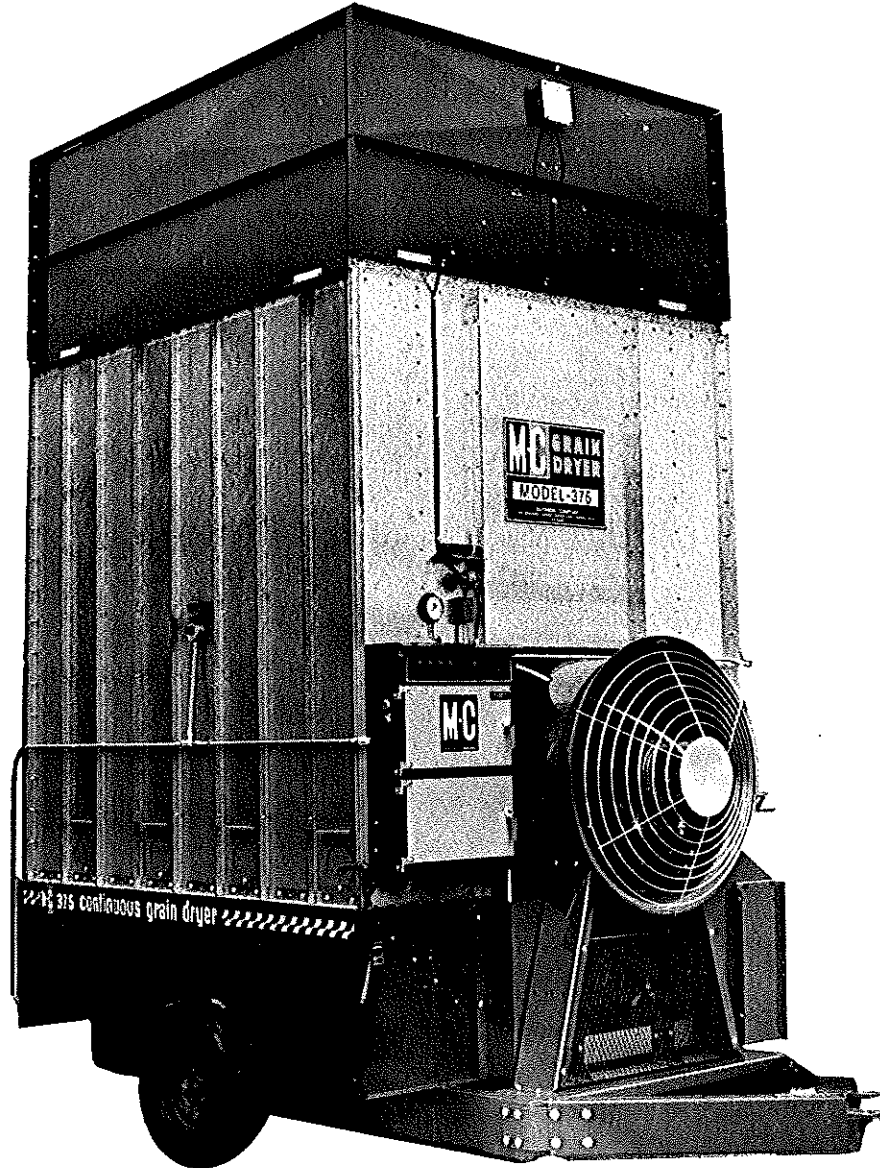


Model 375 Continuous Flow Grain Dryer



OPERATOR'S MANUAL

Form No. 261, January 1989

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815/459-2210 Telex: 72-2488

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NOTES

[Lined area for notes]

INTRODUCTION

To The Owner-Operator

This manual was prepared to provide owners and operators of M-C Model 375 Grain Dryers 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, and the ignition system and unloading system be tested each year prior to the dryer 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.

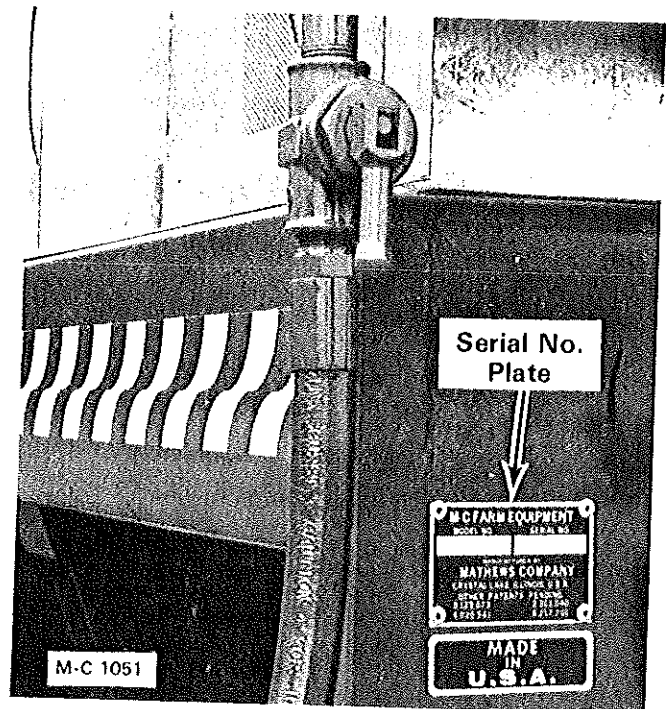


Figure A

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.

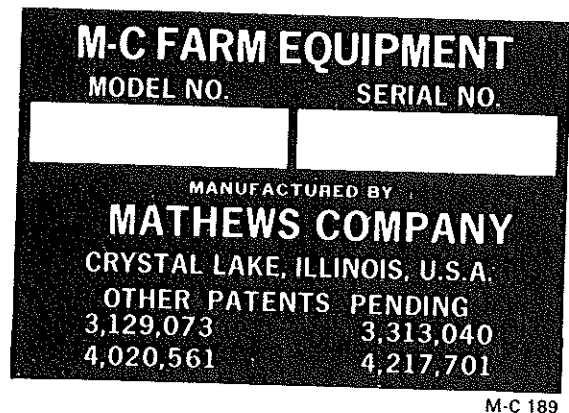


Figure B

Model and Serial Number Location




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

Capscrew Grade Identification

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

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

CAPSCREW GRADE IDENTIFICATION CHART

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

*The center marking identifies the capscrew manufacturer.

Metric (SI) Measurements

(English Units & Metric (SI) Equivalentents)

Area

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

Force

- 1 pound (force) = 4.45 newtons

Length

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

Mass

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

Power

- 1 horsepower = 0.7457 kilowatts

Pressure

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

Temperature

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

Torque

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

Velocity

- 1 mile per hour = 1.61 kilometers per hour

Volume

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

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

SET-UP INSTRUCTIONS

General

Check to make sure that all the parts and hardware listed on the packing list have been received. Make claims for any shortages immediately.

The fan end of the dryer is the FRONT. LEFT and RIGHT is determined by standing at the rear of the dryer and looking at the rear doors. LEFT and RIGHT of the control cabinet is determined by looking from the inside out through the control cabinet doors.

IMPORTANT: When setting up the dryer avoid dropping nuts, bolts or parts down the grain columns. If anything is accidentally dropped it must be removed before filling the dryer with grain.

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 Burning Appliances and Equipment, CAN1 B149.1 and B149.2 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."

Permanent Installation

The dryer must be installed on a level concrete foundation designed to carry the weight of the dryer when full of grain (approx. 20,000 lbs.). The foundation must be engineered locally for ground and weather conditions to prevent settling and frost upheaval.

IMPORTANT: The dryer must be a minimum of 12 inches above the ground to provide clearance to open the quick clean unload auger pan. If the dryer is set on concrete piers perpendicular to the dryer skids, they must be notched to provide the minimum 12 inch clearance. Refer to the dryer base dimension drawing at the back of this manual.

A dryer dimension drawing and an electrical and gas piping entrance drawing are at back of this manual.

A vibration damper (treated wood planks, flat belting, etc.) should be used between the skids and the top of the piers. Be sure to anchor the dryer base to the foundation.

Lift the dryer onto the piers with four slings - two on each side. Attach the slings to or around the skids just behind the fan housing and at the rear of the dryer. Use spreader bars across the top to avoid damage when lifting. Empty weight is approx. 5000 lbs.

NOTE: The top of each pier must be level. If they are not, shim between the top of the pier and the vibration damper.

Portable or Temporary Installation

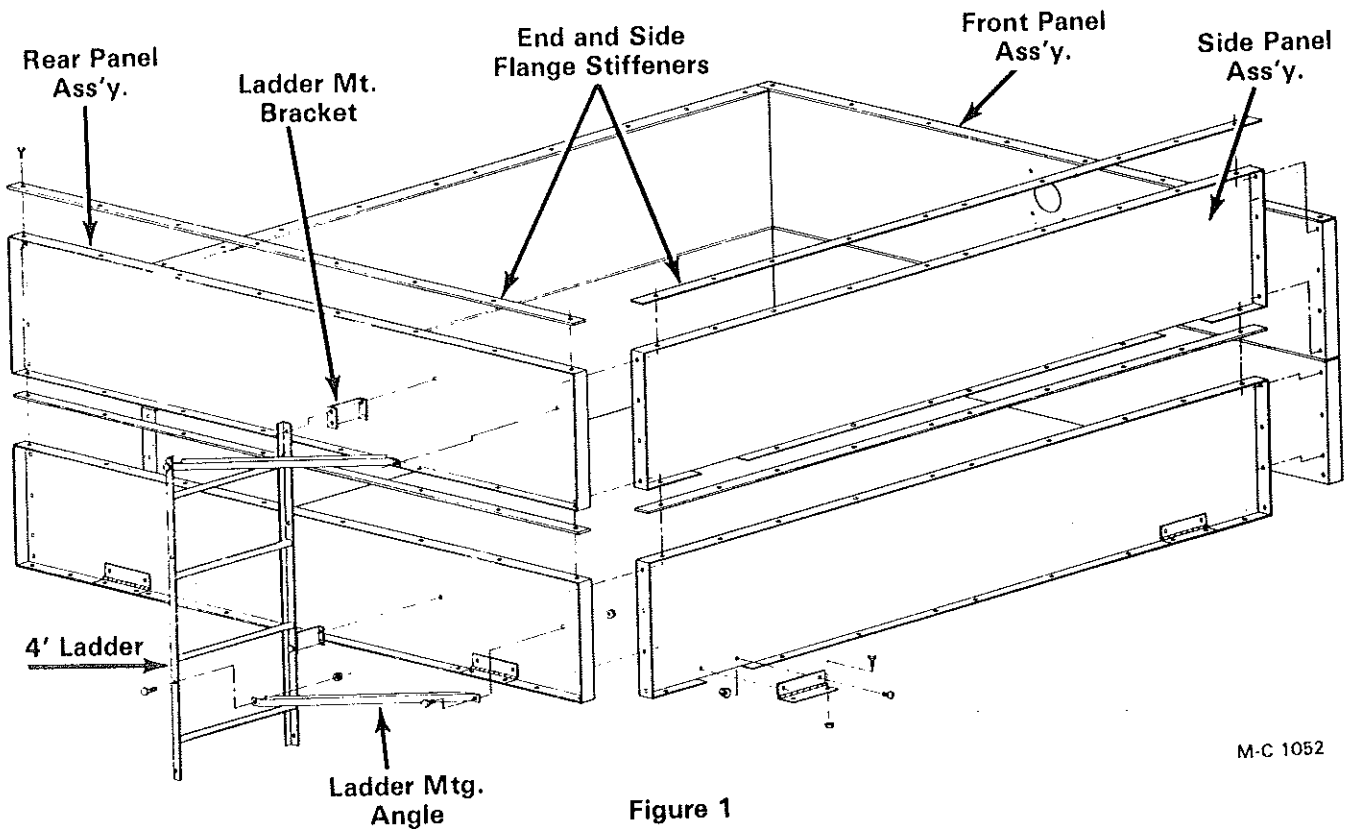
Place timbers or railroad ties under the skids (parallel). The dryer must be a minimum of 12" above the ground to provide clearance to open the quick clean unload auger pan.

A dryer dimension drawing and an electrical and gas piping entrance drawing are at the back of this manual.

Anchoring the Dryer

Immediately after installation, anchor the base of the dryer to the foundation. The dryer should also be guy wired in locations where the possibility of "blow-over" from wind exists.

All anchoring material and cable are to be supplied and installed by the customer.



Hopper and Peak

Hopper (See Figure 1)

NOTE: Use $\frac{3}{8}$ - 16 x 1" capscrews, flatwashers and flanged locknuts. The flatwashers go under the capscrew heads.

IMPORTANT: Put 2" x 6" planks $7\frac{1}{2}$ ' long across the outer and inner screens to walk on. **DO NOT** stand on the grain column stiffener straps.

1. Fold up the front and rear panel assemblies and the two side panel assemblies. Bolt them together at the corner seams.
2. Bolt the bottom flanges of all of the panel assemblies to the joiner hopper angles on the outer screens and end panels. Place flatwashers between the head of the bolts and the hopper panels.

Peak Panels (See Figure 2 & 2A)

NOTE: Leave all capscrews and locknuts loose (finger tight) until the entire peak has been assembled. Solid peak panels are used on dryers equipped with rape seed screens. Perforated peak panels are used on dryers equipped with standard screens.

1. Starting at the front of the dryer install two peak panels to the top of the inside screens, one on each side with 5/16 - 18 x $\frac{3}{4}$ " truss head

screws and flanged locknuts. The heads of the screws go inside the grain column. **DO NOT** bolt the peak panels to the hopper end panels until all peak panels have been installed.

2. Bolt the peak cap onto the top of the two peak panels with 5/16 - 18 x $\frac{3}{4}$ " truss head screws and flanged locknuts. The locknuts go inside the air chamber.
3. Install two more peak panels (one on each side). Install cross tie ($31\frac{1}{4}$ ") and two vertical support angles ($29\frac{1}{4}$ ") to the center hole of peak panel seams with 5/16 - 18 x $1\frac{1}{4}$ " capscrews and flanged locknuts as shown in Figure 2A.
4. Fasten the other end of the vertical support angles to the fourth bolt hole down from the top of the inner screen vertical seam on each side as shown in Figure 2A. Remove and discard the 5/16 - 18 x $\frac{1}{2}$ " capscrews and use 5/16 - 18 x $\frac{3}{4}$ " capscrews to bolt the vertical support angles to the inner screens. Fasten the peak panels to each other at the seams with 5/16 - 18 x $\frac{3}{4}$ " capscrews and locknuts.
5. Continue installing sets of two peak panels (one on each side), cross ties and vertical support angles as outlined in steps 1 through 4.
6. Bolt the seal angle to one end of the peak cap. Bolt the peak panels to the hopper end panels with 5/16 - 18 x $\frac{3}{4}$ " capscrews and

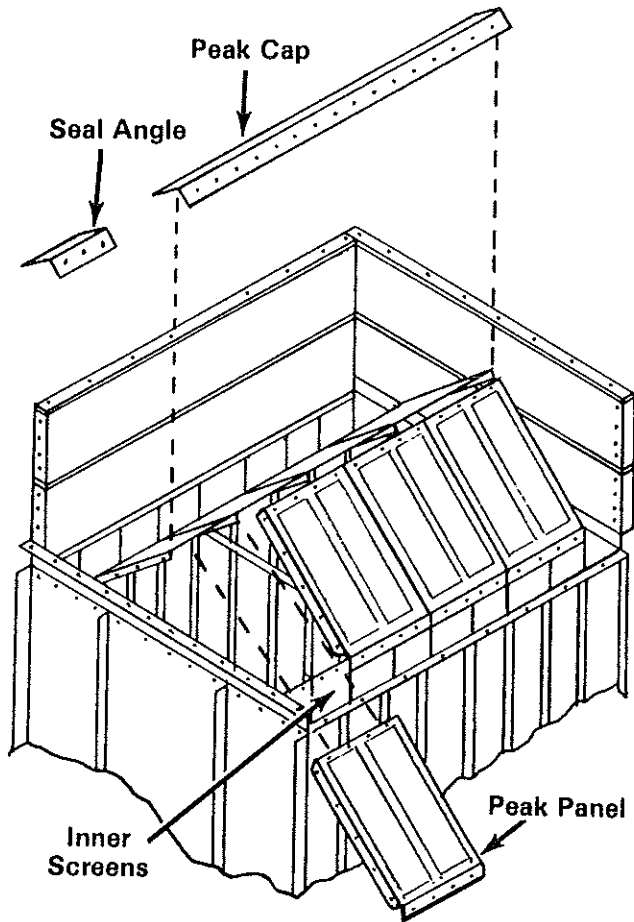


Figure 2

flanged locknuts. The head of the bolts go on the outside of the hopper.

7. Position the peak cap so one end is tight against the hopper end panel and tighten the locknuts. Position the seal angle so it is tight against the other hopper end panel and tighten the locknuts.
8. Tighten all capscrews and locknuts.

Rear Ladder (See Figure 3)

1. Remove and discard the 3rd, 9th and 15th 5/16" capscrew and locknut securing the right rear end panel to the outer end screen.
2. Bolt the mounting angles to the right rear end panel and outer screen, and the mounting brackets to the open holes in the end panel that are in line with the three mounting angle holes with 3/8 - 16 x 3/4" capscrews and locknuts.
3. Bolt the 9 foot ladder to the mounting angles and brackets with 3/8 - 16 x 1" capscrews and locknuts.
4. Remove the capscrew and locknut from the second hole down on the upper and lower

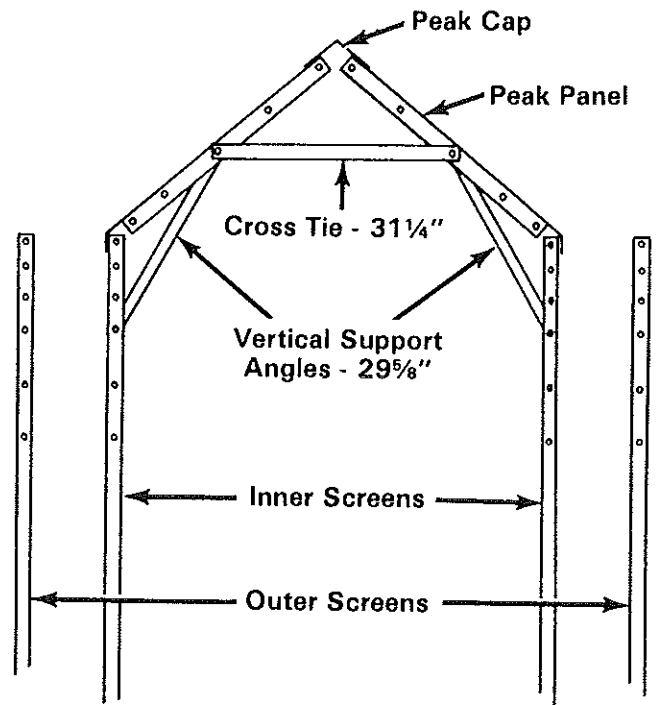


Figure 2A

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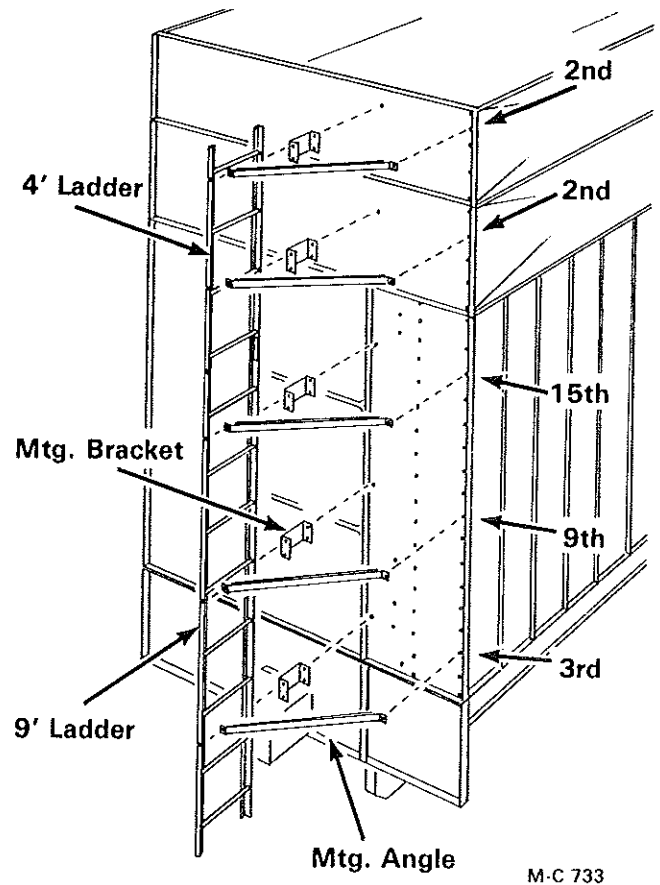


Figure 3

M-C 733

hopper end panels. Use these capscrews and locknuts to bolt a mounting angle to each hole.

5. Bolt two mounting brackets to the open holes in the upper and lower hopper end panels that are

in line with the mounting angles with $\frac{3}{8}$ - 16 x $\frac{3}{4}$ " capscrews and locknuts.

6. Bolt the 4 foot ladder to the mounting angles and brackets with $\frac{3}{8}$ - 16 x 1" capscrews and locknuts. Also bolt the ladders together at the ladder connecting angles with $\frac{3}{8}$ - 16 x 1" capscrews and locknuts.

Variable Speed Pulley Crank

1. Install the variable speed pulley crank assembly as shown in Figure 4. Use a $\frac{1}{2}$ - 13 x $2\frac{1}{2}$ " grade 5 capscrew and hex nut to attach the crank nut to the variable speed pulley arm.
2. Bolt the crank mount bracket to the left front end panel with two 5/16 - 18 x $\frac{3}{4}$ " capscrews and flanged locknuts.

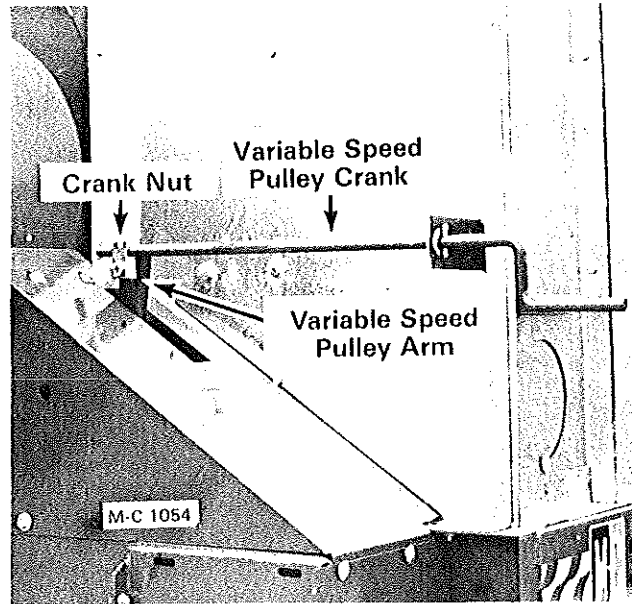


Figure 4

Bin Switch

1. Install the bin switch to the hopper top front panel with four $\frac{1}{4}$ - 20 x 3" capscrews and locknuts, see Figure 5. The locknuts go on the outside.
2. Put the strain relief on the wire cord in the hole in the top of the control cabinet. Connect the piggy-back terminal on the cord to the top terminal of the hopper level switch. Connect the other terminal on the cord to the bottom terminal of the hopper level switch. See wiring diagram on page 31.
3. Tighten the strain relief locknut and anchor the wire cord the dryer with jiffy clips and self tapping screws as shown in Figure 5.



Figure 5

Fan Clearance

1. Before turning on the electric power, check for clearance between the fan and fan housing. The fit between the fan and housing is very close. Some shifting may have occurred during shipping. Clearance can be checked by turning the fan by hand.



CAUTION: Do not touch any part of the fan while it is in motion - even when turned by hand.

2. To adjust fan clearance, loosen the four locknuts under the motor base and turn the adjusting nuts on top to raise or lower the motor, see Figure 6. The holes in the base are slotted to allow for side to side adjustment. Tighten locknuts after adjustment has been completed. Install the fan guard.

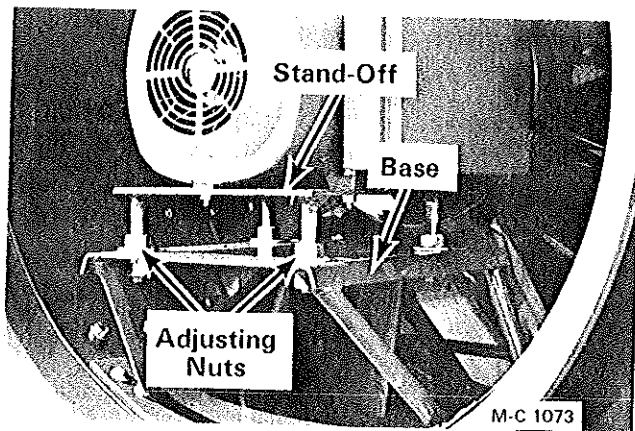


Figure 6

Electric Power Supply



CAUTION: Do not connect the power supply to the dryer until all guards are installed.

It is the customer's responsibility to provide the power source to the control cabinet that meets all requirements of the local electrical codes. The power source must be adequately fused and have a main disconnect. It is suggested that a qualified electrician be consulted for all electrical work needed.

Single Phase Dryers (230V)

1. Connect one 115V line to the L1 terminal and the other 115V line to the L3 terminal at the top of the fan motor magnetic starter, see Figure 7.
2. Connect the power supply ground wire to the ground lug in the cabinet, see Figure 7. The dryer base **MUST** be grounded to a grounding rod. Select a location that will provide a good clean ground connection.
3. Connect the 115V dryer control power supply wire to the L1 or L3 terminal of the fan motor magnetic starter. This is a loose black wire with an orange tag on it that reads "115 VOLTS".

Three Phase Dryers (230V)

1. Connect one 115V line to the L1 terminal and the other 115V line to the L3 terminal at the top of the fan motor magnetic starter, see Figure 7. Connect the 230V line to terminal L2 at the top of the magnetic starter.
2. Connect the power supply ground wire to the ground lug in the cabinet, see Figure 7. The dryer base **MUST** be grounded to a grounding rod. Select a location that will provide a good clean ground connection.

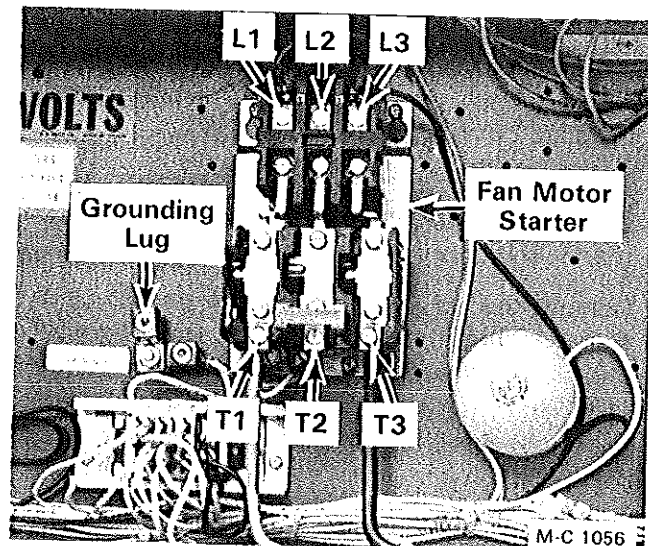


Figure 7

3. Connect the 115V dryer control power supply wire to the L1 or L3 terminal of the fan motor magnetic starter. This is a loose black wire with an orange tag on it that reads "115 VOLTS".

IMPORTANT: The dryer controls operate on 115V. If the 115V dryer control power supply wire is connected to terminal L2 (230V) on the fan motor magnetic starter, the dryer controls will be seriously damaged.

Loading Auger

1. The magnetic starter for the customer supplied loading auger must be furnished by the customer. Install the magnetic starter in the 115V cabinet next to the fan motor magnetic starter.
2. Connect a wire from the piggy-back terminal at the top of the hopper level switch to the 115V coil on the magnetic starter. See wiring diagram on page 31.
3. Connect a neutral wire from TB5 on the terminal block to the magnetic starter.

Gas Supply and Connections

LP Gas

1. Advise your LP Gas supplier that the dryer burner requires liquid propane from the LP tank (not vapor).

IMPORTANT: Do not store liquid propane in tanks that have contained anhydrous ammonia. Mixing liquid propane with anhydrous ammonia produces an extremely caustic solution that will damage the dryer controls. It is recommended that only clean LP Gas equipment be used.

- An "Excess Flow" valve must be installed on the LP tank. One is furnished with the dryer. **NEVER** have two "Excess Flow" tank valves installed on the same LP Gas Line.
- The burner requires 8 to 10 lbs. (less in mild weather) of gas pressure at the gauge in the manifold when operating.
- Consult the LP Gas supplier for gas line size required from the supply tank to the dryer that will provide the amount of fuel to meet the dryer BTU/Hr. requirement at the required operating pressure. See the Gas Consumption (BTU/Hr.) following.

IMPORTANT: Use type of supply line specified by Local Codes.

- Connect the LP Gas line from the tank valve to the short flexible LP Gas inlet hose at the front of the dryer on the right side. (Hose not used on dryers operated in Canada).

CAUTION: Before starting the dryer test for any gas leaks. Turn the gas supply on and apply soap water to **ALL** pipe joints and unions, including pipes assembled on the site and those assembled at the factory.

Natural Gas

- The burner requires 5 to 10 lbs. of gas pressure at the gauge in the manifold when operating.
- Consult the gas company for gas supply line size required to the dryer that will provide an adequate volume of gas to meet the dryer (BTU/Hr.) requirement at the required operating pressure. See Gas Consumption (BTU/Hr.) following.

IMPORTANT: Use type of supply specified by Local Codes.

CAUTION: Before starting the dryer test for any gas leaks. Turn the gas supply on and apply soap water to **ALL** pipe joints and unions, including pipes assembled on the site and those assembled at the factory.

Gas Consumption (BTU/Hr.) see note

Dry & Cool	All Heat
1,400,000	2,000,000

NOTE: BTU/Hr. based on normal drying temperatures (at 50°F) drying shelled corn.

Fan Rotation

IMPORTANT: Before checking fan rotation, inspect for and remove any foreign material (nuts, bolts, tools, parts, etc.) from the hopper, grain columns, metering rolls, unload auger and heat chamber. Also be sure the heat chamber floor door is in position and secure. Close the rear door.

- Check fan rotation from the front of the dryer. The fan must turn counterclockwise.



CAUTION: Do not turn the electric power on until the fan guard has been installed.

- Flip all switches on the control panel OFF. Turn on the electric power supply to the dryer. The 115V POWER ON light will be on.
- With everyone clear of the fan, push the fan start button and 2 seconds later push the stop button and check fan rotation.
- If the fan rotation is not correct it can be changed as follows:



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

- Three phase motors** - Move the wire from terminal T1 to T3 and T3 to T1 on the fan magnetic starter in the control cabinet, see Figure 7.
- Single phase motors** - Refer to the wiring information on the inside of the fan motor junction box cover.

All Heat Conversion

An "All Heat Conversion Kit" was shipped with all dryers starting with S/N 34284. To convert dryers below S/N 34284 to all heat, order LP Gas or

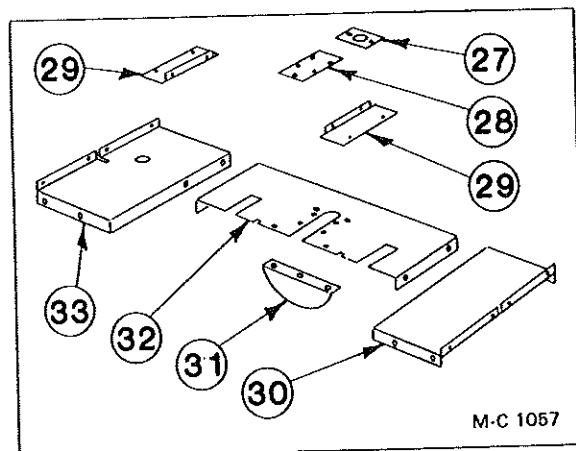
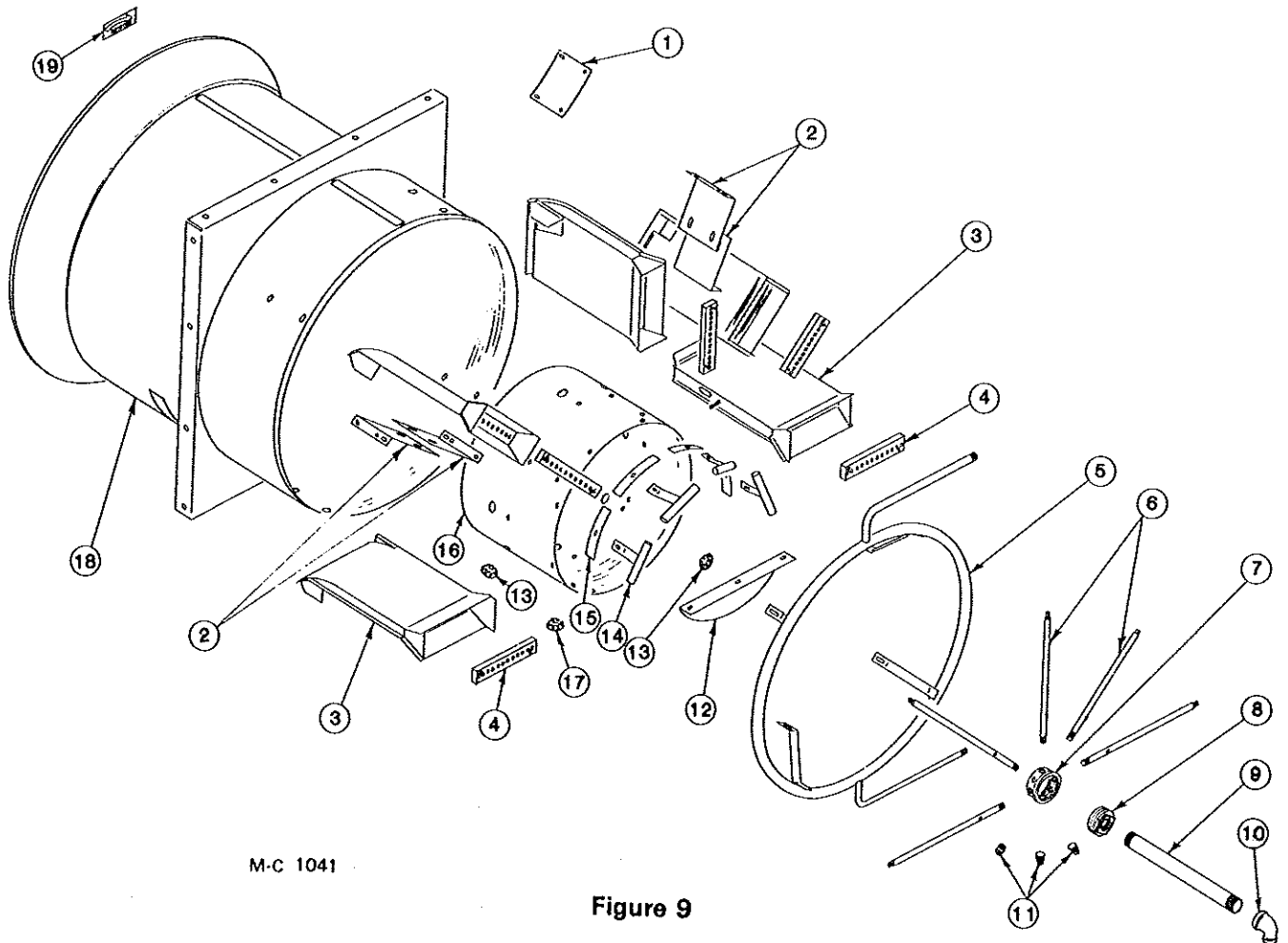


Figure 8 - Front Floor Detail



M-C 1041

Figure 9

Natural Gas conversion kit listed below.

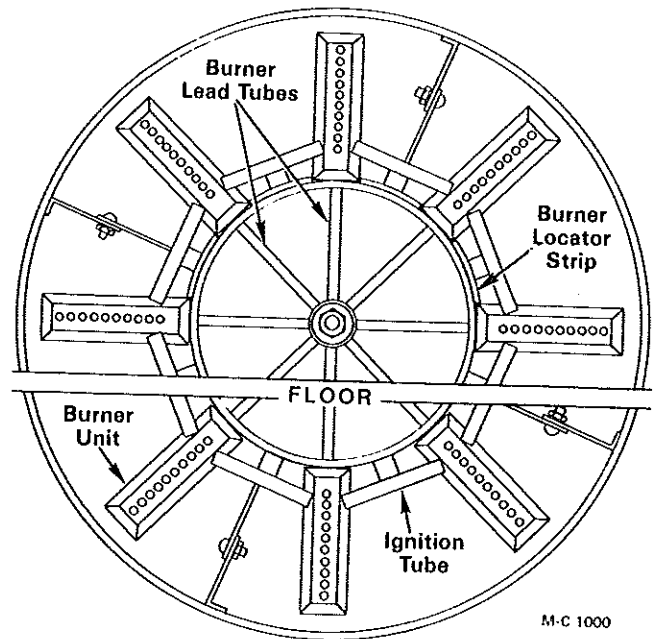
127 9062 - LP Gas All Heat Conversion Kit

127 9063 - Natural Gas All Heat Conversion Kit

Install "All Heat Conversion Kit" as follows:

1. Remove the burner tube baffle (ref. 31 Figure 8). Remove the front floor panel slot cover (ref. 28 Figure 8). Remove the center front floor panel (ref. 32 Figure 8).
2. Remove the three $\frac{3}{8}$ " pipe plugs (ref. 11 Figure 9) from the bottom of the burner head (ref. 7 Figure 9).
3. Install the three new burner units (ref. 3 Figure 9) and burner lead tubes (ref. 6 Figure 9) in the same manner that the five existing burner units are mounted, see Figure 10.

NOTE: There is a small spot of weld on each burner lead tube on the side opposite the burner lead tube orifice. Install the burner lead tube with the spot of weld facing the rear of the dryer. This will assure that the orifice is facing the right direction.



M-C 1000

Figure 10

4. Install the burner locator strips (ref. 15 Figure 9) and ignition tubes (ref. 14 Figure 9) between each burner unit, see Figure 10. The ends of the ignition tubes must fit tightly into the corners of the burner unit flanges.

CONTROL PANEL LIGHTS & SWITCHES

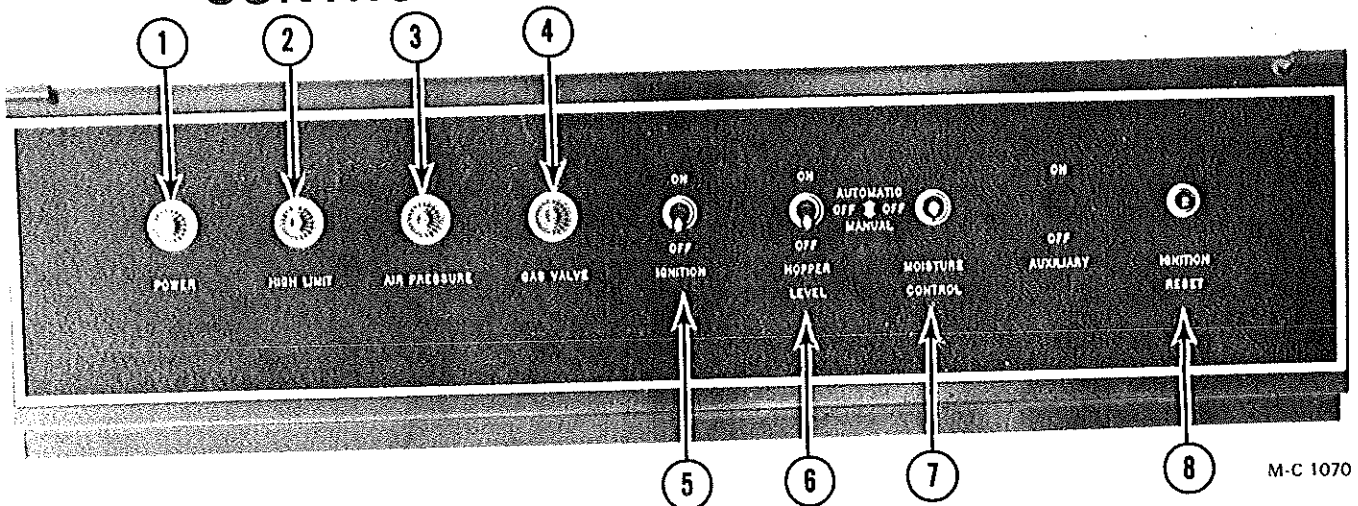


Figure 11

Control Panel Lights (See Figure 11)

Ref. 1 - 115V Power On Light

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

Ref. 2 - High Limit Switch

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

Ref. 3 - Air Pressure Light

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

Ref. 4 - Gas Valve Light

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

Control Panel Switches

(See Figure 11 & 12)

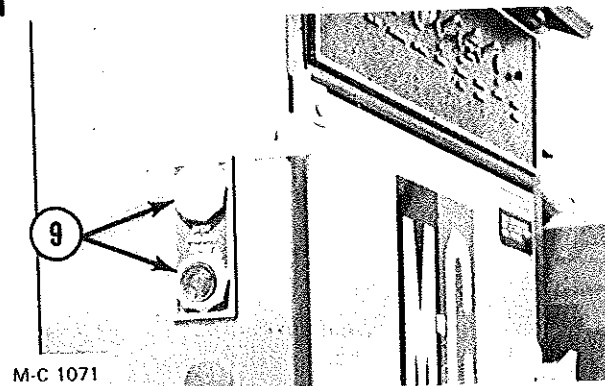
Ref. 5 - Ignition Switch

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.

NOTE: A ten second ignition delay is on dryers above S/N 47163.

Ref. 6 - Hopper Level Switch

When the switch is flipped up to the automatic position the customer supplied loading auger will start. The bin switch in the hopper will stop the loading auger when the hopper is full.



M-C 1071

Figure 12

When the switch is flipped down to the manual position the loading auger will run continuously. The manual operation is a stand-by system to be used if the bin switch fails when the manual position is used, be careful not to overfill the hopper.

Ref. 7 - Moisture Control Switch

When the switch is in the automatic position, the moisture control on each side of the dryer will start and stop the ratchet solenoids automatically. Unloading starts when the moisture content of the grain is reduced to the level that the moisture control is set for and stops when the moisture content is above this setting.

When the switch is in the manual position, the ratchet solenoids will operate continuously.

Ref. 8 - 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. 9 - Fan Start-Stop Buttons

Black button starts and red button stops the fan.

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 chamber before filling the dryer with grain. Also be sure the heat chamber door is in position and secure. Close the rear door.

1. Flip all of the toggle switches on the control panel to the OFF position.
2. **LP Gas** - Close the liquid line flip valve (handle down), see Figure 13.
3. Close the gas main hand valve (handle 90° to the piping), see Figure 14.
4. Check the modulating valve in the gas manifold to be sure the "T" handle has not been turned all the way in to the wide open position, see Figure 14. The "T" handle should be halfway between the closed and fully open position.
5. Turn on the electric power supply to the dryer.
6. The POWER and HIGH LIMIT lights on the control panel will be ON. If the HIGH LIMIT light is not on, push the reset button on the high limit switch, see Figure 15.

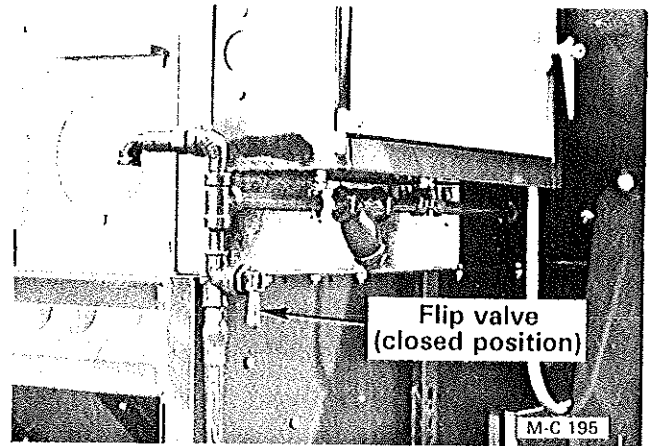


Figure 13

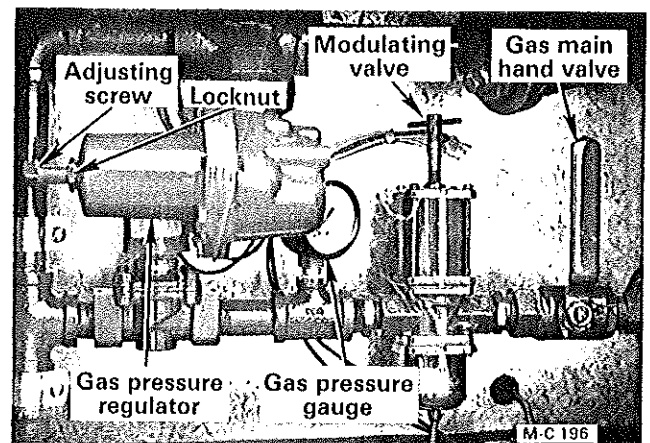


Figure 14

Filling the Dryer

1. Flip the hopper level toggle switch up to the AUTOMATIC position. The loading auger will start immediately.
2. The bin switch in the hopper will stop the loading auger when the hopper is full.

Air Pressure Switch

General

1. The air pressure switch, Figure 15, 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.

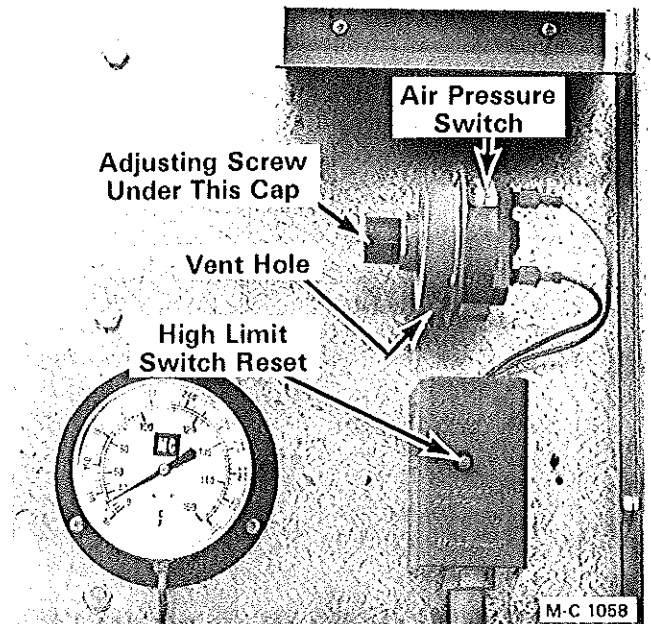


Figure 15



CAUTION: This safety feature is for your protection and protection of the dryer. The air pressure switch 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 the burner is started, the operation of the air pressure switch **MUST** be checked. Be sure the rear door is closed.
2. Start the fan. The air pressure light on the control panel will come ON as the fan comes up to speed.
3. 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.

Adjusting

1. Remove the plastic cap on the air pressure switch. The slotted screw is the adjusting screw, see Figure 15.
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 $\frac{1}{4}$ to $\frac{1}{2}$ turn to allow for normal changes in static pressure.
4. Shut off the fan.
 - A. **Below S/N 46799** — The Air Pressure light should go out when the fan slows down to approximately half speed. If the light does not go out the adjusting screw has been turned out too far. Readjust and check again. Install the plastic cap.
 - B. **Above S/N 46798** — 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.
6. If the air pressure light is blinking, turn the adjusting screw out a small amount.

Starting the Burner

1. **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, see Figure 13. The flip valve is open when the handle is 90° to the piping.
Natural Gas - Open the supply valve.

2. Start the fan.
3. Open the gas main hand valve (Figure 14) $\frac{1}{4}$ of the way. Flip the burner 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 on dryers above S/N 47163. This is a safety feature that allows the fan to purge the heat chamber of any unburned gas that may remain after the burner has been shut down for any reason.

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

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

5. If the LP Gas line freezes, close the gas main hand valve and flip the ignition switch OFF. After the gas line thaws out repeat steps 3 and 4, but open the gas main hand valve slower.

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

6. Flip the ignition switch OFF then ON again. The gas valve light will come ON after the ten second delay and another trial ignition period (5 seconds) will start.
7. 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. 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 25.

8. IF the burner lights for 5 seconds and goes out or the gas solenoid valves chatter check the following:
 - A. **Below S/N 47164** — The tips of the electrode are not immersed in the flame or the gas pressure is too high or too low.

B. Above S/N 47163 — The remote sensor is not immersed in the flame, the ceramic insulator is cracked, the wire is defective or the gas pressure is too high or too low.

9. If the High Limit Switch trips out, close the gas main hand valve and flip the ignition switch OFF. Push the reset button on the High Limit Switch to reset it, see Figure 15. Restart the fan and repeat steps 3 and 4, but open the gas main hand valve slower to prevent the temperature from rising too fast.

10. 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 from the vaporizer coil to the pressure regulator with your hand, see Figure 16.



CAUTION: The line may be very hot.

B. When the vaporizer coil is positioned correctly in the flame, the LP Gas line from the vaporizer coil to the pressure regulator should feel very warm, but not so hot that you cannot hold your hand on it.

C. If it feels cool, the vaporizer coil is not close enough to the flame. If it is very hot, the vaporizer coil is too close to the flame.

D. Shut the burner and fan off.



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

E. Go into the plenum chamber and loosen the four vaporizer coil support brackets (one bracket is below the floor), see Figure 17. Move the coil closer to or away from the burner.

F. After the adjustment has been made, turn on the electric power supply. Restart the fan and burner, and recheck temperature.

11. LP Gas Only - With the burner operating, check the reading on the gas pressure gauge in the manifold see Figure 18. It should be approximately 8 to 10 pounds (less in mild weather). If not, loosen the locknut on the pressure regulator adjusting screw, see Figure

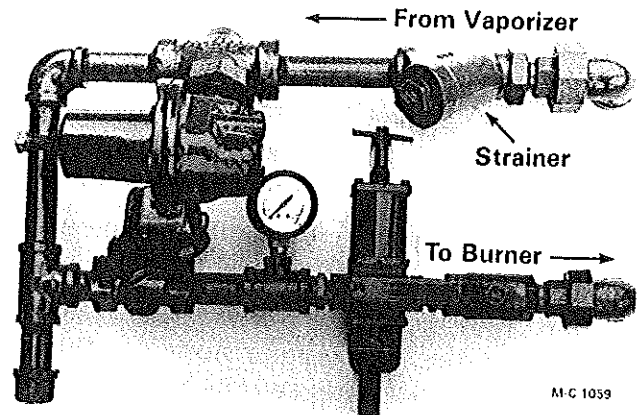


Figure 16 - LP Gas Manifold

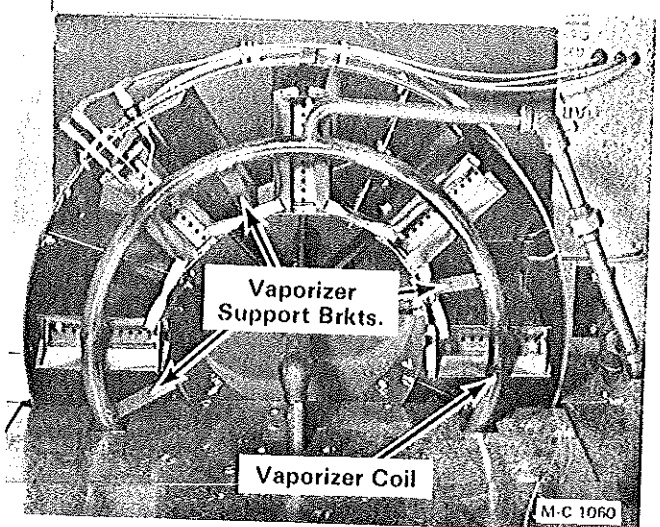


Figure 17

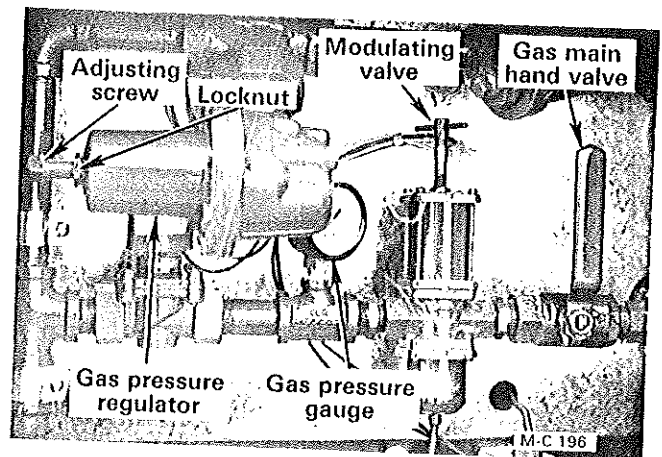


Figure 18

18. Turn the adjusting screw IN to increase and OUT to decrease pressure.

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

Setting Burner Operating Temperature

NOTE: Refer to the "Suggested Burner Operating Temperature Setting Chart" below. 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 18.

3. After the burner operating temperature has been set, close the gas main hand valves, flip the ignition switch off and turn the fan off.

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

Suggested Burner Operating Temperature Settings (F°)

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. For example, when drying mature corn (dry & cool), the drying temperature could be as high as 230°F. When drying immature corn, the drying temperature could be as low as 180°F.

Corn		Sorghum & Wheat		Sunflower, Oats, Barley, Soybeans		Rice*		Seed Grains	
Dry & Cool	All Heat	Dry & Cool	All Heat	Dry & Cool	All Heat	Dry & Cool	All Heat	Dry & Cool	All Heat
215	225	170	170	140	140	115	115	110	110

*Rice drying is critical. Do not exceed these temperatures. Grain temperature should not exceed 105°F.

OPERATING INSTRUCTIONS

Drying Grain

1. Flip all of the toggle switches on the control panel to the OFF position.
2. Turn on the electric power supply to the dryer. The POWER and HIGH LIMIT lights on the control panel will be on. If the HIGH LIMIT light is not on, push the reset button on the high limit switch.
3. Flip the hopper level toggle switch up to the AUTOMATIC position. The loading auger will start immediately.
4. When the dryer is full of grain, start the fan and burner.
5. Be sure that moisture control switch is in the OFF position. It will take approximately 6 minutes per point of moisture removed to dry the first load of grain in the heating section.

The cooling section will have wet grain in it (unless the dryer is being operated "ALL HEAT") and will not be dried on the first run. This grain will have to be recycled back into the heating section.

6. When the first load is dry, flip the moisture control switch to the MANUAL position. This will activate the grain metering roll ratchet solenoids and the unloading auger will begin unloading grain.
7. When dried grain begins to auger out, test it for moisture content. If the moisture content is too high, decrease the unloading speed. If the moisture content is too low, increase the unloading speed.
8. The unloading speed is controlled by adjusting the variable speed pulley and the grain metering roll ratchets. These adjustments are explained under "Variable Speed Pulley Adjustment" and "Grain Metering Roll Ratchet Adjustment" following.
9. If adjustments are made, wait 1 hour to allow the dryer to react to the change. Recheck the moisture content of the grain and adjust the unloading speed again if necessary.

Variable Speed Pulley Adjustment



CAUTION: The guards were removed in Figure 19 and 20 to provide clear illustrations. Do not operate the dryer without guards in place and secure.

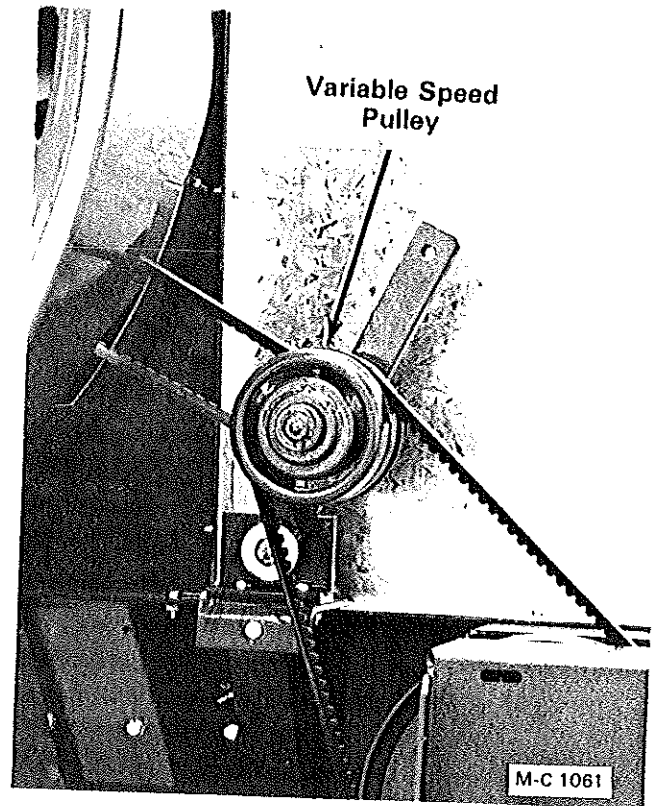


Figure 19

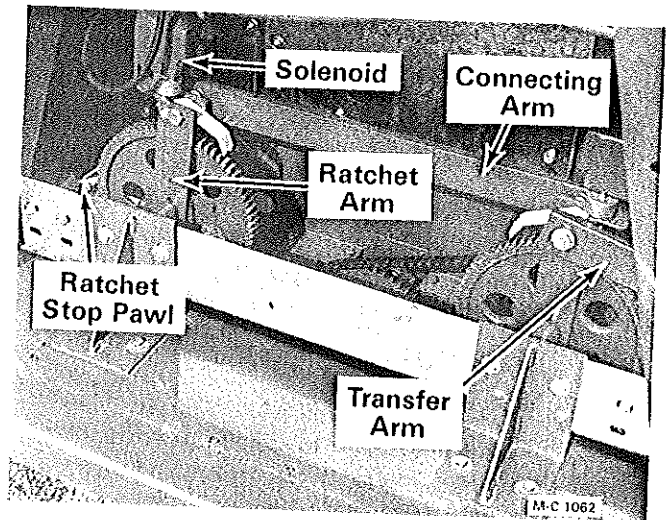


Figure 20

1. The variable speed pulley, Figure 19 controls the speed of the unloading auger and the rate of speed that the grain metering roll ratchet arms move back and forth, see Figure 20.
2. Changing the back and forth speed of the ratchet arms regulates the speed of the grain metering rolls when the ratchet pawls engage the ratchet wheels. Increasing the ratchet arm

speed unloads the grain faster and decreasing the ratchet arm speed unloads the grain slower.

3. The variable speed pulley should only be used for fine adjustment. The range from fast to slow is approximately equal to one tooth on the ratchet wheels.
4. If the grain unloading rate must be increased or decreased beyond the range of the variable speed pulley adjustment, adjust the position of the transfer arm on the eccentric sprocket. See "Grain Metering Roll Ratchets" below.

IMPORTANT: Never put extreme pressure on the belts by bottoming them out in the pulley. This will cause premature belt failure.

5. Turn the variable speed pulley crank clockwise to speed up the grain unloading rate. Turn the variable speed pulley counterclockwise to slow down the grain unloading rate. **Adjust the variable speed pulley only when the dryer is operating.**

IMPORTANT: Note and mark the position of the variable speed pulley crank before any adjustment is made so that it can be returned to the original position. Make changes slowly, avoid over adjusting. Wait 1 hour for the dryer to react to each change.

It is suggested that a log be kept recording the variable speed pulley crank position, moisture control and temperature settings for various grain drying conditions that occur. This log can be referred to each season.

6. The variable speed pulley should be cycled from fast to slow at least once a day (when the dryer is operating) to keep all moving parts operating freely.

Grain Metering Roll Ratchets



CAUTION: The guards were removed in Figure 20 and 21 to provide clear illustrations. Do not operate the dryer without guards in place and secure.

1. The normal factory setting for the Grain Metering Roll Ratchets is two teeth per stroke of the ratchet arms.
2. When removing more than 10 points of moisture it may be necessary to adjust the ratchet arms to one tooth per stroke.
3. When removing less than 10 points of moisture it may be necessary to adjust the ratchet arms to three or more teeth per stroke.

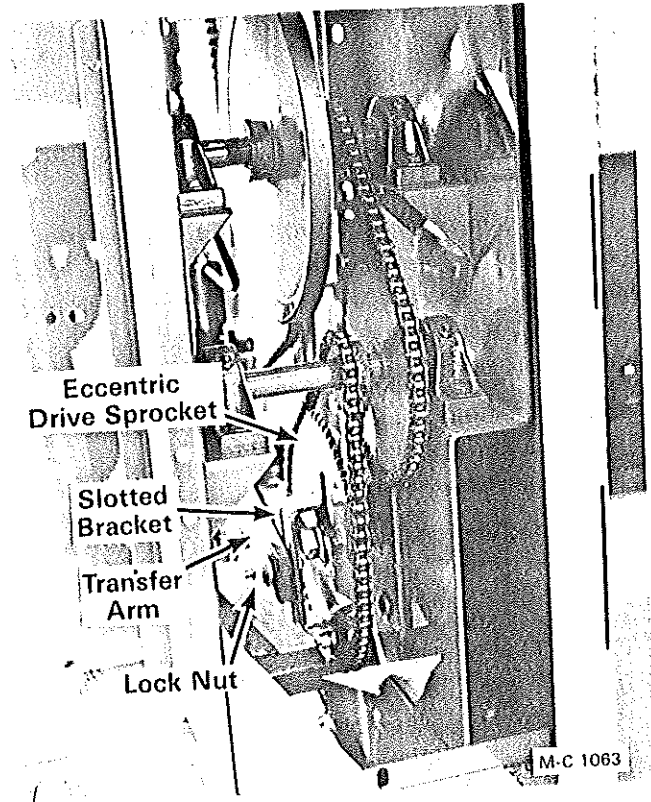


Figure 21

4. The ratchet arms are connected together with the connecting arm and the left ratchet arm is connected to the eccentric drive sprocket with the transfer arm, see Figure 20.
5. The transfer arm controls the length of the ratchet arm stroke.
6. The transfer arm is anchored to a slotted bracket on the eccentric drive sprocket, see Figure 21. Loosen the locknut and adjust the transfer arm as follows:



CAUTION: Do not adjust the transfer arm until the eccentric drive sprocket has come to a complete stop.

To Decrease Ratchet Arm Stroke - Slide the transfer arm towards the center of the eccentric drive sprocket. This will decrease the number of teeth that the ratchet pawls engage the ratchet wheels per stroke.

To Increase Ratchet Arm Stroke - Slide the transfer arm away from the center of the eccentric drive sprocket. This will increase the number of teeth that the ratchet pawls engages the ratchet wheels per stroke.

NOTE: Sliding the transfer arm approximately $\frac{1}{8}$ inch will change the setting by one tooth.

Tighten the locknut and check the adjustment. Readjust if necessary.

- The ratchet pawls must engage the same number of teeth on each ratchet wheel so that the metering rolls unload at the same rate. If they do not, move the ratchet stop pawl(s), shown in Figure 20, closer to the ratchet wheel(s) to prevent ratchet wheel roll back.

Moisture Control Setting

- Test the moisture content of the grain being discharged every 15 minutes until it stabilizes. Adjust the variable speed pulley as required to maintain desired moisture content. Allow 1 hour for the dryer to react to the change.
- When the dryer has discharged grain at the desired moisture content for 1 hour, flip the moisture control toggle switch to the AUTO-MATIC position.
- Set the moisture control (Figure 22) on each side of the dryer by turning the indicator knob up until the ratchet pawl just disengages. Each moisture control will probably have a slightly different setting, this is normal.

NOTE: The moisture control setting should not have to be changed more than ½ mark unless the burner operating temperature is changed or if the moisture content of the discharged grain is to be changed. Allow 1 hour for the dryer to react to the change before changing the setting again.

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

Approximate Moisture Control Setting for Corn and Most Small Grains

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

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

- When the dryer is discharging grain at the desired moisture content, the ratchet pawls will be engaged 50 to 55 minutes of each hour. If they are not, adjust the variable speed pulley. Do not change the moisture control setting.

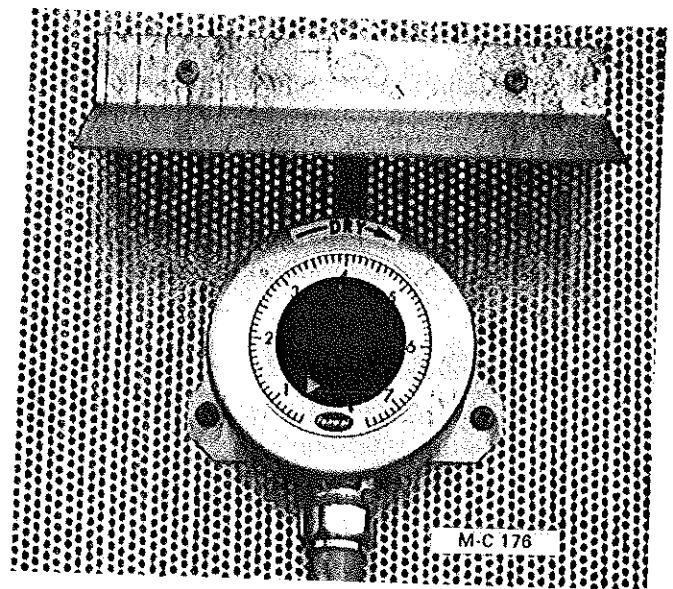


Figure 22

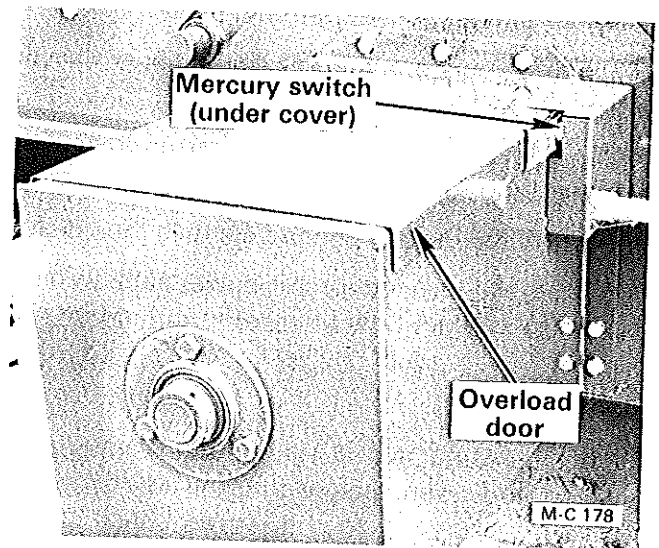


Figure 23

Rear Discharge Overload Door

- 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.
- When the overload door raises, the dryer will shut down and all of the lights on the panel will be out.
- When the problem has been corrected and the rear discharge overload door closes, the POWER and HIGH LIMIT lights on the panel will come on.
- Flip the ignition switch OFF and restart the fan and burner.

Control Cabinet Heat Bulb

1. The heat bulb in the control cabinet, Figure 24, 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.

Temporary Shut Down

1. Close the LP Gas supply valve at the tank or close the natural gas supply valve. Operate the burner until the flame goes out. Flip the ignition switch OFF.
2. Close the gas main hand valve in the cabinet (handle 90° to the piping).
3. **LP Gas** - Close the liquid line flip valve at the dryer (handle parallel to the pipe).
4. Flip the moisture control and hopper level switches OFF.
5. Run the fan 20 minutes to cool the grain in the dryer, then turn it OFF.
6. Turn off the electric power supply to the dryer.

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

Restarts



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

1. If the dryer is being operated "**All Heat**" start the burner to thaw the grain. If the dryer is being operated "**Heat and Cool**" loosen the frozen grain by hand as follows.



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

- A. The lower portion of the grain columns and the metering rolls are accessible from inside the dryer. Do not attempt to clear frozen grain through the quick drain ports on the outside of the dryer.
- B. Open the dryer rear door and remove the heat chamber door in the floor of the heat

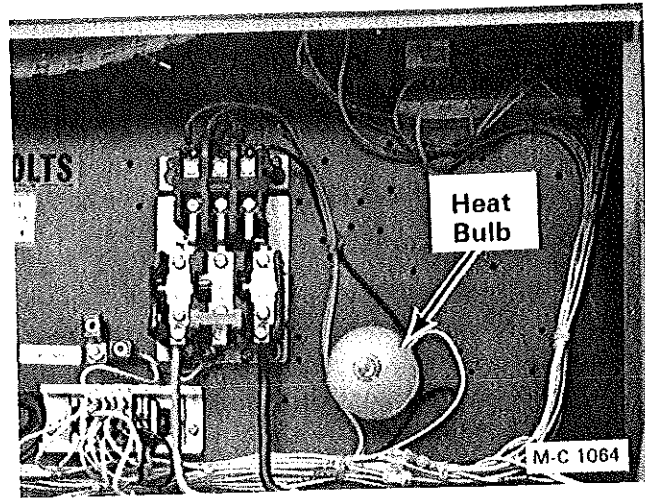


Figure 24

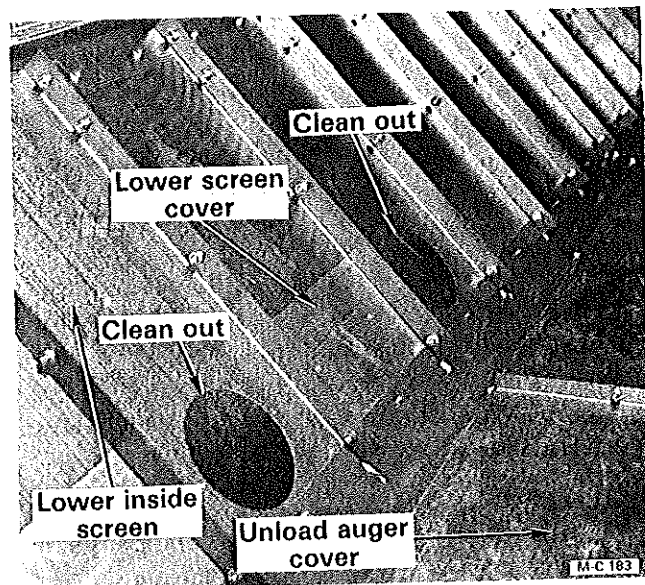


Figure 25

chamber to gain access to the cooling chamber.

- C. There is a clean-out in every lower inside screen. Remove every lower screen cover, see Figure 25. After the frozen grain has been loosened, reinstall the lower screen covers, heat chamber door in the floor and close the dryer rear door.

NOTE: Early models have a clean-out in every other lower inside screen (between each outside quick drain port).

2. Flip all the switches on the control panel OFF and turn on the electric power supply to the dryer.
3. **LP Gas** - Open the tank supply valve and open (lift up) the liquid line flip valve.
4. **Natural Gas** - Turn the gas supply valve on.
5. Start the fan.

6. Flip the burner ignition switch ON. Slowly open the burner gas main hand valve ¼ of the way.
7. When the flame is established, slowly open the gas main hand valve all the way (handle parallel to the piping).
8. Preheat the grain for 15 to 20 minutes.
9. Flip the moisture control switch to the MANUAL position and the hopper level switch to the AUTOMATIC position.
10. Check the moisture content of the grain until it stabilizes. If necessary, adjust the variable speed pulley to maintain desired moisture content. If adjustments are made, allow 1 hour for the dryer to react to the change.
11. When the dryer has discharged grain at the desired moisture content for 1 hour, flip the moisture control switch to the AUTOMATIC position.

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 moisture control and the hopper level switch OFF.
2. Run the burner until all of the grain is at the desired moisture content. It will take approximately 6 minutes per point of moisture being removed to dry all of the grain.
3. When the grain is dry, close the LP Gas supply valve at the tank or close the natural gas supply valve. Operate the burner until the flame goes out. Flip the ignition switch OFF.
4. Close the gas main hand valve in the cabinet (handle 90° to the piping).
5. **LP Gas** - Close the liquid line flip valve at the dryer (handle parallel to the pipe).
6. Run the fan approximately 20 minutes to cool the grain.

7. Flip the moisture control switch to the MANUAL position to unload all of the grain. When the dryer is empty, flip the moisture control switch OFF and turn the fan OFF.



CAUTION: Before continuing to the next step, turn off and lock the electric power supply to the dryer and lock the control cabinet doors.

8. Open the dryer rear door and remove the heat chamber door in the floor of the heat chamber to gain access to the cooling chamber. Remove the unload auger covers, see Figure 25. Clean out the unload auger and the grain metering rolls. Use a vacuum cleaner or compressed air.



CAUTION: Be sure to wear safety goggles if compressed air is used.

NOTE: Dryers starting with serial number 47164 - The 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 pan and pull them up overcenter to lock the pan.

9. Clean the fan, burner and heat chamber.
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 22. Do not over lubricate. Too much grease may damage the bearing seals. Lubricate all chains, sprockets and ratchet drive moving parts with engine oil.
12. Turn the variable speed pulley adjusting crank to the center position so that tension is equal on both belts.
13. Cover the fan housing and motor loosely with canvas or plastic. Cover 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 the dryer during lubrication, turn off and lock the electric power supply to the dryer and lock 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.



CAUTION: The guards were removed in Figure 27 and 28 to provide clear illustrations. Do not operate the dryer without guards in place and secure.

Every 100 Hours

1. Lubricate the variable speed pulley shaft bearings **sparingly**, see Figure 26.
2. Lubricate the unloading auger front bearing and the front bearing on each grain metering roll, see Figure 27.
3. Lubricate the four bearings on the drive reduction base shafts, see Figure 28.
4. All other bearings used on the dryer are prelubricated and require no further lubrication.

Periodically

1. Oil all sprockets, chains and ratchet drive moving parts with engine oil. Be careful not to get oil into the ratchet solenoids or on the belts.

Screens and Heat Recovery System.

NOTE: Be sure to keep the inside screens and heat chamber 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 chamber every 8 to 10 hours.

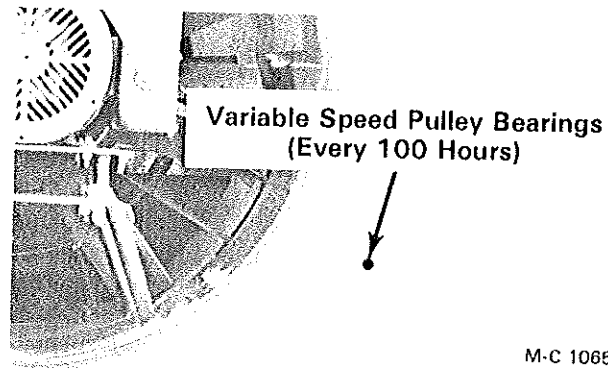


Figure 26

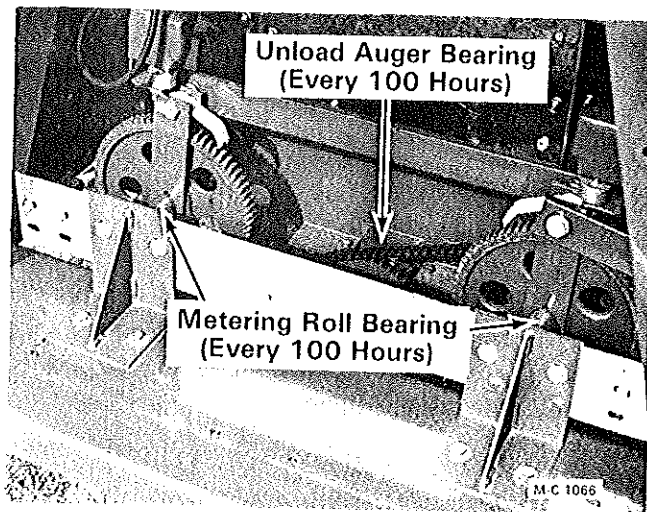


Figure 27

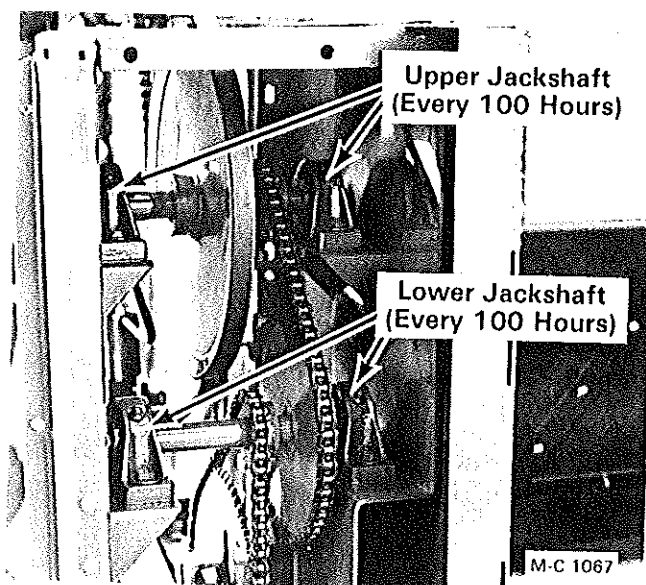


Figure 28

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.

Pre-Season Check

All of the following tests and adjustments can be made when the dryer is empty. The air pressure switch 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 13.



CAUTION: The gas and electric power supply to the dryer **MUST** be off when performing steps 1 thru 6. Lock the main electric supply to the dryer so that the power cannot be accidentally turned on.

1. Lubricate all bearings, chains, sprockets and ratchet drive moving parts. Refer to "Lubrication" on page 22.
2. Tighten all electrical connections in the control cabinet. 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.
3. Open the dryer rear door and remove the heat chamber door in the floor of the heat chamber to gain access to the cooling chamber. Remove the unload auger covers, see Figure 29. Clean out the unload auger and grain metering rolls.

NOTE: Dryers starting with serial number 47164 - The 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 pan and pull them up overcenter to lock the pan.

4. Clean all of the screens, fan, burner and heat chamber. Remove and clean heat recovery system bottom covers (if equipped).
5. Clean out the high limit switch shield. Remove the air pressure switch and clean the tube and filter, see Figure 30. Be sure the $\frac{1}{8}$ " vent hole in the bottom of the air pressure switch body is open, see Figure 34.
6. **LP Gas** - Remove the plug at the end of each strainer, see Figure 31. Remove and clean the screen in each strainer. Check flexible LP inlet hose for signs of fatigue, replace if necessary.
7. Flip all of the toggle switches on the control panel to the OFF position. Turn the electric power supply to the dryer ON.

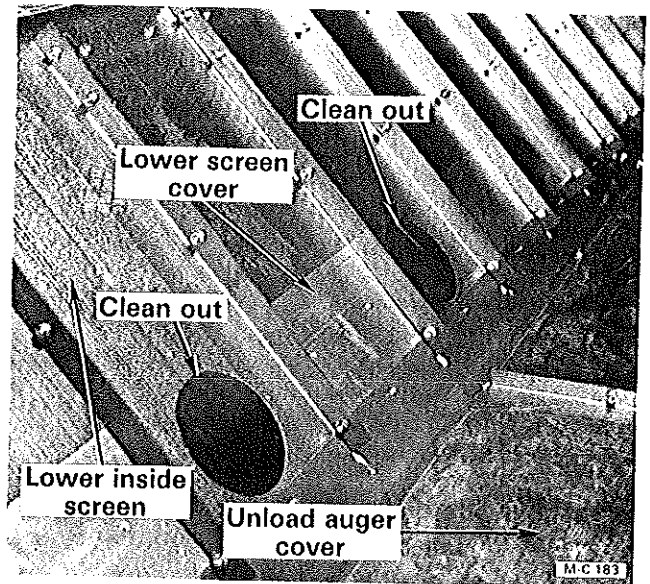


Figure 29

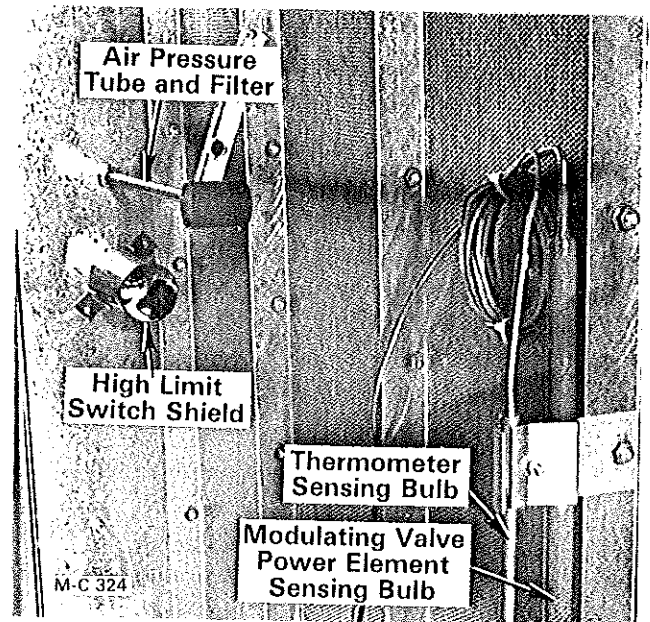


Figure 30

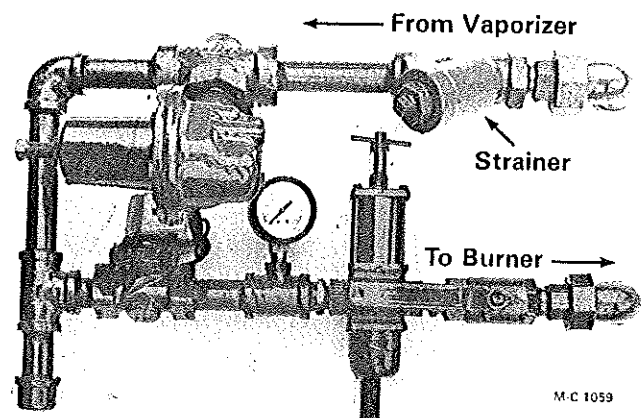


Figure 31

8. Start the fan and flip the moisture control toggle switch to the MANUAL position, the ratchet pawls will engage.
9. Turn the variable speed pulley adjusting crank in and out several times to check the operation of all moving parts.
10. Check the fan and burner as follows:
 - A. Turn off the electric power supply to the dryer. Flip all of the toggle switches on the control panel to the OFF position.
 - B. Close the gas main hand valve (handle 90° to the piping), see Figure 32.
 - C. **LP Gas** - Open the supply valve at the tank and open (lift up) the liquid line flip valve, see Figure 33.
Natural Gas - Open the supply valve.
 - D. Disconnect the two wires at the back of the air pressure switch, see Figure 34. 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.

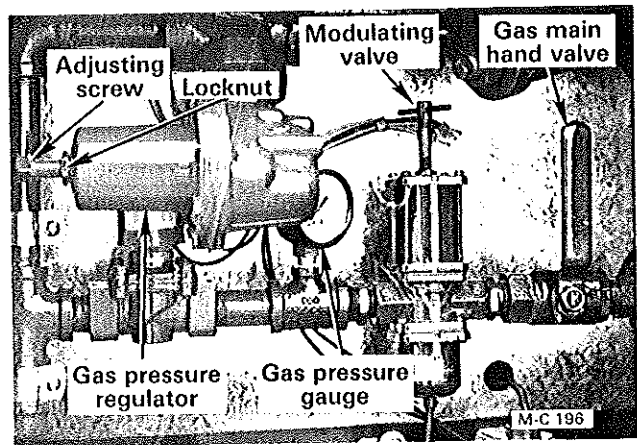


Figure 32

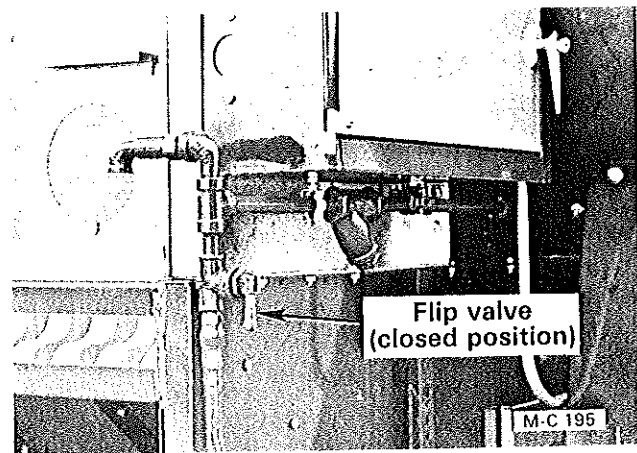


Figure 33

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

- E. Turn on the electric power supply to the dryer. The POWER, HIGH LIMIT and AIR PRESSURE lights will be ON. If the high limit light is not on, push the reset button on the high limit switch, see Figure 34.

NOTE: Above S/N 46798 - The air pressure light will come on when the fan is started.

- F. Start the fan and open the gas main hand valve ¼ of the way. Flip the burner ignition switch ON. After a ten (10) second delay the GAS VALVE light will be ON and the burner will light.

The ten second delay before ignition is on dryers above S/N 47163. This is a safety feature that allows the fan to purge the heat chamber of any unburned gas that may remain after the burner has been shut down for any reason.

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

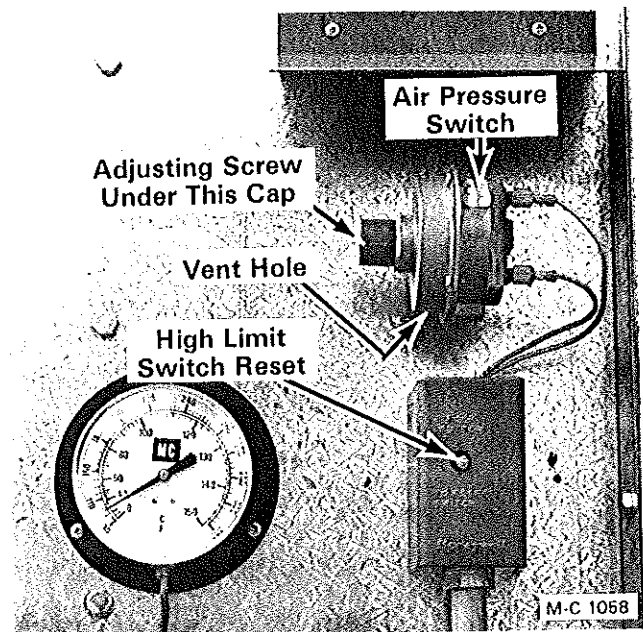


Figure 34

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, wait one minute, then ON again for another "trial ignition" period.

- G. If the ignition switch is flipped OFF and ON too fast, the ignition board circuit breaker will trip out, see step H.
- H. 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. This circuit breaker protects the ignition board from heat build up due to repeated ignition attempts.
- I. If the burner fails to light, check the electrode, 10 second delay and ignition board as explained under "115 Volt Direct Spark Ignition System" on page 25.
- J. If the ignition system is good, check the Gas Solenoid Valves as explained on page 28. They may be defective stopping gas flow to the burner.
- K. If the burner lights for 5 seconds and goes out or the gas solenoid valves chatter check the following:
 1. Below S/N 47164 - The tips of the electrode are not immersed in the flame or the gas pressure is too high or too low.
 2. Above S/N 47163 - The remote sensor is not immersed in the flame, the ceramic insulator is cracked, the wire is defective or the gas pressure is too high or too low.
- L. 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. After the fan and burner has been checked, turn off the gas supply to the dryer. Turn off and lock the electric power supply. Lock the control cabinet doors.

115 Volt Direct Spark Ignition System

General

The 115V direct spark ignition system consists of an electronic ignition board and a direct spark ignition electrode. A remote sensor was added as standard equipment starting with S/N 47164, see Figure 35.

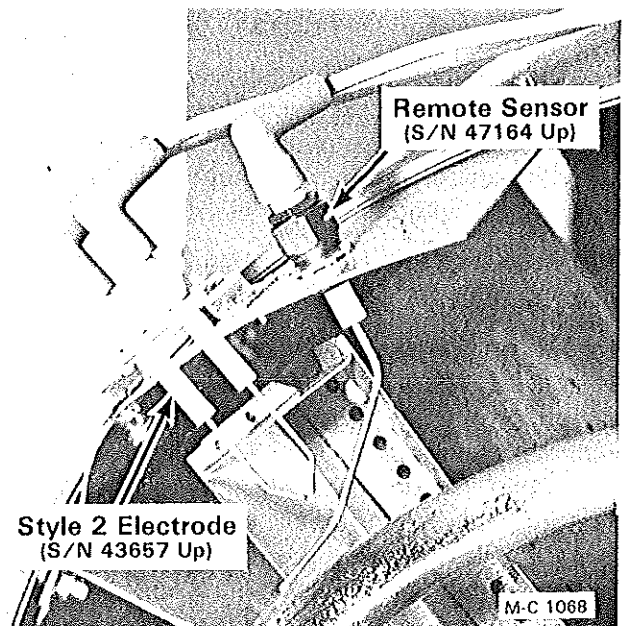


Figure 35

For ignition to occur the dryer must be running and the Power, High Limit and Air Pressure lights on the control panel must be on.

Wiring

Below S/N 46799 - The dryer is wired so that the current flow from the control cabinet goes to the High Limit Switch, Air Pressure Switch, Ignition Switch and then to the ignition board. This is a safety feature that prevents ignition if the High Limit and/or the Air Pressure switches are not activated.

S/N 46799 thru 47163 - 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 and then to the ignition board. This is a safety feature that prevents ignition if the High Limit and/or the Air Pressure switches are not activated, or if the fan is not running.

S/N 47164 Up - 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 High Limit or Air Pressure switches are not activated, or if the fan is not running.

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 the burner has been shut down for any reason.

Operation

When the ignition switch is flipped on, the ignition board is energized 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.

NOTE: S/N 47164 Up - The spark will occur 10 seconds after the ignition switch is flipped on.

Dryers below S/N 47164 - The electrode provides the spark for ignition and also senses the presence of the flame. A small amount of electrical current passes through the flame from one tip of the electrode to the other completing the electrical circuit. If the tips of the electrode are not immersed in the flame, the circuit will be broken and the ignition system will "lock out".

Dryers above S/N 47163 - 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".

All Dryers - 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).

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.

Testing

If the ignition system "locks out", flip the ignition switch OFF, wait one minute, then ON again for another "trial ignition" period. If the ignition switch is flipped OFF and ON too fast, the ignition board circuit breaker will trip out. Push the ignition reset button on control panel.

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

1. 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.

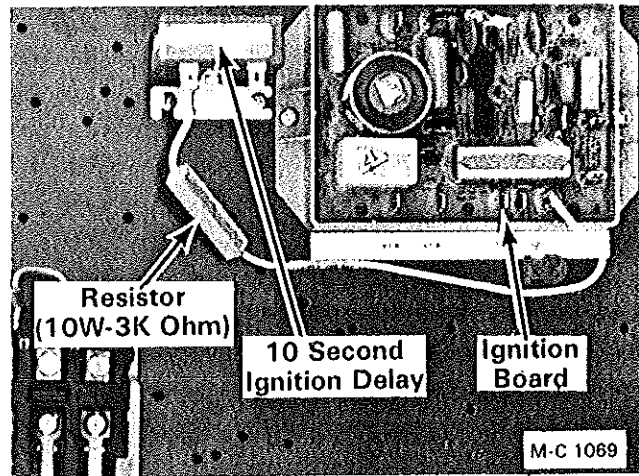


Figure 36 - 10 Second Ignition Delay
(Above S/N 47163)

Carefully dry the ignition board with warm air. Also check the electrode to be sure it is dry.

2. Look for loose, burned or broken wires, poor or corroded connections. Check the 10 second delay (Above S/N 47163), see Figure 36, and the ignition switch with a voltage tester.
3. If the burner still does not light, flip the ignition switch OFF and test the ignition board. The ignition board does not have to be removed for this test. Proceed as follows:
 - A. Turn off the electric power to the dryer and close the burner gas main hand valve (handle 90° to the piping).

NOTE: If the dryer is empty, 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 operate the dryer with the air pressure switch disconnected or by-passed.

- B. Remove the electrode wires from terminals E-1 and E-2 on the ignition board, see Figure 37 and 38.
- C. Using a new properly gapped electrode (1/8 inch) or an automotive spark plug gapped to (1/8 inch) connect terminals E-1 and E-2 on the ignition board to the test electrode or spark plug with jumper wires, see Figure 39.

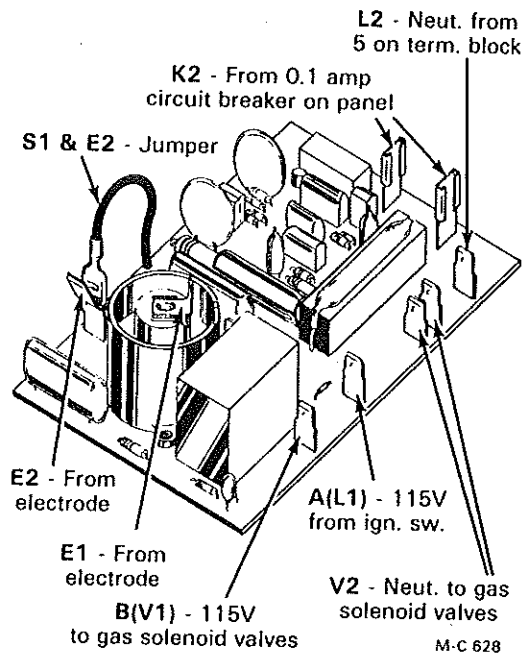


Figure 37 - Ignition Board w/o Remote Sensor

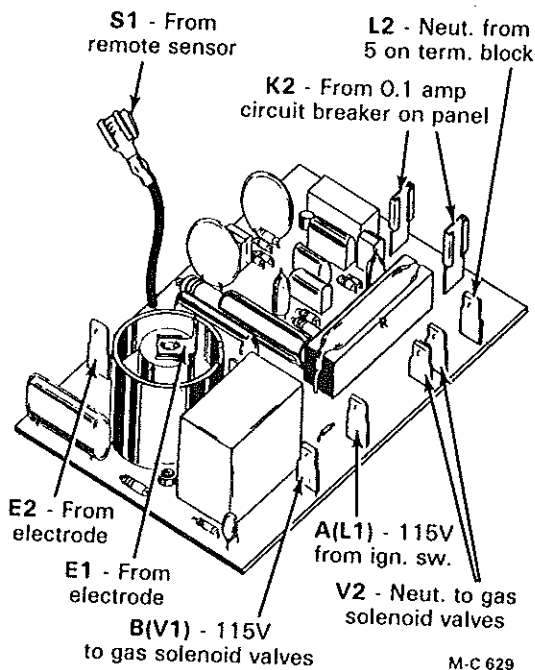
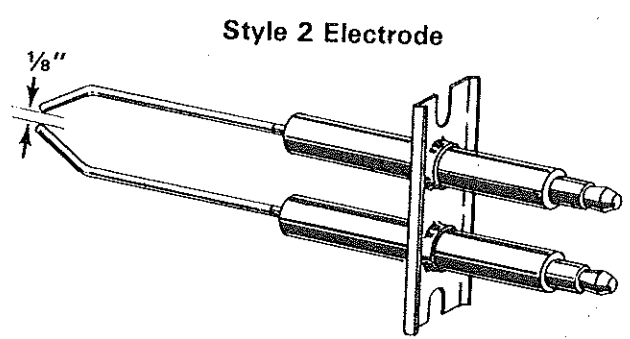
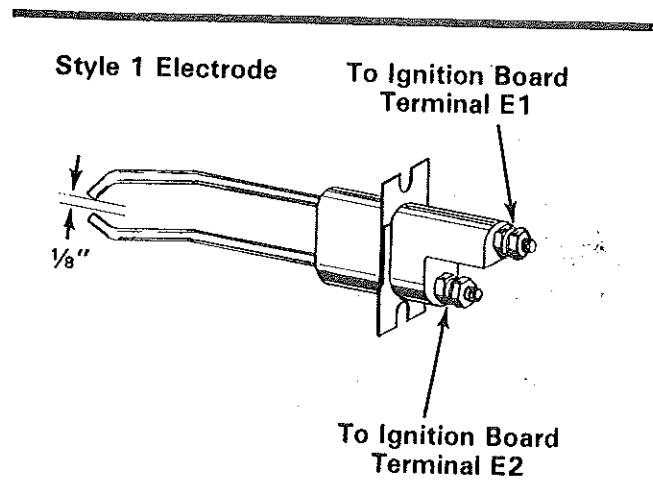


Figure 38 - Ignition Board w/Remote Sensor



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.

D. Turn on the electric power supply, start the fan and flip the ignition switch ON and check for spark at the test electrode (or spark plug). If a spark does not occur, the ignition board is defective and must be replaced.



NOTE: On Style 2 electrodes, wires can be connected to either terminal.

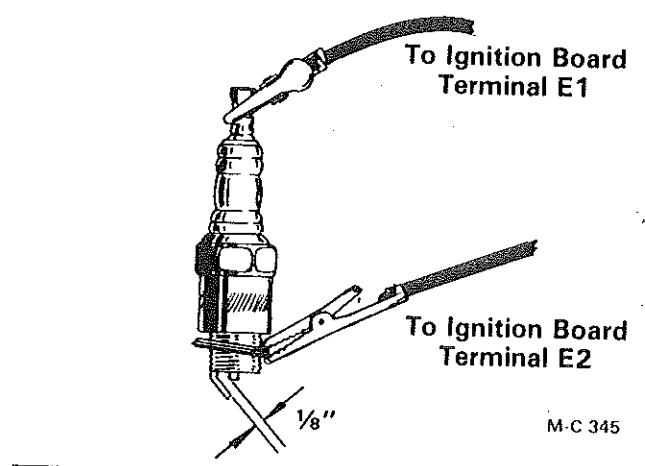


Figure 39

7. If there is a spark on the test electrode or spark plug, the electrode on the dryer or the electrode lead wires are defective.
 - A. Check the condition of the electrode lead wires. The wires must be replaced if they are found to be non-conductive or shorted.
 - B. Examine the electrode in the dryer for damage or improper gap. The gap must be 1/8

inch. Also check for porous or cracked ceramic insulator(s) that could hold moisture. The electrode cannot be repaired. If it is damaged or defective, it must be replaced.



CAUTION: After completing tests or repairs, the jumper wire on the air pressure switch must be removed before starting the dryer.

Checking 115 Volt Gas Solenoid Valves

1. Close the gas main hand valve (handle 90° to the piping). Turn off the electric power to the dryer. Flip all of the toggle switches on the control panel to the OFF position.
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 operate the dryer with the air pressure switch disconnected or by-passed.

3. Turn on the electric power supply and start the fan.
4. 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 37 and 38.
5. Flip the ignition switch ON, the voltmeter should read 115V.

NOTE: S/N 47164 Up - The voltmeter should read 115V after the 10 second ignition delay.

6. If the voltmeter does not read 115V, check the 10 second delay (if equipped) and the ignition switch with a voltage tester. Also check for loose or broken wires from the ignition switch to the ignition board.

7. If there is 115V between terminal **A(L1)** and **L2** check for 115V at terminal **B(V1)** on the ignition board, see Figure 37 and 38. Connect a voltmeter between terminal **V2** and **B(V1)** on the ignition board.
8. Flip the ignition switch OFF then ON. After the 10 second delay the voltmeter should read 115V. If not, the ignition board is defective and must be replaced.

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

9. 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 the top of the solenoid valve. Hold a screw driver near the coil and flip the ignition switch 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.

10. 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 housing for correct reassembly. Pay particular attention to the position of the diaphragm.

11. 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.

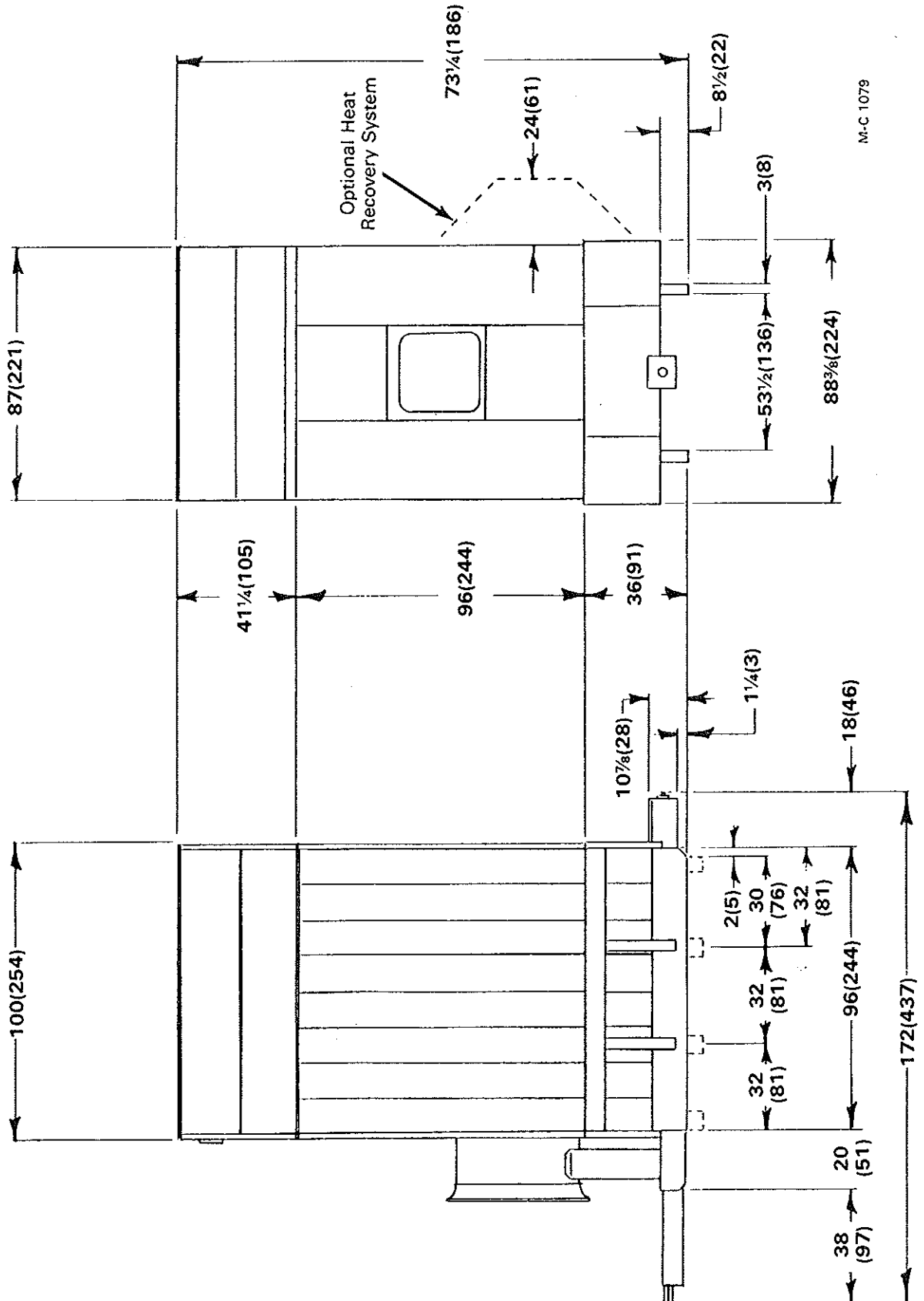


CAUTION: After completing tests or repairs, the jumper wire on the pressure switch must be removed before starting the dryer.

Dryer Dimensions

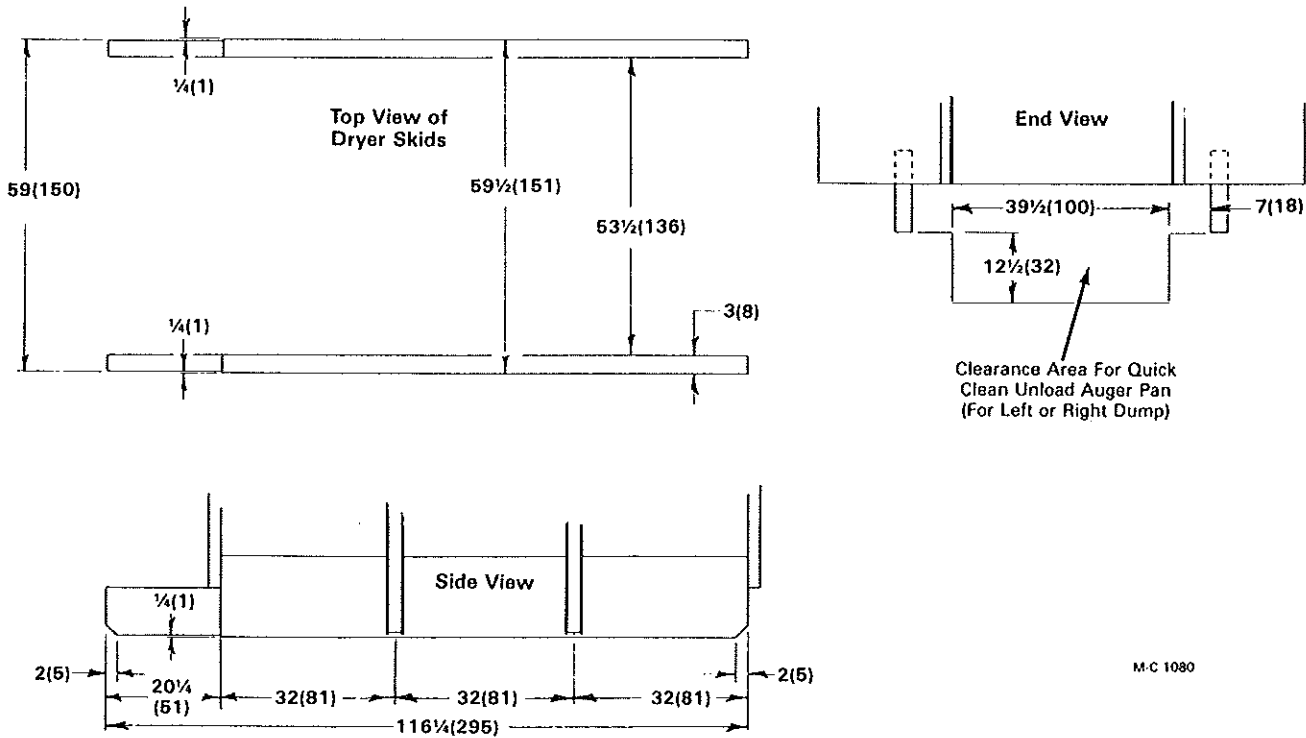
All Dimensions Are In Inches (Centimeters)

NOTE: Inside dimensions of the unload auger discharge are 10⁵/₈" x 16".



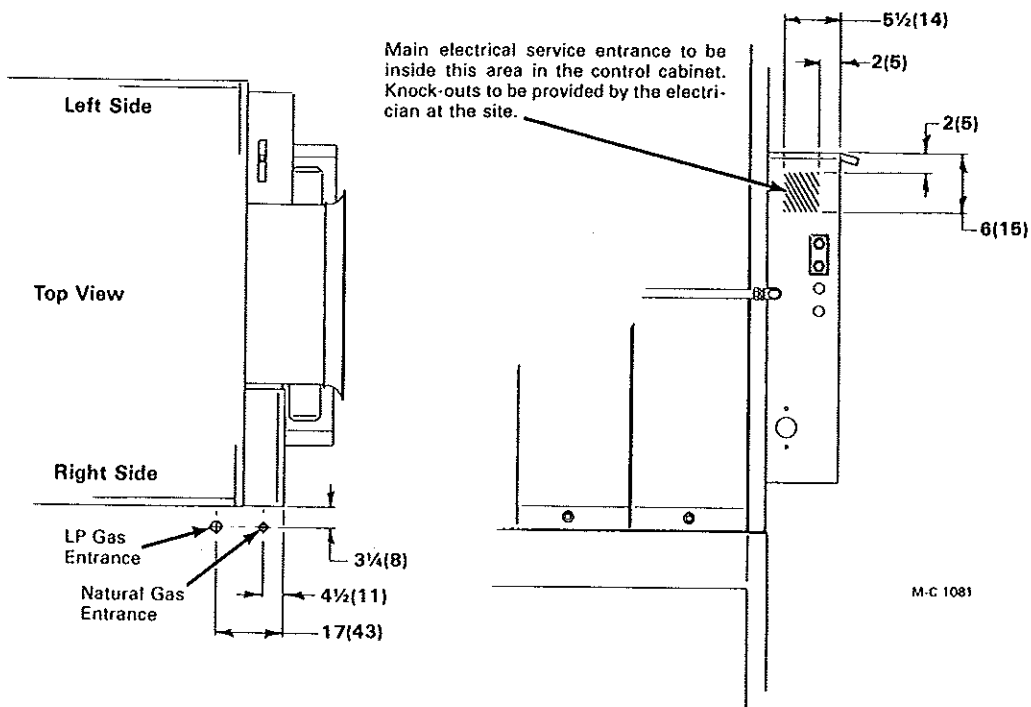
Dryer Base Dimensions

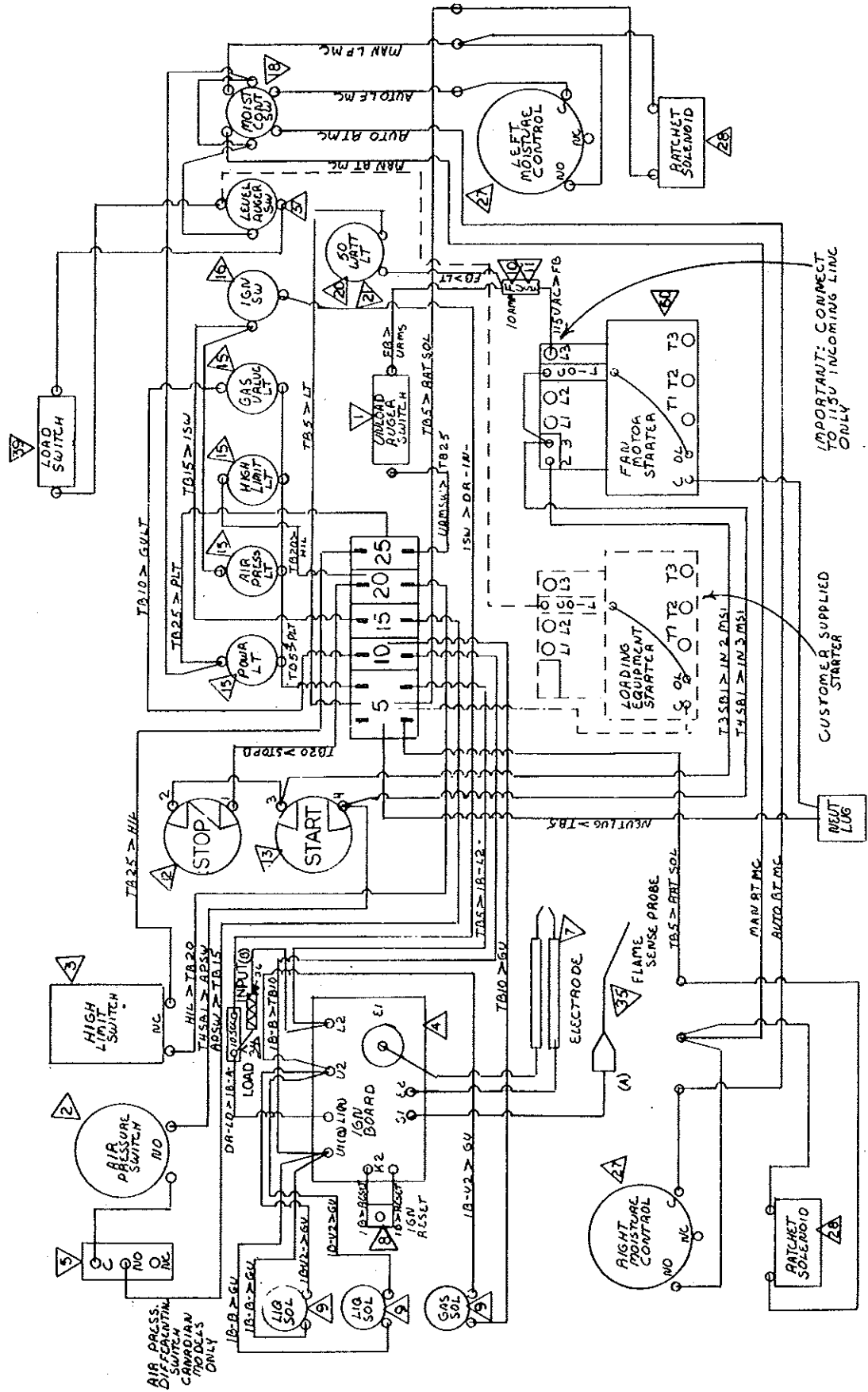
All Dimensions Are In Inches (Centimeters)



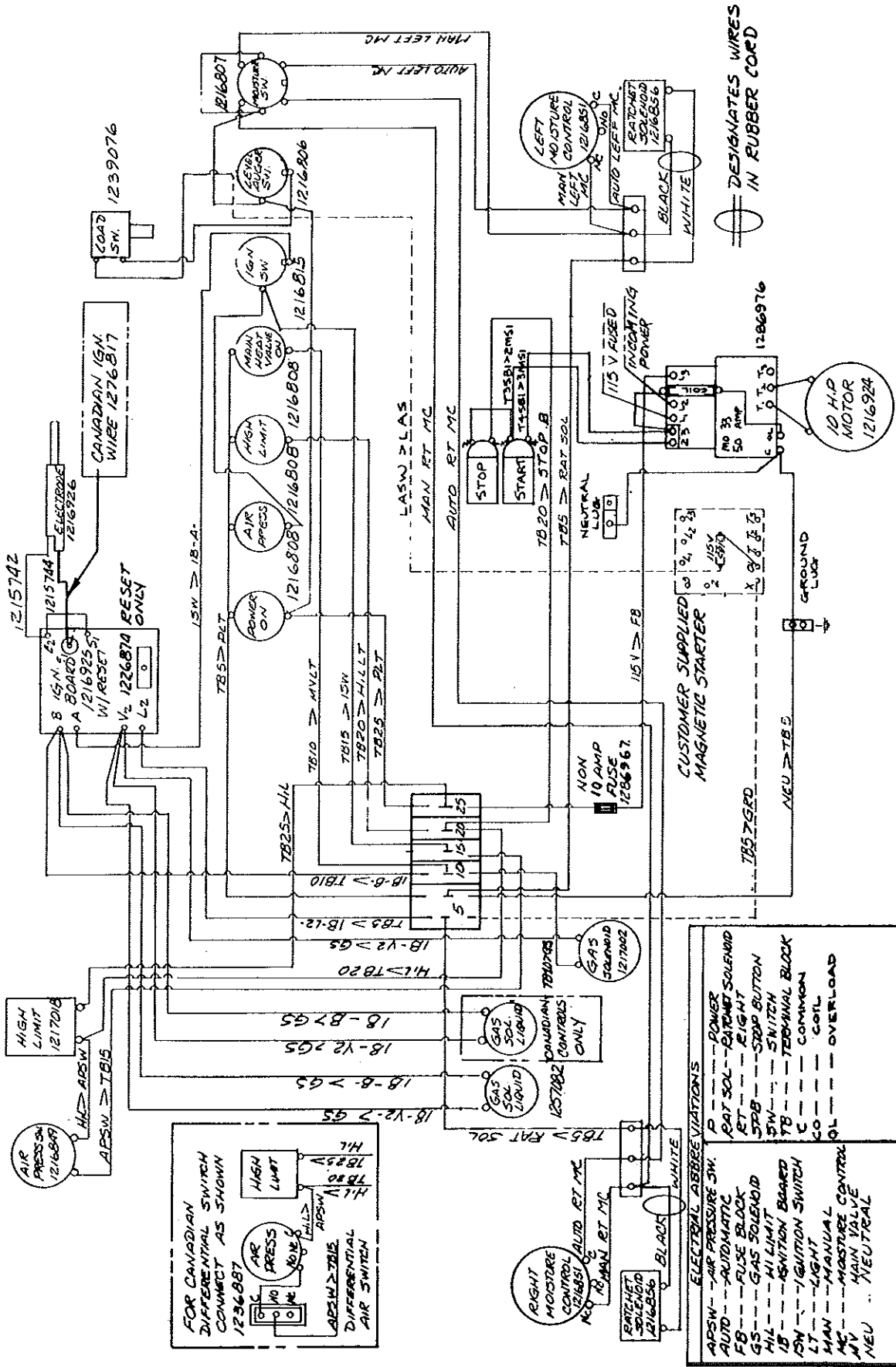
Electrical and Gas Piping Entrance Dimensions

All Dimensions Are In Inches (Centimeters)

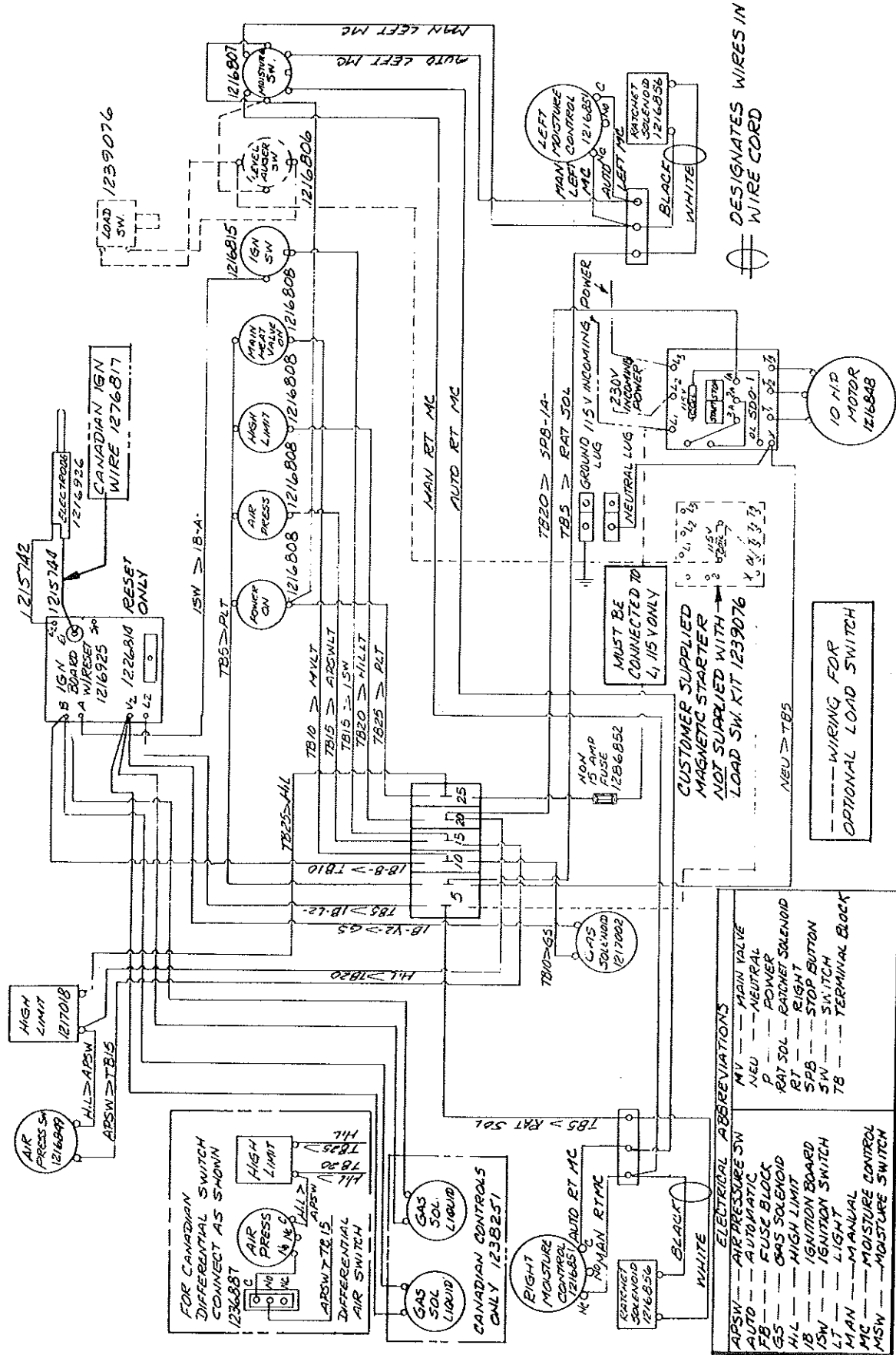




Model 375 EM & EMS Starting With Serial No. 46799
 (Starting With Serial No. 47164 Remote Sensing and 10 Second Delay Were Added)



Model 375 EMS Below Serial No. 46799



DESIGNATES WIRES IN WIRE CORD

MUST BE CONNECTED TO 115 V ONLY

CUSTOMER SUPPLIED MAGNETIC STARTER NOT SUPPLIED WITH LOAD SW KIT 1239076

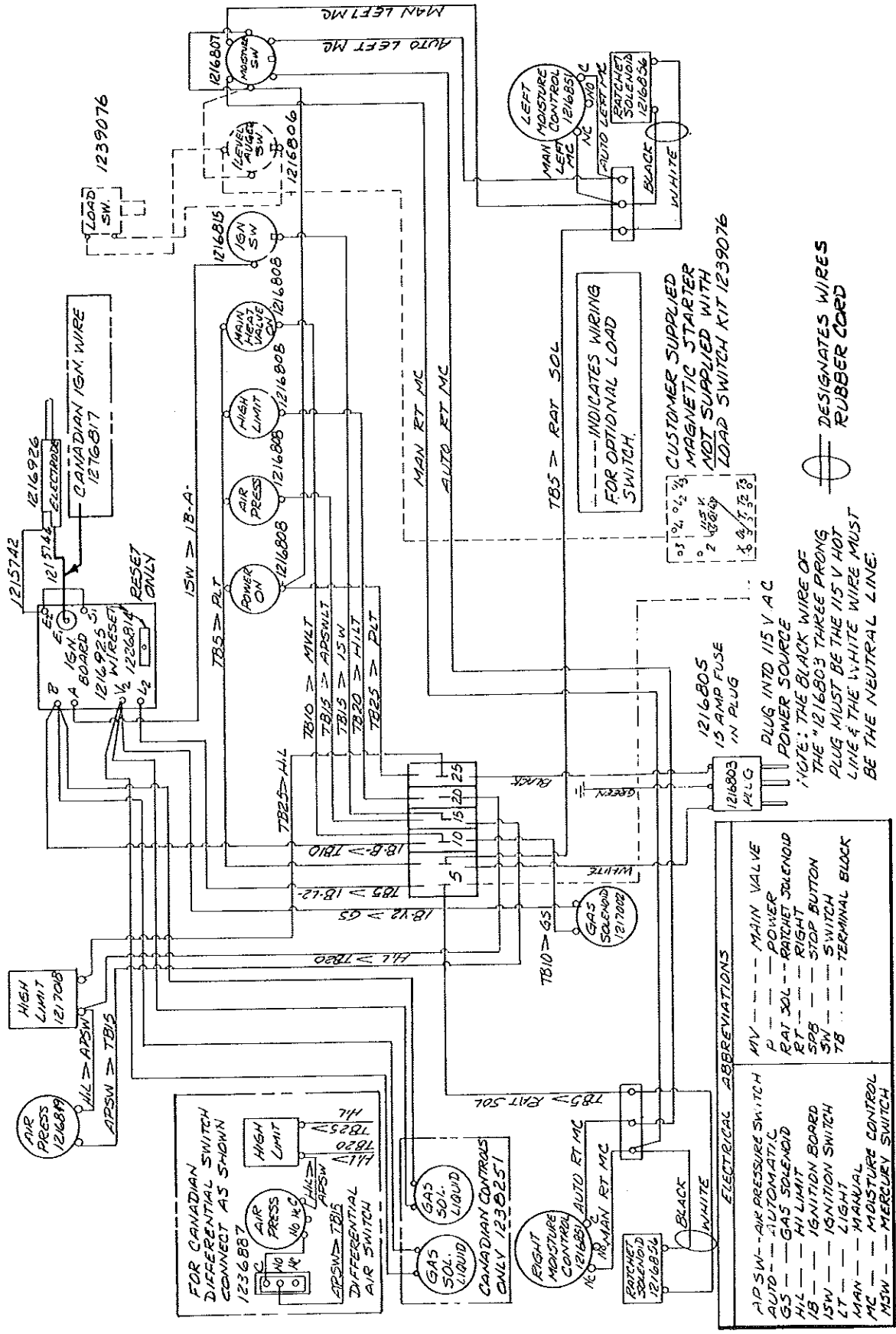
10 HP MOTOR 1216848

OPTIONAL WIRING FOR WIRING FOR OPTIONAL LOAD SWITCH

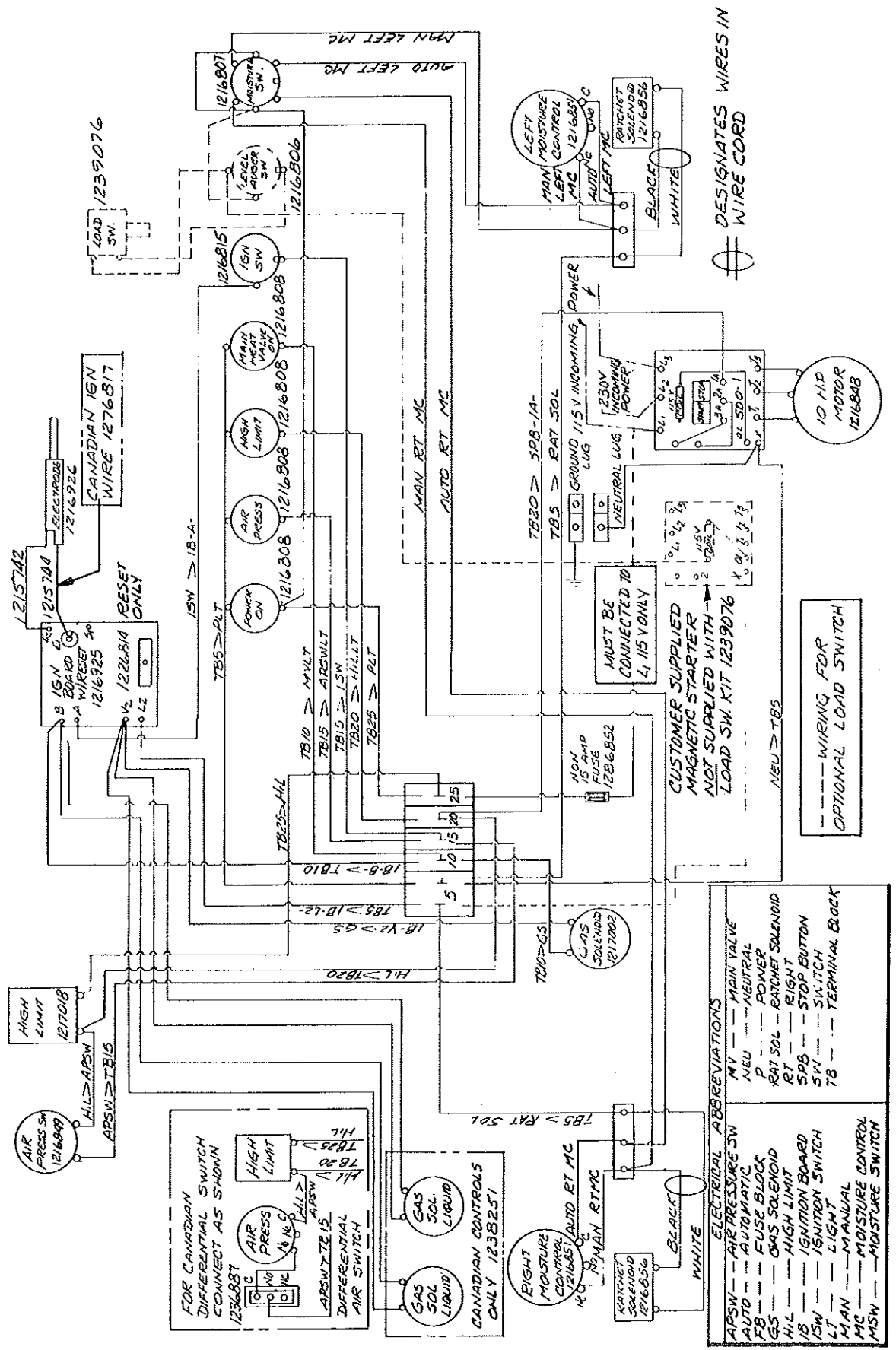
ELECTRICAL ABBREVIATIONS

APSW	--- AIR PRESSURE SW	MV	--- MAIN VALVE
AUTO	--- AUTOMATIC	NEU	--- NEUTRAL
FB	--- FUSE BLOCK	P	--- POWER
GS	--- GAS SOLENOID	RAT SOL	--- RATCHET SOLENOID
H/L	--- HIGH LIMIT	RT	--- RIGHT
IB	--- IGNITION BOARD	SPB	--- STOP BUTTON
ISW	--- IGNITION SWITCH	SW	--- SWITCH
LT	--- LIGHT	TB	--- TERMINAL BLOCK
MAN	--- MANUAL		
MC	--- MOISTURE CONTROL		
MSW	--- MOISTURE SWITCH		

Model 375 EM Below Serial No. 46799



Model 375 B115 Below Serial No. 47164



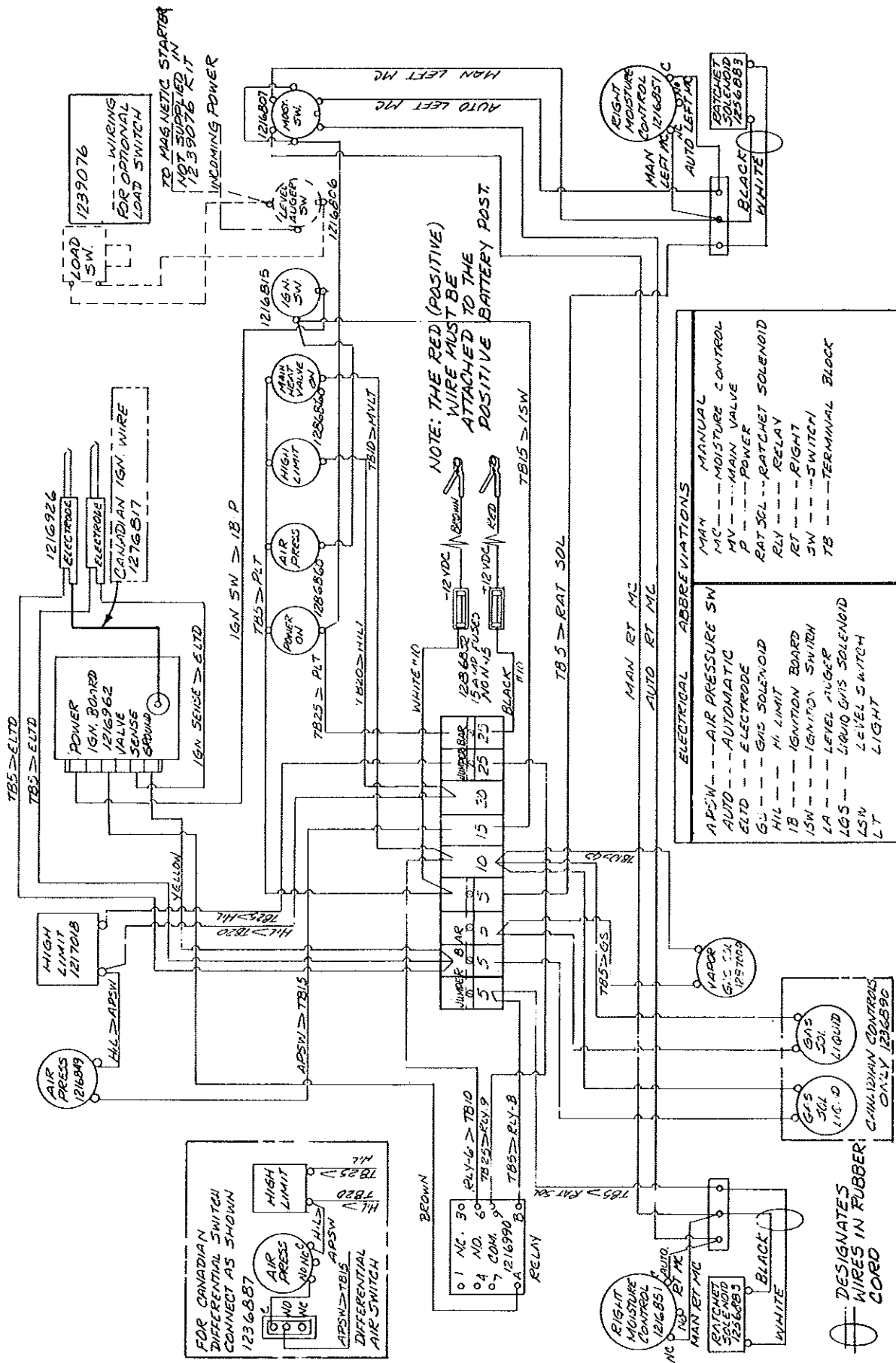
○ DESIGNATES WIRES IN WIRE CORD
 ○ WHITE
 ○ BLACK

--- WIRING FOR OPTIONAL LOAD SWITCH

- ELECTRICAL ABBREVIATIONS**
- APSW --- AIR PRESSURE SW
 - AUTO --- AUTOMATIC
 - FB --- FUSE BLOCK
 - GS --- GAS SOLENOID
 - H/L --- HIGH LIMIT
 - IB --- IGNITION BOARD
 - LT --- LIGHT SWITCH
 - MAN --- MANUAL
 - MC --- MOISTURE CONTROL
 - MSW --- MOISTURE SWITCH
 - MV --- MAIN VALUE
 - NEU --- NEUTRAL
 - P --- POWER
 - RAT SOL --- RATCHET SOLENOID
 - RT --- RIGHT
 - SPB --- STOP BUTTON
 - SW --- SWITCH
 - TB --- TERMINAL BLOCK

- FOR CANADIAN DIFFERENTIAL SWITCH CONNECT AS SHOWN 1236887**
- HL --- HIGH LIMIT
 - APSW --- AIR PRESS SW
 - MSW --- MOISTURE SWITCH
 - MS --- MAIN RT MC
 - ASW --- AUTO RT MC
 - MS --- MOISTURE CONTROL
 - MS --- MOISTURE SWITCH

Model 375 EM Below Serial No. 46799



- ELECTRICAL ABBREVIATIONS**
- APSW --- AIR PRESSURE SW
 - AUTO --- AUTOMATIC
 - ELTD --- ELECTRODE
 - G.L. --- GAS SOLENOID
 - HIL --- HI LIMIT
 - IB --- IGNITION BOARD
 - ISW --- IGNITION SWITCH
 - LA --- LEVEL AUGER
 - LGS --- LIQUID GAS SOLENOID
 - LNS --- LIQUID GAS SWITCH
 - LT --- LIGHT
- ELECTRICAL ABBREVIATIONS**
- MAN --- MANUAL
 - MC --- MOISTURE CONTROL
 - MV --- MAIN VALVE
 - P --- POWER
 - RAT SOL --- RATCHET SOLENOID
 - RLY --- RELAY
 - RT --- RIGHT
 - SW --- SWITCH
 - TB --- TERMINAL BLOCK

TO MAGNETIC STARTER
NOT SUPPLIED IN
12 39076 KIT
WIRING
FOR OPTIONAL
LOAD SWITCH

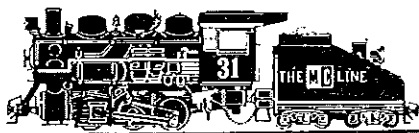
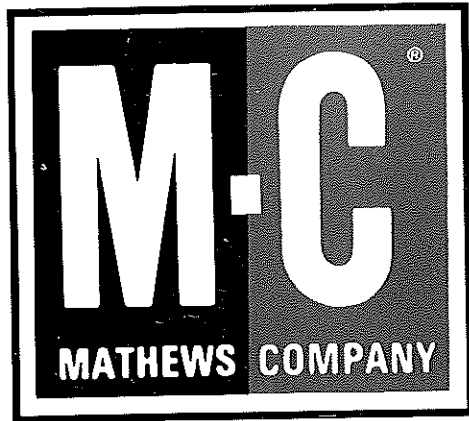
1216926
ELECTRODE
1216962
CANADIAN IGN. WIRE
1276817

FOR CANADIAN
DIFFERENTIAL SWITCH
CONNECT AS SHOWN
1236887

NOTE: THE RED (POSITIVE)
WIRE MUST BE
ATTACHED TO THE
POSITIVE BATTERY POST.

DESIGNATES
WIRES IN RUBBER
CORD

Model 375 B12



Iron Horse Quality