$2.00

ASSEMBLY-OPERATION AND MAINTENANCE INSTRUCTIONS

# CONTINUOUS GRAIN DRYER

## MODEL '250 E'

FROM SERIAL NO. 19,626

DM 71

Mathews Co./ 500 Industrial Avenue, Crystal Lake, IL 60014, U.S.A.
815/459-2210
Form No. D189

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# MODEL "250E" DRYER DIMENSIONS

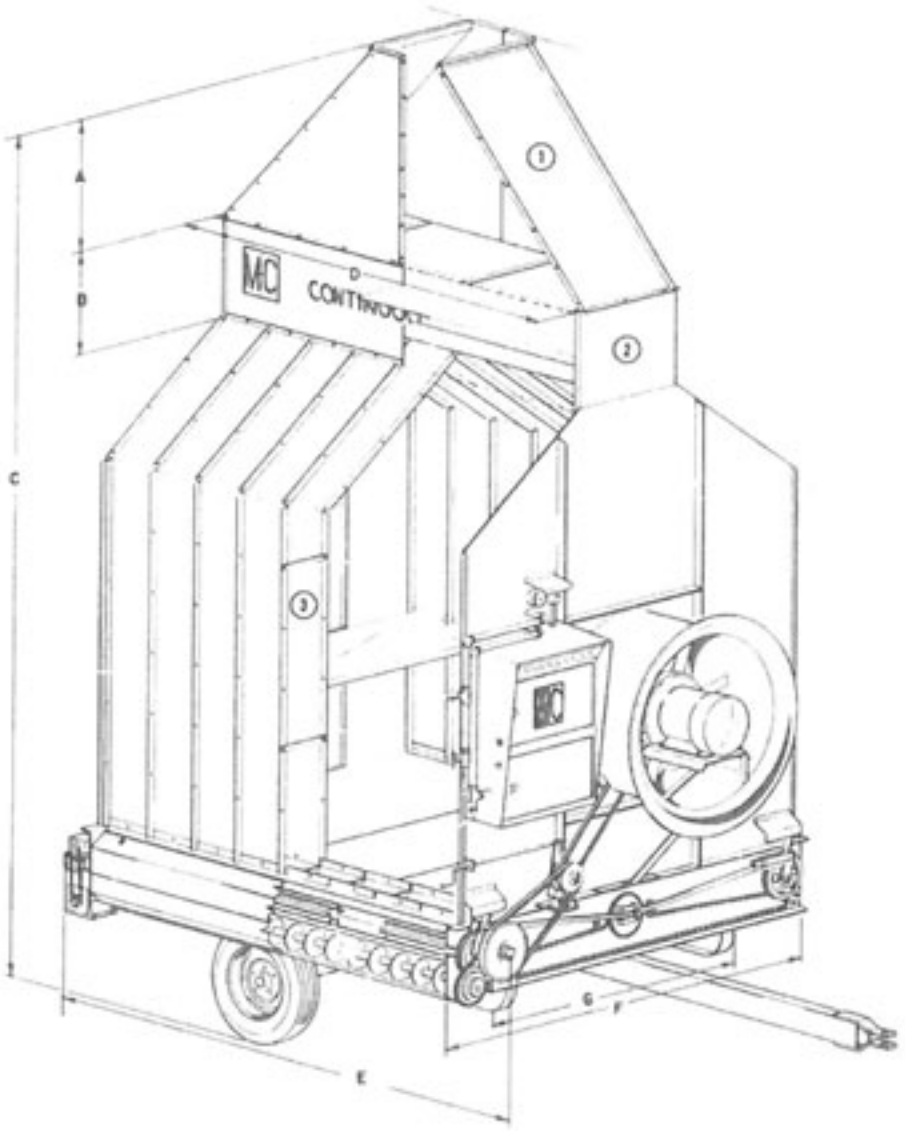
A 3' – 4" EXTENSION HOPPER
B 1' – 6" HOPPER
C 15' – 10" OVERALL HEIGHT (ON WHEELS)
D 8' – 0" COLUMN LENGTH
E 11' – 3" OVERALL LENGTH
F 8' – 0" OVERALL WIDTH
G 5' – 2" SKID WIDTH
*6' – 11" USABLE SKID PAD LENGTH (NOT SHOWN)

9' – 8" SHIPPING HEIGHT

*SHIPPING WEIGHT 3,360#

HOLDING CAPACITY

| | | |
|---|---|---|
| #1. | EXTENSION HOPPER | 47 BU. |
| #2. | HOPPER | 21 BU. |
| #3. | GRAIN COLUMNS | 86 BU. |
| | TOTAL | 143 BU. |



# "250E" DRYER INSTALLATION INSTRUCTIONS

1. Installation of the dryer.

   If the dryer is to remain portable, set it up with 2 blocks directly in front of the axle and blocks on the four corners of skids.

   If permanent installation is desired, remove axle and block dryer or lay a concrete slab for the machine to rest on. Use a vibration pad between skid and concrete. Do not use hollow core concrete blocks.

2. After placing the dryer in its desired location, assemble and install hopper on the machine. (See Page 10).

3. Place fan guard on machine using 5/16 x 1-1/2" J-Bolt (1218255). Mount wire guard brackets on machine; 2 on bottom of front channel, 1 on the orifice brace, and 1 on each end panel, outer flange. Place front guard on brackets and fasten. (See Page 13).

4. Install variable speed crank arm on machine. (See Page 11). Remove existing bolts in front panel and use these holes for mounting.

5. OPTIONAL
   Install and wire loading switch (1201011). See Wiring diagram and Page 17.

6. Connect 110V grounded power to 3-pronged female plug (shipped with machine). Place all switches on control panel in "OFF" position. Connect female plug to plug receptacle on machine.

7. Wire 220V single-phase power into the starter box. Use terminal L1 and L2 in the starter box. For three-phase machine, use L1, L2, and L3. Refer to wiring diagram, Page 17.

8. Advise your LP gas supplier that the dryer takes liquid gas from the tank (not vapor). When the gas dealer hooks up the system, have him use the No. 1217021 excess flow valve furnished with the dryer. The No. 1217021 excess flow valve will shut off flow of gas, should the line break between tank and dryer. The valve furnished with the dryer will shut off quicker than those normally furnished by the gas supplier. We provide the valve as an extra safety precaution. Use a minimum of 1/2" ID tubing between tank and dryer – on runs over 100 feet, use a larger diameter. Connect line from tank to short length of rubber hose on dryer.

9. KEEP ALL GUARDS AND SHIELDS IN PLACE!

# "250E" OPERATING INSTRUCTIONS

NOTE
Turn Fan over by hand to make sure all sprockets, pulleys, feed rolls, and augers have no obstructions in them and turn freely.

1. Fill dryer with grain.

2. Turn off three switches on control cabinet, (A,B,C,) close main valve and turn flip valve off on left side of dryer. (See photo below).

3. Start Fan.

4. Open flip valve on right side of machine (LP only).

5. Open main hand valve slowly 3/4 of a turn.

6. Turn pilot switch to on position "A". Ignition will take place in six seconds. If not, turn switch "OFF", pause a few seconds, and turn it back on. (If ignition did not take place, refer to page 5 for trouble shooting.

7. After ignition, turn hand valve all the way open slowly and set pressure regulator.

8. Adjust modulating valve to desired temperature, by watching thermometer and turning adjusting screw. (DO NOT CLOSE TIGHTLY!)

9. In order to dry all of the corn in the upper section of the machine, it will require approximately one hour of continuous heat to dry the first load from 30% to 12% moisture.

   Make sure automatic moisture control switch "C" is in the "OFF" position. This will disengage the ratchet solenoids and keep the dryer from unloading.

10. The cooling section of the dryer will have wet grain in it, and it will not be dried on the first load. This grain will have to be re-cycled back into the heating section.

11. For safe bin storage the grain is normally dried to 13% moisture. After one hour of drying on the first load, turn moisture control switch to "manual" position. This will engage ratchet solenoids and begin unloading the grain. When grain (in cooling section) has moved through and dried corn begins to auger out, test it for moisture content. If moisture content is too high, slow the unloading down or vice-versa.

12. To slow the speed of unloading, a combination of two adjustments is available:

    (A) By turning variable crank arm clockwise to slow unloading and counter-clockwise to speed unloading. This is normally used for fine adjustment.

    CAUTION: Run through the complete cycle from fast to slow at least once every day when machine is being operated.

    This will keep all moving parts free. Do not put extreme pressure on belts.

    IMPORTANT: Adjust variable speed pulley only when machine is operating.

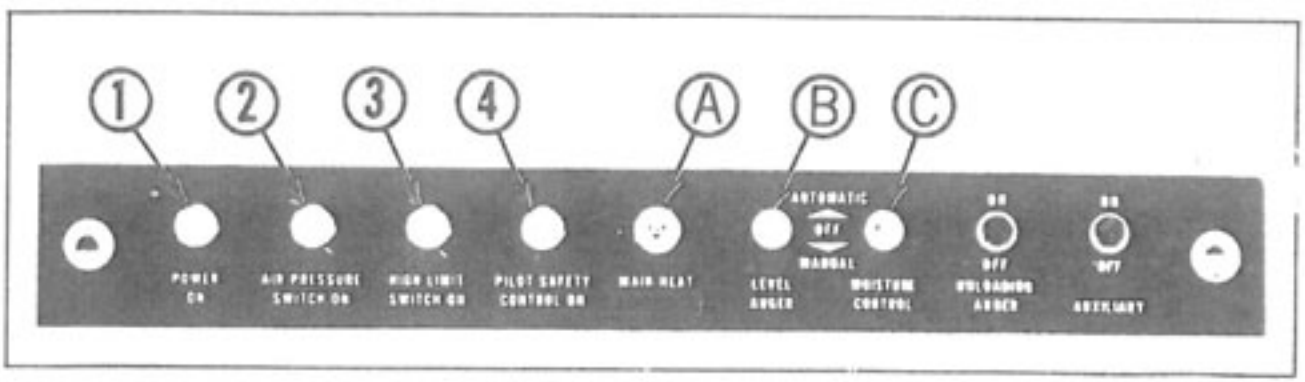
*Control Lights*

*No. 1 Lights when electric power is on.*

*No. 2 Lights when fan is running (air pressure completes circuit to ignition board.*

*No. 3 Lights when high limit control circuit is closed. This indicates the high limit temperature safety device is operating.*

*No. 4 Lights when main solenoid opens and when ignition board is operating.*



NOTE

The feed rolls can be adjusted independently of the side augers by sliding the "eccentric connecting rod" along the slotted bracket on the eccentric sprocket. The eccentric sprocket is located at the center of the base on the drive end of the dryer. Moving the eccentric connecting rod toward the center of the sprocket will decrease the stroke and slow down the unloading of the feed rolls. Moving it away from the center of the sprocket will increase the stroke and speed up the unloading of the feed rolls.

CAUTION: TAKE NO MORE THAN 6 TEETH!

Be careful not to run more grain out of the feed rolls than the side augers can carry away! Six teeth is about the maximum adjustment that the augers can handle.

13. IMPORTANT: Never let the level of grain in your dryer go below the top edges of the upper red wet holding bin. When this happens the air pressure inside of the dryer will drop and cause inefficiency and possible shut down.

14. After you have your dryer operating properly and drying your grain to the desired moisture content, you are ready to switch it to "automatic moisture control."

    Refer to the following chart if you are drying shelled corn and set your moisture control dial – (Located on the left front side of your dryer) at the correct number.

APPROXIMATE SETTING
FOR SHELLED CORN AND MOST SMALL CORNS

| Thermostat Setting | Set Control Dial At — | To Get Percent Moisture |
|---|---|---|
| 140° | 3.5 | 13 – 14% |
| 180° | 4.0 | 14 – 15% |
| 180° | 4.5 | 13 – 15% |
| 180° | 5.0 | 12 – 13% |

Place 3-way switch for moisture control in the "automatic position."

When the combined temperatures of the air passing through the grain and the grain temperature are equal to the calibrated setting on the control dial, the ratchet pawls will engage the ratchet wheels and feed grain out of the dryer. Check the moisture content of the grain coming out of side auger by taking a moisture test. If the moisture is too high, increase the setting of the control one mark at a time until the correct moisture content is reached. Allow ample time between adjustments for the machine to correct itself, suggested time to be 1 hour.

Adjust the grain unloading mechanism to correspond with the rate of feeding of the grain by the automatic moisture control. These adjustments will only be slight if you have had your dryer operating correctly before switching it to "automatic moisture control."

The speed of the variable drive should be fast enough to cause the automatic moisture controls to operate intermittently. If the unloading mechanism is working too slowly, then the moisture controls will operate constantly and the grain will come out drier than the chart indicates.

15. Your dryer is a continuous flow dryer and it is necessary to hold the grain in the dryer for a period of time when finishing a run. Ratchet pawls should be disengaged by turning the moisture control switch to the "off" position. This will give the grain remaining in the dryer time to become dried before the heat automatically turns off. Allow about 30 minutes of drying time for high moisture grain (30%) and proportionately less for drier grain. Then turn the moisture control switch to "manual" position for unloading of dryer.

16. If you should accidentally get a foreign object in the grain feeding mechanism, shear pin on sprocket No. 1216401 at lower left side (as you face drive end of dryer) will help to protect the feeding parts from breakage. Replace this pin when necessary. Do not use hardened shear pins.

17. If you have followed the instructions carefully, your dryer will operate continuously as long as you keep it full of grain.

# TROUBLE SHOOTING

1. IF FLAME DOES NOT LIGHT:
   (A) Electrodes not positioned in flame properly. (See page 6).
   (B) Electric power not on. (Will not run).
   (C) 15 AMP fuse blown. (Will not run).
   (D) Machine not grounded. Connect 3 wire connectors to 110V. grounded service. (Will not run).
   (E) Gas not on.
   (F) Gas solenoid not opening — (faulty or loose wire).
   (G) High limit control (reset) tripped out. (Will not run).
   (H) Air pressure switch not functioning. (See #2 below).
   (I) Broken wire from ignition board to electrodes.
   (J) Ignition board faulty — replace only.

2. AIR PRESSURE SWITCH NOT FUNCTIONING:
   (A) Dryer must be full of grain to operate. If dryer runs out of grain, t air will escape freely and loss of air will cause pressure switch to open circuit.
   (B) Air tube from pressure switch into dryer may be filled with chaff.

3. HEAT SHUTS OFF:
   (A) Dryer has run low of grain.
   (B) Modulating valve may be faulty.
   (C) High limit control may have cut out. (Will shut down fan).
   (D) Gas solenoid may be faulty.
   (E) Faulty or broken electrodes.
   (F) Out of gas.
   (G) Drying temp. too low.

4. NOT ENOUGH HEAT:
   (A) Hand valve is not fully open.
   (B) Adjust modulating valve.
   (C) Increase pressure at pressure regulator. (This is set at factory, however, to increase gas flow, adjust screw at side of pressure regulator.)

5. GAS LINES FROSTING UP:
   (A) When first starting burner, open the main hand valve only partially until the unit becomes warm.
   (B) Adjust vaporizer ring.

6. ELECTRIC CIRCUIT OUT OF ORDER:
   (A) Check circuit with wiring diagram furnished with instructions. Page 17.

7. AUTOMATIC MOISTURE CONTROL DOES NOT WORK:
   (A) Solenoid is burned out. Check and make replacement. In the meantime operate dryer manually by blocking solenoid up.
   (B) Loose or broken wire at solenoid.

# FENWAL IGNITION

OPERATION

Upon a call for heat, power is applied to the control board, creating the spark and powering the gas valve. Electronic timing allows the system to continue to spark and hold the gas valve open for a specified trial for ignition period. If a flame is not present at the end of the trial for ignition period, the system will lockout. If a flame is present, the system will continue to operate; provided the electrodes are immersed in the flame.

In the spark source, a capacitor is charged and discharged rapidly through the primary of high voltage transformer. The current to charge the capacitor also energizes the valve control circuit so that as long as this action continues, the valve will remain open. The capacitor is discharged by a solid state switch, triggered by a neon circuit.

The flame detector monitors the spark current and the flame conductance to ground. If the spark of the flame is not present, feedback to the spark source removes power from the valve control circuit.

# ELECTRODE POSITIONING

## LOCATION OF ELECTRODE TIP

The electrode assembly should be located so that the tips are inside the flame envelope and about 1/2 inch above the base of the flame. IMPORTANT: Ceramic insulator should not be within or close to the flame pattern. Study the illustrations before positioning the electrodes.

NOTE: Electrode assemblies are precision components and should not be adjusted or disassembled. Electrodes should have a gap spacing of 0.125" ± 0.032". If this spacing is not correct, return the electrode assembly to the factory for replacement. Electrodes within their ceramic casing are NOT field adjustable. Adjust only the electrode mounting bracket. WARNING: HIGH VOLTAGE.

## SAFETY CHECKS

1. Manually shut off the gas supply and apply power to the control board. The system shall lockout after the trial for ignition period. Check that there is no voltage output between terminals V1 and V2 using a suitable voltmeter or neon tester.

2. Manually open the gas valve and apply power to the control unit. The system shall lockout after the trial for ignition period and there shall be no voltage between terminals V1 and V2 under the following conditions:

(1) The low voltage electrode is shorted to the ground.
(2) The high voltage electrode is shorted to ground.
(3) The electrodes are shorted together.

NOTE

Recycle system before each test.

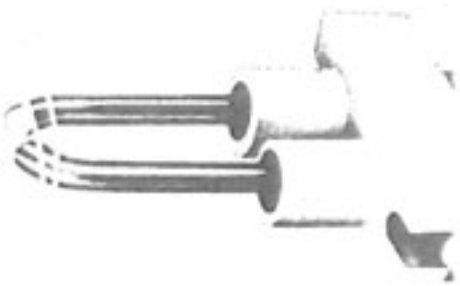
CAUTION

Use well insulated screwdriver for shorting electrodes.

## REPAIRS

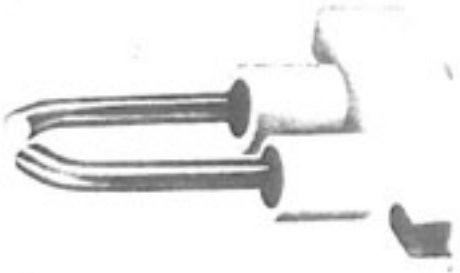
The Ignition System is not field repairable. Faulty units should be returned to the factory for repair or replacement.

**CORRECT**

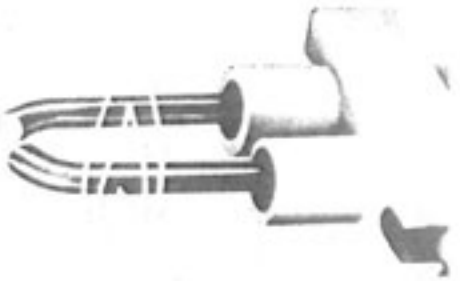


**PROPER LOCATION: Flame impingement on electrode tips only.**

**INCORRECT**



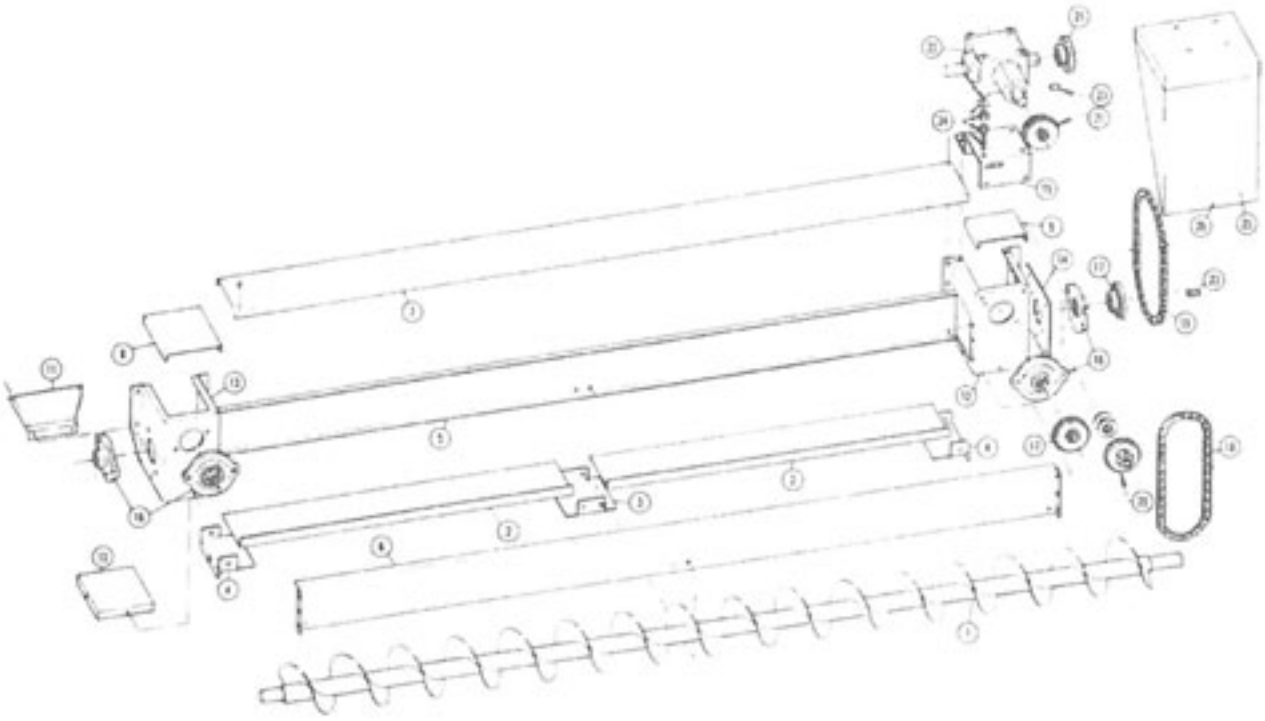
**IMPROPER LOCATION: Electrode tips not immersed in flame to proper distance.**



**IMPROPER LOCATION: Electrode tips immersed too far into flame.**

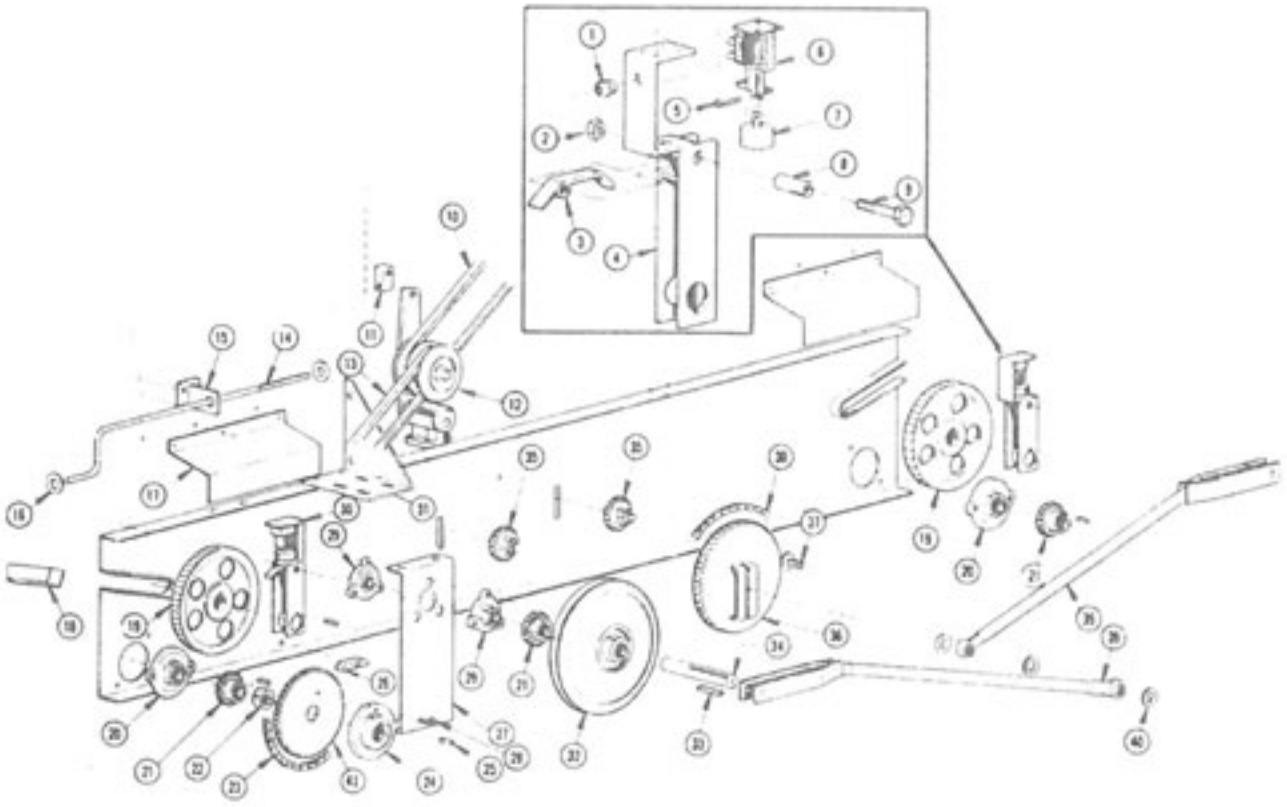
**CAUTION: HIGH VOLTAGE**

# CROSS AUGER ASSEMBLY
# 1211155



| REF NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | 1210344 | Cross Auger Weldment |
| 2 | 1252860 | Cross Auger Bottom Half |
| 3 | 1252859 | Center Support Cross Auger |
| 4 | 1252858 | End Supports Cross Auger |
| 5 | 1254786 | Cross Auger Side - Back |
| 6 | 1254793 | Cross Auger Side - Front |
| 7 | 1254787 | Cross Auger Top |
| 8 | 1254788 | Left Extension Housing Cover |
| 9 | 1254789 | Right Extension Housing Cover |
| 10 | 1254790 | Bottom Seal - Cross Auger |
| 11 | 1254791 | Rear Seal Plate |
| 12 | 1214664 | Right Cross Auger Extension Housing |
| 13 | 1214665 | Left Cross Auger Extension Housing |
| 14 | 1214530 | Cross Auger End Plate |
| 15 | 1214531 | Gear Box Mount |
| 16 | 1206000 | 2-Bolt Flange Bearing - 1-1/4" Bore Special |
| 17 | 1206400 | RC40 Sprocket - 16 Tooth x 1-1/4" Bore |
| 18 | 1216309 | RC40 Chain - 52 Pitch (Input auger to Gear Box) |
| 19 | 1216310 | RC40 Chain - 65 Pitch (Output Gear Box to Auger) |
| 20 | 1216403 | Idler Sprocket - 5/8" Bore |
| 21 | 1216405 | RC40 Sprocket - 16 Tooth x 1" Bore |
| 22 | 1216605 | Gear Box |
| 23 | | Keys - 1/4 x 1/4 x 3/4LG |
| 24 | 1218133 | Stud - 3/8-16 x 2-1/2 Full Thread |
| 25 | 1210351 | Cross Auger Guard Weldment |
| 26 | 1252863 | Cross Auger Guard Support Bracket |

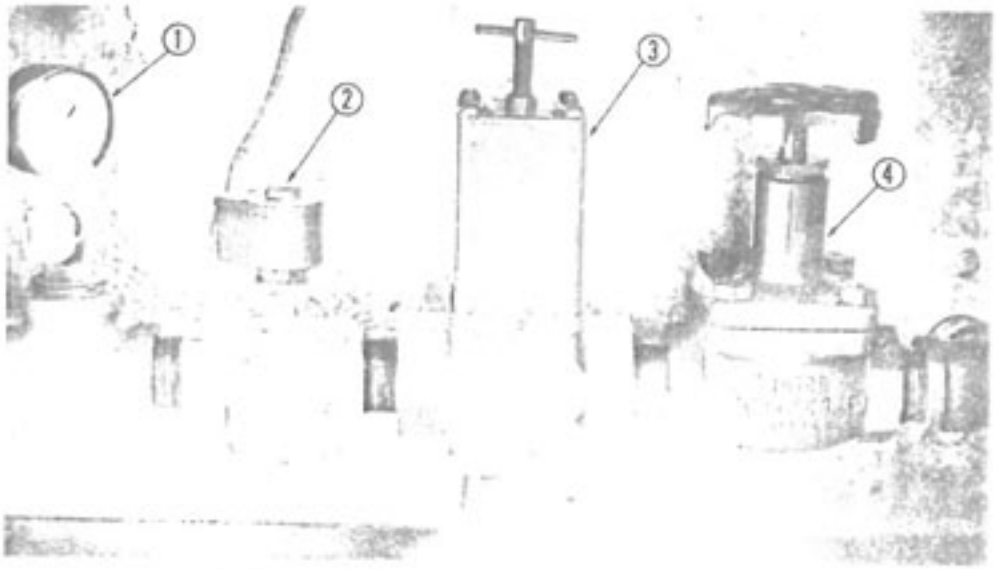
# FRONT CHANNEL ILLUSTRATION



| REF NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | 1218972 | Rubber Grommet - 5/16" ID |
| 2 | | Lock Nut - 5/16-18" |
| 3 | 1215724 | Ratchet Dog |
| 4 | 1210036 | Ratchet Guide Arm Weldment |
| 5 | | Cotter Pin – 1/8 x 1" |
| 6 | 1216856 | Solenoid |
| 7 | 1210029 | Solenoid Weight Weldment |
| 8 | 1215571 | Ratchet Dog Bushing |
| 9 | | HHCS – 5/16 x 2-1/2" |
| 10 | 1216118 | V-Belt, B-81 Super Aggie |
| 11 | 1215190 | Variable Crank Nut |
| 12 | 1216600 | Variable Speed Assembly (Maurey) |
| 13 | 1216115 | V-Belt, B-51 Super Aggie |
| 14 | 1215193 | Variable Drive Crank |
| 15 | 1210320 | Variable Speed Mounting Bracket Weldment |
| 16 | | Flat Washer – 5/8" |
| 17 | 1252833 | Solenoid Cover |
| 18 | 1213321 | Feed Roll Retainer |
| 19 | 1216404 | Ratchet Wheel |
| 20 | 1206000 | 2-Bolt Flange Bearing - 1-1/4" |
| 21 | 1206400 | RC40 Sprocket – 16 Tooth x 1-1/4 Bore |

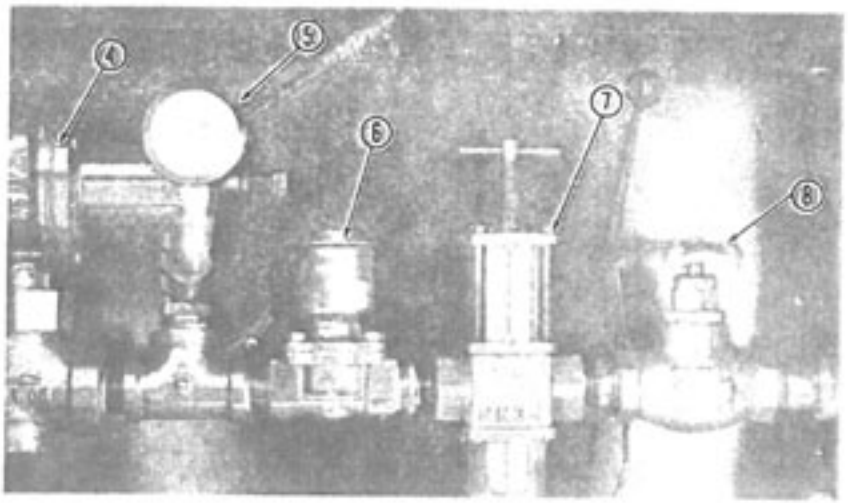
| REF NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 22 | 1218974 | Safety Lock Collar – 1-1/4" |
| 23 | 1216308 | RC40 Chain – 83 Pitches w/Offset & Conn. Link |
| 24 | 1218975 | Shear Flange |
| 25 | | Key – 1/4 x 1-1/2" |
| 26 | 0018255 | Chain Tightener Block |
| 27 | 1214217 | Idler Shaft Mount |
| 28 | | Cotter Key – Size 3/16" |
| 29 | 0016016 | 3-Bolt Flange Bearing - 1-1/4" |
| 30 | | Ratchet Guide Arm (See Blow Up) |
| 31 | 1213375 | Variable Speed Mount Bracket |
| 32 | 1216228 | V-Pulley – 12" OD x 1-1/4" Bore |
| 33 | | Key – 1/4 x 1-1/2" |
| 34 | 1215041 | Shaft Front Idler & Feed Roll |
| 35 | 1216403 | Chain Idler Sprocket - 5/8" |
| 36 | 1211161 | Eccentric Sprocket Assembly |
| 37 | | Carriage Bolt - 1/2-13" Full Thread |
| 38 | 1216307 | RC40 Main Drive Chain – 368 Pitches w/Conn. Link |
| 39 | 1210347 | Connecting Arm Weldment (250E ONLY) w/Brg. # |
| 40 | | Lock Washer & Nut – 1/2" |
| 41 | 1216401 | Shear Sprocket |
| 42 | 1216001 | Bearing 1/2" ID |

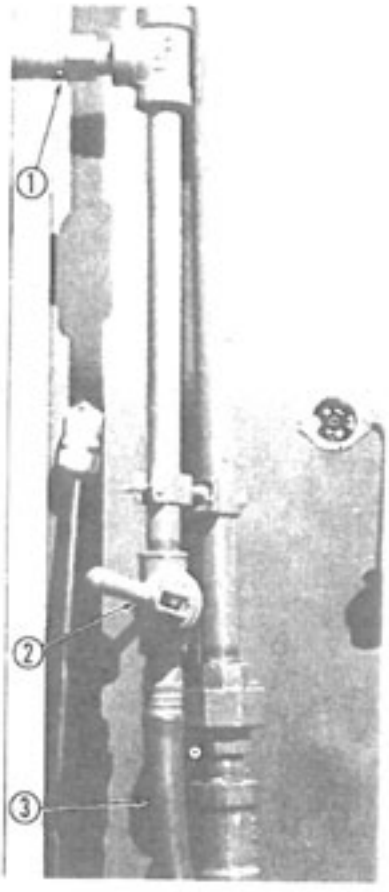
# NATURAL GAS CONTROLS – 250E




| REF NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | 1207002 | Gas Pressure Dial Gauge |
| 2 | 1237000 | Main Solenoid Valve |
| | 1227001 | Replacement Coil (Only) |
| 3 | 1237002 | Modulating Valve |
| 4 | 1237003 | Main Gas Hand Valve |

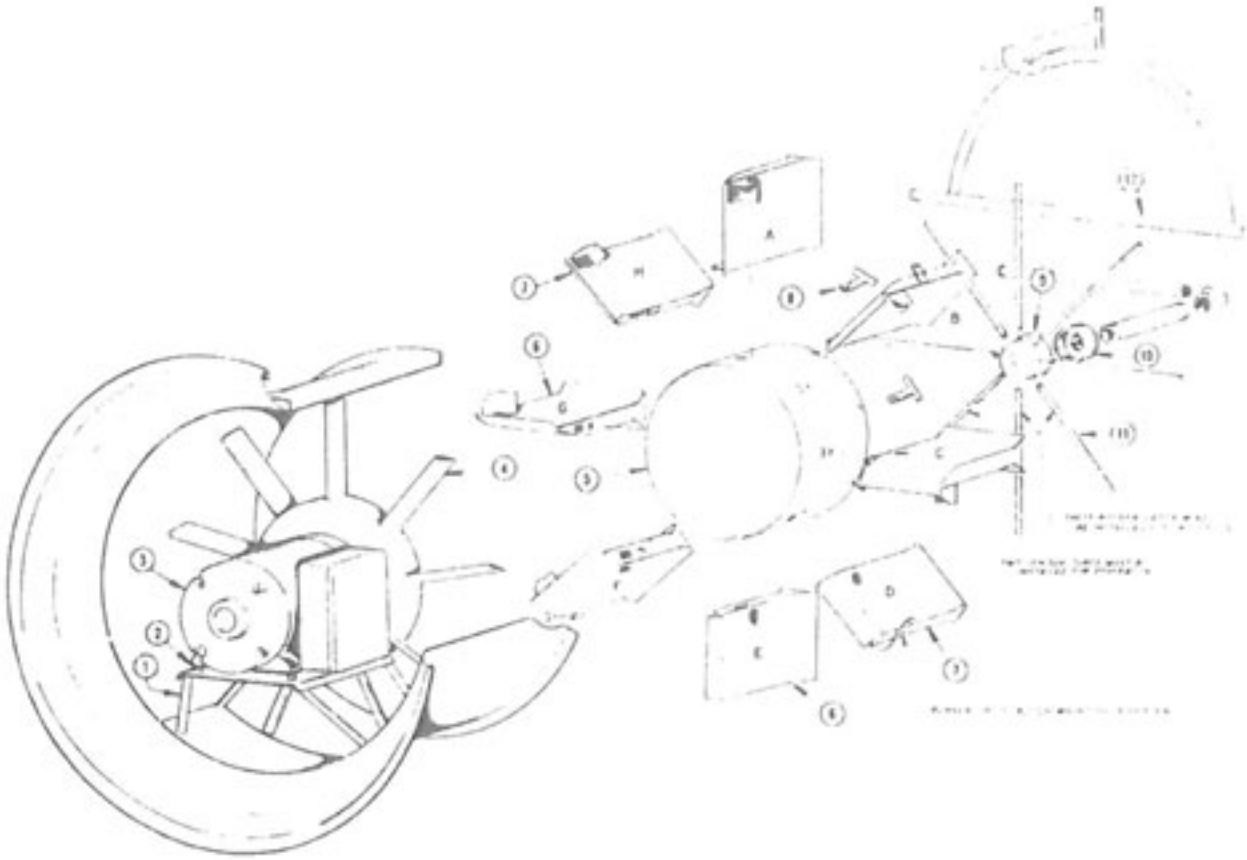
# LP GAS CONTROLS – 250E




| REF NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | 1217013 | Pressure Relief Valve |
| 2 | 1217015 | Liquid Line Hand Shut Off Valve |
| 3 | 1217005 | Inlet Hose |
| 4 | 1217006 | Pressure Regulator (LP Only) |
| 5 | 1207002 | Gas Pressure Dial Gauge |
| 6 | 1217002 | Main Solenoid Valve (LP) |
| | 1227001 | Replacement Coil (Only) |
| 7 | 1217012 | Modulating Valve (LP) |
| 8 | 1217011 | Main Gas Hand Valve |

# BURNER ILLUSTRATION

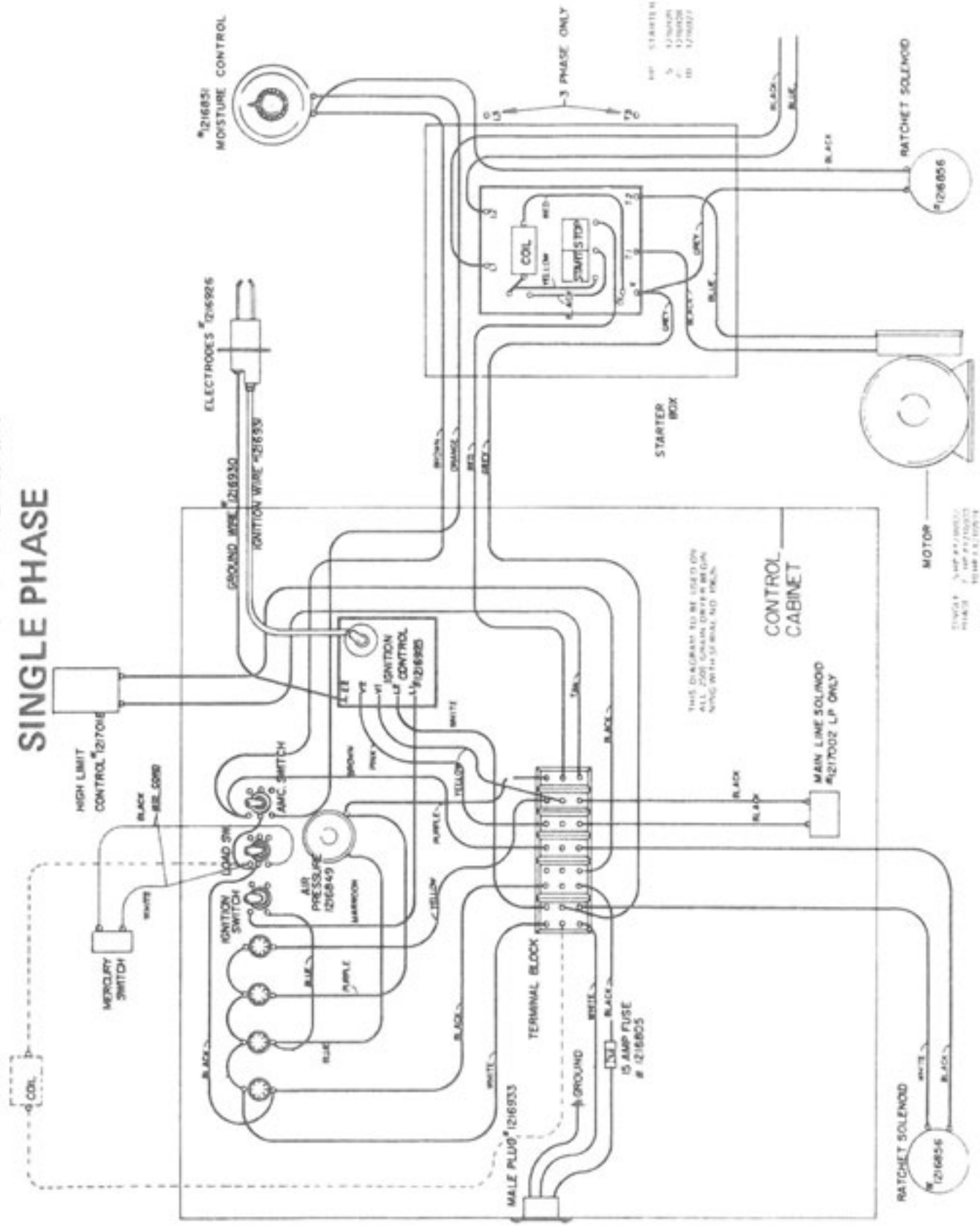


| REF NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | 1210258 | Motor Mount Weldment |
| 2 | 1210323 | Stand Off Motor Mount |
| 3 | 1216922 | 5HP Single-Phase EL Motor |
| | 1216923 | 7½HP Single-Phase EL Motor |
| | 1216924 | 10HP Single-Phase EL Motor |
| | 1216848 | 10HP 3-Phase EL Motor |
| 4 | 1210330 | Front Fan Weldment 15" 6 Blade (5HP) |
| | 1210331 | Front Fan Weldment 18" 6 Blade (7½HP) |
| | 1210332 | Front Fan Weldment 18" 9 Blade (10HP) |
| 5 | 1210322 | Burner Tube Weldment |
| 6 | 1210315 | Burner Unit Weldment |
| 7 | 1210325 | Burner Unit Weldment w/Mounting Bracket |
| 8 | 1210316 | Ignition Tube Weldment |
| 9 | 1215501 | Burner Head |
| 10 | 1218023 | Reducing Bushing 3" to 1-1/4" |
| 11 | 1210314 | Burner Lead |
| 12 | 1210349 | Vaporizer Weldment |

Ignition wire kit 1229009

Not Shown 1252840 Electrode Bkt w/Bolts

# 250 WIRING DIAGRAM
## SINGLE PHASE



**INSTRUCTIONS FOR ORDERING PARTS:**

1. ALL PARTS MUST BE ORDERED FROM YOUR DEALER.
2. GIVE MODEL NUMBER and SERIAL NUMBER that is stamped on the NAME PLATE of your machine.
3. Order from your PARTS LIST, found below each illustration, as this is the ONLY means we have of identifying the parts you need. Order by the QUANTITY DESIRED, the PART NUMBER and the DESCRIPTION OF THE PART.

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

## OWNERS NOTICE

**TO INSURE WARRANTY CLAIMS, BE CERTAIN TO FILL OUT AND MAIL WARRANTY CARD WITHIN 30 DAYS.**