

Circulation Heaters

Special Features

Optional Built-On Thermostats and Contactors

Alternate Temperature Ranges for Standard Type DA Thermostat

- 0-100° F
- 200-550° F
- 300-700° F



Optional Type P Indicating and Two-Stage Thermostats

Stages	Process Temperature Ranges
1 or 2	20 - 120° F
1 or 2	50 - 250° F
1 or 2	100 - 650° F
1 or 2	100 - 1000° F

Tamperproof Thermostat Enclosure – Type DA thermostat is completely enclosed in a box with solid cover.

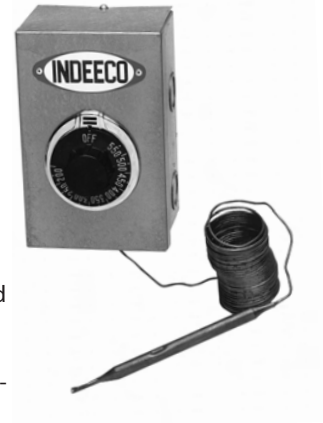


Type EC Thermostat for Process Overtemperature Protection – This field-adjustable thermostat acts as an automatic reset cutout to protect against process overtemperature. The sensing bulb is factory-mounted in the outlet area.

- Overtemperature Ranges:
- 60-250° F
 - 150-550° F

No Built-On Thermostat – A built-on thermostat is not required because process temperature is controlled by remote thermostat or control panels.

Built-On Contactors – Magnetic contactors, required for use with built-on pilot duty thermostats, can be factory-mounted on the circulation heater, eliminating the need for a remote contactor enclosure and the associated field wiring costs.



Circulation Heaters

Built-In Thermocouple/RTD

A built-in Type J or K sheathed thermocouple can be provided for three specific purposes:

- Process Temperature Control – The thermocouple is factory-mounted in the outlet area to sense temperature for the process controller.
- Process Overtemperature Protection – The thermocouple is factory-mounted in the outlet area to sense temperature for the process overtemperature controller, which prevents process liquid or gas overheating.
- Heater High Limit Protection – The thermocouple is attached to the heating element to sense sheath temperature for the heater high limit controller. This prevents element overheating and burnout due to low liquid level, inadequate flow, sludge buildup, etc.

Special Sensors – INDEECO provides a wide range of special thermocouple, RTD and thermistor sensors to meet your temperature control requirements.

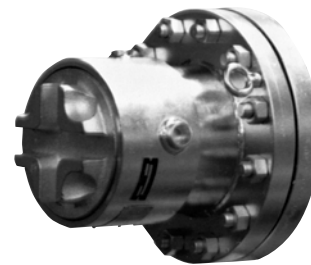
Temperature Control Panels – Control panels, designed and manufactured by INDEECO, offer a convenient, reliable means of completing the heater control package. Control panels containing all necessary components, such as contactors, fuses, transformer, disconnect switch, pilot lights and electronic controls are available.

INDEECO offers built-on, skid-mounted or remote temperature control panels with control components built into NEMA 4, NEMA 4X, NEMA 7 and NEMA 12 enclosures.

ASME Code Stamp – INDEECO has in-house ASME code welding capabilities. All INDEECO circulation heaters are designed in accordance with ASME standards. An ASME code stamp is optional.

ASME Code	Stamp	Description
IV	"H"	Low pressure water heater with working temperature at or below 250° F and working pressure at or below 160 psi.
VIII	"U"	Unfired pressure vessel for all other liquids and gases. ASME code places no restrictions on maximum working temperature or pressure.

Moisture and/or Explosion-Resistant Construction – Recommended for applications where there is danger of moisture entering the terminal and thermostat enclosures (NEMA 4 construction) or for hazardous locations classified by the National Electrical Code as Class I, Divisions 1 & 2, Groups B, C & D (NEMA 7 construction).



For all moisture and/or explosion-resistant constructions, the externally mounted, built-on Type DA thermostat is replaced by a pilot duty, 60-250° F thermostat built into the terminal enclosure. Remote temperature control is required for temperatures above 250° F.

Weatherproof Insulation Jacket – A sealed, galvanized steel construction is recommended for most outdoor installations. Stainless steel construction is also available for high temperature, very wet or corrosive applications.

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Special Features (continued)

High Temperature Construction Features

Extended Terminal Enclosure – This terminal enclosure allows the use of 90° C rated incoming field wiring and epoxy element seals when the outlet temperature exceeds 400° F for gases or 450° F for liquids.

Ceramic Fiber Vessel Insulation – Ceramic fiber vessel insulation should be used when the outlet temperature exceeds 800° F.

Spiral-Wound Gasket – Spiral-wound, Type 304 stainless steel gaskets are recommended for extremes in joint relaxation, temperature or pressure cycling, shock or vibration. Spiral-wound gaskets are required when the outlet temperature exceeds 650° F for gases or 750° F for liquids. They are also recommended for fluids with low surface tension.

Special Mounting Brackets and Jacket Support – This option is required when the outlet temperature exceeds 400° F for gases or 450° F for liquids. One of the angle iron mounting brackets will have slotted holes and the vessel jacket will be supported in one location on a band. This allows for vessel expansion and contraction without heater damage.

Inlet/Outlet Variations

Special Inlet/Outlet Locations – The following configurations are available:

- Inlet/Outlet positioned 180° apart.
- Inlet/Outlet both rotated 180° from standard position.
- Inlet/Outlet located on heater bottom.

Special Ratings

Three types of special ratings are available:

Wattage – Custom designed heaters with non-standard kilowatt (KW) ratings and watt densities are available to meet your specific heating requirements. Special watt densities are often required for certain fluids and gases. See page 7.

Voltage - Any voltage is available up to 600 volts including 120, 208, 277, 380, 400, 415, 440, 480 and 600 volt ratings for custom designed heaters.

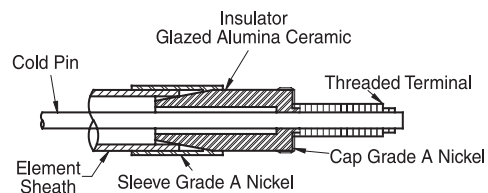
Pressure – Custom designs are available for pressures above the standard 160 psi rating at 250° F.

Special Materials

Vessel and Flanges – Special vessel and flange materials, including stainless steel, Incoloy and copper-nickel alloys can be specified for custom designs.

Heating Elements – Copper, Incoloy, Inconel, Monel, steel, 304 and 316 stainless steel sheath materials are readily available for both catalog and custom designs. Consult factory for availability of other special sheath materials.

Hermetic Terminal End Seals – For applications where an absolute moisture seal is required. Each element is fitted with ceramic-to-metal hermetic seals which are air-tight.



Vessel Sizes – Custom vessel designs are available from 1" to over 24" to accommodate larger KW requirements.

Accessories – Specify Built-In or Loose for Field Installation

Drain Valve – A gate valve is installed in the tank bottom. A drain plug is furnished as standard when a valve is not specified.

Pressure Relief Nozzle – A threaded nozzle can be built into the heater vessel for a customer-supplied, field-installed pressure relief valve.

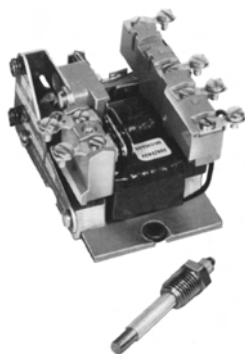
Pressure Relief Valve – Sized for thermal relief, this valve is used to relieve excess pressure should unsafe conditions develop.



Low Liquid Cutoff – A safety device used to disconnect the heater if the liquid drops below a safe level. The cutoff consists of two components: A 316 stainless steel probe to sense liquid level and a pilot relay which de-energizes contactor holding coils. The heater automatically comes back on when the liquid level rises.

Low liquid cutoffs are available for:

- Water and other conducting liquids
- Oil and other non-conducting liquids



Flow Switch – This safety device prevents the heater from coming on unless the fluid is flowing. It requires field wiring to the control circuit.

Pressure Gauge – The standard range is 0-200 psi. Other pressure ranges are available.

Thermometer – This glass tube, liquid-filled thermometer is used to sense process outlet temperature.

Pump Interlock Relay – A safety device which prevents the heater from coming on unless the pump starter is closed. This double-pole, single-throw, normally open relay is field wired in parallel with the pump starter.