



SS-Series Shrink Tunnels
Model: ST-1606-20-110V

Distributed By:

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ST-1606-20-110 Volt Tunnel Service Manual

IMPORTANT - PLEASE READ THIS CAREFULLY

The development of a good safety program, that is rigidly enforced, is absolutely imperative when involved in the operation of industrial equipment. Our machinery is well designed and includes extremely important safety features. The part you the user play through proper installation and maintenance procedures is of far greater significance than our designs. Only properly trained individuals following rigidly enforced safety rules, as recommended by A.N.S.I. and O.S.H.A., should be allowed to operate these machines.

ST-1606-20110 Volt Tunnel Service Manual

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UNPACKING**THOROUGHLY INSPECT EQUIPMENT UPON ARRIVAL.**

If goods are received short or in a damaged condition, it is important that you notify the carrier's driver **before he leaves your company** and **insist** on a notation of the loss or damage across the face of the freight bill. Unless this is done, no claim can be enforced against the transportation company.

If concealed loss or damage is discovered, notify the carrier at once and **insist** on an inspection. This is absolutely necessary! A concealed damage report must be made no later than ten (10) days from the date the shipment was delivered. Unless you do this, the carrier will not consider any claim for loss or damage. The carrier's agent will then make an inspection and grant a concealed damage notation. If you give the transportation company a clear receipt for the goods that have been damaged or lost in transit, you do so at your own risk and expense.

All claims must be filed within six 30 days of delivery date or carrier will not accept them.

Sealer Sales, Inc. is willing to assist in every possible manner to collect claims for loss or damage; however, this does not hold Sealer Sales, Inc. responsible for collection on claims or replacement of material.

Do not throw away damaged pallets or box until freight inspection has occurred.

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Your new Sealer Sales, Inc. Tunnel comes bolted to a pallet and has a tri-walled corrugated box strapped to the pallet to protect the tunnel. The larger box is the Tunnel and the smaller box on the right is the leg set.

If your machine does not arrive in this condition, **write on shipping paperwork that outside of box is damaged. Concealed damage may have occurred.**



If you ordered the Tabletop unit, it comes complete in one box.

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UNPACKING



1. Cut the two steel straps holding corrugated box to pallet.
2. Remove tri-wall corrugated box from pallet.

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UNPACKING



3. Remove plastic bag and stretch film that covers machine.



4. Unbolt tunnel from base of pallet using Phillips screwdriver.
5. Place forks of forklift under center of tunnel to lift off the pallet.
6. If you ordered the Leg Kit – Leave tunnel on forklift and install leg set using the bolts provided.
7. Place in desired location and lock casters.

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UNPACKING



7. Cut plastic strap from **top and bottom** of conveyor rollers before attempting to operate conveyor.

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IMPORTANT WARRANTY NOTICES**OPERATING AND MAINTENANCE MANUAL**

The operating and maintenance manual has been carefully prepared to provide the user with all the information needed to properly install, operate, and maintain your Sealer Sales, Inc. equipment.

Please read this manual carefully and refer to it for information on the care and use of your Sealer Sales, Inc. equipment. It is recommended that additional copies be ordered for use by production, maintenance, and supervisory personnel. Although the design of this equipment incorporates safeguards to protect personnel, care should be used in operating, adjusting, and servicing.

Attention is directed to the warranty that accompanies all your Sealer Sales, Inc. equipment. The terms and conditions of this warranty apply only to unmodified units. **Any unauthorized modifications to the equipment automatically voids this warranty.**

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Sealer Sales, Inc.

WARRANTY

Sealer Sales, Inc., Inc. warrants each new product manufactured to be free from defects in material and workmanship for a period of (1) year from date of shipment by Sealer Sales, Inc..

This warranty is not transferable with any subsequent resale.

Defective parts under warranty must be returned to Sealer Sales, Inc. freight prepaid. Sealer Sales's sole obligation and purchaser's sole remedy in the event of a warranty dispute shall be, at Sealer Sales's option, to repair or replace the part in question. Labor incurred in removing or installing the defective part is not covered by this warranty. Prior to returning any parts for any reason, contact Sealer Sales, Inc. for a Return Authorization Number. This number must accompany all returns.

This warranty shall not apply if equipment has been tampered with, misused, improperly installed, altered, or has received damage due to abuse, carelessness, accident or failure to follow recommended regular maintenance procedures or has been serviced by someone other than a duly authorized factory representative without the express written consent of Sealer Sales, Inc., Inc.

This warranty is in lieu of all other warranties, expressed or implied, including but not limited to warranties of merchantability and fitness for a particular purpose, non-infringement or any other matter.

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Sealer Sales, Inc. shall have no liability to any person for direct, indirect, incidental or consequential damages or delay resulting from any defect negligence, or tort and customer hereby waives for itself any and all claims for punitive damages and all claims of negligence of strict liability or both. In no event shall our liability exceed the purchase price of the product that was actually paid.

Sealer Sales, Inc. reserves the right to make changes, additions, or improvements to our products with no obligation to make such changes in any previously shipped product covered by this warranty.

Sealer Sales, Inc. shall not be held liable for any damages arising out of nor in connection with the operation of the equipment should customer or its agent fail to maintain equipment in safe operating condition. This warranty shall become unenforceable if and to the extent the customer or its agents remove, disconnect, or otherwise render useless any safety device and or parts designed or affixed by us or fails to maintain and service equipment in a manner as advised.

Sealer Sales, Inc. provides a one-year warranty on parts, excluding shipping or freight costs for replacement parts. All warranty parts are shipped F.O.B. Rancho Cucamonga, California. Service Labor to install part is not covered under warranty!

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WARRANTY EXCEPTIONS

The following parts are an exception to the general warranty list on page 10. Each part listed below shall carry a 30-day warranty unless designated otherwise.

ST-1606-20 Tunnel Parts

1. Silicone Tubing (roller covers)
2. Tunnel Curtains

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WARNINGS

Every effort has been taken to ensure your safety while operating this machine; however, there still remain certain risks. Do not allow this machine to be operated before informing all personnel of the following warnings.

WARNING.....

Do not tamper with the electrical wiring. Only use a licensed electrician for maintenance. Always disconnect the electrical power before attempting any maintenance to all electrical and/or moving parts.

WARNING.....

In order to prevent injury to personnel and/or machinery **DO NOT INCREASE SETTINGS OR RATINGS ON EITHER ELECTRICAL OR MECHANICAL OVERLOAD SAFETY DEVICES.**

WARNING.....

KEEP HANDS AWAY FROM MOVING CONVEYORS AND ASSEMBLIES. Conveyor belts that have become worn or frayed are capable of being hazardous. They should be replaced promptly.

WARNING.....

NEVER OPERATE THIS OR ANY MOVING EQUIPMENT WITHOUT ALL COVERS AND GUARDS IN PLACE. The internal mechanism of most packaging machinery contains numerous shear, pinch, and inrunning nip points, many of which are capable of causing severe injury and/or permanent disfigurement.

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WARNING.....

To minimize the potential for personnel injury, always be sure that machine operators and others working on the machinery are properly trained in the correct usage of the equipment and properly instructed regarding the safety procedures for operation.

WARNING.....

Heat sealing arms and jaws on packaging machinery can become very warm after a period of use. KEEP HANDS AWAY WHILE IN OPERATION AND USE CAUTION IF THE MACHINE HAS BEEN RUNNING RECENTLY.

WARNING.....

ANY MODIFICATIONS TO EITHER THE ELECTRICAL CIRCUITRY OR THE MECHANICAL ASSEMBLIES OF THE MACHINERY WILL VOID ANY WARRANTIES ASSOCIATED WITH THIS EQUIPMENT. Such modifications may introduce hazards that would not otherwise be associated with this machinery. Sealer Sales, Inc. will not be responsible for any consequences resulting from such unauthorized modifications.

WARNING.....

The use of certain types of plastic films in sealing and/or shrinking equipment may result in the release of HAZARDOUS FUMES due to the degradation of the film at high temperatures. Before using any plastic film in this equipment, the manufacturer or supplier of the film should be contacted for specific information concerning the potential release of hazardous fumes. ADEQUATE VENTILATION MUST BE PROVIDED AT ALL TIMES.

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WARNING.....

It is important that the machine operator unplug the machine when he/she has finished operating the unit.

WARNING.....

Turn off machine and disconnect power cord from power source before attempting to make any repairs or work on machine.

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**DESCRIPTION AND SPECIFICATIONS OF
MODEL ST-1606-20 TUNNEL****DESCRIPTION**

The ST-1606-20 Tunnel is a conveyORIZED heat shrinking device employing electric heating combined with a recirculating air system, and a complete range of adjustments. The main components are the blower, the heater bank, the shrink chamber, and the package conveyor. Curtains cover the entrance and exit of the heat chamber to minimize heat loss as packages travel through the tunnel. This is a live roller tunnel with High-density roller with 1/2" spacing between rollers to accommodate small packages and special applications. Teflon mesh belt kits are also available.

A simple yet reliable and extremely durable shrink tunnel. The strength and durability of this model are it's greatest features. Straightforward, easy manual operation is employed. Operator training should, at the ultimate extreme, be less than 1-2 hours.

<u>SPECIFICATIONS</u>	Model: ST- 1606-20
Chamber Size:	Width: 16"
	Height: 6"
	Length: 20"
Volts:	110
Amperage:	20
Phase:	Single 1/0
Weight:	250 lbs.

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INSTALLATION AND BASIC SET-UP**IMPORTANT**

Read this manual carefully, and make it available to everyone connected with the supervision, maintenance, or production of this machine. Additional copies are available at your request. (Contact your distributor for this information.) Be very careful when operating, adjusting, or servicing this equipment. If in doubt, stop and obtain qualified help before proceeding.

INSTALLATION OF SHRINK TUNNEL

Place the tunnel in the desired location with the required electrical power source available. (See power requirements.) Make certain that proper electrical wiring is provided to guard against low voltage. If the voltage is too low, the equipment will not function properly.

Finding the proper location is a most important function of the initial set-up. One must take several factors into consideration:

1. Adequate power source.
2. Relationship to source of product.
3. Relationship to sealer.
4. Relationship to any conveyors necessary to remove finished product.
5. Convenience of operator.
6. Avoid drafty areas as heat may be unintentionally drawn from the tunnel and reduce its efficiency.

An electrician should install a plug on the end of the main power cord. If there is any doubt, get qualified assistance to do the initial installation. **Do not take any chances!**

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Do not attempt to install, adjust, or operate this machine without first reading the contents of this manual. Although the design of the equipment incorporates safeguards to protect operating and maintenance personnel, care should be used in operating, adjusting, and servicing.

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-- Front Panel Diagram

ST-1606-20



1. Start Switch -- Green
2. Heater Switch -- White
3. Temperature Control
4. Tunnel Conveyor Speed Control – Small Black Knob

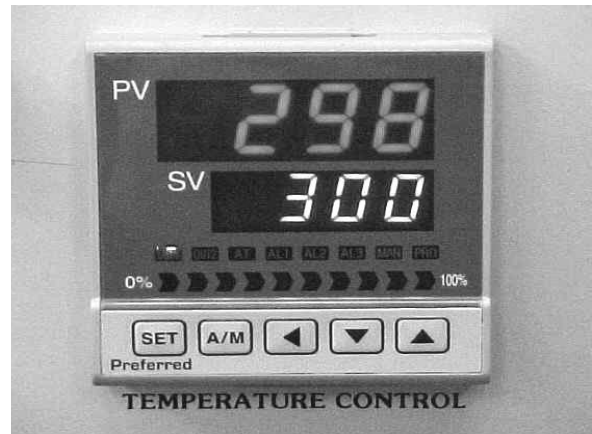
ST-1606-20-110 Volt Tunnel Service Manual**SEQUENCE OF OPERATION**

- A. **Turn the START switch** (1) to the on position to start the machine. (This will also start the cooling fan motor.)
- B. **Turn the HEATER switch** (2) to the on position, this will start the blower, conveyor motors and heater.
- C. **Set the Conveyor Speed Control** (3) between 1 and 3 until the exact desired conveyor speed is determined later (based on package size and sealer speed). Factory setting is 2.
- D. **Set the Temperature Controller** (4) at the temperature you believe will shrink your product. This temperature may need to be adjusted higher or lower until you have achieved the shrink you are happy with for that product. As long as you are running the same product, this temperature should not have to be adjusted again. Factory setting is 325 degrees. **Your 110 volts machine requires approximately 30 minutes to reach set temperature.**

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- E. **CAUTION:** When turning off the tunnel, be sure to turn off by means of the heater bank switch. The tunnel will automatically shut off at about 180 degrees, you may now turn off the main start switch.

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Temperature Control Adjustment

PV = Present Value

SV = Set Value

On the above temperature controller the set value is 300 degrees and its present temperature is at 298 degrees.

To Adjust Temperature Up or Down:

First you must press the arrow key that points left (←). When pressing this key the set value temperature will flash first in the ones column. While flashing, you may adjust temperature by now pressing the arrow keys either up or down (↑↓) to the desired temperature in the ones column. Repeat this procedure by pressing the left arrow (←) to move flashing light to the tens column or the hundreds column and adjust up or down to desired temperature. Once you have adjusted to desired temperature press the set key and the temperature will now become your new set value (SV).

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TROUBLESHOOTING

The following troubleshooting section is provided to aid in determining the source of any operation difficulties that may develop. In performing tests and checks that follow, carefully inspect for any loose components, broken or loose wires, poor electrical connections, etc., while testing the various switches, controls, relays, transformers, etc. For checking electrical problems, use a voltage meter.

Note: While troubleshooting, use caution to avoid danger of electrical shock. When power is not required for checking for the presence of value of voltages used, always have it disconnected.

Refer to electrical components placement sheet and electrical schematic diagrams to assist in all troubleshooting efforts.

DISCONNECT ALL POWER BEFORE MAKING ANY REPAIRS.

**REFER TO ELECTRICAL BOARD LAYOUT AND
ELECTRICAL SCHEMATIC (Page 48)
FOR LOCATION OF ELECTRICAL COMPONENTS**

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TROUBLESHOOTING – TUNNEL

Conveyor malfunction



1. Check for 110-Volt power at main power switch.

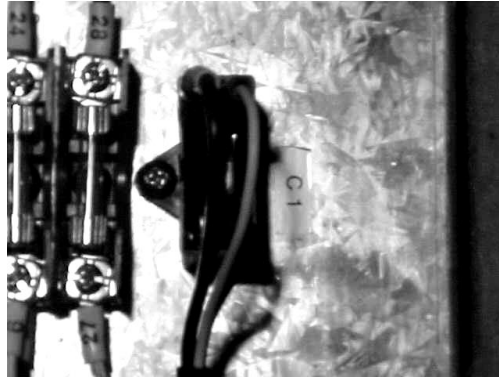
F1 – 20 AMP
F2 – 20 AMP
F7-20 AMP



F3 – 1 AMP
F4 -- 3 AMP
F5 – 2 AMP
F6 -- .5 AMP

2. Open Tunnel Hood top panel, 12 screws. Check conveyor motor fuse (F5/1 AMP) wires No. 16 and 11. If bad, replace.

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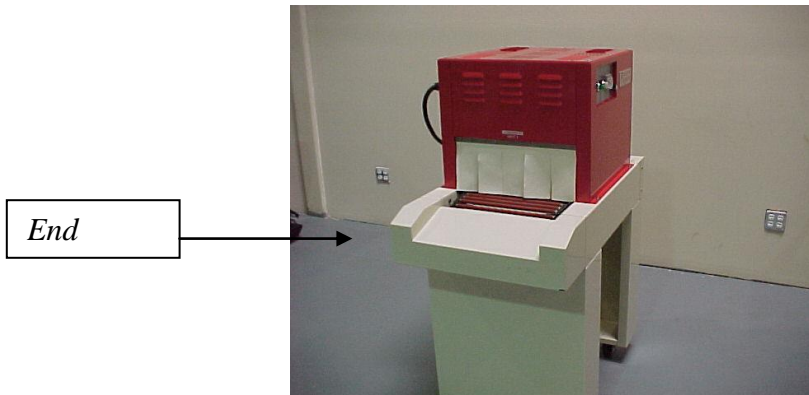


3. Check Motor Capacitor 1.5 mf. Make sure wires 7 and 23 and 22 are connected to Capacitor. Check to see if Capacitor is burned.

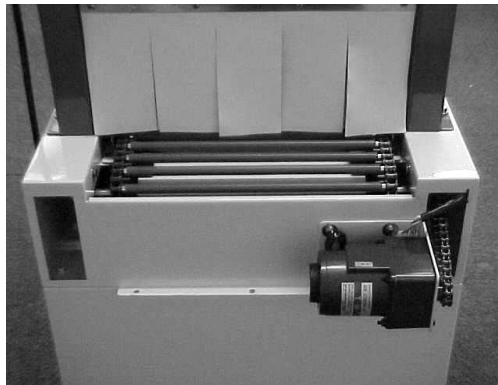


4. Check incoming power on AC Control Board 110 volt, wires 7 and 16 (Pins 8 and 10). If no power present replace AC board.
 - (a) Check to make sure AC Board is not burned or damaged.
 - (b) If power is present at both locations 7 and 16 and motor does not operate, replace conveyor motor.

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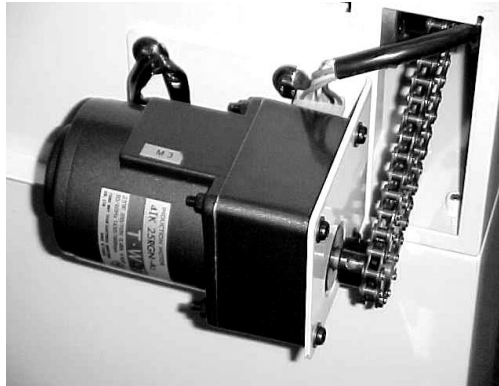


5. Remove end cover.

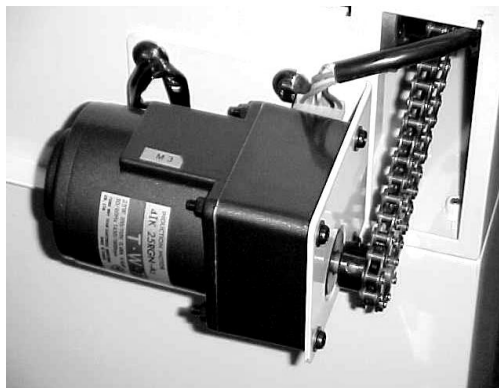


6. Look for obstructed product or lodged rollers.
 - (a) Check lubrication of conveyor chains.

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7. Make sure the connection wire on the motor and cable is not loose.
 - (a) Refer to electrical schematic on page 48 for proper wiring of the motor.
 - (b) Check wires 7 and 16 for power. If power present and motor does not operate, replace motor.



8. Check to make sure the chain is not loose and the sprockets are not touching the frame.
 - (a) Replace the motor if all the above checks properly. See Maintenance, page 37.

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NO AIR FLOW

1. Open main electrical panel. Check power at fuse F1, 20 AMP and F2, 20 AMP. F-7 20 Amp.
2. Test fuses F1, F2, F3, F4, F5, F6 and F7. Replace if bad.



3. Remove end tunnel curtain and check to make sure no air holes are obstructed due to plastic build up covering air holes.

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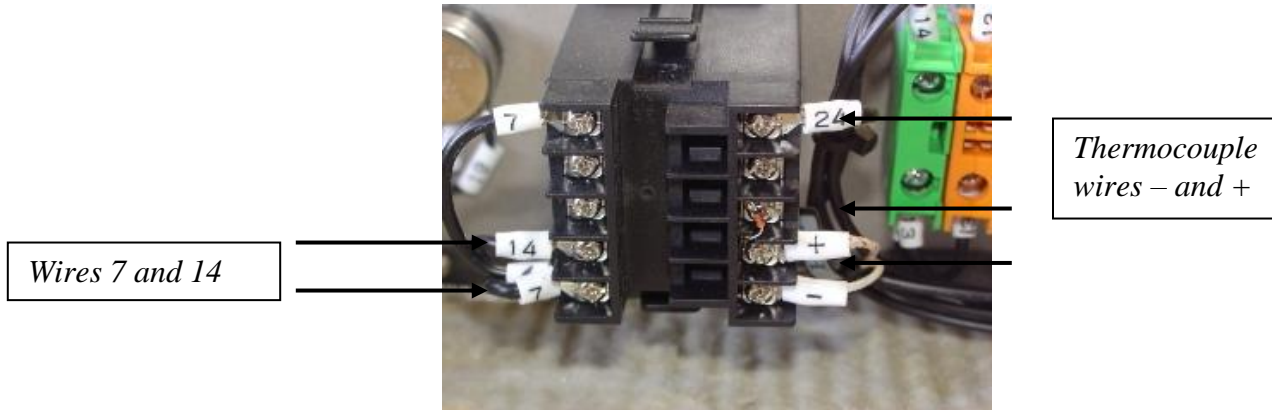
4. Check main blower motor and replace if necessary.
 - (a) Check motor start capacitor to see if burned.
 - (b) Check motor wires 7 and 15 for loose connection.
 - (c) Check for 110 volt power across wires 7 and 15 (motor wires). If voltage is present and the motor still does not operate, replace motor.



5. Remove safety screen covering blower wheel and check to make sure blower wheel is not loose on the blower motor shaft.

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No Heat



1. Check thermocouple wires at temperature controller (Terminals + and -). First, disconnect, then check with meter for continuity across the two thermocouple wires.
 - (a) If no continuity is present across thermocouple wires, replace thermocouple.
 - (b) Check terminals at 6 and 9 (wires 7 and 14) for 110 volt under set temperature.
 - (c) Check for 110 volt present with heater switch in ON position. If no power is present, check Fuse F6, .5 AMP. If voltage present at wires 7 and 14 and Fuse F6 is good, replace Temperature Control.

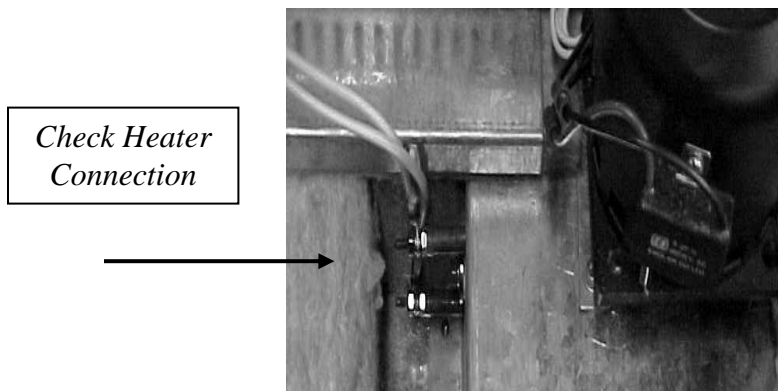
2. **Please note: Before replacing the Temperature Control, check the TS1 (TS1 NO open; thermo overload for blower motor) and TS2 (TS2 NC closed, heat cool down sensor) for continuity with the lead wires disconnected from sensor.**

NOTE: When any of the sensors are not functioning properly, this causes the temperature controller to malfunction.

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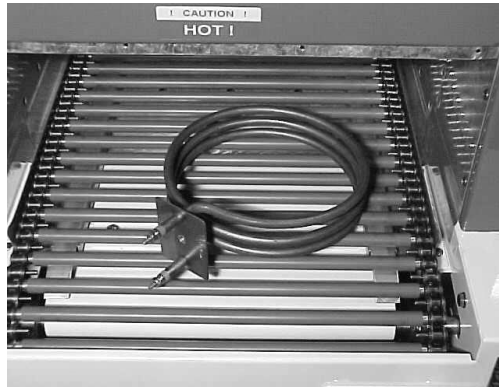


3. Check for 110 volts on wires 8 and 9 on CR2 with CR2 contactor pulled in under set temperature. If voltage is present on CR2, contactor on wires 8 and 9, check the Head Bank for broken lugs or wire inside the heater Bank. If leads and jumper wires on Heater Bank are not broken or burned, then replace the Heater Bank.

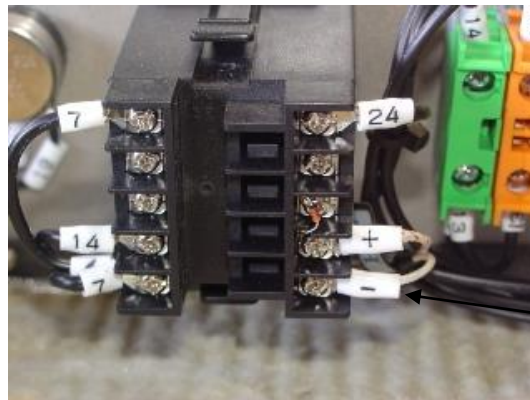


4. Check Heater Bank for replacement. Make sure no lugs on the Heater Bank have been broken.

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5. Check the heater bank to make sure the wires are not loose or broken on the heater bank. Pull the heater bank and make sure the heater bank has continuity across each leg. If not, replace it.



Thermocouple wires – and +

6. If no control over heat, interchange thermocouple wires at temperature controller. If still no control, check for replacement of CR2 or temperature control.

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MAINTENANCE -- TUNNEL

To aid in maintaining the high reliability of this shrink tunnel, the following maintenance should be provided.

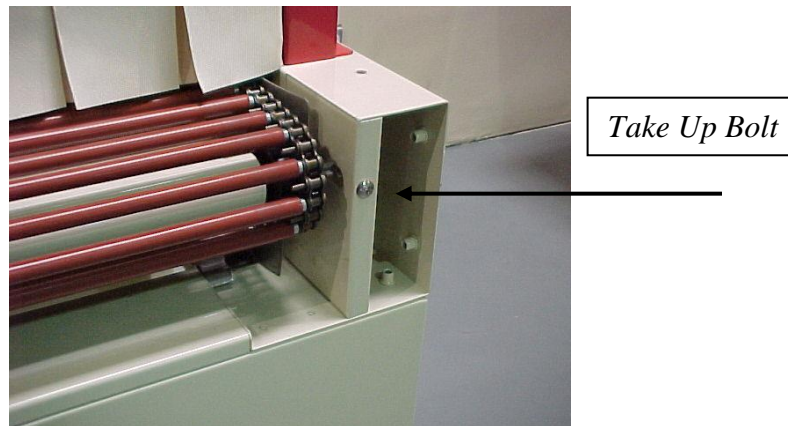
**DISCONNECT ALL POWER BEFORE MAKING ANY REPAIRS.
IF UNSURE OF ANYTHING, CONTACT A QUALIFIED
SERVICE TECHNICIAN**

- A. The conveyor chains should be lubricated once a month with a high temperature oil. The lubricant should be applied with a brush or sprayed while the conveyor is slowly running.
- B. The silicone covering on the tunnel rollers should be inspected regularly to assure that no scrap pieces of film are wrapped around the rollers to cause sticking of packages. To clean, run conveyor until the affected rollers are within the heated chamber, thus heating the film residue to soften the film, then advance the conveyor to stop the rollers outside the heat chamber for cleaning. Make sure the conveyor is stopped before putting your hands or anything else in the conveyor area. If necessary to remove the film residue, use a dull, blunt-edged tool. Do not use any sharp instruments, as nicking the silicone may result in having to replace the roller covering.

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TUNNEL CONVEYOR**Replace silicone covering on the rollers.**

1. Disconnect power to machine.



2. Remove end cover and loosen the two take up bolts for the chain adjustment giving yourself enough slack to pull chain upward and spread chain apart to remove roller. See picture that follows.

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Now you are ready to move the rollers.

- A. Remove old roller covering by very carefully slitting the covering and pulling off.
- B. Clean all rollers, using steel wool or a wire wheel. Make certain all rollers are smooth and free of residue or burrs.
- C. Fit the new silicone rubber tubing onto each roller and work on by hand at least 1/2". At the opposite end of the tubing, attach and secure an air supply hose of low pressure, maximum pressure 5 lbs. While the tubing is slightly expanded by the air pressure, push the tubing onto the roller. Be very careful to hold the roller at all times so it does not escape due to the air pressure.
- D. Replace rollers on conveyor by inserting roller end holes into the extended pins on the chain.
- E. Check conveyor chain tension as described below.

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Roller at 3 o'clock position

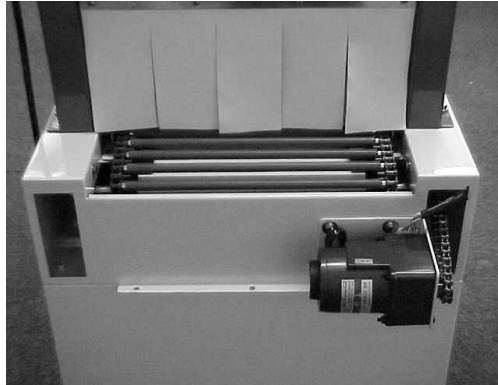
- F. The adjustment of package conveyor chain tension should be checked occasionally to ensure that it is not excessive, as this would cause unnecessary wear of the sprockets. To check or adjust tension, shut off power to the tunnel. Remove idler end caps. Adjust conveyor to these specifications: On the idler end of the conveyor, bring a roller to the three o'clock position (the center of the end of the conveyor). From that point count seven rollers in; the seventh roller should be evenly touching the conveyor roller bottom rails.



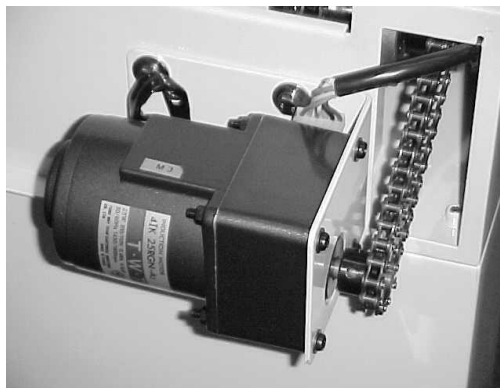
- 3. Replacement of idler roller shaft, bearings, or sprockets.** Disconnect the conveyor chains by removing the master links. Remove two bolts from the idler block holder and

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shaft assembly should pull right out. Remove two tension bolts from idler block holder, then the shaft and sprockets will come right off. Replace and reassemble in the same manner as disassembled.

**4. Drive shaft, bearings, or sprockets replacement.**

- (A) Remove drive end guard instead of idler side.

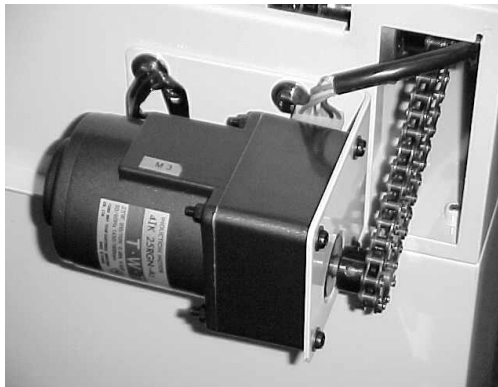


- (B) Disconnect the conveyor chain by removing the master links.

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- (C) Remove two bolts from the flange bearings and remove drive shaft assembly.
- (D) The drive shaft has one sprocket pinned to it and must be reinstalled the same way. The other sprocket and bearings will slide right off the drive shaft. Replace and reassemble.

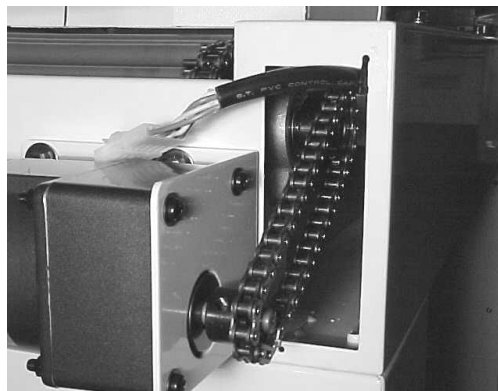


- 5. **Conveyor motor replacement.**
 - (A) Disconnect power to machine.

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- (B) Disconnect electrical wires from drive motor, and remove four bolts that hold the drive motor.

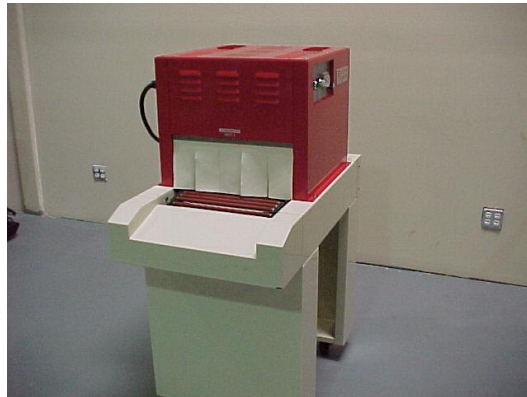


- (C) Remove sprocket from old motor and place on new drive motor. Reassemble in the same manner it was disassembled. For wire hook up refer to electrical schematic, page 48.

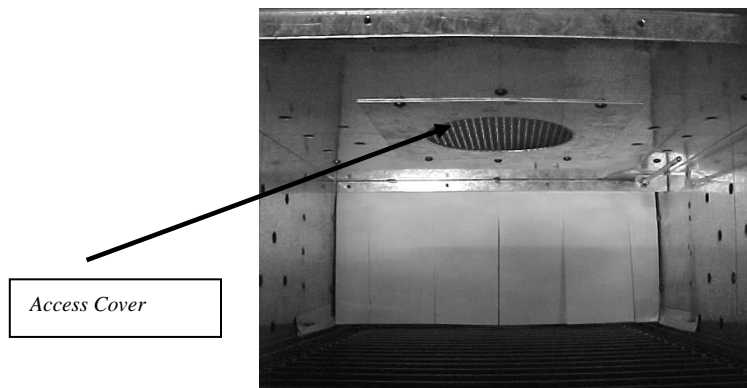
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6. Heater bank replacement.

(A) Shut off power to machine.

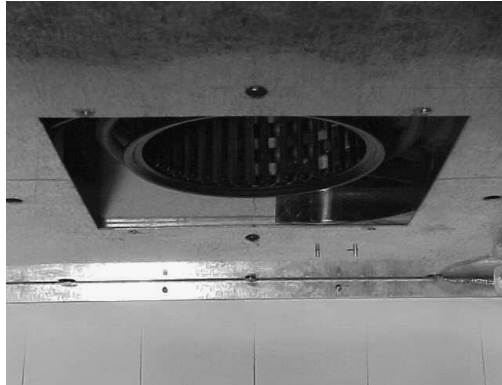


(B) Remove left side tunnel curtains.



(C) Remove four (4) access cover screws to Blower Wheel.

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(D) Remove Blower Wheel Squirrel cage.

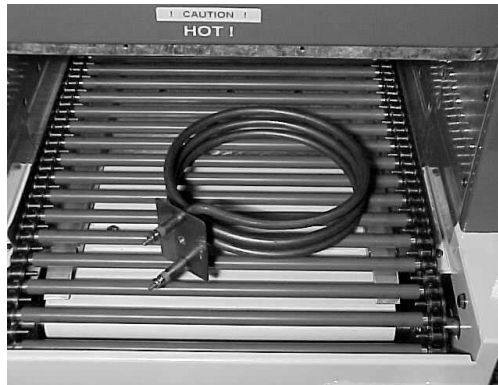


(E) Remove top cover of tunnel hood -- (12) Phillips screws.

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- (F) Remove insulation from hood and disconnect two heater wires connected to heater coil.
 - (a) Remove screw holding heater coil in place and remove heater.

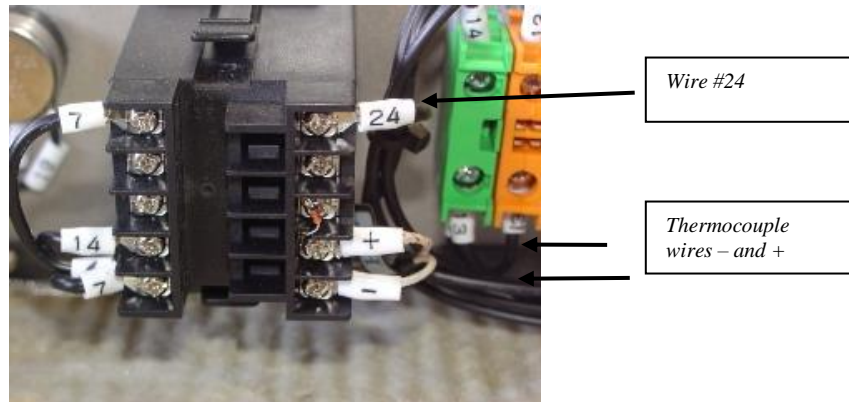


- (b) Then remove heater bank.
 - (c) Replace heater coil. Reassemble in the same manner it was disassembled.

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7. Temperature controller replacement.

- (A) Shut off power to machine.
- (B) Remove top tunnel cover.



- (C) Disconnect five wires (Two Nos. 7, 14 and 24) and thermocouple wires – and + from temperature controller.
- (D) Loosen screws on side of controller itself and pull controller out of the front of the panel. Replace with new controller. Refer to electrical schematic for replacement of four wires (Two Nos. 7, 14 and 24) and thermocouple wires.

WARNING: IF NO CONTROL OVER HEAT, INTERCHANGE THERMOCOUPLE WIRES.

CAUTION! DO NOT EXCEED 500 DEGREES.

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8. Blower Motor Replacement.

(A) Shut off power to machine.



(B) Remove top panel and 12 screws holding the cover.

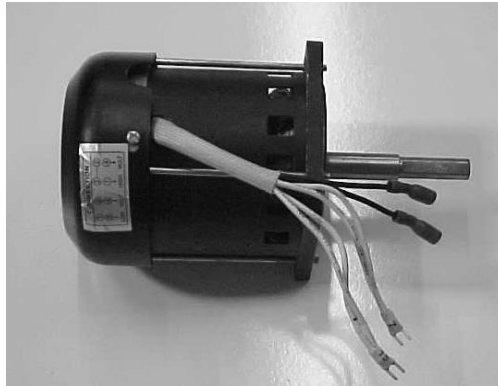
(C) Remove insulation from hood exposing Blower Motor mounting bracket.



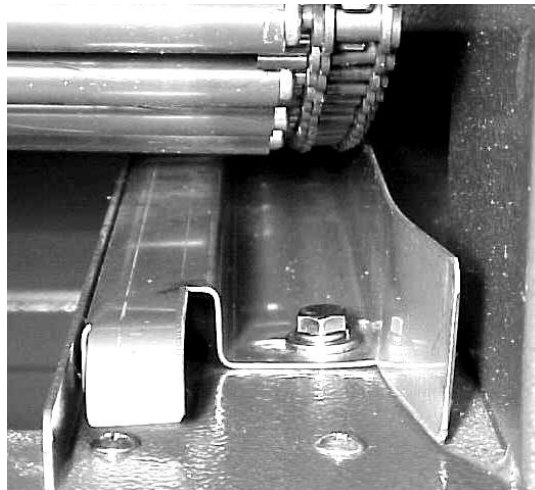
(D) Disconnect wires on the Blower Motor.

(E) Remove (4) bolts holding Blower Motor.

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- (F) Replace Blower Motor.
- (G) Reinstall in same manner it was disassembled.



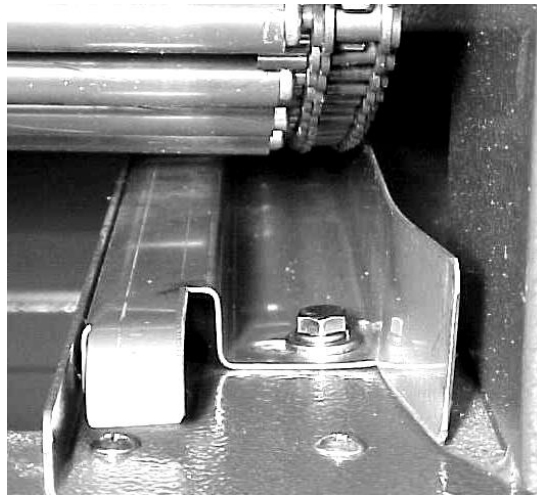
9. Wear rails lower adjustments.

- (A) Disconnect power to machine.
- (B) Remove idler and drive end caps. Loosen four bolts underneath conveyor, and slide rails over towards center. There should be 1/16" to a max. of 1/8" clearance between conveyor chain and roller. Retighten the four bolts and reassemble.

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10. Wear rails lower replacement.

- (A) Disconnect power to machine.
- (B) Remove idler and drive end caps.
- (C) Remove two bolts underneath conveyor from each wear rail and slide rails out.
- (D) Slide new rails in; reassemble and readjust.



- (E) Wear rail should be 1/8" from edge of chain then tighten bolt to secure wear rails.

11. Wear rails upper adjustments.

- (A) Disconnect power to machine.
- (B) Remove drive and idler end caps, and refer to "L." and "M." of this section.

Note: Take out only ten rollers, then move the open space to one end. Loosen the one bolt that holds rail in place. With a screwdriver, pry rail over towards the center. Do the same on all four corners. Spin conveyor by hand and check clearance between chain and roller. The distance should be about 1/16". Then tighten the four bolts on the rails.

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12. **Wear rail upper replacement.**

(A) Disconnect power to machine.

(B) Remove drive and idler end caps, and refer to B-2 of this section.

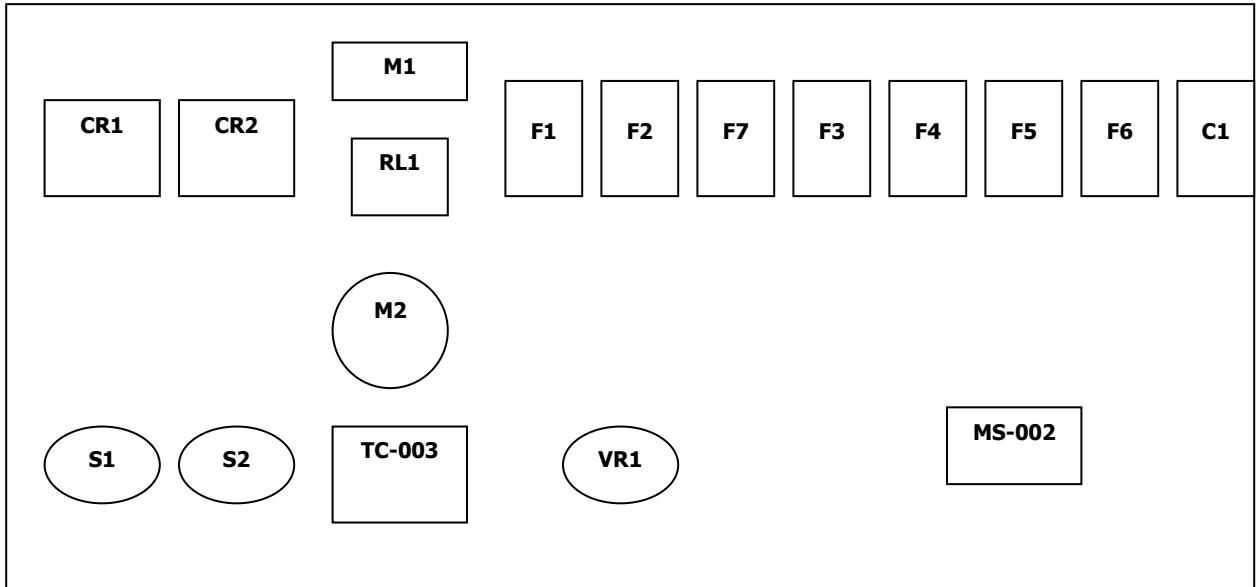
Note: Take out only top half of rollers, then move the open space to expose upper wear rails. Remove the two bolts that hold rails in place. Pull out rails and replace with new rails; reassemble and readjust. Refer to Section K.

IF UNSURE OF ANYTHING, CONTACT A QUALIFIED SERVICE TECHNICIAN.

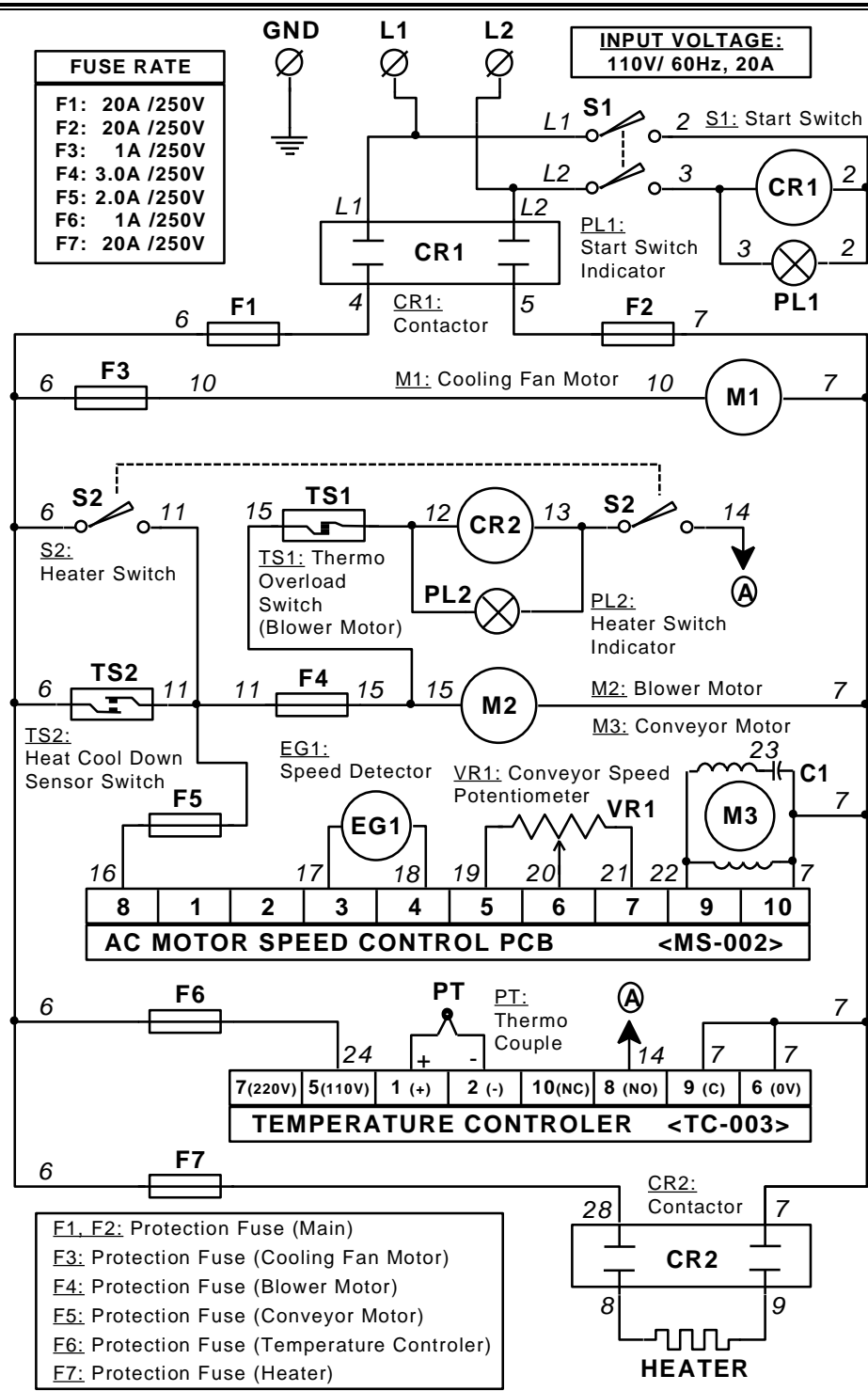
DOUBLE CHECK ALL OF YOUR WORK BEFORE RESTARTING THE MACHINE.

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ELECTRICAL PANEL DIAGRAM
Controls for ST-1606-20-110 Volt
Tunnel



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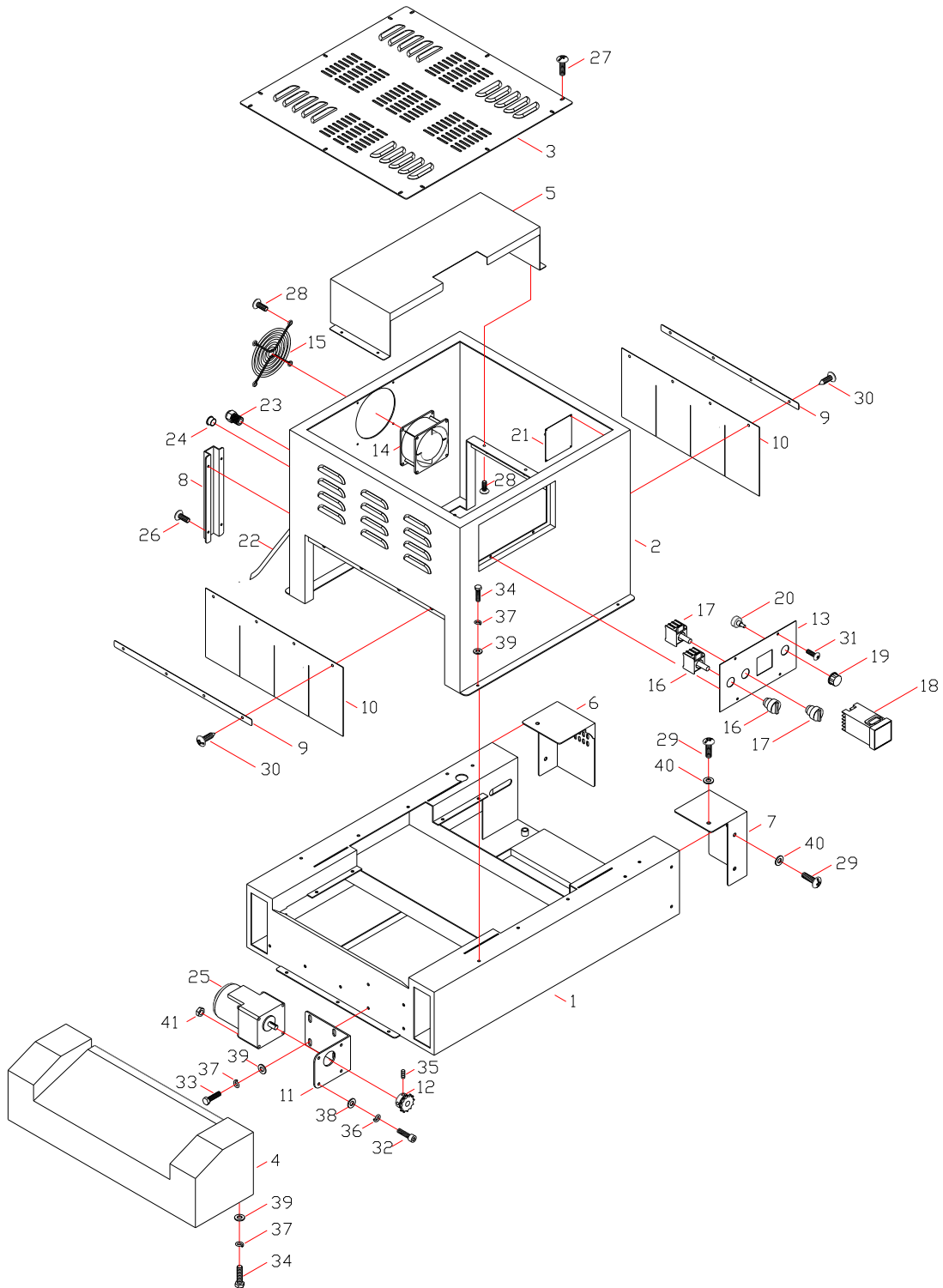
SHRINK TUNNEL MODEL: ST-1606-20 (110V)

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MODEL ST-1606-20 TUNNEL

Item	Part #	Qty	Parts List Nomenclature
MS-002	E04111	1	AC Conveyor Motor Speed Control Board
C1	E65109	1	Blower Motor Capacitor – 5 UF 300 VAC
CR1	E09201	1	Contactors CU-18 2 Pole, 110V
CR2	E09201	1	Contactors CU-18 2 Pole, 110V
M3	E54206	1	Conveyor Motor (25W) 25RGN-30K-110V
M1	E52100	1	Cooling Fan Motor – 110 V
TS1	E50100	1	Thermo Overload Sensor/Switch (A-90)
F3 & F6	E36801	1	Fuse - 1 AMP (30mm)
F4	E36803	1	Fuse – 3 AMP (30mm)
F5	E36802	1	Fuse – 2 AMP (30mm)
F1, 2, 7	E36120	1	Power Fuse – 20 AMP TFU-50-20 (110V)
Heater	E70300	1	Heater Bank – 110V
TS2	E50200	1	Heat Cool Down Sensor (B-100)
M2	E61501	1	Main Blower Motor– 110V
VR1	E45100	1	Speed Potentiometer-Conveyor Motor (B-203)
S1	E22101	1	Start Switch-Green 110V
S2	E22111	1	Heater Switch-White 110V
TC-001	E48301	1	Temperature Controller – 110V
PT	E49100	1	Thermocouple

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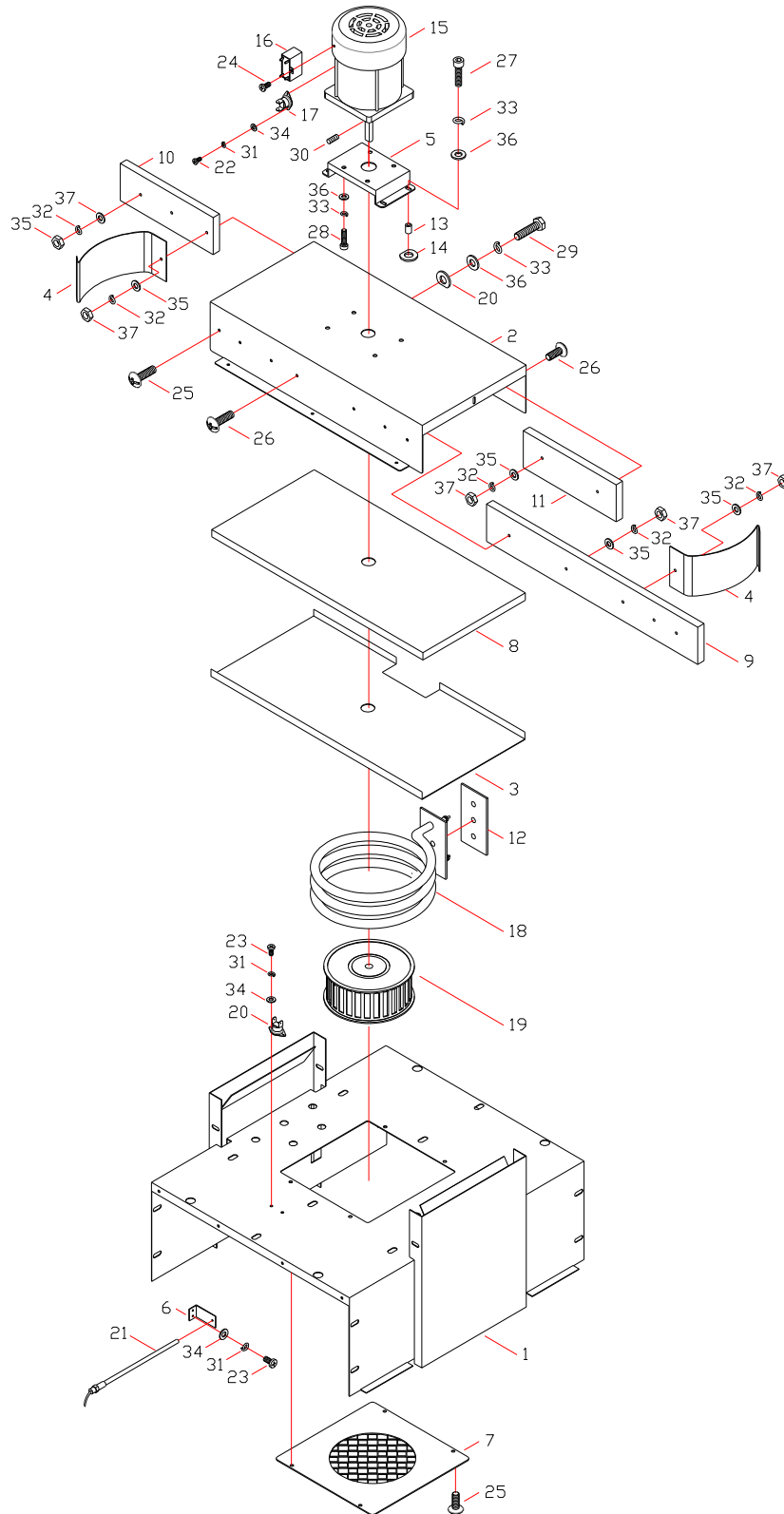
ST-160620 Main Frame

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Pos.	Part #	Qty	Description
1	C01101	1	Base frame
2	C01102	1	Tunnel hood frame
3	C01103	1	Hood top cover
4	C01104	1	Conveyor exit cover
5	C01105	1	Electrical mounting bracket
6	C01106	1	Chain cover, right side
7	C01107	1	Chain cover, left side
8	C01108	1	Cable cover
9	C01109	2	Curtain holding plate
10	C01110	2	Tunnel curtain
11	C01111	1	Motor bracket
12	C01112	1	Motor sprocket
13	C01113	1	Control panel plate
14	E52100	1	Cooling fan, 110V
	E52101		Cooling fan, 220V
15	E52110	1	Cooling fan safety net
16	E22101	1	Green power switch, 110V
	E22102		Green power switch, 220V
17	E22111	1	White heater switch, 110V
	E22112		White heater switch, 220V
18	E48301	1	Temperature controller
19	E47100	1	Speed potentiometer knob
20	E45100	1	Potentiometer, B-203
21	E04111	1	Speed control board, 110V
	E04112		Speed control board, 220V
22	E79000	1	Power cable, 110V
	E79001		Power cable, 220V
23	E80102	1	Cable fitting, MG-20A-14
24	E80110	1	Cable fitting, NB-1216
25	E54206	1	Conveyor motor, 25RGN-30K-110V
	E54207		Conveyor motor, 25RGN-30K-220V
26	S08-0410	4	Truss head machine screw, M4x10
27	S08-0412	12	Truss head machine screw, M4x12
28	S08-0510	8	Truss head machine screw, M5x10
29	S08-0612	6	Truss head machine screw, M6x12

PP160620 Main Frame P-1

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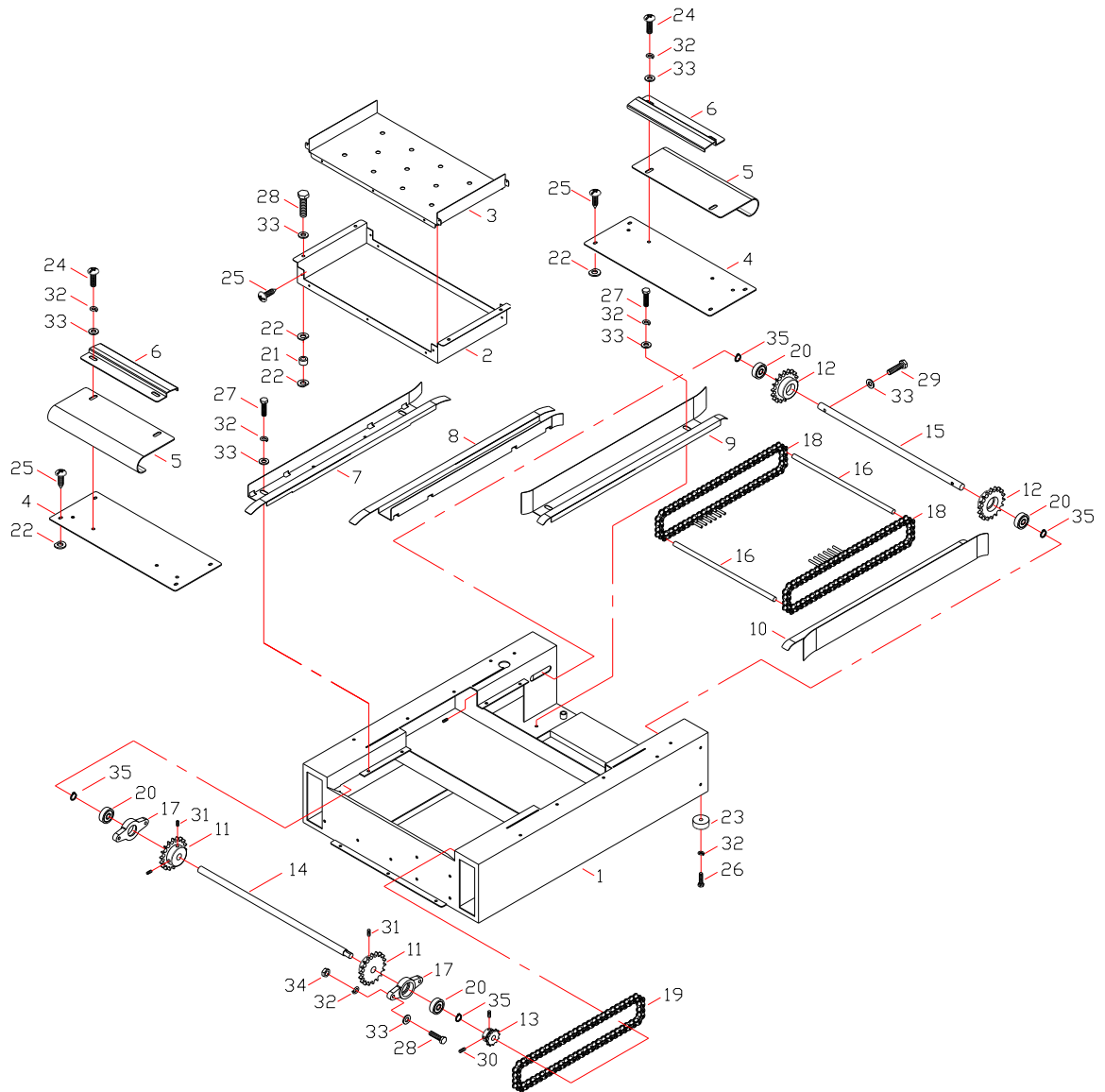


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ST-160620 Tunnel Chamber

Pos.	Part #	Qty	Description
1	C01201	1	Tunnel chamber frame
2	C01202	1	Upper heater chamber
3	C01203	1	Upper insulation wood cover plate
4	C01204	4	Air flow guide plate
5	C01205	1	Blower motor mounting bracket
6	C01206	1	Thermocouple bracket
7	C01207	1	Air return protection lattice
8	C01208	1	Upper insulation wood
9	C01209	1	Side insulation wood - long
10	C01210	1	Side insulation wood – short (left side)
11	C01211	1	Side insulation wood – short (right side)
12	C01212	1	Heater insulation wood
13	C01213	4	Rubber buffer
14	C01214	6	Heat insulation washer
15	E61501	1	Blower motor, 110V
	E61502		Blower motor, 220V
16	E65109	1	Blower motor capacitor, 5uf/300V
17	E50100	1	Thermo-switch, A-90
18	E70300	1	Heater, 110V
	E70301		Heater, 220V
19	C01219	1	Blower wheel, 5"
20	E50200	1	Thermo-switch, B-100
21	E49100	1	Thermocouple
22	S08-0304	2	Truss head machine screw, M3x4
23	S08-0306	4	Truss head machine screw, M3x6
24	S08-0406	1	Truss head machine screw, M4x6
25	S08-0410	8	Truss head machine screw, M4x10
26	S08-0420	6	Truss head machine screw, M4x20
27	S02-0516	4	Hex socket bolt, M5x16
28	S05-0510	4	Phillips pan head screw, M5x10
29	S01-0506	2	Hexagon bolt, M5x6
30	S09-0614	1	Hex socket head set screw, M6x14
31	S16-0300	6	Spring washer, M3
32	S16-0400	6	Spring washer, M4
33	S16-0500	10	Spring washer, M5

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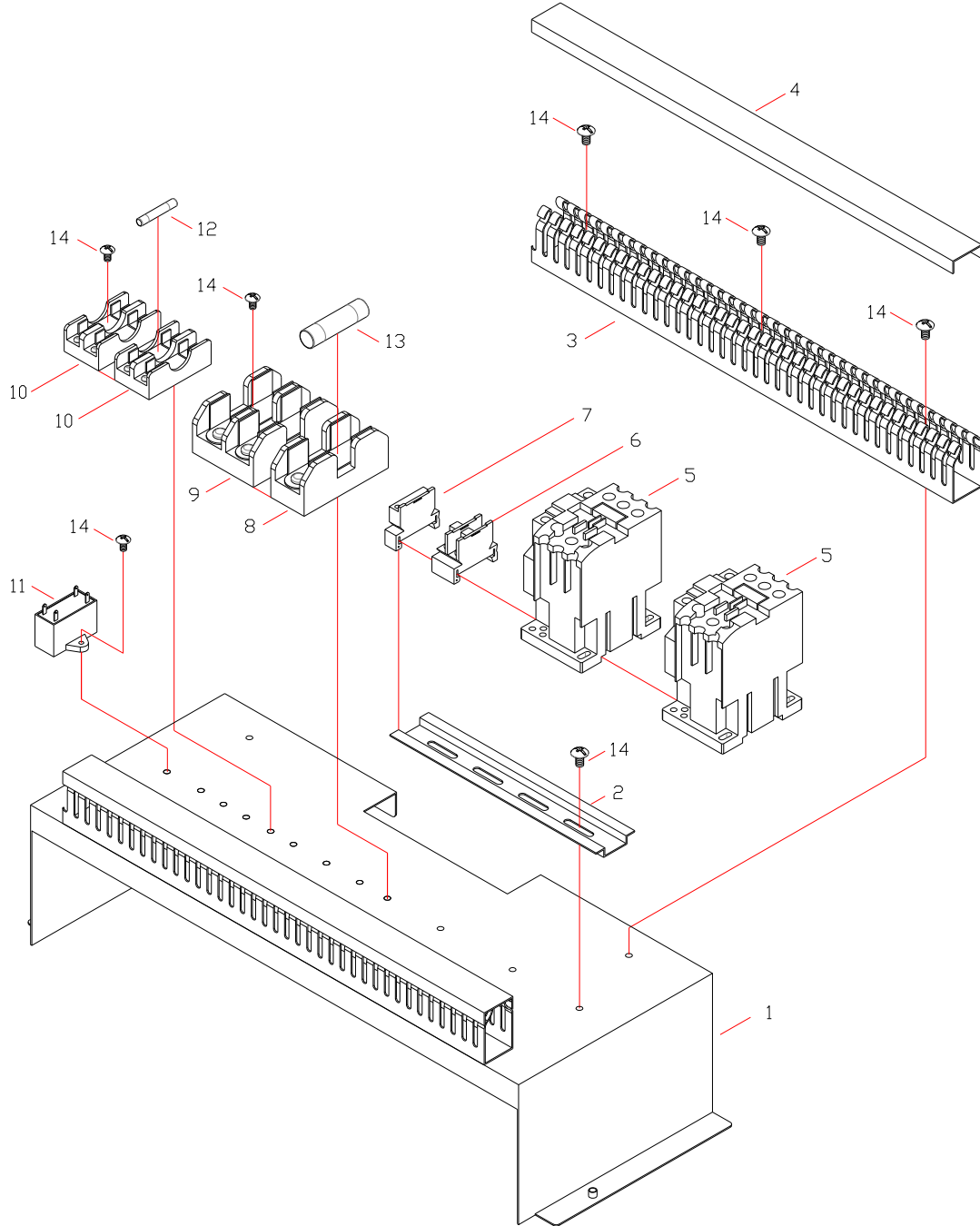


ST-160620 Conveyor Section

ST-1606-20—110 Volt Tunnel Service Manual*ST-160620 Conveyor Section*

Pos.	Part #	Qty	Description
1	C01301	1	Conveyor main frame
2	C01302	1	Bottom air channel
3	C01303	1	Bottom air channel cover
4	C01304	2	Cover plate
5	C01305	2	Shaft cover
6	C01306	2	Shaft cover holding plate
7	C01307	1	Upper chain guide, left side
8	C01308	1	Upper chain guide, right side
9	C01309	1	Bottom chain guide, left side
10	C01310	1	Bottom chain guide, right side
11	C01311	2	Drive sprocket
12	C01312	2	Idle sprocket
13	C01313	1	Motor drive sprocket
14	C01314	1	Drive shaft
15	C01315	1	Idle shaft
16	C01316	59	Conveyor roller with silicon coverage
17	C01317	2	Bearing seat
18	C01318	2	Conveyor chain
19	C01319	1	Motor chain
20	S50-6202	4	Ball bearing, 6202zz
21	C01321	4	Spacer
22	C01322	12	Insulation washer
23	C01323	4	Rubber foot
24	S08-0615	4	Truss head machine screw, M6x15
25	S10-0410	14	Pan head tapping screw, M4x10
26	S01-0616	4	Hexagon bolt, M6x16
27	S01-0620	8	Hexagon bolt, M6x20
28	S01-0625	4	Hexagon bolt, M6x25
29	S01-0650	2	Hexagon bolt, M6x50
30	S09-0610	2	Hex socket head set screw, M6x10
31	S09-0810	4	Hex socket head set screw, M8x10
32	S16-0600	20	Spring washer, M6
33	S15-0620	24	Plain washer, M6x20
34	S12-0600	4	Hexagon nut, M6
35	S24-S15	4	External circlip, S15

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ST-160620 Control Components

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ST-160620 Control Components

Pos.	Part #	Qty	Description
1	C01105	1	Electrical mounting bracket
2	C01402	1	Aluminum rail
3	C01403	1	Plastic cable channel
4	C01404	1	Plastic cable channel cover
5	E09201	2	Contactor CU-18, 110V
	E09202	2	Contactor CU-18, 220V
6	E30500	3	Assembly connector, TBR-20
7	E30501	1	Assembly connector stopper, TBR-F
8	E33201	1	Fuse seat, FSX301 (1P-30A)
9	E33202	1	Fuse seat, FSX302 (2P-30A)
10	E33101	2	Fuse seat, TFB102 (2P-10A)
11	E65104	1	Conveyor motor capacitor, 6uf/250V (110V)
	E65103	1	Conveyor motor capacitor, 1.5uf/450V (220V)
12	E36801	1	Fuse 1A (30mm)
	E36802	1	Fuse 2A (30mm)
	E36803	1	Fuse 3A (30mm)
13	E36120	3	Power fuse 20A, TFU-50-20A (for 110V)
	E36115	3	Power fuse 15A, TFU-50-15A (for 220V)
14	S10-0412	11	Pan head tapping screw

ST-160620 Control Components

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Spare Parts List

Item #	Part #	Description	Qty.	Price
1	1518-340-110	Fuse -- 1 AMP	2	
2	1518-340-110-3	Fuse -- 3 Amp	2	
3	1518-330-110	Fuse – 20 AMP	3	
4	1518-360-110	Heater Bank	1	
5	3500-70 5mm	High temperature wire	4ft	
6	1710-28	Lubrication – Chain	1	
7	3500-48	Lugs	1	
8	3500-20-110	On/off switch	1	
Total Cost				\$ Call