M·C
MATHEWS COMPANY

Iron Horse Quality

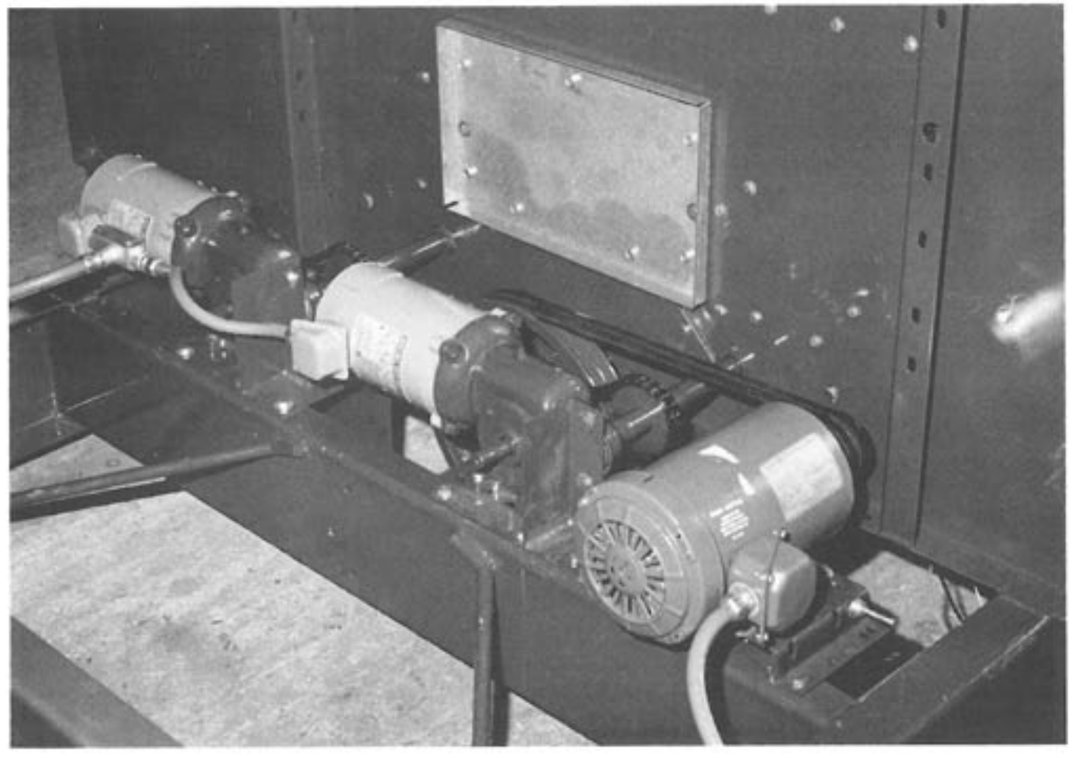
Printed in the United States of America

M·C
MATHEWS COMPANY

# Field Installation of SCR Drive Kits for Model 675EM thru 1195EM Grain Dryers

Starting w/Serial No. 33001

**Kit No. 127 9153 for 230 Volt 3 Phase Dryers**
**Kit No. 127 9154 for 460 and 575 Volt Dryers**



# Installation, Operation and Parts Manual

Form No. D178, September 1984

**B.C. Mathews Co./** 500 Industrial Ave., Crystal Lake, IL 60014, U.S.A.
815/459-2210 Telex 72-2488

**CAUTION:** Before starting to install the SCR Drive Kit, disconnect the electric power supply to the dryer and lock the main electric supply cabinet. Flip all switches on the dryer control cabinet to the OFF position. Turn off the main gas supply to the dryer.

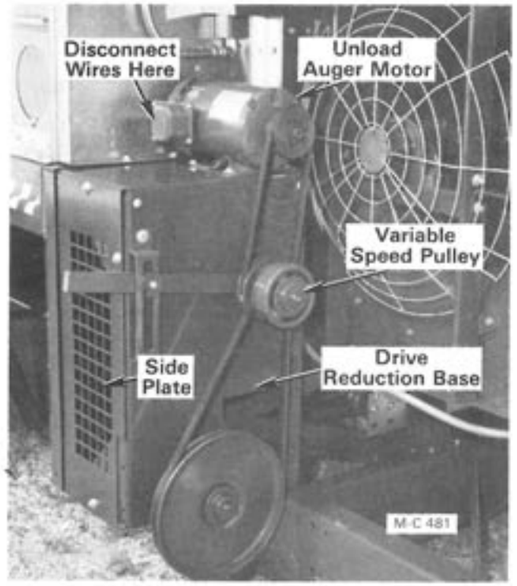



Figure 1

## Ratchet System Removal

1. Remove the variable speed pulley guard and the drive reduction base side plate, see Figure 1.
2. Disconnect the wires to the unload auger motor at the motor. Remove the motor and set it aside for reinstallation later. Do not disconnect the wires from the unload auger magnetic starter in the control cabinet.
3. Disconnect the transfer arms from the eccentric sprocket. Remove the unload auger chain and remove the drive reduction base assembly.
4. Disconnect the ratchet solenoid power cords at the conduit junction boxes see Figure 2.
5. Remove the entire ratchet assembly, ratchet wheels and unload auger sprocket. Set the two metering roll bearings and attaching hardware aside for reinstallation later.

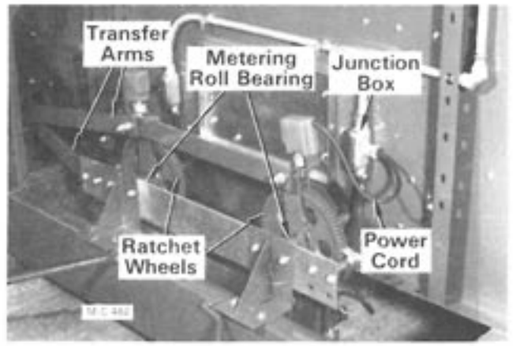



Figure 2

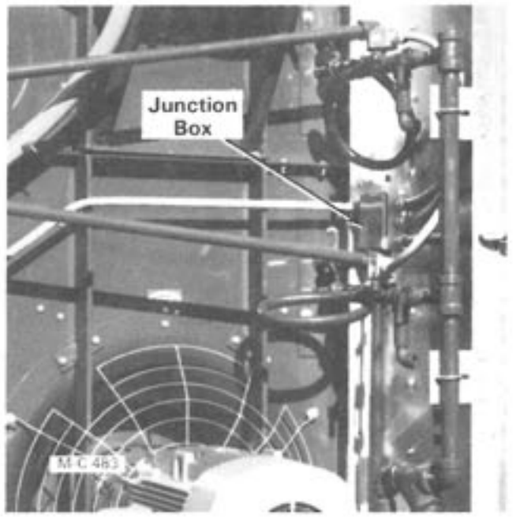



Figure 3

6. Take the cover off of the junction box on the left side of the dryer, see Figure 3. Cut and tape the six (6) wires going to the ratchet solenoids, see Figure 4. Wire codes shown in Figure 4 are imprinted on the wires.
7. Pull all disconnected ratchet solenoid wires out of the conduit. Remove the conduit from the front of the dryer up to the junction box. Close off the open end of the 90° fitting to keep moisture out.

## Dryer Base Rework

**(Dryers below S/N 43657 only)**

1. Drill five 13/32" holes in the outboard bearing mount channel, see Figure 5.



| Ref. | Part No. | Qty. | Description |
|---|---|---|---|
| 15 | 121 6906 | 1 | Pipe Clamp |
| | 000 8212 | 1 | ¼-20 x ½" Truss Hd. Screw |
| | 000 8167 | 1 | ¼-20 Flanged Whiz Locknut |
| 16 | 124 4803 | 4 | Drive Cover Brkt. - Long |
| | 000 8104 | 2 | 5/16-18 x ¾" Truss Hd. Screw |
| | 000 8169 | 2 | 5/16-18 Flanged Whiz Locknut |
| 17 | 124 4804 | 4 | Drive Cover Brkt. Short |
| | 000 8104 | 4 | 5/16-18 x ¾" Truss Hd. Screw |
| | 000 8169 | 4 | 5/16-18 Flanged Whiz Locknut |
| 18 | 124 4802 | 2 | Drive Cover - Right & Left |
| 19 | 001 8314 | 2 | Caution Safety Decal |

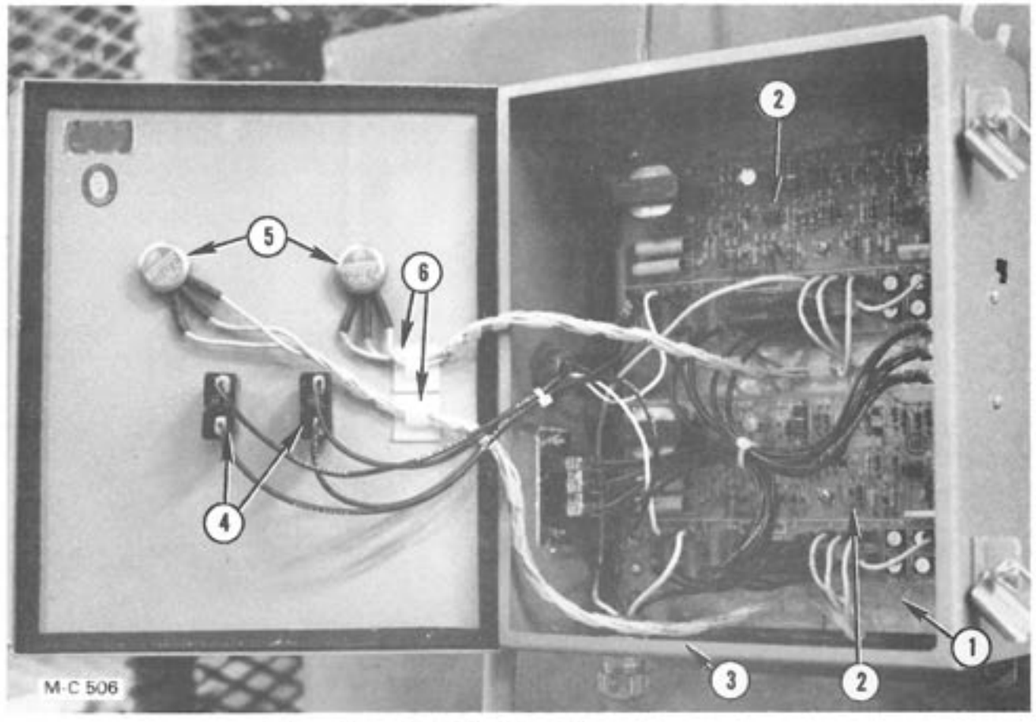



Figure 29 - SCR Drive Control Box Components

| Ref. | Part No. | Qty. | Description |
|---|---|---|---|
| 1 | 128 2939 | 1 | SCR Board Mt. Plate |
| | 000 8191 | 4 | 8-32 x ⅜" Slotted Screw |
| | 000 8188 | 4 | 8-32 Hex Nut |
| 2 | 124 6836 | 2 | SCR Control Board |
| | 128 8252 | 10 | No. 8-18 x 1" Phil. Pan. Hd. Screw |
| | 128 6832 | 10 | Tube ⅜"OD x 3/16 ID x ⅝" |
| 3 | 128 5806 | 1 | SCR Control Box |
| | 125 6943 | 1 | Grounding Lug |
| | 000 8212 | 2 | ¼-20 x ½" Truss Hd. Screw |
| | 000 8211 | 2 | ¼-20 x ¾" Truss Hd. Screw |
| | 000 8172 | 2 | ¼" Flatwasher |
| | 000 8167 | 4 | ¼-20 Flanged Whiz Locknut |
| 4 | 124 6848 | 2 | 8 Amp. Circuit Breaker |
| 5 | 124 6838 | 2 | Potentiometer |
| | 000 8191 | 4 | 8-32 x ⅜" Sltd. Screw |
| | 000 8188 | 4 | 8-32 Hex Nuts |
| 6 | 124 6840 | 2 | Adhesive Cord Clip |

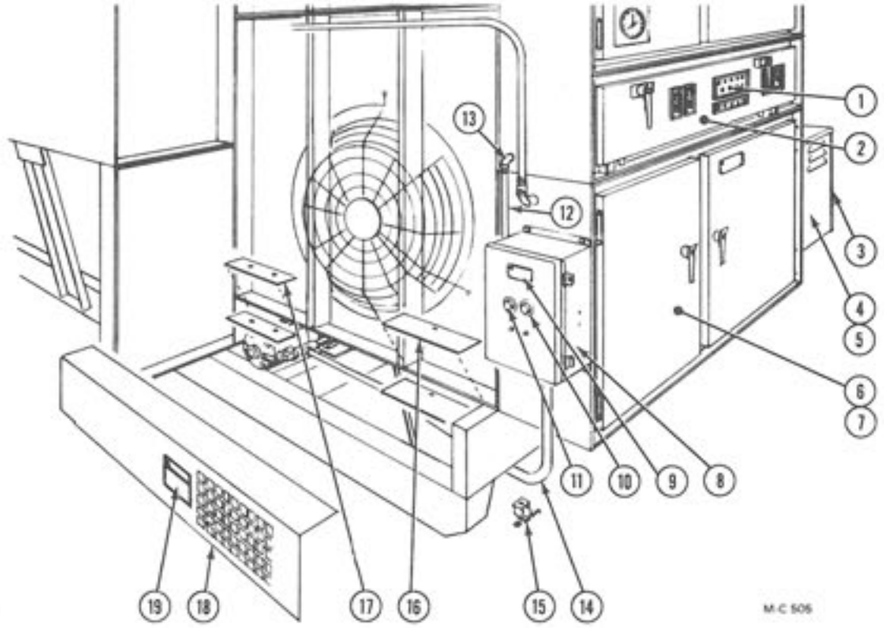



Figure 28 - SCR Drive Transformer and Electrical Components

| Ref. | Part No. | Qty. | Description |
|---|---|---|---|
| 1 | 120 6827 | 1 | Unload Auger Toggle Switch (DPDT) |
| 2 | 128 6852 | 1 | 15 Amp. Fuse - NON15 |
| 3 | 127 4881 | 1 | Transformer Cabinet Door |
| | 001 8111 | 4 | 5/16-18 Clip Nut |
| | 128 8112 | 4 | 5/16" Flatwasher w/Rubber Seal |
| | 000 8108 | 4 | 5/16-18 x 1" Hex-Hd. Capscrew |
| 4 | 127 0028 | 1 | Transformer Cabinet |
| | 000 8121 | 2 | ⅜-16 x 1" Hex-Hd. Capscrew |
| | 000 8119 | 2 | ⅜-16 x ¾" Hex-Hd. Capscrew |
| | 000 8174 | 2 | ⅜" Flatwasher |
| | 000 8168 | 4 | ⅜-16 Flanged Whiz Locknut |
| | 125 6900 | 1 | Universal Bushing |
| 5 | 128 6987 | 1 | Transformer 230/460/575 Volt - 2000 VA |
| | 001 8135 | 4 | ⅜-16 x 1" Hex-Hd. Capscrew - Grd. 5 |
| | 000 8174 | 4 | ⅜" Flatwasher |
| | 000 8168 | 4 | ⅜-16 Flanged Whiz Locknut |
| 6 | 203 6801 | 1 | Double Fuse Block-230 Volt |
| | 121 6988 | 2 | Fuse Holder - 460 & 575 Volt |
| | 001 8106 | 4 | 10-32 x ¾" Phil. Self Tapping Screw |
| | 000 8183 | 4 | No. 10 Lockwasher (Star Tooth) |
| 7 | 120 6837 | 2 | Fuse FRN R20 - 230 Volt |
| | 121 6984 | 2 | Fuse FRS 10 - 460 Volt |
| | 124 6844 | 2 | Fuse FRS 9 - 575 Volt |
| 8 | 128 5806 | 1 | SCR Control Box |
| | 125 6943 | 1 | Grounding Lug |
| | 000 8212 | 2 | ¼-20 x ½" Truss Hd. Screw |
| | 000 8211 | 2 | ¼-20 x ¾" Truss Hd. Screw |
| | 000 8172 | 2 | ¼" Flatwasher |
| | 000 8167 | 4 | ¼-20 Flanged Whiz Locknut |
| 9 | 121 8316 | 2 | Safety Warning Decal |
| 10 | 124 6849 | 2 | Vernier Dial (0 to 100) |
| 11 | 124 6839 | 2 | Knob |
| 12 | 124 6821 | — | ⅜" Liquatite (qty. indicates ft.-order 2) |
| 13 | 124 6824 | 2 | ⅜" Connector - 90° |
| 14 | 128 1808 | 1 | SCR Motor to Cabinet Liquatite |



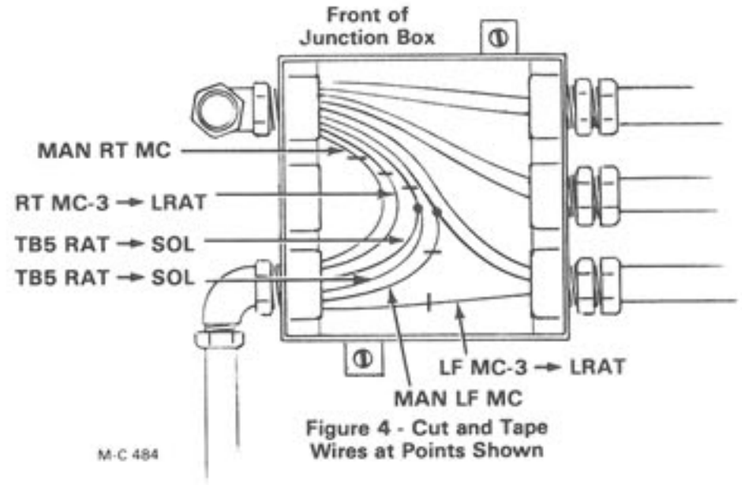



Figure 4 - Cut and Tape Wires at Points Shown

Figure 4

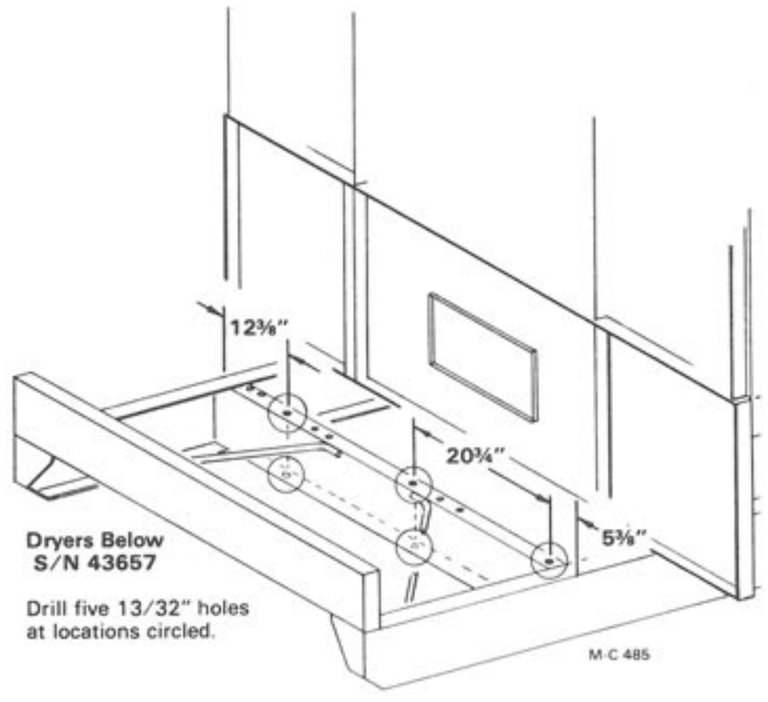



Figure 5

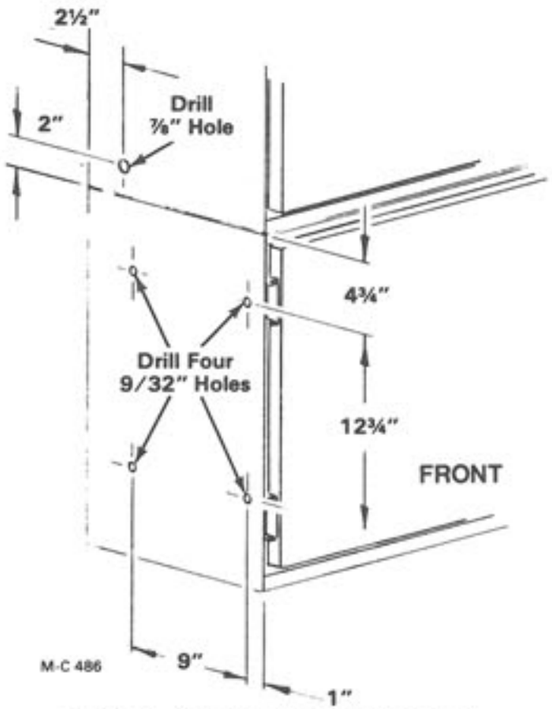



Figure 6 - Control Cabinet (Right Side)

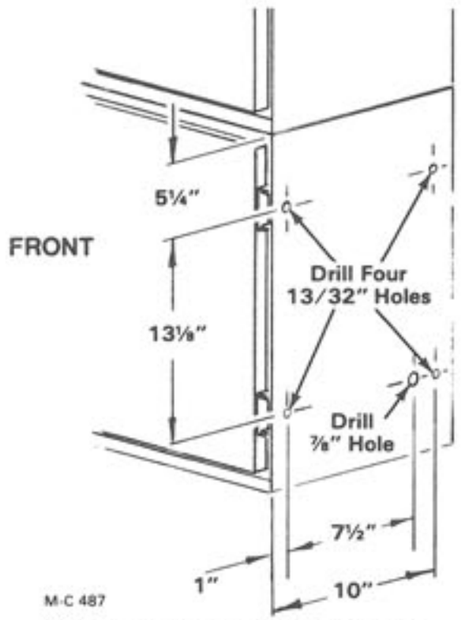



Figure 7 - Control Cabinet (Left Side)

## Control Cabinet Rework

1. Drill four 9/32" holes in the right side of the lower cabinet and one ⅞" hole in the right side of the middle cabinet as shown in Figure 6. These are the mounting holes for the SCR control box.
2. Drill four 13/32" holes and one ⅞" hole in the left side of the lower cabinet as shown in Figure 7. These are the mounting holes for the transformer cabinet.

## Sprocket and Pulley Installation

**NOTE:** Installing the sprockets and pulley as explained below will assure that the chains and belts will be lined up when the SCR motors (with gear box) and the unload auger motor are installed.

### SCR Gear Box Sprocket

1. Tap each SCR gear box sprocket (12 teeth) onto the gear box shaft (hub facing out) until the distance from the end of the shaft to the hub of the sprocket is 7/16", see Figure 8.

**NOTE:** The gear boxes will be to the left when installed, see Figure 11.

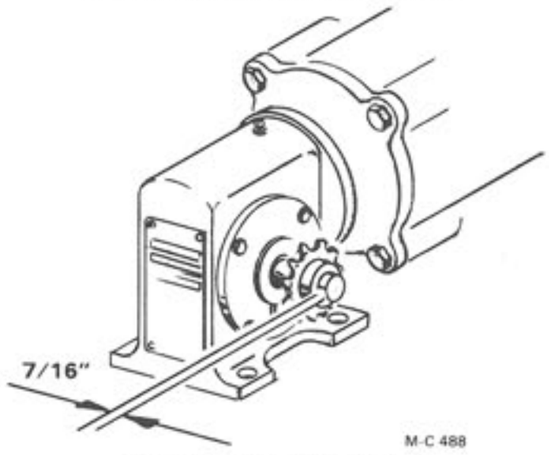



Figure 8 - Gear Box Sprocket

### Metering Roll Sprocket

1. Tap each metering roll sprocket (24 teeth) onto the metering roll shaft (hub facing in) until the distance from the front of the dryer to the face of the sprocket is 6½", see Figure 9. Tighten the set screws.

### Unload Auger Pulley

1. The unload auger pulley is held on the shaft with a tapered bushing.



| Ref. | Part No. | Qty. | Description |
|---|---|---|---|
| 7 | 000 8298 | 2 | Woodruff Key ¼" x ¾" |
| 8 | 128 6413 | 2 | Sprocket RC-40, 24 Tooth, Type-B |
| 9 | 121 6022 | 2 | Outboard Bearing (not incl. in kit) |
| 10 | 124 6624 | 2 | SCR Gear Box - 60 to 1 Ratio (incl. ref. 6) |
| | 000 8123 | 8 | ⅜-16 x 1¼" Hex-Hd. Capscrew |
| | 000 8174 | 8 | ⅜" Flatwasher |
| | 000 8168 | 8 | ⅜-16 Flanged Whiz Locknut |
| 11 | 128 0257 | 2 | Gear Box & Motor Mount |
| | 000 8121 | 9 | ⅜-16 x 1" Hex-Hd. Capscrew |
| | 000 8174 | 9 | ⅜" Flatwasher |
| | 000 8168 | 9 | ⅜-16 Flanged Whiz Locknut |
| 12 | 021 6100 | 1 | B-65 Belts (matched set of 2) |
| 13 | 128 6230 | 1 | SH Bushing ⅝" Bore - For 1½ HP Motor |
| 14 | 128 6237 | 1 | 2B-SH Sheave - For 1½ HP Motor |
| | 121 6203 | 1 | 2B ⅞" Bore Pulley - For 2 HP Motor |

| Ref. | Part No. | Qty. | Description |
|---|---|---|---|
| 15 | - - - - - - - | — | Unload Auger Motor (not incl. in kit) |
| | 000 8110 | 2 | 5/16-18 x 1½" Hex-Hd. Capscrew |
| | 000 8108 | 2 | 5/16-18 x 1" Hex-Hd. Capscrew |
| | 000 8173 | 10 | 5/16" Flatwasher |
| | 000 8169 | 4 | 5/16-18 Flanged Whiz Locknut |
| 16 | 124 4214 | 1 | Motor Mount |
| | 000 8121 | 2 | ⅜-16 x 1" Hex-Hd. Capscrew |
| | 000 8123 | 1 | ⅜-16 x 1¼" Hex-Hd. Capscrew |
| | 000 8174 | 3 | ⅜" Flatwasher |
| | 000 8168 | 3 | ⅜-16 Flanged Whiz Locknut |
| 17 | 001 8132 | 2 | ⅜-16 x 4" "J" Bolt |
| | 000 8174 | 2 | ⅜" Flatwasher |
| | 000 8168 | 2 | ⅜-16 Flanged Whiz Locknut |
| 18 | 001 5132 | 1 | Key ⅜" x 2" |
| 19 | 001 6202 | 1 | SK Bushing 1-7/16" Bore |
| 20 | 021 6201 | 1 | 2B x 13.6 SK Pulley |
| 21 | 120 6914 | 1 | ½" Chase Nipple |

setting of the screw. This will provide a slight over compensation.

**Problem 7: Motor stalled.**

1. Turn the power off. Connect a DC (direct current) ammeter (not clamp-on type) in series with the wire from the **A1** terminal on the SCR Drive control panel to the motor.
2. Set the SCR Drive control knob at 10 on the dial. Turn the power on. The ammeter reading should be 4.37. If the reading is too low, turn the Current Limit ("CUR L") trim pot screw clockwise. If the reading is too high, turn the screw counterclockwise, see Figure 25, page 15.
3. Disconnect the drive chain between the gear box and grain metering roll.
4. If the motor runs, check the grain metering roll. It may be binding or frozen.
5. If the motor does not run, remove the gear box from the motor. Turn the gear box input shaft. It may be binding or frozen.

## Parts

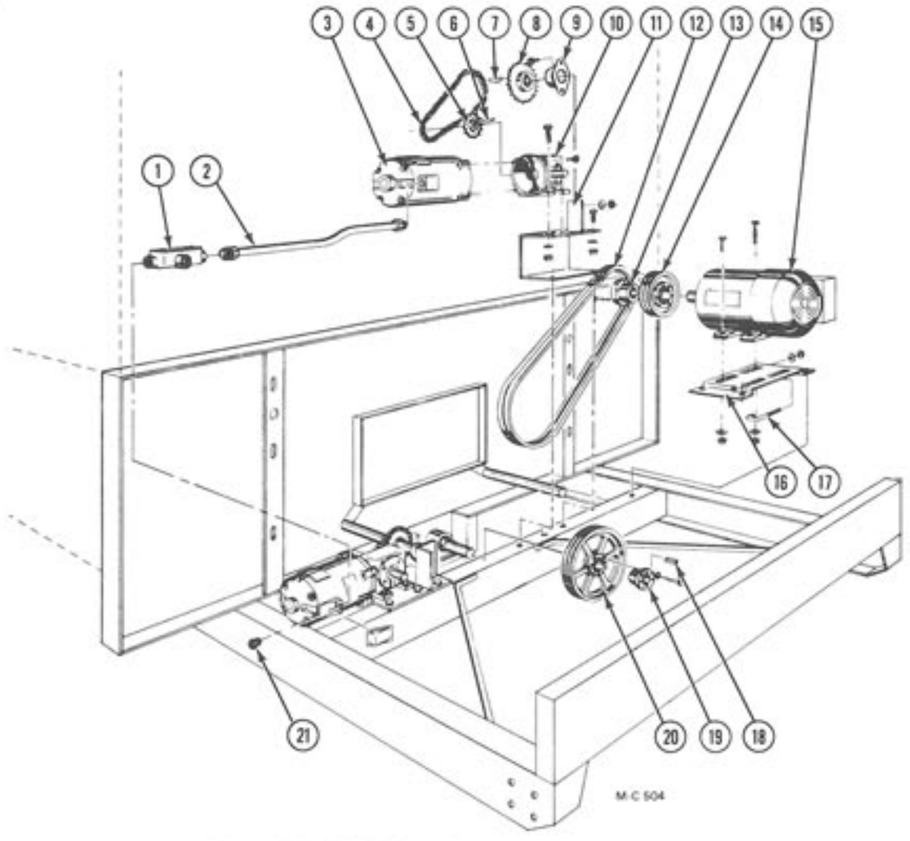



Figure 27 - SCR Drive Gear Boxes and Motors

| Ref. | Part No. | Qty. | Description |
|---|---|---|---|
| 1 | 121 6883 | 1 | ½" Unilet w/Cover & Gasket |
| 2 | 128 1807 | 1 | SCR Motor to Motor Liquatite |
| 3 | 124 6837 | 2 | DC Motor - 1/3 HP |
| 4 | 128 6314 | 2 | Chain RC-40 x 38 Pitch |
| 5 | 128 6422 | 2 | Sprocket RC-40, 12 Tooth, ¾" Bore |
| 6 | 001 5110 | 2 | Key 3/16" x 1" (incl. w/ref. 10) |



2. Before installing the pulley and bushing thoroughly inspect the tapered bore of the pulley and the tapered surface of the bushing. Any paint, dirt, oil or grease **must** be removed.
3. Place the bushing into the pulley. The bushing and the bore of the pulley are tapered. Be sure to install the bushing into the large ID of the pulley tapered bore. If the bushing is installed into the small ID of the pulley, the pulley hub will crack when the mounting capscrews are tightened.
4. Place the three capscrews through the open holes in the bushing and thread them into the pulley by hand. Do not tighten the capscrews.

**IMPORTANT:** The capscrew and pulley threads must be clean and dry. Do not lubricate.

5. Install the ⅜" x 2" key in the unload auger shaft. Slide the pulley and bushing assembly onto the shaft until the distance from the end of the shaft to the face of the bushing is ⅞", see Figure 10. If the bushing is too tight on the shaft, wedge a screwdriver blade into the saw cut in the flange (not the tapered surface) to spread the bushing.

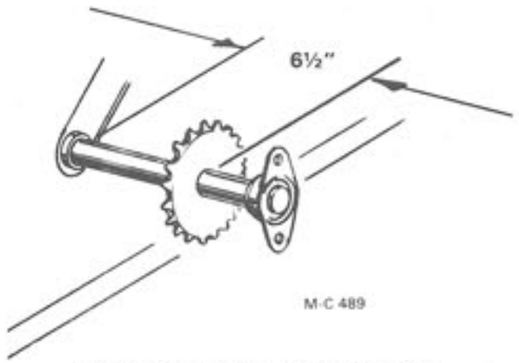



Figure 9 - Metering Roll Sprocket

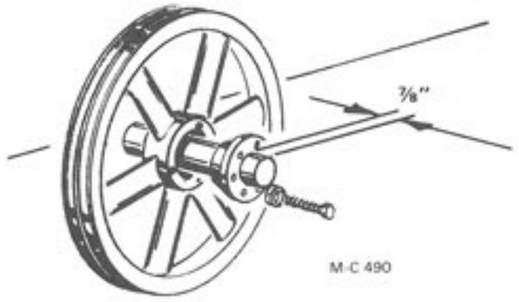



Figure 10 - Unload Auger Pulley

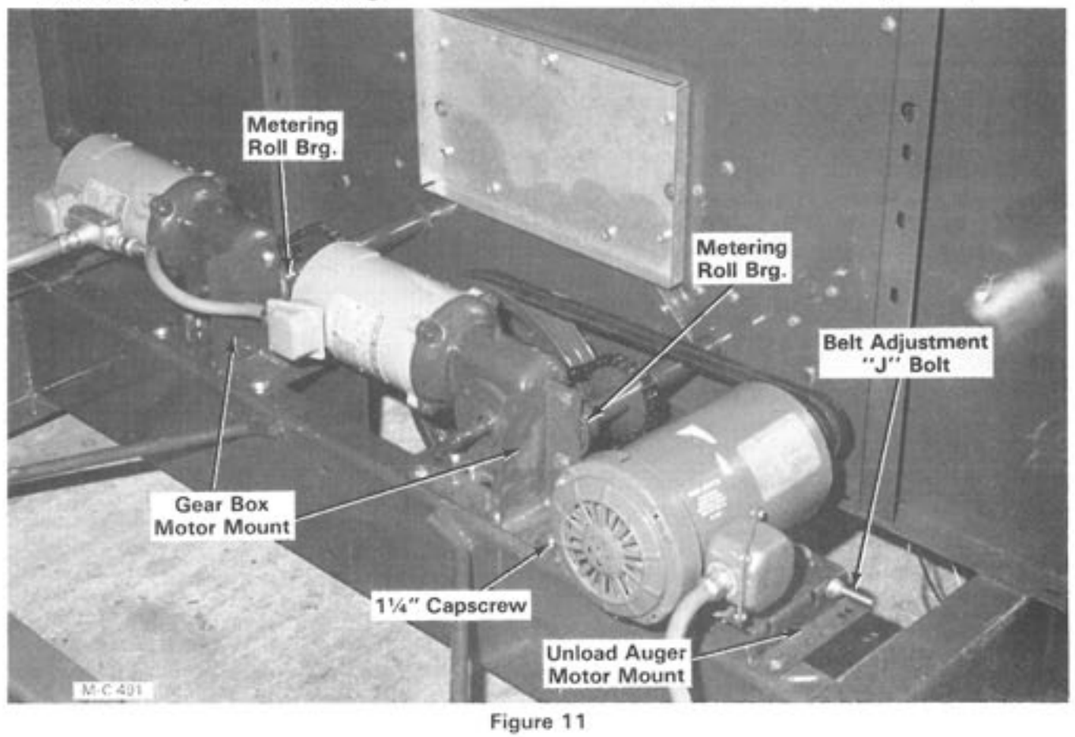



Figure 11

6. Tighten the three capscrews evenly and progressively. Torque the capscrews to 15 ft. lbs.

**IMPORTANT:** The tightening force on the three capscrews is multiplied many times by the wedging action of the bushing tapered surface. Do not exceed the specified torque, or use a lubricant on the capscrew threads. To do so may create bursting pressures in the hub of the pulley.

**NOTE:** There should be a ⅛ to ¼ inch gap between the pulley hub and the flange of the bushing. If the gap is closed, the shaft is undersize.

## SCR Motor and Gear Box Installation

**IMPORTANT:** Put the unload auger belts on the pulley and over the metering roll shaft. Slide the metering roll bearings onto the metering roll shafts.

1. Install both gear box-motor mounts, see Figure 11, page 5. Bolt the right one to the outboard bearing mount channel with five ⅜-16 x 1" capscrews, flatwashers and locknuts. Use four on the left one. Leave the left front hole open. The unload auger motor mount will be bolted to this hole. The flatwashers go under the head of the capscrews.
2. Bolt the metering roll bearings to the gear box-motor mounts with ⅜-16 x 1" capscrews, flatwashers and locknuts.
3. The gear boxes were filled with Mobil 600W cylinder oil at the factory. A solid plug was installed at the top of the gear box to prevent the oil from running out during shipment. The vent plug is taped to the gear box shaft. Remove the solid plug and install the vent plug.
4. Remove the oil level plug (top one) on the end of each gear box. The oil level should be even with the bottom of the hole. If not, remove the vent plug and add Mobil 600W cylinder oil or equivalent until it just runs out. Install the level and vent plug.
5. Bolt the gear boxes with motors to the gear box-motor mounts with ⅜-16 x 1¼" capscrews, flatwashers and locknuts. The flatwashers go under the locknuts.
6. Install both chains on the metering roll and gear box sprockets.

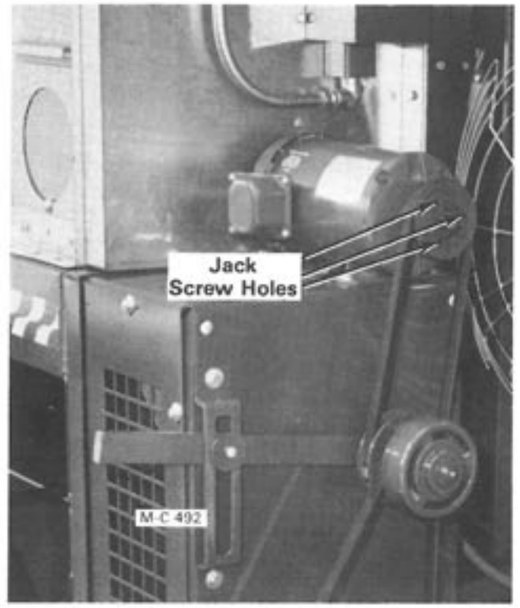



Figure 12

## Unload Auger Motor Installation

1. Remove the old pulley on the unload auger motor as follows:
   A. Remove the three mounting capscrews in the pulley. Thread the capscrews into the three jack screws holes in the pulley, see Figure 12. Tighten the three capscrews progressively and evenly until the pulley is loose on the bushing.
   B. Remove the pulley and bushing from the shaft. If the bushing does not slip off of the shaft, wedge a screwdriver blade in the saw cut in the flange of the bushing to spread the bushing.
2. Install the new ⅞" bore pulley on 2 HP motors with the hub to the inside. Install the new ⅝" bore pulley and bushing on 1½ HP motors as explained in steps 2A thru 2D. Position the pulley so that it is flush with the end of the shaft. Do not tighten it on the shaft until the motor has been installed and belt alignment has been checked.
   2A. Before installing the pulley and bushing thoroughly inspect the tapered bore of the pulley and the tapered surface of the bushing. Any paint, dirt, oil or grease **MUST** be removed.



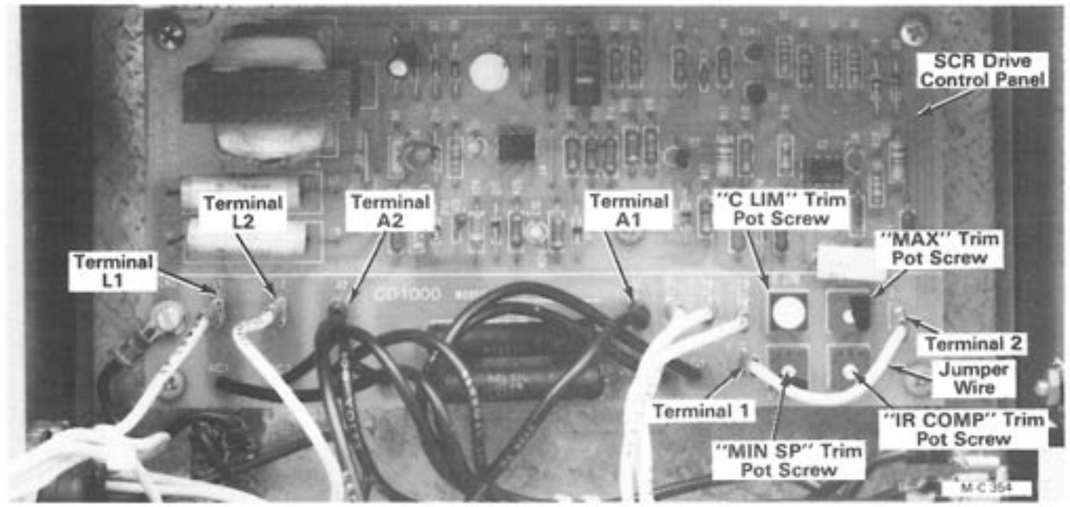



Figure 25 - SCR Drive Control Panel

pin protruding from the cover. Remove the cover to gain access to wire connections. Check wiring and connections, refer to wiring diagrams in Operator's Manual.

When reasassembling, place the dial on the cover with No. 4 at the top and tighten the nut. Be careful not to bend or break the brass pin protruding from the cover. Position the knob with the pointer at No. 1 on the dial and slowly tighten the knob set screw until it just contacts the flat area on the shaft. Pull the knob out until it stops and tighten set screw.

**Problem 3: Motor and metering roll rotation is reversed.**

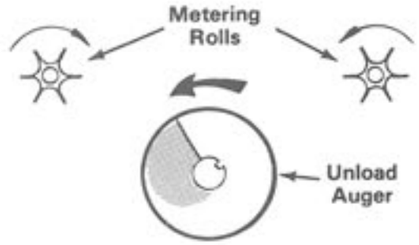
1. Correct rotation is shown in Figure 26. To change motor and metering roll rotation move the wire on terminal **A1** to **A2** and **A2** to **A1** on the SCR Drive control panel, see Figure 25.

**Problem 4: Motor running too fast or too slow (speed control knob turned all the way up). Motor speed should be 1750 RPM.**

1. Use a tachometer or strobe light to check motor RPM. If RPM is below 1750, turn the Maximum Speed ("MAX") trim pot screw clockwise, see Figure 25. If the RPM is above 1750, turn the screw counterclockwise.

**NOTE:** Readjust Min. speed. Changing Max. speed will change Min. speed.

**Problem 5: Motor running too fast or too slow (speed control knob on zero). Speed should be 100 RPM.**




**Grain Metering Roll Rotation**
**Viewed From the Front of the Dryer**

M-C 357

Figure 26

1. Using a tachometer or strobe light check the motor speed. If motor speed is below 100 RPM, turn the Minimum Speed ("MIN SP") trim pot screw clockwise. If motor speed is above 100 RPM turn screw counterclockwise, see Figure 25.

**NOTE:** Readjust Max. speed. Changing Min. speed will change Max. speed.

**Problem 6: Motor surging or hunting (speed fluctuates).**

1. Set the SCR Drive control knob at 20 on the dial.
2. Turn the I.R. Compensation ("IR COMP") trim pot screw clockwise until the motor begins to surge. Turn the screw counterclockwise until the surging stops, see Figure 25.
3. Turn the screw counterclockwise 1/3 of the distance between this setting and the zero

## SCR Drive Troubleshooting

**CAUTION:** To avoid electrical shock that could result in personal injury or possible death, always use properly insulated tools when checking electrical components and circuits. Disconnect the electric power supply before checking switches with a continuity light.

**Problem 1: Motors do not run (moisture control switch in MANUAL position).**

1. Turn speed control knobs all the way up.
2. SCR Drive 8 amp. circuit breakers on the SCR control box tripped, see Figure 24A. Push in to reset.
3. Frozen grain in the metering rolls or metering rolls binding. This would cause the motors to stall.
4. Check for 115V power between terminals **L1** and **L2** on the SCR Drive control panel, see Figure 25. If there is no power between terminals **L1** and **L2** proceed to steps 5, 6 and 7. If there is power between terminals **L1** and **L2** proceed to steps 8, 9 and 10.
5. Check for 115V power at the moisture control switch. Start the unload auger and using a voltmeter or test light, check for power from each center terminal of the moisture control switch to ground.

**NOTE:** The unload auger must be running when checking for power at the moisture control switch because the unload auger switch supplies power to the moisture control switch.

6. If there is no power at the center terminals of the moisture control switch, check the jumper wire between the unload auger switch and the moisture control switch, see Figure 19, page 11.
7. If there is power at the center terminals of the moisture control switch, check the switch with a continuity light. The manual position of the toggle switch may be defective.
8. Check to be sure that the jumper wire between terminals **1** and **2** on the SCR Drive control panel is on and that connections are clean and tight, see Figure 25.
9. Turn the SCR Drive speed control knob on the dryer control panel all the way up. Connect a DC (direct current) voltmeter

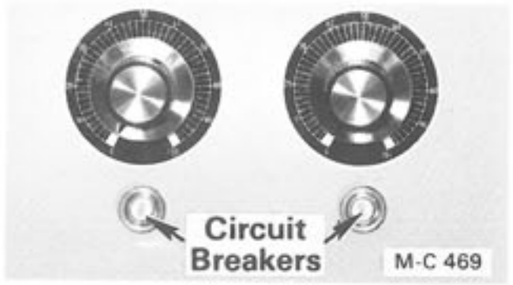



Figure 24A

between terminals **A1** and **A2** on the SCR Drive control panel, see Figure 25.

10. Voltmeter should read 90V. If it does not, adjust the "MAX" trim pot screw on the SCR Drive control panel as explained in Problem 4. If there is no power between terminals **A1** and **A2** after adjusting the "MAX" trim pot screw, the SCR Drive control panel is defective. If there is 90V power between terminals **A1** and **A2**, have motors checked.

**Problem 2: Motors do not run (moisture control switch in AUTOMATIC position).**

1. Turn speed control knobs all the way up.
2. SCR Drive 8 amp. circuit breakers on the SCR control box tripped, see Figure 24A. Push in to reset.
3. Moisture controls set too high. Turn each moisture control knob down until each SCR Drive motor just starts. If they do not start, proceed to steps 4 and 5.

**NOTE:** Each moisture control will probably have a slightly different setting, this is normal.

4. Check the moisture control switch with a continuity light. The automatic position of the toggle switch may be defective.
5. If the moisture control toggle switch is good, check wiring from the moisture control toggle switch to the moisture control for loose connections or broken wires, see note below. If the wiring is good, the moisture control is defective.

**NOTE:** To check wire connections inside the moisture control, turn the control knob to No. 1 on the dial. Remove the knob set screw and carefully remove the knob. To maintain proper calibration, **DO NOT** turn the shaft after the knob has been removed. Remove the nut and dial carefully. **DO NOT** bend or break the brass



2B. Place the bushing into the pulley. The bushing and the bore of the pulley are tapered. Be sure to install the bushing into the large ID of the pulley tapered bore. If the bushing is installed into the small ID of the pulley, the pulley hub will crack when the mounting capscrews are tightened.

2C. Place the three capscrews through the open holes in the pulley and thread them into the bushing by hand. Do not tighten the capscrews.

**IMPORTANT:** The capscrew and pulley threads must be clean and dry. Do not lubricate.

2D. Slide the pulley and bushing assembly onto the shaft. If the bushing is too tight on the shaft, wedge a screwdriver blade into the saw cut in the flange (not the tapered surface) to spread the bushing.

3. Bolt the unload auger motor mount to the outboard bearing mount channel, see Figure 11, page 5. Use a ⅜-16 x 1¼" capscrew, flatwasher and locknut at the right front corner and ⅜-16 x 1" capscrews in the other two holes.
4. Install the belts and loosely bolt the unload auger motor to the motor mount. Use 5/16-18 x 1½" capscrews at location "A", Figure 13 and 5/16-18 x 1" capscrews at location "B", Figure 13. Put flatwashers on each side of the motor mount (put an additional flatwasher on the underside of the 1½" capscrews). Partially thread the locknuts onto the capscrews.
5. Install the two "J" bolts, see Figure 11, page 5. Hook them over the 1½" capscrews with a flatwasher on each side. Put a flatwasher and ⅜-16 locknut on each "J" bolt.
6. Visually check belt alignment. If necessary, adjust the position of the pulley on the motor shaft to align the belts.
7. Tighten the set screws in the pulley on 2HP motors. On 1½ HP motors, tighten the three capscrews in the pulley evenly and progressively. Torque the capscrews to 9 ft. lbs.

**IMPORTANT:** The tightening force on the three capscrews is multiplied many times by the wedging action of the bushing tapered surface. Do not exceed the specified torque, or use a

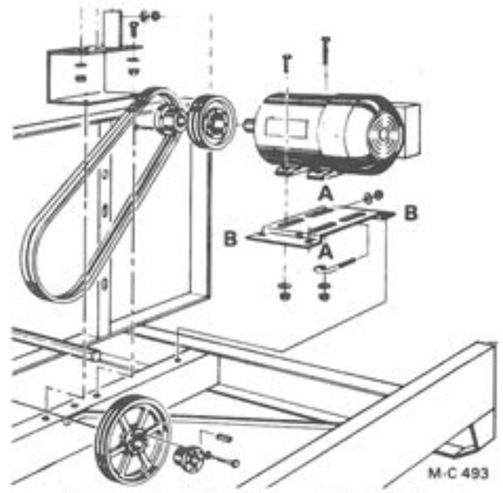



Figure 13 - Unload Auger Motor Mount

lubricant on the capscrew threads. To do so may create bursting pressures in the hub of the pulley.

**NOTE:** There should be a ⅛ to ¼ inch gap between the pulley hub and the flange of the bushing. If the gap is closed, the shaft is undersize.

8. Adjust the belt tension by turning the locknuts on the "J" bolts. Tighten the motor mounting locknuts.

## SCR Control Box Installation

1. Install the SCR control box on the right side of the dryer lower cabinet. Use ¼-20 x ¾" truss head screws and locknuts in the two holes at the front of the cabinet, and ¼-20 x ½" in the two holes at the rear of the cabinet. Use flatwashers on the inside.
2. Connect the short length of liquatite to the dryer middle cabinet.

## Transformer Cabinet Installation

1. Install the transformer cabinet on the left side of the dryer lower cabinet. Use ⅜-16 x 1" capscrews and locknuts in the two holes at the front of the cabinet, and ⅜-16 x ¾" in the two holes at the rear of the cabinet. Use flatwashers on the inside.
2. Install the molded universal bushing in the hole between the transformer cabinet and the dryer lower cabinet.

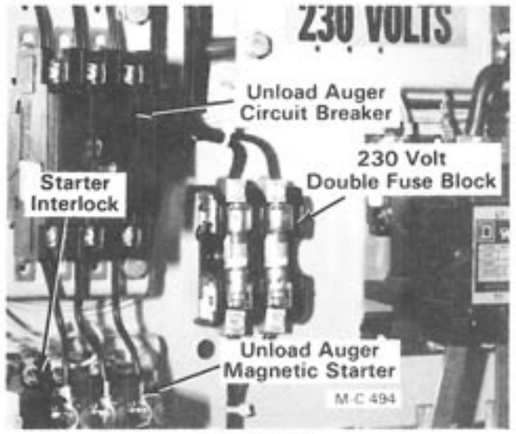



Figure 14

## Fuses

1. Remove the center door post in the lower cabinet of the dryer and remove the plastic guard panel.
2. Install the transformer double fuse block (230 volt) or the two fuse holders (460 and 575 volt) on the back wall of the cabinet, see Figure 14. Drill 5/32" holes and mount the fuse block or holders with 10-32 x ¾" Phillips self tapping screws and No. 10 star tooth lockwashers.
3. Install the two fuses.
   A. 230 Volt - Fuse FRN R20
   B. 460 Volt - Fuse FRS 10
   C. 575 Volt - Fuse FRS 9
4. Remove the 10 amp. fuse in the middle control cabinet and replace it with the 15 amp. fuse furnished, see Figure 15. This fuse protects the dryer 115 volt control circuit.

## Unload Auger Switch Installation

**(Dryers below S/N 43657 only)**

**IMPORTANT:** Dryers below serial number 43657 are equipped with an ON-OFF unload auger toggle switch. This switch must be changed to the current production spring loaded toggle switch that has three positions, START-RUN-OFF.

On dryers equipped with the ON-OFF switch, power flows directly to the moisture control switch when the 115 volt power is turned on. On dryers equipped with the START-RUN-OFF switch, the unload auger must be running

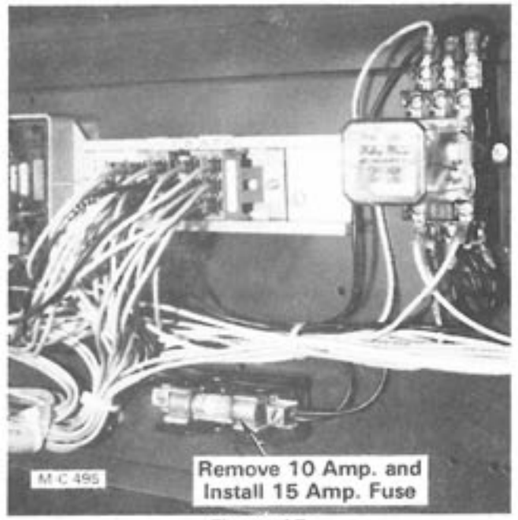



Figure 15

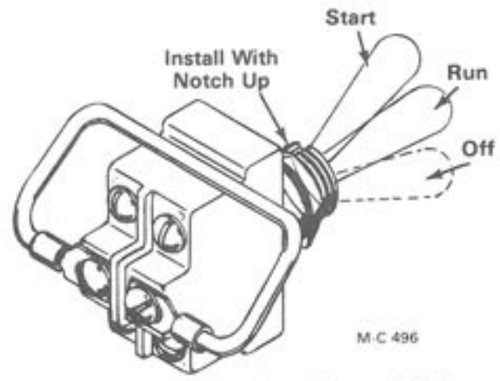



Figure 16 - New Unload Auger Switch

before power goes to the moisture control switch. This prevents the moisture controls from starting the SCR Drive motors unless the unload auger is running.

If there is a momentary loss of electric power, the START-RUN-OFF switch will have to be pushed up to the start position to restart the unload auger. This feature prevents an unattended dryer from unloading when the electric power comes back on.

1. Disconnect the wires from the ON-OFF switch and remove the switch from the control panel.
2. Install the new START-RUN-OFF switch in the control panel with the notch in the threaded portion of the switch UP, see Figure 16.



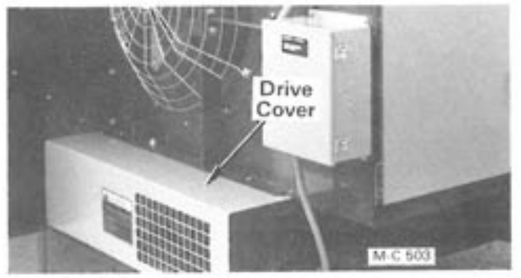



Figure 23

## SCR Drive Operation

1. Fill the dryer with grain and start all of the fans and burners. Flip the moisture control toggle switch to the OFF position.
2. Running on continuous heat, it will take approximately 6 minutes per point of moisture removed to dry the first load. When the first load is dry, push the unload auger spring loaded toggle switch up to the **START** position and release it. It will move down to the **RUN** position.
3. Flip the moisture control toggle switch to the "MANUAL" position. This will activate the SCR Drive Motors and the metering rolls will start. The dryer will begin unloading grain. If the SCR Drive motors do not start, see SCR Drive Troubleshooting on page 14.


Figure 24 - SCR Drive Control Knobs

4. The SCR Drive control knob dials, Figure 24, are graduated from 0 (slow) to 100 (fast). The setting for unloading manually will have to be determined by the operator. The dryer model and whether it operates all heat or dry and cool are factors that must be taken into consideration.
5. Dryers operated "Dry and Cool" will have wet grain in the cooling section. This grain will have to be recycled back into the heating section.
6. When dried grain begins to auger out, test it for moisture content. If the moisture content is too high, turn the SCR Drive control knobs down to a lower number to decrease the unloading speed. If the moisture content is too low, turn the SCR Drive control knobs up to a higher number to increase the unloading speed.
7. Wait 1 hour to allow the dryer to react to the change. Recheck the moisture content and adjust the unloading speed again if necessary.
8. When the dryer has discharged grain at the desired moisture content for 1 hour, flip the moisture control toggle switch to the "AUTOMATIC" position.
9. Set the moisture control on each side of the dryer by turning the indicator knob until the SCR Drive Motor just starts. Each moisture control will probably have a slightly different setting, this is normal.

   The following chart shows approximate moisture control dial settings when the dryer is being operated **"Dry and Cool"**.

**Approximate Moisture Control Setting for Corn and Most Small Grains**

| Set Control Dial At | To Get % Moisture |
|---|---|
| 4.0 | 14 - 15% |
| 4.5 | 13 - 15% |
| 5.0 | 12 - 13% |

**NOTE:** If the dryer is being operated **"All Heat"** the chart above can be used as a starting point. In most cases the final moisture control setting will be 1 to 3 marks lower than the settings shown in the chart. The final setting must be determined under actual drying conditions with each individual dryeration or combination drying system.

10. When the moisture content of the grain is reduced to the level that the moisture control is set, the moisture controls will activate the SCR Drive motors and the grain metering rolls will start unloading grain.
11. The speed of the SCR Drive should be as close to drying capacity as possible. If the SCR Motor is stopped for more than five minutes at any one time, the speed should be slowed down slightly. If the SCR motor runs continuously, increase the speed slightly so that the discharge rate is just slightly more than the drying rate.

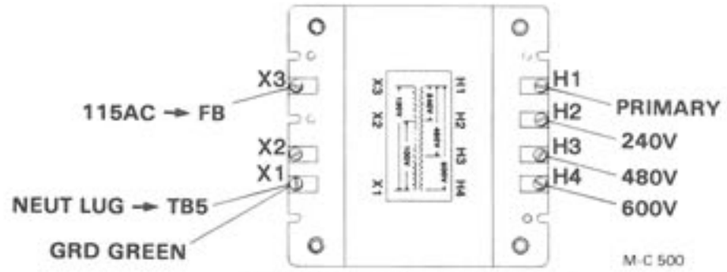



Figure 20 - Transformer Wiring

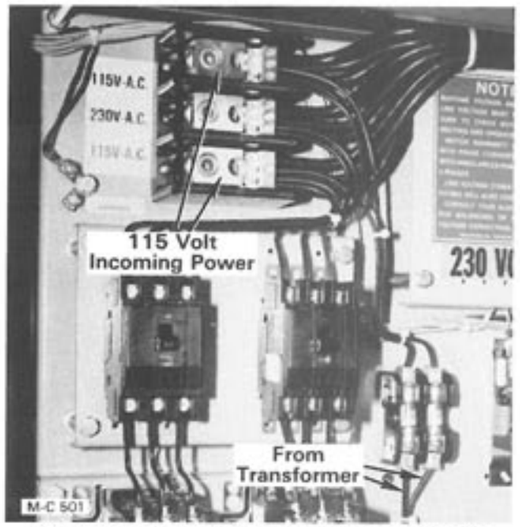



Figure 21 - Incoming Power to Transformer

**Transformer (see Figure 20 & 21)**

1. Connect the wire imprinted 115 AC → FB to terminal X3 on the transformer and to the 15 amp fuse block in the middle cabinet.
2. Connect the wire imprinted NEUT LUG → TB5 to terminal X1 on the transformer and to terminal block No. 5 in the middle cabinet.
3. Connect the green wire to terminal X1 on the transformer and to the ground lug in the lower cabinet.
4. Connect a 12 Ga. black wire to terminal H1 on the transformer, see Figure 20. Connect the other end of this wire to the fuse block or holders that were installed in the lower cabinet, see Figure 21. Install a 12 Ga. black wire between the fuse block or holder and one of the lower voltage incoming power terminals in the lower cabinet, see Figure 21.

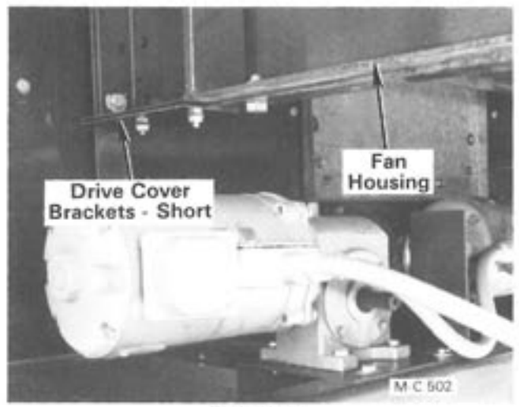



Figure 22

5. Connect a 12 Ga. black wire to terminal H2, H3 or H4 on the transformer depending on the operating voltage of the dryer, see Figure 20. Connect the other end of this wire to the other side of the fuse block or other fuse holder in the lower cabinet, see Figure 21. Install a 12 Ga. black wire from the fuse block or holder to the other lower voltage incoming power terminal.
6. Secure all new wires in the middle and lower cabinets with Ty-Wraps furnished. Reinstall the plastic guard panel and center post in the lower cabinet.

## Drive Cover Installation

1. Bolt two short drive cover brackets to the rear of the fan housing on each side of the dryer with 5/16-18 x ¾" truss head screws and locknuts, see Figure 22. Bolt two long drive cover brackets at the front of the fan housing on each side of the dryer.
2. Slide the top edge of the drive covers between the drive cover brackets and snap them over the dryer frame, see Figure 23.



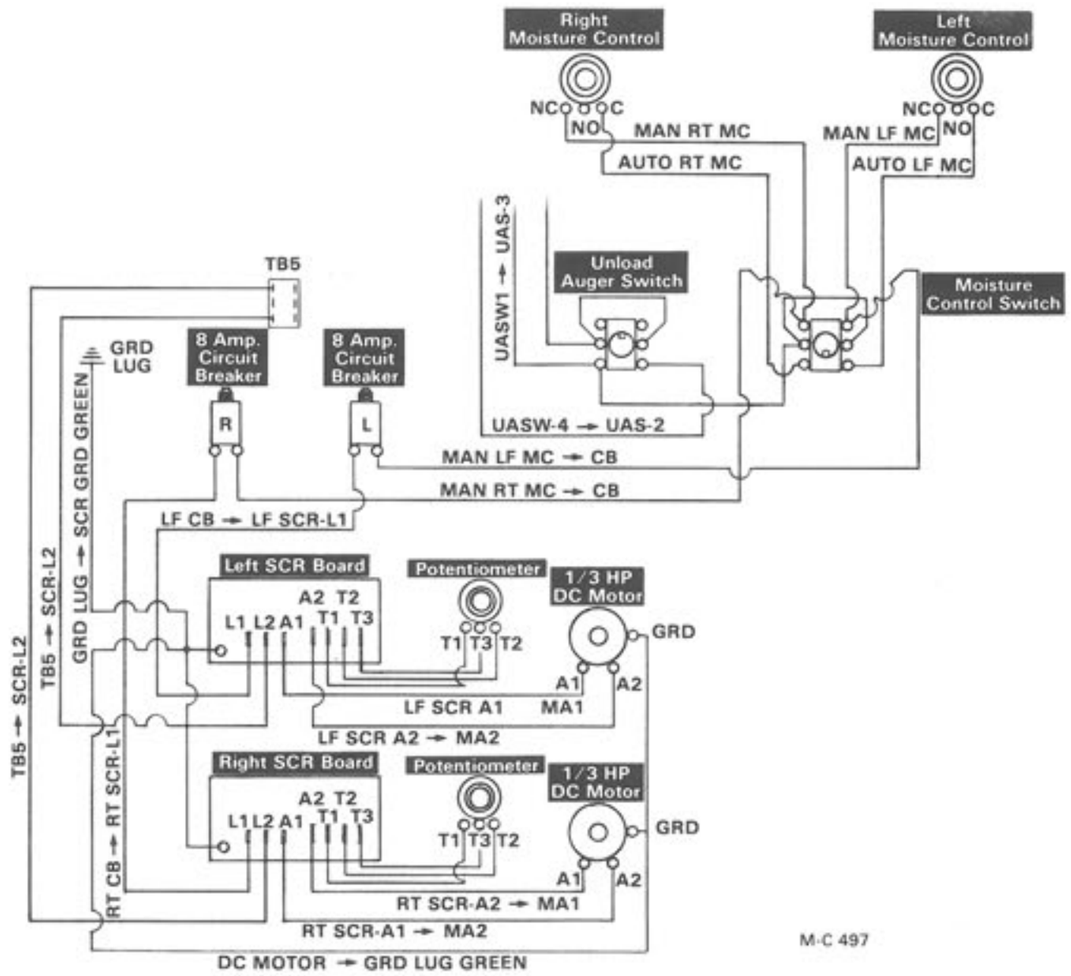



Figure 17 - SCR Control Box, Unload Auger Switch and Moisture Control Switch Wiring

## Unload Auger Motor Magnetic Starter Interlock

**(Dryers below S/N 43657 only)**

1. When the new START-RUN-OFF unload auger toggle switch is installed, it will be necessary to have an interlock installed in the unload auger motor magnetic starter, see Figure 14.
2. M-C dryers are equipped with various types of magnetic starters depending on the model and year of manufacture. Therefore, the interlock is not included in this kit. Have a qualified electrician install an interlock in the magnetic starter on the dryer.

## Wiring

**SCR Motors (see Figure 17)**

1. Remove the junction box covers on both SCR motors and install the ½" unilet on the right SCR motor, see Figure 18, page 11.
2. Remove the cover on the unilet and connect the SCR cabinet to motor liquatite to the unilet. Connect wire imprinted RT SCR-A2 → M-A1 to terminal A1 on the right motor and wire imprinted RT SCR-A1 → M-A2 to terminal A2 on the motor. Connect green ground wire and loose green ground jumper wire to the motor ground terminal.
3. Run the other two wires and the green ground wire through the motor to motor

liquatite and install the liquatite. Connect wire imprinted LF SCR-A2 → M-A2 to terminal A2 on the left motor and wire imprinted LF SCR A1 → M-A1 to terminal A1 on the motor. Connect green ground wire to motor ground terminal.

4. Install the unilet and motor junction box covers.
5. Drill a 9/32" hole in the right side of the bottom flange of the dryer front frame. Bolt the pipe clamp to the underside of the flange with a ¼-20 x ½" truss head screw and locknut. Install the SCR cabinet to motor liquatite in the pipe clamp.

### Unload Auger Motor

1. Connect the liquatite from the unload auger magnetic starter to the junction box on the unload auger motor.
2. Connect the black wire to terminal T1, blue wire to terminal T2 and the red wire to terminal T3 on the motor. Install the motor junction box cover.

**IMPORTANT:** Check the direction of rotation of the unload auger pulley. It **MUST** be counterclockwise (viewed from the front of the dryer). If it is not, move the wire from terminal T1 to T3 and T3 to T1 on the unload auger motor or the unload auger magnetic starter in the lower control cabinet.

### Unload Auger Switch (see Figure 19)
(Dryers below S/N 43657 only)

1. Connect the jumper wire on the No. 1 burner power on light (disconnected from the old unload auger switch) to terminal No. 2 on the new unload auger switch.
2. Connect the jumper wire from the center terminal of the moisture control switch (disconnected from the old unload auger switch) to terminal No. 1 on the new unload auger switch.
3. Disconnect the jumper wire from the No. 2 burner power on light to the moisture control switch at the moisture control switch. Connect it to terminal No. 5 on the new unload auger switch.
4. Disconnect and remove the wire from the 115 volt coil on the unload auger motor magnetic starter in the lower cabinet. This wire is imprinted UA SW → UA S.
5. Connect new wire imprinted UA SW → UA S3 to terminal No. 1 on the new unload auger switch and to terminal No. 3 on the unload auger motor magnetic starter interlock.
6. Connect new wire imprinted UA SW-4 → UA S-2 to terminal No. 4 on the new unload auger switch and to terminal No. 2 on the unload auger motor magnetic starter interlock.
7. Connect a jumper wire between the 115 volt coil terminal and interlock terminal No. 3 on the unload auger magnetic starter.

### SCR Control Box

1. Connect the two white wires coming from the SCR control box imprinted TB5 → SCR-L2 to terminal block No. 5, see Figure 17, page 9. Connect the green ground wire to the ground lug in the lower cabinet.
2. Looking down at the moisture control switch, remove both wires imprinted MAN RT MC from the lower left terminal of the switch. Pull out or cut off the wire that has the piggy back terminal on it. The other end of this wire was cut off in the junction box on the left side of the dryer.
3. Attach a new piggy back terminal to the wire coming from the SCR control box imprinted MAN RT MC → CB. Connect the other wire imprinted MAN RT MC, removed in step 2, to the new piggy back terminal. Connect the piggy back terminal to the lower left terminal of the moisture control switch, see Figure 19.
4. Looking down at the moisture control switch, disconnect the wire imprinted MAN LF MC from the lower right terminal of the moisture control switch.
5. Attach a new piggy back terminal to the wire coming from the SCR control box imprinted MAN LF MC → CB. Connect the wire imprinted MAN LF MC, removed in step 4, to the new piggy back terminal. Connect the piggy back terminal to the lower right terminal of the moisture control switch, see Figure 19.



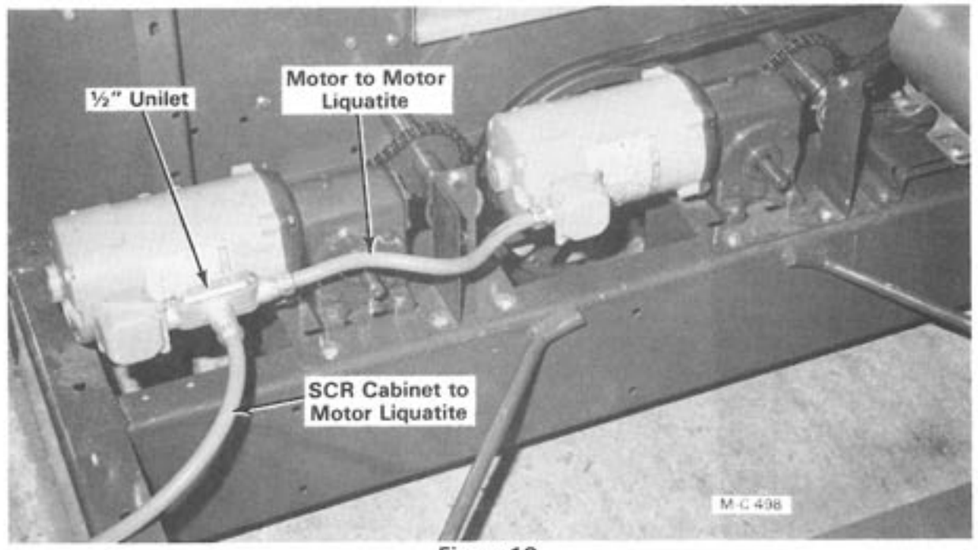



Figure 18

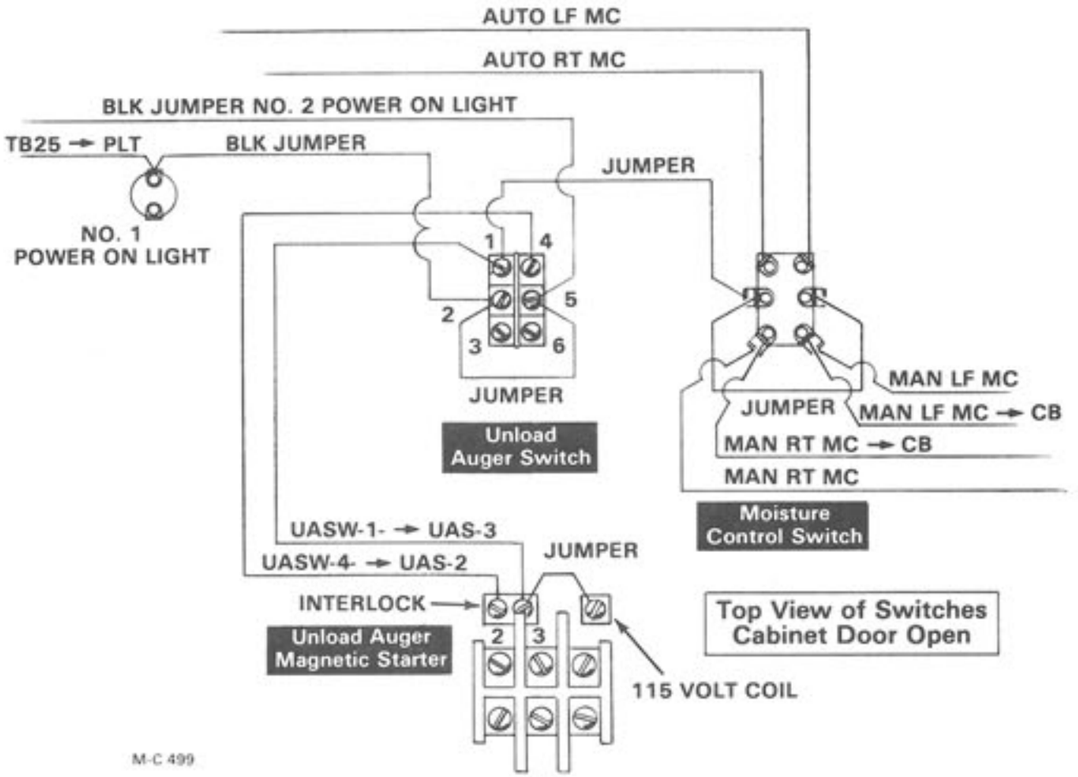



Figure 19 - Unload Auger and Moisture Control Switch Wiring