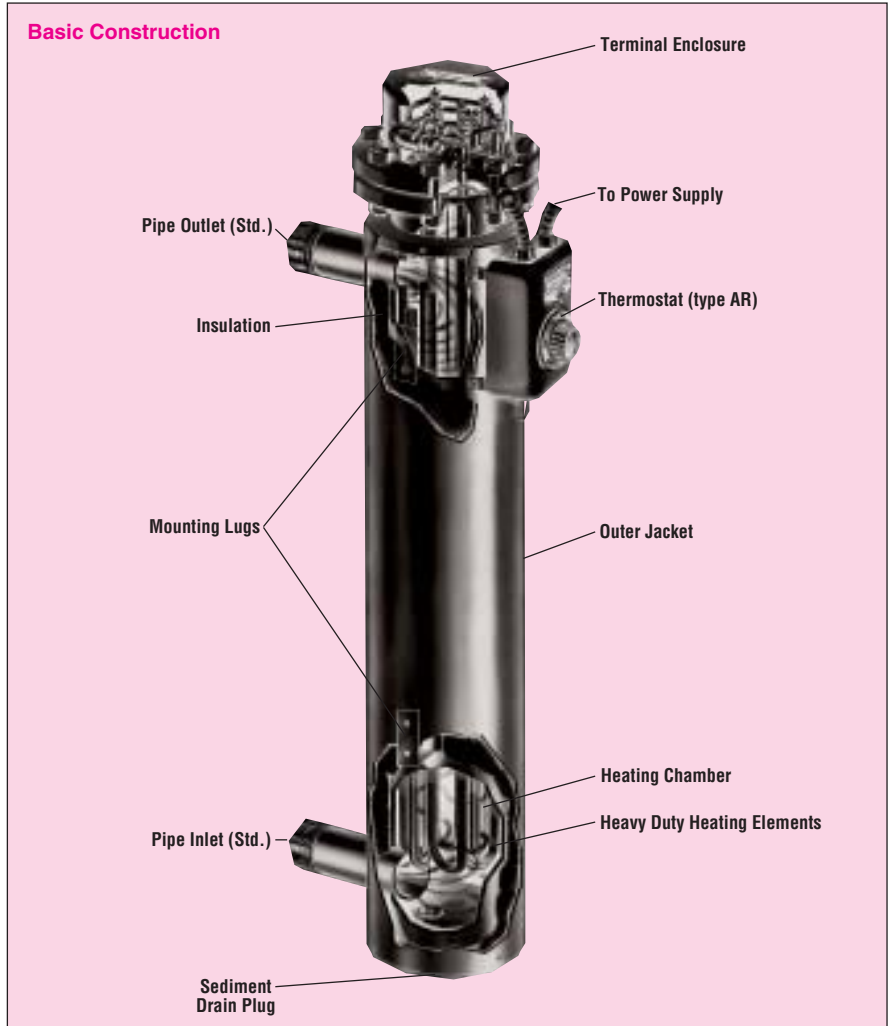


# CIRCULATION HEATERS



## Features

- ✓ Kilowatt Ratings from 0.5 kW (500 W) to Over 500 kW (500,000 W)
- ✓ Voltage Ratings to 600V
- ✓ Pressure Ratings from 150 - 2,500 psig
- ✓ Temperatures to 1500°F (815°C)
- ✓ Pipe Chambers 1 - 18" NPS (or Larger)
- ✓ Quality Heating Elements in Screw Plugs or Flanges for Ease of Installation
- ✓ Sheath Materials include Copper, Steel, Stainless, INCOLOY and INCONEL to Suit Most Operating or Corrosive Environments
- ✓ Vessel Materials include Carbon Steel, 304 or 316 Stainless Steel, Non Ferrous Alloys and High Temperature Plastics
- ✓ Terminal Enclosures for General Purpose, Moisture Resistant and Explosion Resistant Applications
- ✓ Thermocouples and RTD Sensors for Process and Overtemperature Control
- ✓ Wide Range of Mechanical and Solid State Electronic Controls including Temperature Controllers
- ✓ Contactor or SCR Power Panels for Close Temperature Control (see Controls section)
- ✓ Vertical or Horizontal Mounting with Mounting Lugs or Saddle Supports
- ✓ Available with High Temperature Standoffs and Internal Element Baffles
- ✓ Custom Designed Skid Mounting, Multiple Chambers and Integral Control Panels
- ✓ ASME Certification Section I, IV or VIII, Division 1
- ✓ UL, CSA and Other Third Part Approval, Listing or Certification Available on Many Models



## BASIC CONSTRUCTION

**Terminal Enclosures** — E1 General Purpose, sheet metal, painted with red enamel, E2 Moisture Resistant/Explosion Resistant, E3 Explosion Resistant, E4 Moisture Resistant.

**Controls** — Stock and assembly stock NWH, NWHO and GCH circulation heaters, models -A, -MT, -3 and -6, are provided with a thermostat mounted on the heater.

**Mounting** — Small units supported by inlet and outlet piping; larger units provided with mounting lugs for support.

**Outer Jacket** — Constructed of heavy gauge painted steel sleeving which contains high temperature thermal insulation to reduce heat losses from heating chamber.

**Heating Chamber** — Pipe chambers (150 Lb. welded construction, standard) have a flanged or threaded

end to receive heater assembly and are closed at the opposite end.

Larger units have drain connections to allow sludge removal. Inlet and outlet nozzles are provided for circulation of fluid or gas through heater chamber. Chamber material available in steel, galvanized steel or stainless Steel depending on the application.

**Heating Elements** — Flange or screw plug mounted tubular type heating elements offered in Stainless Steel, Copper, Steel or INCOLOY sheath to suit corrosive resistance requirements.

**Wiring Connections** — All OMEGALUX circulation heaters are provided with internal wiring and power connections that are sized in accordance with wiring tables in the National Electrical Code. For safe operation of the heaters, all external wiring should also be in accordance with NEC, state and local codes.

# CIRCULATION HEATERS

## Terminal Enclosures

- ✓ E1 General Purpose
- ✓ E2 Moisture Resistant/Explosion Resistant
- ✓ E3 Explosion Resistant
- ✓ E4 Moisture Resistant
- ✓ Conduit Openings Matched to the Number of Circuits

### APPLICATIONS

The versatility of electric heaters permits them to be used in almost any conceivable location indoors or outdoors, exposed to the weather. OMEGALUX provides a variety of electrical terminal enclosures to match the unique requirements of virtually any environment.

### FEATURES

#### E1 General Purpose Enclosure

— Suitable for most indoor or protected commercial and industrial applications.

#### E2 Combination Moisture Resistant and Explosion Resistant and E3 Explosion Resistant Enclosures

— Type E2 and E3 explosion resistant terminal enclosures are intended for use in hazardous locations including:

- Class I Groups C & D, Div. 1 & 2
- Class I Group B<sup>1</sup>, Div. 1 & 2
- Class II Groups E, F & G, Div. 1 & 2
- Class III, Div. 1 & 2.

Type E2 terminal enclosures are provided with gaskets and are suitable for outdoor or wet locations as well as hazardous areas.

#### E4 Moisture Resistant Enclosure

— Suitable for outdoor or wet locations. The terminal covers are provided with water-tight gaskets to seal the electrical terminals and connections from the environment.

### SPECIAL REQUIREMENTS FOR ELECTRIC HEATERS & TERMINAL ENCLOSURES IN HAZARDOUS LOCATIONS:

**Wiring** — The proper use of Type E2 and E3 terminal enclosures on

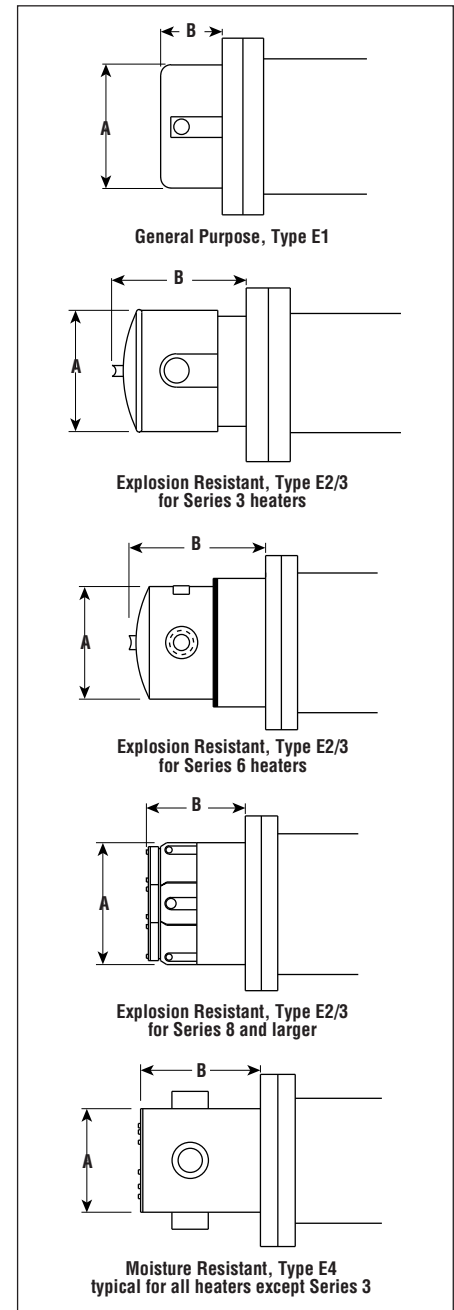
electric heaters located in hazardous areas requires that all electrical wiring comply with National Electrical Code (NEC) requirements for hazardous locations.

**Maximum Temperatures** — Safe operation in a hazardous location requires the maximum operating temperatures of all exposed surfaces of the heater including temperatures on the outside of the vessel, piping, flanges, screw plugs, enclosures and other heat conducting parts be limited. The maximum surface temperature permitted in any hazardous location is determined by the flammable liquids, vapors or gases present. The end user or purchaser of the electric heating equipment is responsible for determining the proper classification of an area and for providing OMEGALUX with hazardous area specifications and requirements for proper equipment design. (NEC Articles 500 and 501 provide guidelines for evaluating and classifying hazardous locations.)

**Safety Devices** — Approved pressure and/or temperature limiting controls must be used on electric heaters and heating elements to ensure safe operation in the event of system malfunctions.

**Note 1** — Class I Group B locations include Hydrogen gas. These areas require additional conduit seals and thread engagement.

### TYPICAL TERMINAL ENCLOSURES



### Terminal Enclosure — Dimensions (Inches)

Series	No. Elements	Dimensions (In.)					
		E1 General Purpose		E2/3 Moist./Explos. Resistant		E4 Moisture Resistant	
		A	B	A	B	A	B
3	3	4	3½	4¼	5½	4¼	5½
6	6	6½	3½	5	6½	3¾	6
18	18	9½	5	9½	10	10	5½
27	27	11½	6	10½	9	12	5½
36	36	13½	6	12	9	12	6
45	45	15½	6	14	9	14	6
72	72	17½	6	18	10	18	7
108	108	19½	7	20	10	20	7

# CIRCULATION HEATERS

## Mechanical & Electronic Control Options

- ✔ **Wide Range of Mechanical and Electronic Control Options**
- ✔ **NEMA 1, 4, 7 and 12 Enclosures**
- ✔ **Process Controllers - Integral or Remote with the Sensor in the Heater Thermowell (AR Control) or in the Heater Outlet**
- ✔ **High Limit Controllers - Integral or Remote, Sensor in the Heater Thermowell (AR Control) or Welded to Element Sheath**
- ✔ **Type J or K Thermocouples (Std.) RTD's and Other Type Thermocouples Available**
- ✔ **Mechanical and Electronic Controls can be Combined**
- ✔ **Magnetic Contactors for Multiple Circuits and High Amperages**

### APPLICATIONS

Mechanical and electronic controls & thermal sensors can be provided for all circulation heaters for overtemperature protection for the heater and fluid medium and/or for process control.

### CONTROL SELECTION GUIDELINES

**AR Controls** — Type AR bulb and capillary controls are standard on many stock heaters with temperature ranges as indicated in the product descriptions. These rugged non-indicating controls are suitable for most applications. Optional temperature ranges are available. Consult the Controls Section for details.

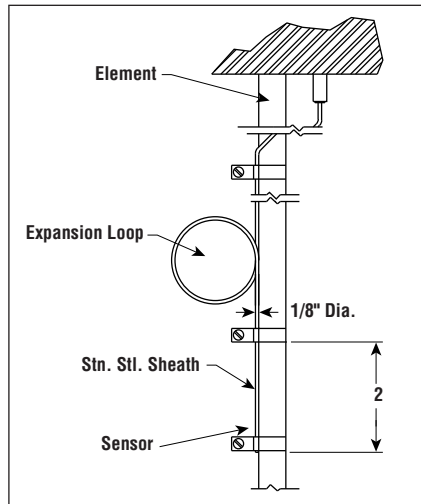
**Electronic Controls** — Electronic process controls provide greater control accuracy and operating system flexibility than is available with mechanical controls. Consult the Controls Section for details.

**Control Panels** — Integral or remote mounted control panels with electronic controls and solid state (SCR) or contactor power control-

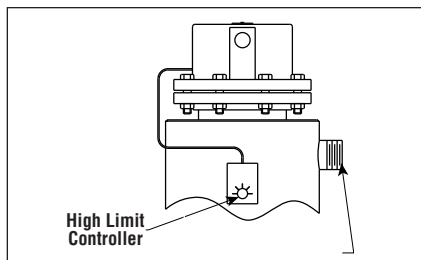
lers can be provided using virtually any combination of control devices. Consult the Controls Section for details.

**Overtemperature Protection** — De-energizing the heating elements when sheath temperatures exceed recommended limits can prevent element damage and extend the life of the heater. A thermal sensor can be attached to the element sheath for overheat protection. Properly connected to a solid state high limit controller, the sensor will turn the heater off in the event of a low-flow or no-flow condition. Type J thermocouples are recommended for liquid and type K for gas applications.

#### Remote Mounted Electronic Control

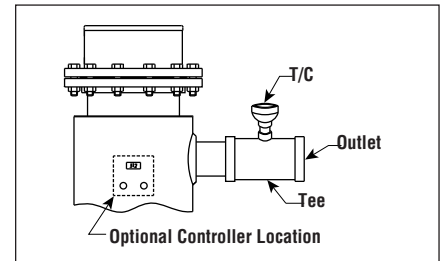


**High Limit Controls** — Electronic high limit controls can be mounted on the heater chamber with an overheat thermocouple welded to heating element sheath inside the chamber. This arrangement provides protection by shutting down the heater at a predetermined element sheath temperature. Option also available with thermocouple only, welded or clamped to heater element sheath as shown above.



**Magnetic Contactors** — Heaters utilizing two or more circuits or with amperage draw that exceeds the thermostat rating will require a contactor(s). Contactors are ordered separately and mounted remote to the heater. Consult the Controls Section for details.

**Electronic Process Control Thermocouples** — Thermal sensors can be mounted in a tee on the heater outlet nozzle. Electronic controller is remote mounted. Option also available with process controller mounted on the heater insulation jacket.



**Ordering Information** — To order circulation heaters with electronic controls, specify model, volts, kW and provide the following information.

#### Electronic Control Check List

Overtemperature thermocouple:	Yes/	No/
High temperature limit controller:	Yes/	No/
Controller Model No.	_____	
Mounting:	/Integral	/Remote
Process control thermocouple:	Yes/	No/
Type:	_____	
Location:	_____	
Process controller:	Yes/	No/
Controller Model No.	_____	
Mounting:	/Integral	/Remote

**Assembly Stock Delivery** — When heaters are listed with a standard mechanical Type AR thermostat, the thermostat will be provided on the heater unless otherwise stated.



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