

Vision Series Portable Dryer

OPERATORS MANUAL 2005

PNEG-1456 (Preliminary) One & Two Fan Portable Dryer Models



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

Thank you for choosing a GSI Vision Series grain dryer. These units are among the finest grain dryers ever built; designed to give you excellent operating performance and reliable service for many years.

This manual describes the installation and operation for all standard production model dryers. These dryers are available with liquid propane or natural gas fuel supply, single phase 230 volt, three phase 230 or 460 volt (60Hz) electrical power.

USE CAUTION IN THE OPERATION OF THIS EQUIPMENT

The design and manufacture of this dryer is directed toward operator safety. However, the very nature of a grain dryer having a gas burner, high voltage electrical equipment and high speed rotating parts does present a hazard to personnel which cannot be completely safeguarded against without interfering with efficient operation and reasonable access to components.

Use extreme caution in working around high speed fans, gasfired 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.

Take special note of the Operating Precautions listed on Page 4 before attempting to operate the dryer.

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

<u>A CAREFUL OPERATOR IS THE BEST INSURANCE</u> <u>AGAINST AN ACCIDENT.</u>

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OPERATING PRECAUTIONS

1. Read and understand the operation manual before attempting to operate the unit.

2. Keep ALL guards, safety decals, and safety devices in place. Never operate dryer while guards are removed.

3. Keep visitors, children and untrained personnel away from dryer at all times.

4. Never attempt to operate the dryer by jumping or otherwise bypassing any safety devices on the unit.

5. Always set the main power supply disconnect switch to OFF and lock it in the OFF position using a padlock before performing any service or maintenance work on the dryer or the auxilliary conveyor equipment.

6. Before attempting to remove and reinstall the fan blade, make certain to read recommended procedure listed within the SERVICING section of the manual.

7. Keep the dryer and wet holding equipment CLEAN. Do not allow fine material to accumulate.

8. Set pressure regulator to avoid excessive gas pressure applied to a burner during ignition and when burner is in operation. See page xx in Section 4 for operating gas pressures. Do not exceed maximum recommended drying temperatures.

9. Do not operate the dryer if any gas leak is detected. Shut down and repair before further operation.

10. Clean grain is safer and easier to dry. Fine material can be highly combustable, and it also requires removal of extra moisture.

11. Use CAUTION in working around high-speed fans, gas burners, augers, and auxiliary conveyors which can start automatically.

12. Be certain that capacities of auxiliary conveyors are matched to dryer auger capacities.

13. Do not operate in an area where combustable material will be drawn into the fan.

14. The operating and safety recommendations in this manual pertain to the common cereal grains as indicated. When drying any other grain or products, consult the factory for additional recommendations.

15. Routinely check for any developing gas plumbing leaks. Check LP vaporizer for contact with burner vanes.



SECTION 1 SPECIFICATIONS

Figure 1.1 DRYER DIMENSIONS



Single Module Transport and Installation Dimensions

Values are valid for transportation of stack modules.

Dryer	A B C Pryer Transport Installed		D Height w/o Wat Bin	E Frame Width	F Transport Width	G Installed Length	H Transport Longth		
Dasket	mergint	wiaui	Wet Bin	Standard Top	wet biii	witti	wiath	Instaneu Length	Length
1108	11'11"	8'	13'	11'6"	10' 3"	6' 5"	8'	15'2"	17'2"
1110	11'11"	8'	13'	11'6"	10'3"	6' 5"	8'	17'2"	19' 2"
1110	13' 5"	8'	14' 6"	13'	10 9"	6' 5"	8'	19'2"	21'2"
1112	13'5"	8'	14' 6"	13'	11'9"	6' 5"	8'	21' 2"	21 2
1116	13'5"	8'	14' 6"	13'	11'9"	6' 5"	8'	21 2	25'2"
1118	13'5"	8'	14' 6"	13'	11'9"	6' 5"	8'	25' 2"	27' 2"
1120	13'5"	8'	14' 6"	13'	11'9"	6'5"	8'	27'2"	29' 2"
1122	13' 5"	8'	14' 6"	13'	11'9"	6'5"	8'	29' 2"	31'2"
1126	13' 5"	8'	14' 6"	13'	11'9"	6' 5"	8'	33' 2"	35' 2"
1214	13' 5"	8'	14' 6"	13'	11' 9"	6' 5"	8'	21'2"	23' 2"
1216	13' 5"	8'	14' 6"	13'	11' 9"	6' 5"	8'	23' 2"	25' 2"
1218	13' 5"	8'	14' 6"	13'	11' 9"	6' 5"	8'	25' 2"	27' 2"
1220	13' 5"	8'	14' 6"	13'	11' 9"	6' 5"	8'	27' 2"	29' 2"
1222	13' 5"	8'	14' 6"	13'	11' 9"	6' 5"	8'	29' 2"	31' 2"
1226	13' 5"	8'	14' 6"	13'	11' 9"	6' 5"	8'	33'2"	35' 2"
1214S	13' 5"	8' 8"	14' 6"	13'	11'9"	6' 5"	8'	21'2"	23' 2"
1218S	13' 5"	8' 8"	14' 6"	13'	11'9"	6' 5"	8'	25' 2"	27' 2"
1220S	13' 5"	8' 8"	14' 6"	13'	11'9"	6' 5"	8'	27' 2"	29' 2"
1222S	13' 5"	8' 8"	14' 6"	13'	11' 9"	6' 5"	8'	29' 2"	31' 2"
1226S	13' 5"	8' 8"	14' 6"	13'	11'9"	6' 5"	8'	33' 2"	35' 2"







1100 Series Dryer Specifications

	1108	1110	1112	1114	1116	1118	1120	1122	1126
Total Holding Capacity (bushels)	190	238	327	381	436	490	544	599	708
Grain Column Holding Capacity (bushels)	160	200	282	329	376	423	470	517	611
Fan	28"	36"	36"	40"	40"	42"	42"	42"	42"
	10-13 Hp	10-13 Hp	15 Hp	15 Hp	15 Hp	20 Hp	25 Hp	30 Hp	40 Hp
Top Auger	8" Dia. 1.5Hp	8" Dia. 2Hp	8" Dia. 3Hp	8" Dia. 5Hp	8" Dia. 5Hp	8" Dia. 5Hp	8" Dia. 7.5Hp	8" Dia. 7.5Hp	8" Dia. 10Hp
Capacity (BHP)	2900	2900	2900	3800	3800	3800	3800	3800	3800
Bottom Auger	8" Dia. 1Hp	8" Dia. 1.5Hp	8" Dia. 1.5Hp	8" Dia. 3Hp	8" Dia. 5Hp	8" Dia. 5Hp	8" Dia. 7.5Hp	8" Dia. 7.5Hp	8" Dia. 10Hp
Meter Roll Drive	SCR, 1/3 Hp	SCR, 1/3 Hp	SCR, 1/3 Hp	SCR, 3/4 Hp	SCR, 3/4 Hp	SCR, 3/4 Hp	SCR, 3/4 Hp	SCR, 3/4 Hp	SCR, 3/4 Hp
Capacity - Max. Rate ¹ (BHP)	1120	1400	1680	1960	2240	2520	2800	3080	3640
Electrical Load (Fans, Top & Bottom Augers ²)									
1 phase, 220 Volt	63	71	85	98	108				
3 phase, 220 Volt	42	42	50	56	65	80	104	114	150
3 phase, 440 Volt	21	23	25	28	33	40	52	57	75
3 phase, 575 Volt	18	16	20	23	27	32	42	46	61
3 phase, 380 Volt	22	23	33	36	44	49	68	75	88
1 A stual dischange note is controlled by motor roll or	and adjustma	nt ot 50/to 1	000/ of more	imarran noto					

1. Actual discharge rate is controlled by meter roll speed adjustment, at 5% to 100% of maximum rate.

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2. Excludes auxiliary load and unload conveyor equipment.

1200 Series Dryer Specifications

1200 Series Dryer Specifications	1214	1216	1218	1220	1222	1226
Total Holding Capacity (bushels)	381	436	490	544	599	708
Grain Column Holding Capacity (bushels)	329	376	423	470	517	611
Fans	26" 10-13Hp 36" 10-13Hp	26" 10-13Hp 36" 15Hp	26" 10-13Hp 36" 15Hp	28" 10-13Hp 40" 15Hp	28" 10-13Hp 42" 20Hp	28" 10-13Hp 42" 25Hp
Top Auger	8" Dia. 5Hp	8" Dia. 5Hp	8" Dia. 5Hp	8" Dia. 7.5Hp	8" Dia. 7.5Hp	8" Dia. 10Hp
Capacity (BHP)	3800	3800	3800	3800	3800	3800
Bottom Auger	8" Dia. 5Hp	8" Dia. 5Hp	8" Dia. 5Hp	8" Dia. 7.5Hp	8" Dia. 7.5Hp	8" Dia. 10Hp
Meter Roll Drive	SCR, 3/4 Hp	SCR, 3/4 Hp	SCR, 3/4 Hp	SCR, 3/4 Hp	SCR, 3/4 Hp	SCR, 3/4 Hp
Capacity - Max. Rate ¹ (BHP)	1960	2240	2520	2800	3080	3640
Electrical Load (Fans, Top & Bottom Augers ²)						
1 phase, 220 Volt	142	156	156	172		
3 phase, 220 Volt	92	99	99	112	126	150
3 phase, 440 Volt	47	50	50	57	63	75
3 phase, 575 Volt	37	42	42	47	52	61
3 phase, 380 Volt	50	61	61	70	75	90

1. Actual discharge rate is controlled by meter roll speed adjustment, at 5% to 100% of maximum rate.

2. Excludes auxiliary load and unload conveyor equipment.

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1200S Series Dryer Specifications

	1214S	1218S	1220S	1222S	1226S
Total Holding Capacity (bushels)	381	490	544	599	708
Grain Column Holding Capacity (bushels)	329	423	470	517	611
Fans	28" 10-13 Hp (2)	36" 10-13 Hp (2)	36" 15 Hp (2)	36" 15 Hp (2)	40" 25 Hp (2)
Top Auger	8" Dia. 5Hp	8" Dia. 5Hp	8" Dia. 7.5Hp	8" Dia. 7.5Hp	8" Dia. 10Hp
Capacity (BHP)	3800	3800	3800	3800	3800
Bottom Auger	8" Dia. 5Hp	8" Dia. 5Hp	8" Dia. 7.5Hp	8" Dia. 7.5Hp	8" Dia. 10Hp
Meter Roll Drive	SCR, 3/4 Hp	SCR, 3/4 Hp	SCR, 3/4 Hp	SCR, 3/4 Hp	SCR, 3/4 Hp
Capacity - Max. Rate ¹ (BHP)	1960	2520	2800	3080	3640
Electrical Load (Fans, Top & Bottom Augers ²)				-	
1 phase, 220 Volt	142	142	186	186	
3 phase, 220 Volt	93	93	118	118	180
3 phase, 440 Volt	47	47	60	60	90
3 phase, 575 Volt	40	33	48	48	72
3 phase, 380 Volt	50	50	80	80	115

Actual discharge rate is controlled by meter roll speed adjustment, at 5% to 100% of maximum rate.
 Excludes auxiliary load and unload conveyor equipment.

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TRANSPORTING DRYER

An optional Transport Kit is available for transporting the unit by truck or tractor. Make certain to observe the following **safety precautions:**

1. Recommended towing hitch height: 16" to 17".

2. Hitch pin to be not less than 3/4 inch in dia. and securely fastened so it will not come out in travel.

3. Use a safety chain.

4. Dryer must be towed empty and in accordance with applicable state or provincial regulations.

5. Recommended tire pressure 55-60 psi (cold).

6. Maximum towing speed: 45 mph.

7. After first 50 miles and every 200 miles thereafter:

a. Check hub and spindle temperature immediately after stopping. Temperature should not exceed 150 degrees F. May be hot to touch, but not melting lubricant.

b. Check wheel lug bolts; they are factory torqued at 115 to 120 ft/lbs. Retighten, if required, to approximately 90 ft/lbs.



Figure 2.1: Use a 14-17 inch towing hitch height and a safety chain.



Figure 2.2: A 3/4 inch hitch bolt and washers fastened with a locking nut at the bottom of the hitch.

INSTALLATION

SYSTEM LAY-OUT — Consider the grain handling system, storage bins, and existing conveyors in selecting the dryer site, in order 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. 1-1 for dryer dimensions.

LEG 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. The optional Leg Set Package with a 16" minimum height is the recommended method of support. See Fig. 2-3 for recommended number of supports. Concrete blocks or other means may be used provided they can carry the total weight of dryer when filled with grain. If

> using blocks or other means, use shims to provide uniform, level support, at a minimum of 16" above the concrete slab to provide space for clean-out and for aux. conveyors. Hitch tongue should be removed, but hitch and fan support must be left on; they are not a part of the transport.

> CONCRETE SLAB — An reinforced concrete slab is recommended as the basic support for the dryer (see Fig. 2-4), 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 dryer may be tied down by cable and turnbuckle to anchors installed at edge of slab. In any case, dryer must be securely anchored to support blocks and concrete base, to prevent overturn or lateral movement by wind forces.

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 (except for special front-loading units).

WET GRAIN SUPPLY — A wet holding bin may be utilized to supply grain to the dryer, 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. In any case, the dryer must have a constant supply of wet grain. Auxiliary loading conveyors should be sized to nearly match the capacity of the top auger, to avoid air loss problems caused by underfilling during high drying rate operations.

Figure 2.3 LEG SUPPORTS



TOP VIEW



Wire Mesh (ft ²)	216	240	264	288	312	336	360	384	432
Steel Legs (minimum)	8	10	10	12	12	14	14	16	18
Anchors	4	4	6	6	6	8	8	8	10
Blocks	14	14	18	18	18	22	22	26	30
Feet of 2 x 6	14	14	18	18	18	22	22	26	30
Turnbuckles	4	4	6	6	6	8	8	8	10
Estimated Manhours	10	12	14	18	18	20	22	24	28

Quantities are approximate and requirements may vary due to site elevations. Setup times do not include preparing site and pouring concrete pad.

WET GRAIN LOADING - The dryer will automatically start the top auger and any loading conveyor electrically connected to the power circuit provided in the main control box. At the beginning, dryer will completely fill, requiring approximately its full holding capacity. During drying, the top auger will start and stop, as required to maintain the dryer full of wet grain.

LOAD TIMER — The unit is equipped with a load timer within the control box to provide automatic shut-down on wet grain outage, if the top auger operates for a time exceeding the adjustable timer setting.

DISCHARGE AUGER EXTENSIONS — Special discharge auger extension kits are available, with an additional length of 1 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. Extensions are available with either a solid or perforated tube.

AUXILIARY CONVEYOR OVERLOAD RELAYS - The dryer is factory equipped with overload protection devices for a 10 HP loading conveyor and a 7.5 HP take-away conveyor. If other HP ratings are used, it will be necessary to change the settings of the overload devices or possibly replace the overload device with one properly sized for the HP rating. See Chart 2-5 on pages 13 and 14 for standard overload ratings.

FUEL CONNECTIONS

LIQUID PROPANE (LP) DRYERS WITH INTERNAL VA-PORIZERS

LIQUID DRAW — The dryer is designed to operate on liquid propane, with liquid draw from a 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 fanheater unit, between vaporizer and burner.

AMMONIA TANKS — Do not use propane supply tanks that have previously held ammonia or fertilizer solutions. These substances are extremely corrosive and may damage 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.

Figure 2.5 A grain dryer connected to a liquid propane tank.



manifold on dryer

Use a flexible connection hose designed for LP gas

See fuel specs chart below for recommended line use

Consult propane supplier for proper fittings, connection hose, and safety controls required to meet standards

Propane supply tank recommended minimum of 1,000 gallons connected for liquid draw

Open LP shut-off valves slowly to prevent accidental closing of excess flow valves

Fuel supply systems should conform with national fire protection association standards

Do not use a pressure regulator at the supply tank



Chart 2.1	LP	orifice
sizes.		

			LP ORIFICE	DATA	
FAN DIA.	HP/Hz	ORIFI	CE SIZE	PART No.	
26"	10-12 / 60	7/32"	0.2188"	HF-7087	
28"	10-12 / 60	1/4"	0.25"	THF-3241	
36"	10-12 / 60	9/32"	0.2813"	THF-3242	
36"	10-12 / 50	9/32"	0.2813"	THF-3242	
36"	15 / 60	21/64"	0.3281"	CD-0150	
36"	15 / 50	21/64"	0.3281"	CD-0150	
40"	15 / 60	11/32"	0.3438"	THF-3058	
40"	25 / 60	23/64"	0.3594"	THF-3245	
40"	25 / 50	23/64"	0.3594"	THF-3245	
40"	40 / 60	7/16"	0.4375"	THF-3059	
42"	15 / 60	11/32"	0.3438"	THF-3058	
42"	15 / 50	11/32"	0.3438"	THF-3058	
42"	20 / 60	3/8"	0.375"	THF-3247	
42"	20 / 50	3/8"	0.375"	THF-3247	
42"	25 / 60	25/64"	0.3906"	THF-3249	
42"	25 / 50	25/64"	0.3906"	THF-3249	
42"	30 / 60	7/16"	0.4375"	THF-3059	
42"	30 / 50	7/16"	0.4375"	THF-3059	
42"	40 / 60	29/64"	0.4531"	THF-3252	
42"	40 / 50	29/64"	0.4531"	THF-3252	

Dryer Model	Max. Heat Capacity (BTU/hr)	Max. Fuel Flow (gal./hr)	Fuel Line Size (Minimum for 100')
1108	3,000,000	33	1/2"
1110	3,500,000	38	1/2"
1112	4,500,000	49	1/2"
1114	5,750,000	63	1/2"
1116	5,750,000	63	1/2"
1118	6,750,000	74	1/2"
1120	7,500,000	82	1/2"
1122	8,750,000	96	3/4"
1126	10,250,000	112	3/4"
1214	6,200,000	68	1/2"
1216	7,200,000	79	1/2"
1218	7,200,000	79	1/2"
1220	8,500,000	93	3/4"
1222	9,750,000	107	3/4"
1226	10,500,000	115	3/4"
1214S	6,000,000	66	1/2"
1218S	7,000,000	77	1/2"
1220S	9,000,000	98	3/4"
1222S	9,000,000	98	3/4"
1226S	13,500,000	148	3/4"

Chart 2.2 LP fuel system specifications & recommendations. (tank pressure)

NATURAL GAS

AS VOLUME AND PRESSURE — The dryer is designed to operate on natural gas having a heat value of about 1,000 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 operating pressure.

Figure 2.6 A grain dryer connected to a natural gas supply tank.



Chart 2.3 NG orifice sizes.

			NG URIFICE	DATA
FAN DIA.	HP/Hz	ORIFI	CE SIZE	PART No.
26"	10-12 / 60	5/16"	0.3125"	HF-7099
28"	10-12 / 60	3/8"	0.375"	THF-3140
36"	10-12 / 60	13/32"	0.4063"	THF-3243
36"	10-12 / 50	13/32"	0.4063"	THF-3243
36"	15 / 60	1/2"	0.5"	THF-3244
36"	15 / 50	1/2"	0.5"	THF-3244
40"	15 / 60	33/64"	0.5156"	THF-3246
40"	25 / 60	17/32"	0.5313"	THF-3236
40"	25 / 50	17/32"	0.5313"	THF-3236
40"	40 / 60	19/32"	0.5938"	THF-3251
42"	15 / 60	33/64"	0.5156"	THF-3246
42"	15 / 50	33/64"	0.5156"	THF-3246
42"	20 / 60	35/64"	0.5469"	THF-3248
42"	20 / 50	35/64"	0.5469"	THF-3248
42"	25 / 60	37/64"	0.5781"	THF-3250
42"	25 / 50	37/64"	0.5781"	THF-3250
42"	30 / 60	19/32"	0.5938"	THF-3251
42"	30 / 50	19/32"	0.5938"	THF-3251
42"	40 / 60	41/64"	0.6406"	THF-3253
42"	40 / 50	41/64"	0.6406"	THF-3253

(to psig operating pressure)						
	Max. Heat Capacity	Max. Fuel Flow	Fuel Line Size			
Dryer Model	(BTU/hr)	(cu ft/hr)	(Minimum for 100')			
1108	3,000,000	3000	1-1/2"			
1110	3,500,000	3500	1-1/2"			
1112	4,500,000	4500	2"			
1114	5,750,000	5750	2"			
1116	5,750,000	5750	2"			
1118	6,750,000	6750	2"			
1120	7,500,000	7500	2"			
1122	8,750,000	8750	2-1/2"			
1126	10,250,000	10250	2-1/2"			
1214	6,200,000	6200	2"			
1216	7,200,000	7200	2"			
1218	7,200,000	7200	2"			
1220	8,500,000	8500	2-1/2"			
1222	9,750,000	9750	2-1/2"			
1226	10,500,000	10500	2-1/2"			
1214S	6,000,000	6000	2"			
1218S	7,000,000	7000	2"			
1220S	9,000,000	9000	2-1/2"			
1222S	9,000,000	9000	2-1/2"			
1226S	13,500,000	13500	2-1/2"			

Chart 2.4 NG fuel system specifications & recommendations. (10 psig operating pressure)

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 adequate enough to prevent low voltage damage to motors and control circuits. Power supply for single phase models must include a neutral wire.

TRANSFORMERS AND WIRING VOLTAGE DROP

Advise the service representative of your local power supplier that an additional load will be placed on the line. Check on KVA rating of transformers, considering total horsepower load. The power supply wiring, main switch equipment and transformers must provide adequate motor starting and operating voltage. Voltage drop during motor starting should not exceed 14% of normal voltage, and after motor is running at full speed it should be within 8% of normal voltage.

POWER SUPPLY DISCONNECT

All dryers are equipped with a power disconnect switch in the power box to permit total power shutdown before opening the power box door, as required for inspection and service. The power disconnect switch is located on the power box door for quick shutdown.

MACHINE TO EARTH GROUNDING

It is very important that a *Machine To Earth Ground Rod* be installed at the dryer. Place the ground rod that comes standard, within 8 feet of the dryer and attach it to the dryer control panel with at least a #6 solid, bare, copper ground wire and the clamp provided. The grounding rod located at the power pole will not provide adequate grounding for the dryer. The proper grounding will provide additional safety in case of any short and will ensure long life of all circuit boards, SCR drive, and the ignition system. The ground rod must be in accordance with local requirements.

PROPER INSTALLATION OF GROUND

ROD

It is not recommended that the rod be driven into dry ground. Follow these instructions for proper installation.

- 1. Dig a hole large enough to hold 1 to 2 gallons of water.
- 2. Fill hole with water.
- 3. Insert rod through water and jab it into the ground.
- 4. Continue jabbing the rod up and down. The water will work

its way down the hole, making it possible to work the rod completely into the ground. This method of installation assures good contact with the surrounding soil, making a proper ground.

5. Connect the bare, copper ground wire to the rod with the proper clamp.

6. Connect ground wire to control panel with the ground lug provided in the control box.

7. Ground wire must not have any breaks or splices. Insulated wire is not recommended for grounding applications.

CONNECTING AUXILIARY CONVEYORS

The auxiliary load and auxiliary unload augers or conveyors can be wired directly to the dryer. Auxiliary Load Information (Chart 2.5 on page 13) shows the maximum horse power and amps of auxiliaries that can be wired to the dryer. If an auxiliary motor is larger than what is recommended, then it must be powered from a source outside the dryer, and must use a separate contactor and overload protection device for each motor. However, the operation of the auxiliaries can be performed by the control panel.

The following charts provide information for the electrician wiring the grain dryer, and are a reference guide for parts. It is recommended that you contact your local power company and have a representative survey the installation to see that your wiring is compatible with their system and that adequate power is supplied to your unit. Remember that the only thing connected to the recommended service amps should be your grain dryer.

Standard electrical safety practices and codes should be used. (Refer to National Electrical Code Standard Handbook by National Fire Protection Association.) A qualified electrician should make all electrical wiring installations.



Figure 2.7: Installation of a ground rod (standard with dryer purchase) specifically for the grain dryer is necessary for safety and equipment preservation.

Chart	2.5
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	Auxiliary Load Information						
Dryer Model	Phase	Voltage	Auxililary Size	Motor Amps	Wire Gauge		
	1	220	(2) 7.5 hp	153	250		
1108	3	220	(2) 7.5 hp	104	150		
	3	440	(2) 7.5 hp	57	150		
	1	220	(2) 7.5 hp	168	250		
1110	3	220	(2) 7.5 hp	101	150		
	3	440	(2) 7.5 hp	56	150		
	1	220	(2) 7.5 hp	196	300		
1112	3	220	(2) 7.5 hp	114	175		
	3	440	(2) 7.5 hp	62	150		
	1	220	(2) 7.5 hp	231	350		
1114	3	220	(2) 10 hp	145	200		
	3	440	(2) 10 hp	78	150		
	1	220	(2) 7.5 hp	231	350		
1116	3	220	(2) 10 hp	145	200		
	3	440	(2) 10 hp	78	150		
1118	3	220	(2) 10 hp	158	250		
	3	440	(2) 10 hp	84	150		
1120	3	220	(2) 15 hp	219	300		
1120	3	440	(2) 15 hp	115	200		
1122	3	220	(2) 15 hp	231	350		
1122	3	440	(2) 15 hp	120	200		
1126	3	220	(2) 15 hp	277	400		
1120	3	440	(2) 15 hp	143	225		

- -

Chart 2.5

Auxiliary Load Information						
Dryer Model	Phase	Voltage	Auxililary Size	Motor Amps	Wire Gauge	
	1	220	(2) 7.5 hp	31	8	
1214	3	220	(2) 10 hp	26	10	
	3	440	(2) 10 hp	13	14	
	1	220	(2) 7.5 hp	31	8	
1216	3	220	(2) 10 hp	26	10	
	3	440	(2) 10 hp	13	14	
	1	220	(2) 7.5 hp	31	8	
1218	3	220	(2) 10 hp	26	10	
	3	440	(2) 10 hp	13	14	
	1	220	(2) 7.5 hp	31	8	
1220	3	220	(2) 15 hp	39	6	
	3	440	(2) 15 hp	19.5	10	
1000	3	220	(2) 15 hp	39	6	
1222	3	440	(2) 15 hp	19.5	10	
1226	3	220	(2) 15 hp	39	6	
1220	3	440	(2) 15 hp	19.5	10	
	1	220	(2) 7.5 hp	31	8	
1214S	3	220	(2) 10 hp	26	10	
	3	440	(2) 10 hp	13	14	
	1	220	(2) 7.5 hp	31	8	
1218S	3	220	(2) 10 hp	26	10	
	3	440	(2) 10 hp	13	14	
	1	220	(2) 7.5 hp	31	8	
1220S	3	220	(2) 15 hp	39	6	
	3	440	(2) 15 hp	19.5	10	
	1	220	(2) 7.5 hp	31	8	
1222S	3	220	(2) 15 hp	39	6	
	3	440	(2) 15 hp	19.5	10	
12265	3	220	(2) 15 hp	39	6	
12200	3	440	(2) 15 hp	19.5	10	







Fig. 3.1 Vision Control Panel Layout

CONTROL POWER SWITCH

The control power to energize the Vision Control System is turned on or off with this switch.

Note: This switch does <u>not</u> disconnect the power that is present at the breakers, contactors, transformer(s), fuses or other electrical components found in the upper and lower control boxes. Turn the Main Disconnect Handle to the OFF posistion prior to servicing any of the installed components.

FAN SWITCH

Each fan is turned on or off with this switch. The on position operates the fan continuously during staged batch and continuous flow modes. The auto position operates the fan in staged batch during the dry and cool cycle but the fan will not operate during the unload cycle. The switch will light up whenever the air pressure switch is sensing air pressure and the dryer is full of grain.

Note: The bottom fan on your dryer is always Fan 1.

HEATER SWITCH

Each burner is turned on or off with this switch. The auto position operates the burner in staged batch during the dry cycle only. The on position will operate the burner only when the fan is running. The switch will light up only when the flame sensor detects the flame.

Note: The bottom burner on your dryer is always Burner 1.

LOAD AUGER SWITCH

This is used to select the operation of the fill auger. In both the auto and manual position the load auger will operate if the dryer is low on grain and will automatically shut off when the dryer is full. In the auto position only, the dryer will shut down after a preset period of time set on the out of grain timer, or if grain flow is interrupted to the dryer. The switch will light whenever the load auger is operating.

Note: If the load auxiliary controls are being used, this switch will also control the operation of the auxiliary equipment.

UNLOAD SWITCH

The unload switch turns the metering rolls and discharge auger on or off, and selects the operation of the metering rolls.

Note: If the unload auxiliary controls are being used, this switch will also control the operation of the auxiliary equipment.

OUTSIDE LIGHT SWITCH

The dryers outside service light is turned on or off here. It also may be set on auto, which turns the light on while the dryer is running and off if a shutdown occurs.

RUN SWITCH

This switch starts and operates the dryer based on switch settings. If other switch settings are in the off position, individual dryer components can be operated by turning the drying mode switch to continuous flow, pressing the dryer power run button and then turning on the desired dryer component.

STOP SWITCH

This switch stops all dryer functions. If an automatic dryer shutdown occurs, first determine and correct the cause of the shutdown. Then, press the dryer power stop button to reset the dryer before restarting.

TOUCH SCREEN DISPLAY

BOOT SCREEN

With the Power Switch in the on position, pushing the Start Switch will start the Vision computer. The first screen to appear will be the boot screen (see fig. 3.2). Notice that there are two "buttons" on the boot screen. The Update Program button is only used for program updates that may be released at a later date. Touching the Start Dryer button will display the Main Screen.



Fig. 3.2 Boot Screen

MAIN SCREEN

All of the timer settings, delays and dryer operation parameters are setup with the touch screen. Below is an image of the Dryer Status Screen or Main Screen. As you can see the main screen is divided into six different sections. These sections show the operator the status of the dryer, the grain temperature/moisture, unload status, plenum temperature, and access to setup screens and other features of the Vision Control system. A description of each section of the Main Screen starts on the next page.



Time, Date and Outside temperature display

This display shows the time, date and outside temperature. See page xx for instructions on how to set the time and date.

11:54 PM	Tuesday	Feb 22,	2005	Fig. 3.4	Time,	Date
Display Tempe	rature: O F			Temp di	isplay	

Dryer Status display

This display shows status of the dryer.

Fig. 3.5 Dryer Status Display

&

YER STOPPED

Grain Temperature / Moisture display

This display shows the moisture output and moisture setpoint, grain temp. and temp. setpoint, and a graph display.

Fig. 3.6 Grain Temp. / Moist. Display



Unload Status display

This display shows the status of the unload system.



Plenum Temp. display

This display shows the plenum temp. setpoint, burner status, and current plenum temp.



TIMERS BUTTON



Touching the **OTIMETS** button will display a timers screen (see fig. 3.9). This screen shows the current setting for each timer, the default setting, and the range that each timer can be set to. Enter a new timer setting by touching the button for the timer you want to change.

Example: To change the Out Of Grain (OOG) timer from its default setting of 8 minutes to a different length of time touch

the **button and the Modifing Timer** Setpoint screen is displayed (see fig. 3.10). Touch the DELETE button to erase the old setpoint. Use the number pad displayed on the screen to enter the new timer setpoint (the number pad on the left is used to modify minutes and the number pad on the right is used to modify seconds). Touching the DEFAULT button will set the timer to its default setting. Touch the ACCEPT button to exit and save or CANCEL to exit without saving.



Touching the **Tump** button will display temperature setup screen (see fig. 3.11). This screen shows the current setting for each plenum, the grain temperature, and the range that each one can be set to. Enter a new temperture setpoint by touching the button for the plenum or grain temp. you want to change.

Example: To change the Plenum 1 Temp from its default setting of 180 degrees F to a different temperature touch

Fi Fi	ig. 3.9 Timer to Modify Scree		
SELECT TIMER TO MODIFY			
Load Startup Delay	Out of Grain Timer		
Evand Timer Relative Value CCC Minutes CCC Minutes CCCC Minutes CCCC Minutes CCC Minutes	Value for previous load operation was 10 Minutes and 12 Seconds Sats maximum time allowed for dryer to fil. [Default = 8 Minutes]		
Fan Startup Delay	Unload Cleanout Delay		
Fan Delay	United Delay		
Sets the minimum time delay between the start of each fan.	Sets the amount of time unload auger(s) run after unload system is turned off.		
[Default = 3 Seconds] [Range 6 1 to 15 Seconds]	[Default = 1 Minute] [Range is 0 to 10 Minutes]		
5	Exit		

Fig. 3.10 Modify Timer Setpoint Screen

Set				002 • 0			
for [De				002.0			
Far	7	8	9	DEFAULT	7	8	9
	4	5	6		4	s	6
Set the	1	2	3	ACCEPT	1	2	з
IDG Ra	0	DEL	ETE	CANCEL.	D	DE	.ETE
				Exit			

TEMP BUTTON



the button and the Modifing Temperature Setpoint screen is displayed (see fig. 3.12). Touch the DELETE button to erase the old setpoint. Use the number pad displayed on the screen to enter the new temperature setpoint and touch ACCEPT to save that setting.

Note: The bottom plenum on your dryer is always Plenum 1.



Touch the

Exit

button on the Timers Screen to return to the Main Screen.

SETUP BUTTON



Touching the setup button will display the Setup Screen (see fig. 3.13).

TEMP. SCALE BUTTON

Touch the **Scale** button to choose the Farenheit or Celsius temperature scales. Just touching this button will change the temp. scale.

DRYING MODE BUTTON

Touch the **Downg Mode** button to choose staged batch or continuous flow drying modes. Just touching this button will change the drying mode.

METER ROLL REVERSE BUTTON

Touch the **Water Box Box area** button to reverse the Meter Rolls to aid in cleaning out fine material that builds up over the course of the drying season. Just touching this button will change between normal meter roll operation and reversed meter roll operation.

BURNER MODE BUTTON

Touching the Burner Mode button will display the burner mode setup screen (see fig. 3.14).

Note: The bottom fan heater on your dryer is always fan heater 1.

This screen will allow the operator to select the type of burner operation for each burner. In the HI/LO mode the





burner will switch from high heat to low heat when the plenum temperature setpoint has been reached. In the ON/ OFF mode the burner will shut off when the upper temperature set point has been reached. To select either the HI/LO or ON/OFF modes touch the SELECT button for the fan heater you wish to change. Touching the ALL HI/LO button will set all burners to HI/LO mode and touching ALL ON/OFF will set all burners to ON/OFF mode. Touch the ACCEPT button to save any changes and return to the setup screen or touch CANCEL to return to setup screen without saving any changes to the burner modes.

DIFFERENTIAL BUTTON

SETUP BUTTON continued

Touching the **Differential** button will display the differential setup screen (see fig. 3.15).

SELECT	HARDWARE SETUP PARA	METER TO MODIFY	
F	ADDIFYING BURNER DIFFI	ERENTIAL SETTINGS	
لاً د	PLENUM 3: 3 °F PLENUM #3	PLENUM 6: 3 °F PLENUM #6	+/- 1 DEGREES
	PLENUM 2: 3 "F	PLENUM 5: 3 "F	+/- 2 DEGREES
¢	PLENUM #2	PLENUM #5	
			+/- 3 DEGREES
-	PLENUM 1: 3 *P	PLENUM 4: 3 *F	
	PLENUM #1	PLENUM #4	+/- 4 DEGREES
	ACCE	PT / EXIT	+/- 5 DEGREES

Fig. 3.15 Burner Differential Settings Screen

Adjusting the Burner Differential settings allows the operator to keep the plenum temperature within a certain range.

Example: If you have the temperture setpoint at 180 degrees F and you select +/- 3 DEGREES as the Burner Differential, then the burner will switch to low heat at 177 degrees F and back to high heat at 183 degrees F.

To modify a burner differential setting touch the desired plenum button, then select one of the five differential setting buttons of the right side of the Modify Burner Differential Settings screen.

Example: To set the burner differential for plenum 2 to +/-4 degress.



button, then touch +/- 4 DEGREES

Burner # 2 will now operate 4 degrees above and below the temperature setpoint for plenum 2. Touch the ACCEPT / EXIT button to return to the Setup screen.

DRYER MODEL BUTTON

Touching the **Dryer Hodel** button will display the Dryer Hardware Setup screen (see fig. 3.16).

Touch the SELECT button to cycle through the selections for each of the setup perameters.



Example: To setup a 1226 Liquid Propane, rear fill dryer. Touch the SELECT button at Number Fan/Heaters section until the box beside two is checked, then touch the SELECT button at Load Systems section until the box beside end fill is checked. A 1226 is a single module dryer, so SELECT one for number of modules, then LP for the fuel.

Touch the ACCEPT/EXIT button to return to the Setup Screen.

DIAGNOSTICS BUTTON

Touching **Cappolice** the button will display the System Diagnostics screen (see fig. 3.17).

As you can see this screen is divided into three sections, Display I/O Testing, Metering Rolls, and Air Switch.

	Fig.	3.17	System	Diagnostics	Screen
SELECT HARDWARE SETU	PARAMETER TO	MODIFY			
System Diagnosti	65				
Display 1/O Tes	sting	1			
Check Li	ght Outputs				
Check Sv	witch Wining				
Metering Rolls			Airswitch —		
Disable Disable	Meter Rolls		Modify Air	Switch Testing	
on de Meter Ro	Testing Disabled		Air Swit	ch Testing Disabled	
		Exit			

DISPLAYI/O TESTING

Touching the Check Light Outputs

button will display the

System Diagnostics screen.



Disable Meter Rolls

button will display the

System Diagnostics screen.

METERING ROLLS



button will display the

System Diagnostics screen.

AIRSWITCH

Touching the Modify Ar Switch Testing System Diagnostics screen. button will display the

DIP switch 8 allows the computer to ignore the testing of the air switch. **DO NOT** operate the dryer in this mode unless you are testing the dryer for proper operation.

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DRYER PRESEASON CHECKS

This section gives a series of checks to be carried out on the dryer before starting for the first time in the drying season. If any of the checks fail to produce the stated result, you should consult your dealer.

YOU SHOULD NOT ATTEMPT TO USE THE DRYER UNLESS ALL THE PRE-START CHECKS HAVE BEEN SUCCESSFULLY COM-PLETED.

BEFORE ATTEMPTING TO OPERATE THE DRYER MAKE SURE ALL SAFETY SHIELDS ARE IN PLACE, ALL BOTTOM CLEANOUT AND REAR ACCESS DOORS ARE CLOSED AND ALL PERSONNEL ARE CLEAR OF THE DRYER

INSPECT THE METERING ROLLS

Open all metering roll access doors and inspect each compartment for any bolts, nuts or other foreign material, that may cause possible jamming of the metering rolls.

ELECTRICAL POWER

Turn on the electrical power supply to the dryer, set all circuit breakers to on, including the safety disconnect handle mounted on front of the dryer power panel.

CONTROL POWER SWITCH

Turn the control power switch to on. The switch will light up. A copyright message, model number, total running time in hours and minutes, current date and time will appear. At this point the controller will lock out all other dryer functions. Once the Boot Screen appears (see fig. 3.2 on page 16), touch the START DRYER button and the dryer will perform a safety circuit check. If a fault is found, the cause will be displayed on the Main Screen. If all are found safe, the controller will supply power to the electronic fuel shut-off valve (Maxon), if so equipped, and the start switch will light up, indicating that the dryer is ready to be started.

START SWITCH

Push the dryer start switch, and all the selector switches on the control panel will be activated.

FUEL CHECK

If using LP gas, make sure the tank has plenty of fuel and that the tank **does not** have a regulator mounted on the liquid line. Slowly open the main fuel supply valve at the tank. Then, open the electronic shut off valve (Maxon valve), if so equipped, or open the manual shut off valve on the dryer to allow fuel flow to the dryer.

If using natural gas, make sure an adequate supply is available. Turn on the valve along the supply line. Then, open the electronic shut off valve (Maxon valve). Inspect all gas lines and connections for possible leaks.

Any gas leaks must be fixed immediately!

LOAD AUGER

With the grain supply shut off, quickly bump the load auger switch to manual, and see if the load auger rotates clockwise as viewed from the drive end, or counterclockwise if the dryer is a front load model. If the wet grain supply auxiliary is wired to the dryer it should also rotate in the correct direction at this time.

Turn the load auger switch to the auto position. The top auger and wet grain supply auxiliary should run for eight (8) minutes, and then the dryer will shutdown leaving the safety shutdown message (out of grain warning) displayed. Press the dryer power stop button to reset the panel, then press the start button.

UNLOAD ONE SPEED OPERATION

To check one speed operation place the unload switch in the one speed setting. Turn the metering roll dial until the metering rolls start rotating. The bottom auger should rotate counterclockwise as viewed from the drive end. The metering roll drive motor should rotate clockwise as viewed from the drive end of the gear box. If the dry grain take away auxiliary is wired to the dryer, it should start and rotate in the proper direction.

UNLOAD TWO SPEED OPERATION

To check two speed operation move the unload switch to the two speed position, change the low speed reading to 200 and high speed on 600. Adjust the moisture control (grain temperature) setpoint to a value **lower** then the ambient temperature or until the moisture control switch light comes on. The metering roll speed is now controlled by the low speed setting. Adjust the moisture control (grain temperature) setpoint to a value **higher** then the ambient temperature or until the light goes out leaves the metering rolls controlled by the high speed setting.

_

METERING ROLL OPERATION

To check the metering roll operation turn the knob clockwise, and the metering roll speed should increase. Turning either knob counterclockwise will decrease the speed. Make sure the drive chain tension is properly adjusted and all sections of the metering rolls rotate. Turn the unload switch off after these checks are complete. The bottom auger will continue to run for 60 seconds (default cleanout delay setting) after the switch is turned off to allow for cleanout.

Note: Due to the nature of the DC drive motor used on the meter rolls, it is possible for the brushes inside the motor to become corroded if the dryer has not been operated for several months. This will cause the meter rolls not to function. To fix this problem, use a rubber mallet or a piece of wood to tap the DC drive motor. The shock is usually all the motor needs to start working again. You should not have any more problems with this during the rest of your drying season.

METERING ROLL ONE SPEED DISPLAY

This is used to adjust the speed of the metering roll when the single speed automatic moisture control feature of the dryer is in use.

This is used to:

Set the speed of the metering rolls when the one speed automatic moisture control feature of the dryer is utilized.
Set the speed of the metering rolls during continuous flow operation or .

Just turn the meter roll adjustment knob and put the is in the **single** speed position, your display will now show the following:

If you are finished with your adjustments, press the button. The screen will also return to the main display if you don't turn or press the knob for about 8 seconds.

METERING ROLL TWO SPEED DISPLAY

• Set the speed of the metering roll when the two speed automatic moisture control feature of the dryer is utilized.

If you turn the meter roll adjustment knob and the is in the **two** speed position, you can adjust your 2 speed settings. Notice that the numbers next to Low is flashing. This indicates that any adjustment you make with the meter roll know will only affect this setting. To change the High setting, press the meter roll adjusment knob until it clicks. You screen should now flash the numbers next to the High setting. Any adjustment made at this point will only affect this setting. If you are finished with your adjustments, press the button. The screen will also return to the main display if you don't turn or press the knob for about 8 seconds.

Note: This screen is only available if the moisture control switch is on and the unload switch is in the 2 speed position.

FAN SWITCHES

Momentarily turn each fan switch to on and observe the fan rotation. The fan should run counterclockwise. Sometimes on three phase models all motors will run backwards. They can easily be reversed by interchanging two of the three power supply wires. All power should be switched and locked off before attempting to reverse the connections. Reverse the two outside wires, L1 and L3, and leave the middle one in the same position.

Note: The bottom fan on your dryer is always refered to as Fan 1.

BURNER SAFETY

To check the burner safety function, first make sure the main gas valve is off. Turn the fan switch on and allow the fan to start. Then, turn the heater switch on for that fan. The dryer will shut down after 20 seconds. The safety message, "Ignition Failure x" will appear. Reset the dryer and repeat for the other fan/heater(s).

BURNER TEST FIRE

Test fire each burner by starting the fan. Then, turn the burner switch to on. Turn on the fuel supply, and the burner should ignite after a short purge delay of approximately 10 seconds. Gas pressure should be shown on the gauge. At this time adjust the plenum set point to 200°F (93°C), causing the burner to operate on hi-fire. Observe the gas pressure on the gauge, and lower the plenum set point until it causes the burner to cycle into lo-fire. When the plenum temperature set point is met, the gas pressure should show a noticeable drop, indicating that the cycle solenoid is closed and the burner is being supplied with less gas through the cycle solenoid bypass port. At this time set the hi-fire and lo-fire pressure settings. Use the pressure regulator (for LP models) or the supply line ball valve (for nat. gas models) for hifire and the adjustment screw on the cycle solenoid for lofire (see figures 7.2 -7.5 on pages xx-xx to help identify fuel line parts). The computer should cycle the burners between high and low, approximately 4 to 5 times per minute.

Only use pressure required to obtain desired temperature.

Approximate settings should be:

LP Gas	Hi-Fire 6-15 PSI (41-102 kPa)
	Lo-Fire 2-6 PSI (14-41 kPa)
Natural Gas	Hi-Fire 6-10 PSI (41-69 kPa)
	Lo-Fire 1-3 PSI (7-20 kPa)

If the burner remains on hi-fire and does not cycle, increase the regulator setting on the propane models, or the supply valve on the natural gas models in order to reach the plenum set point. If the burner remains in lo-fire and does not cycle, slightly decease gas pressure with the lo-fire adjustment screw on the cycle solenoid. If the gas pressure is decreased too much a popping or fluttering sound will be heard. Also, anytime the high pressure side is adjusted, the low pressure side needs to be checked. Repeat the test for each fan/heater unit.

DRYER SHUTDOWN

To shut down the dryer,

1. Close the fuel supply valve at the tank or valve along the fuel line.

 If the burner is operating, let the dryer run out of fuel, and it will shut down automatically due to loss of flame.
 Close the fuel valve at the dryer, and press the dryer power stop button.

4. Turn off the control power.

5. Turn off the safety disconnect handle on the front of the power box, and turn off the main power to the dryer.

EMERGENCY

In case of emergency push the dryer stop button or the emergency stop button. This will interupt power to the control panel and the fan, burner and all augers will stop immediately.



DRYER STARTUP AND OPERATION

FULL HEAT DRYING

Full Heat Operation

With this type of drying, the grain is discharged hot, with no cooling. Drying capacity is substantially higher with FULL HEAT than the DRY AND COOL process.

Dryeration Process

The full heat process is called "DRYERATION". Recommended procedure is to temper the hot grain for 4 to 10 hours in a cooling bin or storage bin, then cool by an aeration fan at an air flow rate of 1/2 to 1 CFM per bushel of grain in the hot batch being cooled. The process of tempering and slow cooling provides higher quality in shelled corn because of less stress cracking of kernels and less breakage during subsequent handling of the grain.

Final Moisture

From 1 to 3% apparant moisture is usually removed in the cooling process, so hot shelled corn is removed from the dryer at about 17% moisture if the final desired moisture content is 15%.

DRYING TEMPERATURES

Shelled Corn

For shelled corn with an initial moisture content of 25-30%, the recommended maximum drying temperature is 220-240° F (104-116° C) for the top fan and 170-190° F (77-88° C) for the bottom fan. For lower initial moisture content, lower drying temperatures are recommended.

Small Grain

For drying small grain (wheat, oats, milo), 150° F (66° C) is suggested.

Rice, Soybeans

Drying temperatures are critical in drying rice and soybeans. A temperature of 130° F (54° C) is recommended to keep grain temperature low.

Drying Efficiency

The general rule for obtaining the highest drying efficiency is to use the highest possible drying temperatures which will not adversely affect grain quality.

Dryer Shutdown

Cooling Hot Grain

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.

INITIAL SETUP PARAMETERS

Timer and Delay Settings

Turn the control power switch to on. The monitor (touch screen) will display a copyright message and model number, total running time in hours and minutes and the current time and date. To activate the controller touch

START DRYER button. the

The Dryer Status screen (Main screen) will be displayed. At the bottom of the Main screen are a row of buttons used to setup how the dryer will operate.

To set the timers and delay settings touch the **B**TIMERS button. The Select Timers To Modify screen is now displayed.

Fan and Auger Delays Load Timer

The load timer is used to delay the starting of the load auger when the dryer is unloading to prevent the load auger from cycling to often. To change the setting of this delay follow these instructions:

Touch the

🛞 Load Timer

button on Select Timers To Modify display. The Modifying Timer Setpoint display is now shown. The default time for the Load Timer is 2 minutes. This timer can be modified to any time within the range of 15 seconds to 10 minutes. To enter a new Load Timer setting, use the number pads displayed on the touch screen (left number pad will change the value for minutes, right number pad for seconds). Once a new timer setting has been entered touch the ACCEPT button to exit and save new timer setting. NOTE: Touching the CANCEL button will exit the Modify Timer Setpoint screen without saving any changes that may have been made and timer setpoint will return to the previous setpoint saved.

Out of Grain (OOG) Timer

The Out of Grain timer should be set to the maximum time it takes for your dryer to refill during continious or batch mode drying.

If the dryer runs out of grain while the load auger switch is in the **auto** position, the out of grain timer automatically shuts off the dryer after the period of time preset on the timer.

(B) 00G Timer

Touch the button on Select Timers To Modify display. The Modifying Timer Setpoint display is now shown. The default time for the OOG Timer is 8 minutes. This timer can be modified to any time within the range of 0 to 30 minutes. To enter a new OOG Timer setting, use the number pads displayed on the touch screen (left number pad will change the value for minutes, right number pad for seconds). Once a new timer setting has been entered touch the ACCEPT button to exit and save new timer setting.

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NOTE: Touching the CANCEL button will exit the Modify Timer Setpoint screen without saving any changes that may have been made and timer setpoint will return to the previous setpoint saved.

NOTE: Anytime your TIME LEFT counter reaches zero, your dryer will shut down with a "Out of Grain" warning.

Fan Sequence Delay

The Fan Sequence Delay controls the amount of time between each fan startup to reduce the dryer startup amps. Default setting is 3 seconds. To change the setting of this delay follow these instructions:

Touch the **Delay** button on the Select Timers To Modify display. The Modifying Timers Setpoint display is now shown. The default time for the Fan Delay is 3 seconds. This timer can be modified to any time within the range of 1 to 15 seconds. To enter a new Fan Delay setting, use the number pads displayed on the touch screen (left number pad will change the value for minutes, right number pad for seconds). Once a new timer setting has been entered touch the ACCEPT button to exit and save new timer setting. NOTE: Touching the CANCEL button will exit the Modify Timer Setpoint screen without saving any changes that may have been made and timer setpoint will return to the previous setpoint saved.

Unload Delay

The Unload Delay is used to control the amount of time the unload auger runs after the metering rolls stop to allow the unload auger to clean itself out. To change the setting of this delay follow these instructions:

Touch the **Control Delay** button on the Select Timers To Modify display. The Modifying Timers Setpoint display is now shown. The default time for the Unload Delay is 1 minute. This timer can be modified to any time within the range of 0 to 10 minutes. To enter a new Unload Delay setting, use the number pads displayed on the touch screen (left number pad will change the value for minutes, right number pad for seconds). Once a new timer setting has been entered touch the ACCEPT button to exit and save new timer setting. NOTE: Touching the CANCEL button will exit the Modify Timer Setpoint screen without saving any changes that may have been made and timer setpoint will return to the previous setpoint saved.

Setting Up The Temperature Set Points Moisture Control Setpoint Drying mode switch is in the Continuous position:

If the moisture control temperature is **below** this set point and you have your unload switch set to two speed position then meter rolls will discharge the grain using the **low** speed meter roll setting.

If the moisture control temperature is **above** this set point and you have your unload switch set to two speed position then meter rolls will discharge the grain using the **high** speed meter roll setting. It is normal for the meter rolls to switch back and forth between high and low speed during the drying process. This regulates the speed of the grain being discharged from the dryer.

Drying mode switch is in the Batch position:

If the moisture control temperature is below this set point and the Dry Timer has reached zero, the heater will continue to fire until the moisture control set point has been reached. During this cycle the moisture control light will flash and a message on the display will read **TEMPERATURE HOLD.**

To change the setting of the moisture control temperature follow these instructions:

STARTUP

Startup Procedure

At the beginning of each harvest and before filling the dryer with grain make sure to inspect the dryer for rodent damage, proper belt and chain tension and missing or damaged safety shields. Test operate the dryer using the pre start check procedures.

1. Before attempting to operate the dryer make sure that all safety shields are in place, all plenum bottom closure panel doors are closed, all rear access doors are closed and all personnel are clear of the grain dryer and grain handling machinery.

Turn all selector switches on the control panel to the off 2. position.

Turn on the electrical power supply to the dryer, and 3. move the safety disconnect handle mounted on the dryer's upper power box to on.

4. Turn the control power switch to on. The switch will light up. A copyright message, model number, total running time in hours and minutes, current date and time will appear. At this point the controller will lock out all other dryer functions. Once the time and date screen appears, touch the

START DRYER button and the dryer will perform its

safety circuit checks. If a fault is found the cause will be displayed on the Display screen (touch screen). If all safeties do not detect a problem the controller will allow the electronic fuel shutoff valve (Maxon) to be manually opened, if so equipped, and the drying mode switch will light up, indicating that the dryer is ready to be started.

5. Move the load auger switch to manual, and push the dryer power start switch. The top auger will immediately start, and the load auger switch will light up. If additional loading equipment is wired to the dryer it will also start immediately.

6. When the dryer is full of grain the top auger will stop automatically, and any auxiliary loading equipment wired to the dryer will also stop.

CONTINUOUS FLOW DRYING MODE Full Heat-Continuous Flow Operation

1. Turn the **CONTORL POWER** switch to on.

2. After the date and time appear on screen, press the

Touch the

3.

on.

Selup button at the bottom of the

Dryer Status (Main) display. Once the Select Hardware

Parameter To Modify screen is displayed touch the

🕝 Drying Mode button until Continuous Flow is displayed Exit

next to it. Then touch the

button to return

to the Dryer Status screen.

Make sure the UNLOAD switch is OFF. 4.

5. Make sure the MOISTURE CONTROL switch is OFF.

Open the main fuel supply valve on the tank if using LP 6. gas, or open the fuel supply line if using natural gas. Turn on the Maxon electric shut off valve, if so equipped, or open the manual shut off valve to allow fuel flow to the dryer.

7. Push the DRYER POWER START switch.

8. The dryer should already be filled with grain. Turn the LOAD AUGER switch to the AUTO position. In both the auto and manual positions, the dryer grain level switch will automatically keep the dryer full of grain. In the auto position the dryer will shut down after a preset time period using the out of grain timer.

Look in the Drying Charts section in the back of this manual for the FULL HEAT chart settings that correspond to your model of dryer. You will see the settings for (Initial Moisture) (Moisture Removed) (Approx. Dry Time) (1 Speed) (2 Speed Low) (2 Speed High) pick the line that has your initial starting moisture. These are the settings we will be referring to during this start up procedure.

10. Turn each FAN switch to ON. The fan will start, and the switch will light up when air pressure is detected.

11. Start each burner by turning the HEATER switch to **ON**. After purging for approximately 10 seconds the burner will fire, and the heater switch will light up. This indicates that the flame sensing circuit is sensing burner flame. For information concerning burner adjustment see the Dryer pre start checks section of this manual.

12. Run the fan(s) and heater(s) for about 10% longer than the (APPROX. DRYING TIME) required for the moisture you are trying to dry.

13. Example: 10% removal would be about 54 minutes, 15% removal would be about 76 minutes and 20% removal would be about 100 minutes. Add 10 minutes to insure that the grain is dry.

14. After the time in step 12 turn the UNLOAD to 1 SPEED and set the METER ROLL SPEED, (HIGH SPEED). to the setting for 1 SPEED operation. Grain should begin to run at this time. Run time for this is about 10% longer than the (APPROX. DRYING TIME) required for the moisture you are trying to dry. This allows the moisture in the dryer to reach an even gradient top to bottom without having any highs or lows in it. It will however, over dry some of the corn a little.

15. Increase the drying temperature to 190 deg. for single fans or for multiple fan dryers set the heat chambers 30 to 60 degrees apart. Hottest at the top, most cool at the bottom.

16. DO NOT TRY TO ADJUST THE DRYER FOR MOIS-TURE DURING THIS PROCESS OR YOU WILL ESTABLISH HIGH AND LOW SWINGS IN THE MOISTURE CONTROL. IT WILL TAKE SEVERAL HOURS TO WORK ITSELF OUT.

17. After the run time in step 14 you are ready to set up the

moisture control. Now turn the MOISTURE CONTROL to the **ON** position. Set the temperature to about 100 deg.

18. Turn the UNLOAD to 2 SPEED. Set the METER ROLL SPEED, LOW SPEED and HIGH SPEED. to the settings listed for them. Let the dryer run on these settings before trying to adjust moisture or meter roll settings. These settings will not have your grain moisture adjusted exactly where you want it, but will be a good place to start initially. A little different moisture at the bottom of the storage bin is not usually a problem as long as you have full floor aeration.

19. After the run time in step 18 you are ready to adjust the moisture control, and the meter roll speeds if required. Each time you make an adjustment to the moisture control it will take about the time shown in the drying charts to see the results of this adjustment.

Dry and Cool-Continuous Flow Operation

- 1. Turn the **CONTORL POWER** switch to on.
- 2 After the date and time appear on screen, press the



Quiet 🔍 button at the bottom of the

Dryer Status (Main) display. Once the Select Hardware Parameter To Modify screen is displayed touch the

🕝 Drying Moda button until Continuous Flow is displayed

next to it. Then touch the Exit button to return

to the Dryer Status screen.

Make sure the UNLOAD switch is OFF. 4.

5. Make sure the MOISTURE CONTROL switch is OFF.

6. Open the main fuel supply valve on the tank if using LP gas, or open the fuel supply line if using natural gas. Turn on the Maxon electric shut off valve, if so equipped, or open the manual shut off valve to allow fuel flow to the dryer.

7. Push the DRYER POWER START switch.

8. The dryer should already be filled with grain. Turn the LOAD AUGER switch to the AUTO position. In both the auto and manual positions, the dryer grain level switch will automatically keep the dryer full of grain. In the auto position the dryer will shut down after a preset time period on the out of grain timer.

Look in the Drying Charts section in the back of this manual for the DRY AND COOL chart settings that correspond to your model of dryer. You will see the settings for (Initial Moisture) (Moisture Removed) (Approx. Dry Time) (1 Speed) (2 Speed Low) (2 Speed High) pick the line that has your initial starting moisture. These are the settings we will be referring to during this start up procedure.

10. Run the bottom fan(s) and heater(s) (to be used for cooling later) for about 20 minutes. This will start the bottom drying so we can cool it before we begin to discharge grain.

11. Take the remaining number of burners to be started,

divide that into the total drying time required, working up, start each burner that many minutes apart. Run them about 10% longer than the (APPROX. DRYING TIME) total required for the moisture you are trying to dry.

12. Example: 10% removal would be about 60 minutes, 15% removal would be about 85 minutes, and 20% removal would be about 110 minutes. Add 10 minutes to insure that the grain is dry.

13. After the required drying time turn the bottom heater (OFF) cool this section for about 20 minutes. Set the upper plenum thermostats to the decreed temperature $(190^{\circ}-230^{\circ}F)$

14. Turn the UNLOAD to 1 SPEED and set the METER ROLL SPEED (HIGH SPEED). to the setting for 1 SPEED operation. Run time for this is about 10% longer than the (ÅPPROX. DRYING TIME) required for the moisture you are trying to dry. This allows the moisture in the dryer to reach an even gradient top to bottom without having any highs or lows in it. It will however, over dry some of the corn a little.

15. DO NOT TRY TO ADJUST THE DRYER FOR MOIS-TURE DURING THIS PROCESS OR YOU WILL ESTABLISH HIGH AND LOW SWINGS IN THE MOISTURE CONTROL. IT WILL TAKE SEVERAL HOURS TO WORK ITSELF OUT.

16. After the run time in step 14 you are ready to set up the moisture control. Now turn the MOISTURE CONTROL to the **ON** position. Set the temperature to about 130 deg.

17. Turn the UNLOAD to 2 SPEED. Set the METERING ROLL SPEED, LOW SPEED and HIGH SPEED. to the settings listed for them. Let the dryer run on these settings before trying to adjust moisture or meter roll settings. These settings will not have your grain moisture adjusted to exactly where you want it, but it will be a good starting place to adjust from. A little different moisture at the bottom of the storage bin is not usually a problem as long as you have full floor aeration.

18. After the run time in step 17, you are ready to adjust the moisture control and the meter roll speeds if required. Each time you make an adjustment to the moisture control it will take about the time shown in drying charts to see the results of this adjustment.

STAGED BATCH DRYING MODE Continuous-Batch Operation

- 1. Turn the **CONTORL POWER** switch to on.
- 2. After the date and time appear on screen, press the



button at the bottom of the

Dryer Status (Main) display. Once the Select Hardware Parameter To Modify screen is displayed touch the

button until Staged Batch is displayed 🍘 Daying Moda

button to return next to it. Then touch the Exit

to the Dryer Status screen.

4. Open the main fuel supply valve on the tank if using LP

gas, or the valve in the fuel supply line if using natural gas. Turn on the Maxon electric shut off valve, if so equipped, or open the manual shut off valve to allow fuel flow to the dryer.

5. The dryer should already be filled with grain. Turn the LOAD AUGER switch to **AUTO**. In both the auto and manual position, the grain level switch will automatically keep the dryer full of grain. In the auto position the dryer will shut down after the preset time period on the out of grain timer, or if the grain flow to the dryer is interrupted.

6. Turn each FAN switch to **AUTO**. The fan will start, and the switch will light up when air pressure is detected.

7. Start each burner by turning the HEATER switch to **AUTO**. After purging for approximately 10 seconds the burner will fire, and the heater switch will light up indicating that the flame sensing circuit is sensing burner flame. For information concerning burner adjustment see the pre start section of this manual.

8. To properly set the correct DRY, COOL and UNLOAD time for various moisture content grains, see the drying charts for your size of dryer.

9. If the dryer is being operated in <u>all heat</u>, turn each FAN switch to **ON**. In this position the fan will run continuously during both the dry and unload stages of the staged batch operation. If the dryer is being operated in the <u>dry and cool</u> <u>mode</u>, the preferred position for the FAN switch is the **ON** position, so the fan will run continuously. If desired, the fan can be turned off during the unload cycle of the dry-cool-unload sequence by turning the fan switch to auto.

10. If the dryer is being operated in <u>all heat</u>, turn each HEATER switch to **ON**. The burner will operate whenever the fan is operating. If the dryer is being used in <u>dry and cool</u>, turn the HEATER switches to **AUTO** and the burner will automatically shut down during the cooling and unloading cycles.

11. Turn the UNLOAD switch to the **ONE SPEED** position. The bottom auger and metering rolls will start automatically during the unload cycle of the dry-cool-unload mode, along with any grain handling equipment that is wired to the dryer. The speed at which the metering rolls operate during the unload cycle is adjusted by using the high speed metering roll knob. Turning the dial clockwise will increase the grain discharge rate, and counterclockwise will decrease the discharge rate.

12. To control the length of the dry cycle using only the dry time setting programmed into the system, turn the moisture control setting to off. To use the automatic moisture control so that the dry time is determined, not only by the dry time setting, but also by the moisture content of the drying grain, turn the MOISTURE CONTROL switch to **ON**, and set the grain temperature set point to a setting of $135^{\circ}F(57^{\circ}C)$.

13. To start the drying operation push the dryer POWER START button. The controller will start all the dryer components in their proper order.

14. To shutdown the dryer, close the fuel supply valve at the fuel tank or fuel source. If the burners are operating, let the dryer run out of fuel causing an automatic shutdown due to a loss of flame. Close the fuel valve at the dryer, and press the dryer power stop button. Turn off the dryer's main circuit breaker located on the front of the power panel. Turn off the main power supply to the dryer.

15. In case of an emergency, press the dryer power stop button. The burners, fans and all augers will stop immediately.

Continuous-Batch Operation

These switches are used to set the cycle times in the staged batch drying mode only. The drying mode switch must be in the staged batch position. The current setting on these three timers is displayed directly above each timer button.

During operation the remaining time on each timer is displayed on the screen. If the power goes out or if the dryer is stopped, these times are saved by the controller. When the dryer is restarted the timers will continue timing down. The timers will return to their initial setting if the reset button is pushed.

Use the dryer charts in the back of this manual for reference of a suggested timer settings.

Dry Timer

This timer controls how long the burner will operate. If the moisture control switch is turned on and the dry time reaches zero, then the burner will continue to burn as long as the grain temperature has not reached the moisture control set point.

To change the setting of this timer follow these instructions:

During dryer operation the remaining time on each timer is displayed on the screen unless reset to their

stored values by pressing the button.

Fan Setting	Heater Setting	Fan Function	Heater Function
Auto	Auto	Fans stay on during dry and cool cycle only	Burners stay on during dry timer cycle only
Auto	On	Fans stay on during dry and cool cycle only	Burners stay on during dry and cool
On	On	Fans are on continuously	Burners are on continuously
On	Auto	Fans are on continuously	Burners shut down at the end of the dry cycle

At the end of the dry cycle in staged batch, the fans and heaters will continue running if in the Auto-Auto setting, until the preset temperature for the moisture control is reached.

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Cool Timer

This timer controls how long the fan will operate after the dry timer has expired.

To change the setting of this timer follow these instructions:

During dryer operation the remaining time on each timer is displayed on the screen unless reset to their

stored values by pressing the button.

Unload Timer

This timer controls how long the unload auger will operate after the cool timer has expired.

Use the dryer charts in the back of this manual for reference of a suggested timer settings.

To change the setting of this timer follow these instructions:

During dryer operation the remaining time on each timer is displayed on the screen unless reset to their stored values by pressing the button.

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Initial Moisture	Moisture Removed	Approx. Dry Time	1 Speed	2 Speed Low	2 Speed High
17%	2 pts.	16 min.	625	317	875
18%	3 pts.	21 min.	476	270	775
19%	4 pts.	26 min.	385	241	675
20%	5 pts.	31.5 min.	317	213	575
21%	6 pts.	37 min.	270	196	476
22%	7 pts.	41.5 min.	241	185	385
23%	8 pts.	47 min.	213	172	317
24%	9 pts.	51 min.	196	161	270
25%	10 pts.	54 min.	185	150	241
26%	11 pts.	58 min.	172	140	213
27%	12 pts.	62 min.	161	132	296
28%	13 pts.	66.5 min.	150	123	285
29%	14 pts.	71.5 min.	140	116	172
30%	15 pts.	76 min.	132	110	161
31%	16 pts.	81 min.	123	104	150
32%	17 pts.	86 min.	116	100	140
33%	18 pts.	91 min.	110	96	132
34%	19 pts.	96 min.	104	87	123
35%	20 pts.	100 min.	100	82	116

1200 Series Continuous Flow Full Heat

Initial Moisture	Moisture Removed	Approx. Dry Time	1 Speed	2 Speed Low	2 Speed High
17%	2 pts.	18 min.	363	187	650
18%	3 pts.	24 min.	272	163	550
19%	4 pts.	30 min.	218	145	450
20%	5 pts.	35 min.	187	131	363
21%	6 pts.	40 min.	163	119	272
22%	7 pts.	45 min.	145	109	218
23%	8 pts.	50 min.	131	101	187
24%	9 pts.	55 min.	119	93	163
25%	10 pts.	60 min.	109	87	145
26%	11 pts.	65 min.	101	82	131
27%	12 pts.	70 min.	93	77	119
28%	13 pts.	75 min.	87	73	109
29%	14 pts.	80 min.	82	69	101
30%	15 pts.	85 min.	77	65	93
31%	16 pts.	90 min.	73	61	87
32%	17 pts.	95 min.	69	57	82
33%	18 pts.	100 min.	65	53	77
34%	19 pts.	105 min.	62	49	73
35%	20 pts.	110 min.	59	45	69

1200 Series Continuous Flow Dry & Cool

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			Dry & Cool						
Fan & B	urner Switch	es on M	anual			Fans	on Manual, l	Burners on	Auto
Approx.				Initial	Approx.	Approx.			
Dry Time	Dry	Cool	Unload	Moist	Dry	Dry	Dry	Cool	Unload
16 min.	6 min.	0	10 min.	17 %	2 pts.	18 min.	18 min.	18 min.	10 min.
21 min.	11 min.	0	10 min.	18 %	3 pts.	24 min.	24 min.	18 min.	10 min.
26 min.	16 min.	0	10 min.	19 %	4 pts.	30 min.	30 min.	18 min.	10 min.
31.5 min.	21.5 min.	0	10 min.	20 %	5 pts.	35 min.	35 min.	18 min.	10 min.
37 min.	27 min.	0	10 min.	21 %	6 pts.	40 min.	40 min.	18 min.	10 min.
41.5 min.	31.5 min.	0	10 min.	22 %	7 pts.	45 min.	45 min.	18 min.	10 min.
47 min.	37 min.	0	10 min.	23 %	8 pts.	50 min.	50 min.	18 min.	10 min.
51 min.	47 min.	0	10 min.	24 %	9 pts.	55 min.	55 min.	18 min.	10 min.
54 min.	44 min.	0	10 min.	25 %	10 pts.	60 min.	60 min.	18 min.	10 min.
58 min.	48 min.	0	10 min.	26 %	11 pts.	65 min.	65 min.	18 min.	10 min.
62 min.	52 min.	0	10 min.	27 %	12 pts.	70 min.	70 min.	18 min.	10 min.
66.5 min.	56.5 min.	0	10 min.	28 %	13 pts.	75 min.	75 min.	18 min.	10 min.
71.5 min.	61.5 min.	0	10 min.	29 %	14 pts.	80 min.	80 min.	18 min.	10 min.
76 min.	66 min.	0	10 min.	30 %	15 pts.	85 min.	85 min.	18 min.	10 min.
81 min.	71 min.	0	10 min.	21 %	16 pts.	90 min.	90 min.	18 min.	10 min.
86 min.	76 min.	0	10 min.	32 %	17 pts.	95 min.	95 min.	18 min.	10 min.
91 min.	81 min.	0	10 min.	33 %	18 pts.	100 min.	100 min.	18 min.	10 min.
96 min.	86 min.	0	10 min.	34 %	19 pts.	105 min.	105 min.	18 min.	10 min.
100 min.	90 min.	0	10 min.	35 %	20 pts.	110 min.	110 min.	18 min.	10 min.

1200 Series Staged Batch

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Initial Moisture	Moisture Removed	Approx. Dry Time	1 Speed	2 Speed Low	2 Speed High
17%	2 pts.	16 min.	655	333	850
18%	3 pts.	21 min.	499	283	760
19%	4 pts.	26 min.	403	252	670
20%	5 pts.	31.5 min.	333	223	580
21%	6 pts.	37 min.	283	205	499
22%	7 pts.	41.5 min.	252	194	403
23%	8 pts.	47 min.	223	181	333
24%	9 pts.	51 min.	205	170	283
25%	10 pts.	54 min.	194	158	252
26%	11 pts.	58 min.	181	147	223
27%	12 pts.	62 min.	170	138	205
28%	13 pts.	66.5 min.	158	129	194
29%	14 pts.	71.5 min.	147	122	181
30%	15 pts.	76 min.	138	115	170
31%	16 pts.	81 min.	129	109	158
32%	17 pts.	86 min.	122	105	147
33%	18 pts.	91 min.	115	99	138
34%	19 pts.	96 min.	109	93	129
35%	20 pts.	100 min.	105	87	122

1200S Series Continuous Flow Full Heat

Initial Moisture	Moisture Removed	Approx. Dry Time	1 Speed	2 Speed Low	2 Speed High
17%	2 pts.	18 min.	293	151	420
18%	3 pts.	24 min.	220	132	370
19%	4 pts.	30 min.	176	117	320
20%	5 pts.	35 min.	151	106	270
21%	6 pts.	40 min.	132	96	220
22%	7 pts.	45 min.	117	88	176
23%	8 pts.	50 min.	106	81	151
24%	9 pts.	55 min.	96	75	132
25%	10 pts.	60 min.	88	70	117
26%	11 pts.	65 min.	81	66	106
27%	12 pts.	70 min.	75	62	96
28%	13 pts.	75 min.	70	59	88
29%	14 pts.	80 min.	66	56	81
30%	15 pts.	85 min.	62	53	75
31%	16 pts.	90 min.	59	50	70
32%	17 pts.	95 min.	56	48	66
33%	18 pts.	100 min.	53	45	62
34%	19 pts.	105 min.	50	42	59
35%	20 pts.	110 min.	48	39	56

1200S Series Continuous Flow Dry & Cool

	Full Hea	at					Dry &	Cool	
Fan & Burner Switches on Manual						Fans on Manual, Burners on Auto			
Approx.				Initial	Approx.	Approx.			
Dry Time	Dry	Cool	Unload	Moist	Dry	Dry	Dry	Cool	Unload
16 min.	6 min.	0	10 min.	17 %	2 pts.	18 min.	18 min.	18 min.	10 min.
21 min.	11 min.	0	10 min.	18 %	3 pts.	24 min.	24 min.	18 min.	10 min.
26 min.	16 min.	0	10 min.	19 %	4 pts.	30 min.	30 min.	18 min.	10 min.
31.5 min.	21.5 min.	0	10 min.	20 %	5 pts.	35 min.	35 min.	18 min.	10 min.
37 min.	27 min.	0	10 min.	21 %	6 pts.	40 min.	40 min.	18 min.	10 min.
41.5 min.	31.5 min.	0	10 min.	22 %	7 pts.	45 min.	45 min.	18 min.	10 min.
47 min.	37 min.	0	10 min.	23 %	8 pts.	50 min.	50 min.	18 min.	10 min.
51 min.	47 min.	0	10 min.	24 %	9 pts.	55 min.	55 min.	18 min.	10 min.
54 min.	44 min.	0	10 min.	25 %	10 pts.	60 min.	60 min.	18 min.	10 min.
58 min.	48 min.	0	10 min.	26 %	11 pts.	65 min.	65 min.	18 min.	10 min.
62 min.	52 min.	0	10 min.	27 %	12 pts.	70 min.	70 min.	18 min.	10 min.
66.5 min.	56.5 min.	0	10 min.	28 %	13 pts.	75 min.	75 min.	18 min.	10 min.
71.5 min.	61.5 min.	0	10 min.	29 %	14 pts.	80 min.	80 min.	18 min.	10 min.
76 min.	66 min.	0	10 min.	30 %	15 pts.	85 min.	85 min.	18 min.	10 min.
81 min.	71 min.	0	10 min.	21 %	16 pts.	90 min.	90 min.	18 min.	10 min.
86 min.	76 min.	0	10 min.	32 %	17 pts.	95 min.	95 min.	18 min.	10 min.
91 min.	81 min.	0	10 min.	33 %	18 pts.	100 min.	100 min.	18 min.	10 min.
96 min.	86 min.	0	10 min.	34 %	19 pts.	105 min.	105 min.	18 min.	10 min.
100 min.	90 min.	0	10 min.	35 %	20 pts.	110 min.	110 min.	18 min.	10 min.

1200 Series Staged Batch

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SECTION 6 SAFETY CIRCUIT SHUTDOWN MESSAGES

FAN AND HEATER GENERATED ERRORS

The following is a list of errors that are generated with the fan and heater controller. Each fan and heater has there own set of safeties which are listed below. You will need to inspect the controller associated with the error. Example: If you get this error, it is telling you the problem is with Housing 1 (bottom most fan) High Limit (see fig. 6.1).



Figure 6.1 Example of Shutdown Warning popup screen.



Air Switch x Stuck

The air switch contacts have closed prior to the fan starting, indicating a freewheeling blade or improper setting of the air switch. The message will distinguish between which fan caused the shutdown. This indicates that 12VDC has been lost to terminal **J4-04** on the Fan/Heater board.

Fan x Loss of Airflow

This error message is displayed when airflow (air pressure) has been established but was lost for some reason. This could happen if while during the dryers operation the grain has settled or shrinkage in the grain columns causing a loss of air pressure in the plenum chamber.

Fan x No Airflow

Contacts in the air switch have never opened due to the fan not turning, or the air switch may need adjustment. The message will distinguish between which fan caused the shutdown.

Flame Loss x

The flame sensor has failed to detect a burner flame which had been established but was lost for some reason and there is a problem with the flame sensing circuitry or the dryer is not getting burner fuel. The message will distinguish between which burner caused the shutdown. The reference to the number one (1) is telling you that it is burner number 1 which is the bottom most fan.

Grain Temp Short x

This error indicates there is a shorted condition with one of the grain temperature sensors located inside the left or right grain columns. This could be a shorted sensor or the sensor wires could be shorted.

Grain x Overheat

An over temperature condition has occurred in one of the grain columns causing the control to shutdown the dryer. This control is set at 210°F (99°C) and automatically resets itself when cool. This can be caused from a grain column plugged with trash or your meter rolls may be adjusted to slow. Feel the grain columns to determine which one may be causing the problems. If all the columns are hot to the touch then you will probably need to check your meter roll settings. If not, then examine the column that feels hot, make sure you can see the grain moving down the column screens. For more information on service see Meter Roll Servicing.

Housing x High Limit

The temperature high limit located on the fan/burner housing has opened, indicating an over temperature condition has occurred towards the rear of the fan/heater housing. This control is set at 200° F (93°C) and must be manually reset. The message will distinguish between which fan housing caused the shutdown. The reference to the number one (1) is telling you that it is fan number 1 which is the bottom most fan.

Ignition Failure x

This condition happens during the initial ignition of the burner. If the burner fails to light, check to make sure that your gas has been turned on and/or the maxon valve has been turned on. The reference to the number one (1) is telling you that it is burner number 1 which is the bottom most fan.

Illegal Flame x

This message is displayed when the flame detection circuit of your heater is sensing flame when the burner is supposed to be off. Example, if you shut down the dryer and the heater continues to burn due to a solenoid stuck in an open state, it will generate this type of error.

Motor Overload x

One of the thermal overloads on either the fan, load, unload or auxiliary motors has opened, indicating an overcurrent condition. The overloads must be manually reset. The message will distinguish between which fan overload caused the shutdown. The reference to the number one (1) is telling you that it is fan number 1 which is the bottom most fan.

Vapor x High Limit

The LP gas vapor temperature sensor located in the gas pipe train downstream from the vaporizer, has opened indicating that the vaporizor is running too hot and must be readjusted. This sensor is set at 200°F (93°C) and automatically resets itself when cool. The message will distinguish between which burner caused the shutdown. The reference to the number one (1) is telling you that it is burner number 1 which is the bottom most fan/heater unit, is where the malfunction is located. Try adjusting the vaporizer coils farther away from the burners flame. You may also want to try switching the burner mode from Hi/Lo to On/Off, especially on warmer days.

INPUT/OUTPUT GENERATED ERRORS

The following is a list of errors that are generated with the Input/Output board located in the upper control box.

Air System Failure

A shutdown has occurred due to a air system that was installed with an intergal safety switch that was in the unit. The air system safety connections are located in the upper control box on the terminal strip. This can occur if this safety looses 12VDC to terminal **J1-10** on the I/O board. This input is jumpered on the terminal strip when it leaves the factory and is usually installed in the field by a qualified electrician.

Aux Load Overload

The motor overload relay has tripped on the Aux Load Motor circuit located in the upper control box. This can occur if this safety looses 12VDC to terminal **J1-05** on the I/O board. Push the red button on the overload to reset this error. This is caused from the motor operating with to much of a work load, which in turn uses more current (amperage). If the problem reoccurs then check the motor to make sure it is not being overworked. You may need to call an electrician to measure the motors full load amps (FLA).

Aux Unload Overload

The motor overload relay has tripped on the Aux Unload Motor circuit located in the upper control box. This can occur if this safety looses 12VDC to terminal **J1-04** on the I/O board. Push the red button on the overload to reset this error. This is caused from the motor operating with to much of a work load, which in turn uses more current (amperage). If the problem reoccurs then check the motor to make sure it is not being overworked. You may need to call an electrician to measure the motors full load amps (FLA).

Grain Discharge Warning

The lid on the grain discharge box has opened, indicating that either the grain is not being taken away fast enough from the discharge box or the take away auger system connected to the dryer may be causing the problem. This can also occur if this safety looses 12VDC to terminal **J1-08** on the I/O board.

Load Motor Overload

The motor overload has tripped on the Load Motor Overload located in the upper control box. This can occur if this safety looses 12VDC to terminal **J1-03** on the I/O board. Push the red button on the overload to reset this error. This is caused from the motor operating with to much of a work load, which in turn uses more current (amperage). If the problem reoccurs then check the motor to make sure it is not being overworked. You may need to call an electrician to measure the motors full load amps (FLA).

Meter Rolls Failed

If you have the meter roll speed adjustment turned too low (not turning), this will cause this error message. It also could indicate that you have a defective meter roll sensor, the metering roll drive system has failed to turn or broken chain or jammed metering roll is a possibility. This can occur if the input is not receiving a 5 volt pulse on terminal **J4-04** on the I/O board.

Out of Grain

The dryer has run low on grain, and the out of grain timer has timed out, shutting the dryer down. The unload auger will continue to run so it can clean out the remaining grain before shutting down.

Unload Motor Overload

The motor overload has tripped on the Unload Motor Overload located in the upper control box. This indicates that 12VDC has been lost to terminal **J1-02** on the I/O board. Push the red button on the overload to reset this error. This is caused from the motor operating with to much of a work load, which in turn uses more current (amperage). If the problem reoccurs then check the motor to make sure it is not being overworked. You may need to call an electrician to measure the motors full load amps (FLA).

User Safety

A shutdown has occurred due to a user installed safety switch that was installed on the dryer. The user installed safety connections are located in the upper control box on the terminal strip. This also indicates that 12VDC has been lost to terminal **J2-01** on the I/O board. This input is jumpered on the terminal strip when it leaves the factory and is usually installed in the field by a qualified electrician.

MASTER DISPLAY GENERATED ERRORS

The following is a list of errors that are generated with the Master Display board located in the lower control box.

Cont-Batch Mode Chng

This error occurs when you switch the dryer mode switch from the Cont. Flow to the Staged Batch position while the dryer is running in the Continous Flow Mode. To avoid this shutdown, stop the dryer before switching modes. Press Stop to clear the error.

Network Failed FH x

This error is generated whenever Fan/Heater board has lost its communications link with the Input/Output board (upper control panel) and the Master Display board (lower control panel). Check the ethernet cable jacks to make sure they are plugged in tightly. An ethernet cable is a computer communication cable that looks like the phone cable in your home (see fig. 6.2) The reference to the number one (FH1) is telling you that it is fan number 1 which is the bottom most fan.

Network Failed I/O

This error is generated whenever Input/Output board (upper control panel) has lost its communications link with the master (lower control panel door) and the fan/heater boards. Check the ethernet cable jacks to make sure they are plugged in tightly. There are 3 LED lights next to this plug, one indicates power and the other two indicate data being transmitted. These two labeled RXD and TXD, should be flashing randomly back and forth indicating network activity.

Network Failed Mast

This error is generated whenever Master Display board (lower control panel) has lost its communications link with the Input/Output board (upper control panel door) and the fan/heater boards. Check the ethernet cable jacks to make sure they are plugged in tightly.



Figure 6.2 Ethernet cable and jack.

Plenum Temp Open x

This error indicates there is a open condition with the plenum temperature sensor located inside the plenum chamber. This could be a open sensor or the sensor wires could have a open connection.

Plenum Temp Short x

This error indicates there is a shorted condition with the plenum temperature sensor located inside the plenum chamber. This could be a shorted sensor or the sensor wires could be shorted.

Plenum x Overheat

An over temperature condition has occurred inside the dryer plenum. This control is a 300°F (149°C) limit and automatically resets itself when cool. The message will distinguish between which plenum caused the shutdown.







Figure 7.1 Supply Line (LP shown)



Figure 7.2 LP Fan/heater pipe train.



Figure 7.3 LP vaporizer coil adjusment.



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Figure 7.6 Fan/heater control box.



Figure 7.7 Top auger drive.



Figure 7.8 Discharge safety switch.

Figure 7.9 Meter roll speed sensor.



Figure 7.10 Upper Control Box.

Figure 7.11 Control Panel (Rear).



GSD Grain Systems

SECTION 8 SERVICE

Before starting any repairs or maintenance on your dryer, observe the following safety steps:

1. Isolate the whole system from the electrical supply by switching off the power isolator and locking it.

2. Isolate the dryer from the gas supply by shutting off the main gas valve (if necessary lock the valve).

3. Keep the keys in your possesion.

4. Augers and drives to augers may be under some degree of tension. Avoid touching these parts with your hands until you are sure that they are free.

5. Do not reconnect the power supply until all work is completed and all guards are correctly refitted.

SEASONAL INSPECTION AND SERVICE

The dryer is made of weather resistant material, and is designed to require a minimum of service. However, each season we recommend the following items be checked before the unit is used, and any damaged or questionable parts replaced. These checks will help eliminate possible failures, and assure dependable operation of the equipment.

1. Shut off electrical power. Open power box and control box, and inspect for moisture, rodent damage or accumulated foreign material. Remove any foreign material present. Inspect and tighten any loose terminal connections. Replace any damaged or deteriorated wiring.

2. Check each blade for freedom of rotation and uniform tip clearance. They should also be inspected for dirt and grain dust, especially inside the hub. Any additional weight can seriously effect the balance, and result in harmful vibrations and a short bearing life.

3. Check each blade for free play. Any side play is an indication of defective motor bearings, which should be replaced to prevent a complete motor failure. Make sure motor mount bolts are tight.

4. Motor bearings should be lubricated periodically, depending on operating conditions. Under normal usage it is desirable to have the motor cleaned, checked and bearings repacked by an authorized service station every two to three seasons. If the unit is operated continuously through most of the year, this service should be performed each year.

Note: If on site bearing relubrication is to be performed, see lubrication instructions for ball bearing motors. To keep motor bearings properly lubricated, and dispel any accumulation of moisture within the windings, the fan and auger motors should be operated for 15 to 30 minutes each month.

LUBRICATION PROCEDURE

If the motors are equipped with an alemite fitting, clean the tip of the fitting and grease with a grease gun. Use 1 or 2 full strokes on motors in NEMA 215 frame and smaller. Use 2 to 3 strokes on NEMA 254 through NEMA 365 frame. Use 3 to 4 strokes on NEMA 404 frames and larger. On motors having drain plugs, remove drain plug and operate motor for 20 minutes before replacing drain plug. On motors equipped with slotted head grease screw, remove screw and apply grease tube to hole. Insert 5 to 8 cm length of grease string into each hole on motors in NEMA frame and smaller. Insert 8 to 13 cm length on larger motors. On motors having grease drain plugs, remove plug and operate motor for 20 minutes before replacing drain plug.

Hours of Service per Year	HP Range	kW Range	Suggested Lube Interal
5000	¹ / ₈ to 7 ¹ / ₂ 10 to 40 50 to 150	.1 to 5.6 7.5 to 29.8 37.3 to 111.9	5 years 3 years 1 year
Continuous Normal Applications	¹ / ₈ to 7 ¹ / ₂ 10 to 40 50 to 150	.1 to 5.6 7.5 to 29.8 37.3 to 111.9	1 year 3 years 9 years
Seasonal Service (motor is idle for 6 months or more)	All	All	1 year-beginning of season
Continuous high ambient temperatures, dirty or moist	$^{1}/_{8}$ to 40	.1 to 29.8	6 months
locations, high vibrations or when shaft gets hot	50 to 150	37.3 to 111.9	3 months
* The bearings have been lubricated at the factory.	thus no lubrication	should be added b	efore start up.

Suggested Lubrication Schedules*

Suggested Lubricant's						
Insulation Class	Consistency	Туре	Grease	Frame Type		
A & B	Medium	Polyurea	Shell Dolium R	215T & Smaller		
A & B	Medium	Polyurea	Shell Dolium R	254 & Larger		
F & H	Medium	Polyurea	Shell Dolium R	All		

Note: All of the auger and metering roll bearings are lifetime lubricated and do not require service relubrication.

5. Remove and clean the gas line strainers. Make certain gas valves are closed and that gas is purged from the system before attempting to disassemble anything.

6. Inspect the collector plate at the top of the burner casting and the burner cup for any accumulation of foreign material. Clean if required. Foreign material in the burner cup or casting will not burn out and will impair burner operation.

7. If required, inspect ignitor plug and clean the electrodes. Use an ignition point file to remove carbon and rust between the electrode surfaces. Ignitor gap should be about 1/4" (3 mm).

8. Inspect flame sensors for possible damage or poor connections. Flame sensor wires must be in good condition.

9. Inspect and manually rotate the top auger paddle assembly. The paddle unit must rotate freely without any indication of sticking or binding.

10. Inspect the top auger and bottom auger drive lines for proper adjustment and condition. Readjust line tension as required.

11. Operate dryer clean out levers, and check clean out hatch mechanism for proper operation. With hatch open, inspect and remove any accumulation of dirt, fines and foreign material from the bottom auger trough area.

Note: Do not allow high moisture material to collect within the trough area. It may adversely affect metal parts.

12. Inspect entire dryer for loose, worn or damaged parts. Include check of auger flighting, metering rolls and other internal parts. Check that temperature sensors within air plenum chamber are secured within insulated clamps, and do not chafe on other metal parts.

13. Make sure all dryer guards and warning decals are securely installed. Make certain guards do not interfere with moving parts. If guards or warning decals are missing, contact your dealer for a free replacement.

14. Test fire the dryer several weeks ahead of the drying season. Check for possible gas leaks. See burner test fire section.

FAN BLADE REMOVAL AND INSTALLATION

When working on or around the fan blade, be aware that it may free wheel, and could cause <u>serious injury</u>. It may be helpful to gently wedge the propeller to prevent this from occuring. However, do remember to remove the wedge before restarting the fan.

If at any stage the blade has become damaged, it is important that it is repaired and that the blade is in balance. Failure to do this could result in the blade running out of balance, and potentially exploding. Balancing the blade is a specialists job, if in doubt contact GSI or your dealer.

The fan blade is secured to the motor shaft by the use of a taper-lock bushing, motor shaft key and three cap screws.

CAUTION: Although the taper-lock method of retaining the blade onto the motor shaft is simple, it is essential that the following points be read carefully and fully understood. Improper installation can cause a loose flying blade, and result in serious injury or death.

FAN REMOVAL AND INSTALLATION

When reassembling parts, the cap screws must be installed through the untapped clearance holes as shown. This will cause the blade to be pulled forward onto the tapered bushing, thus locking the parts securely onto the motor shaft. When fan servicing requires removal and installation of the

- blade, make sure the blade is removed and reinstalled properly.
- 1. Lock out the fan power supply, and remove the fan guard and the venturi, as required on some models.
- 2. Remove the three cap screws from the clearance holes in the taper-lock bushing. (See figure 7.1)
- 3. Install two of the cap screws into the threaded holes in bushing, and turn them by hand until they bottom against the front surface of the blade. (See figure 7.2)

NOTE: The threaded holes within the bushing are provided for disassembly purposes only. Do not attempt to use these holes for reassembly. They will not allow the parts to lock onto the shaft thereby causing a hazardous operating condition.

4. Block blade to prevent it from turning, and gradually turn the cap screws (up to 1/4 turn at a time) until the blade breaks loose from the bushing and motor shaft. Carefully remove bushing and blade. With the blade free from the bushing, a wheel can be used to pull the bushing off of the motor shaft. Re-attach bushing onto blade to prevent the loss of parts.

Note: During manufacturing, the blade and bushing are balanced together and are marked with two small dots to identify their original alignment position. Check the bushing and propeller to make sure they have alignment marks. Mark the alignment of the propeller and bushing, if necessary.



Figure 8.1



Figure 8.2

FAN MOTOR REMOVAL

In the event of motor failure, remove the motor as described, and take it to the nearest service station. An authorized service station is the only place that can provide possible motor warranty. Motor service and repair at other places will be at owners expense.

If the service station determines motor failure is caused by faulty material or workmanship within the warranty period, repair will be covered under the warranty. Motor failure caused by external sources will result in a charge to the owner for repair.

1. Make certain power is shut off and locked out. Remove fan guard and blade.

2. Remove cover from fan/heater control box, and disconnect the motor lead wires from within the box.

Note: Tag or otherwise identify wires for ease of reassembly.

3. Remove motor mount bolts. If there are shims between the motor and its base, note their location so they can be properly installed during reassembly.

4. Disconnect the upper end of the motor conduit, then carefully pull the wires through the hole in the fan/heater housing. Remove motor from the fan/heater unit with the conduit still attached. If motor requires service, take it to an authorized service station.

5. To reinstall motor, slide onto motor base plate and replace shims (if required) between motor base and plate. Reinstall motor mount bolts and washer, but do not fully tighten at this time.

6. Reinstall conduit and wires through hole in fan/heater housing and carefully connect all electrical wiring.

7. Adjust position of motor by temporarily mounting fan blade on motor shaft. Rotate fan blade by hand, making the necessary adjustments, so the tip clearance between blade and housing is uniform. If required, remove the fan blade and fully tighten all four motor mount bolts.

Note: Make sure to install and tighten the blade in accordance with previous instructions.

HEATER PARTS REMOVAL & INSTALLA-TION

Most of the heater parts can be removed by simply identifying any attached wiring, and then disconnecting the obvious mounting parts.

1. **Flame sensor**: Disconnect the wire connector, and unscrew the flame sensor out of its mounting bracket.

2. **Gas Solenoid valve coil(s)**: Unsnap either the plastic cap, or the metal clip on the gas valve, and slide the housing and coil off the valve stem and body. Do not energize the coil when it is removed, as the coil may become damaged due to excessive current flow.

3. **Regulator and gas solenoid valve(s)**: The gas regulator and solenoid valve(s) are directional and must be connected as indicated by the markings near the port openings. Make sure gas is shut off and purged from the system before removing parts.

Note: When installing a liquid gas solenoid valve on LP models, do not over tighten the connection into the inlet side, as the inlet orifice may become partially blocked.

4. **Main Gas Orifice:** With fuel shut off and gas purged from system, proceed as follows:

a. Disconnect the plumbing support brackets from the pipe train.

b. Disconnect gas solenoid valve coils. Be sure to mark which one goes where.

c. Lift pipe (with orifice, solenoid valve and other parts attached), straight up and remove from fan/heater housing. Orifice and other parts can now be removed from pipe train, if desired.

5. **Reassemble**: To reassemble parts, reverse the disassembly procedure and check the following:

a. Make sure all parts are thoroughly cleaned and open.

b. Use a dependable brand of high temperature pipe caulking compuond when assembling gas connections. Apply only a light coating onto male threaded end of fittings.

c. Solenoid valves and gas regulations are directional and must be properly installed. Do not attempt to connect gas solenoid valve by applying force to the valve core stem as it may ruin the unit.

d. Make sure all electrical wires are properly connected. Refer to wiring diagram.

METERING ROLL SERVICING

This dryer is equipped with SCR metering roll drive assembly. The metering rolls are driven by a separate DC type electric motor. The speed of the motor is variable, and is controlled by an electric SCR control within the main control box.

MAIN CONTROLS

1. **SCR speed control**: The metering roll speed pots on the front of the control box regulate the speed of the DC motor which drives the metering rolls.

The scale of adjustment is from 0 to 999 which represents the flow of grain past the metering rolls as a percent of the maximum grain discharge rate for the dryer. The maximum setting of 999 provides a maximum 100% discharge of 1960 BPH for 1214, 2240 BPH for 1216, 2520 BPH for 1218, 2800 BPH for 1220, 3080 BPH for 1222, 3640 BPH for 1226 model dryers.

Note: When the control is set to the maximum discharge rate (999), the metering roll speed should be 17.5 RPM for 8" discharge auger.

2. **DC electric motor**: The direct current (DC) motor provides the drive for the metering roll, and is located on the front left hand side of standard model dryers. The output shaft of the motor is connected directly to the gear box assembly. The DC motor requires no operational adjustment as it is completely controlled from the control box.

3. **Speed reducer gear box**: The direct drive gear box provides the required speed reduction, and transmits power to the metering rolls through a drive chain arrangement. The gear box does not require adjustment. The drive chain

should also be periodically lubricated and retensioned as necessary.

4. **Unload auger time delay**: The delay controls the bottom auger system and causes the unload auger (and any connected auxiliary unloading conveyors) to continue operating for a programmed amount of time, even after the metering rolls stop. This feature permits the cleanout of grain within the unloading equipment at the end of all discharge cycles.

5. If a foreign object becomes lodged in the metering rolls and jams the system, the unloading auger will stay in motion. However, the metering roll drive will stop and the DC motor should stall out. The Vision Control System will shut down the dryer after a two minute period.

To determine if the metering problem is from blockage, perform the following test with the power off. Remove the drive chain by loosening the motor mounting bolts. Refer to photo, and place a pipe wrench on the hub of the roller chain sprocket, on the left hand metering roll at the drive end of the dryer. Apply up to 100 ft.lbs. of force, and attempt to rotate the roll toward the inside of the dryer. If the metering roll will turn, then repeat for right hand side. If the metering roll will turn, it can be assumed that no blockage exists, and the problem is from some other cause. Check for a break in the power train, chain, drive key, pin, etc. **CAUTION:** Keep hands away from sprocket teeth to avoid injury from chain backlash, as a result of torsion build up in the system caused by the jam.

HOW TO CLEAR A JAMMED METERING ROLL

Place a pipe wrench on the hub of the sprocket of the jammed metering roll and turn the roll. First, backward, and then, forward several times in an attempt to dislodge the object, and clear it through the roll. If this is not successful, have an assistant turn the metering roll, and attempt to locate the jam by sound. Shut down the fan/heater, and eliminate any other noise when making this check. Once the location is determined, the roll can be reached from the outside by opening the access door to remove the foreign object causing the jam (before opening doors see below). The service tool must be inserted before opening doors. First, swing open the plenum bottom closure panel. Insert the service tool above the metering roll.

TROUBLE ANALYSIS PROCEDURE

A multimeter is required for some of the following checkout procedures. Before performing any tests, check if the dryer power supply is 1 phase, 230 volt, or 3 phase, 230, 380, 460 and 575 volt.

• The burner circuit is 120 volts AC on all standard U. S. production models.

- The control circuit to the motor starters is 120 AC volts.
- The safety circuit is 12 volts DC

- When checking these circuits, measure voltage between
- the circuit test location and to ground.

• DC circuits should be measured between the test location and its respective DC ground.

Refer to wiring diagrams and the parts list for identification of parts and the electrical terminals.

CAUTION: When making high voltage tests with "live" circuits, be extremely careful. Follow established safety practices. Turn power on for testing only. Do not attempt to make the dryer operate by using a jumper wire to bypass a defective safety component.

Problem		Possible Cause
Control nower switch light off	1	Check that main power and circuit breakers are
Control power switch light on.		turned on. Check for tripped breaker.
	2	Check for blown 5 amp fuses.
	3	Defective transformer or wiring.
	4	Check for a defective power switch.
	5	Check wiring between fuses and input/output
		board. Intelet to wining diagram for test locations.
		This indicates control power is present at
Control power light is on, reset button has	1	input/output board, but no power is being
been pressed, drying mode light off.		transferred through the I/O board.
		Display not finished initial setup: The monitor will
		display a copyright message and model number,
	2	total running time in hours and minutes and then
		the current date and time. Press the reset button to
		activate the controller .
		Input/output board: The input/output board has
	3	developed a problem that requires its replacement.
No display on LCD screen.	1	Check for a defective power switch.
	2	Check wiring between fuses and input/output
		board.
	3	Check for 120 volts AC between points J8-20 and
	-	J8-19 (AC-1).
	4	The display may have a malfunction requiring its
		replacement.
Control nowor light is on dwing mode light		
is an load auger fan heater unload auger	1	Proce the dwar newer start button
is ontoad adger, tan, neater, unioad adger will not operate	1	Fress the diver power start button.
will not operate.		Refer to the problem listed for load auger, fan
	2	heater and unload auger in the following sections
		Incuter and amound anger in the following occupits.
Display shows "12 VOLT POWER SUPPLY		The fuse located on the input/output board of the
WARNING" message.		Network Control System has blown.
		The thermal overload on the fan motor, load motor,
Display shows "MOTOR OVERLOAD x"		unload motor or an auxiliary motor has opened
message.		indicating an overloaded motor. (The overloads
		must be manually reset).

Problem	Possible Cause
Display shows "VAPOR x HIGH LIMIT" message.*	The LP gas vapor temperature sensor located in the gas train downstream from the vaporizor has opened, indicating that the vaporizer is running too hot and must be readjusted. (This control is a 200°F (93°C) limit which automatically resets when it cools).
Display shows "IGNITION FAILURE x" message.*	The flame sensor has failed to detect a burner flame, indicating that the burner has failed to light, there is a problem with the flame sensing circuitry or the dryer is not getting burner fuel.
Display shows "HOUSING x HIGH LIMIT" message.*	The temperature high limit located on the fan/burner housing has opened, indicating an over temperature condition has occurred towards the rear of the fan/heater housing. (This control is a 200°F (93°C) limit control that must be manually reset).
Display shows "GRAIN DISCHARGE WARNING" message.	The cover on the grain discharge box has opened, indicating that grain is backing up into the discharge box.
Display shows "ADJ. GRAIN x OVERHEAT" message.	An over temperature condition has occurred inside the grain columns. (This limit is adjustable in your parameter setup which may need to be increased if a problem is not found in the grain columns).
Display shows "GRAIN x OVERHEAT" message.	An over temperature condition has occurred inside the grain columns. (This control is a 210°F (99°C) thermal overheat switch which will reset automatically when it cools).
Display shows "OUT OF GRAIN" message. Display shows "OUT OF GRAIN-UNLOAD CLEANOUT" message.	The dryer has run low on grain, and the out of grain timer has timed out shutting the dryer down. The unload auger will then clean out the dryer, if the unload switch is on during continuous flow operation. Check the out of grain timer setting, and if necessary adjust. Also, before restarting, inspect load equipment for possible damage or adjustment.
	An over temperature condition has eccurred inside
Display shows "PLENUM x HIGH TEMPERATURE" message.*	the dryer plenum. (This control is a 300°F (149°C) limit which automatically resets when it cools).
Display shows "BURNER x SHUTDOWN LOSS OF AIRFLOW" message.*	The air switch contacts have opened, indicating insufficient air pressure for the burner to operate.

Problem		Possible Cause
Display shows "FAN x NO AIRFLOW" message.*		The air switch contacts have opened, indicating the fan may not be turning or the air switch may need adjustment.
Display shows "AIR SWITCH x STUCK" message.*		The air switch contacts have closed prior to the fan starting, indicating a freewheeling blade or improper setting of air switch.
Fan motor will not start.	1	Check that the fan circuit breaker and the fan switch are on. Also, check for defective switch or bad wiring connections.
	2	If lighted switch does not light, the air switch needs adjustment, or the bulb may be burned out.
	3	Verify closing of fan motor contactor. Check voltage on load side of contactor. See appropriate power wiring for defective points or a burned out coil.
	4	Inspect connections, and check voltage applied to the motor leads in the fan heater box to determine if the motor is defective.
	5	Check capacitors on single phase motors, and replace if defective. If motor starts slowly, check for low voltage during starting due to excessive voltage drop in power
Top auger will not start.	1	Check that the top auger circuit breaker and the load auger switch are turned on.
	2	Check position of the upper auger paddle switch. It must be down to start auger.
	3	Inspect for secure mounting and wiring of mercury switch in the terminal box on the top auger paddle switch shaft. Include check for a defective mercury switch.
	4	Verify closing of the top auger contactor. Check voltage on load side of contactor. Inspect contactor for defective points, or a burned out coil.
	5	Inspect connections, and check voltage applied to motor leads in motor junction box to determine if motor is defective.
	6	Check that the mercury switch box is in the proper position.
Bottom auger will not start.	1	Check that the bottom auger circuit breaker is on.
	2	Check that the unload switch is on (1 or 2 speed).
	3	Verify closing of bottom auger contactor; check voltage on load side of contactor.
	4	If using the moisture control, check for proper setting.

Problem		Possible Cause
Grain not moving through columns.	1	Check the dryer for fine material buildup inside the columns.
	2	Avoid leaving the dryer columns full for long periods at a time (2-3 days) while not operating the dryer or during rainy weather.
	3	Empty the dryer. Keep the dryer clean! Do not allow fine material to gather in the plenum chamber.
	4	It may be necessary to open the strike off plates in the affected columns in half inch intervals.
Uneven drying-Some kernels appear brown while others are under dried. Uneven heat exiting from dryer columns.	1	Check plenum temperature setting. Some varieties of grain are more sensitive to higher operating temperatures. It may be necessary to lower the plenum operating temperature to accommodate this.
	2	Check for proper burner alignment (side to side). Vibration during shipment may have caused misalignment.
Display shows "METER ROLL DRIVE SYSTEM FAILURE" message.	1	The metering roll drive system has failed to turn within two minutes. A faulty D. C. motor, broken chain or jammed roll is a possible cause of this message.
	2	The Meter Roll Sensor located at the back of the dryer has failed and needs replaced.
Burner will not fire with fan operating.	1	Burner switch must be on.
Heater switch light and gas solenoids go on and off erratically-The light blinks on and off while the solenoids "chatter".	1	The blinking light indicates the flame sensor is not detecting flame.
	2	Check for loose wires on flame sensor; replace or repair wires or sensor.
Burner will not fire-No gas pressure with fan operating at least 15 seconds (gas supply or fan heater malfunction).	1	Check gas supply. Also, check gas filter and gas line for possible obstruction or closed valves. Refill tank; replace or repair parts, as required.
	2	Inspect gas solenoid valves (including liquid valve on LP units) for defective coils or improper wiring. Replace valve or coil if valve will not open with proper voltage applied (120 volts).
Burner will not fire-But gauge shows gas pressure.	1	Ignitor: Check that the ignitor is properly gapped to 1/8" (125mm) and that it has a strong spark. Inspect the porcelain and electrodes for damage or cracking. Replace or clean if necessary.

Problem		Possible Cause
Burner maintains desired drying temperature-but cycles from hi-fire to off (without going to lo-fire).	1	The burner has been setup to work as a ON-OFF burner. Change the burner setup to HI-LOW type of burner.
Burner operates-But will not cycle from hi- fire to lo-fire.	1	Check the gas pressure reading on the gauge. Problem may be due to insufficient gas regulator setting. Temporarily decrease the plenum temperature set point and cause the burner to cycle. If burner will cycle at the reduced plenum set point setting, it indicates that the problem was due to insufficient heat to satisfy the original setting. Increase the gas regulator setting for additional heat output. Do not exceed the maximum pressure listed in this manual.
Burner operates-But will not cycle from lo- fire to hi-fire.	1	Check for an excessive lo-fire gas pressure setting. Observe pressure setting shown on gauge, and compare reading with recommended low pressure settings listed in this manual. Readjust lo-fire setting on flow control valve, if necessary.
	2	Temporarily increase the plenum temperature set point setting. If the heater will still not cycle, check for problem in the control wire connections.
	3	Check for improperly connected or faulty hi-fire gas vapor solenoid valve. Correct any poor connections or defective wiring. If wiring appears proper, problem may be caused by a burned out valve coil or defective valve. Replace hi-fire solenoid valve, or its coil, if defective.

Fan Heater Component Layout and Wiring (left side)



Fan Heater Component Layout and Wiring (right side)



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Vision I/O Board Layout

12 Vdc Positive Unload Overload Load Overload Aux Unload Overload Grain High Limit #1 Grain High Limit #2 Rear Discharge Batch Grain Switch Air System Failure

12 Vdc Positive Spare Input #1 Hardware Safety User Safety #1 User Safety #2 User Safety #3 User Safety #4 Spare Input #2 Spare Input #3 Spare Input #4

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Analog Output Ground Analog Output Meter Rolls 12 Vdc Meter Roll Input Meter Roll Ground

Open Limit (Topdry) Actuator +24 Vdc (Topdry) Actuator Ground (Topdry) Close Limit (Topdry) Transformer

12 Vdc Positive Unload Overload Load Overload Aux Unload Overload Aux Load Overload Grain High Limit #1 Grain High Limit #2 Rear Discharge Batch Grain Switch Air System Failure

Maxon Power Maxon AC Ground SCR Drive Power SCR AC Ground Meter Roll Reverse Power Meter Roll Reverse AC Ground– Spare Output Power Spare Power AC Ground Spare Output Power #2 Spare Power #2 AC Ground

Upper Control Panel Wiring



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