



CENTRIFUGAL GRAIN DRYER

Continuous Flow / Automatic Batch

QuadraTouch Pro™ Dryer Control System

EU – Under Declaration of Incorporation



OWNER'S OPERATION MANUAL

Sukup Manufacturing Co.

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Thank you for purchasing a Sukup Grain Dryer.

At Sukup Manufacturing Co., we strive to provide our customers with the best products available. It's important to us that you get the best value for your money. That means producing top-quality products that will provide you with many years of satisfied ownership.

We back our products with experienced staff and the best customer service in the industry. Our dedicated employees have done their best to ensure that your Sukup Grain Dryer provides a hassle-free grain drying experience.

With proper installation and use, it will serve you for many years.

Thank you again for your purchase. We wish you many years of profitable, safe use of your Sukup Grain Dryer.

Eugene, Charles, Steve and
The Entire Sukup Family

Sukup Manufacturing Co.
Sheffield, Iowa, USA

Centrifugal Fan Grain Dryer Owner's Operation Manual

This manual covers installation and operation of centrifugal fan dryers. It is comprised of several tabbed sections. The first provides safety information and identifies components of dryer. Others provide instructions for installation, operation, service and maintenance of dryer, and troubleshooting. Please read entire manual thoroughly before installation or operation. Check with dealer before each drying season for important updates.

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IMPORTANT: Please quote full serial number in any correspondence pertinent to this product.

Preliminary Information

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DRYER LIMITED 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, such as cosmetic (appearance) issues that will not affect life of product. 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, see reverse side.

THE FOREGOING LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR 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. SUKUP MANUFACTURING CO. MAKES NO WARRANTY, EXPRESS OR IMPLIED, OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

GRAIN DRYER WARRANTY PERIOD - Sukup warrants mixed-flow and cross-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.

REPLACEMENT PARTS WARRANTY PERIOD - Sukup warrants replacement parts (e.g. belts, sensors, rotating contacts, gearmotors, switches) purchased from Sukup for one (1) full drying season following purchase.

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 for a 2 year period from motor date code. Contact motor manufacturer for nearest location. If motor warranty is refused by a service center based upon date of manufacture, use the following procedure: Have motor repair shop fill out warranty report form as if they were providing warranty service. State on report reason for refusal. Send report, motor nameplate, and proof of purchase date (invoice from Sukup and invoice for your customer) to Sukup. If electric motor warranty is not satisfactorily handled by motor service center, contact Sukup for assistance. Sukup will attempt to obtain warranty from motor manufacturer, any credit obtained will be passed on. Warranty may also be obtained 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. Labor for removal of motor from fan not included.

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.

2/14/18

Safety Section



Read manual before installing or using product. Failure to follow instructions and safety precautions in manual can result in death or serious injury. Keep manual in a safe location for future reference.



On safety decals and throughout this manual, this symbol and the signal words Danger, Warning, Caution and Notice draw your attention to important instructions regarding safety. They indicate potential hazards and levels of intensity.



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.



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

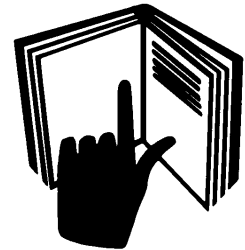


NOTICE alerts you to practices unrelated to personal injury, such as messages related to property damage.

IMPORTANT: To prevent death or serious injury to you or your family, it is essential that safety decals are clearly visible, in good condition, and applied to the appropriate equipment.

FOLLOW MANUAL AND 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 Box 677, Sheffield, Iowa 50475; by phone at 641-892-4222; or by email at info@sukup.com.



It is the responsibility of the owner/operator to know what specific requirements, precautions, and work hazards exist. It is also the responsibility of the owner/operator to inform anyone operating or working in the area of this equipment of the hazards and safety precautions that need to be taken to avoid personal injury or death. Always keep children away from bins and vehicles with flowing grain. **An example training register is printed in this section to assist in that process.**

Make no unauthorized modifications to machine. Modifications may endanger function and/or safety of unit. Keep unit well maintained according to procedures in Service and Maintenance section. Keep shields in place. Replace worn or missing shields free of charge by contacting Sukup Manufacturing Co.

! WARNING

TRANSPORTING THIS EQUIPMENT ON PUBLIC ROADS REQUIRES PRECAUTIONARY MEASURES IN ORDER TO PREVENT AN ACCIDENT.

IMPORTANT: Trucker-transporter must provide approved safety chain when towing dryer.

If road travel is required, it is essential that safety measures are taken.

The following list offers helpful information, but it is best to consult state and local regulations to ensure complete compliance.

- Read and understand operator's manual
- 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 and check behind you when turning
- Use safety chain when towing dryer
- Read safety procedures before moving units

Always strive to prevent accidents! Watch out for other vehicles. Use good judgment when transporting.

CHECK FOR OTHER VEHICLES WHEN TURNING

Be aware that two-thirds of roadway farm accidents occur while turning.

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

DO NOT TRANSPORT UNIT IF VISIBILITY IS IMPAIRED

These conditions may include, but are not limited to:

- Hills or curves that obstruct vision
- Poor weather
- Darkness

FAILURE TO FOLLOW SAFETY GUIDELINES COULD CAUSE AN ACCIDENT RESULTING IN DEATH OR SERIOUS INJURY.



WARNING: 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 half a 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 death or serious injury.

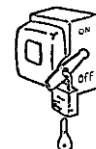
USE PROPER LOCKOUT PROCEDURES. Facility management needs to proactively train employees to ensure use of proper lockout procedures while working on dryer. Management also needs to inspect this unit for any covers or guards not in proper place. It is everyone's responsibility to report any missing grates, guards, equipment failures or failures to lock out. Make certain that no cover is removed unless power is locked out.

To avoid electric shock or electrocution, all equipment must be properly wired and grounded according to electrical codes. Have unit wired by qualified electrician.



IMPORTANT: Supporting electrical panels or combinations of electrical components supplied by the end user must be compliant with current editions of BS EN 60204-1.

Mains Isolater must be located outside of bin. It must be easily accessible from ground level and must be lockable in off position. Mark clearly as to equipment it operates. See Mains Isolater decal placement information later in this section.



Always LOCK OUT main power switch (Mains Isolater) whenever equipment is not in use or when servicing unit. Check with voltage meter before servicing unit.



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 death or serious injury. Keep fan screen guards and all shields in place and in good working condition. Replacement screen guards and shields are available from Sukup Manufacturing Co. at no charge. **Failure to heed these warnings may result in death or serious injury.**

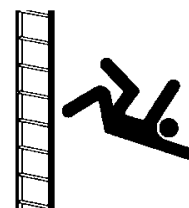


WARNING: Augers, fans, and heaters will start without warning at appropriate times. Please use caution around dryer. **Failure to heed this warning may result in death or serious injury.**



WARNING: USE SAFE CLIMBING PROCEDURES

Inspect ladder carefully before use. Never climb deteriorated, damaged or improperly assembled ladder components. Maintain secure hand and foothold when climbing. Metal is slippery when wet. Never carry items while climbing. Use safety harness and safety line as required by safety regulations. **Failure to heed these warnings may cause death or serious injury.**





CAUTION: Metal edges are sharp. To avoid injury, wear protective clothing and handle equipment and parts with care. Failure to do so may result in minor or moderate injury.

PERSONAL PROTECTIVE EQUIPMENT

Owners/Operators are responsible for developing site-specific personal protective equipment standards.

These include, but are not limited to personal protective equipment for eyes, face, head, and extremities, as well as protective clothing and respiratory devices.

For a complete listing of OSHA's personal protective equipment standards go to www.osha.gov (29CFR 1910.132).



Basic Safety Rules

1. Learn how to use controls and operate equipment.
2. Do not let anyone operate unit without thorough training of basic operating and safety procedures. **Always follow a proper lockout procedure.**
3. Periodically check all mechanical and electrical components. Keep unit in good working condition.
4. Handle equipment and parts with care. **Wear protective clothing** to avoid injury from sharp metal edges.
5. Wear Personal Protective Equipment (PPE) such as safety glasses, gloves, hardhat, steel-toe boots, ear protection and dust mask as required by local, state and national regulations.

Keep unit well maintained according to procedures outlined elsewhere in this manual.

SAFETY QUESTIONS OR CONCERNS

Please contact Sukup Manufacturing Co. with any specific safety questions about dryer or its use!

Good housekeeping practices and correct safety procedures will help protect lives, jobs, property and profits.

EMERGENCIES - KNOW WHAT TO DO

Have emergency numbers and written directions to your location near your telephone in case of emergency. An area to record emergency information is provided below.

Emergency Information	
Ambulance:	_____
Fire:	_____
Address of work site:	_____
Directions to work site:	_____

Risk reduction for servicing dryer

IMPORTANT: Conditions inside dryer plenum may vary greatly from the ambient conditions.

Please follow the safety guidelines before entering the plenum:

- Appoint a responsible individual to oversee the task and remain outside the dryer while servicing.
- Ensure the dryer is isolated and all fuel and power is disabled to the unit.
- Operator is in good physical condition and at low risk of medical problems such as asthma and cardiac problems.
- Unit is empty of grain; avoid entry when unit is full.
- Do not close doors while inside the unit, to ensure proper airflow and vent toxic gasses.
- Have immediate and close access to a lifting device, which can reach the dryer platforms in the event of emergency.
- Have adequate tools on hand for quick removal of ladder in the event of an emergency.
- Carry a communication device to use in the event of an emergency and ensure proper signal is available (mobile phone with adequate signal).
- Wear personal protection equipment such as safety glasses, gloves, dust mask, steel-toe boots, ear protectors, safety harness, and hardhat as required.
- Consider additional risks when performing maintenance that includes cutting or welding (fire, fumes and dust). Ensure quick access to an ABC (dry chemical) fire extinguisher.
- Assess the climatic conditions: If the weather is undesirable (icy platforms, extreme heat) reduce risk by servicing when the climate improves.



Follow additional safety guidelines when servicing top conveyor and wet bin drive on outside of dryer:

- Use a lifting device with a safety cage to safely reach upper areas of dryer.
- Wear relevant personal protective equipment such as hardhat, safety harness and safety glasses when accessing and servicing these areas.

In the event of minor injury (minor cuts and scrapes):

- Ensure first aid kit is available on site and workers are trained in treatment of minor injury.
- Avoid first aid on the platforms due to low available workspace and height.
- Contact emergency services if the injury prevents descending from the dryer platforms.

In the event of serious injury (loss of consciousness or serious cut):

- Contact emergency services immediately.
- In the event of rescue from inside the plenum the ladder may hinder rescue. **The ladder may be removed by cutting or unbolting the bracing brackets from the unit.**

Safety Section

To prevent death or serious injury to people involved in operation of this equipment, it is essential that these safety decals be mounted on dryer. Check that all are in place according to decal placement drawing and are legible 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 Box 677, Sheffield, Iowa 50475; by phone at 641-892-4222; or by e-mail at info@sukup.com. Please specify number when ordering.

1. **Decal L0281 – WARNING:** To avoid death or serious injury, follow general safety regulations.



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



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



4. **Decal L0166 – WARNING:** Keep guards and 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 – WARNING:** Not intended for use on public roads. If road travel is required, take these precautions:



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



Safety Section


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




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



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.



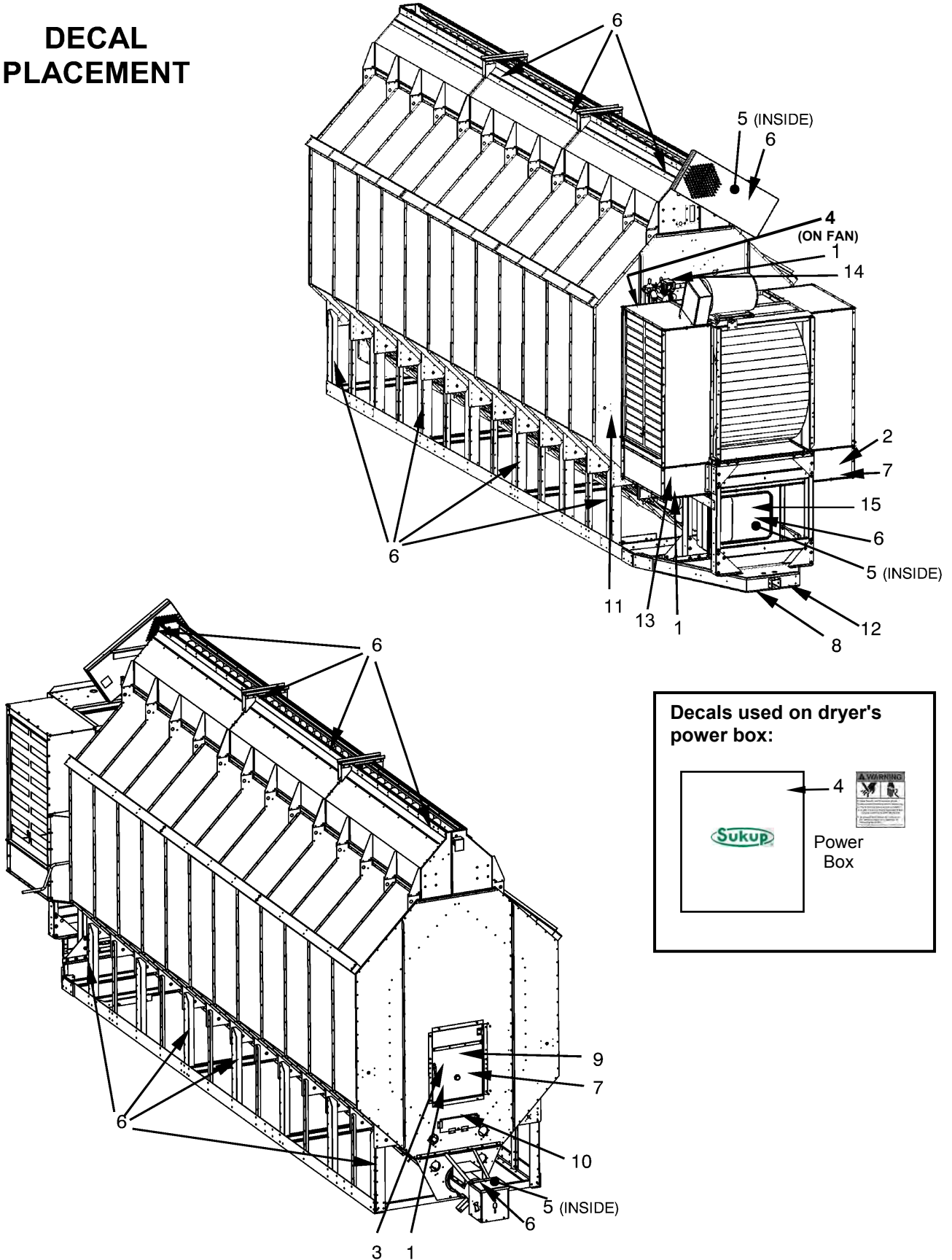
14. Decal L0165 – WARNING: Disconnect Electricity; Bleed gas; etc.



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



DECAL PLACEMENT



EU SAFETY LABELS

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

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.



L5100 Sukup Manufacturing Co Sheffield, IA USA

Label #L5100 – Place inside power box of dryer and on dryer where electrical precautions are needed.



L5101



Sukup Manufacturing Company Sheffield, IA USA

Label #L5101 – Place near power disconnect of dryer.



L5102



Sukup Manufacturing Company Sheffield, IA USA

Label #L5102 – Place near main power source of dryer.



L5103



Sukup Manufacturing Company Sheffield, IA USA

Label #L5103 – Place near main power source of dryer.



L5104

Sukup Manufacturing Co Sheffield, IA USA

Label #L5104 - Place at dryer rear access door (entrance to plenum).



L5105

Sukup Manufacturing Co Sheffield, IA USA

Label #L5105 – Place at dryer rear access door (entrance to plenum).



L5106



Sukup Manufacturing Company Sheffield, IA USA

Label #L5106 – Place near shut off to power source.



Label #L5107 – Place near main power shut off.



Label #L5109 – Place near main power panel.

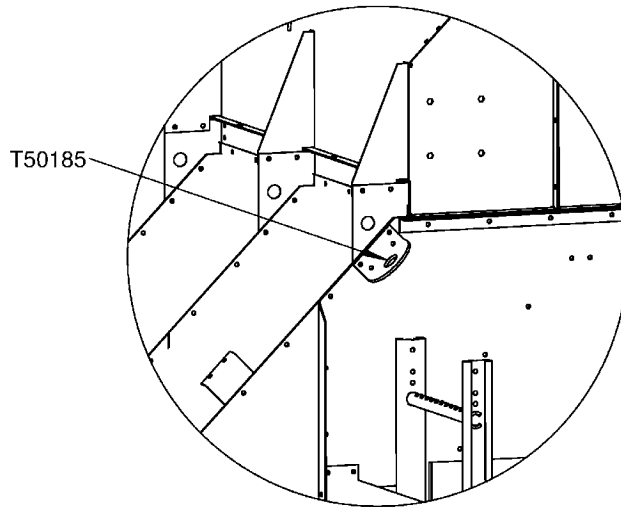
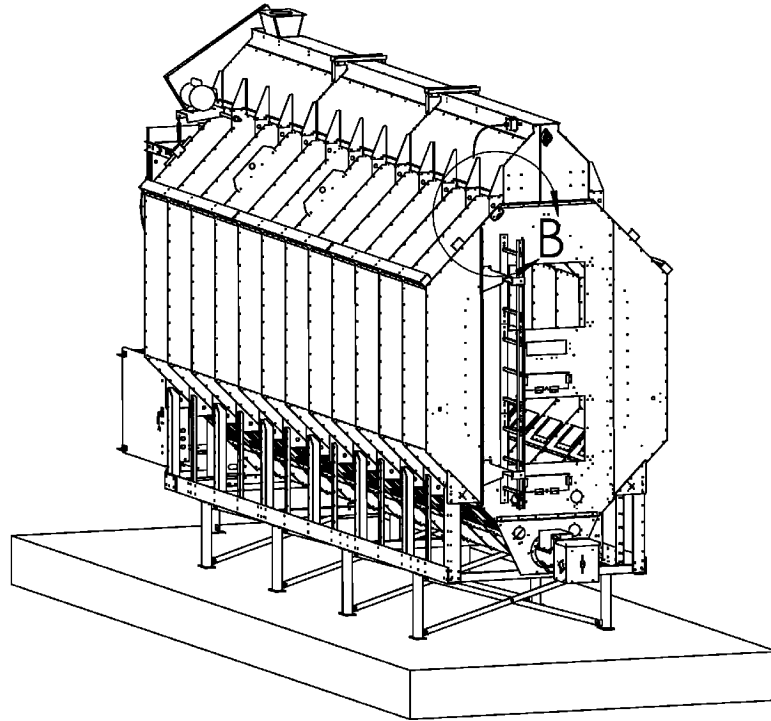


Label #L5108 - Placed on axial fans.



Label #L5111 - Place at dryer rear access door (entrance to plenum).
NOTE: See harness anchor point bracket placement drawing on next page.

HARNESS ANCHOR POINT BRACKET PLACEMENT



INSTALLATION SHOWN
ON SINGLE MODULE
DRYER.

DETAIL B
SCALE 1 : 15

SWCD0077
12/16/2011MCM

Training Register – Continuous Flow Grain Dryer

Training on operation of a Sukup Grain Dryer and related equipment is paramount to ensuring safe and successful use of the dryer.

This training register is to be used in conjunction with the general operation and maintenance instructions to emphasize the importance of safety. Use additional spaces for elements unique to your dryer.

NOTE: It is the owner’s responsibility to give adequate training to employees and to assess their ability to safely use the equipment.

Element	Date	Comments
Check unit prior to start-up		
Power shut off Fuel system shut off		
Action in event of emergency/fire		Use of ABC (dry chemical) fire extinguisher
PPE (Personal Protective Equipment)		
Cleaning/maintenance and safe access to plenum		
Entry into confined spaces Authorized personnel only Safe practice and access		
Maintenance of the dryer - Safe isolation - Problem solving - Authorized personnel only to work on gas train/electrical - Top conveyor and wet bin drive		- Use lifting device with safety cage to access top sections outside of dryer.
Best practices for grain drying		Sunflower seeds require a low temperature setting

Emergency Shutdown Locations

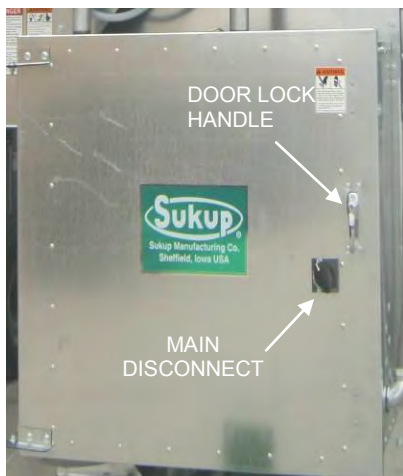


Image 1 – Power distribution box

Power distribution box is located at front of dryer. It contains all main power distribution components. Door handle secures door and can be locked with a key. Main Disconnect prevents opening of power box while power is present in system. Image 1 shows Main Disconnect in "On" position.



WARNING – High voltage will still present on bottom terminals of main switch in power distribution box (see Item 14 in Image 6) even if Main Disconnect is in "Off" position. To remove this voltage from power box, shut off main breaker ahead of dryer. Failure to follow this procedure could cause electrocution or shock resulting in death or serious injury.



Image 2 – Main Disconnect

Image 2 shows Main Disconnect in "Off" position. Power is not present in system except as noted in warning above.



Image 3 – Emergency stop and system control switch

Emergency Stop switch is located on side of power distribution box. During operation, switch is pulled out and red knob is illuminated. See Image 3. Pressing Emergency Stop Switch or switching Main Disconnect switch to "Off" position (Image 2) will shut down power to control systems. Power will still be present inside main power box as noted in warning above.

System Control switch is used to select between Manual or Computer (Automatic) operation of dryer. Turning to "Off" position will shut down power to both control systems. Power will still be present inside main power box as noted in warning above.

Centrifugal Dryer Component Identification, Front and Back Views

Images 4 and 5 identify components on front (upper left) and back (lower right) of Centrifugal Dryer.



Image 4 – Front of Centrifugal Dryer

1. Power box
2. Manual control box
3. Service door
4. Auxiliary box
5. Heater box
6. Fan motor
7. Louvers
8. Emergency stop/Control switch



Image 5 – Back of Centrifugal Dryer

9. Wet bin
10. Plenum access door
w/viewing port
11. Rear door switch (inset shows EU switch-
see Image 14 on page 1-20)
12. Column over-temp capillary
13. Rear junction box
14. Meter roll proximity switch
15. Discharge chute switch
16. Unload proximity switch
17. Discharge chute
18. Access ladder
19. Discharge moisture sensor

Power Box Component Location

Image 6 identifies major components of the power box.

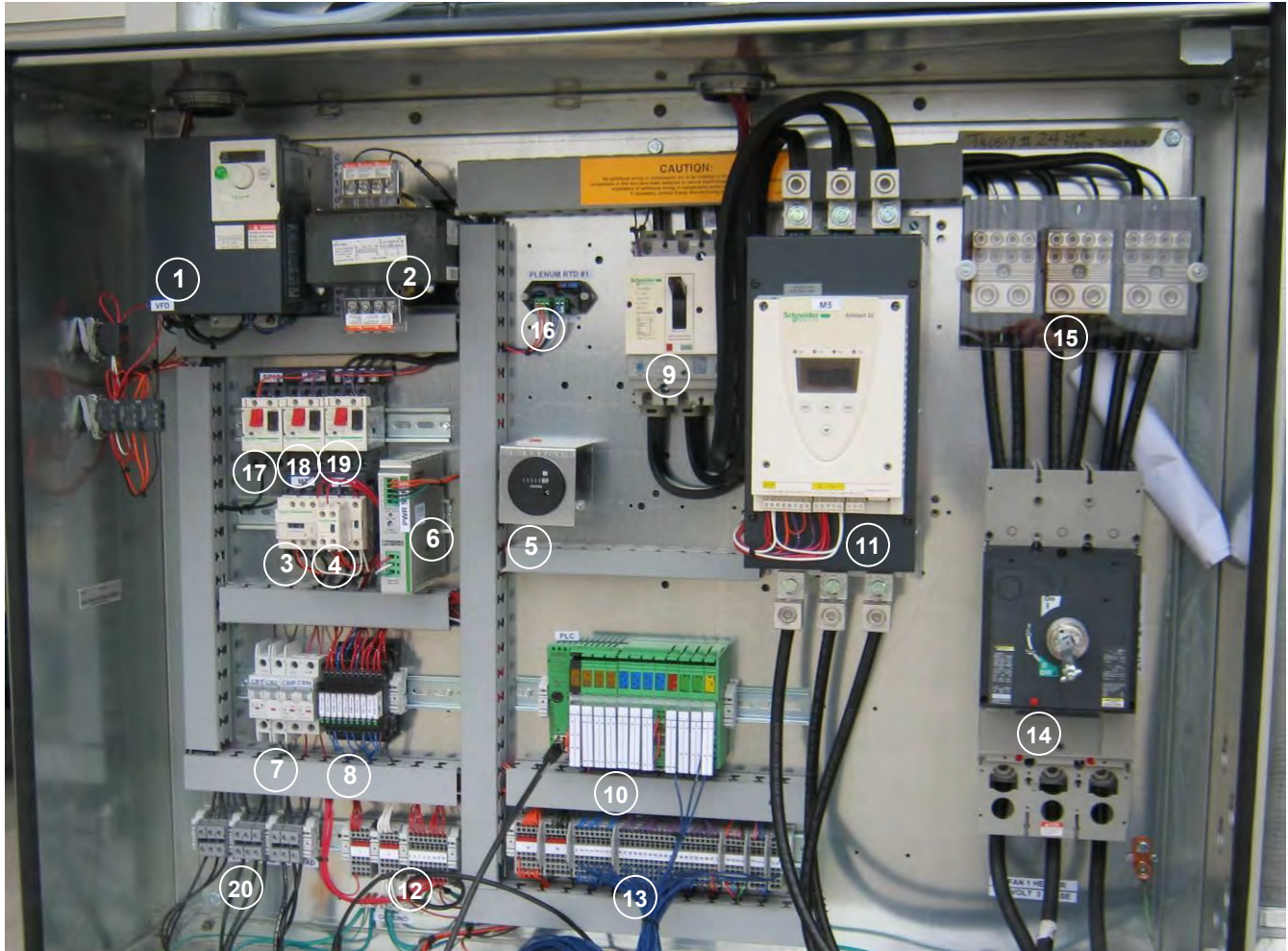


Image 6 – Power box components

- | | |
|--------------------------------------|---|
| 1. Variable frequency drive | 11. Soft start w/ built-in bypass contactor |
| 2. Control transformer | 12. AC feed-through terminals |
| 3. Load contactor | 13. DC feed-through terminals |
| 4. Unload contactor | 14. Main switch |
| 5. Hour meter | 15. Power distribution block |
| 6. 24V power supply | 16. RTD transmitter |
| 7. Control/Heater circuit breakers | 17. Meter roll starter protector |
| 8. 24V DC relays | 18. Load starter protector |
| 9. Fan starter protector | 19. Unload starter protector |
| 10. Programmable logic control (PLC) | 20. Load, unload and meter roll connections |

***IMPORTANT:** During initial setup or after relocation of dryer, it is highly recommended that ALL main power wiring connections be inspected for security and tight connections. Wires are tightened at factory; but connections should be checked after transport.

NOTICE

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

Pipe Train Component Identification

Image 7 identifies components of liquid pipe train (1-6) and vapor pipe train (8-13). (Components will vary for natural gas pipe trains.)



Image 7 – Pipe train components

- | | |
|--|---|
| 1. LP inlet | 10. Main (upstream) gas valve and actuator |
| 2. Shut-off valve | 11. Blocking (downstream) gas valve and actuator |
| 3. Wye strainer | 12. High-pressure gas switch fitting |
| 4. High-pressure pop-off valve | 13. Electronic actuator (under cover) and butterfly valve |
| 5. Liquid solenoid valve | 14. Pressure gauge |
| 6. Liquid vaporizer hose | 15. Pressure gauge |
| 7. LP vaporizer inlet (lower) and outlet (upper) | 16. Valve-proving switch fitting location |
| 8. Vapor hose | |
| 9. Vapor over-temp switch location | |

Centrifugal Fan Dryer Heater Component Identification

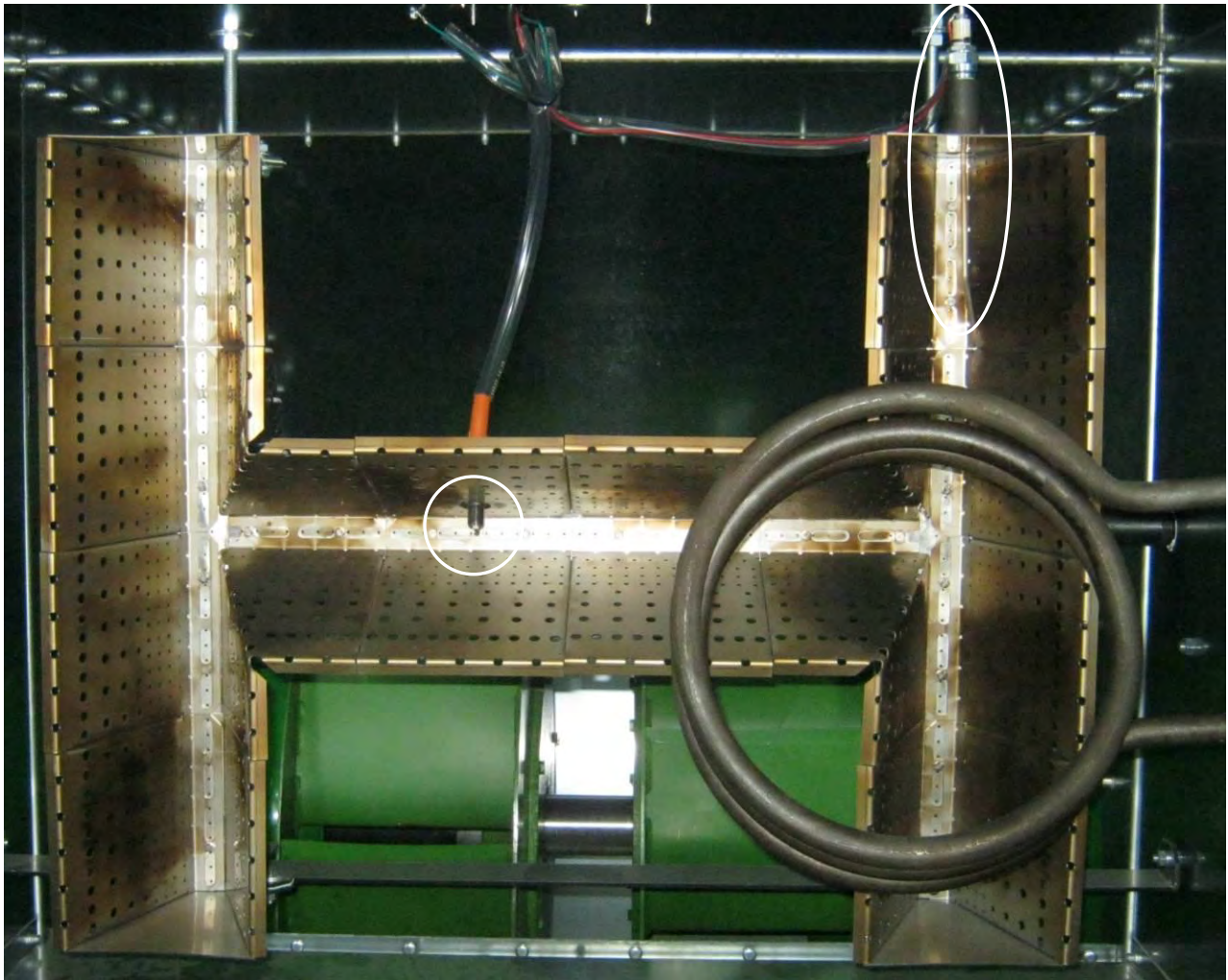


Image 8 – Burner, vaporizer coil, spark plug and flame sensor

Image 13 shows burner in centrifugal dryer. Vaporizer coil, spark plug/igniter (circled) and flame sensor rod (in oval) are shown. **NOTE:** Spark plug may be in different location depending on burner.



Image 9 – Orifice location

Image 14 shows location of orifice used to restrict flow and build pressure. Open circled union to access orifice.

Centrifugal Fan Dryer Heater Component Identification

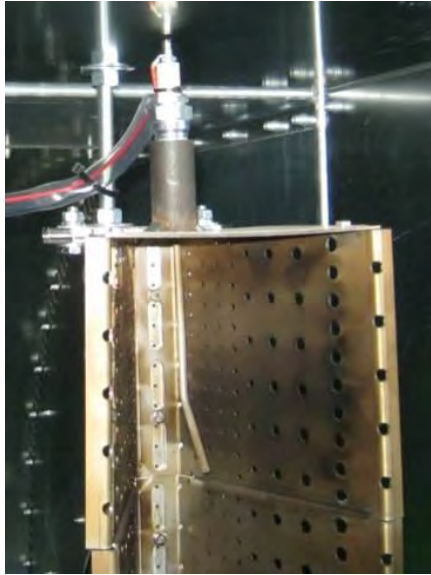


Image 10 – Flame sensor

Image 10 shows flame sensor in H burner.



Image 11 – Plenum RTD and over-temp capillary

Image 11 shows plenum RTD (Resistance Temperature Detector) aluminum tube and plenum over-temp capillary (copper).

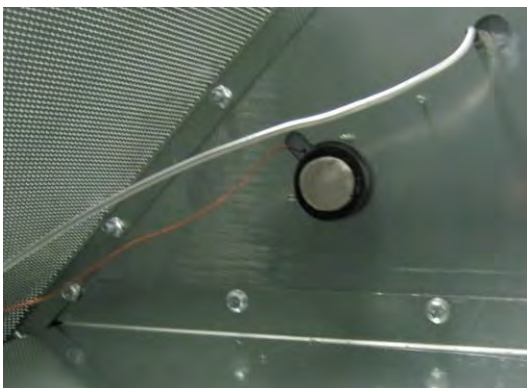


Image 12 – Plenum RTD tube and static air pressure switch

Image 12 shows plenum RTD tube and static air pressure switch.

Switches



Image 13 shows rear door switch

Image 13 – Rear door switch

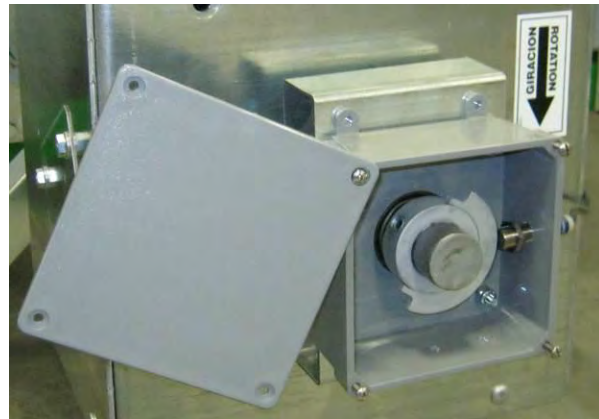


Image 14 shows unload auger proximity switch (at right in box) and rotating target.

Image 14 – Unload proximity switch



Image 15 shows unload auger proximity switch and rotating target mounted on jump auger

Image 15 – Unload proximity switch mounted on jump auger

Lower Plenum Vacuum Cool Fan Inlet Door, Opening Handle



Image 16 – Vacuum door closed

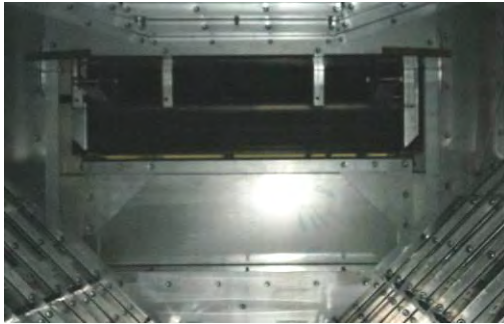


Image 17 – Vacuum door open



Image 18 – Vacuum door opener

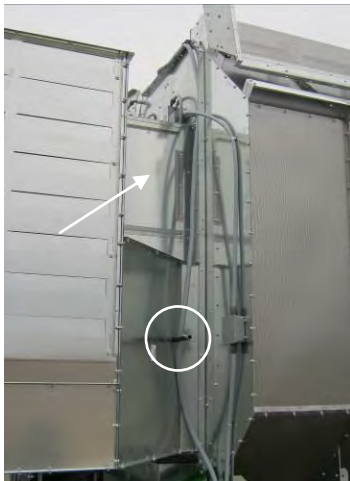


Image 19 – Vacuum door opener, service door locations

Image 16 shows lower plenum vacuum-cool fan inlet door in closed position. Image 17 shows it in open position.

Image 18 shows lower plenum vacuum-cool inlet door opening/closing handle

Image 19 shows location on outside of dryer (circled) where removable handle is attached. Image 19 also shows removable heater service door. See arrow.

Main Switch, Emergency Stop Button



Image 20 – Latch and switch in “Off” position

Image 20 shows power box latch (upper right) in open position and main switch (lower left) in “Off” position.

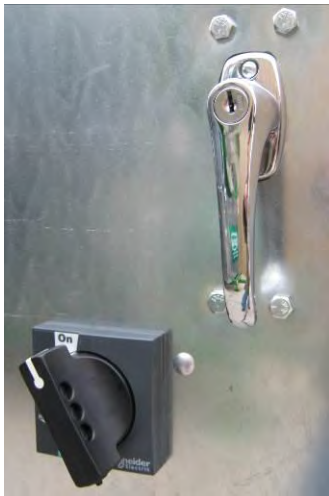


Image 21 – Latch and switch in “On” position

Image 21 shows power box latch (upper right) in closed position and main switch (lower left) in “On” position.



Image 22 – Emergency stop button and system control switch

Image 22 shows emergency stop button and system control switch.

Moisture Sensor, Paddle Switch Box

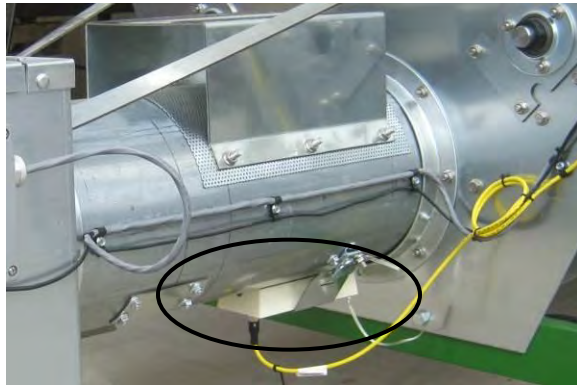


Image 23 – Discharge moisture sensor

Image 23 shows moisture sensor mounted on bottom of discharge chute. It may also be mounted on optional jump auger assembly during dryer operation.



Image 24 – Paddle switch box in shipping position

Image 24 shows paddle switch box in shipping position.



Image 25 – Paddle switch box in operating position

Image 25 shows paddle switch box installed. It is placed on end of dryer opposite from fill hopper.

Cleanouts



Image 26 – Cleanout/inspection door

Image 26 shows lower plenum cleanout/inspection door.

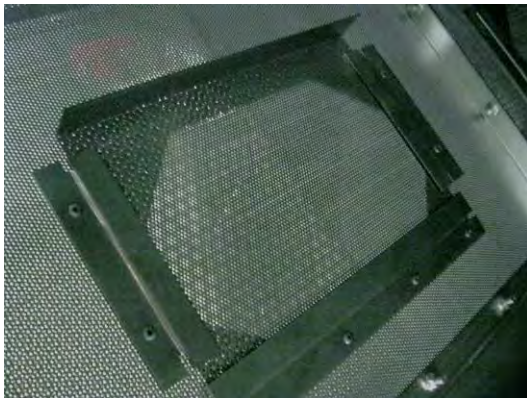


Image 27 – Inner plenum cleanout slide gate

Image 27 shows inner plenum cleanout slide gate.



Image 28 – Unload auger cleanout door cam lock

Image 28 shows handle for unload auger cleanout door cam lock.



Image 29 – Plenum cleanout/blowout door

Image 29 shows partially open rear door for plenum cleanout/blowout.

Cleanout, Plenum Divider Door

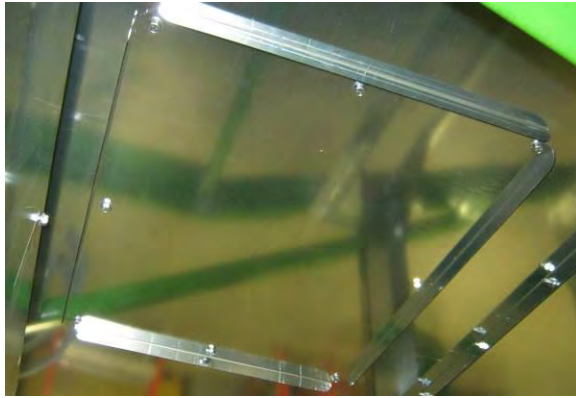


Image 30 – Cleanout door under vacuum-cool duct

Image 30 shows cleanout door under vacuum-cool duct.

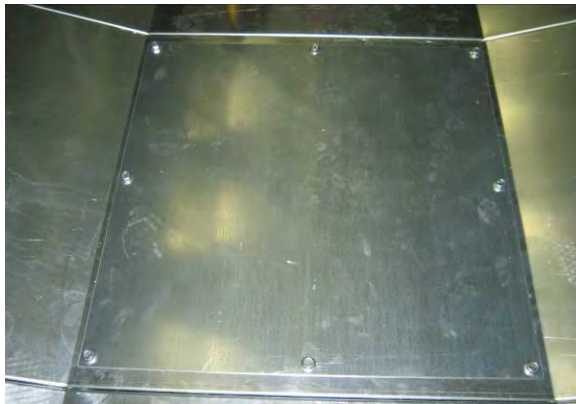


Image 31 – Plenum divider door

Image 31 shows plenum divider door in place (for heat-cool mode) and Image 32 shows door removed (for full-heat mode).

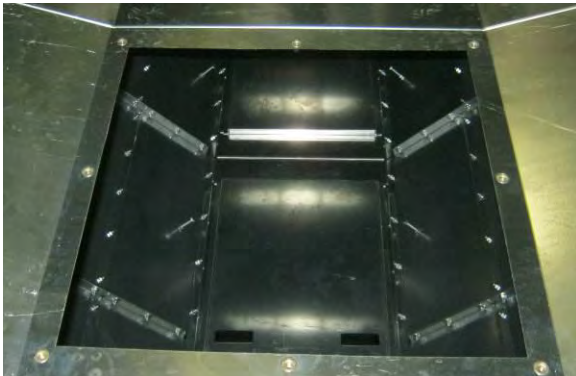


Image 32 – Plenum divider door removed

Take-Away Auger, Meter Roll Motor

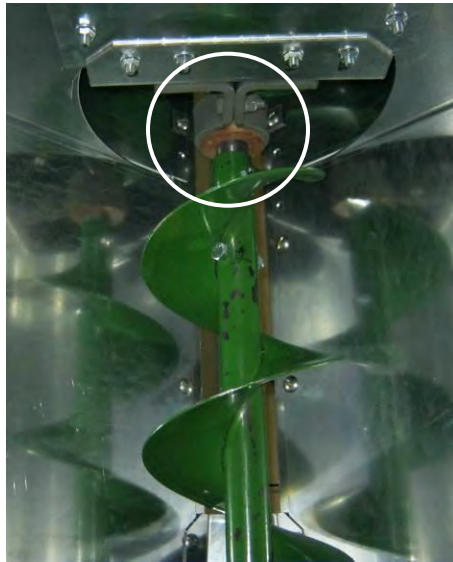


Image 33 – Take-away auger

Image 33 shows take-away auger with hanger bearing (circled).



Image 34 – Meter roll motor

Image 34 shows meter roll motor with gear reducer.



Image 35 – Meter roll proximity switch

Image 35 shows meter roll proximity switch.

Control Boxes, Inlet Louvers, Fan Motor

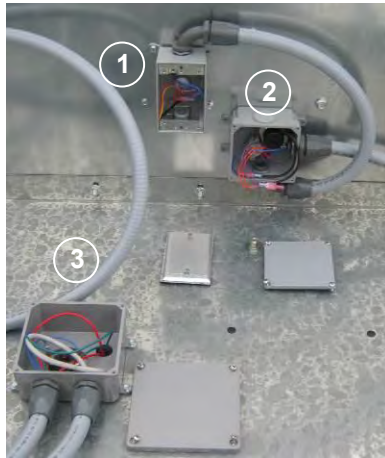


Image 36 – Control boxes on top of heater housing

Image 36 shows:

1. RTD box.
2. Air switch, plenum high limit capillary switch, both inside box 2.
3. Heater housing high-limit switch (manual reset).



Image 37 – Air inlet louvers

Image 37 shows centrifugal fan air inlet louvers in open (full-heat) position.



Image 38 – Fan motor and drive shield

Image 38 shows centrifugal fan motor and drive shield.

Service Doors, Shields



Image 39 – Unload auger/meter roll drive service door

Image 39 shows unload auger/meter roll drive service door. It is located at lower front of dryer, shielding belts for unload auger and chains for meter rolls.



Image 40 – Unload auger service door

Image 40 shows unload auger rear service door. It is located at rear of dryer and also serves as a step (note traction tape) for accessing plenum doors and view ports. Hinged door opens upward.



Image 41 – Load auger shield

Image 41 shows load auger shield. It is installed in field after motor is installed.

Touch Screen Controller Location

QuadraTouch Pro Controller



Image 42 – QuadraTouch Pro control screen

Control box (see Image 43) should be mounted away from dryer and connected by industrial, direct-bury Ethernet cable. Cable is available in 50', 100', 150', and 200' lengths (J8720, J8721, J8722, J8723). Panel needs its own, independent 100VAC – 240VAC power supply.

Main power switch is on bottom, right-hand portion of box. See Image 42. When turned on, switch will illuminate to a green color. Panel will boot up shortly and connect with PLC inside power box.

To connect, main power must also be supplied to dryer and system control switch should be in "COMPUTER" position. Back of panel becomes accessible by removing screws on bottom left and right corners of swing panel. See Image 42.

Although QuadraTouch Pro controller is contained in a sealed enclosure, it's a good idea to mount controller in a shed or other shelter.

QuadraTouch Pro controller has an operating temperature of 10°F to 135°F (-12°C to 57°C) and a storage temperature of -4°F to 150°F (-20°C to 66°C). Outdoor placement is acceptable in most locations, but controller must not be left where temperature may be outside of storage range above. Cover of controller must be closed when unit is not in use.

QuadraTouch Pro controller comes with molded mounting brackets. These allow controller to be mounted directly onto wall or bench using four (4) screws.

NOTICE: If location where controller is mounted is not heated, unit must be taken into a temperature-controlled environment when not in use.

Installation Guide

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Pre-Installation Requirements

Location

Numerous factors need to be taken into consideration when determining where to install the dryer. Very important 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 914.4mm (3 feet) clearance from other structures on side of dryer and 1524mm (5 feet) minimum clearance from other structures at fan inlet.
6. Minimal handling distances needed for load and unload systems
7. Locate dryer and storage bins in a well-drained area
8. Electrical requirements



Warning: Do not install 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 dryer in an area where combustible material can be drawn into fan 914.4mm (3-foot) minimum clearance, or where load and unload augers can contact power lines.



Failure to heed these warnings could result in death or serious injury.

Foundation

DISCLAIMER: Sukup Manufacturing Co. assumes no responsibility regarding the foundation specifications. This is not an engineered foundation and shall not be constructed as such. The specifications given are intended for quoting and estimating purposes only. It shall be the sole responsibility of the customer to obtain actual foundation drawings designed by and constructed to the specifications of a licensed professional structural engineer with knowledge of the actual soil and load specific to the project and location. Consideration should also include, but not be limited to, live loads, dead loads, wind loads, soil bearing loads, seismic zone, proper moisture run-off on top of base, and types of aeration applied for the project.

Sukup Manufacturing Co. will not be responsible for any damage to a product, including, but not limited to, any damage that results from poor soil conditions or inadequate concrete type, grade, bearing strength, and construction method. Soil bearing tests must be performed by a competent, independent, engineering firm. Concrete foundation construction must be done by a competent concrete contractor.

Concrete Pad for Single-Module Dryers

A reinforced concrete pad is recommended for dryer stability. Table 2-1 provides basic quoting guidelines for materials required for each size dryer pad. Quantities are approximate and requirements may vary due to site elevations. See Fig. 2-1 for foundation rebar quoting specifications.

See pages 2-9 through 2-11 for support leg locations for centrifugal dryers.

Dryer Size In Feet	Concrete Pad Size Centimeters (Feet)	Meters (Yards) of Concrete
16'	366 cm x 853 cm (12' x 28')	6 (7.8)
20'	366 cm x 975 cm (12' x 32')	7 (8.9)
24'	366 cm x 1097 cm (12' x 36')	7.6 (9.9)

Table 2-1 – Concrete pad dimensions for centrifugal dryer

Foundation

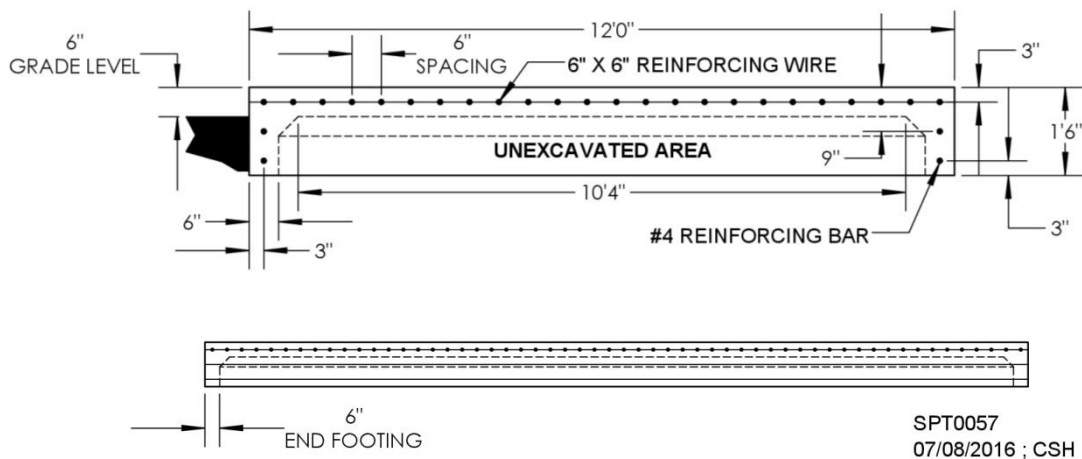


Fig. 2-1 – Foundation specifications for single-module dryer (requirements may vary due to site elevations)

Concrete Pad for Stacked Dryers

A reinforced concrete pad is mandatory for dryer stability. Tables 2-3 and 2-4 provide basic quoting guidelines for materials required for each size dryer pad. Quantities are approximate and requirements may vary due to site elevations. See Fig. 2-2 for foundation rebar quoting specifications.

See pages 2-12 and 2-13 for support leg locations for stacked centrifugal fan dryers.

Table 2-4 – Pad dimensions for stacked centrifugal dryer

Dryer Size	Concrete Pad Size Centimeters (Feet)	Cubic Meters (Yards) Of Concrete
16'	366 cm x 853 cm (12' x 28')	19.1 (25.0)
20'	366 cm x 975 cm (12' x 32')	21.7 (28.4)
24'	366 cm x 1097 cm (12' x 36')	24.3 (31.8)

Foundation

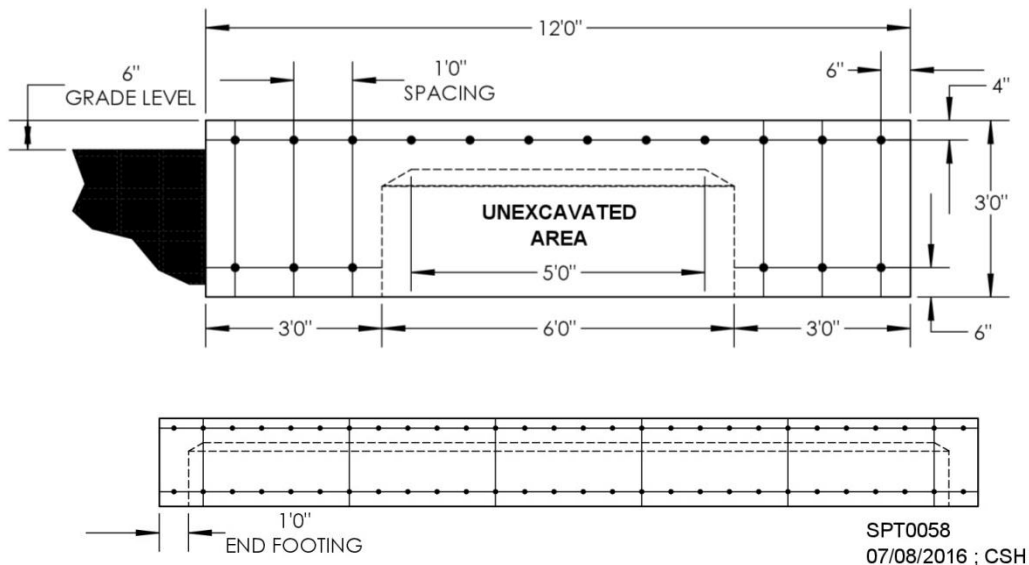


Fig. 2-2 – Foundation specifications for stacked centrifugal dryer

Stacked Dryer

1. Pad to be 254 mm (10") deep with 914.4 mm (36") wide by 914.4 mm (36") deep footings along each side.
2. Use #4 reinforcing rods 305 mm (1 ft.) on centers. Use in both directions in pad and bottom of footing.
3. Minimum soil bearing capacity = 2000 PSF
4. Concrete Specifications:
 - A. Compressive strength at 28 days = 4000PSI
 - B. Minimum cement content = 6 sacks per yard
 - C. Maximum slump = 101.6 mm +/- 305 mm (4 inches +/- 1 foot)

Plan View for Stacked Centrifugal Dryers

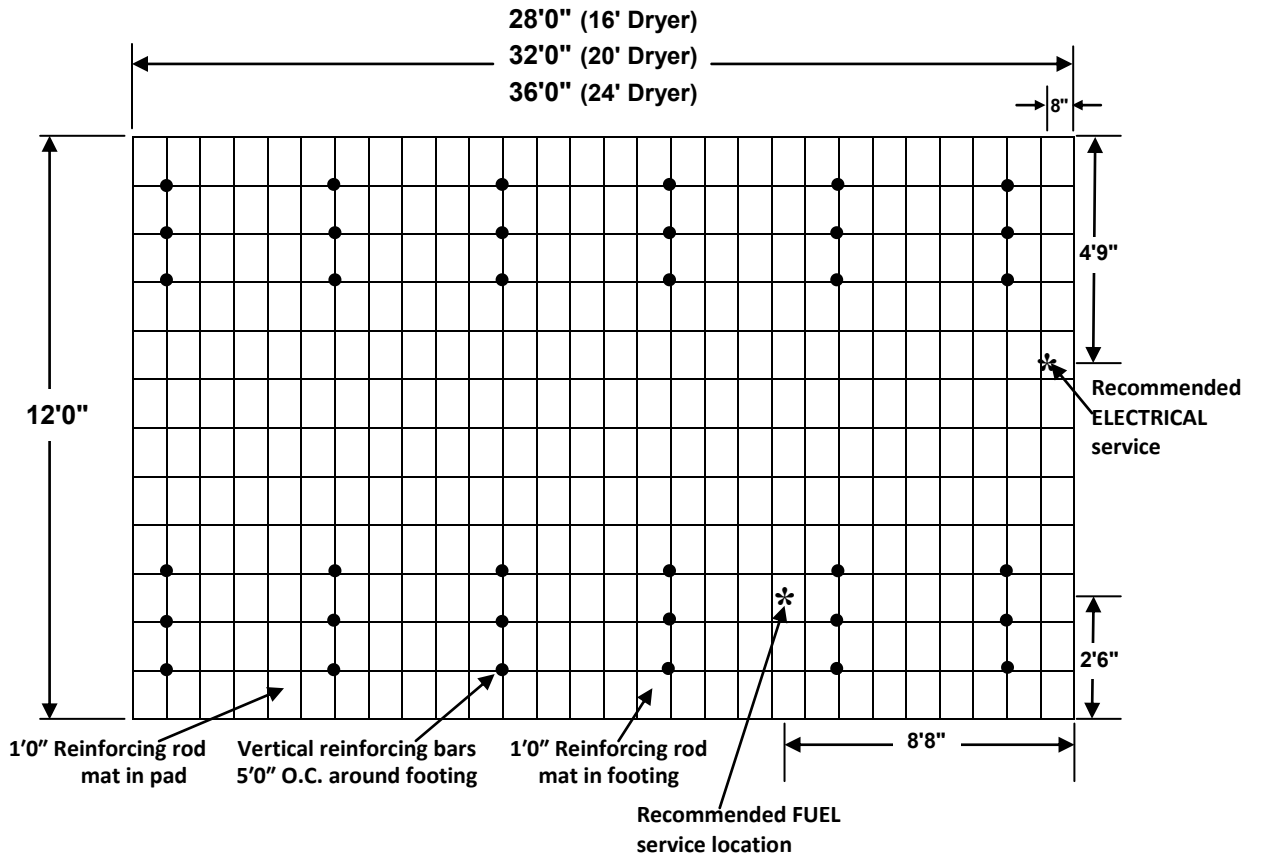
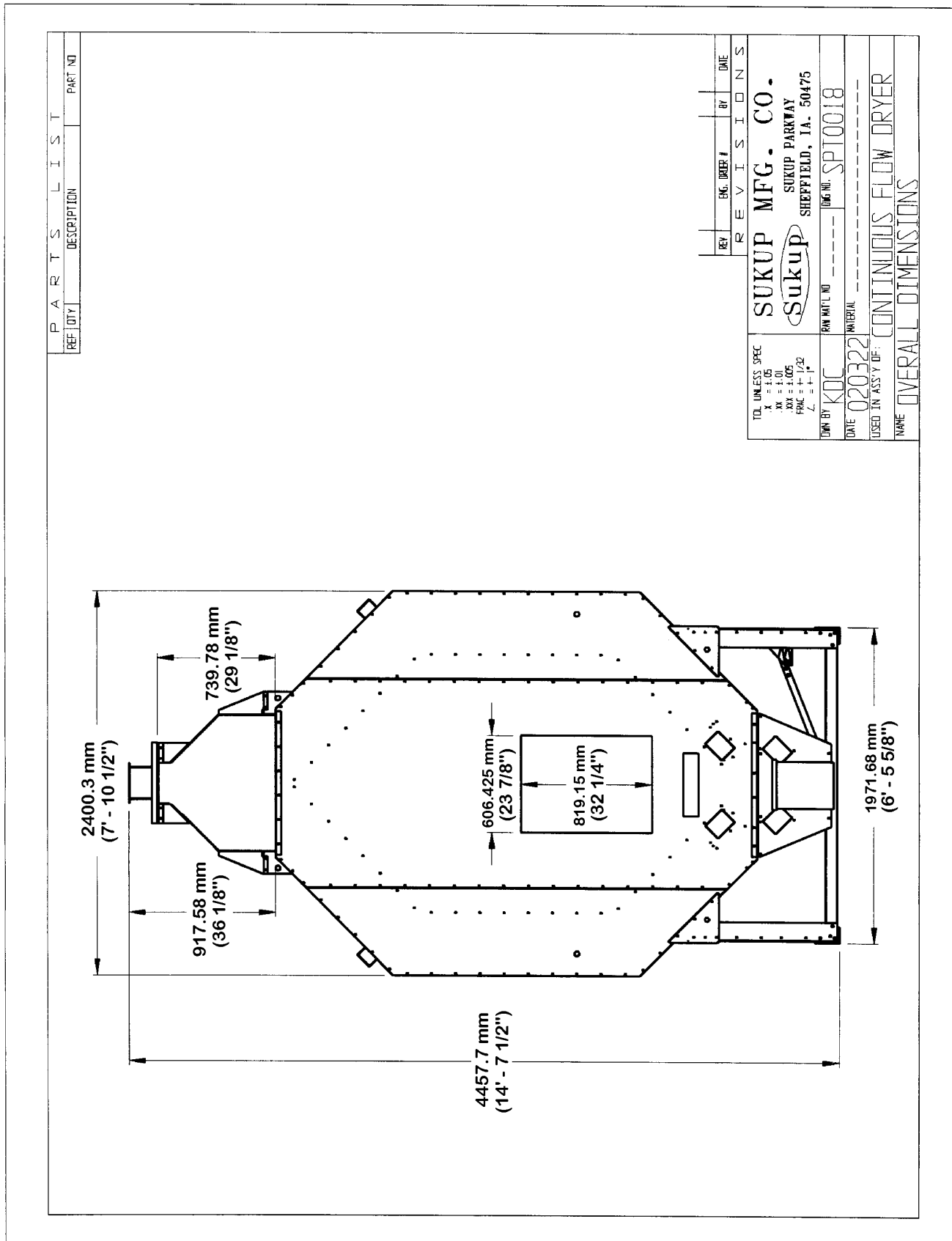


Fig. 2-6 – Minimum rebar specifications and recommended fuel and electrical service locations for stacked centrifugal dryer

Dimensional Drawings



P A R T S L I S T		PART NO.
REF	QTY	DESCRIPTION

REV	ENG.	ORDER #	BY	DATE
R E V I S I O N S				
SUKUP MFG. CO.				
Sukup				
SUKUP PARKWAY SHEFFIELD, IA. 50475				
TD, UNLESS SPEC	DRAWN BY: KOC			
X = 1:05	REV MAT'L NO: SPT0018			
XX = 1:05	DATE: 020322			
XXX = 1:05	USED IN ASSY OF: CONTINUOUS FLOW DRYER			
XXXX = 1:05	NAME: OVERALL DIMENSIONS			

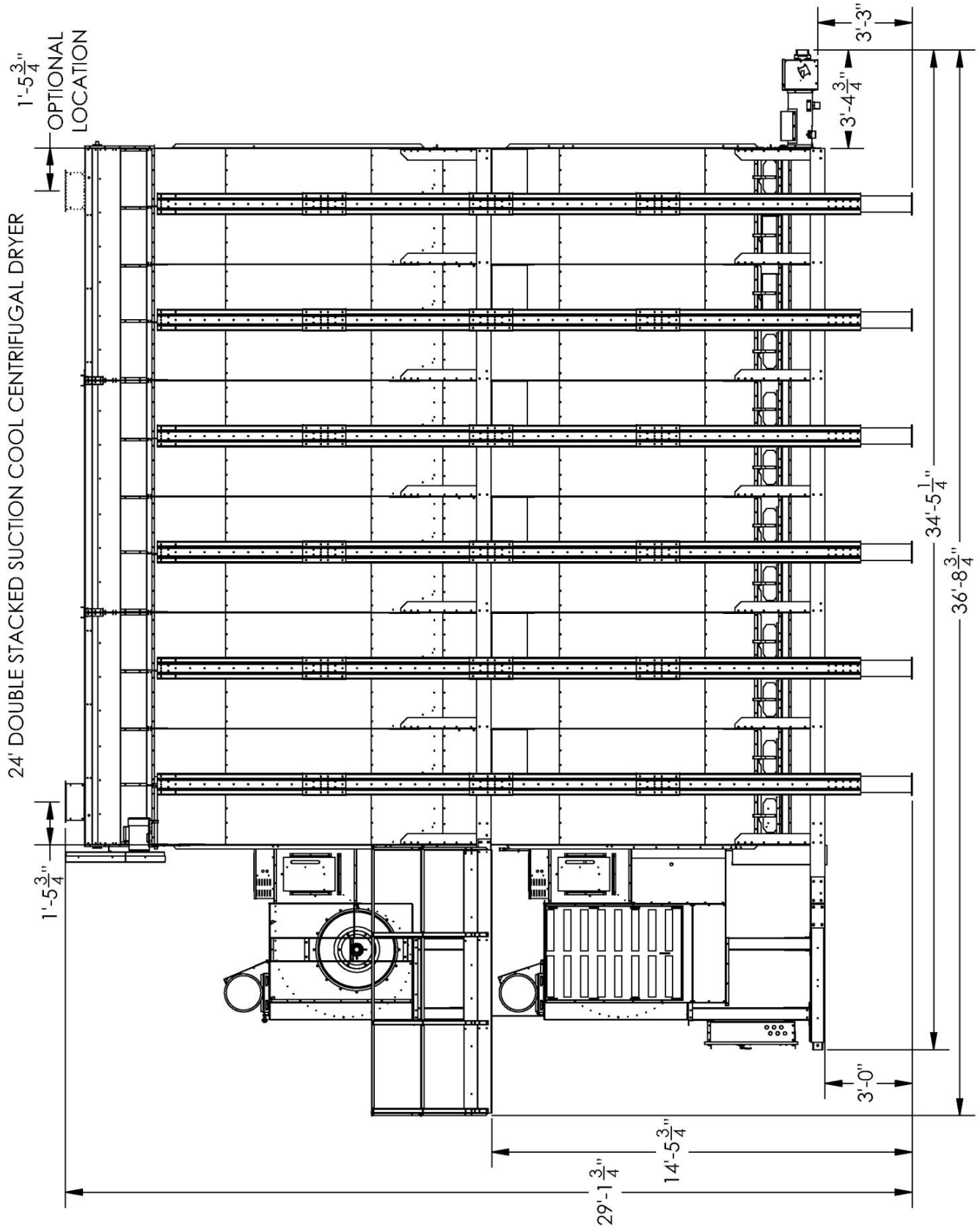


Fig. 2-4 – Dimensional drawing

Dryer Hitch with 24" Extension

Dryers have an extension to compensate for the belt drive distance for easier transport. See below for part descriptions of this extension.

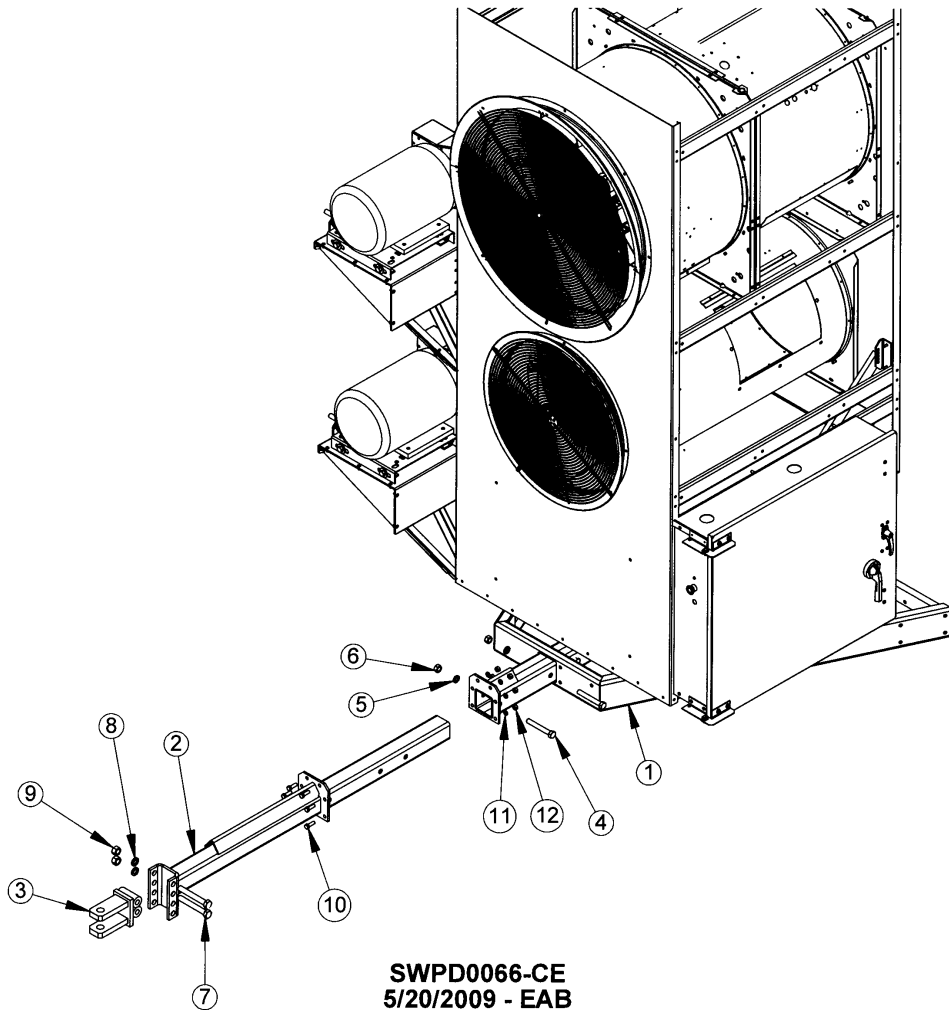


Fig. 2-5 – Dryer hitch with extension

Table 2-2 – Dryer hitch with extension – Parts list

ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	T16310D	HITCH RECEIVER WELDMT, JACK
2	1	T43711	HITCH INSERT WELD, 24" EXT
3	1	T4372	CLEVIS WELD
4	3	J0822	SCREW, 3/4"-10 X 5" LG.
5	3	J1220	3/4" LOCKWASHER
6	3	J1051	3/4"-10 HEX NUT
7	2	J08361	BOLT, 7/8-9 X 6 1/2" LG
8	2	J1222	7/8" LOCKWASHER
9	2	J1059	7/8-9 HEX NUT
10	6	J0730	SCREW, 1/2 -13, 1.50,PLT,GR5,HHCS
11	6	J1215	1/2" LOCKWASHER,PLT,SPLIT
12	6	J1040	NUT, 1/2 - 13,PLT,GD5,HEX

Dryer Set-up/Supports

NOTICE

Wheel transport kit is for transport only and is NOT to be used when operating dryer. Dryer MUST be mounted and supported in an approved manner. See Fig. 2-6.

Dryer must be mounted a minimum of 16 inches (406.4 mm) above surface to allow for clean-out.

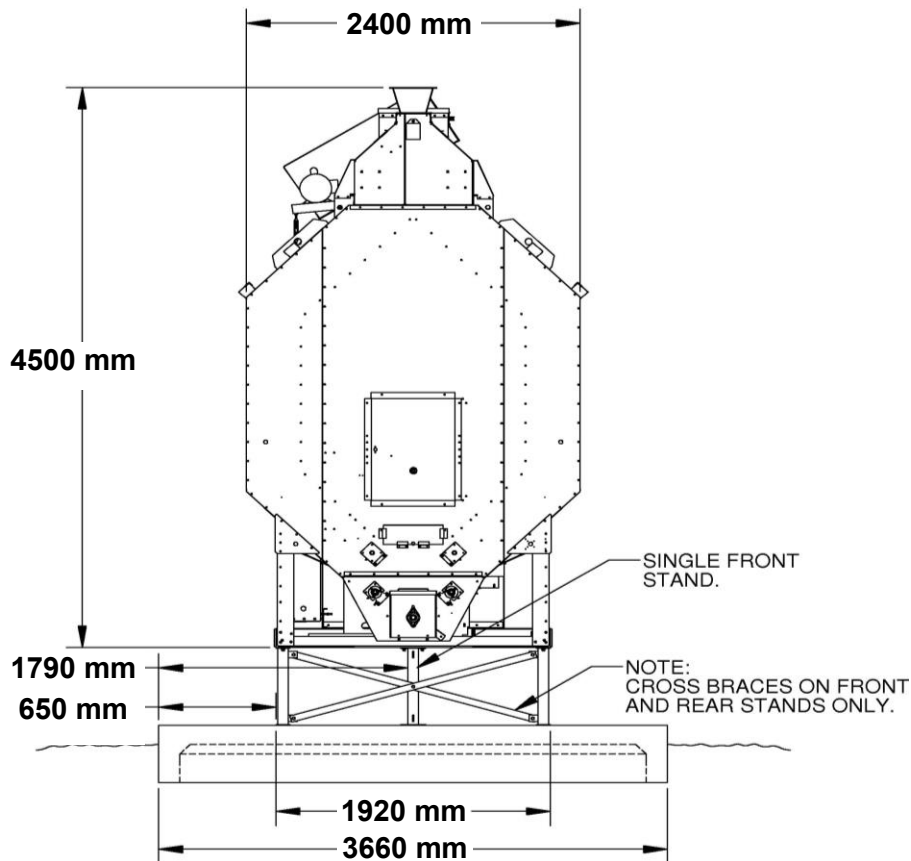


Fig. 2-6 - Cross support braces and rear stand

If dryer is not mounted using Sukup Manufacturing Co. supports, these guidelines must be followed:

- Supports under grain columns must be at least every 6 feet (1828.8 mm).
- Support under front hitch
- Fasten dryer down to foundation using brackets or turnbuckles.

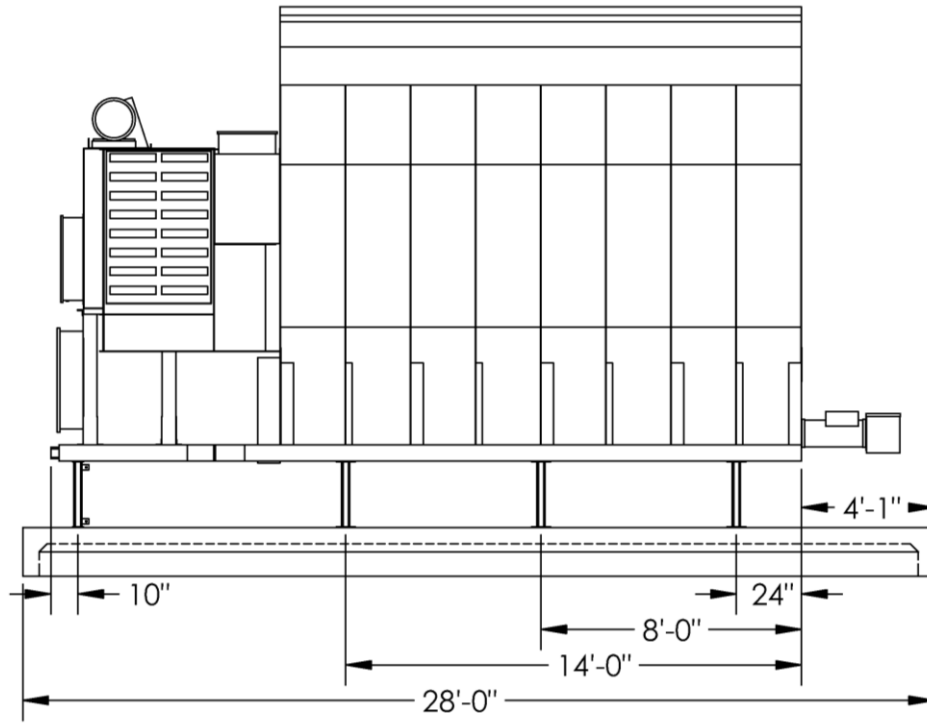
Optional dryer supports are available from Sukup Manufacturing Co. in 2-foot, 3-foot, and 4-foot lengths. Support kits come with necessary hardware to attach supports to dryer frame. Customer must supply hardware to attach to concrete pad. (Required minimum sizes are 1/2" or 5/8" hardware).

Ladder extensions are included with the 3-foot (910mm) and 4-foot (1220mm) leg extension kit. The same length of ladder extension is supplied with the 4-foot kit as the 3-foot kit. For the 3-foot kit, cut off excess ladder length for your application.

Contact your Sukup dealer to order supports and/or extra ladder extensions.

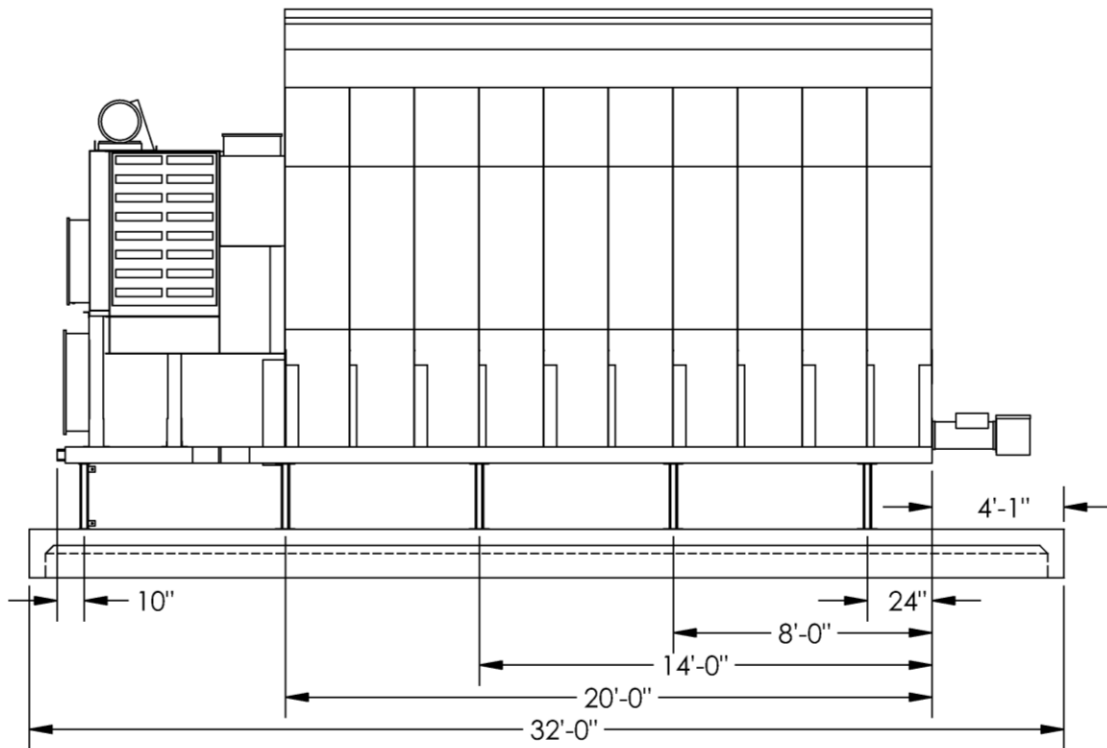
Support Leg Locations

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



16' CENTRIFUGAL DRYER

Fig. 2-7 – Support leg locations (16' dryer)



20' CENTRIFUGAL DRYER

Fig. 2-8 - Support leg locations (20' dryer)

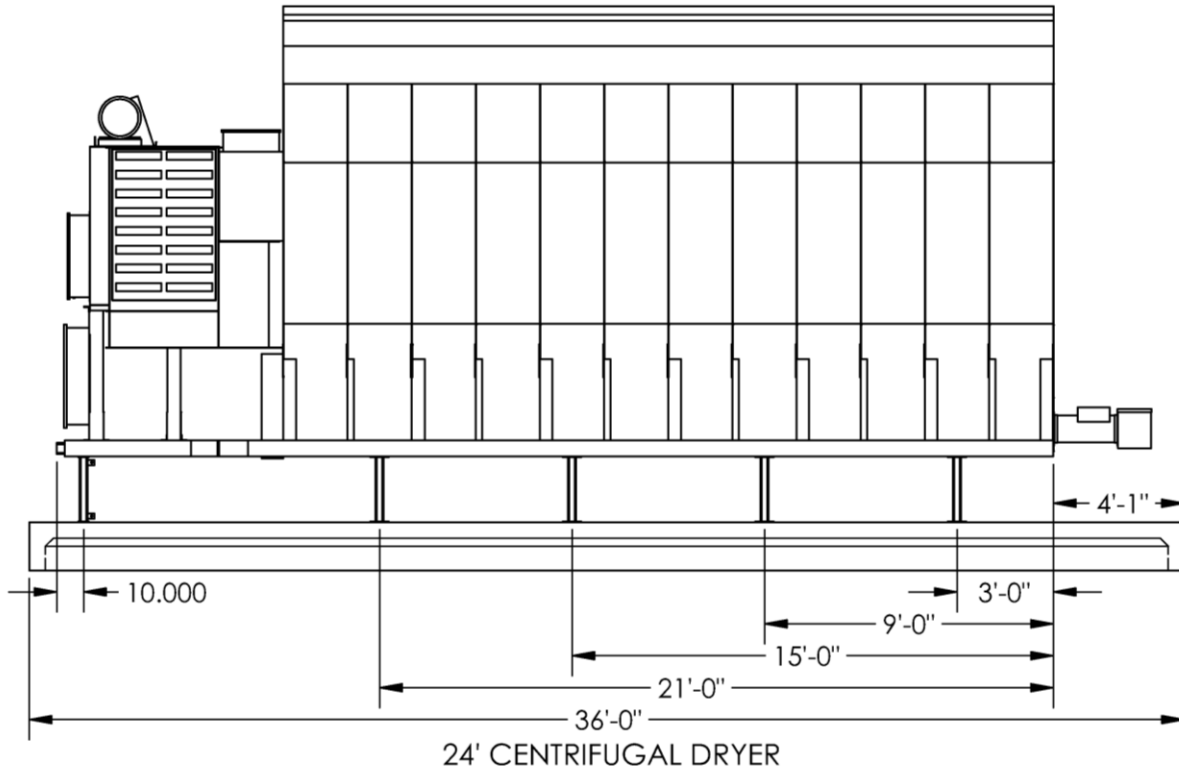


Fig. 2-9 – Support leg locations (24' dryer)

Lift Bracket Locations for Centrifugal Dryers

⚠ WARNING: Do not station a crew member at a location where he/she could be struck by a module that is being lowered into place. Workers should be aware that wind can blow modules lifted by crane, potentially striking or crushing a person. Failure to follow this precaution could result in death or serious injury.

Drawings on this and following page show proper lift bracket locations for 16', 20' and 24' centrifugal dryers. Lift ONLY with Sukup lift bracket or equivalent.

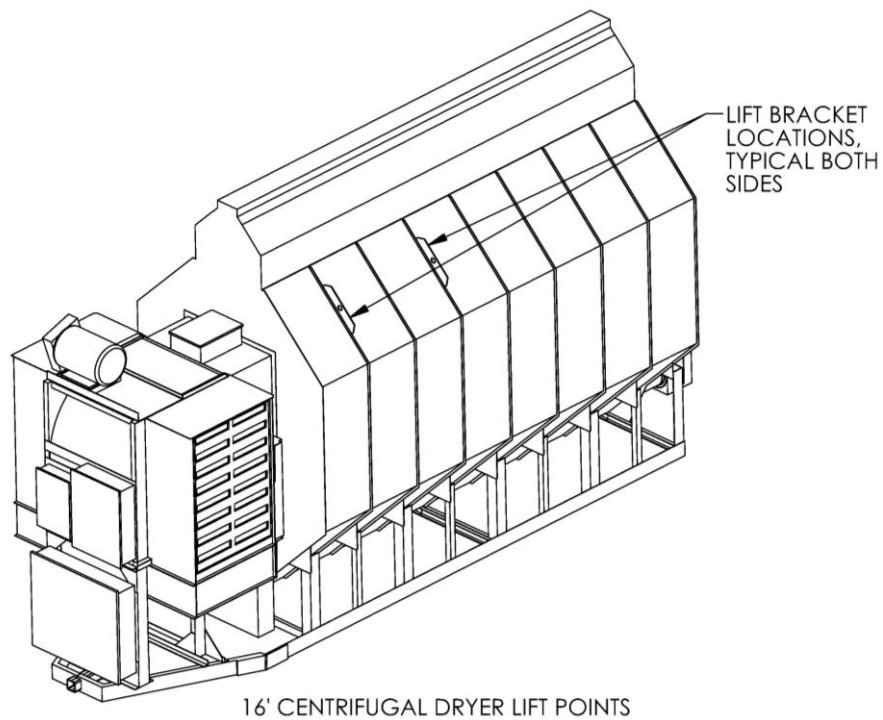


Fig. 2-10 – Lift bracket locations (16' dryer)

Approx. dryer weight: 4,536 kg (10,000 lbs.)

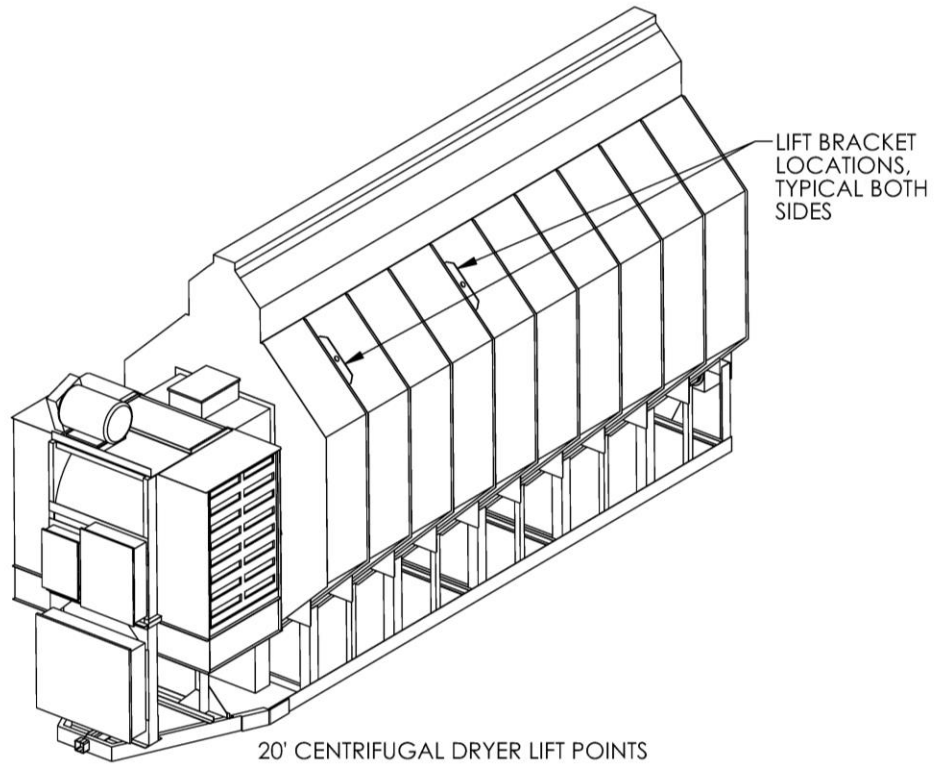


Fig. 2-11 – Lift bracket locations (20' dryer)

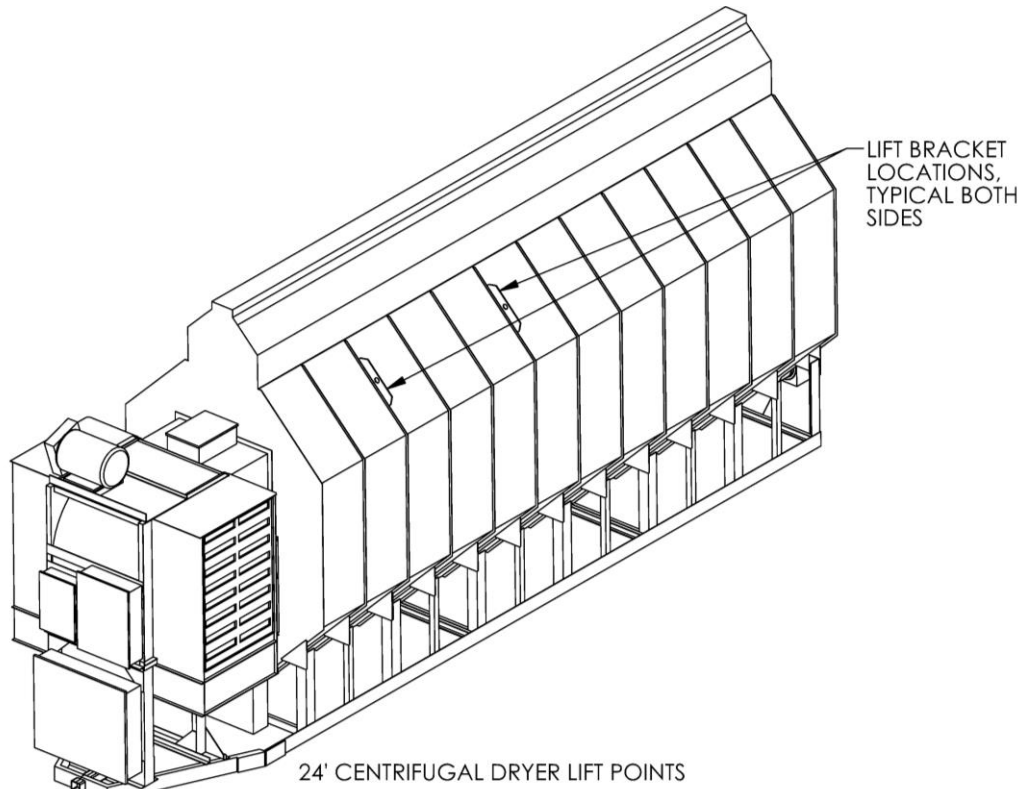


Fig. 2-12 – Lift bracket locations (24' dryer)

Gas and Electric Hookup

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

Supporting electrical panels or combinations of electrical components supplied by the end user must be compliant with current editions of **BS EN 60204-1**.

Fuel Information

LIQUID PROPANE

Sukup dryers using liquid propane must be connected to a supply tank to draw liquid from bottom of tank. Tank should be 3785.4 liters (1,000 gallons) or larger. Connection to dryer should be with a flexible hose designed for LP gas. Have LP gas supplier make proper connections and install safety controls.

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 supply tank may freeze in pipe train or controls, causing damage. To ensure tank is free of moisture, the best precaution is to purge with methanol. Check with 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 dryer, vapor lines of tanks must be connected together to equalize pressure from each tank. Have LP gas supplier make proper connections and install safety controls to meet local codes and national fire protection standards.

Fuel System Recommendations

LIQUID PROPANE

DRYER SIZE	MAXIMUM HEAT CAPACITY (BTU/HR)	MAXIMUM FUEL FLOW L/HR (GAL/HR)	FUEL LINE SIZE (MINIMUM UP TO 100') MM (IN)
16 FT, SINGLE HEATER	6,000,000	246 (65)	12.7 (1/2")
16 FT, 2 MODULE	13,000,000	537.5 (142)	19.1 (3/4")
20 FT, SINGLE HEATER	7,000,000	287.7 (76)	12.7 (1/2")
20 FT, 2 MODULE	16,500,000	681.4 (180)	19.1 (3/4")
24 FT, Single Heater	10,000,000	412.6 (109)	19.1 (3/4")
24 FT, 2 MODULE	20,000,000	825.2 (218)	25.4 (1")

Table 2-3 – Liquid propane specifications

1. See Liquid Propane table above for recommended line size.
2. Open LP shut-off valves slowly to prevent inadvertent closing of excess flow valves.
3. Fuel flow and line size in chart above assume a temperature of 10°F (-12.2°C) or higher.



Connection to liquid manifold on dryer

Image 2-1 - LP-fueled centrifugal dryer

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 1 bar (15 PSI) must be provided for connection to the dryer. **IMPORTANT: Regulator must be in accordance with standard BS EN 88 or BS EN 334.** Ensure also that sufficient volume is maintained for the correct operating pressure.

Fuel System Recommendations

NATURAL GAS

DRYER SIZE	MAXIMUM HEAT CAPACITY (BTU/HR)	MAXIMUM FUEL FLOW L/HR (CUBIC FEET/HR)	FUEL LINE SIZE Minimum up to 100' MM (IN)
16 FT, SINGLE HEATER	6,000,000	169,901 (6000)	38.1 (1-1/2")
16 FT, 2 MODULE	13,000,000	368,119 (13,000)	63.5 (2-1/2")
20 FT, SINGLE HEATER	7,000,000	198,218 (7000)	50.8 (2")
20 FT, 2 MODULE	16,500,000	467,228 (16,500)	63.5 (2-1/2")
24 FT, SINGLE HEATER	10,000,000	283,169 (10,000)	50.8 (2")
24 FT, 2 MODULE	20,000,000	566,337 (20,000)	63.5 (2-1/2")

Table 2-4 – Natural gas specifications



See Natural Gas table above for recommended line size.

Connection to natural gas manifold on dryer

Image 2-2 – Natural gas-fueled centrifugal dryer

Wet Bin Assembly

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

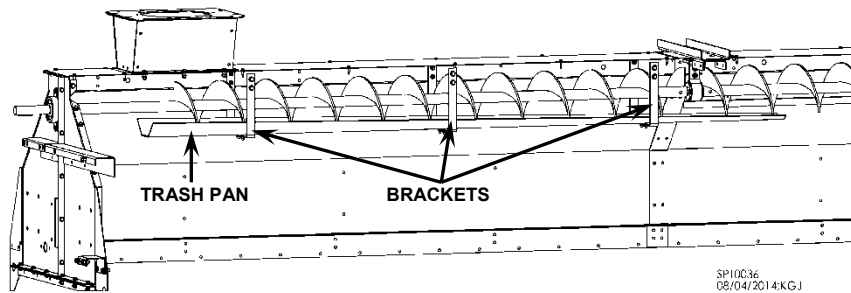


Fig. 2-13 – Trash pan and bracket installation

1. Bolt trash pan brackets into wet bin on filling end of dryer. Bolt trash pan to trash pan brackets. See Fig. 2-13.
2. Position the half of the wet bin without the auger into upright position. Then pivot the side with the auger into upright position. Bolt wet bin together at end plate seams, side seams, pivot seams, and top hanger support.
3. Attach fill auger paddle switch assembly. Locate holes for paddle switch in wet bin on end opposite of filling end. See Fig. 2-14.

NOTICE

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

NOTICE

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

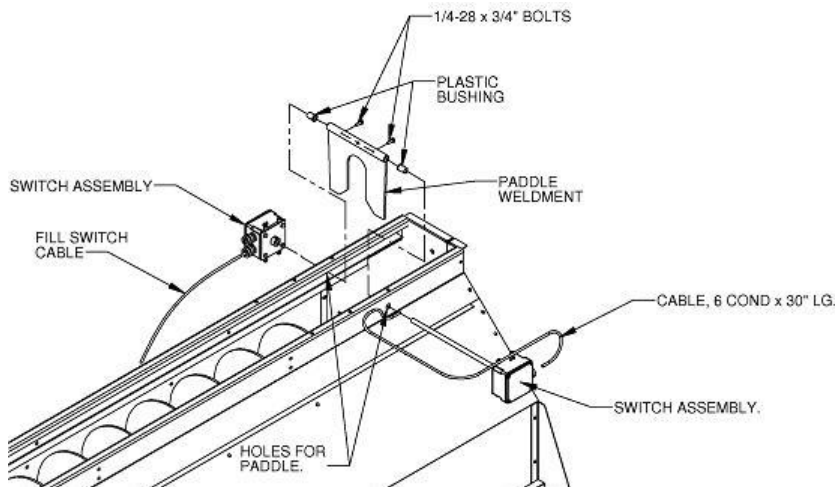


Fig. 2-14 – Paddle switch installation

4. Slide a plastic bushing on each side of wet bin from inside out. Slide shaft with tilt switch box through bushing on one side of wet bin. Position paddle weldment inside of wet bin and slide shaft through pipe of paddle weldment. Slide shaft through bushing on other side of wet bin. Tighten setscrews of paddle weldment onto shaft, making sure paddle and box on shaft are square and paddle can pivot freely. See Fig. 2-14.

Wet Bin Assembly (Continued)

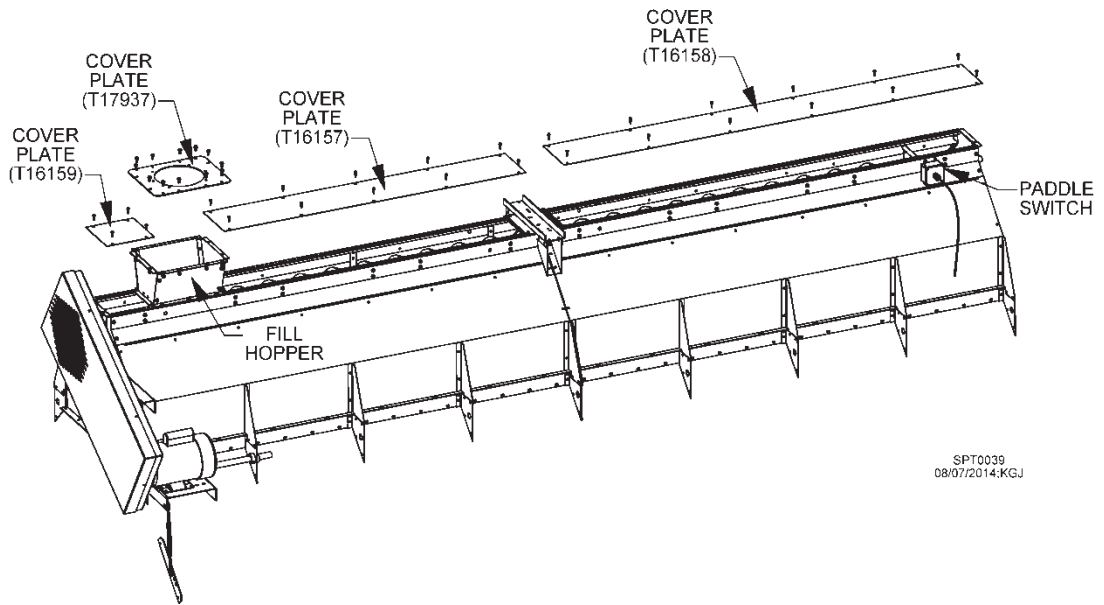


Fig. 2-15 – Fill hopper installation at front of wet bin (16' dryer shown)

5. Bolt top fill hopper to top of wet bin on filling end of dryer. Place cover plates on top and attach with 1/4 x 1" self-drill screws. See Fig. 2-15 for front-fill and Fig. 2-16 for rear-fill dryer.

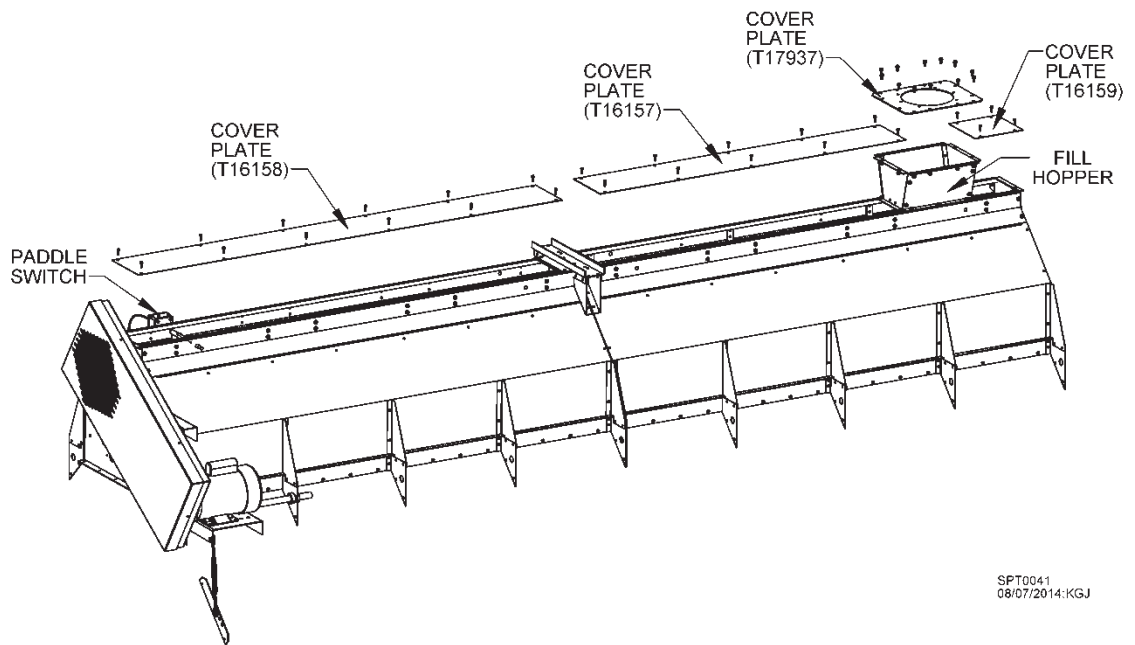


Fig. 2-16 – Fill hopper installation at rear of wet bin (16' dryer shown)

Top Load Auger Motor and Shields

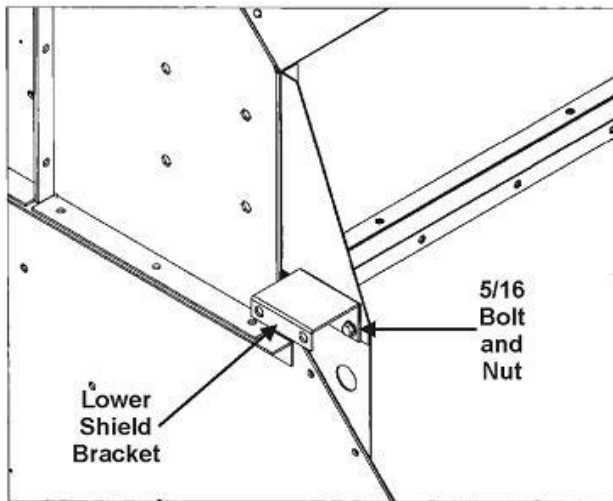
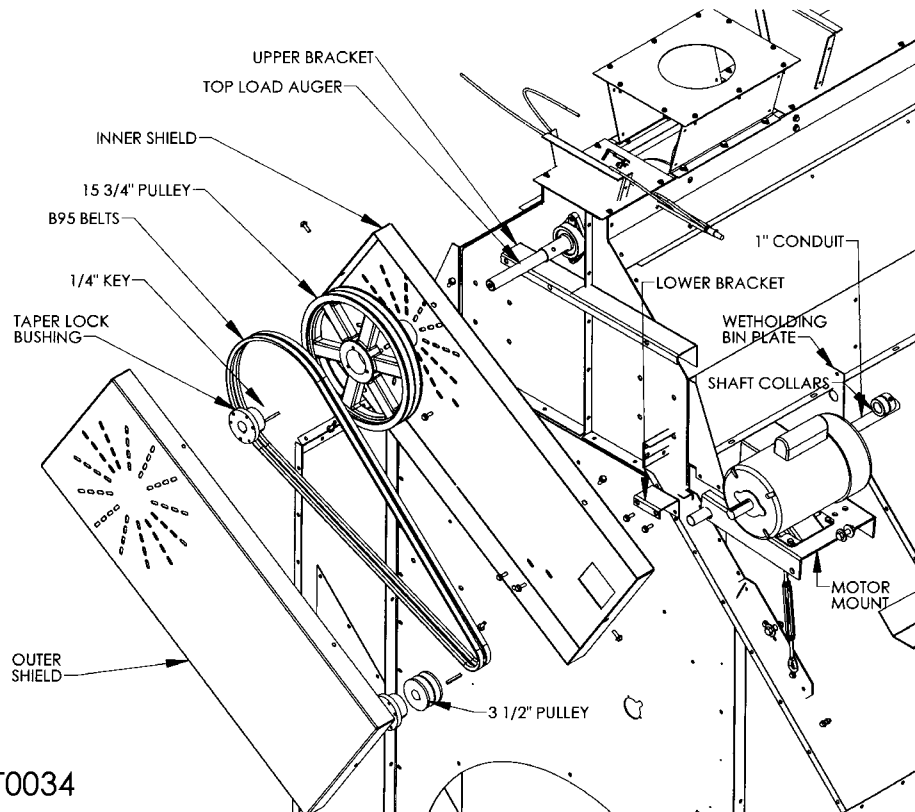


Fig. 2-17 – Lower shield bracket installation

1. Bolt lower shield bracket to end of dryer using 5/16 x 1" bolts and 5/16 nuts. See Fig. 2-17.



SPT0034

Fig. 2-18 – Top load auger components

2. Hold motor mount up to holes on side of wet holding bin. Slide a 1" conduit tube through motor plate holes of dryer. See Fig. 2-18.

Top Load Auger Motor and Shields (Continued)

3. Slide shaft collars on each side of wet holding bin plate. See Fig. 2-19.

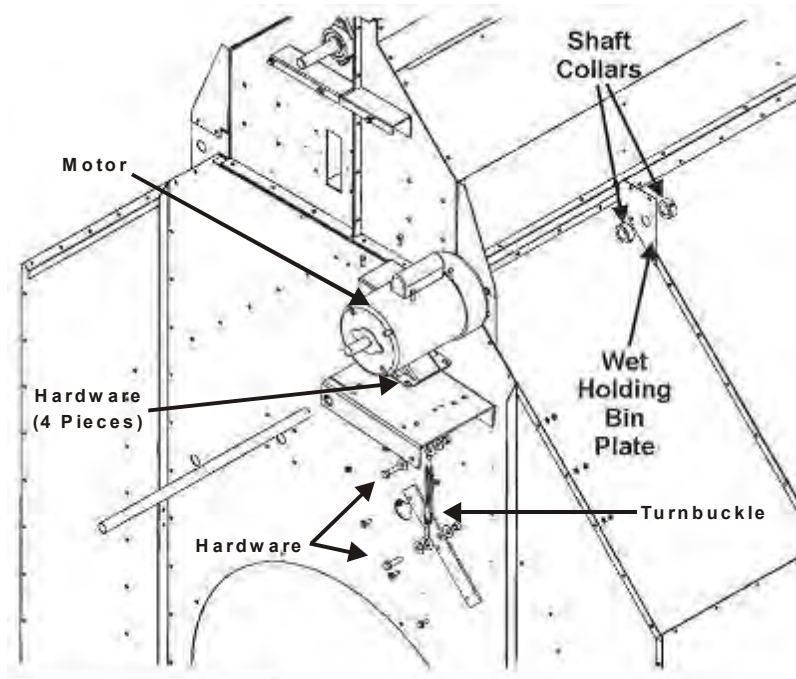


Fig. 2-19 - Motor mount components

4. Tighten shaft collars under motor mount and on each side of wet holding bin plate. Make sure motor mount can pivot. See Image 2-3.

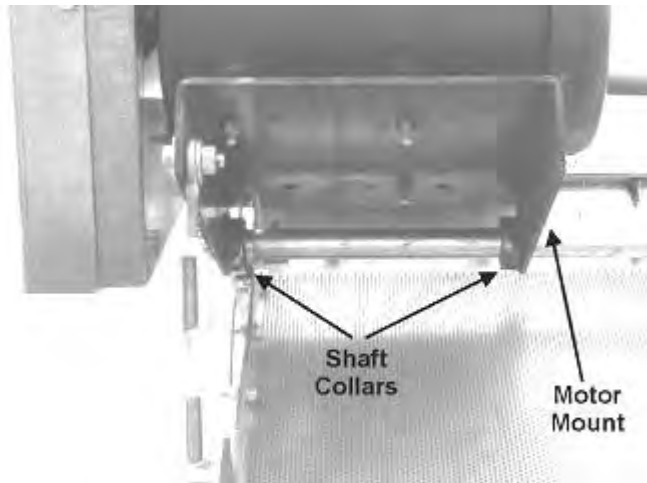


Image 2-3 – Motor mount shaft collars, installed

Top Load Auger Motor and Shields (Continued)

5. Bolt turnbuckle plate to side of dryer. See Fig. 2-19.
6. Bolt turnbuckle between motor mount and turnbuckle plate using 1/2 x 1-3/4" bolts, 1/2" flat washers and 1/2" lock nuts. See Fig. 2-19.
7. Bolt motor to motor mount using 5/16 x 1" bolts and 5/16" nuts and washers. See Fig. 2-19.
8. Bolt inner shield to upper and lower brackets using 5/16" bolts, washers, and nuts. See Fig. 2-18.
9. Attach a 10.8 cm O.D. pulley to motor shaft with a key and attach pulley to top load auger with a taper lock bushing. Use straight edge to align pulleys. Attach two B95 belts between auger pulley and motor pulley. Tighten turnbuckle to tighten belts See Fig. 2-20. **Tension belts so it takes about 2.7 kg. (6 lbs.) pressure to deflect belt 1/2" at center of belt span.**
10. Final assembly should appear as in Fig. 2-20 (Shown without front shield).

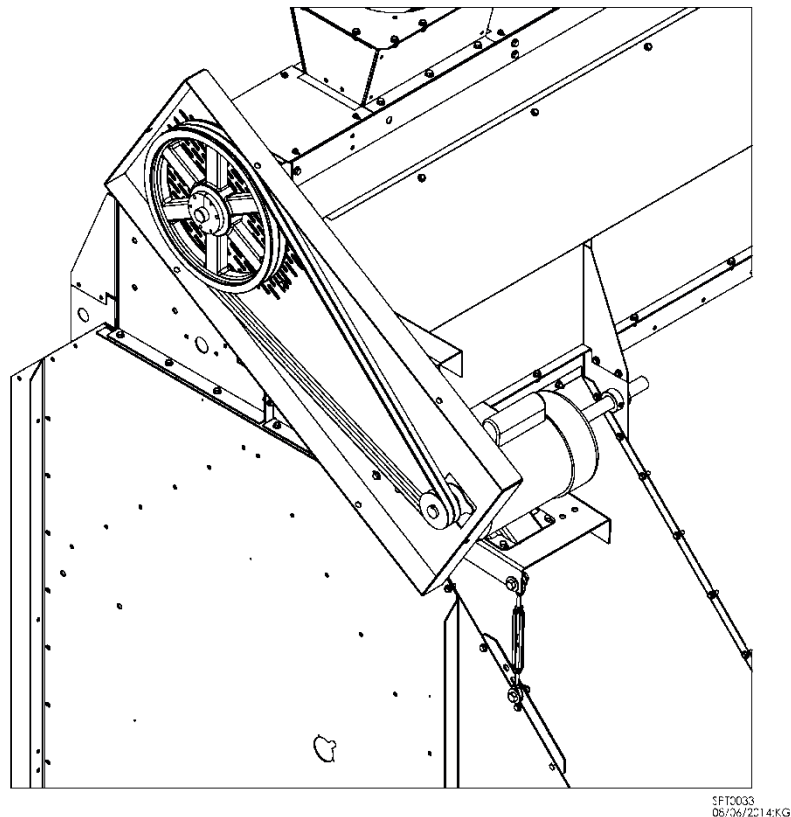
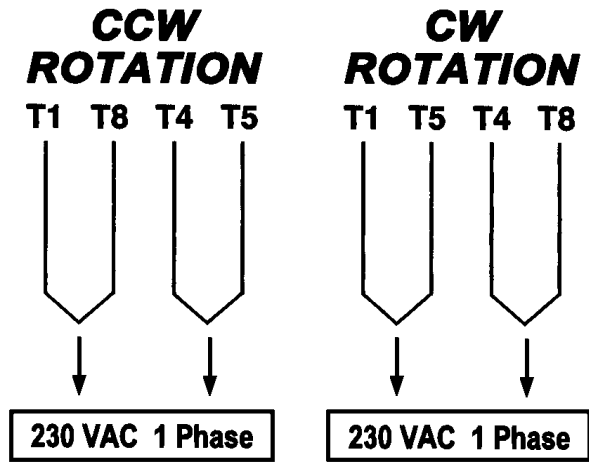


Fig. 2-20 – Final assembly (without front shield)

11. Slide outer shield around inner shield and attach with six (6) 5/16 x 1" bolts. See Fig. 2-18.
12. Check and retighten all fasteners.

Connecting Load Auger Motor



Overload circuit is intentionally disconnected in motor because overload protection (starter protector) is located in power box on dryer. A sticker, L0903, is attached to motor showing how to make wiring connections. See Fig. 2-21.

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

Fig. 2-21 – Sticker L0903

QuadraTouch Pro Controller



Image 2-4 – QuadraTouch Pro controller

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

1. QuadraTouch Pro controller will need its own 100 – 240VAC power source. Choose a location where electricity can be easily accessed. At 120VAC, unit pulls less than 1A. Using an appropriate extension cord is acceptable as long as standard electrical codes are followed.

2. Industrial Ethernet cable ordered with dryer is available in four (4) lengths:

Cable Length		Comp. #
Meters	Feet	
15	50'	J8720
30.5	100'	J8721
46	150'	J8722
61	200'	J8723

Table 2-5 – Ethernet cable lengths and components numbers

Cable length determines how far away controller can be mounted from dryer. Standard length is 50 feet.

3. Although QuadraTouch Pro controller is contained in a sealed enclosure, it's a good idea to mount controller in a shed or other shelter.

QuadraTouch Pro controller has an operating temperature of 10°F to 135°F (-12°C to 57°C) and a storage temperature of -4°F to 150°F (-20°C to 66°C). Outdoor placement is acceptable in most locations, but controller must not be left where temperature may be outside of storage range above. Cover of controller must be closed when unit is not in use.

4. QuadraTouch Pro controller comes with molded mounting brackets. These allow controller to be mounted directly onto wall or bench using four (4) screws.

NOTICE

NOTE: If location where controller is mounted is not heated, unit must be taken into a temperature-controlled environment when not in use.

Ground Rod Requirements



Image 2-5 – Ground rod, buried

A ground rod (J5722) and clamp (J5723) are supplied with dryer and can be found in rear of dryer. Rod is copper-coated, 2.44 m (8 feet) long and 1/2-inch diameter.

1. Installation of ground rod and ground wire must conform to local and national electrical code procedures.
2. Bury ground rod (top of rod should be flush with ground) within 2.44 m (8 feet) of dryer and attach it to an unpainted part of dryer frame or main ground lug in power distribution box. The ground rod located at power pole will *not* provide sufficient grounding for dryer.
3. Proper grounding will provide added safety in case of any short or lightning strike.

IMPORTANT: Ground rod MUST be installed to validate dryer warranty.

Operation

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Make sure to go through the Dryer Startup Checklist in Appendix E before seasonal operation.

To ensure quality operation, gas and electric installations must be completed by qualified service technicians in accordance with local and national regulations.

Introduction

Sukup Grain Dryers are equipped with several advanced features to ensure an effective and hassle-free drying season. However, it's important to understand some of the key features and operating procedures before starting operation.

There are many different ways to run a Sukup Grain Dryer. QuadraTouch Pro™ control system is easy to use, with a menu-driven interface. It guides the operator through each mode of operation with simple, clear instructions. **Make sure to read Software Manual in appendices of this manual.** Most every question can be answered by consulting that section.

NOTE: Grain variety, maturity level, cleanliness, weather conditions and operation can all affect performance and/or capacity of dryer. To the extent possible, be aware of different varieties of grain being fed into dryer, as no two varieties dry identically.

DISCLAIMER: In addition to general capacity ratings and disclaimers, drying capacity of centrifugal dryer may decrease significantly from values in product literature as air intake louvers increase vacuum pressure. Adjust position of louvers to change vacuum pressure to optimal levels of grain temperature and moisture content.

General Dryer Operation

This section briefly describes normal dryer operations.

IMPORTANT: Before starting dryer, refer to Dryer Startup section in Appendix E. To follow processes step by step, consult Software Manual in appendices of this manual.

Continuous Flow

Continuous Flow dryer operation requires creating a gradient of moisture from top of dryer to bottom and is accomplished by three main functions: Initial Dry, Stabilization, and Continuous Flow. Before drying begins, user must enter moisture of incoming grain and desired moisture of outgoing grain into QuadraTouch Pro controller. These moistures are used to calculate the time necessary to perform initial dry at 160°F. No grain is unloaded from dryer during initial dry mode.

After initial dry is complete, user will set desired plenum drying temperatures. Controller then calculates a meter roll speed corresponding to plenum drying temperatures entered. Dryer then performs a stabilization routine. During stabilization, a gradient of moisture is established in dryer by drying and unloading one full load of grain without adjusting meter roll speed.

After stabilization, dryer enters its continuous flow mode. During this phase, dryer adjusts meter roll speed for variances seen in average output moisture compared to desired output moisture.

During continuous flow mode, QuadraTouch Pro controller plots a data point every minute of average discharge moisture, plenum temperature, and meter roll speed. Each of these graphs can be accessed while dryer is running. Refer to Software Manual for further instruction.

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

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

Automatic Batch

Automatic Batch is a standard feature of the Sukup Automatic Grain Dryer. Batch operations enable operators to dry grain in a manner they have become accustomed to; enable them to dry extremely wet grain; allow single-fan dryers to be operated in a heat/cool manner; and make it possible to dry grains that require a low plenum temperature.

Two controlling operations of automatic batch drying have been developed. The first method dries batches according to time entries. Operator enters times into control panel for when dryer will heat, cool, and unload grain. During unload, dryer calculates the average moisture of each batch. Operator can then adjust time entries according to desired output moisture, or have the control system automatically recalculate the time. The second method of operation requires purchasing the temperature control option. Operator enters a desired grain temperature value into control panel. When kernel temperature in column reaches the set temperature, the dryer proceeds to cool the grain, if necessary, and then unload it. The set variables may be changed to operator's choosing at any time during batch operation. New settings take effect on next batch.

Grain Transfer

Increasingly, operators use dryers to transfer grain to storage facilities. Thus, the grain transfer function has been developed to simplify this process. The control panel steps the user through a simple process to begin and end the procedure. Refer to software manual for additional options in this mode.

Manual Operation

Manual operation serves many purposes. If operator wants complete control of dryer, manual operation fulfills this need. After pressing "Start" on main screen, user can select "Manual Operation" to run dryer as desired. User can turn on fan(s), heater(s), load and unload motors. **Dryer uses paddle switches to automatically load dryer during manual operation while user has control of meter roll speeds and plenum temperature.**

Final Dry

In "Final Dry" mode, dry time and unload time are set by operator to finish drying grain. Temperature is based on previous settings. When wet bin is empty and dryer can no longer be filled with wet grain, Final Dry is used to dry last batch of grain through drying system. Dryer will heat the last batch and then shut fans and heaters off and unload the grain.

Dry Fire

"Dry Fire" mode provides a way to run dryer when there is no grain. It is recommended this mode be used to test dryer at start of **EVERY SEASON**. "Dry Fire" allows use of burner without need for air switch to confirm air pressure. This mode is NOT to be used for drying grain; only as a means of inspecting pipe train for leaks and component integrity and confirming overall heater operation.

Vaporizer Coil Adjustment (LP Models Only)



CAUTION: If vaporizer is not adjusted correctly, piping could be hot. Ensure proper adjustment to avoid burn resulting in minor or moderate injury.

Select Dry Fire mode to operate fan and heater when there is no grain in dryer. After dryer has been allowed to run and plenum temperature has stabilized, vaporizer outlet (top) should be warm but not hot to touch.



Image 3-1 – Vaporizer adjustment bracket on centrifugal fan dryer



Fault Condition Vapor Over-Temp

If vapor side of pipe train is hot, or if dryer has shut down due to a “Vapor Over-Temp” fault, vaporizer may need to be moved away from flame. To adjust vaporizer, loosen both pivot bracket bolts (top and bottom) and then pivot vaporizer out of flame as necessary to regulate temperature at vaporizer outlet. U-bolts that hold vaporizer to adjustment bracket can also be loosened and vaporizer can be moved in or out. Viewing hole is provided to watch vaporizer adjustment.

If vaporizer is freezing up, loosen bolts as described above and move vaporizer toward flame instead of away from it.

Tighten all hardware after adjustment.

Adjusting Louvers & Doors on Centrifugal-Fan Dryers

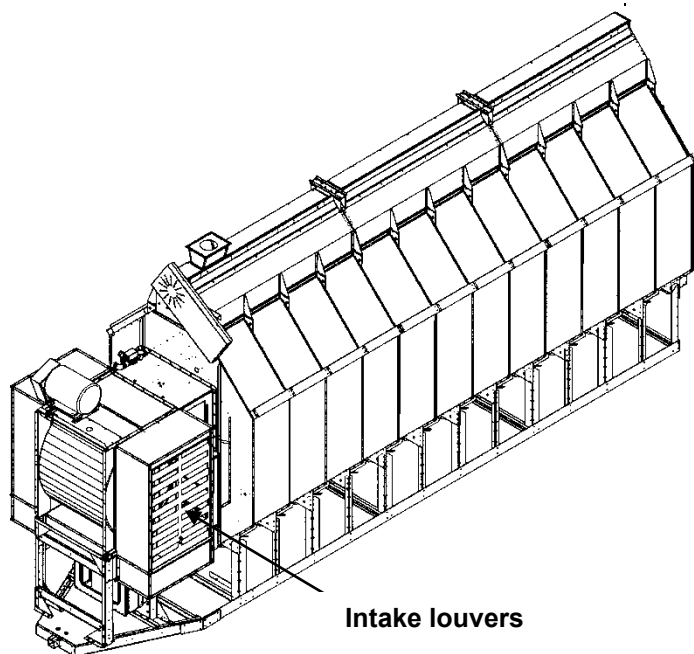


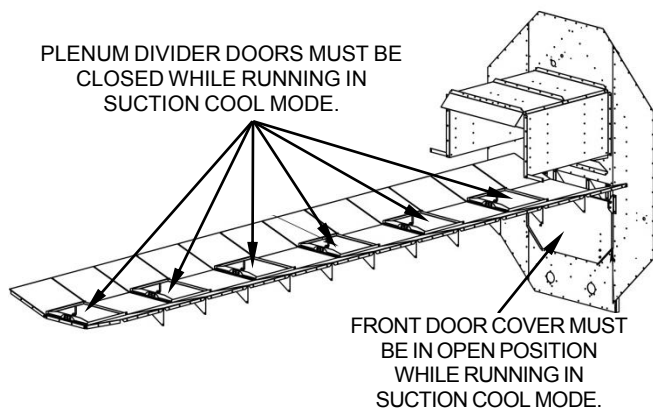
Image 3-2 – Adjustable louvers

Suction Cool Mode

Louver slots should be narrow to create more suction in bottom cooling plenum, but slots should not be fully closed. Start with a 3/4" to 1" opening and adjust from there. Closing louvers more will increase efficiency and pull more heated air into fan, but will decrease capacity. Opening louvers more will increase capacity, but will decrease efficiency. Less-heated air will be pulled into fan.

As shown below, all plenum divider doors must be closed and front door cover must be open.

See additional instructions on next page.



Full Heat Mode

Louvers should be fully open as shown in Image 3-2. As shown below, front 2 (two) plenum divider doors should be closed. All other plenum divider doors must be opened. Front door cover must be closed.

See additional instructions on next page.

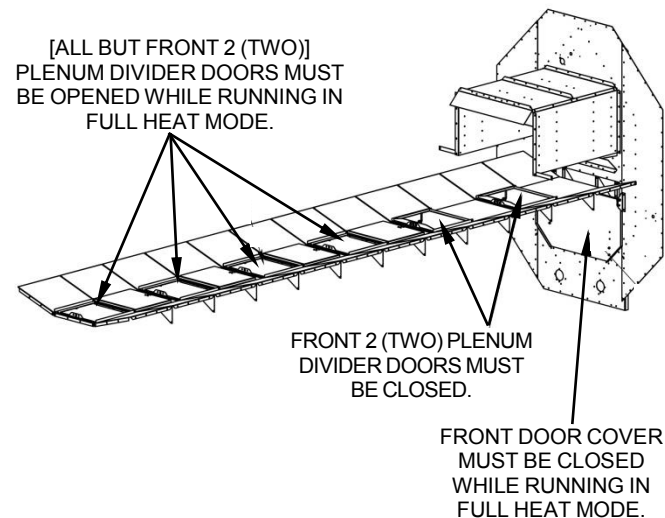




Image 3-3 – Intake door



Image 3-4 – Spring pin on intake door

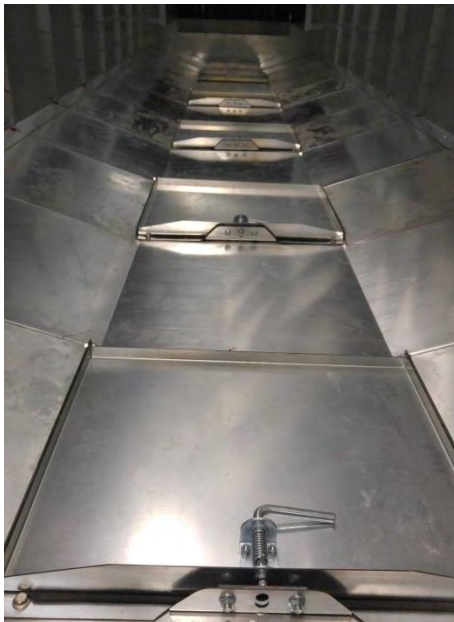


Image 3-5 – Plenum divider doors

Close plenum divider doors for operation in suction cool mode. See Image 3-5. All but 2 (two) front doors must be opened if operating in full heat mode.

Manual Operation Controls

Images 3-6 and 3-7 show controls found in Manual Operation Box.

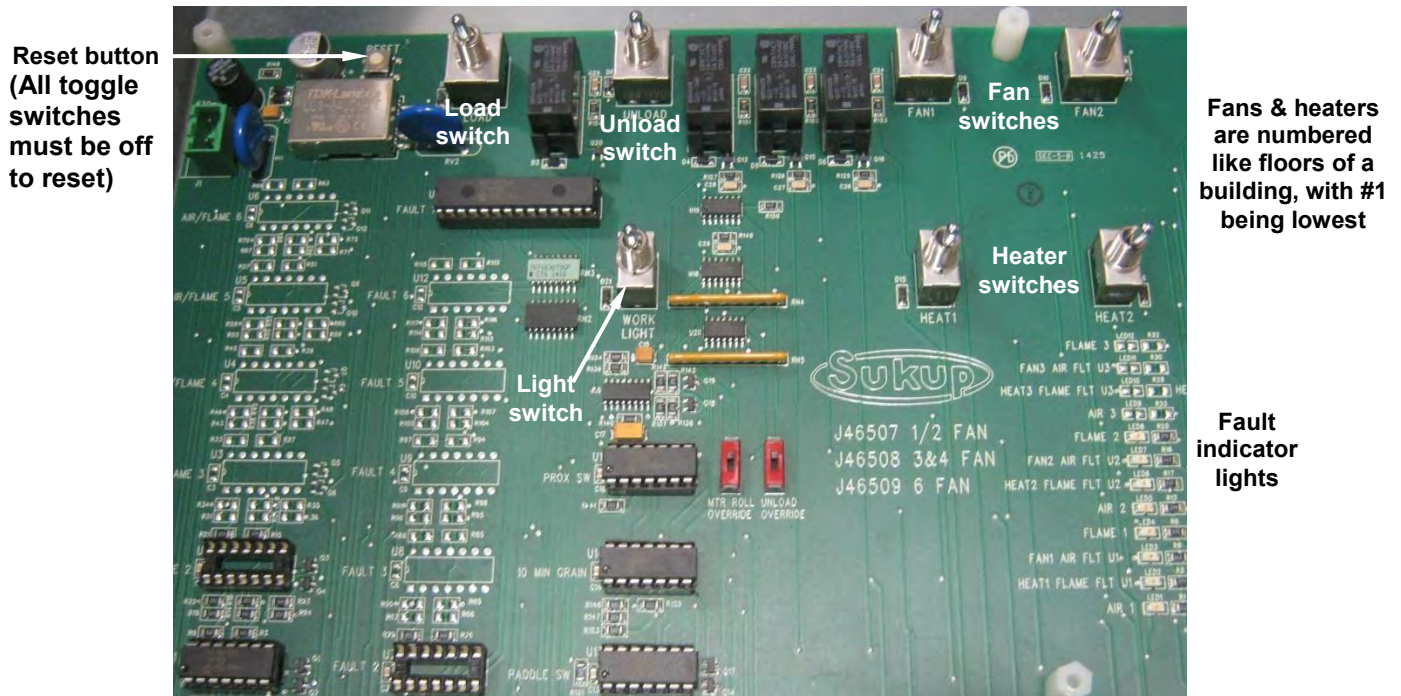


Image 3-6 – Manual operation control board

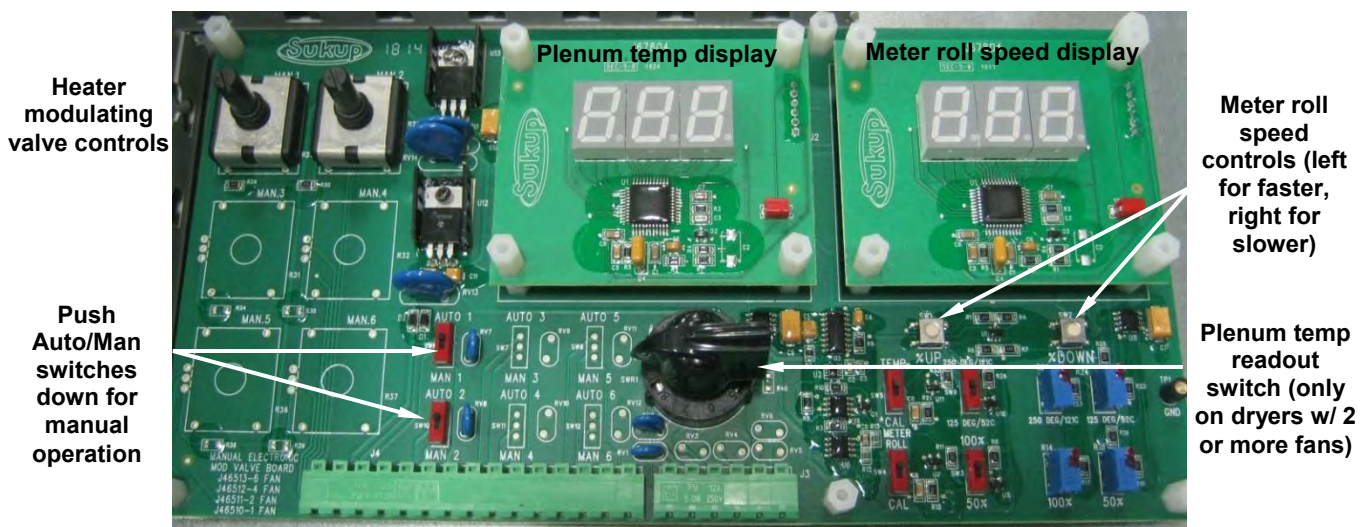


Image 3-7 – Manual electronic mod valve control board

To operate in Manual mode, System Control Switch on side of main power box must be turned to Manual.

See Plenum Temperature table in Appendix A for initial approximate meter roll speed and plenum temperature based on amount of moisture to be removed.

NOTE: Discharge moisture sensor will not be functional in Manual mode. Moisture of grain will need to be checked by an alternate means.

If a fault light comes on, see Troubleshooting section to fix fault. To reset manual control board, make sure all toggle switches are turned down, then press white Reset button.

IMPORTANT: Be sure to push Auto/Man switches back up to run dryer in Automatic mode.

Service & Maintenance

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Sensor Removal and Installation

Discharge Moisture Sensor T6035

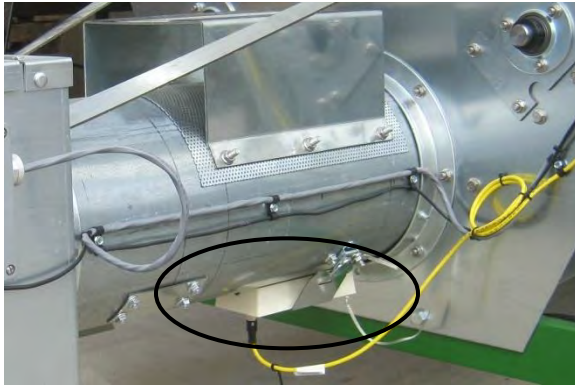


Image 4-1 – Discharge moisture sensor

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

Removal:

1. Turn power off at power box.
2. Locate discharge moisture sensor on bottom of grain discharge chute. See Image 4-1.
3. Disconnect sensor ground strap connected to dryer.
4. Release sensor retaining clamp and remove sensor from discharge tube.
5. Disconnect cable from sensor using quick-connect coupler. See Image 4-2.
6. Replace protective caps on sensor and cable.



Image 4-2 – Quick-connect coupler

Installation:

1. Remove protective caps from cable and sensor.
2. Finger-tighten cable to quick-connect coupler on new sensor.
3. Place new sensor into grain discharge tube. Secure sensor by tightening holding clamp.
4. Connect ground strap to dryer frame and tighten nut.

Grain Discharge Chute Switch T17988



Image 4-3 – Grain discharge chute switch

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

Removal:

1. Turn power off at power box.
2. Locate grain discharge chute switch box. See Images 4-3 and 4-22.
3. Remove cover.
4. Disconnect switch wires from dryer wiring.
5. Remove switch.

Installation:

1. Install new switch onto dryer.
2. Connect two wires from switch to dryer wiring (wire # 18 and wire # 42).
3. Reinstall cover when finished. See Discharge Chute Switch Adjustment in Component Calibration section to calibrate.

Grain Level Switches Fill Switches (Upper – T162441; Lower – T162442)

These devices are used to detect when dryer is full of or needs grain.

Removal:

1. Turn power off at power box.
2. Locate paddle switch junction box, found on right side of wet bin. See Image 25 in Component Identification Section.
3. Remove cover of junction box.
4. For either upper or lower switch, disconnect two wires from dryer wiring.
5. Remove switch from retaining clip.

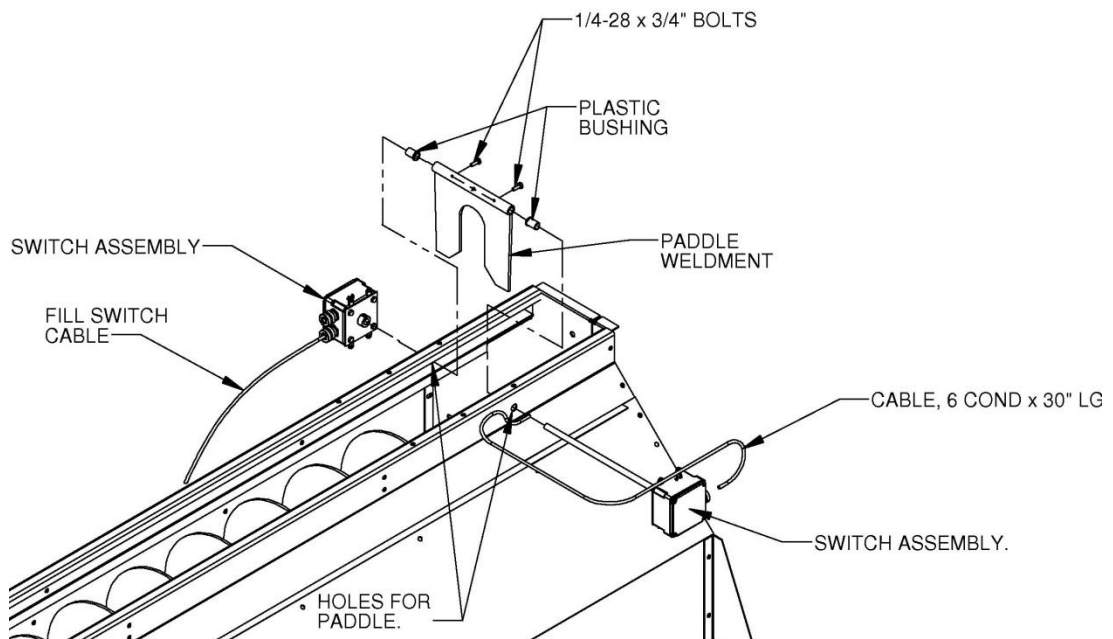


Fig. 4-1 – Grain discharge chute switch

Installation:

1. Insert new switch into wet bin.
2. **IMPORTANT:** Switches must be installed as shown in Image 4-4. Switch wires must emerge from left of switch. If not installed properly, dryer will not function correctly.
3. Connect wires in following manner: red to red, black to black for power, white to white, and green to green for ground.
4. When finished, reinstall junction box cover.

Unload Auger Proximity Switch

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



Image 4-4 – Unload auger proximity switch

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

Removal:

1. Turn power off at power box.
2. Locate unload auger proximity switch on end of grain discharge chute. See Image 4-4.
3. Remove cover.
4. Loosen and remove inside lock nut and remove proximity switch from box.
5. Follow wiring to junction box on side of grain discharge chute (See Image 4-22) and remove cover.
6. Disconnect proximity switch wires from dryer wiring.

Installation:

1. Obtain a new switch and remove first lock nut. Slide switch into hole and secure with lock nut just removed.
2. Adjust gap between proximity switch and rotating target. **IMPORTANT:** Gap between tip of rotating target and proximity switch must be no greater than 1.6mm (approximate width of Kroner or Euro).
3. Route wiring in same manner as before and connect proximity switch wires to dryer wiring: blue to # 95 black; brown to # 18 orange; black to # 96 red.
4. Turn power on at power box and turn system control switch to COMPUTER. Go to Start Menu on QuadraTouch Pro and select Manual Operation. Touch Unload button. Unload auger should now be turning. If installation was NOT successful, a fault message will appear on LCD screen within 5 seconds and unload auger will shut down. See Image 4-3 showing Grain Discharge Chute Switch.
5. Reinstall box covers.

Vaporizer Over-Temperature Switch J5901

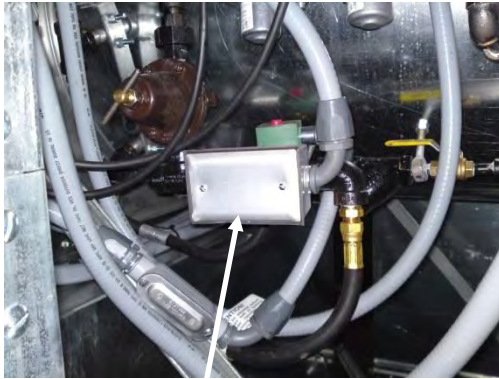


Image 4-5 – Vaporizer over-temp switch

This device monitors vapor temperature as it exits vaporizer coil. If temperature exceeds 60°C (140°F), sensor opens circuit, causing a fault condition.

Removal:

1. Turn power off at power box.
2. Locate vaporizer over-temperature switch on heater pipe train. See Image 4-5.
3. Loosen U-bolt and screws that hold sensor in position.
4. Follow wiring to heater box and remove cover.
5. Disconnect red # 18 wire attached to heater housing hi-limit switch. A new crimp terminal end can be used.
6. Disconnect other red wire.

Installation:

1. Put new over-temperature switch in same position as old switch. Secure by tightening switch screws and U-bolt nuts. Be careful not to over-tighten.
2. Route new switch wiring to heater control box.
3. Attach red # 18 wire to heater housing hi-limit switch.
4. Re-attach other red wire.
5. Replace cover.



Image 4-6 - Vapor Over-Temp Switch

**Rear Door Interlock Switch
J4487
Key with chain
F6991**



The main body of the switch is mounted next to door, with interlock key and chain attached to the door. Key must be removed from switch before door may be opened. If key has been removed from switch, a fault will be displayed and dryer will not start.

Removal:

1. Turn the power off on front of power box.
2. Locate rear door at the back of dryer.
3. Pull interlock key out of switch.
4. Remove a small, gold colored Philips screw which will allow cover to open.
5. Loosen the two wire terminals and remove wires.
6. Remove two 5/16 mounting screws securing switch to dryer.
7. Loosen liquid tight strain relief collar and pull wire from switch. Remove switch from dryer.
8. Remove liquid tight fitting from bottom of switch.



Image 4-7 – Rear door interlock switch

Installation:

1. Obtain a new switch and check the head for proper position.
2. If needed, rotate head 90 degrees to match old switch position.
3. Install liquid tight strain relief collar into bottom of new switch.
4. Remove small, gold Philips screw, which will allow cover to open.
5. Feed wires through liquid tight fitting and up into switch.
6. Attach wires to top two terminals. (N.C.)
7. Close cover and secure with the Philips screw.
8. Attach switch assembly to dryer using the two 5/16 hold down screws.
9. Check interlock key. The key may or may not require changing depending on key design.
10. Insert interlock key into switch.

Grain Column Over-Temperature Switch
T17289 – 16', T17290 – 24', T17288 – 28'



There is one on each side of dryer, running horizontally through grain columns to monitor temperature. Junction boxes containing switches are located outside front end of plenum. See Image 5-12 in Troubleshooting section as example.

Junction boxes housing other ends of sensors are shown as Item 12 in Image 5 of Component Identification section.

Procedures for removing and replacing sensors are identical for both grain column over-temperature switches.

Image 4-8 – Grain column over-temperature switch

Removal:

1. Remove junction box cover for appropriate switch.
2. Locate switch wires and remove blue wire nuts connecting switch to dryer wiring.
3. Remove switch by removing 5/16" nuts holding switch to junction box. See Image 4-8.
4. While removing sensor, coil up small copper tube for easy handling.

Installation:

1. Install new switch by carefully feeding small copper sensor into conduit inside of junction box. Be careful not to kink copper sensor.
2. Attach switch to back of junction box using 5/16" nuts.
3. Reconnect wires. There should be an orange # 18 and either a blue # 40 (right side) or blue # 41 (left side) wire, depending upon side of dryer that sensor serves.
4. Reinstall junction box cover when completed.
5. Coil up excess capillary tube and leave in rear junction box.

Heater Housing Hi-Limit Switch J5772



Image 4-9 – Heater housing hi-limit switch

Heater housing hi-limit switch is located inside a junction box on top of dryer. See Image 4-9 at left and Image 36 in Component Identification section for location of box. Switch monitors temperature of heater housing. Switch is set for 93°C (200°F).

Removal:

1. Disconnect power to dryer.
2. Open junction box cover.
3. Locate heater housing hi-limit switch.
4. Remove wires from switch by pulling on crimped connectors.
5. Remove both hold-down screws.
6. Remove switch.

Installation:

1. Position new switch and secure with two hold-down screws.
2. Attach crimped connectors to tabs on switch. There should be a purple # 103 on one side and a red # 18 and blue # 18 on other side of heater housing hi-limit switch.
3. Reinstall junction box cover when complete.

**Plenum Temperature Sensor RTD (Resistance Temperature Detector)
J5645 – 12', J5642 – 16', J5646 – 20', J5643 – 24', J5648 – 28'**

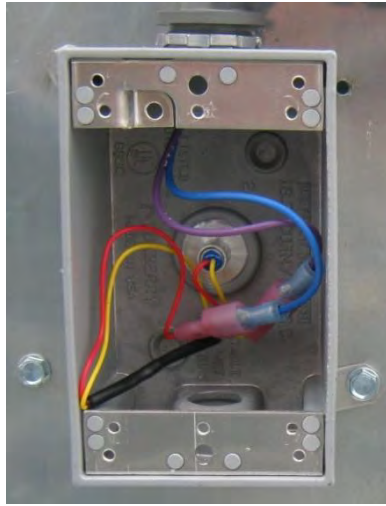


Image 4-10 – Plenum temperature sensor RTD

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

Removal:

1. Turn control switch on control box to OFF.
2. Locate sensor junction box mounted on front of dryer. See Item 1 of Image 36 in Component Identification section for location of box.
3. Open junction box and disconnect wires from RTD.
4. Remove two self-drilling screws on two tabs holding junction box to dryer.
5. Remove conduit fittings from ends of junction box.
6. Remove clips holding sensor tube to inside wall of plenum area. Gently set aside plenum over-temperature capillary.
7. Pull sensor out, leaving grommet on dryer. Coil tube from sensor for ease of removal.

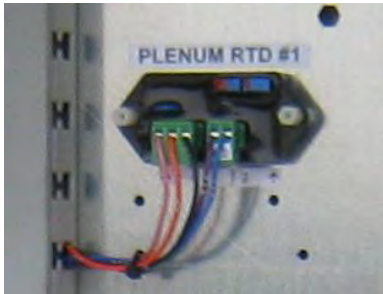


Image 4-11 – Plenum temperature sensor (RTD) transmitter in power box. See Item 16 in Image 6 of Component Identification section.

Installation:

1. Uncoil new sensor carefully. Any kinks will damage new sensor.
2. Feed sensor into plenum.
3. Reusing clips inside plenum, attach sensor tube to inside wall of plenum area, in same manner old tube was attached.

During installation of sensor tube, reinstall plenum over-temperature capillary. Over-temperature capillary and plenum temperature sensor are designed to be mounted to same clip inside plenum area. See Images 11 and 12 in Component Identification section.

4. Attach junction box to outside of dryer after reattaching conduit. Reinstall junction box cover.
5. Reattach wires from conduits to RTD. Make sure to cut off braided shield wires.

Meter Roll Proximity Switch

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

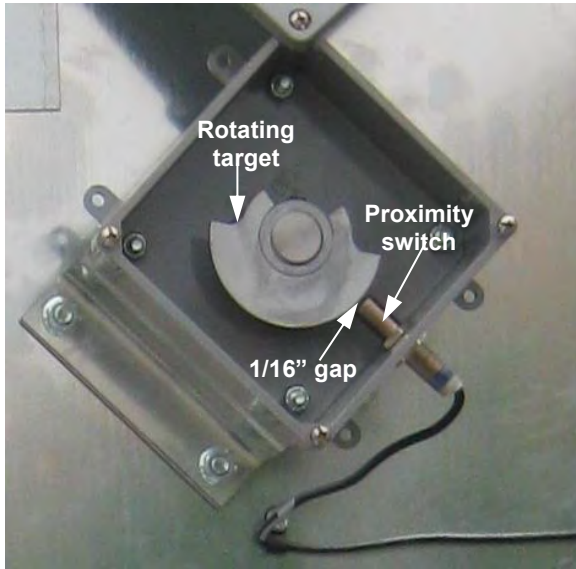


Image 4-12 – Meter roll proximity switch

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

Removal:

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

Installation:

1. Install new proximity sensor by reversing steps used to remove old one.
NOTICE: Adjustment of proximity switch is critical. See Proximity Sensor Calibration in Component Calibration section. Gap between tip of switch and rotating target must be no greater than 1.6mm or 1/16". See Image 4-12. **Damage to proximity switch may occur if it comes into contact with rotating target.**
2. Reinstall box covers.

**Static Air Pressure Switch
J5862 & J6019**



Image 4-13 – Air pressure switch

Static air pressure switch ensures that during operation there is enough static air pressure in plenum area to dry grain properly and to use heater safely.

Removal:

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

Installation:

1. New switch should be pre-calibrated and ready for installation.
2. Install new switch by reversing steps used to remove old one.

**Plenum Over-Temperature Switch
J6795 – 16', J6796 – 24', & J67961 – 28'**



Image 4-14 – Plenum over-temperature switch

Plenum over-temperature switch trips when temperature of plenum area rises above 163°C (325°F). Removal of plenum over-temperature switch is similar to removal of plenum RTD.

Removal:

1. Locate sensor junction box mounted to front of plenum area on front of dryer.
2. Remove junction box cover and disconnect blue and orange wires from sensor.
3. Remove clips holding sensor capillary to inside wall of plenum area. Gently set aside plenum temperature indicator tube.

4. Pull sensor free. Coil copper capillary from sensor for ease of removal.

Installation:

1. Uncoil new sensor carefully to avoid kinks.
2. Feed new copper capillary through junction box and into plenum.
3. Attach sensor capillary to inside wall of plenum, similar to way old one was attached.
4. Reusing clips from inside of dryer, install new sensor capillary to inside wall of plenum area. Over-temperature capillary and plenum temperature sensor are designed to be mounted to same clip inside plenum area.
5. After installation, reconnect blue and orange wires and replace junction box cover.

Component Calibration

Discharge Moisture Sensor T6035

QuadraTouch Pro Moisture Settings

To enter input and output moisture setpoints using touch screen, follow instructions in Software Manual found in appendices of this manual.

Manual Calibration

Output moisture sensor is factory-calibrated so voltage between black wire and ground wire reads 9.0 VDC (while in tube). If voltage is out of range of 8.90 and 9.10 VDC, a RED fault screen indicating "Analog Sensor Not Found" will appear. Sensor will need to be calibrated manually by following steps below.

Manual calibration of sensor is also necessary if installing a new moisture sensor on dryer. Follow steps below for calibration.

Installing New Sensor

Removal of back plate is not necessary for calibration. Sensor shown in Image 4-15 has plug over adjustment screw.



Image 4-15 – Plug over moisture sensor calibration hole

1. Touch Sukup logo at upper left of screen. Analog screen will appear.
2. With sensor clean and inside of tube, MST voltage reading should be 9.0 VDC. If not, continue with following steps.

3. Remove plug from calibration hole in back of sensor. See Image 4-15.
4. Using a small straight-blade screwdriver, put blade into hole and into screw head.
5. Rotate adjustment screw until a reading of 9.0 VDC is displayed (while inside of tube). Replace plug in calibration hole.

Air Switch Adjustment Calibration J5862 & J6019



Image 4-16 – Air pressure switch



Image 4-17 – Adjustment screw

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

1. Find switch in junction box located on upper front of plenum. For general location, see Image 5-20 in Troubleshooting section of manual. See Image 4-16 for specific location of switch.
2. Switch is adjustable between 0 to 3 inches of static pressure. It is factory-set to 0.5" of water column pressure. It is a normally-open switch that closes when set pressure is reached.
3. To increase pressure setpoint, turn adjustment screw **counterclockwise**. See Image 4-17.
4. To decrease pressure set point, turn adjustment screw **clockwise**.

Differential Air Switch Calibration J5863

This switch is adjusted to maximum sensitivity by turning the screw counter-clockwise.

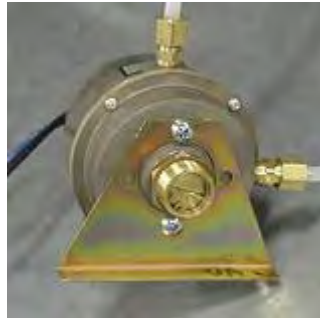


Image 4-18 - Differential Air Switch

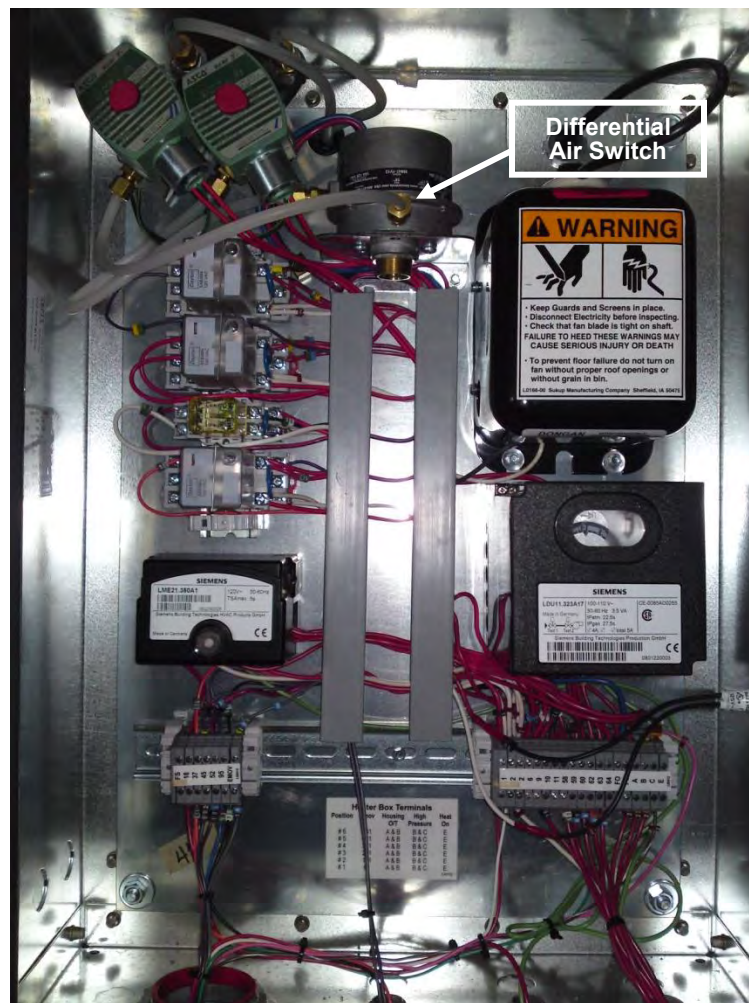


Image 4-19 - Differential Air Switch, installed

Meter Roll Proximity Switch Adjustment



Image 4-20 – Meter roll proximity switch box

1. Locate proximity switch box on back of dryer. Proximity sensor and rotating target will be located inside this box. See Image 4-20.
2. To calibrate proximity switch, loosen locking nut on switch.
3. Adjust switch so it is no more than 1.6mm or 1/16” from target. This distance is important for reliable sensing.

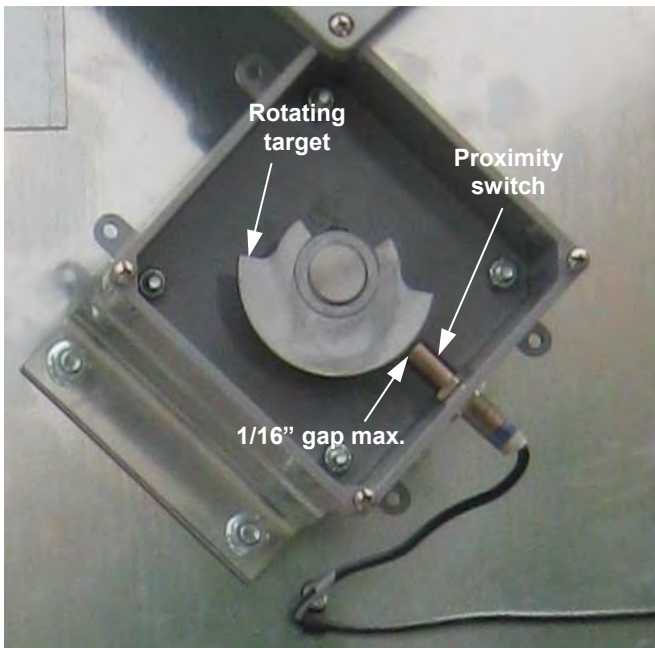


Image 4-21 – Meter roll proximity switch

4. After switch is in place, tighten locking nut and replace cover on box.

Make sure target will not strike or contact end of proximity sensor during normal operation.

Grain Discharge Chute Switch Adjustment

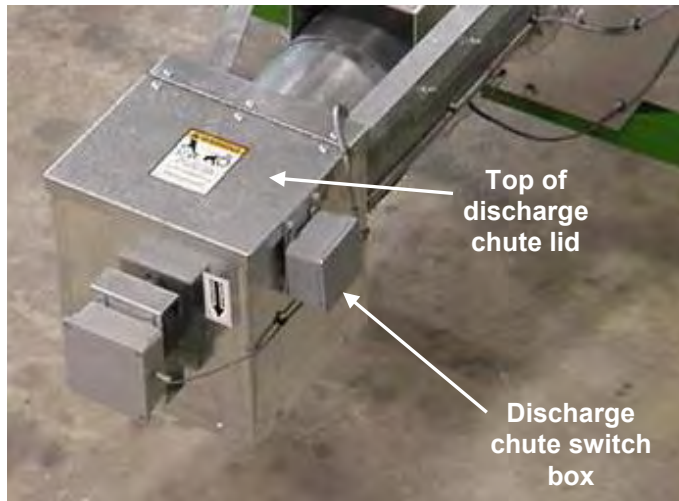


Image 4-22 – Discharge chute switch box

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

1. Locate box on discharge chute at rear of dryer and open discharge chute lid. Remove bottom cover. See Image 4-22.
2. Attached to lid of discharge chute is a metal bracket with this box fastened to it. Using 7/16 socket wrench, loosen screw holding box in place. See Image 4-23.

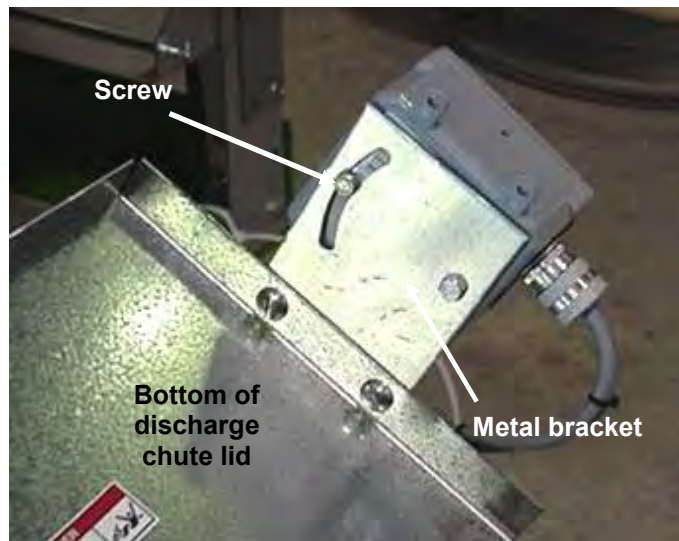


Image 4-23 – Screw and metal bracket

3. Adjust box so that when discharge chute lid is opened 2" to 3" (51mm-76mm), a fault occurs. Box can be adjusted by rotating it. Once position has been found, tighten screw to hold box in place.

Preventive Maintenance

Preventive maintenance is very important. It can help ensure dryer will perform well throughout drying season. Maintenance steps presented here are minimum procedures to be performed.

IMPORTANT: See Appendix F - Parts Assemblies for part numbers.

! WARNING: When using ladder attached to dryer, make sure ladder is dry before climbing. Ladder may be slippery when wet. Falling from ladder could cause death or serious injury.

All bolts used to keep enclosures locked **MUST** be tightened after dryer maintenance to prevent undesired access.

Check and retighten all fasteners.

! WARNING: Lock out electrical power before removing any safety shields. Contact with moving parts could cause death or serious injury.

Physical Inspection

1. Remove fan inlet screens. Check for foreign material on fan blades. Ensure fan rotates freely.
2. Check ventilation openings in motor for any blockage. Pay close attention to inside of fan hub. Reinstall fan inlet screens.

! DANGER: NEVER run fan without screen guard securely attached to fan housing! Contact with spinning fan will cause death or serious injury.

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.

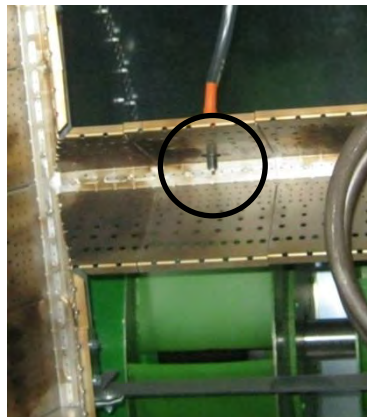


Image 4-24 – Spark plug/igniter

4. Examine spark plug (J5739) for proper gap. See Image 4-24. Clean electrodes if required. Gap should be 3.2mm (1/8"). Spark plug and flame rod should be examined periodically throughout drying season.

5. Remove and clean gas strainer as shown in Fig. 4-2.

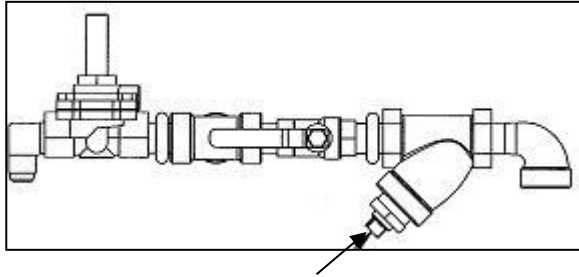


Fig. 4-2 – Remove gas strainer/filter at hex nut

6. Inspect all pipe train components for physical integrity. See Pipe Train Components Identification page elsewhere in this manual.
7. Inspect all pipe train connections for tightness and leaks. Spraying soapy water on connections and looking for bubbles is a good way to detect leaks.
8. Be sure to check vaporizer coil for leaks yearly. See Image 4-25. Vaporizer should be replaced every five (5) years.

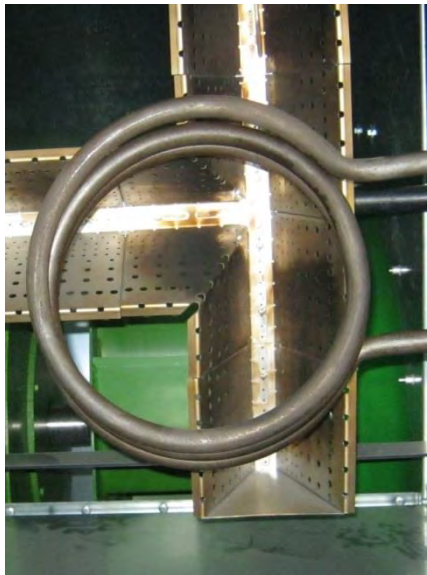


Image 4-25 – Vaporizer coil



WARNING: One drop of liquid propane will expand 270 times as it converts to vapor. It is very dangerous to have vaporizer coil develop a leak during heater operation. Gas leak could cause explosion or fire resulting in death or serious injury.

Daily Maintenance Requirements

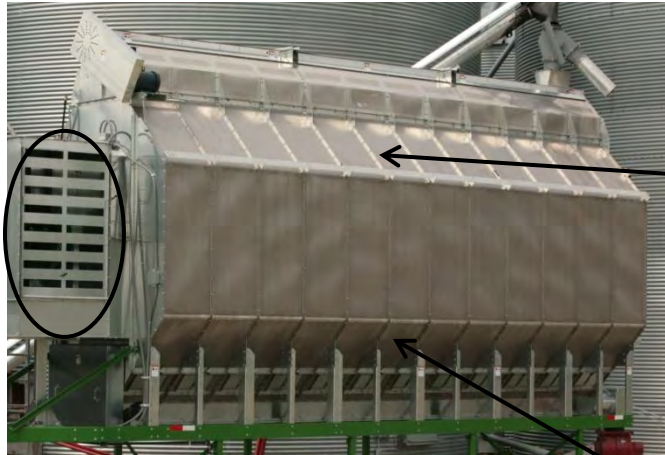


Image 4-26 – Fan inlet, top exhaust slope and lower grain column slope

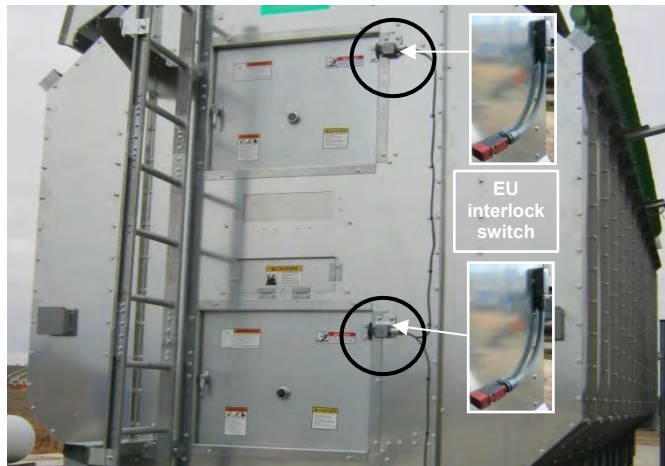


Image 4-27 – Rear access doors, interlock switches

This assumes 24-hour per day operation during harvest.

1. Clean foreign material from fan air inlets (in oval).
2. Sweep off top of exhaust slope where fines may have accumulated on outer perforated skins. Pay particular attention to area directly under wet holding portion of dryer, where excessive amounts of fines and foreign material can accumulate.
3. Visually inspect for an even grain movement along all grain columns. If grain in one column is not moving or is moving slower than grain in other columns, check for obstructions in flow gate area or columns.
4. **Shut dryer down** and clean out any fines and foreign material in plenum. Open rear access door. Sweep all fines and debris from front of plenum to rear of plenum. Close rear access door. Be sure that tip of rear door interlock switch is depressed.



Image 4-28 – Rear cleanout door

5. Open rear cleanout door. See Image 4-28.
6. Operate fan by running it in Dry Fire mode or in Manual mode. Continue running fan until no more debris comes out of rear cleanout.
7. Turn fan off.
8. Close rear clean-out door.
9. Sweep fines/debris off discharge chute screen. See Image 4-29.



Image 4-29 – Grain discharge chute screen

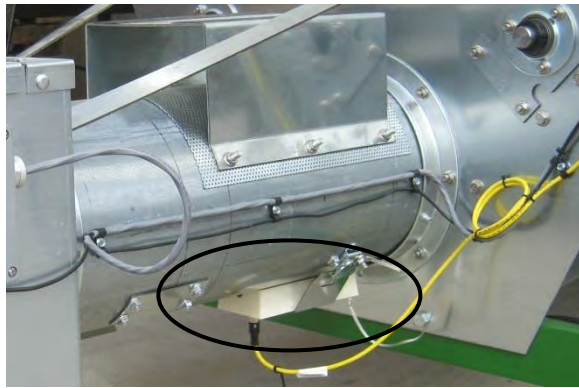


Image 4-30 – Discharge moisture sensor

10. Remove discharge moisture sensor located under discharge tube as shown in Image 4-30 or on optional jump auger assembly (not shown). Clean sensor flag and tube. See Image 4-31. Reinstall moisture sensor.

11. Inspect temperature sensor wire (RTD) as shown in Image 4-32. Clean if necessary.

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

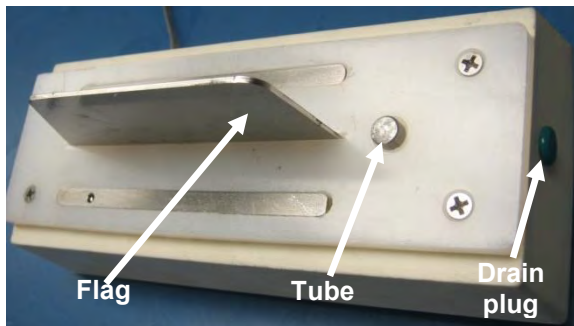


Image 4-31 – Discharge moisture sensor flag, tube & moisture drain plug



Image 4-32 – RTD Temp sensor wire

Semi-weekly Maintenance Requirements

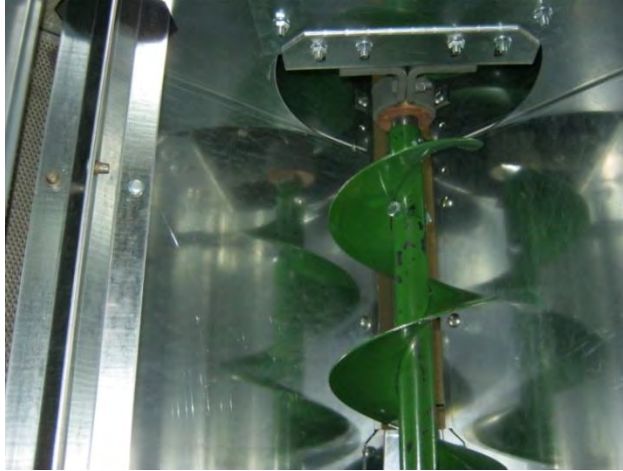


Image 4-33 – Unload auger inside access/cleanout door removed



Image 4-34 – Unload auger outside access/cleanout door handle

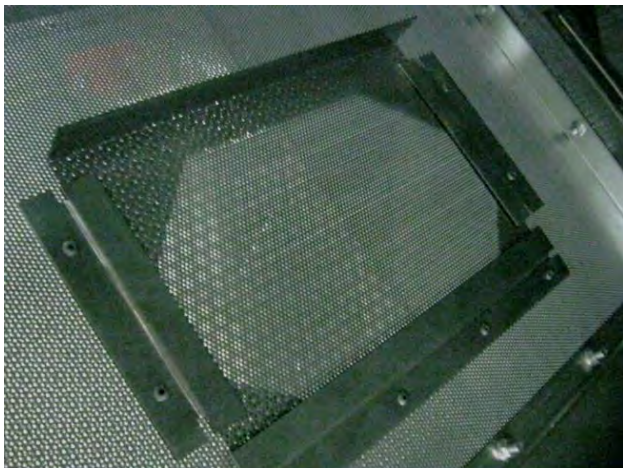


Image 4-35 – Grain column inside cleanout sliding door

1. Perform all steps of daily maintenance requirements as listed in previous section except Step 12, restarting dryer.
2. Remove floor plates and open outside access/cleanout doors and inspect unload auger area for obstructions, fines, and debris. Clean as necessary. Replace floor plates and close inner and outer unload auger cleanout/access doors. See Images 4-33 and 4-34.
3. Open inner and outer grain column access/cleanout doors and remove debris. Close doors. See Images 4-35 and 4-36.



Image 4-36 – Grain column outside cleanout door handle

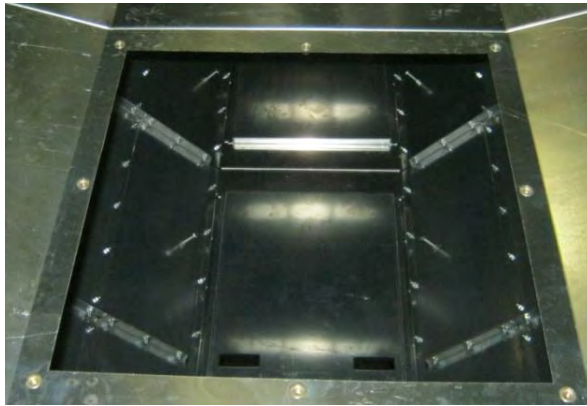


Image 4-37 – Plenum divider door removed

4. Remove plenum divider door and clean out any debris. Replace door. See Image 4-37.

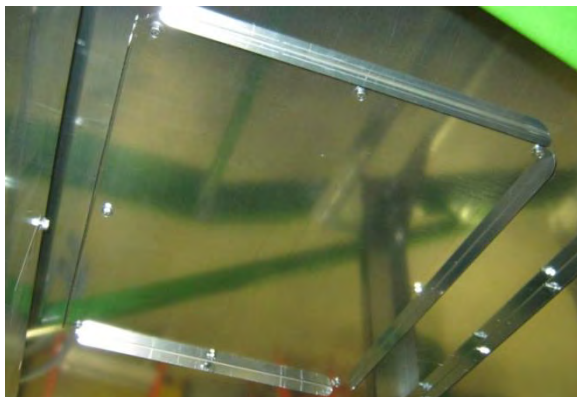


Image 4-38 – Vacuum-cool duct cleanout door

5. Remove vacuum-cool duct door and clean out any debris. Replace door. See Image 4-38.
6. Restart dryer operation using automatic control or manual control.

Weekly Maintenance Requirements

1. Unload grain from dryer by performing Final Dry in automatic mode.
2. Perform all steps from 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 dryer per automatic control (Initial Load, Initial Dry).

End-of-Season Maintenance Requirements

1. After dryer is unloaded for last time, open all access doors and panels. Thoroughly clean entire dryer by sweeping and using compressed air. Power washing may be required after unusually dirty drying seasons. Ensure cleaning of wet bin trash pan.

NOTICE: Do not blow compressed air directly into static air pressure switch. Damage to switch may occur.

2. Perform all steps listed under Preventive Maintenance.
3. **Leave 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 fan. Never place obstacles in way of fan to stop rotation.
6. Remove discharge moisture sensor from grain discharge chute. Remove moisture drain plug (shown at far right in Image 4-31) and store sensor in a cool, dry place.
NOTICE: Sensor could be damaged by standing water if left inside tube. Be sure to cap both coupler fittings as shown in Images 4-39 and 4-40.



Image 4-39 – Moisture sensor cord capped



Image 4-40 – Cord connector capped

7. Ensure that cover of QuadraTouch Pro is closed. Remove Ethernet cable, disconnect from power, and store control unit indoors during offseason.



Automatic Centrifugal Grain Dryer

QuadraTouch Pro™ Dryer Control System

Appendices

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Appendix A

Specifications

Estimated tonnes per hour
Unload times
Dryer holding capacities

Specifications for axial and centrifugal dryers are provided in tables on this and following pages. Many factors, such as grain variety, maturity levels, grain cleanliness, weather conditions and operation/management, can affect the performance of your dryer and results may vary. This information is calculated and is not a guarantee of product specifications or performance. Based on these factors, Sukup specifications should only be used as estimates, and not as a warranty, express or implied, of how a particular Sukup unit will perform under your operating conditions. Because we are continually advancing Sukup products, changes may occur that may not be reflected in the specifications.

Metric Tonnes Per Hour Information

<i>Estimated Drying Capacities</i>	Single Centrifugal Fan/Heater Dryer Models					
	<i>Metric Tonnes/Hour</i>					
	TC16	TC20	TC24	TC163	TC203	TC243
Full Heat 20% - 15%	up to 18.8	up to 24.6	up to 26	up to 18.8	up to 24.6	up to 26
Full Heat 25% - 15%	up to 11.4	up to 15.2	up to 18	up to 11.4	up to 15.2	up to 18
Pressure Heat/Vacuum Cool 20% - 15%	---	---	---	up to 11.2	up to 14.7	up to 17.5
Pressure Heat/Vacuum Cool 25% - 15%	---	---	---	up to 7.1	up to 9	up to 11

<i>Estimated Drying Capacities</i>	Two Module Centrifugal & Hybrid Fan/Heater Dryer Models					
	<i>Metric Tonnes/Hour</i>					
	TC165	TC205	TC245	TH165	TH205	TH245
Full Heat 20% - 15%	up to 40.6	up to 51.3	up to 62.2	up to 40.6	up to 51.3	up to 62.2
Full Heat 25% - 15%	up to 25.4	up to 31.8	up to 38.7	up to 25.4	up to 31.8	up to 38.7
Pressure Heat/Vacuum Cool 20% - 15%	up to 27.4	up to 35.1	up to 42.4	up to 27.4	up to 35.1	up to 42.4
Pressure Heat/Vacuum Cool 25% - 15%	up to 17.3	up to 21.8	up to 26.2	up to 17.3	up to 21.8	up to 26.2

Numbers in tables above are APPROXIMATE.

Determining Meter Roll Speed

Use table below to select meter roll speed for a dryer running in full-heat mode, based on plenum temperature and desired points of moisture to be removed. Percentages are approximate. Adjust as necessary for each drying. **NOTE:** Grain variety, maturity level, cleanliness, weather conditions and operation can all affect performance of dryer. To the extent possible, be aware of different varieties of grain being fed into dryer, as well as other factors that may affect performance.

Table below is to be used for CORN only.

Desired Points of Moisture Removed	DETERMINING METER ROLL SPEED PERCENTAGE						
	PLENUM TEMPERATURE						
	160°F (71°C)	170°F (77°C)	180°F (82°C)	190°F (88°C)	200°F (93°C)	210°F (99°C)	220°F (104°C)
15	7%*	7%*	8%*	9%*	9%*	10%*	11%
12.5	8%	9%	10%	11%	11%	12%	13%
10	10%*	11%	12%	13%	14%	15%	16%
7.5	15%	16%	18%	19%	21%	22%	24%
5	19%	21%	23%	25%	27%	29%	31%
3	32%	36%	39%	42%	46%	49%	52%

*If it is necessary to run meter rolls lower than 5%, Automatic Batch *must* be used.

Percentages in table above are APPROXIMATE.

Dryer Stabilization Using Manual Mode

IMPORTANT: Let dryer stabilize after making any adjustments to meter roll. DO NOT make any further adjustments until dryer has turned grain over completely one time. To determine length of time to turn grain over one time, refer to table 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 Model	Holding Capacity	
	Bushels	Metric Tonnes
TC16	440	11.2
TC163	440	11.2
TC20	550	13.9
TC203	550	13.9
TC24	660	16.8
TC243	660	16.8

Appendix B

Electrical Requirements

Three-phase dryers

Single module

Two module

Electrical Load Requirements, Three-Phase Centrifugal Dryers (50Hz)

IMPORTANT: Grain Dryer power box contains a molded case disconnect switch for incoming power. **IT IS NOT A CIRCUIT BREAKER!** A service-rated, fused disconnect needs to be installed ahead of grain dryer power distribution box. This disconnect is not included with dryer and should be installed by a qualified electrician in accordance with local and national standards. **Grain Dryer should be only device connected to this disconnect.**

Standard electrical safety practices and codes should be used. **IMPORTANT: Any supporting electrical panels or combinations of electrical components supplied by the end user must be compliant with local and national standards.**

All electrical work should be completed by a qualified electrician.

The following tables 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.

Dryer Electrical Specifications:

SINGLE MODULE DRYERS

TC1631DW (LP) or TC1632DW (NG) – 16 Foot Dryer, 1 Fan/Heater, 2/3 – 1/3 Plenum, 380Volt, 3 Phase, 50 Hz, Main Switch = 250 Amps

	Top Auger	Bottom Auger	Fan	Minimum Amps	Maximum Amps
Motor/Wire Amps	3Kw/ #14 5 FLA	3Kw/ #14 5 FLA	30Kw/ #6 55 Amps	65 Amps	250 Amps

TC2431DW (LP) or TC2432DW (NG) – 24 Foot Dryer, 1 Fan/Heater, 2/3 – 1/3 Plenum, 380Volt, 3 Phase, 50 Hz, Main Switch = 250 Amps

	Top Auger	Bottom Auger	Fan	Minimum Amps	Maximum Amps
Motor/Wire Amps	5.5Kw/ #10 13 FLA	5.5Kw/ #10 13 FLA	45Kw/ #4 80 Amps	106 Amps	250 Amps

TWO MODULE DRYERS

TC2451DW (LP) or TC2452DW (NG) – 24 Foot Dryer, 2 Fan, Stacked Module, 380Volt, 3 Phase, 50 Hz, Main Switch = 400 Amps

	Top Auger	Bottom Auger	Fan	FAN	Minimum Amps	Maximum Amps
Motor/Wire Amps	5.5Kw 13 FLA	5.5Kw 13 FLA	45Kw 80 FLA	45Kw 80 FLA	186 Amps	250 Amps

Appendix C

Optional Dryer Accessories

- Dryer aspirator**
- GSM modem**
- Remote mobile app access**
- Personalized sign**
- Moisture sensor jump auger**

<u>DATES</u>	<u>REVISIONS</u>	<u>PAGES</u>
10/01/2016 – Added Remote Mobile App Access	-----	10-11

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Dryer Aspirator Component Instructions

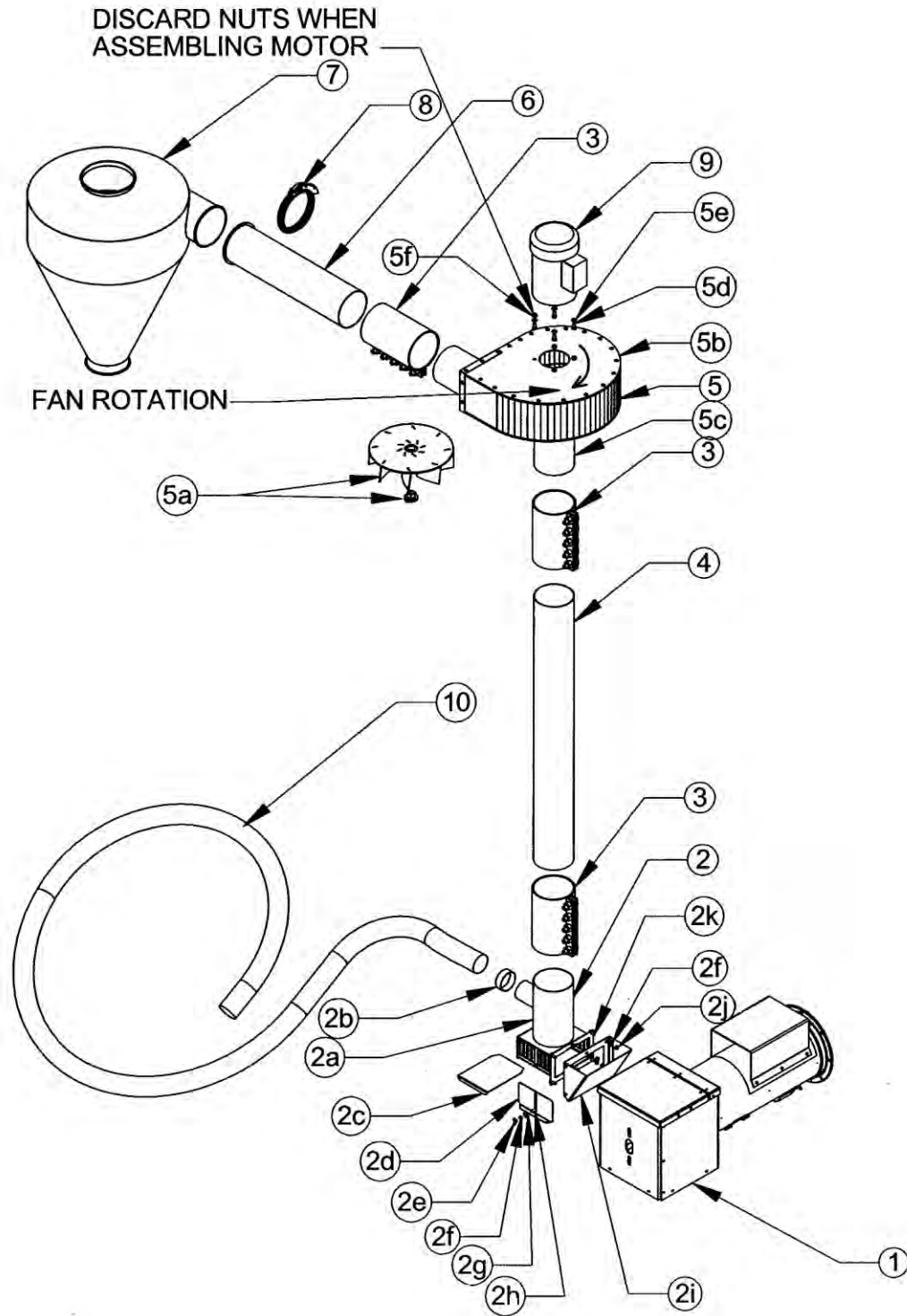
Assembly

1. Attach aspirator base assembly to side of dryer discharge housing. Mark and cut a 3³/₄" x 7¹/₄" hole (about 2 inches from top) in side of dryer discharge housing and drill (6) ³/₈" mounting holes using base flange as a template. Mount deflector with these same holes on inside face of dryer discharge housing.
2. Assemble the C-face motor to aspirator fan housing using hex-head ³/₈" -16 x ³/₄" screws and lock-washers that are provided in housing (discard ³/₈" nuts). Attach fan wheel to motor shaft with a ⁷/₈" split tapered bushing (J0409). Position bushing so it is flush with end of motor shaft and tighten ¹/₄" screws evenly to a torque of 95 inch-pounds.
3. Wire motor so fan wheel rotates in a clockwise direction when viewed from top. (See exploded view on next page.)
4. Fan may be assembled directly on top of aspirator base, or extended with a length of 6" tube. Use 6" compression couplers to fasten extension tube.
5. Assemble the cyclone to 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 aspirator assembly to dryer or other convenient structure.

Operation

1. Remove clean-up plate (Item 2c) from aspirator base when unit is to be used to clean light material from discharged grain. Adjust restrictor plates up or down to vary amount of air pulling chaff from grain.
2. The aspirator base may also be used to clean up around dryer. Remove 3" cap (Item 2b) and attach a 3" flexible hose (Item 10), slide clean-up plate back into base and use it to regulate amount of air required to pull material up the 6" tube to fan.

Dryer Aspirator Component Assembly



Dryer Aspirator Components

REF. #	DESCRIPTION	QTY.	COMP. #
1	Dryer outlet tube	1	T25670-A
2	Aspirator base assembly	1	D9585
2a	Aspirator base weldment	1	D9586
2b	Cap, 3"	1	J7535
2c	Plate, clean-up	1	D9588
2d	Plate, restrictor	2	D9587
2e	5/16" Wing nut	2	J1005
2f	5/16" Lock washer	8	J1200
2g	5/16" Flat washer	2	J1111
2h	5/16 x 1 Carriage bolt	2	J0535
2i	Deflector, aspirator	1	D95861
2j	Nut, 5/16-18, PLT	6	J1002
2k	Screw, 5/16-18 x 1, PLT, GRD 5, HHCS	6	J0527
3	Coupler, compression, 6", 5 bolt	3	J7560
4	6" Tube, cut to desired length	1	K2941-48
5	Fan, aspirator, 2 HP, w/o motor	1	D9580
5a	Fan wheel w/J0409 bushing	1	D9575
5b	Housing assembly, aspirator	1	D9581
5c	Inlet plate, weldment	1	D9583
5d	Screw, 3/8-16 x 3/4, PLT	4	J0605
5e	Washer, lock 3/8, PLT	4	J1205
5f	Nut, hex 3/8-16	4	J1020
6	Tube, weldment, 160mm to 6" adaptor	1	D9589
7	Cyclone, light material	1	J7565
8	Clamp, 160mm tube	1	J7566
9	Motor, 2HP, 3PH, 3450 RPM, C-face, F145TC	1	H2020
	Motor, 2HP, 1PH, 3450 RPM, C-face, F145TC	1	H2010
10	Hose, 3" ID Flex	1	K5248

GSM Modem Kit (T24999) Installation for QuadraTouch Pro

Kit Contents

Antenna
SIM card (pre-installed)
Ethernet 3G GSM modem
SMA male to female connector

4" DIN rail
1/4" Metal screws
6' Ethernet Cat5e STP cable
8' 24VDC power wires



Installation



WARNING: Lock out power to main power box before installation to eliminate potential for electrocution or shock. Modem operates on 24VDC, but higher voltage is present in power box. Failure to take this precaution could result in death or serious injury.



1. Antenna requires a 5/8" hole for through-panel mounting. Drill hole in top of auxiliary box as shown.



2. Ethernet 3G GSM modem mounts easily on DIN rail. If there is no space on DIN rail in auxiliary box, use self-drilling metal screws to attach a small piece of DIN rail (provided) in top left of auxiliary box. To avoid any water-related failures, do not mount modem directly below antenna hole.



- 3. Connect antenna to Ethernet 3G GSM modem using threaded connection. Make sure SMA male to female coupler is between antenna and modem as shown.
- 4. Connect 3G modem to power using provided orange (+24VDC to #18 terminal) and black (- to #95 terminal) Wires.
- 5. Connect GSM Modem to Ethernet switch with provided 6' Ethernet cable.



Ensure PLC and QuadraTouch Pro HMI are connected to Ethernet switch, shown at left in adjacent photo.

PLC, Ethernet 3G GSM modem, and QuadraTouch Pro should now each be connected to Ethernet switch.

Activation

Activation of GSM cellular service can be done in two ways.

OPTION 1:

SIM card provided with T24999 kit comes preinstalled in Ethernet 3G GSM modem. Contact your Sukup dealer for activation through Sukup Manufacturing Co. Dealers can electronically request GSM activation from Sukup using their dealer access at www.sukup.com.

OPTION 2:

You are also welcome to get GSM service on your own. There are typically at least two options for GSM service no matter where you live, such as AT&T, T-Mobile, iWireless, SmartTalk Wireless and Simple Talk Wireless. Here is a brief description of what to do if you want your own GSM service.

1. Check for GSM coverage in your area. Check each one for best coverage/price.
2. Buy a **standard sized** SIM card from company selected. Some companies offer multiple kinds of SIM cards. Get one that can be activated on any phone. For instance, standard AT&T SIM card and GoPhone SIM card are available. While AT&T is the provider of both, AT&T SIM card is the one to use.
3. Remove existing SIM card and install new SIM card into back of Ethernet 3G GSM modem. Use SIM#1 (left slot). Use a paper clip or SIM tool to eject SIM tray.
4. Activate new SIM card online (usually easiest) or over phone.
 - a. You will need to know the 20 digit SIM# on the SIM card.
 - b. You may need 15-digit IMEI# found on sticker on inside of GSM modem.

Prepaid is usually the easiest way to go. Each company has different plans. GSM modem operates with text messages over *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 prepaid option. Keep in mind that if service expires at end of drying season, SIM will expire in 60 days and can never be reactivated.**

GSM Modem Operation Instructions

GSM Modem interacts with 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 per 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 10 minutes, simply send a text response of "00" to the GSM modem.

In addition to receiving text alerts on fault conditions, you can also query the dryer for its 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 you wish to shut the dryer down without being there, a remote shutdown feature can be used. Text "8888" to GSM modem to shut down dryer remotely. You will not, however, be able to remotely start the dryer.

V2.60 and above software allows changing of plenum temperature setpoint(s) and discharge moisture setpoint.

Text "P#XXX" to give 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.

PLC will send an acknowledgement SMS after setpoint has been changed.

Text "MSTXXX" to give dryer a new discharge moisture setpoint.

Example: "MST145" would give dryer a new setpoint of 14.5%.

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

PLC will send an acknowledgement SMS after setpoint has been changed.

Dryer can be texted from ANY phone with messages "00", "1234", "8888", "P#XXX" or "MSTXXX". However, only the preprogrammed number in touch panel will receive fault condition text message alerts.

Remote Mobile App Access

Requires QuadraTouch Pro™ Software V1.14 or later.

Talk to your Sukup Dealer about buying a Remote Access Key **T7101** from Sukup Manufacturing. This can be done online by your dealer with immediate digital delivery. The key will give you full remote access to the system for 1 full calendar year. You will also get free text message notifications with remote access. You will be able to renew the key annually.

Provide your dealer with the Device ID, located in the QuadraTouch Pro™ panel under **Tools → System Tools → Maintenance Tools → Enter Remote Access Key**. (This can also be done from the app interface after it's successfully connected). Once you've obtained the Remote Access Key, enter it below the Device ID.

Go to the App Store or Google Play Store and search for "Phoenix Contact Visu + Mobile". The APP logo is shown on the top right.

Download and Open the App.

Click "+" on the top left corner.

For "**Profile Name**" insert something like "My Dryer" or whatever you want to name the connection.

"**Server Address**" is very important. This is the device ID you have on your panel followed by the domain space: mysukup.com

Example: 11111111.mysukup.com (shown right)

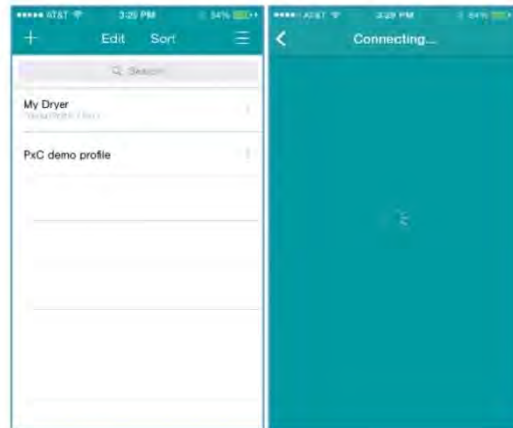
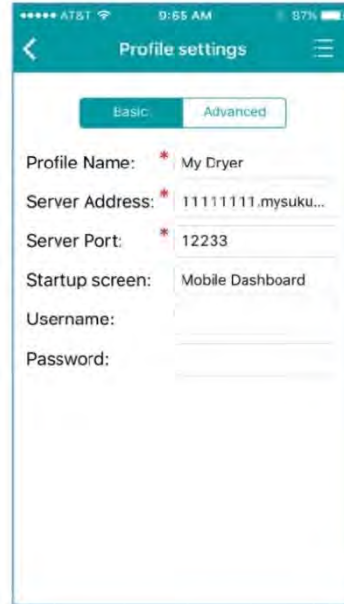
"**Server Port**": Always 12233 unless otherwise specified by Sukup Manufacturing Co.

"**Startup Screen**": "Mobile Dashboard" – No exceptions, case sensitive.

After the settings have been entered correctly, touch the "<" button on the top left. This will save your configuration.

Touch the new profile you created. The app will try to connect the with address you entered.

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*The APP is designed for Landscape orientation. It will be helpful to use the "Lock Orientation" feature on your phone or tablet to reduce the amount of times the information refreshes.

Example -- Remote Access from anywhere in the world!



The QuadraTouch Pro™ system with V1.14 software is designed to be plug and play with any router. The software automatically configures the router to allow remote access*.

Go to Tools → System Tools → Maintenance Tools → Network Configuration

And choose the option for: "Auto-Configure Internet Access for Customer Provided Broadband"

There are two Ethernet ports on the back of the touchpanel. Use the open "X3" port on the back of the panel (pictured above) for remote access. The "X3" port is designated for DHCP assignment. This is meant to be used to connect the touchpanel to your home network. The "X2" port is already used to communicate directly to the PLC located in the power box. It has a static address of 192.168.1.98.

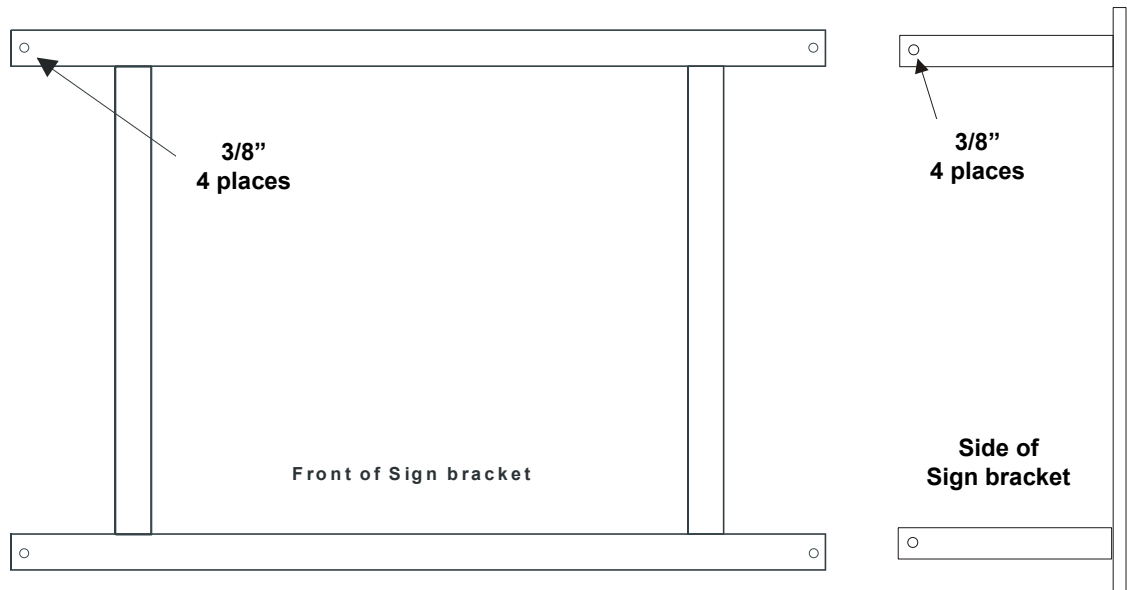
****Important****

*UPNP must be supported/enabled on your router. Otherwise, a manual port forwarding rule will need to be added to your router's configuration. If you get internet access from a wireless provider and/or are behind an additional firewall or private network, you will need to contact your internet provider directly and provide this instructions sheet to them.

Note to internet providers: This system relies on port forwarding to provide customers direct access to the system via the app. **A provisioned Public IP is preferred** as Sukup Manufacturing use a DDNS in conjunction with their Remote Access Key (see server address on first page) to direct web traffic to the QuadraTouch Pro™ panel. The UPNP ports are **12233** (if using DHCP Ethernet Adapter X3) and **12234** (if using Statically Assigned Ethernet Adapter X2). If the private network must stay intact, special routing rules will need to be setup on the front end to make sure incoming traffic on the WAN side reaches the QuadraTouch Pro™ panel. This is all the information needed to properly configure remote access. Sukup Manufacturing will not be able to assist in setting up / troubleshooting custom network solutions.

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Personalized Sign



Sukup Manufacturing Co. provides a sign for portable dryers at no additional charge. Sign shows customer name or farm name and/or dealer name. Dealer will order sign if desired, furnishing appropriate information for printing.

Bracket pictured above can be mounted to outside of dryer on any two-foot grain column section. Sign is then mounted to bracket. It can also be mounted under fan(s) on a sheet metal support.



Moisture Sensor Jump Auger

For instructions to install moisture sensor jump auger, ask for document L1801.

Appendix D

Soft Start & VFD Programming & Troubleshooting

**ATS22 Soft Start
Altivar 312 Variable Frequency Drive**

<u>DATES</u>	<u>REVISIONS</u>	<u>PAGES</u>
01/05/2017 – Updated Soft Start programming	-----	2, 3, 4
01/05/2017 – Added VFD programming and troubleshooting	-----	7

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The following information is needed from motor nameplate before programming the ATS22 Soft Start:

Motor voltage: _____ (Step 5)

Motor horsepower: _____

Motor full load amps: _____ (Step 10)

Steps to program the ATS22 Soft Start

1. Press down arrow until **conF (Configuration Menu)** is shown on screen.
2. Press Enter.
3. Press down arrow until **UIn (Line Voltage)** is shown on screen.
4. Press Enter.
5. Press up or down arrow until display shows line voltage of dryer. If dryer is 230vac, set to 240. If dryer is 380vac, set to 400. If dryer is 460vac, set to 480. If dryer is 575vac, set to 600.
6. Press Enter. Display should blink, indicating that new value is set into memory.
7. Press the down arrow until **In (Motor Rated Current)** is shown on display.
8. Press Enter.
9. Press up or down arrows until you find appropriate motor current using the Full Load Amps table on page D-4.
10. Press Enter. Display should blink indicating that new value is set into memory.
11. Press down arrow until **LAC (Advanced Mode)** is shown on screen.
12. Press Enter.
13. Press down or up arrow until **on** is shown on screen.
14. Press Enter. Display should blink indicating that new value is set into memory.
15. Press Escape.
16. Display should show **ConF**.
17. Press down arrow until **SEt (Settings Menu)** is shown on screen.
18. Press Enter.
19. Display should show **t90 (Initial voltage)**. If not, press down arrow until it appears on screen.
20. Press Enter.
21. Press down or up arrow until **50** is displayed on screen.
22. Press Enter. Display should blink indicating that new value is set into memory.
23. Press down arrow until **tLS (Max Start Time)** is shown on screen.
24. Press Enter.
25. Press down or up button until **50** is displayed on screen.
26. Press Enter. Display should blink indicating that new value is set into memory.
27. Press down arrow until **ACC (Acceleration time)** is displayed on screen.
28. Press Enter.
29. Press down or up arrow until **15** is displayed on screen.
30. Press Enter. Display should blink indicating that new value is set into memory.

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31. Press down arrow until **tHP (Motor Thermal Protection)** appears on screen.
32. Press Enter.
33. Press down or up arrow until **20** appears on screen.
34. Press Enter. Display should blink indicating that new value is set into memory.
35. Press Escape.
36. Display should show **SEt**.
37. Press down arrow until **ADJ (Advanced adjustments menu)** appears on screen.
38. Press Enter.
39. Display should show **Snb (Number of starts)**. If not, press down button until it appears on screen.
40. Press Enter.
41. Press down or up button until **I** appears on screen.
42. Press Enter. Display should blink indicating that new value is set into memory.
43. Press down arrow until **SLG (Start period)** shows up on screen.
44. Press Enter.
45. Press down or up arrow until **5** appears on screen.
46. Press Enter. Display should blink indicating that new value is set into memory.
47. Press down arrow until **SSC (Start-stop control)** appears on screen.
48. Press Enter.
49. Press down or up arrow until **oFF** appears on display.
50. Press Enter. Display should blink indicating that new value is set into memory.
51. Press Escape.
52. Press Escape again. Display should show **ADJ**.
53. Press down arrow until **IO (Advanced Input/Output Menu)** appears on screen.
54. Press Enter.
55. Press down arrow until **r1 (Relay 1)** appears on screen.
56. Press Enter.
57. Press down or up arrow until **Tr Ip** appears on the screen.
58. Press Enter. Display should blink indicating that new value is set into memory.
59. Press down arrow until **r2 (Relay 2)** appears on screen.
60. Press Enter.
61. Press down or up arrow until **rUn** appears on screen.
62. Press Enter. Display should blink indicating that new value is set into memory.
63. Press Escape.
64. Display should show **IO**.
65. Press Escape again or until **rdY** appears on display.
66. Turn off control power to soft start.
67. Restore power to soft start and allow it to reboot.

Soft Start Full Load Amps

Motor	Voltage	Full Load Amps (FLA)	Voltage	Full Load Amps (FLA)
5HP	208VAC	17.5	230VAC	15.2
	380VAC	9.2	460VAC	7.6
	575VAC	6.1		
7½HP	208VAC	25.3	230VAC	22
	380VAC	13	460VAC	11
	575VAC	9.0		
10HP	208VAC	32.2	230VAC	28
	380VAC	16	460VAC	14
	575VAC	11		
15HP	208VAC	48.3	230VAC	42
	380VAC	25	460VAC	21
	575VAC	17		
20HP	208VAC	62.1	230VAC	54
	380VAC	32	460VAC	27
	575VAC	22		
25HP	208VAC	78.2	230VAC	68
	380VAC	41	460VAC	34
	575VAC	27		
30HP	208VAC	92	230VAC	80
	380VAC	48	460VAC	40
	575VAC	32		
40HP	208VAC	120	230VAC	104
	380VAC	62	460VAC	52
	575VAC	41		
50HP	208VAC	150	230VAC	130
	380VAC	78	460VAC	65
	575VAC	52		
60HP	208VAC	177	230VAC	154
	380VAC	93	460VAC	77
	575VAC	62		
75HP	208VAC	221	230VAC	192
	380VAC	116	460VAC	96
	575VAC	77		
100HP	208VAC	285	230VAC	248
	380VAC	150	460VAC	124
	575VAC	99		
125HP	208VAC	359	230VAC	312
	380VAC	189	460VAC	156
	575VAC	125		

Troubleshooting ATS22 Soft Start

NOTE: The following pages are from Altistart 22 Soft Start User Manual, BBV51330, dated 09/2015. A complete copy can be found at www.schneider-electric.com.


Diagnostics / Troubleshooting

Soft starter does not start, no trip code displayed

- No display:
 - check that the line supply is present on the control supply CL1/CL2,
 - check if a short circuit is not existing on the Modbus network cable (especially between RJ45 pin 7 and RJ45 pin3 or pin8. See pages [35](#) and [36](#)).
- Check that the code displayed does not correspond to the normal state of the soft starter (see page [46](#)).
- Check for the presence of the RUN/STOP commands (see page [37](#)).

Soft starter does not start, trip code displayed

- Trip code flashes on the display.
- Storing of the last 7 trips, visible with SoMove software workshop.
- The soft starter locks and the motor stop with to freewheel mode.


DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand the precautions in "Before you begin" chapter, before performing any procedure in this section.

Failure to follow these instructions will result in death or serious injury.

Trip code displayed	Name	Remedy
<i>b P F</i>	Bypass contactor detected fault	• Switch-off the soft starter and contact Schneider Electric services.
<i>C F F</i>	Invalid configuration on power-up	• Revert to the factory setting in the soft starter <i>U E I L</i> menu • Reconfigure the soft starter
<i>E E F</i>	External detected fault	• Clear the cause of the detected fault
<i>G r d F</i>	Ground leakage current detected fault	• Check the electrical insulation of the motor • Check the installation • Check the values of <i>G r d d</i> , <i>G r d t</i> parameters in <i>P r O</i> menu page 57
<i>I n F</i>	Internal detected fault	• Disconnect and reconnect the control supply. If the detected fault persists, contact Schneider Electric product support
<i>O C F</i>	Motor overcurrent	• Check the values of <i>O I d</i> and <i>O I t</i> parameters in <i>P r O</i> menu page 56
<i>O H F</i>	Over heat detected fault Low temperature detected fault	• Check the sizing of the soft starter in relation to the motor and the mechanical requirement • Check the operation of the fan (if the Altistart 22 used has one), ensuring that the air passage is not obstructed in any way and the heatsink is clean. Ensure that the mounting recommendations are observed • Wait for the Altistart 22 cooling before restarting, keeping the starter powered on
<i>O L F</i>	Overload motor	• Check the mechanism (wear, mechanical play, lubrication, blockages, etc.) • Check the sizing of the soft starter motor in relation to the mechanical requirement • Check the value of <i>t H P</i> parameter in <i>S E E</i> menu page 52 and <i>I n</i> parameter in <i>c o n F</i> menu page 50 • Wait for the motor to cool before restarting
<i>O S F</i>	Overvoltage	• Check <i>U L n</i> parameter in <i>c o n F</i> menu • Check the power supply circuit and voltage • Check <i>O S d</i> and <i>O S t</i> parameters in <i>P r O</i> menu
<i>O t F</i>	Motor Over Temperature • Motor thermal trip detected by the PTC probes	• Check the mechanism (wear, mechanical play, lubrication, blockages, etc.) • Check the sizing of the soft starter motor in relation to the mechanical requirement • Check the value of <i>P t C</i> setting in <i>P r O</i> menu page 59 • Wait for the motor to cool before restarting

Diagnostics / Troubleshooting

Trip code displayed	Name	Remedy
<i>PHbd</i>	Phase unbalance	<ul style="list-style-type: none"> Check the line voltage. Check the values of <i>Ubd</i>, <i>Ubt</i> parameters in <i>PrD</i> menu page 57.
<i>PHF</i>	Loss of a line phase	<ul style="list-style-type: none"> Check the line voltage, the connection to the soft starter and any isolating devices located between the line and the soft starter (contactors, fuses, circuit breakers, etc.). Check the motor connection and any isolating devices located between the soft starter and the motor (contactors, circuit breakers, etc.). Check the motor state.
	Line frequency, out of tolerance This detected fault can be configured in <i>PrD</i> menu	<ul style="list-style-type: none"> Check the line frequency. Check the configuration of <i>PHL</i>.
<i>PIF</i>	Phase inversion Line phase inversion does not conform to the selection made by <i>PHr</i> in <i>PrD</i> menu	<ul style="list-style-type: none"> Invert two lines phases or set <i>PHr</i> = <i>oFF</i>.
<i>ErAP</i>	Trap code	<ul style="list-style-type: none"> Disconnect and reconnect the control supply. If the detected fault persists, contact Schneider Electric support.
<i>SCF</i>	Short circuit: <ul style="list-style-type: none"> short-circuit on soft starter output 	<ul style="list-style-type: none"> Switch-off the soft starter. Check the motor connections and the motor insulation. If connections and insulation are OK, contact Schneider Electric services.
<i>SLF</i>	Modbus Time Out	<ul style="list-style-type: none"> Serial link detected fault. Check the RS485 connection.
<i>SnbF</i>	Too many starts	<ul style="list-style-type: none"> The number of soft starts has exceeded the maximum allowed by <i>Snb</i> in <i>SLG</i> period. See <i>Snb</i> page 53.
<i>SSCr</i>	Shorted thyristor or wrong connection	<ul style="list-style-type: none"> Switch-off the soft starter. Check the motor connections and the motor insulation. If connections and insulation are OK, contact Schneider Electric services.
<i>SEF</i>	Starting time detected fault <ul style="list-style-type: none"> Too long start time 	<ul style="list-style-type: none"> Check the mechanism (wear, mechanical play, lubrication, blockages, etc.) Check that <i>tLS</i> (Max start time) is bigger than <i>ACC</i> (Acceleration time). See <i>SEt</i> menu page 51. Check the sizing of the soft starter motor in relation to the mechanical requirement Check ILt value : if the value is too low, the motor may not reach acceleration and full speed.
<i>tbs</i>	Too many starts	<ul style="list-style-type: none"> Wait 5 minutes for frame size A. Wait 15 minutes for frame sizes B, C, D and E. <i>tbs</i> appears after <i>SnbF</i> trip message, when trying to reset the soft starter before end of the timer.
<i>UCF</i>	Motor underload (undercurrent)	<ul style="list-style-type: none"> Check the values of <i>UId</i> and <i>UIt</i> parameters in <i>PrD</i> menu page 57.
<i>USF</i>	Under voltage or no voltage	<ul style="list-style-type: none"> Check <i>UIn</i>, <i>USd</i> and <i>USk</i> parameters in <i>PrD</i> menu Check line voltage.

Remote keypad messages

Display	Message	Description
<i>InIt</i>	On initializing itself	Microcontroller initializing. Communication configuration searching.
<i>CDNE</i>	flashing Communication interruption	It has 50 ms time out. This message is shown after 20 times retrying.
<i>A-17</i>	flashing Key alarm	<ul style="list-style-type: none"> Key has been held consecutively more than 10 seconds. Membrane switch disconnected. Keypad waked up while a key is holding.
<i>CLr</i>	flashing Confirm trip reset	This is shown when : First time STOP key has been pressed while the soft starter has tripped in detected fault.
<i>dEUE</i>	flashing Soft starter mismatch	Soft starter type (brand) did not match with keypad type (brand).
<i>rDNE</i>	flashing ROM trip	Keypad ROM detected fault.
<i>rANE</i>	flashing RAM trip	Keypad RAM detected fault.
<i>CPUE</i>	flashing CPU trip	Keypad CPU detected fault.

Appendix D

Programming Altivar 312 Variable Speed Drive

Jog dial: Used for navigation by turning clockwise or counterclockwise. Pressing jog dial enables user to make a selection or confirm information.

STOP/RESET button: Enables detected fault to be reset; can be used to control motor stopping.

RUN button: Controls powering up of motor for forward running in LOCAL configuration and in REMOTE configuration if the [2/3 wire control] (tCC) parameter in [INPUTS /OUTPUTS CFG] (I-O-) menu is set to [Local] (LOC).

MODE button: 3-second press of MODE button switches between REMOTE and LOCAL configurations.

ESC button: Used to quit a menu or parameter or to clear value displayed in order to revert to value in memory. In LOCAL configuration, 2-second press of ESC button switches between Control and Programming modes.

Settings for 230V 3HP

UNS	(Rated Output Motor Voltage)	230
BFR	(Std. motor frequency)	60

Settings for 380V 3HP 50HZ

UNS	230
BFR	50

Settings for 460V 3HP

UNS	230
BFR	60

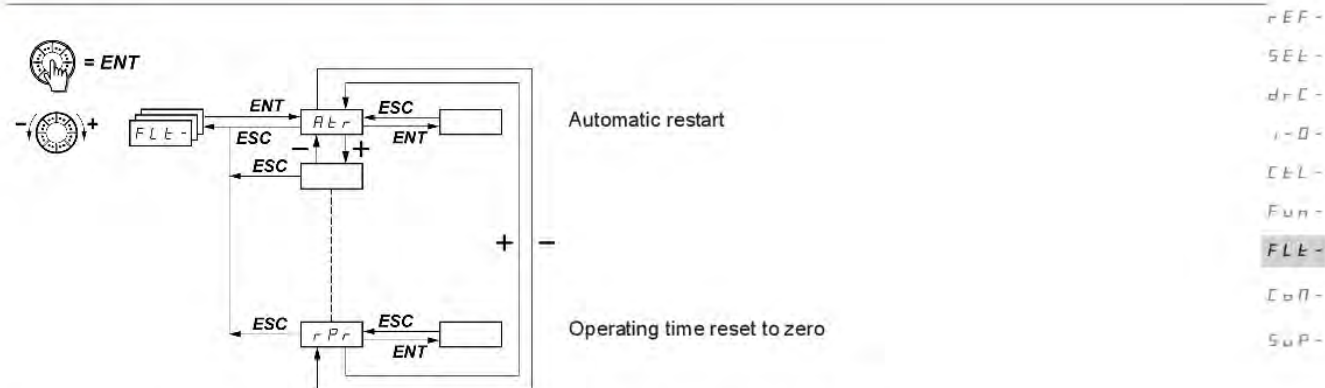
Settings for 230V 1PH

UNS	230
BFR	60

Troubleshooting Altivar 312 Variable Speed Drive

NOTE: The following pages are from Altivar 312 Variable Speed Drives Programming Manual, BBV46385, dated 07/2014. A complete copy can be found at www.schneider-electric.com.

[FAULT MANAGEMENT] (FLt-) menu




The parameters can only be modified when the drive is stopped and no run command is present. On the optional remote display terminal, this menu can be accessed with the switch in the position.

Code	Description	Adjustment range	Factory setting
R1r	<p><input type="checkbox"/> [Automatic restart]</p> <p style="text-align: center;">⚠ DANGER</p> <p>UNINTENDED EQUIPMENT OPERATION</p> <ul style="list-style-type: none"> The automatic restart can only be used on machines or installations which do not pose any danger to either personnel or equipment. If the automatic restart is activated, R1 will only indicate a fault has been detected once the time-out period for the restart sequence has expired. The equipment must be used in compliance with national and regional safety regulations. <p>Failure to follow these instructions will result in death or serious injury.</p> <p>The motor's automatic restart function will only be active in 2-wire level control ([2/3 wire control] (tCC) = [2 wire] (2C), and [2 wire type] (tCt) = [Level] (LEL) or [Fwd priority] (PFO)).</p> <ul style="list-style-type: none"> <input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [Yes] (YES): Automatic restart if the fault has been cleared and the other operating conditions permit the restart. The restart is performed by a series of automatic attempts separated by increasingly longer waiting periods: 1 s, 5 s, 10 s, then 1 min for subsequent ones. <p>If the restart has not taken place once the [Max. restart time] (tAr) configurable time has elapsed, the procedure is aborted and the drive remains locked until it is turned off and then on again.</p> <p>This function is possible with the following conditions:</p> <ul style="list-style-type: none"> [NETWORK FAULT] (CnF): Communication detected fault on the communication card [CANopen com.] (COF): CANopen communication detected fault [External] (EPF): External fault [4-20mA] (LFF): 4-20 mA loss [Overbraking] (ObF): DC bus overvoltage [Drive overheat] (OHF): Drive overheating [Motor overload] (OLF): Motor overload [Mot. phase] (OPF): Motor phase loss [Mains overvoltage] (OSF): Line supply overvoltage [Mains phase loss] (PHF): Line phase loss [MODBUS FAULT] (SLF): Modbus communication <p>Relay R1 remains activated if this function is active. The speed reference and the operating direction must be maintained.</p>		[No] (nO)

[FAULT MANAGEMENT] (FLt-) menu

Code	Description	Adjustment range	Factory setting
<p>REF -</p> <p>SEt -</p> <p>drC -</p> <p>1-0 -</p> <p>CEt -</p> <p>Fun -</p> <p>FLt -</p> <p>COPI -</p> <p>SUP -</p> <p>5</p> <p>10</p> <p>30</p> <p>1h</p> <p>2h</p> <p>3h</p> <p>Ct</p>	<p><input type="checkbox"/> [Max. restart time]</p> <p>Parameter is only visible if [Automatic restart] (Atr) = [Yes] (YES). It can be used to limit the number of consecutive restarts in the event of a recurrent detected fault.</p> <p><input type="checkbox"/> [5 min] (5): 5 minutes</p> <p><input type="checkbox"/> [10 min] (10): 10 minutes</p> <p><input type="checkbox"/> [30 min] (30): 30 minutes</p> <p><input type="checkbox"/> [1 hour] (1h): 1 hour</p> <p><input type="checkbox"/> [2 hours] (2h): 2 hours</p> <p><input type="checkbox"/> [3 hours] (3h): 3 hours</p> <p><input type="checkbox"/> [Unlimited] (Ct): Unlimited (except for [MOTOR PHASE LOSS] (OPF) and [INPUT PHASE LOSS] (PHF); the max. duration of the restart process is limited to 3 hours)</p>		[5 min] (5)
<p>r 5F</p> <p>nO</p> <p>L i 1</p> <p>L i 2</p> <p>L i 3</p> <p>L i 4</p> <p>L i 5</p> <p>L i 6</p>	<p><input type="checkbox"/> [Fault reset]</p> <p><input type="checkbox"/> [No] (nO): Not assigned</p> <p><input type="checkbox"/> [LI1] (LI1): Logic input LI1</p> <p><input type="checkbox"/> [LI2] (LI2): Logic input LI2</p> <p><input type="checkbox"/> [LI3] (LI3): Logic input LI3</p> <p><input type="checkbox"/> [LI4] (LI4): Logic input LI4</p> <p><input type="checkbox"/> [LI5] (LI5): Logic input LI5</p> <p><input type="checkbox"/> [LI6] (LI6): Logic input LI6</p>		[No] (nO)

 These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and set from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

[FAULT MANAGEMENT] (FLt-) menu

rEF-
SEt-
drL-
i-D-
CEL-
Fun-
FLt-
COP-
SUP-



Code	Description	Adjustment range	Factory setting
FLr no YES	<p><input type="checkbox"/> [Catch on the fly]</p> <p>Used to enable a smooth restart if the run command is maintained after the following events:</p> <ul style="list-style-type: none"> - Loss of line supply or simple power off - Reset of current drive or automatic restart - Freewheel stop <p>The speed given by the drive resumes from the estimated speed of the motor at the time of the restart, then follows the ramp to the reference speed.</p> <p>This function requires 2-wire control ([2/3 wire control] (tCC) = [2 wire] (2C)) with [2 wire type] (tCt) = [Level] (LEL) or [Fwd priority] (PFO).</p> <p><input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [Yes] (YES): Function active</p> <p>When the function is operational, it activates at each run command, resulting in a slight delay (1 second max.).</p> <p>[Catch on the fly] (FLr) is forced to [No] (nO) if brake control [Brake assignment] (bLC) is assigned, page 84.</p>		[No] (nO)
EEF no L i 1 L i 2 L i 3 L i 4 L i 5 L i 6 Cd 11 Cd 12 Cd 13 Cd 14 Cd 15	<p><input type="checkbox"/> [External fault ass.]</p> <p><input type="checkbox"/> [No] (nO): Not assigned <input type="checkbox"/> [L1] (L1): Logic input LI1 <input type="checkbox"/> [L2] (L2): Logic input LI2 <input type="checkbox"/> [L3] (L3): Logic input LI3 <input type="checkbox"/> [L4] (L4): Logic input LI4 <input type="checkbox"/> [L5] (L5): Logic input LI5 <input type="checkbox"/> [L6] (L6): Logic input LI6</p> <p>If [ACCESS LEVEL] (LAC) = [Level 3] (L3), the following assignments are possible:</p> <p><input type="checkbox"/> [CD11] (CD11): Bit 11 of the control word from a communication network <input type="checkbox"/> [CD12] (CD12): Bit 12 of the control word from a communication network <input type="checkbox"/> [CD13] (CD13): Bit 13 of the control word from a communication network <input type="checkbox"/> [CD14] (CD14): Bit 14 of the control word from a communication network <input type="checkbox"/> [CD15] (CD15): Bit 15 of the control word from a communication network</p>		[No] (nO)
LEL Lo HiG	<p><input type="checkbox"/> [External fault config]</p> <p><input type="checkbox"/> [Active low] (LO): The external fault is detected when the logic input assigned to [External fault ass.] (EtF) changes to state 0. Note: In this case, [External fault ass.] (EtF) cannot be assigned to a control word bit from a communication network.</p> <p><input type="checkbox"/> [Active high] (HiG): The external fault is detected when the logic input or the bit assigned to [External fault ass.] (EtF) changes to state 1. Note: Where [External fault config] (LEt) = [Active high] (HiG), [External fault ass.] (EtF) is assigned to a control word bit from a communication network, and where there is no [External fault ass.] (EtF) fault detection, switching to [External fault config] (LEt) = [Active low] (Lo) triggers [External fault ass.] (EtF) fault detection. In this case, it is necessary to turn the drive off and then back on again.</p>		[Active high] (HiG)
EPL no YES r n P FSt	<p><input type="checkbox"/> [External fault mgt]</p> <p><input type="checkbox"/> [Ignore] (nO): Ignore <input type="checkbox"/> [Freewheel] (YES): Detected fault management with freewheel stop <input type="checkbox"/> [Ramp stop] (rMP): Detected fault management with stop on ramp <input type="checkbox"/> [Fast stop] (FSt): Detected fault management with fast stop</p>		[Freewheel] (YES)

[FAULT MANAGEMENT] (FLt-) menu

REF -
SEE -
drC -
i-D -
CLL -
Fun -
FLt -
CaP -
SUP -

Code	Description	Adjustment range	Factory setting
<p>no YES aPL</p>	<p><input type="checkbox"/> [Output Phase Loss]</p> <p style="text-align: center;">⚠ ⚠ DANGER</p> <p>HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH</p> <p>If [Output Phase Loss] (OPL) is set to no loss of cable is not detected</p> <ul style="list-style-type: none"> • Check this action will not endanger personnel or equipment in any way <p>Failure to follow these instructions will result in death or serious injury.</p> <ul style="list-style-type: none"> <input type="checkbox"/> [No] (no): Function inactive <input type="checkbox"/> [Yes] (YES): Tripping on the [MOTOR PHASE LOSS] (OPF) <input type="checkbox"/> [Output cut] (OAC): No tripping on a [MOTOR PHASE LOSS] (OPF), but management of the output voltage in order to avoid an overcurrent when the link with the motor is re-established and catch on the fly performed even if [Catch on the fly] (FLr) = [No] (no). To be used with output contactor. <p>[Output Phase Loss] (OPL) is forced to [Yes] (YES) if [Brake assignment] (bLC) is not set to [No] (no), page 84.</p>		[Yes] (YES)
<p>no YES iPL</p>	<p><input type="checkbox"/> [Input phase loss]</p> <p>This parameter is only accessible on 3-phase drives.</p> <ul style="list-style-type: none"> <input type="checkbox"/> [No] (no): Ignore <input type="checkbox"/> [Yes] (YES): Stop mode when fault detected: freewheel 		[Yes] (YES)
<p>no YES rMP FSt aHL</p>	<p><input type="checkbox"/> [Overtemp fault mgt]</p> <p style="text-align: center;">CAUTION</p> <p>RISK OF DAMAGE TO THE MOTOR</p> <p>Inhibiting drive overheating fault detection results in the drive not being protected. This invalidates the warranty.</p> <ul style="list-style-type: none"> • Check that the possible consequences do not present any risk. <p>Failure to follow these instructions can result in equipment damage.</p> <ul style="list-style-type: none"> <input type="checkbox"/> [Ignore] (no): Ignore <input type="checkbox"/> [Freewheel] (YES): Detected fault management with freewheel stop <input type="checkbox"/> [Ramp stop] (rMP): Detected fault management with stop on ramp <input type="checkbox"/> [Fast stop] (FSt): Detected fault management with fast stop 		[Freewheel] (YES)
<p>no YES rMP FSt aLL</p>	<p><input type="checkbox"/> [Overload fault mgt]</p> <p style="text-align: center;">CAUTION</p> <p>RISK OF DAMAGE TO THE MOTOR</p> <p>If [Overload fault mgt] is set to no, motor thermal protection is no longer provided by the drive. Provide an alternative means of thermal protection.</p> <p>Failure to follow these instructions can result in equipment damage.</p> <ul style="list-style-type: none"> <input type="checkbox"/> [Ignore] (no): Ignore <input type="checkbox"/> [Freewheel] (YES): Detected fault management with freewheel stop <input type="checkbox"/> [Ramp stop] (rMP): Detected fault management with stop on ramp <input type="checkbox"/> [Fast stop] (FSt): Detected fault management with fast stop 		[Freewheel] (YES)

[FAULT MANAGEMENT] (FLt-) menu

Code	Description	Adjustment range	Factory setting
SLL	<input type="checkbox"/> [Modbus fault mgt] <div style="text-align: right;">[Freewheel] (YES)</div> <div style="text-align: center; border: 1px solid black; padding: 5px;">  WARNING </div> <p>LOSS OF CONTROL If [Modbus fault mgt] (SLL) = [Ignore] (n0), communication control will be inhibited. For safety reasons, inhibiting the communication fault detection should be restricted to the debug phase or to special applications.</p> <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p> <ul style="list-style-type: none"> <input type="checkbox"/> [Ignore] (n0): Ignore <input type="checkbox"/> [Freewheel] (YES): Detected fault management with freewheel stop <input type="checkbox"/> [Ramp stop] (rMP): Detected fault management with stop on ramp <input type="checkbox"/> [Fast stop] (FSt): Detected fault management with fast stop <p>This parameter does not apply to PC-Software.</p>		
COL	<input type="checkbox"/> [CANopen fault mgt] <div style="text-align: right;">[Freewheel] (YES)</div> <div style="text-align: center; border: 1px solid black; padding: 5px;">  WARNING </div> <p>LOSS OF CONTROL If [CANopen fault mgt] (COL) = [Ignore] (n0), communication control will be inhibited. For safety reasons, inhibiting the communication fault detection should be restricted to the debug phase or to special applications.</p> <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p> <ul style="list-style-type: none"> <input type="checkbox"/> [Ignore] (n0): Ignore <input type="checkbox"/> [Freewheel] (YES): Detected fault management with freewheel stop <input type="checkbox"/> [Ramp stop] (rMP): Detected fault management with stop on ramp <input type="checkbox"/> [Fast stop] (FSt): Detected fault management with fast stop 		
EnL	<input type="checkbox"/> [Autotune fault mgt] <div style="text-align: right;">[Yes] (YES)</div> <p>This parameter can be used to manage drive behavior in the event that auto-tuning is unsuccessful [AUTO TUNING FAULT] (tnF)</p> <ul style="list-style-type: none"> <input type="checkbox"/> [No] (n0): Ignored (the drive reverts to the factory settings) <input type="checkbox"/> [Yes] (YES): Detected fault management with drive locked <p>If [Cold stator resist.] (rSC), page 42, is not set to [No] (n0), [Autotune fault mgt] (tnL) is forced to [Yes] (YES).</p>		
LFL	<input type="checkbox"/> [4-20mA loss] <div style="text-align: right;">[Freewheel] (YES)</div> <ul style="list-style-type: none"> <input type="checkbox"/> [Ignore] (n0): Ignored (only possible value if [AI3 min. value] (CrL3) ≤ 3 mA, page 48) <input type="checkbox"/> [Freewheel] (YES): Detected fault management with freewheel stop <input type="checkbox"/> [fallback spd] (LFF): The drive switches to the fallback speed ([fallback spd] (LFF) parameter). <input type="checkbox"/> [Spd maint.] (rLS): The drive maintains the speed at which it was operating when the loss was detected. This speed is saved and stored as a reference until the fault has disappeared. <input type="checkbox"/> [Ramp stop] (rMP): Detected fault management with stop on ramp <input type="checkbox"/> [Fast stop] (FSt): Detected fault management with fast stop <p>Note: Before setting [4-20mA loss] (LFL) to [fallback spd] (LFF) check the connection of input AI3. If [4-20mA loss] (LFL) = [fallback spd] (LFF) or [Spd maint.] (rLS), no code is displayed.</p>		
LFF	<input type="checkbox"/> [Fallback speed] <div style="text-align: right;">0 to 500 Hz</div> <div style="text-align: right;">10 Hz</div> <p>Fallback speed setting in the event of a [4-20mA loss] (LFL).</p>		

[FAULT MANAGEMENT] (FLt-) menu


rEF-
SEt-
drC-
i-D-
CLL-
Fun-
FLt-
COP-
SUP-

Code	Description	Adjustment range	Factory setting
<p>drn</p> <p>⌚ 2 s</p> <p>na YES</p>	<p><input type="checkbox"/> [Derated operation]</p> <p>Lowers the tripping threshold of [Undervoltage] (USF): in order to operate on line supplies with 50% voltage drops.</p> <p><input type="checkbox"/> [No] (nO): Function inactive <input type="checkbox"/> [Yes] (YES): Function active In this case, drive performance is derated.</p>		[No] (nO)
<p>SEp</p> <p>na naS rPP FSt</p>	<p><input type="checkbox"/> [Underv. prevention]</p> <p>This function can be used to control the type of stop where there is a loss of line supply.</p> <p><input type="checkbox"/> [No] (nO): Locking of the drive and freewheel stopping of the motor <input type="checkbox"/> [DC Maintain] (MMS): This stop mode uses the inertia to maintain the drive power supply as long as possible. <input type="checkbox"/> [Ramp stop] (rMP): Stop according to the valid ramp ([Deceleration] (dEC) or [Deceleration 2] (dE2)) <input type="checkbox"/> [Fast stop] (FSt): Fast stop, the stopping time depends on the inertia and the braking ability of the drive.</p>		[No] (nO)
<p>inH</p> <p>⌚ 2 s</p> <p>na L11 L12 L13 L14 L15 L16</p>	<p><input type="checkbox"/> [Fault inhibit assign.]</p> <p>⚠ DANGER LOSS OF PERSONNEL AND EQUIPMENT PROTECTION</p> <ul style="list-style-type: none"> Enabling the fault inhibition parameter [Fault inhibit assign.] (inH) will disable the drive controller protection features. InH should not be enabled for typical applications of this equipment. InH should be enabled only in extraordinary situations where a thorough risk analysis demonstrates that the presence of adjustable speed drive protection poses a greater risk than personnel injury or equipment damage. <p>Failure to follow these instructions will result in death or serious injury.</p> <p>This function disables drive protection for the following detected faults: SLF, CnF, EPF, CrF, LFF, OHF, OBF, OLF, OSF, OPF, PHF, SOF, tnF, COF, bLF</p> <p><input type="checkbox"/> [No] (nO): Not assigned <input type="checkbox"/> [L1] (L1): Logic input L1 <input type="checkbox"/> [L2] (L2): Logic input L2 <input type="checkbox"/> [L3] (L3): Logic input L3 <input type="checkbox"/> [L4] (L4): Logic input L4 <input type="checkbox"/> [L5] (L5): Logic input L5 <input type="checkbox"/> [L6] (L6): Logic input L6 The logic inputs are active in the high state.</p>		[No] (nO)



The jog dial (ENT) needs to be pressed and held down (for 2 s) to change the assignment for this parameter.

[FAULT MANAGEMENT] (FLt-) menu

Code	Description	Adjustment range	Factory setting
rPr nO r tH	<input type="checkbox"/> [Operating t. reset] <input type="checkbox"/> [No] (nO): No <input type="checkbox"/> [rst. runtime] (rtH): Operating time reset to zero The [Operating t. reset] (rPr) parameter automatically returns to [No] (nO) after resetting to 0.		[No] (nO)
rP  2s nO YES	<input type="checkbox"/> [Product reset] <div style="background-color: black; color: white; text-align: center; padding: 5px;">⚠ DANGER</div> <p>UNINTENDED EQUIPMENT OPERATION</p> <p>You are going to reset the drive.</p> <ul style="list-style-type: none"> • Check this action will not endanger personnel or equipment in any way. <p>Failure to follow these instructions will result in death or serious injury.</p> <input type="checkbox"/> [No] (nO): No <input type="checkbox"/> [Yes] (YES): Yes		[No] (nO)



The jog dial (ENT) needs to be pressed and held down (for 2 s) to change the assignment for this parameter.

Appendix E

Dryer Startup

Actions required to start dryer
Adjusting vaporizer coil on LP models
Dryer installation checklist

Dryer Startup

Following are minimum actions required to successfully start dryer. **See Software Manual for detailed instructions.**

IMPORTANT: Augers, fan(s) and heater(s) on dryer, along with auxiliary fill and take-away equipment, will start without warning during dryer operation. Use extreme caution around grain handling system.

1. Open the power box and ensure that all internal breakers and starter protectors are turned on. Close door to power box, close latch, and turn Main Disconnect to "ON".
2. Pull Emergency Stop button out. It should illuminate red. If using QuadraTouch Pro™ controller, System Control Switch needs to be turned to "COMPUTER" position. If using manual backup system, "MANUAL" needs to be selected. The System Control switch will illuminate when power has been applied.
3. Turn on QuadraTouch Pro control unit using green rocker switch on bottom right of console. All faults must be cleared before dryer can start.
4. Press "Start" to choose an operation. Display will give options of selecting Continuous Flow, Manual Operation, Grain Transfer, Dry Fire, Final Dry and Auto Batch.

NOTE: Press "Reset" to abort dryer startup or to stop any operation in progress.

NOTE: Please refer to Software Manual for a detailed description of each operation mode. Software is updated frequently, so content may differ slightly from descriptions in this manual.

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 (71°C) 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.

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.



Fault Condition
Vapor Over-Temp

If the vapor side of the pipe train is hot, or if the dryer has shut down due to a "VAPOR OVER-TEMP" 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.

**TO VALIDATE WARRANTY PERIOD
YOUR SUKUP DEALER MUST
COMPLETE THIS FORM AND
FAX, E-MAIL, OR MAIL TO SUKUP.**



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E-mail: Info@sukup.com

SAMPLE Sukup Grain Dryer Startup Checklist

(Use ball point pen and press firmly)

Customer: _____
Street: _____
City/State: _____
Dryer Model #: **T** _____
Date: _____

Dealer: _____
Street: _____
City/State: _____
Serial #: _____
Tested By: _____

(Please Print Name)

Initials

1. Tighten all gas connections and check that all electrical wires are inserted properly and secured. _____
2. Ensure that gas and electrical power is connected properly and secured. _____
3. Check that all circuit breakers and starter protectors in the power box are in the ON position. _____
4. Check the ground rod for proper installation and secure connections. _____
5. Check that the gas supply is ready for use and all manual valves are in the OPEN position. _____
6. Turn on main power disconnect handle, pull out E-Stop. E-Stop should illuminate red. _____
7. Turn the system control switch to COMPUTER, it should illuminate green. Plug in and turn on The QuadraTouch Pro™ Controller. Connect the Ethernet cable from the controller to the dryer. The QuadraTouch Pro™ panel will take approx. 1 min to boot up. Any fault conditions that exist must be cleared before proceeding. _____
8. Perform Dry Fire tests by pressing START → Dry Fire (Refer to the Software Manual Section of the Dryer Manual.)
 1. Check each fan for proper rotation. _____
 2. Check each heater for proper operation, and check for leaks on the gas pipe train by using soapy water. Inspect each component for structural integrity and proper operation. _____
9. Perform sensor test by pressing "Sukup" logo in top left corner. This will take you to the System Diagnostics screen. The display should show ambient temperature and little to no moisture. Press the "Back" or "Reset" button to return to main screen. _____
10. Go into manual operation by pressing START → Manual Operation. _____
11. Press "Load" button. It's "X" should change to a checkmark, and start the load operation. Check the leveling auger for correct rotation. Check all Auxiliary load augers as necessary. Press "Load" button again to stop the operation. _____
12. Press "Unload" button. Check unload auger for correct rotation. Check all Auxiliary unloads as necessary. _____
13. Increase and decrease the meter roll speed to confirm that the speed is changing. _____
14. Press "Reset" – all moving parts should stop. _____
15. Secure the Power box by turning the system control switch to "OFF", pushing in the E-Stop, and turning off the main power disconnect (on the power box door). Lock out power. _____

(Signature)



Appendix F

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Adjusting Louvers & Doors on Centrifugal-Fan Dryers

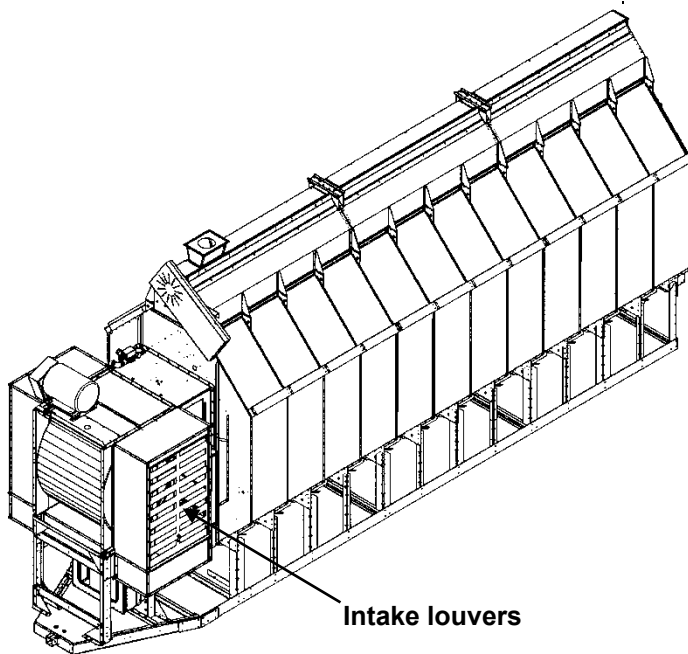


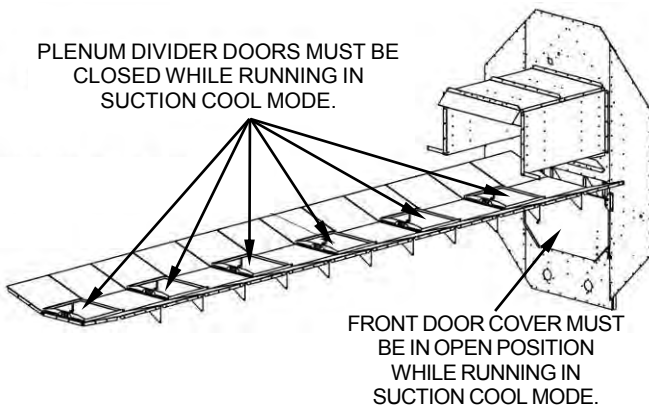
Image 1 – Adjustable louvers

Suction Cool Mode

Louver slots should be narrow to create more suction in bottom cooling plenum, but slots should not be fully closed. Start with a 3/4" to 1" opening and adjust from there. Closing louvers more will increase efficiency and pull more heated air into fan, but will decrease capacity. Opening louvers more will increase capacity, but will decrease efficiency. Less-heated air will be pulled into fan.

As shown below, all plenum divider doors must be closed and front door cover must be open.

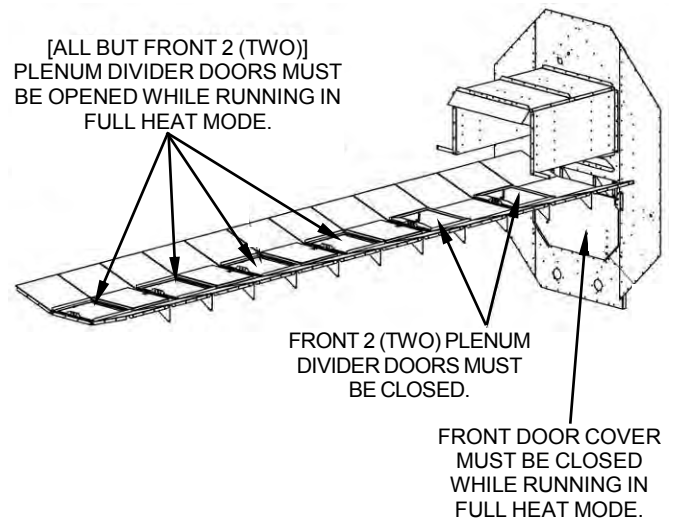
See additional instructions on next page.



Full Heat Mode

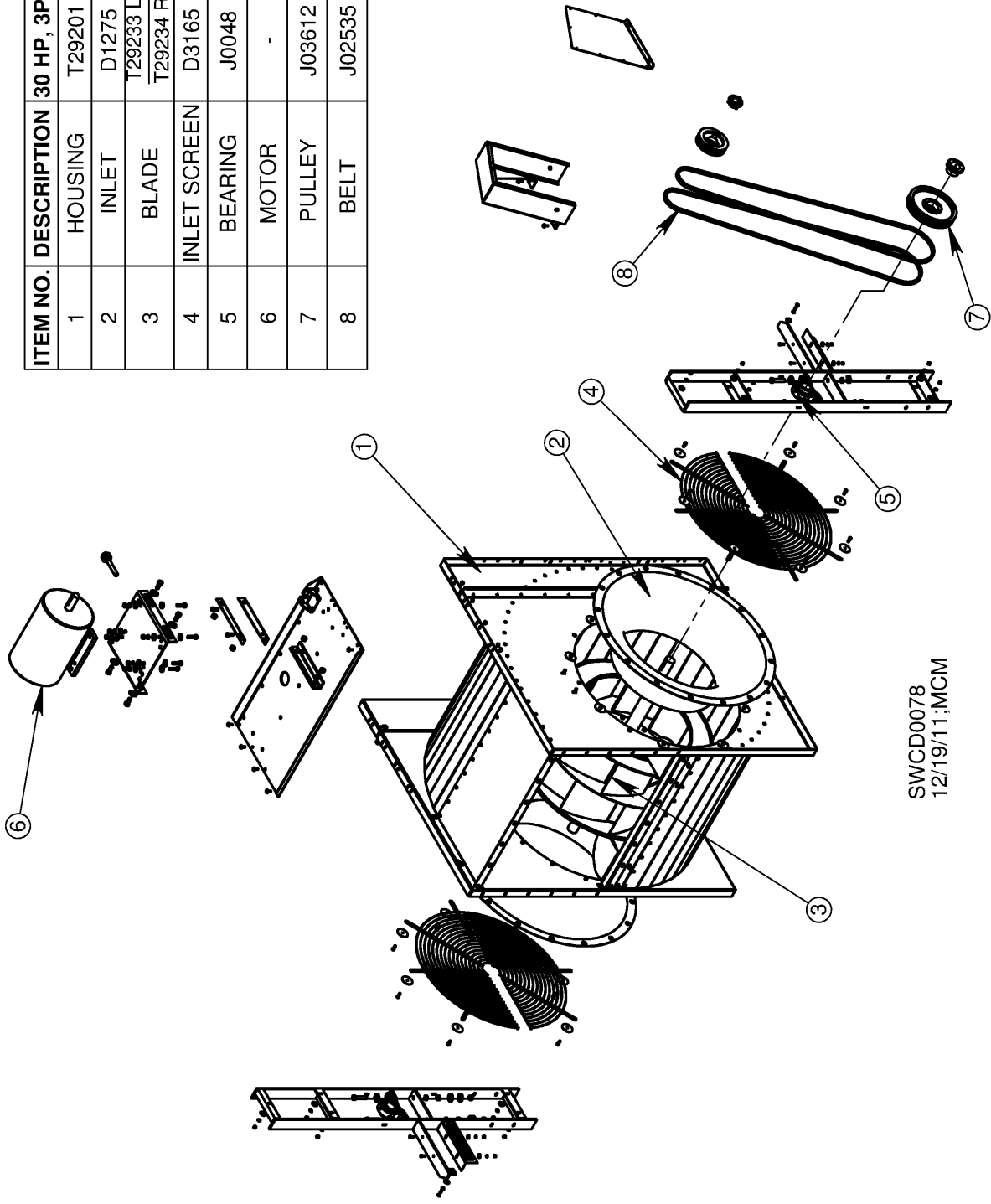
Louvers should be fully open as shown in Image 1. As shown below, front 2 (two) plenum divider doors should be closed. All other plenum divider doors must be opened. Front door cover must be closed.

See additional instructions on next page.



DRYER FAN PARTS, EU, D-C

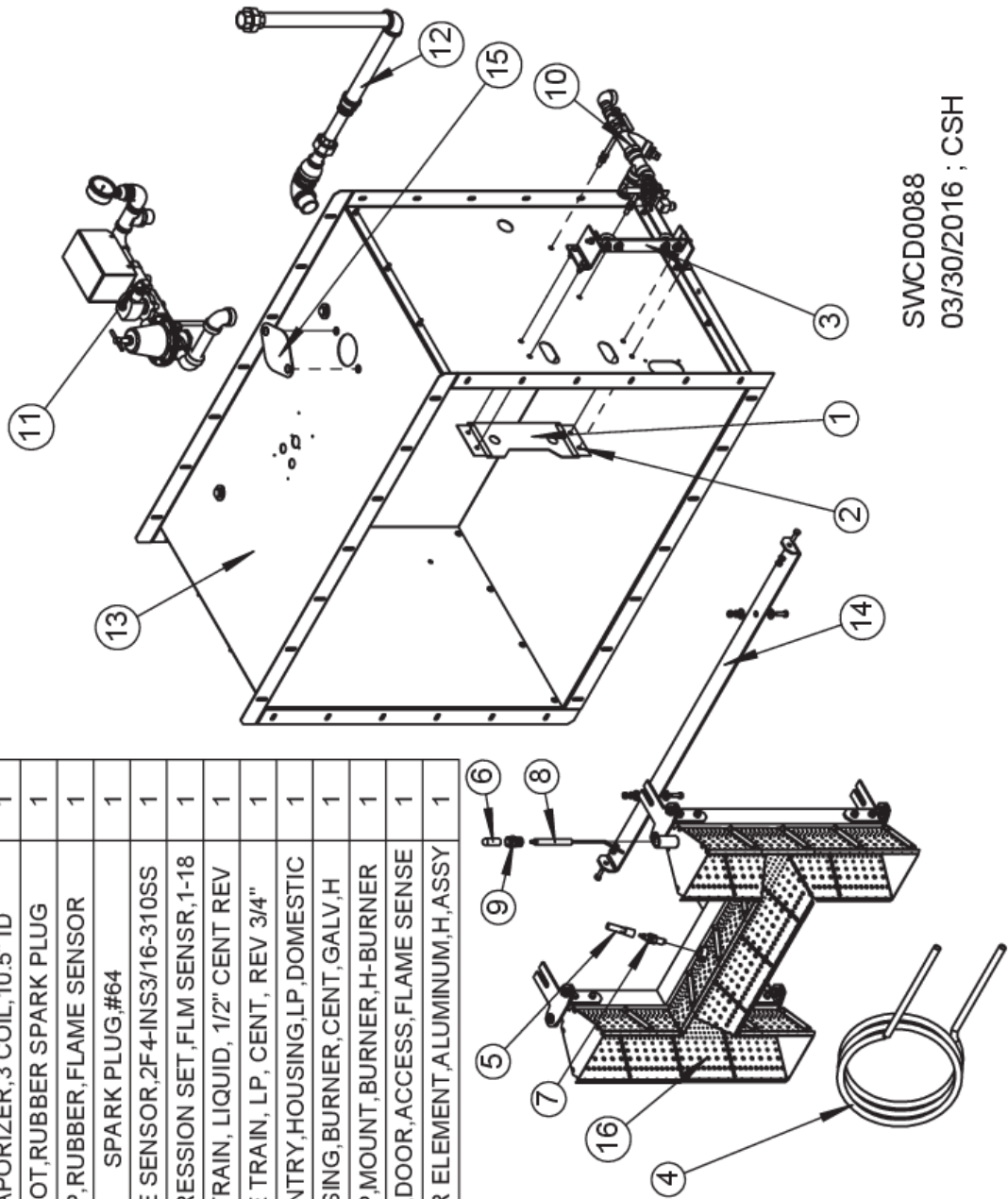
ITEM NO.	DESCRIPTION	30 HP, 3PH	40 HP, 3PH	50HP, 3PH
1	HOUSING	T29201	T29201	T29201
2	INLET	D1275	D1275	D1275
3	BLADE	T29233 L T29234 R	T29133 L T29134 R	T29333 L T29334 R
4	INLET SCREEN	D3165	D3165	D3165
5	BEARING	J0048	J0048	J0048
6	MOTOR	-	-	-
7	PULLEY	J03612	J03612	J03612
8	BELT	J02535	J02533	J02533



SWCD0078
12/19/11;MCM

DRYER HEATER PARTS SINGLE AND THREE-PHASE HEATERS

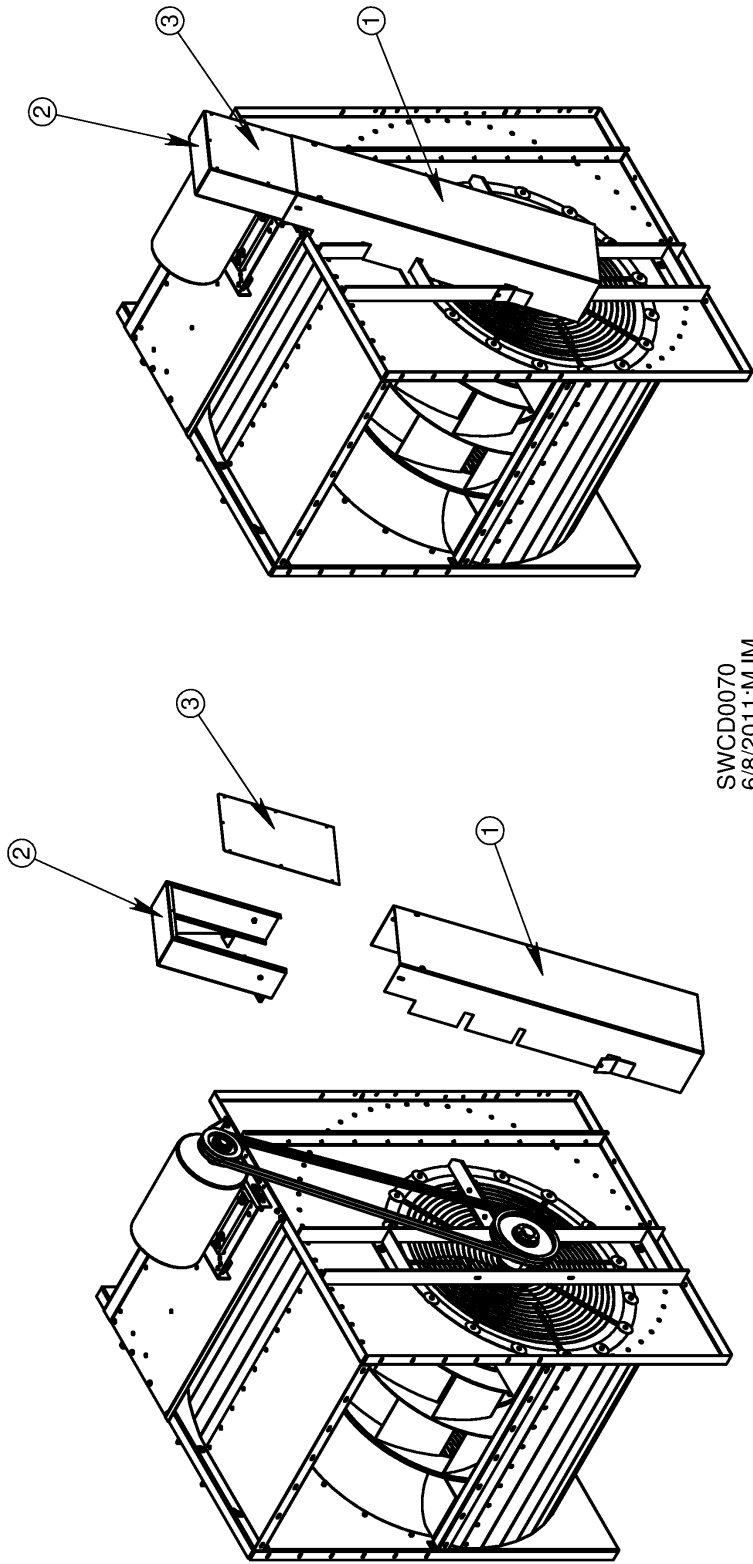
ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	D6307	COVER PLATE,VAPORIZER,GALV HTR	1
2	D6308	RAIL,COVER PLATE,18"-28"GALV	2
3	D6322	ASSY,PIVOT BRACKET,VAP,90 DEG	1
4	D70321	VAPORIZER,3 COIL,10.5" ID	1
5	J4538	BOOT,RUBBER SPARK PLUG	1
6	J45381	CAP,RUBBER,FLAME SENSOR	1
7	J5739	SPARK PLUG,#64	1
8	J5747	FLAME SENSOR,2F4-INS3/16-310SS	1
9	J5748	COMPRESSION SET,FLM SENSR,1-18	1
10	T17134	PIPE TRAIN, LIQUID, 1/2" CENT REV	1
11	T17221	PIPE TRAIN, LP, CENT, REV 3/4"	1
12	T17234	PIPE,ENTRY,HOUSING,LP,DOMESTIC	1
13	T29187	HOUSING,BURNER,CENT,GALV,H	1
14	T291875	STRAP,MOUNT,BURNER,H-BURNER	1
15	T29629	COVER,DOOR,ACCESS,FLAME SENSE	1
16	T29630	BURNER ELEMENT,ALUMINUM,H,ASSY	1



SWCD0088
03/30/2016 ; CSH

FULL HEAT FAN BELT SHIELD ASSEMBLY

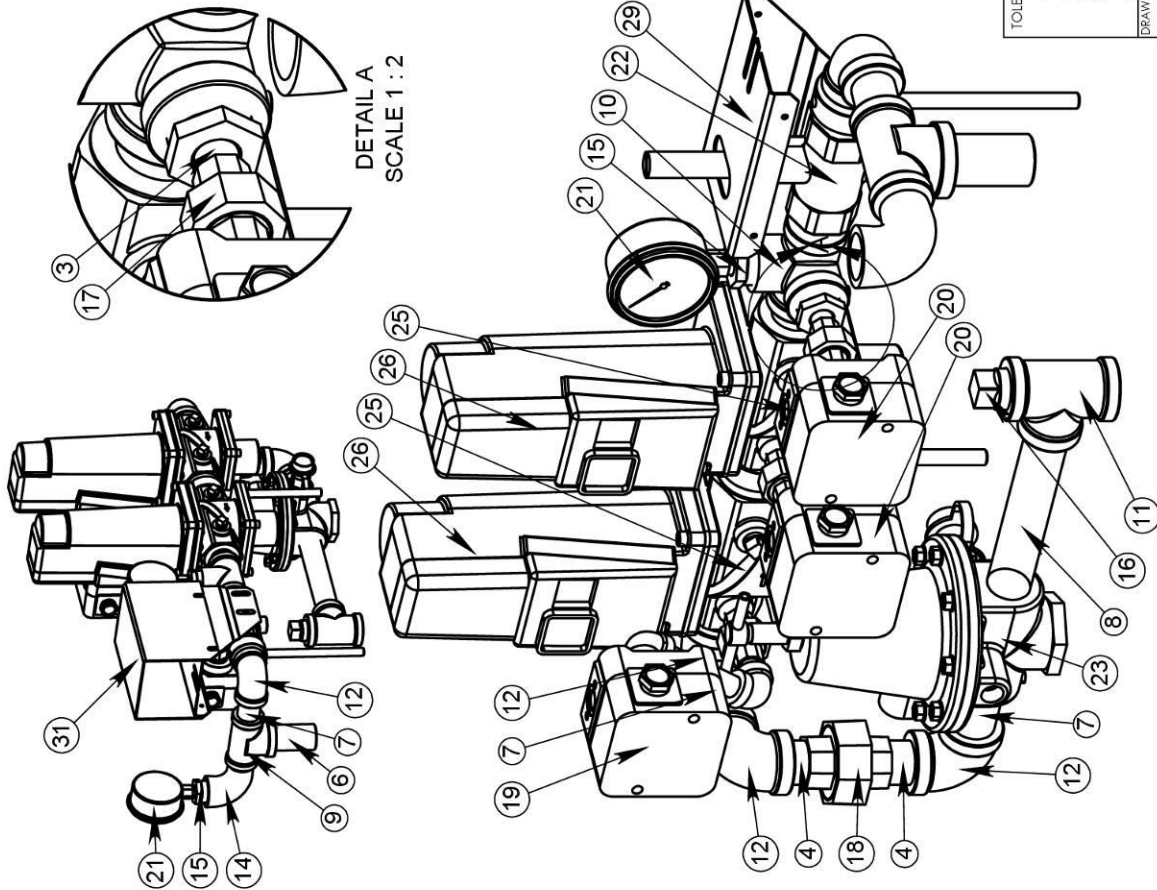
PART NUMBER	DESCRIPTION	QTY
1	SHIELD, ASSY, BELT, LOWER	1
2	SHIELD, ASSY, UPPER	1
3	COVER, BELT SHIELD	1



SWCD0070
6/8/2011;MJM



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	J0975	STUD. WELD. RTANGLE, 10-24 x 1/2" LG.	1
2	J0976	NUT, #10-24, WING	1
3	J24003	NIPPLE, 1/4" X 7/8", SCH 40	9
4	J2410	NIPPLE, 3/4 x CLOSE, SCH 40	5
5	J2411	NIPPLE, 1/4" X 3", SCH 40	1
6	J24173	NIPPLE, 1.00 X 2.5 SCH40	1
7	J2420	NIPPLE, 3/4" X 2", SCH40	5
8	J2428	NIPPLE, 3/4 x 6, SCH 80	1
9	J24811	TEE, 3/4 X 3/4 X 1, SCH40	1
10	J2490	TEE, SIDE OUTLET, 3/4 BLACK	1
11	J2491	TEE, 3/4 X 3/4 X 3/4, SCH80	1
12	J2525	ELBOW, 3/4, 90 DEG., SCH40	4
13	J2526	ELBOW, 1/4 x 90, SCH 40	4
14	J2530	ELBOW, STREET, 3/4", 90 DEG, SCH 40	1
15	J2570	BUSHING, REDUCING, 3/4 X 1/4, SCH40	3
16	J2620	PLUG, 3/4, PIPE	1
17	J2703	UNION, 1/4" SCH40	3
18	J2710	UNION, 3/4, BLACK, #150	1
19	J4437	SWITCH, PRESS., DUNGS, GW2000 A4	1
20	J4443	SWITCH, PRESS., DUNGS, GW6000 A4H	2
21	J5960	GAUGE, PRES., 0-30, LIQ., 1/4BTM, MT	2
22	J6126	VALVE, BUTTERFLY, L/ACTUATOR, 3/4	1
23	J6163	REGULATOR, 3/4", 1586VN	1
24	J6171	VALVE, 1/4", RELIEF, A1325, H120	1
25	J6236	VALVE GAS, 3/4" SINGLE, VGG10.2044	2
26	J6240	ACTUATOR, SKP15.001E1	2
27	J6241	KIT, NEMA 4, AGA66	2
28	T10150	SHIM	1
29	T161935	BRACKET, ELECTRONIC MOD VALVE	1
30	T18810	EYEBOLT, PIPE TRAIN, 4.75" THREAD	2
31	T26902	COVER, ELECTRONIC VALVE, 5.625 X 3.5	1



DETAIL A
SCALE 1 : 2

TOLERANCE UNLESS SPECIFIED
 .X = ± .050
 .XX = ± .010
 .XXX = ± .005
 FRAC = ± 1/32
 ∠ = ± 1°

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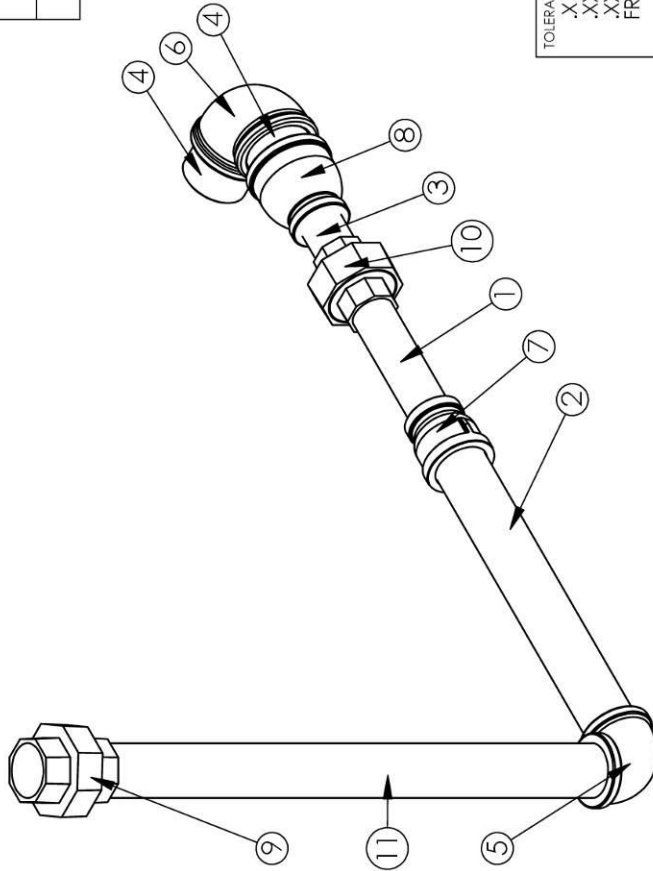
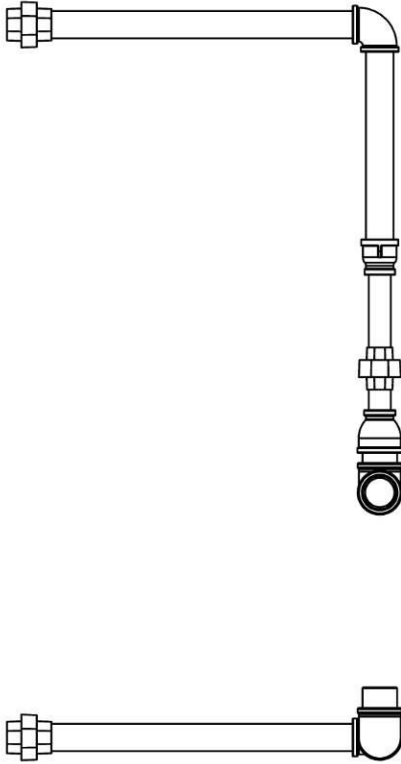
DRAWN BY: **MJM** PART NO.: **T17223D**
 DATE: **05/23/2011** RAW MATL. NO.: -----
 MATERIAL: -----
 DESCRIPTION: **CE, CENT. PIPE TRAIN**
 DESCRIPTION: **PIPE TRAIN, ELMOD, 3/4", LP, DC**

REMOVED ENTRY PIPE COMPONENTS: 02/03/2016 CSH
 DESCRIPTION OR ENG. ORDER #: REVISIONS

WEIGHT: **54.95**
 SHEET: 1 OF 2

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ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	D71220	ORIFICE PIPE, 3/4" X 4.5"	1
2	J24171	NIPPLE, 1 X 10, SCH 40	1
3	J2420	NIPPLE, 3/4" X 2", SCH 40	1
4	J2500	NIPPLE, 1.25 X CLOSE	2
5	J25251	ELBOW, 1, 90 DEG., SCH 40	1
6	J2540	ELBOW, 1 1/4, 90 DEG, SCH 40	1
7	J2552	COUPLING, RED, 1 X 3/4", SCH 40	1
8	J2576	COUPLING, REDUCING, 1 1/4 X 3/4 SC40	1
9	J2696	UNION, 1" SCH 40	1
10	J2710	UNION, 3/4, BLACK, #150	1
11	T17218	PIPE, 1" X 15.5", SCH 40	1



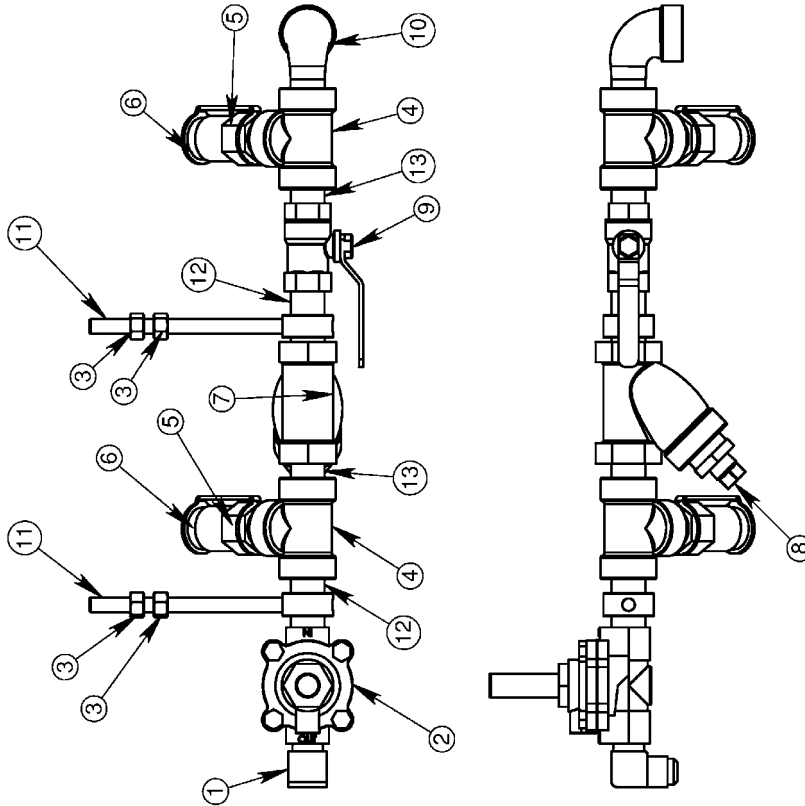
TOLERANCE UNLESS SPECIFIED
 .X = ± .050
 .XX = ± .010
 .XXX = ± .005
 FRAC = ± 1/32
 ∠ = ± 1°

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DRAWN BY	CSH	RAW MTL NO.	----	PART NO.	T17234
DATE	02/04/2016	MATERIAL	----		
DESCRIPTION	H BURNER				
DESCRIPTION	PIPE, ENTRY, HOUSING, LP, DOMESTIC				
REVISIONS				WEIGHT	8.33
REV.					

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	J2745	ELBOW, 1/2 FL X 1/2 MIP, 90 DEG, E1-8D	1
2	T17097	CONDUIT WITH J6257 SOLENOID, LIQUID W/WRS, VA, D-C	1
3	J1020	NUT, HEX, 3/8-16,PLT	4
4	J2472	TEE, 1/2 X 1/2 X 1/2, SCH80	2
5	J6170	VALVE, 1/2", RELIEF, 3129G,H135-2	2
6	J6200	RAIN CAP, 7545-10	2
7	J5992	STRAINER, LIQ, 1/2"	1
8	J2610	PLUG, 3/8, PIPE, BLK	1
9	J6082	VALVE, 1/2", BALL, ITT 1550	1
10	J2519	ELBOW, STREET, 1/2, 90 DEG., SCH80	1
11	D71161	EYEBOLT, PIPE TRAIN, 7/8" SHAFT COLLAR	2
12	J24071	NIPPLE, 1/2" x 2, SCH 80	2
13	J2407	NIPPLE, 1/2" x CLOSE, SCH 80	2



DXF CREATED:

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RAW MATL. NO. ----- PART NO. T17132D

MATERIAL -----

DATE 05/31/2011

USED IN ASSY OF: CENT REV DRYER

SHEET 7.605

DESCRIPTION: PIPE TRAIN, LIQ, 1/2, CENT RV, D-C SHEET: 1 OF 1

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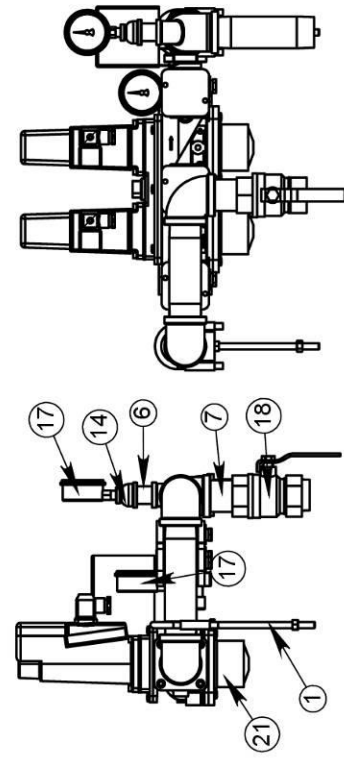
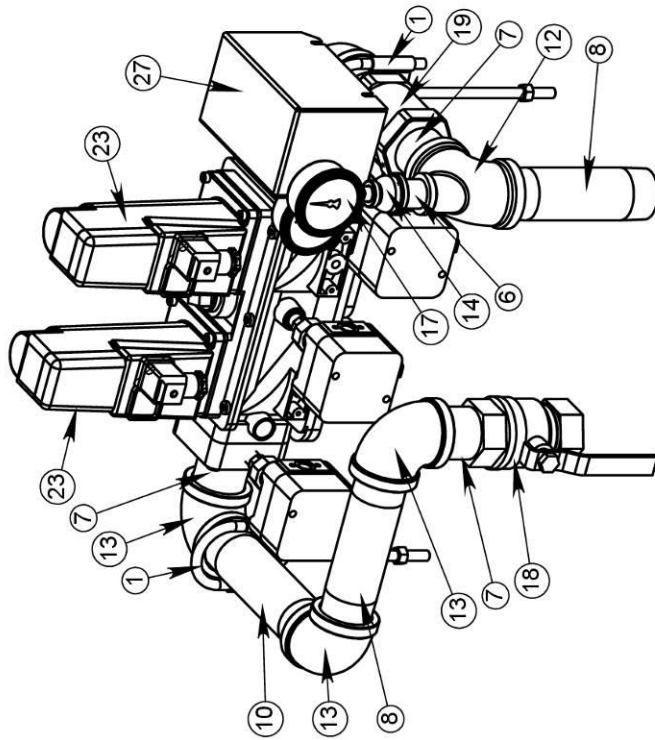
REV.	DESCRIPTION OR ENG. ORDER #	DATE	BY
REVISIONS			

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	D71163	CLAMP, PIPE TRAIN, 2"	2
2	J0496	SCREW, 1/4-20, 3/4, PLT, SELFDRILL	2
3	J0975	STUD, WELD, RTANGLE, 10-24 x 1/2" LG.	1
4	J0976	NUT, #10-24, WING	1
5	J24003	NIPPLE, 1/4" X 7/8", SCH 40	7
6	J2410	NIPPLE, 3/4 x CLOSE, SCH 40	1
7	J2431	NIPPLE, 1 1/2"XCLOSE SCH 40	4
8	J2432	NIPPLE, 1 1/2 x 2, SCH 40	1
8	J2437	NIPPLE, 1.5 X 6" SCH40	2
10	J2445	NIPPLE, 1 1/2" x 7", SCH 40	1
11	J2469	TEE, 1/4" X 1/4" X 1/4", SCH40	1
12	J2477	TEE, 1 1/2 x 3/4 x 1 1/2, SCH 40	1
13	J2541	ELBOW, 1 1/2", 90 DEG, SCH40	4
14	J2574	COUPLING, REDUCING, 3/4X1/4 SC40	1
15	J2703	UNION, 1/4", SCH40	3
16	J4437	SWITCH, PRESS., DUNGS, GW2000 A4	3
17	J5967	GAUGE, PRESSURE, 0-15, LIQ, 1/4" BTM, MT	2
18	J6087	VALVE, 1 1/2", BALL	1
19	J6127	VALVE, BUTTERFLY, L/ACTUATOR, 1 1/2", MAXON	1
20	J6229	CONNECTOR, DIN, ACTUATOR (SWITCH), AGA65	2
21	J6237	VALVE, GAS, 1 1/2, DBL, VGD20.403	1
22	J6239	FLANGE SET, 1 1/2 NPT, AGA4U	2
23	J6240	ACTUATOR, SKP15.001E1	2
24	J6241	KIT, NEMA 4, AGA66	2
25	T10150	SHIM	1
26	T161935	BRACKET, ELECTRONIC MOD VALVE	1
27	T26902	COVER, ELECTRONIC VALVE, 5.625 X 3.5	1

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TOLERANCE UNLESS SPECIFIED
 .X = ± .050
 .XX = ± .010
 .XXX = ± .005
 FRAC = ± 1/32
 = ± 1°

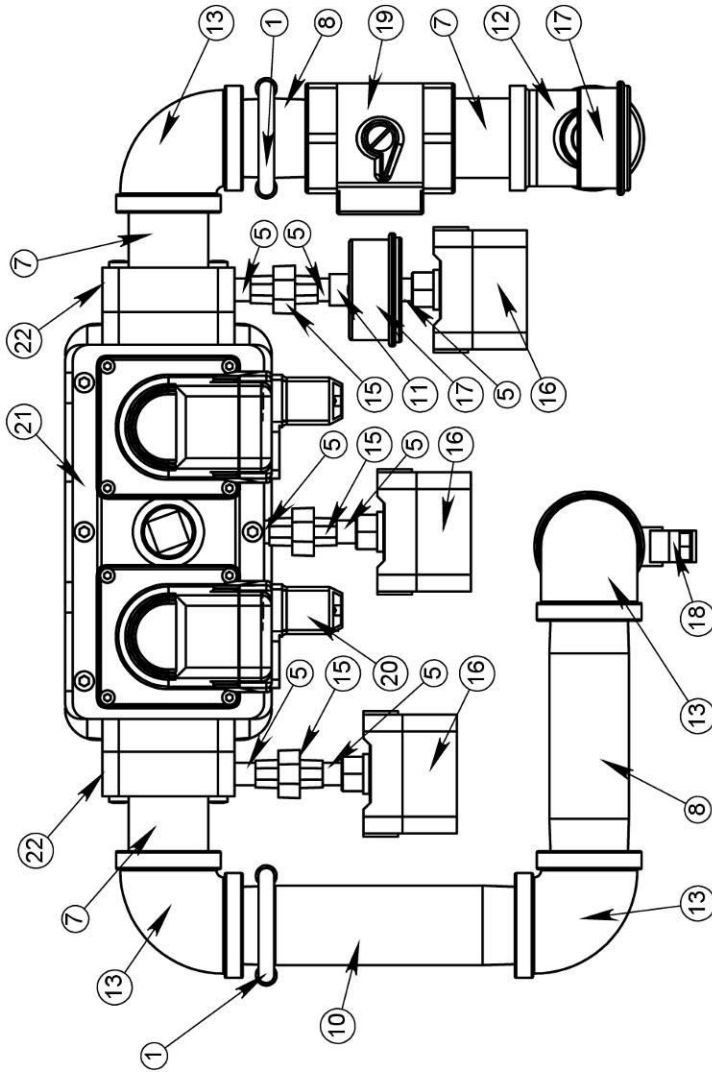
DRAWN BY: **MJM** PART NO.: **T18823D**
 RAW MTL NO.: - - - - MATERIAL: - - - -
 DATE: **02/07/2012**
 DESCRIPTION: **DC, CENT HEATER**
 DESCRIPTION: **PIPE TRAIN, NG, ELMVLV, CENT, DC** WEIGHT: **105.95**
 SHEET: 1 OF 2



REV.	DESCRIPTION OR ENG. ORDER #	DATE	BY
A	REMOVED ENTRY PIPE COMPONENTS	02/03/2016	CSH

REVISIONS

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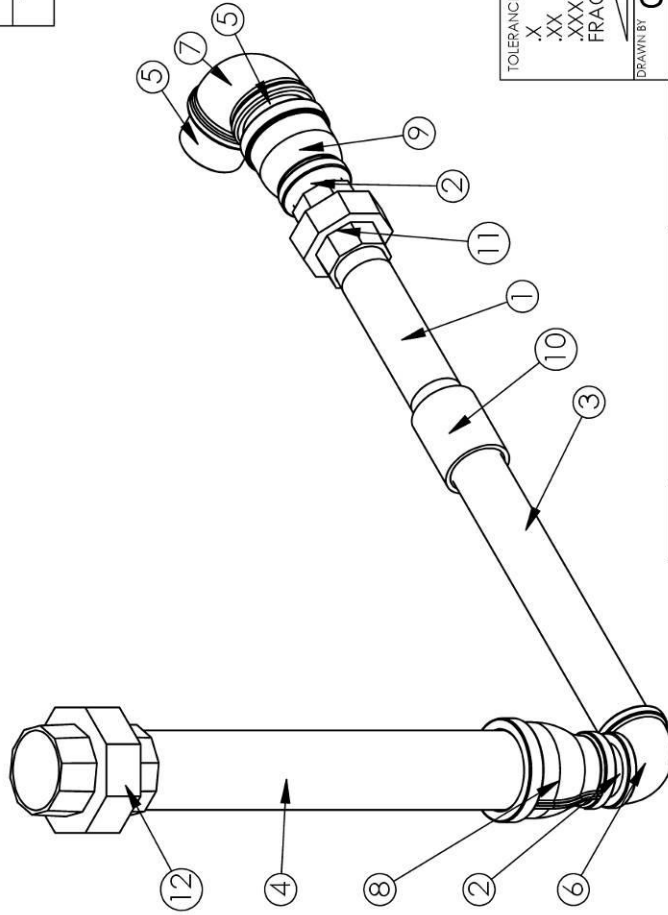
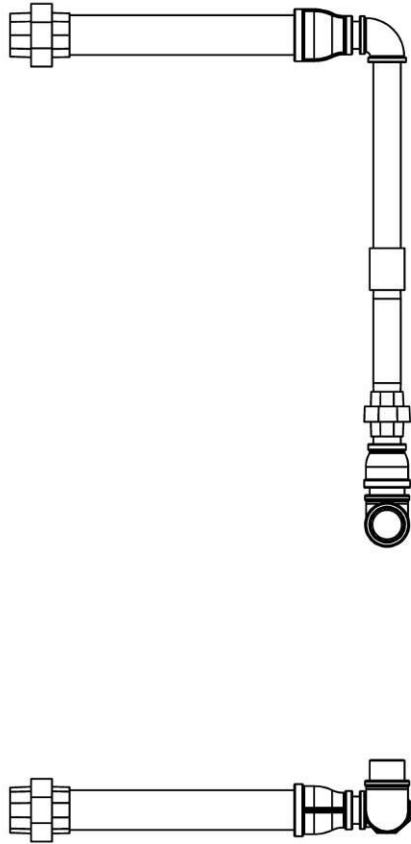


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<p>SUKUP MFG. CO. Sukup SUKUP PARKWAY SHEFFIELD, IA. 50475</p>		<p>PART NO. T18823D</p>	
<p>TOLERANCE UNLESS SPECIFIED .X = ±.050 .XX = ±.010 .XXX = ±.005 FRAC = ± 1/32 ANGLE = ± 1°</p>		<p>RAW MATL. NO. ----- MATERIAL -----</p>	
<p>DRAWN BY MJM</p>		<p>DATE 02/07/2012</p>	
<p>DESCRIPTION DC, CENT HEATER</p>		<p>WEIGHT 105.95</p>	
<p>DESCRIPTION PIPE TRAIN,NG,ELMVLV,CENT,DC</p>		<p>SHEET: 2 OF 2</p>	

<p>REMOVED ENTRY PIPE COMPONENTS</p>		<p>DATE 02/03/2016</p>	
<p>DESCRIPTION OR ENG. ORDER #</p>		<p>DATE BY</p>	
<p>REVISIONS</p>			

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	D71191	ORIFICE PIPE, 1"X6"	1
2	J2417	NIPPLE, 1.00X CLOSE SCH 40	2
3	J24171	NIPPLE, 1 X 10, SCH 40	1
4	J24391	NIPPLE, 1.5 X 12" SCH 40, BLACK	1
5	J2500	NIPPLE, 1.25 X CLOSE	2
6	J25251	ELBOW, 1, 90 DEG., SCH 40	1
7	J2540	ELBOW, 1 1/4, 90 DEG, SCH 40	1
8	J2553	COUPLING, RED., 1 1/2" x 1", SCH 40	1
9	J25761	CPLNG, REDUCING, 1 1/4" x 1", SCH 40	1
10	J2675	COUPLING, 1, BLACK, SCH 40	1
11	J2696	UNION, 1" SCH 40	1
12	J2707	UNION, 1 1/2", SCH 40	1



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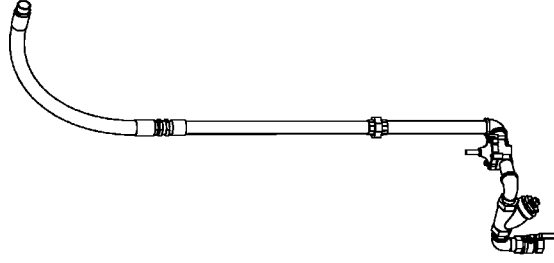
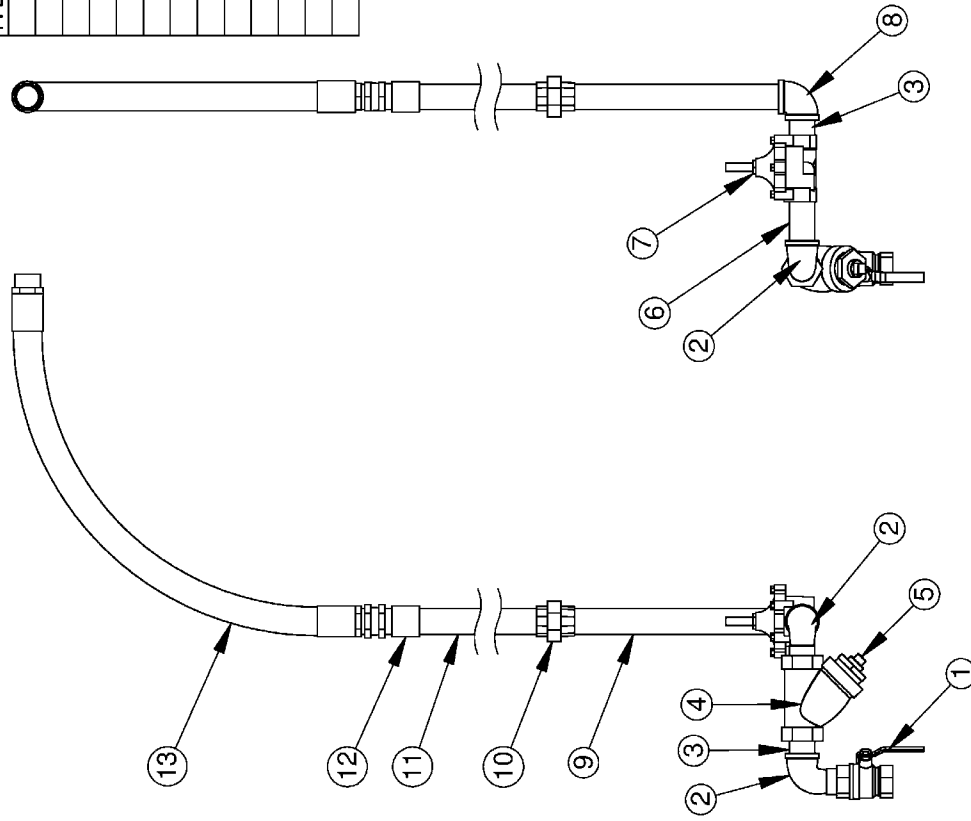
TOLERANCE UNLESS SPECIFIED
 .X = ± .050
 .XX = ± .010
 .XXX = ± .005
 FRAC = ± 1/32
 ∠ = ± 1°

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DRAWN BY: CSH	RAW MATL. NO. ---	PART NO. T17235
DATE: 02/04/2016	MATERIAL: ---	
DESCRIPTION: H BURNER	WEIGHT: 11.87	
DESCRIPTION: PIPE, ENTRY, HOUSING, NG, DOMESTIC	SHEET: 1 OF 1	

REV.	DESCRIPTION OR ORDER #	DATE	BY
B	FIXED BALLOON ERROR	03/31/2016	CSH
REVISIONS			

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	J6087	VALVE, 1 1/2", BALL (FIREING)	1
2	J2542	ELBOW, STREET, 1.5", 90 DEG, SCH40	2
3	J2431	NIPPLE, 1.5X CLOSE SCH40	2
4	J6232	STRAINER, 1 1/2"	1
5	J2625	PLUG, 1"	1
6	J2436	NIPPLE, 1.5 X 4", SCH40	1
7	T25163S	SOLENOID ASSY, NG, 1 1/2", MNFLD	1
8	J2541	ELBOW, 1 1/2", 90 DEG, SCH40	1
9	T25167	PIPE, 1 1/2 X 16", SCH40	1
10	J2707	UNION, 1 1/2", SCH40	1
11	T25164	PIPE, 1 1/2 X 29", SCH40	1
12	J26781	COUPLING, 1 1/2" BLACK PIPE	1
13	J5935	HOSE, NG, 1 1/2 X 36"	1



UNLESS OTHERWISE SPECIFIED
 .X = ±.010
 .XX = ±.005
 .XXX = ±.001
 FRAC = ± 1/32
 ±

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DRAWN BY: JFJ
 DATE: 6/13/2008
 RAW MATL. NO.: T25152
 DVG. NO.: T25152

MATERIAL: CENT CONT FLOW DRYER

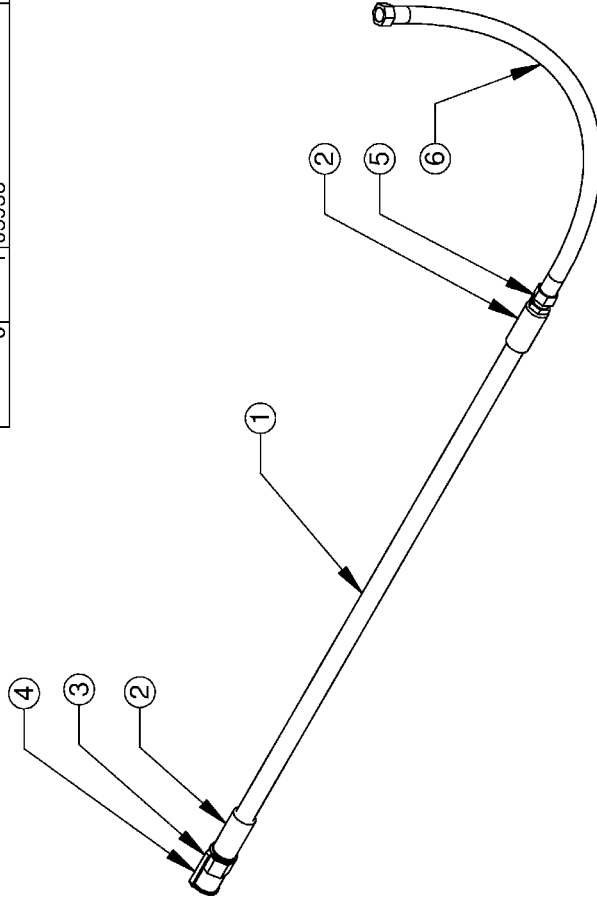
USED IN ASSY OF: MANIFOLD, NG, 1 1/2", SUCT COOL CENT DRYER

NAME: MANIFOLD, NG, 1 1/2", SUCT COOL CENT DRYER

REF	ENG. ORDER #	BY	DATE
B	REVISED	DDV	01/13/2011
A	ADDED T25167, J2678	DJB	7-29-08

R E V I S I O N

ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	T24161	PIPE, 1/2" X 2 1/2", SCH 80
2	2	J2577	COUPLING, 1/2", SCH 80
3	1	J6170	VALVE, 1/2", RELIEF, 3129G, H135-2
4	1	J6200	RAIN CAP, 7545-10
5	1	J2840	UNION, 1/2 FL X 1/2 NIP
6	1	J5938	HOSE, CGA x 28 1/2", 7000808-886



TOLERANCE UNLESS SPECIFIED
 X = ± .050
 XX = ± .010
 .XXX = ± .005
 FRAC = ± 1/32
 ∠ = ± 1°

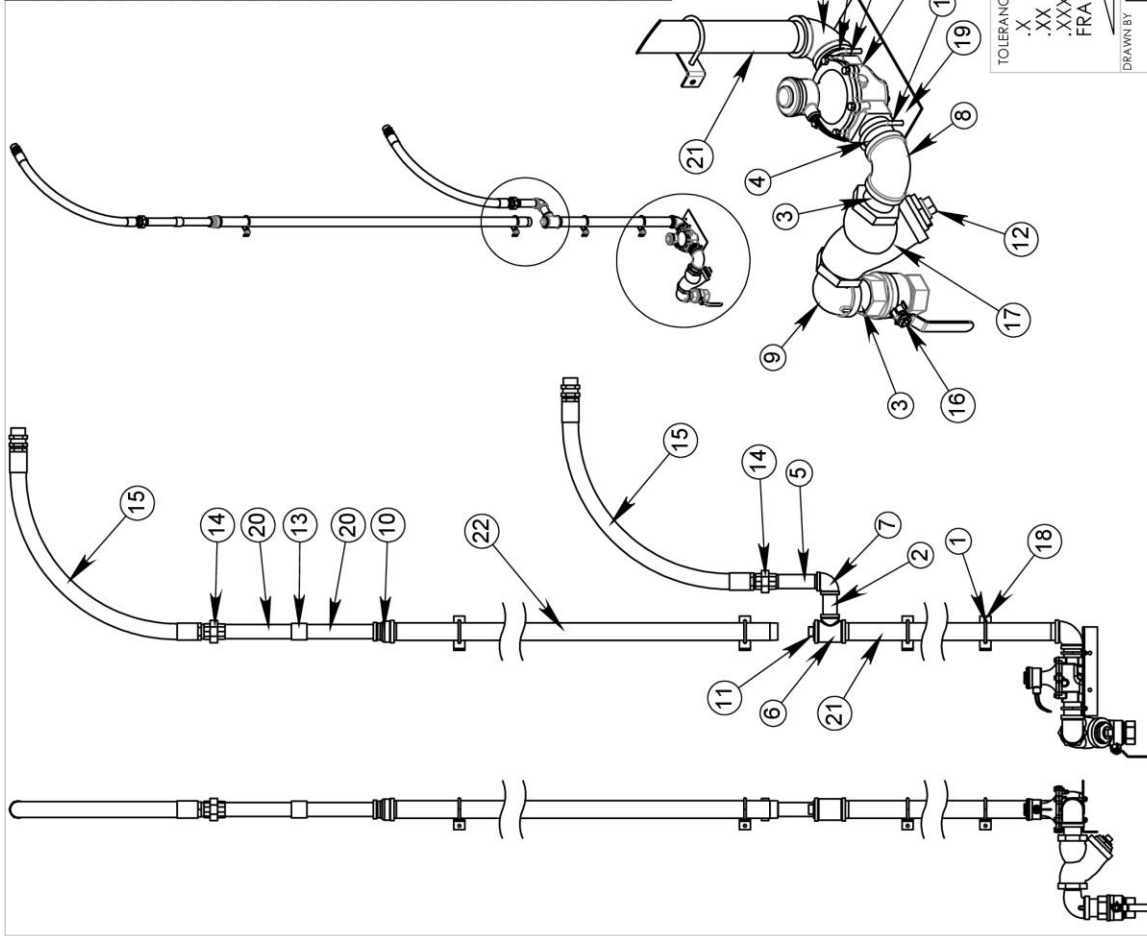
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 SHEFFIELD, IA. 50475

DRAWN BY: THW	RAW MATL. NO.	PART NO. T20195CS
DATE 01/03/2011	MATERIAL	WEIGHT
USED IN ASSY OF:	DRYER, SUCT COOL	
DESCRIPTION	MANIFOLD, RELIEF VALVE, CENT DRYER, CSA	

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REF	ENG. ORDER #	BY	DATE
R E V I S I O N			

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	J08101	U-BOLT, 5/16-18 X 2 9/16ID, 2 7/8 DEEP	6
2	J2436	NIPPLE, 1.5 X 4" SCH40	1
3	J2440	NIPPLE, 2 X CLOSE SCH 40	3
4	J2441	NIPPLE, 2 X 3, SCH 40	1
5	J2445	NIPPLE, 1 1/2" x 7", SCH 40	1
6	J2497	TEE, 2x2x1 1/2, SCH 40	1
7	J2541	ELBOW, 1 1/2", 90 DEG, SCH40	1
8	J2543	ELBOW, 2", 90DEG, SCH 40	2
9	J2544	ELBOW, STREET, 90DEG, 2" SCH 40	1
10	J2586	COUPLING, REDUCING, 2 x 1.5, SCH 40	1
11	J2621	PLUG, 2", PIPE, IRON	1
12	J2626	PLUG, 1 1/4, IRON	1
13	J26781	COUPLING, 1 1/2" BLACK PIPE	1
14	J2707	UNION, 1 1/2", SCH40	2
15	J5935	HOSE, NG, 1 1/2 X 36"	2
16	J6088	VALVE, 2", BALL	1
17	J6234	STRAINER, 2", 100 MESH	1
18	T24183	BRACKET, MANIFOLD, NG	4
19	T241831	BRACKET, SPRT, MANIFOLD, NG	1
20	T25162	NIPPLE, 1 1/2", 10.5"L	2
21	T30162	PIPE, 2", 37", SCH 40	1
22	T30163	PIPE, 2", 99", SCH 40	1
23	T30166	VALVE, SOLENOID, COMP, 2", ASCO	1



TOLERANCE UNLESS SPECIFIED
X = ± .050
.XX = ± .010
.XXX = ± .005
FRAC = ± 1/32
= ± 1°

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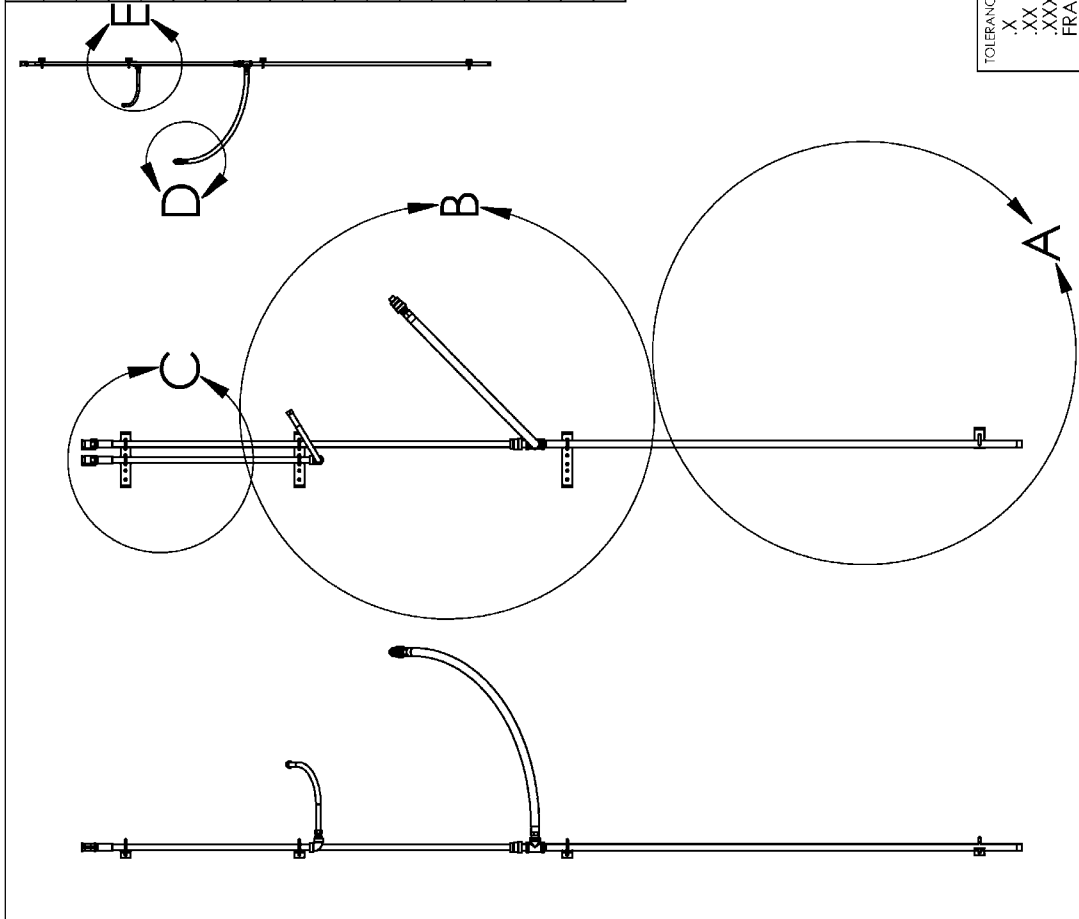
RAW MATL. NO. ----- PART NO. T25154

A	REV.	REMOVED T80200 (X1), ADDED T241831 (X1)	DATE	05/18/2017	TSR	DATE	BY	DESCRIPTION	WEIGHT
		DESCRIPTION OR ENG. ORDER #						DRYER, PORT, 16', 2STK CENT	134.996
REVISIONS									SHEET: 1 OF 1

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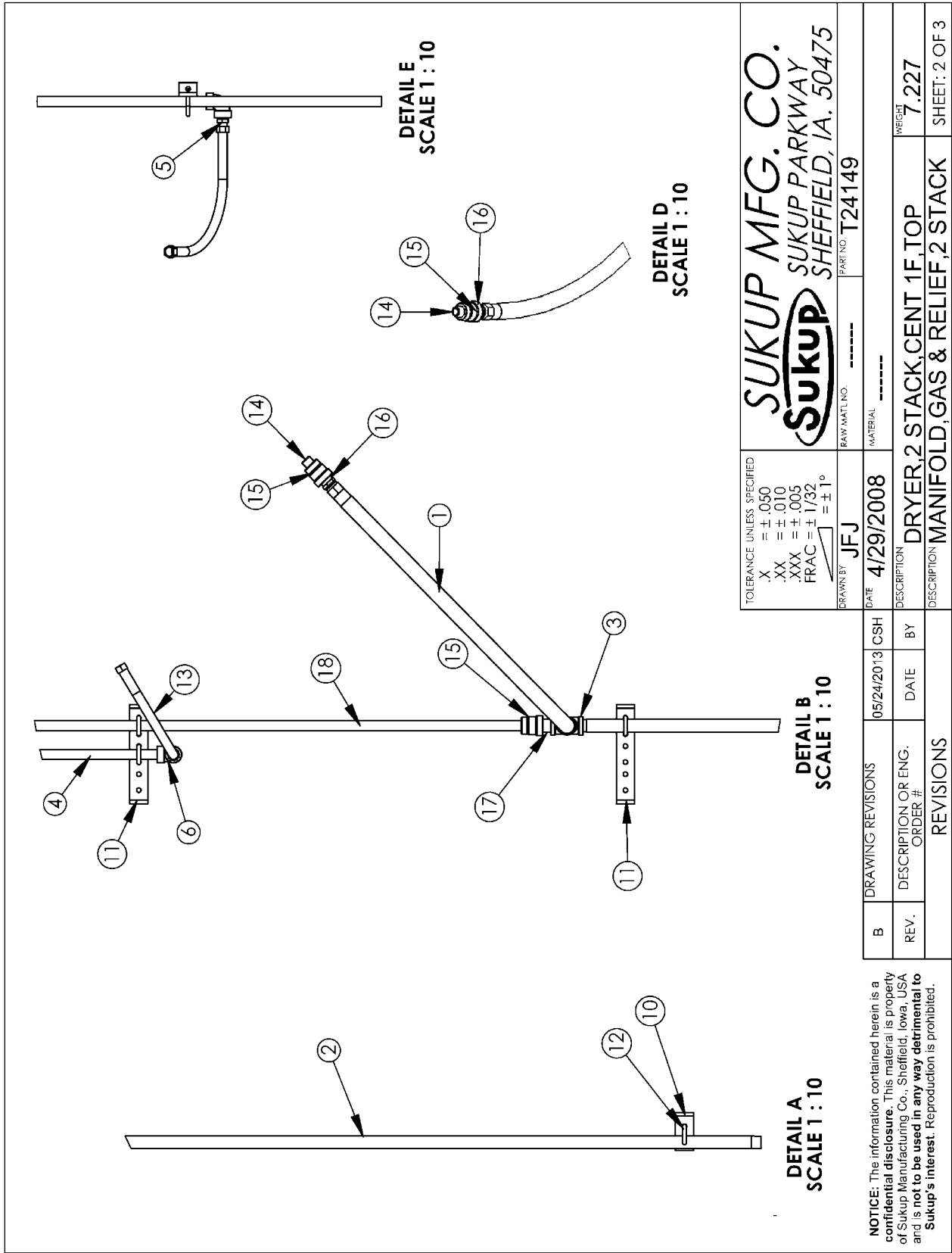
ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	J5928	HOSE, HIGH PRESSURE, 3/4" X 48"
2	1	T24144	PIPE, THREADED, 3/4 X 6' SCH 80
3	1	J2491	TEE, 3/4 X 3/4 X 3/4, SCH 80
4	1	T24161	PIPE, 1/2" X 2 1/2', SCH 80
5	1	J2840	UNION, 1/2 FL X 1/2 NIP
6	1	J2523	ELBOW 1/2 X 90° SCH 80
7	2	J2577	COUPLING, 1/2", SCH 80
8	2	J6170	VALVE, 1/2", RELIEF, 3129G, HI 135-2
9	2	J6200	RAIN CAP, 7545-10
10	1	T24184	BRACKET SHORT, MANIFOLD, LP
11	3	T24185	BRACKET LONG, MANIFOLD, LP
12	6	J0810	U-BOLT, 5/16-18, 1 1/16" ID 1.75D
13	1	J5936	HOSE, HIGH PRESSURE, 3/8" X 28"
14	1	J2407	NIPPLE, 1/2" x CLOSE, SCH 80
15	2	J25751	COUPLING, REDUCING, 3/4 X 1/2 SCH 80
16	1	J2416	NIPPLE, 3/4 X CLS, BR5, HEX
17	1	J2415	NIPPLE, 3/4 X CLOSE, SCH 80
18	1	T24162	PIPE, 1/2" X 5', SCH 80



<p>TOLERANCE UNLESS SPECIFIED</p> <p>.X = ± .050</p> <p>.XX = ± .010</p> <p>.XXX = ± .005</p> <p>FRAC = ± 1/32</p> <p>FRAC = ± 1°</p>		<p>SUKUP MFG. CO.</p> <p>Sukup</p> <p>SUKUP PARKWAY</p> <p>SHEFFIELD, IA. 50475</p>	
DRAWN BY	JFJ	RAW MAT. NO.	-----
DATE	4/29/2008	PART NO.	T24149
DESCRIPTION	DRYER, 2 STACK CENT 1F, TOP	MATERIAL	-----
DESCRIPTION	MANIFOLD, GAS & RELIEF, 2 STACK	WEIGHT	7.227
DESCRIPTION	REVISIONS	SHEET:	1 OF 3

NOTICE: The information contained herein is a confidential disclosure. This material is property of Sukup Manufacturing Co., Sheffield, Iowa, USA and is not to be used in any way detrimental to Sukup's interest. Reproduction is prohibited.





SUKUP MFG. CO.
Sukup
 SUKUP PARKWAY
 SHEFFIELD, IA. 50475

TOLERANCE UNLESS SPECIFIED
 .X = ± .050
 .XX = ± .010
 .XXX = ± .005
 FRAC = ± 1/32
 ∠ = ± 1°

DRAWN BY: JFJ
 RAW MATL. NO.: -----
 PART NO.: T24149

DATE: 4/29/2008
 MATERIAL: -----

DESCRIPTION: DRYER, 2 STACK CENT 1F, TOP
 WEIGHT: 7.227

DESCRIPTION: MANIFOLD, GAS & RELIEF, 2 STACK
 SHEET: 2 OF 3

DETAIL B
 SCALE 1 : 10

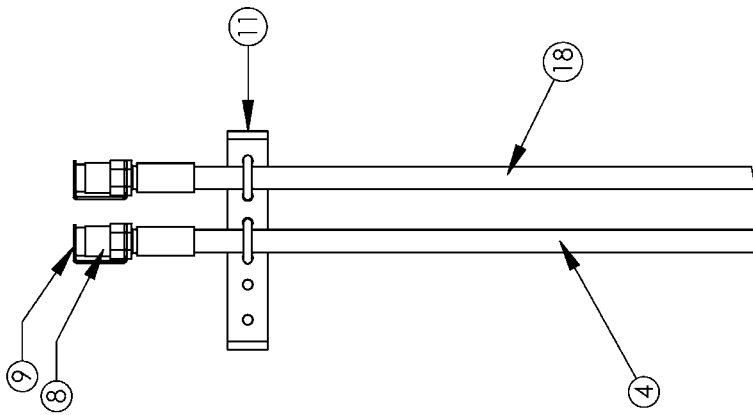
DETAIL A
 SCALE 1 : 10

DETAIL D
 SCALE 1 : 10

REVISIONS			
B	DRAWING REVISIONS	DATE	BY
B	05/24/2013	CSH	
REV.	DESCRIPTION OR ORDER #	DATE	BY



NOTICE: The information contained herein is a confidential disclosure. This material is property of Sukup Manufacturing Co., Sheffield, Iowa, USA and is not to be used in any way detrimental to Sukup's interest. Reproduction is prohibited.





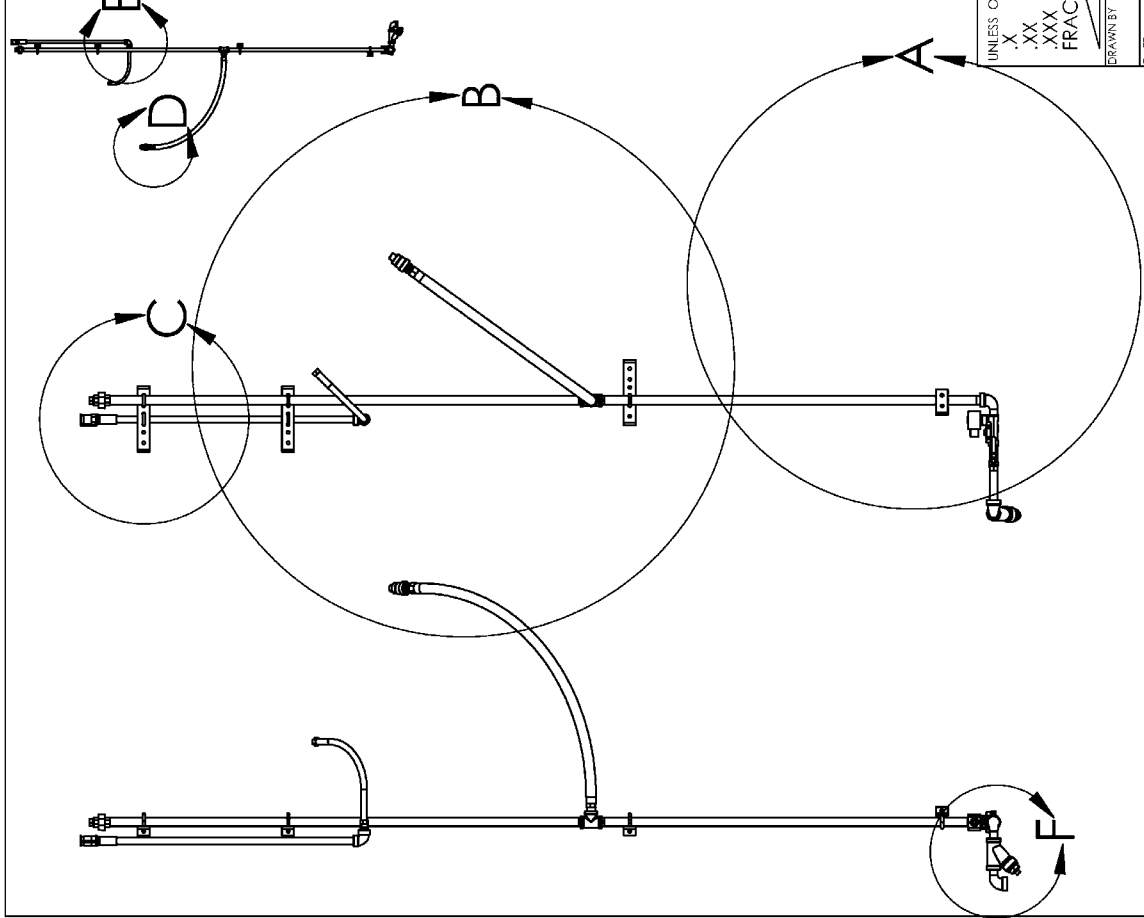
DETAIL C
SCALE 1 : 6

DXF CREATED:

<p>SUKUP MFG. CO.  SUKUP PARKWAY SHEFFIELD, IA. 50475</p>		PART NO. T24149
TOLERANCE UNLESS SPECIFIED .X = ± .050 .XX = ± .010 .XXX = ± .005 FRAC = ± 1/32  = ± 1°	DRAWN BY JFJ	RAW MATL. NO. ----- MATERIAL -----
DATE 4/29/2008	DESCRIPTION DRYER, 2 STACK CENT 1F, TOP	
DESCRIPTION ORDER #	DATE BY	WEIGHT 7.227
REVISIONS		SHEET: 3 OF 3

NOTICE: The information contained herein is a **confidential disclosure**. This material is property of Sukup Manufacturing Co., Sheffield, Iowa, USA and is **not to be used in any way detrimental to Sukup's interest**. Reproduction is prohibited.

ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	J5928	HOSE, HIGH PRESSURE, 3/4" X 48"
2	3	J2532	ELBOW, STREET, 3/4, 90 DEG., EX HVY
3	1	J6083	VALVE, 3/4", BALL
4	1	J2415	NIPPLE, 3/4 X CLOSE, SCH 80
5	1	T24143	PIPE, THREADED, 3/4" X 4', SCH 80
6	1	J2491	TEE, 3/4 X 3/4 X 3/4, SCH 80
7	1	T24161	PIPE, 1/2" X 2 1/2', SCH 80
8	1	J2840	UNION, 1/2 FL X 1/2 NIP
9	1	J2523	ELBOW 1/2 X 90° SCH 80
10	1	J2577	COUPLING, 1/2", SCH 80
11	1	J6170	VALVE, 1/2", RELIEF, 3129G, H135-2
12	1	J6200	RAIN CAP, 7545-10
13	1	T24184	BRACKET SHORT, MANIFOLD, LP
14	3	T24185	BRACKET LONG, MANIFOLD, LP
15	6	J0810	U-BOLT, 5/16-18, 1 1/16" ID 1.75D
16	1	J5936	HOSE, HIGH PRESSURE, 3/8" X 28"
17	1	J24251	PIPE, 3/4 X 4 1/2, SCH 80
18	1	J2407	NIPPLE, 1/2" x CLOSE, SCH 80
19	1	J25751	COUPLING, REDUCING, 3/4 X 1/2 SCH 80
20	1	J2416	NIPPLE, 3/4 X CLS, BR5, HEX
21	1	J6230	STRAINER, 3/4"
22	1	T24152	PIPE, 3/4" ID, SCH 80, 5'
23	1	J2617	PLUG, 1/2, SQ HD, BLACK
24	1	T24166C	SOLENOID ASSY, LP, 3/4", MANIFOLD
25	1	J2704	UNION, 3/4, SCH 80
26	1	J2620	PLUG, 3/4, PIPE



SUKUP MFG. CO.
Sukup SUKUP PARKWAY
SHEFFIELD, IA. 50475

UNLESS OTHERWISE SPECIFIED
.X = ±.010
.XX = ±.005
.XXX = ±.001
FRAC = ± 1/32
± = ±

DRAWN BY: JFJ
DATE: 4/29/2008
MATERIAL: -----
RAW MATL. NO.: -----
DWG. NO.: T24148

REF	ENG. ORDER #	BY	DATE

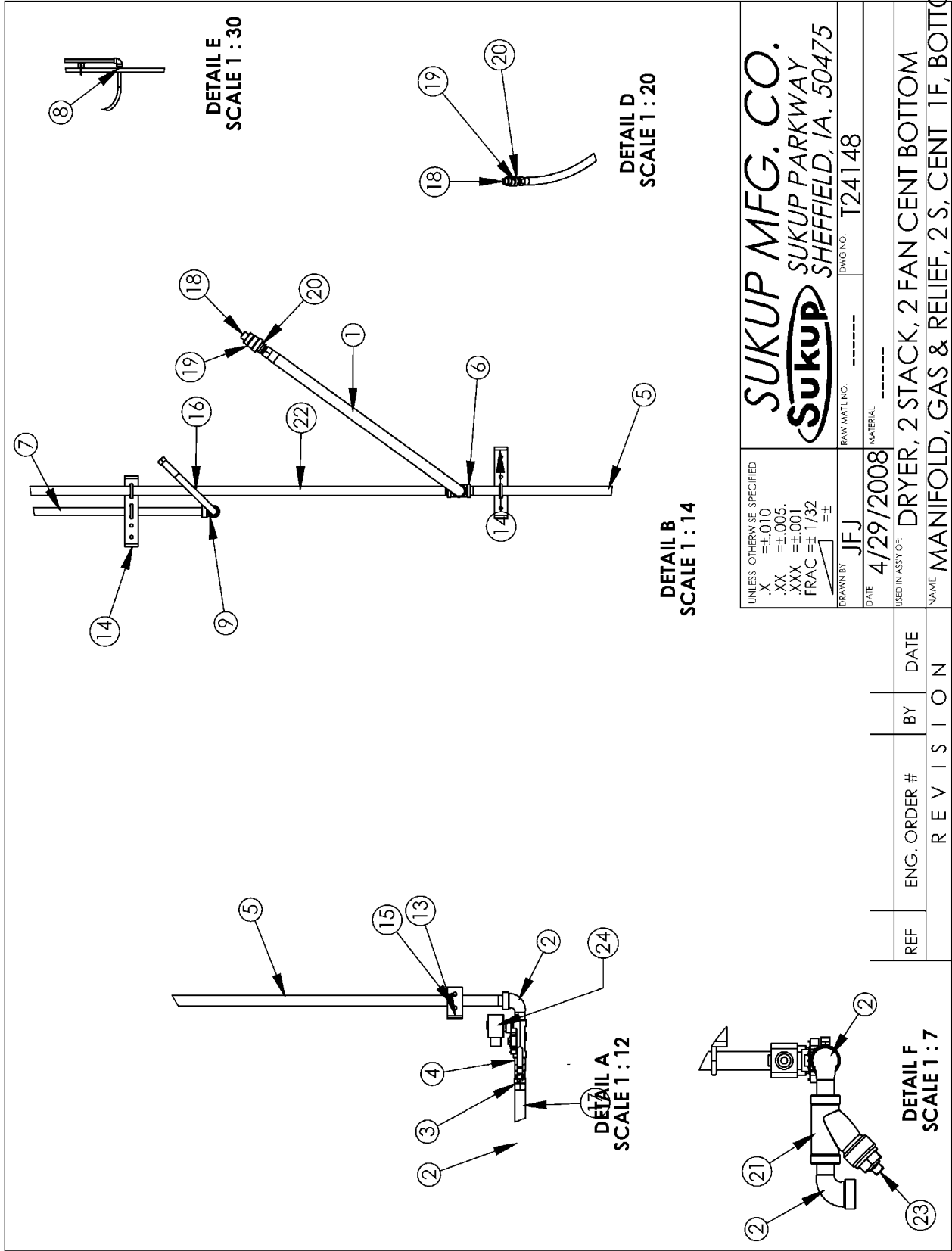
USED IN ASSY OF: DRYER, 2 STACK, 2 FAN CENT BOTTOM

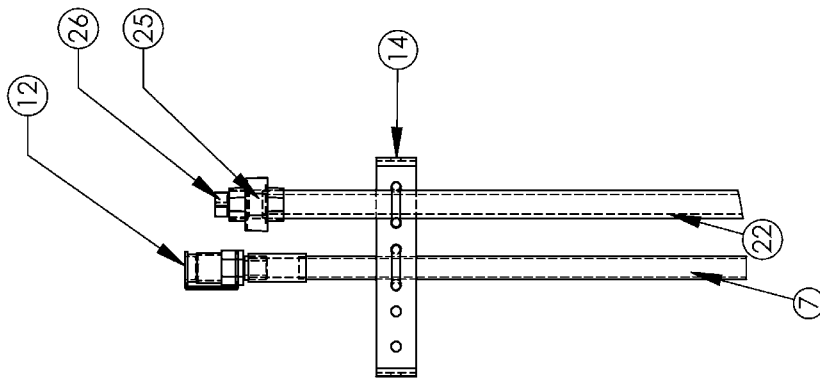
NAME: MANIFOLD, GAS & RELIEF, 2 S, CENT 1F, BOTTOM

REVISION

NO.	DESCRIPTION	DATE







DETAIL C
SCALE 1 : 6

UNLESS OTHERWISE SPECIFIED .X = ±.010 .XX = ±.005 .XXX = ±.001 FRAC = ± 1/32 ± = ±	SUKUP MFG. CO.	
	Sukup SUKUP PARKWAY SHEFFIELD, IA. 50475	
DRAWN BY JFJ	RAW MATL. NO. -----	DWG. NO. T24148
DATE 4/29/2008	MATERIAL -----	
USED IN ASSY OF:	DRYER, 2 STACK, 2 FAN CENT BOTTOM	
NAME	MANIFOLD, GAS & RELIEF, 2 S, CENT 1F, BOTTOM	

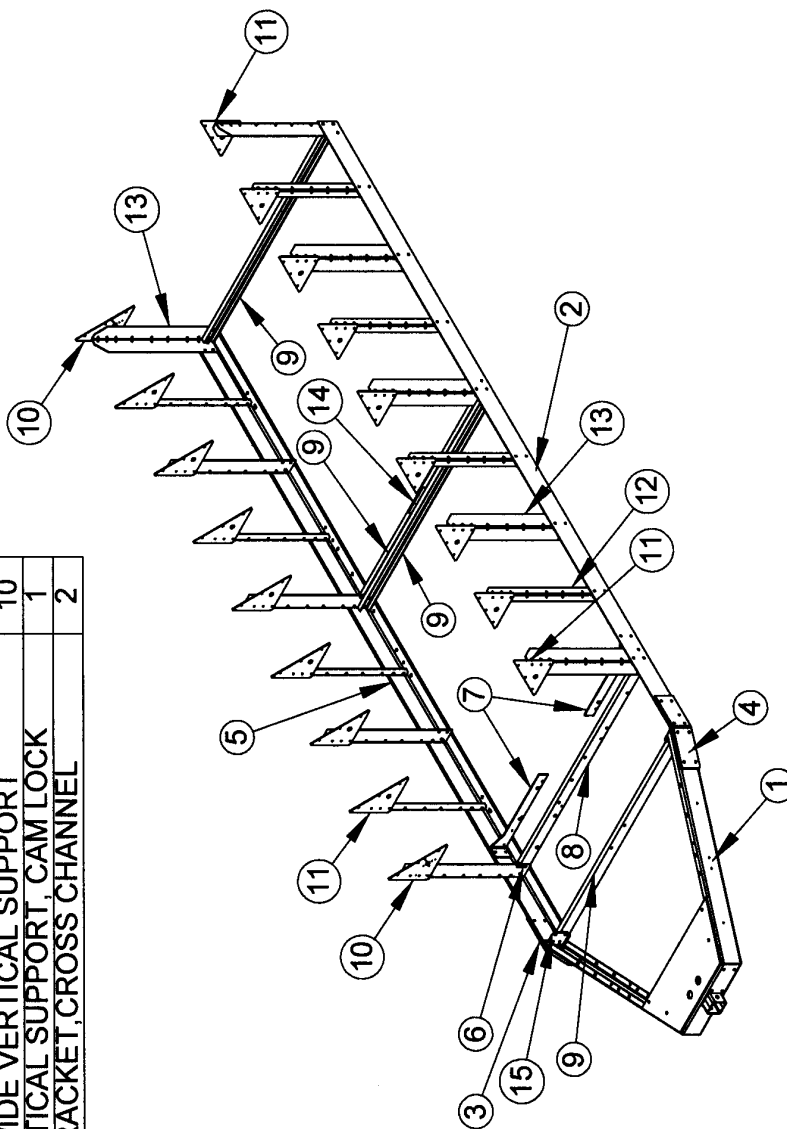
REF	ENG. ORDER #	BY	DATE

R E V I S I O N

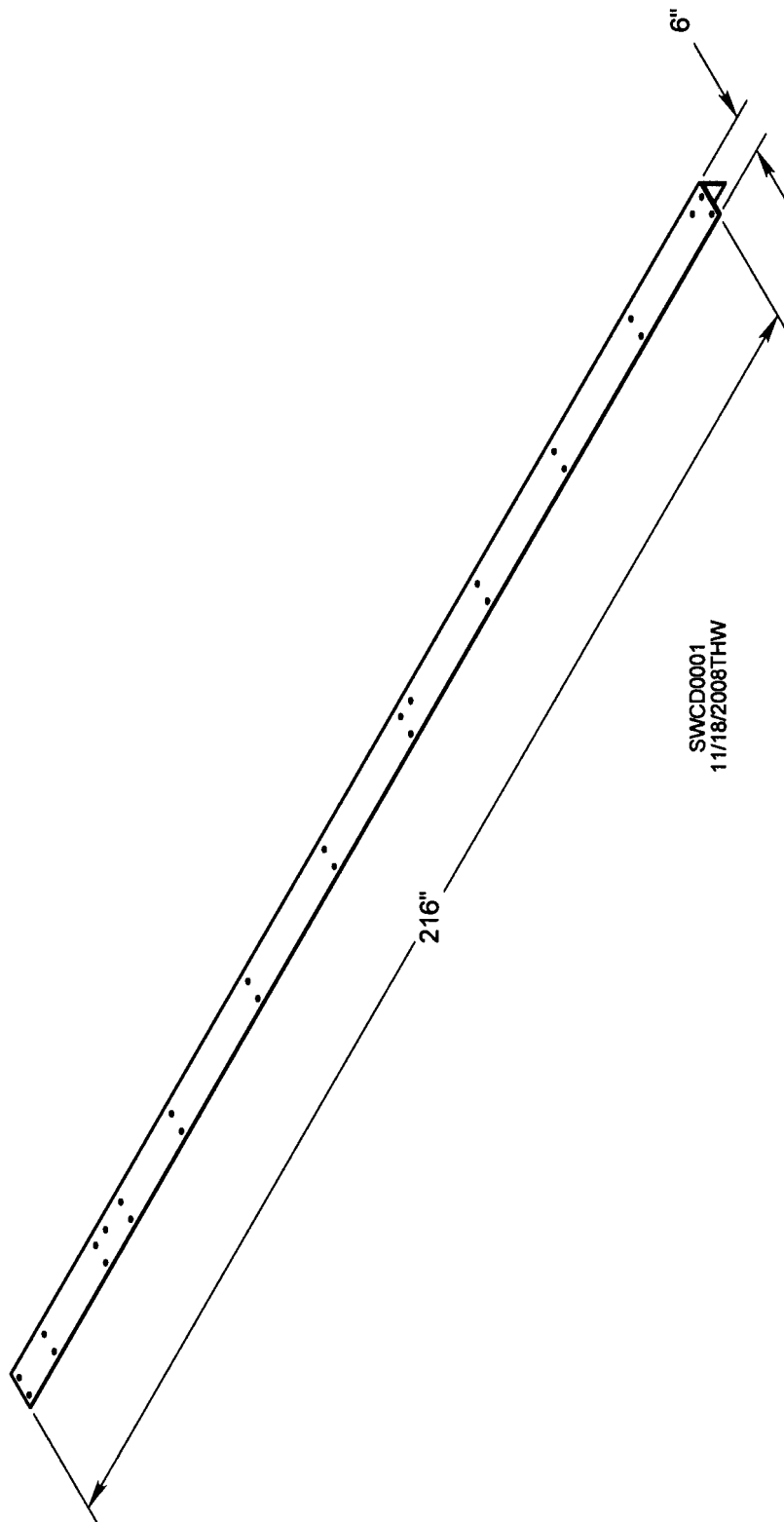
FRAME ASSEMBLY

T16306 FRAME ASSEMBLY FOR 16' CENTRIFUGAL DRYER

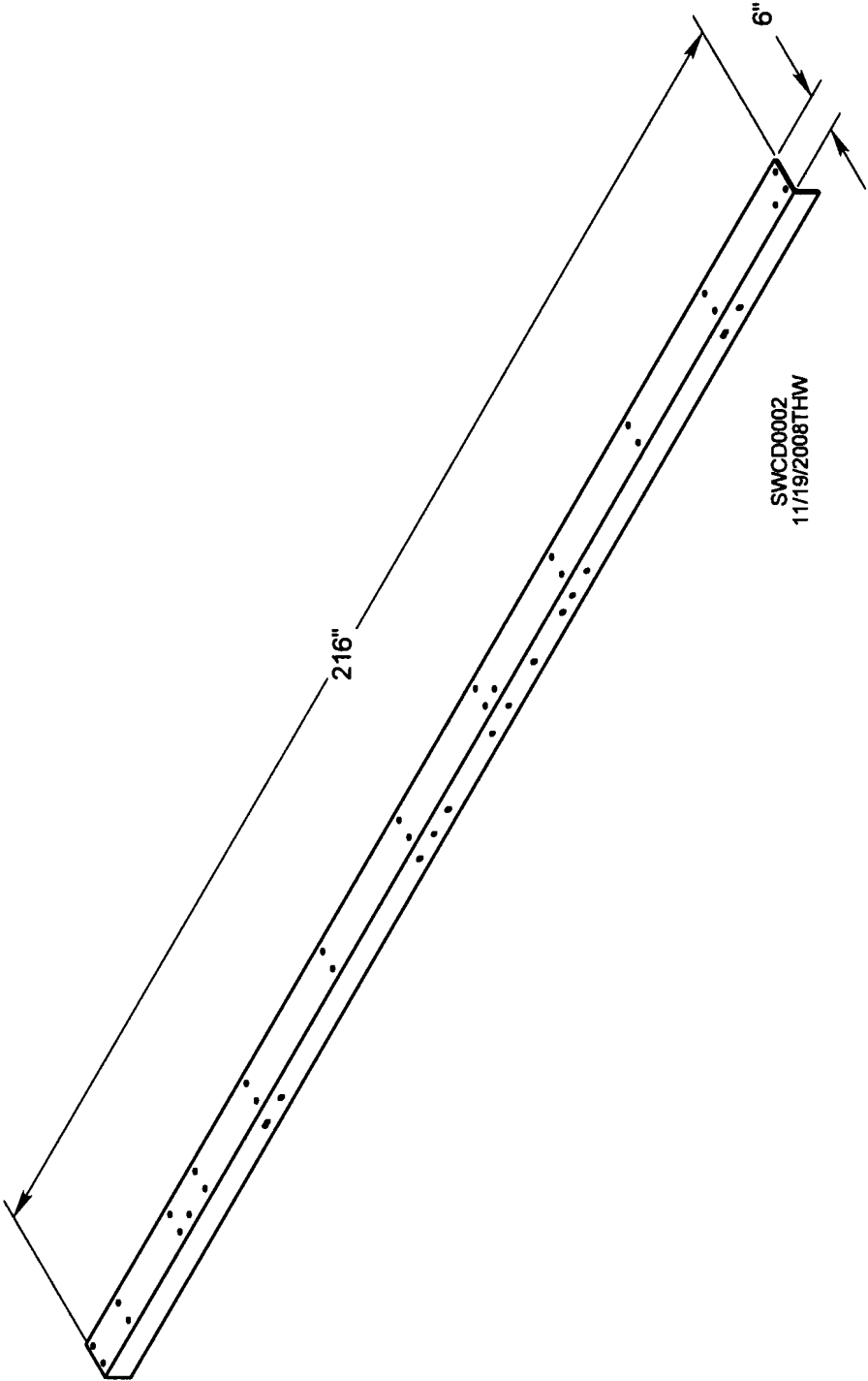
ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	T24423	HITCH RECEIVER WELDMENT	1
2	T80206	LEFT FRAME ANGLE	1
3	T16332D	PLATE, 3/4" HITCH CONNECTOR, R.H.	1
4	T16321D	PLATE, 3/4" HITCH CONNECTOR, L.H.	1
5	T80205	RIGHT FRAME ANGLE	1
6	T16329	TIGHTENER ANGLE	1
7	T16328	DC MOTOR BRACE	2
8	T16333	FRONT CROSS CHANNEL	1
9	T16325	CROSS CHANNEL	4
10	T16331	PLATE, MAIN CONNECTOR, BOX, CONDUIT	2
11	T16324	MAIN CONNECTOR PLATE	16
12	T16323	NARROW VERTICAL SUPPORT	8
13	T16322	WIDE VERTICAL SUPPORT	10
14	T16389	VERTICAL SUPPORT, CAM LOCK	1
15	T80147	BRACKET, CROSS CHANNEL	2



T80205 RIGHT FRAME ANGLE FOR 16' CENTRIFUGAL DRYER

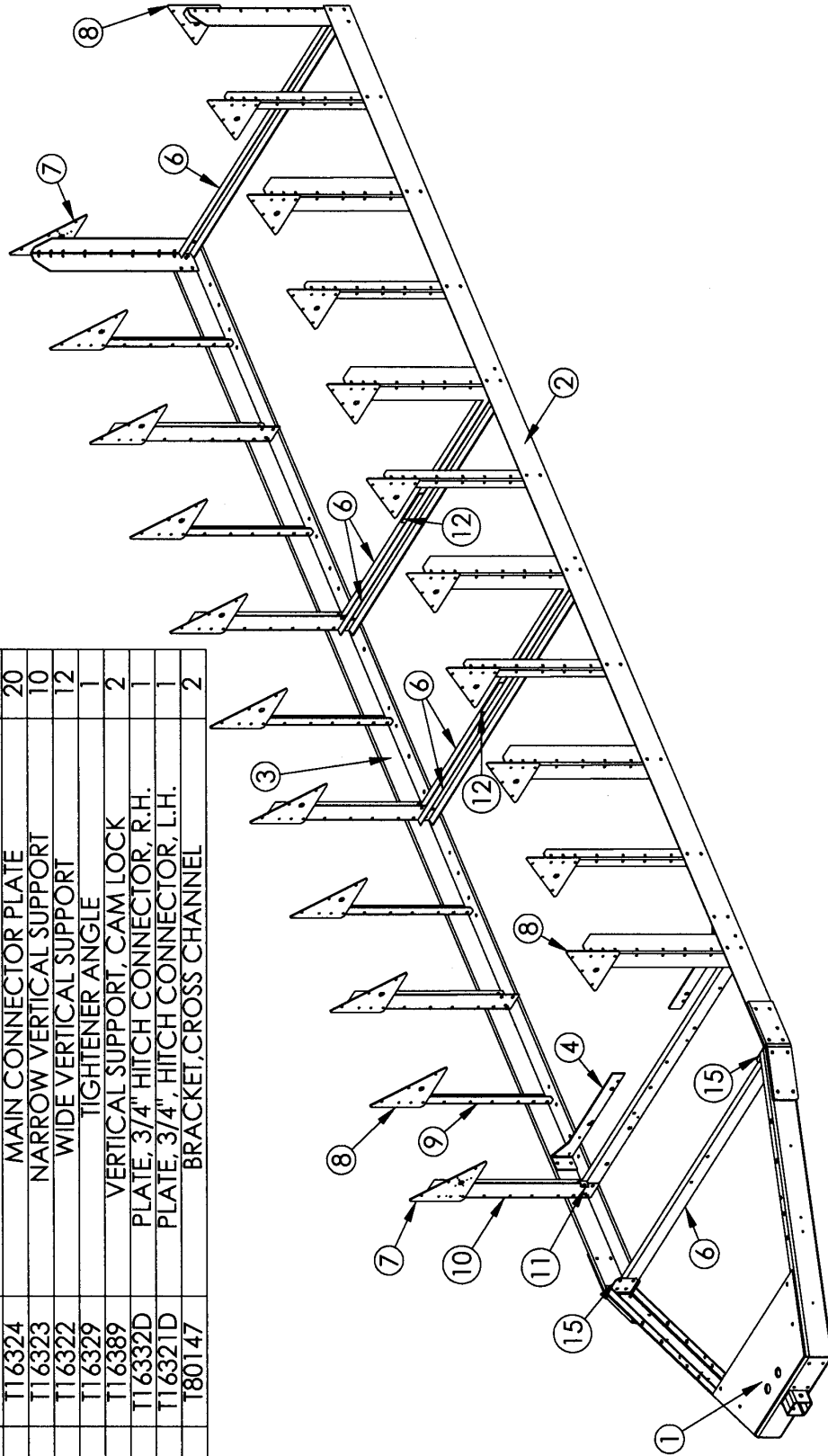


T80206 LEFT FRAME ANGLE FOR 16' CENTRIFUGAL DRYER

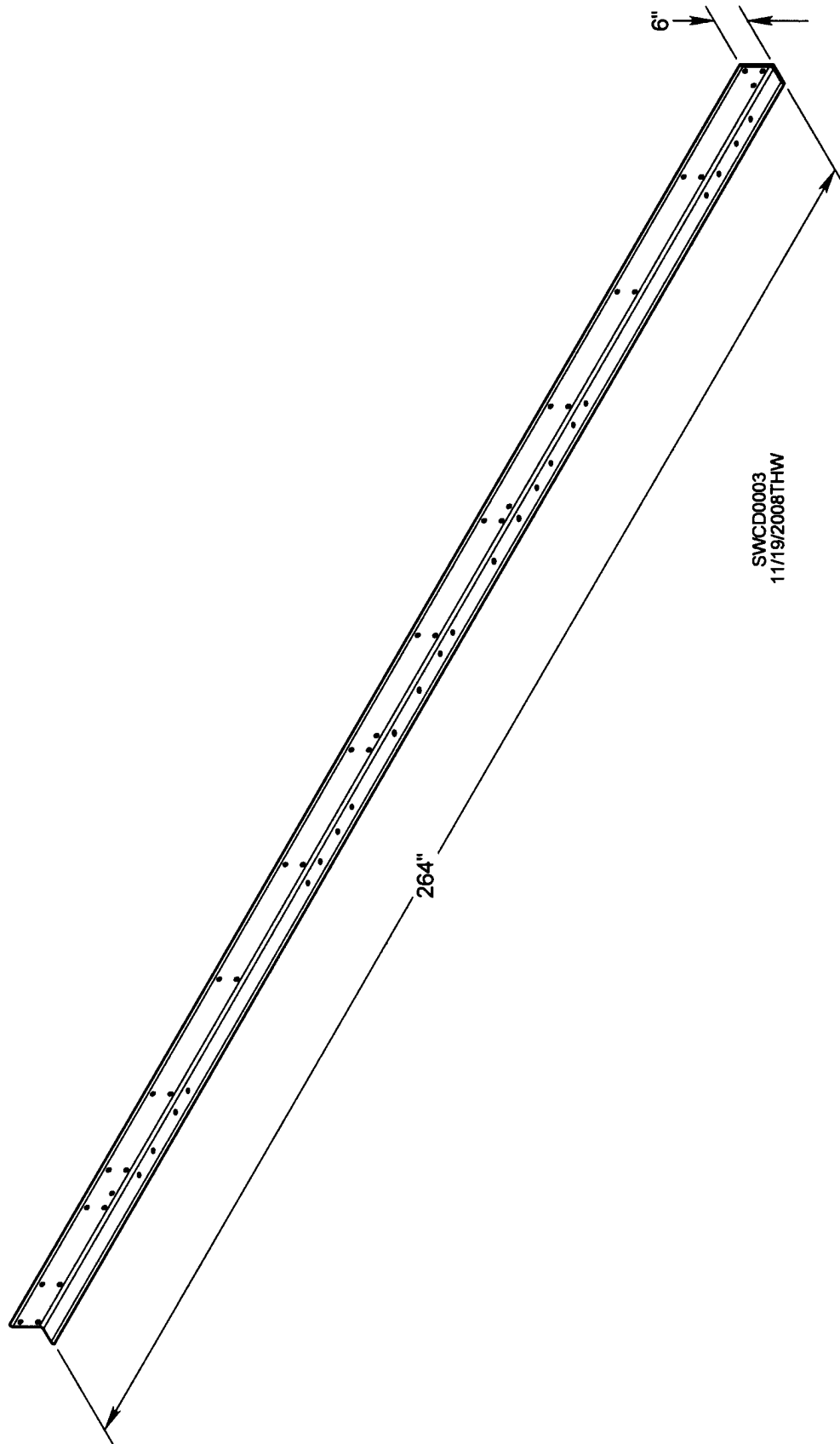


T20306 FRAME ASSEMBLY FOR 20' CENTRIFUGAL DRYER

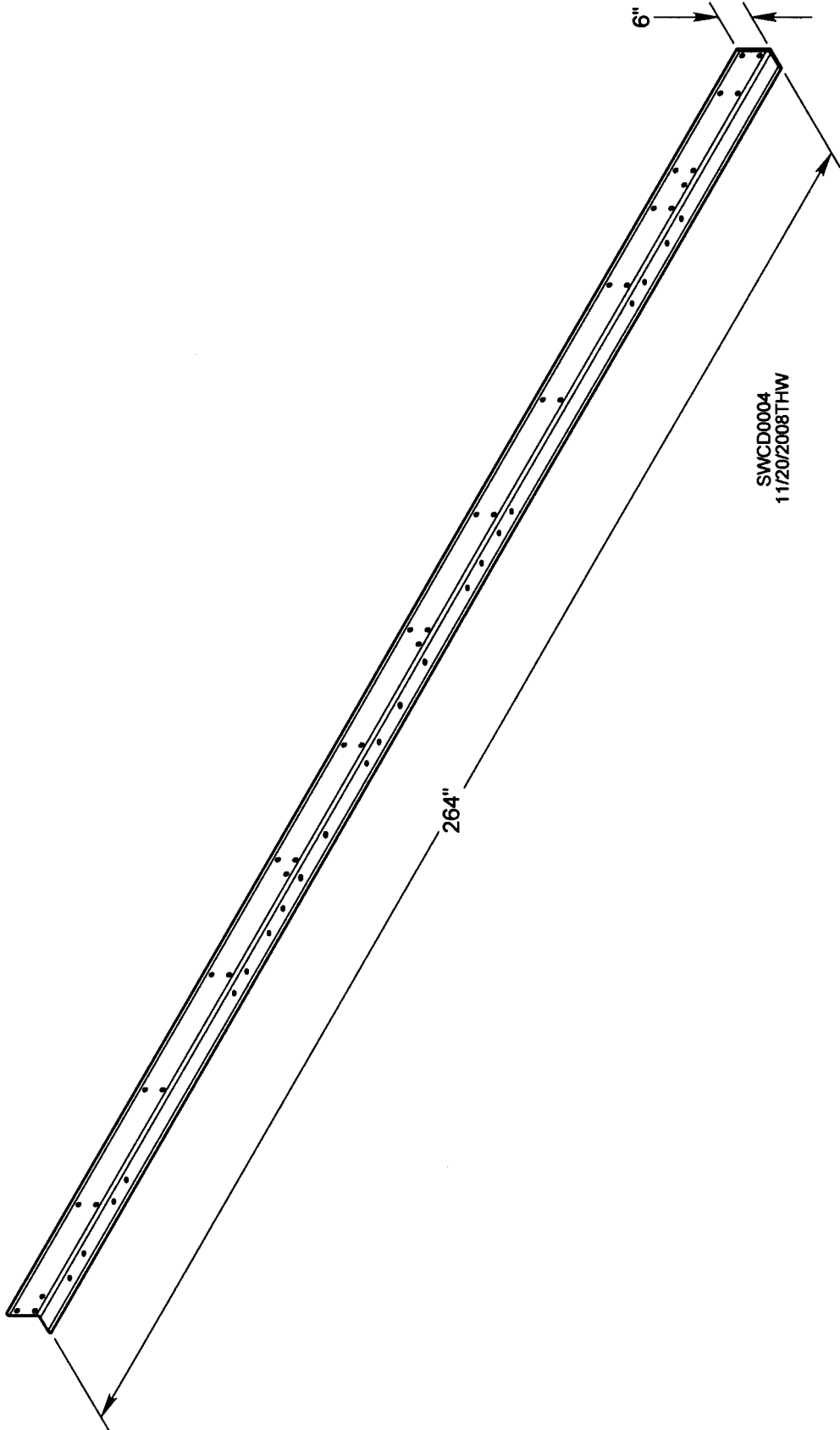
ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	T24423	HITCH RECEIVER WELDMENT	1
2	T20420	LEFT FRAME ANGLE, 20' CENT DRYER	1
3	T20419	RIGHT FRAME ANGLE, 20' CENT DRYER	1
4	T16328	DC MOTOR BRACE	2
5	T16333	FRONT CROSS CHANNEL	1
6	T16325	CROSS CHANNEL	6
7	T16331	PLATE, MAIN CONNECTOR, BOX, CONDUIT	2
8	T16324	MAIN CONNECTOR PLATE	20
9	T16323	NARROW VERTICAL SUPPORT	10
10	T16322	WIDE VERTICAL SUPPORT	12
11	T16329	TIGHTENER ANGLE	1
12	T16389	VERTICAL SUPPORT, CAM LOCK	2
13	T16332D	PLATE, 3/4" HITCH CONNECTOR, R.H.	1
14	T16321D	PLATE, 3/4" HITCH CONNECTOR, L.H.	1
15	T80147	BRACKET, CROSS CHANNEL	2



T20419 RIGHT FRAME ANGLE FOR 20' CENTRIFUGAL DRYER

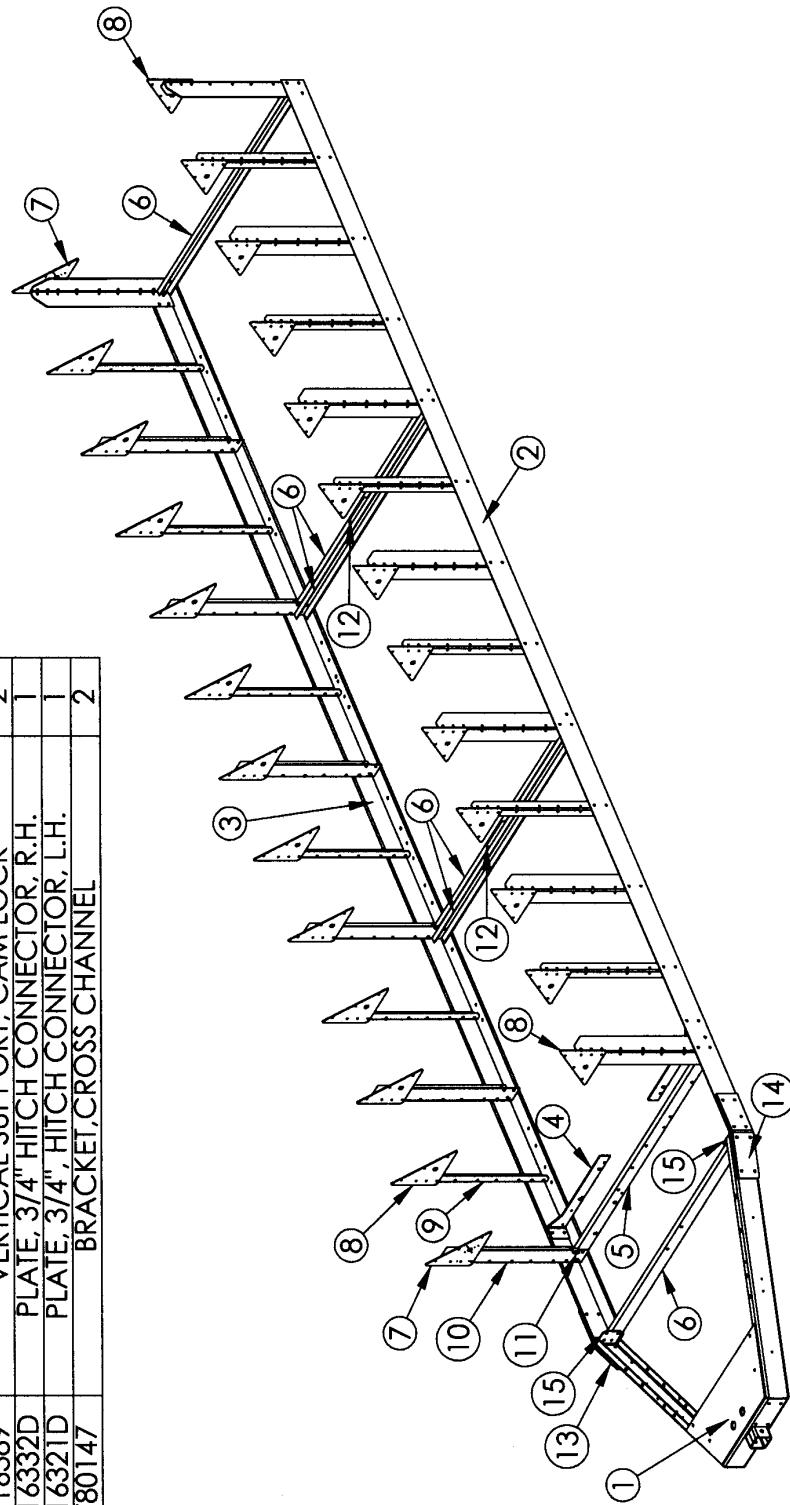


T20420 LEFT FRAME ANGLE FOR 20' CENTRIFUGAL DRYER

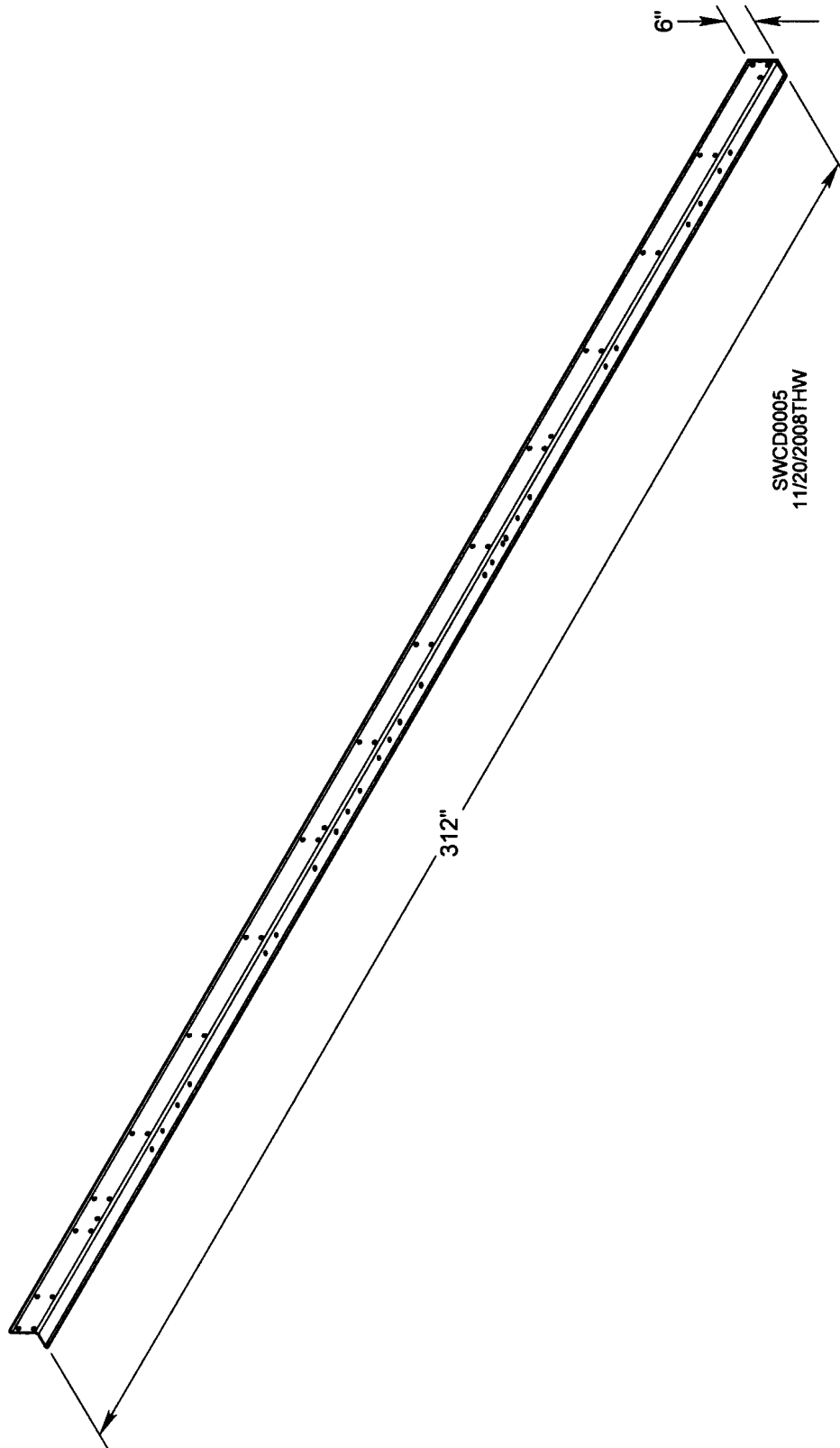


T24306 FRAME ASSEMBLY FOR 24' CENTRIFUGAL DRYER

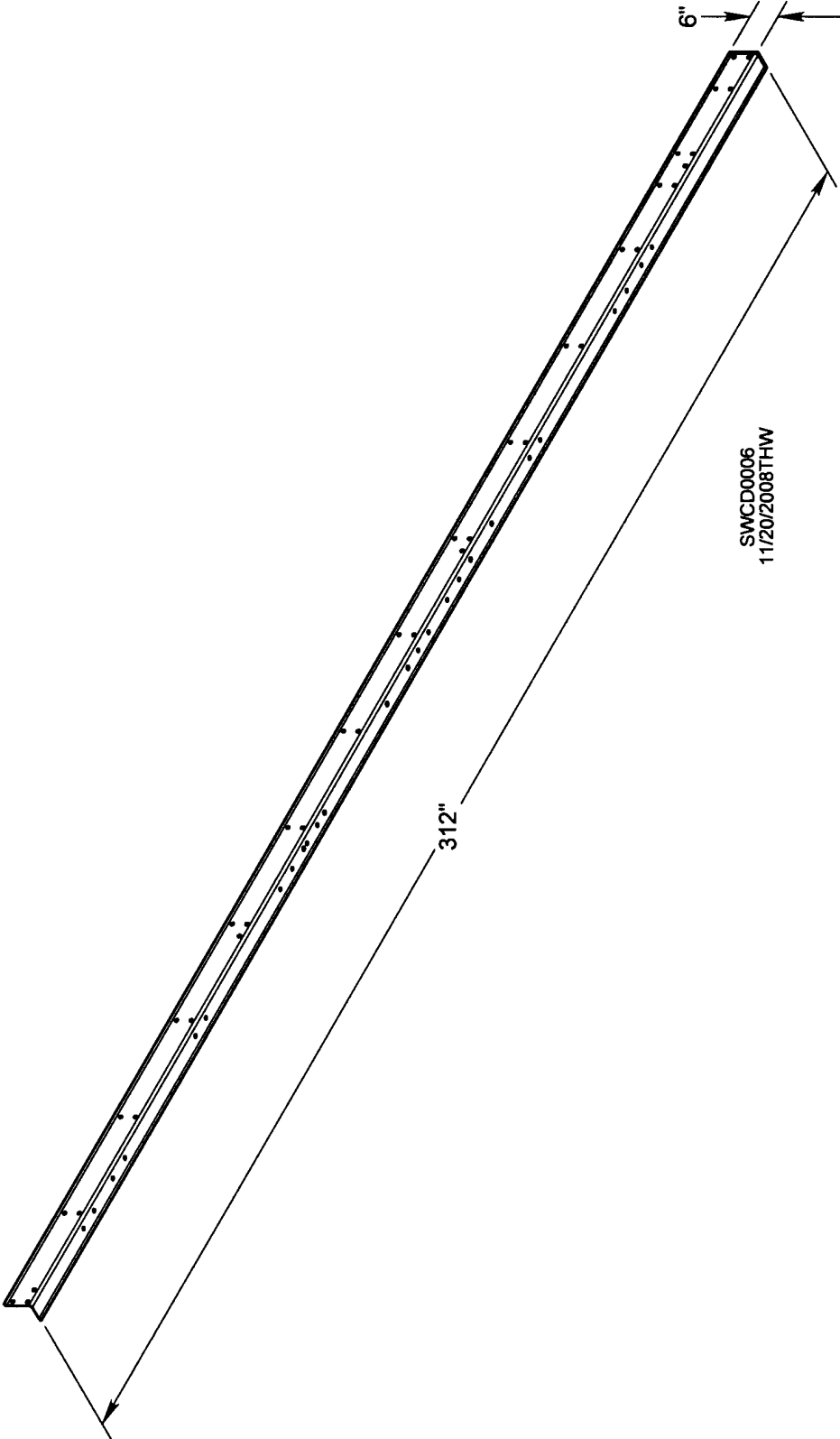
ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	T24423	HITCH RECEIVER WELDMENT	1
2	T24420	LEFT FRAME ANGLE	1
3	T24419	RIGHT FRAME ANGLE	1
4	T16328	DC MOTOR BRACE	2
5	T16333	FRONT CROSS CHANNEL	1
6	T16325	CROSS CHANNEL	6
7	T16331	PLATE, MAIN CONNECTOR, BOX, CONDUIT	2
8	T16324	MAIN CONNECTOR PLATE	24
9	T16323	NARROW VERTICAL SUPPORT	12
10	T16322	WIDE VERTICAL SUPPORT	14
11	T16329	TIGHTENER ANGLE	1
12	T16389	VERTICAL SUPPORT, CAM LOCK	2
13	T16332D	PLATE, 3/4" HITCH CONNECTOR, R.H.	1
14	T16321D	PLATE, 3/4" HITCH CONNECTOR, L.H.	1
15	T80147	BRACKET, CROSS CHANNEL	2



T24419 RIGHT FRAME ANGLE FOR 24' CENTRIFUGAL DRYER

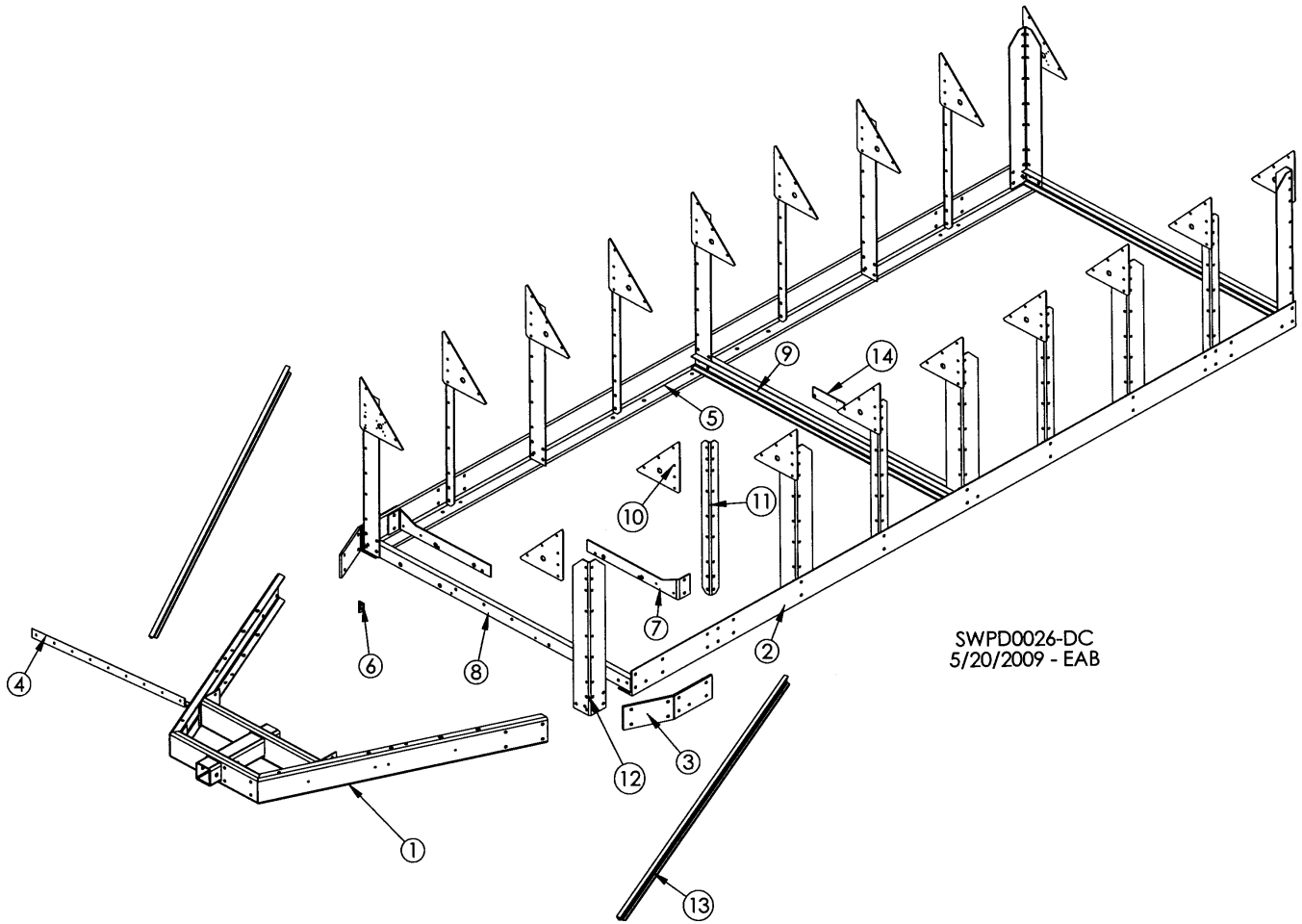


T24420 LEFT FRAME ANGLE FOR 24' CENTRIFUGAL DRYER



FRAME FOR BOTH STANDARD & STACKED DRYERS

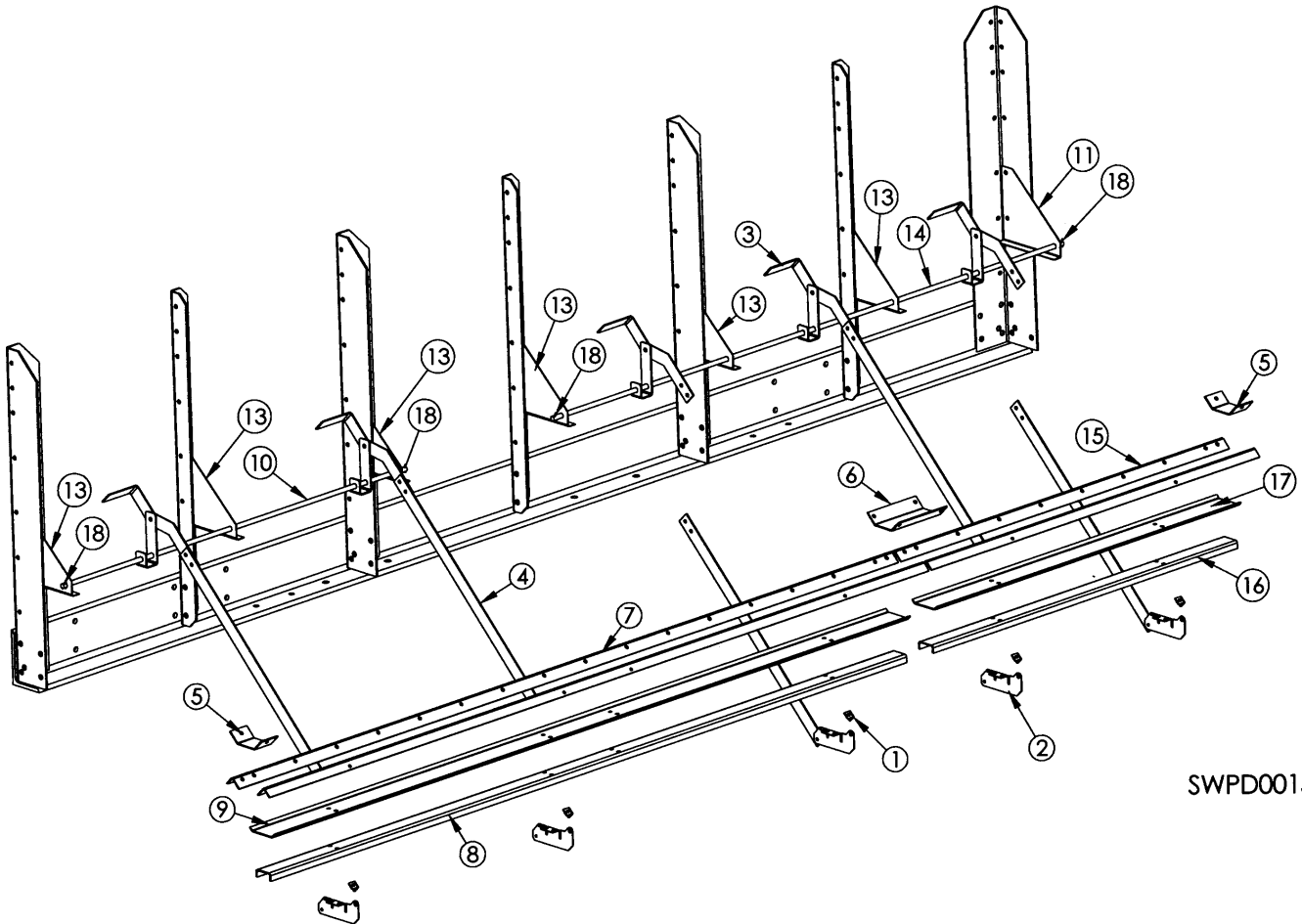
12', 16', 20', 24', & 28'



SWPD0026-DC
5/20/2009 - EAB

REF#	DESCRIPTION	12'		16'		20'		24'		28'	
		QTY	PT #	QTY	PT #	QTY	PT #	QTY	PT #	QTY	PT #
1	Hitch Receiver Weldmnt	1	T16310D	1	T16310D	1	T16310D	1	T16310D	1	T16310D
2	Left Frame Angle	1	T12518	1	T16319	1	T20320	1	T24320	1	T28320
3	Connector Plate	2	T16321D	2	T16321D	2	T16321D	2	T16321D	2	T16321D
4	Angle (Fan Support)	1	T16176	1	T16176	1	T16176	1	T16176	1	T16176
5	Right Frame Angle	1	T12517	1	T16320	1	T20319	1	T24319	1	T28319
6	Tightener Angle	1	T16329	1	T16329	1	T16329	1	T16329	1	T16329
7	DC Motor Brace	2	T16328	2	T16328	2	T16328	2	T16328	2	T16328
8	Front Cross Channel	1	T16326	1	T16326	1	T16326	1	T16326	1	T16326
9	Cross Channel	3	T16325	3	T16325	5	T16325	5	T16325	7	T16325
10	Main Connector Plate	14	T16324	18	T16324	22	T16324	26	T16324	28	T16324
11	Narrow Vertical Support	6	T16323	8	T16323	8	T16323	12	T16323	14	T16323
12	Wide Vertical Support	8	T16322	10	T16322	12	T16322	14	T16322	16	T16322
13	Channel Brace, Frame	2	T12327	2	T12327	2	T12327	2	T12327	2	T12327
14	Vert. Support, Camlock	1	T16389	1	T16389	2	T16389	2	T16389	3	T16389

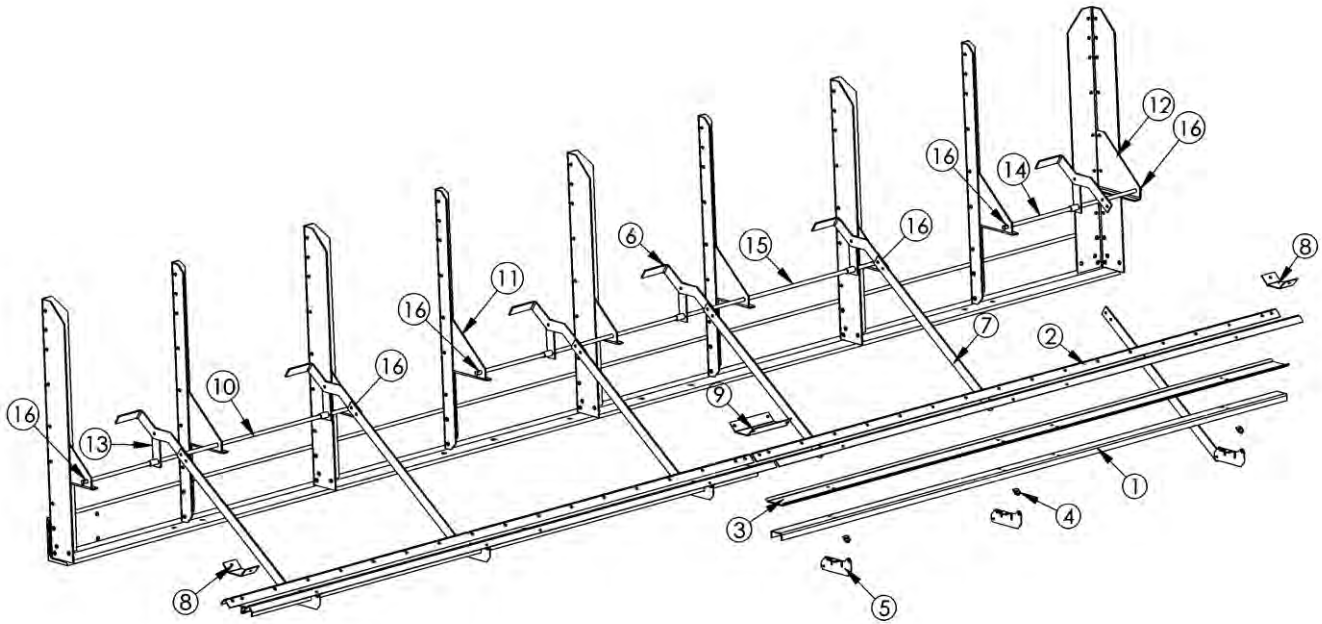
12' CAM LOCK ASSEMBLY



SWPDO015

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

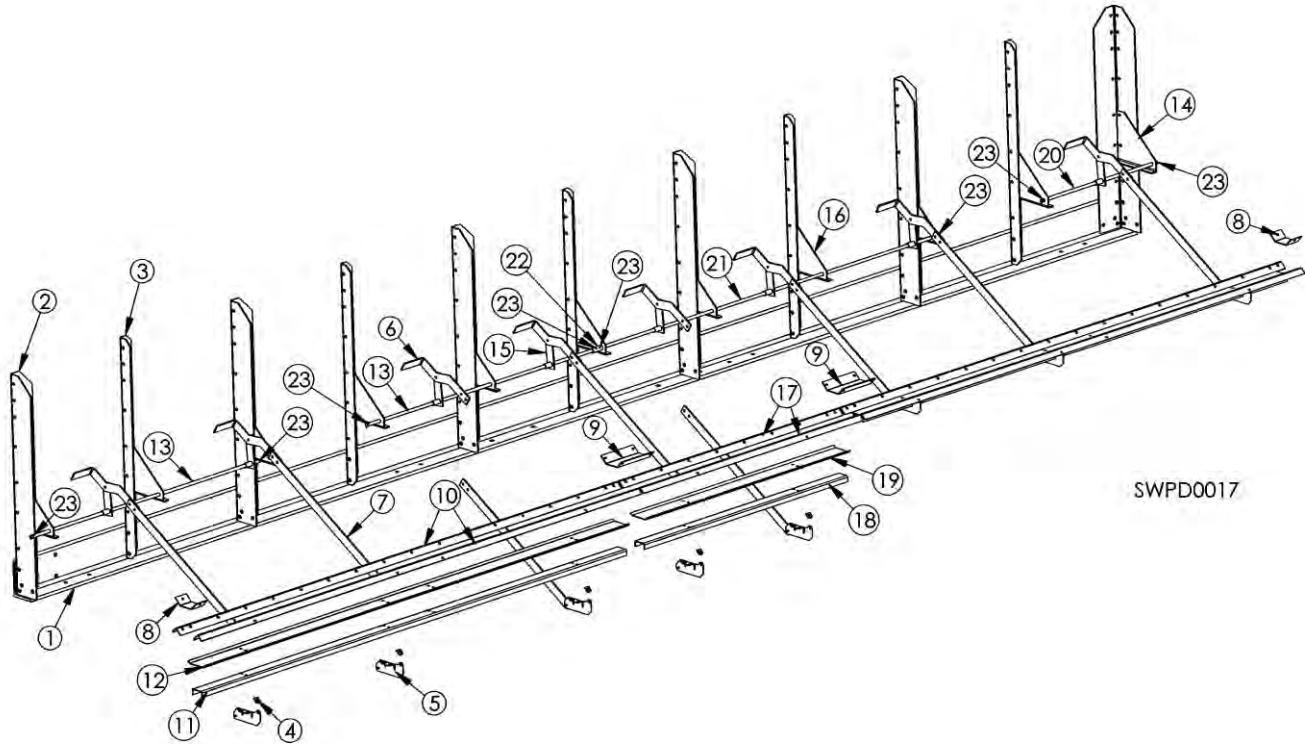
16' CAM LOCK ASSEMBLY



SWPD0016

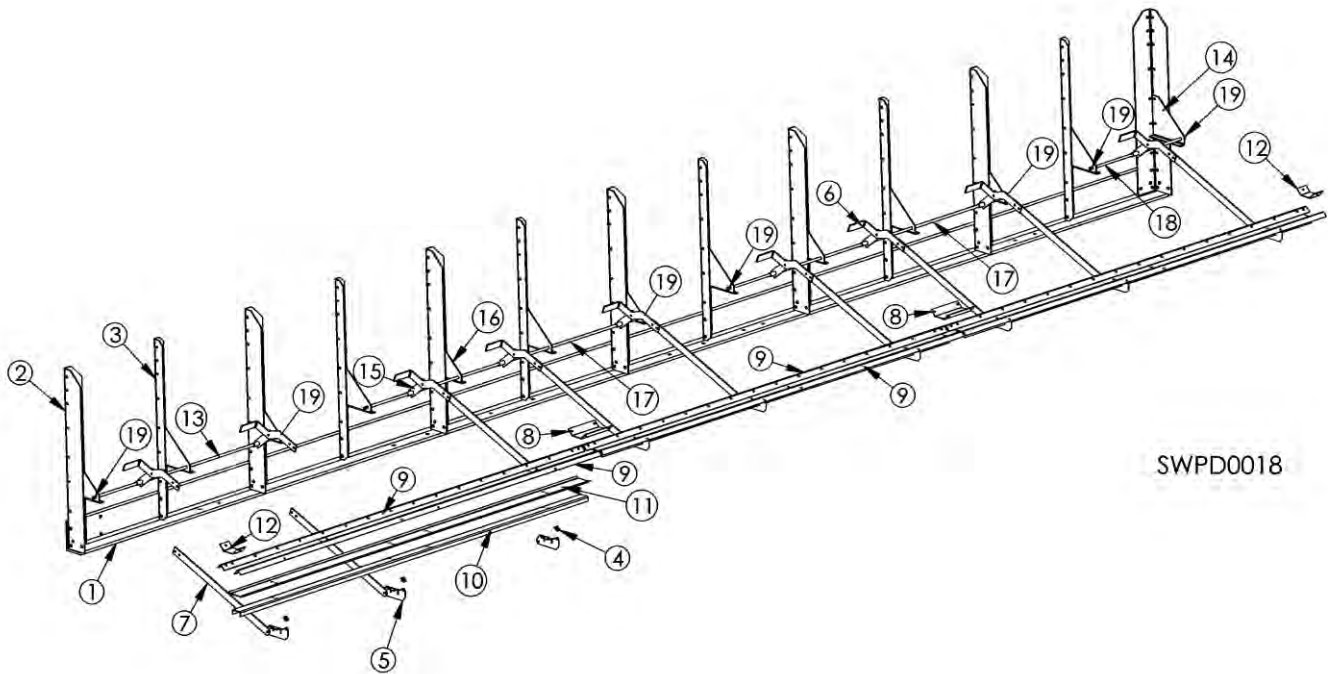
REF. #	DESCRIPTION	QTY	COMP. #
1	8' Door Support, Cam Lock	2	T17454
2	8' Angle, Cam Lock	4	T17456
3	8' Door, Cam Lock	2	T17455
4	Pivot Bracket	6	T16393
5	Hinge, Bottom Door, Cam Lock	6	T16387
6	Handle, Cam Lock	6	T16382
7	Extension Arm, Cam Lock	6	T16386
8	Seal Plate, End, Cam Lock	2	T16398
9	Seal Plate, 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



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

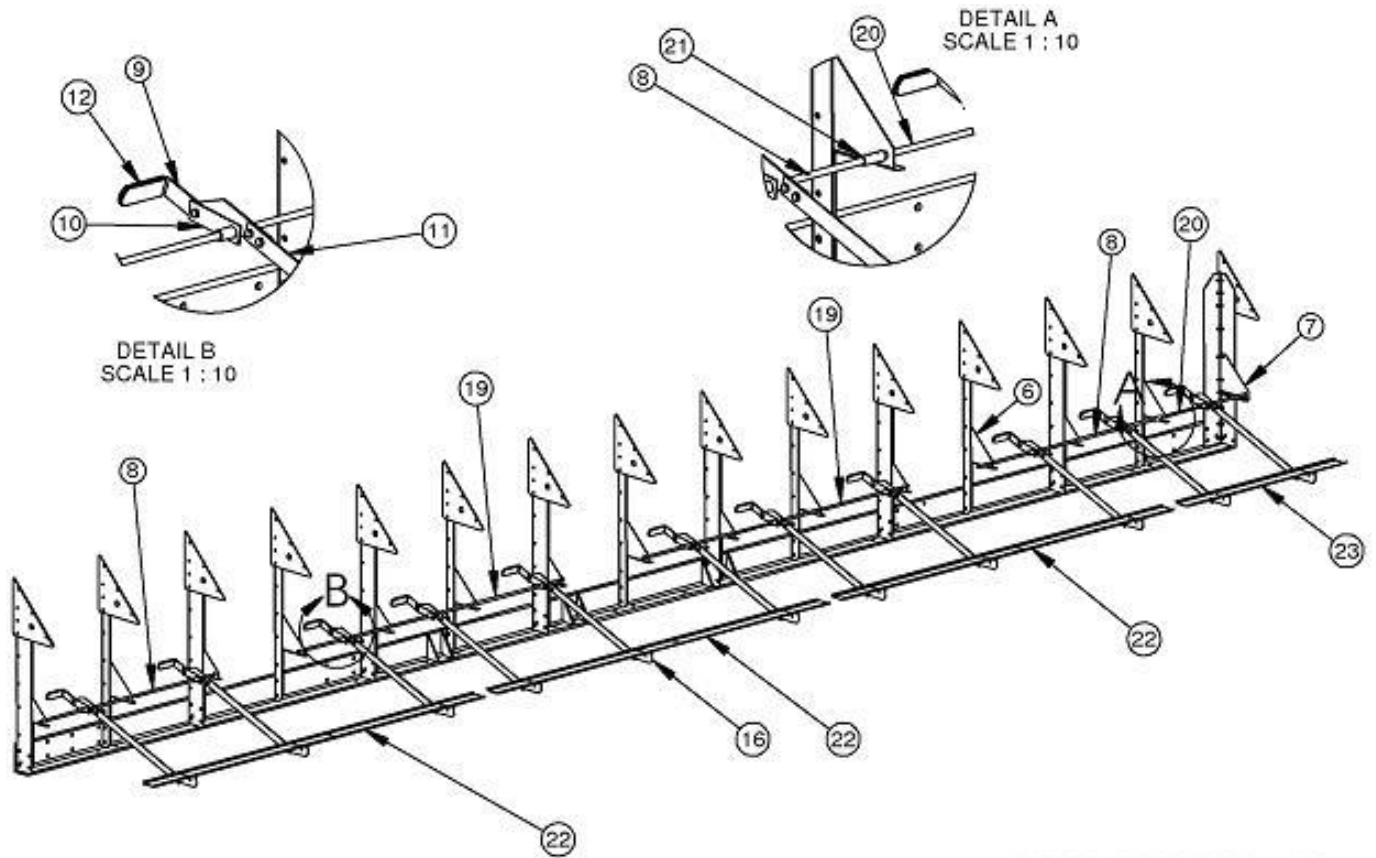
24' CAM LOCK ASSEMBLY



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

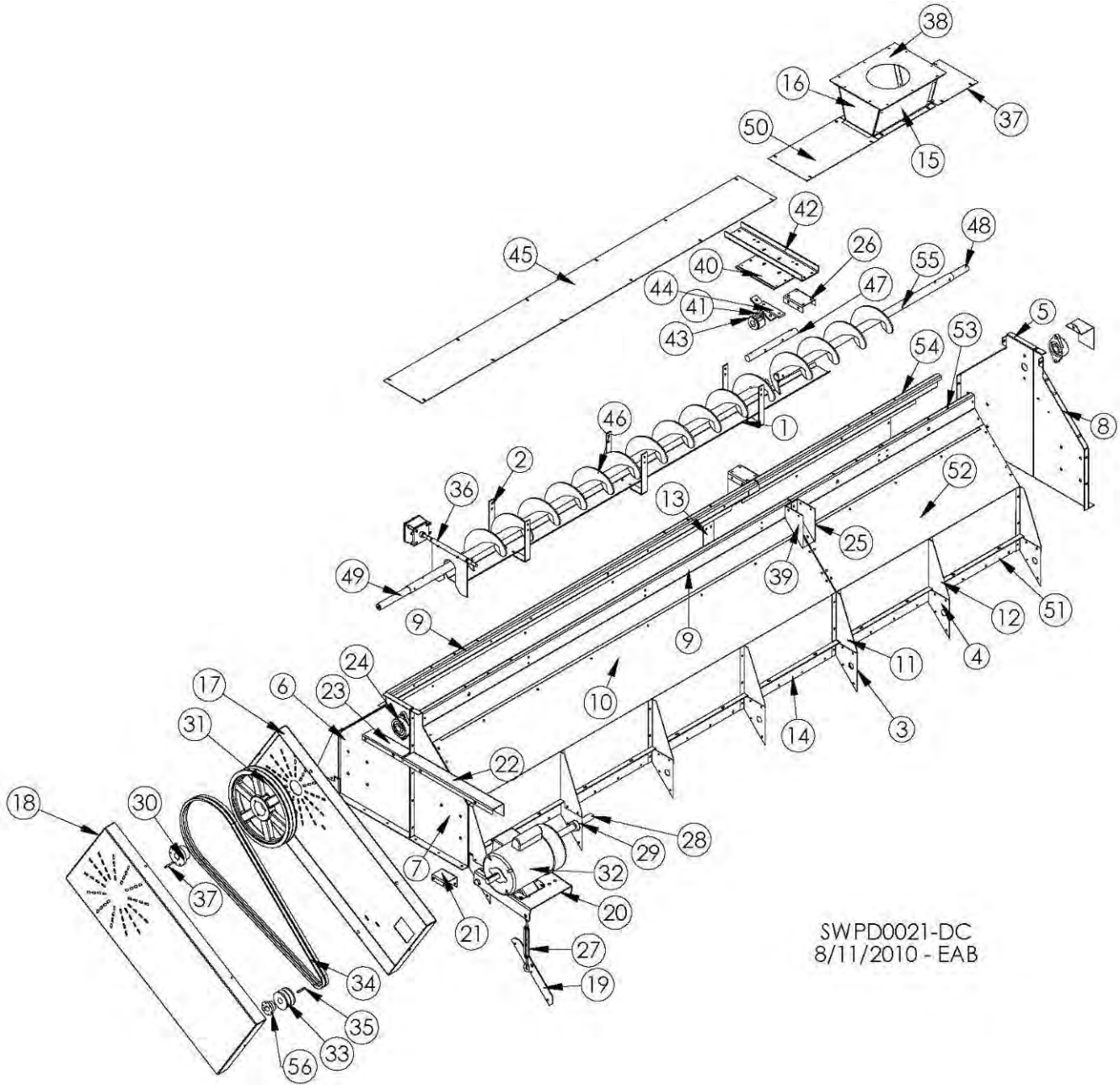


CAMLOCK ASSEMBLY, 28 FT
SHEET 1 OF 2

SWPD0067-CE
051128JFJ

REF. #	DESCRIPTION	QTY	COMP. #
1	RIGHT FRAME ANGLE WELD	1	T28318
2	WIDE VERTICAL SUPPORT	8	T16322
3	PLATE, MAIN CONNECTOR, BOX, CONDUIT	2	T16331
4	NARROW VERTICAL SUPPORT	7	T16323
5	MAIN CONNECTOR PLATE	13	T16324
6	GUSSET, FRONT, CAM LOCK	14	T16380
7	GUSSET, REAR CAM LOCK	1	T16381
8	SHAFT, LONG CAN-LOCK	2	T16400
9	HANDLE, CAM-LOCK	11	T16382
10	PIVOT ARM WELD, CAM-LOCK	11	T16383
11	EXTENSION ARM, CAM LOCK	11	T16386
12	COVER, PLASTIC, HANGLE, 1 1.2 X 4 LG	11	J23182
13	SCREW, 3/8 -16 X 1, JS500, GD 5	33	J06063
14	NUT, WHIZLOCK, 3/8-16	22	B5962
15	NUT, HEX, 3/8-16, PLT LOCK	11	J1025
16	HINGE, BOTTOM DOOR, CAM LOCK	11	T16387
17	BOLT, 5/16-18 X 3/4" GR 5, HEX WASHER HD, JS500	9	J0536
18	NUT, LOCK, 5/16-18, PLT	11	J1010
19	SHAFT, CAM-LOCK, LONG, 12' '99	2	T12516
20	SHAFT, SHORT, CAM LOCK	1	T20401
21	CONNECTOR, SHAFT	1	T20403
22	8' DOOR, CAM-LOCK 2000	3	T17455
23	DOOR, CAM-LOCK 4' 2000	1	T12528

12' WET BIN

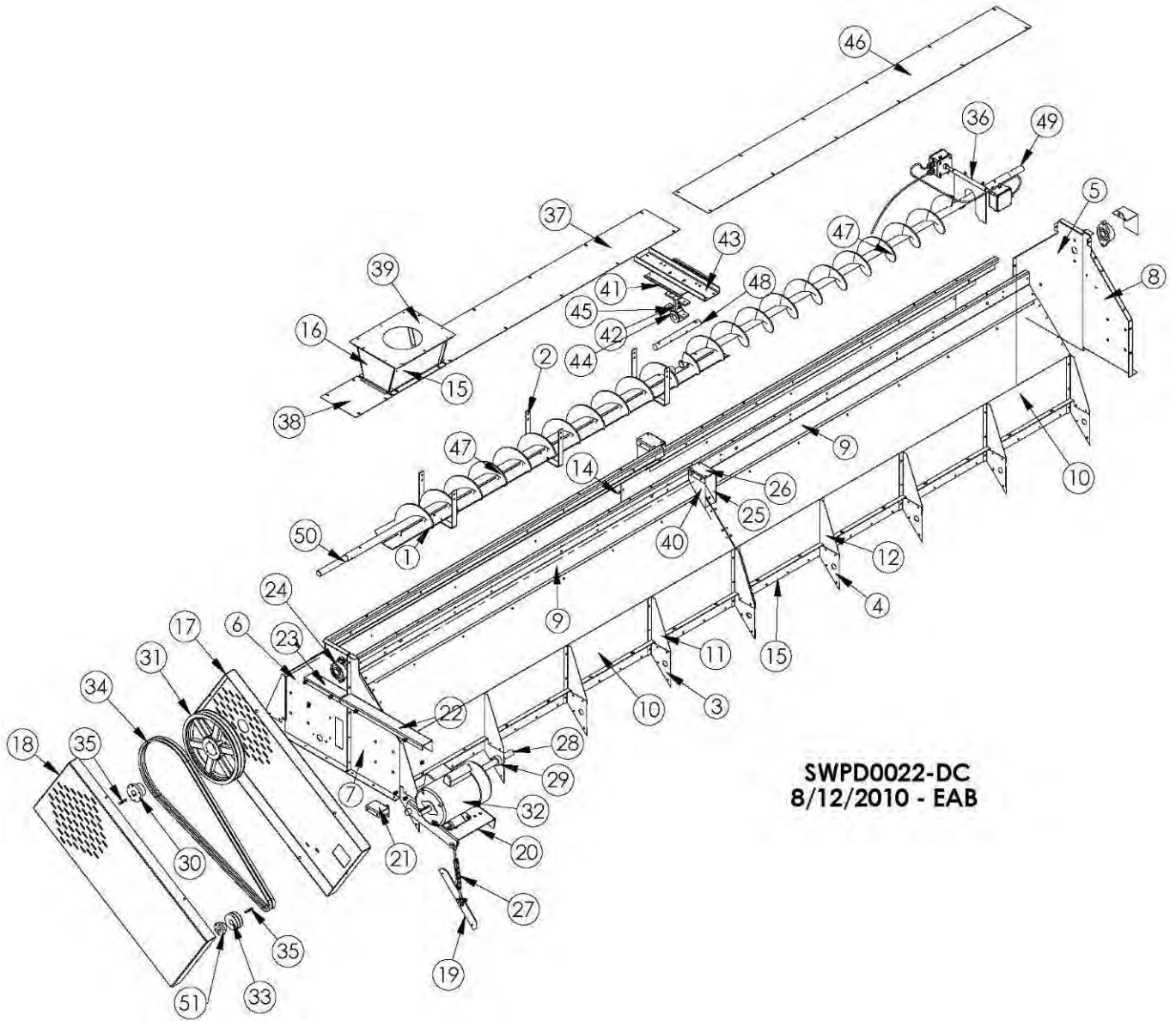


SWPD0021-DC
8/11/2010 - EAB

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 (Stainless, Perf)	2	T17450S
	Wet Bin Side (.094, Galvanized, Perf)	2	T17450
	Wet Bin Side (.063, Galvanized, Perf)	2	T17441W
11	LT Pivot Brace Wet Bin	10	T17410
12	RT Pivot Brace Wet Bin	6	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	Motor (US only)	-	-
33	Pulley, 4.15 OD, DBL, B, Cast	1	J03352
34	Belt, B95	2	J0252
35	Key, 1/4 x 1/4 x 2"	2	F4499
36	Paddle, Assembly, D-C	1	T18262E
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	Bottom Auger Shaft	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, Perf)	2	T12525
	Side, Wet Bin, 4' (Stainless, Perf)	2	T12525S
	Side, Wet Bin, 4' (.063, Galvanized, Perf)	2	T12536W
53	Top 4' Panel (LR) 12'	1	T12526
54	Top 4' Panel (RR) 12'	1	T12527
55	4' Rear, Top Auger	1	T12503
56	Bushing, 28 mm	1	J04275

16' WET BIN

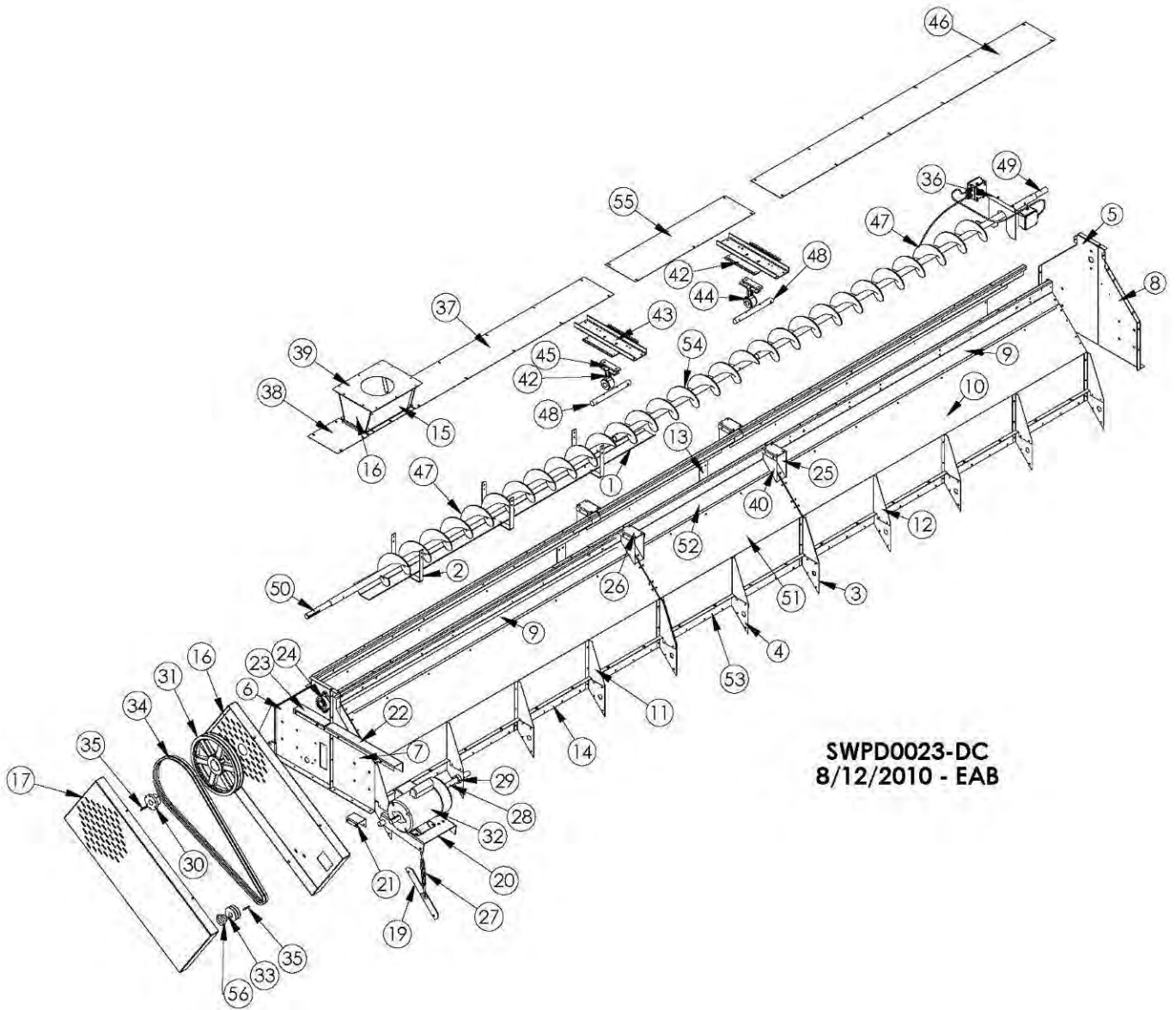


SWPD0022-DC
8/12/2010 - EAB

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 (Stainless, Perf)	4	T17450S
	Wet Bin Side (.094, Galvanized, Perf)	4	T17450
	Wet Bin Side (.063, Galvanized, Perf)	4	T17441W
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 (US only)	-	-
33	Pulley, 4.15 OD, Double, B, Cast	1	J03352
34	Belt, B95	2	J0252
35	Key, 1/4 x 1/4 x 2	2	F4499
36	Paddle, Assembly, D-C	1	T18262E
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	Bushing, 28 mm	1	J04275

20' WET BIN

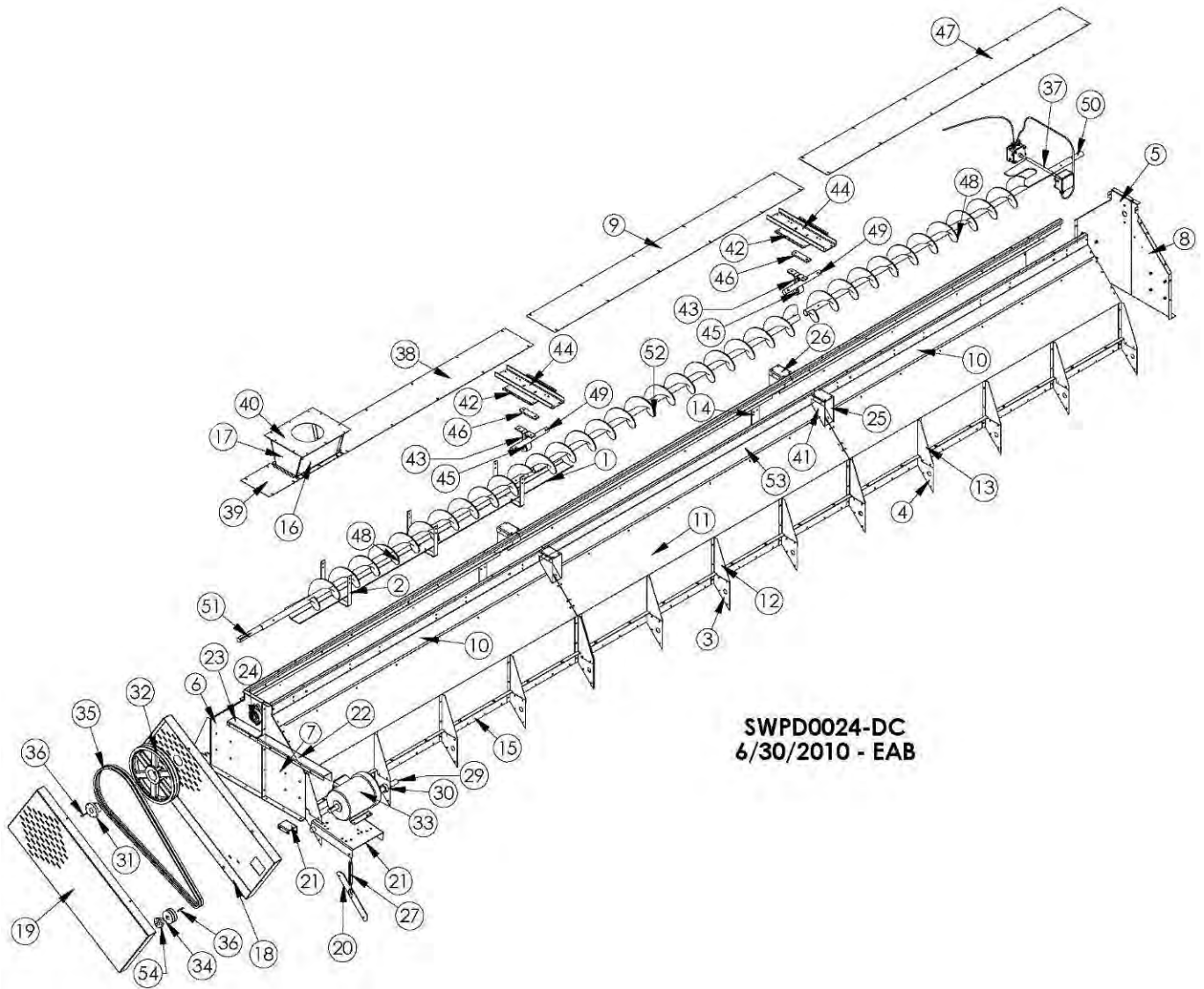


SWPD0023-DC
8/12/2010 - EAB

20' WET BIN

REF. #	DESCRIPTION	QTY	COMP. #
1	Trash Pan	1	T16235
2	Support, Trash Pan	3	T16236
3	Left Support Gusset	16	T16117
4	Right Support Gusset	10	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 (Stainless, Perf)	4	T17450S
	Wet Bin Side (.094, Galvanized, Perf)	4	T17450
	Wet Bin Side (.063, Galvanized, Perf)	4	T17441W
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 (US only)	-	-
33	Pulley, 4.15 OD, Double, B, Cast	1	J03352
34	Belt, B95	2	J0252
35	Key, 1/4 x 1/4 x 2	2	F4499
36	Paddle, Assembly, D-C	1	T18262E
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	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
	Side, Wet Bin, 4' (.063, Galvanized, Perf)	2	T12536W
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	Bushing, 28 mm	1	J04275

24' WET BIN

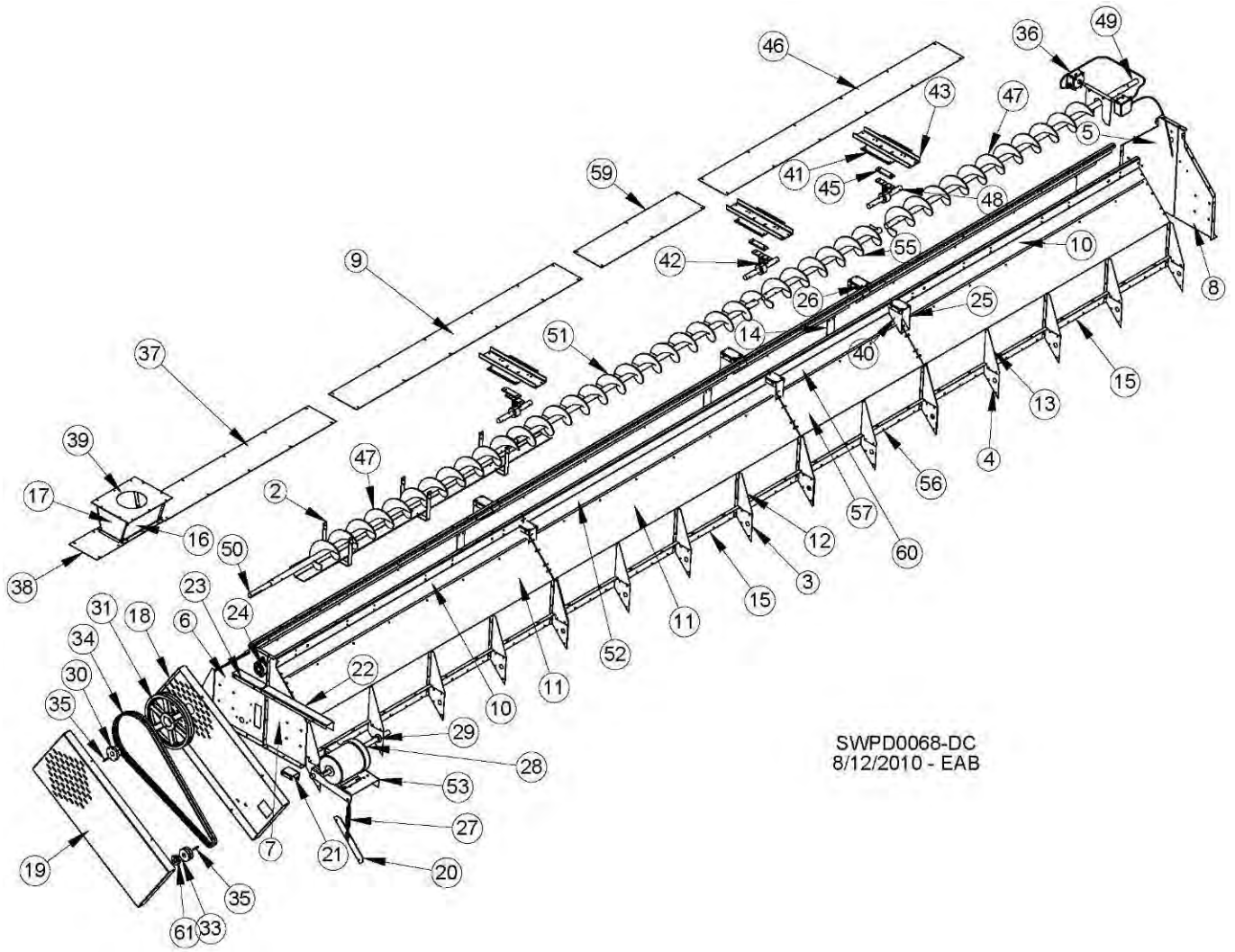


SWPD0024-DC
6/30/2010 - EAB

24' WET BIN

REF. #	DESCRIPTION	QTY	COMP. #
1	Trash Pan	1	T16235
2	Support, Trash Pan	3	T16236
3	Left Support Gusset	18	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	Lid, 87-3/4" Wet Holding Bin	1	T16167
10	Top 8' Panel Fill Switch	4	T17457
11	Wet Bin Side (Stainless, Perf)	6	T17450S
	Wet Bin Side (.094, Galvanized, Perf)	6	T17450
	Wet Bin Side (.063, Galvanized, Perf)	6	T17441W
12	LT Pivot Brace Wet Bin	18	T17410
13	RT Pivot Brace Wet Bin	12	T17411
14	Splice, Wet Bin Side	4	T17412
15	Bolt Down Lip 8', 2000	6	T17453
16	Hopper Side	2	T17935
17	Hopper End	2	T17936
18	Top Auger Shield (Inner)	1	T16256
19	Top Auger Shield (Outer)	1	T16255
20	Plate, Turnbuckle, Connector	1	T16283
21	Top Motor Mount	1	T16277
22	Top Shield Brace	1	T16258
23	Bracket, LF Top Auger Shield	1	T16861
24	Bracket, RF Top Auger Shield	1	T16860
25	Bearing, 1.25, FLG, W/LC, HCFTS207 - 20	2	J0010
26	Splice Gusset Right	4	T16145
27	Channel, Splice, Short	4	T16146
28	Turnbuckle, 3/8" x 6"	1	J0904
29	Pivot, Motor Mount, Top	1	T18150
30	Collar, Shaft, 1-3/16"	2	J1338
31	Bushing, 1.25 SK	1	J0410
32	Pulley, 15.75OD, Double "B" Gr. SK	1	J03992
33	Motor (US only)	-	-
34	Pulley, 4.15 OD, Double, B, Cast	1	J03352
35	Belt, B95	2	J0252
36	Key, 1/4 x 1/4 x 2	2	F4499
37	Paddle, Assembly, D-C	1	T18262E
38	Lid, Wet Holding Bin	1	T16157
39	Lid, 10.5", Extension, Wet Bin	1	T16159
40	Cover, Hopper	1	T17937
41	Splice Gusset Left	4	T16144
42	Crimp Plate	2	T16142
43	Hanger, Auger, T, 6CH2203	2	J0097
44	Splice Channel	2	T16143
45	Bushing, Wood, 1.25" ID	2	J0096
46	Spacer, T-Hanger, Top auger	2	T16096
47	Lid, 92-1/2" Wet Holding Bin	1	T16158
48	Top Auger	2	T16428
49	Shaft, 8' Hanger Bearing	2	F4720
50	Shaft, 1.25" x 9"	1	G73291
51	Shaft, Top Front, 12-3/4"	1	T16436
52	Auger, Bottom Front, 93-1/2"	1	T16430
53	Top 8' Panel (LR&RF) 2000	2	T24451
54	Bushing, 28 mm	1	J04275

28' WET BIN

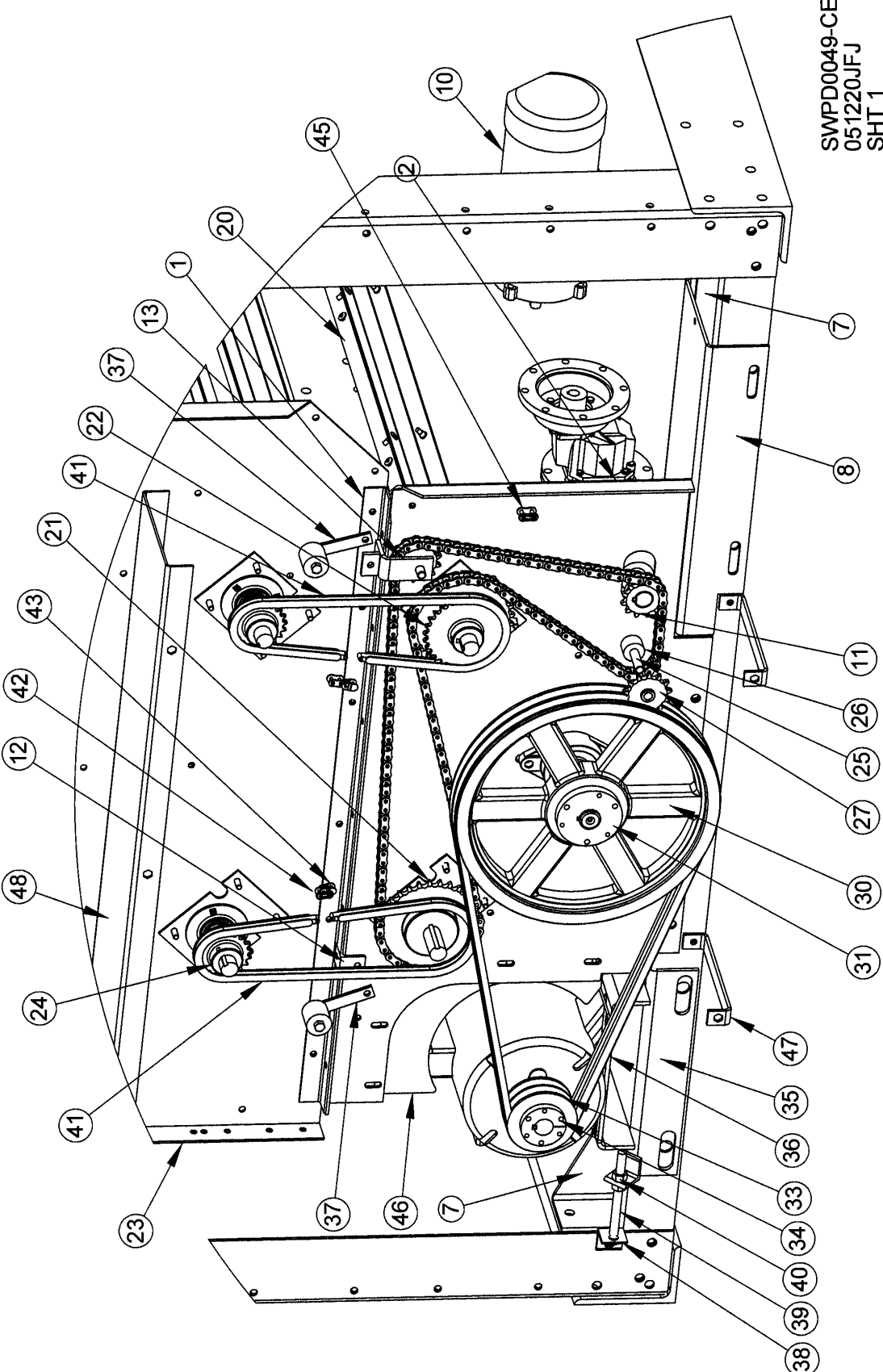


SWPD0068-DC
8/12/2010 - EAB

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	LID 87-3/4" WET HOLDING BIN	1	T16167
10	TOP 8' PANEL	4	T17457
11	WET BIN SIDE PERF, 2000	6	T17450S
	WET BIN SIDE (.063, GALV, PERF)	6	T17441W
12	LT PIVOR BRACE WET BIN	20	T17410
13	RT PIVOR BRACE WET BIN	16	T17411
14	SPLICE, WET BIN SIDE	6	T17412
15	BOLT DOWN LIP 8' 2000	6	T1745
16	HOPPER SIDE	2	T17935
17	HOPPER END	2	T17936
18	TOP AUGER SHIELD (INNER)	1	T16256
19	TOP AUGER SHIELD (OUTER)	1	T16255
20	PLATE, TURNBUCKLE, MTR MNT	11	T16283
21	TOP SHIELD BRACE	1	T16258
22	BRACKET, LF TOP AUGER SHIELD	1	T16861
23	BRACKET, LF TOP AUGER SHIELD	1	T16860
24	BRACKET, RF TOP AUGER SHIELD	2	J0010
25	SPLICE GUSSET RIGHT	6	T16145
26	CHANNEL, SPLICE, SHORT	6	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 1/4" SK	1	J0410
31	PULLEY, 15.75OD, DBL "B" GR, SK	1	J03992
32	Motor (US only)	-	-
33	PULLEY, 4.15 OD, DBL, B, CAST	1	J03352
34	BELT, B95	2	J0252
35	KEY, 1/4 X 1/4 X 2	2	F4499
36	PADDLE, ASSY, D-C	1	T18262E
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	6	T16144
41	CRIMP PLATE	3	T16142
42	HANGER, AUGER, T, 6CH2203	3	J0097
43	SPLICE CHANNEL	3	T16143
44	BUSHING, WOOD, 1.25" I.D.	3	J0096
45	SPACER, T-HANGER, TOP AUGER	3	T16096
46	LID 92 1/2" WET HOLDING BIN	2	T16158
47	TOP AUGER	2	T16428
48	SHAFT, 8" HANGER BEARING	3	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	2	T24451
53	MOTOR MOUNT, TOP LOAD	1	T16277
54	PLATE, COVER RF GARNER END	1	T17415
55	TOP MIDDLE AUGER (20 FT)	1	T16427
56	BOLT DOWN LIP, 4 FT 2000	2	T12524
57	SIDE, WET BIN, 4FT 2000	2	T12525
	SIDE, WET BIN, 4' (.063, GALV, PERF)	2	T12536W
58	PLATE, SHORT SPLICE	6	T16141
59	LID, WET HOLD BIN 40.25"	1	T20158
60	TOP 4' PANEL (LR) 12FT 2000	2	T20526
61	BUSHING, 28 mm	1	J04275

METERING ROLLS & UNLOAD AUGER DRIVES



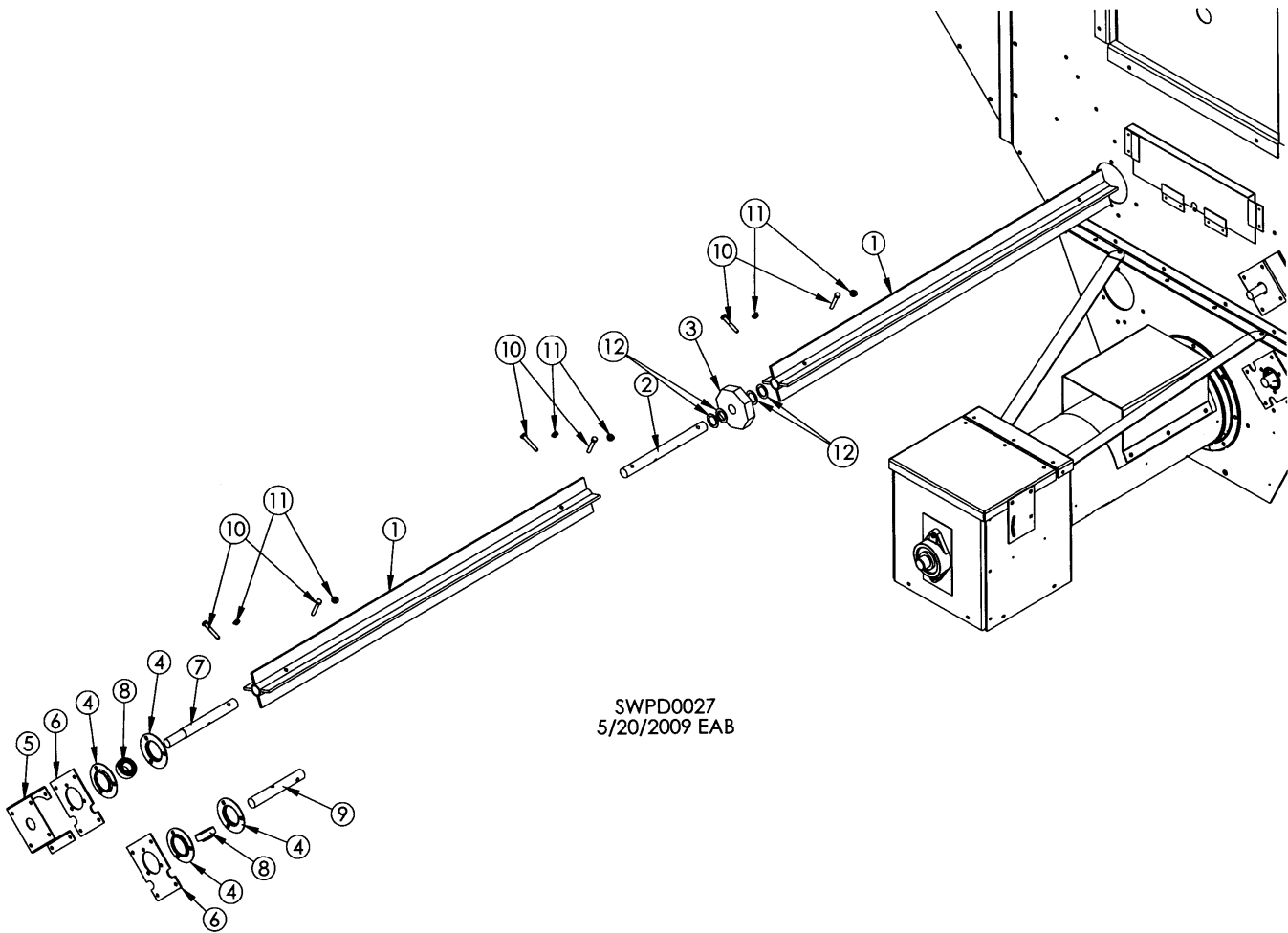
SWPD0049-CE
051220JFJ
SHT 1



METERING ROLLS & UNLOAD AUGER DRIVES

REF#	DESCRIPTION	QTY	COMP#	REF#	DESCRIPTION	QTY	COMP#
1	Splice, Bottom Angle (2005)	1	T17964	26	Spacer, Sprocket	2	T16282
2	Plate, Bottom Front End (2005)	1	T17963	27	Sprocket, Idler, 50-13	2	J1685
3	Front Cross Channel	1	T16326	28	Shaft, Top Front, 12-3/4"	1	T16436
4	Wide Vertical Support	2	T16322	29	Bearing, 1.25, FLG, W/LC, HCFTS207-20	1	J0010
5	Left Frame Angle, Jacks	1	T12518	30	Pulley, 15.75OD, Dbl "B" GR, SK	1	J03992
6	Right Frame Angle, Jacks	1	T12517	31	Bushing, 1-1/4" SK	1	J0410
7	DC Motor Brace	2	T16328	33	Pulley, 4.15"OD, 2B38SH	1	J03352
8	Mount, Motor DC (2005)	1	T17284	34	Bushing, 28MM SH	1	J04275
9	Reducer, Speed, 150:1 (2005)	1	J3682	35	Unload Motor Mount Weldment	2	T16290
10	Motor, 1 HP, 230V AC, 1750 RPM TEFC	1	H1143	36	Belt, B x 73, (15.75 x 4.15) 28'	2	J02392
11	Sprocket, 50B12, 1.125" BR	1	J16612		Belt, 12' + 16'	2	J0246
12	Chain Tightener Bracket	1	T16274	37	Chain Tightener	2	T7367
13	Bracket Weldment, Idler Sprocket	1	T17965	38	Tightener Angle	1	T16329
14	Meter Plate	4	T17920	39	Bolt, 1/2-13 x 6, PLT, GR5, TAP	1	J0765
15	Bolt, 5/16-18, 1.00, PLT, G5, HHWZ	16	J0537	40	Nut, Hex, 1/2-13, PLT	2	J1040
16	Nut, Tinnernan, 5/16-18	16	J1009	41	Chain, #40, 73 Links	2	T16800
17	Flangette, 3-hole, for 205 Brg. (BRH52MS)	8	J0098	42	Chain, Link, #40 Connector	2	J1745
18	Brg., 1", Center, FH205-16, W/L CLR	4	J0005	43	Chain, Link, #40 Offset, 1/2 Link	2	J1750
19	Front Shaft, Meter Roll	4	T16266	44	Chain, #50, 157 Links, 2005	1	T16803
20	Metering Roll Assy. 8', Galv.	4	T16297	45	Chain, Link, #50 Connector	1	J1760
21	Sprocket, 50B30, 1.000" BR	2	J1678	46	Shield, Motor, 7-1/2 Hp, 28'	1	T17970
22	Sprocket, 40B, 30-Tooth, 1" Bore, Keyed	2	J1649		Shield, 12' + 16'	1	T17928
23	Panel, Front End, 2/3-1/3, 38"-28"	1	T24820	47	Brace, Front Shield	2	T16412
24	Sprocket, 40B, 20-Tooth, 1" Bore, Keyed	2	J16487	48	Front Shield Mounting Bracket	1	T16411
25	Screw, 1/2-13, 3, 6PLT, GR5, HHCS	2	J0750	49	Front Chain Shield	1	T16410

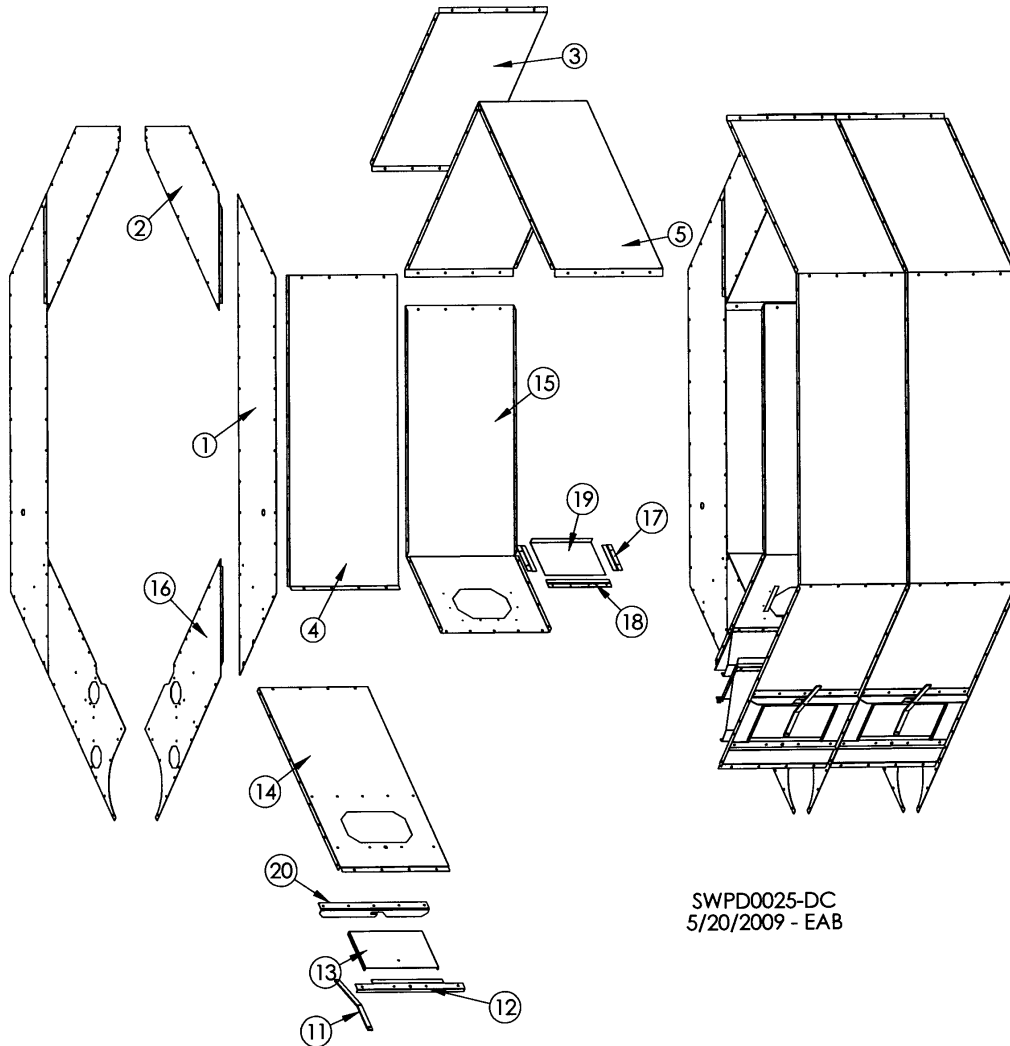
DRIVE END OF DRYERS, SINGLE FAN - REAR



SWPD0027
5/20/2009 EAB

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	Screw, 5/16-18, 2, PLT, G5, HHCS	J0585
11	Nut, 5/16-18, PLT, HHWZ	J1110
12	Bushing, Mach, 1-18GA	J1266

COLUMN PARTS

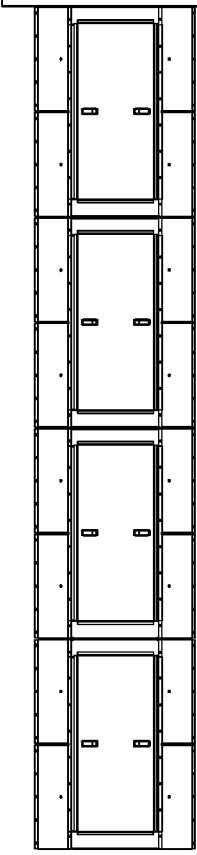
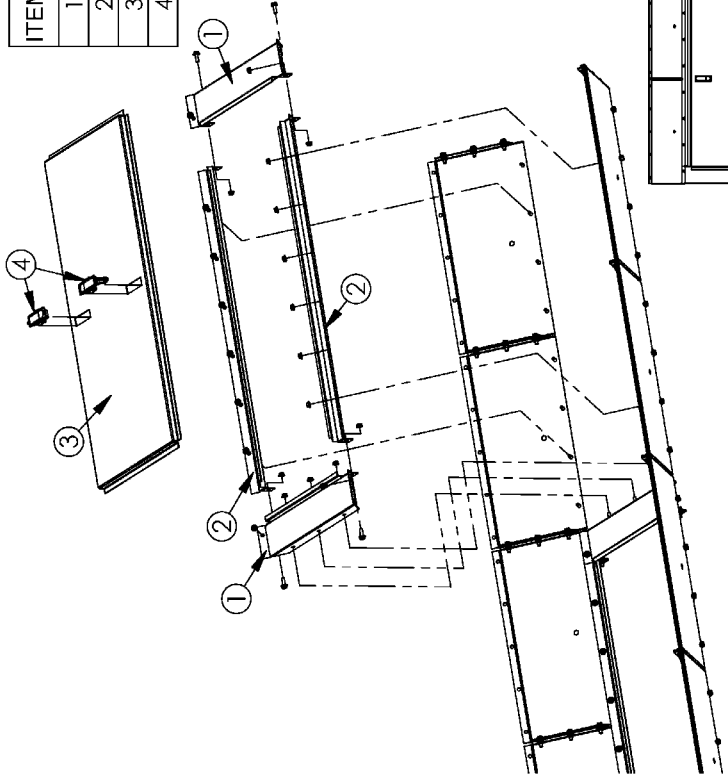


SWPD0025-DC
5/20/2009 - EAB

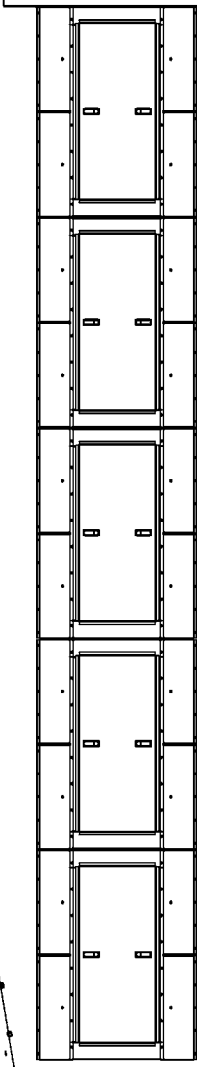
REF#	DESCRIPTION	12'		16'		20'		24'		28'	
		QTY	COMP#	QTY	COMP#	QTY	COMP#	QTY	COMP#	QTY	COMP#
1	Side Divider	10	T16110	14	T16110	18	T16110	22	T16110	26	T16110
2	Upper Divider	10	T16111	14	T16111	18	T16111	22	T16111	26	T16111
3	Outer Top Perf Panel (Ss)	12	T16105S	16	T16105S	20	T16105S	24	T16105S	28	T16105S
	Outer Top Perf Panel (Galv)	12	T16105	16	T16105	20	T16105	24	T16105	28	T16105
	Outer Top Perf Panel (.063 Galv)	12	T17503W	16	T17503W	20	T17503W	24	T17503W	28	T17503W
4	Outside Mid Perf Panel (SS)	12	T16104S	16	T16104S	20	T16104S	24	T16104S	28	T16104S
	Outside Mid Perf Panel (Galv.)	12	T16104	16	T16104	20	T16104	24	T16104	28	T16104
	Outsd Mid Perf Panel (.063 Galv)	12	T17504W	16	T17504W	20	T17504W	24	T17504W	28	T17504W
5	Top Inner Perforated Panel	6	T16114	8	T16114	10	T16114	12	T16114	14	T16114
	Top Inner Perf Panel (.063 Galv)	6	T17414W	8	T17414W	10	T17414W	12	T17414W	14	T17414W
11	Latch	12	T17906	16	T17906	20	T17906	24	T17906	28	T17906
12	Support Latch Strap	12	T17907	16	T17907	20	T17907	24	T17907	28	T17907
13	Outer Cleanout Door	12	T17908	16	T17908	20	T17908	24	T17908	28	T17908
	Outer Cleanout Door (.063 Galv)	12	T17913W	16	T17913W	20	T17913W	24	T17913W	28	T17913W
14	Bottom Outer Perf Panel (SS)	12	T17909S	16	T17909S	20	T17909S	24	T17909S	28	T17909S
	Btm Outer Perf Panel (Galv.)	12	T17909	16	T17909	20	T17909	24	T17909	28	T17909
	Btm Outer Perf Panel (.063 Galv)	12	T17919W	16	T17919W	20	T17919W	24	T17919W	28	T17919W
15	Inner Side Perforated Panel	12	T17910	16	T17910	20	T17910	24	T17910	28	T17910
	Inner Side Perf Panel (.063 Galv)	12	T17510WAM	16	T17510WAM	20	T17510WAM	24	T17510WAM	28	T17510WAM
16	Lower Divider	10	T17924	14	T17924	18	T17924	22	T17924	28	T17924
17	Side Rail, Inner Access	24	T16219	32	T16219	40	T16219	48	T16219	56	T16219
18	Bottom Rail, Inner Access	12	T16220	16	T16220	20	T16220	24	T16220	28	T16220
19	Inner Access Door	12	T16221	16	T16221	20	T16221	24	T16221	28	T16221
	Inner Access Door (.063 Galv)	12	T16225W	16	T16225W	20	T16225W	24	T16225W	28	T16225W
20	Door Latch Bracket	12	T17657	16	T17657	20	T17657	24	T17657	28	T17657

CENTRIFUGAL DRYER INNER CLEAN OUT PANEL ASSEMBLY

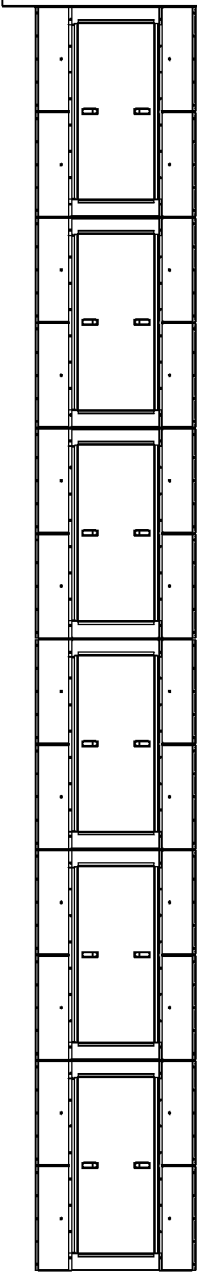
ITEM #	PART #	16' DRYER	20' DRYER	24' DRYER	DESCRIPTION
1	T17931	8	10	12	END, DOOR FRAME
2	T17932	8	10	12	DOOR FRAME SIDE
3	T17929C	4	5	6	PANEL, DOOR, 4' FOR J2308 LATCH
4	J2308	8	10	12	ADJUSTABLE LATCH, LEVER, FLUSH C2-32-35



16' DRYER



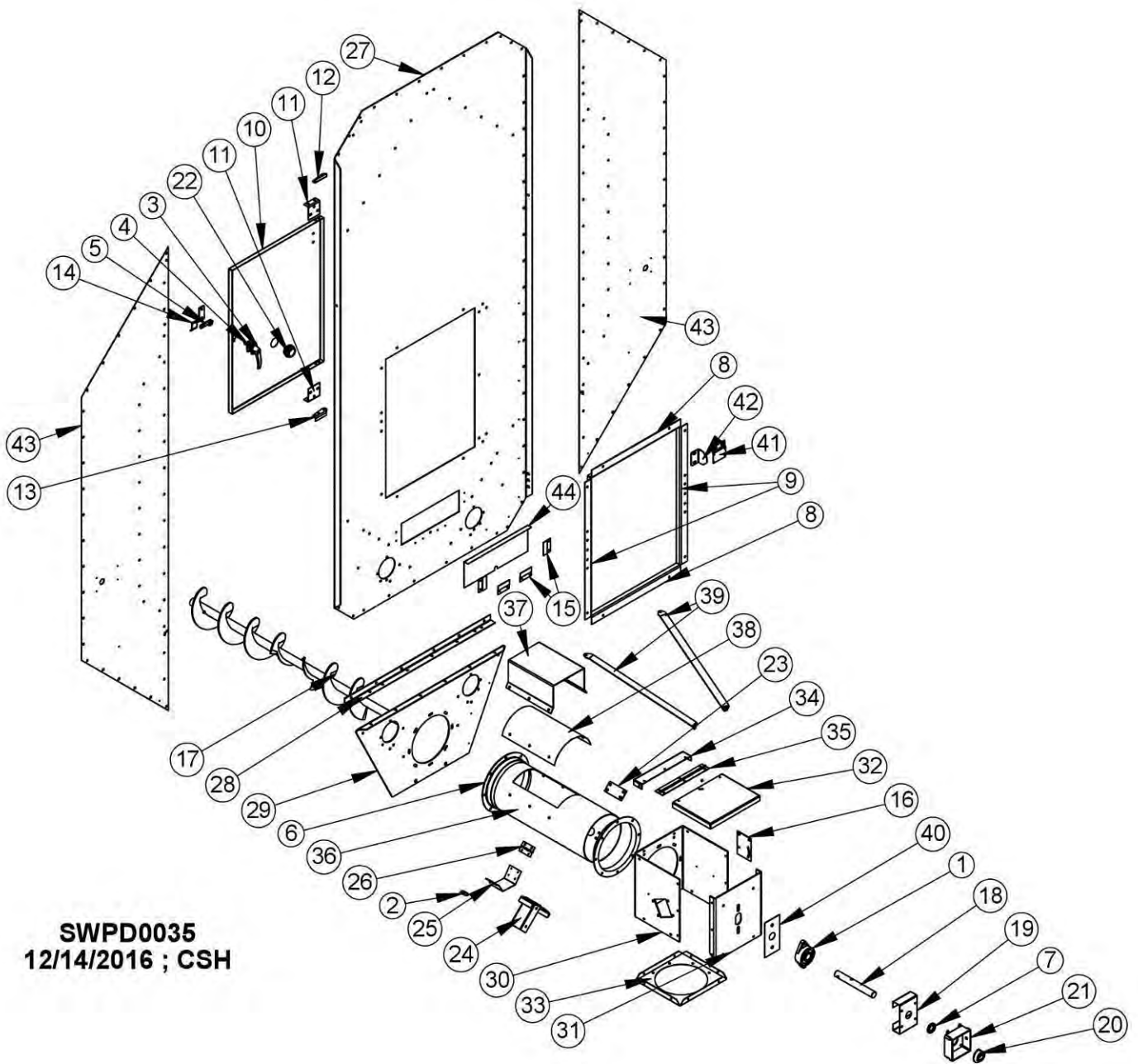
20' DRYER



24' DRYER

This page is left blank in order to match drawings and parts lists on facing pages.

FULL SIZE PLENUM

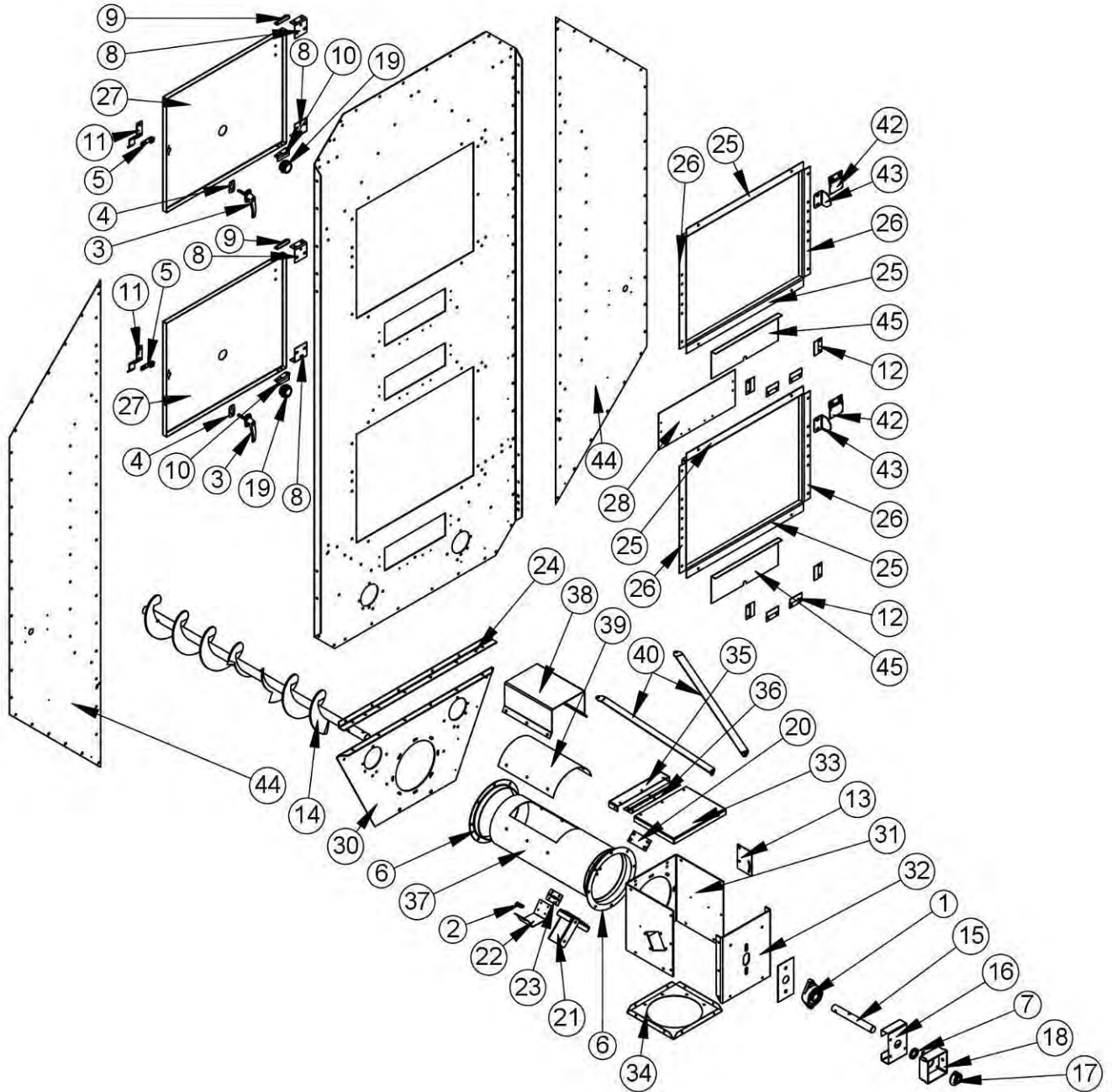


SWPD0035
12/14/2016 ; CSH

FULL SIZE PLENUM

REF #	DESCRIPTION	QTY	COMP #
1	Bearing, 1.25, Flange, W/LC, HCFTS207-20	1	J0010
2	Latch, 3-10 LL, 2-57-1625-07-00	1	J2310
3	Handle, Locking, #GD303	1	J2313
4	Gasket, #G-2, For GD303 Handle (J2313)	1	J2314
5	Latch, Adjustable, #5559	1	J2318
6	Ring, 10", Flange	2	J6610
7	Seal, 2" OD 1-1/4 ID CR#12481	1	J7023
8	Edging Top & Bottom, Door	2	T16136
9	Edging Sides, Rear Door	2	T16137
10	Access Door	1	T16147
11	Hinge Bracket	2	T16148
12	Top Hinge, Access Door	1	T16149
13	Bottom Hinge, Access Door	1	T16150
14	Catch, Rear Access Door	1	T16151
15	Side Rail, Blowout Door	4	T16154
16	Merc Switch Plate	1	T16358
17	Bottom Rear Auger	1	T16431
18	Shaft, 1.25 x 10, Bottom Auger	1	T17251
19	Bracket, Prox. Switch, Unload Auger	1	T17252
20	Target, Prox. Switch, Unload Auger	1	T17256
21	Box, Prox. Switch, Unload Auger	1	T17263
22	Viewing Hole Assembly	1	T17654
23	Cover, Sample Spout (Unload)	1	T17663
24	Spout, Sample, Unload Auger, Assembly	1	T17668
25	Strap, Moisture Sensor – Rear	1	T17850
26	Hinge, Moisture Sensor – Rear	1	T17851
27	Rear End Plate	1	T17916
28	Bottom Angle Splice	1	T17925
29	Rear Bottom End Plate	1	T25521
30	Front-Sides, Sump Box	1	T25670
31	Rear Plate, Sump Box	1	T25671
32	Lid, Sump Box	1	T25672
33	Bottom, Sump Box	1	T25674
34	Lid Hinge Side, Sump Box	1	T25675
35	Hinge, Sump Box	1	T25676
36	Tube, Discharge	1	T25677
37	Step, Unload Tube	1	T25678
38	Cover, Tube, Rear Discharge	1	T25679
39	Brace for Unload Auger	2	T25681
40	Bearing Shim Plate	1	T25682
41	Bracket, Switch Mounting	1	T80215
42	Angle, Switch Actuation	1	T80216
43	Side End Plate	2	T16101
44	Blowout Door	1	T17658

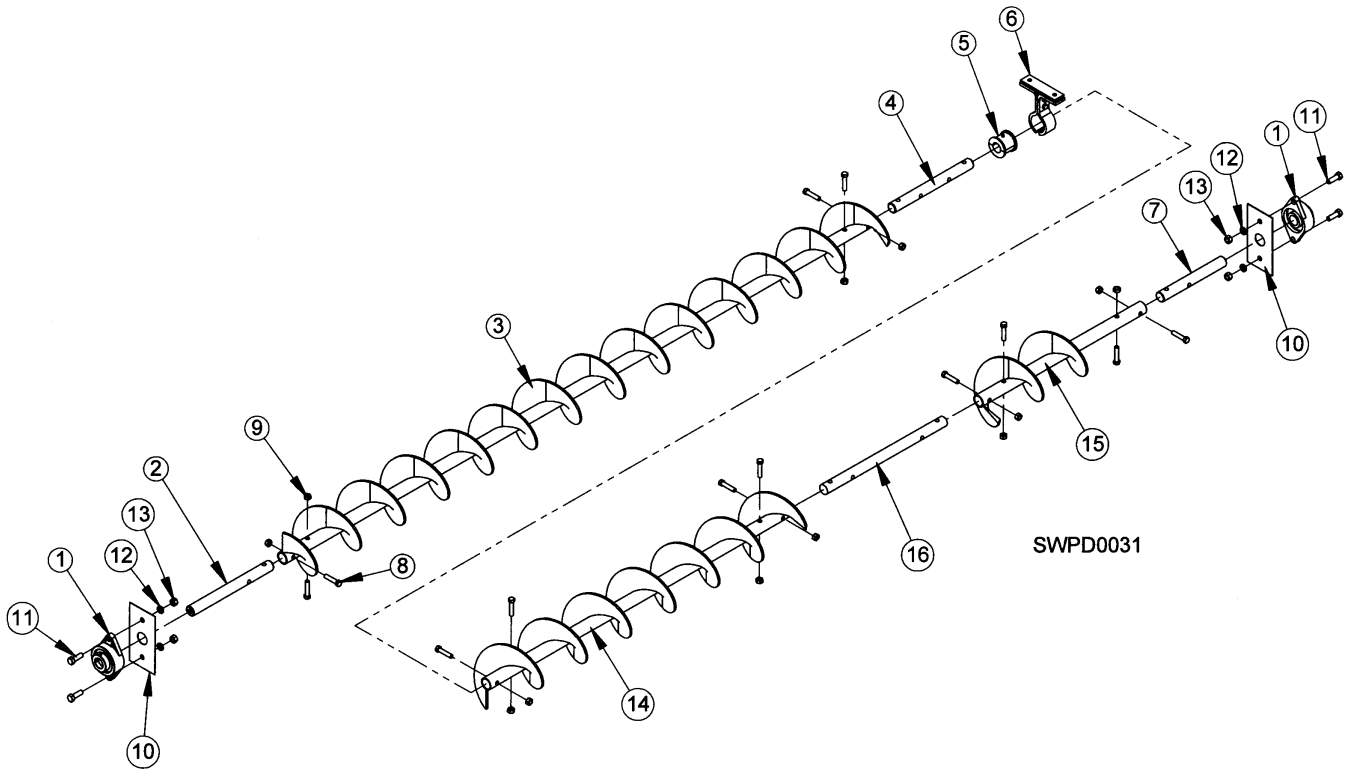
SPLIT PLENUM



SPLIT PLENUM

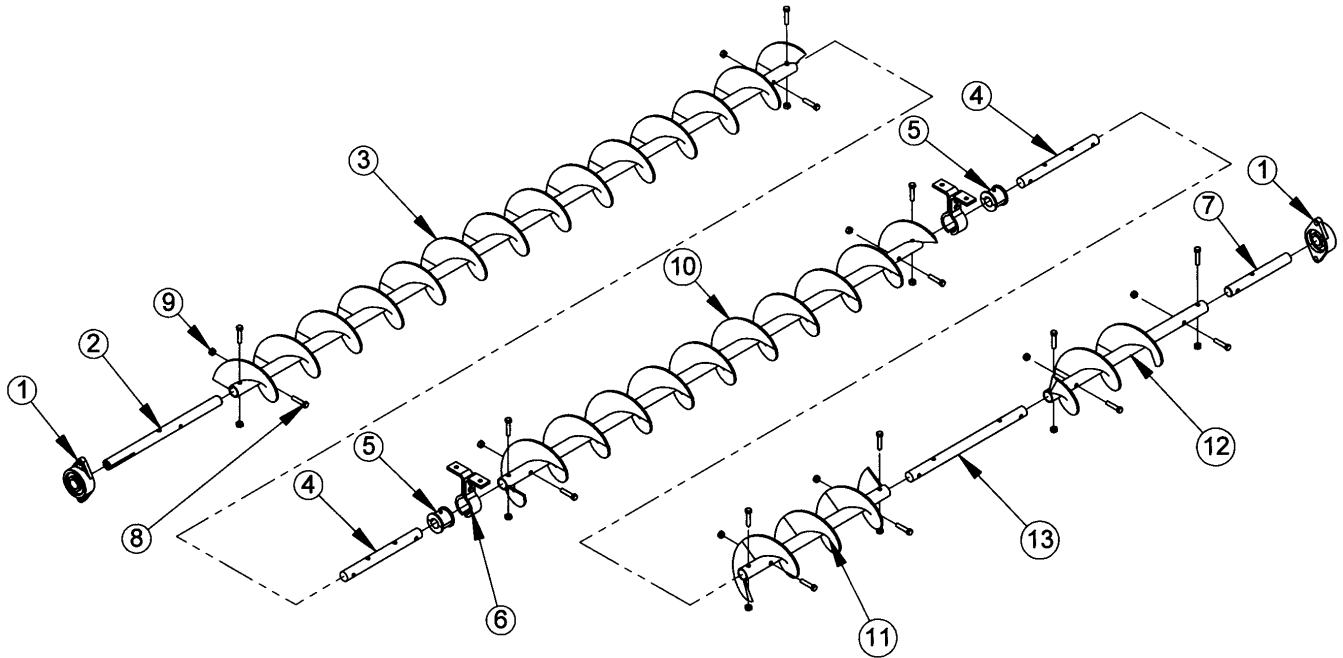
REF #	DESCRIPTION	QTY	COMP #
1	Bearing, 1.25, Flange, W/LC, HCFTS207-20	1	J0010
2	Latch, 3-10 LL, 2-57-1625-07-00	1	J2310
3	Handle, Locking, #GD303	2	J2313
4	Gasket, #G-2, For GD303 Handle (J2313)	2	J2314
5	Latch, Adjustable, #5559	2	J2318
6	Ring, 10", Flange	2	J6610
7	Seal, 2" OD 1-1/4 ID CR#12481	1	J7023
8	Hinge Bracket	4	T16148
9	Top Hinge, Access Door	2	T16149
10	Bottom Hinge, Access Door	2	T16150
11	Catch, Rear Access Door	2	T16151
12	Side Rail, Blowout Door	8	T16154
13	Tilt Switch Plate	1	T16358
14	Bottom Rear Auger	1	T16431
15	Shaft, 1.25 x 10, Bottom Auger	1	T17251
16	Bracket, Prox. Switch, Unload Auger	1	T17252
17	Target, Prox. Switch, Unload Auger	1	T17256
18	Box, Prox. Switch, Unload Auger	1	T17263
19	Viewing Hole Assembly	2	T17654
20	Cover, Sample Spout (Unload)	1	T17663
21	Spout, Sample, Unload Auger, Assembly	1	T17668
22	Strap, Moisture Sensor – Rear	1	T17850
23	Hinge, Moisture Sensor – Rear	1	T17851
24	Bottom Angle Splice	1	T17925
25	Top & Bottom Edging, 2-Fan/Heater	4	T24136
26	Edging, Sides, 2-Fan/Heater	4	T24137
27	Access Door, 2-Fan/Heater	2	T24147
28	Cover, Blowout, Rear	1	T24602
29	Rear End Plate, 2-Fan/Heater	1	T24916
30	Rear Bottom End Plate	1	T25521
31	Front-Sides, Sump Box	1	T25670
32	Rear Plate, Sump Box	1	T25671
33	Lid, Sump Box	1	T25672
34	Bottom, Sump Box	1	T25674
35	Lid, Hinge Side, Sump Box	1	T25675
36	Hinge, Sump Box	1	T25676
37	Tube, Discharge	1	T25677
38	Step, Unload Tube	1	T25678
39	Cover, Tube, Rear Discharge	1	T25679
40	Brace for Unload Auger	2	T25681
41	Bearing Shim Plate	1	T25682
42	Bracket, Switch Mounting	2	T80215
43	Angle, Switch Actuation	2	T80216
44	Side End Plate	2	T16101
45	Blowout Door	2	T17658

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

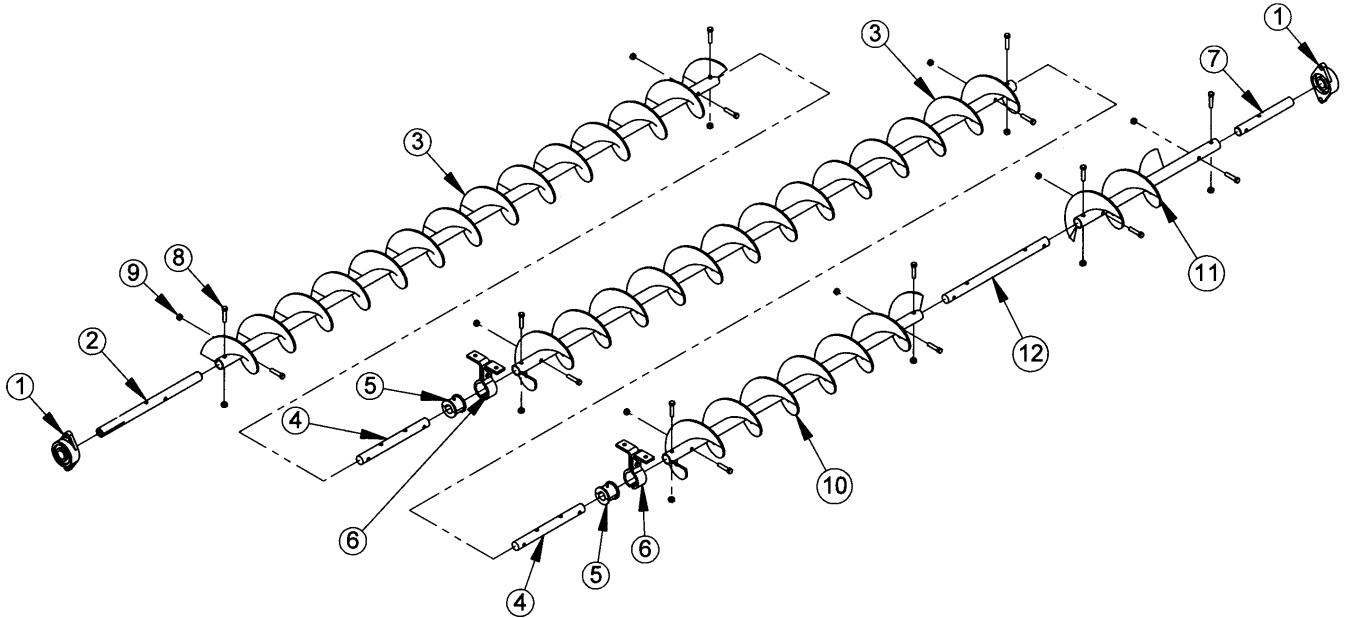
16' BOTTOM AUGER



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

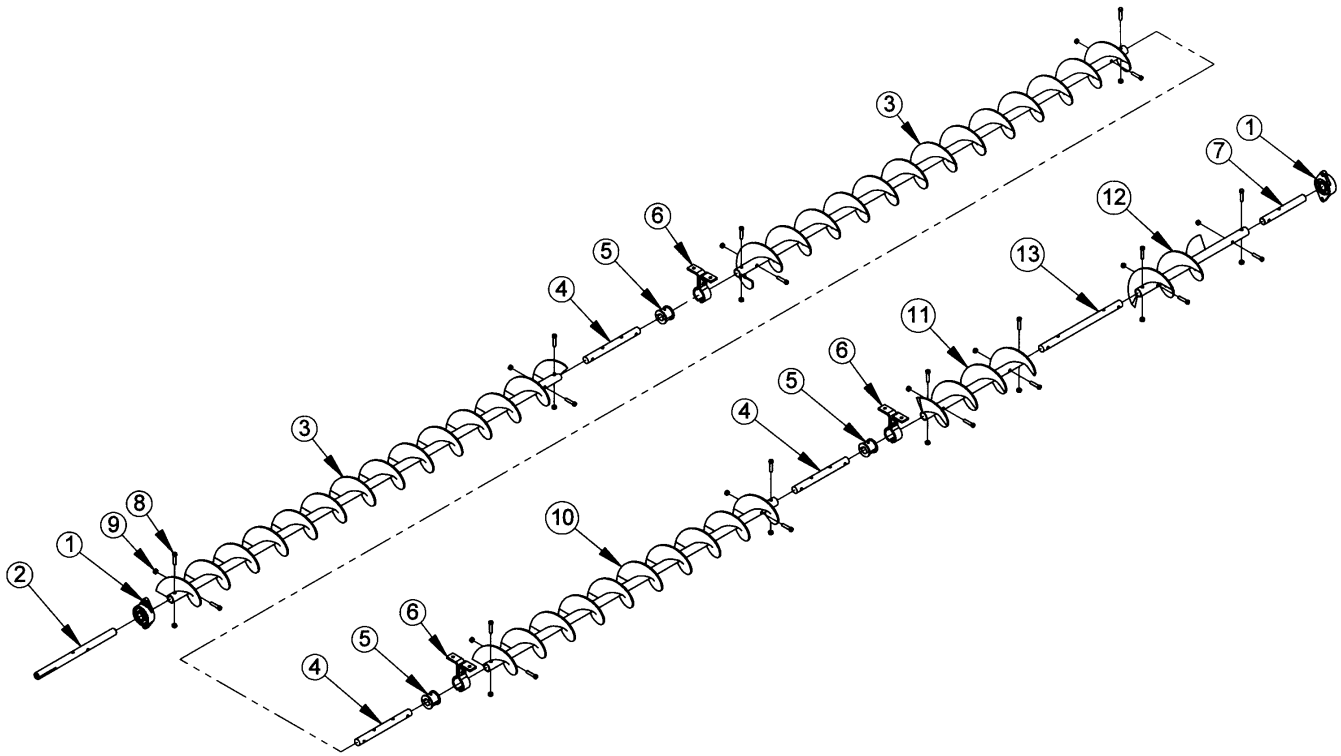
20' BOTTOM AUGER



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

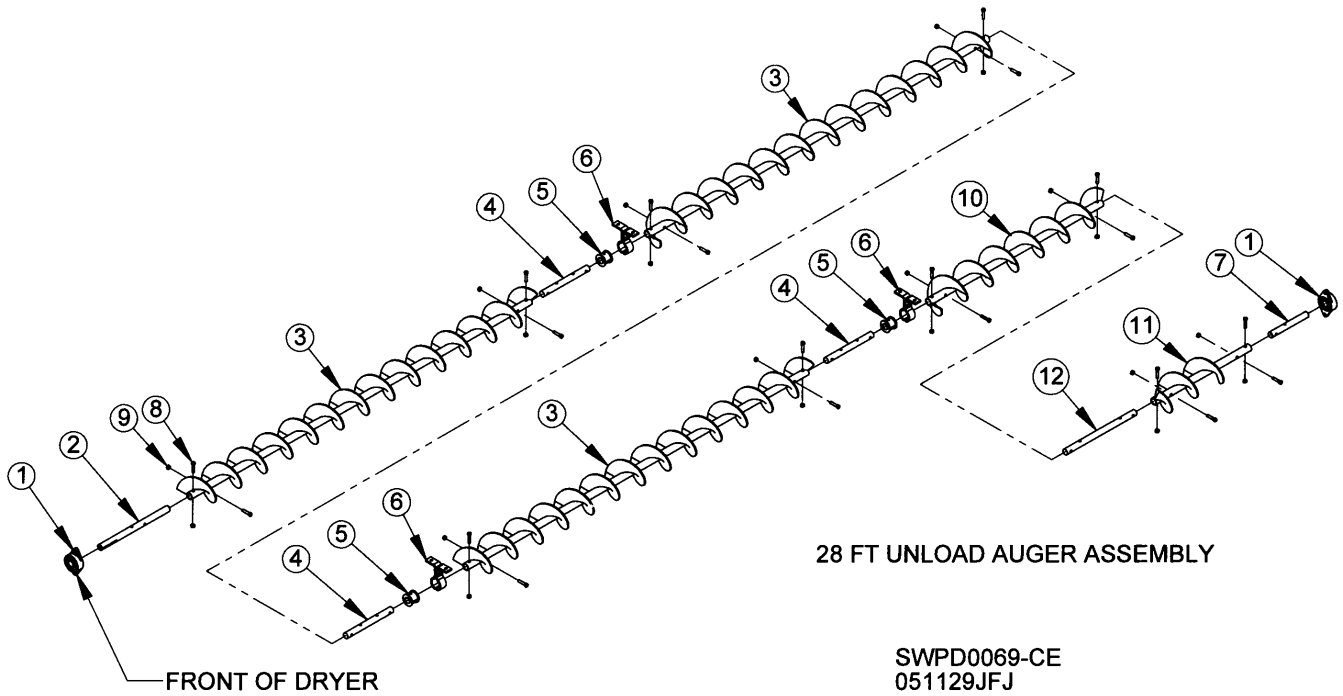
24' BOTTOM AUGER



SWPD0034

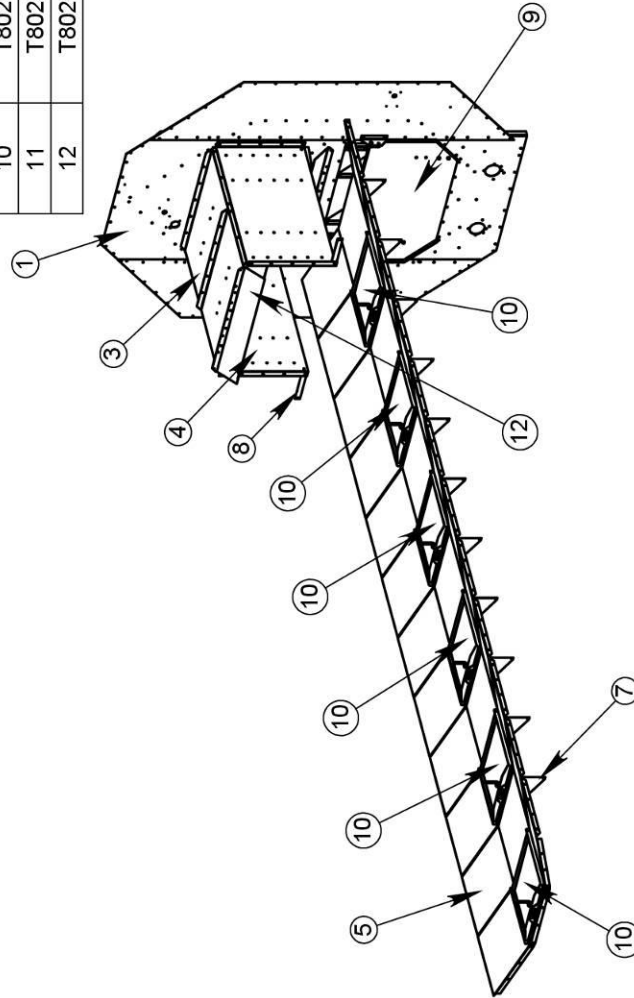
REF. #	DESCRIPTION	QTY	COMP. #
1	Bearing, 1.25, Flange, W/LC, HCFTS207-20	2	J0010
2	Shaft, Top Front, 12-3/4"	1	T16436
3	Auger, Bottom Front, 93-1/2"	2	T16430
4	Shaft, 8" Hanger Bearing	3	F4720
5	Bushing, Wood, 1.25" I.D.	3	J0096
6	Hanger Auger, T, 6CH2203	3	J0097
7	Shaft, 1.25" x 10", Bottom Auger	1	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

EU - DC LAYOUT



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	T80150	PLATE, FRONT END, CENT FAN	1
2	T16101	SIDE END PLATE	2
3	T80151	TOP PANEL, HEATER SHIELD	2
4	T80241	PANEL, SIDE, TUNNEL EXTEN	2
5	T24600	DIVIDER, PLENUM	6
6	T80144AM	DIVIDER WITH HOLE ASSM, WITH NUT INSERTS	6
7	T24601	GUSSET, PLENUM DIVIDER	22
8	T80240	BRKT, EXTENSION TO PERF	2
9	T43940	AIR BAFFLE ASSEMBLY	1
10	T80263	DOOR, PLENUM, ASSM	6
11	T80258	STAGNATOR 14IN, CFD, CENT DC	1
12	T80266	BAFFLE, 45DEG, HEAT DIST, CENT	2

DXF CREATED:

TOLERANCE UNLESS SPECIFIED
 X = ± .050
 .XX = ± .010
 .XXX = ± .005
 FRAC = ± 1/32
 ∠ = ± 1°

DRAWN BY: JFJ

DATE: 4/15/2008

USED IN ASSY OF: CONT FLOW DRYER

DESCRIPTION: PANEL, FRONT, FAN SUPT, SUCT COOL

SUKUP MFG. CO.
Sukup
 SUKUP PARKWAY
 SHEFFIELD, IA. 50475

RAW MATL. NO. -----

PART NO.: T15713C

WEIGHT

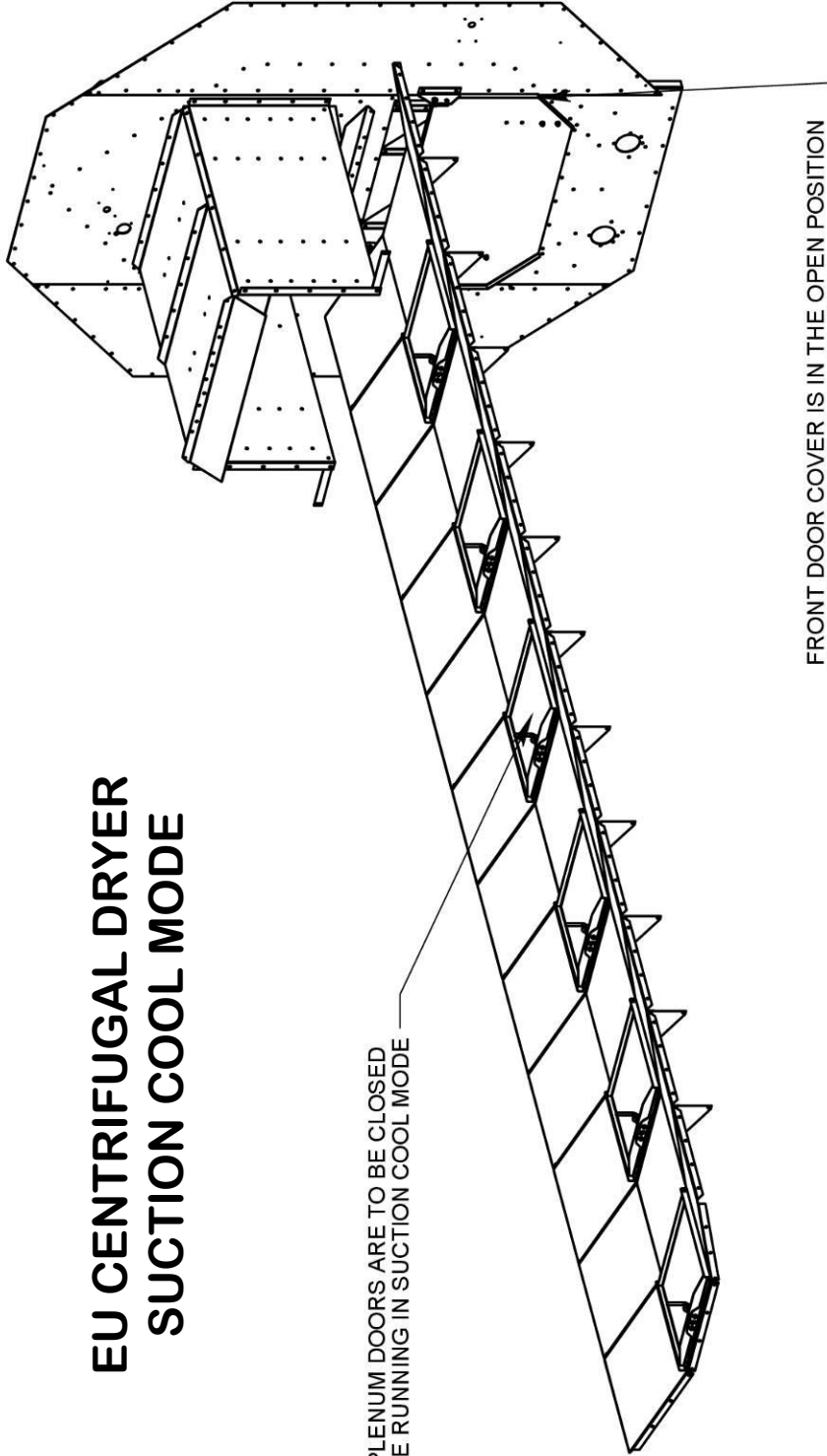
896.156

SHEET: 4 OF 6

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EU CENTRIFUGAL DRYER SUCTION COOL MODE

ALL PLENUM DOORS ARE TO BE CLOSED
WHILE RUNNING IN SUCTION COOL MODE



FRONT DOOR COVER IS IN THE OPEN POSITION
TO RUN IN SUCTION COOLED MODE
DXF CREATED:

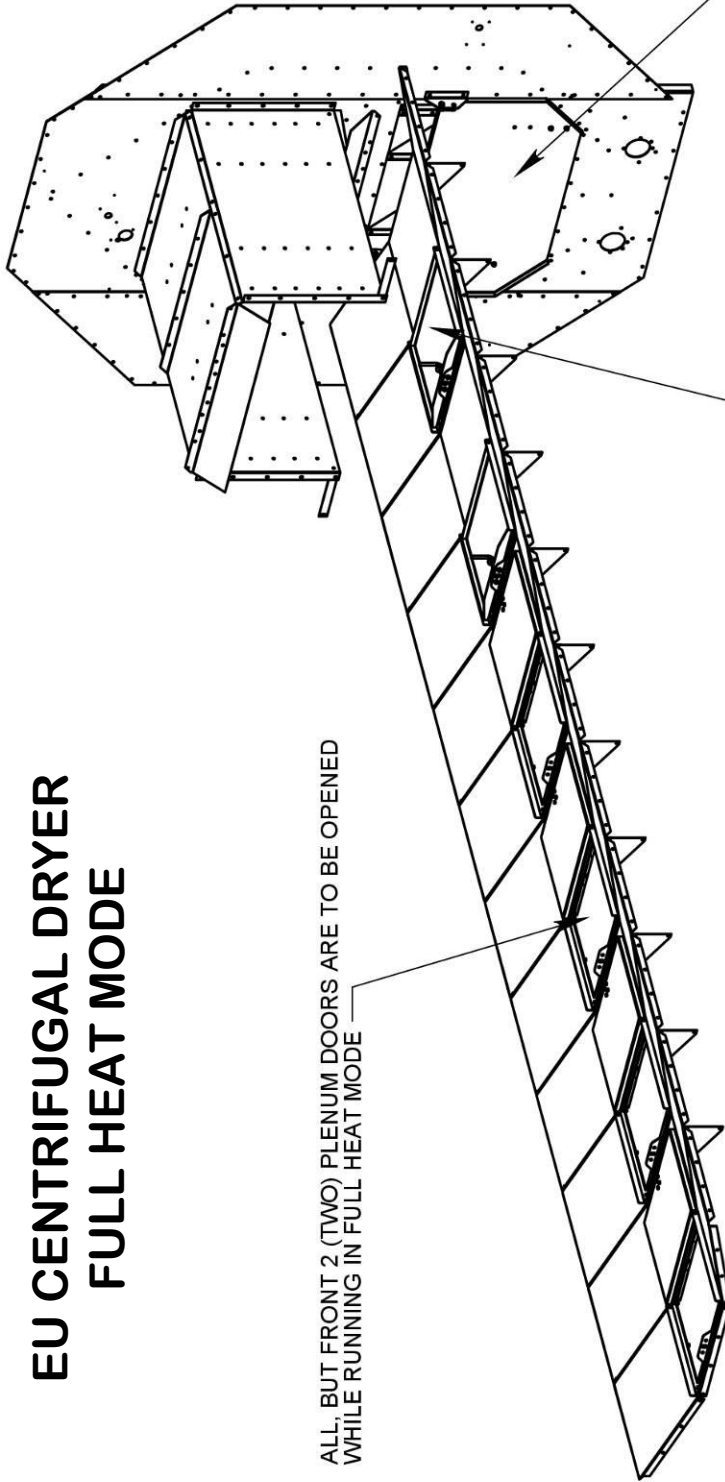
TOLERANCE UNLESS SPECIFIED
.X = ± .050
.XX = ± .010
.XXX = ± .005
FRAC = ± 1/32
ANGLE = ± 1°

SUKUP MFG. CO.
Sukup
SUKUP PARKWAY
SHEFFIELD, IA. 50475

DRAWN BY	JFJ	RAW MATL. NO.	-----	PART NO.	T15713C
DATE	4/15/2008	MATERIAL	-----		
USED IN ASSY OF:	CONT FLOW DRYER		WEIGHT	896.156	
DESCRIPTION:	PANEL, FRONT, FAN SUPT, SUCT COOL			SHEET: 6 OF 6	

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EU CENTRIFUGAL DRYER FULL HEAT MODE



FRONT 2 (TWO) PLENUM DOORS REMAIN IN CLOSED POSITION

FRONT DOOR COVER IS IN THE CLOSE POSITION TO RUN IN FULL HEAT MODE

DXF CREATED:

TOLERANCE UNLESS SPECIFIED
 .X = ± .050
 .XX = ± .010
 .XXX = ± .005
 FRAC = ± 1/32
 = ± 1°

SUKUP MFG. CO.
Sukup
 SUKUP PARKWAY
 SHEFFIELD, IA. 50475

DRAWN BY: **JFJ** RAW MATL. NO.: ----- PART NO.: **T15713C**

DATE: **4/15/2008** MATERIAL: -----

USED IN ASS'Y OF: **CONT FLOW DRYER**

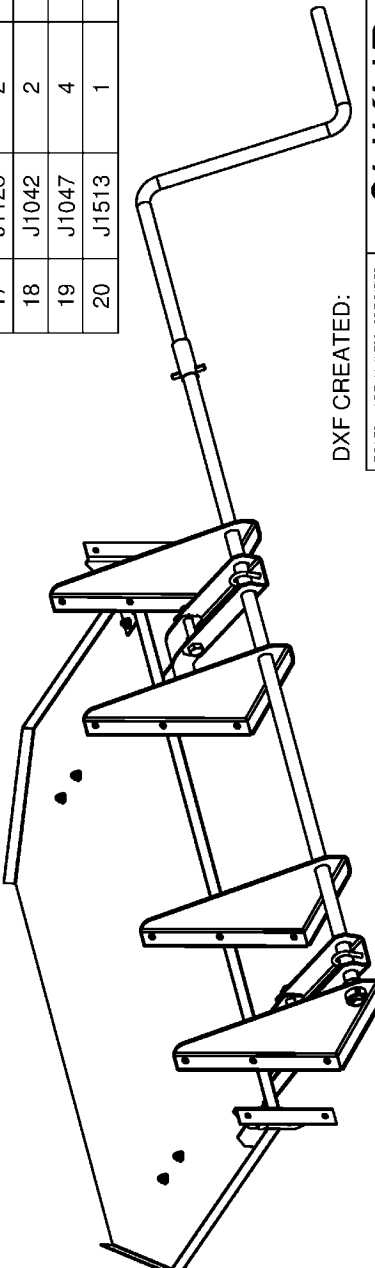
WEIGHT: **896.156**

DESCRIPTION: **PANEL_FRONT,FAN SUPT,SUCT COOL**

SHEET: 5 OF 6

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ITEM NO.	PART NUMBER	EXPLODED VW/QT.	DESCRIPTION
1	T43941	1	BAFFLE PANEL
2	T43942	1	HINGE BAFFLE PANEL, RIGHT
3	T43943	1	HINGE BAFFLE PANEL, LEFT
4	T43944	2	HINGE, FRONT END PLATE
5	T43945	2	LINKAGE BRACKET, PANEL
6	T43946	2	LINKAGE ARM SHORT
7	T43947	2	LINKAGE ARM LONG
8	T43948	4	PIVOT BRACKET
9	T43949	1	PIVOT ROD
10	T43952	1	PIVOT HANDLE WELDMENT
11	J0810	2	U-BOLT, 5/16-18, 1 1/16" ID 1.75D
12	J0795	4	SCREW 5/8-11 X 3 1/2
13	J1335	2	1" SHAFT COLLAR
14	J0605	8	SCREW, 3/8-16, 3/4, PLT
15	J1017	8	NUT, 3/8-16 FLANGE WHIZLOK
16	J0728	2	SCREW, 1/2-13, 1.25, PLT
17	J1125	2	WASHER, FLAT, 1/2
18	J1042	2	NUT, 1/2-13, PLT, GR8, LOCK
19	J1047	4	NUT, 5/8 - 11 TOP LOCK
20	J1513	1	ROLL PIN, 3/8 X 2 1/2"



DXF CREATED:

TOLERANCE UNLESS SPECIFIED
 X = ± .050
 .XX = ± .010
 .XXX = ± .005
 FRAC = ± 1/32
 ° = ± 1°

SUKUP MFG. CO.
Sukup
 SUKUP PARKWAY
 SHEFFIELD, IA. 50475

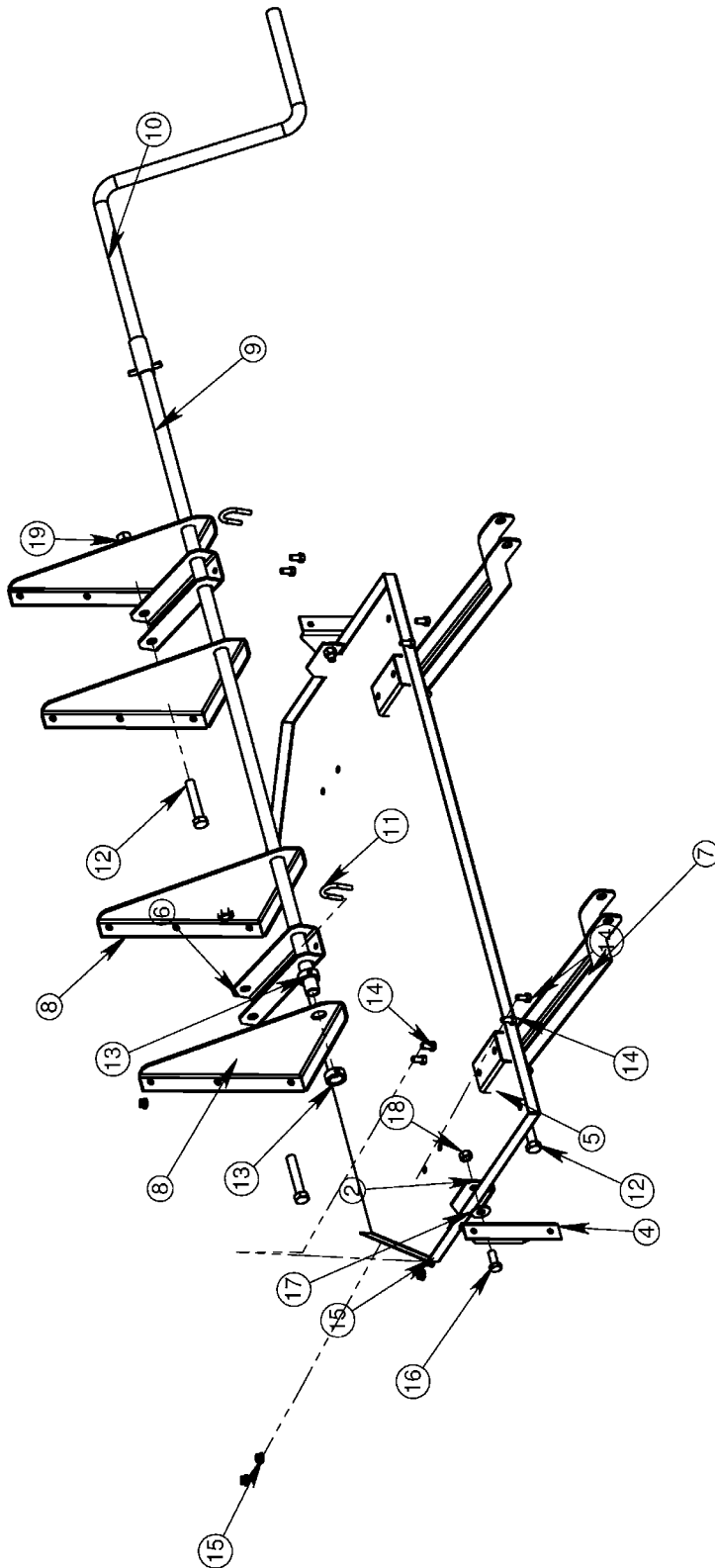
DRAWN BY: **KGJ** PART NO.: **T43940**

DATE: **10/30/2009** MATERIAL:

USED IN ASSY OF: **AIR BAFFLE, CENTRIFUGAL DRYER** WEIGHT: **82.76**

DESCRIPTION: **AIR BAFFLE ASSEMBLY** SHEET: **1 OF 2**

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DXF CREATED:

TOLERANCE UNLESS SPECIFIED
 X = ± .050
 .XX = ± .010
 .XXX = ± .005
 FRAC = ± 1/32
 = ± 1°

SUKUP MFG. CO.
Sukup
 SUKUP PARKWAY
 SHEFFIELD, IA. 50475

DRAWN BY: **KGJ** PART NO. **T43940**

DATE: **10/30/2009** MATERIAL:

USED IN ASSY OF: **AIR BAFFLE, CENTRIFUGAL DRYER** WEIGHT: **82.76**

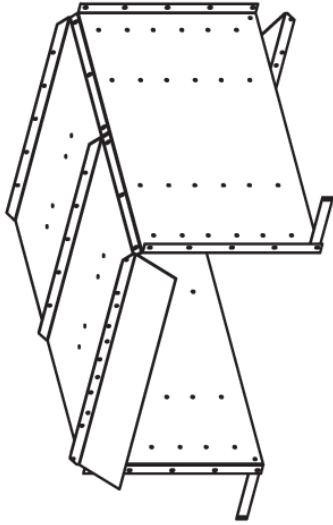
DESCRIPTION: **AIR BAFFLE ASSEMBLY** SHEET: **2 OF 2**

REV. DESCRIPTION OR ENG. ORDER # DATE BY

REVISIONS

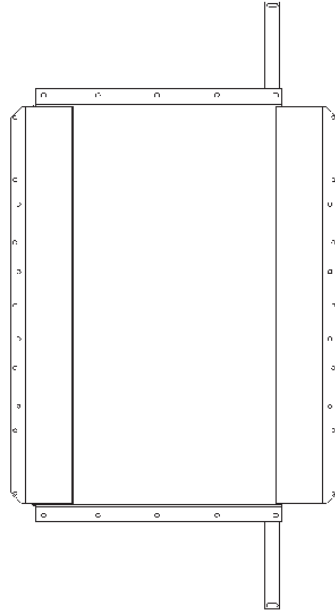
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PLENUM DUCTWORK

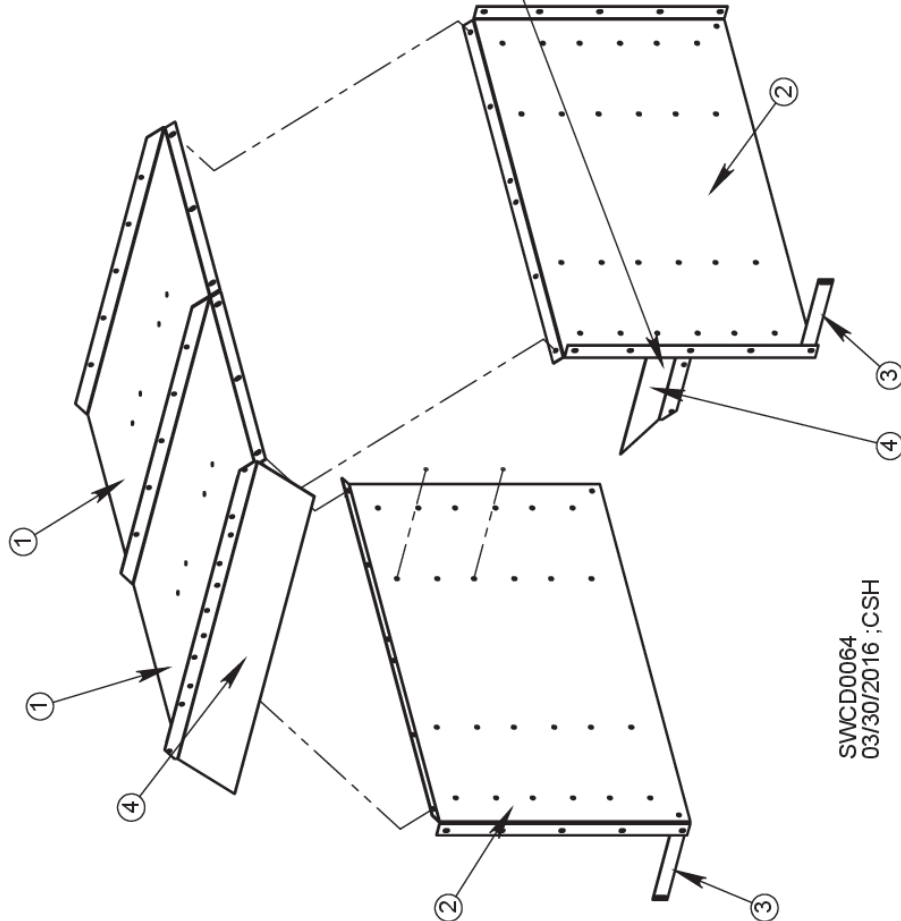


ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	T80151	TOP PANEL, HEATER SHIELD	2
2	T80241	PANEL,SIDE,TUNNEL EXTEN	2
3	T80240	BRKT,EXTENSION TO PERF	2
4	T80266	BAFFLE,45DEG,HEAT DIST,CENT	2

THIS BAFFLE BOLTED TO PLENUM END PLATE

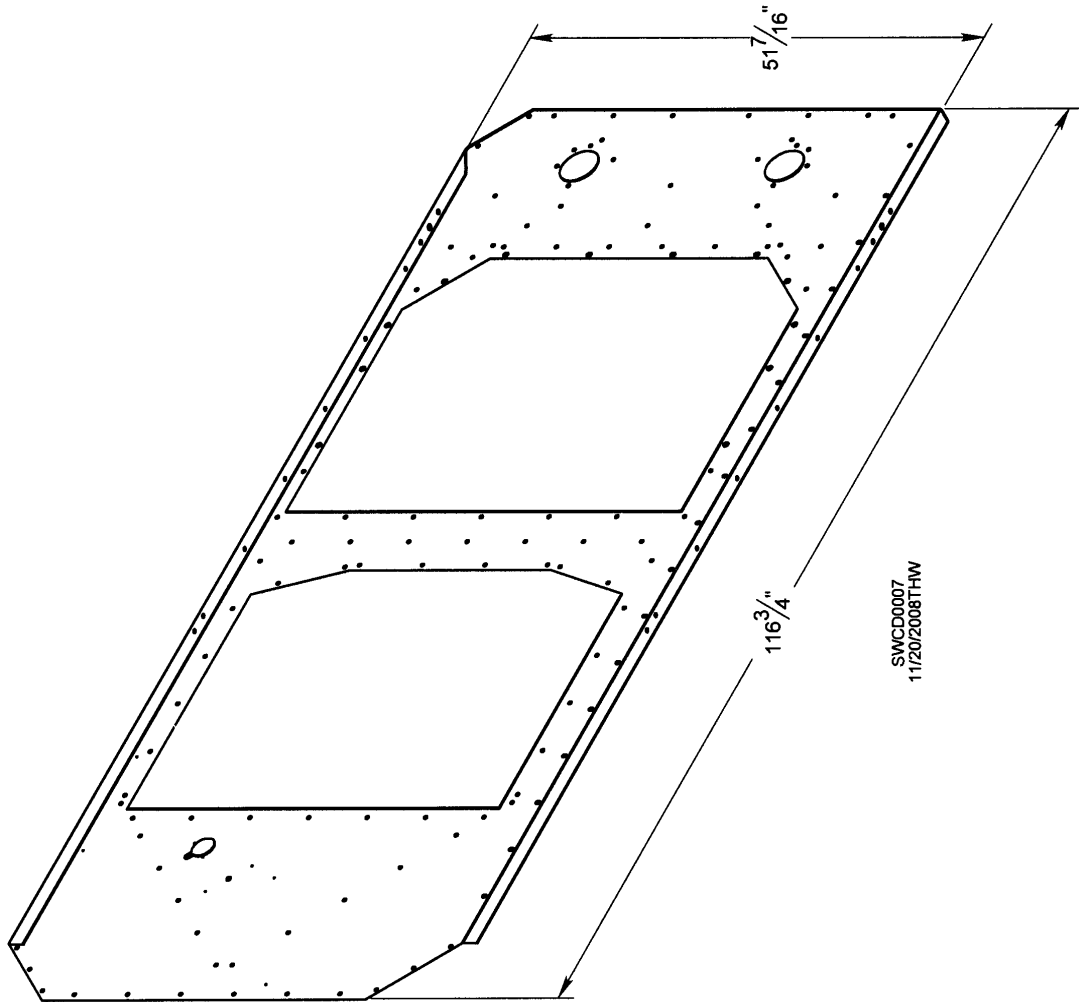


PLENUM DUCTWORK

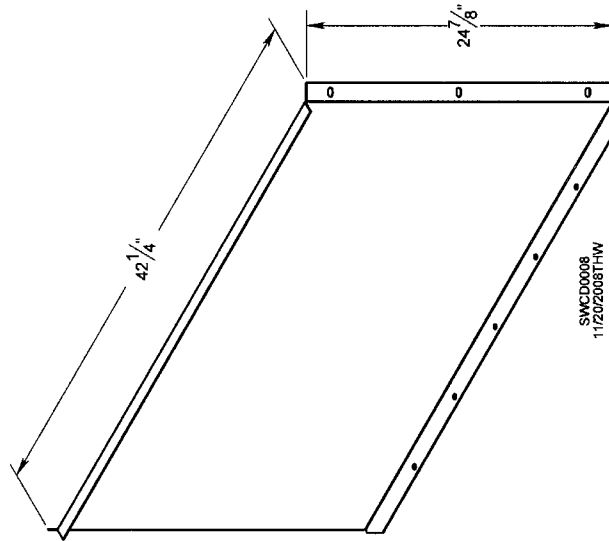


SWCD0064
03/30/2016 ;CSH

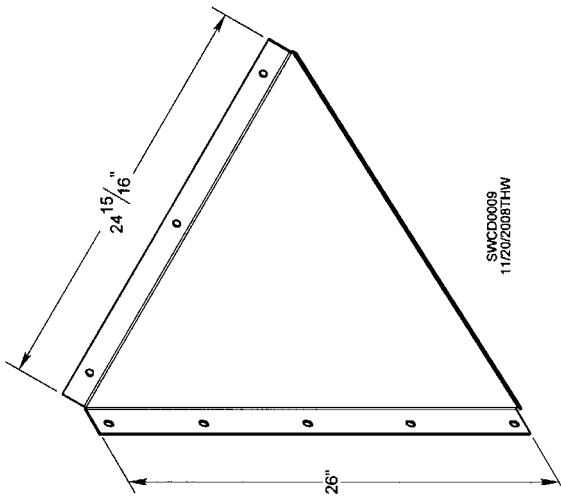
T80150 FRONT END PLATE



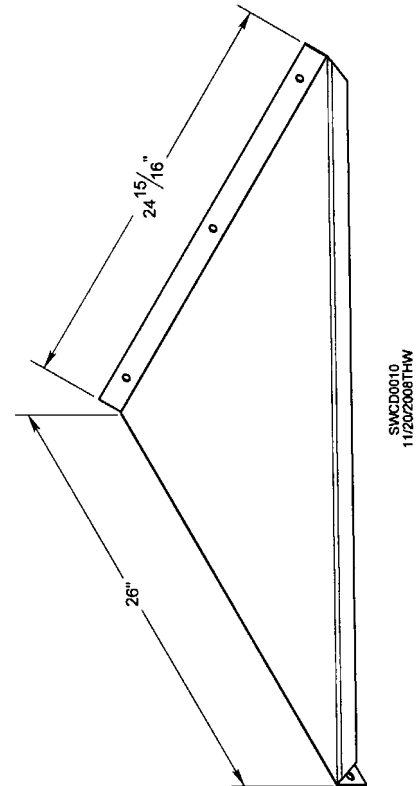
T80151 TOP PANEL, HEATER SHIELD



T80152 LEFT PANEL, HEATER SHIELD

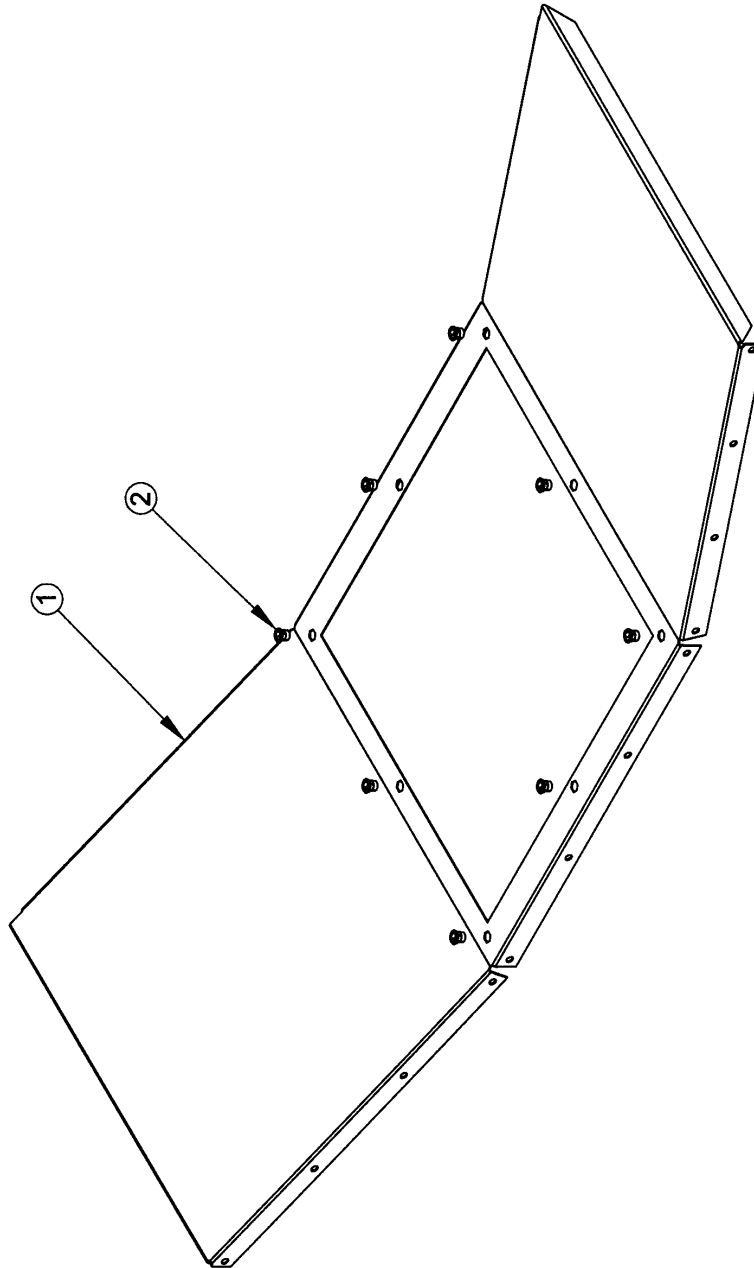


T80153 RIGHT PANEL, HEATER SHIELD

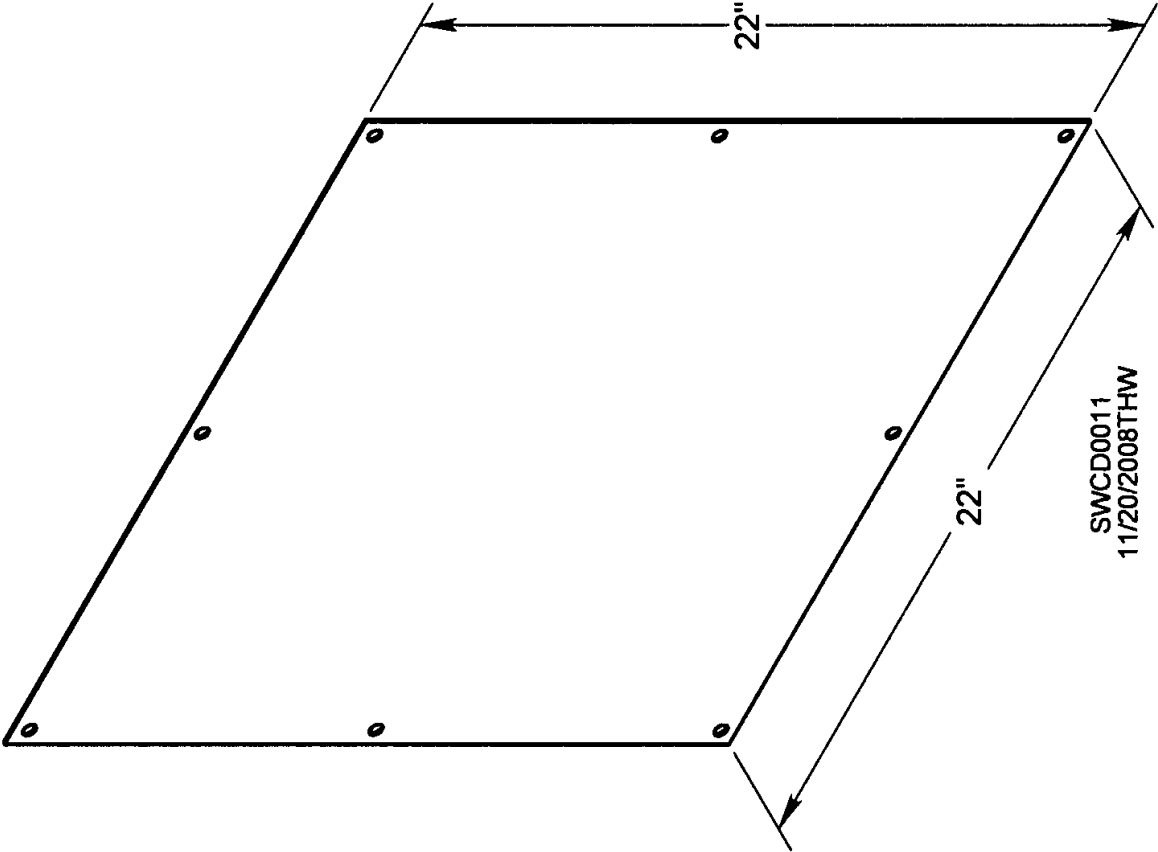


T80144AM DIVIDER WITH HOLE ASSEMBLY

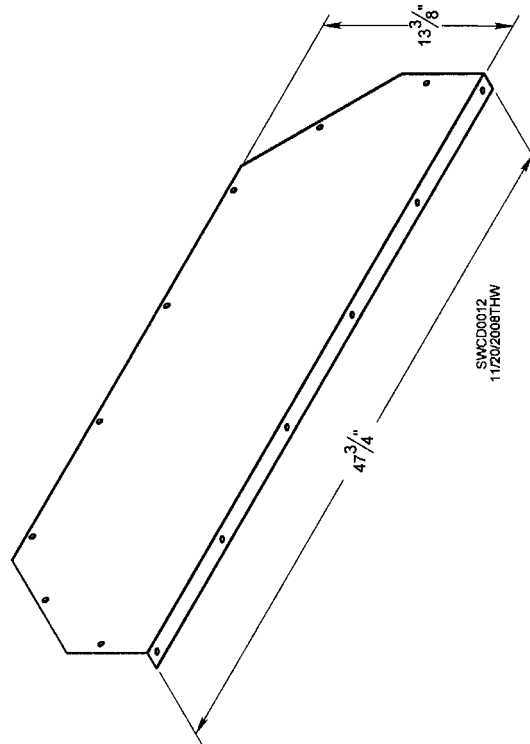
ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	T80144	DIVIDER W/ CUTOUT, PLENUM
2	8	J1007	NUT, RIVET, 5/16"-18



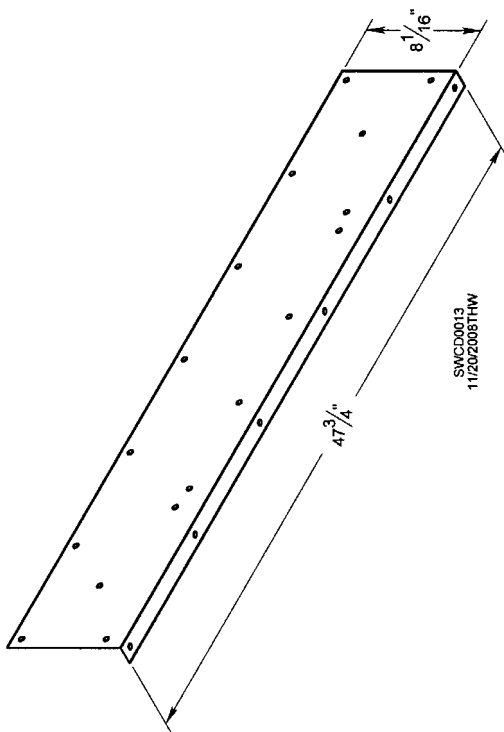
T80145 COVER, PLENUM DIVIDER W/CUTOUT



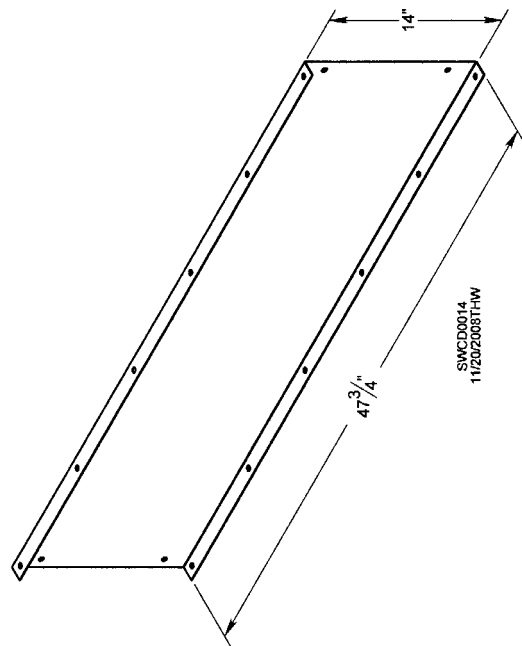
T80127 LOWER SEAL PLATE



T80128 UPPER SEAL PLATE

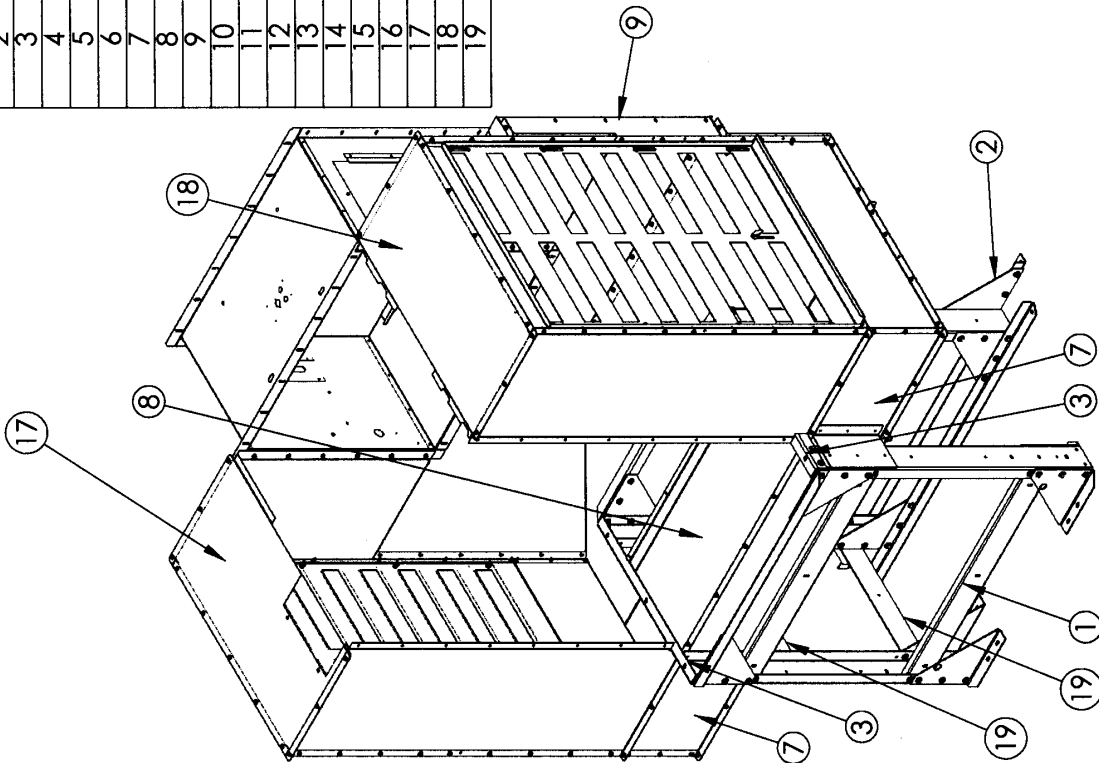


T80129 MIDDLE SEAL PLATE



T15743C DRYER FRONT FAN SUPPORT

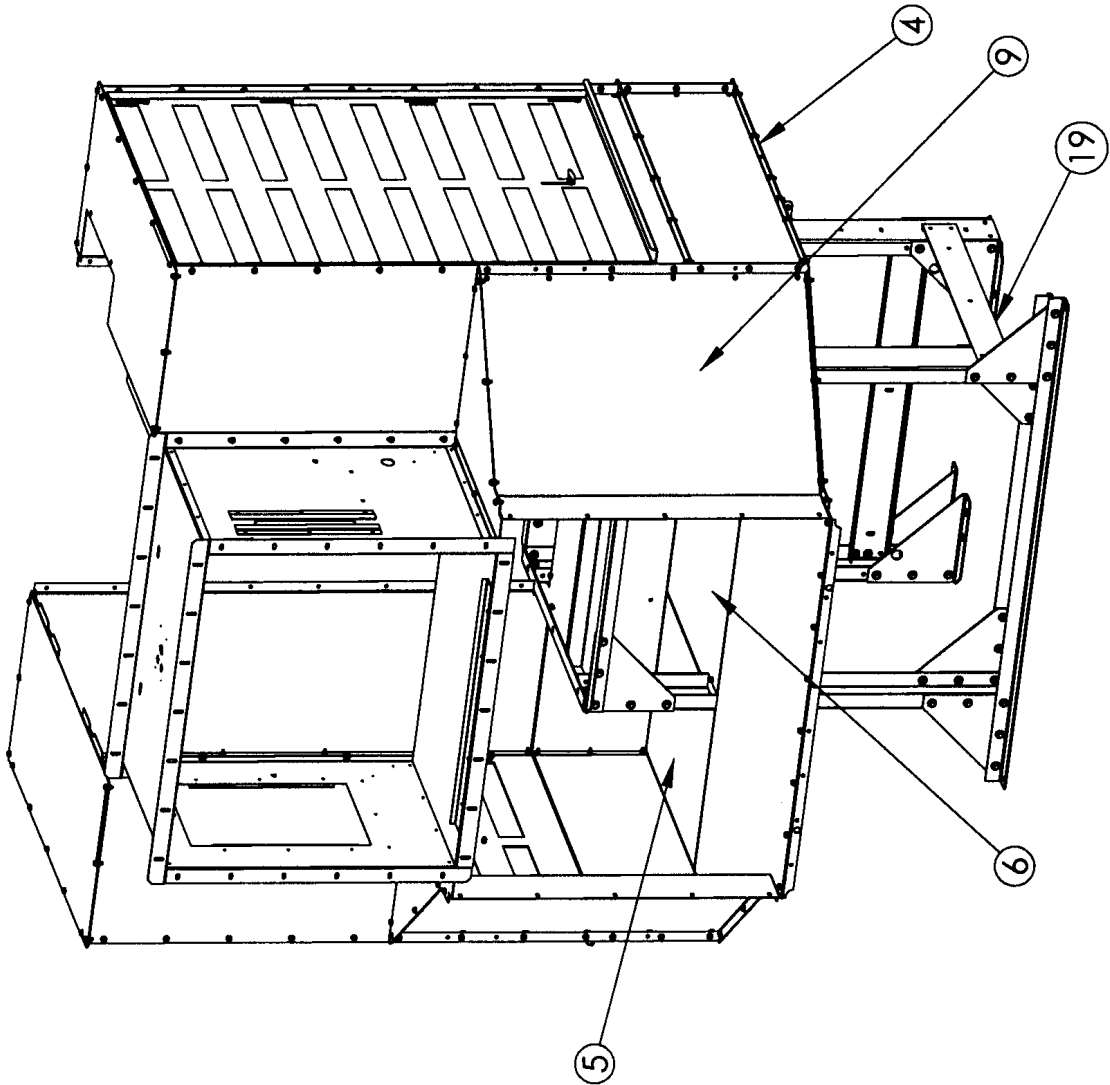
ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	T80160	FRAME HEATER SUPPORT, BACK	1
2	T80161	FRAME HEATER SUPPORT, FRONT	1
3	T80139	HOZT SIDE, BLOWER MOUNT FRAME	2
4	T801052	LOWER PANEL ASSY, RH	1
5	T80105	LOWER PANEL ASSY, LH	1
6	T80123	BOTTOM CENTER PANEL, BLOWER DUCT	1
7	T80115	FRONT PANEL, BLOWER INTAKE DUCT	1
8	T80116	UPPER MID PANEL, BLOWER INTAKE DUCT	1
9	T80164	DUCTWORK, SUCT COOL DRYER CONNECTION	1
10	J0606	SCREW, 3/8 - 16, 1, PLT	8
11	J1025	NUT, HEX 3/8-16, PLT LOCK	8
12	J1117	WASHER, FLAT, 3/8, PLT	16
13	J0536	SCREW, 5/16-18, 3/4", PLT, GR5, HHWZ	106
14	J1110	NUT, WHIZ, 5/16-13	106
15	T80166	MOUNTING PLATE, HEATER CONTROL BOX	2
16	T80200	BRACKET, DRYER DUCTWORK FRONT SUPPORT	2
17	T80163	INTAKE PLENUM, RH	1
18	T80162	INTAKE PLENUM, LH	1
19	T80219	MOUNTING PLATE, MANUAL CONTROL BOX	2



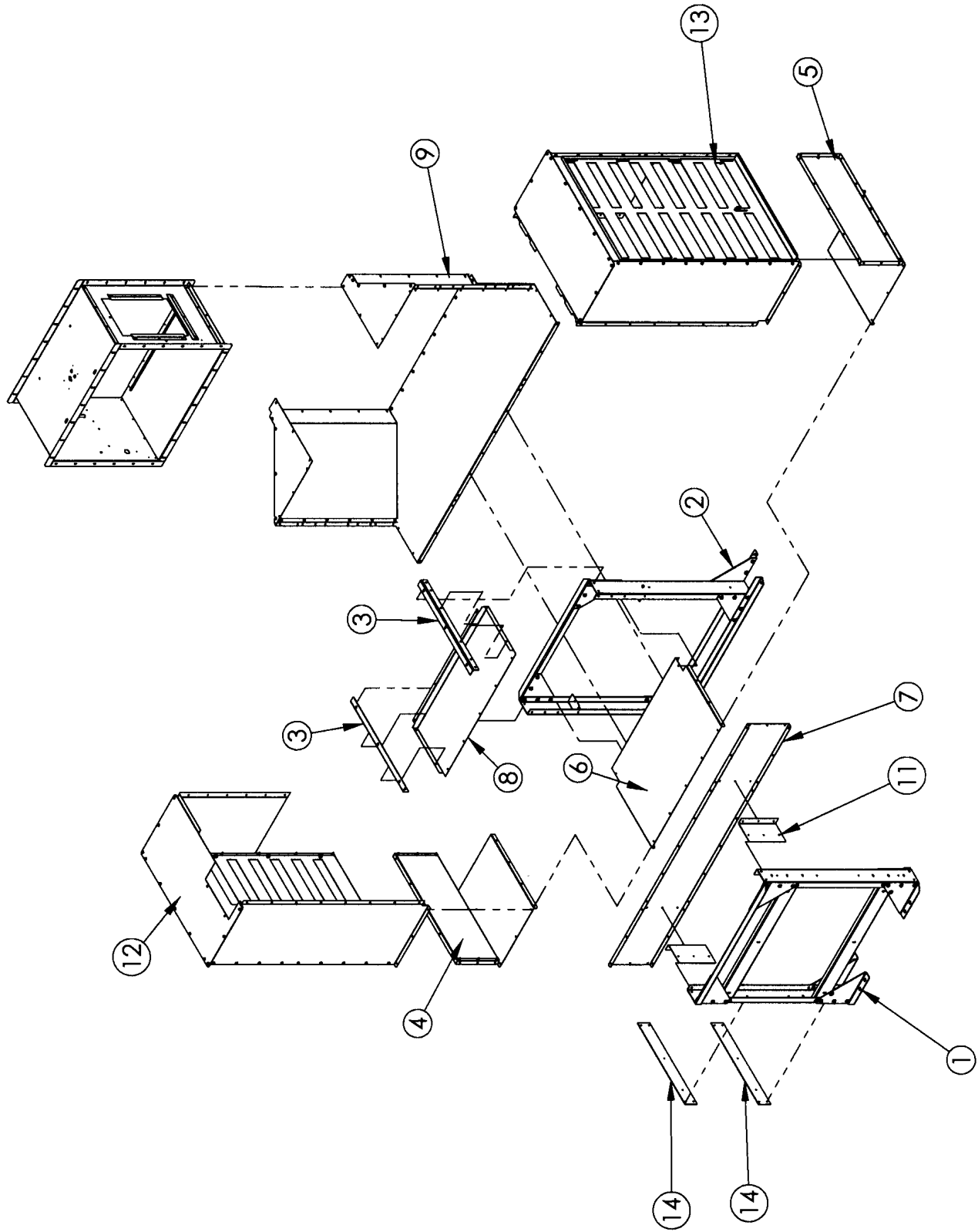
T15743C DRYER FRONT FAN SUPPORT

ITEM NO.	PART NO.	DESCRIPTION	QTY.	ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	T80160	FRAME HEATER SUPPORT, BACK	1	12	J1117	WASHER, FLAT, 3/8, PLT	16
	T80137	FRONT LEG, BLOWER MOUNT FRAME	2	13	J0536	SCREW, 5/16-18, 3/4", PLT, GR5, HHWZ	106
	T80155	LF BRACKET, FRONT LEGS, BLOWER MNT FRM	2	14	J1110	NUT, WHIZ, 5/16-13	106
	T80135	CHANNEL, POWER BOX MOUNT	2	15	T80166	MOUNTING PLATE, HEATER CONTROL BOX	2
	T80138	GUSSET PLATE, BLOWER MOUNT FRAME	2	16	T80200	BRACKET, DRYER DUCTWORK FRONT SUPPORT	2
	T80140	HOZI BASE 1, BLOWER MOUNT FRAME	1	17	T80163	INTAKE PLENUM, RH	1
	T80156	RT BRACKET, FRONT LEGS, BLOWER MNT FRM	2	T80101	AIR PANEL, STATIONARY ASSEM	1	
	J0616	SCREW, 3/8-16, 1.25", PLT	26	T80102	AIR PANEL, STATIONARY	1	
	J1117	WASHER, FLAT, 3/8, PLT	52	T80103	END FLANGE, AIR PANEL	2	
	J1025	NUT, HEX, 3/8-16, PLT LOCK	26	J0892	1/4" X 5/8" HUCKBOLT	12	
2	T80161	FRAME HEATER SUPPORT, FRONT	1	J0893	SLEEVE, HUCKBOLT, 1/4"	12	
	T80136	REAR LEG, BLOWER MOUNT FRAME	2	T80110	RT SIDE PANEL, BLOWER INTAKE DUCT	1	
	T80138	GUSSET PLATE, BLOWER MOUNT FRAME	6	T80117	RT TOP PANEL, BLOWER INTAKE DUCT	1	
	T80126	CLIP, CENTER BOTTM PANEL, BLOWER DUCT	2	T80109	RT FRONT SIDE PANEL, BLOWER INTAKE DUCT	1	
	T80141	HOZI BASE 2, BLOWER MOUNT FRAME	1	J1007	NUT, RIVET, 5/16"-18	9	
	T80142	HOZI BASE 3, BLOWER MOUNT FRAME	1	14167	KNOB, PLASTIC, 5/16-18 X 3/4"	1	
	J0616	SCREW, 3/8-16, 1.25", PLT	20	J0536	SCREW, 5/16-18, 3/4", PLT, GR5, HHWZ	25	
	J1025	NUT, HEX, 3/8-16, PLT LOCK	30	J1110	NUT, WHIZ, 5/16-13	25	
	J1117	WASHER, FLAT, 3/8, PLT	60	T80204	AIR PANEL ASSEMBLY, ADJUSTABLE	1	
	J0606	SCREW, 3/8-16, 1, PLT	10	T80104	AIR PANEL, ADJUSTABLE	1	
	J0536	SCREW, 5/16-18, 3/4", PLT, GR5, HHWZ	2	J70955	VINYL EDGE GUARD 13/32X35/64	1	
	J1110	NUT, WHIZ, 5/16-13	2	J1111	WASHER, FLAT, 5/16	16	
	T80140	HOZI BASE 1, BLOWER MOUNT FRAME	1	J0550	SCREW, 5/16-18, 1.25, PLT, GR5	8	
3	T80139	HOZI SIDE, BLOWER MOUNT FRAME	2	J1010	NUT, LOCK, 5/16-18, PLT	8	
4	T801052	LOWER PANEL ASSY, RH	1	18	T80162	INTAKE PLENUM, LH	1
	T80107	END FLANGE	2	T80101	AIR PANEL, STATIONARY ASSEM	1	
	T80106	LOWER PANNEL	1	T80102	AIR PANEL, STATIONARY	1	
	J0892	1/4" X 5/8" HUCKBOLT	6	T80103	END FLANGE, AIR PANEL	2	
	J0893	SLEEVE, HUCKBOLT, 1/4"	6	J0892	1/4" X 5/8" HUCKBOLT	12	
	T80124	BOTTOM LEFT PANEL, BLOWER DUCT	1	J0893	SLEEVE, HUCKBOLT, 1/4"	12	
	J0536	SCREW, 5/16-18, 3/4", PLT, GR5, HHWZ	4	T80204	AIR PANEL ASSEMBLY, ADJUSTABLE	1	
	J1110	NUT, WHIZ, 5/16-13	4	T80104	AIR PANEL, ADJUSTABLE	1	
5	T80105	LOWER PANEL ASSY, LH	1	J70955	VINYL EDGE GUARD 13/32X35/64	1	
	T80107	END FLANGE	2	T80119	LT SIDE PANEL, BLOWER INTAKE DUCT	1	
	T80106	LOWER PANNEL	1	T80118	LF FRONT PANEL, BLOWER INTAKE DUCT	1	
	J0892	1/4" X 5/8" HUCKBOLT	6	T80120	LT TOP PANEL, BLOWER INTAKE DUCT	1	
	J0893	SLEEVE, HUCKBOLT, 1/4"	6	J0536	SCREW, 5/16-18, 3/4", PLT, GR5, HHWZ	25	
	T80125	BOTTOM RIGHT PANEL, BLOWER DUCT	1	J1110	NUT, WHIZ, 5/16-13	25	
	J0536	SCREW, 5/16-18, 3/4", PLT, GR5, HHWZ	4	J1007	NUT, RIVET, 5/16"-18	9	
	J1110	NUT, WHIZ, 5/16-13	4	J0550	SCREW, 5/16-18, 1.25, PLT, GR5	8	
6	T80123	BOTTOM CENTER PANEL, BLOWER DUCT	1	J4167	KNOB, PLASTIC, 5/16-18 X 3/4"	1	
7	T80115	FRONT PANEL, BLOWER INTAKE DUCT	1	J1111	WASHER, FLAT, 5/16	16	
8	T80116	UPPER MID PANEL, BLOWER INTAKE DUCT	1	J1010	NUT, LOCK, 5/16-18, PLT	8	
9	T80164	DUCTWORK, SUCT COOL DRYER CONNECTION	1	19	T80219	MOUNTING PLATE, MANUAL CONTROL BOX	2
	T80111	TRANSITION TOP PANEL	2				
	T80121	BOTTOM ANGLE, BLOWER TRANS-END PLT	1				
	T80122	BOTTOM PANEL, BLOWER TRANSITION	1				
	T80112	TRANSITION SIDE PANEL	2				
	T80113	PANEL, TRANSITION SIDE PANEL	1				
	T80114	END FLANGE, TRANSITION SIDE PANEL	1				
	J0892	1/4" X 5/8" HUCKBOLT	6				
	J0893	SLEEVE, HUCKBOLT, 1/4"	6				
	J0536	SCREW, 5/16-18, 3/4", PLT, GR5, HHWZ	24				
	J1110	NUT, WHIZ, 5/16-13	24				
10	J0606	SCREW, 3/8-16, 1, PLT	8				
11	J1025	NUT, HEX, 3/8-16, PLT LOCK	8				

T15743C DRYER FRONT FAN SUPPORT

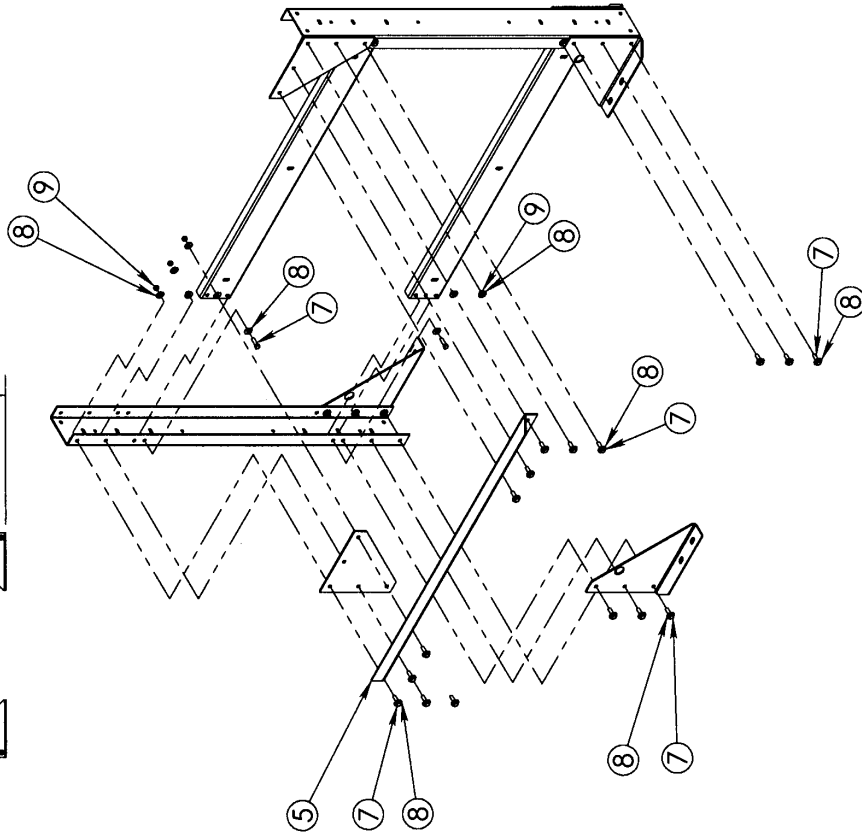
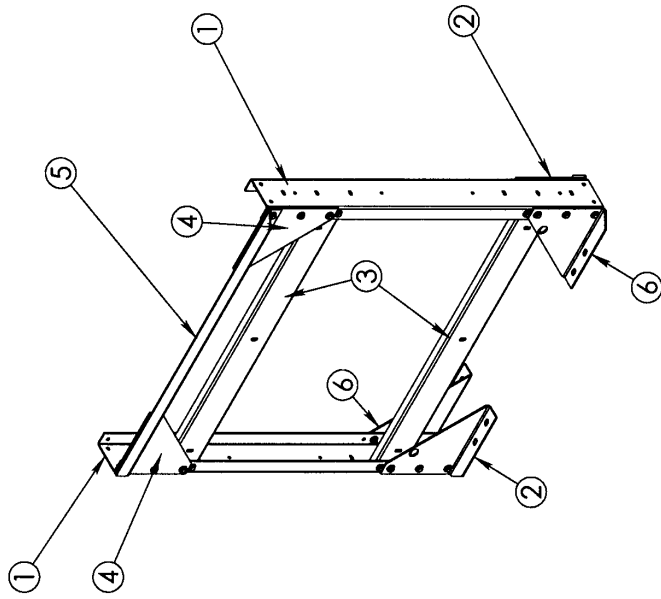
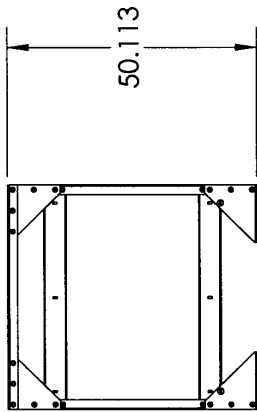


T15743C DRYER FRONT FAN SUPPORT



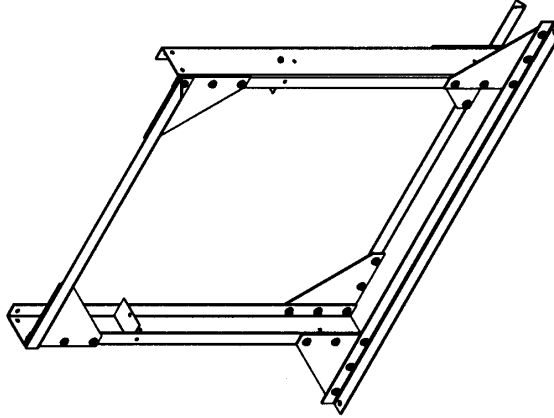
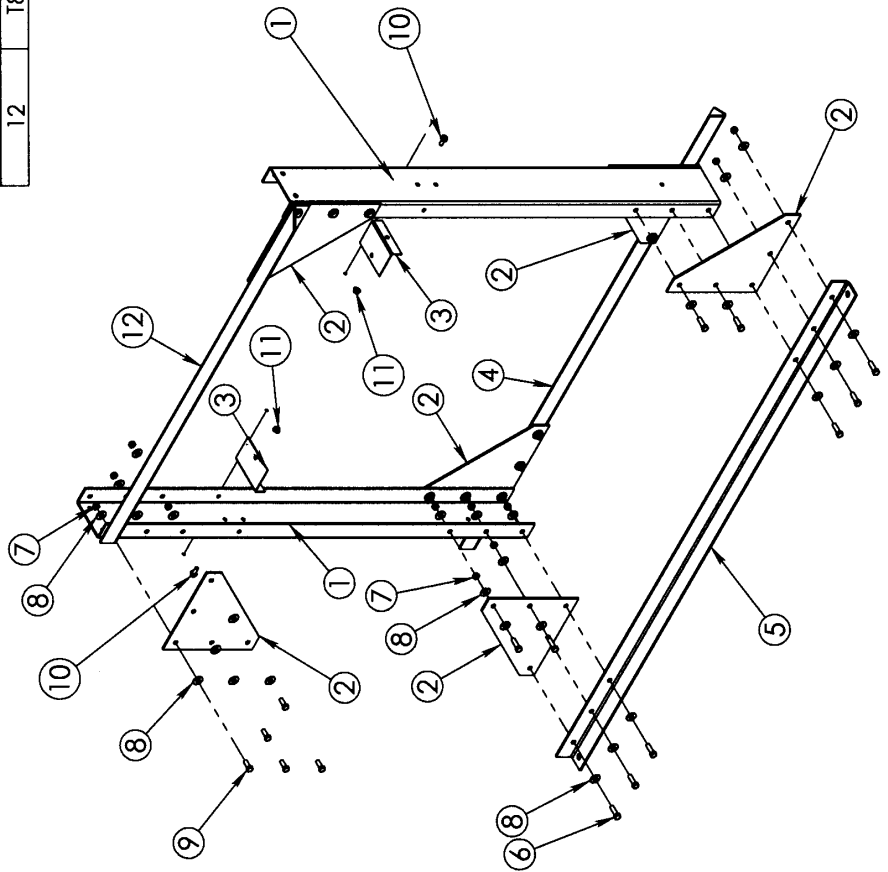
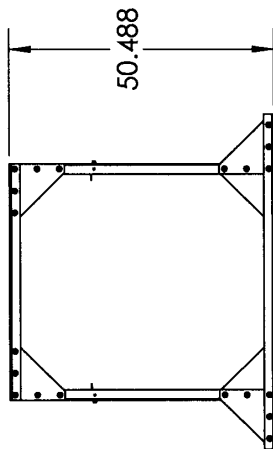
T80160 FRAME FAN SUPPORT, BACK

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	T80137	FRONT LEG, BLOWER MOUNT FRAME	2
2	T80155	LF BRACKET, FRONT LEGS, BLOWER MNT FRM	2
3	T80135	CHANNEL, POWER BOX MOUNT	2
4	T80138	GUSSET PLATE, BLOWER MOUNT FRAME	2
5	T80140	HOZT BASE 1, BLOWER MOUNT FRAME	1
6	T80156	RT BRACKET, FRONT LEGS, BLOWER MNT FRM	2
7	J0616	SCREW, 3/8-16, 1.25", PLT	26
8	J1117	WASHER, FLAT, 3/8, PLT	52
9	J1025	NUT, HEX, 3/8-16, PLT LOCK	26

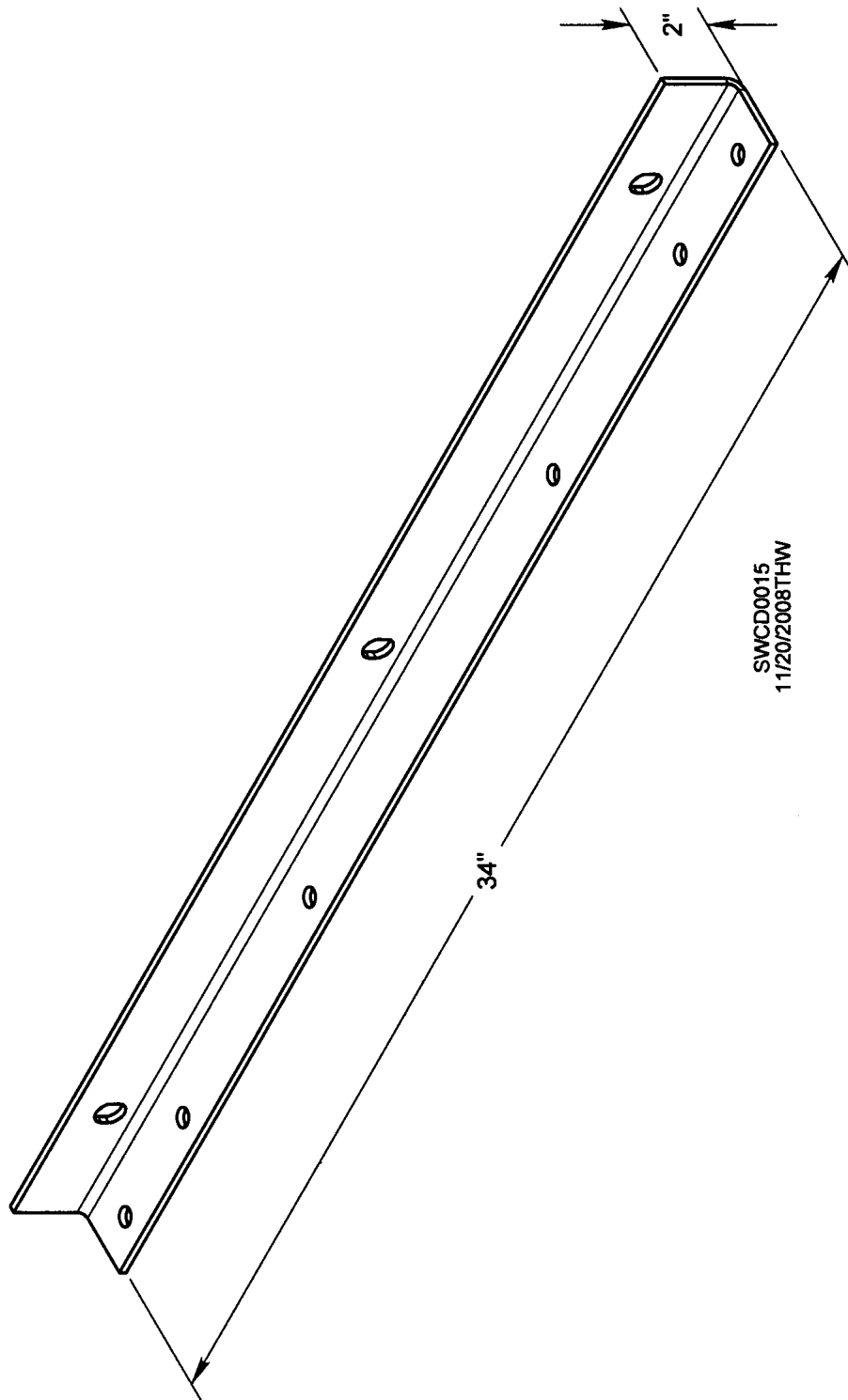


T80161 FRAME FAN SUPPORT, FRONT

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	T80136	REAR LEG, BLOWER MOUNT FRAME	2
2	T80138	GUSSET PLATE, BLOWER MOUNT FRAME	6
3	T80126	CLIP, CENTER BOTTM PANEL, BLOWER DUCT	2
4	T80141	HOZT BASE 2, BLOWER MOUNT FRAME	1
5	T80142	HOZT BASE 3, BLOWER MOUNT FRAME	1
6	J0616	SCREW, 3/8-16, 1.25", PLT	20
7	J1025	NUT, HEX, 3/8-16, PLT LOCK	30
8	J1117	WASHER, FLAT, 3/8, PLT	60
9	J0606	SCREW, 3/8-16, 1, PLT	10
10	J0536	SCREW, 5/16-18, 3/4", PLT, GR5, HHWZ	2
11	J1110	NUT, WHIZ, 5/16-13	2
12	T80140	HOZT BASE 1, BLOWER MOUNT FRAME	1

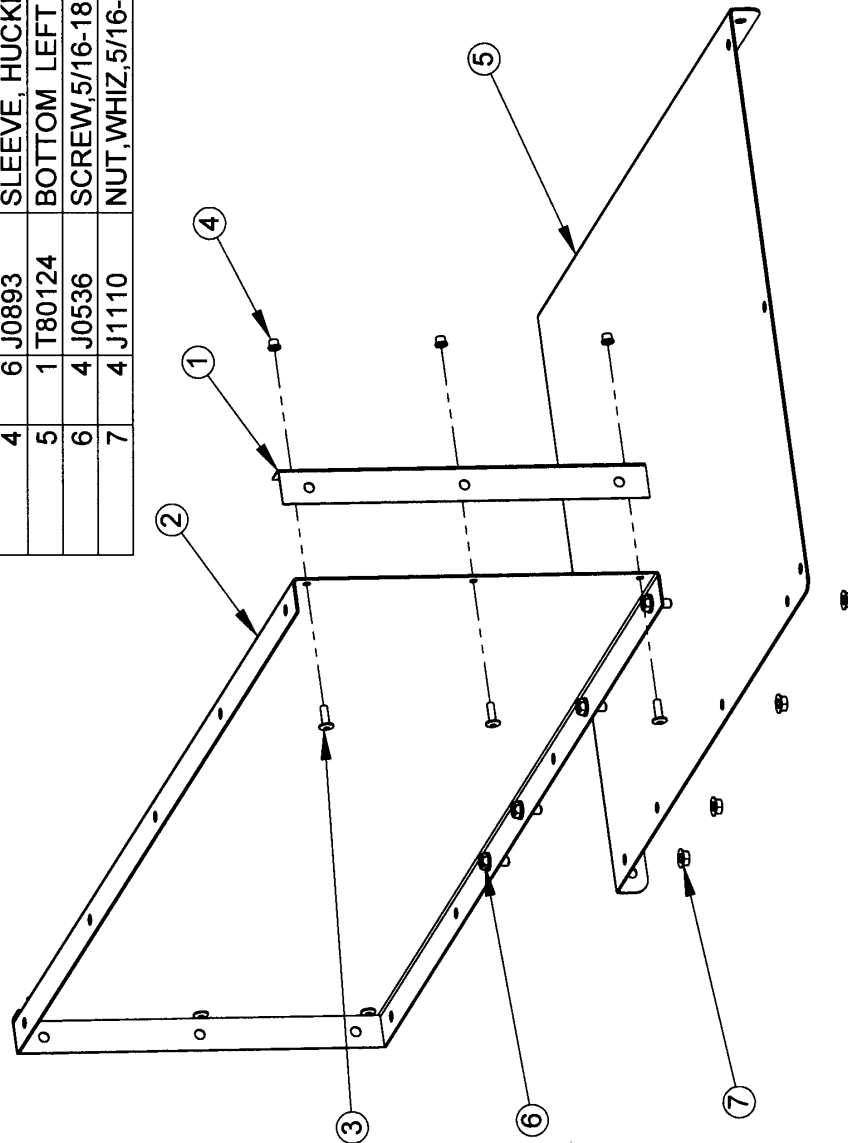


T80139 HORIZONTAL SIDE BLOWER MOUNT FRAME



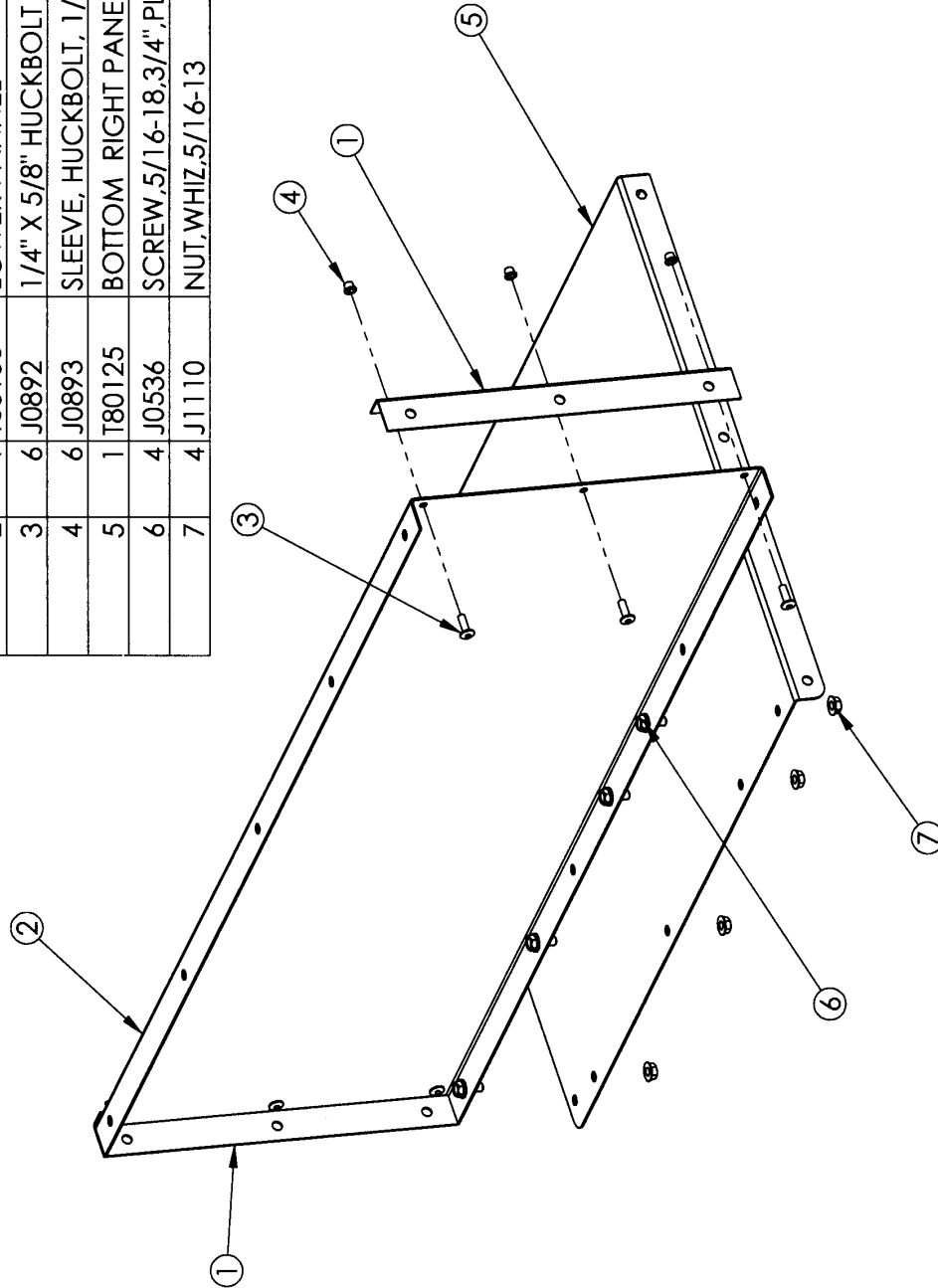
T801052 LOWER PANEL ASSEMBLY, RIGHT

ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	2	T80107	END FLANGE
2	1	T80106	LOWER PANNEL
3	6	J0892	1/4" X 5/8" HUCKBOLT
4	6	J0893	SLEEVE, HUCKBOLT, 1/4"
5	1	T80124	BOTTOM LEFT PANEL, BLOWER DUCT
6	4	J0536	SCREW, 5/16-18, 3/4", PLT, GR5, HHWZ
7	4	J1110	NUT, WHIZ, 5/16-13

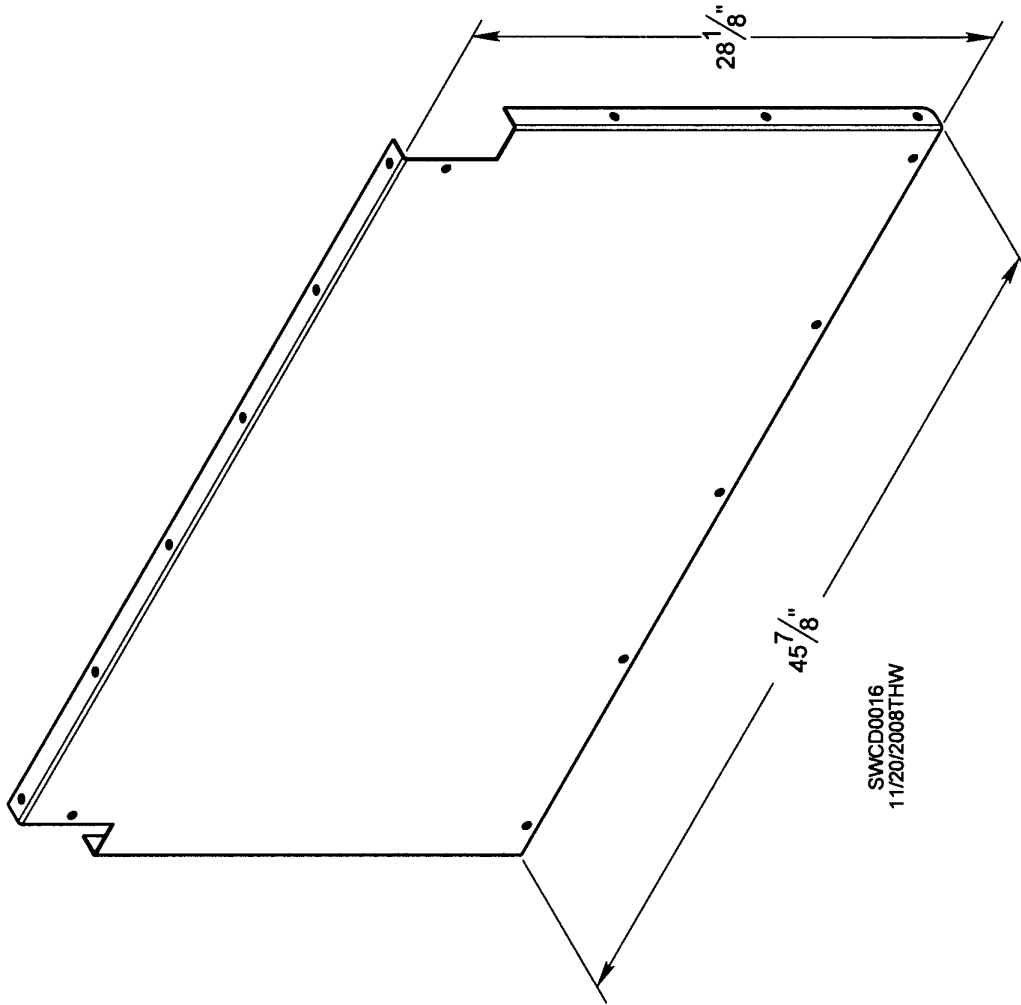


T80105 LOWER PANEL ASSEMBLY, LEFT

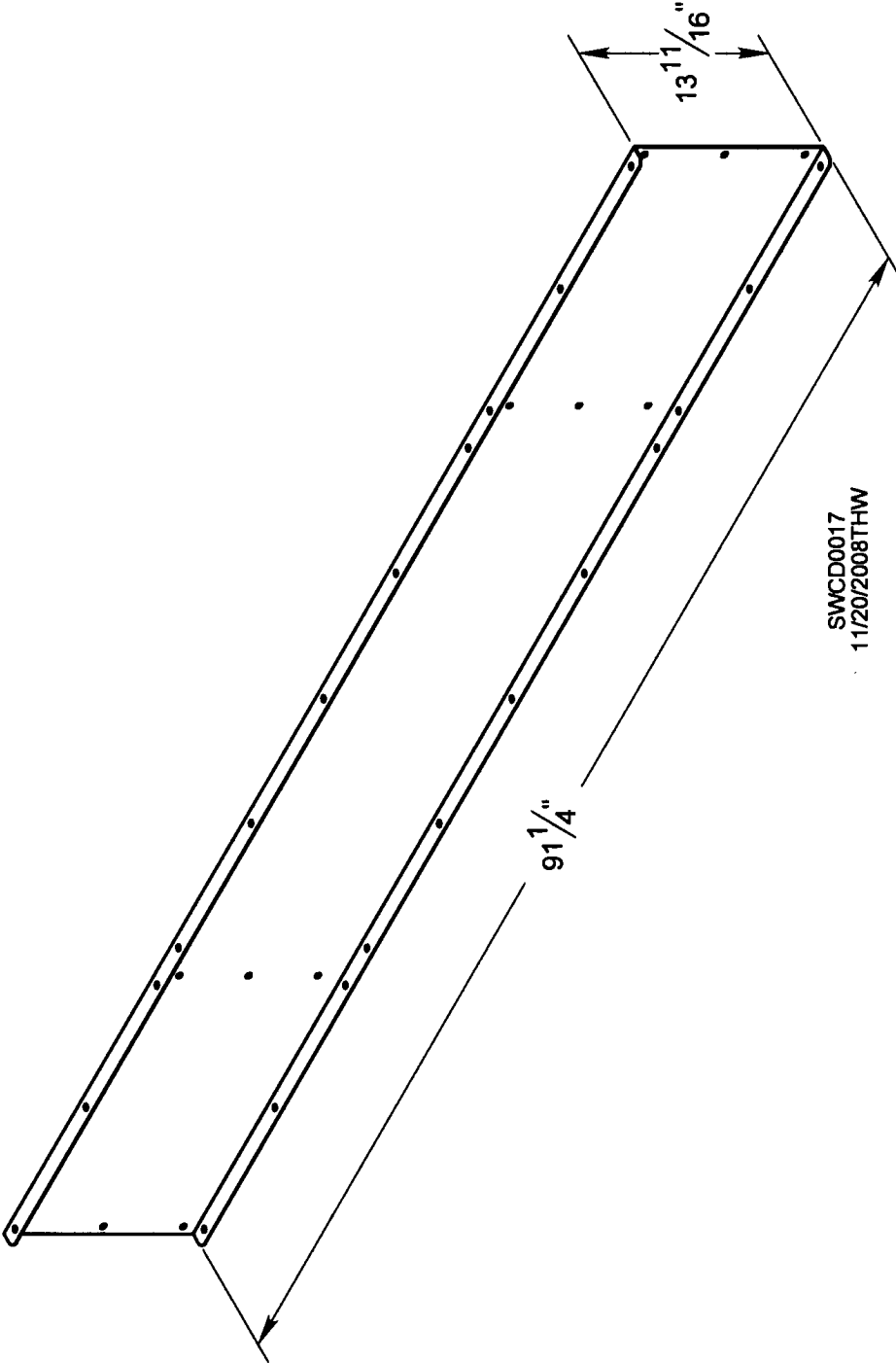
ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	2	T80107	END FLANGE
2	1	T80106	LOWER PANNEL
3	6	J0892	1/4" X 5/8" HUCKBOLT
4	6	J0893	SLEEVE, HUCKBOLT, 1/4"
5	1	T80125	BOTTOM RIGHT PANEL, BLOWER DUCT
6	4	J0536	SCREW, 5/16-18, 3/4", PLT, GR5, HHWZ
7	4	J1110	NUT, WHIZ, 5/16-13



T80123 BOTTOM CENTER PANEL, BLOWER DUCT

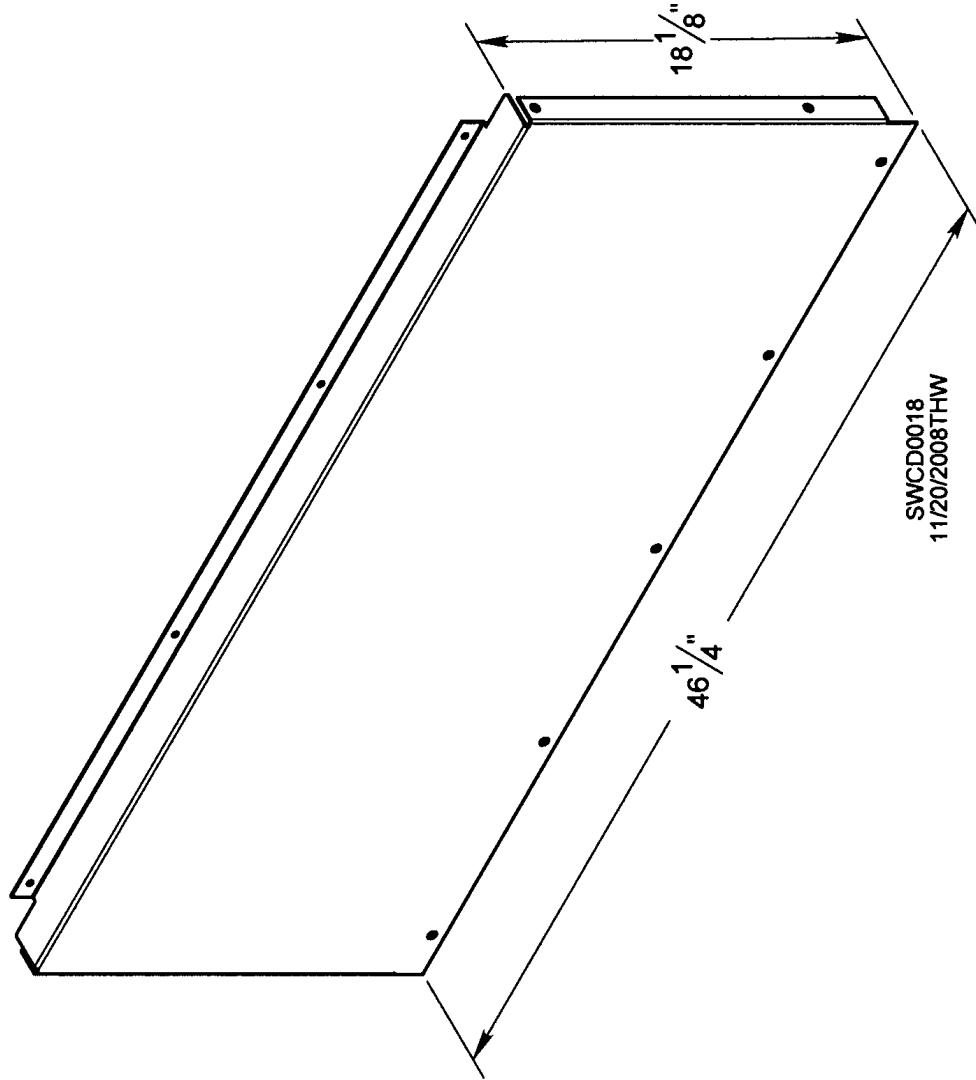


T80115 FRONT PANEL, BLOWER INTAKE DUCT



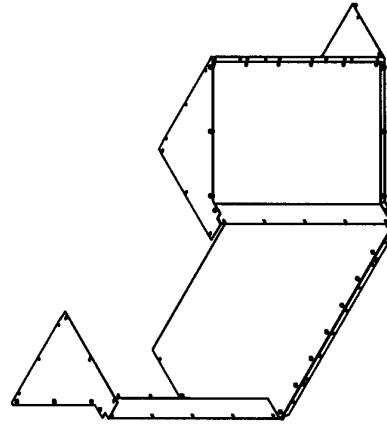
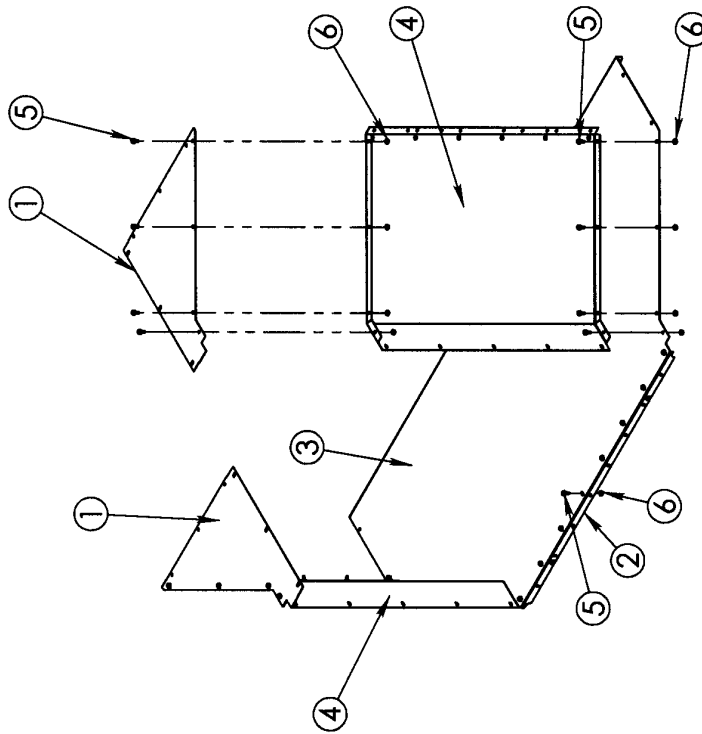
SWCD0017
11/20/2008THW

T80116 UPPER MID PANEL, BLOWER INTAKE DUCT

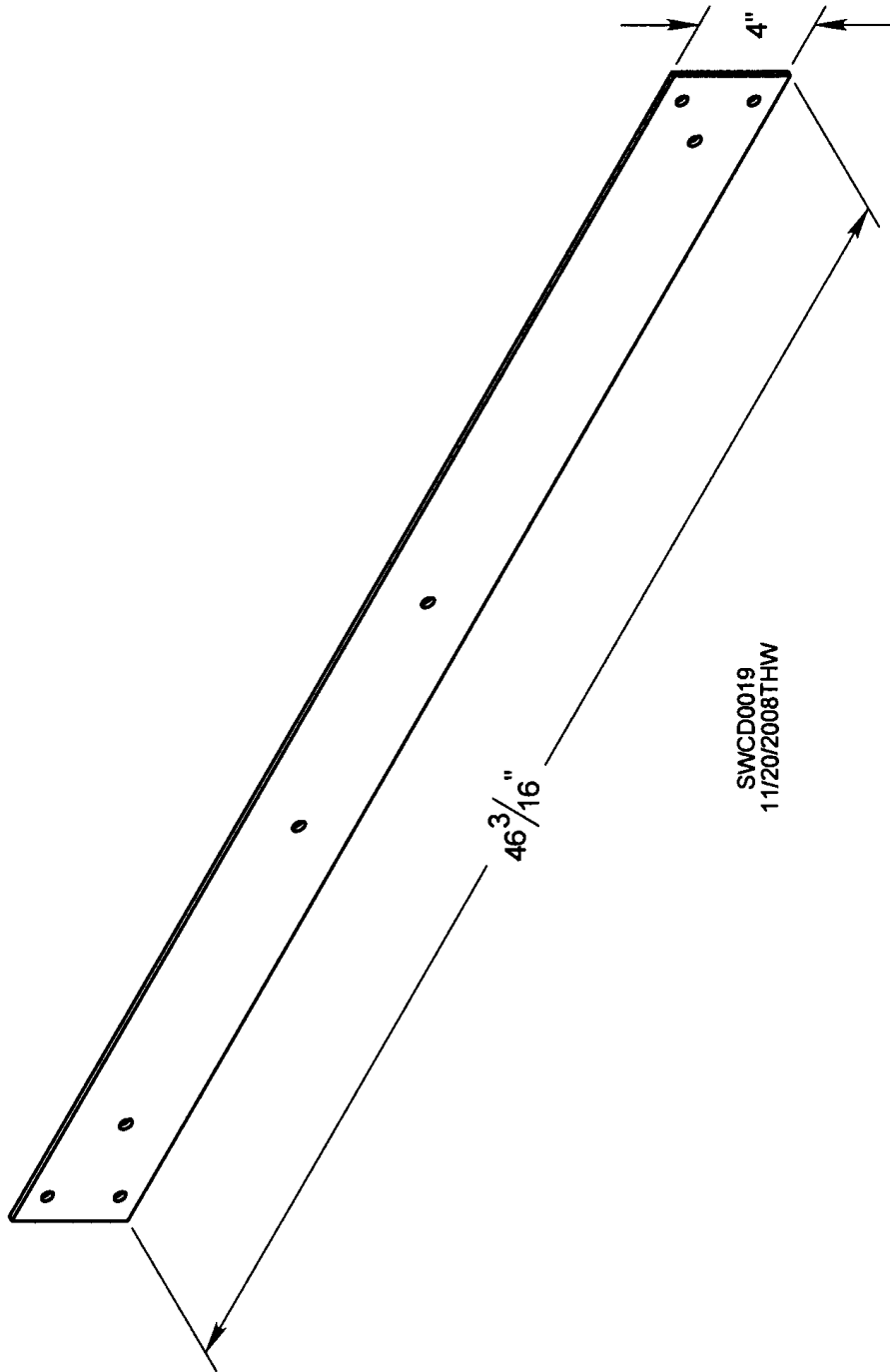


T80164 DRYER FRONT FAN SUPPORT, DUCTWORK, DRYER CONNECTION

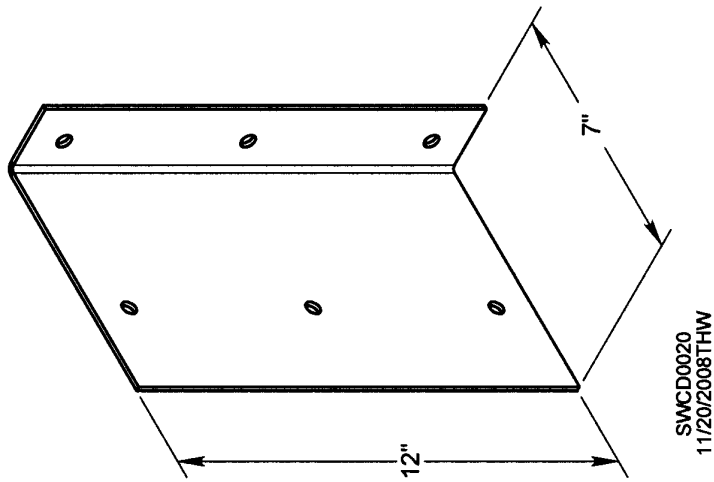
ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	2	T80111	TRANSITION TOP PANEL
2	1	T80121	BOTTOM ANGLE, BLOWER TRANS-END PLT
3	1	T80122	BOTTOM PANEL, BLOWER TRANSITION
4	2	T80112	TRANSITION SIDE PANEL
5	24	J0536	SCREW, 5/16-18, 3/4", PLT, GR5, HHWZ
6	24	J1110	NUT, WHIZ, 5/16-13



T80166 MOUNTING PLATE, HEATER CONTROL BOX

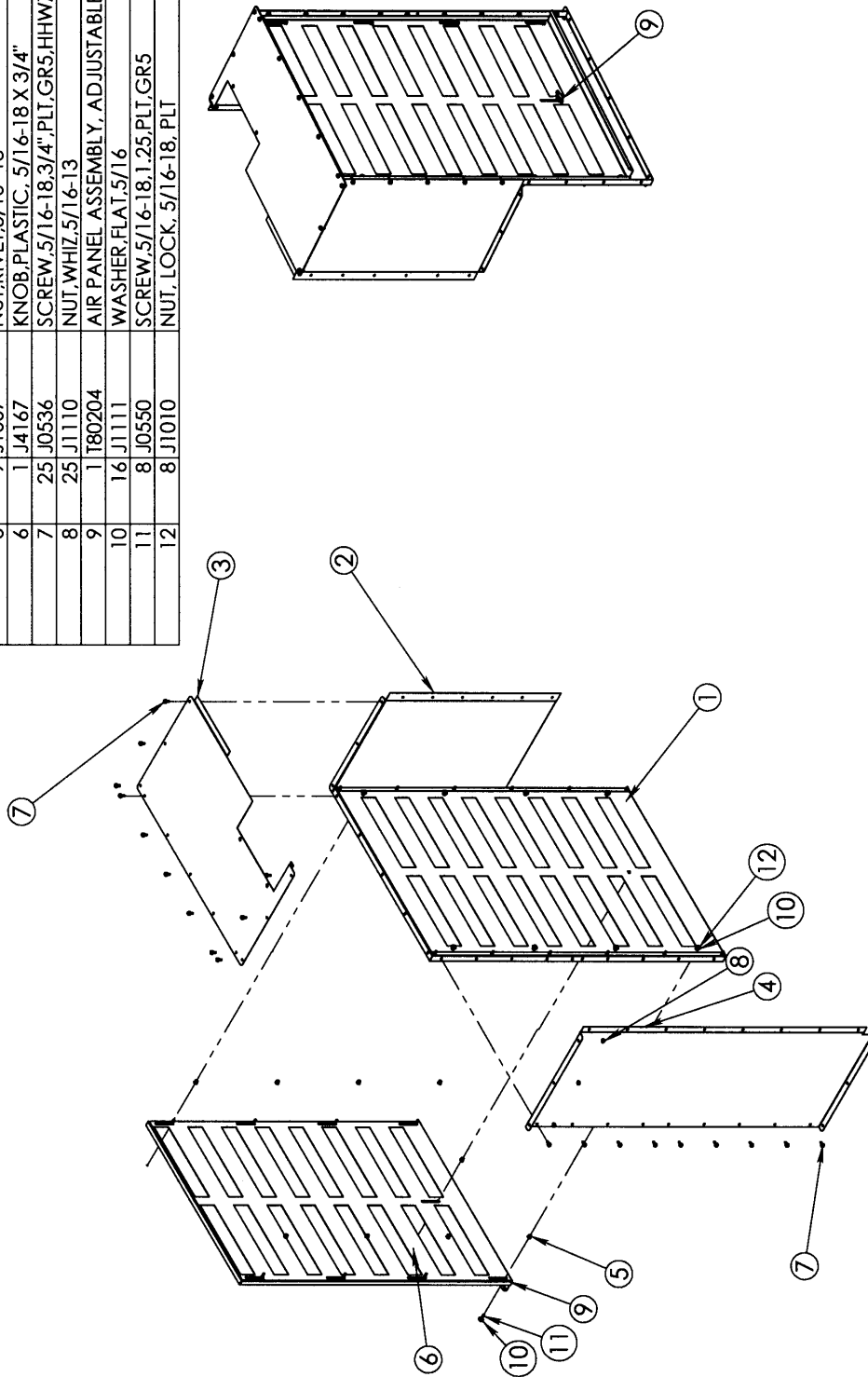


T80200 BRACKET, DRYER DUCTWORK FRONT SUPPORT



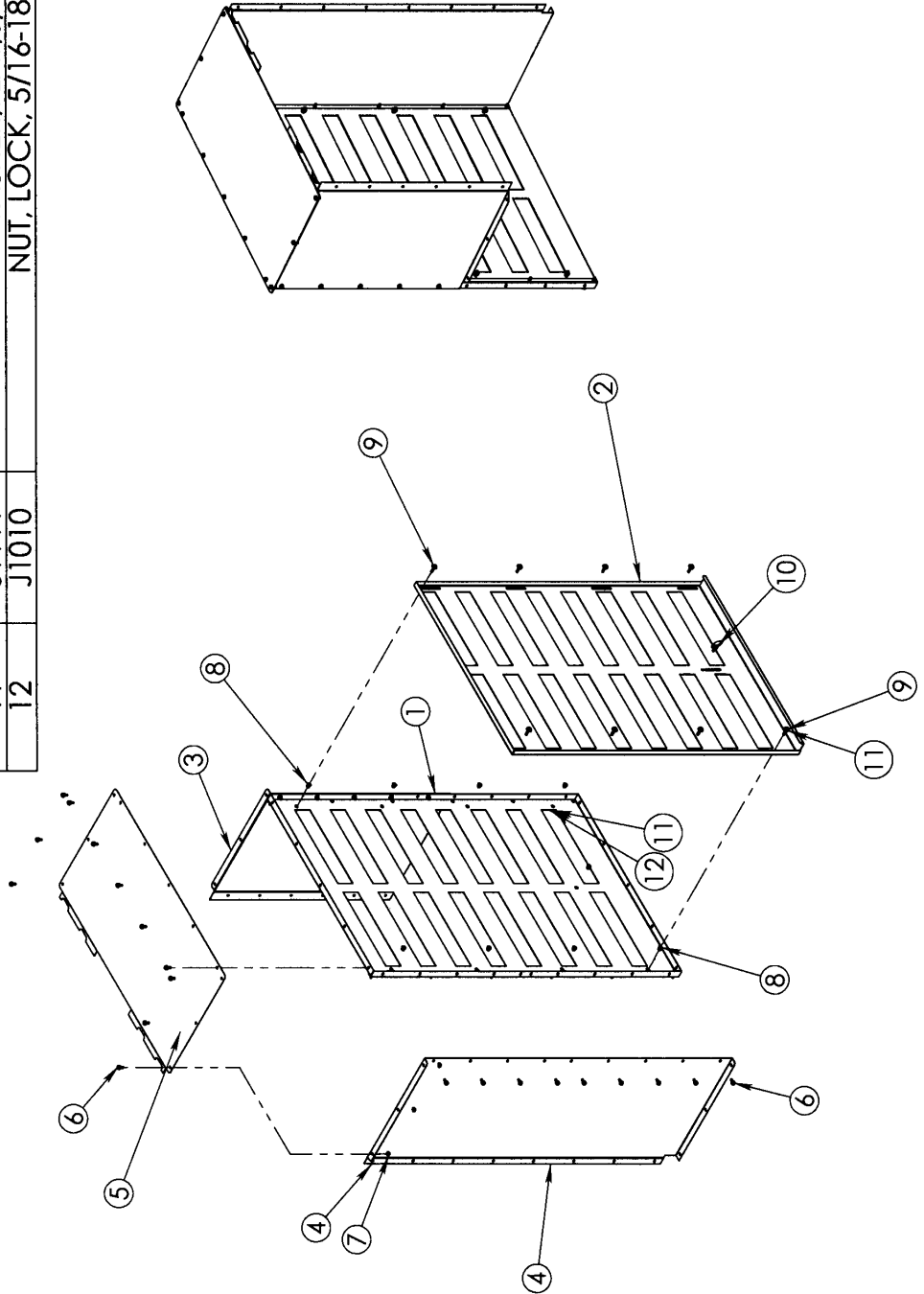
T80163 DRYER FRONT FAN SUPPORT, INTAKE PLENUM, RIGHT

ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	T80101	AIR PANEL, STATIONARY ASSEM
2	1	T80110	RT SIDE PANEL, BLOWER INTAKE DUCT
3	1	T80117	RT TOP PANEL, BLOWER INTAKE DUCT
4	1	T80109	RT FRONT SIDE PANEL, BLOWER INTAKE DUCT
5	9	J1007	NUT, RIVET, 5/16"-18
6	1	J4167	KNOB, PLASTIC, 5/16-18 X 3/4"
7	25	J0536	SCREW, 5/16-18, 3/4", PLT, GR5, HHWZ
8	25	J1110	NUT, WHIZ, 5/16-13
9	1	T80204	AIR PANEL ASSEMBLY, ADJUSTABLE
10	16	J1111	WASHER, FLAT, 5/16
11	8	J0550	SCREW, 5/16-18, 1.25, PLT, GR5
12	8	J1010	NUT, LOCK, 5/16-18, PLT

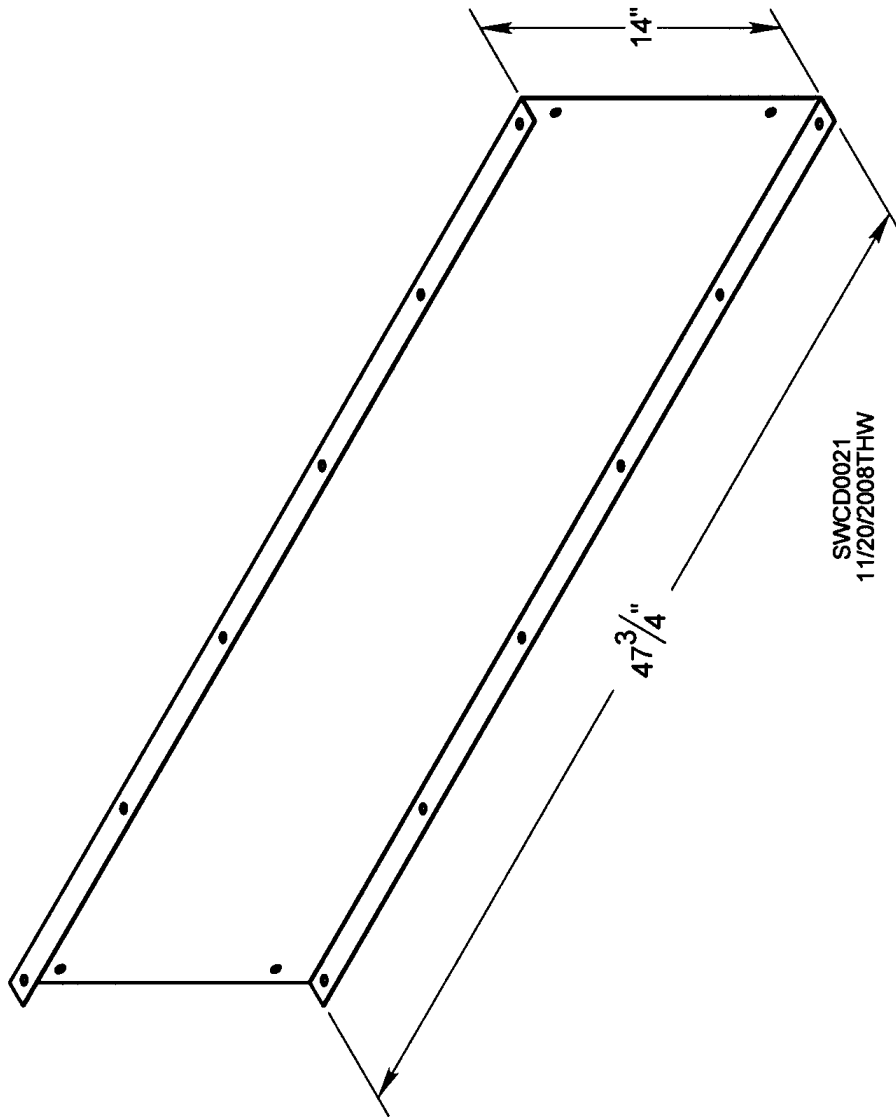


T80162 DRYER FRONT FAN SUPPORT, INTAKE PLENUM, LEFT

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	T80101	AIR PANEL, STATIONARY ASSEM	1
2	T80204	AIR PANEL ASSEMBLY, ADJUSTABLE	1
3	T80119	LT SIDE PANEL, BLOWER INTAKE DUCT	1
4	T80118	LF FRONT PANEL, BLOWER INTAKE DUCT	1
5	T80120	LT TOP PANEL, BLOWER INTAKE DUCT	1
6	J0536	SCREW, 5/16-18, 3/4", PLT, GR5, HHWZ	25
7	J1110	NUT, WHIZ, 5/16-13	25
8	J1007	NUT, RIVET, 5/16"-18	9
9	J0550	SCREW, 5/16-18, 1.25, PLT, GR5	8
10	J4167	KNOB, PLASTIC, 5/16-18 X 3/4"	1
11	J1111	WASHER, FLAT, 5/16	16
12	J1010	NUT, LOCK, 5/16-18, PLT	8

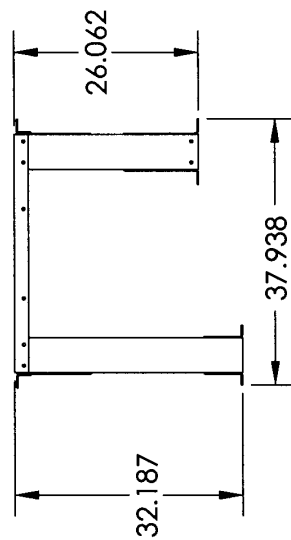
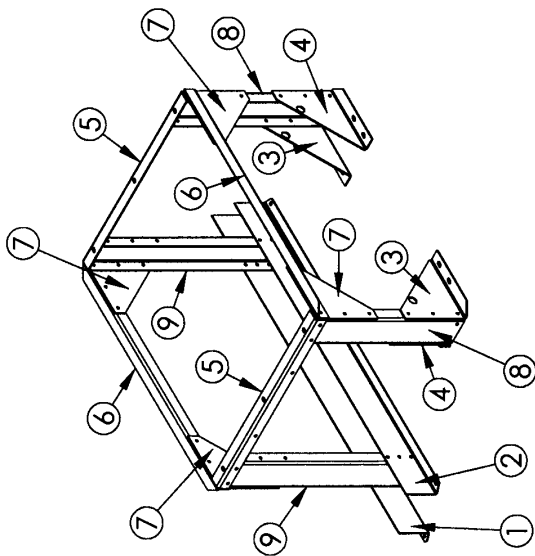
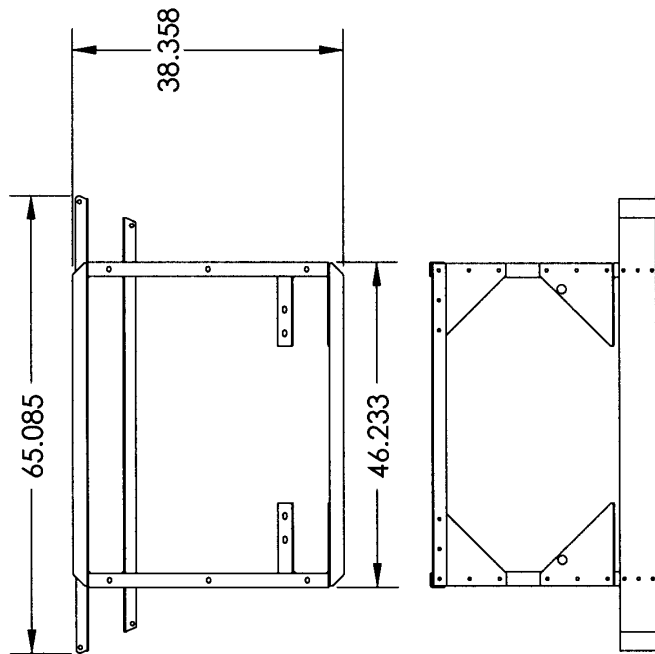


T80219 MOUNTING PLATE, MANUAL CONTROL BOX

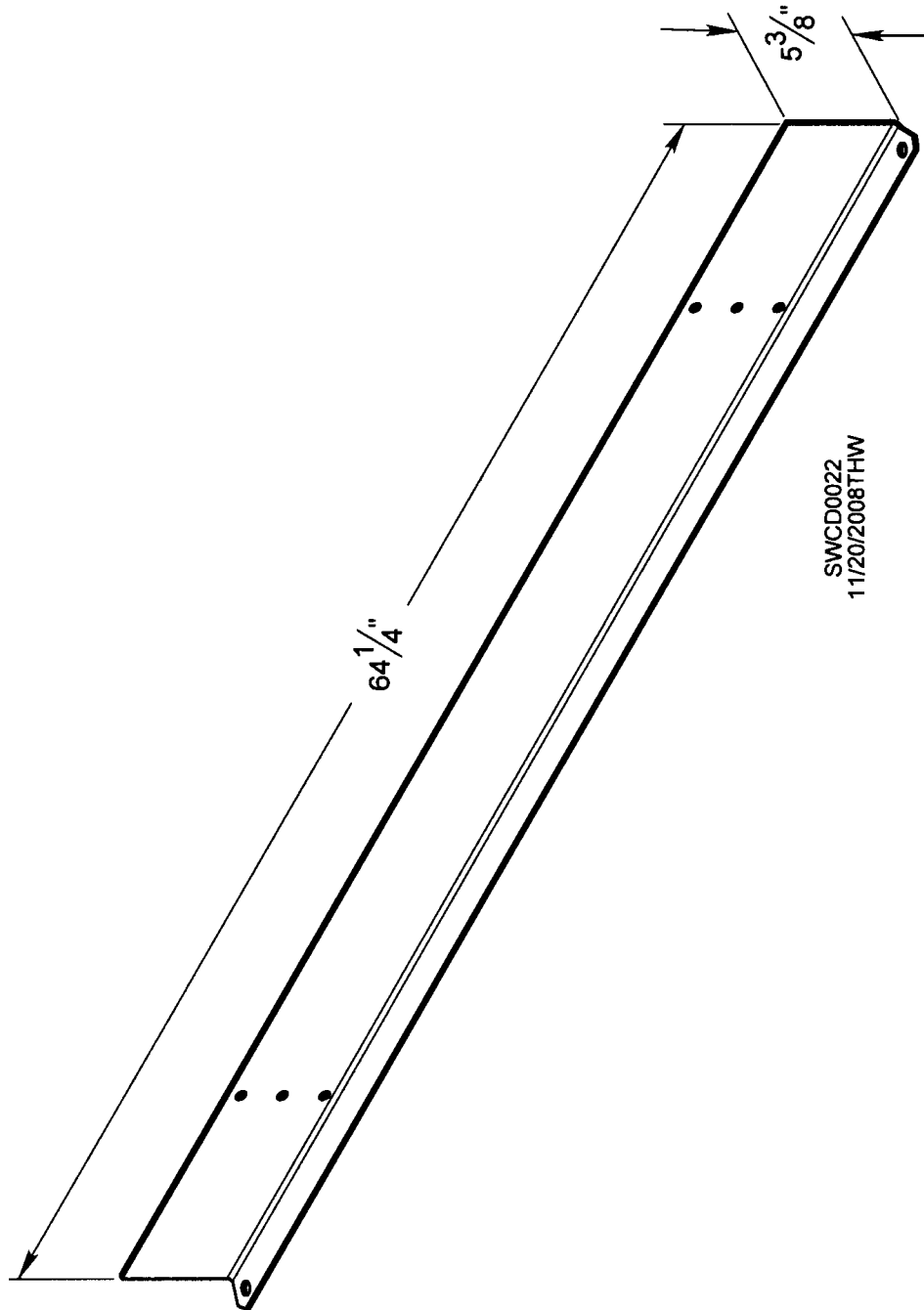


T80167 BLOWER MOUNTING FRAME, TOP UNIT

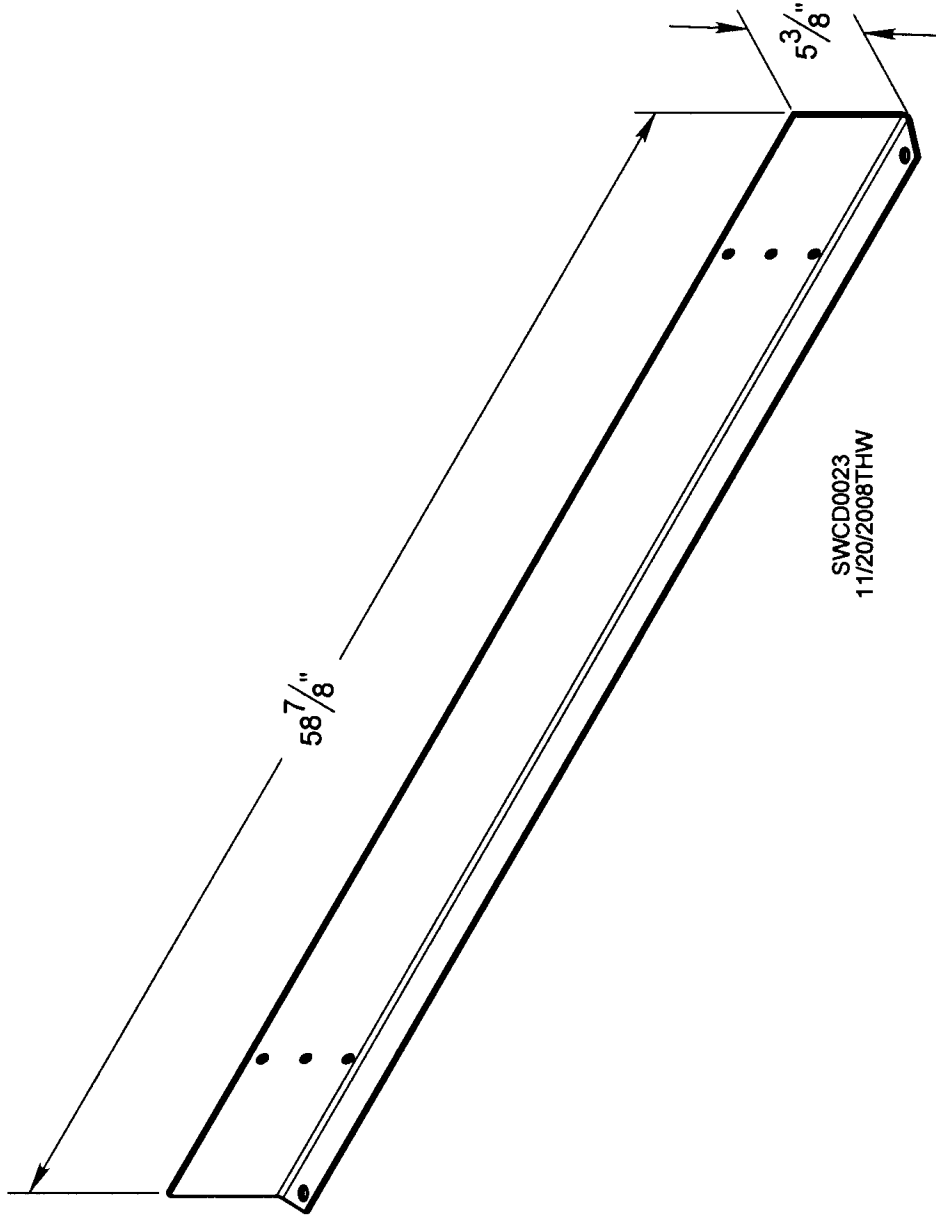
ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	T80172	REAR HORZ SUPPORT B, BLOWER MNT FRAME	1
2	T80170	REAR HORZ SUPPORT A, BLOWER MNT FRAME	1
3	T80155	LF BRACKET, FRONT LEGS, BLOWER MNT FRM	2
4	T80156	RT BRACKET, FRONT LEGS, BLOWER MNT FRM	2
5	T80139	HOZT SIDE, BLOWER MOUNT FRAME	2
6	T80140	HOZT BASE 1, BLOWER MOUNT FRAME	2
7	T80138	GUSSET PLATE, BLOWER MOUNT FRAME	4
8	T80168	FRONT LEG, BLOWER MOUNT FRAME	2
9	T80169	REAR LEG, BLOWER MOUNT FRAME	2



T80172 BLOWER MOUNTING FRAME, TOP UNIT
REAR HORIZONTAL SUPPORT B

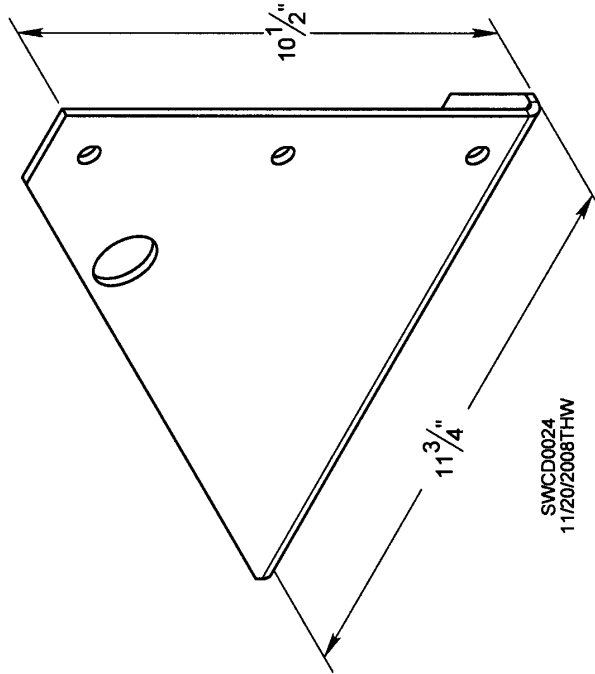


T80170 BLOWER MOUNTING FRAME, TOP UNIT
REAR HORIZONTAL SUPPORT A

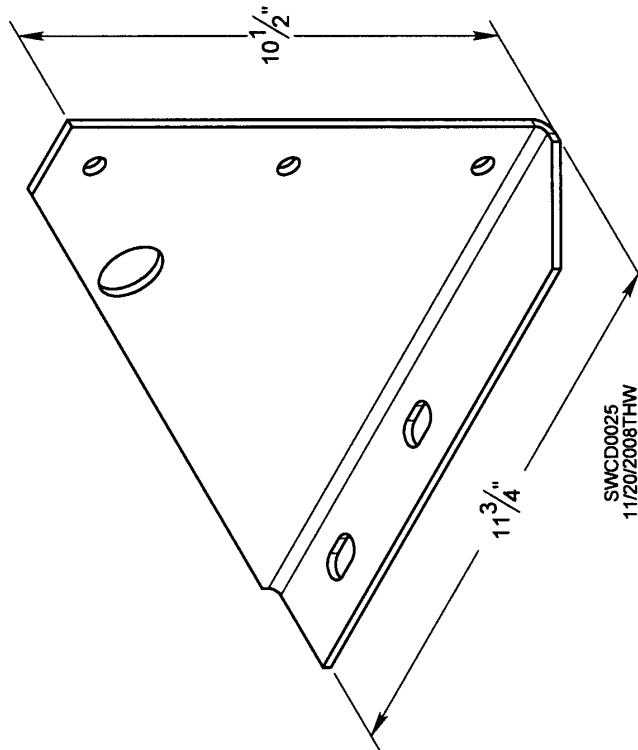


SWCD0023
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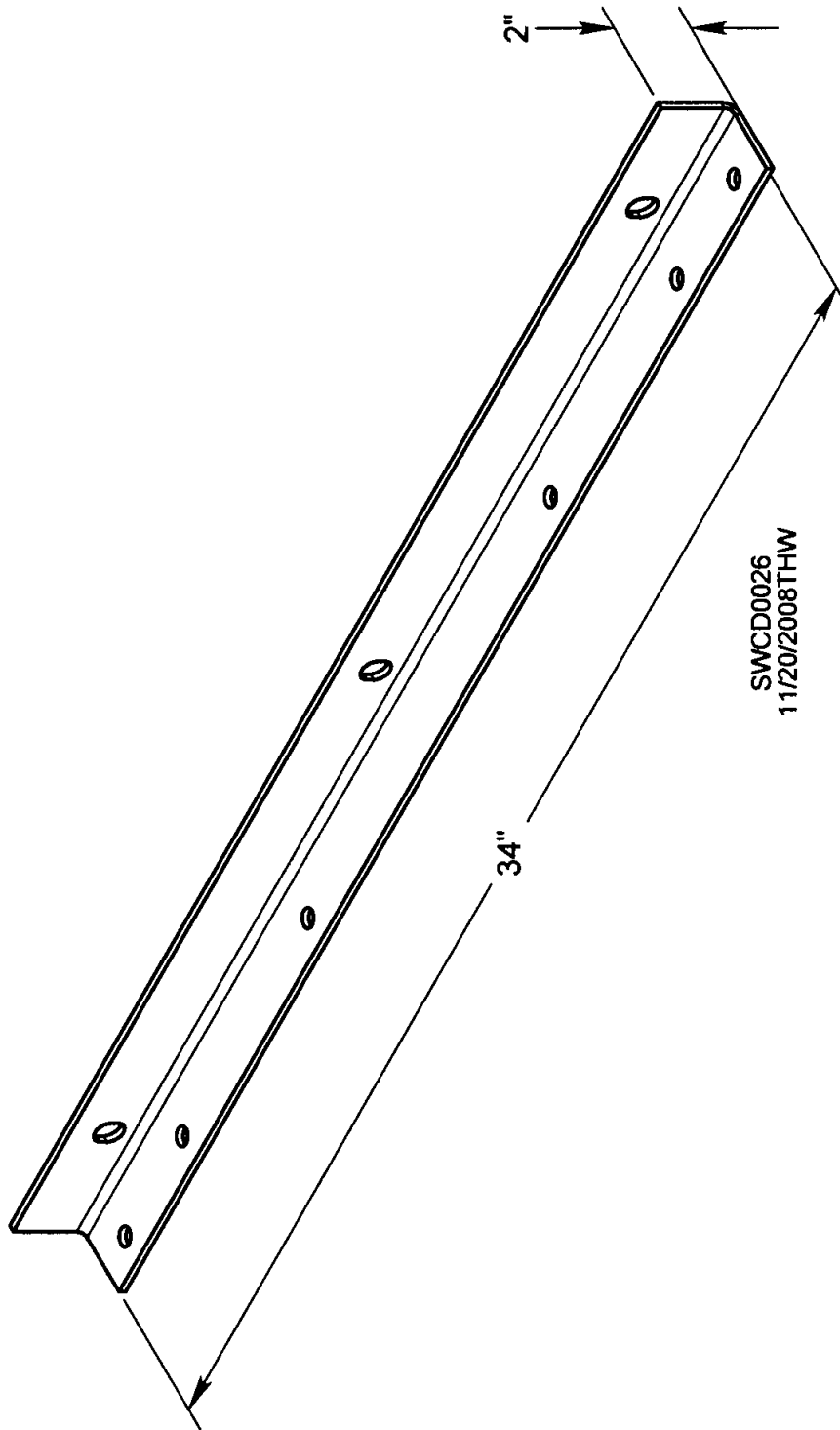
T80155 BLOWER MOUNTING FRAME, LEFT BRACKET, FRONT LEGS



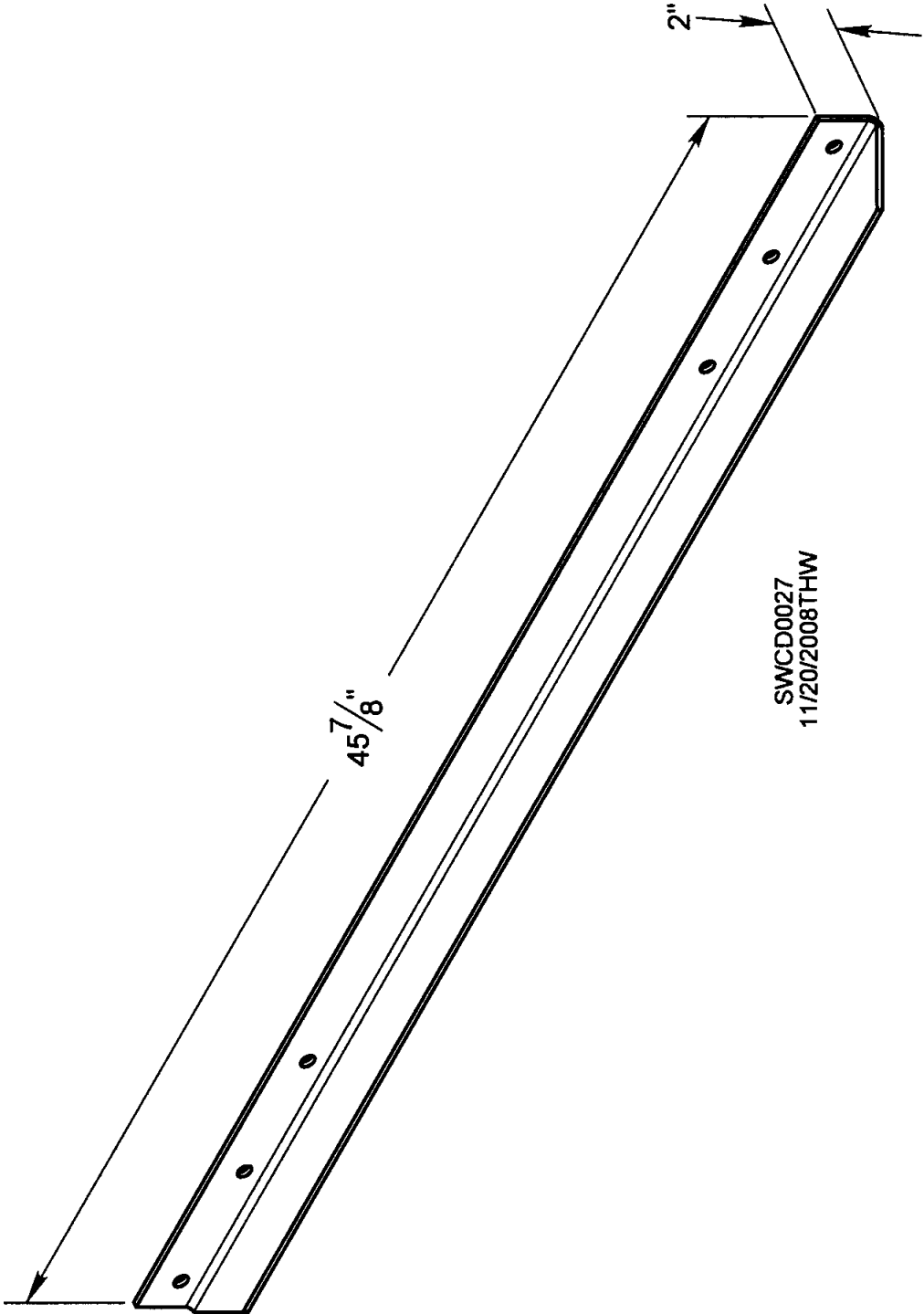
T80156 BLOWER MOUNTING FRAME, RIGHT BRACKET, FRONT LEGS



T80139 BLOWER MOUNTING FRAME, HORIZONTAL SIDE

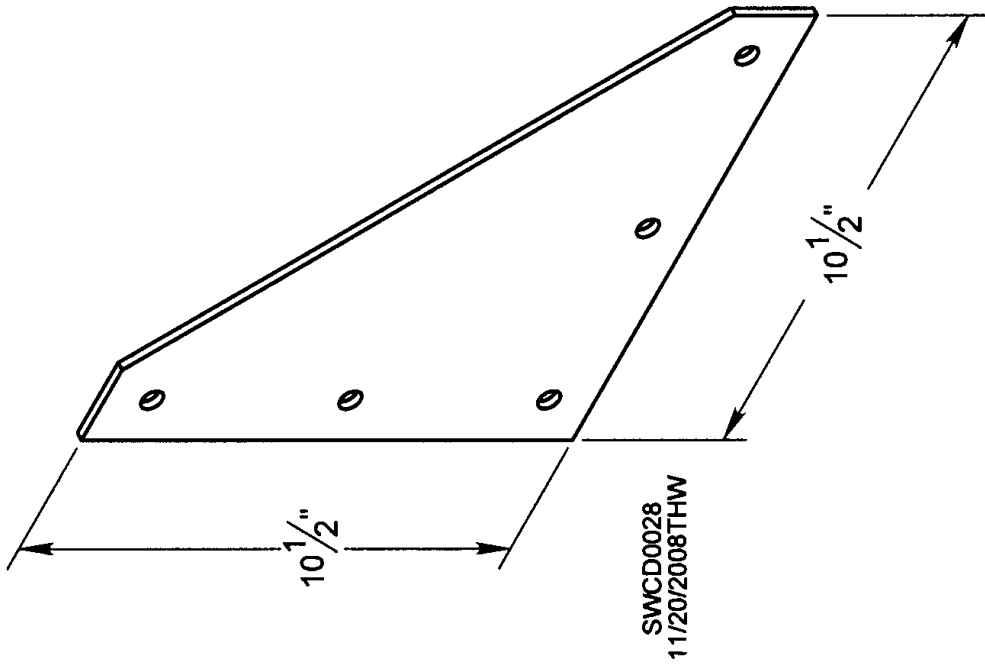


T80140 BLOWER MOUNTING FRAME, HORIZONTAL BASE 1

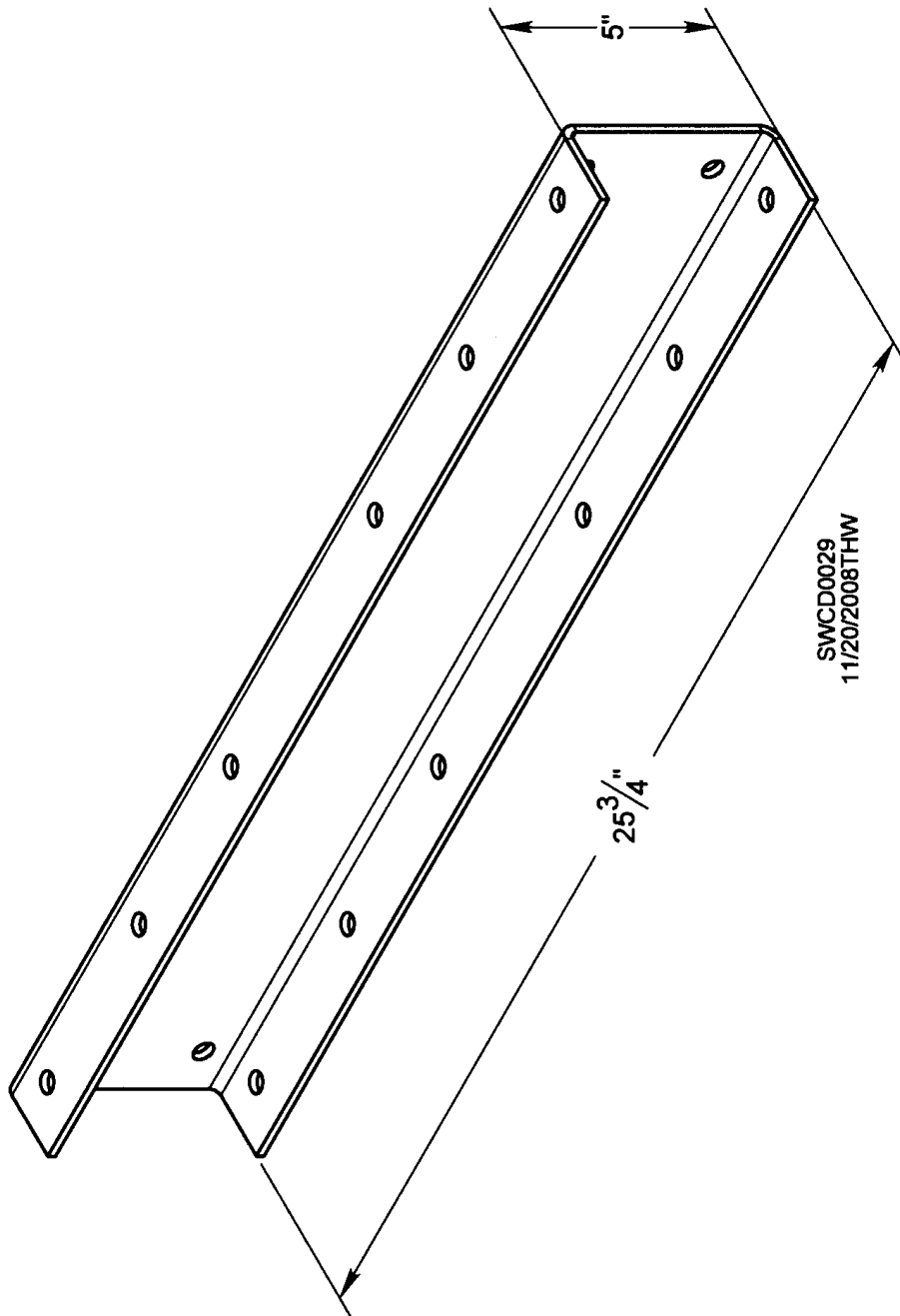


SWCD0027
11/20/2008THW

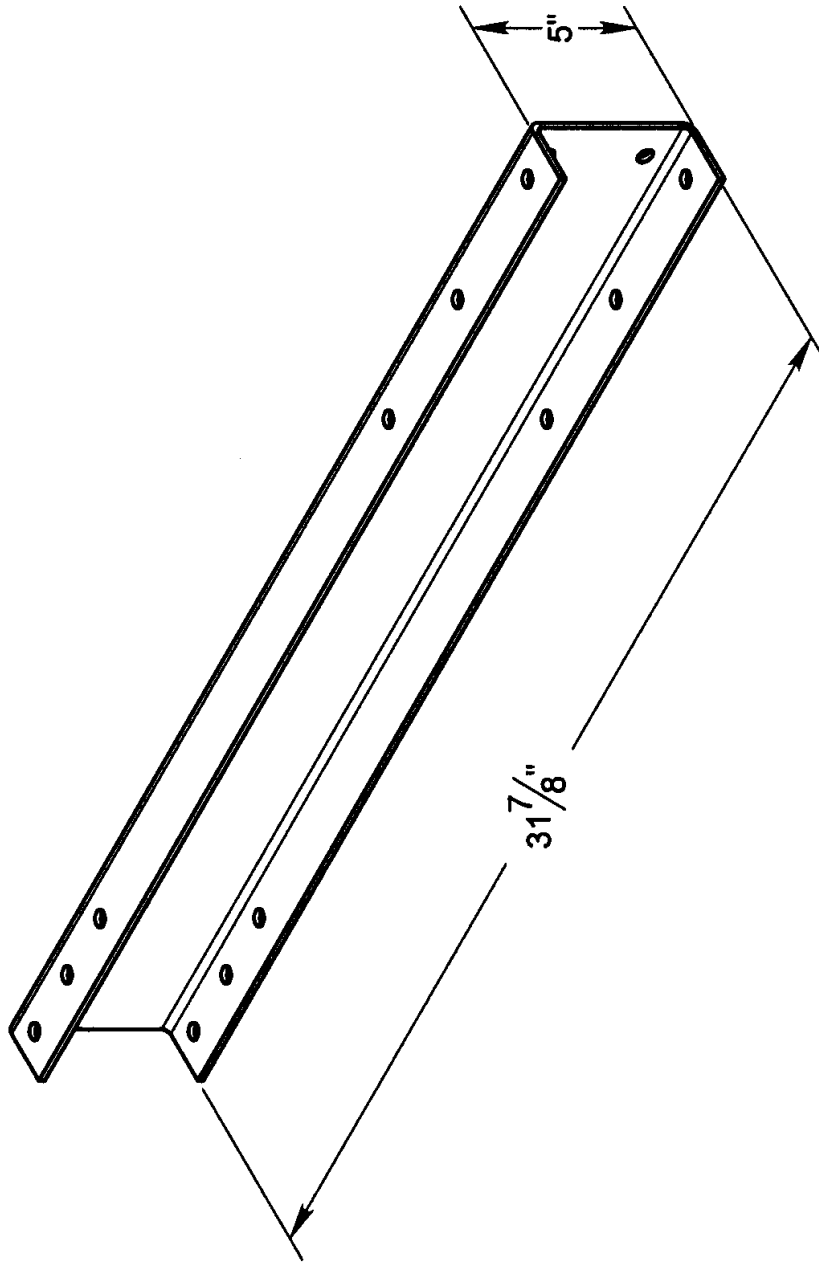
T80138 BLOWER MOUNTING FRAME, GUSSET PLATE



T80168 BLOWER MOUNTING FRAME, FRONT LEG

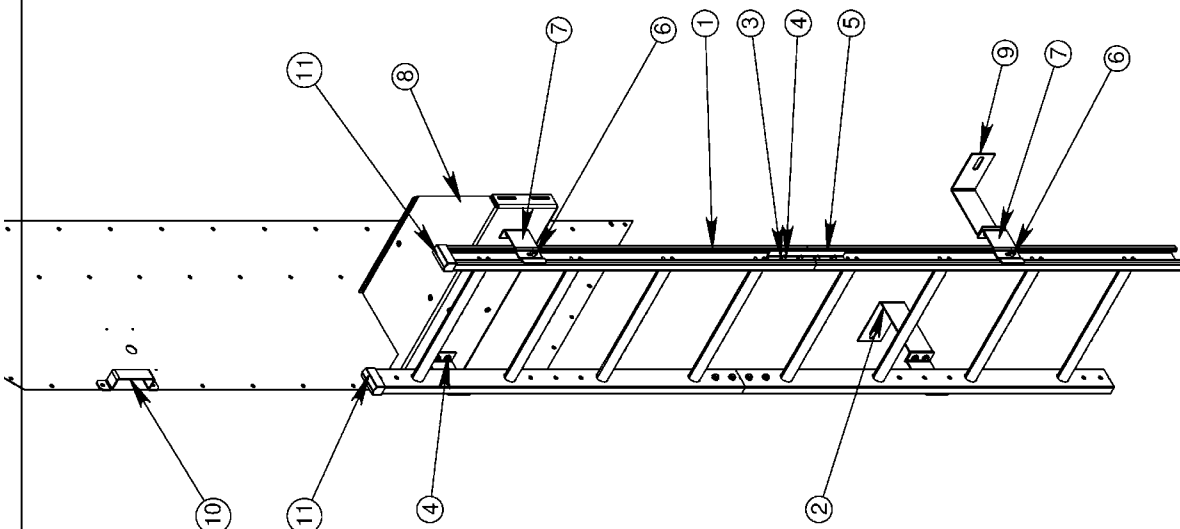


T80169 BLOWER MOUNTING FRAME, REAR LEG



SWCD0030
11/20/2008THW

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	B5084	LADDER, 44"	2
2	T80222	BRACKET, LADDER, FRONT STACK CENT DRYER	1
3	J1110	NUT, WHIZ, 5/16-13	16
4	J0536	SCREW, 5/16-18, 3/4", PLT, GR5, HHWZ	16
5	T25545	SPLICE, LADDER	2
6	B5008	CLIP & BOLT, LADDER	4
7	T35515	BRKT, LADDER, REAR PLATFORM	4
8	T28151	PLATFORM ASSY, LADDER SUPT, SUCT COOL DRYER	1
9	T80223	BRACKET, LADDER, FRONT STACK CENT DRYER	1
10	T28152	HANDLE, DRYER FRONT	1
11	J5065	CAP, LADDER, VINYL	2



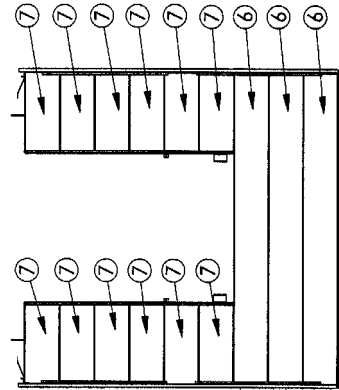
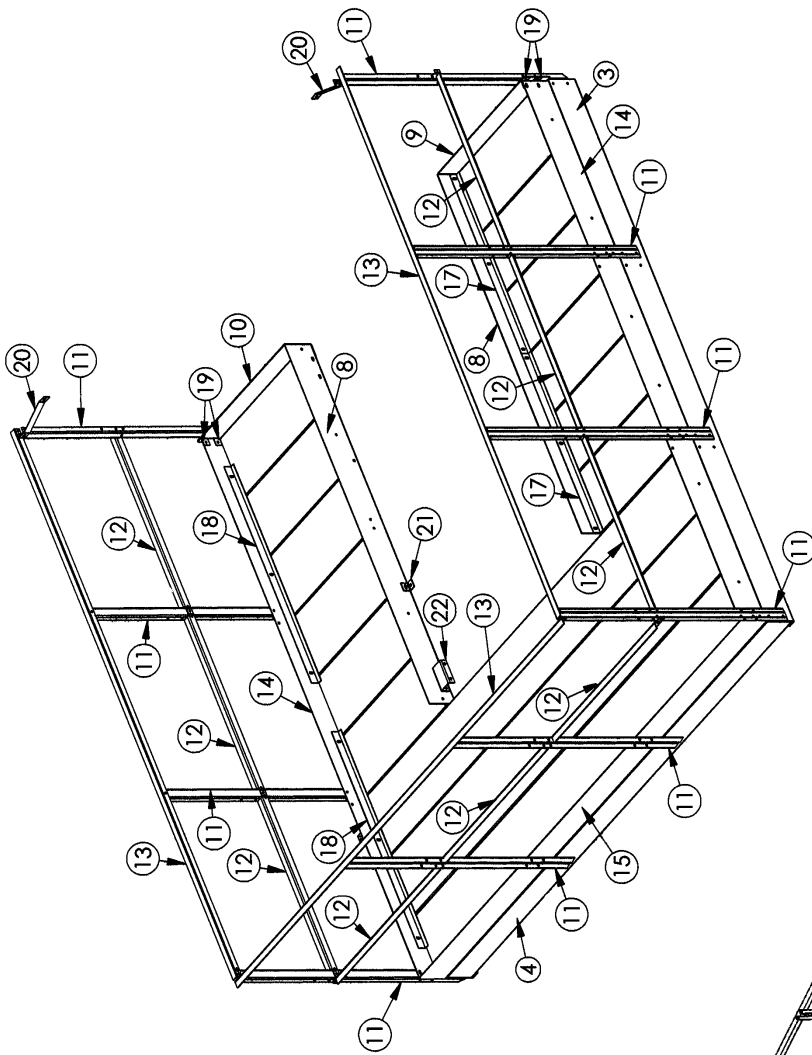
TOLERANCE UNLESS SPECIFIED
.X = ± .050
.XX = ± .010
.XXX = ± .005
FRAC = ± 1/32
= ± 1°

SUKUP MFG. CO.
Sukup
SUKUP PARKWAY
SHEFFIELD, IA. 50475

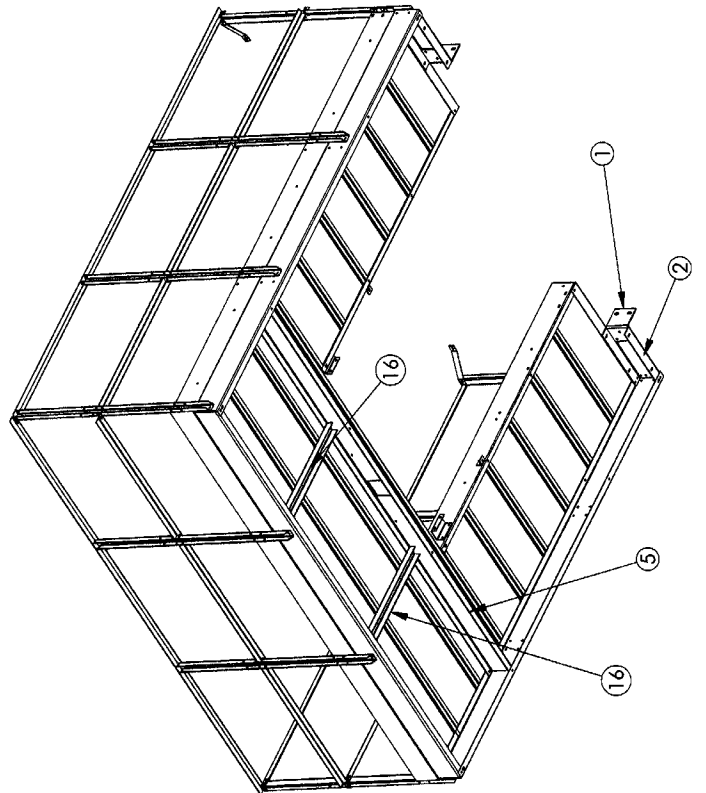
DRAWN BY: DJB	RAW MATL. NO.	PART NO. T80224
DATE 8-29-08	MATERIAL	WEIGHT 92.00
USED IN ASSY. OF:	DRYER, SUCT COOL	
DESCRIPTION	LADDER, FRONT SUCT COOL DRYER	

REF	ENG. ORDER #	BY	DATE
R E V I S I O N			
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CENTRIFUGAL STACK DRYER FRONT DECK

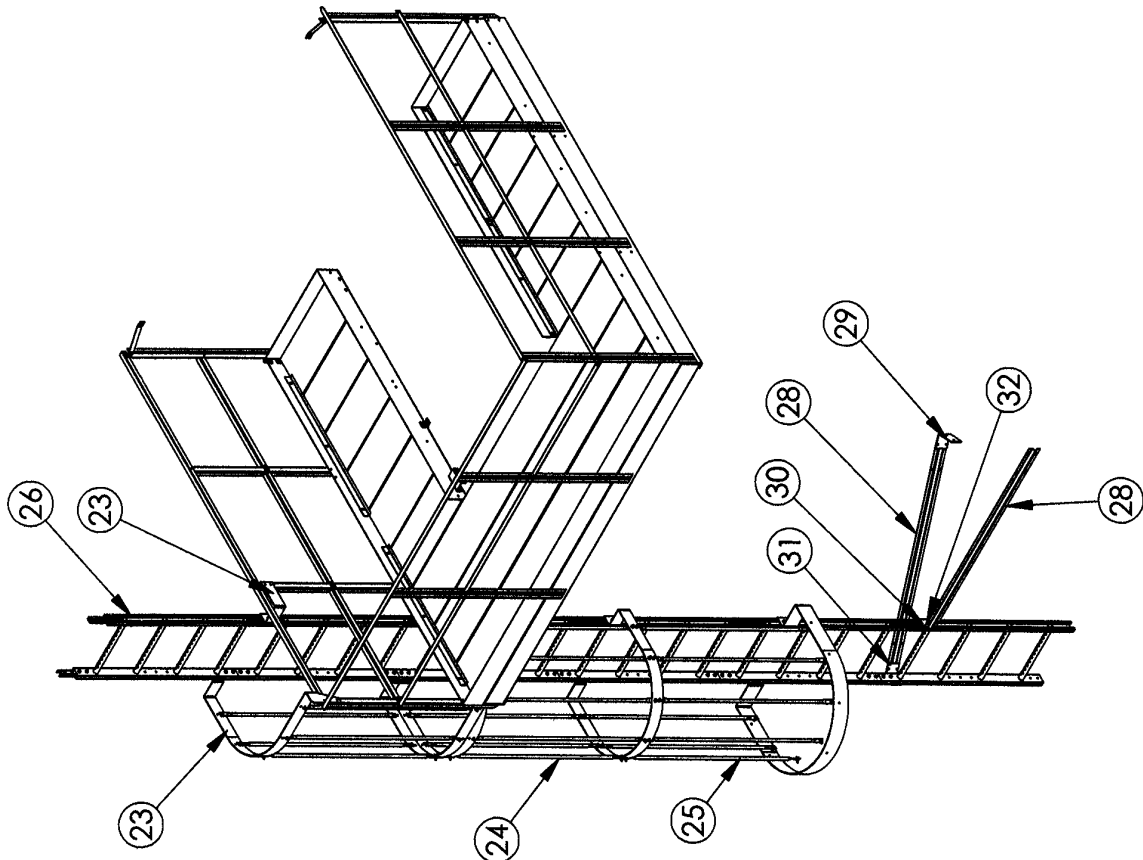


NOTE: T80165 support panel is to be installed between top of bottom of module fan and bottom of top module frame.

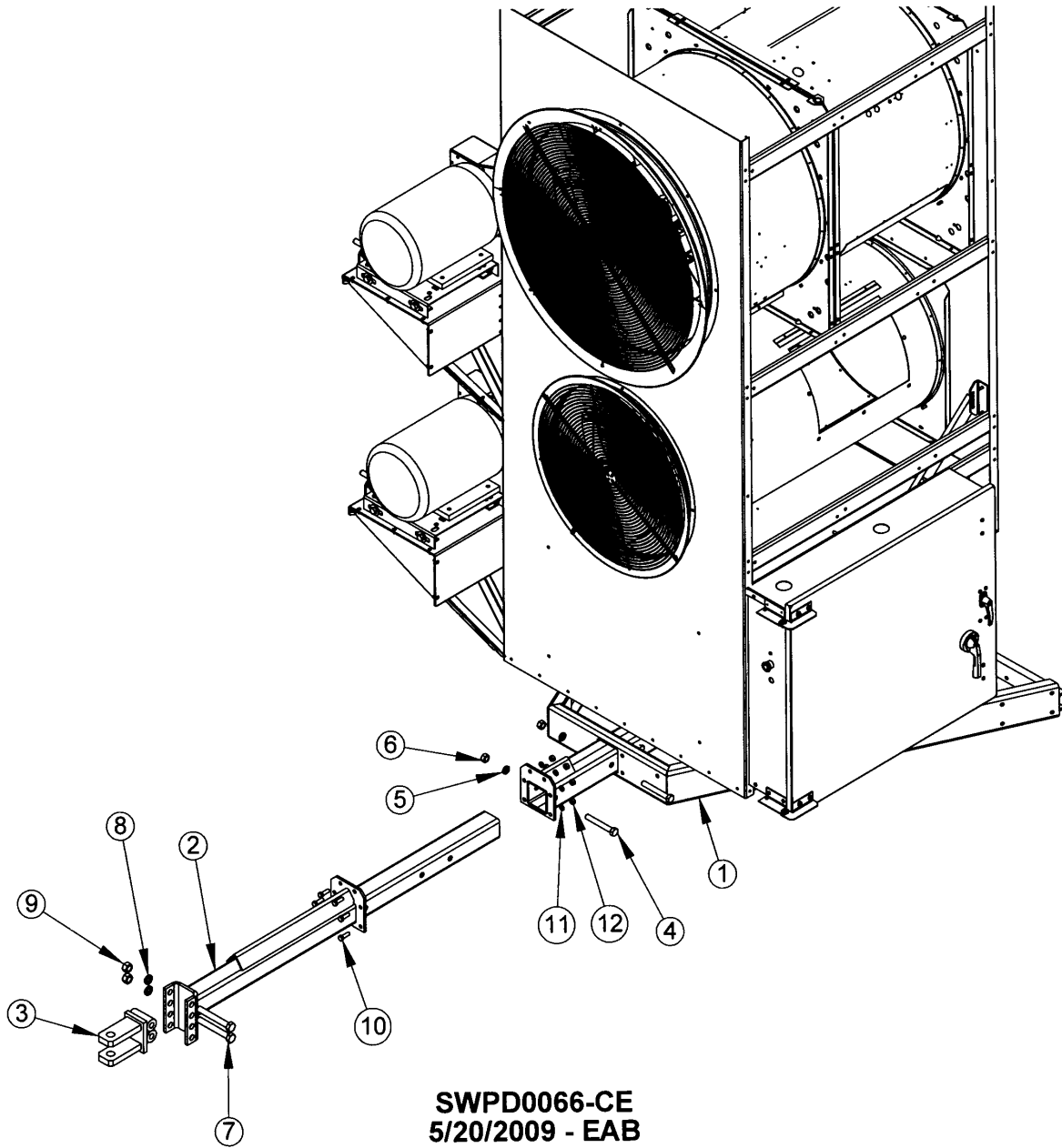


CENTRIFUGAL STACK DRYER FRONT DECK

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	180179	REAR FRAME BRKT, DECK	2
2	180175	OUTER REAR FRAME RAIL, DECK	2
3	180176	OUTER SIDE RAIL, DECK	2
4	125454	OUTER FRONT RAIL, DECK	1
5	125455	CENTER RAIL, DECK	1
6	150122	DECKING, WALKWAY	3
7	150121	DECKING, WALKWAY	12
8	180178	INNER A-FRAME RAIL, DECK	2
9	125457	KICK, REAR TOE, LF DECK	1
10	125458	KICK, REAR TOE, RT	1
11	125465	POST, HAND RAIL	10
12	125466	HAND RAIL 37", DECK	9
13	125469	TOP HAND RAIL FRONT, DECK	3
14	180177	SIDE TOE KICK, DECK	2
15	125461	KICK, TOE FRONT, DECK STACK DRYER	1
16	180180	SUPPORT BRACE, DECK	2
17	125472	CLAMP STRIP, DECKING	4
18	125474	CLAMP STRIP, DECKING, 43.5" LG	4
19	180201	CLIP, DECK CORNER	4
20	180181	RAILING TIE-IN STRAP, DECK	2
21	180183	FRAME L BRACKET, DECK	2
22	180182	MOUNTING BRACKET, DECK	2
23	B50282	CAGE, 4", SAFETY, ACCESS SECTION	1
24	B5028	CAGE, 4", SAFETY	1
25	B5029	CAGE, 4", SAFETY, FLARED	1
26	B5084	LADDER, 44"	6
27	180165	SUPPORT, UPPER FRAME (NOT SHOWN)	1
28	180207	SUPPORT FRAME, LADDER BASE	2
29	180208	ANGLE, LADDER BRACE MNT	1
30	180209	ANGLE, LADDER BRACE MNT	1
31	180210	ANGLE, LADDER BRACE MNT	1
32	B5008	CLIP & BOLT, LADDER	2
33	125545	SPLICE, LADDER	12
34	J0536	SCREW, 5/16-18, 3/4", PLT, GR5, HHWZ	48
35	J1110	NUT, WHIZ, 5/16-18	48



DRYER HITCH WITH 24" EXTENSION

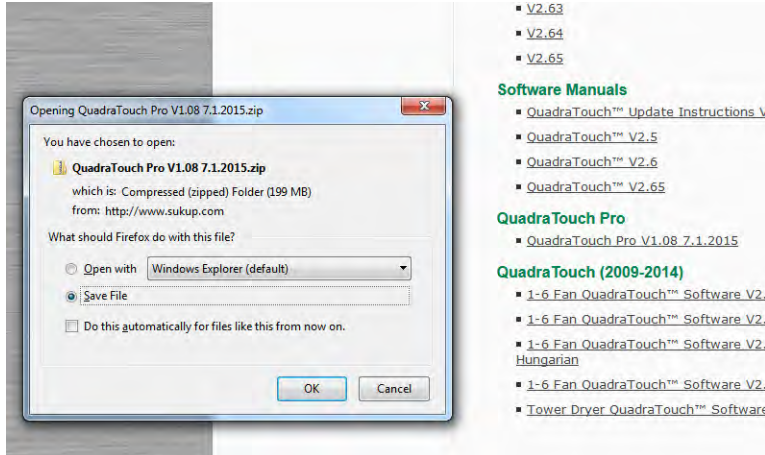


SWPD0066-CE
5/20/2009 - EAB

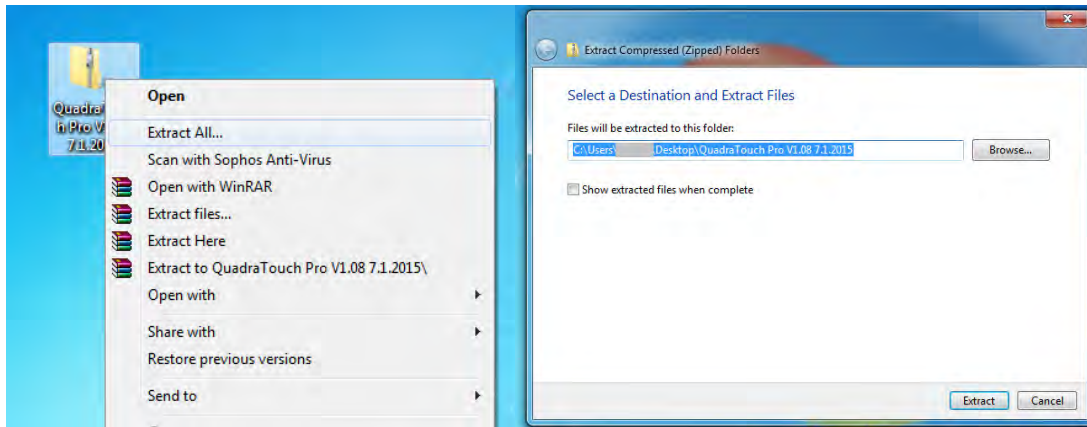
ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	T16310D	HITCH RECEIVER WELDMT, JACK
2	1	T43711	HITCH INSERT WELD, 24" EXT
3	1	T4372	CLEVIS WELD
4	3	J0822	SCREW, 3/4"-10 X 5" LG.
5	3	J1220	3/4" LOCKWASHER
6	3	J1051	3/4-10 HEX NUT
7	2	J08361	BOLT, 7/8-9 X 6 1/2" LG
8	2	J1222	7/8" LOCKWASHER
9	2	J1059	7/8-9 HEX NUT
10	6	J0730	SCREW, 1/2 -13, 1.50,PLT,GR5,HHCS
11	6	J1215	1/2" LOCKWASHER,PLT,SPLIT
12	6	J1040	NUT, 1/2 - 13,PLT,GD5,HEX

QuadraTouch Pro™ Update Instructions:

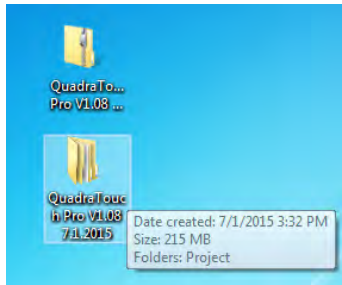
Download the newest QuadraTouch Pro™ software from
<http://www.sukup.com/Products/QuadraTouch>



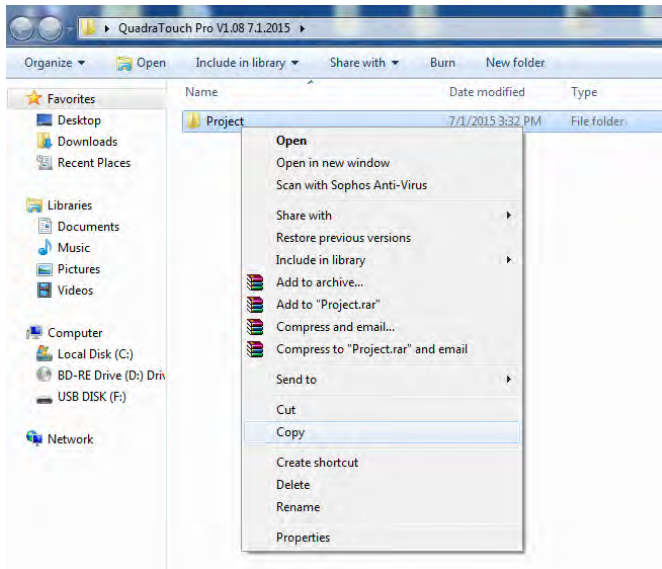
After downloading the .zip file, extract the contents.



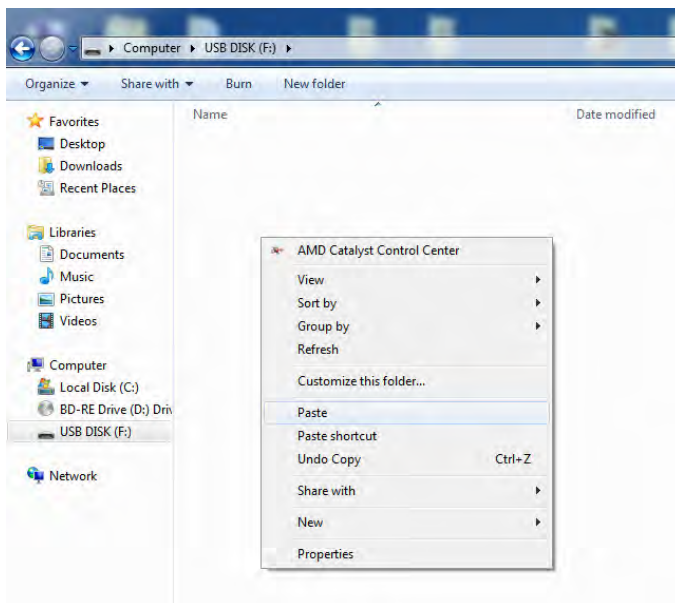
A new folder will appear, double click it.



Right-Click and Copy the folder called “Project”



Paste the “Project” folder onto the root directory of a USB stick.



After the file transfer is complete to the USB stick, you are ready to take the USB stick to the QuadraTouch Pro™ display.

To perform the update:

Insert the USB stick into the external USB service port on the bottom of the box.

Navigate to Tools → System Tools → QuadraTouch Update → and choose STEP 1. The transfer will begin automatically (original versions 1.06 and 1.07 of QuadraTouch Pro software will ask you to continue)

After the panel automatically updates itself, it will prompt you for the PLC update after it reboots. Then perform step 2.

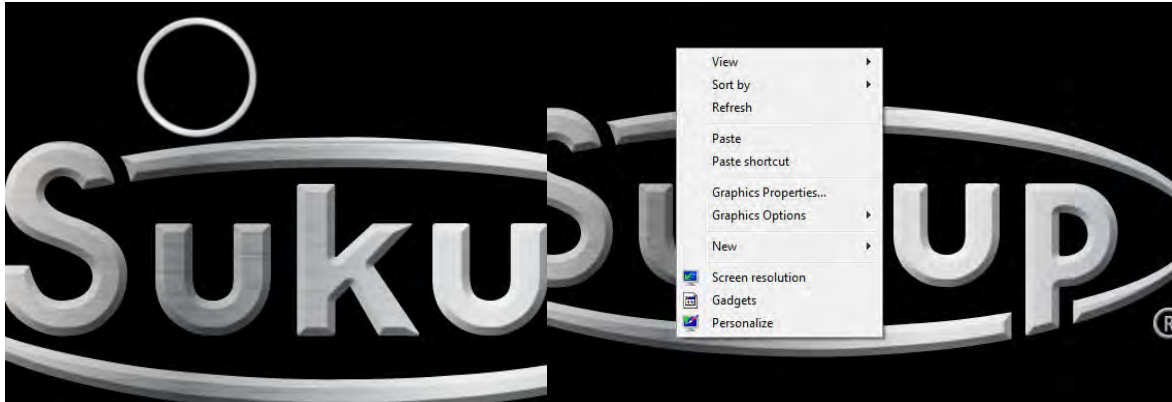
Manually Updating QuadraTouch Pro™

In the event an automatic update will not work, Insert the programmed USB stick

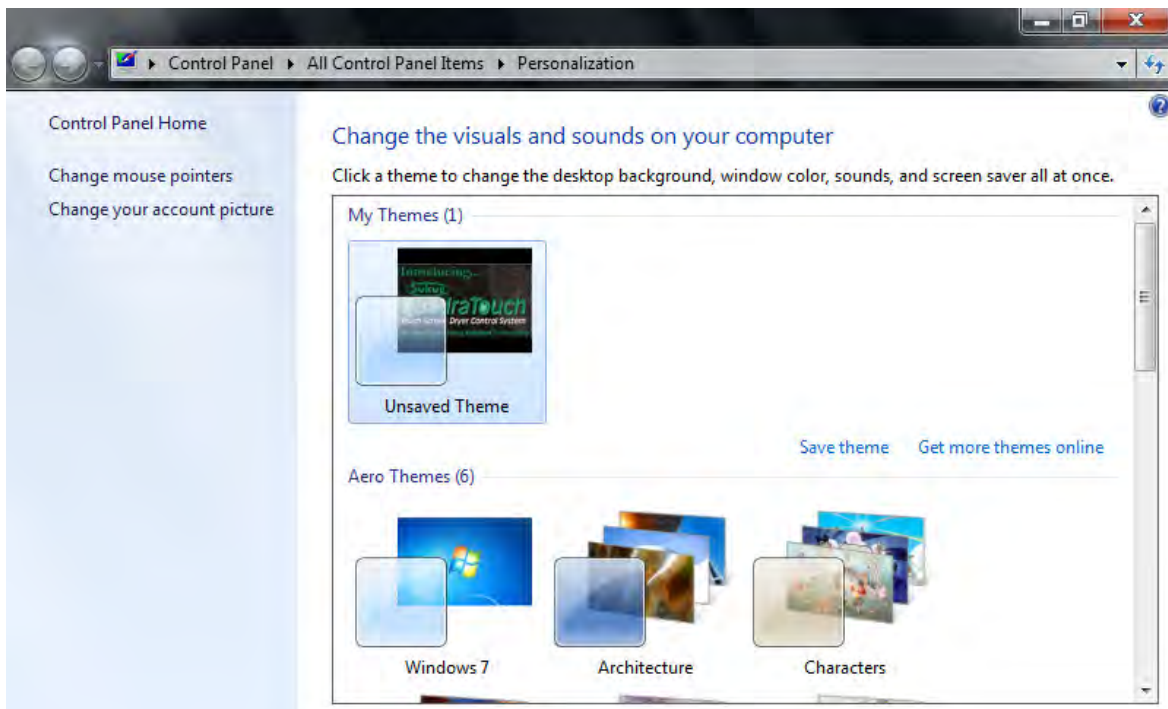
Go to Tools → System Tools → Maintenance Tools → Stop HMI

This will close the program and take you back to the HMI's Desktop.

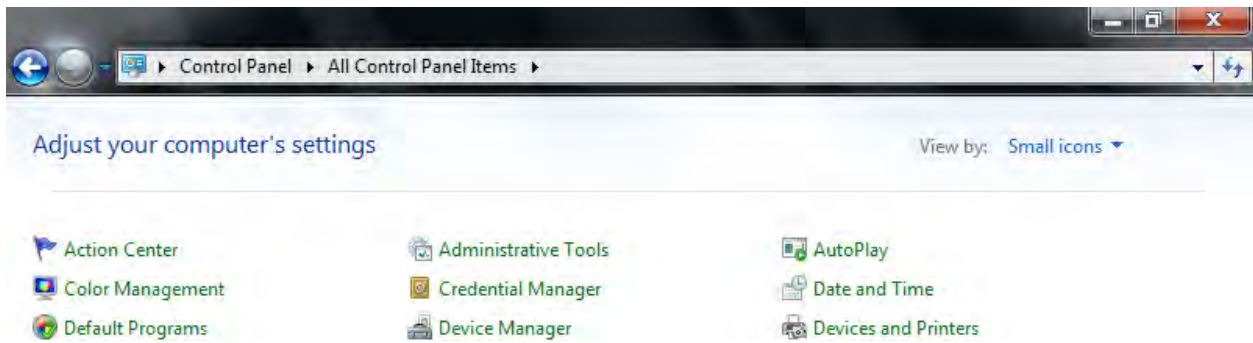
Press and Hold the screen until a circle appears – release the screen.



The Right-Click menu will appear, choose “Personalize”

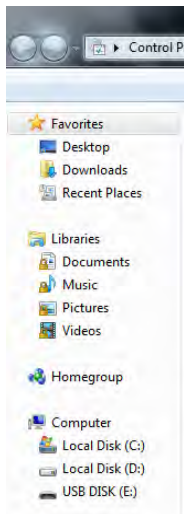


On the top of the screen, choose “All Control Panel Items”

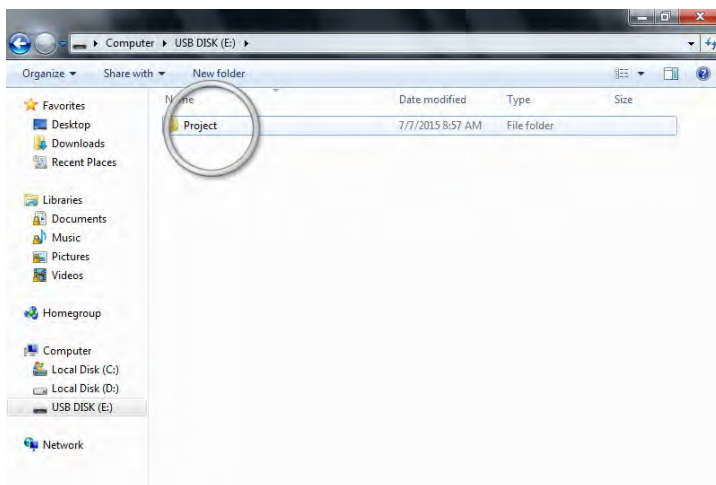


Choose "Administrative Tools"

In the left navigation pane, choose the USB DISK (Probably (E:), but not always)



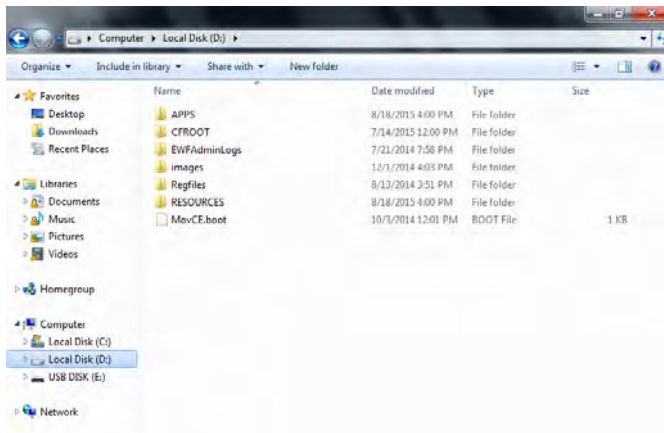
Press and hold the folder called "Project" until a circle appears.



When the Right-Click Menu appears, choose "Copy."

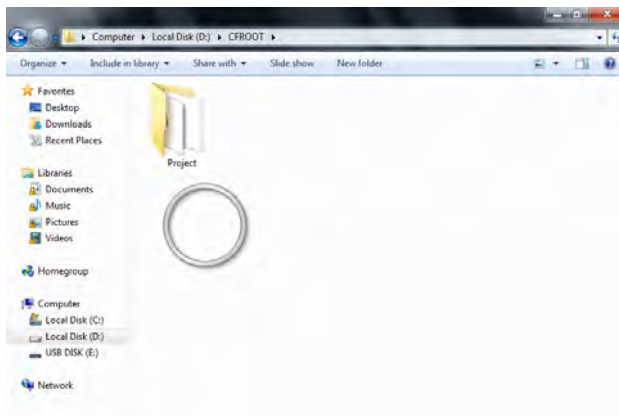
In the left navigation pane, choose “Local Disk (D:)”

Double-Click on the folder called CFROOT

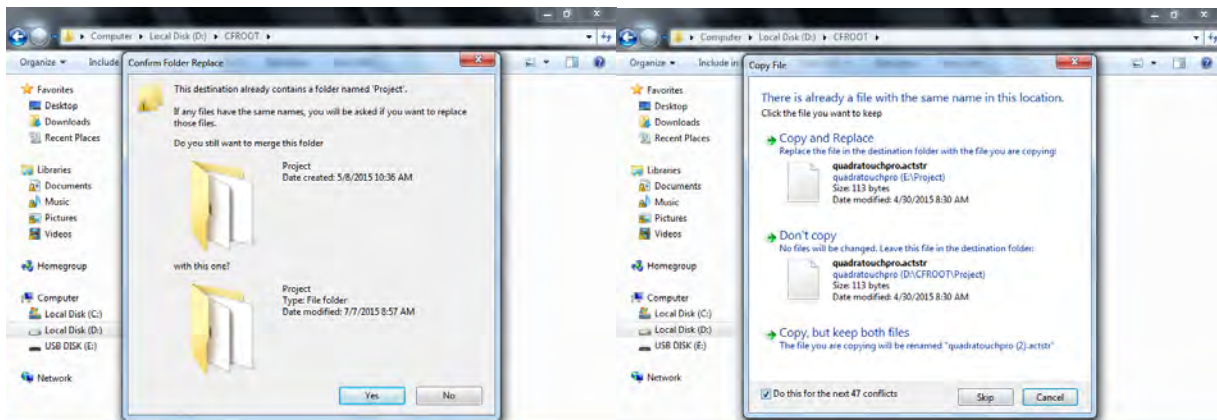


You will see the folder called Project, DO NOT go into the folder.

Press and hold the screen somewhere in the white area.



Choose “Paste”



Select “Yes” and merge the folders. Overwrite all existing files and folders by checking the “Do this for the next # conflicts” and choose “Copy and Replace”



QuadraTouch Pro™ Software Manual

Dryer Control System

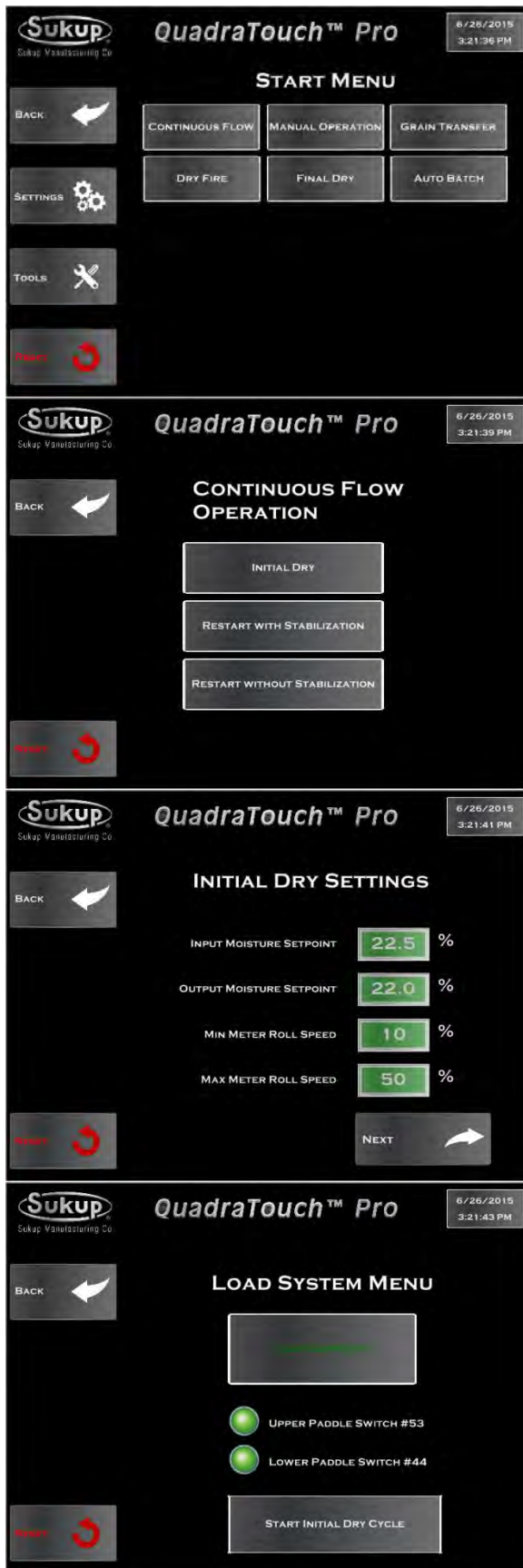


Software is constantly changing. Make sure you are up to date with Sukup's newest software. New software and manuals are available for download at:

<http://www.sukup.com/Products/QuadraTouch>

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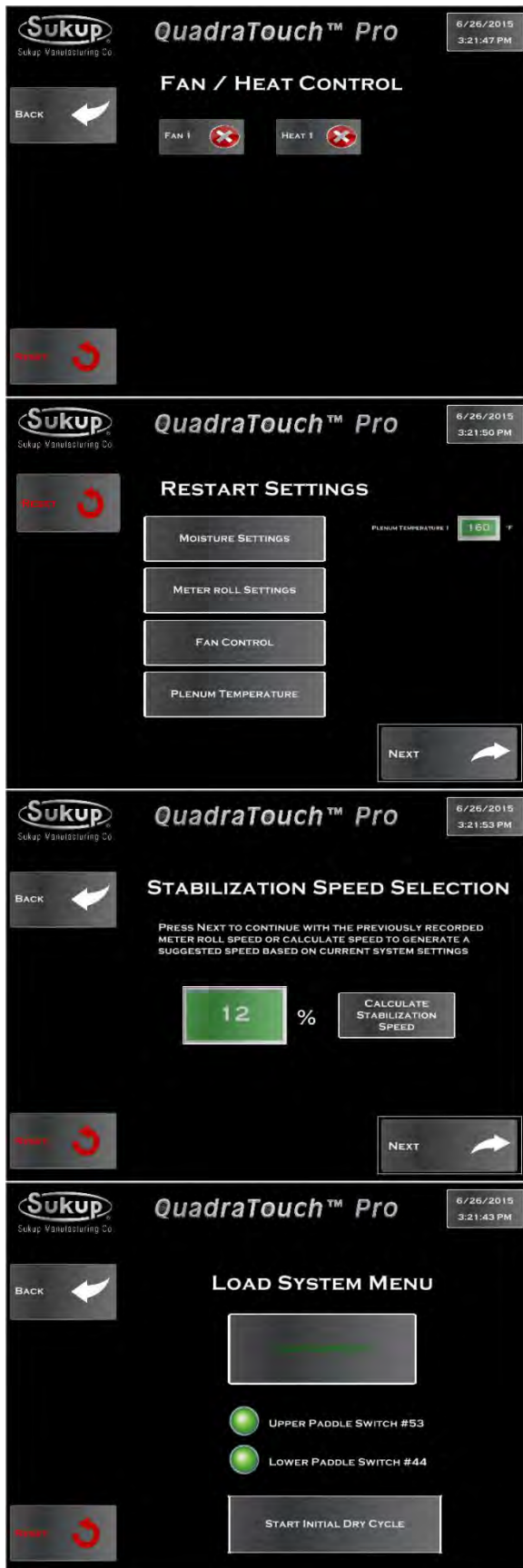
Pressing the “Start” button on the main screen will bring up the start menu. From here, the dryer can be used in many different drying modes, the most common of which will be continuous flow. This section will describe each mode and how it’s accessed.

Start → Continuous Flow

Continuous Flow is divided into 3 smaller processes when grain is loaded into the dryer for the first time. Initial dry essentially warms up the grain for a set period of time depending on the user input. The fans and heaters will turn on, and a timer will appear on the screen. This is essential for creating a steady flow of grain through the next step of stabilization.

To begin initial dry, the dryer needs some information to get started for the first time. To give it an idea of how long to heat the first batch of grain, enter in the values of the incoming and desired output moisture. Press “Next” to continue on to the loading phase.

Now that the dryer has been programmed with a few basic settings, we are ready to load the dryer with grain and start initial dry. After the dryer has been loaded with grain, a button will appear to start initial dry cycle.



Start → Stabilization

After Initial Dry is finished, Stabilization is the next phase of Continuous Flow Mode. Stabilization is designed to go through 1 full cycle of grain, discharging at a calculated roll speed. The first step of stabilization is to select which fans and heaters should be utilized. Heaters will not be enabled unless its corresponding fan is used.

Stabilization/Restart

All previous settings will be stored from the last time the dryer was running, so make any changes necessary on this page before calculating the stabilization speed.

The stabilization speed in the green box is the last recorded speed when the dryer was running in continuous flow mode. If the dryer was running well the last time it was used, using this value for Stabilization is recommended.

If you are currently coming out of Initial Dry, the screen will automatically switch to Stabilization mode. If you have not performed Initial Dry, the load menu will appear. After the dryer has been loaded with grain, a button will appear to start Stabilization.



Start → Dry Fire

Dry Fire mode allows the dryer to turn its fan(s) and heater(s) on when the dryer is empty. This mode should be run every year before operation to test for functionality. Be sure to inspect each heater and pipe train for component integrity and functionality.



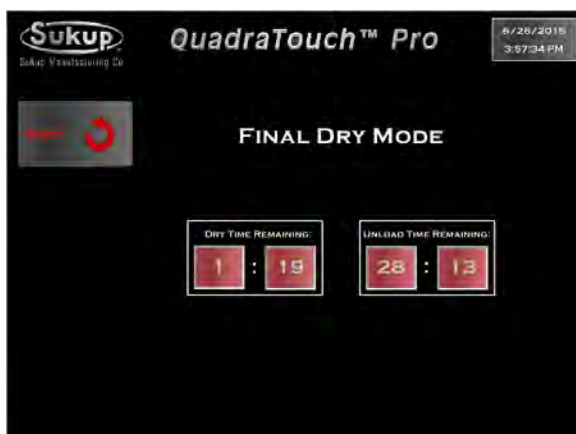
Start → Dry Fire

Dry Fire mode lasts for 10 minutes and that status of the signals will be displayed. When the dryer is empty, the air switch will most likely not be closed.



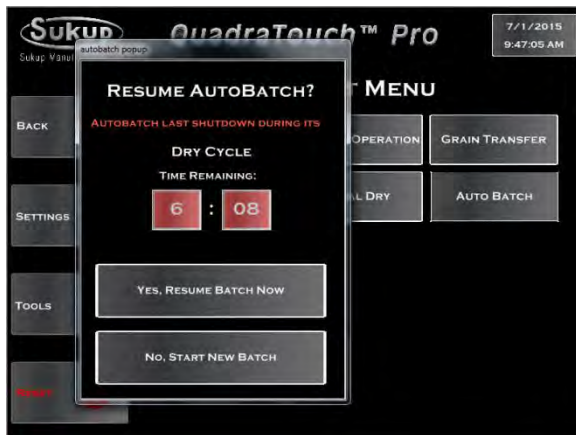
Start → Final Dry

Final Dry mode is used to finish off the last “batch” when there is no more grain to dry in continuous flow. The dryer will batch dry the last grain in the dryer, then turn its fan(s) and heater(s) off and unload the dryer for a set period of time.



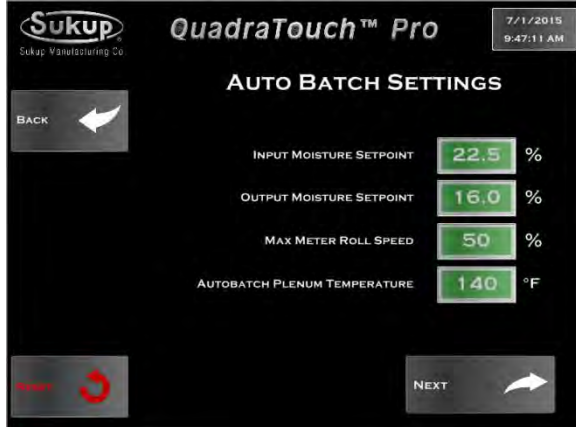
Start → Final Dry

Final Dry mode will automatically exit when the timers have expired.



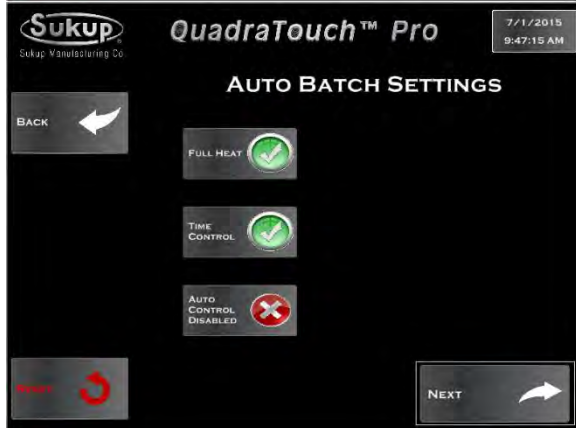
Start → Auto Batch

Due to very high moisture content, Auto Batch mode may be required. After selecting Auto Batch, the system will prompt you about restarting from the last batch. If no previous batch has been recorded, it will start you from the new batch settings.



Start → Auto Batch

Input the settings for Auto Batch.



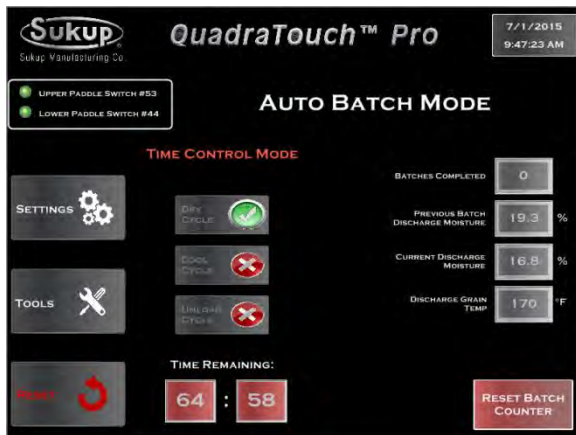
Start → Auto Batch

Choose the heat or heat/cool operation and control method.



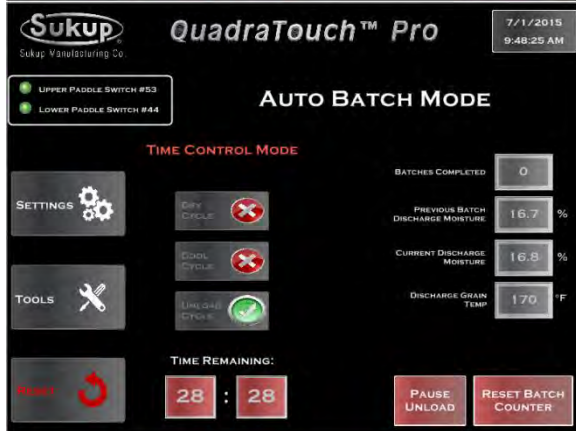
Start → Auto Batch

Based on your settings, the dryer will calculate a base point to start from.



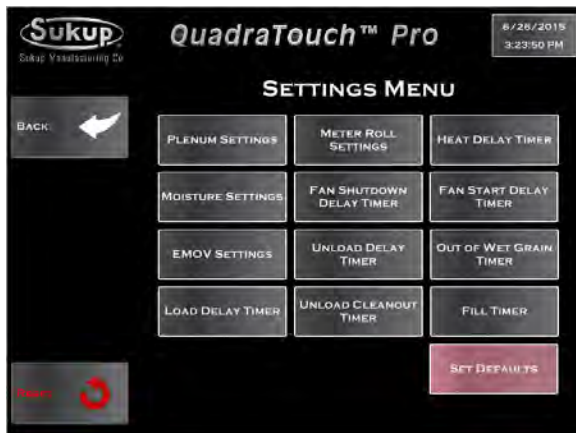
Start → Auto Batch

Auto Batch will start with the Dry Cycle. After the timer expires, the Cool Cycle will be used (if heat/cool operation was selected), then the dryer will start unloading the batch.



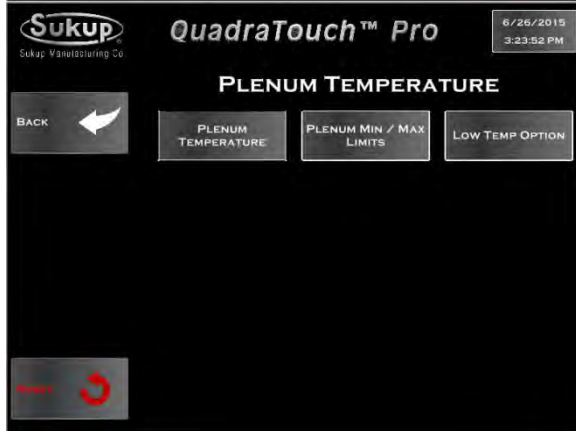
Start → Auto Batch

The Unload Cycle can be paused during operation, but needs to be resumed before the next cycle starts. Each of the mode times can be changed using the settings menu.



Settings Menu

The Settings menu houses most of the drying settings that are commonly used during operation.



Settings → Plenum Temperature

The Plenum Temperature menu contains settings for each individual plenum/heater.



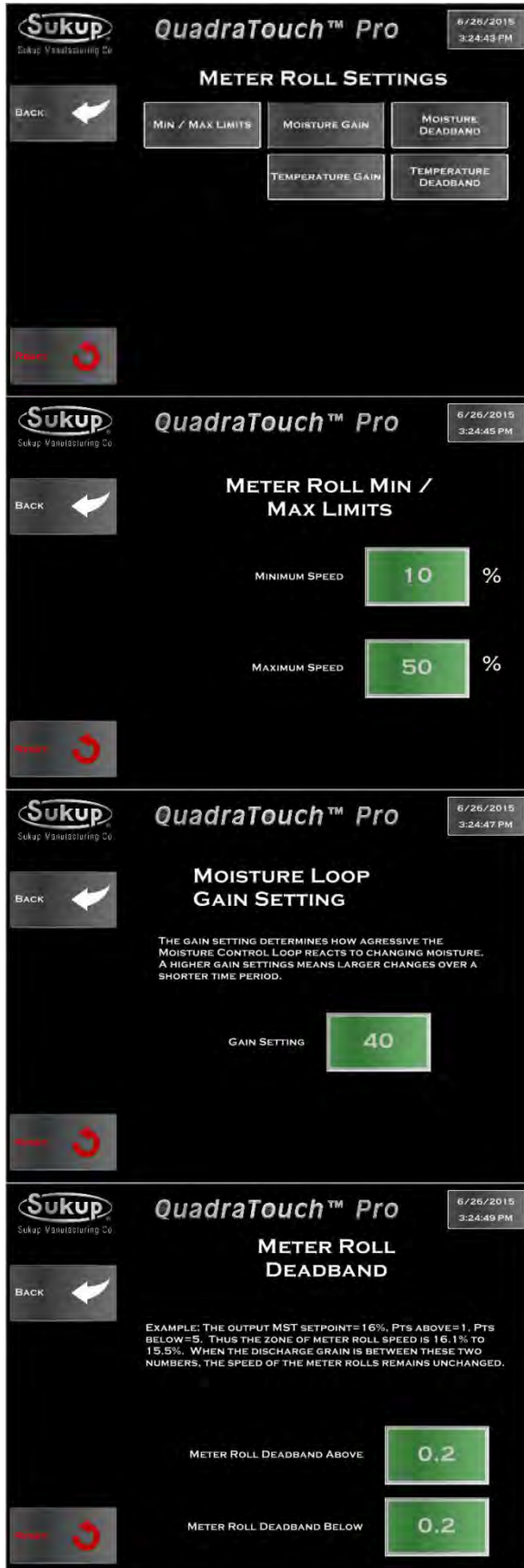
Settings → Plenum Temperature → Min/Max

The minimum and maximum plenum temperatures can be found here. When choosing the low temp option, the values can be adjusted even further.



Settings → Plenum Temperature → Low Temp Option

If enabled, the low temp option allows the plenum to be set as low as 100°F. It may result in permanent damage if a low temp kit is not installed in the dryer. The port cup and orifice may need to be changed out on axial fan heaters.



Settings → Meter Roll Settings

The Meter Roll Settings (Unload Settings for Tower Dryers) contain the minimum and maximum speed settings as well as loop control settings

Settings → Meter Roll Settings → Min/Max

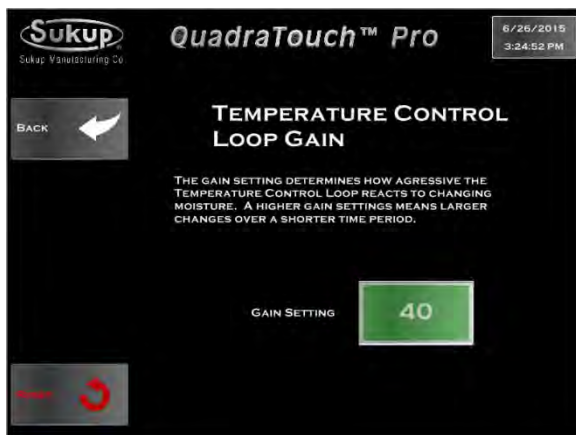
The minimum and maximum settings dictate how fast or slow the system is capable of running. Make sure to never unload faster than your takeaway system is capable of running.

Settings → Meter Roll Settings → Moisture Gain

The Moisture Loop Gain settings are important for optimum operation when discharging, based on moisture. Choosing a higher setting will mean more aggressive changes in a shorter amount of time. When the dryer is running at slower speeds, this number should stay around 40 or so. Conversely, at higher speeds, it may yield better control to boost this setting up higher.

Settings → Meter Roll Settings → Meter Roll Deadband

For some systems, it may be preferable to lock in the unload speed when grain is discharging very near the target setpoint. This is referred to as the loop deadband.



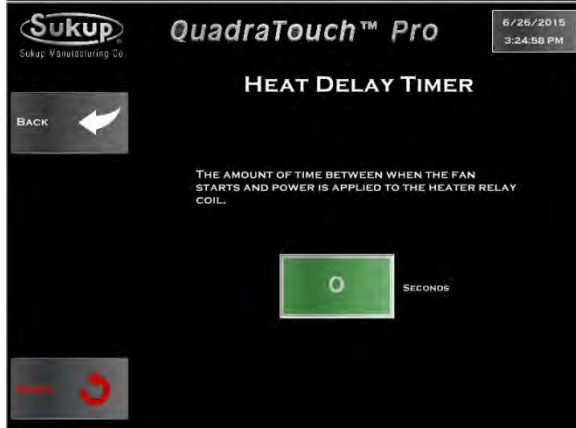
Settings → Meter Roll Settings → Temperature Gain

The Temperature Gain settings are important for optimum operation when discharging based on temperature. Choosing a higher setting will mean more aggressive changes in a shorter amount of time. When the dryer is running at slower speeds, this number should stay around 40 or so. Conversely, at higher speeds, it may yield better control to boost this setting up higher.



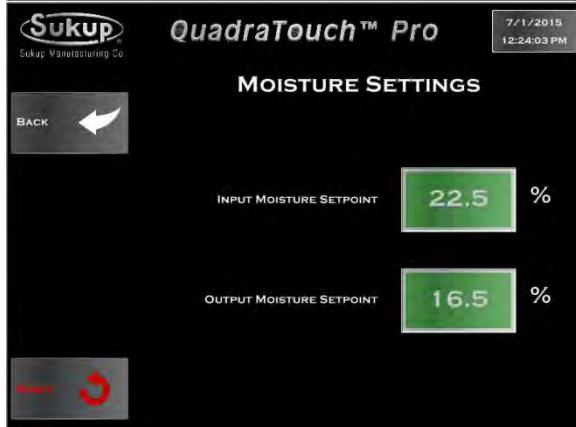
Settings → Meter Roll Settings → Temperature Deadband

For some systems, it may be preferable to lock in the unload speed when grain is discharging very near the target setpoint. This is referred to as the loop deadband.



Settings → Heat Delay Timer

Sometimes, it may be necessary to put a delay between when the fan starts, and when power is applied to the heater box.



Settings → Moisture Settings

The moisture settings are important for internal calculations as well as the target moisture for grain discharge. These can be accessed almost anytime the dryer is running.



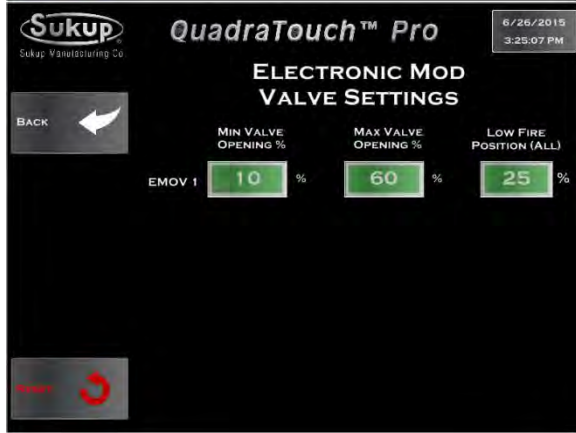
Settings → Fan Shutdown Delay

In addition to the standard 3-second fan shutdown delay, additional time can be added to cool off the grain when stopping operation or fault shutdowns that aren't related to temperature or direct safety.



Settings → Fan Start Delay

This setting dictates the amount of time between fan starts. Stretching this time out may be a good idea if power is limited or motor current draws are very high.



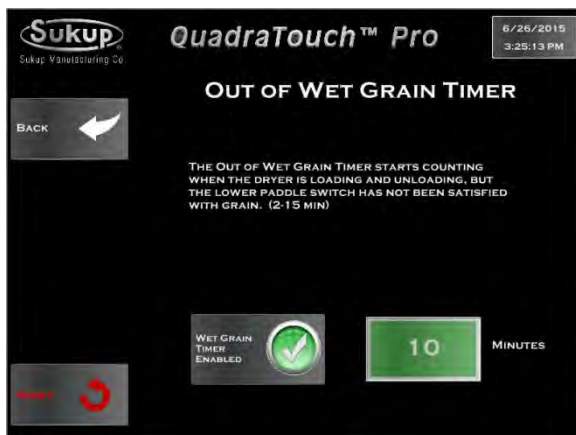
Settings → EMOV Settings

The electronic mod valve settings generally never need to be touched, however, if needed, they are here. The Low Fire Position is the percentage the valve stem will be open when heater ignition takes place.



Settings → Unload Delay

During operation, it sometimes becomes necessary to shut the unload system down to change takeaways, air system distributors, or like situations. This timer will begin counting when the unload is paused, and will cause a fault condition if the unload isn't resumed in time.



Settings → Out of Wet Grain Timer

Defaulted to 10 minutes, this timer begins counting when both paddle switches are down (calling for more grain) and will trigger a fault condition if they aren't satisfied within that period of time.



Settings → Fill Timer

Defaulted to 15 minutes, this timer begins counting when the paddles switches are satisfied and haven't dropped back down. This timer will trigger a fault condition if it expires before the switches drop down again.



Settings → Load Delay

The Load Delay timer is an additional period of time put between when the load auger starts and when the auxiliary devices are energized.



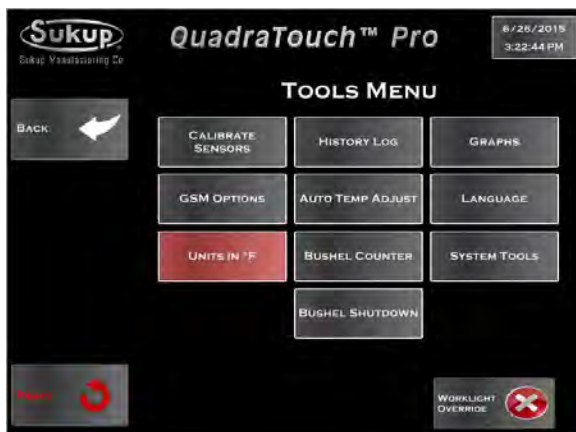
Settings → Unload Cleanout

Additional time for the unload auger to run after a standard shutdown. It provides an opportunity for the unload to clean itself out before shutting down.



Settings → Set Defaults

If the need ever arises, setting defaults will return all values in the QuadraTouch Pro panel back to factory default settings.

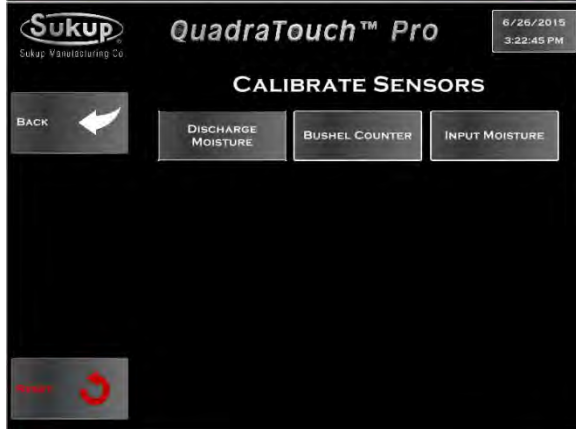


Tools Menu

The Tools menu provides many helpful system settings and options to enhance the drying experience. From using the GSM modem to looking at live and historical graphs, the Tools menu is an important section of the QuadraTouch Pro platform.

Tools → Calibrate Sensors

The dryer's moisture sensor(s), as well as the bushel counter, can be calibrated here. The bushel counter must be calibrated in order to access the counting and bushel shutdown features shown in the Tools menu.



Tools → Calibrate Sensors → Discharge Moisture

The dryer's moisture sensor may need to be calibrated during operation. It's important that the dryer is operating under good, usable data.



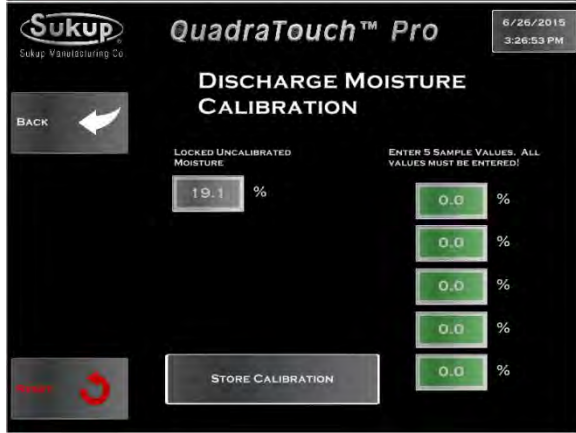
In a nutshell, the dryer will tell you when to go take a sample -- a period of 10 seconds after you are ready to sample. Take a bucket out to the discharge of the dryer and get samples over the course of the next minute. Then enter those samples in on the next page. The dryer retrieves data stored during the previous minute, and then compares it with your data.





Tools → Calibrate Sensors → Discharge Moisture

1-minute sampling period



Tools → Calibrate Sensors → Discharge Moisture

The Locked, Uncalibrated Moisture value is what the sensor recorded over the past minute. Fill in the 5 values on the left with samples you have taken from the bucket. The dryer will do the math for you and store the calibration.



Tools → Calibrate Sensors → Bushel Counter

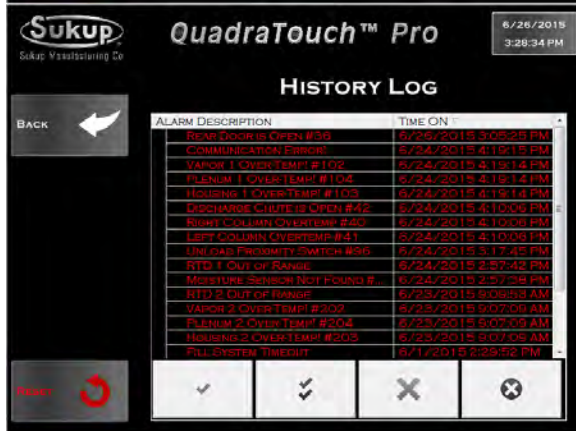
The bushel counter can be calibrated automatically or manually. Automatically is generally the most accurate way to calibrate the counter.



In automatic bushel counter calibration, the dryer needs to be discharging grain into a measurable space like a grain cart or semi load. Press the timer button to start the timer, then when the load is finished, press it again to stop the timer. Then enter the amount of bushels discharged during the time period. The dryer will do the bushel calculation for you.

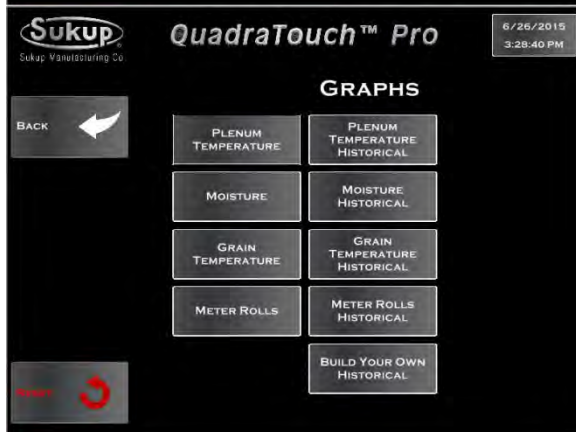


In manual bushel counter calibration, the user inputs a meter roll speed and an approximate yield at that speed. The dryer will do the bushel/hr calculation for you.



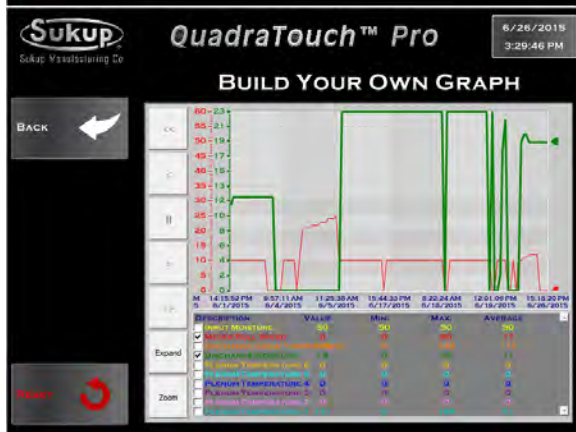
Tools → History Log

The history log contains all the alarms, settings changes, and fault history of the dryer.



Tools → Graphs

The QuadraTouch Pro system allows the user to look at graphs both in real-time and historical methods. Because this screen can contain a lot of data, a stylus may be required to touch the small sections of the screen.



You can also build your own graph where multiple values can be compared.

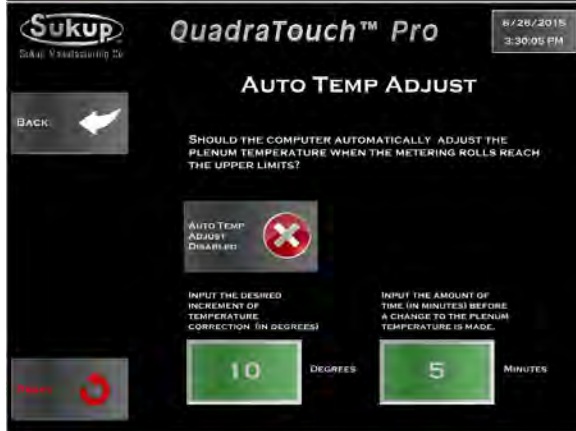


Tools → GSM Options

If equipped, the GSM modem options give you an opportunity to receive text alerts from the dryer. Up to 2 people can receive them. Further information on the GSM modem can be found by pressing the .PDF logo on this page. It contains installation and operational instructions.



New with QuadraTouch Pro, there is also a GSM diagnostics section that helps with first time setup to ensure the modem is operating correctly.



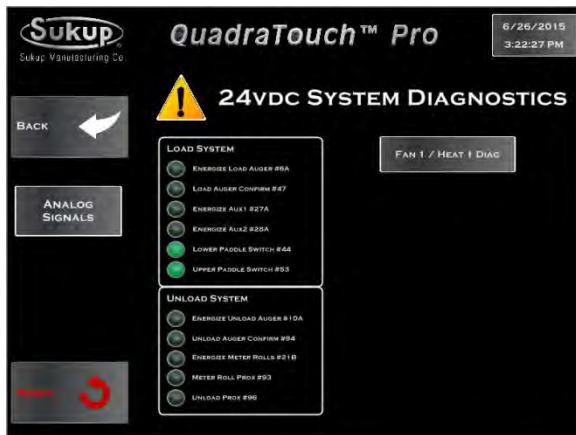
Tools → Auto Temp Adjust

If enabled, the Auto Temp adjust feature will turn down the temperature inside the plenum when the dryer reaches its upper roll speed limit. Therefore, when the dryer is trying to run faster than is allowed, it will automatically turn down its drying temperature.



Tools → Language Selection

Coming 2016

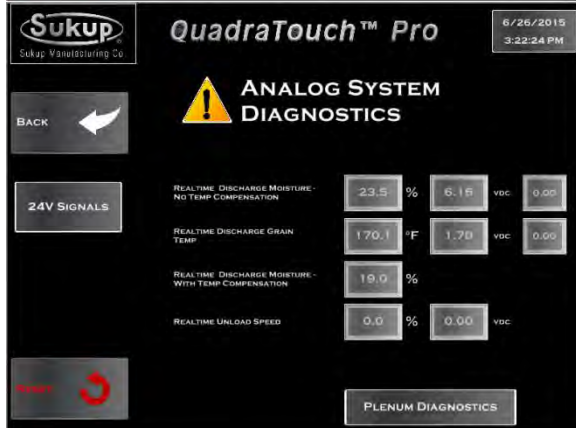


Tools → System Diagnostics

The System Diagnostics menu provides an overview of all the main system signals and those of the ones relating to the individual fan(s) and heater(s). A green light means that that circuit has 24vdc on it. This menu can be accessed at almost any time by pressing on the SUKUP logo on the top left of your screen.

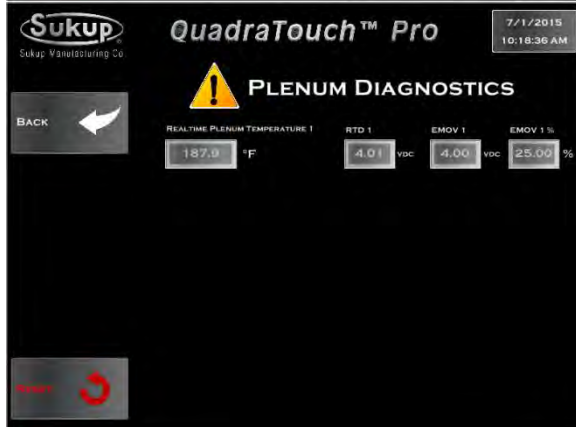


The individual fan inputs/outputs are shown here.



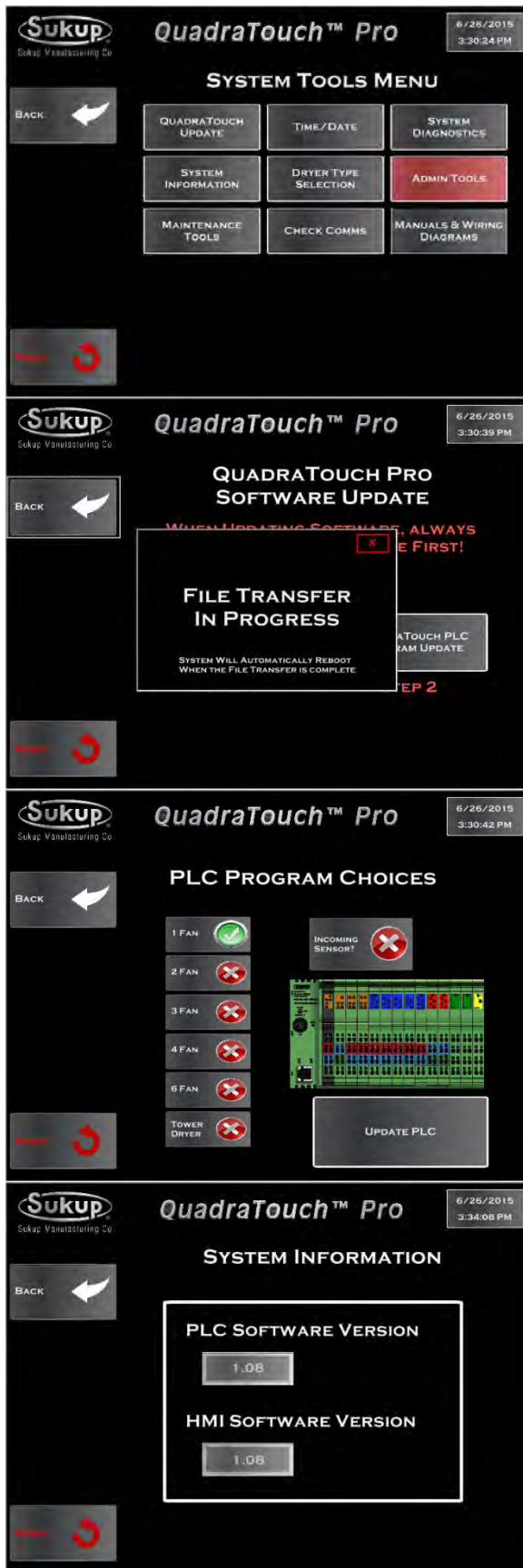
Tools → System Diagnostics → Analog Signals

The QuadraTouch Pro system provides real-time feedback of all the analog input sensors and output reference signals. Pressing “Plenum Diagnostics” will show each plenum feedback value, and the reference signal and percentage opening on the EMOV.



Tools → System Diagnostics → Analog Signals → Plenum Diagnostics

Values for each individual plenum are shown here.



Tools → System Tools

The System Tools menu is very important to the QuadraTouch Pro system. It provides a wide range of functionality and has many features that help maintain and update the system.

Tools → System Tools → QuadraTouch Update

Download the newest QuadraTouch Pro software from our website, extract the contents. You will find a folder called “project” in the extracted contents. Copy that folder onto the root directory of a USB stick. Insert that stick into the external USB port of the QuadraTouch Pro (located on the bottom of the box), and press “Step 1” – if the files were put onto the USB stick correctly, the file transfer will begin automatically.

After the QuadraTouch Pro has restarted, it will prompt you to perform step 2. Here, you’ll select which PLC is being programmed. Make sure the PLC setup you choose matches what’s inside the power cabinet! If you choose the wrong one, it will tell you, and get you back to programming page to try again.

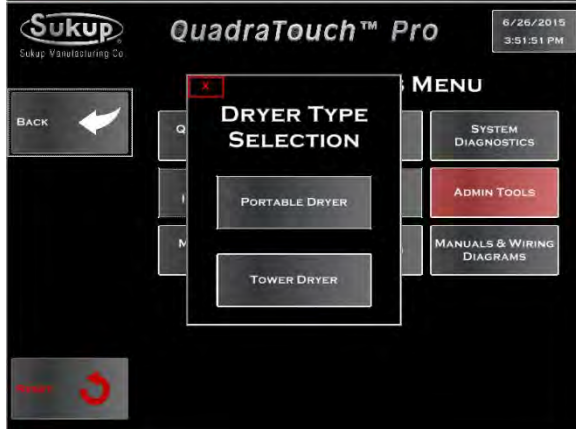
Tools → System Tools → System Information

This page shows the software versions of the PLC and the HMI. They are released together, so they should always match. If the HMI version is older than the PLC version somehow, make sure to perform a QuadraTouch™ update.



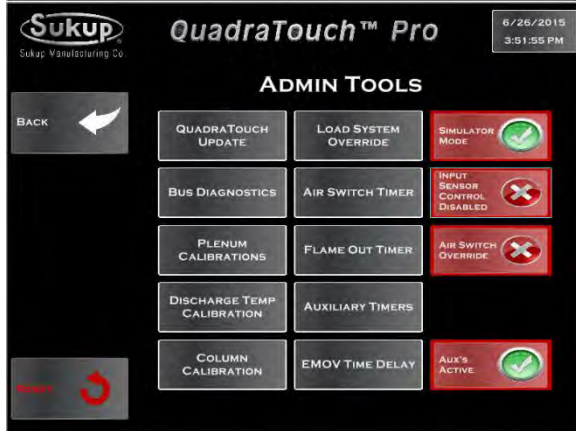
Tools → System Tools → Time and Date

Set system time and date information. It will be used for all graphing and historical data.



Tools → System Tools → Dryer Type

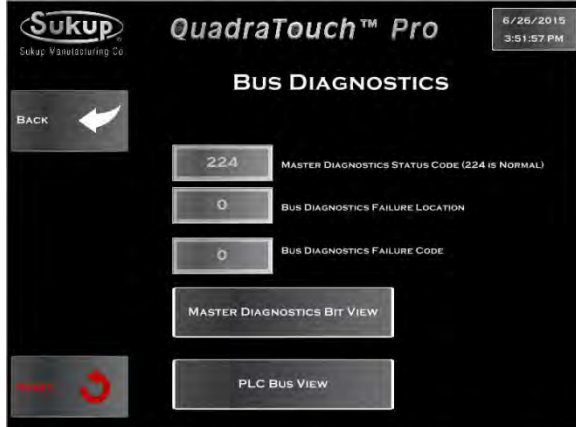
The QuadraTouch Pro software contains enough information to run an 8' single fan dryer and a 10,000 bu/hr Tower Dryer. Your system should be factory-preset for your specific dryer, but if needed, you can select that here. The QuadraTouch Pro needs to be restarted when changing this setting. It will do so automatically.



Tools → System Tools → Admin Tools

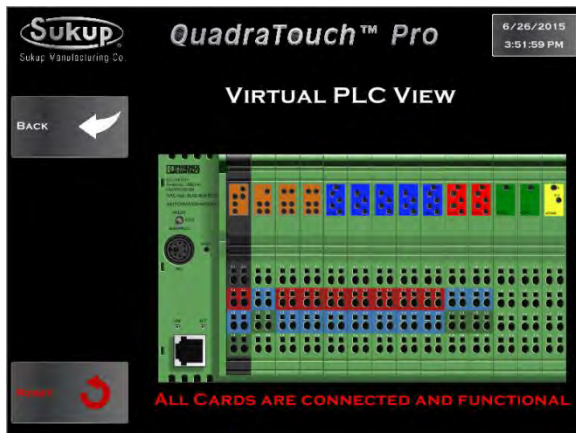
The Admin Tools menu provides the option to change critical settings inside the QuadraTouch Pro environment.

NOTICE: DO NOT CHANGE any of these settings without thorough knowledge of dryer operation and very close attention to detail. Changing settings and/or using the overrides can result in permanent damage to the dryer!



Tools → System Tools → Admin Tools → Bus Diagnostics

This section provides critical information about the PLC. This menu would only need to be accessed in the event of a PLC or I/O card failure.



Tools → System Tools → Admin Tools → Bus Diagnostics → PLC Bus View

This shows a picture of your PLC and identifies any problems with it. In the event a device is not functioning properly, it will be highlighted for easy serviceability.



Tools → System Tools → Admin Tools → Bus Diagnostics → Master Diagnostic Bit View

The information contained here will most likely only be needed by a Sukup Service Technician.



Tools → System Tools → Admin Tools → Load System Override

Sometimes it becomes necessary to run the load auger or auxiliary devices independently of each other irrespective of the paddle switch position. This mode allows you to do that. However, permanent damage can occur if it's not used properly.



Tools → System Tools → Admin Tools → Air Switch Timer

The air switch will need to be satisfied within 5 seconds after the fan contactor closes. With a Soft Start, the air switch is given until the fan reaches run state. In the event that the fan doesn't get up to speed during that amount of time, this timer can be adjusted to allow for longer ramp time.



Tools → System Tools → Admin Tools → Flame Out Timer

In the event the heater ignition isn't taking place within 45 seconds of heater power, a longer flame fault time may be needed.



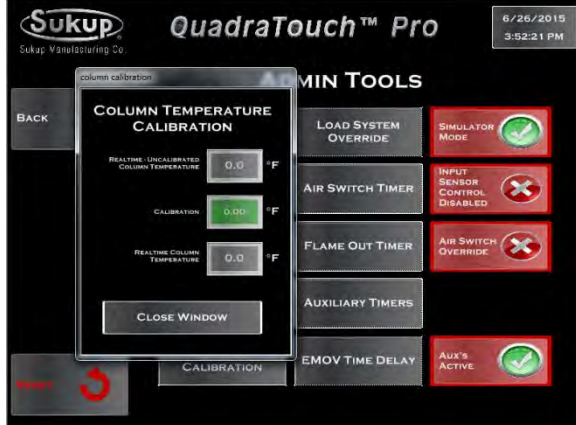
Tools → System Tools → Admin Tools → Auxiliary Timer Delays

This feature allows the user to select how much time delay takes place between when the load auger, aux 1, and aux 2 relays are pulled in. This feature is especially helpful in large incline situations.



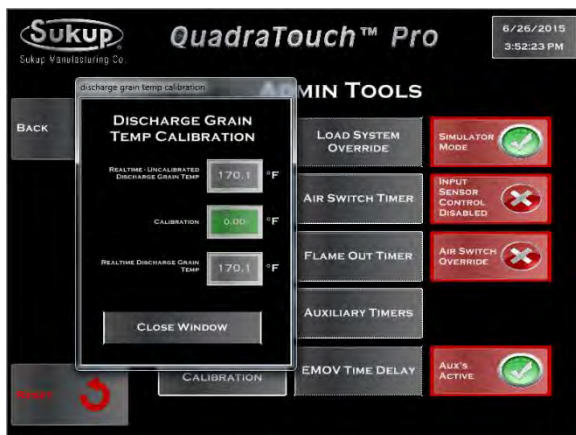
Tools → System Tools → Admin Tools → EMOV Time Delay

During Dry Fire mode, the heater will ignite, but wait a period of time before allowing the EMOV to take control of burner temperature. This time delay can be used to set the STEM valve of each heater. The factory setting is 5 PSI at low fire of 25% open.



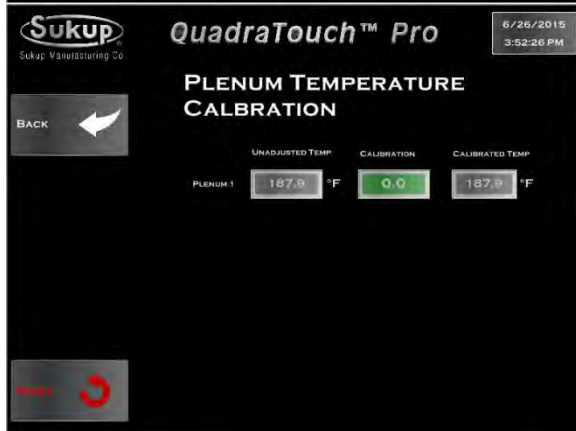
Tools → System Tools → Admin Tools → Column Calibration

Here is a quick menu to calibrate the column RTD if equipped. This sensor is generally very accurate, so exercise caution when adjusting this value.



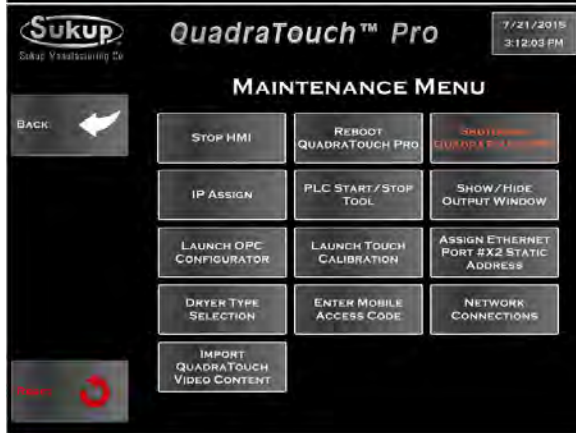
Tools → System Tools → Admin Tools → Discharge Grain Temp Calibration

Here is a quick menu to calibrate the discharge grain temp on the moisture sensor. This sensor is generally very accurate, so exercise caution when adjusting this value.



Tools → System Tools → Admin Tools → Plenum Temperature Calibration

Here is a quick menu to calibrate the individual Plenums. These sensors are generally very accurate, so exercise caution when adjusting these values.



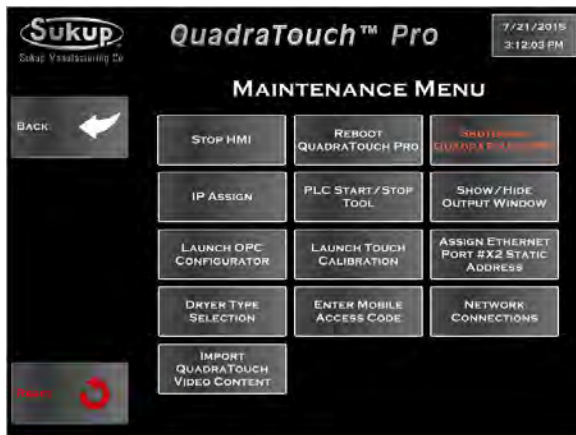
Tools → System Tools → Maintenance Menu

The QuadraTouch Pro System is equipped with many special Apps to make operation as reliable as possible. Most of these tools will never need to be used, but in the event they are needed, they are preloaded on your system for added convenience.



Tools → System Tools → Maintenance Menu → IP Assign

The IP Assign tool is used to give a PLC an IP address when it's reset to out-of-box condition. Consult your dealer before using this tool. A USB keyboard will be needed.

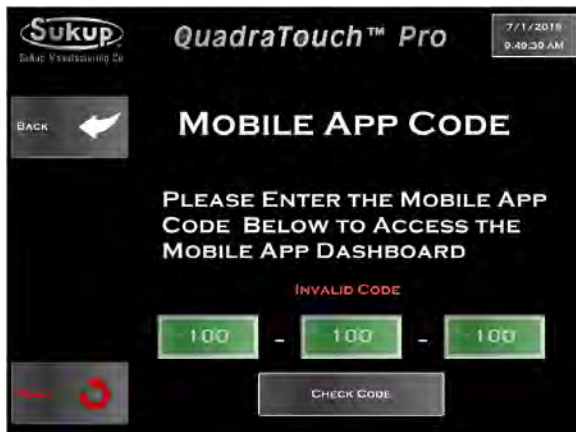


Tools → System Tools → Maintenance Menu → Launch Touch Calibration

In the event the cursor doesn't align exactly where your finger touches the screen, you can easily calibrate the touch panel to your desired specifications. Choose "Launch Touch Calibration" to open the calibration screen.



Touch the 4 Corners on the panel calibration shown left.



Tools → System Tools → Maintenance Menu → Mobile App Code

Coming in 2016: a full-blown remote access interface will be available from any phone or tablet. Directly access and partially control your dryer from anywhere in the world.



Tools → System Tools → Maintenance Menu → Comm Check

This value should read 192 when the OPC server is running. The xPLC Toggle Bit should be turning ON and OFF when the PLC and Touch Panel are talking to each other.



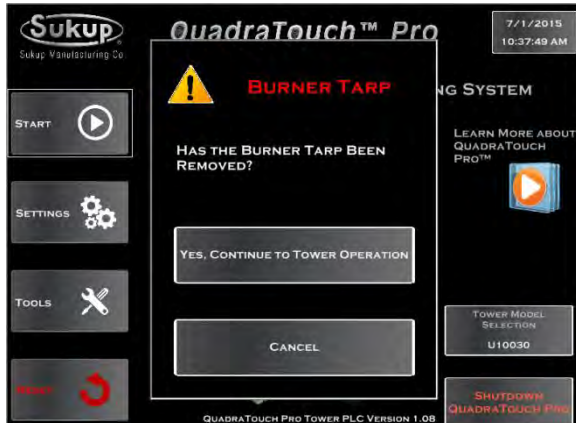
Tools → System Tools → Maintenance Menu → Manuals and Diagrams

Here, entire copies of the system manuals and wiring diagrams can be found. Information related to specific components and frequently asked questions is located here.

Tower Dryer Operation

When operating the Tower Dryer, the program flow is similar to that found on previous pages for portable dryers, with a few exceptions. They are described here.

The first key difference is in the “Start” menu. It will prompt you to answer if the burner tarp has been removed.



Choosing Control Method

In Tower Operation, you will first choose the control method (automatic or manual). The control method can be changed by pressing either of the two red rectangles.



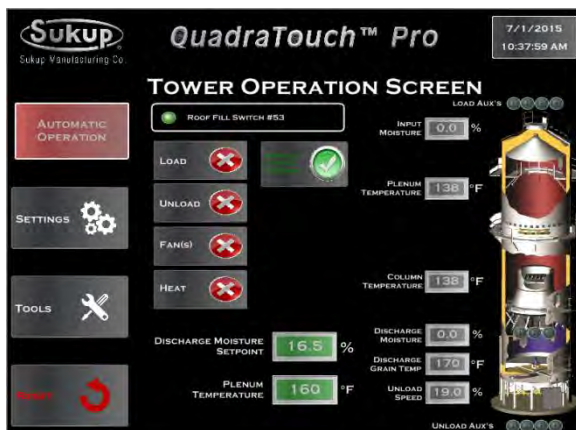
Choose how you'd like to operate the Tower Dryer.

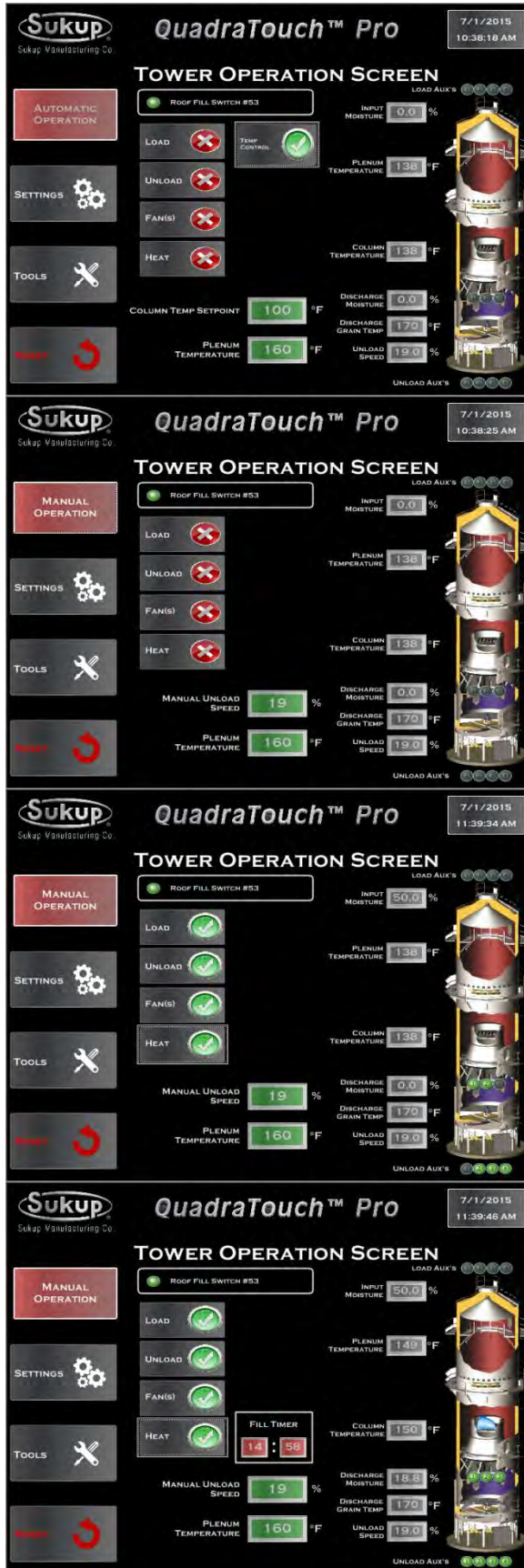


Automatic Operation

Choosing Automatic Operation, the larger of the two red rectangles disappears, leaving the controls for the load and unload systems, fan(s) and heater.

Notice to the right there is a blinking button indicating you are discharging based on moisture or grain column temperature.





Changing from Moisture to Temperature Control

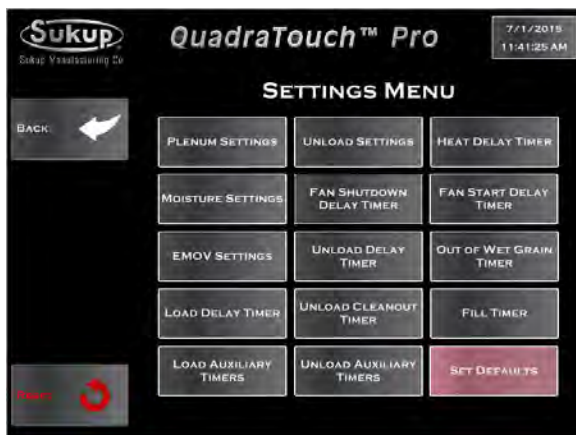
Toggling the blinking button will change from moisture to temperature control. You'll notice the temperature setpoint will appear on the bottom in place of the moisture setpoint.

Manual Operation

Choosing the red rectangle, you can change the operation method to manual operation, as shown here. Notice the temperature and moisture setpoints are removed, and they are replaced with a manual unload speed setting.

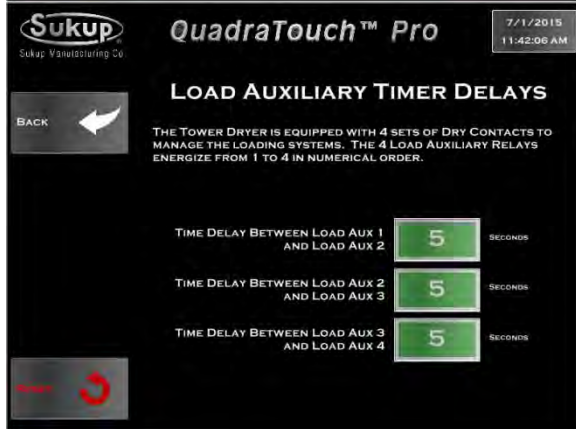
Turning the load, unload, fan(s), and heat on, you can see the devices turning on in order. The fans will start up in sequence along with the load and unload systems. An animated blue flame will show up when the burner control unit senses flame.

As soon as the unload table has started, any applicable countdown timers will be displayed. Notice the Fill Timer displayed in the bottom center of the screen.



Settings Menu

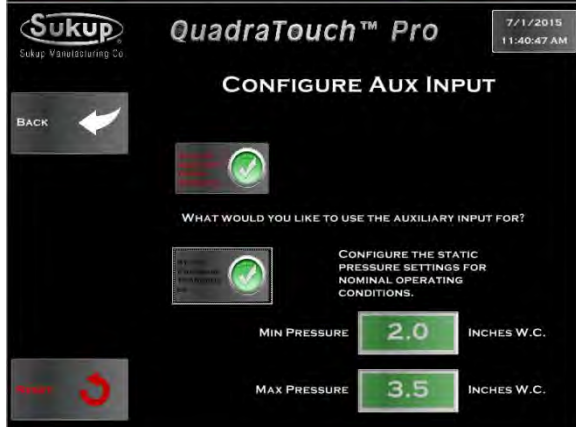
The settings menu is relatively the same as the portable dryer software with an exception at the bottom of the page for load and unload auxiliary timers. (Settings menu for portable dryers begins on page 9 of this Software Manual.)



Time delays between load auxiliaries can be programmed here.



Time delays between unload auxiliaries can be programmed here.



Tools → System Tools → Maintenance Tools → Configure Aux Input

New for QuadraTouch Pro, the available analog input can be configured for an additional temperature readout or static air pressure sensor. Ask your local Sukup dealer about this feature.



Sukup Manufacturing Co.

1555 255th Street, Box 677

Sheffield, Iowa, USA 50475-0677

Phone: 641-892-4222

Fax: 641-892-4629

Website: www.sukup.com

Email: info@sukup.com

Appendix H

Electrical Drawings

**Wire numbers and uses
Electrical drawings**

Wire Numbers and their Uses: QuadraTouch Pro™ 2015

Common System Wires		
Wire #	Description	Use
LINE	110VAC supply from transformer to CB8	Line power from Transformer
0	110VAC from bottom of CB8 to E-Stop	Conductor between CB8 and E-Stop
1	110VAC supply after E-Stop	Emergency Switched Control Supply
2	Neutral Wire	Provides Return for 110V circuits
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
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

Wire Numbers and their Uses: QuadraTouch Pro™ 2015

Common System Wires		
Wire #	Description	Use
36	Rear door signal wire	24V present = Door closed, provides voltage at PLC for rear door status (Doors are in series)
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
44	Lower Grain paddle switch	24V present = status grain not empty, lower grain switch
47	PLC load ON input	24V present = load auger ON, provides PLC with status of load operation (on or off)
49A	Motor overload- Meter Rolls	24V present = status ok, provides voltage back to PLC for overload status of Meter Rolls
49B	Motor overload--Load Motor	24V present = status ok, provides voltage back to PLC for overload status of Load Motor
49C	Motor overload- Unload Motor	24V present = status ok, provides voltage back to PLC for overload status of Unload Motor
49D	Motor overload- Auxiliary Box	24V present = status ok, provides voltage back to PLC for overload status of device(s) in the auxiliary box (series wired)
53	Upper Grain paddle switch	24V present = Status Dryer FULL
70	Automatic batch RTD signal wire	Provides signal to processor for autobatch temperature drying, 0 – 5 volt DC reference
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	24VDC ground. DC Common.
96	Unload Auger Proximity Signal Wire	24VDC oscillating square wave = unload auger rotation confirmed.
U	User Fault Circuit	24VDC = User Fault OK – Jumped out from the factory.
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 9VDC moisture signal to the PLC	Provides the processor with a voltage signal corresponding to moisture
D5	Moisture sensor black, 0 to 9VDC moisture signal to the PLC	Provides the processor with a voltage signal corresponding to moisture
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 Main Gas Valve Relay K10

Wire Numbers and their Uses: QuadraTouch Pro™ 2015

Fan / Heat #1		
Wire #	Description	Use
100	Fan Soft Start Monitoring (pos. #1)	24V = status ok, provides voltage at PLC for Soft Start Trip Monitoring
101	Differential Air Switch (pos. #1)	24V = status ok, provides voltage at PLC for Differential Air switch closure
102	Vapor high limit switch (pos. #1)	24V = status ok, provides voltage at PLC for vapor high temperature
103	Housing high limit switch (pos. #1)	24V = status ok, provides voltage at PLC for heater housing high temperature
104	Plenum over-temp switch (pos. #1)	24V = status ok, provides voltage at PLC for plenum high temperature
105	Plenum static air switch (pos. #1)	24V present = status ok, provides voltage back to PLC for static air status
106	Heater flame sense (pos. #1)	24V present = status ok, provides voltage back to PLC for flame sense status
107	PLC fan ON input (pos. #1)	24V present = fan ON, provides PLC with status of fan operation
108	PLC heat ON input (pos. #1)	24V present = ON, tells the PLC the system is calling for the heater to turn on
109	Motor Overload Fan (pos #1)	24V present = ON, tells the PLC the fan breaker is OK
110A	24VDC from PLC to K3 Fan#1 Relay	24V present energizes Fan1 Relay K3
111A	24VDC from PLC to K4A, K4B Heat#1 Relay	24V present energizes Heat1 Relays K4A, K4B
110C	110V power from K3 Fan1 Relay to Fan #1 Coil	110V present energizes Fan#1 contactor or soft start and supply power Fan#1 NO contact
110H	110V power from Fan#1 NO contact to K4A Heat#1 relay	110V present supplies 110V power to K4A Heat#1
111	110V power from Heat1A relay to CB9 breaker	110V present supplies CB9 with power
112	110V from CB9 breaker to heater box (pos. #1)	110V present heater circuit will begin firing sequence
161	EMOV (2-10V) (pos. #1)	Reference voltage for the EMOV

Wire Numbers and their Uses: QuadraTouch Pro™ 2015

Fan / Heat #2		
Wire #	Description	Use
200	Fan Soft Start Monitoring (pos. #2)	24V = status ok, provides voltage at PLC for Soft Start Trip Monitoring
201	Differential Air Switch (pos. #2)	24V = status ok, provides voltage at PLC for Differential Air switch closure
202	Vapor high limit switch (pos. #2)	24V = status ok, provides voltage at PLC for vapor high temperature
203	Housing high limit switch (pos. #2)	24V = status ok, provides voltage at PLC for heater housing high temperature
204	Plenum over-temp switch (pos. #2)	24V = status ok, provides voltage at PLC for plenum high temperature
205	Plenum static air switch (pos. #2)	24V present = status ok, provides voltage back to PLC for static air status
206	Heater flame sense (pos. #2)	24V present = status ok, provides voltage back to PLC for flame sense status
207	PLC fan ON input (pos. #2)	24V present = fan ON, provides PLC with status of fan operation
208	PLC heat ON input (pos. #2)	24V present = ON, tells the PLC the system is calling for the heater to turn on
209	Motor Overload Fan (pos #2)	24V present = ON, tells the PLC the fan breaker is OK
210A	24VDC from PLC to K8 Fan#2 Relay	24V present energizes Fan#2 Relay K8
211A	24VDC from PLC to K9A, K9B Heat#2 Relay	24V present energizes Heat#2 Relays K9A, K9B
210C	110V power from K8 Fan#2 Relay to Fan #2 Coil	110V present energizes Fan#2 contactor or soft start and supply power Fan#2 NO contact
210H	110V power from Fan#2 NO contact to K9A Heat#2 relay	110V present supplies 110V power to K9A Heat#2
211	110V power from Heat9A relay to CB10 breaker	110V present supplies CB10 with power
212	110V power from CB10 breaker to heater box (pos. #2)	110V present heater circuit will begin firing sequence
261	EMOV (2-10V) (pos. #2)	Reference voltage for the EMOV

Wire Numbers and their Uses: QuadraTouch Pro™ 2015

Fan / Heat #3		
Wire #	Description	Use
300	Fan Soft Start Monitoring (pos. #3)	24V = status ok, provides voltage at PLC for Soft Start Trip Monitoring
301	Differential Air Switch (pos. #3)	24V = status ok, provides voltage at PLC for Differential Air switch closure
302	Vapor high limit switch (pos. #3)	24V = status ok, provides voltage at PLC for vapor high temperature
303	Housing high limit switch (pos. #3)	24V = status ok, provides voltage at PLC for heater housing high temperature
304	Plenum over-temp switch (pos. #3)	24V = status ok, provides voltage at PLC for plenum high temperature
305	Plenum static air switch (pos. #3)	24V present = status ok, provides voltage back to PLC for static air status
306	Heater flame sense (pos. #3)	24V present = status ok, provides voltage back to PLC for flame sense status
307	PLC fan ON input (pos. #3)	24V present = fan ON, provides PLC with status of fan operation
308	PLC heat ON input (pos. #3)	24V present = ON, tells the PLC the system is calling for the heater to turn on
309	Motor Overload Fan (pos #3)	24V present = ON, tells the PLC the fan breaker is OK
310A	24VDC from PLC to K11 Fan#3 Relay	24V present energizes Fan#3 Relay K11
311A	24VDC from PLC to K12A, K12B Heat#3 Relay	24V present energizes Heat#3 Relays K12A, K12B
310C	110V power from K11 Fan#3 Relay to Fan #3 Coil	110V present energizes Fan#3 contactor or soft start and supply power Fan#3 NO contact
310H	110V power from Fan#3 NO contact to K12A Heat#3 relay	110V present supplies 110V power to K12A Heat#3
311	110V power from Heat12A relay to CB11 breaker	110V present supplies CB11 with power
312	110V power from CB11 breaker to heater box (pos. #3)	110V present heater circuit will begin firing sequence
361	EMOV (2-10V) (pos. #3)	Reference voltage for the EMOV

Wire Numbers and their Uses: QuadraTouch Pro™ 2015

Fan / Heat #4		
Wire #	Description	Use
400	Fan Soft Start Monitoring (pos. #4)	24V = status ok, provides voltage at PLC for Soft Start Trip Monitoring
401	Differential Air Switch (pos. #4)	24V = status ok, provides voltage at PLC for Differential Air switch closure
402	Vapor high limit switch (pos. #4)	24V = status ok, provides voltage at PLC for vapor high temperature
403	Housing high limit switch (pos. #4)	24V = status ok, provides voltage at PLC for heater housing high temperature
404	Plenum over-temp switch (pos. #4)	24V = status ok, provides voltage at PLC for plenum high temperature
405	Plenum static air switch (pos. #4)	24V present = status ok, provides voltage back to PLC for static air status
406	Heater flame sense (pos. #4)	24V present = status ok, provides voltage back to PLC for flame sense status
407	PLC fan ON input (pos. #4)	24V present = fan ON, provides PLC with status of fan operation
408	PLC heat ON input (pos. #4)	24V present = ON, tells the PLC the system is calling for the heater to turn on
409	Motor Overload Fan (pos #4)	24V present = ON, tells the PLC the fan breaker is OK
410A	24VDC from PLC to K13 Fan#4 Relay	24V present energizes Fan#4 Relay K13
411A	24VDC from PLC to K14A, K14B Heat#4 Relay	24V present energizes Heat#4 Relays K14A, K14B
410C	110V power from K13 Fan#4 Relay to Fan #4 Coil	110V present energizes Fan#4 contactor or soft start and supply power Fan#4 NO contact
410H	110V power from Fan#4 NO contact to K12A Heat#4 relay	110V present supplies 110V power to K12A Heat#4
411	110V power from Heat14A relay to CB12 breaker	110V present supplies CB12 with power
412	110V power from CB12 breaker to heater box (pos. #4)	110V present heater circuit will begin firing sequence
461	EMOV (2-10V) (pos. #4)	Reference voltage for the EMOV

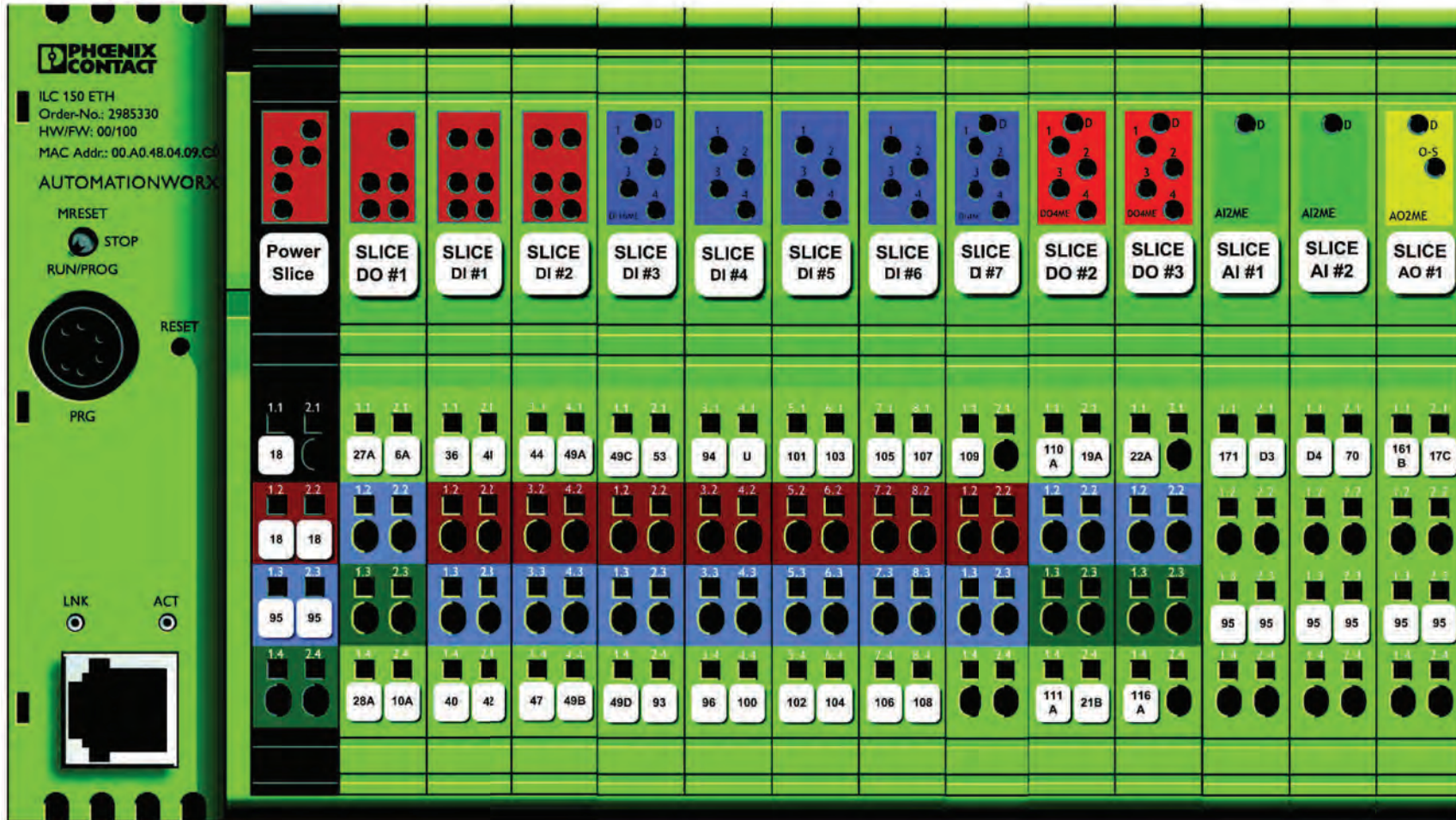
Wire Numbers and their Uses: QuadraTouch Pro™ 2015

Fan / Heat #5		
Wire #	Description	Use
500	Fan Soft Start Monitoring (pos. #5)	24V = status ok, provides voltage at PLC for Soft Start Trip Monitoring
501	Differential Air Switch (pos. #5)	24V = status ok, provides voltage at PLC for Differential Air switch closure
502	Vapor high limit switch (pos. #5)	24V = status ok, provides voltage at PLC for vapor high temperature
503	Housing high limit switch (pos. #5)	24V = status ok, provides voltage at PLC for heater housing high temperature
504	Plenum over-temp switch (pos. #5)	24V = status ok, provides voltage at PLC for plenum high temperature
505	Plenum static air switch (pos. #5)	24V present = status ok, provides voltage back to PLC for static air status
506	Heater flame sense (pos. #5)	24V present = status ok, provides voltage back to PLC for flame sense status
507	PLC fan ON input (pos. #5)	24V present = fan ON, provides PLC with status of fan operation
508	PLC heat ON input (pos. #5)	24V present = ON, tells the PLC the system is calling for the heater to turn on
509	Motor Overload Fan (pos #5)	24V present = ON, tells the PLC the fan breaker is OK
510A	24VDC from PLC to K15 Fan#5 Relay	24V present energizes Fan#5 Relay K15
511A	24VDC from PLC to K16A, K16B Heat#5 Relay	24V present energizes Heat#5 Relays K16A, K16B
510C	110V power from K15 Fan#5 Relay to Fan #5 Coil	110V present energizes Fan#5 contactor or soft start and supply power Fan#5 NO contact
510H	110V power from Fan#5 NO contact to K16A Heat#5 relay	110V present supplies 110V power to K16A Heat#5
511	110V power from Heat16A relay to CB13 breaker	110V present supplies CB13 with power
512	110V power from CB13 breaker to heater box (pos. #5)	110V present heater circuit will begin firing sequence
561	EMOV (2-10V) (pos. #5)	Reference voltage for the EMOV

Wire Numbers and their Uses: QuadraTouch Pro™ 2015

Fan / Heat #6		
Wire #	Description	Use
600	Fan Soft Start Monitoring (pos. #6)	24V = status ok, provides voltage at PLC for Soft Start Trip Monitoring
601	Differential Air Switch (pos. #6)	24V = status ok, provides voltage at PLC for Differential Air switch closure
602	Vapor high limit switch (pos. #6)	24V = status ok, provides voltage at PLC for vapor high temperature
603	Housing high limit switch (pos. #6)	24V = status ok, provides voltage at PLC for heater housing high temperature
604	Plenum over-temp switch (pos. #6)	24V = status ok, provides voltage at PLC for plenum high temperature
605	Plenum static air switch (pos. #6)	24V present = status ok, provides voltage back to PLC for static air status
606	Heater flame sense (pos. #6)	24V present = status ok, provides voltage back to PLC for flame sense status
607	PLC fan ON input (pos. #6)	24V present = fan ON, provides PLC with status of fan operation
608	PLC heat ON input (pos. #6)	24V present = ON, tells the PLC the system is calling for the heater to turn on
609	Motor Overload Fan (pos. #6)	24V present = ON, tells the PLC the fan breaker is OK
610A	24VDC from PLC to K17 Fan#6 Relay	24V present energizes Fan#6 Relay K17
611A	24VDC from PLC to K18A, K18B Heat#6 Relay	24V present energizes Heat#6 Relays K18A, K18B
610C	110V power from K17 Fan#6 Relay to Fan#6 Coil	110V present energizes Fan#6 contactor or soft start and supply power Fan#6 NO contact
610H	110V power from Fan#6 NO contact to K18A Heat#6 relay	110V present supplies 110V power to K18A Heat#6
611	110V power from Heat18A relay to CB14 breaker	110V present supplies CB14 with power
612	110V power from CB14 breaker to heater box (pos. #6)	110V present heater circuit will begin firing sequence
661	EMOV (2-10V) (pos. #6)	Reference voltage for the EMOV

1 Fan PLC Setup



Title: PORTABLE DRYER: 1 FAN PLC Setup

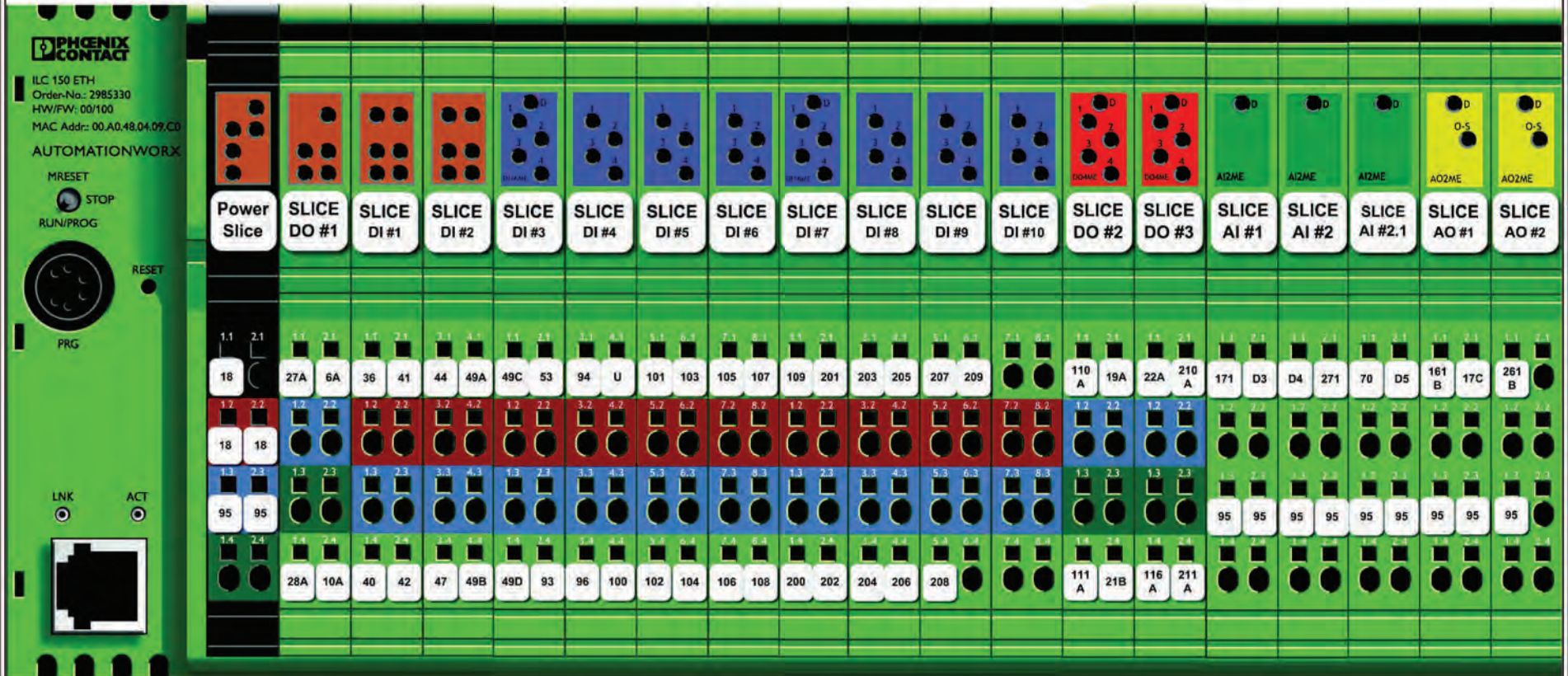
Author: SUKUP MFG CO - MRK

Date: 3/15

Sheet: 101.1

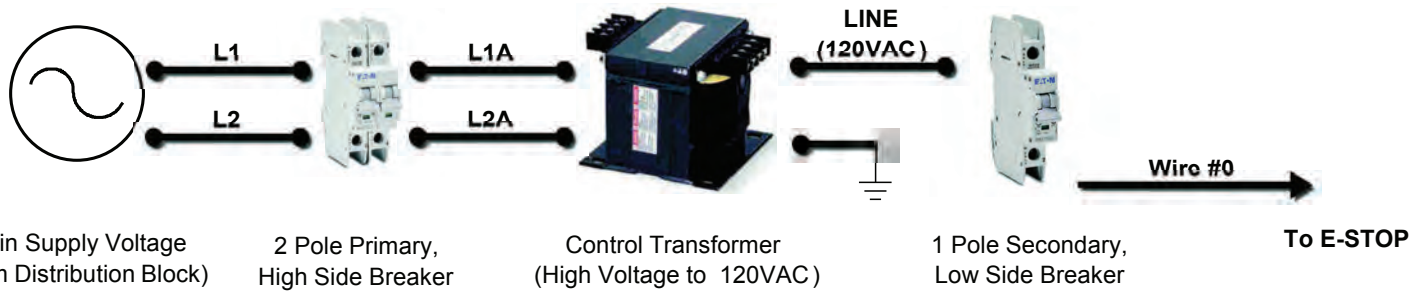
Revision:

2 Fan PLC Setup

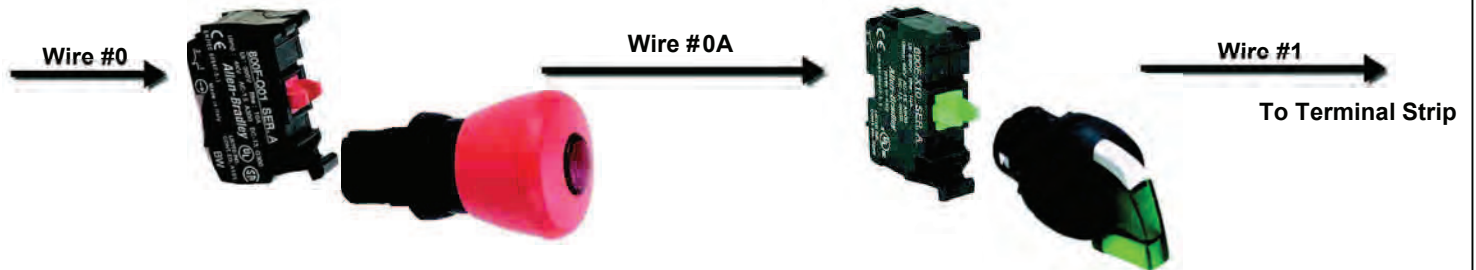


Title: PORTABLE DRYER: 2 FAN PLC Setup	
Author: SUKUP MFG CO - MRK	
Date: 3/15	Sheet: 101.2
Revision:	

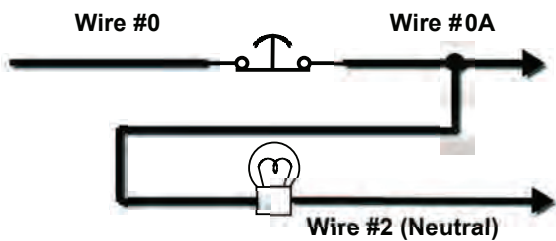
Emergency Stop and System Control Switch Wiring



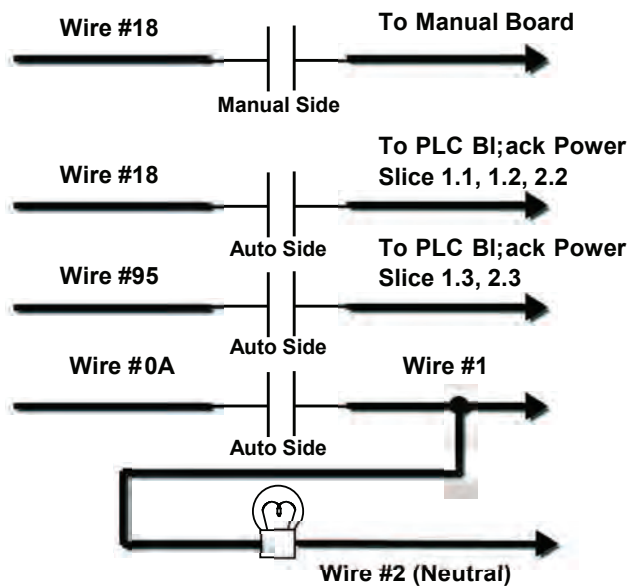
NOTE: 575VAC is Fused Instead of 2 Pole breaker shown



E-STOP (Emergency Stop Switch)



System Control Switch Manual --- OFF --- Auto (3 Position)



Title: PORTABLE DRYER: Emergency Stop and System Control Switch Wiring

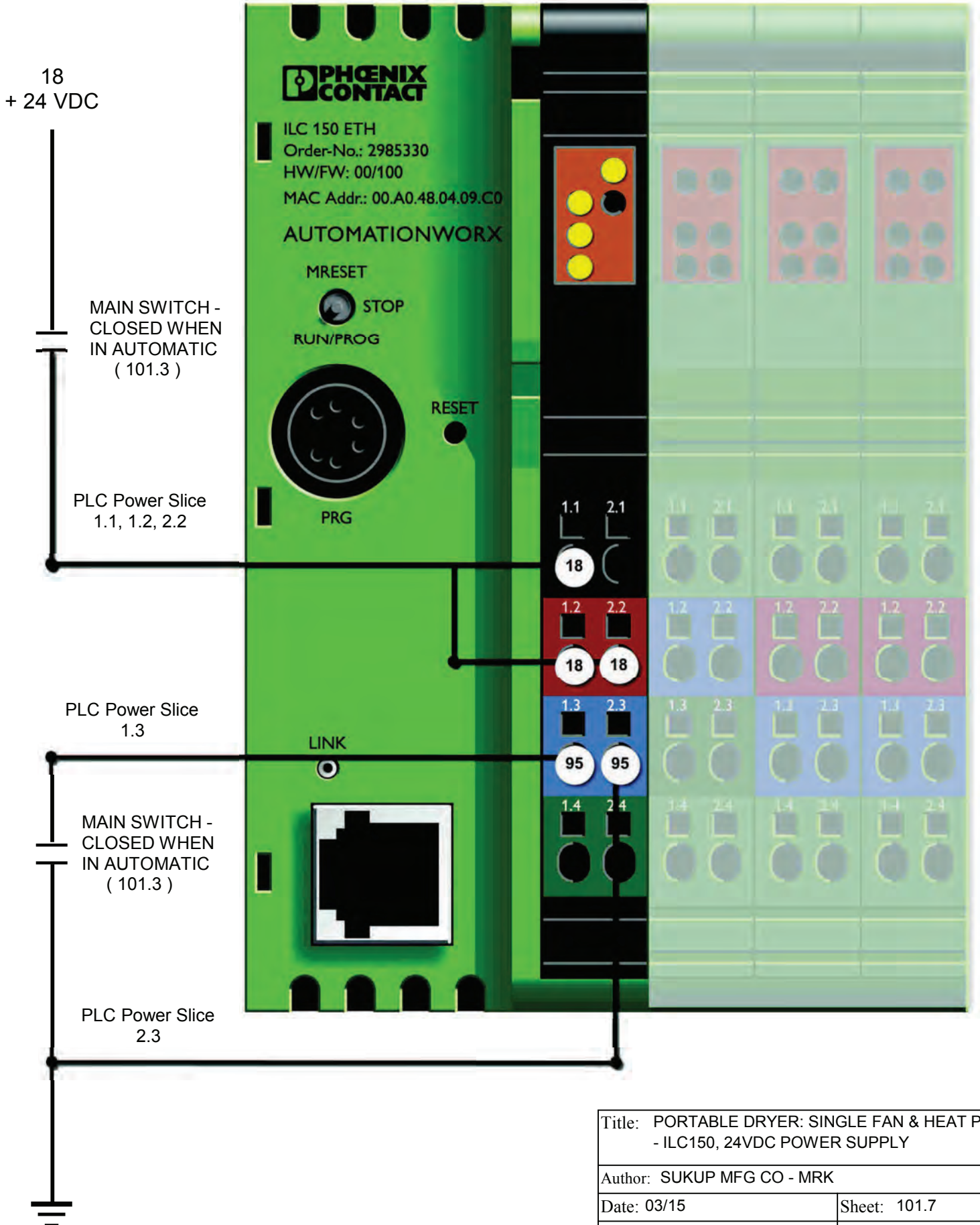
Author: SUKUP MFG CO - MRK

Date: 03/15

Sheet: 101.3

Revision: 8/17/2017 - DWS (1)

PLC POWER SLICE (Designated by Black Wiring Arm)



Title: PORTABLE DRYER: SINGLE FAN & HEAT PLC
- ILC150, 24VDC POWER SUPPLY

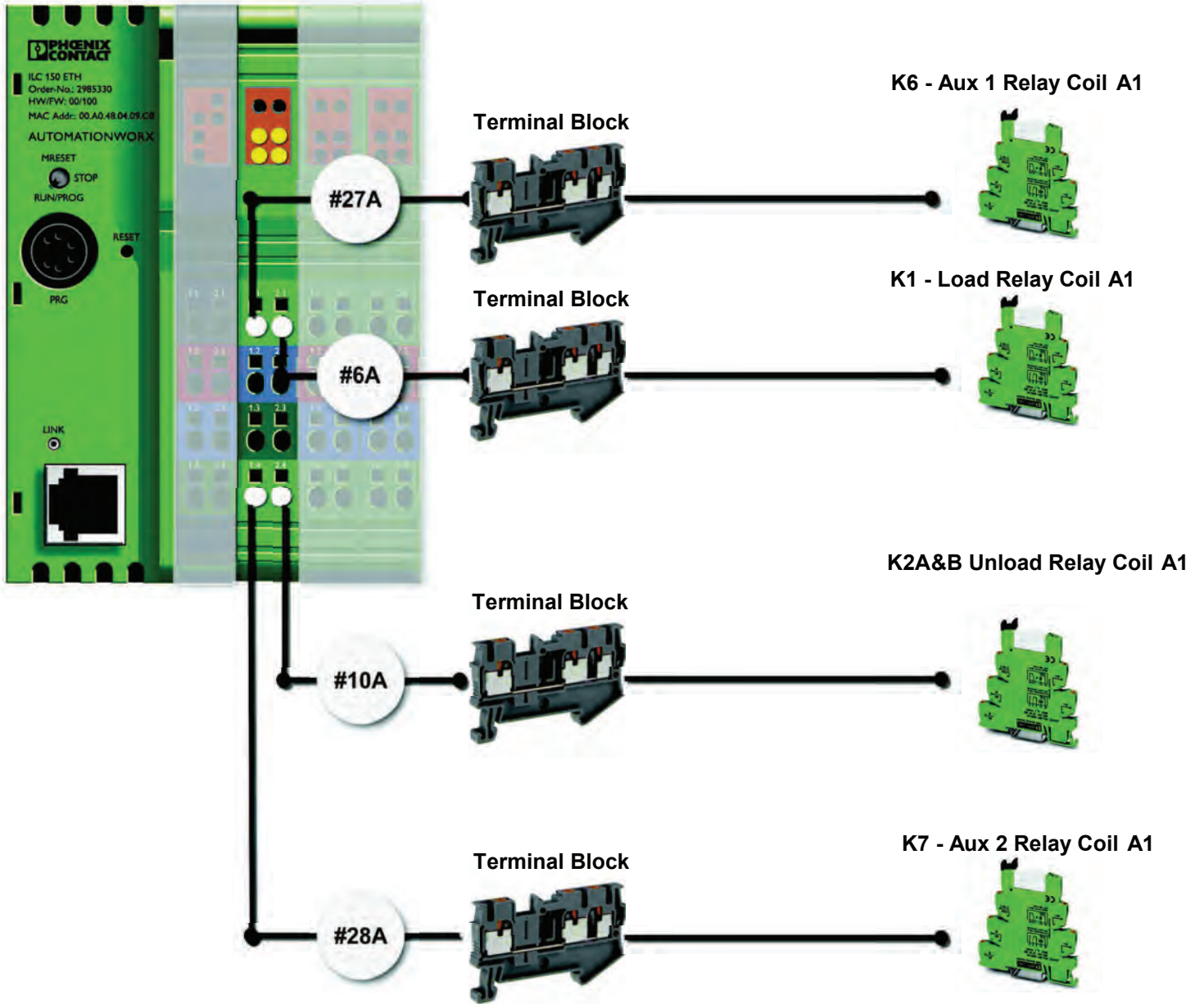
Author: SUKUP MFG CO - MRK

Date: 03/15

Sheet: 101.7

Revision:

PLC DO SLICE #1 (Digital Output Card #1 - same as red cards)



All Digital Output cards **SEND** 24Vdc from the PLC to a certain device. Typically they are used to energize a relay or provide an interlock or "GO" signal to a process.

Title: PORTABLE DRYER: Digital Output Slice #1

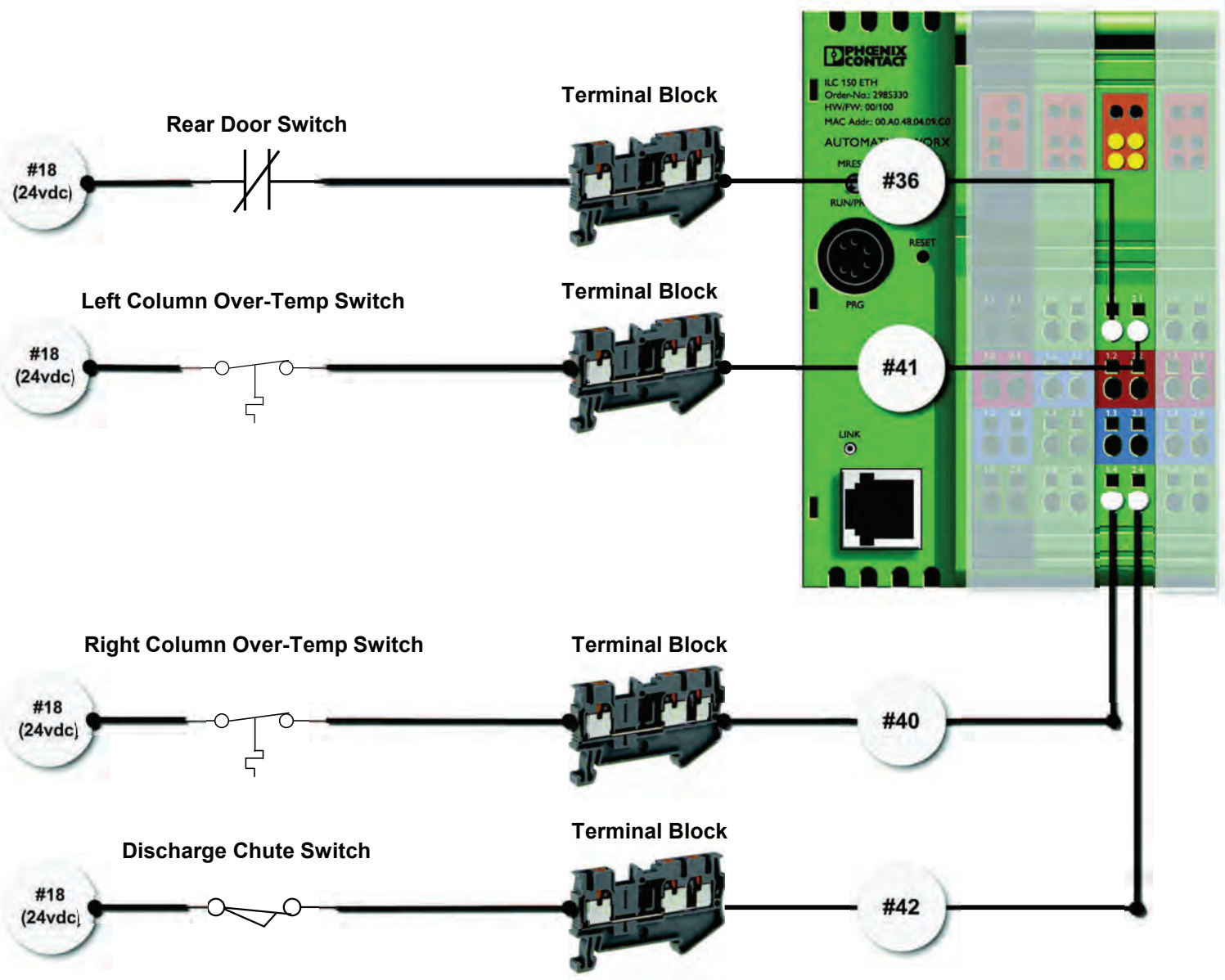
Author: SUKUP MFG CO - MRK

Date: 03/15

Sheet: 101.8

Revision:

PLC DI SLICE #1 (Digital Input Card #1 - same as blue cards)



All Digital Input cards **RECEIVE** 24Vdc into the PLC from certain device. Typically they are receiving the ON/OFF status of a switch on the dryer.

Title: PORTABLE DRYER: Digital Input Slice #1

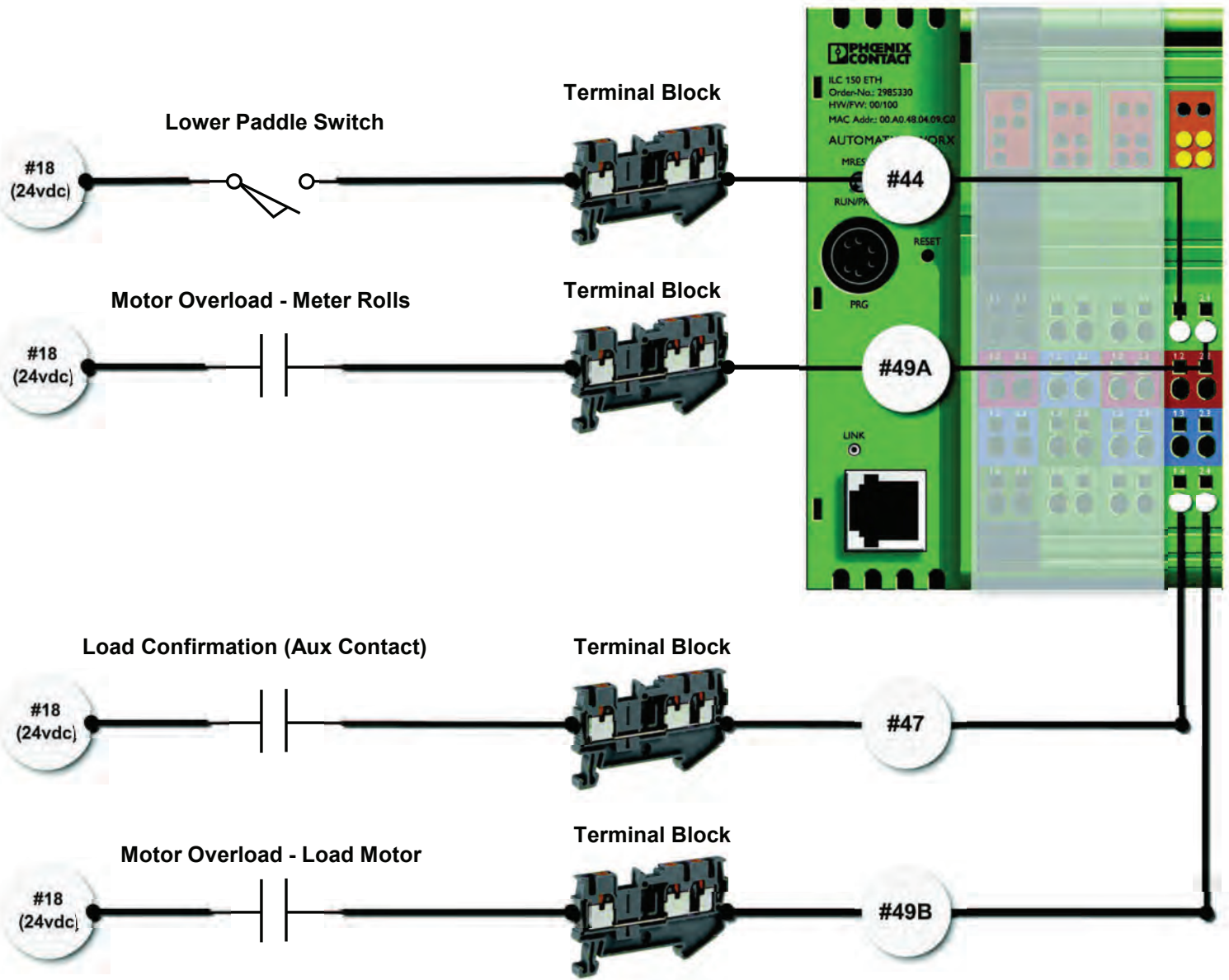
Author: SUKUP MFG CO - MRK

Date: 03/15

Sheet: 101.9

Revision: 6/6/2017 - DWS (1)

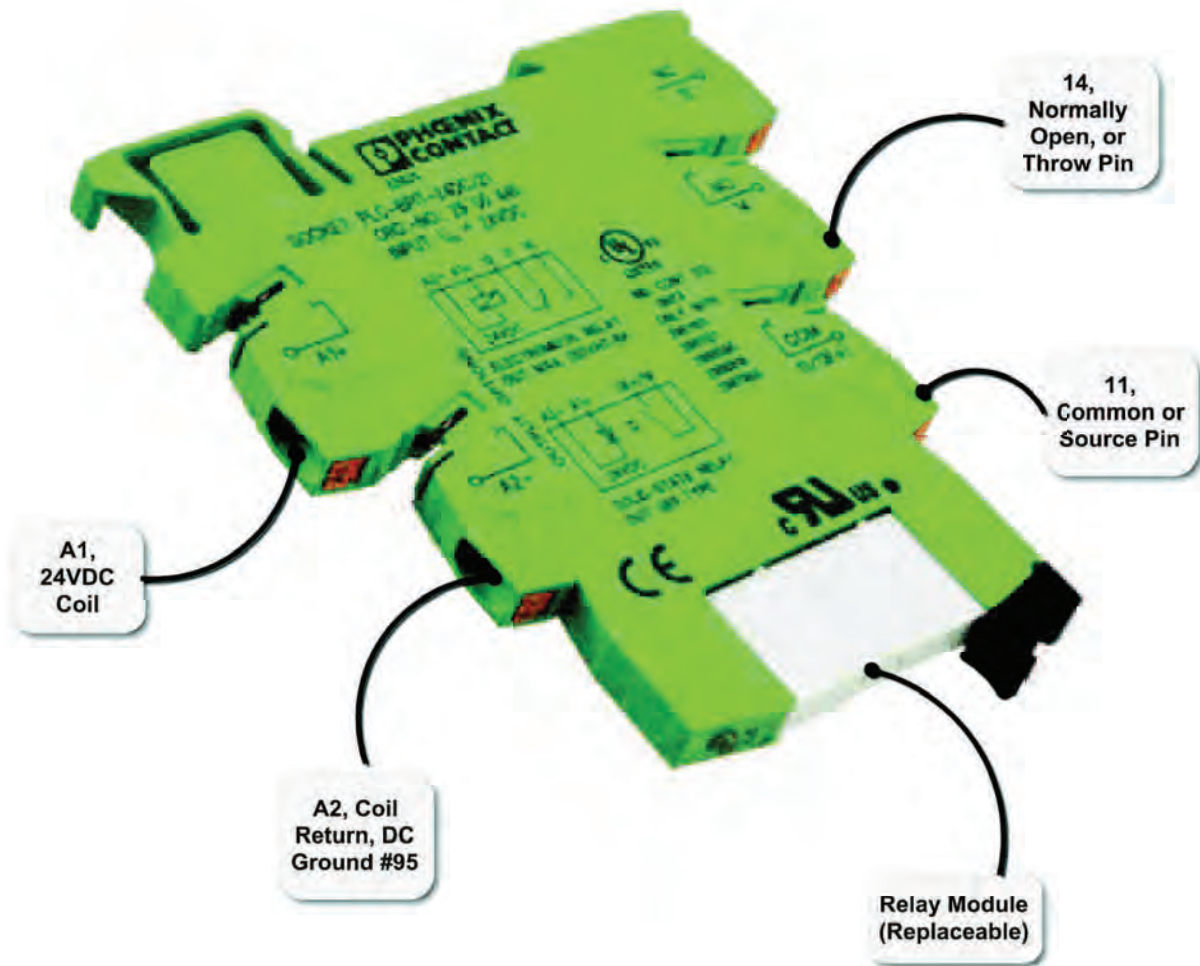
PLC DI SLICE #2 (Digital Input Card #2- same as blue cards)



All Digital Input cards **RECEIVE** 24Vdc into the PLC from certain device. Typically they are receiving the ON/OFF status of a switch on the dryer.

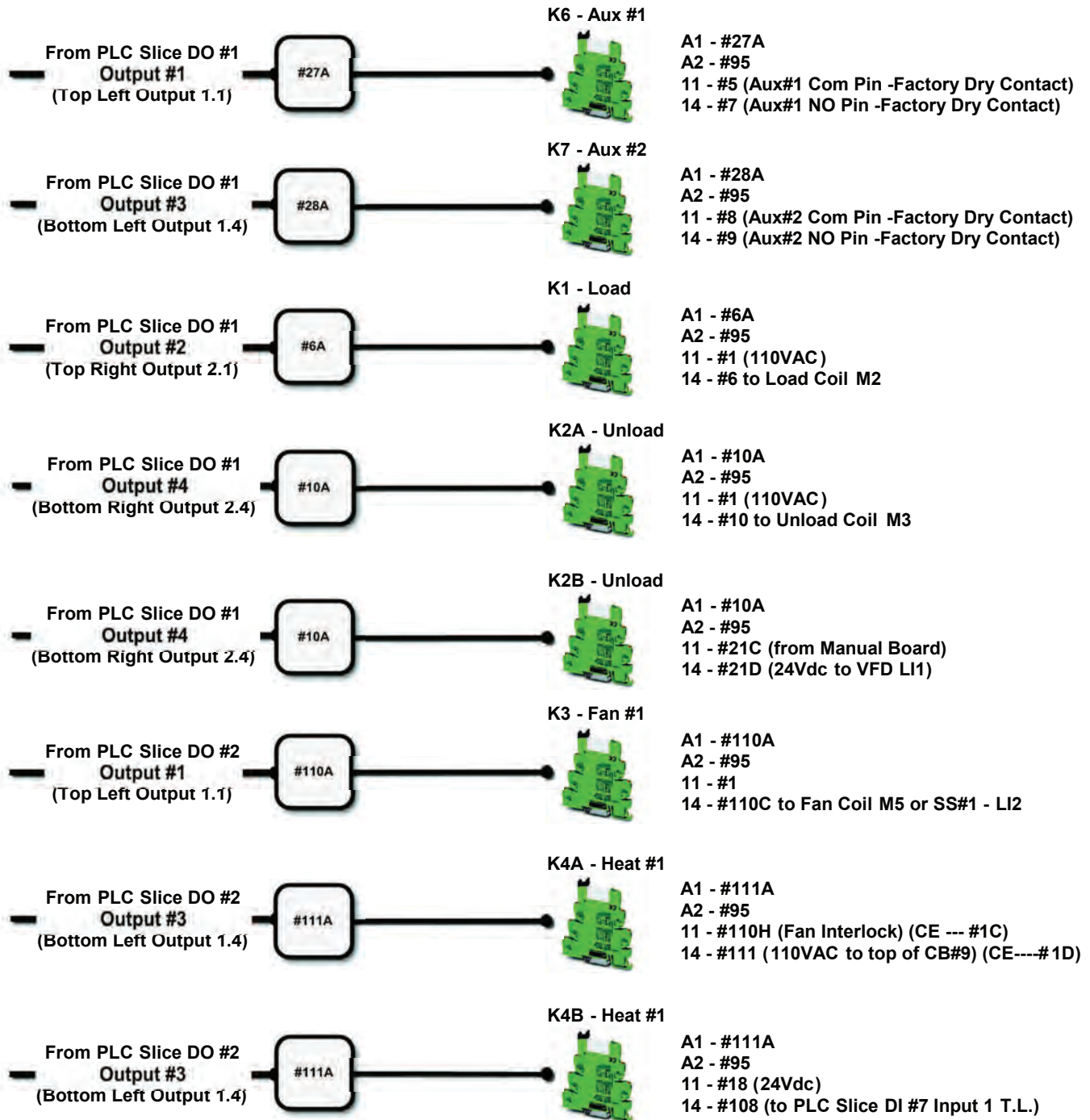
Title: PORTABLE DRYER: Digital Input Slice #2	
Author: SUKUP MFG CO - MRK	
Date: 03/15	Sheet: 101.10
Revision: 6/6/2017 - DWS (1)	

24VDC PLC Relay



Title: PORTABLE DRYER: PLC Relays	
Author: SUKUP MFG CO - MRK	
Date: 3/15	Sheet: 101.11
Revision:	

1-6 Fan PLC Relay Wiring



Title: PORTABLE DRYER: PLC Relay Wiring	
Author: SUKUP MFG CO - MRK	
Date: 3/15	Sheet: 101.12
Revision: 6/7/2017 - DWS (1)	

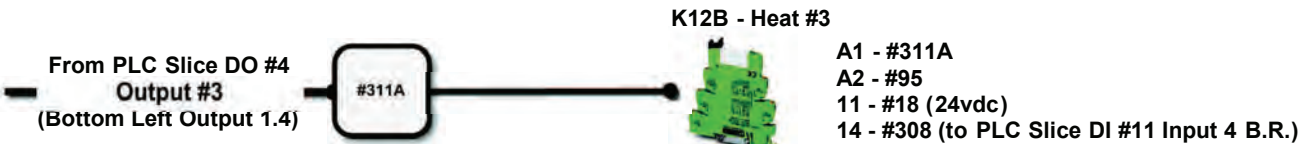
1-6 Fan PLC Relay Wiring



1 Fan - Stop Here



2 Fan - Stop Here



3 Fan - Stop Here

Title: PORTABLE DRYER: PLC Relay Wiring

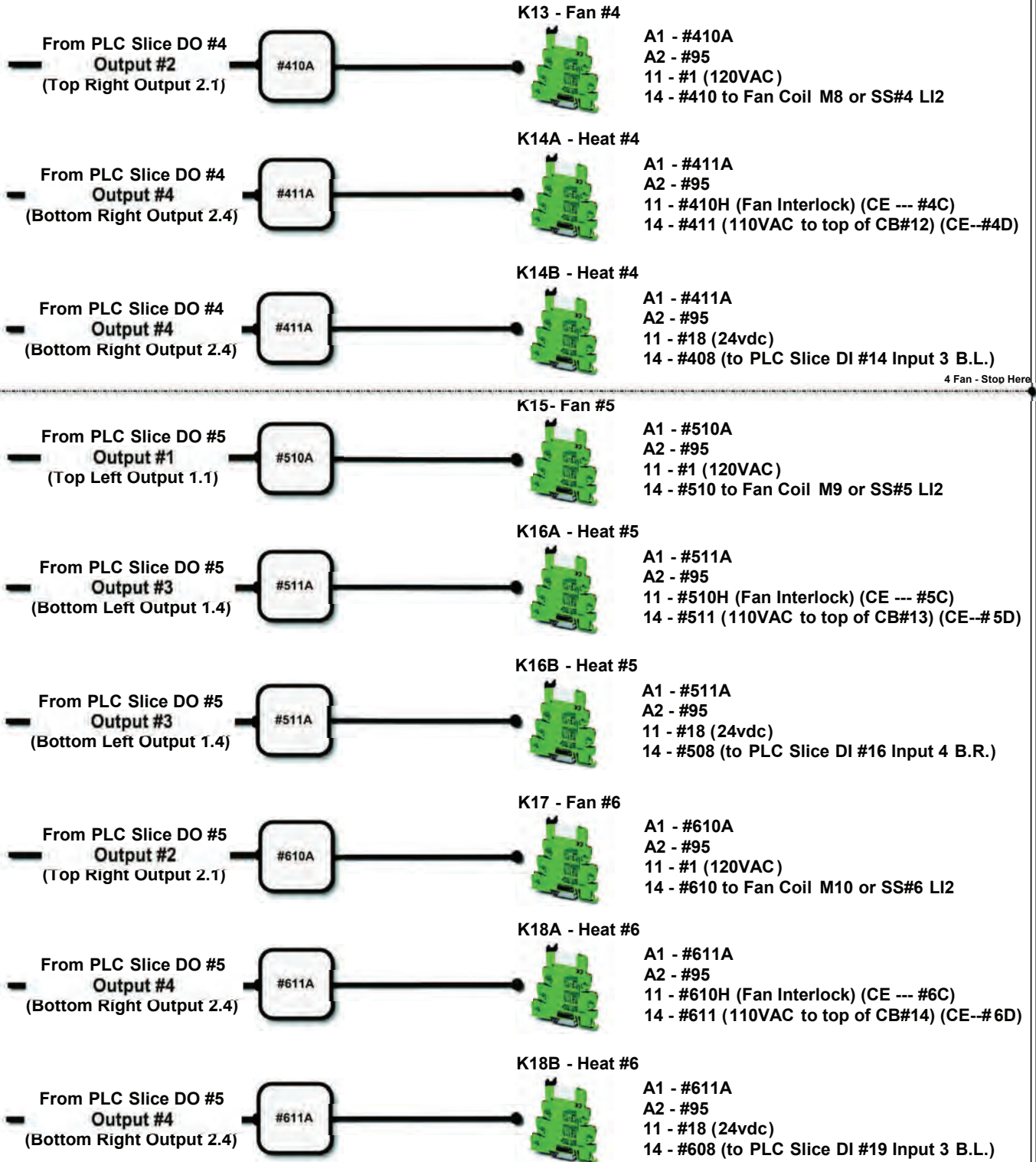
Author: SUKUP MFG CO - MRK

Date: 3/15

Sheet: 101.13

Revision:

1-6 Fan PLC Relay Wiring



Title: PORTABLE DRYER: PLC Relay Wiring

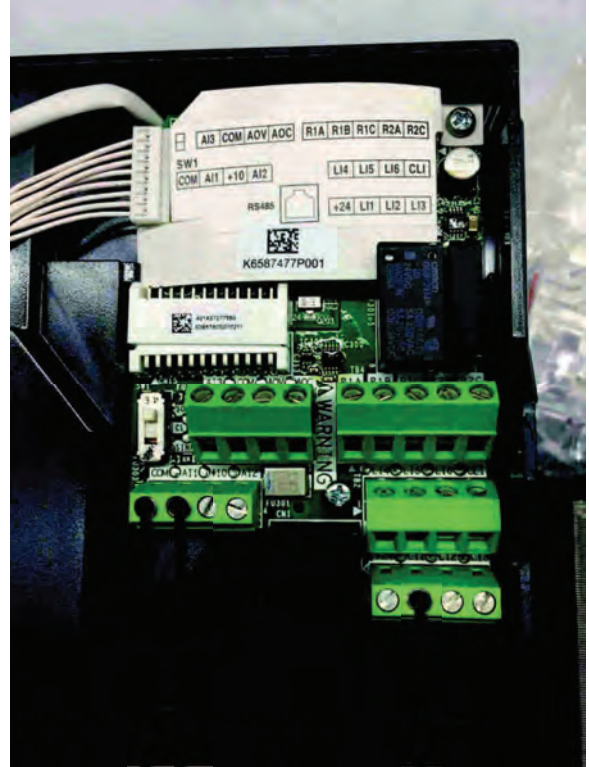
Author: SUKUP MFG CO - MRK

Date: 3/15

Sheet: 101.14

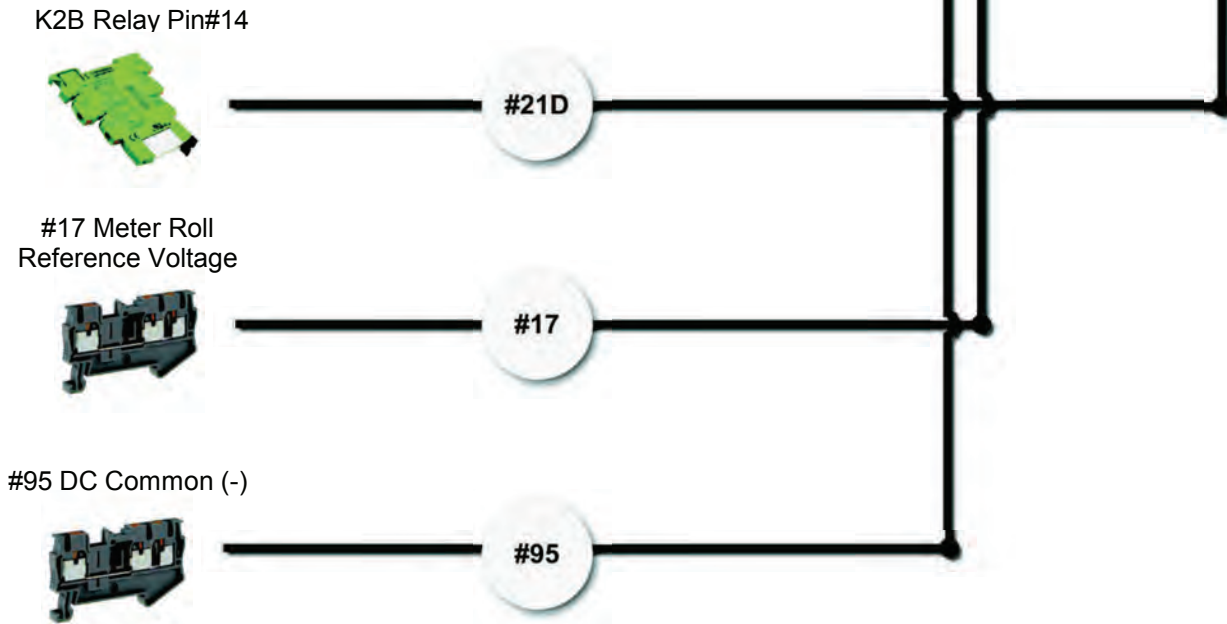
Revision:

Altivar 312 VFD Control Wiring



Wiring Pinout

- #95 Black ----- COM
- #17 Gray ----- AI1
- #21D Blue ----- LI1



Title: PORTABLE DRYER: VFD Control Wiring
ATV312

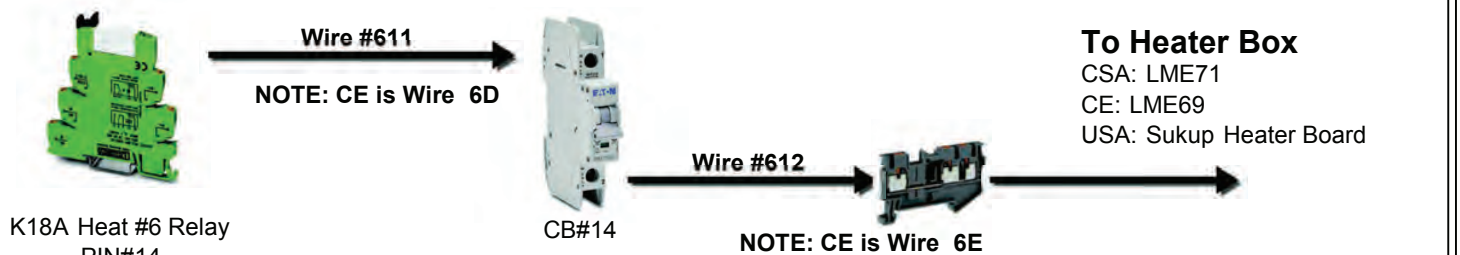
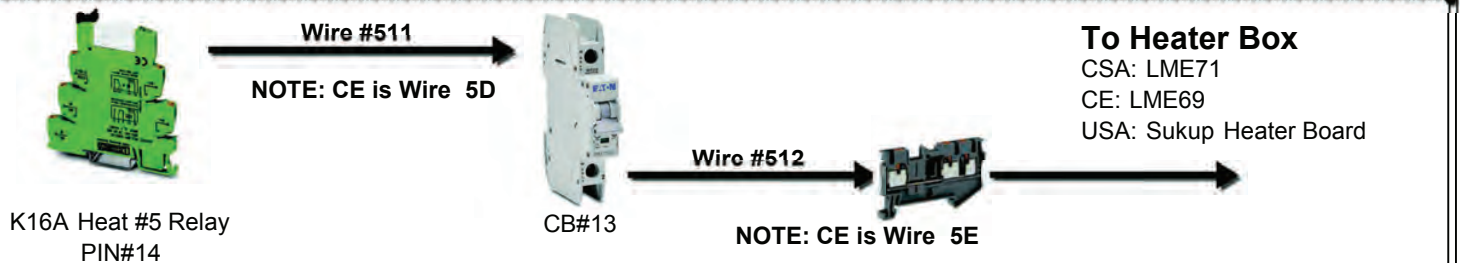
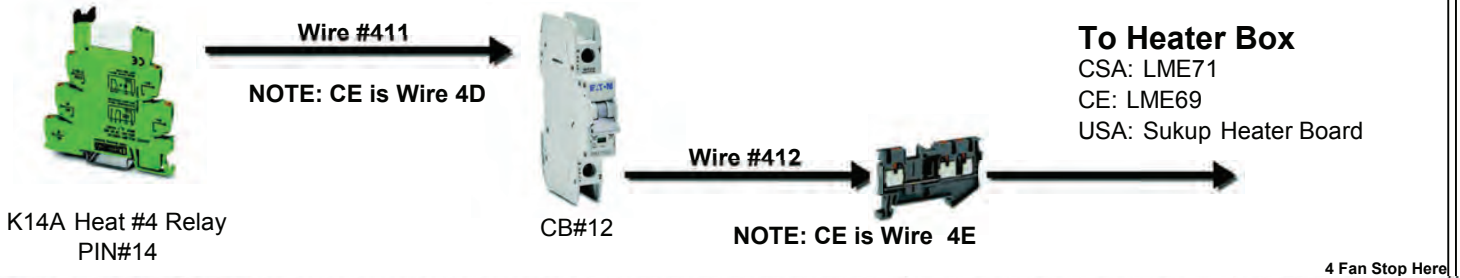
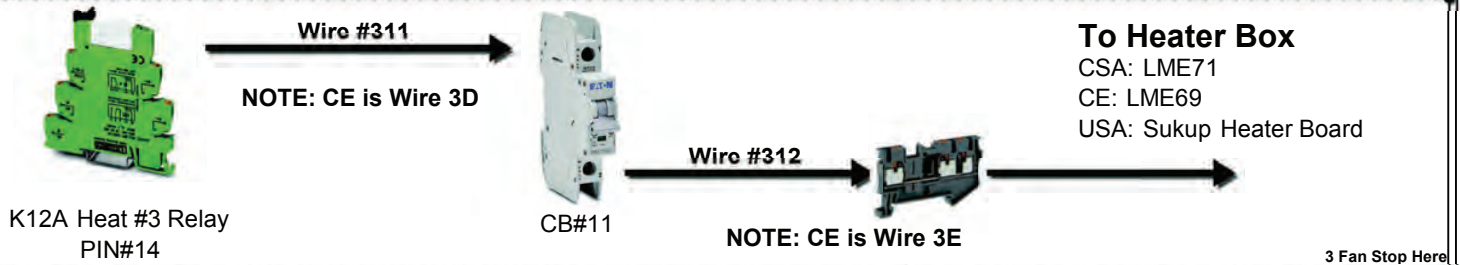
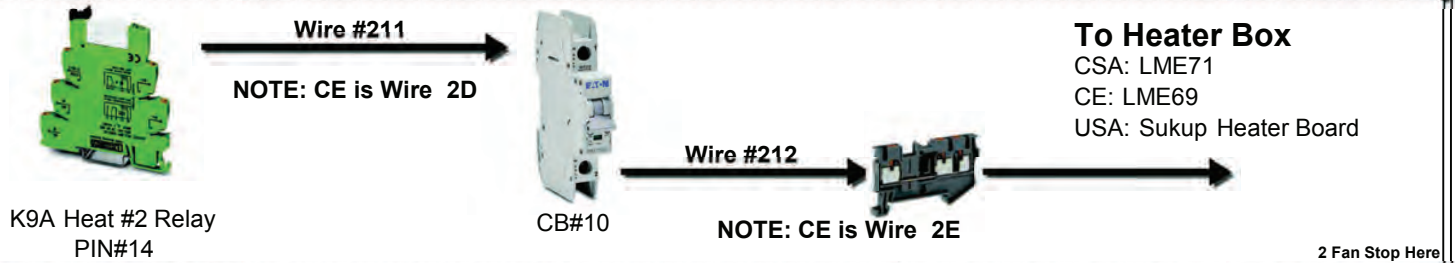
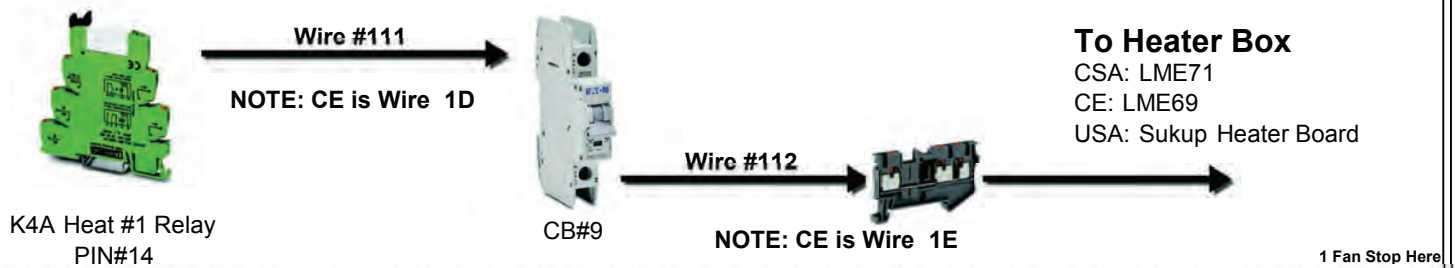
Author: SUKUP MFG CO - MRK

Date: 03/15

Revision:

101.15

Heater Relay and Heater Breaker Wiring



Title: PORTABLE DRYER: Heater Breaker Wiring

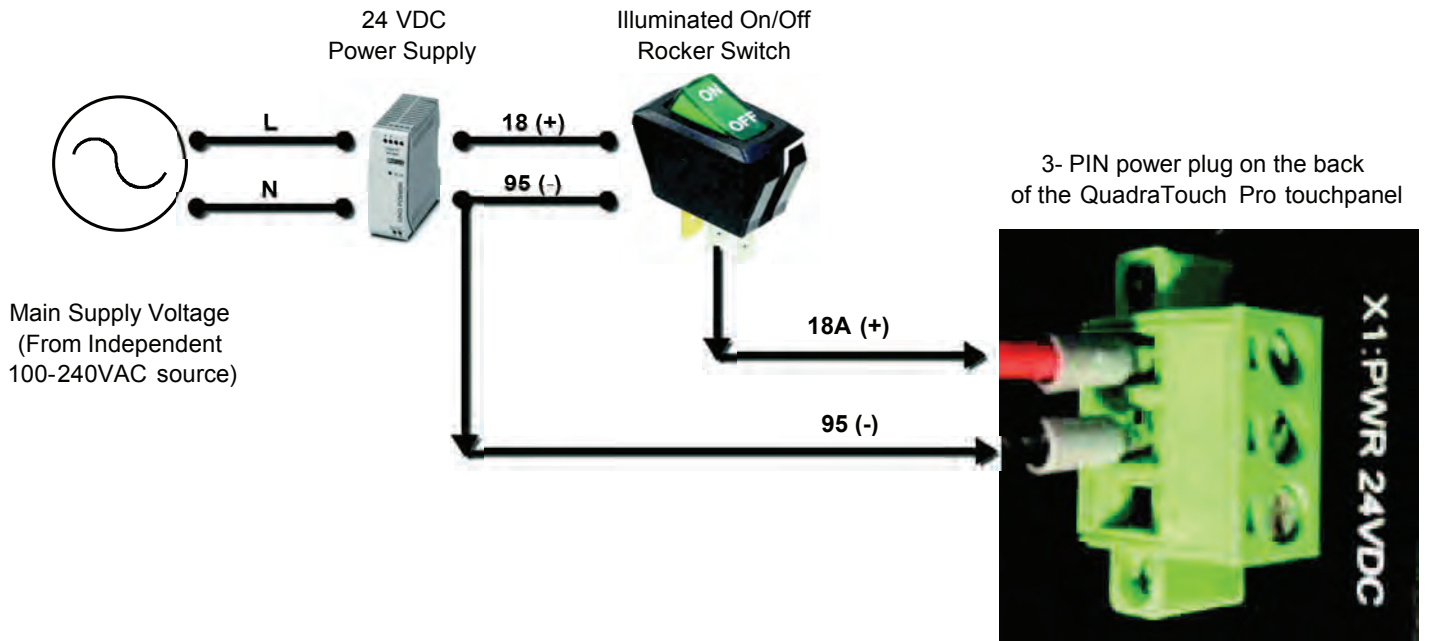
Author: SUKUP MFG CO - MRK

Date: 03/15

Sheet: 101.16

Revision:

2016 QuadraTouch Pro™ Wiring



Title: T23476/U23476: QuadraTouch Pro™ Wiring

Author: SUKUP MFG CO - MRK

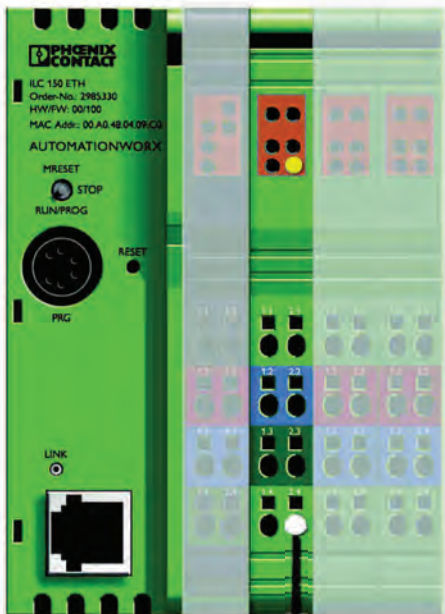
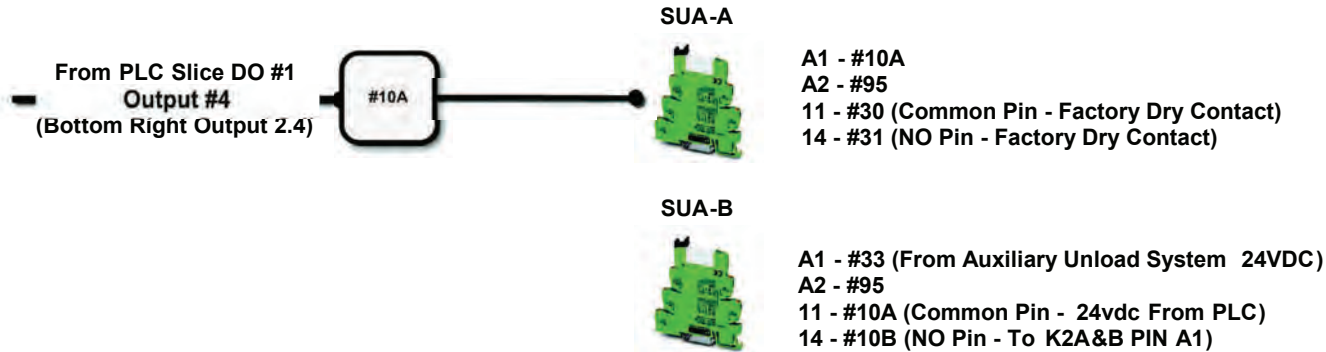
Date: 10/15

Sheet: 101.17

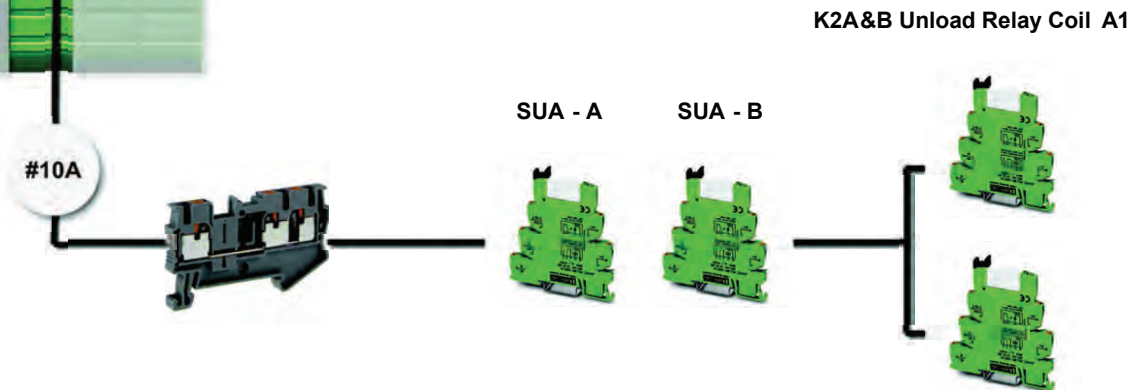
Revision:

SUA Relay Wiring

The SUA (special unload auxiliary) relays A&B are used to turn on an auxiliary unloading system before the dryer's unload system starts discharging grain.

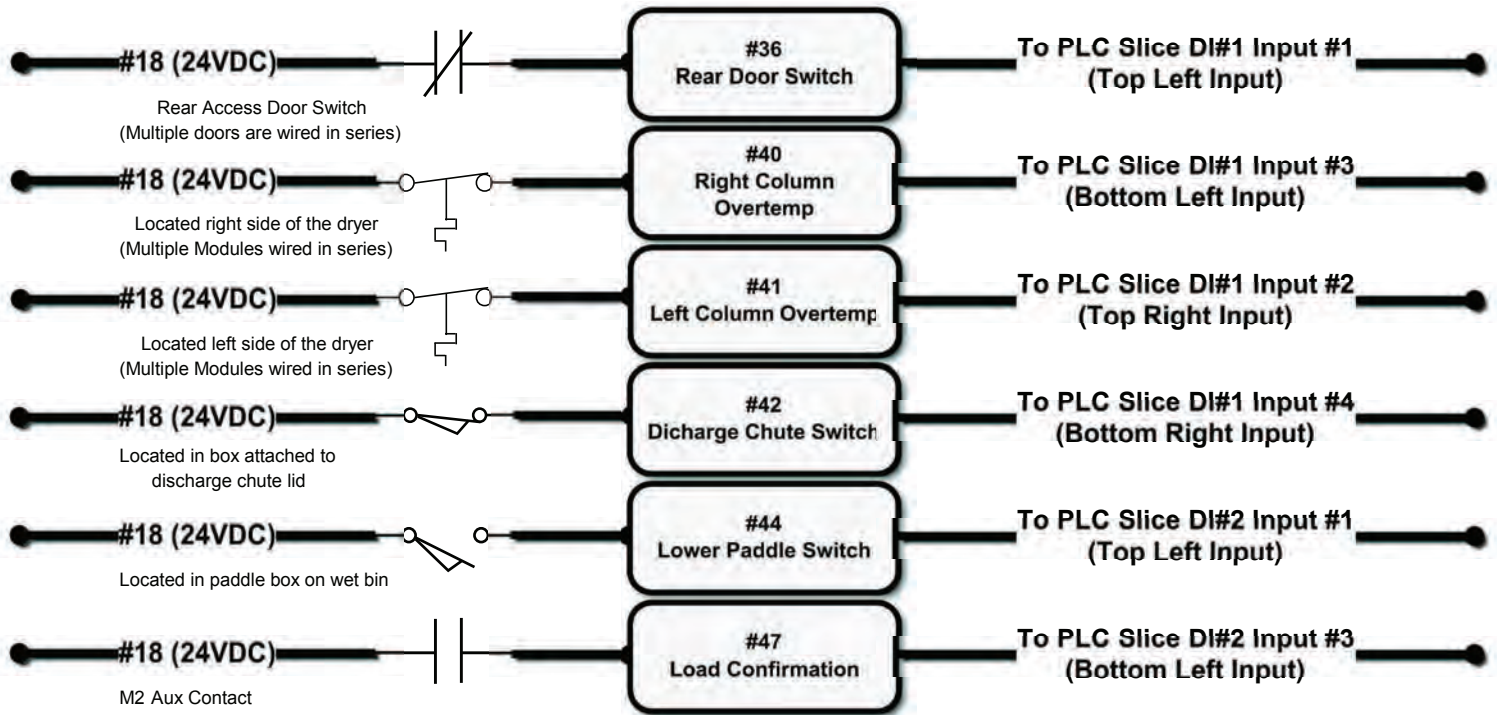
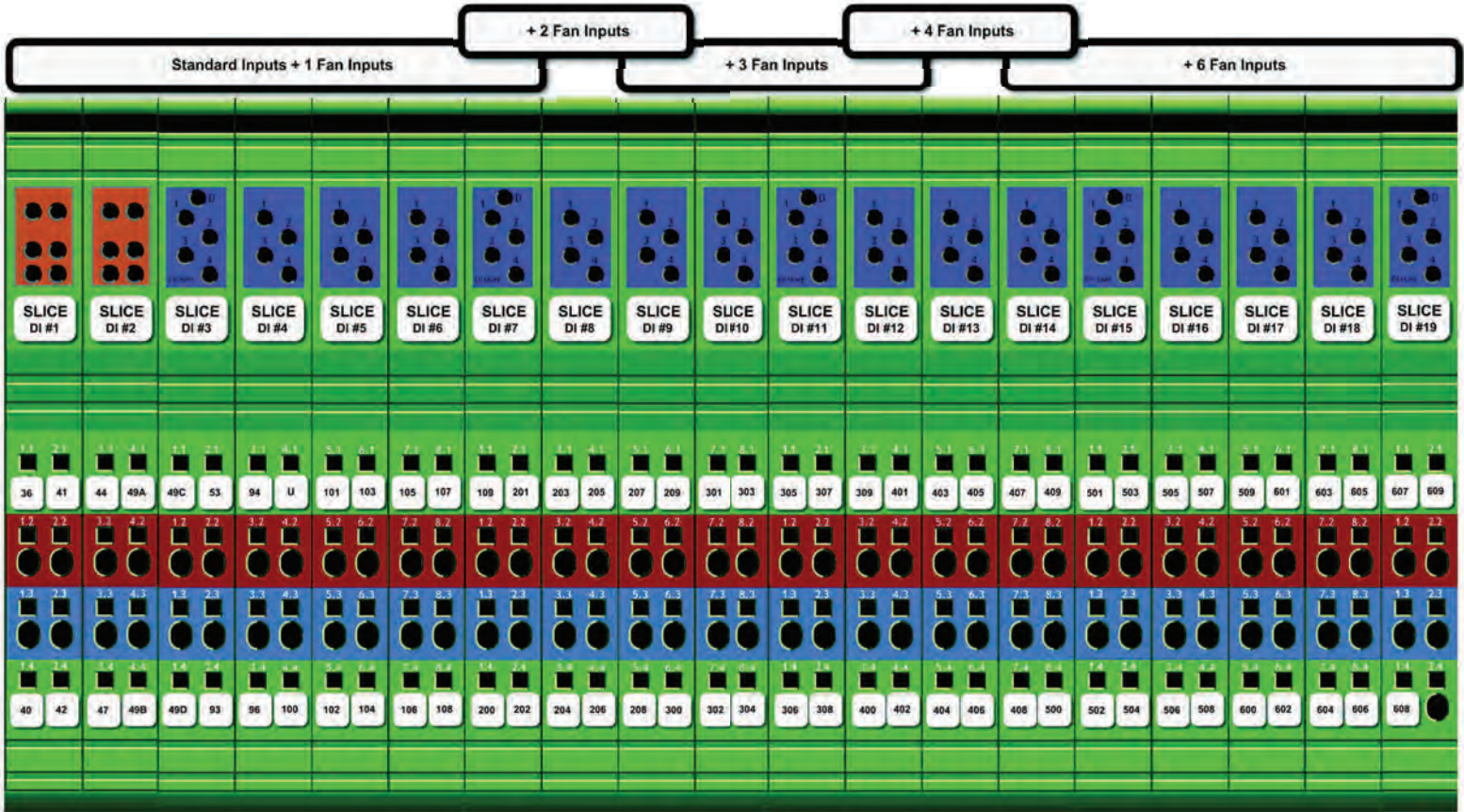


The Output 10A from the PLC energizes the SUA-A, A1 coil. Wire 30 is connected to wire 31 (factory dry contact). This is the "GO" command for the auxiliary unloading system. This system needs to close a contact (wires 32 & 33) when it's ready for the dryer to unload in to the auxiliary unload system. Wire 32 is supplied with 24vdc from Sukup Manufacturing. When 32 and 33 are connected together (by a contact on the auxiliary unload system) it will energize SUA - B which will start the dryer's unload system.



Title: PORTABLE DRYER: SUA Relay Wiring	
Author: SUKUP MFG CO - MRK	
Date: 10/15	Sheet: 101.18
Revision:	

PLC Digital Inputs 1-6 Fan



Title: PORTABLE DRYER: Digital Input Line Diagram

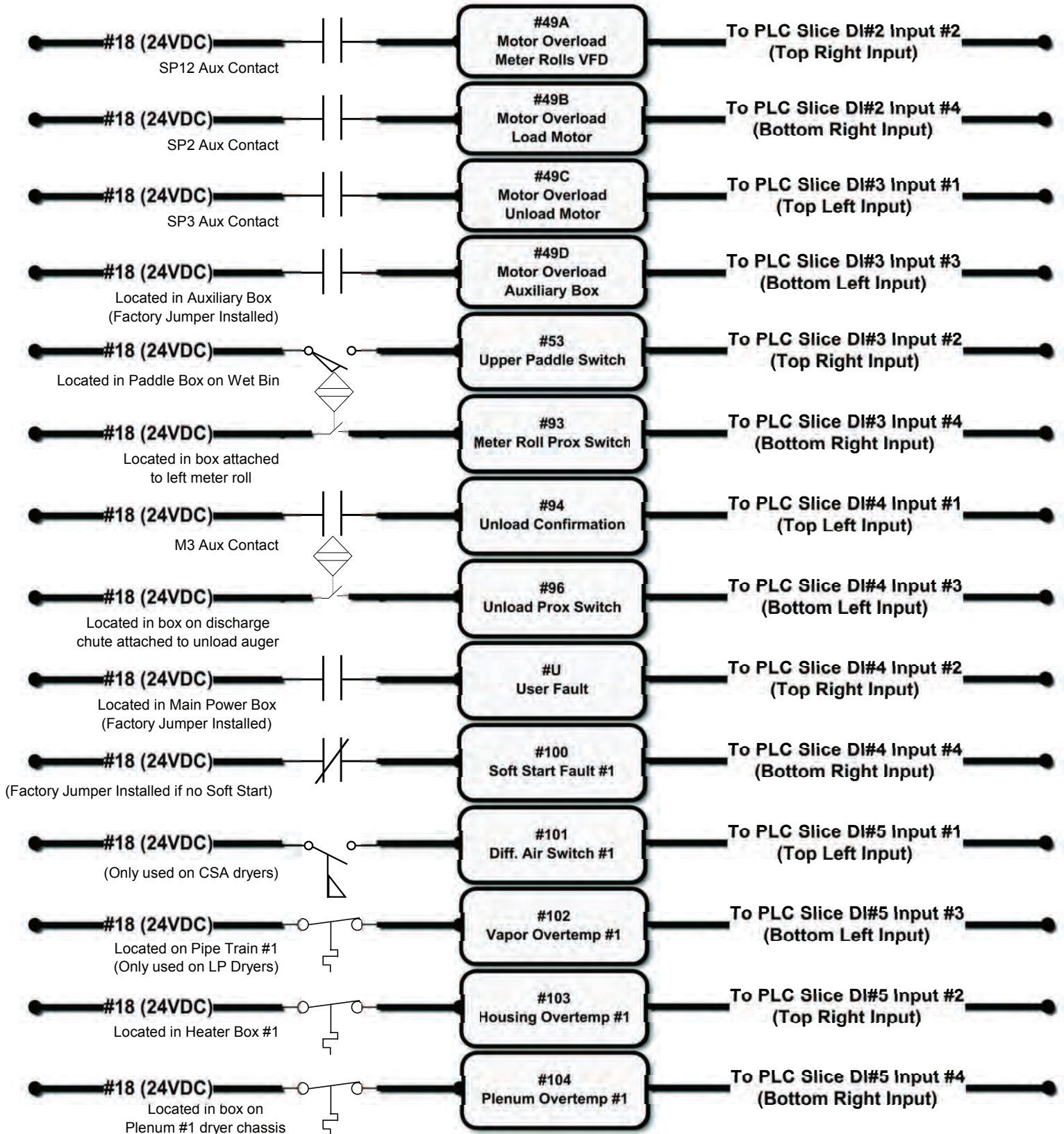
Author: SUKUP MFG CO - MRK

Date: 03/15

Sheet: 102.1

Revision: 6/7/2017 - DWS (1)

PLC Digital Inputs 1-6 Fan



Title: PORTABLE DRYER: Digital Input Line Diagram

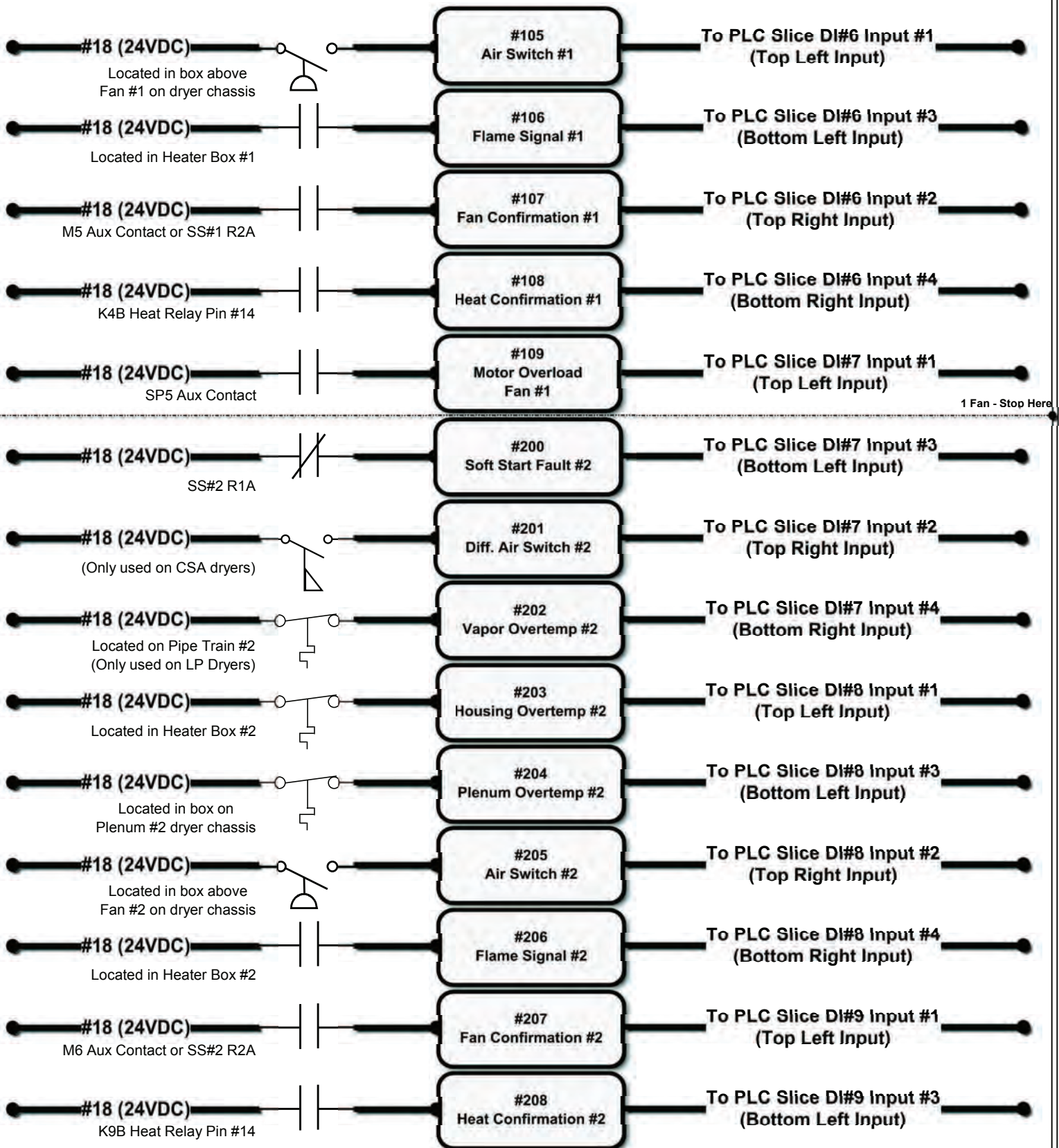
Author: SUKUP MFG CO - MRK

Date: 03/15

Sheet: 102.2

Revision: 8/23/2017 - DWS (2)

PLC Digital Inputs 1-6 Fan



1 Fan - Stop Here

Title: PORTABLE DRYER: Digital Input Line Diagram

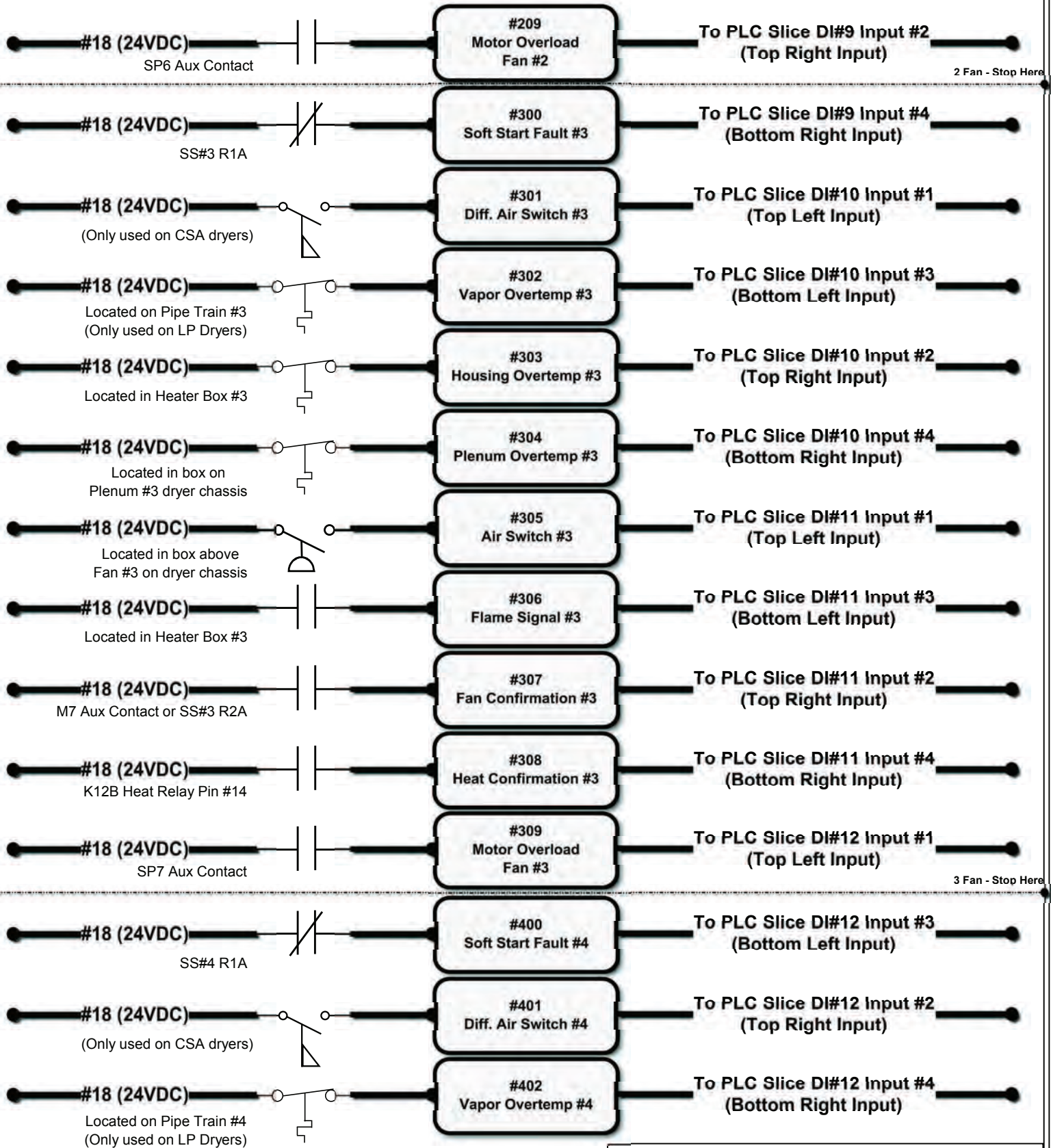
Author: SUKUP MFG CO - MRK

Date: 03/15

Sheet: 102.3

Revision: 8/23/2017 - DWS (2)

PLC Digital Inputs 1-6 Fan



Title: PORTABLE DRYER: Digital Input Line Diagram

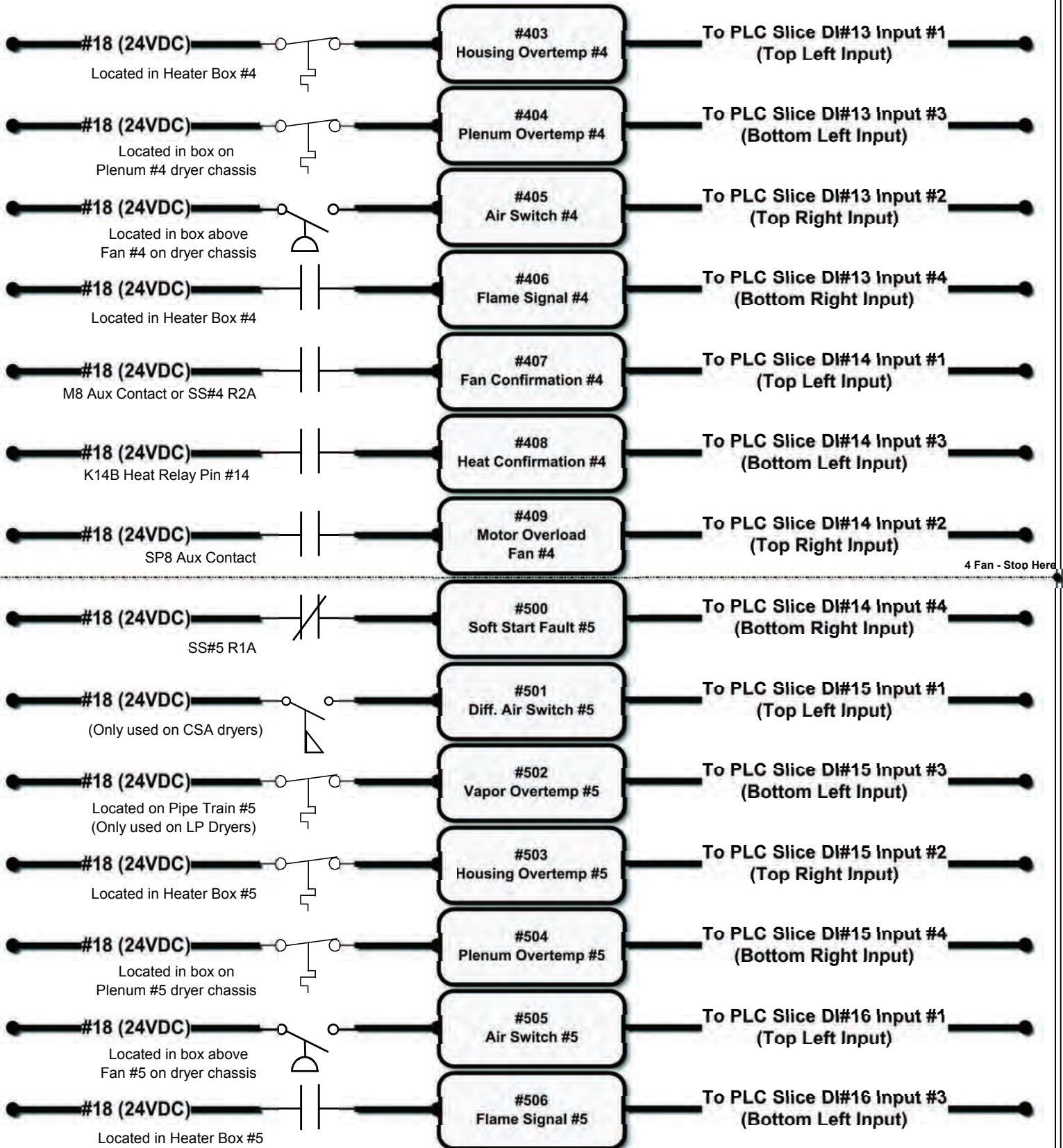
Author: SUKUP MFG CO - MRK

Date: 03/15

Sheet: 102.4

Revision: 6/7/2017 - DWS (1)

PLC Digital Inputs 1-6 Fan



4 Fan - Stop Here

Title: PORTABLE DRYER: Digital Input Line Diagram

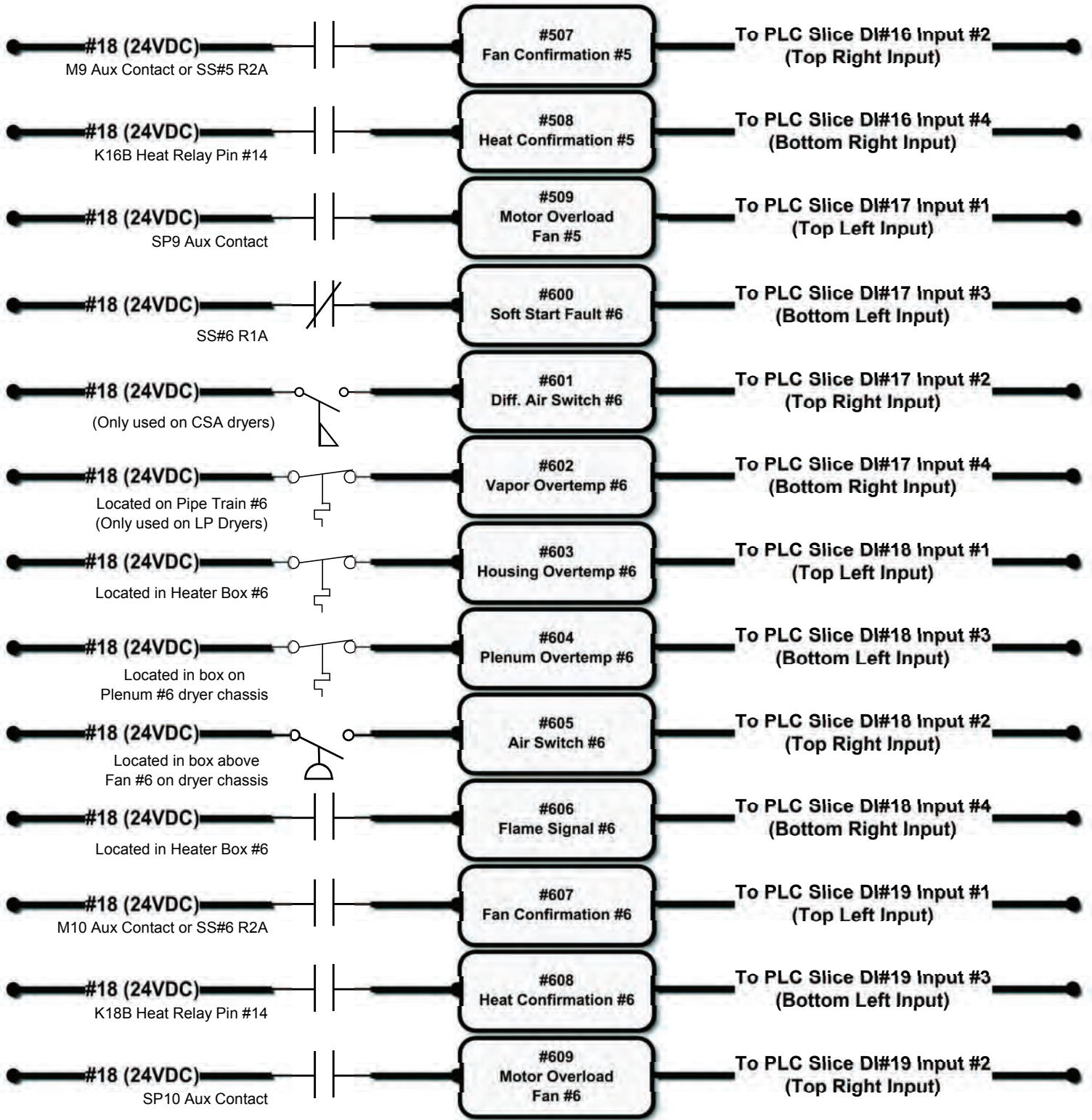
Author: SUKUP MFG CO - MRK

Date: 03/15

Sheet: 102.5

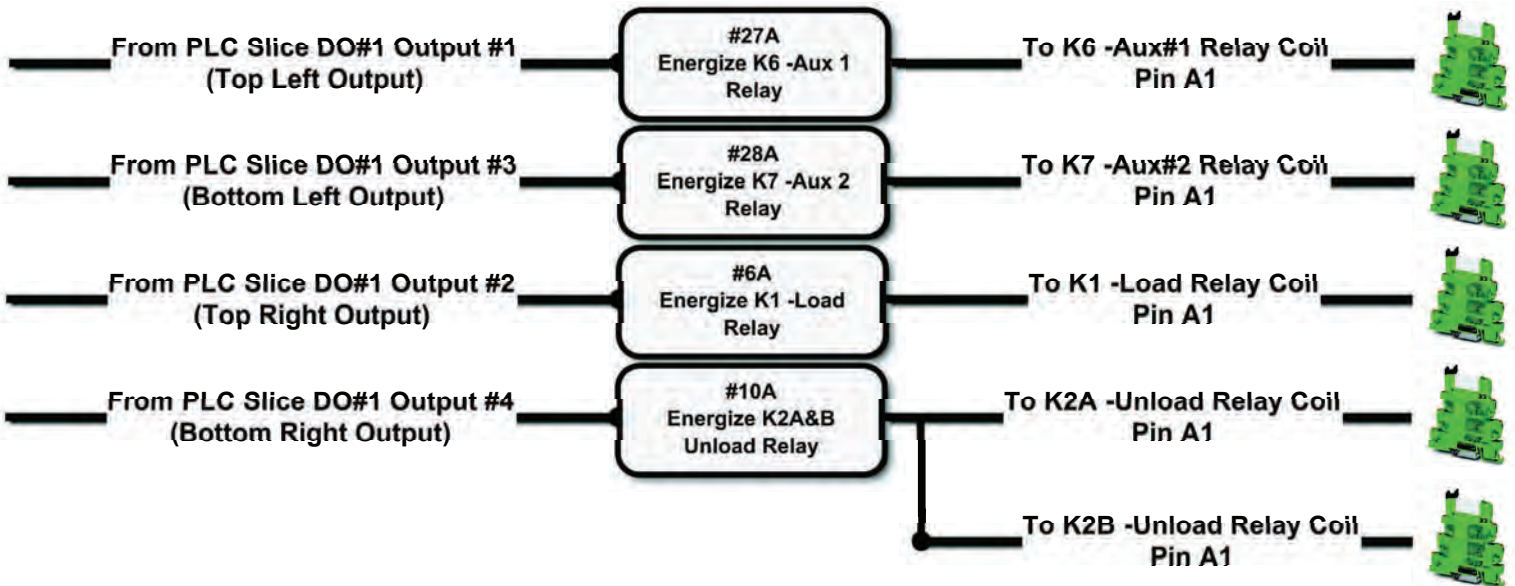
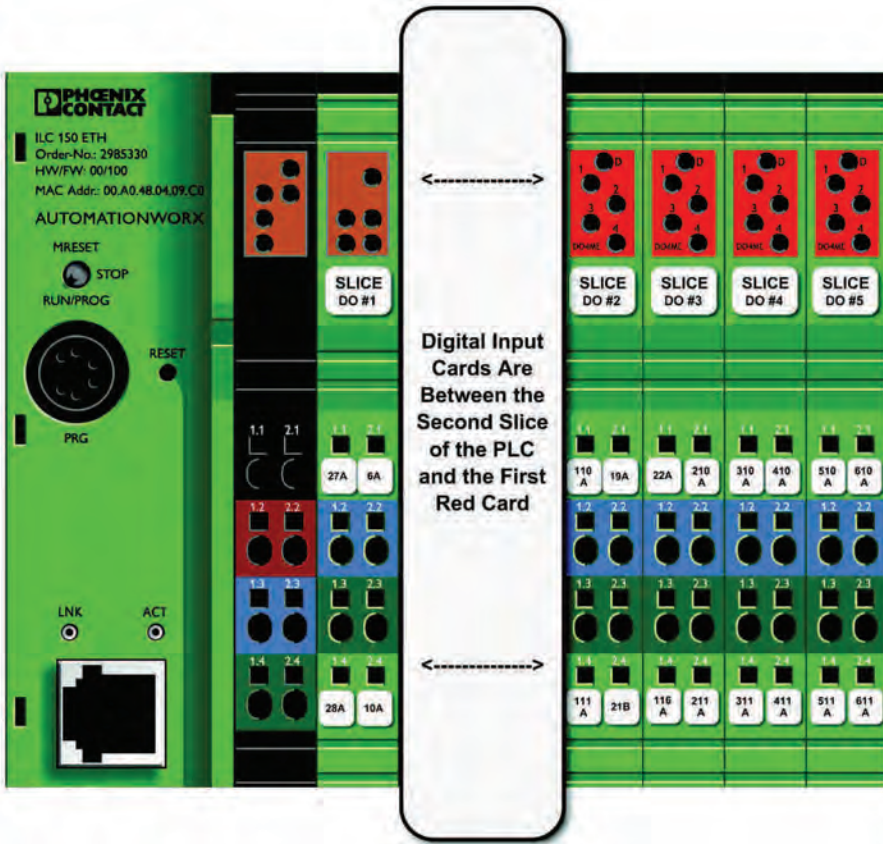
Revision: 6/7/2017 - DWS (1)

PLC Digital Inputs 1-6 Fan



Title: PORTABLE DRYER: Digital Input Line Diagram	
Author: SUKUP MFG CO - MRK	
Date: 03/15	Sheet: 102.6
Revision: 6/7/2017 - DWS (1)	

PLC Digital Outputs 1-6 Fan



Title: PORTABLE DRYER: Digital Output Line Diagram

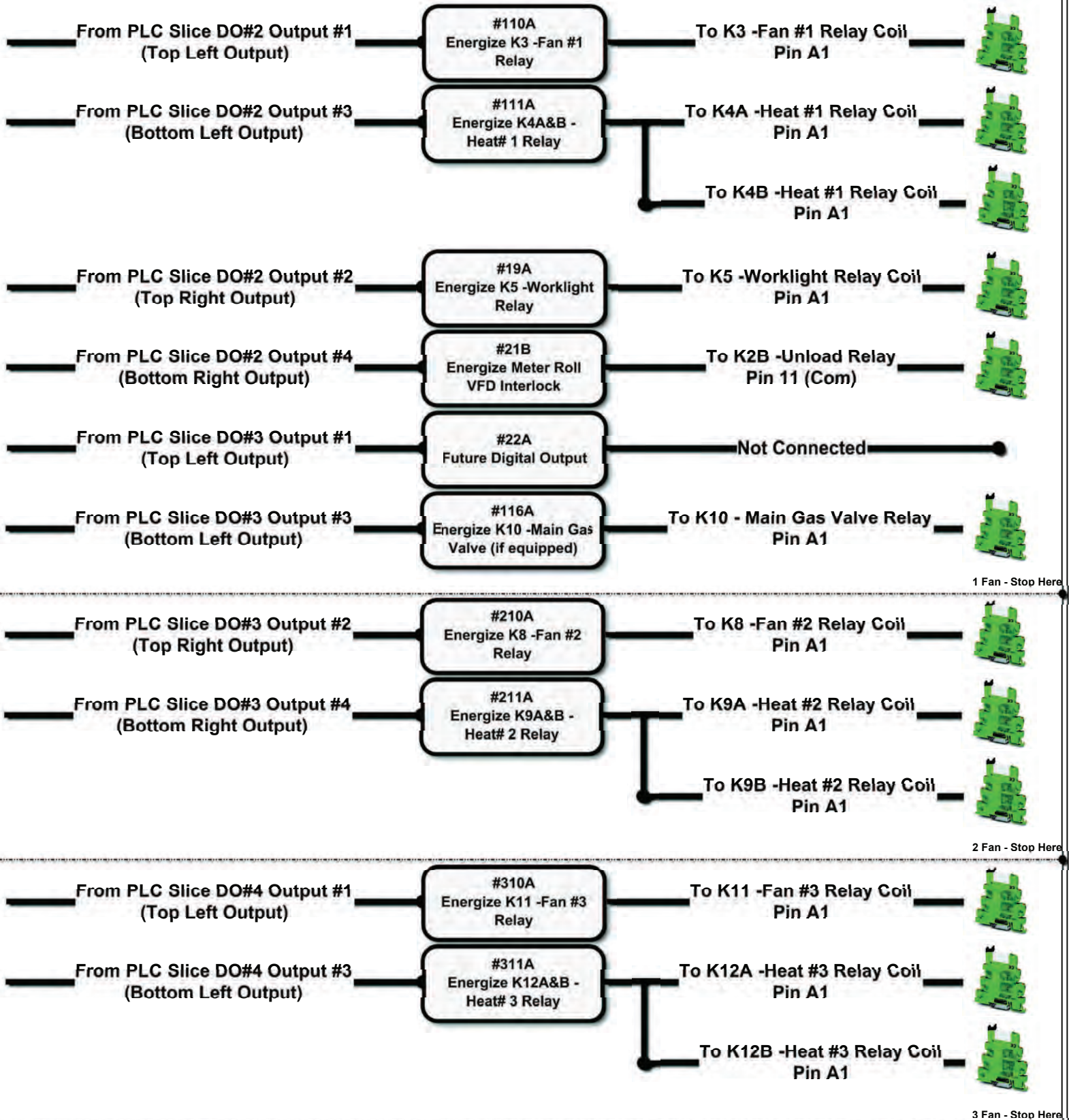
Author: SUKUP MFG CO - MRK

Date: 03/15

Sheet: 103.1

Revision:

PLC Digital Outputs 1-6 Fan



1 Fan - Stop Here

2 Fan - Stop Here

3 Fan - Stop Here

Title: PORTABLE DRYER: Digital Output Line Diagram

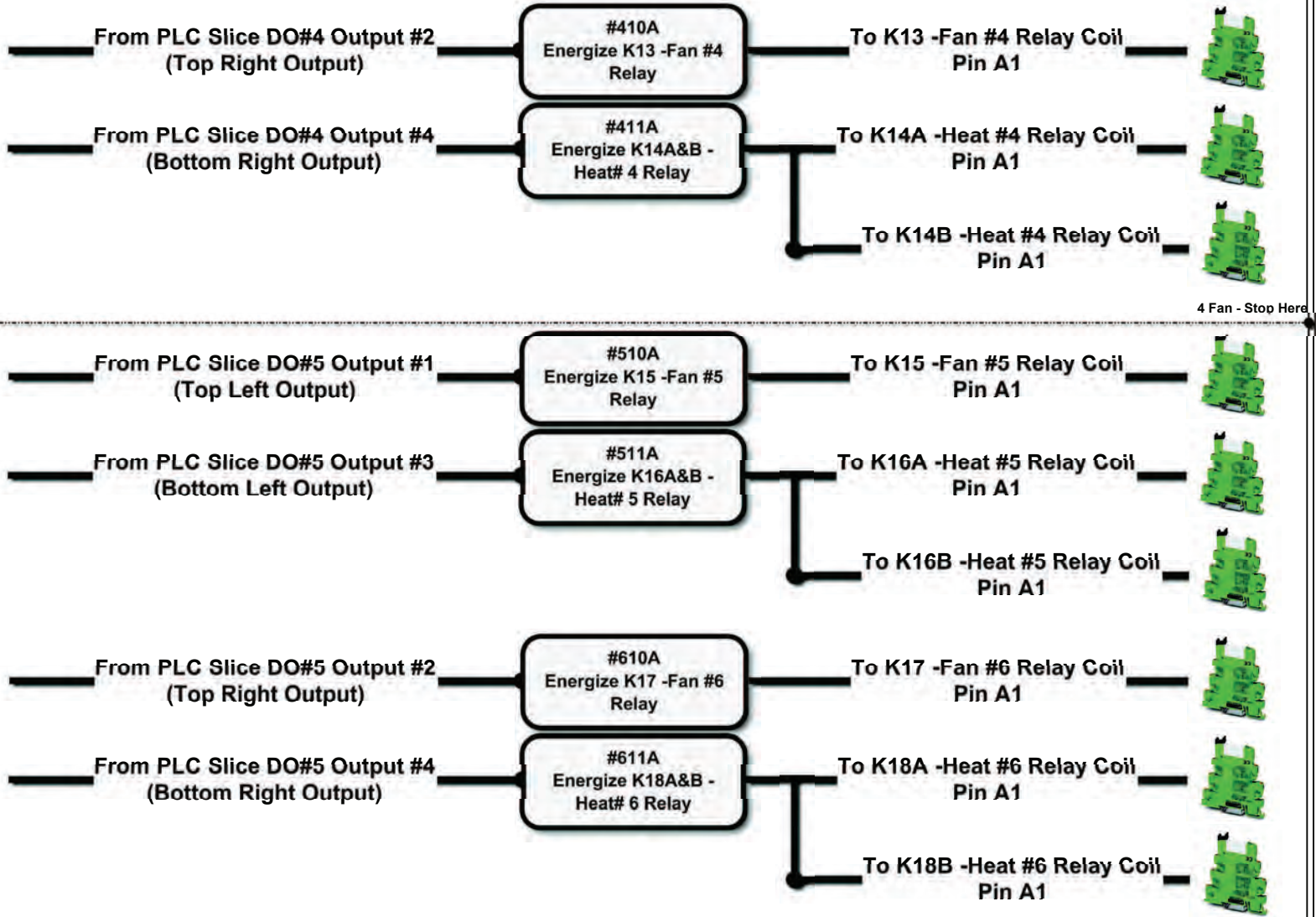
Author: SUKUP MFG CO - MRK

Date: 03/15

Sheet: 103.2

Revision:

PLC Digital Outputs 1-6 Fan



Title: PORTABLE DRYER: Digital Output Line Diagram

Author: SUKUP MFG CO - MRK

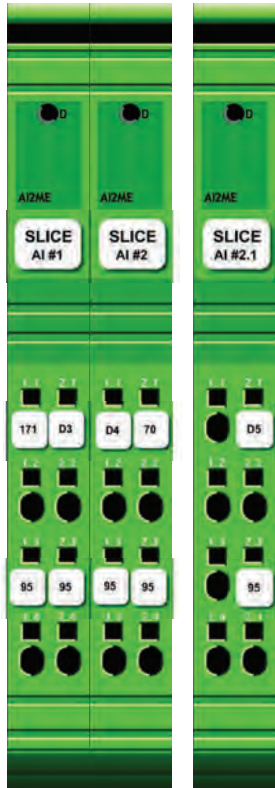
Date: 03/15

Sheet: 103.3

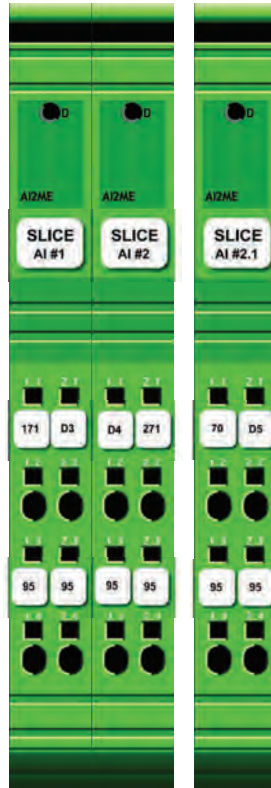
Revision:

PLC Analog Inputs 1-6 Fan

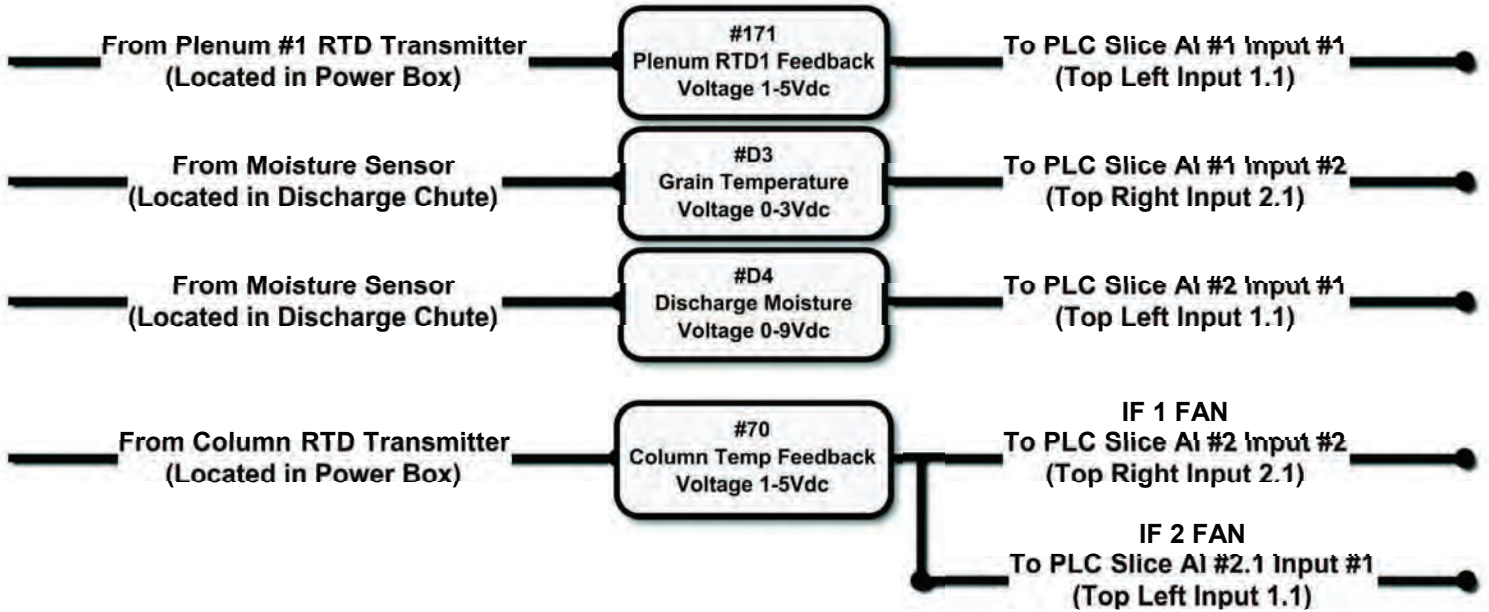
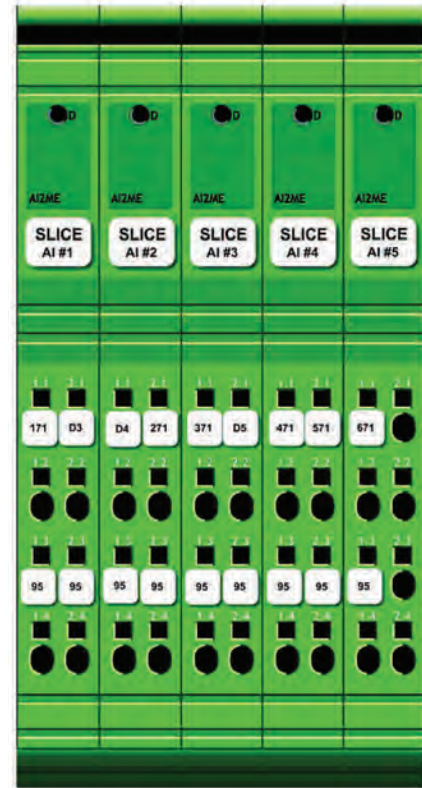
1 Fan



2 Fan



3-6 Fan



1 Fan without 2.1 (Input MST Sensor) - Stop Here

Title: PORTABLE DRYER: Analog Input Line Diagram

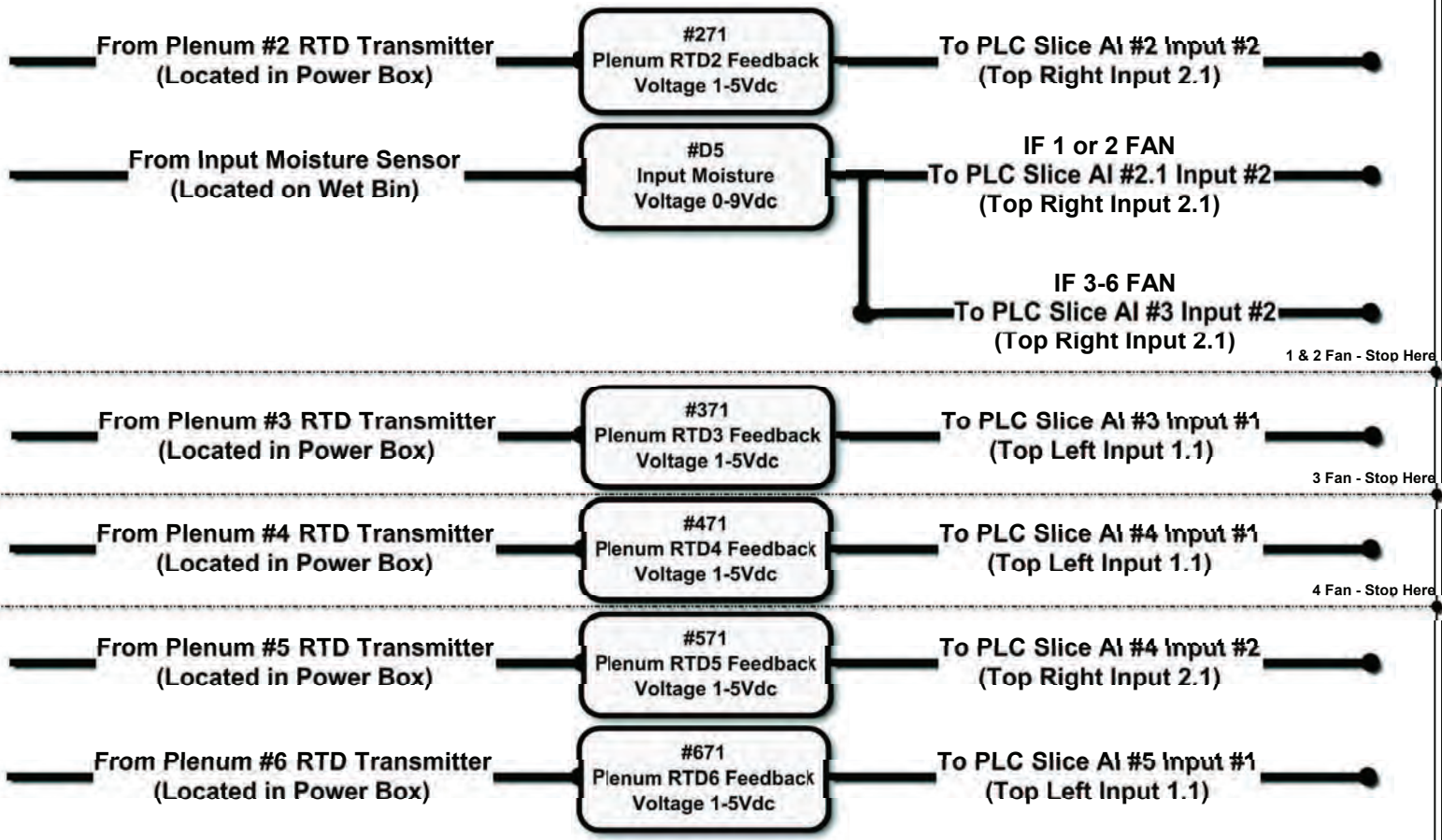
Author: SUKUP MFG CO - MRK

Date: 03/15

Sheet: 104.1

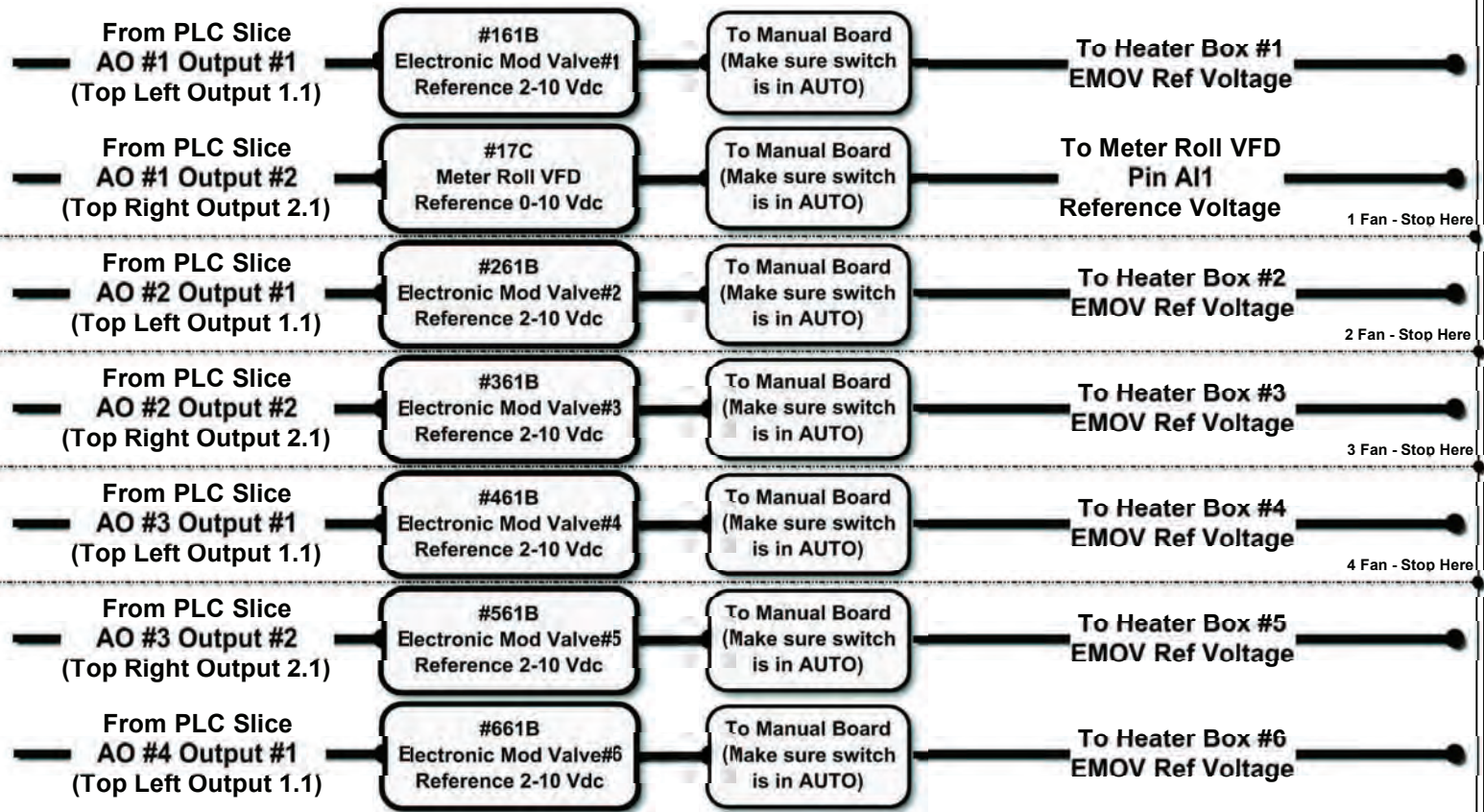
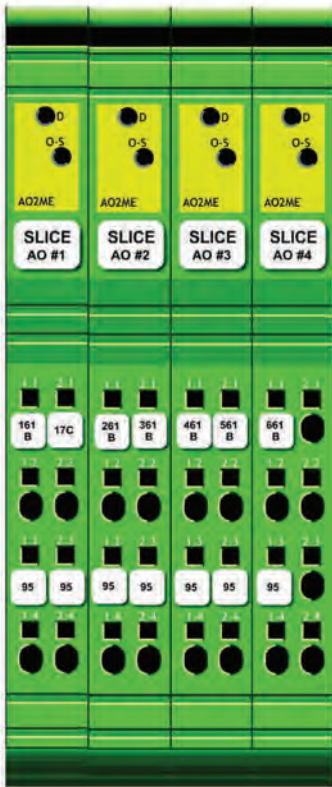
Revision:

PLC Analog Inputs 1-6 Fan



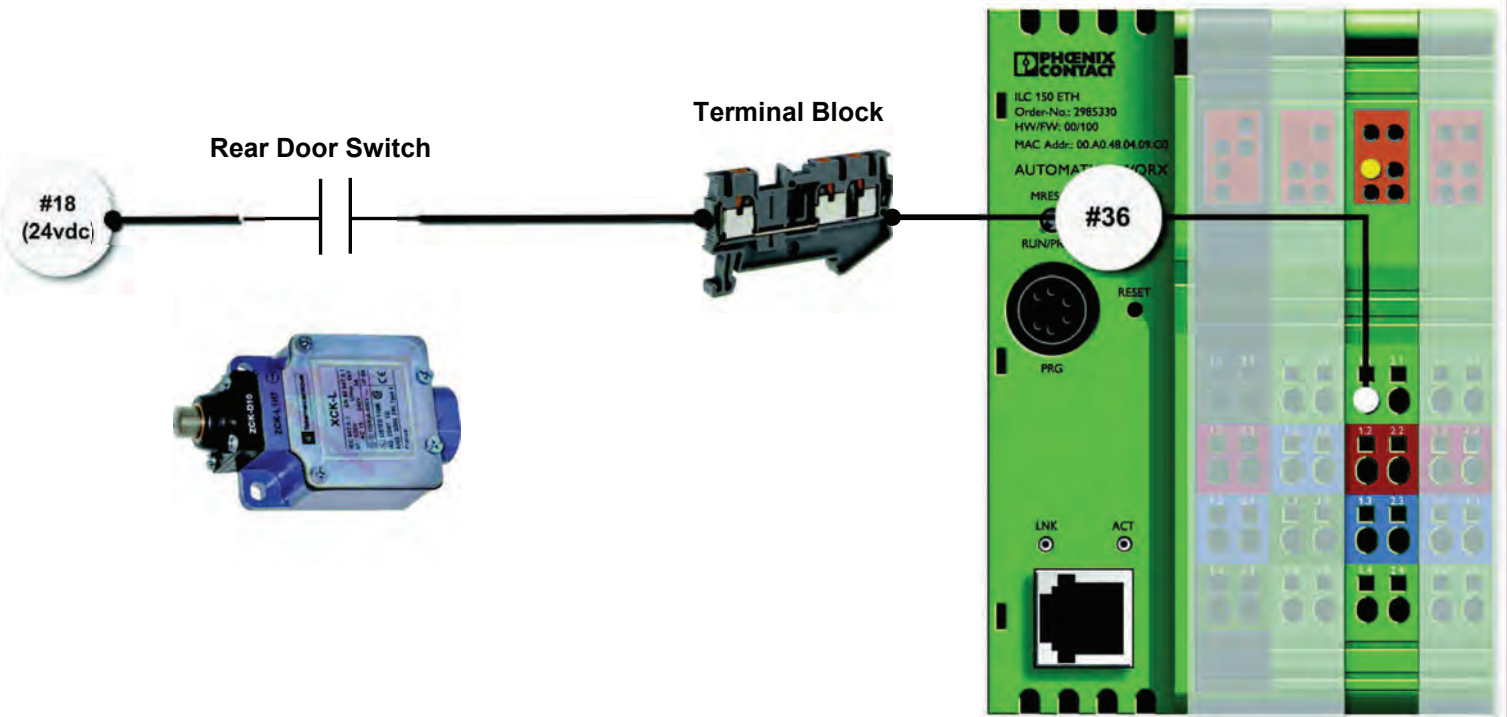
Title: PORTABLE DRYER: Analog Input Line Diagram	
Author: SUKUP MFG CO - MRK	
Date: 03/15	Sheet: 104.2
Revision:	

PLC Analog Outputs 1-6 Fan



Title: PORTABLE DRYER: Analog Input Line Diagram	
Author: SUKUP MFG CO - MRK	
Date: 03/15	Sheet: 105.1
Revision:	

Rear Door Circuit #36



The Rear Door Switch circuit starts in the power box. 24vdc is sent to the rear junction box on wire #18. From there, 24vdc is sent to the rear door switch. When the switch is depressed, it completes the circuit and sends 24vdc back to the rear junction box on wire #36. From there, wire #36 goes back to the power box, and into the PLC on Slice DI #1, input 1 (1.1 top left). If there are multiple door switches on the dryer, they are wired in series before returning #36 to the rear junction box.

Title: PORTABLE DRYER: Rear Door Circuit #36

Author: SUKUP MFG CO - MRK

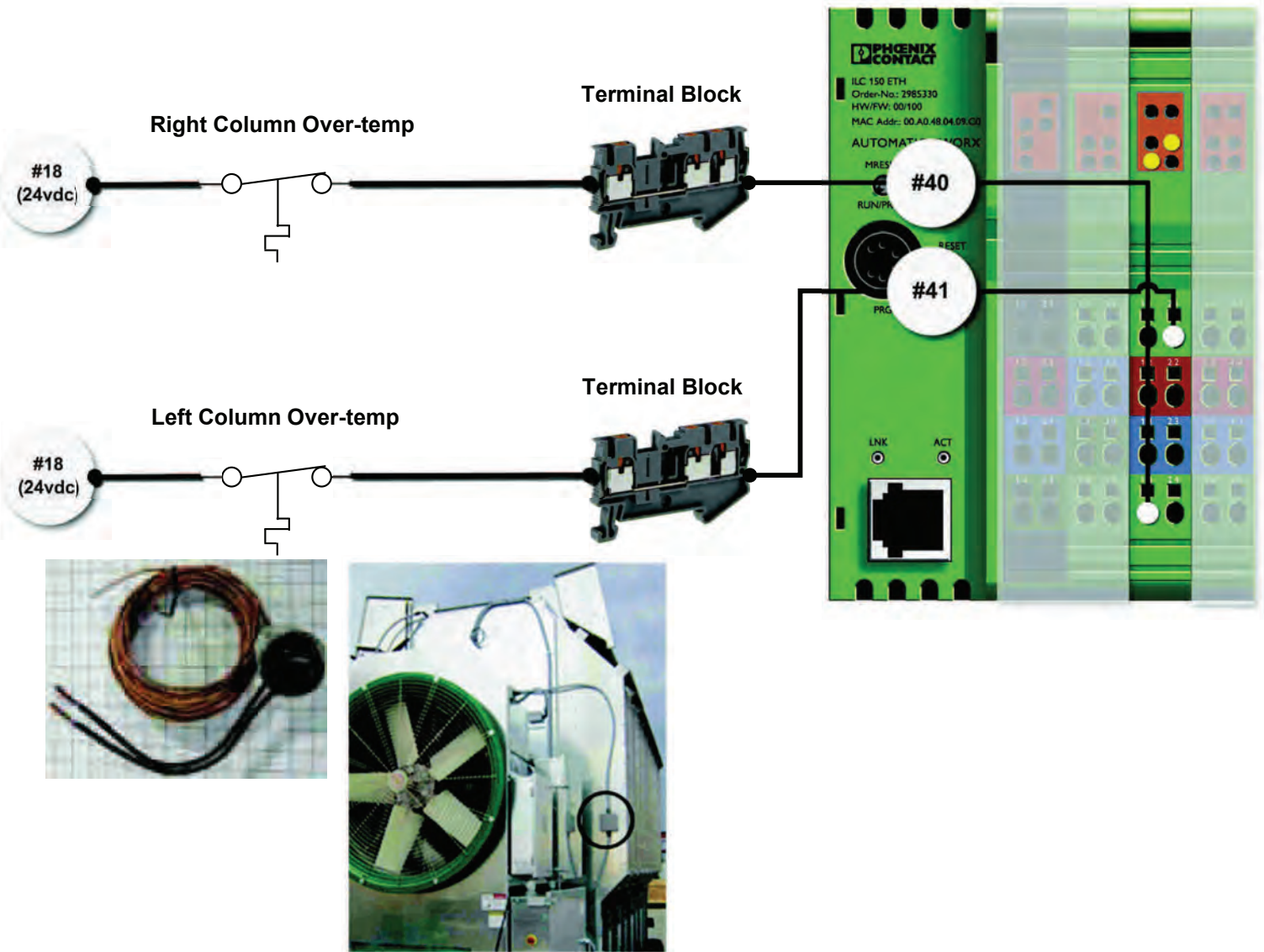
Date: 03/15

Sheet: Rear Door #36

Revision: 6/7/2017 -
DWS (1)

106.1

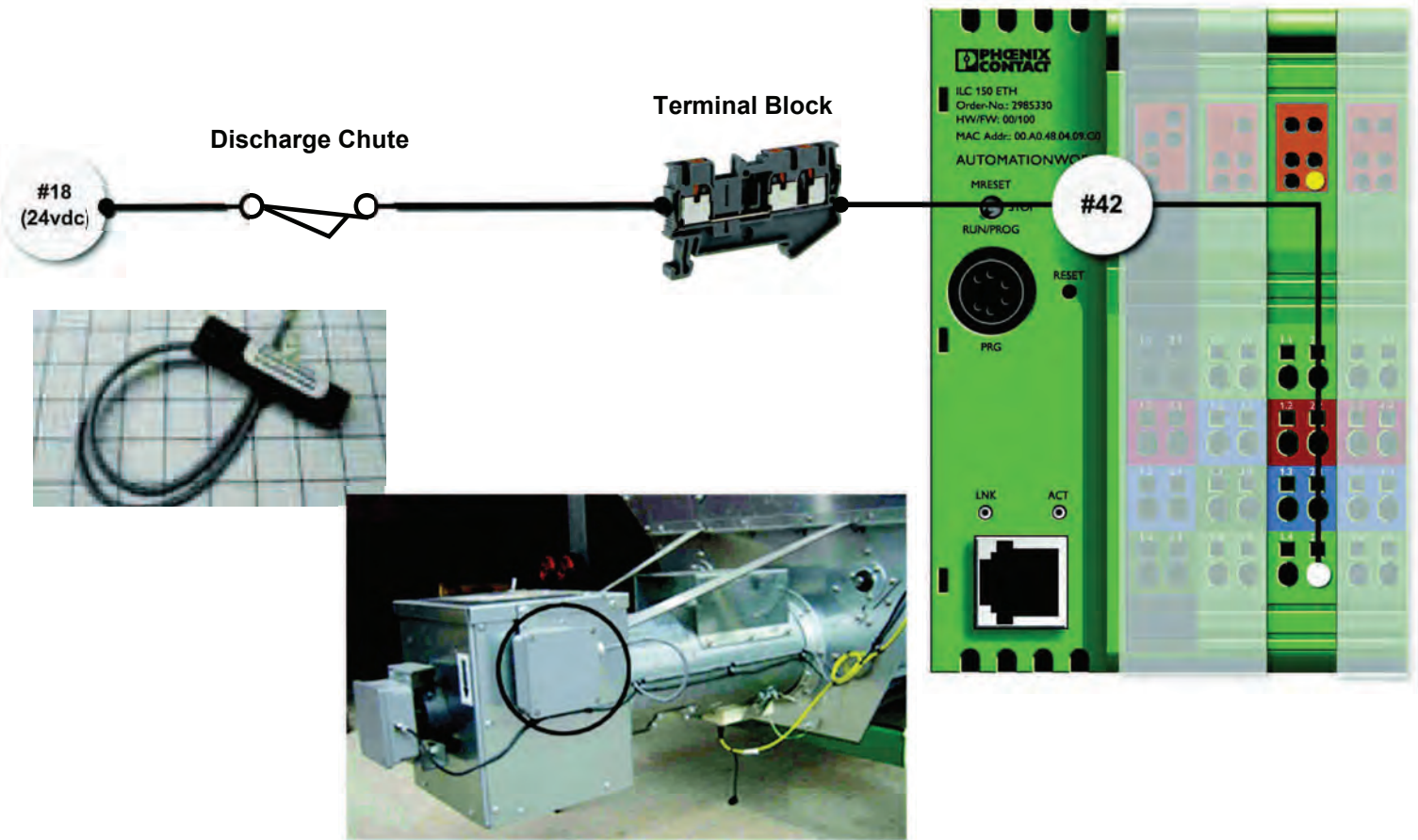
Column High-Limit Circuits #40 and #41



The Right and Left Column High-Limit (Over-temp) Circuits are designed to detect dangerously high temperatures in their respective grain columns. When the column temperature is too high, the switch opens, interrupting the 24vdc back to inputs #40 or #41.

Title: PORTABLE DRYER: Column Overtemp Circuits	
Author: SUKUP MFG CO - MRK	
Date: 03/15	Sheet: Column Overtemp #40, #41
Revision: 6/17 DWS	106.2

Rear Discharge Chute #42



The Rear Discharge Chute Circuit is located on the back of the dryer, directly above the discharge point of grain. Intended to detect the backup of grain, the lid is attached to a gray plastic box containing a tilt switch. When the lid is lifted open, the switch opens, interrupting the flow of 24vdc on wire #42.

Title: PORTABLE DRYER: Rear Discharge Chute

Author: SUKUP MFG CO - MRK

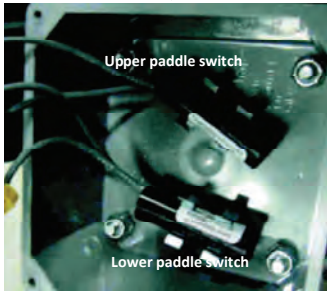
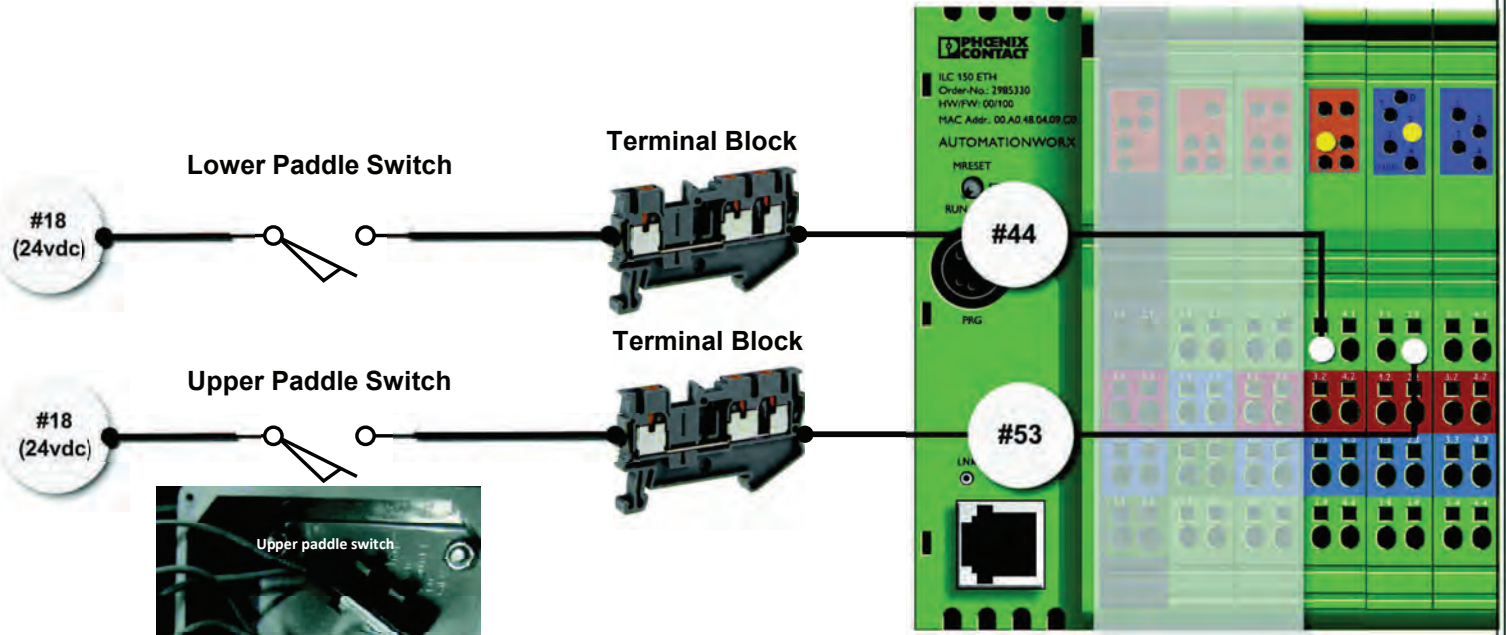
Date: 03/15

Sheet: Discharge Chute #42

Revision: 6/17 DWS

106.3

Paddle Switches #44 & #53



The Paddle Switch on the dryer is a 2-position switch that helps the dryer with its automated loading procedure. It also assists in telling the dryer when the wet bin is empty or full for too long. As grain fills the wet bin, the lower paddle switch (#44) will gently lift up and close the circuit (24vdc). This will also tell the dryer to disengage the Aux #2 relay K7. Next, as the wet bin is almost full, the upper paddle switch (#53) will gently lift up and close the circuit (24vdc). When the upper paddle switch closes, the Load Relay K1 and Aux #1 Relay will also disengage.

Title: PORTABLE DRYER: Paddle Switch Circuit

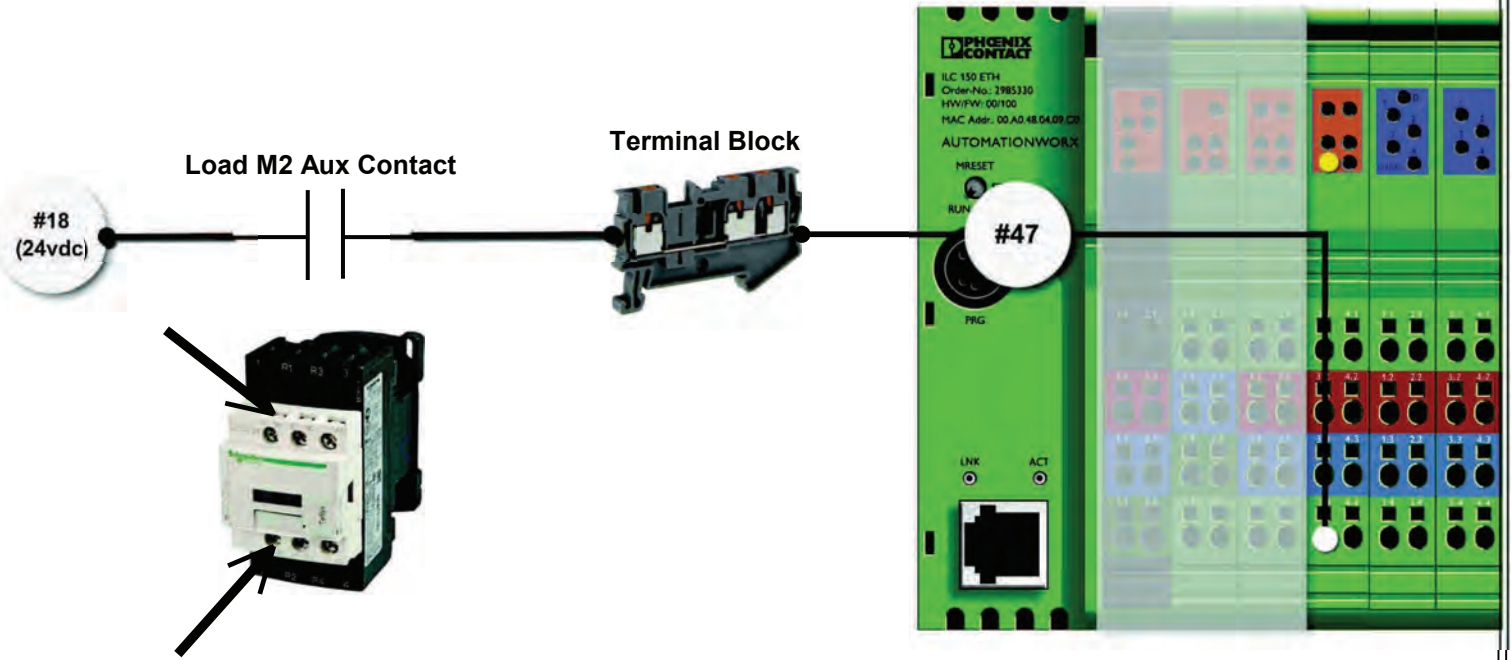
Author: SUKUP MFG CO - MRK

Date: 03/15

Revision: 6/7/2017 - DWS (1)

106.4

Load Confirmation #47



The Load Confirmation Circuit closes when the Load contactor is energized by the K1 Load Relay. When the contactor pulls in (sending voltage to the unload motor) the normally open auxiliary contact on the M2 Load Contactor closes - thus sending 24vdc back to the PLC on wire #47.

Title: PORTABLE DRYER: Load Confirmation #47

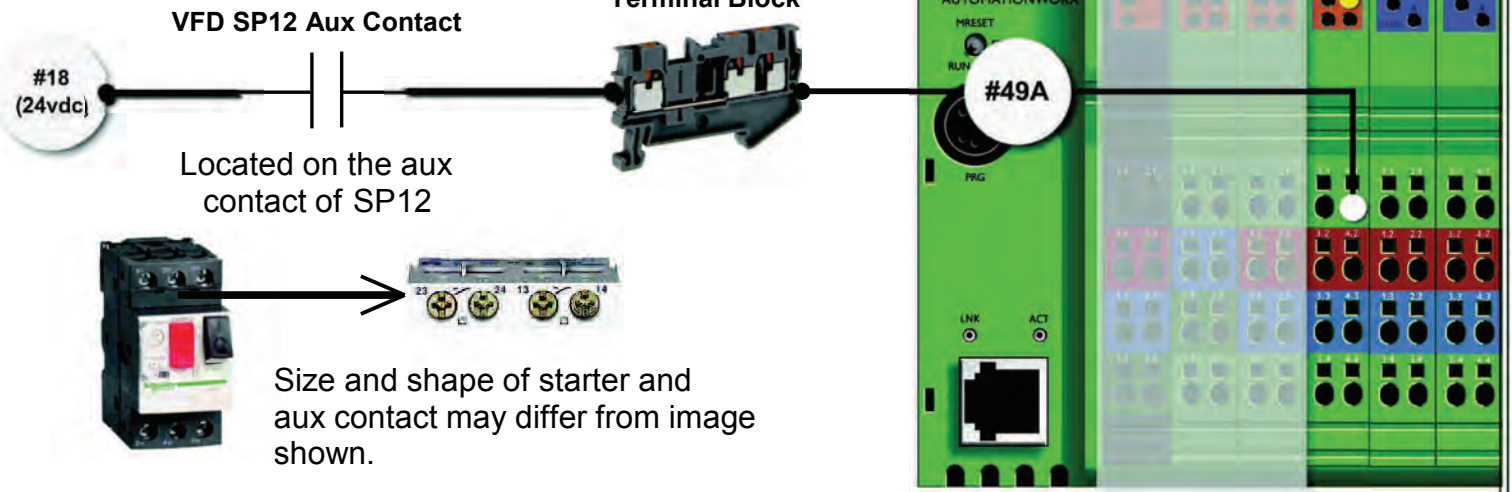
Author: SUKUP MFG CO - MRK

Date: 03/15

Revision: 6/7/2017 - DWS (1)

106.5

Motor Overload VFD #49A



The Motor Overload VFD circuit is designed to monitor the starter protector for the VFD which operates the meter roll motor. The circuit is closed under normal operating conditions. It is open during a trip or overload condition.

Title: PORTABLE DRYER: Motor Overload VFD #49A

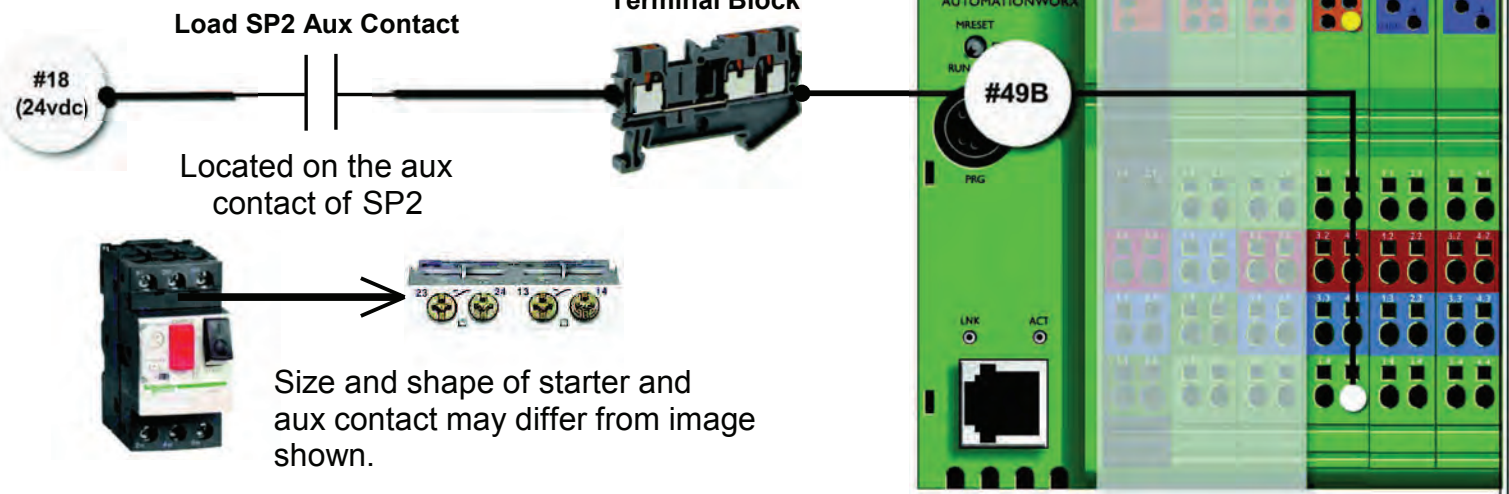
Author: SUKUP MFG CO - MRK

Date: 03/15

Revision: 6/7/2017 - DWS (1)

106.6

Motor Overload Load #49B



The Motor Overload Load circuit is designed to monitor the starter protector for the Load which operates the leveling auger on the top of the dryer. The circuit is closed under normal operating conditions. It is open during a trip or overload condition.

Title: PORTABLE DRYER: Motor Overload Load #49B

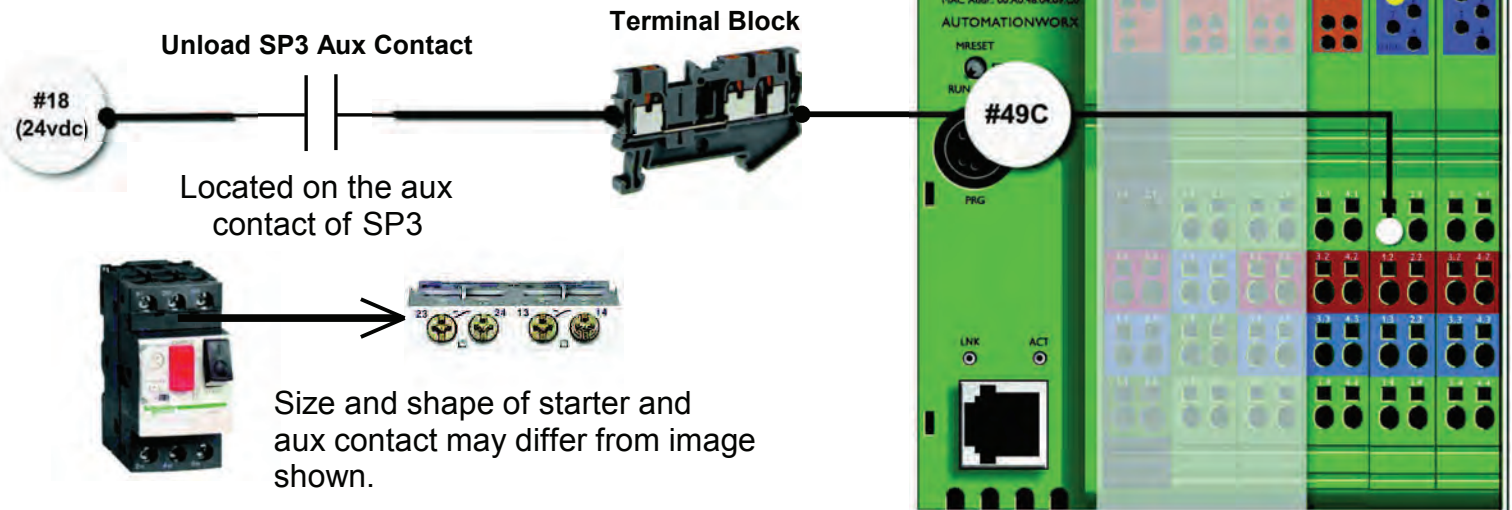
Author: SUKUP MFG CO - MRK

Date: 03/15

Revision: 6/7/2017 - DWS (1)

106.7

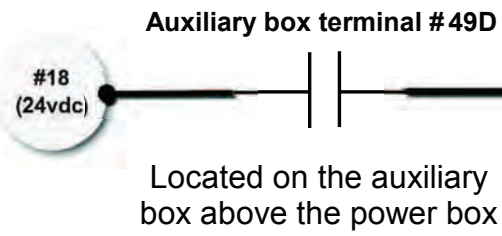
Motor Overload Unload #49C



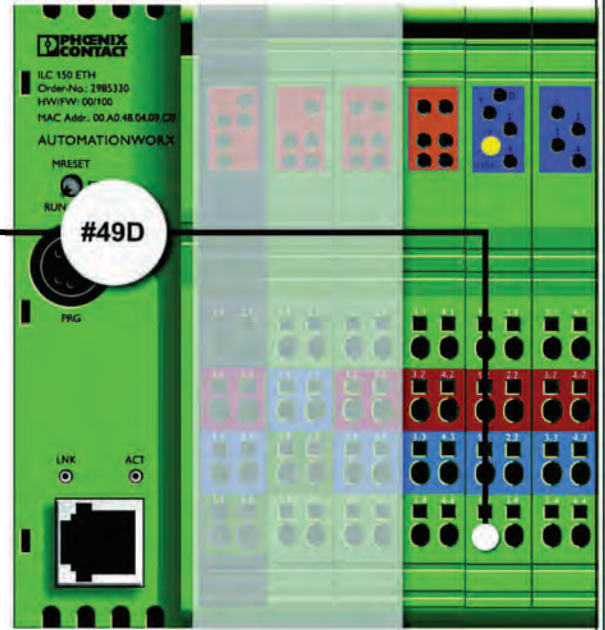
The Motor Overload Unload circuit is designed to monitor the starter protector for the unload which operates the auger on the bottom of the dryer. The circuit is closed under normal operating conditions. It is open during a trip or overload condition.

Title: PORTABLE DRYER: Motor Overload Unload #49C	
Author: SUKUP MFG CO - MRK	
Date: 03/15	
Revision: 6/7/2017 - DWS (1)	106.8

Motor Overload Auxiliary Box #49D



Terminal Block



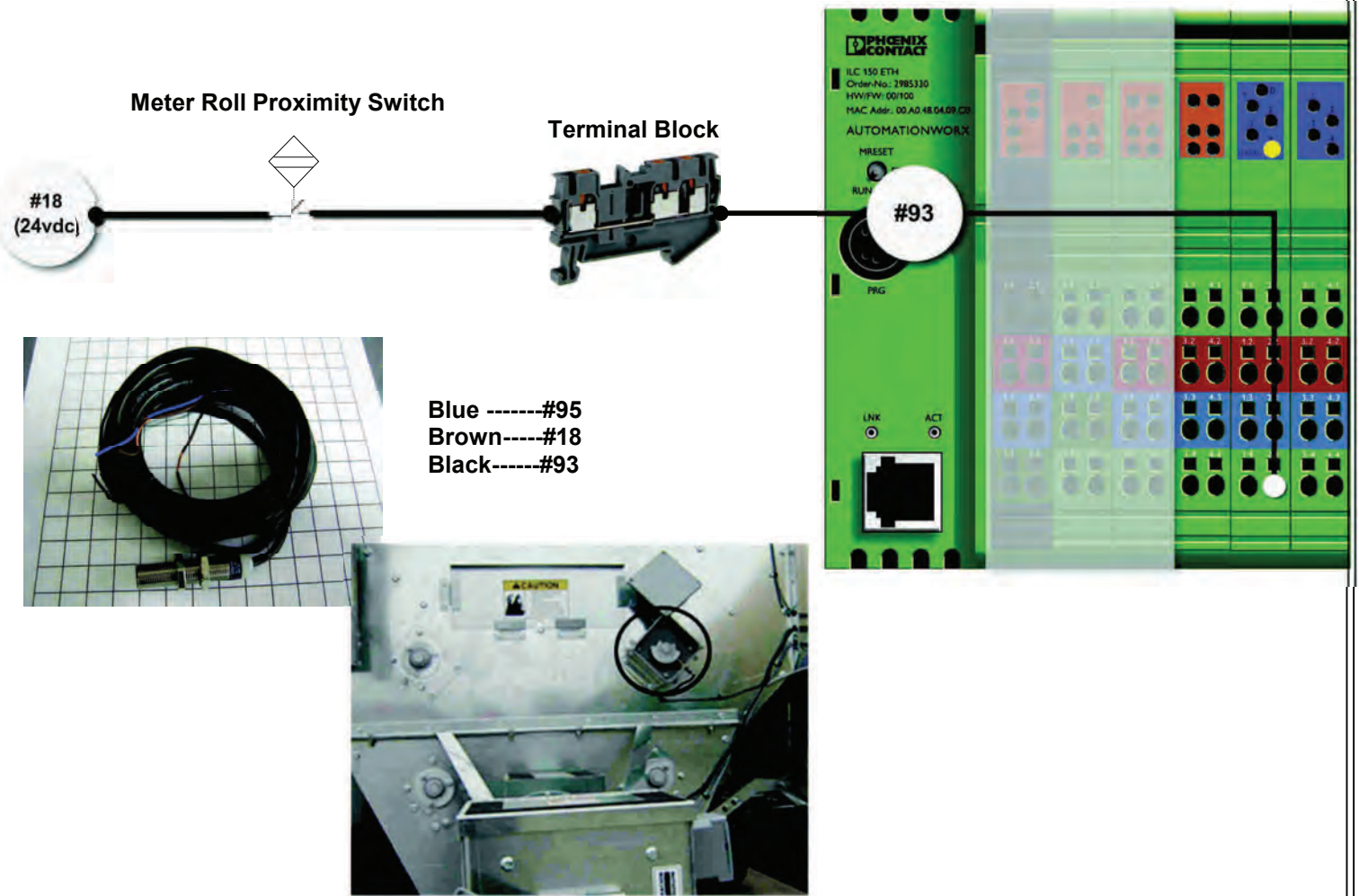
Factory Jumper Installed!



The Motor Overload Auxiliary Box circuit is designed to monitor and additional starter protectors which typically assist in loading and unloading the dryer. If multiple starters are used, they need to be wired in series. The circuit is closed under normal operating conditions. It is open during a trip or overload condition.

Title: PORTABLE DRYER: Motor Overload Aux #49D	
Author: SUKUP MFG CO - MRK	
Date: 03/15	
Revision: 6/7/2017 - DWS (1)	106.9

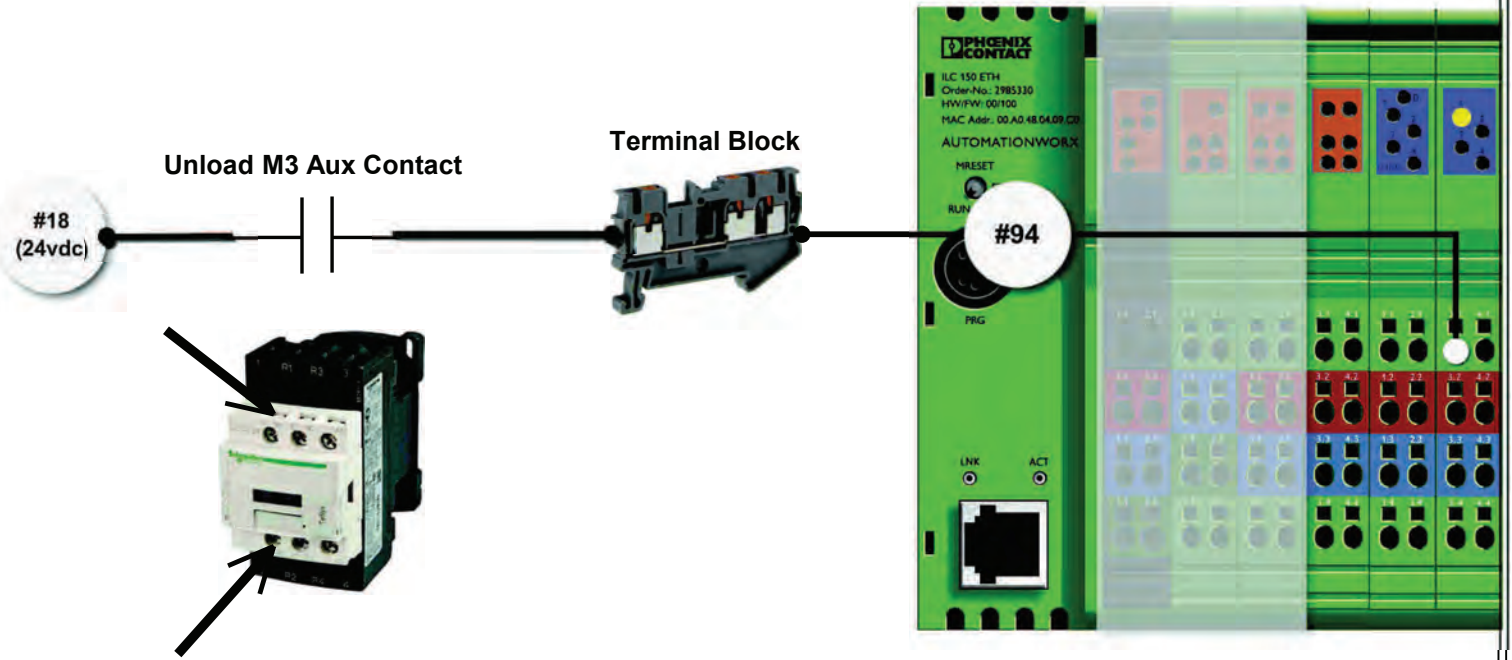
Meter Roll Proximity Switch #93



The Meter Roll Proximity Switch Circuit is designed to confirm rotation of the metering rolls when the VFD has been energized. The circuit will close when the proximity switch is in close contact with the flag or target. It will open when it is not. During operation, the meter roll proximity signal #93 needs to turn off and back on every 2 minutes.

Title: PORTABLE DRYER: Meter Roll Prox Switch #93	
Author: SUKUP MFG CO - MRK	
Date: 03/15	
Revision: 6/7/2017 - DWS (1)	106.10

Unload Confirmation #94



The Unload Confirmation Circuit closes when the unload contactor is energized by the K2A Unload Relay. When the contactor pulls in (sending voltage to the unload motor) the normally open auxiliary contact on the M3 unload contactor closes - thus sending 24vdc back to the PLC on wire #94.

Title: PORTABLE DRYER: Unload Confirmation #94

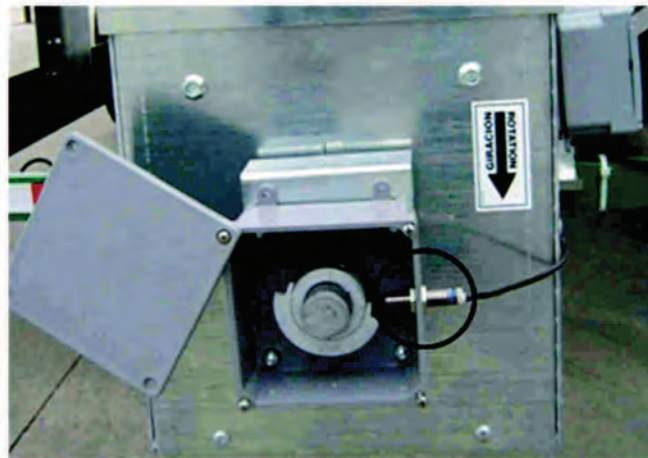
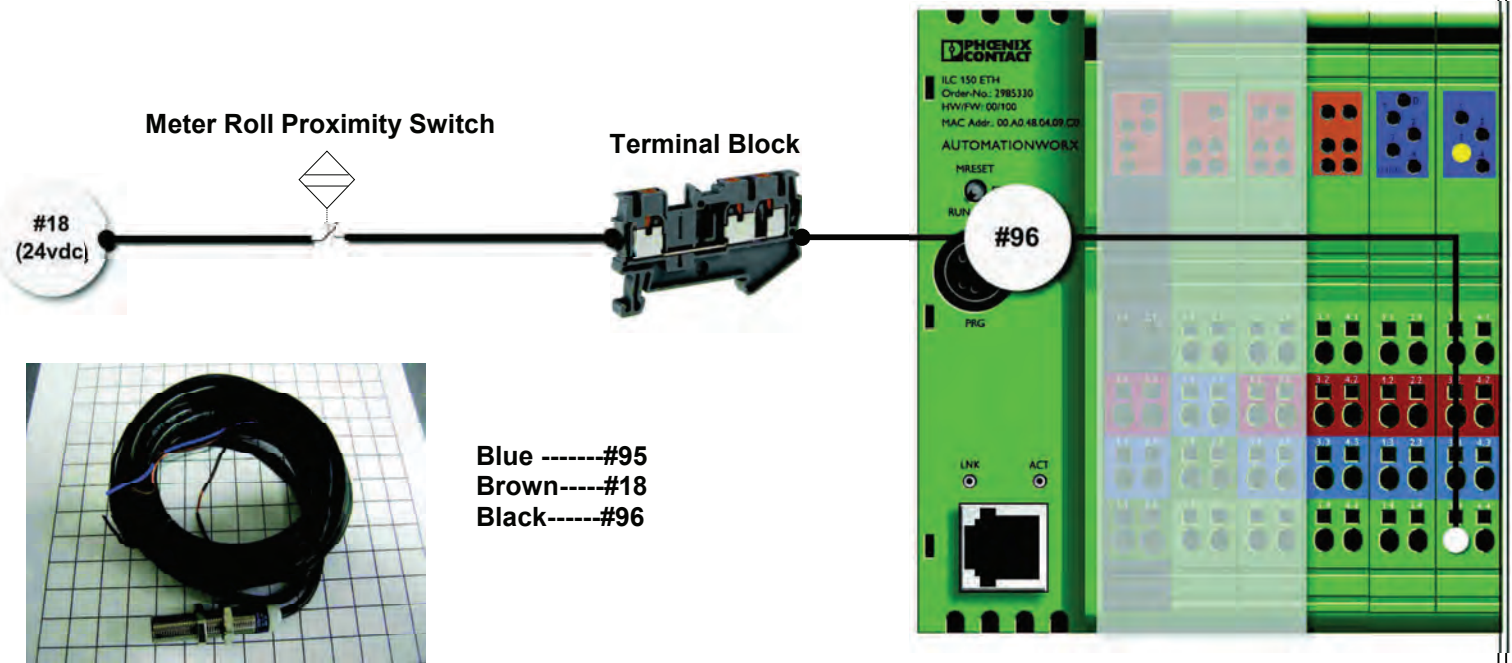
Author: SUKUP MFG CO - MRK

Date: 03/15

Revision: 6/7/2017 - DWS (1)

106.11

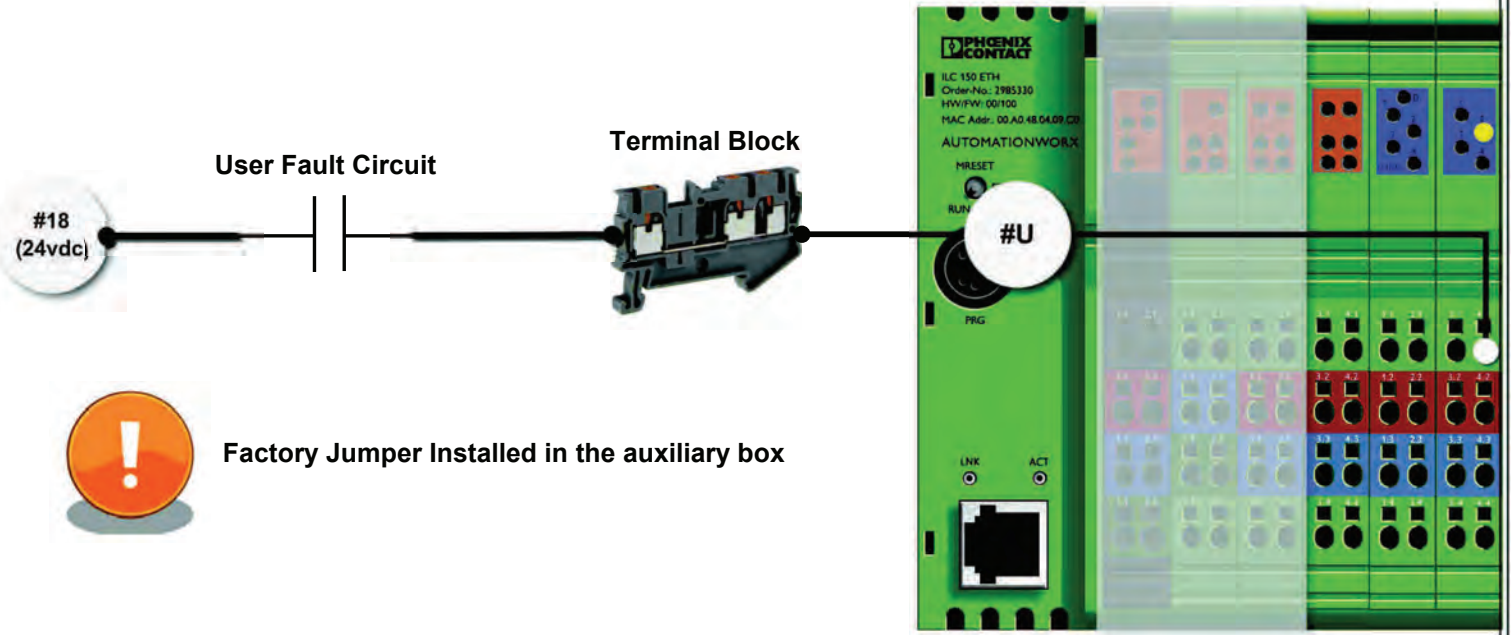
Unload Proximity Switch #96



The Unload Proximity Switch Circuit is designed to confirm rotation of the unload auger when the K2A Unload Relay has been energized. The circuit will close when the proximity switch is in close contact with the flag or target. It will open when it is not. During operation, the unload proximity signal #96 needs to turn off and back on every 5 seconds.

Title: PORTABLE DRYER: Unload Prox #96	
Author: SUKUP MFG CO - MRK	
Date: 03/15	
Revision: 6/7/2017 - DWS (1)	106.12

User Fault Circuit #U



The User Fault Circuit #U is an additional fault circuit provided to the dryer operator for additional equipment monitoring. For example, the dryer operator has a custom unload system that needs to be running in order for the dryer to keep running. The operator can interlock the unload system with the user fault circuit. 24vdc needs to be present under normal operating conditions. An open circuit results in dryer shutdown.

Title: PORTABLE DRYER: User Fault Circuit #U

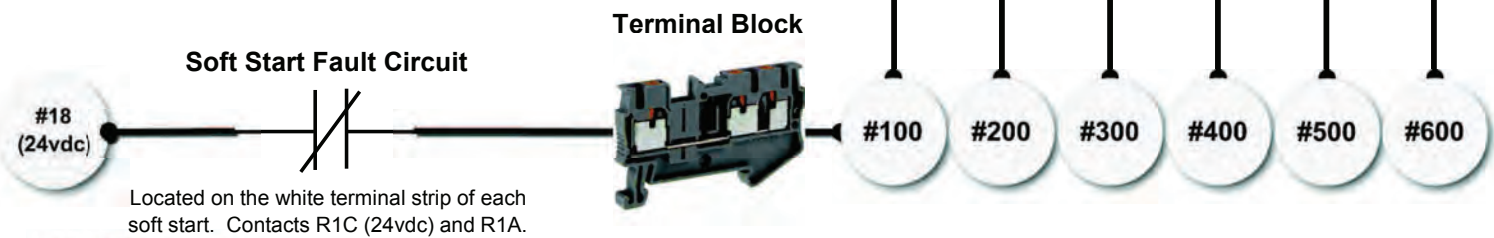
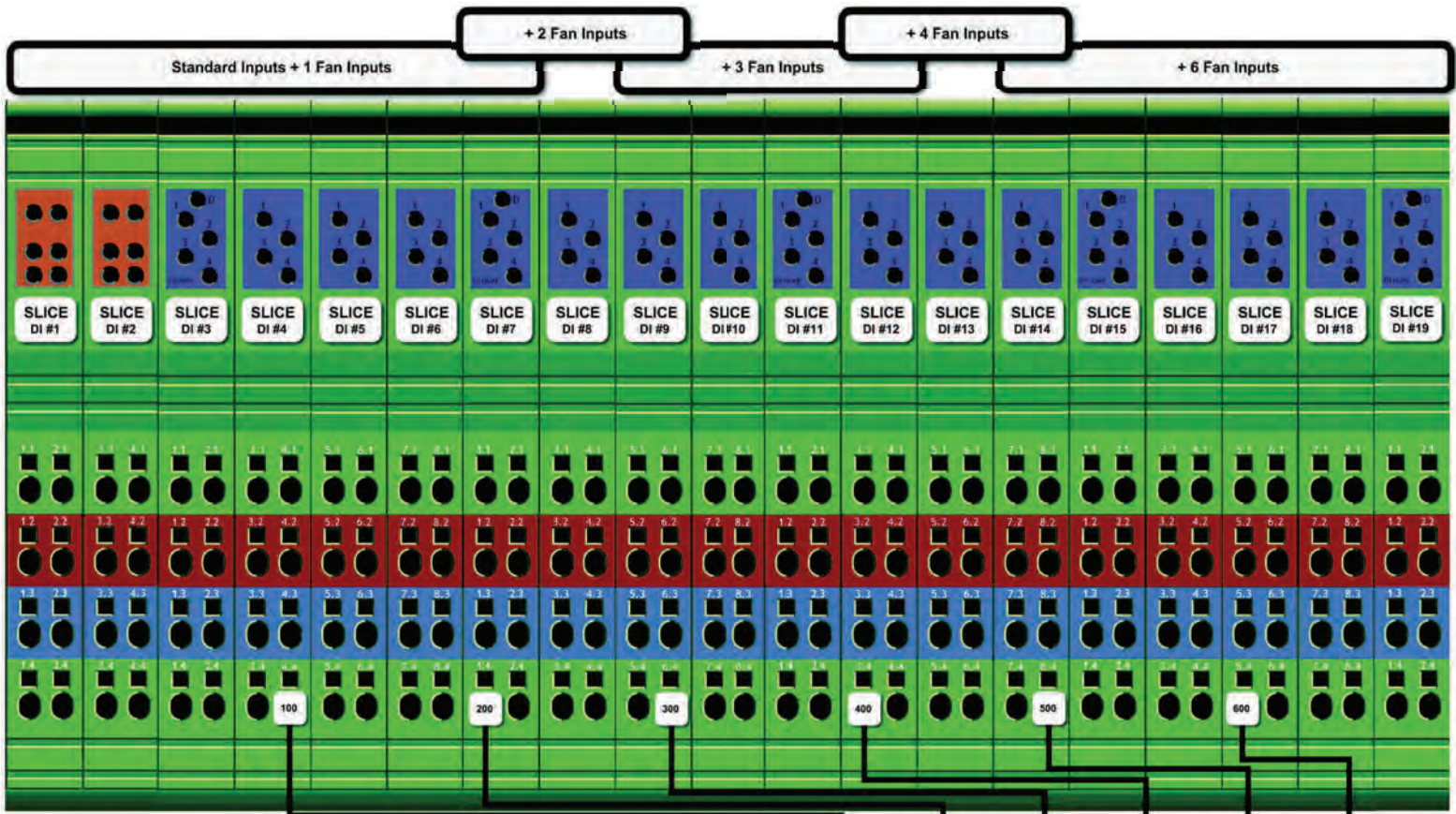
Author: SUKUP MFG CO - MRK

Date: 03/15

Revision: 6/7/2017 - DWS (1)

106.13

Soft Start Fault #100, #200, #300, #400, #500, #600



Located on the white terminal strip of each soft start. Contacts R1C (24vdc) and R1A.



The Soft Start Fault Circuit is designed to monitor each soft start for any failures. In the event the soft start faults, the contact on R1A opens, and the dryer will shutdown.

Title: PORTABLE DRYER: Soft Start Fault Circuit

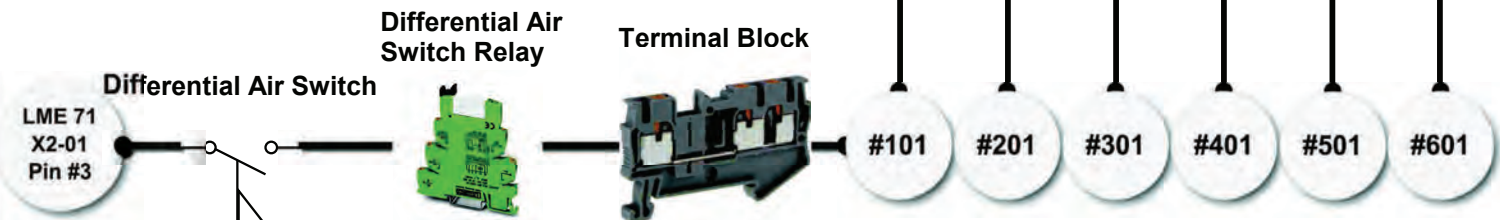
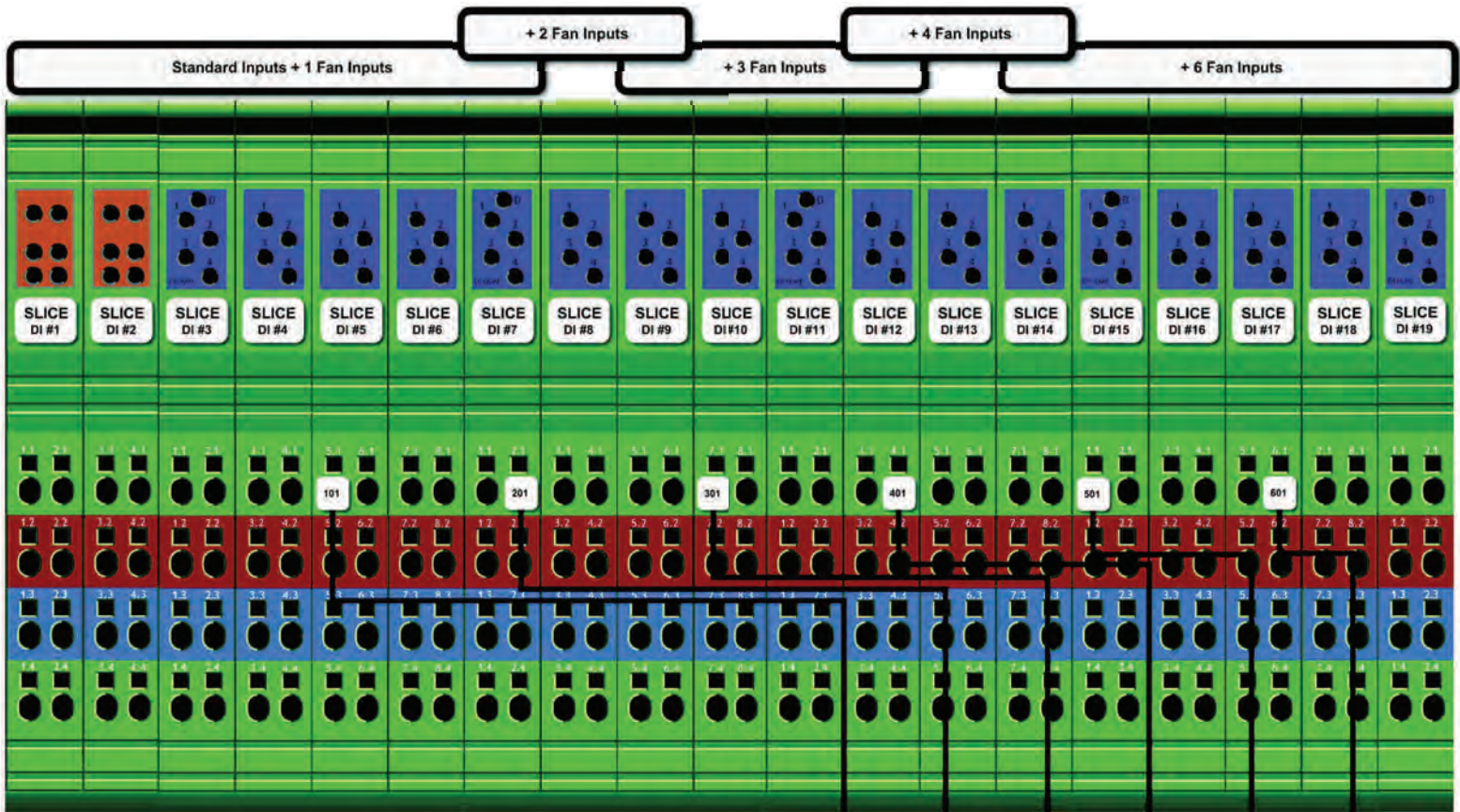
Author: SUKUP MFG CO - MRK

Date: 03/15

Revision: 6/7/2017 - DWS (1)

106.14

Differential Air Switch Circuits #101, #201, #301, #401, #501, #601



- A1 - #NO side of Differential Air Switch
- A2 - #2 (Neutral)
- 11 - #18 (24VDC)
- 14 - #X01 to PLC (Differential Air Switch Relay Confirmation)



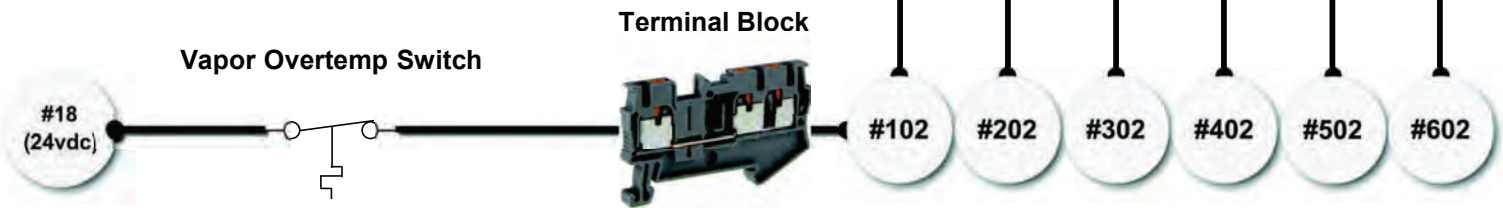
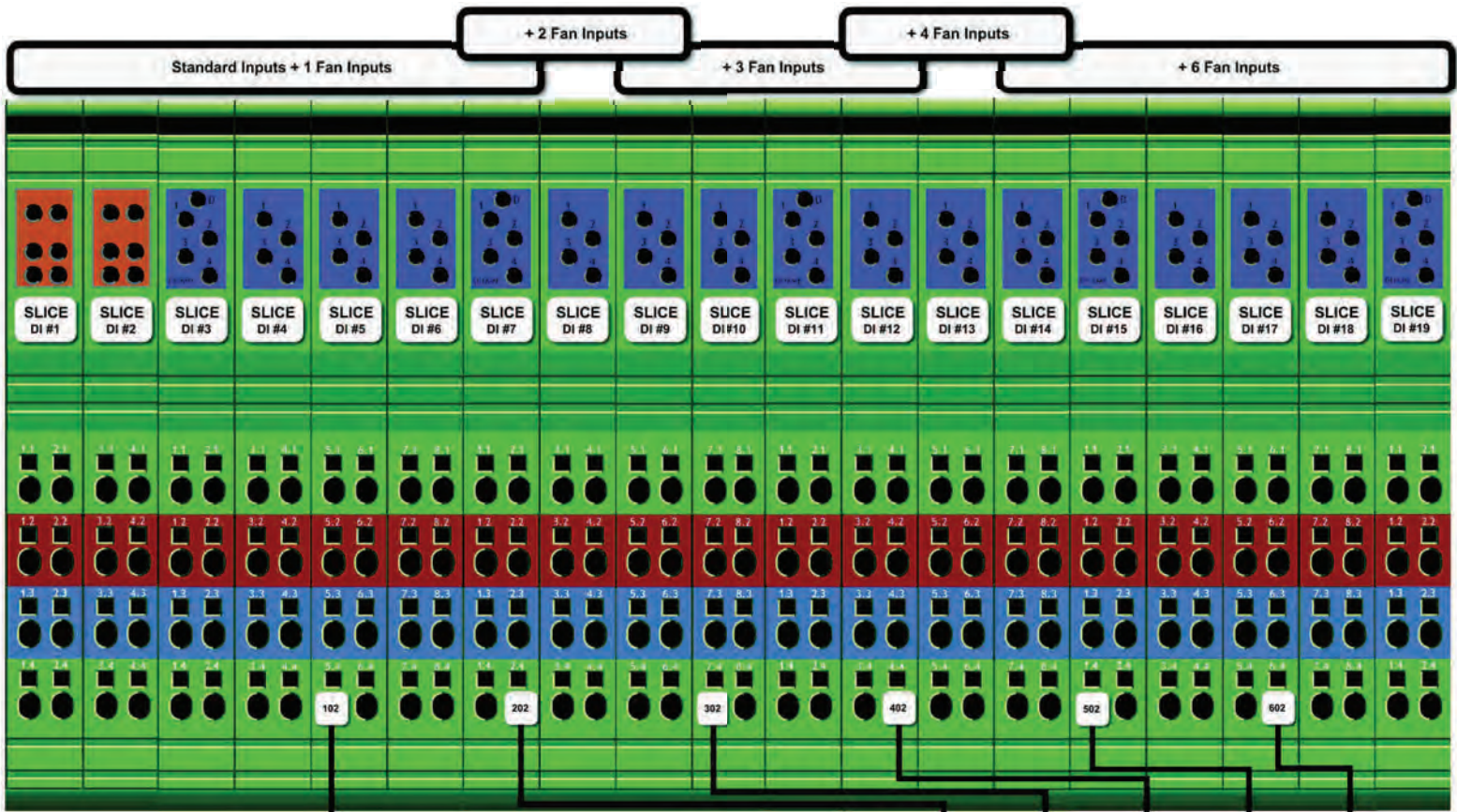
CSA Dryers ONLY
 Domestic USA and International CE dryers have factory jumper installed



The Differential Air Switch Circuit is Closes when the differential air switch (Located in the heater box) closes, thus closing a 110VAC relay. The relay allows 24vdc to flow back to the PLC indicating the differential air switch is closed, indicating suction. This differential air switch is only used on CSA dryers, and domestic and CE have a factory jumper installed.

Title: PORTABLE DRYER: Differential Air Switch Circuit	
Author: SUKUP MFG CO - MRK	
Date: 05/16	
Revision: 6/7/2017 - DWS (1)	106.15

Vapor Over-Temp Circuits #102, #202, #302, #402, #502, #602



Switch is located on the Pipe Train then junctioned in each respective heater box.



The Vapor Over-Temp Circuit is designed to detected excessive gas temperatures (>140°F) in the vapor lines of each heater. Each vaporizer coil can be independently adjusted, and they should be warm/hot to the touch, but not to the point it will burn your hand. In the event you cannot get the vapor overtemp switch from tripping after coil adjustment, a defector cone may need to be used to keep the vapor from getting too hot.

Title: PORTABLE DRYER: Vapor Over-Temp Circuit

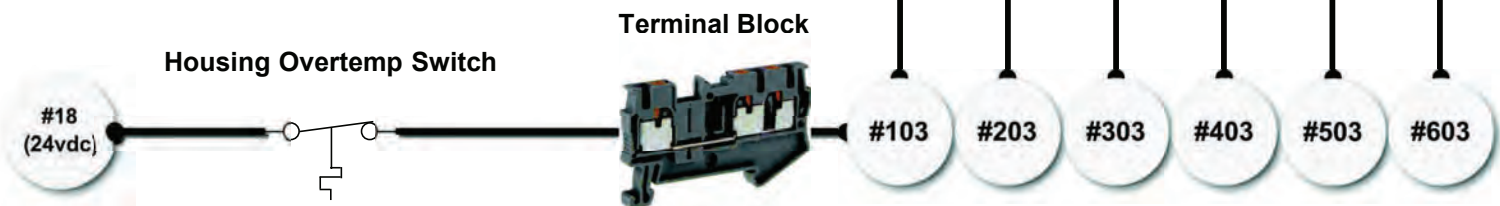
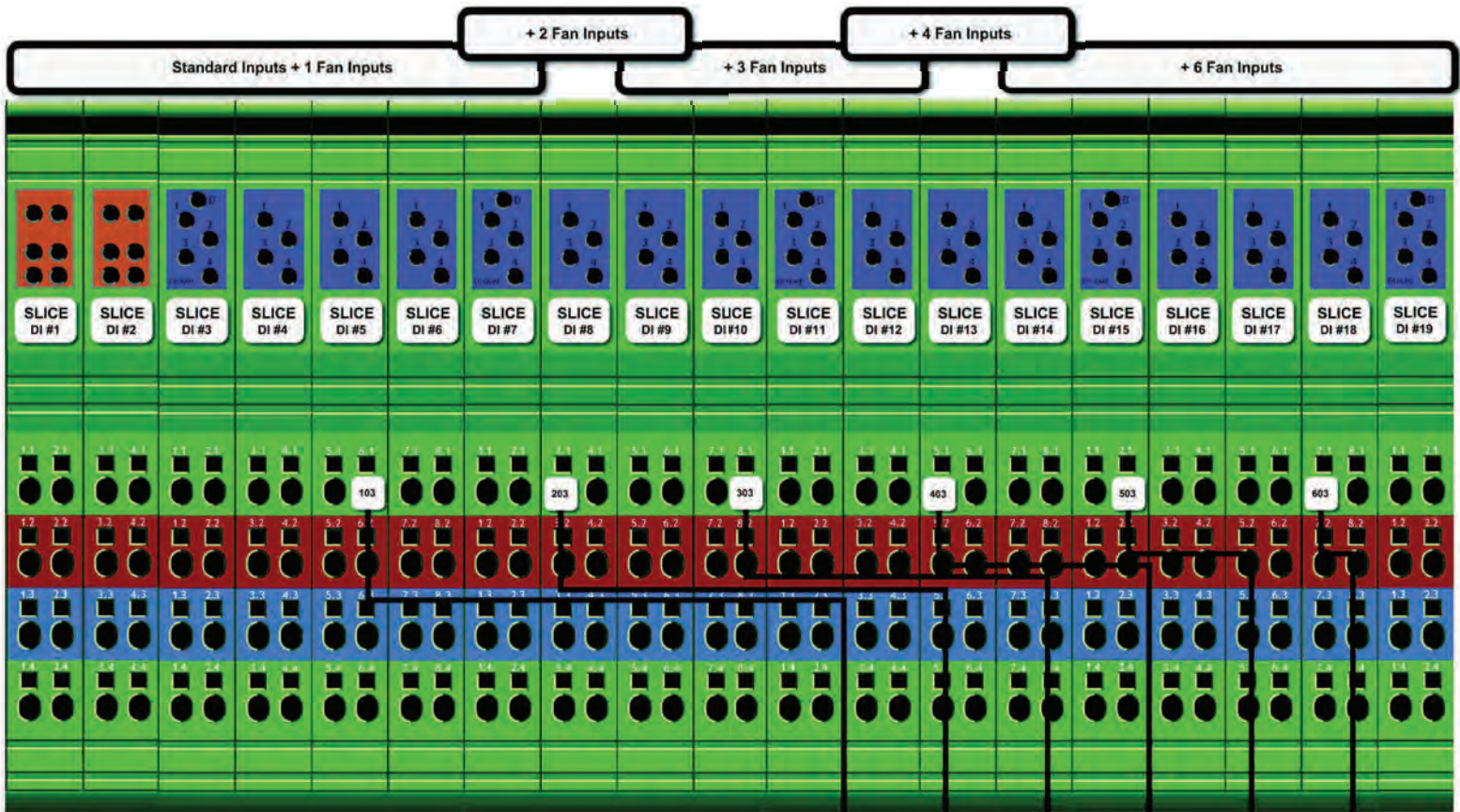
Author: SUKUP MFG CO - MRK

Date: 03/15

Revision: 6/7/2017 - DWS (1)

106.16

Housing High-Limit Circuits #103, #203, #303, #403, #503, #603



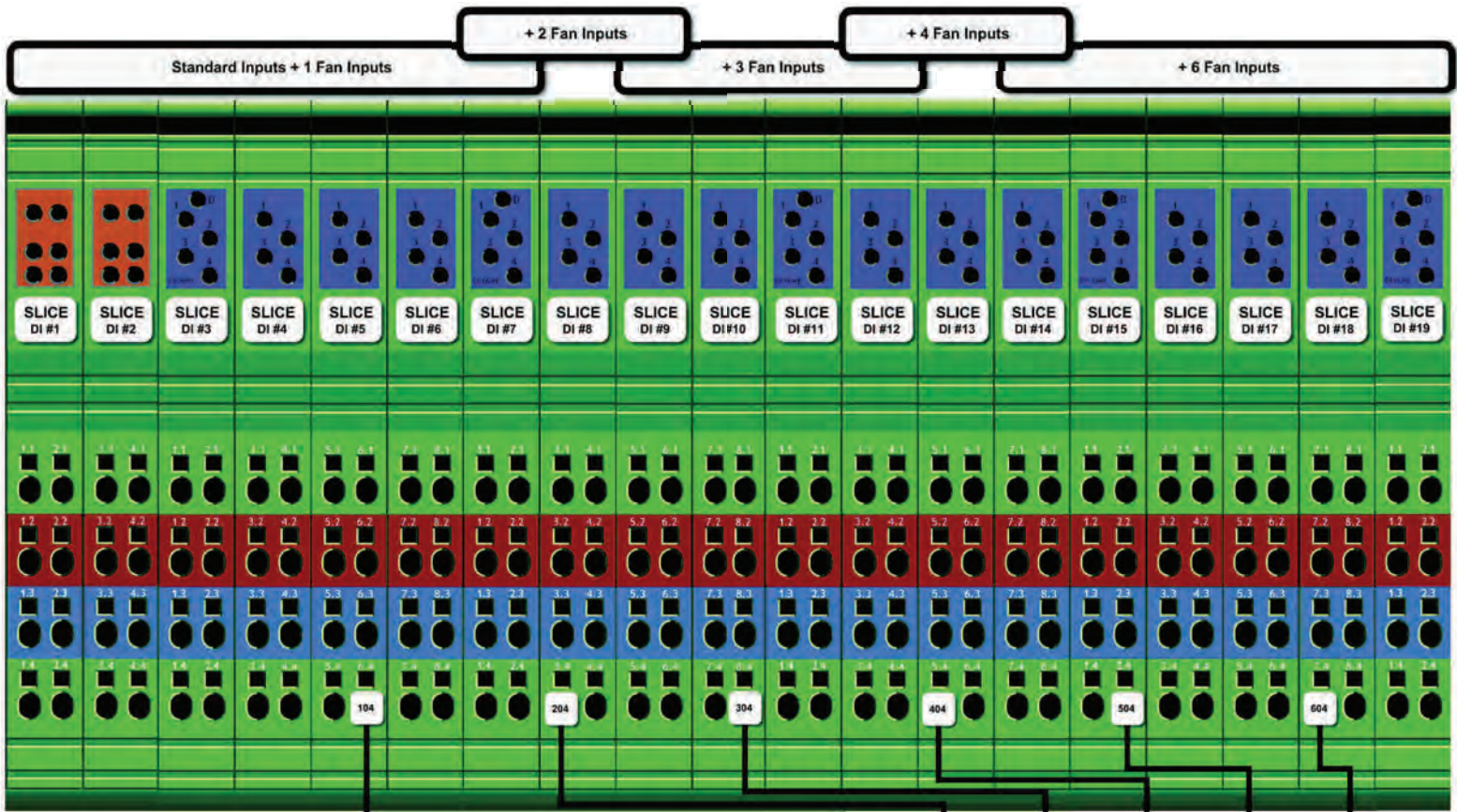
Switch is located on the heater box of each respective fan/heater.



The Housing Over-Temp Circuit is designed to detect excessive temperatures in the heater housing itself. This circuit serves as a backup to the fan monitoring circuits. If the fan stops working during operation, heat will rapidly rise inside the heater housing, thus shutting down the dryer. This is a manual reset circuit. Depress the button on the middle of the switch to reset it.

Title: PORTABLE DRYER: Housing Over-Temp Circuit	
Author: SUKUP MFG CO - MRK	
Date: 03/15	
Revision: 6/7/2017 - DWS (1)	106.17

Plenum Over-Temp Circuits #104, #204, #304, #404, #504, #604



Plenum Overtemp Switch

Terminal Block

#18
(24vdc)

#104 #204 #304 #404 #504 #604

Switch is located in a box with the air switch on the chassis of the dryer above each fan/heater housing



The Plenum Over-Temp Circuit is designed to detect excessive temperatures (>325°F) in the plenum of each fan/heater. This circuit serves as a fire detection system as well as a backup in the event of a loss in control of the electronic modulating valve in each respective pipe train.

Title: PORTABLE DRYER: Plenum Overtemp Circuit

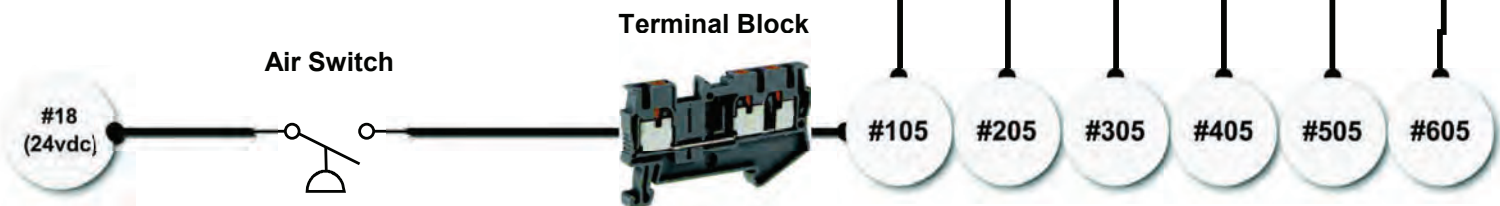
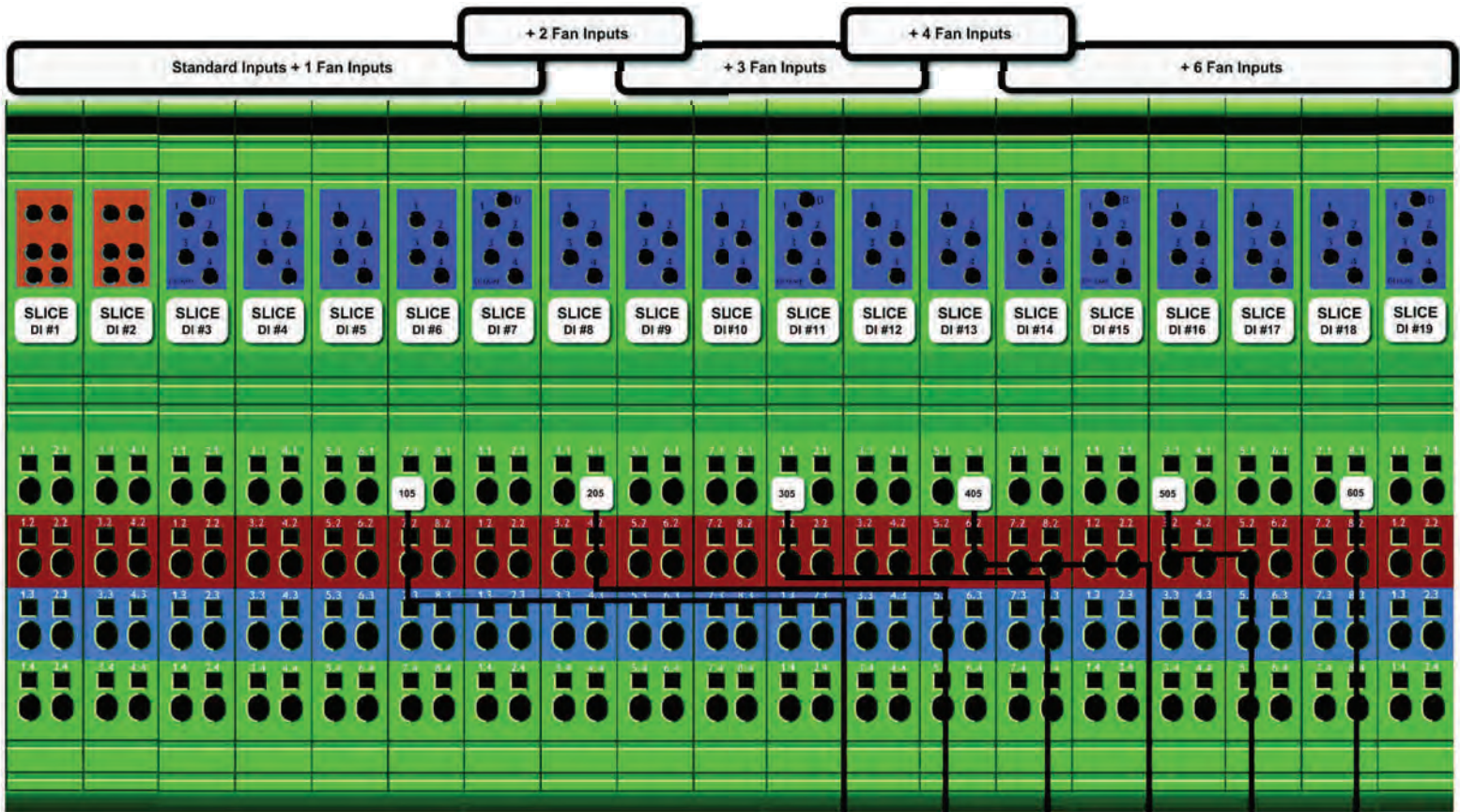
Author: SUKUP MFG CO - MRK

Date: 03/15

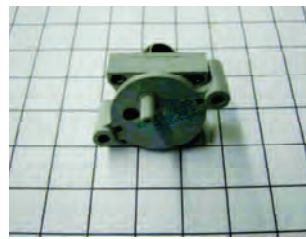
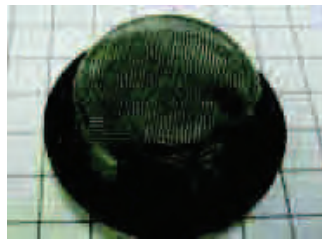
Revision: 6/7/2017 - DWS (1)

106.18

Air Switch Circuits #105, #205, #305, #405, #505, #605



Switch is located above the fan housing or on the chassis of the respective plenum.



The Air Switch Circuit is designed to detect a rise in static pressure inside the plenum of each respective fan/heater. When the dryer is full of grain, and the fan is on, the air switch will close sending 24vdc to the PLC indicating it sees increased static air pressure.

Title: PORTABLE DRYER: Air Switch Circuit

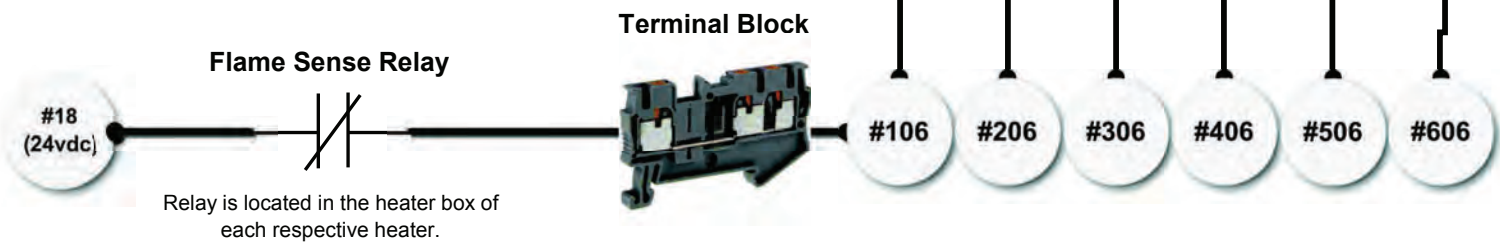
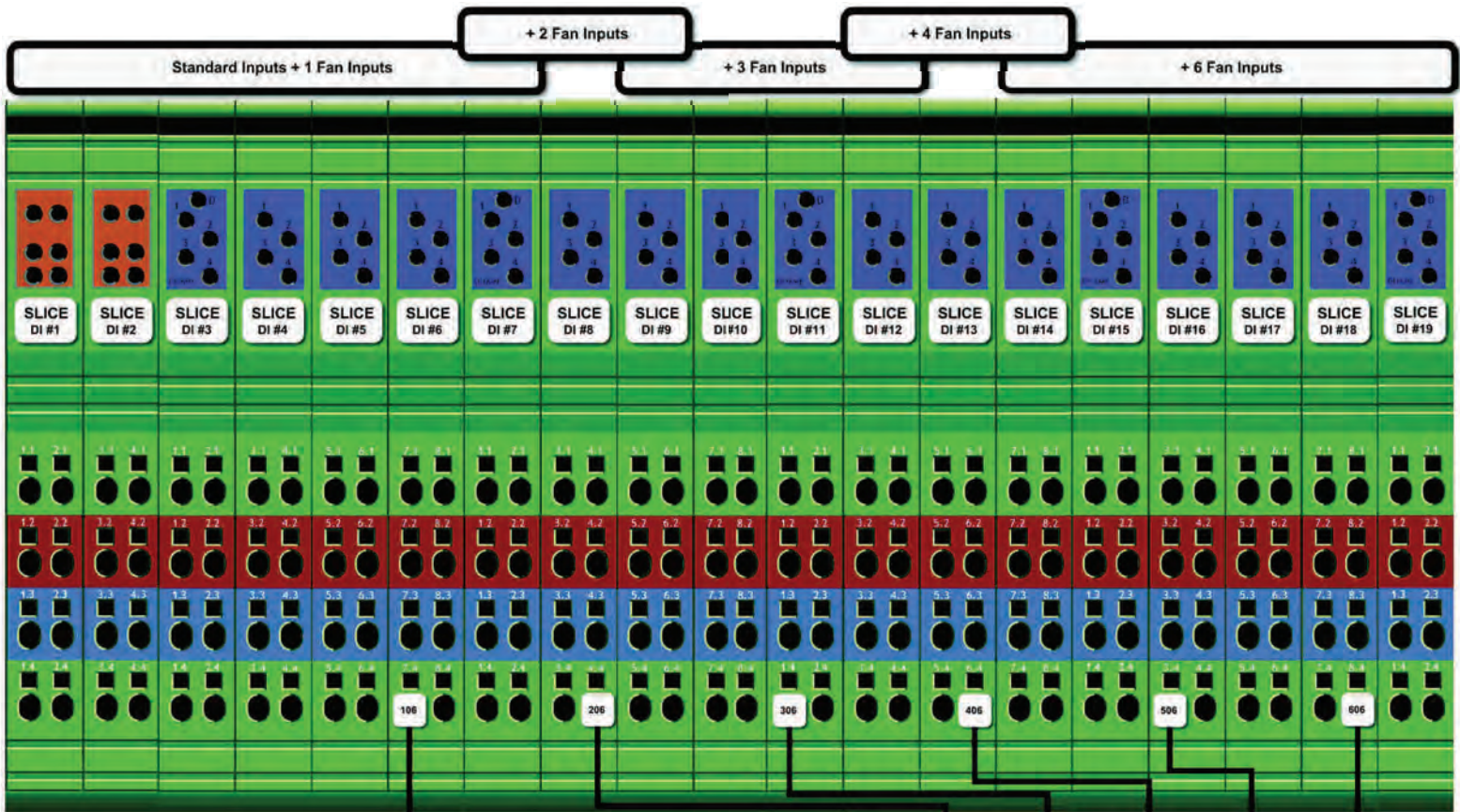
Author: SUKUP MFG CO - MRK

Date: 03/15

Revision: 6/7/2017 - DWS (1)

106.19

Flame Sense Circuits #106, #206, #306, #406, #506, #606



The Flame Sense Circuit is designed to detect flame in each respective heater. During heater board ignition, the heater board waits for the flame probe to confirm micro current in the flame. Upon confirmation, the heater board closes the flame sense relay, sending 24vdc back to the PLC on the flame sense circuit wire.

Title: PORTABLE DRYER: Flame Sense Circuit

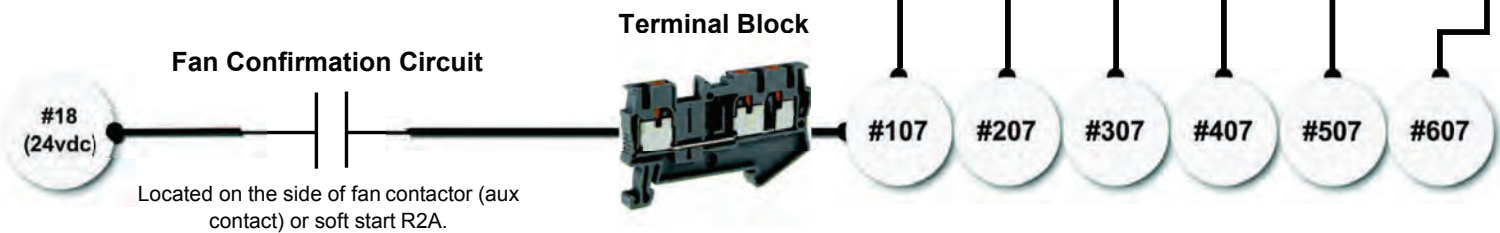
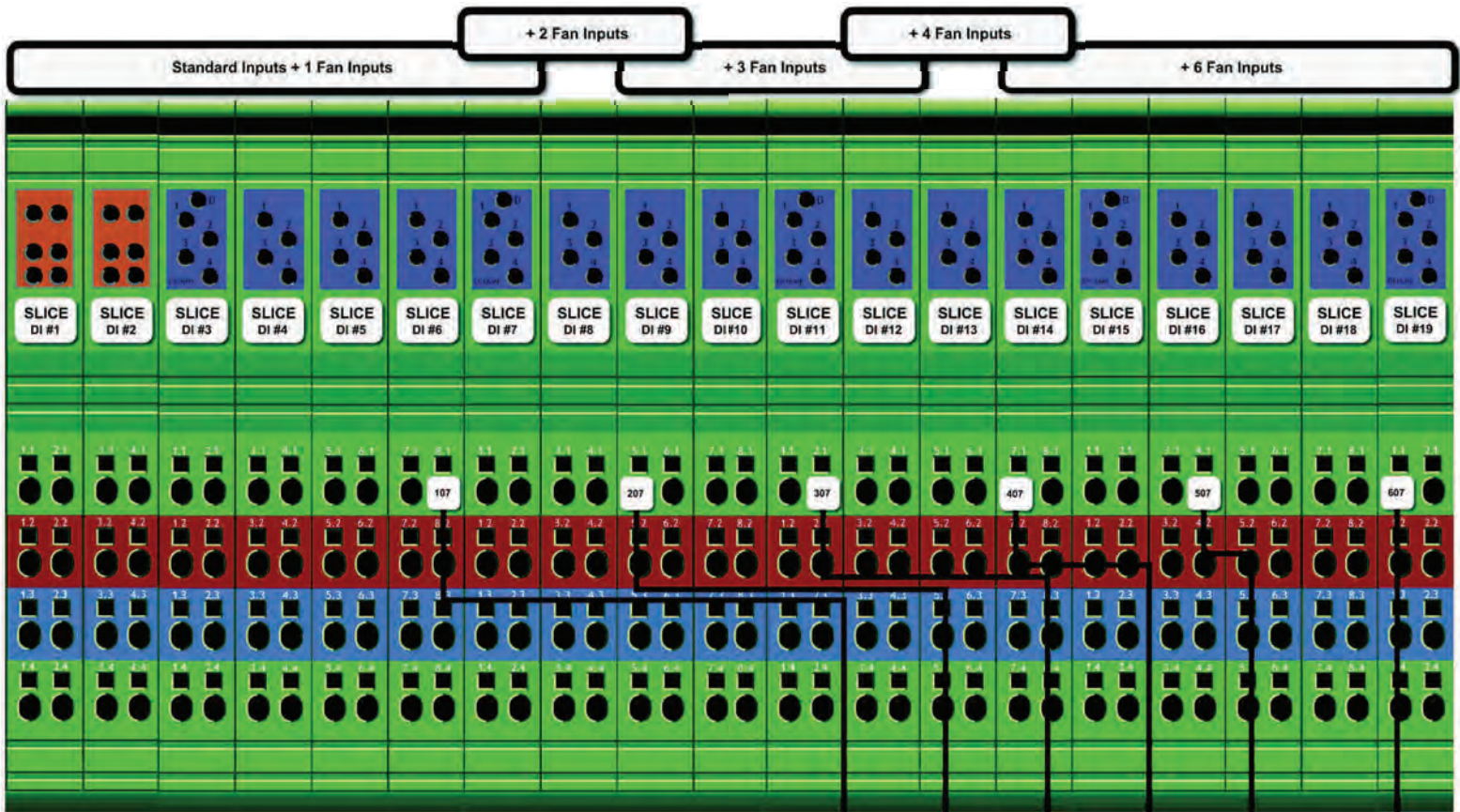
Author: SUKUP MFG CO - MRK

Date: 03/15

Revision: 6/7/2017 - DWS (1)

106.20

Fan Confirmation Circuits #107, #207, #307, #407, #507, #607



The Fan Confirmation Circuit is designed to tell the PLC that the contactor has been pulled in, and voltage should be flowing to the motor. This signal also triggers the timer for the air switch and serves as a software interlock for heater power. On Soft Starts, the fan confirmation signal will not close until the fan is up to speed.

Title: PORTABLE DRYER: Fan Confirmation Circuit

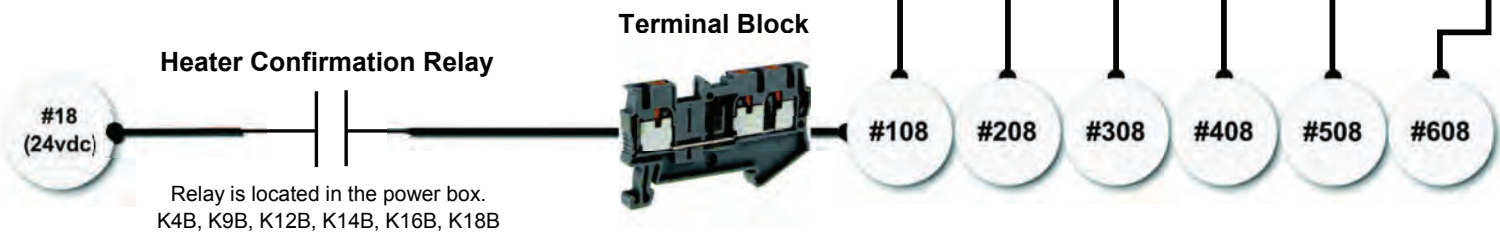
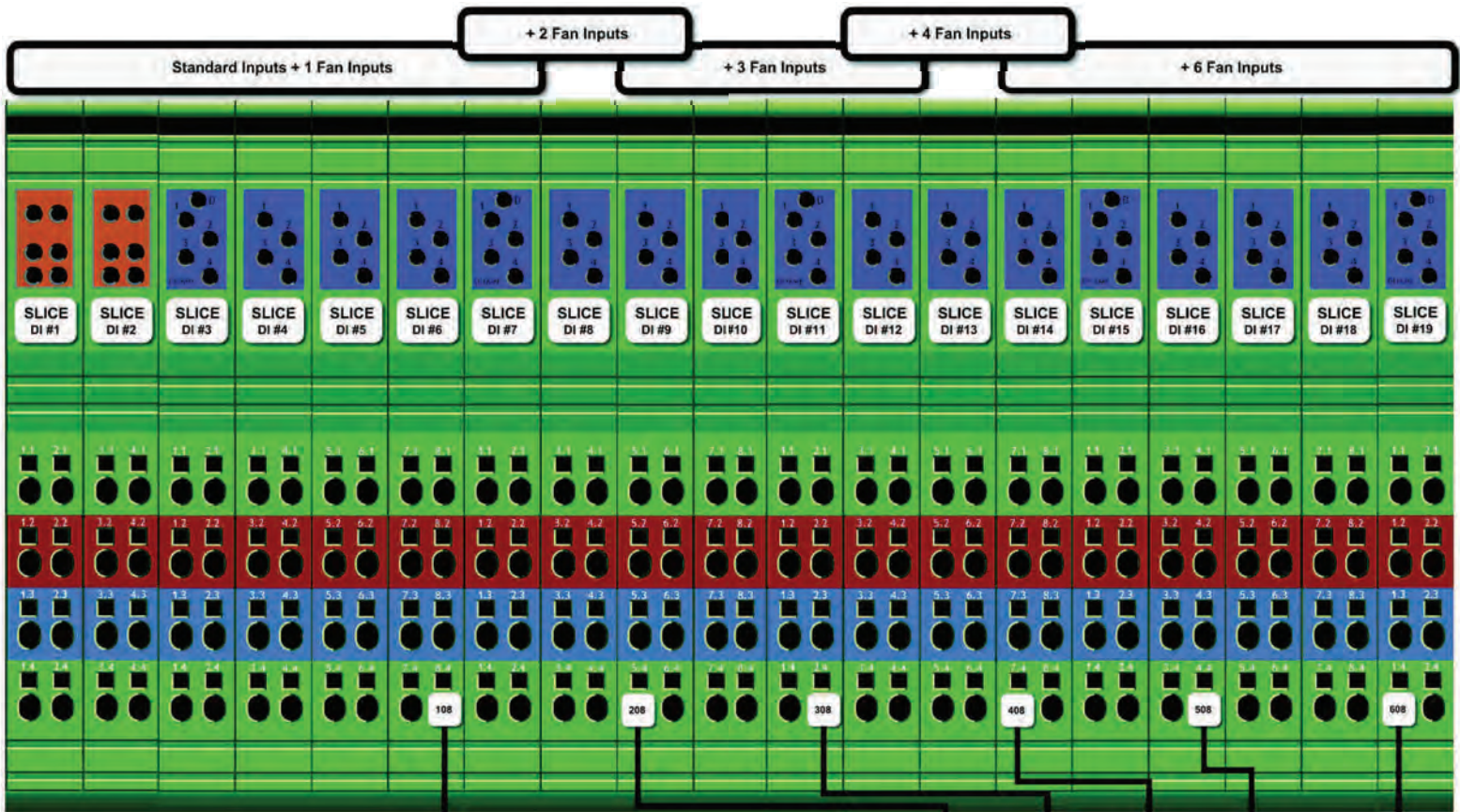
Author: SUKUP MFG CO - MRK

Date: 03/15

Revision: 6/7/2017 - DWS (1)

106.21

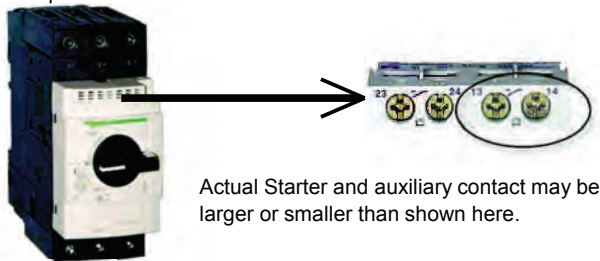
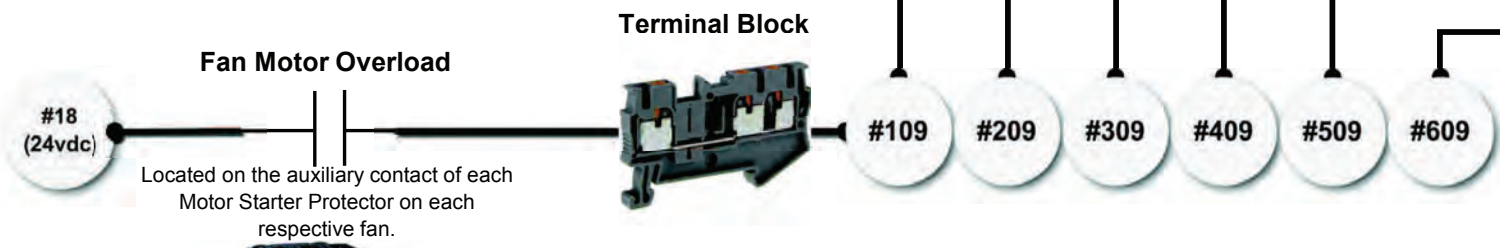
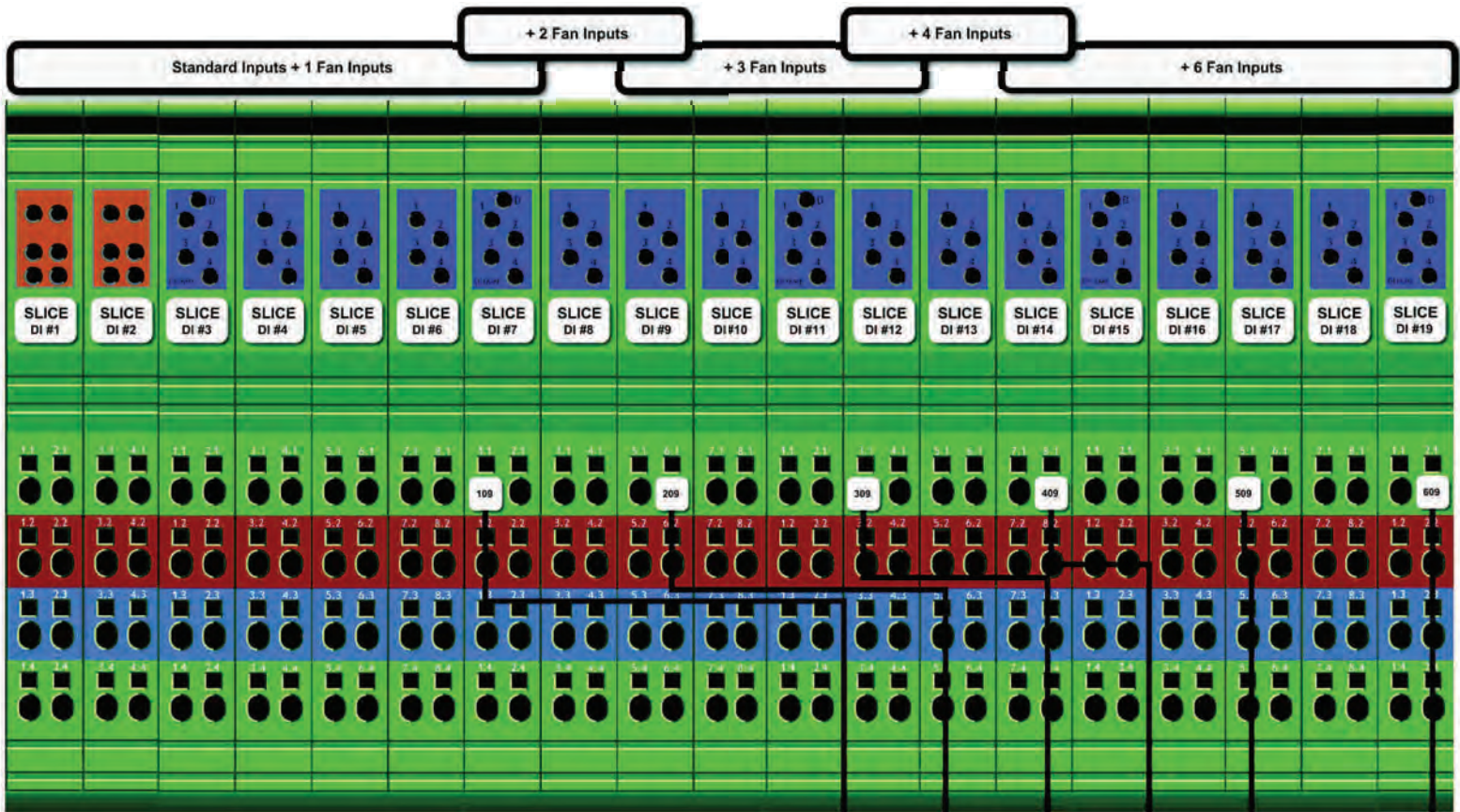
Heater Confirmation Circuits #108, #208, #308, #408, #508, #608



The Heater Confirmation Relay tells the PLC that it has energized the Heater Relays, and power is intended to be sent to the heater box. This will start the Flame Out Timer. If the flame signal doesn't come on before the timer expires, the dryer will fault on a Flame Timeout.

Title: PORTABLE DRYER: Heater Confirmation Circuit	
Author: SUKUP MFG CO - MRK	
Date: 03/15	
Revision: 6/7/2017 - DWS (1)	106.22

Fan Motor Overload Circuits #109, #209, #309, #409, #509, #609



The Fan Motor Overload Circuits are located on each of the fan starter protectors. When the starter is in operational mode, the circuit is complete. When the starter is in trip position, the circuit is open.

Title: PORTABLE DRYER: Fan Motor Overload Circuit

Author: SUKUP MFG CO - MRK

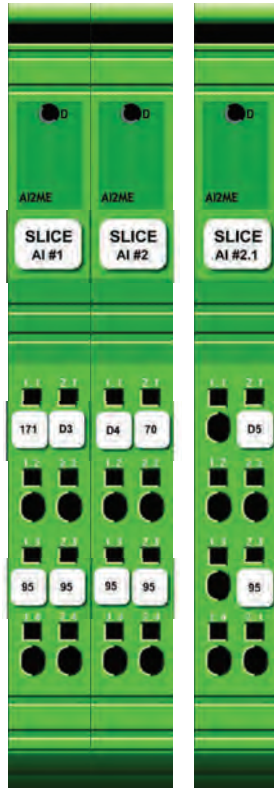
Date: 03/15

Revision: 6/7/2017 - DWS (1)

106.23

Plenum RTD Transmitter

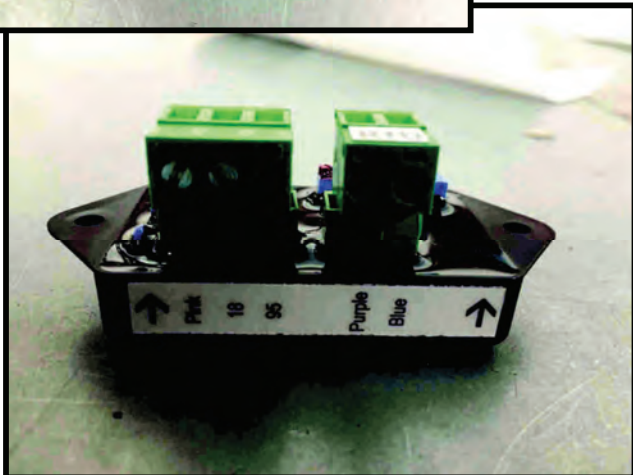
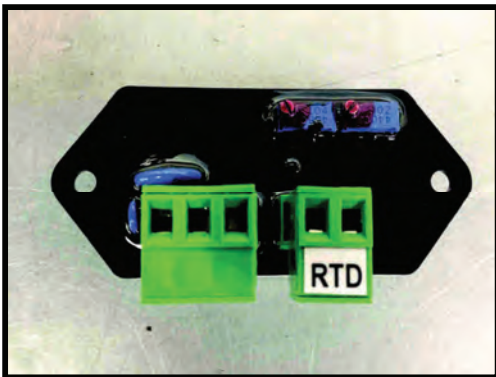
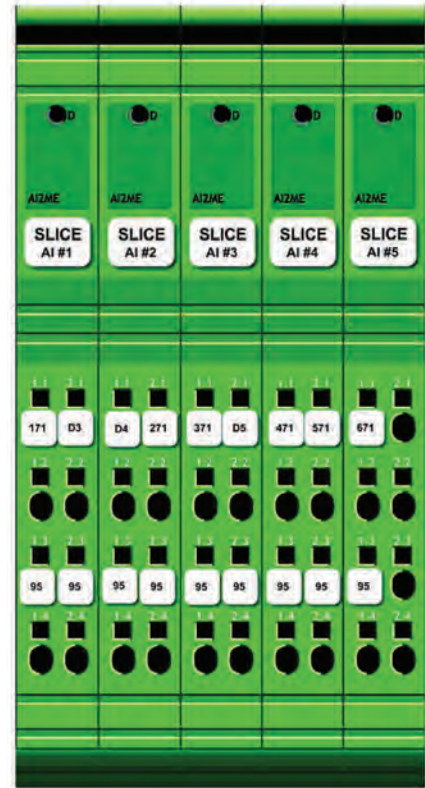
1 Fan



2 Fan



3-6 Fan



**Pink - DC voltage Reference to PLC
(171, 271, 371, 471, 571, 671)**

**Wire #18 - 24vdc Power
Wire #95 - dc common (-)**

**Purple - Resistance from RTD
Blue - Resistance from RTD**

Title: PORTABLE DRYER: Plenum RTD Transmitter

Author: SUKUP MFG CO - MRK

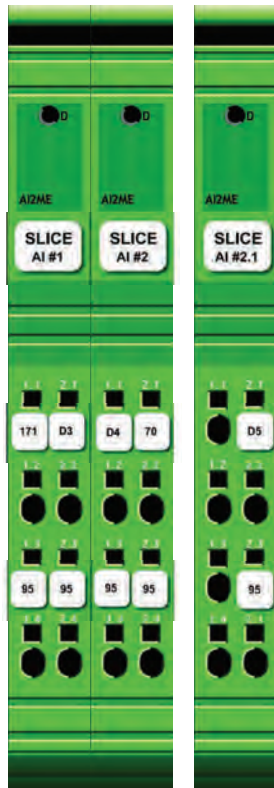
Date: 03/15

Sheet: 106.24

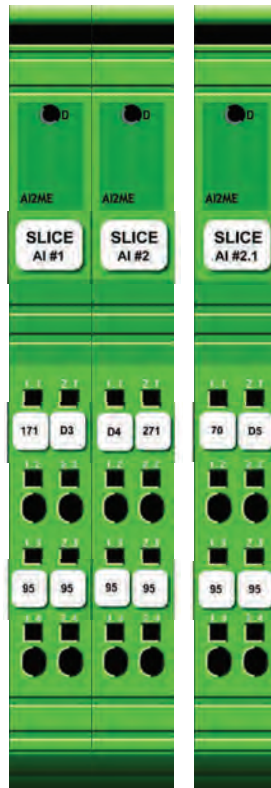
Revision:

Moisture Sensor

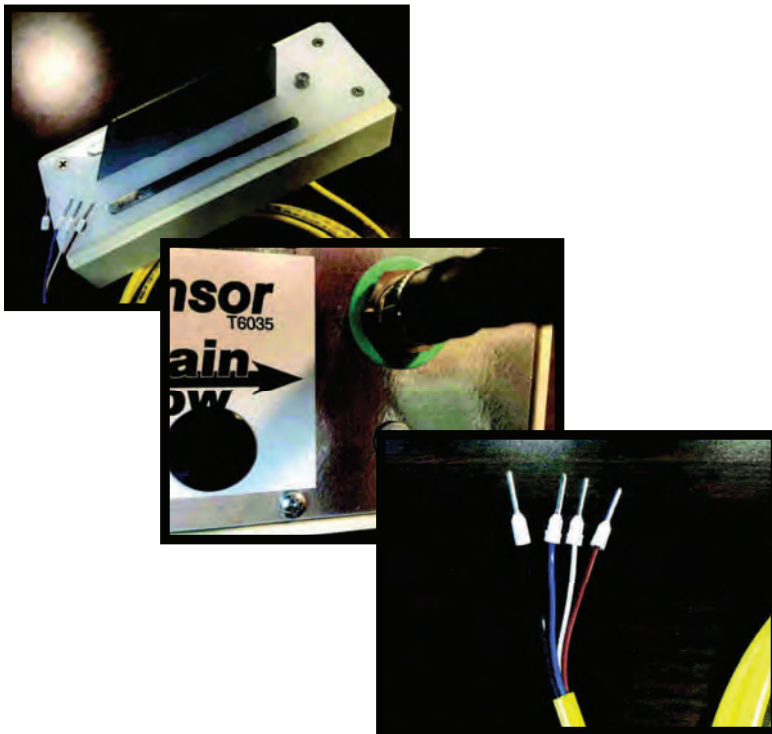
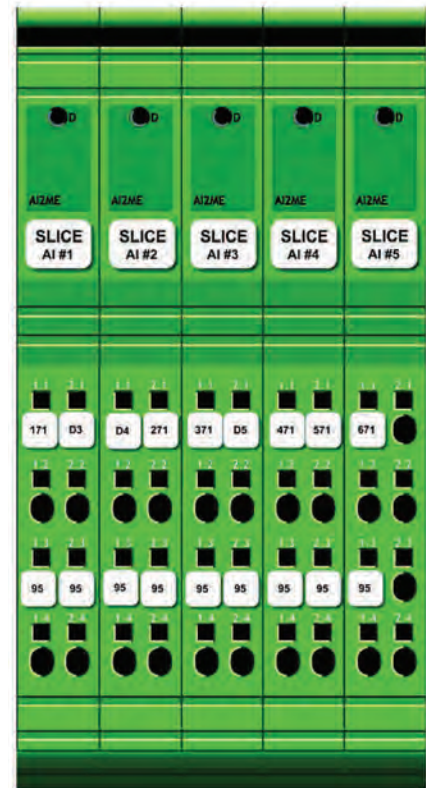
1 Fan



2 Fan



3-6 Fan



Pinout:

Black Wire: Moisture Reference (D4 or D5)

Blue Wire: Temperature Reference (D3)

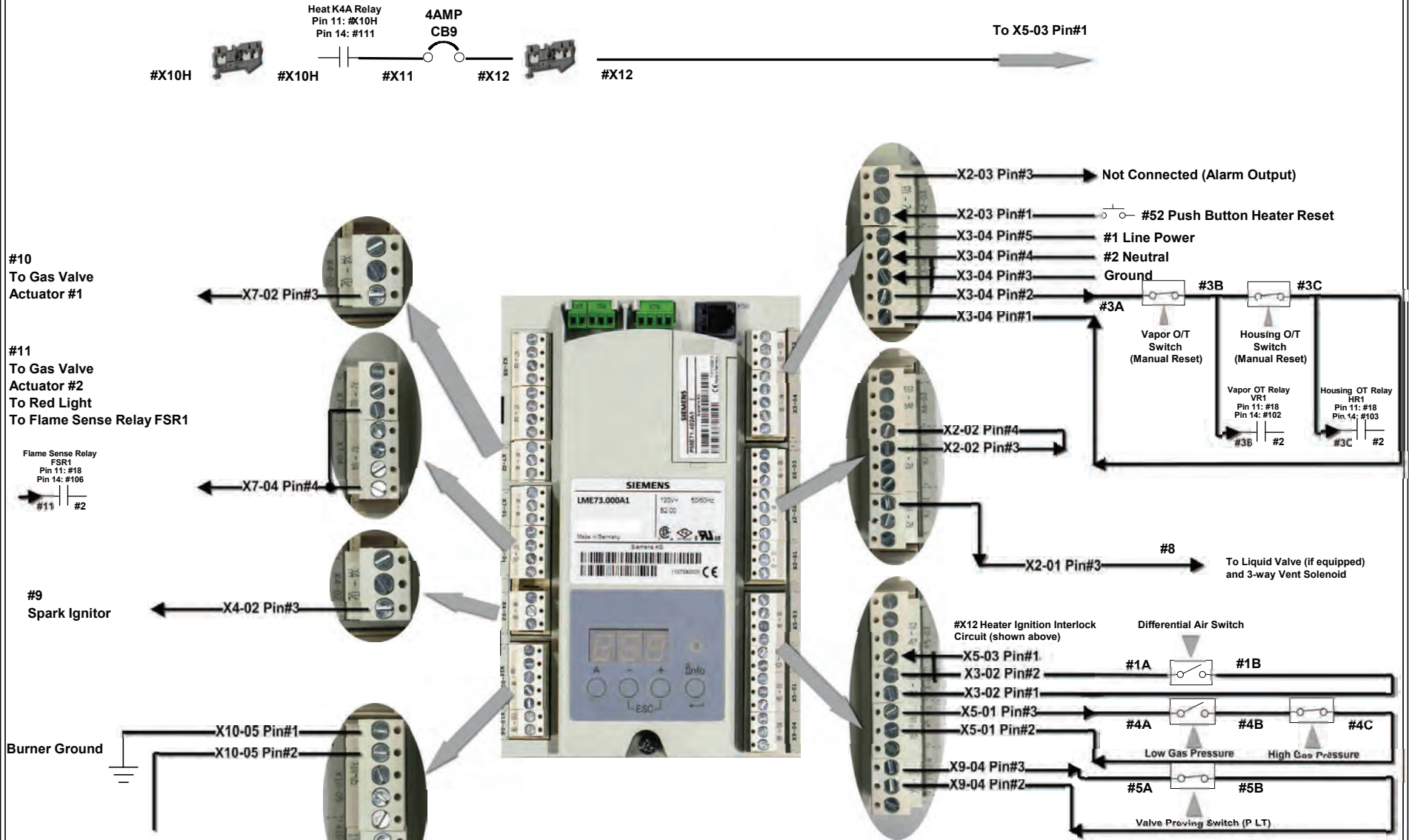
Brown: #18 - 24vdc Supply

White: #95 - DC common (-)

Important: take advantage of the quick connect plug, take the sensor inside during the off-season!

Title: PORTABLE DRYER: Moisture Sensor	
Author: SUKUP MFG CO - MRK	
Date: 03/15	Sheet: 106.25
Revision:	

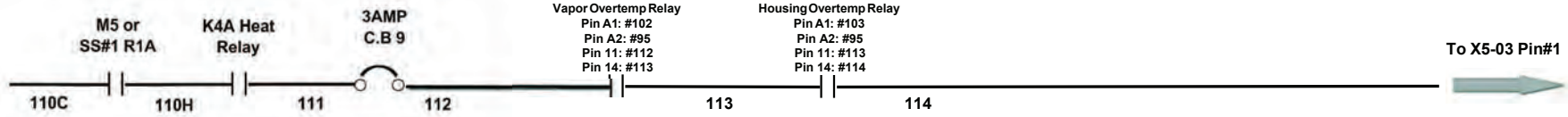
Heater Control Unit LME73.000A1



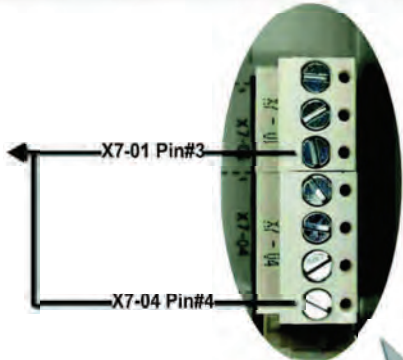
Title: Burner Control Unit - LME73 CE	
Author: SUKUP MFG CO - MRK	
Date: 11/2017	Sheet: 107.25
Revision:	

Heater Control Unit LME71.000A1

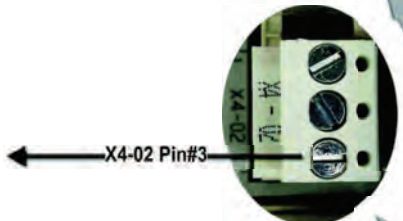
Located in Power Box



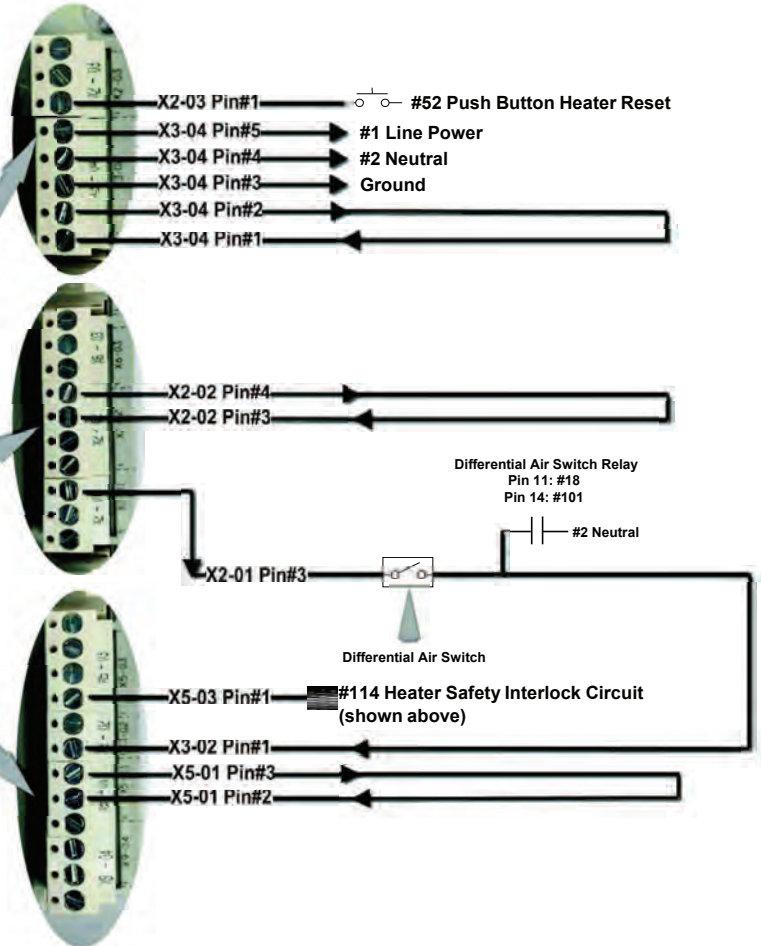
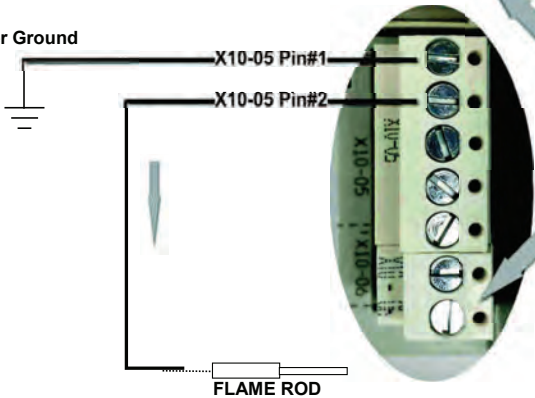
#10
To Gas Valve Actuators #1 & #2
To Red Light
To D. Air Relay
To Flame CR2B Relay



#9
To Spark Ignitor



Burner Ground

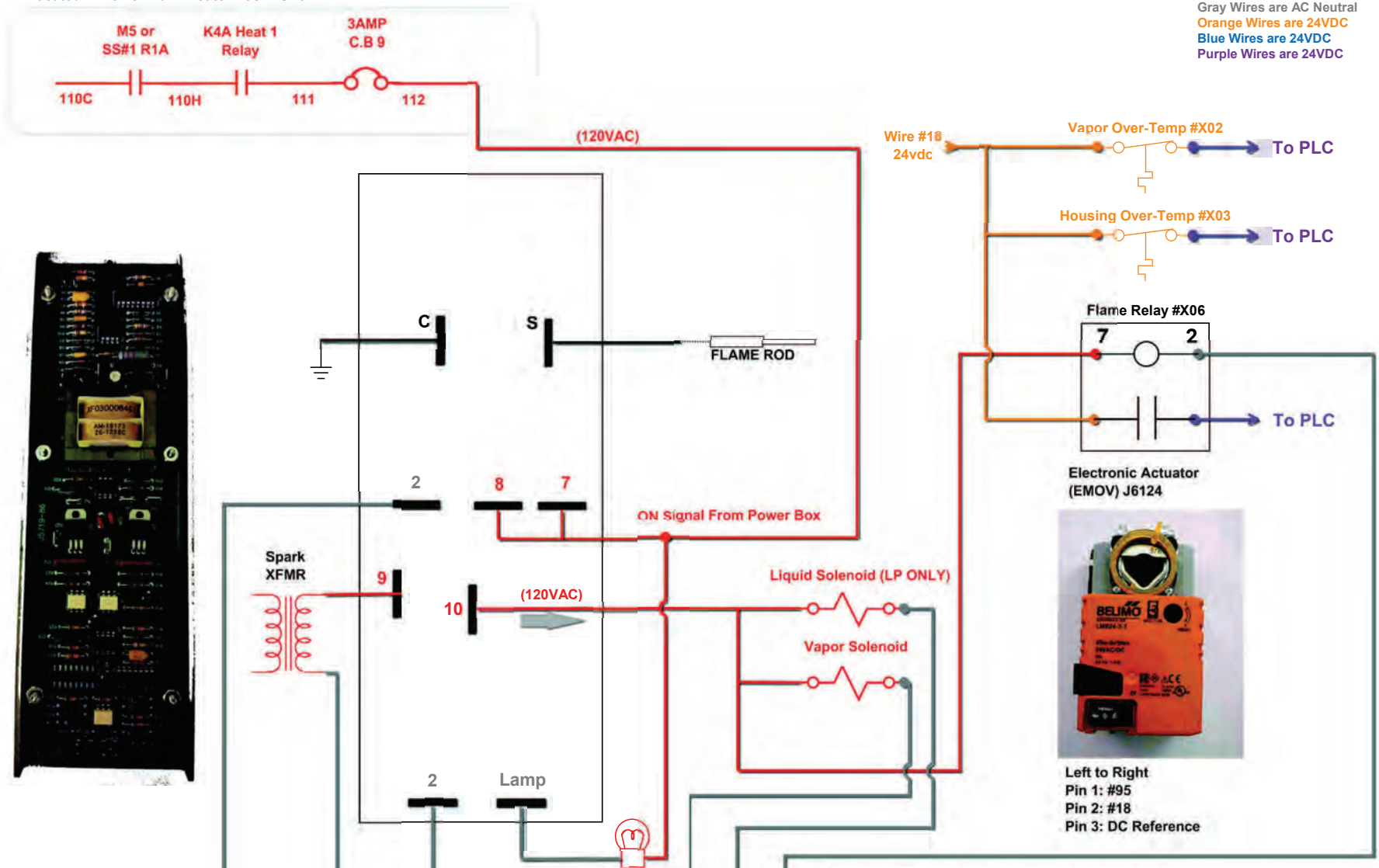


Title: Portable Dryer Heater Control Unit - LME71 CSA	
Author: SUKUP MFG CO - MRK	
Date: 6/15	Sheet: 107.7
Revision:	

Sukup Heater Ignition Board - D3948

Located in Power Box - Heater Pos. 1 Shown

Red Wires are 110VAC
 Gray Wires are AC Neutral
 Orange Wires are 24VDC
 Blue Wires are 24VDC
 Purple Wires are 24VDC



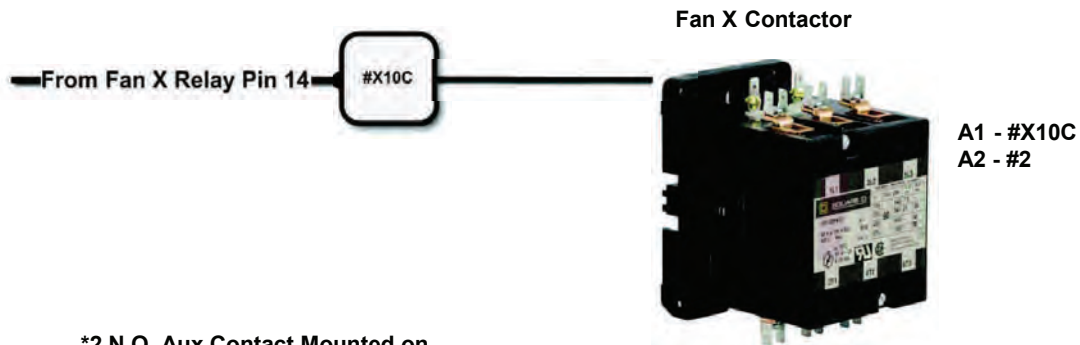
Title: Sukup Heater Ignition Board D3948	
Author: SUKUP MFG CO - MRK	
Date: 5/2015	Sheet: 107.8
Revision: 8/23/2017 - DWS (2)	



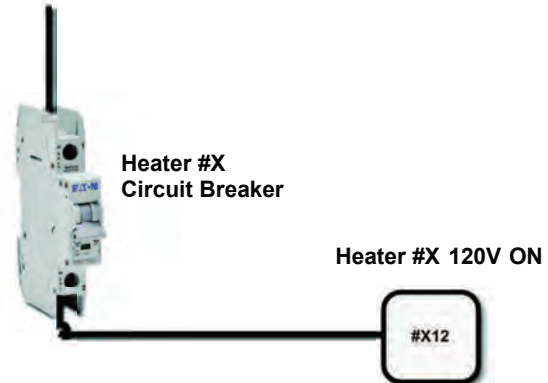
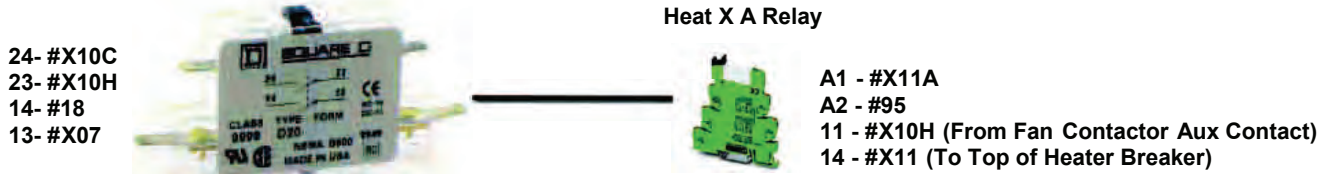
Left to Right
 Pin 1: #95
 Pin 2: #18
 Pin 3: DC Reference

Fan / Heater Interlock Circuit

"X" is dictated by the Fan Position. Fan #1 is always the lowest fan. Fans are counted from the ground up, like floors on a building. Pictures of components like relays, contactors, and auxiliary contacts may vary from your actual product.



*2 N.O. Aux Contact Mounted on the side of the Fan X contactor



*Older Dryers that do not have thermal magnetic breakers with Fault monitoring (Prior to MY 2008) will require a 240VAC relay in place of the 2 N.O. Auxiliary Contact to avoid possible contactor closure without power present.

Title: PORTABLE DRYER: Fan/Heater Wiring

Author: SUKUP MFG CO - MRK

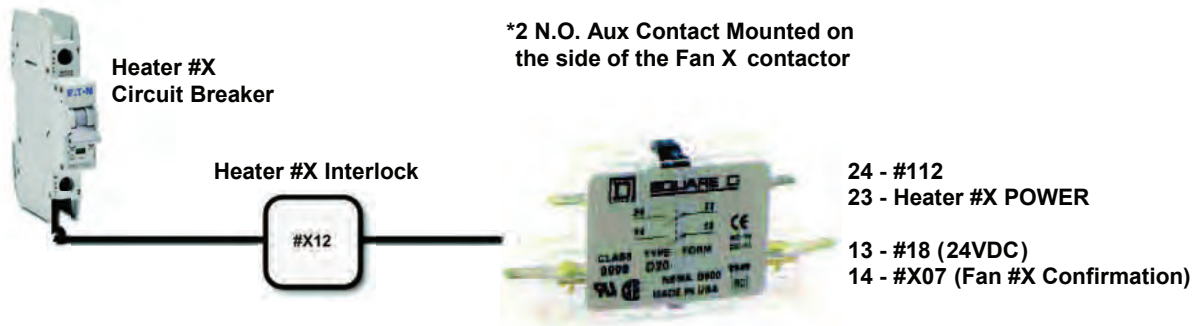
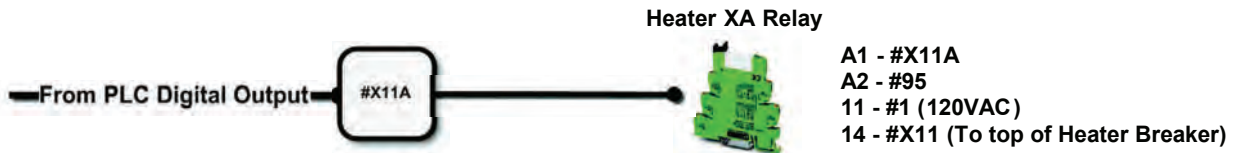
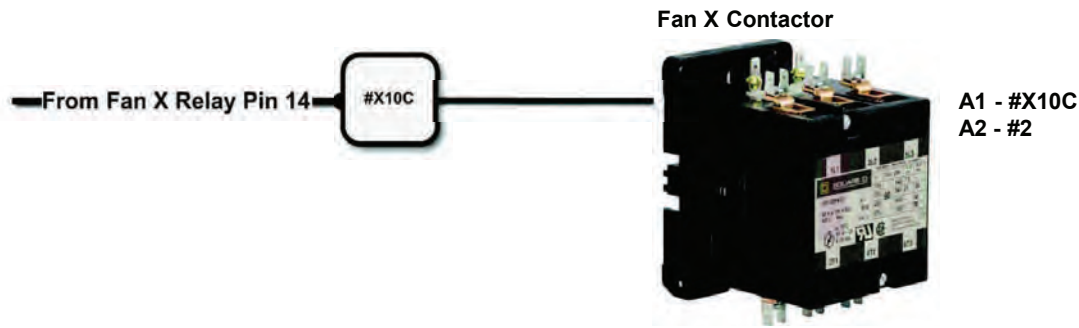
Date: 3/16

Sheet: 113.1

Revision:

Retrofit Fan / Heater Interlock Circuit

"X" is dictated by the Fan Position. Fan #1 is always the lowest fan. Fans are counted from the ground up, like floors on a building. Pictures of components like relays, contactors, and auxiliary contacts may vary from your actual product.



*Older Dryers that do not have thermal magnetic breakers with Fault monitoring (Prior to MY 2008) will require a 240VAC relay in place of the 2 N.O. Auxiliary Contact to avoid possible contactor closure without power present.

Title: PORTABLE DRYER: Retrofit Fan/Heater Wiring

Author: SUKUP MFG CO - MRK

Date: 3/16

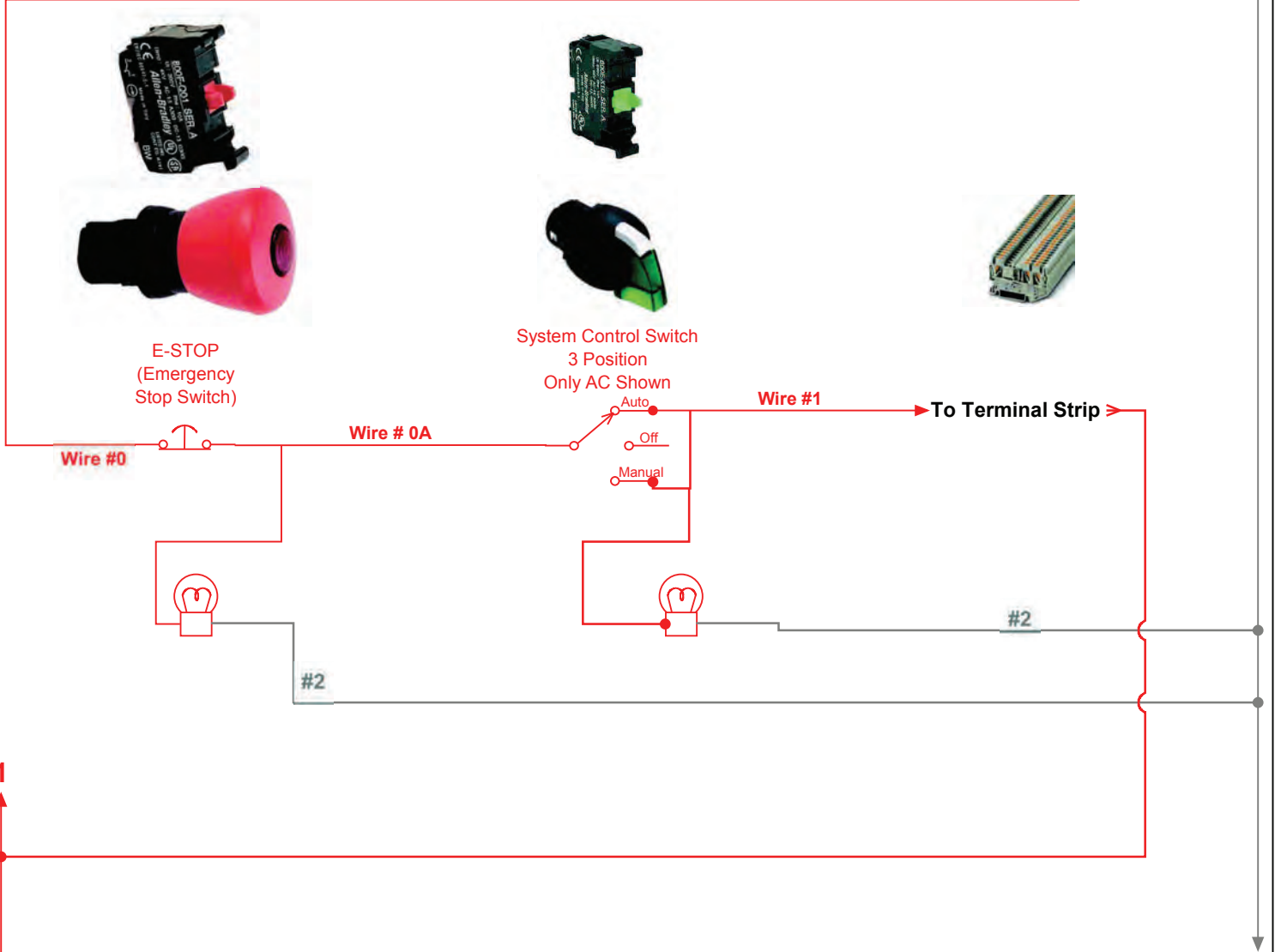
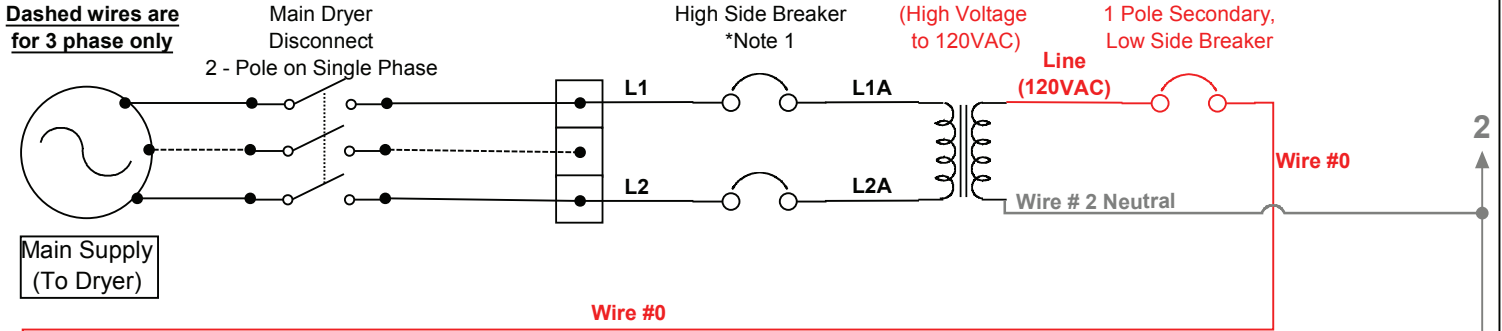
Sheet: 113.2

Revision:

Emergency Stop and AC System Control Switch Wiring



Dashed wires are for 3 phase only

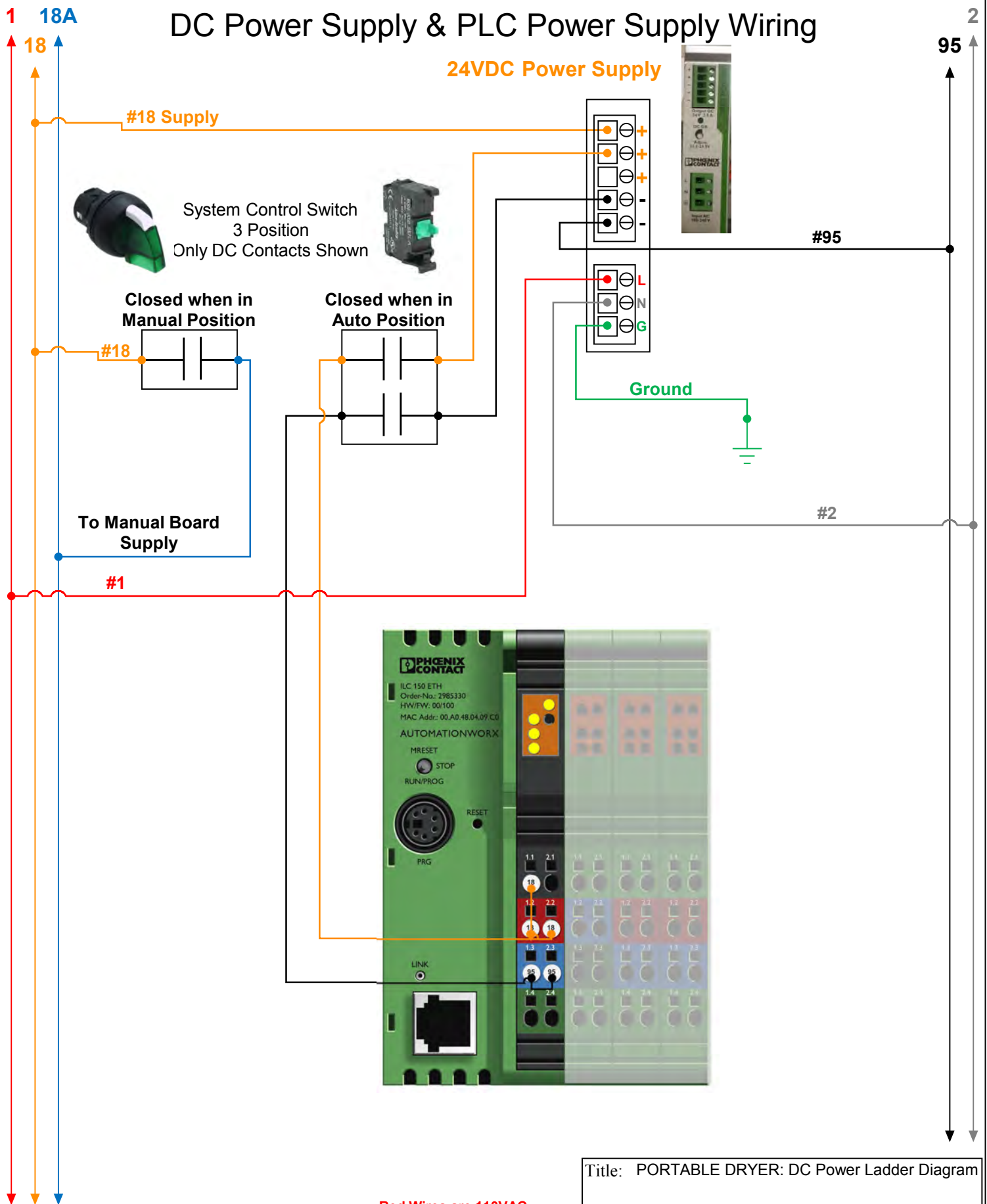


NOTE 1: 575VAC is Fused Instead of 2 Pole breaker shown

Red Wires are 110VAC
 Gray Wires are AC Neutral
 Orange Wires are 24VDC
 Blue Wires are 24VDC
 Purple Wires are 24VDC
 Black Wires are DC Ground

Title: PORTABLE DRYER: Emergency Stop and System Control Switch Wiring	
Author: SUKUP MFG CO - MRK	
Date: 03/15	Sheet: 115.1
Revision: 6/7/2017 - DWS (1)	

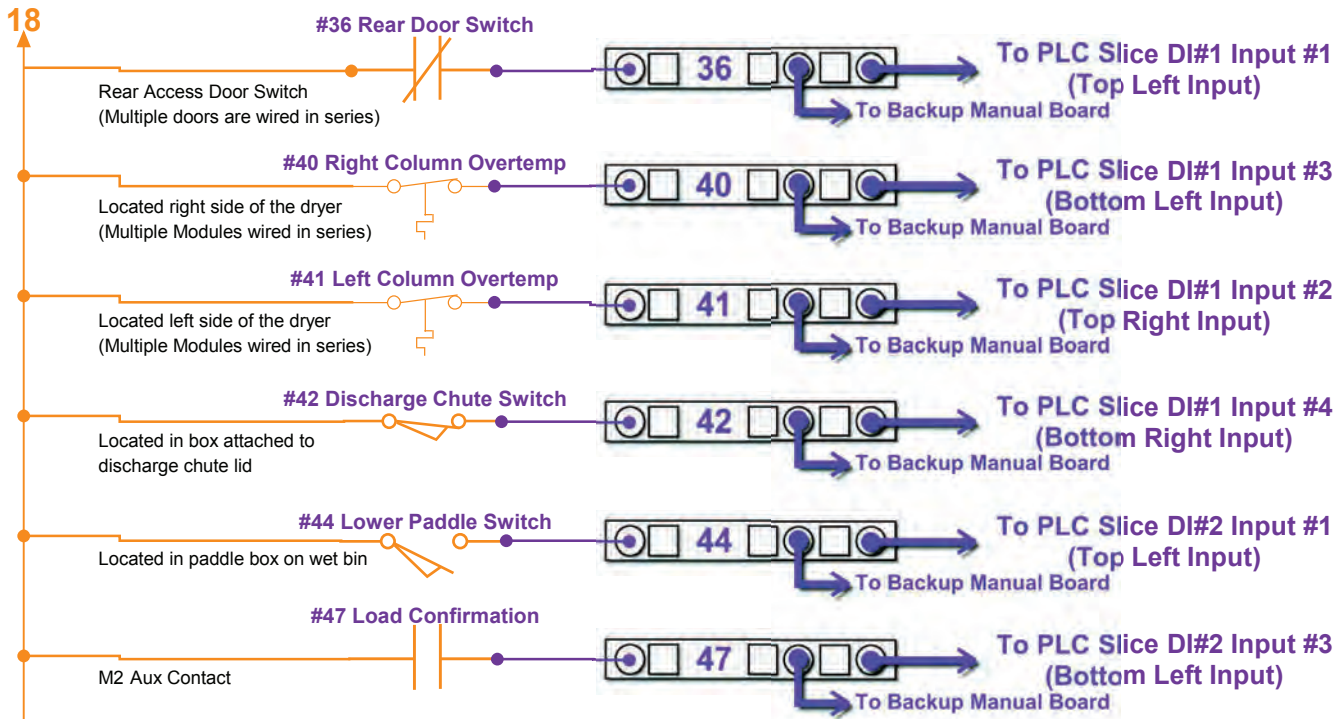
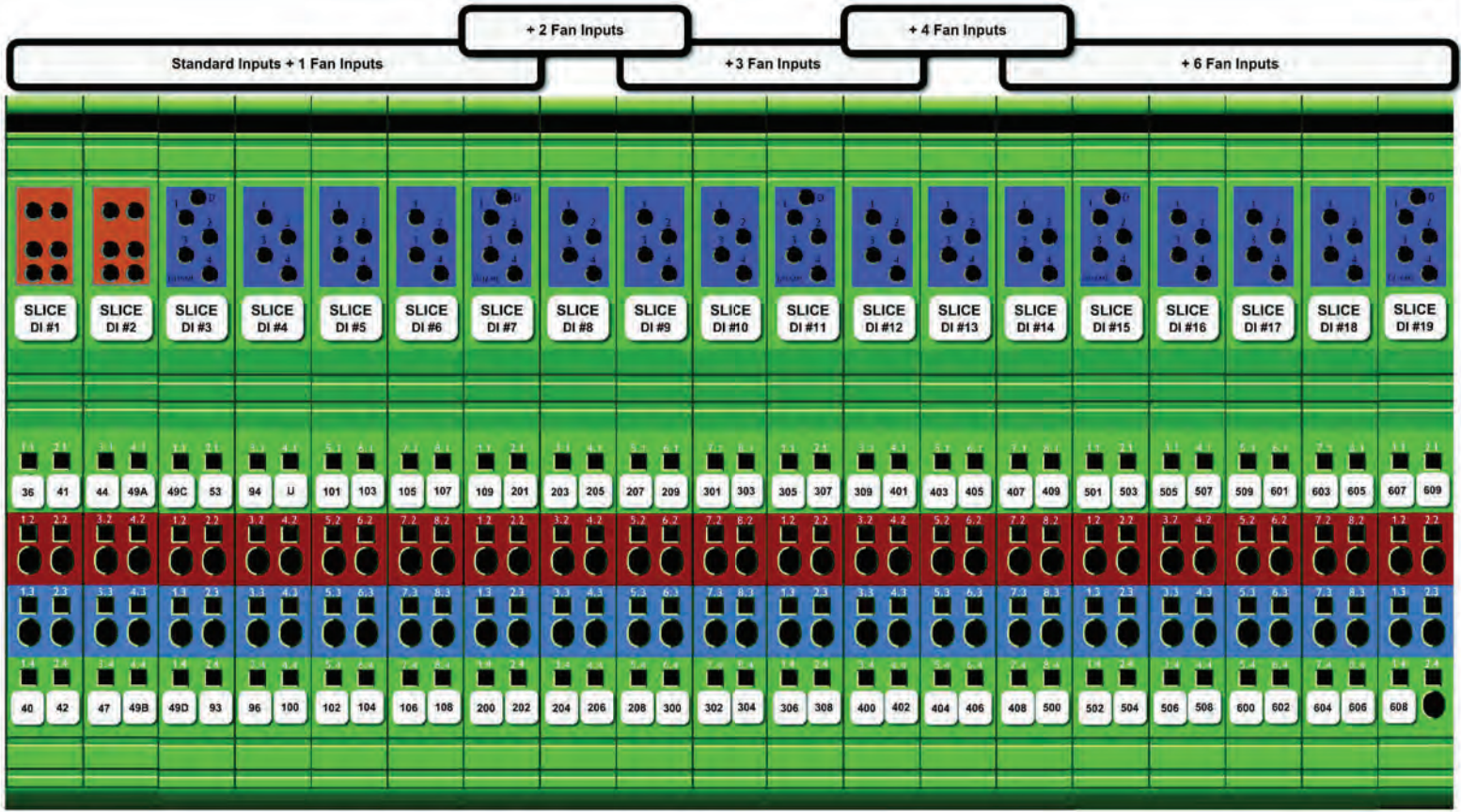
DC Power Supply & PLC Power Supply Wiring



Red Wires are 110VAC
 Gray Wires are AC Neutral
 Orange Wires are 24VDC
 Blue Wires are 24VDC
 Purple Wires are 24VDC
 Black Wires are DC Ground

Title: PORTABLE DRYER: DC Power Ladder Diagram	
Author: SUKUP MFG CO - DWS	
Date: 6/7/2017	Sheet: 115.2
Revision: 11/17/2017 - DWS(1)	

PLC Digital Inputs 1-6 Fan



Red Wires are 110VAC
Gray Wires are AC Neutral
Orange Wires are 24VDC
Blue Wires are 24VDC
Purple Wires are 24VDC
Black Wires are DC Ground

Title: PORTABLE DRYER: Digital Input Ladder Diagram

Author: SUKUP MFG CO - DWS

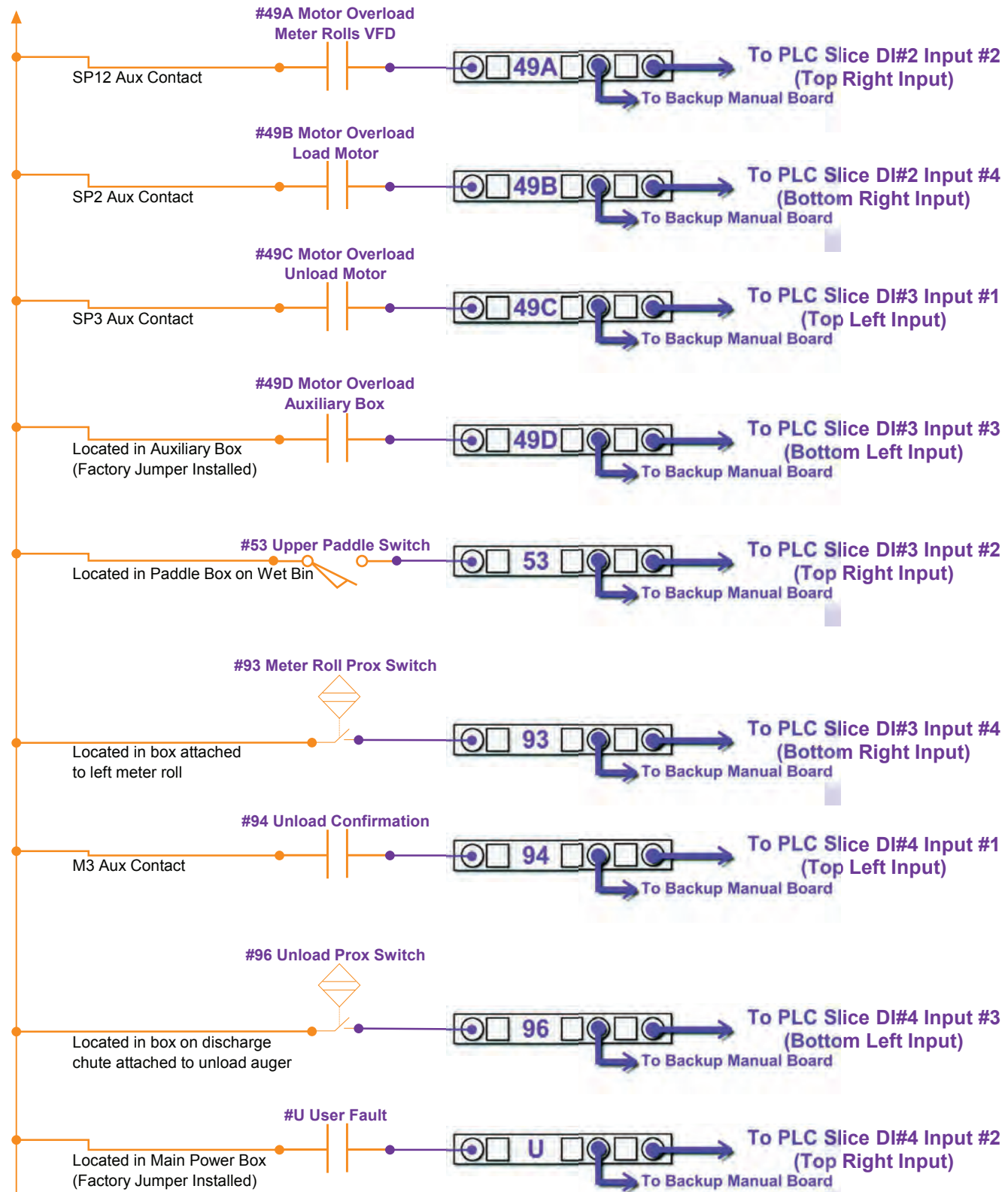
Date: 6/7/2017

Sheet: 115.3

Revision:

PLC Digital Inputs 1-6 Fan (Continued - 2)

18



Red Wires are 110VAC
 Gray Wires are AC Neutral
 Orange Wires are 24VDC
 Blue Wires are 24VDC
 Purple Wires are 24VDC
 Black Wires are DC Ground

Title: PORTABLE DRYER: Digital Input Ladder Diagram

Author: SUKUP MFG CO - DWS

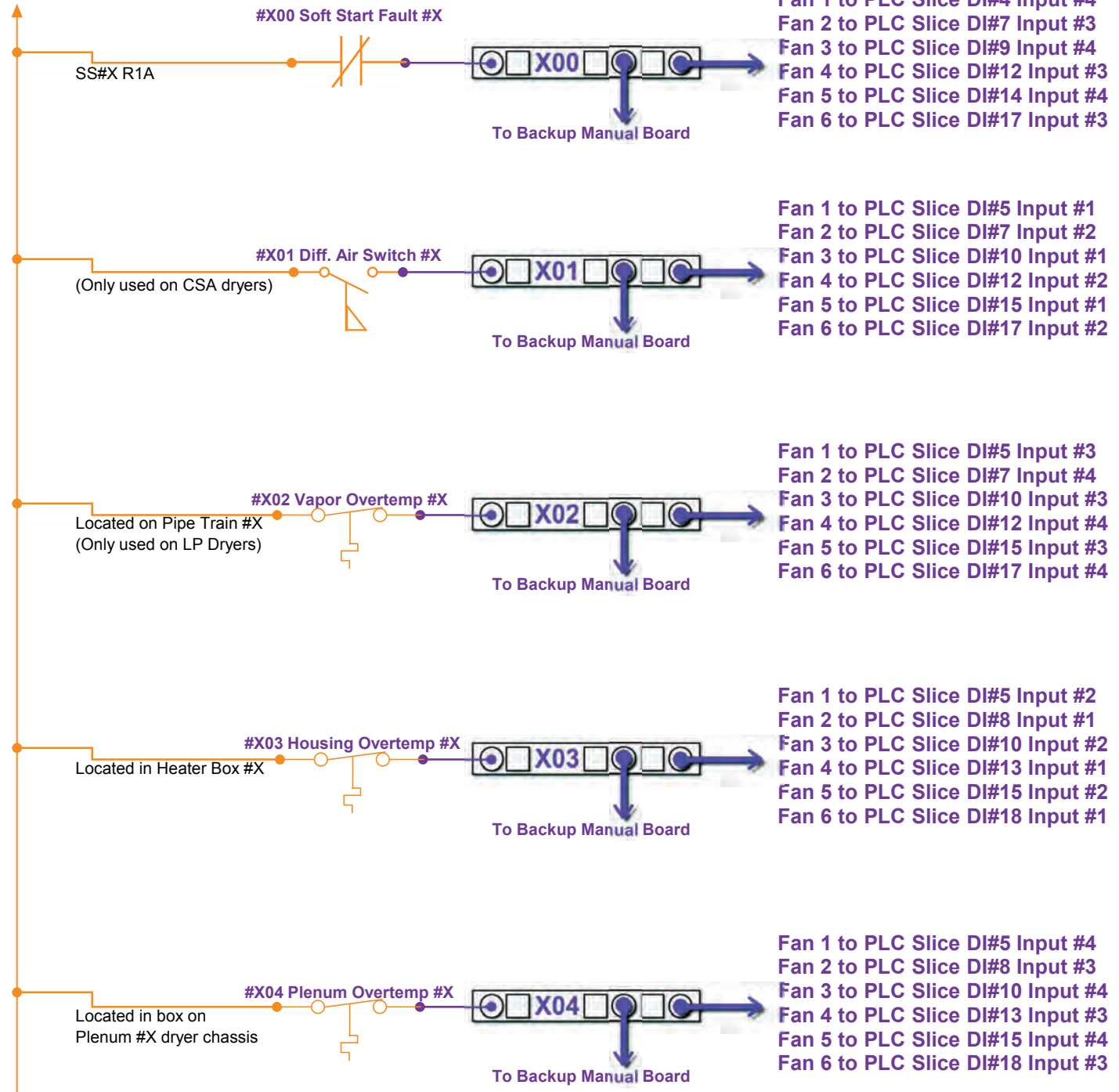
Date: 6/7/2017

Sheet: 115.4

Revision:

PLC Digital Inputs 1-6 Fan (Continued - 3)

18



Replace "X" with Fan Number

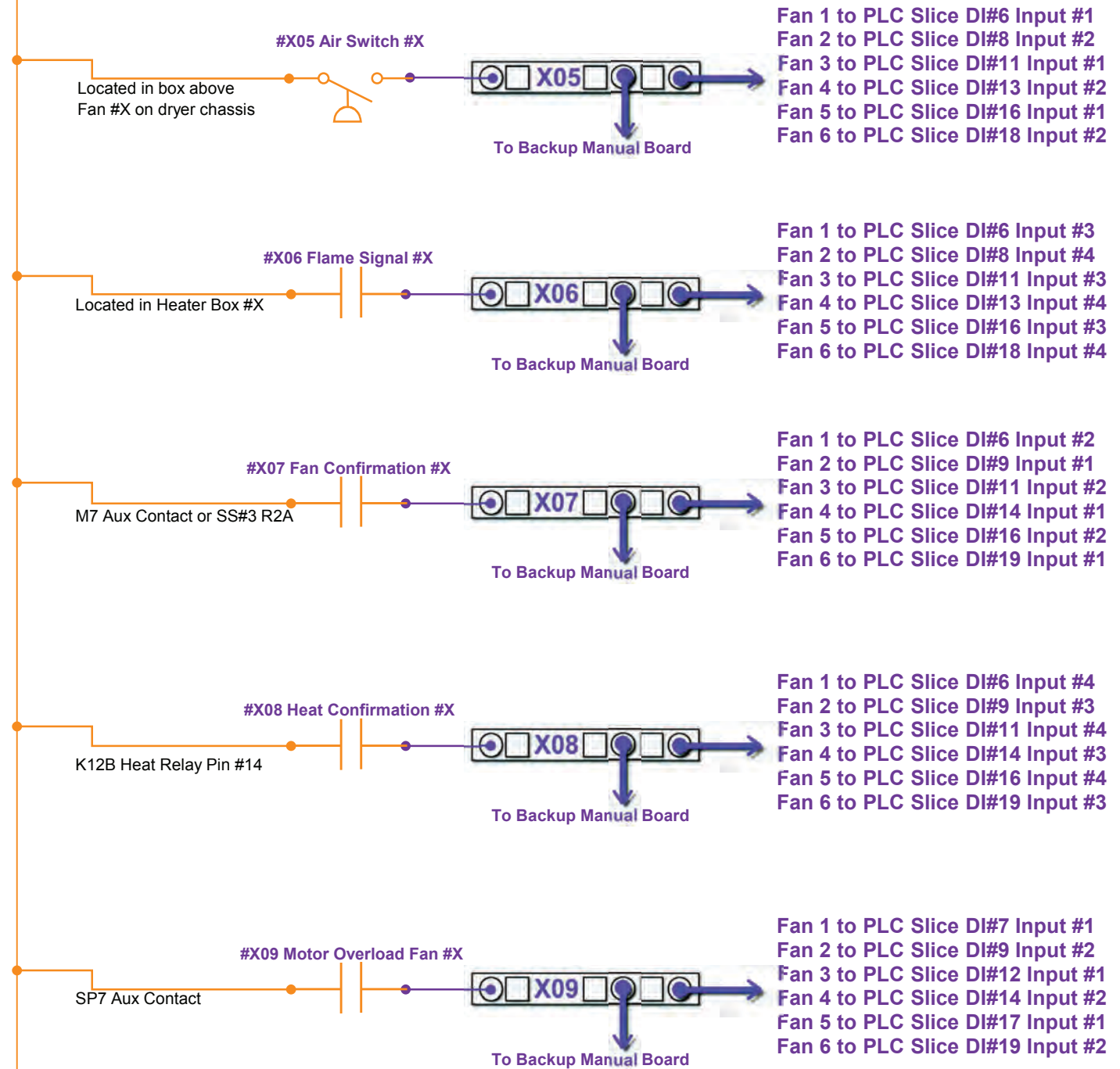
PLC Input Reference
 Input #1 - Top Left
 Input #2 - Top Right
 Input #3 - Bottom Left
 Input #4 - Bottom Right

Red Wires are 110VAC
 Gray Wires are AC Neutral
 Orange Wires are 24VDC
 Blue Wires are 24VDC
 Purple Wires are 24VDC
 Black Wires are DC Ground

Title: PORTABLE DRYER: Digital Input Ladder Diagram	
Author: SUKUP MFG CO - DWS	
Date: 6/7/2017	Sheet: 115.5
Revision:	

PLC Digital Inputs 1-6 Fan (Continued - 4)

18



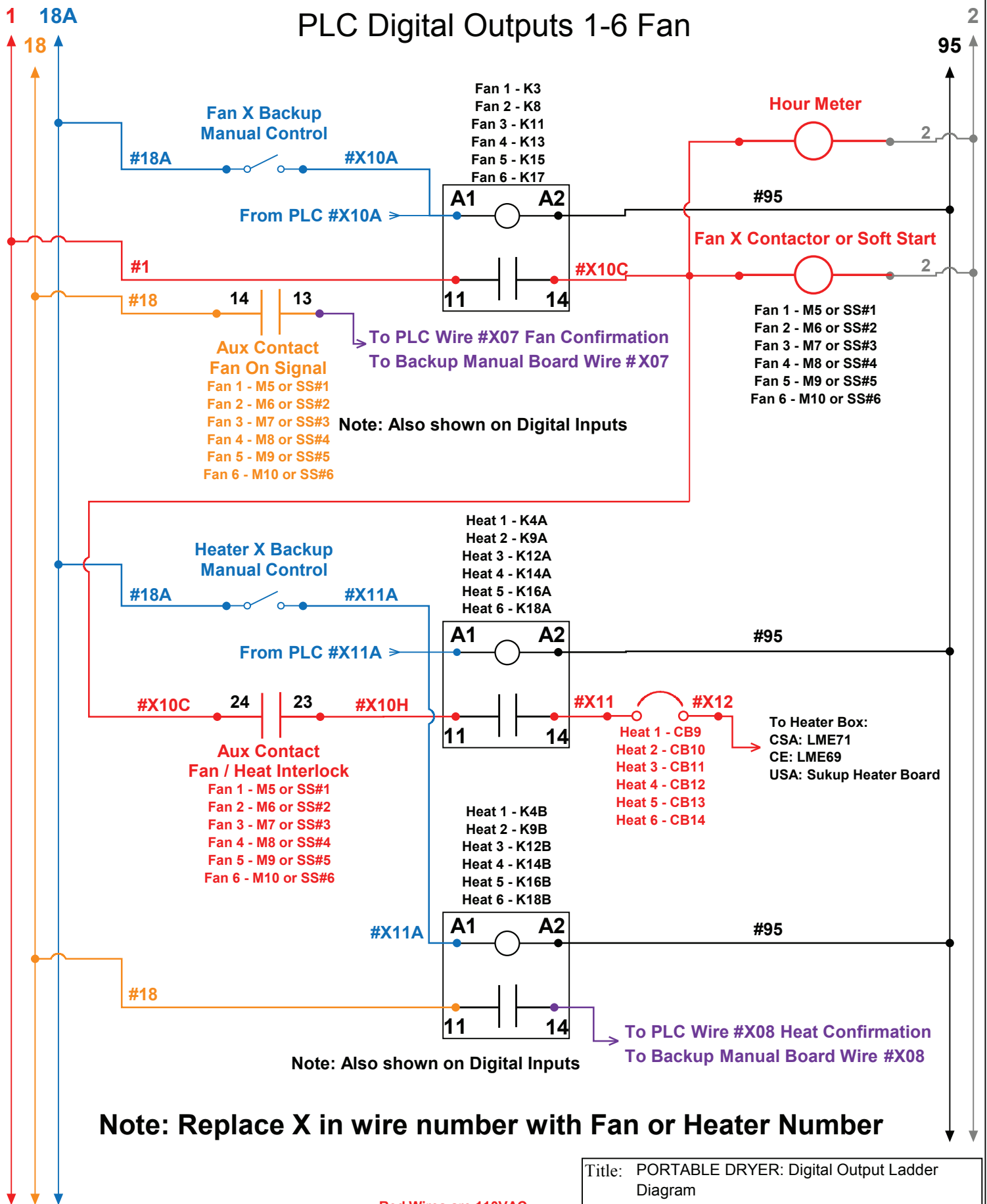
Replace "X" with Fan Number

PLC Input Reference
 Input #1 - Top Left
 Input #2 - Top Right
 Input #3 - Bottom Left
 Input #4 - Bottom Right

Red Wires are 110VAC
 Gray Wires are AC Neutral
 Orange Wires are 24VDC
 Blue Wires are 24VDC
 Purple Wires are 24VDC
 Black Wires are DC Ground

Title: PORTABLE DRYER: Digital Input Ladder Diagram	
Author: SUKUP MFG CO - DWS	
Date: 6/7/2017	Sheet: 115.6
Revision:	

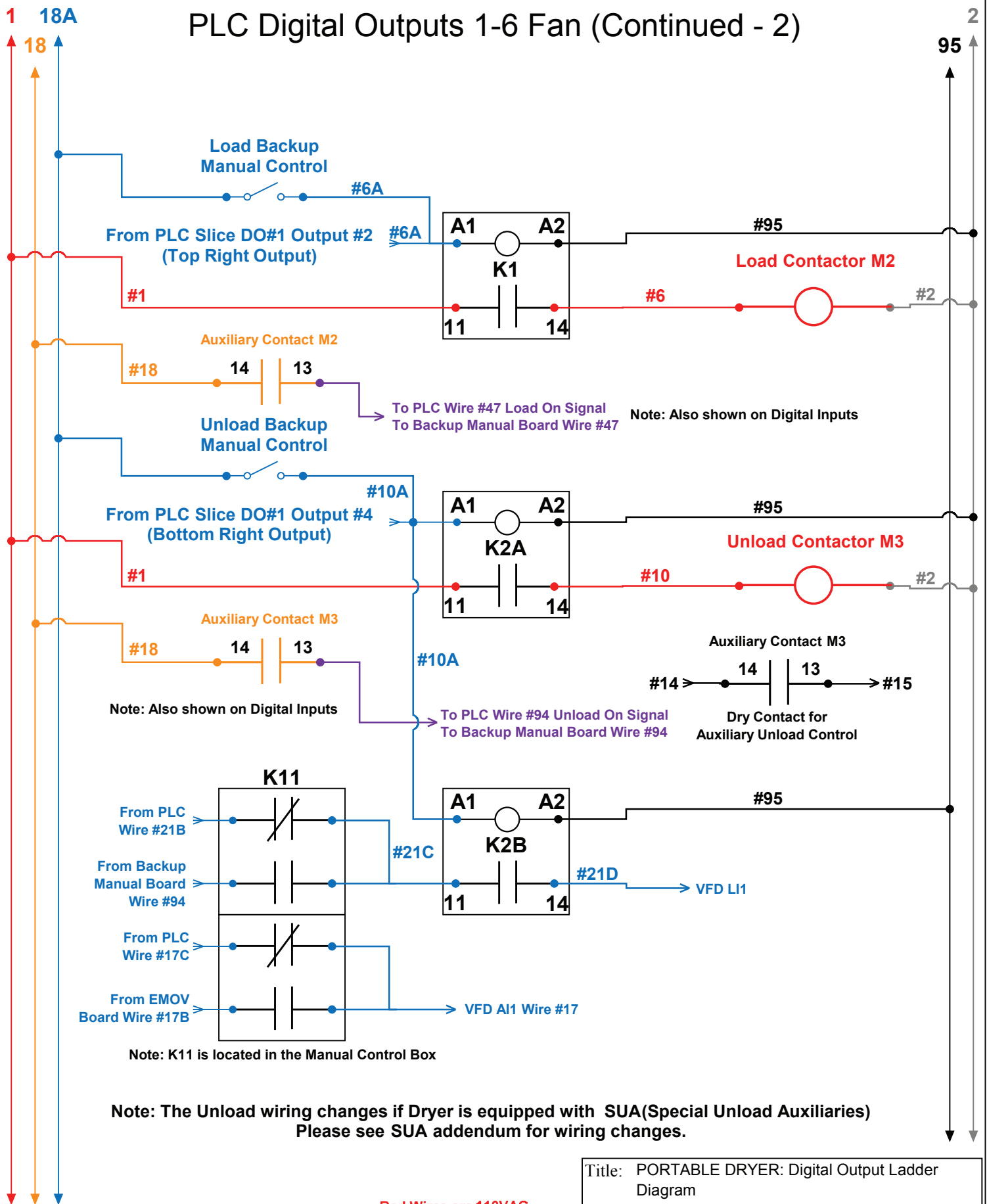
PLC Digital Outputs 1-6 Fan



Red Wires are 110VAC
 Gray Wires are AC Neutral
 Orange Wires are 24VDC
 Blue Wires are 24VDC
 Purple Wires are 24VDC
 Black Wires are DC Ground

Title: PORTABLE DRYER: Digital Output Ladder Diagram	
Author: SUKUP MFG CO - DWS	
Date: 6/7/2017	Sheet: 115.7
Revision:	

PLC Digital Outputs 1-6 Fan (Continued - 2)

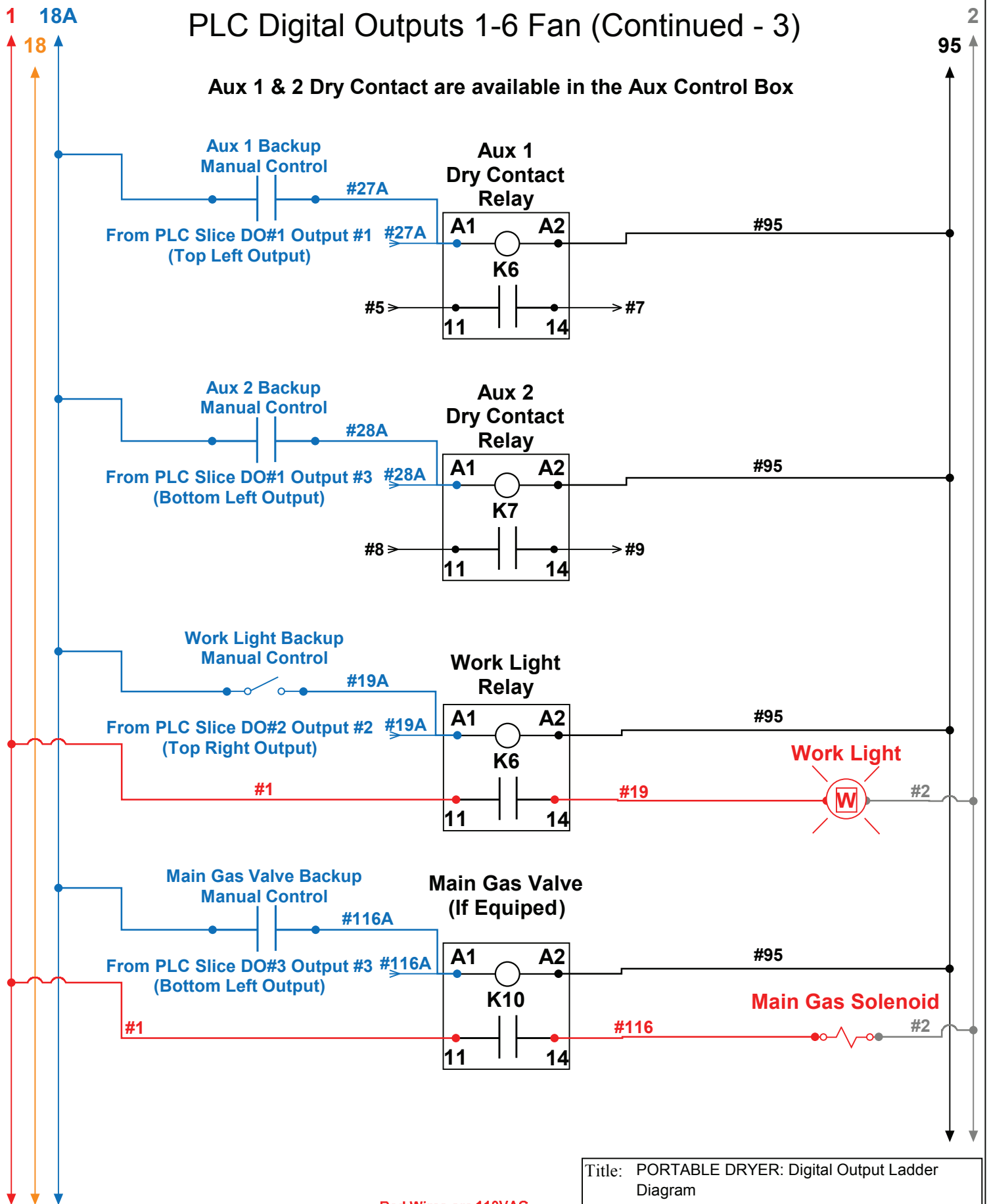


Red Wires are 110VAC
 Gray Wires are AC Neutral
 Orange Wires are 24VDC
 Blue Wires are 24VDC
 Purple Wires are 24VDC
 Black Wires are DC Ground

Title: PORTABLE DRYER: Digital Output Ladder Diagram	
Author: SUKUP MFG CO - DWS	
Date: 6/7/2017	Sheet: 115.8
Revision:	

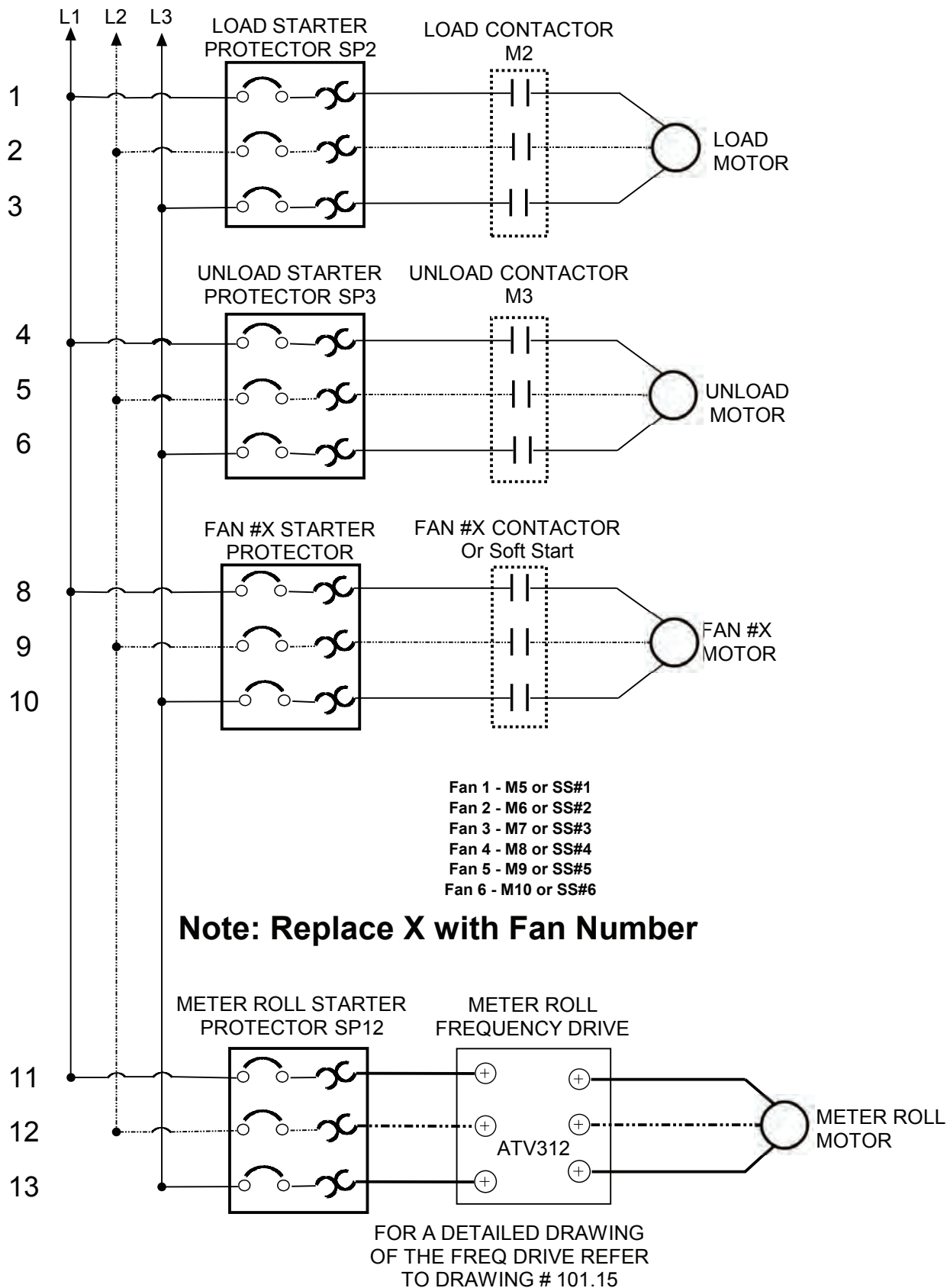
PLC Digital Outputs 1-6 Fan (Continued - 3)

Aux 1 & 2 Dry Contact are available in the Aux Control Box



Red Wires are 110VAC
 Gray Wires are AC Neutral
 Orange Wires are 24VDC
 Blue Wires are 24VDC
 Purple Wires are 24VDC
 Black Wires are DC Ground

Title: PORTABLE DRYER: Digital Output Ladder Diagram	
Author: SUKUP MFG CO - DWS	
Date: 6/7/2017	Sheet: 115.9
Revision:	



Note: Dotted/Dashed Lines are for 3 Phase Only

Title: PORTABLE DRYER: 1-6 FAN MOTOR CONTACTOR & RELAY WIRING	
Author: SUKUP MFG - DWS	
Date: 10/4/2017	Sheet: 115.10
Revision:	