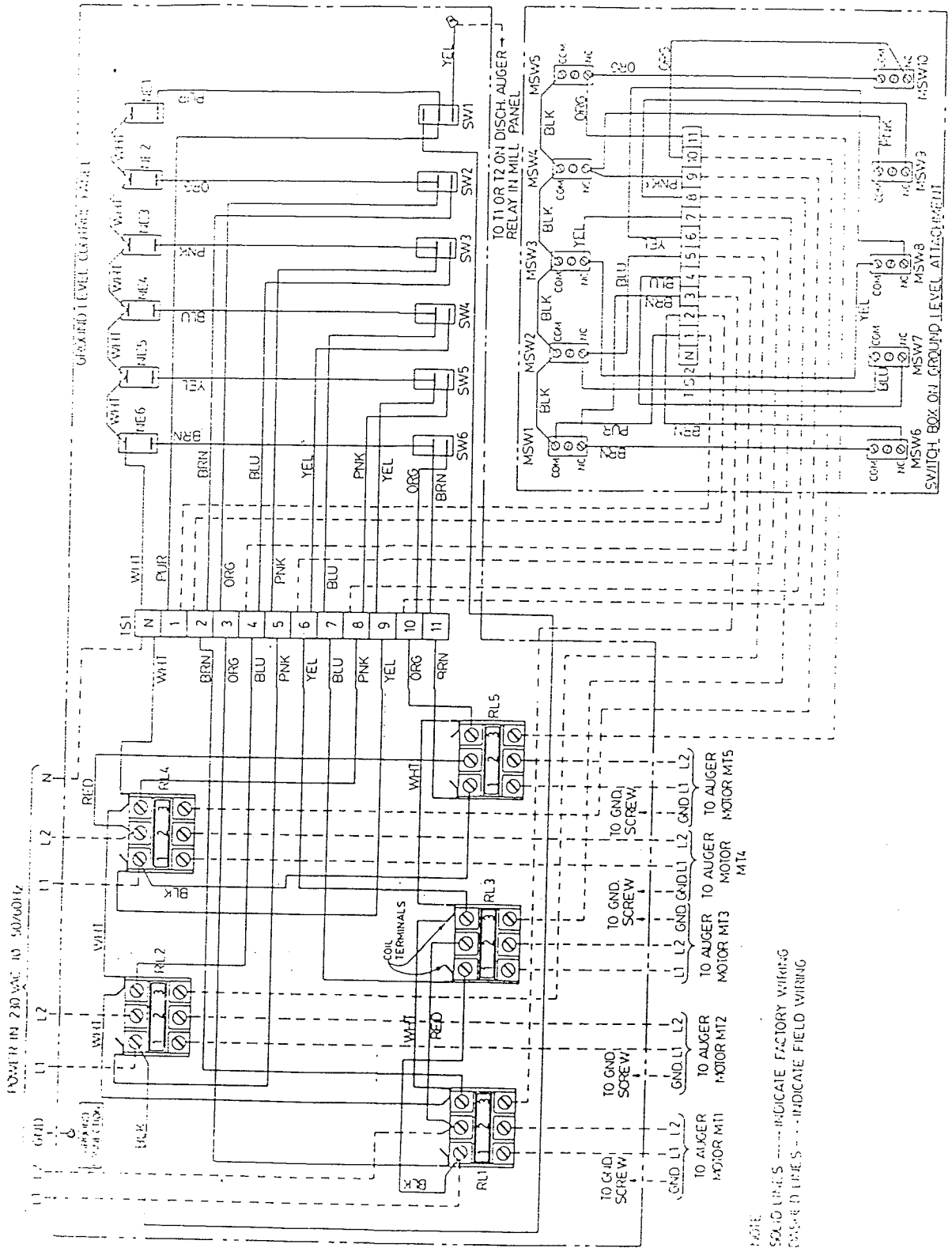


Figure 32 - Wiring, Ground Level Attachment

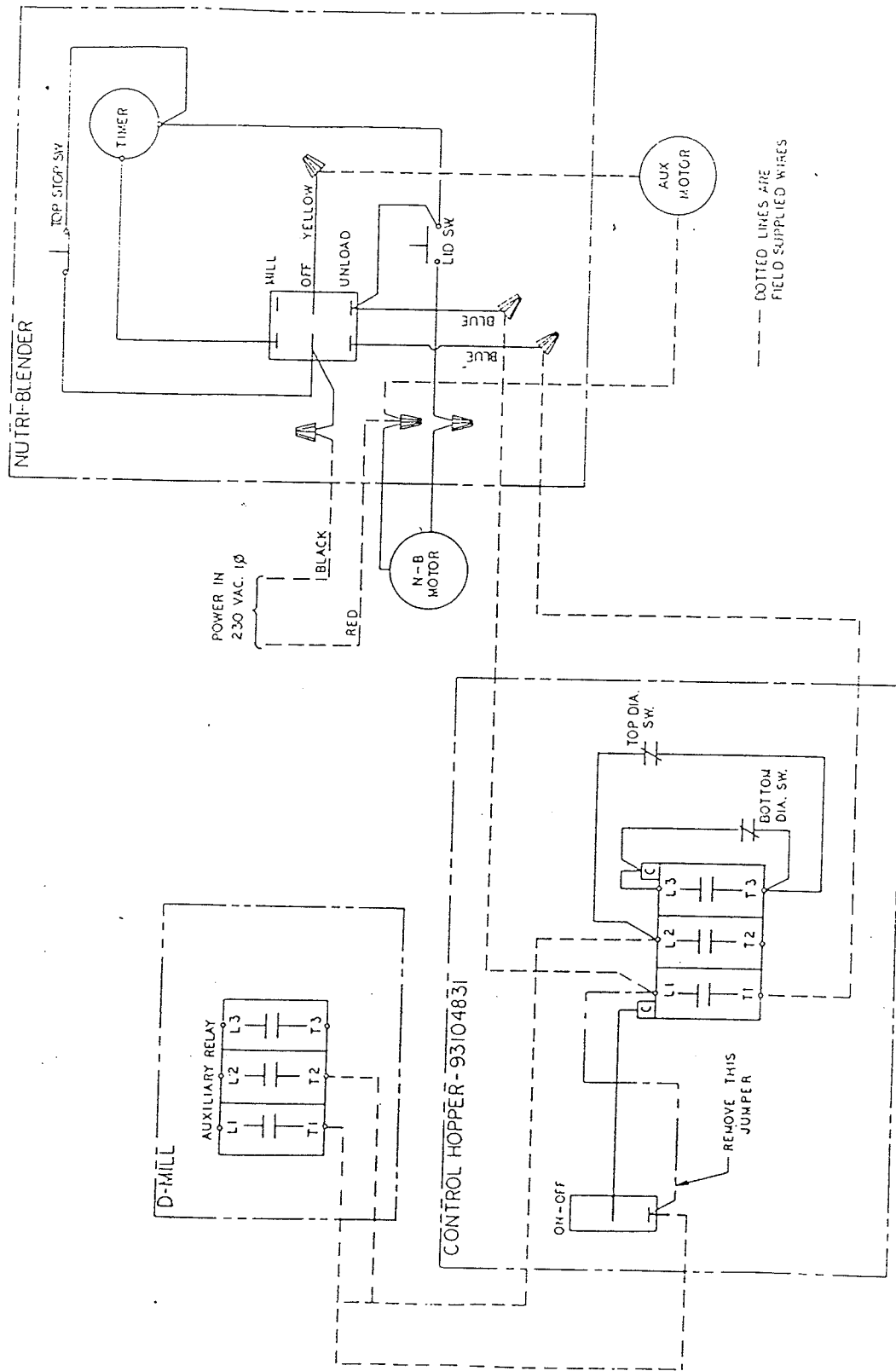


Figure 33 - Interlock Wiring, Nutri Blender and Control Hopper

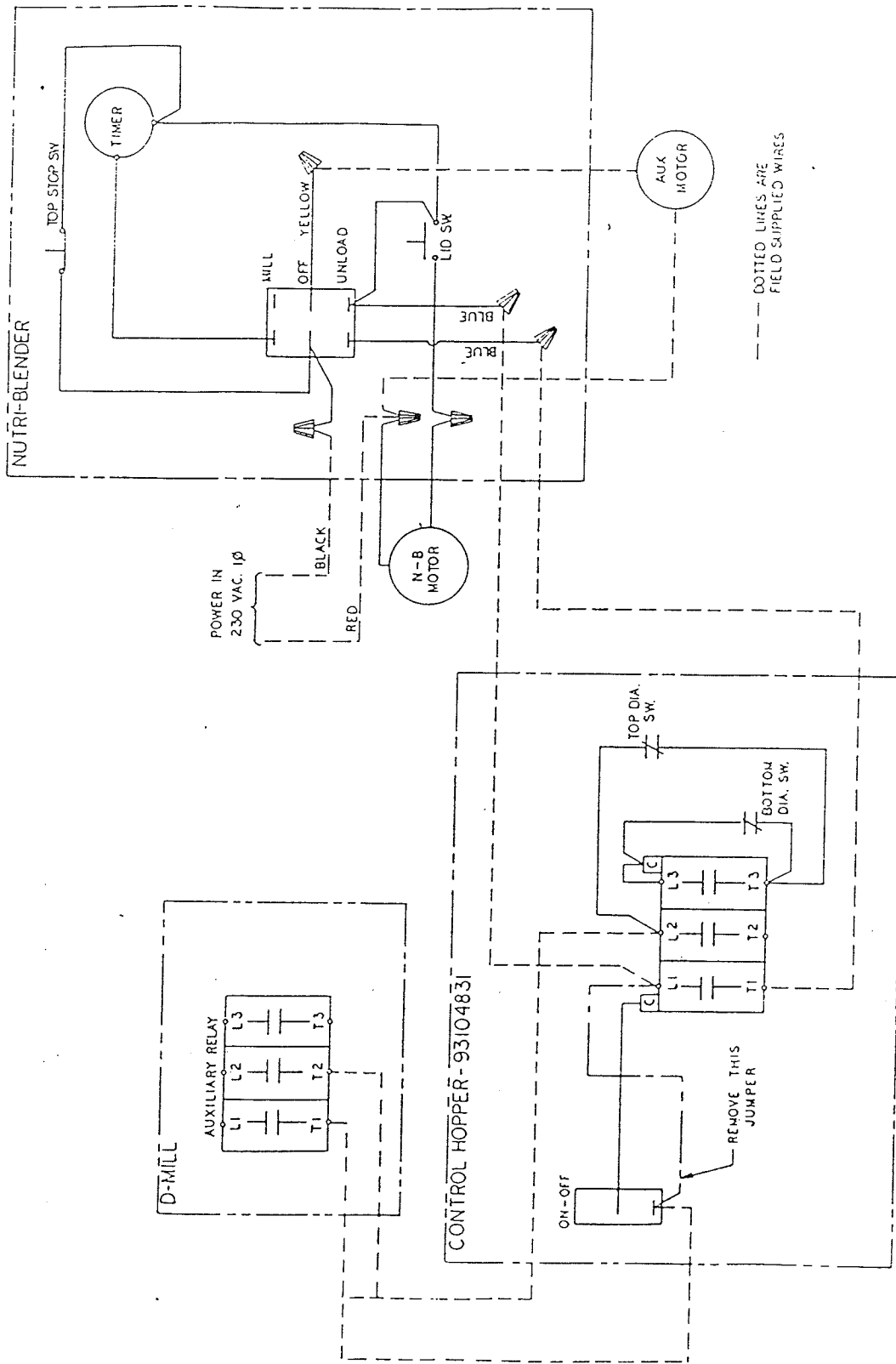


Figure 33 - Interlock Wiring, Nutri Blender and Control Hopper

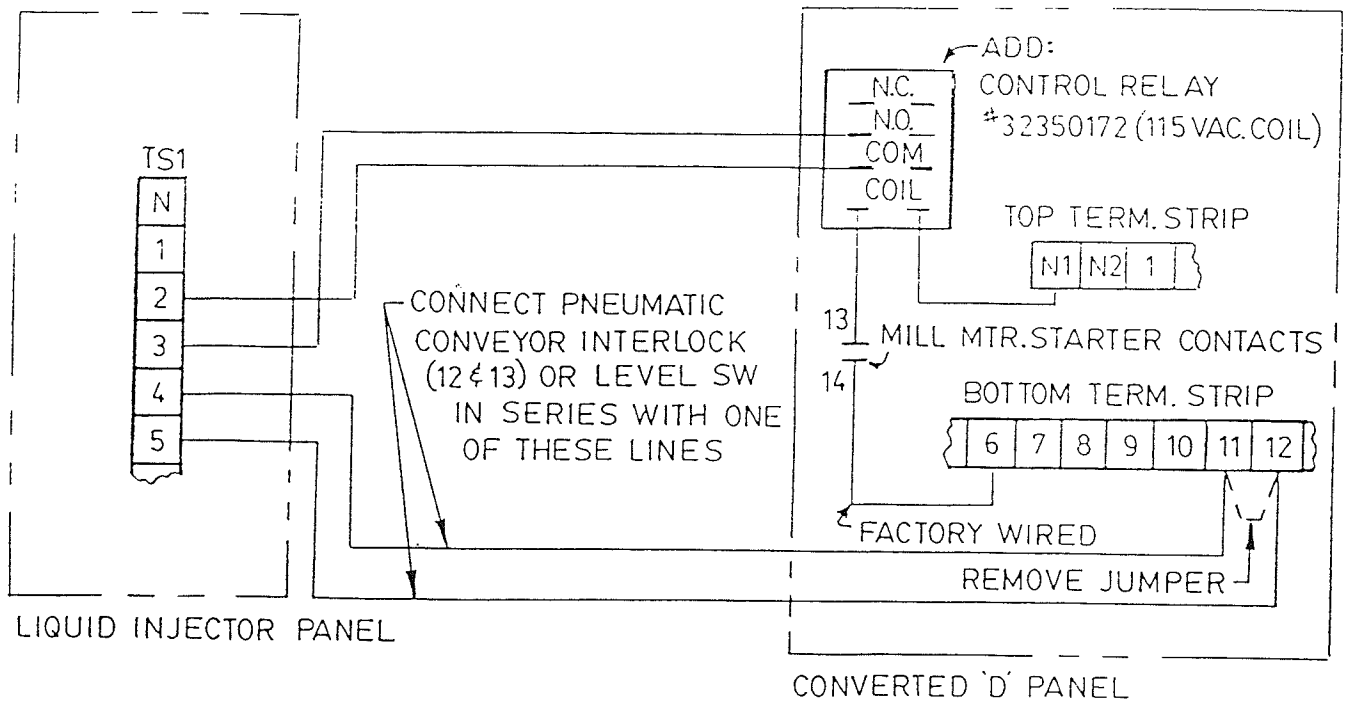


Figure 34 - Interlock Wiring, Liquid Injector



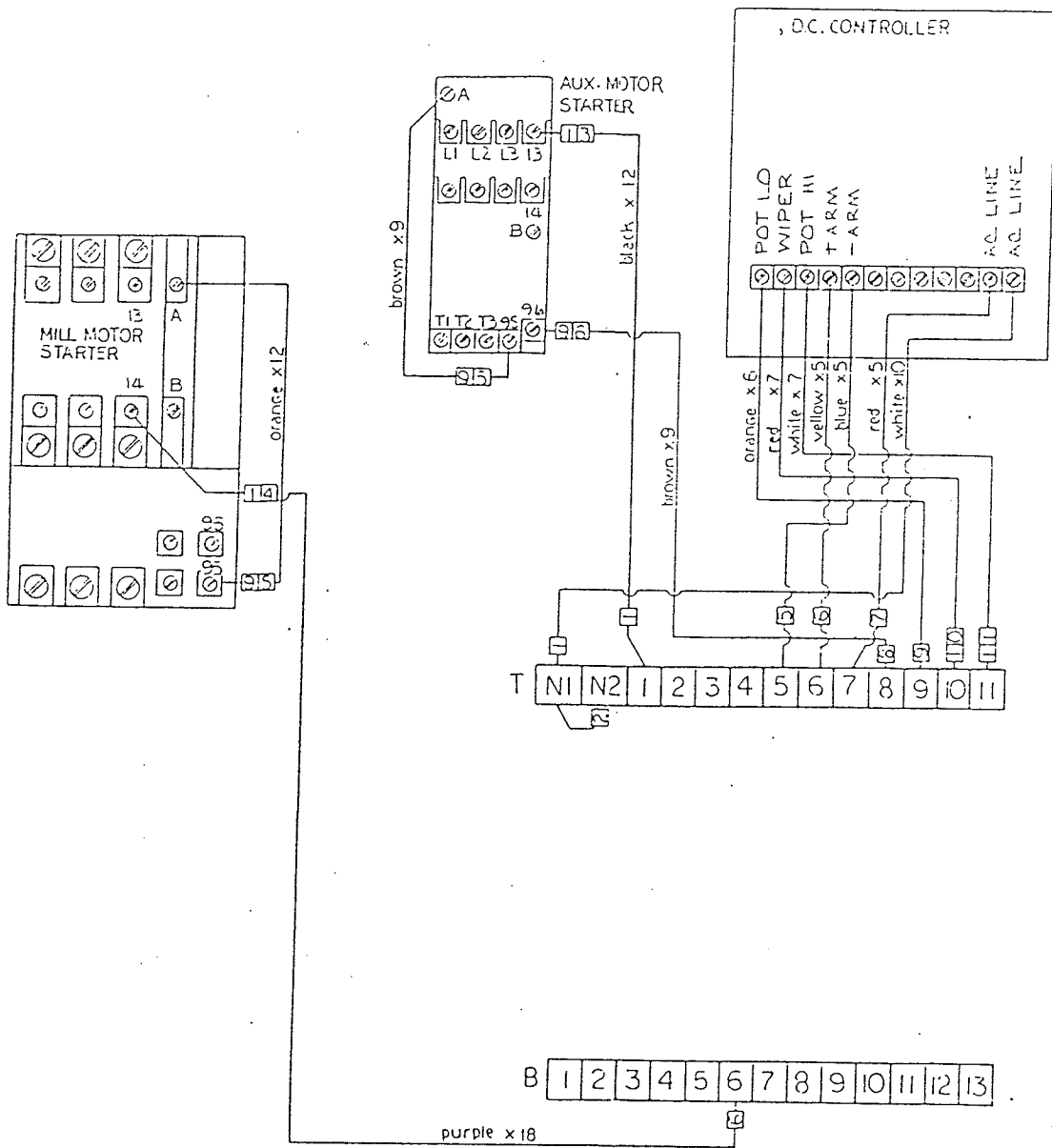
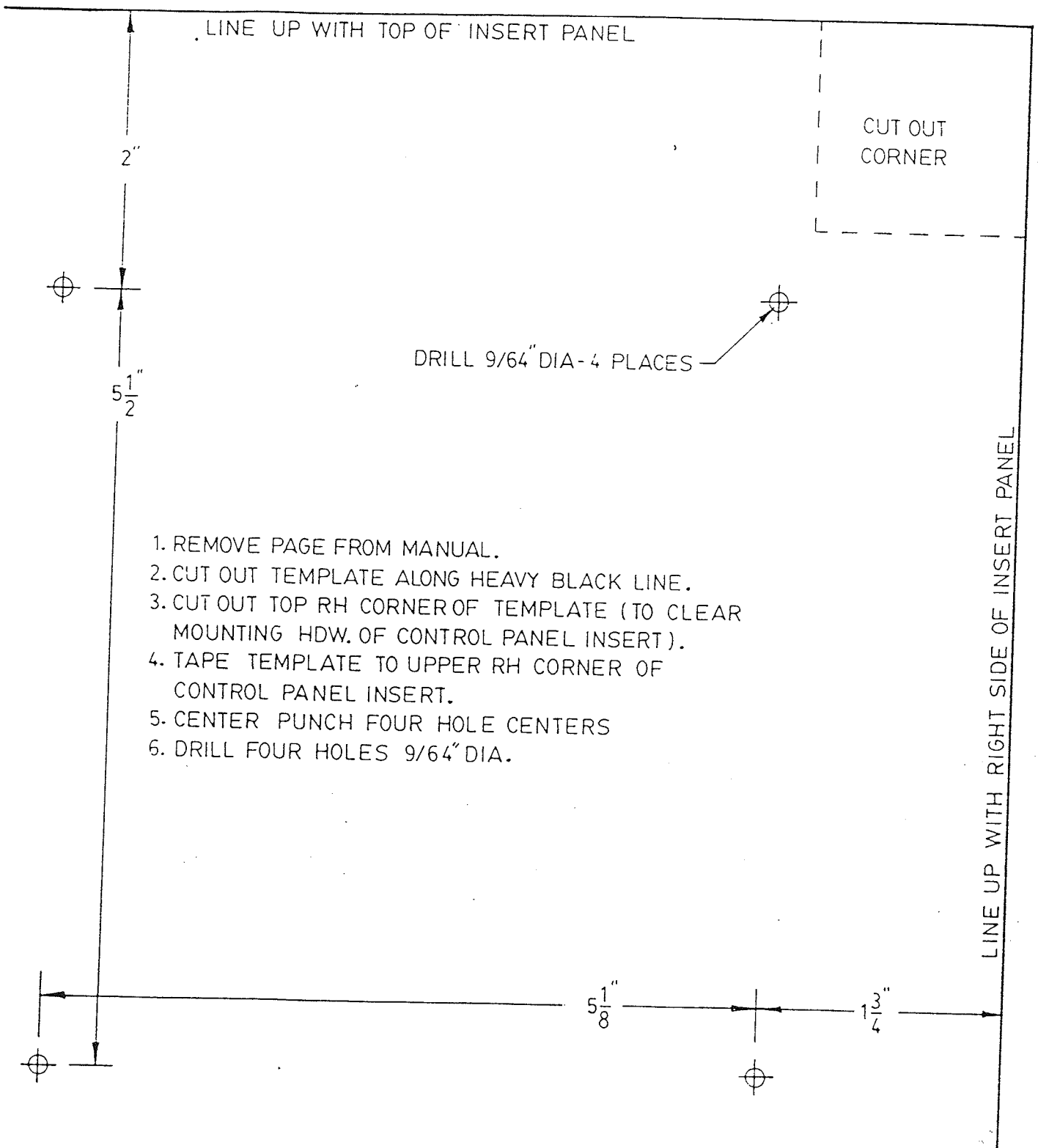


Figure 4 - Wires to add in step 6



1. REMOVE PAGE FROM MANUAL.
2. CUT OUT TEMPLATE ALONG HEAVY BLACK LINE.
3. CUT OUT TOP RH CORNER OF TEMPLATE (TO CLEAR MOUNTING HDW. OF CONTROL PANEL INSERT).
4. TAPE TEMPLATE TO UPPER RH CORNER OF CONTROL PANEL INSERT.
5. CENTER PUNCH FOUR HOLE CENTERS
6. DRILL FOUR HOLES 9/64" DIA.

Figure 3 - Template for D.C. Controller location

032888

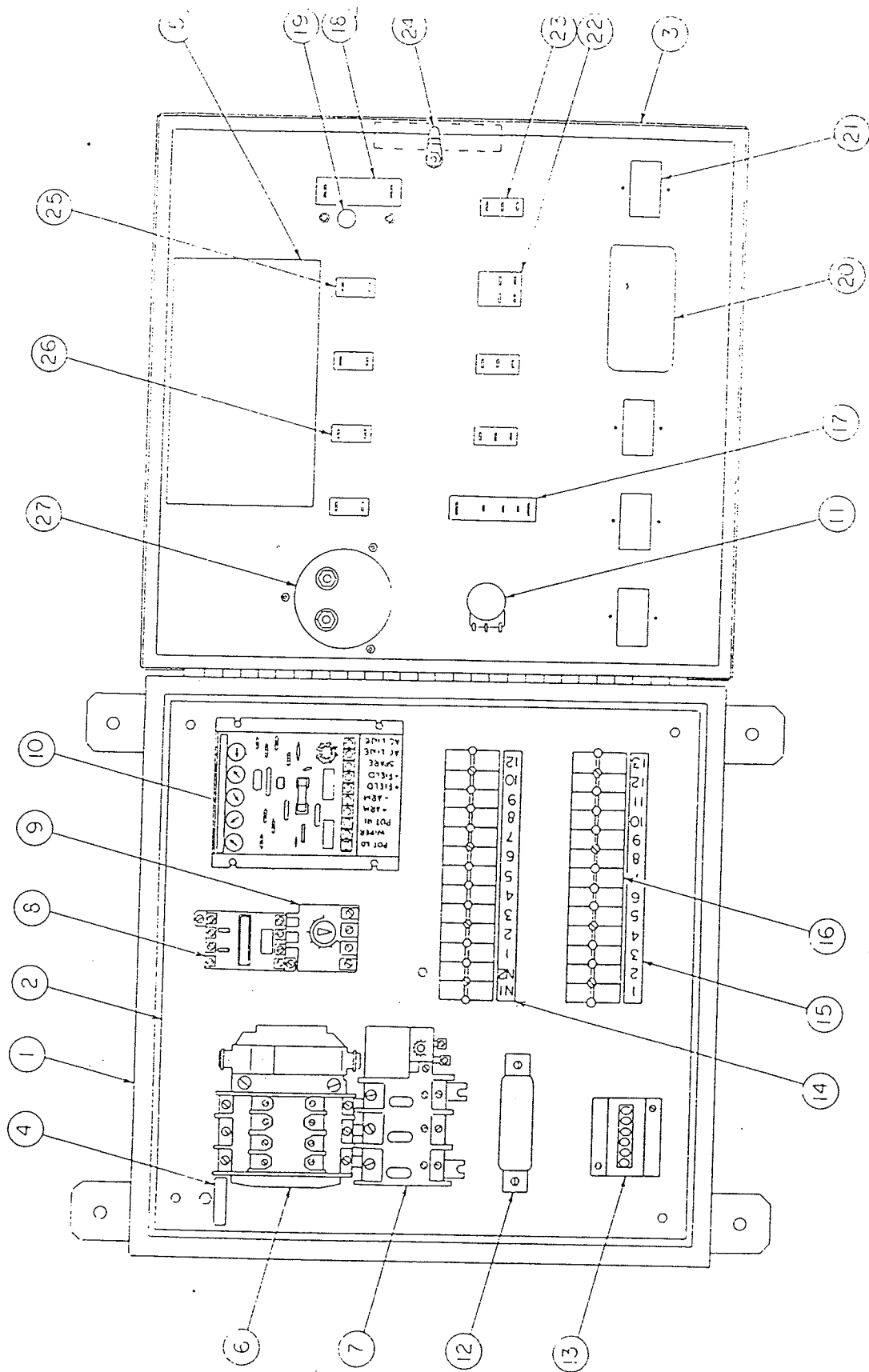


Figure 22 - Converted Control Panel

CONTROL PANEL COMPONENTS (AFTER CONVERSION)

<u>ITEM</u>	<u>PART NO.</u>	<u>QTY.</u>	<u>DESCRIPTION</u>
1	90000487	1	CONTROL BOX WELDMENT
2	11209050	1	PANEL INSERT
3	90000582	1	PANEL FRONT
4	80006501	1	GROUND LABEL
5	80003565	1	SCHEMATIC DECAL
6	31016102	1	CONTACTOR 25 AMP-5HP 1Ø 3Ø, 10HP 3Ø
	OR 31016103	1	40 AMP - 7.5HP 1Ø
	OR 31016104	1	63 AMP - 10HP 1Ø, 20HP 3Ø
7	31016110	1	OVERLOAD RELAY 10-16A - 5HP 3Ø
	OR 31016112	1	20-30A - 5HP 1Ø, 10HP 3Ø
	OR 31016113	1	25-42A - 7.5HP 1Ø, 10HP 1Ø
	OR 31016114	1	40-72A - 20HP 3Ø
8	31016101	1	CONTACTOR 16 AMP
9	31016107	1	OVERLOAD RELAY 2.5-4 AMP
	OR 31016108	1	3.8-6 AMP
10	31012026	1	D.C. CONTROLLER
11	31012010	1	SPEED POT ASSY
12	31013003	1	CURRENT TRANSFORMER
13	31003501	1	HOUR METER
14	80006508	1	DECAL - TERMINAL BLOCK
15	80006508	1	DECAL - TERMINAL BLOCK
16	31009005	26	TERMINAL BLOCK - MODULAR
17	31001004	1	CIRCUIT BREAKER 3 AMP W/AUX SW
18	31001040	1	CIRCUIT BREAKER 5 AMP
19	80010510	1	CAFLUG BPF 5/8
20	31003505	1	COUNTER - LARGE
21	31003504	4	COUNTER SMALL
22	31008021	1	SWITCH - START/STOP
23	31008026	3	SWITCH - SPDT
24	70004501	1	DOOR LATCH
25	31005504	1	GREEN LIGHT
26	31005505	1	AMBER LIGHT
27	31000004	1	AMMETER

Figure 28 - Control Panel Internal Wiring (conversion)

