

# ERT-OAL36 & 48

## Radiant Heat Shrink Tunnel User Guide





# **ERT-OAL36 & 48**

## **Radiant Heat Shrink Tunnel**

### **Models:**

***ERT-OAL36-V2***

***ERT-OAL36-V6***

***ERT-OAL48-V2***

***ERT-OAL48-V6***

## **User Guide**

Revised 4/19/2022

P/N 4510002 – Rev C

### **Copyright and Trademarks**

Copyright ©2022 American Film and Manufacturing.

All rights reserved. All trademarks and brand names are the property of their respective owners.

### **AFM**

7041 Boone Avenue North  
Brooklyn Park, MN 55428

Phone: 714-974-9006, Fax: 763-795-8867

**[www.afmsleeves.com](http://www.afmsleeves.com)**



# Contents

- Abbreviations .....7**
- Safety.....9**
  - Warnings..... 9
  - Understanding Safety Notifications ..... 10
  - Cautions..... 11
- Introduction .....13**
  - General System Description ..... 13
  - System Components..... 14
  - System Overview ..... 15
  - System Specifications..... 17
  - Component Dimensions..... 18
    - ERT-OAL36-V2 and ERT-OAL36-V6 ..... 18
    - ERT-OAL48-V2 and ERT-OAL48-V6 ..... 19
  - Optional Equipment..... 20
    - Sleever .....20
    - Conveyor.....21
    - Accumulation Table.....22
- Installation and Setup.....23**
  - General Recommendations ..... 23
    - Material Handling .....23
    - Conveyor Material Requirements .....23
    - Work Area .....23
    - Maintenance Access .....24
  - Unpacking and Placement ..... 25
  - AC Wiring..... 27
  - Tunnel Placement ..... 28
    - Conveyor Alignment.....28
    - Sleever Alignment.....29
- Operation .....31**
  - Startup ..... 31
  - Control Panel ..... 32
    - TZ4ST Digital Temperature Controller.....33
    - Electric Lift Operation .....35

Setting the Raised and Lowered Lift Positions for AUTO Mode .....	37
<b>Maintenance .....</b>	<b>41</b>
Mounting Hardware and Connections .....	41
External Cleaning .....	41
Parts Replacement .....	42
Blower Motor Replacement .....	42
Replacing Heater Elements .....	45
<b>Troubleshooting .....</b>	<b>49</b>
<b>Schematics .....</b>	<b>51</b>
ERT-OAL36-V2 and ERT-OAL48-V2 .....	51
ERT-OAL36-V6 and ERT-OAL48-V6 .....	54
<b>Wiring Diagrams .....</b>	<b>57</b>
Heating Element – All Models .....	57
Heater/Blower/RTD – All Models .....	58
<b>Parts List .....</b>	<b>59</b>
Electrical Parts .....	59
Mechanical Parts .....	61
Recommended Spare Parts – ERT-OAL36 .....	63
Recommended Spare Parts – ERT-OAL48 .....	63
<b>Warranty Statement .....</b>	<b>65</b>
Limitations .....	65
Repairs .....	65
Shrinking Quality .....	65
Shipping Policy .....	65
Exclusions .....	65
Warranty Verification .....	65
Warranty Eligibility .....	66
Limited Warranty .....	66
<b>AFM Technical Support .....</b>	<b>67</b>

# Abbreviations

The following abbreviations are used throughout this User Guide:

Abbreviation	Meaning	Abbreviation	Meaning
AC	Alternating Current	lbs	Pounds
AFM	<b>American Film &amp; Machinery</b> (714) 974-9006 info@afmsleeves.com	MAN	Manual
C	Celsius	RTD	Resistance Temperature Device
cm	Centimeters	SSR	Solid State Relay
CR	Control Relay	V	Volts
F	Fahrenheit	VDC	Volts Direct Current
GMP	Good Manufacturing Practices	°	Degrees
Hz	Hertz	"	Inches
kW	Kilowatts	#	Number





---

# Safety





When installing, operating, and maintaining the ERT-OAL36 or ERT-OAL48 Heat Shrink Tunnel, follow these safety practices.

## Warnings

- All operators should study this manual thoroughly before operating the machine.
- Always follow GMP (Good Manufacturing Practices) when operating this machinery.
- The machine is heavy. While unpacking and setting up the unit, always use proper lifting techniques. Avoid overreaching and leaning over while handling the machine and accessories. Use more than one person to lift and move the Heat Tunnel.
- Wear safety shoes and work gloves when moving the machine.
- Beware of uneven spots on the factory floor, as the machine could tip over.
- Make sure the electrical power source is properly wired and grounded. The power source should comply with all safety regulations and codes applicable to the installation location.
- Always turn off and disconnect the machine from the power source before servicing or performing maintenance procedures.
- The equipment generates heat, so make sure the area is properly ventilated.
- Do not place any body parts or tools into a running machine.
- The machine has electrical and moving parts which can cause injury.
- Do not tamper with electrical wiring. Use only licensed electricians for maintenance.
- To prevent injury to machinery and/or personnel, do not increase settings on either electrical or mechanical overload safety devices.
- Keep hands away from moving conveyors and assemblies. Conveyor belts that have become worn or frayed can be hazardous and should be replaced promptly.
- Never operate this or any moving equipment without all covers and guards in place. The internal mechanism of most packaging machinery contains numerous shear, pinch, and in-running nip points, many of which are capable of causing severe injury and permanent disfiguration.
- To minimize potential for personal injury, always be sure that machine operators and others working on machinery are properly trained in the correct usage of the equipment and properly instructed regarding the safety procedures for operation.
- Do not make any modifications to either the electrical circuitry or the mechanical assemblies of this machinery. Such modifications may introduce hazards that would not otherwise be associated with this machinery. American Film & Machinery will not be responsible for any consequence resulting from such unauthorized modification.








- The use of certain types of plastic films in sealing and/or shrinking equipment may result in the release of hazardous fumes due to the degradation of the film at high temperatures. Before using any plastic film in this equipment, the manufacturer or supplier of the film should be contacted for specific information concerning the potential release of hazardous fumes. Adequate ventilation should be provided at all times.
- Keep combustible and explosive materials away from this equipment. The equipment may be a source of ignition.
- Do not use with pressurized containers. Exposure to high temperatures can cause pressurized containers to burst, and could cause injury to operators and other personnel nearby.
- Take care when clearing product jams inside the Heat Tunnel. Do not use anything that could potentially puncture a container. Use an electric lift to raise the tunnel from the conveyor before clearing product from inside the Heat Tunnel. Turn off power and allow the temperature to drop below 100 °F (38 °C) before clearing. Temperature inside the Heat Tunnel can easily cause burns.

## Understanding Safety Notifications

	<b>DANGER:</b> Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	<b>WARNING:</b> Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	<b>CAUTION:</b> Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
	<b>ATTENTION</b> Indicates a hazardous situation which, if not avoided, could result in property damage only.

## Cautions

When installing, operating, and maintaining the ERT-OAL36 or ERT-OAL48 Radiant Heat Shrink Tunnel, observe these cautions.

	<b>Electrical Hazard:</b> Do not open cover. No user-serviceable parts inside.
	<b>Electrical Ground Hazard:</b> Ensure that unit is properly grounded.
	<b>Hot Surfaces:</b> May cause burns. Do not touch when equipment is operating.
	<b>Fire Hazard:</b> Do not tamper with electrical equipment.
	<b>Health Hazard:</b> Some fumes may be a health hazard with prolonged exposure. Ensure that the area has adequate ventilation.
	<b>Live Steam:</b> Some areas will be very hot.
	<b>Keep Dry:</b> Keep the equipment dry and indoors.



# Introduction

## General System Description

AFM heat shrink tunnels use heat to shrink film (labels, tamper bands, multi-pack) onto containers over which they have been applied. Containers with labels enter the Tunnel on a conveyor for a “dwell time” of 3-6 seconds – the timeframe needed to achieve proper coverage without overheating the containers. Operators must ensure that no container stays inside the AFM tunnel for no longer than 6 seconds.

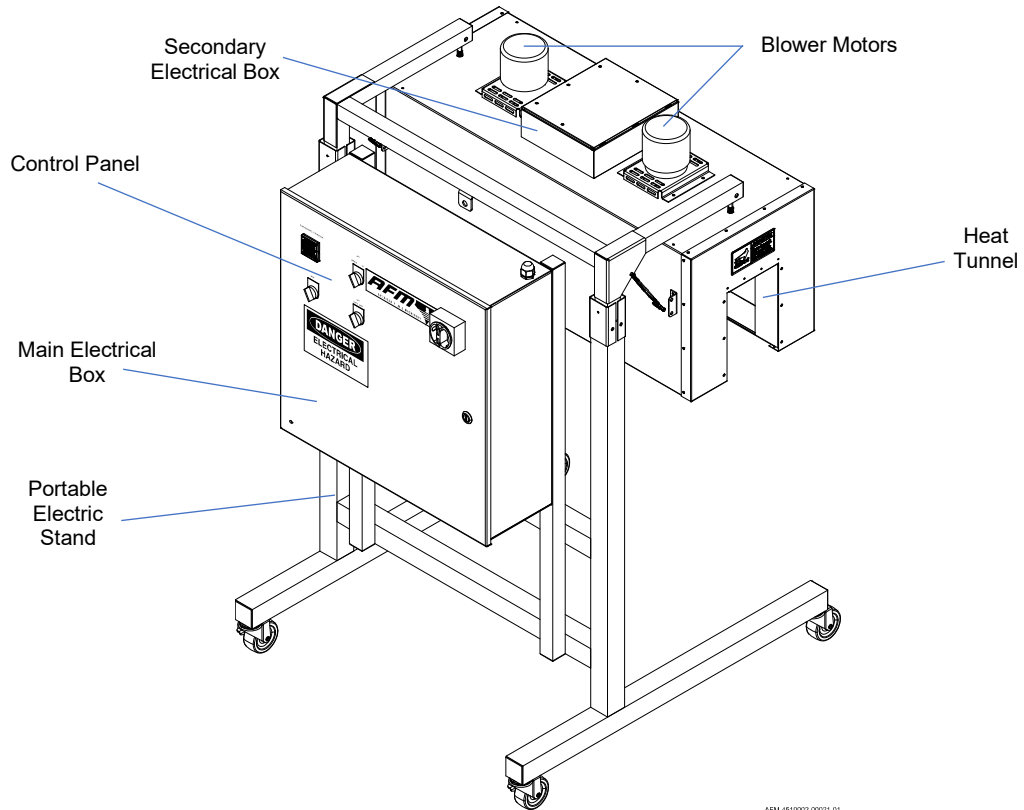
Four models of the ERT-OAL are available:

Model	Tunnel Chamber Length		Electrical Requirements
	Inches	Centimeters	
ERT-OAL36-V2	36	91.4	240 V
ERT-OAL36-V6	36	91.4	480 V
ERT-OAL48-V2	48	121.9	240 V
ERT-OAL48-V6	48	121.9	480 V

AFM shrink tunnels are intended for industrial use only.

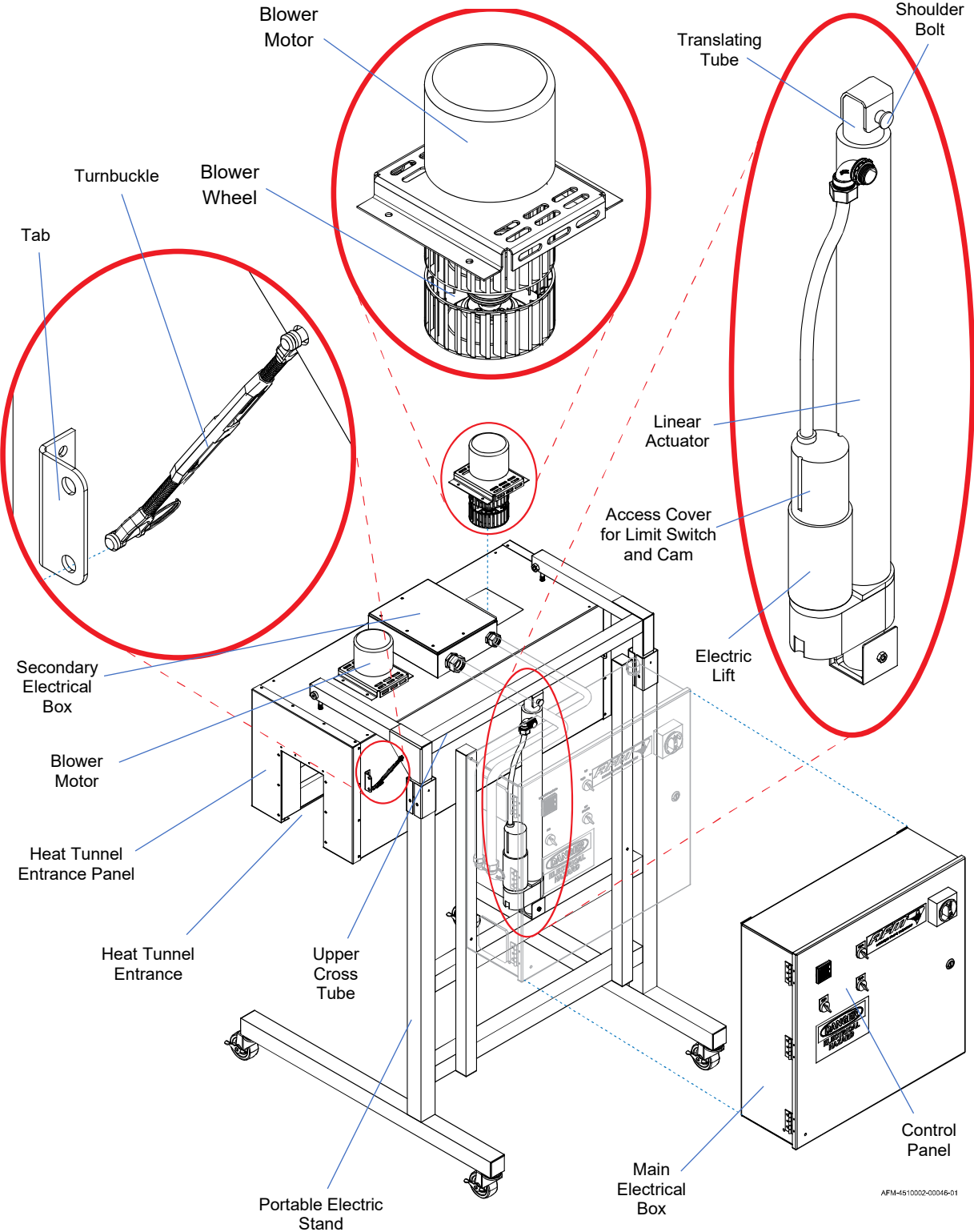
## System Components

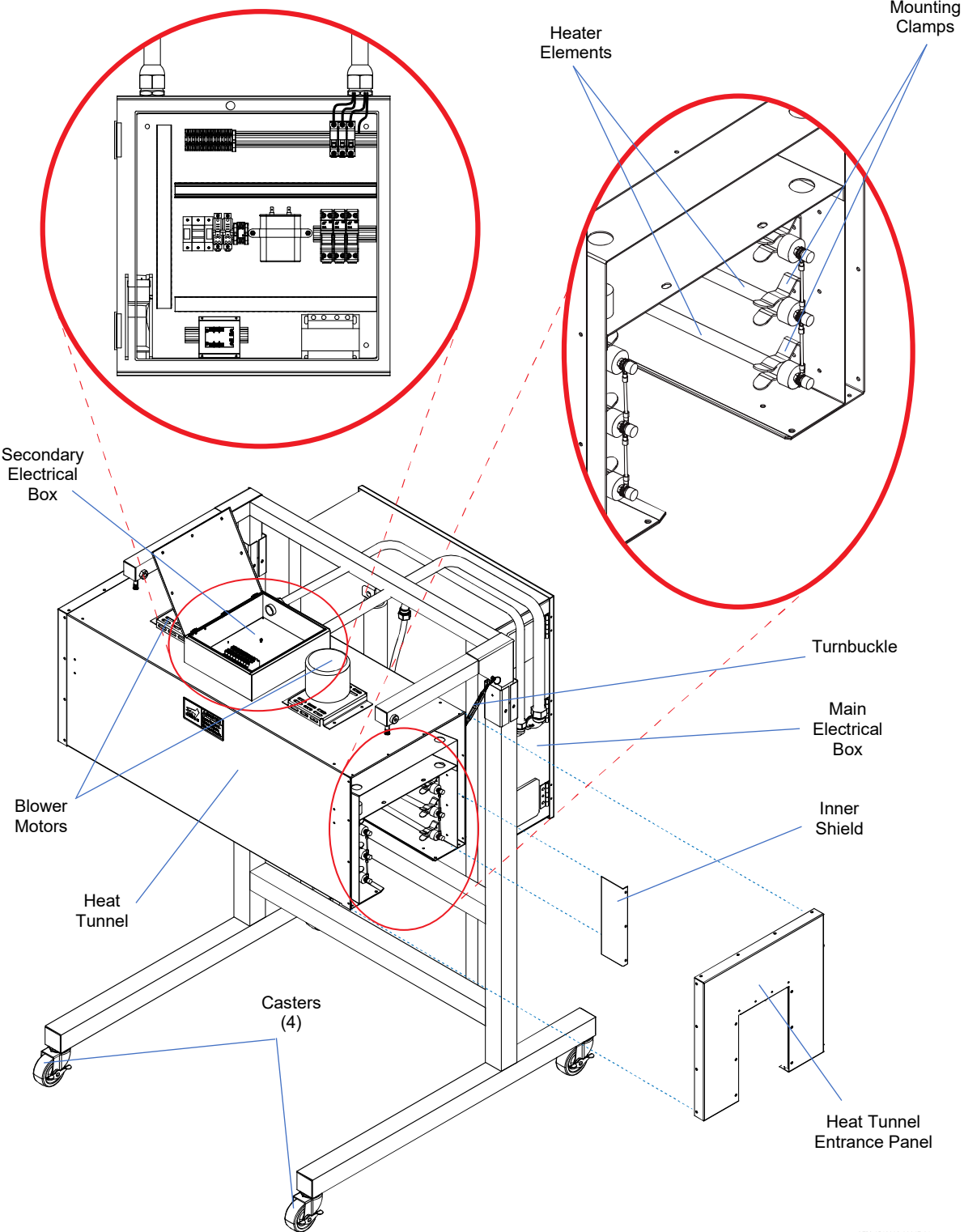
- Stainless Steel Stand with Motorized Height Control
- IR Heat Tunnel
- Digital Time Proportional Control
- Electrical Boxes
- Operator Controls



APN-811002-20021-01

# System Overview





AFM-4510002-00047-01



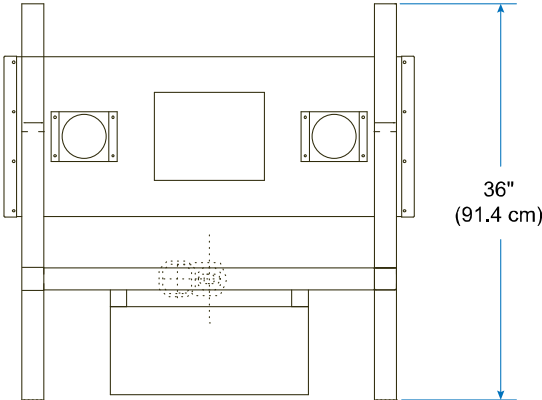
## System Specifications

<b>Power</b>	ERT-OAL36-V2 ERT-OAL48-V2	AC 3-Phase, 240 Volt, 50/60 Hz, 12 kW, 35 Amp	
	ERT-OAL36-V6 ERT-OAL48-V6	AC 3-Phase, 480 Volt, 50/60 Hz, 12 kW, 18 Amp	
<b>Chamber Dimensions</b>	ERT-OAL36 (V2 or V6)	Length 37.3" 94.7 cm Width 6.0" 15.2 cm Height 9.0" 22.8 cm	
	ERT-OAL48 (V2 or V6)	Length 49.3" 125.2 cm Width 6.0" 15.2 cm Height 9.0" 22.8 cm	
<b>Machine Dimensions</b>	ERT-OAL36 (V2 or V6)	Length 37.3" 94.7 cm Width 31.5" 80.0 cm Height 70.0" 17.8 cm	
	ERT-OAL48 (V2 or V6)	Length 49.3" 125.2 cm Width 31.5" 80.0 cm Height 70.0" 17.8 cm	
<b>Max Temperature</b>		400 °F	204 °C

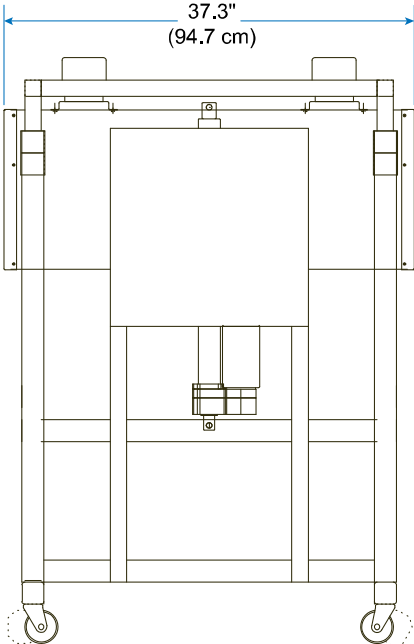
# Component Dimensions

## ERT-OAL36-V2 and ERT-OAL36-V6

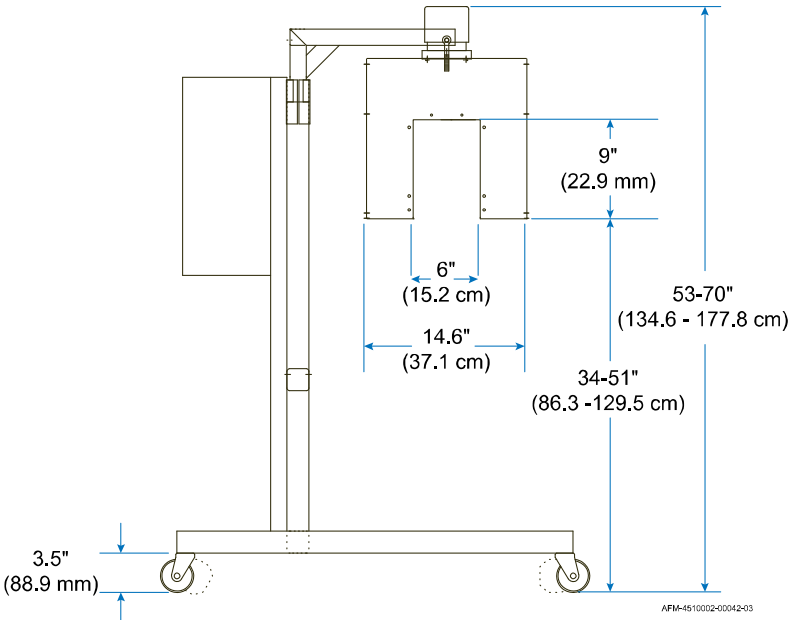
Top View



Front View

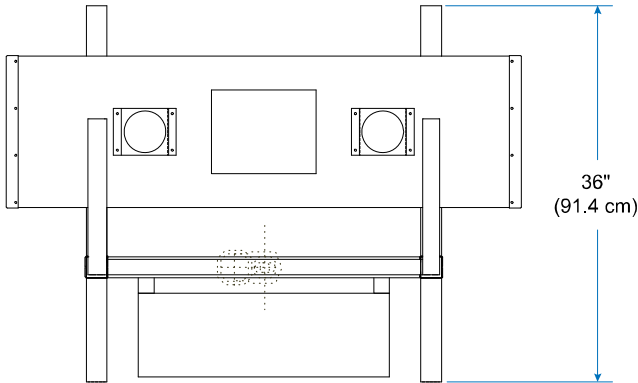


Side View

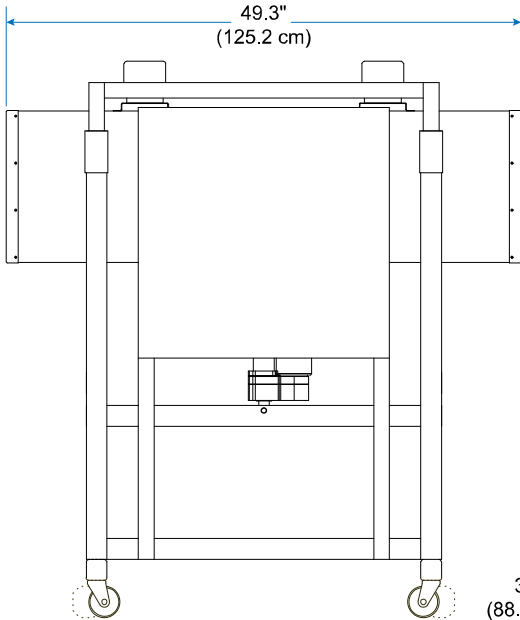


# ERT-OAL48-V2 and ERT-OAL48-V6

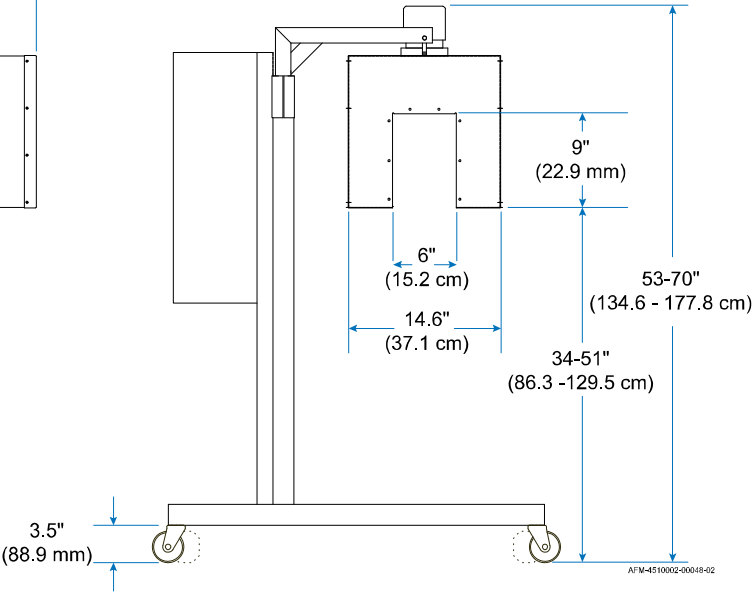
Top View



Front View



Side View



## Optional Equipment

Depending on the labeling tasks being performed, additional equipment may be needed to complete the standard ERT-OAL setup:

### Sleever

A Sleever applies labels to products before the ERT-OAL shrinks those labels onto the products. A Sleever is not included with the ERT-OAL, but AFM offers several models depending on label size and production speed.

**AFM LX-100**



AFM-4510002-00006-01

**AFM LX-150**



AFM-4510002-00007-01

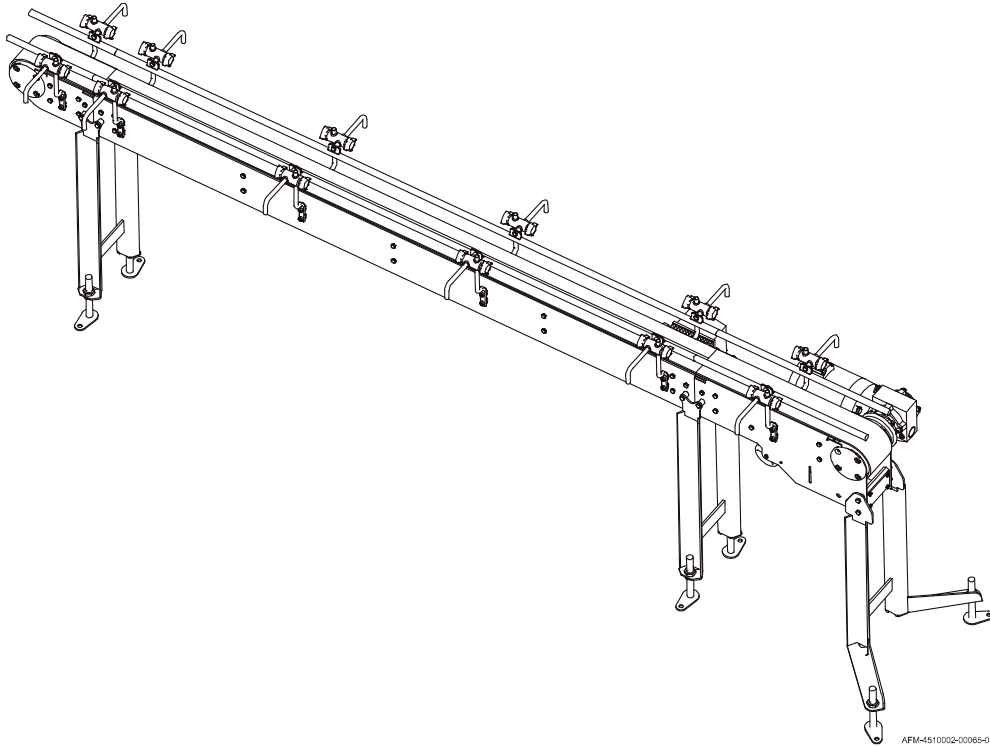
**AFM LX-350**



AFM-4510002-00008-01

## Conveyor

A Conveyor is not included with the ERT-OAL, but is needed to carry products to and from Shrink Tunnels. AFM can offer Conveyor solutions as required.



## Accumulation Table

An Accumulation Table is not included with the ERT-OAL36-48, but can be used to stop, hold, and release products after the ERT-OAL36-48 has fixed the labels onto them. Two height-adjustable Accumulation Table options are available from AFM's sister company, Eastey – the 36" diameter TT36 and the 48" diameter TT48.

Accumulation Table



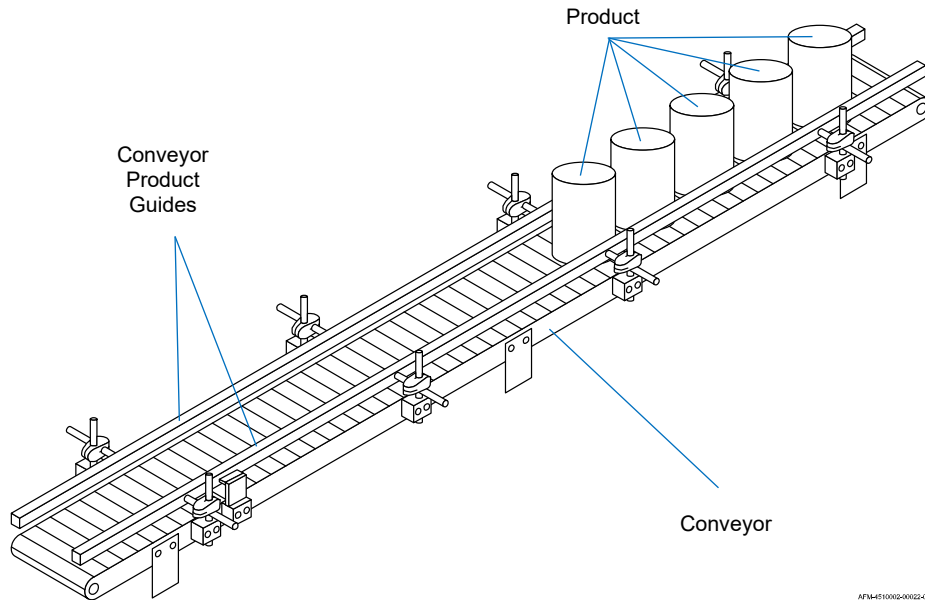
# Installation and Setup

## General Recommendations

### Material Handling

The most critical factor for consistently achieving superior quality heat shrinking is material handling. Adequate conveyor product guides must be provided, correctly installed, and properly maintained. Incorrect or inconsistent product handling may cause shrink quality problems, maintenance problems, and could lead to product damage. The customer is responsible for maintaining proper material handling equipment.

### Conveyor Product Guides



### Conveyor Material Requirements

The ERT-OAL Tunnel Chamber is very hot (up to 400 °F / 224 °C) and can potentially damage Conveyor Belts, Wear Rails and Guide Rails. Particularly when shrinking full-body labels, or where the Tunnel is near the Conveyor Belt, stainless steel Conveyor Belting is recommended. Please contact AFM for Conveyor solutions.

### Work Area

The ERT-OAL is a sturdy and durable machine. Reducing the amount of dust and dirt in the work area will result in the best performance. The ERT-OAL may occasionally require cleaning due to environmental contaminants.

## **Maintenance Access**

When planning the ERT-OAL installation, allow for easy access to the Tunnel so that clean-up can be done conveniently.

**IMPORTANT:** Turn off the power and allow the Tunnel to cool before doing any cleaning or maintenance.



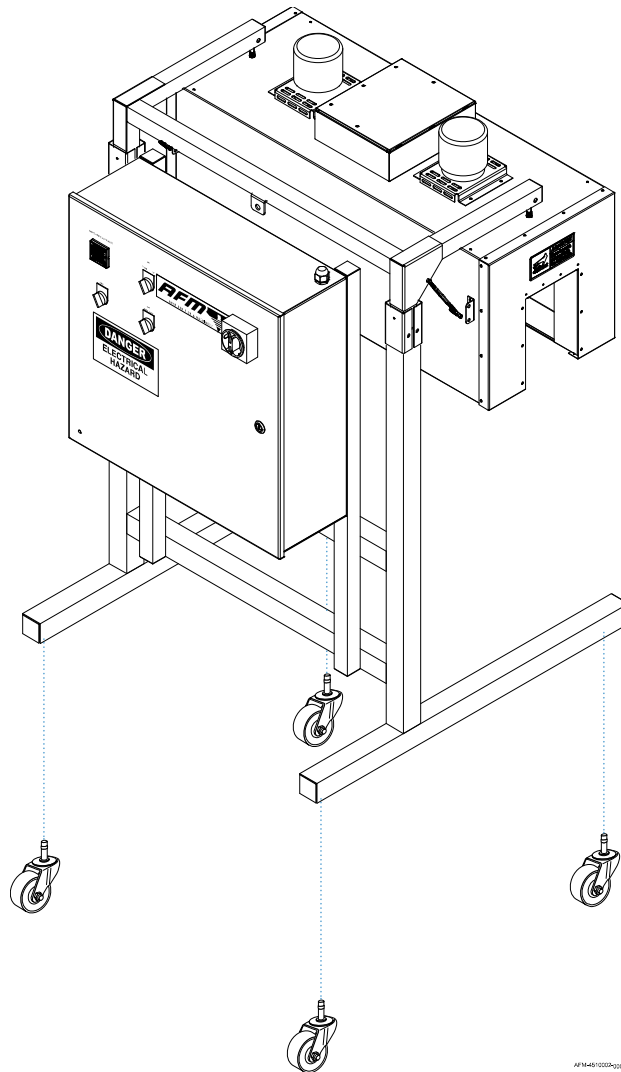
## Unpacking and Placement



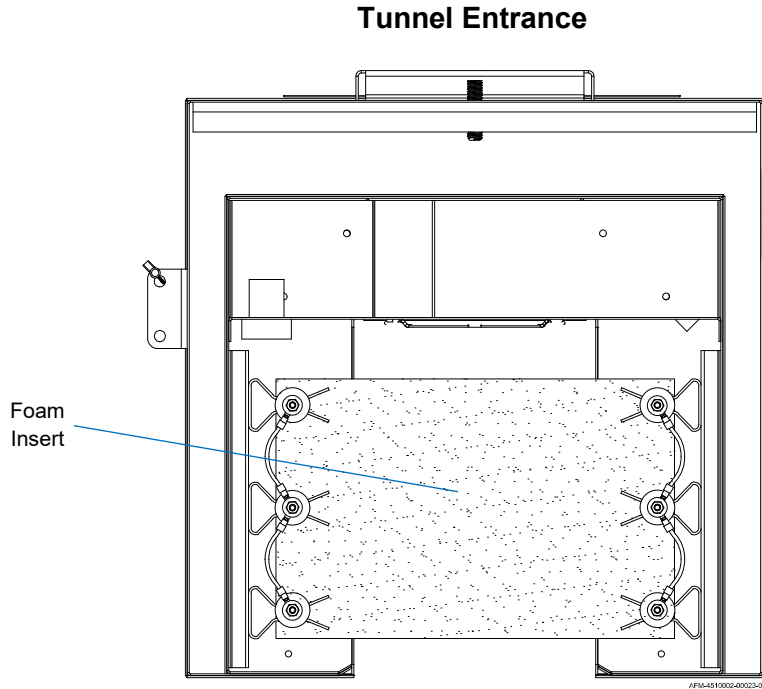
**CAUTION:** Use only the supplied mounting hardware to attach the Tunnel to the Stand. Using hardware other than that supplied by AFM can damage the assembly and void the warranty.

1. Open the crate and carefully remove the system. A forklift may be necessary.
2. The ERT-OAL36 and ERT-OAL48 ship fully assembled, with the exception of the Casters, which are shipped separately. Before proceeding, install the Casters.

### Installing the Casters



3. Remove the packing boards holding the Tunnel up from the stand.
4. Remove the foam insert block used to cushion the Tubes inside the Heat Tunnel.



5. Inspect the Quartz Heating Tubes to make sure that no breakage has occurred. If there is any breakage, do not proceed. Contact your authorized AFM distributor immediately.

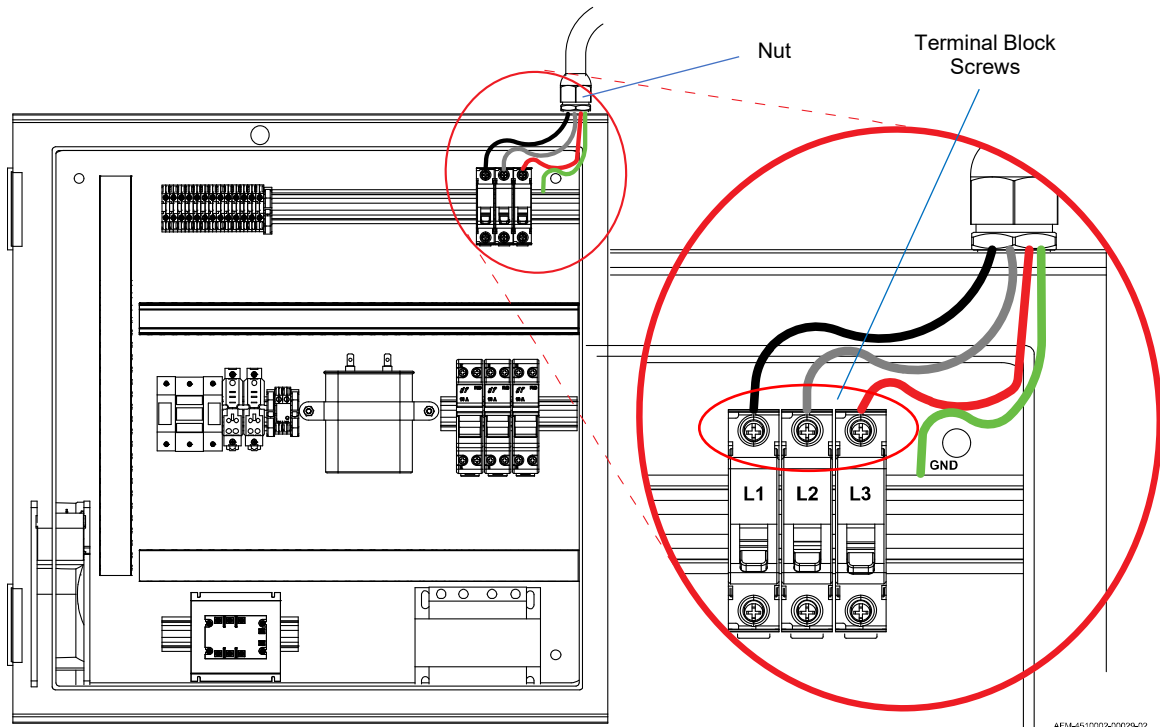


**CAUTION:** Do not operate the Heat Tunnel with broken Heating Tubes.

## AC Wiring

**NOTE:** Customer must provide any required Fittings, AC Cord, and Wiring.

1. If required, remove the nut on the AC cord connector end.
2. Slip the AC cord wiring through the hole on the top of the main electrical box.
3. Attach the wiring as shown in the following illustration:

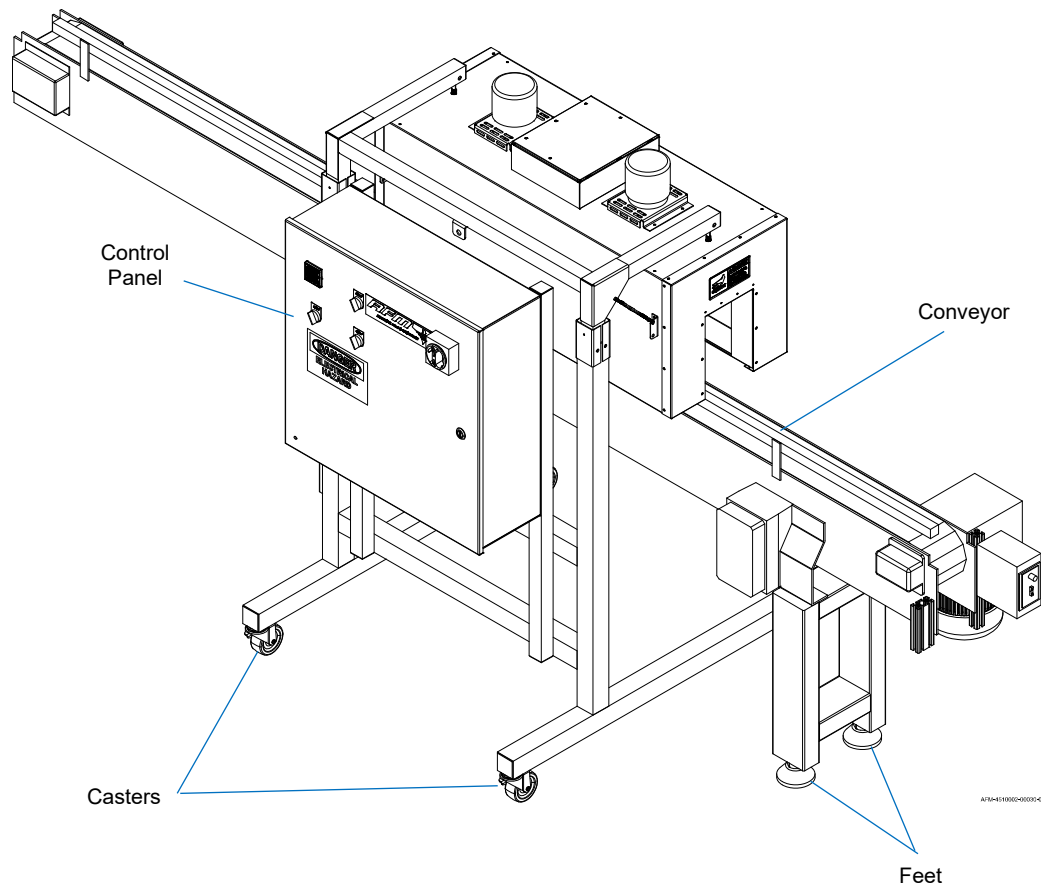


4. Tighten the terminal block screws.
5. Retighten the nut on the end of the cord.
6. Place the correct male AC plug onto the end of the power wire.
7. Check the connections.

## Tunnel Placement

### Conveyor Alignment

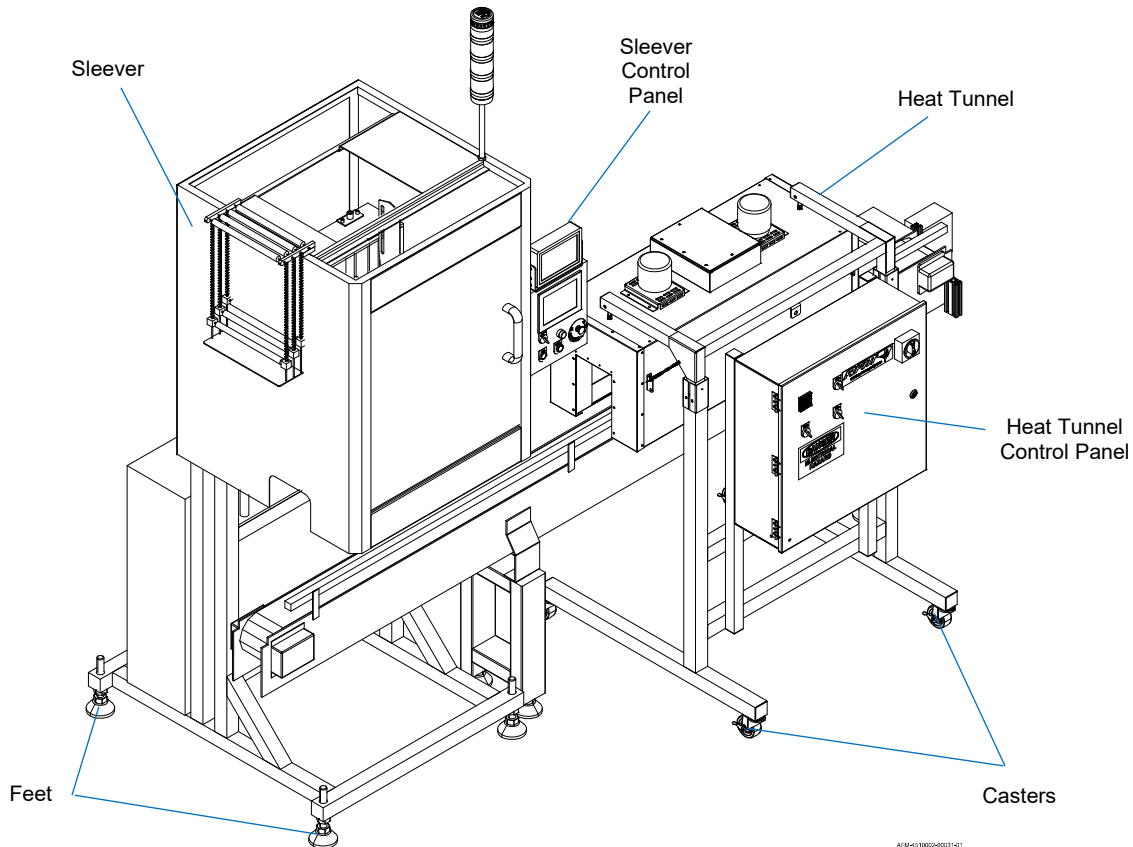
1. Position the Heat Tunnel over the existing conveyor.
2. Ensure that all controls on the Control Panel are easily accessible.
3. Ensure that the Tunnel Chamber is centered over the centerline of the Conveyor Belt.
4. Ensure sufficient space around the Tunnel so that the heat emitted from the Tunnel does not damage other equipment.
5. On the Heat Tunnel and Conveyor Stands, lock the wheels and feet.



## Sleever Alignment

### If using a Sleever with the Heat Tunnel:

1. Align the Heat Tunnel with the existing Sleever.
2. Ensure that all controls on the Control Panels are easily accessible.
3. On the Sleever and Heat Tunnel stands, lock the Casters and Feet.



### If not using a Sleever with the Heat Tunnel:

1. Ensure that the operator has enough room to move and is not in danger of getting caught in moving mechanisms.



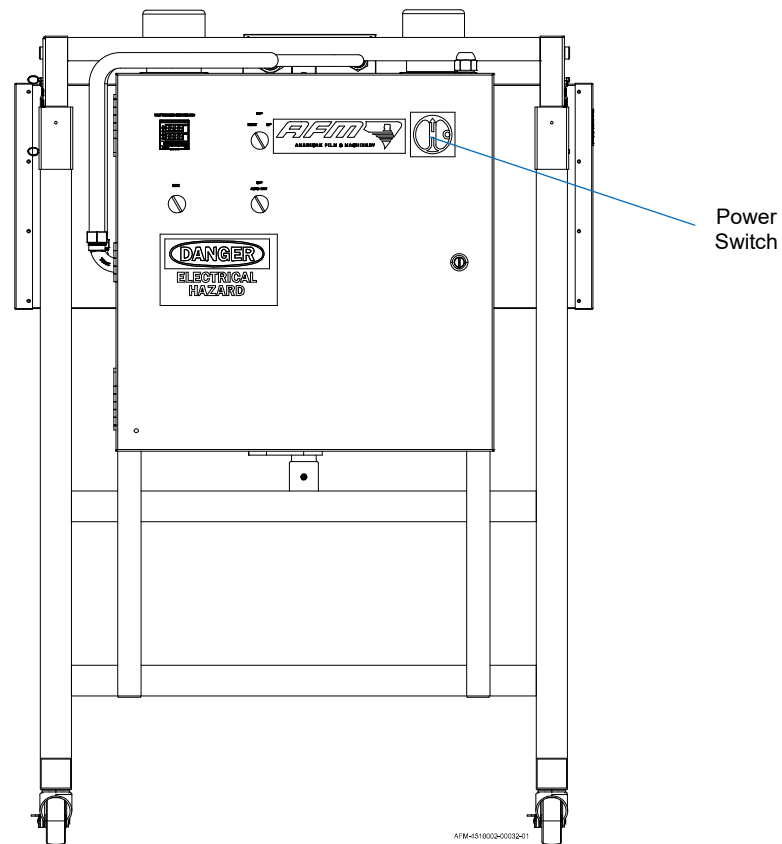
# Operation

When all components have been properly mounted and connected, the ERT-OAL Heat Tunnel is ready to begin production.

## Startup

### To power up the ERT-OAL Tunnel:

1. Double-check the installation. Ensure that all components are securely mounted and that all data and power cables are properly seated and connected.
2. Ensure that the system is connected to an appropriate power source.
3. On the front of the Control Panel, turn the Power Switch to the ON (I) position.



4. Ensure that all six Quartz Heating Tubes glow red upon startup.
5. Listen to ensure that both Blowers are operating.

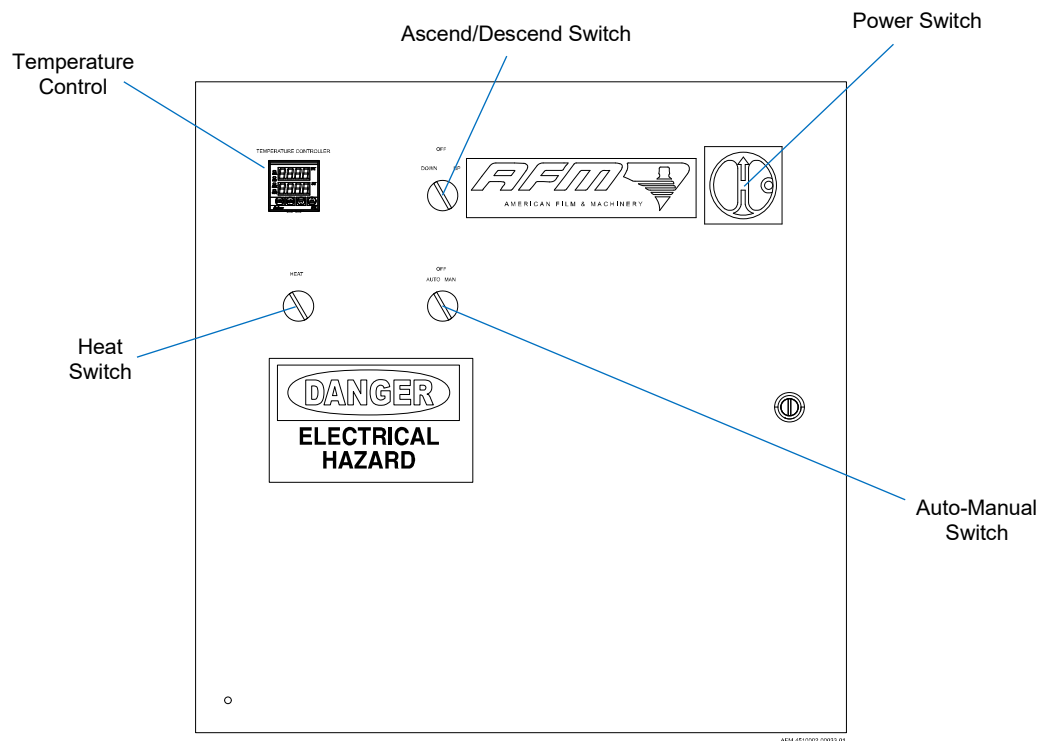
## Control Panel



**CAUTION:** The Main Electrical Box is not a watertight enclosure. Do not splash the Control Panel or Main Electrical Box with liquid. If liquid does splash on the Main Electrical Box, turn off the machine immediately and clean/dry it.

The Control Panel on the Main Electrical Box includes the following:

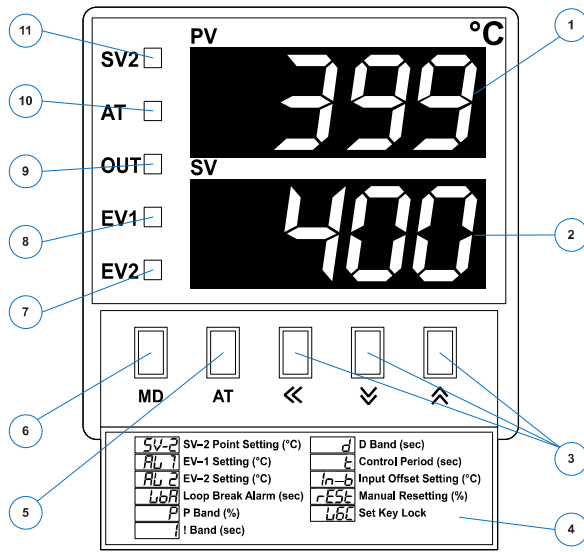
- Power Switch
- TZ4ST Digital Temperature Control
- HEAT Switch
- Lift (DOWN OFF UP) Vertical Switch
- Lift (AUTO OFF MANUAL) Auto-Manual Switch





## TZ4ST Digital Temperature Controller

The Autonics TZ4ST Temperature Controller controls the Heat Chamber temperature in the heat zone. The RTD (Resistance Temperature Device) Sensor that connects to the Temperature Controller is located inside the Secondary Electrical Box on top of the Heat Tunnel. The temperature setting may have to be changed for each product application to obtain the desired results.



1. PV: Processing value indicator (red)
2. SV: Setting value indicator (green)
3. Key shifting the display
4. Information for operation mode
5. AT Key: The mode key to excite Auto tuning function.
6. MD Key: Mode key
7. EV2: Event 2 output signal lamp
8. EV1: Event 1 output signal lamp
9. OUT: Output signal lamp
10. AT: The signal lamp flickers while Auto tuning is being executed
11. SV2: SV2 lamp for SV2 operation

### Changing the Set Value

1. Press the left-arrow (←) button and a digit will begin to flash. The flashing digit indicates the digit whose value can be changed by pressing the down- (↓) or up-arrow (↑) buttons.
2. If necessary, press the left-arrow (←) to shift to the place of the digit that needs to be changed. (The digit to the right will begin flashing.)
3. Press up (↑) or down (↓), as required to change the flashing digit to the required value.
4. Repeat instructions 2 and 3 above as necessary until all digits have been set to the required value, and then press the MD button. No digits will be flashing, the new value entered is applied.

### Fine Tuning the Set Value

After a temperature setpoint has been selected, wait for the temperature inside the Heat Tunnel to stabilize and run some product to observe the results. Adjust the temperature as required, again waiting for the temperature to stabilize before doing further testing.

### Changing the Set Value for Over Temperature

The Temperature Controller has a high limit set at the factory to 500° F. This turns the heat off if the temperature inside the Heat Chamber exceeds 500 °F. This high limit can be changed if it is necessary to reduce the temperature at which the heat turns off.

PV, the Process Value is the actual temperature reading at the sealing elements. PV and SV are mentioned in this procedure, but they are only displayed at the beginning of the procedure.


1. Press and hold the MD button until SV-2 is displayed.
2. Press the MD button (do not hold it down) repeatedly to scroll through the menu until LOC is displayed.
3. Press the left-arrow (◀) button. (ON will begin flashing.)
4. Press the down-arrow button (▼). (ON will turn to OFF and OFF will be flashing.)
5. Press the MD button. (OFF will stop flashing.)
6. Press MD again. (This will bring you back to SV-2.)
7. Press MD again until AL-1 is displayed.
8. AL-1 is set to 500 °F.

### Setting the Over Temperature Alarm

1. Press and hold the MD button for approximately three (3) seconds.
  - a. IN-T is displayed.
2. Press and hold the MD button and up-arrow (▲) buttons at the same time for three (3) seconds to activate the menu.
3. Scroll to LOC and press the left-arrow (◀) button. On will begin flashing. Press the down-arrow button (▼). When “On” turns to “Off,” press the MD button until LOC appears, indicating that the “Off” setting is locked.
4. Press the MD button until EU-1 appears (Event 1). Below EU-1, AL-6 should appear. If not, use the up and down buttons to select AL-6.
5. Return to LOC and change it to “On.”
6. Press and hold both the MD and up-arrow (▲) buttons at the same time for three (3) seconds to access the other menu.
7. Scroll through the menu using just the MD button and turn LOC Off.
8. Scroll through the menu until AL-1 appears. This is your high alarm. The normal factory setting is 500 °F.
9. Return to LOC and change it to “On.”

## Electric Lift Operation

The ERT-OAL Electric Lift may be used to raise the Heat Tunnel up from the Conveyor or lower it onto the Conveyor.

	<p><b>ATTENTION:</b> The Heat Tunnel should be raised whenever the Conveyor stops to prevent heat damage to product.</p>
---	--

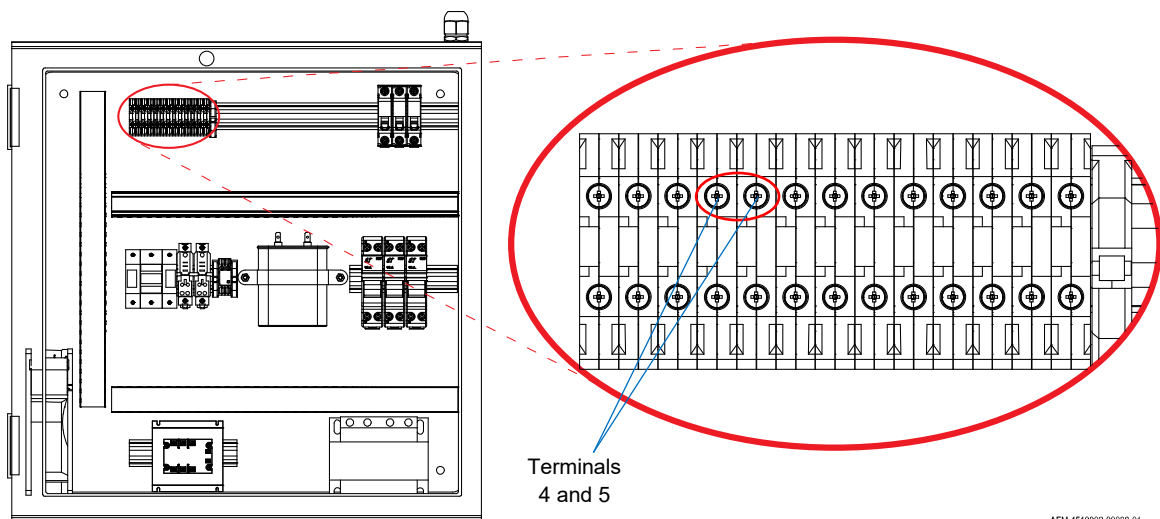
The Electric Lift can be operated manually or automatically with an external trigger signal. Contact AFM for guidance electronically integrating the Heat Tunnel into an overall production system.

### Manual Mode

When the “Auto-Manual” switch on the Control Panel is in the **MANUAL** position, the “Ascend/Descend” switch may be used to cause the Electric Lift to raise and lower the Heat Tunnel. The Electric Lift stops when the user releases the “Ascend/Descend Switch.”

### Auto Mode

When the “Auto-Manual” switch on the Control Panel is in the **AUTO** position, the Electric Lift automatically raises and lowers the Heat Tunnel to positions that have been preset on the Limit Switch in the Linear Actuator (see “Setting the Raised and Lowered Lift Positions for AUTO Mode” on page 37). Lowering of the Electric Lift occurs when 24 VDC is applied to terminals 4 and 5 in the Secondary Electrical Box.



AFM-4510002-00028-01

**NOTE:** When in **AUTO**, the Electric Lift begins to raise immediately upon removal of power to the Lift Control Terminals (terminals 4 and 5). If power to the Lift is interrupted, the Lift will not move.

The 24 VDC relay may be replaced with whatever relay is desired to allow a different voltage signal to operate the Lift remotely.



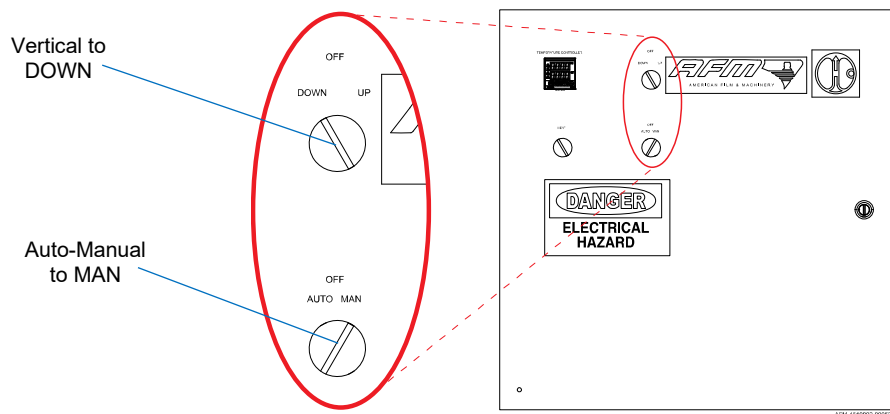
**CAUTION:** To avoid damage to equipment, set the “Lowered Lift Position” before operating the Electric Lift in the **AUTO** mode (see “Setting the Lowered Lift Position” on page [37](#)).

## Setting the Raised and Lowered Lift Positions for AUTO Mode

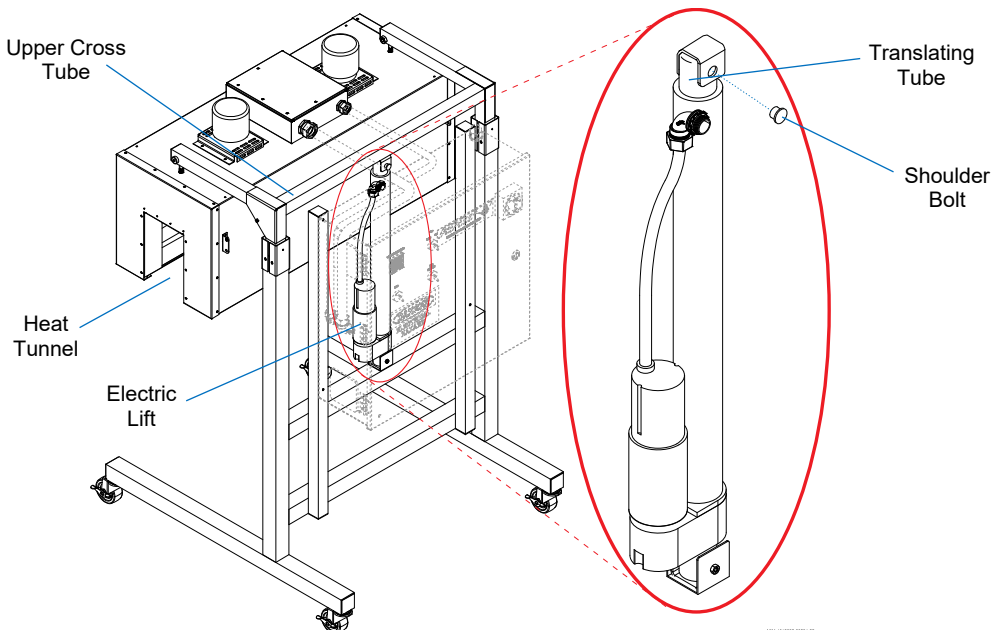
Before using the Electric Lift in “Auto” mode, the desired raised and lowered positions must be set.

### Setting the Lowered Lift Position

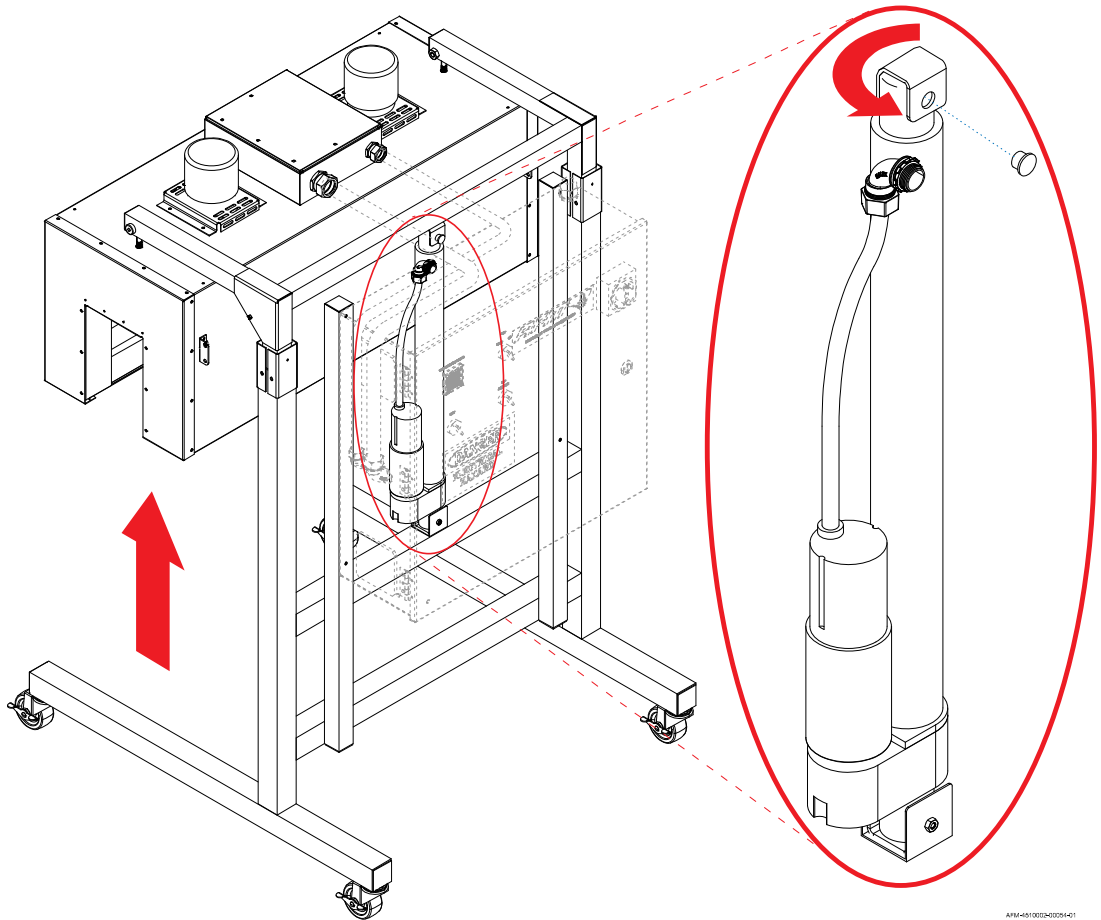
1. Ensure that the Heat Tunnel is properly attached to its Stand.
2. Make sure that the Heat Tunnel and the Stand are in a clear area with no obstructions to the vertical motion of the Lift.
3. Turn the “Auto-Manual” switch to the **MAN** position.
4. Hold the “Vertical” switch in the **DOWN** position until the Electric Lift stops.



5. Disconnect the Translating Tube from the Upper Cross Tube on the Stand by removing the Shoulder Bolt.



6. With multiple people, physically lift the Upper Cross Tube and the Heat Tunnel (the Heat Tunnel weighs approximately 125 lbs).
7. Unscrew the Translating Tube until it moves to the desired minimum height.

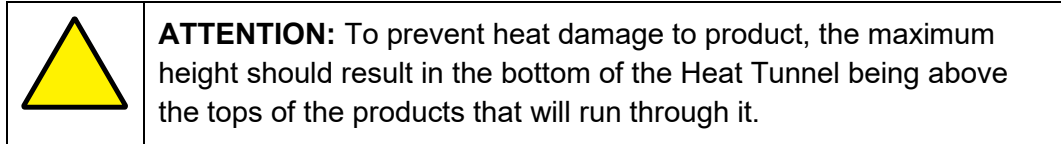


APR-01-001-0026-01

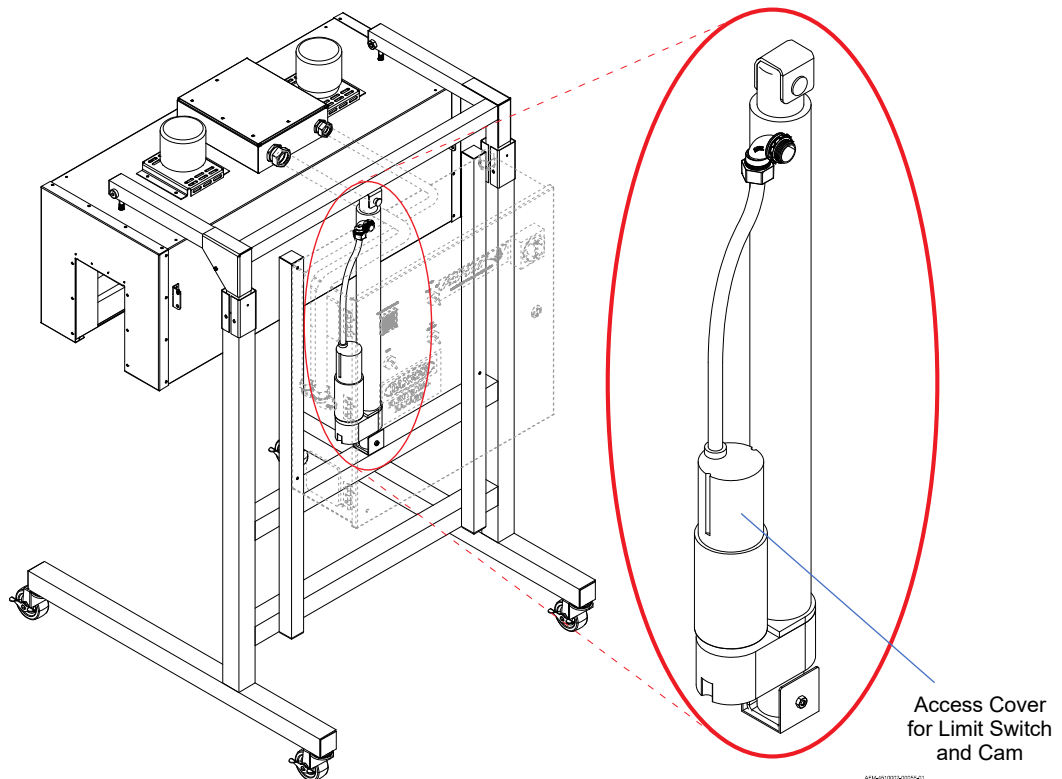
8. Align the Translating Tube with the Upper Cross Tube and reinsert the Shoulder Bolt.

## Setting the Raised Lift Position

1. Use the “Vertical” switch to raise the Heat Tunnel to your maximum desired height (the upper position at which the Electric Lift will stop in Automatic mode).



2. Remove the cover from the Limit Switch.



3. Adjust the Cam Switch (next to the Limit Switch) until the Limit Switch is actuated. Allow for vertical drift of the Heat Tunnel, especially when the Heat Tunnel lowers.
4. Check the operation of the Electric Lift to ensure correct range of movement and readjust if necessary.
5. Replace the cover on the Limit Switch.





# Maintenance

## Mounting Hardware and Connections

Occasionally check the mounting hardware and retighten any mounting brackets or screws that may have vibrated loose during operation.

## External Cleaning

1. Verify that the Heat Tunnel is cool and that all power has been disconnected.
2. Apply cleaning spray to a fresh cloth, and gently but thoroughly wipe and dry the external components.



**CAUTION:** Do not attempt to clean electronics, Heater Elements, or parts that are inaccessible.



**CAUTION:** Do not attempt to clean inside the Main Electrical Box or the Secondary Electrical Box.

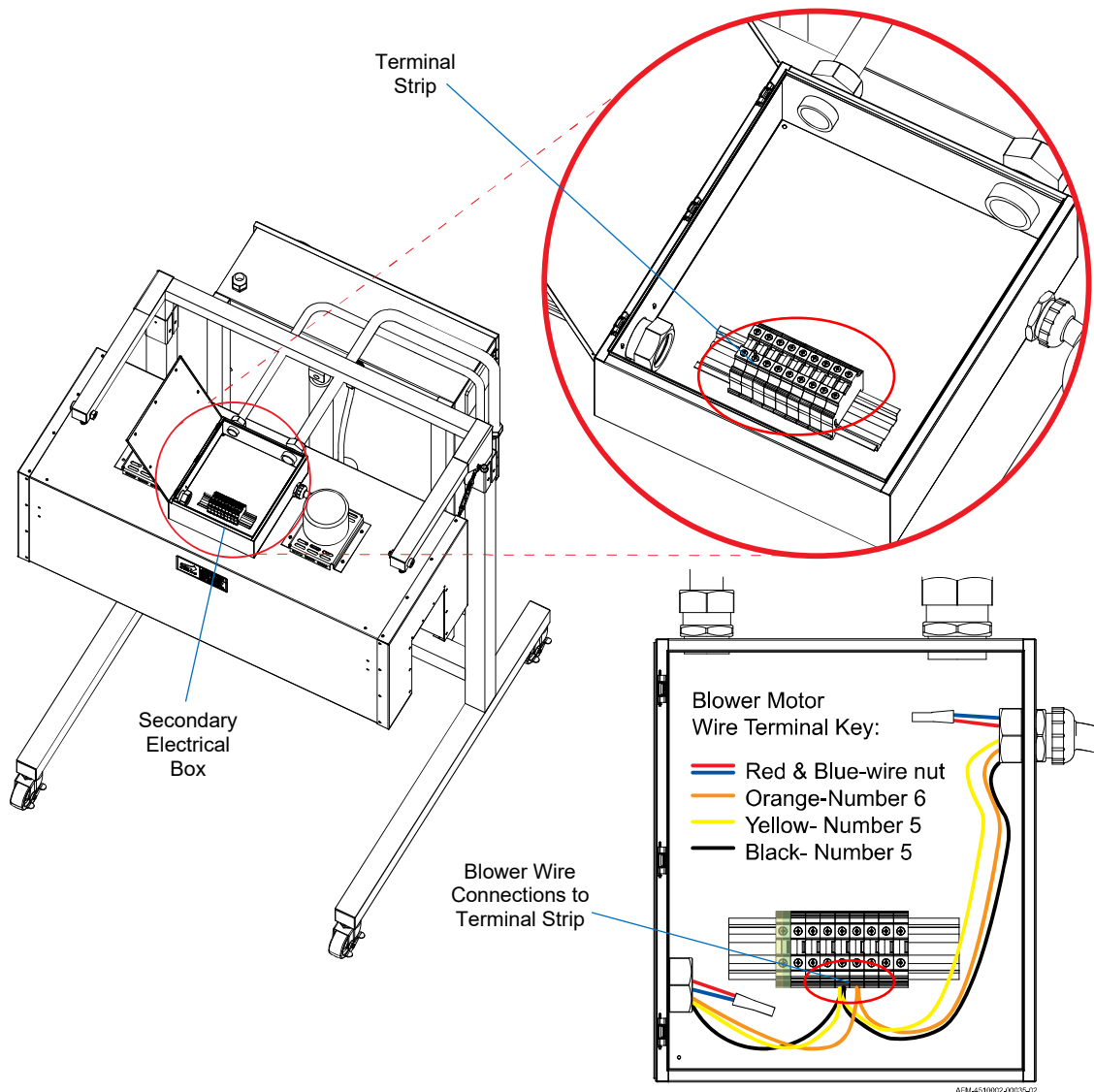
3. Be sure that any residual cleaning spray dries before reconnecting the power supply and turning the power on.

## Parts Replacement

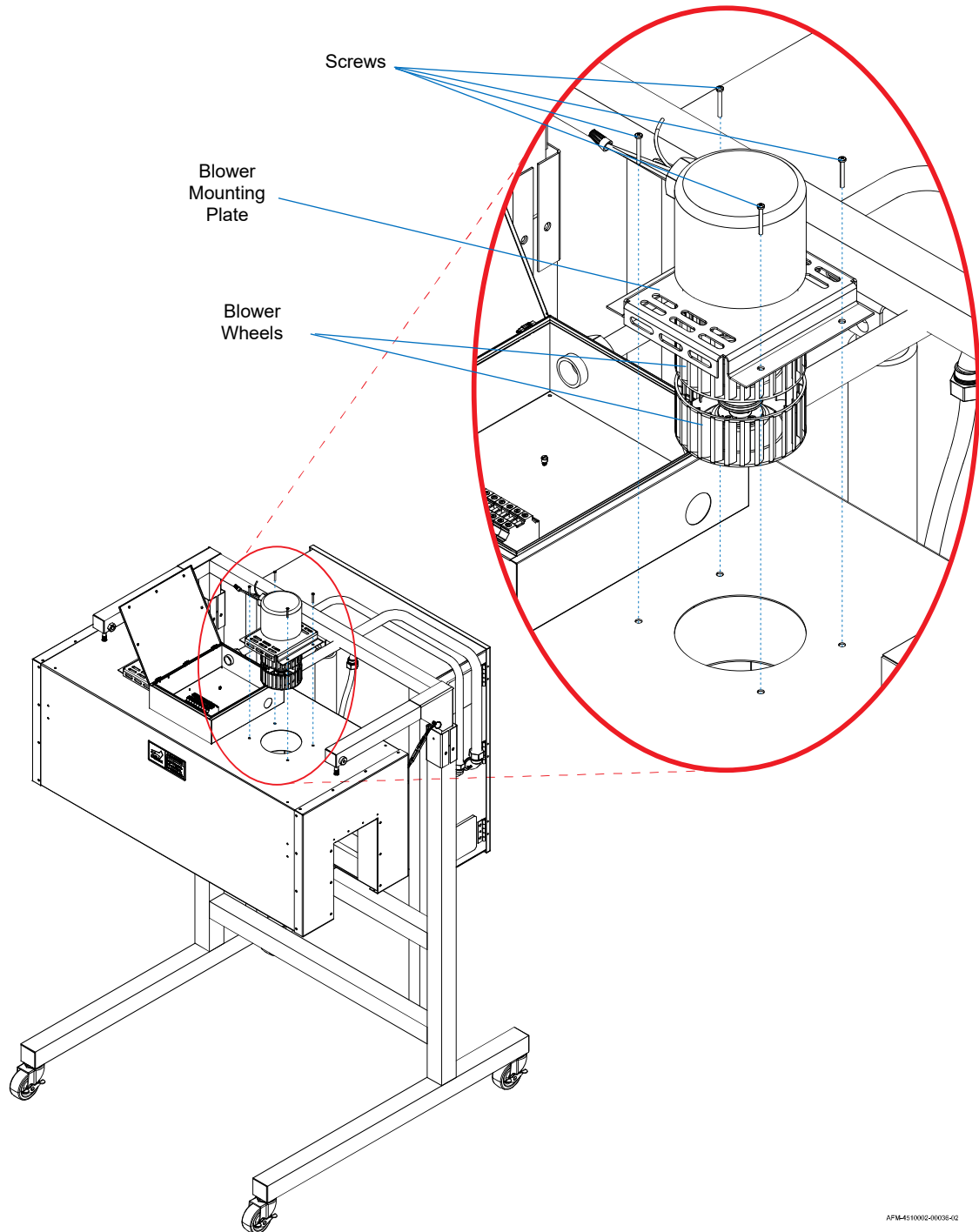
### Blower Motor Replacement

1. Before replacing the Blower Motor, make sure that all power to the Main Electrical Box is turned off.
2. Unplug the Heat Tunnel from power.
3. Disconnect the blower wires by removing the wires at the Terminal Strip inside the Secondary Electrical Box.

**NOTE:** Other wiring has been removed for clarity. Refer to the “AC Wiring” section on page 27 for more wiring diagrams.



4. Remove the four #8-32 Phillips head screws that hold the Blower Mounting Plate to the Heat Tunnel's outer shell.



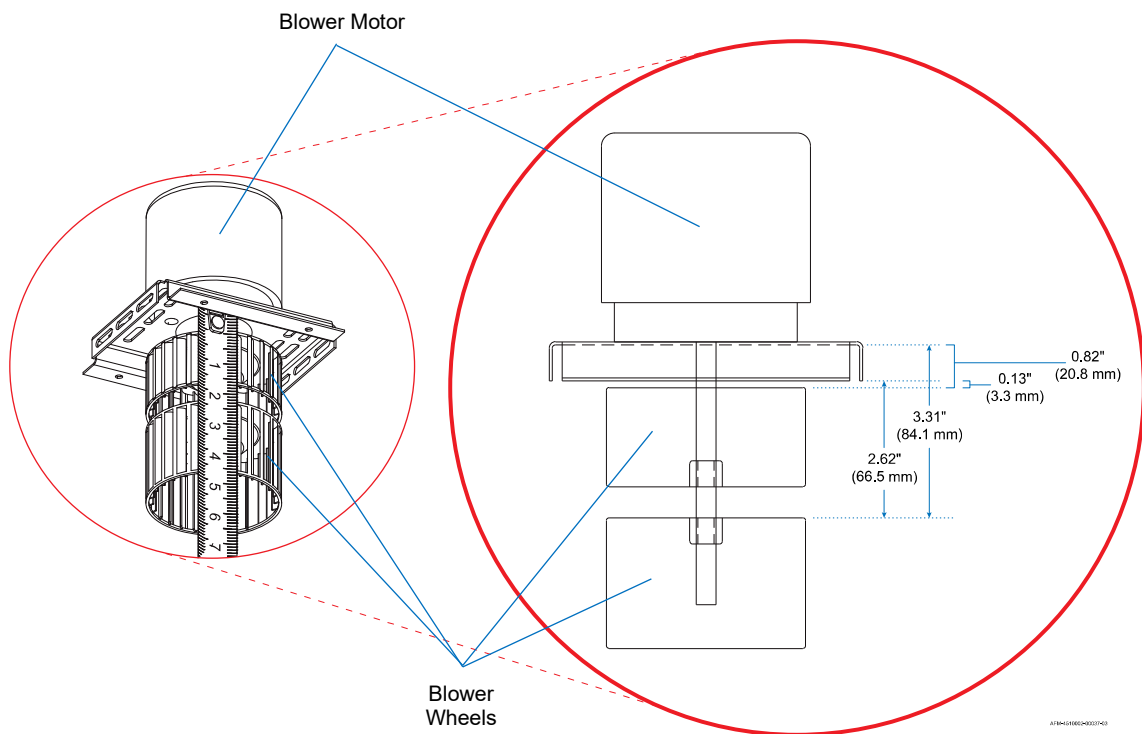
AFM-4510002-00035-02

5. Remove the Blower, Blower Mounting Plate, and Blower Wheels as an assembly.



**CAUTION:** Blower Wheels are sharp; be careful when removing them from the old motor.

- When replacing, install the Blower Wheels on the fan shaft as shown in the illustration below.



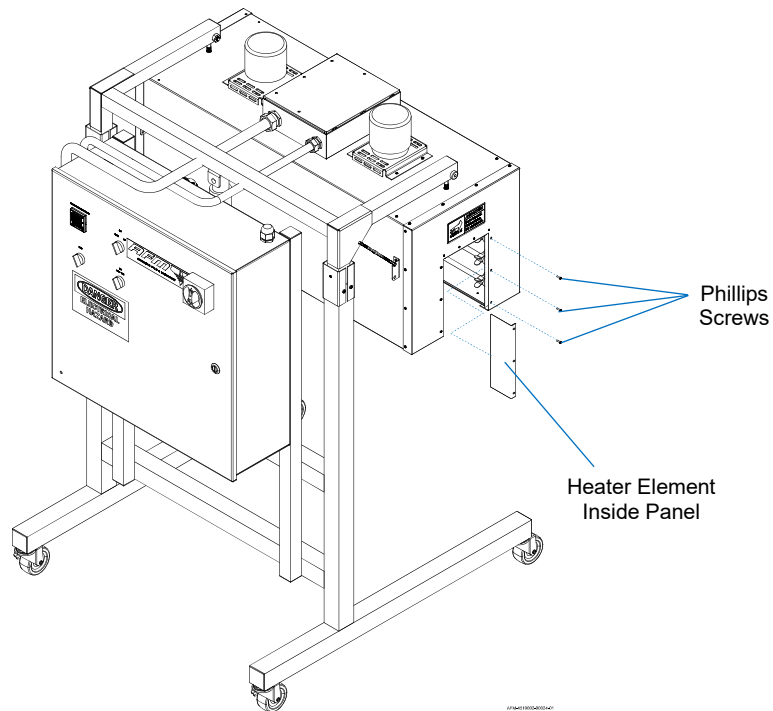
- Replace the Blower Motor and reinstall the Blower assembly. Do not reuse damaged Blower Wheels.

## Replacing Heater Elements

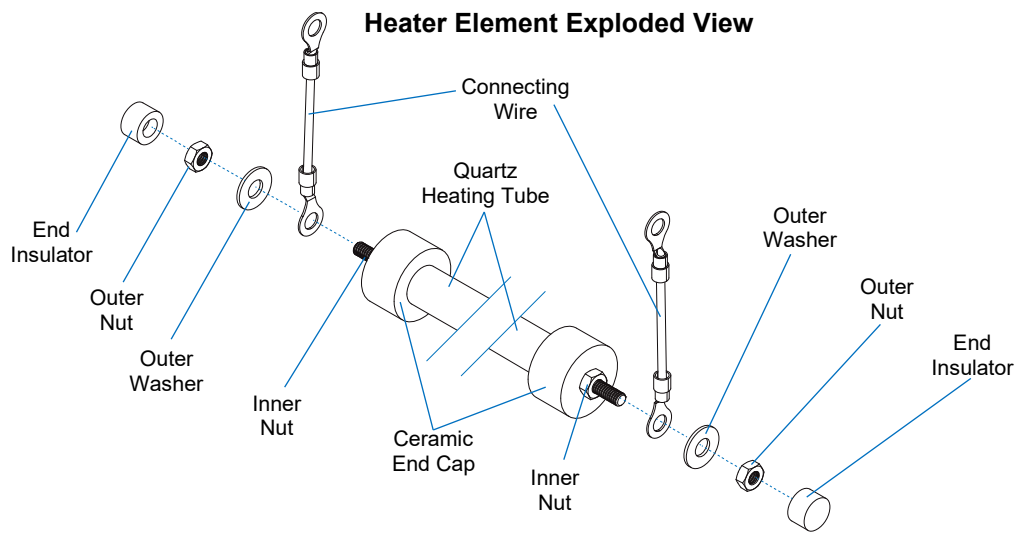


**WARNING:** Heater Elements should be removed and replaced one at a time to avoid rewiring them incorrectly, which can result in equipment failure or a dangerous safety hazard.

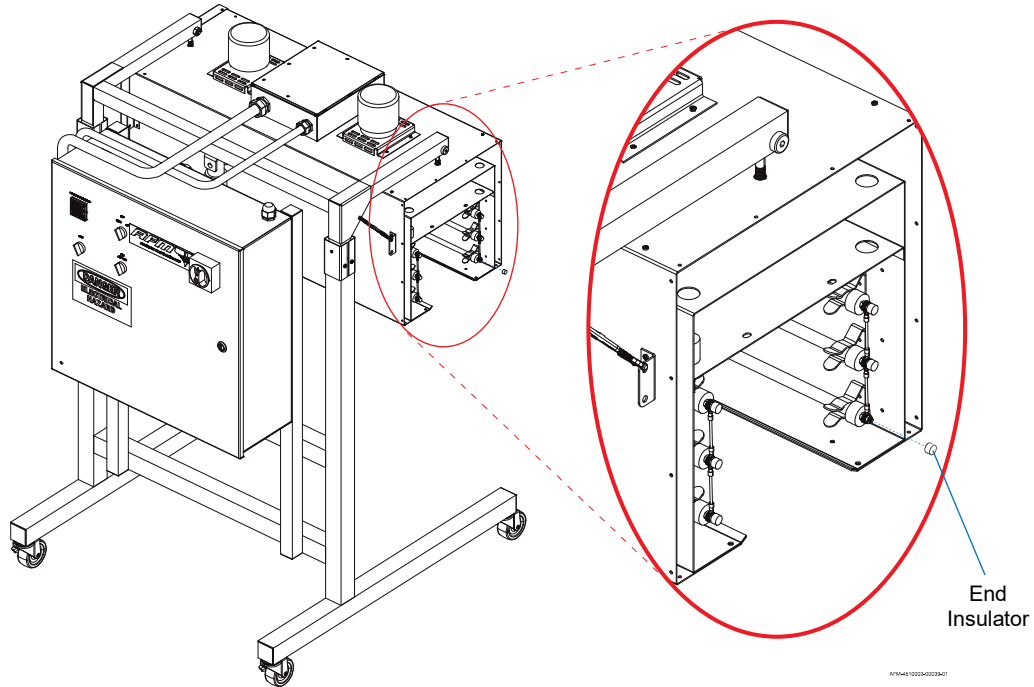
1. Verify that the Heat Tunnel is cool and that all power has been disconnected.
2. Remove the Heater Element Inside Panels from each side within the Heat Tunnel by removing the #8-32 Phillips head screws.



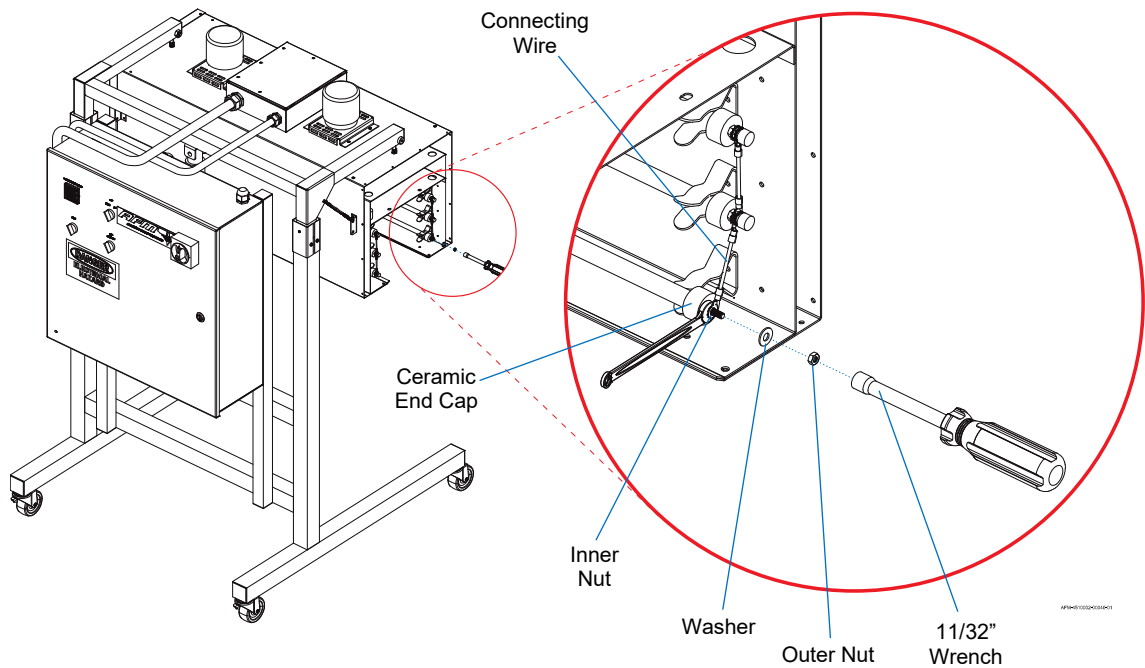
3. Reaching into the Heat Tunnel, remove the ceramic End Insulators from both Heater Element ends.



**NOTE:** End Panels shown removed for clarity; do not remove End Panels.



4. Holding the Inner Nut with a (skinny) 11/32" wrench on the Inner Nut, use a Nut Driver to remove the #8-32 Outer Nut and Washer at both ends of the Heater Element.



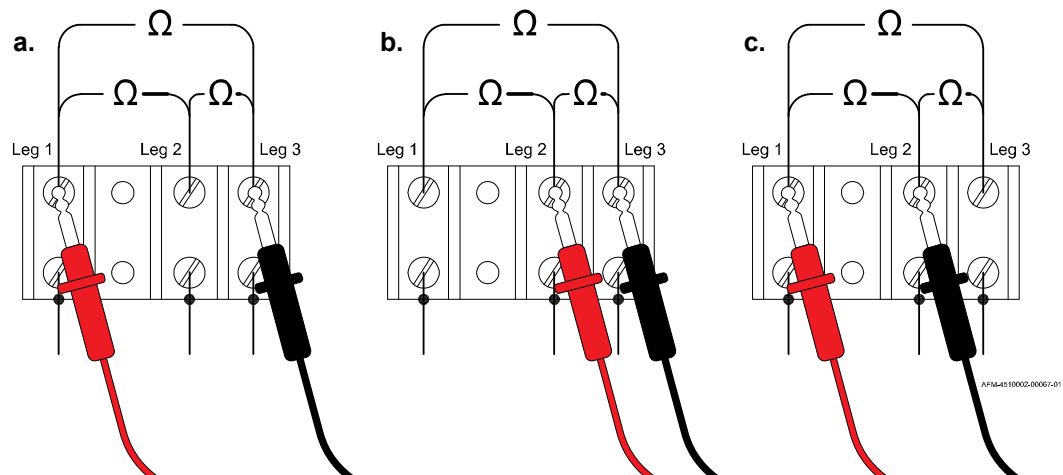
5. Remove the Connecting Wires from each end of the Heater Element so that the Heater Element is free from the wiring. Set the Connecting Wires aside for later use.
6. Remove and discard the old Heater Element.
7. Insert a new Heater Element into the Mounting Clamps.
8. Reattach the Connecting Wires at either end of the Heater Element.
9. Holding the Inner Nut firmly with a (skinny) 11/32" wrench on, securely tighten the Outer Nut with a #8-32 Wrench.



**WARNING:** Electrical arcing can occur if the nuts are not properly tightened, creating a safety hazard and potentially damaging the equipment.

10. Replace the ceramic End Insulators to prevent short circuits. Verify that the Heater Element Terminals are not pinched, and that the Heater Element Terminals do not touch the stainless steel housings or other Heater Elements.
11. Repeat this entire process for each Heater Element to be replaced.
12. Using a Volt-Ohm meter, measure resistance between each leg (see Diagram !D269 in "Heating Element – All Models" on page 57).
  - a. Measure resistance across Leg 1 and Leg 3.
  - b. Measure resistance across Leg 2 and Leg 3.
  - c. Measure resistance across Leg 1 and Leg 2.

All measurements should be equal, and at the Ohm measurements shown below:



**ERT-OAL36-V2 or ERT-OAL48-V2:**

All should be 9.5 Ohms/Phase

**ERT-OAL36-V6 or ERT-OAL48-V6:**

All should be 38 Ohms/Phase





# Troubleshooting

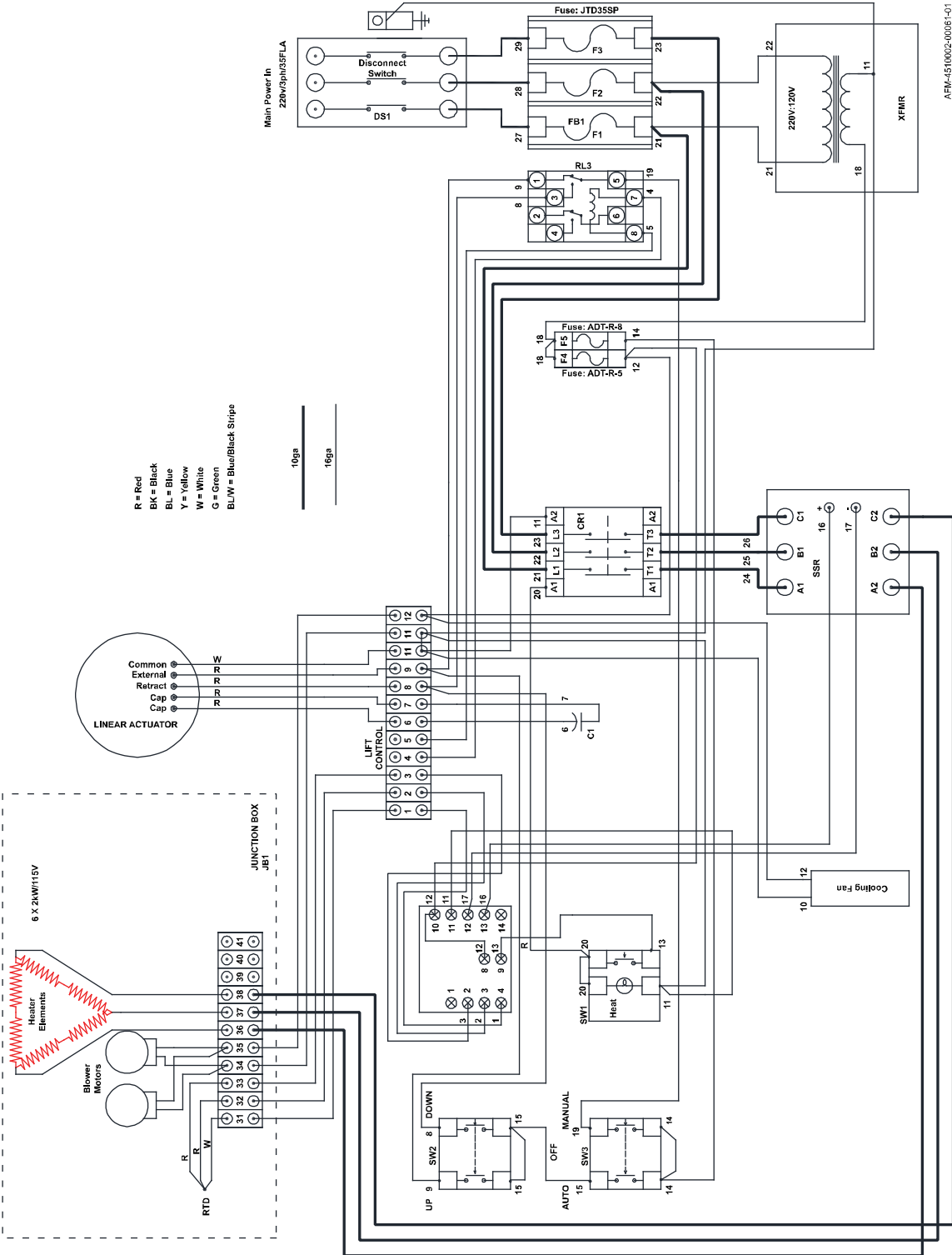
Below are some problems that may be encountered during heat shrinking. If other issues occur that are not covered in this section, call your authorized AFM distributor for assistance.

Problem	Possible Cause	Solution
No power.	System is not connected to power source.	Check power source.
	Blown fuse.	Check main fuses (F1, F2, F3) and replace if needed. (see "Schematics" starting on page <a href="#">51</a> ).
No heat.	Heater Element(s) burned out.	Check Heater Elements and replace if needed (see "Replacing Heater Elements" on page <a href="#">45</a> ).
	Temperature Probe failed.	Replace Temperature Probe.
	SSR failed.	Replace SSR.
	CR1 Contactor failed.	Replace CR1.
	Temperature Control failed.	Replace Temperature Control on the Control Panel (see "Control Panel" on page <a href="#">32</a> ).
Fan not working.	Overheat condition.	Allow Blower Motor to cool and try again.
	Blower Motor stalled.	Check that Blower Motor is free to spin.
	Blower Motor failed.	Replace Blower Motor (see "Blower Motor Replacement" on page <a href="#">42</a> ).

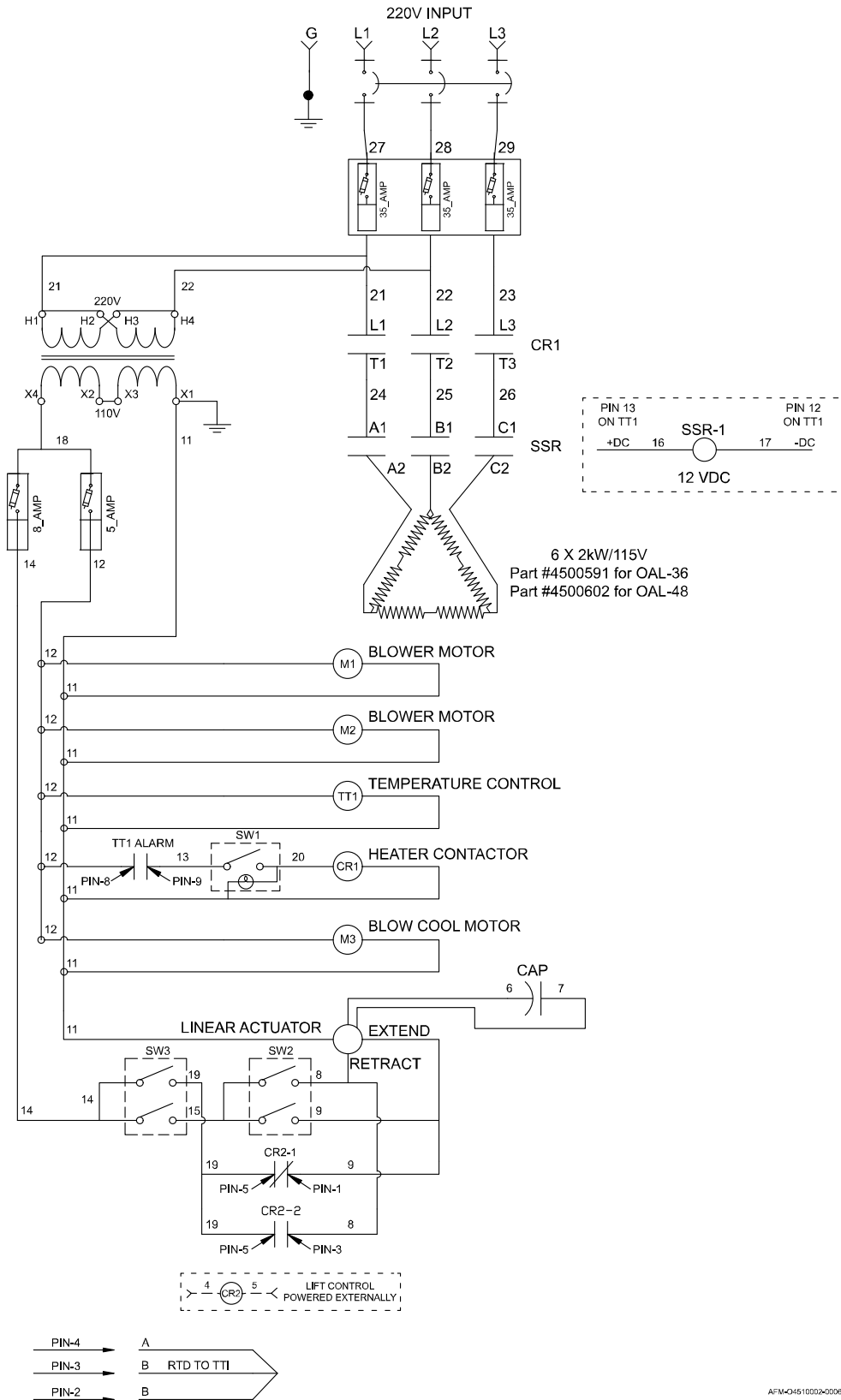


# Schematics

## ERT-OAL36-V2 and ERT-OAL48-V2



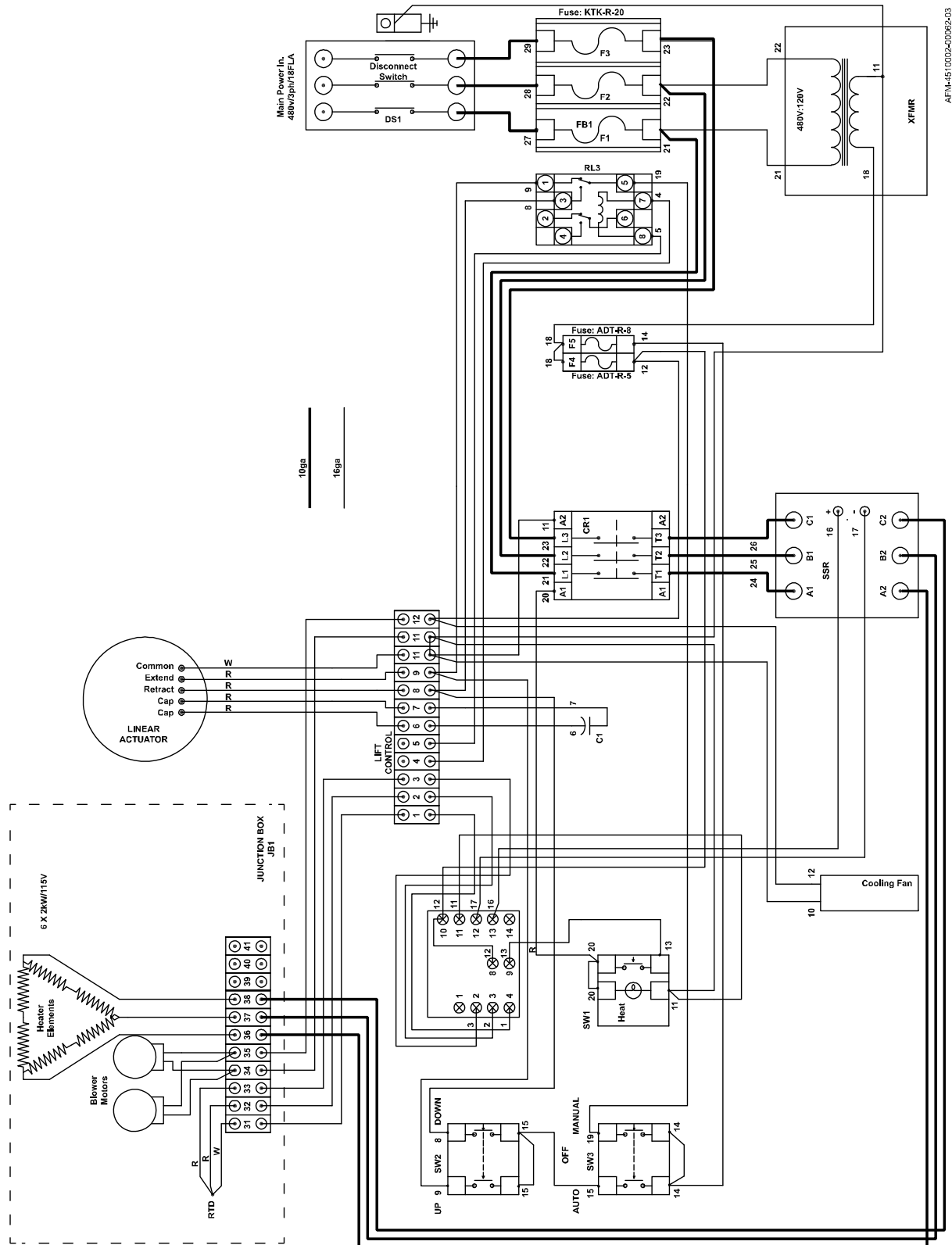
AFIM-4510002-00051-01

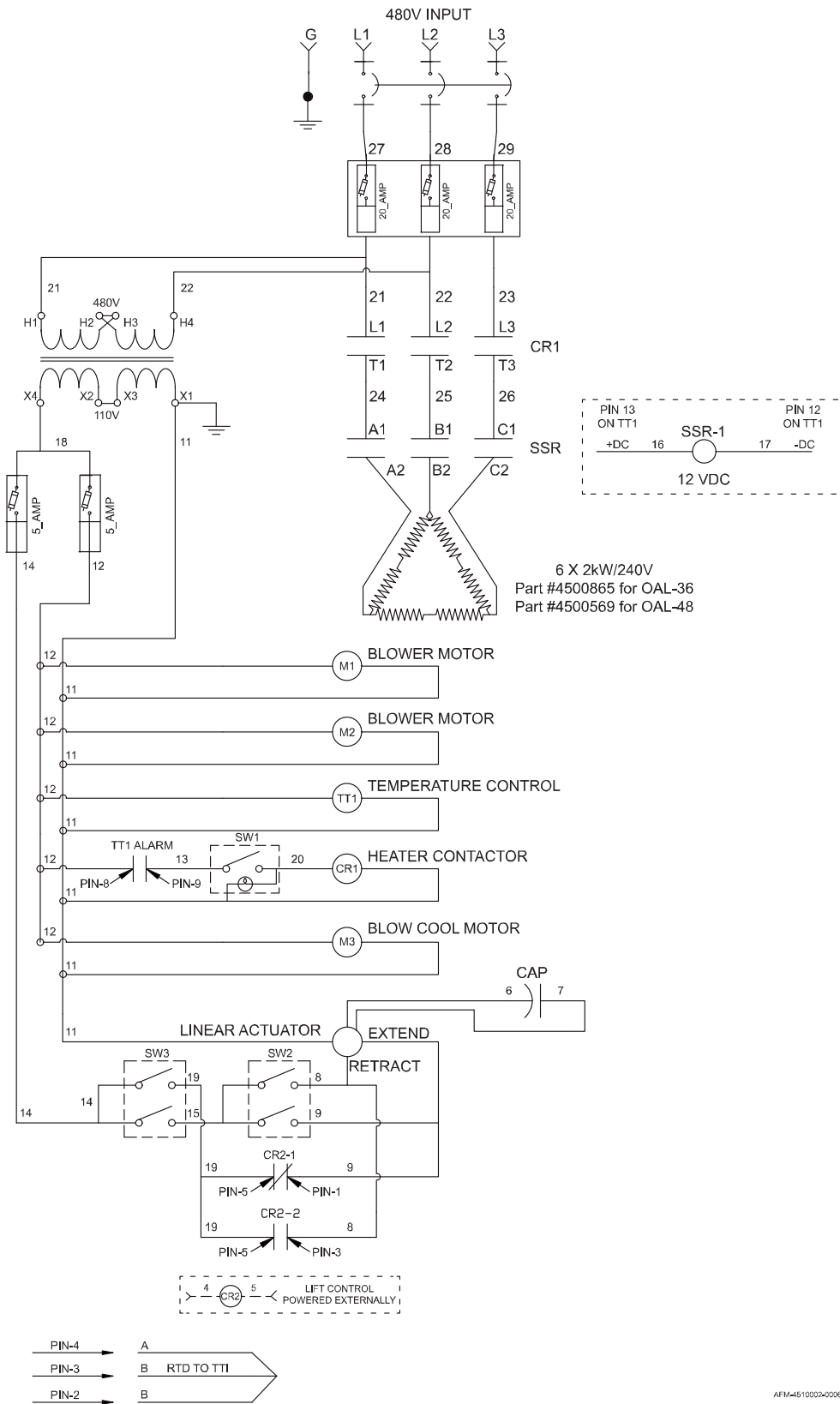


AFIM-Q45/1002-200063-03

Item	Part No.	Description	Manufacturing No.	Qty
CAP	4500091	CAPACITOR, AC MOTOR-RUN, 370 V	50 MICROFARAD RATING	1
CR1	4500541	RELAY, DIN RAIL INFREQUENT USE	3 PST, 40 AMPS @ 600 VAC, 120	1
CR2-BASE	4501352	SOCKET, RELAY. 8PIN 15 A	4DG59	1
CR2-RELAY	4501361	RELAY, ICE CUBE, DPDT	24 VDC, COIL VOLTS, 15A	1
FUSE 35 AMP 600V LPJ-35SP	4500786	FUSE UL CLASS J TD,600 VAC, 35A	LPJ-SP-35	3
FUSE 5 AMP KTK-R-5	4500784	FUSE UL CLASS CC, 5A, 600V	KTK-R5	1
FUSE 8 AMP KTK-R-8	4501959	FUSE UL CLASS CC, 8A, 600 V	ATD-R8	1
HEATER ELEMENT 2KW/115V	4500591	ELEMENT, HEATER FOR -V2 (240V)	ELEM754	6
LINEAR ACTUATOR	4500101	ACTUATOR, LINEAR FOR LIFT	TAL10-1A20-18	1
M1	4501098	MOTOR, 3000RPM 115/230 V – M1	MOTO91WR	1
M2	4501098	MOTOR, 3000RPM 115/230 V – M2	MOTO91WR	1
M3	4501935	FAN, COOLING 4.69SQ, 120 V	1976K43	1
RTD	4501403	RTD 100 OHM 8" LONG	RTD100-8	1
SSR1	4501375	RELAY; SSR; ZERO-SW	CUR-RTG 50A; CTRL-V 3-32 DC; VOL-RTG 48	1
SW1	4501439	SELECTOR SWITCH, ILLUMINATED	2 POS, RED	1
SW2	4501438	SELECTOR SWITCH, 3 POS	MOMENTARY	1
SW3	4501437	SELECTOR SWITCH, 3 POS	MAINTAINED	1
TT1	EAST0494	CONTROL, TEMP. DIGITAL		1
TRANSFORMER	4501775	TRANSFORMER, CONTROL	240/480VAC TO 110V, 1KVA	1

# ERT-OAL36-V6 and ERT-OAL48-V6





AFM-4510002-00064-02

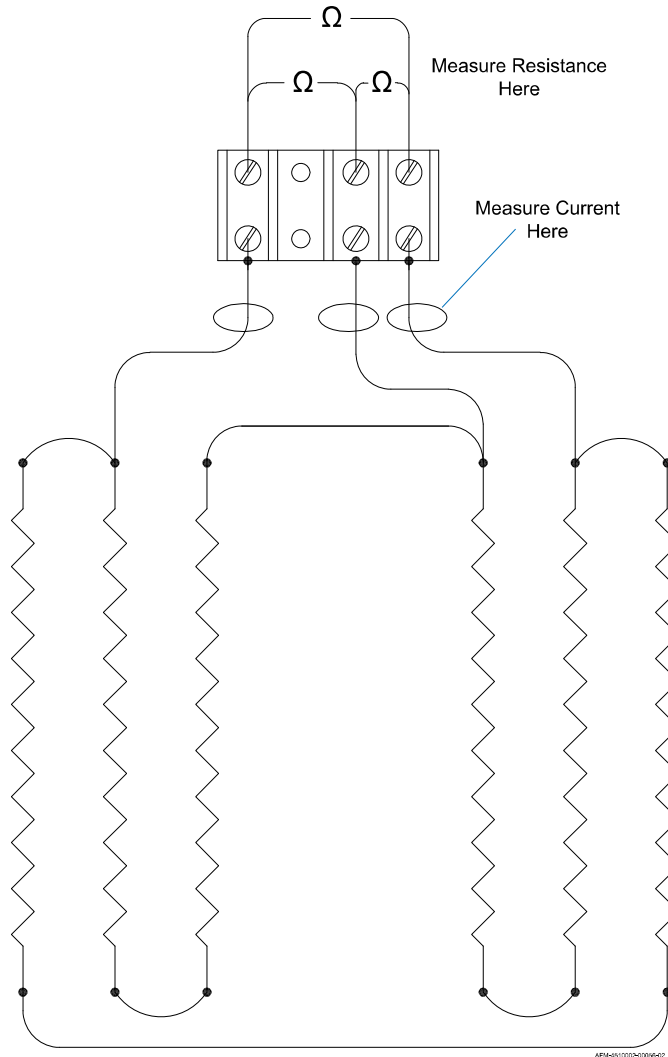
Item	Part No.	Description	Manufacturing No.	Qty
CAP	4500091	CAPACITOR, AC MOTOR-RUN, 370 V	50 MICROFARAD RATING	1
CR1	4500541	RELAY, DIN RAIL INFREQUENT USE	3 PST, 40 AMPS @ 600 VAC, 120	1
CR2-BASE	4501352	SOCKET, RELAY. 8PIN 15 A	4DG59	1
CR2-RELAY	4501361	RELAY, ICE CUBE, DPDT	24 VDC, COIL VOLTS, 15A	1
FUSE 20 AMP 600V KTK-R-20	ETC00129	FUSE UL CLASS CC, 600 VAC, 20A		3
FUSE 5 AMP KTK-R-5	4500784	FUSE UL CLASS CC, 5A, 600V	KTK-R5	1
FUSE 8 AMP KTK-R-8	4501959	FUSE UL CLASS CC, 8A, 600 V	ATD-R8	1
HEATER ELEMENT 2KW/240V	4500865	ELEMENT, HEATER FOR -V6 (480V)	ELEM34	6
LINEAR ACTUATOR	4500101	ACTUATOR, LINEAR FOR LIFT	TAL10-1A20-18	1
M1	4501098	MOTOR, 3000RPM 115/230 V	MOTO91WR	1
M2	4501098	MOTOR, 3000RPM 115/230 V	MOTO91WR	1
M3	4501935	FAN, COOLING 4.69SQ, 120 V	1976K43	1
RTD	4501403	RTD 100 OHM 8" LONG	RTD100-8	1
SSR1	4501375	RELAY; SSR; ZERO-SW	CUR-RTG 50A; CTRL-V 3-32 DC; VOL-RTG 48	1
SW1	4501439	SELECTOR SWITCH, ILLUMINATED	2 POS, RED	1
SW2	4501438	SELECTOR SWITCH, 3 POS	MOMENTARY	1
SW3	4501437	SELECTOR SWITCH, 3 POS	MAINTAINED	1
TRANSFORMER	4501775	TRANSFORMER, CONTROL	240/480VAC TO 110V, 1KVA	1
TT1	EAST0494	CONTROL, TEMP. DIGITAL		1



# Wiring Diagrams

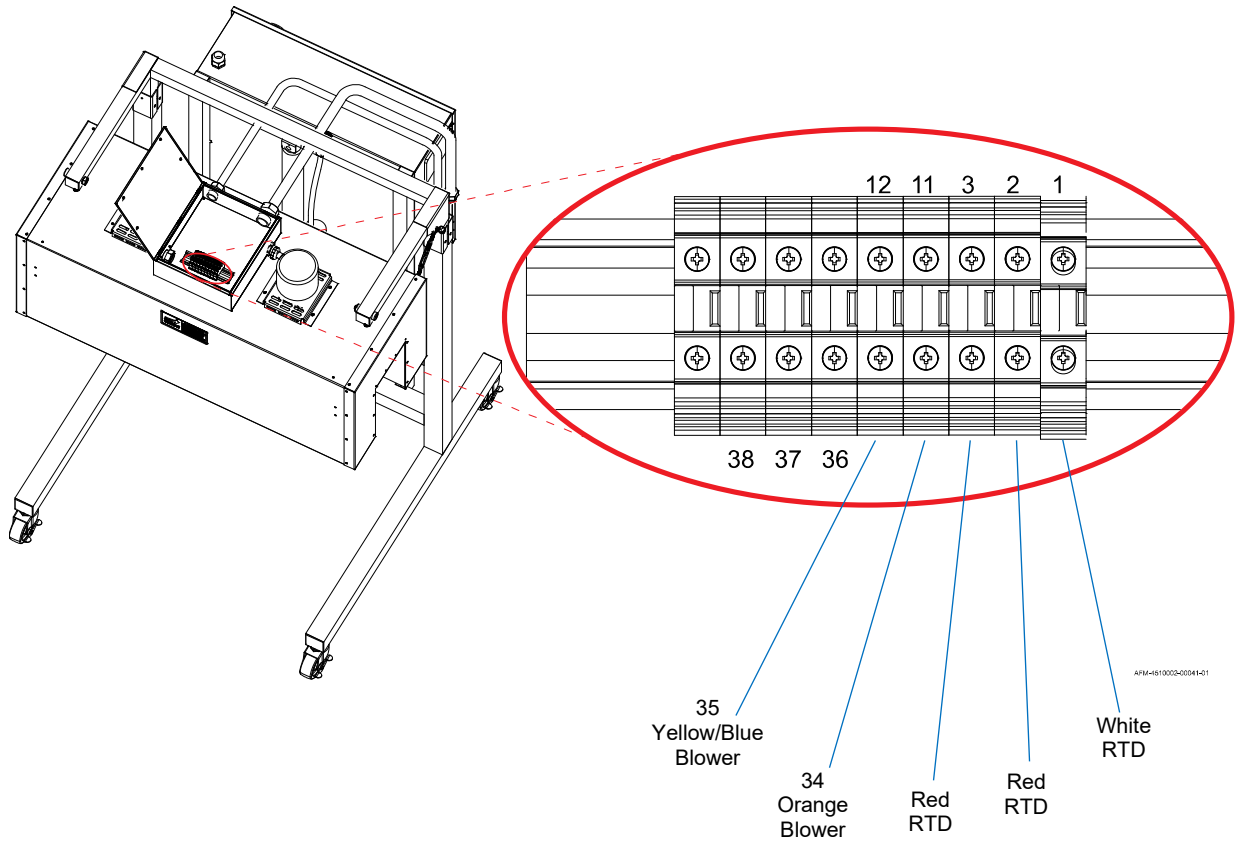
## Heating Element – All Models

Diagram ID-269



Model	Tunnel Length	Tunnel Voltage	Ohms/Phase (All must be equal)	Amps/Phase (All must be equal)	Heater Element Part Number	Element Voltage	Element Wattage	Total Wattage
ERT-OAL36-V2	36"	240	9.5	29	4500591	115	2000	12000
ERT-OAL36-V6	36"	480	38	15	4500865	240	2000	12000
ERT-OAL48-V2	48"	240	9.5	29	4500602	115	2000	12000
ERT-OAL48-V6	48"	480	38	15	4500569	240	2000	12000

# Heater/Blower/RTD – All Models



# Parts List

## Electrical Parts

Part No.	Description	Manufacturing No.	Model	Qty
4500091	CAPACITOR, AC MOTOR-RUN, 370 V	50 MICROFARAD RATING	All	1
4500101	ACTUATOR, LINEAR FOR LIFT	TAL10-1A20-18	All	1
4500400	CONTACT BLOCK, 22 mm	6HZ06	All	2
4500451	COVER; POLYCARBONATE	4.4 IN 2.80; 0.25; UL94V-0	All	1
4500541	RELAY, DIN RAIL INFREQUENT USE	3 PST, 40 AMPS @ 600 VAC, 120	All	1
4500543	FUSE BLOCK, CLASS CC 30A, 1 POLE	6113T14	All	2
4500569	ELEMENT, HEATER FOR -V6 (480V)	ELEM481	ERT-OAL48-V2 ERT-OAL48-V6	6
4500591	ELEMENT, HEATER FOR -V2 (240V)	ELEM754	ERT-OAL36-V2 ERT-OAL36-V6	6
4500602	ELEMENT, HEATER FOR -V2 (240V)	ELEM386	ERT-OAL48-V2 ERT-OAL48-V6	6
4500626	ENCLOSURE DISC. SWITCH	63 AMPS @ 600 VAC, 5 HP @ 240 VAC: S	All	1
4500763	FUSE BLOCK, UL CLASS CC 3 POLE		ERT-OAL36-V6 ERT-OAL48-V6	1
4500764	FUSE BLOCK, UL CLASS J 3 POLE		ERT-OAL36-V2 ERT-OAL48-V2	1
4500784	FUSE UL CLASS CC, 5A, 600V	KTK-R5	All	1
4500786	FUSE UL CLASS J TD,600 VAC, 35A	LPJ-SP-35	ERT-OAL36-V2 ERT-OAL48-V2	3
4500842	GRAY END SECT. FOR DIN 1&3	5-10MM, 1-CIRCUIT MOD. DR-M TE	All	3
4500854	HEAT SINK, DIN RAIL	1.0C/W, -1, 2 OR 3 SSRS	All	1
4500865	ELEMENT, HEATER FOR -V6 (480V)	ELEM34	ERT-OAL36-V2 ERT-OAL36-V6	6
4500992	LED, LAMP MODULE, 22 mm 120 V RED	6HZ63	All	1
4501098	MOTOR, 3000RPM 115/230 V	MOTO91WR	All	2
4501117	MOUNTING BASE WITH CONTACT	BLOCK, 22 mm	All	3
4501352	SOCKET, RELAY. 8PIN 15 A	4DG59	All	1
4501361	RELAY, ICE CUBE, DPDT	24 VDC, COIL VOLTS, 15A	All	1
4501375	RELAY; SSR; ZERO-SW	CUR-RTG 50A; CTRL-V 3-32 DC; VOL-RTG 48	All	1
4501403	RTD 100 OHM 8" LONG	RTD100-8	All	1

Part No.	Description	Manufacturing No.	Model	Qty
4501437	SELECTOR SWITCH, 3 POS	MAINTAINED	All	1
4501438	SELECTOR SWITCH, 3 POS	MOMENTARY	All	1
4501439	SELECTOR SWITCH, ILLUMINATED	2 POS, RED	All	1
4501674	TERMINAL BLOCK MOD., DIN 1 & 3	SCREW CLAMP, 8MM WIDTH, GRAY	All	20
4501675	TERMINAL BLOCK MOD., DIN 1 & 3	SCREW-CLAMP GROUND, 10 MM WIDT	All	3
4501775	TRANSFORMER, CONTROL	240/480VAC TO 110V, 1KVA	All	1
4501884	WIRE, TYPE MG	10 GA., PER FOOT	All	20
4501935	FAN, COOLING 4.69SQ, 120 V	1976K43	All	1
4501943	STOP, END FOR TERMINAL BLOCKS	7641K35	All	3
4501959	FUSE UL CLASS CC, 8A, 600 V	ATD-R8	All	1
EAST0494	CONTROL, TEMP. DIGITAL		All	1
ETC00129	FUSE UL CLASS CC, 600 VAC, 20A		ERT-OAL36-V6 ERT-OAL48-V6	3

## Mechanical Parts

Part No.	Description	Manufacturing No.	Model	Qty
4500109	DEFLECTOR, AIR	CTAD	All	4
4500241	MOUNT, BLOWER	RBMMB	All	2
4500243	BLOWER WHEEL, 3.81 DIA × 2.87	LOWER, P/N 2-20	All	2
4500253	BRACKET	AB2A	All	2
4500256	BRACKET SST72	SST72B1	All	2
4500257	BRACKET, LIFT MOUNT ERT-OAL CLASSIC	AB14	All	2
4500271	BUSHING, CERAMIC #20	BUSH20	All	5
4500319	STRAP, CAPACITOR MOUNTING	7602K21-29, 39, 41, 43 MOTOR-R	All	1
4500357	COLLAR ONE-PIECE ALUM. CLAMP	1/4" BORE 11/16" OD	All	1
4500369	CONDUIT SUP. TCH. LIQ. TIGHT	PVC 1/2" TRADE SIZE, 0.63" ID	All	5
4500370	CONDUIT SUP. TCH. LIQ. TIGHT	PVC 3/4" TRADE SIZE, 0.83" ID	All	5
4500440	CORROSION-RESISTANT TURNBUCKLE	JAW & JAW, 3/16"-24 THREAD, 2	All	2
4500496	DIN RAIL, STEEL, DIN 3	35MM X 7.5 MM H	All	1
4500558	MOUNT, ELEMENT	REM9	All	4
4500641	ENCLOSURE, NEMA 1 24" × 24" × 8.6"	A24N24BLP	All	1
4500725	FITTING, LIQ. TIGHT METAL	CONDUIT 90 D ELBOW, MALL. IRON	All	2
4500727	FITTING, LIQ. TIGHT METAL	CONDUIT STRAIGHT, STEEL, 1/2"	All	2
4500729	FITTING, LIQ. TIGHT METAL	CONDUIT, PREM., 90 DEG ELBOW	All	1
4500730	FITTING, LIQ. TIGHT METAL	CONDUIT, STRAIGHT, STEEL, 3/4	All	1
4500739	FITTING, CONDUIT 1/2" LOCKNUT	STEEL	All	2
4500934	INNER CAP, 6 × 9 REV. N	RIC69N	All	2
4500671	FAN FILTER GUARD 4-11/16"	19155K23	All	2
4500721	BUSHING, CONDUIT 1/2" POLY	7513K211	All	1
4500738	FITTING, LIQ. TIGHT NONMETAL	CONDUIT, STRAIGHT, NYLON, 1/4"	All	2
4500936	INNER COVER, 9" HIGH, FOR GUARD	RIC9N	All	4
4501060	MID SHELL 48" ERT-OAL CLASSIC	RM469NB	ERT-OAL48-V2 ERT-OAL48-V6	1
4501141	ENCLOSURE, NEMA 1 10 × 8 × 4	A10N84	All	1
4501146	NIPPLE, STD-WALL TYPE 304/304L	SS THRD PIPE 1/2 PIPE SIZE X 2	All	1

## 62 Parts List

Part No.	Description	Manufacturing No.	Model	Qty
4501154	NUT, STD NO-SLIP CLIP-ON	8-32 SIZE, .045"-.062" PANEL, .328	All	12
4501177	OUTER CAP, 6 × 9	ROC69	All	2
4501179	OUTER SHELL 6 × 9 × 36	RO369N	ERT-OAL36-V2 ERT-OAL36-V6	1
4501183	OUTER SHELL 6 × 9 × 48	RO469NB	ERT-OAL48-V2 ERT-OAL48-V6	1
4501196	PANEL FOR ENCLOSURE, 10 × 8 × 4	A10N8P	All	1
4501198	PANEL, FOR 24" × 24" ENCLOSURE	A24N24MP	All	1
4501384	NUT, RIVET, 3/8-16	ZINC PLATED 0.027-0.150"	All	4
4501386	MID SHELL 36" ERT-OAL CLASSIC	RM369NA	ERT-OAL36-V2 ERT-OAL36-V6	1
4501387	ROD END,304 SS, 3/8"-16 THREAD	6251K14	All	2
4501429	SCREW 18-8 SS SHOULDER, 1/2"	1-3/4" L SHOULDER, 3/8"-16	All	2
4501430	SCREW 18-8 SS SHOULDER, 3/8"	1-1/2" L SHOULDER, 5/16"-1	All	2
4501565	SST EXTENSION	SSTX4	All	4
4501595	STEM CASTER, WITH BRAKE	3" X 1-1/4" RUBBER WHEEL, 1/2"-13	All	4
4501691	THIRD SHELL	RT369NA	ERT-OAL36-V2 ERT-OAL36-V6	1
4501693	THIRD SHELL	RT469NB	ERT-OAL48-V2 ERT-OAL48-V6	1
4501763	TOOL HOLDER TYPE 302	5/8" TO 7/8" TOOL DIA, 1-9/16" PROJECT	All	2.2
4501836	WHEEL, BLOWER 3.81" × 1.50"	UPPER, P/N 2-14	All	2
4501847	WIRE DUCT PVC SLT.	1-1/2" W X 3" H, 6' 6" L	All	1
4501849	WIRE DUCT PVC SLT.	1" W × 1-1/2" H, 6' 6" L	All	0.3
4501907	BLOWER HOUSING 6"	RBH6N	All	4
4501908	STAND, FOR 36" TUNNEL	SST-36	All	1
4501958	TUBE, S.S. ¼ × 0.028 × 72"	8457K53	All	0.1
4501964	SPRING, CONICAL COMPRESSION	1692K55	All	4

## Recommended Spare Parts – ERT-OAL36

Part No.	Description	Manufacturing No.	Model	Qty
4500591	ELEMENT, HEATER FOR -V2 (240V)	ELEM754	V2	3
4500784	FUSE UL CLASS CC, 5A, 600V	KTK-R5	V2 ,V6	1
4500786	FUSE UL CLASS J TD,600 VAC, 35A	LPJ-SP-35	V2	3
4500865	ELEMENT, HEATER FOR -V6 (480V)	ELEM34	V6	3
4501098	MOTOR, 3000RPM 115/230 V	MOTO91WR	V2 ,V6	1
4501375	RELAY; SSR; ZERO-SW	CUR-RTG 50A; CTRL-V 3-32 DC; VOL-RTG 48	V2 ,V6	1
4501403	RTD 100 OHM 8" LONG	RTD100-8	V2 ,V6	1
4501959	FUSE UL CLASS CC, 8A, 600 V	ATD-R8	V2 ,V6	1
ETC00129	FUSE UL CLASS CC, 600 VAC, 20A		V6	3

## Recommended Spare Parts – ERT-OAL48

Part No.	Description	Manufacturing No.	Model	Qty
4500569	ELEMENT, HEATER FOR -V6 (480V)	ELEM481	V6	3
4500602	ELEMENT, HEATER FOR -V2 (240V)	ELEM386	V2	3
4500784	FUSE UL CLASS CC, 5A, 600V	KTK-R5	V2, V6	1
4500786	FUSE UL CLASS J TD,600 VAC, 35A	LPJ-SP-35	V2	3
4501098	MOTOR, 3000RPM 115/230 V	MOTO91WR	V2, V6	1
4501375	RELAY; SSR; ZERO-SW	CUR-RTG 50A; CTRL-V 3-32 DC; VOL-RTG 48	V2, V6	1
4501403	RTD 100 OHM 8" LONG	RTD100-8	V2, V6	1
4501959	FUSE UL CLASS CC, 8A, 600 V	ATD-R8	V2, V6	1
ETC00129	FUSE UL CLASS CC, 600 VAC, 20A		V6	





# Warranty Statement

American Film & Machinery (AFM) warrants that all products it ships will be in good working order and free from defects in material and workmanship for a period of one year from the date of shipment by AFM and will conform to the published specifications for that product.

## Limitations

The warranty of AFM is contingent upon installation, operation, and maintenance of equipment under normal operating conditions. The warranty is void on equipment or parts: damaged by corrosion, improper use, accident, negligence or not operating within the specifications provided; damaged by fire, flood, earthquake, or such other causes beyond the control of AFM; that have been altered or repaired in any way changing the original performance and; that are normally expendable in the usual course of operation.

Expendable items include, but are not limited to, heater elements, cutter blades and belts.

The warranty period on each replacement equipment or part in fulfillment of the warranty on new equipment or parts shall be for the unexpired portion of the original warranty.

## Repairs

All in-house repairs are rigorously tested for optimum operation and performance and warranted to be, under normal and proper use, free from defects in material and workmanship for a period of 90 days from the date of service.

## Shrinking Quality

Shrinking quality achieved in a given application is dependent on the film, product, installation, material handling, and the maintenance provided. AFM makes no warranty that the shrinking quality achieved in an application will be the same as that achieved on a test piece in our demo facility.

## Shipping Policy

Customer pays all incoming shipping charges for replacement components. If the item is defective and under warranty, AFM will pay all return shipping charges via the least costly method. If expedited shipping is desired, the customer must furnish their shipping account number and shipping fees will be charged to that account.

## Exclusions

Damage due to tampering, abuse, improper adjustment, electrical interference, or the use of non-approved components will void any and all warranties by AFM and its distributors.

## Warranty Verification

If you believe that a product or component may be defective and may be covered by warranty, obtain a Return Material Authorization number by contacting AFM Technical Support (Phone: 714-974-9006, Fax: 763-795-8867, Email: [info@afmsleeves.com](mailto:info@afmsleeves.com)). Based

on the recommendation from AFM Technical Support, replacement components may be shipped via UPS Ground or similar method. If expedited shipping is desired, customer must furnish their shipping account and shipping fees will be charged to that account.

Customer is required to return the defective component to AFM. If, after 30 days, AFM hasn't received the defective component, the customer will be invoiced for the replacement component. If the returned component is found to not be eligible for warranty, AFM will contact the customer, and the customer will be invoiced for the replacement component.

## **Warranty Eligibility**

The warranty provided by AFM is only to the original buyer.

## **Limited Warranty**

THIS WARRANTY SHALL NOT APPLY IF ANY MODIFICATION, ALTERATION, OR ADDITION IS MADE TO THE PRODUCT WITHOUT AFM'S PRIOR WRITTEN APPROVAL. FURTHERMORE, THIS WARRANTY DOES NOT APPLY TO PRODUCT DEFECTS DUE TO MISUSE, ABUSE, NEGLIGENCE, OR FAILURE TO FOLLOW RECOMMENDED PROCEDURES. ANY PRODUCT REPAIRED OR ALTERED BY PERSONS OTHER THAN AUTHORIZED AFM REPRESENTATIVES WILL NOT BE COVERED BY THIS WARRANTY. THIS WARRANTY DOES NOT APPLY TO CONSUMABLE ITEMS.

EXCEPT AS EXPRESSLY PROVIDED IN THIS WARRANTY, AFM MAKES NO REPRESENTATION OR WARRANTY, EXPRESSED OR IMPLIED, WITH RESPECT TO THE PRODUCT, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT OR ANY OTHER MATTER.

AFM SHALL HAVE NO LIABILITY TO ANY PERSON FOR INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES OF ANY DESCRIPTION WHETHER ARISING OUT OF WARRANTY OR INABILITY TO USE THESE PRODUCTS EVEN IF AFM HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

# **AFM Technical Support**

For assistance with installing, operating, and maintaining the ERT-OAL36-48 Shrink Tunnel, contact your authorized AFM reseller or AFM Technical Support.

Phone: 714-974-9006

Fax: 763-795-8867

Email: [info@afmsleeves.com](mailto:info@afmsleeves.com)

Web: [www.afmsleeves.com](http://www.afmsleeves.com)

Thank you for your purchase of AFM products. We are pleased to be a part of your shrink sleeve labeling requirements.

