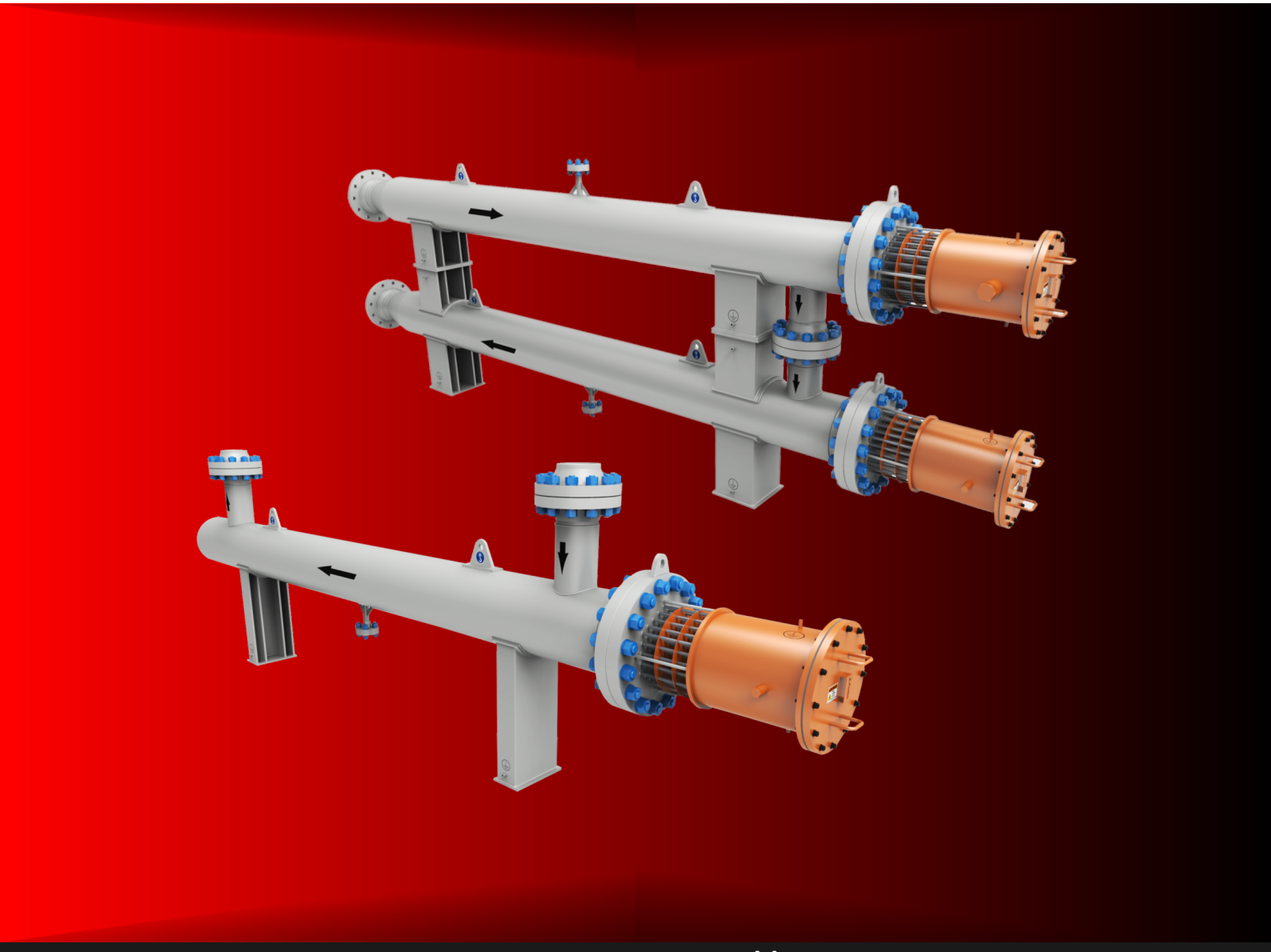
TEMPSENS

Thermal and Cable Solutions

ISO 9001-2015 CE IEC CCOE Underwriters Laboratories

CIRCULATION HEATER



TEMPSENS INSTRUMENTS (I) PVT. LTD.

B188A, Road No.-5, M.I.A., Madri, Udaipur, (Rajasthan.) INDIA 313 003

Ph.: +91 294 3507700, **Fax :** +91 294 3507731

E-mail : info@tempsens.com

www.tempsens.com

CIRCULATION HEATERS

Circulation heater is a combined unit of Electric heater bundle inserted inside a Pressure vessel or shell, in which fluid will be flowing continuously. It is a compact heating system with fast heating of the process fluids.

The Circulation heaters are designed in such a way that cold process fluid enters the pressure vessel through inlet nozzle at a low temperature, passes though the active zone of the heater bundle and leaves the vessel through outlet nozzle at desired high temperature. The system is designed in such a way that heating element skin temperature and the pressure drop across the nozzles are maintained within permissible limits. The Circulation heater system can be designed in single stage vessel or multi stage vessels based on the process requirements. The System can be installed vertically or horizontally based on the requirement and space availability

Construction

Typical Circulation heaters are made of below listed parts.

1. Terminal Enclosures : The Design of terminal enclosure changes based on the area of installation (Safe or hazardous). The Terminal enclosure is designed to protect the terminals of the individual elements from external impact, such as dust, moisture etc and to facilitate the connection of Incoming power supply to the heater bundle. Marathon flameproof heaters are certified to install in hazardous area zone 1 &2,Gas group IIC,IP 66

2. Heater Bundle : Consist of No. of U Pin heating elements adequately supported by set of Baffles & Tie rods, designed to deliver the specified temperature at outlet by maintaining the element temperature & pressure drop within the safe limits.

Heating elements can be fixed to heater flange by means of standoff sleeve pipes with brazing or by direct welding or by means of threaded couplings.

Heat duty of a bundle can be divided in to many sub groups (banks) based on process conditions. This will help in better control as flexibility in the operation.

3. Pressure Vessel: Pressure Vessel or heater housing is a fabricated shell in accordance with ASME or equivalent international standards. The Vessel has a inlet and outlet nozzle for the process fluid to flow. The Vessels are also provided with a drain & vent nozzle for the maintenance & safe operation purpose. The Vessel can be designed for either horizontal or vertical installation with single stage or multistage configuration. It is recommended to have the vessel insulated so as to avoid excess heat loss and also to protect from any thermal shock.

4. Temperature Sensors : The Heater bundle will have Element skin temperature sensors for monitoring and regulating the Element skin temperature within the limits. The Unit may also need additional sensors such as Tube sheet Temperature Sensor, Terminal Box Sensor, vessel Body temperature sensor and process fluid Temperature sensors based on case to case. The Sensors used for the system will be certified in accordance with the area of installation.

The Temperature sensors are Typically RTD or Thermocouples. A simple heater bundle can also be controlled using Thermostat protection for skin & process temperature.

If the Operation pressure is High, It is recommended to have a PSV (Pressure safety Valve) installed within the Heater Vessel as an additional safety measure.

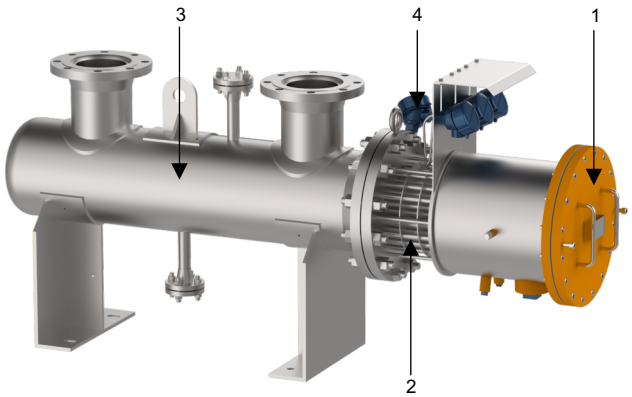
5. Control Panel : Heater controls Panel are designed to monitor & control the operations of the heater bundle also to ensure the safety of the equipment and operations.

The control logic can be either ON/OFF (contactor) or regulated (Thyristor) or combination of both in a single panel.

The control panels can be installed in both safe area & hazardous area by following respective design guidelines & certification requirements.

The Control Panels are provided with various indication systems such as Power ON, Heater ON OFF, Trip, High Temperature etc for comfortable handling of the process. The Temperatures of Elements, Process fluid & other areas (with sensors) are displayed on the Panel for better monitoring & awareness.

Control Panel will also have safety interlocks such as high element temperature, Earth fault, process over temperature etc along with Emergency stop access for the safe operation and control



CIRCULATION HEATERS

Rating	From 1kW to 10,000kW (Max) in Single Bundle or combination
Design Temperature	-40 deg C to 650 degree C
Design Pressure	Upto 350 bar(g)
Pressure Vessel	LTCS/ CS / SS, Alloys etc
Heating Elements:	Mineral filled insulated Heating Elements or Tubular heating Elements with Ni-Cr (80-20) as heating Coil and suitable outer sheaths.
Terminal Enclosure*:	As required (Weather proof or Flameproof).
Control System	Thyristor control Panel + Local control Stations. (Safe area or Hazardous area)
Protections & control:	Element Skin Temperature controls process temperature control Earth leakage protection. Overload current protection. Temperature class Protection (for Hazardous area only)
Installation:	Horizontal / Vertical
Certification:	Will be provided based n Requirement. (U,U2, PED, ATEX, IEC Ex, CCOE, DOSH etc)

Advantages

- Environment friendly design. No hazardous gas / smoke/ emission from the system.
- Compact design for quick heating of continuous flow.
- Can be used for short duration operation as well as continuous operation.
- Precision Temperature control
- Can be accommodated in small foot prints.
- Custom designed to meet specifications.
- Highly energy efficient and provide maximum dielectric strength.
- Compatible with standard industry piping and safety standards.
- Reliable design
- Easy to operate and maintenance friendly
- Energy Saving

Applciation

- For heating any fluid from Low temperature to high temperature in Industrial applications.
- Most popular applications are
- Fuel Gas / Natural gas heating skids
- Oil Heating (crude, Thermic fluids, and other Process fluids etc)
- Gas Heating (Air, Nitrogen, Hydrogen, argon, fuel gas, flue gas etc)
- Water heating applications & vaporizer System.
- Steam Boilers.
- Edible oil heating for food industries.

Industries We Serve

- Oil & gas
- Refinery & petrochemicals
- Gas processing plants
- Air separation units
- Power plants
- Chemical & fertilizers
- OEM's (compressor, skids, boilers etc)
- Steel plants & Auxiliary Units
- Aluminum plants & Auxiliary Units
- Food & beverages