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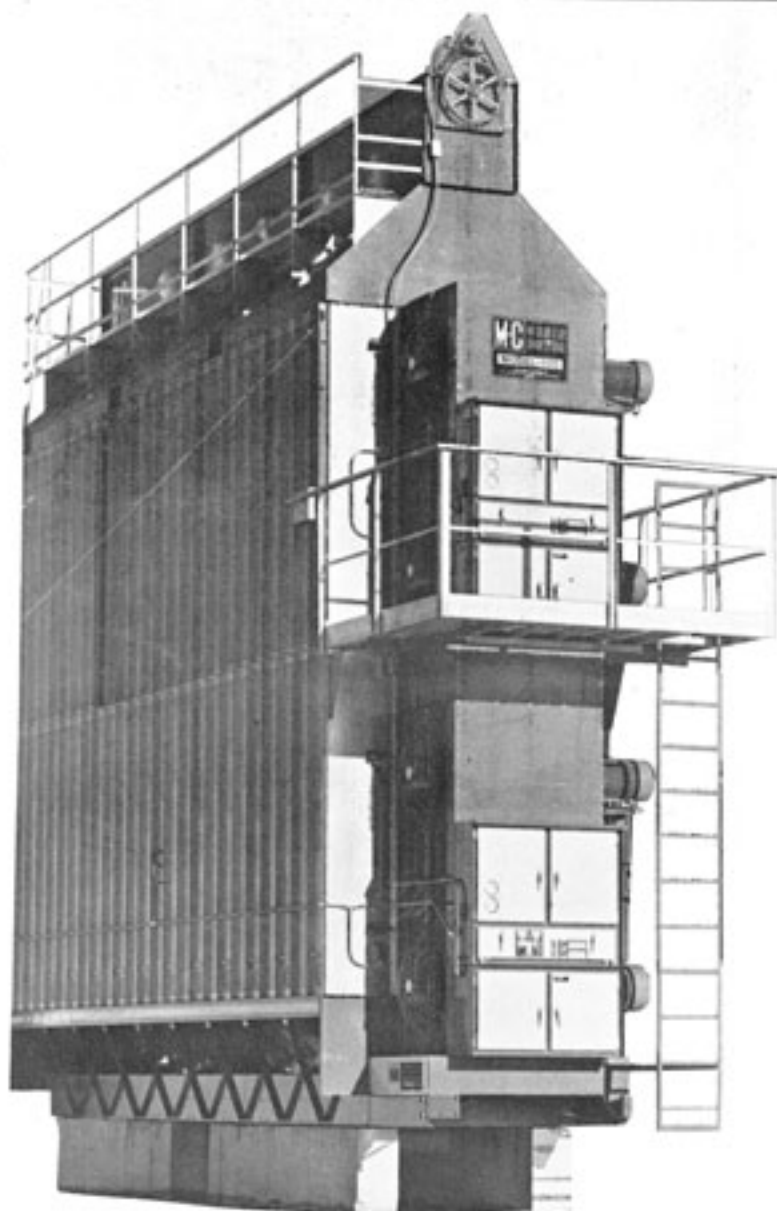


Model 675 thru 1195

(EM, EMS and B-115)

**Continuous Flow
Grain Dryers**

(Starting w/Serial No. 48981)



OPERATOR'S MANUAL

Form No. D266-1, July 1990
(Replaces D266 Dated April 1989)

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CONTENTS

	Page
Introduction	
To the Owner - Operator	2
Safety Precautions	2
Warranty Registration	2
Model and Serial Number Location	2
Capscrew Grade Identification	2
Metric (SI) Measurement Conversion Table	3
Dimensional Drawings	
Dryer	39
Dryer Base	38
Electrical and Gas Piping Entrance	37
Wiring Diagrams	(see foldouts at the back of the manual)
Electrical Component Parts Listing	40
Control Panel Lights, Switches and Controls	4
Initial Start-Up Instructions	
General	6
Filling the Dryer	7
Air Pressure Switches	7
Starting the Burners	8
Setting Burner Operating Temperature	10
Operating Instructions	
Operation of the Discharge System	13
Drying Grain	14
Level Auger Operation	15
Rear Discharge Overload Door	17
Control Cabinet Heat Bulb	17
Safety Control Fire Alarm w/Safety Shut-Off Valve(optional)	17
Temporary Shut Down	18
Restarts	18
Final Shut Down	19
Maintenance	
Lubrication	20
Screens and Heat Recovery System	21
Belt Adjustment	21
Pre-Season Check	23
Direct Spark Ignition System	26
Venturi Burner Air Adjustment	28
Checking Gas Solenoid Valves	30
Discharge System	
Description	32
SCR Board Terminal Strip Connections	32
SCR Board Trim Pot Adjustment Procedure	33
Troubleshooting Discharge System	34

INTRODUCTION

To The Owner - Operator

This manual was prepared to provide owners and operator's of M-C Model 675 through 1195 Grain Dryers (starting with serial number 48981) with Operating Instructions and Maintenance Information that will enable them to keep their M-C Grain Dryer operating at peak efficiency.

Before operating your Grain Dryer read the Start-Up and Operating instructions. Check each item referred to and become familiar with the controls, adjustments and settings required to obtain efficient operation.

To keep the dryer operating at peak efficiency it is suggested that it be cleaned, lubricated, belt tension adjusted and the ignition system, level auger and unloading system be tested each year prior to the drying season. Refer to "Pre-Season Check" in the Maintenance section. The pre-season check can be made when the dryer is empty. Any necessary repairs or adjustments can be made so that the dryer will be ready to operate before the drying season.

Safety Precautions



This symbol is used to call your attention to instructions concerning your personal safety. Be sure to observe and follow these instructions.

A safe operator is the best insurance against accidents. The precautions listed below must be observed at all times.

- Do not allow children or bystanders to be near the Grain Dryer or grain handling machinery while it is operating.
- Do not operate the Grain Dryer without all safety shields in place and secure.

NOTE: To provide clear illustrations some of the covers, guards and shields were removed.

Warranty Registration

It is important to send in your warranty registration card as soon as your new Grain Dryer is delivered. Not only does the card validate your Grain Dryer warranty, but it is also

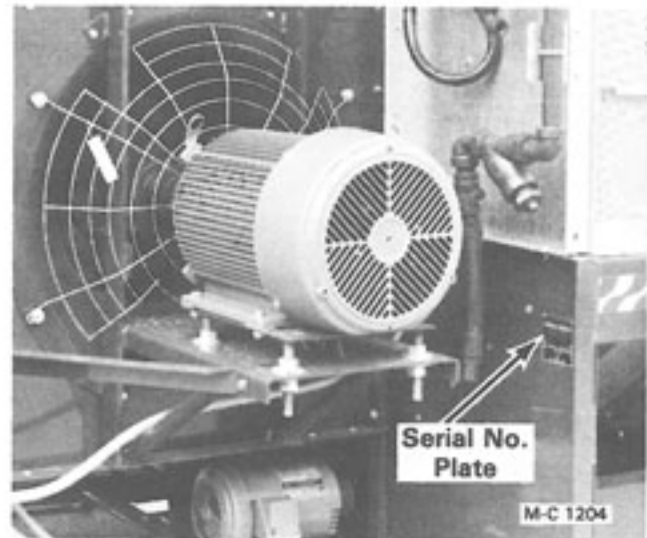


Figure A

M-C FARM EQUIPMENT	
MODEL NO.	SERIAL NO.
<input type="text"/>	<input type="text"/>
MANUFACTURED BY	
MATHews COMPANY	
CRYSTAL LAKE, ILLINOIS, U.S.A.	
OTHER PATENTS PENDING	
3,129,073	3,313,040
4,020,561	4,217,701

Figure B

M-C 189

our way of knowing who has purchased M-C equipment so that we can keep in touch with you.

Model and Serial Number Location





The model and serial number of your grain dryer are stamped on a plate located on the left front base panel, see Figure A. For future reference, record the model and serial number in the blank spaces in Figure B.

Capscrew Grade Identification

There are four grades of hex-head capscrews. Grade 1 and 2 are common capscrews, grade 5 and grade 8 are used when greater strength is required. Each grade can be identified by the marking on the head of the capscrew, see chart.

When servicing the Dryer and/or replacing capscrews, be sure to use the correct size and grade.

CAPSCREW GRADE IDENTIFICATION CHART

S.A.E. Grade	Description	Capscrew Head Marking*
1	WILL HAVE A PLAIN HEAD - NO RADIAL LINES	
2	Low or Medium Carbon Steel Not Heat Treated	
5	WILL HAVE 3 RADIAL LINES Quenched and Tempered Medium Carbon Steel	
8	WILL HAVE 6 RADIAL LINES Quenched and Tempered Special Carbon or Alloy Steel	

*The center marking identifies the capscrew manufacturer.

Metric (SI) Measurements

(English Units & Metric (SI) Equivalents)

Area

1 square inch = 6.4516 square centimeters
 1 square foot = 0.0929 square meters
 1 square yard = 0.8361 square meters
 1 acre = 4047 square meters
 1 acre = 0.4047 hectare

Force

1 pound (force) = 4.45 newtons

Length

1 inch = 25.4 millimeters
 1 inch = 2.54 centimeters
 1 foot = 304.8 millimeters
 1 foot = 30.5 centimeters
 1 foot = 0.305 meters
 1 yard = 0.9144 meters
 1 mile = 1.6093 kilometers

Mass

1 ounce = 28.35 grams
 1 pound = 0.454 kilograms
 1 ton = 907.1848 kilograms

Power

1 horsepower = 0.7457 kilowatts

Pressure

1 psi = 6.89 kilopascals
 1 psi = 0.00689 megapascals
 1 inch of mercury = 3.377 kilopascals

Temperature

1 degree Fahrenheit ($^{\circ}\text{F} - 32$) \div 1.8 = $^{\circ}\text{Celsius}$

Torque

1 inch pound = 0.113 newton meters
 1 foot pound = 1.356 newton meters

Velocity

1 mile per hour = 1.61 kilometers per hour

Volume

1 bushel = 35.24 liters
 1 bushel = 0.0352 cubic meters
 1 pint = 0.4731 liters
 1 quart = 0.9464 liters
 1 gallon = 3.7854 liters
 1 cubic inch = 16.387 cubic centimeters
 1 cubic foot = 0.0283 cubic meters
 1 cubic yard = 0.7646 cubic meters

NOTE: The Mathews Company reserves the right to incorporate any changes in design without obligation to make these changes on units previously sold.

CONTROL PANEL LIGHTS, SWITCHES & CONTROLS

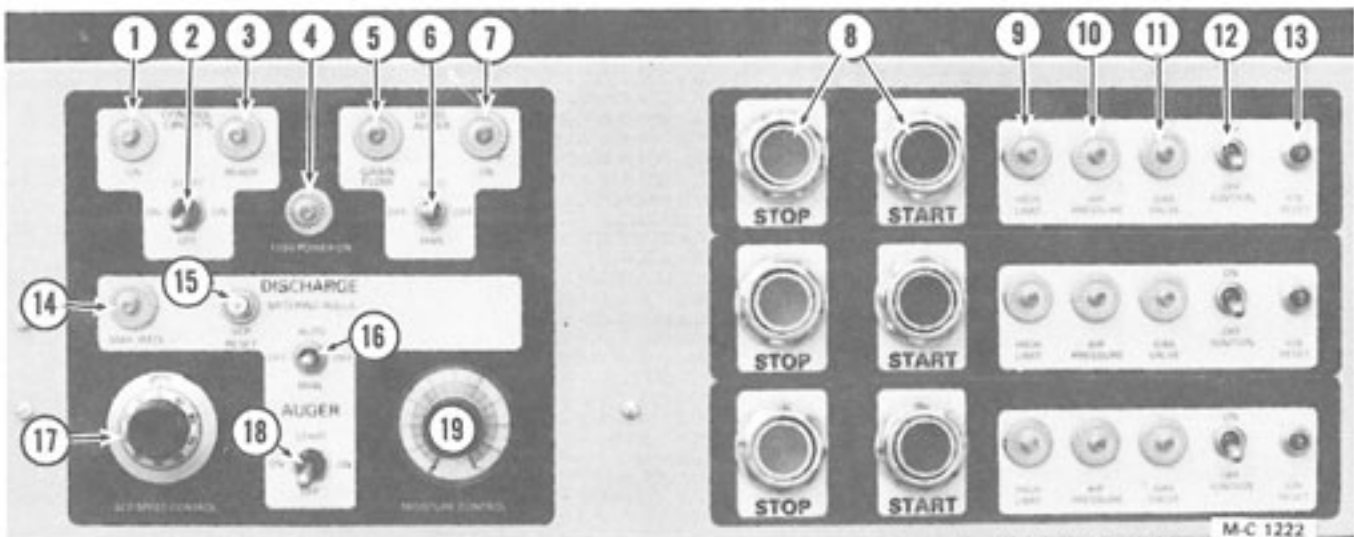


Figure 1 - Base Section Control Panel Lights, Switches and Controls (Model 1075 Shown)

Ref. 1 - Control Circuit On Light

Indicates that the control circuit toggle switch is in the on position, the rear discharge overload door is closed and all motor magnetic starter overload relay blocks are closed.

Ref. 2 - Control Circuit Switch

When the switch is in the on position, the control circuit on light will be on if the rear discharge overload door is closed and all magnetic starter overload relay blocks are closed. All high limit lights will be on.

When the switch is pushed up to the start position, the ready light will be on if all the high limit lights are on. When the ready light is on the dryer can be started.

NOTE: If there is a momentary loss of electric power, the dryer will shut down. When the power comes back on, the 115V POWER light and the control circuit ON light will be on. The dryer will have to be restarted. This feature prevents an unattended dryer from restarting.

If equipped - the main gas supply safety shut-off valve must be opened manually before the burners can be started.

Ref. 3 - Control Circuit Ready Light

Indicates that the control circuit toggle switch has been pushed up to the start position and the dryer is ready to be started.

Ref. 4 - 115V Power On Light

Indicates that 115 Volt electric power to the dryer control panel is on.

Ref. 5 - Grain Flow Light

Indicates low grain level or no grain movement in the hopper. The dryer will shut down when this light comes on.

Ref. 6 - Level Auger Switch

When the switch is in the manual position the level auger will start immediately when the level auger bin switch in the hopper closes and stop when the hopper is full.

When the switch is in the automatic position, the level auger bin switch will start and stop the level auger automatically.

NOTE: The operation of the level auger circuit is explained in detail under "Level Auger Operation" on page 15.

Ref. 7 - Level Auger Light

Indicates that the grain level in the hopper is low and the level auger bin switch in the hopper has closed, activating the level auger circuit.

Ref. 8 - Fan Start-Stop Buttons

Black button starts and red button stops the fans.

Ref. 9 - High Limit Light

Indicates that the high limit switch is closed and the temperature in the plenum chamber has not exceeded the high limit setting.

Ref. 10 - Air Pressure Light

Indicates that the air pressure switch is closed and the fan motor magnetic starter is engaged. (Dryer must be full of grain and fans running).

Ref. 11 - Gas Valve Light

Indicates that the ignition board has supplied power to the gas solenoid valves. (Ignition switch must be on).

Ref. 12 - Ignition Switch

Flip this switch on to light the burner. After a ten second delay the gas valve light will come on and the burner will light. If the burner does not light in 5 seconds (after the gas valve light comes on) the ignition board will "lock out" closing the gas solenoid valves.

Ref. 13 - Ignition Reset Button

The ignition reset button (0.1 amp. circuit breaker) protects the ignition board from heat build up due to repeated ignition attempts.

Ref. 14 - Max. Rate Light

Indicates that the SCR drive motor is running at the maximum speed selected by the operator.

Ref. 15 - SCR Drive Reset Button

The SCR drive reset button (8 amp. circuit breaker) protects the SCR drive control board.

Ref. 16 - Discharge Metering Roll Switch

When the switch is in the automatic position, the moisture control will start and stop the SCR drive motor automatically.

Unloading starts when the moisture content of the grain is reduced to the level that the moisture control is set for and slows down or stops when the moisture content is above this setting.

When the switch is in the manual position, the SCR drive motor will run continuously. The operation of the moisture control is explained under "Operation of the Discharge System" on page 13.

Ref. 17 - SCR Drive Speed Control

This control is used to adjust the speed of the DC motor that drives the grain metering rolls.

Ref. 18 - Discharge Auger Switch

This switch starts and stops the discharge auger. Push this spring loaded switch up to the start position to start the discharge auger and release it. It will move down to the on position.

Ref. 19 - Moisture Control

When the discharge metering roll switch is in the automatic position, the moisture control will start, slow down or stop the SCR Drive motor to maintain the moisture content of discharge grain.

INITIAL START-UP INSTRUCTIONS

General

IMPORTANT: Inspect for and remove any foreign material (nuts, bolts, tools, parts etc.) from the hopper, grain columns, metering rolls, unload auger and heat chambers before filling the dryer with grain. Also be sure all heat chamber floor doors are in position and secure. Close all rear doors.

1. Flip all of the toggle switches on the control panel(s) to the OFF position, see Figure 1.
2. **LP Gas** - Close the liquid line flip valve for each burner (handle down), see Figure 2.
3. Close the gas main hand valve for each burner (handle 90° to the piping), see Figure 3.
4. Check the modulating valve in each burner gas manifold to be sure the "T" handle has not been turned all the way in to the wide open position, see Figure 3. The "T" handle should be halfway between the closed and fully open position.
5. Turn on the electric power supply to the dryer. The 115V POWER ON light will be on.
6. Flip the control circuit toggle switch ON. The control circuit ON light and high limit lights will be on. If the high limit light(s) are not on, push the reset button on the high limit switch, see Figure 4.

NOTE: Reset button not on adjustable high limit switches.

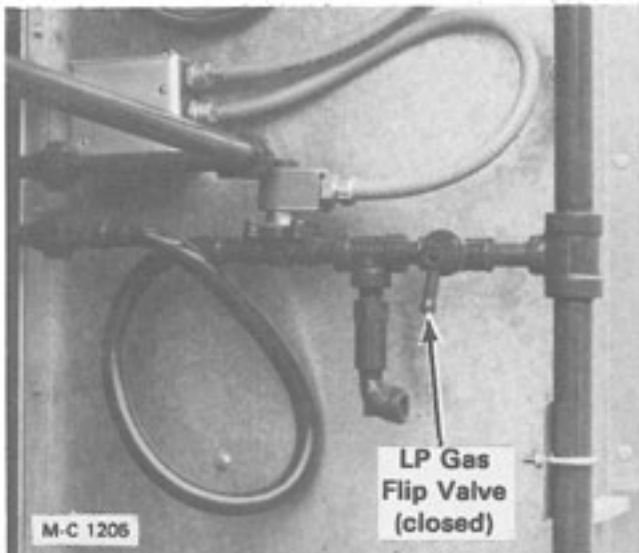


Figure 2 - LP Gas

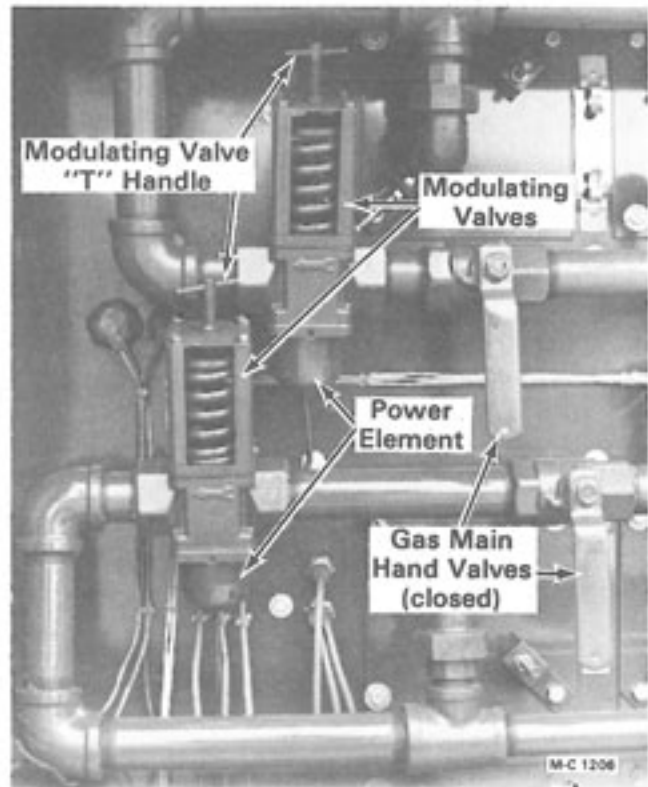


Figure 3 - Two Burner Cabinet

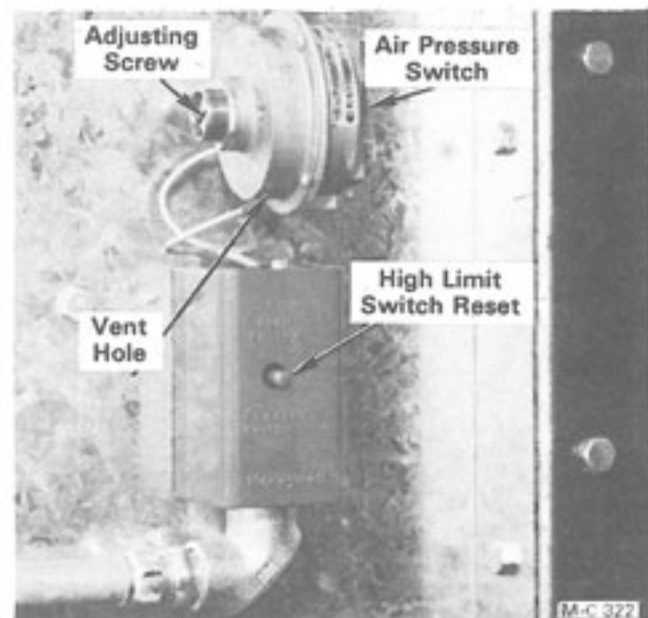


Figure 4 - Nonadjustable High Limit Switch

7. Push the spring loaded control circuit toggle switch up to the START position and release it. The READY light and LEVEL AUGER light will be on.

Filling the Dryer



CAUTION: Do not allow anyone to be in the hopper when filling the dryer. Always turn off and lock the electric power supply to the control cabinet before allowing anyone to work in the hopper.

NOTE: An adjustable flow restrictor in the receiving hopper prevents overloading the level auger.

1. Flip the level auger toggle switch to the **MANUAL** position. The level auger will start immediately and the level auger light on the control panel will be **ON**.
2. When the dryer is full, the grain will open the level auger bin switch in the hopper. The level auger will stop and the **LEVEL AUGER** light will be out.

Air Pressure Switches

General

1. There is an air pressure switch for each heat chamber, see Figure 4. The air pressure switch senses the static air pressure in the heat chamber when the dryer is full of grain and the fan is running. If the static air pressure drops because of fan failure, the air pressure switch opens stopping current flow to the ignition switch. The gas solenoid valves will close and the burner will shut down.
2. The air pressure switch is designed to protect the dryer from fire that may result from fan (air flow) failure while the burner is ignited and flame is present.



CAUTION: This safety feature is for your protection and protection of the dryer. The air pressure switches should be checked for correct operation at the start of the drying season and periodically during the season.

Checking

1. After the dryer has been filled and before any burners are started, the operation of each air pressure switch **MUST** be checked. Be sure the rear doors are closed.
2. Start the bottom fan. When it comes up to speed, start the next fan. Continue this procedure until all of the fans are running.

NOTE: The fan magnetic starters are wired in series. If one fan magnetic starter overload relay

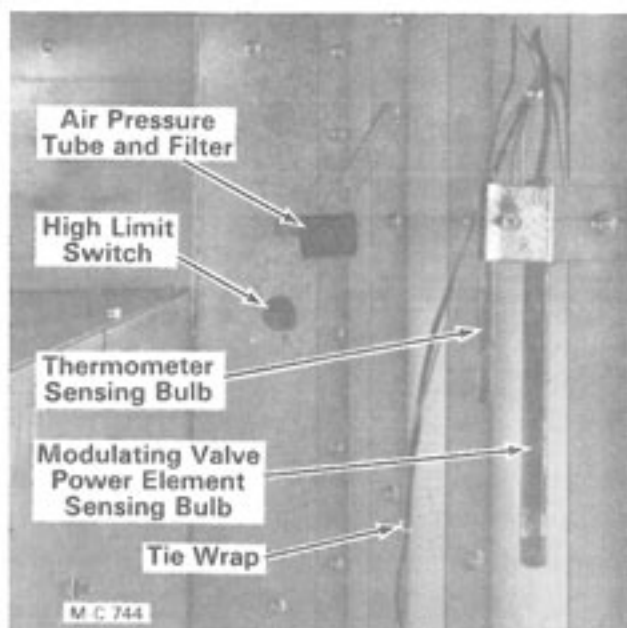


Figure 5

trips the dryer will shut down. All lights except the **POWER ON** light will be out. When the overload relay is reset the control circuit on and high limit lights will be on.

Flip the control circuit switch up to the start position and release it, the **READY** light will be on. Restart the fans.

3. The air pressure light on the control panel will come on as each burner fan comes up to speed.
4. If the light does not come on or comes on too soon (before the fan comes up to speed) the air pressure switch must be adjusted.

NOTE: If the light does not come on, remove the air pressure switch and check to be sure the $\frac{1}{8}$ " vent hole in the bottom of the air pressure switch is open, see Figure 4. Also check for an obstruction in the air pressure tube and filter, see Figure 5.

Adjusting

NOTE: All of the fans must be running (including the cooling fans) before the air pressure switches can be accurately adjusted.

1. Remove the plastic cap on the air pressure switch. The slotted screw is the adjusting screw, see Figure 4.
2. Turn the adjusting screw in (clockwise) until the air pressure light goes out.
3. Turn the adjusting screw out (counterclockwise) until the air pressure light comes

on. After the Air Pressure light comes on, turn the adjusting screw out an additional $\frac{1}{4}$ to $\frac{1}{2}$ turn to allow for normal changes in static pressure.

4. Shut off the fan. The Air Pressure light will go out when the fan stop button is pushed. These dryers are wired so that the power flows from the fan start button to the air pressure switch.
5. If all air pressure switch adjustment is used and the Air Pressure light does not come on, the air pressure switch is defective and must be replaced. Check the operation of the new air pressure switch. Adjust if necessary.
6. If the air pressure light is blinking, turn the adjusting screw out a small amount.

Starting the Burners

NOTE: If the dryer is equipped with optional "Base Section Controls" follow the burner starting procedure in the Base Section Control manual.

1. If equipped - set all of the adjustable high limit switches approximately 50° F above the desired burner operating temperature, see Figure 6 and the "Suggested Burner Operating Temperature Setting Chart" on page 12.

This will eliminate nuisance dryer shut down caused by a high limit switch tripping out during burner initial start-up.

2. **LP Gas** - Open the supply valve at the tank, the hand valve at the LP Gas inlet hose and open (lift up) the liquid line flip valve on each burner, see Figure 7 and 8. The flip valve is open when the handle is 90° to the piping.

Natural Gas - Open the supply valve.

NOTE: If equipped - the main gas supply safety shut-off valve must be opened manually before the burners can be started.

3. Start the bottom fan. When it comes up to speed, start the next fan. Continue this procedure until all of the fans are running.
4. Open the gas main hand valve (Figure 9) $\frac{1}{4}$ of the way. Flip the bottom burner ignition switch ON. After a ten (10) second delay the gas valve light will be ON and the burner will light.

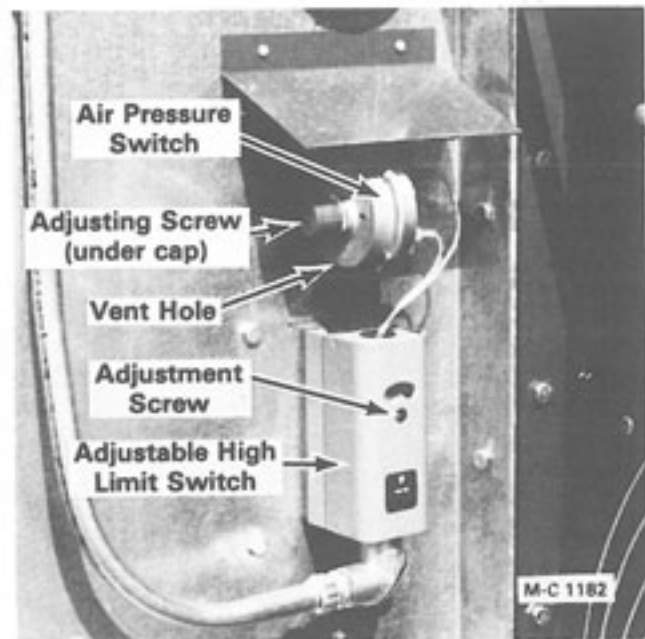


Figure 6 - Adjustable High Limit Switch

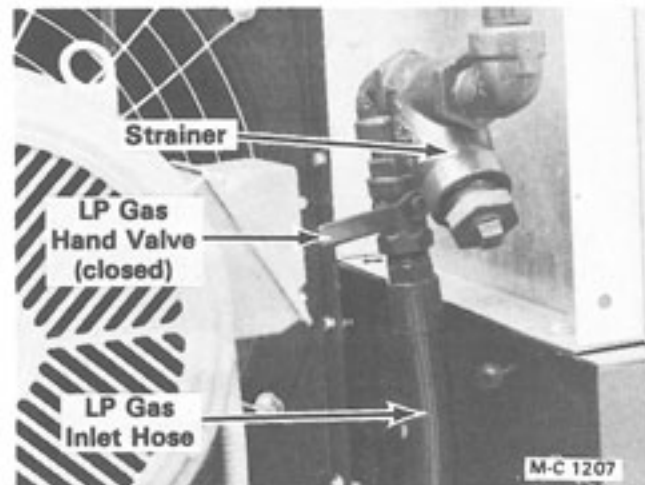


Figure 7 - LP Gas

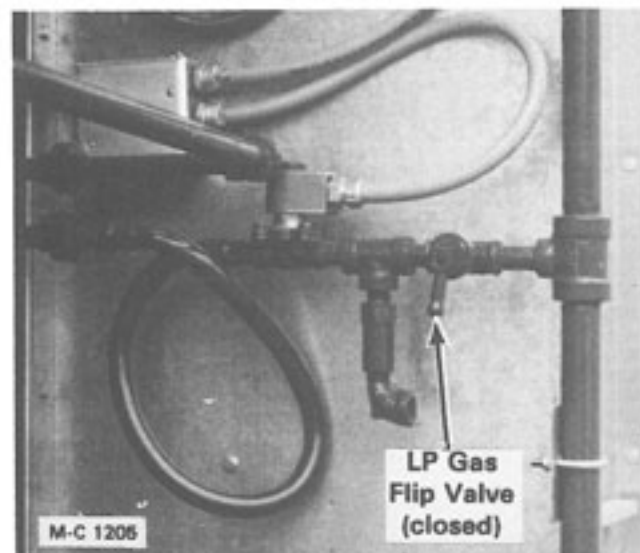


Figure 8 - LP Gas

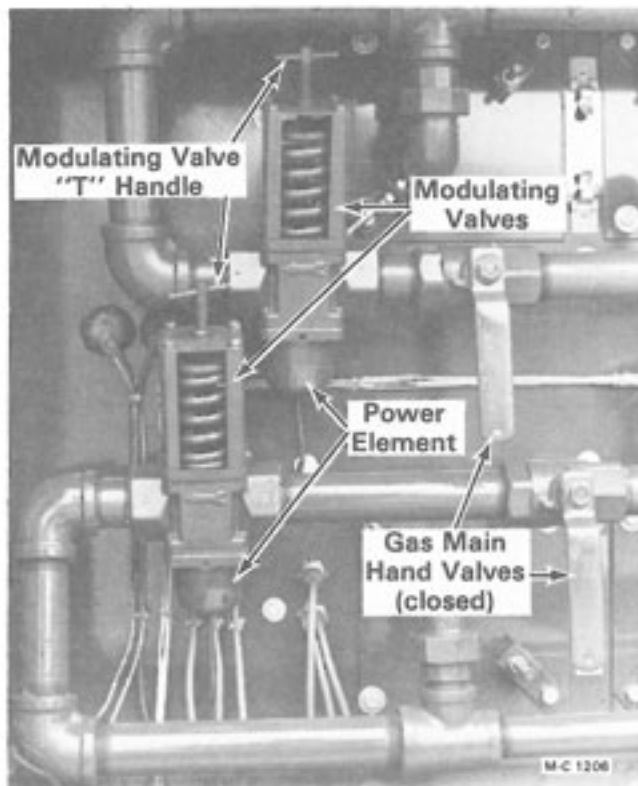


Figure 9 - Two Burner Cabinet

NOTE: The ten second delay before ignition is a safety feature that allows the fan to purge the heat chamber of any unburned gas that may remain after a burner has been shut down for any reason.

5. After the flame is established, slowly open the bottom burner gas main hand valve all the way (handle parallel to the piping).

NOTE: Opening the gas main hand valve slowly will prevent possible freezing of the LP Gas line and also prevent the temperature from rising too fast. If the temperature rises too fast, the High Limit Switch will trip out and the dryer will shut down.

6. If the LP Gas line freezes, close the gas main hand valve and flip the ignition switch OFF. After the gas line thaws out repeat steps 4 and 5, but open the gas main hand valve slower.

NOTE: The ignition board is electronically timed so that the ignition system will continue to spark and hold the solenoid gas valves open for a "trial ignition" period (about 5 seconds). If the burner does not light, the system will "lock out" (after the 5 second trial period) closing the solenoid gas valves. The gas valve light will be out.

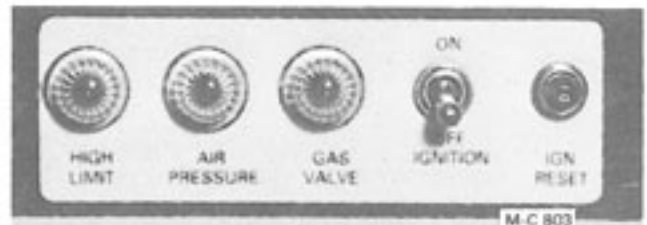


Figure 10

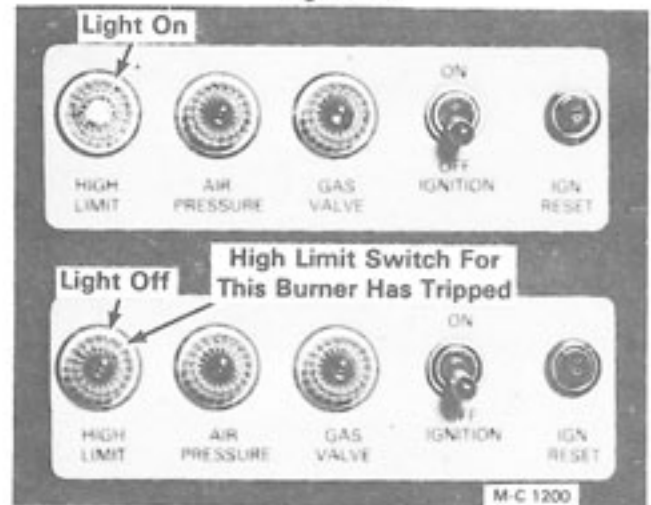


Figure 11

7. Flip the ignition switch OFF then ON again. The gas valve light will come ON after the ten second delay and another trial for ignition period (5 seconds) will start.
8. If after several attempts for ignition there is still no flame, push the 0.1 (1/10th) amp. ignition reset button (circuit breaker) on the control panel, see Figure 10. This circuit breaker protects the ignition board from heat build up due to repeated ignition attempts.

NOTE: If the burner fails to light, check the electrode, 10 second delay and ignition board as explained under "Direct Spark Ignition System," page 26.

9. If the High Limit Switch trips out the dryer will shut down. Close the gas main hand valve and flip the ignition switch OFF. All fans and burners will have to be restarted.

NOTE: When a High Limit Switch trips out the high limit light for that burner and all of the high limit lights below it will be out, see Figure 11.

Nonadjustable High Limit Switches - Push the reset button on the High Limit Switch to reset it, see Figure 12. The high limit lights will come back on.

Adjustable High Limit Switches - The High Limit Switch will automatically reset when the

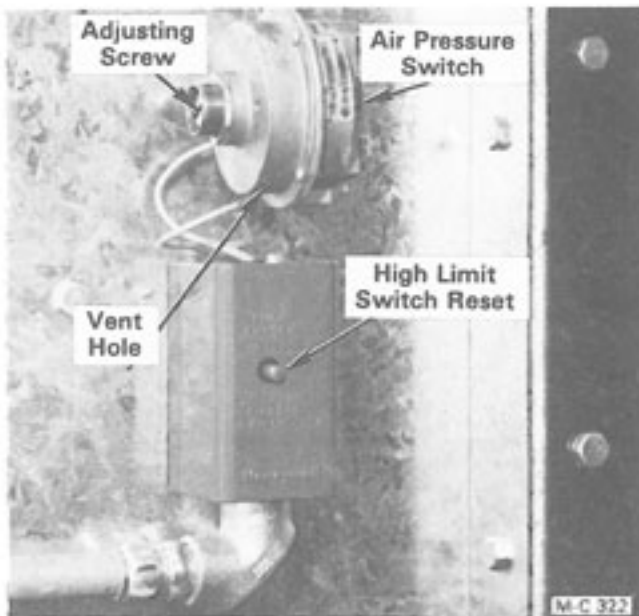


Figure 12 - Nonadjustable High Limit Switch

plenum chamber temperature falls 20° below the High Limit Switch setting. The high limit lights will come back on.

10. Push the control circuit switch up to the START position and release it. Restart the fan. Repeat steps 4 and 5, but open the gas main hand valve slower to prevent the temperature from rising too fast.

NOTE: If equipped - the main gas supply safety shut-off valve must be opened manually before the burner can be started.

11. **LP Gas Only** - When the flame is established, the heat causes the LP Gas to vaporize. After the burner has been running for 10 minutes check the vaporizer coil as follows:

- A. Check the LP Gas line coming out of the fan housing from the vaporizer coil to the pressure regulator with your hand.



CAUTION: The line may be very hot.

- B. When the vaporizer coil is positioned correctly in the flame, the LP Gas line coming out of the fan housing from the vaporizer coil to the pressure regulator should feel very warm, but not so hot that you cannot hold your hand on it.
- C. If it feels cool, the vaporizer coil is not close enough to the flame. If it is very hot, the vaporizer coil is too close to the flame.
- D. Shut the burner and all fans off.

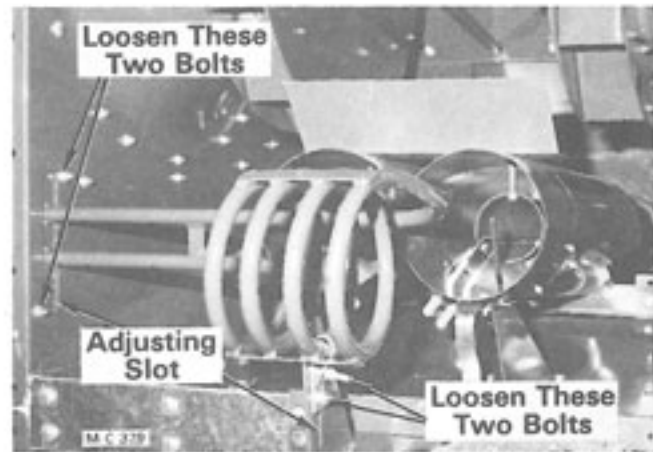


Figure 13 - LP Gas Vaporizer Coil



CAUTION: Turn off and lock the electric power supply to the control cabinet.

- E. Go into the plenum chamber and move the coil closer to or away from the flame, see Figure 13.
- F. After the adjustment has been made, turn on the electric power supply. Restart the fans and burner, and recheck temperature.

NOTE: If equipped - the main gas supply safety shut-off valve must be opened manually before the burner can be started.

12. **LP Gas Only** - With the burner operating, check the reading on the gas pressure gauge in the manifold see Figure 14. It should be approximately 8 to 10 pounds (less in mild weather). If not, loosen the locknut on the pressure regulator adjusting screw, see Figure 14. Turn the adjusting screw IN to increase and OUT to decrease pressure.

NOTE: After the dryer has been operating for several hours the pressure regulator(s) will be functioning properly. It will not be necessary to adjust them on future start-ups.

Setting Burner Operating Temperature

NOTE: Refer to the "Suggested Burner Operating Temperature Setting Chart" on page 12. Temperatures shown are initial settings and may have to be adjusted for local crop and weather conditions.

1. With the burner operating, set the operating temperature by adjusting the modulating valve.

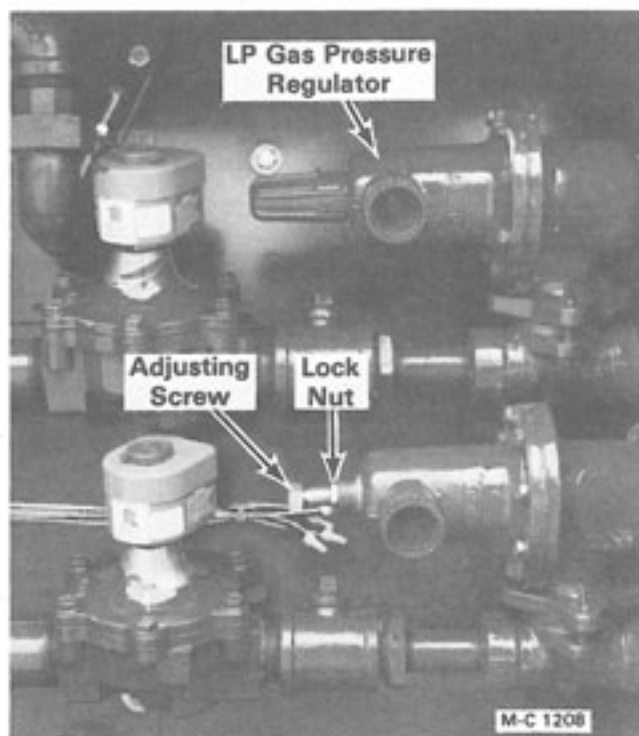


Figure 14 - LP Gas Two Burner Cabinet

2. Turn the "T" handle on the modulating valve IN to INCREASE temperature and OUT to DECREASE temperature, see Figure 15. There is a temperature gauge on the control panel for each burner.
3. Observe the burner flame through the window behind the gas manifold, see Figure 16. The flame should be blue with a little bit of orange in it and have a bushy ball shape.

NOTE: Initial yellow flame is normal on LP Gas dryers until the fuel begins to vaporize.

If any of the conditions listed below exist, they can be corrected by changing the primary and/or secondary air adjustment slightly. See Venturi Burner Air Adjustment on page 28.

IMPORTANT: Both venturi burners must be adjusted the same distance or amount to provide even heat in the plenum chamber.

- A. Unstable flame (quick ON-OFF-ON flame). Adjust secondary air.
- B. Gas Solenoid Valve Chatters. Adjust secondary air.
- C. Flame is very yellow or orange in color. Adjust primary air.
- D. Flame is light blue with no orange or yellow at all. Adjust primary air.

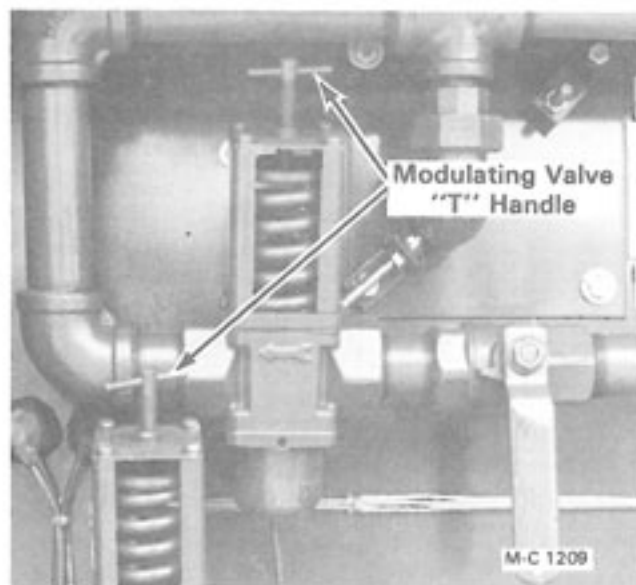


Figure 15 - Two Burner Cabinet

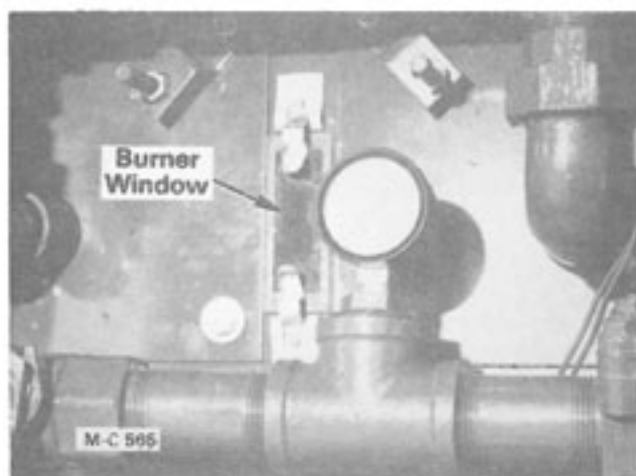


Figure 16

- E. Flame popping. Adjust secondary air.
4. After the burner operating temperature has been set and the flame checked, close the gas main hand valve and flip the ignition switch OFF (leave the fan running).
5. Repeat the starting and burner operating temperature setting procedure for the remaining burners (in order from the bottom to the top). After the burner operating temperature has been set for each burner, turn all of the fans off.

NOTE: After the dryer has been operating for several hours the modulating valve(s) will be functioning properly. It will not be necessary to adjust them on future start-ups unless the burner operating temperature is to be changed.

Suggested Burner Operating Temperature Settings (°F)

(Fans and Burners From the Top to the Bottom)

IMPORTANT: Use this chart as a starting point for drying the crops listed. Depending on the condition of the crop, you may have to increase or decrease the temperature shown. When drying seed grain, use lower temperatures.

Dryer Model	Corn	Sorghum & Wheat	Sunflower, Oats, Barley, Soybeans
	Temperature °F	Temperature °F	Temperature °F
675 & 975	230	170	140
	Cool or 180	Cool or 150	Cool or 130
775 & 1075	235	180	140
	225	160	130
	Cool or 200	Cool or 150	Cool or 120
875 & 1175	235	180	140
	225	170	130
	200	160	120
	Cool or 180	Cool or 150	Cool or 120
885 & 1185	235	180	140
	230	170	140
	210	160	130
	200	150	130
	Cool or 180	Cool or 150	Cool or 120
895 & 1195	240	180	140
	235	170	140
	225	160	130
	210	150	130
	Cool or 200	Cool or 150	Cool or 120
	Cool or 180	Cool or 150	Cool or 120

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OPERATING INSTRUCTIONS

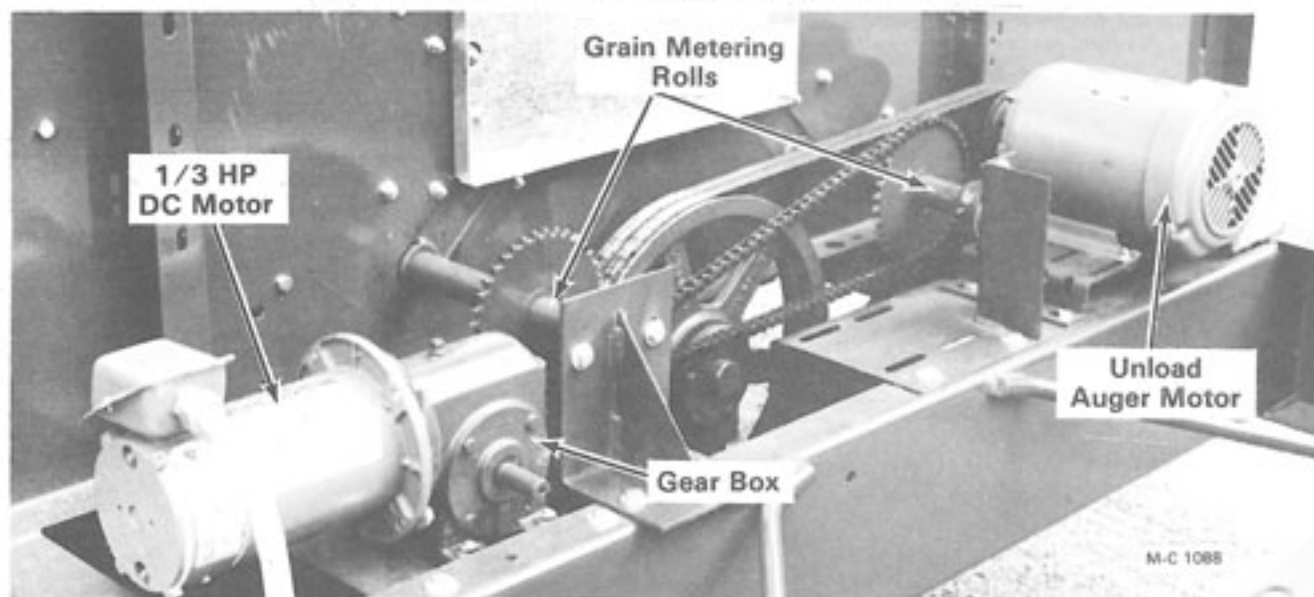


Figure 17 - SCR Drive

Operation of the Discharge System (See Figure 17)

1. The grain metering rolls are driven by a 1/3 HP direct current motor and gear box. The speed of the motor is controlled by a potentiometer (SCR drive speed control) located on the control panel, see Figure 18. The speed control dial is graduated from 0 (slow) to 10 (fast).
2. A grain temperature sensing thermistor probe is located in the grain column on the right side of the dryer. It sends the grain temperature reading to the adjustable Zytron moisture control on the component mounting panel in the control cabinet, see Figure 19. The Zytron moisture control is adjusted by turning the moisture control dial (potentiometer) on the control panel.
3. When the discharge metering roll switch is in the AUTOMATIC position, the Zytron moisture control controls the SCR drive motor.
4. When the discharge metering roll switch is in the MANUAL position, the Zytron moisture control is by-passed and power flows directly to the SCR drive motor. The SCR drive motor will run continuously at a speed established by the speed control setting. The MAX. RATE light on the control panel will be ON.
5. The Zytron moisture control has two sets of contacts that react to two different



Figure 18

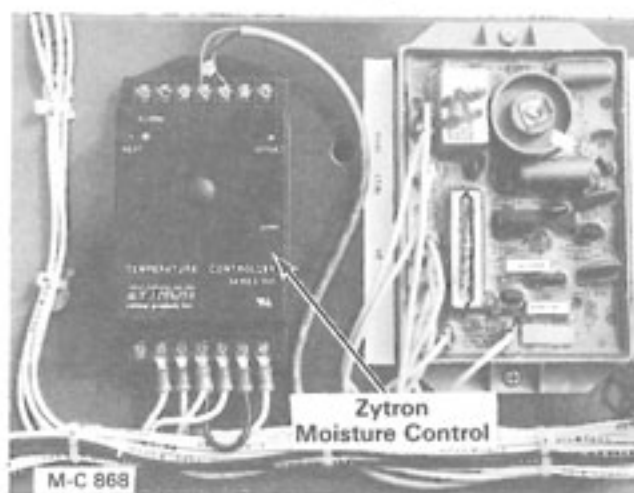


Figure 19

temperatures approximately 20° apart.

6. The discharge system will operate as follows when the discharge metering roll switch is in the AUTOMATIC position.

- A. The SCR drive motor will run at the speed established by the speed control setting when the moisture control senses the high temperature setting. The MAX. RATE light on the control panel will be ON.
- B. If the grain temperature falls below the high temperature setting the contacts in the moisture control open and the speed of the SCR drive motor decreases approximately 40%. The MAX. RATE light on the panel will be OUT.
- C. When the grain temperature rises to the high temperature setting the moisture control contacts close and the SCR drive motor runs at the speed established by the speed control setting. The MAX. RATE light comes back ON.
- D. If the grain temperature falls below the low temperature setting the contacts in the moisture control open and the SCR drive motor stops so that the dryer will not unload wet grain.
- E. When the grain temperature rises above the low temperature setting the SCR drive motor will start and run at the reduced speed until the grain temperature reaches the high temperature setting. It will then run at the speed established by the speed control setting and the MAX. RATE light will be ON.

Drying Grain

NOTE: If the dryer is equipped with optional "Base Section Controls" follow the grain drying procedure in the Base Section Control manual.

1. Flip all of the toggle switches on the control panels to the OFF position.
2. Turn on the electric power supply to the dryer. The 115V POWER ON light will be on.
3. Flip the control circuit toggle switch ON. The control circuit ON light and high limit lights will be on.
4. Push the control circuit toggle switch up to the START position and release it. The READY light will be on. The level auger light will be on if the dryer is not full of grain.

NOTE: If equipped — the main gas supply safety shut-off valve must be opened manually before the burners can be started.

5. Flip the level auger toggle switch to the MANUAL position. Turn the moisture control dial down to 0. Set the Grain Flow Timer as explained under "Level Auger Operation" on page 15.
6. With the dryer full of grain, flip the level auger switch to AUTOMATIC and start the bottom fan. When it comes up to speed, start the next fan. Continue this procedure until all of the fans are running.

NOTE: If the dryer is to be operated "Dry and Cool" it is suggested that the lower burner be started and run until the first load of grain is dry to avoid having to recycle the wet grain in the cooling section back to the heating section.

7. Start the burners in order from the bottom to the top.
8. Running on continuous heat, it will take approximately 6 minutes per point of moisture being removed to dry the first load.
9. When the first load is dry, push the discharge auger spring loaded toggle switch up to the START position and release it. It will move down to the ON position.
10. Flip the discharge metering roll switch to the MANUAL position. The SCR drive motor will start and the dryer will begin unloading grain. The MAX. RATE light will be ON.

If the SCR drive motor does not start, push the SCR drive circuit breaker reset button in, see Figure 18.

11. The SCR drive speed control dial, Figure 18, is graduated from 0 (slow) to 10 (fast). Use the Grain Metering Roll Discharge Rate Chart Figure 20, as a guide to set the SCR drive speed control.
12. Test the moisture content of the grain being discharged every 15 minutes until it stabilizes.
13. If the moisture content is too high after it stabilizes, turn the SCR drive speed control down to a lower number to decrease the unloading speed. If it is too low, turn the speed control up to a higher number to increase the unloading speed.

IMPORTANT: Avoid over adjusting, make small changes in the dial setting. Wait 1 hour to allow the dryer to react to the change.

Grain Metering Roll Discharge Rate Chart

NOTE: Discharge rates shown are with the discharge metering roll switch in the MANUAL position and are based on a 12 tooth drive sprocket and SCR Drive motor speeds of 100 RPM (min.) and 1750 RPM (max.).

When capacity exceeds the unloading rate, increase the size of the drive sprocket.

SCR Drive Dial Setting	16' Dryers Bu./Hr. (approx.)	24' Dryers Bu./Hr. (approx.)
0	75	114
1	149	225
2	287	432
3	427	640
4	564	847
5	703	1055
6	841	1262
7	979	1470
8	1117	1677
9	1256	1885
10	1329	1995

M-C 1185

Figure 20

14. Recheck the moisture content and change the speed control setting again if necessary.

Moisture Control Setting

1. When the dryer has discharged grain at the desired moisture content for 1 to 2 hours, flip the discharge metering roll switch to the AUTOMATIC position.
2. Turn the moisture control dial up slowly until the MAX. RATE light on the control panel goes OUT.

NOTE: The moisture control setting should not have to be changed unless the bottom burner operating temperature is changed or if the moisture content of the discharged grain is to be changed. Allow 1 hour for the dryer to react to the change before changing the setting again.

3. Observe the MAX. RATE light on the control panel. It will be going ON and OFF. It should be on approximately 45 minutes each hour. If the light is on less than 45 minutes each hour, the discharge rate is too fast. If the light is on more than 55 minutes each hour, the discharge rate is too slow.
4. If the discharge rate is to be changed, adjust the SCR drive speed control. Do not change the moisture control setting. Allow 1 hour for the dryer to react to the change before changing the setting again.

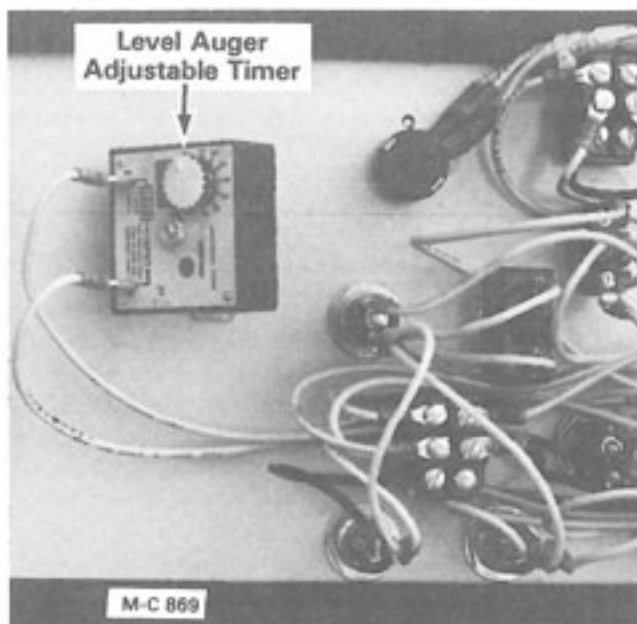


Figure 21

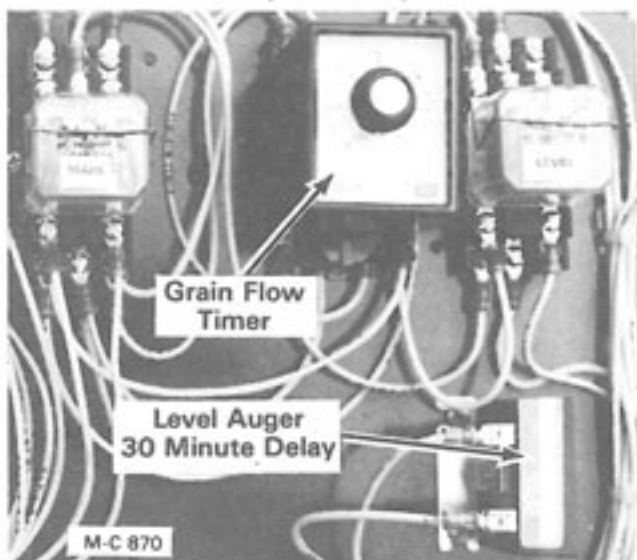


Figure 22

Level Auger Operation

Description

There is an adjustable .2 to 8 minute delay in the level auger circuit, see Figure 21. It is activated when the level auger switch is in the AUTOMATIC position and the level auger light is calling for grain.

This delay prevents nuisance starting and stopping of the level auger. If the level auger switch is flipped to OFF and back to the AUTOMATIC position the delay will recycle.

The Grain Flow Timer, Figure 22, will shut the dryer down if there is an insufficient grain supply to fill the hopper. When the level auger starts, the Grain Flow Timer will be activated. When the

timer counts down to zero, the dryer will shut down and the Grain Flow light will come on.

There is a 30 minute delay, see Figure 22, in the level auger circuit also. It starts when the bin switch in the hopper closes. If the dryer does not discharge grain (caused by plugged metering rolls, broken unload auger belt or chain) the hopper will remain full of grain.

If the level auger does not start for 30 minutes after the bin switch in the hopper closes, the 30 minute delay will activate the Grain Flow Timer and it will shut the dryer down. The Grain Flow light will come on.

If the bin switch opens and the level auger starts before the 30 minutes are up, the 30 minute delay automatically resets to zero.

Setting the Grain Flow Timer

IMPORTANT: If the timer has not been set, the dryer will shut down when the level auger toggle switch is flipped from MANUAL to AUTOMATIC.

1. Set the adjustable level auger delay, Figure 21, for time desired (.2 to 8 minutes).
2. Flip the level auger switch to the AUTOMATIC position. Turn the timer control knob, Figure 22, to 30 minutes. The level auger will start after the .2 to 8 minute delay if the level auger light is on calling for grain.
3. Check the level auger refill time a minimum of 6 times. The level auger light will come ON when the level auger bin switch in the hopper calls for grain and will go OUT when the hopper is full. The length of time that the level auger light is on is the refill time (including the .2 to 8 minute delay).
4. Average the 6 refill times and reset the Grain Flow Timer, Figure 22, to run 5 minutes longer. For example, if it takes the level auger an average of 5 minutes to refill the dryer (including the .2 to 8 minute delay), set the Grain Flow Timer to run 10 minutes.

NOTE: The timer does not operate when the level auger toggle switch is in the MANUAL or OFF position.

Grain Flow Timer Operation

With the Grain Flow Timer set to run 5 minutes longer than the level auger refilling time, the timer will work as follows:

1. The timer will start when the level auger starts. The red light on the face of the timer will be on and the red needle on the timer dial will start to move to zero.
2. After the level auger refills the dryer and shuts off, the level auger light will go out and the timer red needle will automatically reset. The red light on the face of the timer will be out.
3. If there is an insufficient grain supply, the level auger will continue to run beyond the 5 minute refilling period. When the level auger has run the length of time that the Grain Flow Timer has been set for, the dryer will shut down.

If the dryer has not discharged grain for 30 minutes after the bin switch in the hopper closes, the Grain Flow Timer will start and shut the dryer down when it counts down to zero.

4. The grain flow, high limit, control circuit ON and 115V power ON lights will be on. Flip the level auger switch OFF.

NOTE: When the Grain Flow Timer shuts the dryer down determine if the problem is low grain level in the hopper or dryer discharge system failure.



CAUTION: Turn off and lock the electric power supply to the dryer before any service work is performed.

5. When the problem has been corrected, flip the control circuit switch OFF, then ON to reset the Grain Flow Timer. Flip it up to the START position and release it, the READY light will be on.

NOTE: If equipped — the main gas supply safety shut-off valve must be opened manually before the burners can be started.

6. Flip the level auger switch to MANUAL. Restart the fans, burner(s) and discharge auger. Flip the level auger switch to the AUTOMATIC position. The level auger .2 to 8 minute delay will be activated if the level auger panel light is on calling for grain.



CAUTION: Do not allow anyone to be in the hopper as the level auger will start automatically.

Rear Discharge Overload Door

1. If the customer supplied grain take away system fails, the dryer will continue to discharge grain until the rear discharge overload door, Figure 23, is raised by the grain.
2. When the overload door raises, the dryer will shut down and all of the lights except the 115V POWER ON light will be out. The Grain Flow Timer will automatically reset.
3. When the problem has been corrected and the rear discharge overload door closes, the control circuit ON and the high limit lights will be on. Flip the control circuit switch up to the start position and release it, the READY light will be on.

NOTE: If equipped — the main gas supply safety shut-off valve must be opened manually before the burners can be started.

4. The level auger delay will be activated if the level auger switch is in the AUTOMATIC position and the level auger bin switch in the hopper is calling for grain.



CAUTION: Do not allow anyone to be in the hopper as the level auger will start automatically.

5. Flip the ignition switch(es) OFF and restart the fans, burner(s) and discharge auger.

Control Cabinet Heat Bulb

1. The heat bulb in the upper control cabinet will always be on when the electric power supply to the dryer is on. It does not have an ON-OFF switch.
2. The bulb supplies heat to help keep the electrical components in the cabinet dry.

Safety Control Fire Alarm w/Safety Shut-Off Valve (Optional)

General

The safety control fire alarm with safety shut-off valve is activated when the control circuit READY light is ON.

The linear limit sensors on the outside of the dryer screens monitor the exhaust air temperature, see Figure 24. The temperature operating range of the sensors is pre-set and is not adjustable.

The safety shut-off valve shuts off the main gas supply to the dryer, see Figure 24.

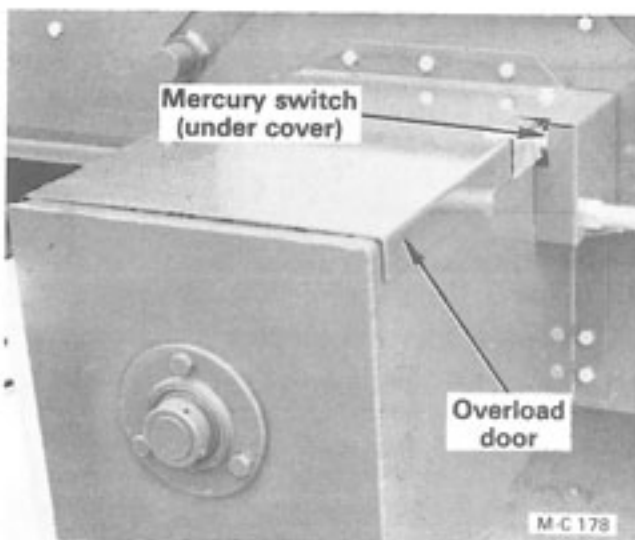


Figure 23

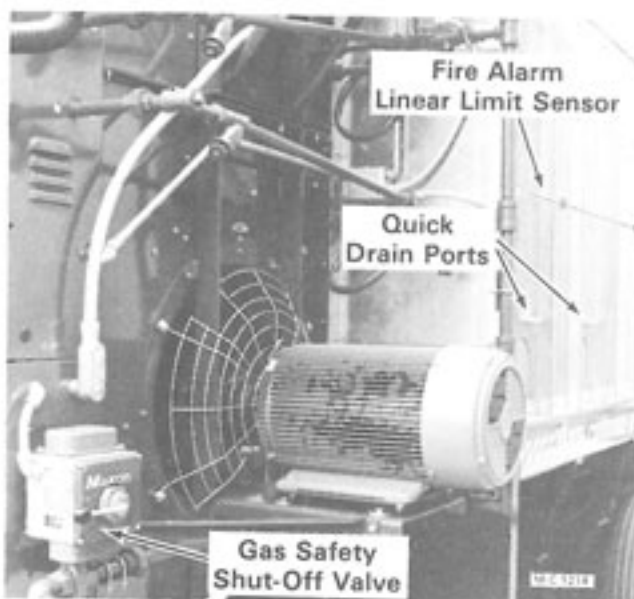


Figure 24 - Optional Safety Control Fire Alarm w/Safety Shut-Off Valve

Fire Alarm Operation

1. If the exhaust air temperature increases above the sensor setting, the sensor opens breaking the alarm circuit.
2. When the alarm circuit is broken, the red light on the dryer will be on, the horn will sound, the safety shut-off valve will close and the dryer will shut down.
3. When the dryer cools down the sensors will automatically close completing the alarm circuit.
4. The fire alarm red light will remain on and the horn will continue to sound until the control circuit toggle switch on the control panel is flipped to the OFF position.

5. Before restarting the dryer, make a thorough inspection of the dryer to determine what caused the fire alarm to shut the dryer down.
6. Push the control circuit toggle switch up to start and release it. If the linear limit sensors have cooled down completing the alarm circuit, the READY light will remain on.
7. Reset the safety shut-off valve manually. The reset lever is on the side of the valve.
8. Flip the ignition switches OFF and restart the fans and burners.

Safety Shut-Off Valve Operation

1. The safety shut-off valve will close shutting off the main gas supply to the dryer when any of the following occur.
 - A. Exhaust temperature increases above the fire alarm linear limit sensor setting, breaking the fire alarm circuit.
 - B. Rear discharge overload door opens.
 - C. Grain flow timer shuts the dryer down.
 - D. Fan magnetic overload relay trips.
 - E. High limit switch trips.
2. When the problem has been corrected, push the control circuit toggle switch up to start and release it. The READY light will be on.
3. Reset the safety shut-off valve manually. The reset lever is on the side of the valve, see Figure 24.
4. Flip the ignition switches OFF and restart the fans and burners.

Temporary Shut Down

1. Close the LP Gas supply valve at the tank or close the natural gas supply valve. Operate the burner(s) until the flame goes out. Flip the ignition switch(es) OFF.
2. Close the gas main hand valve(s) in the cabinet(s) (handle 90° to the piping).
3. **LP Gas** - Close the liquid line flip valve for each burner (handle down) and the hand valve at the LP Gas inlet hose.
4. Flip the discharge metering roll, level auger and discharge auger toggle switches OFF.
5. Run the fans approximately 20 minutes to cool the grain in the dryer, then turn them

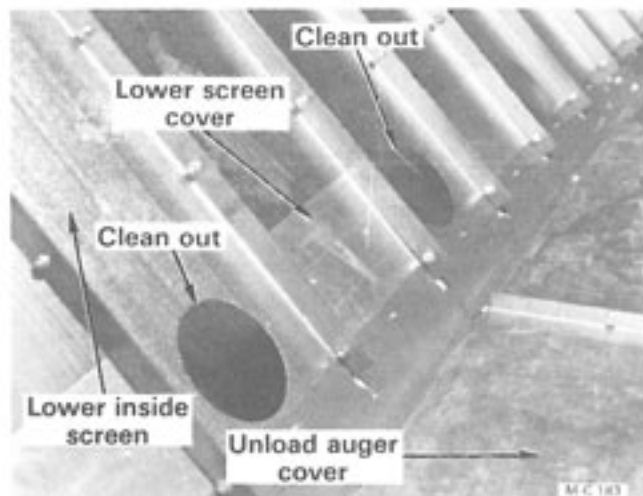


Figure 25

OFF. Flip the control circuit toggle switch OFF.

6. Turn off and lock the electric power supply to the dryer.

NOTE: Do not turn the 115V electric power supply off if the heat bulb in the middle control cabinet is to remain on.

Restarts



CAUTION: If the outside temperature went below freezing (32°F) after the dryer was shut down, check to be sure that the grain in the lower part of the grain drying columns or in the metering rolls is not frozen. Frozen grain would prevent the dryer from unloading, which could possibly result in a fire.

1. If the dryer has a burner in the bottom chamber it will thaw the grain when it is started. If not, loosen the frozen grain by hand as follows:
 - A. The lower portion of the grain columns and the metering rolls are accessible from inside the dryer. Do not attempt to clear frozen grain through the quick drain ports on the outside of the dryer.
 - B. Open the dryer rear lower door.
 - C. There is a clean-out in every lower inside screen. Remove all lower screen covers, see Figure 25. After the frozen grain has been loosened reinstall the lower screen covers and close the dryer rear door.
2. Flip all of the toggle switches on the control panel(s) to the OFF position. Turn on the electric power supply to the dryer.

3. **LP Gas** - Open the tank supply valve, hand valve at the LP Gas inlet hose and the liquid line flip valve for each burner (handle 90° to the piping).
4. **Natural Gas** - Open the gas supply valve.
5. Flip the control circuit toggle switch ON. Then push it up to the START position and release it, the READY light will be on.

NOTE: If equipped — the main gas supply safety shut-off valve must be opened manually before the burners can be started.

6. Start the bottom fan. When it comes up to speed, start the next fan. Continue this procedure until all of the fans are running.
7. Start the burners in order from the bottom to the top. Flip the level auger toggle switch to AUTOMATIC.
8. Preheat the grain for 5 to 10 minutes.
9. Push the discharge auger spring loaded toggle switch up to the START position and release it. It will move down to the ON position.
10. Flip the discharge metering roll toggle switch to the MANUAL position to begin discharging grain.
11. Discharge grain for 15 minutes, then flip the discharge metering roll toggle switch to AUTOMATIC. The moisture control will automatically control the metering rolls to maintain the desired moisture content.

NOTE: The grain that was left in the dryer after shut down will be slightly over dried when discharged. **DO NOT** change the discharge rate or moisture control setting until all of the old grain has been discharged (1 to 2 hours) and moisture content has stabilized.

Final Shut Down

When finishing a crop or at the end of the season all of the grain in the dryer must be dry before the dryer is completely unloaded.

1. Flip the discharge metering roll, level auger and discharge auger switches OFF.
2. Run the burners until all of the grain is at the desired moisture content.
3. When the grain is dry, close the LP Gas supply valve at the tank or close the natural

gas supply valve. Operate the burners until the flame goes out. Flip the ignition switch(es) OFF.

4. Close the gas main hand valve(s) in the top cabinet(s) (handle 90° to the piping).
5. **LP Gas** - Close the liquid line flip valve for each burner (handle down) and the hand valve at the LP Gas inlet hose.
6. Run the fans approximately 20 minutes to cool the grain in the dryer, then turn them off.
7. Flip the discharge metering roll toggle switch to the MANUAL position and start the discharge auger to unload all of the grain. When the dryer is empty, flip the discharge metering roll and discharge auger toggle switches OFF. Flip the control circuit toggle switch OFF.



CAUTION: Before continuing to the next step, turn off and lock the electric power supply to the dryer. Flip all of the circuit breakers in the lower cabinet OFF and lock all of the control cabinet doors.

8. Clean out the unload auger and the grain metering rolls. Each unload auger pan is hinged on the left side and secured on the right side with two overcenter latches. Push the handle on the latches down to open the pans and pull them up overcenter to lock the pans.
9. Clean the fans, burners and heat chambers.
10. Clean all of the screens. If the dryer is equipped with a heat recovery system, remove and clean the bottom covers.
11. Lubricate all bearings with a hand grease gun. See "Lubrication" on page 20. Do not over lubricate. Too much grease may damage the bearing seals. Lubricate the SCR drive chain and sprockets with engine oil.
12. Loosen the level auger and unload auger drive belts.
13. **Model 675B and 975B** - Loosen the main drive and fan drive belts.
14. Cover the fan housing(s) and motors loosely with canvas or plastic. Covers must allow air circulation to prevent condensation.

MAINTENANCE



CAUTION: Do not allow children or bystanders near the dryer while it is being adjusted and/or serviced.

Lubrication



CAUTION: To prevent accidental starting of any of the motors during lubrication, turn off and lock the electric power supply to the dryer. Flip all of the circuit breakers in the lower cabinet(s) OFF and lock all of the control cabinet doors.

NOTE: Use a hand grease gun to lubricate bearings. Use a good grade of bearing grease and do not over lubricate. Too much grease may damage the bearing seals. Avoid getting grease on any of the belts.

Change the oil in the SCR drive gear box after the first two weeks of operation. Use Mobil SHC 634 oil or equivalent. Gear box capacity is $\frac{3}{4}$ pint. Also change the oil at the start of each drying season.

Mobil SHC 634 oil is available from M-C in one pint containers. Order M-C part number 128 8947.

Every 100 Hours

1. Lubricate the bearing on each end of the fan shafts, see Figure 26.

NOTE: EMS model dryers (single phase motors) have two fan shafts, one for each motor. There is a bearing on each end of the shafts. The lubrication fittings for the center bearings are accessible from inside the heat chamber.

2. Lubricate the unloading auger front bearing and the front bearing on each grain metering roll, see Figure 27.
3. **Model 675B and 975B PTO Drive** - Lubricate the PTO jack shaft bearings, see Figure 28. Also lubricate the PTO shaft universal joints.
4. **All Model 675B and 975B** - Lubricate the fan drive belt idler pulleys, see Figure 29.
5. All other bearings used on the dryer are prelubricated and require no further lubrication.

Periodically

1. **All Model 675B and 975B** - Check the oil level in the gear box. Figure 30 shows PTO front and



Figure 26



Figure 27

irrigation drive gear box. Oil level should be even with the bottom of the hole. If not, remove the vent plug on the top and add Mobilfluid 423 multipurpose transmission lubricant or equivalent. Install level and vent plug. Be sure vent plug is open.

Mobilfluid 423 is available from M-C in one pint containers. Order M-C part number 000 8991.

2. **SCR Drive Gear Box** - Remove the oil level plug (top one) on the end of the gear box, see Figure 31. The oil level should be even with the bottom of the hole. If not, remove the vent plug on top of the gear box and add Mobil SHC 634 oil or equivalent until it just runs out. Install the level and vent plug.

Mobil SHC 634 oil is available from M-C in one pint containers. Order M-C part number 128 8947.

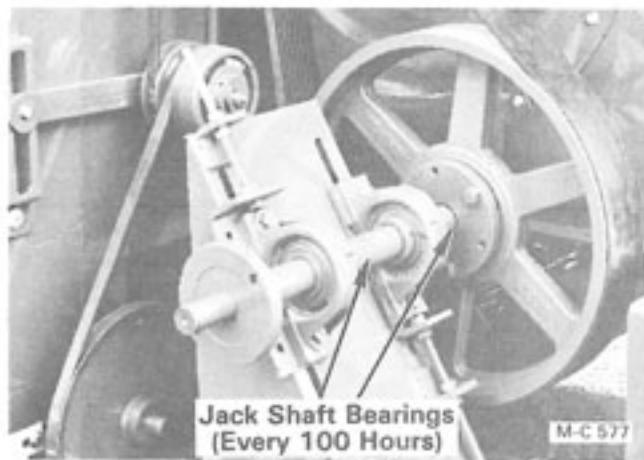


Figure 28

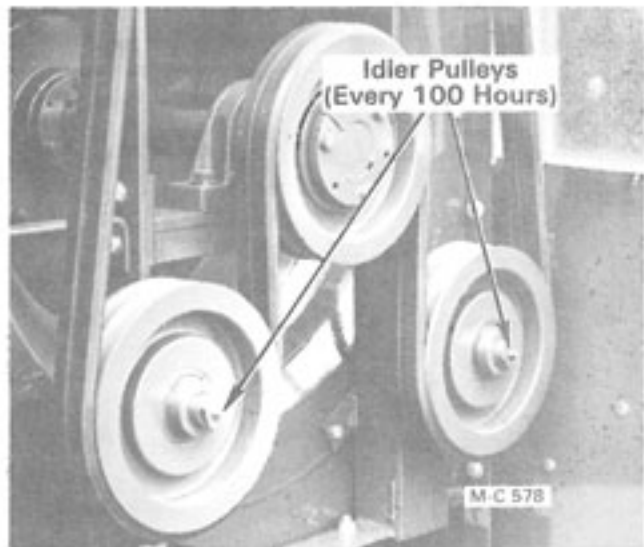


Figure 29

3. Oil SCR drive sprockets and chain with engine oil. Be careful not to get oil on the belts.

Screens and Heat Recovery System

NOTE: Be sure to keep the inside screens and heat chambers as clean as possible to reduce the possibility of fire. Also, a clean dryer works better than a dirty one.

1. Check the exterior screens periodically and clean as necessary.
2. Clean the inside screens and heat chambers every 8 to 10 hours.
3. If the dryer is equipped with a heat recovery system, remove and clean the bottom covers every 8 to 10 hours.

NOTE: Under some drying conditions, the inside screens and heat recovery bottom covers may have to be cleaned more often.

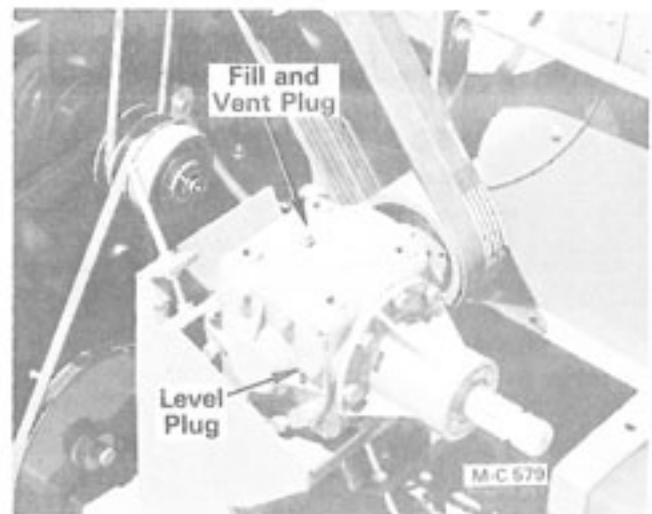


Figure 30 - PTO Front and Irrigation Drive

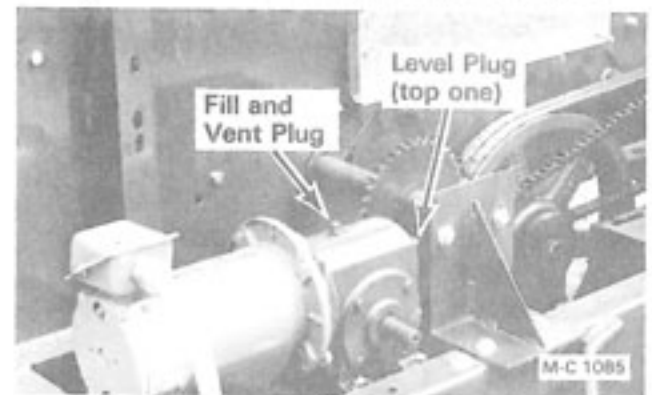


Figure 31

Belt Adjustment

General

1. After approximately 24 hours of operation the belts will seat themselves in the pulley grooves and the tension may have to be readjusted. If the belts squeal when the motor starts they are not tight enough.
2. Never apply belt dressing as this will damage the belt and cause early belt failure.

Discharge Auger

1. Loosen motor mounting locknuts. Turn locknut on the "J" bolt to adjust tension.

Level Auger

1. Adjust the belt tension by loosening the locknuts and raising the motor mount plate evenly with the four adjusting nuts, then tighten the locknuts, see Figure 32.

Main Drive

(Model 675B & 975B PTO Side Drive)

1. Loosen the bolts securing the two pillow block bearings to the jack shaft base.

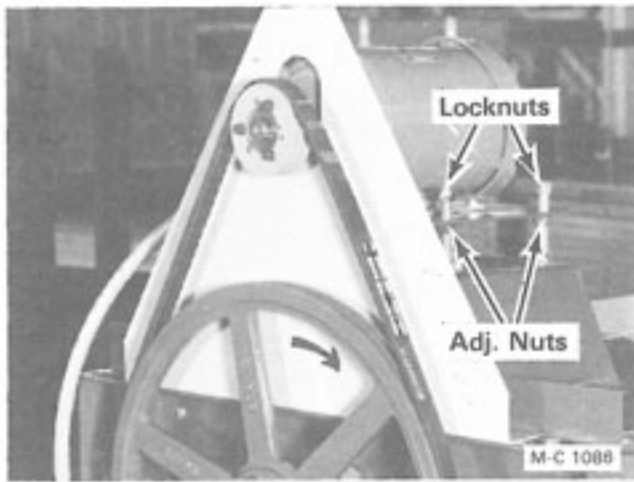


Figure 32

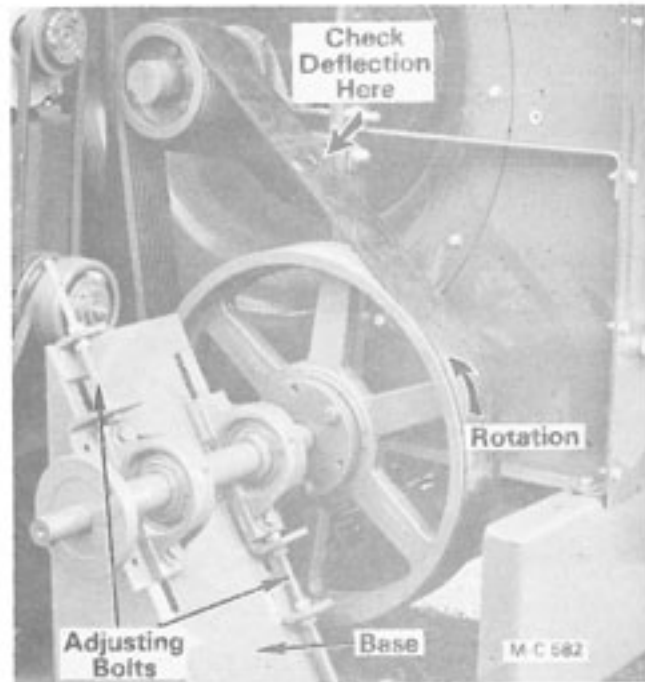


Figure 33 - PTO Side Drive

2. Loosen the locknuts on the adjusting bolts. Turn the nuts on the adjusting bolts to move the jack shaft and bearings down to increase belt tension, see Figure 33.
3. On new belts, adjust tension so that 66 lbs. of pressure will deflect the belt(s) 5/16". After 24 to 48 hours of running readjust belt tension so that 54 lbs. of pressure will deflect the belt(s) 5/16".
4. Tighten the adjusting bolt locknuts and pillow block bearing bolts.

**Main Drive
(Model 675B & 975B
front PTO and Irrigation Drive)**

1. Loosen the bolts securing the front drive mount to the base.
2. Loosen the locknuts on the adjusting bolts. Turn the nuts on the adjusting bolts to move the gear box down to increase belt tension, see Figure 34.
3. On new belts, adjust tension so that 66 lbs. of pressure will deflect the belt(s) 5/16". After 24 to 48 hours of running readjust belt tension so that 54 lbs. of pressure will deflect the belt(s) 5/16", see Figure 34.
4. Tighten the adjusting bolt locknuts.

**Fan Drive
(Model 675B and 975B)**

1. After 24 to 48 hours of running, adjust belt tension so that 24 lbs. of pressure (on both belts at the same time) will deflect the belts 1". Check deflection midway between the bottom stationary idler and the top fan pulley.

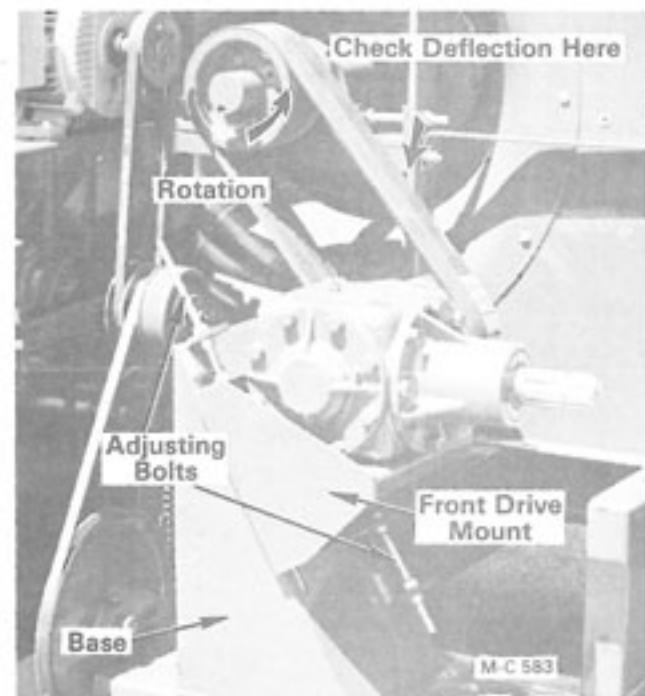


Figure 34 - PTO Front and Irrigation Drive

2. Loosen the nut on the adjustable idler pulley shaft and the locknuts on the adjusting bolt, see Figure 35.
3. Turn the nut on the adjusting bolt to move the fan drive tightener and idler pulley down to increase belt tension, see Figure 35.

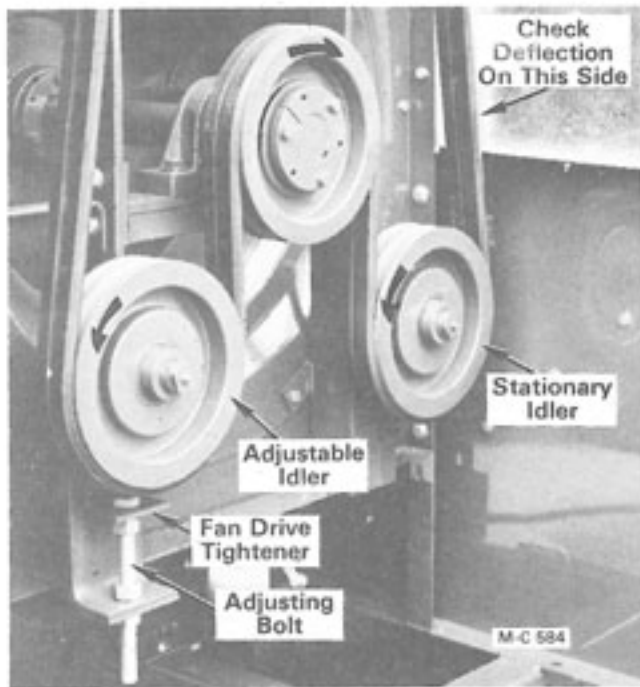


Figure 35 - PTO Fan Drive

Pre-Season Check

All of the following tests and adjustments can be made when the dryer is empty. The air pressure switch, burner primary and secondary air, modulating valve and vaporizer coil (LP Gas) adjustments can only be made when the dryer is full of grain. These adjustments are covered under "Initial Start-Up Instructions" on page 6.

CAUTION: The gas and electric power supply to the dryer **MUST** be off when performing steps 1 thru 7. Flip all of the circuit breakers in the lower cabinet(s) OFF. Lock the main electric supply to the dryer so that the power cannot be accidentally turned on.

General

1. Lubricate all bearings, chains and sprockets. Check the oil level in all gear boxes. Refer to "Lubrication" on page 20.
2. Check and adjust all belts. Refer to "Belt Adjustment" on page 21.
3. Tighten all electrical connections in the lower control cabinet(s). Check the ground connection in the cabinet to be sure it is clean and tight. Also check the ground connection from the dryer base to the grounding rod.
4. Clean out the unload auger and grain metering rolls. Each unload auger pan is hinged on the left side and secured on the

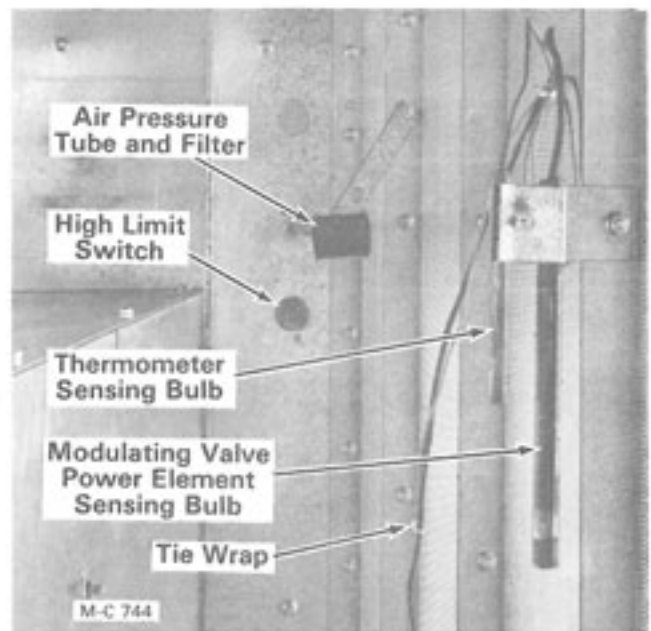


Figure 36

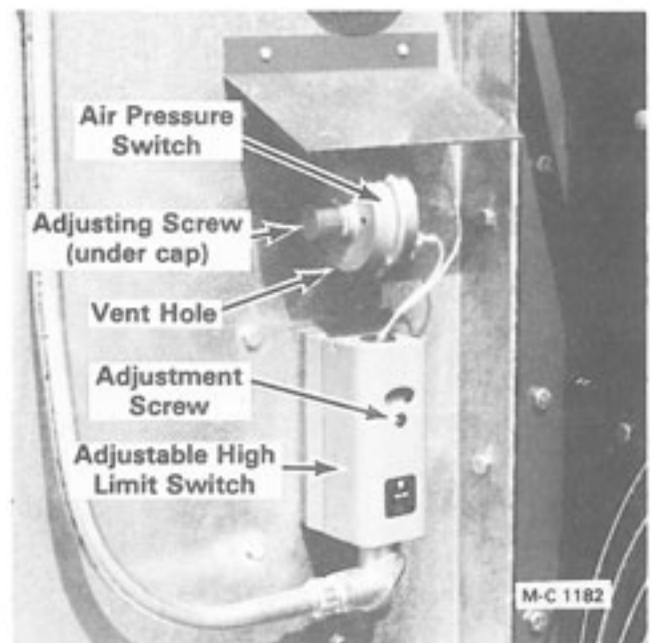


Figure 37

right side with two overcenter latches. Push the handle on the latches down to open the pans and pull them up overcenter to lock the pans.

5. Clean all of the screens, fans, burners and heat chambers. Remove and clean heat recovery system bottom covers (if equipped).
6. Remove the air pressure switches and clean the tube and filter, see Figure 36. Be sure the $\frac{1}{8}$ " vent hole in the bottom of the air pressure switch is open, see Figure 37.

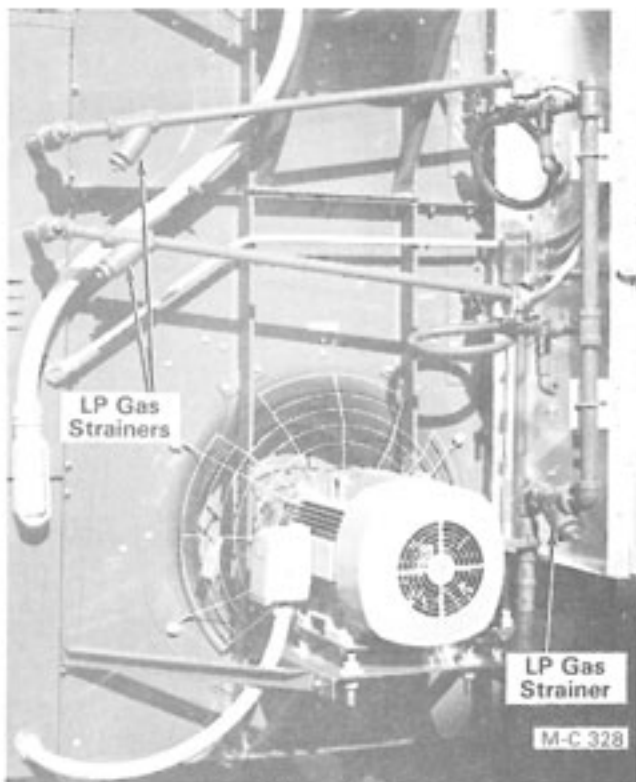


Figure 38

7. **LP Gas** - Remove the plug at the end of each strainer, see Figure 38. Remove and clean the screen in each strainer. Check flexible LP hoses for signs of fatigue, replace as necessary.

Level Auger and Discharge System

1. Flip all of the toggle switches on the control panel(s) to the OFF position. Flip all of the circuit breakers in the lower cabinet(s) ON. Turn the electric power supply to the dryer ON.
2. Flip the control circuit toggle switch ON. Then push it up to the START position and release it. The READY light will be on.
3. Check the level auger. Flip the level auger toggle switch to the MANUAL position. The level auger will start immediately.
4. Push the discharge auger toggle switch up to the START position and release it. The discharge auger will start.
5. Turn the SCR speed control to zero (0) and flip the discharge metering roll toggle switch to the MANUAL position. The SCR drive motor will start and the MAX. RATE light will be on.
6. Check the SCR motor speed, it should be 100 RPM. Turn the SCR speed control to ten (10) and check the SCR motor speed, it should be

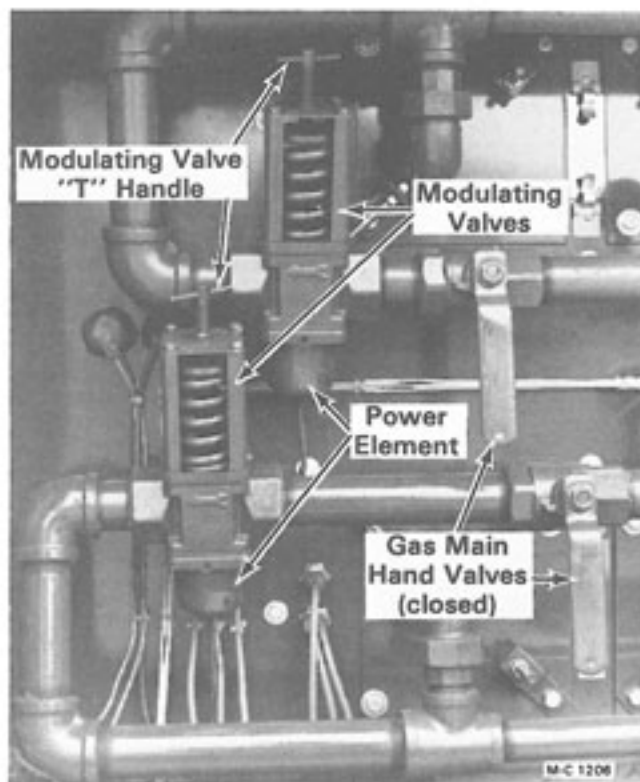


Figure 39 - Two Burner Cabinet

1750 RPM. If motor speed is not correct, see "Troubleshooting Discharge System" on page 34.

NOTE: To perform the balance of the discharge system check the outside air temperature must be above 50°F.

7. Set the SCR speed control to mid-range and lock in place. Turn the moisture control to zero (0).
8. Flip the discharge metering roll switch to AUTOMATIC. The SCR drive motor will run at the speed selected in step 7 and the MAX. RATE light will be on.
9. Turn the moisture control up until the MAX. RATE light goes out. The SCR motor speed will decrease approximately 40%.
10. Turn the moisture control up approximately ten (10) more increments. The SCR motor will stop.

Fans and Burners

1. Turn off the electric power supply to the dryer. Flip all of the toggle switches on the control panel(s) to the OFF position.
2. Close the gas main hand valve for each burner (handle 90° to the piping), see Figure 39.

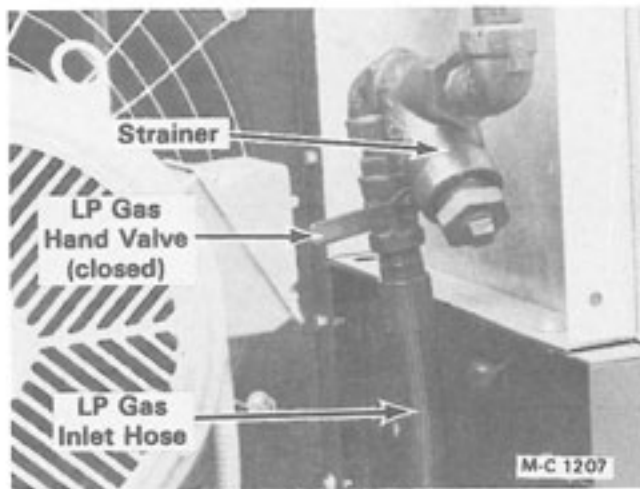


Figure 40 - LP Gas

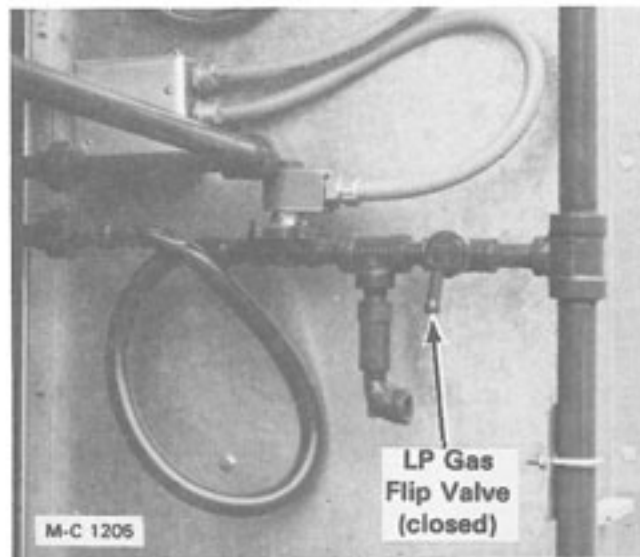


Figure 41 - LP Gas

3. **LP Gas** - Open the supply valve at the tank, the hand valve at the LP Gas inlet hose and open (lift up) the liquid line flip valve on each burner, see Figure 40 and 41.
Natural Gas - Open the supply valve.

4. Disconnect the two wires at the back of each air pressure switch (there is one for each burner), see Figure 42. Connect the two wires together with a short jumper wire. Do not allow the jumper wire to come in contact with any metal. This will by-pass the air pressure switch.



CAUTION: This is only a temporary procedure for checking the burners. When drying grain **NEVER** operate the dryer with the air pressure switch(es) disconnected or by-passed. This safety air pressure switch is for your protection and the protection of the dryer.

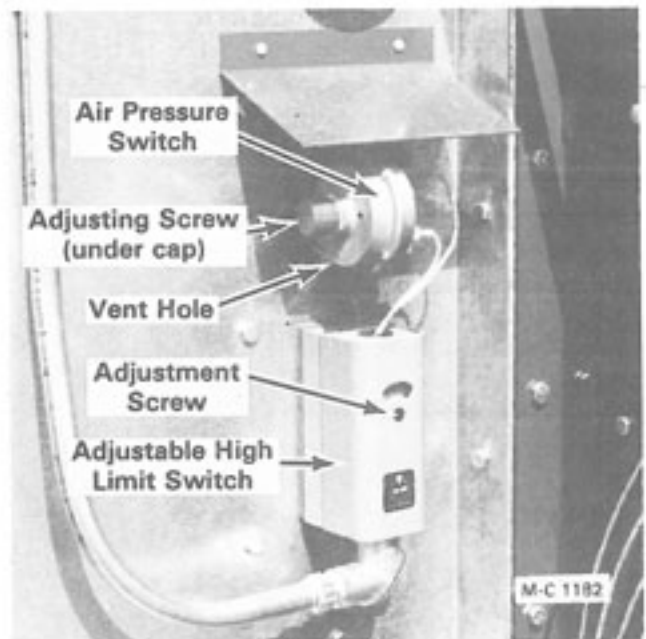


Figure 42

5. Turn on the electric power supply to the dryer. Flip the control circuit toggle switch ON. The control circuit ON light and high limit lights will be on.
6. Push the control circuit toggle switch up to the START position and release it. The READY and LEVEL AUGER lights will be on.

NOTE: If equipped — the main gas supply safety shut-off valve must be opened manually before the burners can be started.

7. Start the bottom burner fan, the air pressure light will be ON. When the fan comes up to speed, open the gas main hand valve $\frac{1}{4}$ of the way. Flip the ignition switch ON. After a 10 second delay the gas valve light will be ON and the burner will light.

NOTE: The ignition board is electronically timed so that the ignition system will continue to spark and hold the solenoid gas valves open for a "trial ignition" period (about 5 seconds). If the burner does not light the system will "lock out" (after the 5 second trial period) closing the solenoid gas valves. The gas valve light will be out. Flip the ignition switch OFF, then ON again for another "trial ignition" period.

8. If after several attempts for ignition there is still no flame, push the 0.1 (1/10th) amp. ignition reset button (circuit breaker) on the control panel, see Figure 43. This circuit breaker protects the ignition board from heat build up due to repeated ignition attempts.

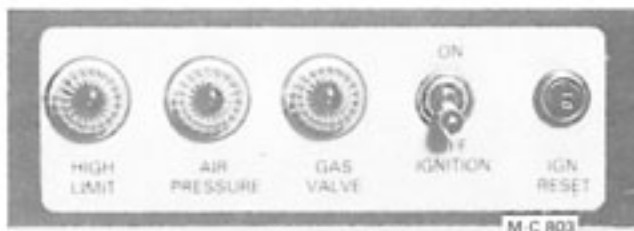


Figure 43

9. If the burner fails to light, check the electrode and ignition board as explained under "Direct Spark Ignition System" below.
10. If the ignition system is good, check the Gas Solenoid Valves as explained on page 30. They may be defective stopping gas flow to the burner.
11. After the burner lights, close the gas main hand valve. Run the fan until the burner goes out, then turn the fan off.



CAUTION: Be sure to remove the jumper wire on the air pressure switch and reconnect the two wires that were removed.

12. Check the remaining fans and burners one at a time. After all of the fans and burners have been checked, turn off the gas supply to the dryer. Turn off and lock the electric power supply. Lock all of the control cabinet doors.

Direct Spark Ignition System

Operation

The direct spark ignition system consists of an electronic ignition board, a direct spark ignition electrode and remote sensor (Figure 44) for each burner. For ignition to occur, the dryer must be running and the High Limit and Air Pressure lights on the control panel must be on.

The dryer is wired so that the current flow from the control cabinet goes to the High Limit Switch, Fan Start-Stop Button, Fan Magnetic Starter, Air Pressure Switch, Ignition Switch, 10 second delay and then to the Ignition Board. This is a safety feature that prevents ignition if the heat chamber temperature is too high or there is insufficient air flow.

The 10 second delay before ignition is also a safety feature that allows the fan to purge the heat chamber of any unburned gas that may remain after a burner has been shut down for any reason.

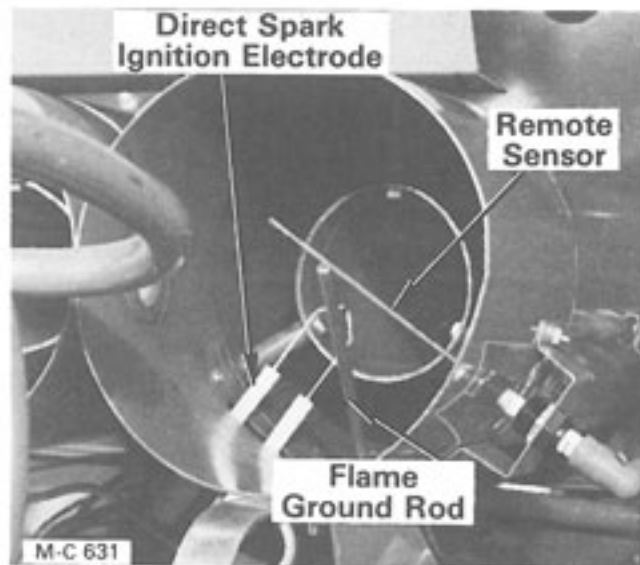


Figure 44

When the ignition switch is flipped on, the ignition board is energized (after the 10 second delay) and generates a high voltage spark between the tips of the electrode and opens the gas solenoid valves at the same time. The gas valve light on the control panel will be on.

The electrode provides the spark for ignition and the remote sensor senses the presence of the flame. A small amount of electrical current passes from the remote sensor to the flame completing the electrical circuit. If the flame is not present, the circuit will be broken and the ignition system will "lock out".

The ignition board is electronically timed so that when the ignition switch is flipped ON, the electrode will continue to spark and the gas solenoid valves will be held open for a "trial ignition" period (about 5 seconds) — after the 10 second delay.

When ignition occurs and a flame is present, the ignition system will continue to operate (spark shuts off). If ignition fails, flame is not present, the ignition system will "lock out" (after the 5 second trial period) closing the gas solenoid valves. The gas valve light on the control panel will be out. Flip the ignition switch OFF, then ON for another "trial ignition" period.

Testing

If after several attempts for ignition there is still no flame, turn the fan off and check the ignition system as follows:

1. Push the ignition reset button (0.1 (1/10th) amp., circuit breaker) on the control panel in, see Figure 43. The circuit breaker protects the

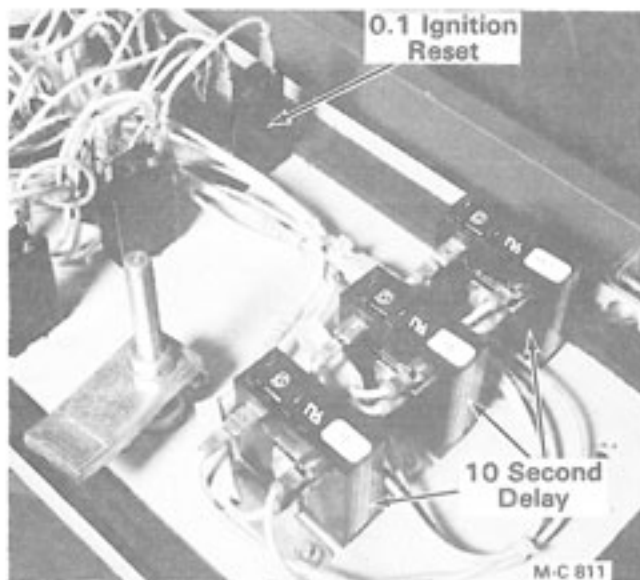


Figure 45

ignition board from heat build up due to repeated ignition attempts.

2. The ignition board may have absorbed some moisture during periods of continued rain, fog or blowing snow which would cause the ignition board not to function properly. Carefully dry the ignition board with warm air. Also check the electrode to be sure it is dry.
3. Look for loose, burned or broken wires, poor or corroded connections. Check the 10 second delay, Figure 45, and the ignition switch with a voltage tester.
4. Check for spark at the electrode. Turn off the electric power supply to the dryer. Flip all of the toggle switches on the control panel(s) to the OFF position. Turn off the fan motor circuit breaker.
5. Close the burner gas main hand valve (handle 90° to the piping).
6. Disconnect the two wires at the back of the air pressure switch and connect them together with a short jumper wire. Do not allow the jumper wire to come in contact with any metal. This will by-pass the air pressure switch.



CAUTION: This is only a temporary test procedure. Do not run the fan and burner with the air pressure switch disconnected or by-passed.

7. Turn on the electric power supply to the dryer. Flip the control circuit toggle switch ON, then push it up to the START position and release it.

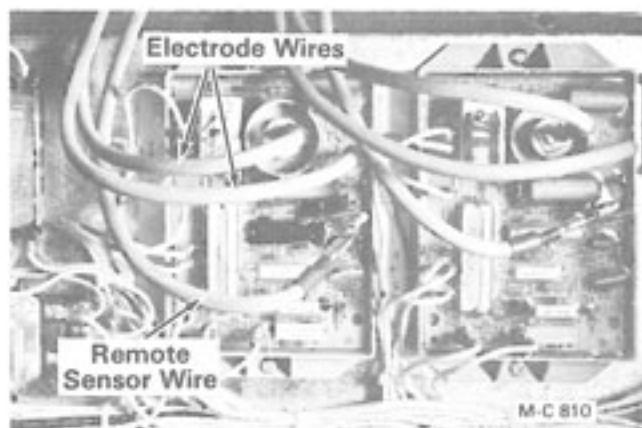


Figure 46 - Ignition Boards

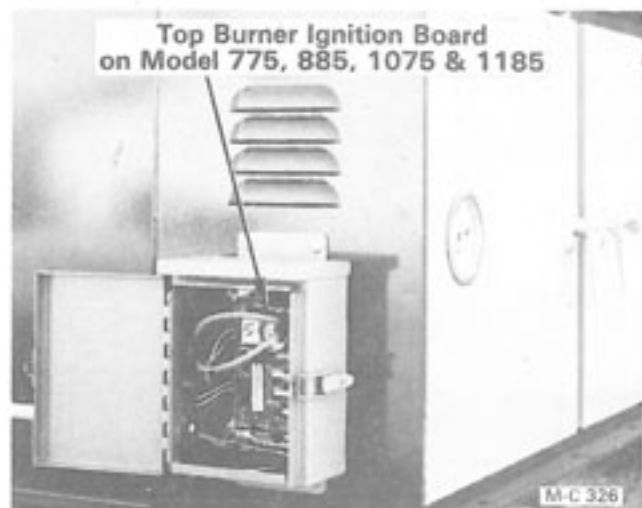


Figure 47

8. Push the fan start button. The air pressure light will be on.
9. Flip the ignition switch ON. After the 10 second delay observe the electrode during the "trial ignition" period. In some cases the spark can be heard.



CAUTION: There may be a small amount of gas in the line that could ignite. Flip the ignition switch on and off for several "trial ignition" periods before entering the dryer to observe the electrode.

10. If there is no spark, the ignition board must be tested. The ignition board does not have to be removed for this test. Proceed as follows:
 - A. Flip the ignition switch OFF. Remove the electrode wires from terminals E-1 and E-2 on the ignition board, see Figure 46, 47 and 48.
 - B. Using a new properly gapped electrode (1/8 inch) or an automotive spark plug gapped

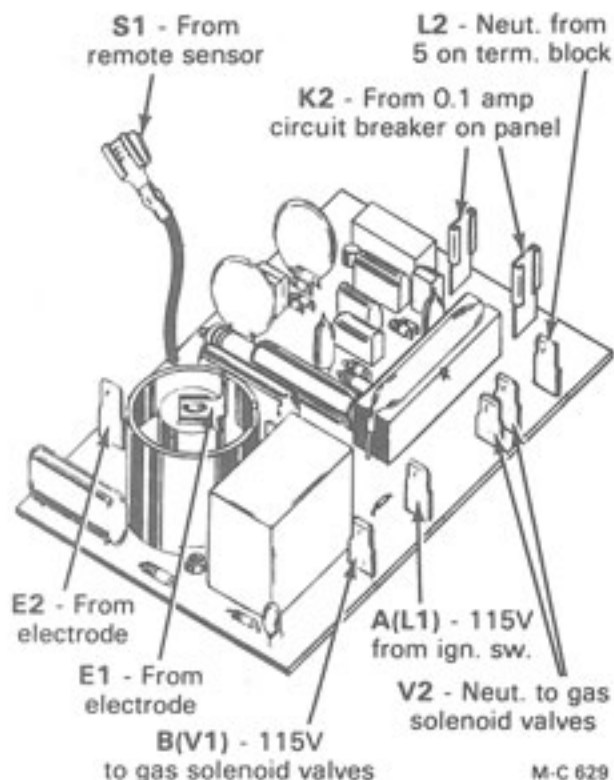


Figure 48 - Ignition Board

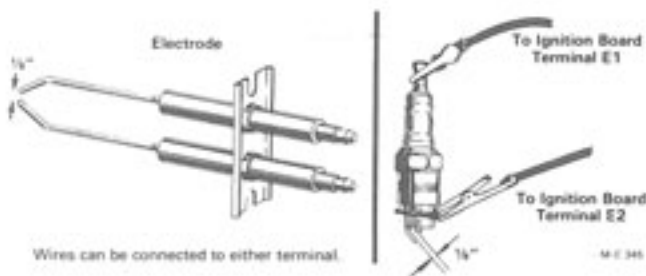


Figure 49

to (1/8 inch), connect terminals E-1 and E-2 on the ignition board to the test electrode or spark plug with jumper wires, see Figure 49.



CAUTION: HIGH VOLTAGE - to prevent severe electrical shock, hold the test electrode or spark plug with an insulated device during the test and keep the wires away from the control cabinet to prevent arcing.

- C. Flip the ignition switch ON and check for spark at the test electrode or spark plug. Spark should occur after the 10 second delay. If a spark does not occur, the ignition board is defective and must be replaced.

11. If there is a spark on the test electrode or spark plug, the electrode on the dryer or the electrode lead wires are defective.

- A. Check the condition of the electrode lead wires. The wires must be replaced if they are found to be non-conductive or shorted.
- B. Examine the electrode in the dryer for damage or improper gap. The gap must be 1/8 inch. Also check for porous or cracked ceramic insulator(s) that could hold moisture. The electrode cannot be repaired. If it is damaged or defective, it must be replaced.



CAUTION: After completing tests or repairs, be sure to remove the jumper wire on the air pressure switch and reconnect the two wires that were removed before starting the dryer.

Venturi Burner Air Adjustment

General

1. The primary air adjustment controls the air fuel mixture to provide a good, clean, efficient flame. This adjustment is similar to the air adjustment on a burner in a gas furnace or stove.
2. The secondary air adjustment controls the flame pattern. Too much secondary air will keep the flame small and confined. It will also cause the flame to be blown off of the remote sensor interrupting the flame sensing circuit which may result in gas solenoid valve chatter or possibly keep the burner from lighting. When this occurs, the ignition system will operate for the "trial ignition" period (approximately five seconds), then lock out.

Correct secondary air adjustment will result in a bushy ball shaped flame that covers the remote sensor insuring a positive flame sensing circuit.

3. If the primary and secondary air adjustments have been misadjusted, time can be saved by shutting down the burner and starting over. Close the primary air adjustment all the way by loosening locking bolt (1) and turning the primary air adjuster pipe (2) clockwise, see Figure 50 and 51, then open it 1 1/2 to 2 turns. See note.

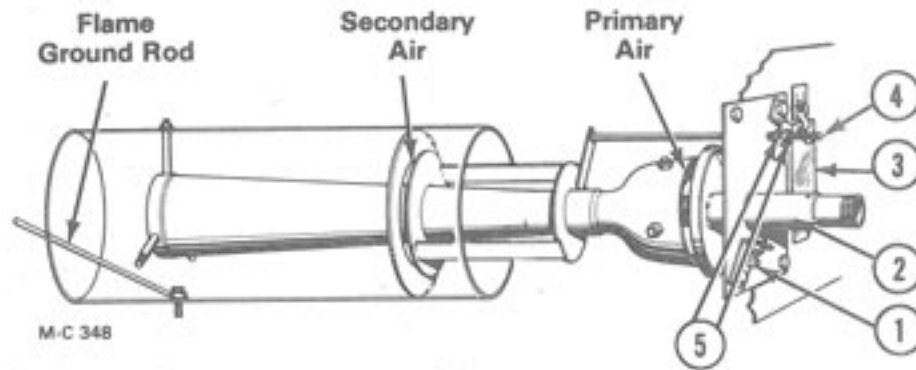


Figure 50

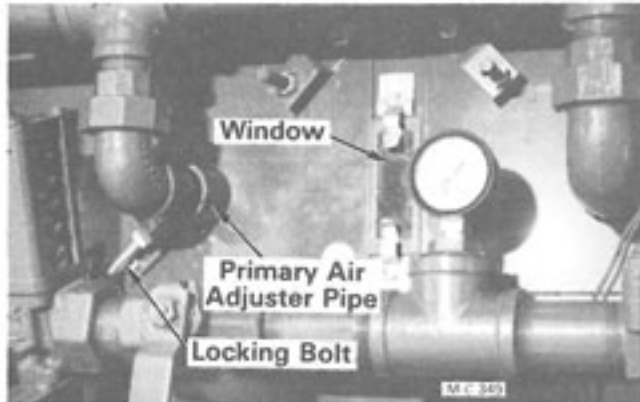


Figure 51

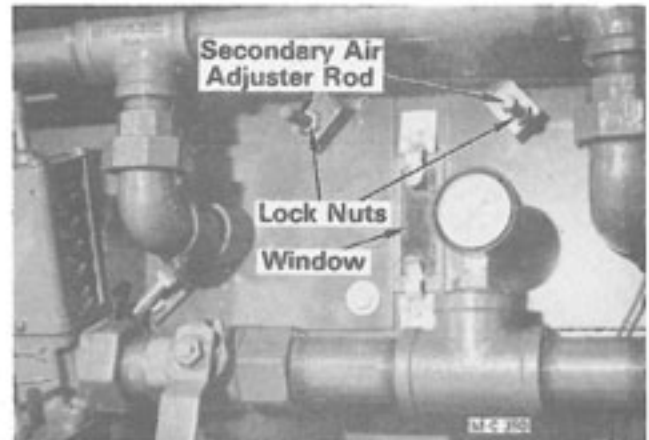


Figure 52

NOTE: If the primary air adjuster pipe turns hard, loosen the four bolts in the corners of the square plate and shift the plate until the air adjuster pipe turns freely. Tighten the four bolts.

Close the secondary air adjustment all the way by loosening locknuts (5) and pushing the secondary air adjustment rod (4) in all the way, see Figure 50 and 52, then pull the adjustment rod out approximately $\frac{1}{8}$ inch.

Start the burner and adjust the primary and secondary air as follows:

Primary Air (See Figure 50 and 51)

1. If the flame appears very yellow or orange in color, open the primary air adjustment slightly to provide more air. If the flame is light blue in color with no yellow or orange at

all, close the primary air adjustment slightly until there is just a trace of yellow or orange at the tips of the flame.

NOTE: Allow 5 to 10 minutes for LP Gas to properly vaporize before changing the adjustment.

2. To adjust, loosen locking bolt (1) and turn the primary air adjuster pipe (2) clockwise to decrease the amount of air and counter-clockwise to increase the amount of air. See note. The flame can be viewed through the window (3) as the adjustment is made. Tighten locking bolt (1).

NOTE: If the primary air adjuster pipe turns hard, loosen the four bolts in the corners of the square plate and shift the plate until the air adjuster pipe turns freely. Tighten the four bolts.

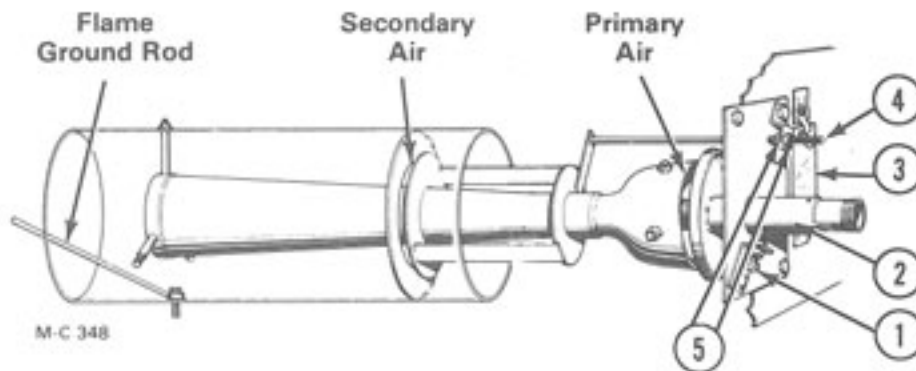


Figure 53

Secondary Air
(See Figure 53 and 54)

1. If the flame is unstable and fluctuates greatly, open the secondary air adjustment slightly. This condition may cause the solenoid valves to chatter. If the flame is confined in a small area and is blowing past the remote sensor and electrode, close the secondary adjustment slightly.
2. To adjust, loosen the locknuts (5) and push the secondary air adjustment rod (4) in to decrease the amount of air and pull it out to increase the amount of air. The flame can be viewed through the window (3) as the adjustment is made. Tighten the locknuts (5) carefully so that the adjustment does not change.

IMPORTANT: Each venturi burner must be adjusted the same distance or amount to provide even heat in the plenum chamber.

Checking Gas Solenoid Valves

1. Close the gas main hand valve in the control cabinet. Turn off the electric power to the dryer. Flip all of the toggle switches on the control panel(s) to the OFF position. Turn off the fan motor circuit breaker.
2. Disconnect the two wires at the back of the air pressure switch and connect them together with a short jumper wire. Do not allow the jumper wire to come in contact with any metal. This will by-pass the air pressure switch.

CAUTION: This is only a temporary test procedure. Do not run the fan and burner with the air pressure switch disconnected or by-passed. This safety air pressure switch is for your protection and the protection of the dryer.



Figure 54

3. Turn on the electric power supply to the dryer. Flip the control circuit toggle switch ON, then push it up to the START position and release it.
4. Push the fan start button. The air pressure light will be on.
5. Check to be sure that there is 115V power to the ignition board. Connect a voltmeter between terminal A (L1) and L2 on the ignition board, see Figure 55, 56 and 57.
6. Flip the ignition switch ON. After the 10 second delay the voltmeter should read 115V.
7. If the voltmeter does not read 115V, check the 10 second delay and the ignition switch with a voltage tester. Also check for loose or broken wires from the ignition switch to the ignition board.
8. If there is 115V between terminal A (L1) and L2 check for 115V at terminal B (V1) on the ignition board, see Figure 55, 56 and 57. Connect a voltmeter between terminal V2 and B (V1) on the ignition board.

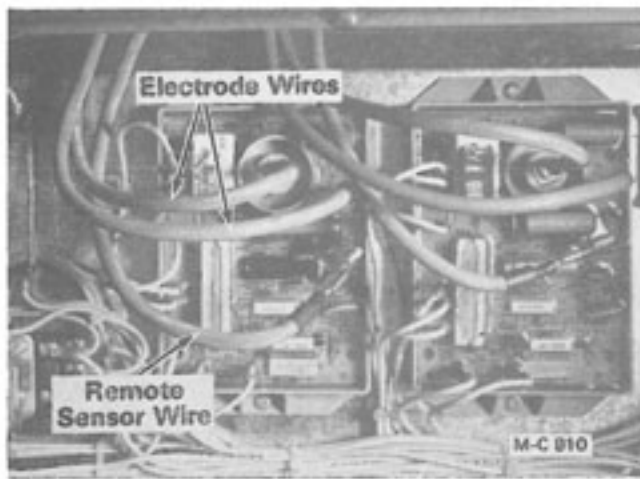


Figure 55 - Ignition Boards

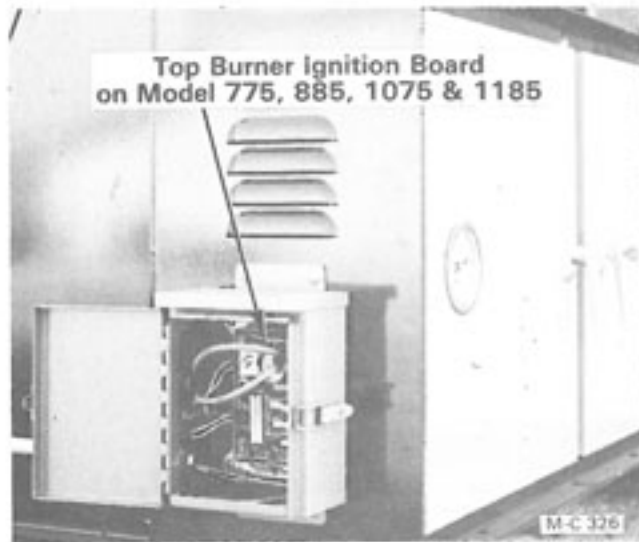


Figure 56

9. Flip the ignition switch OFF then ON. After the 10 second delay the voltmeter should read 115V. If not, the ignition board is defective and must be replaced.

NOTE: The voltmeter will show a reading during the "trial ignition" period only, (5 seconds). To check again, flip the ignition switch OFF then ON. The 5 second "trial ignition" period starts after the 10 second delay.

10. If there is 115V at terminal B (V1) check to be sure that both solenoid valves are working. To do this, remove the red cap on top of the solenoid valve. Hold a screw driver near the coil and flip the ignition switch OFF then ON. If the coil is working, a magnetic attraction will be felt (after the 10 second delay).

Instructions for replacing the coil are included with the replacement coil.

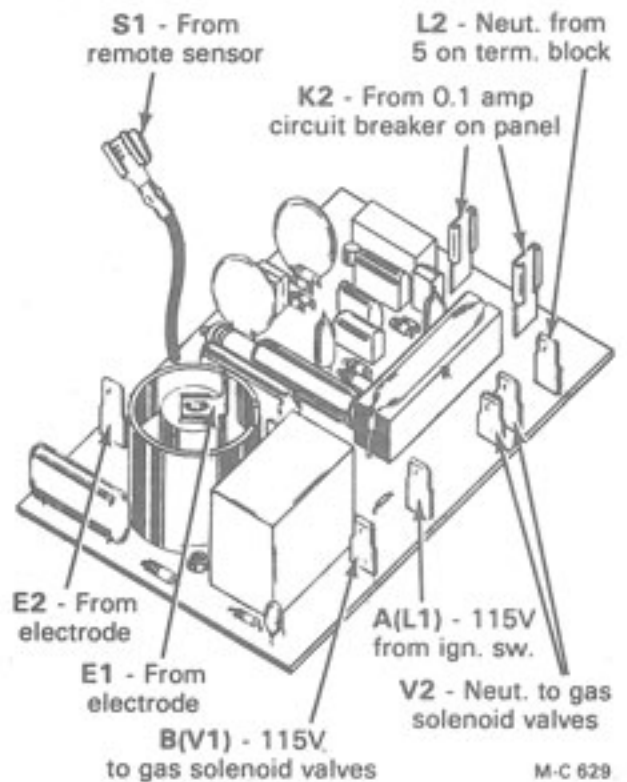


Figure 57 - Ignition Board

11. If the solenoid coil is working but the solenoid valve is not opening or closing, shut off the gas supply, open the gas main hand valve and turn off the electric power supply. Loosen a union in the gas line to relieve gas pressure. Carefully disassemble the valve.

NOTE: Before disassembly, index the housings for correct reassembly. Pay particular attention to the position of the diaphragm.

12. Check for foreign material inside of the valve. Check the diaphragm to be sure it is not cracked or ruptured. A diaphragm repair kit is available. Installation instructions are included in the kit.



CAUTION: After completing tests or repairs, be sure to remove the jumper wire on the air pressure switch and reconnect the two wires that were removed before starting the dryer.

Discharge System



Figure 58 - SCR Drive Control Board
Approximate Trim Pot Settings

Description

The metering rolls are driven by a 1/3HP variable speed permanent magnet DC motor and reduction gear box. The RPM range of the metering rolls is 1/2 to 10.

The speed of the motor is directly proportional to the amount of DC voltage supplied to it. When voltage increases speed increases and when voltage decreases speed decreases.

The SCR control board converts incoming AC current to DC current and controls the amount of DC voltage going to the motor. The SCR speed control regulates the amount of DC voltage the SCR control board supplies to the motor.

When the discharge metering roll switch is in the AUTOMATIC position, the moisture control controls the SCR board as explained in step 6 on page 13.

SCR Board Terminal Strip Connections

- POT LO** - Connects to low side (white wire) of speed control. **INPUT MUST NOT BE GROUNDED** or serious damage to SCR board may result.
- WIPE** - Connects to wiper (red wire) of speed control. **INPUT MUST NOT BE GROUNDED** or serious damage to SCR board may result.
- POT HI** - Connects to high side (black wire) of speed control. Addition of a 3K ohm resistor (via a relay operated by the moisture control) reduces DC voltage output by approximately 40%. **INPUT MUST NOT BE GROUNDED** or serious damage to SCR board may result.
- + ARM** - Connects to motor armature wires 0-90 volts DC. **MUST NOT BE SWITCHED OR BROKEN WHILE POWER IS ON** or serious damage to SCR board may result.
- ARM** - Connects to motor armature wires. Reverse + and - motor leads to reverse motor rotation. **MUST NOT BE SWITCHED OR BROKEN WHILE POWER IS ON** or serious damage to SCR board may result.
- + FIELD** - NOT USED (Shunt wound motors)
- FIELD** - NOT USED (Shunt wound motors)
- SPARE** - NOT USED
- SPARE** - NOT USED
- AC LINE** - Connect hot wire 115 volt AC.
- AC LINE** - Connect neutral wire (white).

SCR Board Trim Pot Adjustment Procedure

NOTE: Figure 58 shows approximate trim pot settings. Follow adjustment procedure below for final calibration.

Trim Pot	Function	Adjustment
MIN.	Sets Minimum Motor Speed when Speed Control is set at zero. CW rotation will increase minimum motor speed.	<ol style="list-style-type: none"> 1. Set SPEED control to zero. (Fully CCW) 2. Rotate Min pot CW until desired Min speed is reached (5.6 volts DC or 100 RPM).
MAX.	Sets Maximum Motor Speed when Speed Control is set at maximum (10) 100% rotation CW. CW rotation of MAX trim pot increases maximum motor speed.	<ol style="list-style-type: none"> 1. TURN DRIVE POWER OFF! 2. Connect DC Voltmeter; + to + Arm, - to - ARM. 3. Set meter voltage range: (90 VDC) 4. Turn power on. Set SPEED control at 100% (10). 5. Adjust MAX pot to rated motor armature voltage as shown on meter (85 volts DC). <p>NOTE: A tachometer or strobe maybe used in lieu of a meter. Follow above steps, except adjust MAX pot to rated motor speed (1750 RPM).</p>
ACCEL	Allows Adjustment of Acceleration.	<ol style="list-style-type: none"> 1. CW rotation increases time of acceleration (.5 to 8 seconds).
IR COMP	Calibrates speed regulation — % speed change from no load to full load at adjusted speed.	<ol style="list-style-type: none"> 1. Set Speed control at 50% (5). 2. Turn IR COMP pot CW until motor begins to hunt. 3. Turn IR COMP CCW until hunting stops. 4. Set IR COMP pot 1/3 of the span between where motor hunting stopped and fully CCW position. <p>NOTE: For more precise calibration, a tachometer or strobe may be substituted for the above.</p>
CUR. LIM.	Limits DC motor armature current (torque) to prevent damage to the motor or SCR board. The current limit is set for the rated motor current. CW rotation of this trim pot increases the armature current (or torque produced).	<ol style="list-style-type: none"> 1. TURN DRIVE POWER OFF! 2. Connect a DC Ammeter between A1 on motor and + ARM on SCR board. This is in series with motor. 3. Turn power on. 4. Set SPEED control at 50% (5). 5. Apply friction braking to the motor shaft until motor stalls. (zero RPM) 6. While motor is stalled, set current at 125% of rated motor armature current on the name-plate 4.4 amps (3.5 amps x 125%) by adjusting the CUR LIM pot. Remove ammeter after calibration.

Troubleshooting Discharge System



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. **NEVER** check circuit continuity by shorting terminals with a screwdriver or other metal devices.

SCR Drive Motor Does Not Run (Metering roll switch in MANUAL position)

Problem	Possible Cause	Remedy
A. No 115 volt AC input between "AC Line" terminals on SCR board.	<ol style="list-style-type: none"> 1. Discharge auger not running. 2. SCR 8 amp. circuit breaker tripped. 3. Defective or dirty discharge relay. 4. Loose wire or defective switch(es). 	<ol style="list-style-type: none"> 1. Start discharge auger. 2. Reset. 3. Clean or replace if necessary. 4. Trace power flow. See discharge circuit schematic at back of this manual.
B. No DC voltage output between "Arm + and Arm -" terminals on SCR board.	<ol style="list-style-type: none"> 1. SCR board 10 amp. fuse blown. 2. Minimum motor speed set incorrectly. 3. Defective speed control. 4. Defective SCR board. 	<ol style="list-style-type: none"> 1. Replace. 2. See "Trim Pot Adjustment" on page 33. 3. Replace. 4. Replace.
C. Have 115 volt AC input between "AC Line" terminals and output of 6 to 85 volts DC between "Arm + and Arm -" terminals.	<ol style="list-style-type: none"> 1. Overload condition. 2. Current limit set incorrectly. 3. Maximum motor speed set incorrectly. 4. Worn or improperly seated motor brushes. 5. Moisture or dirt accumulation in motor. 6. Defective motor. 	<ol style="list-style-type: none"> 1. Check metering rolls and gear box for binding. 2. See "Trim Pot Adjustment" on page 33. 3. See "Trim Pot Adjustment" on page 33. 4. Replace or adjust. 5. Disassemble and dry or clean. 6. Replace.

SCR Drive Motor Does Not Run (Metering roll switch in AUTOMATIC position)

NOTE: Operation of the moisture control is explained under step 6 on page 13.

Problem	Possible Cause	Remedy
A. Motor operates normally when metering roll switch is in the MANUAL position, but not in the AUTOMATIC position.	<ol style="list-style-type: none"> 1. Moisture control set too high. 2. Grain temperature not high enough to allow discharge. 	<ol style="list-style-type: none"> 1. Adjust set point. 2. Allow time.

Problem	Possible Cause	Remedy
	3. Wet grain slug covering temperature probe. 4. Loose wire or defective switch(es). 5. Defective moisture control or moisture control component. 6. Defective or dirty discharge relay.	3. Operate in MANUAL for several minutes to clear area. 4. Trace power flow. See discharge circuit schematic at back of this manual. 5. Replace. 6. Clean or replace if necessary.

SCR Drive Motor Runs Erratically (Metering roll switch in MANUAL position)

Problem	Possible Cause	Remedy
A. Motor speed fluctuates.	1. Loose connection from speed control potentiometer or discharge relay to SCR board. 2. Defective speed control potentiometer or discharge relay. 3. Motor is at current limit. 4. Too much "IR" compensation.	1. Trace power flow. See discharge circuit schematic at back of this manual. 2. Replace potentiometer. Clean or replace relay if necessary. 3. See "Trim Pot Adjustment" on page 33. 4. See "Trim Pot Adjustment" on page 33.
B. Speed control does not regulate motor speed.	1. Loose connection from speed control potentiometer or discharge relay to SCR board. 2. Defective speed control potentiometer. 3. Minimum and maximum speed set incorrectly. 4. Defective SCR board.	1. Trace power flow. See discharge circuit schematic at back of this manual. 2. Replace. 3. See "Trim Pot Adjustment" on page 33. 4. Replace.
C. Motor runs backwards.	1. Motor leads reversed.	1. Switch leads.
D. Repeated blowing of SCR board 10 amp. fuse	1. Low input voltage between "AC Line" terminals on SCR board. 2. Current limit set too high.	1. Check - should be above 110 volts AC. 2. See "Trim Pot Adjustment" on page 33.

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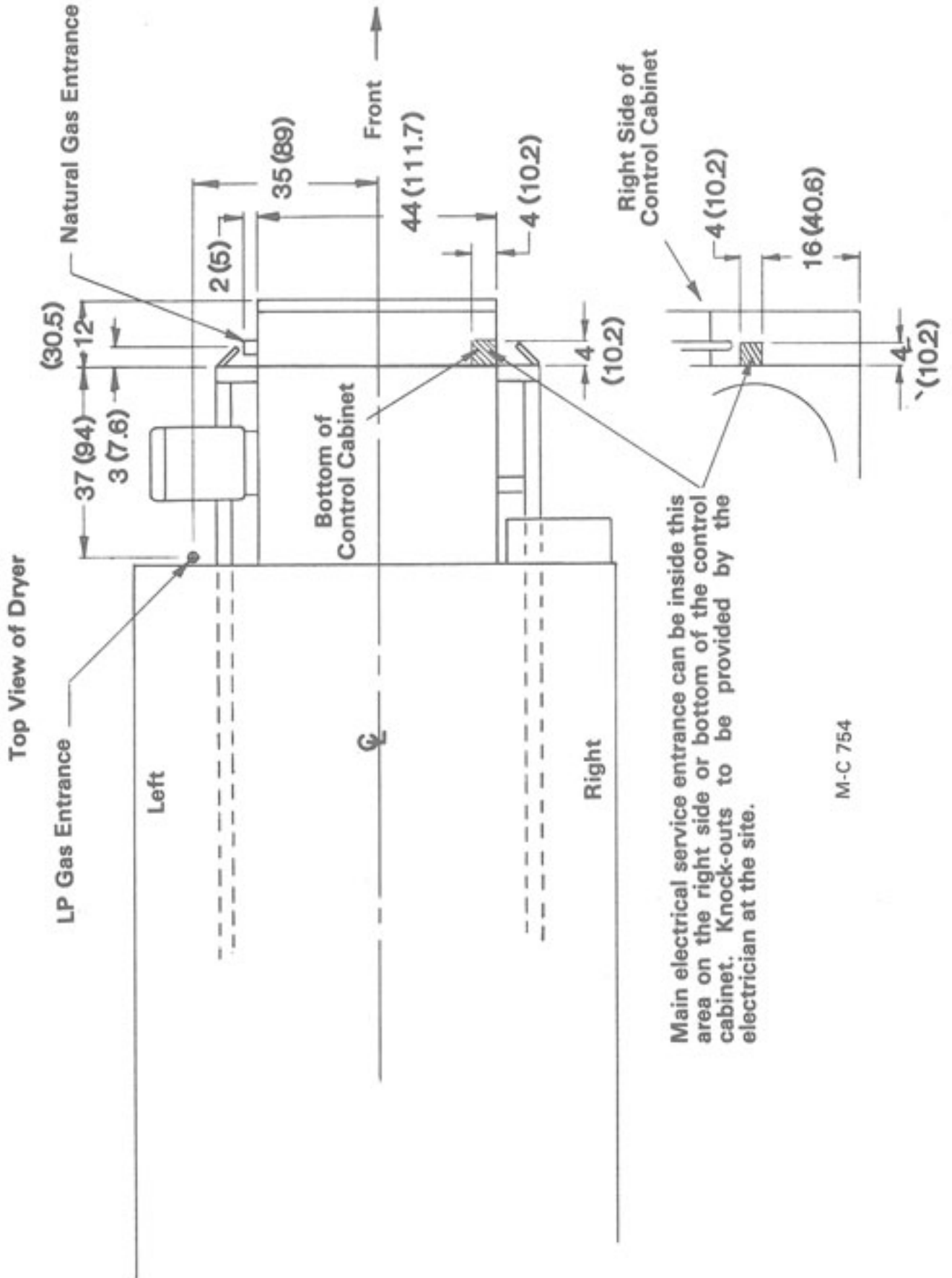
Problem	Possible Cause	Remedy
D. Repeated blowing of SCR board 10 amp. fuse	3. Motor shorted.	3. Replace or repair. Check for moisture in motor.
	4. Worn motor brushes.	4. Replace.
	5. Defective motor bearings.	5. Replace.
	6. Defective SCR board.	6. Replace.

SCR Drive Motor Runs Erratically (Metering roll switch in AUTOMATIC position)

NOTE: Operation of the moisture control is explained under step 6 on page 13.

Problem	Possible Cause	Remedy
A. SCR drive motor speed does not decrease when moisture control senses cooler grain (MAX. RATE light goes out).	1. Shorted resistor (ref. 36 on discharge circuit schematic at back of this manual).	1. Replace.
	2. Defective or shorted discharge relay.	2. Replace
B. SCR drive motor stops instead of decreasing speed when moisture control senses cooler grain.	1. Great increase in moisture content of input grain.	1. Reduce speed control setting.
	2. Speed control set below 1.0.	2. Increase speed control setting.
	3. Differential between moisture control set point and secondary point too close.	3. Increase differential by adjusting "Zytron Alarm" trim pot.
	4. Open resistor (ref. 36 on discharge circuit schematic at back of this manual).	4. Replace.
	5. Defective or dirty discharge relay.	5. Clean or replace if necessary.
	6. Defective moisture control or component.	6. Replace.

Electrical and Gas Piping Entrance (All Dimensions Are In Inches (Centimeters))

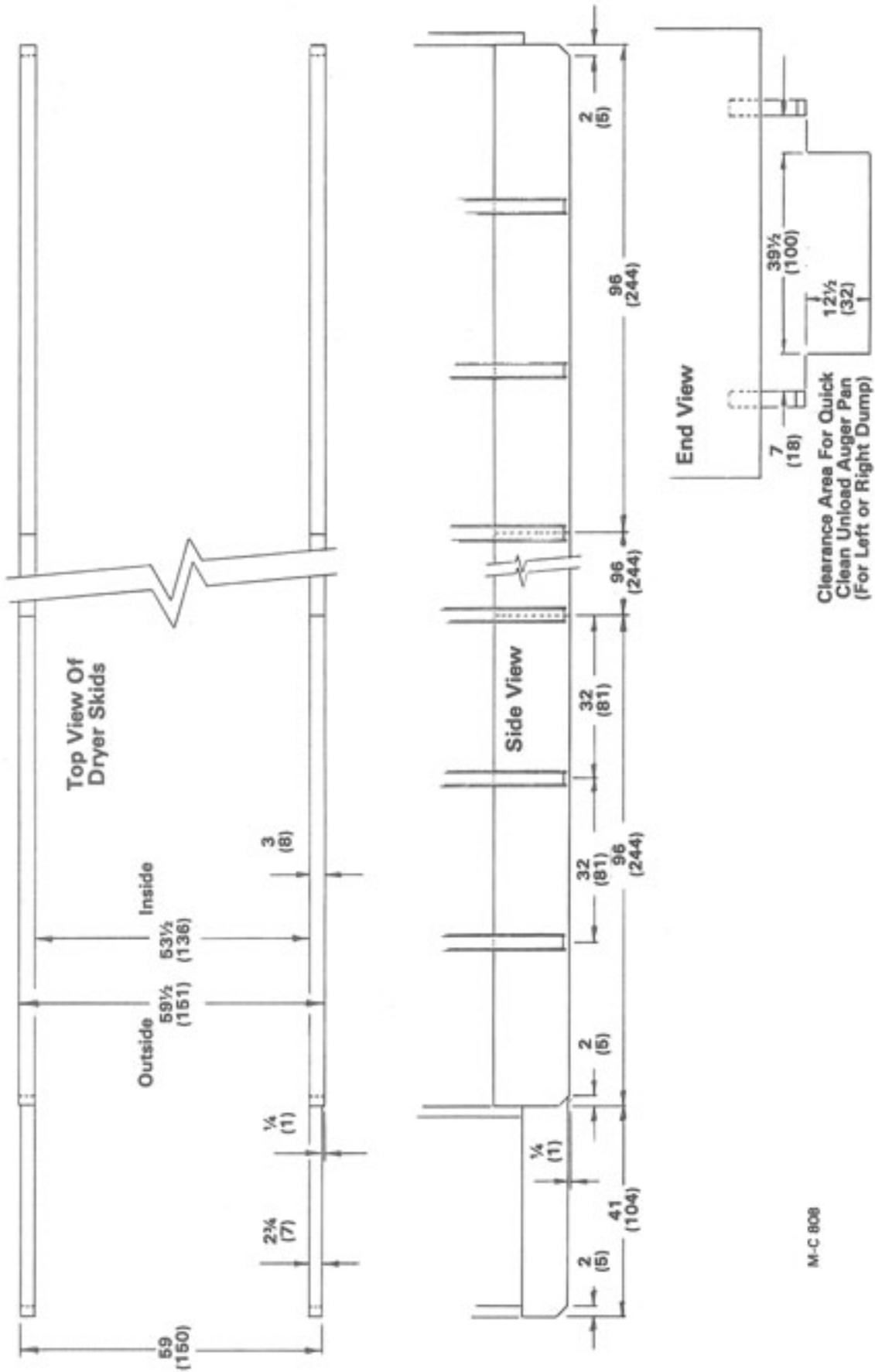


Main electrical service entrance can be inside this area on the right side or bottom of the control cabinet. Knock-outs to be provided by the electrician at the site.

M-C 754

Dryer Base Dimensions

(All Dimensions Are In Inches (Centimeters))



M-C 808

Dryer Dimensions

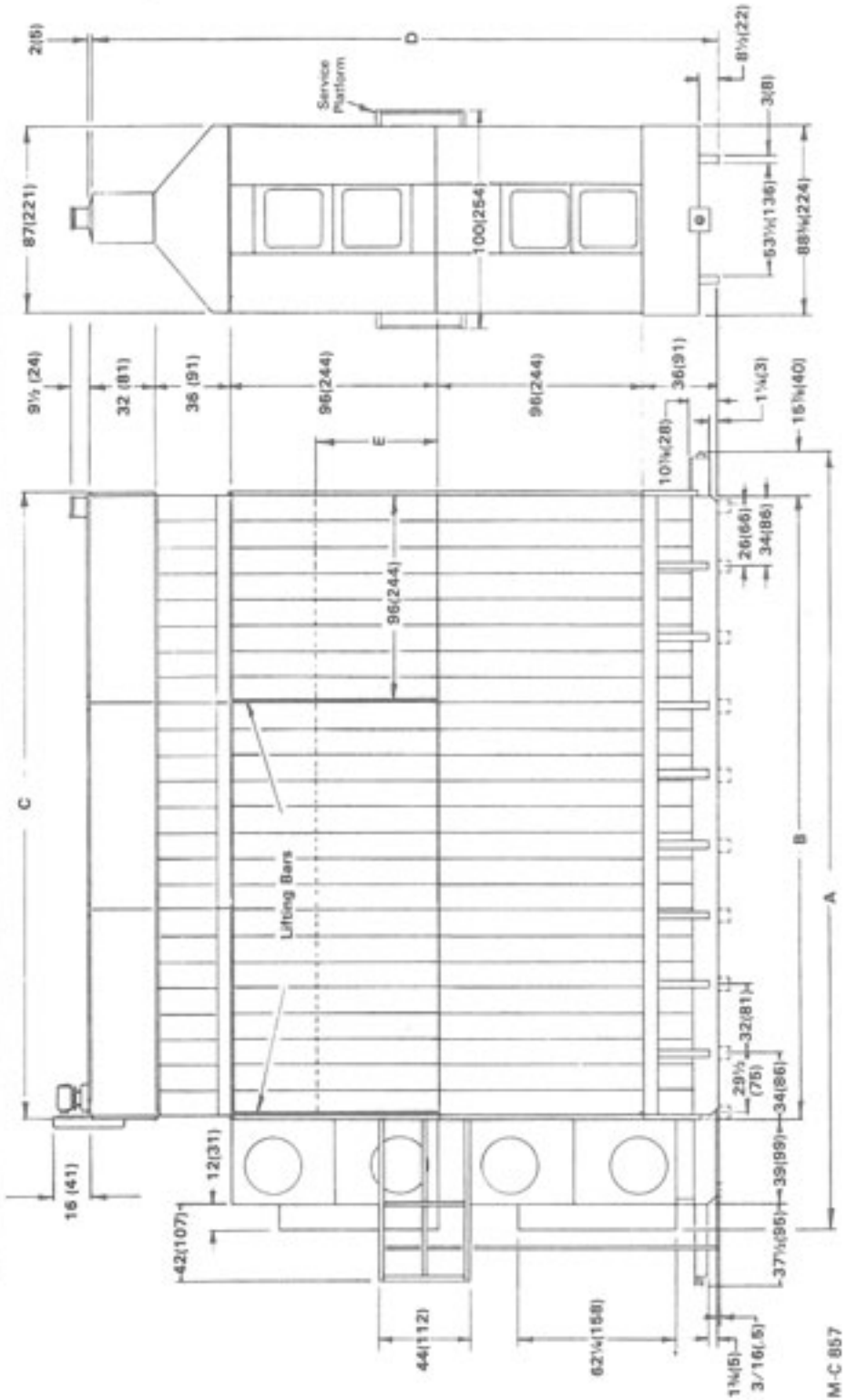
All Dimensions Are In Inches (Centimeters)

NOTE: Width of dryer with optional heat recovery system is:
 135 (342) Model 675 and 975
 170 (432) All other models



Inside dimensions of the unload auger discharge are 10 $\frac{1}{2}$ (27) x 16(41).
 The grain receiving tube is a standard 10(25) tube.

All Dimensions Are In Inches (Centimeters)

Model	A	B	C	D	E
675	261 $\frac{3}{4}$ (665)	196 (498)	194 $\frac{1}{4}$ (494)	200 (508)	—
775	261 $\frac{3}{4}$ (665)	196 (498)	194 $\frac{1}{4}$ (494)	260 (660)	60 (152)
875	261 $\frac{3}{4}$ (665)	196 (498)	194 $\frac{1}{4}$ (494)	296 (752)	—
885	261 $\frac{3}{4}$ (665)	196 (498)	194 $\frac{1}{4}$ (494)	356 (904)	60 (152)
895	261 $\frac{3}{4}$ (665)	196 (498)	194 $\frac{1}{4}$ (494)	392 (996)	—
975	357 $\frac{3}{4}$ (909)	294 (747)	290 $\frac{1}{4}$ (737)	200 (508)	—
1075	357 $\frac{3}{4}$ (909)	294 (747)	290 $\frac{1}{4}$ (737)	260 (660)	60 (152)
1175	357 $\frac{3}{4}$ (909)	294 (747)	290 $\frac{1}{4}$ (737)	296 (752)	—
1185	357 $\frac{3}{4}$ (909)	294 (747)	290 $\frac{1}{4}$ (737)	356 (904)	60 (152)
1195	357 $\frac{3}{4}$ (909)	294 (747)	290 $\frac{1}{4}$ (737)	392 (996)	—



Electrical Components

Starting with S/N 46799 - The reference numbers in this list are shown in the  or  symbols on the wiring diagram:s.

Ref.	Part No.	Description	Ref.	Part No.	Description
1	120 6800	Mercury Switch	10	128 6916	6 Amp. Fuse (NON-6)
2	121 6849	Air Pressure Switch		128 6967	10 Amp. Fuse (NON-10)
3	121 7018	High Limit Switch		128 6852	15 Amp. Fuse (NON-15)
4	121 6925	115V Ignition Board (Incl. Ref. 8)		121 6970	15 Amp. Fuse (FRN 15)
5	123 6887	Differential Air Pressure Switch (Canadian Dryers Only)		120 6837	20 Amp. Fuse (FRN 20)
				128 6936	25 Amp. Fuse (FRN 25)
6	Terminal Track Ass'y. (Incl. cages & end locks)		11	128 6851	Fuse Holder
	127 1020	For Two Burner Control Cabinet	12	128 6845	Stop Button (Red)
	128 1354	For Three Burner Control Cabinet	13	128 6844	Start Button (Black)
	128 1402	For Model 375 (12V)	14	124 6848	8 Amp. Circuit Breaker (SCR Drive)
	128 1429	For Model 375 (115V)	15	121 6808	125V Indicator Lamp Ass'y.
				122 6810	125V Indicator Lamp
	Terminal Track & End Locks			122 6800	Indicator Lamp Lens (Clear)
	121 5200	Track - 1 1/8" x 6 1/2"	16	121 6815	SPST ON-OFF Toggle Switch
	203 5200	Track - 1 1/8" x 4 1/2"	17	120 6827	Momentary Contact Toggle Switch
	121 6818	End Lock Ass'y.	18	121 6807	DPDT ON-OFF-ON Toggle Switch
	Cage Assemblies		19	124 6890	.2 to 8 Minute Adj. Timer w/Brkt.
	121 6824	3 Way - Yellow		127 6802	60 Second Timer w/Brkt.
	121 6830	6 Way - Black		127 6821	2 Minute Timer w/Brkt.
	121 6831	6 Way - Yellow		128 6960	3 Minute Timer w/Brkt.
	121 6839	6 Way - White		128 6847	5 Minute Timer w/Brkt.
7	128 6995	Electrode (Above S/N 43656)	20	124 6841	Light Bulb Socket
	121 6926	Electrode (Below S/N 43657)	21	124 6850	25W Rough Service Bulb
	124 6883	Electrode (Below S/N 43657)		124 6842	50W Rough Service Bulb
8	122 6814	Ignition Reset (0.1 Amp.)	22	021 6810	Relay Socket
9	115V LP Gas Solenoid Valves		23	021 6809	Relay
	125 7082	1/2" Solenoid Valve in LP Liquid Line (All USA and Canadian 375 thru 1195)	24	021 6816	Timer Socket
	121 7002	3/4" Solenoid Valve in Gas Manifold (All USA & Canadian 375 & 665, & Canadian 675 thru 3175)	25	021 6815	60 Minute Adjustable Timer
	128 7001	1 1/4" Solenoid Valve in Gas Manifold (All USA & Canadian 670, 690 & 970, & USA 675 thru 3175)	26	121 6963	Dual Range Thermoswitch
			27	121 6851	Single Range Thermoswitch
			28	121 6856	115V Ratchet Solenoid
			29	124 6836	SCR Board (Morse)
				124 6874	SCR Board (Dart)
			30	124 6838	Potentiometer
			31	124 6839	Potentiometer Knob
			32	124 6837	1/3 HP DC Motor
			33	128 6957	Splitter Block
			34	124 6831	10 Second, Timer w/Brkt.
			35	124 6872	Flame Sensing Probe
			36	127 6812	Resistor (10W - 3K OHM)
			37	121 6806	SPDT ON-OFF-ON Toggle Switch
			38	121 6803	Male 3 Wire Plug w/o 10 Amp. Fuse
			39	128 6992	Bin Level Indicator (Inside Mt.)
				128 7003	Bin Level Indicator (Outside Mt.)
			40	128 6860	12V Indicator Lamp Ass'y.
				121 6978	12V Indicator Lamp
				122 6800	Indicator Lamp Lens (Clear)

Ref.	Part No.	Description
41	125 6883	12V Ratchet Solenoid
42	121 6990	12V Relay
43	121 6962	12V Ignition Board
44	121 6956	Linear Limit Control (138")
	128 6850	Linear Limit Control (92")
45	123 6854	Light Fixture Cpt.
	123 6898	Red Glass Globe
	125 6823	100W Rough Service Bulb
46	123 6868	Horn (Alarm Buzzer)
47	- - - - -	Magnetic Starters (See Service Bulletin D-8-86)
48	127 6855	Transformer-208V (750VA)
	127 6827	Transformer-230/460V (750VA)
	127 6829	Transformer-230/460/575V (750VA)
	128 6897	Transformer-230/460/575V (2000VA)
	128 6856	Transformer-230/460V (3000VA)
	124 6845	Transformer-230/460/575V (3000VA)
49	124 1020	Ten Turn Potentiometer w/Wire
50	124 6892	Multi-Dial
51	124 6893	Thermistor (Zytron)
52	124 6894	Potentiometer (Zytron)
53	124 6889	Temperature Controller (Zytron)
54	121 6806	SPDT ON-OFF-ON Toggle Switch
55	124 6895	3PDT ON-OFF-ON Toggle Switch

Ref.	Part No.	Description
56	124 6896	30 Minute Delay
57	121 6805	10 Amp. GLH Fuse
71	121 6825	Temperature Read-Out Meter
	122 6821	Rebuilt Temperature Read-Out Meter (8 position scale)
	122 6822	Rebuilt Temperature Read-Out Meter (6 position scale)
72	121 6828	Adjustable High Limit
73	121 6965	Cold Grain Warning Bell
74	125 6907	115V AC Control Relay
75	125 6911	115V Starter Relay
76	121 6827	Thermistor Probe (3")
77	123 7025	Vent Solenoid Valve - Nat. Gas
78	123 7017	Manual Reset Shut-Off Valve (3")
	123 7020	Manual Reset Shut-Off Valve (1") (Below S/N 51493)
	123 7027	Manual Reset Shut-Off Valve (1") 675-3175 LP Gas (Above S/N 51942)
	123 7028	Manual Reset Shut-Off Valve (2") 675-1195 Nat. Gas
	123 7029	Manual Reset Shut-Off Valve (2½") 2675 & 3175 Nat. Gas
79	123 7018	Pressure Switch - Nat. Gas
	123 7021	Pressure Switch - LP Gas
80	123 7019	Transducer - Nat. Gas
	123 7022	Transducer - LP Gas
81	021 6800	Mercury Switch (2 Way)



Iron Horse Quality