READ THESE INSTRUCTIONS BEFORE INSTALLATION AND OPERATION SAVE FOR FUTURE REFERENCE.

This grain dryer is a versatile piece of equipment, adaptable to a variety of conditions. As such, it features a number of adjustments for automatic control of the drying process. Operation should not be attempted before reading this manual; these instructions include the information necessary to successful operation and care of the dryer.

USE CAUTION IN THE OPERATION OF THIS EQUIPMENT

The design and manufacture of this dryer is directed toward operator safety.

Use extreme caution in working around high speed fans, gas-fired heaters, augers and auxiliary conveyors which may start without warning when the dryer is operating on automatic control.

Continued safe, dependable operation of automatic equipment depends to a great degree upon the owner. For a safe and dependable drying system, follow the recommendations within the manual and make it a practice to regularly inspect the operation of the unit for any developing problems or unsafe conditions.

Keep the dryer clean. Do not allow fine material to accumulate in the plenum chambers.

A CAREFUL OPERATOR IS THE BEST INSURANCE AGAINST AN ACCIDENT

Warranty

Farm Fans, Inc., warrants its products to be free of defects in material and workmanship. The only obligation of the manufacturer is to repair or replace products which have been submitted and found to be defective within 12 months after installation. If so found defective, the products will be repaired or replaced without charge, this constituting and entirely fulfilling the warranty obligation. Farm Fans, Inc., assumes no liability for expenses incurred without written authorization; in no event shall its liability include special or consequential damages, or exceed the selling price of the product.

This warranty does not cover products or parts which have been damaged by negligent use, misuse, alteration or accident. Electric motors, tires, and other components supplied by manufacturers are warranted separately by those suppliers. This warranty is exclusive and in lieu of all other warranties, expressed or implied. Farm Fans, Inc., reserves the right to make design or specification changes at any time, without any contingent obligation to purchasers of products already sold.

All instructions shall be construed as recommendations only; because of the many variable conditions in actual installation, Farm Fans, Inc., assumes no liability for results arising from the use of such recommendations.
**SPECIFICATIONS**

**TYPE:** Staged automatic, with automatically controlled fan/heater units for high and low heat drying stages; dry and cool (three stages) or full heat (two stages).

**GRAIN COLUMNS:** Two 14" thickness grain columns, with special perforated panels for uniform air flow.

**FANS:** Heavy duty axial fans with air volume, horsepower, and static pressure matched to dryer size; automatically controlled, with full overload protection, single or three phase.

**HEATERS:** High capacity heaters, with Star-Fire burners, full electric ignition, and thermostat control of high and low fire drying temperatures; available for liquid propane (with vaporizer) or natural gas.

**AUGERS:** Top level auger and bottom discharge auger, automatically controlled: 8" diameter augers with heavy duty belt-chain drive system; power circuits provided for loading and take-away conveyors, with overload protectors for each motor.

**AUTO CONTROL:** Automatic control of all functions - loading, drying, cooling, unloading; automatic reset timer; full safety control circuits; automatic shutdown on wet grain outage or excessive temperature; moisture check thermostat control circuit; unload delay control for alternate use of dry grain conveyor; hour meter; cycle counter.

**DRYER CIRCUIT MONITOR:** Equipped with new 8-channel detector system to identify cause of safety shutdown.

<table>
<thead>
<tr>
<th>Total Holding Capacity</th>
<th>350 bushels by volume.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain Columns</td>
<td>14 feet length, 2 columns, 14&quot; thickness.</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td></td>
</tr>
<tr>
<td>Less Transport:</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>21'-0&quot; (hitch to rear of loading hopper).</td>
</tr>
<tr>
<td>Width</td>
<td>7'-11-1/2&quot; (overall width).</td>
</tr>
<tr>
<td>Height</td>
<td>12'-8&quot; (base to top of loading hopper).</td>
</tr>
<tr>
<td>With Transport:</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>23'-1-1/2&quot; (hitch to rear of loading hopper).</td>
</tr>
<tr>
<td>Width</td>
<td>7'-11-1/2&quot; (overall width).</td>
</tr>
<tr>
<td>Height</td>
<td>13'-4-1/2&quot; (overall height).</td>
</tr>
</tbody>
</table>

**Fans**
- 2 Fans, 10-13 HP each, 1750 RPM, 28" diameter.
- 2 Heaters, 3,000,000 BTU/ Hour maximum capacities.

**Heaters**
- 5 HP, belt-chain drive, 2090 BPH capacity.

**Top Loading Auger**
- 8" diameter, 5 HP, belt-chain drive, 2090 BPH capacity.

**Bottom Auger:**
- Max. Discharge Rate: 8" dia., 10" discharge tube, belt-chain drive.
- Standard Discharge Rate: 7-1/2 HP, 3340 BPH
- Low Discharge Rate: 5 HP, 2090 BPH
- Min. Discharge Rate: 5 HP, 1720 BPH
- Min. Discharge Rate: 3 HP, 1030 BPH

**Electrical Load:**
- Max. Running Amps:
  - Single Phase, 230 V: 172 A. (two fans, top auger, and 7 1/2 HP aux. loading conveyor).
  - Three Phase, 220 V: 100 A. (two fans, top auger, and 7 1/2 HP aux. loading conveyor).

**Drying Capacity:**
- Dry and Cool, 25 to 15%
- Dry and Cool, 20 to 15%
- Full Heat, 25 to 15%
- Full Heat, 20 to 15%
- Dry and Cool, 25 to 15%
- Dry and Cool, 20 to 15%
- Full Heat, 25 to 15%
- Full Heat, 20 to 15%
- 270 BPH Capacities based upon wet bushels of shelled corn, excluding load and unload.
- 360 BPH Capacities based upon wet bushels of shelled corn and operation with standard load and unload rates.
- 370 BPH Capacities based upon wet bushels of shelled corn, excluding load and unload.
- 370 BPH Capacities based upon wet bushels of shelled corn and operation with standard load and unload rates.
INSTALLATION

SYSTEM LAY-OUT

Consider the grain handling system and the location of storage bins and existing conveyors in selecting the dryer site, to facilitate wet grain supply and dry grain discharge to conveyors.

SITE SELECTION

The dryer is not to be operated inside a building or in any area not permitted by electrical codes, fuel installation regulations, or insurance requirements. Do not operate in an area where combustible material can be drawn into the fans. Maintain a minimum distance of three feet to other structures. Refer to Fig. 1 for dryer dimensions.

BLOCK SUPPORT

The wheels are provided only for transportation of the empty dryer. Before loading any grain into the dryer, it is necessary to support the frame of the unit on each side, by concrete blocks or other means, to carry the total weight when filled with grain. Use shims to provide uniform, level support, at a minimum of 16" above the concrete slab, to provide space for clean-out and for auxiliary conveyors. Use a minimum of three supports on each side, plus one support at the fan support panel.

CONCRETE SLAB

A reinforced concrete slab is recommended as the basic support for the dryer, located in a well drained area. The slab should be large enough to provide working area around the dryer, with a surface elevation consistent with other parts of the grain handling and storage system.

TIE-DOWN ANCHORS

Anchor points may be cast into the concrete slab, or the dryer may be tied down by cable and turnbuckle to anchors installed at the edge of the slab. In any case, the dryer must be securely anchored to the support blocks and concrete base, to prevent overturn or lateral movement by wind forces.

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**MODEL**

| **DIMENSIONS**
<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AB-350A</strong></td>
<td>23'-11&quot;</td>
<td>7'-11&quot;</td>
<td>13'-41/2&quot;</td>
<td>3'-1/8&quot;</td>
<td>11'-11&quot;</td>
<td>4'-9&quot;</td>
<td>6'-11&quot;</td>
<td>14'</td>
<td>2'-2&quot;</td>
</tr>
</tbody>
</table>

* Wheel assemblies are removable. Installed height (dimension C) depends upon height of blocks used to support dryer on concrete slab.

** Standard discharge is 24' length. Optional discharge auger extension kits are available to provide discharge lengths (1') dimension of 2'-2" to 10'-2" in increments of one foot.

Figure 1. Dryer dimensions.
FILLING POINT

Wet grain must enter the dryer at the hopper at the rear end of the top auger, since the top auger moves grain forward, toward the paddle switch controlling the top auger.

The dryer will automatically start the top auger and any loading conveyor which has been properly connected to the dryer. At the beginning of each cycle, the dryer will completely fill, requiring 300 bushels of wet grain. Refill for shrink occurs only during the drying period, not during cooling. Cycle timer settings range from 35 to 145 minutes for various moisture contents and drying methods. The total cycle time, including load and unload time, is 10 to 25 minutes longer than the cycle timer setting, depending upon the actual rate of loading and unloading. Cycle times for various types of drying are shown by the CYCLE TIME CHART, Fig. 7.

A wet holding bin may be provided, with gravity flow into the dryer loading conveyor, or gravity flow from a wagon or truck into a loading conveyor may be used to fill the dryer. The top leveling auger will accept grain at any rate up to about 2000 BPH for standard models. In any case, the dryer must have a constant supply of wet grain.

ADJ-350A dryers are equipped with adjustable dampers within the loading hopper. The dampers are designed to allow the grain inlet opening for the top auger to be varied for use with gravity fill systems.

To prevent a large charge of overhead grain from overloading the top auger, start with a smaller inlet opening for the initial setting, then increase the opening until the proper grain loading rate is obtained. Make sure to allow some reserve motor power to handle any heavier loads caused by unusually high moisture grain which may be encountered.

TOP AUGER (LOADING) TIMER

The unit is equipped with a top auger timer (behind cover in bottom control panel section of main control box) to provide automatic shut-down on wet grain outage, if the top auger operates for a time exceeding the setting of the top auger timer (field adjustable).

At the end of the cooling period (or at the end of the drying period for full heat), the bottom auger will automatically start, along with any take-away conveyor which has been properly connected to the dryer.

Some variation in discharge rate can be obtained by adjusting the height of the auger shield when the dryer is empty. Further change in discharge rate requires change of sprockets, sheaves and/or pulleys as shown by Fig. 5.

Special discharge auger extension kits are available, with a total length of 2 to 10 feet (one foot increments) to provide dry grain discharge points at various distances from the rear of the dryer, for direct discharge into elevator legs or other conveyors.

The bottom auger will operate for an additional 30 seconds after the dryer is empty, to clear the take-away conveyor. If a longer time interval is needed, time delay relay No. 2 must be changed.

ADJ-350A model dryers have overload relays for the loading conveyor and take-away conveyor which are factory equipped with heater elements for 7/8 HP motors on the auxiliary conveyors. If other HP ratings are used, it is necessary to change the heater elements to provide proper running load protection for the motors. See Fig. 6 for heater element specifications.

The UNLOAD AUGER switch may be set OFF to stop the automatic cycle when the dryer would normally begin unloading. To start the bottom auger, move switch to AUTO. The ability to “hold” or delay the unloading is of advantage where an elevator leg may be in use for wet grain when the dryer would start unloading if on AUTO, or where the operator desires to be present when unloading occurs.
** Fig. 2 - AFl-350A Auger Drive Data **

- Extension
- With amount of fine material, position of bottom auger shield and length of discharge
- Amount of fine material in flange, Bottom auger capacity and power requirement varies
- Top auger capacity and power requirement varies with well grain moisture content and

Motor frame size. Check motor shaft diameter before ordering replacement parts.

All drive sheaves are two groove for two belt drive. Motor sheave and bore varies with

<table>
<thead>
<tr>
<th>HP</th>
<th>RPM</th>
<th>HP</th>
<th>RPM</th>
<th>HP</th>
<th>RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>12,75</td>
<td>3.75</td>
<td>1/2</td>
<td>12,75</td>
<td>3.75</td>
</tr>
<tr>
<td>1/4</td>
<td>12,75</td>
<td>3.75</td>
<td>1/4</td>
<td>12,75</td>
<td>3.75</td>
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<tr>
<td>1/8</td>
<td>12,75</td>
<td>3.75</td>
<td>1/8</td>
<td>12,75</td>
<td>3.75</td>
</tr>
<tr>
<td>1/4</td>
<td>12,75</td>
<td>3.75</td>
<td>1/4</td>
<td>12,75</td>
<td>3.75</td>
</tr>
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<td>12,75</td>
<td>3.75</td>
<td>1/4</td>
<td>12,75</td>
<td>3.75</td>
</tr>
<tr>
<td>1/4</td>
<td>12,75</td>
<td>3.75</td>
<td>1/4</td>
<td>12,75</td>
<td>3.75</td>
</tr>
</tbody>
</table>

Max. 3340

Std. 2090

8" Dia. 1720

Bottom Aug. Low 3 1750

Min. 1035

Top Aug. 5 1750

Std. 2095
FUEL CONNECTION

Liquid Propane (LP)
Dryers with Internal Vaporizers

LIQUID DRAW

The dryer is designed to operate on liquid propane, with liquid draw from the supply tank. A piping system is provided on the dryer, including strainer, pressure relief valve, and manual shut-off valve; a pressure regulator is provided on the fan heater unit, between the vaporizer and burner.

AMMONIA TANKS

Do not use propane supply tanks which have previously contained ammonia or fertilizer solutions. These substances are extremely corrosive and damaging to fuel supply and burner parts.

OIL OR WATER IN TANKS

With liquid draw from the supply tank, any water present in the tank may freeze in the piping and controls in cold weather. To ensure that tanks are free of moisture, the usual precaution is to purge with methanol. Avoid tanks which may contain an accumulation of oil or heavy hydrocarbons from long use on a vapor withdrawal system.

Connection to liquid manifold on dryer.
See Fig. 5 for recommended line size.
Minimum distance of 25'

Consult propane supplier for proper fittings and safety controls in the fuel supply system. Do not use a pressure regulator at the supply tank.

Propane supply tank. Recommended minimum of 1000 gal. connected for liquid draw.

Figure 3. Liquid propane (LP) fuel supply.

Natural Gas (N)

GAS VOLUME AND PRESSURE

The dryer is designed to operate on natural gas having a heat value of about 1,000,000 BTU per cubic foot.

The dryer is equipped with a natural gas supply pipe system connected to the heater solenoid valves. A regulated pressure of 5 to 10 PSI must be provided at the connection to the dryer, with gas available in sufficient volume to maintain the operating pressure.

Connection to natural gas manifold on dryer.
See Fig. 5 for recommended line size.
Min. dist. as determined by supplier

Natural gas meter and regulator. See Fig. 5 for required pressure and typical maximum fuel flow rates.

Figure 4. Natural gas (N) fuel supply.

<table>
<thead>
<tr>
<th>Maximum Heat Capacity, BTU per Hour</th>
<th>AR-350A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Max., Operating Heat Requirement, BTU per Hour</td>
<td>6,000,000</td>
</tr>
<tr>
<td>Liquid Propane (LP)</td>
<td></td>
</tr>
<tr>
<td>Typical Max. Fuel Flow, Gal. per Hour</td>
<td>64</td>
</tr>
<tr>
<td>Recommended Liquid Line Size</td>
<td>1/2</td>
</tr>
<tr>
<td>Heater Orifice Drill Size</td>
<td>.250&quot;</td>
</tr>
<tr>
<td>Operating Press. Range (heater press. gauge), PSI</td>
<td>3-15</td>
</tr>
<tr>
<td>Natural Gas (N)</td>
<td></td>
</tr>
<tr>
<td>Typical Max. Fuel Flow, Cubic Feet per Hour</td>
<td>6,000</td>
</tr>
<tr>
<td>Minimum Pressure at Connection to Dryer, PSI</td>
<td>8</td>
</tr>
<tr>
<td>Recommended Minimum Line Size</td>
<td>1 1/2&quot;</td>
</tr>
<tr>
<td>Heater Orifice Drill Size</td>
<td>2&quot;</td>
</tr>
<tr>
<td>Operating Pressure Range (heater press. gauge), PSI</td>
<td>.375&quot;</td>
</tr>
<tr>
<td></td>
<td>2-7</td>
</tr>
</tbody>
</table>

Figure 5. Fuel system specifications and recommendations.
ELECTRICAL POWER SUPPLY

An adequate power supply and proper wiring are important factors for maximum performance and long life of the dryer. Electrical service must be of adequate size to prevent low voltage damage to motors and control circuits.

All dryers should be equipped with a power disconnect switch external to the ASC Control Box to permit total power shut down before opening ASC dead front, as required for inspection and service. The power disconnect switch should also be located close to the dryer for quick shut down.

Contact the service representative of the power supplier, to advise of the additional load to be placed on the line. Check with KVA rating of transformers, considering total horsepower load. The power supply wiring, main switch equipment, and transformers must be capable of providing adequate motor starting and operating voltage. Voltage drop during motor starting should not exceed 14% of normal voltage, and running voltage (after motor is at full speed) should be within 8% of normal voltage.

Fig. 6 indicates the electrical load in horsepower and full load current, for the dryer motors, and for auxiliary loading and take-away conveyors which can be directly connected to the power circuits in the control panel.

Overload relays are adjustable from 85% to 115% of normal load in amperes, as shown by the overload relay heater specifications of Fig. 6, by an adjustment knob on each relay. The AB-350A model dryers are shipped with overload relay heaters for auxiliary conveyors to operate 7 1/2 HP motors; if different motors are used, the heater elements should be changed to provide adequate motor overload protection.

Two shipping hold-down bolts secure the power chassis rigid for shipment. Loosen the nuts on these bolts to allow support of the electrical chassis by the rubber mountings.

The maximum size auxiliary conveyor motors which can be powered directly from the power terminals of the dryer is 1/2 HP for single phase and 10 HP for three phase models. See appropriate power circuit wiring diagram for terminal connection numbers.

To connect auxiliary auger motors which are LARGER than the maximum, refer to the following information.

A. Motors must be powered from a source outside of the dryer with the use of a separate contactor and overload protection device for each motor.

B. For automatic operation with single phase dryers -- use 220 V. contactor coils and connect LOADING coil to power terminals 3 and 4. Connect UNLOADING coil to power terminals 11 and 12.

C. For automatic operation with 220 V. three phase dryers -- use 220 V. contactor coils and connect LOADING coil to power terminals 4 and 5. Connect UNLOADING coil to power terminals 16 and 18.

D. For automatic operation with 440 V. three phase dryers -- either use a control stepdown transformer to power a 220 V. contactor coil, or use 440 V. contactor coils and connect them as described earlier in Item C.

E. When conveyor motors are powered from an external source and are connected for automatic type operation, their overload protective switches should be connected in series and then connected into the dryer safety circuit. This connection can be made at the dryer control terminal strip, by removing the small horseshoe-shaped jumper fitting at terminals 16 and 17 and connecting the switch wires to these terminals.
<table>
<thead>
<tr>
<th>Horsepower</th>
<th>Fan Motors</th>
<th>Top Auger</th>
<th>Bottom Auger (2)</th>
<th>Aux. Conveyor (3) Motors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ph. - 230 V.</td>
<td>10-13 (Two)</td>
<td>5</td>
<td>5</td>
<td>7½ (Two)</td>
</tr>
<tr>
<td>3 Ph. - 220 V.</td>
<td>10-13 (Two)</td>
<td>5</td>
<td>5</td>
<td>7½ (Two)</td>
</tr>
<tr>
<td>3 Ph. - 440 V.</td>
<td>10-13 (Two)</td>
<td>5</td>
<td>5</td>
<td>7½ (Two)</td>
</tr>
<tr>
<td>Full Load Current</td>
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<td></td>
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<tr>
<td>Amperes per Motor</td>
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<tr>
<td>1 Ph. - 230 V.</td>
<td>58</td>
<td>22</td>
<td>22</td>
<td>34</td>
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<tr>
<td>3 Ph. - 220 V.</td>
<td>34</td>
<td>13</td>
<td>13</td>
<td>18</td>
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<td>3 Ph. - 440 V.</td>
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<td>6.5</td>
<td>6.5</td>
<td>9</td>
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<tr>
<td>Max. Running Load (4)</td>
<td>1 Ph. - 230 V.</td>
<td>138</td>
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<tr>
<td>Dryer Only - Amps</td>
<td>3 Ph. - 220 V.</td>
<td>81</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>3 Ph. - 440 V.</td>
<td>42</td>
<td></td>
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<tr>
<td>Max. Running Load (4)</td>
<td>1 Ph. - 230 V.</td>
<td>172 (3)</td>
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<td></td>
</tr>
<tr>
<td>with Aux. Conv. - Amps</td>
<td>3 Ph. - 220 V.</td>
<td>100</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>3 Ph. - 440 V.</td>
<td>51.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommended Service</td>
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<tr>
<td>Equip. Rating - Amps</td>
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<td>150</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>3 Ph. - 440 V.</td>
<td>100</td>
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</tr>
<tr>
<td>Control Panel</td>
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<td>C22.8</td>
<td>C32.8</td>
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<td>C13.7</td>
<td>C13.7</td>
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<tr>
<td>Heater Element Spec.</td>
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<td>C16.3</td>
<td>C6.95</td>
<td>C6.95</td>
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<td>80</td>
<td>---(1)</td>
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<td>60</td>
<td>---(1)</td>
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<tr>
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<td>3 Ph. - 440 V.</td>
<td>100</td>
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<td></td>
</tr>
</tbody>
</table>

(1) Auxiliary conveyor motors are controlled by the top and bottom auger circuit breakers.

(2) 5 HP standard and low discharge model auger motor listed in chart. Dryers with minimum (3 HP) or maximum (7½ HP) discharge motors will have different maximum running loads and O/L relay heater elements than listed.

(3) Current and maximum running load based upon 7½ HP auxiliary conveyor motors; maximum size motor which can be powered through dryer is 7½ HP for single phase, 230 volt, and 10 HP for three phase, 220 volt models. All larger than maximum auxiliary conveyor motors require separate contactors and overload protectors with coil circuits connected to the dryer for automatic operation.

(4) Maximum running load is less than total connected load. Maximum load occurs with fans, top auger and auxiliary loading conveyor in operation (during refill for shrink within the drying portion of the cycle).

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**TEST FIRING**

It is advisable to test fire the dryer before loading with grain, to check the proper function of major components.

1. Turn ON power supply to dryer, and OPEN all manual fuel supply valves.
2. Set the CYCLE TIMER at 45 minutes by turning the double pointer assembly.
   **NOTE:** Always press the timer reset button while making this adjustment, if fan circuit breakers are ON.
3. Set the HI-LIMIT thermostat to maximum setting.
   Set the IMC thermostat to minimum setting.
   Set the HI-HEAT thermostat at 200°.
   Set the LO-HEAT thermostat at 160°.
4. Move all circuit breakers to ON.
5. Set BURNER switch to AUTO and the LOAD and UNLOAD AUGER switches to AUTO.
6. Press the CONTROL CIRCUIT START button. The start button light should indicate power being supplied, and the top auger (and any connected loading conveyor) should start.

NOTE: The safety control circuit includes all current overload relays, grain column hi limit thermostats, air plenum hi limit thermostats, top auger timer, burner lock-out switches and burner hi limit thermostats. ALL OF THESE ITEMS MUST BE IN THE CLOSED CIRCUIT POSITION TO ACTIVATE THE START BUTTON LIGHT.

CAUTION - Electrically connected loading and take-away conveyors start automatically. Keep personnel away from moving parts.

7. Move the TOP AUGER circuit breaker OFF.

8. Press the MANUAL RESTART button. The top fan should start and the burner should fire after the fan has been running about 30 seconds for the purge cycle. The top fan should start first and after a 10 second time delay the bottom fan should start. The delay period can be adjusted to meet field requirements. See "Bottom Fan Start Delay Timer" in operating procedure instructions. With the CYCLE TIMER at 45 minutes, the HI-HEAT thermostat (set at 200°F) controls the heater. Set the gas pressure regulator to provide 15 PSI on the heater pressure gauge for propane units; regulate supply pressure to provide 5 to 7 PSI on natural gas units. Actual hi-heat and lo-heat drying temperatures cannot be accurately set until the dryer is filled with grain.

NOTE: If a burner fails to ignite within one to two minutes, due to the gas being shut off (or for any other reason) the safety lock-out device within the burner will automatically shut-down the entire dryer. If this condition occurs, wait for several minutes to cool the safety lock-out heater before again restarting the dryer and attempting to fire the burner.

9. The heaters should operate on hi-heat, with the HI-HEAT thermostat controlling (200°F setting) until the CYCLE TIMER reaches 40 minutes (factory setting for switching from hi-heat to lo-heat by action of No. 3 cam in the cycle timer). At 40 minutes, burner control switches to the LO-HEAT thermostat. Gas pressure should fluctuate as the LO-HEAT thermostat opens and closes No. 1 vapor solenoid valve, from 3 to 15 PSI on LP units, and 2 to 7 PSI on natural gas (N) dryers. The high side gas pressure should be adjusted with the pressure regulator on propane models, or by regulating the supply pressure on natural gas models. Adjust the low side gas pressure at the flow control valve on propane models, or the hand fuel shut-off valve located within the No. 2 solenoid gas supply line of the natural gas model dryers.

Both top and bottom burners should be set at similar Hi and Lo Fire gas pressures.

10. Hold the moving cycle timer pointer with one hand; press the TIMER RESET button (releasing the timer clitch), and move the pointer to 5 minutes; release the TIMER RESET button to engage the clutch. This places the dryer in the cooling period and the burner should go off, with the fan continuing to operate (burner switch must be on AUTO). If the burner stays on (MC hold), press the MANUAL RESTART button.

11. Continue operation of the fan only as the CYCLE TIMER runs down to 0. When the timer reaches 0, the fan should stop and the bottom auger starts (along with any connected take-away conveyor). The bottom auger will run for only about 30 seconds, with no grain in the dryer. The CYCLE TIMER clutch then releases to recycle the timer to the original 45 minute setting of the pointer assembly, and the top auger would start again if its circuit breaker was ON.

12. Push CONTROL CIRCUIT STOP button; shut off power supply disconnect switch and close all manual fuel supply valves to complete the test firing procedure.
AB-350A
OPERATING INSTRUCTIONS

Refer to Operating Procedures for important instructions for:

- Adjustment of operating gas pressures
- Setting HI-HEAT and LO-HEAT thermostats
- Setting MC thermostat
- Setting Top Auger Timer
- Setting HI-LIMIT thermostat
- Changes in CYCLE TIMER cam settings

After these adjustments are made the dryer can be operated on full automatic control.

AUTOMATIC OPERATION, DRY AND COOL:
1. Turn main power supply ON and OPEN all manual gas supply valves.
2. Set CYCLE TIMER to the desired DRY AND COOL time. See CYCLE TIME CHART below for suggested cycle times for various types of drying.
3. All circuit breakers ON.
4. BURNER and the LOAD and UNLOAD AUGER switches to AUTO.
5. Press CONTROL CIRCUIT START button.
6. Dryer will operate automatically to load, dry, cool, and unload.

AUTOMATIC OPERATION, FULL HEAT:
As above, but set BURNER switch to ON.

TO RESTART DRYER OR CHANGE CYCLE TIMER SETTINGS:
With control circuit ON, press TIMER RESET button and move timer pointer to the desired point in the cycle; release TIMER RESET button; push MANUAL RESTART BUTTON.

FINAL MOISTURE CONTENT:
Increase cycle time for lower final moisture content in the dried grain; reduce cycle time for higher final moisture content. Raising or lowering drying air temperatures will reduce or increase final moisture. Changes in moisture content of wet grain require adjustment of cycle time.

---

### CYCLE TIME CHART

<table>
<thead>
<tr>
<th>Examples of Various Types of Drying</th>
<th>Cycle Time*</th>
<th>Drying Time**</th>
<th>Dry Bu/HR Excluding Load and Unload Time</th>
<th>Approx. Wet Bu/HR Incl. Load - 2090 bu/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minutes</td>
<td>Minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DRY AND COOL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sh. Corn 20% - 15%</td>
<td>45</td>
<td>25</td>
<td>465</td>
<td>360</td>
</tr>
<tr>
<td></td>
<td>55</td>
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<td>390</td>
<td>315</td>
</tr>
<tr>
<td></td>
<td>65</td>
<td>45</td>
<td>325</td>
<td>275</td>
</tr>
<tr>
<td>Sh. Corn 25% - 15%</td>
<td>75</td>
<td>35</td>
<td>200</td>
<td>225</td>
</tr>
<tr>
<td></td>
<td>85</td>
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<td>245</td>
<td>225</td>
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<tr>
<td></td>
<td>95</td>
<td>75</td>
<td>220</td>
<td>205</td>
</tr>
<tr>
<td>Sh. Corn 30% - 15%</td>
<td>105</td>
<td>85</td>
<td>200</td>
<td>190</td>
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<td>125</td>
<td>105</td>
<td>170</td>
<td>160</td>
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<tr>
<td>Sh. Corn 30% - 15%</td>
<td>135</td>
<td>115</td>
<td>155</td>
<td>150</td>
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<td></td>
<td>145</td>
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<tr>
<td>FULL HEAT (DREATION)</td>
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<tr>
<td>Sh. Corn 20% - 15%</td>
<td>36</td>
<td>36</td>
<td>600</td>
<td>430</td>
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<td>55</td>
<td>380</td>
<td>315</td>
</tr>
<tr>
<td>Sh. Corn 25% - 15%</td>
<td>65</td>
<td>65</td>
<td>325</td>
<td>275</td>
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<tr>
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<td>70</td>
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<tr>
<td>Sh. Corn 30% - 15%</td>
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<tr>
<td></td>
<td>115</td>
<td>115</td>
<td>185</td>
<td>175</td>
</tr>
</tbody>
</table>

*Suggested cycle times are based upon 230° hi-heat and 170° lo-heat for drying 25% moisture shelled corn. Lower drying temperatures are used for lower initial moisture contents and for other types for grain. Cycle time must be adjusted to provide the desired final moisture content.

**Drying time is equal to cycle timer setting less 20 minutes for cooling (factory setting of No. 2 cam).
OPERATING PROCEDURE

Pressure Regulator and Flow Control Valve

When the dryer is operating in the hi-heat part of the time cycle (above the 40 minute factory setting of No. 3 timer cam), the HI HEAT thermostat opens and closes No. 1 vapor solenoid valve, resulting in gas pressure fluctuating from "high-side" to "low-side" as the No. 1 solenoid valve opens and closes. See Fig. 9 for identification of components.

The high-side pressure is controlled by the manually adjustable pressure regulator provided on propane units. For maximum heat capacity, the regulator should be adjusted to about 15 PSI as shown by the pressure gage on the fan-heater control box.

For maximum heat on natural gas units, the supply pressure to the dryer should be regulated to provide a high side pressure of about 7 PSI.

The general requirement is that high-side pressure must be in the correct range to allow the HI HEAT thermostat to control at its hi-heat setting by opening and closing No. 1 solenoid valve. If No. 1 valve is open continuously, the high-side pressure is too low. If the high-side pressure is set too high, ignition failure may occur, or excessive heat may be produced in the plenum chamber.

When the dryer is operating in the lo-heat part of the time cycle, (below the 40 minute factory setting of No. 3 timer cam), the LO HEAT thermostat opens and closes No. 1 vapor solenoid valve, resulting in gas pressure fluctuating from "high-side" to "low-side" as No. 1 solenoid valve opens and closes. The low-side pressure is controlled by the manually adjustable flow control valve serving No. 2 solenoid valve (see Figs. 10 and 11).

On propane units, the low-side pressure should be adjusted to about 3 to 5 PSI by turning the knob on the flow control valve. Lock the setting with an Allen wrench after making this adjustment.

For natural gas, turn the handle on the gas shut-off valve to produce a low-side pressure of about 1/2 to 2 PSI.

The low-side pressure setting must be low enough to allow the LO HEAT thermostat to control at its lo-heat setting, by opening and closing No. 1 solenoid valve. If the low-side pressure is set excessively low, BACK FIRE or FLAME-OUT may occur as No. 1 valve closes. EXCESSIVELY LOW GAS PRESSURE IS NORMALLY INDICATED BY BACK FIRE AND COMBUSTION OCCURRING WITHIN THE BURNER CUP.

Drying Temperatures

The dryer is designed for a two stage drying period, with automatic reduction of the drying air temperature during the last part of the drying period. The temperature reduction from hi-heat to lo-heat occurs at 40 minutes on the CYCLE TIMER, when heater control shifts from the HI HEAT thermostat to the LO HEAT thermostat.

The drying temperature is shown by the dial thermometer located at the front of the plenum chamber.

For shelled corn with an initial moisture content of 25 to 30%, the suggested HI HEAT thermostat setting is 220 to 240 degrees, with a LO HEAT thermostat setting of 160 to 180 degrees.

For other types of grain, and lower initial moisture contents, lower drying temperatures are recommended. For small grain drying, HI HEAT and LO HEAT temperatures of 170 and 140 degrees are suggested, except for rough rice, where 140 and 120 degrees are suggested.

Lower drying temperatures usually produce higher quality grain. The general rule is to use the lowest drying temperature which will produce the required capacity through the dryer.
Cycle Timer

The cycle timer is an automatic reset timing device, containing three cams to activate switches at various points in the cycle. The timer recycles (the moving pointer returns to full cycle setting) each time voltage is removed from its clutch. Therefore, the timer will recycle each time the clutch power supply is interrupted; the clutch is connected ahead of the control circuit relay so the moving pointer will show the time when the dryer stops due to an open safety control circuit.

The cycle timer may be manually set to any point in the cycle by holding the TIMER RESET button depressed and moving the pointer to the desired time. Then releasing the TIMER RESET button to engage the clutch. The MANUAL RESTART button must be pressed also to restart within a cycle.

Refer to the CYCLE TIME CHART, Fig. 7, for suggested initial cycle timer settings for various types of drying, by reference to the examples, and by making allowance for higher or lower initial or final moisture contents. Since the examples are only approximate, it is necessary to check final moisture and adjust the drying time and/or drying temperature.

The last 20 minutes of the cycle time are for cooling (factory setting); any increase in time setting will provide that much more drying time, without affecting cooling time. For example, a timer setting of 70 minutes provides 50 minutes of drying and 20 minutes of cooling; if the setting was increased to 75 minutes, the drying time would be 65 minutes, with 20 minutes for cooling.

The discharge grain moisture content should be checked periodically to indicate the need for any change in cycle time. Any appreciable change in wet grain moisture content will require an adjustment in cycle time.

The cycle time is set by rotating the entire pointer assembly to the desired number of minutes for dry and cool. ALWAYS PRESS THE TIMER RESET BUTTON WHILE MAKING THIS ADJUSTMENT.

Cycle Timer Cam Settings

The cycle timer contains three cams, numbered from the clock face as follows: Cam No. 1 stops the fan at the end of the cooling period and starts the bottom auger. The factory setting is 0 minutes and this cam should NOT be field adjusted.

Cam No. 2 stops the burner and starts the cooling period (burner switch on AUTO). The factory setting is 20 minutes, but the setting can be changed to provide greater or less cooling time.

Cam No. 3 causes the burner to go from hi-heat to lo-heat. The factory setting is 40 minutes, but the setting can be changed to provide more or less hi-heat and lo-heat during the drying period. For example, with a 70 minute cycle timer setting, there would be 30 minutes of hi-heat, 20 min. of lo-heat, and 20 min. of cooling. Changing No. 3 cam to 50 min. would result in 20 min. in hi-heat, 30 min. of lo-heat, and 20 min. of cooling.

The No. 3 cam setting of 40 min. should be satisfactory for most applications, since lower initial moisture will require shorter cycle times, resulting in shorter hi-heat periods when the No. 3 cam is left at 40 min. On the other hand, very high initial moisture contents will require a longer cycle time and will automatically receive more time on hi-heat if the No. 3 cam is left on 40 minutes.

The No. 2 and No. 3 cam settings can be changed by holding the timer pointer (with power OFF and timer clutch disengaged) and manually rotating the cam on the shaft; the cam has a friction fit on the shaft. Rotate the pointer and shaft to observe when the cam moves the microswitch lever.

Hi-Limit Thermostat

The hi-limit thermostat has a sensing element in the grain column to provide shut-down of the dryer if the grain temperature becomes too high. This thermostat is electrically connected in the safety control circuit. The setting should be 40 degrees below the hi-heat drying temperature.
Moisture Check (MC) Thermostat

The function of the MC thermostat is to continue heater operation for additional drying, at the point where the cooling would normally begin (factory setting of 20 min.), if the temperature in the grain column is below the MC thermostat setting, thereby preventing discharge of grain with excessive moisture content. When the MC thermostat is “holding” the timer at the 20 minute point, with burner operating, the MC indicator light will be ON, showing that the temperature in the grain column is below the MC setting.

Setting The MC Thermostat

MC Hold

MC Hold Each Cycle

After drying temperatures have been adjusted and the cycle time has been set to produce the desired final moisture content, the MC thermostat can be set as follows:

A. While the cycle timer is in the drying period, any time before the cooling period begins, turn the MC up from its minimum setting to maximum setting.
B. When the timer reaches the beginning of the cooling period, the burner will not stop in the usual manner; the MC thermostat will “hold” and the burner will continue to operate, with the timer stopped, and the MC indicator light ON.
C. Turn the MC down until the indicator light goes OFF, and leave it at that setting.
D. For full heat drying (no cooling), follow the same procedure, just before the cycle timer reaches 20 minutes (factory setting of No. 2 cam).

The MC thermostat, as set above, will prevent grain from being discharged from the dryer at too high a moisture content, such as might occur with an increase in wet grain moisture content (if the cycle time has not been increased).

The MC thermostat can be set so high as to “hold” on each cycle, in attempts to obtain automatic moisture control. However, the MC thermostat may not provide sufficient accuracy in controlling final moisture, with uniform and consistent results, considering the somewhat variable relationship between grain temperature and final moisture, as well as the effect of other operating variables. Proper adjustment of the cycle timer is a more reliable method of controlling final moisture.

Dry Grain Discharge

Paddle Switch

When the cycle timer reaches 0, the No. 1 cam micro-switch starts the bottom auger (with unload auger switch on AUTO), the bottom auger continues to operate until the swinging vane or paddle moves to the dryer “empty” position, and tilts the mercury switch (paddle switch) to close the electrical circuit causing time delay No. 2 (TDR2) to open the circuit to the cycle timer (after a 30 second delay), resulting in timer recycle.

See Fig. 2 for standard discharge rates, and the variation in discharge rate which may be provided by changing sprockets, sheaves and/or drive motors. Some change in discharge rate can be made by raising or lowering the bottom auger shield.

Discharge Rate

The paddle at the discharge end of the dryer swings through an arc of about 20° from its straight down (dryer empty) position to the up position with grain against the paddle. The position of the mercury switch on the paddle shaft is adjustable by loosening the clamping nut; the mercury switch should be located on the paddle shaft so it is “closed circuit” for the bottom 1/3 to 1/2 of the paddle swing arc, and “open circuit” for the top 1/3 to 1/2 of the paddle swing. The mercury switch must be positioned in its mounting clutch so that there is no interference between the switch and housing.

Full Heat Drying

Full Heat

If the burner switch is set ON, both heaters will operate throughout the entire cycle timer period, eliminating the cooling process.

Dryeration Process

Hot grain will be discharged from the dryer. This type of drying process, called “Dryeration”, increases drying capacity and can increase grain quality. The usual procedure is to temper the hot grain for 4 to 10 hours in a cooling bin or storage bin, then cool by an air-ion fan at a controlled rate. Dryeration provides higher quality in shelled corn because of less stress cracking of kernels in the process of tempering and slow cooling. From 1 to 3% moisture is removed in the cooling process, so that shelled corn is removed from the dryer at about 17% if the desired final moisture is 15%.

The full heat process results in somewhat shorter cycle times and it may be desirable to reduce the 40 min. factory setting of No. 3 Cam to provide more burner operation time on high fire. A 50 min. cycle time would provide only 10 min. of high fire; if the No. 3 Cam setting was reduced to 30 min., the high fire period would then be 20 min., with the remaining 30 min. on low fire.
Top Auger Timer

The top auger timer is located behind the cover in the control section of the main control box. It is an automatic reset timer, with adjustable setting, to provide shut-down of the dryer if the top auger (and any connected loading conveyor) operates continuously for a time period exceeding the timer setting, thereby indicating an absence of wet grain.

Observe the time required for the dryer to fill, then set the top auger timer at the average fill time plus 3 or 4 minutes. The timer will open the safety control circuit for shut-down if the top auger operates continuously for a time equal to the setting, either during filling or refill for shrink.

Unload Delay

The UNLOAD AUGER switch may be set OFF to stop the automatic cycle when the dryer would normally begin unloading. To start the bottom auger, move the UNLOAD AUGER switch to AUTO. This ability to "hold" or delay the unloading is of advantage where an elevator leg may be in use for wet grain when the dryer would start unloading if on AUTO, or where the operator desires to be present when unloading occurs.

Load Delay

The load conveyor switch has two positions ---- OFF - AUTO. The AUTO switch position is the normal setting for automatic loading of the dryer as controlled by the loading timer setting. When the switch is in OFF position, the top auger will not operate. The OFF position is of advantage during the last load and for certain situations where the operator may want to delay the automatic loading operation of the dryer.

Overload Relays

The dryer is equipped with a complete set of current overload relays, with heater ratings as shown by Fig. 8. The safety control circuit of single phase units includes 6 current overload relays as shown in Figs. 14 and 15. Three phase units have 6 current overload relays in the control circuit as shown in Figs. 15 and 20.

All current overload relays are manual reset. If an electrical overload occurs, the control box must be opened to push the reset lever. Note: Pushing reset levers while holding the control circuit START button depressed will indicate which overload relay is open. Use CAUTION to avoid contact with electrical parts which are energized.

Current overload relays are adjustable from 85% to 115% of the rated current of the heater strip, by turning the knob (clockwise turning to 85%).

Shut-Down Indicator

The shut-down indicator lights are connected within the 115 volt safety control circuit to identify the cause of unexpected dryer shut-down problems.

Due to the special circuitry of the shut-down indicators, they will quickly verify power interruption problems and locate intermittent malfunctions within the various self-resetting type safety devices within the dryer. Once an indicator light is activated, it will continue to identify the cause of dryer shut-down until the dryer is manually restarted. This will apply even if a safety device which has interrupted the dryer circuit may have already reset itself.

Anytime the circuit breakers are turned "ON" to energize the safety and control circuits, the No. 1A indicator light should come ON and remain ON until the dryer has been started. Once the start button has been depressed and the dryer starts operating, the light should go out.

NOTE: The detector unit is designed so that if a malfunction occurs within the unit, such as a bad light or poor wiring connections, it will not prevent the dryer from operating, but will only cause abnormal action of the indicator lights.

TO RESTART THE DRYER AFTER A SHUT-DOWN:

1. Investigate the cause of shut-down and perform any necessary adjustments or corrections. For additional information, refer to heading "Control Circuit Not Energized" within trouble analysis procedure. As a future reference, it may be advisable to make a record of the cause, as indicated by the shut-down detector.
NOTE: On rare situations, several dryer safety devices may act to interrupt the safety control circuit. If this occurs, the LOWEST NUMBER INDICATOR LIGHT on the detector will always take priority, as the unit is constructed to indicate only one cause at a time.

2. Press the dryer start button. When the dryer button is pressed, the dryer control light should come ON, indicating the dryer is operational.

If the dryer will not restart, the cause must be further investigated and corrected. In the event of a dryer shut-down where the dryer will not restart and there is no detector light ON, the problem can be further identified as follows:

A. Depress the dryer start button and observe if the dryer circuit becomes activated.

B. If the dryer will now start while the button is held depressed, it will isolate the problem to within the dryer safety circuit and verify that the detector unit is not operating properly. Refer to TROUBLE-SHOOTING and THE SAFETY CIRCUIT WIRING DIAGRAM for additional information.

C. The reason the dryer may now restart is due to the fact that holding the button depressed will act to by-pass the various safety devices within the circuit of the dryer.

### SHUT-DOWN INDICATOR LIGHT IDENTIFICATION

<table>
<thead>
<tr>
<th>LIGHT</th>
<th>SAFETY CONTROL</th>
<th>CONTROL LOCATION</th>
<th>CONTROL TERMINAL CONNECTIONS</th>
<th>MONITOR BOARD CONNECTION TERMINALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>POWER SUPPLY, CIRCUIT BREAKER, FUSE</td>
<td>POWER PANEL</td>
<td>FUSE TERMINAL (COMMON TO MOTOR O/L RELAYS)</td>
<td>A 3 1-3</td>
</tr>
<tr>
<td>2A</td>
<td>MOTOR O/L RELAYS, TOP BURNER HI-LIMIT, (TOP FAN MOTOR 2-WIRES, AB-500A 1-PHM. ONLY)</td>
<td>POWER PANEL, TOP FAN-HTR. CONTROL BOX (6 FAN MOTORS ON AB-500A 1-PHM.)</td>
<td>2</td>
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</tr>
<tr>
<td>3A</td>
<td>TOP BURNER LOCK-OUT</td>
<td>TOP FAN-HTR. CONTROL BOX</td>
<td>B 2 1-2</td>
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<tr>
<td>5A</td>
<td>BOTTOM BURNER LOCK-OUT</td>
<td>B 4 3-5</td>
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<tr>
<td>2B</td>
<td>PLENUM HI-LIMIT THERMOSTATS (27-020), FIXED GRAIN HI-LIMIT THERMOSTAT (27-030), SEE BELOW</td>
<td>THERMOSTAT DRAFT-EXTER ON FRONT PANEL</td>
<td>3</td>
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<tr>
<td>3B</td>
<td>ADJUSTABLE GRAIN HI-LIMIT THERMOSTAT (27-020), SEE BELOW</td>
<td>ASC CONTROL PANEL</td>
<td>B 4 3-4</td>
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<tr>
<td>4B</td>
<td>LOADING TIMER TERMINAL (COMMON TO STOP SWITCH)</td>
<td>ASC CONTROL PANEL</td>
<td>B 5 4-5</td>
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</table>

* As dryers equipped with optional wall motor kit, the HM THERMOSTATS are connected in series with the plenum HI-LIMIT THERMOSTAT and the fixed grain HI-LIMIT THERMOSTAT. These HM THERMOSTATS are located on the front panel of the dryer behind the ladder and in the Thermostat cassette.

* As dryers only, if equipped with optional loading assist sensor, the dryer overload RELAY is connected in series with the adjustable grain HI-LIMIT THERMOSTAT. This O/L RELAY is located on power panel.
Dryer Shut-Down

If the dryer is to be shut down while filled with grain, it is recommended that hot grain be cooled for 10 to 15 minutes, especially in cold weather, to prevent water vapor condensation and possible freezing of such condensate following shut down.

When vaporizer-equipped burners are to be shut down for several hours or more, it is recommended that pressure be relieved on vaporizer and supply lines by first closing the valve at the supply tank, then letting the burner operate until the flame stops from lack of fuel, immediately turn the burner OFF. After the burner is OFF, close all other valves in fuel supply piping.

To stop the dryer, push control circuit STOP button, turn main power supply OFF, and CLOSE all valves in the fuel supply lines to the dryer.

Fan-Heater Units

Fan blades must rotate freely and the direction of rotation must be as indicated by the arrow on the blade hub. The fan should reach full speed in less than 7/ seconds, and running current should not exceed 110% of motor nameplate rating.

The operating principle of the FL-02 burner control is listed as follows (see burner control wiring diagram):

1. Power is available to the burner control—ONLY WHEN THE FAN IS OPERATING.

   With the fan operating and the burner switch closed, power is transmitted from the indicated motor lead wires through the two fuses, burner switch and flame switch to supply power to P/L Terminals No. 2 and No. 1, thereby energizing the heater elements within the purge and lock-out tube.

2. After the purge tube has been energized for approximately 30 seconds, the purge tube contacts CLOSE the circuit between P/L Terminals No. 5 and No. 1 and energizes the control relay coil. As the relay coil becomes energized it supplies voltage to the ignition transformer and gas solenoid valves by CLOSING the relay contacts between P/L Terminals No. 3 and No. 5, thereby starting ignition spark and gas flow.

3. Shortly after the heater starts operating, the flame switch responds to burner heat and OPENS its contact points, thereby de-energizing the purge tube and lock-out tube heater element circuit. After the circuit becomes de-energized and the purge tube contacts reopen, a second set of closed contact points within the relay act to keep the relay coil energized to maintain heater operation.

4. The heater will operate on Hi-Fire with both gas solenoid valves energized until the thermostat control (either Hi-Heat or Lo-Heat thermostat) opens its contacts and interrupts the circuit to de-energize the Hi-Fire gas solenoid valve.

   When the thermostat control senses that additional heat is required and closes its contact points, the Hi-Fire gas solenoid valve will immediately open and repeat the ON-OFF cycle to maintain the desired heat.

5. If the heater fails to start operating, due to lack of fuel or possible malfunction, after the ignition transformer and gas solenoid valves are energized:

   A. The flame switch remaining in its COLD (closed contacts) position will continue to energize the lock-out tube heater circuit.

   B. After the lock-out heater has been energized for approximately 60 seconds, the lock-out tube contacts will OPEN and interrupt the circuit, thereby providing automatic shut-down.

On vaporizer units, the vaporizer should be moved slightly toward the flame if the copper tubing from the regulator accumulates frost. If the burner is shut off by the vapor high limit thermostat, move the vaporizer slightly away from the burner. The small wedge-shaped heat baffles can also be removed from burner vanes to reduce vapor temperature.
Fan-Heater Units (cont.)

Before each drying season, the following inspection and service is recommended:

A. Inspect fan blade for free rotation, uniform tip clearance, and accumulation of dirt or grain dust inside the blade hub, which can unbalance the blade to cause vibration and short bearing life. Check fan blade for side play, which is an indication of defective motor bearing requiring replacement.

B. Lubricate roller chains every 50,000 bu. and at end of each drying season. The top and bottom auger drive chains should be tensioned so each chain has approximately ⅛” of total deflection. To avoid misaligning the jackshaft bearings, MAKE SURE TO COMPLETELY LOOSEN THE DRIVE BELTS BEFORE ADJUSTING THE CHAIN TENSION.

C. Under normal usage, the motor should be cleaned, checked, and have bearings repacked every two or three seasons by an authorized motor service station. Only a dependable brand of high-quality electric motor bearing grease should be used, as standard type grease gun lubricants will not withstand the high operating speeds and bearing temperatures.

D. The auger bearings are lifetime lubricated, but are equipped with fittings to allow relubrication after prolonged operation. When relubricating, use a high-quality lithium-base grease and add grease sparingly until it begins to flow past the seals.

E. The fan-heater control box and main control box should be inspected for moisture, rodent damage, or accumulation of foreign material.

F. Foreign material in the burner casting or burner cup will not burn out and will impair burner operation. Inspect and clean if necessary. Clean the primary air screen at the top of the burner casting.

G. Check the ignitor electrode gap; it should be about 3/32”. Use emery paper to remove rust and carbon.

TEST FIRE: Test fire the dryer to check the operation of major components; see TEST FIRING.

The function of this timer is to prevent both fans from starting simultaneously, causing an excessive starting current draw. The delay is factory set at 10 seconds, but could be field adjusted if required. Caution should be exercised not to extend the delay time too long, as the bottom fan will begin to windmill backwards, making it harder to start.

OPERATING PRECAUTIONS

1. Keep the dryer CLEAN. Do not allow fine material to accumulate in the plenum chamber.
2. Set pressure regulator to avoid excessive gas pressure applied to burner during ignition and when burner is in operation. See Fig. 5 for operating gas pressures. Do not exceed maximum recommended drying temperatures.
3. Power supply should be OFF for service of electrical components. Use CAUTION in checking voltages or other procedures requiring power ON.
4. Do not operate the dryer if any gas leak is detected. Shut down and repair before further operation.
5. Clean grain is easier to dry. Fine material increases resistance to air flow and requires removal of extra moisture.
6. Use CAUTION in working around high-speed fans, gas burners, augers, and auxiliary conveyors which start automatically.
7. Keep auger drive belts tight enough to prevent slippage.
8. Be certain that capacities of auxiliary conveyors are matched to dryer auger capacities.
9. Do not operate in an area where combustible material will be drawn into the fan.
10. Never operate dryer while guards are removed.
FIG. 8 - LIQUID PROPANE MODEL PARTS

FIG. 9 - NATURAL GAS MODEL PARTS IDENTIFICATION
FIG. 10 - L.P. MODEL FUEL SUPPLY AND FAN-HEATER PARTS
(SINGLE PHASE 230 VOLT TYPE UNIT SHOWN)

FIG. 11 - NATURAL GAS MODEL FUEL SUPPLY AND FAN-HEATER PARTS
(THREE PHASE 220 VOLT TYPE UNIT SHOWN)
Fig. 14 - Dryer Power Panel Parts - Single Phase Models

Fig. 15 - Dryer Power Panel Parts - Three Phase 220V Models

* Power Terminal Strip Connections shown in wiring diagrams by numbers within single box symbols (□).

** Connections on control terminal strip shown in wiring diagrams by numbers within double box symbols (□).
Fig. 16 - Bottom Auger Drive Components

Fig. 17 - Motor Mount and Belt Tension Adjusting Bolt Details
FIG. 18 - SPEED JACK AND AUGER DRIVE CHAIN DETAILS

FIG. 18A - TYPICAL VIEW WITHIN AIR PLENUM CHAMBER OF DRYER
AB-350A Power Circuit

230 Volt-Single Phase

110 Volt Circuits

Neutral Lug on Load Center
230 Volt Single Phase Power Supply

Aux Load

Load C.B. * Top Fan C.B.

Bot. Fan C.B.

Un-Load C.B.

G Amp Fuse

To General Control Circuit

To Safety Circuit

220 Volt Three Phase

220 Volt-Three Phase

AB-350A Power Circuit

110 Volt Circuit

Ground

Load C.B.

Top Fan C.B.

Bot. Fan C.B.

Un-Load C.B.

6 Amp Fuse

220V

2A

110 V Transformer

To Safety Circuit

To General Control Circuit

Legend:

- Noted Circuit Breaker
- Noted Contactor
- Coil, Loading Contactor
- Coil, Top Fan
- Coil, Bottom Fan
- Coil, Unloading Contactor
- Noted Motor

* Manual reset type safety device - if this device trips to open circuit position, it must be reset before the dryer can be restarted.

Fig. 19 - AB-350A Power Circuits - 1 Phase 230 Volt and 3 Phase 220 Volt Models
Manual reset type safety device - if this device trips to open circuit position, it must be reset before the dryer can be restarted.

FIG. 20 - AB-350A POWER CIRCUIT - 3 PHASE 440 VOLT MODELS
On dryers equipped with optional mill mutual kit, the HI-Limit thermostats are connected in series with plenum HI-Limit thermostats and fixed grain columns HI-Limit thermostats.

FIG. 21 - AB-310A SAFETY CIRCUIT - 1 PHASE AND 3 PHASE MODELS
AB-350A BURNER CONTROL

NOTE: ON PROPANE MODEL DRYERS, THE NO. 1 GAS VALVE IS 15/16" PIPE SIZE, AND NO. 2 GAS VALVE IS 15/16" PIPE SIZE. NAT GAS MODELS REQUIRE 5/8" LARGER SIZE.

LOCATION OF 115 VOLT SAFETY CIRCUIT WIRES WITHIN THE 230 VOLT BURNER CONTROL CIRCUIT

☆ Manual reset type safety device - if this device trips to open circuit position, it must be reset before the dryer can be restarted.

FIG. 23 - AB-350A DRYER BURNER CONTROL CIRCUIT
Mercury Switch Paddle Position

Free hang--dryer calling for grain.
Switches "A" & "B" both closed.
Switch "C" open;
fan not started.

Partially activated--dryer almost full.
Switch "A" closed.
Switch "B" opens.
Switch "C" closes;
fan starts.

Fully activated--dryer full.
Switches "A" & "B" both open.
Switch "C" closed & fan contactors interlocked by aux. contacts.

Switch Function: "A"--Top Auger Stop
"B"--Top Auger Start
"C"--Fan Start

FIG. 24 - AB-350A TOP AUGER MERCURY SWITCH WIRING DETAILS