



# Installation, Operation Maintenance Instructions

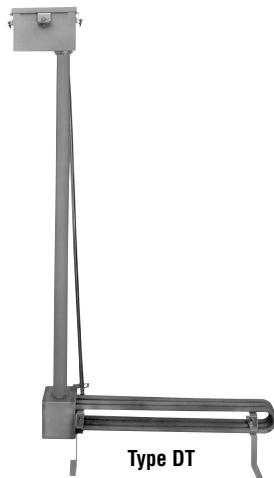
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## RENEWAL PARTS IDENTIFICATION

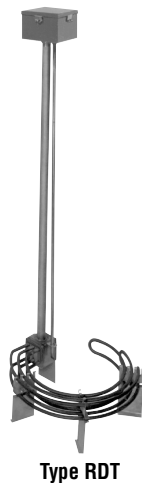
### SERVICE REFERENCE

DIVISION	SECTION
SALES REFERENCE	PD411-OMC
	161-305399-003
DATE	JANUARY, 2006

## Type DT, RDT, OT, OS, DH (Drum Heater) & SS (Sink Sanitizer) Series Industrial Over-The-Side Immersion Heaters



Type DT



Type RDT



Type OT



Type OS



Type DH




Type SS

Note: See 1.(E) below.

### GENERAL

#### Safety Guidelines

The safety and performance of this heater is dependent on proper handling, installation, control and maintenance. As Ogden can not anticipate all conditions under which this information and heater, or this heater in combination with other manufacturer's products may be used, it is advised that you conduct your own tests to determine the safety and suitability of this heater in combination with other products in your application. Where the consequences of overheating or failure could result in personal injury or property damage, back-up controls and safety devices are essential.

The Safety Alert Symbol:  is found throughout these installation instructions to identify potential hazards that can result in personal injury. The seriousness of the potential risk is identified by one of these three words:

**▲ DANGER** – will result in serious injury or death.

**▲ WARNING** – could result in serious injury or death.

**▲ CAUTION** – may result in minor or moderate injury.

Read and follow these instructions to minimize risks of electric shock or fire. Save these instructions for future reference.

Ogden Type DT, RDT, OT, OS, DH (Drum Heater), SS (Sink Sanitizer) series industrial Over-The-Side immersion heaters are designed for a wide variety of heating applications.

#### 1. Heater Construction Characteristics

- High quality resistance wire held in place by compacted Magnesium Oxide Refractory or compacted proprietary cement enclosed in a wide variety of sheath materials.
- Low to high watt densities.
- Standard selection of sheath materials include copper, steel, INCOLOY® alloy and stainless steel. This broad selection of sheath materials will operate successfully in many corrosive solutions.
- Riser type construction puts the heat at the bottom inducing natural "stirring action" and evenly distributed temperatures.
- Units are available with General Purpose, Moisture Resistant, Explosion/Moisture Resistant and Explosion Resistant terminal enclosures.

# SPECIFICATIONS

**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. OGDEN cannot warrant any electric immersion heater against failure by sheath corrosion if such failure is the result of operating conditions beyond our control.

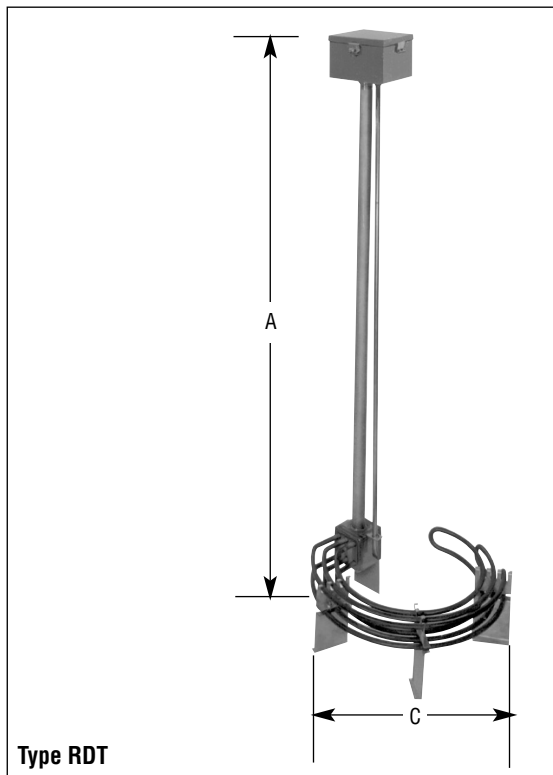
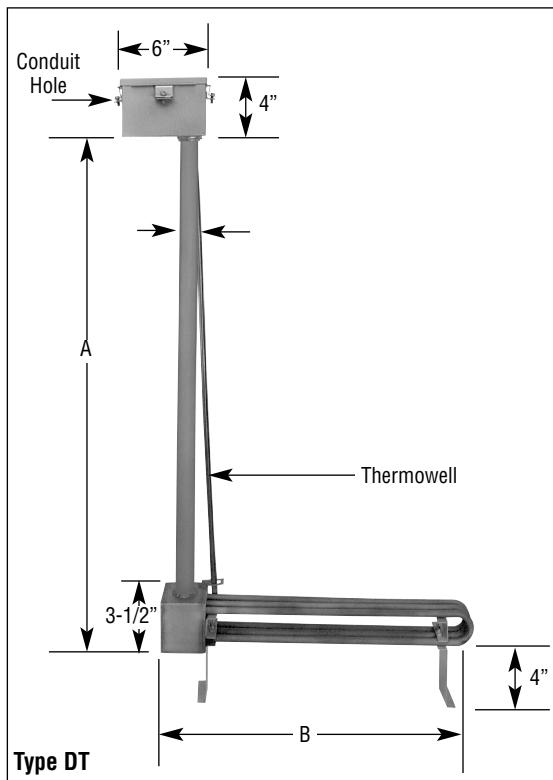
## ⚠ WARNING

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

### Type DT, RDT

#### Specifications

KILOWATTS	VOLTS 3 PHASE	A	B	DT CATALOG NUMBER	C	RTD CATALOG NUMBER
<b>STAINLESS STEEL ELEMENTS</b>						
<b>40 watts/sq. in.</b>						
3	120	36	12-1/4	DTS-031-001	10-5/8	RDS-031-001
	240			DTS-032-002		RDS-032-002
	480			DTS-034-003		RDS-034-003
6	240	36	22-1/4	DTS-062-004	13-3/4	RDS-062-004
	480			DTS-064-005		RDS-064-005
9	240	36	29-1/2	DTS-092-006	16-1/8	RDS-092-006
	480			DTS-094-007		RDS-094-007
12	240	48	37-3/8	DTS-122-008	18-5/8	RDS-122-008
	480			DTS-124-009		RDS-124-009
15	240	48	45	DTS-152-010	21-1/4	RDS-152-010
	480			DTS-154-011		RDS-154-011
18	240	48	52-1/2	DTS-182-012	23-1/2	RDS-182-012
	480			DTS-184-013		RDS-184-013
<b>INCOLOY ELEMENTS</b>						
<b>40 watts/sq. in.</b>						
3	120	36	12-1/4	DTI-031-001	10-5/8	RDTI-031-001
	240			DTI-032-002		RDTI-032-002
	480			DTI-034-003		RDTI-034-003
6	240	36	22-1/4	DTI-062-004	13-3/4	RDTI-062-004
	480			DTI-064-005		RDTI-064-005
9	240	36	29-1/2	DTI-092-006	16-1/8	RDTI-092-006
	480			DTI-094-007		RDTI-094-007
12	240	48	37-3/8	DTI-122-008	18-5/8	RDTI-122-008
	480			DTI-124-009		RDTI-124-009
15	240	48	45	DTI-152-010	21-1/4	RDTI-152-010
	480			DTI-154-011		RDTI-154-011
18	240	48	52-1/2	DTI-182-012	23-1/2	RDTI-182-012
	480			DTI-184-013		RDTI-184-013
<b>STEEL ELEMENTS</b>						
<b>20 watts/sq. in.</b>						
3	120	36	22 1/4	DTO-031-001	13 3/4	RDTO-031-001
	240			DTO-032-002		RDTO-032-002
	480			DTO-034-003		RDTO-034-003
4.5	240	36	29 1/2	DTO-0452-004	16 1/8	RDTO-0452-004
	480			DTO-0454-005		RDTO-0454-005
6	240	36	37 3/8	DTO-062-006	18 5/8	RDTO-062-006
	480			DTO-064-007		RDTO-064-007
7.5	240	48	45	DTO-0752-008	21 1/4	RDTO-0752-008
	480			DTO-0754-009		RDTO-0754-009
9	240	48	52 1/2	DTO-092-010	23 1/2	RDTO-092-010
	480			DTO-094-011		RDTO-094-011
10	240	48	56 1/2	DTO-102-012	24 7/8	RDTO-102-012
	480			DTO-104-013		RDTO-104-013

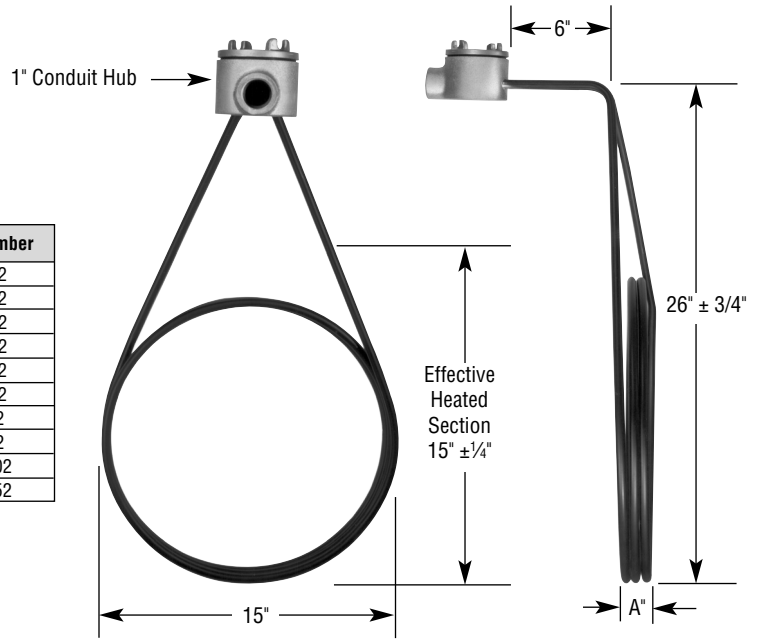


# SPECIFICATIONS (cont'd.)

## Type OT

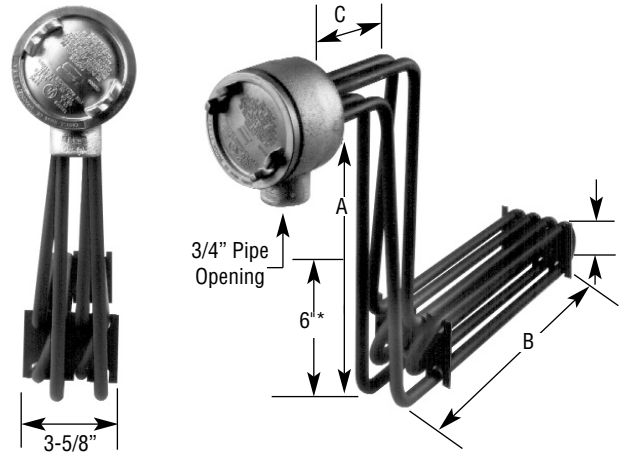
### Specifications

Sheath Material	A	Watts	Volts	W/Sq. In.	Model Number
Copper	2	5000	240	25	OTC-502
		7500	240	38	OTC-752
Steel	2	5000	240	25	OTO-502
		7500	240	38	OTO-752
Stainless Steel	2	5000	240	25	OTS-502
		7500	240	38	OTS-752
Incoloy	2	5000	240	25	OTI-502
		7500	240	38	OTI-752
316 Stainless Steel	2	5000	240	25	OTSS-502
		7500	240	38	OTSS-752

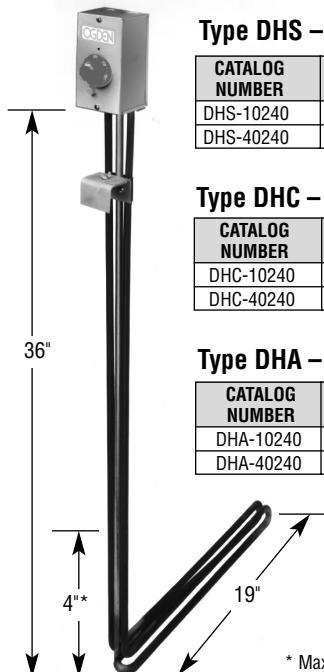


## Type OS

A	B	C	KW	VOLTS	WATT DENS.	SHEATH MATERIAL	CATALOG NUMBER
11-1/8	13-7/8	4	3	240/480	20	STEEL	OSS-138L111R4
11-1/8	15	4	4.5	240/480	20	STEEL	OSS-150L111R4
11-7/8	20-5/16	4	6	240/480	20	STEEL	OSS-203L118R4
14-5/8	25-9/16	4	7.5	240/480	20	STEEL	OSS-255L146R4
11-1/8	13-7/8	4	3	240/480	20	INCOLOY	OSI-138L111R4
11-1/8	15	4	4.5	240/480	20	INCOLOY	OSI-150L111R4
11-7/8	20-5/16	4	6	240/480	20	INCOLOY	OSI-203L118R4
14-5/8	25-9/16	4	7.5	240/480	20	INCOLOY	OSI-255L146R4



## Type DH



### Type DHS – Steel Sheath

CATALOG NUMBER	WATTS	VOLTS	WATTS/SQ. IN.
DHS-10240	1000	240	7.5
DHS-40240	4000	240	30

### Type DHC – Copper Sheath

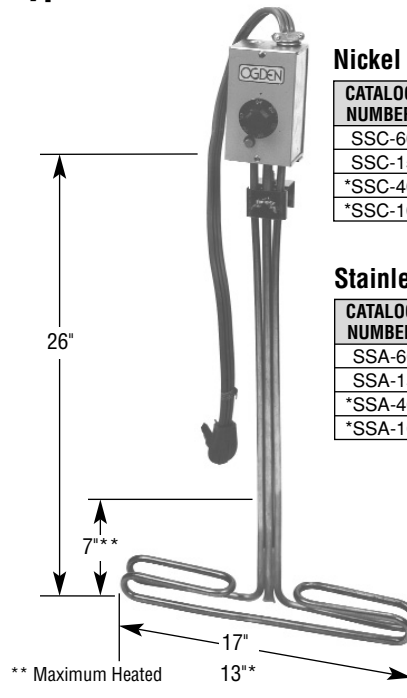
CATALOG NUMBER	WATTS	VOLTS	WATTS/SQ. IN.
DHC-10240	1000	240	7.5
DHC-40240	4000	240	30

### Type DHA – 321 Stainless Steel Sheath

CATALOG NUMBER	WATTS	VOLTS	WATTS/SQ. IN.
DHA-10240	1000	240	7.5
DHA-40240	4000	240	30

\* Maximum Heated

## Type SS



\*\* Maximum Heated

### Nickel Plated Copper

CATALOG NUMBER	WATTS	VOLTS	WATTS/SQ. IN.
SSC-60	6000	240	40
SSC-15	1500	120	10
*SSC-40	4000	240	40
*SSC-10	1000	120	10

### Stainless Steel

CATALOG NUMBER	WATTS	VOLTS	WATTS/SQ. IN.
SSA-60	6000	240	40
SSA-15	1500	120	10
*SSA-40	4000	240	40
*SSA-10	1000	120	10

## SPECIFICATIONS (cont'd.)

### **⚠ WARNING**

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

### **⚠ 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.

### **⚠ WARNING**

**FIRE/EXPLOSION HAZARD.** Use only Explosion Resistant Enclosures in hazardous atmospheres where flammable vapors, gases, liquids or other combustible atmospheres are present as defined in the National Electrical Code (NFPA 70). Failure to comply could result in personal injury or property damage.

## INSTALLATION

### **⚠ 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 by a qualified person in accordance with the National Electrical Code, NFPA 70.

1. Before installing, check your Over-The-Side heater for any damage that may have occurred during shipment. Also, check to ensure that the line voltage is the same as that stamped on the nameplate.
2. Do not bend heating elements. If bending is necessary, consult factory.
3. **IMPORTANT:** Mount the heater in the tank so that the liquid level will always be above the effective heated portion of the heater. If the heater is not properly submerged, it will overheat and damage the heating elements and create a possible fire hazard due to excessive sheath temperatures. See "Warning" under "Installation" section. (see Figure 3).
4. Heater must be supported from tank bottom. Heater must not be operated in sludge. Sludge legs can be provided. Assemble as shown in Figure 3.
5. Where work will pass over or near equipment, additional protection, such as a metal guard, may be needed.
6. In the electroplating operation the heaters are not, under any circumstance, to be placed between the electrodes and the work.
7. When melting solids by direct immersion, a surface vent should be provided to allow gases to escape. Operate the heater on half voltage until melted material completely covers the heater area.
8. A drip loop is recommended to minimize passage of moisture along wiring into terminal enclosure and connections.

### **⚠ WARNING**

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

- A. Use explosion-resistant terminal enclosures in hazardous locations. Consult Ogden for selection of explosion-resistant terminal enclosures for hazardous locations.
- B. Avoid contact between heater and combustible materials.
- C. Keep combustible materials far enough away to be free of the effects of high temperatures.

### **⚠ CAUTION**

**FREEZE HAZARD.** Some Over-The-Side heaters are equipped with a thermowell for process control or over-temperature control. Do not allow moisture to accumulate in thermowell. Freezing temperatures can cause damage that may result in the heated medium leaking into terminal enclosure.

9. To prevent moisture accumulation in cryogenic applications or when heater is exposed to freezing temperatures:
  - A. Slope conduit away from enclosure (drip loop).
  - B. Seal all conduit openings to moisture/explosion resistant terminal enclosure.
  - C. Insulate terminal enclosure.

### **⚠ WARNING**

**FIRE OR SHOCK HAZARD.** Moisture accumulation in the element refractory material, element over-temperature, or sheath corrosion can cause ground fault to the element sheath, generating arcing and molten metal. Install Ground Fault Circuit-Interrupter (GFCI) to prevent personal injury or Equipment Ground Fault Protection to prevent property damage.

10. Heaters with floor flange:
  - A. Remove electrical enclosure.
  - B. Mount heater to tank or manhole cover.
  - C. Install electrical enclosure.

## INSTALLATION (cont'd.)

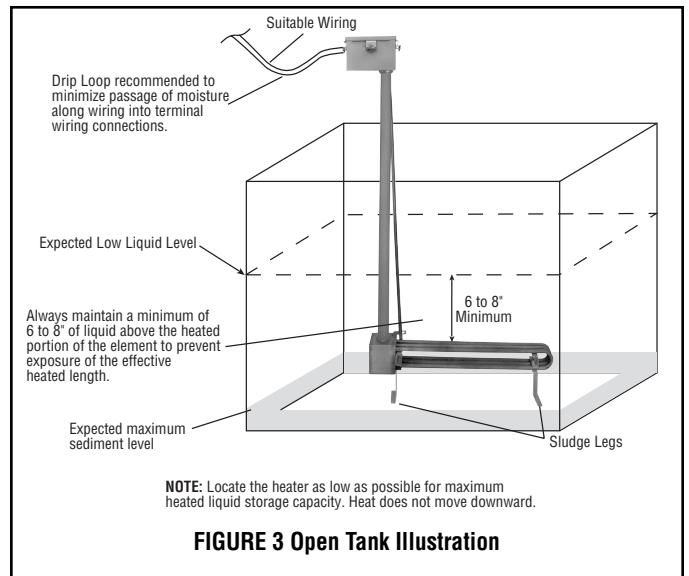
### ⚠ CAUTION

**Fittings into electrical enclosure must be properly sealed to prevent contamination of electrical contacts from vapors.**

### ⚠ WARNING

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

**NOTE: If heating in closed vessels, controls and backup controls must be used to prevent buildup of temperature and/or pressure. Maximum pressure rating is 50 PSI.**



**FIGURE 3 Open Tank Illustration**

## WIRING

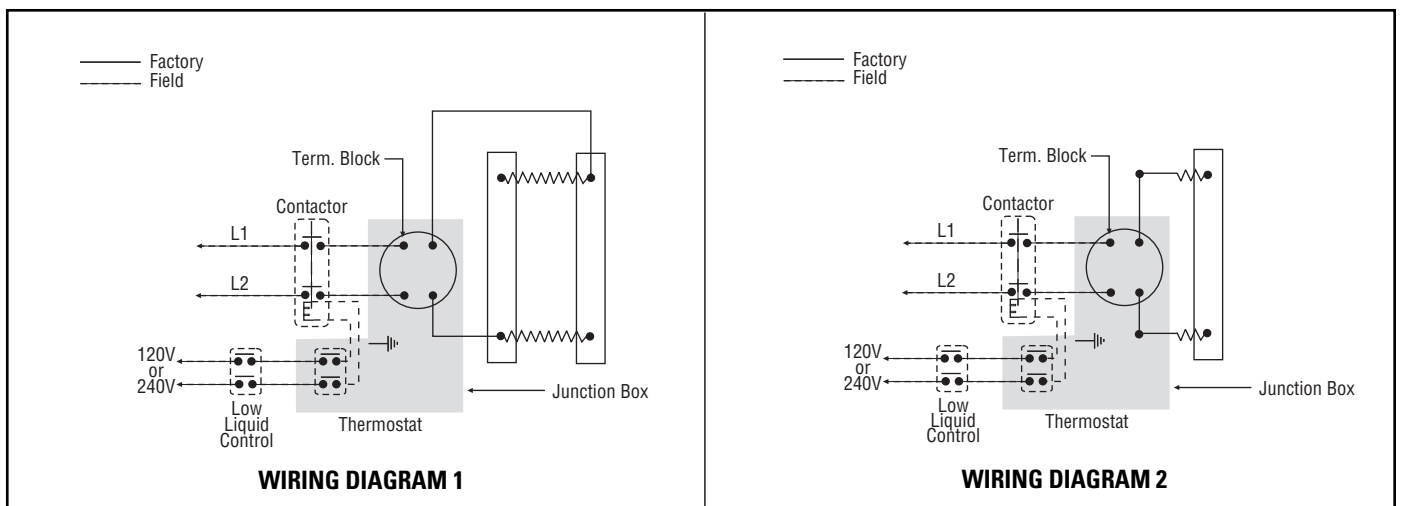
### ⚠ WARNING

**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.**

1. Electric wiring to heater must be installed in accordance with the National Electrical Code and with local codes by a qualified person. CAUTION: Use copper conductors only.
2. When element wattages are not equal, heaters must not be connected in series.
3. Electrical wiring to heater should be contained in rigid conduit or in sealed flexible conduit to keep corrosive vapors and liquids out of the terminal enclosure. If high humidity is encountered, the conduit should slope away from the heater.
4. If flexible cord is employed, a watertight connector should be used for entry of the cord into the terminal enclosure. Outdoor applications require liquid-tight conduit and connectors.
5. Bring the power line wires through the opening in the terminal enclosure.

6. Heaters are prewired and tagged for easy installation of electrical wiring to the heater.
7. Make sure heater is grounded by attaching ground conductor, traceable back to service entrance, to the ground terminal located inside the terminal enclosure. If heater is used in an electroplating tank, the heater should be grounded externally to the tank wall to minimize stray plating currents in heater sheath that may cause sheath corrosion.
8. Check for loose terminal connections and tighten if necessary. Made to order items are prewired and tagged at the factory. Wiring of made to order items may differ from those shown in the tabulations. Carefully check voltage and phase on the heater nameplate and select either the appropriate wiring shown above or check for the appropriate wiring diagram in the heater terminal enclosure. For reference purposes, some typical wiring diagrams are shown in the following figures.

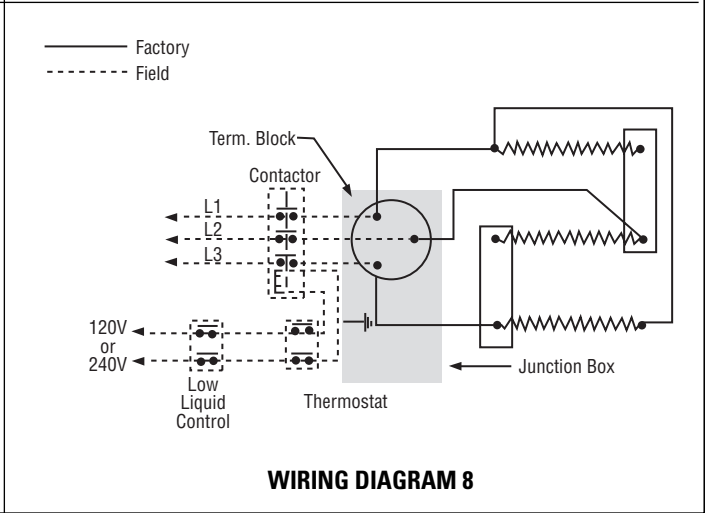
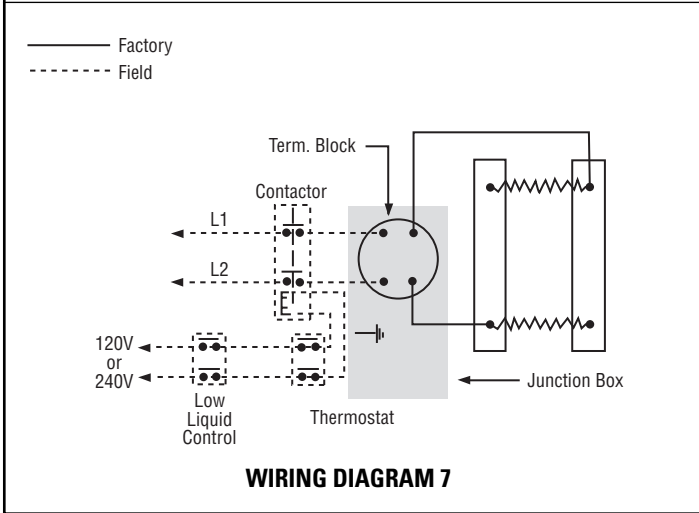
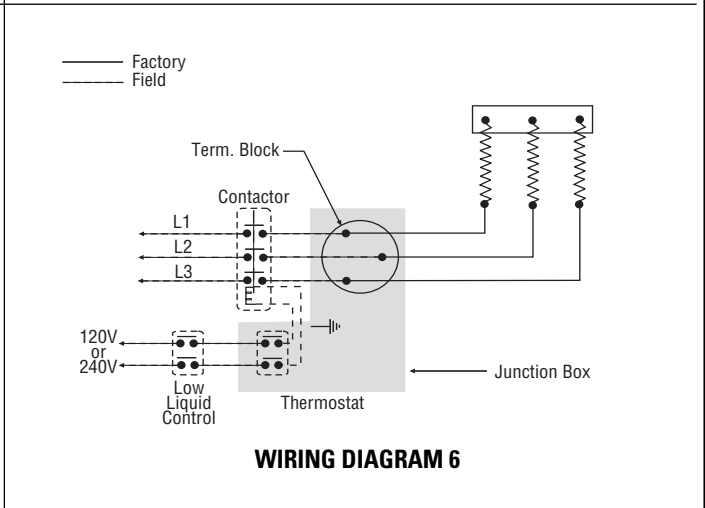
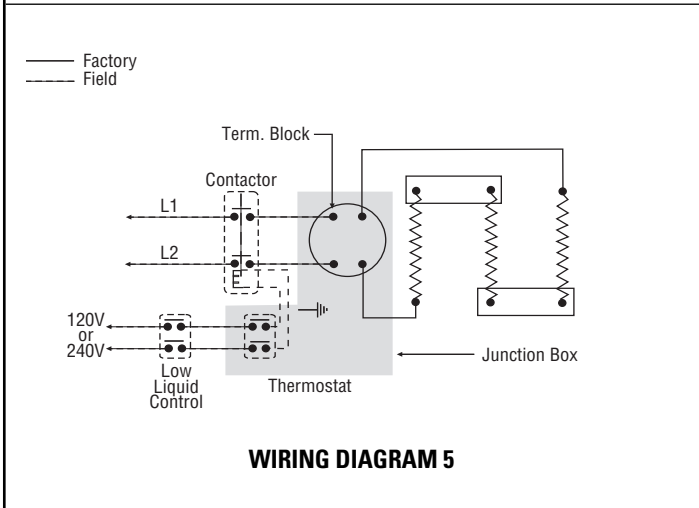
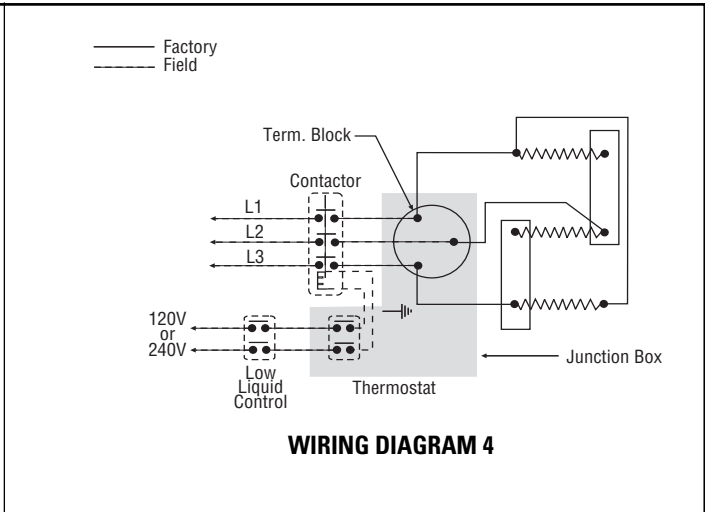
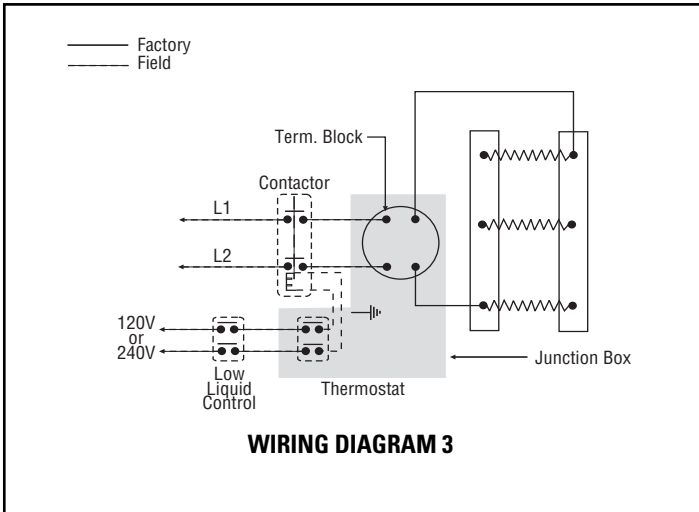
## TYPICAL WIRING DIAGRAMS



**WIRING DIAGRAM 1**

**WIRING DIAGRAM 2**

## TYPICAL WIRING DIAGRAMS (cont'd.)



**Note:** Use wire size and type specified by NEC.  
 480V heaters require 600V wire per NEC.  
 480V heaters require a contactor.  
 Contactor and wiring supplied by customer.

## OPERATION

1. Do not operate heater at voltages in excess of that stamped on the heater since excess voltage will shorten heater life.
2. Always maintain a minimum of 6 to 8" of liquid above the heated portion of the element to prevent exposure of the effective heated length. If the heater is not properly submerged, it will overheat and shorten heater life. **DO NOT OPERATE HEATER IF DRY.**
3. Keep heating elements above sediment deposits.
4. **Low Megohm Condition** — The refractory material used in electric heaters may absorb moisture during transit, storage or when subject to humid environments that will reduce the cold insulation resistance (low megohm). Low megohm may result in a high leakage current to ground and nuisance trips of ground fault protection equipment. Normally, the megohm value increases after heat-up. Typical insulation values are 5 megohm or greater on complete assemblies or 20 megohm on individual unsealed elements. It is recommended that heaters with 1 megohm or less be dried out before applying full power. If dried properly, low megohm will not effect heater life or efficiency.

To correct a low megohm condition, remove terminal enclosure cover, gaskets, and terminal hardware. Bake heaters in an oven at 300 to 500°F for several hours or preferably overnight.

An alternate procedure is to cycle the heater in 10 to 15 minute periods at low voltage until megohm values are normal. Sheath temperatures should not exceed 350°F.

**NOTE:** Low megohm on heating elements with epoxy or hermetic seals cannot be serviced in the field. Typical resistance values when sealed are 200 megohm or greater. Contact Ogden service center at number listed.

## MAINTENANCE

### **⚠ WARNING**

**ELECTRIC SHOCK HAZARD. Disconnect all power before installing or servicing heater. Failure to do so could result in personal injury or property damage.**

1. Heaters should be checked periodically for coatings and corrosion and cleaned if necessary.
2. The tank should be checked regularly for sediment around the heater as sediment can act as an insulator and shorten heater life. **Note:** Applies to all items, not just #2.

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

3. Remove any accumulated sludge deposits from heater and from tank.
4. Check for loose terminal connections.
5. If corrosion is indicated in the terminal enclosure, check terminal enclosure gasket and replace if necessary. Check conduit layout to correct conditions that allow corrosion to enter the terminal enclosure.
6. Clean terminal ends of all contamination.

#### **WARRANTY AND LIMITATION OF REMEDY AND LIABILITY**

Ogden warrants only that the Products and parts manufactured by Ogden, when shipped, and the work performed by Ogden 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 Ogden. Defective and nonconforming items must be held for Ogden's inspections 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.

Notwithstanding the provisions of this WARRANTY AND LIMITATION Clause, it is specifically understood that Products and parts not manufactured and work not performed by Ogden are warranted only to the extent and in the manner that the same are warranted to Ogden by Ogden's vendors, and then only to the extent that Ogden is reasonably able to enforce such warranty, it being understood Ogden shall have no obligation to initiate litigation unless Buyer undertakes to pay all cost and expenses therefor, including but not limited to attorney's fees, and indemnifies Ogden against any liability to Ogden's vendors arising out of

such litigation.

Upon Buyer's submission of a claim as provided above and its substantiation, Ogden 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.

THE FOREGOING IS OGDEN'S ONLY OBLIGATION AND BUYER'S EXCLUSIVE REMEDY FOR BREACH OF WARRANTY, AND IS BUYER'S EXCLUSIVE REMEDY AGAINST OGDEN FOR ALL CLAIMS ARISING HEREUNDER OR RELATING HERETO WHETHER SUCH CLAIMS ARE BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR OTHER THEORIES, BUYER'S FAILURE TO SUBMIT A CLAIM AS PROVIDED ABOVE SHALL SPECIFICALLY WAIVE ALL CLAIMS FOR DAMAGES OR OTHER RELIEF, INCLUDING BUT NOT LIMITED TO CLAIMS BASED ON LATENT DEFECTS. IN NO EVENT SHALL BUYER BE ENTITLED TO INCIDENTAL OR CONSEQUENTIAL DAMAGES AND BUYER SHALL HOLD OGDEN HARMLESS THEREFROM. ANY ACTION BY BUYER ARISING HEREUNDER OR RELATING HERETO, WHETHER BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR OTHER THEORIES, MUST BE COMMENCED WITHIN ONE (1) YEAR AFTER THE DATE OF SHIPMENT OR IT SHALL BE BARRED.

**W2008M**



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