



AUTOMATIC GRAIN DRYER

**Continuous Flow / Automatic Batch
QuadraTouch™ Dryer Control System**



OWNER'S OPERATION MANUAL

Sukup Manufacturing Company

1555 – 255th Street, Box 677

Sheffield, Iowa USA 50475

Phone: 641-892-4222

Fax: 641-892-4629

Website: www.sukup.com

E-mail: info@sukup.com

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Congratulations on your purchase of a new Sukup Automatic Dryer! We're pleased to add your name to the growing list of Sukup Dryer customers. Your Sukup Automatic Dryer offers the most advanced automatic operation of any dryer on today's market. You can feel confident that you have purchased your Dryer from a company committed to serving farmers for years to come. Sukup Manufacturing is one of the few family-owned companies in an era of corporate mergers. Our family has more than 45 years of grain drying and handling experience and an excellent reputation for standing behind our products - we appreciate your purchase. You can look forward to many years of superior performance from your Sukup Automatic Dryer!



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PO Box 677 Sheffield, IA USA 50475

Phone: 641-892-4222 Fax: 641-892-4629

E-mail: Info@sukup.com Visit us at: www.sukup.com

LIMITED DRYER WARRANTY

SUKUP MANUFACTURING CO. (Sukup) warrants to original retail purchaser that within time limits set forth, new equipment shall be free from defects in material and workmanship. A part will not be considered defective if it substantially fulfills performance specifications. Should any part prove defective within warranty period, part will be replaced or repaired without charge F.O.B. Sukup Manufacturing Co., Sheffield, Iowa USA or Distribution Centers - Arcola, Illinois; Aurora, Nebraska; Cameron, Missouri; Defiance, Ohio; Jonesboro, Arkansas; Watertown, South Dakota. To claim warranty, a copy of original invoice is required.

THE FOREGOING LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY, FITNESS OR PURPOSE AND OF ANY OTHER TYPE, WHETHER EXPRESS OR IMPLIED. Sukup neither assumes nor authorizes anyone to assume for it any other obligation or liability in connection with said part, and will not be liable for incidental or consequential damages. **THE REMEDIES STATED HEREIN SHALL BE THE EXCLUSIVE REMEDIES AVAILABLE UNDER THIS LIMITED WARRANTY.**

Sukup reserves the right to change specifications, add improvements or discontinue manufacture of any of its equipment without notice or obligation to purchasers of its equipment. This warranty gives you specific legal rights. You may also have other rights, which vary according to state or province.

WARRANTY EXCLUSIONS - Labor, transportation, shipping, or any cost related to a service call is not provided by Sukup. This Limited Warranty does not apply to damage resulting from misuse, neglect, normal wear, accident or improper installation or maintenance. **ITEMS NOT MANUFACTURED BY SUKUP** (e.g. tires, belts, motors) ARE COVERED UNDER WARRANTIES OF THEIR RESPECTIVE MANUFACTURERS AND ARE EXCLUDED FROM COVERAGE UNDER THE SUKUP WARRANTY.

GRAIN DRYER WARRANTY PERIOD - Sukup warrants continuous flow grain dryers (single module and stacked units) for a period of two years (24 months) from date of purchase.

An optional **THREE-YEAR LIMITED WARRANTY EXTENSION (COMP # TWARREXT)** may be purchased **only** at time of grain dryer purchase. This period of extended warranty begins on the twenty-fifth (25th) month after date of purchase, and continues through the sixtieth (60th) month from the date of purchase. Dryer parts found to be defective during this time period will be replaced or repaired, with the exception of motors (as excluded herein) or "wear parts" (any part worn by high usage, such as augers, bearings, burner components, moving parts, sensors, etc.). This extended limited warranty does not apply to labor, transportation, shipping, or any cost related to a service call.

HEATER CIRCUIT BOARD WARRANTY PERIOD - Sukup warrants heater circuit boards for three (3) years from date of purchase.

ELECTRIC MOTOR WARRANTY - The manufacturers of electric motors warranty their motors through authorized service centers. Contact motor manufacturer for nearest location. If motor warranty is refused by a service center based upon date of manufacture, use following procedure: Have motor repair shop fill out the warranty report form as if they were providing warranty service. State on the report the reason for refusal. Send report, motor nameplate, and proof of purchase date to Sukup. If electric motor warranty is not satisfactorily handled by motor service center, contact Sukup for assistance. Warranty may also be claimed by returning motor to Sukup Manufacturing Co. or Distribution Centers with prior authorization. **NOTE:** Sukup will not be responsible for unauthorized motor replacement or repair.

WARRANTY CERTIFICATION - Warranty registration card should be completed and returned to Sukup Dryer Service Department within two weeks of product delivery to certify warranty coverage.

UNAPPROVED PARTS OR MODIFICATION - All obligations of Sukup under this warranty are terminated if: unapproved parts are used, or if equipment is modified or altered in any way not approved by Sukup.

Purchaser must adhere to applicable safety regulations and federal, state and local codes in the location, installation, and use of this product. Sukup assumes no responsibility for property damages or personal injuries.

Safety Section

General Safety Practices



This symbol means “ATTENTION! Be Alert! Your personal safety is involved.” The safety alert symbol draws your attention to important instructions concerning your personal safety. Read the messages carefully to avoid possible injury or death.



DANGER indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.



WARNING indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed.



CAUTION indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury.



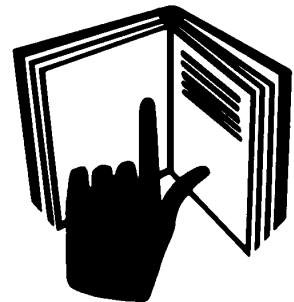
NOTICE alerts you to practices unrelated to personal injury, such as messages related to property damage.

FOLLOW MANUAL & SAFETY DECAL MESSAGES

Observe safe operating practices. Carefully read this manual and all safety decals on your equipment. Safety decals must be kept in good condition. Replace missing or damaged safety decals free of charge by contacting Sukup Manufacturing Co. by mail at PO Box 677, Sheffield, Iowa 50475; by phone at 641-892-4222; or by e-mail at info@sukup.com.

Learn how to use controls and operate machine. Do not let anyone operate unit without thorough training of basic operating and safety procedures.

Make no unauthorized modifications to machine. Modifications may endanger function and/or safety of unit. Keep unit well maintained according to the procedures in the maintenance section of the Operator's Manual.



EMERGENCIES - KNOW WHAT TO DO

Have emergency numbers and written directions to your location near your telephone in case of emergency. An area for emergency phone numbers to be recorded has been provided below.

Emergency ▪ Fire ▪ Police 9-1-1
Bin Rescue Team:
Local EMS Team: _____
911 Address of work site: _____
Directions to work site: _____ _____

Safety Section

TRANSPORT SAFETY WARNING: TRUCKER-TRANSPORTER IS TO PROVIDE APPROVED SAFETY CHAIN WHEN TOWING DRYER.



WARNING: Transporting this equipment on public roads requires precautionary measures in order to prevent serious injury or death. If road travel is required it is essential that all of the following procedures be adhered to:

- Read and understand operator's manual.
- Check and comply with state & local regulations.
- Use required emblems or lights.
- Travel at a reasonable and safe speed. Reduce speed and/or use lower gear on rough ground or slopes.
- Stop gradually.
- Have extended rear angle mirrors on vehicles.
- Signal & check behind you when turning.
- Use safety chain when towing dryer.
- Use break-away kit (available from Sukup Mfg Co - Computer #T4366).



WARNING: Check for other vehicles when turning. **(2/3 of roadway farm accidents occur while turning.)**

- Use mirrors
- Be sure to have clear visibility
- Use signal lights



WARNING: Do not transport unit if visibility is impaired.

These conditions may include, but are not limited to:

- hills
- poor weather
- nighttime driving

Failure to heed these warnings may result in serious injury or death. Use good judgment when transporting. Maintain complete control of unit at all times. Comply with state and local regulations. Read safety procedures before moving units. Always strive to prevent accidents! Watch out for other vehicles.



WARNING: TO PREVENT EXPLOSION OR FIRE



- Carefully review operator's manual.
 - Keep dryer clean inside and out, as fines may cause a fire.
 - Check for gas leaks, (spray soapy solution on piping and joints.)
 - Run fan at least a half minute before starting heater.
 - NEVER start heater if you smell gas or hear a hissing sound.
- NEVER run heater with inspection door open.

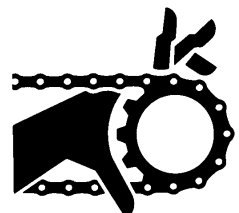
Failure to heed these warnings may cause serious injury or death.



WARNING: KEEP CLEAR OF ALL MOVING PARTS

Keep people (ESPECIALLY YOUTH) away from equipment, particularly during operation. Keep away from all moving parts. Entanglement can cause serious injury or death. Keep fan screen guards and all shields in place and in good working condition. Replacement screen guards and shields are available from Sukup Mfg. Co. at no charge.

Failure to follow the above precautions may cause serious injury or death.



Safety Section

To prevent serious injury or death to you or your family, it is essential that these safety decals be mounted on your dryer.

Check that all safety decals are in place according to the decal placement drawing and in good legible condition when dryer is installed.

IMPORTANT!! If suggested locations are not clearly visible, place safety decals in a more suitable area. Never cover up existing safety decals.

Make sure location for decal is free from grease, oil and dirt. Remove backing from decal and place in proper position. Replace missing or damaged safety decals or shields free of charge by contacting Sukup Manufacturing Co. by mail at PO Box 677, Sheffield, Iowa 50475; by phone at 641-892-4222; or by e-mail at info@sukup.com. Please specify computer number.

1. Decal L0281 - WARNING: To avoid serious injury or death.



2. Decal L02741 - DANGER: Keep away from any electrical lines, especially when moving unit.



3. Decal L0234 - DANGER: Do not allow rear door to close with someone inside; lock out power; do not bypass interlock switch.



4. Decal L0166 - WARNING: Guards & screens in place. Disconnect electricity. Check fan blade.



5. Decal L0271 - DANGER: Shield missing, do not operate.



6. Decal L0284 - WARNING: Keep away from all moving parts.



7. Decal L0285 - CAUTION: Not intended for use on public roads. If road travel is required:



Safety Section

8. Decal L02831 – WARNING: Lower and secure parking stands before unhitching unit.



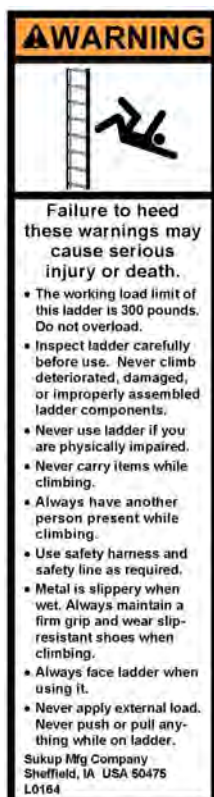
9. Decal L03061 - DANGER: Keep away when auger is running! Entanglement will cause serious injury or death!



10. Decal L0520 - CAUTION: Failure to keep unit clean may cause fire and serious injury or death.



11. Decal L0164 - WARNING: Ladder safety – falling from heights hazard. Overall precautions for ladder safety.



12. Decal L0512 – WARNING: Use safety chain when towing unit to eliminate detachment hazard.



13. Decal L0062 – DANGER: Never run fan without screen guard; Stay clear from front of fan; Follow correct procedure when installing fan blade.

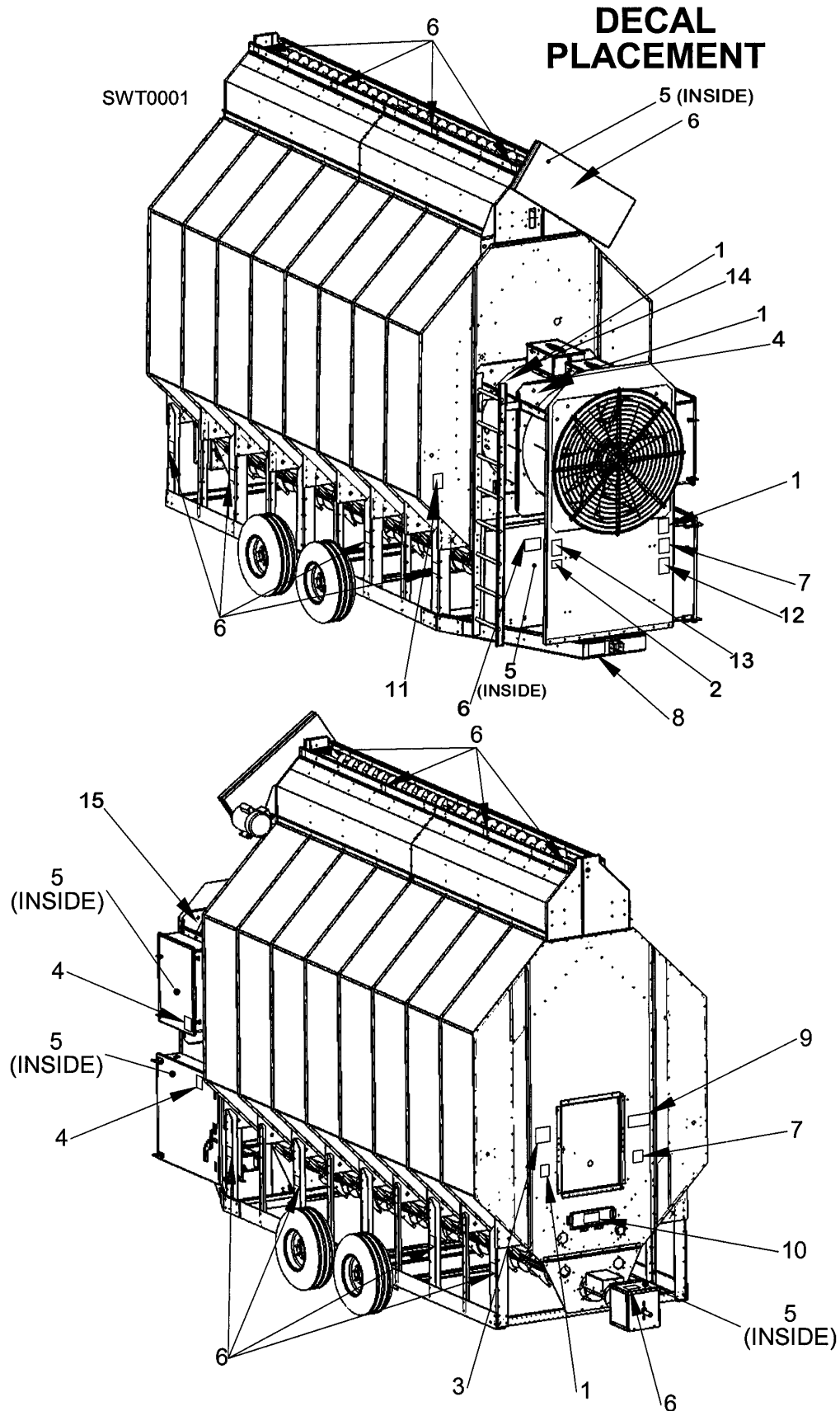


14. Decal L0165 - WARNING: Disconnect Electricity; Bleed gas; etc.



15. Decal L0204 - DANGER: Do not operate with service door removed.





Emergency Shutdown Locations

The power distribution box is located at the front left of the dryer. It contains all of the main power distribution components.

On the outside of the power distribution box, the front door has two latches mounted to it.

The door lock handle secures the door and can be locked with a key.

The main disconnect mechanism prevents the opening of the power box while power is present in the system.



Caution

Power is still present at the lower side of the main switch when the power box is open.

The picture at right shows the main disconnect in the "on" position, power is present in the system.

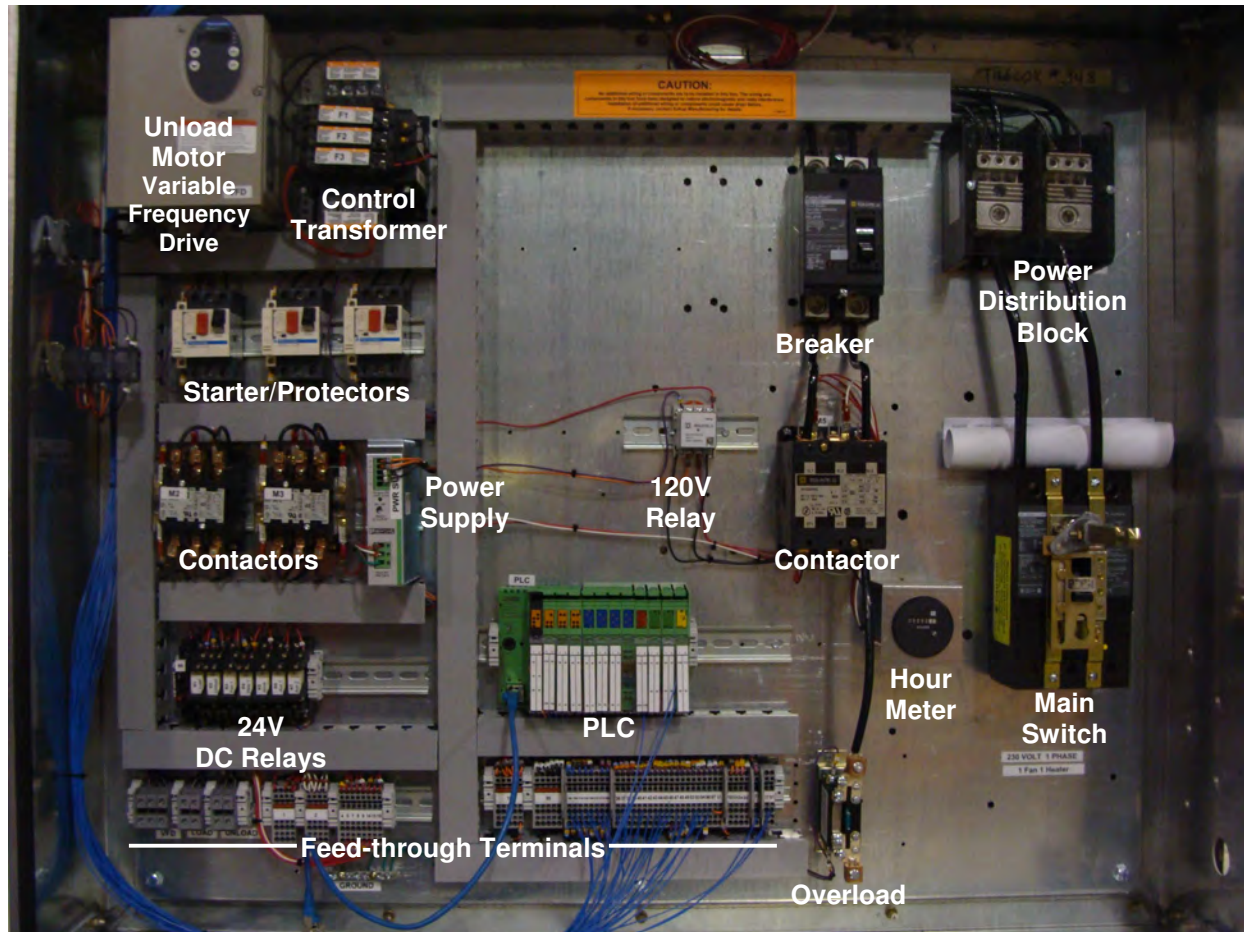
Located on the side of the power distribution box, is the Emergency Stop switch. During operation, the switch is pulled out and is illuminated in red. - Shown Below



Pressing the Emergency Stop Switch or switching the system control switch to the "OFF" position will shut down power to the PLC and the backup control system. Main power is still present inside the box.

Power Box Component Location

The picture below displays the power box and identifies all of the major components.



Important

During initial setup or after relocation of the dryer, it is highly recommended that ALL of the main power wiring connections be inspected for security and tight connections. The wires are tightened at the factory; however the connections should be checked after transport.

Note

All power boxes use 24VDC control voltage to minimize the amount of EM noise inside the box. AC/DC separation is key to reducing EMI inside the panel. When installing, make sure to practice good wire maintenance to assure quality operation.

Control Box Component Location

QuadraTouch™ Controller

The control box is now mounted away from the dryer and connected by industrial, direct bury Ethernet cable. This cable is available in 50', 100', 150', and 200' lengths (J8720-J8723). The panel needs its own, independent 100VAC – 240VAC power supply.



The main power switch is on the bottom, right-hand portion of the box. When switched “ON” the switch will illuminate to a green color. The panel will boot up in a very short time and connect with the PLC inside the power box.



To connect, main power must also be supplied to the dryer and the system control switch should be in the “COMPUTER” position.



By removing the screws on the bottom left and right-hand corners of the swing panel, the back of the panel becomes accessible.

After removing the screws, the panel may be lifted up to find the Compact Flash Type II card located on the rear of the panel. The door lifts up and swings back. All data logged during dryer operation is stored on this 1 GB compact flash card. Each QuadraTouch™ controller includes this card. Reference the software manual on accessing the CF card's memory.



Dryer Installation
Gas and Electric Hook-up

Initial gas hookups should only be performed by qualified gas service technicians in accordance with all applicable code requirements.

Initial electric hookups should only be performed by qualified electrical service technicians in accordance with all applicable code requirements.

Heater Operation

The heater will operate only when its corresponding fan is running. The user will control heater function in all manual/test, "Stabilization", and "Continuous Flow" modes. During "Initial Dry" mode, the heater(s) will automatically fire after the fan(s) has/have started.

Purge

After the heater is switched on, an automatic 20-30 second purge cycle commences. During this cycle, with the fan operating, any residual gas is cleared. The ignition board controls heater startup sequences. The ignition board is located in the heater control box.

Air Pressure Check

If operating in manual or automatic control, the dryer must be filled with grain. If without grain, insufficient air pressure will cause a dryer shutdown in 5 seconds due to a low static air pressure fault. If operating in the "Dry Fire" mode, the air pressure sensor is disabled. No gas is being supplied during the 20-30 second purge cycle due to the gas solenoids being closed.

Ignition

After the 20-30 second purge delay, the liquid and the vapor solenoids are opened and a 10-second ignition attempt occurs. ([See picture on page 19](#)).

Operation

The red power light on the heater box's right side should be on at this time. If a flame is not sensed within 45 seconds (20-30 second purge delay plus the 10 second ignition attempt), the dryer will shutdown indicating that no flame was sensed or a flame timeout occurred.

Plenum Temperature Adjustment Liquid Propane systems

To adjust the plenum temperature using the QuadraTouch™ controller, go to the settings menu and choose plenum temperature. Refer to the Software manual for further instruction.

Heater Housing Over Temp

The heater housing high limit switch detects excessive temperatures inside the heater housing. It is rated to open above 200 °F. If this trips, the QuadraTouch™ will display a Housing Over-temp fault on the screen.

The heater housing high limit switch must be manually reset. The reset switch, located in the heater box, is shown right.



Caution

High voltage in heater box! Care must be taken when resetting the switch.

Vaporizer Over-Temp

The heater's vaporizer serves to convert the liquid propane into vapor propane by using heat from the burner. A vapor high limit fault will shut the dryer down if the vapor fault exceeds 140 °F. The dryer will lock out the system and display a Vapor Over-temp alarm. The limit switch is self-resetting once the vapor temperature drops. The QuadraTouch™ controller will display the fault and will require the operator to acknowledge the fault by pressing Fault Status and then the "Reset" button.

The vaporizer should be adjusted before operating. Normally, the vaporizer outlet hose should be very warm to the touch but not so hot that it can't be held. To adjust the vaporizer, refer to the next section, [Dry Fire / Test](#).



Caution

Vaporizer may be hot, use extreme caution when handling.

Heater

Heater Operation at Low Plenum Temperatures

Operating the dryer at low temperatures (approximately less than 80° above ambient temperature) requires changing parts on the heater. A symptom of operating at low temperatures with original equipment is a rumbling sound. This symptom occurs when the gas pressure is low and the flame is burning back into the port cup. **Dryers are shipped with Intermediate port cups.** Contact your Sukup dealer to purchase additional equipment to reach lower temperatures (see chart below).

Caution

Operating the dryer with too low of gas pressure will damage the port cup. Contact dealer if symptoms occur.

Heater Orifice and Port Cup Configurations

Liquid Propane (LP)	44" 40HP	44" 30HP	44" 15HP	38" 10,15,20HP	28" 15HP	28" 20HP
High-Temp Orifice	D71125 (25/64")	D71113 (23/64")	D71112 (19/64")	D71112 (19/64")	D71110 (13/64")	D7106 (17/64")
High-Temp Port Cup	D4044 (3/4")	D4044 (3/4")	D4044 (3/4")	D4044 (3/4")	D4027 (9/16")	D4027 (9/16")
Flame Deflector (T16204)	Yes	Yes	Yes	Yes	No	No
Intermediate Orifice	D71125 (25/64")	D71113 (23/64")	D71112 (19/64")	D71112 (19/64")	N/A	N/A
Intermediate Port Cup	D40443 (9/16")	D40443 (9/16")	D40443 (9/16")	D40443 (9/16")	N/A	N/A
Flame Deflector (T16204)	Optional	Optional	Optional	Optional	N/A	N/A
Low-Temp Orifice	D71112 (19/64")	D71112 (19/64")	D71110 (13/64")	D71110 (13/64")	D7125 (11/64")	D7125 (11/64")
Low-Temp Port Cup	D4041 (3/8")	D4041 (3/8")	D4041 (3/8")	D4041 (3/8")	D4025 (3/8")	D4025 (3/8")
Flame Deflector	No	No	No	No	No	No

Natural Gas (NG)	44" 40HP	44" 30HP	44" 15HP	38" 10,15,20HP	28" 15HP	28" 20HP
High-Temp Orifice	D71128 (5/8")	D71127 (9/16")	D71124 (1/2")	D71124 (1/2")	D71125 (25/64")	D71125 (25/64")
High-Temp Port Cup	D4044 (3/4")	D4044 (3/4")	D4044 (3/4")	D4044 (3/4")	D4027 (9/16")	D4027 (9/16")
Flame Deflector	No	No	No	No	No	No
Intermediate Orifice	D71128 (5/8")	D71127 (9/16")	D71124 (1/2")	D71124 (1/2")	N/A	N/A
Intermediate Port Cup	D40443 (9/16")	D40443 (9/16")	D40443 (9/16")	D40443 (9/16")	N/A	N/A
Flame Deflector	No	No	No	No	N/A	N/A
Low-Temp Orifice	D71129 (7/16")	D71129 (7/16")	D71131 (23/64")	D71131 (23/64")	D7112 (19/64")	D7112 (19/64")
Low-Temp Port Cup	D4041 (3/8")	D4041 (3/8")	D4041 (3/8")	D4041 (3/8")	D4025 (3/8")	D4025 (3/8")
Flame Deflector	No	No	No	No	No	No

High-Temp = Approx. 80-180°F Rise Above Ambient Air Temp

Intermediate = Approx. 60-160°F Rise Above Ambient Air Temp

Low-Temp = Approx. 40-80°F Rise Above Ambient Air Temp

Dry Fire / Test
Introduction

The “Dry Fire” mode of operation enables the operator a means of running the dryer when there is no grain. This provides a great way of testing the dryer before seasonal operation.

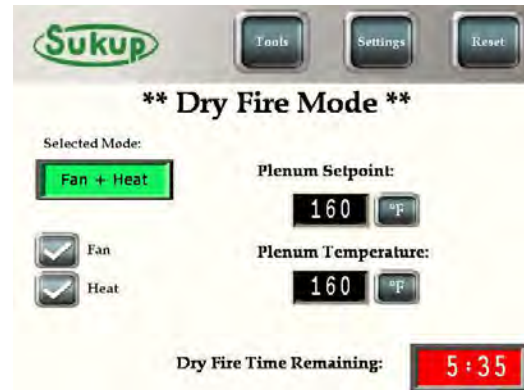
To operate the dryer in “Dry Fire/Test” mode, ensure the red emergency stop button is pulled out and main power is ON. The emergency stop button should illuminate red, indicating control power is available. In addition to the main power switch and the emergency stop button, there is a System Control Switch. This switch should be turned to “COMPUTER” when using the QuadraTouch™ controller. It will illuminate green when in the “Manual” or “Computer” position.

**Caution**

While the dryer is running, excessive audible noise is present. Hearing protection is strongly recommended.

Dry Fire / Test

To access the Dry Fire / Test mode, touch “Tools” from the main screen and select “Dry Fire / Test”. The following screens will come up:



Fan Only

Selecting “COOL” at the prompt will energize the fan(s) only. The static air pressure switch is disabled during this test. All other monitored safeties are operational at this time.

Fan and Heater

Selecting “HEAT” will apply power to the fan and heater. First the fan will come on, followed by the heater after a 20-30 second delay. The static air pressure switch will be ignored, but the flame sensor will still be active.

Selecting “COOL” or “HEAT” will commence a 10 minute timer countdown followed by the fan and if selected, the heater startup. At the end of the 10-minute period, the fan and heater will turn off automatically giving the option of returning to the main menu. The heater(s) may not be started independent of the fan(s) being started.

Note:

For multiple fan dryers, there will be a “COOL” and “HEAT” option for each fan/burner. There is a 5 second delay between fan startups. They will start top to bottom.

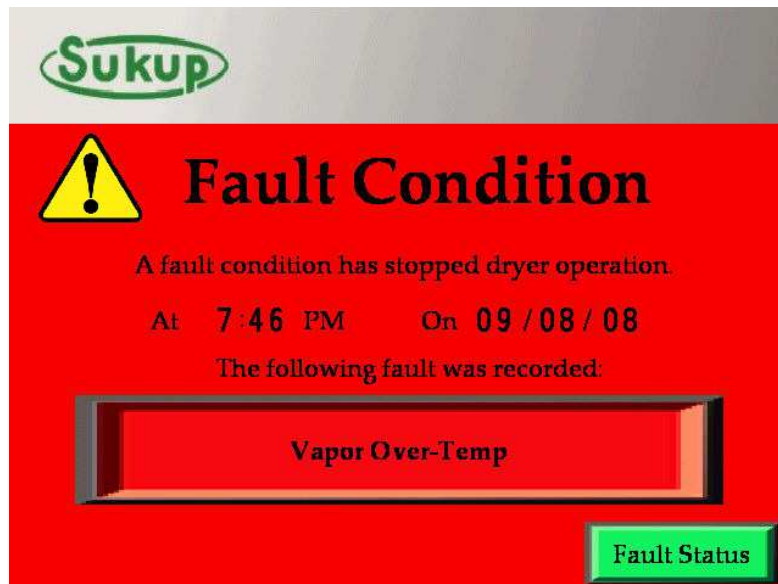
Vaporizer Coil Adjustment (LP Models Only, Not Applicable to Natural Gas)**Adjusting the Heater: Vaporizer Coil****Caution**

If vaporizer is not adjusted correctly, piping could be hot!

Selecting the Dry Fire / Test Mode is required to operate the dryer's fan and heater when there is no grain in the dryer. After the dryer has been allowed to run and the plenum temperature has stabilized, the vaporizer outlet (top) should be warm but not hot to the touch. If the vapor side of the pipe train is hot, or if the dryer has shut down due to a "VAPOR OVERTEMP" alarm. The vaporizer may need to be adjusted out (away from the flame). To adjust the vaporizer loosen the 2 pivot bolts (1 top, 1 bottom) of the vaporizer adjustment bracket and then pivot the vaporizer either in or out of the flame as necessary to regulate the temperature at the vaporizer outlet. The U-Bolts mounting the vaporizer to the adjustment bracket can also be loosened and vaporizer can be moved in and out to adjust. Viewing hole is present to watch vaporizer adjustment.



In the event the exact opposite is happening and the vaporizer is freezing up, loosen the vaporizer as described above and move it toward the flame instead of away from it.



Maintenance and Service

Preventative

Performing preventative maintenance on your dryer is very important and can help to ensure that the dryer will perform well throughout the drying season. The following guidelines are the minimum recommended procedures to be performed.

When performing maintenance and using the ladder attached to the dryer, make sure the ladder is dry before climbing. Ladder may be slippery when wet.

Important

See Automatic Dryer Parts Assemblies Manual for part numbers.

Caution

All bolts used to keep enclosures locked **MUST** be tightened beyond hand removal after opening to prevent undesired access.

Prior to Drying season

*Plan well in advance in case repairs or parts are needed!!



Warning

Lock out electrical power before removing any safety shields

Physical Inspection

1. Remove fan inlet screens. Check for foreign material on fan blade. Check that the fan rotates freely and that all blade tip clearances are the same.
2. Check ventilation openings in motor for any blockage. Pay close attention to inside of fan hub. Reinstall fan inlet screens.



Warning

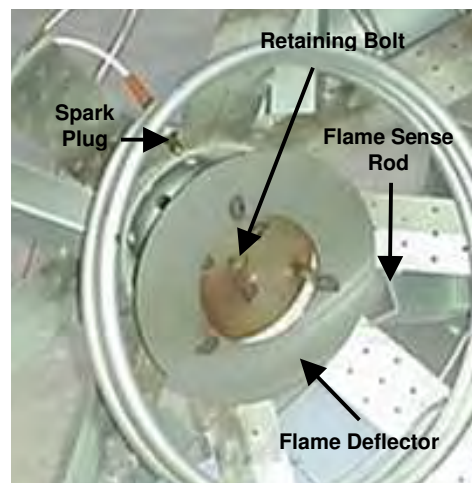
NEVER run fan without screen guard securely attached to fan housing!

3. Check wiring of fan and heater. Look for loose connections, bare wires or rodent damage. Be sure to check ignition wire and flame sensor wire for damage or short to ground.

4. Examine the flame sense rod (J5747) for cracked porcelain insulation and verify it is not touching any metal burner parts.

5. Examine spark plug (J5739) for proper gap and clean the electrodes if required. The gap should be 1/8". Spark plug and flame rod should be examined

periodically throughout the drying season.



6. Inspect the port cup for any accumulation of foreign material. Clean if required. Foreign material in the port cup will not burn out, and will impair burner operation, (Port cup located behind Flame Deflector).

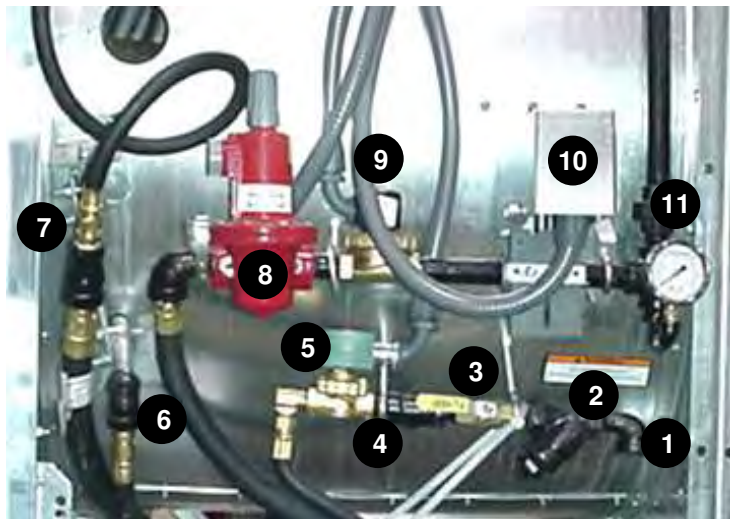
Inspect Vaporizer, Diffuser, and Flame deflector for damage and physical integrity.

Caution

One drop of Liquid propane will expand 270 times as it converts to Vapor. It is very dangerous to have the Vaporizer coil develop a leak during heater operation. Be sure to check the vaporizer coil yearly. The Vaporizer should be replaced every 5 years.

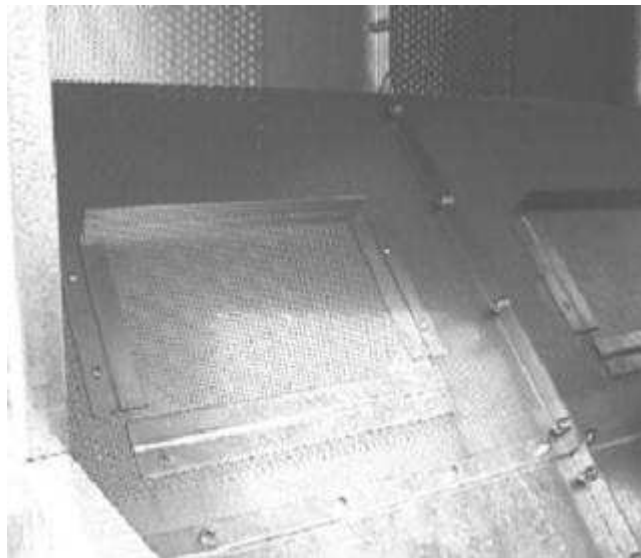
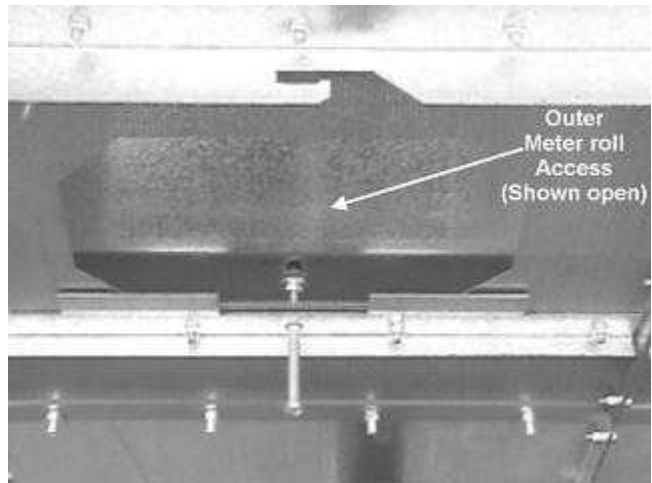
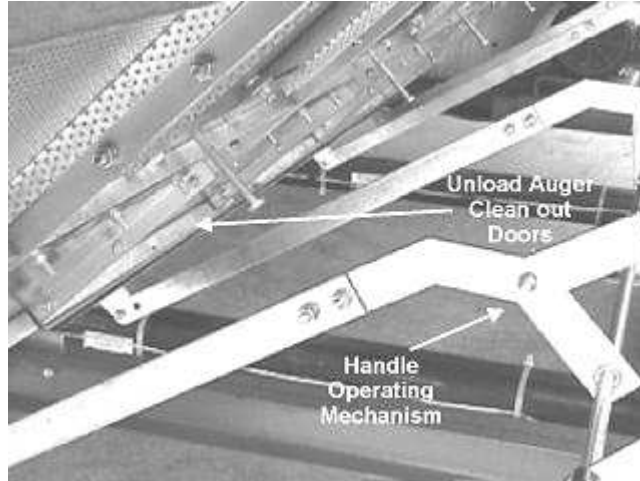
7. Remove and clean the gas strainer.
8. Inspect all valve train components for physical integrity.
9. Inspect all valve train connections for tightness.

Liquid Propane



1. NPT LP Inlet Fitting
2. LP Gas Strainer
3. Fuel Shutoff Valve
4. LP Over Pressure Relief
5. LP Solenoid
6. Vaporizer Inlet
7. Vaporizer Outlet and Vapor Over-Pressure Relief
8. Pressure Regulator
9. Vapor Solenoid
10. Electronic Modulating Valve
11. Vapor Pressure Gauge

10. Open inner and outer unload auger cleanout/access doors, and inner and outer column cleanout /access doors.



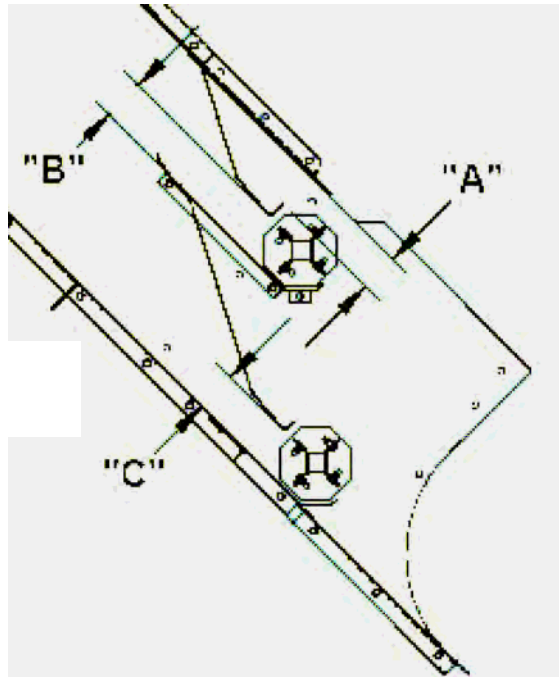


11. Remove any accumulation of fines, dirt or foreign material from the bottom auger trough area, meter rolls and lower column.
12. Inspect unload auger, 1 1/4" auger end flange bearings and wooden hanger bearing and flighting for damage and security.
13. Inspect meter rolls for damage and security.
14. Inspect meter roll wood bearings for damage, hole elongation (excessive play), and security.

Note

Auger end flange bearings are lifetime lubricated and do not require service lubrication.
Auger wood hanger bearings are oil-impregnated and do not require service lubrication.
Meter roll bearings are oil-impregnated wood and do not require service lubrication.

ANY ADJUSTMENTS MADE TO THESE FLOW GATES ARE THE RESPONSIBILITY OF THE PERSON MAKING THE ADJUSTMENTS. SUKUP MFG. COMPANY WILL NOT BE RESPONSIBLE FOR ANY CIRCUMSTANCE THAT MAY ARISE AS A RESULT OF THESE ADJUSTMENTS.



Dryer Length	Dimension (Column)	A	C
8'	Front 3	2"	1 3/4"
	Rear 1	1 3/4"	2"
10'	Front 4	2"	1 3/4"
	Rear 1	1 3/4"	2"
12'	Front 4	2"	1 3/4"
	Rear 2	1 3/4"	2"
16'	Front 6	2"	1 3/4"
	Rear 2	1 3/4"	2"
20'	Front 7	2"	1 3/4"
	Rear 3	1 3/4"	2"
24'	Front 9	2"	1 3/4"
	Rear 3	1 3/4"	2"
28'	Front 11	2"	1 3/4"
	Rear 3	1 3/4"	2"

Note

One full turn of adjustment bolt changes flow gate opening 1/16". Outer flow gate adjustment bolt turns clockwise (CW) to open outer flow gate. Inner flow gate adjustment bolt turns counter-clockwise (CCW) to open inner flow gate.

Caution

When inner flow gate adjustment bolt adjustment reaches 3 1/4" or outer flow gate bolt adjustment reaches 3 1/8" a free flow condition may occur. This is when the grain is able to flow freely over metering rolls.

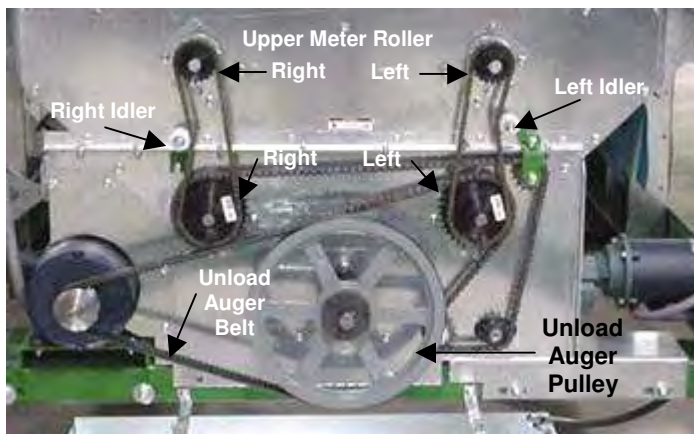
15. Reinstall all clean out / access doors. Close unload auger clean out doors.



Warning

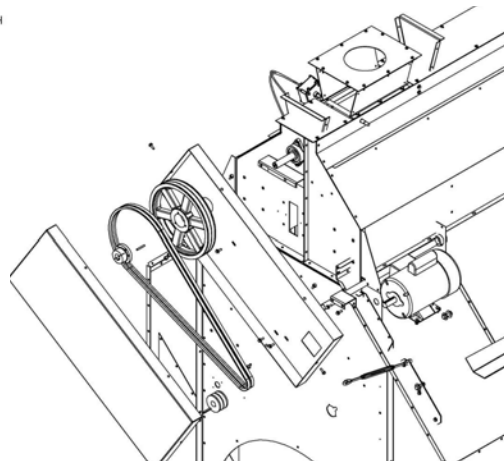
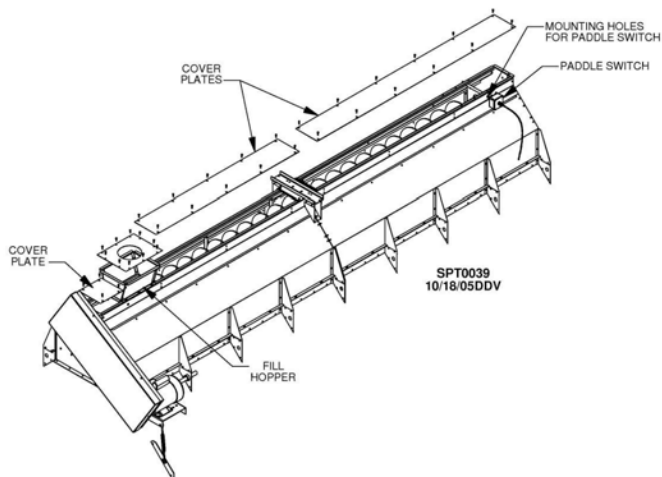
Ensure electrical power is locked out

16. Remove unload auger/meter roll drive train shield.
17. Refer to the pictures below when checking the unload auger / meter roll drive train.



18. Inspect unload auger pulleys and meter roll sprockets for wear or damage.

19. Inspect unload auger belts for cracks or breaks. Check belt tension for proper adjustment. For proper belt tension test, press on the belt mid-way between pulleys. Belt should deflect $\frac{5}{16}$ " to $\frac{3}{8}$ " with about 6 lbs. pressure on center of belt.
20. Inspect the chain belt links, and idler rolls for wear or damage.
21. Check that the idlers are adjusted properly to remove slack in drive chains.
22. Check that the reduction gearbox/AC motor is adjusted outward enough to remove slack on lower drive chain
23. Inspect reduction gearbox for damage and check fluid level.
24. Inspect unload auger motor, AC meter roll motor for damage and security.
25. Reinstall unload auger/ meter roll drive train shield.
26. Remove cover from load auger motor drive and covers from top of wet bin.
(see pictures below)



27. Inspect load auger drive pulleys for damage and security
28. Inspect load auger drive belts for cracks and breaks. Check auger drive belts for proper tension. To test for proper tension, press on each belt at the mid-way point between the two pulleys. Belt should deflect $\frac{1}{2}$ " with about 6 lbs. pressure on center of belt. Adjust as necessary.
29. Inspect load auger end flange bearings and mid wood hanger bearing for wear or damage.
30. Inspect flighting for wear or damage.

Note

The load auger bearings are lifetime lubricated and do not require service lubrication.

31. Reinstall all covers and shield.
32. Perform overall inspection of the rest of the dryer looking for loose, missing or damaged parts.

Operational Check

33. Perform pre-season operation test of dryer by performing the Dry Fire / Test mode. While the fan and heater are running, perform a leak test of the heater gas train using a soapy water solution and a squeeze bottle.

General Dryer Operation

This section briefly describes normal dryer operations. To follow the processes step by step, consult the Software Manual, which has its own tab in this manual.

Continuous Flow

Continuous Flow dryer operation requires creating a gradient of moisture from the top to the bottom of the dryer and is accomplished by three main functions; initial dry, stabilization, and continuous flow. Before the first drying operation is started, the user must enter the incoming moisture and the desired output moisture into the QuadraTouch™ controller. These moistures are used to calculate the time necessary to perform the initial dry at 160°F. No grain is unloaded from the dryer during initial dry mode. After initial dry is complete, the user will set the desired drying plenum temperatures and the controller calculates a meter roll speed corresponding to the plenum temperatures entered. The dryer then performs a stabilization routine. During stabilization, a gradient of moisture is established in the dryer by drying and unloading one full load of grain without adjusting the meter roll speed. After stabilization has completed, the dryer enters its continuous flow mode. During this operation, the dryer adjusts the meter roll speed for variances seen in the average output moisture compared to the desired output moisture. During continuous flow mode, the QuadraTouch™ controller plots a data point every minute of the average discharge moisture, plenum temperature, and meter roll speed. Each of these graphs can be accessed while the dryer is running. Refer to the Software Manual for further instruction.

When the wet bin is empty or the user is ready to dry the final batch of the season, the user simply enters the final dry function and follows the simple instructions listed on the screen of the control panel.

When continuing a drying operation after the dryer has run out of grain or has been shut down, it is often desirable to run with the settings as before the shut down. Therefore, quick methods of restarting the dryer have been developed to meet this demand. Restarting the dryer with or without stabilization, depending upon the particular situation, can be accomplished by following a short series of steps, laid out on the control panel screen during normal startup operation.

Automatic Batch

Automatic batch is a standard feature of the Sukup Automatic Grain Dryer. Batch operations enable operators to dry their grain in a manner that they have become accustomed to, enables them to dry extremely wet grain, allows single fan dryers to be operated in a heat cool manner, and makes it possible to dry grains which require a low plenum temperature.

Two controlling operations of automatic batch have been developed. The first method dries batches according to time entries. The operator enters set times into the control panel during which the dryer will heat, cool, and unload the grain.

During unload the dryer calculates the average moisture of each batch and prints it. The user can then adjust the time entries according to the desired output moisture, or have the control system automatically recalculate the time. The second method of operation requires purchasing the temperature control option. The operator enters a desired dry temperature value into the control panel. When the kernel temperature in the column reaches the set temperature, the dryer proceeds to cool the grain, if necessary, and then unload the grain. The set variables may be changed to the operator's choosing at any time during the batch operation (the new settings take effect the next batch).

Grain Transfer

Increasingly, operators require the dryer to transfer grain through it to reach their storage facilities. Thus, the grain transfer has been developed to simplify this process. The control panel display, steps the user through a simple process to begin and end the procedure through normal startup operation.

Manual

Manual operation serves many purposes. When operators want complete control of their dryer, manual operation fulfills this need. The Sukup QuadraTouch™ controller incorporates a full manual control into its operation. By pressing "Tools" from the main screen, the user can select "Manual Operation" to run the dryer in a manner they choose.

Also incorporated into the dryer is a completely independent, redundant control set, allowing the user to operate the dryer while the dealer meets any necessary service demands. Manual operation is a simple procedure of manually turning on fans, heaters, loads, and unloads. The dryer automatically loads the dryer during manual operation while the user has control of the meter roll speeds.

Grain Dryer Control System Menus

Quick Reference Guide QuadraTouch™ Controller

!!!! SPECIAL NOTE !!!!

READ THE SOFTWARE MANUAL PRIOR TO DRYER OPERATION

The Software Manual has its own tab in this manual.



Located to the left is the main screen that appears after a successful connection to the PLC located inside the power box. The date and time will be shown below the “System Ready” text.

Pressing the “Start” button will bring up the main four modes of operation (refer to the previous section). The “Tools” menu will give the user options on system operation and diagnostics. The “Settings” menu will allow the user to edit system set-points. Finally the “Reset” key will shut everything down and return the user to the main screen.



The menu to the left shows the four main modes of operation. Each mode can be easily accessed by simply touching the button, and the program will guide the user through each setting.

Select “Final Dry” mode when the dryer is not completely full of grain and there is no more grain to be loaded. The static air pressure switch will be ignored during this mode. Refer to the software manual for further information.

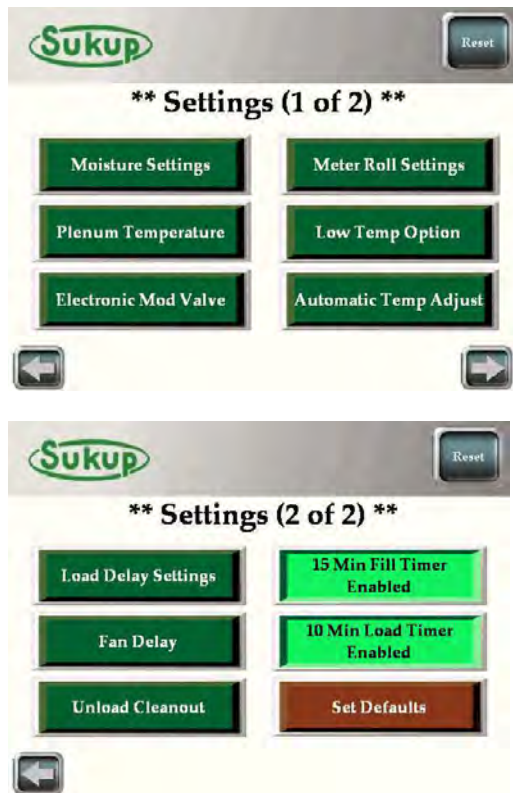


In addition to the “Start” menu, the “Tools” menu can be accessed from the main screen. During a system mode operation such as continuous flow, a limited “Tools” menu may be available.

In this menu, the user can select “Manual Operation” and “Dry Fire / Test” mode.

There are many new features like the “History Log”, “Graphs / Trends”, and “System Tools”. Each tool is very helpful in simplifying operation and troubleshooting. All of these tools are explained in the software manual.

NOTE: The worklight may be toggled on/off from this menu.



The “Settings” menu is a two-page menu containing all of the system set points and operational information.

Each setting can be changed to better meet the needs of the user. Read about each setting in the software manual. Understanding each setting will help tremendously during the drying process.

The second page of the settings menu contains system timer set points.

Another function given in the “Settings” menu is the option to set the factory defaults. The last button on this page allows the user to restore the factory settings and eliminate all user calibrations to sensors and start over from square one. This is helpful if multiple users run the dryer during the same season or if the user wishes to start over from the beginning.

General Dryer Operation

Before Loading or Starting the Dryer

Caution

Ensure that all safety shields are in place. Ensure that outside access covers on both sides of Dryer are secured and latched.

Dryer Startup Preliminary Steps

1. Prior to starting the dryer, turn the Main Disconnect on the front of the power box to "OFF".
2. Open the front panel of the power box by turning the chrome cabinet latch 1/4 turn (see below).
3. Ensure that all circuit breakers and/or starter/protectors in the power box are turned ON for dryer operation. (Meter Roll, Load, and Unload starter protectors are shown here)



4. Close the power box front panel and latch by turning the chrome cabinet latch 1/4 turn.
5. Engage the main disconnect, by turning the lever 45° clockwise indicating "ON". The main disconnect lever must appear as shown for dryer operation. On the left front side of the power box, pull the red "Emergency Stop" button out. The "Emergency Stop" button illuminates RED when pulled out with the main disconnect "ON".



Dryer Operation

Four automatic operations have been designed to operate the Sukup QuadraTouch™ Dryer.

1. Continuous Flow
2. Autobatch
3. Grain Transfer
4. Final Dry

In addition to drying in automatic modes, the QuadraTouch™ allows the user to use a “Manual Operation” mode inside the “Tools” menu. This gives the user full control over the fan(s), heater(s), load, and unload.

As an option, the QuadraTouch™ dryer is also equipped with a manual backup system. Located just above the power box (on axial fan units, different location on centrifugal models), this box allows the user to manually turn on the fan(s), heater(s), etc using switches.

To operate the dryer in any automatic mode including the “Manual Operation” mode on the QuadraTouch™ controller, select the “COMPUTER” position of the system control switch on the side of the power box – below the Emergency Stop.

Operating the dryer using the manual backup system mode requires turning the system control switch to the “MANUAL” position.

In manual mode (from the QuadraTouch™ controller or backup system), when turning the switches to the on position, this will start the corresponding device ***immediately***.

Continuous Flow

Two options exist to begin the operation of continuous flow: Initial Dry and Restart. If Restart is chosen, the user will have the option of restarting ***with or without*** Stabilization. The table below details the starting scenarios to choose the correct method to start the dryer.

Start/Restart scenario	Initial Dry w/ Stabilization	Restart with Stabilization	Restart without Stabilization
All wet grain, No gradient established	Yes	No	No
Shutdown greater than 1 Hour, gradient established, grain cool	No	Yes	No
Shutdown less than 1 Hour, gradient established	No	No	Yes

Functional Maintenance Requirements

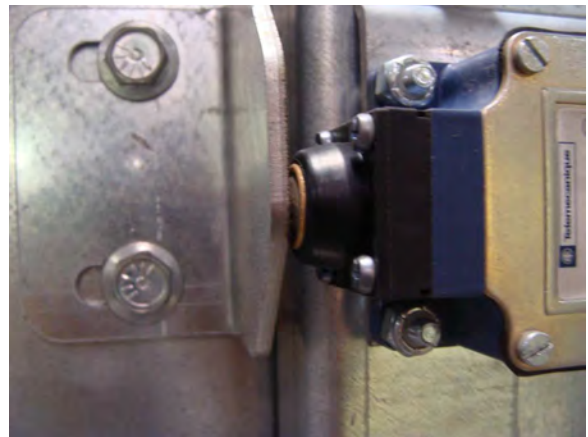
Start of Drying Season Requirements

At the start of every drying season, the Trantorque bushing on each fan(s) must be checked for proper torque. See Appendix A in the Installation tab of this manual for more information.

Daily Maintenance Requirements

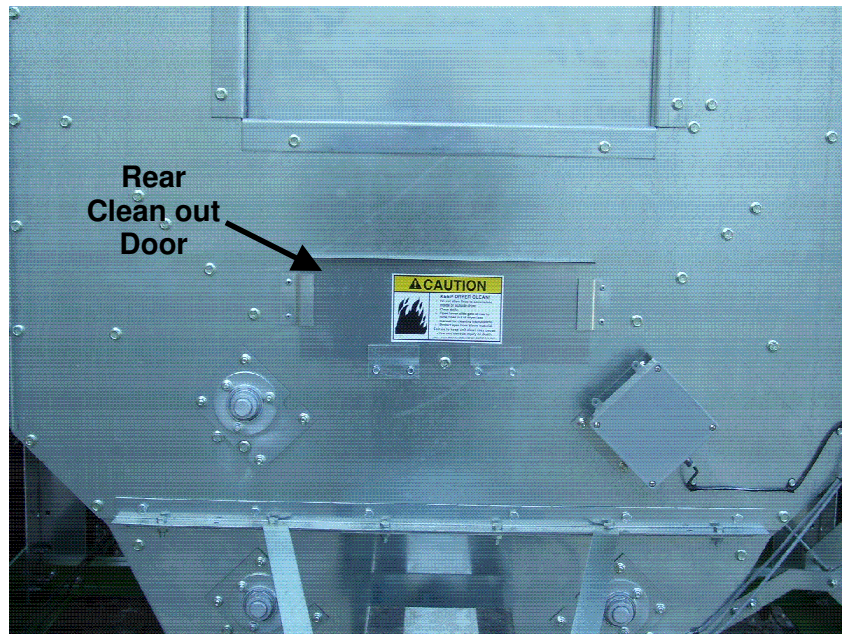
This assumes 24-hour day operation during harvest.

1. Clean foreign material from fan air inlet screen.
2. Sweep off top of exhaust slope where fines may have accumulated on the outer perforated skins.
3. Visually inspect for an even grain movement along all perforated panels of the lower outer grain column slope. If grain in one section is not moving, or it is moving slowly, check for obstructions in the flow gate area or columns. Pay particular attention to the area directly under the wet holding portion of the dryer where excessive amounts of fines and foreign material can accumulate.
4. Perform plenum cleanout where fines and foreign material may have accumulated. **Shut the Dryer down.** Open rear access door. Sweep all fines and debris from front of plenum area to the rear plenum area. Close rear access door and the rear door switch will depress as shown here:



Functional Maintenance Requirements

5. Open rear clean out door

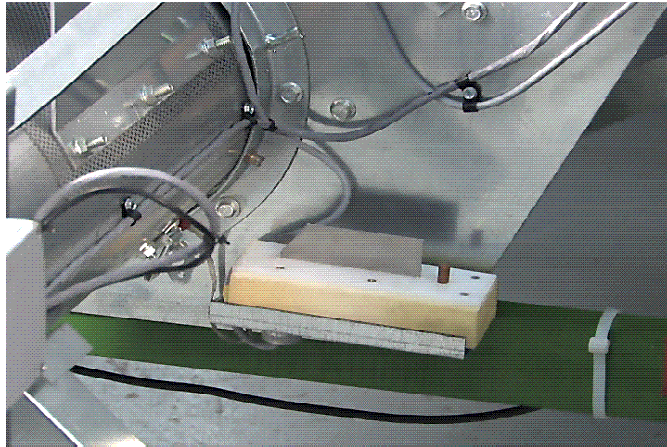


6. Operate the fan only by either running it in the Dry Fire mode or in the manual mode. Continue running the fan until no more fines / debris come out of the rear clean out.
7. Turn fan off.
8. Reinstall rear clean out door.
9. Sweep fines / debris off discharge chute screen.



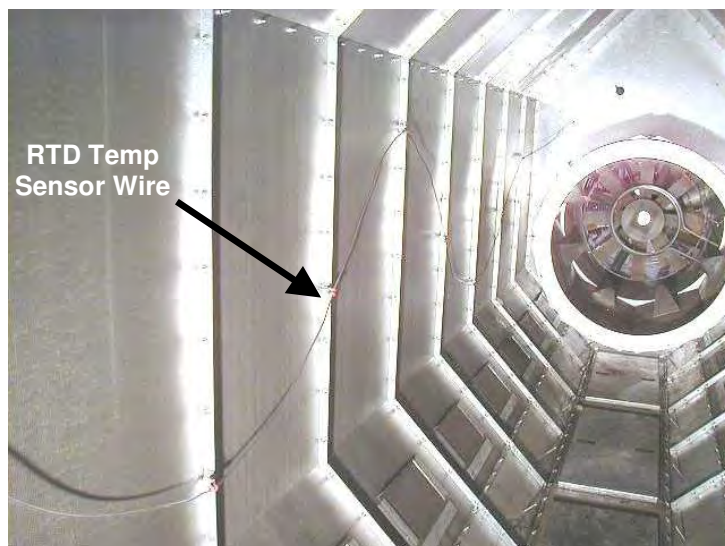
Functional Maintenance Requirements

10. Remove discharge moisture sensor and clean sensor flag and copper tube.



Reinstall moisture sensor.

11. Inspect temperature sensor wire (RTD). Clean if necessary.

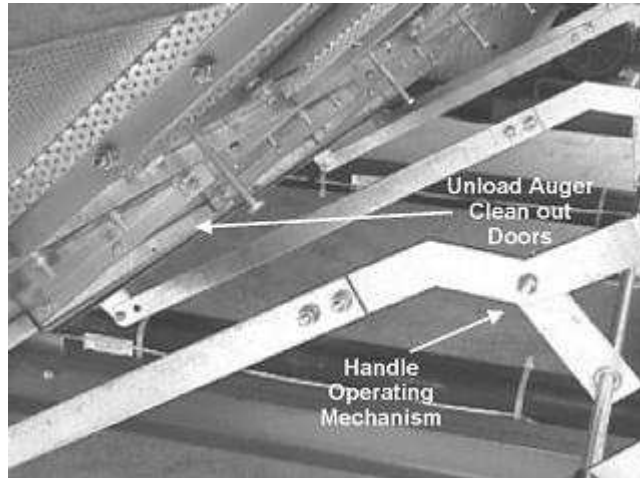


12. Restart dryer operation per automatic control or per manual control

Functional Maintenance Requirements

Semi-weekly Maintenance requirements

1. Perform all steps of daily maintenance requirements as listed in previous section, except step 12, restarting dryer.
2. Open inner and outer unload auger clean out / access doors.



3. Inspect unload auger area and meter roll area for obstructions, fines, and debris. Clean as necessary. Close inner and outer unload auger cleanout / access doors.
4. Restart dryer operation per automatic control or per manual control.

Functional Maintenance Requirements

Weekly Maintenance requirements

1. Unload grain from dryer by performing Final Dry in automatic.
2. Perform all steps from the Daily and Semi-weekly requirements except for restarting dryer.
3. Thoroughly inspect grain columns for accumulation of trash and fines, at peak of inner perforated grain walls, and above meter roll flow gates.
4. Check tension of load and unload auger drive belts.
5. Restart the dryer per automatic control (Initial Load, Initial Dry).

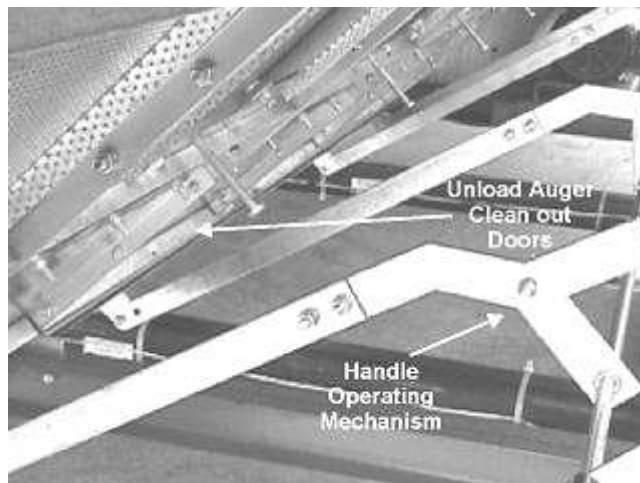
End of Season Maintenance requirements

1. After dryer is unloaded for the last time, open all access doors and panels. Thoroughly clean the entire dryer by sweeping and using compressed air. Ensure cleaning of the wet bin trash pan.

Caution

Do not blow compressed air directly into static air pressure switch.

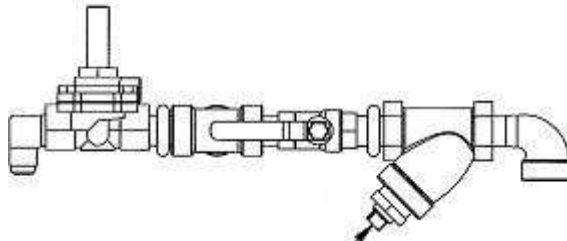
2. Perform all steps listed in prior to season maintenance inspection.
3. **Leave the Unload Auger clean out doors open for water drainage.**



4. Lock out electrical power.
5. Install a cover on fan inlet screen to keep debris from entering the fan and to keep the fan from windmilling. Never place obstacles in the way of the fan to stop rotation.
6. Remove discharge moisture sensor from grain discharge chute and put into sensor holder (sensor could be damaged by standing water if left inside tube).

Pre-Season Maintenance requirements

1. Remove fan inlet cover and control box cover. Make sure fans are free and clear to rotate. Apply electrical power.
2. Operate the fan, load auger, unload auger and meter rolls for 10 minutes using the **Dry Fire / Test** mode ([see page 15](#)). This will redistribute the grease in the motor bearings, auger bearings, reduction gearbox and meter roll drive train.
3. Remove and lock out electrical power, reinstall covers.
4. Remove Wye strainer on the Liquid pipe train (see picture below) and clean out all fines. Replace strainer.

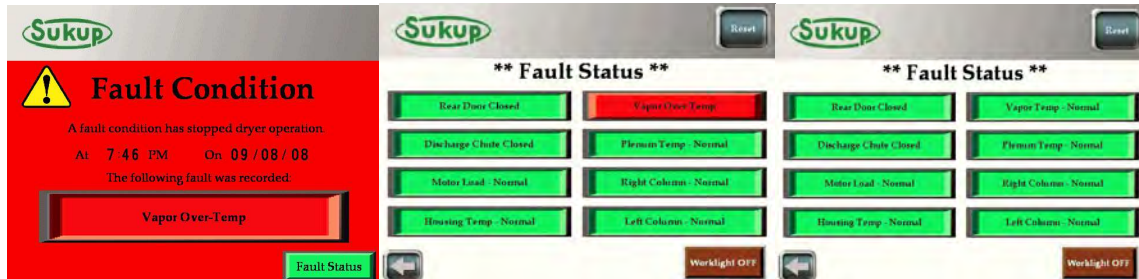


Wye Strainer/filter
remove at hex nut

Shutdown Faults

In the event of a fault, the system will automatically shut down all fans, heaters, load, unload, and auxiliary devices. Each time a fault occurs, the system will display a red screen with the time, date, and cause of shutdown.

When a fault occurs, the user will have the option to touch the “Fault Status” button on the bottom, right-hand portion of the screen. This will show the user if a fault still exists in the system. It will be denoted by a red color. When the fault is cleared, it will turn from red to green.



! Warning

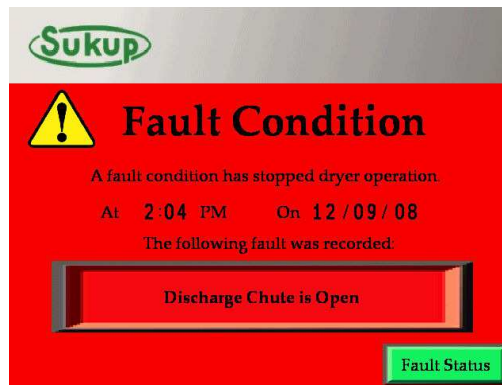
If necessary, when a fault occurs, power must be disconnected from the dryer and gas must be turned off before correcting the fault. If at all unsure, contact your Sukup dealer. Be cautious of other people or objects around the dryer.

If delay timers are programmed under the second page of the settings menu, the fan/unload motors may continue to run after some fault conditions.

Example: In the second page of the settings menu, there is a Fan Delay Option. This option allows the fan to run in the event of a user shutdown or a fault shutdown that isn't related to the fan. This is also true of the unload cleanout timer setting.

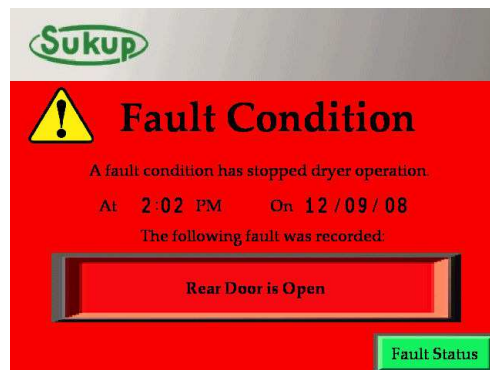
All fault messages are latched, meaning that they will remain on screen until the operator acknowledges the message by pressing the “Fault Status” button followed by the “Reset” button. This is useful in the event of a nuisance trip that may have otherwise reset by the time the operator realizes that the dryer has shut down. The following pages show the system shutdown faults as well as give a description of possible problems and their solutions.

Grain Discharge Chute / Unload Auger Warning



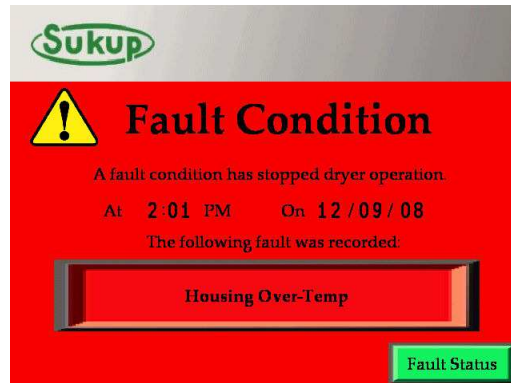
Possible Problems	Possible Solutions
Grain Discharge lid opened	✓ Return lid to a closed position
Grain overflow of discharge	✓ Slow maximum roll speed. (Grain may over dry) ✓ Ensure that take-away system is operating properly. ✓ Lower plenum temperature, (if necessary) to prevent grain from over drying. Maximum roll speed is indicated by an asterisk on screen following roll order %.
Broken or jammed unload auger	✓ Check unload auger for broken flighting or foreign material. ✓ Check motor and belts.

Rear Access Door Open



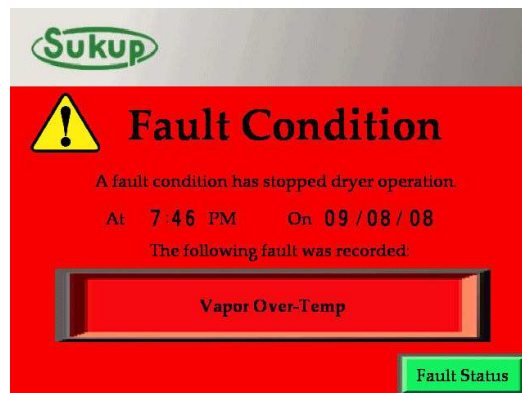
Possible Problems	Possible Solutions
Rear door is open or push-button switch is not being depressed.	✓ Check rear door for door/switch contact.

Housing High Temperature Alarm



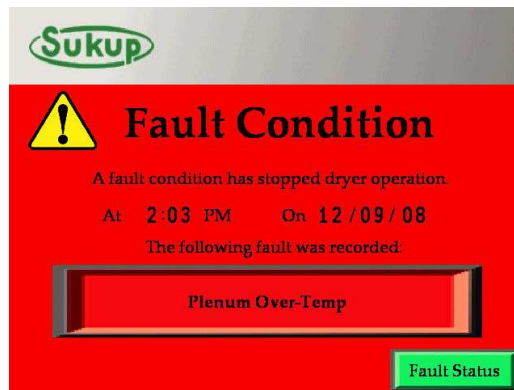
Possible Problems	Possible Solutions
Housing temperature has exceeded 200°F	✓ Manually reset switch in heater box of proper heater after temperature has gone down. Refer to heater operation section. ✓ Check condition of fan blade and for proper rotation. ✓ Check for plugged fan grill. ✓ Check for defective MOD valve.

Vaporizer High Temperature Alarm



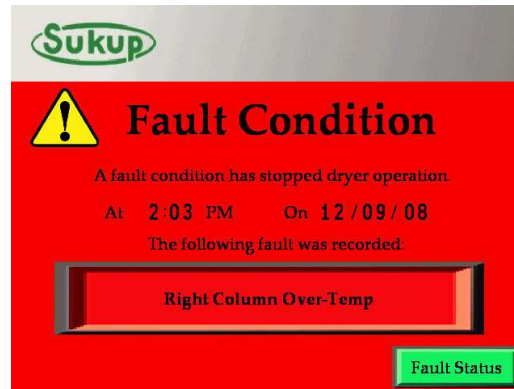
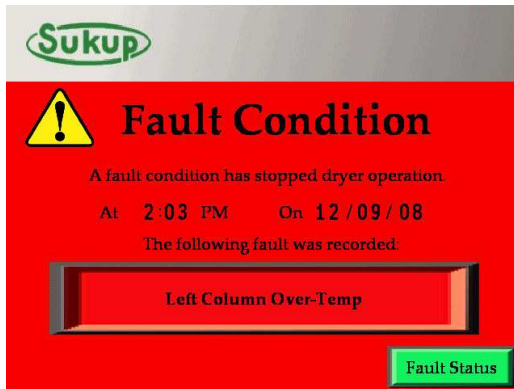
Possible Problems	Possible Solutions
Vapor coil exceeded 140°F	✓ Supply tank may be low. Fill tank ✓ Vaporizer misadjusted, readjust, and refer to the heater operation section. ✓ Fan airflow obstructed. Check for obstructions.

Plenum High Temperature Alarm



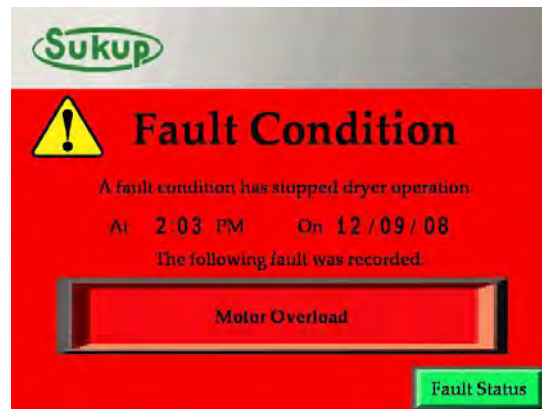
Possible Problems	Possible Solutions
Temperature exceeded 325°F for capillary	✓ Check plenum by placing back of hand near rear door, checking for heat. If ok, enter the plenum and assess problem. ✓ Plenum temperature set too high (adjust setting). ✓ The electronic mod valve malfunctioned and/or needs to be re-adjusted.

Grain Column High Temperature Alarms



Possible Problems	Possible Solutions
Column temperature exceeds 210°F	✓ Check for stagnant column that has overheated. Unplug if necessary. ✓ Lower the plenum temperature if no columns are plugged. ✓ Unload dryer and check for restrictions, plugging, or slow columns.

Motor Thermal Overload Alarm



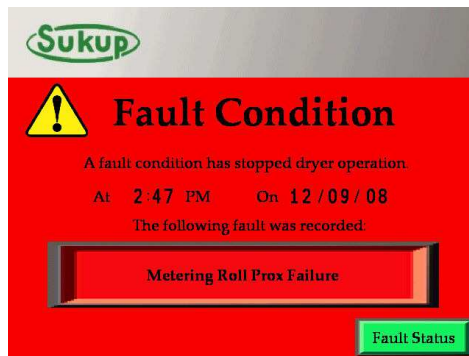
Possible Problems	Possible Solutions
Motor overload occurred for fan, load or unload auger, or auxiliary device.	✓ Check starter protectors, breakers and thermal overloads in power and auxiliary box for a trip. Check faulted device for possible overheating conditions caused by an obstruction in the auger or a bad bearing in the motor or auger.

Analog Sensor Not Found



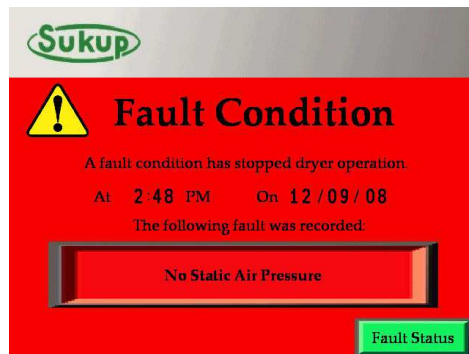
Possible Problems	Possible Solutions
The analog sensors (Moisture Sensor and Plenum RTD transmitters) are not transmitting the correct voltages back to the PLC.	✓ This means a break in the connection between the device and the PLC. To correct the problem, start near the device with a voltmeter and check each connection down the line. If a "Grain Temp Sensor Not Found" occurs, check the junction box at the rear of the dryer for voltage between 95 (ground) and D3 (blue wire). The voltage will read from 0-3Vdc. 1 VDC = 100 °F ✓ Check if sensor is placed in operating position.

Meter Roll Failure



Possible Problems	Possible Solutions
Meter rolls have stopped turning	✓ Check for obstruction in meter rolls. ✓ Check chain linkage for broken chain. ✓ Check proximity switch adjustment. ✓ Check for motor rotation or voltage.

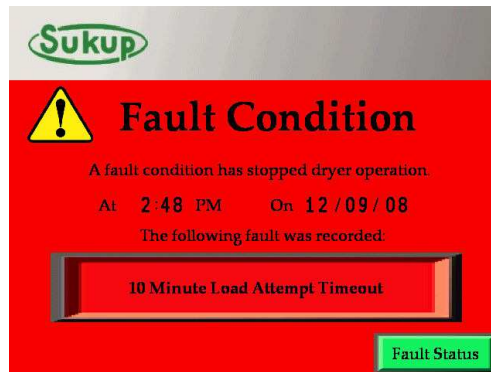
Low / No Static Air Pressure



Possible Problems	Possible Solutions
Internal plenum pressure could not be reached upon start-up.	✓ Dryer is not filling. Check load auger for proper operation.
Internal plenum pressure was lost during operation. This will occur when the fan is started and static air pressure is not detected within 5 seconds.	✓ Wet bin has run out of grain and allowed the plenum to release air pressure before out of wet grain timeout occurs.
Air switch out of calibration	✓ Refer to the Service Manual 3-15 for calibration.

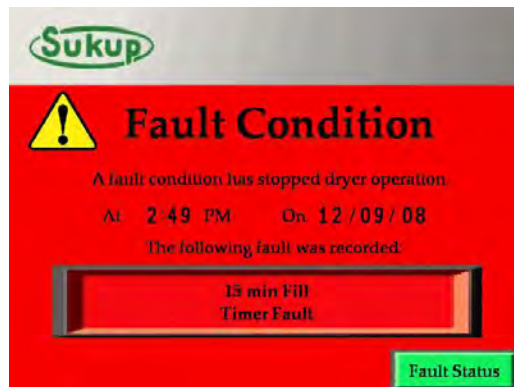
Shutdown Faults

10 Minute Out of Wet Grain – (Dryer is not full)



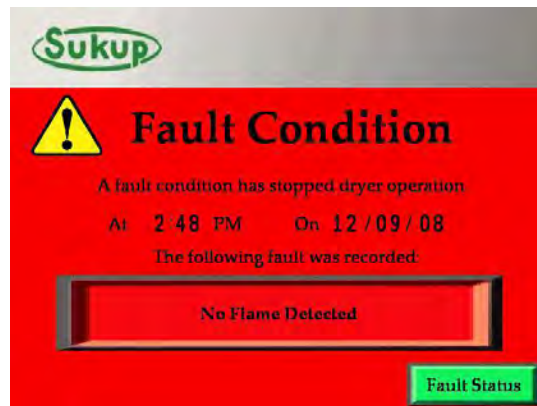
Possible Problems	Possible Solutions
Paddle switch not satisfied in under 10 minutes	✓ Supply more grain to dryer.
Wet bin has been emptied	✓ Run Final Dry if end of season
Fill device has failed	✓ Check all fill devices
Dryer unloading faster than filling	✓ Make sure the load delay setting is set to "0" seconds.

15 Minutes (Without) Fill Timer Fault— (Dryer is full)



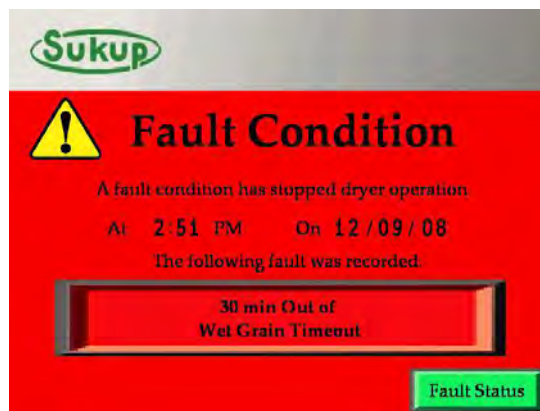
Possible Problems	Possible Solutions
Dryer must fill at least once every 15 minutes when unloading for Continuous Flow. The paddle switches contained in the grain level switch are stuck in the "On" position.	✓ Broken unload auger/belt or meter roll chain. ✓ Make sure the grain level indicator can move freely.

Heater Fault



This will occur if the flame rod does not sense flame within 45 seconds of heater ignition.

30 minute Out of Wet Grain timeout



During Grain Transfer mode, if the paddle switches are not satisfied in 30 minutes, a fault shutdown is initiated.

Appendix A – Auxiliary Motor Operation and Installation

Auxiliary controls can be set up in a number of configurations. Three control circuits exist, one for the auxiliary unload and two for the auxiliary fill.

For the unload system, a single control circuit is used to start and stop an external unload device at the **same time** as the unload auger of the dryer.

The auxiliary fill operations have **two** control circuits. When commencing the load sequence, there is a **delay of 5 seconds** between the start of the load motor and the first auxiliary. After the first auxiliary has started, there is an **additional 5 second delay** before the second auxiliary is started.

The fill paddle will send a signal to the control system that the dryer is nearly full, a switch is triggered to turn the second auxiliary load off. When the second switch is triggered, the first auxiliary and the load auger are shut off. The dryer will not call for grain again until both paddle switches are in their respective “OFF” (down) positions.

Caution

Auxiliary components should not be installed in the power box, only in auxiliary box located above the power box.

Installing the components

When installing the components into the box, the starter/protector is mounted on the top DIN rail and the contactor is mounted on the middle DIN rail directly below.

If the components kits are purchased from Sukup Mfg. Co., the starter/protector and contactors will be pre-wired together.



Wiring the components

Wiring the auxiliaries:

1. Terminal Assignments (Dry Contacts—Potential Free):
 - a. 5 & 7 Load Auxiliary 1 (i.e. Incline)
 - b. 8 & 9 Load Auxiliary 2 (i.e. Horizontal)
 - c. 14 & 15 Unload Auxiliary

IMPORTANT!!!! Terminals 5 & 7, 8 & 9, and 14 & 15 are all potential free contacts. This means that there is no voltage present on these terminals when it leaves the factory. If the auxiliary contactors use a 110VAC coil voltage, supply terminals 5 and 8 with 110VAC via a jumper wire from 1. Therefore, 7 and 9 will be the coil voltages for Load Auxiliaries 1 and 2 respectively.

Special NOTE

If the contactors being used are not purchased from Sukup Manufacturing Company **AND** use a coil voltage other than 115VAC, **DO NOT** jumper 1 to 5 & 8. Supply terminals 5 & 8 with the correct coil voltage.

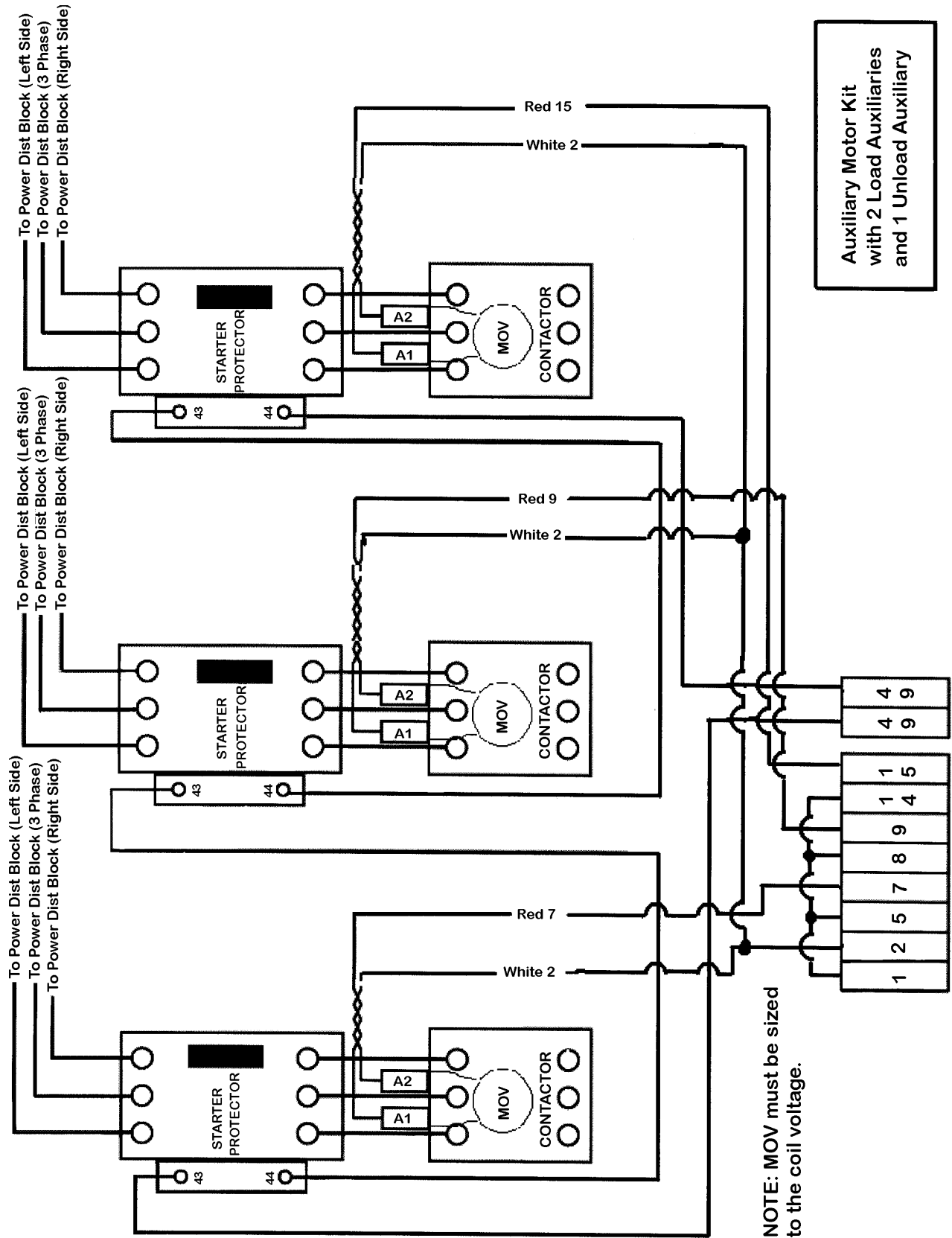
2. Fault protection wiring
 - Wire 49D – Fed from the terminal strip into the first motor overload contact (N/O - will be closed during normal operation)
 - All additional motor overload contacts are then wired in series
 - Wire 49* – Taken from the last motor overload contact to the terminal strip
 - * Final letter (i.e. – 49'E') depends on the number of overloads used.
3. Power wiring
 - Installed similar to those located in power box
 - Direct wire leaving space from transformer as it heats up slightly during operation.

Caution

If contacts installed are not purchased from Sukup Manufacturing, fault protection must be installed. Contact Sukup Manufacturing to purchase these components.

NOTE: On three-phase systems, wild leg should always be connected to the center terminal of the Main Disconnect Switch.





Appendix B – Bushels Per Hour Information

		APPROXIMATE BUSHEL PER HOUR FOR EACH MODULE								
		Dryer Length and # of Modules								
		12 Foot 1 Mod.	16 Foot 1 Mod.	20 Foot 1 Mod.	24 Foot 1 Mod.	16 Foot 2 Mod.	20 Foot 2 Mod.	24 Foot 2 Mod.	20 Foot 3 Mod.	24 Foot 3 Mod.
Meter Roll	10%	120	160	200	240	240	300	360	300	360
	20%	240	320	400	480	480	600	720	600	720
	30%	360	480	600	720	720	900	1,080	900	1,080
	40%	480	640	800	960	960	1,200	1,440	1,200	1,440
	50%	600	800	1,000	1,200	1,200	1,500	1,800	1,500	1,800
	60%	720	960	1,200	1,440	1,440	1,800	2,160	1,800	2,160
	70%	840	1,120	1,400	1,680	1,680	2,100	2,520	2,100	2,520
	80%	960	1,280	1,600	1,920	1,920	2,400	2,880	2,400	2,880
	90%	1,080	1,440	1,800	2,160	2,160	2,700	3,240	2,700	3,240
	100%	1,200	1,600	2,000	2,400	2,400	3,000	3,600	3,000	3,600

The above chart is an **APPROXIMATION** only!

Approximate meter roll speed, given the plenum temperature and points removal for a single fan

This chart is a starting point; adjust as necessary for each dry.

This chart is to be used for CORN only.

Points Removed	Plenum 160	Plenum 170	Plenum 180	Plenum 190	Plenum 200	Plenum 210	Plenum 220
15	065 *	071 *	078 *	085 *	091 *	098 *	105
12.5	081 *	089 *	098 *	106	114	123	131
10	097 *	107	117	127	137	147	157
7.5	146	161	176	191	206	221	236
5	194	214	234	254	274	294	314
3	323	357	390	423	457	490	523

*If it is necessary to run the meter rolls lower than 100 and more than 999, Automatic Batch **must** be used.

Dryer Stabilization Using Manual Mode

Important

It is very important to let the dryer stabilize. DO NOT make any further Meter Roll adjustments until the dryer has turned the grain over completely one time. To determine the amount of time to turn the dryer over one time, refer to the chart below.

UNLOAD TIME BASED ON METER ROLL SPEED PERCENTAGE

Meter Roll Setting	Minutes to Unload Entire Dryer	Meter Roll Setting	Minutes to Unload Entire Dryer
10%	165.0	60%	27.5
15%	110.0	65%	25.4
20%	82.5	70%	23.6
25%	66.0	75%	22.0
30%	55.0	80%	20.6
35%	47.1	85%	19.4
40%	41.3	90%	18.3
45%	36.7	95%	17.4
50%	33.0	100%	16.5
55%	30.0		

DRYER HOLDING CAPACITIES

Dryer Size	Holding Capacity
12 ft.	330 bu.
16 ft.	440 bu.
20 ft.	550 bu.
24 ft.	660 bu.
28 ft.	770 bu.

Dryer Operating under Manual Meter Roll Control

At the end of the Dryer stabilization period as determined above, monitor the discharge moisture content by either observing the control box display (only if computer is operational) or by performing a manual sample test using the sample spout. Calibrate temperature and moisture readout as described in the Software Manual found in this manual.

If the discharge moisture content is not correct, adjust the meter roll speed according to Figure #1 if moisture content is too high, or according to Figure #2 if moisture content is too low.

Deviation Above Set Point	Decrease Meter Roll Setting
Moisture 0.5% High	Decrease Dial setting 025
Moisture 1.0% High	Decrease Dial setting 050
Moisture 1.5% High	Decrease Dial setting 075
Moisture 2.0% High	Decrease Dial setting 100
Moisture 2.5% High	Decrease Dial setting 125
Moisture 3.0% High	Decrease Dial setting 150
Moisture 3.5% High	Decrease Dial setting 175
Moisture 4.5% High	Decrease Dial setting 200
Moisture 4.5% High	Decrease Dial setting 225

Figure 1

Deviation Below Set Point	Increase Meter Roll Setting
Moisture 0.5% Low	Increase Dial setting 025
Moisture 1.0% Low	Increase Dial setting 050
Moisture 1.5% Low	Increase Dial setting 075
Moisture 2.0% Low	Increase Dial setting 100
Moisture 2.5% Low	Increase Dial setting 125
Moisture 3.0% Low	Increase Dial setting 150
Moisture 3.5% Low	Increase Dial setting 175
Moisture 4.0% Low	Increase Dial setting 200
Moisture 4.5% Low	Increase Dial setting 225

Figure 2

Important

After adjusting the meter roll speed, allow at least 15 minutes of operation before re-checking moisture and/or re-adjusting meter speed again.

Appendix C – Dryer Startup Checklist

Following are the minimum operator actions required to successfully start the Dryer

Warning

Augers, fans, and heaters will start without warning at the appropriate times. Please use caution around dryer.

1. Open the power box and ensure that all internal breakers and starter protectors are turned on. Close the door to the power box, close the latch, and turn the master disconnect "ON".
2. On the power box, pull the Emergency Stop button out. It should illuminate red. If using the QuadraTouch™ controller, the System Control Switch needs to be turned to the "COMPUTER" position. If using the manual backup system, "MANUAL" needs to be selected.
3. The Display should show "System Ready". All faults must be cleared before the dryer can start. Press "Start" to choose an operation.
4. The display will give the options of selecting Continuous Flow, Autobatch, Grain Transfer, and Final Dry. Press "Reset" to abort dryer startup.

For Continuous Flow

- Operator must select Initial Dry, Restart & Stabilization, or Restart without Stabilization.

Initial Dry

- Input Moisture Set, Output Moisture Set, Maximum Roller Speed, Minimum Roller Speed must be accepted or changed.
- A 160°F plenum temperature is required for an Initial Dry
- It is **HIGHLY RECOMMENDED** that the operator is at the dryer to verify the grain moisture accuracy once sampling has started and calibrate if necessary.
- If an output sensor moisture or temperature calibration adjustment is necessary, while the dryer is sampling, press "Tools" and select "Calibrate Sensors" to change the moisture or temperature. Once the required calibration adjust has been entered, the dryer will recommence with the moisture sampling. Allow 30 minutes for the dryer to stabilize before repeating this procedure.

Restart & Stabilization

- Input Moisture Set, Output Moisture Set, Maximum Roller Speed, Minimum Roller Speed must be accepted or changed.
- Plenum temperatures and meter roll speed must be accepted or changed.
- Dryer will run through stabilization. This choice is **recommended** if dryer has been off for longer than three (3) hours and the grain in the dryer is partially dry.

Restart without Stabilization

- If dryer has been off for less than 1 hour and the grain has retained some heat from the last drying sequence, it is **recommended** that this option be used.
- If dryer is off for more than one (1) hour, the operator can choose to use stabilization or can skip that option.

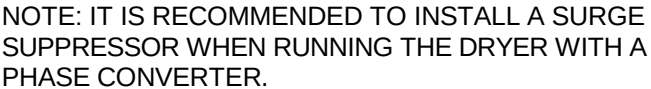
For Automatic Batch

- If user has the “Temperature Option”, the user must choose if the dryer will run in Time Setting or Temperature Setting.
- When the Time Option is chosen, user must decide the times for heating and cooling of the grain.
- If the Temperature Option is present and chosen, user must decide the temperature for heating and time for cooling the grain.
- When the dryer unloads the grain, the meter rolls will run at the maximum meter roll setting given by the operator.

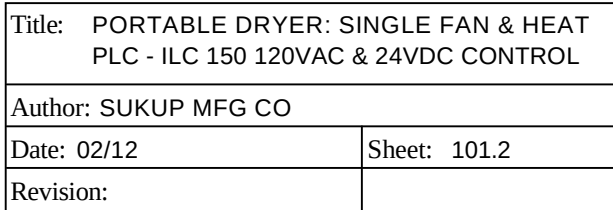
For Grain Transfer

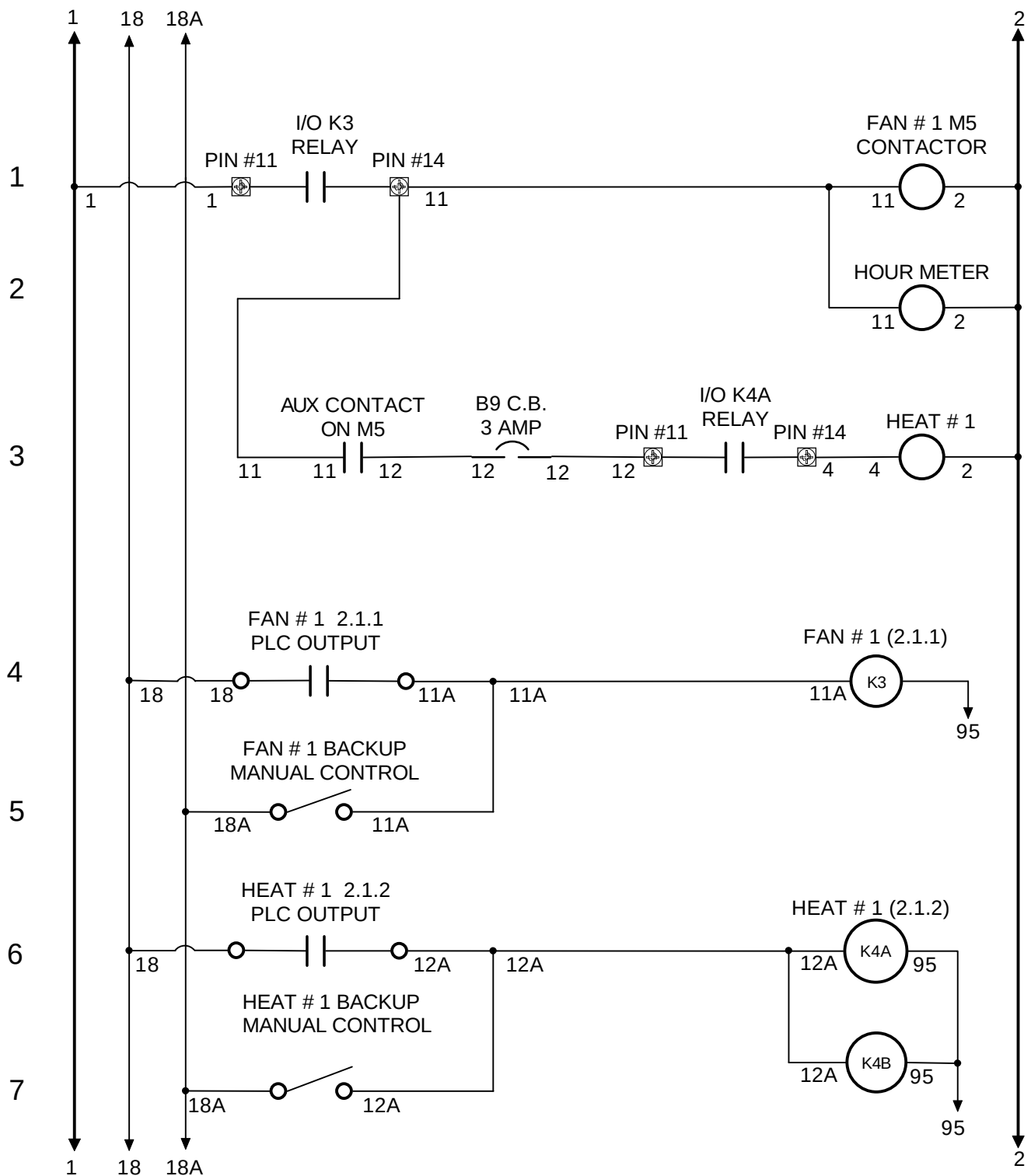
- Dryer operator must decide the maximum meter roll speed for this option.
- **Do not** exceed unload system capability.

2012
ELECTRICAL DRAWINGS
SINGLE FAN & HEAT



Title: PORTABLE DRYER: SINGLE FAN & HEAT PLC - ILC 150 120 VAC & 24VDC CONTROL	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 101.1
Revision:	





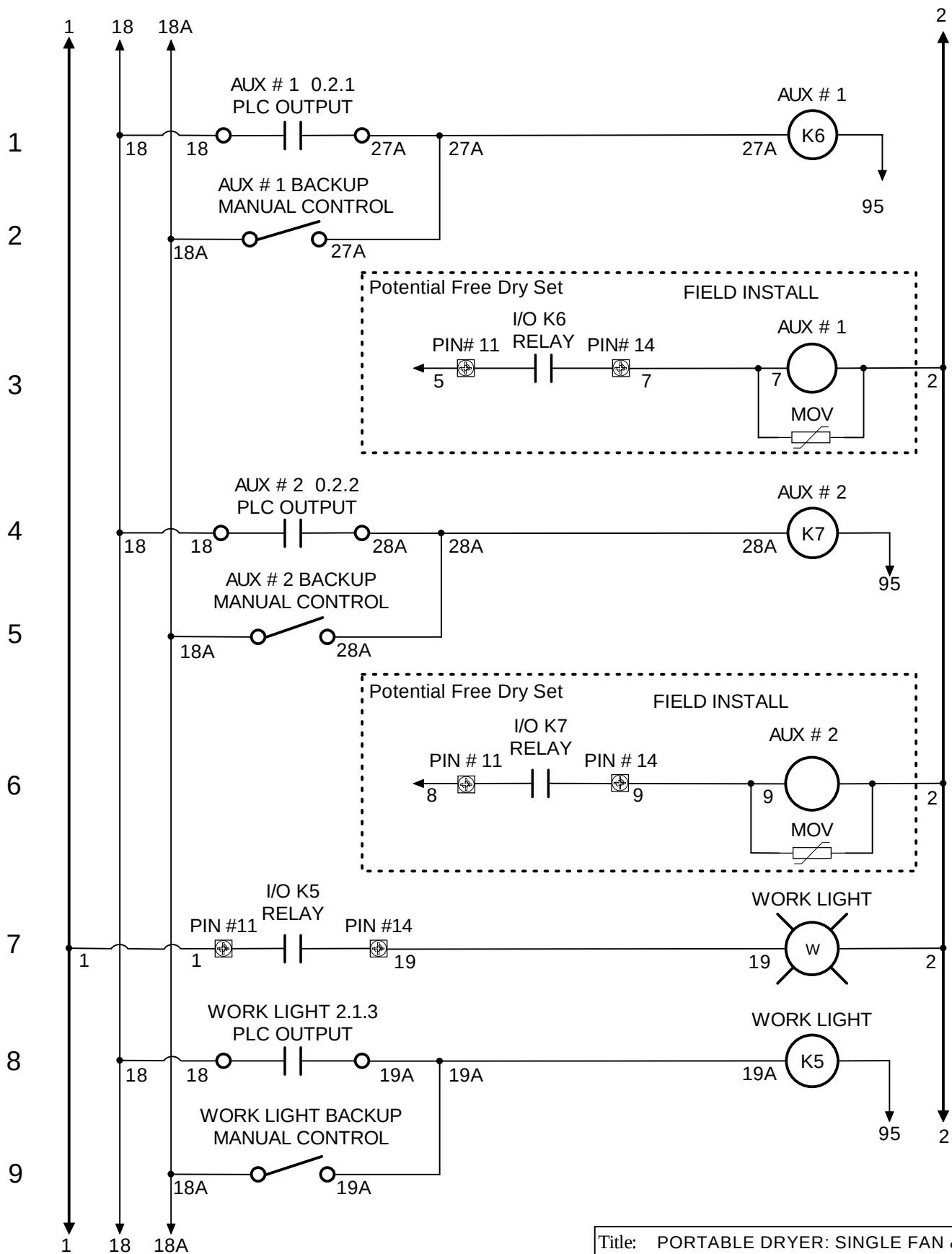
Title: PORTABLE DRYER: SINGLE FAN & HEAT
PLC - ILC 150 120VAC & 24VDC CONTROL

Author: SUKUP MFGCO

Date: 012/12

Sheet: 101.3

Revision:



Title: PORTABLE DRYER: SINGLE FAN & HEAT PLC - ILC 150 120VAC & 24 VDC CAONTROL	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 101.4
Revision:	

NOTE PAGE

1. The following note applies to MANUAL operation only.

This contact is located on fault relay RL4. The relay is physically mounted on the manual control board. The contact is closed if no faults are present. Check LED # 57 (NO Fault) on the manual control board. This LED should be ON if no faults are present. (Load, Unload, and all Fan switches need to be in the OFF position before the NO Fault LED will turn ON - assuming no other faults are present)

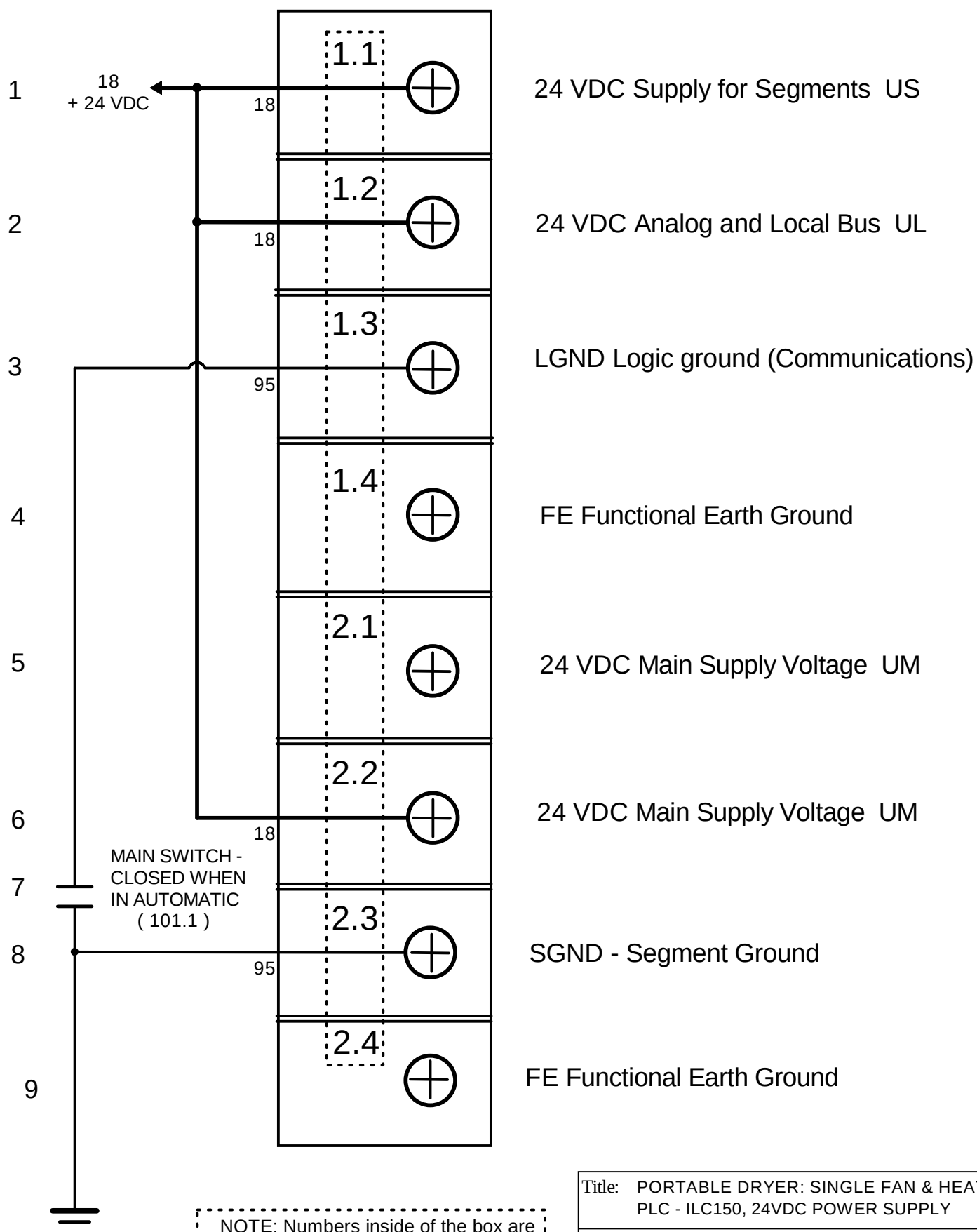
If a fault condition was present, the manual reset (located on the manual control board - upper left corner) will need to be pressed to clear the fault. If the fault condition *has not* been corrected, the RED LED associated with that fault will go out when the reset has been pushed, but will turn ON again within a few seconds, after the faults are scanned.

2. The X indicates the switch position. An X to the left, indicates the switch is in the Manual position, and an X to the right indicates the switch is in the Automatic position.

 - Indicates a power box connection terminal.

Title: PORTABLE DRYER: SINGLE FAN & HEAT PLC - ILC 150 NOTE PAGE	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 101.5
Revision:	

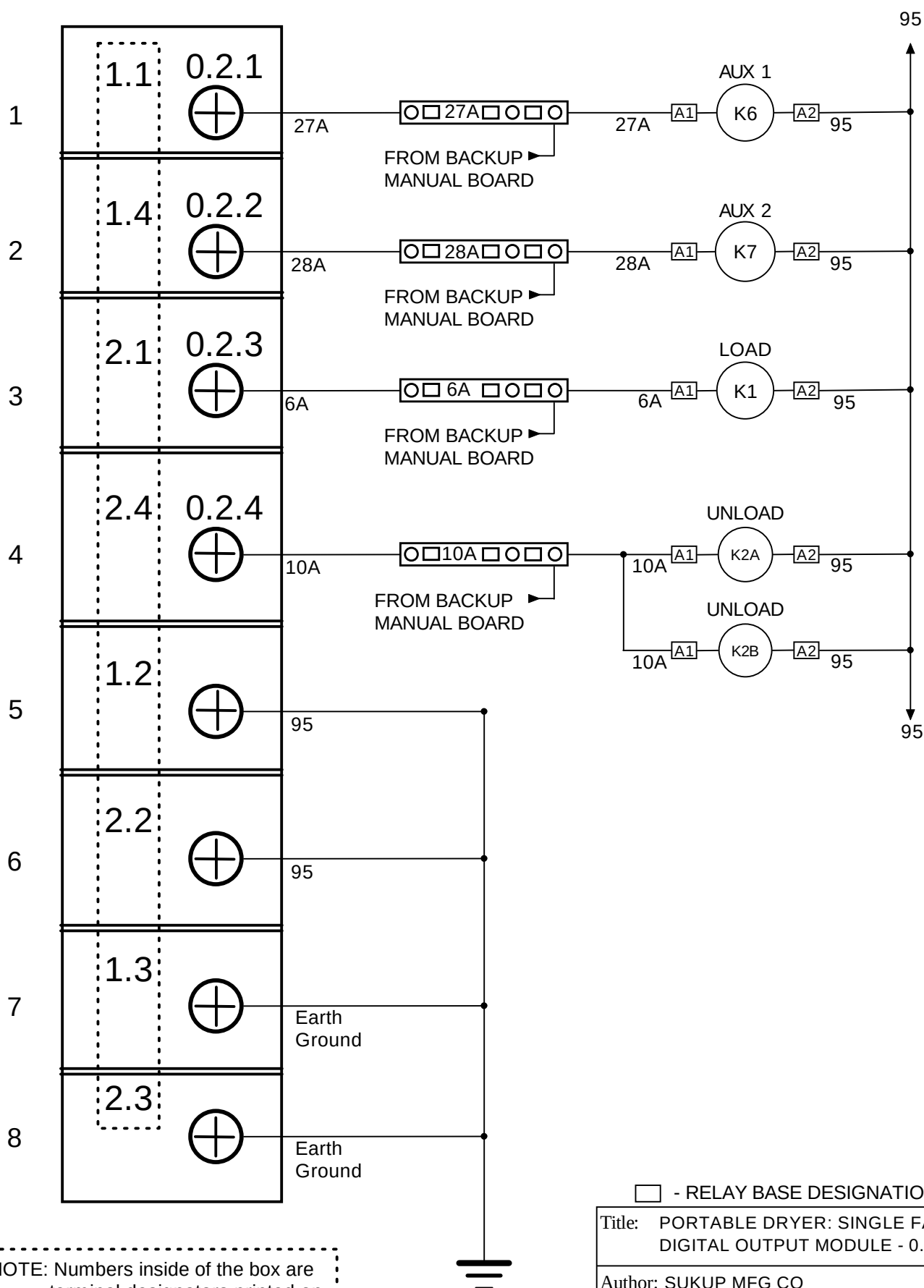
24 VDC POWER SUPPLY MODULE - 0.1 (ORANGE)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: SINGLE FAN & HEAT PLC - ILC150, 24VDC POWER SUPPLY	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 101.7
Revision:	

DIGITAL OUTPUT MODULE - 0.2 (ORANGE)



□ - RELAY BASE DESIGNATION

Title: PORTABLE DRYER: SINGLE FAN & HEAT
DIGITAL OUTPUT MODULE - 0.2

Author: SUKUP MFG CO

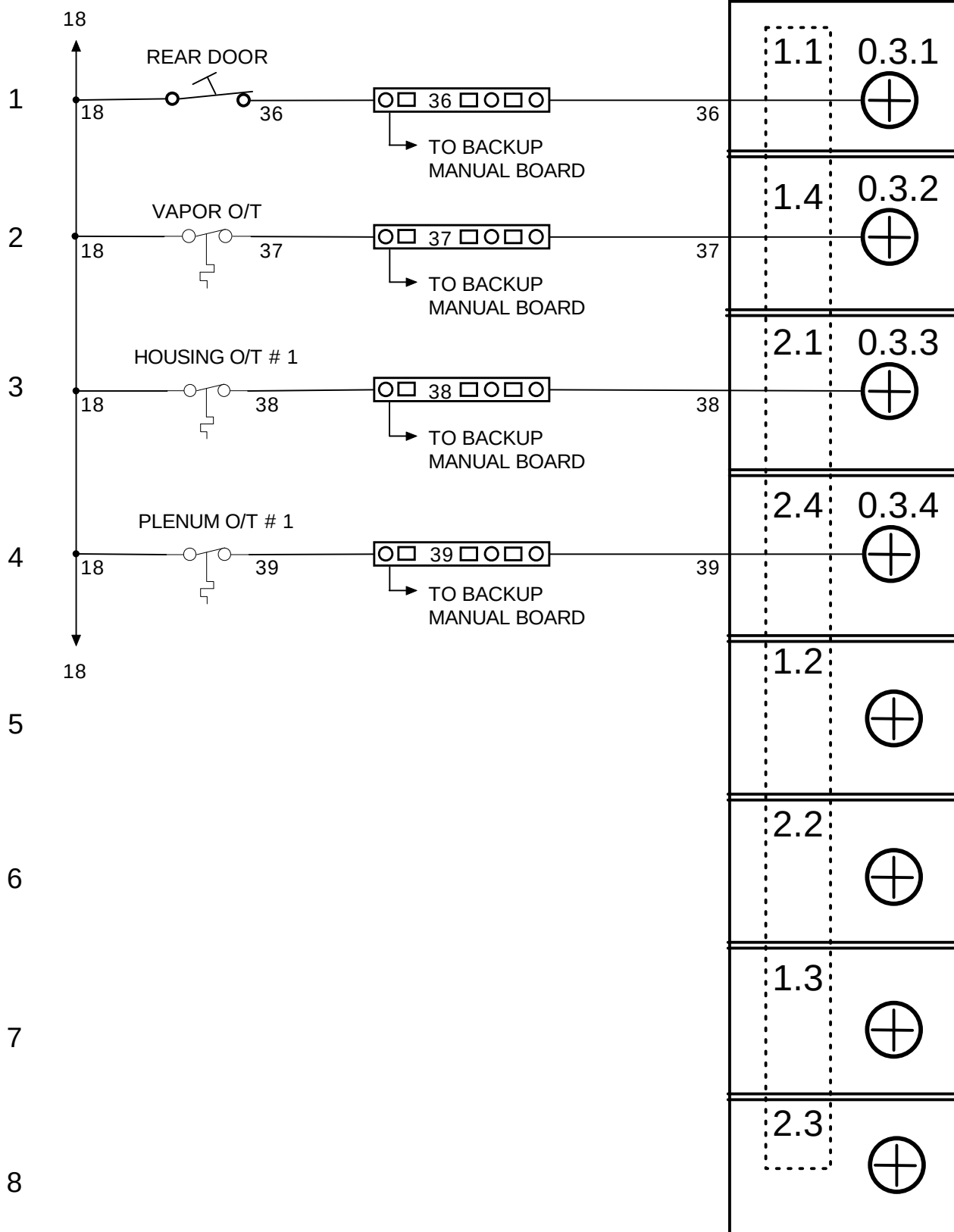
Date: 02/12

Sheet: 101.8

Revision:

NOTE: Numbers inside of the box are terminal designators printed on the module.

DIGITAL INPUT MODULE - 0.3 (ORANGE)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: SINGLE FAN & HEAT
DIGITAL INPUT MODULE - 0.4

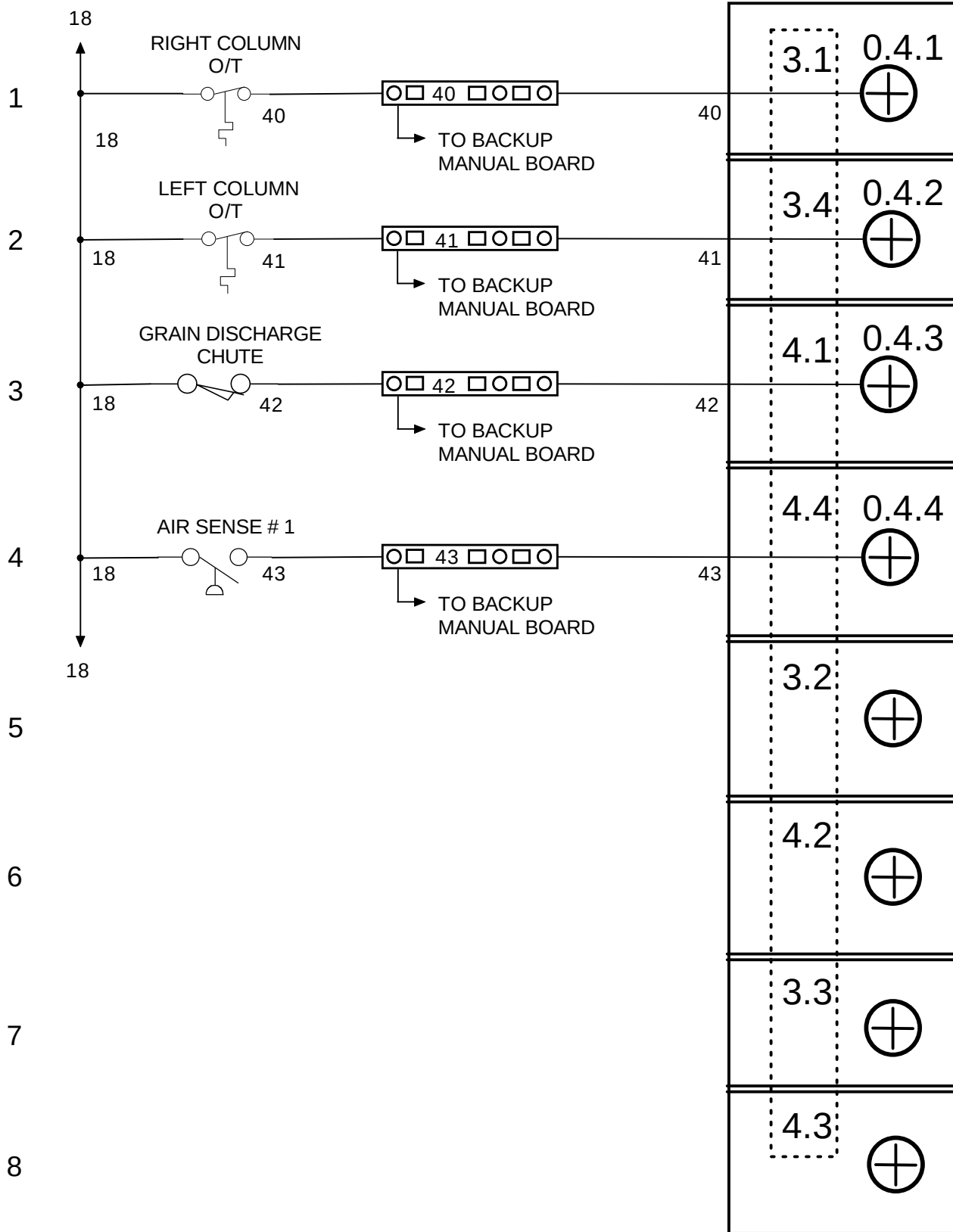
Author: SUKUP MFG CO

Date: 02/12

Sheet: 101.9

Revision:

DIGITAL INPUT MODULE - 0.4 (ORANGE)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: SINGLE FAN & HEAT
DIGITAL INPUTMODULE - 0.4

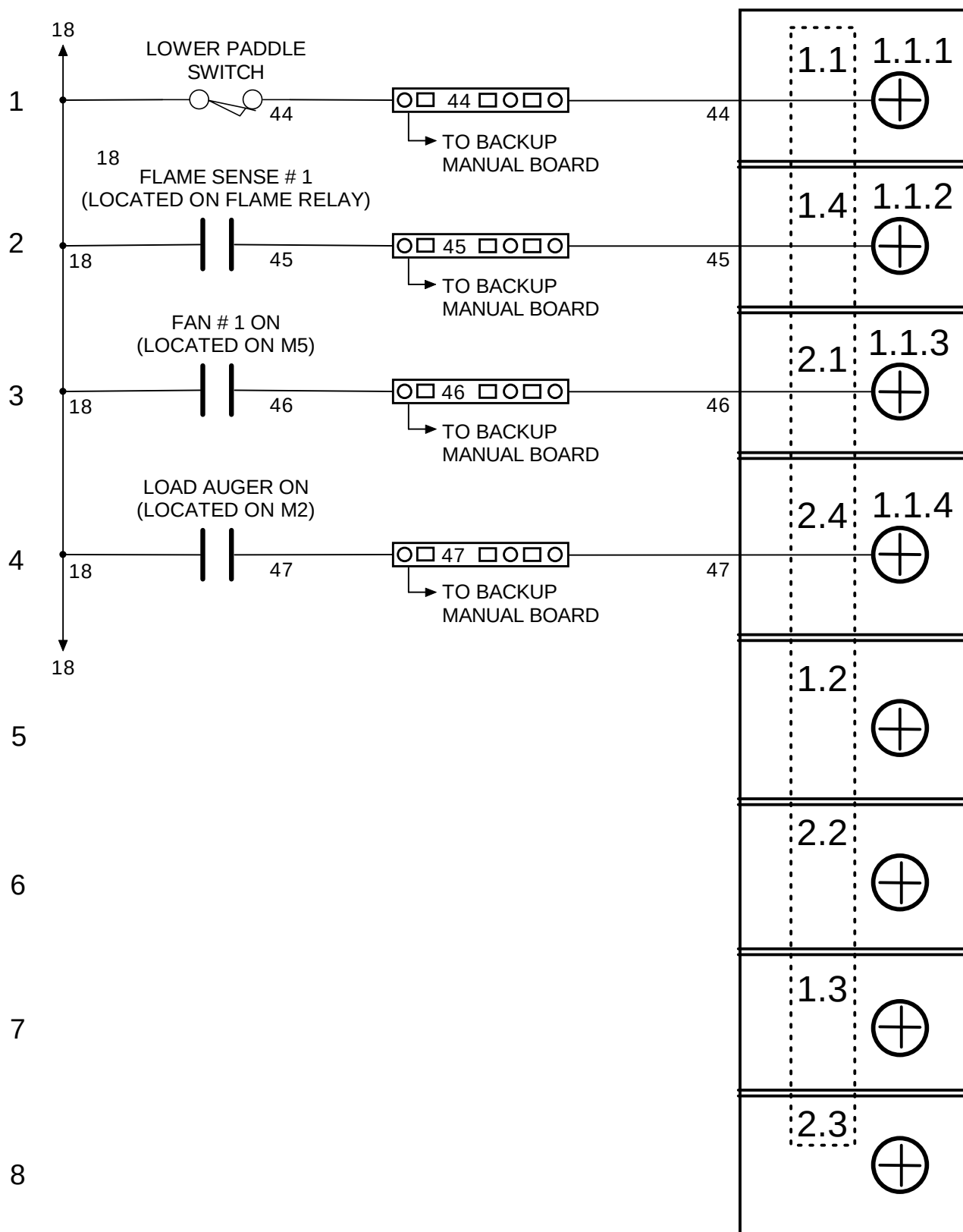
Author: SUKUP MFG CO

Date: 02/12

Sheet: 101.10

Revision:

DIGITAL INPUT MODULE - 1.1 of 4 (BLUE)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: SINGLE FAN & HEAT
DIGITAL INPUT MODULE - 1.1

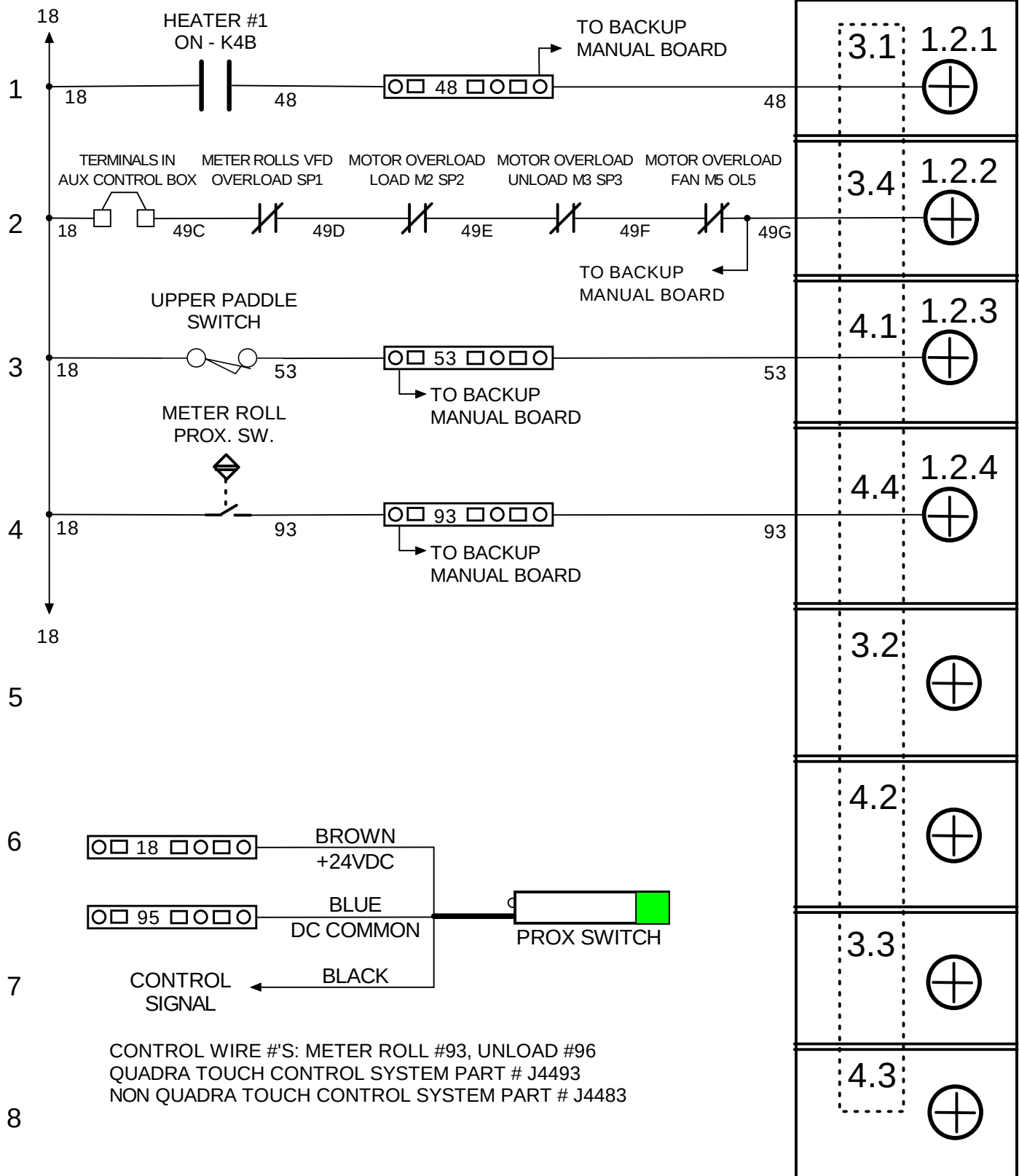
Author: SUKUP MFG CO

Date: 02/12

Sheet: 101.11

Revision:

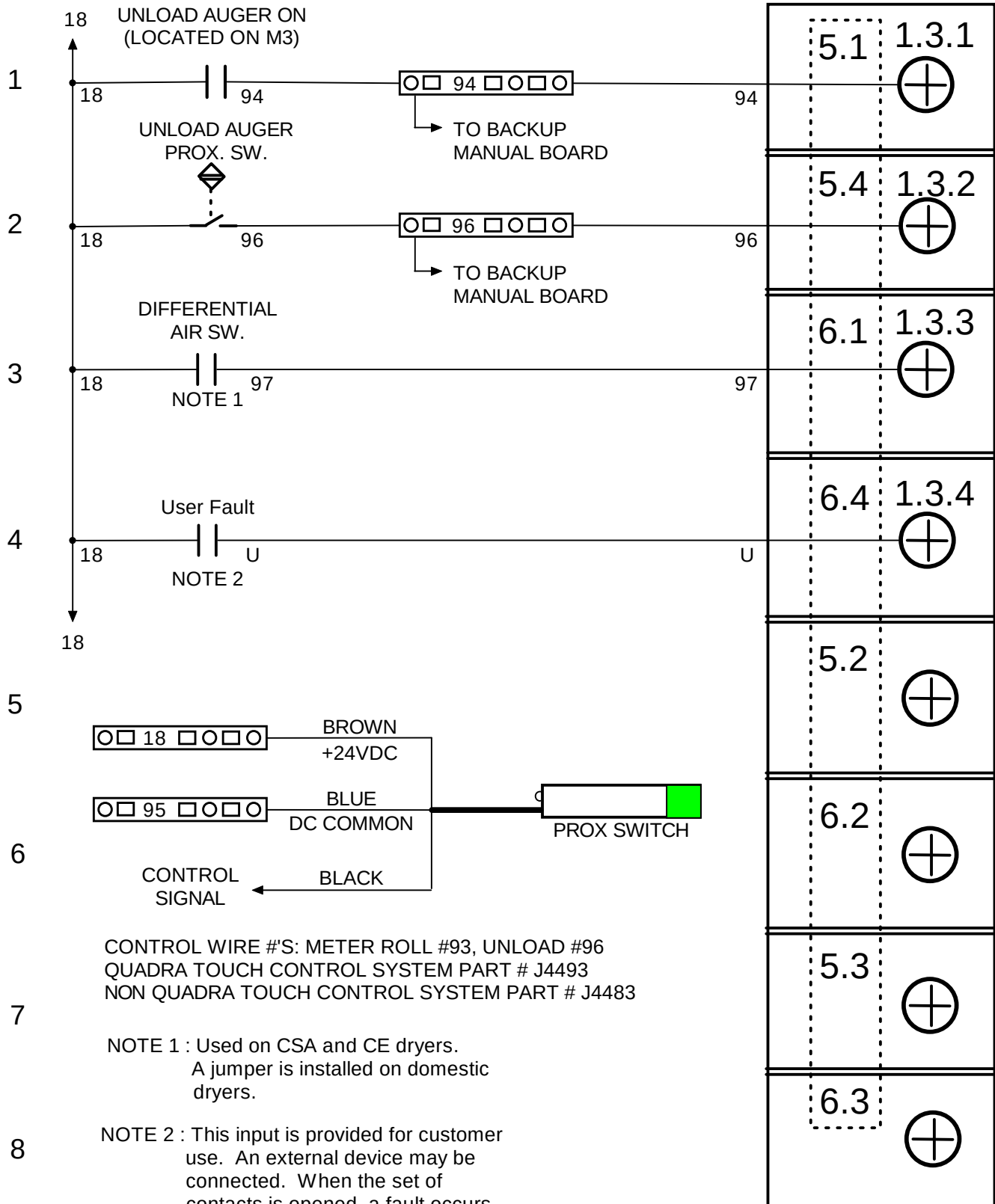
DIGITAL INPUT MODULE - 1.2 OF 4 (BLUE)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: SINGLE FAN & HEAT DIGITAL INPUT MODULE - 1.2	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 101.12
Revision:	

DIGITAL INPUT MODULE - 1.3 OF 4 (BLUE)



CONTROL WIRE #'S: METER ROLL #93, UNLOAD #96
QUADRA TOUCH CONTROL SYSTEM PART # J4493
NON QUADRA TOUCH CONTROL SYSTEM PART # J4483

NOTE 1 : Used on CSA and CE dryers.
A jumper is installed on domestic dryers.

NOTE 2 : This input is provided for customer use. An external device may be connected. When the set of contacts is opened, a fault occurs. 24 VDC *ONLY* applied to PLC input. A jumper is installed at the factory.

NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PROTABLE DRYER: SINGLE FAN & HEAT
DIGITAL INPUT MODULE - 1.3

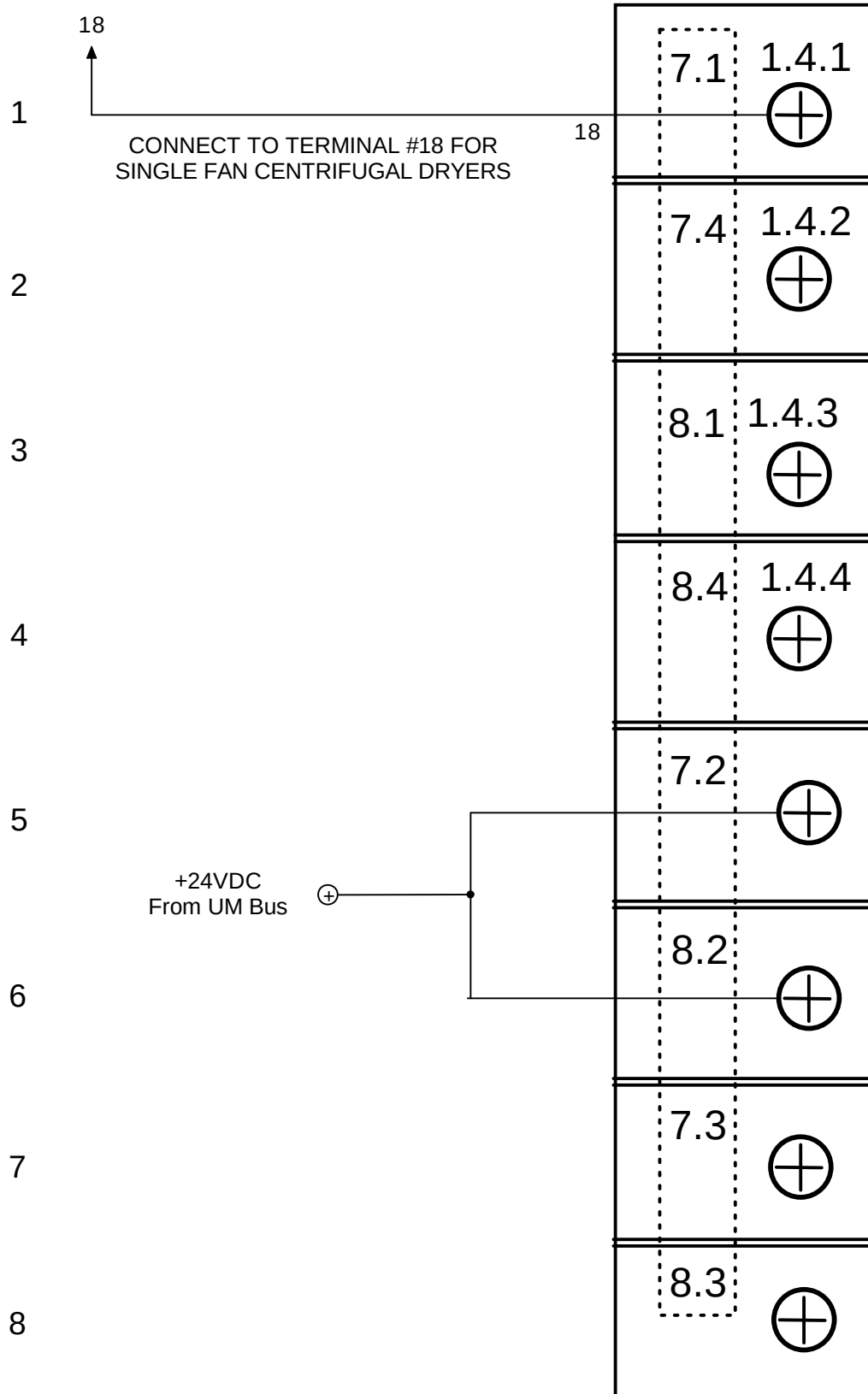
Author: SUKUP MFG CO

Date: 02/12

Sheet: 101.13

Revision:

DIGITAL INPUT MODULE - 1.4 OF 4 (BLUE)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: SINGLE FAN & HEAT
DIGITAL INPUT MODULE - 1.4

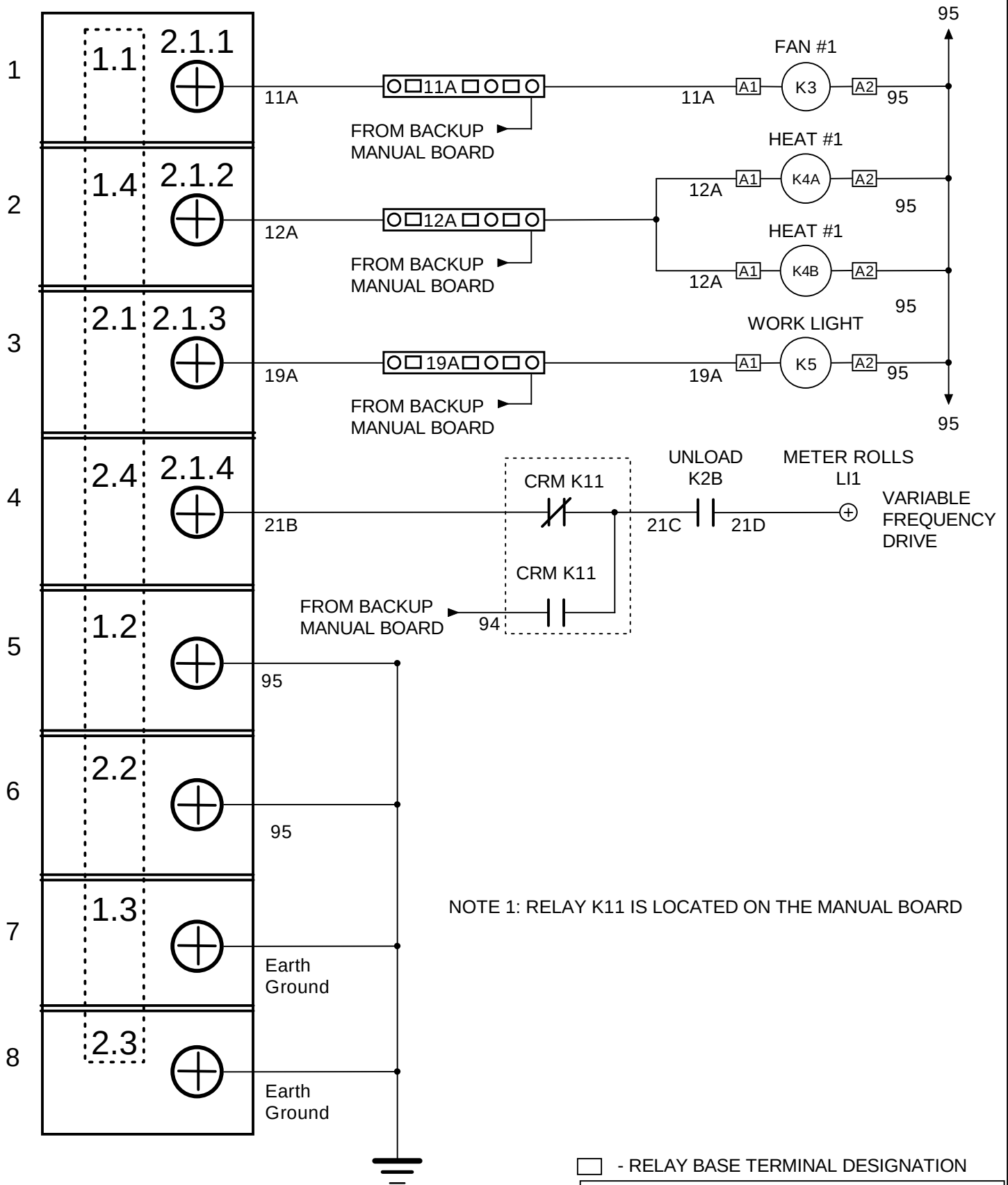
Author: SUKUP MFG CO

Date: 02/12

Sheet: 101.14

Revision:

DIGITAL OUTPUT MODULE 2.1 (RED)



NOTE: Numbers inside of the box are terminal designators printed on the module.

□ - RELAY BASE TERMINAL DESIGNATION

Title: PORTABLE DRYER: SINGLE FAN & HEAT
DIGITAL OUTPUT MODULE - 2.1

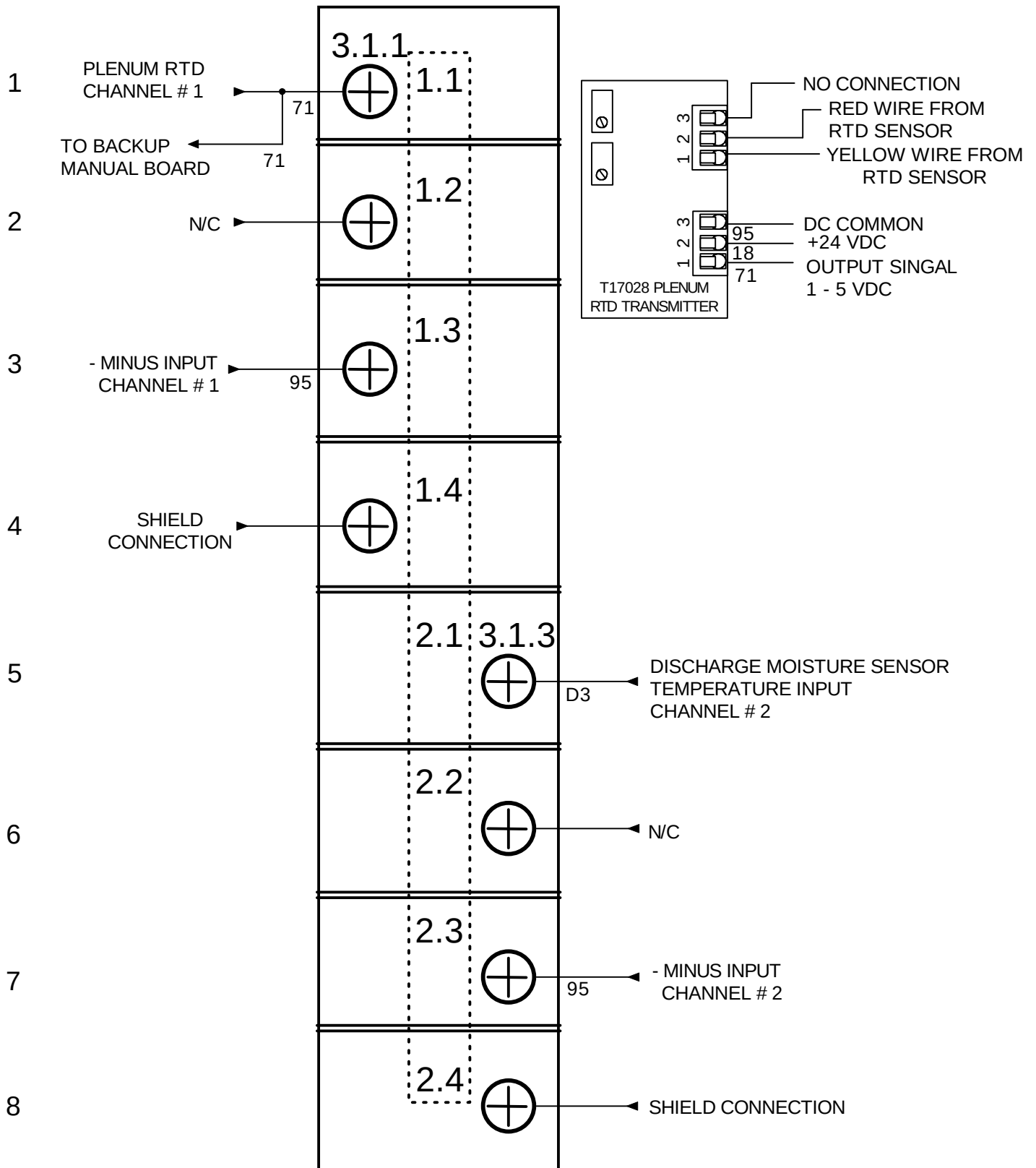
Author: SUKUP MFG CO

Date: 02/12

Sheet: 101.15

Revision:

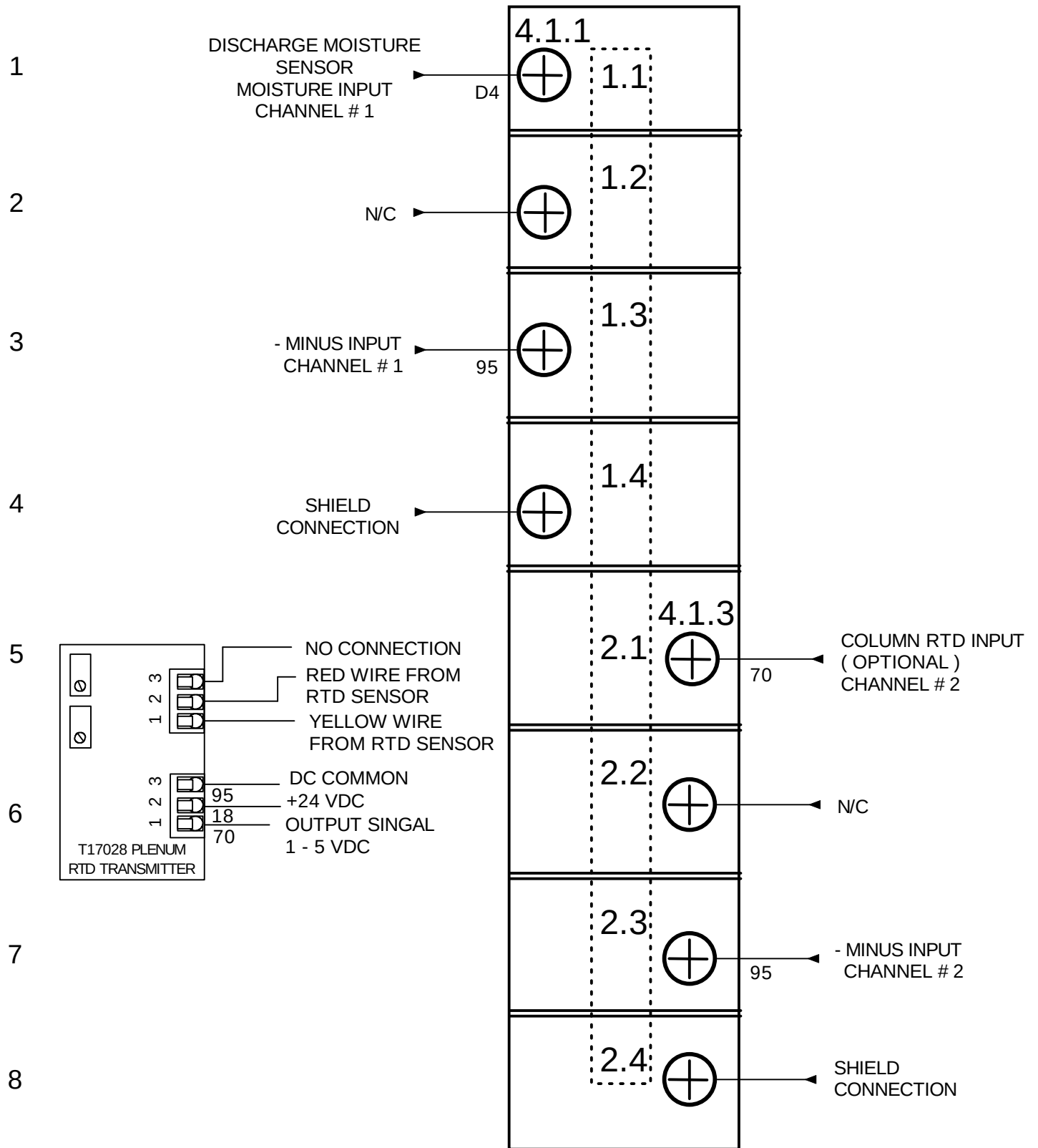
ANALOG INPUT MODULE - 3.1 (GREEN)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: SINGLE FAN & HEAT ANALOG INPUT MODULE - 3.1	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 101.16
Revision:	

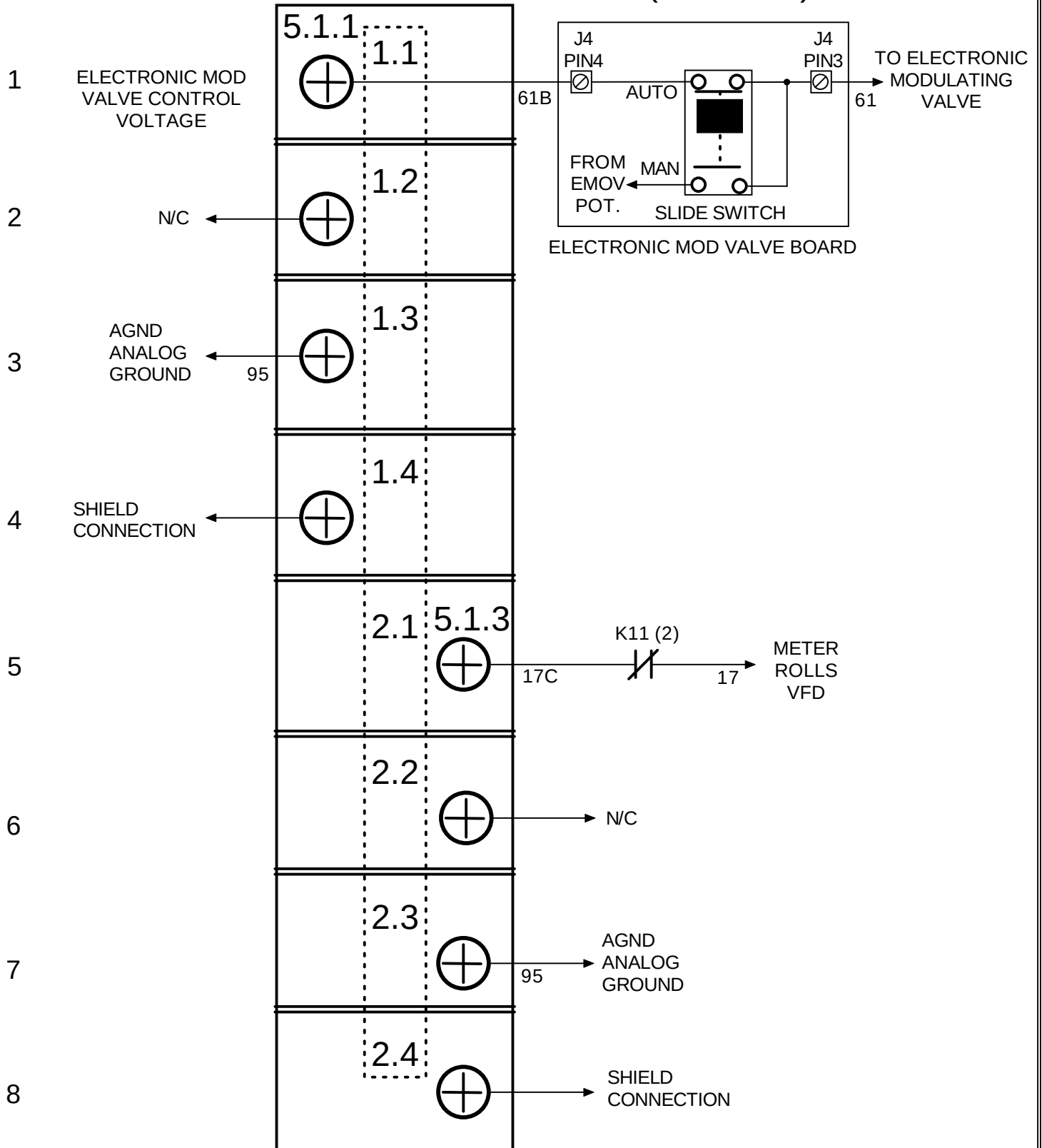
ANALOG INPUT MODULE - 4.1 (GREEN)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: SINGLE FAN & HEAT ANALOG INPUT MODULE -4.1	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 101.17
Revision:	

ANALOG OUTPUT MODULE 5.1 (YELLOW)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: SINGLE FAN & HEAT ANALOG OUTPUT MODULE - 5.1

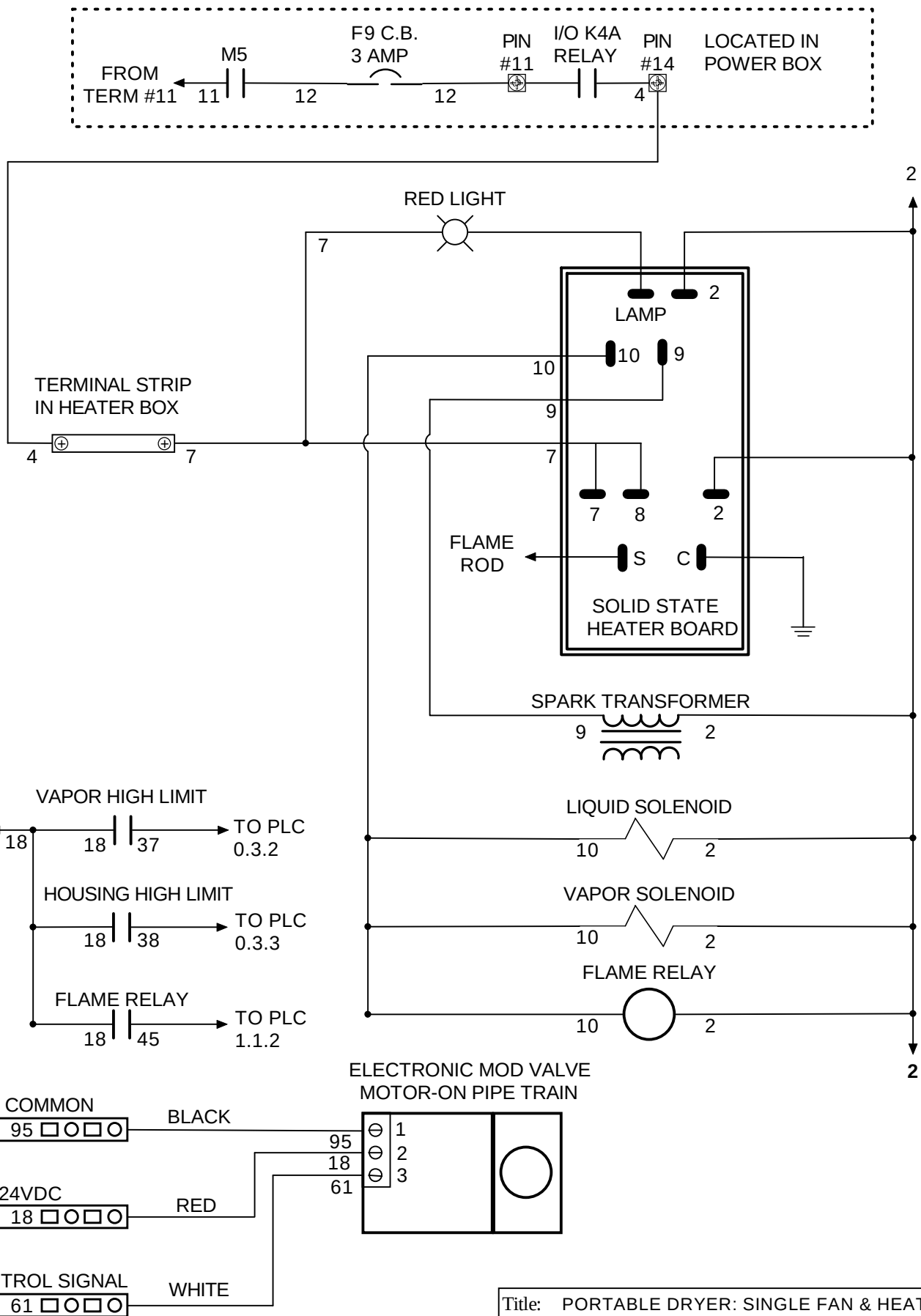
Author: SUKUP MFG CO

Date: 02/12

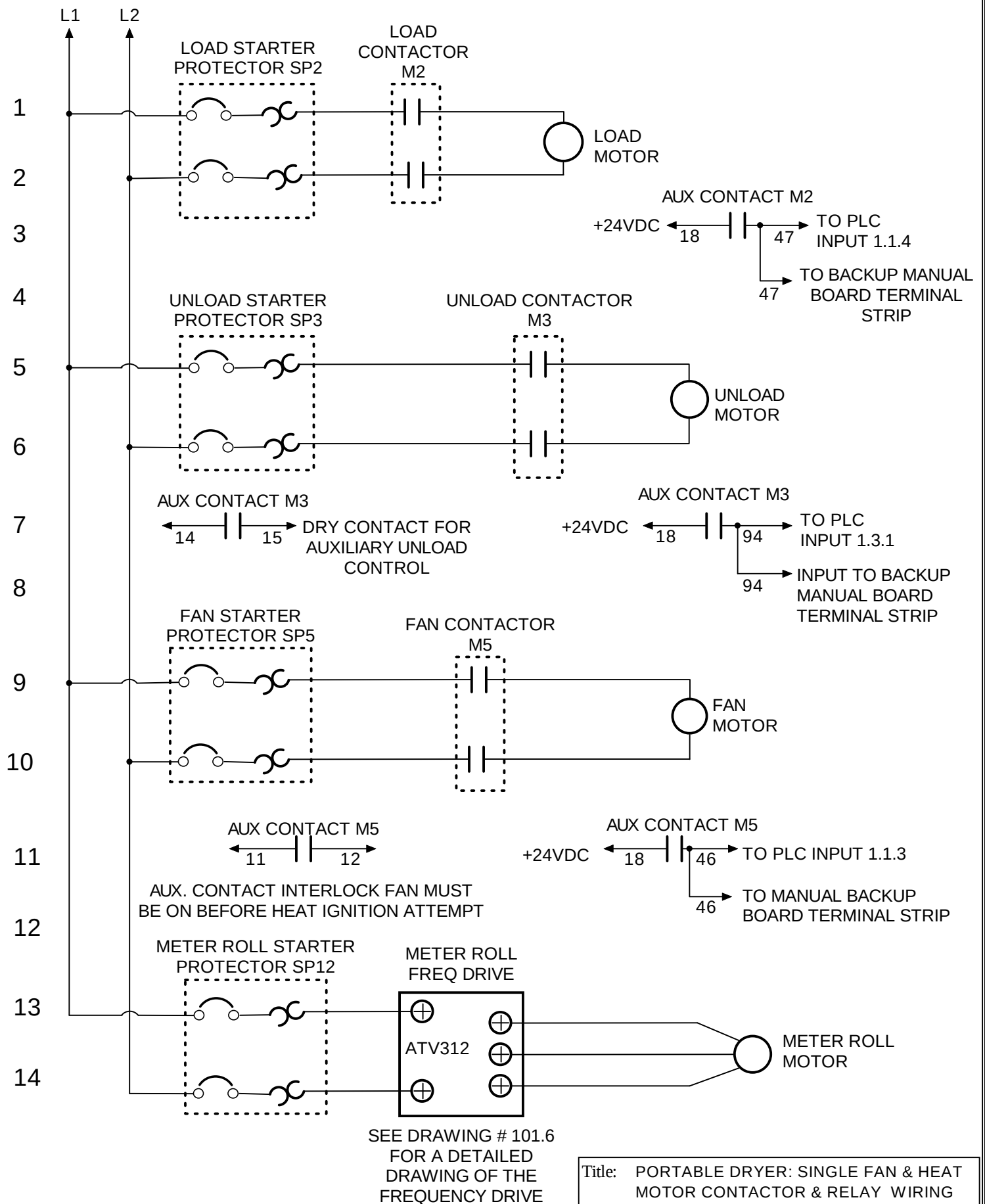
Sheet: 101.18

Revision:

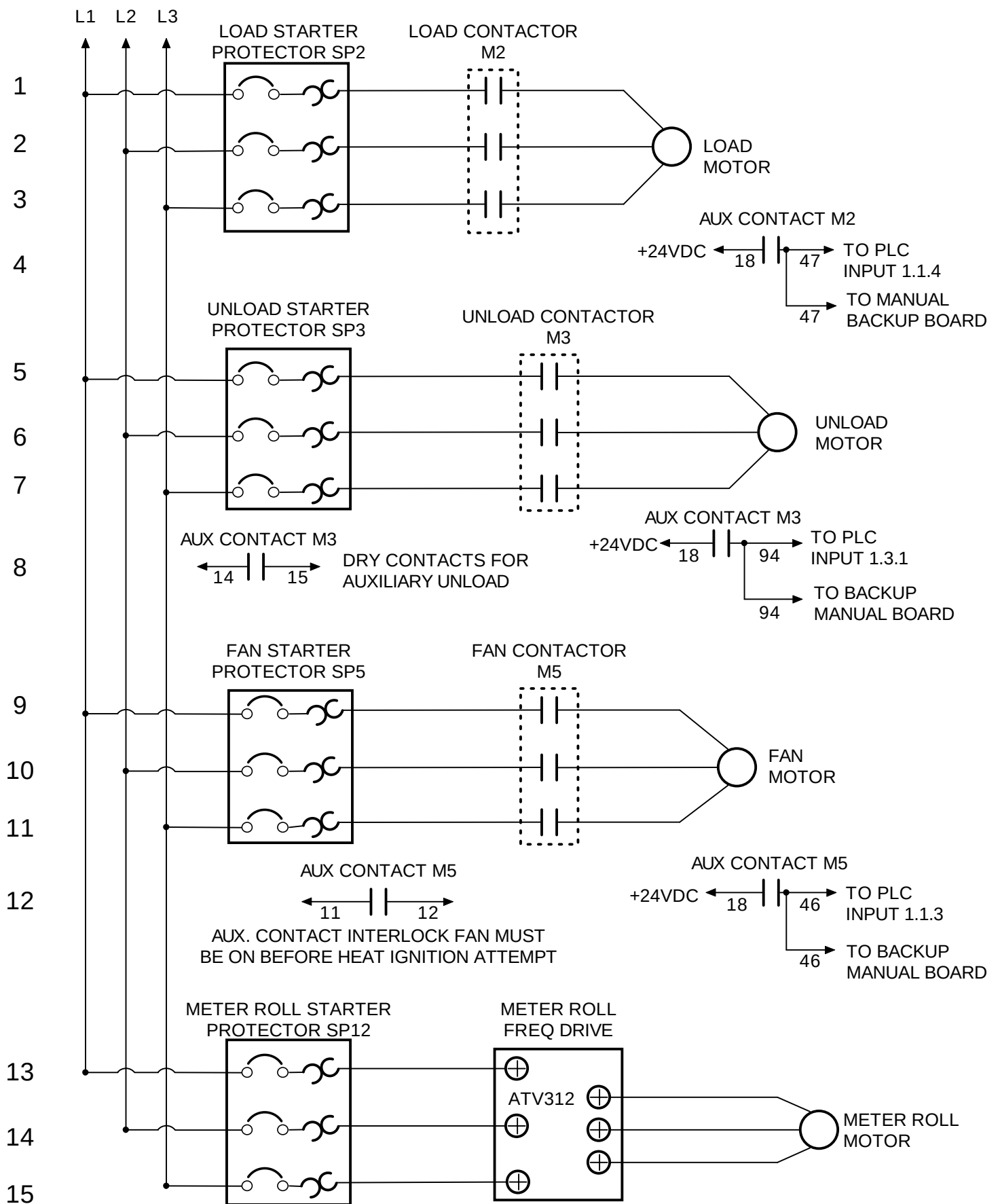
1
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Title: PORTABLE DRYER: SINGLE FAN & HEAT HEATER CONTROL BOARD	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 101.19
Revision:	

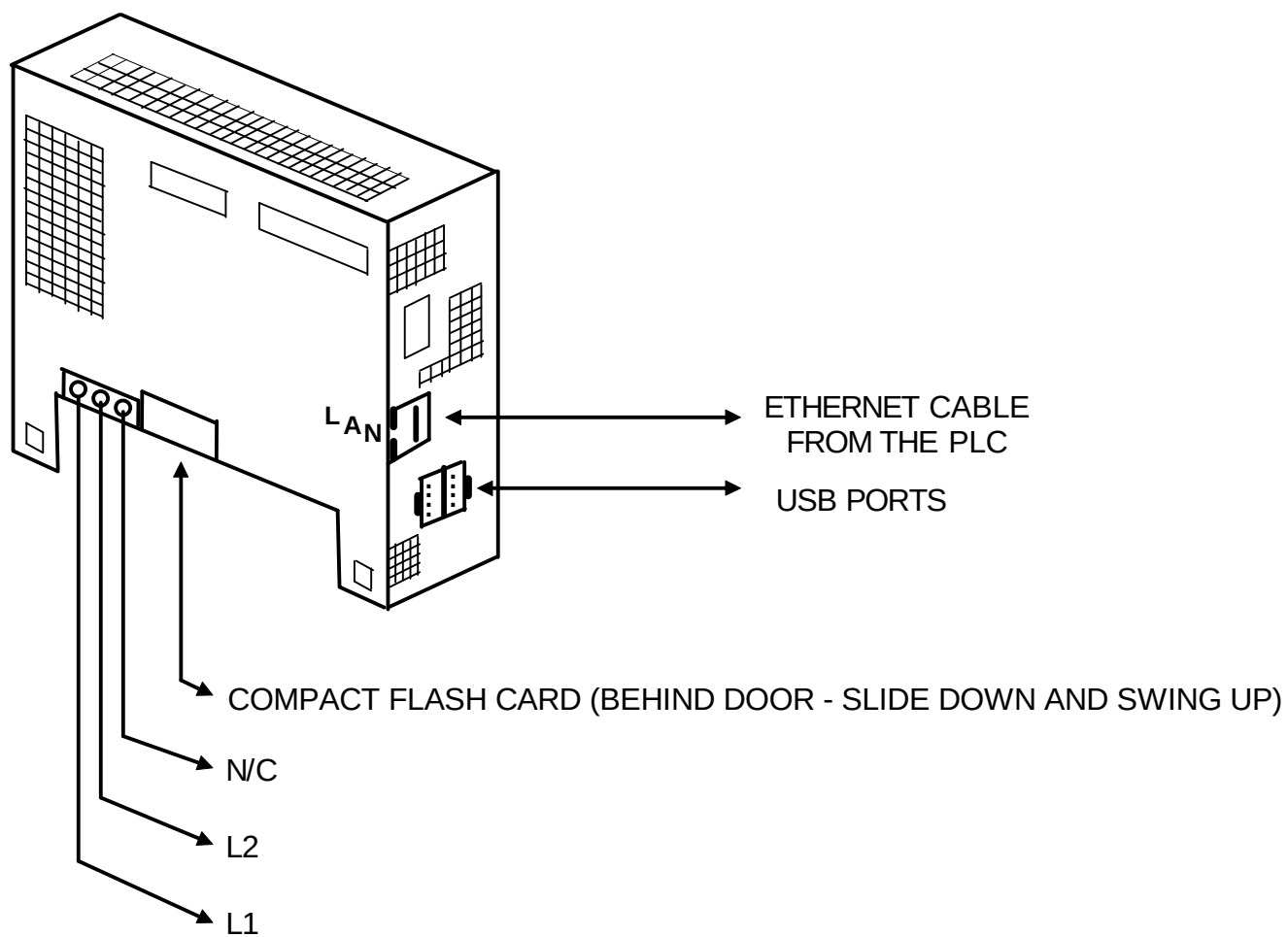


Title: PORTABLE DRYER: SINGLE FAN & HEAT MOTOR CONTACTOR & RELAY WIRING	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 101.20
Revision:	



SEE DRAWING # 101.6 FOR A DETAILED
DRAWING OF THE FREQUENCY DRIVE

Title: PORTABLE DRYER: SINGLE FAN & HEAT MOTOR CONTACTOR & RELAY WIRING	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 101.21
Revision:	



Title: PORTABLE DRYER: SINGLE FAN & HEAT
HMI - TOUCH SCREEN

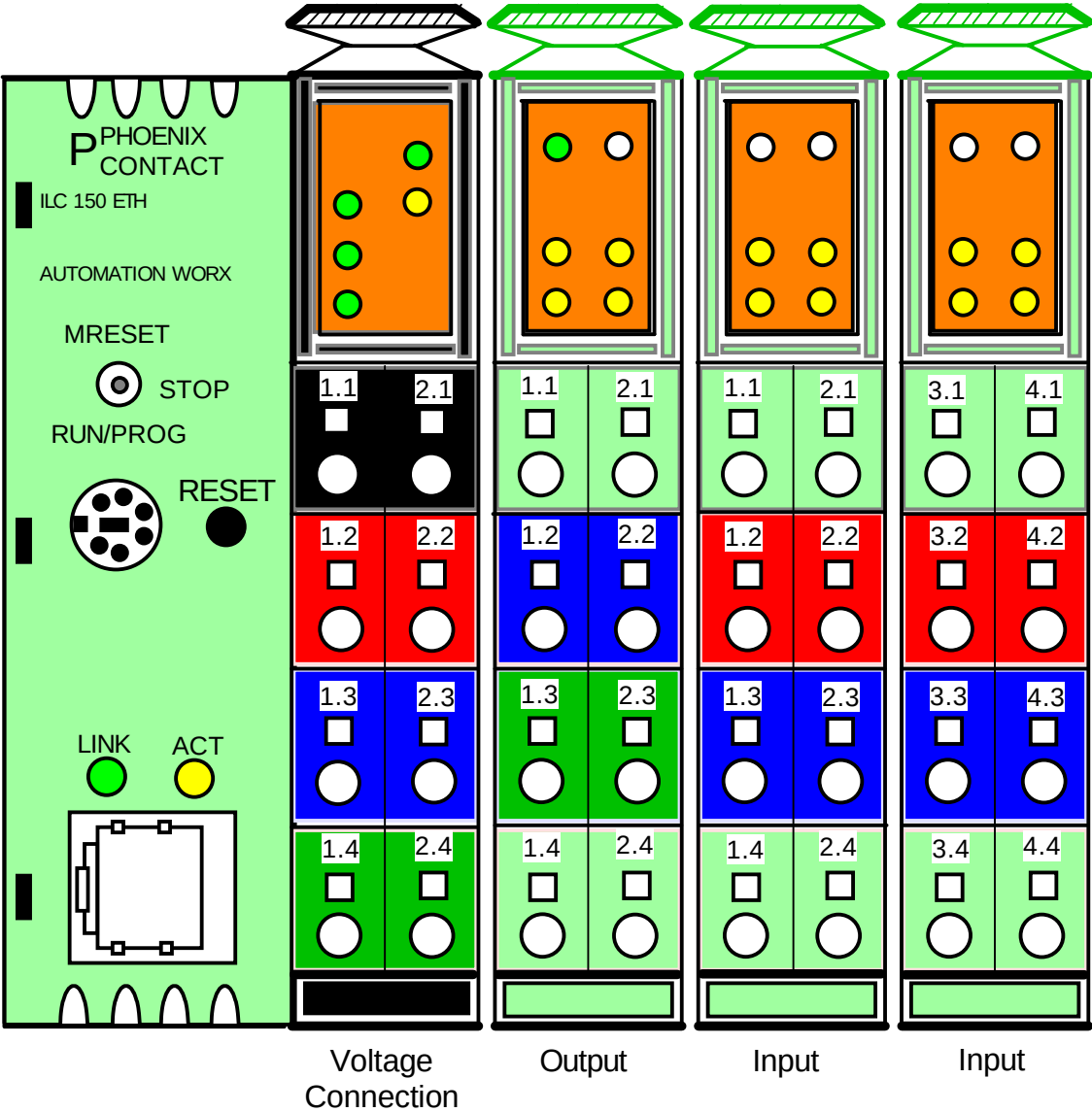
Author: SUKUP MFG CO

Date: 01/10

Sheet: 101.23

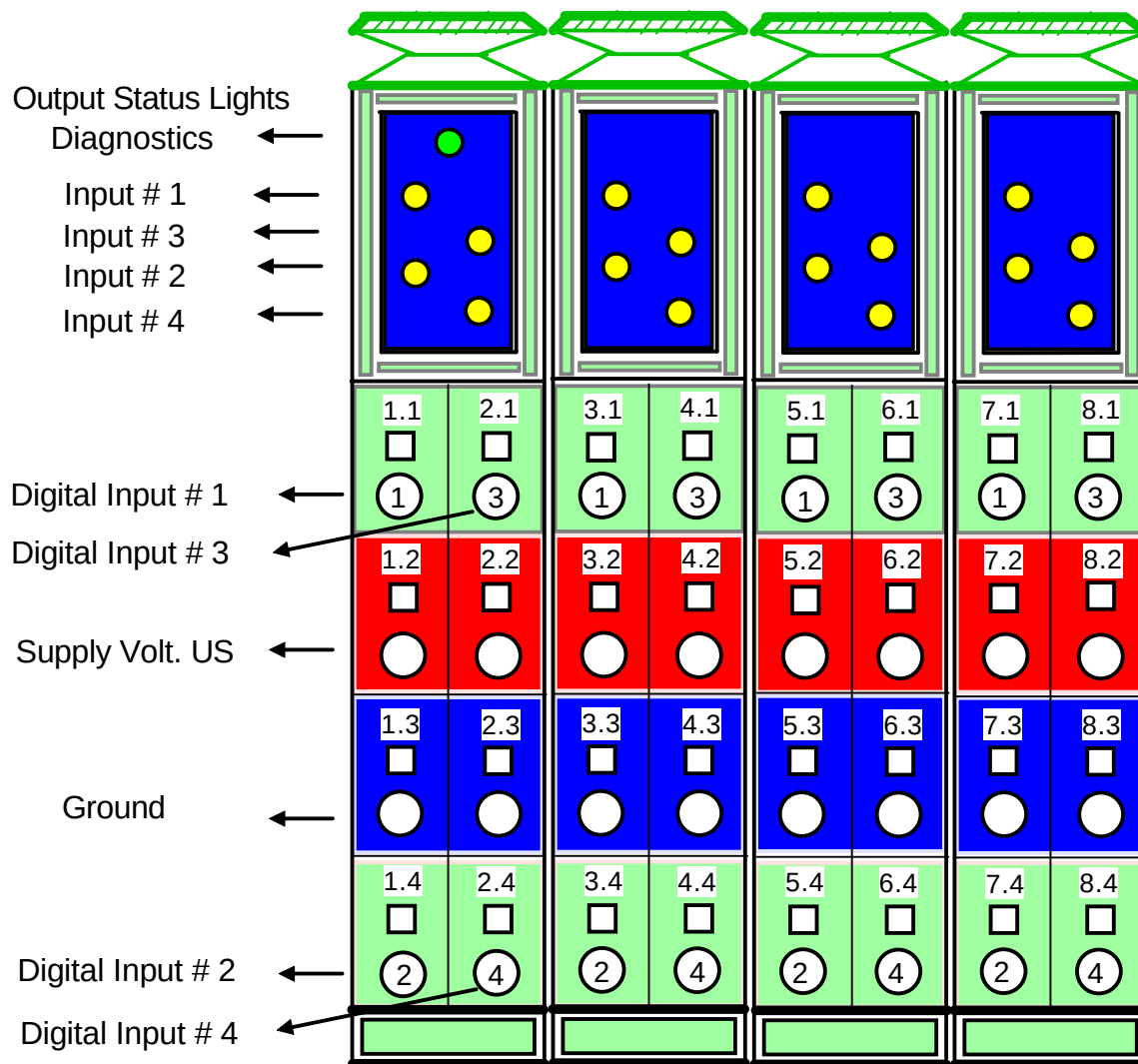
Revision:

PHOENIX CONTACT PLC MODULE ILC 150 (ORANGE)



Title: PORTABLE DRYER: SINGLE FAN & HEAT PHOENIX CONTACT PLC -ILC 150	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 101.24
Revision:	

DIGITAL INPUT MODULE - ILC 150 (BLUE)



DIGITAL OUTPUT MODULE - 16 INPUTS

Diagnostics:

- 1) Green - OK
- 2) Flashing 0.5 Hz - communications power UL available but buss not active
- 3) Flashing 2 Hz - peripheral fault
- 4) Flashing 4 Hz - local bus error

Title: PORTABLE DRYER: SINGLE FAN & HEAT
DIGITAL INPUT MODULE - 16 INPUTS

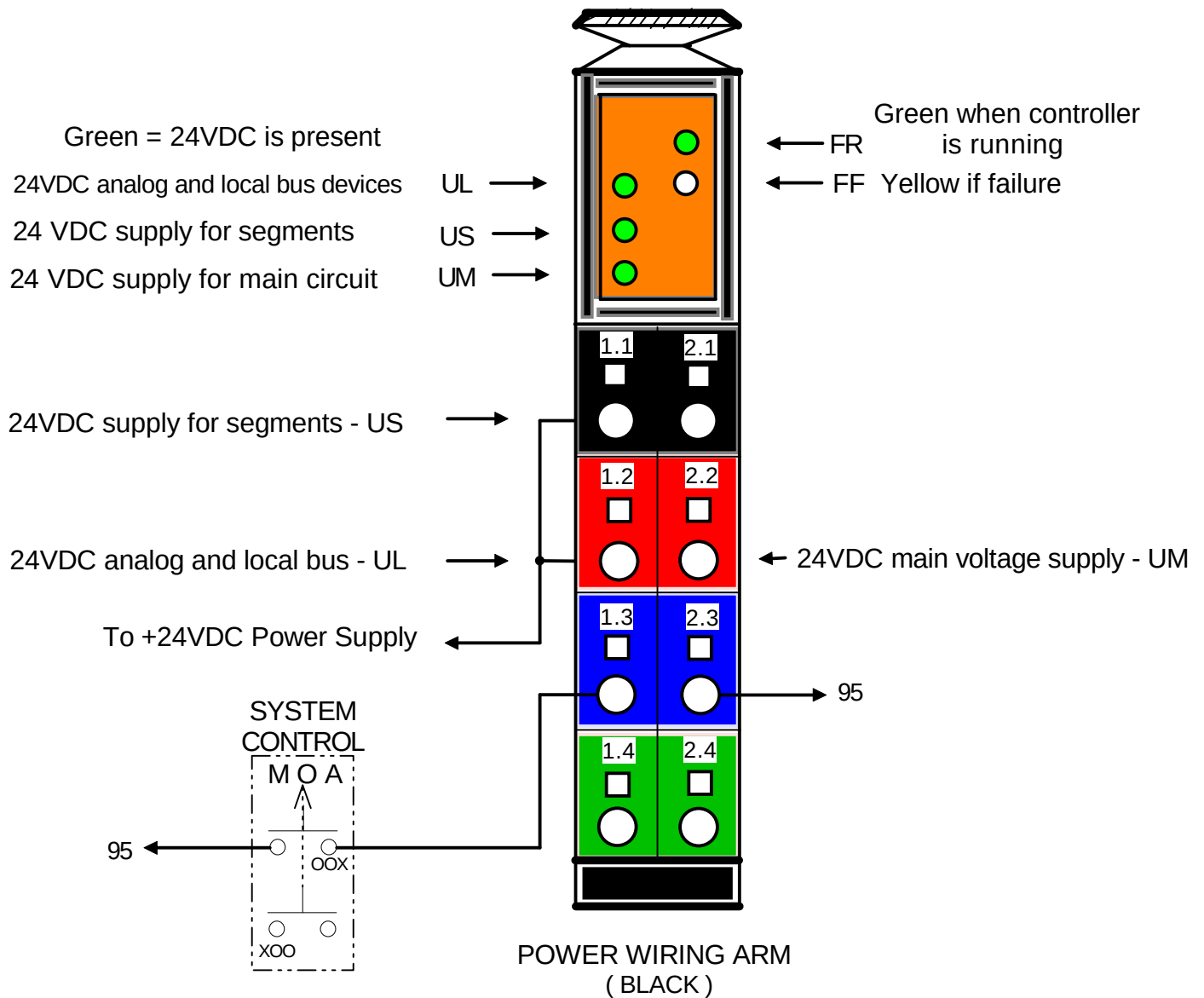
Author: SUKUP MFG CO

Date: 02/12

Sheet: 101.25

Revision:

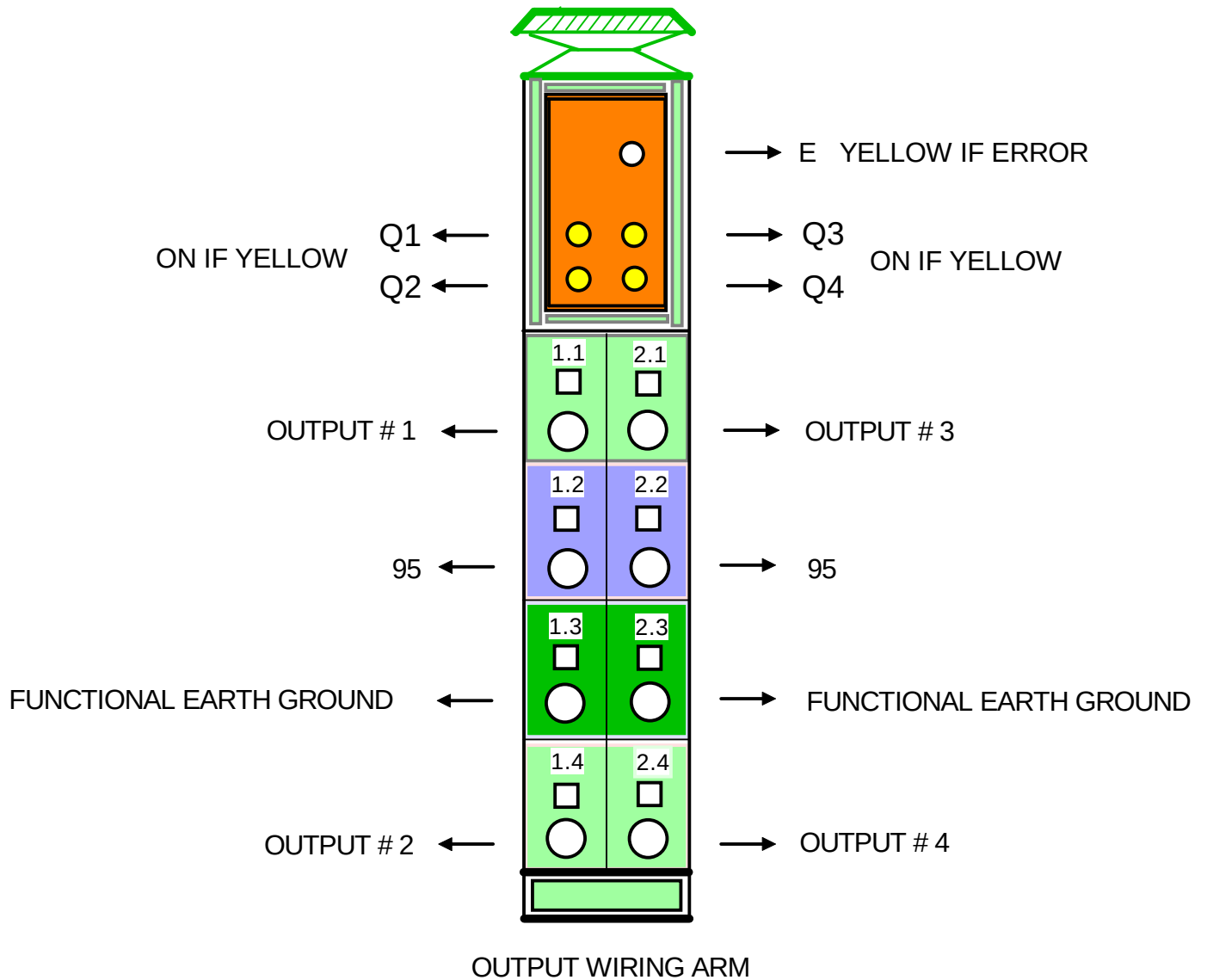
POWER SUPPLY CONNECTION FOR THE ILC 150 (ORANGE)



NOTE: This wiring arm is not a power supply. 24VDC is provided by an independent power supply and connected to this arm, which then supplies the PLC and modules.

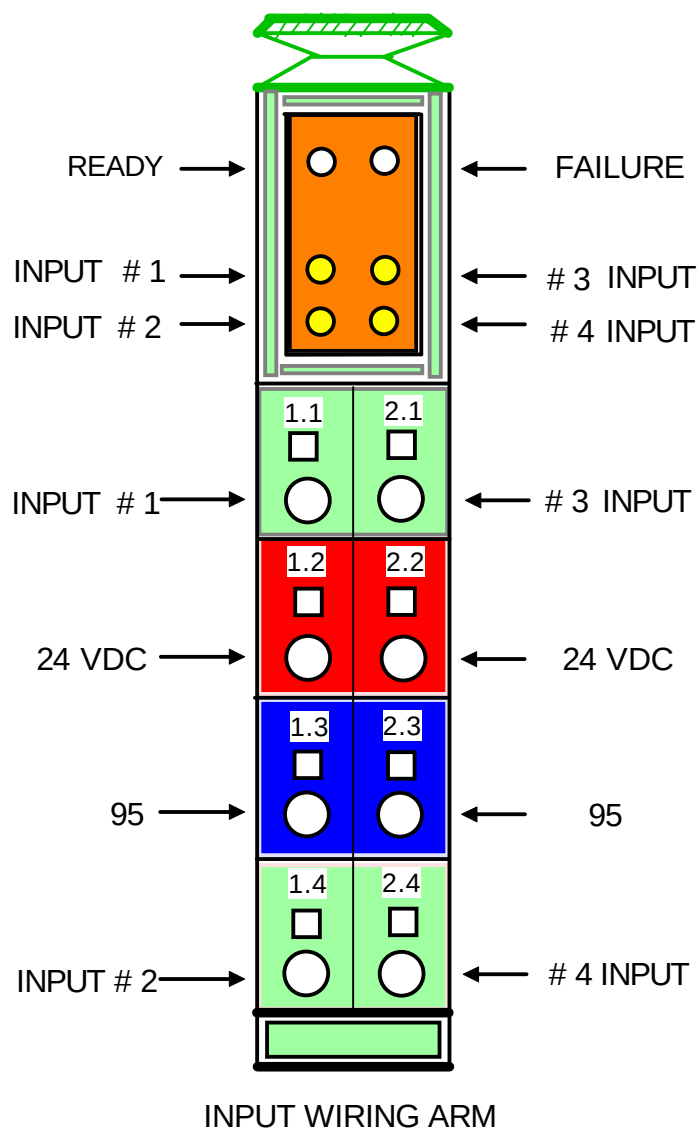
Title: PORTABLE DRYER: SINGLE FAN & HEAT POWER SUPPLY MODULE 24VDC	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 101.26
Revision:	

OUTPUT WIRING ARM - ILC 150 (ORANGE)



Title: PORTABLE DRYER: SINGLE FAN & HEAT OUTPUT MODULE 4 - OUTPUT	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 101.27
Revision:	

INPUT WIRING ARM - ILC 150 (ORANGE)



Title: PORTABLE DRYER: SINGLE FAN & HEAT
INPUT MODULE - 4 INPUTS

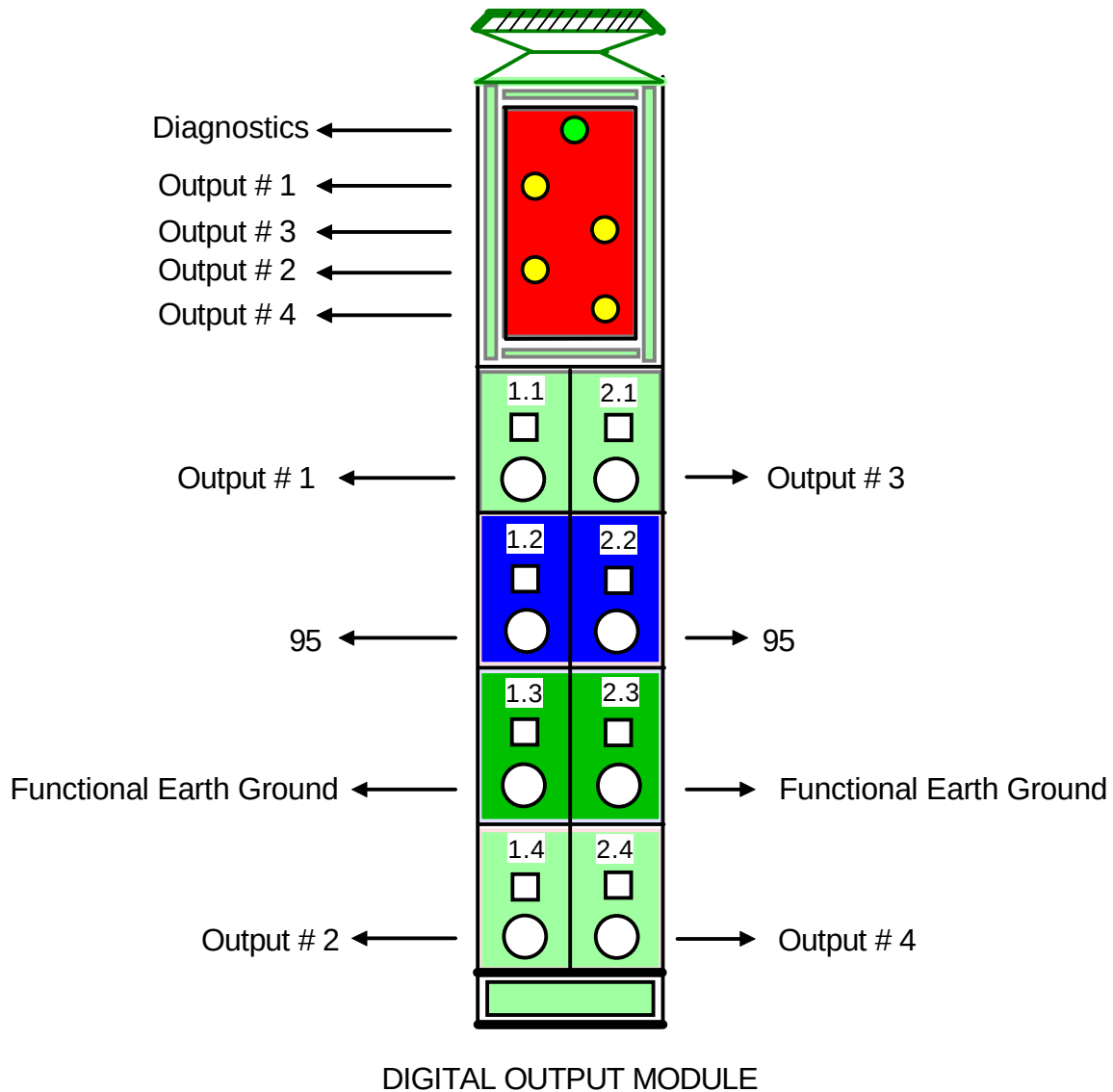
Author: SUKUP MFG CO

Date: 02/12

Sheet: 101.28

Revision:

DIGITAL OUTPUT MODULE PLC - ILC - 150 (RED)

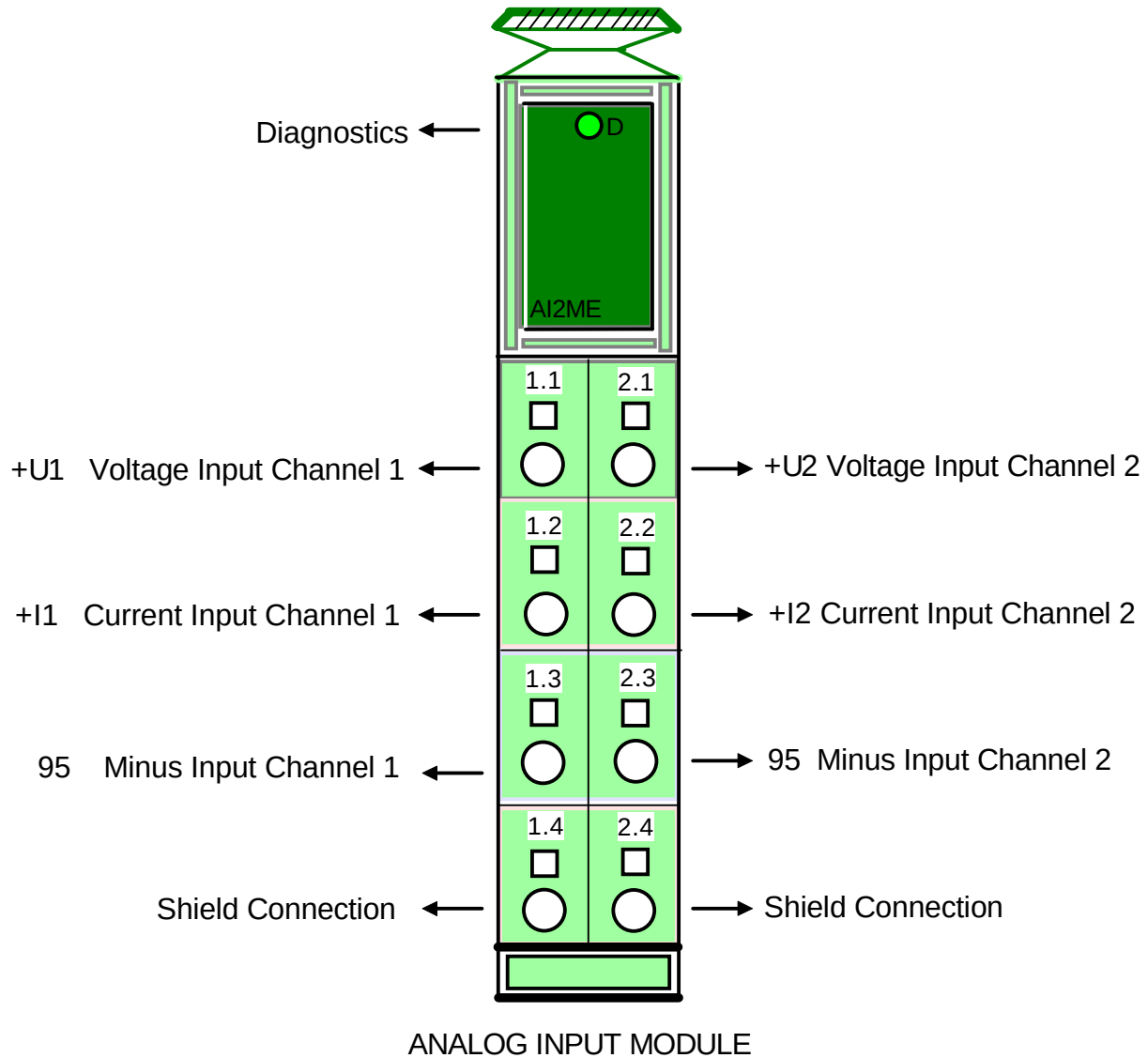


Diagnostics:

- 1) Green - OK - Bus Active
- 2) Flashing @ 0.5 HZ - Communications power UL available, bus not active
- 3) Flashing @ 2 HZ - Peripheral fault
- 4) Flashing @ 4 HZ - Local bus error

Title: PORTABLE DRYER: SINGLE FAN & HEAT DIGITAL OUTPUT MODULE - 4 OUTPUTS	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 101.29
Revision:	

ANALOG INPUT MODULE PLC - ILC 150 (GREEN)



Title: PORTABLE DRYER: SINGLE FAN & HEAT
ANALOG INPUT MODULE 0 - 10 VDC

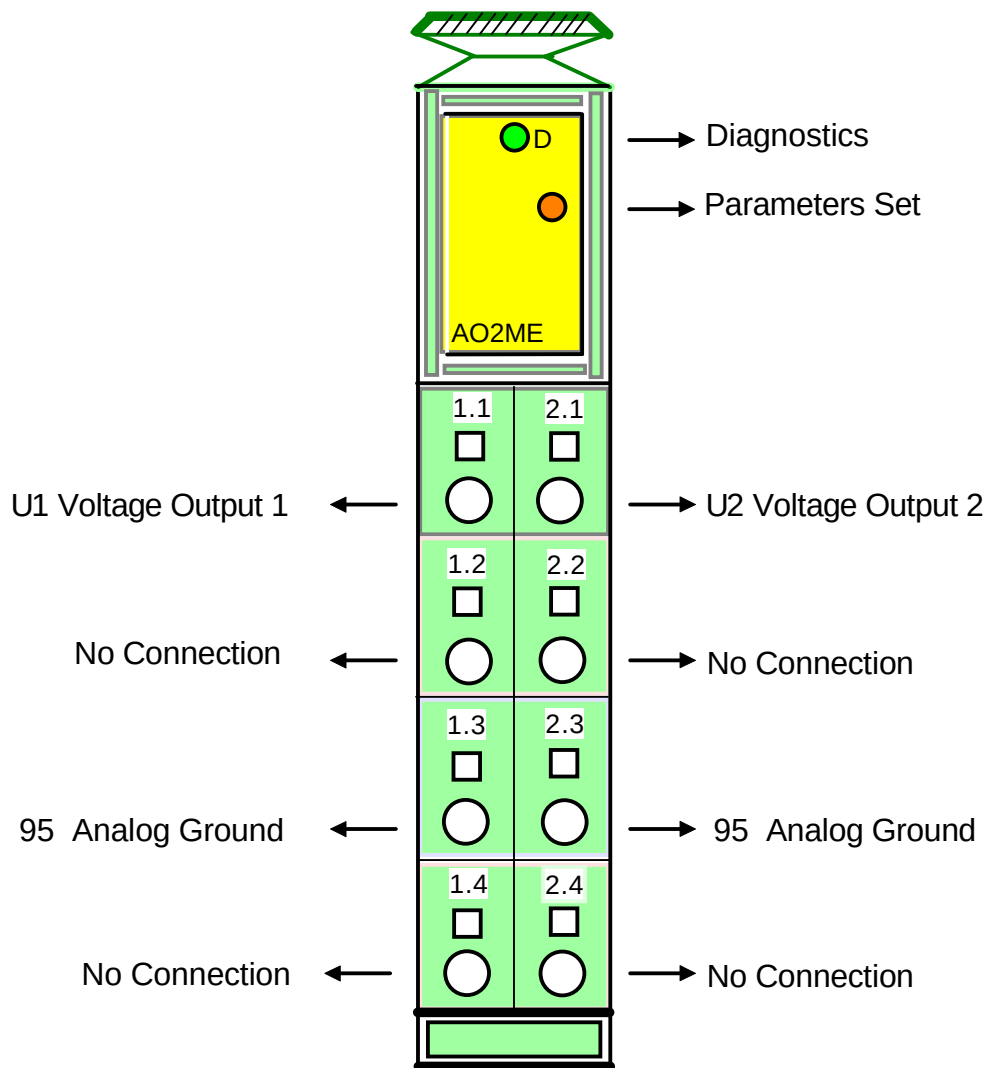
Author: SUKUP MFG CO

Date: 02/12

Sheet: 101.30

Revision:

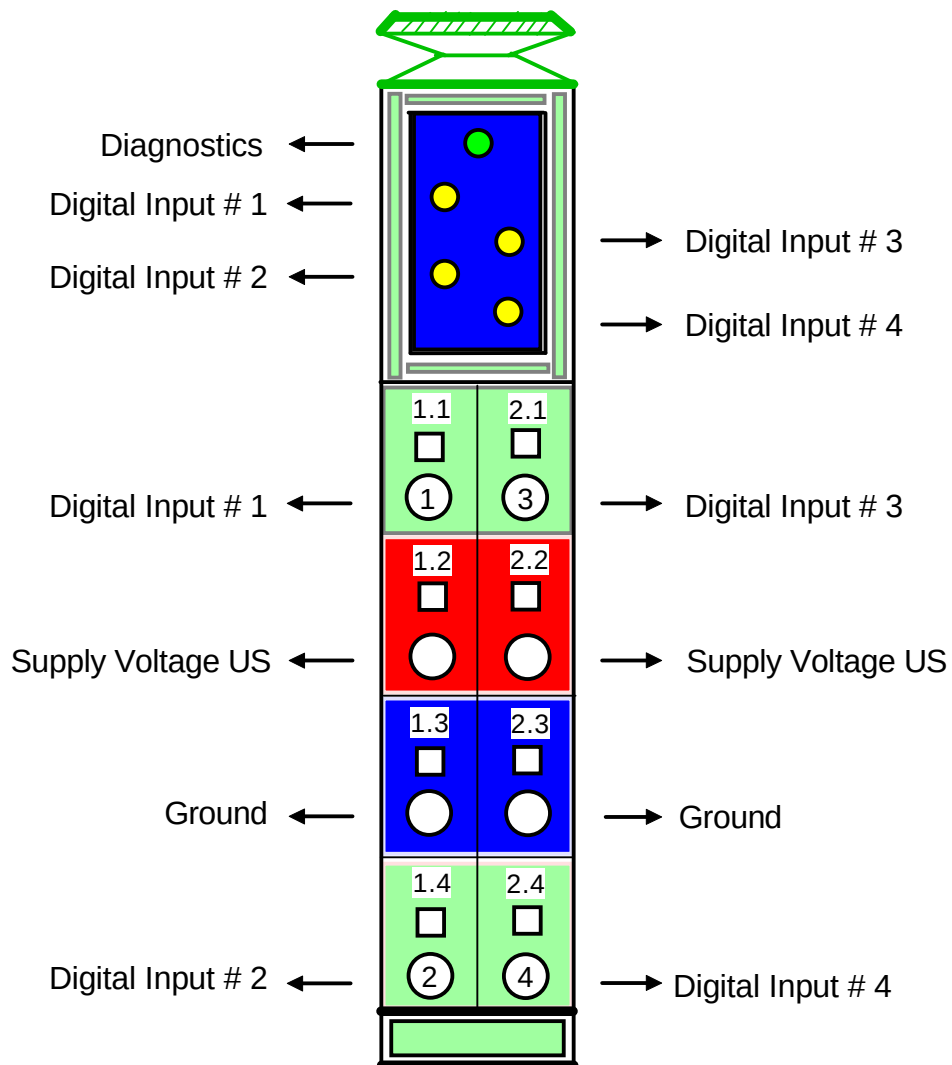
ANALOG OUTPUT MODULE PLC - ILC 150 (YELLOW)



ANALOG OUTPUT MODULE

Title: PORTABLE DRYER: SINGLE FAN & HEAT ANALOG OUTPUT MODULE0 - 10 VDC	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 101.31
Revision:	

DIGITAL INPUT MODULE - 4 INPUTS PLC - ILC - 150, 24 VDC (BLUE)



Diagnostics:

- 1) Green - OK
- 2) Flashing 0.5 Hz - communications power UL available but buss not active
- 3) Flashing 2 Hz - peripheral fault
- 4) Flashing 4 Hz - local bus error

Title: PORTABLE DRYER: SINGLE FAN & HEAT
DIGITAL INPUT MODULE 4 INPUTS

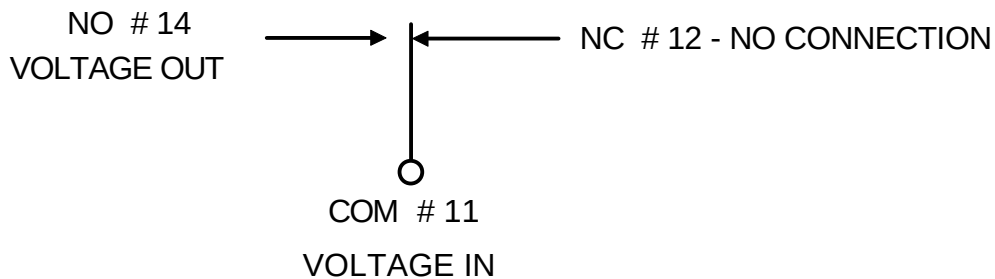
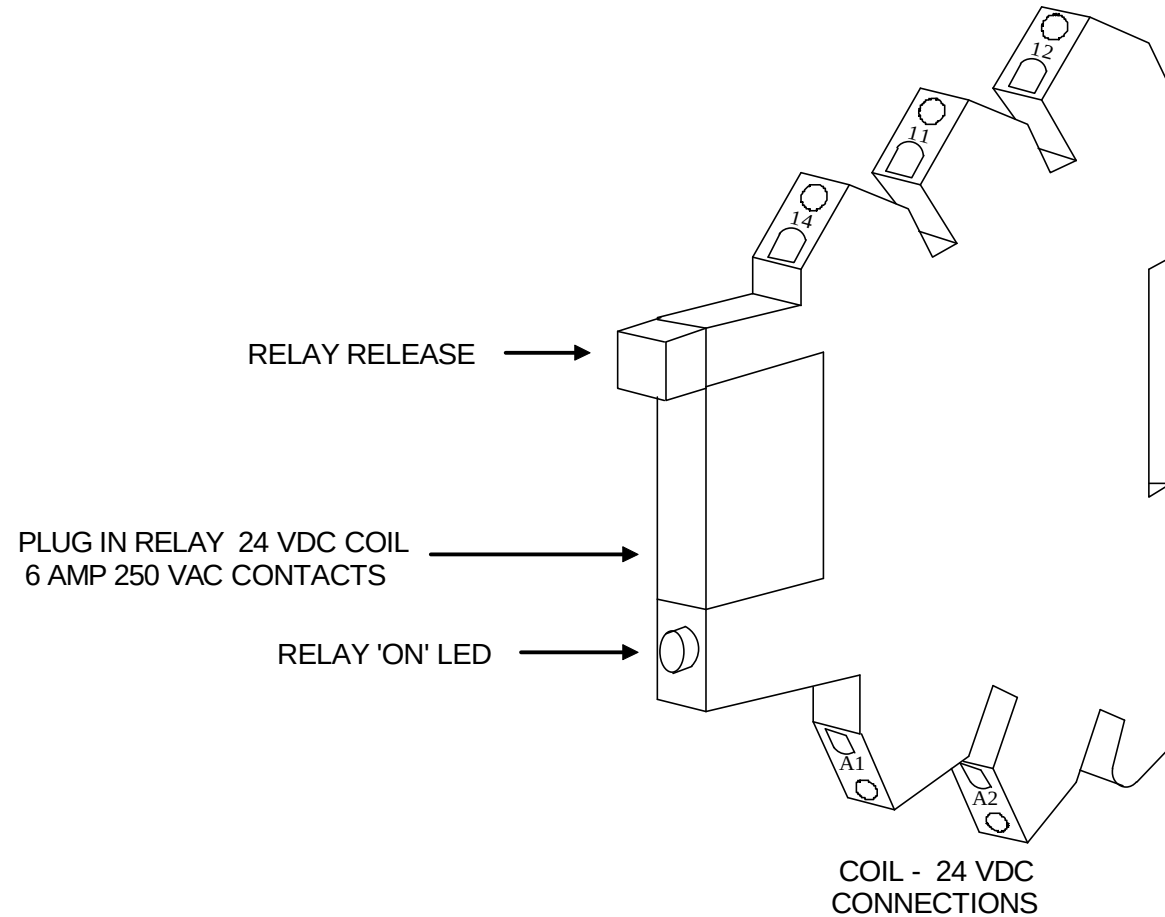
Author: SUKUP MFG CO

Date: 02/12

Sheet: 101.32

Revision:

RELAY MODULE - 1 POLE



Title: PORTABEL DRYER: SINGLE FAN & HEAT
RELAY MODULE 24V COIL, 1POLE

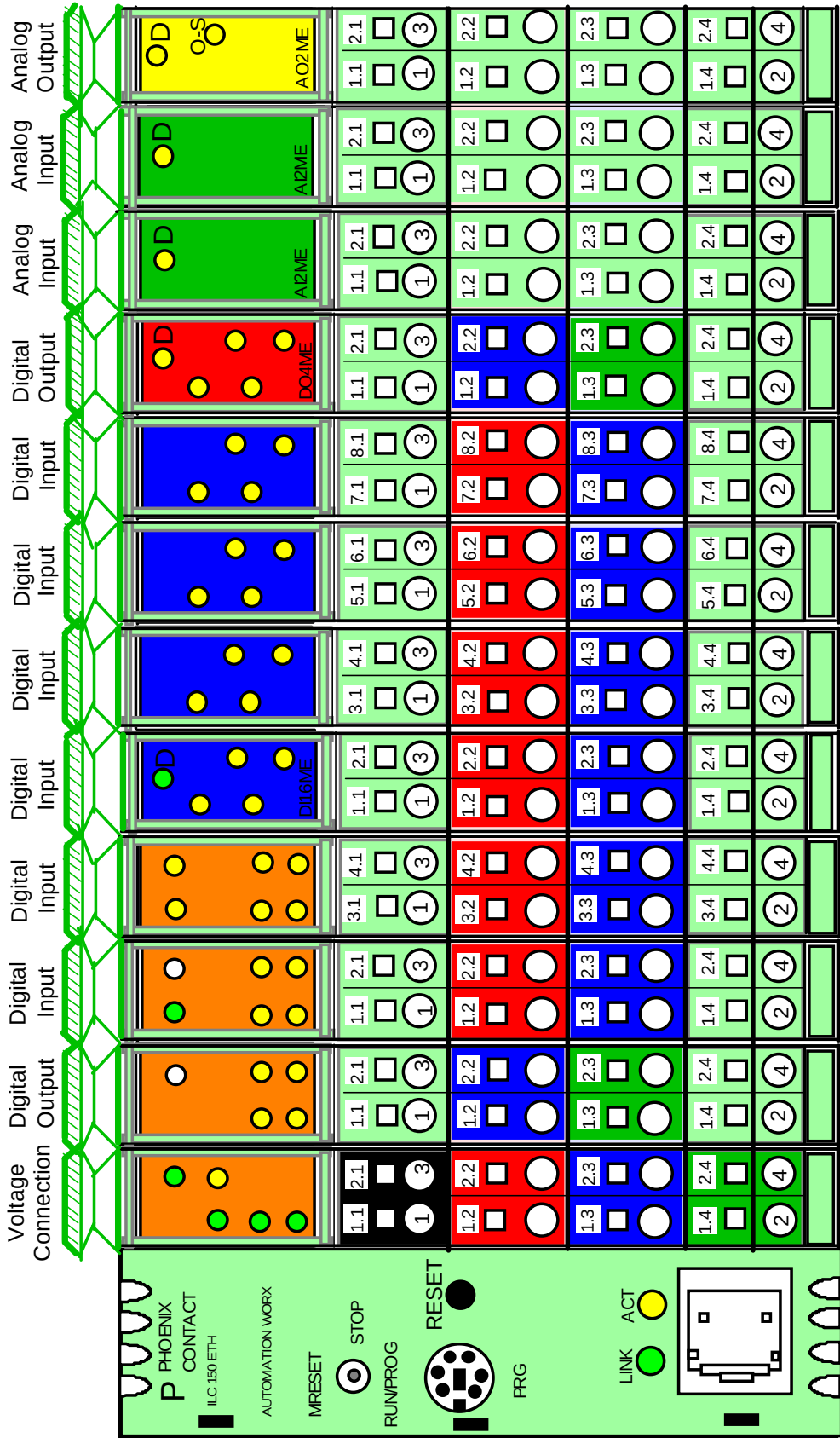
Author: SUKUP MFG CO

Date: 02/12

Sheet: 101.33

Revision:

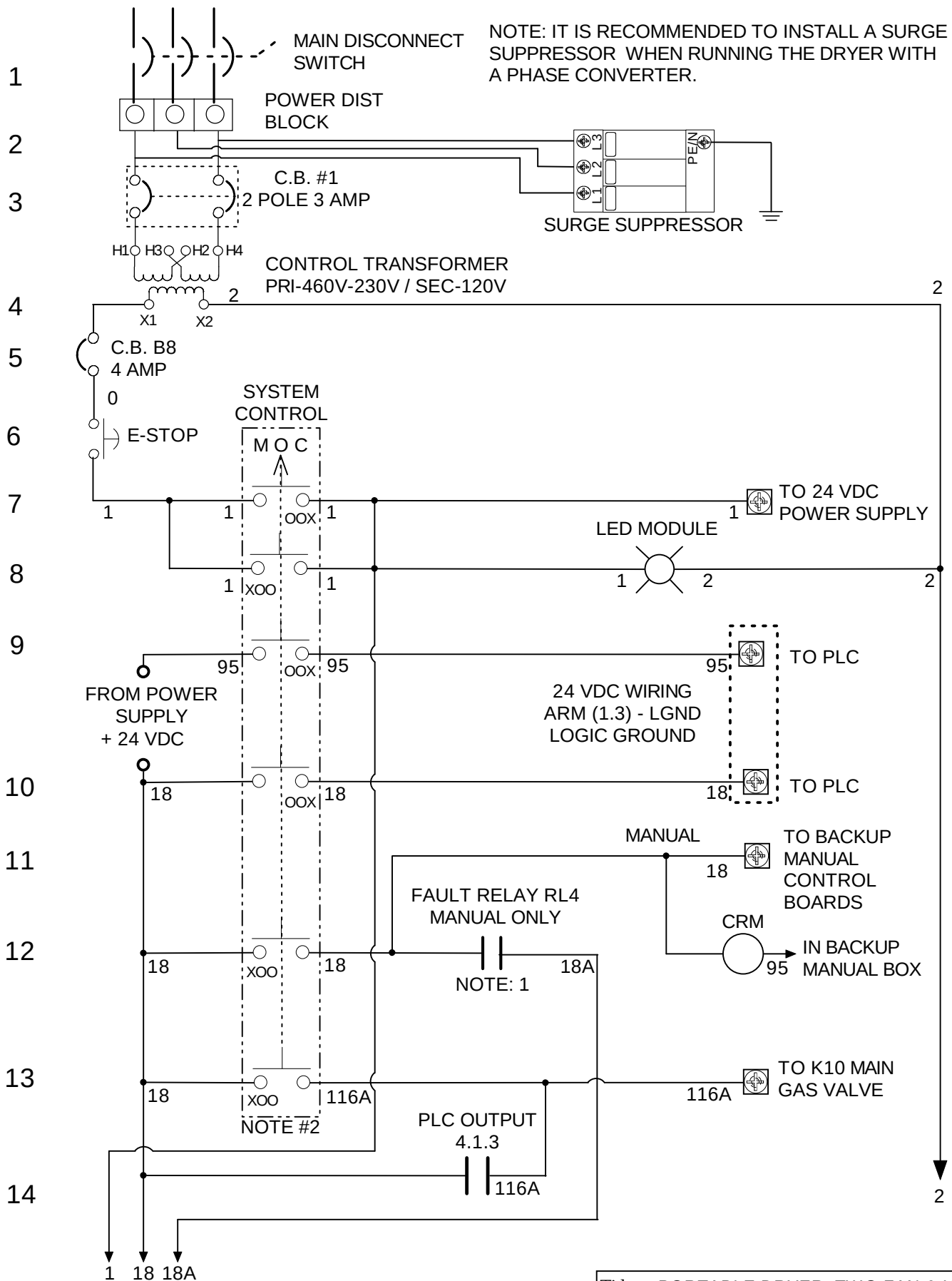
BASE NUMBERING - SINGLE FAN PLC



NOTE: 1st number = module # 2nd number = segment # in that module 3rd number = I/O # on that segment

Title: PORTABLE DRYER: SINGLE FAN & HEAT PLC MODULE BASE NUMBERING	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 101.34
Revision:	

2012
ELECTRICAL DRAWINGS
TWO FAN & HEAT



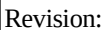
Title: PORTABLE DRYER: TWO FAN & HEAT
PLC - ILC 150 120VAC & 24VDC CONTROL

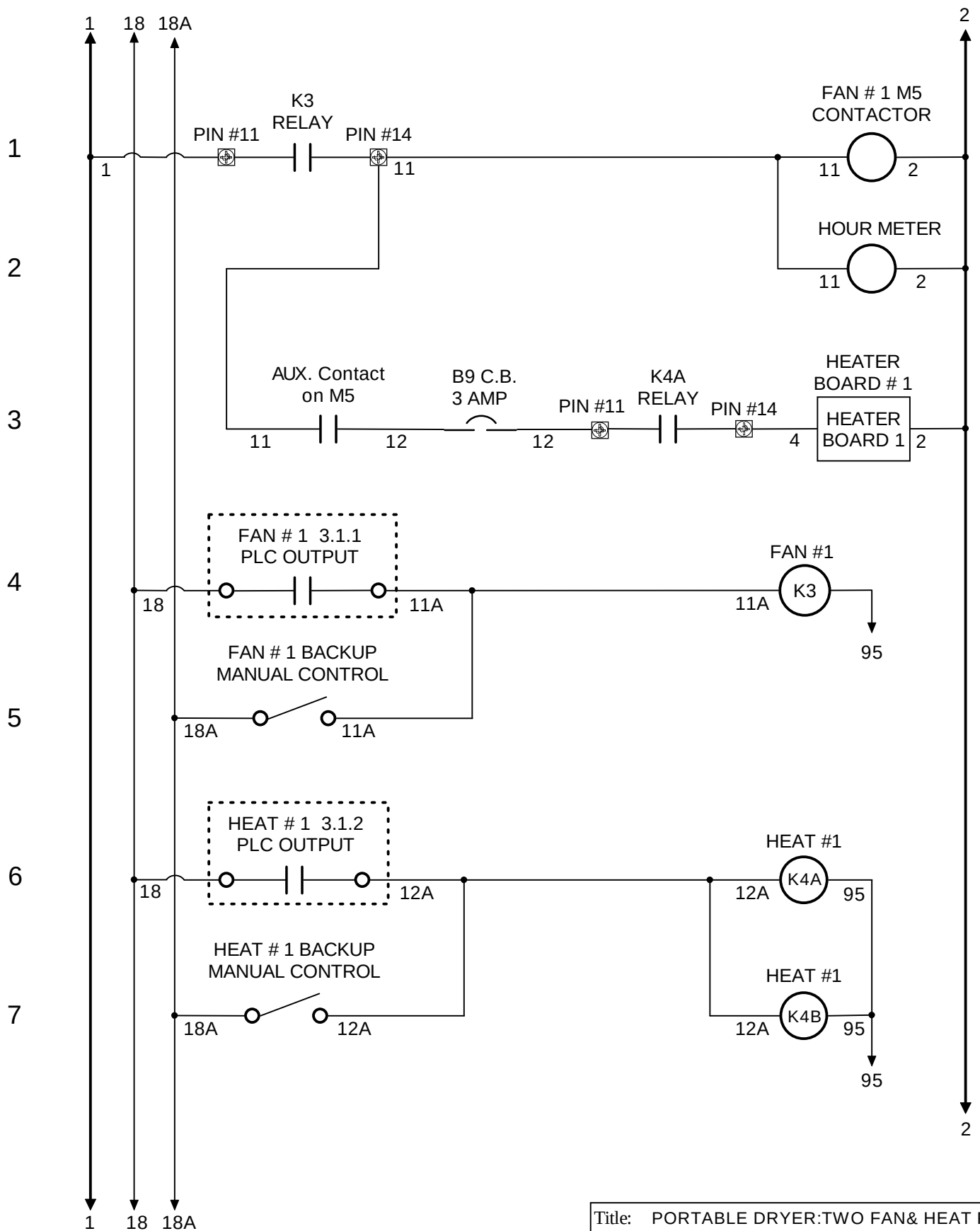
Author: SUKUP MFG CO

Date: 02/12

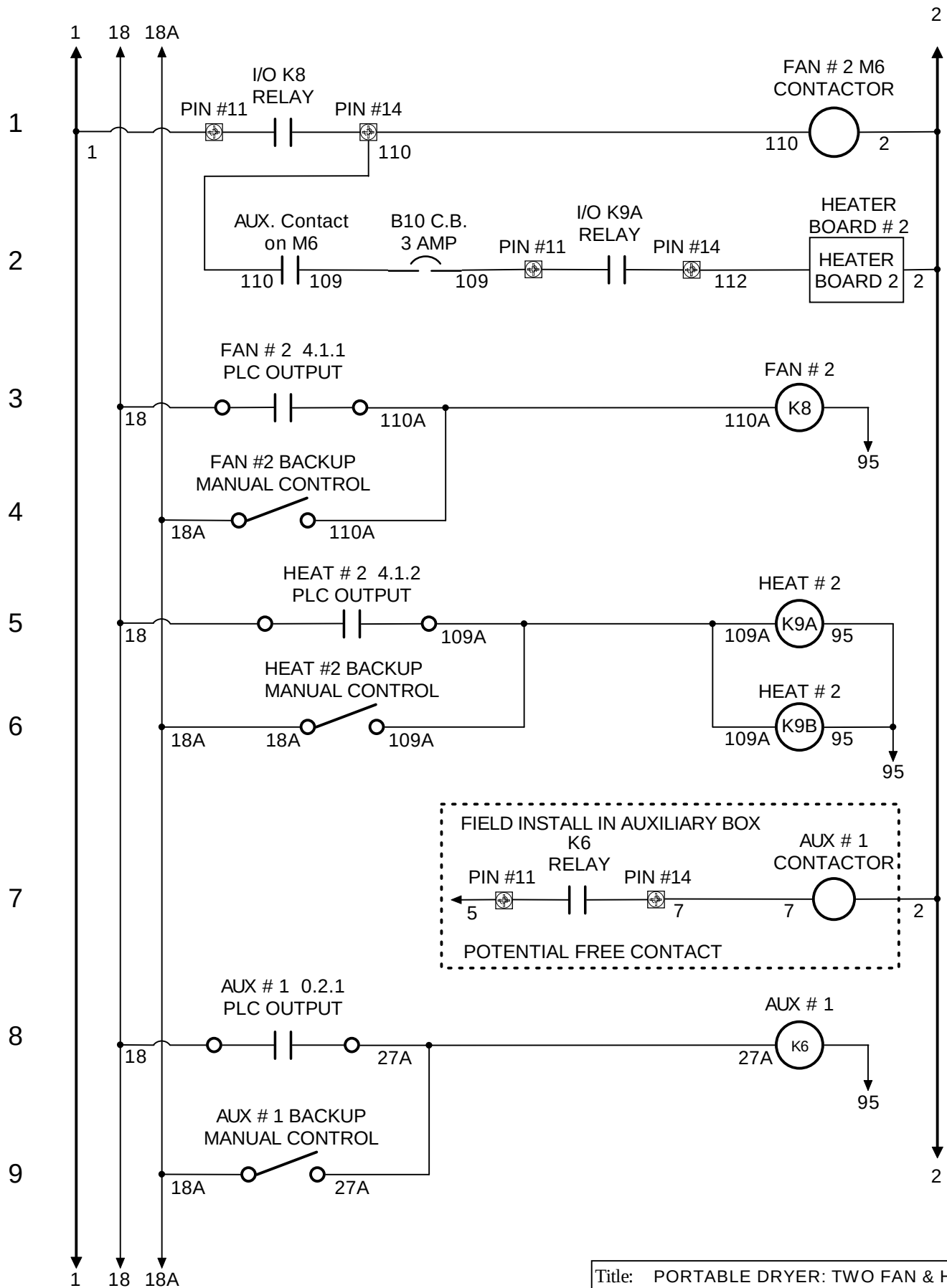
Sheet: 102.1

Revision:

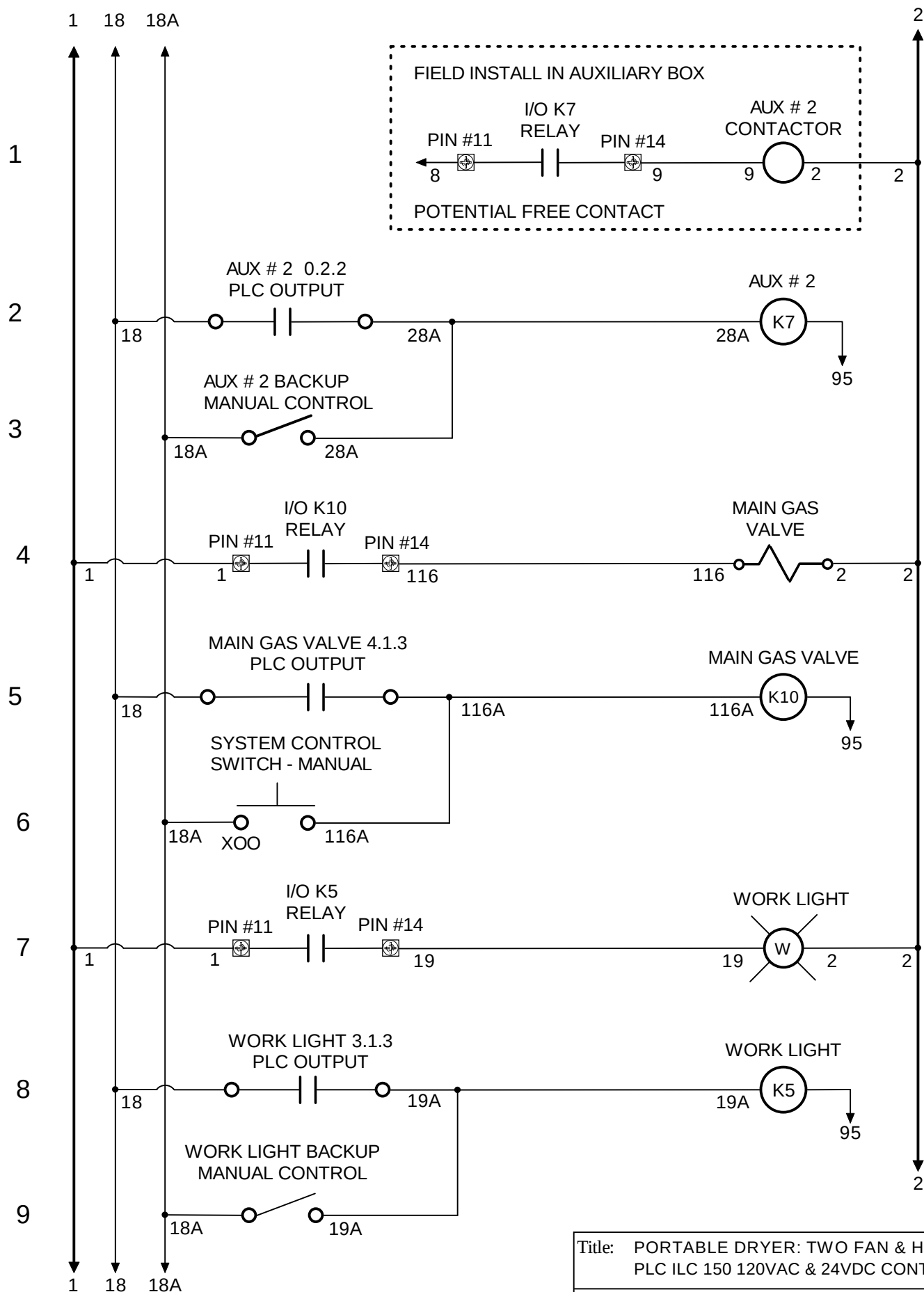




Title: PORTABLE DRYER:TWO FAN& HEAT PLC ILC 150 120VAC & 24 VDC CONTROL	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 102.3
Revision:	



Title: PORTABLE DRYER: TWO FAN & HEAT PLC ILC 150 120VAC & 24VDC CONTROL	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 102.4
Revision:	



Title: PORTABLE DRYER: TWO FAN & HEAT
PLC ILC 150 120VAC & 24VDC CONTROL

Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.5

Revision:

NOTE PAGE

1. The following note applies to MANUAL operation only.

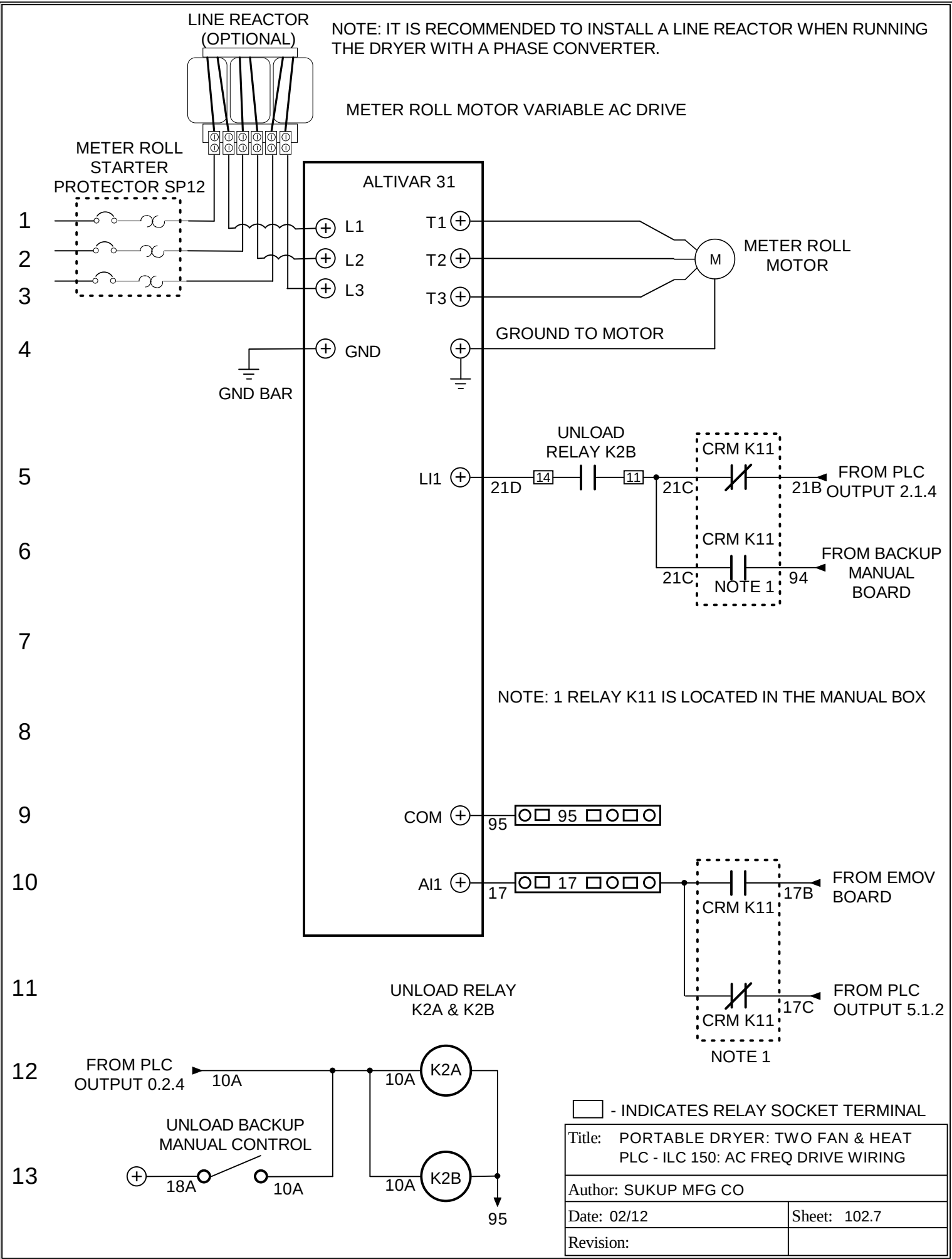
This contact is located on fault relay RL4. The relay is physically mounted on the manual control board. The contact is closed if no faults are present. Check LED # 57 (NO Fault) on the manual control board. This LED should be ON if no faults are present. (Load, Unload, and all Fan switches need to be in the OFF position before the NO Fault LED will turn ON - assuming no other faults are present)

If a fault condition was present, the manual reset (located on the manual control board - upper left corner) will need to be pressed to clear the fault. If the fault condition *has not* been corrected, the RED LED associated with that fault will go out when the reset has been pushed, but will turn ON again within a few seconds, after the faults are scanned.

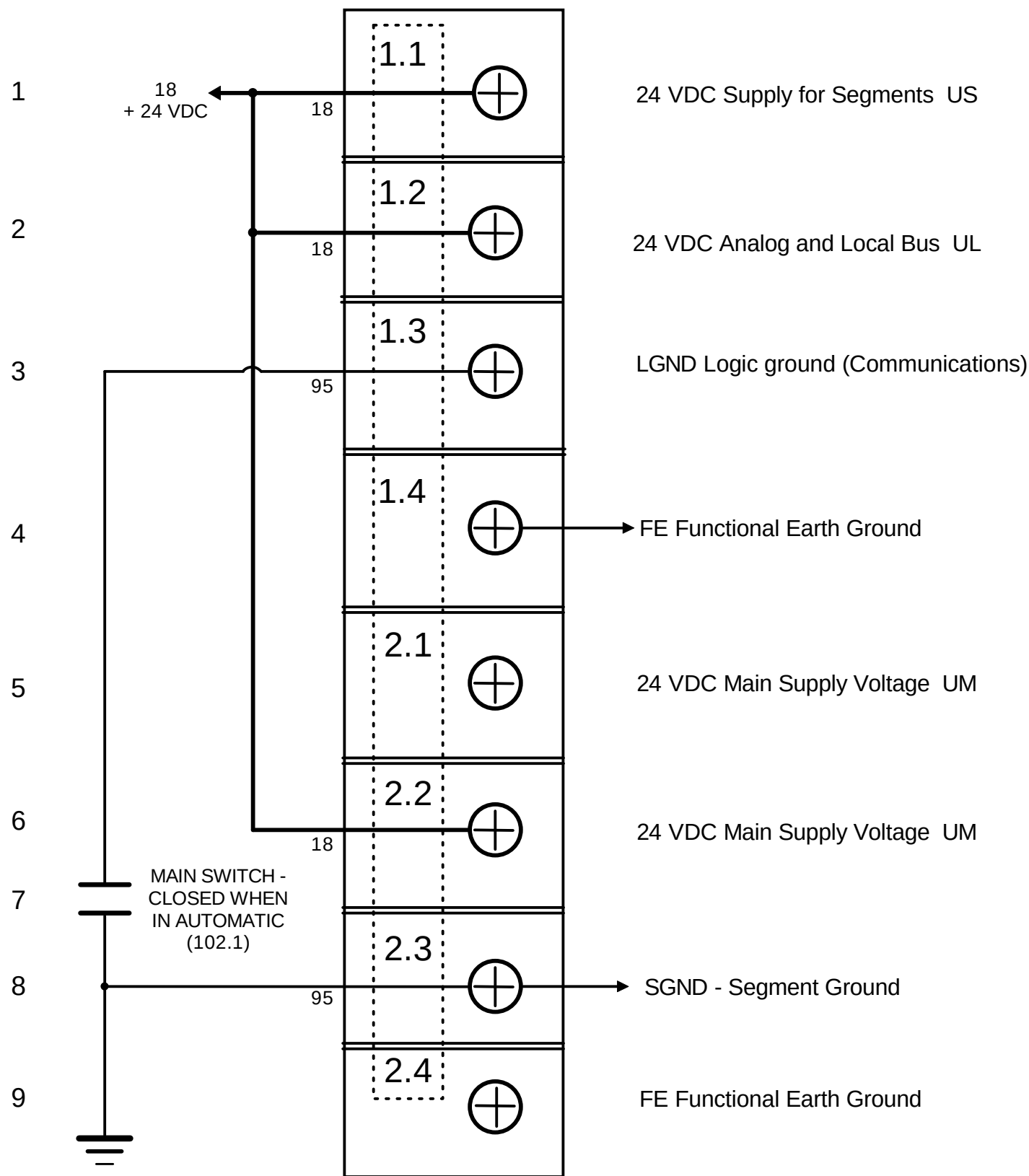
2. The X indicates the switch position. An X to the left, indicates the switch is in the Manual position, and an X to the right indicates the switch is in the Automatic position.
3. If auxiliary contactors are used, the overloads are wired in series and connected to these terminals. If auxiliary contactors are not used, a jumper is required between these two terminals, or an overload fault will occur.

  - Indicates a power box connection terminal.

Title: PORTABLE DRYER: TWO FAN & HEAT NOTES PAGE	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 102.6
Revision:	



24 VDC WIRING ARM - 0.1 (ORANGE)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER:TWO FAN & HEAT
PLC - ILC 150 POWER SUPPLY MODULE

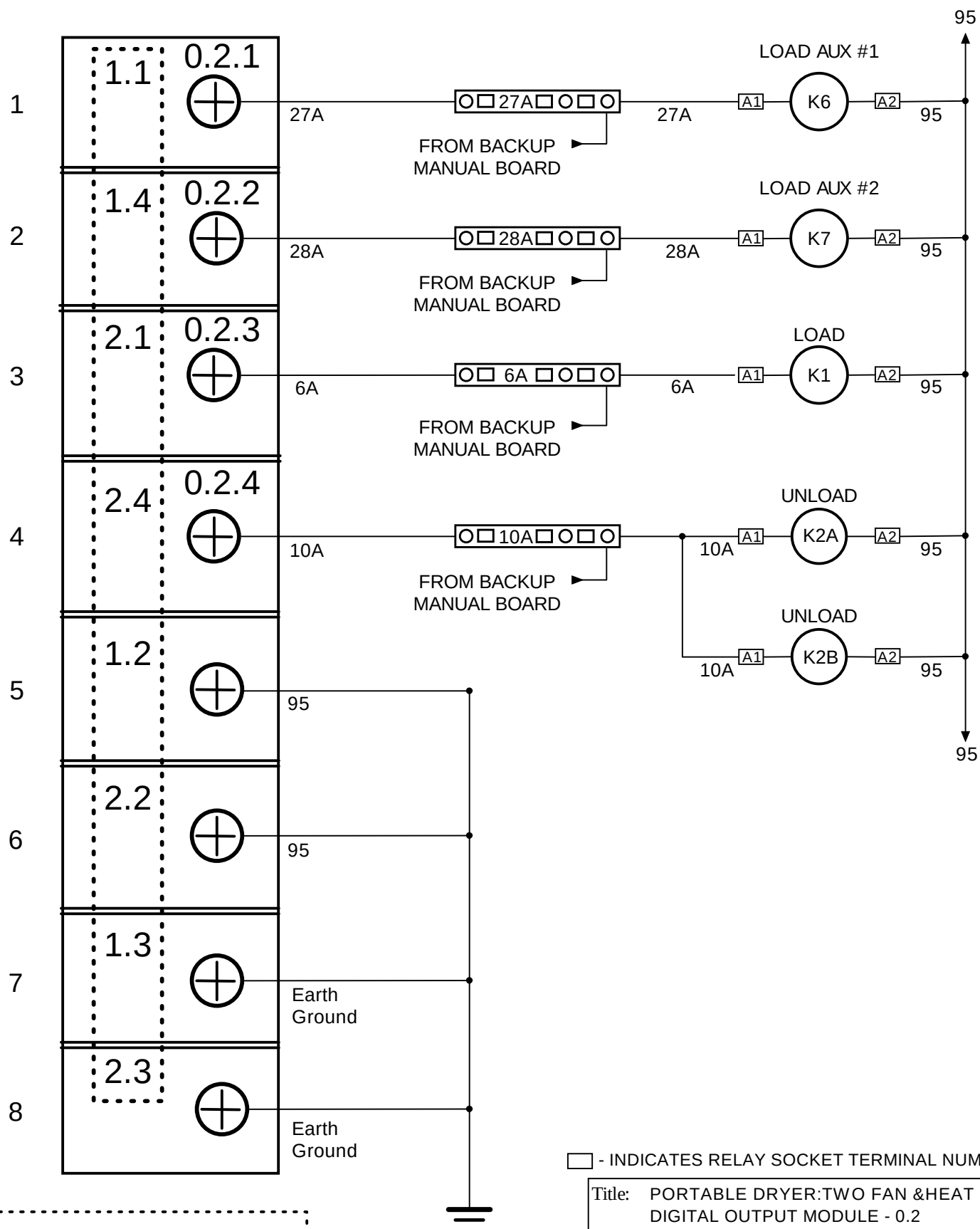
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.8

Revision:

DIGITAL OUTPUT MODULE - 0.2 (ORANGE)



□ - INDICATES RELAY SOCKET TERMINAL NUMBER

Title:	PORTABLE DRYER:TWO FAN &HEAT DIGITAL OUTPUT MODULE - 0.2
--------	---

Author: SUKUP MFG CO

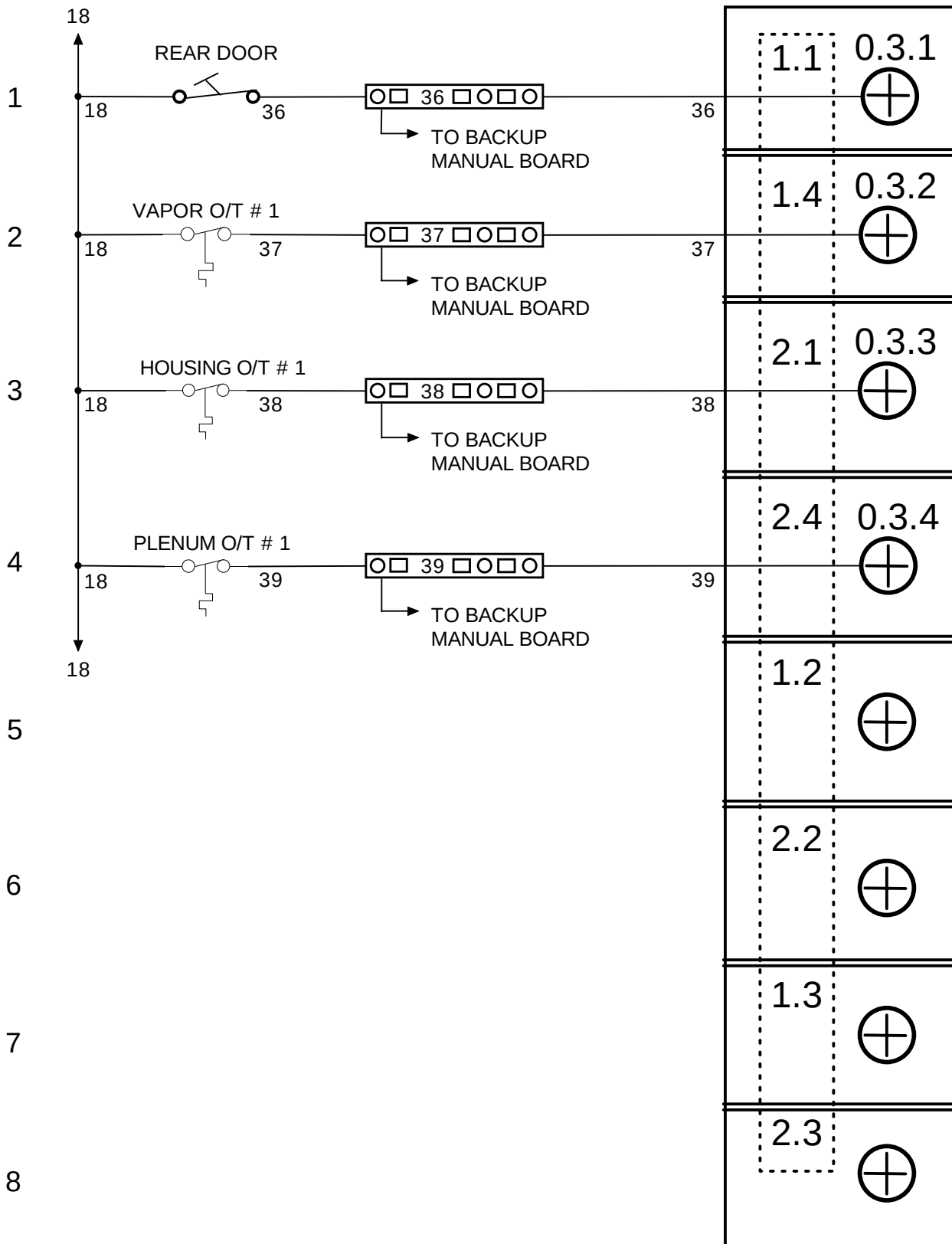
Date: 02/12

Sheet: 102.9

Revision:

NOTE: Numbers inside of the box are terminal designators printed on the module.

DIGITAL INPUT MODULE - 0.3 (ORANGE)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: TWO FAN & HEAT
DIGITAL INPUT MODULE - 0.3

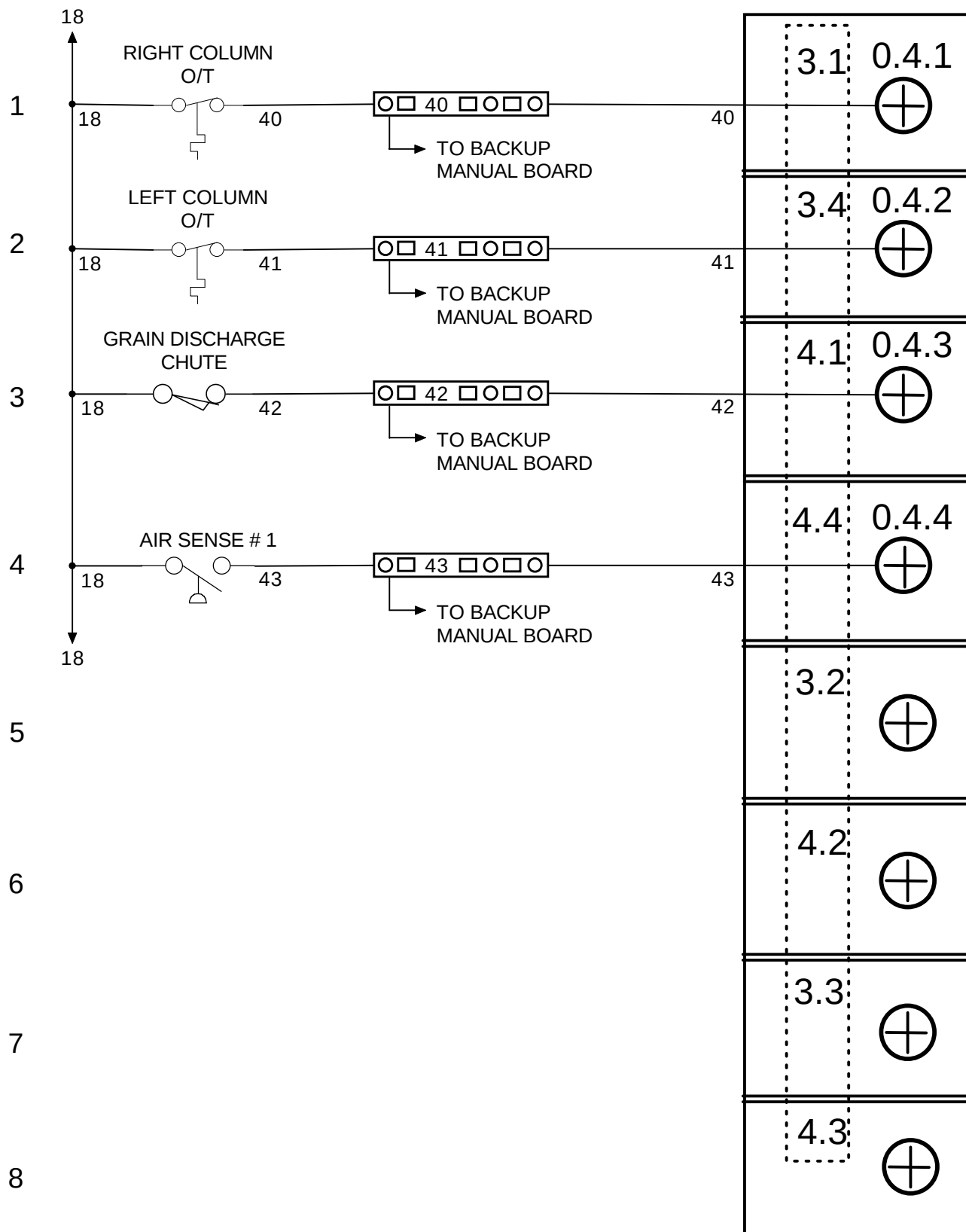
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.10

Revision:

DIGITAL INPUT MODULE - 0.4 (ORANGE)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: TWO FAN & HEAT
DIGITAL INPUT MODULE - 0.4

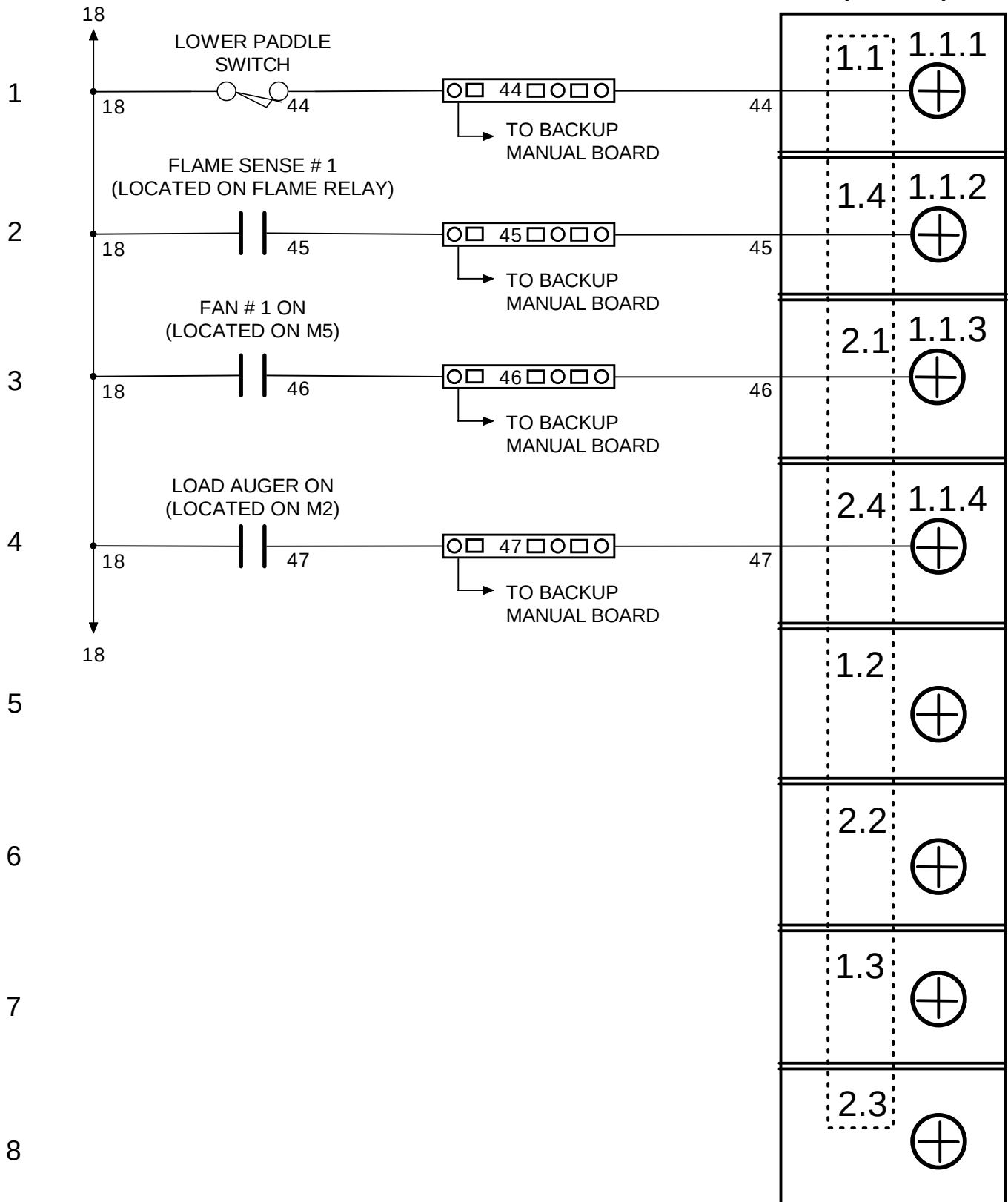
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.11

Revision:

DIGITAL INPUT MODULE - 1.1 OF 4 (BLUE)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: TWO FAN & HEAT
DIGITAL INPUT MODULE - 1.1

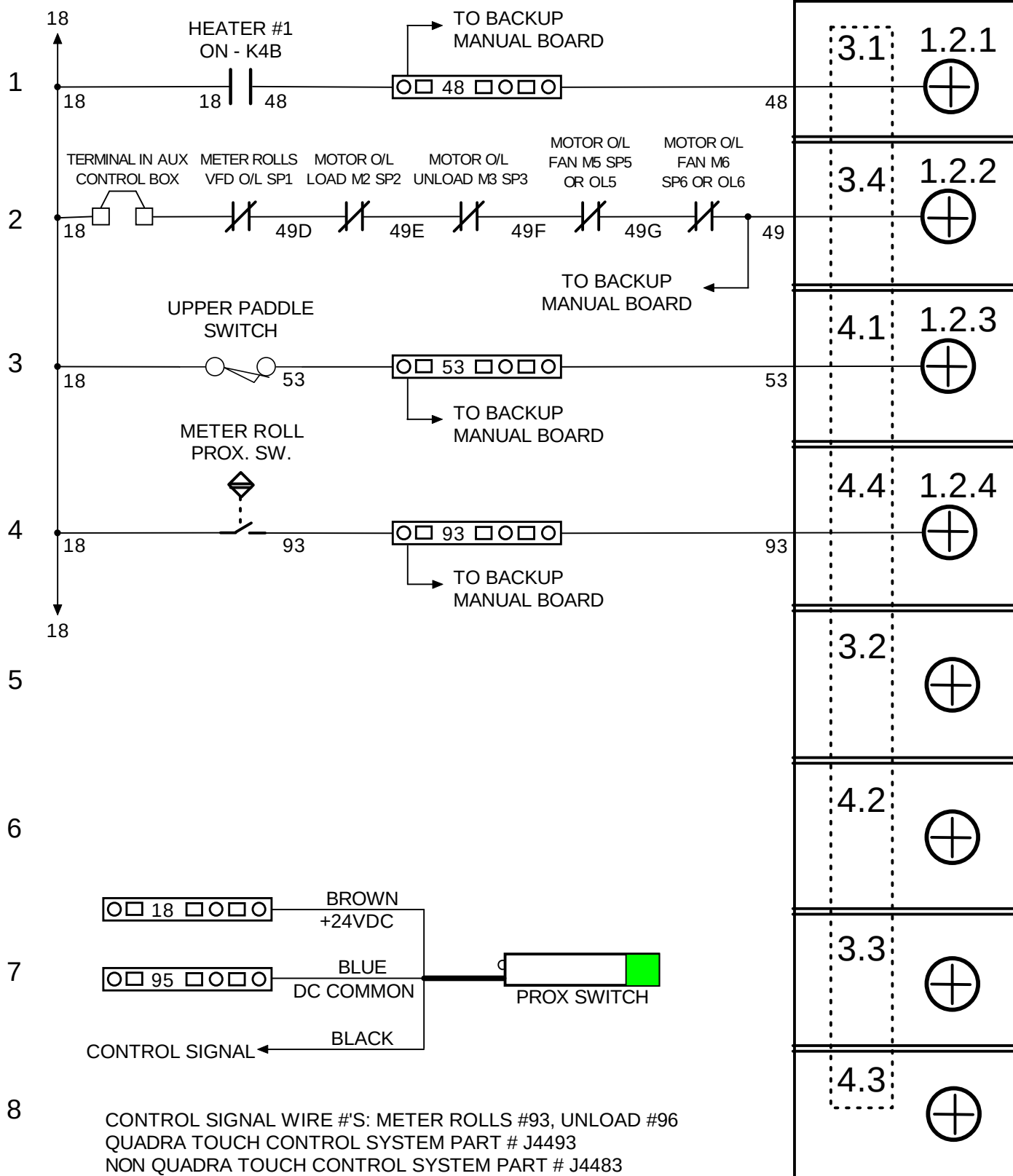
Author: SUKUP MFG SO

Date: 02/12

Sheet: 102.12

Revision:

DIGITAL INPUT MODULE - 1.2 OF 4 (BLUE)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABEL DRYER: TWO FAN & HEAT
DIGITAL INPUT MODULE - 1.2

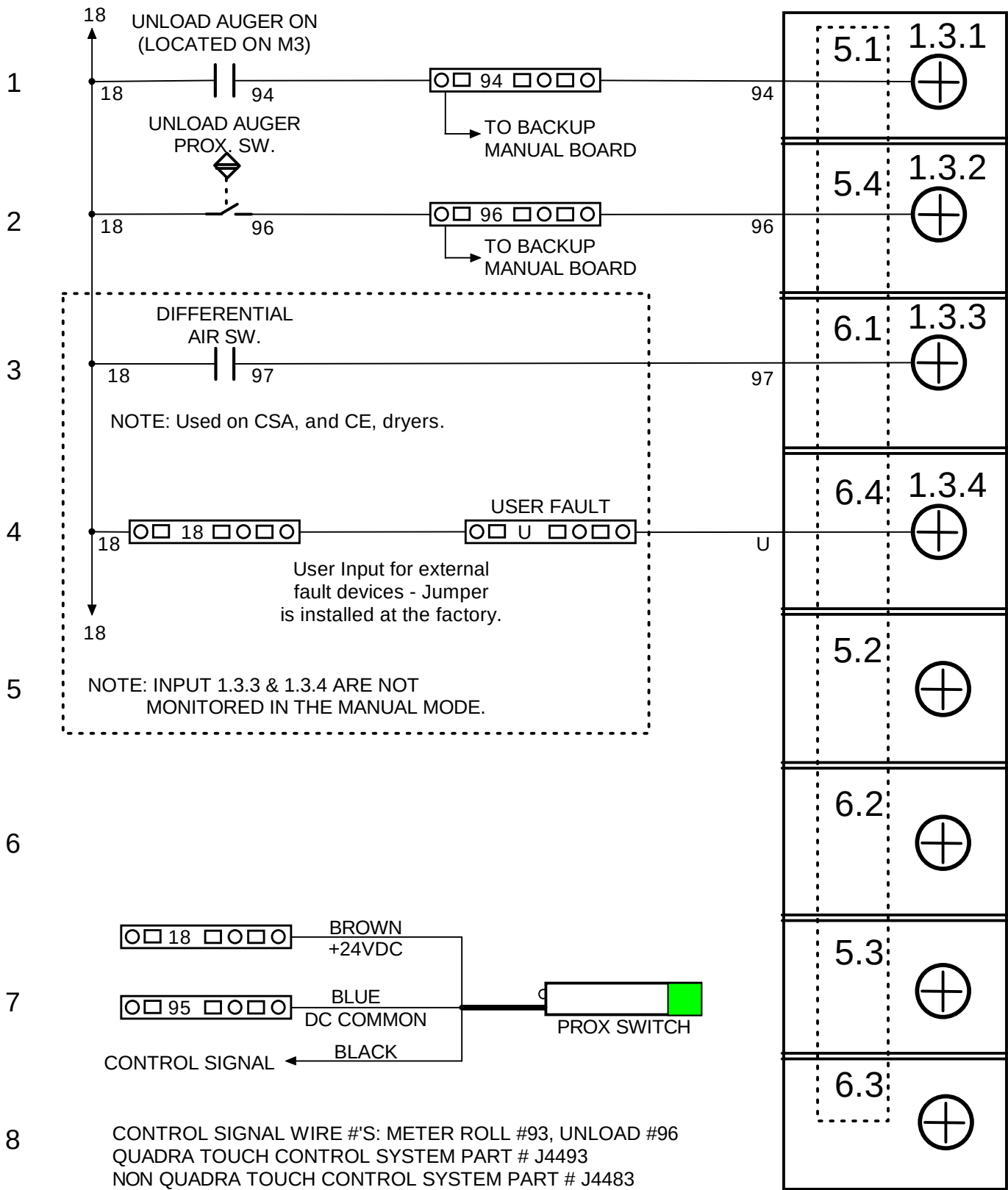
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.13

Revision:

DIGITAL INPUT MODULE -1.3 OF 4 (BLUE)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: TWO FAN & HEAT
DIGITAL INPUT MODULE - 1.3

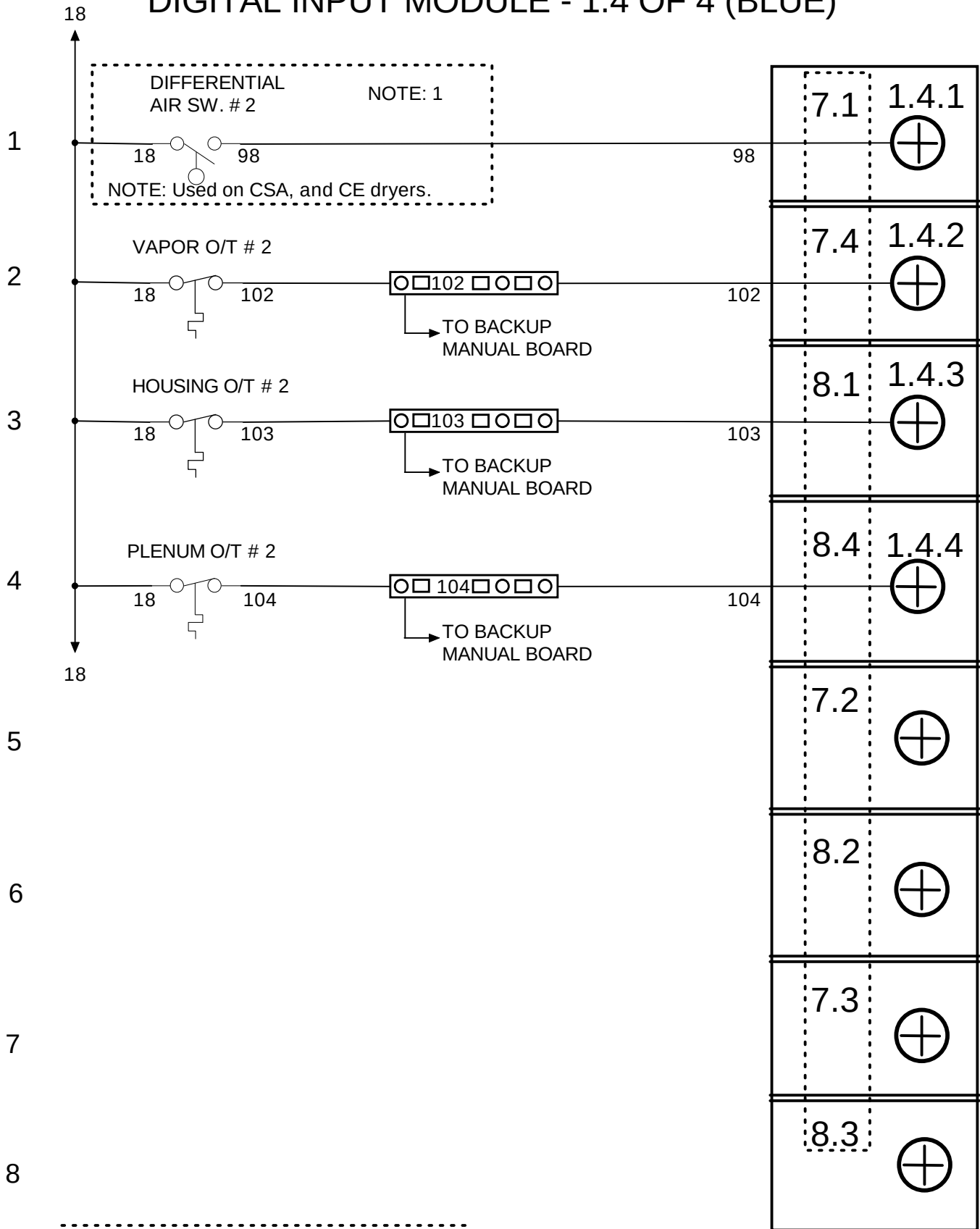
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.14

Revision:

DIGITAL INPUT MODULE - 1.4 OF 4 (BLUE)



NOTE: Numbers inside of the box are terminal designators printed on the module.

NOTE : 1 INPUT 1.4.1 IS NOT MONITORED IN THE MANUAL MODE

Title: PORTABLE DRYER: TWO FAN & HEAT
DIGITAL INPUT MODULE - 1.4

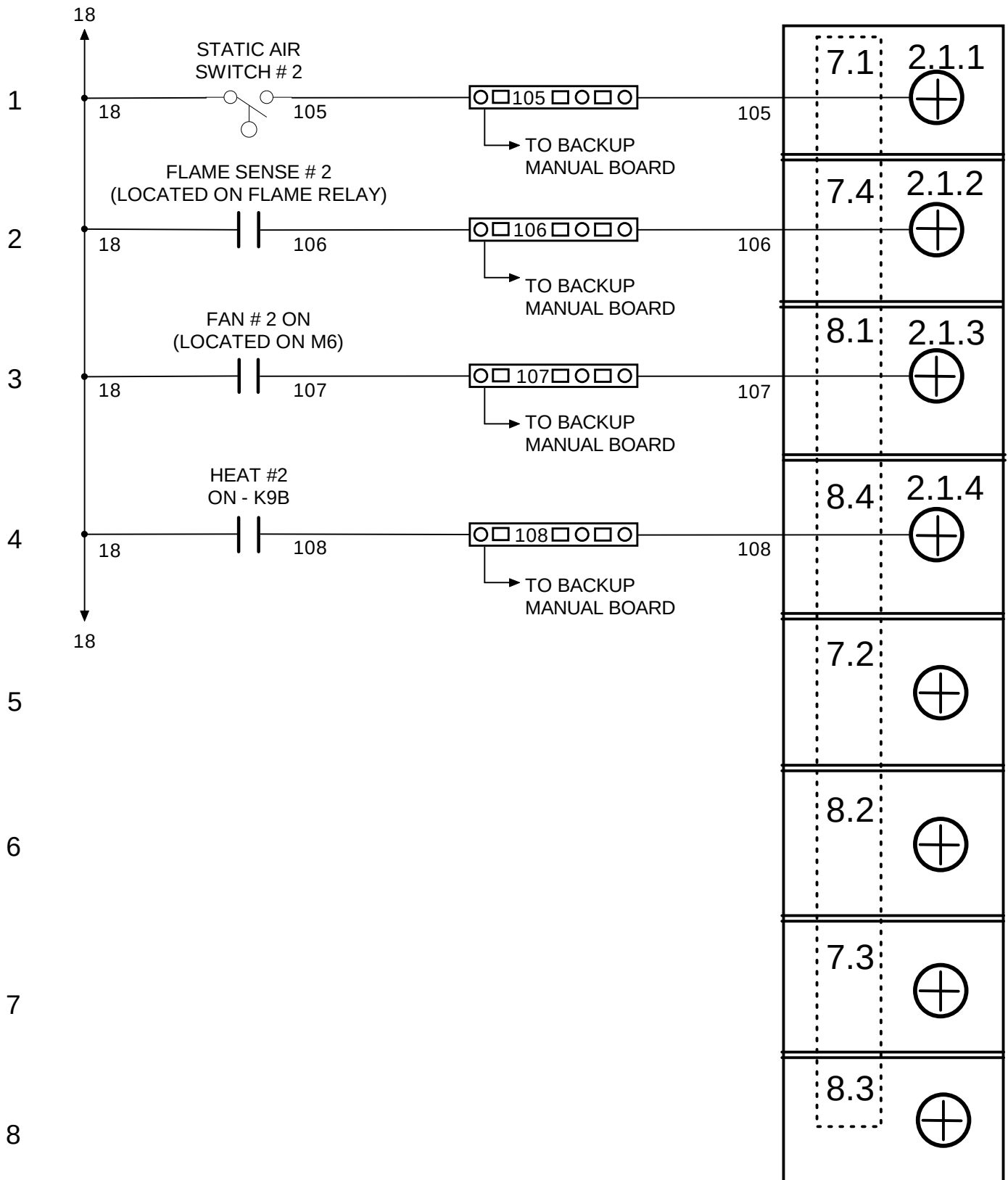
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.15

Revision:

DIGITAL INPUT MODULE - 2.1 (BLUE)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: TWO FAN & HEAT
DIGITAL INPUT MODULE - 2.1

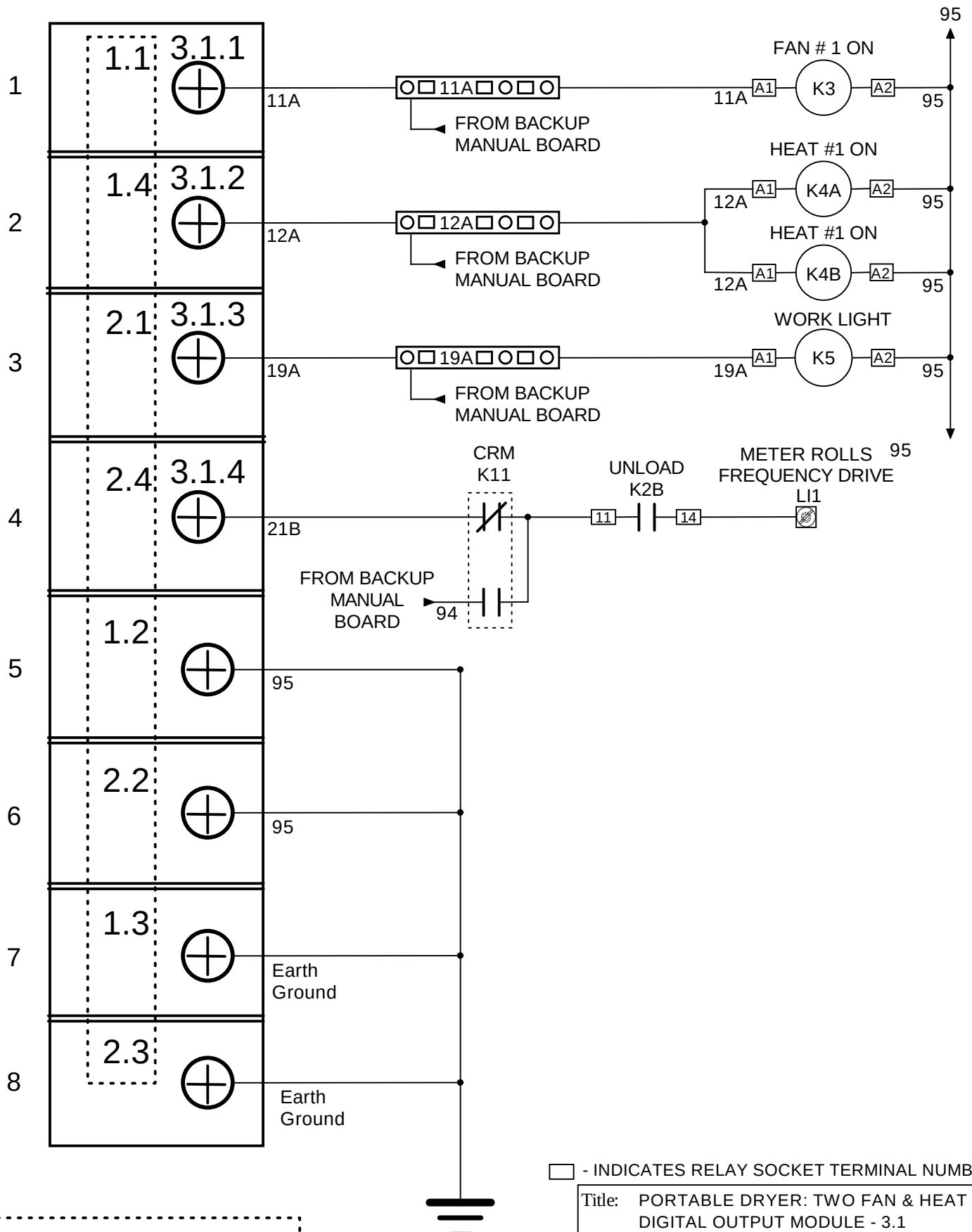
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.16

Revision:

DIGITAL OUTPUT MODULE 3.1 (RED)



NOTE: Numbers inside of the box are terminal designators printed on the module.

□ - INDICATES RELAY SOCKET TERMINAL NUMBER

Title: PORTABLE DRYER: TWO FAN & HEAT
DIGITAL OUTPUT MODULE - 3.1

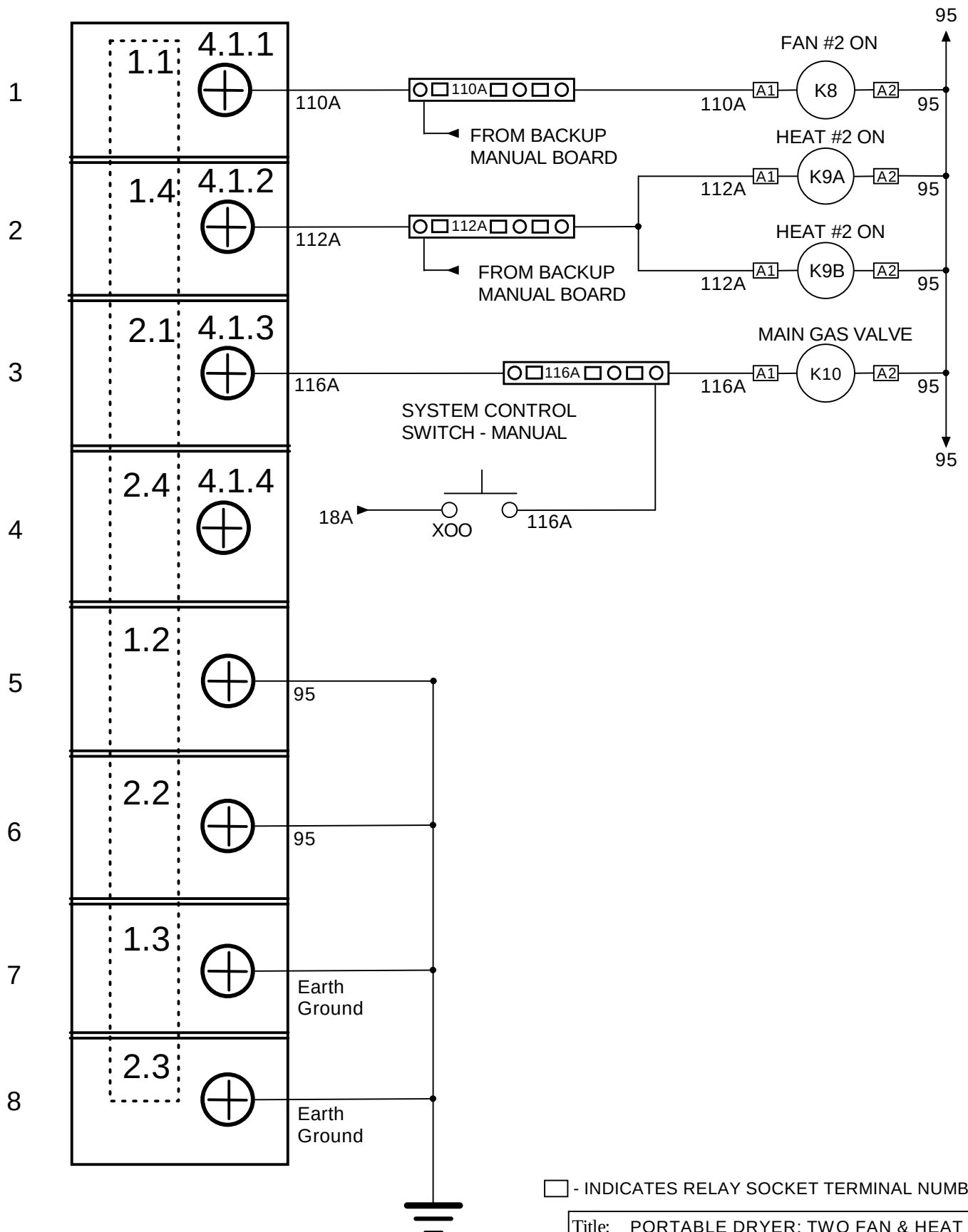
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.17

Revision:

DIGITAL OUTPUT MODULE 4.1 (RED)



□ - INDICATES RELAY SOCKET TERMINAL NUMBER

NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER; TWO FAN & HEAT
DIGITAL INPUT MODULE - 4.1

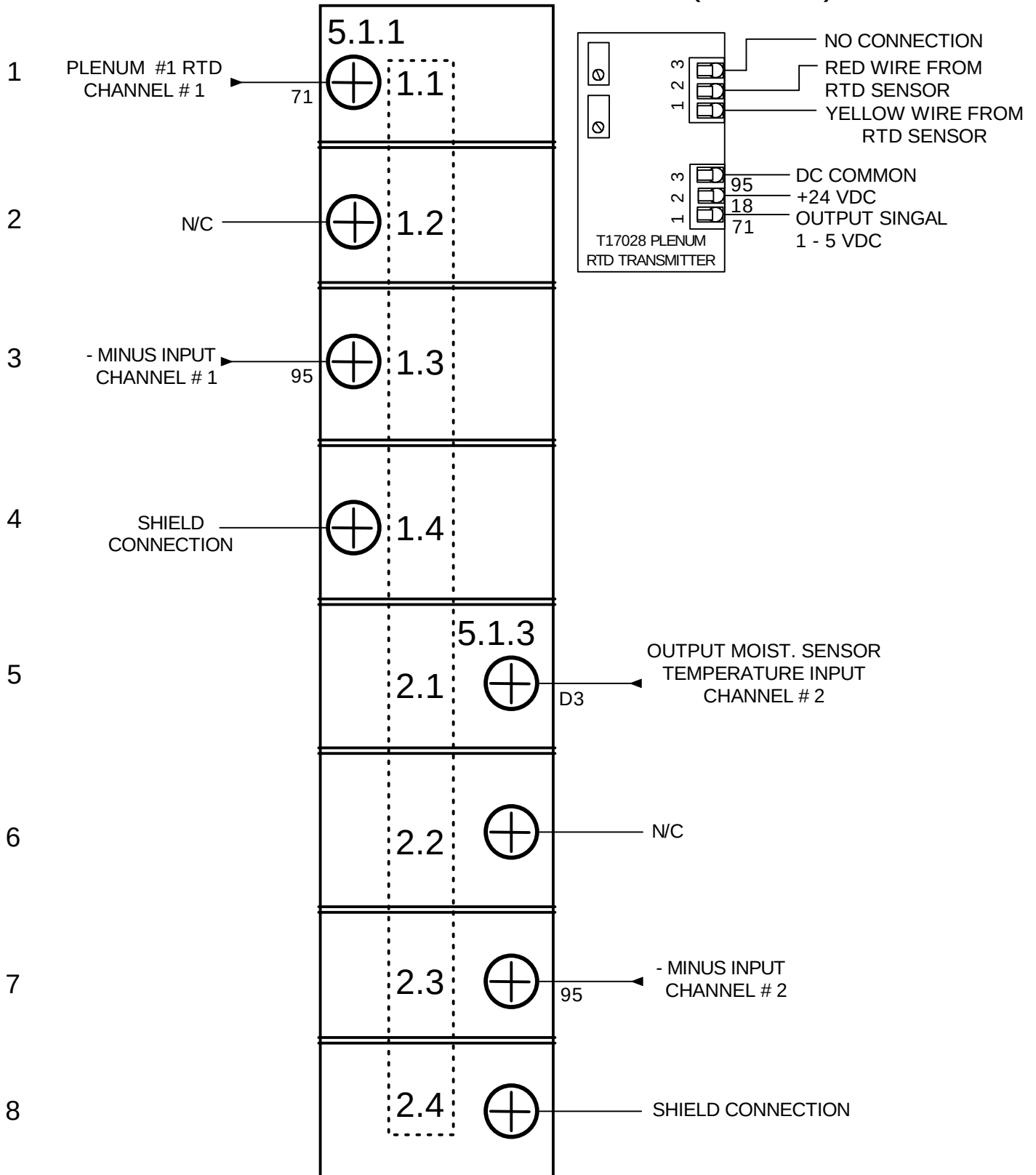
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.18

Revision:

ANALOG INPUT MODULE - 5.1 (GREEN)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: TWO FAN & HEAT
ANALOG INPUT MODULE - 5.1

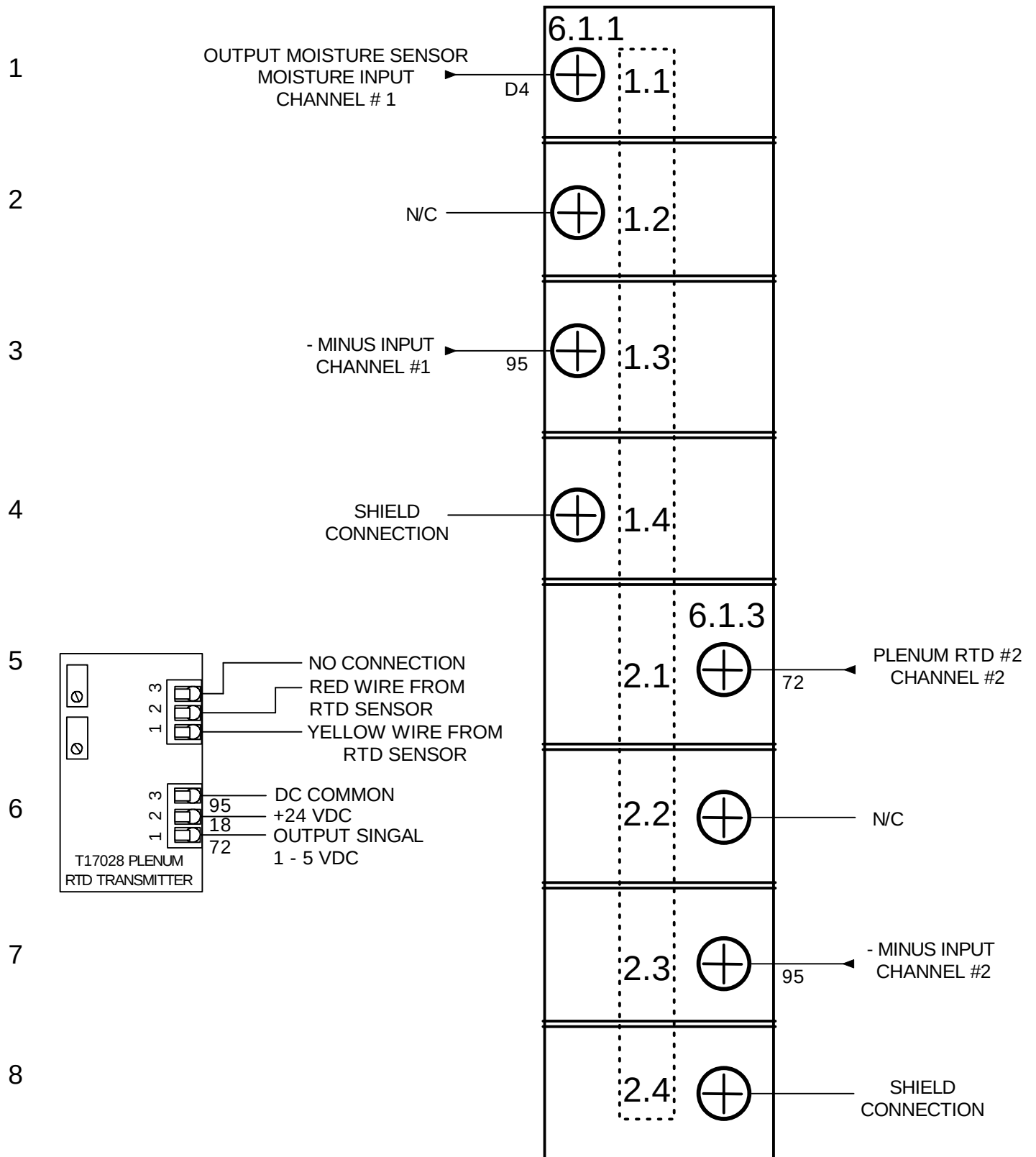
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.19

Revision:

ANALOG INPUT MODULE - 6.1 (GREEN)



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: TWO FAN & HEAT
ANALOG INPUT MODULE - 6.1

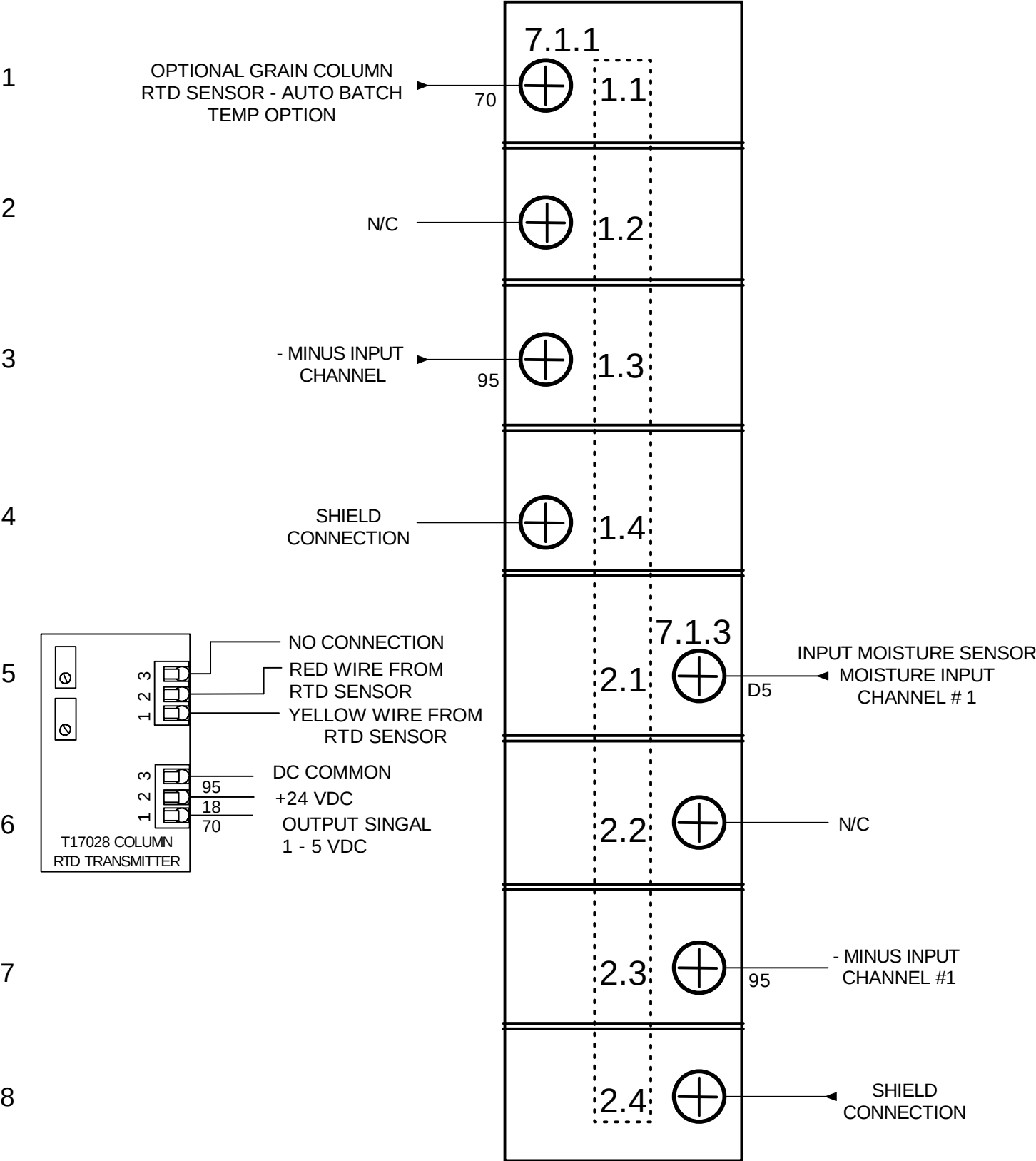
Author: SUKUP MFG CO

Date: 02/10

Sheet: 102.20

Revision:

ANALOG INPUT MODULE - 7.1 (GREEN), TWO FAN WITH INPUT
MOISTURE SENSOR & GRAIN COLUMN RTD OPTIONS

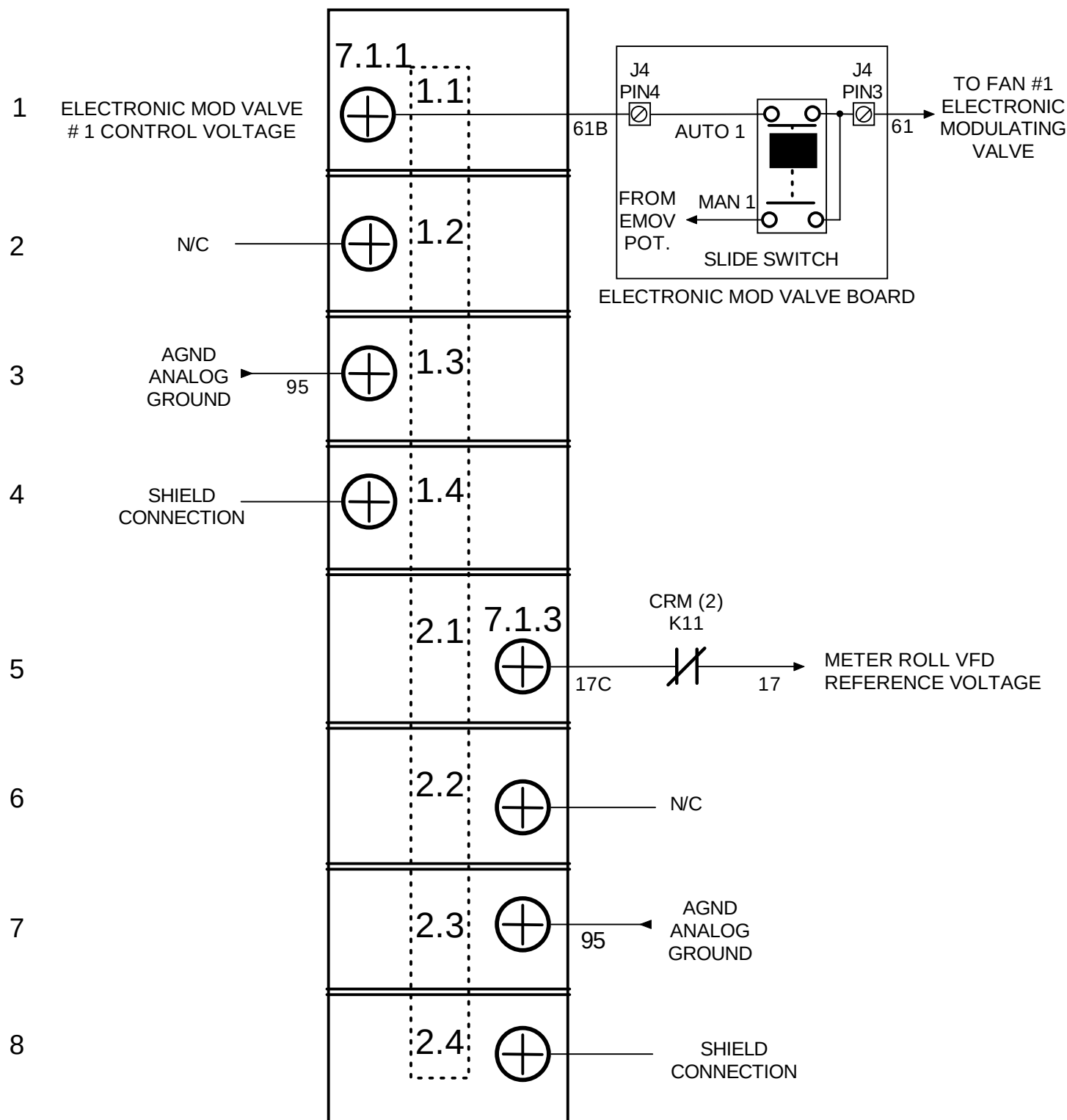


NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: TWO FAN & HEAT STACK ANALOG INPUT MODULE - 7.1	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 102.21
Revision:	

ANALOG OUTPUT MODULE (0-10 VDC) 7.1 (YELLOW)

THIS CARD IS 8.1 ON A TWO FAN STACK DRYER OR WHEN
EQUIPPED WITH A INPUT MOISTURE SENSOR



NOTE: Numbers inside of the box are terminal designators printed on the module.

Title: PORTABLE DRYER: TWO FAN & HEAT
ANALOG OUTPUT MODULE - 8.1

Author: SUKUP MFG CO

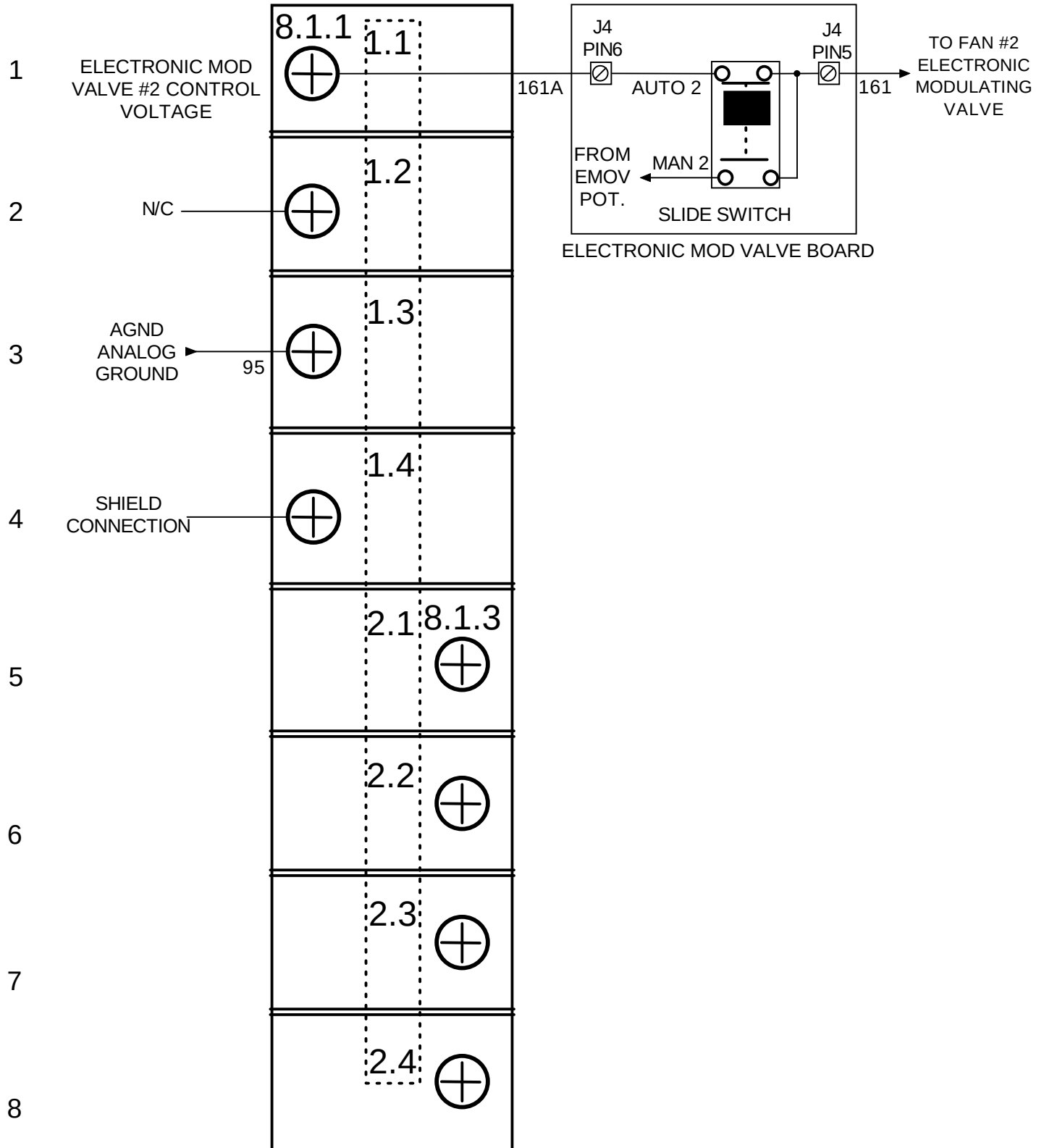
Date: 02/12

Sheet: 102.22

Revision:

ANALOG OUTPUT MODULE 8.1 (YELLOW)

THIS CARD IS 9.1 ON A TWO FAN STACK DRYER OR WHEN EQUIPPED WITH A INPUT MOISTURE SENSOR



NOTE: Numbers inside of the box are terminal designators printed on the module.

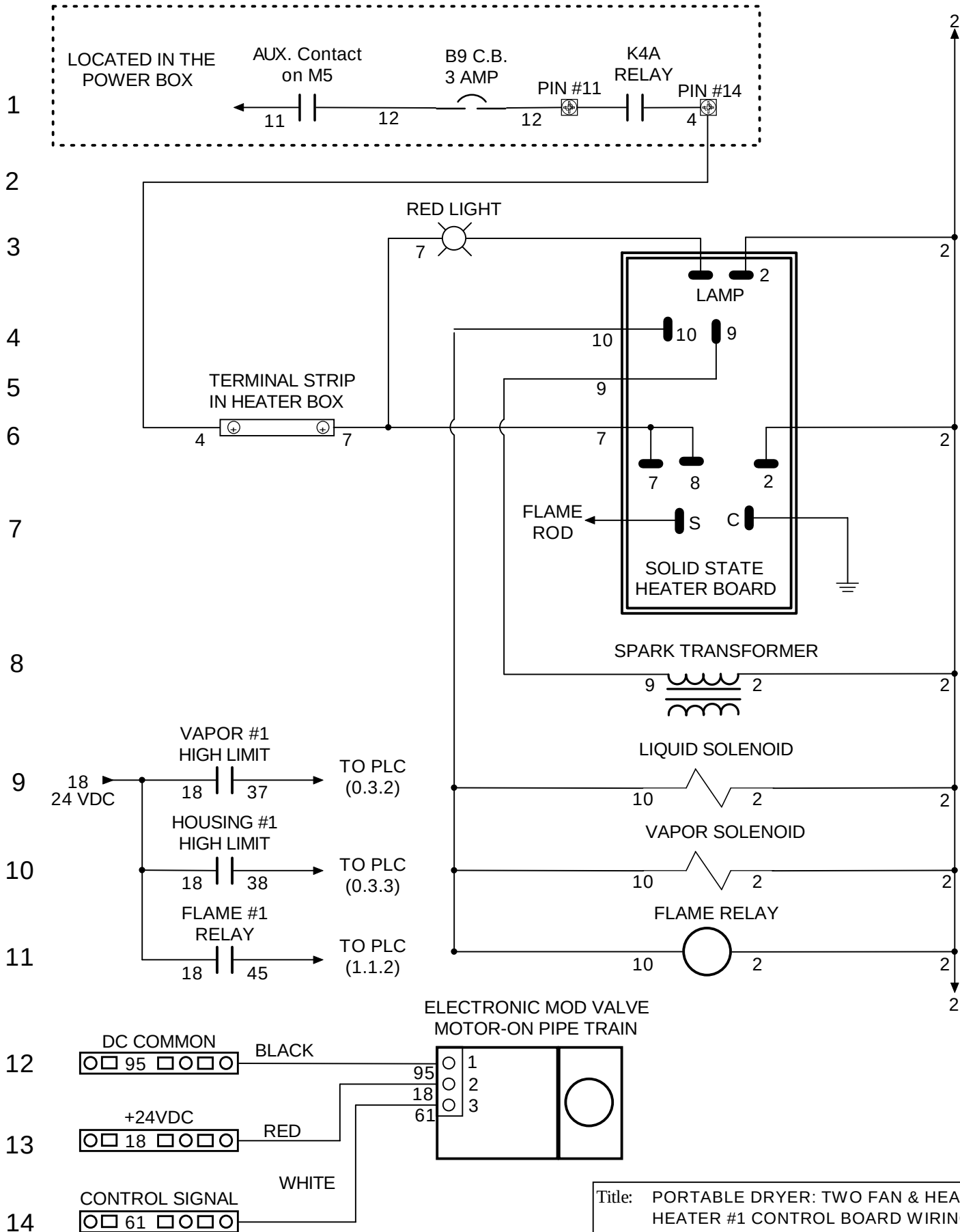
Title: PORTABLE DRYER: TWO FAN & HEAT
ANALOG OUTPUT MODULE - 8.1

Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.23

Revision:



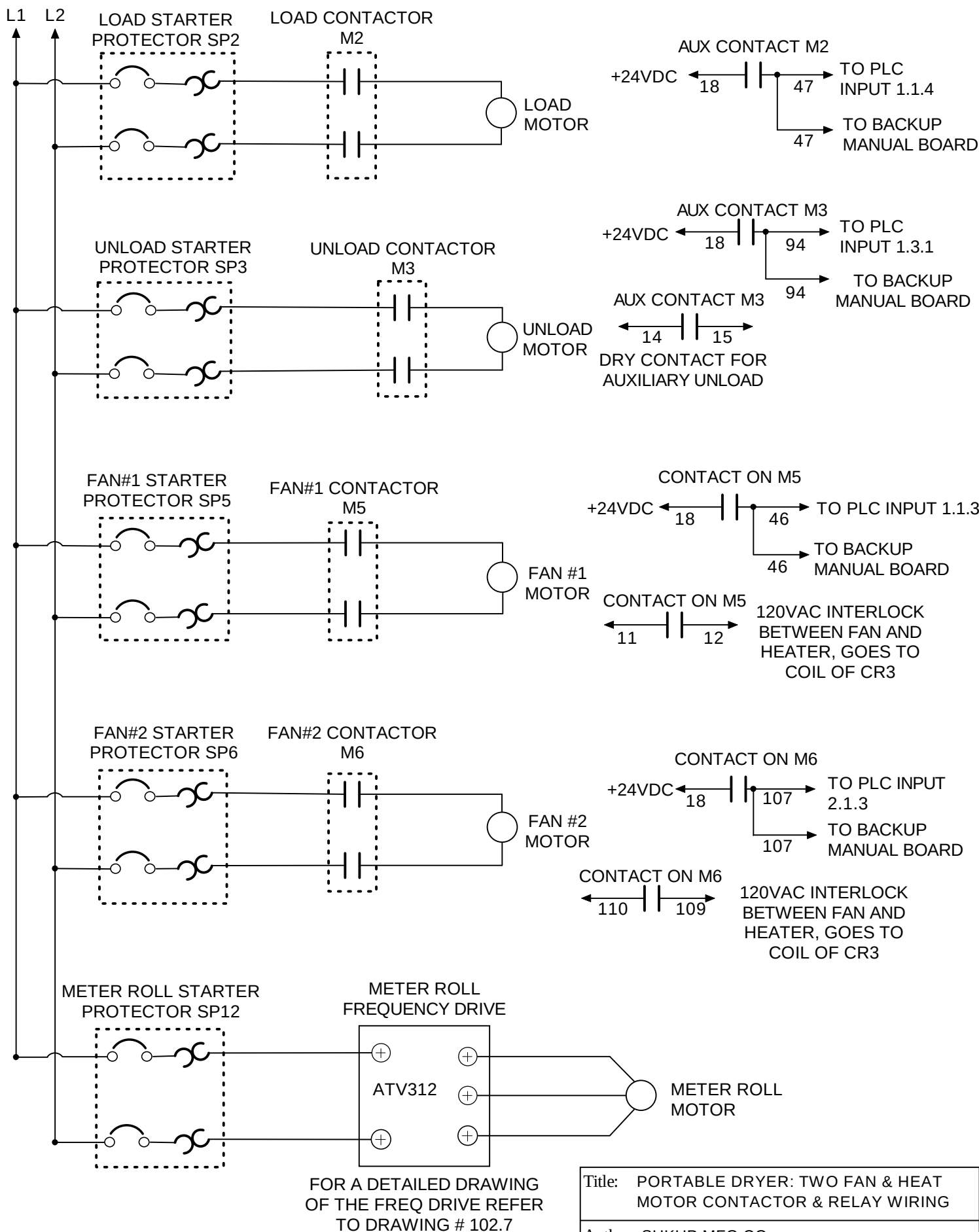
Title: PORTABLE DRYER: TWO FAN & HEAT
HEATER #1 CONTROL BOARD WIRING

Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.24

Revision:



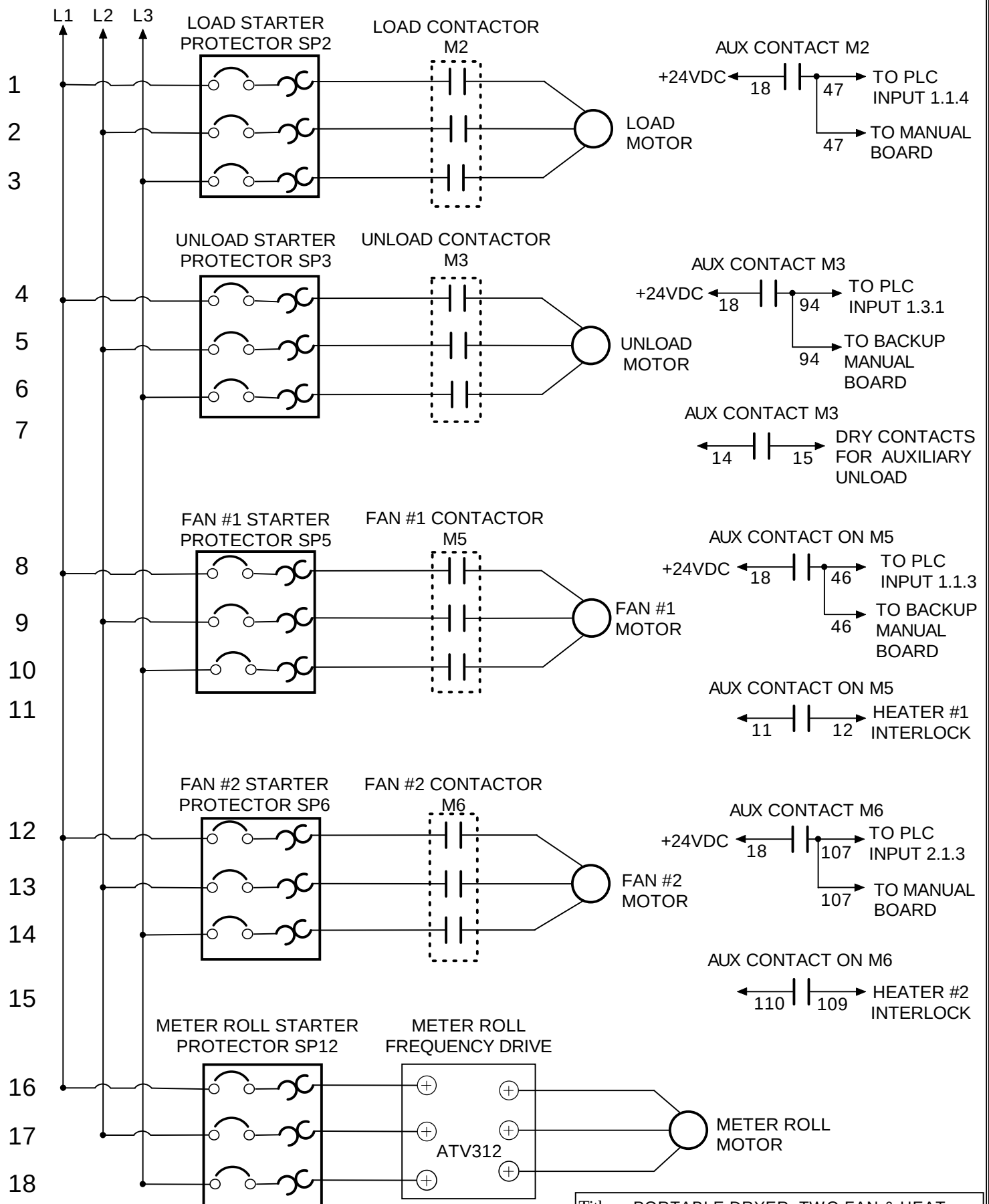
Title: PORTABLE DRYER: TWO FAN & HEAT MOTOR CONTACTOR & RELAY WIRING

Author: SUKUP MFG CO

Date: 02/12

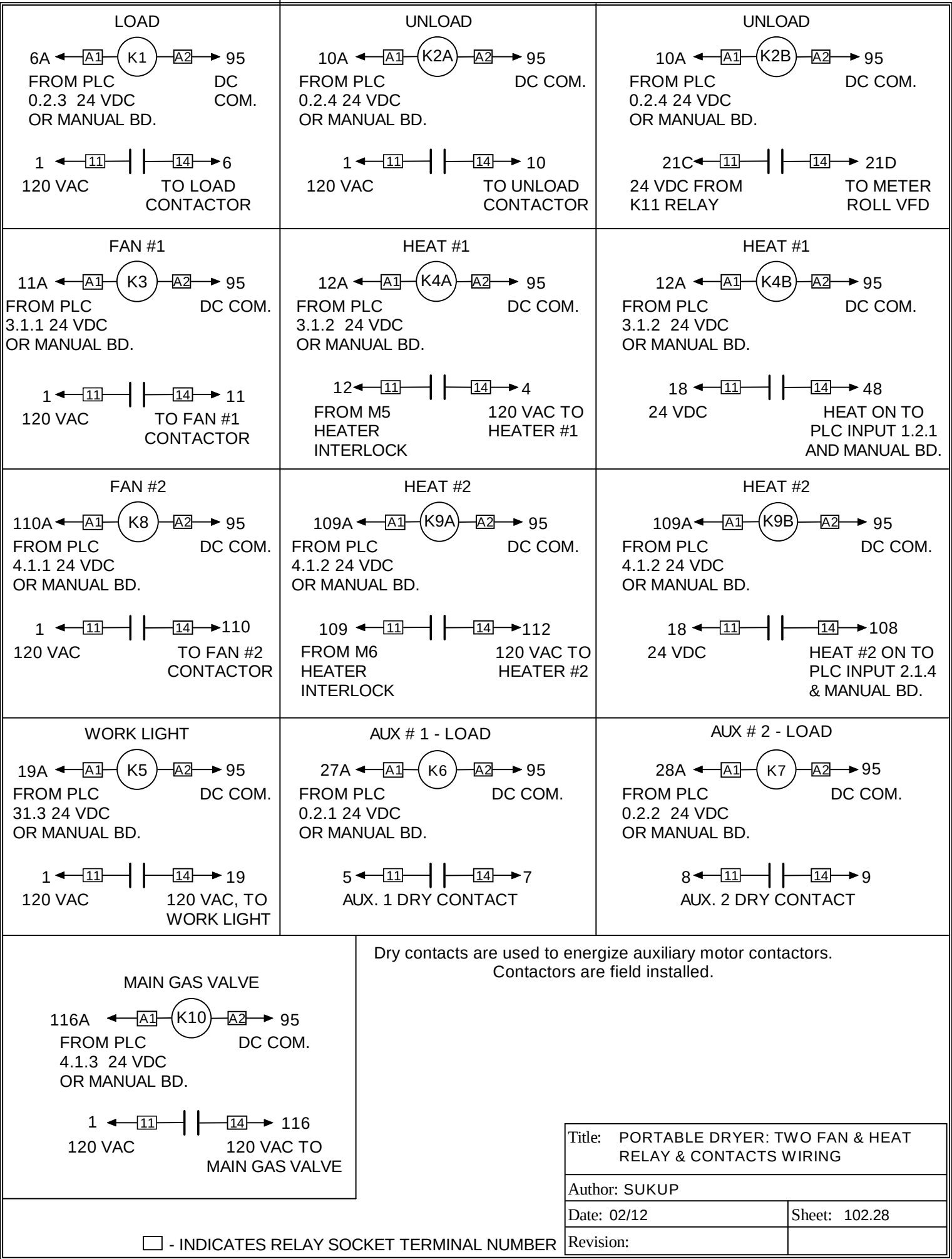
Sheet: 102.26

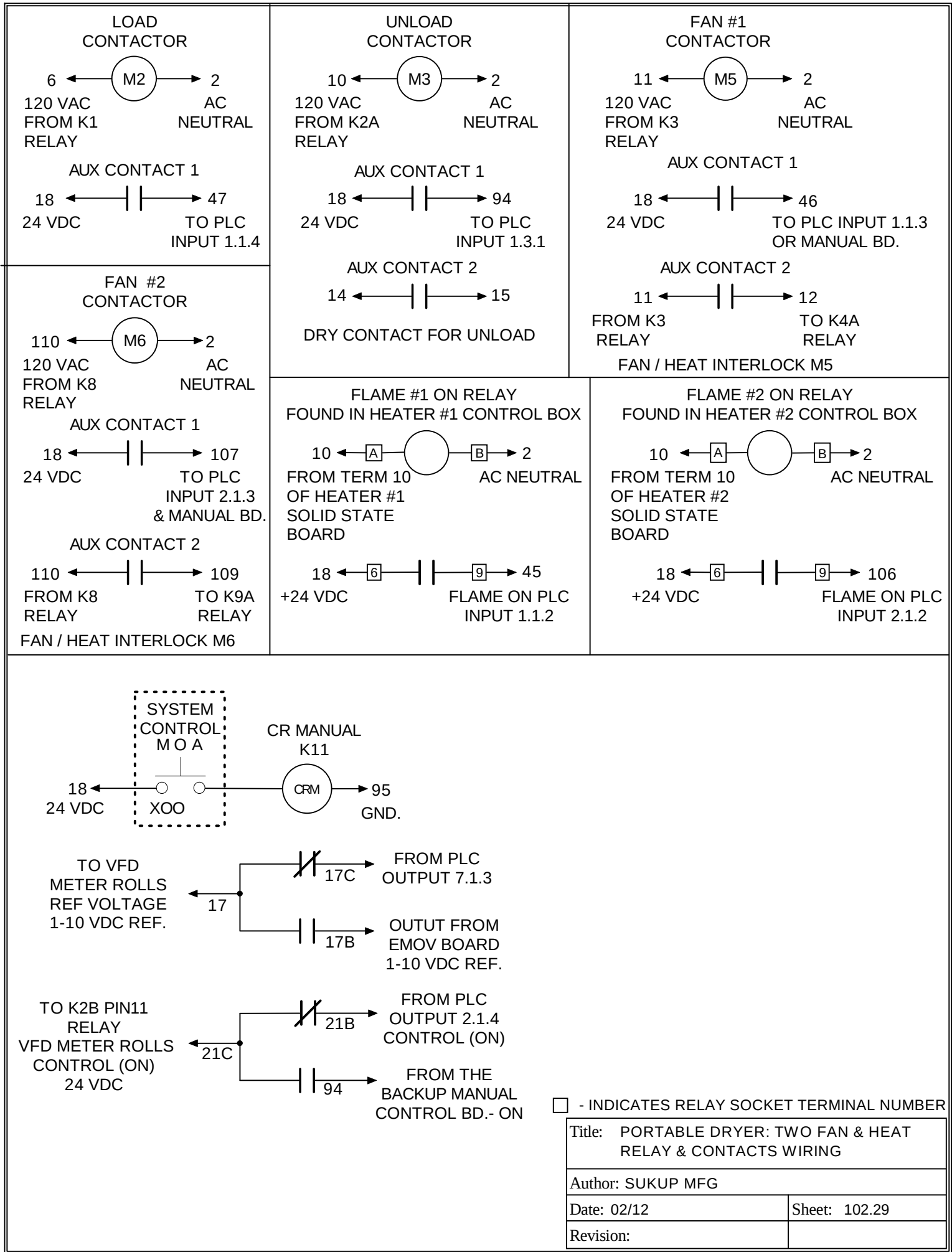
Revision:

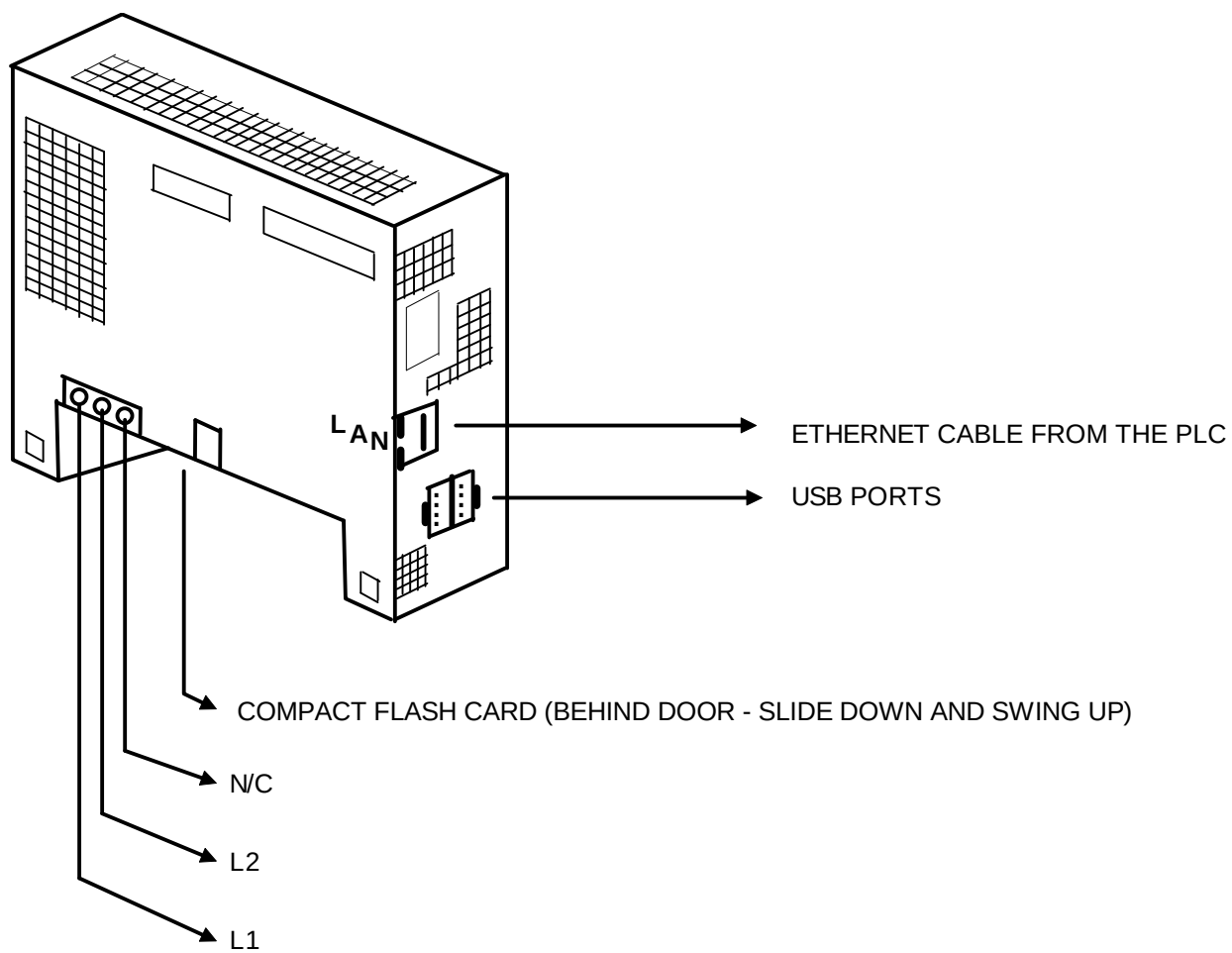


FOR A DETAILED DRAWING
OF THE FREQ DRIVE REFER
TO DRAWING # 102.7

Title: PORTABLE DRYER: TWO FAN & HEAT MOTOR CONTACTOR & RELAY WIRING	
Author: SUKUP MFG	
Date: 02/12	Sheet: 102.27
Revision:	







Title: PORTABLE DRYER: TWO FAN & HEAT
HMI - TOUCHSCREEN

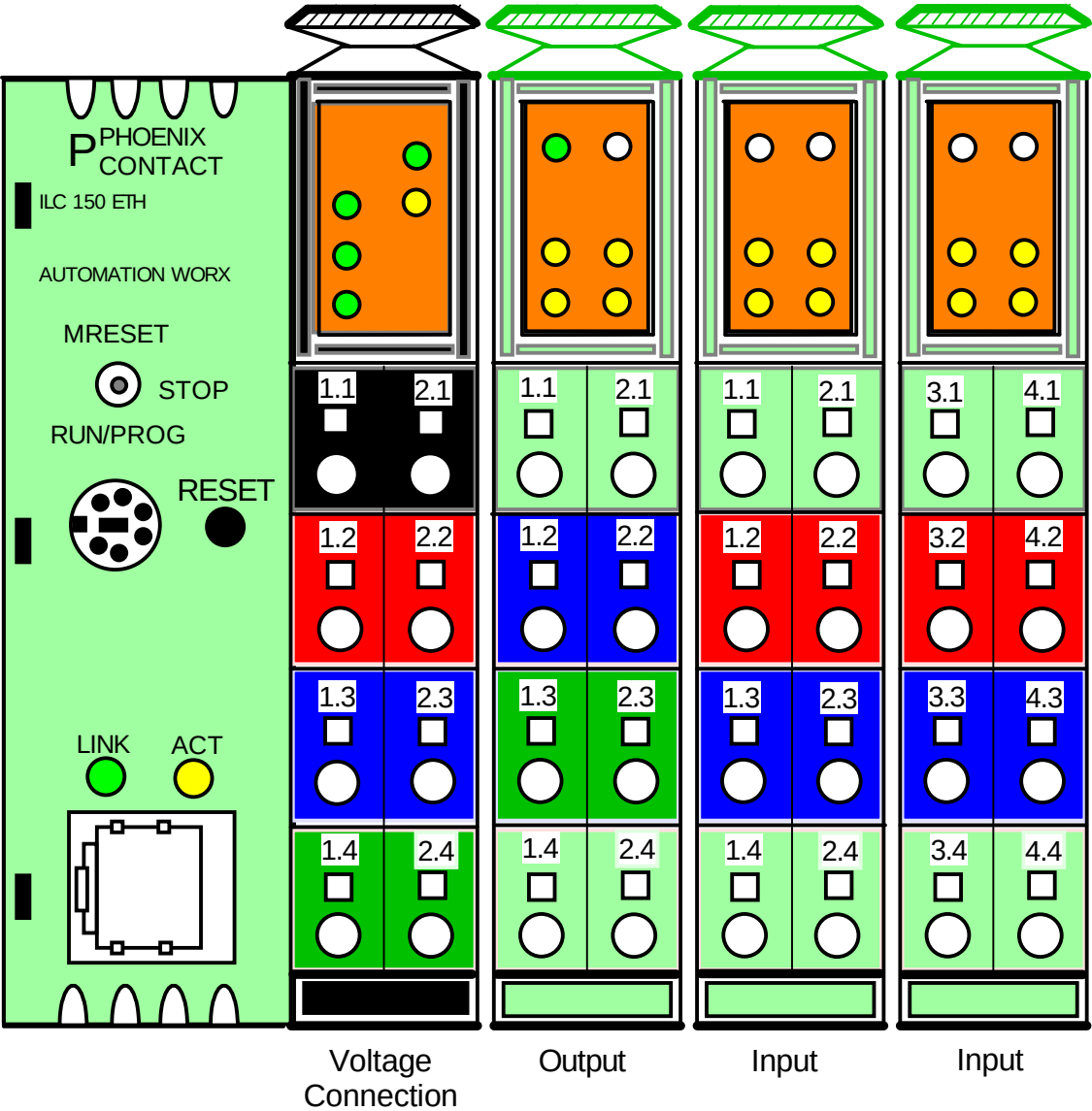
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.29

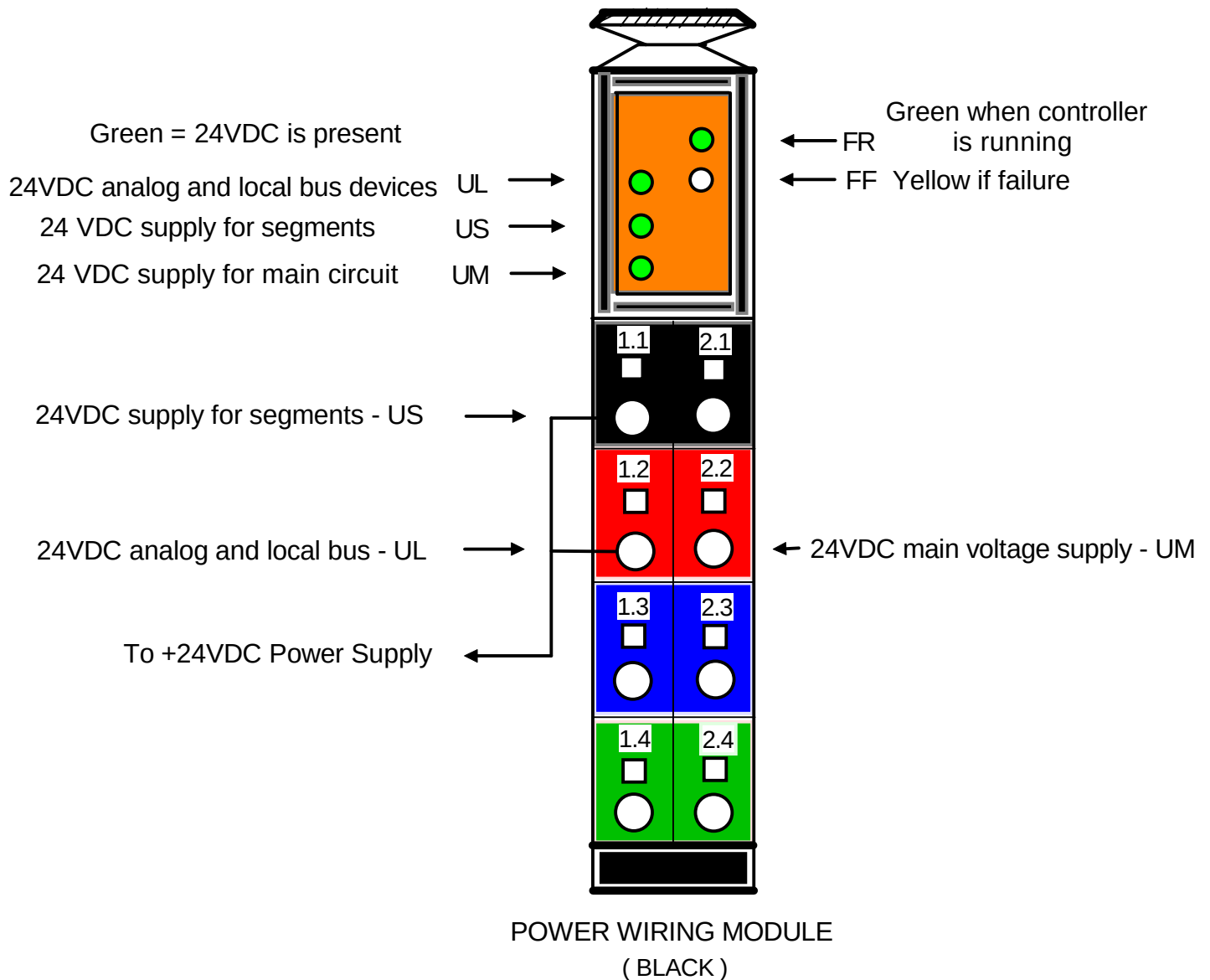
Revision:

PHOENIX CONTACT PLC MODULE ILC 150 (ORANGE)



Title: PORTABLE DRYER: TWO FAN & HEAT PHOENIX CONTACT PLC - ILC150	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 102.31
Revision:	

POWER SUPPLY CONNECTION FOR THE ILC 150 (ORANGE)



NOTE: This wiring module is not a power supply. 24VDC is provided by an independent power supply and connected to this arm, which then supplies the PLC and modules.

Title: PORTABLE DRYER: TWO FAN & HEAT
PLC POWER WIRING MODULE 24VDC

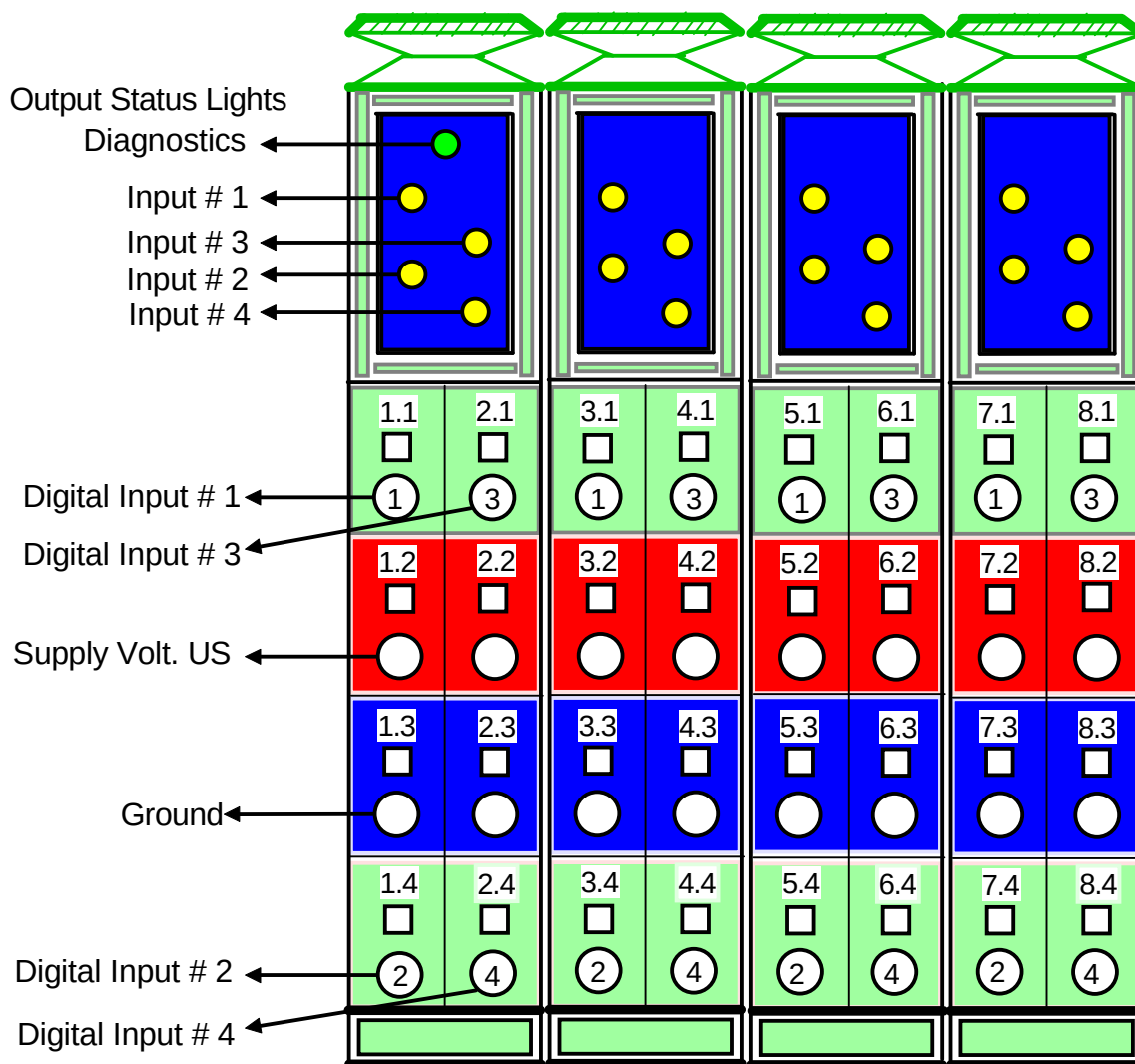
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.32

Revision:

DIGITAL INPUT MODULE - ILC 150 (BLUE)



DIGITAL OUTPUT MODULE - 16 INPUTS

Diagnostics:

- 1) Green - OK
- 2) Flashing 0.5 Hz - communications power UL available but buss not active
- 3) Flashing 2 Hz - peripheral fault
- 4) Flashing 4 Hz - local bus error

Title: PORTABLE DRYER: TWO FAN & HEAT
DIGITAL INPUT MODULE - 16 INPUTS

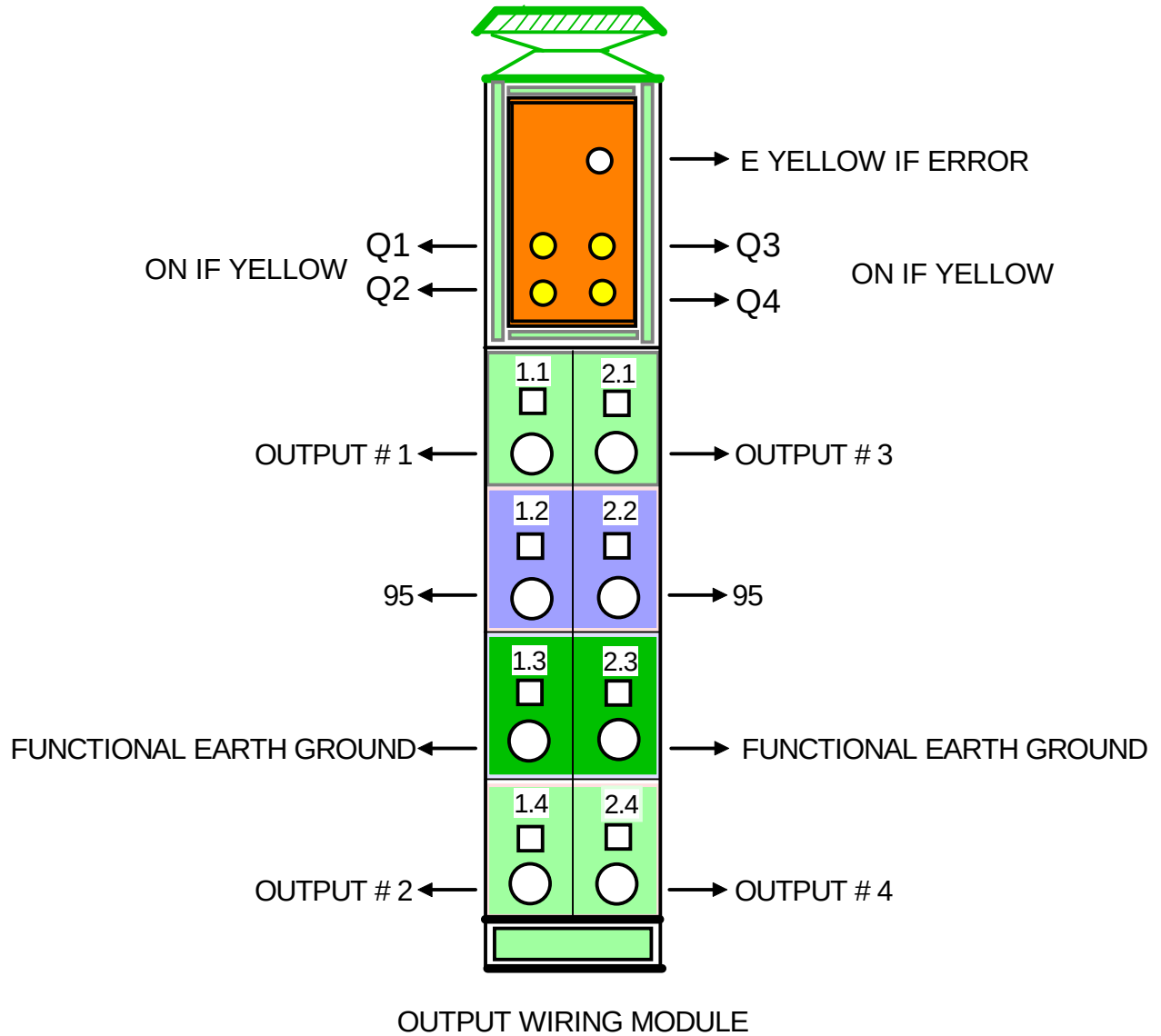
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.33

Revision:

OUTPUT WIRING ARM - ILC 150 (ORANGE)



Title: PORTABLE DRYER: TWO FAN & HEAT
OUTPUT WIRING MODULE

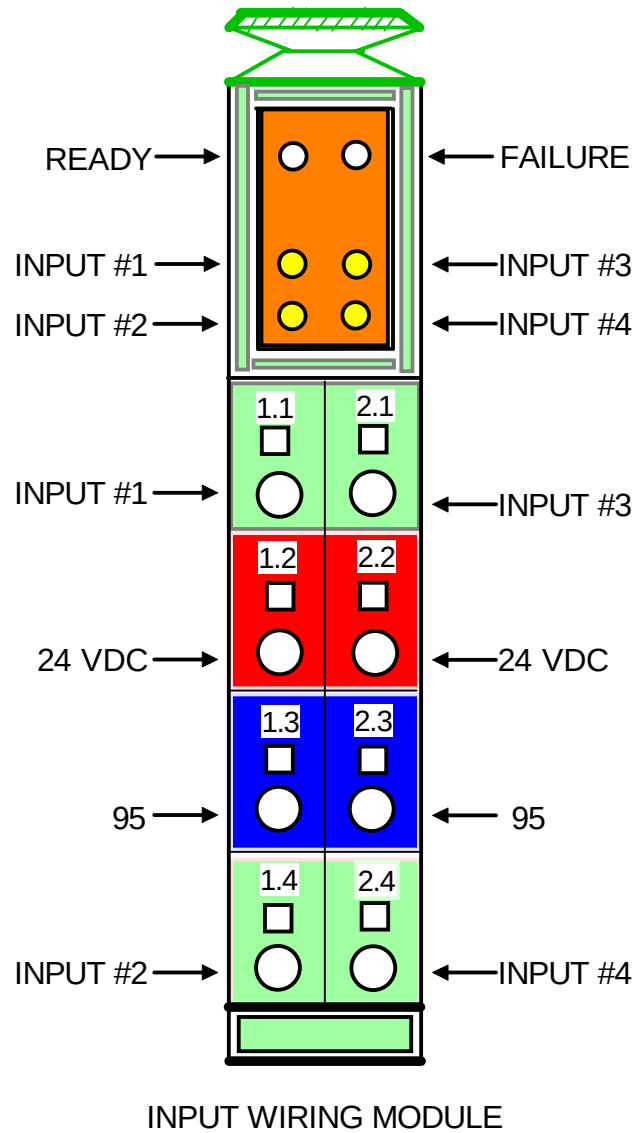
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.34

Revision:

INPUT WIRING ARM - ILC 150 (ORANGE)



Title: PORTABLE DRYER: TWO FAN & HEAT
INPUT WIRING MODULE

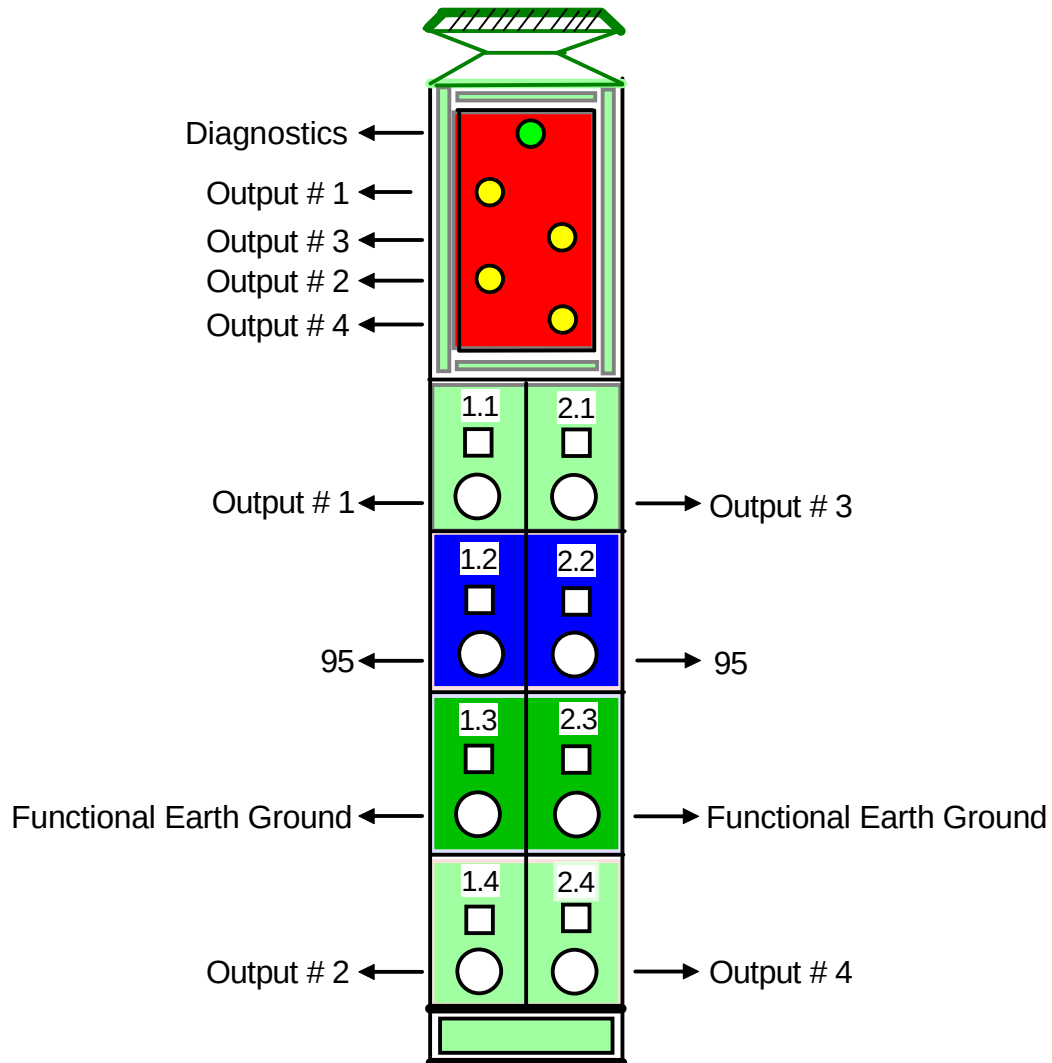
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.35

Revision:

DIGITAL OUTPUT MODULE PLC - ILC - 150 (RED)



DIGITAL OUTPUT MODULE

Diagnostics:

- 1) Green - OK - Bus Active
- 2) Flashing @ 0.5 HZ - Communications power UL available, bus not active
- 3) Flashing @ 2 HZ - Peripheral fault
- 4) Flashing @ 4 HZ - Local bus error

Title: PORTABLE DRYER: TWO FAN & HEAT
DIGITAL OUTPUT MODULE

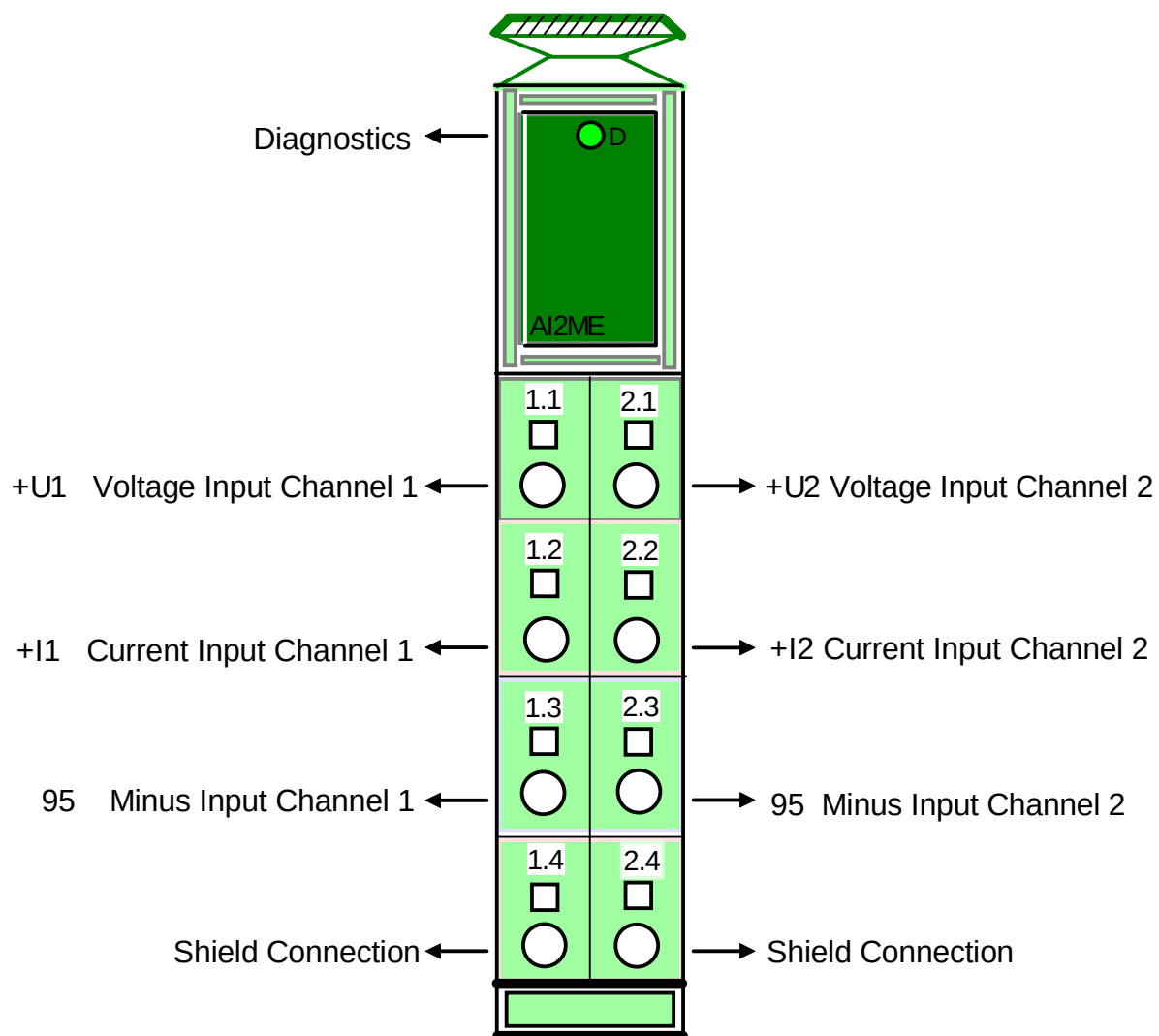
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.36

Revision:

ANALOG INPUT MODULE PLC - ILC 150 (GREEN)



ANALOG INPUT MODULE

Title: PORTABLE DRYER: TWO FAN & HEAT
ANALOG INPUT MODULE

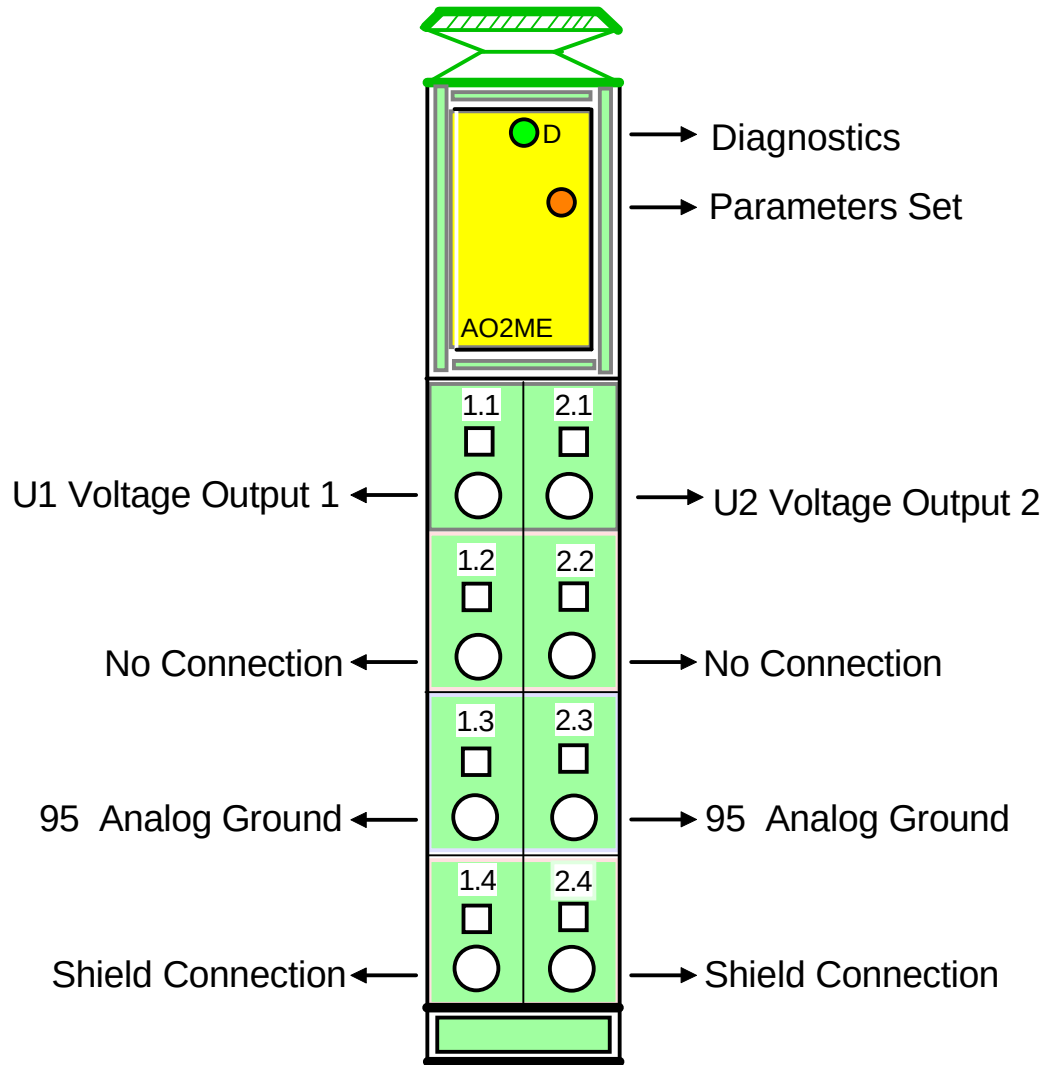
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.37

Revision:

ANALOG OUTPUT MODULE PLC - ILC 150 (YELLOW)



ANALOG OUTPUT MODULE

Title: PORTABLE DRYER: TWO FAN & HEAT
ANALOG OUTPUT MODULE

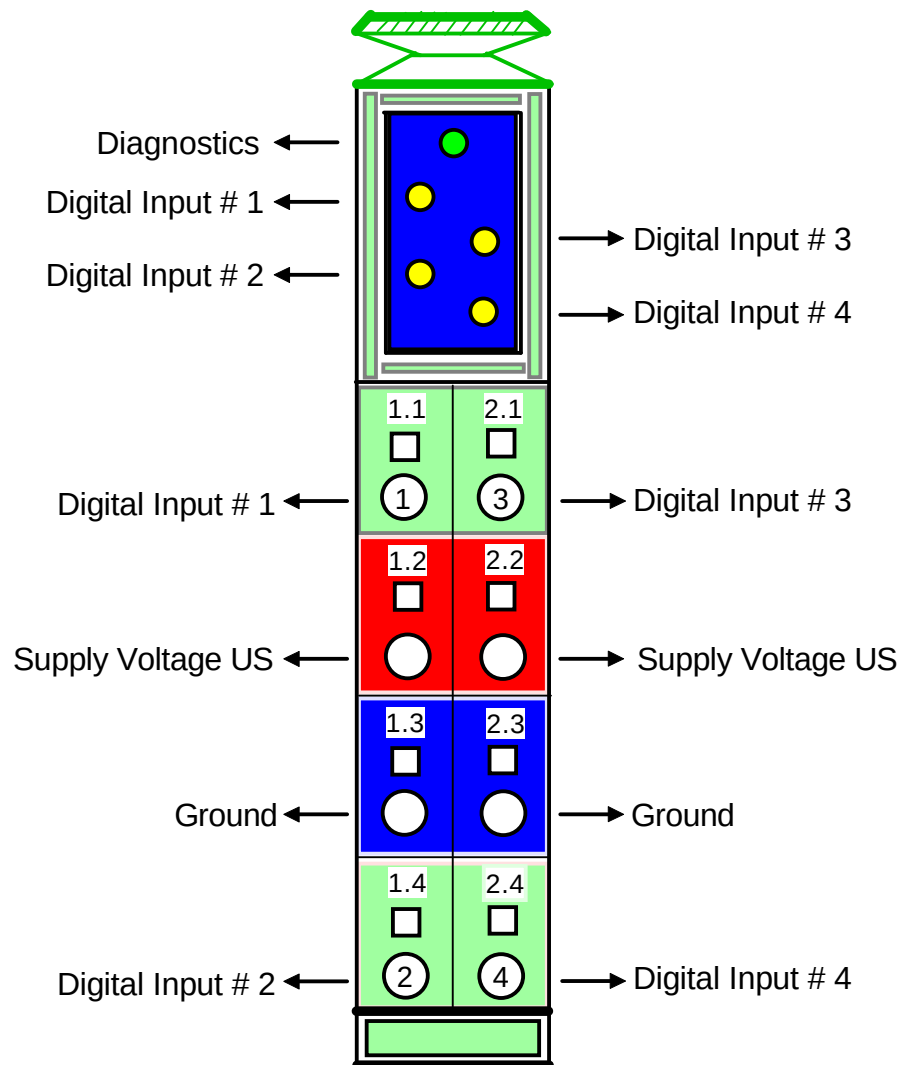
Author: SUKUP MFG CO

Date: 02/12

Sheet: 102.38

Revision:

DIGITAL INPUT MODULE - 4 INPUTS PLC - ILC - 150: 24 VDC (BLUE)



DIGITAL INPUT MODULE

Diagnostics:

- 1) Green - OK
- 2) Flashing - 0.5 Hz - communications power UL available but buss not active
- 3) Flashing - 2 Hz - peripheral fault
- 4) Flashing - 4 Hz - local bus error

Title: PORTABLE DRYER: TWO FAN & HEAT
DIGITAL INPUT MODULE

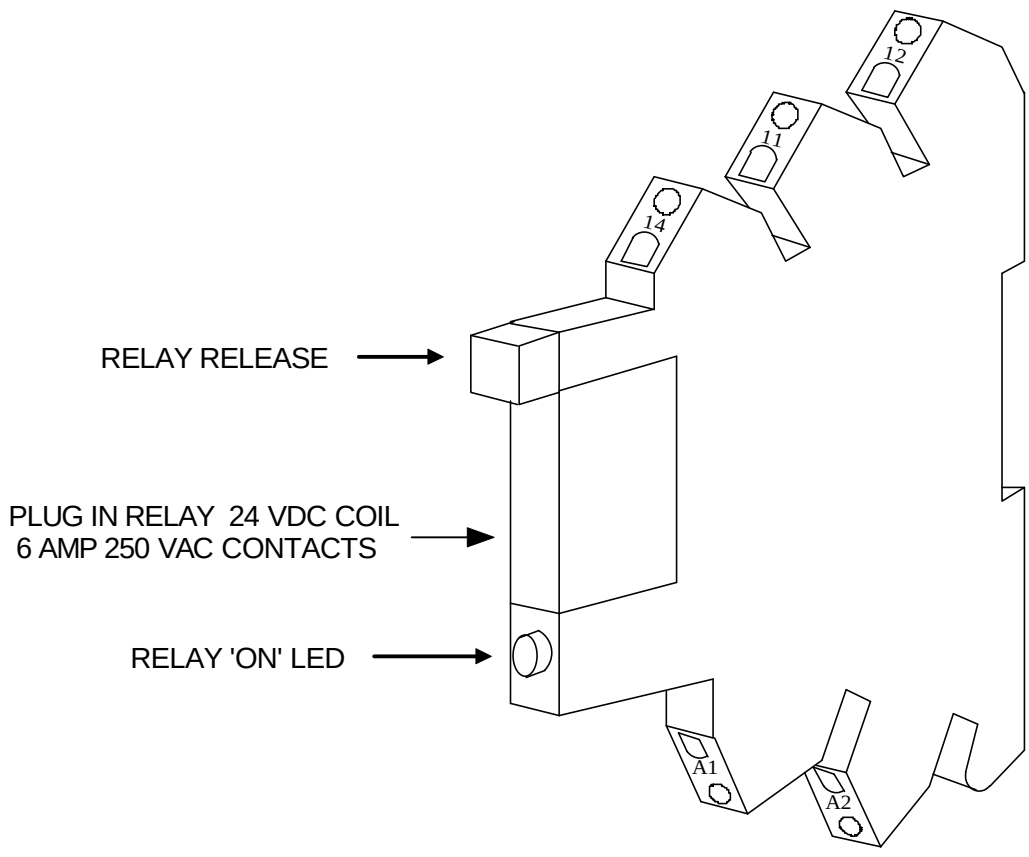
Author: SUKUP MFG CO

Date: 02/12

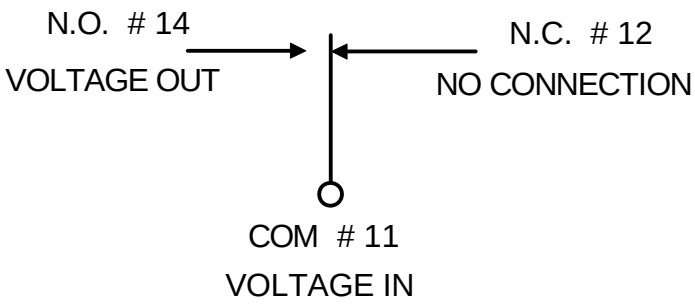
Sheet: 102.39

Revision:

RELAY MODULE

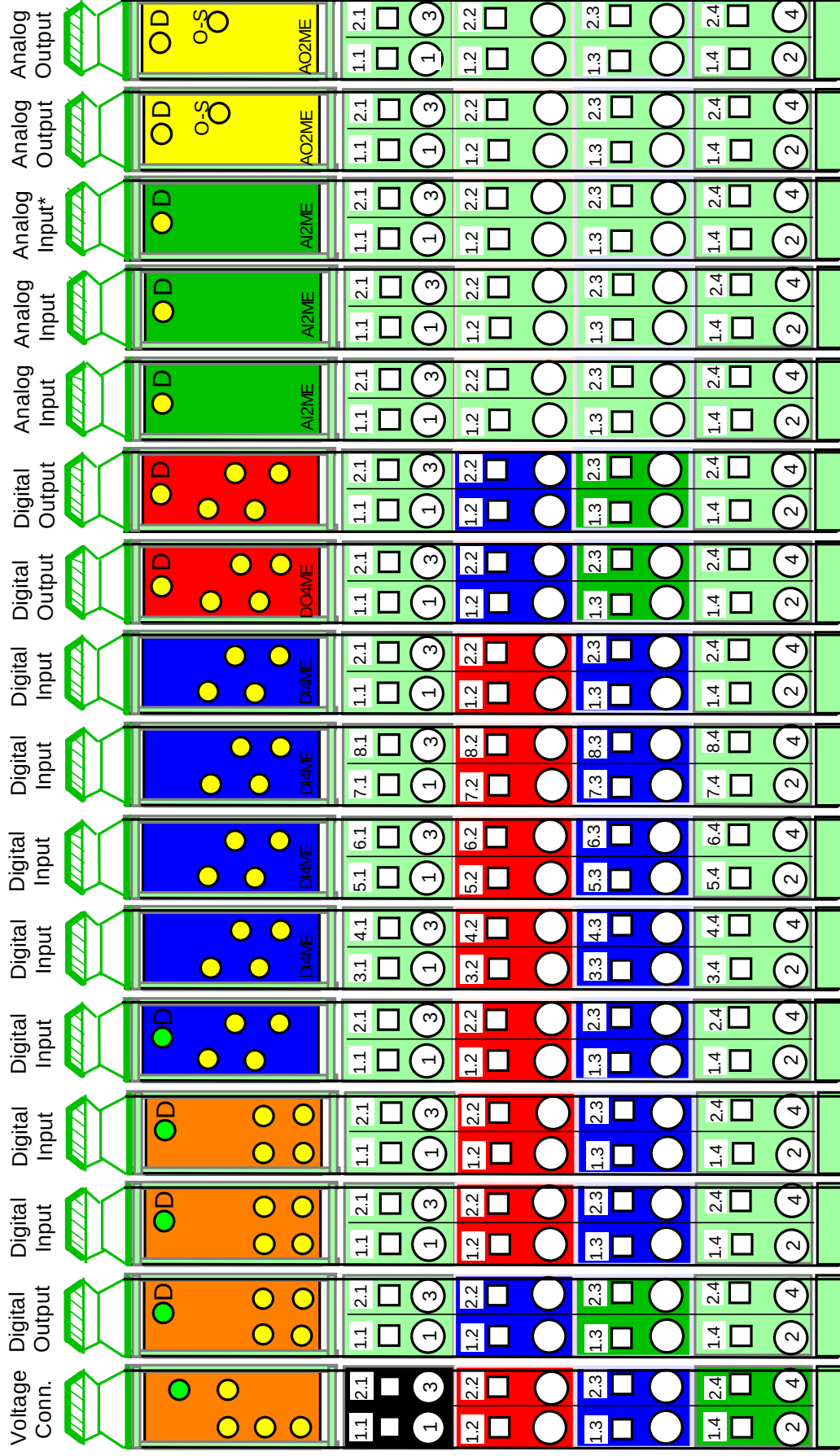


COIL - 24 VDC
CONNECTIONS



Title: PORTABLE DRYER: TWO FAN & HEAT RELAY 24V COIL, SINGLE POLE	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 102.40
Revision:	

BASE NUMBERING - TWO FAN PLC



0.1	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	3.1	4.1	5.1	6.1	7.1	8.1	9.1
0.1.1	0.2.1	0.3.1	0.4.1	1.1.1	1.2.1	1.3.1	1.4.1	2.1.1	3.1.1	4.1.1	5.1.1	6.1.1	7.1.1	8.1.1	9.1.1
0.1.2	0.2.2	0.3.2	0.4.2	1.1.2	1.2.2	1.3.2	1.4.2	2.1.2	3.1.2	4.1.2	5.1.2	6.1.2	7.1.2	8.1.2	9.1.2
0.1.3	0.2.3	0.3.3	0.4.3	1.1.3	1.2.3	1.3.3	1.4.3	2.1.3	3.1.3	4.1.3	5.1.3	6.1.3	7.1.3	8.1.3	9.1.3
0.1.4	0.2.4	0.3.4	0.4.4	1.1.4	1.2.4	1.3.4	1.4.4	2.1.4	3.1.4	4.1.4	5.1.4	6.1.4	7.1.4	8.1.4	9.1.4

NOTE: 1st number = module #, 2nd number = segment # in that module, 3rd number = I/O # on that segment
 * The third Analog input card just used when it is a two fan stack dryer or when a input moisture sensor is installed on the dryer.

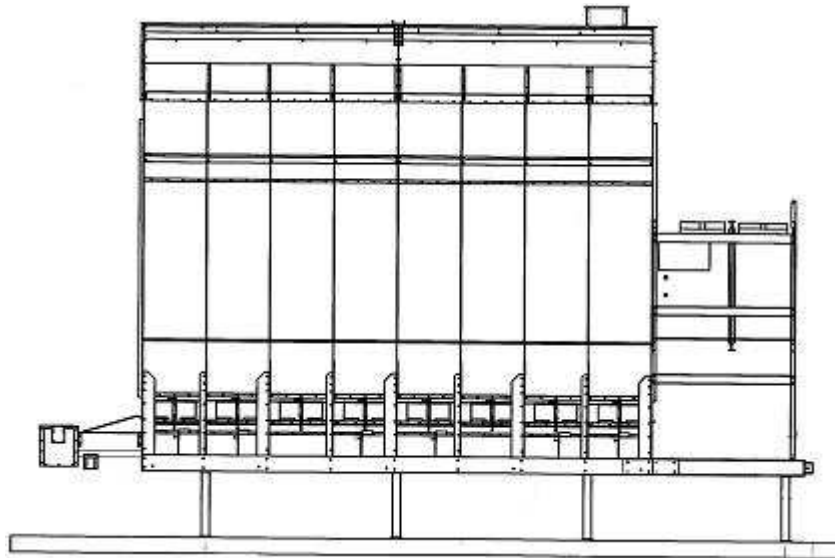
Title: PORTABLE DRYER: TWO FAN & HEAT PLC	
BASE WIRING SEQUENCE	
Author: SUKUP MFG CO	
Date: 02/12	Sheet: 102.41
Revision:	



AUTOMATIC GRAIN DRYER

Continuous Flow / Automatic Batch

Installation Manual



Sukup Manufacturing Company
1555 - 255th Street P.O. Box 677
Sheffield, Iowa 50475
Phone 641 – 892 – 4222
Fax 641 – 892 – 4629

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Installation and Pre-operational Check out**Dryer set up / supports****⚠ Warning**

The wheel transport kit is for transport only and is NOT to be used when operating the dryer. The dryer MUST be mounted and supported in an approved manner.

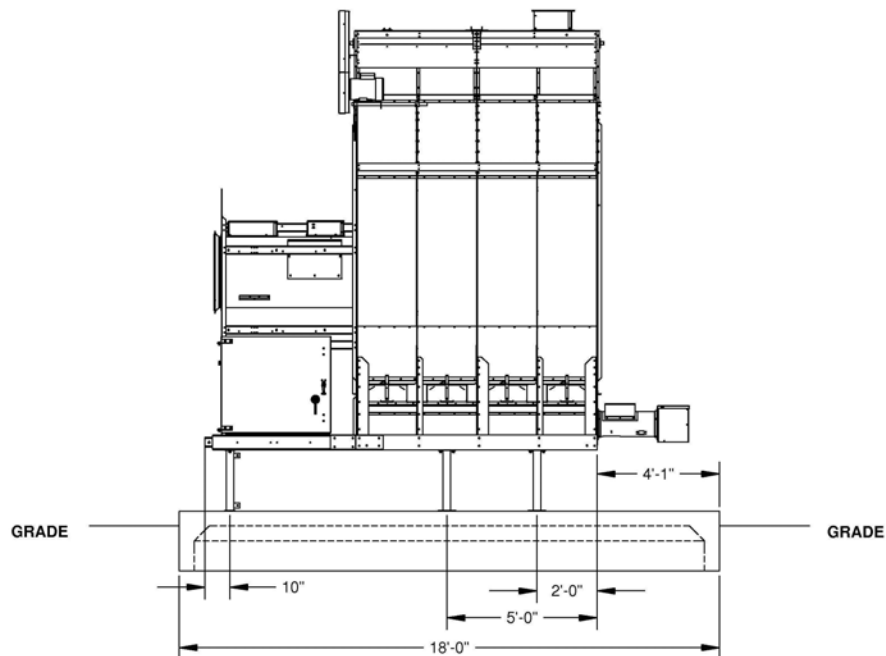
The dryer must be mounted a minimum of 16 inches above the surface to allow for clean out.

Optional dryer supports are available from Sukup Mfg. in 2-foot, 3-foot, and 4-foot lengths. The support kits come with the necessary hardware needed to attach the supports to the dryer frame. The customer must supply the hardware necessary for attachment to the concrete pad. (Required minimum sizes are 1/2" or 5/8" hardware).

Ladder extensions are included with the 3 & 4-foot leg extension kit. The same length of ladder extension is supplied with the 4-foot kit as the 3-foot kit.

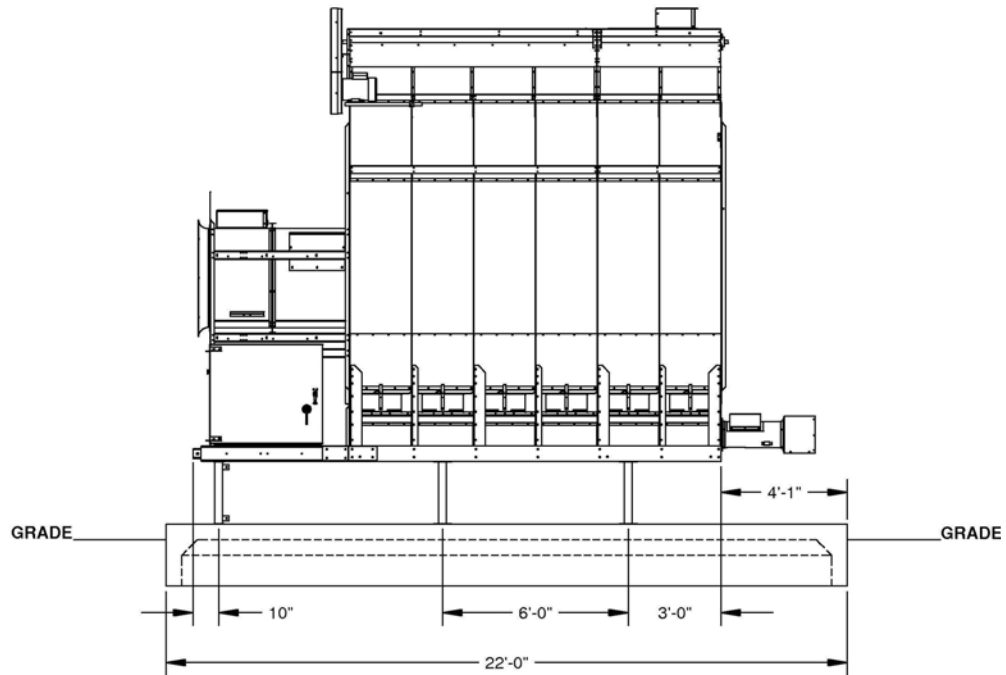
Contact your Sukup Dealer to order either the supports and / or extra ladder extensions.

The following five drawings show proper support leg locations for 8, 12, 16, 20, 24 and 28-foot dryers. Lift ONLY with Sukup lift bracket or equivalent.



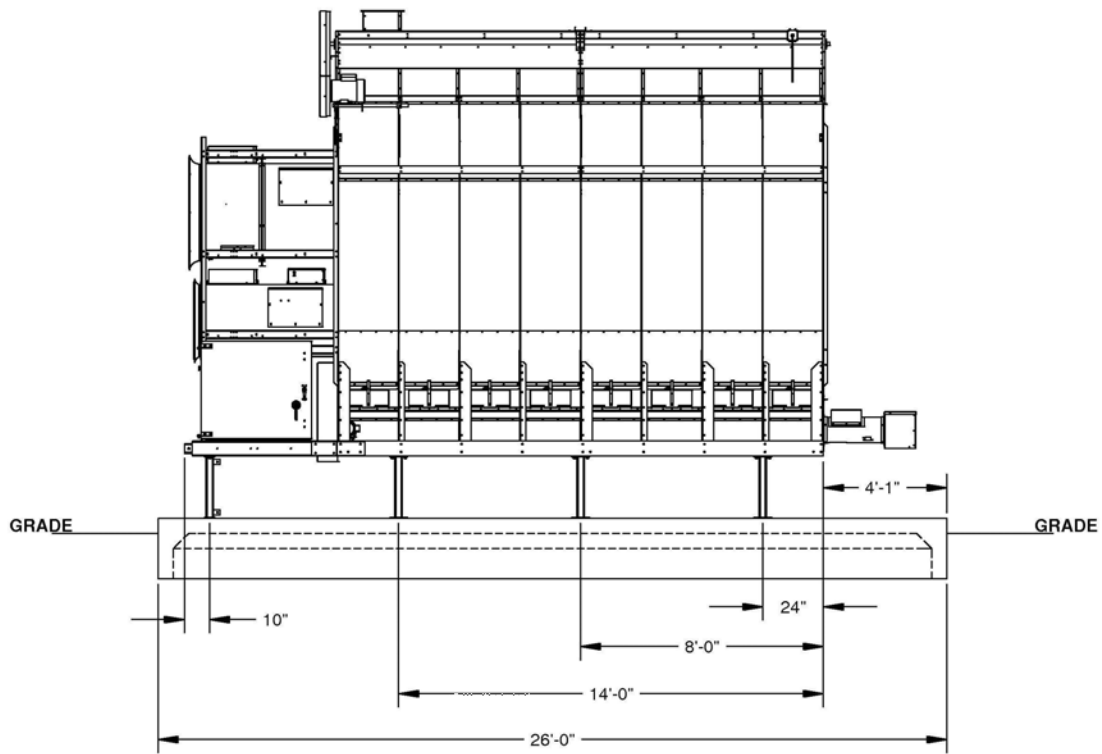
SPT0048
11/02/05DDV

8 Foot Dryer

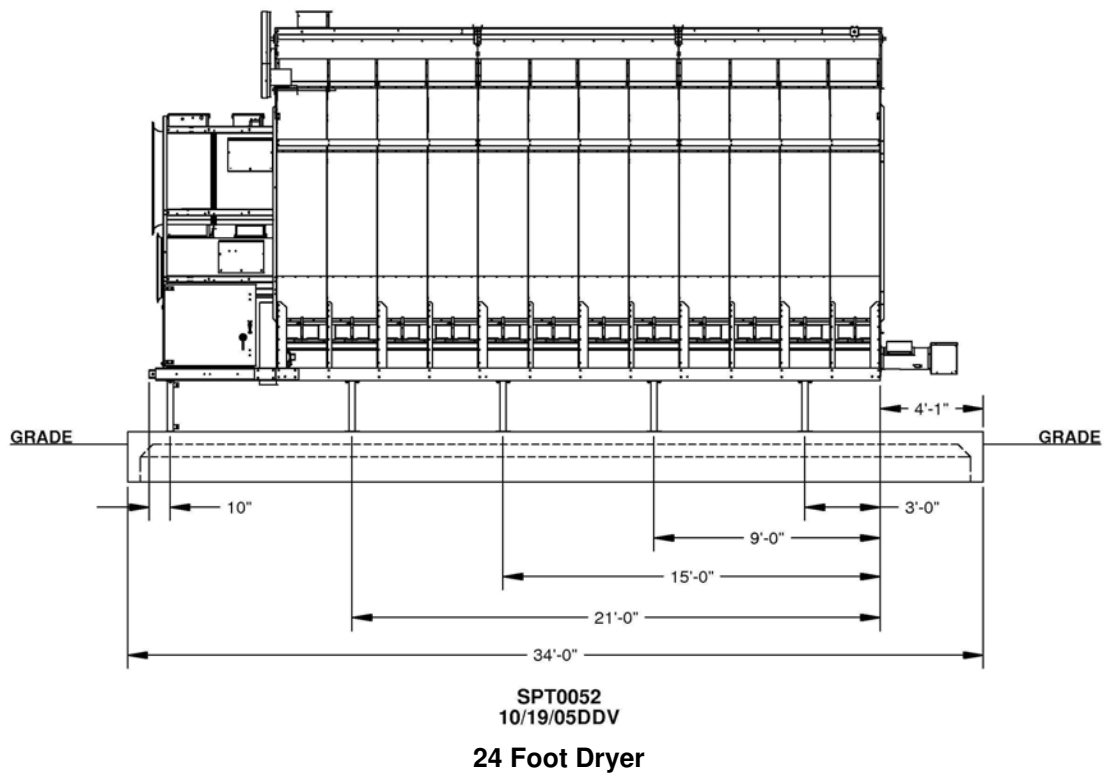
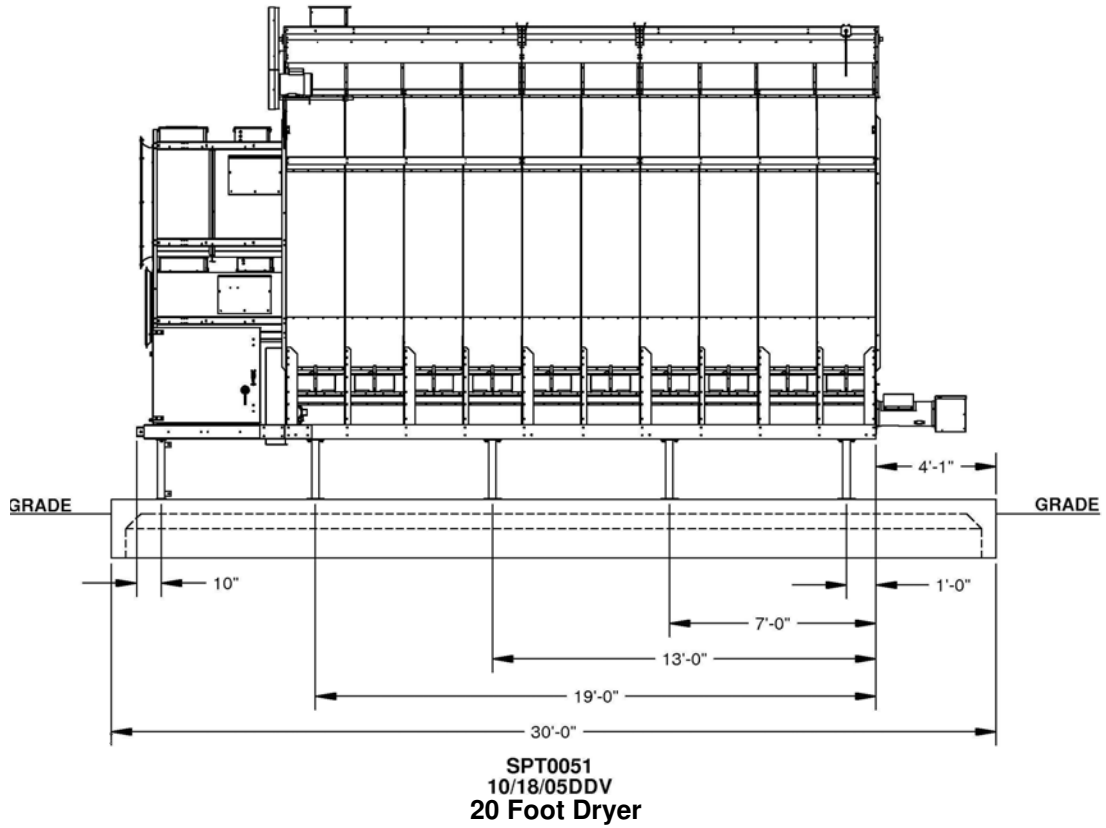


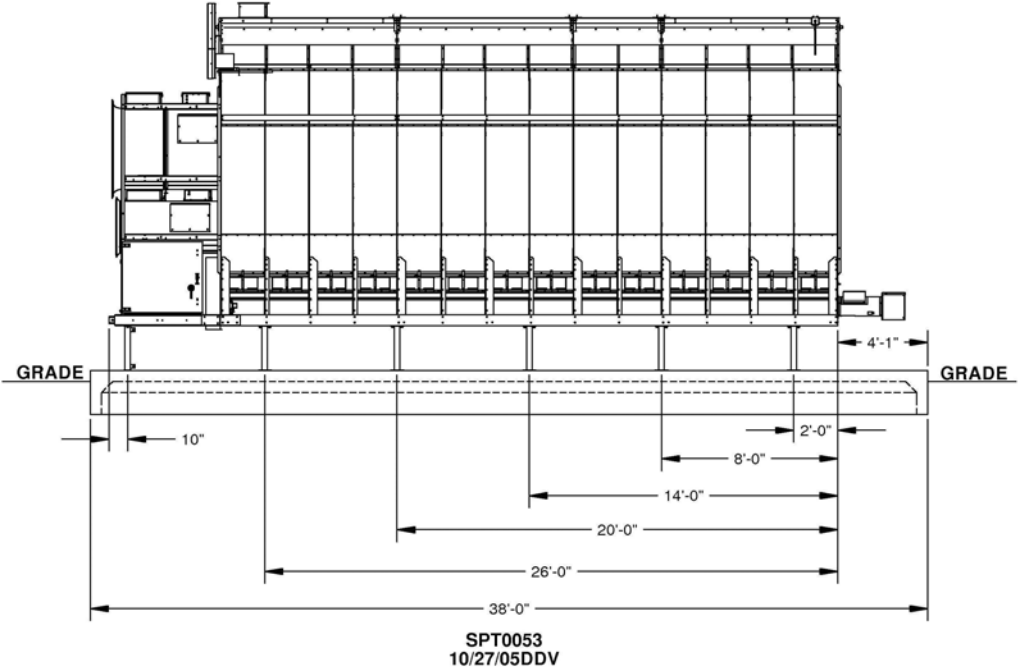
SPT0049
10/18/05DDV

12 Foot Dryer

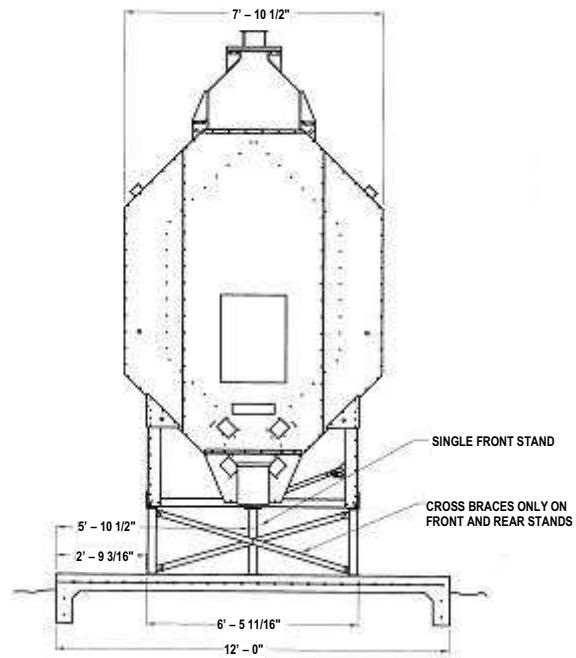


SPT0050
10/18/05DDV
16 Foot Dryer





28 Foot Dryer

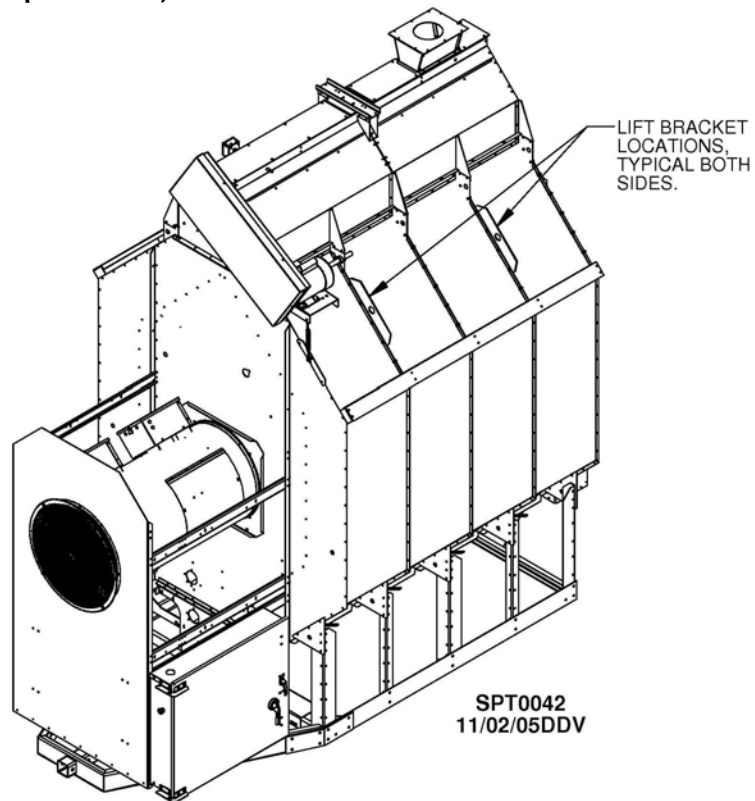


Cross support braces and Front stand

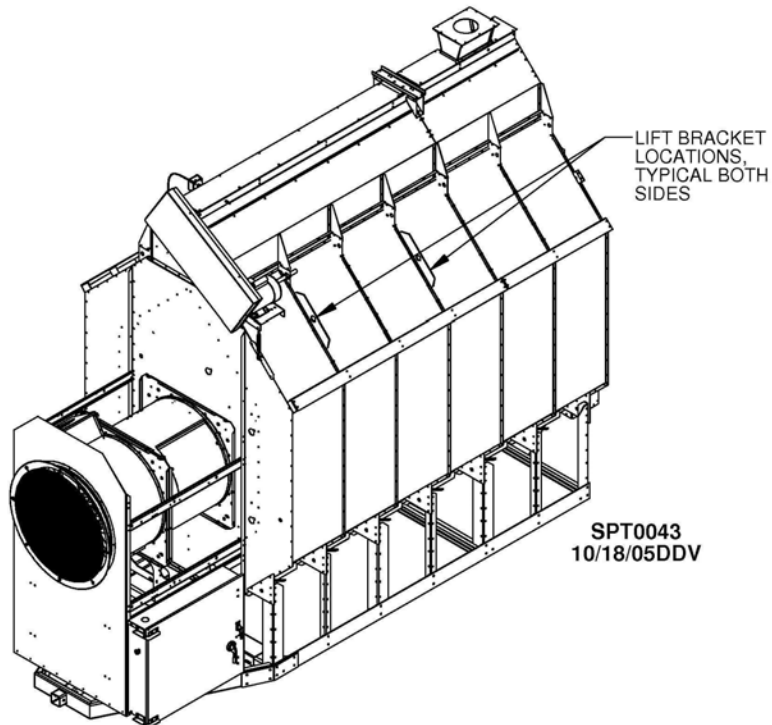
If the dryer is not mounted using Sukup Mfg supports, the following guidelines must be followed:

- Supports under grain columns must be at least every 6 feet
- Support under front hitch
- Fasten dryer down to foundation using brackets or turnbuckles

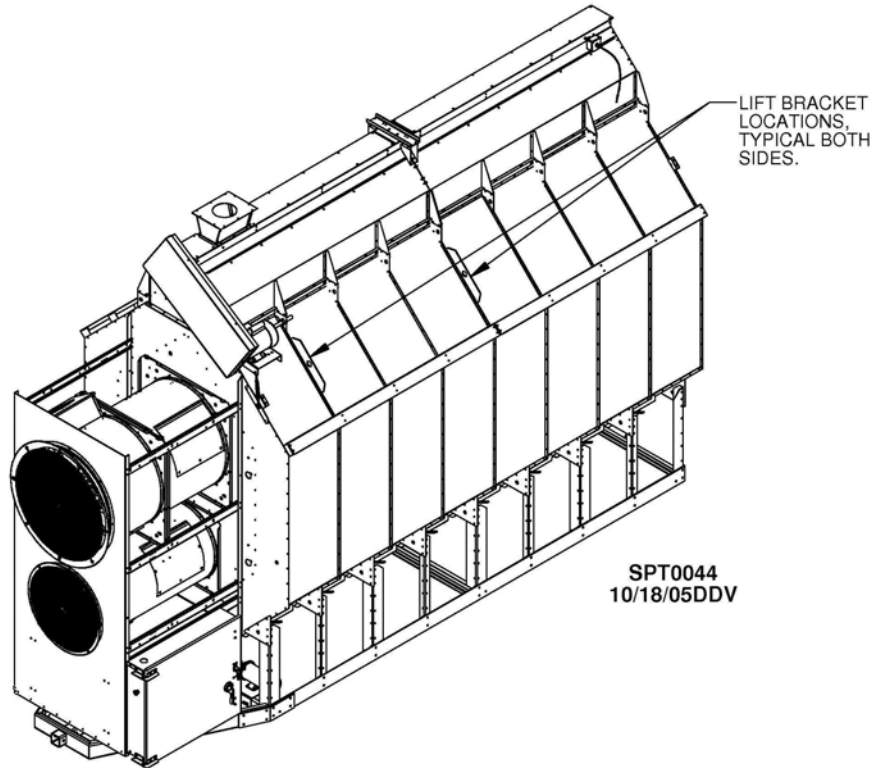
Lift Bracket (Comp. #T16532) Locations



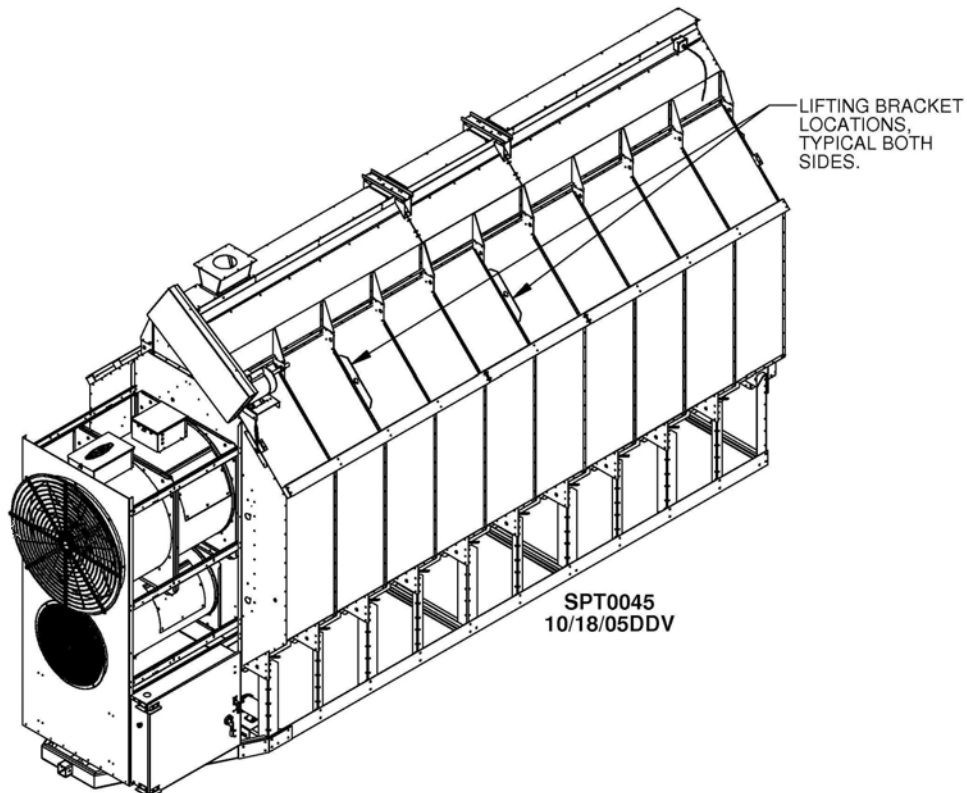
8 Foot Dryer Lift Points



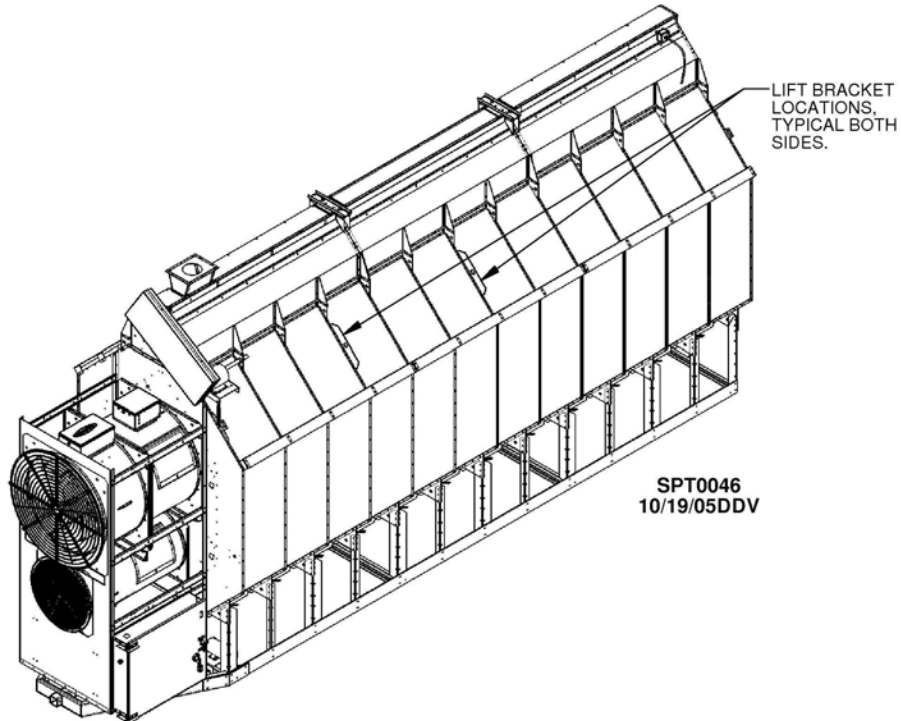
12 Foot Dryer Lift Points



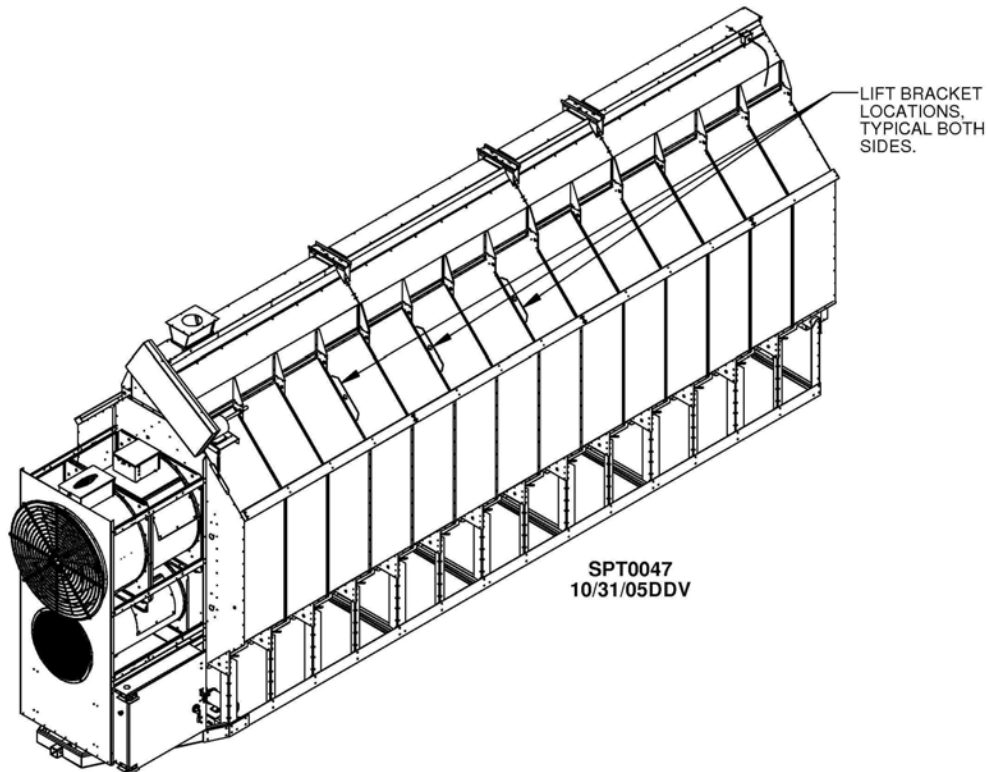
16 Foot Dryer Lift Points
(Approx. dryer weight: 9,000 lbs.)



20 Foot Dryer Lift Points
(Approx. dryer weight: 12,000 lbs.)



24 Foot Dryer Lift Points
(Approx. dryer weight: 14,000 lbs.)



28 Foot Dryer Lift Points
6 lift points are required.
(Approx. dryer weight: 16,000 lbs.)

Wet Bin Assembly

Wet Bin Folding Kits (T17699) are available to aid in lifting the wet bin.

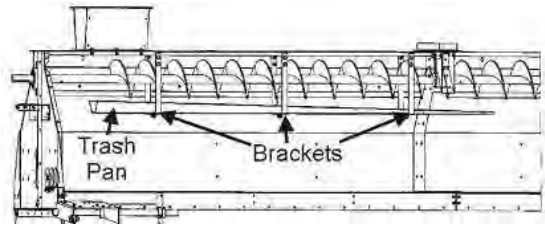


Figure SPT0036

1. Bolt the trash pan brackets into the wet bin on filling end of dryer. Bolt the trash pan to the trash pan brackets. Refer to Figure SPT0036.
2. Position the half of the wet bin without the auger into the upright position first, then pivot the side with the auger into the upright position. Bolt the wet bin together at the end plate seams, side seams, pivot seams, and top hanger support.
3. Attach the fill auger paddle switch assembly. Locate the holes for the paddle switch in the wet bin on the end opposite the filling end.

Note

Holes are pre-punched for mounting at either end. Remove desired plastic plugs. Leave plugs in end not being used.

Important

Any open bolt holes in the wet bin should be filled with bolts and secured with nuts to prevent grain leakage.

4. Slide a plastic bushing on each side of wet bin from inside out. Slide the shaft with the tilt switch box through the bushing on one side of the wet bin. Position the paddle weldment inside of the wet bin, and slide the shaft through the pipe of paddle weldment. Slide the shaft through the bushing on the other side of the wet bin. Tighten setscrews of paddle weldment onto shaft, making sure the paddle and box on shaft are square, and paddle can pivot freely. Refer to Figure SPT0038.

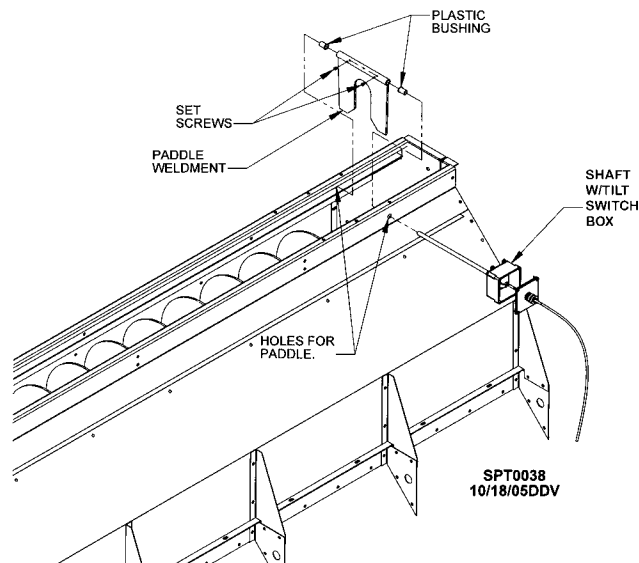


Figure SPT0038

Wet Bin Assembly (Continued)

5. Bolt the top fill hopper to the top of the wet bin on the filling end of the dryer. Place the cover plates on top and attach with $\frac{1}{4} \times 1$ " self drill screws. Refer to Figure SPT0039 for Front fill and Figure SPT0041 for Rear fill dryers. (16' dryer is shown in drawings below.)

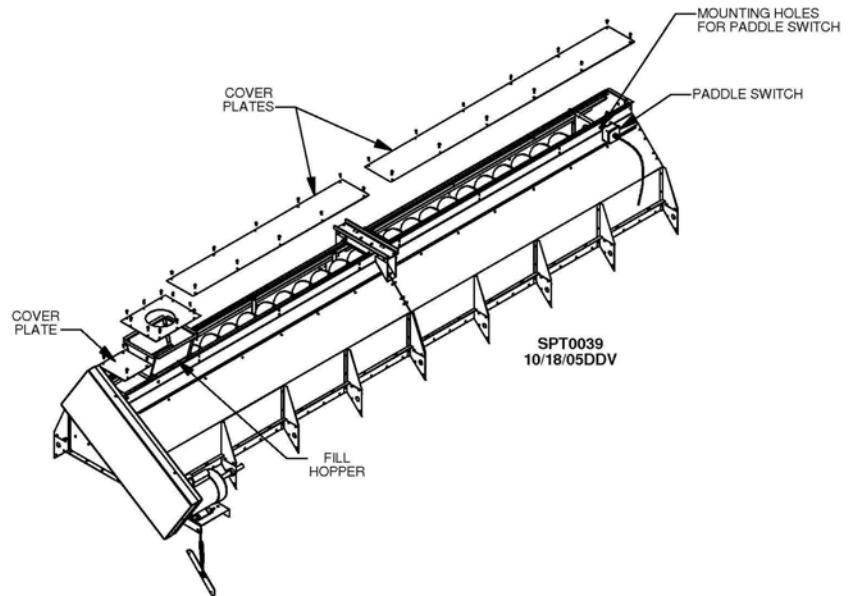


Figure SPT0039

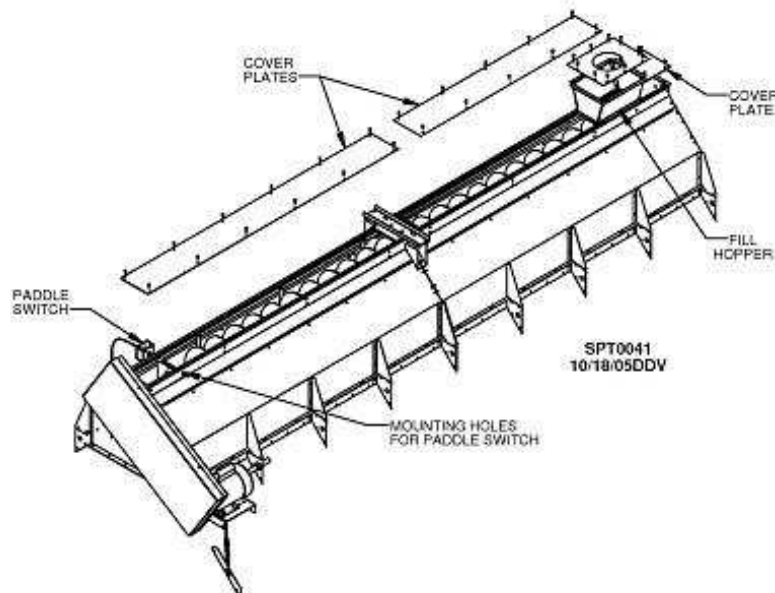


Figure SPT0041

Top Load Auger Motor and Shields

1. Bolt the lower shield bracket to the end of the dryer, using 5/16 x 1" bolts and 5/16 nuts. Refer to Figure SPT0031.

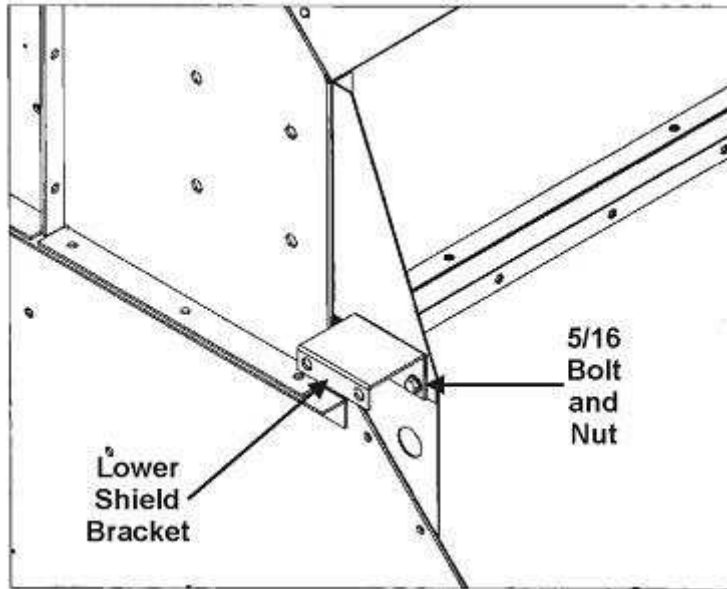


Figure SPT0031

2. Hold the motor mount up to the holes on the side of the wet holding bin. Slide a 1" conduit tube through the motor plate holes of the dryer. Refer to Figure SPT0034.

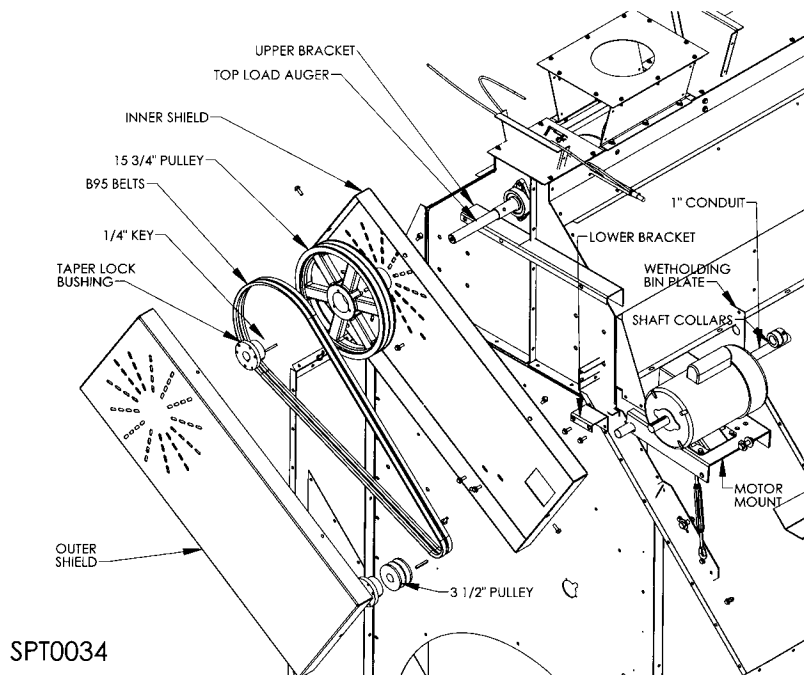


Figure SPT0034

Top Load Auger Motor and Shields (Continued)

3. Slide the shaft collars on each side of the wet holding bin plate. Refer to Figure SPT0035.

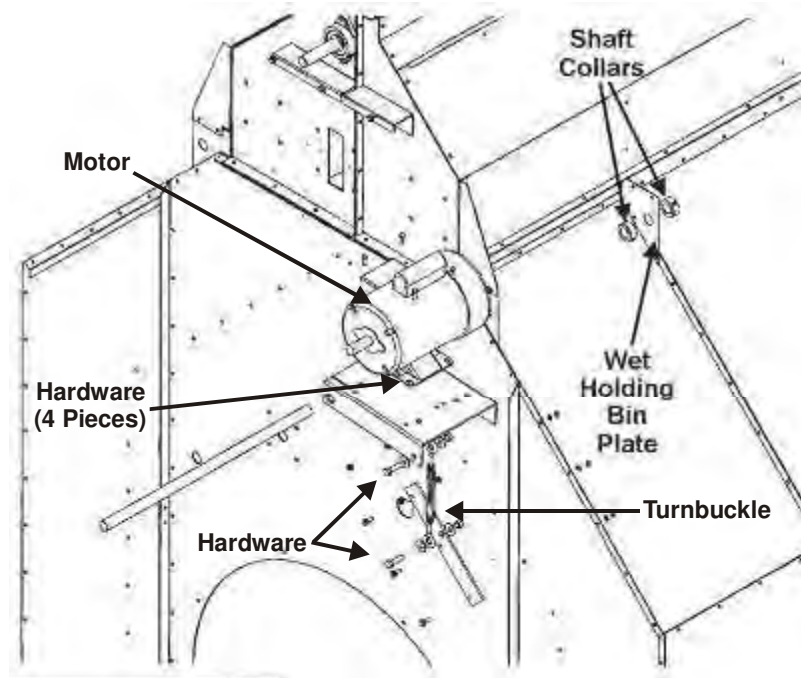
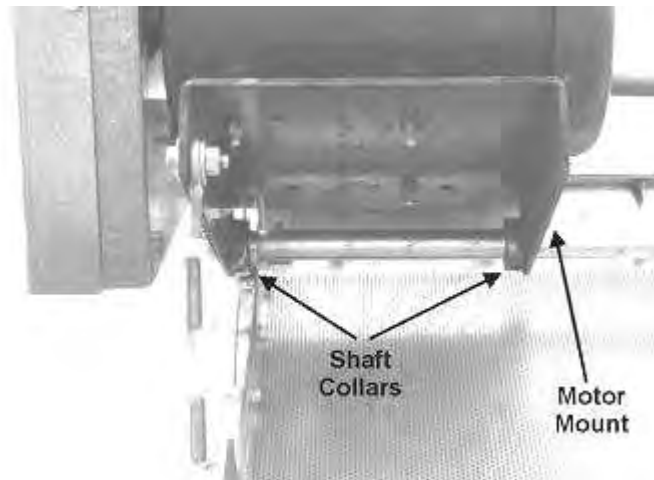


Figure SPT0035

4. Tighten the shaft collars under the motor mount and on each side of the wet holding bin plate. Make sure the motor mount can pivot. Refer to picture below.



Top Load Auger Motor and Shields (Continued)

5. Bolt the turnbuckle plate to the side of the dryer. Refer to Figure SPT0034.
6. Bolt the turnbuckle between the motor mount and the turnbuckle plate using $\frac{1}{2} \times 1 \frac{3}{4}$ " bolts and $\frac{1}{2}$ " flat washers and $\frac{1}{2}$ " lock nuts. Refer to Figure SPT0035.
7. Bolt the motor to the motor mount using $\frac{5}{16} \times 1$ " bolts and $\frac{5}{16}$ " nuts and washers. Refer to Figure SPT0034.
8. Bolt the inner shield to the upper and lower brackets using $\frac{5}{16}$ " bolts, washers, and nuts. Refer to Figure SPT0034.
9. Attach a $3 \frac{1}{2}$ " O.D. pulley to the motor shaft with a key and attach the $15 \frac{3}{4}$ " O.D. pulley to the top load auger with a taper lock bushing. Use suitable straight edge to align pulleys. Attach two B95 belts between the auger pulley and the motor pulley. Tighten the turnbuckle to tighten the belts. Refer to Figure SPT0034. Tension belts so that it takes about 6 lbs. pressure to deflect belt $\frac{1}{2}$ " at center of belt span.
10. The final assembly should appear as below. (Shown without front shield.)

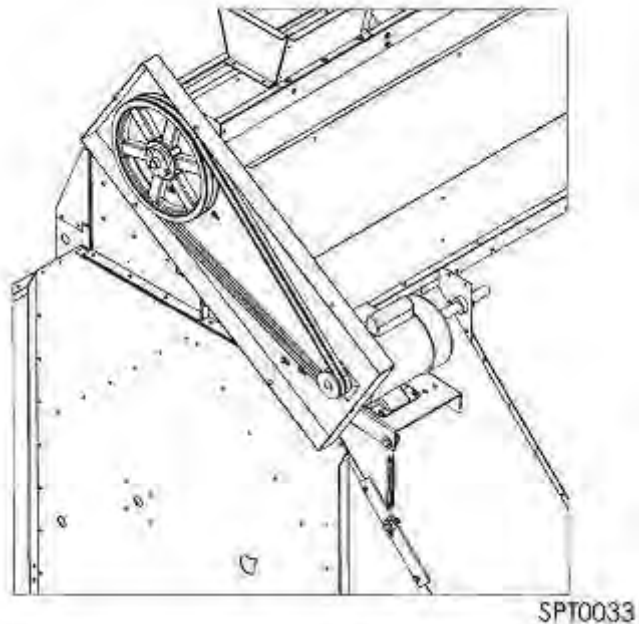


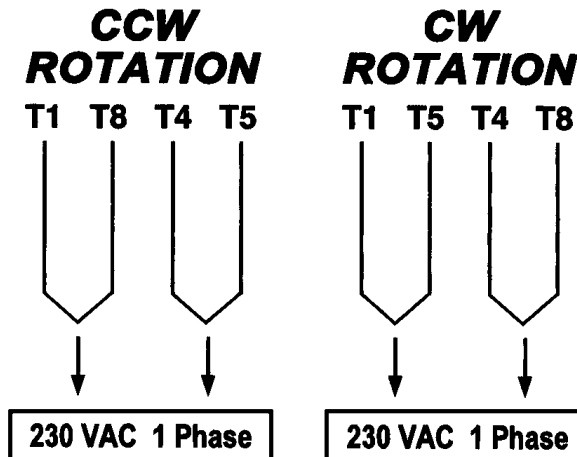
Figure SPT0033

11. Slide the outer shield around the outside of the inner shield and attach with 6 – $\frac{5}{16} \times 1$ " bolts.

Refer to Figure SPT0034.

Connecting the Load Auger Motor

The overload circuit is intentionally disconnected in the motor because the overload protection (starter protector) is now located in the power box on the dryer. A sticker (L0903) is attached to the motor showing how to make wiring connections.

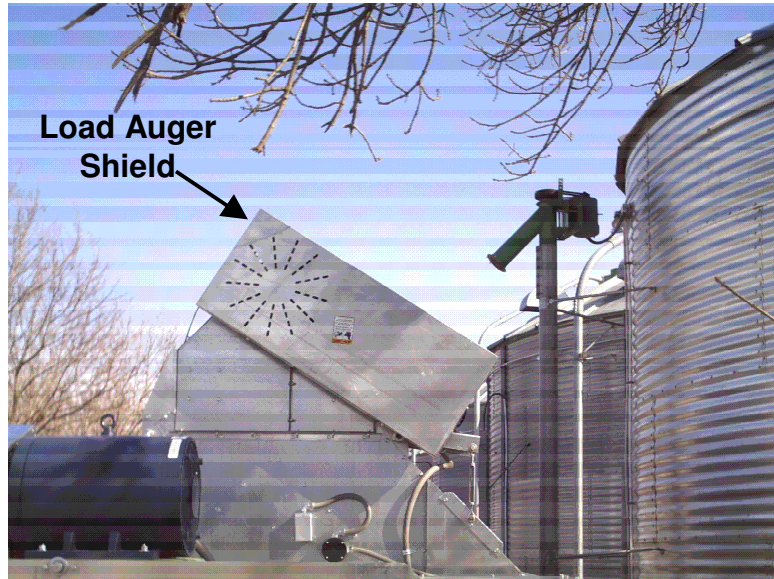


NOTE: The thermal overload device used in this motor has been disconnected. The over-current protection for motor is located in the power box.

L0903

Safety shields / Access doors and covers**Warning**

It is extremely important to operate the dryer with all safety shields installed.

1. Safety Shields

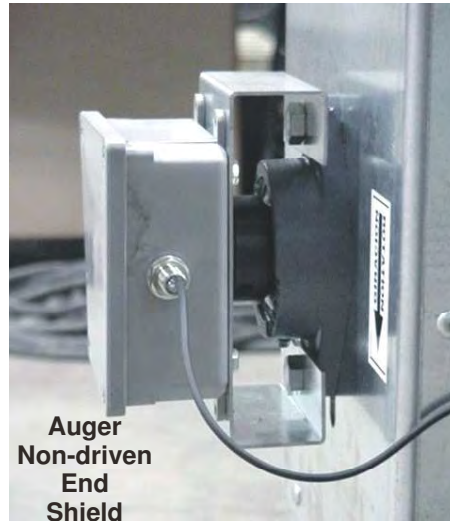
The load auger safety shield is located on the top of the Dryer and it functions to cover the load auger drive pulleys, motor, and belts.



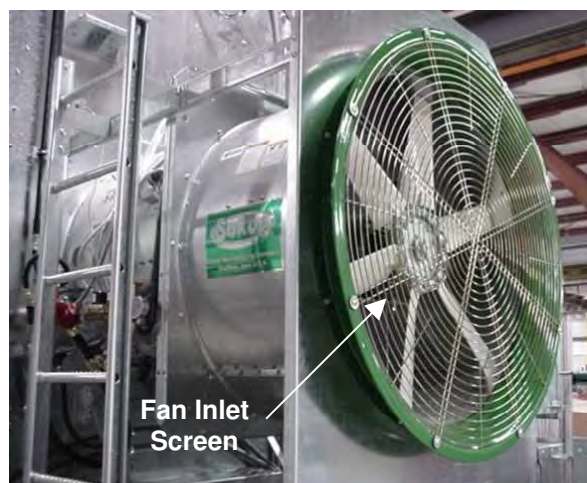
The unload auger and meter roll drive safety shield is located on the front of the dryer and functions to cover the unload auger motor, pulleys and belts. It also covers the meter roll sprockets and drive chains.

Safety Shields (continued)

The non-driven end of the unload auger has a safety shield and is located at the rear of the dryer. The shield also serves as a mount for the unload proximity junction box.

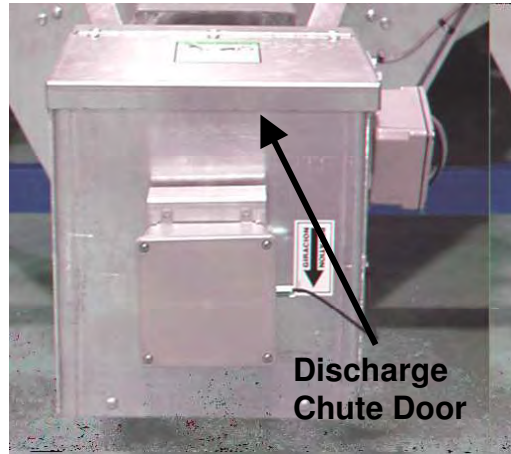


The fan inlet screen is located at the intake of the fan. It prevents foreign material from being drawn into the fan. Keep clean with periodic maintenance.

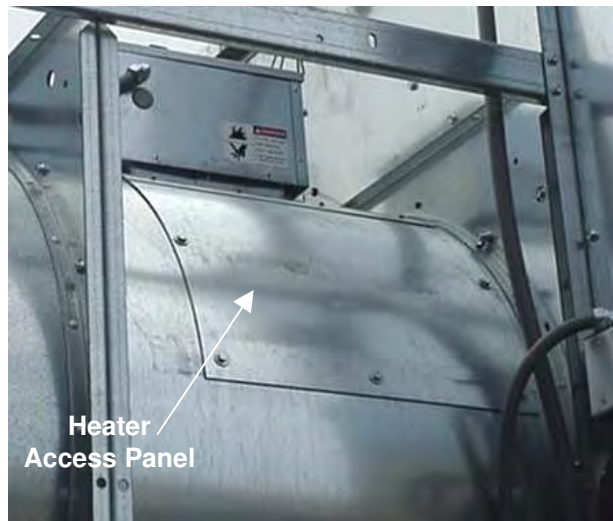


Safety Shields (continued)

The grain discharge chute door is located at the rear of the dryer, on the top of the grain discharge chute. It prevents access to the unload auger while dryer is in operation and opens on grain overflow if the takeaway system fails.

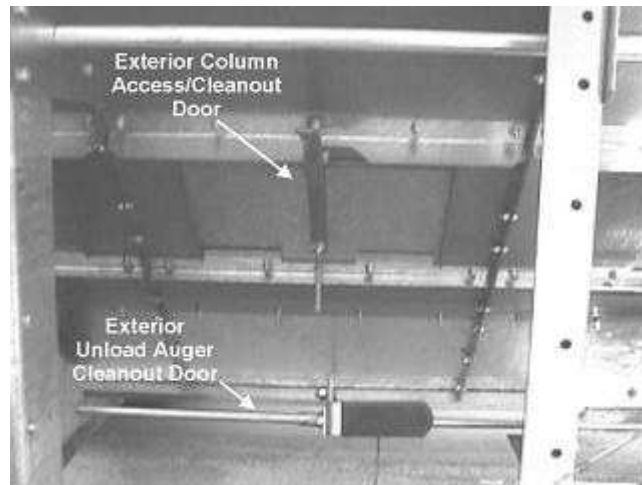
**2. Access doors/covers**

The heater access panel is located on the upper left side of the heater and allows access to the inside of the heater barrel.

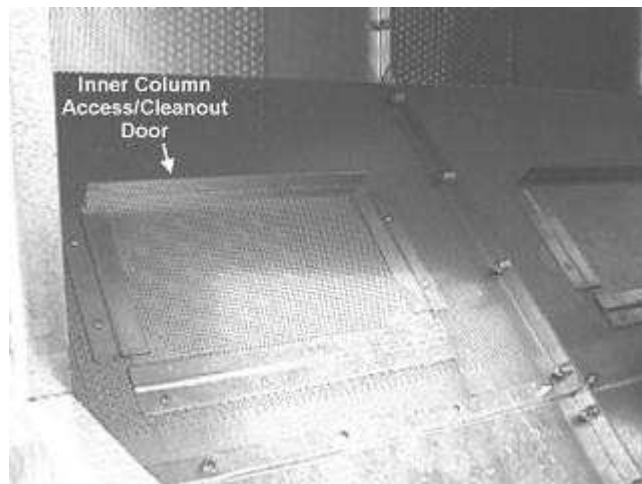


Access doors/covers (continued)

The exterior grain column access and cleanout doors and the exterior unload auger access and cleanout doors are located on the bottom portion of the dryer.



The inner grain column access doors are located in the plenum area on each column, both sides.



The unload auger inner access panels are located in the plenum, on the floor.

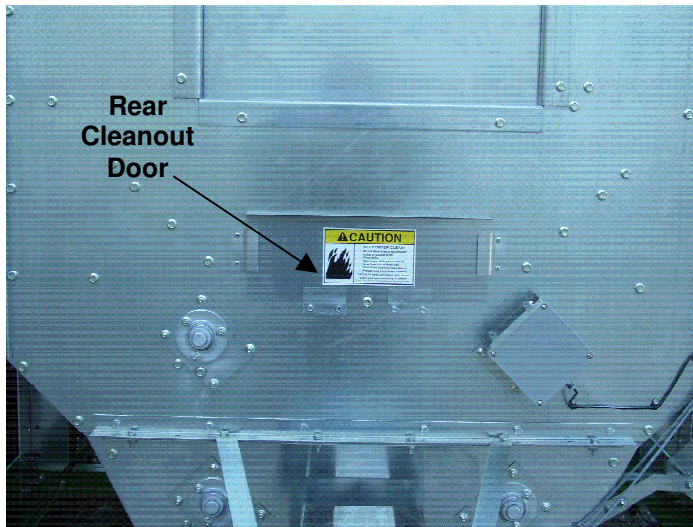


Access doors/covers (continued)

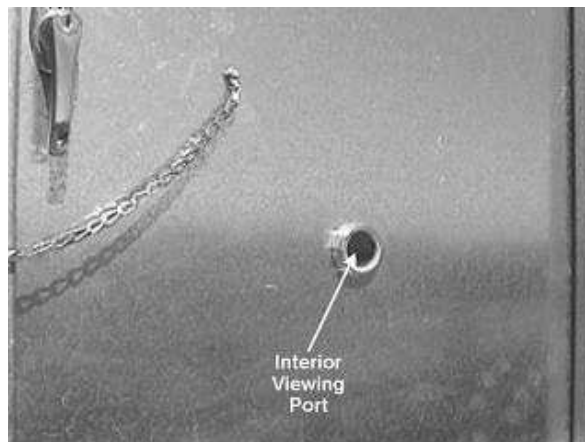
The plenum access door is located at the rear of the dryer.



The clean out door is located at the rear of the dryer just below the plenum access door. It is used to clean out the plenum. With the fan running and standing to the side, lift the door and fines and debris will be blown out.



The rear viewing port is located in the plenum access door and is used to view the interior of the dryer during operation.



Ground Rod Installation



A system ground rod (J5722) and clamp (J5723) are supplied with the dryer and can be found in the rear of the dryer. The rod is copper-coated, 8 feet long, and ½ inch diameter.

1. The installation of the ground rod and ground wire must conform to National Electrical Code Handbook procedures.
2. Bury the ground rod (top of rod must be flush with ground) within 8 feet of the dryer and attach it to the power distribution box ground lug located in the lower right corner. The ground rod located at the power pole will **not** provide sufficient grounding for the dryer.



3. The proper grounding will provide added safety in case of any short or lightning strike.
4. **Ground rod MUST** be installed to validate the dryer warranty!

QuadraTouch™ Controller Installation

The design of the QuadraTouch™ controller allows for easy installation. However, there are a few things to keep in mind when choosing an installation location:

1. The QuadraTouch™ controller will need its own 100 – 240VAC power source. Choose a location where electricity can be easily accessed. @120VAC, the unit pulls less than 1A. Using an appropriate extension cord is acceptable, as long as standard electrical codes are followed.
2. The industrial Ethernet cable that is ordered with the dryer is available in 4 lengths:

Cable Length	Comp #
50'	J8720
100'	J8721
150'	J8722
200'	J8723

The cable length determines how far away the controller can be mounted from the dryer. 200 feet is the longest, standard length.

3. Although the QuadraTouch™ controller is contained in a sealed enclosure, it's a good idea to mount the controller in a shed or place of shelter. This is easier for everyone involved in the process.

The QuadraTouch™ controller has an operating temperature of 10°F – 135°F and a storage temperature of –4°F to 150°F. Therefore, outdoor placement is acceptable in most locations, however, it is recommended that it be placed indoors during the winter months when not in use.

4. The QuadraTouch™ controller comes with pre-installed mounting brackets. These allow the controller to be mounted directly onto the wall or bench using 4 screws.

NOTE: If the location where the controller is mounted is not heated, it is recommended that the unit be taken indoors during the winter months or anytime the controller would be exposed to temperatures outside its temperature limits.



AUTOMATIC GRAIN DRYER
Continuous Flow / Automatic Batch
QuadraTouch™ Dryer Control System



SERVICE MANUAL

Sukup Manufacturing Company
1555 – 255th Street, Box 677
Sheffield, Iowa USA 50475

Phone: 641-892-4222
Website: www.sukup.com

Fax: 641-892-4629
E-mail: info@sukup.com

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Sensor Installation

Sensor Installation and Removal Instructions

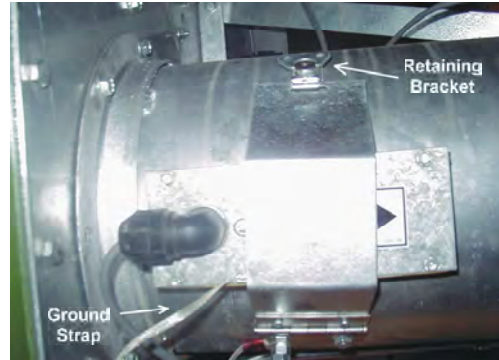
A. Discharge Moisture Sensor

F60337X (QuadraTouch dryer uses yellow identifier)

This sensor is used to monitor the grain's moisture as it exits the dryer.

Removal:

1. Turn power off at the power box.
2. Locate the discharge moisture sensor on the bottom of the grain discharge chute.
3. Disconnect the sensor ground strap connected to the dryer with a regular nut.
4. Release the sensor-retaining clamp and remove the sensor from the discharge tube.
5. Remove the wire cable retaining clips fastening the wire to the dryer all the way back to the junction box located at the right rear of the dryer.
6. Remove the junction box cover by removing the four screws.
7. Disconnect the sensor wires from the dryer wiring.



Installation:

1. Obtain a new moisture sensor and place it into the grain discharge tube. Secure the sensor by tightening the holding clamp.
2. Connect the ground strap to the dryer frame, and tighten the nut.
3. Route the wire cable to the junction box using the cable clamps to secure the cable to the dryer.
4. Connect the sensor wiring to the dryer wiring. Red to Red. Blue to Blue. Black to Black. Green to Green. Shield to Shield.
5. Install junction box cover by tightening four screws.
6. Tighten strain relief. See Moisture Sensor Calibration in the Component Calibration section to calibrate.



Sensor Installation

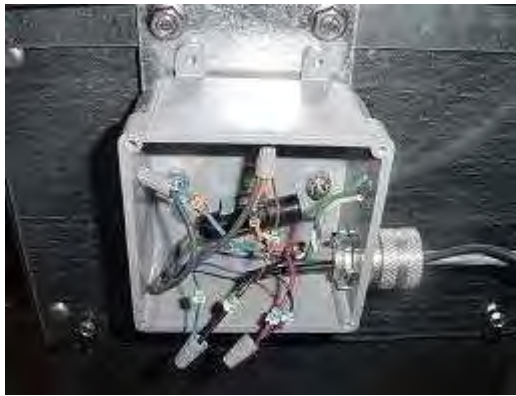
B. Grain Discharge Chute Sensor

J4440 (Same switch is used for Grain Level Sensor)

This sensor is used to detect a plugged take-away system. Should the take-away system malfunction, the grain would push up the discharge chute door, causing a fault condition.

Removal

1. Turn the power off at the power box.
2. Locate the grain discharge chute sensor junction box.
3. Remove the cover by removing the four screws.
4. Disconnect the two sensor wires from the dryer wiring.
5. Remove the switch from the retaining clip.



Installation

1. Obtain a new sensor and insert the sensor into the retaining clip.
2. **IMPORTANT:** The sensor must be installed exactly as shown in the picture. The wires coming from the sensor must be down and to the left of the retaining clip, or dryer will not operate properly.
3. Connect the two sensor wires to the dryer wiring. (Wire #18 and Wire #42)
4. Reinstall cover when finished (See Discharge Chute Switch Adjustment in the Component Calibration section to calibrate).

Sensor Installation

C. Grain Level Sensor

J4440 (Same switch is used for Grain Discharge Chute Sensor)

Used to detect when the dryer is full of or needs grain.

Removal

1. Turn power off at the power box.
2. Locate the grain level sensor junction box. Found on the right side of the wet bin, opposite the fill end.
3. Remove the cover by removing the four screws.
4. For either upper or lower switch, disconnect the two wires from the dryer wiring.
5. Remove the switch from the retaining clip.



Installation

1. Obtain a new switch and insert into the retaining clip.
2. **IMPORTANT:** Switches must be installed as shown in the picture. Switch wires must be to the left. If not installed properly, the dryer will not function correctly.
3. Connect the wires in the following manner – All #18's together. #44 to #44. #53 to #53.
4. When finished, reinstall the cover by tightening the four screws.

D. Unload Auger Proximity Sensor

J4493 (Same switch is used for Metering Roll Proximity Sensor)

This sensor monitors the rotation of the unload auger. Should the unload auger stop turning for 5 seconds, a fault condition will occur.

Removal

1. Turn the main power off at the power box.
2. Locate the unload auger sensor on the end of the grain discharge chute.
3. Remove the cover by removing four screws.
4. Loosen and remove the inside lock nut and remove the proximity sensor from the box.
5. Follow the wiring to the junction box located on the side of the grain discharge chute and remove the cover by removing four screws.
6. Disconnect the sensor wires from the dryer wiring.



Installation

1. Obtain a new sensor and remove the first locknut. Slide the sensor into the hole and secure with the locknut just removed.
2. **IMPORTANT:** The gap between the tip of the rotating target and the proximity sensor must be no greater than 4mm. (approximately the width of a nickel).
3. Route the wiring in the same manner as before and connect the sensor wires to the dryer wiring. Blue to #95 Black. Brown to #18 Orange. Black to #96 Red.
4. Turn power on at the power box and turn the system control switch to COMPUTER. Go to Tools → Manual Operation, and press and hold the Unload button. Unload auger should now be turning. If installation was NOT successful, a fault message will appear on the LCD screen within 5 seconds and the unload auger will shut down. See photo of Grain Discharge Chute Sensor, page 3.
5. Reinstall the cover by tightening the four screws.

Sensor Installation

E. Vaporizer Over-Temperature Sensor J5900

This sensor monitors the vapor temperature as it exits the vaporizer coil. Should the temperature exceed 140°F, the sensor opens the circuit, causing a fault condition.

Removal

1. Turn the power off at the power box.
2. Locate the vaporizer over-temperature switch on the heater pipe train, on the vaporizer coil.
3. Loosen the worm clamp holding the sensor in position.
4. Follow the wiring to the heater box and remove cover. See photo in Section H, Heater High Limit.
5. Disconnect the red #18 wire attached to the housing high limit switch. A new crimp terminal end should be used.
6. Disconnect the red #37 wire, which is also attached to a blue #37 wire by removing the blue wire nut.

Installation

1. Obtain a new over-temperature switch and position the new switch in the same position as the old switch and secure by tightening the worm clamp. Be careful not to over tighten!
2. Route the new switch wiring to the heater control box.
3. Attach the red #18 wire to the housing high-temperature switch where #18 blue connects.
4. Attach the red #37 wire to the blue #37 wire using a wire nut.



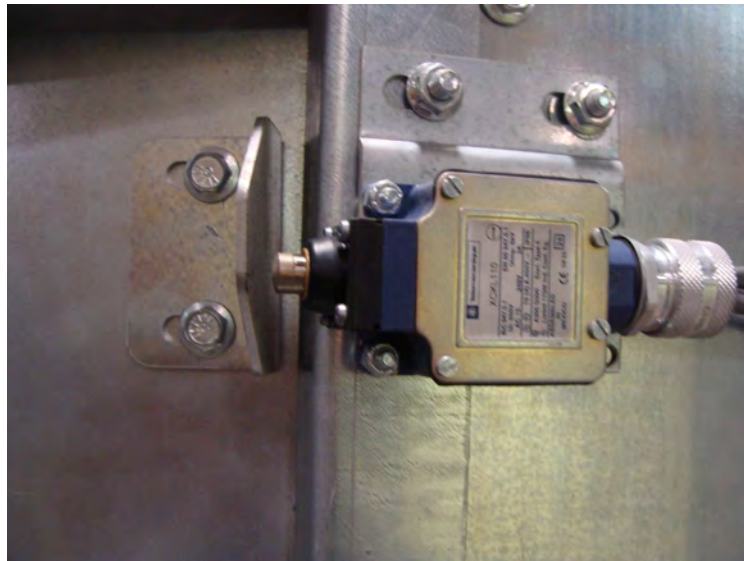
Sensor Installation

F. Rear Door Interlock Switch J44872

If the door is opened, a fault will be detected.

Removal

1. Turn the power off on the front of the power box.
2. Locate the rear door at the back of the dryer.
3. Loosen the strain relief using an adjustable wrench.
4. Remove the four (4) small screws holding the bronze plate onto the switch. There will be two (2) wires, red and black, on the normally open (NO) set of contacts (13 and 14).
5. Loosen and remove the two (2) wires.
6. Remove 2 small bolts and 2 nuts holding the door switch in place.
7. Remove the switch from the dryer.



Installation

1. Turn off power to the dryer (main disconnect switch on power box).
2. Using a flathead screwdriver, remove the 4 screws holding the bronze-colored plate.
3. With the strain relief loosened, insert the two wires (red and black) into the right side of the switch.
4. Connect the red and black leads to the normally open set of contacts (13 and 14).
5. Put the bronze-colored plate back on the switch.
6. Bolt the new switch back on the dryer in the same place as the old one.
7. Make sure the door contacts and depresses the metal switch down when the door is closed. Adjust if necessary.

Sensor Installation

G. Grain Column Over Temperature Sensors

T17289 – 16', T17290 – 24', T17288 – 28'

The removal and installation procedure is identical for both grain column over-temperature sensors. Refer to the photos below.

Removal:

1. Remove the junction box cover for the appropriate sensor.
2. Locate the sensor wires and remove the blue wire nuts connecting the sensor to the dryer wiring.
3. Remove the sensor by removing the 5/16" nuts holding the sensor to the junction box, see photo for details.
4. While removing the sensor, coil the small copper tube for easy handling.



Installation:

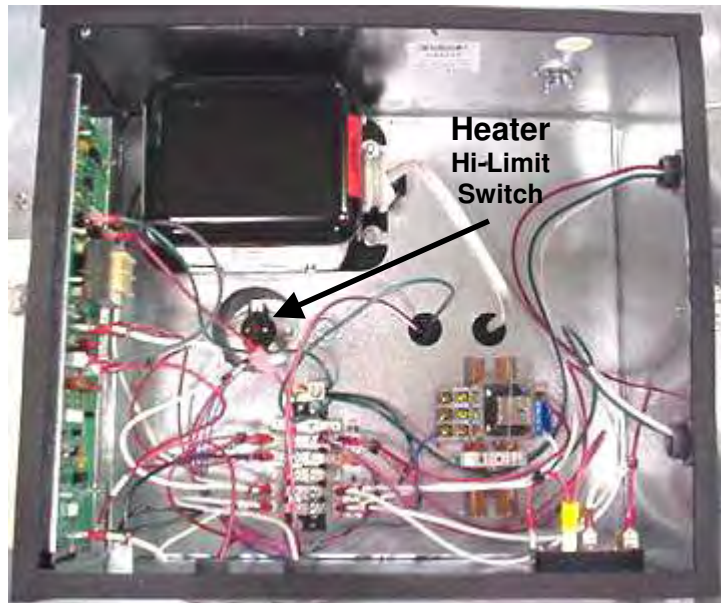
1. Install the new sensor by carefully uncoiling the small copper tube into the conduit inside the junction box. Be very careful not to kink the copper tube.
2. Using extreme care not to bend the copper tube. Attach the switch to the back of the junction box using the 5/16" nuts.
3. Reconnect the wires. There should be orange #18 and blue #40 or blue #41 depending upon side of the dryer.
4. Reinstall the junction box cover when completed.
5. Excess capillary tube is coiled and left in the rear junction box.

H. Heater Housing Hi-Limit Switch J5772

The heater housing hi-limit switch is located inside the heater box. The switch is mounted on the housing between the spark transformer and the terminal block and monitors the temperature of the heater housing. The switch is set for 200°F.

Removal:

1. Disconnect power to dryer.
2. Open the heater box cover by flipping the J clip on each side of the box.
3. Locate the housing high limit switch.
4. Remove the wires from the switch by pulling on the crimped connectors.
5. Remove the two hold down screws.
6. Remove the switch.



Installation:

1. Insert the new switch into position and secure with two hold down screws.
2. Attach the crimped connectors to the tabs on the switch. There should be a blue #38 to one side and a red #18 and blue #18 to the other side of the housing high limit switch.
3. Reinstall the heater box cover when complete.

Sensor Installation

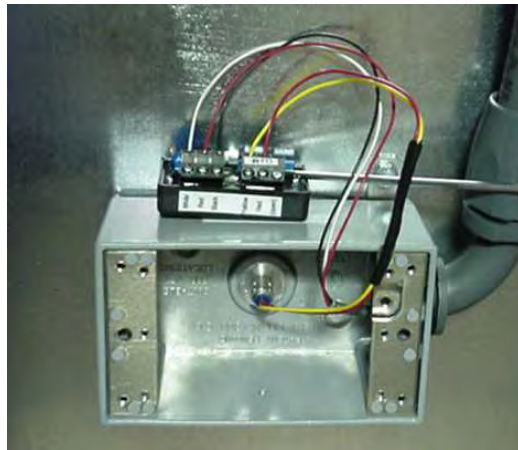
I. Plenum Temperature Sensor (RTD)

J5645 – 12', J5642 – 16', J5646 – 20', J5643 – 24', J5648 – 28'

This sensor monitors the temperature of the plenum area. If the temperature exceeds a value determined by the sensor used a fault condition will exist.

Removal:

1. Turn control switch on control box to OFF.
2. Locate the sensor junction box mounted to the front of the plenum area on the front of the dryer.
3. Open the junction box and disconnect the wires from the transmitter (T17028).
4. Remove the two self-tapping screws on the two tabs holding the junction box to the dryer.
5. Remove the conduit fittings from the ends of the junction box.
6. Remove the clips holding the sensor tube to the inside wall of the plenum area. Gently set aside the plenum over temperature capillary.
7. Pull the sensor out leaving the grommet on the dryer and coil the tube from the sensor for ease of removal.



Installation:

1. Uncoil the new sensor carefully. Any kinks will damage the new sensor.
2. Feed the sensor into the plenum.
3. Attach the sensor tube to the inside wall of the plenum area similar as removal.
4. Attach the junction box to the outside of the dryer after reattaching the conduit.
5. Reusing the clips from the inside of the dryer install the new sensor tube to the inside wall of the plenum area. During installation of sensor tube, reinstall the plenum over temperature capillary. The over temperature capillary and the plenum temperature sensor are designed to be mounted to the same clip inside the plenum area.
6. Wire the transmitter (T17028) to the wires from the conduits and install the junction box cover. Make sure to cut off braided shield wires.



Sensor Installation

J. Metering Roll Proximity Sensor

J4493 (Same switch is used for Unload Auger Proximity Sensor)

This sensor monitors the rotation of the meter rolls. During operation the light on the proximity sensor and the #93 input on the PLC will flash indicating rotation. Due to the slow rotation of the meter rolls, the lights might flash slowly. If removal of the target is necessary, install using fresh anti-seize compound.

Removal:

1. Remove the cover to the metering roll junction box at the rear of the dryer.
2. Remove the inner lock nut on the proximity sensor.
3. Remove the sensor from the box.
4. Remove the hold-down clamps for the wires and remove the cover to the right rear junction box.
5. Disconnect the wiring from the right rear junction box.
6. Loosen the liquid tight strain relief collar connector freeing the wires
7. Remove the wires from the junction box.



Installation:

1. Installation of the new proximity sensor is opposite to that of removal.
2. **Caution:** Adjustment of the proximity sensor is critical. See Proximity Sensor Calibration in the Component Calibration section to calibrate. The gap from the tip of the switch to the rotating target MUST be 1/16", or 1.6mm maximum (approximately the thickness of a dime) - see the above photo.
3. Reinstall the covers.

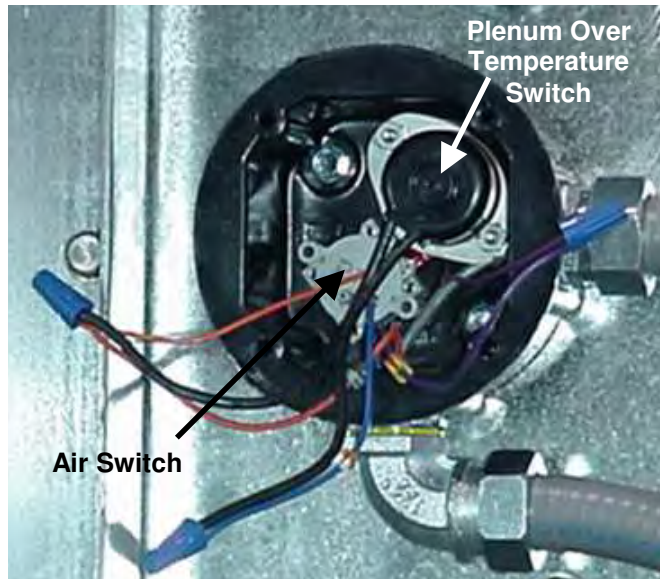
Sensor Installation

K. Static Air Pressure Sensor J5862 & J6019

The static air pressure sensor detects that, during operation, there is enough static air pressure within the plenum area to dry properly and safely use the heater.

Removal:

1. Locate the junction box on the front plenum area.
2. Remove the cover and disconnect the orange and purple wires from the sensor by removing the spade terminals at the switch.
3. Remove the screen filter (J6019) from the backside of the sensor (J5862) from inside the plenum area of the dryer.
4. Remove the air sensor.



Installation:

1. Installation of the sensor is the reverse of the removal procedure.
2. New sensors should be pre-calibrated and ready for installation.
3. After sensor installation, reinstall wires, screen filter, and the junction box cover.

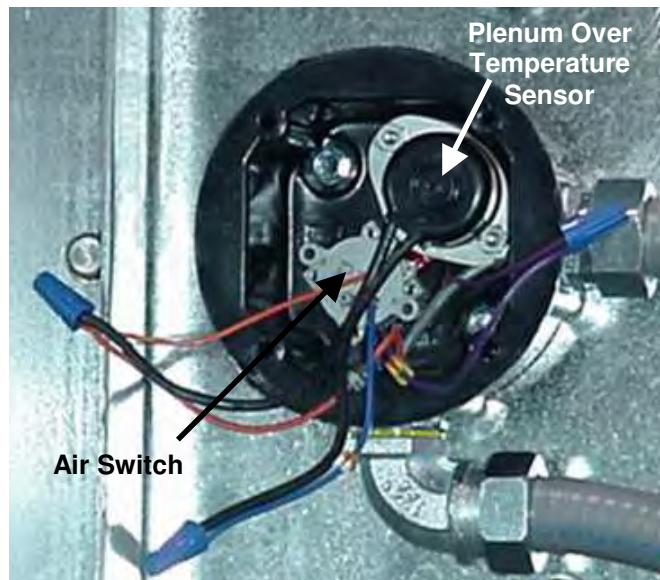
Sensor Installation

L. Plenum Over Temperature Sensor J6795 – 16', J6796 – 24', & J67961 – 28'

The plenum over temperature sensor trips when the temperature of the plenum area rises above 325°F. Removal of the plenum over temperature sensor is similar to the removal of the plenum RTD.

Removal:

1. Locate the sensor junction box mounted to the front of the plenum area on the front of the dryer.
2. Remove the junction box cover and disconnect the blue and orange wires from the sensor.
3. Remove the clips holding the sensor capillary to the inside wall of the plenum area. Gently set aside the plenum temperature indicator tube.
4. Pull the sensor free and coil the copper capillary from the sensor for ease of removal.



Installation:

1. Uncoil the new sensor carefully. Kinks may damage the sensor.
2. Feed the new copper capillary through the junction box into the plenum.
3. Attach the sensor capillary to the inside wall of the plenum area similar as removal.
4. Reusing the clips from the inside of the dryer, install the new sensor capillary to the inside wall of the plenum area. The over temperature capillary and the plenum temperature sensor are designed to be mounted to the same clip inside the plenum area.
5. After installation, reconnect blue and orange wires and replace cover.

Component Calibration

Component Calibration

A. Moisture Sensor Calibration

Touch Screen

Refer to Settings in the Software Manual tab of this manual.

Manual calibration

This action is necessary if "Analog Sensor Not Found" is displayed on touch screen.

The output moisture sensor is factory-calibrated so that voltage between black wire and ground wire reads 9.95 VDC (while in the tube). Should this voltage become out of adjustment, a RED fault screen indicating "Analog Sensor Not Found" will appear if voltage exceeds 10 VDC. Sensor will need to be calibrated manually by following steps below.

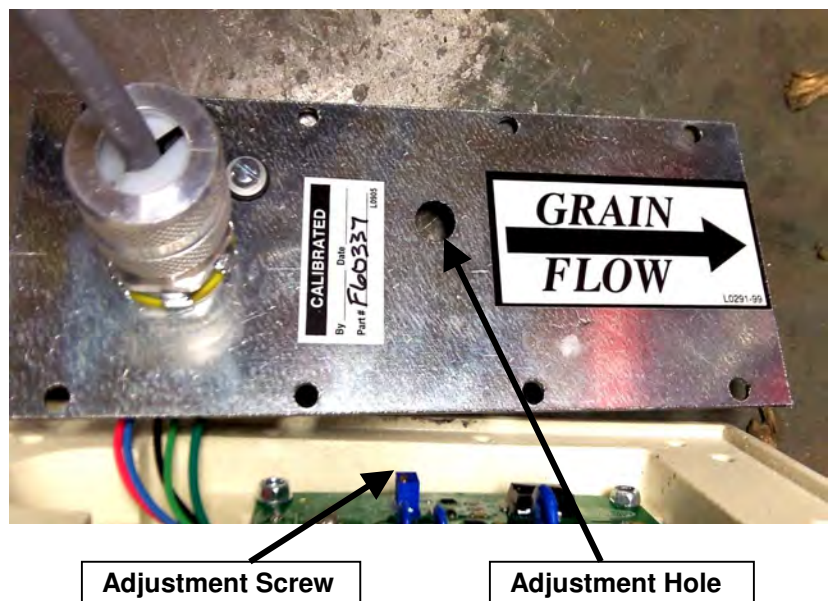
Installing new sensor

(F60337X Quadra Touch)

Calibration of the sensor is necessary if you are installing a new moisture sensor on dryer. Follow these steps for calibration.

Removal of back plate from sensor is NOT necessary.

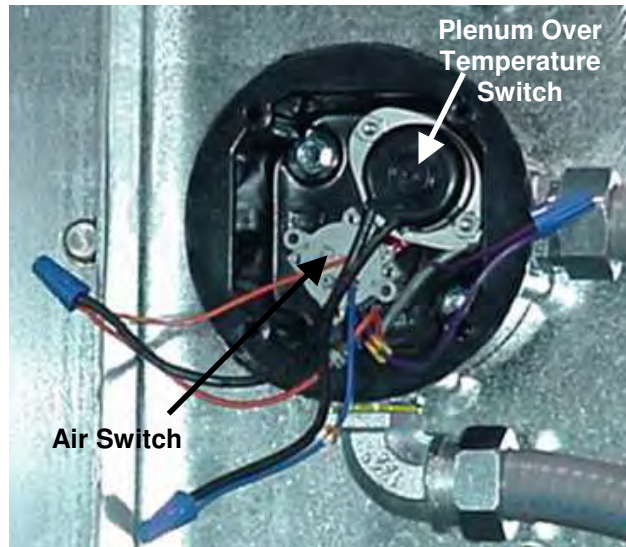
1. Press and hold Sukup logo at upper left quadrant of touch screen until analog screen appears.
2. With the sensor clean and in the tube, MST voltage reading should be 9.95 VDC. If it is not, continue with following steps.
3. Locate hole in metal plate of sensor, as shown below.
4. Using a small straight-blade screwdriver, put screwdriver blade into hole, pushing through gel sealing material (if necessary) and into screw head.
5. Rotate adjustment screw until a reading of 9.95 VDC is displayed (while in the tube).



(Sensor is shown disassembled to indicate adjustment screw. Removal of back plate is not necessary for calibration.)

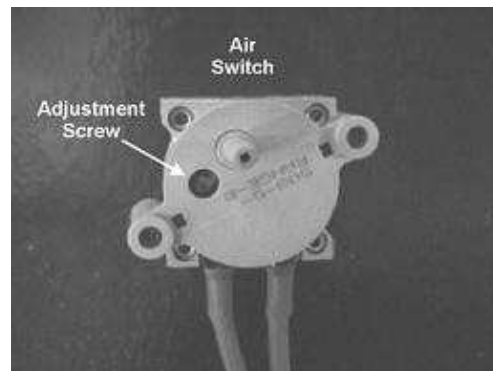
Component Calibration

B. Air Switch Adjustment Calibration (J5862 & J6019)



It may become necessary to adjust the static air pressure switch. Follow these instructions:

1. Find the switch located on the upper front plenum in a 4" black, round junction box (see above).
2. The switch is adjustable between 0 to 3 inches of static pressure. Factory set to 0.5" of water column pressure. It is a normally open switch that closes when the set pressure is reached.
3. To increase the pressure set point, turn the adjustment screw **counter-clockwise** (see below).
4. To decrease the pressure set point, turn the adjustment screw **clockwise** (see right).



J5862 – Air Switch

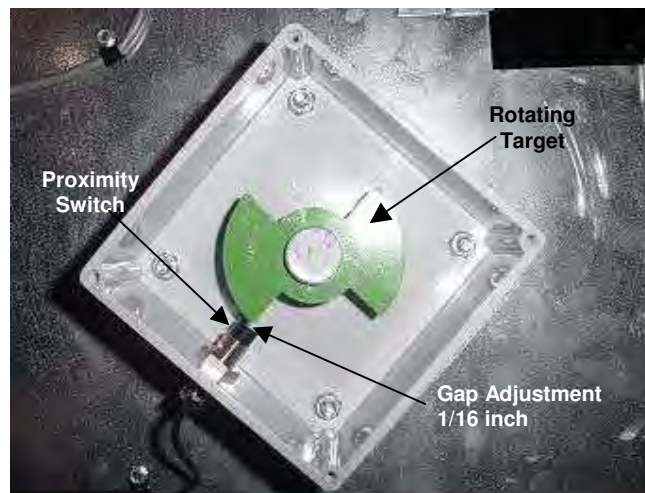
C. Proximity Sensor Adjustment

When adjusting the proximity sensor (J4493), a small benchmark such as a dime can be used.

1. Locate the box at the end of the discharge chute on the dryer. The proximity sensor and rotating target will be located inside this box. See below:



2. Once the box is opened, a galvanized rotating target and the proximity sensor can be found inside.
3. To calibrate the proximity sensor, loosen the locking nut on the switch.

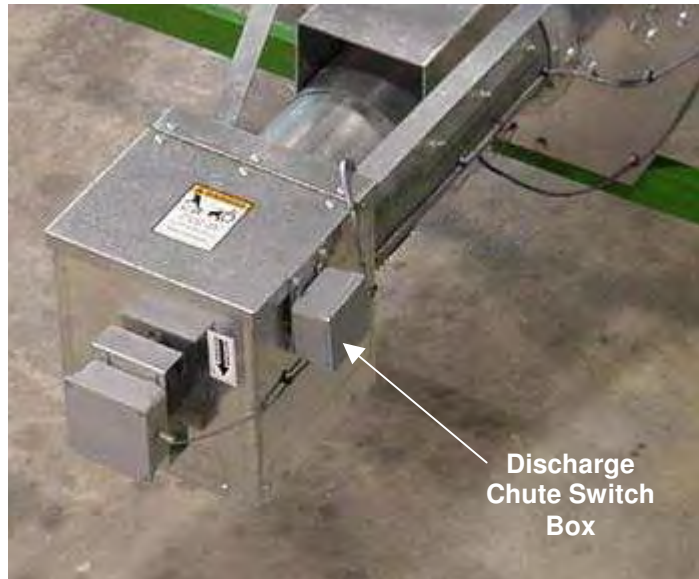


4. Using that same benchmark, shift the sensor so that it is 1/16", or 1.6mm from target (approximately the thickness of a dime). This measurement is important for reliable sensing. The sensor must be this distance so that it can sense the target as it rotates.
5. Once the sensor is in place, tighten the locking nut and replace the cover on the box. Make sure the target will not strike or contact the end of the proximity sensor!

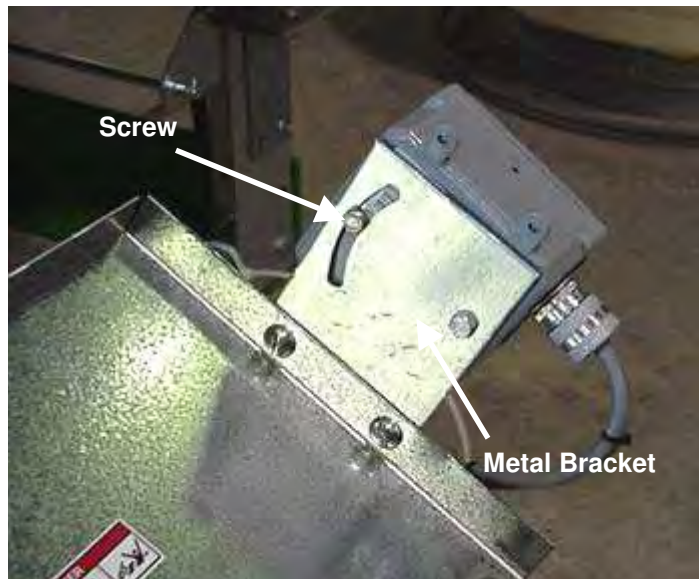
D. Rear Discharge Chute Switch Adjustment

When adjusting the Rear Discharge Chute switch, a 7/16 socket wrench will be needed.

1. Locate the box on the discharge chute at the rear of the dryer and open the discharge chute lid. Remove the bottom cover. See below:



2. Attached to the lid of the discharge chute is a metal bracket with the box fastened to it. Using a 7/16 socket wrench, loosen the screw holding the box in place. See below:



3. Adjust the box so that when the discharge chute lid is opened 2"-3", a faults occurs. The box can be adjusted by rotating it. Once the position has been found, tighten the screw to hold the box in place.

Heater Operation

Heater operation at low plenum temperatures

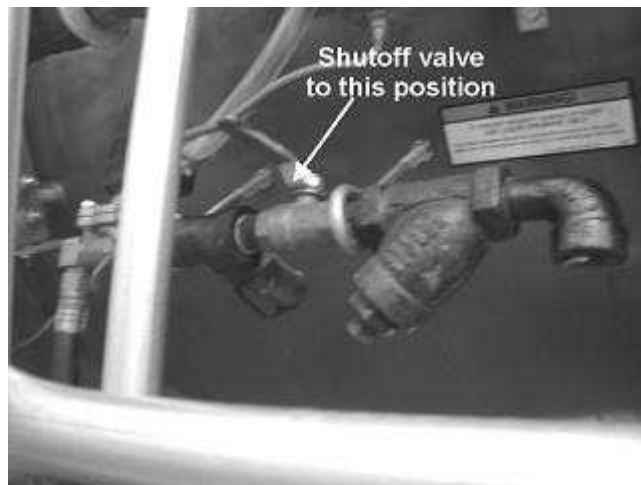
If you are trying to operate the heater on your dryer at low temperatures (at 80°F temperature rise or less), you may experience some difficulty. If you hear rumbling sounds and / or see the flames are burning yellow instead of blue, then the pressure is too low and the flame is burning back into the port cup. If you desire to operate at the lower temperature range, the port cup and orifice on the heater must be changed. Contact your Sukup dealer.

Caution

The following procedure is to be performed by *qualified* service personnel only.

The following procedure is a modification of the heater that involves changing the gas line orifice and the port cup.

1. Operate the dryer fan and heater. While it is running turn the fuel shutoff lever to the off position. (See figure below) Allow heater to flame out (purge gas lines).
2. Lock out all electrical power and gas lines



(Continued on next page)

Heater Operation

3. Locate the orifice pipe train assembly (refer to picture at right)
4. Loosen the union located at the bottom of the orifice pipe train assembly (refer to picture at right)
5. Remove the bracket located at the top of the orifice pipe train assembly. (refer to picture at right)



6. Remove the orifice pipe train assembly by lifting out and up at the bottom of the assembly, and pulling the top of the assembly straight out of the heater housing.
7. With orifice pipe train removed from heater housing, locate the threaded orifice (refer to picture below).



(Continued on next page)

Heater Operation

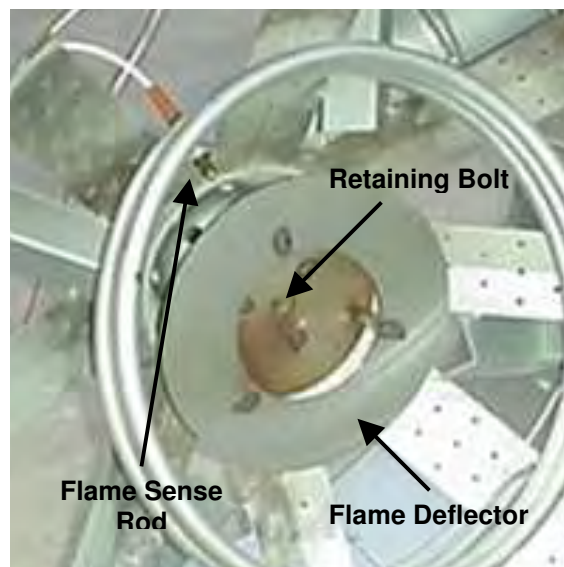
8. Remove the threaded orifice by rotating it CCW.
9. From the table below select the appropriate orifice for your dryer. Select from the column labeled "Low Temperature Orifice".

Heater Type	Standard Orifice & Part #	Low Temperature Orifice & Part #
44" 30 HP	23 / 64" D7113	19 / 64" D7112
44" 15 HP	19 / 64" D7112	13 / 64" D7110
38" 15 HP	19 / 64" D7112	13 / 64" D7110
28" 15 HP	13 / 64" D7110	11 / 64" D7125

10. Install new orifice into pipe train assembly.
11. Re-install orifice pipe train assembly into heater housing by reversing steps 4 through 6 above.

Caution Ensure that the union is re-tightened properly to prevent gas leaks

12. Access the dryer heater housing area by entering through the rear door. Locate the heater burner assembly. Remove the flame deflector by removing the 3/8" bolt located in the center of the deflector.
(Refer to picture below)



13. Mounting position of flame sense rod (for re-installation). Remove flame sense rod from the mounting bracket. Then, remove the two port cup retention bolts. Remove port cup. (refer to picture above)

(Continued on next page)

Heater Operation

14. From the table below select the appropriate port cup for your dryer. Select from the column labeled "Low Temperature Port Cup"

Heater Type	Standard Port Cup & Part #	Low Temperature Port Cup & Part #
44" 40 HP	9/16" D40443	5 / 8" D71128
44" 30 HP	9/16" D40443	3 / 8" D4041
44" 15 HP	9/16" D40443	3 / 8" D4041
38" 15 HP	9/16" D40443	3 / 8" D4041
28" 15 HP	9/16" D4027	3 / 8" D4025

15. Install new port cup by reversing the items in Step 11.

Important

When re-installing the top bolt be sure to re-attach the heater harness bracket, located at the rear of the burner assembly.

Important

When re-installing the flame sense rod, ensure that the rod is not grounded out and that the rod is in the flame path.
(see picture on previous page)

Note

Do NOT re-install the flame deflector as it is not needed in lower temperature applications.

16. Restore electrical power to the dryer and open the fuel valves.
17. Start fan and heater. When heater turns on, inspect for gas leaks around the union area using soapy water.
18. Re-adjust the vaporizer coil as needed.
19. Inspect heater flame. Look for nice clean flame, blue in color. Minor yellow coloring at the tips of the flame is acceptable.

The dryer can now be returned to operation.

Appendix A

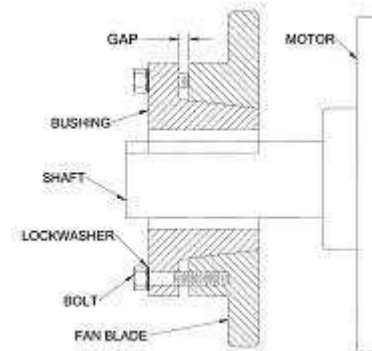
Appendix A – Fan Blade Replacement

Fan torque specifications (For Trantorque specifications, see next page)

Follow these instructions when replacing the blade on the fan of the dryer and maintaining the blade at the start of the drying season.

Failure to properly tighten blade may cause serious injury or death:

- **USE TORQUE WRENCH** with settings capable of attaining the correct torque specifications.
- There **MUST** be a gap between the bushing and the blade to insure a tight fit.
- **DO NOT** over-tighten. May cause hub to crack and threads to strip.
- **NEVER** run fan without screen guard installed.
- **DO NOT** stand in front of fan when running.



Procedure to Install Axial Fan Blade with Taper-lock Bushing:

1. Put blade on motor shaft.
2. Position bushing on motor shaft and tighten setscrew (if applicable).
3. Insert bolts with lockwashers through the unthreaded holes in the bushing into the threaded holes on the blade.
4. Tighten bolts evenly to draw the fan blade onto the bushing. Using a torque wrench, tighten bolts to $\frac{3}{4}$ of the recommended torque, then continue to alternately tighten them until they remain at their full torque rating specified below.
5. Install screen guard and run for a minute. **DO NOT STAND IN FRONT OF FAN.**
6. Recheck bolt torque. Continue this process until bolts maintain specified torque after fan has been run.

Fan Torque Specifications – Prior to 2006

PART #	FAN SIZE	HP	BUSHING	BORE SIZE	BUSHING BOLT	TORQUE FT-LBS
J0426	28"	15	P1	1.125	5/16"	16
J04265	28"	20	SDS	1.375	1/4"	9
J0424	38"	10	P1	1.375	5/16"	16
J04286	44"	15	SK	1.625	5/16"	15
J04285	44"	30	SD	1.875	1/4"	9
J0432	44"	40	SK	2.125	5/16"	15

Appendix A

Trantorque GT Bushing specifications

A Trantorque GT Keyless Bushing offers flexible and easy installation while providing exceptional holding power. To ensure a Trantorque GT unit performs as specified, it must be installed properly.

! WARNING: Do not lubricate the Trantorque GT bushing or shaft. The use of any lubricant on the contact surfaces could result in bushing failure and will void all warranties.

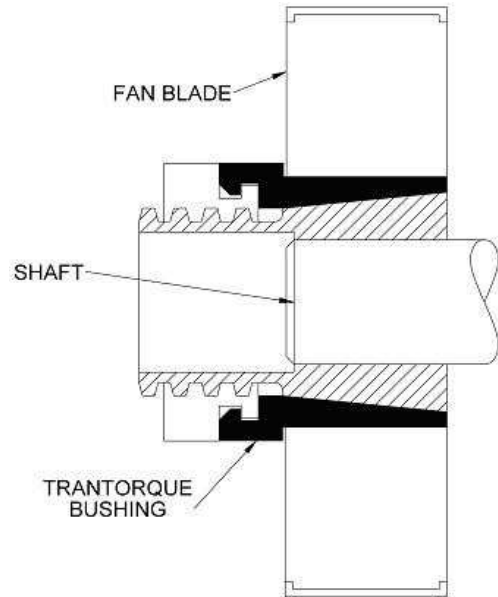
1. Insert the Trantorque GT unit into the component to be mounted, making sure the mating hub is flush against the shoulder at the hex flats.

2. Position the assembly at the desired location on the shaft and hand-tighten the nut (clockwise), until the assembly becomes snug on the shaft.

! WARNING: Do not hammer or use any type of impact to force the Trantorque GT assembly along the shaft.

! WARNING: The shaft must fully engage the shaft gripping area of the Trantorque GT unit.

3. Using a torque wrench, tighten the nut to the proper installation torque. The hex flats on the outer ring are provided for counter-torque, eliminating the need to hold the component or shaft, while applying installation torque.



NOTE: At full installation torque, the assembly will have moved approximately 1/16" axially along the shaft away from the nut. If axial position is critical, it may be necessary to loosen the nut and reposition the assembly.

! WARNING: Over-tightening the nut could damage the Trantorque GT unit and/or the mounted component.

Trantorque Bushings

PART #	FAN SIZE	HP	BUSHING	BORE SIZE	NUT SIZE	TORQUE
J0436	28"	15	TRANTORQUE	1.125	1.75"	165 FT-LBS
J0437	28"	20	TRANTORQUE	1.375	2"	190 FT-LBS
J0437	38"	10	TRANTORQUE	1.375	2"	190 FT-LBS
J0435	38"	15	TRANTORQUE	1.625	2.25"	230 FT-LBS
J0435	38"	20	TRANTORQUE	1.625	2.25"	230 FT-LBS
J0435	44"	15	TRANTORQUE	1.625	2.25"	230 FT-LBS
J04371	44"	30	TRANTORQUE	1.875	2.5"	400 FT-LBS
J04372	44"	40	TRANTORQUE	2.125	2.75"	440 FT-LBS



Instructional Decal located on Fan Blade

QuadraTouch™

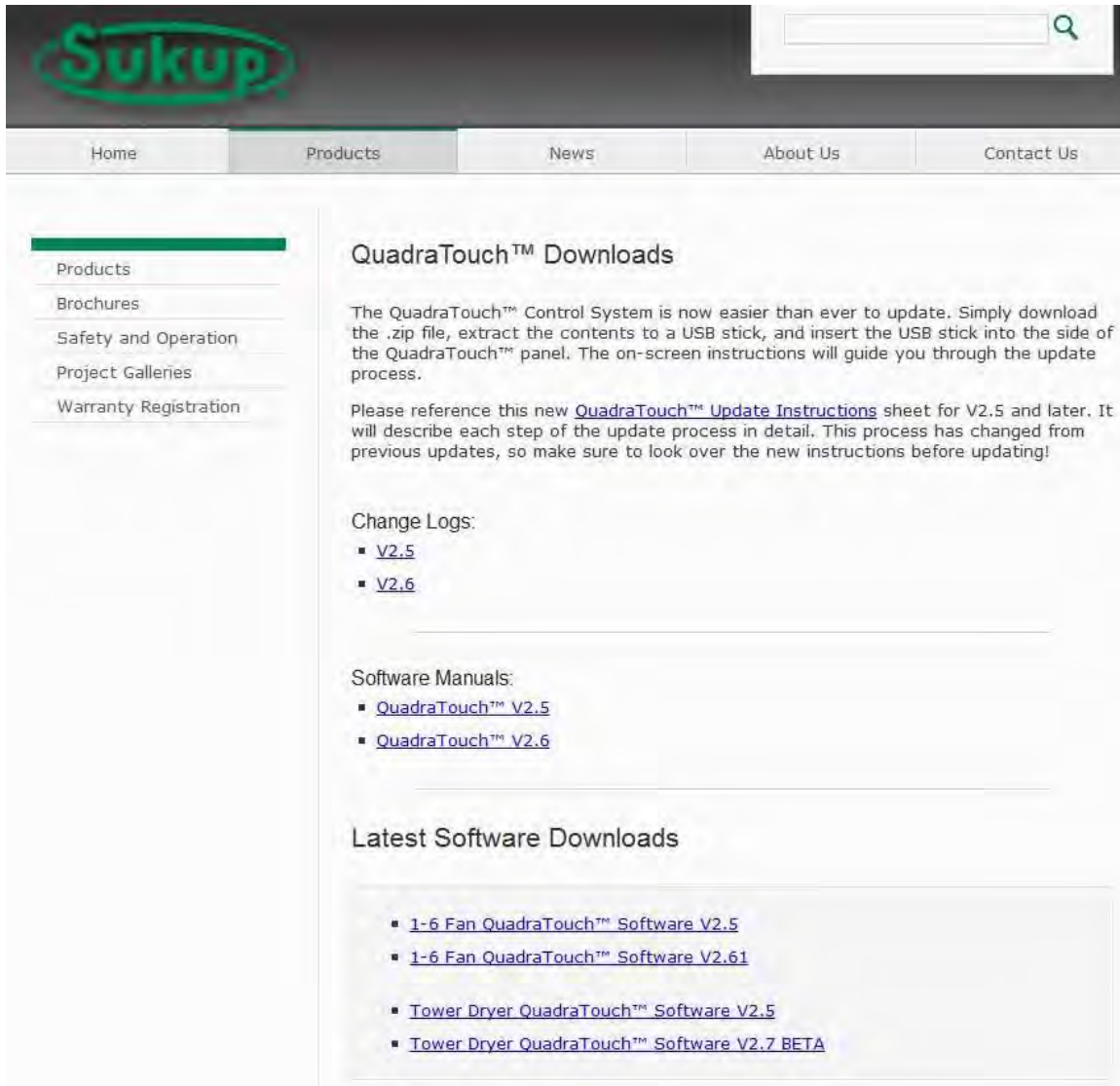


Download & Installation Instructions V2.5 and later

The QuadraTouch™ Control System is now easier than ever to update. Simply go to <http://www.sukup.com/Products/QuadraTouch> and download the newest software for your grain dryer. It's fast, easy, and it comes at no charge for our customers.

Downloading Instructions:

1. Go to www.sukup.com/Products/QuadraTouch



The screenshot shows the Sukup website's 'QuadraTouch™ Downloads' page. The header features the Sukup logo and a search bar. The navigation menu includes Home, Products, News, About Us, and Contact Us. The left sidebar contains links for Products, Brochures, Safety and Operation, Project Galleries, and Warranty Registration. The main content area is titled 'QuadraTouch™ Downloads' and contains the following text:

The QuadraTouch™ Control System is now easier than ever to update. Simply download the .zip file, extract the contents to a USB stick, and insert the USB stick into the side of the QuadraTouch™ panel. The on-screen instructions will guide you through the update process.

Please reference this new [QuadraTouch™ Update Instructions](#) sheet for V2.5 and later. It will describe each step of the update process in detail. This process has changed from previous updates, so make sure to look over the new instructions before updating!

Change Logs:

- [V2.5](#)
- [V2.6](#)

Software Manuals:

- [QuadraTouch™ V2.5](#)
- [QuadraTouch™ V2.6](#)

Latest Software Downloads

- [1-6 Fan QuadraTouch™ Software V2.5](#)
- [1-6 Fan QuadraTouch™ Software V2.61](#)
- [Tower Dryer QuadraTouch™ Software V2.5](#)
- [Tower Dryer QuadraTouch™ Software V2.7 BETA](#)

2. Select the newest Portable/Stack or Tower Dryer program for your dryer.

QuadraTouch™ Downloads

The QuadraTouch™ Control System is now easier than ever to update. Simply download the .zip file, extract the contents to a USB stick, and insert the USB stick into the side of the QuadraTouch™ panel. The on-screen instructions will guide you through the update process.

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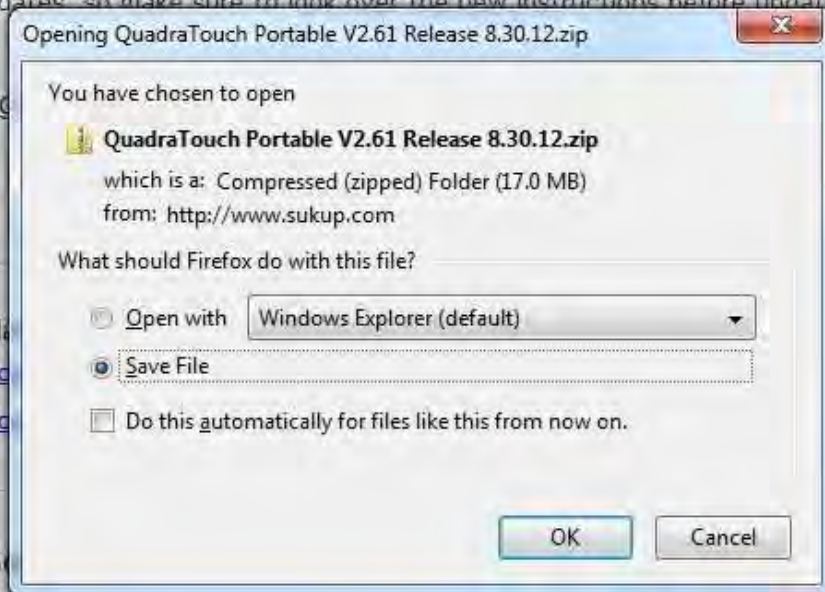
Change Log

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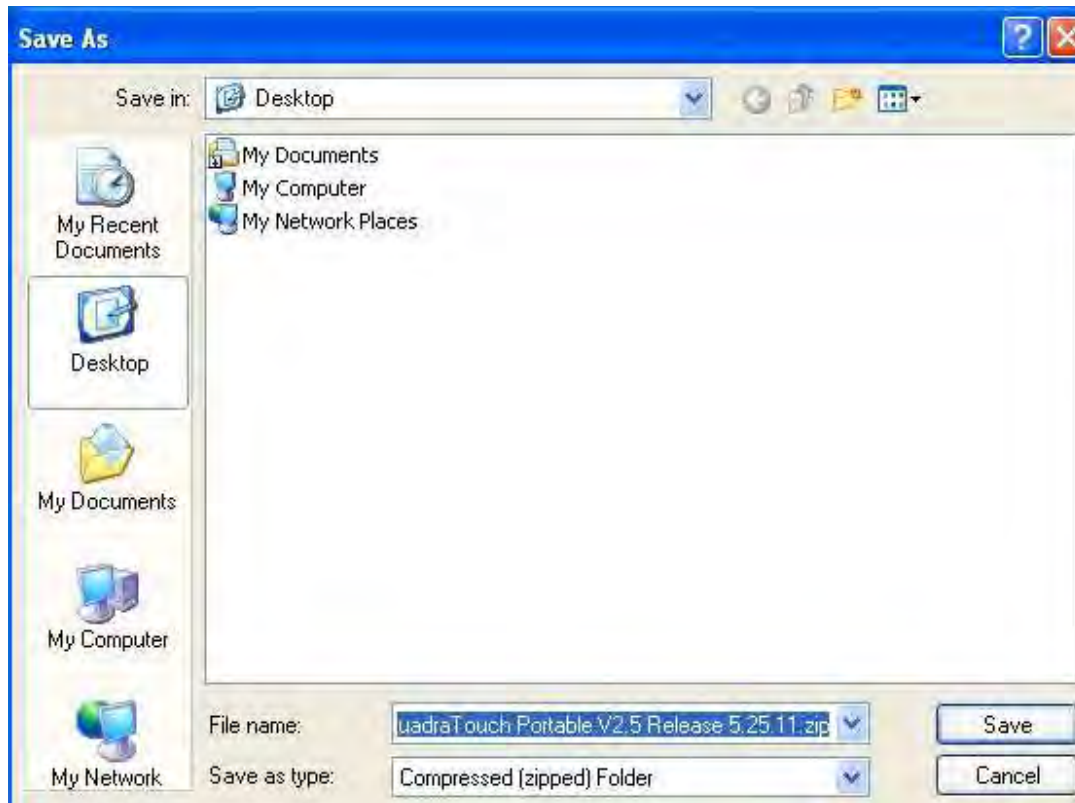


- [1-6 Fan QuadraTouch™ Software V2.5](#)
- [1-6 Fan QuadraTouch™ Software V2.61](#)
- [Tower Dryer QuadraTouch™ Software V2.5](#)
- [Tower Dryer QuadraTouch™ Software V2.7 BETA](#)

A dialog box will appear. Select "Save"

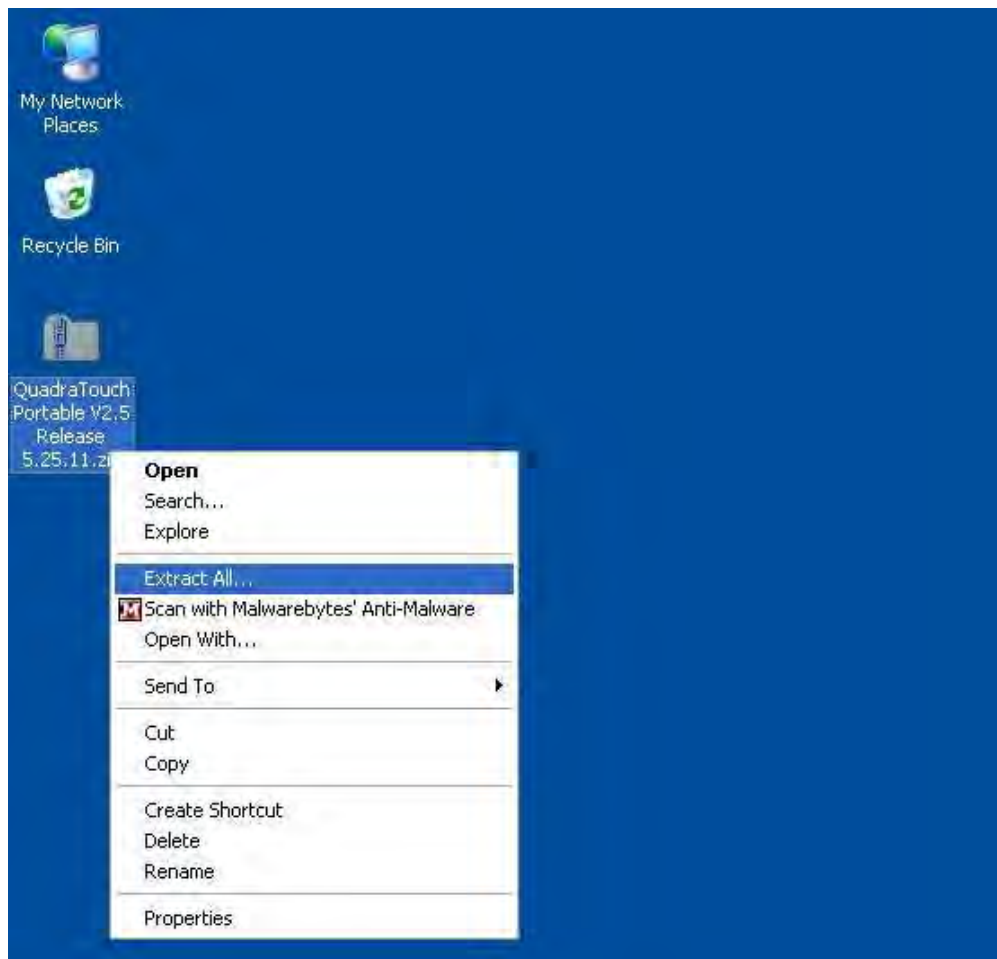
3. Next, another dialog box will appear. This time, it will ask you where you'd like to save the file. Typically "Desktop" is the easiest and preferred selection.

Locate "Desktop" in the Save in: dropdown menu or quick links on the left side of the screen. Then click "Save"



The download is about 16-20mb. It should take less than a minute on a high-speed connection.

4. After the download finishes, it will appear on your desktop (or wherever you choose to save it).

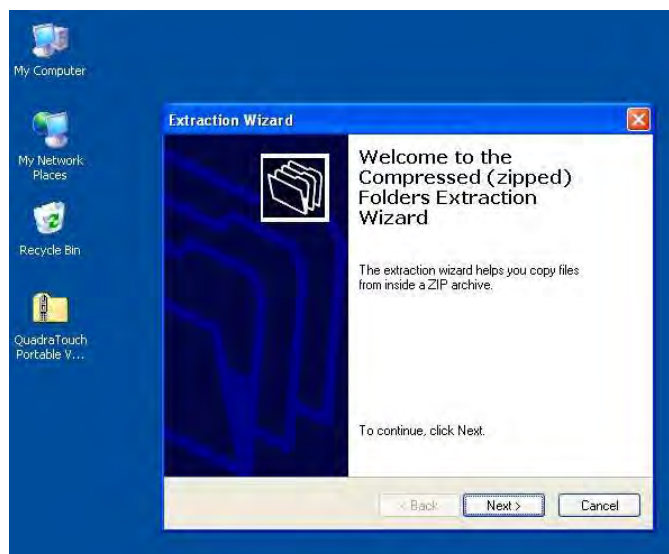


5. “Right Click” on the new program .zip file and select “Extract All”

Windows Vista and 7 users skip to step 8

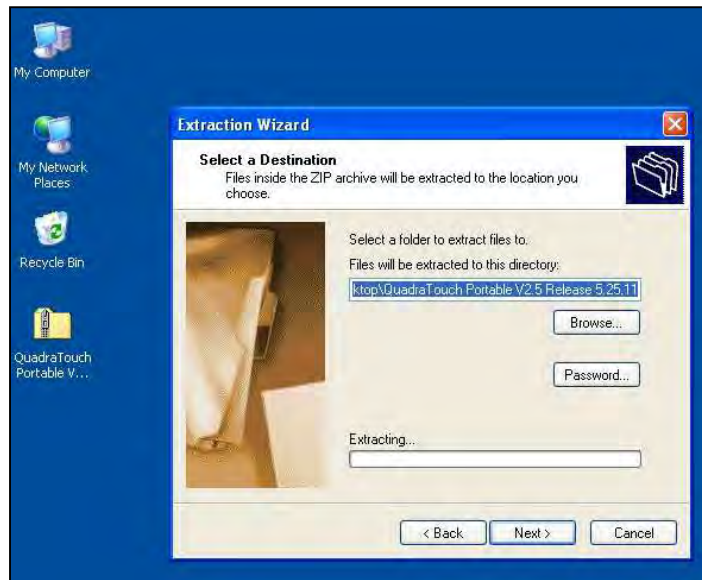
A dialog wizard will pop up.

Select “Next”



6. The next page will ask you where you'd like to extract the files. It will automatically choose the directory you're currently working out of. In this case, it's the desktop.

Select "Next"

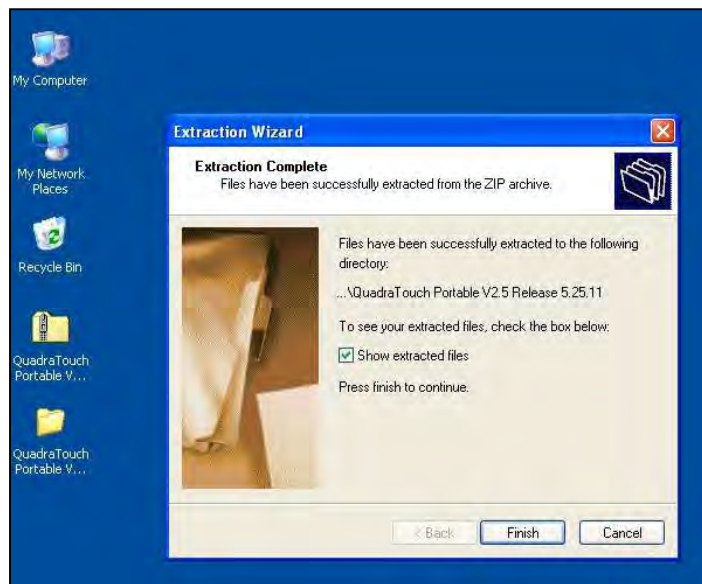


7. You'll notice a folder has been created on the desktop.

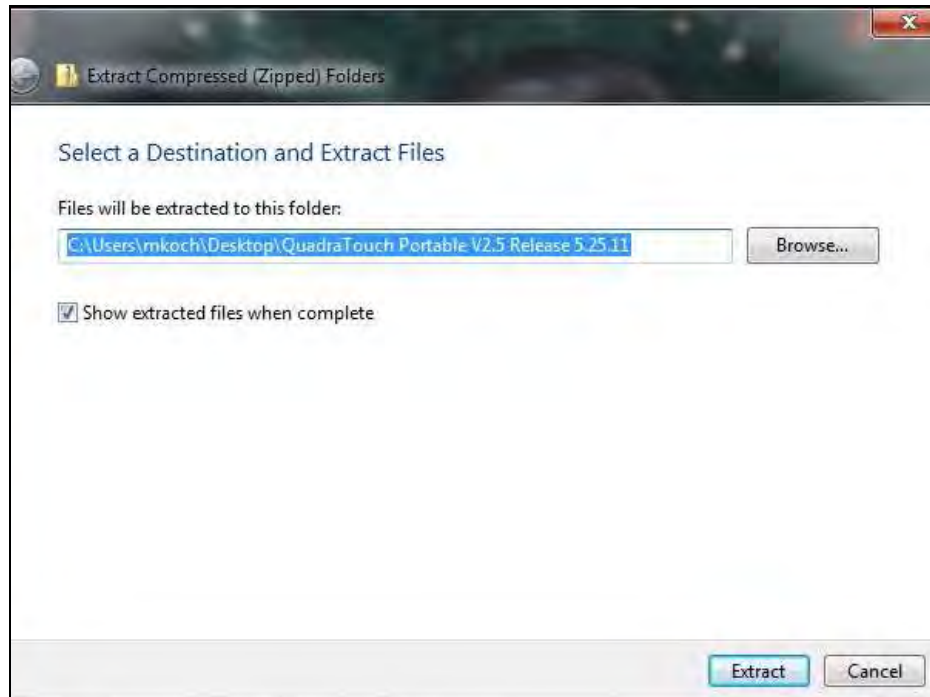
Select the check box for "Show the extracted files"

Select "Finish"

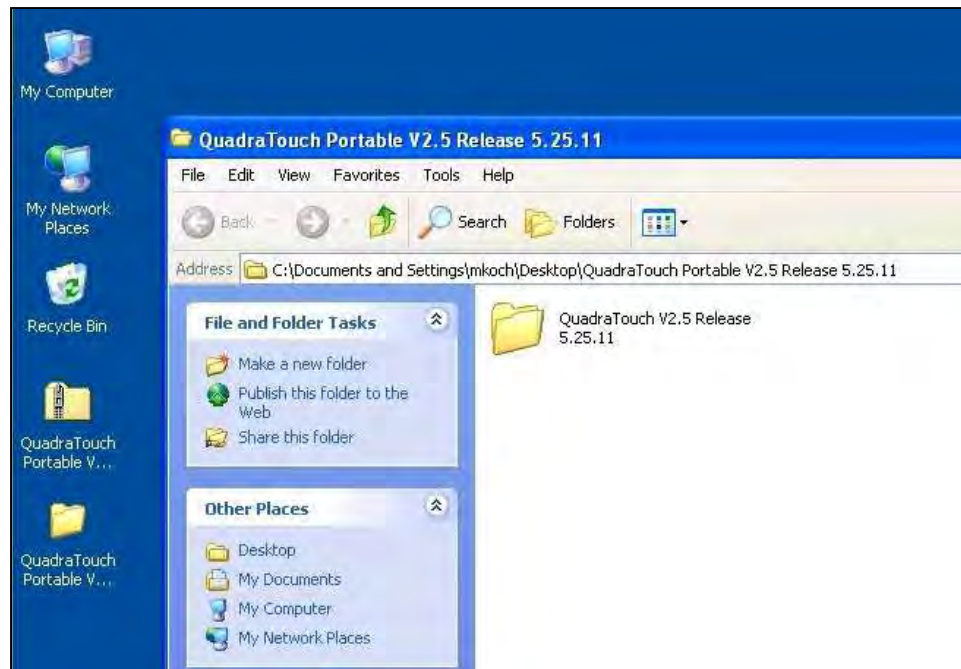
A window will open with the contents of the newly extracted files.



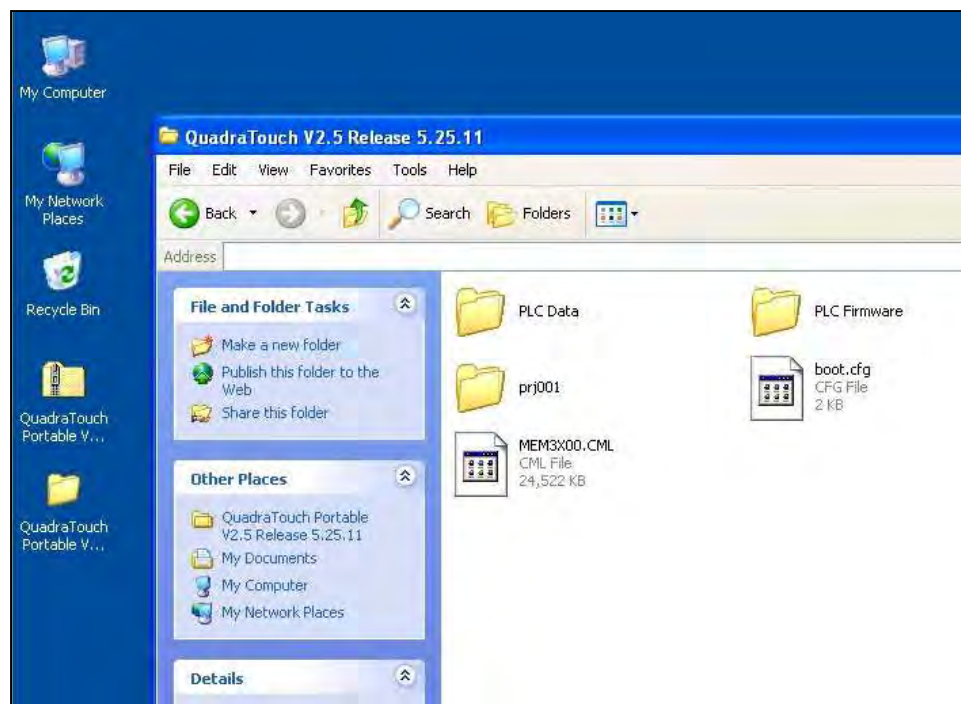
8. Windows Vista and 7 users will see something slightly different, pictured here. Simply choose the “Extract” option.



9. “Double-Click” the folder, and it’s contents will be opened in another window.

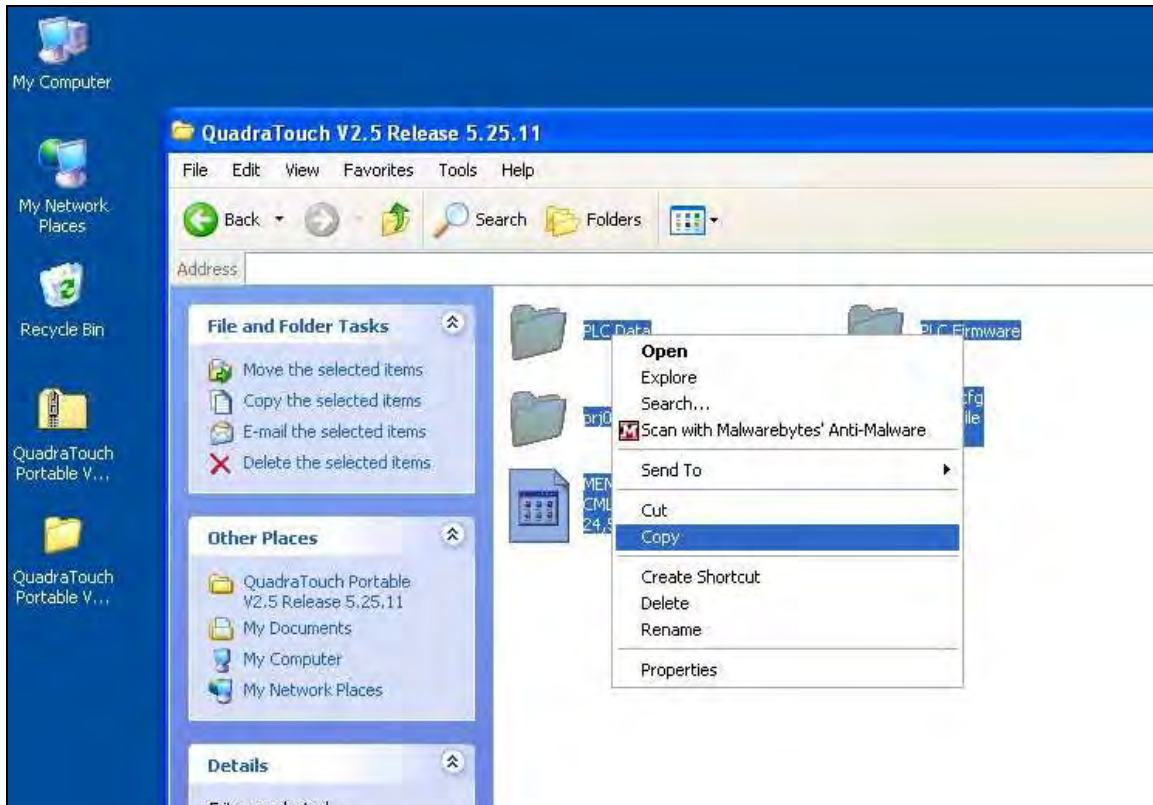


10. You will see this:



11. Highlight the contents of the folder by either holding the left mouse key down and dragging over the files or pressing Ctrl+A on you keyboard.

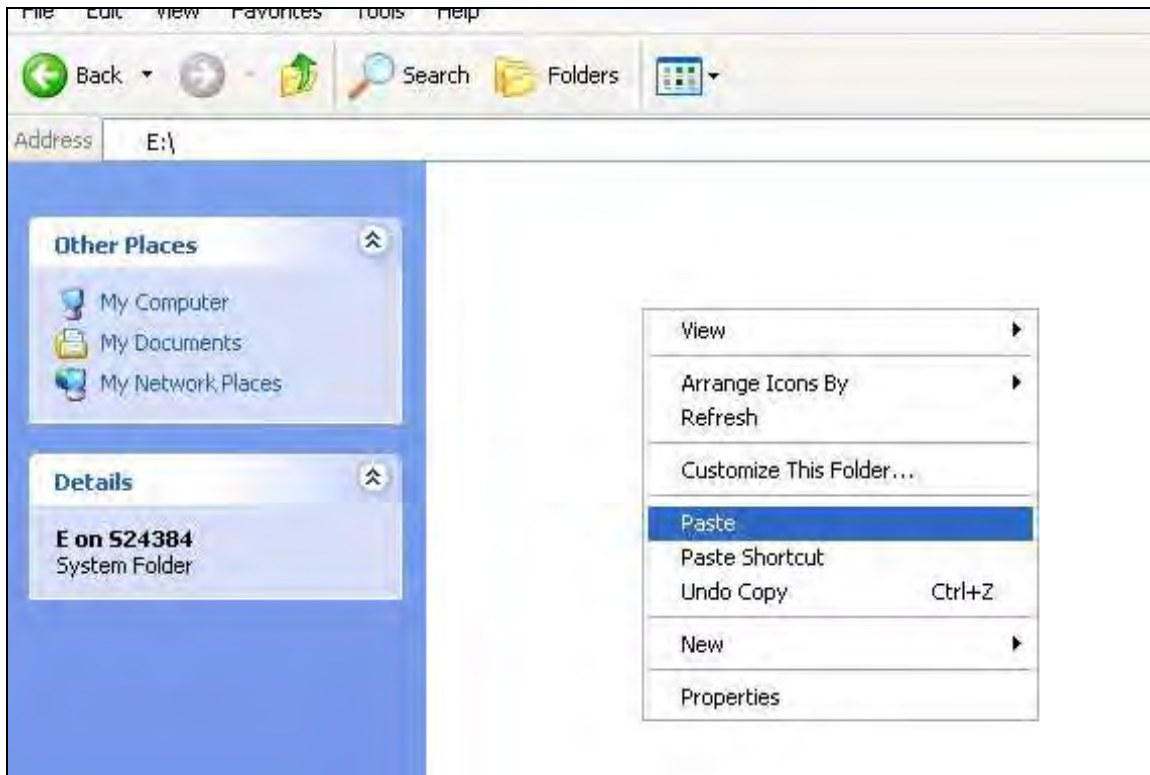
“Right-Click” any one of the selected files and select “Copy”



12. Insert a USB stick into the computer. A dialog window may open automatically, or a quick launch menu may appear. If not, you'll need to manually open the contents of the USB stick by opening the "My Computer" or "Computer" icon and locating the USB stick.

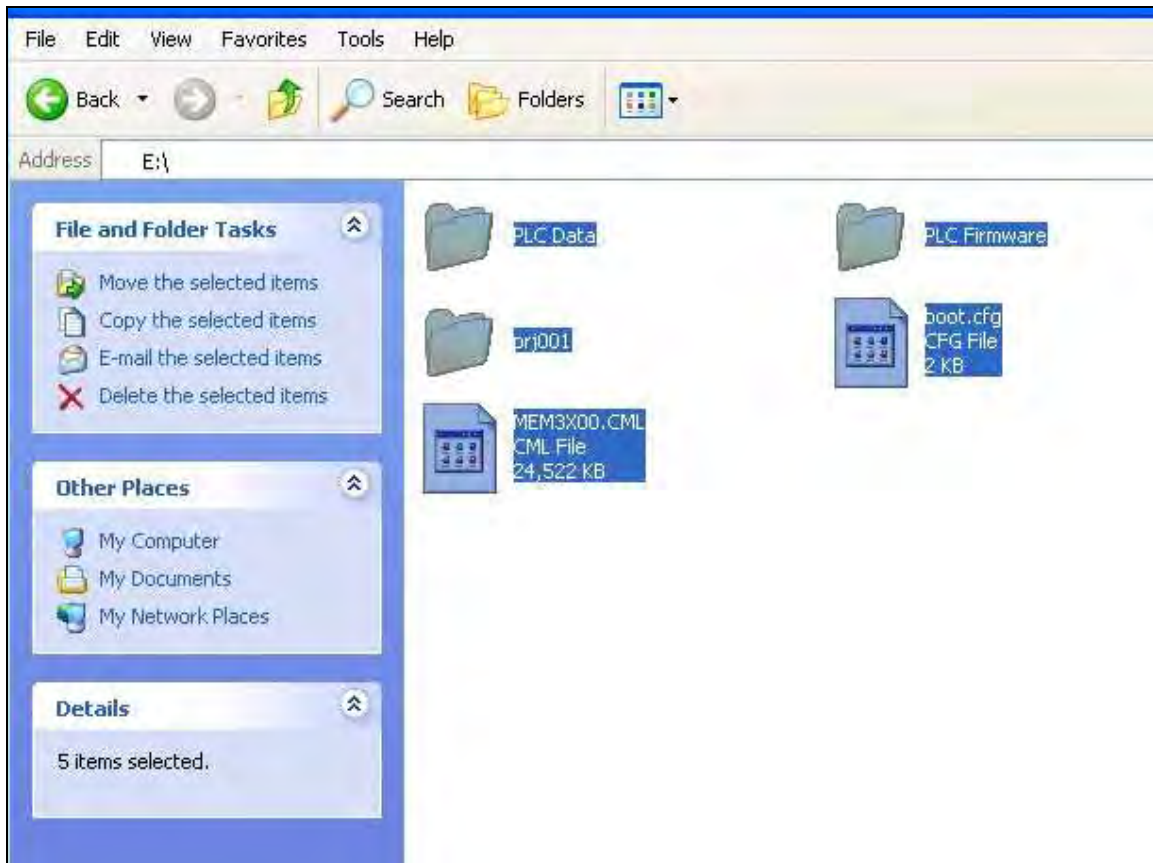
Once the USB stick has been opened, "Right-Click" in the "white, empty folder area and select "Paste"

The files will begin to copy onto your USB stick.



It's important that the files be placed on the root directory of the USB stick and NOT in another Sub-Folder. The touchpanel will not be able to read the contents otherwise. Notice in the "Address" bar, it says: "E:\"

13. If everything has been done according to these instructions, the contents of the file downloaded from the Internet should now be successfully on the USB stick as shown below.



QuadraTouch™ V2.5 HMI Update Instructions

Loading the QuadraTouch™ with new software takes about 5 minutes. Follow the step-by-step instructions listed below.

1. Power Up the QuadraTouch™ controller. Do not power on the dryer. If the dryer has power, turn the main disconnect switch to the “OFF” position.
2. Insert the USB stick (prepared in the previous instructions) into the side of the QuadraTouch™ controller. There are 2 USB ports on the side of the panel. Either one will work.
3. When the gray error bar appears at the bottom of the screen, select the black button (Left-most button of the group of 3 buttons on the right side of the gray error bar)
4. Select CF/USB
5. Select USB_Starting (If there is a problem here, it’s because the files weren’t placed correctly on the USB stick)
6. The panel will automatically reboot.
7. Upon Reboot, select “English” as the language
8. Select the button to the right: Download USB → Display
9. Select “Start”
10. Select “Yes”
11. When the process finishes, hit the back button twice, and then exit. Then select “Yes” you want to restart. (or simply turn power off and back on again)

DO NOT POWER THE UNIT DOWN DURING PROGRAMMING. THIS WILL CAUSE THE UNIT TO FAIL, AND IT WILL NEED TO COME BACK TO SUKUP MANUFACTURING FOR REPAIR.

QuadraTouch™ V2.5 PLC Update Instructions

After updating your HMI program to V2.5 or greater, you will have the option to load the PLC program directly from the HMI without the use of a computer. All necessary files are included with your program download.

To get to this screen (if not automatically prompted) Choose the “Tools” → “System Tools” → “QuadraTouch Update”

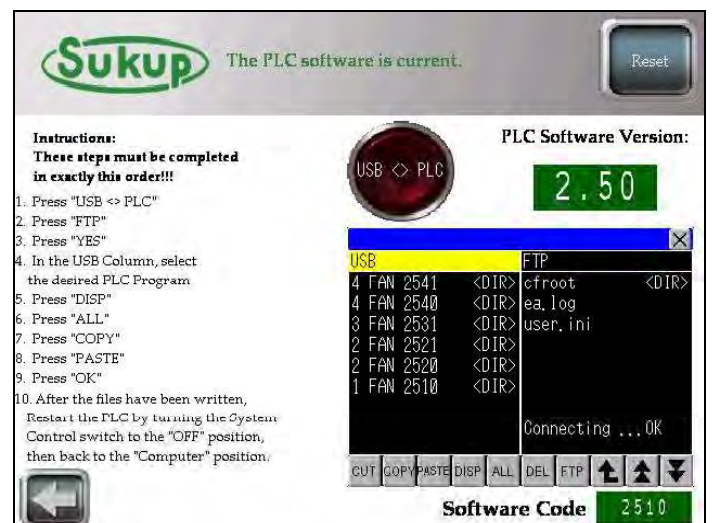
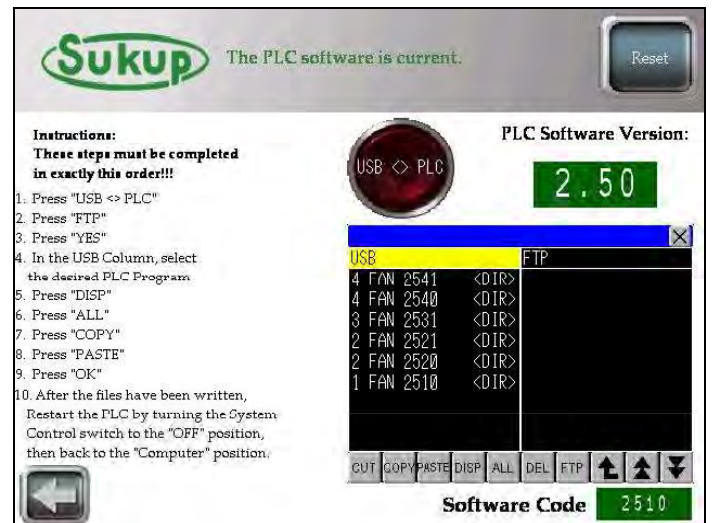
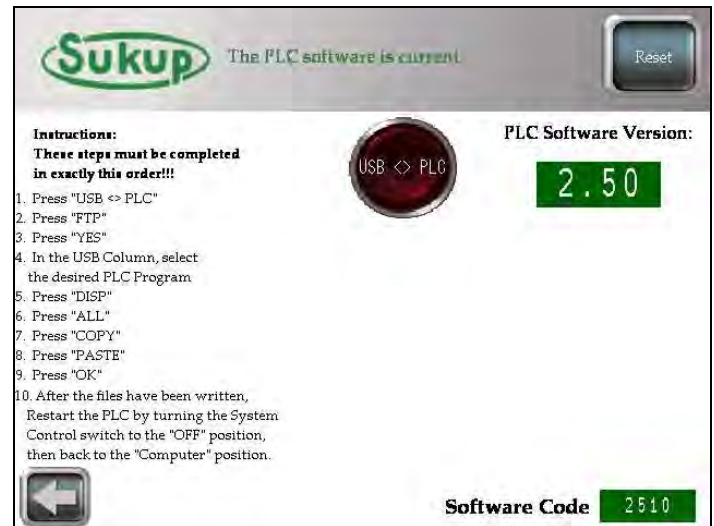
Nicely enough, the directions are right on screen with you, so performing this task should be relatively painless.

First, touch the black, circular “USB⇔PLC” button. A rectangular USB/FTP box will appear in the lower-right corner of the screen (shown in the picture to the right).

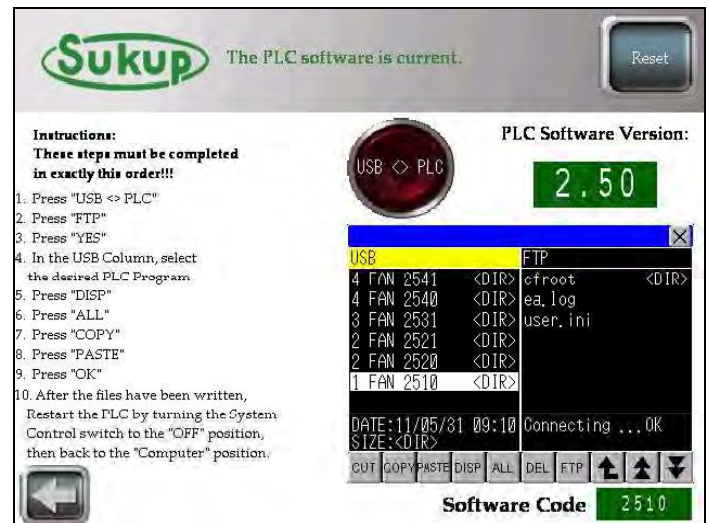
Next, press “FTP”, and a dialog box will pop up. Select “YES”

After selecting “YES”, the FTP column will show the PLC’s contents.

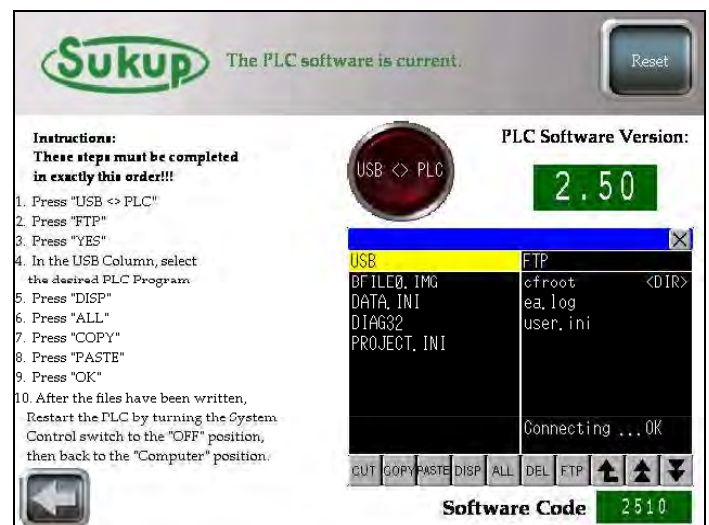
All V2.5 and later software releases will contain all the portable dryer programs. After updating to V2.5, there will also be a software code that appears in the lower-right corner of the screen. The code 2510 means V2.5 software, single-fan program, and no incoming moisture sensor. Similarly, a code of 2521 would mean, V2.5 software, two-fan program, and an incoming moisture sensor.



In the USB column, select the appropriate fan setup. As was just mentioned, after updating to V2.5, you'll have a software code to help you in choosing the right PLC folder. Don't worry though, if something goes wrong, you can always start the process over! Here, we are updating a single fan model. Touch the desired PLC folder in the USB column to highlight the desired folder.



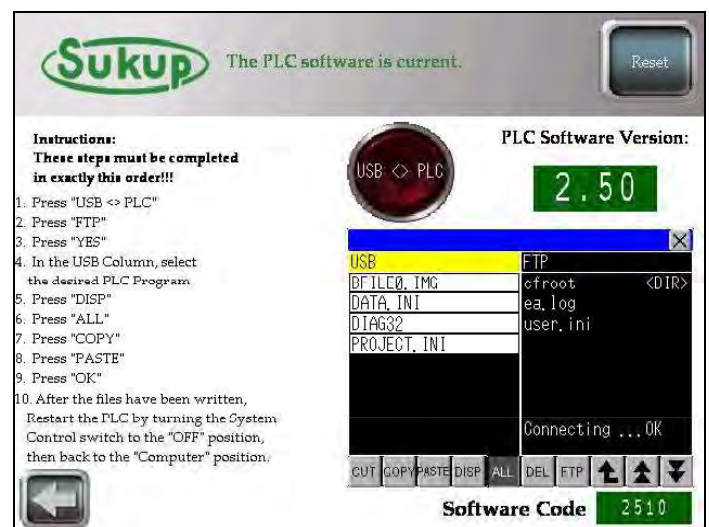
Touch the "DISP" button. The contents of the selected folder will then be displayed in the USB column.



Next, touch the "ALL" button. This will highlight all the files in the USB column.

Select "COPY"

Select "PASTE"



A dialog window will appear. Select “OK”

Finally, the HMI will send the files over to the PLC for programming.

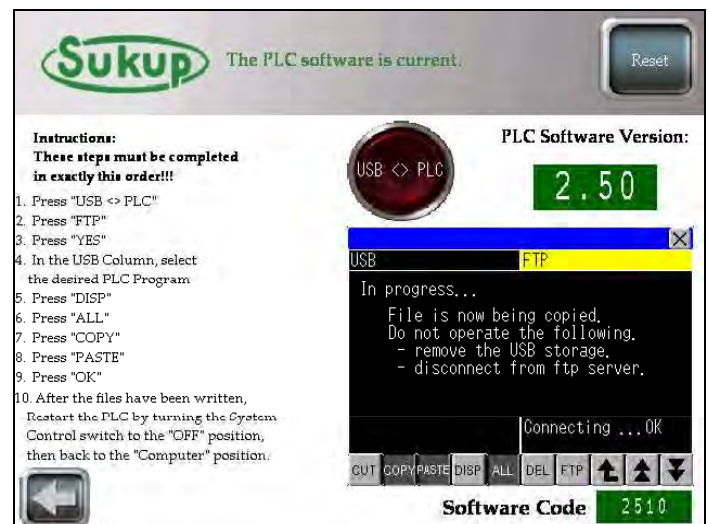
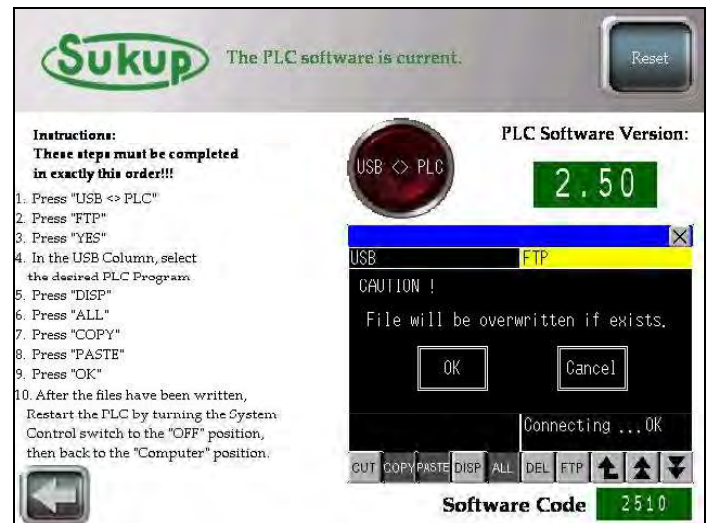
A progress box will open with “In progress” blinking.

Do not power off either device during programming!

When the file transfer is complete, the “In progress” dialog will disappear, and the process is finished. For the new program to take effect, the PLC will need to be restarted. As shown in step 10 of the on-screen instructions, simply turn the system control switch, located on the side of the power box, to the “OFF” position, then back to the “Computer” position.

IMPORTANT!!!

After completing step 10, the PLC will be loaded with the new software. However, if the PLC doesn't reconnect with the touchpanel and show the new version of software, the 7-step procedure will be required on the next page.



****** IMPORTANT INFORMATION ******

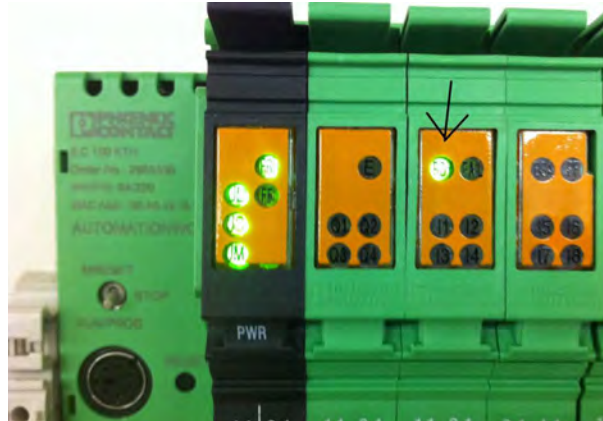
**PLC's with HW/FW 04/205, 04/220, and select 04/354
(found on the left side of the PLC, third line of text)**

Model Year '08, '09, early part of '10

After updating the PLC software to V2.50:

The PLC will boot the new program, and the RDY light (shown in the picture to the right with the arrow) will stop blinking and be constantly lit "ON". All other lights on the green slices should also stop blinking.

If the FR light is still blinking (the top-right light on the black power slice) when the RDY light is solid, you will need to perform the following steps:



This procedure is time sensitive. If you think you may have deviated from the instructions, turn the power off, then on again, and start the process over. The whole procedure only takes about 8 seconds to accomplish, so read these instructions BEFORE ATTEMPTING!!!

1. Find the small gray toggle switch on the left side of the PLC (shown in picture to the right). It's currently in the "RUN/PROG" position.
2. Hold the switch in the "MRESET" position. The "FR" light will stop blinking and immediately turn "ON" solid. Continue holding it up until the "FR" light turns "OFF". This usually takes about 3 seconds.
3. When the "FR" light turns "OFF", let the switch fall down into the "STOP" position. The "FR" and "FF" lights will begin to blink together.
4. As soon as the lights begin to blink together, hold the switch up in the "MRESET" position again. The "FR" and "FF" lights will continue to blink together, but the "FF" light will stop blinking in about 3 seconds. When the "FF" light stops blinking with the "FR" light, release the switch. It will fall back down into the "STOP" position.
5. Cycle the PLC power (turn power off, then back on again).
6. After the RDY light has stopped blinking and goes solid "ON", flip the gray toggle switch to the RUN/PROG position and the FR light should stop blinking and turn solid "ON".
7. ALL DONE! The HMI will now prompt you to update the firmware on the PLC. Follow the on screen instructions.



QuadraTouch™ Firmware Update

In order for your PLC to take advantage of the newest features offered in the most recent QuadraTouch™ software release, it's sometimes necessary to update the PLC's firmware in addition to the PLC's program you've just updated.

Make sure the USB programming stick is still inserted into the QuadraTouch™ panel.

The QuadraTouch™ panel will automatically prompt you to complete a firmware update procedure if necessary. If the screen doesn't come up, your system is already up-to-date with the latest firmware.

The firmware update is accomplished in much the same way the PLC program update is performed. The instructions are on-screen, so they are very easy to follow along.

In step 9, you'll be asked to press and hold the "Update FW" button. After pressing that button, the gray error bar will appear on the QuadraTouch panel, and the PLC will perform a system reset, then reboot. During this process, the PLC will be installing its new firmware.

THE RESET/REBOOT SEQUENCE TAKES ABOUT 1 MINUTE. AFTER THE "RDY" LIGHT TURNS "ON" SOLID, THE "FR" LIGHT MAY STILL BE BLINKING— AS IN THE PREVIOUS PAGE'S INSTRUCTIONS.

TO GET THE "FR" LIGHT TO STOP BLINKING –

- 1. PUT THE SMALL GRAY TOGGLE SWITCH IN THE "STOP" POSITION.**
- 2. PUT THE SMALL GRAY TOGGLE SWITCH BACK INTO THE "RUN/PROG" POSITION.**
- 3. THE "FR" LIGHT WILL TURN "ON" SOLID. ALL DONE!**

Software Manual

V2.6 QuadraTouch™ Dryer Control System



Look for the newest updates on www.sukup.com/Products/QuadraTouch

“Main Screen”

Located to the right is the main screen. If all the faults are clear, and all of the system inputs are functional, this screen will appear on startup. There are four (4) buttons located on the top of the screen. In addition, the version number and fan setup are listed on the bottom right hand portion of the screen.

(You will see this header with the Sukup logo and any number of buttons throughout the entire program.)

The “Tools” and “Settings” menus will be explained first.



“Tools” Menu

Pressing the “Tools” button will change screens to this one located to the right. (“Bushel Shutdown” and “Bushel Count” will not appear until after the bushel counter has been calibrated under the “Calibrate Sensors” menu)

Manual Operation and Dry Fire modes are available in the tools menu.

The History Log keeps track of all fault occurrences and past dryer operations. It shows the date and time when each event happens.

The “Graphs / Trends” button will display a color graph of the discharge moisture, plenum temperature, and meter roll speed.

The “Calibrate Sensors” button will allow you to adjust your moisture sensor and plenum RTD to better reflect exact values.

There is also a nice system tools menu that will be explained in the “System Tools” Section.



Tools → Manual Operation

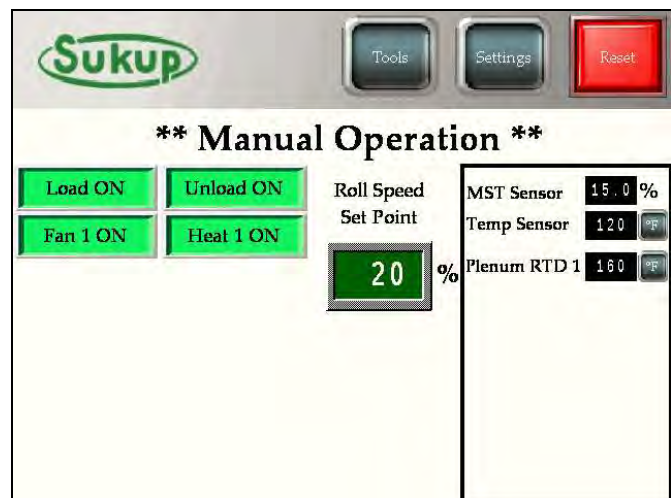
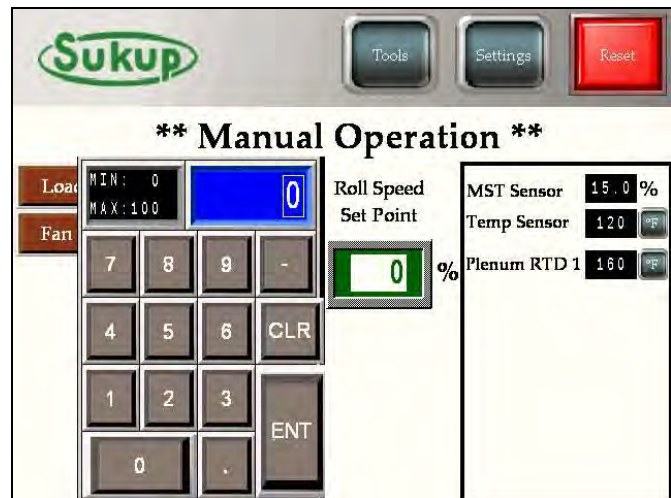
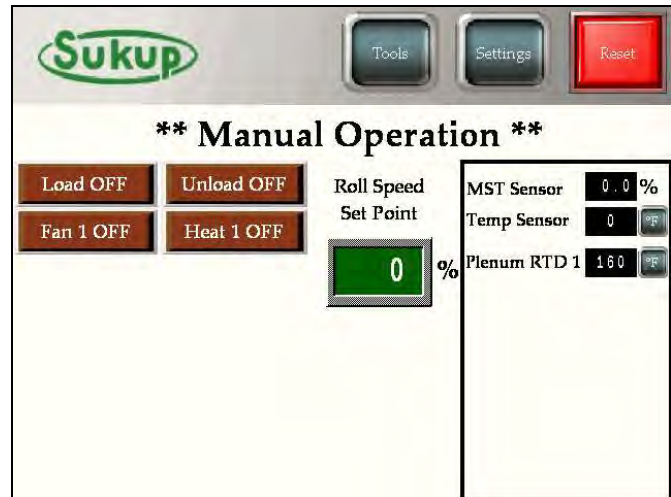
The first option on the “Tools” menu is the “Manual Operation” button. In manual mode, the user is completely in charge of fan/heater operation as well as load and unload operations. The user is also able to specify a desired meter roll speed. The “Heater” function is interlocked with the “Fan” button. If the fan is not running, the heater will not be able to be turned on.

After about 1 minute and 30 seconds, a push-and-hold button will appear on the screen. “Go To Auto Control” will take the user from manual operation to automatic operation seamlessly without the need to shutdown and restart.

Any number display on the touch-panel that appears like the “Roll Speed Set Point” is an adjustable value. Simply touch the number and specify a value using the pop-up keypad.

**Special NOTE:

All buttons that appear burgundy in color (like the load, unload, fan, and heater buttons in the first image) require you to press and hold that button for a full second before the button’s action will be processed. When these buttons are activated, the button will appear in an “On” state denoted by depressed button style and a light, neon-green color (like in the second image).



Tools → “Dry Fire” Mode

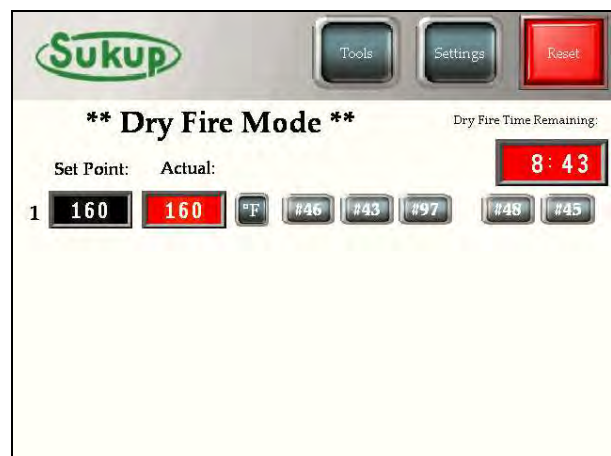
In addition to “Manual Operation”, “Dry Fire” can also be accessed from the “Tools Menu”.

This mode is used to test the dryer’s fan(s) and heater(s). It’s a good idea to dry fire the dryer before each drying season to ensure quality operation.

The user will start by selecting “HEAT” or “COOL” operation, and then press the “OK” button that appears.



The screen will display a 10- minute running timer while showing the operation type and plenum temperature(s). The signals for Fan On, Air Switch, Differential Air Switch, Heat On, and Flame Detection will appear next to each plenum. This can be a very helpful diagnostic tool.



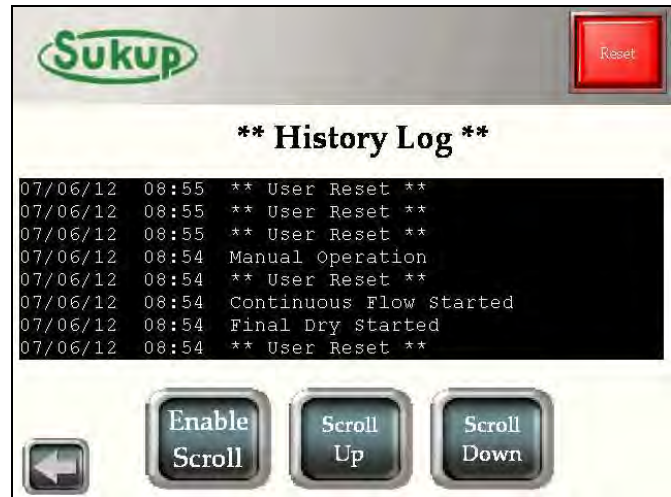
Lastly, “Dry Fire” will conclude after the timer has expired, and the fans and heaters will automatically turn off.



Tools → History Log

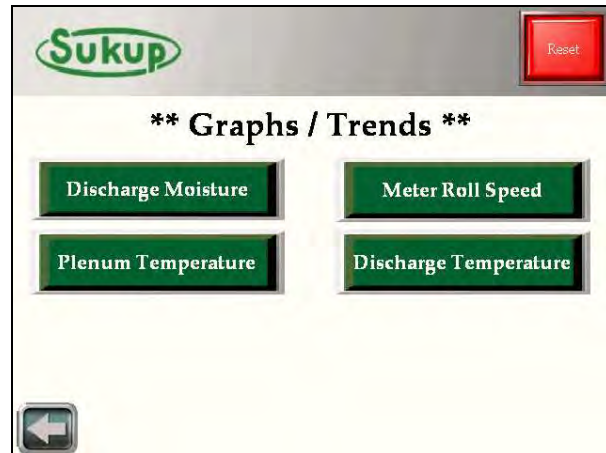
The “History Log” displays events like faults or mode operations. It always shows the latest event on top.

To navigate through the history log, touch the “Enable Scroll” button, and the first entry will become highlighted. Select the “Scroll Up” / “Scroll Down” buttons to move the highlighted entry up or down.



Tools → Graphs / Trends

The “Graphs / Trends” button gives you the ability to visualize the progress/performance of the dryer. The user can have a visual representation of moisture, plenum temperature, roll speed, and discharge temperature. Each of these graphs are stored independently on the Panel’s Compact Flash card. These features are explain in the “CSV Data Transfer” section.

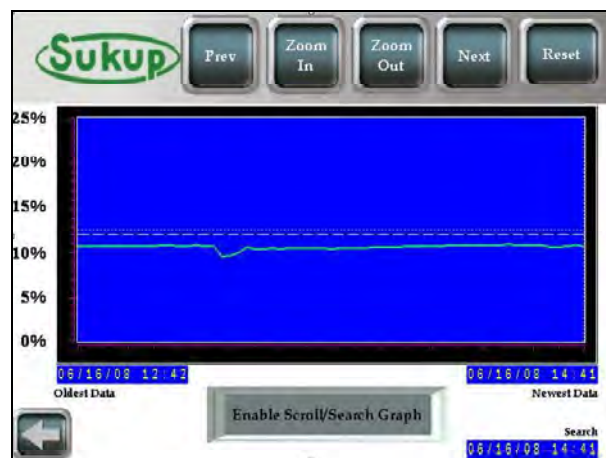


The graph is searchable/scrollable after selecting the “Enable Scroll/Search Graph” button located at the bottom-center of the screen. After pressing that button, crosshairs will appear on the screen, and the buttons located in the header will be functional.

Each graph will display the time and date of the oldest and newest data on the left and right of the x-axis.

The buttons on the header (except Reset) will be inactive until the “Enable Scroll/Search Graph” button is pressed.

The graph is also searchable by time/date by pressing the blue area under “Search” on the bottom-right of the screen.



Tools → Calibrate Sensors

By selecting the “Calibrate Sensors” button, the user can put offsets on the analog inputs of the system. These include the moisture sensor, bushel counter, and input moisture sensor (if applicable).

NOTE: Read the “Red” box on the top of each page very carefully.

Tools → Calibrate Sensors MOISTURE SENSOR

This screen shows the calibration for the moisture sensor. The numbers in BLACK are actual, unadjusted values. The offset is determined by the difference in the GREEN box minus the BLACK box.

If both values are going to be adjusted, adjust the temperature first, press “Done”, and return to this same menu to change the moisture calibration. This is because moisture is a function of temperature.

Example: The BLACK box displays 120°F as the recorded temperature. Its value plus the offset is loaded into the GREEN box when this screen is loaded. Since the current offset is zero (0), 120°F is also displayed in the GREEN box. If the number in the GREEN box were changed to 110°F, the offset would be (-10°). Thus, the next time this screen is loaded, the number in BLACK will remain 120°F, but the value in the GREEN box will be 120°F + the offset of (-10°) which gives 110°F.

The image displays four sequential screenshots of the Sukup calibration interface, showing the process of calibrating moisture and temperature sensors.

Screenshot 1: Main Calibration Menu
The interface shows the Sukup logo and a "Reset" button. The title is "** Calibrate Sensors **". There are two green buttons: "Discharge Moisture Sensor" and "Bushel Counter".

Screenshot 2: Discharge Moisture Calibration
The interface shows the Sukup logo and a "Reset" button. The title is "** Calibrate Sensor **". A red box contains instructions: "When calibrating both, calibrate Discharge Temperature FIRST! If you have just calibrated the Discharge Temperature, WAIT 1 FULL MINUTE before calibrating the Discharge Moisture". There are two green buttons: "Discharge Moisture" and "Discharge Temperature".

Screenshot 3: Discharge Moisture Calibration (Input)
The interface shows the Sukup logo and a "Reset" button. The title is "** Calibrate Sensor **". Below the title is the subtitle "** Discharge Moisture **". A red box contains instructions: "Enter in the DESIRED value in the GREEN box. The new user value should be TEMPERATURE COMPENSATED! If your handheld sensor is already temperature compensated, enter that value into the GREEN box." Below this, there are two input fields: "** Non-Calibrated Moisture Value **" (displaying 15.0 %) and "** New User Value **" (displaying 15.0). There are up and down arrow buttons next to the "New User Value" field. A "Done" button is at the bottom.

Screenshot 4: Discharge Temperature Calibration
The interface shows the Sukup logo and a "Reset" button. The title is "** Calibrate Sensor **". Below the title is the subtitle "** Discharge Temperature **". A red box contains instructions: "Enter in the DESIRED value in the green box. The next time this page is loaded, the green box will reflect the offset made now." Below this, there are two input fields: "** Discharge Sensor Value **" (displaying 150 °F) and "** New User Value **" (displaying 150). There are up and down arrow buttons next to the "New User Value" field. A "Done" button is at the bottom.

Tools → Calibrate Sensors BUSHEL COUNTER

The bushel counter is configurable in two ways – automatic and manual. Read the instructions in red on the top of the screen.

The automatic calibration is shown here. For the calibration to work, the user will need to know how much grain (in bushels) has been discharged from the dryer. A grain cart equipped with a scale works well.

To do the automatic calibration correctly, the dryer **MUST BE UNLOADING GRAIN**.

Simply start the timer, then after a period of time, stop the timer and enter the number of bushels discharged. The dryer will keep track of the unload speed during the unload process then compute a bushel/hr rating.

The user must then select “Save/Store” to store that value. The dryer will then begin to keep track of the amount of grain being discharged from the dryer.

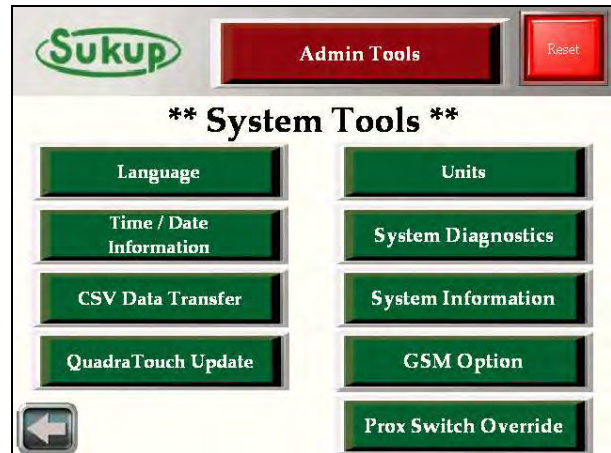
After calibration is completed, the options for “Bushel Shutdown” and “Bushel Counter” will appear in the “Tools” menu.

The interface consists of four sequential screens for the Sukup Bushel Counter Calibration process. Each screen features the Sukup logo and a red 'Reset' button in the top right corner.

- Screen 1:** Titled "** Bushel Counter Calibration **", it contains a red instruction box: "Calibrate the bushel counter two ways. Choose 'User Calibration' to tell the dryer how many bushels/hr it puts out based on a certain unload speed. Choose 'Automatic Calibration' to start a timer during which period the dryer keeps track of its average meter roll speed. After the time is stopped, the system will compute and save the avg bushel/hr. 'Automatic Calibration' mode needs to be done while the dryer is already unloading grain." Below the box are two green buttons: "Manual Calibration" and "Automatic Calibration". A back arrow is on the left.
- Screen 2:** Also titled "** Bushel Counter Calibration **", it has two sections. On the left, under "Start / Stop the Calibration Timer", are green "Timer Started" and "Stop Timer" buttons. On the right, under "Number of Bushels Discharged", is a green display showing "0". A "Compute" button is at the bottom. A back arrow is on the left.
- Screen 3:** This screen is identical to Screen 2, showing the "Timer Started" and "Stop Timer" buttons, the "Number of Bushels Discharged" display at "0", and the "Compute" button.
- Screen 4:** Titled "** Bushel Counter Calibration **", it displays the result under "Bushels / HR" in a green display showing "2571". A "Save / Store" button is at the bottom. A back arrow is on the left.

Tools → System Tools

The “System Tools” menu allows the user to visualize and adjust the main system settings as well as offer some great diagnostic tools.



Tools → System Tools → Language

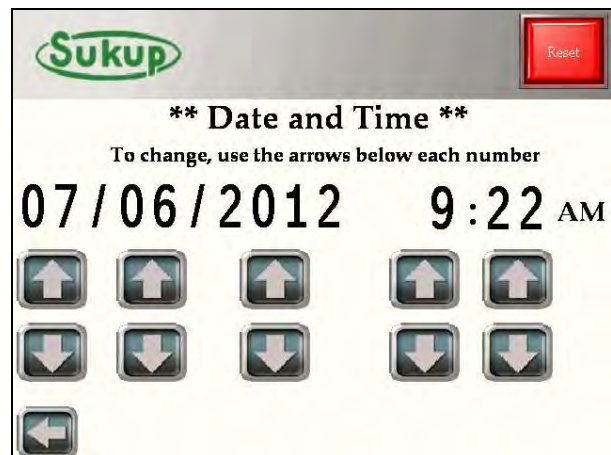
Select a system language. V2.6 will have different languages in 2 different program selections. English, Danish, Russian, French, and Spanish are in the primary release.

Hungarian and Romanian will be in a separate release.



Tools → System Tools → Time/Date

Change Date and Time using the arrow keys.



Tools - System Tools – CSV Data Transfer

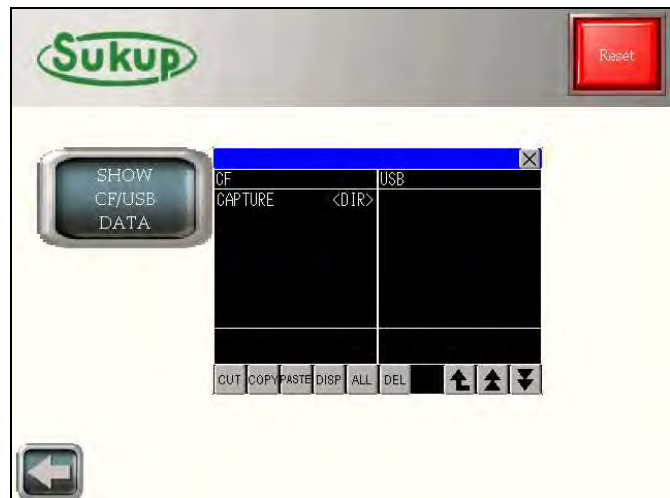
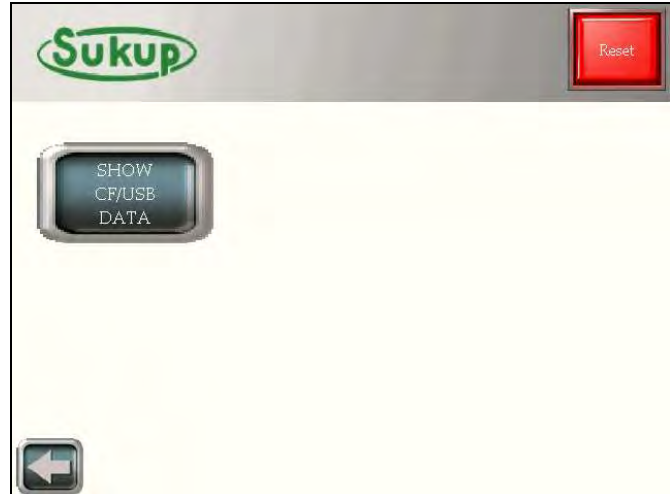
Selecting the “SHOW CF/USB DATA” displays the black directory window. This window shows all the folders and files available on the Compact Flash Card and USB storage devices plugged into the panel.

In this image (right), the panel has a Compact Flash card inserted in the back of the panel, and the CF card has one folder called “Capture”. The USB device is either not inserted or empty. To transfer files between the two cards, simply touch the file or folder you want, and then select the “Cut”, “Copy”, “Paste”, “Disp”, “All”, or “Del”. These buttons are relatively self-explanatory.

Each Touch-Panel comes with a factory-supplied Compact Flash card. All data that is collected in the drying process will be stored to this card. A person would use this feature to copy data from the card for backup purposes and/or to graph the data on a computer.

***It wouldn't be necessary to use this feature if the user already has a CF card reader for their computer. They could just remove the CF card from the back of the touch-panel and insert it into their card reader.

If not, the data must be transferred over to a USB flash drive, using this function.



Tools → System Tools → Units

Change between Fahrenheit and Celsius.

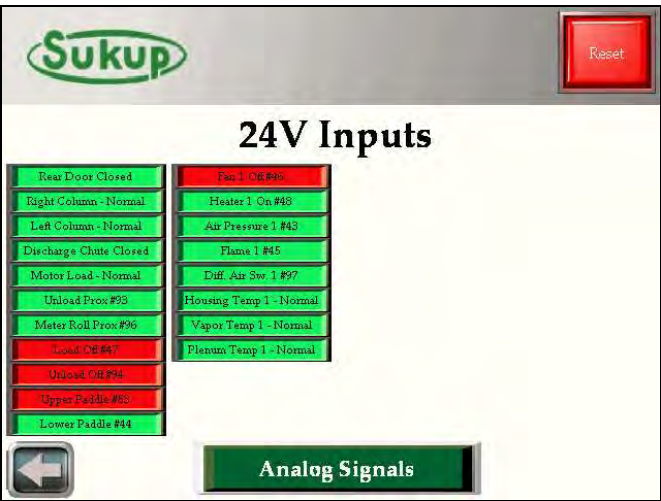
This page allows the user to press the button and the units will change from °F to °C or vice-versa.

On other screens where this same image is displayed (but smaller, generally always next to a temperature value), the user is also able to press and hold that button, and the units will change as well.



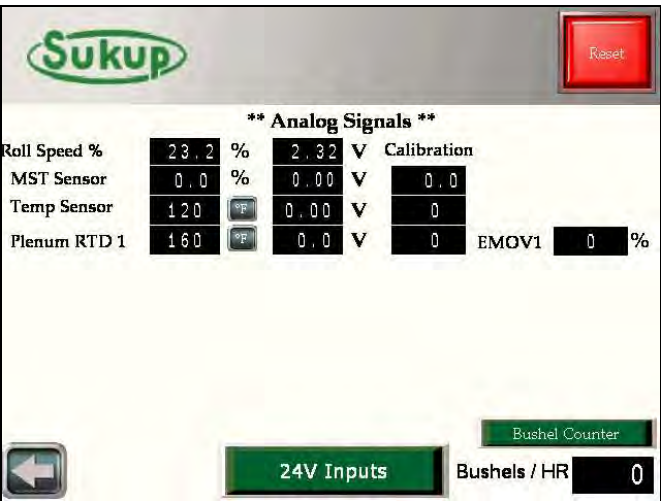
Tools → System Tools → System Diagnostics

The “System Diagnostics” feature is very nice to have. Locate to the right is a picture of the system’s 24VDC input. It is an up-to-the-second, visual representation of the PLC’s discrete inputs and outputs. When the input is triggered or 24VDC is present, the “lamp” will appear green in color. When not energized, it will appear red.



By selecting the “Analog Signals” button, the user will be able to see the voltages and interpreted values of all the analog inputs and outputs. These are especially helpful when troubleshooting problems.

SPECIAL NOTE!!!!:
Pressing and holding the SUKUP logo on the top left of every screen will get to this analog signals page.



Tools → System Tools → System Information

In the system information page, the PLC and HMI software versions are displayed. Check <http://www.sukup.com/Products/QuadraTouch> to make sure your dryer has the latest software updates.



Sukup Reset

**** System Information ****

PLC Software Version: 2.60

HMI Software Version: V2.6 BUILD 6/9/2012

Fan Setup: Single Fan

Fan Selection

Tools → System Tools → GSM Option

If equipped with the T24999 GSM kit, the dryer will automatically contact the programmed number on this page in the event of a fault condition. Press and Hold “International Dialing” if the number you want to notify is outside the +1 country code.

See the L24999 GSM modem operating instructions at the end of this section for more information.



Sukup Reset

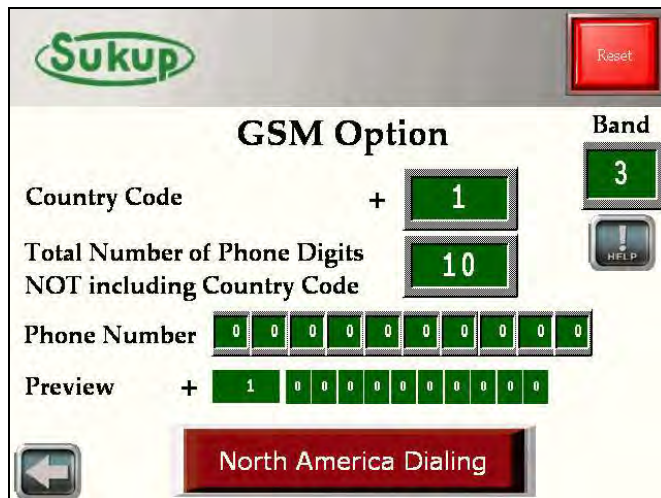
GSM Option

The GSM modem will text message this number in the event of a fault condition. Enter the 10 digit mobile number below.

000 - 000 - 0000

International Dialing

If dialing outside of North America, you may need to change the band setting of the GSM modem. Touch the “Help” button to show band setting options.



Sukup Reset

GSM Option

Country Code + 1

Total Number of Phone Digits NOT including Country Code 10

Phone Number 0 0 0 0 0 0 0 0 0 0

Preview + 1 0 0 0 0 0 0 0 0 0

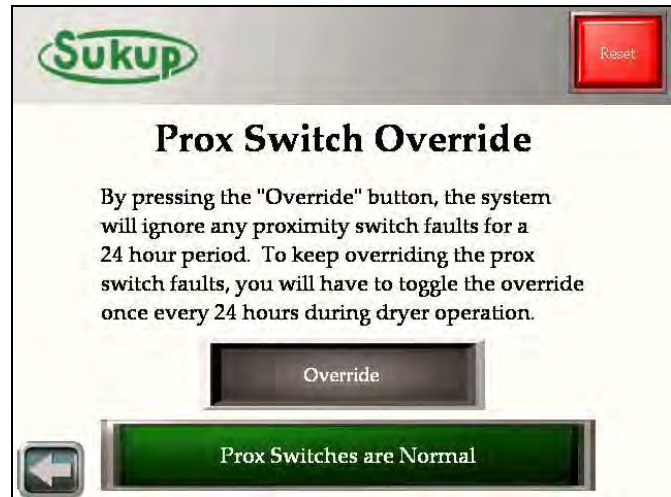
Band 3

HELP

North America Dialing

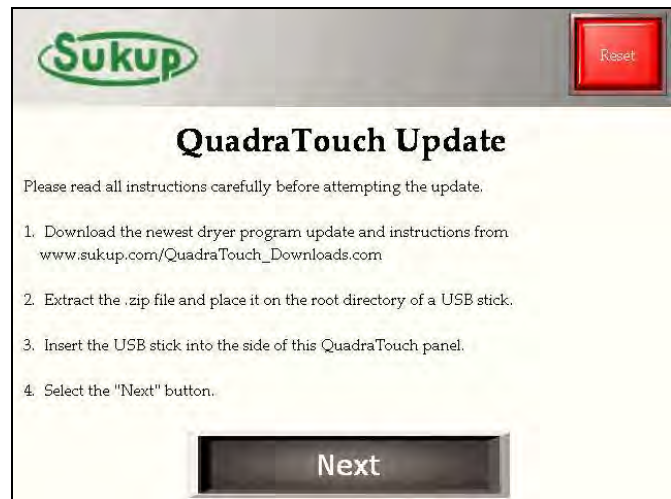
Tools → System Tools → Prox Switch Override

Sometimes it may become necessary to ignore the system's 2 proximity switches. These switches are intended to verify auger rotation, and this override should only be used in extreme cases. If the switch is malfunctioning, a replacement switch should be ordered immediately! Should you choose to continue dryer operation in the event of a missing or failed switch, this override can be used to bypass the proximity switch failure fault. The override will last for 24 hours, and then the override will be cancelled automatically.



Tools → System Tools → QuadraTouch Update

Please refer to the QuadraTouch™ Update instructions sheet for more information.



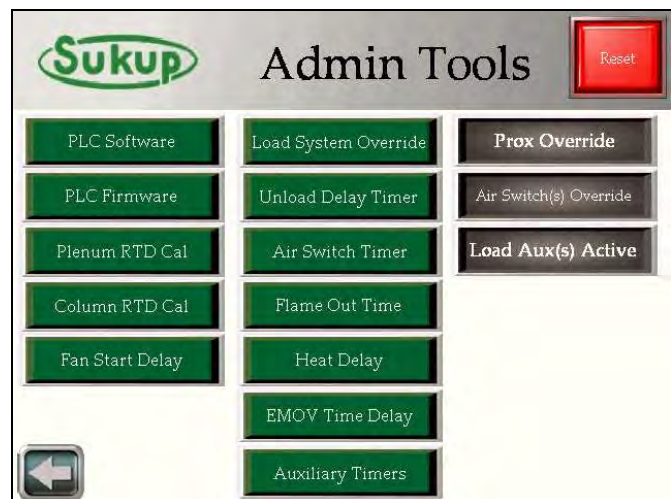
Tools → System Tools → Admin Tools

The Admin Tools menu allows you to customize your dryer in order to better suit your operating conditions. **HOWEVER: Some options will allow you to seriously change the way the dryer operates. In some cases, serious and permanent damage may occur if the dryer may occur if the settings are used improperly.**

SUKUP MANUFACTURING DOES NOT RECOMMEND BYPASSING SAFETY CIRCUITS AND SENSORS FOR ANY PERIOD OF TIME. ONLY USE THESE SETTINGS IF ABSOLUTELY NECESSARY.



To the right is the admin tools section. You will always see the “RED” warning screen when trying to access this menu.



Tools → System Tools → Admin Tools → Load System Override

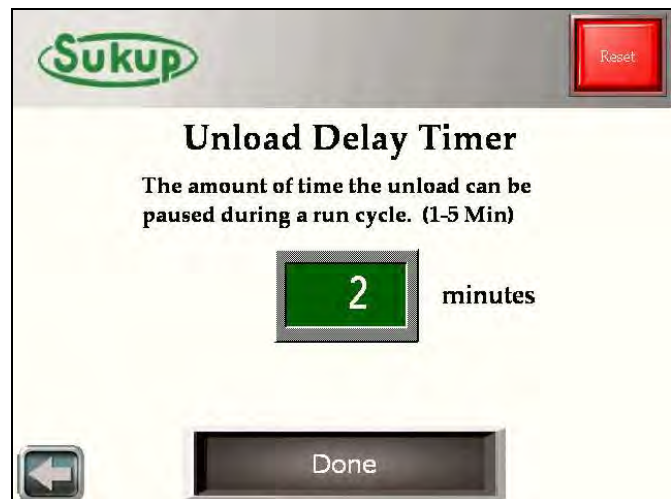
The load system override function allows you to turn on the load motor and either auxiliary motor in any order regardless of the paddle switch position.

Serious and/or Permanent Damage can occur if the load system is used improperly.



Tools → System Tools → Admin Tools → Unload Delay Timer

The Unload Delay Timer can be used to stop the unload auger from running during automatic operation. This value is user selectable from 1-5 minutes.



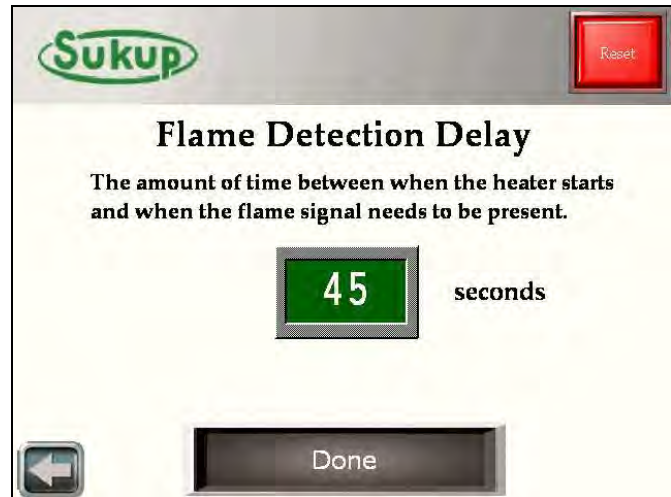
Tools → System Tools → Admin Tools → Air Switch Fault Timer

In **RARE** cases, the air switch timer may not close before calling for heat. This function gives you the ability to extend the air switch closing time for up to 20 seconds. This may be applicable in Soft Start Applications. However, it's highly recommended to use the **HEAT DELAY** function if possible.



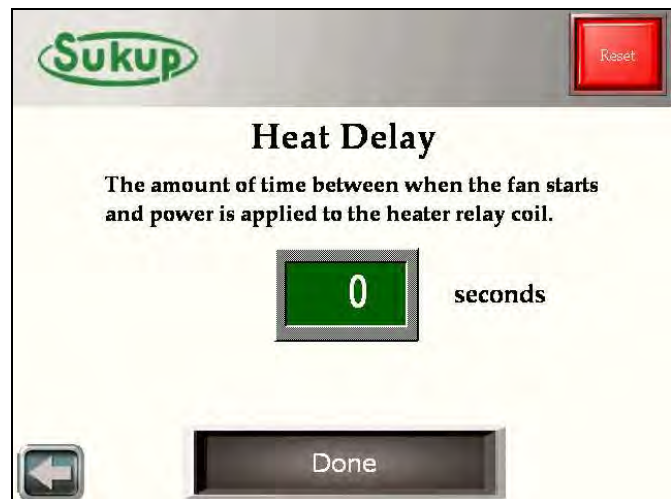
Tools → System Tools → Admin Tools → Flame Out Time

In **RARE** cases, it may be necessary to extend the flame detection timer. This timer may be extended up to 90 seconds.



Tools → System Tools → Admin Tools → Heat Delay

In Soft Start Applications (or any application for that matter) where it takes an extra couple of seconds for the fan to build enough pressure to close the air switch, the Heat Delay function is very useful. You can tell the dryer to wait a certain period of time between when the fan starts and when power is applied to the heater relay. This reduces the chance of a start-up flame-out fault.



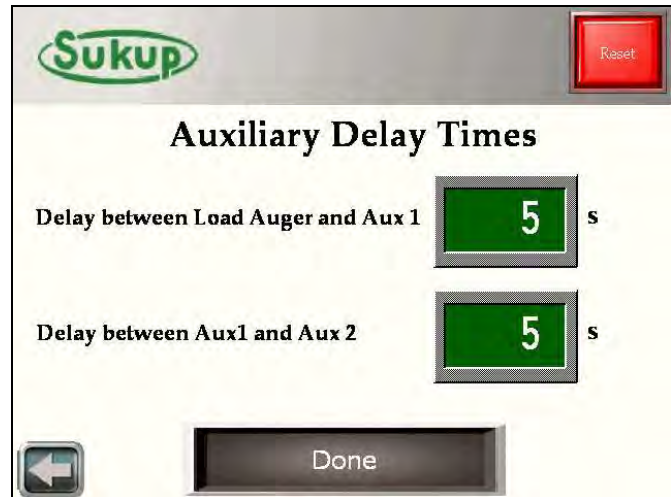
Tools → System Tools → Admin Tools → EMOV Delay

If the Electronic Mod Valve (EMOV) butterfly valve stem ever needs to be adjusted, this is a great way to do it. This function allows you to lock the EMOV stem in its low-fire position for up to 4 minutes. At factory settings, the EMOV will open to 25%, which should read 5lbs of pressure on the pipe train. Fire the burner in dry fire mode with this setting to adjust the stem position of the butterfly valve to 5lbs of pressure. After the Timer delay, the valve will start actuating like normal.



Tools → System Tools → Admin Tools → Aux Timers

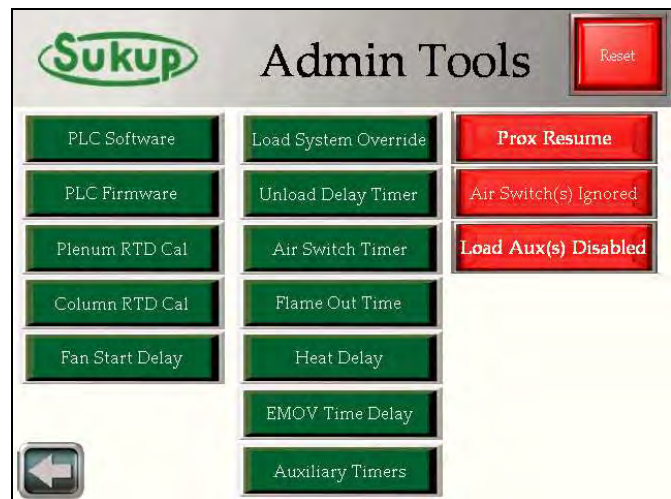
Because everyone's dryer setup is different, it may be necessary or helpful to change the factory delay settings on the auxiliary load devices. This will allow a longer or shorter delay between when the load auger, auxiliary 1, and auxiliary 2 start.



Tools → System Tools → Admin Tools → Overrides

In **RARE** cases, it may be necessary to use the override functions. These overrides, shown in red on the right-hand part of the screen, should only be used for short periods of time until the dryer can be serviced. These overrides allow the program to disregard the proximity switches and air switches for a period of 24 hours.

The program also gives you the option to turn BYPASS the Auxiliary Load devices. This can be a nice feature when you are transferring grain through the dryer and bypassing the wet bin.



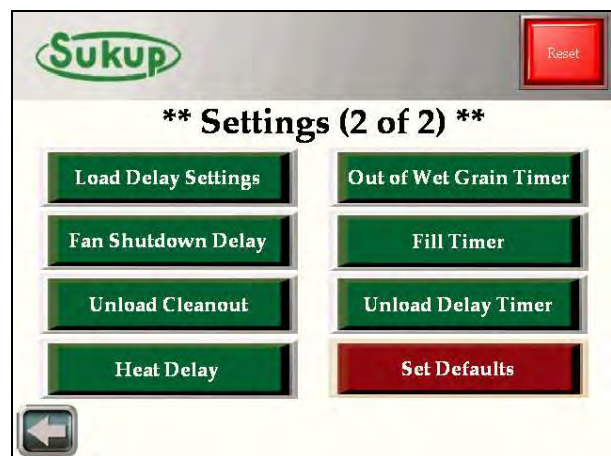
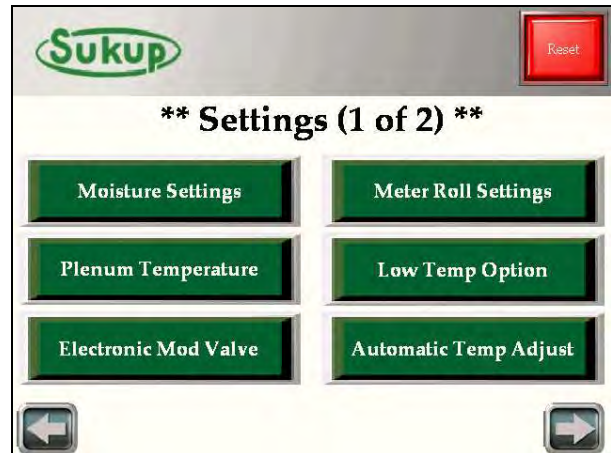
“Settings” Menu

The “Settings” menu allows the operator to specify optimal settings for grain drying.

The “Settings” menu is broken up into two pages. The first page includes settings that have to do with drying operation such as moisture and plenum temperature set points. The second page includes mainly delay timer settings. There is also a button to reset factory defaults.

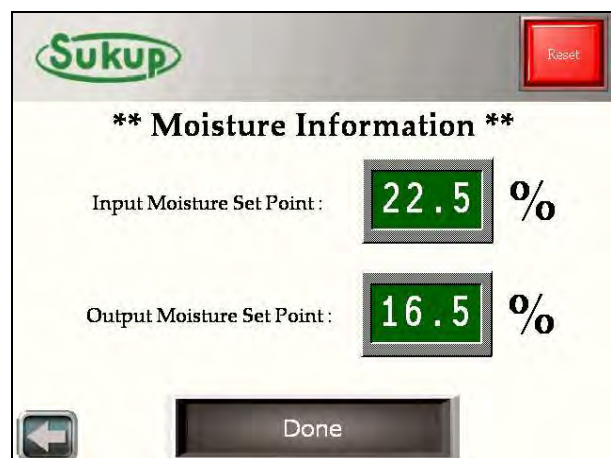
**As before, the burgundy and light, neon-green buttons have press and hold features.

Each button opens a new screen where the user will specify their desired values. Each setting is factory set before it leaves Sukup Manufacturing Company.



Settings (1 of 2)→ Moisture Settings

Specify the input and desired output set points.



Settings (1 of 2)→ Meter Roll Settings

A user may specify the high and low limits of the meter roll speed. It is also possible to adjust how fast the meter rolls react to changing output moisture using the “Meter Roll Gain” feature. Use the Deadband zone to freeze meter roll speed around the discharge moisture setpoint.

The default setting for the “Meter Roll Gain” is 2. The scale goes from 1 to 10 where “2” is normal reacting and “10” is very fast reacting.

A setting higher than 4 will rarely ever need to be used.

The minimum and maximum metering roll speeds can be set with this screen.

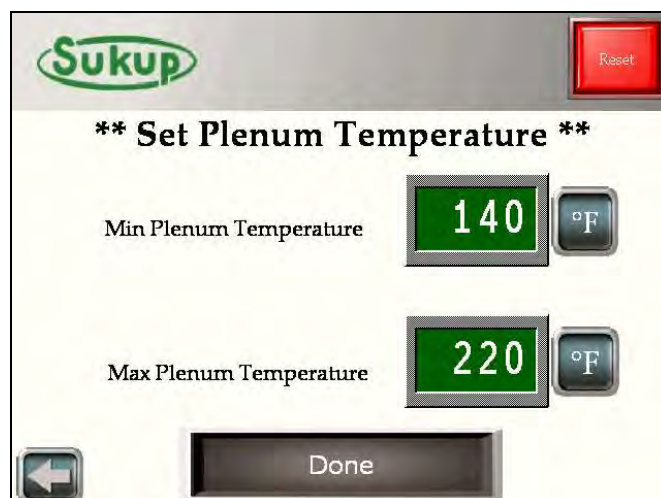
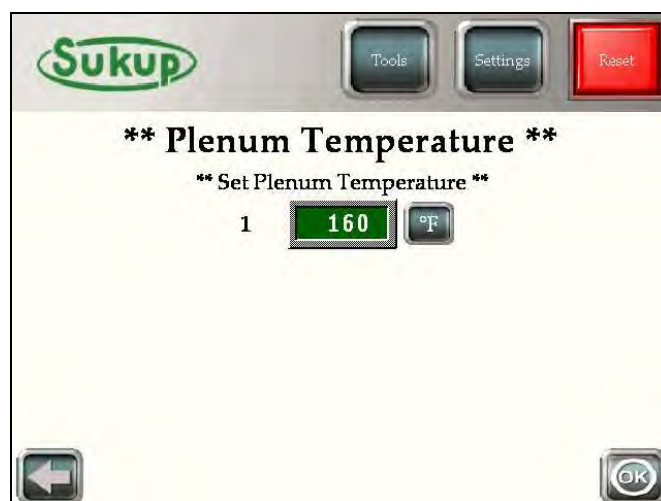
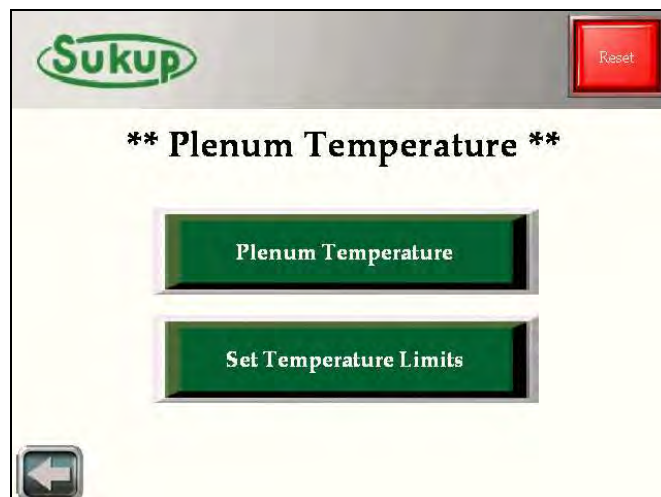
The deadband zone is a great feature to help the dryer from swinging around a set point. The deadband settings can be changed according to user preference. With a default setting of 2 tenths above and 2 tenths below, the meter roll speed will stay at a constant speed while the discharge moisture remains between 2 tenths above and 2 tenths below the set point.

The image displays four sequential screenshots of the Sukup control interface, specifically the 'Meter Roll Settings' section. Each screen features the Sukup logo at the top left and navigation buttons (Tools, Settings, Reset) at the top right. A back arrow is located at the bottom left of each screen.

- Screen 1: ** Meter Roll Settings ****
This screen contains three large green buttons: 'Multiplier', 'Min / Max Limits', and 'Deadband Settings'.
- Screen 2: ** Meter Roll Gain ****
This screen prompts the user to 'Select the desired Meter Roll Gain (1=Slowest, 10= Fastest)'. A large green button displays the value '2'.
- Screen 3: ** Roll Speed Limits ****
This screen allows setting 'Set Minimum Roll Speed' and 'Set Maximum Roll Speed'. The minimum is set to '10 %' and the maximum to '50 %'. A 'Done' button is at the bottom.
- Screen 4: ** Deadband Settings ****
This screen provides an example: 'Example: The output MST setpoint=16%, Pts above=1, Pts below=5. Thus the zone of meter roll speed is 16.1% to 15.5%. When the discharge grain is between these two numbers, the speed of the meter rolls remains unchanged.' It then asks for 'Amount of points above the setpoint before a change is made to meter roll speed. (Tenths)' and 'Amount of points below the setpoint before a change is made to meter roll speed. (Tenths)'. Both input fields show the value '2'.

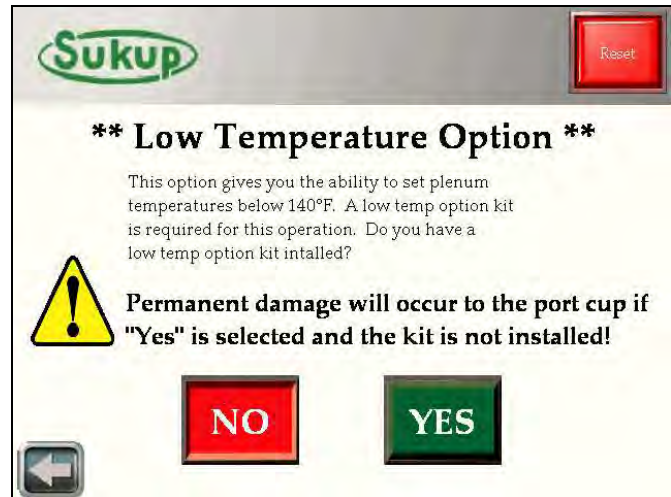
Settings (1 of 2)→ Plenum Temperature

A user can also specify the **RANGE** in which the plenum temperature may be set. Use the “Set Temperature Limits” button to control the temperature range, and use the “Set Plenum Temperature” button to set a specific temperature.



Settings (1 of 2)→ Low Temp Option

The “Low Temp Option” page has a good description on it, but its key feature is to decrease the plenum temperature low limit down to 120°F.



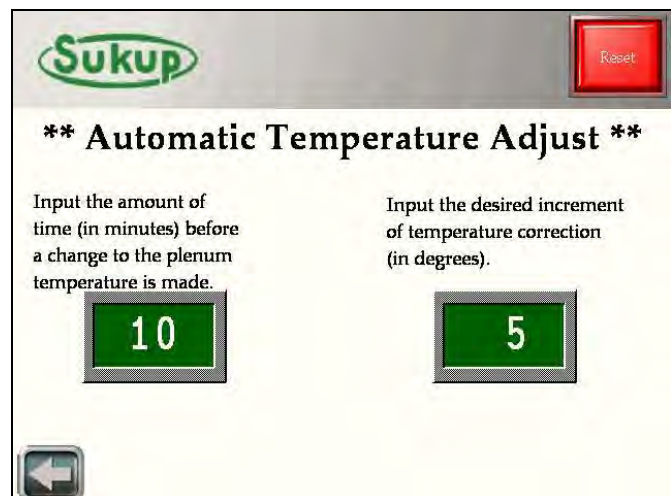
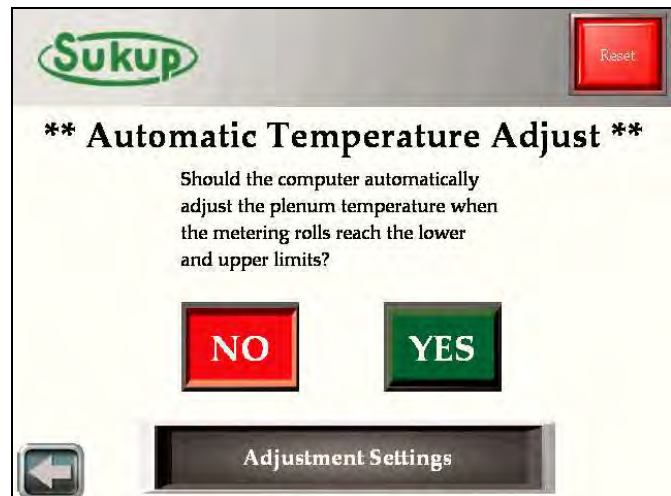
Settings (1 of 2)→ Automatic Temp Adjust

The “Automatic Temperature Adjust” feature allows the computer to automatically change the plenum temperature up and down based upon metering roll speed. (Factory Default is OFF)

The user is able to set the specific amount of time in minutes before a change is made as well as the increment of change itself. Both of these changes can be made after pressing the “Yes” button or the “Adjustment Settings” button.

This function will increase the plenum temperature up or down if the meter rolls are running at their minimum or maximum speeds respectively.

When the metering rolls are no longer running on their minimum or maximum speed, the plenum temperature will return to its original setpoint in the increments in which it was increased or decreased. These increments or decrements will occur in the reverse order using the same time and temperature corrections.



Settings (1 of 2)→ Electronic Mod Valve

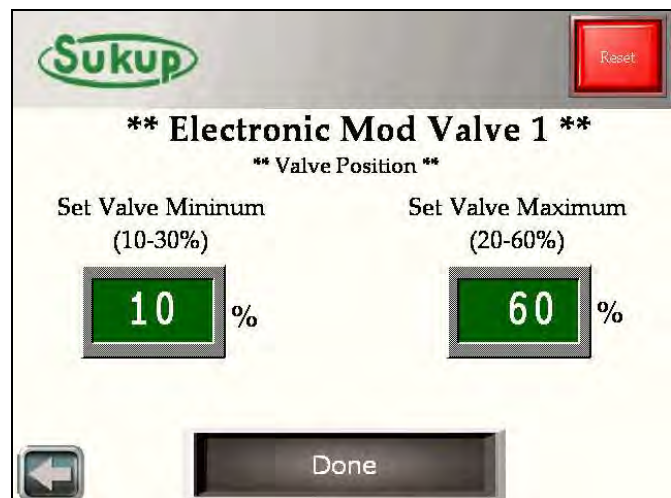
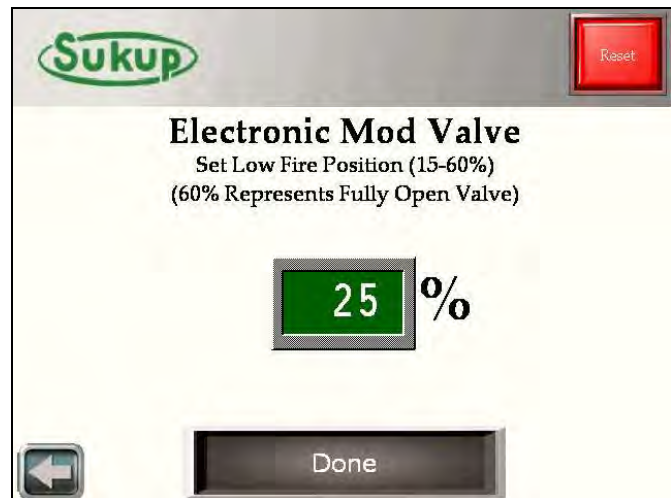
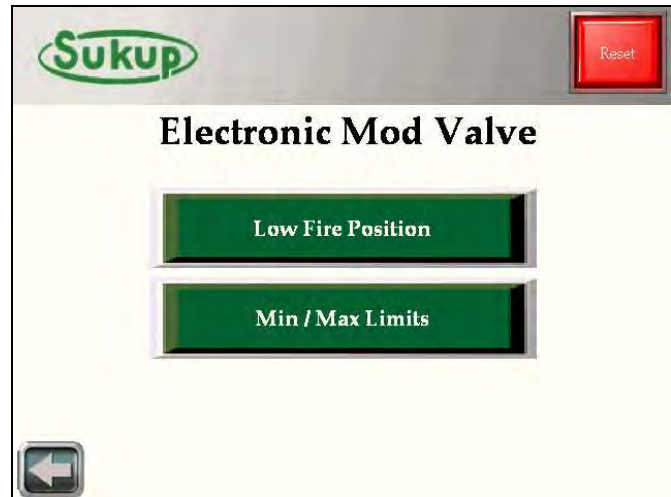
This menu gives the user the option to specify a low fire position (the position the valve is opened to for ignition) as well as setting the minimum and maximum valve opening position.

The control loop used to control plenum temperature is very accurate. Users will seldom need to make changes in this area. The default setting for low fire position is 25% max valve opening.

Sukup Manufacturing Company finds that at 25% opening, the pressure gauge should read 5lbs. of pressure (+ or – ½ lb.). To check if this setting is correct, select “Valve Settings” and decrease the max valve opening setting down to 25% and increase the min valve opening to 25%.

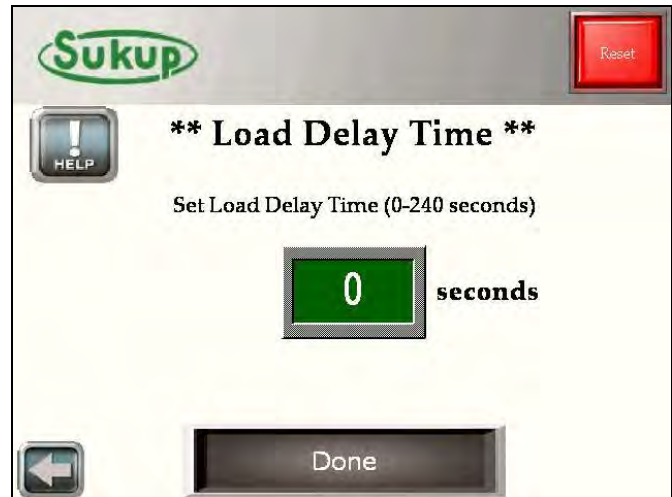
***Special NOTE:

The actuating time of the butterfly valve is very fast which gives better control of plenum temperature. If for some reason the valve is opening too fast, and the temperature is rising too quickly, reduce the valve maximum setting from 60% down to 40% and re-evaluate.



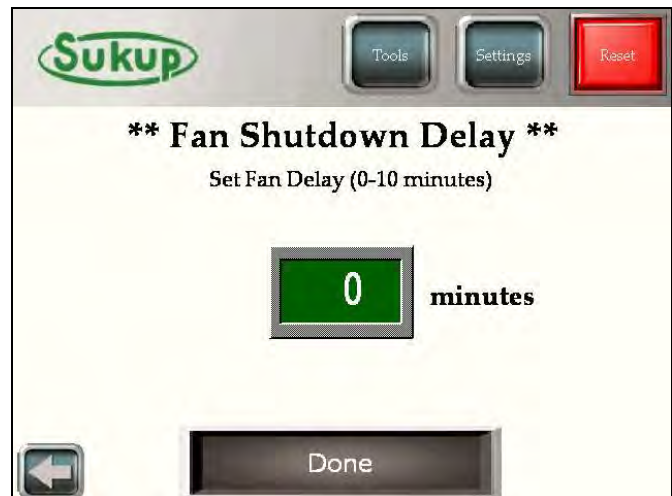
Settings (2 of 2)→ Delay Settings

The Load Delay Settings menu will give the user the option of waiting a set period of time (0-240 seconds) in addition to the 5 & 10-second timers before the auxiliary load motors start. This is especially helpful when the loading system is oversized for the dryer it's attached to. Having a constant on/off situation is tough on motors. Putting a delay in allows time for the dryer to unload a little bit more than usual and allows the auxiliary load motors to stay on for longer periods of time. The default setting is 0 seconds.



The Fan Delay timer allows the fan to run for up to 10 minutes after the dryer is shut down.

However, the fan will not always run upon a fault condition. If the fault that stopped the dryer is unrelated to heat/over-temp alarms, the fan will be allowed to run.



The Unload Cleanout Timer allows the unload auger to run for up to 60 seconds after the dryer has been shut down.

Just like the Fan Delay, the unload auger will not run during an unloading related fault.



Settings (2 of 2)→ Delay Settings

The Heat Delay setting is the delay time between when the fan relay closes and when power is applied to the heat relay. This setting is helpful when supply power to the dryer is unstable or inadequate.

The Unload Delay Timer allows the unload auger to be paused for up to 5 minutes during a run cycle. This may be helpful when changing a distributor on your air system or managing your auxiliary take-away system during operation.

The Out-of-Wet Grain timer is user settable from 2-15 minutes. Its default value is 10 minutes. While unloading, if the dryer hasn't been filled (meaning the lower paddle switch hasn't been satisfied) for the timer duration, it will shut down with an out-of-wet grain fault.

Similarly, the Fill timer is also user adjustable from 5-30 minutes. Its default value is 15 minutes. During the unloading process, the dryer has between 5 and 30 minutes to call for grain. If the paddle switch hasn't been released during that time period, it will shut down with a fill timer fault.

The image shows a vertical stack of four settings screens from the Sukup control interface. Each screen has a 'Sukup' logo at the top left and a 'Reset' button at the top right. The first screen is 'Heat Delay' with a description: 'The amount of time between when the fan starts and power is applied to the heater relay coil.' The value is set to 0 seconds. The second screen is 'Unload Delay Timer' with a description: 'The amount of time the unload can be paused during a run cycle. (1-5 Min)'. The value is set to 2 minutes. The third screen is 'Out of Wet Grain Timer' with a description: 'The Out of Wet Grain Timer starts counting when the dryer is loading and unloading, but the lower paddle switch has not been satisfied with grain. (2-15 min)'. It shows a green status bar 'Out of Wet Grain Timer Enabled' and the value is set to 10 minutes. The fourth screen is 'Fill Timer' with a description: 'The Fill Timer is a fault timer that starts counting when the dryer is unloading, but the lower paddle switch has yet to drop into its "OFF" position. (5-30 min)'. It shows a green status bar 'Fill Timer Enabled' and the value is set to 15 minutes. Each screen has a 'Done' button at the bottom and a back arrow icon in the bottom left corner.

Heat Delay
The amount of time between when the fan starts and power is applied to the heater relay coil.
0 seconds
Done

Unload Delay Timer
The amount of time the unload can be paused during a run cycle. (1-5 Min)
2 minutes
Done

Out of Wet Grain Timer
The Out of Wet Grain Timer starts counting when the dryer is loading and unloading, but the lower paddle switch has not been satisfied with grain. (2-15 min)
Out of Wet Grain Timer Enabled
10 minutes
Done

Fill Timer
The Fill Timer is a fault timer that starts counting when the dryer is unloading, but the lower paddle switch has yet to drop into its "OFF" position. (5-30 min)
Fill Timer Enabled
15 minutes
Done

BASIC OPERATION

From the “Main Screen” touch the “Start” button.

The “Choose Operation” menu will come up.

There are 4 automatic modes in which the dryer can operate. Each operation sequence will be shown below.



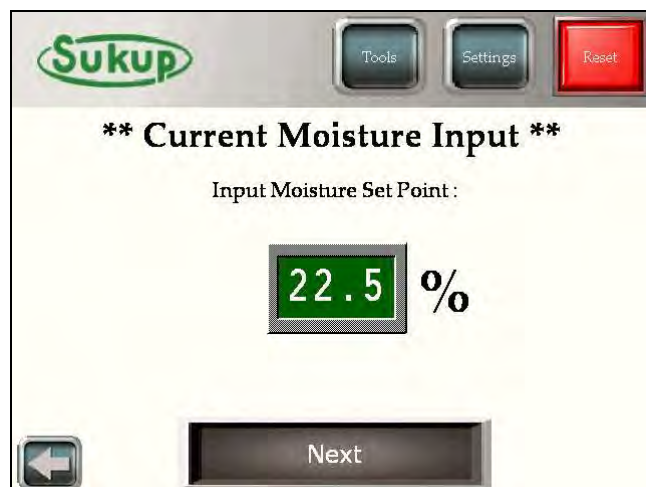
Continuous Flow Mode

→ Initial Dry

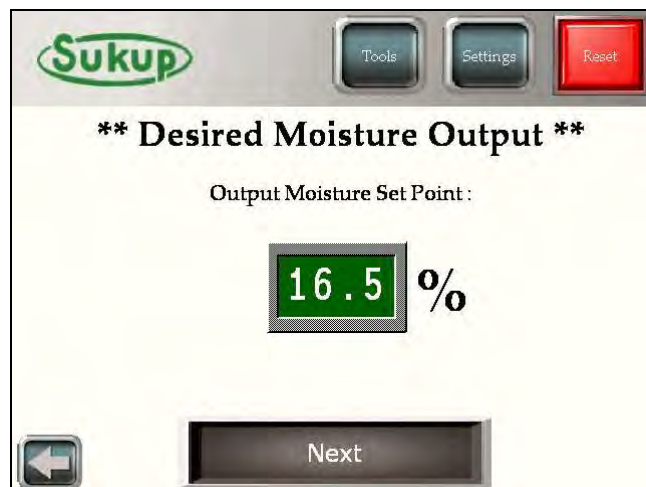
After selecting “Continuous Flow” from the “Select Operation” menu, choose the “Initial Dry” option.



The next screen to appear is the “Current Moisture Input” screen. Using the pop-up key pad, enter the moisture content of the incoming grain.



After the input moisture has been entered, specify the desired output moisture.



Lastly, set your desired minimum and maximum roll speeds.

Special NOTE:

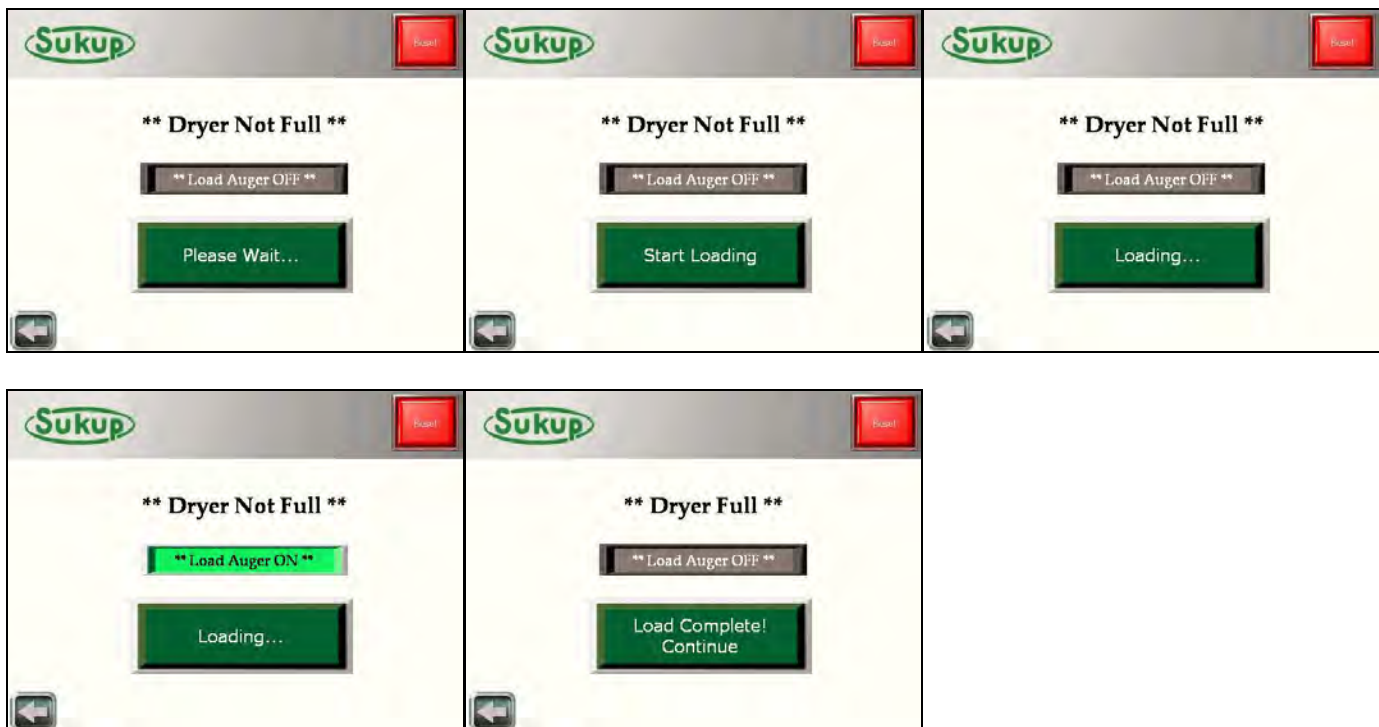
This system uses a Variable Frequency Drive to control the speed of the metering rolls. Set points are exact, and there is no need to calibrate this device.



When “Next” is pressed, the “Loading Sequence” begins.

Loading Sequence

The dryer will check its paddle switches to determine if the columns are full of grain. After a short delay (When the main button flashes “Please Wait...”), the dryer will give the option of “Start Loading” or “Load Complete! Continue”



Firing Sequence

After loading has finished, the dryer will now start its fans and heaters. The fan(s) and heater(s) will start from the top down.

Example: A two-fan dryer will start its upper fan first.

After each device is started, a check mark will appear when operation has been confirmed. When all heaters are started, a 90 second, plenum stabilization timer will begin.

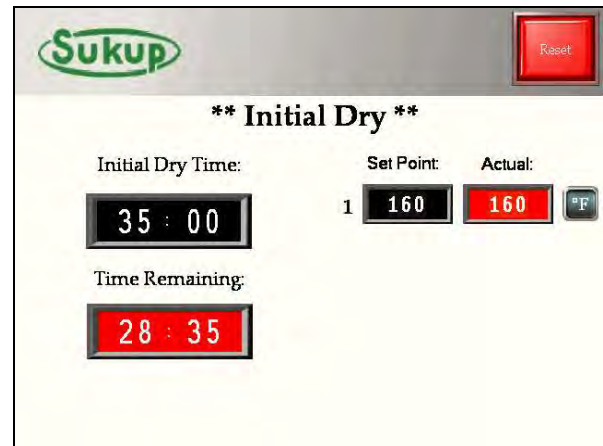


INITIAL DRY

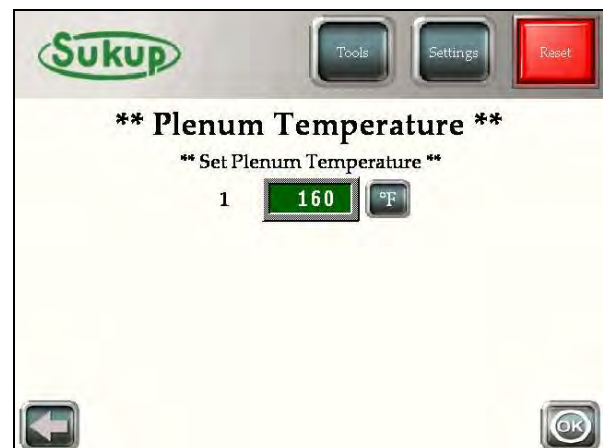
After the fans and heaters have been started, the “Initial Dry” timer will begin.

Initial Dry Time is determined by 6 min/pt (+) or (-) 1 min/pt per 20°F difference from 160°F

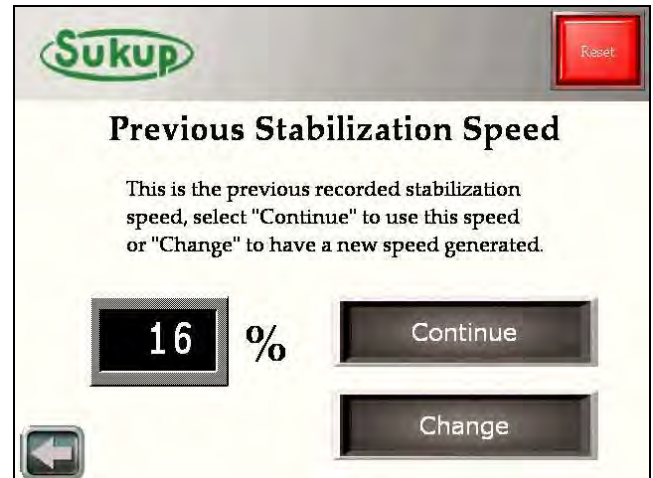
Example: Input MST =22%, Desired MST = 16% → 6 pt removal. 6 min/pt at 6 pts @160°F = 36 min.



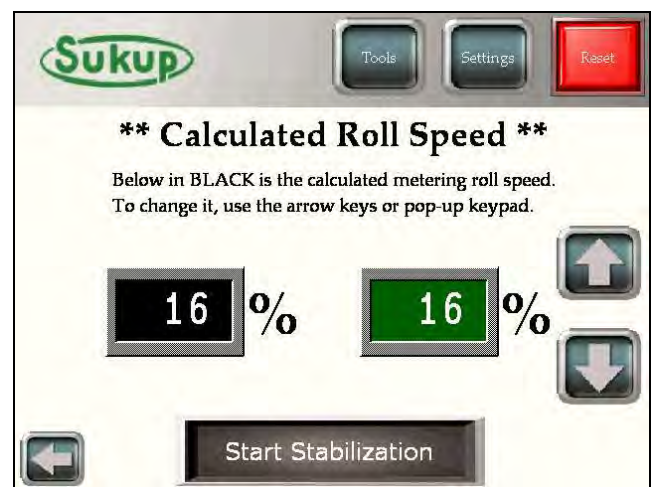
After the “Initial Dry” timer has expired, the operator will have the opportunity to specify a stabilization temperature and the computer will determine and unload rate based upon that temperature.



If the dryer has been run previously, the user will be prompted to resume a previous stabilization period or calculate a new one.



The computer will determine a "Calculated Roll Speed" based upon the temperature desired for "Stabilization" mode. This calculated number is displayed in BLACK on the left. This value is automatically loaded into the GREEN box on the right. This value is adjustable. If the calculated speed is outside the user's predetermined minimum and maximum meter roll speeds, and error message will pop up and give you the option to change the plenum temperature.



STABILIZATION

After the user has selected "Start Stabilization", the computer will determine a dry time based on the roll speed and the amount of moisture to be taken out of the grain.

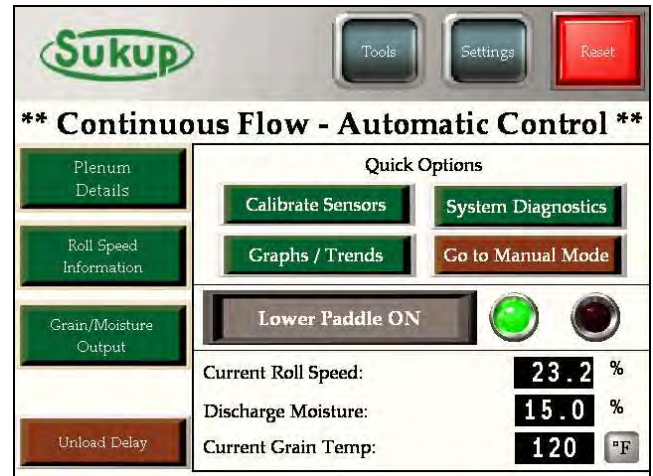
Ten seconds after the "Stabilization" mode has started, the unload process will begin.



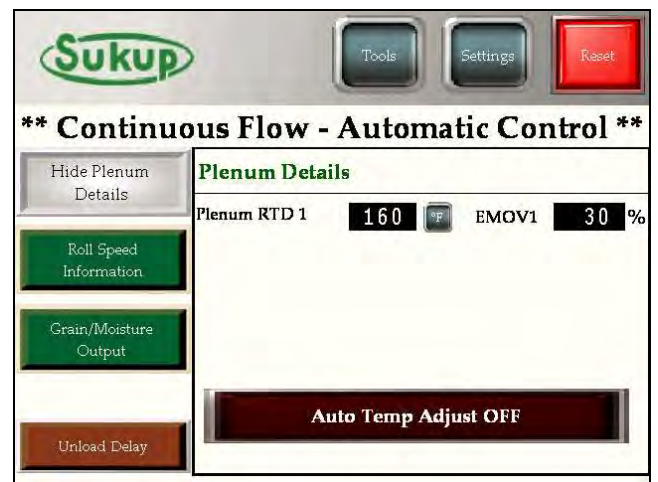
Continuous Flow

After the “Stabilization” timer ends, the “Continuous Flow” mode begins. During this mode, the dryer constantly monitors the outgoing moisture and makes corrections to roll speed and plenum temperature (optional). The buttons along the left side of the screen allow the user to keep track of all relevant drying information.

The paddle switches are also visually represented by the two lamps next to the Load Auger status.

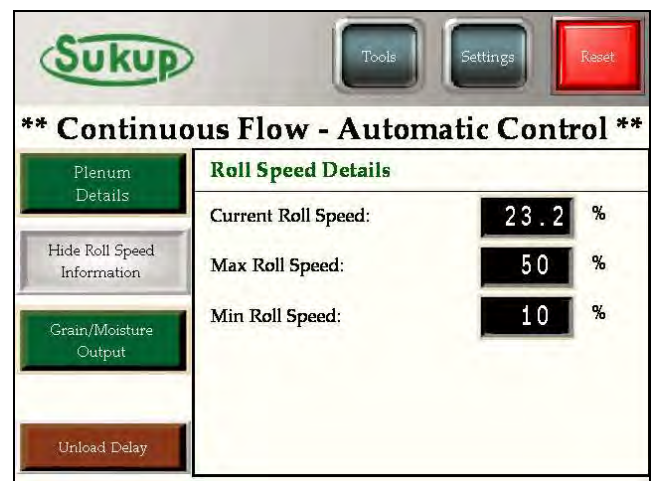


Pop-up menu for “Plenum Details”
This will show plenum temperature(s) and corresponding electronic mod valve position(s).

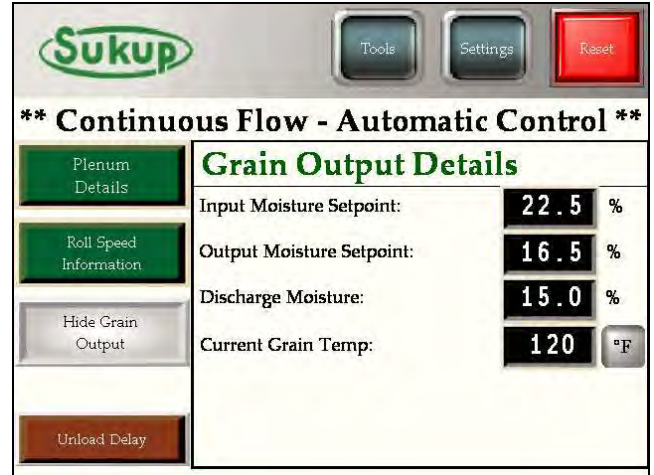


Pop-up menu for “Roll Speed Information”
This will show all the corresponding unload speeds and their limits.

After the bushel counter has been calibrated, it will show up on this menu as well.



Pop-up menu for “Grain/Moisture Output”
This menu will show all the set points and actual moisture levels of the grain.



Sukup Tools Settings Reset

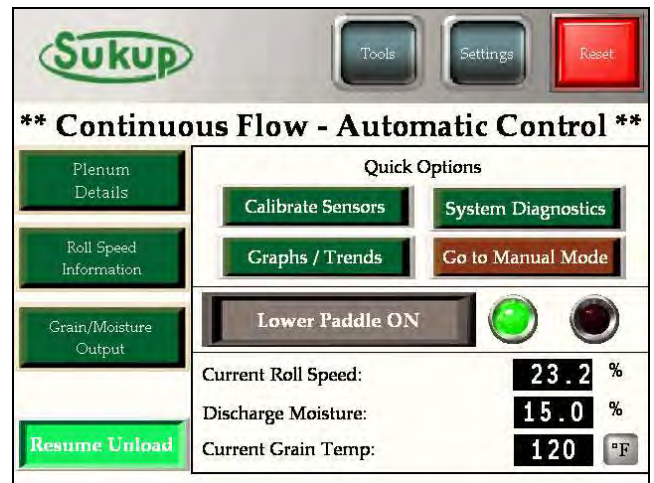
**** Continuous Flow - Automatic Control ****

Grain Output Details

Input Moisture Setpoint:	22.5 %
Output Moisture Setpoint:	16.5 %
Discharge Moisture:	15.0 %
Current Grain Temp:	120 °F

Plenum Details
Roll Speed Information
Hide Grain Output
Unload Delay

During operation, it sometimes becomes necessary to stop the unloading process for a brief period to clean the sensor or switch storage bins. Using the press-and-hold “2 Minute Unload Delay”, the dryer will stop its unloading system for 2 minutes. The system will not re-engage the unload system unless the button is pressed and held again. The dryer will shut itself down with a fault condition if the unload system is not re-engaged by the user within 2 minutes.



Sukup Tools Settings Reset

**** Continuous Flow - Automatic Control ****

Quick Options

Calibrate Sensors System Diagnostics
Graphs / Trends Go to Manual Mode

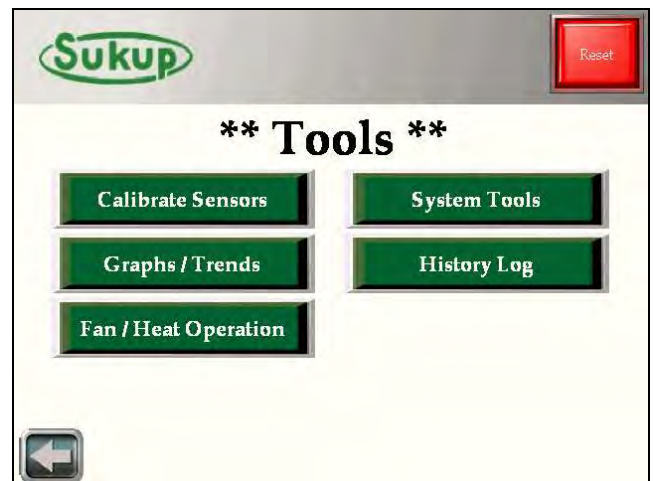
Lower Paddle ON

Current Roll Speed:	23.2 %
Discharge Moisture:	15.0 %
Current Grain Temp:	120 °F

Plenum Details
Roll Speed Information
Grain/Moisture Output
Resume Unload

During normal, automatic operations, a limited “Tools” menu will be available for use.

The Fan/Heat Operation option will come up during automatic modes. This will allow you to turn fan(s) and heater(s) on and off during continuous flow.



Sukup Reset

**** Tools ****

Calibrate Sensors System Tools
Graphs / Trends History Log
Fan / Heat Operation

←

Continuous Flow → Restart Menu

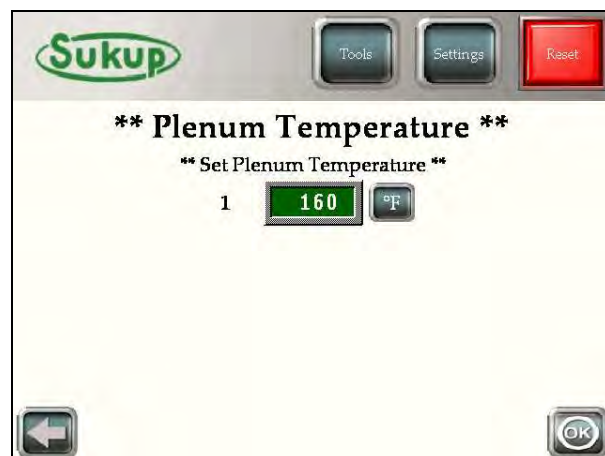
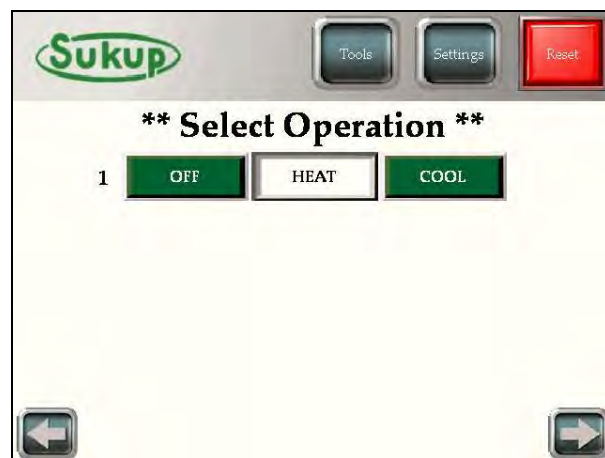
If the dryer has already completed its “Initial Dry” and/or the user is restarting the dryer after a shutdown, the “Restart” option is a great way to pick up where the dryer left off. If the dryer shut down due to a fault condition, the time and date will be stored and displayed on the screen.

Choose either “Restart With Stabilization” or “Restart Without Stabilization”

Choose your Fan/Heat Operation.

The “Heat” option will engage the fan and heater. The “Cool” option will engage only the fan.

“Restart w/ Stabilization” will put the dryer through its “Stabilization” process of calculating dry time based on temperature, incoming moisture, and meter roll speed. “Restart w/o Stabilization” will take you directly into “Continuous Flow” computer controlled mode.

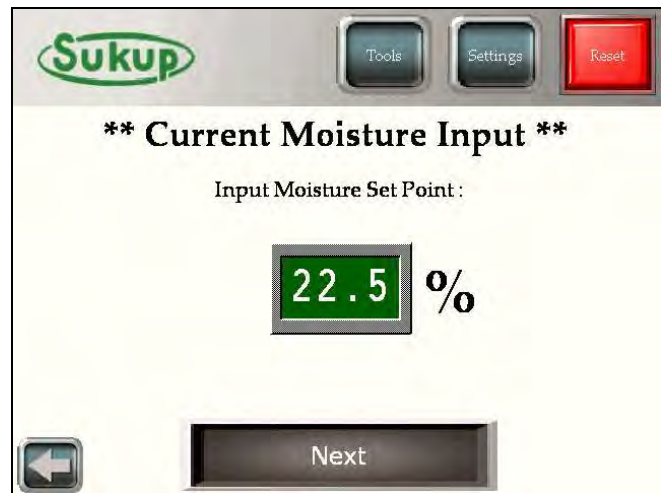


“Autobatch” Mode

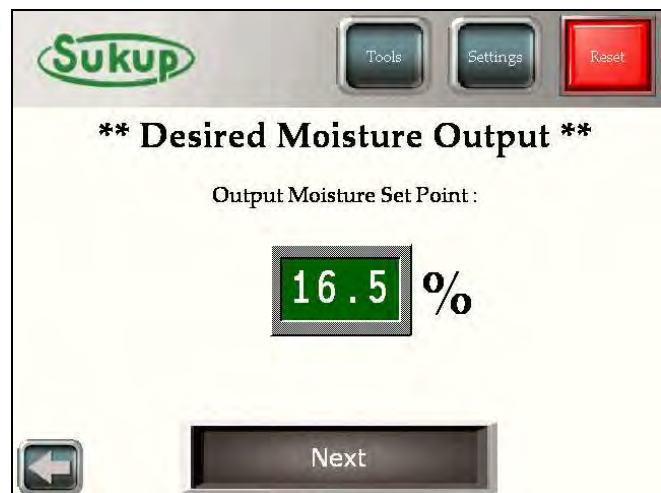
In the event of extreme high moisture grain, it may be necessary to run the dryer in “Autobatch” mode. This mode allows the user to dry grain in batches with the option of computer-controlled adjustments.

The system will prompt the user for some set points to make dry-time and unload time calculations.

The user will enter input and output moisture as well as the maximum unloading capacity.



The screenshot shows the 'Sukup' logo at the top left. To the right are three buttons: 'Tools' (blue), 'Settings' (blue), and 'Reset' (red). The main title is '** Current Moisture Input **'. Below it is the label 'Input Moisture Set Point :'. A large green box displays the value '22.5' followed by a '%' symbol. At the bottom left is a back arrow button, and at the bottom right is a 'Next' button.



The screenshot shows the 'Sukup' logo at the top left. To the right are three buttons: 'Tools' (blue), 'Settings' (blue), and 'Reset' (red). The main title is '** Desired Moisture Output **'. Below it is the label 'Output Moisture Set Point :'. A large green box displays the value '16.5' followed by a '%' symbol. At the bottom left is a back arrow button, and at the bottom right is a 'Next' button.

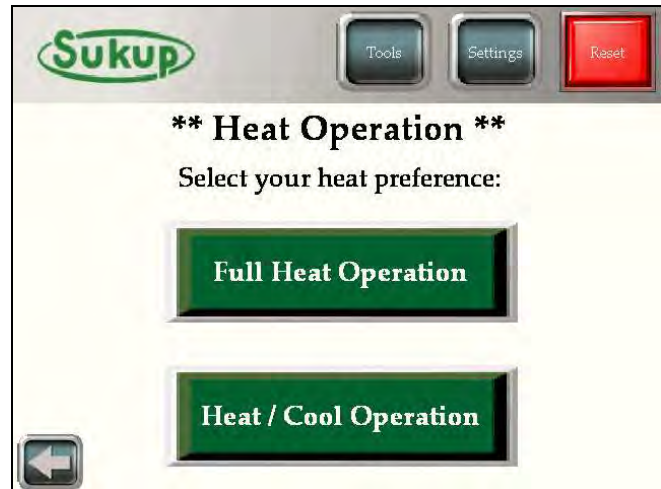


The screenshot shows the 'Sukup' logo at the top left. To the right are three buttons: 'Tools' (blue), 'Settings' (blue), and 'Reset' (red). The main title is '** Maximum Roll Speed **'. Below it is the label 'Maximum Roll Speed Set Point:'. A large green box displays the value '50' followed by a '%' symbol. At the bottom left is a back arrow button, and at the bottom right is a 'Next' button.

After the user has selected the desired set points, it's time to select a fan/heat operation.

“Full Heat Operation” runs the fan(s) and heater(s) during the “Dry Cycle”, and the “Cool Cycle” is omitted.

“Heat/Cool Operation” runs the fan(s) and heater(s) during the “Dry Cycle” and shuts off the heater(s) for the “Cool Cycle”



If the user is resuming a previous batch, the “Resume” button will start the batch immediately using the past temperature and timer set points.

The batch number is incremented each time a load is discharged.

If a new batch is desired, the “New Batch” button is offered, and the user will be able to set drying temperature and dry cycle timers.



After pressing “New Batch” the user will select a drying temperature.



After selecting a drying temperature, the system will offer to automatically adjust the batch dry time based on outgoing moisture after the batch has been dried.

The screenshot shows the 'Sukup' logo at the top left and a red 'Reset' button at the top right. The main title is '** Autobatch Computer Control **'. Below it, the text asks: 'Should the computer automatically recalculate drytime based on previous batch average moisture?'. There are two large buttons: a red 'NO' button and a green 'YES' button. At the bottom, there is a grey arrow button pointing left and a grey 'Next' button.

Next the user will decide on the method of grain discharge. In most cases, time discharge will be the only option.

If the dryer has a Column RTD option installed in it, there will be two (2) more discharge options on this page (Temp Based and Time and Temp Based Control)

The screenshot shows the 'Sukup' logo at the top left and a red 'Reset' button at the top right. The main title is '** Grain Discharge **'. Below it, the text says: 'Select Grain Discharge Method'. There is a single large green button labeled 'Time Based Control'. At the bottom, there is a grey arrow button pointing left.

After selecting "Time Based Control" the computer will calculate a recommended dry time based upon the user's set points. That number is placed in the BLACK box. It is automatically loaded into the GREEN box, which is user selectable.

The screenshot shows the 'Sukup' logo at the top left and a red 'Reset' button at the top right. The main title is '** Batch Dry Time **'. Below it, the text says: 'Below in BLACK is the recommended dry time. To change it, use the arrows or pop-up keypad.' There are two boxes: a black box containing the number '54' and a green box containing the number '54', both followed by the word 'minutes'. To the right of the green box are two arrow buttons: an up arrow and a down arrow. At the bottom, there is a grey arrow button pointing left and a grey 'Next' button.

Similar to the batch dry time, the batch unload time is also calculated and placed into the BLACK box.

Sukup

**** Batch Unload Time ****

Below in BLACK is the recommended unload time.
To change it, use the arrows or pop-up keypad.

28 minutes 28 minutes

Next

After all set points and timers have been decided, the “Autobatch” program can begin. Each step of the process (under “Batch Status”) is highlighted in GREEN. The middle of the screen displays the time remaining in each highlighted section, and the “Batch Details” section shows the batch information.

Sukup Tools Settings Reset

**** Autobatch Program ****

Batch Status:

- ☐ Load Cycle
- ☒ Dry Cycle
- ☒ Cool Cycle
- ☒ Unload Cycle

Cycle Time Remaining:

0 : 00
0 : 00
0 : 00

Batch Details:

Discharge by Time Only
Heat / Cool
Auto Control Disabled

Previous Batch MST Current Moisture Grain Temp Batch Number

15.0 % 15.0 % 120 °F 1

“Grain Transfer” Mode

The first step after selecting “Grain Transfer” is to specify a Maximum Roll Speed. This tells the dryer’s control system how fast the unload system is capable of taking grain away from the dryer. During “Grain Transfer” the dryer’s unload system will always run at the maximum roll speed.

After a speed is selected, the user will have the opportunity to use an Out-of-wet-Grain timer. This timer will start after both paddle switches are in their respective “off” positions. If the lower switch hasn’t been made in 30 minutes, the dryer will automatically stop with a 30 minute Out of Wet Grain fault timeout.

New in 2.6, Grain Transfer gives you the option to use the fans during transfer operation.

This screen will show up for the entire “Grain Transfer” process. It shows the discharge moisture, grain temp, and your unloading speed.

The image displays four sequential screenshots of the Sukup Grain Transfer control interface, arranged vertically. Each screen features the Sukup logo in the top left corner and a red 'Reset' button in the top right corner. A back arrow is located in the bottom left corner of each screen.

- Screen 1: Maximum Roll Speed**
 - Title: **** Maximum Roll Speed ****
 - Text: Maximum Roll Speed Set Point:
 - Value: 50 %
 - Button: Next
- Screen 2: Grain Transfer**
 - Title: **** Grain Transfer ****
 - Text: Would you like to use a 30 min out of wet grain timeout?
 - Buttons: Yes, No
- Screen 3: Grain Transfer**
 - Title: **** Grain Transfer ****
 - Text: Would you like to use the fan(s) during Grain Transfer?
 - Buttons: Yes, No
- Screen 4: Grain Transfer Summary**
 - Title: **** Grain Transfer ****
 - Discharge Moisture: 15.0 %
 - Current Grain Temp: 68 °F
 - Max Roll Speed: 50 %
 - Warning: A yellow triangle with an exclamation mark icon is shown next to the text: Pressing "Reset" will stop the transfer, turn off all augers, fan(s), and return to the start screen.

“Final Dry” Mode

After selecting “Final Dry” from the “Start” menu, the user will specify the current moisture of the remaining grain in the dryer. This mode allows the remaining grain to dried and unloaded without the dryer being completely full.

After the moisture content has been entered, the system calculates a recommended dry-time for the user. Pressing “Start Final Dry” will start the fan(s) and heater(s), and the ignition sequence will begin.

Because the batch remaining is already partially dried, a calculation of 3 min/pt @ 140°F is used.

After the 90 sec. plenum stabilization timer expires, this screen will appear.

After the “Dry Time Remaining” timer has expired the fans and heaters will turn off. The unload auger will run for the length of the “Unload Time Remaining” timer. This value is calculated off the system’s maximum roll speed.

When “Final Dry” mode finishes, this screen will appear. The screen also tells the user to user the manual operation feature to unload any grain still remaining in the dryer.

The image displays four sequential screenshots of the Sukup Final Dry mode interface, showing the progression from moisture input to completion.

Screenshot 1: Current Moisture Input
The screen shows the Sukup logo at the top left and navigation buttons (Tools, Settings, Reset) at the top right. The title is “** Current Moisture Input **”. Below it, the text “Input Moisture Set Point :” is followed by a large digital display showing “22.5 %”. A “Next” button is at the bottom right, and a back arrow is at the bottom left.

Screenshot 2: Final Dry Time
The screen shows the Sukup logo and navigation buttons. The title is “** Final Dry Time **”. Below it, the text “Below in BLACK is the recommended Final Dry time. To change it, use the arrow keys or pop-up keypad.” is displayed. There are two digital displays, both showing “18 minutes”; the first has a black background and the second has a green background. A “Start Final Dry” button is at the bottom right, and a back arrow is at the bottom left.

Screenshot 3: Final Dry
The screen shows the Sukup logo and a “Reset” button at the top right. The title is “** Final Dry **”. Below it, the text “Dry Time Remaining:” is followed by a red digital display showing “0 : 00”. Below that, the text “Unload Time Remaining:” is followed by a red digital display showing “28 : 30”. At the bottom, there are three green buttons labeled “Plenum Details”, “Roll Speed Information”, and “Grain/Moisture Output”.

Screenshot 4: Final Dry Complete!
The screen shows the Sukup logo and a “Reset” button at the top right. The title is “Final Dry Complete!”. Below it, the text “If grain is still inside the dryer, use the manual unload feature to unload it.” is displayed. A large “Main Menu” button is at the bottom center.

Fault Screens and Error Messages

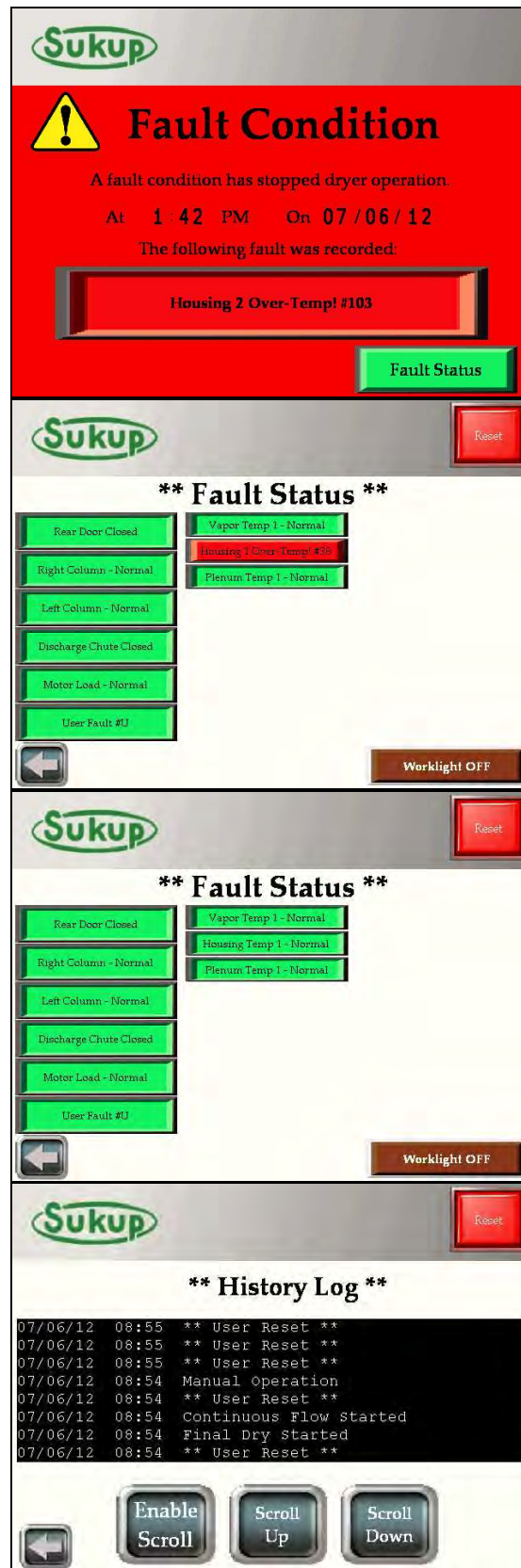
There are many safety switches and relays that are constantly being monitored on the dryer. Sukup Manufacturing Company uses these fault devices to ensure the safety of the product and our customers.

The dryer has an intelligent system that monitors all faults. If at any time a 24 VDC signal is lost through a safety circuit, a fault is triggered and the PLC shuts all dryer function down. It also contains the wire number of the fault in question

The set of images to the right shows an example of the Housing #1 Over-Temp safety circuit. When the fault occurs, the dryer immediately shuts down the dryer and records the date and time of the fault. It shows the fault on the screen that shut the dryer down, and it will remain on the screen until someone checks its status. The only button available to press on the screen is the “Fault Status” button located in the lower right-hand corner of the “Fault Condition” screen.

When the “Fault Status” button is pressed, the faults that still exist will be displayed in RED. The faults that are cleared will be displayed in GREEN. When a fault condition exists, the worklight will automatically turn off. If the user needs to turn the worklight on to work on the dryer, it’s possible to turn it on from this screen. (This is a press and hold button located on the lower right-hand corner of the screen)

When a fault occurs or a drying mode is selected, it is recorded in the “History Log”



The dryer also has some special sensing features.

Each analog input sensor of the dryer is constantly monitored as well. In the event of a missing or inoperative sensor, these messages located to the right will appear.

**These examples are errors from a Single Fan Dryer. More error messages are possible in multiple fan models.

Each fan and heater has its own Plenum RTD sensor. Therefore, a Two Fan Dryer will have an additional Plenum RTD error message.

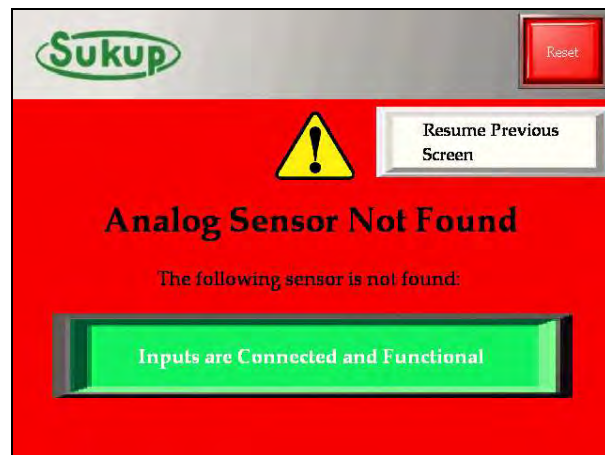
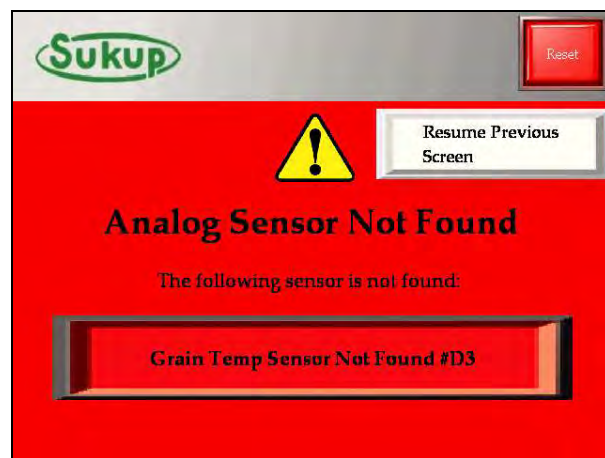
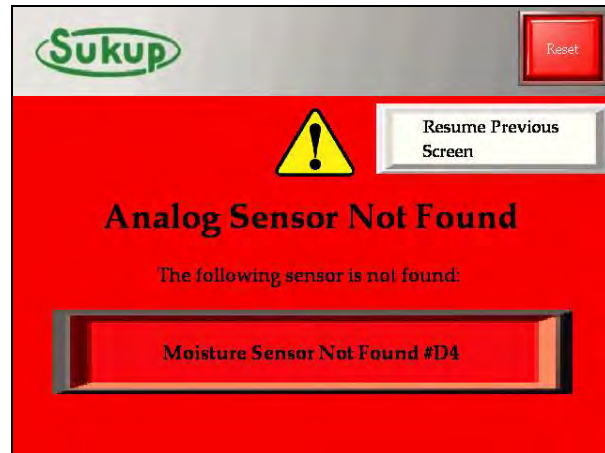
**Diagnosing a Problem:

Each sensor is monitored for voltage. If less than .05VDC is read by the PLC, this error will come up. This either means that the individual sensor is bad, or the connection between the PLC and the sensor needs to be checked. Use a voltmeter to check for voltage and continuity between the PLC, the connection terminals, and the device itself.

SPECIAL NOTE!!!

This is NOT a FAULT. The dryer will not shut down unless the Reset key is pressed.

Pressing the “Resume Previous Screen” button will allow the user to continue using the dryer. This screen will appear every 30 seconds until the sensor has been re-connected.



BASIC OPERATION TIPS

All screens are touch-navigable using the buttons provided on page. When a screen has a GREEN box with a grey border, it indicates that that value is user selectable.

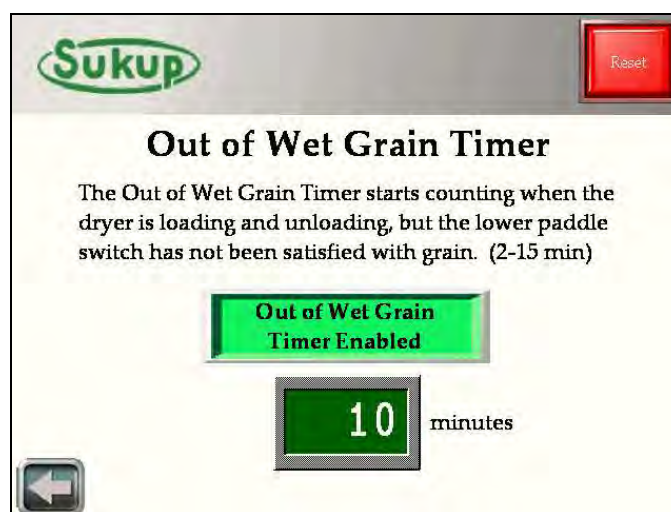
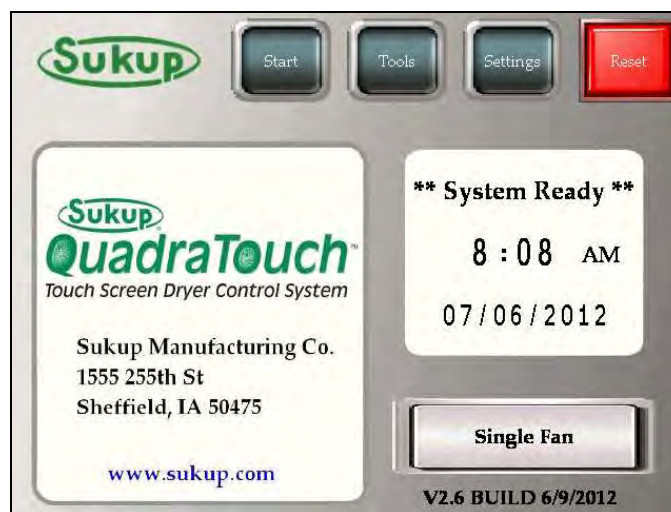
Also available on each screen is a **RESET** key located in the top right-hand corner. If the **RESET** key is pressed at any time, the dryer will shut down all fans, heaters, and augers and return to the main screen. The **RESET** key is never used for program navigation.

If the user is able to return to the previous screen, a back arrow is placed in lower left-hand part of the screen. If the user is deep into a menu, it may be necessary to press the back arrow multiple times to return to the desired screen.

Press-and-Hold Buttons

All buttons that appear burgundy (“OFF” state) in color require you to press and hold that button for a full second before the button’s action will be processed. When these buttons are activated, the button will appear in an “ON” state denoted by depressed button style and a light, neon-green color (like this first image).

The Fill timer and the Out-of-Wet Grain timer are both factory enabled. To turn them off, press and hold the neon-green button, and they will turn burgundy in color (their “OFF” state as in the picture to the right). If the user wishes to turn them on, press and hold the burgundy button until it becomes neon-green in color.



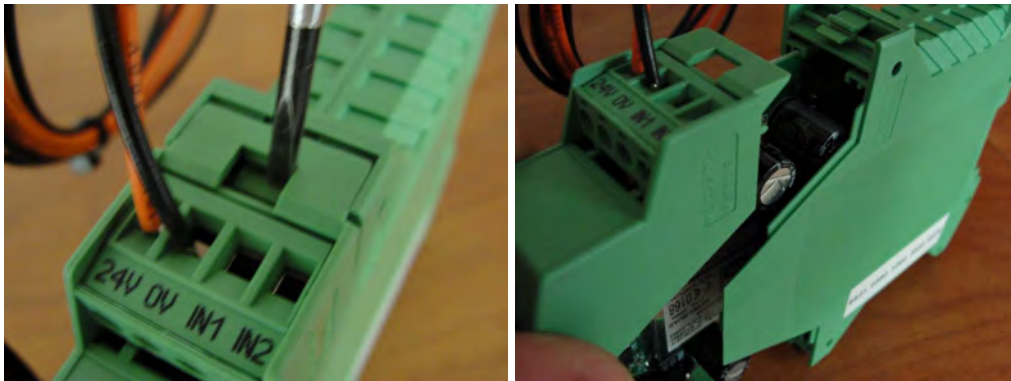
T24999 Kit Install Instructions

IMPORTANT!!!!

To make this modem work, the software version must be V2.02 or greater on both the PLC and HMI. Without this, the modem will not function properly. To get the latest dryer updates, go to <http://www.sukup.com/Products/QuadraTouch>. It's highly recommended to get the latest software to ensure the most current functionality.

1. Check for GSM coverage in your area. AT&T, T-Mobile, and I-Wireless are popular GSM providers, and each offer prepaid plans. Check each one for the best coverage plan.
 - a. You will need to know the 20 digit ICCID# on the provided card
 - b. You may need the 15 digit IMEI# found on the sticker on the side of the side of the GSM modem.
 - c. Activating your SIM card online is usually the easiest, but if you do call, talking to a real person is generally the next best option.
 - d. Prepaid is usually the easiest way to go. Each company has different plans to accommodate your situation. The GSM modem operates with text messages over the **VOICE NETWORK**. **Do not get a data plan. DON'T ADD A LINE if it's not necessary! It will be much less expensive to use the prepaid option.**

The SIM card comes pre-installed into the GSM modem. If for some reason you need to change SIM cards (like in step 7) or need the IMEI#, you may open the modem by pressing in the green tabs with a small screwdriver on top and bottom of the modem. The piece will slide freely outwards as shown.



2. Mount the GSM modem onto the Din Rail. The modem should be mounted in the power box or the auxiliary box.
3. Connect the GSM modem's power wires to terminals 18 (orange) and 95 (black) located at the bottom of the power box.



4. Connect the GSM modem to the PLC with the Serial Interface Cable as shown.



5. To mount the antenna, you'll need to make a 5/8" hole. The hole should go in the top of the power box or the top of the auxiliary box (**typically gives the best reception**), depending of course where you mounted the modem.
6. Mount the antenna, and connect the other end to the GSM modem as shown



7. You are finished. When you power up, you will see the VCC light flashing. After it has started up, the modem will search for a GSM signal. If it finds a signal, you will see a steady flashing or solid light on the NET light (after a couple of minutes). If the NET light is not lit, the SIM card was not properly activated, or there is no GSM signal. You may have to try a different GSM provider if this is the case.

IMPORTANT REMINDER!!!!

To make this modem work, the software version must be V2.02 or greater on both the PLC and HMI. Without this, the modem will not function properly. To get the latest dryer updates, go to <http://www.sukup.com/Products/QuadraTouch>

OPERATION INSTRUCTIONS

The GSM Modem interacts with the PLC by relaying text messages to a preprogrammed number in the touch-panel. In the event of a fault condition, the system will automatically text message that preprogrammed number one time a minute for 10 minutes. It will include the reason for the fault as well as a wire number if applicable.

If you have received the fault message, and do not wish to keep receiving the same message for the next ten minutes, simply send a text response of “00” to the GSM modem.

In addition to receiving text alerts in fault conditions, you can also query the dryer for it's running status. Text message the GSM modem with “1234” and the modem will respond with the dryer's running status including time remaining (if applicable), plenum temperatures, moisture content, grain temperature, and roll speed.

If for some reason you wish to shut the dryer down without being there, we also offer a remote shutdown feature. Text message the GSM modem with “8888” to shut the dryer down remotely. You will not, however, be able to remote start the dryer.

V2.6 software updates allow you to change the plenum temperature setpoint(s) and the discharge moisture setpoint.

Text “P#XXX” to give the dryer a new plenum temperature setpoint.

Example: “P1220” would give plenum 1 (lowest plenum) a new setpoint of 220°.

This command **is not** case sensitive. “P” or “p” will work.

This command will receive an acknowledgement after it has been changed.

Text “MSTXXX” to give the dryer a new discharge moisture setpoint.

Example: “MST145” would give the dryer a new setpoint of 14.5%.

This command **is slightly** case sensitive. “MST”, “Mst”, and “mst” will work.

This command will receive an acknowledgement after it has been changed.

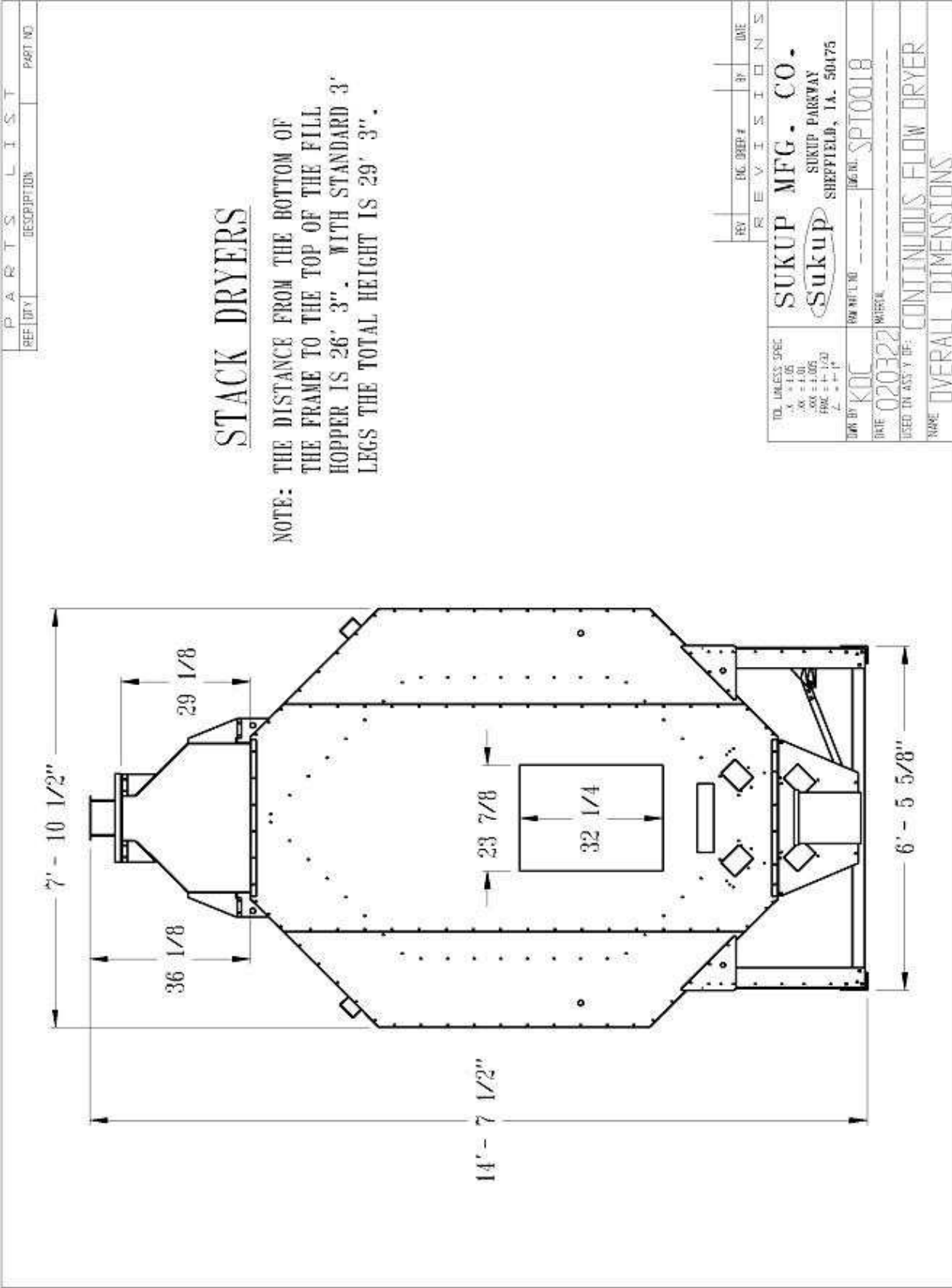
Keep in mind, you can text the dryer from ANY phone with the messages “00” “1234” or “8888” or “P#XXX” or “MSTXXX”. However, only the preprogrammed number in the touch-panel will receive fault condition text message alerts.

SUKUP DRYER CATALOG TECHNICAL DATA

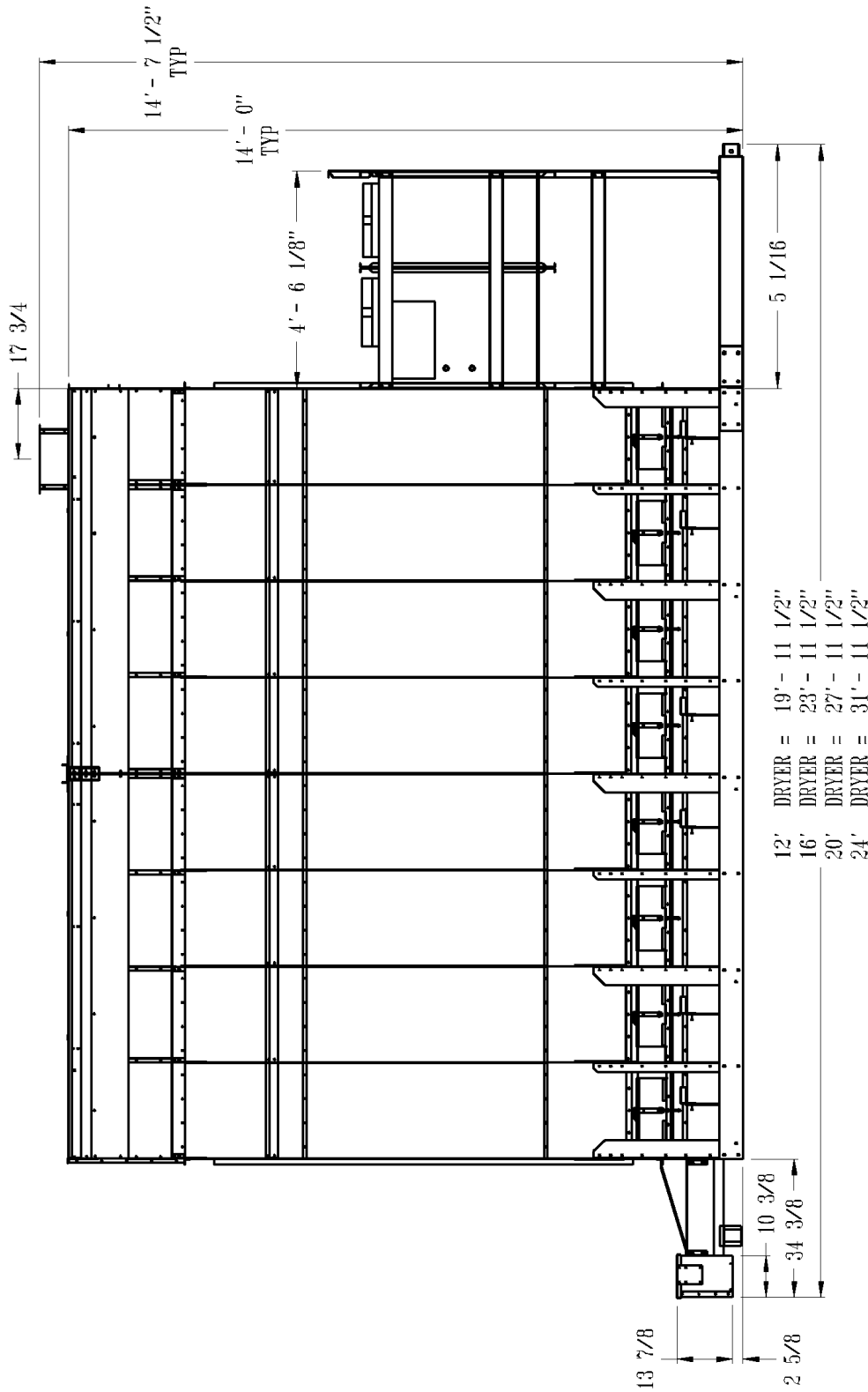
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Dimensional Drawings



PARTS LIST	DESCRIPTION	PART NO.
REF QTY		



TOL. UNLESS SPEC		SUKUP MFG. CO.	
.X = ±.05		SUKUP PARKWAY	
.XX = ±.01		SHEFFIELD, IA. 50475	
.XXX = ±.005			
FRAC. ± 1/32			
.L = ±.1"			
DRAWN BY KDC	DATE 020322	SPT0017	
USED IN ASS'Y OF:	MATERIAL		
NAME	CONTINUOUS FLOW DRYER		
OVERALL DIMENSIONS			

REV	ENG. ORDER #	BY	DATE



SUKUP DRYER SPECIFICATIONS

SINGLE FAN MODELS

PART #	HP	FAN DIAMETER	FUEL	VOLT	PH	PLENUM	10 PT FULL HEAT	5 PT FULL HEAT	10 PT HEAT/COOL	5 PT HEAT/COOL	HOLD CAPACITY	BTU/HR	LOAD HP	UNLOAD HP
T1211A	10-15	38"	LP	230	1	Single	345	560	---	---	330bu	5 mill	3	3
T1211B	10-15	38"	LP	230	3	Single	345	560	---	---	330bu	5 mill	3	3
T1211C	10-15	38"	LP	460	3	Single	345	560	---	---	330bu	5 mill	3	3
T1212A	10-15	38"	NG	230	1	Single	345	560	---	---	330bu	5 mill	3	3
T1212B	10-15	38"	NG	230	3	Single	345	560	---	---	330bu	5 mill	3	3
T1212C	10-15	38"	NG	460	3	Single	345	560	---	---	330bu	5 mill	3	3
T1611A	10-15	44"	LP	230	1	Single	440	710	---	---	440bu	6 mill	3	3
T1611B	10-15	44"	LP	230	3	Single	440	710	---	---	440bu	6 mill	3	3
T1611C	10-15	44"	LP	460	3	Single	440	710	---	---	440bu	6 mill	3	3
T1612A	10-15	44"	NG	230	1	Single	440	710	---	---	440bu	6 mill	3	3
T1612B	10-15	44"	NG	230	3	Single	440	710	---	---	440bu	6 mill	3	3
T1612C	10-15	44"	NG	460	3	Single	440	710	---	---	440bu	6 mill	3	3
T2011B	30	44"	LP	230	3	Single	560	905	---	---	550bu	7 mill	5	5
T2011C	30	44"	LP	460	3	Single	560	905	---	---	550bu	7 mill	5	5
T2012B	30	44"	NG	230	3	Single	560	905	---	---	550bu	7 mill	5	5
T2012C	30	44"	NG	460	3	Single	560	905	---	---	550bu	7 mill	5	5

TWO FAN MODELS

PART #	HP	FAN DIAMETER	FUEL	VOLT	PH	PLENUM	10 PT FULL HEAT	5 PT FULL HEAT	10 PT HEAT/COOL	5 PT HEAT/COOL	HOLD CAPACITY	BTU/HR	LOAD HP	UNLOAD HP
T1631A	(1) 15hp-38", (1) 15hp-28"		LP	230	1	2/3, 1/3	500	820	310	490	440bu	5 mill/3 mill	3	3
T1631B	(1) 15hp-38", (1) 15hp-28"		LP	230	3	2/3, 1/3	500	820	310	490	440bu	5 mill/3 mill	3	3
T1632A	(1) 15hp-38", (1) 15hp-28"		NG	230	1	2/3, 1/3	500	820	310	490	440bu	5 mill/3 mill	3	3
T1632B	(1) 15hp-38", (1) 15hp-28"		NG	230	3	2/3, 1/3	500	820	310	490	440bu	5 mill/3 mill	3	3
T2031A	(1) 15hp-44", (1) 15hp-28"		LP	230	1	2/3, 1/3	600	970	355	580	550bu	6 mill/3 mill	5	5
T2031B	(1) 15hp-44", (1) 15hp-28"		LP	230	3	2/3, 1/3	600	970	355	580	550bu	6 mill/3 mill	5	5
T2032A	(1) 15hp-44", (1) 15hp-28"		NG	230	1	2/3, 1/3	600	970	355	580	550bu	6 mill/3 mill	5	5
T2032B	(1) 15hp-44", (1) 15hp-28"		NG	230	3	2/3, 1/3	600	970	355	580	550bu	6 mill/3 mill	5	5
T2021A	(2) 15hp	38"	LP	230	1	50/50	620	1000	300	470	550bu	(2) 5 mill	5	5
T2021B	(2) 15hp	38"	LP	230	3	50/50	620	1000	300	470	550bu	(2) 5 mill	5	5
T2022A	(2) 15hp	38"	NG	230	1	50/50	620	1000	300	470	550bu	(2) 5 mill	5	5
T2022B	(2) 15hp	38"	NG	230	3	50/50	620	1000	300	470	550bu	(2) 5 mill	5	5
T2431B	(1) 30hp-44", (1) 15hp-28"		LP	230	3	2/3, 1/3	710	1025	435	690	660bu	7 mill/3 mill	5	5
T2432B	(1) 30hp-44", (1) 15hp-28"		NG	230	3	2/3, 1/3	710	1025	435	690	660bu	7 mill/3 mill	5	5
T2421B	(2) 20hp	38"	LP	230	3	50/50	740	1180	350	570	660bu	(2) 5 mill	5	5
T2422B	(2) 20hp	38"	NG	230	3	50/50	740	1180	350	570	660bu	(2) 5 mill	5	5

©2/03/04

STREAMLINE SINGLE FAN MODELS

PART #	HP	FAN DIAMETER	FUEL	VOLT	PH	PLENUM	10 PT FULL HEAT	5 PT FULL HEAT	10 PT HEAT/ COOL	5 PT HEAT/ COOL	HOLD CAPACITY	BTU/HR	LOAD HP	UNLOAD HP
T1213A	10-15	38"	LP	230	1	Single	345	560	---	---	330	5 mill	3	3
T1213B	10-15	38"	LP	230	3	Single	345	560	---	---	330	5 mill	3	3
T1213C	10-15	38"	LP	460	3	Single	345	560	---	---	330	5 mill	3	3
T1214A	10-15	38"	NG	230	1	Single	345	560	---	---	330	5 mill	3	3
T1214B	10-15	38"	NG	230	3	Single	345	560	---	---	330	5 mill	3	3
T1214C	10-15	38"	NG	460	3	Single	345	560	---	---	330	5 mill	3	3
T1613A	10-15	44"	LP	230	1	Single	440	710	---	---	440bu	6 mill	3	3
T1613B	10-15	44"	LP	230	3	Single	440	710	---	---	440bu	6 mill	3	3
T1613C	10-15	44"	LP	460	3	Single	440	710	---	---	440bu	6 mill	3	3
T1614A	10-15	44"	NG	230	1	Single	440	710	---	---	440bu	6 mill	3	3
T1614B	10-15	44"	NG	230	3	Single	440	710	---	---	440bu	6 mill	3	3
T1614C	10-15	44"	NG	460	3	Single	440	710	---	---	440bu	6 mill	3	3
T2013B	30	44"	LP	230	3	Single	560	905	---	---	550bu	7 mill	5	5
T2013C	30	44"	LP	460	3	Single	560	905	---	---	550bu	7 mill	5	5
T2014B	30	44"	NG	230	3	Single	560	905	---	---	550bu	7 mill	5	5
T2014C	30	44"	NG	460	3	Single	560	905	---	---	550bu	7 mill	5	5

Pre-Installation Requirements

Location:

Location of the dryer is a very important decision to make. Numerous factors should be taken into consideration when determining where to install the Dryer. Factors to consider when selecting your site are:

1. Wet grain supply
2. Dry grain discharge
3. Location of storage bins
4. Other grain handling equipment
5. Minimum of 3 feet clearance from other structures on the side of the Dryer and 5 feet minimum clearance from other structures at the fan inlet.
6. Minimize handling distances of load and unload systems
7. Locate Dryer and storage bins in a well drained area
8. Electrical requirements

Warning: Do not install the dryer inside a building or any other area where fuel installation regulations, and or electrical codes, and or insurance requirements do not allow.



Warning: Do not operate the dryer in an area where combustible material can be drawn into the Fan, or where load and unload augers can come in contact with power lines.



Foundation:

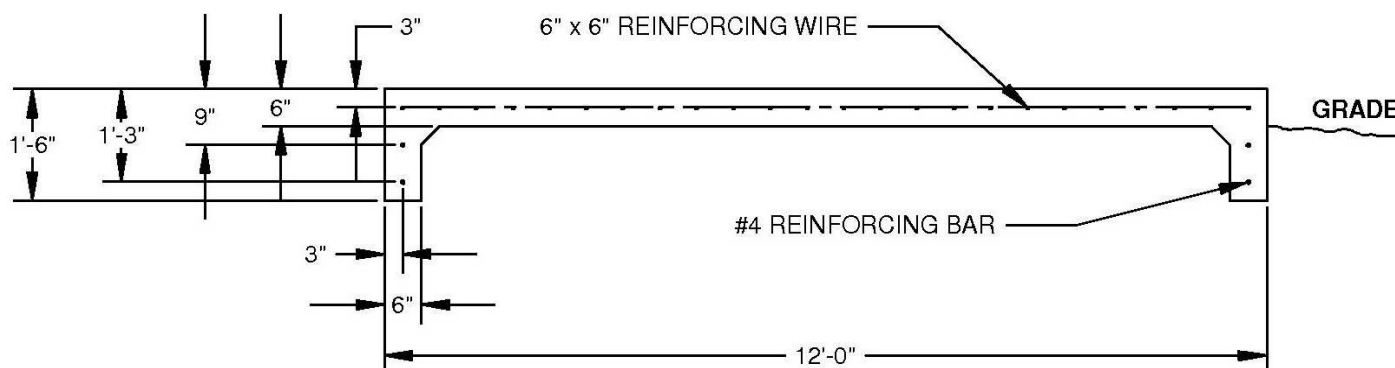
A reinforced concrete pad is recommended for dryer stability.

The following table is a basic guideline for materials required for each size dryer pad.

	Concrete Pad Size	Yards of Concrete
8 Foot Dryer	12' x 18'	5.9
12 Foot Dryer	12' x 22'	7.1
16 Foot Dryer	12' x 26'	8.3
20 Foot Dryer	12' x 30'	9.5
24 Foot Dryer	12' x 34'	10.7
28 Foot Dryer	12' x 38'	11.9

Quantities are approximate and requirements may vary due to site elevations. See the Installation and Pre-operational check out section in the Installation-Service part of the manual for the proper support leg locations for 12, 16, 20, 24, and 28-foot dryers.

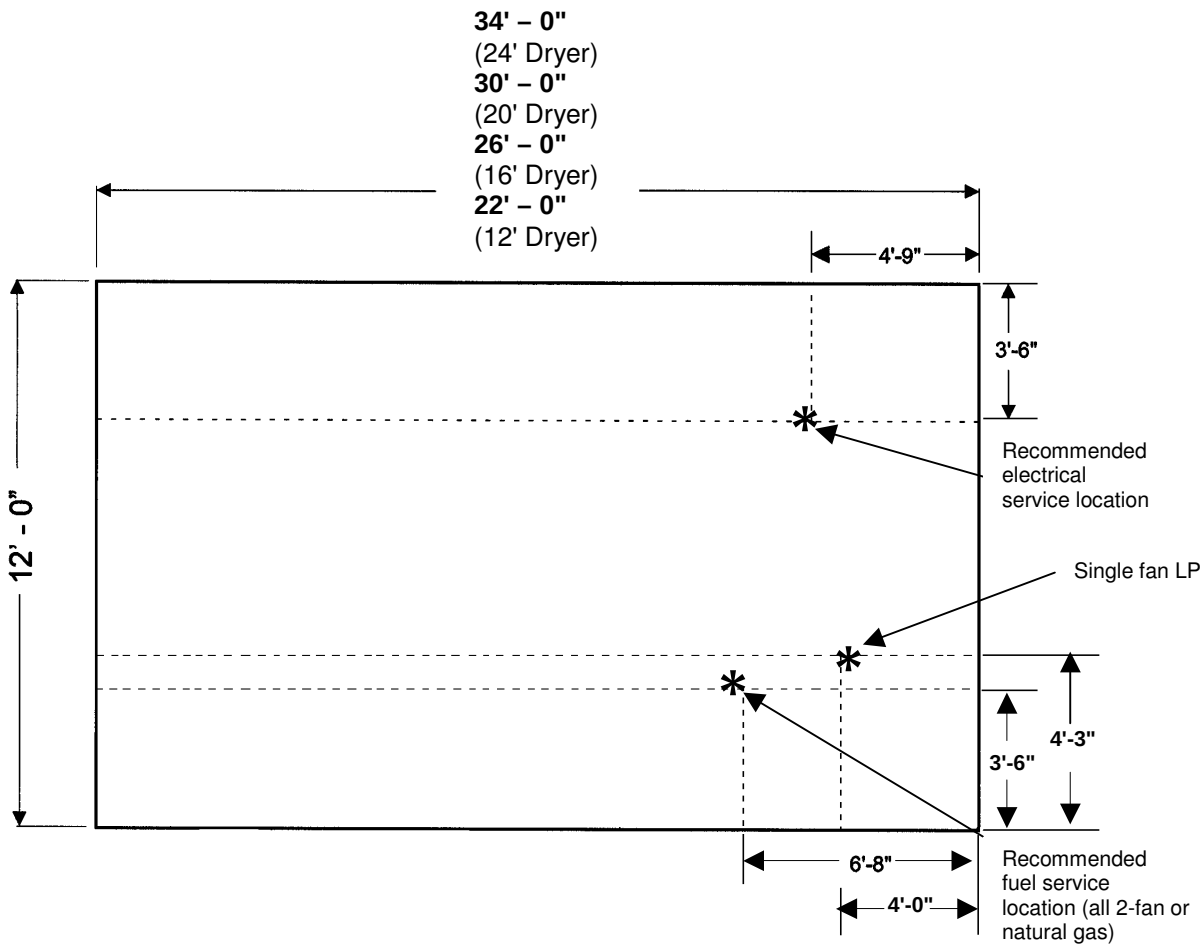
Foundation:



SPT0055
8/10/06DDV

Pre-Installation Requirements (continued)

Plan View
Single Module Dryer



Electrical Load Requirements, Single Module Dryers

Note: A Service-Rated, Fused Disconnect needs to be installed ahead of the Dryer power distribution box. This disconnect is not included with the dryer and should be installed by a qualified electrician.

Caution: The only device connected to this disconnect should be your Grain Dryer.

Note: All current specifications include the Service Factor.

The following charts provide information for the electrician wiring the Grain Dryer. It is recommended that you contact your local Power Company and have a representative inspect the installation to see that your wiring is compatible with their system, and that sufficient power is supplied to your dryer.

Standard electrical safety practices and codes should be used. Refer to the National Electrical Code Standard Handbook by the National Fire Protection Association.

All electrical work should be completed by a qualified electrician.

SINGLE FAN MODELS

T0811A - 8 Foot Dryer – Single Fan/Heater - 230 Volt – 1 Phase (No Auxiliaries Included) **Main Switch = 250 Amps**

	Top Auger H2845	Bottom Auger H2845	Fan 38" H5753	Minimum Amps	Maximum Amps
Motor/Wire	3HP/#10 22 FLA	3HP/#10 22 FLA	15 HP/#2 66 FLA	122 Amps	250 Amps

** See Auxiliary Kits section for options

T1011A – 10 Foot Dryer – Single Fan/Heater - 230 Volt – 1 Phase **Main Switch = 250 Amps**

	Top Auger H2845	Bottom Auger H2845	Fan 38" H5753	Minimum Amps	Maximum Amps
Motor/Wire	3HP/#10 22 FLA	3HP/#10 22 FLA	15 HP/#2 66 FLA	122 Amps	250 Amps

** See Auxiliary Kits section for options

T1211A - 12 Foot Dryer – Single Fan/Heater - 230 Volt – 1 Phase **Main Switch = 250 Amps**

	Top Auger H2845	Bottom Auger H2845	Fan 38" H5755	Minimum Amps	Maximum Amps
Motor/Wire	3HP/#10 22 FLA	3HP/#10 22 FLA	15 HP/#2 62 FLA	122 Amps	250 Amps

** See Auxiliary Kits section for options

T1211B - 12 Foot Dryer – Single Fan / Heater - 230 Volt – 3 Phase **Main Switch = 250 Amps**

	Top Auger H3345	Bottom Auger H3345	Fan 38" H6275	Minimum Amps	Maximum Amps
Motor/Wire	3 HP/#14 9.4 FLA	3 HP/#14 9.4 FLA	15 HP/#6 44 FLA	74 Amps	250 Amps

** See Auxiliary Kits section for options

T1211C - 12 Foot Dryer – Single Fan / Heater - 460 Volt – 3 Phase **Main Switch = 100 Amps**

	Top Auger H3345	Bottom Auger H3345	Fan 38" H6275	Minimum Amps	Maximum Amps
Motor/Wire	3 HP/#14 5.4 FLA	3 HP/#14 5.4 FLA	15 HP/#6 22 FLA	37 Amps	100 Amps

** See Auxiliary Kits section for options

**T1212A - 12 Foot Dryer – Single Fan/Heater - 230 Volt – 1 Phase, Natural Gas
Main Switch = 250 Amps**

	Top Auger H2845	Bottom Auger H2845	Fan 38" H5755	Minimum Amps	Maximum Amps
Motor/Wire	3HP/#10 22 FLA	3HP/#10 22 FLA	15 HP/#2 62 FLA	122 Amps	250 Amps

** See Auxiliary Kits section for options

**T1212B - 12 Foot Dryer – Single Fan / Heater - 230 Volt – 3 Phase, Natural Gas
Main Switch = 250 Amps**

	Top Auger H3345	Bottom Auger H3345	Fan 38" H6275	Minimum Amps	Maximum Amps
Motor/Wire	3 HP/#14 9.4 FLA	3 HP/#14 9.4 FLA	15 HP/#6 44 FLA	74 Amps	250 Amps

** See Auxiliary Kits section for options

**T1212C - 12 Foot Dryer – Single Fan / Heater - 460 Volt – 3 Phase, Natural Gas
Main Switch = 100 Amps**

	Top Auger H3345	Bottom Auger H3345	Fan 38" H6275	Minimum Amps	Maximum Amps
Motor/Wire	3 HP/#14 4.7 FLA	3 HP/#14 4.7 FLA	15 HP/#6 22 FLA	37 Amps	100 Amps

** See Auxiliary Kits section for options

**T1611A - 16 Foot Dryer – Single Fan/Heater - 230 Volt – 1 Phase
Main Switch = 250 Amps**

	Top Auger H2845	Bottom Auger H2845	Fan 44" H5755	Minimum Amps	Maximum Amps
Motor/Wire	3HP/#10 22 FLA	3HP/#10 22 FLA	15 HP/#2 62 FLA	122 Amps	250 Amps

** See Auxiliary Kits section for options

**T1611B - 16 Foot Dryer – Single Fan / Heater - 230 Volt – 3 Phase
Main Switch = 250 Amps**

	Top Auger H3345	Bottom Auger H3345	Fan 44" H6800	Minimum Amps	Maximum Amps
Motor/Wire	3 HP/#14 9.4 FLA	3 HP/#14 9.4 FLA	20 HP/#6 55.2 FLA	131 Amps	250 Amps

** See Auxiliary Kits section for options

**T1611C - 16 Foot Dryer – Single Fan / Heater - 460 Volt – 3 Phase
Main Switch = 100 Amps**

	Top Auger H3345	Bottom Auger H3345	Fan 44" H6800	Minimum Amps	Maximum Amps
Motor/Wire	3 HP/#14 4.7 FLA	3 HP/#14 4.7 FLA	20 HP/#10 27.6 FLA	43 Amps	100 Amps

** See Auxiliary Kits section for options

**T1612A - 12 Foot Dryer – Single Fan/Heater - 230 Volt – 1 Phase, Natural Gas
Main Switch = 250 Amps**

	Top Auger H2845	Bottom Auger H2845	Fan 38" H5755	Minimum Amps	Maximum Amps
Motor/Wire	3HP/#10 22 FLA	3HP/#10 22 FLA	15 HP/#2 62 FLA	122 Amps	250 Amps

** See Auxiliary Kits section for options

**T1612B - 12 Foot Dryer – Single Fan / Heater - 230 Volt – 3 Phase, Natural Gas
Main Switch = 250 Amps**

	Top Auger H3345	Bottom Auger H3345	Fan 38" H6800	Minimum Amps	Maximum Amps
Motor/Wire	3 HP/#14 9.4 FLA	3 HP/#14 9.4 FLA	20 HP/#6 55.2 FLA	74 Amps	250 Amps

** See Auxiliary Kits section for options

**T2011B - 20 Foot Dryer – Single Fan / Heater - 230 Volt – 3 Phase
Main Switch = 250 Amps**

	Top Auger H4190	Bottom Auger H4190	Fan 44" H7125	Minimum Amps	Maximum Amps
Motor/Wire	5 HP/#12 15 FLA	5 HP/#12 15 FLA	30 HP/#3 83 FLA	134 Amps	250 Amps

** See Auxiliary Kits section for options

**T2011C - 20 Foot Dryer – Single Fan / Heater - 460 Volt – 3 Phase
Main Switch = 250 Amps**

	Top Auger H4190	Bottom Auger H4190	Fan 44" H7125	Minimum Amps	Maximum Amps
Motor/Wire	5HP/#12 7.5 FLA	5HP/#12 7.5 FLA	30HP/#10 42 FLA	68 Amps	250 Amps

** See Auxiliary Kits section for options

**T2012B - 20 Foot Dryer – Single Fan / Heater - 230 Volt – 3 Phase, Natural Gas
Main Switch = 250 Amps**

	Top Auger H4190	Bottom Auger H4190	Fan 44" H7125	Minimum Amps	Maximum Amps
Motor/Wire	5 HP/#12 15 FLA	5 HP/#12 15 FLA	30 HP/#3 83 FLA	134 Amps	250 Amps

** See Auxiliary Kits section for options

**T2012C - 20 Foot Dryer – Single Fan / Heater - 460 Volt – 3 Phase, Natural Gas
Main Switch = 250 Amps**

	Top Auger H4190	Bottom Auger H4190	Fan 44" H7125	Minimum Amps	Maximum Amps
Motor/Wire	5HP/#12 7.5 FLA	5HP/#12 7.5 FLA	30HP/#10 42 FLA	68 Amps	250 Amps

** See Auxiliary Kits section for options

**T2411B - 24 Foot Dryer – Single Fan / Heater - 230 Volt – 3 Phase
Main Switch = 250 Amps**

	Top Auger H4190	Bottom Auger H4190	Fan 44" H7125	Minimum Amps	Maximum Amps
Motor/Wire	5 HP/#12 15 FLA	5 HP/#12 15 FLA	40 HP/#3 120 FLA	180 Amps	250 Amps

** See Auxiliary Kits section for options

TWO FAN MODELS

T1631A – 16 Foot Dryer – 2 Fan / Heater 2/3 – 1/3, 230V – 1 Phase

Main Switch = 400 Amps

	Top Auger H2845	Bottom Auger H2845	Upper Fan 38" H5755	Lower Fan 28" H5753	Minimum Amps	Maximum Amps
Motor/Wire	3HP/#10 22 FLA	3HP/#10 22 FLA	10-17HP/#3 62 FLA	10-15HP/#4 66 FLA	189 Amps	400 Amps

** See Auxiliary Kits section for options

T1631B – 16 Foot Dryer – 2 Fan / Heater 2/3 – 1/3, 230V – 3 Phase

Main Switch = 250 Amps

	Top Auger H3345	Bottom Auger H3345	Upper Fan 38" H6275	Lower Fan 28" H3345	Minimum Amps	Maximum Amps
Motor/Wire	3 HP/#14 9.4 FLA	3 HP/#14 9.4 FLA	15HP/#6 44 FLA	15HP/#6 40 FLA	114 Amps	250 Amps

** See Auxiliary Kits section for options

T1631C – 16 Foot Dryer – 2 Fan / Heater 2/3 – 1/3, 460V – 3 Phase

Main Switch = 100 Amps

	Top Auger H3345	Bottom Auger H3345	Upper Fan 38" H6275	Lower Fan 28" H5758	Minimum Amps	Maximum Amps
Motor/Wire	3 HP/#10 4.7 FLA	3HP/#10 4.7 FLA	10-17HP/#3 22 FLA	10-15HP/#4 20 FLA	57 Amps	100 Amps

** See Auxiliary Kits section for options

T1632A – 16 Foot Dryer – 2 Fan / Heater 2/3 – 1/3, 230V – 1 Phase, Natural Gas

Main Switch = 400 Amps

	Top Auger H2845	Bottom Auger H2845	Upper Fan 38" H5755	Lower Fan 28" H5753	Minimum Amps	Maximum Amps
Motor/Wire	3HP/#10 22 FLA	3HP/#10 22 FLA	10-17HP/#3 62 FLA	10-15HP/#4 66 FLA	189 Amps	400 Amps

** See Auxiliary Kits section for options

T1632B – 16 Foot Dryer – 2 Fan / Heater 2/3 – 1/3, 230V – 3 Phase, Natural Gas

Main Switch = 250 Amps

	Top Auger H3345	Bottom Auger H3345	Upper Fan 38" H3275	Lower Fan 28" H5758	Minimum Amps	Maximum Amps
Motor/Wire	3 HP/#14 9.4 FLA	3 HP/#14 9.4 FLA	15HP/#6 44 FLA	15HP/#6 40 FLA	114 Amps	250 Amps

** See Auxiliary Kits section for options

T2021A - 20 Foot Dryer – 2 Fan / 2 Heater - 230 Volt – 1 Phase – 50/50 split plenum

Main Switch = 400 Amps

	Top Auger H3675	Bottom Auger H3675	Upper Fan 38" H5755	Lower Fan 38" H5755	Minimum Amps	Maximum Amps
Motor/Wire	5HP/#10 24 FLA	5HP/#10 24 FLA	15HP/#2 62 FLA	15HP/#2 62 FLA	188 Amps	400 Amps

** See Auxiliary Kits section for options

T2021B - 20 Foot Dryer – 2 Fan / 2 Heater - 230 Volt – 3 Phase – 50/50 split plenum

Main Switch = 250 Amps

	Top Auger H4190	Bottom Auger H4190	Upper Fan 38" H6275	Lower Fan 38" H6275	Minimum Amps	Maximum Amps
Motor/Wire	5 HP/#12 15 FLA	5 HP/#12 15 FLA	15HP/#6 44 FLA	15HP/#6 44 FLA	129 Amps	250 Amps

** See Auxiliary Kits section for options

**T2021C - 20 Foot Dryer – 2 Fan / 2 Heater - 460 Volt – 3 Phase – 50/50 split plenum
Main Switch = 250 Amps**

	Top Auger H4190	Bottom Auger H4190	Upper Fan 38" H6275	Lower Fan 38" H6275	Minimum Amps	Maximum Amps
Motor/Wire	5HP/#12 7.5 FLA	5HP/#12 7.5 FLA	15HP/#10 22 FLA	15HP/#10 22 FLA	65 Amps	250 Amps

** See Auxiliary Kits section for options

**T2022B - 20 Foot Dryer – 2 Fan / 2 Heater - 230 Volt – 3 Phase – 50/50 split plenum, NG
Main Switch = 250 Amps**

	Top Auger H4190	Bottom Auger H4190	Upper Fan 38" H6275	Lower Fan 38" H6275	Minimum Amps	Maximum Amps
Motor/Wire	5 HP/#12 15 FLA	5 HP/#12 15 FLA	15HP/#6 44 FLA	15HP/#6 44 FLA	129 Amps	250 Amps

** See Auxiliary Kits section for options

**T2022C - 20 Foot Dryer – 2 Fan / 2 Heater - 460 Volt – 3 Phase – 50/50 split plenum, NG
Main Switch = 250 Amps**

	Top Auger H4190	Bottom Auger H4190	Upper Fan 38" H6275	Lower Fan 38" H6275	Minimum Amps	Maximum Amps
Motor/Wire	5HP/#12 7.5 FLA	5HP/#12 7.5 FLA	15HP/#10 22 FLA	15HP/#10 22 FLA	65 Amps	250 Amps

** See Auxiliary Kits section for options

**T2031A – 20 Foot Dryer – 2 Fan / Heater 2/3 – 1/3, 230V – 1 Phase
Main Switch = 400 Amps**

	Top Auger H3675	Bottom Auger H3675	Upper Fan 38" H5755	Lower Fan 28" H5753	Minimum Amps	Maximum Amps
Motor/Wire	5 HP/#10 24 FLA	5HP/#10 24 FLA	10-17HP/3 62 FLA	10-15HP/4 66 FLA	193 Amps	400 Amps

** See Auxiliary Kits section for options

**T2031B – 20 Foot Dryer – 2 Fan / Heater 2/3 – 1/3, 230V – 3 Phase
Main Switch = 250 Amps**

	Top Auger H4190	Bottom Auger H4190	Upper Fan 44" H6275	Lower Fan 28" H5758	Minimum Amps	Maximum Amps
Motor/Wire	5 HP/#12 15 FLA	5 HP/#12 15 FLA	15HP/#6 44 FLA	15HP/#6 40 FLA	125 Amps	250 Amps

** See Auxiliary Kits section for options

**T2031C - 20 Foot Dryer – 2 Fan / Heater 2/3 – 1/3, 460 Volt – 3 Phase
Main Switch = 100 Amps**

	Top Auger H4190	Bottom Auger H4190	Upper Fan 44" H6275	Lower Fan 28" H5758	Minimum Amps	Maximum Amps
Motor/Wire	5HP/#12 7.5 FLA	5HP/#12 7.5 FLA	15HP/#10 22 FLA	15HP/#10 20 FLA	63 Amps	100 Amps

** See Auxiliary Kits section for options

**T2032A – 20 Foot Dryer – 2 Fan / Heater 2/3 – 1/3, 230V – 1 Phase, Natural Gas
Main Switch = 400 Amps**

	Top Auger H3675	Bottom Auger H3675	Upper Fan 38" H5755	Lower Fan 28" H5753	Minimum Amps	Maximum Amps
Motor/Wire	5 HP/#10 24 FLA	5HP/#10 24 FLA	10-17HP/3 62 FLA	10-15HP/4 66 FLA	193 Amps	400 Amps

** See Auxiliary Kits section for options

T2032B - 20 Foot Dryer – 2 Fan / Heater 2/3 – 1/3, 230 Volt – 3 Phase, Natural Gas
Main Switch = 250 Amps

	Top Auger H4190	Bottom Auger H4190	Upper Fan 44” H6275	Lower Fan 28” H5758	Minimum Amps	Maximum Amps
Motor/Wire	5 HP/#12 15 FLA	5 HP/#12 15 FLA	15HP/#6 44 FLA	15HP/#6 40 FLA	125 Amps	250 Amps

** See Auxiliary Kits section for options

T2032C - 20 Foot Dryer – 2 Fan / Heater 2/3 – 1/3, 460 Volt – 3 Phase, Natural Gas
Main Switch = 100 Amps

	Top Auger H4190	Bottom Auger H4190	Upper Fan 44” H6275	Lower Fan 28” H5758	Minimum Amps	Maximum Amps
Motor/Wire	5HP/#12 7.5 FLA	5HP/#12 7.5 FLA	15HP/#10 22 FLA	15HP/#10 20 FLA	63 Amps	100 Amps

** See Auxiliary Kits section for options

T2421B - 24 Foot Dryer – 2 Fan / 2 Heater - 230 Volt – 3 Phase – 50/50 split plenum
Main Switch = 250 Amps

	Top Auger H4190	Bottom Auger H4190	Upper Fan 38” H6800	Lower Fan 38” H6800	Minimum Amps	Maximum Amps
Motor/Wire	5 HP/#12 15 FLA	5 HP/#12 15 FLA	20 HP/#6 55 FLA	20 HP/#6 65 FLA	168 Amps	250 Amps

** See Auxiliary Kits section for options

T2421C - 24 Foot Dryer – 2 Fan / 2 Heater - 460 Volt – 3 Phase – 50/50 split plenum
Main Switch = 250 Amps

	Top Auger H4190	Bottom Auger H4190	Upper Fan 38” H6800	Lower Fan 38” H6800	Minimum Amps	Maximum Amps
Motor/Wire	5HP/#12 7.5 FLA	5HP/#12 7.5 FLA	20 HP/#10 28 FLA	20 HP/#10 28 FLA	78 Amps	250 Amps

** See Auxiliary Kits section for options

T2422B - 24 Foot Dryer – 2 Fan / 2 Heater - 230 Volt – 3 Phase – 50/50 split plenum
Main Switch = 250 Amps

	Top Auger H4190	Bottom Auger H4190	Upper Fan 38” H6800	Lower Fan 38” H6800	Minimum Amps	Maximum Amps
Motor/Wire	5 HP/#12 15 FLA	5 HP/#12 15 FLA	20 HP/#6 55 FLA	20 HP/#6 65 FLA	168 Amps	250 Amps

** See Auxiliary Kits section for options

T2431B – 24 Foot Dryer – 2 Fan / 2 Heater – 230 Volt – 3 Phase – 2/3-1/3 split plenum
Main Switch = 250 Amps

	Top Auger H4190	Bottom Auger H4190	Upper Fan 44” H7125	Lower Fan 38” H5758	Minimum Amps	Maximum Amps
Motor/Wire	5 HP/#12 15 FLA	5 HP/#12 15 FLA	30 HP/#3 83 FLA	15 HP/#6 40FLA	174 Amps	250 Amps

** See Auxiliary Kits section for options

T2431C – 24 Foot Dryer – 2 Fan / 2 Heater – 460 Volt – 3 Phase – 2/3-1/3 split plenum
Main Switch = 250 Amps

	Top Auger H4190	Bottom Auger H4190	Upper Fan 44” H7125	Lower Fan 38” H5758	Minimum Amps	Maximum Amps
Motor/Wire	5 HP/#14 7.5 FLA	5 HP/#14 7.5 FLA	30 HP/#6 42 FLA	15 HP/#10 20 FLA	88 Amps	250 Amps

** See Auxiliary Kits section for options

**T2432B – 24 Foot Dryer – 2 Fan / 2 Heater – 230 Volt – 3 Phase – 2/3-1/3 split plenum, NG
Main Switch = 250 Amps**

	Top Auger H4190	Bottom Auger H4190	Upper Fan 44” H7125	Lower Fan 38” H5758	Minimum Amps	Maximum Amps
Motor/Wire	5 HP/#12 15 FLA	5 HP/#12 15 FLA	30 HP/#3 83 FLA	15 HP/#6 40FLA	174 Amps	250 Amps

** See Auxiliary Kits section for options

**T2432C – 24 Foot Dryer – 2 Fan / 2 Heater – 460 Volt – 3 Phase – 2/3-1/3 split plenum, NG
Main Switch = 250 Amps**

	Top Auger H4190	Bottom Auger H4190	Upper Fan 44” H7125	Lower Fan 38” H5758	Minimum Amps	Maximum Amps
Motor/Wire	5 HP/#14 7.5 FLA	5 HP/#14 7.5 FLA	30 HP/#6 42 FLA	15 HP/#10 20 FLA	88 Amps	250 Amps

** See Auxiliary Kits section for options

**T2831B – 28 Foot Dryer – 2 Fan / 2 Heater – 230 Volt – 3 Phase – 2/3-1/3 split plenum
Main Switch = 400 Amps**

	Top Auger H4910	Bottom Auger H4910	Upper Fan 44” H7125	Lower Fan 38” H5758	Minimum Amps	Maximum Amps
Motor/Wire	7.5 HP/#12 22 FLA	7.5 HP/#12 22 FLA	30 HP/#4 83 FLA	20 HP/#6 40 FLA	188 Amps	400 Amps

** See Auxiliary Kits section for options

**T2831C – 28 Foot Dryer – 2 Fan / 2 Heater – 460 Volt – 3 Phase – 2/3-1/3 split plenum
Main Switch = 250 Amps**

	Top Auger H4910	Bottom Auger H4910	Upper Fan 44” H7125	Lower Fan 38” H6758	Minimum Amps	Maximum Amps
Motor/Wire	7.5 HP/#14 11 FLA	7.5 HP/#14 11 FLA	30 HP/#10 42 FLA	20 HP/#12 20 FLA	95 Amps	250 Amps

MOTOR DATA

COMP #	DESCRIPTION	MFG.	CAT. #	HP	PH	VOLTAGE	AMP	SERVICE FACTOR	RPM	HZ	FRAME	ENCLOSURE	SHAFT DIA.	LBS.
H0045	Spreadway	Leeson	100558	0.5	1	115	7.4	1.00	1725	60	N48Z	TENV	0.625	20
H0160	Farm Duty	Leeson	110086	0.5	1	115/208-230	8.8/4.4	1.15	1725	60	C56	TEFC	0.625	25
H0350	Spreadway	Leeson	110032	0.5	3	208-230/460	1.8/0.9	1.15	1725	60	D56	TENV	0.625	21
H0700	VA Fan	Baldor	AFL3520A	0.75	1	115/230	11/5.5	1.00	3450	60	56Z	TEAO	0.625	25
H0700	VA Fan	Leeson	111332	0.75	1	115/230	10/5	1.00	3450	60	E56Z	TENV	0.875	27
H0725	Spreadway	Leeson	110013	0.75	1	115/208-230	10.8/5.4	1.15	1725	60	D56	TEFC	0.625	32
H0726	Motor	Leeson	110065	0.75	1	110/220	11.8/5.9	1.00	1425	50	E56	TEFC	0.625	35
H0820	Spreadway	Leeson	114309	0.75	3	208-230/460	2.5/1.25	1.15	1725	60	E56	TENV	0.625	33
H0950	VA Fan	Baldor	AFM3528	0.75	3	230/460	2.6/1.3	1.00	3450	60	56Z	TEAO	0.625	21
H1000	VA Fan	Leeson	111333	1	1	115/230	12/6	1.00	3450	60	56Z	TENV	0.625	32
H1050	VA Fan	Baldor	AFM3529	1	3	230/460	3.6/1.8	1.25	3450	60	56Z	TEAO	0.625	23
H1050	VA Fan	Leeson	111335	1	3	208-230/460	3.4-3.2/1.6	1.00	3450	60	56Z	TENV	0.625	25
H1100	Auger	Leeson	110088	1	1	115/208-230	14/7	1.15	1725	60	E56	TEFC	0.625	33
H1150	Farm Duty	Leeson	110035	1	3	208-230/460	3.6-3.8/1.9	1.15	1725	60	D56	TEFC	0.625	25
H1425	Stirup	Leeson	110230	1.5	1	115/230	17.2/8.6	1.00	1725	60	G56Z	TEFC	0.875	42
H1525	Farm Duty	Leeson	110089	1.5	1	115/208-230	17.2/8.8-8.6	1.15	1725	60	56H	TEFC	0.625	44
H1530	Farm Duty	Leeson	G120015	1.5	3	208-230/460	4.5-4.4/2.2	1.15	1740	60	F145T	TEFC	0.825	39
H1540	Roof Vent	Leeson	110444	1.5	3	208-230/460	5/2.5	1.15	1725	60	E56	TEFC	0.625	33
H1605	VA Fan	Leeson	111949	1.5	1	115/208-230	17/8.5	1.00	3450	60	56Z	TENV	0.625	35
H1745	Stirway	Leeson	110235	1.5	3	230-190/460-380	5.2-5.6/2.6-2.8	1.00	1725/1425	60/50	56Y	IP54	0.875	39
H1900	VA Fan	Leeson	120377	1.5	3	208-230/460	4.4-4.2/2.1	1.00	3450/2850	60/50	143T2	TENV	0.875	34
H1950	VA Fan	Baldor	M7018T	1.5	3	208-230/460	5-4.6/2.3	1.00	3450	60	143T	XPFC	0.875	42
H2000	VA Fan	Leeson	120375	2	1	230	10	1.00	3450	60	145T2	TENV	0.875	44
H2010	Air System	Leeson	120102	2	1	115/208-230	20/10	1.15	3450	60	F145TC	TEFC	0.875	35
H2020	Air System	Leeson	120061	2	3	208-230/460	5.6/2.8	1.00	3450	60	F145TC	TEFC	0.875	35
H2050	VA Fan	Leeson	120378	2	3	208-230/460	5.8-5.6/2.8	1.00	3450	60	145T2	TENV	0.875	37
H2125	Stirway	Leeson	110684	2	1	230	9.2	1.00	1725	60	56HZ	TEFC	0.875	49
H2170	Farm Duty	Leeson	110090	2	1	230	9.2	1.15	1725	60	56HZ	TEFC	0.875	46
H2175	Farm Duty	Leeson	131541	2	1	115/208-230	24.8/13-12.4	1.15	1740	60	JX182T	TEFC	1.125	61
H2475	Auger	Leeson	G120016	2/1.5	3	208-230/190/460/380	6-5.6/5.2/2.8/2.6	1.15	1740/1440	60/50	145T	TEFC	0.875	49
H2845	Farm Duty	Leeson	131542	3	1	230	19	1.15	1740	60	NX184T	TEFC	1.125	86
H2885	C Fan	Leeson	131534	3	1	115/230	33.8/16.9	1.15	1740	60	LX184T	DP	1.125	76
H2945	VA Fan	Leeson	120376	3	1	230	12.8	1.00	3450	60	145T	TENV	0.875	48
H3000	VA Fan	Leeson	120379	3	3	208-230/460	8.4/7.6/3.8	1.00	3450	60	145T	TENV	0.875	41
H3005	VA Fan	MagneTek	R155	3-4	3	230/460	8.4/4.2	1.00	3450	60	L145T	TEAO	0.875	
H3100	C Fan	Leeson	131637	3	1	115/208-230	26.8/14.4/13.4	1.15	3500	60	KX182T	TEFC	1.125	81
H3150	C Fan	Leeson	130099	3	3	230/460	9/4.5	1.00	3475	60	182T	TEFC	1.125	48
H3245	C Fan	Leeson	131458	3	3	208-230/460	8.8/4.4	1.15	1740	60	GX182T	ODP	1.125	58
H3345	Auger	Leeson	G130008	3	3	208-230/460	8.8-8.2/4.1	1.15	1760	60	HX182T	TEFC	1.125	73
H3500	Inline & Ch VA	Leeson	112046	4.5	1	230	18.6	1.00	3450	60	J56HZ	TENV	0.875	50
H3510	Inline Fan	Leeson	114941	4.5	3	230/460	11.4/5.7	1.00	3450	60	J56HZ	TENV	0.875	37
H3675	Farm Duty	Leeson	131543	5	1	230	20.5	1.15	1740	60	RX184T	TEFC	1.125	98
H3790	C Fan	Leeson	131537	5	1	230	21	1.15	1740	60	MX184T	ODP	1.125	82

MOTOR DATA

COMP #	DESCRIPTION	MFG.	CAT. #	HP	PH	VOLTAGE	AMP	SERVICE FACTOR	RPM	HZ	FRAME	ENCLOSURE	SHAFT DIA.	LBS.
H3900	C Fan	Leeson	131549	5	1	230	19.8	1.15	3450	60	PX184T	TEFC	1.125	107
H3950	C Fan	Leeson	G130101	5	3	208-230/460	12.8-12/6	1.15	3510	60	JX184T	TEFC	1.125	100
H4110	C Fan	Leeson	G130004	5	3	208-230/460	13.2/6.6	1.15	1760	60	KX184T	DP	1.125	69
H4190	Foreway & Auger	Leeson	G130027	5	3	208-230/460	13.8-13/6.5	1.15	1750	60	KX184T	TEFC	1.125	83
H4395	VA Fan	Baldor	UCL570	5-7	1	230	35	1.00	3450	60	182TZ	OPEN	1.125	93
H4395	VA Fan	Leeson	13847	5-7	1	230	27.2-35	1.00	3450	60	182TZ	DP	1.125	94
H4430	VA Fan	Baldor	UCM575	5-7	3	230/460	19.9/5	1.00	3450	60	184TZ	AODP	1.125	67
H4431	C Fan	Baldor	M3219T	7.5	3	208-230/460	19-17/8.5	1.15	3450	60	184T	OPSB	1.125	81
H4625	C Fan	Leeson	140155	7.5	1	230	36	1.15	1740	60	215T	DP	1.375	116
H4700	C Fan	Baldor	L3709T	7.5	1	208-230	36-33	1.00	3450	60	213T	TEFC	1.375	121
H4750	C Fan	Leeson	G130103	7.5	3	208-230/460	17.6-16.8/8.4	1.15	3505	60	MX213T	TEFC	1.375	150
H4800	C Fan	Leeson	G150142.60	7.5	3	208-230/460	23.2-21.6/10.8	1.15	1765	60	213T	ODP	1.375	147
H4900	Auger	Leeson	140130	7.5	1	230	33.6	1.15	1740	60	215T	TEFC	1.375	147
H4910	Auger	Leeson	G150157.60	7.5	3	208-230/460	20.4-19.2/9.6	1.15	1760	60	213T	TEFC	1.375	153
H5022	VA Fan	Baldor	UCL710	7-10	1	230	31-42	1.00	3450	60	182TZ	OPEN	1.125	95
H5055	VA Fan	Baldor	UCM713	7-10	3	208-230/460	25-24/12	1.00	3450	60	184TZ	OPEN	1.125	90
H5055	VA Fan	Leeson	131850	7.5-10	3	208-230/460	27-24.2/12.1	1.00	3450	60	184TZ	DP	1.125	88
H5175	C Fan	Lincoln	LM31754AA	10	1	230	40	1.25	1740	60	215TY	DP	1.375	160
H5176	C Fan	Baldor	GDL1610T	10	1	230	40	1.00	1725	60	215TZ	ODTF	1.375	174
H5300	C Fan	Leeson	140414	10	1	230	40	1.15	1740	60	215T	TEFC	1.375	156
H5310	C Fan	Leeson	G150140.60	10	3	208-230/460	27-24.6/12.3	1.15	1760	60	215T	TEFC	1.375	176
H5400	C Fan	Baldor	L3711T	10	1	230	40	1.00	3450	60	215T	TEFC	1.375	
H5450	C Fan	Leeson	G150159.60	10	3	208-230/460	26-23.6/11.8	1.15	3450	60	215T	TEFC	1.375	168
H5475	C Fan	Leeson	140772	10	3	208-230/460	33.2/16.6	1.25	1760	60	215TZ	DP	1.375	150
H5501	Motor	Baldor	GDM3313T	10	3	208-230/460	30-28/14	1.15	1725	60	215TZ	OPEN	1.375	122
H5753	VA Fan	Baldor	37E765Y966	10-15	1	230	43-65	1.00	1725	60	215Z	OPAO	1.125	135
H5755	VA Fan	Baldor	39E179X522G1	10-17	1	230	39-62	1.00	1760	60	256TZ	OPEN	1.625	288
H5758	VA FAN	Baldor	37E766Z064	15	3	208-230/460	42.6-40/20	1.00	1725	60	215	OPSB	1.125	105
H5759	VA Fan	Baldor	37E766T654	10-15	3	575	13.7-17.5	1.00	1725	60	215Z	OPEN	1.125	105
H5760	VA Fan	Baldor	UCL1015	10-15	1	230	44-55	1.00	3450	60	215TZ	OPEN	1.125	134
H5775	VA Fan	Baldor	UCM1014	10-15	3	208-230/460	38-36/18	1.00	3450	60	215Z	OPEN	1.125	101
H5775X	VA Fan	Baldor	M3713T-5	15	3	575	13.5	1.00	3450	60	215T	TEFC		
H6030	C Fan	Baldor	GDL1615T	16	1	230	62	1.00	1760	60	256TZ	OPEN	1.625	288
H6035	Auger	Baldor	39N042W971	15	1	230	63	1.00	1725	60	256T	TEFC	1.625	322
H6100	C Fan	Leeson	150116.60	15	3	575	14.8	1.15	1750	60	254T	TEFC	1.625	294
H6110	C Fan	Leeson	G150086.60	15	3	208-230/460	39.2-36.6/18.3	1.15	1765	60	254T	TEFC	1.625	277
H6250	C Fan	Leeson	151317.60	15	3	208-230/460	38-36/18	1.15	3500	60	215T	TEFC	1.375	200
H6275	C Fan	Leeson	G151540.60	15	3	208-230/460	40.5-37.6/18.8	1.15	1765	60	254T	ODP	1.625	265
H6277	C Fan	Baldor	GDM2513T	15	3	230/460	39/19.5	1.15	1760	60	245TZ	OPEN	1.625	172
H6610	Auger	Leeson	G150007.60	20	3	208-230/460	52-48.2/24.1	1.15	1755	60	256T	TEFC	1.625	321
H6758	VA Fan	Baldor	37K221Y299	20	3	230/460	44/22	1.25	3450	60	215TZ	OPSB	1.125	120
H6775	C Fan	Leeson	G150033.60	20	3	208-230/460	51.3-46.2/23.1	1.15	3540	60	256T	TEFC	1.625	296
H6800	C Fan	Leeson	G151541.60	20	3	208-230/460	52.7-48/24	1.15	1765	60	256T	ODP	1.625	307

MOTOR DATA

COMP #	DESCRIPTION	MFG.	CAT. #	HP	PH	VOLTAGE	AMP	SERVICE FACTOR	RPM	HZ	FRAME	ENCLOSURE	SHAFT DIA.	LBS.
H6801	C Fan	Baldor	GDM2515T	20	3	230/460	53/26.5	1.15	1760	60	254TZ	OPEN	1.625	165
H7050	VA Fan	Leeson	150117.60	20	3	575	19.2	1.15	1750	60	256T	TEFC	1.625	377
H7100	Material Handling	Leeson	G150011.60	25	3	208-230/460	63.4-58.8/29.4	1.25	1775	60	284T	TEFC	1.875	380
H7101	Material Handling	Leeson	150118.60	25	3	575	24	1.15	1750	60	284T	TEFC	1.875	400
H7125	C Fan	Leeson	G151542.60	30	3	208-230/460	77-72/36	1.15	1775	60	286T	ODP	1.875	434
H7126	Auger	Leeson	G150015.60	30	3	208-230/460	73.5-69.8/34.9	1.25	1775	60	286T	TEFC	1.875	428
H7127	C Fan	Leeson	150119.60	30	3	575	28	1.15	1760	60	286T	TEFC	1.875	421
H7175	C Fan	Leeson	G150017.60	40	3	208-230/460	105-96/48	1.25	1775	60	324T	ODP	2.125	528
H7200	Auger	Leeson	G150019.60	40	3	208-230/460	95.2/47.6	1.15	1775	60	324T	TEFC	2.125	528
H7205	C Fan	Leeson	150021.60	50	3	208-230/460	129.6-120/60	1.15	1780	60	326T	ODP	2.125	612
H7250	Air System	Leeson	G150023	50	3	230/460	117.8/58.9	1.15	1750	60	326T	TEFC	2.125	561
H7260	Air Systm/Twr Dryr	Leeson	G150027.60	60	3	208-230/460	153-138/69	1.25	1780	60	364T	TEFC	2.375	687
H7275	Air System	Leeson	G150031	75	3	208-230/460	187-173/86.5	1.15	1750	60	365T	TEFC	2.375	723
H7350	C Fan	Leeson	150037.60	30	3	208-230/460	76.4-69.2/34.6	1.15	3450	60	286T	TEFC	1.625	375
H7400	C Fan	Leeson	150039.60	40	3	208-230/460	100-92/46	1.15	3450	60	324TS	TEFC	1.875	554
H7450	C Fan	Baldor	M4114T	50	3	230/460	110/55	1.15	3450	60	326TS	TEFC	1.875	550
H7450	C Fan	Leeson	G150041.60	50	3	230/460	112/56	1.15	3450	60	326TS	TEFC	1.875	531
H7510	Tower Dryer	Leeson	G150087	100	3	208-230/460	250-229/114.5	1.25	1785	60	405T	TEFC	2.875	1050
H7511	Material Handling	Leeson	G151369.60	125	3	460	139	1.25	1790	60	444T	TEFC	3.375	1940
H7512	Material Handling	Leeson	G151371.60	150	3	460	169	1.25	1790	60	445T	TEFC	3.375	1920
H7513	Material Handling	Leeson	G150352.60	200	3	460	223	1.15	1790	60	447T	TEFC	3.375	2073

Auxiliary Load and Unload Kits (Optional):

Dryers may be equipped with auxiliary load and / or unload motor starters / overloads. These are available as a kit and can only be field installed.

From the chart below, use HP, Voltage and Phase to determine the correct auxiliary kit number.

Field-Installed Kits

HP	Voltage	Phase	Part No.	Starter/Protector	Contactor	Wire Size	Min Amps	Max Amps
5	230	1	T4270	J5230 (16-25A)	J52462 (40A)	#6	16	25
5	230	3	T4620	J4243 (13-18A)	J52462 (40A)	#8	13	18
5	460	3	T4621	J5236 (6-10A)	J52462 (40A)	#10	6	10
7.5	230	1	T4273	J5232 (25-40A)	J5247 (60A)	#6	25	40
7.5	230	3	T4623	J5230 (16-25A)	J52462 (40A)	#8	16	25
7.5	460	3	T4624	J5237 (9-14A)	J52462 (40A)	#10	9	14
10	230	1	T4276	J5242 (40-63A)	J5247 (60A)	#6	40	63
10	230	3	T4626	J5232 (25-40A)	J52462 (40A)	#8	25	40
10	460	3	T4627	J5243 (13-18A)	J52462 (40A)	#10	13	18

Auxiliary Load and Unload Kit specifications:

NOTE: Most dryer main switches and distribution blocks have been sized to handle up to 4 (four) 10 HP kits on single module dryers. Refer to the electrical load requirements to ensure that the main switch and distribution block are sized adequately. If unsure, contact your dealer.

If additional auxiliaries are required, the Dealer is responsible to determine if the dryer can handle the additional load. If the dryer is not able to handle the extra load, the auxiliary must have its own power source independent of the dryer.

Temperature Compensated Overloads, 3 Phase Units:

All dryers manufactured as three-phase units are equipped with temperature-compensated overloads. If auxiliary load and unload kits are installed and not purchased from Sukup Manufacturing Company, it is recommended that temperature-compensated units be used.

Fuel Information

LIQUID PROPANE

Sukup dryers for liquid propane use must be connected to a supply tank to draw liquid from the bottom of the tank. The tank should be 1,000 gallons or larger, and have no regulator mounted to it. The connection to the dryer should be with piping designed for LP gas. Have your LP gas supplier make proper connections and safety controls to meet local codes and National Fire Protection Association standards.

Do not use tanks that have previously been used for ammonia or fertilizer solutions. These substances are extremely corrosive and can damage fuel supply and burner parts.

Water in the supply tank may freeze in the pipe train or controls, causing damage. To ensure the tank is free of moisture, the best precaution is to purge with methanol. Check with the gas supplier if this needs to be done. Do not use tanks with an accumulation of oil or heavy hydrocarbons from long use on a vapor withdrawal system.

If more than one tank is needed to supply liquid propane to the dryer, the vapor sides of the tanks must be connected together to equalize the pressure from each tank. Have your LP gas supplier make proper connections and safety controls to meet local codes and National Fire Protection Association standards.

FUEL SYSTEM RECOMMENDATIONS

LIQUID PROPANE

DRYER SIZE	MAXIMUM HEAT CAPACITY (BTU/HR)	MAXIMUM FUEL FLOW (GAL/HR)	FUEL LINE SIZE (MINIMUM UP TO 100')
8 FT, SINGLE HEATER	3,000,000	33	3 / 8"
12 FT, SINGLE HEATER	5,000,000	54	1 / 2"
16 FT, SINGLE HEATER	6,000,000	65	1 / 2"
16 FT, 2 MODULE	13,000,000	142	3 / 4"
16 FT, 3 MODULE	20,000,000	218	1"
20 FT, SINGLE HEATER	7,000,000	76	1 / 2"
20 FT, DUAL HEATER	9,000,000	98	3 / 4"
20 FT, 2 MODULE	16,500,000	180	3 / 4"
20 FT, 3 MODULE	25,000,000	272	1"
24 FT, DUAL HEATER	10,000,000	109	3 / 4"
24 FT, 2 MODULE	20,000,000	218	1"
24 FT, 3 MODULE	30,000,000	326	1"
28 FT, DUAL HEATER	11,000,000	120	3 / 4"



Connection to liquid manifold on Dryer

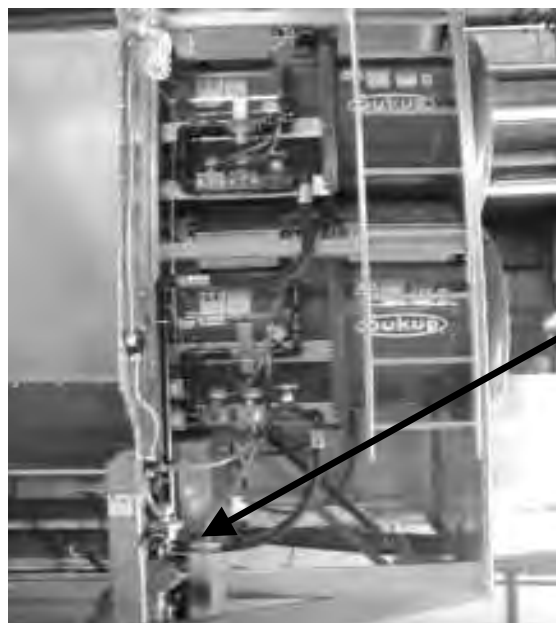
1. See fuel specification chart above for recommended line size.
2. DO NOT use a pressure regulator at the supply tank.
3. Open LP shut-off valves slowly to prevent inadvertent closing of excess flow valves.
4. The fuel flow and line size in the above chart assume a 10°F or higher temperature.

NATURAL GAS

Sukup dryers for natural gas use are designed to function at a heat value of approximately 1000 BTU per cubic foot. A regulated pressure of 15 PSI must be provided for connection to the dryer. Ensure also that sufficient volume is maintained for the correct operating pressure.

NATURAL GAS

DRYER SIZE	MAXIMUM HEAT CAPACITY (BTU/HR)	MAXIMUM FUEL FLOW (CUBIC FEET/HR)	FUEL LINE SIZE (MINIMUM UP TO 100')
8 FT, SINGLE HEATER	3,000,000	3000	1 1 / 4"
12 FT, SINGLE HEATER	5,000,000	5000	1 1 / 2"
16 FT, SINGLE HEATER	6,000,000	6000	1 1 / 2"
16 FT, 2 MODULE	13,000,000	13,000	2 1 / 2"
16 FT, 3 MODULE	20,000,000	20,000	2 1 / 2"
20 FT, SINGLE HEATER	7,000,000	7000	2"
20 FT, DUAL HEATER	9,000,000	9000	2"
20 FT, 2 MODULE	16,500,000	16,500	2 1 / 2"
20 FT, 3 MODULE	25,000,000	25,000	3"
24 FT, DUAL HEATER	10,000,000	10,000	2"
24 FT, 2 MODULE	20,000,000	20,000	2 1 / 2"
24 FT, 3 MODULE	30,000,000	30,000	3"
28 FT, DUAL HEATER	11,000,000	11,000	2"



See fuel specification chart above for recommended line size.

Connection to natural gas manifold on dryer

2-fan/heater natural gas dryer

Dryer Installation Information

Dryer set up / supports:

 **Warning:** The wheel transport kit is for transport only and is NOT to be used when operating the dryer. The dryer **MUST** be mounted and supported in an approved manner.

The dryer must be mounted a minimum of 16 inches above the surface to allow for clean out.

Optional dryer supports are available from Sukup Mfg. in 2-foot, 3-foot, and 4-foot lengths.

The support kits come with attaching hardware to attach the supports to the dryer frame. Customer must supply hardware for attachment to concrete pad (Recommend 1/2" or 5/8" hardware).

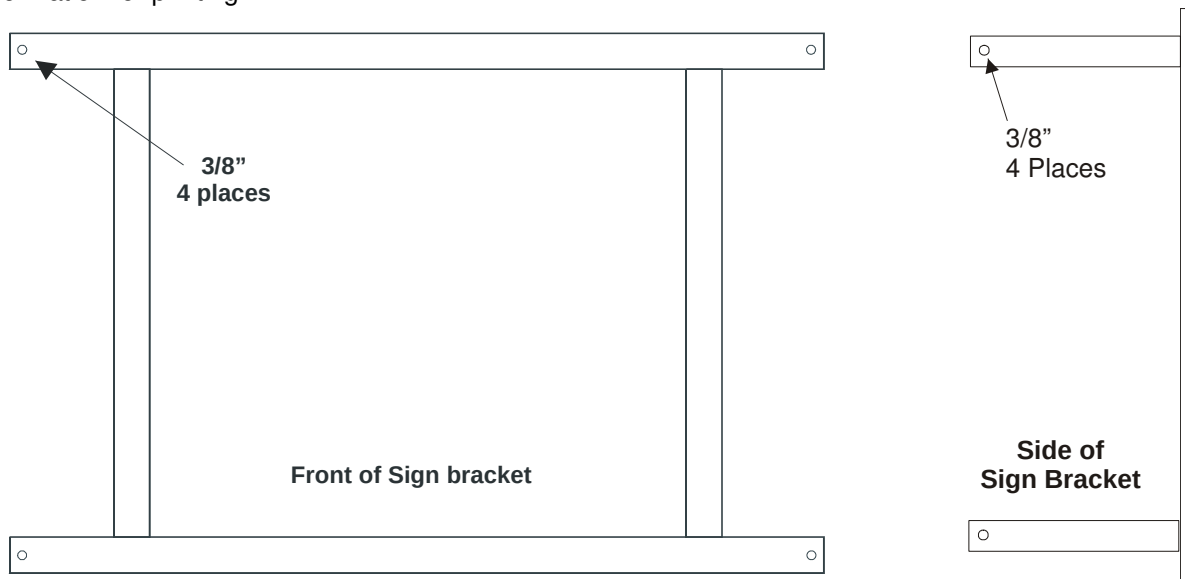
Optional Dryer ladder extensions are available from Sukup Mfg. in 33-inch (B5083) and 44-inch (B5084) lengths.

Contact your Sukup Dealer to order either the supports and / or ladder extensions.

See the Installation and Pre-operational check out section in the Installation part of the manual for the proper support leg locations for 8, 12, 16, 20, 24, and 28-foot dryers.

Installation of Customer Sign

Sukup Manufacturing Co. provides a sign for portable dryers, showing customer name or farm name and / or dealer name, at no additional charge. The dealer will order the sign if desired, furnishing the appropriate information for printing.



The bracket pictured above can be mounted to the outside of the dryer, on any two-foot grain column section. The sign is then mounted to the bracket. It can also be mounted under the fan(s) on a sheet metal support.



Appendix A: Estimated Bushels Per Hour Information Per Module

This chart is only an approximation!

	Dryer					
	8 Foot 1 Module	12 Foot 1 Module	16 Foot 1 Module	20 Foot 1 Module	24 Foot 1 Module	28 Foot 1 Module
10% Meter Roll	80	120	160	200	240	280
20% Meter Roll	160	240	320	400	480	560
30% Meter Roll	240	360	480	600	720	840
40% Meter Roll	320	480	640	800	960	1120
50% Meter Roll	400	600	800	1000	1200	1400
60% Meter Roll	480	720	960	1200	1440	1680
70% Meter Roll	560	840	1120	1400	1680	1960
80% Meter Roll	640	960	1280	1600	1920	2240
90% Meter Roll	720	1080	1440	1800	2160	2520
100% Meter Roll	800	1200	1600	2000	2400	2800

PARTS INDEX
TABLE OF CONTENTS

POWER BOX, TOUCH. 230V, 1PH, 15HP ----- 2

POWER BOX, TOUCH. 230V, 3PH, 20HP ----- 4

POWER BOX, TOUCH. 460V, 3PH, 15HP, 2 Fan/2 Heater ----- 6

POWER BOX, CENT. DRYER, TOUCH. 230V, 3PH, 30HP/20HP, 2 Fan/2 Htr ----- 8

POWER BOX, CENT. DRYER, TOUCH. 230V, 1PH, 15HP, 2 Fan/2 Htr -----10

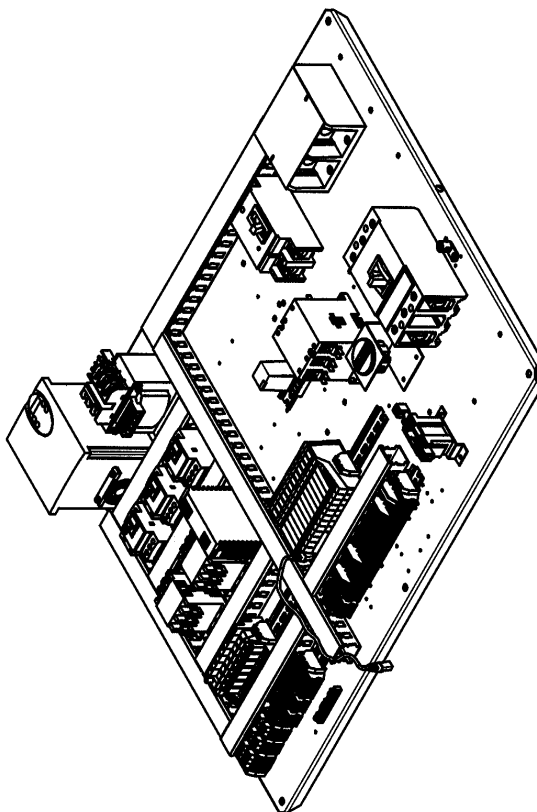
POWER BOX, CENT. DRYER, TOUCH. 460V, 3PH, 20HP-----11

POWER BOX, CENT. DRYER, TOUCH. 460V, 3PH, 20HP-----12

AUTOMATIC DRYER PARTS ASSEMBLIES, #L1455 ----- Section 7 – Pages 1 through 50

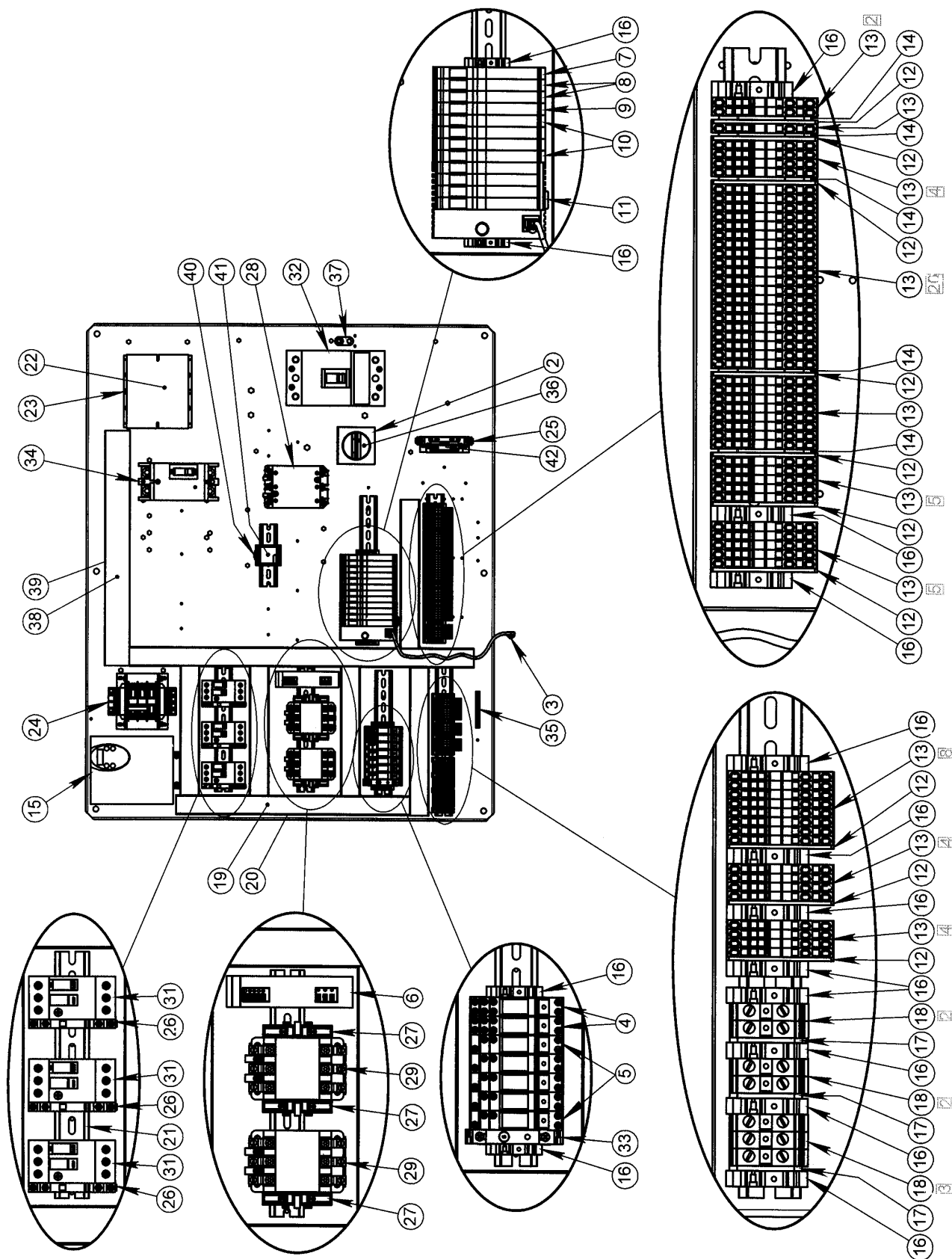
Note: The charts in this section are for 230 & 460 Volt dryers. Please contact your local dealer or Sukup Manufacturing for additional information.

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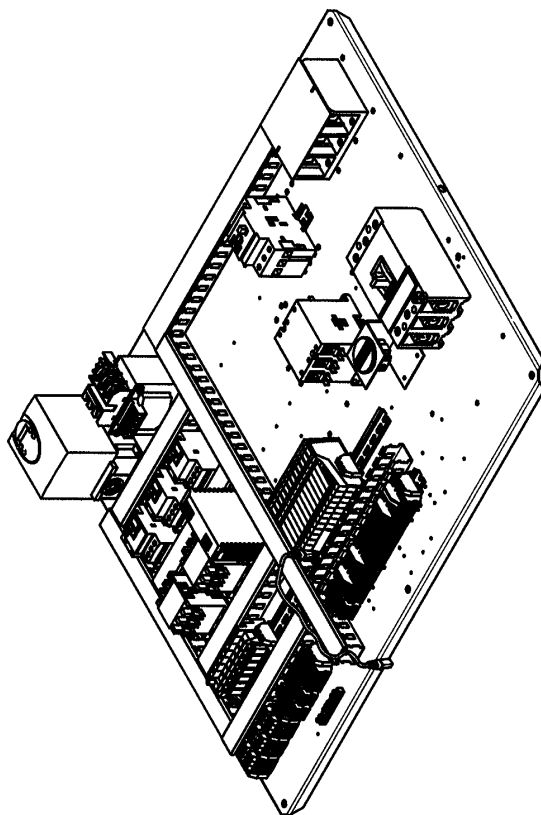
TOLERANCE UNLESS SPECIFIED X = ± .050 XX = ± .010 .XXX = ± .005 FRAC = ± 1/32  = ± 1°			SUKUP MFG. CO. SUKUP PARKWAY SHEFFIELD, IA. 50475	
	DRAWN BY	THW	RAW MATL. NO.	-----
DATE	12/18/2008	DWG. NO.		T16600X
USED IN ASSTY OF:		MATERIAL		
NAME		PWR BOX, TOUCHSCREEN		
		COMP.ELEC.230V, 1PH, 15 Hp		

POWER BOX, TOUCH. 230V, 1PH, 15HP, Exploded View



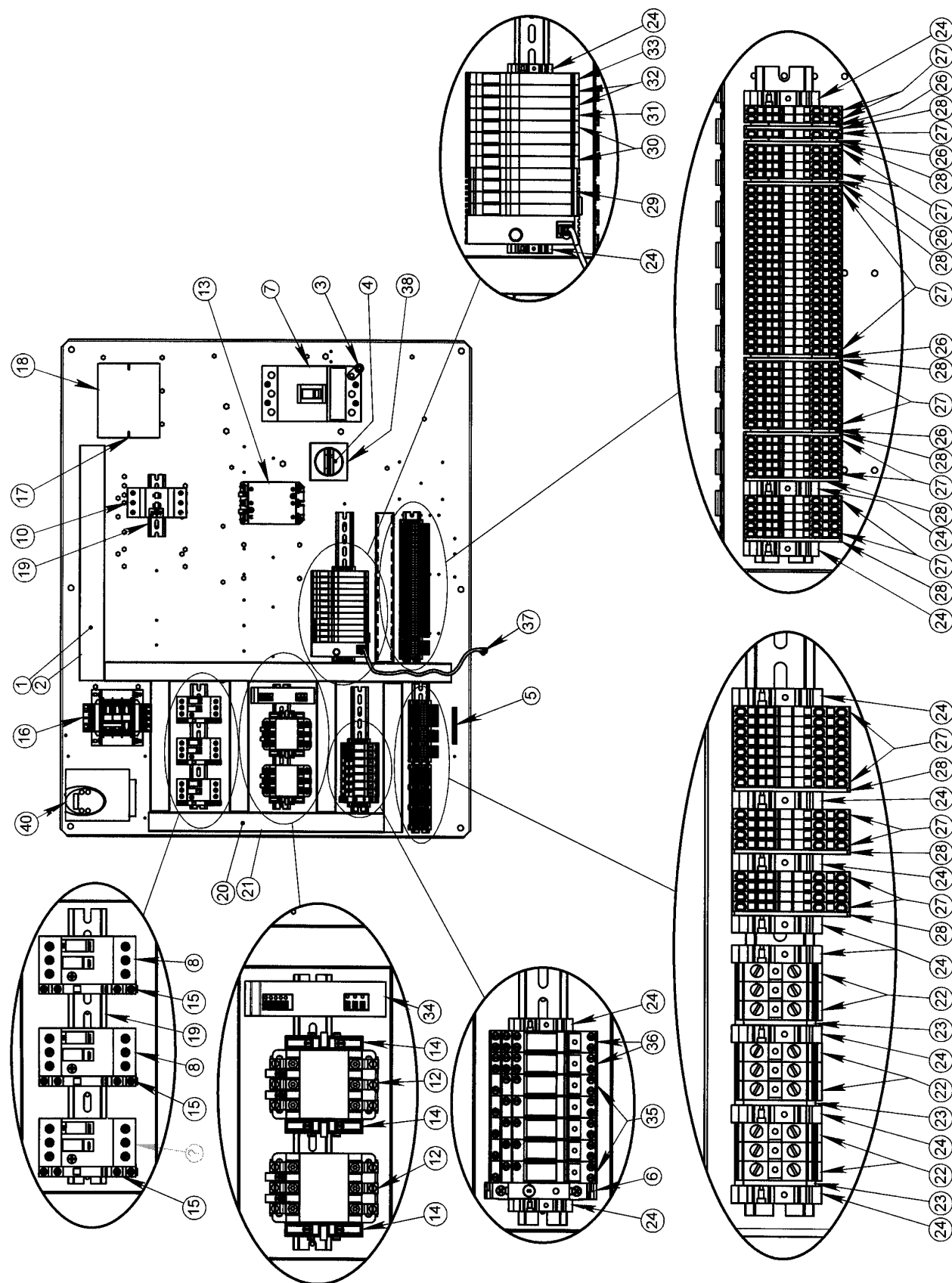
ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	J3886	RACEWAY, 2"
2	1	J3887	COVER, 2" RACEWAY
3	1	J4048	LUG, COPPER TERMINAL, L125
4	1	J4766	HOURLMETER, 115V, 60HZ
5	1	J47901	GROUND BAR, 7 HOLE ALUM (PK7GTA)
6	1	J48185	BREAKER, CIRCUIT, 3 AMP
7	1	J5212	SWITCH, MAIN, 250 AMP, 3 POLE (KHL36000M)
8	2	J5237	STARTER, PROTECTOR, 9 - 14 AMPS (GV2M16)
9	1	J5238	STARTER, PROTECTOR, 17 - 23 AMPS (GV2M21)
10	1	J5242	STARTER, PROTECTOR, 40 - 63 AMP
11	2	J5245	CONT. MOUNTING BRKT 9999 DMBI
12	2	J52462	CONTACTOR, 40A, SqD, 115V COIL
13	1	J5248	CONTACTOR, 90A, 115V CL, (DPA93V02)
14	3	J5260	AUX CONT, 30/60 AMP, 9999D10
15	3	J5265	AUX CONTACT (GV AN11)
16	1	J6490	TRANSFORMER, CONTROL, 500WA
17	1	J6700	BLOCK, POWER DISTRIBUTION, 3 PH
18	1	J6701	COVER ASSY, 3P, 9080
19	7	J6718	RAIL, DIN, 8501NT13
20	7	J6740	RACEWAY, 1.5"
22	9	J67421	TERMINAL, FEED THRU, 70 AMP
23	3	J67532	BARRIER, END
24	15	J6754	STOP, DIN END
26	5	J6904	TERMINAL, PARTITION, PHOENIX
27	61	J6915	TERMINAL, TWIN, PHOENIX
28	10	J6916	TERMINAL, COVER, TWIN, PHOENIX
29	1	J8700	SLICE, ILC150, PHOENIX
30	1	J8702	SLICE, I/O D16ME, PHOENIX
31	1	J8703	SLICE, I/O DO4ME, PHOENIX
32	2	J8704	SLICE, I/O A12ME, PHOENIX
33	1	J8705	SLICE, I/O AO2ME, PHOENIX
34	1	J8706	POWER SUPPLY, TRIO, PHOENIX
35	5	J8709	RELAY, SGL THROW, CH, RSBI1208D
36	2	J8711	RELAY, DBL THROW, CH, RSBA20808D
37	1	J8717	CABLE, CAT 5E, 2 FT, SHIELDED
38	1	T16530	BRACKET, HOURMETER, PORT DRYER
39	1	T18512	INTERIOR MOUNTING PLATE
40	1	J6850	DRIVE UNIT, AC, 3HP 230V 3 PH
41	6	J6741	COVER, 1.5" RACEWAY

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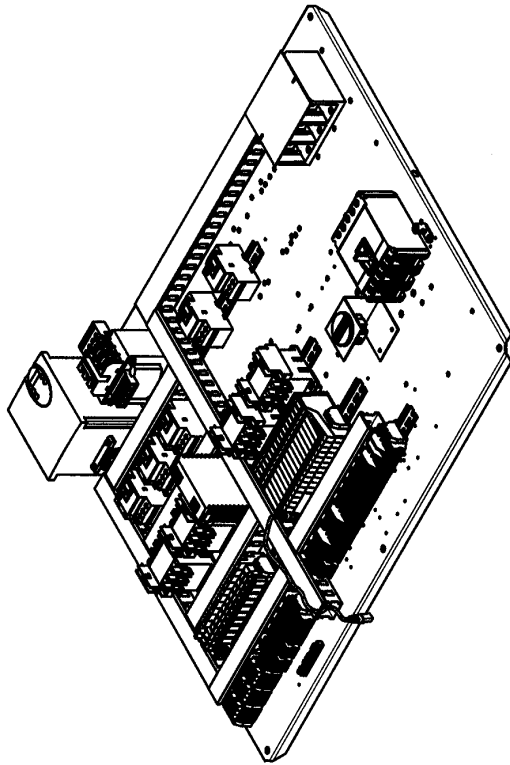
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REF	ENG. ORDER #	BY	DATE
REVISION			

POWER BOX, TOUCH. 230V, 3PH, 20HP, Exploded View



POWER BOX, TOUCH. 460V, 3PH, 15HP, 2 Fan/2 Heater



ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	J3886	RACEWAY, 2"
2	1	J3887	COVER, 2" RACEWAY
3	1	J4048	LUG, COPPER TERMINAL, L125
4	1	J4766	HOURLY METER, 115V, 60HZ
5	1	J47901	GROUND BAR, 7 HOLE ALUM (PK7GTA)
6	2	J48185	BREAKER, CIRCUIT, 3 AMP
7	1	J5215	SWITCH, MAIN, 100 AMP, 3 POLE (FHL36000M)
8	1	J5233	STARTER, PROTECTOR, 2.5 - 4.0 AMPS (GV2ME08)
9	2	J5236	STARTER, PROTECTOR, 6-10 AMPS (GV2ME14)
10	2	J5238	STARTER, PROTECTOR, 17 - 23 AMPS (GV2M21)
11	4	J5245	CONT. MOUNTING BRKT 9999 DMBI
12	4	J52462	CONTACTOR, 40A, SQD, 115V COIL
13	7	J5260	AUX CONT, 30/60 AMP, 9999D10
14	3	J5265	AUX CONTACT (GV AN11)
15	1	J6490	TRANSFORMER, CONTROL, 500WA
16	1	J6700	BLOCK, POWER DISTRIBUTION, 3 PH
17	1	J6701	COVER ASSY, 3P, 9080
18	1	J6706	COVER ASSY
19	8	J6718	RAIL, DIN, 8501NT13
20	7	J6740	RACEWAY, 1.5"
21	7	J6741	COVER, 1.5" RACEWAY
22	9	J67421	TERMINAL, FEED THRU, 70 AMP
23	3	J67532	BARRIER, END
24	15	J6754	STOP, DIN END
25	1	J6851	UNIT, AC DRIVE, 3HP, 460V, 3P (ATV31HU22N4)
26	5	J6904	TERMINAL, PARTITION, PHOENIX
27	73	J6915	TERMINAL, TWIN, PHOENIX
28	10	J6916	TERMINAL, COVER, TWIN, PHOENIX
29	1	J8700	SLICE, ILC150, PHOENIX
30	1	J8702	SLICE, I/O DI16ME, PHOENIX
31	2	J8703	SLICE, I/O DO4ME, PHOENIX
32	2	J8704	SLICE, I/O AI2ME, PHOENIX
33	2	J8705	SLICE, I/O AO2ME, PHOENIX
34	1	J8706	POWER SUPPLY, TRIO, PHOENIX
35	7	J8709	RELAY, SGL THROW, CH, RSB1A120BD
36	3	J8711	RELAY, DBL THROW, CH, RSB2A080BD
37	1	J8717	CABLE, CAT 5E, 2 FT, SHIELDED
38	1	T16530	BRACKET, HOURLY METER, PORT DRYER
39	1	T18512	INTERIOR MOUNTING PLATE
40	1	J8701	SLICE, I/O DI14ME, PHOENIX

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.X = ± .050
.XX = ± .010
.XXX = ± .005
FRAC = ± 1/32
= ± 1°

SUKUP MFG. CO.

Sukup

SUKUP PARKWAY
SHEFFIELD, IA. 50475

DRAWN BY THW
RAW MATL NO. ---
DWG NO. T20609X

DATE 12/31/2008
MATERIAL ---
USED IN ASST OF: POWER BOX, TOUCHSCREEN

NAME COMP, ELEC. 460V, 3 PH, 15HP, 2 FAN/HTR

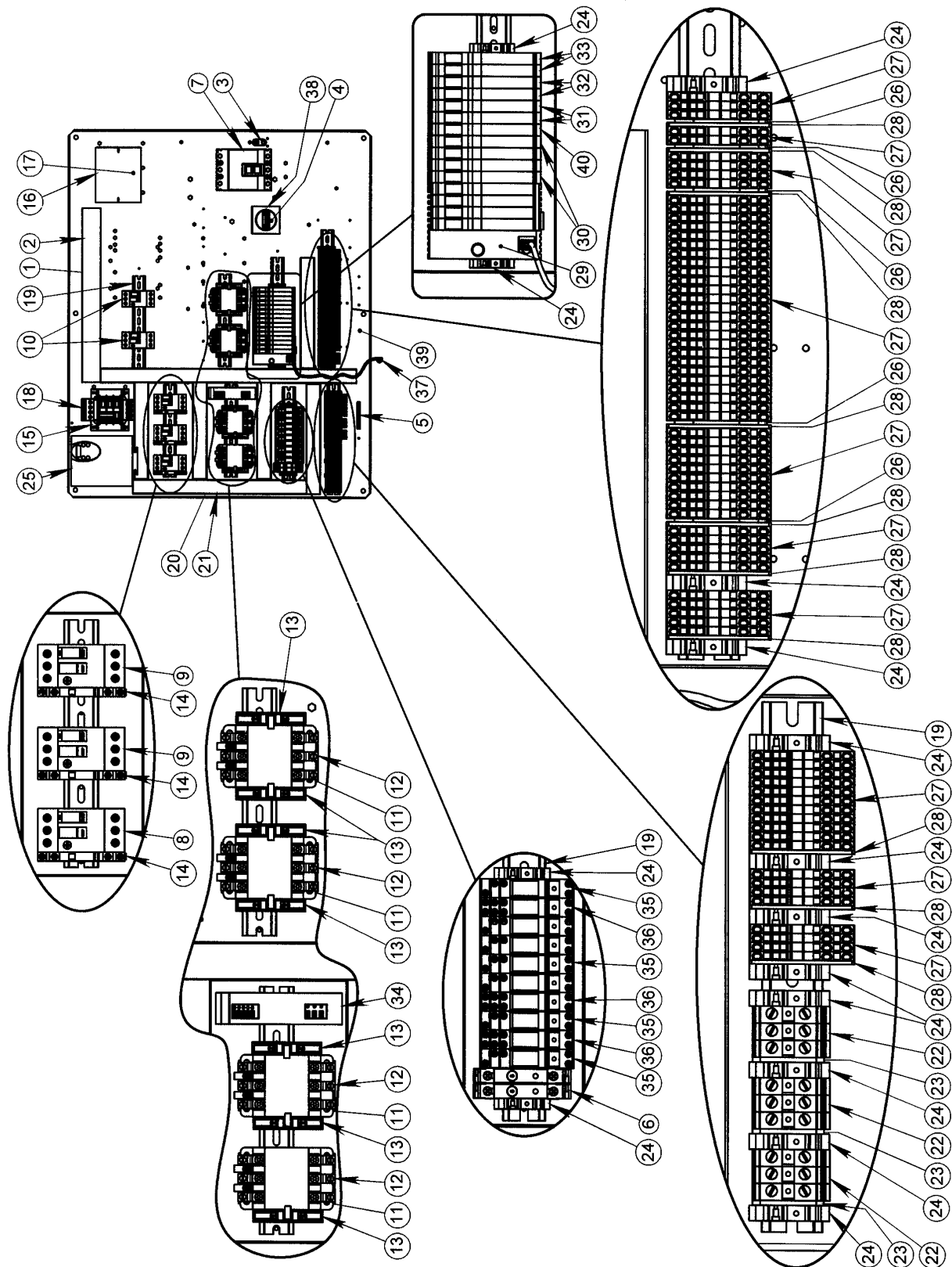
REF	ENG. ORDER #	BY	DATE

R E V I S I O N

6 - 6

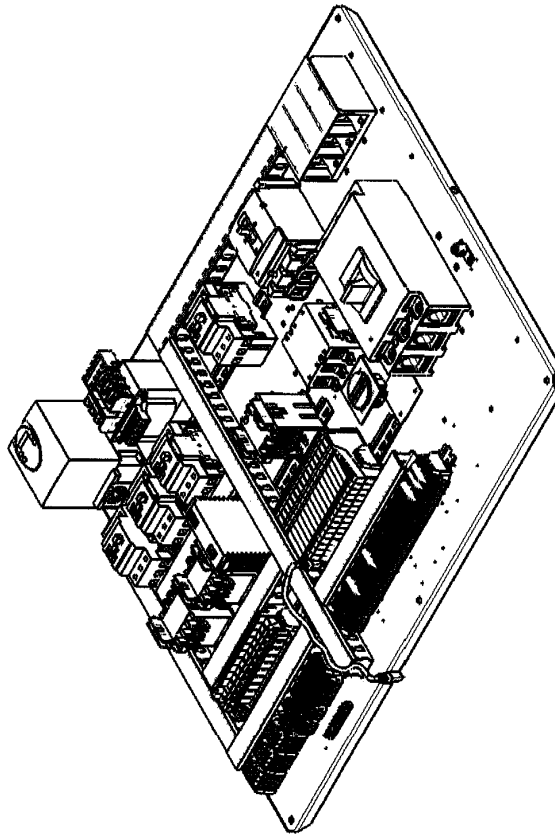
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POWER BOX, TOUCH. 460V, 3PH, 15HP, 2 Fan/2 Heater, Exploded View



POWER BOX, CENT. DRYER, TOUCH. 230V, 3PH, 30HP/20HP, 2 Fan/2 Htr

ITEM NO.	QTY.	PART NO.	DESCRIPTION	ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	J3886	RACEWAY, 2"	36	2	J8703	SLICE, I/O DO4ME, PHOENIX
2	1	J3887	COVER, 2" RACEWAY	37	2	J8704	SLICE, I/O A12ME, PHOENIX
3	1	J4048	LUG, COPPER TERMINAL, L125	38	2	J8705	SLICE, I/O AO2ME, PHOENIX
4	1	J4766	HOURMETER, 115V, 60HZ	39	1	J8706	POWER SUPPLY, TRIO, PHOENIX
5	1	J47901	GROUND BAR, 7 HOLE ALUM (PK7GTA)	40	7	J8709	RELAY, SGL THROW, CH, RSB1A120BD
6	2	J48185	BREAKER, CIRCUIT, 3 AMP	41	3	J8711	RELAY, DBL THROW, CH, RSB2A080BD
7	1	J5214	SWITCH, MAIN, 400 AMP, 3 POLE (LHL36000M)	42	1	J8717	CABLE, CAT 5E, 2 FT, SHIELDED
8	2	J5230	STARTER, PROTECTOR, 16 - 25 AMPS	43	1	T16530	BRACKET, HOURMETER, PORT DRYER
9	1	J5234	STARTER, PROTECTOR, 4-6.3 AMPS	44	1	T18512	INTERIOR MOUNTING PLATE
10	1	J5235	STARTER, PROTECTOR, 60 - 100 AMP				
11	1	J5242	STARTER, PROTECTOR, 40 - 63 AMP				
12	3	J5245	CONT. MOUNTING BRKT 9999 DMBI				
13	2	J52462	CONTACTOR, 40A, SQD, 115V COIL				
14	1	J5247	CONTACTOR, 60A, 115V CL, (DPA63V02Y181)				
15	1	J5248	CONTACTOR, 90A, 115V CL, (DPA93V02)				
16	7	J5260	AUX CONT, 30/60 AMP, 9999D10				
17	1	J5265	AUX CONTACT (GV AN11)				
18	3	J5266	AUX CONTACT (GV3A01)				
19	1	J6490	TRANSFORMER, CONTROL, 500WA				
20	1	J6700	BLOCK, POWER DISTRIBUTION, 3 PH				
21	1	J6701	COVER ASSY, 3P, 9080				
22	1	J6706	COVER ASSY				
23	8	J6718	RAIL, DIN, 850TNT13				
24	7	J6740	RACEWAY, 1.5"				
25	7	J6741	COVER, 1.5" RACEWAY				
26	9	J67421	TERMINAL, FEED THRU, 70 AMP				
27	3	J67532	BARRIER, END				
28	15	J6754	STOP, DIN END				
29	1	J6850	DRIVE UNIT AC, 3HP 230V 3 PH				
30	5	J6904	TERMINAL, PARTITION, PHOENIX				
31	76	J6915	TERMINAL, TWIN, PHOENIX				
32	10	J6916	TERMINAL, COVER, TWIN, PHOENIX				
33	1	J8700	SLICE, ILC150, PHOENIX				
34	1	J8701	SLICE, I/O DI14ME, PHOENIX				
35	1	J8702	SLICE, I/O DI16ME, PHOENIX				



TOLERANCE UNLESS SPECIFIED
X = ± .050
.XX = ± .010
.XXX = ± .005
FRAC = ± 1/32
= ± 1°

SUKUP MFG. CO.
SUKUP
SUKUP PARKWAY
SHEFFIELD, IA. 50475

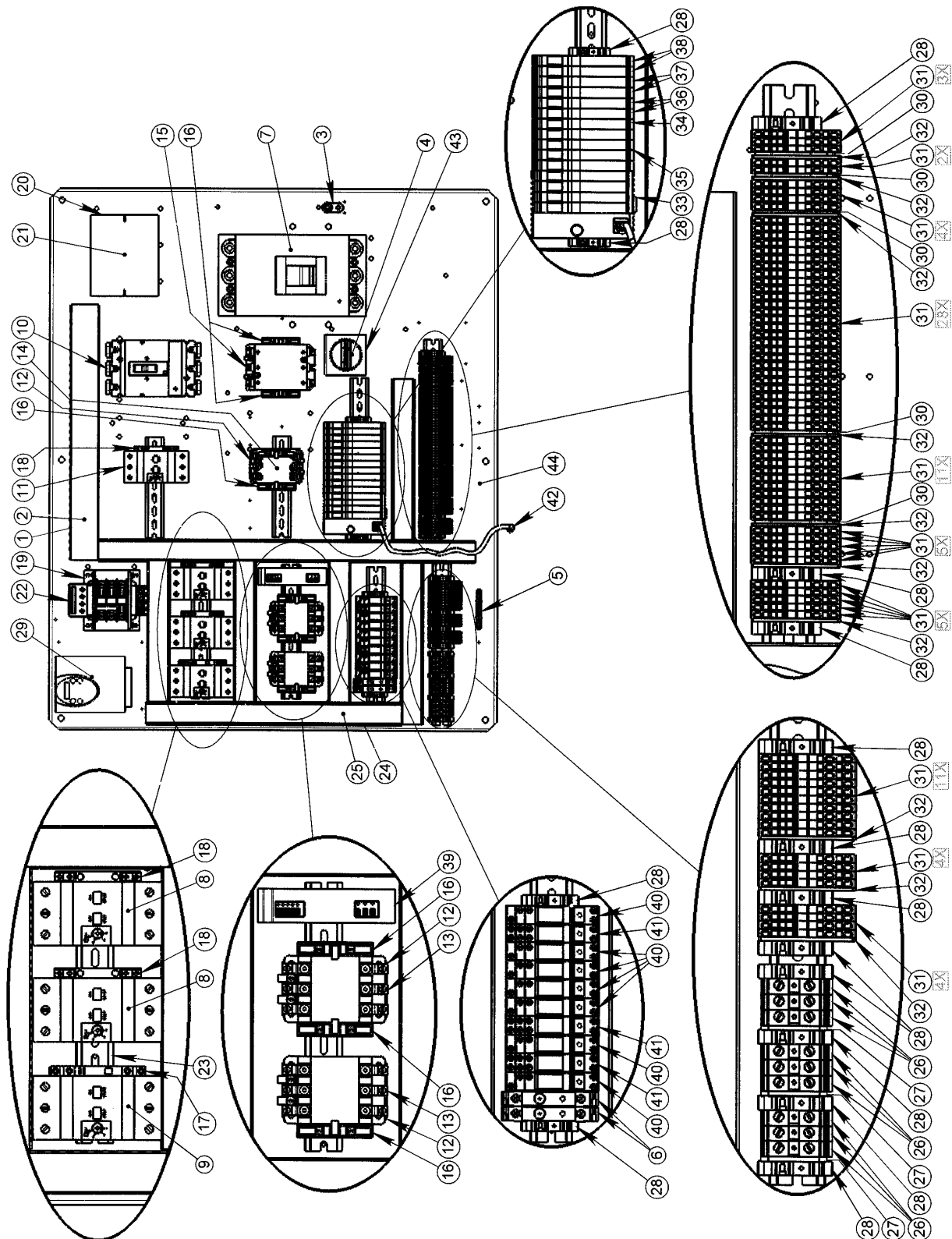
DRAWN BY THW
DATE 01/07/2009
USED IN ASSY OF: CENT. FAN DRYER, 2 FAN/HTR, TCHSCRN
NAME
DWG NO. T24611X
MATERIAL

REF ENG. ORDER # BY DATE
R E V I S I O N

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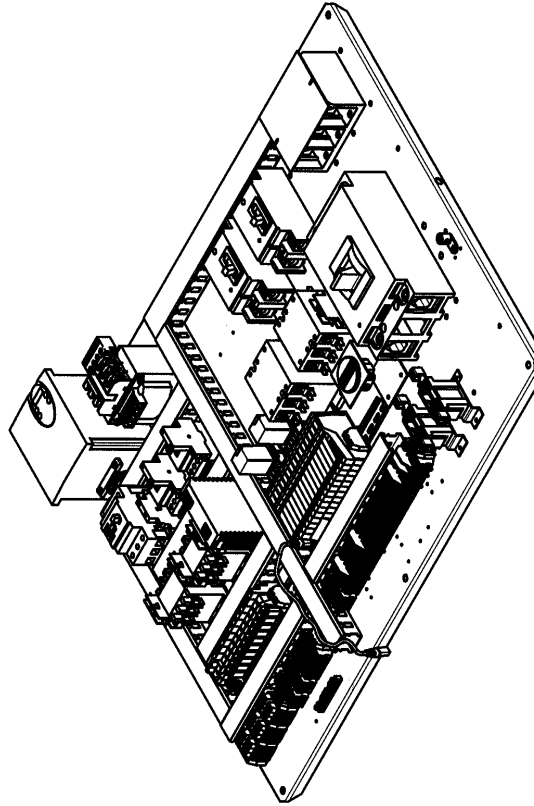
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POWER BOX, CENT., TOUCH. 230V, 3PH, 30HP/20HP, 2 Fan/2 Htr, Exploded View



POWER BOX, CENT. DRYER, TOUCH. 230V, 1PH, 15HP, 2 Fan/2 Htr

ITEM NO.	QTY.	PART NO.	DESCRIPTION	ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	2	J38804	RELAY, 8 PIN, SQRD, 230V (8501KP12V24)	39	2	J8703	SLICE, I/O DO4ME, PHOENIX
2	2	J38811	SOCKET, ROUND, 8 PIN	40	2	J8704	SLICE, I/O A12ME, PHOENIX
3	1	J3886	RACEWAY, 2"	41	2	J8705	SLICE, I/O AO2ME, PHOENIX
4	1	J3887	COVER, 2" RACEWAY	42	1	J8706	POWER SUPPLY, TRIO, PHOENIX
5	1	J4048	LUG, COPPER TERMINAL, L125	43	7	J8709	RELAY, SGL THROW, CH, RSB1A120BD
6	1	J4259	HEATER STRIP, E78	44	3	J8711	RELAY, DBL THROW, CH, RSB2A080BD
7	1	J4261	HEATER STRIP, E80	45	1	J8717	CABLE, CAT 5E, 2 FT, SHIELDED
8	1	J4766	HOURLMETER, 115V, 60HZ	46	1	T16530	BRACKET, HOURLMETER, PORT DRYER
9	1	J47901	GROUND BAR, 7 HOLE ALUM (PK7GTA)	47	1	T18512	INTERIOR MOUNTING PLATE
10	2	J4818	BREAKER, FAN CIRCUIT, 150 AMP (QBL22150)				
11	2	J48185	BREAKER, CIRCUIT, 3 AMP				
12	1	J5216	SWITCH, MAIN, 400 AMP, 2 POLE (LHL26000M)				
13	1	J5234	STARTER, PROTECTOR, 4-6.3 AMPS				
14	2	J5238	STARTER, PROTECTOR, 17 - 23 AMPS (GV2M21)				
15	2	J5245	CONT. MOUNTING BRKT 9999 DMBI				
16	2	J52462	CONTACTOR, 40A, SQD, 115V COIL				
17	2	J5248	CONTACTOR, 90A, 115V CL, (DPA93V02)				
18	5	J5260	AUX CONT, 30/60 AMP, 9999D10				
19	1	J5265	AUX CONTACT (GV AN11)				
20	2	J5266	AUX CONTACT (GV3A01)				
21	2	J5274	OVERLOAD, 86 AMP, 9065 HA2				
22	1	J6490	TRANSFORMER, CONTROL, 500WA				
23	1	J6700	BLOCK, POWER DISTRIBUTION, 3 PH				
24	1	J6701	COVER ASSY, 3P, 9080				
25	1	J6706	COVER ASSY				
26	7	J6718	RAIL, DIN, 8501NT13				
27	7	J6740	RACEWAY, 1.5"				
28	7	J6741	COVER, 1.5" RACEWAY				
29	9	J67421	TERMINAL, FEED THRU, 70 AMP				
30	3	J67532	BARRIER, END				
31	15	J6754	STOP, DIN END				
32	1	J6848	DRIVE UNIT, AC, 3HP, 460V, 3P (ATV31HU22M2)				
33	5	J6904	TERMINAL, PARTITION, PHOENIX				
34	76	J6915	TERMINAL, TWIN, PHOENIX				
35	10	J6916	TERMINAL, COVER, TWIN, PHOENIX				
36	1	J8700	SLICE, ILC150, PHOENIX				
37	1	J8701	SLICE, I/O D14ME, PHOENIX				
38	1	J8702	SLICE, I/O D16ME, PHOENIX				



TOLERANCE UNLESS SPECIFIED
 .X = ± .050
 .XX = ± .010
 .XXX = ± .005
 FRAC = ± 1/32
 = ± 1°

DRAWN BY THW DATE 01/08/2009
 RAW MATL NO. T40602
 MATERIAL

SUKUP MFG. CO.
Sukup
 SUKUP PARKWAY
 SHEFFIELD, IA. 50475

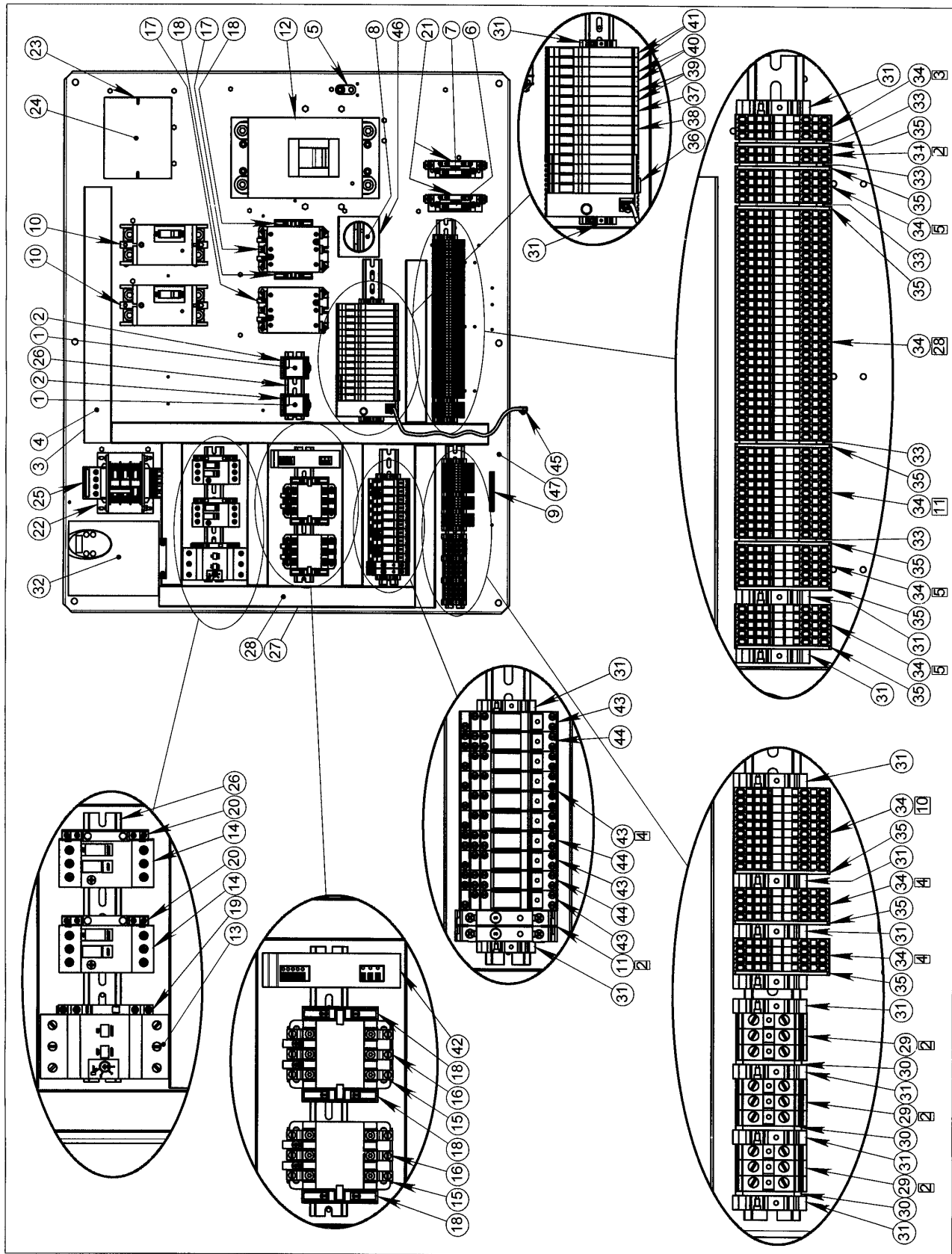
USED IN ASSEMBLY
 NAME COMP, ELC, 230V, 1 PH, 15HP
 DATE 01/08/2009
 MATERIAL

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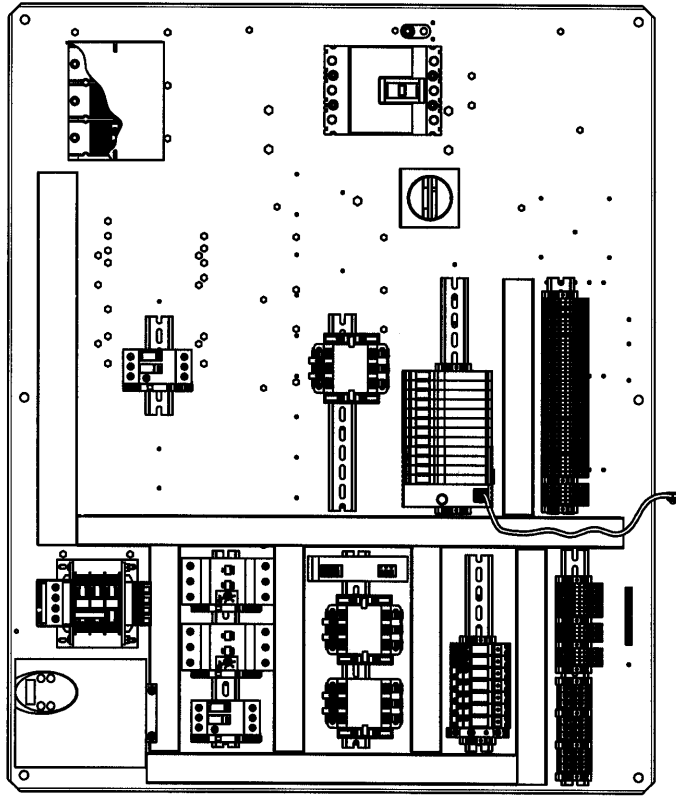
Parts Index

POWER BOX, CENT. DRYER, TOUCH. 230V, 1PH, 15HP, 2 Fan/2 Htr, Exploded View



POWER BOX, CENT. DRYER, TOUCH. 460V, 3PH, 20HP

ITEM NO.	QTY	PART NO.	DESCRIPTION
1	1	J3886	RACEWAY, 2"
2	1	J3887	COVER, 2" RACEWAY
3	1	J4048	LUG, COPPER TERMINAL, L125
4	1	J4766	HOURMETER, 115V, 60HZ
5	1	J47901	GROUND BAR, 7 HOLE ALUM (PK7GTA)
6	1	J48185	BREAKER, CIRCUIT, 3 AMP
7	1	J5215	SWITCH, MAIN, 100 AMP, 3 POLE (FHL36000M)
8	1	J5233	STARTER, PROTECTOR, 2.5 - 4.0 AMPS (GV2ME08)
9	2	J5234	STARTER, PROTECTOR, 4-6.3 AMPS
10	1	J5239	STARTER, PROTECTOR, 24 - 32 AMPS (GV2M32)
11	3	J5245	CONT. MOUNTING BRKT 9999 DMBI
12	3	J52462	CONTACTOR, 40A, SQD, 115V COIL
13	5	J5260	AUX CONT, 30/60 AMP, 9999D10
14	4	J5265	AUX CONTACT (GV AN11)
15	1	J6490	TRANSFORMER, CONTROL, 500WA
16	1	J6700	BLOCK, POWER DISTRIBUTION, 3 PH
17	1	J6701	COVER ASSY, 3P, 9080
18	1	J6706	COVER ASSY
19	8	J6718	RAIL, DIN, 8501NT13
20	7	J6740	RACEWAY, 1.5"
21	7	J6741	COVER, 1.5" RACEWAY
22	9	J67421	TERMINAL, FEED THRU, 70 AMP
23	3	J67532	BARRIER, END
24	15	J6754	STOP, DIN END
25	1	J6851	UNIT, AC DRIVE, 3HP, 460V, 3P (ATV31HU22N4)
26	5	J6904	TERMINAL, PARTITION, PHOENIX
27	61	J6915	TERMINAL, TWIN, PHOENIX
28	10	J6916	TERMINAL, COVER, TWIN, PHOENIX
29	1	J8700	SLICE, ILC150, PHOENIX
30	1	J8702	SLICE, I/O DI16ME, PHOENIX
31	1	J8703	SLICE, I/O DO4ME, PHOENIX
32	2	J8704	SLICE, I/O AI2ME, PHOENIX
33	1	J8705	SLICE, I/O AO2ME, PHOENIX
34	1	J8706	POWER SUPPLY, TRIO, PHOENIX
35	5	J8709	RELAY, SGL THROW, CH, RSB1A120BD
36	2	J8711	RELAY, DBL THROW, CH, RSB2A080BD
37	1	J8717	CABLE, CAT 5E, 2 FT, SHIELDED
38	1	T16530	BRACKET, HOURMETER, PORT DRYER
39	1	T18512	INTERIOR MOUNTING PLATE



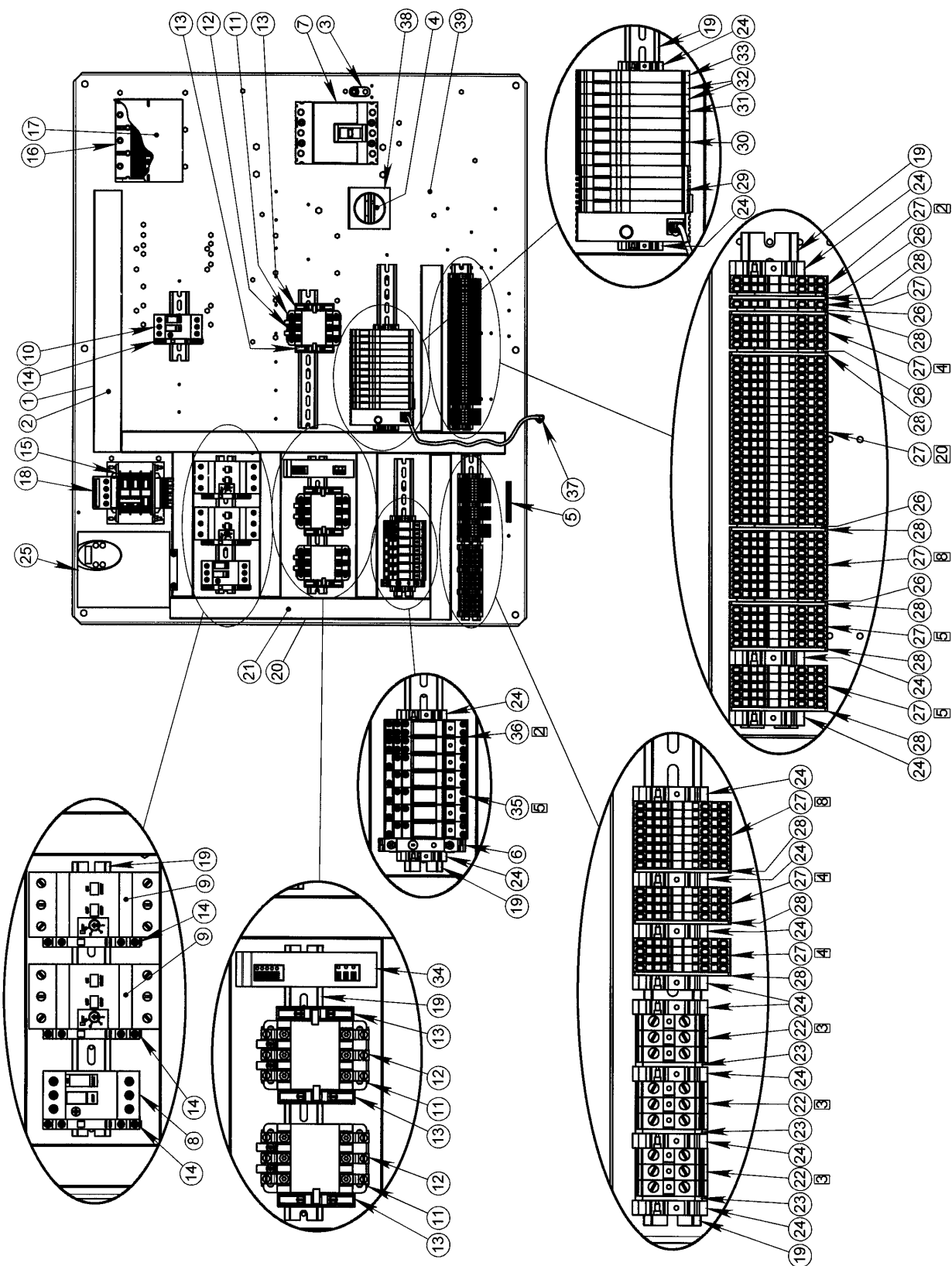
TOLERANCE UNLESS SPECIFIED X = ± .050 XX = ± .010 XXX = ± .005 FRAC = ± 1/32 = ± 1°		SUKUP MFG. CO. SUKUP PARKWAY SHEFFIELD, IA. 50475	
DRAWN BY THW	RAW MATL. NO. ----	DWG NO. T40653	MATERIAL ----
DATE 01/08/2009	USED IN ASSY OF: CENTRIFUGAL FAN DRYER, TCHSCRN		
NAME ----	COMP, ELEC, 460V, 3PH, 20 Hp		

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REF	ENG. ORDER #	BY	DATE
	R E V I S I O N		

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POWER BOX, CENT. DRYER, TOUCH. 460V, 3PH, 20HP, Exploded View



NOTES



AUTOMATIC DRYER PARTS ASSEMBLIES



Sukup Manufacturing Company

1555 255th Street, Box 677
Sheffield, Iowa, USA 50475-0677

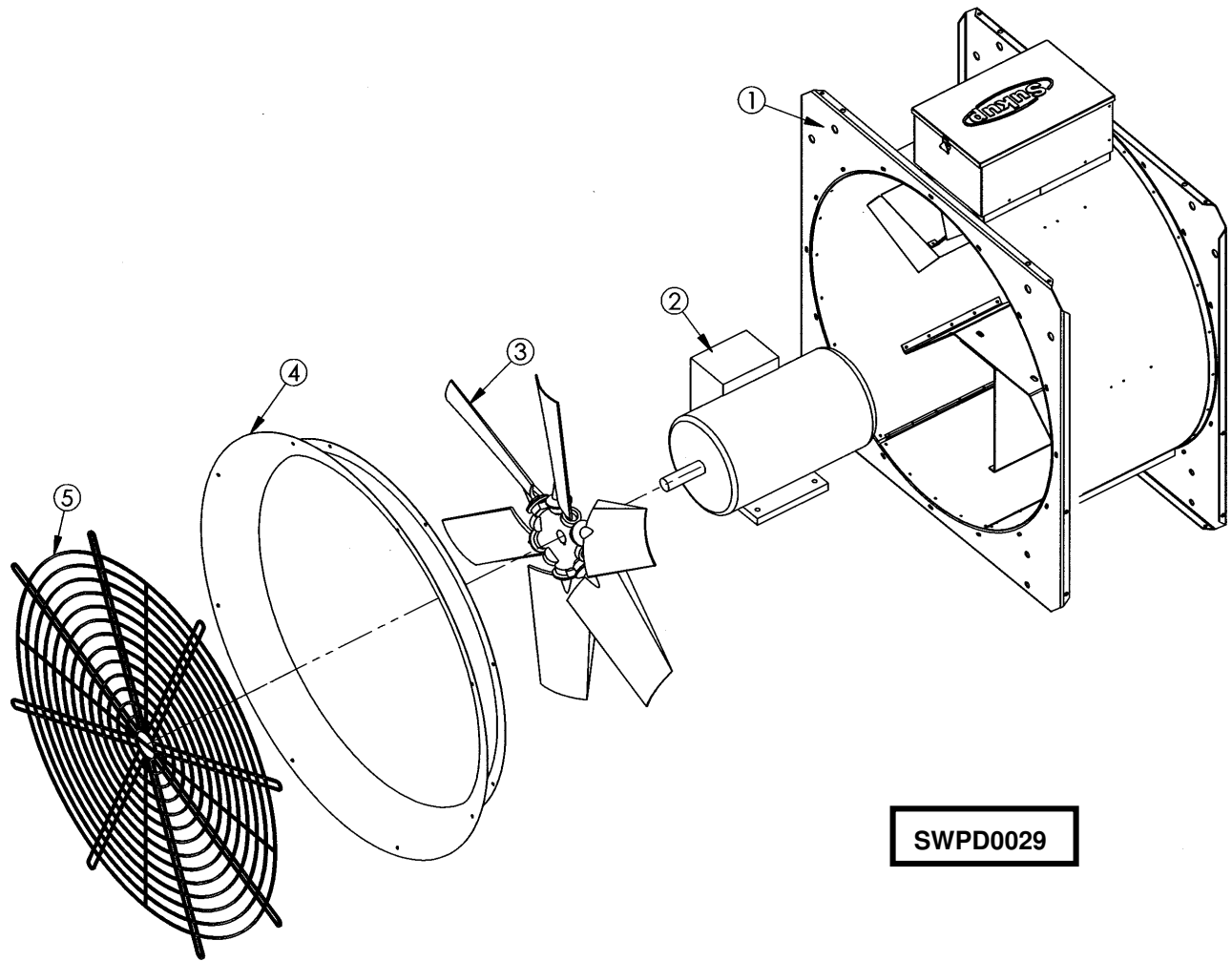
Phone: 641-892-4222
Website: www.sukup.com

Fax: 641-892-4629
E-mail: info@sukup.com

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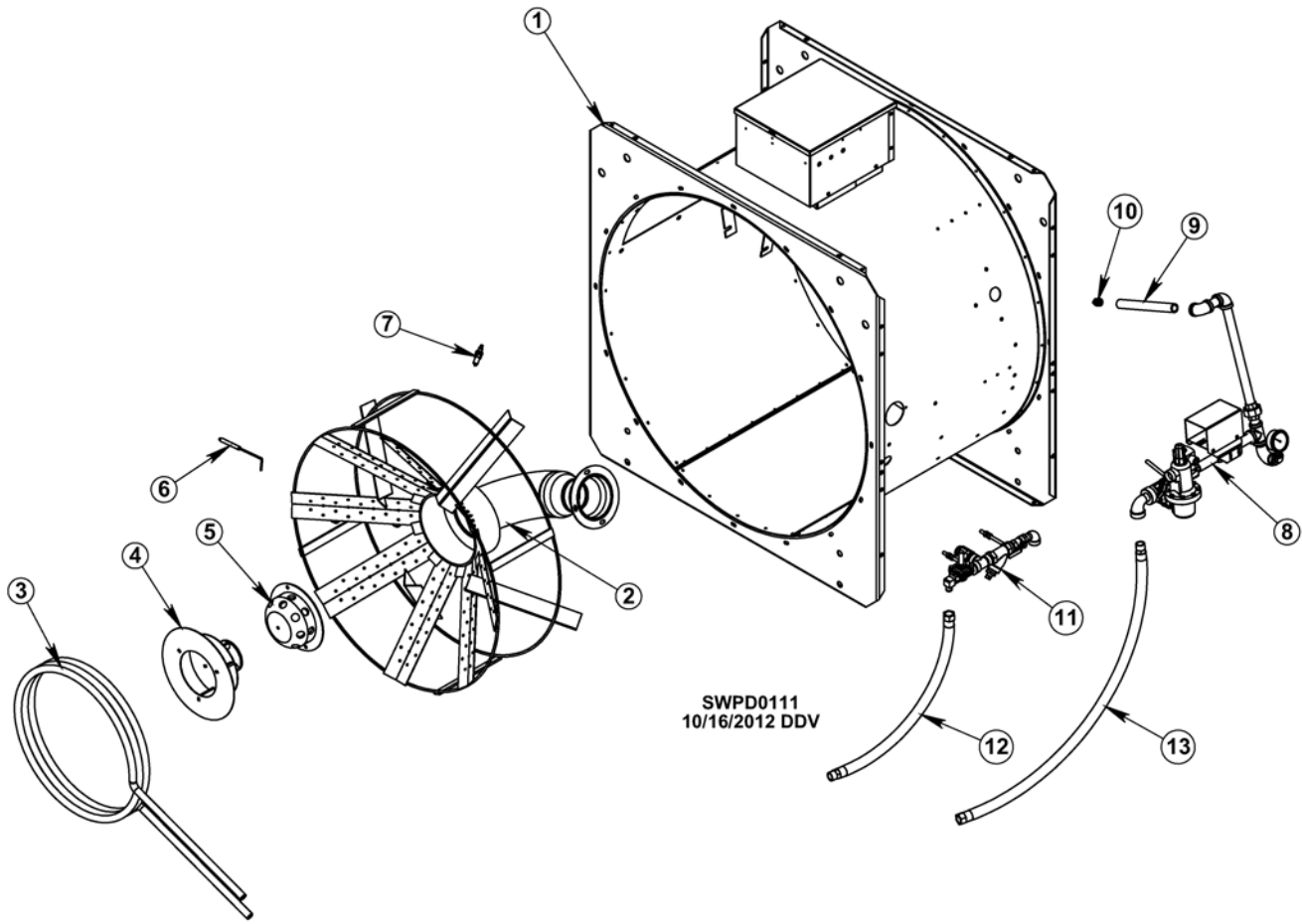
DRYER FAN PARTS



SWPD0029

Ref. #	Description	28" 15HP 1hp	28" 15HP 3ph	38" 15HP 1ph	38" 15HP 3ph	38" 20HP 3ph	44" 15HP 1ph	44" 15HP 3ph	44" 30HP 3ph	44" 40PH 3ph
1	Housing	T28550	T28550	T12980	T12981	T12981	T16980	T16980	T20980	T24980
2	Motor	H5753	H5758	H5755	H6275	H6800	H5755	H6275	H7125	H7175
3	Blade	J3062	J3962	T12175	T12175	T121752	J3070	J3070	J3067	J3068
4	Venturi	J3080	J3080	J3085	J3085	J3085	J3090	J3090	J3090	J3090
5	Inlet Screen	D3824	D3824	J3132	J3132	J3132	J2957	J2957	J2957	J2957

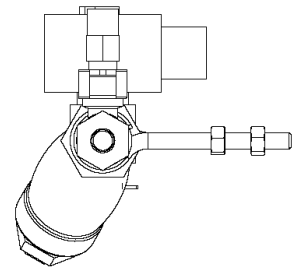
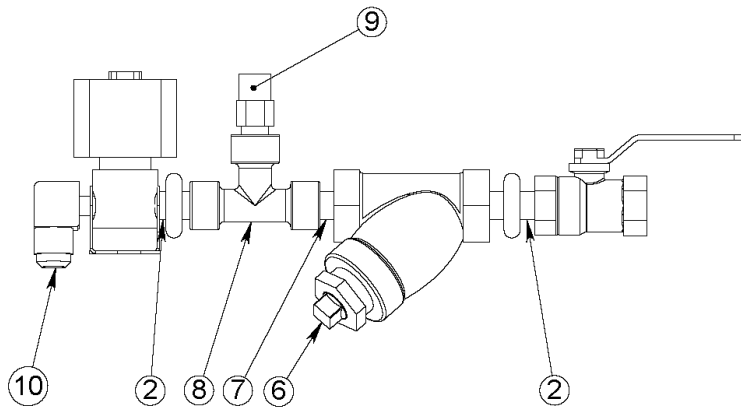
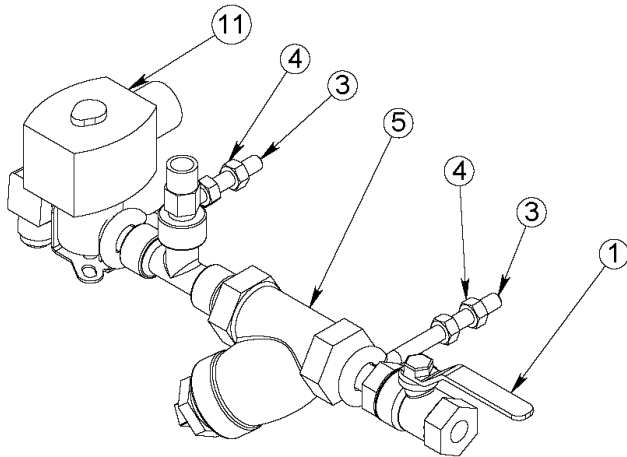
DRYER HEATER PARTS



REF #	DESCRIPTION	28" LP	28" NG	38" LP	38" NG	44" LP 15HP	44" NG 15HP	44" LP 30HP	44" NG 30HP	44" LP 40HP	44" NG 40HP
1	Housing	T28550	T28550	T12990	T12990	T16990	T16990	T16990	T16990	T16990	T16990
2	Burner	D4017	D4017	T12196	T12196	T16201	T16201	T16201	T16201	T16201	T16201
3	Vaporizer	D70321	----	T16194	----	T16194	----	T16194	----	T16194	----
4	Flame Deflector	----	----	T16204	----	T16204	----	T16204	----	T16204	----
5	Port Cup, High-Temp	D4027	D4027	D4044	D4044	D4044	D4044	D4044	D4044	D4044	D4044
	Port Cup, Intermediate	----	----	D40443	D40443	D40443	D40443	D40443	D40443	D40443	D40443
	Port Cup, Low-Temp	D4025	D4025	D4041	D4041	D4041	D4041	D4041	D4041	D4041	D4041
6	Flame Sensor	J5747	J5747	J5747	J5747	J5747	J5747	J5747	J5747	J5747	J5747
7	Spark Plug	J5739	J5739	J5739	J5739	J5739	J5739	J5739	J5739	J5739	J5739
8	Pipe Train	T241731	T24172M	T161934	T26195	T161937	T26195	T161937	T26195	T161937	T26195
9	Orifice Pipe	D7119	D7119	D7119	D71191	D71281	D71192	D71281	D71192	D71281	D71192
10	Orifice	D7110	D71125	D7112 15HP	D71124 15HP	D7112	D71124	D7113	D71127	D71125	D71128
11	Liquid Pipe Train	D40062	----	T161871	----	T16187	----	T16187	----	T16187	----
12	Hose (liquid)	J5929	----	J5936	----	J5936	----	J5936	----	J5936	----
13	Hose (vapor)	J5936	----	J5928	----	J5928	----	J5928	----	J5928	----

28" HEATER LIQUID PIPE TRAIN - 1/4"

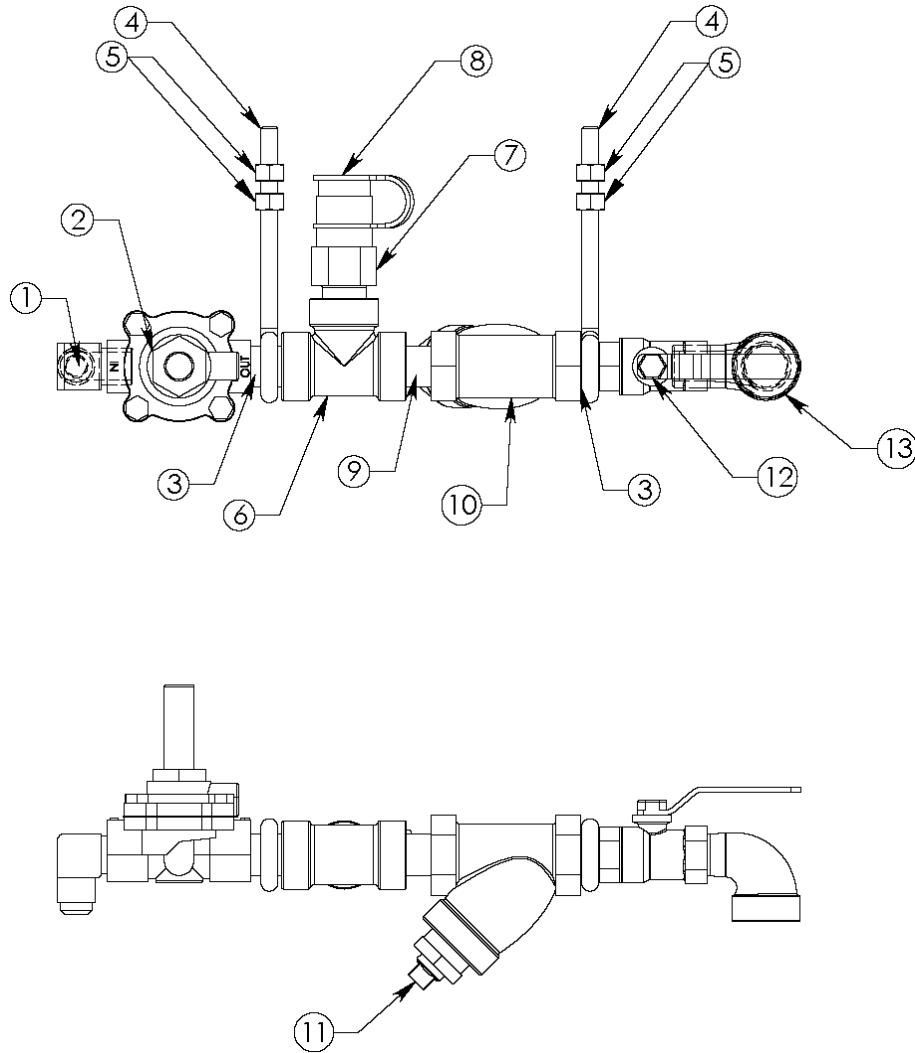
D40062



REF. #	DESCRIPTION	QTY	COMP. #
1	Valve, 1/4", LP Ball	1	J6080
2	Nipple, 1/4" x 1-1/2", Black pipe, Sch80	2	J2400
3	Eyebolt, 5/16-18, 3, 5/8" ID EYE	2	J0850
4	Nut, Hex, 5/16-18, PLT	4	J1002
5	Strainer, Liquid, 1/4"	1	J5990
6	Plug, 3/8", Pipe, Blk	1	J2610
7	Nipple, 1/4" x CL, Sch80	1	J24003
8	Tee, 1/4" x 1/4" x 1/4", Sch80	1	J2470
9	Valve, Relief, 1/4"	1	J6050
10	Elbow, 3/8FL x 1/4MIP, 90°, E1-6B	1	J2740
11	Solenoid Assy, 1/4" Liquid, ASCO Vlv, W/Wires	1	T20207
	Valve, Solenoid, 1/4" Liquid, ASCO, LESS Wires	1	J6035

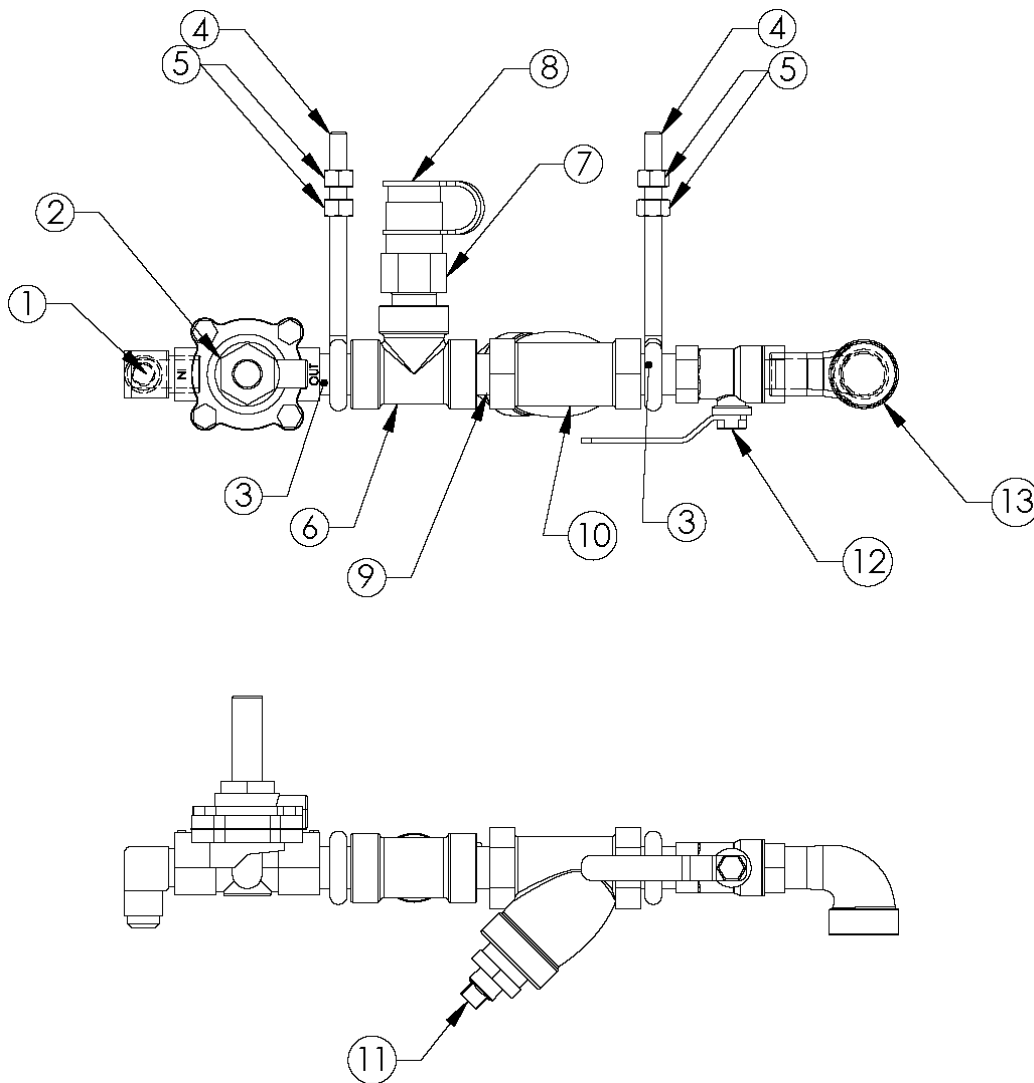
38" HEATER LIQUID PIPE TRAIN - 1/2"

T161871



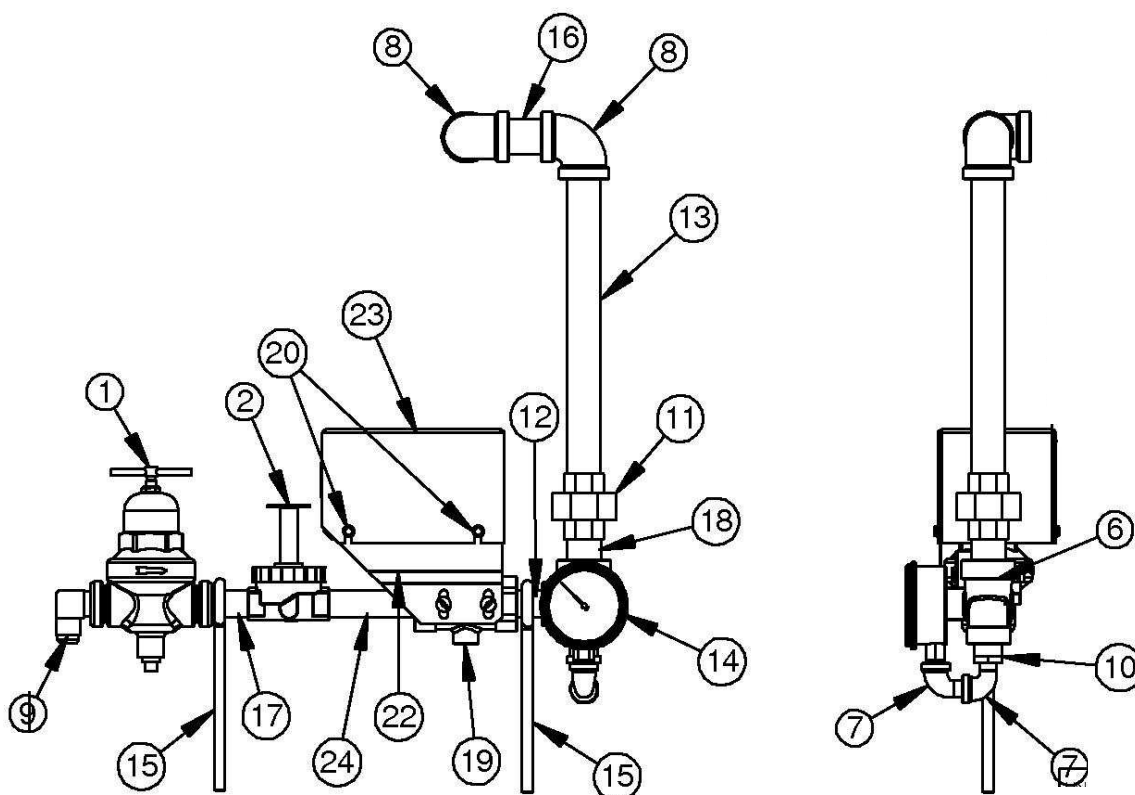
REF. #	DESCRIPTION	QTY	COMP. #
1	Elbow, 1/2FL x 1/2MIP, 90°, E1-8D	1	J2745
2	Solenoid Assy, Liquid, 1/2", 38", ASCO, W/Wires	1	T12202
	Valve, Solenoid, 1/2" Liquid, ASCO, LESS Wires	1	J6257
3	Nipple, 1/2 x 1-1/2, Sch80	2	J2406
4	Eyebolt, 3/8-16, 4.25, 1" ID EYE	2	J0860
5	Nut, Hex, 3/8-16, PLT	4	J1020
6	Tee, 1/2" x 1/2" x 1/2", Sch80	1	J2472
7	Valve, 1/2", Relief	1	J6170
8	Rain Cap, 7545-10	1	J6200
9	Nipple, 1/2 x CLOSE, Sch80	1	J2407
10	Strainer, Wye, 1/2", 20 MESH	1	J5992
11	Plug, 3/8, Pipe, Blk	1	J2610
12	Valve, 1/2", Ball, ITT 1550	1	J6082
13	Elbow, Street, 1/2, 90°, Sch80	1	J2519

44" HEATER LIQUID PIPE TRAIN - 1/2" **T16187**



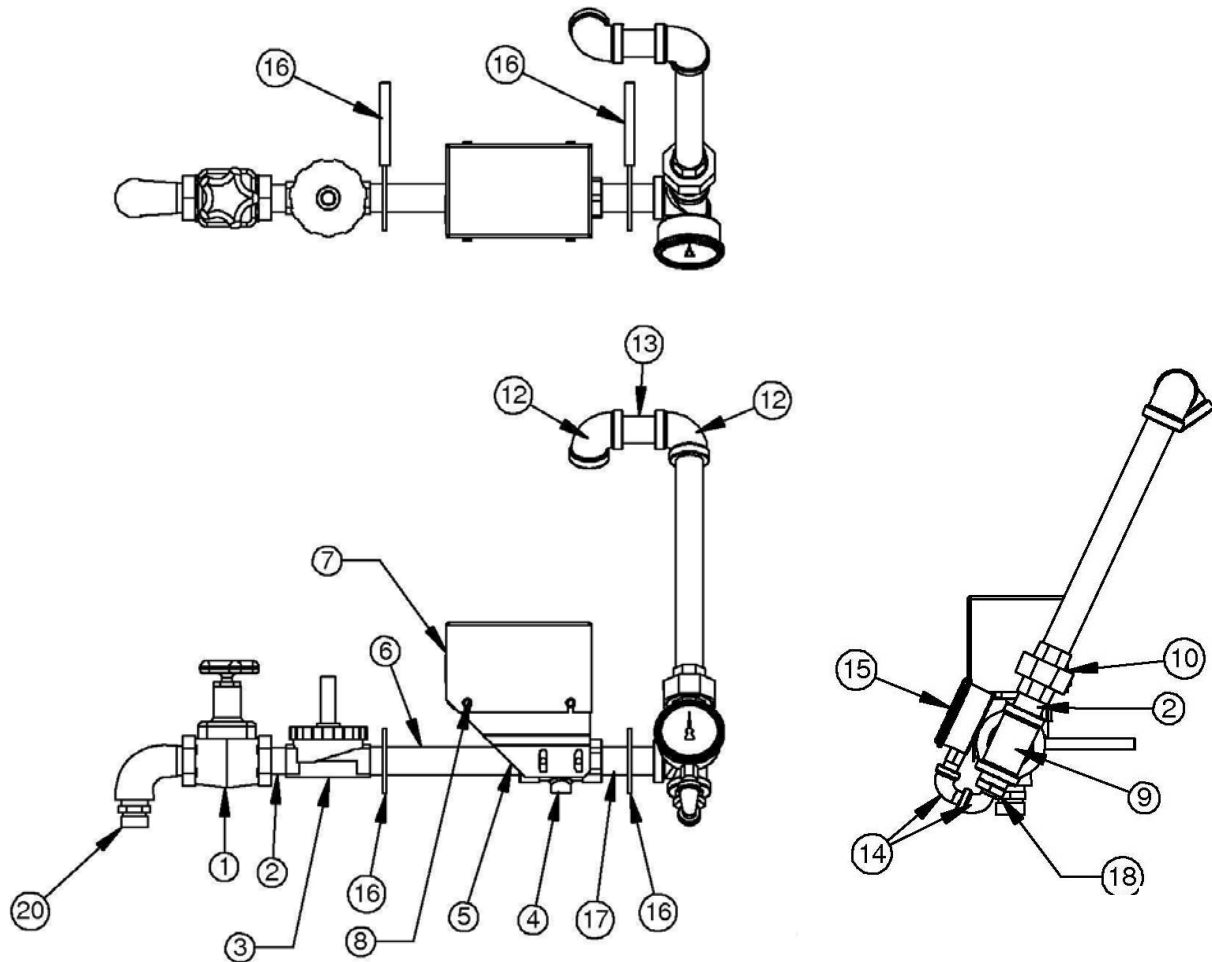
REF. #	DESCRIPTION	QTY	COMP. #
1	Elbow, 1/2FL x 1/2MIP, 90°, E1-8D	1	J2745
2	Solenoid Assy, 1/2" Liquid, ASCO Vlv, W/Wires	1	T16202
	Valve, Solenoid, 1/2" Liquid, ASCO, LESS Wires	1	J6257
3	Nipple, 1/2" x 1-1/2", Sch80	2	J2406
4	Eyebolt, 3/8-16, 4.25, 1" ID EYE	2	J0860
5	Nut, Hex, 3/8-16, PLT	4	J1020
6	Tee, 1/2" x 1/2" x 1/2", Sch80	1	J2472
7	Valve, Relief, 1/2"	1	J6170
8	Rain Cap, 7545-10	1	J6200
9	Nipple, 1/2" x CL, Sch80	1	J2407
10	Strainer, WYE, 1/2", 20 MESH	1	J5992
11	Plug, 3/8", Pipe, Blk	1	J2610
12	Valve, 1/2", Ball, ITT 1550	1	J6082
13	Elbow, Street, 1/2", 90°, Sch80	1	J2519

**PIPE TRAIN, EL MOD VALVE 1/2" 250°
28" FAN-HEATER (LP MODEL) - T241731**



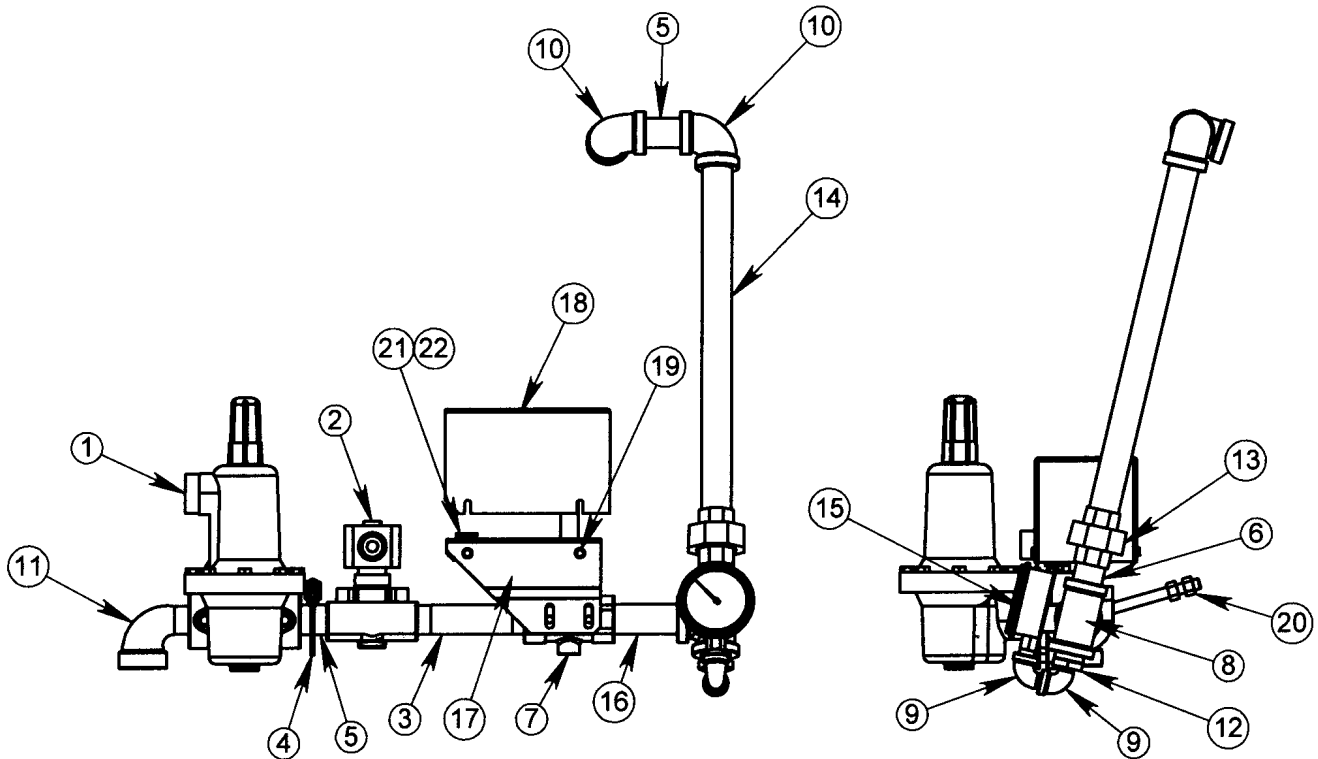
REF. #	DESCRIPTION	QTY	COMP. #
1	Regulator, Cash Acme, 1/2"	1	J6111
2	Valve, Solenoid, Body, 1/2"	1	J6254
6	Tee, Reducing, 3/4 x 1/2 x 1/2 Sch40	1	J2481
7	Elbow, Street, 1/4" 90°, Sch40	2	J2517
8	Elbow, 3/4", 90°, Sch40	2	J2525
9	Elbow, 1/2: FL x 1/2" MIP, 90° E1-8D	1	J2745
10	Bushing, Reducing, 1/2 x 1/4"	1	J2569
11	Union, 3/4", Black, #150	1	J2710
12	Nipple, 1/2" x 1-1/2", Sch40	1	J24062
13	Orifice Pipe, 3/4" X10", Sch80	1	J2429
14	Gauge, Pressure 0-30, Liquid, 1/4 Btm Mt	1	J5960
15	Eyebolt, 3/8-16, 4.25, 1" ID EYE	2	J0860
16	Nipple, 3/4" x 2", Sch40	2	J2420
17	Nipple, 1/2" x 2", Sch40	1	J24061
18	Nipple, 3/4" x Close, Sch40	1	J2410
19	Valve, Butterfly, L/Actuator, 1/2, Maxon	1	J6125
20	Screw, #10-16, 3/4, PLT, Selfdrill	4	J0469
22	Bracket, Electronic, MOD Valve	1	T161935
23	Cover, Electronic Valve, 5.625 X 3.5	1	T26902
24	Nipple, 1/2 X 3 1/2, Sch40	1	J24083

PIPE TRAIN, EL MOD VALVE, NG 3/4"
28" Heater, Continuous Flow Dryer
T24172M



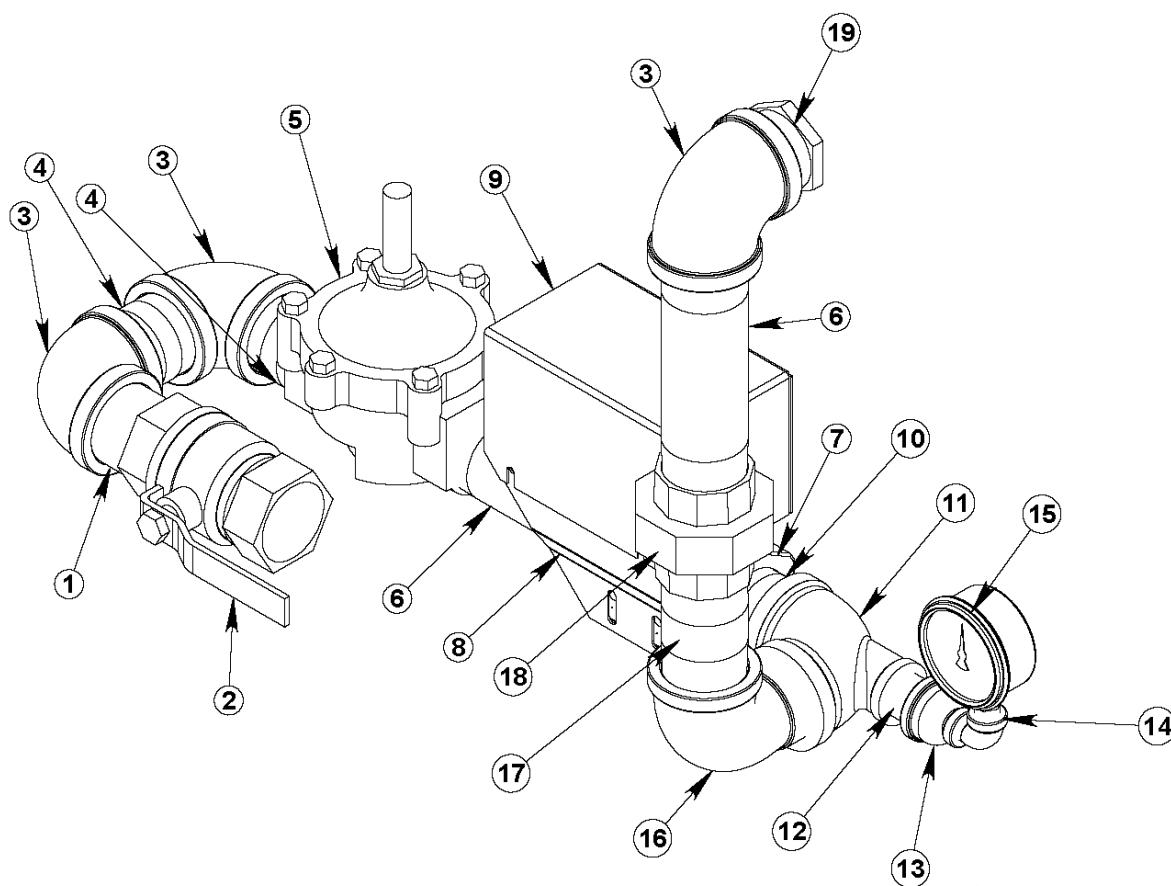
REF. #	DESCRIPTION	QTY	COMP. #
1	Valve, Globe, 3/4"	1	J2875
2	Nipple, 3/4" x Close	2	J2410
3	Valve, Solenoid, Body, 3/4, GP600	1	J6264
4	Valve, Butterfly, L/Actuator, 3/4, Maxon	1	J6126
5	Bracket, Electronic MOD Valve	1	T161935
6	Nipple, 3/4 x 6 1/2", Sch40	1	J2427
7	Cover, Electronic Valve, 5.625 x 3.5	1	T26902
8	Screw, #10-16, 3/4, PLT, Selfdrill	4	J0469
9	Tee, 3/4 x 3/4 x 3/4, Sch40	1	J2485
10	Union, 3/4, Black, #150	1	J2710
11	Nipple, 3/4 x 10", Sch80	1	J2429
12	Elbow, 3/4, 90°, Sch40	2	J2525
13	Nipple, 3/4 x 2, Sch40	1	J2420
14	Elbow, Street, 1/4, 90° Sch40	2	J2517
15	Gauge, Pressure, 0-30, Liquid, 1/4 Btm Mt	1	J5967
16	Eyebolt, Pipe Train	2	T16224
17	Nipple, 3/4 x 3, Sch40	1	J2423
18	Bushing, Reducing, 3/4 x 1/4, Sch40	1	J2570
19	Elbow, Street, 3/4", 90 Deg, Sch40	1	J2530
20	Nipple, 3/4 x CLS, BRS, HEX	1	J2416

PIPE TRAIN, EL MOD VALVE 3/4"
38" Heater, CONTINUOUS FLOW DRYER
T161934



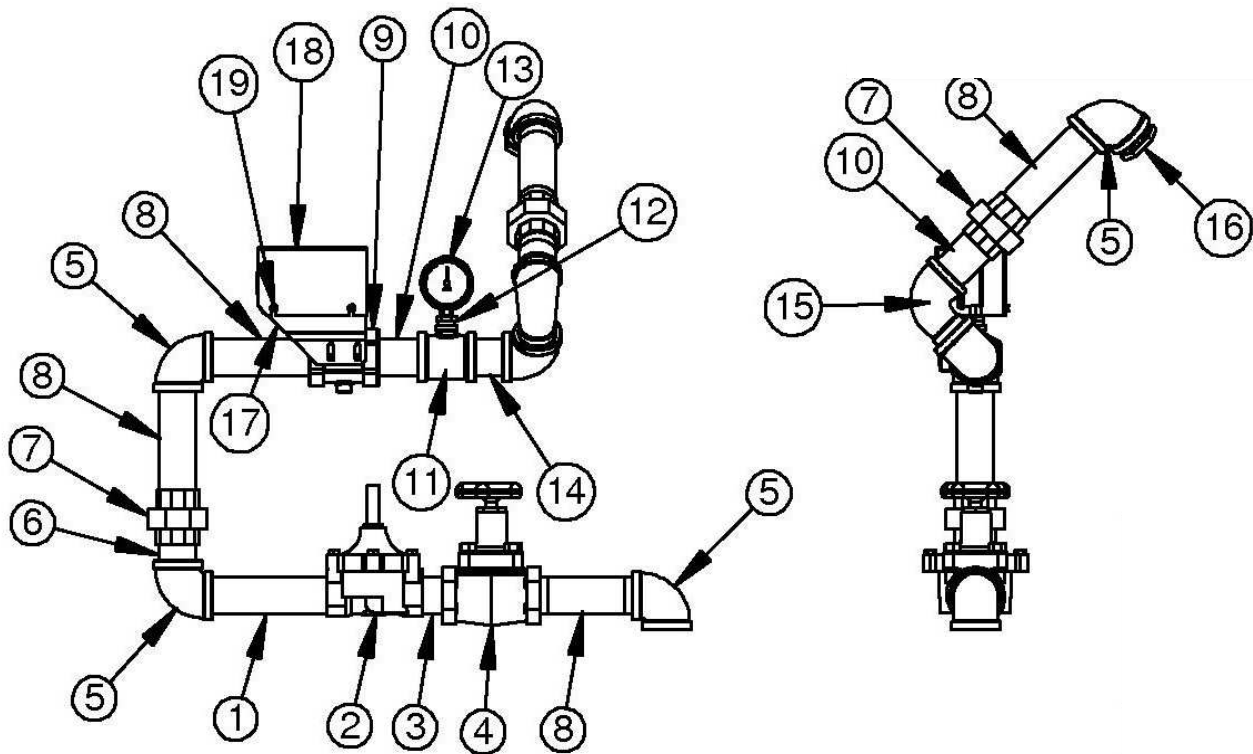
REF. #	DESCRIPTION	QTY	COMP. #
1	Regulator, 3/4", 627/6210, 5-20 lbs.	1	J6112
2	Vapor Solenoid Assy, 38", ASCO Vlv, W/Wires	1	T20212
	Valve, Solenoid, Vapor, 3/4, LESS Wires	1	J6038
3	Nipple, 3/4 X 4 1/2, Sch40	1	J2425
4	Eyebolt, Pipe Train, Heater	1	T16224
5	Nipple, 3/4 x 2, Sch40	2	J2420
6	Nipple, 3/4" x Close	1	J2410
7	Valve, Butterfly, L/Actuator, 3/4"	1	J6126
8	Tee, 3/4" x 3/4" x 3/4", Sch40	1	J2485
9	Elbow, Street, 1/4", 90°, Sch40	2	J2517
10	Elbow, 3/4", 90°, Extra Sch40	2	J2525
11	Elbow, Street, 3/4", 90°, Extra Heavy	1	J2532
12	Bushing, Reducing, 3/4" x 1/4", Sch40	1	J2570
13	Union, 3/4", Black, #150	1	J2710
14	Nipple, 3/4 x 14", Black, Sch40	1	J24291
15	Gauge, Pressure, 0-30, Liquid, 1/4 Btm Mt	1	J5960
16	Nipple, 3/4 x 3. Sch40	1	J2423
17	Bracket, Electronic MOD Valve	1	T161935
18	Cover, Electronic Valve, 5.625 x 3.5	1	T26902
19	Screw, #10-16, 3/4, PLT, Selfdrill	4	J0469
20	Nut, 3/8-16, PLT, Hex	2	J1020
21	Stud, Weld, Rtriangle, 10-24 x 1/2", LG	1	J0975
22	Nut, #10-24, Wing	1	J0976

**PIPE TRAIN, EL MOD VALVE, 1-1/2" NATURAL GAS
38" & 44" Heater, 2009 CONTINUOUS FLOW DRYER
T26195**



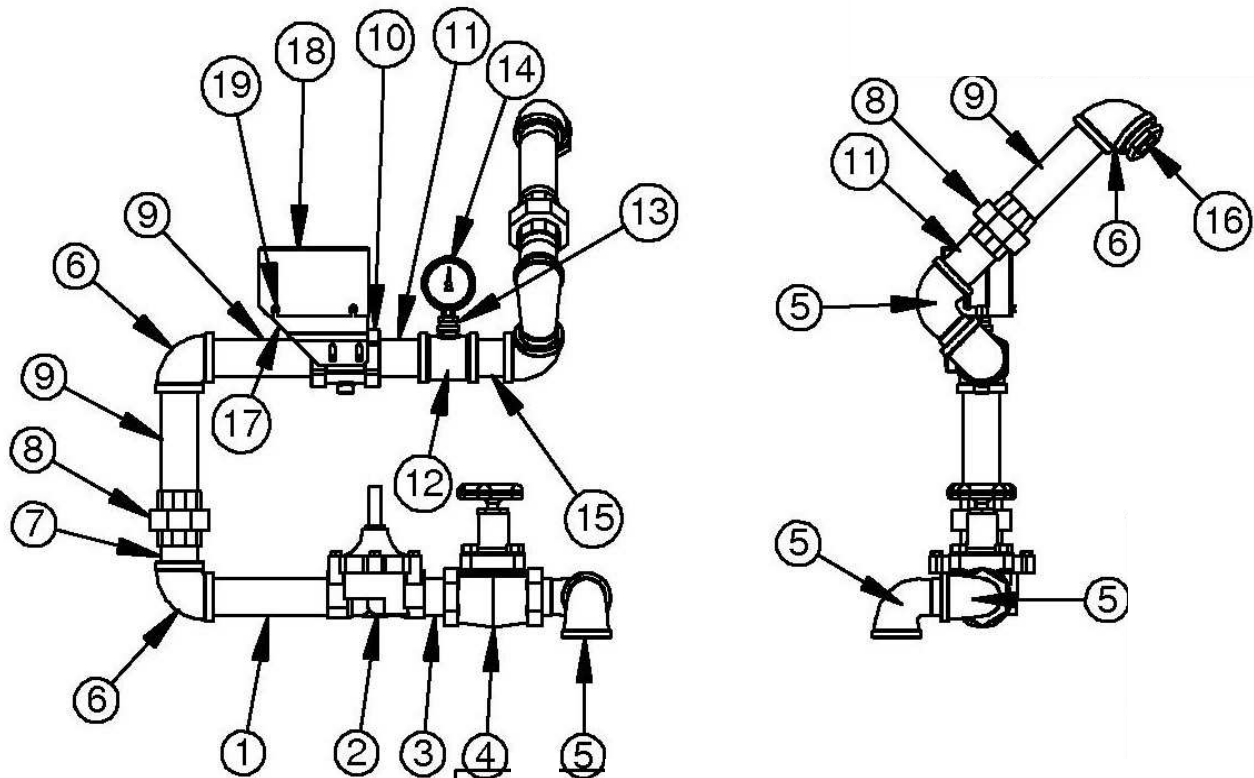
REF. #	DESCRIPTION	QTY	COMP. #
1	Nipple, 1.5 x Close, Sch40	1	J2431
2	Valve, 1-1/2", Ball (Firing)	1	J6087
3	Elbow, 1-1/2", 90 Deg, Sch40	3	J2541
4	Nipple, 1-1/2 x 2-1/2, Sch40	2	J24084
5	Solenoid Assy, 1-1/2" NG, ASCO Vlv, W/Wires	1	T20202
	Valve, Solnd, 1-1/2" NG, ASCO, LESS Wires	1	J6247
6	Nipple, 1.5 x 6" Sch40	2	J2437
7	Valve, Butterfly, L/Actuator, 1-1/2", Maxon	1	J6127
8	Bracket, Electronic Mod Valve	1	T161935
9	Cover, Electronic Valve, 5.625 x 3.5	1	T26902
10	Nipple, 1-1/2 x 2, Sch40	1	J2432
11	Tee, 1-1/2 x 3/4 x 1-1/2, Sch40	1	J2477
12	Nipple, 3/4 x Close, Sch40	1	J2410
13	Coupling, Reducing, 3/4 x 1/4 Sch40	1	J2574
14	Elbow, Street, 1/4, 90°, Sch40	1	J2517
15	Gauge, Pressure, 0-15, Liq, 2-1/2", 1/4" NPT	1	J5967
16	Elbow, Street, 1.5", 90°, Sch40	1	J2542
17	Nipple, 1.5 x 3", Sch40	1	J2433
18	Union, 1-1/2", Sch40	1	J2707
19	Bushing, Reducing, 1.5 x 1, Black	1	J2581

**PIPE TRAIN, EL MOD VALVE, 1-1/2" NATURAL GAS, 250°
NATURAL GAS - HEATER, CONTINUOUS FLOW DRYER
T25192**



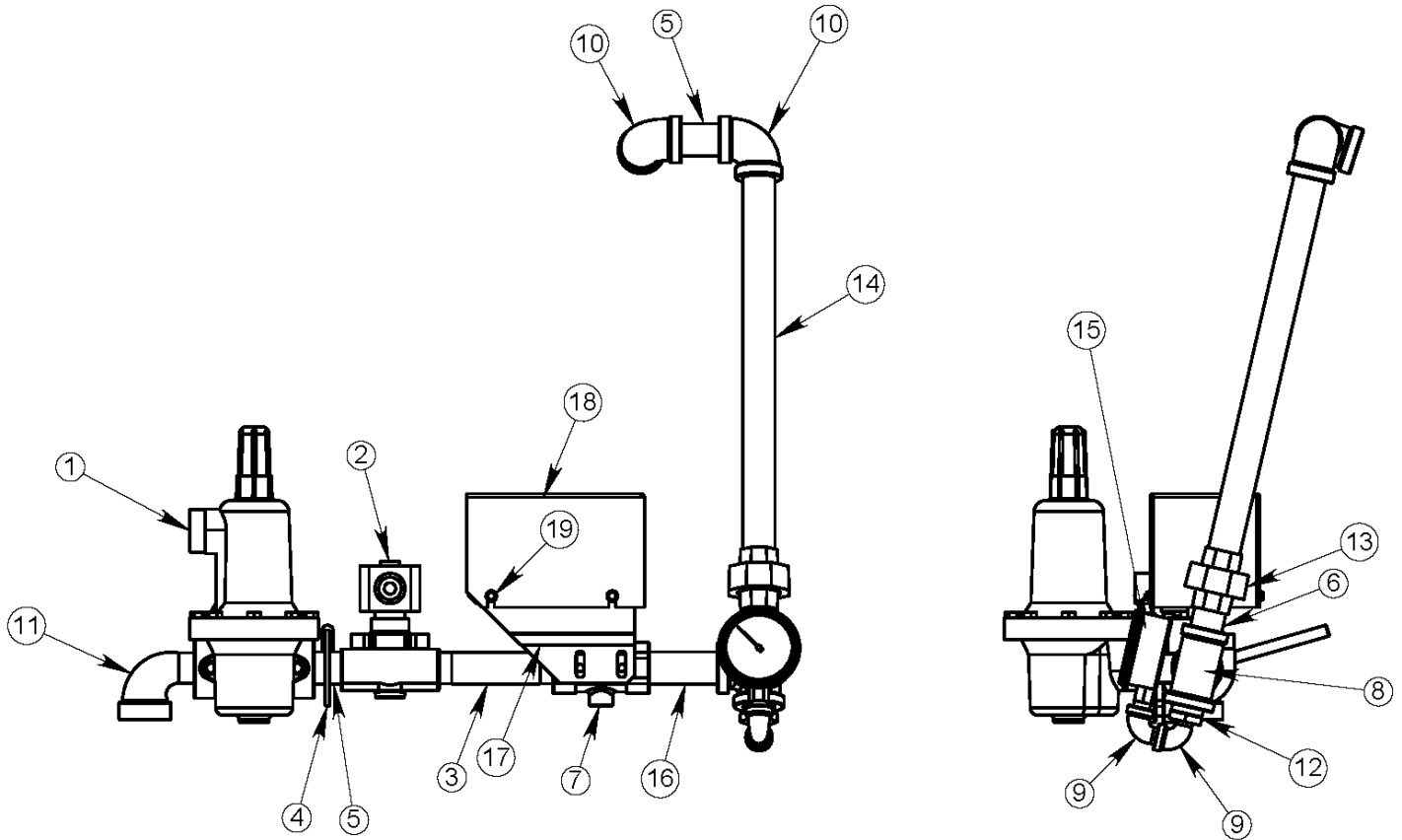
REF. #	DESCRIPTION	QTY	COMP. #
1	Nipple, 1 1/2" x 7", Sch40	1	J2445
2	Solenoid Assy, Nat. Gas, 1 1/2"	1	T20205
3	Nipple, 1 1/2 x 2, Sch40	1	J2432
4	Valve, Globe, 1-1/2"	1	J2880
5	Elbow, 1-1/2", 90° Sch40	5	J2541
6	Nipple, 1.5 x Close Sch40	4	J2431
7	Union, 1-1/2", Sch40	1	J2707
8	Nipple, 1.5 x 6", Sch40	2	J2437
9	Valve, Butterfly, L/Actuator, 1 1/2", Maxon	1	J6127
10	Nipple, 1.5 x 3" Sch40	2	J2433
11	Tee, Reduce, 1 1/2 x 1 1/2 x 1/2	1	J2479
12	Bushing, Reducing, 1/2 x 1/4	1	J2569
13	Gauge, Pressure, 0-15, Liq, 1/4 Btm Mt	1	J5967
14	Nipple, 1 1/2 x 2 1/2, Sch40	1	J24084
15	Elbow, Street, 1.5", 90 Deg, Sch40	1	J2542
16	Bushing, Reducing, 1.50 x 1.00, Black	1	J2581
17	Bracket, Electronic MOD Valve	1	T161935
18	Cover, Electronic Valve, 5.625 x 3.5	1	T26902
19	Screw, #10-16, 3/4, PLT, Selfdrill	4	J0469

**PIPE TRAIN, EL MOD VALVE, 1-1/2" & 2"
NATURAL GAS - T25194**



REF. #	DESCRIPTION	QTY	COMP. #
1	Nipple, 1 1/2" x 7", Sch40	1	J2445
2	Solenoid Assembly, Natural Gas, 1-1/2"	1	T20205
3	Nipple, 1 1/2 x 2, Sch40	1	J2432
4	Valve, Globe, 1-1/2"	1	J2880
5	Elbow, Street, 1.5", 90 Deg, Sch40	3	J2542
6	Elbow, 1-1/2", 90° Sch40	4	J2541
7	Nipple, 1.5xClose Sch40	1	J2431
8	Union, 1-1/2", Sch40	2	J2707
9	Nipple, 1.5 x 6" Sch40	3	J2437
10	Valve, Butterfly & Actuator, 1 1/2", Maxon	1	J6127-02
11	Nipple, 1.5 x 3", Sch40	2	J2433
12	Tee, Reduce, 1 1/2 x 1 1/2 x 1/2	1	J2479
13	Bushing, Reducing, 1/2 x 1/4"	1	J2569
14	Gauge, Pressure, 0-30, Liquid, 1/4 Btm Mt	1	J5967
15	Nipple, 1 1/2 x 2 1/2, Sch40	1	J24084
16	Bushing, Reducing, 1.50 x 1.00, Black	1	J2581
17	Bracket, Electronic MOD Valve	1	T161935
18	Cover, Electronic Valve, 5.625 x 3.5	1	T26902
19	Screw, #10-16, 3/4, PLT, Selfdrill	4	J0469

PIPE TRAIN, EL MOD VALVE, 3/4"
44" Heater, CONTINUOUS FLOW DRYER
T161937

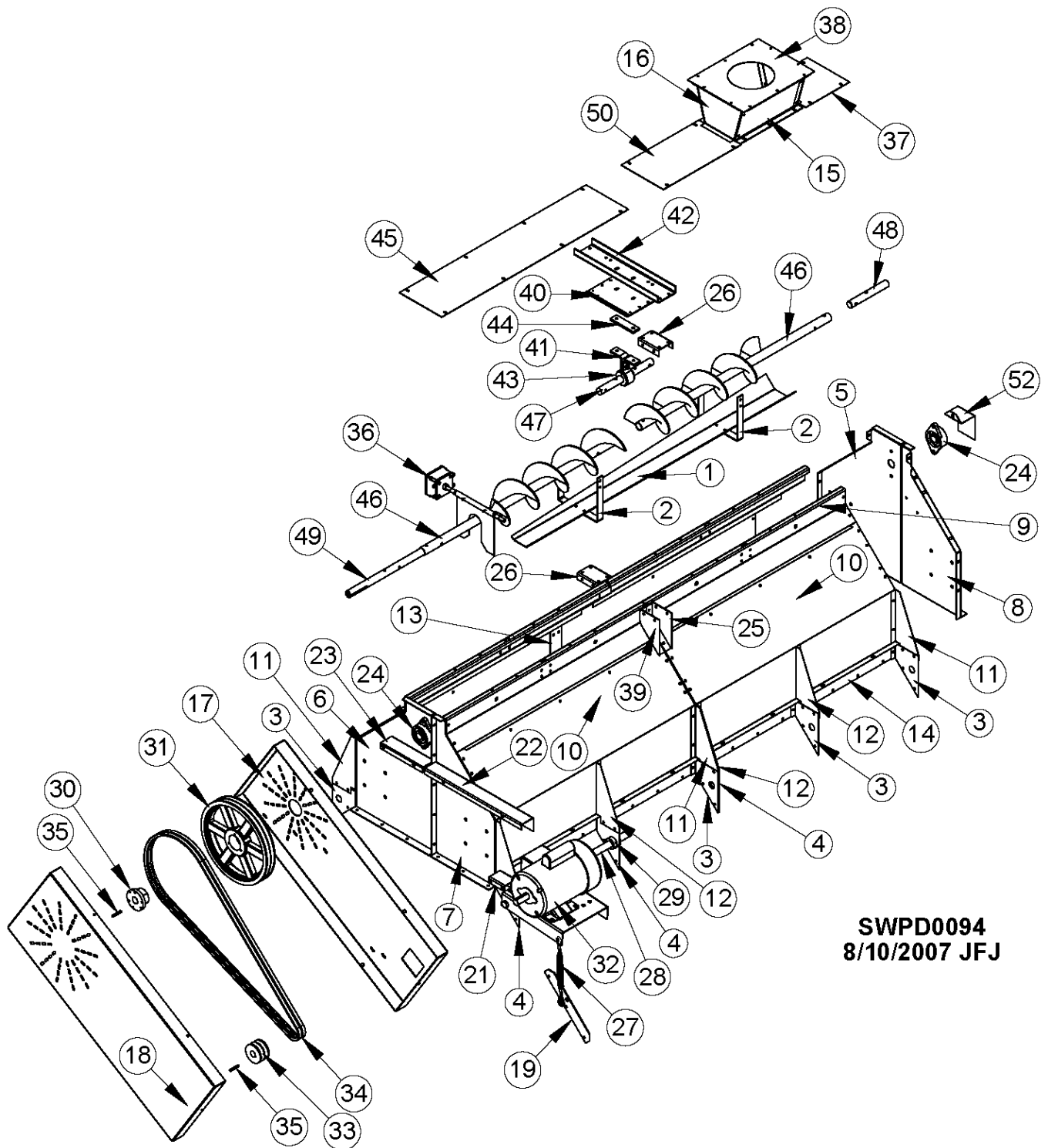


REF. #	DESCRIPTION	QTY	COMP. #
1	Regulator, 3/4", 5-20 Lb	1	J6112
2	Vapor Solenoid Assy, 44", ASCO Vlv, W/Wires	1	T20211
	Valve, Solenoid, 3/4" Vapor, ASCO, LESS Wires	1	J6038
3	Nipple, 3/4 x 4-1/2, Sch40	1	J2425
4	Eyebolt, Pipe Train, Heater	1	T16224
5	Nipple, 3/4 x 2, Sch40	2	J2420
6	Nipple, 3/4 x Close, Sch40	1	J2410
7	Valve, Butterfly, L/Actuator, 3/4"	1	J6126
8	Tee, 3/4 x 3/4 x 3/4, Sch40	1	J2485
9	Elbow, Street, 1/4", 90°, Sch40	2	J2517
10	Elbow, 3/4", 90°, Sch40	2	J2525
11	Elbow, Street, 3/4, 90°, Ex Hvy	1	J2532
12	Bushing, Reducing, 3/4 x 1/4, Sch40	1	J2570
13	Union, 3/4, Black, #150	1	J2710
14	Nipple, 3/4 x 14", Black, Sch40	1	J24291
15	Gauge, Pressure, 0-30, Liq, 1/4 Btm Mt	1	J5960
16	Nipple, 3/4 x 3	1	J2423
17	Bracket, Electronic Mod Valve	1	T161935
18	Cover, Electronic Valve	1	T26902
19	Screw, #10-16, 3/4, PLT, Self-drill	4	J0469

NOTES

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8' WET BIN

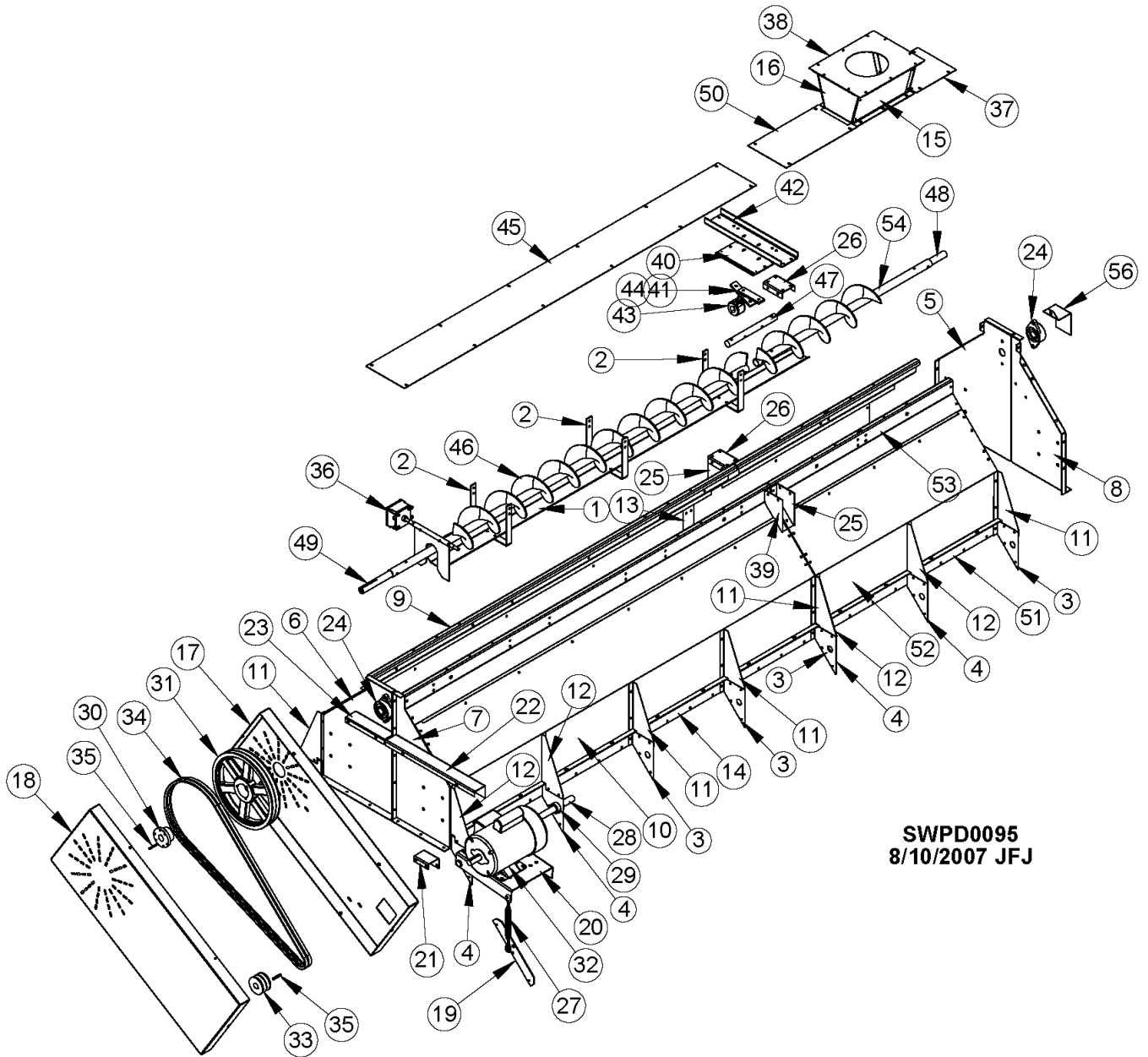


SWPD0094
8/10/2007 JFJ

8' WET BIN

REF. #	DESCRIPTION	QTY	COMP. #
1	Trash Pan	1	T10235
2	Support, Trash Pan	2	T16236
3	Left Support Gusset	6	T16117
4	Right Support Gusset	6	T16118
5	RR Wet Bin End Plate	1	T17401
6	RF Wet Bin End Plate	1	T17400
7	LF Wet Bin End Plate	1	T17402
8	LR Wet Bin End Plate	1	T17403
9	Top 4' Panel (Fill Switch)	4	T12537
10	Side, Wet Bin, 4FT 2000	4	T12525
11	LT Pivot Brace Wet Bin	4	T17410
12	RT Pivot Brace Wet Bin	8	T17411
13	Splice, Wet Bin Side	2	T17412
14	Bolt Down Lip 8' 2000	2	T17453
15	Hopper Side	2	T17935
16	Hopper End	2	T17936
17	Top Auger Shield (Inner)	1	T16256
18	Top Auger Shield (Outer)	1	T16255
19	Plate, Turnbuckle, Motor Mount	1	T16283
20	Top Motor Mount	1	T16277
21	Top Shield Brace	1	T16258
22	Bracket, LF Top Auger Shield	1	T16861
23	Bracket, RF Top Auger Shield	1	T16860
24	Bearing, 1.25, FLG, W/LC, HCFTS207-20	2	J0010
25	Splice Gusset Right	2	T16145
26	Splice Channel Short	2	T16146
27	Turnbuckle, 3/8" x 6"	1	J0904
28	Pivot, Motor Mount, Top	1	T18150
29	Collar, Shaft, 1-3/16"	2	J1338
30	Bushing, 1.25, SK	1	J0410
31	Pulley, 15.75 OD, DBL "B" Gr, SK	1	J03992
32	MTR, Auger 3HP, TEFC,	1	T12590
33	Pulley, 3.5 OD, 1.25, DBL, B, Cast	1	J0317
34	Belt, B95	2	J0252
35	Key, 1/4 x 1/4 x 2"	2	F4499
36	Paddle, Assembly	1	T16262
37	Lid, Extension, Wet Bin	1	T16159
38	Cover, Hopper	1	T17937
39	Splice Gusset Left	2	T16144
40	Crimp Plate	1	T16142
41	Hanger, Auger, T, 6CH2203	1	J0097
42	Splice Channel	1	T16143
43	Bushing, Wood, 1.25" ID	1	J0096
44	Spacer, T-Hanger, Top Auger	1	T16096
45	Lid, Wet Holding Bin	1	T08100
46	4' Rear, Top Auger	2	T12503
47	Shaft, 8" Hanger Bearing	1	F4720
48	Shaft, 1.25" x 9" LG	1	G73291
49	Shaft, Top Front, 12 3/4"	1	T16436
50	Lid, Bin, Wet HLD. 12'	1	T12519
51	Plate, Short Splice	2	T16141
52	Rear Shaft Shield	1	T16420

12' WET BIN

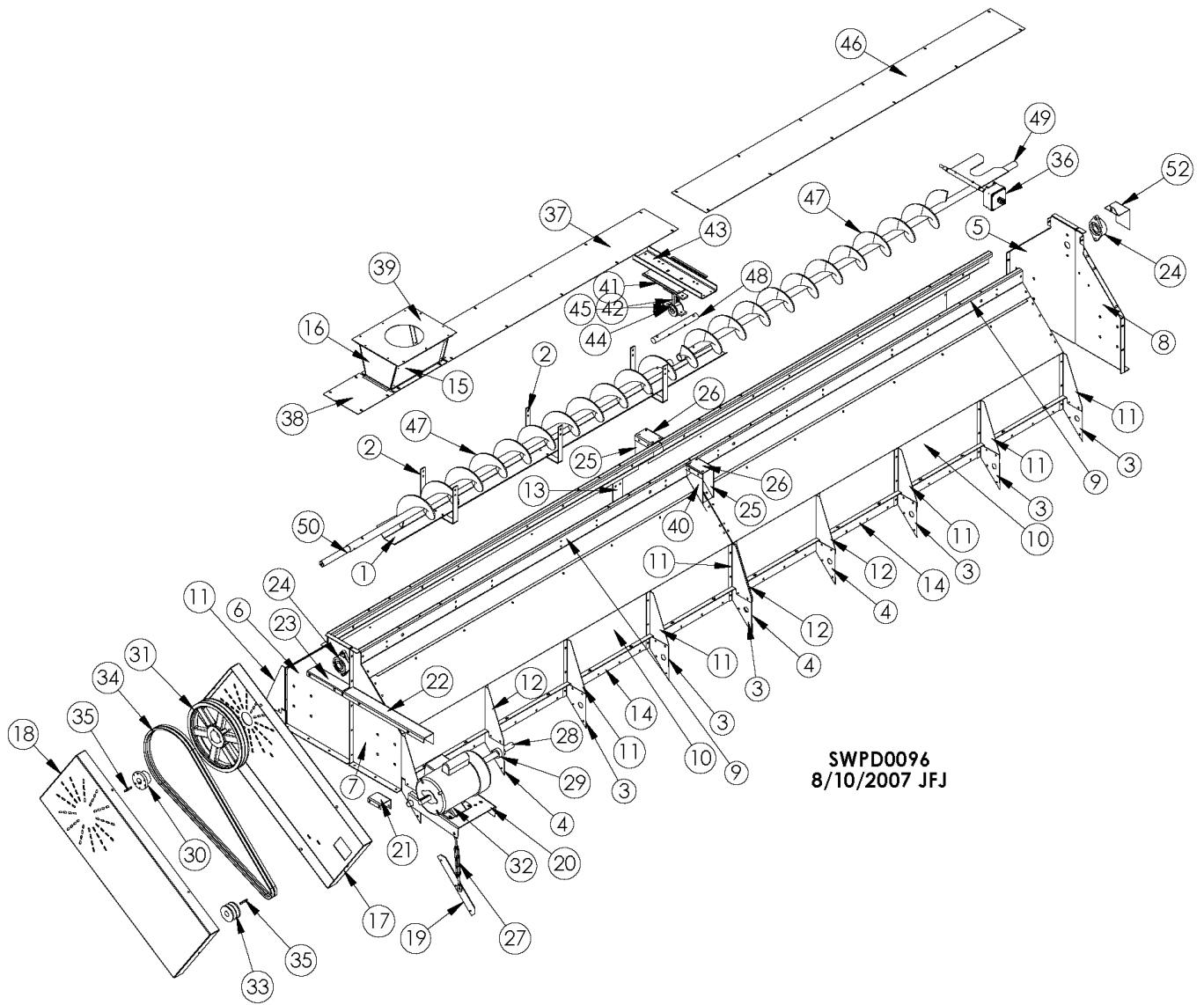


SWPD0095
8/10/2007 JFJ

12' WET BIN

REF. #	DESCRIPTION	QTY	COMP. #
1	Trash Pan	1	T16235
2	Support, Trash Pan	3	T16236
3	Left Support Gusset	8	T16117
4	Right Support Gusset	8	T16118
5	RR Wet Bin End Plate	1	T17401
6	RF Wet Bin End Plate	1	T17400
7	LF Wet Bin End Plate	1	T17402
8	LR Wet Bin End Plate	1	T17403
9	Top 8' Panel (Fill switch)	2	T17457
10	Wet Bin Side Perforated (Stainless)	2	T17450S
	Wet Bin Side Perforated (Galvanized)	2	T17450
11	LT Pivot Brace Wet Bin	8	T17410
12	RT Pivot Brace Wet Bin	8	T17411
13	Splice, Wet Bin Side	2	T17412
14	Bolt Down Lip 8' 2000	2	T17453
15	Hopper Side	2	T17935
16	Hopper End	2	T17936
17	Top Auger Shield (Inner)	1	T16256
18	Top Auger Shield (Outer)	1	T16255
19	Plate, Turnbuckle, Connector	1	T16283
20	Top Motor Mount	1	T16277
21	Top Shield Brace	1	T16258
22	Bracket, LF Top Auger Shield	1	T16861
23	Bracket, RF Top Auger Shield	1	T16860
24	Bearing, 1.25, FLG, W/LC, HCFTS207-20	2	J0010
25	Splice Gusset Right	2	T16145
26	Splice Channel Short	2	T16146
27	Turnbuckle, 3/8" x 6"	1	J0904
28	Pivot, Motor Mount, Top	1	T18150
29	Collar, Shaft, 1-3/16"	2	J1338
30	Bushing, 1.25, SK	1	J0410
31	Pulley, 15.75 OD, DBL "B" Gr, SK	1	J03992
32	MTR, Auger 3HP, 1ph, TEFC,	1	T12590
	MTR, Auger 3HP, 3ph, TEFC	1	H3345
33	Pulley, 3.5 OD, 1.25, DBL, B, Cast	1	J0317
34	Belt, B95	2	J0252
35	Key, 1/4 x 1/4 x 2"	2	F4499
36	Paddle, Assembly	1	T16262
37	Lid, Extension, Wet Bin	1	T16159
38	Cover, Hopper	1	T17937
39	Splice Gusset Left	2	T16144
40	Crimp Plate	1	T16142
41	Hanger, Auger, T, 6CH2203	1	J0097
42	Splice Channel	1	T16143
43	Bushing, Wood, 1.25" ID	1	J0096
44	Spacer, T-Hanger, Top auger	1	T16096
45	Lid, Wet Holding Bin	1	T16158
46	Top Auger	1	T16428
47	Stub Shaft	1	F4720
48	Shaft, 1.25" x 9" LG	1	G73291
49	Auger Shaft, Top Front	1	T16436
50	Lid, Bin, Wet HLD. 12"	1	T12519
51	Bolt Down Lip, 4'	2	T12524
52	Side, Wet Bin 4' (Galvanized)	2	T12525
	Side, Wet Bin 4' (Stainless)	2	T12525S
53	Top 4' Panel (Fill switch)	2	T12537
54	4' Rear, Top Auger	1	T12503
55	Plate, Short Splice	2	T16141
56	Rear Shaft Shield	1	T16420

16' WET BIN

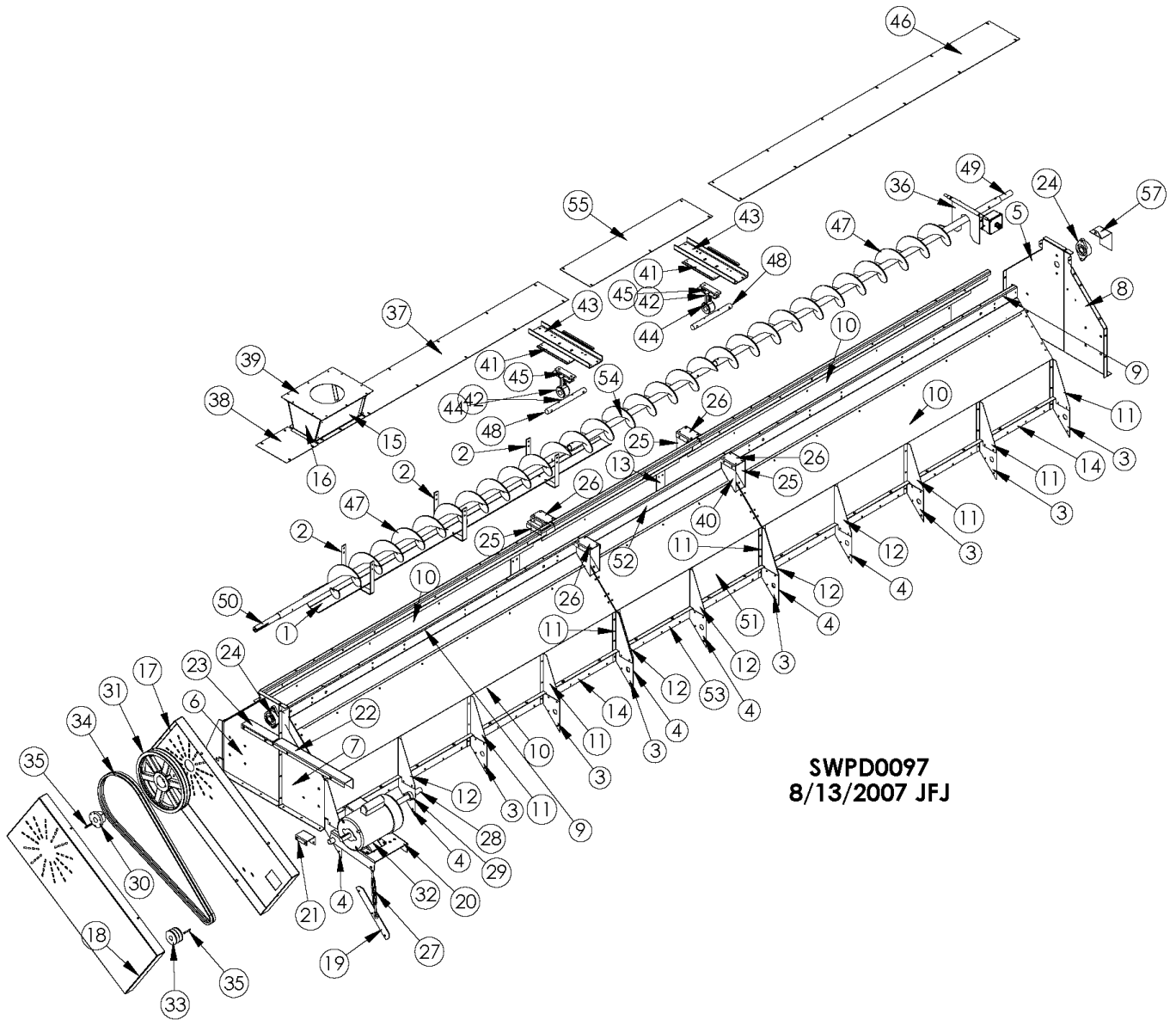


SWPD0096
8/10/2007 JFJ

16' WET BIN

REF. #	DESCRIPTION	QTY	COMP. #
1	Trash Pan	1	T16235
2	Support, Trash Pan	3	T16236
3	Left Support Gusset	12	T16117
4	Right Support Gusset	8	T16118
5	RR Wet Bin End Plate	1	T17401
6	RF Wet Bin End Plate	1	T17400
7	LF Wet Bin End Plate	1	T17402
8	LR Wet Bin End Plate	1	T17403
9	Top 8' Panel (Fill switch)	4	T17457
10	Wet Bin Side Perf, (Stainless)	4	T17450S
	Wet Bin Side Perf, (Galvanized)	4	T17450
11	LT Pivot Brace Wet Bin	12	T17410
12	RT Pivot Brace Wet Bin	8	T17411
13	Splice, Wet Bin Side	2	T17412
14	Bolt Down Lip 8', 2000	4	T17453
15	Hopper Side	2	T17935
16	Hopper End	2	T17936
17	Top Auger Shield (Inner)	1	T16256
18	Top Auger Shield (Outer)	1	T16255
19	Plate, Turnbuckle, Connector	1	T16283
20	Top Motor Mount	1	T16277
21	Top Shield Brace	1	T16258
22	Bracket, LF Top Auger Shield	1	T16861
23	Bracket, RF Top Auger Shield	1	T16860
24	Bearing, 1.25, FLG, W/LC, HCFTS207 - 20	2	J0010
25	Splice Gusset Right	2	T16145
26	Channel, Splice, Short	2	T16146
27	Turnbuckle, 3/8" x 6"	1	J0904
28	Pivot, Motor Mount, Top	1	T18150
29	Collar, Shaft, 1-3/16"	2	J1338
30	Bushing, 1.25 SK	1	J0410
31	Pulley, 15.75OD, Double "B" Gr. SK	1	J03992
32	Motor, Auger 3HP, 1ph, TEFC	1	T12590
	Motor, Auger 3HP, 3ph, TEFC	1	H3345
33	Pulley, 3.5 OD, 1.25, Double, B, Cast	1	J0317
34	Belt, B95	2	J0252
35	Key, 1/4 x 1/4 x 2	2	F4499
36	Paddle, Assembly	1	T16262
37	Lid, Wet Holding Bin	1	T16157
38	Lid, 10.5", Extension, Wet Bin	1	T16159
39	Cover, Hopper	1	T17937
40	Splice Gusset Left	2	T16144
41	Crimp Plate	1	T16142
42	Hanger, Auger, T, 6CH2203	1	J0097
43	Splice Channel	1	T16143
44	Bushing, Wood, 1.25" ID	1	J0096
45	Spacer, T-Hanger, Top auger	1	T16096
46	Lid, 92-1/2" Wet Holding Bin	1	T16158
47	Top Auger	2	T16428
48	Shaft, 8' Hanger Bearing	1	F4720
49	Shaft, 1.25" x 9"	1	G73291
50	Shaft, Top Front, 12-3/4"	1	T16436
51	Plate, Short Splice	2	T16141
52	Rear Shaft Shield	1	T16420

20' WET BIN

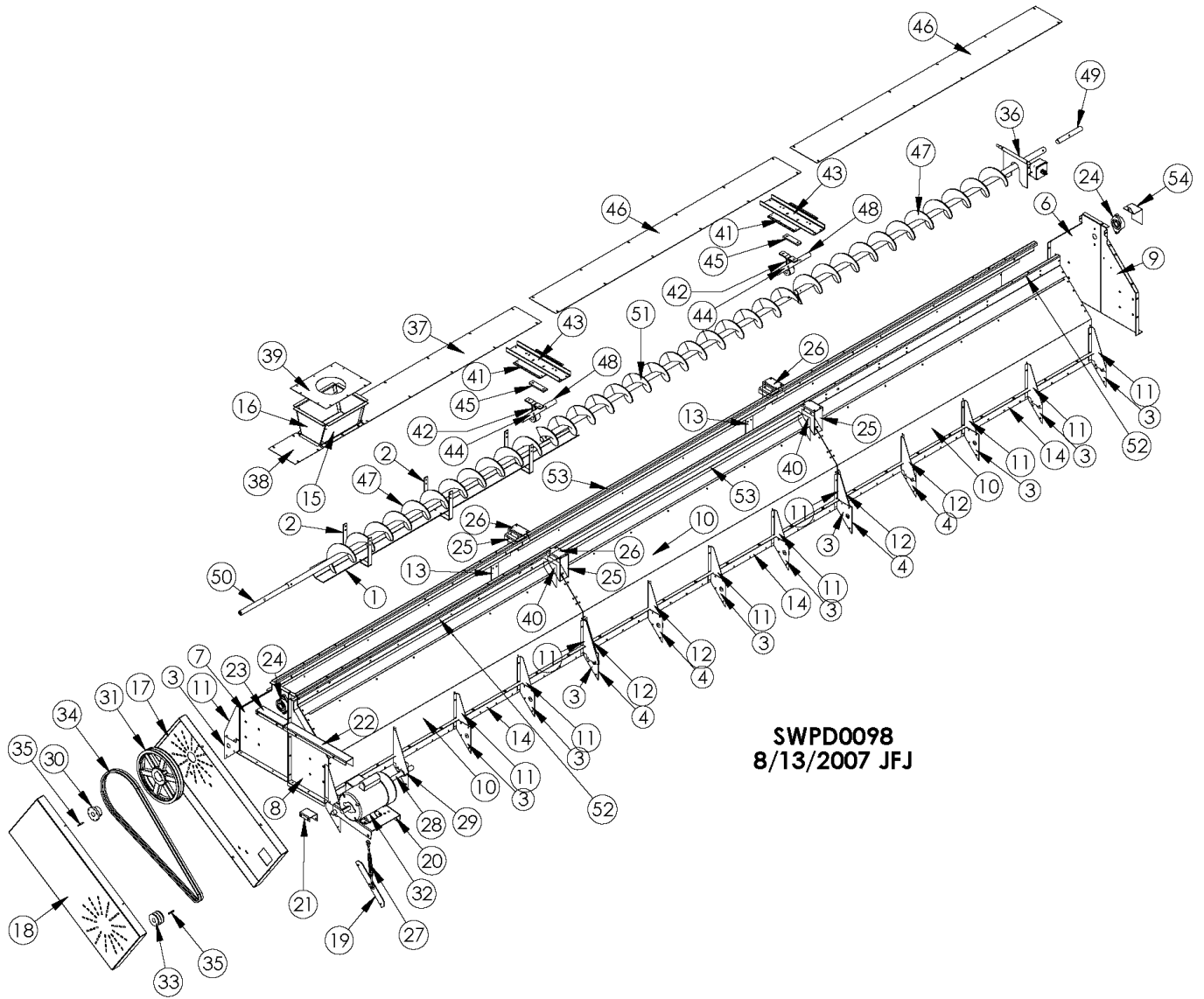


SWPD0097
8/13/2007 JFJ

20' WET BIN

REF. #	DESCRIPTION	QTY	COMP. #
1	Trash Pan	1	T16235
2	Support, Trash Pan	3	T16236
3	Left Support Gusset	14	T16117
4	Right Support Gusset	12	T16118
5	RR Wet Bin End Plate	1	T17401
6	RF Wet Bin End Plate	1	T17400
7	LF Wet Bin End Plate	1	T17402
8	LR Wet Bin End Plate	1	T17403
9	Top 8' Panel (Fill Switch)	4	T17457
10	Wet Bin Side Perf, (Stainless)	4	T17450S
	Wet Bin Side Perf, (Galvanized)	4	T17450
11	LT Pivot Brace Wet Bin	14	T17410
12	RT Pivot Brace Wet Bin	12	T17411
13	Splice, Wet Bin Side	4	T17412
14	Bolt Down Lip 8', 2000	4	T17453
15	Hopper Side	2	T17935
16	Hopper End	2	T17936
17	Top Auger Shield (Inner)	1	T16256
18	Top Auger Shield (Outer)	1	T16255
19	Plate, Turnbuckle, Connector	1	T16283
20	Top Motor Mount	1	T16277
21	Top Shield Brace	1	T16258
22	Bracket, LF Top Auger Shield	1	T16861
23	Bracket, RF Top Auger Shield	1	T16860
24	Bearing, 1.25, FLG, W/LC, HCFTS207 - 20	2	J0010
25	Splice Gusset Right	4	T16145
26	Channel, Splice, Short	4	T16146
27	Turnbuckle, 3/8" x 6"	1	J0904
28	Pivot, Motor Mount, Top	1	T18150
29	Collar, Shaft, 1-3/16"	2	J1338
30	Bushing, 1.25 SK	1	J0410
31	Pulley, 15.75OD, Double "B" Gr. SK	1	J03992
32	Motor, Auger 5HP, 1ph, TEFC	1	T20590
	Motor, Auger 5HP, 3ph, TEFC	1	H4190
33	Pulley, 3.5 OD, 1.25, Double, B, Cast	1	J0317
34	Belt, B95	2	J0252
35	Key, 1/4 x 1/4 x 2	2	F4499
36	Paddle, Assembly	1	T16262
37	Lid, Wet Holding Bin	1	T16157
38	Lid, 10.5", Extension, Wet Bin	1	T16159
39	Cover, Hopper	1	T17937
40	Splice Gusset Left	4	T16144
41	Crimp Plate	2	T16142
42	Hanger, Auger, T, 6CH2203	2	J0097
43	Splice Channel	2	T16143
44	Bushing, Wood, 1.25" ID	2	J0096
45	Spacer, T-Hanger, Top auger	2	T16096
46	Lid, 92-1/2" Wet Holding Bin	1	T16158
47	Top Auger	2	T16428
48	Shaft, 8' Hanger Bearing	2	F4720
49	Shaft, 1.25" x 9"	1	G73291
50	Shaft, Top Front, 12-3/4"	1	T16436
51	Side, Wet Bin, 4', 2000	2	T12525
52	Top 4' Panel (LR) 12'	2	T20526
53	Bolt Down Lip, 4'	2	T12524
54	Top Middle Auger 20'	1	T16427
55	Lid, Wet Holding Bin 20'	1	T20158
56	Plate, Short Splice	4	T16141
57	Rear Shaft Shield	1	T16420

24' WET BIN

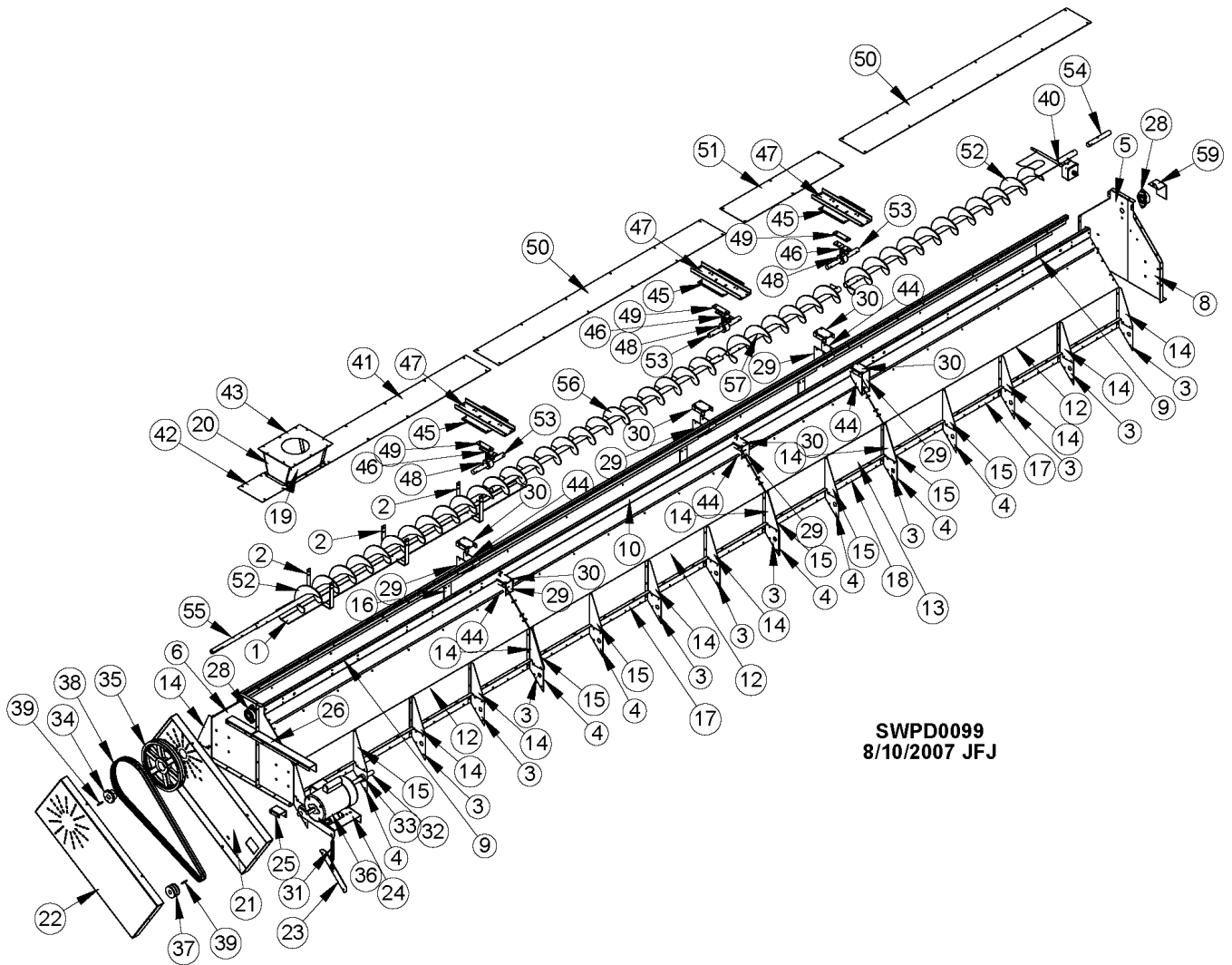


SWPD0098
8/13/2007 JFJ

24' WET BIN

REF. #	DESCRIPTION	QTY	COMP. #
1	Trash Pan	1	T16235
2	Support, Trash Pan	3	T16236
3	Left Support Gusset	17	T16117
4	Right Support Gusset	13	T16118
5	Plate, Short Splice	4	T16141
6	RR Wet Bin End Plate	1	T17401
7	RF Wet Bin End Plate	1	T17400
8	LF Wet Bin End Plate	1	T17402
9	LR Wet Bin End Plate	1	T17403
10	Wet Bin Side Perf, (Stainless)	6	T17450S
	Wet Bin Side Perf, (Galvanized)	6	T17450
11	LT Pivot Brace Wet Bin	17	T17410
12	RT Pivot Brace Wet Bin	13	T17411
13	Splice, Wet Bin Side	4	T17412
14	Bolt Down Lip 8', 2000	6	T17453
15	Hopper Side	2	T17935
16	Hopper End	2	T17936
17	Top Auger Shield (Inner)	1	T16256
18	Top Auger Shield (Outer)	1	T16255
19	Plate, Turnbuckle, Connector	1	T16283
20	Top Motor Mount	1	T16277
21	Top Shield Brace	1	T16258
22	Bracket, LF Top Auger Shield	1	T16861
23	Bracket, RF Top Auger Shield	1	T16860
24	Bearing, 1.25, FLG, W/LC, HCFTS207 - 20	2	J0010
25	Splice Gusset Right	4	T16145
26	Channel, Splice, Short	4	T16146
27	Turnbuckle, 3/8" x 6"	1	J0904
28	Pivot, Motor Mount, Top	1	T18150
29	Collar, Shaft, 1-3/16"	2	J1338
30	Bushing, 1.25 SK	1	J0410
31	Pulley, 15.75OD, Double "B" Gr. SK	1	J03992
32	Motor, Auger 5HP, 1ph, TEFC	1	T20590
	Motor, Auger 5HP, 3ph, TEFC	1	H4190
33	Pulley, 3.5 OD, 1.25, Double, B, Cast	1	J0317
34	Belt, B95	2	J0252
35	Key, 1/4 x 1/4 x 2	2	F4499
36	Paddle, Assembly	1	T16262
37	Lid, Wet Holding Bin	1	T16157
38	Lid, 10.5", Extension, Wet Bin	1	T16159
39	Cover, Hopper	1	T17937
40	Splice Gusset Left	4	T16144
41	Crimp Plate	2	T16142
42	Hanger, Auger, T, 6CH2203	2	J0097
43	Splice Channel	2	T16143
44	Bushing, Wood, 1.25" ID	2	J0096
45	Spacer, T-Hanger, Top auger	2	T16096
46	Lid, 92-1/2" Wet Holding Bin	2	T16158
47	Top Auger	2	T16428
48	Shaft, 8' Hanger Bearing	2	F4720
49	Shaft, 1.25" x 9"	1	G73291
50	Shaft, Top Front, 12-3/4"	1	T16436
51	Auger, Bottom Front, 93-1/2"	1	T16430
52	Top 8' Panel (Fill Switch)	4	T17457
53	Top 8' Panel (LR&RF) 2000	2	T24451
54	Rear Shaft Shield	1	T16420

28' WET BIN

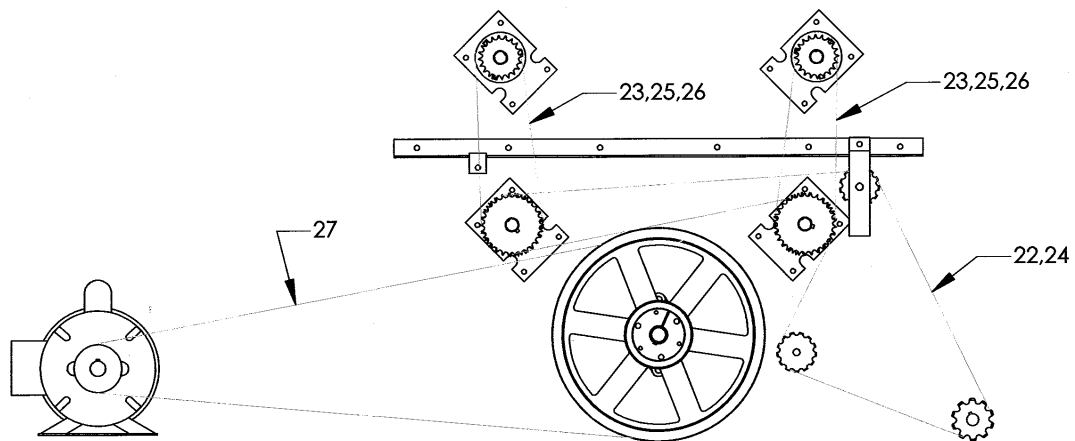
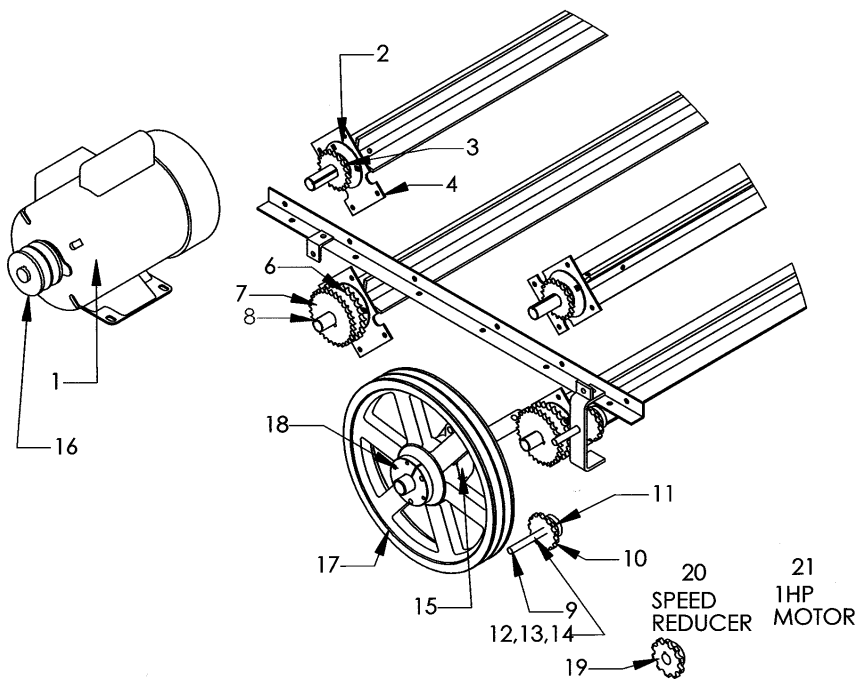


SWPD0099
8/10/2007 JFJ

28' WET BIN

REF. #	DESCRIPTION	QTY	COMP. #
1	Trash Pan	1	T16235
2	Support, Trash Pan	3	T16236
3	Left Support Gusset	20	T16117
4	Right Support Gusset	16	T16118
5	RR Wet Bin End Plate	1	T17401
6	RF Wet Bin End Plate	1	T17400
7	LF Wet Bin End Plate	1	T17402
8	LR Wet Bin End Plate	1	T17403
9	Top 8' Panel (Fill Switch)	4	T17457
10	Top 8' Panel (LR & RF) 2000	2	T24451
11	Top 4' Panel (LR) 12FT 2000	2	T20526
12	Wet Bin Side Perf, (Stainless)	6	T17450S
	Wet Bin Side Perf, (Galvanized)	6	T17450
13	Side, Wet Bin, 4FT 2000	2	T12525
14	LT Pivot Brace Wet Bin	20	T17410
15	RT Pivot Brace Wet Bin	16	T17411
16	Splice, Wet Bin Side	6	T17412
17	Bolt Down Lip 8', 2000	6	T17453
18	Bolt Down Lip 4', 2000	2	T12524
19	Hopper Side	2	T17935
20	Hopper End	2	T17936
21	Top Auger Shield (Inner)	1	T16256
22	Top Auger Shield (Outer)	1	T16255
23	Plate, Turnbuckle, Connector	1	T16283
24	Top Motor Mount	1	T16277
25	Top Shield Brace	1	T16258
26	Bracket, LF Top Auger Shield	1	T16861
27	Bracket, RF Top Auger Shield	1	T16860
28	Bearing, 1.25, FLG, W/LC, HCFTS207 - 20	2	J0010
29	Splice Gusset Right	6	T16145
30	Channel, Splice, Short	6	T16146
31	Turnbuckle, 3/8" x 6"	1	J0904
32	Pivot, Motor Mount, Top	1	T18150
33	Collar, Shaft, 1-3/16"	2	J1338
34	Bushing, 1.25 SK	1	J0410
35	Pulley, 15.75OD, Double "B" Gr. SK	1	J03992
36	Motor, Auger 5HP, 1ph, TEFC	1	T20590
	Motor, Auger 5HP, 3ph, TEFC	1	H4190
37	Pulley, 3.5 OD, 1.25, Double, B, Cast	1	J0317
38	Belt, B95	2	J0252
39	Key, 1/4 x 1/4 x 2	2	F4499
40	Paddle, Assembly	1	T16262
41	Lid, Wet Holding Bin	1	T16157
42	Lid, 10.5", Extension, Wet Bin	1	T16159
43	Cover, Hopper	1	T17937
44	Splice Gusset Left	6	T16144
45	Crimp Plate	3	T16142
46	Hanger, Auger, T, 6CH2203	3	J0097
47	Splice Channel	3	T16143
48	Bushing, Wood, 1.25" ID	3	J0096
49	Spacer, T-Hanger, Top auger	3	T16096
50	Lid, 92-1/2" Wet Holding Bin	2	T16158
51	Lid, Wet Holding Bin 20FT	1	T20158
52	Top Auger	2	T16428
53	Shaft, 8' Hanger Bearing	3	F4720
54	Shaft, 1.25" x 9"	1	G73291
55	Shaft, Top Front, 12-3/4"	1	T16436
56	Auger, Bottom Front, 93-1/2"	1	T16430
57	Top Middle Auger (20FT)	1	T16427
58	Plate, Short Splice	6	T16141
59	Rear Shaft Shield	1	T16420

DRIVE END OF DRYERS

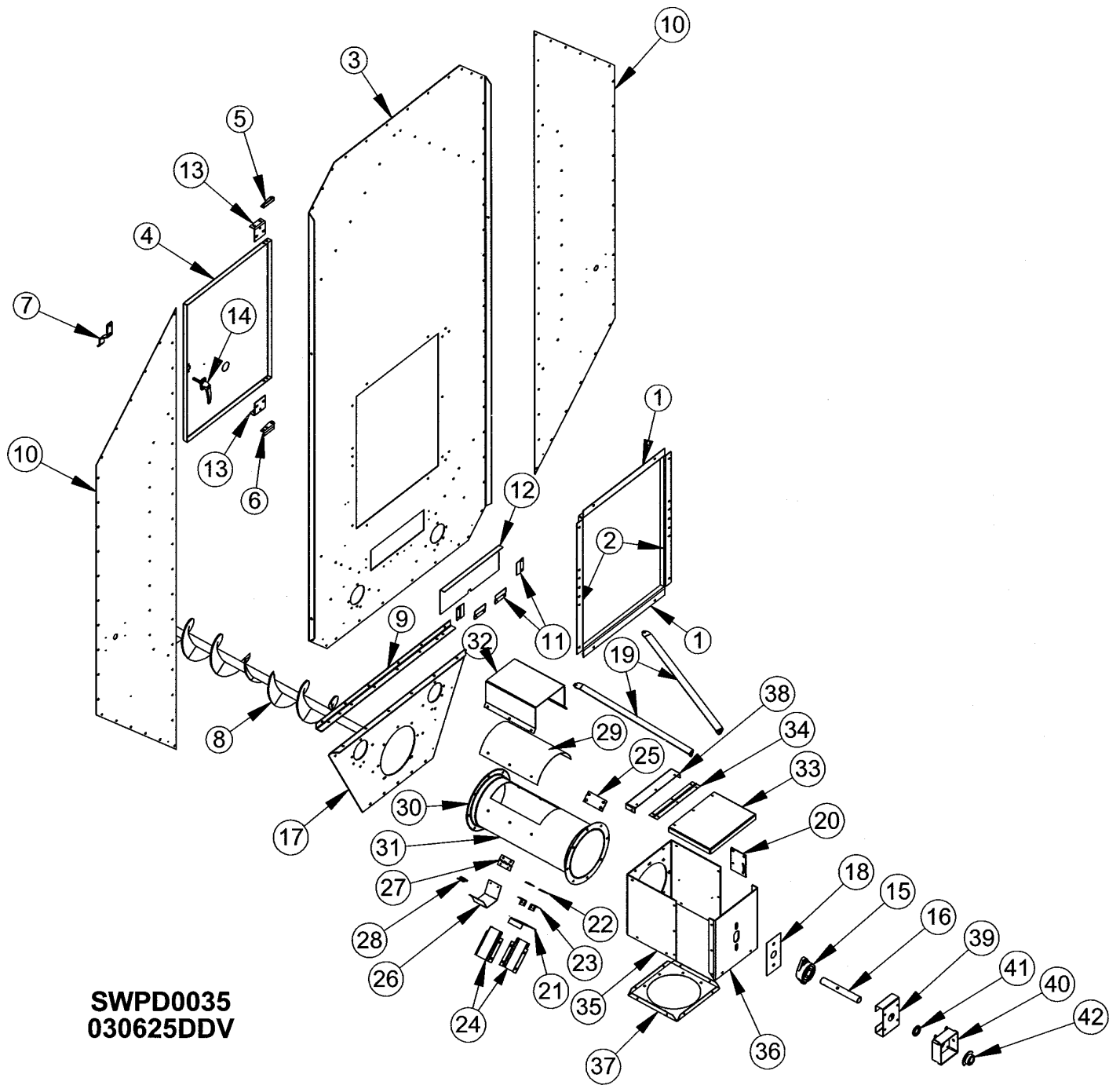


SWPD0014
010824BDW

DRIVE END OF DRYERS

REF. #	DESCRIPTION	QTY	COMP. #
1	Motor, 3HP, 1ph	1	T12590
	Motor, 3HP, 3ph	1	H3345
	Motor, 5HP, 1ph	1	T20590
	Motor, 5HP, 3ph	1	H4190
2	Flangette, 3 hole for 205 Bearing	8	J0098
3	Sprocket, 40B20, 1" Bore	2	J16487
4	Meter Plate	4	T17920
6	Sprocket, 50B12, 1" Bore	2	J1678
7	Sprocket, 40B30, 1" Bore	2	J1649
8	Shaft, Front, Meter Roll	4	T16266
9	Screw, 1/2-13, 3, PLTD, Gr. 5, HHCS	2	J0750
10	Sprocket, Idler, 50-13	2	J1685
11	Spacer, Sprocket, Continuous	2	T16282
12	Nut, Hex, 1/2-13, PLT, Gr. 5	2	J1040
13	Washer, Lock, 1/2, PLT, Split	2	J1215
14	Washer, Flat, 1/2, PLT	2	J1125
15	Bearing, 1.25, FLG, W/LC, HCFTS207-20	1	J0010
16	Pulley, 3.5 OD, 1.125, DBL, B, Cast	1	J0317
17	Pulley, 15.75OD, DBL "B" Gr., SK	2	J03992
18	Bushing, 1.25, SK	2	J0410
19	Sprocket, 50B12, 1.125" Bore	1	J16612
20	Reducer, Speed, 150: 1, 6003869	1	J3682
21	Motor, 1HP, 180V DC, 1750 RPM, TEFC	1	H1140
22	Chain, #50 157 Links	1	T16803
23	Chain, #40 73 Links	2	T16800
24	Chain Link, #50 Connector	1	J1760
25	Chain Link, #40 Connector	2	J1745
26	Chain Link, #40 Offset 1/2 Link	2	J1750
27	Belt, BX 72	2	J0246

DRIVE END OF DRYERS, SINGLE FAN - BACK END

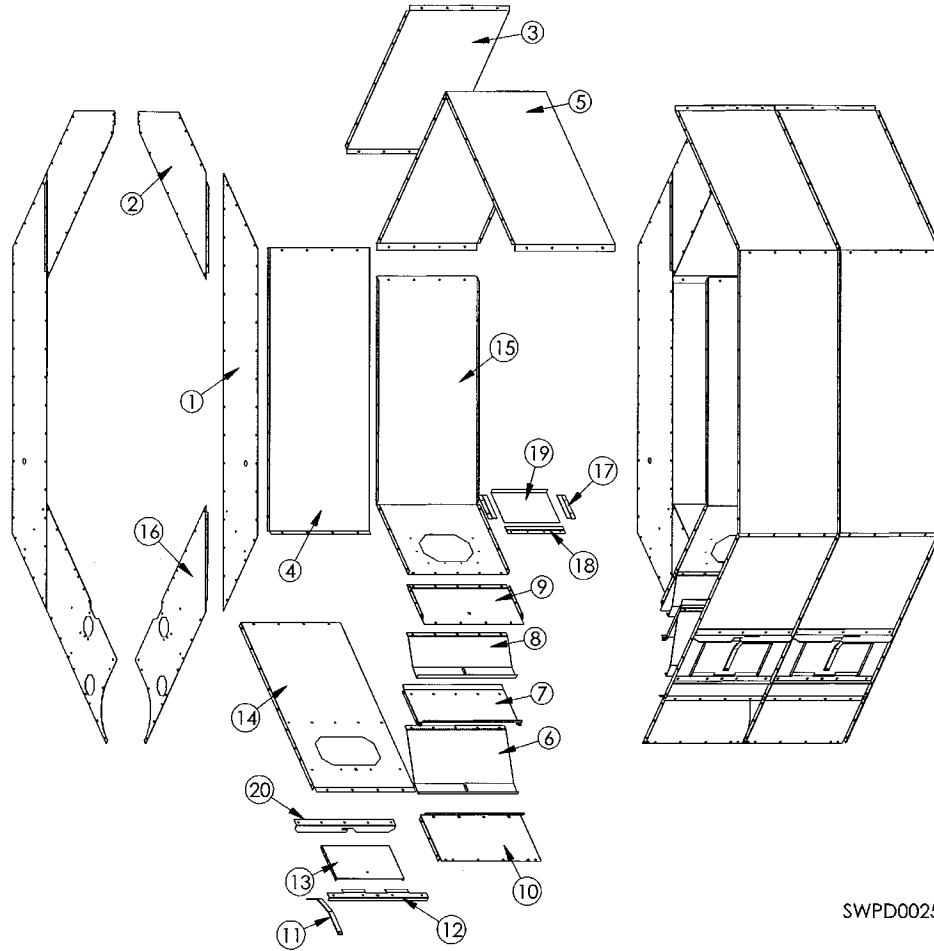


SWPD0035
030625DDV

SINGLE FAN - BACK END

COMP. #	DESCRIPTION	QTY	COMP. #
1	Edging Top & Bottom, Door	2	T16136
2	Edging Sides, Back Door	2	T16137
3	Back End Plate	1	T17916
4	Access Door	1	T16147
5	Top Hinge, Access Door	1	T16149
6	Bottom Hinge, Access Door	1	T16150
7	Catch, Rear Access Door	1	T16151
8	Bottom Back Auger	1	T16431
9	Bottom Angle Splice	1	T17925
10	Side End Plate	2	T16101
11	Side Rail, Blowout Door	4	T16154
12	Blowout Door	1	T17658
13	Hinge Bracket	2	T16148
14	Handle, Locking, #GD303	1	J2313
15	Bearing, 1.25, Flange, W/LC, HCFTS207-20	1	J0010
16	Bottom Auger Shaft, 1, 1.25" x 10"	1	T17251
17	Back Bottom End Plate	1	T25521
18	Bearing Shim Plate	1	T25682
19	Brace for Unload Auger	2	T25681
20	Mercury Switch Plate	1	T16358
21	Gate, Sample Spout	1	T17652
22	Spacer, Sample Spout	2	T17653
23	Sample Spout Angle	2	T17651
24	Spout, Sample	2	T17655
25	Cover, Sample Spout, (Unload)	1	T17663
26	Strap, Moisture Sensor - Back	1	T17850
27	Hinge, Moisture Sensor- Back	1	T17851
28	Latch, 3-10 LL, 2-57-1625-07-00	1	J2310
29	Cover, Tube, Rear Discharge	1	T25679
30	Ring, 10" Flange	2	J6610
31	Tube, Discharge	1	T25677
32	Step, Unload Tub	1	T25678
33	Lid, Sump Box	1	T25672
34	Hinge, Sump Box	1	T25676
35	Front-Sides, Sump box	1	T25670
36	Back Plate, Sump Box	1	T25671
37	Bottom, Sump Box	1	T25674
38	Lid Hinge Side, Sump Box	1	T25675
39	Bracket, Prox. Switch, Unload Auger	1	T17252
40	Box, Prox. Switch, Unload Auger	1	T17263
41	Seal, 2" OD, 1-1/4" ID, CR #12481	1	J7023
42	Target, Prox. Switch, Unload Auger	1	T17256

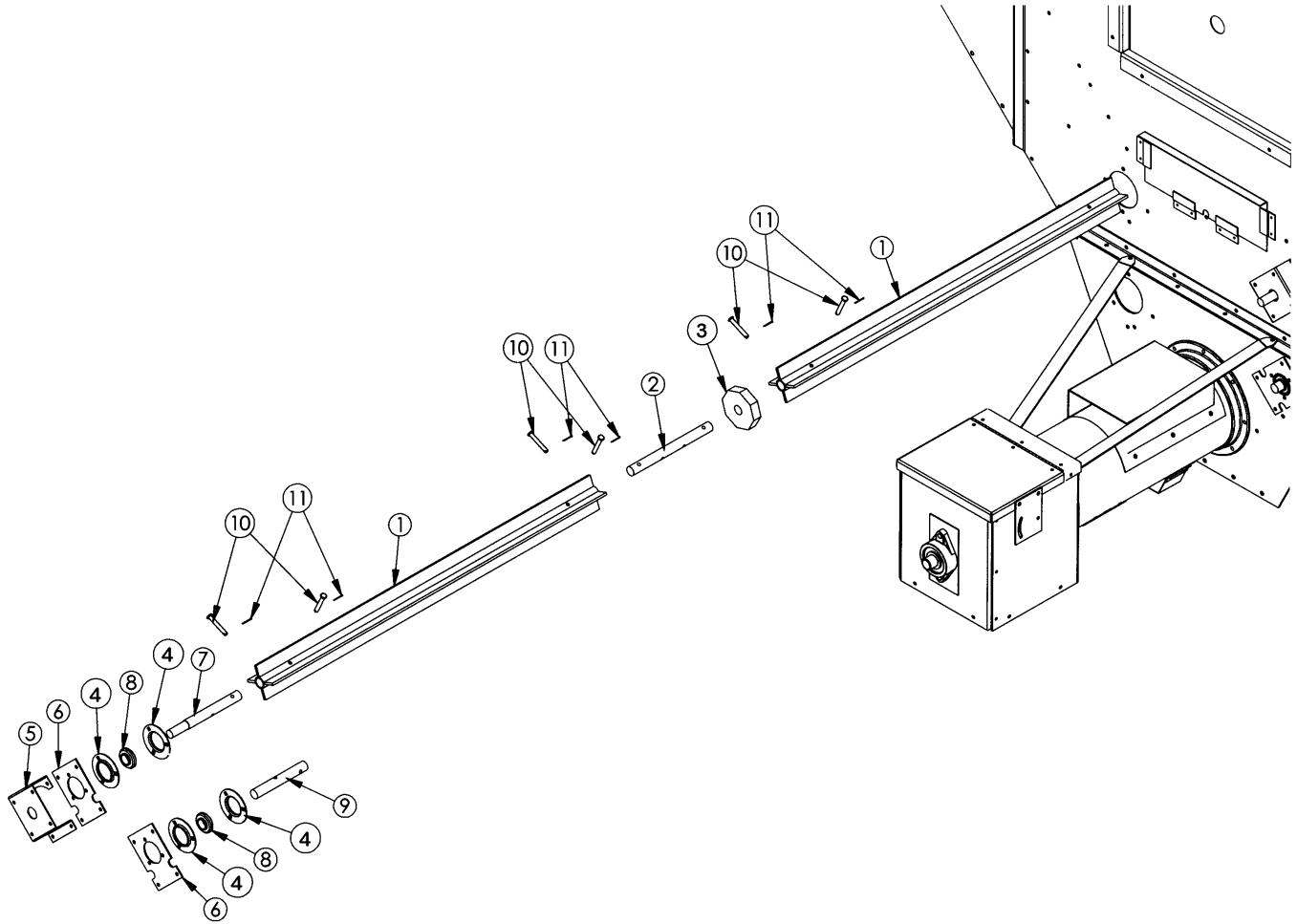
COLUMN PARTS



SWPD0025

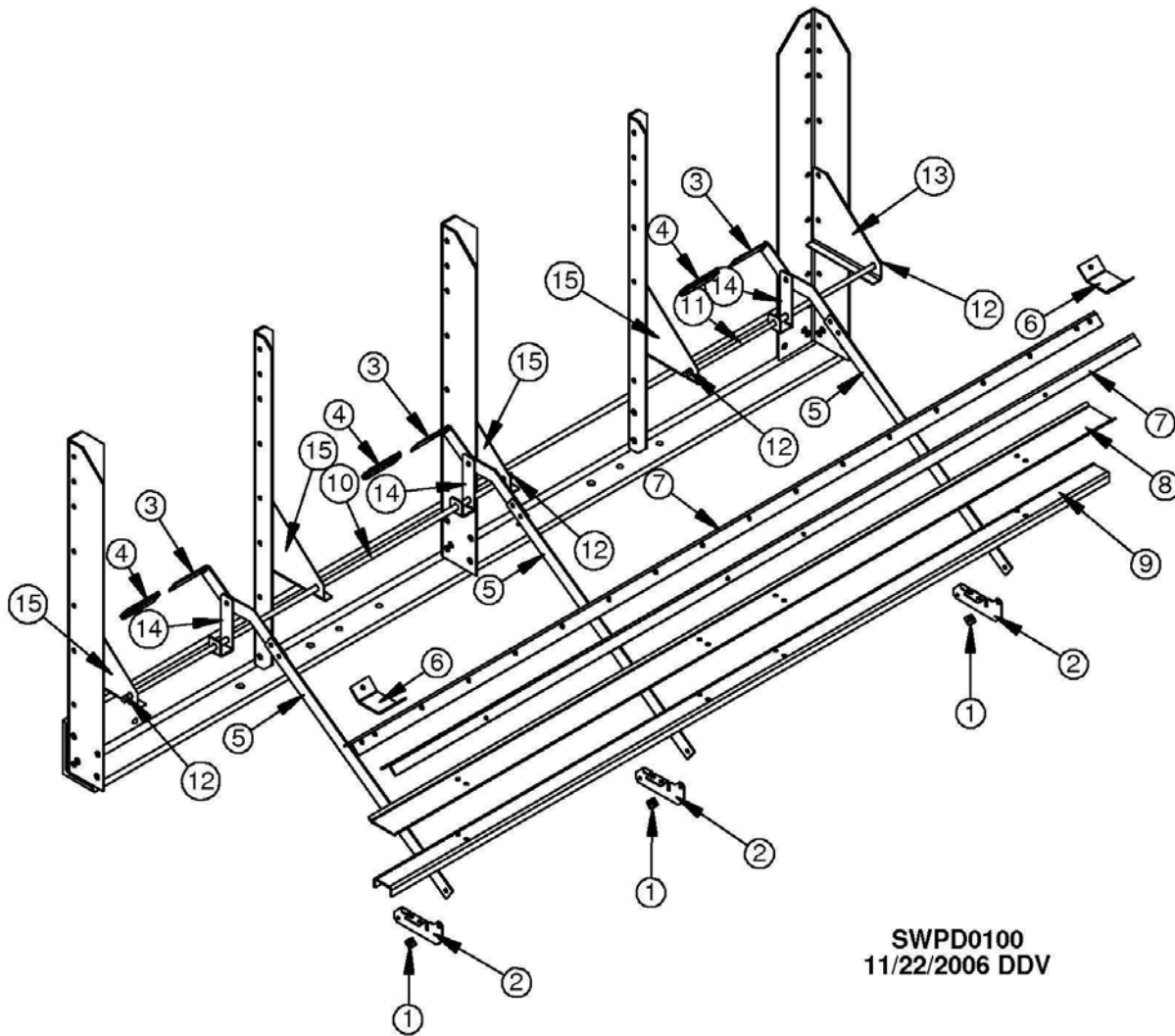
REF#	DESCRIPTION	12'		16'		20'		24'	
		QTY	COMP#	QTY	COMP#	QTY	COMP#	QTY	COMP#
1	Side Divider	10	T16110	14	T16110	18	T16110	22	T16110
2	Upper Divider	10	T16111	14	T16111	18	T16111	22	T16111
3	Outer Top Perf. Panel (Stainless)	12	T16105S	16	T16105S	20	T16105S	24	T16105S
	Outer Top Perf. Panel (Galvanized)	12	T16105	16	T16105	20	T16105	24	T16105
4	Outside Middle Perf. Panel (Stainless)	12	T16104S	16	T16104S	20	T16104S	24	T16104S
	Outside Middle Perf. Panel (Galv.)	12	T16104	16	T16104	20	T16104	24	T16104
5	Top Inner Perf. Panel	6	T16114	8	T16114	10	T16114	12	T16114
6	Bottom Flow Control Gate	12	T17900	16	T17900	20	T17900	24	T17900
7	Column Separator	12	T17901	16	T17901	20	T17901	24	T17901
8	Top Flow Control Gate	12	T17902	16	T17902	20	T17902	24	T17902
9	Rigid Adjustment Plate	12	T17903	16	T17903	20	T17903	24	T17903
10	Bottom Rigid Door	12	T17904	16	T17904	20	T17904	24	T17904
11	Latch	12	T17906	16	T17906	20	T17906	24	T17906
12	Support Latch Strap	12	T17907	16	T17907	20	T17907	24	T17907
13	Outer Cleanout Door	12	T17908	16	T17908	20	T17908	24	T17908
14	Bottom Outer Perf. Panel (Stainless)	12	T17909S	16	T17909S	20	T17909S	24	T17909S
	Bottom Outer Perf. Panel (Galv.)	12	T17909	16	T17909	20	T17909	24	T17909
15	Inner Side Perf. Panel	12	T17910	16	T17910	20	T17910	24	T17910
16	Lower Divider	10	T17924	14	T17924	18	T17924	22	T17924
17	Side Rail, Inner Access	24	T16219	32	T16219	40	T16219	48	T16219
18	Bottom Rail, Inner Access	12	T16220	16	T16220	20	T16220	24	T16220
19	Inner Access Door	12	T16221	16	T16221	20	T16221	24	T16221
20	Door Latch Bracket	12	T17657	16	T17657	20	T17657	24	T17657

BACK METERING ROLLS



REF. #	DESCRIPTION	COMP. #
1	Metering Roll Assembly, 8'	T16297
	Metering Roll Assembly, 4'	T16298
2	Connecting Shaft, Meter Roll	T16269
3	Bushing, Wooden, Octagon, 1" ID	J1245
4	Flangette, for 205 Bearing	J0098
5	Encoder Bracket	T17921
6	Meter plate	T17920
7	Top Back Shaft, Meter Roll	T16267
8	Bearing, 1", Center, FH205-16, W/L CLR	J0005
9	Bottom Back Shaft, Meter Roll	T16268
10	Pin, Picker, 3/8, 1-1/2, PLT	J15431
11	Pin, Cotter, 1/8, 1, PLT	J1420

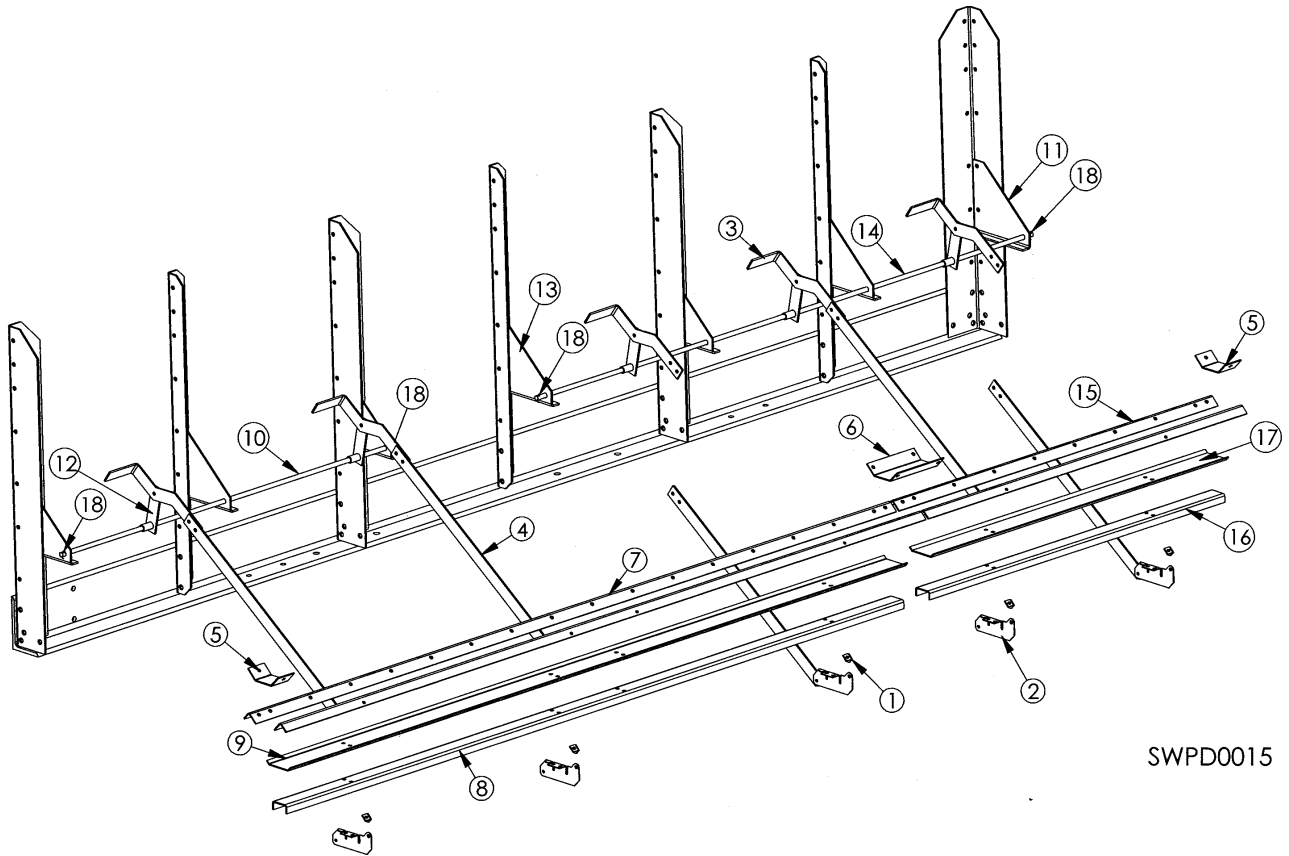
8' CAM LOCK ASSEMBLY



SWPD0100
11/22/2006 DDV

REF. #	DESCRIPTION	QTY	COMP. #
1	Pivot Bracket	3	T16393
2	Hinge, Bottom Door, Cam Lock	3	T16387
3	Handle, Cam Lock	3	T16382
4	Cover, Plastic, Handle, 1 ½ x 4 LG	3	J23182
5	Extension Arm, Cam Lock	3	T16386
6	Seal Plate, End, Cam Lock	2	T16398
7	8' Angle, Cam Lock	2	T17456
8	8' Door, Cam Lock	1	T17455
9	8' Door Support, Cam Lock	1	T17454
10	Shaft, Long, Cam Lock	1	T16400
11	Shaft, Short, Cam Lock	1	T20401
12	Pin, Cotter, 1/8, 1, PLT	4	J1420
13	Gusset, Rear, Cam Lock	1	T16381
14	Pivot Arm, Cam Lock	3	T16383
15	Gusset, Front, Cam Lock	4	T16380

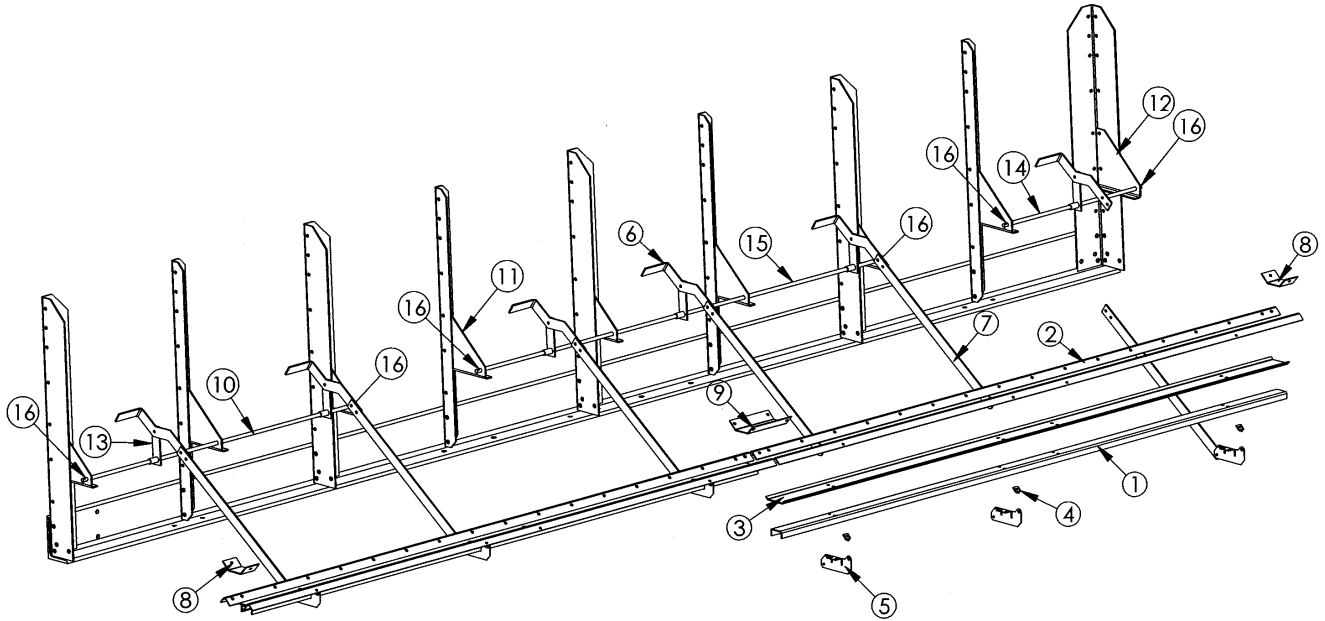
12' CAM LOCK ASSEMBLY



SWPD0015

REF. #	DESCRIPTION	QTY	COMP. #
1	Pivot Bracket	5	T16393
2	Hinge, Bottom Door, Cam Lock	5	T16387
3	Handle	5	T16382
4	Extension Arm, Cam Lock	5	T16386
5	Seal Plate, End, Cam Lock	2	T16386
6	Seal Plate, Mid, Cam Lock	1	T16390
7	8' Angle, Cam Lock	2	T17456
8	8' Door Support, Cam Lock	1	T17454
9	8' Door, Cam Lock	1	T17455
10	Shaft, 49-3/4", Cam Lock	1	T16400
11	Gusset, Rear, Cam Lock	1	T16381
12	Pivot Arm Weldment, Cam Lock	5	T16383
13	Gusset, Front, Cam Lock	6	T16380
14	Shaft, 74", Cam Lock	1	T12516
15	Angle, Cam Lock, 4'	2	T12529
16	Door Support, Cam Lock, 4'	1	T12530
17	Door, Cam Lock, 4"	1	T12528
18	Pin, Cotter, 1/8, 1, PLT	4	J1420

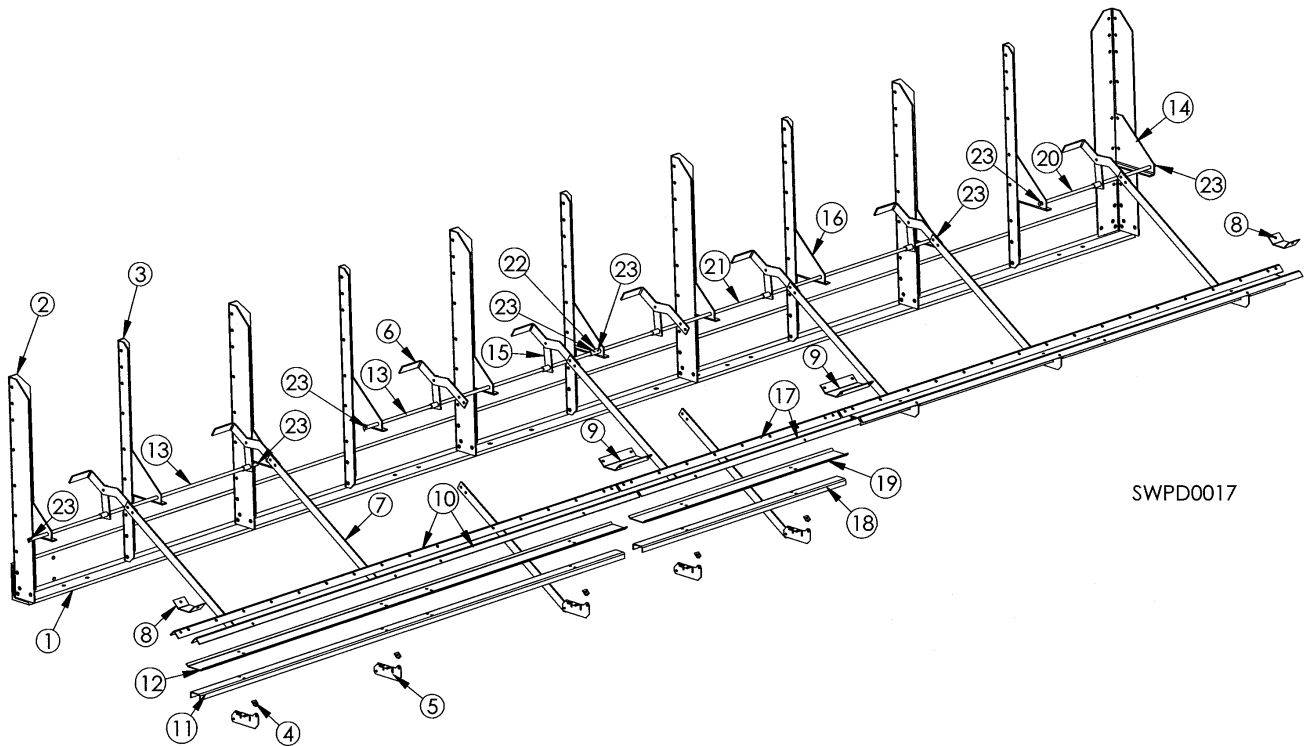
16' CAM LOCK ASSEMBLY



SWPD0016

REF. #	DESCRIPTION	QTY	COMP. #
1	8' Door Support, Cam Lock	2	T17454
2	8' Angle, Cam Lock	4	T17456
3	8' Door, Cam Lock	2	T17455
4	Pivot Bracket	6	T16393
5	Hinge, Bottom Door, Cam Lock	6	T16387
6	Handle, Cam Lock	6	T16382
7	Extension Arm, Cam Lock	6	T16386
8	Seal Plate, End, Cam Lock	2	T16398
9	Seal Plate, Mid, Cam Lock	1	T16390
10	Shaft, 49.75", Cam Lock	1	T16400
11	Gusset, Front, Cam Lock	8	T16380
12	Gusset, Rear, Cam Lock	1	T16381
13	Pivot Arm Weldment, Cam Lock	6	T16383
14	Shaft, 25", Cam Lock	1	T20401
15	Shaft, Cam Lock, 74"	1	T12516
16	Pin, Cotter, 1/8", 1, PLT	6	J1420

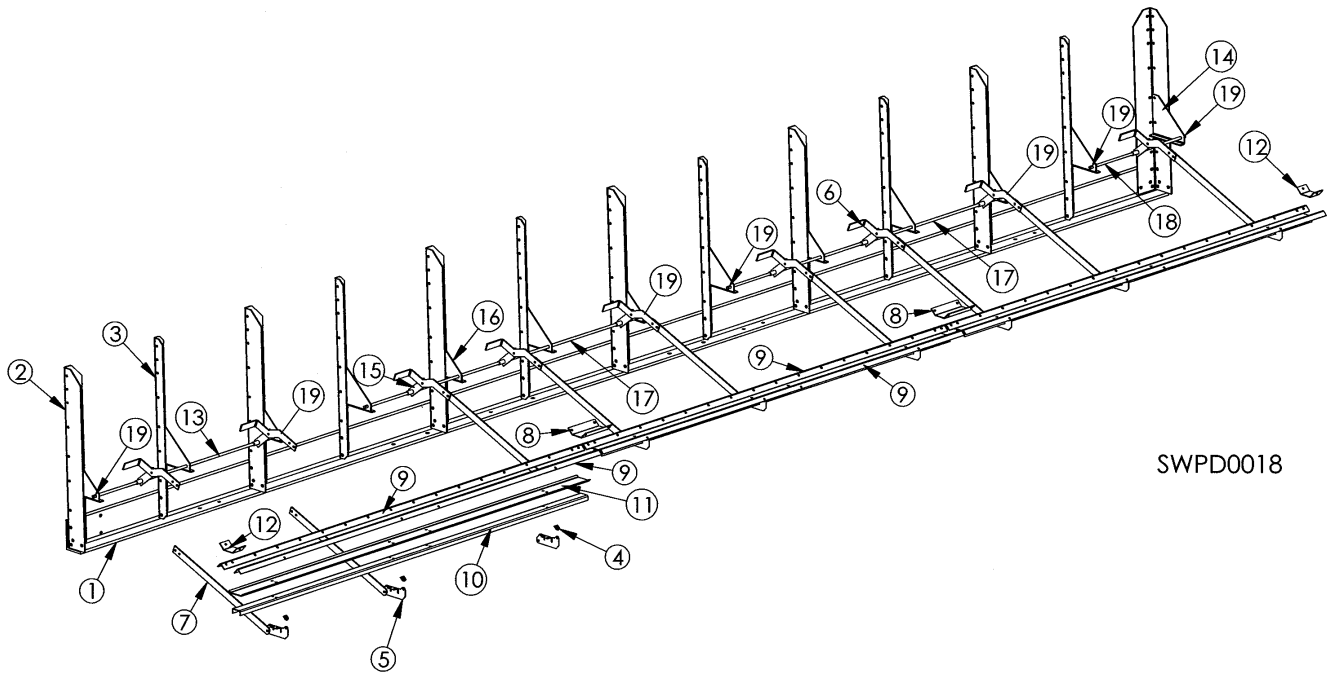
20' CAM LOCK ASSEMBLY



SWPD0017

REF. #	DESCRIPTION	QTY	COMP. #
1	Right Frame Angle	1	T20319
2	Wide Vertical Support	6	T16322
3	Narrow Vertical Support	5	T16323
4	Pivot Bracket	8	T16393
5	Hinge Bottom Door Cam Lock	8	T16387
6	Handle Cam Lock	8	T16382
7	Extension Arm, Cam Lock	8	T16386
8	Seal Plate, End, Cam Lock	2	T16398
9	Seal Plate, Mid, Cam Lock	2	T16390
10	8' Angle, Cam Lock	4	T17456
11	8' Door Support, Cam Lock	2	T17454
12	8' Door, Cam Lock	2	T17455
13	Shaft, 49.75", Cam Lock	2	T16400
14	Gusset, Rear, Cam Lock	1	T16381
15	Pivot Arm Weldment, Cam Lock	8	T16383
16	Gusset, Front, Cam Lock	10	T16380
17	Angle, Cam Lock 4'	2	T12529
18	Door Support, Cam Lock 4'	1	T12530
19	Door, Cam Lock 4'	1	T12528
20	Shaft, 25", Cam Lock	1	T20401
21	Shaft, Cam Lock, 74"	1	T12516
22	Connector, Shaft	1	T20403
23	Pin, Cotter, 1/8, 1, PLT	8	J1420

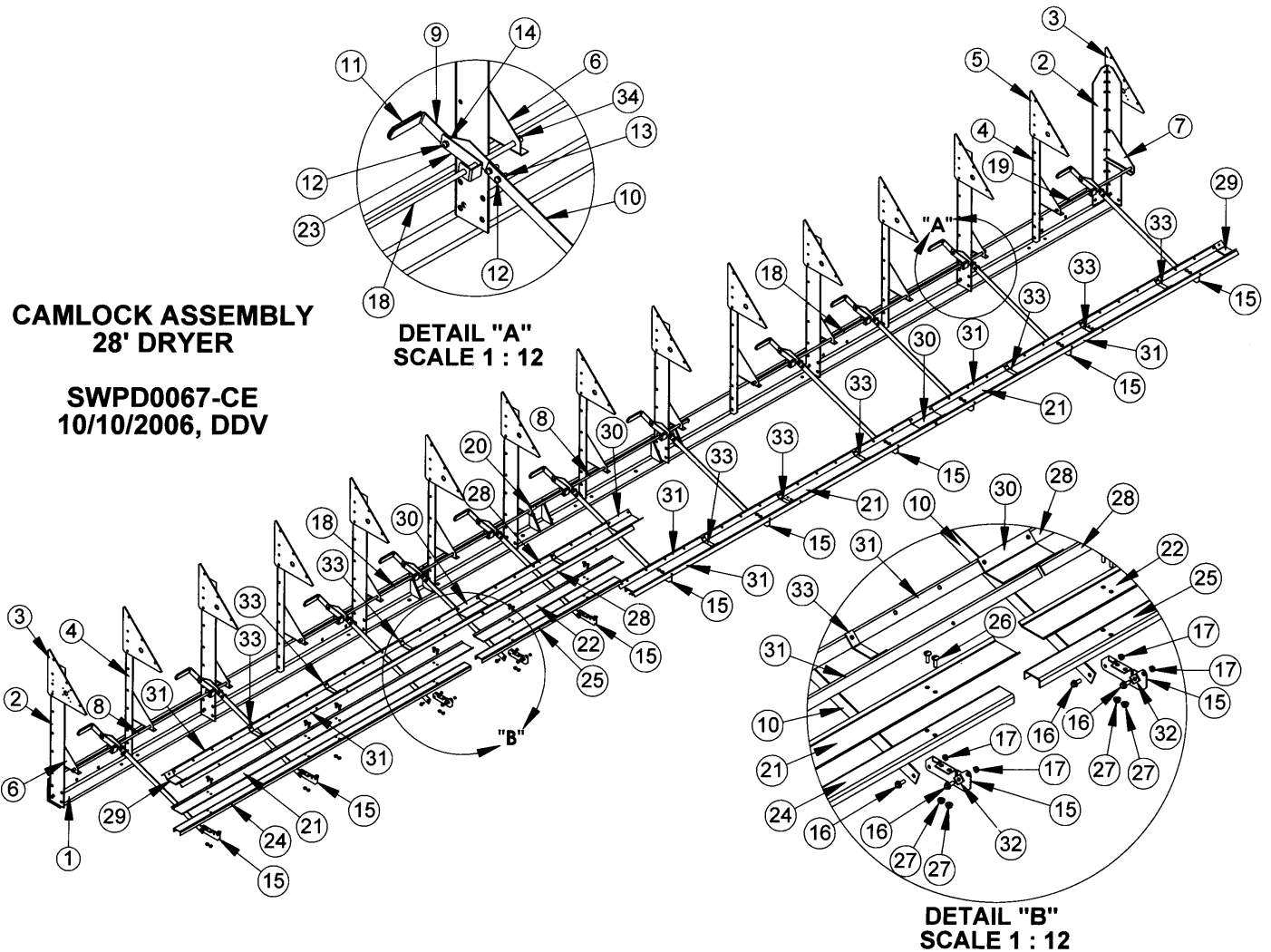
24' CAM LOCK ASSEMBLY



SWPD0018

REF. #	DESCRIPTION	QTY	COMP. #
1	Right Frame Angle	1	T24319
2	Wide Vertical Support	7	T16322
3	Narrow Vertical Support	8	T16323
4	Pivot Bracket	9	T16393
5	Hinge, Bottom Door, Cam Lock	9	T16387
6	Handle, Cam Lock	9	T16382
7	Extension Arm, Cam Lock	9	T16386
8	Seal Plate, Mid, Cam Lock	2	T16390
9	8' Angle, Cam Lock	6	T17456
10	8' Door Support	3	T17454
11	8' Door, Cam Lock	3	T17455
12	Seal Plate, End, Cam Lock	2	T16398
13	Shaft, Cam Lock, 49.75"	1	T16400
14	Gusset, Rear	1	T16381
15	Pivot Arm Weldment	9	T16383
16	Gusset, Front	12	T16380
17	Shaft, Cam Lock, 74"	2	T12516
18	Shaft, Cam Lock, 25"	1	T20401
19	Pin, Cotter, 1/8, 1, PLT	8	J1420

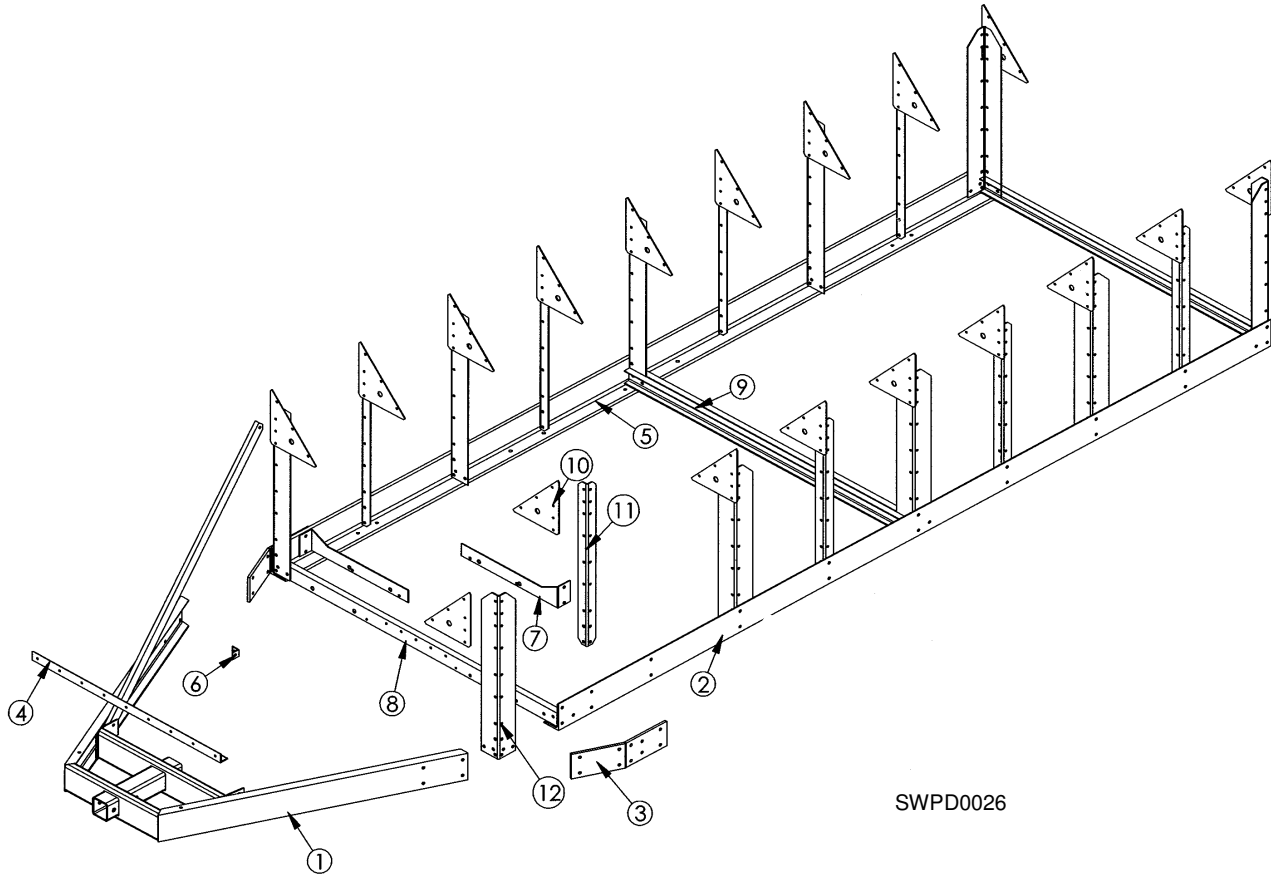
28' CAM LOCK ASSEMBLY



REF#	DESCRIPTION	COMP#	REF#	DESCRIPTION	COMP#
1	Right Frame Angle	T28318	18	Shaft, Cam Lock, 74"	T12516
2	Wide Vertical Support	T16322	19	Shaft, Cam Lock, 25"	T20401
3	Main Conn. Plate Conduit Box	T16331	20	Connector, Shaft	T20403
4	Narrow Vertical Support	T16323	21	8' Door, Cam Lock	T17455
5	Main Connector Plate	T16324	22	Door, Cam Lock 2000	T12528
6	Gusset, Front, Cam Lock	T16380	23	Pivot Arm Weldment	T16383
7	Gusset, Rear, Cam Lock	T16381	24	8' Door Support	T17454
8	Shaft, Cam Lock, 49.75"	T16400	25	Door Support, Cam Lock 4' 2000	T12530
9	Handle, Cam Lock	T16382	26	Screw, 5/16-18,1,PLT,TR,SL,RHMS	J0528
10	Extension Arm, Cam Lock	T16386	27	Nut, Whiz, 5/16-18	J1110
11	Cover, Plastic, Handle, 1 1/2 x 4 LG	J23182	28	Angle, Cam Lock 4' 2000	T12529
12	Screw, 3/8-16 x 1, JS500, GD5	J06063	29	Seal Plate, End, Cam Lock	T16398
13	Nut, Whizlock, 3/8-16	B5962	30	Seal Plate, Mid, Cam Lock	T16390
14	Nut, Hex, 3/8-16, PLT Lock	J1025	31	8'Angle, Cam Lock	T17456
15	Hinge, Bottom Door, Cam Lock	T16387	32	Pivot Bracket	T16393
16	Bolt, 5/16-18x3/4" GR5, Hex Wash	J0536	33	Connecting Bracket	T16399
17	Nut, Lock, 5/16-18, PLT	J1010	34	Pin, Cotter, 1/8,1,PLT	J1420

FRAME FOR BOTH STANDARD & STACKED DRYERS

8', 12', 16', 20', 24', & 28'

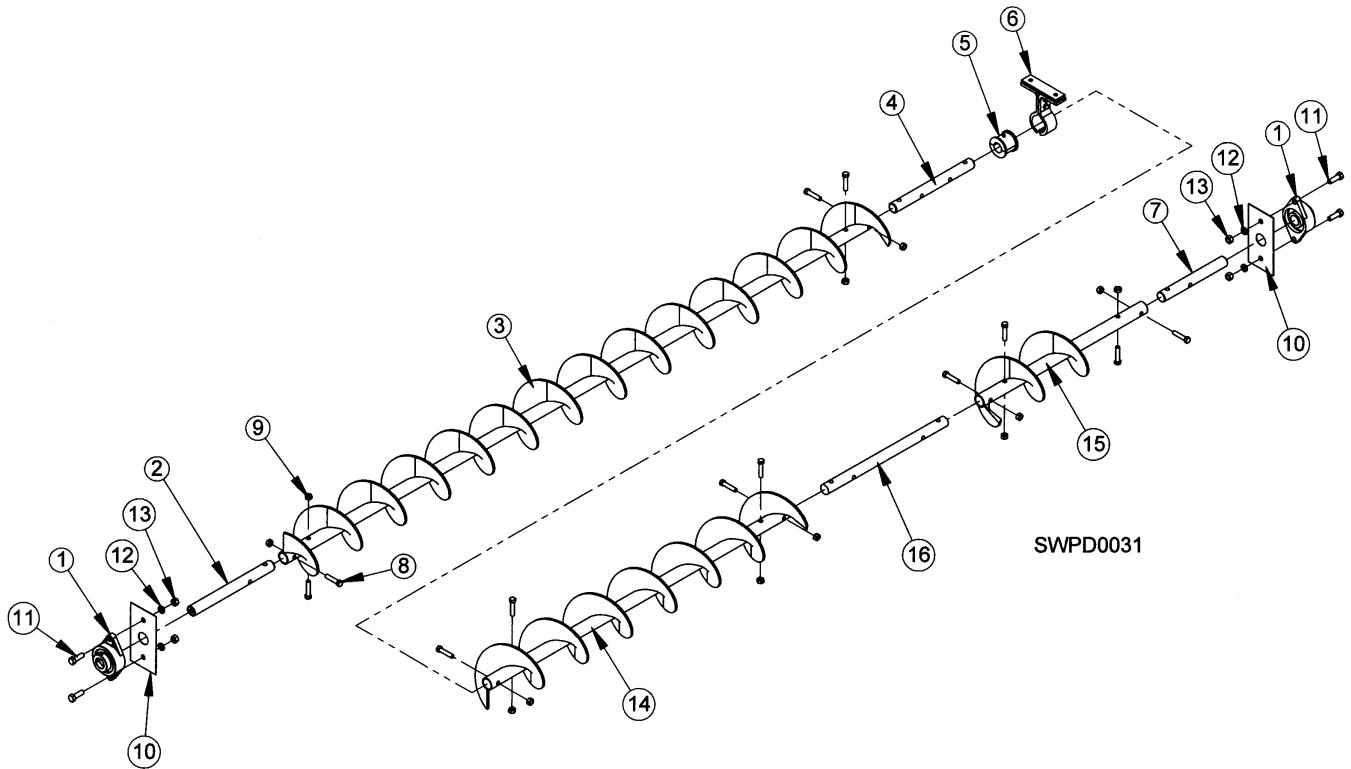


SWPD0026

REF#	DESCRIPTION	8' DRYER		12' DRYER		16' DRYER	
		QTY	COMP#	QTY	COMP#	QTY	COMP#
1	Hitch Receiver Weld	1	T16310	1	T16310	1	T16310
2	Left Frame Angle	1	T08518	1	T12518	1	T16319
3	Connector Plate	2	T16321	2	T16321	2	T16321
4	Angle (Fan Support)	1	T16176	1	T16176	1	T16176
5	Right Frame Angle	1	T08517	1	T12517	1	T16320
6	Tightener Angle	1	T16329	1	T16329	1	T16329
7	DC Motor Brace	2	T16328	2	T16328	2	T16328
8	Front Cross Channel	1	T16333	1	T16333	1	T16333
9	Cross Channel	1	T16325	3	T16325	3	T16325
10	Main Connector Plate	8	T16324	14	T16324	18	T16323
11	Narrow Vert Support	4	T16323	6	T16323	8	T16323
12	Wide Vert Support	6	T16322	8	T16322	10	T16322

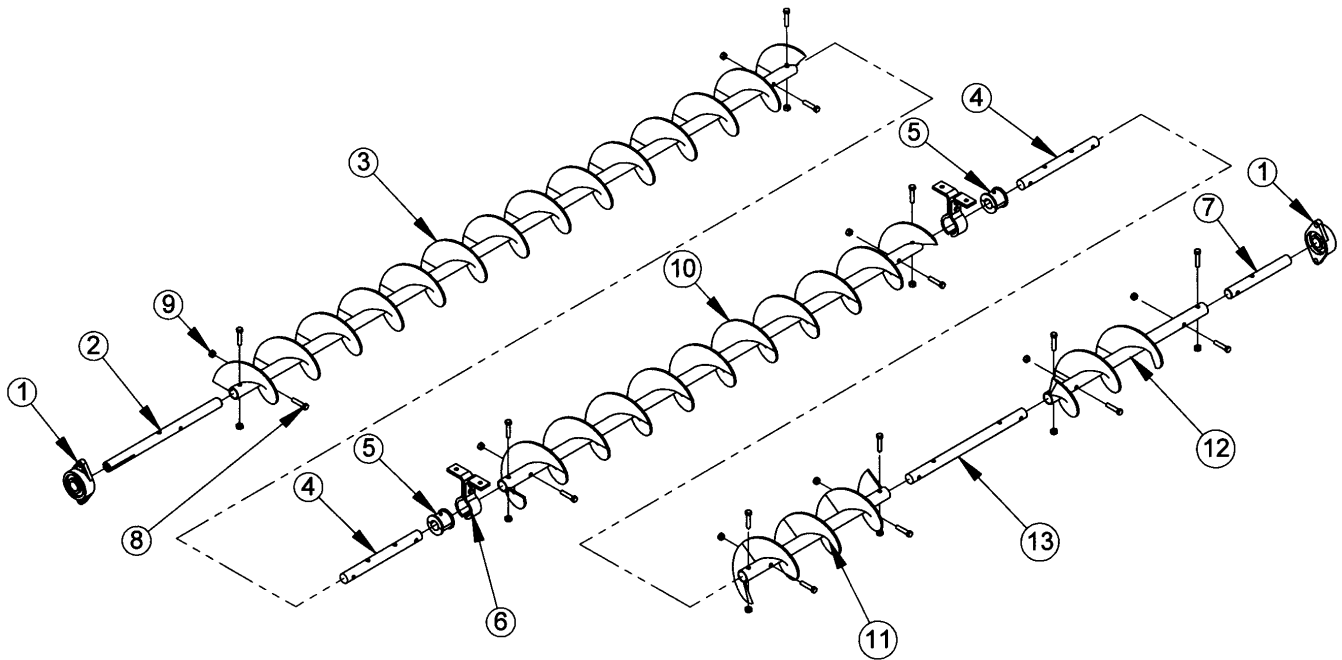
REF#	DESCRIPTION	20' DRYER		24' DRYER		28' DRYER	
		QTY	COMP#	QTY	COMP#	QTY	COMP#
1	Hitch Receiver Weld	1	T16310	1	T16310	1	T16310
2	Left Frame Angle	1	T20320	1	T24320	1	T28310
3	Connector Plate	2	T16321	2	T16321	2	T16321
4	Angle (Fan Support)	1	T16176	1	T16176	1	T16176
5	Right Frame Angle	1	T20319	1	T24319	1	T28319
6	Tightener Angle	1	T16329	1	T16329	1	T16329
7	DC Motor Brace	2	T16328	2	T16328	2	T16328
8	Front Cross Channel	1	T16333	1	T16333	1	T16333
9	Cross Channel	5	T16325	5	T16325	7	T16325
10	Main Connector Plate	22	T16323	26	T16323	30	T16323
11	Narrow Vert Support	8	T16323	12	T16323	12	T16323
12	Wide Vert Support	14	T16322	14	T16322	16	T16322

12' BOTTOM AUGER



REF. #	DESCRIPTION	QTY	COMP. #
1	Bearing, 1.25, Flange, W/LC, HCFTS207-20	2	J0010
2	Shaft, Top Front, 12-3/4"	1	T16436
3	Auger, Bottom Front, 93-1/2"	1	T16430
4	Shaft, Stub	1	F4720
5	Bushing, Wood, 1.25", I.D.	1	J0096
6	Hanger, Auger, T, 6CH2203	1	J0097
7	Shaft, 1.25" x 10", Bottom Auger	1	T17251
8	Screw, 7/16-14, 2, PLT	12	J0718
9	Nut, Lock, 7/16"-14, PLT	12	J1034
10	Bearing Shim Plate	2	T25682
11	Screw, 1/2-13, 1.5, GR 5 HHCS	4	J0730
12	Washer, Lock, 1/2, PLT	4	J1215
13	Nut, Hex, 1/2-13, PLT	4	J1040
14	Auger, Bottom, Rear, 47.50"	1	T12492
15	Auger, Bottom, Std Unld Ext	1	T12493
16	Shaft, Auger, Moisture Sensor	1	F4723

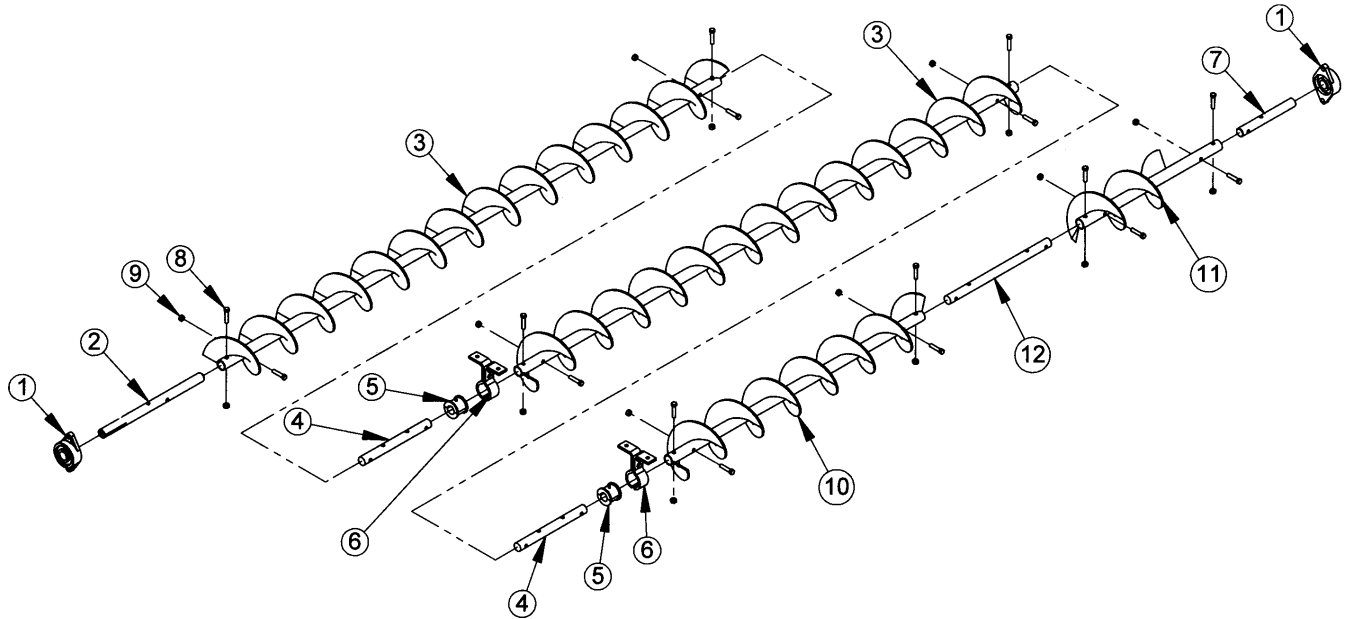
16' BOTTOM AUGER



SWPD0032

REF. #	DESCRIPTION	QTY	COMP. #
1	Bearing, 1.25, Flange, W/LC, HCFTS207-20	2	J0010
2	Shaft, Top Front, 12-3/4"	1	T16436
3	Auger, Bottom Front, 93-1/2"	1	T16430
4	Shaft, 8", Hanger Bearing	2	F4720
5	Bushing, Wood, 1.25", I.D.	2	J0096
6	Hanger, Auger, T, 6CH2203	2	J0097
7	Shaft, 1.25" x 10"	1	T17251
8	Screw, 7/16-14, 2, PLT	16	J0718
9	Nut, Lock, 7/16-14, PLT	16	J1034
10	Auger, Bottom Middle, 69-1/2"	1	T16432
11	Auger, Bottom Rear, 24"	1	T12498
12	Auger, Bottom, Std Unld Ext	1	T12493
13	Shaft, Auger, Moisture Sensor	1	F4723

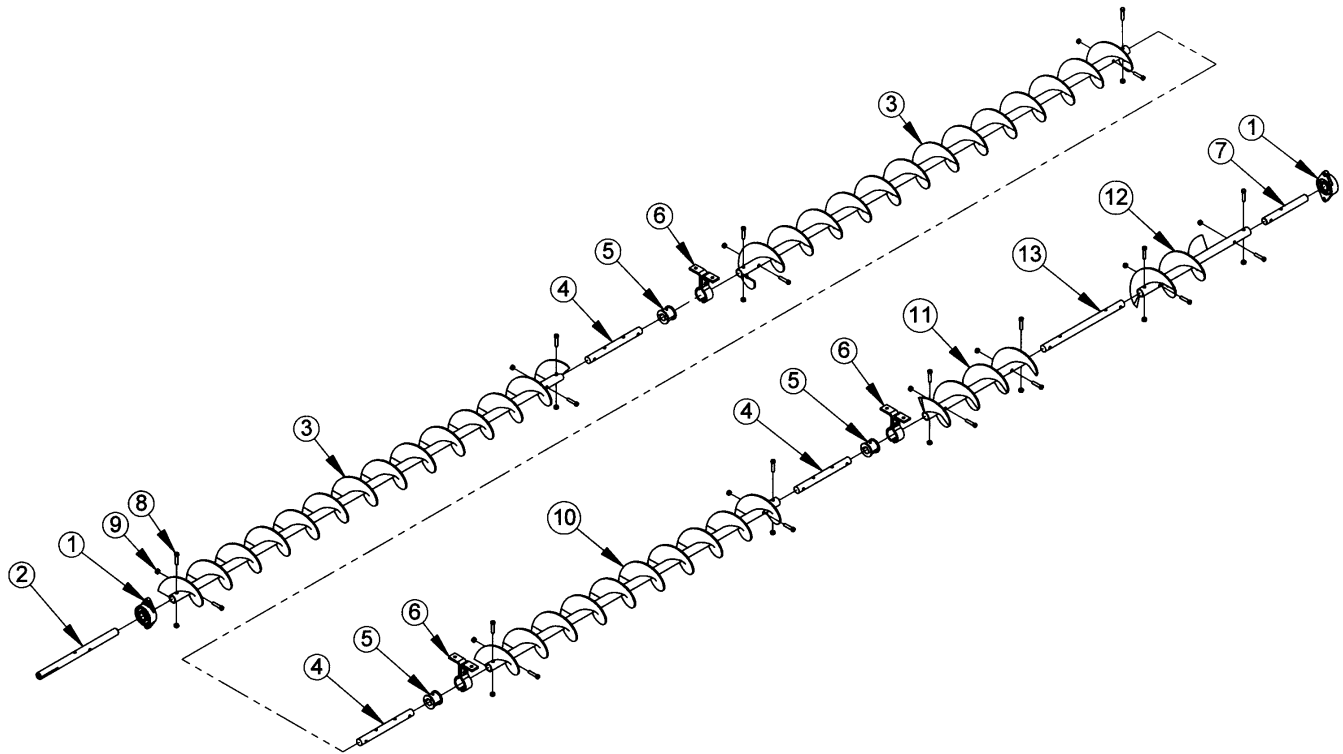
20' BOTTOM AUGER



SWPD0033

REF. #	DESCRIPTION	QTY	COMP. #
1	Bearing, 1.25, Flange W/LC, HCFTS207-20	2	J0010
2	Shaft, Top Front, 12-3/4"	1	T16436
3	Auger, Bottom Front, 93-1/2"	2	T16430
4	Shaft, 8" Hanger Bearing	2	F4720
5	Bushing, Wood, 1.25" I.D.	2	J0096
6	Hanger, Auger, T, 6CH2203	2	J0097
7	Shaft, 1.25" x 10", Bottom Auger	1	T17251
8	Screw, 7/16-14, 2, PLT	16	J0718
9	Nut, Lock, 7/16-14, PLT	16	J1034
10	Auger, Bottom Rear, 47.50"	1	T12492
11	Auger, Bottom, Std Unld Ext	1	T12493
12	Shaft, Auger, Moisture Sensor	1	F4723

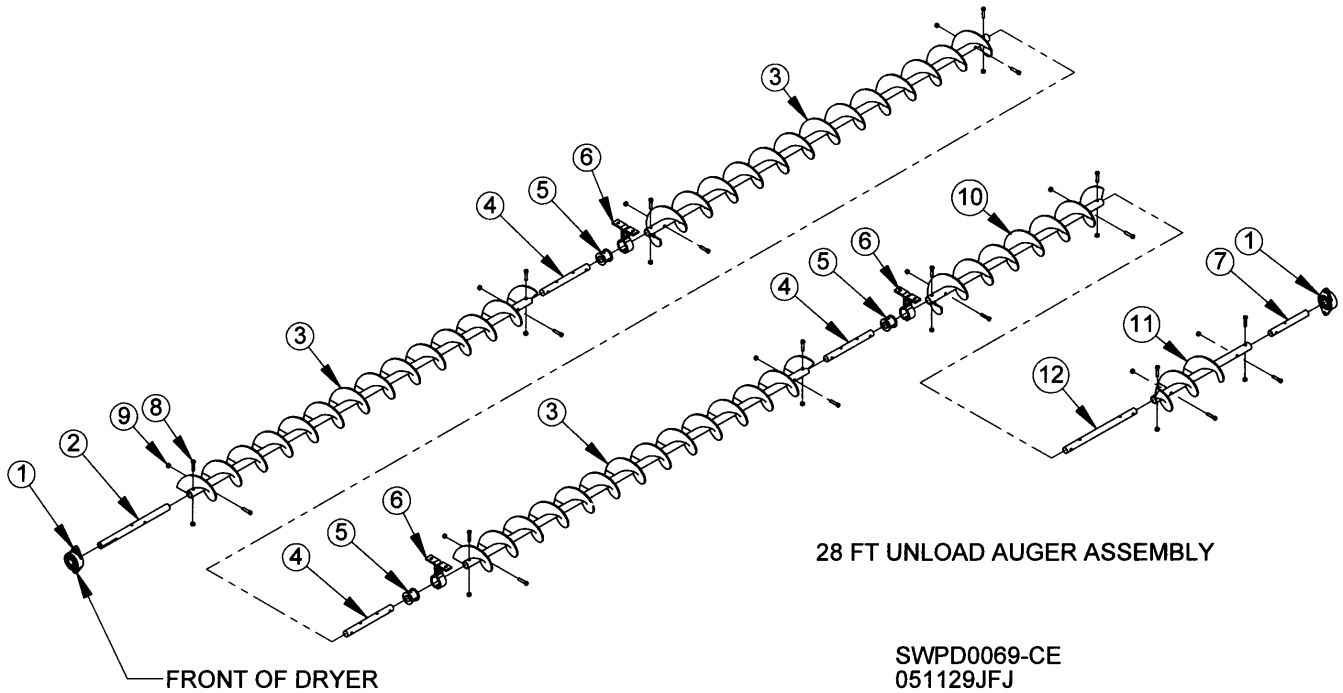
24' BOTTOM AUGER



SWPD0034

REF. #	DESCRIPTION	QTY	COMP. #
1	Bearing, 1.25, Flange, W/LC, HCFTS207-20	2	J0010
2	Shaft, Top Front, 12-3/4"	1	T16436
3	Auger, Bottom Front, 93-1/2"	2	T16430
4	Shaft, 8" Hanger Bearing	3	F4720
5	Bushing, Wood, 1.25" I.D.	3	J0096
6	Hanger Auger, T, 6CH2203	3	J0097
7	Shaft, 1.25" x 10", Bottom Auger	1	T17251
8	Screw, 7/16-14, 2, PLT	20	J0718
9	Nut, Lock, 7/16-14, PLT	20	J1034
10	Auger, Bottom Middle, 69-1/2"	1	T16432
11	Auger, Bottom Rear, 24"	1	T12498
12	Auger, Bottom, Std Unld Ext	1	T12493
13	Shaft, Auger, Moisture Sensor	1	F4723

28' BOTTOM AUGER



REF. #	DESCRIPTION	QTY	COMP. #
1	Bearing, 1.25, Flange, W/LC, HCFTS207-20	2	J0010
2	Shaft, Top Front, 12-3/4"	1	T16436
3	Auger, Bottom Front, 93-1/2"	3	T16430
4	Shaft, 8" Hanger Bearing	3	F4720
5	Bushing, Wood, 1.25" I.D.	3	J0096
6	Hanger Auger, T, 6CH2203	3	J0097
7	Shaft, 1.25" x 10", Bottom Auger	1	T17251
8	Screw, 7/16-14, 2, PLT	20	J0718
9	Nut, Lock, 7/16-14, PLT	20	J1034
10	Auger, Bottom Rear, 47.50"	1	T12492
11	Auger, Bottom, Std Unld Ext	1	T12493
12	Shaft, Auger, Moisture Sensor	1	F4723

NOTES

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DRYER ASPIRATOR COMPONENT INSTRUCTIONS

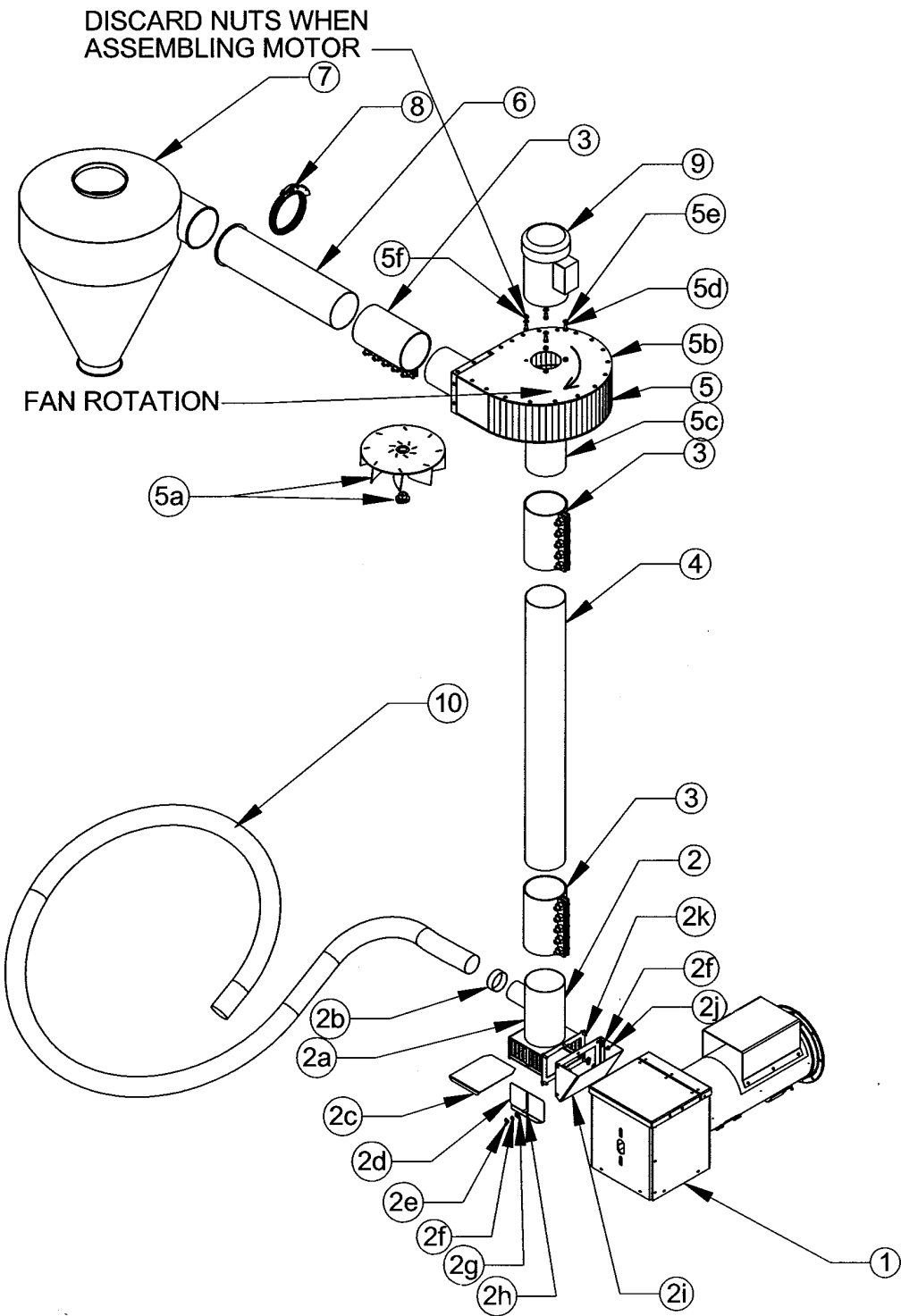
ASSEMBLY:

1. Attach the aspirator base assembly to the side of the dryer discharge housing. Mark and cut a 3 3/4" x 7 1/4" hole (about 2 inches from the top) in the side of dryer discharge housing and drill (6) 3/8" mounting holes using the base flange as a template. Mount the deflector with these same holes on the inside face of the dryer discharge housing.
2. Assemble the C-face motor to the aspirator fan housing using the hex-head 3/8" -16 x 3/4" screws and lock-washers that are provided in the housing (discard the 3/8" nuts). Attach the fan wheel to the motor shaft with a 7/8" split tapered bushing (J0409). Position the bushing so it is flush with the end of the motor shaft and tighten the 1/4" screws evenly to a torque of 95 inch-pounds.
3. Wire the motor so the fan wheel rotates in a clockwise direction when viewed from the top. (See exploded view on next page.)
4. The fan may be assembled directly on top of the aspirator base, or extended with a length of 6" tube. Use 6" compression couplers to fasten the extension tube.
5. Assemble the cyclone to the fan in the same manner using a 6" extension tube if desired. The 6" to 160mm tube adapter and clamp ring are used to secure the cyclone.
6. Use standard 6" tube supports and brackets (not shown in exploded view) to secure the aspirator assembly to the dryer or other convenient structure.

OPERATION:

1. Remove the clean-up plate (Item 2c) from the aspirator base when the unit is to be used to clean light material from discharged grain. Adjust the restrictor plates up or down to vary the amount of air pulling chaff from the grain.
2. The aspirator base may also be used to clean up around the dryer. Remove the 3" cap (Item 2b) and attach a 3" flexible hose (Item 10), slide the clean-up plate back into the base and use it to regulate the amount of air required to pull material up the 6" tube to the fan.

DRYER ASPIRATOR COMPONENT ASSEMBLY (Optional)



DRYER ASPIRATOR COMPONENT ASSEMBLY (Optional)

ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	T25670-A	DRYER OUTLET TUBE
2	1	D9585	ASPIRATOR BASE ASSM
2a	1	D9586	ASPIRATOR BASE WELDMT (PART OF D9585)
2b	1	J7535	CAP, 3" (PART OF D9585)
2c	1	D9588	PLATE, CLEAN-UP (PART OF D9585)
2d	2	D9587	PLATE, RESTRICTOR (PART OF D9585)
2e	2	J1005	5/16 WING NUT (PART OF D9585)
2f	8	J1200	5/16 LOCK WASHER (PART OF D9585)
2g	2	J1111	5/16 FLAT WASHER (PART OF D9585)
2h	2	J0535	5/15 X 1 CARRIAGE BOLT (PART OF D9585)
2i	1	D95861	DEFLECTOR, ASPIRATOR (PART OF D9585)
2j	6	J1002	NUT, 5/16-18, PLT
2k	6	J0527	SCREW, 5/16-18 X 1, PLT, GRD 5, HHCS
3	3	J7560	COUPLER, COMPRESSION, 6", 5 BOLT
4	1	K2941-48	6" TUBE, CUT TO DESIRED LENGTH
5	1	D9580	FAN, ASPIRATOR, 2 HP, W/O MOTOR
5a	1	D9575	FAN WHEEL W/J0409 BUSHING(PART OF D9580)
5b	1	D9581	HOUSING ASSY, ASPIRATOR (PART OF D9580)
5c	1	D9583	INLET PLATE, WELDMENT (PART OF D9580)
5d	4	J0605	SCREW, 3/8-16 X 3/4 , PLT (PART OF D9580)
5e	4	J1205	WASHER, LOCK, 3/8, PLT (PART OF D9580)
5f	4	J1020	NUT, HEX, 3/8-16 (PART OF D9580)
6	1	D9589	TUBE WELDMENT, 160MM TO 6" ADAPTOR
7	1	J7565	CYCLONE, LIGHT MATERIAL
8	1	J7566	CLAMP, 160 MM TUBE
9	1	H2020	MOTOR, 2 HP, 3 PH, 3450 RPM, C FACE, F145TC
9	1	H2010	MOTOR, 2 HP, 1 PH, 3450 RPM, C FACE, F145TC
10	1	K5248	HOSE, 3" I.D. FLEX



Sukup Automatic Grain Dryer

QuadraTouch™ Dryer Control System



Troubleshooting Guide

Sukup Manufacturing Company

1555 – 255th Street, Box 677

Sheffield, Iowa USA 50475

Phone: 641-892-4222

Fax: 641-892-4629

Website: www.sukup.com

E-mail: info@sukup.com

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General Safety Practices



The American Society of Agricultural and Biological Engineers (ASABE) safety alert symbol means "ATTENTION! Be Alert! Your personal safety is involved." This symbol draws your attention to important instructions concerning your personal safety. Read the messages carefully to avoid personal injury or death.

SAFETY SIGNAL WORDS

On safety decals, three signal words are used with corresponding colors of red, orange, and yellow to indicate hazard intensity. Definitions are as follows:



(red) indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.



(orange) indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.



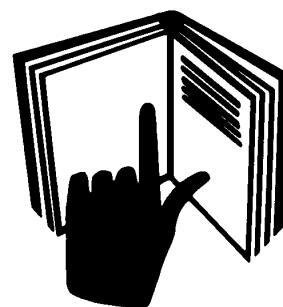
(yellow) indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

FOLLOW MANUAL & SAFETY DECAL MESSAGES

Observe safe operating practices. Carefully read this manual and all safety decals on your equipment. Safety decals must be kept in good condition. Replace missing or damaged safety decals free of charge by contacting Sukup Manufacturing Co. by mail at PO Box 677, Sheffield, Iowa 50475; by phone at 641-892-4222; or by e-mail at info@sukup.com.

Learn how to use controls and operate machine. Do not let anyone operate unit without thorough training of basic operating and safety procedures.

Make no unauthorized modifications to machine. Modifications may endanger function and/or safety of unit. Keep unit well maintained according to the procedures in the maintenance section of the Operator's Manual.



EMERGENCIES - KNOW WHAT TO DO

Have emergency numbers and written directions to your location near your telephone in case of emergency. An area for emergency phone numbers to be recorded has been provided below.

Ambulance Service: _____
Doctor: _____
Emergency Medical Squad: _____
Fire Department: _____
Hospital: _____
911 Address: _____
Written Directions to Your Location: _____

Safety Section

TRANSPORT SAFETY WARNING: TRUCKER-TRANSPORTER IS TO PROVIDE APPROVED SAFETY CHAIN WHEN TOWING DRYER.



WARNING: Transporting this equipment on public roads requires precautionary measures in order to prevent serious injury or death. If road travel is required it is essential that all of the following procedures be adhered to:

- Read and understand operator's manual.
- Check and comply with state & local regulations.
- Use required emblems or lights.
- Travel at a reasonable and safe speed. Reduce speed and/or use lower gear on rough ground or slopes.
- Stop gradually.
- Have extended rear angle mirrors on vehicles.
- Signal & check behind you when turning.
- Use safety chain when towing dryer.
- Use break-away kit (available from Sukup Mfg Co - Computer #T4366).



WARNING: Check for other vehicles when turning. (2/3 of roadway farm accidents occur while turning.)

- Use mirrors
- Be sure to have clear visibility
- Use signal lights



WARNING: Do not transport unit if visibility is impaired.

These conditions may include, but are not limited to:

- hills
- poor weather
- nighttime driving

Failure to heed these warnings may result in serious injury or death. Use good judgment when transporting. Maintain complete control of unit at all times. Comply with state and local regulations. Read safety procedures before moving units. Always strive to prevent accidents! Watch out for other vehicles.



WARNING: TO PREVENT EXPLOSION OR FIRE



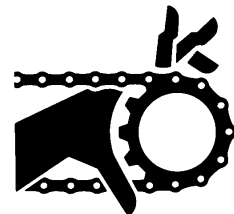
- Carefully review operator's manual.
- Keep dryer clean inside and out, as fines may cause a fire.
- Check for gas leaks, (spray soapy solution on piping and joints.)
- Run fan at least a half minute before starting heater.
- NEVER start heater if you smell gas or hear a hissing sound.
- NEVER run heater with inspection door open.

Failure to heed these warnings may cause serious injury or death.



WARNING: KEEP CLEAR OF ALL MOVING PARTS

Keep people (ESPECIALLY YOUTH) away from equipment, particularly during operation. Keep away from all moving parts. Entanglement can cause serious injury or death. Keep fan screen guards and all shields in place and in good working condition. Replacement screen guards and shields are available from Sukup Mfg. Co. at no charge.



Failure to follow the above precautions may cause serious injury or death.

Safety Section

To prevent serious injury or death to you or your family, it is essential that these safety decals be mounted on your dryer.

Check that all safety decals are in place according to the decal placement drawing and in good legible condition when dryer is installed.

IMPORTANT!! If suggested locations are not clearly visible, place safety decals in a more suitable area. Never cover up existing safety decals.

Make sure location for decal is free from grease, oil and dirt. Remove backing from decal and place in proper position. Replace missing or damaged safety decals or shields free of charge by contacting Sukup Manufacturing Co. by mail at PO Box 677, Sheffield, Iowa 50475; by phone at 641-892-4222; or by e-mail at info@sukup.com. Please specify computer number.

1. Decal L0281 - WARNING: To avoid serious injury or death.



2. Decal L02741 - DANGER: Keep away from any



electrical lines, especially when moving unit.

3. Decal L0234 - DANGER: Do not allow rear door to close with someone inside; lock out power; do not bypass interlock switch.



4. Decal L0166 - WARNING: Guards & screens in place. Disconnect electricity. Check fan blade.



5. Decal L0271 - DANGER: Shield missing, do not operate.



6. Decal L0284 - WARNING: Keep away from all moving parts.



7. Decal L0285 - CAUTION: Not intended for use on public roads. If road travel is required:



Safety Section

8. Decal L02831 – WARNING: Lower and secure parking stands before unhitching unit.



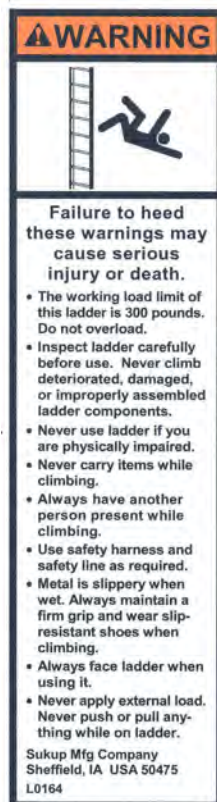
9. Decal L03061 - DANGER: Keep away when auger is running! Entanglement will cause serious injury or death!



10. Decal L0520 - CAUTION: Failure to keep unit clean may cause fire and serious injury or death.



11. Decal L0164 - WARNING: Ladder safety – falling from heights hazard. Overall precautions for ladder safety.



12. Decal L0512 – WARNING: Use safety chain when towing unit to eliminate detachment hazard.



13. Decal L0062 – DANGER: Never run fan without screen guard; Stay clear from front of fan; Follow correct procedure when installing fan blade.

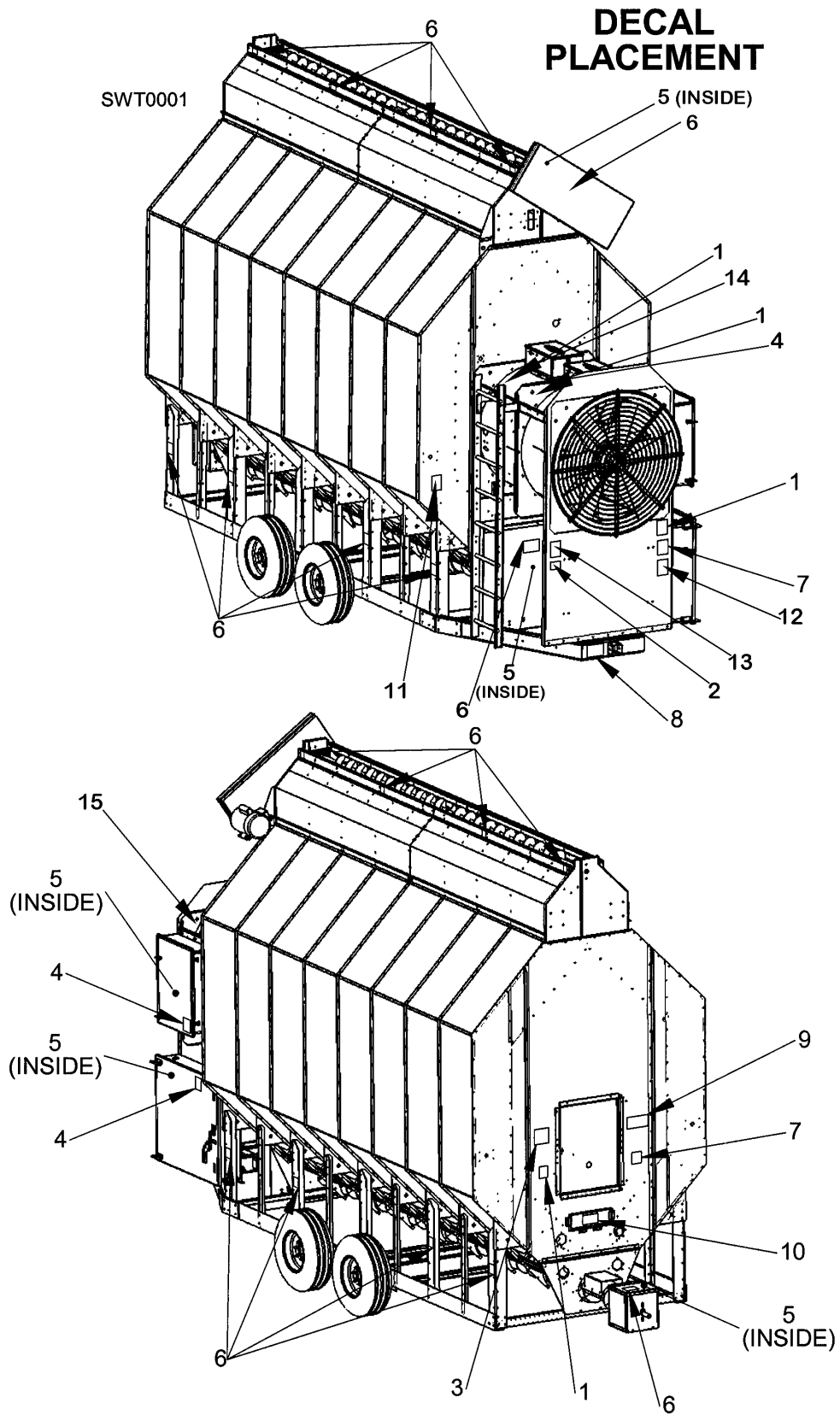


14. Decal L0165 - WARNING: Disconnect Electricity; Bleed gas; etc.



15. Decal L0204 - DANGER: Do not operate with service door removed.





Fault Troubleshooting

Grain Discharge Chute Sensor

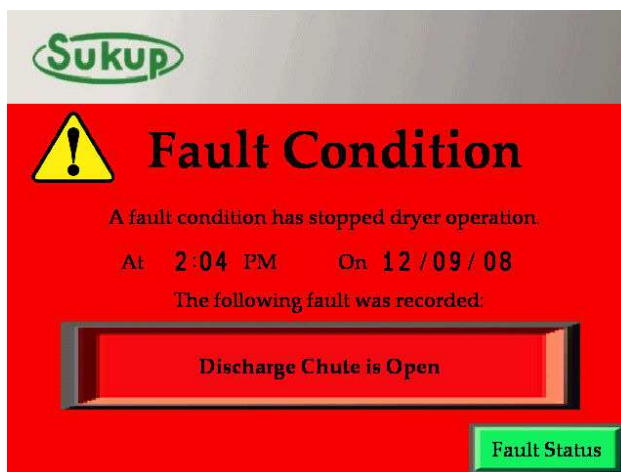
The Grain Discharge Chute Sensor is present on the dryer to detect the Discharge Chute opening during operation. This fault usually indicates a problem with the take-away system.

Model	Wire #
1 Fan Portable Dryer	42
2 Fan Portable Dryer	42
2 Module Stack Dryer	42
3 Module Stack Dryer	42



Figure 1.1b: Grain Discharge Chute Sensor

1. Is the Discharge Chute open?
Determine the cause of the door being opened and return the door to the closed position.
2. Is the sensor out of adjustment?
This can be determined by watching the input light on the PLC or by observing the System Diagnostics screen in the Tools Menu. Adjust the angle of the switch after placing the door at the height you wish the fault to occur. The PLC input light turns off when a fault occurs.
3. If unable to adjust the sensor and turn on the PLC input light, a voltmeter will be used to determine if the sensor is malfunctioning.
4. At the Discharge Chute, find the junction box fastened to the lid. This box contains the sensor. Remove the cover and locate the two wires coming from the sensor. One of the wires should be labeled # 18. Measure for 24VDC from wire #18 to ground. (On older dryers, a jumper may need to be installed in the control box from wire # 95, found on the PLC, to the ground bar at the bottom of the control box).
5. If 24VDC is measured on wire # 18, check for voltage on wire # 42. If 24VDC is not present, tilting the sensor may be necessary to allow the mercury to make contact with the switch contacts. If unable to measure 24VDC on wire # 42, the sensor is bad and must be replaced.
6. If 24VDC is present on wire # 42, but the PLC input light is still off, proceed to the Power Box and measure terminal # 42 for 24VDC. If unable to measure 24VDC on terminal # 42, check connections between the Discharge Chute Sensor and the Power Box.
7. If 24VDC was measured on terminal # 42 in the Power Box, measure the PLC input where 42 goes into the PLC. If 24VDC is present on the input on the PLC but the light is OFF, the PLC is malfunctioning.



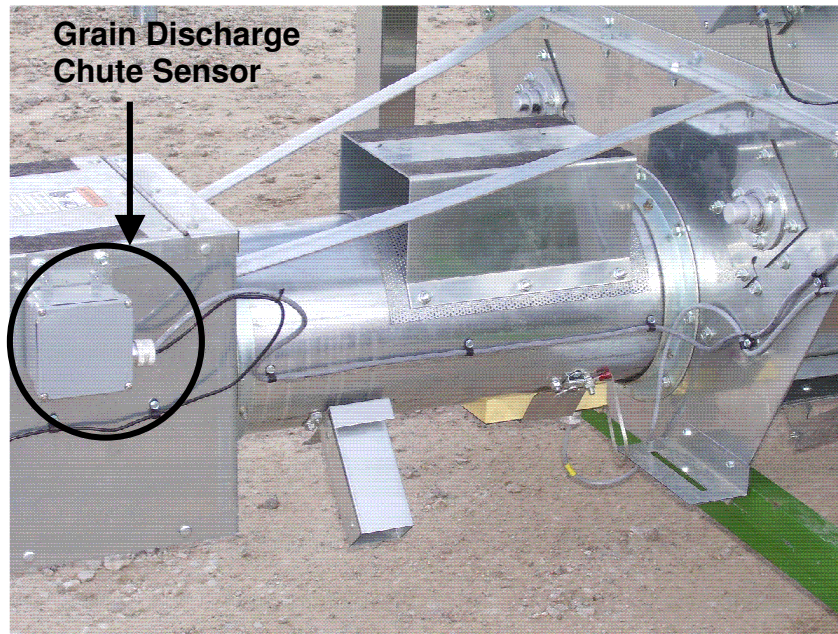


Figure 1.1c: Placement of sensor on dryer

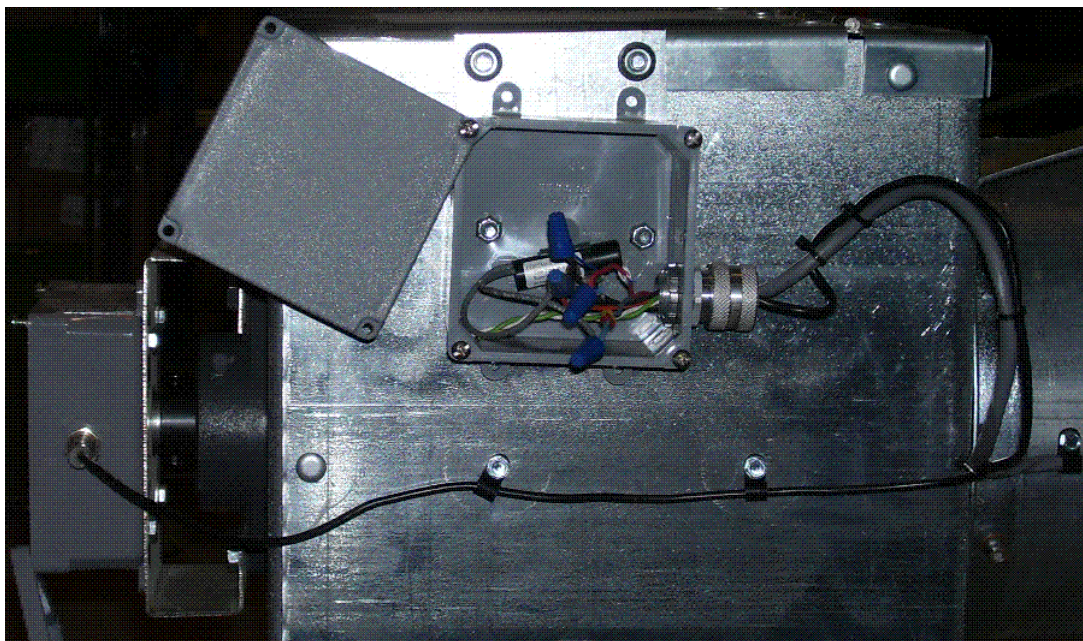


Figure 1.1d: View of Grain Discharge Chute Sensor

Grain Level Sensor

The Grain Level sensor is located on the side of the dryer connected to the paddle switch. This sensor is used to indicate when the dryer is running low or out of grain. A fault will be displayed when this occurs.

Model	Wire #
1 Fan Portable Dryer	44
2 Fan Portable Dryer	44
2 Module Stack Dryer	44
3 Module Stack Dryer	44

- Is the wet bin out of grain?
If this is the last load for the season, press Reset and Start →Final Dry.
- Has an auxiliary load malfunctioned?
Repair the cause of the load failure and press Reset.
- If wet grain is available and the load auxiliaries are functioning, is the paddle switch bound up?
If so, free the paddle switch and repair the cause.
- Are both PLC input lights off? (Both lights should be off when the dryer is calling for grain – paddle down)
Are both PLC input lights on? (Both lights should be on when the dryer is full – paddle up)
If not, remove the cover from the junction box on the paddle switch assembly and visually check sensors for proper placement in their respective holders. Refer to Fig. 1.2c
- Observe the PLC input lights (#44-Lower; #53-Upper) while someone moves the paddle switch from the down position to the up position.

Lower-Input 1.1.1; Upper-Input 1.2.3

If either PLC input light does not turn on, measure for 24VDC on wire #18 to ground. (Touch the black probe from the meter to the dryer frame.)

- If 24VDC is measured on wire #18, measure for 24VDC on the other wire going to the sensor.
 - With the paddle switch in the up position, 24VDC should be measured on wire #44 and #53.
 - If not, replace the respective sensor and recheck for voltage.
- If the paddle switch is in the up position and 24VDC is present on both sensors, but one or both of the PLC input lights are off, voltage will need to be measured on the respective terminal on the Power Box terminal strip. If 24VDC is not measured on the respective terminal, check the wiring connections between the Paddle Switch junction box and the Power Box terminal strip.
- If 24VDC is measured at the Power Box terminal strip and the PLC input lights are not on, the PLC may be malfunctioning.



Figure 1.2b: Grain Level Sensor

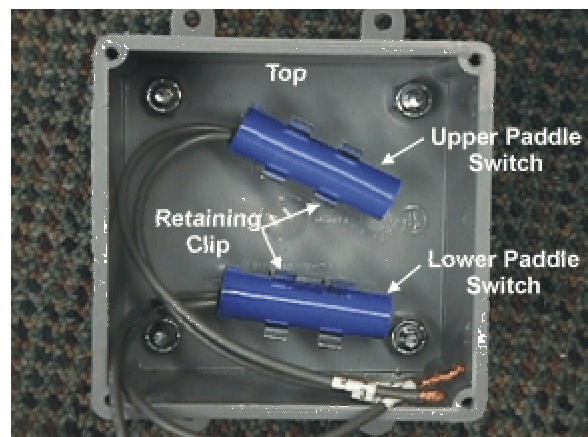
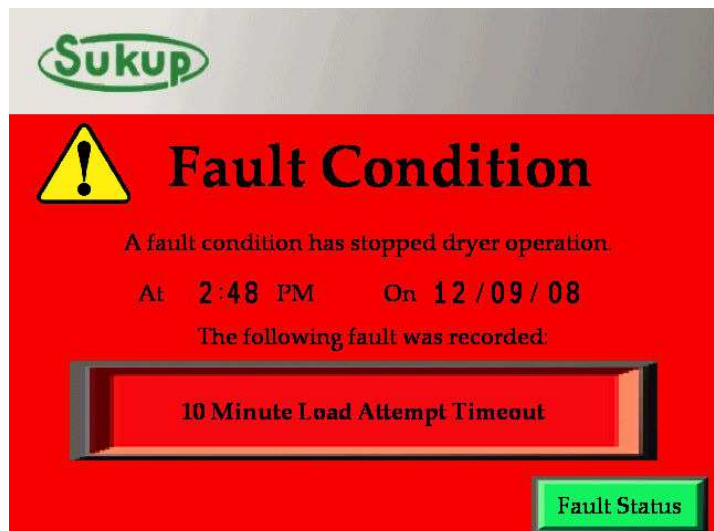


Figure 1.2c: Grain Level Sensor

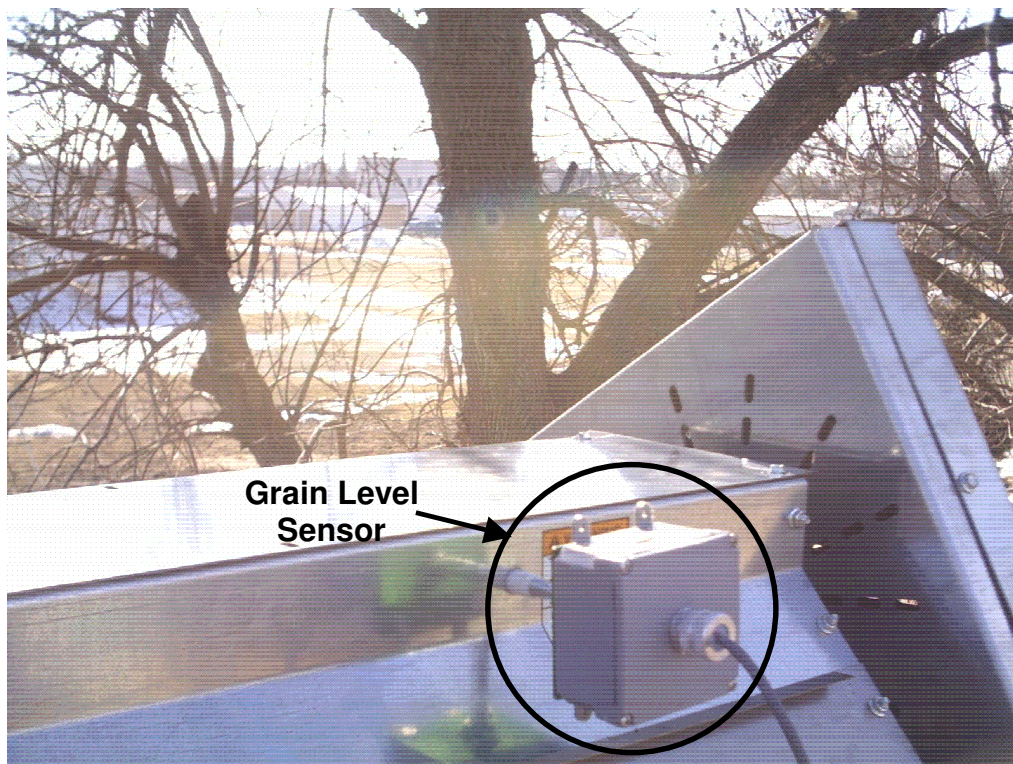


Figure 1.2d: Grain Level Sensor Installed on Dryer

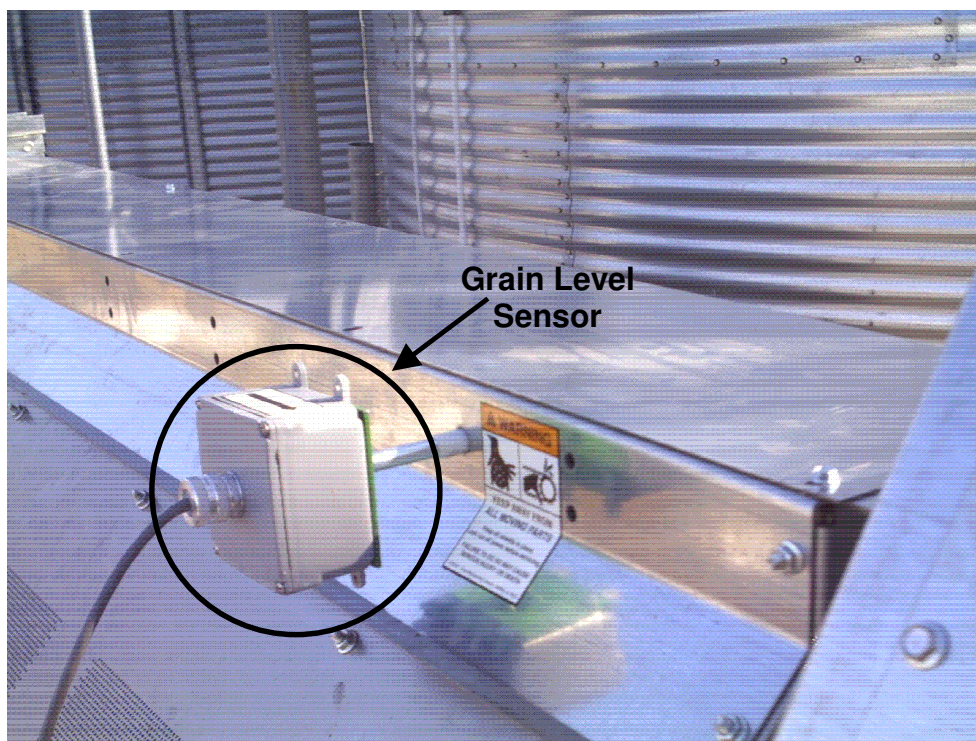


Figure 1.2e: Grain Level Sensor installed on Dryer

Unload Auger Proximity Sensor

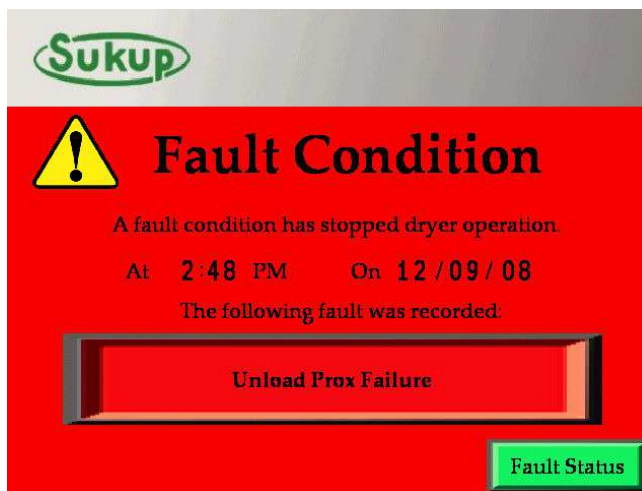
The Unload Auger sensor is located on the discharge bin on the end of the unload auger. This sensor monitors the unload auger and will give a fault and stop the dryer if the unload auger stops turning.

Model	Wire #
1 Fan Portable Dryer	96
2 Fan Portable Dryer	96
2 Module Stack Dryer	96
3 Module Stack Dryer	96



Figure 1.3b: Unload Auger Proximity Sensor

1. Visually inspect the load auger for a problem.
 - a. Are the belts tight and in good condition?
 - b. Does the motor smell or feel hot?
 - c. Is a Motor Overload fault being displayed along with the Unload Auger fault? If so, do not restart the Unload motor until a definite cause for the overload has been determined. After repairing the cause of the fault, reset the motor overload. Then press RESET on the keypad.
2. If no fault is being displayed, go to Manual and turn on the Unload and check for rotation.
 - a. While the auger is rotating, check the PLC Input light, this light should be flashing at a regular rate, indicating rotation. **Input-1.3.2**
 - b. If the PLC Input light is not flashing, check auger for rotation. If the auger is not rotating, find the cause and repair.
3. If rotating, look at the back of the sensor itself. A small, orange light should be visible and flashing on and off.
4. If the light on the back of the sensor is not flashing, find the junction box attached to the discharge chute and remove the cover.
 - a. Locate the Brown, Black, and Blue wires coming from the Unload Auger Sensor. Measure for 24VDC on wire # 18 (brown), with respect to wire # 95 (blue).
 - b. If 24VDC is not measured on wire # 18, go to the Power Box terminal strip and measure for 24VDC on the bottom terminal strip.
 - c. If 24VDC is not measured on wire # 18 in the Power Box, go to the Control Box and measure for 24VDC on the terminal strip.
 - d. If 24VDC is not measured on wire # 18 in the control box, go to the PLC and measure for 24VDC on the topside of the PLC.
5. If possible, position the flag over the sensor so that the sensor will be in the ON condition.



Unload Auger Proximity Sensor (continued)

- a. With the sensor in the ON condition, the light on the back of the sensor should be on. Measure for 24VDC on the output wire (black).
If the light is on but 24VDC is not measured on the output (black) sensor wire, the sensor is malfunctioning.
- b. If 24VDC is measured on the output (black) sensor wire, go to the PLC in the Power Box and check the PLC Input light. This light should be on when the sensor is in the ON condition.
- c. If 24VDC is measured on the output (black) sensor wire but the PLC input light is not on, measure for 24VDC on the Power Box terminal strip. If 24VDC is not measured, in the Power Box, check wiring connections between the junction box and the Power Box.

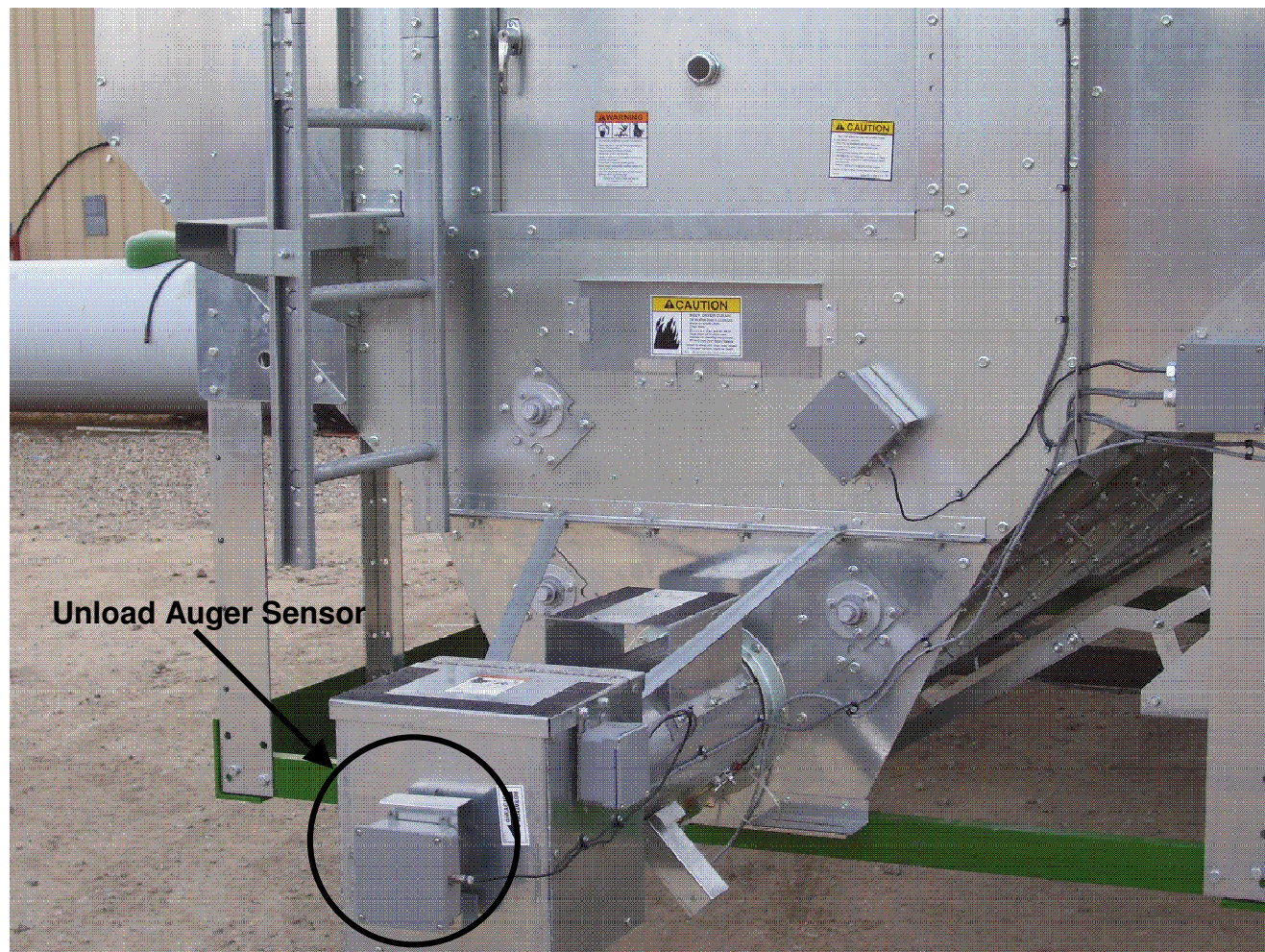


Figure 1.3c: Unload Auger Proximity Sensor Installed on Dryer

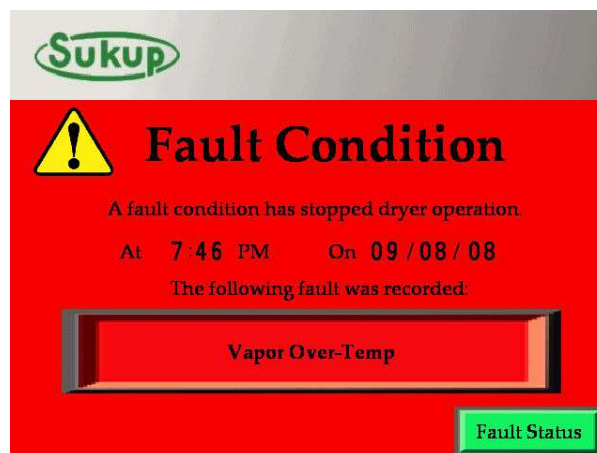
Vapor Over-Temperature Sensor

The Vapor Over-Temperature Sensor is located on the pipe train for the heater(s). It is provided to prevent the gas from over heating the vaporizer and causing vapor to vaporize.



Figure 1.4b: Vapor Over-Temperature Sensor

Model	Wire #
1 Fan Portable Dryer	37
2 Fan Portable Dryer (Lower)	37
2 Fan Portable Dryer (Upper)	102
2 Module Stack Dryer (#1)	37
2 Module Stack Dryer (#2)	102
2 Module Stack Dryer (#3)	202
2 Module Stack Dryer (#4)	302
3 Module Stack Dryer (#1)	37
3 Module Stack Dryer (#2)	102
3 Module Stack Dryer (#3)	202
3 Module Stack Dryer (#4)	302
3 Module Stack Dryer (#5)	402
3 Module Stack Dryer (#6)	502



1. This fault indicates when the output of the vaporizer coil has become too hot (above 140 F.).
 - a. The tubing near the fault device should be fairly warm to the touch but not hot.
 - b. Check the fuel supply - is the tank low on fuel?
 - c. Air inlet obstruction – clean debris from the fan grill.
 - d. Vaporizer coil is too close to the flame. – Adjust vaporizer coil.
2. Has the Vaporizer Coil had sufficient time to cool down?
This device will automatically reset when the device has cooled down.
3. Is the PLC Input light on?
 - a. After the device has cooled down and reset, the PLC Input light should now be ON.
 - b. If not, follow the wiring from the coil to the heater box and measure for 24VDC on wire # 18.
4. If 24VDC is not measured on wire # 18, go to the Power Box and measure 24VDC on the terminal strip.
If 24VDC is measured on wire # 18 on the Power Box terminal strip, check the wiring connections from the Heater Box to the Power Box.
5. With 24VDC now being measured on wire # 18 on one wire of the vaporizer O/T switch, and the device has cooled down to ambient temperature, measure for 24VDC on the other wire (not # 18) coming from the O/T switch.
 - a. If 24VDC is NOT measured on the other wire, the O/T switch is bad.
 - b. If 24VDC is measured on the other wire coming from the O/T switch, take note of the wire number and go to the Power Box and measure for 24VDC on the terminal strip.
 - c. If 24VDC is NOT measured on the Power Box terminal strip, check the wiring connections between the Power Box and the Heater Box.
 - d. If 24VDC is measured on the Input terminal, and the Input light is NOT on, and the fault message is still being displayed (after pressing RESET), the PLC is malfunctioning.

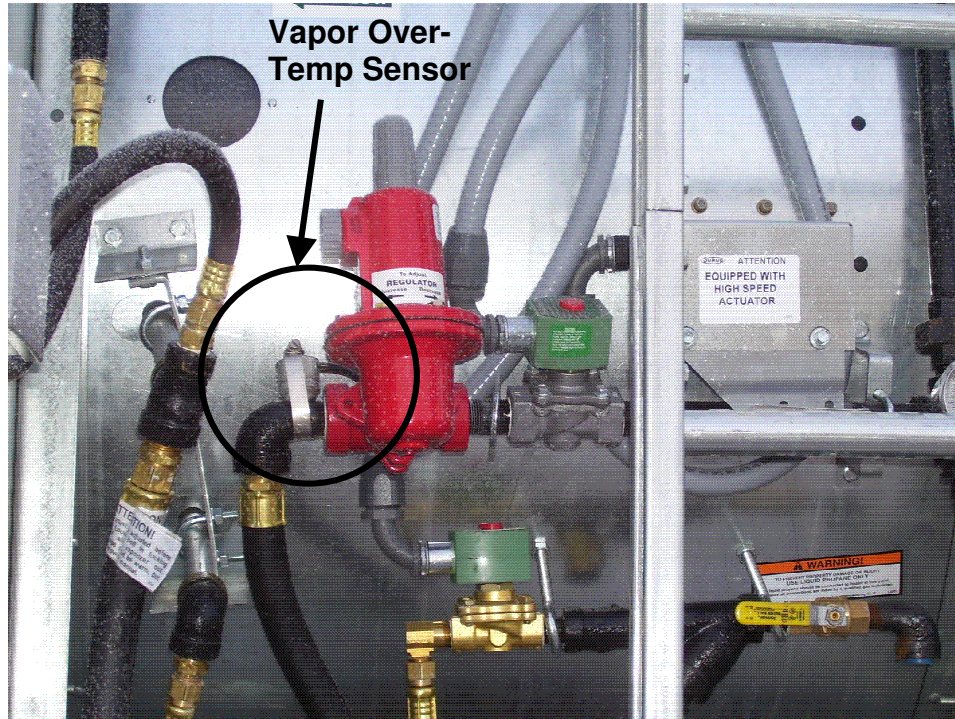


Figure 1.4c: Vapor Over-Temperature Sensor Installed on Dryer

Fault Troubleshooting

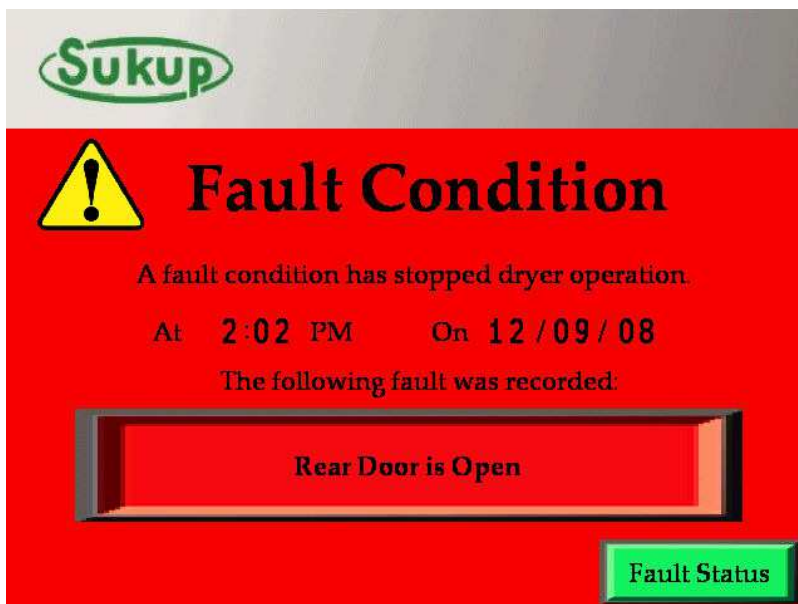
Rear Door Interlock Switch

The Rear Door Interlock Switch is located to the right of each rear door on the dryer. This device is used to keep the dryer from running when the rear door is open and a person may be in the plenum of the dryer.

Model	Wire #
1 Fan Portable Dryer	36
2 Fan Portable Dryer	36
2 Module Stack Dryer	36A-D
3 Module Stack Dryer	36



Figure 1.5b: Rear Door Switch



1. Check the rear door or doors to be sure that the doors are closed.
2. If all doors are closed, check that the PLC input light is ON.
If the light is not ON, go to the junction box on the back of the dryer containing the wire from the switches. Remove the cover and locate and measure 24VDC on input wire.
NOTE: On ALL dryers, wire # 18 feeds into the door switch and out of the push-button switch. If more than one plenum, the switches are connected in series and then routes back to the PLC input.
3. If 24VDC is not present on input wire, check that 24VDC is measured on wire #18.
 - a. If 24VDC is present on input wire, but the PLC input light is not ON, check for 24VDC returning from all the switches. Generally, each additional door switch adds a letter to the wire number after coming out each successive key switch. 36 – 36A – 36B – etc.
 - b. If 24VDC is not returned from the door switches, a voltage check on the wire coming from each switch may be required. (Rear Door key switches are in SERIES)
4. If 24VDC is being returned from the last switch, measure for 24VDC on the appropriate wire on the Power Box terminal strip.
 - a. If 24VDC is not measured on the Power Box terminal strip, check the wiring connections between the junction box and the Power Box.
 - b. If 24VDC is measured on the Power Box terminal strip, check #36 on the PLC for 24VDC
5. If 24VDC is measured on the PLC input terminal but the input light is not on, and you have a Rear Door fault, the PLC is malfunctioning.

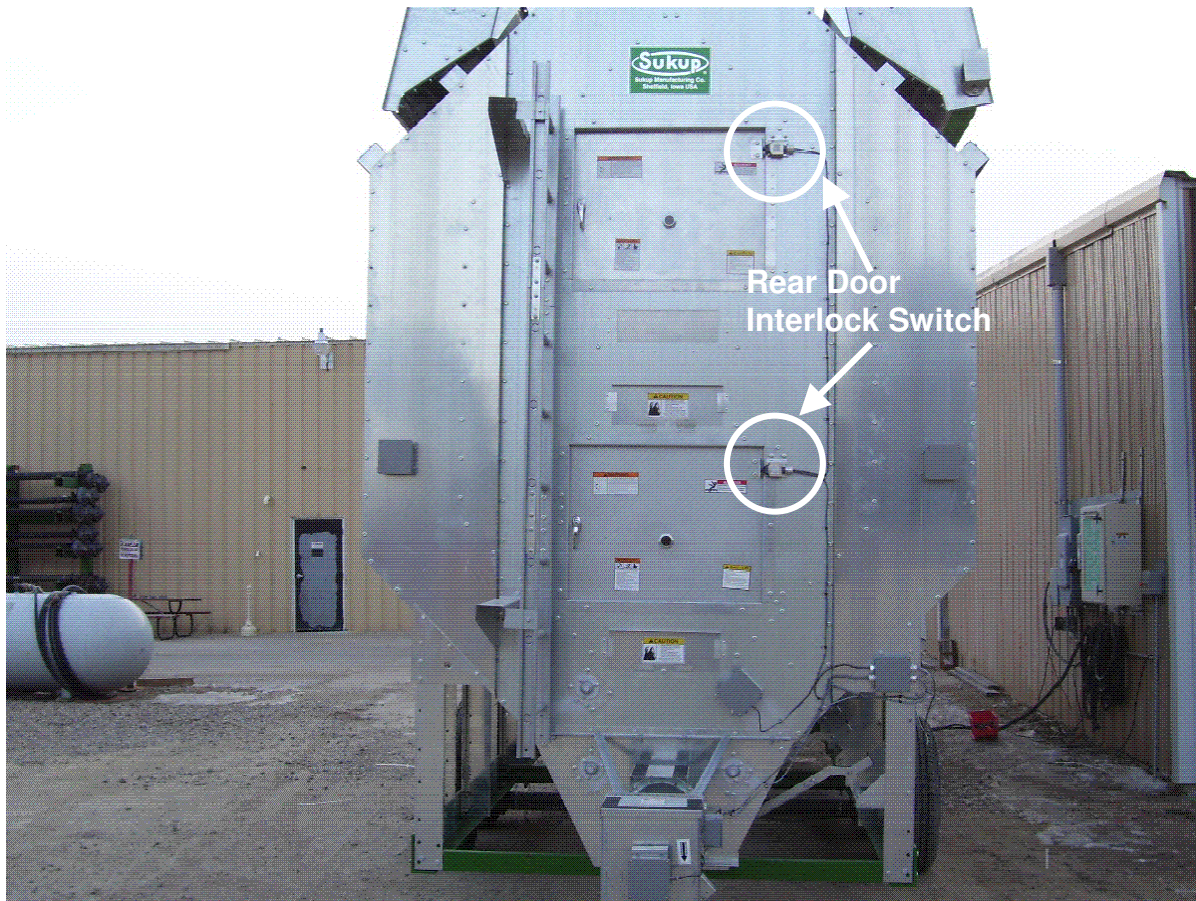


Figure 1.5c: Rear Door Interlock Switch Installed on Dryer

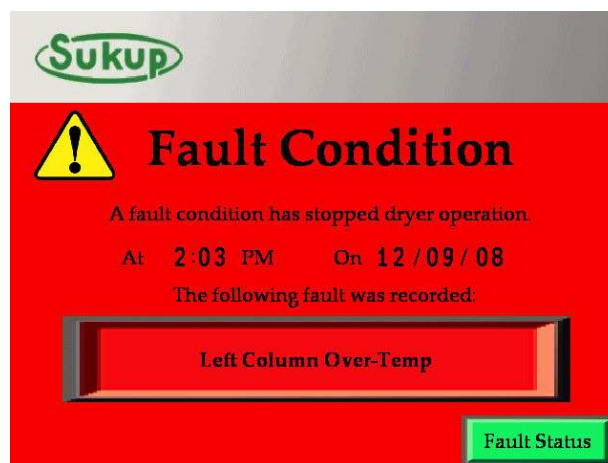
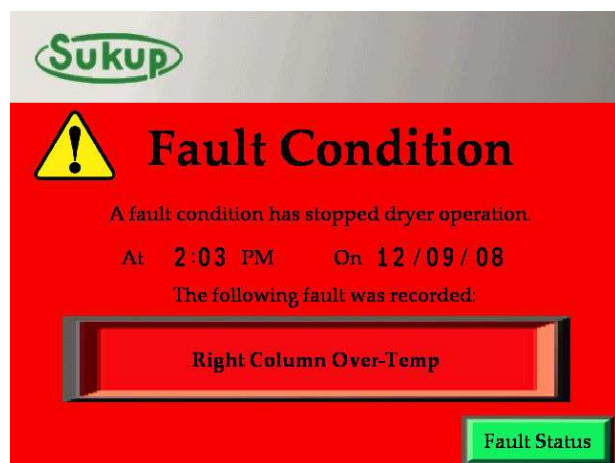
Grain Column Over-Temperature Sensor

The Grain Column Over-Temp sensor is located in conduit running through the grain columns horizontally. This device is used to monitor the temperature of the columns and will turn the dryer off if the columns reach 210° F.

Model	Wire #
1 Fan Portable Dryer (Right)	40
1 Fan Portable Dryer (Left)	41
2 Fan Portable Dryer (Right)	40
2 Fan Portable Dryer (Left)	41
2 Module Stack Dryer (Right)	40
2 Module Stack Dryer (Left)	41
3 Module Stack Dryer (Right)	40
3 Module Stack Dryer (Left)	41



Figure 1.6b: Grain Column Over-Temperature Sensor



1. Check all of the grain columns for an obstruction, which would prevent the grain from flowing through the grain column.
If an obstruction is found, do not restart the dryer until the obstruction has been cleared.
2. If no obstruction is found and grain is flowing freely through each column, the plenum temperature may need to be reduced.

NOTE: To check for an obstruction, go to Manual Operation and turn the Unload to ON. Run the Unload long enough for the grain level in the columns to drop at least 1 foot. Stand back from the dryer and look through the screens to notice the grain level in each column. Any column, which has an obstruction, will be readily visible.

3. If the column temperature has cooled down and the RESET button has been pressed on the keypad, and the fault message is still being displayed, remove the junction box cover and measure for 24VDC on wire # 18.
4. Allow time for the Columns to cool down.
5. At this point, 24VDC should be measured on wire # 18 at the O/T sensor.
Measure for 24VDC on the other wire (not # 18) coming from the sensor.
 - a. If 24VDC is NOT measured, the O/T sensor is defective.
 - b. If 24VDC is measured on the wire coming from the O/T sensor but
The PLC Input light is NOT on, note the wire number and go to
The Power Box and measure for 24VDC on the terminal strip.
 - c. If 24VDC is NOT measured on the terminal strip in the Power Box, check the wiring connections between
the junction box and the Power Box.

Fault Troubleshooting

- d. If 24VDC is measured on the terminal strip in the Power Box, go to the PLC and measure for 24VDC on the Input terminal.
- e. If 24VDC is measured on the PLC Input terminal, the Input light is not on, and the fault message is still being presented (after pressing RESET), the PLC is malfunctioning.

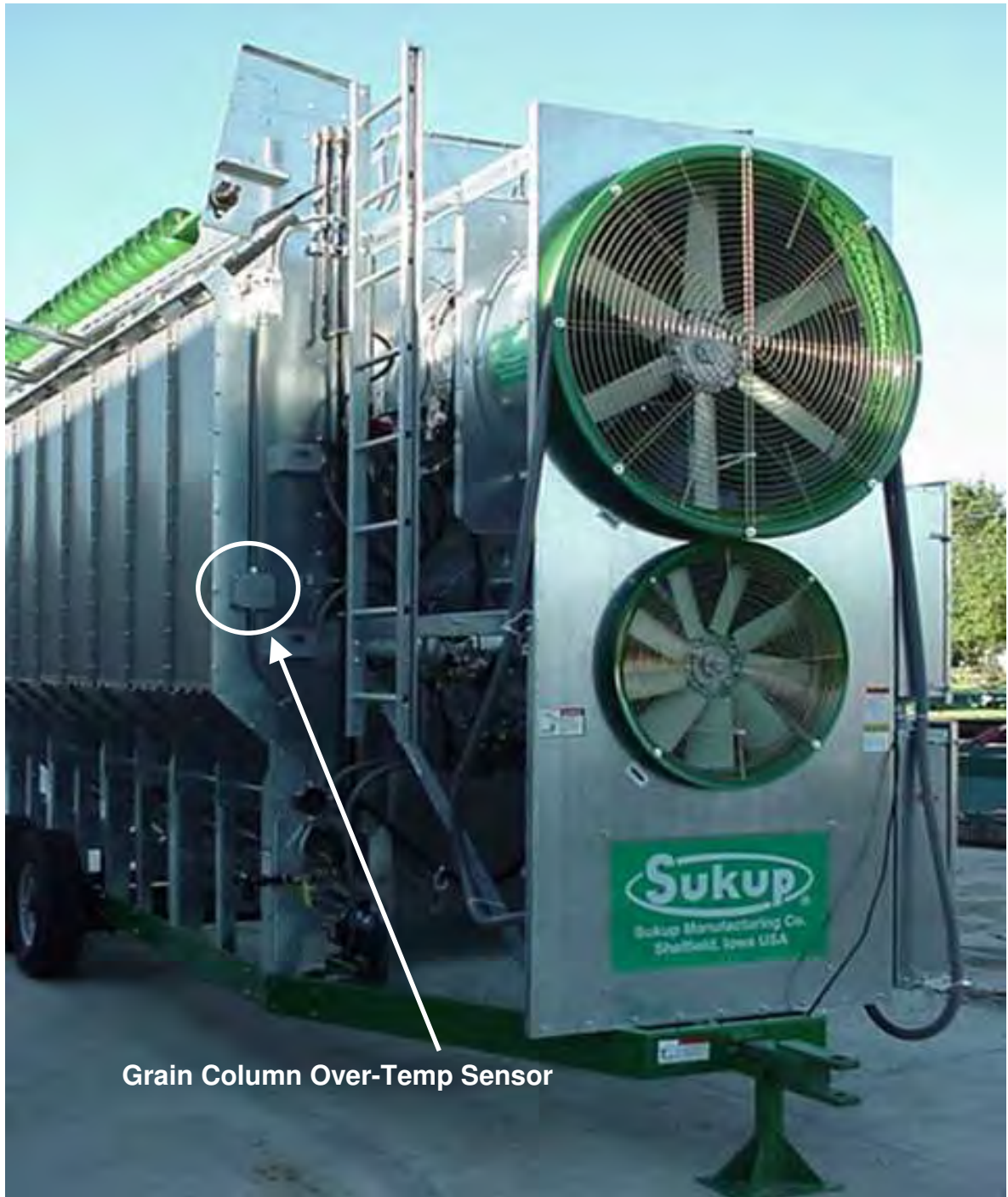


Figure 1.6c: Grain Column Over-Temperature Sensor Installed on Dryer

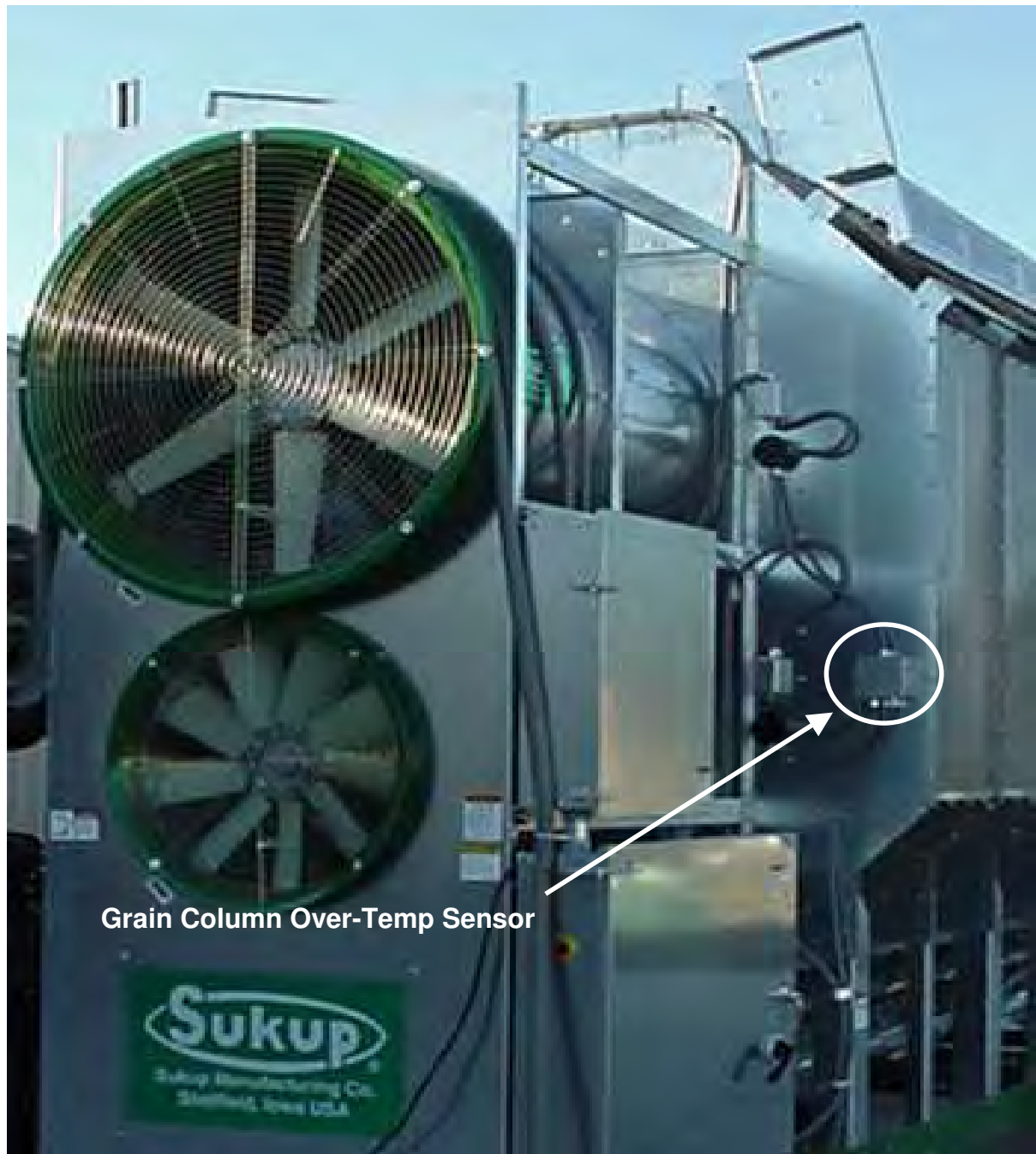


Figure 1.6d: Grain Column Over-Temperature Sensor Installed on Dryer

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Heater Housing Hi-Limit Switch

Heater Housing Hi-Limit switch is the reset button located in the heater box mounted above the heater. This switch trips when the heater reaches a temperature considered too high for drying grain.



Figure 1.7b: Heater Housing Hi-Limit Switch

Model	Wire #
1 Fan Portable Dryer	38
2 Fan Portable Dryer (Lower)	38
2 Fan Portable Dryer (Upper)	103
2 Module Stack Dryer (#1)	38
2 Module Stack Dryer (#2)	103
2 Module Stack Dryer (#3)	203
2 Module Stack Dryer (#4)	303
3 Module Stack Dryer (#)	38
3 Module Stack Dryer (#)	103
3 Module Stack Dryer (#)	203
3 Module Stack Dryer (#)	303
3 Module Stack Dryer (#)	403
3 Module Stack Dryer (#)	503



1. Check for proper fan operation and airflow.
 - a. Check the ignition harness for burned wires. Replace is necessary.
 - b. Check for a plugged fan grill and remove any debris.
 - c. Remove the cover from the faulted Heater Box and push the RED reset button located at the center of the Heater Box.
 - d. Go to manual and turn on the fan. Insure that the fan is running at the proper speed.
 - e. Turn the burner switch to ON and observe the burner for proper operation.
2. After allowing time enough to cool, the RED reset button on the hi-limit switch should push in and latch.
 - a. If the reset button will not latch, the hi-limit switch is defective.
 - b. If the reset button will latch but the fault remains after RESET is pressed, voltage measurements will need to be taken.
3. Locate the two wires plugged in to the hi-limit switch. Measure for 24VDC on wire # 18.
 - a. If 24VDC is not present on wire # 18, go to the Power Box and check for 24VDC on the terminal strip.
 - b. If 24VDC is measured on the terminal strip, check wiring connections between the Heater Box and the Power Box.
4. At this point, 24VDC should be measured on wire # 18 at the hi-limit switch in the Heater Box.
 - a. Measure for 24VDC on the other wire connected to the hi-limit switch. With the RED reset button latched in, 24VDC should be present.
 - b. If 24VDC is NOT measured, the hi-limit switch is defective.
 - c. If 24VDC is measured but the PLC Input light is not ON, take note of the wire number and go to the Power Box and measure for 24VDC on the terminal strip.
 - d. If 24VDC is NOT measured on the terminal strip, check the wiring connections between the Heater Box and the Power Box.

Fault Troubleshooting

- e. If 24VDC is measured on the Power Box terminal strip, go to the PLC Input terminal and measure for 24VDC.
- f. If 24VDC is NOT measured on the PLC input terminal, check the wiring connections from the PLC Input terminal to the Power Box terminal strip.
- g. If 24VDC is measured on the input terminal on the PLC but the input light is NOT on, and the fault message is still being displayed after pressing RESET on the keypad, the PLC is malfunctioning.

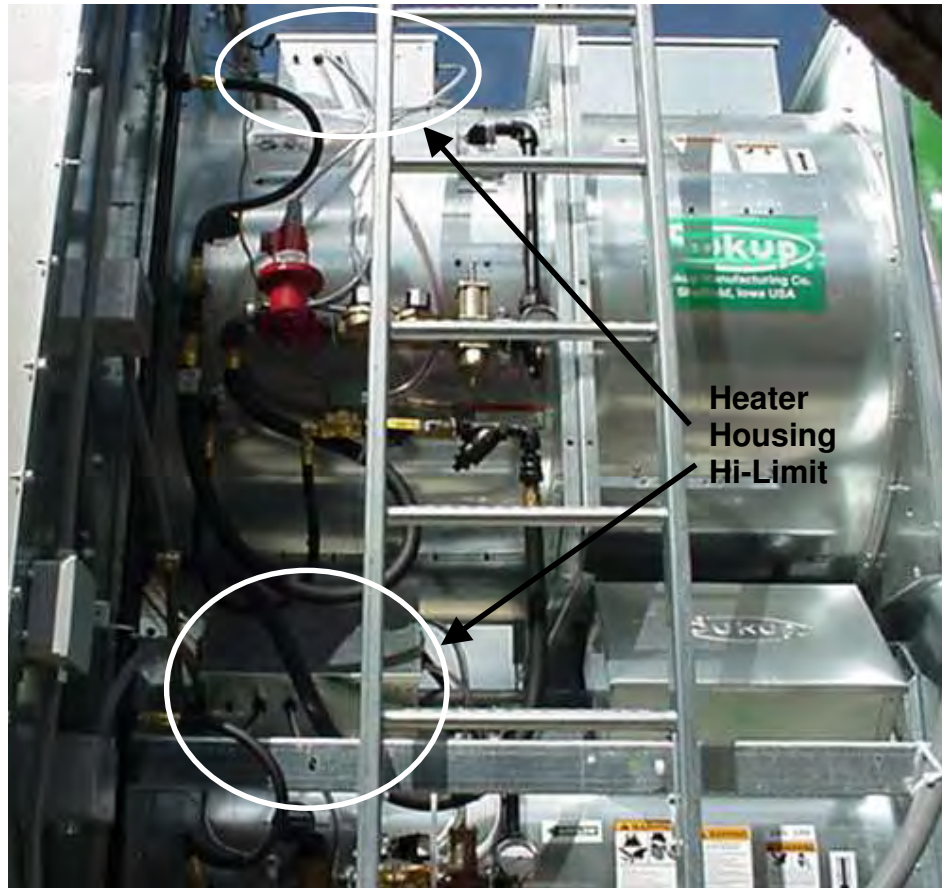
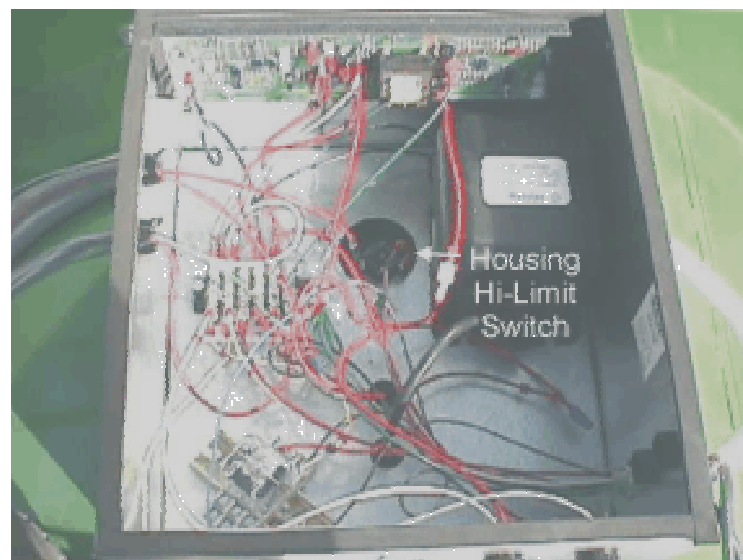


Figure 1.7c: Heater Housing Hi-Limit Switch Installed on Dryer



Metering Roll Proximity Switch

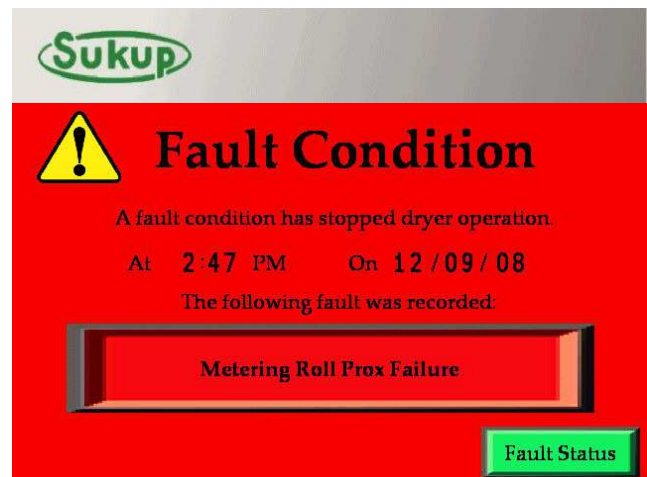
The Metering Roll Proximity Switch is located in junction box at the back of the dryer. This device is used to monitor the metering rolls for rotation. If the rolls cease to turn, the fault will be displayed and the dryer will shut down.

Model	Wire #
1 Fan Portable Dryer	93
2 Fan Portable Dryer	93
2 Module Stack Dryer	93
3 Module Stack Dryer	93



Figure 1.8b: Metering Roll Proximity Switch

- Go to Tools → Manual Operation.
- Turn the manual Meter Roll Speed control to 15%.
- Press and Hold the Unload OFF button until it turns bright green and the unload starts.
- Observe the chain on the Meter Rolls DC Motor for movement.
 - If the chain is moving than check to see if the Meter Rolls are turning.
 - If the Meter Rolls are not turning, check for a broken chain.
- If the Meter Rolls are turning, go to the back of the dryer and look at the back of the Meter Roll sensor for the light turning on and off.
 - Check PLC Input for the light turning on and off.
 - After determining which Meter Roll Input signal is missing, go to that Meter Roll box which houses the proximity switch and remove the cover. Make sure that the flag is within 1/8" of the sensor head when passing over the sensor. If not, this adjustment will need to be made before proceeding. Turn the Unload OFF at a point where the Meter Roll flag is positioned above the proximity sensor. The orange light on the back of the proximity sensor should now be on.
 - If the orange light is not on, follow the wire from the proximity sensor to the junction box. Remove the junction box cover.
 - Measure for 24VDC on wire # 18.
 - If 24VDC is not measured on wire # 18 go to the Power Box and measure for 24VDC on the terminal strip.
 - If 24VDC is measured on the Power Box terminal strip, check the wiring connections between the junction box and the Power box.
- At this point, 24VDC should be present on wire # 18 in the junction box on the back of the dryer (brown sensor wire). This voltage is referenced to ground (blue sensor wire).
- Make sure the flag is over the proximity sensor head and adjusted to 1/8th inch or less.
- The light on the back of the proximity sensor should be on, and 24VDC should be measured on the output (black sensor wire). If not, the sensor is defective.
- If 24VDC is measured on the output (black) wire, go to the Power Box and check the PLC Input light. The input light should be ON when the sensor is in the ON condition.



Fault Troubleshooting

- a. If 24VDC is measured on the black sensor wire but the PLC Input light is not ON, take note of the wire number and go to the Power Box terminal strip and measure for 24VDC.
- b. If 24VDC is NOT measured on the Power Box terminal strip, check the wiring connections between the junction box and the Power Box.
- c. If 24VDC is measured on the Power Box terminal strip, go to the PLC and measure for 24VDC on the PLC Input terminal.
- d. If 24VDC is measured on the PLC Input terminal but the light is NOT ON, the PLC is malfunctioning.

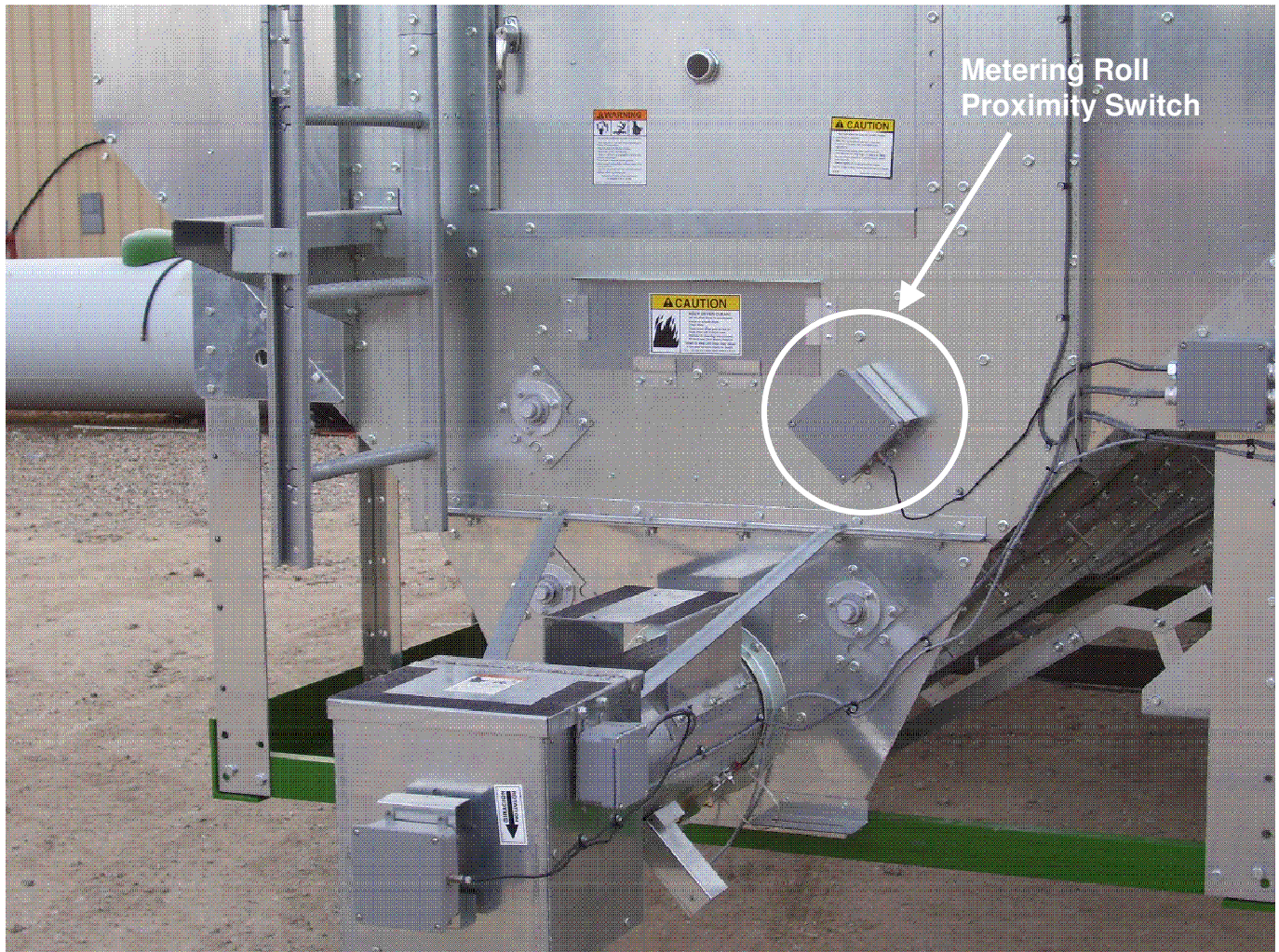


Figure 1.8c: Metering Roll Proximity Switch Installed on Dryer

Static Air Pressure Sensor

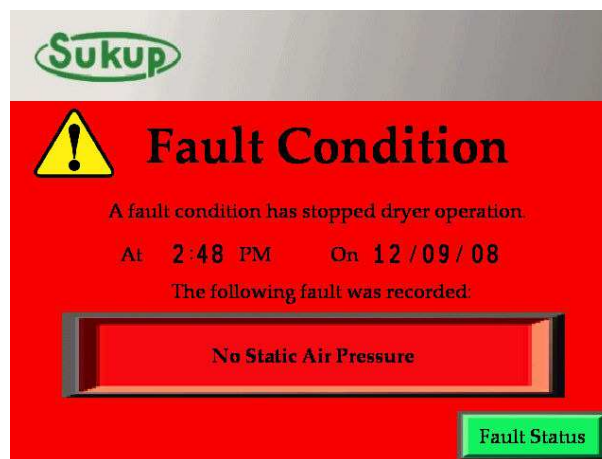
The Static Air Pressure sensor is located in the junction box with the air switch (see below). It monitors the amount of static pressure in the plenum and will shut down the dryer if there is not enough present.

Dryer must be full of grain to satisfy this sensor!!!



Figure 1.9b: Static Air Pressure Sensor Apart

Model	Wire #
1 Fan Portable Dryer	43
2 Fan Portable Dryer (Lower)	43
2 Fan Portable Dryer (Upper)	105
2 Module Stack Dryer (#1)	43
2 Module Stack Dryer (#2)	105
2 Module Stack Dryer (#3)	205
2 Module Stack Dryer (#4)	305
3 Module Stack Dryer (#1)	43
3 Module Stack Dryer (#2)	105
3 Module Stack Dryer (#3)	205
3 Module Stack Dryer (#4)	305
3 Module Stack Dryer (#5)	405
3 Module Stack Dryer (#6)	505



1. To develop static air pressure in the plenum, the dryer must be full of grain. Check the grain level in the columns.
If columns are not full, check for the out of wet grain cause, and correct.
2. Using Tools → Manual Operation, turn the Fan ON.
Check the fan for proper operation and airflow.
3. If a fault message is displayed, the air switch may not be adjusted correctly.
 - a. Remove the junction box cover containing the air switch.
 - b. With the dryer full of grain, and the fan switch turned to ON, check the PLC Input light. The input light should be ON at this time.
 - c. If the input light is NOT on, using a small straight screwdriver, turn the adjustment screw counter-clockwise until the input light turns on.
 - d. Once the input light is on, turn the fan off and observe the PLC Input light. The light should turn OFF as the fan slows down.
 - e. If the light remains ON after the fan has slowed, turn the adjustment screw clockwise very slowly until the input light turns off.
 - f. While watching the PLC Input, turn the fan ON and then OFF, making sure that the input light is turning on and off with the fan.
4. If, after going through the above procedure, the PLC Input light remains in either the on or the off position without changing, voltage measurements will be necessary.
 - a. Locate wire # 18 in the junction box and measure for 24VDC.
 - b. If 24VDC is NOT measured, go to the Power Box and measure for 24VDC on the terminal strip.
 - c. If 24VDC is measured on the terminal strip, go to the PLC and measure for 24VDC.
 - d. If 24VDC is measured on this wire, use a small screwdriver and turn the adjustment clockwise until the 24VDC is no longer present.

- e. If turning the adjustment screw clockwise fails to turn OFF the Air Switch, the switch is defective.
 - f. If 24VDC is NOT measured on the wire coming from the Air Switch, use a small screwdriver and turn the adjustment screw counter-clockwise until 24VDC is measured.
 - g. If turning the adjustment screw counter-clockwise fails to turn ON the Air Switch, the switch is defective.
5. After replacing the Air Switch, follow the previous instructions on switch adjustment for proper operation.
- a. If the PLC Input light is not turning on when the Air Switch is on, voltage measurements will need to be taken.
 - b. Adjust the Air Switch to the ON position. Measure for 24VDC on the wire coming from the Air Switch.
 - c. Take note of the wire number and go to the Power Box and measure for 24VDC on the terminal strip.
 - d. If 24VDC is NOT measured on the terminal strip, check the wiring connections between the junction box and the Power Box terminal strip.
 - e. If 24VDC IS measured on the terminal strip, go to the PLC Input terminal and measure for 24VDC.
 - f. If 24VDC is NOT measured on the input terminal, check wiring connections between the terminal strip and the PLC.
 - g. If 24VDC is measured on the PLC Input terminal but the input light is not on, but the fault message is still being displayed after pressing RESET, the PLC is malfunctioning.

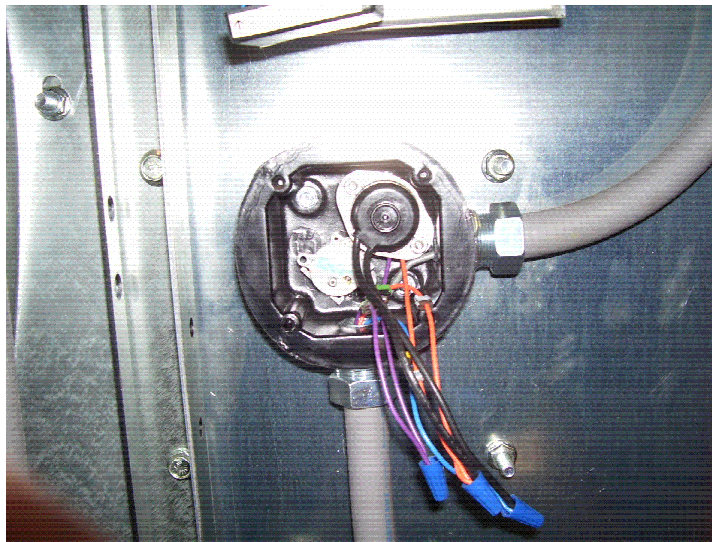


Figure 1.9c: Static Air Pressure Sensor



Figure 1.9d: Static Air Pressure Sensors Installed on Dryer

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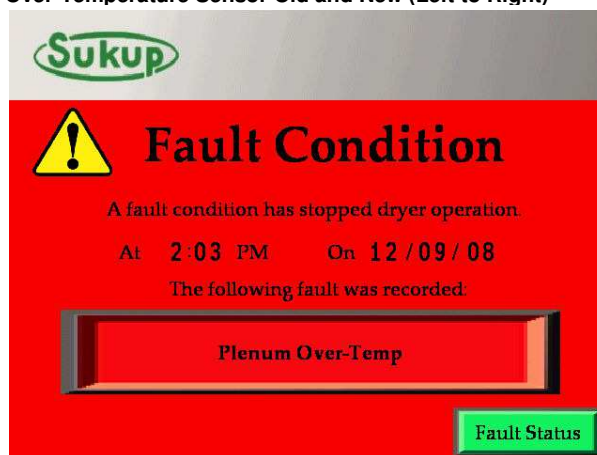
Plenum Over-Temperature Sensor

The Plenum Over-Temperature Sensor is located inside the plenum of the dryer. It is provided to protect from the plenum over heating.



Figure 1.10b: Plenum Over-Temperature Sensor Old and New (Left to Right)

Model	Wire #
1 Fan Portable Dryer	39
2 Fan Portable Dryer (Lower)	39
2 Fan Portable Dryer (Upper)	104
2 Module Stack Dryer (#1)	39
2 Module Stack Dryer (#2)	104
2 Module Stack Dryer (#3)	204
2 Module Stack Dryer (#4)	304
3 Module Stack Dryer (#1)	39
3 Module Stack Dryer (#2)	104
3 Module Stack Dryer (#3)	204
3 Module Stack Dryer (#4)	304
3 Module Stack Dryer (#5)	404
3 Module Stack Dryer (#6)	504



1. Check the fan grill for obstruction and remove any accumulated debris.
2. With the dryer shut down, remove the key from the key-lock switch at the plenum access door. Open the door and inspect the plenum for any problems.
3. After the plenum has cooled down, press the RESET, and the fault should be cleared.
4. If the fault has not cleared, remove the cover from the junction box containing the Plenum O/T sensor and measure for 24VDC on wire # 18.
If 24VDC is NOT measured, check the connection with the bank of terminal 18 in the Power Box.
5. At this point, 24VDC should be measured on wire # 18 on the Plenum O/T switch.
6. Measure for 24VDC on the other side of the switch.
 - a. If the O/T switch is cooled down and 24VDC is NOT measured on the other wire, the sensor is defective.
 - b. If 24VDC is measured on the other wire coming from the sensor, Go to the PLC and check the input light. If the input light is ON, press RESET, and the fault should clear.
 - c. If the input light is not ON, take note of the wire number coming out of the O/T sensor and go to the Power Box and measure for 24VDC on the terminal strip.
 - d. If 24VDC is NOT measured on the Power Box terminal strip, check the wiring connections between the junction box and the Power Box.
 - e. If 24VDC is measured on the Power Box terminal strip, measure for 24VDC on the PLC Input terminal.
 - f. If 24VDC is measured on the PLC terminal, and the input light is OFF, but the fault message is still being displayed, the PLC is malfunctioning.



Figure 1.10c: Plenum Over-Temperature Sensors Installed on Dryer

Device Troubleshooting

Discharge Moisture Sensor

The Discharge Moisture sensor is found under the discharge chute at the rear of the dryer. It is used to calculate the moisture and temperature of the grain as it is discharged from the dryer.



Figure 2.1b: Discharge Moisture Sensor

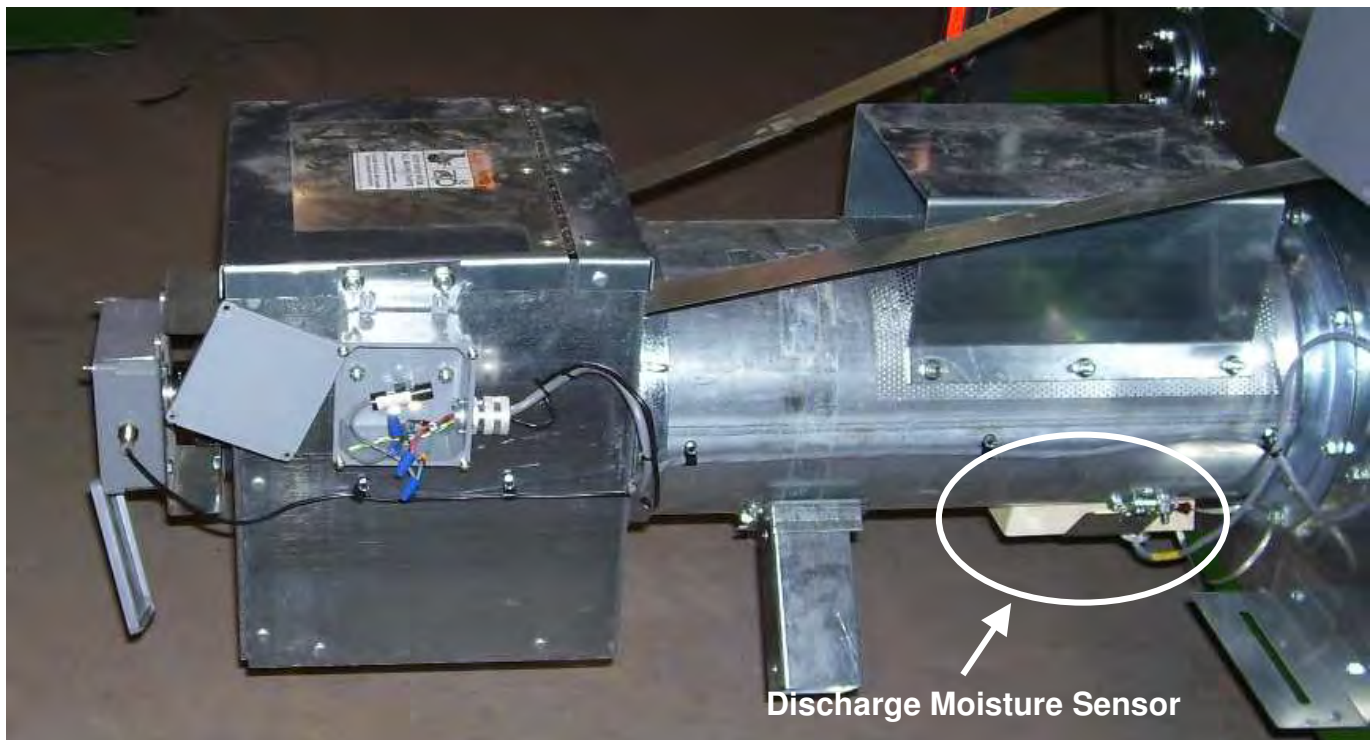
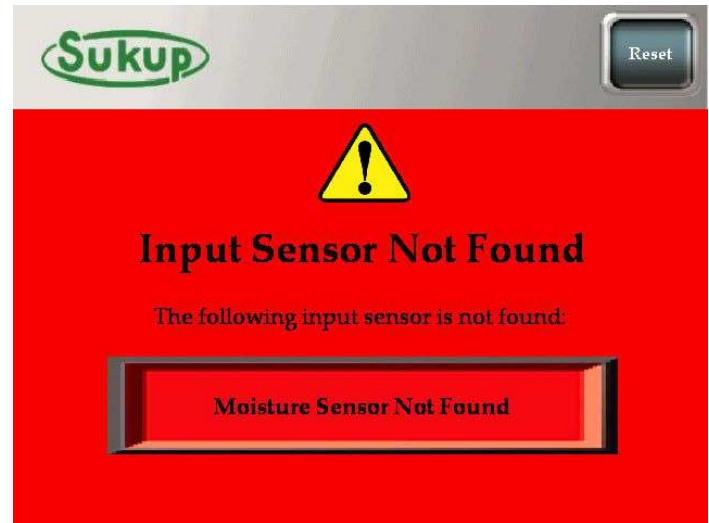


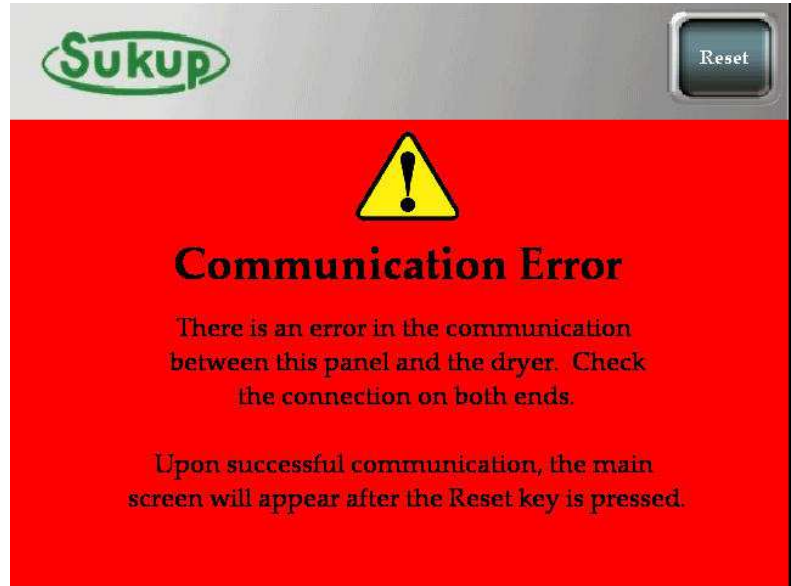
Figure 2.1c: Discharge Moisture Sensor Installed on Dryer

Discharge Moisture Sensor (continued)

1. If you see the red "Input Sensor Not Found" screen, it means that at least one analog input sensor is missing from the PLC. In this case we'll describe the "Moisture Sensor Not Found" error.
 - a. Using a screwdriver, remove the cover on the junction box on the rear of the dryer.
 - b. Find the four (4) wires used by the moisture sensor. They are red, blue, black, green + shield.
 - c. Using a voltmeter, measure for DC voltage between the red and green + shield. Confirm 24VDC. If 0VDC is measured, check the connection between the power box and the junction box.
 - d. Assuming the red wire has 24VDC on it, measure for DC voltage between the black and green + shield wires. You should measure something between 1 and 10VDC. If you measure this voltage, check the connection between the junction box and the power box. The black wire is labeled D4 on the power box terminal strip. If 0VDC is measured, the sensor is malfunctioning and will need to be replaced.
 - e. If you measure the same voltage on the D4 terminal in the power box as back in the junction box, measure between the D4 terminal on the PLC and 95. If 0VDC is found, there is a connection problem between the power box terminal strip and the PLC. If the same voltage (1-10VDC) is present on the PLC D4 input as the junction box at the rear of the dryer, the green analog input PLC card may be malfunctioning.

QuadraTouch™ Controller

In the event that the connection between the QuadraTouch™ controller and the PLC is lost, the following screen will come up. Depending on where you are in the program, this screen may be coupled with a gray, horizontal error bar on the bottom of the screen. It describes for the user that it can no longer find the IP address of the PLC and it's unable to communicate.



Fixing a Communication Error

1. Make sure power is ON to both the QuadraTouch™ controller and the PLC. This means making sure the Emergency Stop switch is pulled out to it's normal operating position, and the system control switch is in the "COMPUTER" position. Also, the green rocker switch on the QuadraTouch™ controller needs to be ON.
 - a. If you turn both devices on at the same time, the QuadraTouch™ controller will boot up slightly faster than the PLC. You will most likely see the main screen with the gray, horizontal error bar on the bottom of the screen. It will take a brief period (up to 15-20 seconds) before both realize that they are talking to each other. You will know when you've cleared this error because the gray, horizontal error bar will disappear.
 - b. When you see this screen without the gray, horizontal error bar, simply press reset, and the system will take you to the main screen.
2. If both devices have power, then the problem lies in the connection cable.
 - a. Make sure the cable is securely fastened into the side of the QuadraTouch™ controller → Ethernet coupler in the box → Ethernet coupler in the Power Box → PLC
 - b. If you want to make sure the connection is available, connect the Ethernet cable directly between the QuadraTouch™ controller and the PLC. Thus eliminating the couplers.

Plenum Temperature Sensor (RTD)

Averaging RTD – Resistive Temperature Device

The averaging RTD is a device, which measures the average resistance over the length of the tube. The dryer commonly uses 16ft. and 24ft. lengths.

The RTD is used in conjunction with a transmitter which converts the resistance into a 1.0VDC – 5.0VDC signal.

This voltage is then fed into the Plenum Temperature Display, which will be located on the Control Panel and near the pipe train of each heater.

If the RTD is in question, a voltage and resistance comparison can be made to determine if the unit is defective.

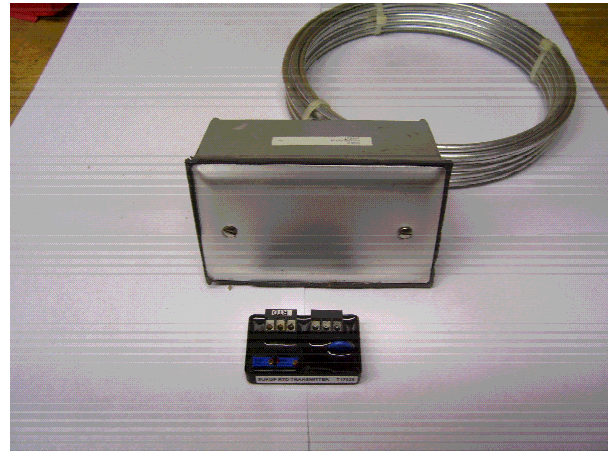


Figure 2.3b: Plenum Temperature Sensor & RTD

1. Begin by locating the junction box containing the RTD transmitter. This is a rectangular box approximately 4in. by 2 1/2in. The transmitter is attached to the inside of the cover.
2. A white label should be attached to the transmitter. Also, two terminal strips, each with three terminals will be located on the top of the transmitter.
3. Next to the terminal strips is a small adjustment screw. NEVER adjust either of these screws. These are calibration adjustments and once moved, the transmitter will not work correctly until a factory calibration is performed.
4. Locate the terminal strip with the output, +, and – connections. Measure for 24VDC on terminal #2 and #3.
5. If 24VDC is not present, note the wire numbers and go to the Power Box and check for voltage on the terminal strip.
6. With 24VDC present at the transmitter, measure the output voltage (#1 and #3). A voltage between 1.0VDC and 5.0VDC should be measured.
7. With 24VDC present on terminals #2 and #3 but no voltage is measured between terminals #1 and #3, the transmitter is defective.
8. If a voltage is measured, use the chart on the next page to determine if the voltage is reasonable.
9. If a voltage is measured between terminals #1 and #3, go to the other terminal strip and remove the two wires coming from the RTD (red and yellow).
10. A jumper should be connected between terminals #2 and #3.
11. Take a resistance reading with the meter. The resistance of the RTD is directly related to the temperature of the RTD.

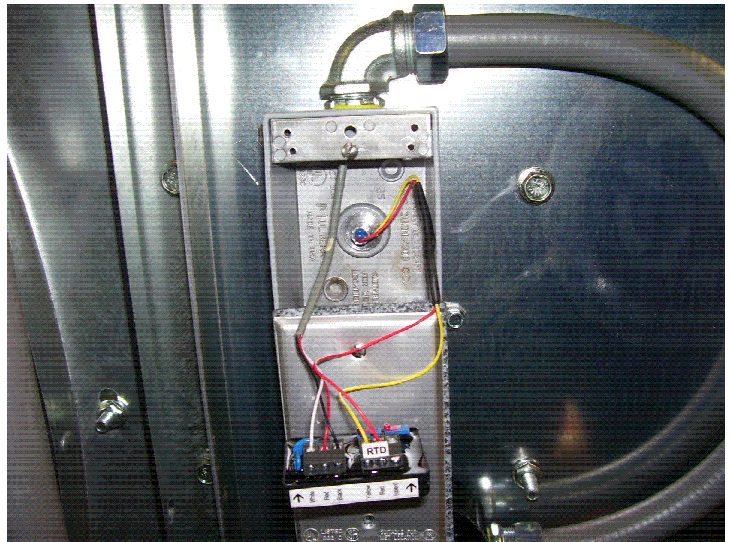


Figure 2.3c: Plenum Temperature Sensor Installed

NOTE: This reading should be taken with the dryer cooled down and at ambient temperature.

Plenum Temperature Sensor (RTD) (continued)

12. If the reading shows infinite (open) resistance, the RTD is defective. Compare the resistance reading to the following table to determine if the resistance is reasonable.

Temperature	Resistance	Voltage
10	952	1.16
15	963	1.24
20	974	1.32
25	984	1.40
30	995	1.48
35	1006	1.56
40	1017	1.64
45	1028	1.72
50	1039	1.80
55	1049	1.88
60	1060	1.96
65	1071	2.04
70	1082	2.12
75	1093	2.20
80	1103	2.28
85	1114	2.36
90	1125	2.44
95	1136	2.52
100	1146	2.60
105	1157	2.68
110	1168	2.76
115	1178	2.84
120	1189	2.92
125	1200	3.00
130	1211	3.08
135	1221	3.16
140	1232	3.24
145	1243	3.32
150	1253	3.40
155	1264	3.48
160	1275	3.56
165	1285	3.64
170	1296	3.72
175	1306	3.80
180	1317	3.88
185	1328	3.96
190	1338	4.04
195	1349	4.12
200	1359	4.20
205	1370	4.28
210	1380	4.36
215	1391	4.44
220	1402	4.52
225	1412	4.60
230	1422	4.68
235	1433	4.76
240	1443	4.84
245	1454	4.92
250	1464	5.00

13. If the resistance compares to the ambient temperature around the dryer, and the voltage on the output wire is close to the ambient temperature, then the transmitter and the RTD are functioning correctly.

Go to the Plenum Temperature Display troubleshooting page to continue.

Heater Box

HEATER IGNITION SEQUENCE

1. When heat is called for, the 24VDC output(s) on the PLC is/are energized.
2. That 24VDC signal is then sent to the 24VDC PLC Relays.

K4 – Lower Heat
K9 – Upper Heat
3. This relay sends 120 VAC to the respective heater box and 24 VDC to the PLC indicating the heat is on.
4. The 120 VAC must go through B9 for the Lower Heater and B10 for the Upper Heater. This 120 VAC, which is sent to each respective heater board, is sent through wire # 4 for the Lower Heater and wire # 112 for the Upper Heater.
5. Once the 120 VAC is present at the heater board, a 20 – 30 second purge time begins.
6. After the purge cycle is complete, 120 VAC is sent out on wire # 10 to the liquid solenoid and the 1st vapor solenoid. The external purge relay is also energized at this time.
7. The external purge relay (located in the Heater Box) has a timing of 60 seconds (red wire # 21).
8. At the same time the purge relay is energized, the ignition transformer is energized for 10 seconds.
9. At this point, the ignition transformer is energized and the 1st vapor solenoid is energized. Gas flows through this solenoid and through the drilled orifice in the 2nd vapor solenoid (2nd vapor solenoid is closed at this time).
10. After the ignition transformer has shut off, the gas remains on for an extra 5 seconds. If a flame has not been detected by this time, the heater board shuts the gas off and goes into a lockout condition.
11. During the ignition attempt, the flame relay in the heater box is energized, sending a signal to the PLC (24 VDC – Blue # 45).
12. Input to the PLC is #45 for the Lower heater and #108 for the Upper heater.
13. If flame has been detected, after the external purge timer has timed out (45 sec.).
14. The 2nd vapor solenoid is energized and the burner is now operational.

NOTE: The RED Light on the heater box is on during the ignition sequence.

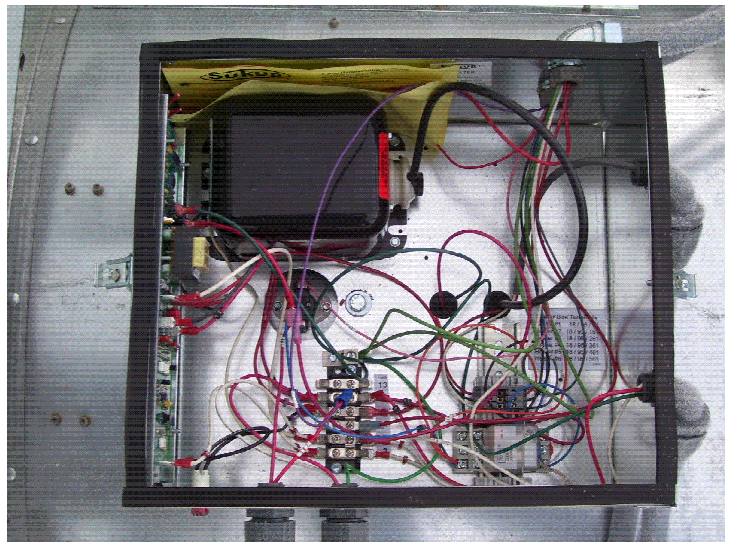


Figure 2.4b: Heater Box

Fault Troubleshooting

Electronic MOD Valve

General Information

1. A plenum RTD and Transmitter are required. The transmitter generates a 1 – 5 VDC signal that is sent to the processor board and the EMOV board.
2. A Belimo actuator is connected to a butterfly valve, which opens or closes to control the temperature of the plenum. The Belimo actuator requires a 24 VDC power source and accepts a 2 – 10VDC control signal. This signal comes from the PLC or backup system (via the EMOV board).
3. Trouble shooting the Belimo valve requires a familiarity with the software being used to control the valve. The following covers software information:

QUICK REFERENCE:

a. SETTING ELECTRONIC MOD VALVE POSITION



1. Press Settings → Electronic Mod Valve
2. Select Valve Settings
3. Make both numbers 25 % and select Done
4. Press the back arrow or press Reset to return to the main screen.
5. Press Tools → Dry Fire / Test and select HEAT for each fan available.
6. Upon heater ignition, verify that each heater is operating at a pressure of 4 – 5 PSI. If the pressure is less than 4 PSI, or exceeds 5 PSI, loosen the nuts on the u-bolt that connect the actuator to the butterfly valve shaft and rotate the valve shaft until the gas pressure is reading between 4 – 5 PSI.
7. When finished adjusting all valves, press Reset to turn off all fans and heaters and return to the main screen.

Fault Troubleshooting

1. The first step in troubleshooting an EMOV problem is to determine whether or not the problem is with just one heater or with all of the heaters.
2. If the problem is with all of the heaters, check for 24 VDC coming from the power supply. This is the supply voltage to all of the Belimo actuators.
3. If the 24 VDC is present, check for a voltage on each actuator's signal wire. If the actuator is not receiving a 2-10VDC volt reference signal, go to the power box.
4. Measure the DC voltage on the power box terminals, (between GND - #95) and the signal wire going to that actuator (61, 161, 261, 361, 461, or 561). The low fire position of the electronic mod valve is factory defaulted at 4.0VDC. This gives the valve position of 25% open. The terminals 61, 161, etc, should all have 4.0VDC (if the low fire position is set to 25%) on them when the burners are OFF. Thus the PLC is operating correctly. Check your connection between the power box terminals and the actuators themselves. If there is 0VDC on the terminals 61, 161, etc, then there may be a problem with the PLC or its Yellow Analog Output Card.
5. If the burner fires and the electronic mod valve does not open, it's more than likely that there is a problem with the flame sense circuit on the heater board. The FLAME ON signal (#45, #106, etc) tells the PLC to start controlling the plenum temperature by adjusting the EMOV. If this signal doesn't come back from the heater box, the valve will not operate.
6. If a reference voltage (2-10VDC) is measured at the valve, but the valve did not open or close, re-confirm the presence of 24 VDC to the valve. If 24 VDC is present, the valve is probably defective, or the u-bolt, which mechanically connects the valve to the butterfly shaft is loose and needs to be tightened.

Wire Numbers and their uses

Wire #	Description	Use
0	110VAC supply from transformer	Conductor between transformer and E-Stop
1	110VAC supply after E-Stop	Emergency Switched Control Supply
2	Neutral Wire	Provides Return for 110V circuits
4	110VAC heater power ON (pos. #1)	110V present heater circuit will begin firing sequence
5	5 second load auxiliary 1 – Supply Side	Voltage supplied to 5 will relay to 7 upon K6 PLC relay being activated (27A).
6A	24VDC K1 PLC Load Relay Coil	24VDC present energizes PLC Load Relay K1
6	110V load contactor	110V present energizes load contactor
7	5 second load auxiliary 1 – Coil Side	Connect 7 to the coil on load auxiliary 1 contactor.
8	10 second load auxiliary 2 – Supply Side	Voltage supplied to 8 will relay to 9 upon K7 PLC relay being activated (28A).
9	10 second load auxiliary 2 – Coil Side	Connect 9 to the coil on load auxiliary 2 contactor.
10	110V unload power ON	110V present energizes unload contactor
10A	24VDC K2 PLC Unload Relay Coil	24VDC present energizes PLC Unload Relay K2
11A	110V fan power ON (pos. #1)	110V present energizes fan (pos. #1) contactor
12A	110V heater switch leg (pos. #1)	110V present; power available for heater pending upon fan on/off
14	Dry Contact Unload Auxiliary – Supply Side	Voltage supplied to 14 will relay to 15 upon Load contactor being energized.
15	Dry Contact Unload Auxiliary – Coil Side	Connect auxiliary device to 15 and voltage from 14 will pass to 15 when unload coil is energized.
17	Meter roll reference voltage	0 to 10 volt reference for AC Drive, 1V=10% meter roll, 10V=100% meter roll
17B	Manual Backup Reference AC Drive Voltage	0 to 10 volt reference for AC Drive, 1V=10% meter roll, 10V=100% meter roll
17C	PLC Reference AC Drive Voltage	0 to 10 volt reference for AC Drive, 1V=10% meter roll, 10V=100% meter roll
18	24V supply	Powered from PLC DC supply, provides voltage for sensors
19	110V switch leg for worklight	Provides switched 110V for worklight (110V present, worklight ON)
19A	24VDC K5 PLC Worklight Relay Coil	24VDC present energizes PLC Worklight Relay K5
21B	PLC AC Drive ON signal	24VDC present tells AC Drive to turn meter rolls in forward direction.
21C	Manual Backup AC Drive ON signal	24VDC present tells AC Drive to turn meter rolls in forward direction.
21D	AC Drive ON signal	24VDC present tells AC Drive to turn meter rolls in forward direction.
27A	24VDC K6 PLC Load Aux 1 Relay Coil	24VDC present energizes PLC Load Aux 1 Relay K6
28A	24VDC K7 PLC Load Aux 2 Relay Coil	24VDC present energizes PLC Load Aux 2 Relay K7
30	Special Aux Unload – Supply Side	Potential Free Contact with 31
31	Special Aux Unload – Coil Side	Potential Free Contact with 30
32	Special Aux Unload – Supply Side	24VDC supplied to 32 and Factory Jumper between 32 & 33.
33	Special Aux Unload – Coil Side	33 carries 24VDC and goes through the Special Aux Unload Relay and energizes K2 unload relay
36	Rear door signal wire	24V present = Door closed, provides voltage at PLC for rear door status (Doors are in series)
37	Vapor high limit switch (pos. #1)	Reference voltage for the EMOV
38	Housing high limit switch (pos. #1)	24V present = status ok, provides voltage at PLC for heater housing high temperature status
39	Plenum over-temperature switch (pos. #1)	24V present = status ok, provides voltage at PLC for plenum high temperature status

Wire Numbers and their uses (continued)

Wire #	Description	Use
40	Right grain column over-temperature	24V present = status ok, provides voltage at PLC for plenum high temperature status
41	Left grain column over-temperature	24V present = status ok, provides voltage at PLC for plenum high temperature status
42	Grain discharge chute	24V present = status ok, provides voltage back to PLC for grain discharge chute status
43	Plenum static air switch (pos. #1)	24V present = status ok, provides voltage back to PLC for static air status
44	Lower Grain paddle switch	24V present = status grain not empty, lower grain switch
45	Heater flame sense (pos. #1)	Reference voltage for the EMOV
46	PLC fan ON input (pos. #1)	24V present = fan ON, provides PLC with status of fan operation
47	PLC load ON input	24V present = load auger ON, provides PLC with status of load operation (on or off)
48	Heater ON relay signal to PLC 24V = ON (pos. #1)	24V present = ON, Tells the PLC the system is calling for the heater to turn on
49&49 A-49L	Motor overload switches	24V present = status ok, provides voltage back to PLC for overload status. All wired in SERIES.
53	Upper Grain paddle switch	24V present = Status Dryer FULL
61	EMOV (0-10V) (pos. #1)	Reference voltage for the EMOV
70	Automatic batch RTD signal wire	Provides signal to processor for autobatch temperature drying, 0 – 5 volt DC reference
71	RTD Signal wire fan (pos. #1 - lowest)	Provides control system with 0 – 5 volt DC reference for plenum temperature indication
72	RTD Signal wire fan (pos. #2)	Provides control system with 0 – 5 volt DC reference for plenum temperature indication
73	RTD Signal wire fan (pos. #3)	Provides control system with 0 – 5 volt DC reference for plenum temperature indication
74	RTD Signal wire fan (pos. #4)	Provides control system with 0 – 5 volt DC reference for plenum temperature indication
75	RTD Signal wire fan (pos. #5)	Provides control system with 0 – 5 volt DC reference for plenum temperature indication
76	RTD Signal wire fan (pos. #6)	Provides control system with 0 – 5 volt DC reference for plenum temperature indication
93	Meter Roll Proximity Signal Wire	24VDC oscillating square wave = meter roll rotation confirmed.
94	Unload ON signal	24VDC = Unload Coil has been energized.
95	Common reference on PLC for 24V supply	All items referenced to this terminal
96	Unload Auger Proximity Signal Wire	24VDC oscillating square wave = unload auger rotation confirmed.
97	Differential Air Switch 1 (CSA & CE Only)	24VDC = Air Pressure Confirmed
98	Differential Air Switch 2 (CSA & CE Only)	24VDC = Air Pressure Confirmed
99	Differential Air Switch 3 (CSA & CE Only)	24VDC = Air Pressure Confirmed
100	Differential Air Switch 4 (CSA & CE Only)	24VDC = Air Pressure Confirmed
U	User Fault Circuit	24VDC = User Fault OK – Jumped out from the factory.
D1	Moisture sensor red, 24VDC moisture sensor circuit supply	Supply voltage for the moisture sensor circuit
D3	Moisture sensor blue, 0V to 3VDC temperature signal to the PLC	Provides the processor with a voltage signal corresponding to temperature
D4	Moisture sensor black, 0 to 10VDC moisture signal to the PLC	Provides the processor with a voltage signal corresponding to moisture

Wire Numbers and their uses (continued)

Wire #	Description	Use
D6	Moisture sensor green, ground	Ground
D7	Moisture sensor grounding braid (shielded ground)	Grounds the shielding for noise purposes
102	Vapor high limit switch (pos. #2)	Reference voltage for the EMOV
103	Housing high limit switch (pos. #2)	24V = status ok, provides voltage at PLC for heater housing high temperature
104	Plenum over-temp switch (pos. #2)	24V = status ok, provides voltage at PLC for plenum high temperature status
105	Plenum static air switch (pos. #2)	24V present = status ok, provides voltage back to PLC for static air status
106	Heater flame sense (pos. #2)	Reference voltage for the EMOV
107	PLC fan ON input (pos. #2)	24V present = fan ON, provides PLC with status of fan operation
108	PLC heat ON input (pos. #2)	24V present = ON, tells the PLC the system is calling for the heater to turn on
109A	110V heater switch leg (pos. #2)	110V present; power available for heater pending upon fan on/off
110A	110V fan power ON (pos. #2)	110V present energizes lower fan (pos. #2) contactor
111	110V power CR6 relay (lower) heat turn on safety due to fan failure	110V present energizes CR3 relay, system calls for heat. Wired to aux. contact or relay to provide protection due to fan not running while contactor energized
112	110V heater power ON (pos. #2)	110V present heater circuit will begin firing sequence
116	110V Main Gas Valve ON	110V present energizes Main Gas Valve (2 Fan & up)
116A	24VDC K10 PLC Main Gas Valve Relay	24VDC present energizes PLC Main Gas Valve Relay K10
161	EMOV (0-10V) (pos. #2)	Reference voltage for the EMOV
202	Vapor high limit switch (pos. #3)	Reference voltage for the EMOV
203	Housing high limit switch (pos. #3)	24V = status ok, provides voltage at PLC for heater housing high temperature
204	Plenum-over-temp switch (pos. #3)	24V = status ok, provides voltage at PLC for plenum high temperature status
205	Plenum static air switch (pos. #3)	24V present = status ok, provides voltage back to PLC for static air status
206	Heater flame sense (pos. #3)	Reference voltage for the EMOV
207	PLC fan ON input (pos. #3)	24V present = fan ON, provides PLC with status of fan operation
208	PLC heat ON input (pos. #3)	24V present = ON, tells the PLC the system is calling for the heater to turn on
209A	110V heater switch leg (pos. #3)	110V present; power available for heater pending upon fan on/off
210A	110V fan power ON (pos. #3)	110V present energizes lower fan (pos. #3) contactor
261	EMOV (0-10V) (pos. #3)	Reference voltage for the EMOV
302	Vapor high limit switch (pos. #4)	Reference voltage for the EMOV
303	Housing high limit switch (pos. #4)	24V = status ok, provides voltage at PLC for heater housing high temperature
304	Plenum over-temp switch (pos. #4)	24V = status ok, provides voltage at PLC for plenum high temperature status
305	Plenum static air switch (pos. #4)	24V present = status ok, provides voltage back to PLC for static air status
306	Heater flame sense (pos. #4)	Reference voltage for the EMOV

Wire Numbers and their uses (continued)

Wire #	Description	Use
307	PLC fan ON input (pos. #4)	24V present = fan ON, provides PLC with status of fan operation
308	PLC heat ON input (pos. #4)	24V present = ON, tells the PLC the system is calling for the heater to turn on
309A	110V heater switch leg (pos. #4)	110V present; power available for heater pending upon fan on/off
310A	110V fan power ON (pos. #4)	110V present energizes lower fan (pos. #4) contactor
361	EMOV (0-10V) (pos. #4)	Reference voltage for the EMOV
402	Vapor high limit switch (pos. #5)	Reference voltage for the EMOV
403	Housing high limit switch (pos. #5)	24V = status ok, provides voltage at PLC for heater housing high temperature
404	Plenum over-temp switch (pos. #5)	24V = status ok, provides voltage at PLC for plenum high temperature status
405	Plenum static air switch (pos. #5)	24V present = status ok, provides voltage back to PLC for static air status
406	Heater flame sense (pos. #5)	Reference voltage for the EMOV
407	PLC fan ON input (pos. #5)	24V present = fan ON, provides PLC with status of fan operation
408	PLC heat ON input (pos. #5)	24V present = ON, tells the PLC the system is calling for the heater to turn on
409A	110V heater switch leg (pos. #5)	110V present; power available for heater pending upon fan on/off
410A	110V fan power ON (pos. #5)	110V present energizes lower fan (pos. #4) contactor
461	EMOV (0-10V) (pos. #5)	Reference voltage for the EMOV
502	Vapor high limit switch (pos. #6)	Reference voltage for the EMOV
503	Housing high limit switch (pos. #6)	24V = status ok, provides voltage at PLC for heater housing high temperature
504	Plenum over-temp switch (pos. #6)	24V = status ok, provides voltage at PLC for plenum high temperature status
505	Plenum static air switch (pos. #6)	24V present = status ok, provides voltage back to PLC for static air status
506	Heater flame sense (pos. #6)	Reference voltage for the EMOV
507	PLC fan ON input (pos. #6)	24V present = fan ON, provides PLC with status of fan operation
508	PLC heat ON input (pos. #6)	24V present = ON, tells the PLC the system is calling for the heater to turn on
509A	110V heater switch leg (pos. #6)	110V present; power available for heater pending upon fan on/off
510A	110V fan power ON (pos. #6)	110V present energizes lower fan (pos. #4) contactor
561	EMOV (0-10V) (pos. #6)	Reference voltage for the EMOV

Auxiliary Load and Unload Terminals

Note: Terminals 5 & 7, 8 & 9, and 14 & 15 can be used as either dry contacts or 115VAC by using Terminals 1 (115VAC) and 2 (Neutral)

1	2	5	7	8	9	14	15	49D	49E	115VAC	Neutral	1 st Aux Load 5 Sec. Delay On	2 nd Aux Load 10 Sec. Delay On	Aux Unload	Motor Overload Safety Circuit
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