

Chromalox®

Installation Instructions

SERVICE REFERENCE

DIVISION 4	SECTION GEN
SALES REFERENCE (Supersedes P00400-4)	P00400-5
161-048339-001	
DATE	JANUARY, 1999

General Recommendations on the Use of Chromalox® Electric Heating Elements for Clamp-On, Oven and Air Duct Heating

CHROMALOX ELECTRIC HEATING ELEMENTS FOR CLAMP-ON

The electric heating element(s) supplied herein are ruggedly constructed and if properly installed, operated and maintained, are designed for long life and dependable, trouble-free service.

GENERAL

WARNING: Users should install adequate controls and safety devices with their electric heating equipment. Where the consequences of failure may be severe, back-up controls are essential, including GFCI (Ground Fault Circuit Interrupters). Although the safety of the installation is the responsibility of the user, Chromalox will assist in identifying equipment options.

DANGER: Hazard of Fire. Since electric heaters are capable of developing high temperatures, extreme care should be taken to:

- Avoid mounting heaters in an atmosphere containing combustible gases and vapors.
- Avoid contact between heaters and combustible materials.
- Keep combustible materials far enough away to be free of the effects of high temperatures.

INSTALLATION

WARNING: Hazard of Electric Shock. Disconnect all power before installing heater.

High heating efficiency, low sheath temperatures and long heater life result when electric heaters are properly installed.

INSTALLATION – CLAMP-ON

- Clamp strip heaters securely, along their entire length, to smooth metal surface. Use utility clamps spaced 5" apart and 5/16" stainless steel studs or oversized steel studs for clamping. Retighten following initial heat-up. Allow for expansion. When more than one clamp is used, tighten clamps to avoid bowing of heater, poor heat transfer and possible premature failure. Leave 1/2" space between heater ends clamped in line for expansion. Do not use mounting tabs for clamping to surface.
- When strips are clamped to tank bottom for melting paraffin, waxes, asphalt, greases, etc., one or two strips should be clamped vertically to the tank side extending above the liquid level. This is necessary to open a passage to the tank surface for the initially melted material.

DANGER: Failure to comply with this recommendation could cause a buildup of pressure and could result in dangerous erupting or splashing of hot material.

- Clamp ring heaters to smooth metal surface. Use cast iron utility clamps with 1/4" MONEL® or stainless steel studs. Retighten following initial heat-up.
- Tubular heaters are clamped the same as strips against the metal surface.
- Allow a minimum of 1" air space between heaters and insulation.

WIRING

WARNING: Hazard of Electric Shock. Any installation involving electric elements must have its metal frame effectively grounded in accordance with the National Electrical Code to eliminate shock hazard.

- Electric wiring to heating elements must be installed in accordance with National Electrical Code or local electrical codes by a qualified person.
- Temperatures at heater terminals may require use of high-temperature wire. Check factory for recommendations.
- Maximum torque on strip heater terminals is 25 in-lbs.

GENERAL INFORMATION

- Strip heaters of equal wattage and voltage may be series connected for use on a power supply up to 480 volts. Where the power supply is greater than 480 volts (600 volt max.) series connections may be used but secondary insulation bushings must be provided.
- Ring heaters of equal wattage and voltage with a surface temperature of less than 1000°F may be series connected for use on a power supply up to 240 volts maximum.
- Tubular heaters of equal wattage and voltage can be series connected for use on a maximum power supply of 480 volts. Heaters for use above 480 volts must be equipped at the factory with special high voltage terminal insulation.
- Use iron or steel sheathed heaters for temperatures up to 750°F maximum sheath temperature. Use chrome steel sheathed rings or strips for temperatures up to 1200°F maximum sheath temperature. Use alloy or INCONEL® sheathed tubular heaters for temperatures up to 1500°F maximum sheath temperature. The sheath temperature is the highest temperature on the surface of the heater when operating.
- Do not bend or form strip heaters. Do not bend tubular heaters on inside radii of less than 4". When it is required to bend or curve strips or dish rings, or bend tubulars on small radii, consult our factory.
- Use seamless strips where condensation, spray, oil or fumes are present.
- Protect terminals from drippings, spray, condensation or spillover. Provide adequate electrical clearance.
- Use manganese nickel wire or alloy bus bar for making electrical connections within the heater itself, and for bringing leads out through the insulating jacket to a cooler region where insulated copper wire may be attached.

MAINTENANCE

WARNING: Hazard of Severe Shock. Disconnect all power to heater before servicing or replacing heaters.

- Periodically clean terminals of dust and corrosion to maintain good electrical connections and to permit rapid heat dissipation. Use air-blast and be careful to avoid damage to mica insulation.
- Check for loose terminal connections.

CHROMALOX ELECTRIC HEATING ELEMENTS FOR OVEN HEATING – AIR DUCTS

The electric heating element(s) supplied herein are ruggedly constructed and if properly installed, operated and maintained, are designed for long life and dependable, trouble-free service.

GENERAL

Temperature regulating and temperature limiting controls are recommended to be used with electric heaters to control the heating process and safeguard the electric heaters from excessive temperatures that can damage heaters.

DANGER: Hazard of Fire. Since electric heaters are capable of developing high temperatures, extreme caution should be taken to:

- A. Avoid mounting heaters in an atmosphere containing combustible gases and vapors.
- B. Avoid contact between heaters and combustible materials.
- C. Keep combustible materials far enough away to be free of the effects of high temperatures.

INSTALLATION

WARNING: Hazard of Electric Shock. Disconnect all power before installing heater.

High heating efficiency, low sheath temperatures and long heater life result when electric heaters are properly installed.

INSTALLATION – OVEN HEATING

1. When mounting the strip heaters vertically, locate the terminals at the bottom or cooler parts of the oven. Allow for expansion and contraction by loosely bolting the top mounting tab. Secure the bottom tab firmly.
2. In a forced air system, the width of the strip should be parallel to the direction of air flow.
3. For horizontal installation of strips, the tab on the terminal end should be firmly connected and the opposite end loosely connected to allow for expansion and contraction.
4. Mount strips on edge in horizontal installation across the bottom and along the sides on the oven, allowing 3" minimum air space between the heaters and the bottom of the oven and 1" from the oven wall to allow for proper circulation of heated air. For large ovens, allow a 6" minimum clearance.
5. In horizontal mounting, install a protective screen or grill above the strips at the bottom of the oven.
6. Support long iron sheathed strips on 36" centers and chrome steel sheathed strips on 24" centers to prevent sagging.

INSTALLATION – AIR DUCTS

1. Locate protective thermostat on downstream side of heaters near the top of the duct and close to the heated portion of the heaters.

2. Mount heaters with terminals at the duct bottom to prevent overheating.
3. Where condensation, spray, oil or fumes are present use seamless fin-strips, type SSEF, with the terminals placed outside of the air duct.
4. As a safety feature in advent of abnormal temperatures, it is suggested to use a thermal cutout in conjunction with thermostatic control.

WIRING

WARNING: Hazard of Electric Shock. Any installation involving electric elements must have its metal frame effectively grounded in accordance with the National Electrical Code to eliminate shock hazard.

1. Electric wiring to heating elements must be installed in accordance with National Electrical Code or local electrical codes by a qualified person.
2. Temperatures at heater terminals may require use of high-temperature wire. Check factory for recommendations.

GENERAL INFORMATION

1. Strips of equal wattage and voltage can be series connected for a maximum of 480 volts. If a higher voltage (600 volt max.) is necessary use the same series connections and use secondary insulation bushings.
2. Use iron or steel sheathed heaters for temperatures up to 750°F maximum sheath temperature. Use chrome steel sheathed strips for temperatures up to 1200°F maximum sheath temperature. Use alloy or INCONEL® sheathed tubular heaters for temperatures up to 1500°F maximum sheath temperature. The sheath temperature is the highest temperature on the surface of the heater when operating.
3. Do not bend or form strips.
4. Use manganese nickel wire or alloy bus bar for making electrical connections where temperatures are above 350°F. Insulated copper wire may be used in the cooler region.
5. Terminals should always be in the coolest part of the oven. If oven temperature is over 800°F the terminals should be placed outside the oven if possible. If not possible, weld electrical connections to heater terminals. Protect terminals from welding flux.
6. Tubulars are to be mounted the same as strips and supported on 24" centers.

MAINTENANCE

WARNING: Hazard of Severe Shock. Disconnect all power to heater before servicing or replacing heaters.

1. Periodically clean terminals of dust and corrosion to maintain good electrical connections and to permit rapid heat dissipation. Use air-blast and be careful to avoid damage to mica insulation.
2. Check for loose terminal connections.

WARRANTY AND LIMITATION OF REMEDY AND LIABILITY

Chromalox warrants only that the Products and parts manufactured by Chromalox, when shipped, and the work performed by Chromalox when performed, will meet all applicable specification and other specific product and work requirements (including those of performance), if any, and will be free from defects in material and workmanship under normal conditions of use. All claims for defective or nonconforming (both hereinafter called defective) Products, parts or work under this warranty must be made in writing immediately upon discovery, and in any event, within one (1) year from delivery, provided, however all claims for defective Products and parts must be made in writing no later than eighteen (18) months after shipment by Chromalox. Defective and nonconforming items must be held for Chromalox's inspections and returned to the original f.o.b. point upon request. THE FOREGOING IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES WHATSOEVER, IMPLIED AND STATUTORY, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

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fees, and indemnifies Chromalox against any liability to Chromalox's vendors arising out of such litigation.

Upon Buyer's submission of a claim as provided above and its substantiation, Chromalox shall at its option either (i) repair or replace its Products, parts or work at the original f.o.b. point of delivery or (ii) refund an equitable portion of the purchase price.

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WIEGAND INDUSTRIAL DIVISION
EMERSON ELECTRIC CO.



Chromalox®

Installation Instructions

General Recommendations on the Use of Electric Heating Elements

The electric heating element(s) supplied herein are ruggedly constructed and if properly installed, operated and maintained, are designed for long life and dependable, trouble-free service.

It is suggested that you take a couple of minutes to read the few helpful hints listed below.

GENERAL

WARNING: Users should install adequate controls and safety devices with their electric heating equipment. Where the consequences of failure may be severe, back-up controls are essential. Although the safety of the installation is the responsibility of the user, Chromalox will be glad to make equipment recommendations.

INSTALLATION

High heating efficiency, low sheath temperatures, and long heater life result when electric heaters are properly installed.

WARNING: Hazard of Electric Shock. Turn off all power to heaters before installing, servicing or replacing heating elements.

1. Heater mounting must allow for heater expansion without sacrificing heat transfer efficiency.
2. Electric heaters should not be bent or deformed because heater insulation can be damaged, leading to electrical problems and a short heater life. Refer to Chromalox catalog or check your Local Chromalox Sales office for recommendations.
3. **DANGER:** Hazard of Explosion or Fire. Since electric heaters are capable of developing high temperatures, extreme care should be taken to:
 - A. Avoid mounting heaters in an environment containing combustible liquids, gases or vapors.
 - B. Avoid contact between heaters and combustible materials.
 - C. Keep combustible materials far enough away to be free of the effects of high temperatures.
4. Clamp-on heaters should be securely clamped to clean, smooth, metal surfaces. No insulation should contact sheath.
5. Cartridge heaters, when inserted, should be provided with snug fitting holes. Use Chromalox HTRC as required.

SERVICE REFERENCE

DIVISION 4	SECTION GEN
SALES REFERENCE (Supersedes P00401-6)	P00401-7
161-053241-001	
DATE	APRIL, 1998

WIRING

WARNING: Hazard of Electric Shock. Any installation involving electric heaters must be effectively grounded in accordance with the National Electrical Code to eliminate shock hazard.

1. Electric wiring to heating elements must be installed by a qualified person in accordance with the National Electrical Code or local electrical codes.
2. Type and temperature rating of wire should be suitable for application. Check Local Chromalox Sales office for recommendations.

OPERATION

1. **DO NOT** operate heaters at voltages in excess of that marked on heater since excess voltage can shorten heater life.
2. **DO NOT** operate heaters under conditions that result in sheath temperatures higher than the recommended maximum since excess temperatures can cause premature failure and fire.

Generally, sheath materials are limited to the following maximum temperatures.

Sheath Material	Maximum Sheath Temperatures
Copper	350°F
Iron or Steel	750°F
Chrome or Stainless Steel	1200°F
INCOLOY®	1500°F
MONEL®	900°F

The table above applies to ring, tubular and cartridge element as well as most strip elements.

- A. Chrome Steel Finned Strips — 950°F.
3. Heaters should not be operated in environments with factors that can destroy the integrity of electrical insulation inside the heater. The following contaminants and others can create current leakage (shock) hazards, permanent heater damage, or cause heater failure and therefore, should be avoided.
 - A. Water or water vapors
 - B. Grease, oil or oil vapors
 - C. Corrosive liquids and vapors
 - D. Noxious or reactive gases

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Chromalox warrants only that the Products and parts manufactured by Chromalox, when shipped, and the work performed by Chromalox when performed, will meet all applicable specification and other specific product and work requirements (including those of performance), if any, and will be free from defects in material and workmanship under normal conditions of use. All claims for defective or nonconforming (both hereinafter called defective) Products, parts or work under this warranty must be made in writing immediately upon discovery, and in any event, within one (1) year from delivery, provided, however all claims for defective Products and parts must be made in writing no later than eighteen (18) months after shipment by Chromalox. Defective and nonconforming items must be held for Chromalox's inspectors and returned to the original f.o.b. point upon request. THE FOREGOING IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES WHATSOEVER, EXPRESS, IMPLIED AND STATUTORY, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

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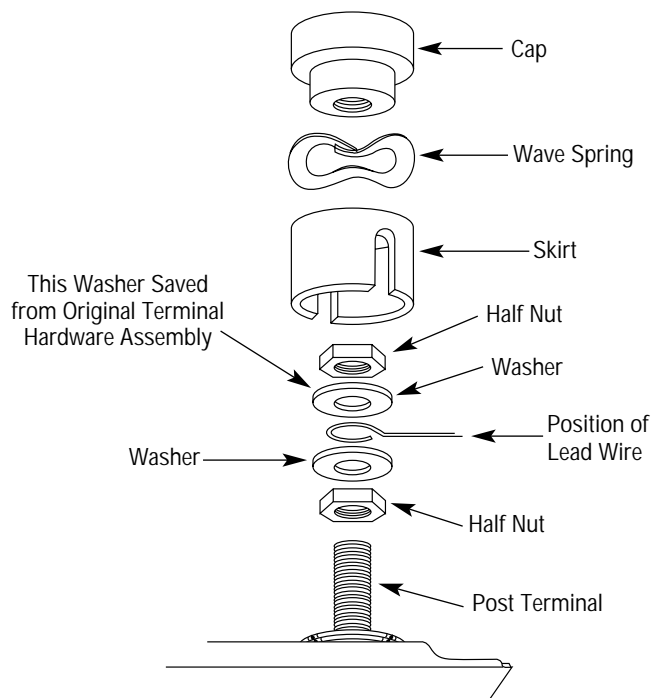
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Installation, Wiring and RENEWAL PARTS IDENTIFICATION

SERVICE REFERENCE		
DIVISION 4	SECTION STRIP	
SALES REFERENCE	(Supersedes PA400-4)	PA400-5
161-050318-001		
DATE	MARCH, 1999	

Individual Ceramic Post Terminal Cover Insulators for S, SE, OT and PT Strip Elements

MOUNTING, WIRING AND RENEWAL PARTS IDENTIFICATION



WARNING: Hazard of Electric Shock. Disconnect all power before installing ceramic post terminal covers.

1. Remove standard post terminal hardware.
- Note:** Save one flat washer from original hardware assembly (half nuts and one flat washer furnished with insulator assembly).
2. Screw on first half nut firmly.
3. Position first washer.
4. Electric wiring to heating elements must be installed in accordance with National Electrical Code and local electrical codes by a qualified person.

WARNING: Hazard of Electric Shock. Any installation involving electric heaters must be effectively grounded in accordance with the National Electrical Code to eliminate shock hazard.

5. Connect lead wire.
6. Position second washer.
7. Screw on second half nut tightly.
8. Position insulator skirt allowing slots to slip over leads.
9. Position wave spring on insulator skirt (if needed).
10. Position insulator cap to line up with threaded terminal of heater.
11. Turn cap clockwise until seated firmly on insulator skirt.

WARNING: Do not exceed 25 inch pounds of torque when tightening the hex nuts on the heater terminals. Excessive torque will result in stripping the terminals from the refractory of the heating element. Do not use tool to tighten cap. Ceramic insulator is fragile and overtightening cap will cause breakage.

Note: If lead wire is too heavy to permit cap to seat firmly, omit washers.

Kit Part No.	Ceramic Skirt	Ceramic Cap	Wave Spring	Nut (Half)	Washer
080-041059-001	263-050140-001 (2)	039-039742-002 (2)	—	200-075520-075 (4)	328-075528-024 (2)
080-041059-002	263-050140-001 (2)	039-039742-003 (2)	—	200-075520-075 (4)	328-075528-024 (2)
080-041059-003	263-050140-001 (2)	039-039742-002 (2)	—	200-075520-075 (4)	328-075528-024 (2)
					328-075527-012 (3/8" Mica)
080-041059-004	263-050140-002 (2)	039-039742-002 (2)	—	200-075520-075 (4)	328-075528-024 (2)
080-041059-005	263-050140-001 (2)	039-039742-004 (2)	—	200-075520-062 (4)	328-075528-013 (2)
080-041059-006	263-050140-003 (2)	039-039742-002 (2)	328-057580-002 (2)	200-075520-075 (4)	328-075528-024 (2)
080-041059-008	263-050140-003 (2)	039-039742-002 (2)	328-057580-002 (2)	200-075523-058 (4)	328-075528-035 (2)

NOTE: Part numbers suffixed by a number in () indicates quantity of same part number used.

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