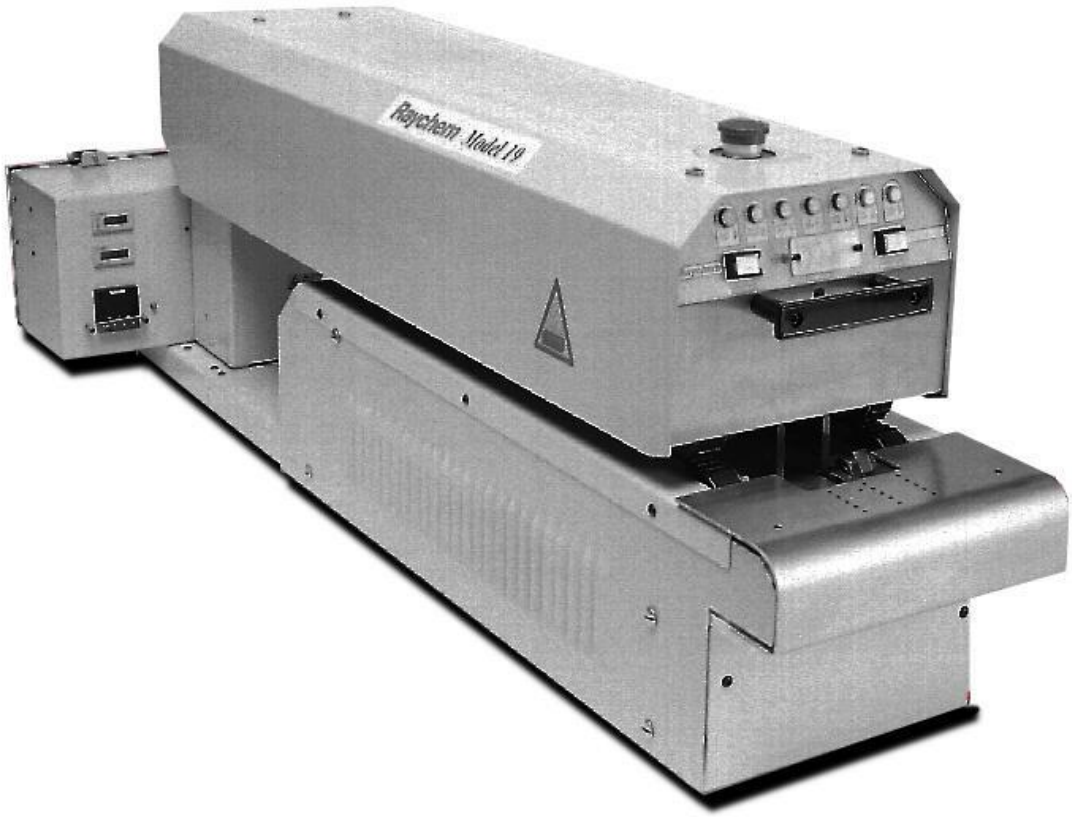

Operation Manual

Model 19 Belt heater
Heat-Shrinkable Tubing Conveyor Heater

Customer Manual Spec. No.: *412-94264 Rev. A1*
Customer Manual PN: *7-744015-7*
Language: *English (Original)*

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The dimensions in this document are for reference purposes only and are subject to change without notice. Specifications are subject to change without notice.
Contact TE for current dimensions and design specifications.

Table of Contents

1 Description

This manual applies to:

- Standard Version 714529-000 (TE PN 6-1195592-4)
- 6-Inch Version 075131-000 (TE PN 1190562-8)
- SS Version D43037-000 (TE PN 1-1200141-3)

First Aid Instructions

In the event of injury from electrical shock or burns the victim should seek immediate medical assistance from qualified medical personal.

Fire and Shock Hazard

As with all electrical equipment, the Model 19 conveyor heater must be set up and operated properly, according to the procedures detailed in this manual.

Carefully read and observe the instructions and warnings for setup, operation, maintenance, troubleshooting, and repair.

Cotton gloves are recommended for operating the machine and for unloading fin-ished harnesses. Touching hot adhesives, hot splices, or heating elements can cause burns.

Prior to performing maintenance or repair, always press the OFF pushbutton, allow the machine to cool down, and then turn off the circuit breaker and unplug the machine. Opening the electrical control box while the machine is powered may cause electrical shock.

Operate the machine with all covers and panels in place. If hands, hair, clothing, or any other foreign objects are caught by the machine’s moving parts, you could be injured and the machine could be damaged.

On the Standard model always use the operator support rod when opening the heating chamber and ensure that the support rod is fully seated in the receiver on the upper housing. If the upper heating chamber is opened and the operator sup-port rod is not fully seated in the receiver, the heating chamber may fall and cause injury or damage.

On the Model 19SS model the support rod is not used as the heating chamber opening has an inhibit feature limiting movement. Special care must therefore be taken when raising and lowering the upper housing.

Always provide adequate ventilation and avoid overheating the product or components during processing. Charring or burning of the tubing or wire insulation will produce fumes that may cause eye, skin, nose, or throat irritation.

1.1 General

The Raychem Model 19 conveyor heater is a low-maintenance, high-production heater that recovers Raychem heat-shrinkable tubing up to 4 inches in length and 1 inch in diameter onto wire harness assemblies or other suitable substrates. End terminations and ring terminals can be processed with minor modification. Optional heating elements allow tubing as long as 7 inches to be processed. The optional Model 19SS version is used for narrow width products.

Users should independently evaluate the suitability of this equipment for satisfactorily installing tubing to meet their requirements. It is also the users' responsibility to maintain and adjust the equipment, monitor the process, and inspect the installed product to ensure that process requirements are met on an ongoing basis.

Throughout the manual photographs refer to the standard version of the Model 19 heater, and may not accurately reflect the Model 19SS narrow version. However where possible supplemental photographs have been added. If additional information is required contact TE.

On the standard Model 19, assemblies are continuously loaded at one end between two sets of double- sided timing belts. For narrow width product the Model 19SS uses one set of flat belts.These timing belts grip and carry the assemblies through a heating and cooling zone and then deposit them into a collection bin located at the end of the drive belts, where the assemblies can be removed individually or in batches, with virtually no process-time delay. Allowing for a few seconds of cooldown, the assemblies can be removed almost as quickly as they are fed in. Process-speed control and heating-element-temperature set point are both closedloop systems and can be controlled within a wide range of time and temperature combinations as needed for specific applications.

The Model 19 is a tabletop processor that can run continuously with only interim routine maintenance and cleaning. It can be converted to operate as a floor (standing) unit, if desired.

➲ For assistance, contact your local TE representative.

To achieve proper machine cooling after use, the fans and belts continue running for approximately 20 minutes after the OFF push-button is pressed; at the end of the 20 minutes the fans and belts stop automatically. This cooldown cycle prevents heat damage to the belts, belt guides, and other components.

The Model 19 has several safety features and self-diagnostic circuitry designed to protect the operator, machine, and product. If any one of the alarms is activated, a warning light located on the front control panel will illuminate, power to the heating elements will shut off, and the lockout gate will rise, preventing the processing of assemblies and the unit will enter cool down mode. These alarms include:
“Heater Fault”-- one of the heating elements fails.
“High Temp” – the actual temp exceeds the set point temp by 20C.
“Over Temp” – the internal chamber temp exceeds the rating of a thermal switch.
“Top Open” – the upper chamber is opened by operator during operation.
“Speed Fault” – the motor speed is set below 0,4FPM or the motor has failed.

Once the fault is cleared, and the ON push-button is pressed, the belt speed and temperature will return to the chosen settings, the lockout gate will lower, and normal processing can resume.

1.2 Safety Features/Self-Diagnostic Circuitry

1.2.1 Lockout Gate

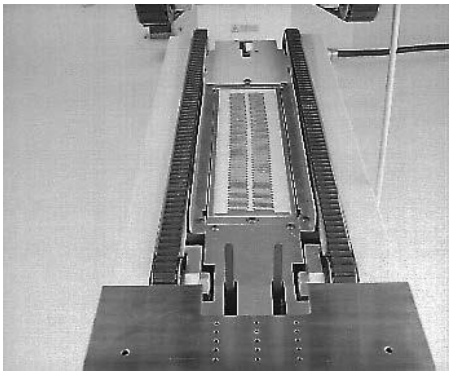


Fig. 1 : Lockout Gate

When the temperature is below the prescribed limit or when the machine is in cooldown mode, the lockout gate in front of the drive belts rises. It also rises if any of the alarms activate. The gate is located between the feed tray and the drive belts.

1.2.2 Cooldown Circuit

To prevent equipment damage, a timer circuit allows the fans and belts to continue running after the OFF button has been pressed or one of the alarms is activated. This circuit will shut off power to the heating elements and activate the lockout gate for a period of 20 minutes, until the heating elements are cool, at which time all power will shut off automatically.

1.2.3 Overtemperature Alarm

To prevent an overtemperature condition within the upper chamber, a resettable thermal switch has been mounted in the chamber. Activation of this switch will cause a light on the front control panel to illuminate, indicating an overtemperature alarm. This puts the processor into cooldown mode. Once the condition has been corrected, pressing the ON push-button will restore power to the heating elements.

1.2.4 High-Temperature Alarm

Should the chamber temperature exceed the set point by more than 20ºC, a light on the front control panel will illuminate, indicating a high-temperature alarm. This puts the processor into cooldown mode. Once the condition has been corrected, press the ON push-button to restore power to the heating elements.

1.2.5 Low-Temperature Indicator

When the heating element temperature is below the set point temperature by more than 20ºC (during warm-up or when the set point temperature has been raised), a light on the front control panel will illuminate. During this time the lockout gate will be activated and rise, preventing the operator from processing tubing. Once the temperature is within the acceptable range, the light will go off, the lockout gate will lower, and normal processing can begin.

1.2.6 Heater Failure Circuit

In the event of a heating element failure, a light on the front control panel will illuminate, initiating the cooldown mode. Once the problem has been corrected, pressing the ON push-button will restore power to the heating elements.

1.2.7 Drive Fault Circuit

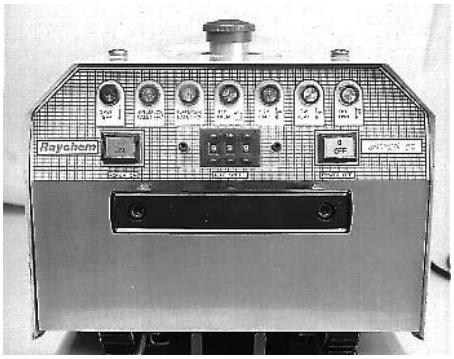


Fig. 2 : Drive Fault Circuit

In the event of a failure of the drive system, or if an unsafe slow speed is set on the speed control, a light on the front control panel will illuminate, initiating the cooldown mode. Once the problem has been corrected, pressing the ON pushbutton will restore power to the heating elements.

1.2.8 Emergency Stop Button

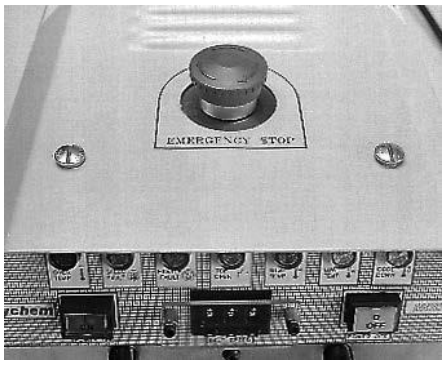


Fig. 3 : Emergency Stop button

This button is located on the upper heating chamber. Pressing the button will kill all power to the processor.

Do not use this as the normal shutdown procedure because it will defeat the cooldown circuit.

1.2.9 Upper-Chamber-Open Switch

If the upper heating chamber is opened approximately 30 degrees a light on the front control panel will illuminate, initiating the cooldown mode. When the upper chamber is closed the light will go off. Pressing the ON push-button will restore power to the heating elements.

Fig. 4 : Model 19SS Heater Opening Inhibit (main upper cover removed)

The Model 19SS has an open inhibit feature allowing only a limited opening of the upper heating chamber. This facility can be removed1 by first removing the upper heater cover and unlocking the two screws, as shown in Figure 4.

- First remove upper heater cover.
- Remove locking screws (x2) to allow upper heater to raise

1.2.10 Fuses

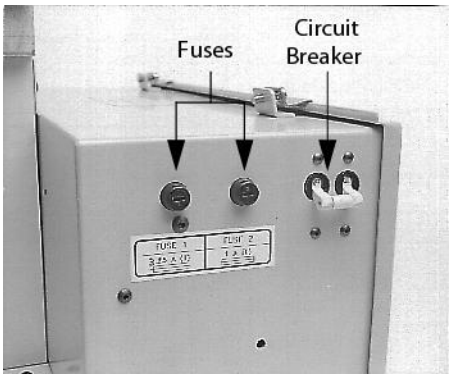


Fig. 5 : Fuses and Circuit Breaker

Six fuses protect the processor: two external line fuses, two fuses located on the motor control board, and two fuses on the DC power supply/drive fault detector board.

1.2.11 Circuit Breaker

This device protects the machine from an electrical overload. It may be left on indefinitely but should only be turned off by qualified maintenance personnel for servicing and repair.

Do not use the circuit breaker as the normal shutdown procedure because it defeats the cooldown circuit. The circuit breaker is located on the right side of the control box, above the power cord.

Fig. 6 : Model 19SS Circuit Breaker and Control Panel Access Locks

For the Model 19SS the circuit breaker operation and control panel access can be inhibited by fitting a padlock to each, as shown in Figure 6.

1.3 Components and Controls

1.3.1 Multitap Transformer

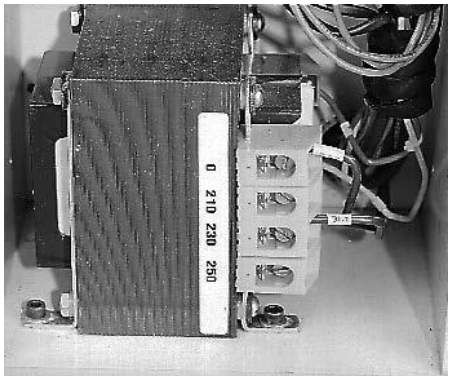


Fig. 7 : Multitap Transformer

A step-down, multitap transformer ensures proper voltage to the control circuitry independent of the incoming voltage. The three taps include 210, 230, and 250 Vac. This transformer is located at the back of the collection bin, between the vertical frame supports.

1.3.2 Low-Voltage Transformer

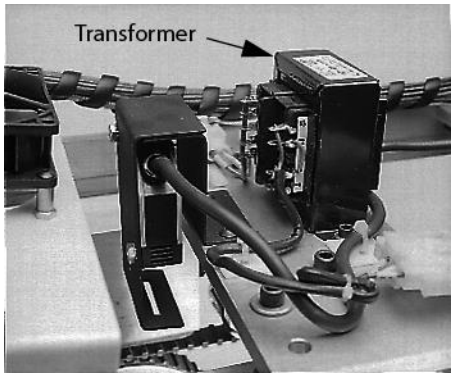


Fig. 8 : Low-Voltage Transformer

The low-voltage transformer supplies the 24-Vac input voltage for the DC power supply/drive fault detector board.

1.3.3 DC Power Supply/Drive Fault

Detector Board

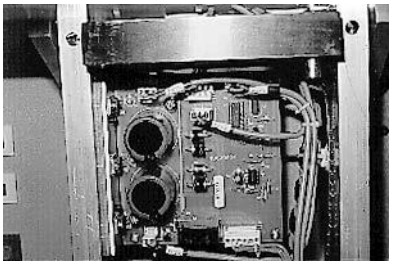


Fig. 9 : DC Power Supply/Drive Fault Detector Board

This printed circuit board is a multiple-output DC power supply and also contains the circuitry for drive fault detection. The regulated (+) 12-Vdc output stage drives the lockout gate solenoid. The unregulated (+) 12-Vdc output stage powers the lower fans. The upper fans are driven by the unregulated (-) 12-Vdc source.

1.3.4 ON Push-Button

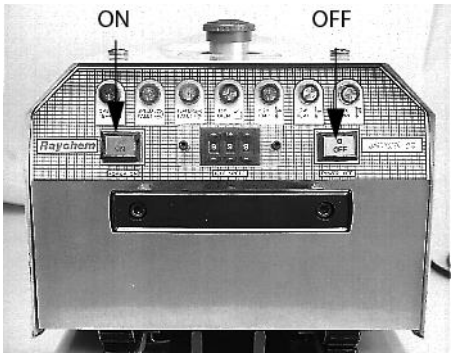


Fig. 10 : ON/OFF Push-Buttons on Front Control Panel

This button is the switch that is used to turn the machine ON and restore power to the heating elements once an alarm condition has been corrected. It is located on the left side of the front control panel.

1.3.5 OFF Push-Button

This button is the switch that is used to turn OFF the processor. Activating this switch initiates the cooldown mode, shutting off power to the heating elements and raising the lockout gate. The belts and fans will continue to operate for 20 minutes, until the processor cools to a safe temperature, at which time the belts and fans will shut OFF automatically. The button is located on the right side of the front control panel.

Do not use the circuit breaker or the emergency stop button for normal shutdown because this will defeat the cooldown circuit.

1.3.6 Drive System

A 1/50-horsepower DC gear motor provides the power to drive the belts. It is a closed-loop direct-drive system. The rear pulleys are attached directly onto the output shaft of the gear motor. This eliminates the need for chains, sprockets, or transfer gears - eliminating the need for regular lubrication.

1.3.7 Drive Belts

On each side of the heating chamber is a set (upper and lower) of double-sided timing belts that rotate around timing pulleys mounted on sealed needle bearings. The belts grip and pull the assemblies through the heating and cooling chambers. The direct-drive feature and sealed bearings eliminate the need for lubrication.

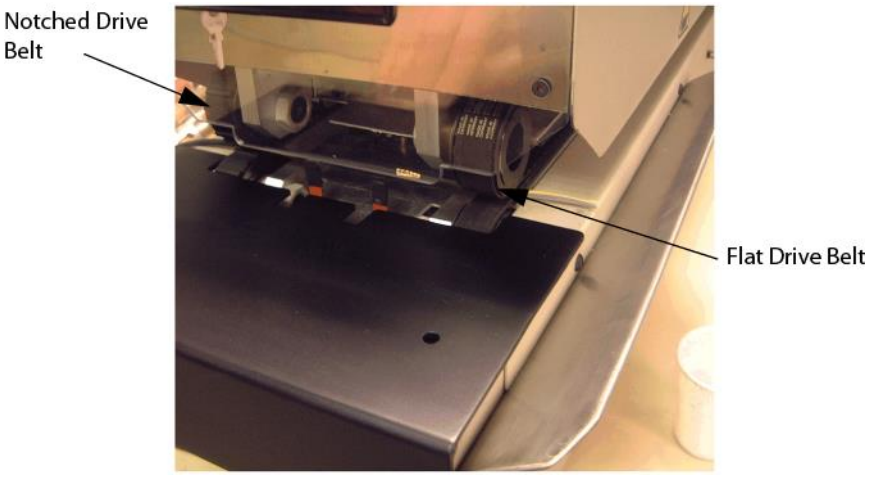


Fig. 11 : Model 19SS drive belts

As shown in Figure 11: above one set of drive belts on the Model 19SS are flat.

1.3.8 Speed Control

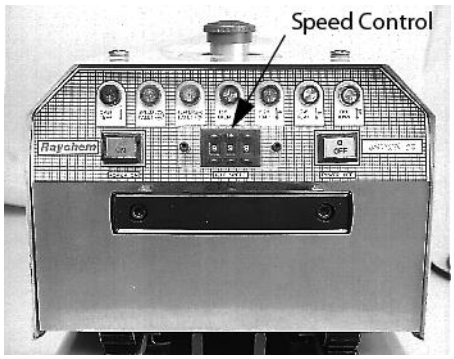


Fig. 12 : Speed Control

The drive belt speed control is a closed-loop circuit, meaning the drive belt speed should not drift over time. The drive belt speed can be adjusted from a setting of 100 to 999, which varies the speed from 15.2 to 152.4 centimetres (0.5 to 5.0 feet) per minute. Refer to Section 1.5, Specifications, for the centimetres/feet-perminute equivalents of various settings.

The drive belt speed control is a three-digit thumbwheel located in the centre of the front control panel. A lockout cover over the speed control prevents tampering once the control is set to the desired setting. This can be locked using a padlock on the Model 19SS. (See Figure 13:)

Operating the processor at a speed setting of less than 100 will cause the drive fault circuit to activate.

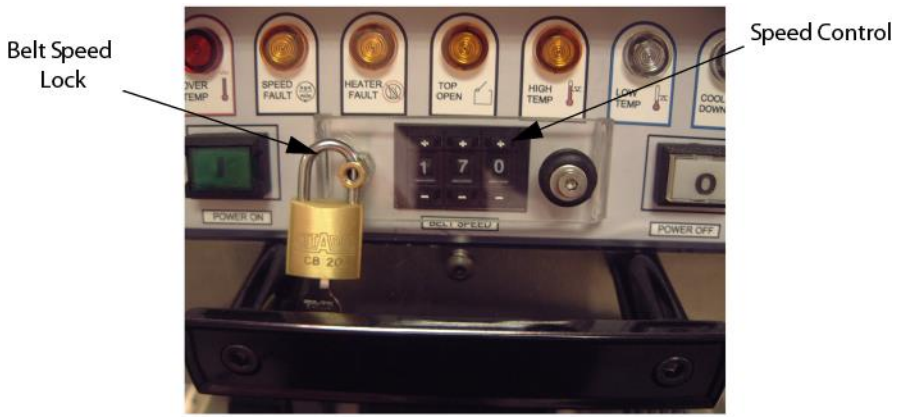


Fig. 13 : Model 19SS Belt Speed Lock

1.3.9 Temperature Control

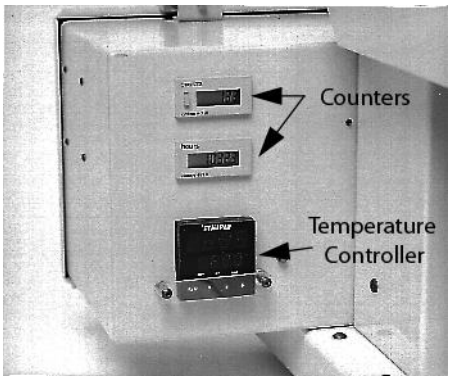


Fig. 14 : Temperature Controls and Counters

The temperature control is a closed-loop circuit. The heating element temperature set point can be adjusted from 0ºC to 700ºC for different types and sizes of assemblies and tubing. Up and Down arrows on the face of the controller adjust the temperature set point. The temperature controller is located on the front of the control box, left side. There is a lockout cover over the controller to prevent tampering. Never set the temperature above 700ºC.

Operating the processor above 700ºC set point voids all warranties, written or implied.

1.3.10 Heating Elements

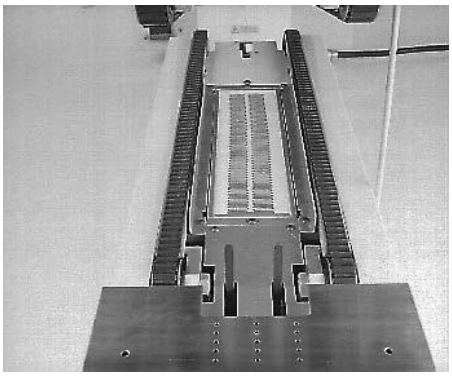


Fig. 15 : Inside the Heating Chamber

The processor has two 1580-watt heating elements, one upper and one lower. The temperature is controlled through a K-type thermocouple embedded in the upper element. Optional 6-inch-width and narrow width heating element kits are available.

➲ For assistance, contact your local TE representative.

1.3.11 Counters

The processor has two counters: a resettable optical parts counter and a nonresettable hour meter. The photo sensor for the parts counter and reflector is located at the end of the processing chamber and the counter is located above the temperature controller. The hour meter is located below the parts counter readout.

1.3.12 Airflow Baffles

Airflow baffles are located between the drive belts in both the upper and lower sections of the machine. These isolate the cooling air from the heating chamber, which prevents air turbulence in the heating chamber, ensuring consistent temperature within the chamber. These baffles should not be altered in any way.

1.3.13 Status Indicator Lights

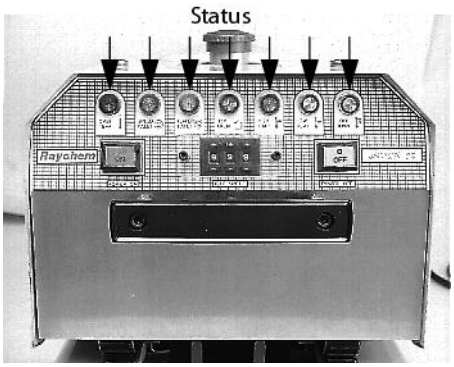


Fig. 16 : Status Indicators

Seven lights on the front control panel indicate the state of the processor. These indicators include a low-temperature light and many alarm condition indicators. If any of the lights illuminate, the lockout gate will activate. Any alarm condition will also shut off power to the heating elements and initiate the cooldown mode, preventing tubing from being processed until the alarm condition is cleared.

1.3.14 Feed Tray

The feed tray has drilled guide and centring marks to help align the wire assemblies and tubing prior to entering the processing chamber. The outer holes indicate the edge of the heating elements and the centre hole indicates the centre of the heating elements. The feed tray is located on the front of the machine. It is of sufficient thickness to be drilled and tapped for additional guides or locators.

On the Model 19SS the product is guided using the pictogram labels, as the heaters are not positioned on the machine centerline.

1.3.15 Upper Chamber

The upper heating chamber can easily be opened for access to the heating elements for cleaning, inspection, or component replacement. However, opening the chamber more than 30 degrees will activate an alarm, which will initiate the cooldown mode.

The Model 19SS has an open inhibit feature allowing only a limited opening of the upper heating chamber. This facility can be removed1 by removing the two locking screws as shown in Figure 4 on page 8-82.

➲ For assistance, contact your local TE representative.

1.3.16 Operator Support Rod

This rod supports the upper chamber in the open position for easy access to the processing chamber. When not in use, the rod rests on a holder located on the right side of the machine. The receiver for the rod is located on the upper cover.

This facility is not available on the Model 19SS.

1.3.17 Maintenance Support Pin

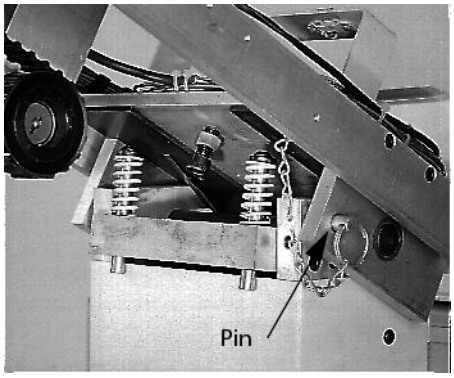


Fig. 17 : Maintenance Pin

When the top sheet-metal cover is removed, a pin can be inserted into a matching hole in the rear vertical frame to support the upper chamber in the open position. This should always be used during maintenance or repair. The pin is attached to a chain at the back of the upper chamber frame.

On the Model 19SS, this can only be accessed after removing the opening inhibit device as shown in Figure 4 on page 8-82.

1.3.18 Assist Springs

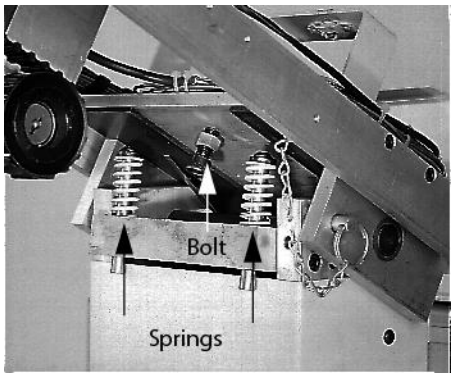


Fig. 18 : Assist Springs

Two compression springs are attached to either side of the rear frame to ease the opening of the upper chamber and the loading of larger cables.

1.3.19 Positive Stop Adjustment

A bolt located between the assist springs (see above) allows a gap to be set between the front of the upper and lower belts when the chamber is in the closed position. This makes it easier for larger cables to be processed.

Too large a gap will prevent the upper belts from rotating when no assemblies are being processed. This may cause overheating of the belts.

1.3.20 Cooling Fans

Four fans keep the components of the processor cool and ensure a consistent temperature inside the heating chamber. Two of the fans are mounted in the upper chamber and one fan is mounted on each side of the lower chamber. All of the fans blow the air out to minimize air turbulence in the heating chamber. They operate on DC voltage to accommodate both 50- and 60-Hz voltage systems.

1.3.21 Upper Floating Backing Rails

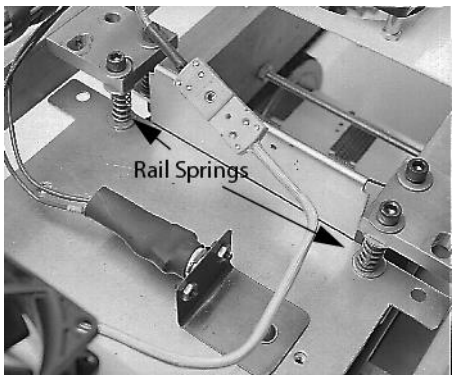


Fig. 19 : Rail Springs

To keep tension on several assemblies being processed together, the upper belt backing rails are spring-loaded. These rails can be easily adjusted for a variety of different sizes of harnesses or cables. To grip a single 20 AWG wire, more downward pressure can be put on the belts by adjusting the rails down. For larger bundles, a precise gap may be set to ensure that the entering assemblies have sufficient gripping force while other assemblies are travelling through the heating chamber.

On the Model 19SS the rails front spring has a different tension force onthe right side, which allows smaller wires to be gripped

The rails are split into two sections to help facilitate running larger and smaller assemblies at the same time. These rails have a Teflon-tape-covered foam backing to allow smooth travel of the belts.

1.3.22 Lower Belt Guides

To prevent the belts from tracking off the pulleys, the lower belts are seated in Ushaped phenolic channels or guides. These guides run the entire length of the lower belts.

1.3.23 Collection Bin

Finished assemblies drop into this receptacle and can be collected in batches or individually as each assembly is processed. The bin is located at the end of the drive belts.

1.4 Standard Model 19 Parts Layout

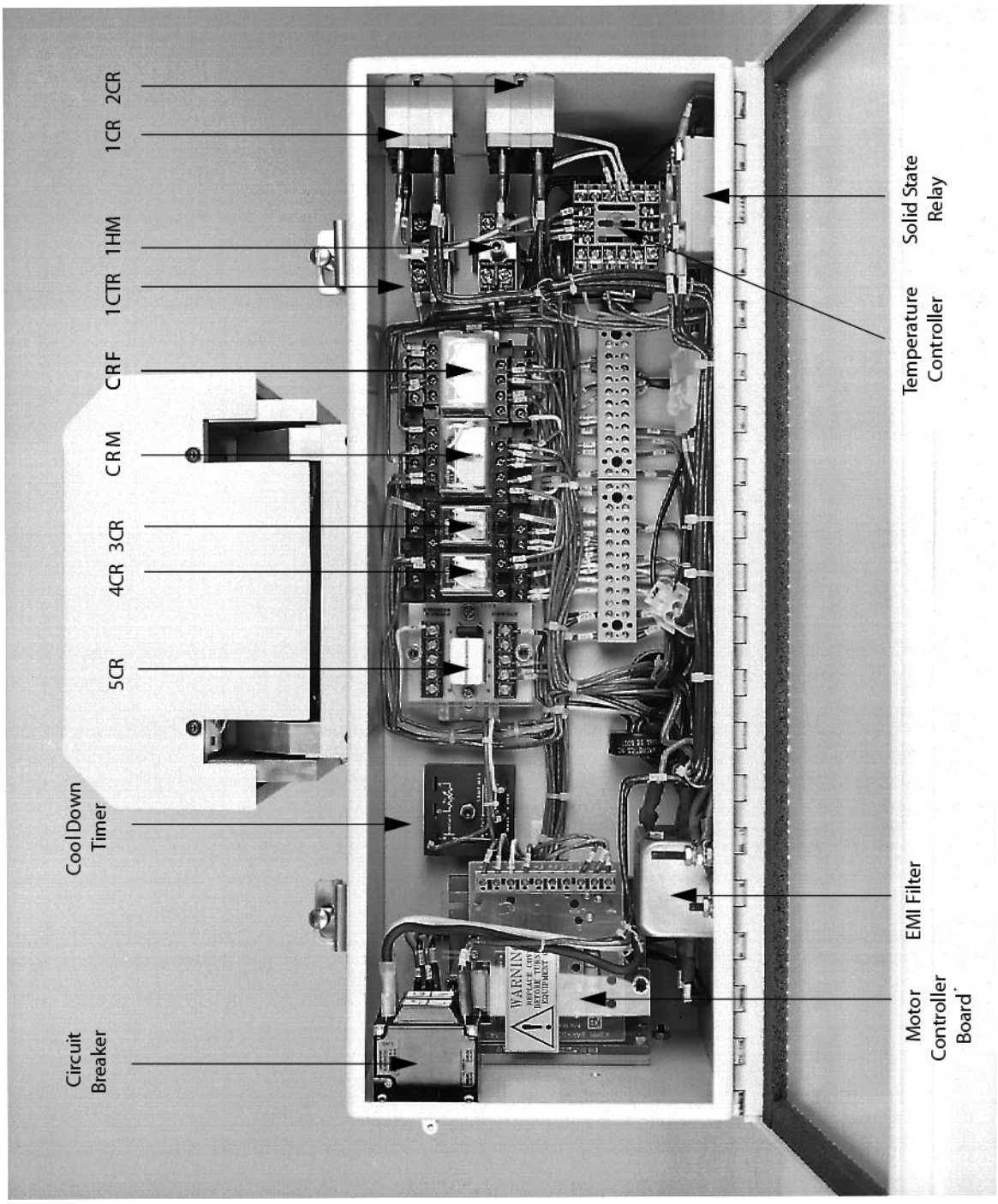


Fig. 20 : Standard Model 19 Parts Layout

1.4.1 Model 19SS Parts Layout Variation

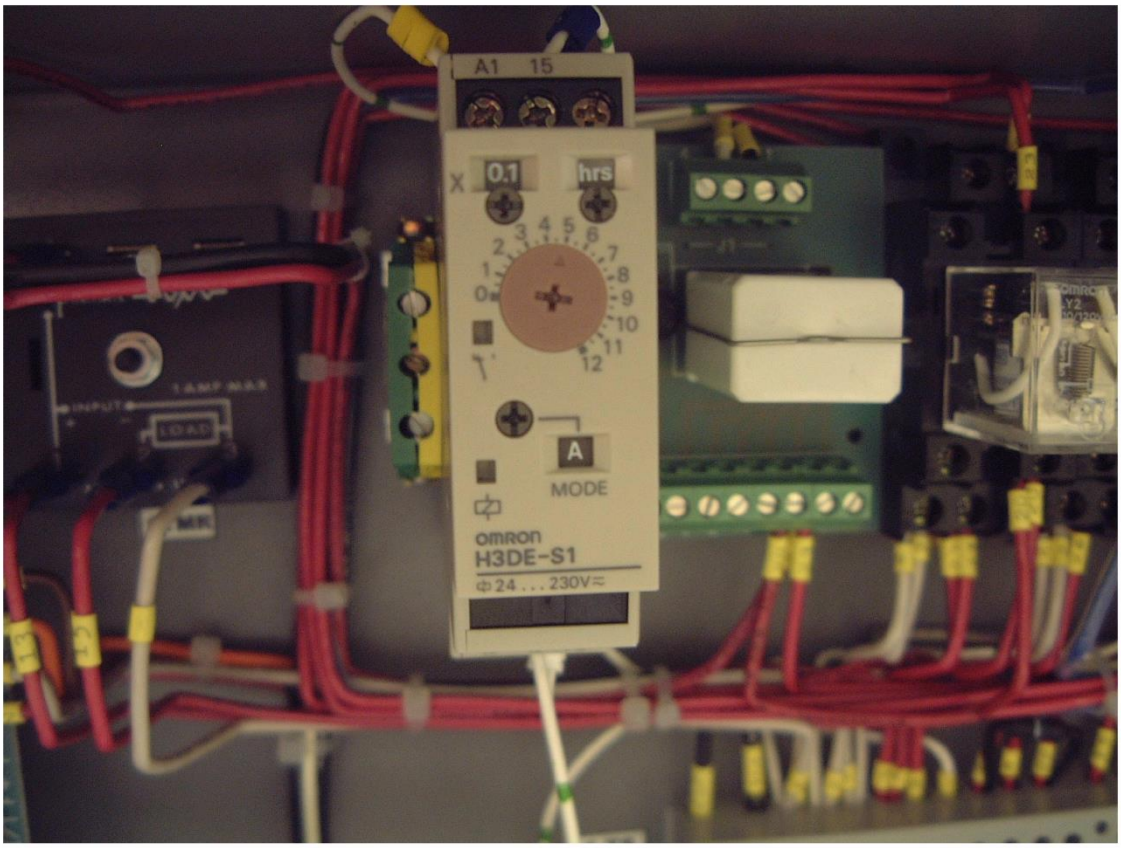


Fig. 21 : Model 19SS Auto Off Timer

1.5 Specifications

Tubing sizes	Up to 10 cm (4.0") long Up to 18 cm (7.0") long with optional heating elements Up to 2.54 cm (1.0") in diameter Up to 5 cm long (8 mm) diameter. Narrow element version (Model 19SS)			
Input power	208/230/240 Vac, 50/60 Hz, 20 A, 1Ø, 3 wire			
Fuses	1- and 2-amp AGC, 3.18 cm (1.25") 1- and 3.15-amp IEC, 5 x 20 mm, time delay 3.15-amp TR5 sub miniature, time delay			
Heating	Two stamped-foil 1580-watt elements: 9.5 cm (3.75") x 35.5-cm (14.1")			
	Optional elements: 15 cm (6.0") x 35.5 cm (14.1") 4.5 cm (1.75”) x 35.5 cm (14.1”) 800Watt.			
Temperature control	Partlow temperature controller with a K-type thermocouple embedded in the upper heating element			
Operating tempe-rature	0ºC to 700ºC maximum			
Sound Level	Less than 70 dB(A)			
Belt speed	100 to 999 (0.5-5.0 fpm); 3-digit thumbwheel			
	Setting	Cm/min.	Ft/min.	Sec/ft
	100	15.2	0.5	120
	200	30.5	1.0	60
	300	45.7	1.5	40
	400	61.0	2.0	30
	500	76.2	2.5	24
	600	91.4	3.0	20
	700	106.7	3.5	17
	800	121.9	4.0	15
	900	137.2	4.5	13
	999	152.4	5.0	12
Dimensions	53 cm (21") wide, 135 cm (53") long, 45 cm (18") high			
Shipping case (approx.)	66 cm (26") wide, 147 cm (58") deep, 58 cm (23") high			
Shipping weight (approx.)	86 kg (190 lb.) with crate			

Tab. 1 : Specifications

2 Preventing Damage

- To prolong belt life, do not set the belt speed to less than 100 (0.5 fpm). Setting the belt speed below 100 will activate the drive fault alarm and initiate cooldown mode.
- For normal maintenance and repair, press the OFF push-button and allow the machine to cool before turning OFF the circuit breaker. When the machine cools and the belts and fans stop running, turn OFF the circuit breaker and unplug the machine. Do not attempt to by-pass the circuit breaker.
- Do not set the temperature above 700ºC. This will cause heat damage to the components of the processor and shorten the life of the heating elements.

Operating the processor above 700ºC voids any and all warranties, written or implied

- Do not cover the fan louvres. Covering the louvres by setting objects on or next to them may cause uneven heating, or overheating of components.
- An exposed thermocouple wire due to abrasion of the insulation will cause an overtemperature condition that can destroy components of the processor and cause inconsistent processing of assemblies. When replacing the covers, ensure that no wires get trapped between the cover and the frame.
- Tight belts put excessive side loading on the bearings and can cause premature bearing wear and uneven belt stretch. To adjust the tension in the belts, follow the steps outlined in Section 8.4, Belt Tension Adjustment.
- Emergency Stop: In case of excessive smoke, sparks, grinding noises, or any other signs of malfunction, press the emergency stop button. Then open the upper chamber and immediately remove any assemblies that may be in the heating chamber. Contact maintenance personnel to investigate the cause of the problem before restarting the machine.

Such malfunctions are the only reasons to press the emergency stop button while the belts and fans are still running. DO NOT use this as the normal shutdown procedure because it will defeat the cool-down circuit

3 Setup

3.1 Unpacking, Transport, Handling and Storage

- The Model 19 has a mass of 86Kg. When unpacking, transporting, handling or moving the unit to storage, it is recommended that no less than two persons or a lift truck be used for the process. When storing the unit it should be placed in a suitable crate 66cm x 147cm x 58cm tall, and stored indoors away from any harmful effects of weather or other hazards.
- Remove the processor from its shipping container and check for damage. Inspect the shipping container and processor for any evidence of damage during shipment. If you believe there has been damage, contact the shipping agent immediately.
- Set the processor on a flat, level surface. Choose a work area with enough room around the processor for loading and unloading wire harnesses. Also allow room for routine maintenance and repair.
- Provide adequate ventilation. Allow enough clearance above and around the processor so that the fans can circulate cooling air without obstruction. Do not place anything on the upper chamber or cover the fan louvres.
- Remove packing material from between the heaters. Packing material has been placed between the heating elements to prevent vibration damage during shipment. Discard this material.

3.2 Inspection (Power OFF)

At the completion of the unpacking sequence, follow these steps to inspect the processor before making any electrical connections. If you believe damage may have been caused during shipping, contact the shipping agent immediately.

- Check the alignment. When the upper heating chamber is closed the upper belts should be aligned with the lower belts along their entire length with no more than a 6-mm (.25-in) offset. If the belts are not aligned contact your local Raychem representative.
- Inspect the heating elements for damage. Visually check the heating elements for evidence of cracking or chipping of the glass face during shipment. The heaters should be fastened firmly into the baffles.
- Ensure that the cover panels are in place and secure. The top cover and two side panels each have four quarter-turn screws that secure them to the frame.

3.3 Electrical Connections

Improper electrical connections will result in damage to the processor. Ensure that proper electrical connections are made before energizing.

DANGER !

Electrical connections should be carried out only by a qualified electrician.

- Refer to the bright orange label on the cord and the electrical schematic in the back of this manual for proper connections. Measure the incoming voltage! Do not assume the rated voltage is nominal.The transformer comes from the factory connected to the centre (230 V) tap.

3.3.1 North American Input Power (3 Wire, 208/240 Vac, 60 Hz)

- Connect the power cord to the processor using the following connections:
  Black = L1 (circuit breaker)
  White/Red = L2/N circuit breaker)
  Green = PE (protective earth ground)
- It is important that the proper tap is connected on the transformer. The transformer is located behind the back cover of the collection bin. It can be accessed by removing the four screws holding the cover in place, and sliding the cover forward. Connect the transformer as follows:

Actual line voltage	Transformer tap
200-220V	210V
221-240V	230V
241-260V	250V

3.3.2 European Input Power (3 Wire, 230 Vac, 50 Hz)

- Connect the power cord to the processor using the following connections:
  Brown = L1 (circuit breaker)
  Blue = L2/N (circuit breaker)
  Green/Yellow = PE (protective earth ground)
- It is important that the proper tap is connected on the transformer. The transformer is located behind the back cover of the collection bin. It can be accessed by removing the four screws holding the cover in place, and sliding the cover forward. Connect the transformer as follows:

Actual line voltage	Transformer tap
200-220V	210V
221-240V	230V
241-260V	250V

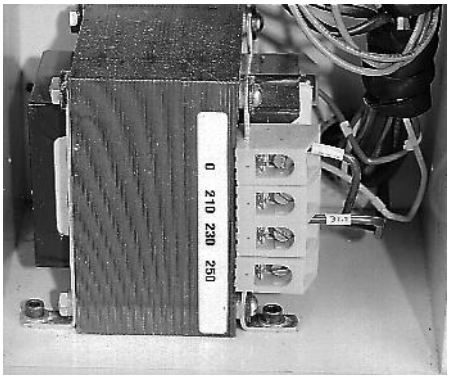


Fig. 22 : Multitap Transformer

3.4 Inspection (Power ON)

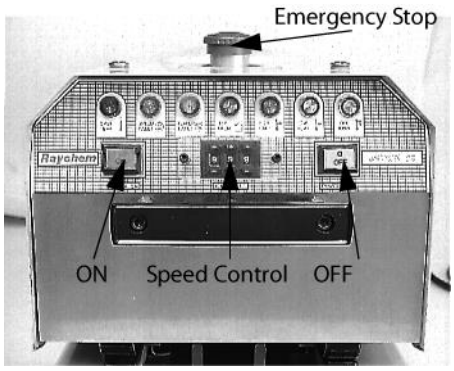


Fig. 23 : Front Control Panel

At the completion of the power OFF inspection sequence and the electrical connections, follow these steps to complete the setup and inspection of the processor.

- Switch the circuit breaker ON.
- Ensure that the emergency stop button is not depressed. A ¼ counterclockwise turn will release the emergency stop button.
- Press the ON push-button. With the temperature set above ambient and the belt speed control set above 100 on the thumbwheel, the heaters, belts, and fans will begin to function. If the speed is set below 100 (0.5 fpm), the processor will automatically go into cooldown due to the drive fault circuitry.
- Set the temperature controller to 600ºC and the belt-speed control at or above 100. The temperature controller is preset at the factory to 600ºC and the belt speed above 100.

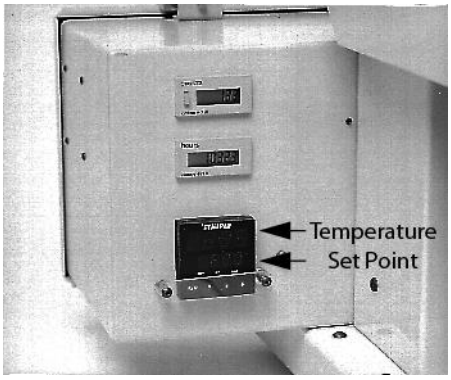


Fig. 24 : Temperature Controller

- Change the digital belt-speed control from maximum (999 setting) to minimum (100 setting), to verify that the belt speed increases and decreases smoothly, with no jerky motion or excessive noises.
- Wait approximately 5 minutes for the heating element temperature to stabilize. When the heating elements have reached the set temperature, the low-temperature light will come on and the lockout gate will lower, indicating that processing can begin.
- The lower display on the temperature controller face indicates the temperature set point; the upper display indicates the actual heating element temperature. Both displays should show the same temperature during normal operation.

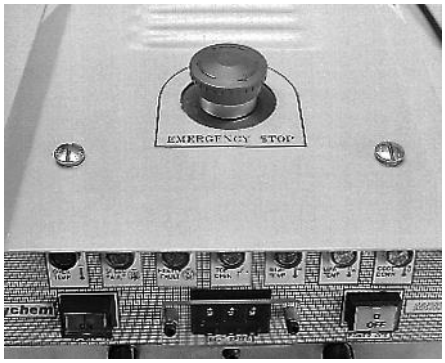


Fig. 25 : Emergency Stop

➲ Press the OFF push-button. Power will be shut off to the heating elements and the lockout gate will rise, but the belts and fans will continue to run for 20 minutes, until the heating elements have cooled to a safe temperature, at which time all power will automatically shut off.

Using the emergency stop or circuit breaker as the normal shutdown procedure defeats the automatic cooldown circuit and will cause heat damage to the processor

4 Operation

After the processor has been set up and inspected as described in Section 3, read the following warnings carefully; then proceed with the normal operation steps in sections 4.1 through 4.3.

DANGER !

Opening the electrical panel while the machine is powered may cause electrical shock.

- Always press the OFF push-button, turn OFF the circuit breaker, and unplug the processor prior to any electrical maintenance or repair

- Touching hot adhesives, hot splices, or heaters can cause burns. Cotton gloves are recommended for operating the processor and for unloading finished harnesses.
- If hands, hair, clothing, or any other foreign objects are caught by the processor's moving parts, you could be injured and the equipment could be damaged. Operate the processor with all covers and panels in place.
- If you open the upper chamber and do not use the support rod, the upper chamber may fall and cause injury or damage the processor. Always use the support rod and ensure the rod is fully seated in the receiver on the upper chamber.
- On the Model 19SS the support rod is not available as the heating chamber opening has an inhibit feature which limits movement to 15mm. This limitation MUST be shown to the operator as it may affect access. The inhibit feature may be disabled as shown in Figure 4 on page 8-82.

To keep the processor in optimum working condition, on a regular basis follow all of the maintenance procedures described in Sections 5.1 through 5.3.

Do not use the circuit breaker or emergency stop as your normal shutdown procedure because this will defeat the cooldown circuit and will cause heat damage to the processor

- In case of excessive smoke, sparks, grinding noises, or any other signs of malfunction, press the emergency stop button, then open the upper chamber and remove any assemblies that may be in the heating chamber. Contact maintenance personnel to investigate the cause of the emergency before restarting the machine.

Such malfunctions are the only reasons to press the emergency stop button while the processor is still running

4.1 Power On and Warm-up

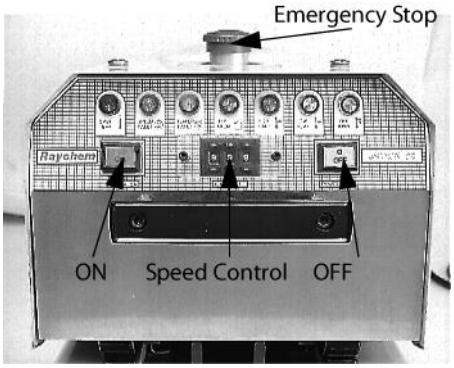


Fig. 26 : Front Control Panel

- Verify that the machine is connected to the appropriate power source and that the circuit breaker is ON, the emergency stop button is not depressed, and the belt speed control is set above 100.
- Press the ON push-button.

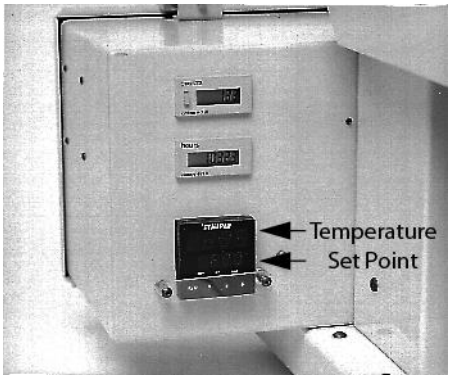


Fig. 27 : Temperature Controller

- 3. Set the temperature controller to the correct set point temperature for your application. Remember, never set the temperature above 700ºC.

Operating the processor above a set point of 700ºC voids all warranties, written or implied

- Set the belt speed to the proper setting for your application. Always set the belt speed at or above a thumbwheel setting of 100 (0.5 fpm). A setting of less than 100 will activate the drive fault circuitry and put the processor in cooldown mode. Refer to the belt speed chart in Section 1.5, Specifications, to translate dial settings to actual belt speeds.
- Allow the processor to warm up for about 5 minutes. When the heating elements have reached the set point, the low-temperature light will go out, the lockout gate will lower, and processing can begin.

4.2 Loading and Unloading

At the completion of the power ON and warm-up sequence, follow these steps to process wire assemblies. These instructions are for processing centre splices. For other applications contact your local Raychem representative.

For the narrow version Model 19SS products are aligned using a product pictogram label to one side of the machine centre

- Prepare the wire assembly. Slide a piece of Raychem heat-shrink tubing over the assembly, next to the splice to be sealed.

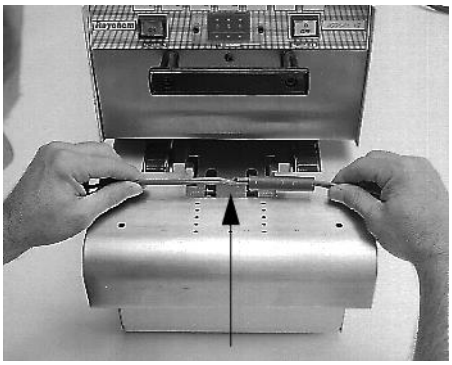


Fig. 28 : Centering the Splice Nugget

- Centre the nugget on the feed tray. Use the centre guide mark to align the nugget of the splice.

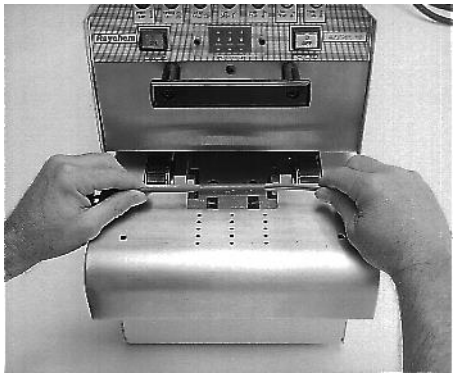


Fig. 29 : Locating the Tubing

- Centre the tubing over the nugget, using the outboard alignment marks on the feed tray.

For significantly unbalanced splices, offsetting the tubing toward the larger side is helpful to prevent ‘milk-off’ of the tubing

- Slide the assembly into the belts. The timing belts grip the assembly and pull it through the processing chamber, then deposit the finished assembly into the collection bin.
- Allow the assemblies to cool for a few seconds after they reach the bin.
- Pull the cooled assembly out of the collection bin.

4.3 Power Off and Cooldown

- At the end of the work shift, press the OFF push-button. This will shut off power to the heating elements. The belts and the fans will continue to run for 20 minutes, until a cool safe temperature has been reached, at which time all power will shut off automatically.

Do not use the circuit breaker or emergency stop for the normal shutdown procedure. This defeats the automatic cooldown cycle and will cause heat damage to the processor

5 Maintenance

The Model 19 conveyor heater is a very low maintenance processor; however, a few minutes of maintenance each week will ensure its reliability and long service life. The following are guidelines for daily, weekly, and monthly maintenance procedures that will keep the Model 19 in optimum working condition. Don't wait until the Model 19 has a problem to give it some attention.

DANGER !

These procedures should be performed only by qualified maintenance personnel. To minimize the risks of burns, electrical shock, or other injuries, all safety precautions must be observed.

The heaters remain hot after the belts and fans stop moving. To avoid any burns or injury during maintenance, wait an additional 15 minutes after the normal cooldown cycle is complete before beginning.

Do not use solvents for cleaning. Solvents are unnecessary and may damage some components of the processor.

5.1 Daily Maintenance

Before the daily production begins, while the processor is cool, take a few minutes to perform the following steps.

- Clean and inspect the belts and pulleys. Using a dull soft tool (wood or brass dowel), remove any adhesive or foreign matter from the belts and pulley grooves. Press the ON push-button briefly to rotate the belts. Ensure that the belts are seated properly in the timing grooves and the grooves are clean. Adhesive buildup in the timing grooves may cause the belts to 'walk' off the pulleys.
- Clean and inspect the heating elements. Using a soft scraping tool, soft wire brush, or wet cloth, clean any adhesive or foreign matter from the quartz face of the heating elements. Ensure that the heating elements are securely fastened in place.
- Verify that the temperature controller is not set above 700ºC. Operating the Model 19 at a set point above 700ºC will cause heat damage and will shorten the life of the processor.

Operating the Model 19 above 700ºC voids any and all warranties, written or implied.

- General condition check. As the Model 19 warms up for normal operation, check the general condition of the processor. Ensure that all the fans are operating, and listen for any grinding or clicking noises. The belts should be running smoothly without a jerky motion, and all covers must be securely in place. Make any repairs or adjustments necessary to return the unit to proper working order.

5.2 Weekly Maintenance

In addition to the daily procedures, perform the following procedures every week or after 40 to 50 hours of operation.

- Check the belts for alignment. Make sure the belts are seated properly in the timing pulleys, and that the pulley grooves are clean. Make sure the pulleys are in alignment and securely in place. With the upper chamber in the down position, make sure the top belts mesh with the bottom belts.

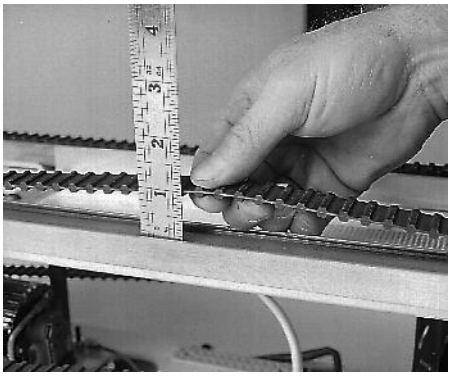


Fig. 30 : Checking Belt Tension with a Ruler

- Check the belts for tension. With the upper chamber raised and the support rod in place, measure the free-play distance at the centre of each belt. The distance between the belt and foam pad, or guide, should be between 19 mm (0.75 in) and 38 mm (1.50 in).

Belts that are too tight will prematurely wear the bearings and belts

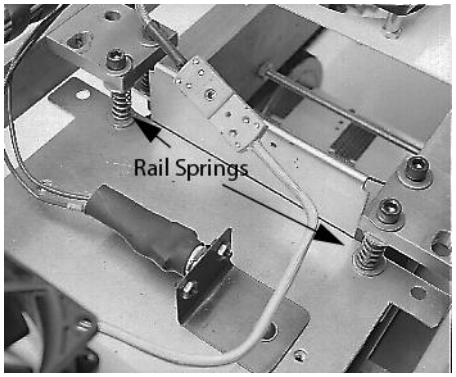


Fig. 31 : Rail Springs

- Verify that the upper floating rails contact the upper belts. With the upper chamber raised, inspect the position of the upper rails. If they do not touch the belts along the entire length of the rail, adjust the spring-loaded bolts on either end of the rails. If the rails do not make contact with the belts, smaller assemblies may not be gripped sufficiently and will tend to roll through the heating chamber.
- Silicone the belts. With the belts turning, spray silicone (not solvent or oil) over the entire length of the belts. This will increase the life of the belts significantly.

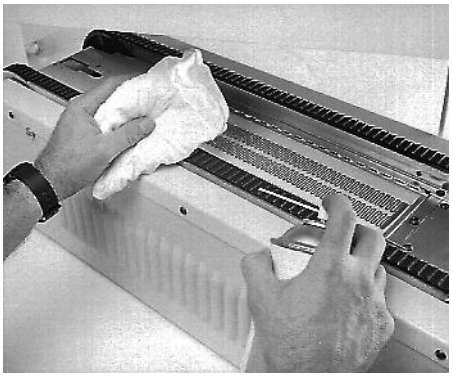


Fig. 32 : Spraying Silicone over the Belts

- General condition check. As the processor warms up for normal operation, check its general condition. Ensure that all the fans are operating and listen for any grinding or clicking noises. The belts should be rotating smoothly without a jerky motion. All guards and covers must be securely in place. Make any repairs or adjustments necessary to return the unit to proper working order.

5.3 Monthly Maintenance

Don’t wait for the Model 19 to break down before giving it some attention. Take a few minutes each month to perform the following procedures. This should ensure a long and reliable service life with minimal downtime for repairs.

- Clean the inside of the Model 19 of dirt, dust, or any foreign material. Open each side panel and (with an air hose, vacuum, or damp cloth) clean out any dirt, dust, wires, tubing, adhesive, or anything else that has been trapped inside the processor.
- Inspect the belts. If the belts are worn and fibres are peeling off, replace the belts. Spraying the belts weekly with silicone will increase the life of the belts.

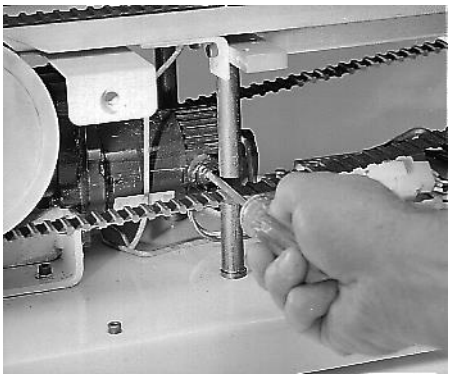


Fig. 33 : Motor Brushes

- Inspect the motor brushes. Every few months, inspect the length and condition of the motor brushes. If they are not at least 9.5 mm (0.37 in) long, replace them.

6 Troubleshooting

If the processor is still inoperative after following the troubleshooting and repair procedures in this manual, contact your local TE representative

DANGER !

Some troubleshooting procedures require the processor's power to be ON. To minimize the risk of burns, electric shock, or other injuries, these procedures should be performed only by a qualified maintenance person, and all safety precautions must be observed.

Wear protective gloves to prevent possible burns or electric shock.

The heating elements remain hot after the belts and fans stop moving. To avoid any burns or injury during troubleshooting, before you begin wait an additional 15 minutes after the normal cooldown cycle is complete.

6.1 Troubleshooting Guide

Problem	Possible Cause	Corrective Action
No power in the processor.	Main power source isn't connected.	Connect the power source.
	Emergency stop button is depressed.	Turn and release the emergency stop button.
	Circuit breaker is OFF.	Turn ON the circuit breaker.
	Circuit breaker is defective.	Replace the circuit breaker.
	ON push-button has not been pressed.	Press the ON push-button.
	ON push-button is defective.	Replace the ON push-button
	Fuse F1 is blown.	Replace the fuse.
	Transformer is defective.	Replace the transformer.
	Master control relay is defective.	Replace the master control relay.
Power to the processor drops as soon as the ON pushbutton is released, without entering cooldown mode.	Fuse 2FU is blown.	Replace the fuse.
	Cooldown timer module 1TMR is defective.	Replace the timer module.
	Master control relay is defective.	Replace the master control relay
	CRF is defective.	Replace the CRF.
Heating elements will not reach set point.	Heating element failed (see Section 6.2).	Replace as necessary (see Section 7.3).
	Thermocouple or thermocouple lead wire is faulty between controller and heating element (see Section 6.3.1).	Repair as necessary.
	Thermocouple in upper heating element is faulty (see Section 6.3.1).	Replace the upper heating element (see Section 7.3).
	Solid-state relay is defective (see Section 6.4).	Replace the solid-state relay.
	Temperature controller is defective.	Replace as necessary.
	Temperature controller isn't programmed correctly.	Reset the parameters (see Section 8.2.2).
Temperature control varies.	Thermocouple wire is faulty.	Repair the thermocouple wire as necessary or replace the upper heating element (see Section 7.3).
	Temperature controller isn't programmed correctly (see	Reset the internal parameters (see Section 8.2).

Problem	Possible Cause	Corrective Action
	Section 8.2)	
	Excessive air movement around processor.	Check for external fans or airconditioning that may be blowing excessive air at the processor.
No power to heating elements.	ON push-button has not been pressed.	Press the ON push-button.
	Solid-state relay is defective (see Section 6.4).	Replace the solid-state relay.
	Master control relay is defective (see Section 6.6).	Replace the master control relay.
	Temperature controller set point is too low.	Increase the set point as necessary.
	Temperature controller is programmed incorrectly (see Section 8.2).	Reset the parameters (see Section 8.2).
	Temperature controller is defective.	Replace the controller.
	Electrical connections are faulty.	Ensure the integrity of the connections.
Heating elements will not shut off.	Temperature controller is defective.	Replace the controller.
	Solid-state relay is defective (see Section 6.4).	Replace the solid-state relay.
Automatic cooldown isn't functioning.	Cooldown timer is defective.	Replace the cooldown timer.
Fans don't operate.	A fan is defective.	Replace the defective fan.
	DC power supply fuse is blown.	Replace fuse(s) on the DC power supply/drive fault detector board - F1 for lower fans, F2 for upper fans.
	DC power supply failure.	Replace the DC power supply/drive fault detector board.
	Low-voltage transformer failure.	Replace the low-voltage transformer.
	Faulty electrical connections to fans.	Ensure the integrity of the connections.
Belts don't move.	Set screws and keys are loose or missing on the drive pulleys.	Align pulleys and tighten set screws.
	Electrical connections are faulty.	Check connections between the motor controller and the motor.
	Motor is defective (see Section 6.5).	Inspect the motor brushes; replace as necessary.
	Speed dial is set below 100.	Increase the speed dial setting.
	Motor controller is defective	Check the controller and

Problem	Possible Cause	Corrective Action
	(see Section 6.5).	replace as necessary.
	Motor speed potentiometer is defective (see Section 6.5).	Replace controller as necessary.
No variable speed control.	Motor controller failure.	Replace the controller (see Section 7.6).
	Digital speed control failure.	Replace as necessary.
Belts walking off pulleys.	Belts are too loose.	Adjust tension (see Section 8.4).
	Upper rails aren't adjusted properly.	Adjust position of rails (see Section 8.3).
	Pulley grooves are dirty.	Clean the pulleys
	Assemblies are dragging behind the splice location.	Adjust the position of the assemblies (toward middle of processor).
No grip on wire assemblies being processed.	Floating rails aren't adjusted properly.	Adjust pressure on rails (see Section 8.3).
	Positive stop adjustment is set incorrectly.	Readjust bolt so chamber closes completely.
Model 19SS Only Auto-off Feature does not operate (For timer location see Figure 211: on page 20-82)	Timer set incorrectly.	Adjust as necessary.
	Timer Failure	Replace
	Parts Sensor Failure	Replace.

6.2 Heating Element Test

If a heating element has failed, the Heater Fault or Lowtemp light on the front control panel will illuminate. The temperature controller will cease to display the element temperature. The following procedure will determine which heating element has failed.

- When the machine is cool, turn OFF the circuit breaker and unplug the power cord.
- Remove the top and side panels.
- Measure the heating element resistance at terminal blocks 4TS and 5TS, located near each element. The resistance of each standard heating element should be approximately 30.0Ω ± 2 (14.7Ω ± 2 for the Model 19SS).

If the resistance of both heaters is acceptable and a heater fault continues to occur, the problem is likely one of the heater power relays, 1CR or 2CR.

6.3 Temperature Control Circuit Test

The temperature circuit consists of the temp controller, thermocouple overtemperature switch, and cooldown timer circuit. The following procedure describes the test for each circuit.

6.3.1 Thermocouple Check

The upper heating element and the thermocouple are a single unit. If a damaged wire or insulation cannot be repaired, the upper heating element must be replaced

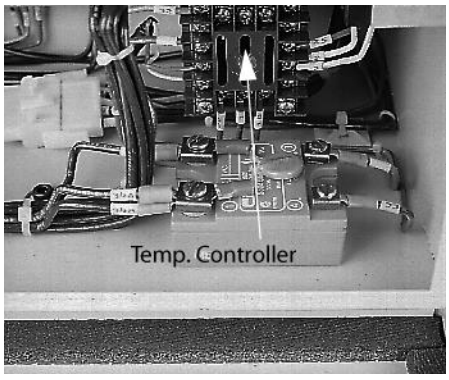


Fig. 34 : Back of the Temperature Controller

- When the machine is cool, turn OFF the circuit breaker and unplug the power cord.
- Open the control box.
- Disconnect either thermocouple lead from the rear of the temperature controller and measure the resistance across thermocouple wires. If the resistance is infinity, the wire is broken. If tracing the length of the wire does not reveal the break, it may be inside the upper heating element. Continue with the following steps.
- Remove the top sheet metal cover.
- Disconnect the miniature thermocouple plug and measure the resistance from the male end connected to the heating element. If the resistance is greater than 2Ω, replace the upper heating element. If the resistance is less than 2Ω, the fault lies in the extension wire between the plug and the temperature controller.

6.3.2 Overtemperature Circuit Test

A normally closed resettable thermal switch, located in the upper heating chamber, senses when there is an overtemperature condition. Should an overtemperature condition occur, a light on the front control panel will illuminate, the lockout gate will rise, and power to the heating elements will be shut off.

- When the machine is cool, turn OFF the circuit breaker and then turn it back ON.
- Press the ON push-button. If the processor immediately illuminates the overtemperature indicator light and goes into cooldown mode even though the machine is cool, the overtemperature switch (1TSW) is defective and must be replaced.

If you have reason to believe that the overtemperature indicator light is burned out, the overtemperature switch (1TSW) can be checked directly by measuring the resistance across the terminals of the switch. The resistance should be 0Ω. If the resistance is infinity, replace the switch (see Section 7.4).

- Remove the top sheet metal cover.

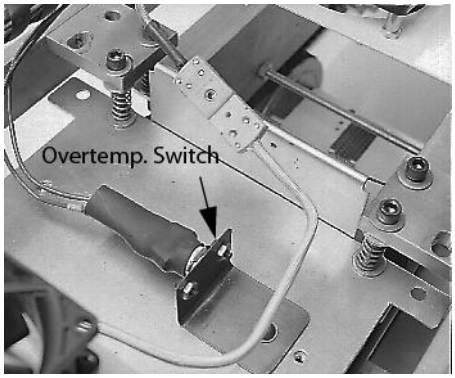


Fig. 35 : Overtemperature Switch (1TSW)

- Remove the bracket (with the overtemperature switch attached) from the top of the upper-heating-element shield.
- If the switch is closed (overtemperature light is OFF), apply heat to the switch with a heat gun. The switch should then open (overtemperature light illuminates) at a temperature of approximately 200ºC. If the switch does not open, replace it.

6.3.3 Cooldown Circuit Test

When the OFF push-button is pressed, it actuates an electronic timer located in the control box.

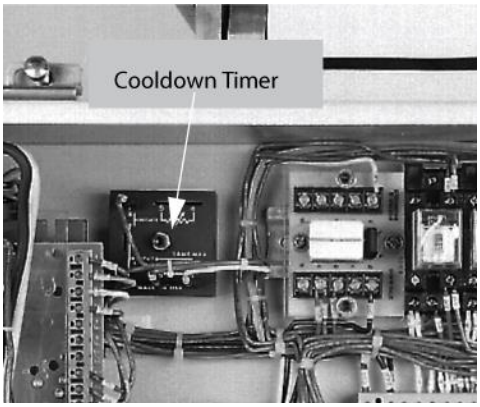


Fig. 36 : Cooldown Timer (1TMR)

- Measure the input voltage of the timer on terminals #1 and #3; wires #13 and #2. The voltage should be approximately 120 Vac.
- Measure the output voltage of the timer on terminals # 2 and #3; wires #15 and #2. When the processor is operating normally (and during cooldown), the voltage should be approximately 120 Vac. After 20 minutes, the output voltage drops off and there should be no power to the processor.
- Measure the 'initiate' voltage on the timer on terminals #6 and #3; wires #14 and #2. Press and hold the ON push-button. With the ON push-button depressed, the voltage should be approximately 120 Vac. When the ON push-button is released, the voltage should drop below 100 Vac. (This reading will vary, depending on the type of meter used.)

6.4 Solid-State Relay Test

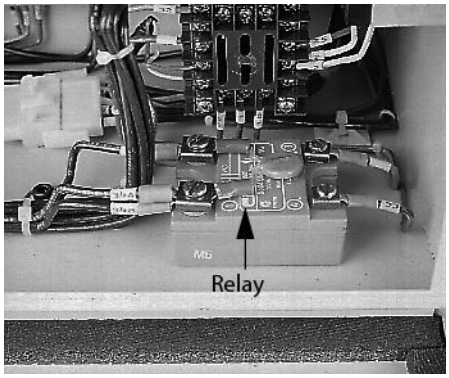


Fig. 37 : Solid State Relay

DANGER !

Only a qualified electrician should perform this test with processor power on, and should wear electrical insulating gloves and follow all electrical safety precautions when performing the test

The first part of this test is performed while the temperature controller is supplying full power to the heating elements. The second part of the test is performed with the temperature controller supplying no power to the heating elements.

- After the processor has cooled down, open the control box cover and remove the Plexiglas cover on the solid-state relay.
- Press the ON push-button.
- Set the temperature control to 600ºC.
- Measure the input voltage across terminals #3 and #4 of the solid-state relay. When full power is on to the heating elements, the voltage measured should be approximately 5 Vdc. If no voltage is present, check the output of the temperature controller and the electrical connections between the temperature controller and the relay.
- Measure the output voltage across terminals #1 and #2. If there is power to the heaters, the voltage measured should be approximately 0 Vac. If the voltage present is significant (>3 Vac), the solid-state relay has an open circuit; replace the relay. If the relay is not open and still fails to heat up, check the heater power relays.
- Lower the set point of the temperature controller to 20ºC. This part of the procedure is performed with no power supplied to the heating elements.
- Measure the input voltage across terminals #3 and #4. The voltage should be approximately 0 Vdc. If significant voltage is present, the temperature controller is defective.
- Measure the output voltage across terminals #1 and #2. The voltage measured should be the line voltage (200 to 260 Vac). If no voltage is present, the solid-state relay is shorted.

6.5 Drive Circuit Test

The drive circuit consists of the motor, motor controller, and speed potentiometer and all inter-connections.

DANGER !

This test is performed with the processor power on. Wear electrical insulating gloves and follow all electrical safety precautions when performing this procedure

This test is performed with the processor power on. Wear electrical insulating gloves and follow all electrical safety precautions when performing this procedure.

6.5.1 Speed Controller Test

- Open the control box cover to gain access to the speed controller.
- Remove the Plexiglas cover only if the fuses need to be checked.
- Measure the input AC voltage across terminals L1 and L2, wires #27 and #2. The voltage measured should be approximately 120 Vac. If it is not, check the line fuse on the controller board.

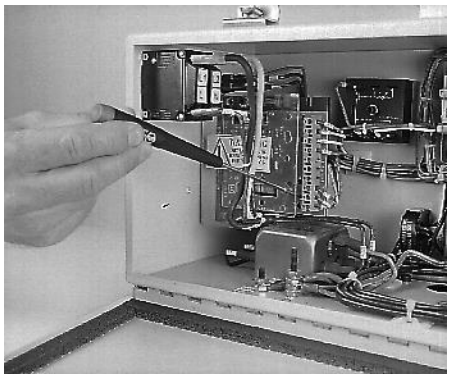


Fig. 38 : Motor Controller Adjustment

- Adjust the speed potentiometer to maximum speed (999).
- Measure the output DC voltage across terminals A+ and A-, wires #28 and #29. With the speed set at maximum, the voltage measured should be approximately 80 Vdc. If there is no output voltage, check the armature fuse on the controller board. If the armature fuse is good, the controller is defective.

6.5.2 Motor Resistance

- Disconnect power to the processor.
- Disconnect either wire from A+ or A- on the motor controller board to measure the resistance to the motor between wires #28 and #29. The resistance should be approximately 55Ω. If the resistance is significantly higher or lower, replace the motor.

6.5.3 Motor Brush Inspection

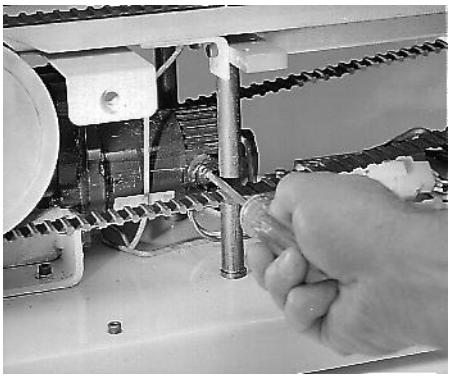


Fig. 39 : Motor Brush Location

- Remove the lower side panels to gain access to the motor brushes.
- Unscrew the brush receptacles located on either side of the motor casing and remove the brushes. They should be at least 10 mm (.37 in) in length. Replace as necessary.

When reinstalling the brushes, ensure that they are seated with the same orientation as when they were removed.

6.6 Master Control Relay Test

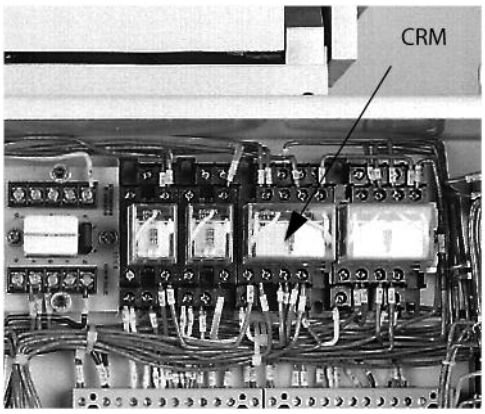


Fig. 40 : Master Control Relay (CRM)

- Open the control box to gain access to the motor controller.
- Press the ON push-button. The relay should activate, sending power to the components of the processor.
- Measure the voltage on the coil of the relay on terminals #13 and #14; wires #6 and #2. Measure the voltage while pressing and holding the ON pushbutton. The voltage should be approximately 120 Vac. If there is voltage, but the relay is not active, the relay is defective.
- Contact latching. The master control relay (CRM) contacts send voltage to several other components in the system that must operate properly to cause the CRM to latch. These components include CRF, the overtemperature switch (1TSW), the cooldown timer (1TMR), and the drive fault detector (PS/SFD). If the CRM is not latching, check these components as required.

6.7 DC Power Supply/Drive Fault Detector Circuit Test

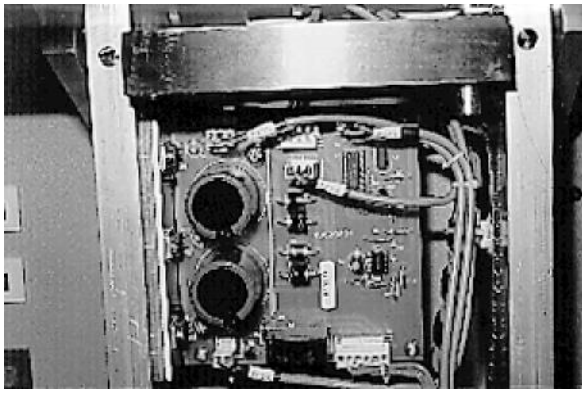


Fig. 41 : DC Power Supply/Drive Fault Detector Board

The DC power supply/drive fault detector board (PCB) powers the fans and lockout gate and monitors the actual belt speed of the processor to ensure that it is greater than 0.5 fpm. This PCB is located in front of the control box between the vertical frame struts (see photo). The input voltage of 24 Vac is provided by a step-down transformer located above the PCB, near the rear of the upper chamber frame.

- With the machine cool and the circuit breaker OFF, remove the back cover of the collection bin. The power supply is located above the power transformer. Remove the two fuses (F1 and F2) on the PCB and check them for continuity. If the resistance is infinity, replace the fuses.
- Remove the top cover to gain access to the low-voltage transformer.
- When the machine is cool, press the ON push-button and immediately press the OFF push-button to put the processor in cooldown mode.

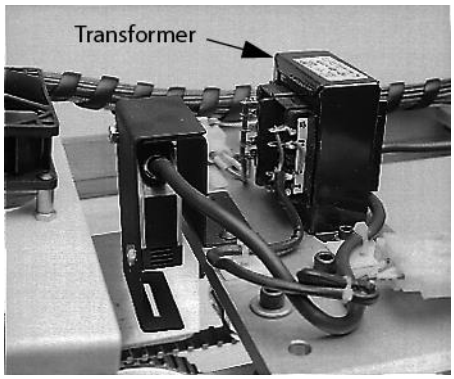


Fig. 42 : Low Voltage Transformer

- Measure the voltage at the input of the low-voltage transformer. The voltage should be approximately 120 Vac ± 10%. If there is no voltage, a wiring problem exists. If there is voltage but it is out of range, the tap on the power transformer should be changed (see Section 3.3, Electrical Connections).
- Measure the input voltage between pins #1 and #2 of connector J1. Then measure between pins #2 and #3 of connector J6. If there is not approximately 12 to 14 Vac at each location, the low-voltage transformer (2XFMR) is defective.

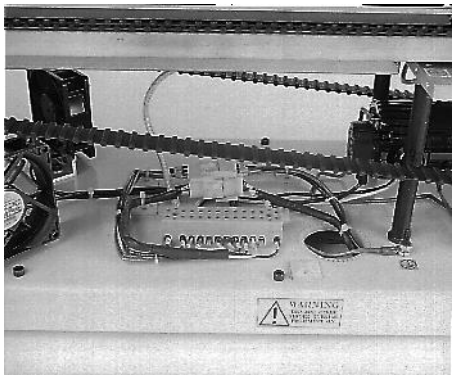


Fig. 43 : J3 and J4

If the following measurements do not produce the required voltage, replace the PCB.

- Measure the voltage to the upper fans between pins #1 and #2 on J4. The voltage measured should be approximately -12 Vdc.
- Measure the voltage to the lower fans between pins #3 and #2 on J3. The voltage measured should be 12 to 18 Vdc.
- Measure the voltage to the lockout gate between pins #1 and #2 on J3. The voltage measured should be 11.5 to 12.5 Vdc.
- Measure the voltage between pins #3 and #1 on J2. The voltage measured should be 4.7 to 5.3 Vdc. This is the 5-V signal to the motor encoder for the drive fault detection circuit.

6.8 Optical Parts Counter

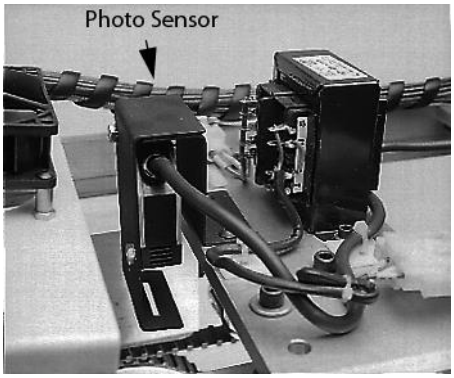


Fig. 44 : Photo Sensor (1PHTSENS)

- With the machine cool and the circuit breaker OFF, open the control panel rear cover.
- Clip test leads to the wired terminals on the rear of the counter (wires #16 and #17).

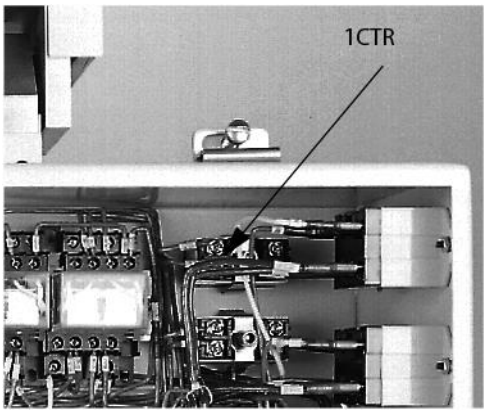


Fig. 45 : Parts Counter (1CTR)

- Touch leads together. Each time the leads are touched together, the counter should increment. If it does not, the counter is defective. If the counter increments during this test but does not count parts, the fault lies in the reflector or photo sensor.
- Inspect the reflector. If it is dirty, clean it using a damp soft cloth. If it is damaged, replace the reflector.
- Place a piece of white paper under the photo sensor (over the reflector). A red light beam should be visible. If it is not, replace the photo sensor.

6.9 Auto-off Feature

The Auto-off feature is only available on the Model 19SS.

If no part has been processed for 60 minutes the machine will automatically enter the cool-down mode.

This feature uses the same photo sensor as the optical parts counter described above.

For information on adjustment to the time period contact your nearest Tyco representative.

7 Component Replacement

Follow the guidelines in Sections 7.1 through 7.9 for replacing the major components of the Model 19.

If the machine is still inoperative after following all troubleshooting and repair procedures, please contact your local TE representative.

DANGER !

These procedures should be performed only by a qualified maintenance person. To minimize the risks of burns, electrical shock, or other injuries, all safety precautions must be observed.

To prevent electric shock, perform this work with the power OFF. First turn off the power switch, then the circuit breaker. Then unplug the power cord.

The heaters remain hot after the belts and fans stop moving. To avoid any burns or injury during maintenance, wait an additional 15 minutes after the normal cooldown cycle is complete before beginning.

- Do not attempt to bypass the circuit breaker.
- Do not attempt to bypass the emergency stop switch.

When reassembling panels, be sure no wires are pinched between the outer panels and the inner frame, or an electrical short or blown fuse could result.

To avoid machine damage, replace fuses only with new fuses of the original amperage, voltage, and type. For recommended values, see Section 1.5, Specifications, or the fuse labels.

To rotate the belts, or to check the voltages for heater output, you may reconnect the processor. Disconnect it again before resuming repair work.

7.1 Belt Replacement

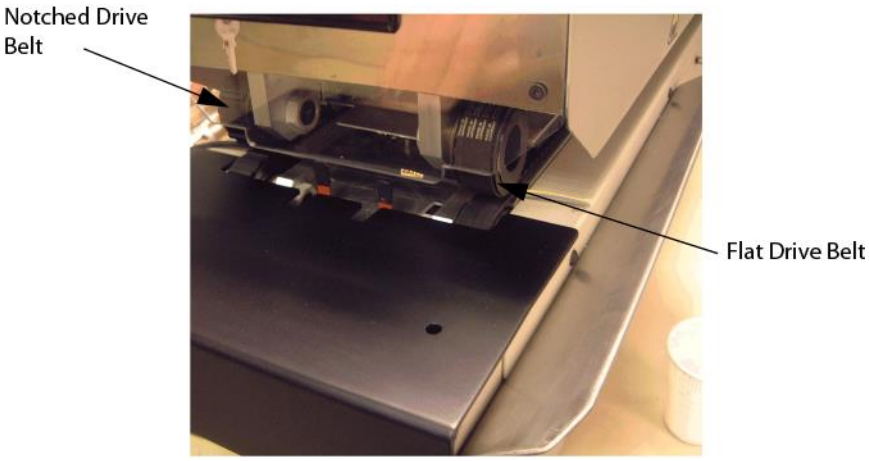


Fig. 46 : Model 19SS drive belts

As shown in Figure 46: above one set of drive belts on the Model 19SS are flat

- When the machine is cool, turn OFF the circuit breaker and unplug the power cord.
- Remove all of the covers upper panel (for access to upper belts for replacement), both side panels, and lower front panel (for access to lower belts for replacement).
- Loosen the two tensioning screws located on the end of the front bearing stand.
- Remove the two screws on the rear of the belt guides to remove the lower belts.
- Remove the belts.
- Clean the pulley grooves. Use a wire-bristled brush to remove any dirt or adhesive buildup in the timing grooves.
- Check that the set screws are in place and secure in the drive pulleys and that the pulleys are aligned properly with the belt guides.
- Ensure that the bearings are secured to the bearing stands. They are secured with a bolt and nut though the stands.
- Inspect the foam backing pads and belt guides at this time. Replace as necessary.
- Install new belts by reversing the previous procedure (Steps 1-9).

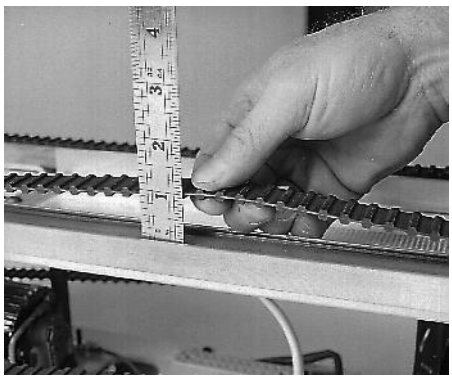


Fig. 47 : Measuring the Belt Tension

- Tension the belts by gripping the bearing stand and pulling forward. While keeping tension on the stand and belts, tighten the two locking screws on the corresponding bearing stand.

- Replace and tighten the screws on the rear of the belt guides after replacing the lower belts.
- Measure the belt play by gripping the belt in the centre and lightly pulling the belt away from the foam pad or belt guide. There should be a 17 mm to 35 mm (.75 in to 1.50 in) gap between the centre of the belt and the foam pad or guide.

Belts that are too tight will prematurely wear the bearings and stretch the belts.

- Ensure that the upper backing rails are touching the upper belts. If they do not touch the belts, they may not securely grip smaller assemblies being processed. Adjust the rails by using the spring-loaded screws at the end of the rails.

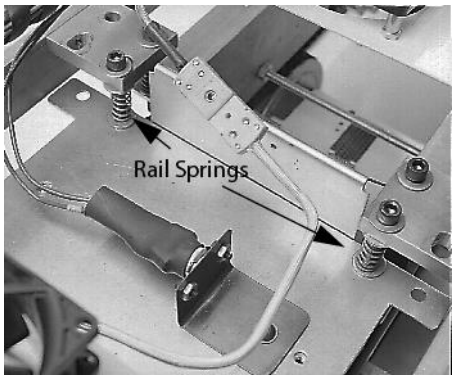


Fig. 48 : Rail Springs

7.2 Fan Replacement

- When the machine is cool, turn OFF the power switch and circuit breaker. Then unplug the power cord.
- Remove the appropriate panels.
- Note the polarity of the fan leads at the terminal block. Note which terminal block position houses the red fan lead and which position houses the black fan lead.

Disconnect the fan leads from the terminal block. The fans operate on DC voltage, so when the new fan is installed, the wires must be installed with the same orientation as before or the fans will not operate. Fans that are not operating will disrupt the normal airflow, which will cause the processor to overheat and may cause extensive damage.

- Remove the defective fan by removing the four mounting screws holding the fan to the frame.
- Install the new fan by reversing the above procedure.
- Replace all panels and guards. When reassembling panels, be sure that no wires are pinched between the panels and the inner frame.

7.3 Heating Element Replacement

- Remove the two mounting screws securing the heating elements to the baffles.
- Disconnect the power leads by loosening the screws on the terminal block.

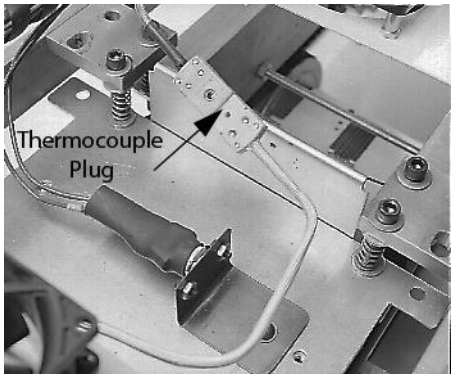


Fig. 49 : Thermocouple Plug

- Disconnect the thermocouple miniplug when replacing the upper heating element.
- Remove the heating element.
- Install a new heating element by reversing the procedure.

7.4 Overtemperature Switch Replacement

The overtemperature switch is attached to a mounting bracket on top of the upper heater baffle.

- Turn OFF the circuit breaker and unplug the power cord.
- Remove the top panel from the upper chamber.
- Remove the heat-shrink tubing from the rear of the switch, taking care not to damage the wire insulation.

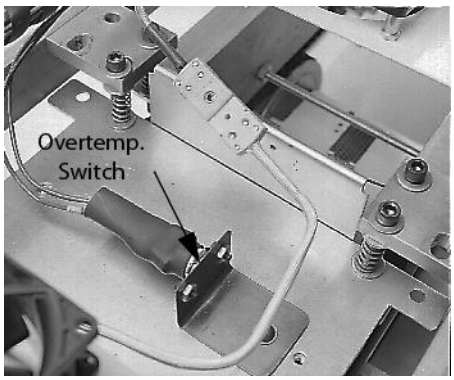


Fig. 50 : Overtemperature Switch

- Remove the two wires from the switch.
- Remove the two screws holding the switch to the backing plate.
- Install a new switch by reversing the above procedure.

In order to ensure safety from electric shock, make sure the heat-shrink tubing is applied to the rear of the overtemperature switch whenever the switch is replaced.

7.5 Cooldown Timer Replacement

- Turn OFF the circuit breaker and unplug the power cord.
- Open the control box.
- Remove the wires connected to the timer. Be sure to mark the wires for reconnection

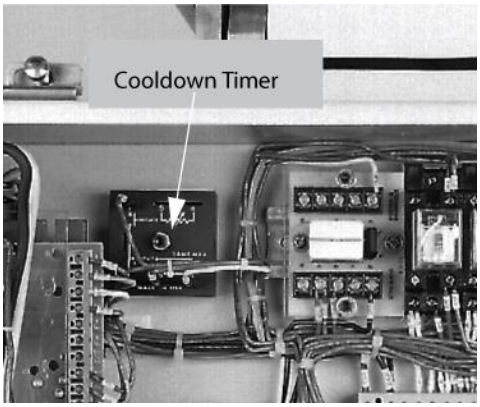


Fig. 51 : Timer

- Remove the single bolt in the middle of the timer to remove the timer.
- Install a new timer by reversing the above procedure.

7.6 Motor Controller Replacement

- Switch the circuit breaker to the OFF position and unplug the power cord.
- Open the control box cover.

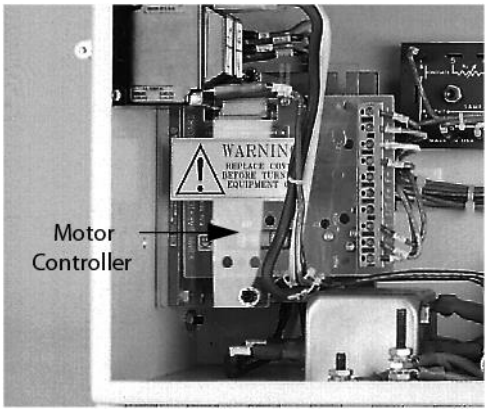


Fig. 52 : Motor Controller

- Remove the motor controller cover.
- Remove the motor controller cover standoffs.
- Remove all of the wires from the controller. Note the position and mark the wires before removal.
- Remove the mounting screws from the controller.
- Install a new controller by reversing the above procedure.

7.7 Idler Pulley and Bearing Replacement

The pulleys come already pressed into the sealed needle bearings. They are replaced as a set, pulley and bearing.

- 1. Remove the nut that secures the bolt to the bearing into the stand.
- 2. Remove the pulley and bearing assembly from the stand and replace the entire unit. Do not try to separate the bearing from the pulley—the bearing is pressed into the pulley hub and is replaced as one unit.

7.8 Drive Pulley Replacement

- Remove the side covers.
- Mark the position of the pulley on the shaft. The pulley must be reinstalled in exactly the same position on the shaft as the old pulley.
- Loosen the 2 set screws in the pulley.
- Slide the pulley off the shaft, ensuring that the key is not lost.
- Slide the new pulley onto the shaft and locate it in the exact same position as the old pulley.
- Install the key and tighten the set screw.

7.9 Motor Encoder Replacement

When performing in-field service replacement of the Model 19 encoder, it is imperative that the service technician does not move, loosen, or damage the original encoder base plate (see Figure 53).

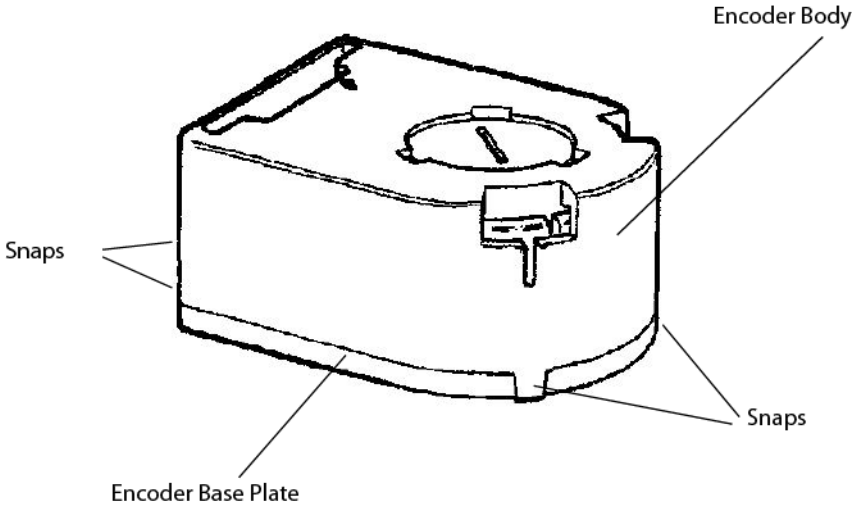
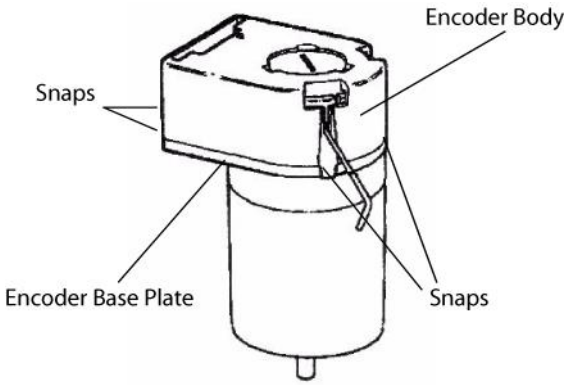


Fig. 53 : Parts of the Encoder

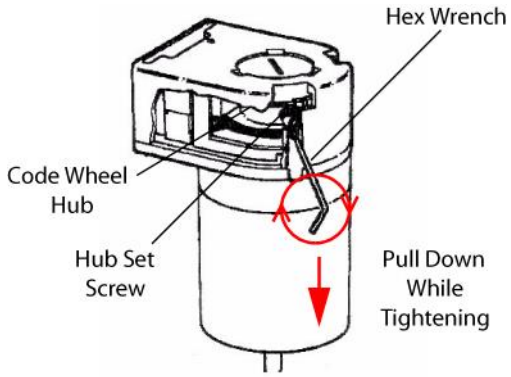
To disassemble the existing encoder, grip the encoder body with one hand while prying the snaps open with a small, flat bladed, screwdriver. When the encoder body is free from the base plate, it can be forcibly removed from the motor. Any damage to the existing encoder body and code wheel is of no consequence since they are being replaced. Using the existing base plate as factory mounted is the only way to ensure proper encoder wheel alignment.

Encoder Assembly

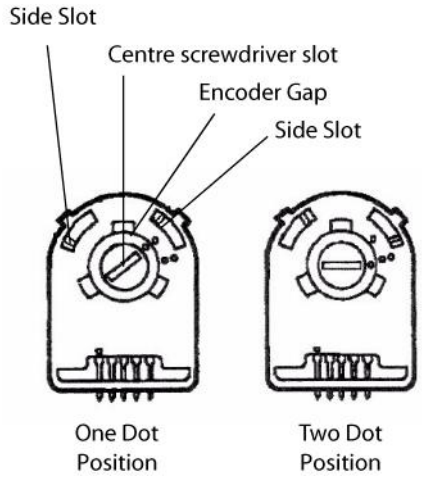
- Loosen the set screw on the hub of the existing code wheel and remove the hub and code wheel from the shaft.
- With hex wrench inserted into the hub set screw, snap the encoder body onto the base plate locking all four snaps.



- Push the hex wrench into the body of the encoder to ensure that it is properly seated into the code wheel hub set screws. Then apply a downward force on the end of the hex wrench. This sets the code wheel gap by levering the code wheel hub to its upper position.
- While continuing to apply a downward force, rotate the hex wrench in a clockwise direction until the hub set screw is tight against the motor shaft. The hub set screw attaches the code wheel to the motor's shaft.
- Remove the hex wrench by pulling it straight out from the encoder body.



- Use the centre screwdriver slot, or either of the two side slots, to rotate the encoder cap dot clockwise from the one dot position to the two dot position.
  Do not rotate the encoder cap anti-clockwise beyond the one dot position.



7. The encoder is now ready for use.

8 Calibration and Adjustment

8.1 Motor Controller/Speed Calibration

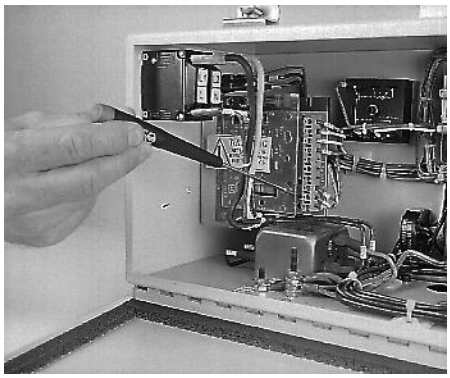


Fig. 54 : Adjusting Trimpot with Screwdriver

Only the MIN. and MAX. trimpots are used for calibration purposes. The ACCEL., IR., and CL. are calibrated at the factory and should not need adjustment. For adjustments of these pots, consult your local Raychem representative.

- Measure the belt speed at the 999 speed setting. The target is 5.0 ± 0.1 fpm. If it is not, adjust the MAX. trimpot slightly in the clockwise direction to increase the speed, or counterclockwise to reduce the speed.
  - To measure the belt speed, place a ruler next to the belt, mark 1-foot spacing next to the belt, and measure the speed using a stop watch.

1 ft = 12 ± 0.3 sec/ft or 60 in/min.

- Measure the belt speed at the 100 speed setting. The target speed is 0.5 fpm + 0.05 fpm, or 13 cm (6 in) per minute. If it does not measure 0.5 fpm, adjust the MIN. trimpot slightly in the clockwise direction to increase the speed, or counterclockwise to decrease the speed.
  - To measure 0.5 fpm, place a ruler next to the belt and, using a stop watch, measure the belt speed.

1 ft = 120 + 5 sec – 0 sec

6 in. = 60 + 5 sec – 0 sec

The minimum belt speed alarm is set at 0.5 fpm. Setting the speed too slow will activate the drive fault alarm and interrupt the operation of the processor.

- Repeat the above steps until the maximum and minimum speed targets are reached. The process may take a few adjustments to meet both the MIN. and MAX. requirements.

Adjusting the MAX. trimpot affects the MIN. setting and vice versa.

8.2 Temperature Controller

The internal parameters of the temperature controller are preset at the factory. The only time these parameters should be adjusted is when calibrating the processor or installing a new controller. However, it is a good idea to periodically check the parameters to ensure that the settings are correct.

There are two versions of Temperature Controller - Dynapar or Partlow. The Partlow is current.

8.3 Dynapar Controller

8.3.1 Operation

The number in the bottom display is the set point temperature; the number in the upper display is the actual heating element temperature.

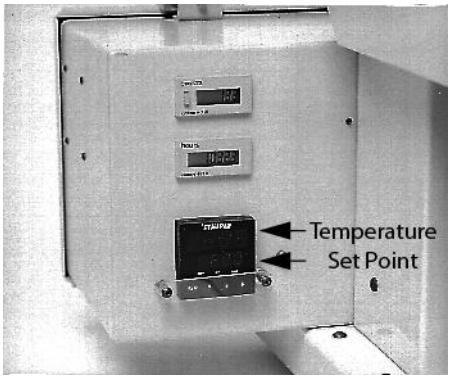


Fig. 55 : Temperature Controller

- To set the temperature, press the Up/Down arrows to the desired set point, measured in °C.
- In case of thermocouple failure, an error message “SnSr” will appear in the upper display.

8.3.2 Internal Function Settings

The various parameters of the temperature controller are preset at the factory; however, they should be checked periodically to ensure that the settings are correct.

Adjustment, if access is locked

- Depress and hold UP/Down arrows for approximately 5 seconds. AT light will flash once and display will stop blinking
- Continue to press Up/Down arrows for 5 more seconds. “EnAb1” displayed. Releasing arrows will cause “Epro” to be displayed.
- Press “F” key. “Epro On” displayed
- Press “F” key twice. “Etun On” displayed
- Press “F” key twice. “ESPC Off” displayed

To unlock (allow adjustment):

- Press Up arrow. “ESPC On” displayed.
- Press A/M (stores changed parameter).

To exit after unlock:

- Press “F” key until “Epro” or “Etun” or “ESPC” with no value, is displayed.
- Press Down arrow key. Temperature displayed (exit adjust mode / return back to normal running mode).

OR to adjust other parameters:

- Press Up arrow. “CtrL” displayed.
- Press “F” key until “ESPC” or “Etun” or “Epro” with no value, is displayed.
- Press Up arrow. “CtrL” displayed.
- Press “F” key to scroll between Program mode, Tune mode, and Control mode.
- When desired mode has been reached, press the Down arrow to scroll down through the parameters of each mode.
- To view the value of a particular parameter, press “F”. To adjust value, press Up/Down arrows accordingly. To store a value, press “A/M” key.

To prevent operator adjustment after parameter adjustment:

- Adjust “ESPC” to “Off” as per 1-7 above.

To exit after adjustment to any parameter:

- Press “F” key until any parameter with no value, is displayed.
- Press Up arrow until “CtrL” is displayed.
- Press Down arrow key. Temperature displayed (exit adjust mode / return back to normal running mode).

Parameter	Value	Parameter Acronym	Value Acronym
Program Mode			
Input Select	1719	inPS	1719
Output 1 Action	Reverse	out1	rEv
Alarm 1 Type	Deviation	ALA1	bAnd
Alarm 2 Type	Deviation	ALA2	bAnd
Output 2 Usage	Alarm 2 Direct	USE2	A2_d
Output 3 Usage	Alarm 2 Reverse	USE3	A1_r
Comm. Baud Rate	4800	CbS	4800
Comm. Address	1	Cad	1
Cold Junction Compensation	Enabled	CJC	EnAb
Tune Mode			
Ramping SP Value	*	SPrP	*
Set Point Ramp Rate	9999	Sprr	9999
Input Filter	0.5	FiLt	0.5
Input Correction	**	iCor	**
Output 1 P-Band (%)	2.0	Pb1	2.0 (4.0 for Model 19SS)
Automatic reset	0.12	ArSt	0.12
Rate Time	0.03	rAtE	0.03 (0.05 for Model 19SS)
Manual Reset	0	rSEt	0
Set Point Upper Limit	700	SPuL	700 (650 for Model 19SS)
Set Point Lower Limit	0	SPLL	0
Output 1% Limit	100	o1PL	100
Cycle Time	0.5	Ct1	0.5
Deviation Alarm 1	–20	dAL1	–20
Deviation Alarm 2	20	dAL2	20
Loop Alarm Enable	0	LAEn	0
Enable Pre-Tune	0	Eptn	0
Enable Manual Control	0	Esby	0
Set Point Rate Enable	1	ESPr	1
Serial Comm. Enable	1	Ccon	1
Temp Controller Internal Function Settings	On	Epro	On
	On	Etun	On
	Off ***	Espc	Off
*Indicates read-only memory location.			

Parameter	Value	Parameter Acronym	Value Acronym
This is the input correction for temperature calibration. * Set to off to prevent operator access to parameters			

8.3.3 Temperature Calibration

To ensure that all Model 19 processors are operating at the same heating element temperature and to ensure reliable results when using the Raychem recommended installation conditions, the processor should be calibrated using the following procedure.

The processor must be calibrated every time one of the following occurs:

- Either heating element is changed.
- Motor is changed.
- Motor controller is changed.
- Speed potentiometer is changed.
- Temperature controller is changed.

- Set the temperature set point to 600°C. (620º C for Model 19SS).
- Set the belt speed to a setting of 400, or 2.0 fpm. (170 belt speed for Model 19SS).
- Pass the UHI-250 temperature probe through the processor a minimum of three times and record the average of the maximum temperature reading. The target temperature is 150°C (162 ºC ± 5°C for the Model 19SS (at 620º C & 170 belt speed)). If the measured temperature is not the target ± 5°C, continue with Steps 4 through 9.
- * Ensure “Epro”, “Etun”, “Ctrl” are set to “On” (See “Internal Function Settings” on page 8-2).
- * Depress and hold the Up and Down arrow keys for approximately 5 seconds, after which time the AT light will flash once and the display will stop blinking. Hold the keys down for 5 more seconds.
- * Press the Up arrow key (“Ctrl” will be displayed).
- * Press the function (F) key until “Tune” is displayed/
- * Press the Down arrow key to scroll the lower display through the “Tune” parameters. Scroll down until iCor is shown in the bottom display.
- * Press the F key to show the current offset in the top display.
- Adjust the offset of the controller using the Up and Down arrows. Use the Up arrow if the recorded probe temperature is higher than the target temperature; use the Down arrow if the recorded temperature is lower than the target temperature.

As a rule of thumb, adjust the offset two degrees for every one degree the actual probe readings vary from the target temperature.

* (Dynapar Only - See Partlow Instructions if required)

This equation can also be used to estimate the offset:

Adjust offset = (Avg. probe – Target) x 2

Example 1 (For Standard Model 19)

If the probe temperature is 170°C, then the offset would be approximately up 40°:

+40 = (170 – 150) x 2 in the Up direction.

Example 2 (For Standard Model 19)

If the recorded temperature is 130°C, then adjust the offset down 40°:

–40 = (130 – 150) x 2 in the Down direction.

Follow the same procedure for the narrow version Model 19SS. Important: Allow the processor to restabilize for a minimum of 5 minutes after every offset adjustment.
Cool the UHI probe to 23 º C ± 2ºC between each reading.

➲ Pass the UHI-250 probe again through the processor three times and record the maximum temperature. Two or three adjustments may be necessary to reach the target, but be patient—if the machine is not allowed to stabilize between adjustments you could be chasing the calibration back and forth.

The temperature controller will return to the Control Mode if there is no activity for 30 seconds.

8.4 Partlow Controller

8.4.1 Operation

The Partlow temperature controller has five operating modes. The unit powers up in the Operator mode by default.

8.4.2 Operator Mode

The following table shows the parameters accessible from Operator Mode (OPtr). These parameters can be reached by pressing the ↺ (Scroll) button.

Action	Upper Display	Lower Display	Description	Factory Setting
	Actual Temperature	Temperature Set-point	Normal instrument operation	600°C
↺	Active Alarms	ALSt	2 = Alarm 2 active, 1 = Alarm 1 active (Visible only if an alarm is active)	N/A (read only)

Any value displayed in the Lower Display window that is not a read only parameter can be changed by pressing the ▽ or △ button.

8.4.3 Mode Selection

To select a mode, press and hold the ↺ button then depress the △ button. Once in the select mode, use the ▽ or △ button to locate the desired mode then press ↺ to proceed within that mode.

The table below shows the five modes employed by the Partlow controller.

Action	Mode	Upper Display	Lower Display	Description
	Operator	OPtr	SLct	Normal instrument operation
▽	Auto-Tuning	Atun	SLct	Invoke Pre-Tune or Self-Tune
▽	Product Information	inFo	SLct	Partlow product information
▽	Configuration	ConF	SLct	Configure device
▽	Set Up	SEtP	SLct	Tailor settings

To exit from any mode, press and hold the ↺ button then depress the △ button. Select the new mode using the ▽ or △ button, and enter the desired mode by pressing the ↺ button.

Always return to the Operator (OPtr) mode to return to normal operation.

8.4.4 Configuration Mode

To select the Configuration Mode (ConF), press and hold the ↺ button then depress the r button. Once in the select mode, use the ▽ or △ button to locate the Configuration Mode then press ↺ to proceed with the configuration.

Use the ▽ or △ button to change the value in the Upper Display until it matches the value shown in the table below, then press the “AUTO/MANUAL” button to register the value in the Upper Display window.

If you do not press the “AUTO/MANUAL” button after changing the parameter in the Upper Display, the setting will revert to the previous value.

Action	Parameter	Upper Display	Lower Display	Description
↺	Input Type	YC	inPt	Type K thermocouple
↺	Range Upper Limit	760	ruL	Upper Range for Scaling (°C)
↺	Range Lower Limit	0	rLL	Lower Range for Scaling (°C)
↺	Control Type	SnGL	Ctyp	Single control (heat only)
↺	Primary Output Action	rEV	Ctrl	Reverse acting (for heating)
↺	Alarm 1 Type	dE	ALA1	Alarm 1 = Deviation Alarm
↺	Alarm 1 Value	-20	dAL1	Deviation Alarm 1 = -20°C
↺	Alarm 1 Hysteresis	1	Ahy1	Alarm 1 Hysteresis = 1°C
↺	Alarm 2 Type	dE	ALA2	Alarm 2 = Deviation Alarm
↺	Alarm 2 Value	20	dAL2	Deviation Alarm 2 = 20°C
↺	Alarm 2 Hysteresis	1	AHy2	Alarm 2 Hysteresis = 1°C
↺	Loop Alarm	diSA	LAEn	Loop Alarm disabled
↺	Alarm Inhibit	nonE	Inhi	No alarms inhibited
↺	Output 1 Usage	Pri	USE1	Use Output 1 for primary control
↺	Output 2 Usage	A2_d	USE2	Use Output 2 for Alarm 2
↺	Output 3 Usage	A1_r	USE3	Use Output 3 for Alarm 1
↺	Display Strategy	2	diSP	Use second display strategy
↺	Configuration Lock Code	0	CLoc	Configuration Menu unlocked

To exit from Configuration Mode, press and hold the ↺ button then depress the △ button. Select the new mode using the ▽ or △ button, and enter the desired mode by pressing the ↺button.

Always return to the Operator (OPtr) mode to return to normal operation.

8.4.5 Setup Mode

To select the Setup Mode (SEtP), press and hold the ↺ button then depress the △ button. Once in the select mode, use the ▽ or △ button to locate the Setup Mode then press ↺ to proceed with the setup.

Use the △ or s button to change the value in the Upper Display until it matches the value shown in the table below, then press the ↺ button to register the value in the Upper Display window. There is no need to press the “AUTO/MANUAL” button to register the value when operating in the Setup Mode.

Action	Parameter	Upper Display	Lower Display	Description
↺	Input Filter Time Constant	0.5	FiLt	Time constant of 0.5 second used for input filter
↺	Temperature Offset	?	OFFS	Actual value determined by factory or field calibration
↺	Primary Power	?	PPW	Power output (Read only)
↺	Primary Proportional Band	5.0	Pb_P	Proportional Band setting (Actual setting may vary slightly)
↺	Automatic Reset	0.56	ArSt	Integrator time setting (Actual setting may vary slightly)
↺	Rate	0.14	rAtE	Derivative time setting (Actual setting may vary slightly)
↺	Bias (Manual reset)	0	biAS	Bias setting is turned off
↺	Setpoint Upper Limit	700	SPuL	Setpoint Upper Limit is 700°C
↺	Setpoint Lower Limit	0	SPLL	Setpoint Lower Limit is 0°C
↺	Primary Output Power Limit	100	OPuL	Control Output = 100% (Not limited)
↺	Output 1 Cycle Time	0.5	Ct1	Control output cycle time is 0.5 seconds
↺	Deviation Alarm 1	-20	dAL1	Deviation Alarm 1 = -20°C
↺	Alarm 1 Hysteresis	1	AHy1	Alarm 1 Hysteresis Value = 1°C
↺	Deviation Alarm 2	20	dAL2	Deviation Alarm 2 = 20°C
↺	Alarm 2 Hysteresis	1	AHy2	Alarm 2 Hysteresis Value = 1°C
↺	Auto Pre-Tune	diSA	APt	Auto Pre-Tune capability is disabled
↺	Auto/Manual Control Selection	diSA	PoEn	Auto/manual control selection is disabled
↺	Setpoint Ramping	EnAb	SPr	Setpoint Ramping capability is enabled
↺	Setpoint Ramp Rate Value	9999	rP	Setpoint Ramp Rate
↺	Setpoint	600	SP	Setpoint 600°C (factory setting – actual setpoint determined by application requirements)
↺	Setup Lock Code	0	SLoc	Setup Menu unlocked

To exit from Setup Mode, press and hold the ↺ button then depress the △ button. Select the new mode using the ▽ or △ button, and enter the desired mode by pressing the ↺button.

Always return to the Operator (OPtr) mode to return to normal operation.

8.4.6 Automatic Tuning Mode

Variations in system dynamics may occur due to normally occurring differences in the thermal characteristics of heater elements originating from different manufacturing lots, different materials or changes brought about by improved heater element design. Therefore, if you find that the factory-installed parameters yield unsatisfactory performance, you may wish to perform a Pre-Tuning operation when replacing heater elements. To perform a Pre-Tuning operation you must enter the Automatic Tuning Mode.

Before performing the Pre-Tuning operation it is important to first allow the system to reach the setpoint operating temperature, then press the O (off) button and allow the actual temperature to fall at least 100°C below the setpoint temperature.

Press the I (on) button and immediately enable Pre-Tuning by following the steps below.

Note that the table below details the parameters located in the Automatic Tuning Mode menu.

Action	Parameter	Upper Display	Lower Display	Description
↺	Pre-Tune	OFF	Ptun	Pre-Tune capability is disabled
↺	Self-Tune	OFF	Stun	Self-Tune capability is disabled
↺	Tune Lock	0	tLoc	Automatic Tuning Menu unlocked

Enter select mode by pressing and holding the ↺ button then depressing the △ button. Use the △ or s button to locate the Automatic Tuning Mode (Atun) then press ↺ button to proceed with the operation.

Use the ↺ button to select the Pre-Tune (Ptun) parameter then depress the △ button to turn on the Pre-Tuning operation. You are now performing a Pre-Tuning operation.

Do not change the value of the Self-Tune (Stun) parameter or the Tune Lock (tLoc) parameter when in the Automatic Tuning Mode menu.

Watch the display windows. The Lower Display should read Ptun, and the Upper Display should read On. When the value in the Upper Display changes from On to OFF, the Pre-Tuning operation has successfully completed. Exit the Automatic Tuning Mode by pressing and holding the button then depress the ↺ button. Select the new mode using the ▽ or △ button, and enter the desired mode by pressing the ↺ button.

The entire process should take one or two minutes depending on the actual heater element temperature when the Pre-Tune process is invoked.

Always return to the Operator (OPtr) mode to return to normal operation.

8.4.7 Product Information Mode

To select the Product Information Mode (inFo), press and hold the ↺ button then depress the △ button. Once in the select mode, use the ▽ or △ button to locate the Product Information Mode then press ↺ to proceed with the interrogation.

All information in the Product Information Mode menu is read only. As such, the △ and ▽ and “AUTO/MANUAL” buttons serve no purpose when operating within this menu.

Action	Parameter	Upper Display	Lower Display	Description
	Input Type	Uni	In_1	Input 1 is a universal type input
	Option 1 Module Type	SSr	oPn1	Output 1 module = + 3 to 5 VDC for driving a solid state relay
	Option 2 Module Type	rLy	oPn2	Output 2 module = relay contact
	Option 3 Module Type	rLy	oPn3	Output 2 module = relay contact
	Auxiliary Module Type	nonE	oPnA	No auxiliary module used
	Firmware Type	?	FW	Value displayed is firmware type
	Firmware Issue	?	ISS	Value displayed is firmware issue
	Product Revision Level	?	PrL	Value displayed is product revision level
	Date of Manufacture	?	dOM	Manufacturing date code (mmyy)
	Serial Number 1	?	Sn1	First four digits of serial number
	Serial Number 2	?	Sn2	Middle four digits of serial number
	Serial Number 2	?	Sn2	Last four digits of serial number

8.5 Floating Rail Adjustment

The upper belts are equipped with spring- loaded backing rails to ensure gripping pressure on the assemblies being processed. The rails are split at the back end of the heating elements for aid in processing larger bundles or cables. Adjustments are the same for each set of rails.

➲ Remove the top panel cover.

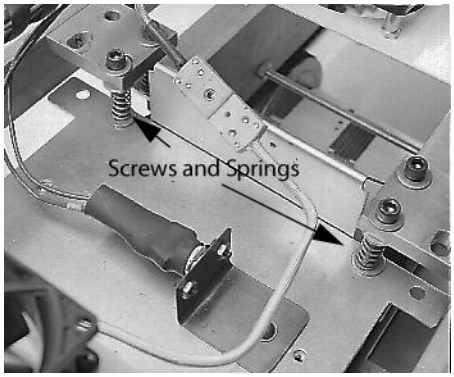


Fig. 56 : Screws and Springs for Upper Rails

➲ Loosen the nuts on the adjustment screws. The adjustment screws are located on each end of the upper backing rail. They are captured by a spring.

- Adjust the rails down until they make contact with the belts along the entire length of the belt. For larger bundles, the rails can be set with a gap between the belt and rail to ensure even pressure on all of the assemblies being processed.
- Replace the top panel before restoring power.

8.6 Belt Tension Adjustment

The adjustment procedure is the same for both upper and lower belts.

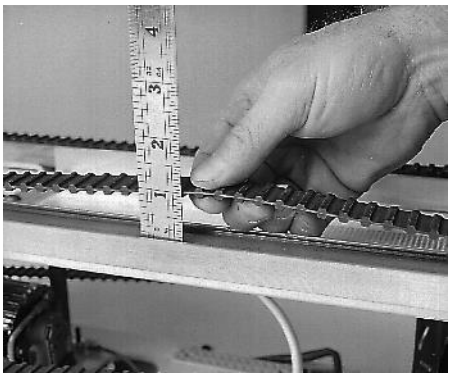


Fig. 57 : Measuring the Belt Tension

- Remove the top and side panels from the processor and lower front cover under the feed tray.
- Loosen the four screws securing the front bearing stands. The upper screws are on the top frame; the lower ones are located under the feed tray.
- Loosen the two screws at the rear end of the belt guides to remove the lower belts.
- Pull forward on the pulleys until the belts are tight.
- Tighten the four screws while holding pressure on the pulleys.
- Replace the covers.

If the belts are too tight the bearings may wear prematurely.

8.7 Pulley Alignment

IMPORTANT !

If the pulleys are not aligned, they will wear down the teeth on the belts and eventually the belts will “walk” the pulley up.

- Measure the distance from any edge of the frame to the edge of a pulley.
- Measure the distance from the same frame edge to the opposing pulley of the same belt. The distance must be the same.
- Adjust the pulleys as necessary.

9 Spare Parts

Description	PCN	Guidline	Comments
Accessories – ALL TOOL VERSIONS			
IR-1900-M19-Ring-Term-Kit	108277-000	Ring Terminal Kit	TE Supplied
Accessories - Calibration tooling - ALL TOOL VERSIONS			
CLTEQ-UHI-250A-1-PRB	288869-000	Thermocouple (not calibrated)	Use with a suitable calibrated (K type) temperature meter and extension cable 952687-000.
CLTEQ-UHI250-EXT-CABL	952687-000	Extension cable	
Spare Parts - Vendor Supplied			
IR-1900-Arm-Fuse-1A	858515-000	Motor controller armature fuse	Buss (5ea; 1 1/4" Glass Tube; 1A Time Delay Fuse)
IR-1900-Motor-Line-Fuse	156817-000	Motor controller line fuse	Buss (5ea; 1 1/4" Glass Tube; 250V, 3A, Time Delay Fuse)
IR-2200-A-Fuse-1A	073117-000	Control circuit fuse	Buss (IEC; Pub, 5X20mm, T.D. 250V, 1A)
IR-2200-A-Fuse-3.15A	547827-000	Incoming main line fuse	Buss (IEC; Pub, 5X20mm, T.D., 250V, 3.15A)
IR-1900-LV-Trnsfmr	958053-000	Low voltage transformer	Signal Transformer (43VA; 120V IN, 24VAC OUT)
IR-1900-Main-Trnsfmr	657123-000	Main step down transformer	Signal Transformer (Signal M4L-2-3)
IR-1900-Timing-Belt	861021-000	Drive Belts - Double sided timing belts	Jason Industrial (Jason #D600L075)
IR-1900-KBMM-Control	146903-000	Motor controller	KB Electronics (#KBMM-125 Motor Controller)
IR-1900-Contr-Resist	267479-000	Power resistor for motor controller	KB Electronics (KB#98340.81 OHM 5w Res)
IR-1900-Term-Bar-Board	189813-000	Motor controller terminal board	KB Electronics (KB9897)
IR-1900-Relay-3CR/4CR	353155-000	Power relay	Omron (10amp, #LY1-AC120)
IR-1900-Relay-1CR/2CR	882465-000	Power relay	Omron (25A#G7L-2A-TUBJ-CB-AC-100/120)
IR-1900-Relay-CRM/CRF	832785-000	Control relay	Omron (4PDT, 10A, LY4-AC120)
IR-1900-Off-Switch	128877-000	OFF switch	Idec AB6H-M1P-W)
IR-1900-On-Switch	165005-000	ON switch	Idec (AB6H-M1P-G)
IR-1900-E-Stop-Complete	051731-000	Emergency contact block & button	S+S (D7P-MT44PX01)
IR-2200-A-EMC-Filter	909813-000	Incoming line filter	Schaffener (Schaffe-

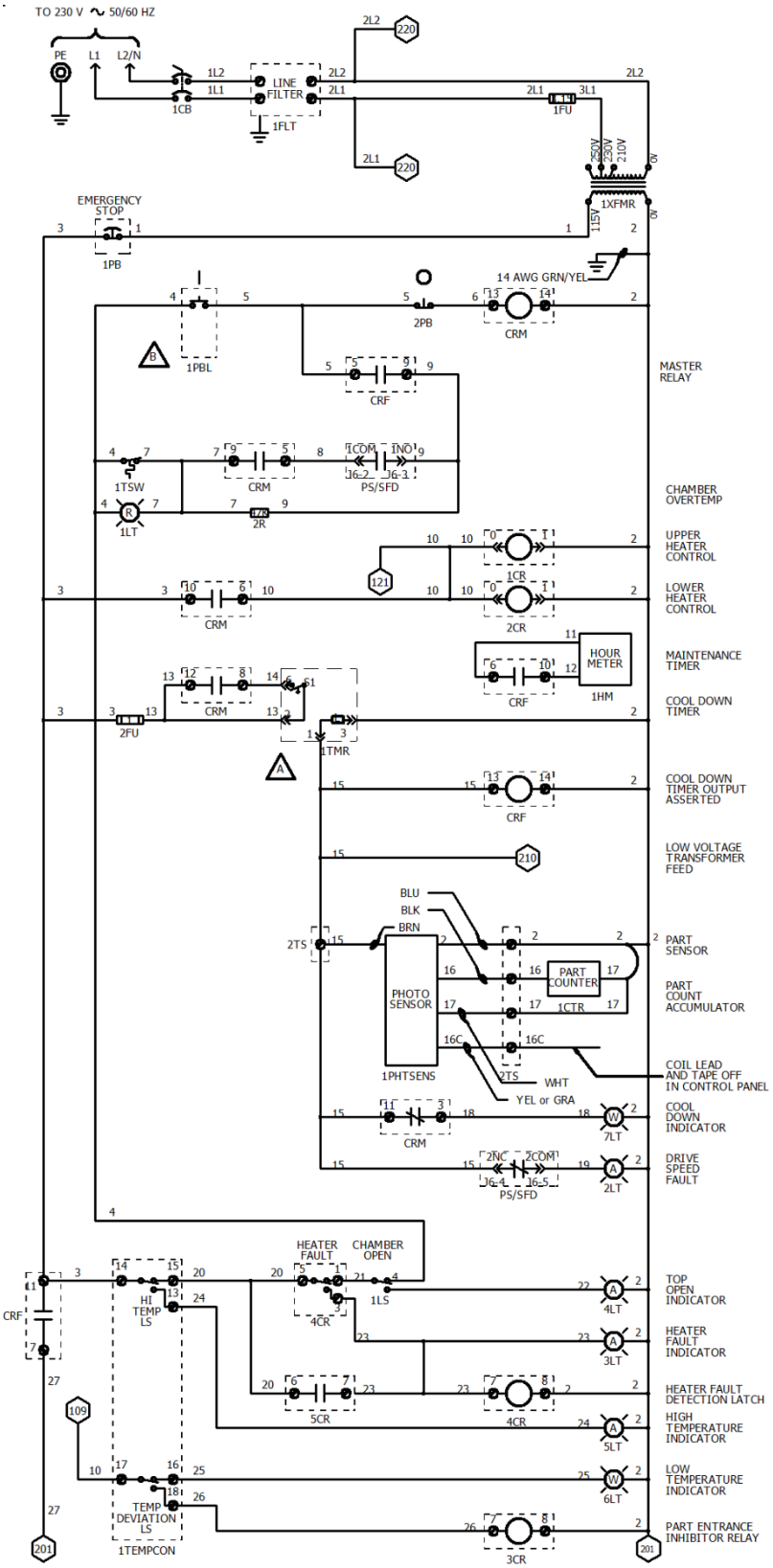
Description	PCN	Guidline	Comments
			nerFN- 602-20/3)

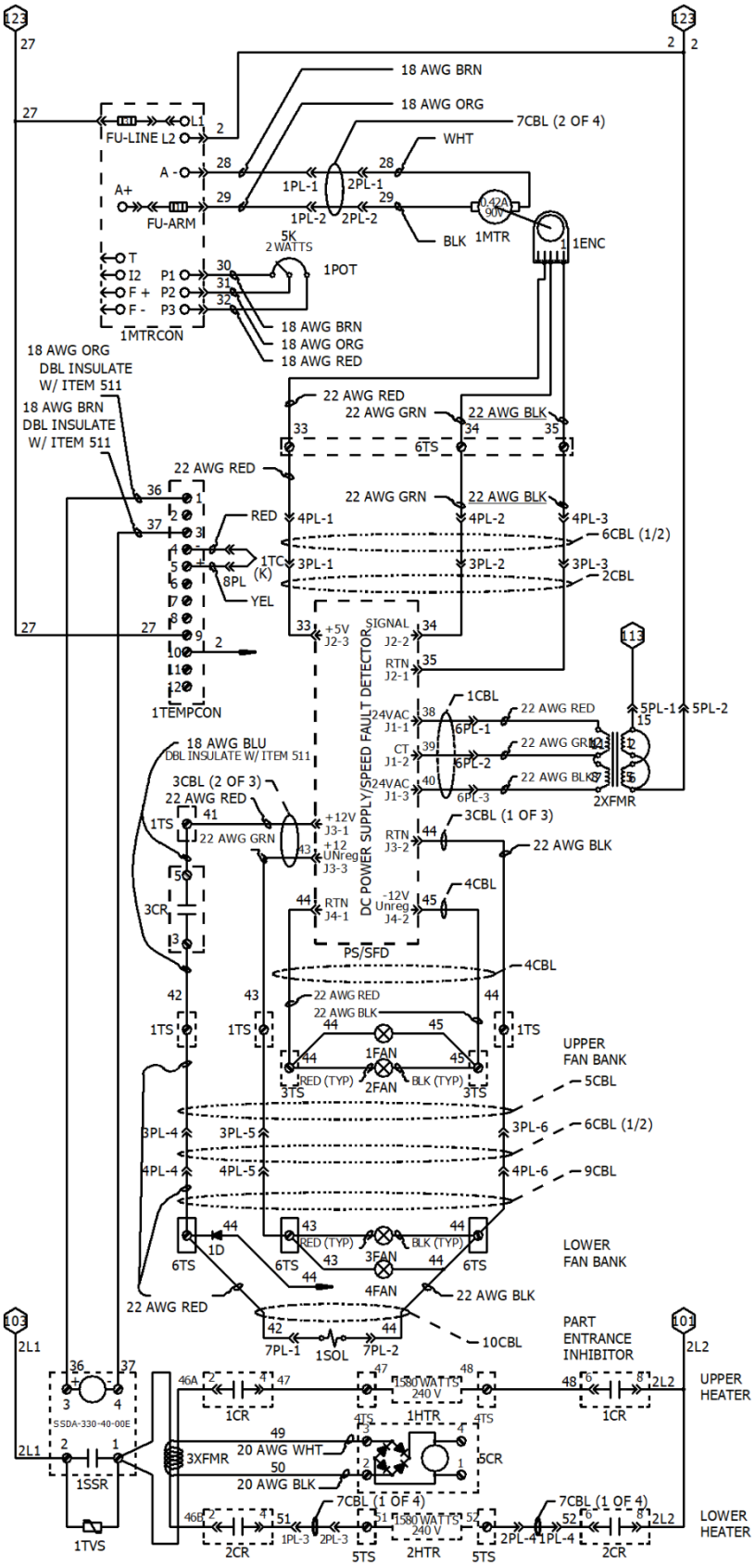
Description	PCN	Guidline	Comments
IR-2200-Fuse-Hldr	369517-000	Incoming fuse holder (VDE Approved)	Schurter - (Schurter FPG3101.0110)
IR-1900-Down-Timer	812785-000	Cool down timer	SSAC(KSDB 4120M: 120V 20 Min)
IR-1900-Board-Fuse-3.15A	919753-000	Board fuse 3.15A	Any Fuse Manufacturer (Type TR5 (Plug in) (IEC 127-3) 3.15)
Spare Parts - ALL TOOL VERSIONS			
IR-1900-Maint-Pin-W/Brkt	295741-000	Maintenance mounting pin withbracket	TE Supplied
IR-2200-3-Dig-Pot	514357-000	Digital speed control potentiometer	TE Supplied
IR-1900-Lockout-Gate	839871-000	Product inhibit lockout gate	TE Supplied
IR-1900-Feed-Tray	270733-000	Input feed tray	TE Supplied
IR-1900-Idler-Puly-W/Brg	841201-000	Idler pulley with bearing installed	TE Supplied
IR-1900-Drive-Pulley	546137-000	Drive pulley - NOT FOR -SS version D43037-000	TE Supplied
IR-1900-Motor-W/Encoder	435077-000	Obsolete -Motor with encoder attached	Obsolete 10/3/03 - Use A04349-000 CLTEQ-M19-BLDR-GEARMTR. Bracket also required when ordering replacement motor for the first time on Machine Serial Nos.up to and including 130. (CLTEQ-M19-BLDR-MTR-BRKT)
IR-1900-Solid-State-Relay	641271-000	Solid State Relay	TE Supplied
IR-1900-Motor-Bracket	482913-000	Obsolete - Motor mounting bracket	Obsolete 10/3/03. If a bracket is required for a machine using obsolete motor (IR-1900-Motor-W/Encoder) please contact division. If motor (Clteq-M19-Bldr-Gearmtr) is being used please quote CLTEQ-M19-Bldr-Mtr-Brkt / F61949-000
IR-1900-Lockout-solenoid	324201-000	Product inhibit bar solenoid	TE Supplied
IR-1900-DC-Pwr-Sup-Board	023611-000	Low voltage power supply / drive fault circuit	TE Supplied
IR-2200-A-euro-Crd-3Wire	611457-000	European Power Cord	TE Supplied
IR-1900-Belt-Guide-Set	432237-000	Lower belt backing guide	Supplied in set of 2 - TE Supplied

Description	PCN	Guidline	Comments
IR-1900-Foam-Pad-Set	309229-000	Upper rail backing pad with tape	Supplied in set of 2 - TE Supplied
IR-1900-Over-Temp-Sw-Kit	384673-000	Bi-metal over temperature thermal switch kit	TE Supplied
IR-1900-Temp-Controller	463715-000	Temperature controller	TE Supplied
IR-1900-FAN-12VDC	454165-000	12Vdc Fan	Also US Vendor Supplied Mechatronics #F8025E-12B
IR-2200-A-Crkt-Brkr	150485-000	Circuit breaker (VDE Approved)	TE Supplied
IR-1900-Encoder-Replcmnt	646794-000	Encoder separate from motor	TE Supplied - Can be used with bothcurrent and obsolete motors (IR-1900-Motor-W/Encoder - Obsolete & CLTEQM19-BLDR-GEARMTR - Current)
CLTEQ-M19-BLDR-GEARMTR	A04349-000	Motor with encoder attached	Replaces IR-1900-Motor-W/Encoder. Bracket also required when ordered for first time for S/N up to 130 (CLTEQ-M19-BLDRMTR-BRKT)
CLTEQ-M19-BLDR-MTR-BRKT	F61949-000	Motor mounting bracket	For S/N up to 130 (motor CLTEQ-M19-Bldr-Gearmtr being ordered for the first time). Not for obs. motor (IR-1900-Motor-W/Encoder)
Spare Parts - Spares for CLTEQ-M19-Beltheater-SS			
IR-1900-Photo-Sensor	227805-000	Parts counter photo sensor	TE Supplied
CLTEQ-M19SS-Timer-Module	649230-000	Timer Module	TE Supplied
CLTEQ-M19SS-Flat-Belts	A72751-000	Flat Belts	TE Supplied
CLTEQ-M19SS-Upr-Shft-Brng	802452-000	Upper Drive Shaft Ball Bearings	TE Supplied
CLTEQ-M19SS-Upr-Drive-SFT	645068-000	Upper Drive Shaft	TE Supplied
CLTEQ-M19SS-Upr-Drive-PLY	642514-000	Upper Drive Pulleys	TE Supplied
CLTEQ-M19SS-LWR-HTR-ELMT	956470-000	Lower Heater Element 1.75	TE Supplied
CLTEQ-M19SS-UPR-HTR-ELMT	E25750-000	Upper Heater Element 1.75	TE Supplied
Spare Parts - Spares for CLTEQ-M19-Belt-Htr-6In			
IR-1900-6IN-Htr	369475-000	6" Wide Lower Heating	TE Supplied

Description	PCN	Guidline	Comments
		Element	
IR-1900-6IN-Htr-Ktc	233183-000	6" Wide Upper Heating Element With Thermo-couple	TE Supplied
IR-1900-Htr-Kit-6IN	295139-000	Kit for modifying pro-cessor to accept 6" heating elements	TE Supplied
Spare Parts - Spares for CLTEQ-M19-Blthtr			
IR-1900-Std-Htr	322965-000	1580 W Lower Heater element	TE Supplied
IR-1900-Std-Htr-Ktc	501937-000	1580 W upper TE Supplied heater ele-ment with thermocou-ple	TE Supplied

10 E-PLAN





11 Customer Support

EMEA Service Hotline

For service interventions or technical support you can contact us:

Monday-Thursday 8:00 - 16:00 hours
Friday 8:00 - 14:00 hours
Tel. +49 (0) 6151 607 -1518
www FieldServiceEMEA@te.com

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c/o Schenck Technologie- und Industriepark GmbH
Landwehrstr. 55 / Gebäude 83
D-64293 Darmstadt
Germany

Additional information and contacts can also been found on the WEB.
Visit us : http://tooling.te.com/europe

Our EMEA Service Hotline supervises and provides the following services:

- Deployment of our customer service technicians for
  - Commissioning
  - Preventive maintenance
  - Repair
  - Certification of hand crimp tools
  - Activities based on service contracts
- Customer training on
  - Operation, maintenance and repair of TE processing equipment
  - TE connection technology including crimping techniques, IDC termination, etc.
- Support in identifying spare parts requirements
- Provision of technical documentation for TE processing equipment

To help us help you as quickly as possible with your questions about TE processing equipment, it is always useful if you have the following basic data available when making your call:

- Machine description
- TE part number
- Serial number
- Commissioning date / construction year

To avoid unnecessary delays,

- for spare parts orders in general and related questions about prices and delivery times, please contact your local TE sales specialist or distributor, direct.
- for all technical questions about TE plug-in connectors, please contact our Product Information Center via www.te.com/support-center

Please note that the staff of our EMEA Service Hotline speaks German and English.

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412-94264 Rev. A1 / 20-05-28