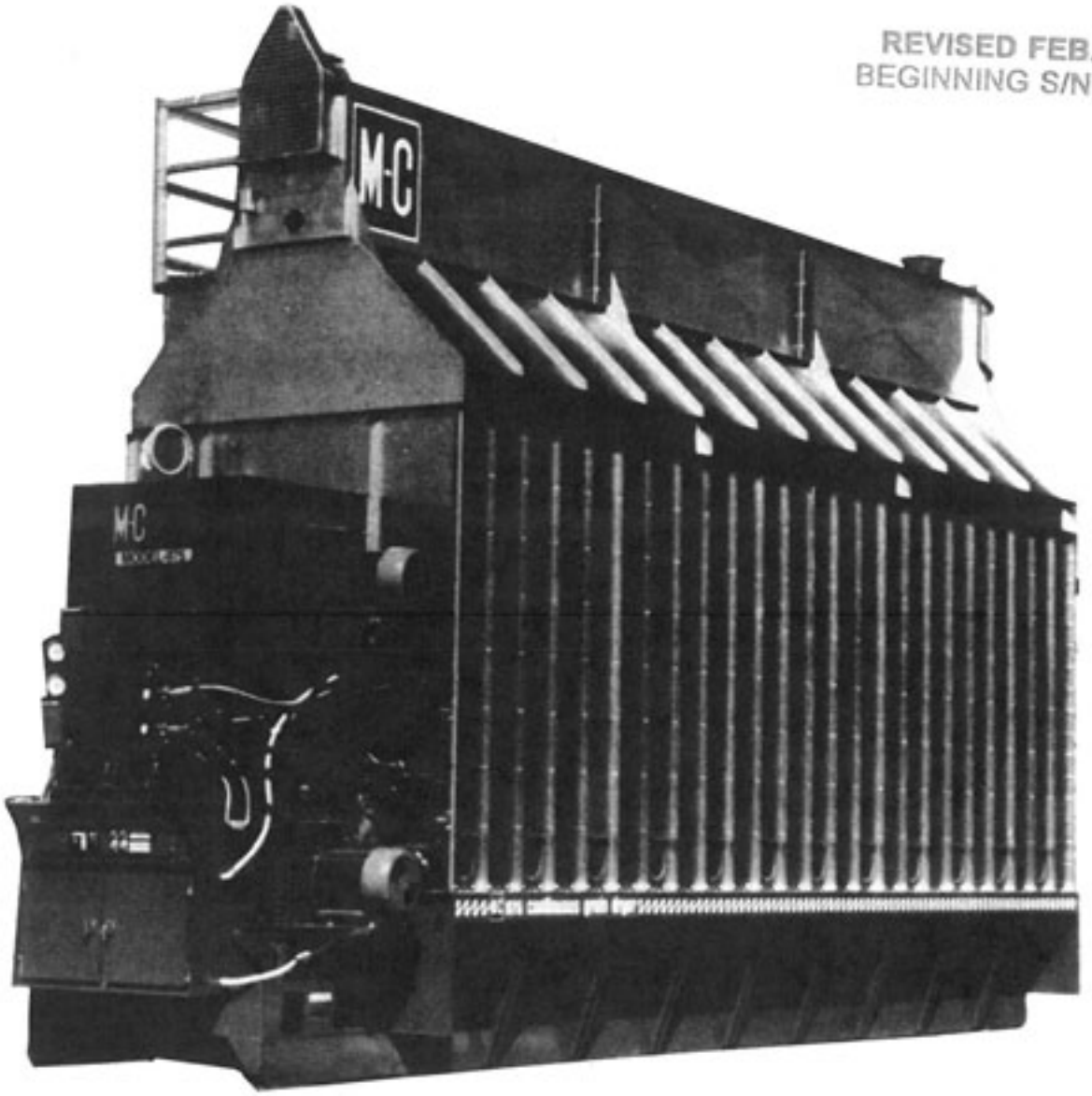
Model 675 thru 1195

(EM, and B-115)

Continuous Flow Grain Dryers

(Starting w/Serial No. 55242)

REVISED FEB. (98)
BEGINNING S/N 56052



OPERATOR'S MANUAL

Form No. D329, August 1996

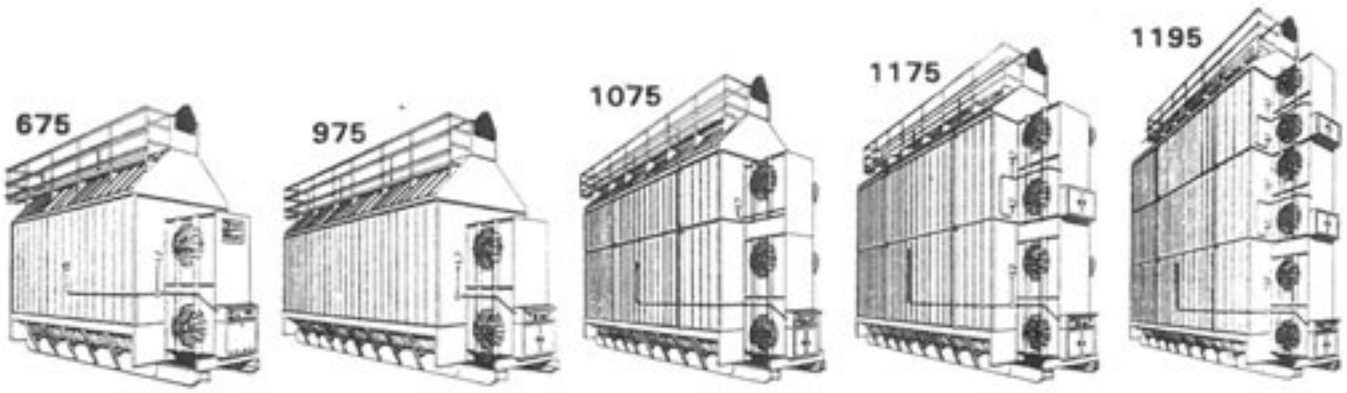
Mathews Company / 500 Industrial Avenue
P.O. Box 70, Crystal Lake, IL 60039-0070, U.S.A.
815/459-2210 FAX 815/459-5889

Canadian Requirements

Dryers to be operated in Canada must comply with the following:

1. The equipment shall be installed in accordance with the current Installation Code for Gas-Fired Equipment for Drying Farm Crops CAN/CGA-38-M86 and/or applicable Provincial Regulations which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

2. All electrical connections are to be made in accordance with CSA C22.1 Canadian Electrical Code Part 1 and/or Local Codes.



M-C EXPANDABLE DRYERS WITH MULTIPLE HEAT ZONES

CONTENTS

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 55242) 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 our way of knowing who has purchased M-C equipment so that we can keep in touch with you.

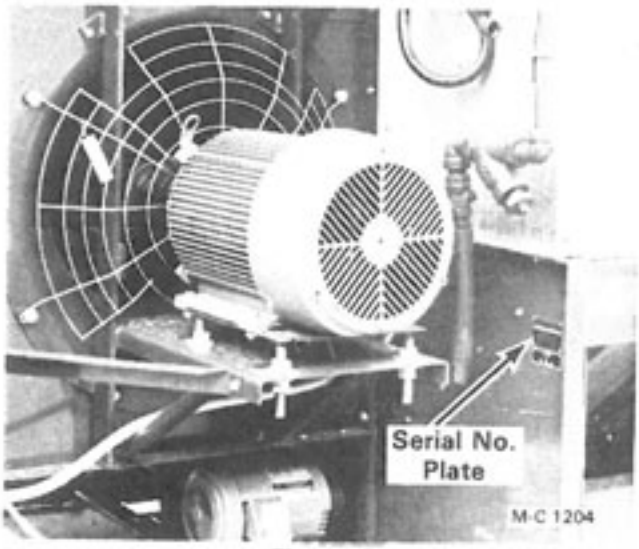


Figure A

M-C FARM EQUIPMENT

MODEL NO.	SERIAL NO.

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

M-C 189

Figure B

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 2	WILL HAVE A PLAIN HEAD - NO RADIAL LINES 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 (°F – 32) ÷ 1.8 = °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

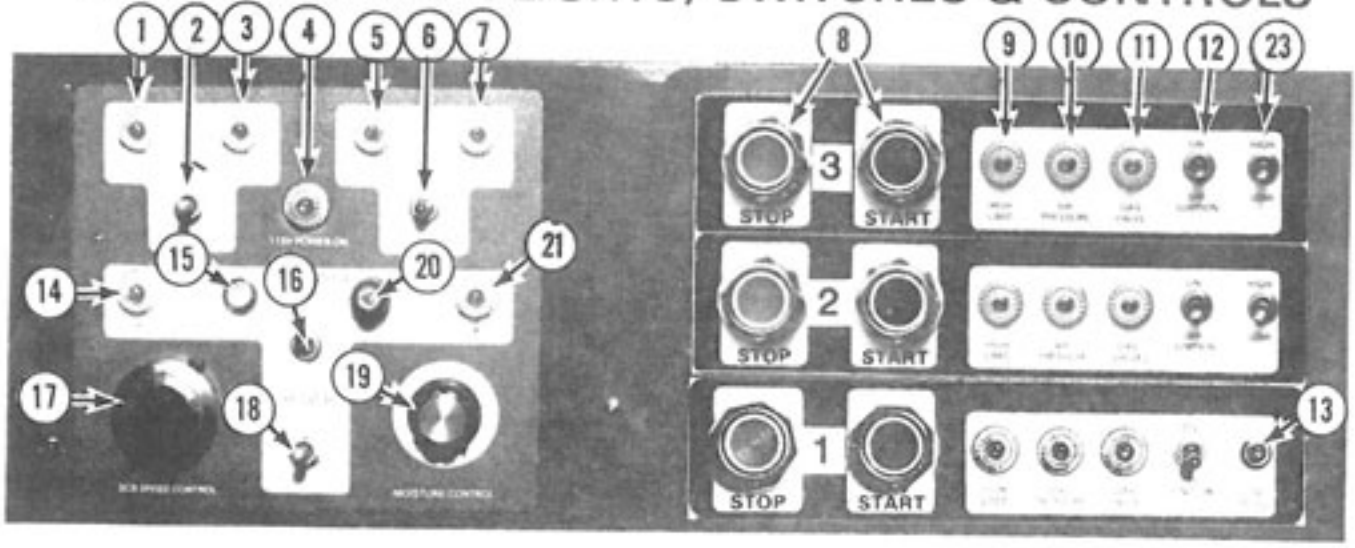


Figure 1 - Base Section Control Panel Lights, Switches and Controls (Model 1075 Shown)

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 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 switch in the hopper calls for grain and stop when the hopper is full.

When the switch is in the automatic position, the level auger switch will start and stop the level auger automatically after the preset time on the delay

NOTE: The operation of the level auger circuit is explained in detail under "Level Auger Operation" on page 13.

Ref. 7 - Level Auger Light

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

Ref. 8 - Fan Start-Stop Buttons

Green 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 - (-) Light

Indicates that the discharge rate is slowing down if Moisture-Matic® is in automatic.

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-Matic® will speed up and slow down 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 - Manual SCR Drive Speed Control

This manual speed 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-Matic® Balance Knob

When the discharge metering roll switch is in the automatic position, the Moisture-Matic will control the SCR drive motor to maintain the moisture content of discharge grain.

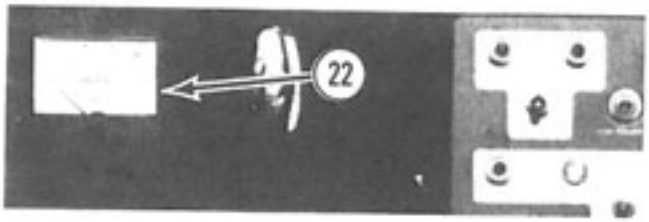
Ref. 20 - Moisture-Matic® Fuse

Ref. 21 - (+) Light

Indicates that the discharge rate is speeding up if Moisture-Matic® is in automatic.

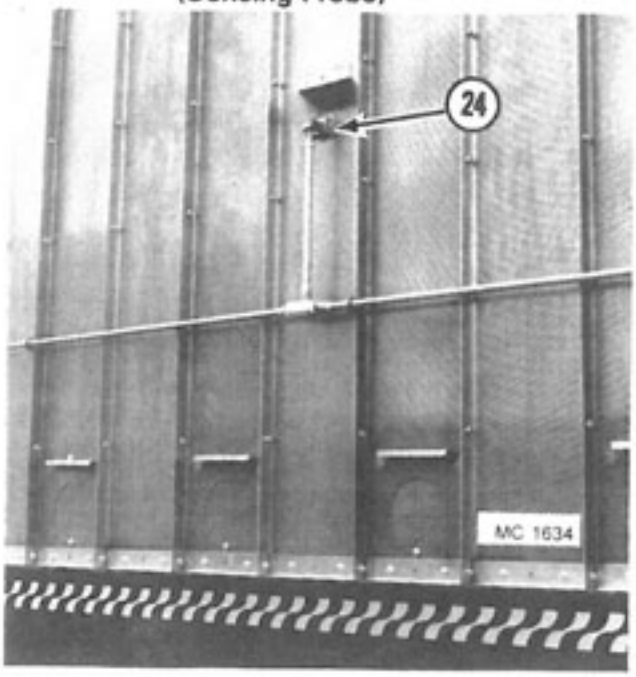
Ref. 22 - Discharge Meter

Indicates the rate of discharge in manual and automatic.



Ref. 23 - High/Low Burner Switch

Ref. 24 - Moisture-Matic Thermistor (Sensing Probe)



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.

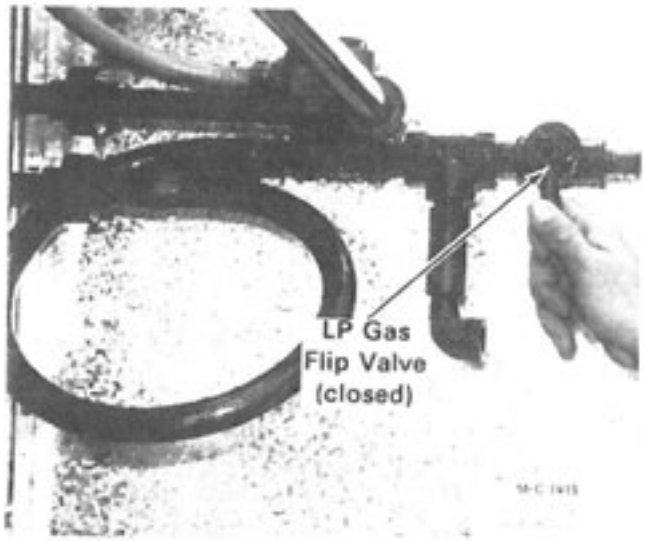


Figure 2 - LP Gas

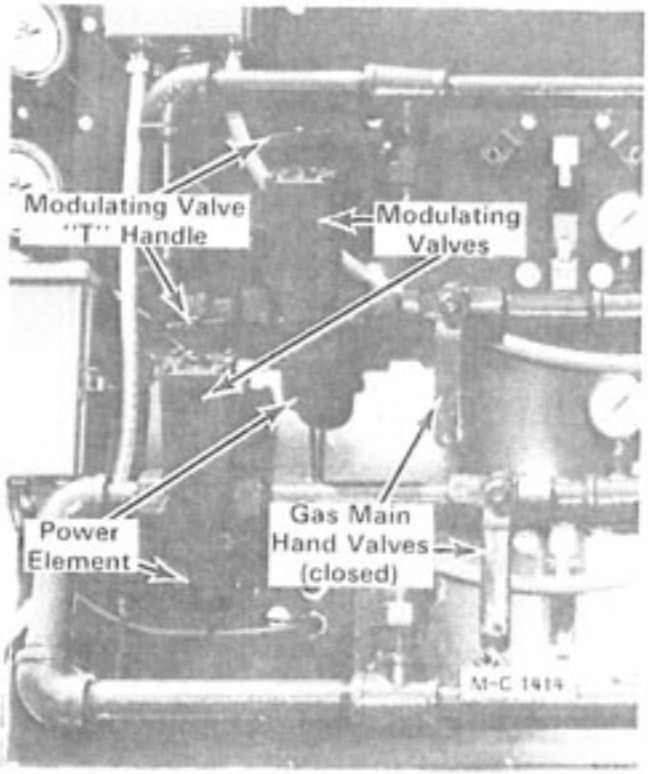


Figure 3 - Two Burner Controls

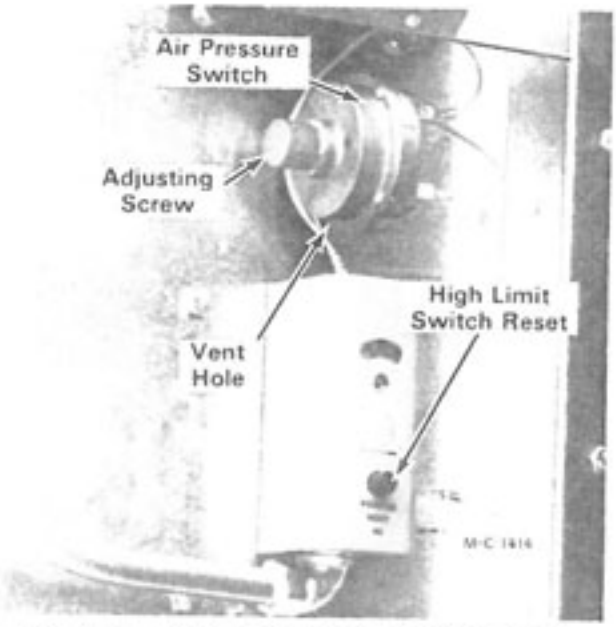


Figure 4 - Adjustable High Limit Switch

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 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 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 ⅛" 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.

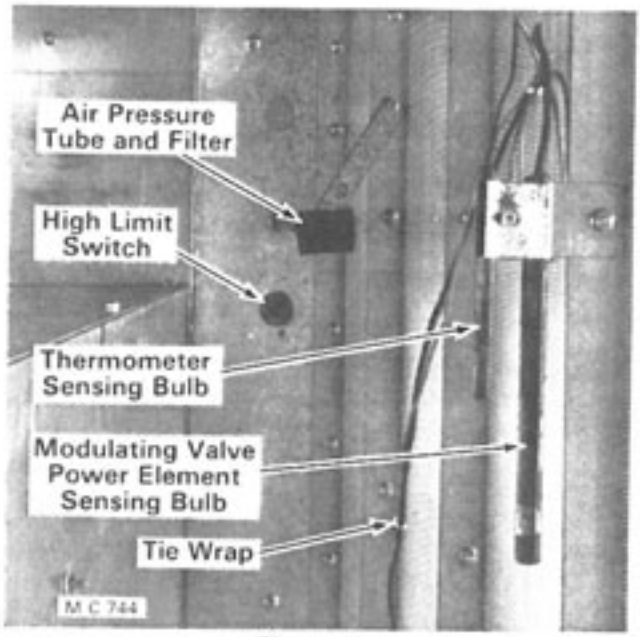


Figure 5

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 (counter-clockwise) until the air pressure light comes

on. After the Air Pressure light comes on, turn the adjusting screw out an additional ¼ to ½ 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: All 675 thru 1195 dryers are equipped with base section controls. With this system all burners and fans can be started from the Base Section Control Panel. All burners except the bottom Burner #1 (located in the base section) will have a High-Low Fire Switch on the Base Section Control Panel. When a cold burner is first started, the High-Low Fire Switch for that burner is placed in the LOW position and a limited amount of gas is allowed to enter the burner. Once the burner is warm (15 to 20 minutes), the High-Low Switch can be placed into the HIGH position in one continuous motion.

Burner #1 has an ignition board reset button in place of the High-Low Fire Switch. Burner #2 has a reset button that is mounted on the side of the gray ignition box which contains the ignition board for Burner #2.

Model 1075 does not have a Dryer and Motor Control Cabinet for the 5 ft. Module as there is room in the base section magnetic starter cabinet for the module motor starter and circuit breaker. The 1075 is somewhat special because both Burners #2 (base section) and #3 (5 ft. module) have ignition reset buttons that are mounted on the side of the gray ignition boxes that contain the ignition boards.

The burners and fans for the upper module(s) (1175 and 1195) have a control bezel that is located on the left door (looking from front to rear) of the Dryer and Motor Control Cabinet of the module. Each burner and fan control bezel has fan Stop and Start Buttons, (3) Indicator Lights, a Burner Ignition Switch, and an Ignition Reset Button.

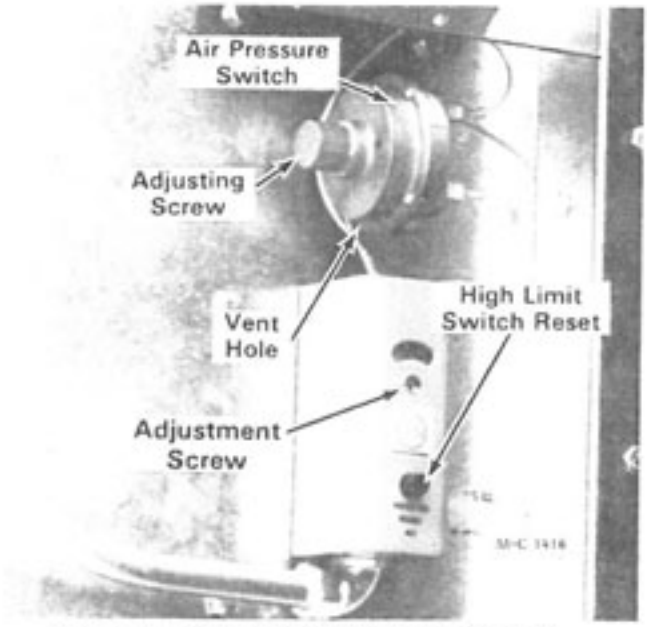


Figure 6 - Adjustable High Limit Switch

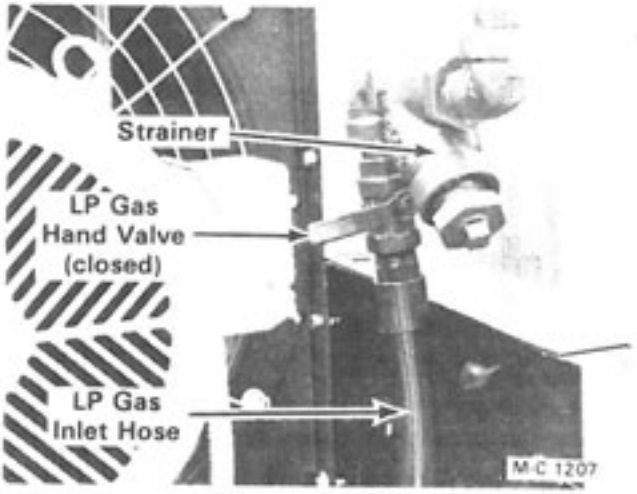


Figure 7 - LP Gas

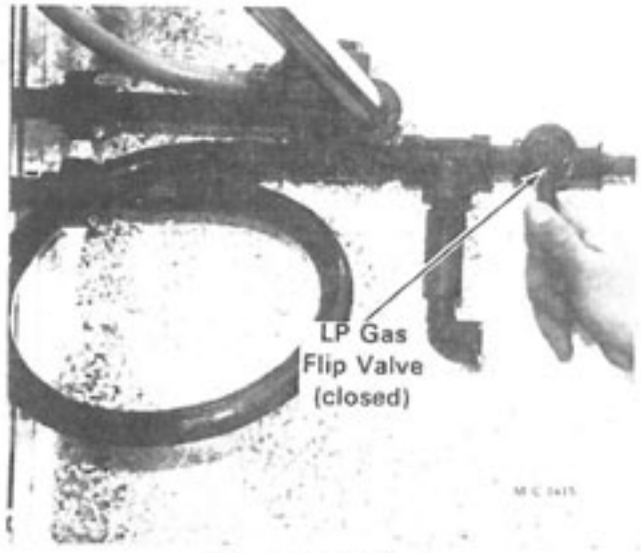


Figure 8 - LP Gas

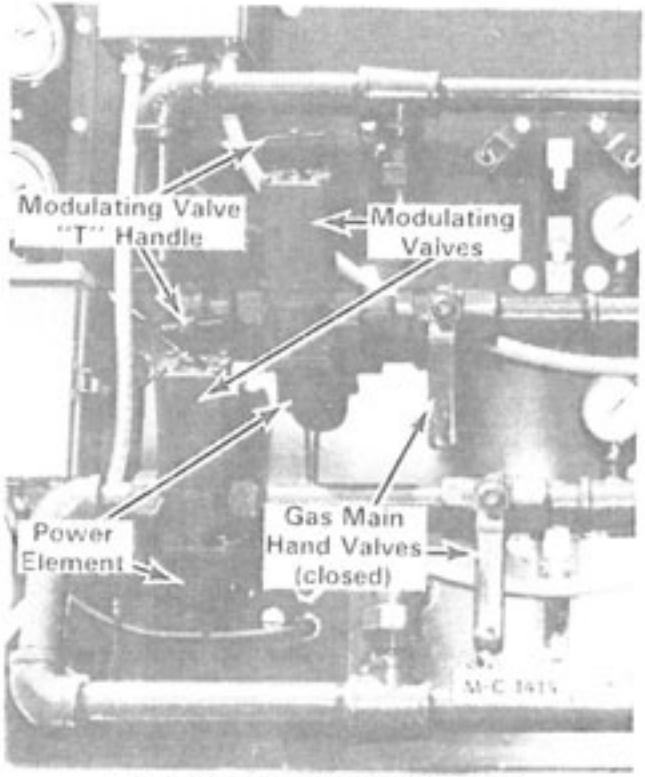


Figure 9 - Two Burner Controls

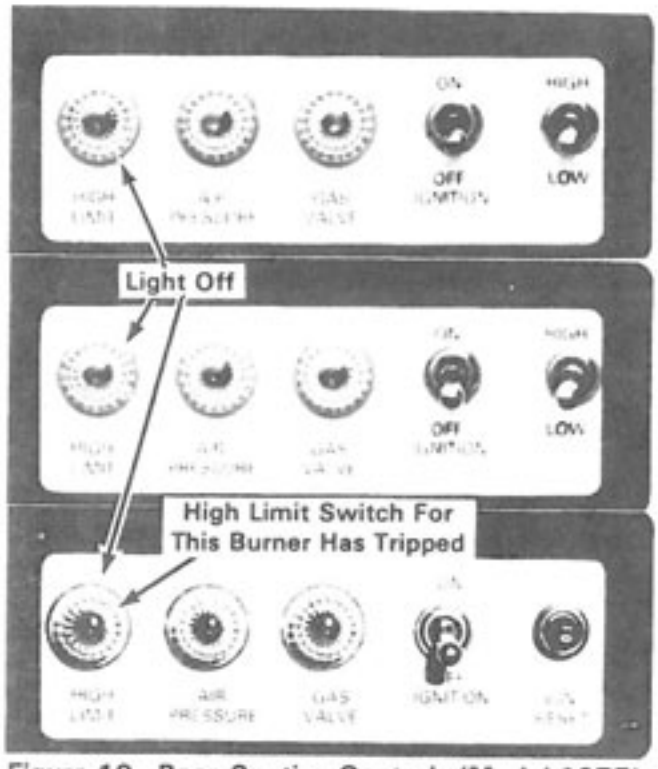


Figure 10 - Base Section Controls (Model 1075)

Before the base section control system can be used, it will be necessary to set the operating temperature (adjust modulating valve) of each burner.

1. 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."

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

2. The ignition switches on the Base Section Control Panel must be flipped to the ON position (except Burner #1) and the High-Low Fire Switches must be flipped up to the HIGH position before burners can be started at each module Dryer and Motor Control Cabinet. See Figure 10.

3. **LP Gas** - Open the supply valve at the tank, the hand valve at the LP Gas inlet line 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°F to the piping.

4. **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. See Figure 24.

4. Start bottom fan #1. When it comes up to speed, start the next fan. Continue this procedure until all of the fans are running.

5. Open the gas main hand valve ¼ of the way. See Figure 9. Flip bottom burner #1 ignition switch ON. After a ten (10) second delay the gas valve light will be ON and the burner will light.

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.

6. After the flame is established, **slowly** open bottom burner #1 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.

7. If the LP Gas line freezes, close the gas main hand valve and flip the ignition switch

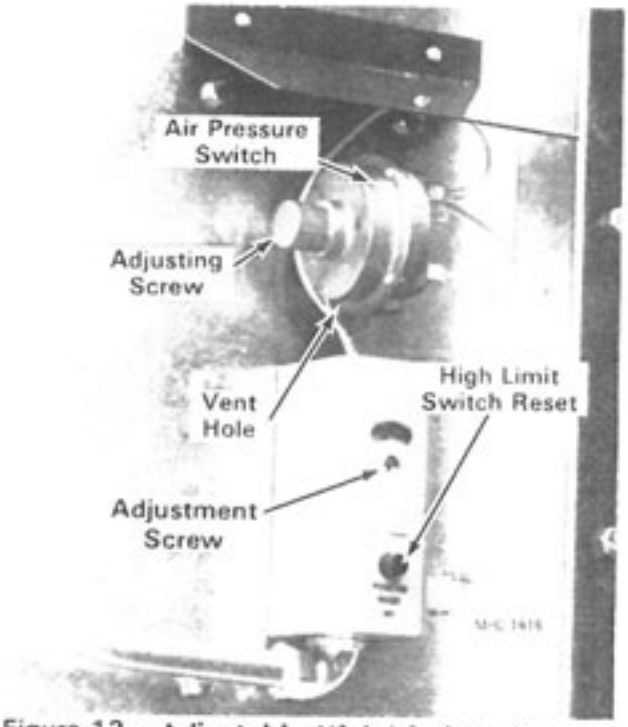


Figure 12 - **Adjustable High Limit Switch**

OFF. After the gas line thaws out repeat steps 5 and 6, 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 gas solenoid 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 gas solenoid valves. The gas valve light will be out.

8. 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 (5 seconds) will start.

9. 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.

10. 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.

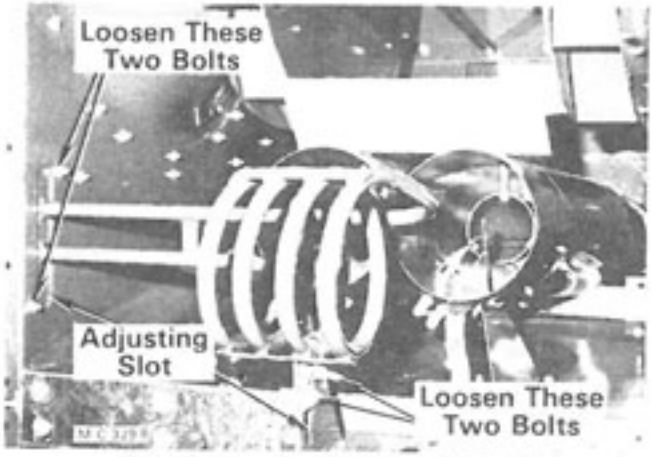


Figure 13 - LP Gas Vaporizer Coil

NOTE: When a High Limit Switch trips out, the high limit light for that burner and all of the high limit lights above it will be out, see Figure 10. The High Limit Switch will have to be reset when the plenum chamber temperature falls 20°F below the High Limit Switch setting. All of the high limit lights will come back on when the High Limit is reset.

11. Push the control circuit switch up to the START position and release it. Restart the fan. Repeat steps 5 and 6, 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 burners can be started.

12. **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 very slowly 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

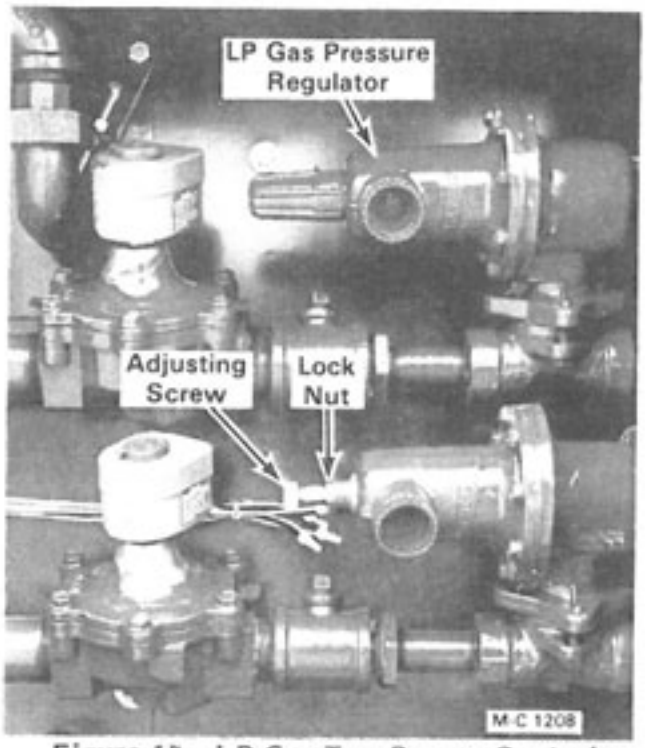


Figure 14 – LP Gas Two Burner Controls

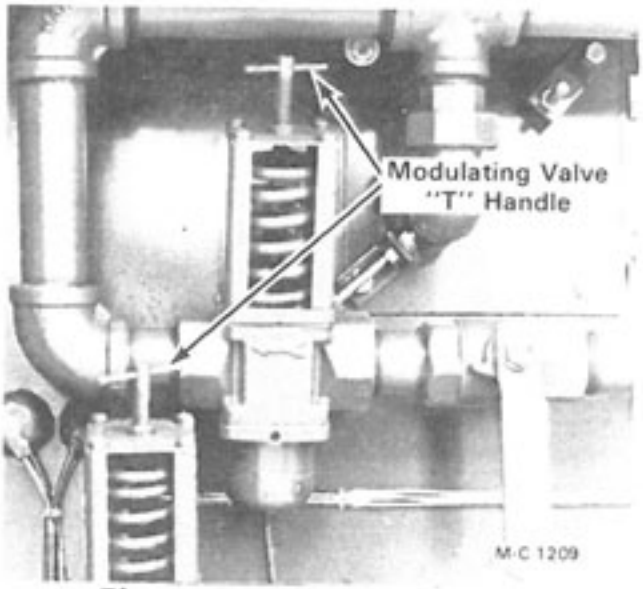


Figure 15 – Two Burner Controls

hot, the vaporizer coil is too close to the flame.

D. Shut off the burner and all fans.

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

E. Go into the plenum chamber and move the coil up or down for warmer or cooler. See Figure 13.

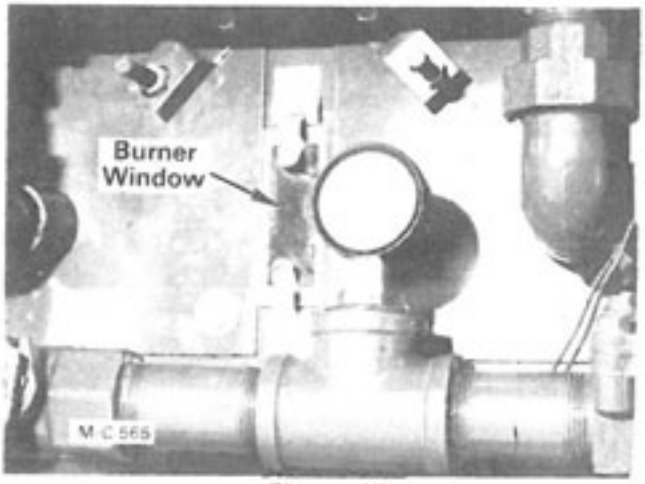


Figure 16

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 burners can be started.

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

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.

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 for each burner placed at the left front corner (viewed front to back) of each fan housing.

3. Observe the burner flame through the window behind the gas manifold, see Figure 16. The flame should be blue with a little 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 venturis on each burner 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.

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 off all of the fans.

Suggested Burner Operating Temperature Settings °F (°C)

(From 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	(Maize) Corn	Sorghum & Wheat	Canola (rape), Sunflowers, Oats, Barley, Soybeans
	Temperature °F (°C)	Temperature °F (°C)	Temperature °F (°C)
675 & 975	230 (110)	170 (77)	140 (60)
	Cool or 180 (82)	Cool or 150 (66)	Cool or 130 (54)
1075	235 (113)	180 (82)	140 (60)
	225 (109)	160 (71)	130 (54)
	Cool or 200 (93)	Cool or 150 (66)	Cool or 120 (49)
1175	235 (113)	180 (82)	140 (60)
	225 (109)	170 (77)	130 (54)
	200 (93)	160 (71)	120 (49)
	Cool or 180 (82)	Cool or 150 (66)	Cool or 120 (49)
1195	240 (116)	180 (82)	140 (60)
	235 (113)	170 (77)	140 (60)
	225 (109)	160 (71)	130 (54)
	210 (99)	150 (66)	130 (54)
	Cool or 200 (93)	Cool or 150 (66)	Cool or 120 (49)
	Cool or 180 (82)	Cool or 150 (66)	Cool or 120 (49)

OPERATING INSTRUCTIONS

Level Auger Operation

675-1195

Description

There is an adjustable .2 to 2 minute delay in the level auger circuit, see Figure 17. It is activated when the level auger switch is in the AUTOMATIC position and the level auger light is signaling 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 18, 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.

Figure 17

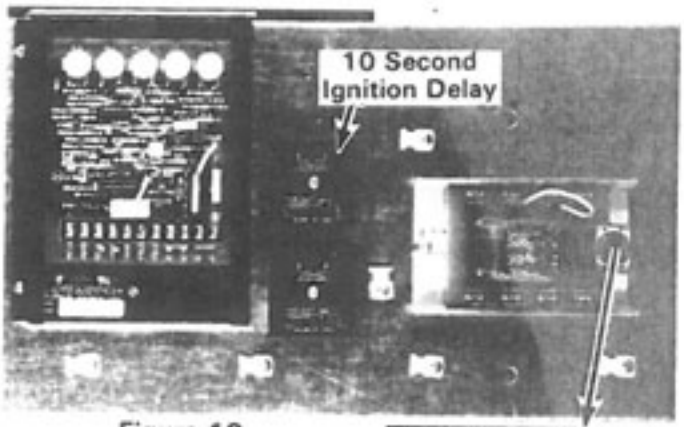
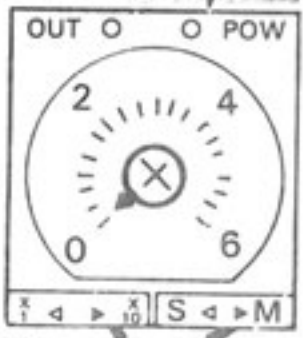


Figure 18



Grain Flow Timer

NOTE:
SET TIMER FOR X 10 AND MINUTES. ADJUST FROM UNDERSIDE OF TIMER.

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 2 minutes).
2. Set the Grain Flow Timer arrows at the bottom of the timer face to X10 (times ten) and to M (minutes). It may be necessary to remove the timer from its socket to make this adjustment. Now turn the timer control knob to 3 (3x10) or 30 minutes and flip the level auger switch to AUTOMATIC. The level auger will start after the .2 to 2 minute delay if the level auger light is on signaling 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 switch in the hopper signals 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 2 minute delay).
4. Average the 6 refill times and reset the Grain Flow Timer, Figure 18, to run 5 minutes longer. For example, if it takes the level auger an average of 5 minutes to refill the dryer, 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 timer will start to count down to zero.
2. After the level auger refills the dryer and shuts off, the level auger light will go out and the timer 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, the dryer will shut down.
4. The grain flow, high limit, control circuit ON, 115V power ON and the two red lights at the top of the Grain Flow Timer will be on. Flip the level auger switch OFF.

NOTE: When the Grain Flow Timer shuts the dryer down determine the problem.

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 go 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 .1 to 8 minute delay will be activated if the level auger panel light is on signaling for grain.

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

Operation of the Discharge System

(See Figures 19, 20, 21 & 22)

The unload (discharge) auger and metering rolls are used to unload grain from the dryer. The unload auger operates at a constant speed while the metering roll speed can vary depending upon the speed of the DC motor that drives the metering rolls.

1. The discharge auger spring loaded toggle switch must be pushed up to the START position and released so that it will move to the ON position and start the auger before the metering roll switch is activated. This prevents the metering rolls from dumping grain onto a stopped discharge auger. If the electricity to the dryer is interrupted for any reason, the discharge auger toggle switch will lock out and must be pushed down to the OFF position and then back up to the START position to restart the discharge auger and metering rolls.
2. The grain metering rolls are driven by a 1/3HP direct current motor and gearbox. The speed of the motor when the metering roll switch is in MANUAL is controlled by a potentiometer (SCR drive speed control) located on the control door. The speed control dial is graduated from 0 (slow) to 10 (fast). Be sure to set the SCR motor Maximum Speed as described on page 33.
3. When the discharge metering roll switch is in the AUTOMATIC position, the Moisture-Matic® automatic moisture control determines the speed of the 1/3HP DC drive motor and the discharge metering rolls in response to grain temperature changes.
4. A rear discharge overload door at the top rear of the discharge auger is provided in case the customer supplied grain take-away system fails. If such a failure occurs, the dryer will continue to discharge grain until the rear discharge overload door is raised by the excess grain.

   When the overload door rises, the unload switch opens, the dryer shuts down, and all of the indicator lights except the 115V POWER ON light will be out. The grain flow timer will automatically reset. When the problem has been corrected and the rear discharge overload door closes, 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. The level auger delay will also be activated if the level auger toggle switch is in the AUTOMATIC position and the level switch in the hopper is signaling for grain.

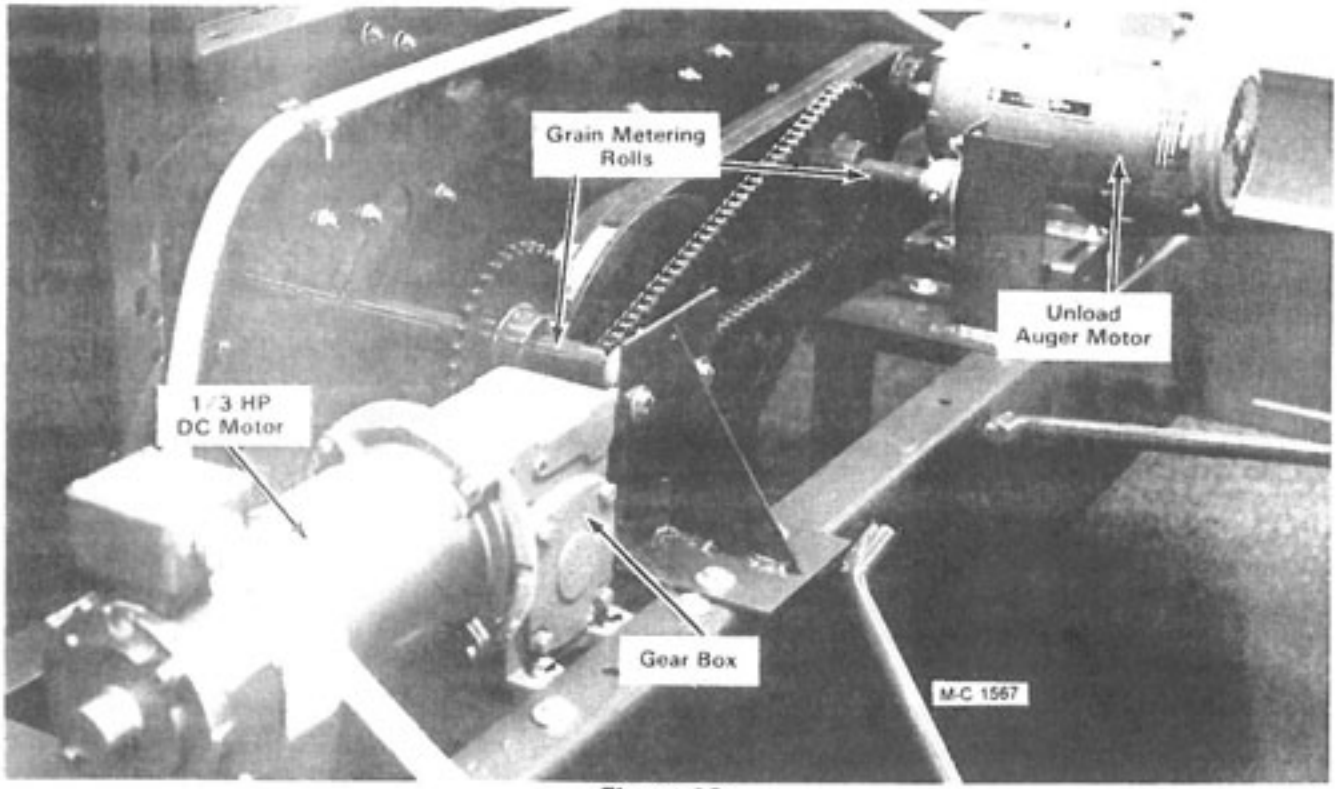


Figure 19

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

Flip the ignition switches OFF and restart the fans, burners and discharge auger.

Automatic Moisture Control System

There is a direct relationship between grain temperature and grain moisture and any change in grain temperature will mean a change in grain moisture. If the temperature of the grain goes down, the moisture content will have increased. If the temperature of the grain goes up, the moisture content will have gone down.

The automatic moisture control on M-C Dryers maintains uniform moisture content of the grain being discharged from the dryer by changing the unloading speed of the dryer.

The moisture control is sensing grain temperature and reacting to it by slowing down or speeding up the unload rate of the metering rolls.

Drying Grain

IMPORTANT: To operate the dryer from the Base Section Control Panel, the ignition switches on each module control panel must be ON and the gas main hand valve for each burner must be open all the way (handle parallel to the piping).

1. Flip all of the ignition switches on the base section control panel OFF and flip the HIGH-LOW FIRE switches to LOW, see Figure 20.
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." See page 13.
6. With the dryer full of grain, flip the level auger switch to AUTOMATIC and start bottom fan #1. When it comes up to speed, start the next fan. Continue this procedure

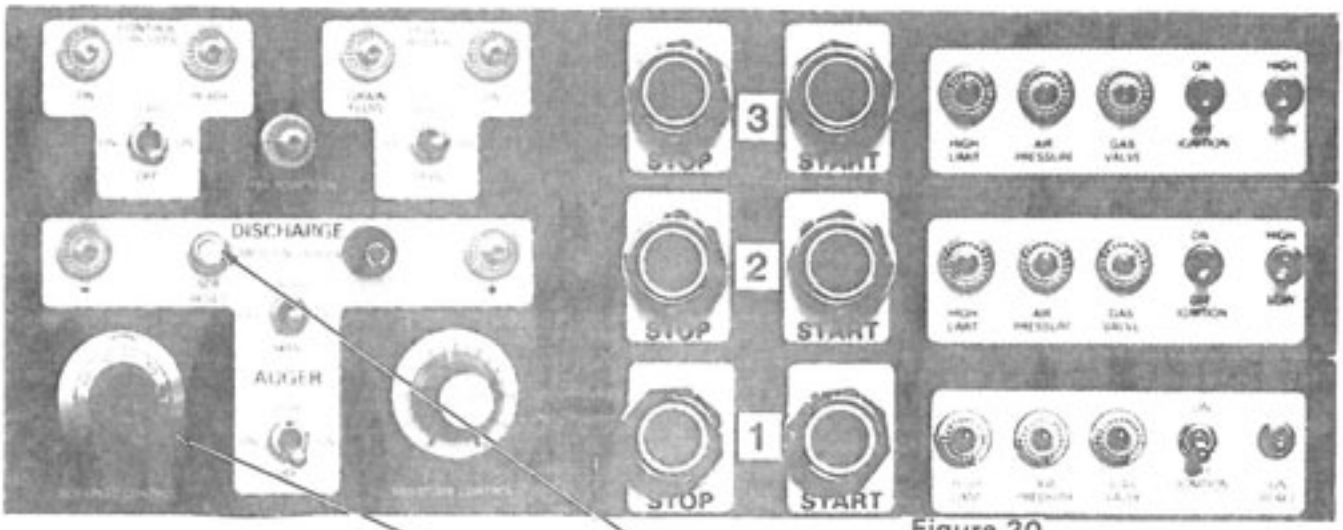


Figure 20

until all of the fans are running.

NOTE: If the dryer is to be operated "Dry and Cool," it is suggested that the bottom 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 on LOW-FIRE in order from the bottom to the top. Run all burners on LOW-FIRE for 15 to 20 minutes to warm them up.

IMPORTANT: The burners **MUST** run on LOW-FIRE for 15 to 20 minutes before switching to HIGH-FIRE to allow the temperature modulating valve to warm up. If the burner is switched from LOW-FIRE to HIGH-FIRE too soon, the temperature may rise too fast causing the modulating valve to overreact and close, shutting off the gas to the burner. If the temperature rises beyond the high limit switch setting, the switch will trip out shutting down the dryer.

8. After the burners have been running on LOW-FIRE for 15 to 20 minutes, flip all of the HIGH-LOW FIRE switches up to HIGH FIRE in one continuous motion.

9. Running on continuous heat, it will take approximately 6 minutes per point of moisture being removed to dry the first load.

10. 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.

11. Flip the discharge metering roll switch to the MANUAL position. The SCR drive motor will start and the dryer will begin unloading grain.

If the SCR drive motor does not start, push the SCR drive circuit breaker reset button in, see Figure 20.

12. The SCR drive speed control dial, Figure 20, is graduated from 0 (slow) to 10 (fast). Use the Grain Metering Roll Discharge Rate Chart Figure 21, as a guide to set the SCR drive speed control.

13. Test the moisture content of the grain being discharged every 15 minutes until it stabilizes. Use grain sampler on unload auger discharge housing. See Figure 23.

14. 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.

Start-Up SCR Manual Drive Speed Settings

NOTE: These dial settings are not final and are based on normal drying temperature (see page 12). Exact settings will vary with outside temperatures, humidity, crop maturity, variety, cleanliness of grain, test weight, drying temperatures, etc. All values based on 70 volts as SCR maximum voltage. Under 0.5 setting of SCR dial, voltage to SCR motor may become inadequate to properly turn loaded feed rolls. Care should be taken when operating at these low speeds.

CROP AND DRYING MODE	MOISTURE REMOVAL	SCR SETTING MODEL 675†	975*	1075*	1175*	1195*	1195**
Corn Dry & Cool	20% - 15%	5.2	3.3	5.5	6.7	10.0	4.9
Corn Dry & Cool	25% - 15%	3.1	1.9	3.2	4.0	6.1	2.8
Corn All Heat	22% - 17.5%	7.7	5.1	7.4	9.0	10.0	5.2
Corn All Heat	25% - 17.5%	6.2	3.9	5.8	7.1	8.7	4.1
Wheat Dry & Cool	17% - 12%	5.4	3.5	5.7	7.0	10.0	5.0
Sorghum Dry & Cool	20% - 15%	4.9	3.0	5.1	6.2	9.2	4.4
	Sprocket Gear Ratio:	†266:1		*180:1		**90:1	

Figure 21

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

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

SWITCHING FROM MANUAL TO AUTOMATIC

1. Before placing the discharge metering roll switch into automatic position, the dryer must be operated in the MANUAL position. When the moisture content of the discharged grain has been consistent for two or more hours, it is time to switch up to AUTOMATIC.
2. While the discharge metering roll switch is in MANUAL, turn the moisture control dial to balance the Moisture-Matic® to the point where both the (-) and (+) lights are off. At this point the Moisture-Matic® is calibrated to the moisture content established in the MANUAL setting.
3. Flip the metering roll switch up to the AUTOMATIC position.

   Now the manual SCR speed control is OFF and the discharge rate is being controlled by the Moisture-Ma tic® board and the thermistor (sensing probe).

   The unloading speed on the discharge meter indicator should be the same as when the switch was in MANUAL, but the meter will begin to change automatically.

   When the moisture content of the incoming grain changes (wetter or drier), the discharge rate will change automatically. If the speed slows down because the incoming grain is wetter, the (-) light will come on and the discharge meter indicator will drop until the unload speed is automatically adjusted. When the adjustment is completed, the (-) light will go out and the discharge meter indicator and the unload speed will remain constant until another change is required.

   If the discharge speed increases because the incoming grain is drier, the (+) light will come on and the discharge meter indicator will move up until the unload speed is automatically adjusted. When the adjustment is completed, the (+) light will go out and the discharge meter indicator and the unload speed will remain constant until another change is required.

   The system will automatically change speed (+) or (-) to keep the discharge grain at the moisture content that was selected when the metering roll switch was in the MANUAL position.

Moisture Control Setting and Adjustment When in Automatic

The discharge rate will change to keep moisture content the same as when in manual. However, if you want to change the discharge moisture content when operating in automatic, simply turn the moisture control dial up to a higher number for drier grain or down to a lower number for wetter grain. When you turn the dial either the (+) light or the (-) light will come on and you will see the discharge meter indicator change to reflect the change in speed.

Cold Grain Shut-Down Timer

(Starting with Serial Number 56052)

This 0 to 60 minute timer is provided to limit the time that the dryer will discharge grain after the burner unexpectedly goes out (lack of fuel, etc.).

The timer is only activated when the Discharge Metering Roll Switch is in the automatic position and the Moisture Control System reduces the speed of the metering rolls. At this time one of the red lights on the face of the timer will be on and the timer will start to move to zero.

If the speed of the metering rolls is not increased before the time selected on the timer is reached, the dryer will be shut down and only the 115V power ON, control circuit ON, and high limit lights will be on.

Set the timer arrows at the bottom of the timer face to X10 (times ten) and to M (minutes). Now turn the time control knob to 3 (3x10) or 30 minutes for a starting point.

End of Day Shutdown

1. To shut off the dryer, close the liquid propane (LP) gas supply valve at the tank or close the natural gas (NG) supply valve. Operate burners until the flame goes out then turn off ignition switches and place High-Low Burner Switches into LOW.

2. Close gas main hand valve liquid line flip valves on dryers equipped with liquid propane burners.

3. To make next day start-up much easier, be sure to set the Manual SCR Dial to match the reading on the discharge meter before placing the Metering Roll Switch into the OFF position.

   After at least one minute place the Discharge Auger and Level Auger Switches into the OFF position.

4. Operate fans about 15 to 20 minutes to cool grain in dryer then turn off fans and flip the Control Circuit Toggle Switch to OFF.

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

Next Day Start-Up

1. Turn on electrical power to dryer, flip Control Circuit Switch up to START, place Level Auger Switch into AUTOMATIC and start fans.

2. Open liquid propane (LP) gas supply valve at tank or natural gas (NG) supply valve and liquid line flip valves on dryers equipped with liquid propane burners.

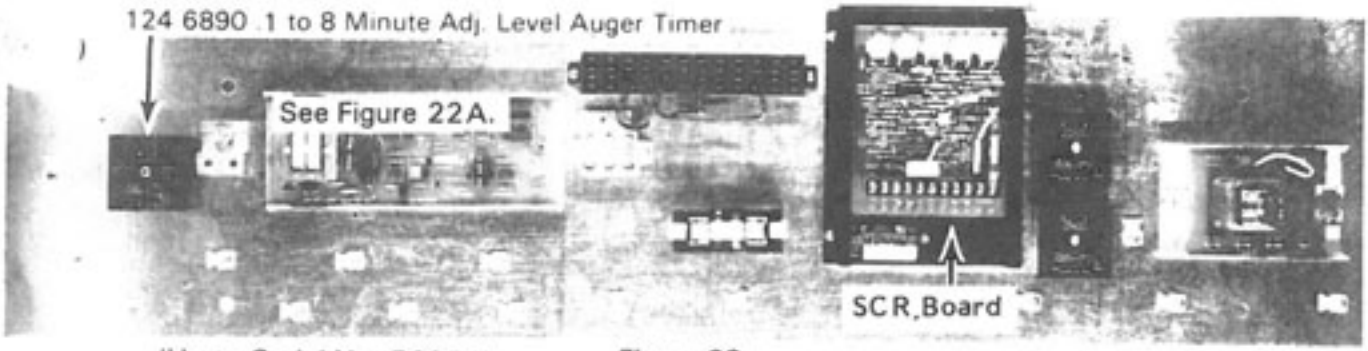
3. Place all High-Low Burner Switches into the LOW position and start burners in order from bottom to top. Allow burners to operate for a couple of minutes before placing the Discharge Auger Switch into the ON position and the Discharge Metering Roll Switch into MANUAL.

4. After the dryer has been unloading grain for at least 45 minutes, the Metering Roll Switch can be placed into AUTOMATIC. DO NOT ATTEMPT TO RE-BALANCE THE MOISTURE CONTROL SYSTEM.

GOING BACK TO MANUAL

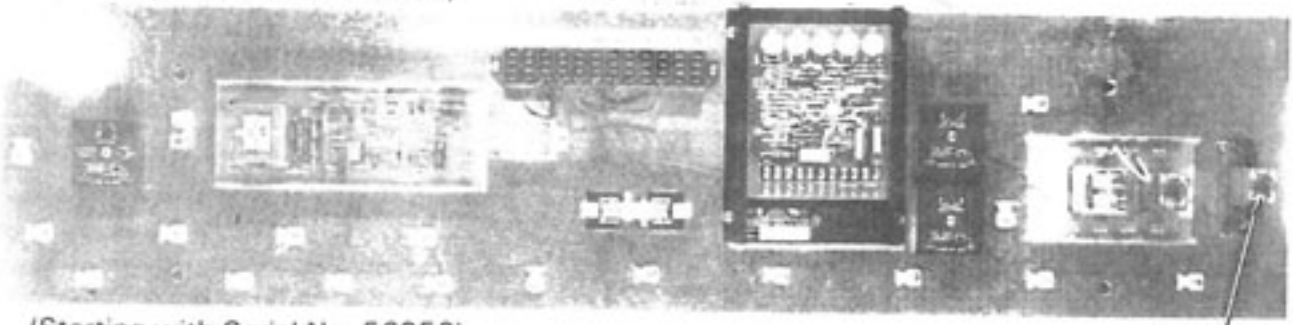
At any time you can switch back to manual. Just flip the metering switch to the manual position. At that time the Moisture-Matic® will be out of the system and the discharge speed will be controlled by the SCR speed control manually. The DC volt meter will indicate the manual speed setting. If you want to unload at the same speed in manual as it was in automatic, readjust the SCR speed dial until the DC volt meter indicates the same DC volts as you had in automatic.

When operating in manual the (+) and (-) lights may be lit. However, they are only indicating what would happen if you were in automatic based on the set point of the moisture control knob. When in manual you can balance the (+) and (-) lights. However, unless you go to the automatic position nothing will change. In the manual position only you will change the discharge rate by adjusting the SCR dial.



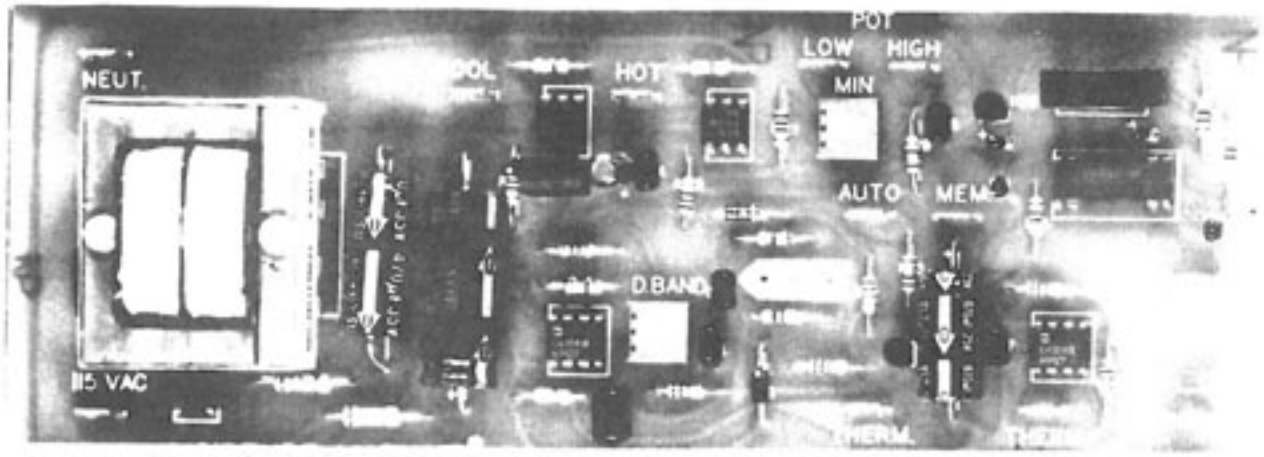
(Up to Serial No. 56051)

Figure 22



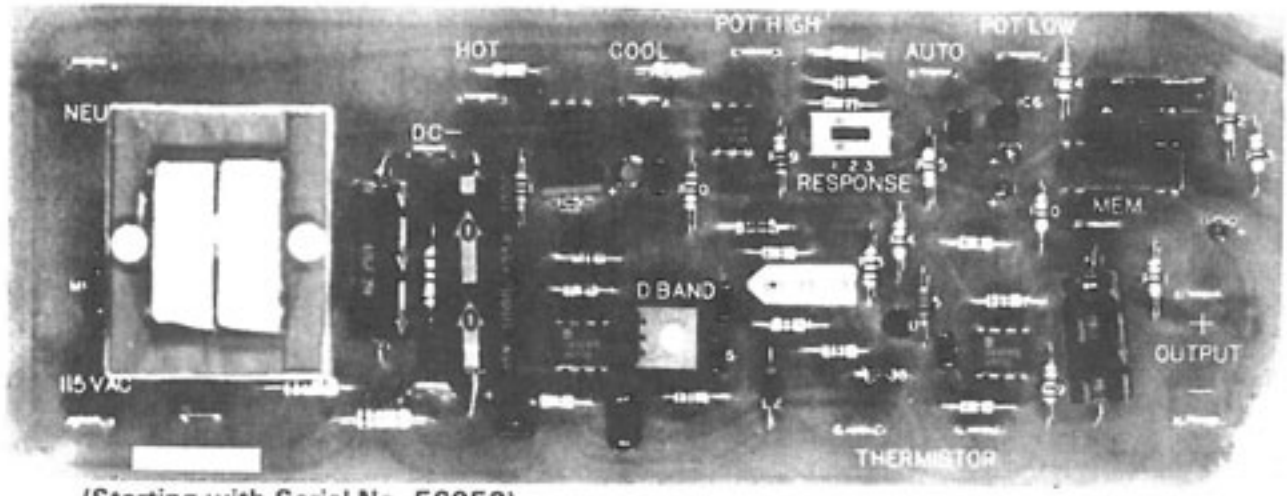
(Starting with Serial No. 56052)

Moisture Control Boards



(Up to Serial No. 56051)

Figure 22A



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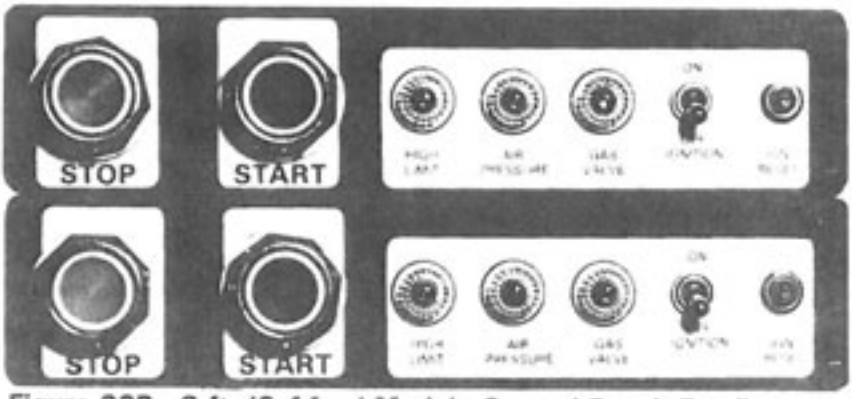
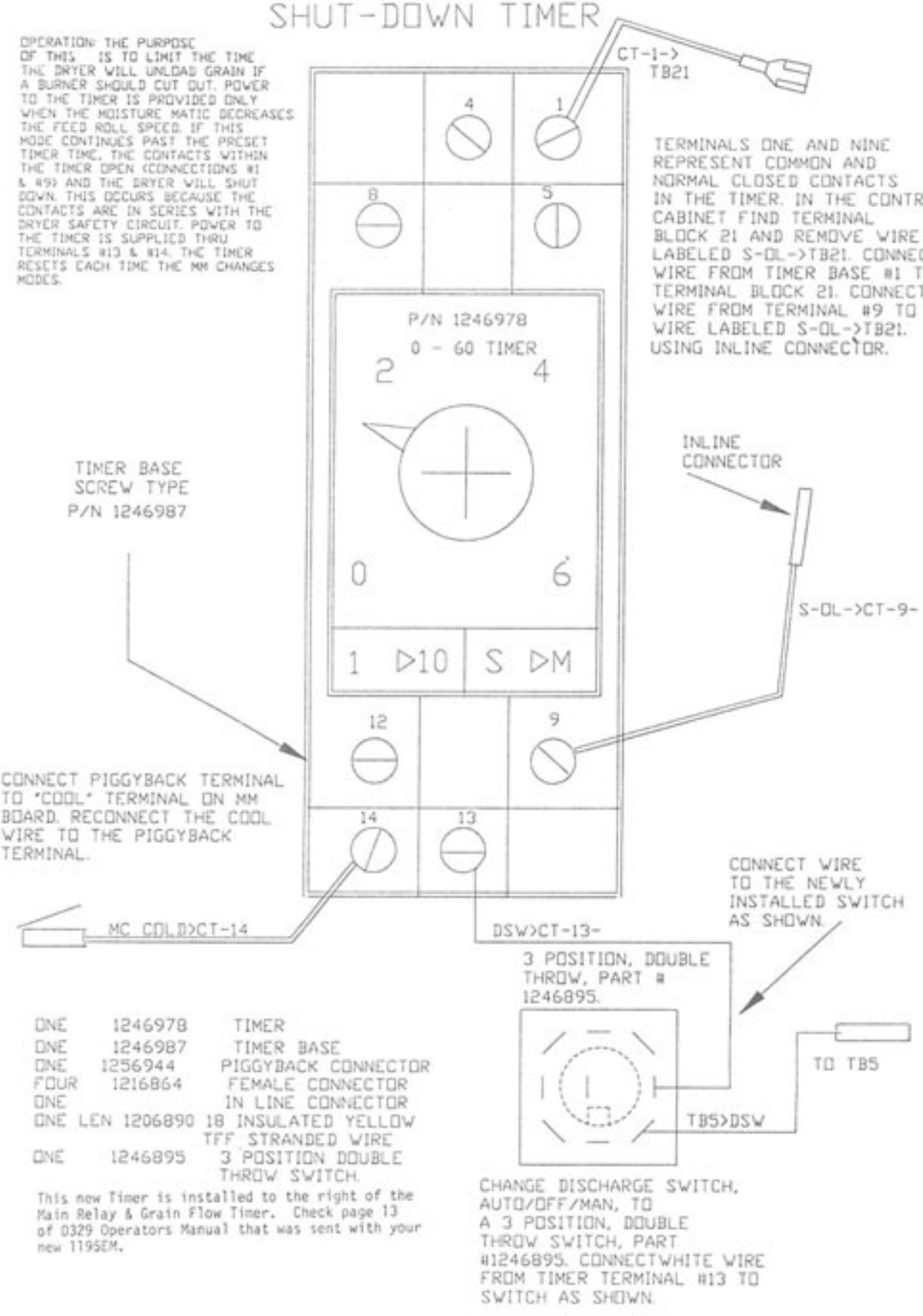


Figure 22B - 8 ft. (2.44m.) Module Control Panel, Fan Buttons, Indicator Lights, Ignition Switch and Reset Button

0 - 60 COLD GRAIN SHUT-DOWN TIMER

OPERATION: THE PURPOSE OF THIS IS TO LIMIT THE TIME THE DRYER WILL UNLOAD GRAIN IF A BURNER SHOULD CUT OUT. POWER TO THE TIMER IS PROVIDED ONLY WHEN THE MOISTURE MATIC DECREASES THE FEED ROLL SPEED. IF THIS MODE CONTINUES PAST THE PRESET TIMER TIME, THE CONTACTS WITHIN THE TIMER OPEN (CONNECTIONS #1 & #9) AND THE DRYER WILL SHUT DOWN. THIS OCCURS BECAUSE THE CONTACTS ARE IN SERIES WITH THE DRYER SAFETY CIRCUIT. POWER TO THE TIMER IS SUPPLIED THRU TERMINALS #13 & #14. THE TIMER RESETS EACH TIME THE MM CHANGES MODES.



ONE	1246978	TIMER
ONE	1246987	TIMER BASE
ONE	1256944	PIGGYBACK CONNECTOR
FOUR	1216864	FEMALE CONNECTOR
ONE		IN LINE CONNECTOR
ONE LEN	1206890	18 INSULATED YELLOW TFF STRANDED WIRE
ONE	1246895	3 POSITION DOUBLE THROW SWITCH.

This new Timer is installed to the right of the Main Relay & Grain Flow Timer. Check page 13 of 0329 Operators Manual that was sent with your new 1195EM.

CHANGE DISCHARGE SWITCH, AUTO/OFF/MAN, TO A 3 POSITION, DOUBLE THROW SWITCH, PART #1246895. CONNECTWHITE WIRE FROM TIMER TERMINAL #13 TO SWITCH AS SHOWN.

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.
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 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.

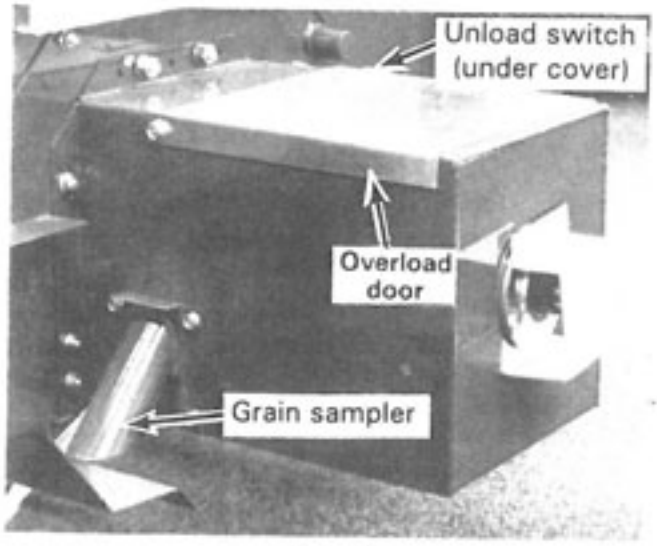


Figure 23

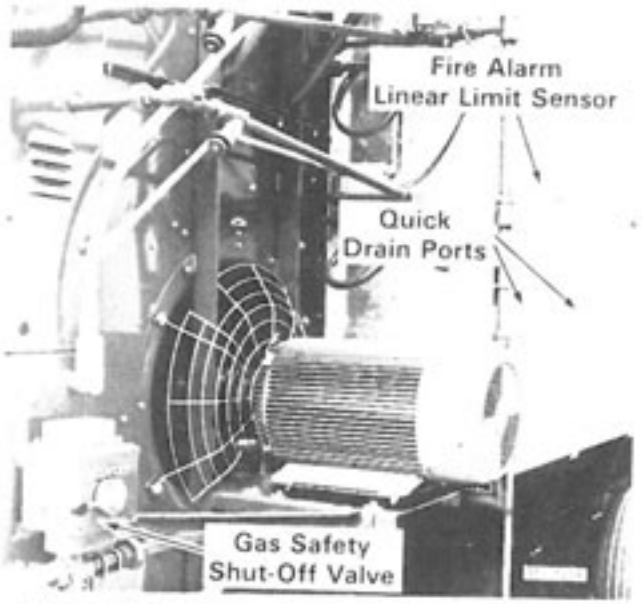


Figure 24 - Optional Safety Control Fire Alarm w/Safety Shut-Off Valve

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 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 control cabinet is to remain on.

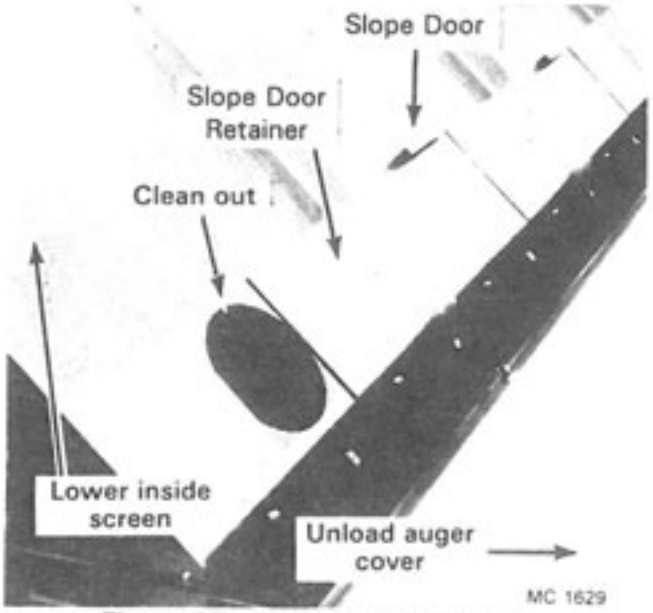


Figure 25 - Metering Roll Access

Restarts

CAUTION: If the outside temperature dropped 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 could prevent the dryer from unloading and create the possibility of a fire. Before checking metering rolls, turn off and lock electric power supply to dryer. See Figure 25.

If the grain is frozen, start burner to thaw out grain. Be careful not to run burner more than 5 to 10 minutes to avoid exposing dry grain to excessive heat and the chance of fire. Once grain is flowing evenly down columns, drying can begin again.

1. Flip all of the toggle switches on the control panel(s) to the OFF position. Turn on the electric power supply to the dryer.

2. **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).

3. **Natural Gas** - Open the gas supply valve.

4. 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.

5. Start the bottom fan. When it comes up to speed, start the next fan. Continue this procedure until all of the fans are running.

6. Start the burners in order from the bottom to the top. Flip the level auger toggle switch to AUTOMATIC.

7. Preheat the grain for 5 to 10 minutes.

8. Push the discharge auger spring loaded toggle switch up to the START position and release it. It will move down to the ON position.

9. Flip the discharge metering roll toggle switch to the MANUAL position to begin discharging grain or 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 overdried when discharged. The discharge rate will change automatically until all the dried grain has been discharged 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) (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 ¾ 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.

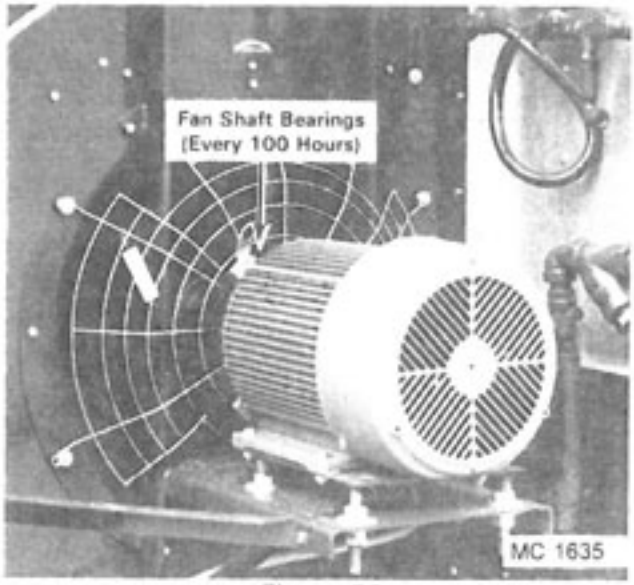


Figure 26

2. Lubricate the unloading auger front bearing and the front bearing on each grain metering roll, see Figure 27.

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 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.

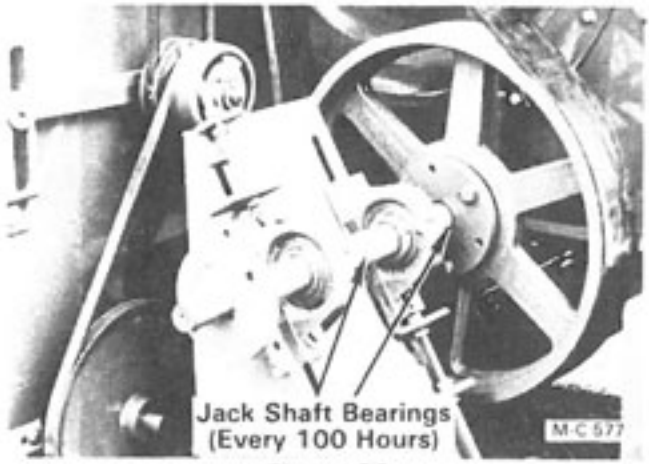


Figure 28

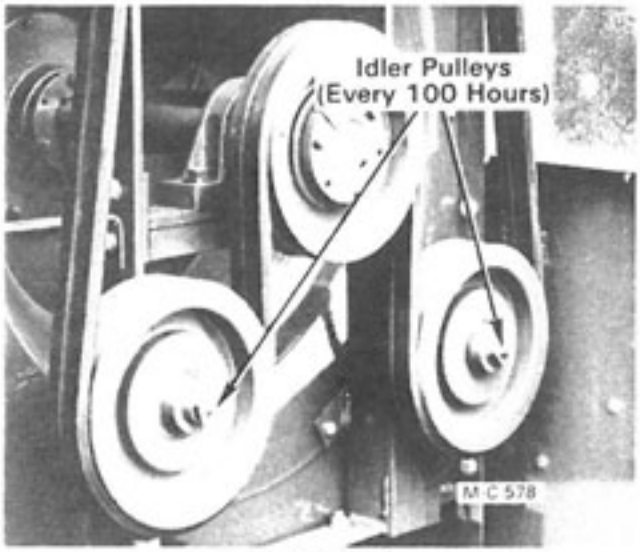


Figure 29

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.

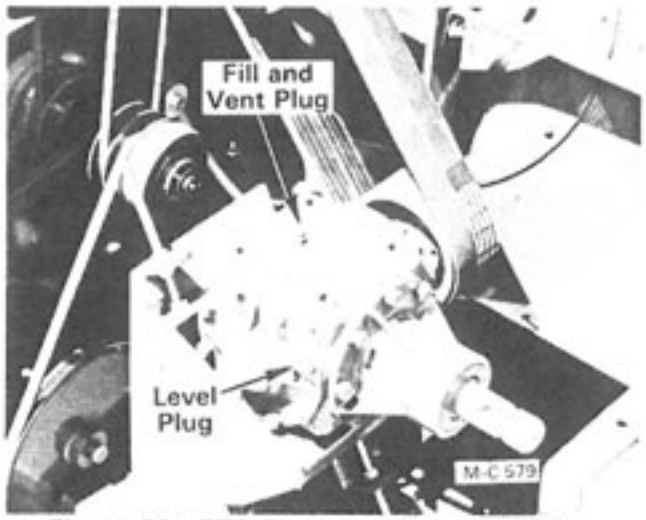


Figure 30 - PTO Front and Irrigation Drive

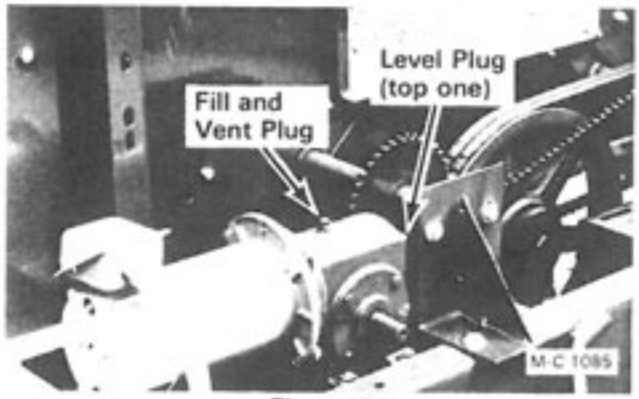


Figure 31

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.

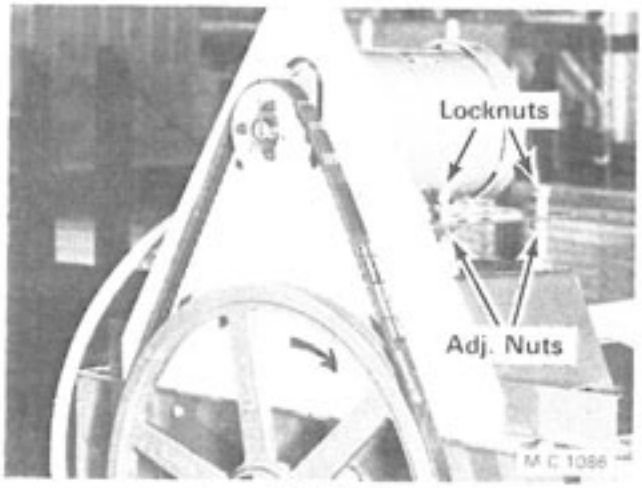


Figure 32

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 delfection midway between the bottom stationary idler and the top fan pulley.

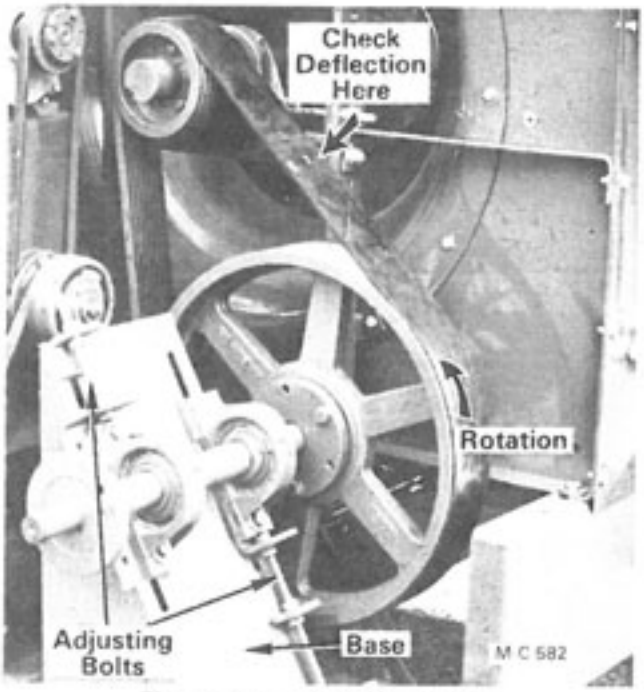


Figure 33 - PTO Side Drive

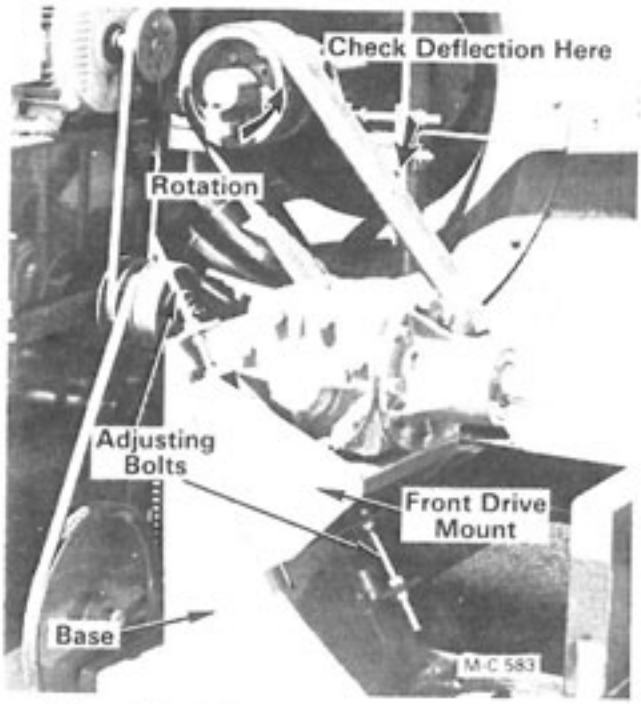


Figure 34 - PTO Front and Irrigation Drive

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.

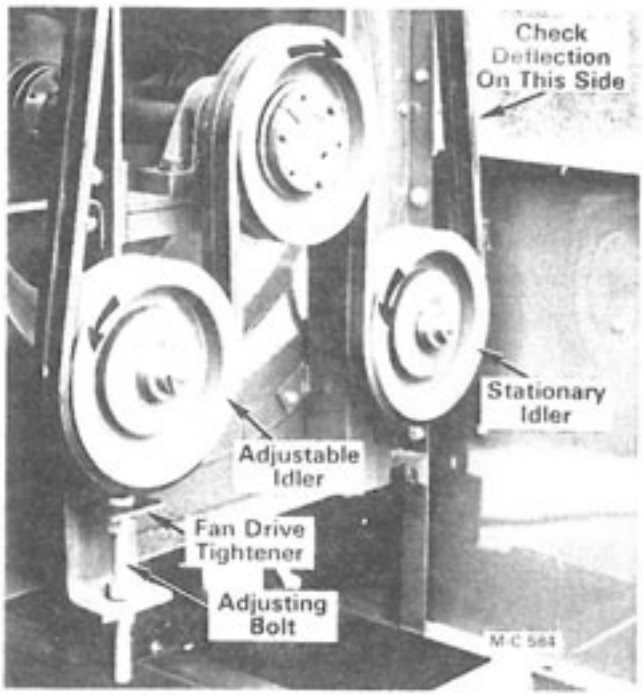


Figure 35 - PTO Fan Drive

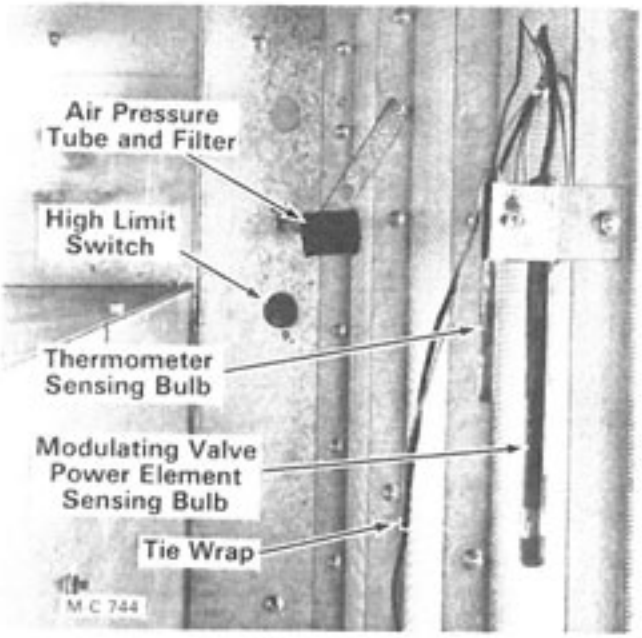


Figure 36

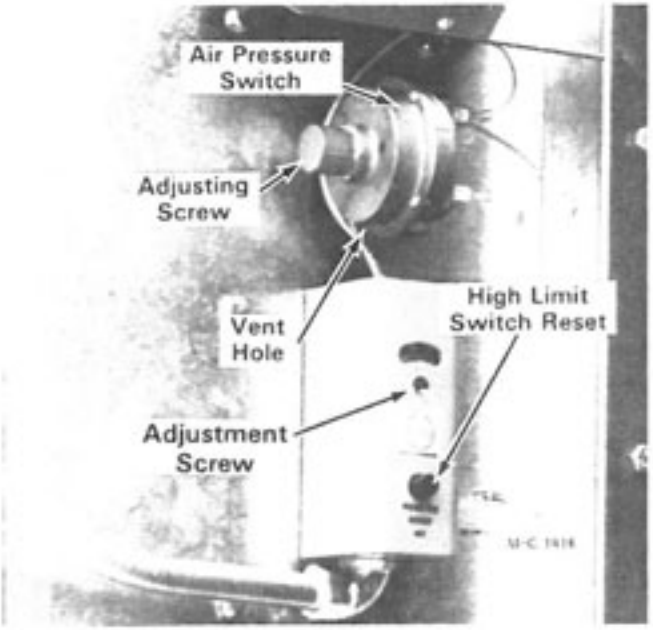


Figure 37

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 accidently 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 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 ⅛" vent hole in the bottom of the air pressure switch is open, see Figure 37.

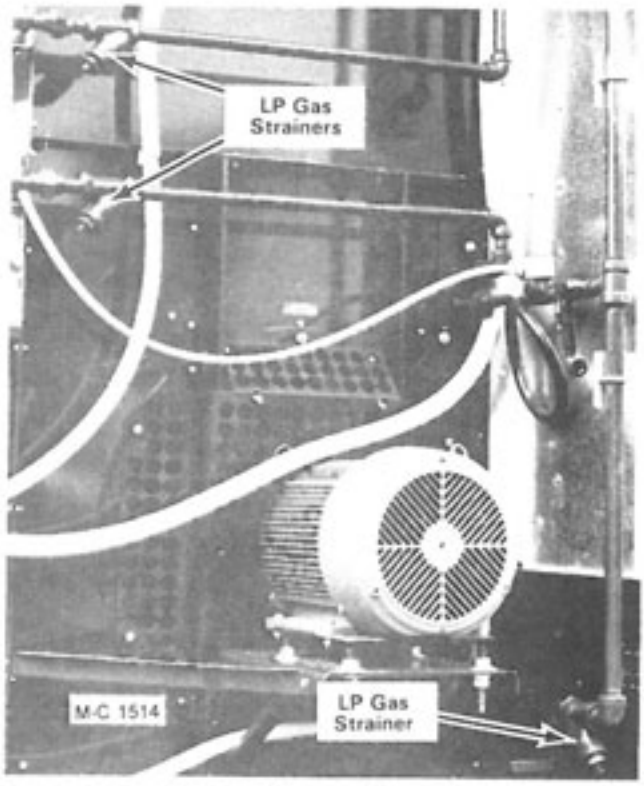


Figure 38

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. Flip the discharge metering roll toggle switch to the MANUAL position. The SCR drive motor will start and turn the SCR speed control to change speed.
6. Check the SCR motor speed, it should be 5 to 6 DC volts. Turn the SCR speed control to ten (10) and check the SCR motor speed, it should be 85 DC volts. If motor speed is not correct, see "Troubleshooting Discharge System" on page 34.

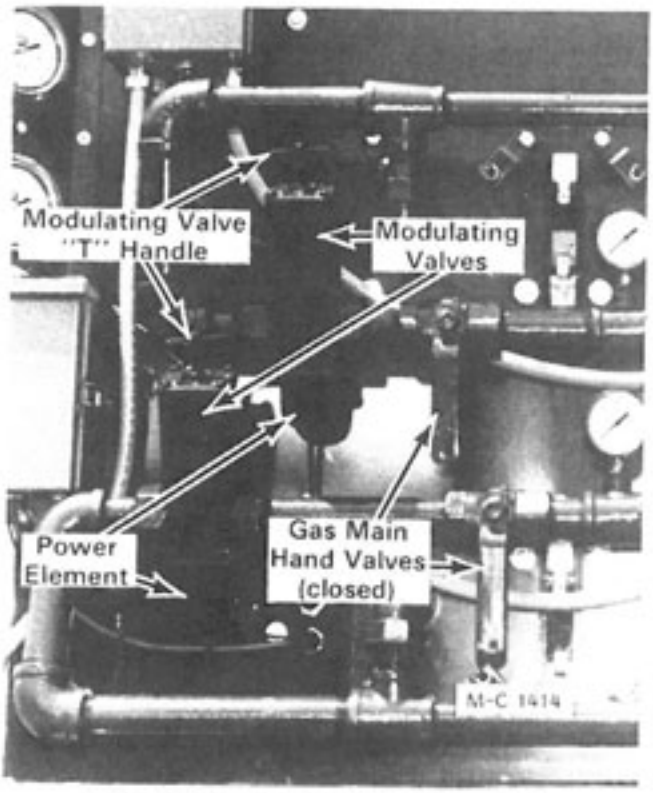


Figure 39 – Two Burner Controls

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 balance the lights.
8. Flip the discharge metering roll switch to AUTOMATIC. The SCR drive motor will run at the speed selected in step 7.
9. Turn the moisture control balance up until (-) light goes on. The SCR motor speed will decrease.
10. Turn the moisture control balance down until the (+) light goes on. The SCR motor will increase.

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.

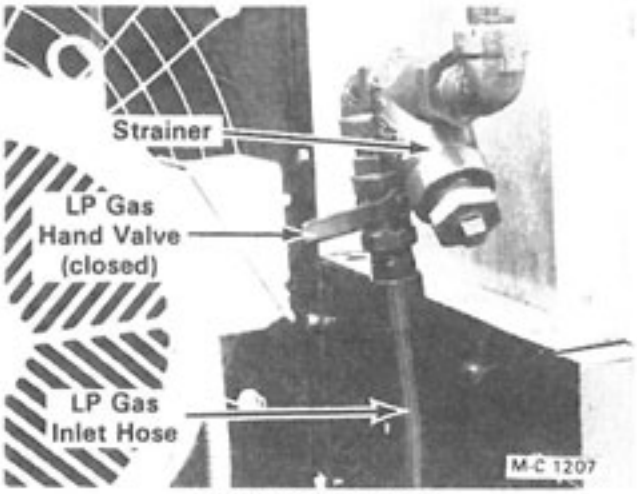


Figure 40 - LP Gas

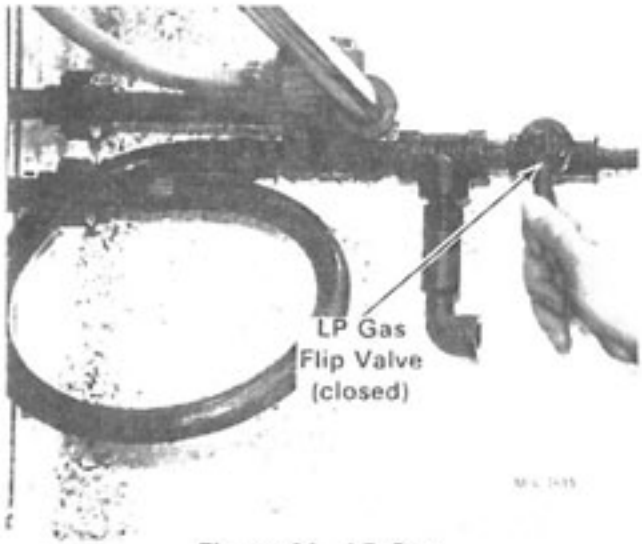


Figure 41 - LP Gas

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. Close all hand valves, Figure 39.

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.

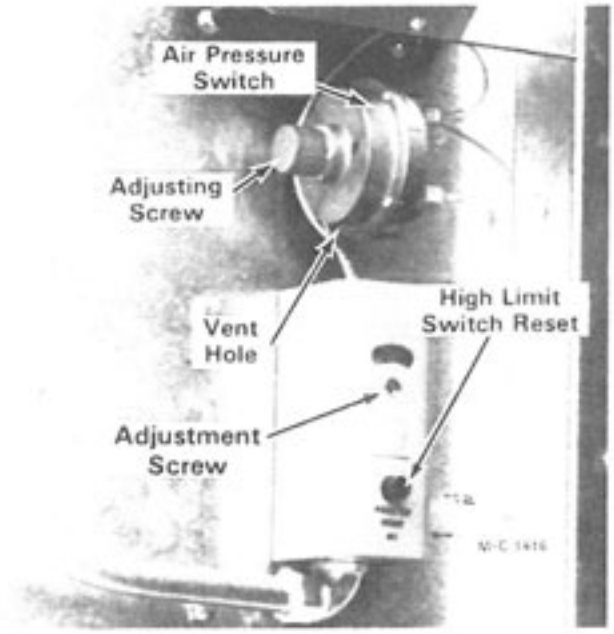


Figure 42

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 ¼ 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.

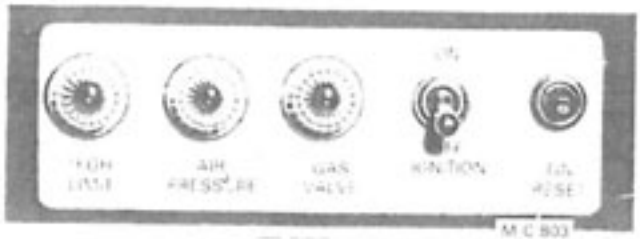


Figure 43

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.

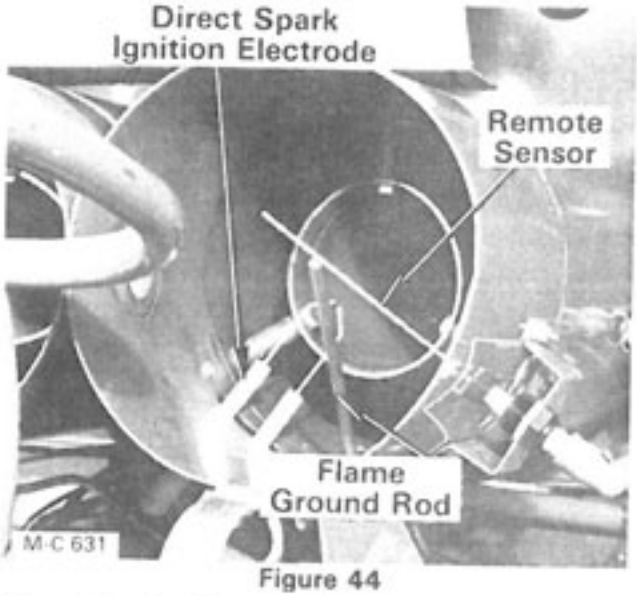


Figure 44

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".

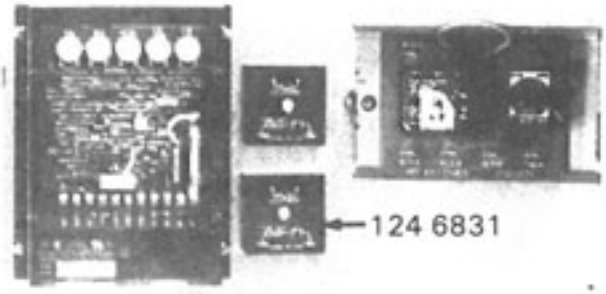
The ignition board is electronically timed so that when the ignition switch is flipped ON, the electrode will continue to spark and the gas solenoid valves will be held open for a "trial ignition" period (about 5 seconds) — after the 10 second delay.

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



124 6831 10 Second Ignition Timer

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.

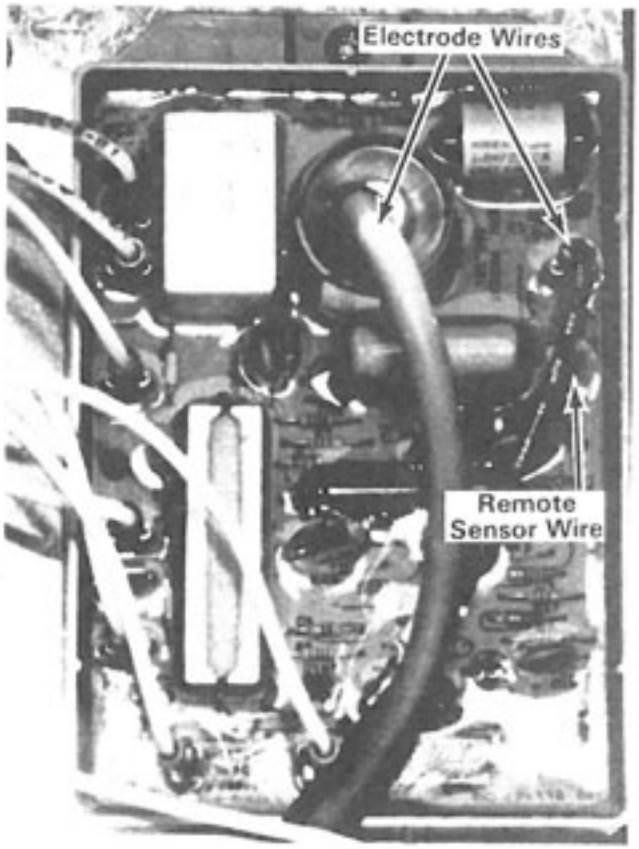


Figure 46 - Ignition Boards

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 and 47.
    B. Using a new properly gapped electrode (⅛ inch) or an automotive spark plug gapped

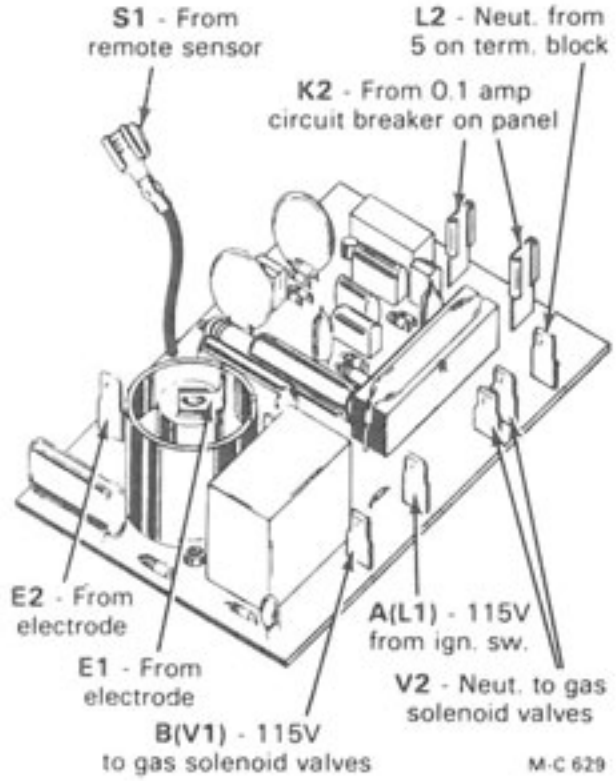


Figure 47 - Ignition Board

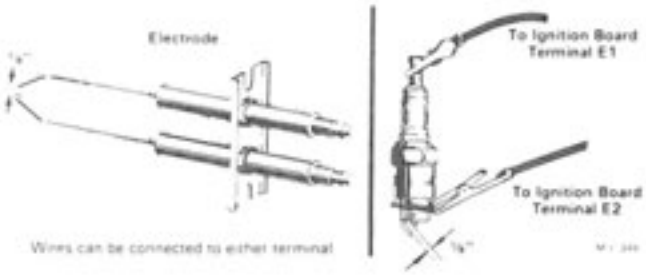


Figure 48

to (⅛ 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 ⅛ 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 49 and 50, then open it 1½ to 2 turns. See note.

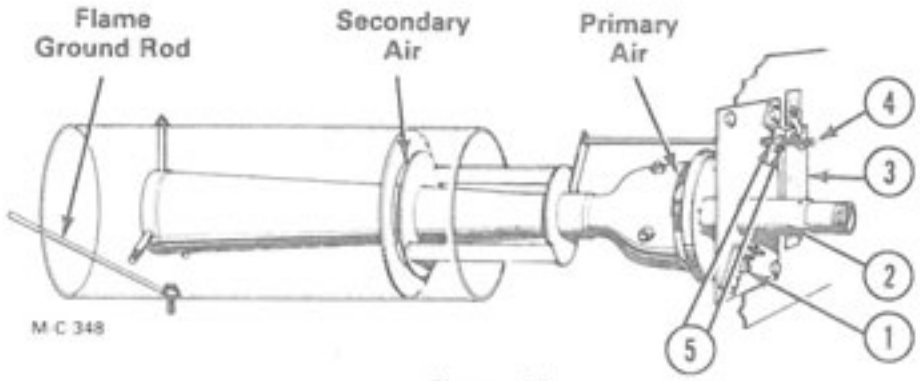


Figure 49

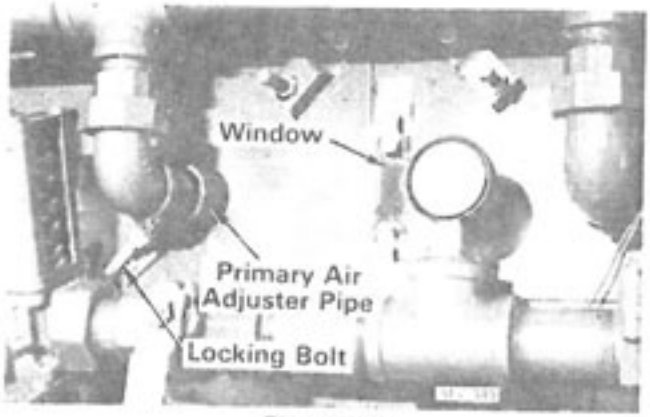


Figure 50

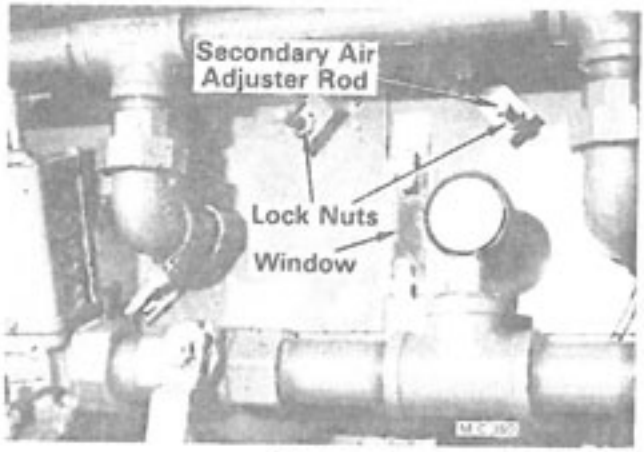


Figure 5 1

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.

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 49 and 51, then pull the adjustment rod out approximately ⅛ inch.

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

Primary Air
(See Figure 49 and 50)

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.

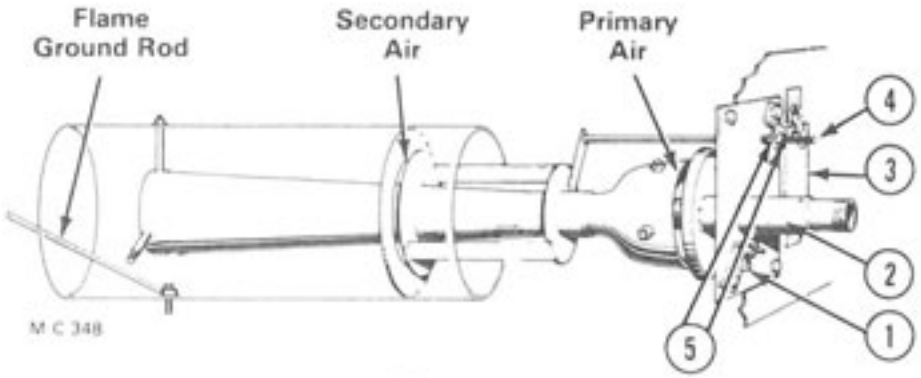


Figure 52

Secondary Air
(See Figure 52 and 53)

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 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.

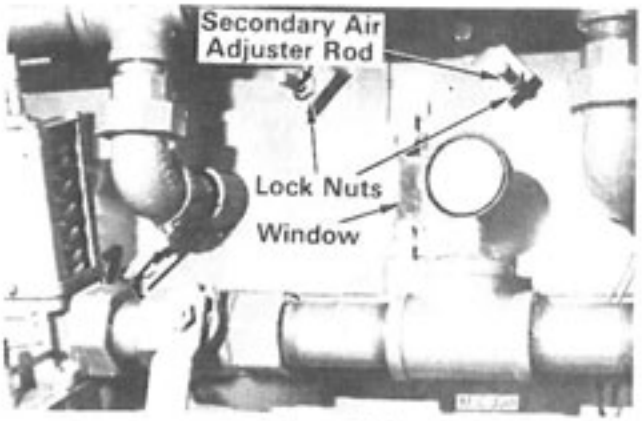


Figure 53

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 54 and 55.

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 54 and 55. Connect a voltmeter between terminal **V2** and **B (V1)** on the ignition board.

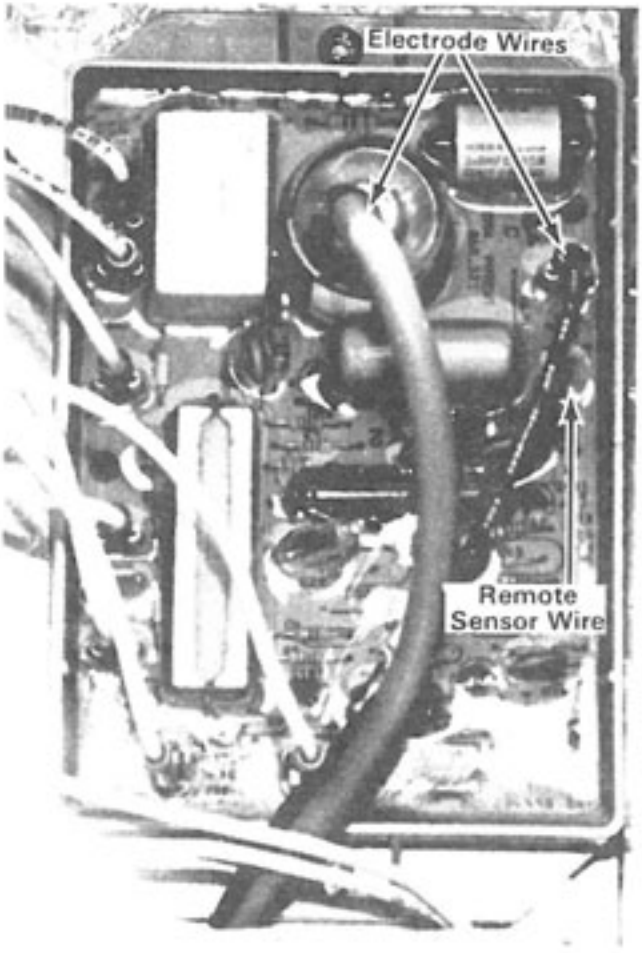


Figure 54 - Ignition Boards

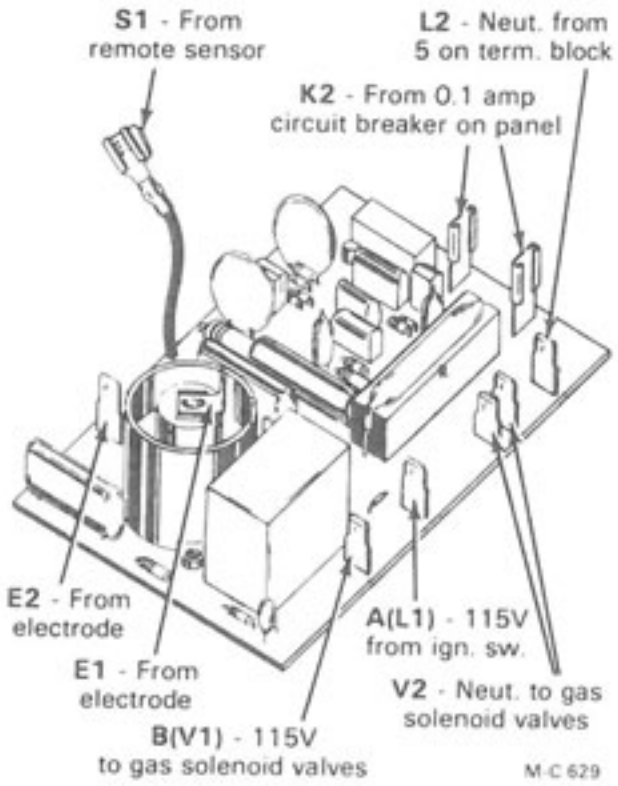


Figure 55 - Ignition Board

9. Flip the ignition switch OFF then ON. After the 10 second delay the voltmenter 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.

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.

Figure 41 - Approximate Trim Pot Settings

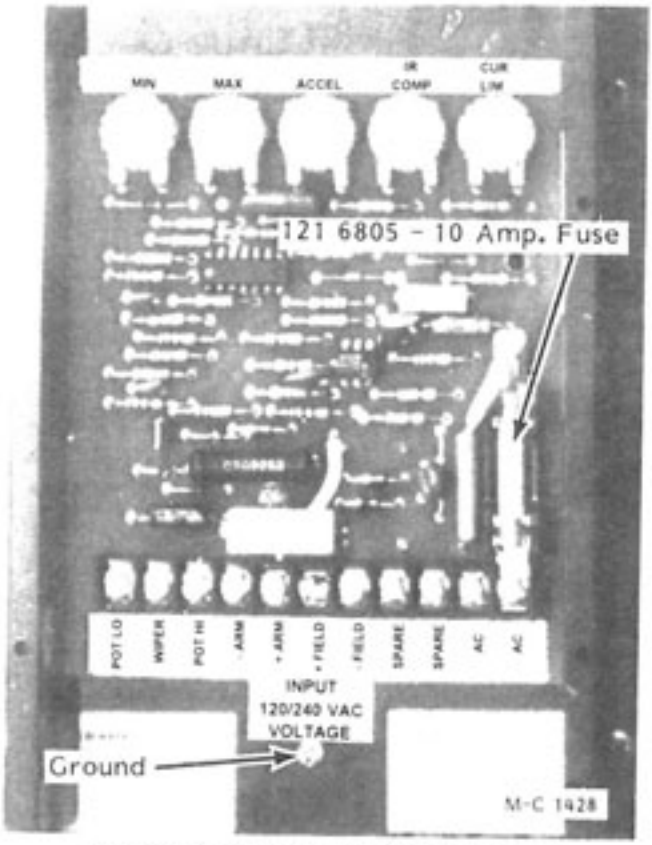


Figure 56 - SCR Drive Control Board Approximate Trim Pot Settings

Description

The metering rolls are driven by a 1/3HP variable speed permanent magnet DC motor and reduction gearbox.

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 (Figure 56) 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-Matic® controls the SCR board as explained on page 14.

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.

WIPER - Connects to (+) of Moisture-Matic® board.

POT HI - Connects to high side (black wire) of speed control. 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 - Connects to (-) of Moisture-Matic® board.

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 56 shows approximate trim pot settings. Follow adjustment procedure below for final calibration.

Trim Pot	Function	Adjustment
MIN.	**(Up to and including S/N 56051)** Sets Minimum Motor Speed when Speed Control is set at zero. CW rotation will increase minimum motor speed.	1. TURN DRIVE POWER OFF! 2. Connect DC Voltmeter + to + ARM, - to - ARM. 3. Set meter voltage range: (90 VDC). 4. Turn power ON. 5. Set SPEED CONTROL to zero (Fully CCW). 6. Rotate MIN Pot CW until desired MIN speed is reached (7.5 volts DC or 100 RPM). Min Pot now located on Moisture-Matic Board.
MIN.	**(Starting with S/N 56052)** The Dart SCR Board minimum speed trim pot is non-functional. The minimum speed is now fixed by the M-C Moisture Control Board for both the auto and manual mode.	None.
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.	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 (70 volts DC). **NOTE:** A tachometer or strobe may be used in lieu of a meter. Follow above steps, except adjust MAX pot to rated motor speed (1750 RPM).
ACCEL	Allows Adjustment of Acceleration	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.	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. NOTE: For more precise calibration, a tachometer or strobe may be substituted for the above.
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).	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 nameplate 4.4 amps (3.5 amps x 125%) by adjusting the CUR LIM pot. Remove ammeter after calibration.

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.	1. Discharge auger not running.	1. Start discharge auger.
	2. SCR 8 amp. circuit breaker tripped.	2. Reset.
	3. Defective or dirty discharge relay.	3. Clean or replace if necessary.
	4. Loose wire or defective switch(es).	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.	1. SCR board 10 amp. fuse blown.	1. Replace.
	2. Minimum motor speed set incorrectly.	2. See "Trim Pot Adjustment" on page 33
	3. Defective speed control.	3. Replace.
	4. Defective SCR board.	4. Replace.
C. Have 115 volt AC input between "AC Line" terminals and output of 6 to 70 volts DC between "Arm + and Arm -" terminals.	1. Overload condition.	1. Check metering rolls and gear box for binding.
	2. Current limit set incorrectly.	2. See "Trim Pot Adjustment" on page 33.
	3. Maximum motor speed set incorrectly.	3. See "Trim Pot Adjustment" on page 33.
	4. Worn or improperly seated motor brushes.	4. Replace or adjust.
	5. Moisture or dirt accumulation in motor.	5. Disassemble and dry or clean.
	6. Defective motor.	6. Replace.

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

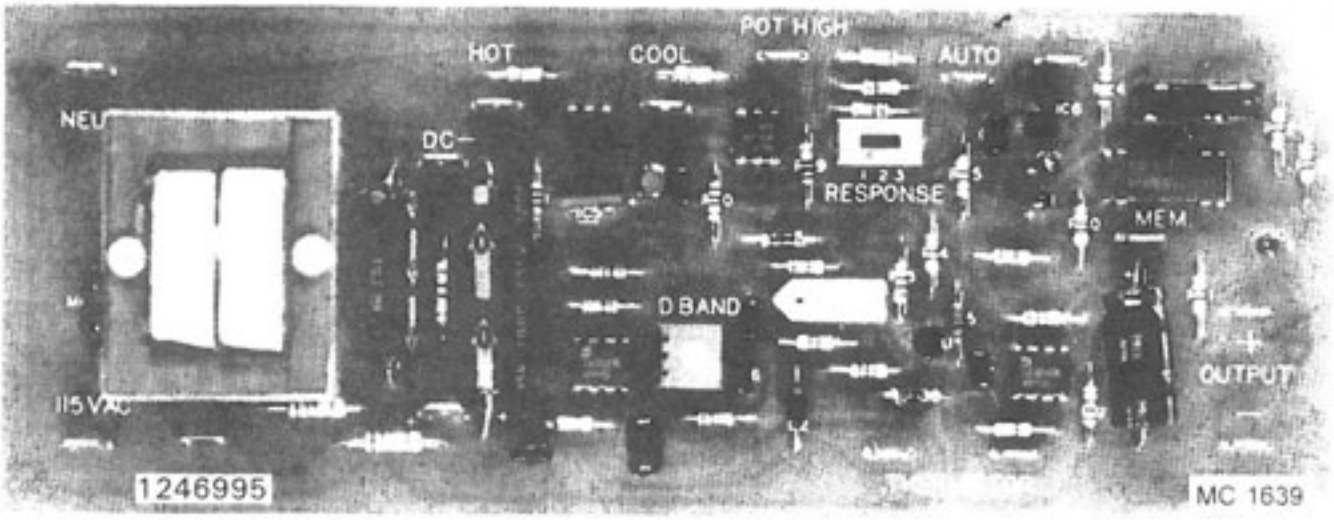
Note: Operation of the moisture control is explained on page 14.

Problem	Possible Cause	Remedy
A. Motor operates normally when metering roll switch is in the MANUAL position, but not in the AUTOMATIC position.	1. Moisture control set too high.	1. Adjust set point.
	2. Grain temperature not high enough to allow discharge.	2. Allow time.

Problem	Possible Cause	Remedy
	3. Wet grain slug covering temperature probe.	3. Operate in MANUAL for several minutes to clear area.
	4. Loose wire or defective switch(es).	4. Trace power flow. See discharge circuit schematic at back of this manual.
	5. Defective Moisture Control System.	5. Replace.

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.	1. Trace power flow. See discharge circuit schematic at back of this manual.
	2. Defective speed control potentiometer.	2. Replace potentiometer.
	3. Motor is at current limit.	3. See "Trim Pot Adjustment" on page 33.
	4. Too much "IR" compensation.	4. See "Trim Pot Adjustment" on page 33.
B. Speed control does not regulate motor speed.	1. Loose connection from speed control potentiometer.	1. Trace power flow. See discharge circuit schematic at back of this manual.
	2. Defective speed control potentiometer.	2. Replace.
	3. Minimum and maximum speed set incorrectly.	3. See "Trim Pot Adjustment" on page 33.
	4. Defective SCR board.	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.	1. Check - should be above 110 volts AC.
	2. Current limit set too high.	2. See "Trim Pot Adjustment" on page 33.
	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.



M-C MOISTURE CONTROL SYSTEM

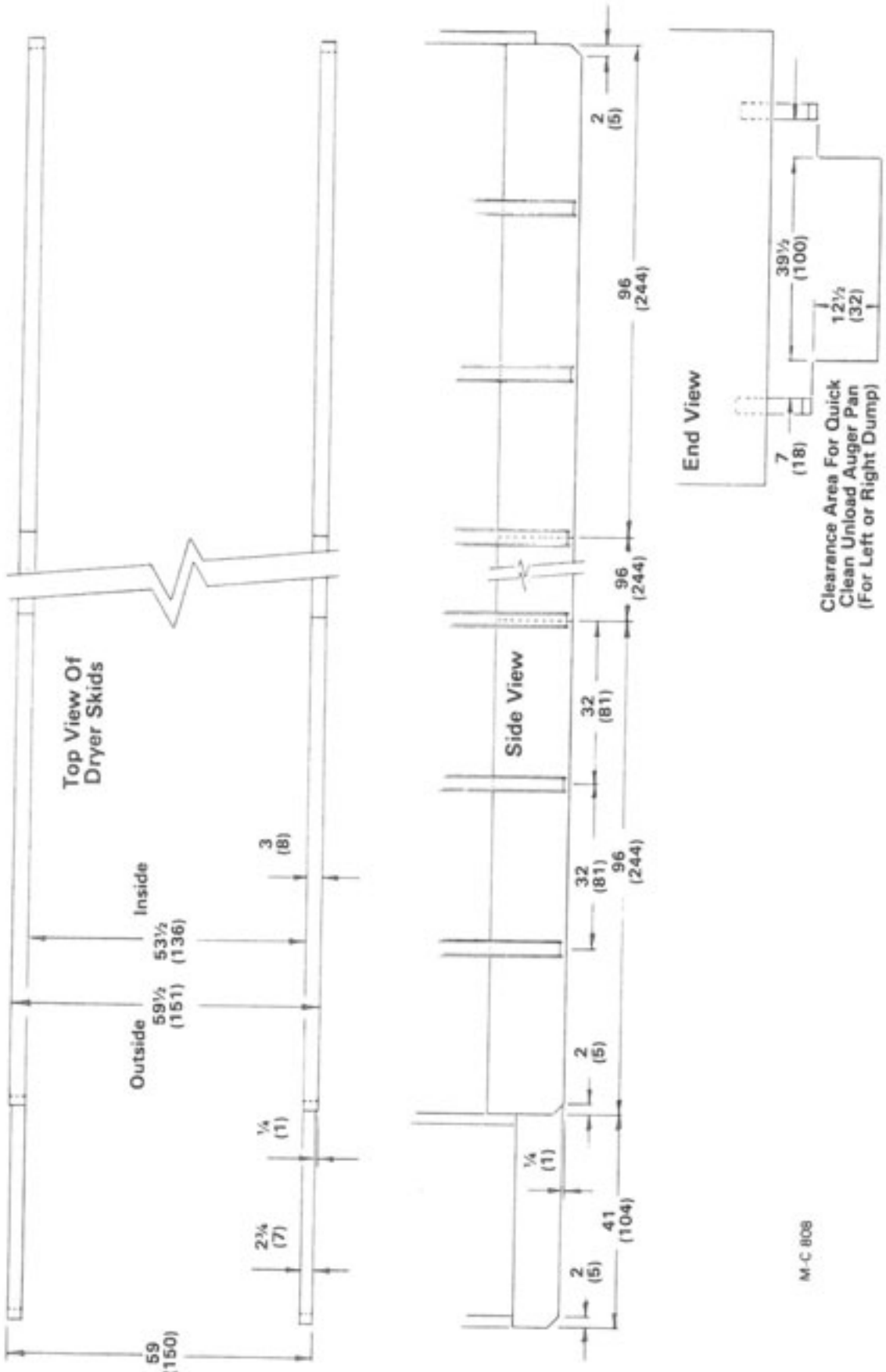
Problem	Corrective Action
A. Plus (+) and minus (-) lights will not go off when calibrating Moisture Control System.	1. Adjust the deadband trip pot on Moisture Control System board (R-7) until both lights stay off when turning moisture control dial two spaces on the scale.
B. Metering rolls will not run.	1. Discharge auger starter interlock bad. 2. Discharge auger not started. 3. Moisture Control System amp fuse is blown. 4. Moisture Control System board inoperative. Check output voltage at (+) and (-) terminals on Moisture Control System board. Voltage should be approximately 3 to 11 volts DC depending on the SCR speed control potentiometer setting in manual or moisture control setting in automatic. If no voltage, consult factory.
C. Moisture Control System does not control grain moisture.	1. Moisture Control System MANUAL OFF-AUTO switch not in AUTO position. 2. Bad thermistor. Check response with ohmmeter. Thermistor Temp. — Thermistor Resistance 30°F — 29,000 OHMS 40°F — 23,000 " 50°F — 18,000 " 60°F — 14,500 " 70°F — 11,000 " 110°F — 5,200 " 120°F — 4,200 " 130°F — 3,600 " 140°F — 3,000 " 150°F — 2,500 " 160°F — 2,100 " 3. Bad Moisture Control System board. 4. Bad moisture control potentiometer. Check potentiometer with ohmmeter. 5. Burner temperature not holding steady.

Electrical and Gas Piping Entrance

(All Dimensions Are In Inches (Centimeters)

Dryer Base Dimensions

(All Dimensions Are In Inches (Centimeters)



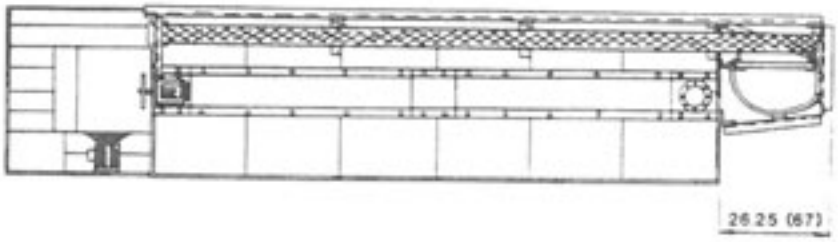
Model 675 thru 1195 Centrifugal Fan Grain Dryer Dimensions

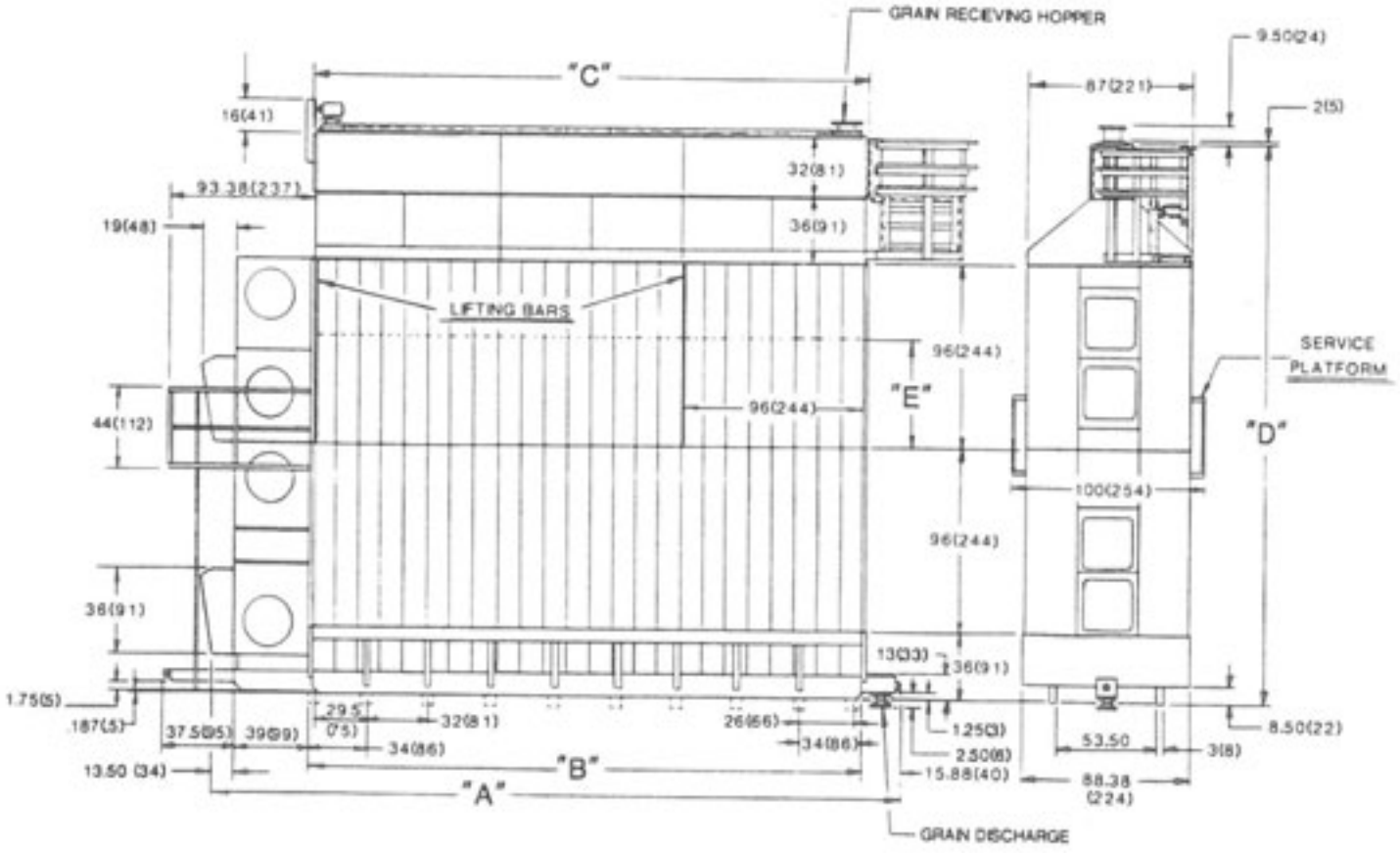
All Dimensions Are In Inches (Centimeters)

NOTE: Width of grain dryer with Optional Heat Recovery System is: Model 675 and 975 - 135" (342cm.). All other models - 170" (432cm.)

The Grain Receiving Hopper Tube Ring is 10" (25.4cm.) I.D. - 12.5" (31.75cm.) O.D.
The Grain Unload Auger Discharge Ring is 10" (25.4cm.) I.D. - 12.5" (31.75cm.) O.D.

Model	A	B	C	D	E
675	264 ⅜ (672)	196 (498)	194 ¼ (494)	200 (508)	---
975	360 ⅜ (915)	292 (742)	290 ¼ (737)	200 (508)	---
1075	360 ⅜ (915)	292 (742)	290 ¼ (737)	260 (660)	60 (152)
1175	360 ⅜ (915)	292 (742)	290 ¼ (737)	296 (752)	---
1195	360 ⅜ (915)	292 (742)	290 ¼ (737)	392 (996)	---





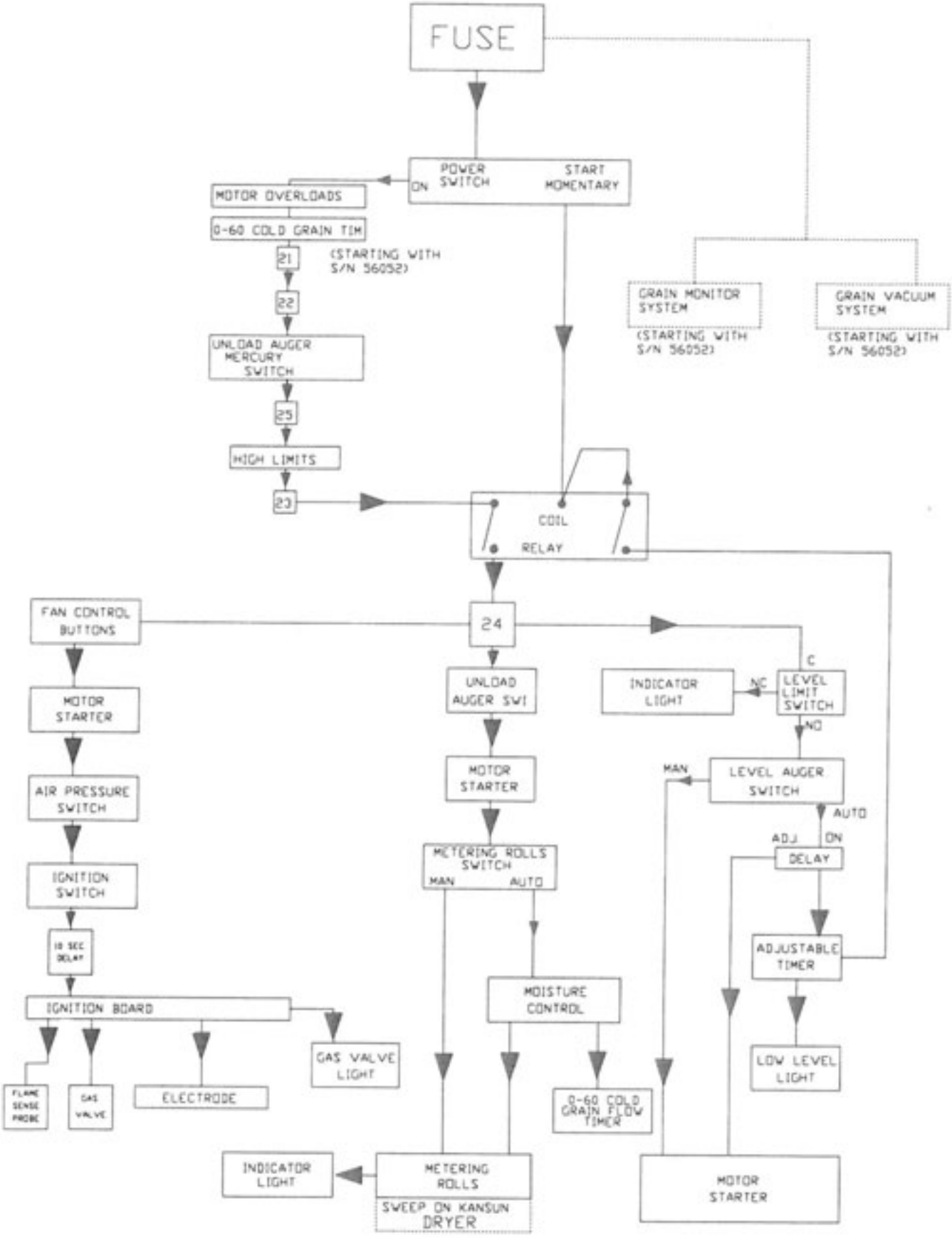
Electrical Components

Starting with S/N 55242 -

Part No.	Description
120 6800	Unload Switch
121 6849	Air Pressure Switch
124 6934	High Limit Switch
121 6925	115V Ignition Board (Incl. Ref. 8)
123 6887	Differential Air Pressure Switch (Canadian Dryers Only)
Terminal Block	
124 6928	12 Position
124 6929	3 Position
128 6995	Electrode
122 6814	Ignition Reset (0.1 Amp.)
115V LP Gas Solenoid Valves	
125 7082	½" Solenoid Valve in LP Liquid Line (All USA & Canadian 370 thru 1195)
121 7002	¾" Solenoid Valve in Gas Manifold (All USA & Canadian 370 & 665, & Canadian 675 thru 3175)
128 7001	1¼" Solenoid Valve in Gas Manifold (All USA & Canadian 670, 690 & 970, & USA 675 thru 3175)
115V Natural Gas Solenoid Valves	
128 7001	1¼" Solenoid Valve in Gas Manifold (All USA & Canadian 370 thru 3175)
128 6967	10 Amp. Fuse (NON-10)
128 6851	Fuse Holder
128 6845	Stop Button (Red)
128 6844	Start Button (Green)
124 6848	8 Amp. Circuit Breaker (SCR Drive)
121 6808	125V Indicator Lamp Ass'y
122 6810	125V Indicator Lamp
122 6800	Indicator Lamp Lens (Clear)
121 6815	SPST ON-OFF Toggle Switch

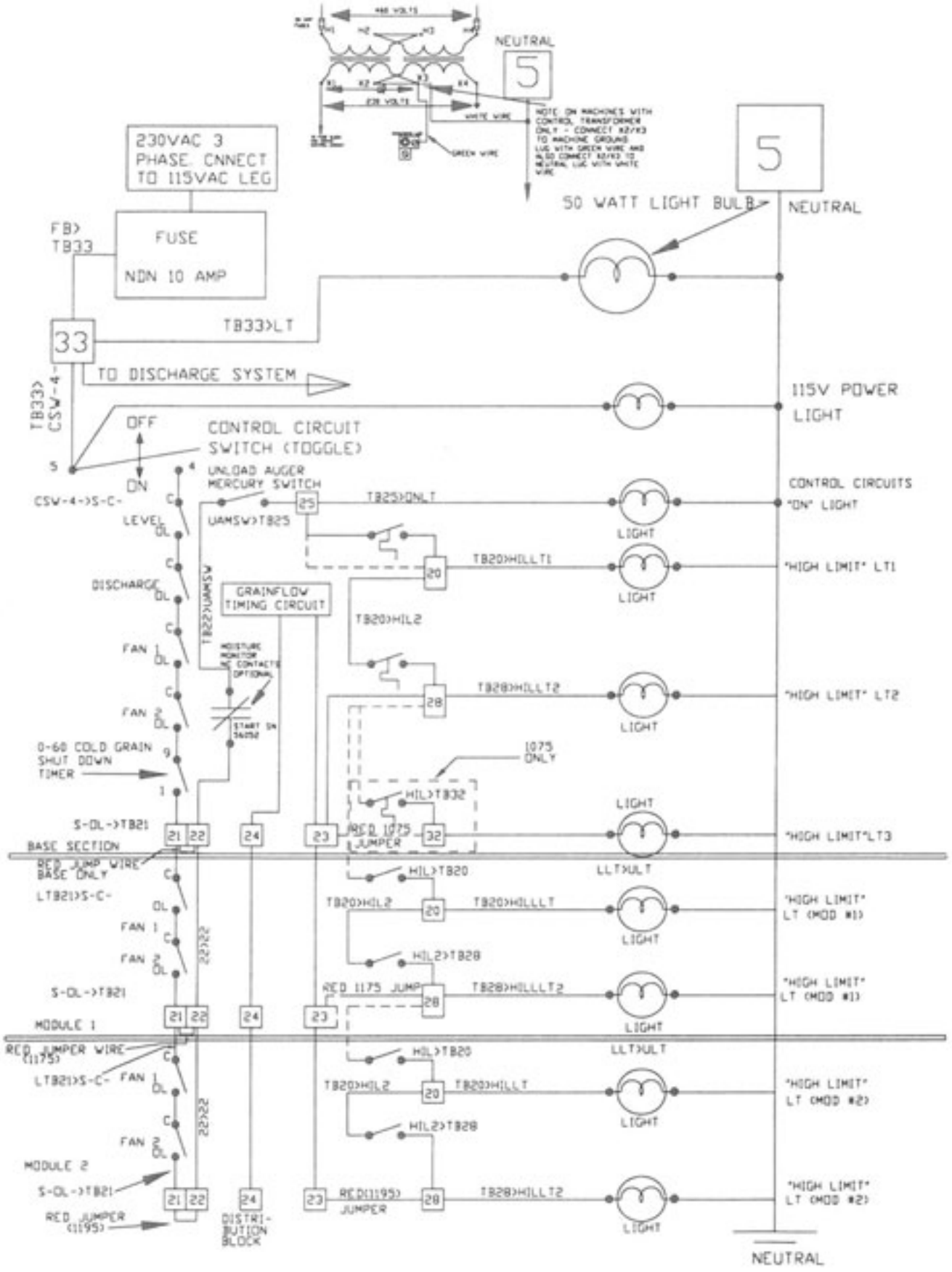
Part No.	Description
120 6827	Momentary Contact Toggle Switch
121 6807	DPDT ON-OFF-ON Toggle Switch
124 6890	.1 to 8 Minute Adj. Timer
124 6831	10 Second Timer
124 6841	Light Bulb Socket
124 6842	50W Rough Service Bulb
124 6972	Relay and Timer Socket
021 6809	Relay
127 6823	Neutral Lug
124 6978	60 Minute Adjustable Timer
124 6874	SCR Board (Dart)
124 6837	⅓HP DC Motor
128 6957	Splitter Block
124 6872	Flame Sensing Probe
128 6992	Level Switch (Inside Mt.)
121 6956	Linear Limit Control (138")
128 6850	Linear Limit Control (92")
123 6854	Light Fixture Cpt.
123 6898	Red Glass Globe
125 6823	100W Rough Service Bulb
123 6868	Horn (Alarm Buzzer)
- - - - - - -	Magnetic Starters (See Magnetic Starters Table)
127 6855	Transformer-208V (750VA)
127 6829	Transformer-230/460/575V (750VA)
124 1089	10 Turn Potentiometer w/Wire
124 6892	Multi-Dial
124 6893	Thermistor
124 6939	Potentiometer
121 6805	10 Amp. GLH Fuse
123 7027	Manual Reset Shut-Off Valve (1") 675-3175 LP Gas
123 7028	Manual Reset Shut-Off Valve (2") 675-1195 Nat. Gas
128 7004	Canadian Low Pressure Interlock
124 6957	Moisture-Matic® Board
124 6981	Discharge Meter
124 6938	Fuse Holder
124 6937	1 Amp. Fuse

NOTES

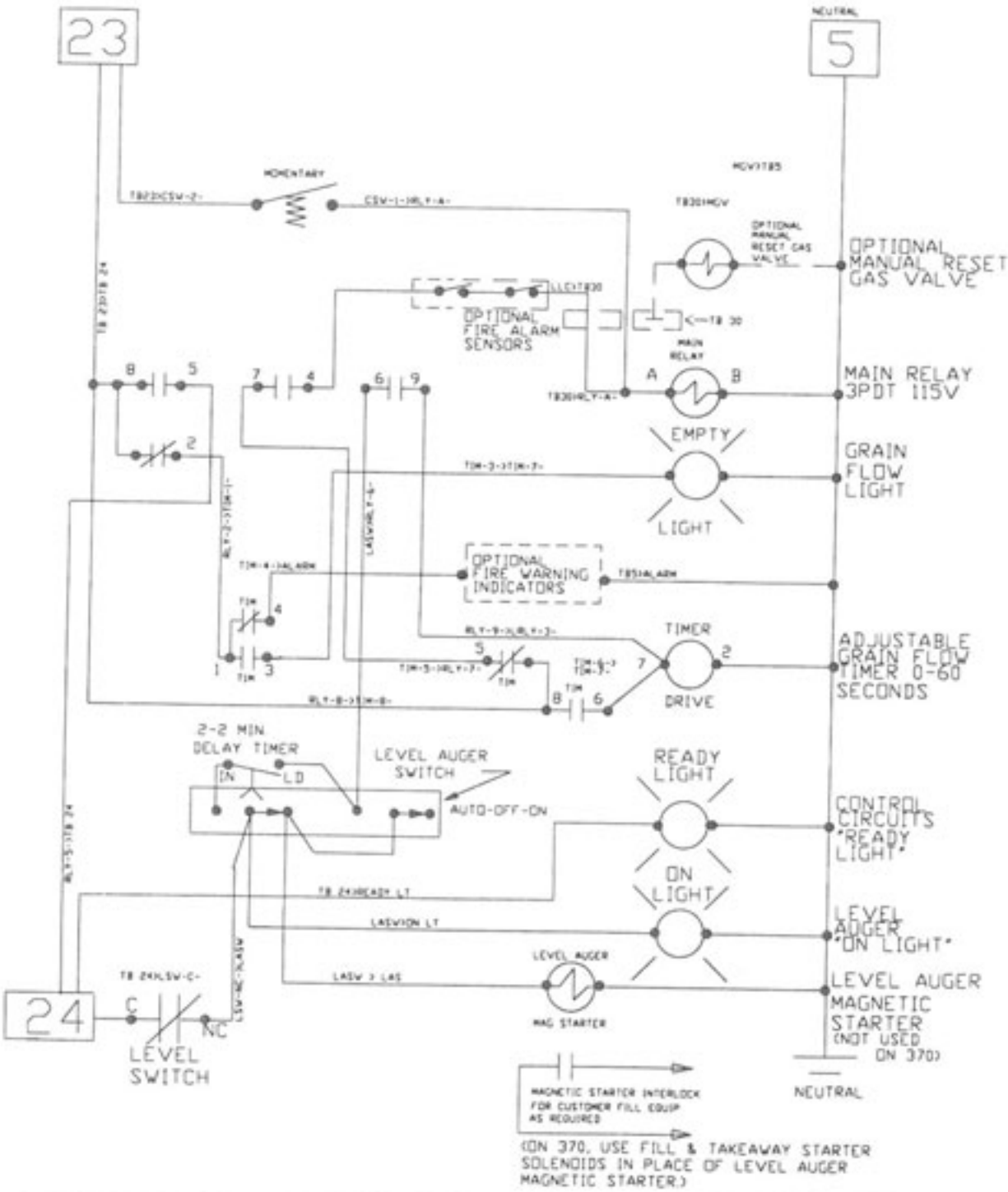


FLOW CHART

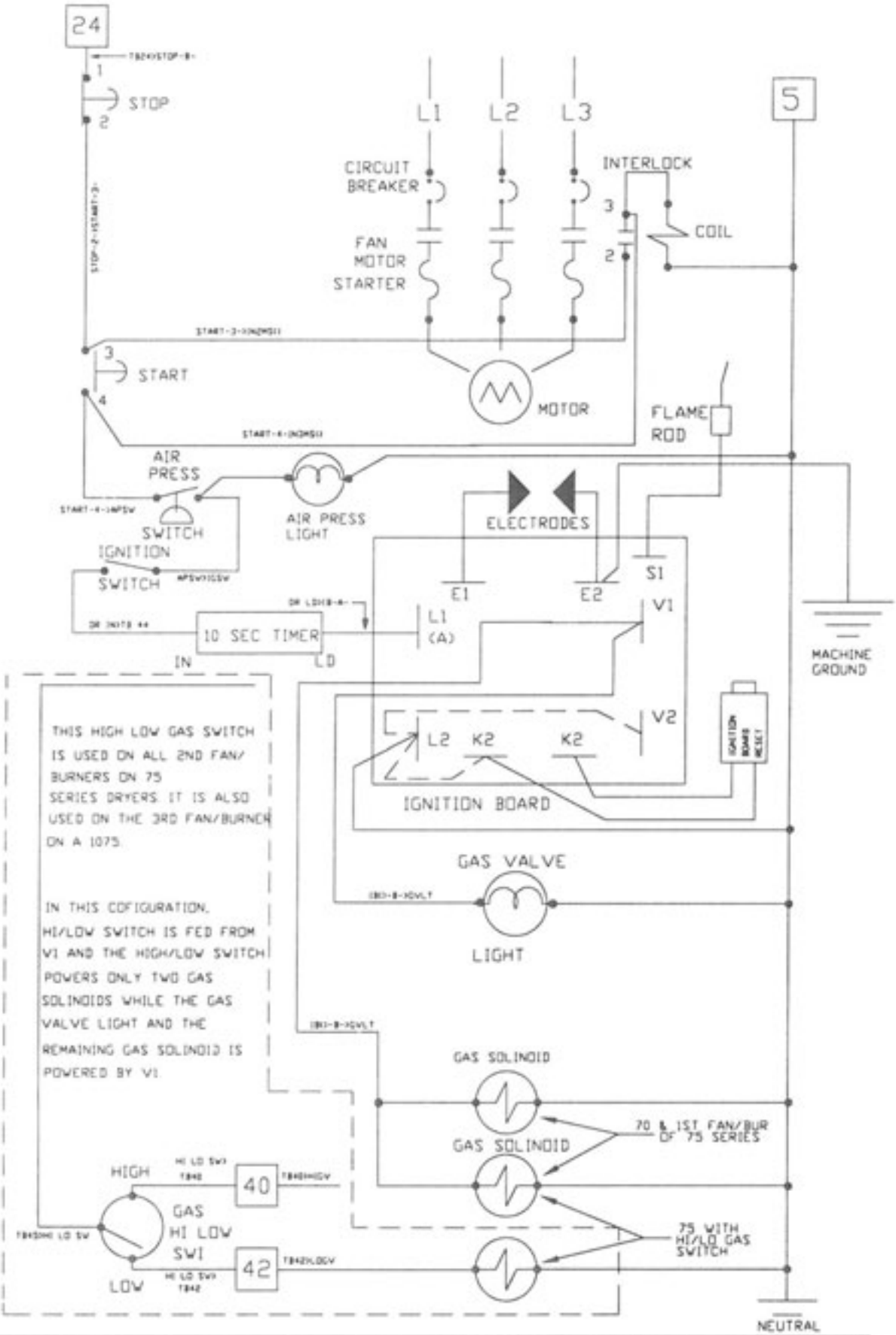
MC 70 & 75 SERIES	START S/N 55467	
1615000, 01,04,05,08,09, 12,14,&16.	REVISED 8/18/98	P.1



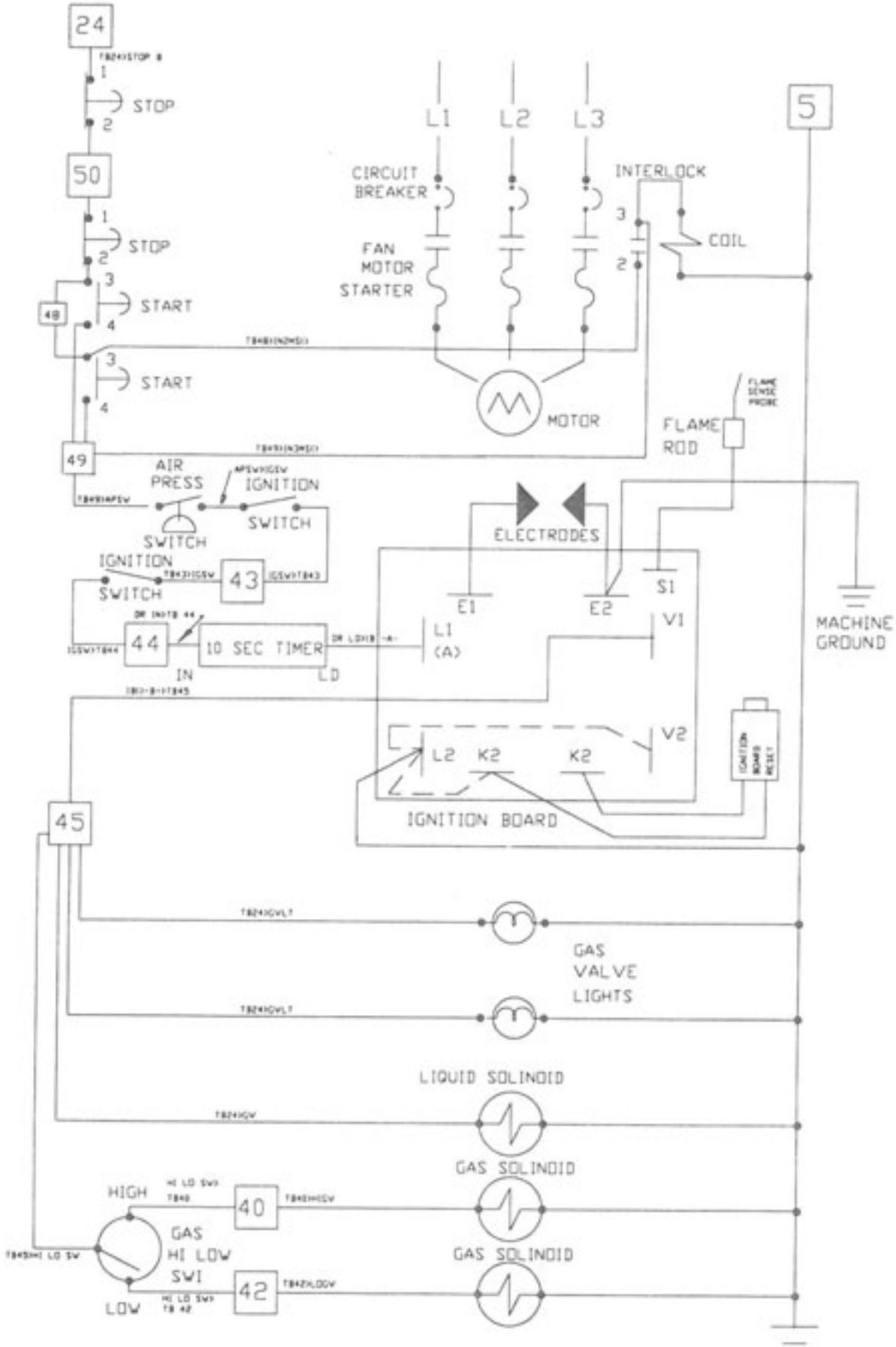
PRIMARY SAFETY CIRCUIT 70 & 75 SERIES	HC 70 & 75 SERIES DRYERS	START S/N 55467	
	1615000,1615001, 1615004,1615005	2/25/97 REV9/1/98	P. 2



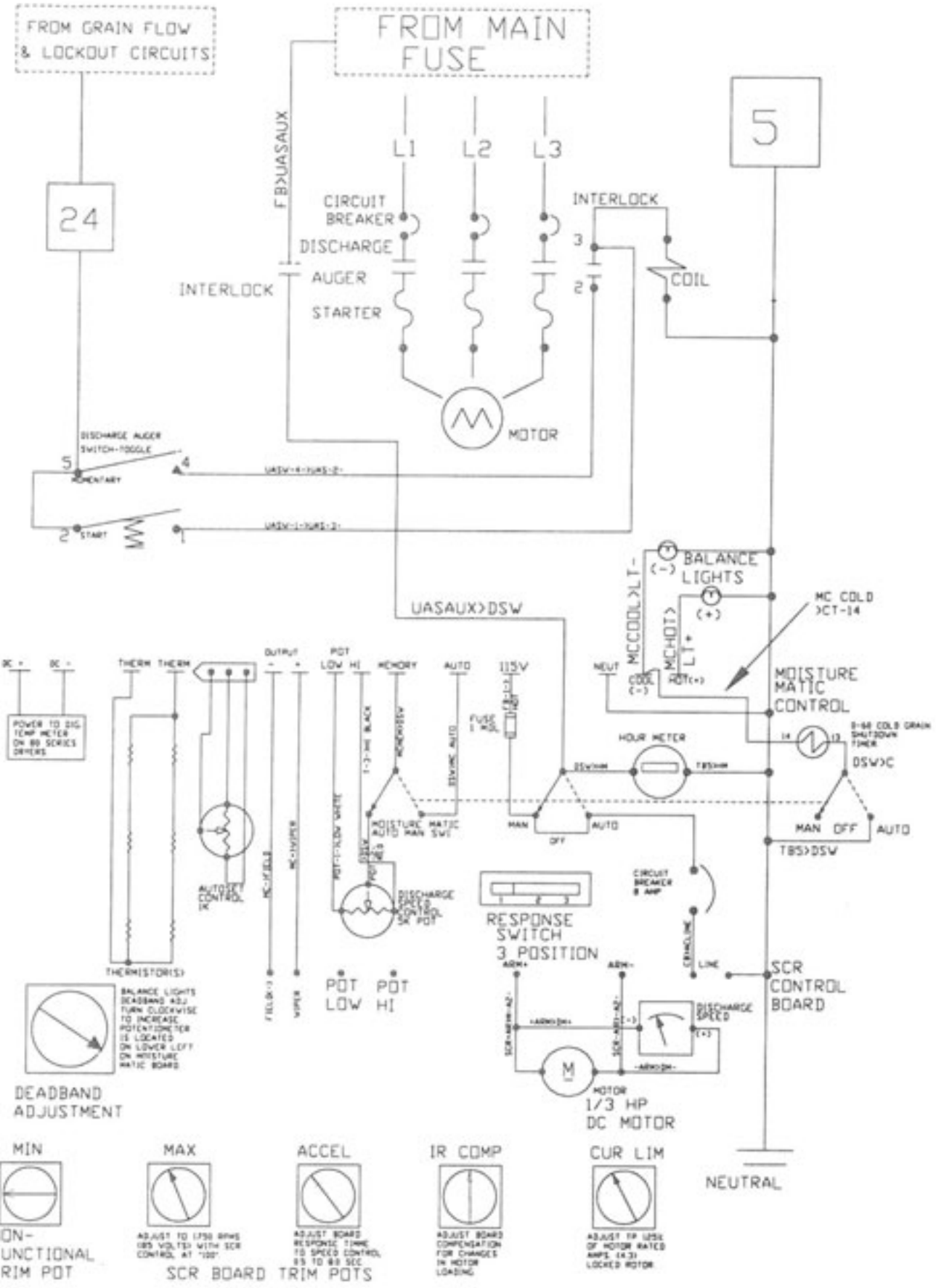
GRAIN FLOW TIMING & SYSTEM LOCKOUT CIRCUITS	MC 70 & 75 SERIES	START S/N 55467	
	P/N 1615000, 1615001 1615004,1615005	REVISED 9/1/98	P. 3



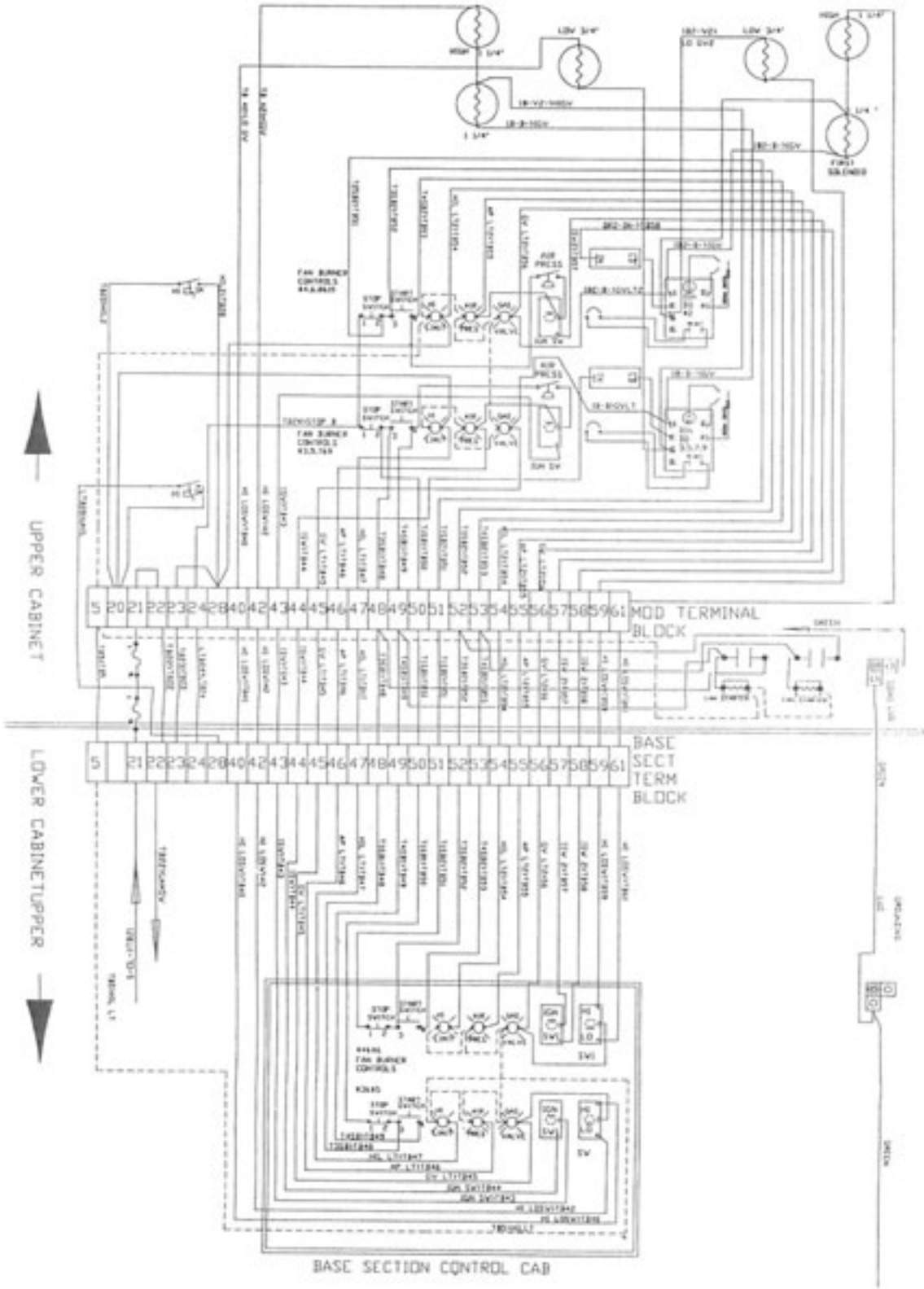
70 &75 SERIES DRYER BASE & 1075 3RD FAN/BURNER	MC 70 & 75 SERIES	START S/N 55467	
	1615000, 1615004	REVISED 8/8/98	P. 4



FAN/BURNER MOD SECTIONS 1175 & 1195	MC 75 SERIES	START S/N 55467	
	P/N 1615004	7/15/97 REV 5/22/98	P.4

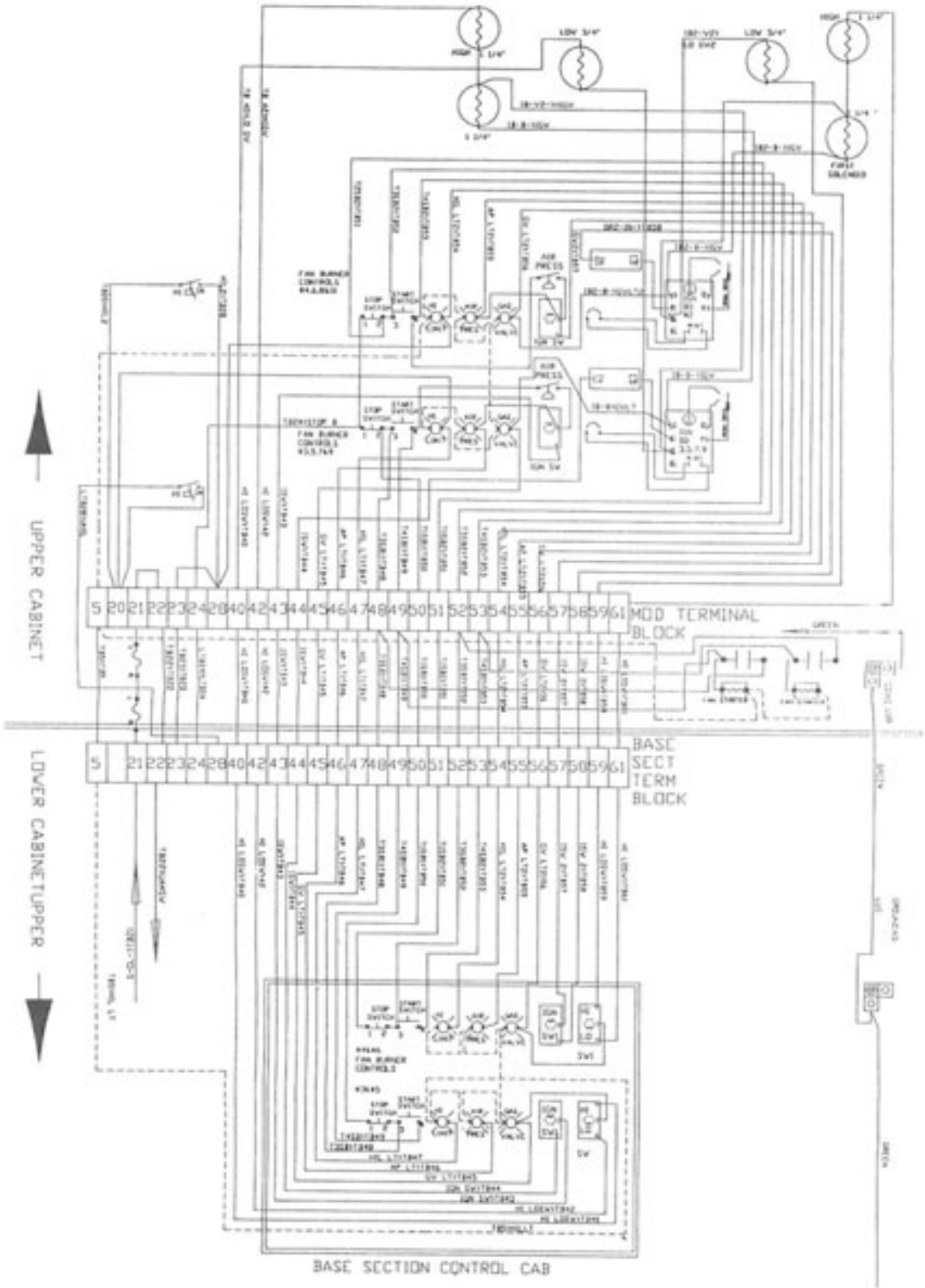


MC MOISTURE CONTROL DISCHARGE SYSTEM	70,75,&80 SERIES DRYERS	START S/N 56052	
	1615000,1615001 1615004,1615005 1615008,1615009	REVISED 5/98	P.5



TYP MODULE "75" SERIES	RD-1000	FOLDER8	
	P/N	75TYPMOD	P.

There are (20) wires placed in a 1" (2.54cm.) gray flexible conduit coming from the Base Section Control Cabinet to be attached to the bottom of each Module Control Cabinet. These wires are to control the burners and fans of each module from the Base Section Control Cabinet and are connected to terminal blocks 40 through 61 of each Module. There are also (7) wires in a 1/2" (12.7mm.) gray flexible conduit attached to the side of each Module Control Cabinet that have to be connected to terminal blocks 5, 21, 22, 23, 24 & 28 mounted on the inside right hand (viewed from rear) cabinet door of Module #1 of an 1195EM or the same terminal blocks mounted on the component mounting board at the rear of the top portion of the Base Section Control Cabinet of an 1175EM. One of these wires is a green ground wire that must be placed into the ground lug that is in each control cabinet.



TYP MODULE "75" SERIES	RD-1000	FOLDER8	
	P/N	75TYPMOD	P.

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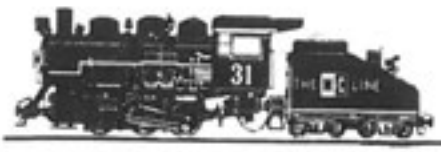

Iron Horse Quality

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