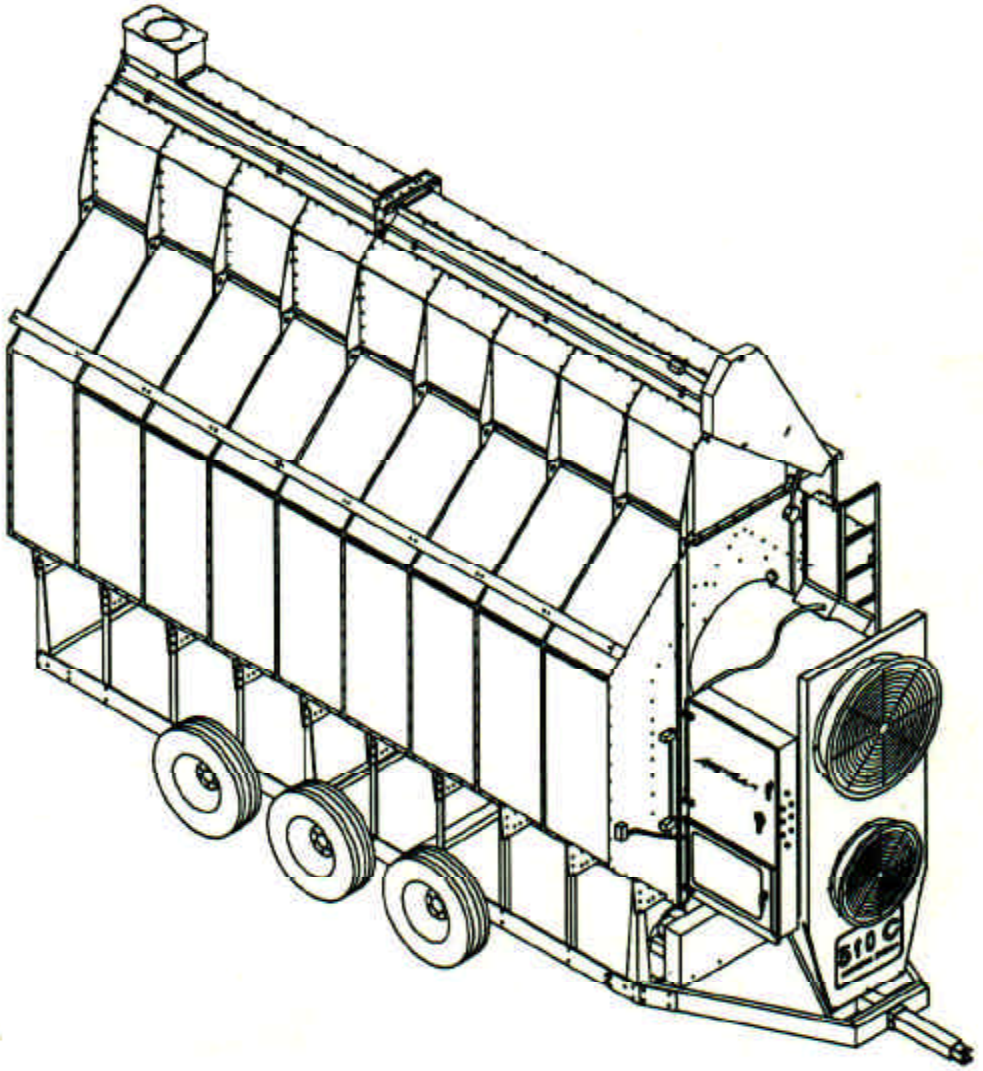
AIRSTREAM

TOWING & INSTALLATION MANUAL



AIRSTREAM C-SERIES TWO-FAN GRAIN DRYERS

GSI
GRAIN SYSTEMS, INC.
ASSUMPTION, IL 62510 217/226-4421

PNEG-262A
8/15/92

TOWING AND INSTALLATION MANUAL

Thank you for choosing and AIRSTREAM C-Series Two-Fan grain dryer. These units are one of the finest grain dryers ever built and designed to give excellent performance and service for many years.

This manual provides information on Towing and Installation of all standard production 410C, 510C, 600C, 610C, and 710C dryers. These dryers are available for liquid propande or natural gas fuel supply, with either single phase 230 volt, or three phase 220 or 440 volt electrivcal power.

WARRANTY

Grain Systems, Inc. warrants its products to be free of defects in material and workmanship. The only obligation of the manufacturer is to repair or replace components which have been submitted and found to be defective within 24 months after installation. If so found to be defective, the components will be repaired or replaced without charge, this consitituting and entirely fulfilling the warranty obligation. Grain Systems, Inc. assumes no liability for expenses incurred without written authorizations; in no event shall liability include special or consequential damages, or exceed the selling price of the product.

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

All instructions shall be construed as recommendation only. Because of the many variable conditions in actual installation, Grain Systems, Inc. assumes no liability for results arising from the use of such recommendations. Any alteration in design or operation of any Grain Systems, Inc. product must be submitted and approved in writing by Grain Systems, Inc. before alteration is made.

SAFETY FIRST

GENERAL SAFETY STATEMENTS

Grain Systems, Inc.'s principle concern is your safety and the safety of others associated with grain handling equipment. This manual was written with this thought in mind. We want to keep you as a customer. This manual is to help you understand safe operating procedures and some problems which may be encountered by the operator and other personnel.

As owner and/or operator, it is your responsibility to know what requirements. hazards and precautions exist and inform all personnel associated with the equipment or in the area. Safety precautions may be required from the personnel. Avoid any alterations to the equipment. Such alterations may produce a very dangerous situation, where serious injury or death may occur.

SAFETY ALERT SYMBOL

The symbol shown below is used to call your attention to instructions concerning your personal safety. Watch for this symbol; it points out important safety precautions. It means "ATTENTION", "WARNING", "CAUTION", and "DANGER". Read the message that follows and be cautious to the possibility of personal injury or death.

WARNING!

BE ALERT Personnel operating or working around dryer should read this manual. This manual must be delivered with equipment to its owner. Failure to read this manual and its safety instructions is a misuse of the equipment.

DANGER

Disconnect electricity before inspecting or servicing.

WILL CAUSE SERIOUS INJURY OR DEATH

Grain Systems, Inc. recommends that you contact your local power company and have a representative survey your installation so your wiring will be compatible with their system and so that you will have adequate power supplied to your unit.

SIGN-OFF SHEET

As a requirement of OSHA, it is necessary for the employer to train the employee in the safe operating and safety procedures for this auger. We included this sign-off sheet for your convenience and personal record keeping.

DATE	EMPLOYER'S SIGNATURE	EMPLOYEE

SAFETY PRECAUTIONS

1. Read and understand the operating manual before trying to operate the dryer.
2. Never operate dryer while guards are removed.
3. Power supply should be OFF for service of electrical components. Use **CAUTION** in checking voltages or other procedures requiring power to be ON.
4. Check for gas leaks at all gas pipe connections, if any leaks are detected, do not operate dryer. Shut down and repair before further operation.
5. Never attempt to operate the dryer by jumping or otherwise bypassing any safety devices on the unit.
6. Set pressure regulator to avoid excessive gas pressure applied to burner during ignition and when burner is in operation. See chart for operating procedures. Do not exceed maximum recommended drying temperature.
7. Keep the dryer clean. Do not allow fine material to accumulate in the plenum chamber.
8. Keep auger drive belts tight enough to prevent slippage.
9. Use **CAUTION** in working around high speed fans, gas burners, augers, and auxiliary conveyors which **START AUTOMATICALLY.**
10. Do not operate in an area where combustible material will be drawn into the fan.
11. Before attempting to remove and reinstall any propellor, make certain to read the recommended procedure listed within the SERVICING section of the manual.
12. Be certain that capacities of auxiliary conveyors are matched to dryer auger capacities.
13. Clean grain is easier to dry. Fine material increases resistence to air flow and requires removal of extra moisture.

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

USE CAUTION IN 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 can not be completely safeguarded against without interfering with efficient operation and reasonable access to components.

Use extreme caution in working around high speed fans, gas-fired heater, 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 this 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 Safety Precautions listed above before attempting to operate the dryer.

KEEP THE DRYER CLEAN. Do not allow fine material to accumulate in the plenum chamber.

A CAREFUL OPERATOR IS THE BEST INSURANCE AGAINST AN ACCIDENT.

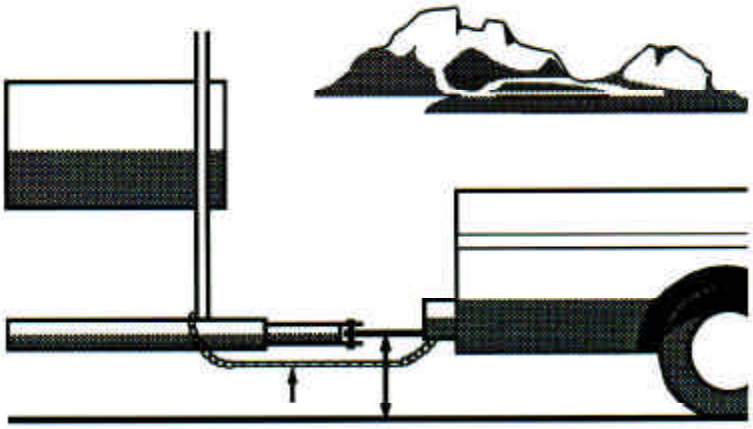
TABLE OF CONTENTS

1. TRANSPORTING DRYER

The dryer is available with an optional Transport kit for transporting the unit by truck or tractor. Make certain to observe the following safety precautions.

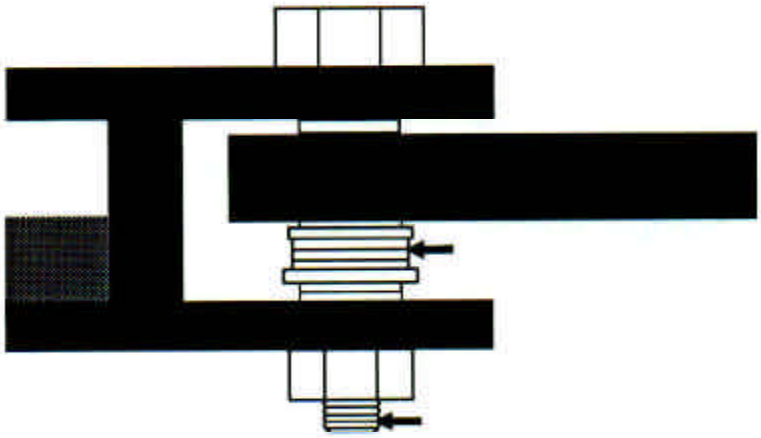
1. Recommended Towing Hitch Height 14-17 inches. (Figure1)

Figure 1



2. Hitch Bolt to be NOT LESS THAN 3/4 INCH in diameter and securely fastened with a locking nut, so it will not come out in travel and hitch will not bend. (Figure 2)

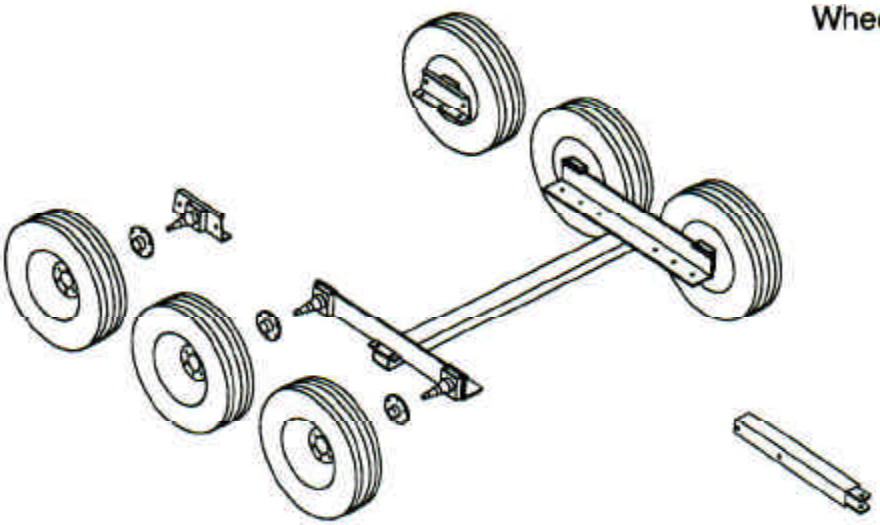
Figure 2



3. Use Safety Chain.
4. Dryer must be towed empty and in accordance with applicable state or Provincial Regulations. Dryer must never be towed with grain or other material in it.
5. Recommended tire pressures 55-60 P.S.I. (Cold)
6. Maximum towing speed 45 Miles Per Hour or speed limit, which ever is lower.
7. After the first 50 miles and every 200 miles thereafter:
   a. Check hub and spindle temperature immediately after stopping. Temperature should not exceed 150°F.;May be hot to touch, but not melting lubricant.

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

Wheel Kit



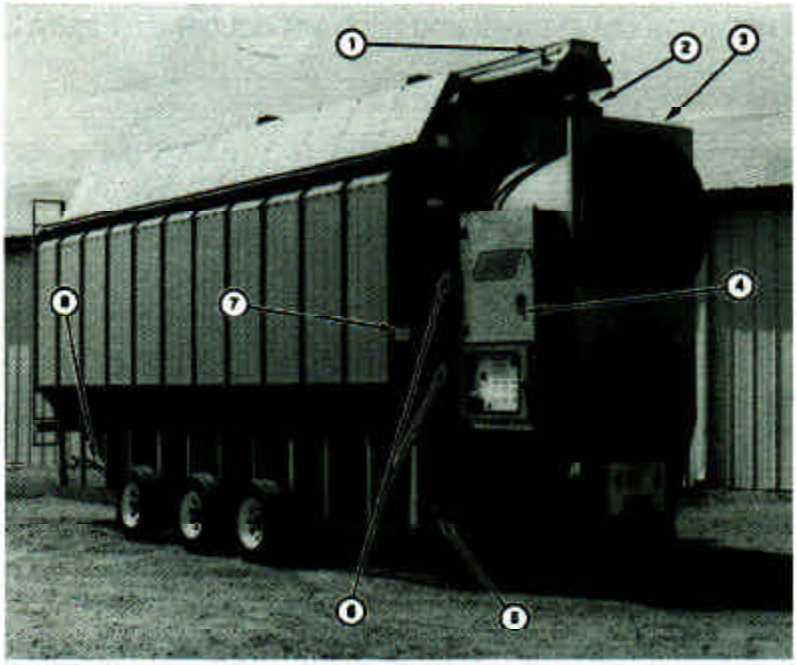


Figure 3

Airstream Two-Fan Model Grain Dryer

1. Mercury switch for fill control
2. Loading auger motor
3. Fan-Heater contol box
4. Main control box
5. Unloading auger motor
6. Plenum hi-limit
7. Grain hi-limit
8. Bottom auger clean-out

SPECIFICATIONS

TYPE:

Continuous, multi-stage with two automatically controlled fan/heater units for staged drying temperature; equipped for staged, intermittend discharge or continuous flow discharge.

GRAIN COLUMNS:

Two grain columns. 14" thickness, with grain movement through columns controlled by variable speed metering rolls; grain column construction of galvanized steel with heavy steel partitions each two feet of length, and with metering roll access panels and grain clean out mechanism.

FAN:

Heavy-duty vane axial fans, direct drive, with total airflow, static pressure, and horsepower matched to grain volume, and with full motor overload protection.

HEATER:

High capacity direct fired heater, with ACCUFIRE burner, full electric ignition, and thermostatic temperature control by two level fuel flow modulation (Hi-Lo burner control.)

AUTO CONTROL:

Fully equipped for:

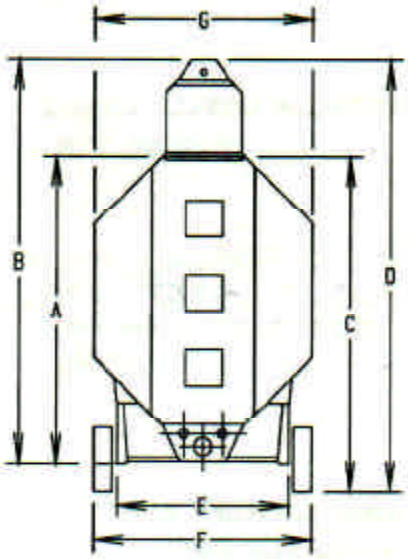
(1) Dry and Cool, Staged Automatic,

(2) Dry and Cool, Continuous Flow,

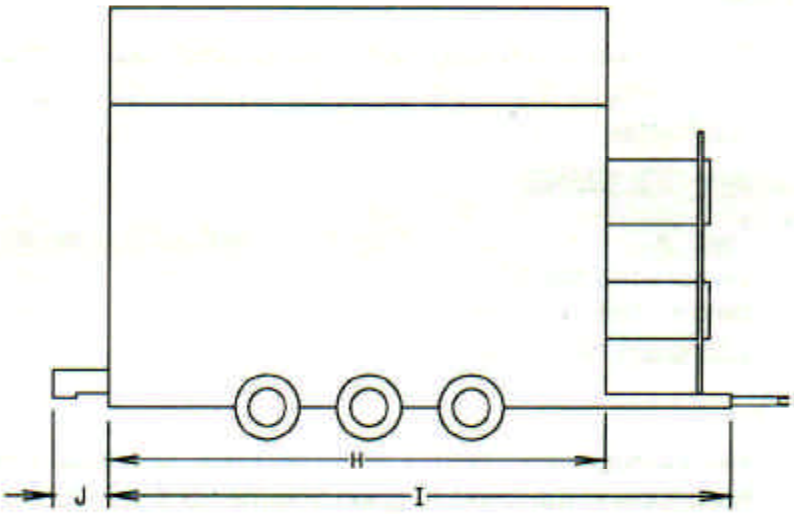
(3) Full Heat, Staged Automatic,

(4) Full Heat, Continuous Flow.

Automatic control of all functions; loading, drying, cooling, and discharge. Staged automatic process controlled by automatic reset timers; continuous flow process controlled by adjustable rate metering roll system. Full safety control systems; automatic shut down on wet grain outage or excessive temperature: moisture check thermostat. Control circuit; circuit monitor system to identify cause of safety shut-down; hour meter.



REAR VIEW



SIDE VIEW

Airstream Model	A	B	C	D	E	F	G	H	I	J
410C	11'-4 1/2"	14'-11"	12'-3 1/2"	15'-10"	6'-4"	8'-3"	8'	14 1/2"	18'-9"	24"
510C	11'-4 1/2"	14'-11"	12'-3 1/2"	15'-10"	6'-4"	8'-3"	8'	18 1/2"	22'-9"	24"
600C	11'-4 1/2"	14'-11"	12'-3 1/2"	15'-10"	6'-4"	8'-3"	8'	20 1/2"	24'-9"	24"
610C	11'-4 1/2"	14'-11"	12'-3 1/2"	15'-10"	6'-4"	8'-3"	8'	22' 1/2"	26'-9"	24"
710C	11'-4 1/2"	14'-11"	12'-3 1/2"	15'-10"	6'-4"	8'-3"	8'	26' 1/2"	30'-9"	24"

SPECIFICATIONS CHART FOR TWO FAN MODEL DRYERS

	410C	510C	600C	610C	710C
Drying Capacity, Shelled Corn *1					
Dry and Cool, 25% to 15% *2	260 BPH	325 BPH	375 BPH	380 BPH	450 BPH
Dry and Cool, 20% to 15%	420 BPH	520 BPH	550 BPH	620 BPH	690 BPH
Full Heat, 25% to 15% *2	410 BPH	510 BPH	600 BPH	610 BPH	710 BPH
Full Heat, 20% to 15%	680 BPH	910 BPH	950 BPH	1025 BPH	1225 BPH
Grain Columns	14",14' Long	14",18' Long	14",22' Long	14",22' Long	14",22' Long
Total Holding Capacity	415 Bu.	540 Bu.	460 Bu.	500 Bu.	600 Bu.
Top-Loading Auger	8", 5HP	8", 5HP	7.5 HP	7.5 HP	10 HP
Capacity	2800 BPH	2800 BPH	2800 BPH	2800 BPH	3800 BPH
Bottom Auger	8",10" Tube, 5HP	8",10' Tube, 5HP	7.5 HP	7.5 HP	10 HP
Meter Roll Systems,Max. Rate *3	SCR 3/4 HP	SCR 3/4 HP	SCR 3/4 HP	SCR 3/4 HP	SCR 3/4 HP
Maximum Capacity	1800 BPH	2300 BPH	2500 BPH	2500 BPH	3500 BPH
Transport Length (Hitch to Discharge Auger)	23'-1"	27'-1"	29'-1"	31'-1"	35'-1"
Transport Width	8'	8'	8'	8'	8'
Transport Height	13'-5"	13'-5"	13'-7"	13'-7"	13'-7"
Transport Weight	7100 Lbs.	8260 Lbs.	9700 Lbs.	9700 Lbs.	10,000 Lbs.
Installed Length	21'-1"	25'-1"	27'-1"	29'-1"	33'-1"
Installed Width	8'	8'	8'	8'	8'
Installed Height (Above Foundation Supports)	15'-9"	15'-9"	15'-9"	15'-9"	15'-9"
Fan	10-15 HP, 28" 5-7 HP, 24"	(1) 10-16 HP, 36" (1) 10-12 HP, 26"	(1) 10-16 HP, 42" (1) 10-12 HP, 26"	(1) 10-16 HP, 42" (1) 10-12 HP, 28"	(1) 25 HP, 40 (1) 10-12 HP, 28"
Heater (Max. BTU)	(1) 3 Mill Btu/Hr (1) 2 Mill Btu/Hr	(1) 4.5 Mill Btu/Hr (1) 2 Mill Btu/Hr	(1) 5 Mill Btu/Hr (1) 2.7 Mill Btu/Hr	(1) 5 Mill Btu/Hr (1) 3 Mill Btu/Hr	(1) 6 Mill Btu/Hr (1) 2.7 Mill Btu/Hr
Electric Load (Fan, Top					
Auger, Bottom Auger) *4					
Single Phase, 230V	134 Amps	159 Amps	184 Amps	184 Amps	N/A
Three Phase, 220 V	75 Amps	94 Amps	120 Amps	120 Amps	164 Amps
Three Phase, 440 V	38 Amps	47 Amps	60 Amps	60 Amps	82 Amps

*1. Capacities listed are wet bushels at input moisture content.

*2. Grain discharged hot from the dryer at 17% output moisture should result in a final moisture content of 15% to 15 1/2% after cooling (dryeration).

*3. Actual discharge rate is controlled by meter roll speed adjustment, at 0% to 100% of maximum rate.

*4. Excludes auxiliary load and unload motors.

2. INSTALLATION

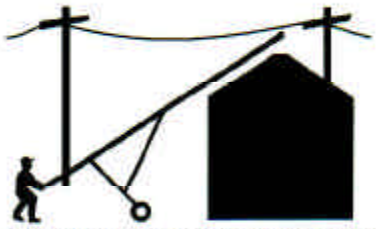
SYSTEMS LAY-OUT:

Consider the grain handling systems, the location of storage bins and existing conveyors in selecting the dryer site. The wet grain supply and dry grain discharge needs to be planned as well.

SITE SELECTION:

The dryer is not to be operated inside a building or in any area **not** permitted by:

1. Electrical codes
2. Fuel installation regulations
3. Insurance requirements.



Don't maneuver augers in raised position.

Do not operate in an area where combustible material can be drawn into the fans. Maintain a minimum distance of three feet(3) to other structures. Refer to (Fig.4) on page 5 for dryer dimensions. Dryer should not be placed in a position requiring augers to be moved close to power lines or other dangerous obsticles.

FOUNDATION:

A concrete or similar permanent foundation as recommended. See (Fig. 5 and 6) for specifications and layout.

BLOCK SUPPORT:

The wheels are provided only for transportation of the empty dryer. Before loading any grain into the dryer, it is necessary to support the frame of the unit on each side. To carry the total weight when filled with grain use concrete blocks or other means to support the weight. Use shims to provide uniform, level support. It is required that they be a minimum of 16", above the concrete slab. This provides space for clean-out and for auxiliary conveyors. **Use a minimum of one support per each 6 feet of basket length on each side, plus one support at the hitch point**. The hitch tongue should be removed, but the hitch assembly and the fan support must be left on during operation; they are not a part of the transport assembly.

TIE-DOWN ANCHORS:

Anchor points may be cast into the concrete slab, or the dryer may be tied down by cable and turn-buckle to anchors installed at the edge of the slab. This is to prevent overturn or lateral movement by wind or other forces.

WET GRAIN SUPPLY:

A wet holding bin provides, gravity flow into the dryer or loading conveyor. This conveyor may be electrically connected to the power circuit provided in the Main Control Box. At the beginning, the dryer will completely fill. During drying, the top auger will start and stop, as required depending upon the dry grain discharge rate and grain shrinkage, to maintain the dryer fill. If the dryer does not fill within the preset time on the load timer the dryer will shut down.

DRY GRAIN REMOVAL:

The dry grain is standardly discharged out the rear end of the dryer. Front discharge is an optional feature. A take away system needs to be provided to remove grain from the drying system. This conveyor may be electrically connected to the power circuit provided in the main control box.

3. FUEL CONNECTION

LIQUID PROPANE (LP)

LIQUID DRAW: Dryers have internal vaporizers, they are designed to operate on liquid propane, with liquid draw from the supply tank. A piping system is provided on the dryer, including strainer, pressure relief valve, and electronic safety shut-off valve; a pressure regulator is provided on the fan-heater unit, between the vaporizer and burner.

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

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

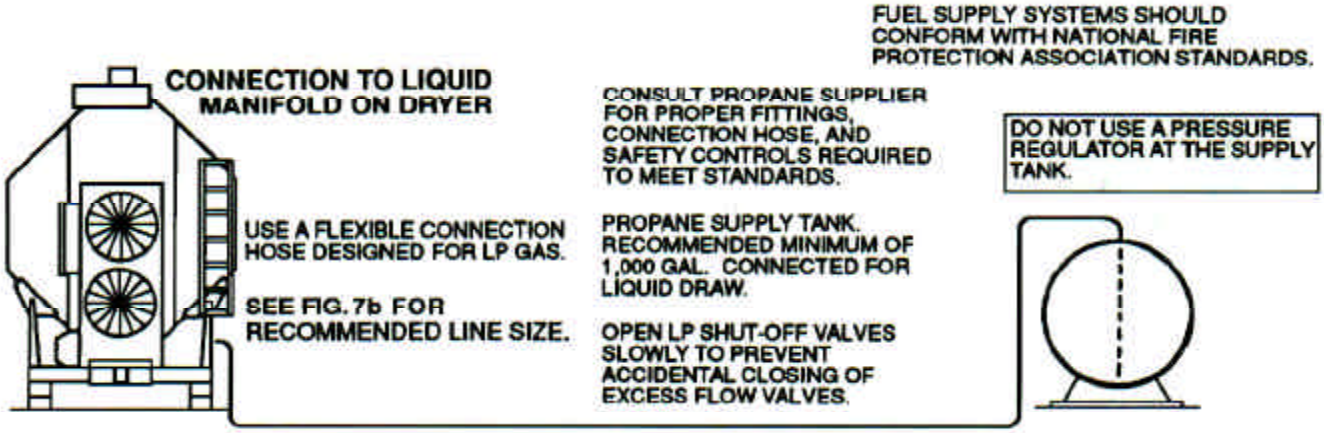


FIG. 7a LIQUID PROPANE FUEL SUPPLY

FUEL SYSTEM SPECIFICATIONS & RECOMMENDATIONS

		410C	510C	600C	610C	710C
	MAXIMUM HEAT CAPACITY (BTU PER HOUR)	5,200,000	6,000,000	7,700,000	8,000,000	9,000,000
LIQUID PROPANE (LP)	TYPICAL MAXIMUM FUEL FLOW *(GALLONS PER HR.)	64	74	95	98	111
	RECOMMENDED LIQUID LINE SIZE	1/2"PIPE	1/2" PIPE	1/2"PIPE	1/2" PIPE	3/4" PIPE
	HEATER ORIFICE DRILL SIZE					
	TOP BURNER	.250 INCH	.281 INCH	.328 INCH	.328 INCH	.328 INCH
	BOTTOM BURNER	.218 INCH	.234 INCH	.234 INCH	.250 INCH	.250 INCH
	OPERATING PRESSURE RANGE (heater pressure gauge), PSI	4-30	4-30	4-30	4-30	4-30
	LO-FIRE PRESSURE SETTING, PSI	4 PSI	4 PSI	4 PSI	4 PSI	4 PSI

** MAXIMUM FUEL FLOW RATES LISTED ASSUME FULL HEAT OUTPUT FOR GAS LINE SIZING PURPOSES. IN NORMAL OPERATION THE FLOW RATES WOULD BE CONSIDERABLY LOWER THAN INDICATED, DUE TO ACTUAL PRESSURE SETTINGS USED & CYCLING OF HEATER.

FIG. 7b FUEL SYSTEMS SPECIFICATIONS AND RECOMMENDATIONS

NATURAL GAS (N)

GAS 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 10 PSI must be provided at the connection to the dryer. with gas available in sufficient volume to maintain the operating pressure.

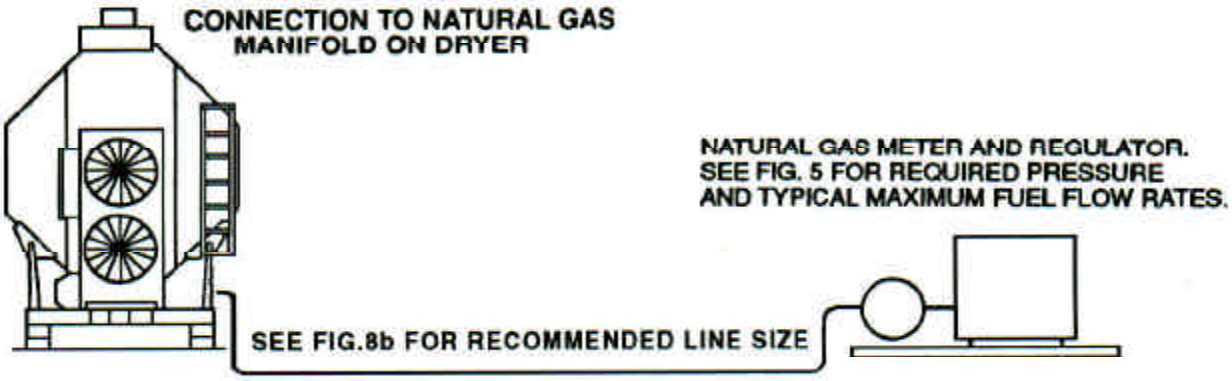


FIG. 8a NATURAL GAS FUEL

FUEL SYSTEM SPECIFICATIONS & RECOMMENDATIONS

		410C	510C	600C	610C	710C
MAXIMUM HEAT CAPACITY (BTU PER HOUR)		5,200,000	6,000,000	7,700,000	8,000,000	9,000,000
NATURAL GAS (N)	TYPICAL MAXIMUM FUEL FLOW * (CUBIC FT. PER HR.)	5,200	6,000	7,700	8,000	9,000
	MINIMUM PRESSURE AT CONNECTION TO DRYER, PSI	10 PSI	10 PSI	10 PSI	10 PSI	10 PSI
	RECOMMENDED MINIMUM LINE SIZE -100' DISTANCE	1 1/2" PIPE	1 1/2" PIPE	2" PIPE	2" PIPE	2" PIPE
	HEATER ORIFICE DRILL SIZE					
	TOP BURNER	.375 INCH	.438 INCH	.531 INCH	.531 INCH	.531 INCH
	BOTTOM BURNER	.313 INCH	.344 INCH	.344 INCH	.375 INCH	.375 INCH
	OPERATING PRESSURE RANGE (heater pressure gauge), PSI	2-10 PSI	2-10 PSI	2-10 PSI	2-10 PSI	2-10 PSI
	LO-FIRE PRESSURE SETTING, PSI	2 PSI	2 PSI	2 PSI	2 PSI	2 PSI

**MAXIMUM FUEL FLOW RATES LISTED ASSUME FULL HEAT OUTPUT FOR GAS LINE SIZING PURPOSES. IN NORMAL OPERATION THE FLOW RATES WOULD BE CONSIDERABLY LOWER THAN INDICATED, DUE TO ACTUAL PRESSURE SETTINGS USED & CYCLING OF HEATER.

FIG. 8b FUEL SYSTEMS SPECIFICATIONS AND RECOMMENDATIONS

4. AUGER DRIVE DATA

	AUGER		MOTOR			SHEAVES	
AUGER DRIVE DATA	SIZE	APPROX. CAPACITY BU./HR.*	HP	RPM	BELTS	DRIVE OD	DRIVEN OD
TOP AUGER	8"	2800 (410C, 510C) 2800 (600C,610C) 3800 (710C)	5 7.5 10	1750	BX120 (TWO)	2BK40	2TB184
BOTTOM AUGER	8"	1800 (410C)** 2300 (510C) 2500 (600C, 610C) 3500 (710C)	5 7.5 10	1750	BX81 (TWO)	2BK32	2TB160

* Dryer auger capacities and power requirements vary with grain moisture content and amount of fine material in grain.

**Listed bu./hr. represent the maximum metering roll discharge rate. The bottom auger capacity exceeds the max. metering roll rate.

FIG. 10

CONNECTING AUXILIARY CONVEYORS:

The maximum size auxiliary conveyor motors which can be powered directly from the power terminals of the dryer are 7.5 HP 1 phase, 10 HP 3 Phase for the 410C, 510C and 10 HP 1 Phase & 3 Phase for the 600C, 610C and 710C. See appropriate power circuit wiring diagram for terminal connection numbers.

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

1. Motors must be powered from a source outside of the dryer with the use of a separate contactor and overload protection device for each motor for 110V coil operation.
2. For automatic operation with auxiliary loading, connect one lead to the top of the load contactor wire yellow number 3. Connect the other led to the grounding lug.
3. For automatic operation with auxiliary unloading, connect one lead to the top of the unload contactor wire orange number 13. Connect the other led to the grounding lug.
4. When conveyor motors are powered from an external source and are connected for automatic type operation, their overload protective switches should be connected in series and then connected into the dryer safety circuit. For recommended connections, refer to motor overload protection connections shown within the SAFERY CIRCUIT wiring diagram.

5. WET BIN ASSEMBLY

The following instructions, if followed in the sequence given, will simplify field erection of wet bin and prevent backtracking that may be caused if not observed. Also refer to (Fig. 11) on page 18.

1. Check to see that all parts listed on packing list are inside dryer.
2. Remove wet bin side shipping brackets.
3. Take up turnbuckles uniformly to cause auger housing assembly to set up in position.

   NOTE: During initial stages of set up, make sure all four corners pick-up uniformly. Free by hand assist or prying, if required.

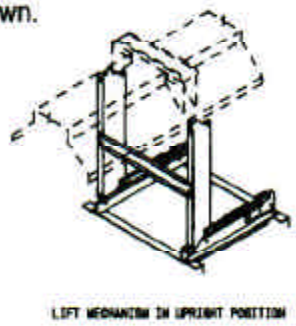
4. The following parts; belt guard spacer, end tie channel and top angle bracket are attached with bolts that install from inside the wet bin and must be in place prior to folding up sides.

   NOTE: Secure belt guard spacer to front end of wet bin with bolt, washer, nut and tighten fully. To add belt shield later, sandwich between two additional wachers and add second nut.

5. Fold up left hand side of wet bin and add wet bin side section adjacent to motor.
6. Fold up right hand side of wet bin and install screws loosely.
7. Tighten all screws and bolts.

   NOTE: Take care not to over-tighten and strip threads on self-tapping screws.

8. Loosen motor from shipping position and arrange tightener bar, as shown.
9. Install sheaves, properly align belt and secure sheaves (with keys) in position. Adjust belt tension and secure tightener.
10. Attach belt guard as described in step 4.
11. Attach fill hopper assembly as shown.



LIFT MECHANISM IN UPRIGHT POSITION

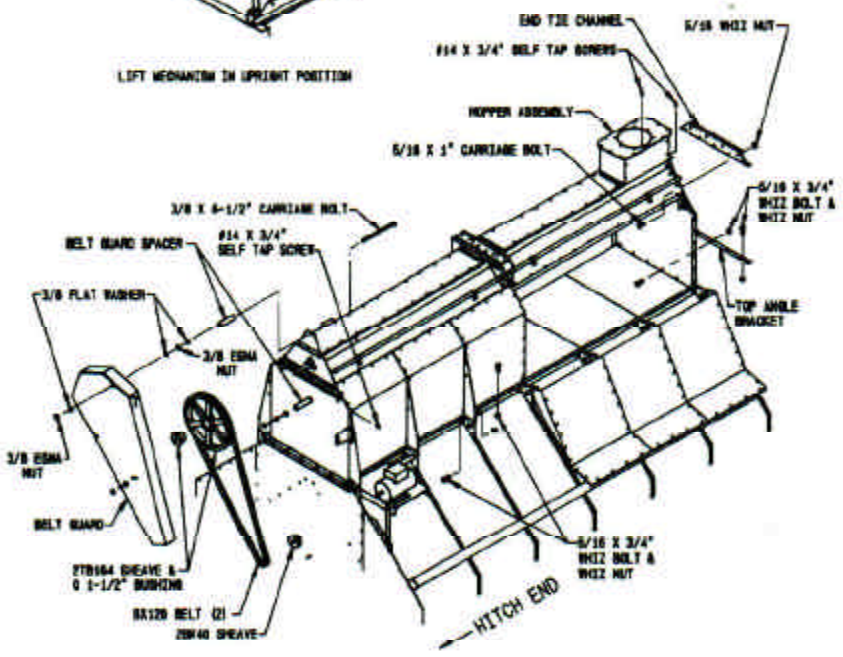
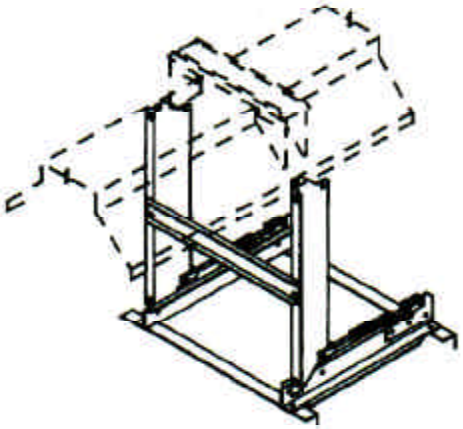
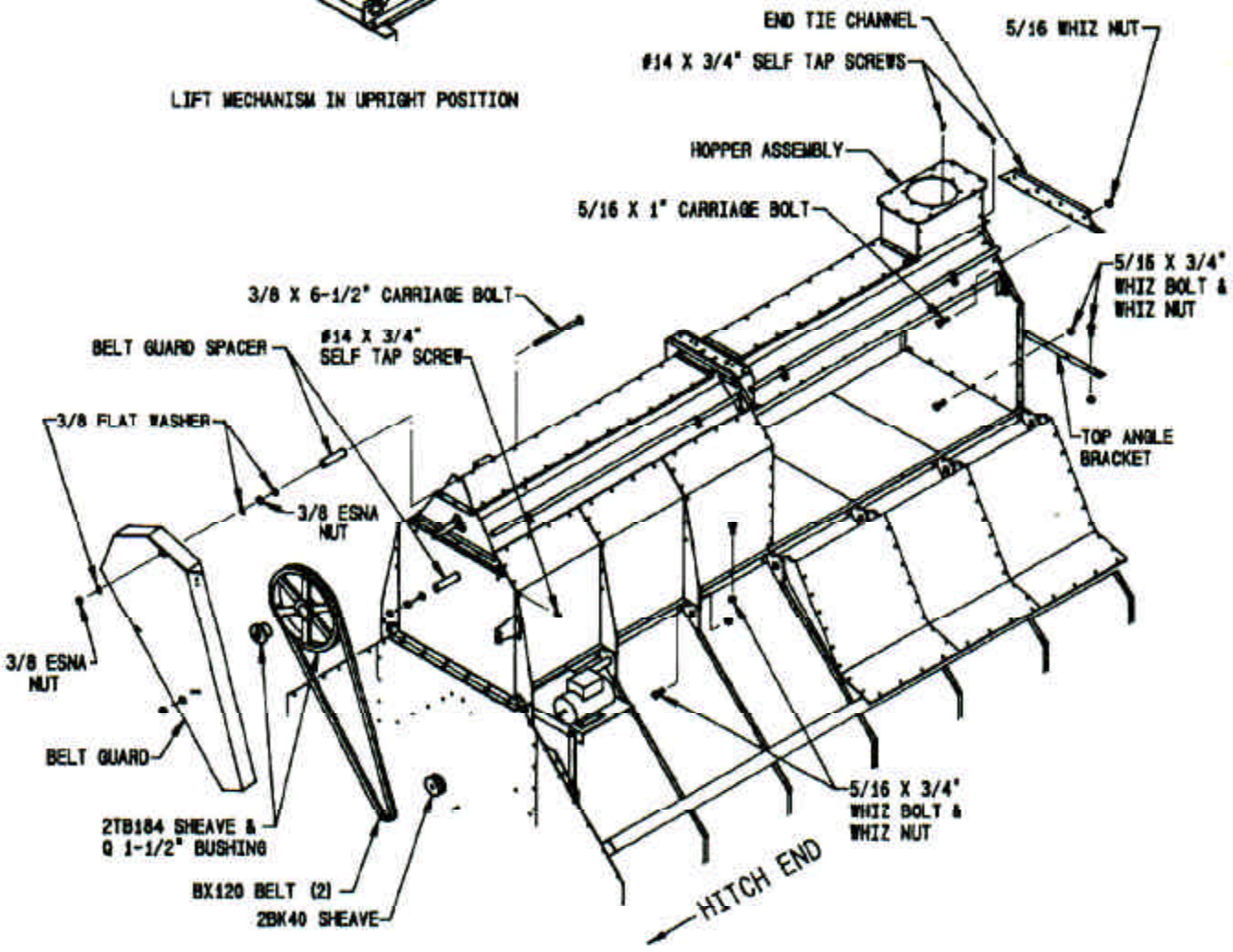


Fig. 11



LIFT MECHANISM IN UPRIGHT POSITION



6. ELECTRICAL POWER SUPPLY

POWER SUPPLY:
An adequate power supply and proper wiring supply are important factors for maximum performance and long life of the dryer. Electrical service must be adequate size to prevent low voltage damage to motors and control circuits. Power supply for 1-phase models must include a neutral wire.

MACHINE TO EARTH GROUND:

It is very important that a MACHINE TO EARTH GROUND ROD be installed at the dryer. (Fig. 8) This is true even if there is a ground at the pole 15 feet away. This ground needs to be as close to the dryer as possible, but no more that 8 feet away. The GROUND ROD should be connected to the dryer control panel with, at least a #6 solid bare Ground Wire, or in accordance with local requirements. The Machine to Earth Ground provides additional safety in case of any short. It also provides the grounding necessary for long life, of the solid state circuit boards used in control circuits, the SCR drive, and the fenwal ignition system.

PROPER INSTALLATION OF GROUND ROD:
It is **not recommended** that the rod be driven into dry ground. The proper way to install a Ground Rod is to do the following:

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 jabing 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 installing the rod gives it a 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.
7. Ground wire must not have any breaks or splices. Insulated wire is not recommended for grounding applications.

POWER SUPPLY DISCONNECT:
All dryers in this model series are equipped with a power disconnect switch in the Control Box to permit total power shut-down before opening dead front, as required for inspection and service. The power disconnect switch is located on the door of the dryer Control Box for quick shut-down.

TRANSFORMERS WIRING VOLTAGE DROP:
Contact the service representative of the power supplier, to advise them of the additional load to 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 be capable of providing adequate motor starting and operating voltage. Voltage drop during motor starting should not exceed 14% of normal voltage, and running voltage (after motor is at full speed) should be within 8% of normal voltage.

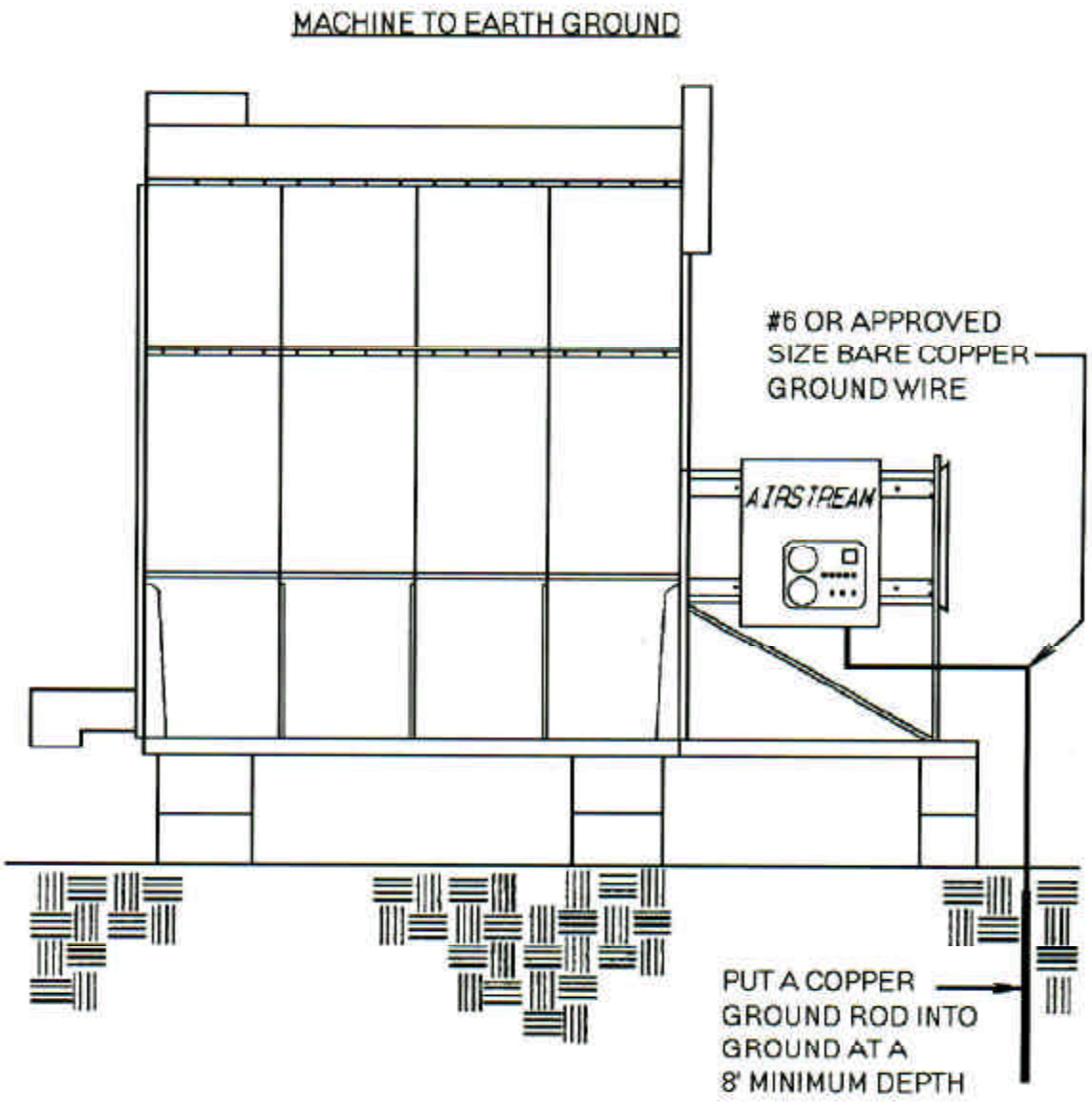


FIG. 8 EARTH GROUND

OVERLOAD RELAYS

STANDARD EQUIPMENT:
The dryer is equipped with a complete set of current overload relay with heater ratings as shown by (Fig. 9a-e). The safety conrtol circuit of the dryer includes 5 current overload relays, plus a thermal overload protector in each fan motor winding.

OVERLOAD RELAYS:
Overload relays are adjustable from 85% to 115% of normal load in amperes, as shown by the overload relay heater specifications of (Fig. 9a-e), by an adjustable knob in each relay. Dryers are shipped with overload relay, for auxiliary conveyors (adjacent to top and bottom auger contactors) to operate 5 HP, 1 phase, or 10 HP, 3 phase motors for 525C and 7.5 HP 1 phase or 10 HP 3 phase for the 425C. And 10 HP 1 and 3 phase for 625C; if different motors are used, the heater elements must be changed to provide adequate motor overload protection.

AUXILILARY CONVEYOR OVERLOAD RELAYS:
Overload relays are provided for up to 5HP motor for the conveyors. It is necessary to provide the heater elements to provide running load protection for the motors. See (Fig. 9a-e) for heater element specification.

NOTE: The heater elements are not provided with the relays for the auxiliary conveyors.

MANUAL RESET:
All current overload relays are manually reset, except for the automatic reset locked rotor overload and the thermal protector on the single phase fan motors. If an electrical overload occurs, the Control Box must be opened to push the reset lever.

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

ELECTRICAL LOAD:
(Fig. 9a-e) indicates the electrical load in horsepower and full load current, for the motor on the dryer, and for auxiliary loading and take-away conveyors which can be directly connected to the power circuits in the dryer Control Panel.

ELECTRICAL LOAD, OVERLOAD RELAYS, & CIRCUIT BREAKERS

MODEL 410C DRYER	VOLTAGE	FAN		TOP AUGER	BOTTOM AUGER	CONVEYOR (1) MOTORS
HORSEPOWER	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	5-7 5-7 5-7	10-15 10-15 10-15	5 5 5	5 5 5	7.5 (TWO) 10 (TWO) 10 (TWO)
FULL LOAD CURRENT AMPS/ MOTOR	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	35 15 7.5	58 34 17	24 13.0 6.5	24 13.0 6.5	31 26 13
MAX. RUNNING LOAD DRYER ONLY-AMPS	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	141 75 37.5				
MAX. RUNNING LOAD (1) WITH AUX. CONV.-AMPS	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	203 127 63.5				
RECOMMENDED SERVICE EQUIP. RATING-AMPS	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	225 150 100				
CONTROL PANEL OVERLOAD RELAY HEATER ELEMENT SPEC.	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	C303B C214B C125B	F658B C330B C190B	C228B C463A C867A	C228B C463A C867A	C303B C250B C137B
CONTROL PANEL CIRCUIT BREAKER RATING AMPS	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	60 50 100 (one breaker)	100 50	100 60	100 60	(2) (2)

FIG. 9a

MODEL 510C DRYER	VOLTAGE	FAN		TOP AUGER	BOTTOM AUGER	CONVEYOR (1) MOTORS
HORSEPOWER	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	10-12 10 10	10-16 15 15	5 5 5	5 5 5	7.5 10 10
FULL LOAD CURRENT AMPS/ MOTOR	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	40 28 14	74 40 20	24 13.0 6.5	24 13.0 6.5	31 26 13
MAX. RUNNING LOAD DRYER ONLY-AMPS	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	162 106 53				
MAX. RUNNING LOAD (1) WITH AUX. CONV.-AMPS	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	224 158 79				
RECOMMENDED SERVICE EQUIP. RATING-AMPS	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	250 200 100				
CONTROL PANEL OVERLOAD RELAY HEATER ELEMENT SPEC.	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	F614B C303B C163B	F848B C440B C250B	C228B C163B C867A	C228B C163B C867A	C228B C228B C137B
CONTROL PANEL CIRCUIT BREAKER RATING-AMPS	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	60 50 100 (one breaker)	100 50	100 60	100 60	(2) (2)

FIG. 9b

MODEL 600C DRYER	VOLTAGE	FAN		TOP AUGER	BOTTOM AUGER	CONVEYOR (1) MOTORS
HORSEPOWER	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	10-12 10 10	10-16 15 15	7.5 7.5 7.5	7.5 7.5 7.5	10(TWO) 10(TWO) 10(TWO)
FULL LOAD CURRENT AMPS/ MOTOR	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	40 28 14	74 40 20	31 20 10	31 20 10	40 26 13
MAX. RUNNING LOAD DRYER ONLY-AMPS	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	176 120 60				
MAX. RUNNING LOAD (1) WITH AUX. CONV.-AMPS	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	256 172 86				
RECOMMENDED SERVICE EQUIP. RATING-AMPS	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	300 225 150				
CONTROL PANEL OVERLOAD RELAY HEATER ELEMENT SPEC.	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	F614B C303B C163B	F848B C440B C250B	C303B C228B C137B	C303B C228B C137B	C330B C303B C163B
CONTROL PANEL CIRCUIT BREADER RATING-AMPS	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440V.	60 50 100 (one breaker)	100 50	100 60	100 60	(2) (2)

(1) The motor currnt and maximum dryer running loads shown are based upon the listed HP auxiliary conveyor motors. The maximum size motor which can be powered directly through the dryer control box is listed for each dryer. All larger than maximum auxiliary conveyor motors require separate contactors and overload protectors with coil circuits connected to the dryer for automatic operation.

IMPORTANT: ALL STANDARD MODEL DRYERS ARE FACTORY EQUIPPED WITHOUT OVERLOAD RELAY HEATER ELEMENTS SIZED FOR LISTED HP AUXILIARY MOTORS. Heater elements must be matched to the actual horsepower motors used.

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

FIG. 9c

MODEL 610C DRYER	VOLTAGE	FAN		TOP AUGER	BOTTOM AUGER	CONVEYOR (1) MOTORS
HORSEPOWER	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	10-12 15 15	10-16 15 15	7.5 7.5 7.5	7.5 7.5 7.5	10 10 10
FULL LOAD CURRENT AMPS/ MOTOR	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	48 40 20	74 40 20	31 20 10	31 20 10	40 26 13
MAX. RUNNING LOAD DRYER ONLY-AMPS	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	184 120 60				
MAX. RUNNING LOAD (1) WITH AUX. CONV.-AMPS	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	264 172 86				
RECOMMENDED SERVICE EQUIP. RATING-AMPS	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	300 225 150				
CONTROL PANEL OVERLOAD RELAY HEATER ELEMENT SPEC.	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	F614B C440B C250B	F848B C440B C250B	C303B C228B C137B	C303B C228B C137B	C330B C303B C163B
CONTROL PANEL CIRCUIT BREADER RATING-AMPS	1-PH.-230 V. 3-PH.-220 V. 3-PH.-440 V.	60 50 100 (one breaker)	100 50	100 60	100 60	(2) (2)

FIG. 9d

MODEL 710C DRYER	VOLTAGE	FAN		TOP AUGER	BOTTOM AUGER	CONVEYOR (1) MOTORS
HORSEPOWER	3-PH.-220 V. 3-PH.-440 V.	15 15	25 25	10 10	10 10	10(TWO) 10(TWO)
FULL LOAD CURRENT AMPS/ MOTOR	3-PH.-220 V. 3-PH.-440 V.	40 20	64 32	26 13	26 13	26 13
MAX. RUNNING LOAD DRYER ONLY-AMPS	3-PH.-220 V. 3-PH.-440 V.	132 66				
MAX. RUNNING LOAD (1) WITH AUX. CONV.-AMPS	3-PH.-220 V. 3-PH.-440 V.	184 92				
RECOMMENDED SERVICE EQUIP. RATING-AMPS	3-PH.-220 V. 3-PH.-440 V.	250 150				
CONTROL PANEL OVERLOAD RELAY HEATER ELEMENT SPEC.	3-PH.-220 V. 3-PH.-440 V.	C440B C250B	F656B C330B	C303B C163B	C303B C163B	C303B C163B
CONTROL PANEL CIRCUIT BREAKER RATING-AMPS	3-PH.-220 V. 3-PH.-440V.	50 125 (one breaker)		60	60	(2)

(1) The motor currnt and maximum dryer running loads shown are based upon the listed HP auxiliary conveyor motors. The maximum size motor which can be powered directly through the dryer control box is listed for each dryer. All larger than maximum auxiliary conveyor motors require separate contactors and overload protectors with coil circuts connected to the dryer for automatic operation.

IMPORTANT: ALL STANDARD MODEL DRYERS ARE FACTORY EQUIPPED WITHOUT OVERLOAD RELAY HEATER ELEMENTS SIZED FOR LISTED HP AUXILIARY MOTORS. Heater elements muet be matched to the actual horsepower motors used.

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

FIG. 9e