

# Chromalox®

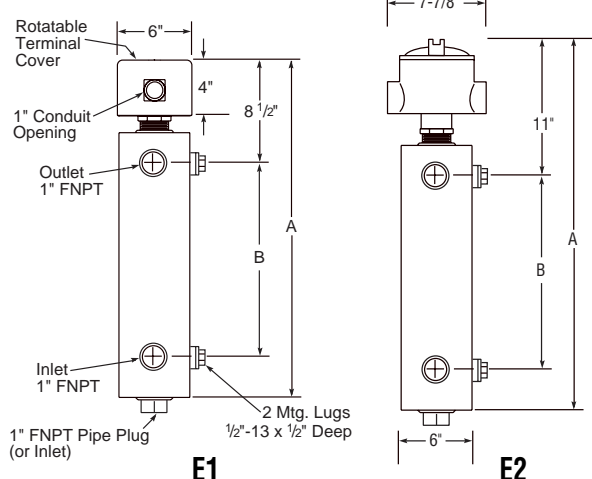
## Installation, Operation and RENEWAL PARTS IDENTIFICATION

### SERVICE REFERENCE

|                                      |             |
|--------------------------------------|-------------|
| DIVISION 4                           | SECTION NWH |
| SALES REFERENCE (Supersedes PE414-2) | PE414-3     |
| 161-304777-001                       |             |
| DATE                                 | MAY, 2007   |

## versaTHERM™ Circulation Heaters for Oil or Water Heating

### Dimensions (Inches)



### Specifications – Table A

| Dim. (In.)                                 |                                | Model             | PCN    |
|--|--------------------------------|-------------------|--------|
| A  | B                              |                   |        |
| <b>Cast Iron Body / Oil .5 to 10 kW</b>    |                                |                   |        |
| 29   | 19                             | NWHOSR-06-04P5-E1 | 100108 |
| 29   | 19                             | NWHOSR-06-04P5-E1 | 100116 |
| 41   | 30 <sup>3</sup> / <sub>4</sub> | NWHOSR-06-005P-E1 | 100124 |
| 29   | 19                             | NWHOSR-06-006P-E1 | 100132 |
| 29   | 19                             | NWHOSR-06-006P-E1 | 100140 |
| 41   | 30 <sup>3</sup> / <sub>4</sub> | NWHOSR-06-010P-E1 | 100159 |
| <b>Galvanized Body / Water .5 to 40 kW</b> |                                |                   |        |
| 29   | 19                             | NWHSRG-06-018P-E1 | 100010 |
| 29   | 19                             | NWHSRG-06-018P-E1 | 100028 |
| 41   | 30 <sup>3</sup> / <sub>4</sub> | NWHSRG-06-020P-E1 | 100036 |
| 29   | 19                             | NWHSRG-06-024P-E1 | 100044 |
| 29   | 19                             | NWHSRG-06-024P-E1 | 100079 |
| 41   | 30 <sup>3</sup> / <sub>4</sub> | NWHSRG-06-040P-E1 | 100095 |

### Specifications – Table B

| Dim. (In.)                                 |                                | Model             | PCN    |
|--|--------------------------------|-------------------|--------|
| A  | B                              |                   |        |
| <b>Cast Iron Body / Oil .5 to 10 kW</b>    |                                |                   |        |
| 32   | 19                             | NWHOSR-06-04P5-E2 | 100255 |
| 32   | 19                             | NWHOSR-06-04P5-E2 | 100263 |
| 44   | 30 <sup>3</sup> / <sub>4</sub> | NWHOSR-06-005P-E2 | 100271 |
| 32   | 19                             | NWHOSR-06-006P-E2 | 100280 |
| 32   | 19                             | NWHOSR-06-006P-E2 | 100298 |
| 44   | 30 <sup>3</sup> / <sub>4</sub> | NWHOSR-06-010P-E2 | 100300 |
| <b>Galvanized Body / Water .5 to 40 kW</b> |                                |                   |        |
| 32   | 19                             | NWHSRG-06-018P-E2 | 100327 |
| 32   | 19                             | NWHSRG-06-018P-E2 | 100343 |
| 44   | 30 <sup>3</sup> / <sub>4</sub> | NWHSRG-06-020P-E2 | 100351 |
| 32   | 19                             | NWHSRG-06-024P-E2 | 100360 |
| 32   | 19                             | NWHSRG-06-024P-E2 | 100378 |
| 44   | 30 <sup>3</sup> / <sub>4</sub> | NWHSRG-06-040P-E2 | 100386 |

## GENERAL

### READ ALL INSTRUCTIONS BEFORE USE

### ⚠ WARNING

**FIRE/EXPLOSION HAZARD.** Ordinary location heaters (designated E1) are not intended for use in hazardous atmospheres where flammable vapors, gases, liquids or other combustible atmospheres are present as defined in the National Electrical Code. Failure to comply can result in personal injury or property damage.

This design has the versatility of field adjustments of voltage kW through various wiring combinations.

The NWHSRG model is a general purpose water circulation heater intended for indoor use. E2 designs have a Moisture Resistant/Explosion Resistant enclosure. Designs are up to 40kW - **DO NOT USE THE NWHSRG MODEL FOR OIL.**

The NWHOSR model is a general-purpose regular and fuel oil solution circulation heater intended for use indoors. E2 designs have a Moisture Resistant/Explosion Resistant enclosure. Designs are up to 10kW - **DO NOT USE THE NWHOSR MODEL FOR WATER.** Ensure the wiring guide for oil is used for the correct wiring diagram.

Both the NWHSRG and NWHOSR use six INCOLOY® sheath elements welded to a steel 2.5" screw plug. The vessel is cast iron and is surrounded by 1.5" insulation and a sheet metal jacket. For water applications, the vessel has a galvanized coating. A J-type thermocouple in a thermowell is standard. These versaTHERM™ heaters are designed for 150 psig max. at 35°F min. to 300°F max.

**IMPORTANT: It is the responsibility of the purchaser of the heater to make the ultimate choice of sheath material based upon his knowledge of the chemical composition of the corrosive solution, character of the materials entering the solution, and controls which he maintains on the process.**

### ⚠ WARNING

**ELECTRIC SHOCK HAZARD.** Disconnect all power before installing or servicing heater. Failure to do so could result in personal injury or property damage. Heater must be installed or serviced by a qualified person in accordance with the National Electrical Code. NFPA 70.

### ⚠ WARNING

**The system designer is responsible for the safety of this equipment and should install adequate back-up controls and safety devices with their electric heating equipment. Where the consequences of failure could result in personal injury or property damage, back-up controls are essential.**

If foreign material is to be carried by the liquid flow, install suitable filters in the inlet pipe to the heater.

Ensure the temperature/pressure is controlled below the vapor point of the liquid at all times and is within the temperature/pressure ratings for this heater.

Heating elements must be completely immersed in liquid when energized.

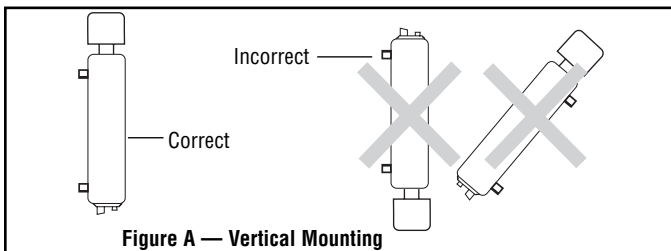
## INSTALLATION

### ⚠ WARNING

**ELECTRIC SHOCK HAZARD. Disconnect all power before installing heater. Failure to do so could result in personal injury or property damage. Heater must be installed by a qualified person in accordance with the National Electrical Code, NFPA 70.**

#### 1. Vertical Mounting (Preferred) —

When the heater is vertically mounted, the electrical enclosure will be at the top of the heater. The inlet pipe will be located on the side near the bottom of the heater and the outlet pipe at the top.

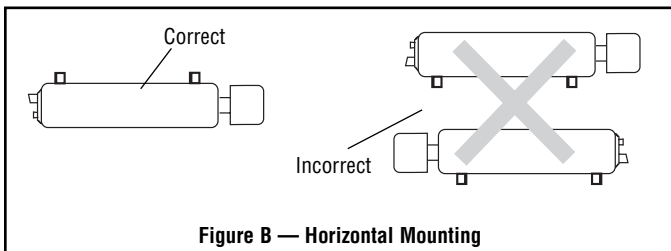


The axis of the chamber will be in a vertical position as in Figure A.

#### 2. Horizontal Mounting (Optional) —

When mounting heater horizontally, inlet and outlet pipes **must** be up. In any other position, heater cannot be purged of air, and elements may be seriously damaged. (See Figure B.)

**Note:** Heater cannot be completely drained in the horizontal position. When mounting the heater, allow adequate spacing for draining the heater.



3. Whether vertical or horizontal, the heater should be rigidly mounted so that vibration is at a minimum since excessive vibration will result in erratic thermostat operation (if thermostat is used instead of thermocouple). The NWHOSR/NWH-SRG is provided with mounting lugs to support the heating chamber. (See drawing on front page.)

### ⚠ WARNING

**FIRE HAZARD. An integral thermostat, if used, is designed for temperature control service only. Because the thermostat is not fail safe, it should not be used for temperature limiting duty. Wiring to this device is the responsibility of the user.**

### ⚠ WARNING

**FIRE HAZARD. Since heaters are capable of developing high temperatures, extreme care should be taken to:**

- A. Provide minimum of 6" spacing from chamber and related piping to nearest combustible material.**
- B. Do not operate near combustible fluids or in combustible vapor or gas laden atmosphere.**

4. Ensure clearance is available to allow removal of the heating assembly from the chamber. Generally this is a space extending from the electrical enclosure equal to the length of the entire unit. Otherwise, removing the entire heater may be required to service the heater.
5. Standard side inlet can be changed to the end connection for ease of piping.
6. Mount heaters to permit unrestrained expansion of the chamber due to temperature. This may be accomplished by using a slotted mounting assembly on either of the mounting lugs.
7. If two or more heaters are required to provide the heating capacity, pipe units in series or parallel.

### ⚠ WARNING

**EXPLOSION HAZARD. When heating in closed vessels, controls and back-up controls must be used to regulate build-up of temperature and/or pressure.**

8. A pressure relief valve should be provided by customer at outlet of vessel. There should be no other valving between vessel and relief valve.
9. Install adequate collection/drainage below the heater to prevent damage to other materials and property at your location.

## WIRING

### ⚠ WARNING

**ELECTRIC SHOCK HAZARD. Any installation involving electric heaters must be performed by a qualified person and must be effectively grounded in accordance with the National Electrical Code to eliminate shock hazard.**

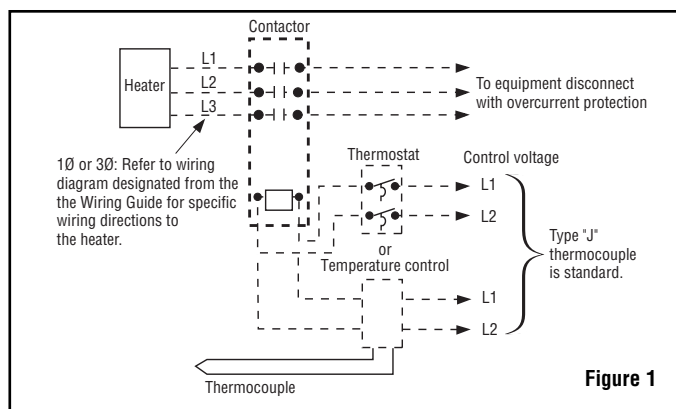
### ⚠ CAUTION

**Ensure the correct Wiring Guide is used for your heated medium and model type, and ensure the correct wiring diagram is used. Miswiring could result in an unsafe wattage.**

1. Be sure line voltage matches your intended voltage and does not exceed the max voltage on the nameplate.
2. Electric wiring to heater must be installed in accordance with local and National Electrical Codes by a qualified person as defined in the NEC.
3. Power controllers must be used with this product.
4. Electrical wiring to heater should be with rigid conduit or flexible conduit to keep corrosive vapors and liquids out of the electrical enclosure. If high humidity is encountered, the conduit should slope down away from the heater.
5. Refer to appropriate wiring diagram for your model heater from the Wiring Guide (on next two pages).

The specific Wiring Guide provides easy to follow steps to determine the appropriate wiring diagram for your heater installation. Figure 1 may be referenced as a general diagram of how a contactor and temperature control are used in conjunction with the specific wiring diagrams.

6. Use ground fault protection equipment where electrical insulation failure can cause process problems.
7. When element wattages are not equal, heaters must not be connected in series.
8. If flexible cord is employed, a watertight connector should be used for entry of the cord into the electrical enclosure. Outdoor applications require liquid-tight conduit and connectors.
9. If application uses a standard PCN at different voltages and kW's from the Wiring Guide, refer to the Customer Wiring Guide Supplement if included with these instructions, or contact Customer Service at (800) 368-2493.



**Note:** Dotted lines indicate "customer furnished." Complete power/temperature control panels or components are available. **Contact Chromalox 1-800-443-2640 for more information and assistance.**

## WIRING GUIDE – OIL (NWHOSR)

### Directions:

- Step 1: Select the PCN number below which matches the PCN number on your heater.
- Step 2: Choose your kW, Volts, phase, and number of circuits under your PCN number **(you must know the kW and watt density (watts/sq. in.) needs for your application).**
- Step 3: Note the Wiring diagram # for your selection.
- Step 4: Go to Wiring Diagram sheet. Peel off the diagram that matches the # in step 3. Stick this to the inside of your electrical enclosure.\*
- Step 5: Peel off corresponding Volts, circuit-phase, and kW info from the Wiring Diagram sheet and stick to the designated spot on the nameplate. (These labels will cover the maximum rating stamped on the nameplate.)\*\*
- Step 6: Wire Heater according to the sticker on the inside of your electrical enclosure (from step 4).

| Oil Applications   |                      |                        |                |
|--|----------------------|------------------------|----------------|
| Watts-Volts  | Circuit-Phase (amps) | Approx. Watts /Sq. In. | Wiring Diag. # |
| <b>PCN 100108 (P/N 052-304749-001)</b><br><b>PCN 100255 (P/N 052-304749-301)</b> |                      |                        |                |
| 4.5kW - 120V   | 1-1Ph (38 amps)      | 15                     | #7             |
| <b>PCN 100116 (P/N 052-304749-002)</b><br><b>PCN 100263 (P/N 052-304749-302)</b> |                      |                        |                |
| 1.5kW - 480V   | 1-3Ph (2 amps)       | 5                      | #6             |
| 2.5kW - 240V   | 1-1Ph (11 amps)      | 15                     | #13*           |
| 2.5kW - 240V   | 1-3Ph (7 amps)       | 15                     | #11*           |
| 4.5kW - 240V   | 1-1Ph (19 amps)      | 15                     | #7             |
| 4.5kW - 240V   | 2-1Ph (2 x 10 amps)  | 15                     | #8             |
| 4.5kW - 240V   | 1-3Ph (11 amps)      | 15                     | #1             |
| 4.5kW - 240V   | 2-3Ph (2 x 6 amps)   | 15                     | #2             |
| 4.5kW - 480V   | 1-1Ph (10 amps)      | 15                     | #10            |
| 4.5kW - 480V   | 1-3Ph (6 amps)       | 15                     | #3             |
| <b>PCN 100124 (P/N 052-304749-003)</b><br><b>PCN 100271 (P/N 052-304749-303)</b> |                      |                        |                |
| 5.0kW - 120V   | 1-1Ph (42 amps)      | 11                     | #7             |
| 5.0kW - 208V   | 1-3Ph (14 amps)      | 11                     | #4             |
| 5.0kW - 240V   | 1-1Ph (21 amps)      | 11                     | #10            |
| 5.0kW - 240V   | 1-3Ph (13 amps)      | 11                     | #3             |
| <b>PCN 100132 (P/N 052-304749-004)</b><br><b>PCN 100280 (P/N 052-304749-304)</b> |                      |                        |                |
| 3.0kW - 120V   | 1-1Ph (25 amps)      | 20                     | #13*           |
| 3.0kW - 208V   | 1-3Ph (9 amps)       | 20                     | #12*           |
| 6.0kW - 120V   | 1-1Ph (50 amps)      | 20                     | #8             |
| 6.0kW - 208V   | 1-3Ph (17 amps)      | 20                     | #4             |
| 6.0kW - 208V   | 2-3Ph (2 x 9 amps)   | 20                     | #5             |

| Oil Applications   |                      |                        |                |
|--|----------------------|------------------------|----------------|
| Watts-Volts  | Circuit-Phase (amps) | Approx. Watts /Sq. In. | Wiring Diag. # |
| <b>PCN 100140 (P/N 052-304749-005)</b><br><b>PCN 100298 (P/N 052-304749-305)</b> |                      |                        |                |
| .5kW - 240V  | 1-3Ph (1.3 amps)     | 2                      | #6             |
| .75kW - 120V   | 1-1Ph (7 amps)       | 5                      | #13*           |
| .75kW - 208V   | 1-3Ph (2.1 amps)     | 5                      | #12*           |
| 1.5kW - 120V   | 1-1Ph (13 amps)      | 5                      | #7             |
| 1.5kW - 120V   | 2-1Ph (2 x 7 amps)   | 5                      | #8             |
| 1.5kW - 208V   | 1-3Ph (4.2 amps)     | 5                      | #4             |
| 1.5kW - 240V   | 1-1Ph (7 amps)       | 5                      | #10            |
| 1.5kW - 240V   | 1-3Ph (3.7 amps)     | 5                      | #3             |
| 2.25kW - 208V  | 1-1Ph (11 amps)      | 15                     | #13*           |
| 2.25kW - 208V  | 1-3Ph (7 amps)       | 15                     | #11*           |
| 3.0kW - 240V   | 1-1Ph (13 amps)      | 20                     | #13*           |
| 3.0kW - 240V   | 1-3Ph (8 amps)       | 20                     | #11*           |
| 4.5kW - 208V   | 1-1Ph (22 amps)      | 15                     | #7             |
| 4.5kW - 208V   | 2-1Ph (2 x 11 amps)  | 15                     | #8             |
| 4.5kW - 208V   | 1-3Ph (13 amps)      | 15                     | #1             |
| 4.5kW - 208V   | 2-3Ph (2 x 7 amps)   | 15                     | #2             |
| 6.0kW - 240V   | 1-1Ph (25 amps)      | 20                     | #7             |
| 6.0kW - 240V   | 2-1Ph (2 x 13 amps)  | 20                     | #8             |
| 6.0kW - 240V   | 1-3Ph (15 amps)      | 20                     | #1             |
| 6.0kW - 240V   | 2-3Ph (2 x 8 amps)   | 20                     | #2             |
| 6.0kW - 480V   | 1-1Ph (13 amps)      | 20                     | #10            |
| 6.0kW - 480V   | 1-3Ph (8 amps)       | 20                     | #3             |
| <b>PCN 100159 (P/N 052-304749-006)</b><br><b>PCN 100300 (P/N 052-304749-306)</b> |                      |                        |                |
| 2.5kW - 120V   | 1-1Ph (21 amps)      | 15                     | #7             |
| 2.5kW - 120V   | 2-1Ph (2 x 11 amps)  | 15                     | #8             |
| 2.5kW - 208V   | 1-3Ph (7 amps)       | 15                     | #4             |
| 2.5kW - 240V   | 1-1Ph (11 amps)      | 15                     | #10            |
| 2.5kW - 240V   | 1-3Ph (7 amps)       | 15                     | #3             |
| 10kW - 240V  | 1-1Ph (42 amps)      | 21                     | #7             |
| 10kW - 240V  | 2-1Ph (2 x 21 amps)  | 21                     | #8             |
| 10kW - 240V  | 1-3Ph (25 amps)      | 21                     | #1             |
| 10kW - 240V  | 2-3Ph (2 x 13 amps)  | 21                     | #2             |
| 10kW - 480V  | 1-1Ph (21 amps)      | 21                     | #10            |
| 10kW - 480V  | 1-3Ph (13 amps)      | 21                     | #3             |

\* Half of the heating elements are used

\*\* For E2, affix to sheet metal on outside of enclosure

## WIRING GUIDE – WATER (NWHSRG)

**Directions:**

- Step 1: Select the PCN number below which matches the PCN number on your heater.
- Step 2: Choose your kW, Volts, phase, and number of circuits under your PCN number **(you must know the kW and watt density (watts/sq. in.) needs for your application).**
- Step 3: Note the Wiring diagram # for your selection.
- Step 4: Go to Wiring Diagram sheet. Peel off the diagram that matches the # in step 3. Stick this to the inside of your electrical enclosure.\*\*
- Step 5: Peel off corresponding Volts, circuit-phase, and kW info from the Wiring Diagram sheet and stick to the designated spot on the nameplate. (These labels will cover the maximum rating stamped on the nameplate.)
- Step 6: Wire Heater according to the sticker on the inside of your electrical enclosure (from step 4).

| Water Applications                 |                      |                        |                |
|------------------------------------|----------------------|------------------------|----------------|
| Watts-Volts                        | Circuit-Phase (amps) | Approx. Watts /Sq. In. | Wiring Diag. # |
| <b>PCN 100010 (054-304745-001)</b> |                      |                        |                |
| <b>PCN 100327 (054-304745-301)</b> |                      |                        |                |
| 4.5kW - 120V                       | 1-1Ph (38 amps)      | 15                     | #7             |
| 9.0kW - 240V                       | 1-1Ph (38 amps)      | 59                     | #13*           |
| 9.0kW - 240V                       | 1-3Ph (22 amps)      | 59                     | #11*           |
| 18kW - 240V                        | 2-1Ph (2 x 38 amps)  | 59                     | #8             |
| 18kW - 240V                        | 1-3Ph (44 amps)      | 59                     | #1             |
| 18kW - 240V                        | 2-3Ph (2 x 22 amps)  | 59                     | #2             |
| <b>PCN 100028 (054-304745-002)</b> |                      |                        |                |
| <b>PCN 100343 (054-304745-302)</b> |                      |                        |                |
| 1.5kW - 480V                       | 1-3Ph (4 amps)       | 5                      | #6             |
| 2.5kW - 240V                       | 1-1Ph (11 amps)      | 15                     | #13*           |
| 2.5kW - 240V                       | 1-3Ph (6 amps)       | 15                     | #11*           |
| 4.5kW - 240V                       | 1-1Ph (19 amps)      | 15                     | #7             |
| 4.5kW - 240V                       | 2-1Ph (2 x 10 amps)  | 15                     | #8             |
| 4.5kW - 240V                       | 1-3Ph (11 amps)      | 15                     | #1             |
| 4.5kW - 240V                       | 2-3Ph (2 x 6 amps)   | 15                     | #2             |
| 4.5kW - 480V                       | 1-1Ph (10 amps)      | 15                     | #10            |
| 4.5kW - 480V                       | 1-3Ph (6 amps)       | 15                     | #3             |
| 9.0kW - 480V                       | 1-1Ph (19 amps)      | 59                     | #13*           |
| 9.0kW - 480V                       | 1-3Ph (11 amps)      | 59                     | #11*           |
| 18kW - 480V                        | 1-1Ph (38 amps)      | 59                     | #7             |
| 18kW - 480V                        | 2-1Ph (2 x 19 amps)  | 59                     | #8             |
| 18kW - 480V                        | 1-3Ph (22 amps)      | 59                     | #1             |
| 18kW - 480V                        | 2-3Ph (2 x 11 amps)  | 59                     | #2             |
| <b>PCN 100036 (054-304745-003)</b> |                      |                        |                |
| <b>PCN 100351 (054-304745-303)</b> |                      |                        |                |
| 5.0kW - 120V                       | 1-1Ph (42 amps)      | 11                     | #7             |
| 5.0kW - 208V                       | 1-3Ph (14 amps)      | 11                     | #4             |
| 5.0kW - 240V                       | 1-1Ph (21 amps)      | 11                     | #10            |
| 5.0kW - 240V                       | 1-3Ph (13 amps)      | 11                     | #3             |
| 20kW - 240V                        | 2-1Ph (2 x 42 amps)  | 80                     | #8             |
| 20kW - 240V                        | 2-3Ph (2 x 25 amps)  | 80                     | #2             |
| <b>PCN 100044 (054-304745-004)</b> |                      |                        |                |
| <b>PCN 100360 (054-304745-404)</b> |                      |                        |                |
| 3.0kW - 120V                       | 1-1Ph (25 amps)      | 20                     | #13*           |
| 3.0kW - 208V                       | 1-3Ph (9 amps)       | 20                     | #12*           |
| 6.0kW - 120V                       | 1-1Ph (2 x 25 amps)  | 20                     | #8             |
| 6.0kW - 208V                       | 1-3Ph (17 amps)      | 20                     | #4             |
| 6.0kW - 208V                       | 2-3Ph (2 x 9 amps)   | 20                     | #5             |
| 12kW - 240V                        | 1-3Ph (29 amps)      | 78                     | #11*           |
| 24kW - 240V                        | 3-1Ph (3 x 34 amps)  | 78                     | #9             |
| 24kW - 240V                        | 2-3Ph (2 x 29 amps)  | 78                     | #2             |

\* Half of the heating elements are used

\*\* For E2, affix to sheet metal on outside of enclosure

| Water Applications                 |                      |                        |                |
|------------------------------------|----------------------|------------------------|----------------|
| Watts-Volts                        | Circuit-Phase (amps) | Approx. Watts /Sq. In. | Wiring Diag. # |
| <b>PCN 100079 (054-304745-005)</b> |                      |                        |                |
| <b>PCN 100378 (054-304745-305)</b> |                      |                        |                |
| .5kW - 240V                        | 1-3Ph (1.3 amps)     | 2                      | #6             |
| .75kW - 120V                       | 1-1Ph (7 amps)       | 5                      | #13*           |
| .75kW - 208V                       | 1-3Ph (2.1 amps)     | 5                      | #12*           |
| 1.5kW - 120V                       | 1-1Ph (13 amps)      | 5                      | #7             |
| 1.5kW - 120V                       | 2-1Ph (2 x 7 amps)   | 5                      | #8             |
| 1.5kW - 208V                       | 1-3Ph (4.2 amps)     | 5                      | #4             |
| 1.5kW - 240V                       | 1-1Ph (7 amps)       | 5                      | #10            |
| 1.5kW - 240V                       | 1-3Ph (3.7 amps)     | 5                      | #3             |
| 2.25kW - 208V                      | 1-1Ph (11 amps)      | 15                     | #13*           |
| 2.25kW - 208V                      | 1-3Ph (7 amps)       | 15                     | #11*           |
| 3.0kW - 240V                       | 1-1Ph (13 amps)      | 20                     | #13*           |
| 3.0kW - 240V                       | 1-3Ph (8 amps)       | 20                     | #11*           |
| 4.5kW - 208V                       | 1-1Ph (22 amps)      | 15                     | #7             |
| 4.5kW - 208V                       | 2-1Ph (2 x 11 amps)  | 15                     | #8             |
| 4.5kW - 208V                       | 1-3Ph (13 amps)      | 15                     | #1             |
| 4.5kW - 208V                       | 2-3Ph (2 x 7 amps)   | 15                     | #2             |
| 6.0kW - 240V                       | 1-1Ph (25 amps)      | 20                     | #7             |
| 6.0kW - 240V                       | 2-1Ph (2 x 13 amps)  | 20                     | #8             |
| 6.0kW - 240V                       | 1-3Ph (15 amps)      | 20                     | #1             |
| 6.0kW - 240V                       | 2-3Ph (2 x 8 amps)   | 20                     | #2             |
| 6.0kW - 480V                       | 1-1Ph (13 amps)      | 20                     | #10            |
| 6.0kW - 480V                       | 1-3Ph (8 amps)       | 20                     | #3             |
| 12kW - 480V                        | 1-1Ph (25 amps)      | 78                     | #13*           |
| 12kW - 480V                        | 1-3Ph (15 amps)      | 78                     | #11*           |
| 24kW - 480V                        | 2-1Ph (2 x 25 amps)  | 78                     | #8             |
| 24kW - 480V                        | 1-3Ph (29 amps)      | 78                     | #1             |
| 24kW - 480V                        | 2-3Ph (2 x 15 amps)  | 78                     | #2             |
| <b>PCN 100095 (054-304745-006)</b> |                      |                        |                |
| <b>PCN 100386 (054-304745-306)</b> |                      |                        |                |
| 2.5kW - 120V                       | 1-1Ph (21 amps)      | 15                     | #7             |
| 2.5kW - 120V                       | 2-1Ph (2 x 11 amps)  | 15                     | #8             |
| 2.5kW - 208V                       | 1-3Ph (7 amps)       | 15                     | #4             |
| 2.5kW - 240V                       | 1-1Ph (11 amps)      | 15                     | #10            |
| 2.5kW - 240V                       | 1-3Ph (7 amps)       | 15                     | #3             |
| 10kW - 240V                        | 1-1Ph (42 amps)      | 21                     | #7             |
| 10kW - 240V                        | 2-1Ph (2 x 21 amps)  | 21                     | #8             |
| 10kW - 240V                        | 1-3Ph (25 amps)      | 21                     | #1             |
| 10kW - 240V                        | 2-3Ph (2 x 13 amps)  | 21                     | #2             |
| 10kW - 480V                        | 1-1Ph (21 amps)      | 21                     | #10            |
| 10kW - 480V                        | 1-3Ph (13 amps)      | 21                     | #3             |
| 20kW - 480V                        | 1-1Ph (42 amps)      | 80                     | #13*           |
| 20kW - 480V                        | 1-3Ph (25 amps)      | 80                     | #11*           |
| 40kW - 480V                        | 2-1Ph (2 x 42 amps)  | 80                     | #8             |
| 40kW - 480V                        | 2-3Ph (2 x 25 amps)  | 80                     | #2             |

# WIRING

Sample page of Wiring Diagram Labels. Please apply actual labels to your product.

## CAUTION

Before applying rating labels - refer to wiring instructions. Incorrect wiring could result in an unsafe wattage

STEP 4: PEEL OFF APPROPRIATE WIRING DIAGRAM AND AFFIX TO INSIDE OF ELECTRICAL ENCLOSURE.

STEP 5: PEEL OFF THE APPROPRIATE VOLTS, CIRCUIT-PHASE, AND KW, AND AFFIX TO NAMEPLATE.

|  |  |  |  |  |  |  |  |  |   |   |   |   |
|--|--|--|--|--|--|--|--|--|---|---|---|---|
| <p><b>#1</b></p> <p>1 CIRCUIT - 3ø (1-3PH)</p> | <p><b>#2</b></p> <p>2 CIRCUIT - 3ø (2-3PH)</p> | <p><b>#3</b></p> <p>1 CIRCUIT - 3ø (1-3PH)</p> | <p><b>#4</b></p> <p>1 CIRCUIT - 3ø (1-3PH)</p> | <p><b>#5</b></p> <p>2 CIRCUIT - 3ø (2-3PH)</p> | <p><b>#6</b></p> <p>1 CIRCUIT - 3ø (1-3PH)</p> | <p><b>#7</b></p> <p>1 CIRCUIT - 3ø (1-3PH)</p> | <p><b>#8</b></p> <p>2 CIRCUIT - 3ø (2-3PH)</p> | <p><b>#9</b></p> <p>1 CIRCUIT - 3ø (1-3PH)</p> | <p><b>#10</b></p> <p>1 CIRCUIT - 1ø (1-1PH)</p> | <p><b>#11</b></p> <p>2 CIRCUIT - 1ø (2-1PH)</p> | <p><b>#12</b></p> <p>3 CIRCUIT - 1ø (3-1PH)</p> | <p><b>#13</b></p> <p>1 CIRCUIT - 1ø (1-1PH)</p> |
|--|--|--|--|--|--|--|--|--|---|---|---|---|

LIMITED FOR USE ON WATER APPLICATIONS ONLY

12KW  
18KW  
20KW  
24KW  
40KW

120V 1-1PH .5KW  
208V 2-1PH 1.5KW  
240V 3-1PH 2.5KW  
480V 1-3PH 4.5KW  
2-3PH 6.0KW  
10.0KW

- NOTES
1. ALL WIRES MARKED 1L1, 2L1, 1L2, ETC. ARE CUSTOMER SUPPLIED CONNECTIONS.
  2. ALL WIRES MUST BE CAPPED.

## PRE-OPERATION

1. Follow the instructions for operation of your application. Ensure your procedure includes:
  - A. Make sure all electrical and piping connections are tight.
  - B. Remove all air from the heater and piping.

## OPERATION

### ⚠ WARNING

**Important: NWHOSR/NWHSRG Circulation Heaters are equipped with INCOLOY® heating elements and cast iron heating chambers (galvanized for the NWHSRG). It is the responsibility of the purchaser of the heater to know the chemical composition of the corrosive solution and the character of the materials entering the solution as well as the corrosive effect of the solution upon the heating elements and chamber.**

### ⚠ WARNING

**Sheath corrosion can result in a ground fault which depending upon the solution being heated, can cause an explosion or fire.**

### ⚠ WARNING

**If the heater is not properly submerged, the heating elements will overheat and could result in a fire or damaged equipment.**

1. Do not heat solutions that are corrosive to the heating element sheath or the heating chamber.
2. Terminal ends of heater must be protected from drippings, condensation, spray or direct spill-over of material. Their presence at the terminals may damage heater electrical insulation.
3. If foreign material is carried by the liquid flow, install suitable filters in the inlet pipeline to the heater. Liquid flow to the heater should be free of suspended solids.
4. Do not allow heater to operate when liquid flow is interrupted.
5. The NWHSRG/NWHOSR is designed as a flow through heater. The chamber **must** be full for safe operation.

## MAINTENANCE

### ⚠ WARNING

**ELECTRIC SHOCK HAZARD. Disconnect all power before servicing heater. Failure to do so could result in personal injury or property damage. Heater must be serviced by a qualified person in accordance with the National Electrical Code, NFPA 70.**

1. Remove heating element assembly periodically to check heater sheath for sealing, corrosion or excessive oxidation. Correct operating conditions to minimize sheath deterioration. Refer to warnings in operation section.
2. Drain heater periodically to remove sludge deposit. Deposits can act as an insulator and shorten heater life.

**Note:** User is responsible for maintenance schedule based on their knowledge of the heated medium and operating conditions.

3. Periodically check temperature control operation to insure accurate and safe process operation.
4. Check all electrical connections periodically and retighten connections which may have loosened in service. Replace wire and wire terminals which show signs of oxidation which would interfere with establishment of reliable electrical connections.
5. Correct any excessive leaking. Also refer to the last step in the installation section regarding adequate collection/drainage.
6. Reinstallation steps.
  - A. Reseal thread fittings with adequate seal material for the pressure/temperature rating on your heater.
  - B. Refer to the pre-operation section.

## RENEWAL PARTS IDENTIFICATION

| Description Standard | PCN    | Replacement Immersion Heater |
|----------------------|--------|------------------------------|
| NWHOSR-06-04P5-E1    | 100108 | 156-304748-001               |
| NWHOSR-06-04P5-E1    | 100116 | 156-304748-002               |
| NWHOSR-06-005P-E1    | 100124 | 156-304748-003               |
| NWHOSR-06-006P-E1    | 100132 | 156-304748-004               |
| NWHOSR-06-006P-E1    | 100140 | 156-304748-005               |
| NWHOSR-06-010P-E1    | 100159 | 156-304748-006               |
| NWHSRG-06-018P-E1    | 100010 | 156-304748-001               |
| NWHSRG-06-018P-E1    | 100028 | 156-304748-002               |
| NWHSRG-06-020P-E1    | 100036 | 156-304748-003               |
| NWHSRG-06-024P-E1    | 100044 | 156-304748-004               |
| NWHSRG-06-024P-E1    | 100079 | 156-304748-005               |
| NWHSRG-06-040P-E1    | 100095 | 156-304748-006               |
| NWHOSR-06-04P5-E2    | 100255 | 156-304748-301               |
| NWHOSR-06-04P5-E2    | 100263 | 156-304748-302               |
| NWHOSR-06-005P-E2    | 100271 | 156-304748-303               |
| NWHOSR-06-006P-E2    | 100280 | 156-304748-304               |
| NWHOSR-06-006P-E2    | 100298 | 156-304748-305               |
| NWHOSR-06-010P-E2    | 100300 | 156-304748-306               |
| NWHSRG-06-018P-E2    | 100327 | 156-304748-301               |
| NWHSRG-06-018P-E2    | 100343 | 156-304748-302               |
| NWHSRG-06-020P-E2    | 100351 | 156-304748-303               |
| NWHSRG-06-024P-E2    | 100360 | 156-304748-304               |
| NWHSRG-06-024P-E2    | 100378 | 156-304748-305               |
| NWHSRG-06-040P-E2    | 100386 | 156-304748-306               |

| Parts Common To All PCNs    |                     |
|-----------------------------|---------------------|
| Thermocouple 12" (Type "J") | .....309-304460-012 |
| Thermocouple 24" (Type "J") | .....309-304460-024 |
| Bayonet Fitting             | .....001-027343-007 |

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# Chromalox®

## PRECISION HEAT AND CONTROL

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