



VULCANIC S.A. - 48, rue Louis Ampère
Zone Industrielle des Chanoux - F 93330 NEUILLY / MARNE (France)
Tél. (33) 01.49.44.49.20 - Fax (33) 01.49.44.49.41



OWNER'S MANUAL

MODELS 10706 AND 10707 LOW-FLOW FLUID REHEATER

1 - DESCRIPTION :

The reheater is composed of :

- an unlagged AISI 304 stainless body with inlet-outlet nozzles composed of 1/4", 3/4" or 1" 1/4 gas thread sleeves.
- a single-tube resistance heater instrumented with a thermocouple on the inner surface and compensated connector (with terminal box for some models).
- a thimble for probe with max. dia 3.5 on the outlet nozzle for regulating outlet temperature. Probe provided with model 10706 heater.
- a thimble for probe with max. dia. 6 cm to measure temperature of the reheater body.

2 - TECHNICAL CHARACTERISTICS :

For more detail, refer to our commercial brochure "Low-flow Fluid Reheater" and the corresponding drawing (for special designs).

3 - INSTALLATION AND WIRING :

3 - 1 - BEFORE INSTALLATION :

Check the following:

- that materials composing the body and single-tube resistance heater as well as thermal load (in W/cm²) are compatible with fluids to be reheated under the predicted operating conditions, and that there is no risk of electric coupling.
- that the pressure of the fluid system is not greater than the maximum reheater pressure.
- that the direction of fluid flow is correct.
- that the body is mounted horizontally (for special cases of vertical mounting, the inlet nozzle must always be at the bottom); the inlet nozzle must be aimed vertically upward.
- that there is sufficient room to remove the single-tube resistance (tank draining dimension).
- for outdoor systems, that the reheater is protected from inclement weather (snow, rain, etc.).
- that the voltage is appropriate for the reheater (as specified on the rating plate).

3 - 2 - INSTALLATION :

- when making hydraulic connections, precautions should be taken to prevent interruption of flow at any time when the reheater is energized.

PROVIDE THE FOLLOWING :

- a flow meter.
- a safety valve.
- a temperature tap to check fluid temperature, on the outlet nozzle (a thimble for max. dia 3.5 probe is provided for this with model 10707 heater).
- a temperature tap for the body (a thimble for 6 cm dia. probe is provided).
- to heat liquid flowing in a closed circuit, provide safety features required by law intended to eliminate risk of pressure surges caused by overheating (relief valve, steam trap, surge tank, etc.).
- coat the temperature taps with thermal grease before inserting them into the thimbles.
- if the reheater is not heat lagged, always install heat lagging opposite thimble housing the body temperature sensor.

HEAT LAGGING :

For high-temperature liquids ($> 60^{\circ}\text{C}$) when ambient temperature is $> 30^{\circ}\text{C}$ as well as for gas service, the reheater body will be exposed to high temperatures. It must therefore be heat lagged. Do not heat lag the offset portion of the single-tube resistance heater and its terminal box if provided.

3 - 3 - WIRING :

- **POWER SUPPLY :** The single-tube resistance heater should be connected by the installer using terminal strips that should preferably be placed in a protected enclosure (if not supplied mounted on any support to prevent accidental disconnection of wires).
- **GROUND :** Connect the ground terminal to the system earthing network.
- **SAFETY SYSTEMS :**
The body temperature interlock should irreversibly interrupt power to the reheater following a fault.
The single-tube resistance heater surface temperature measurement device depending on the process involved may :
 - either irreversibly interrupt power to the reheater following a fault,
 - or limit reheater power preferably using a PID control system.
 Before connecting, make sure that the wiring appropriate for the type of temperature sensor has been used (for example, a K-type compensation wire for a K-type thermocouple).
- Make sure all connections are fast.

4 - STARTUP PROCEDURE :

4 - 1 - Precautions prior to startup :

Never energize the reheater before minimum design flow has been achieved (installation of a flow monitor is strongly recommended, a steam trap is often indispensable for liquids).

Check that the reheater body has been completely refilled (when liquids are being reheated) after the system has been completely drained.

The body temperature interlock should be set temporarily to a temperature setpoint higher than the temperature reached during minimum flow operation and at maximum temperature. If the single-tube resistance heater surface temperature also provides a process interlock, its setpoint should also be reset in the same manner.

4 - 2 - STARTUP :

- Energize the reheater once maximum flow is reached and the fluid outlet temperature setpoint is set to its minimum value.

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- Immediately check that the line intensity is in agreement with its design value and adjust regulation devices.
- Increase the regulation setpoint to its maximum value.
- Reduce fluid flowrate to minimum value and optimize the body temperature setpoint and if used as an interlock, optimize the single-tube resistance heater setpoint.
 - Progressively reduce the body temperature setpoint until the interlock irreversibly interrupts power. Reset it at about 10°C above this value.
 - Perform the same operation on the single-tube resistance heater surface temperature setpoint (if used as an interlock); after an appropriate cooldown, reenergize the reheater by resetting the body temperature interlock without modifying the regulation setpoint (minimum value) or flow setpoint (minimum value).
 - Progressively reduce the single-tube resistance heater surface temperature setpoint until the interlock irreversibly interrupts power. Reset it about 10°C above this value.
 - Once this (these) adjustment(s) have been completed make sure that thermal equilibrium is reached during operation at nominal flow and outlet temperature and that a reduction in flow to below the minimum specified value interrupts heater operation.

4 - 3 - SHUTDOWN THE INSTALLATION :

For heating liquids and especially gases by forced convection, when shutting down the installation it is necessary to maintain the liquid flow rate for a few moments after powering down the fluid circulation heater, in order to allow the calories built up in the single-tube resistance heater to be discharged.

In certain conditions, failure to comply with instruction will result in destruction of the single-tube resistance heater and/or its environment, or even pose a hazard for user.

5 - MAINTENANCE :

After 50 hours of operation :

- Check that all connections are fast and that temperature probes for the body and outlet nozzle are in place.

Every six months :

Same operations as after 50 hours.

At least once a year or more often if needed :

When heating liquids, remove the single-tube resistance heater and clean it taking care not to damage it if there is any deposit (Fouling can considerably reduce service life by interfering with heat transfer to the liquid).

Remove any sludge that may have accumulated at the bottom of the heater.

After replacement of the single-tube resistance heater, start up the system as specified in Section 4.

6 - GUARANTEE :

The Guarantee complies with French Electrical Construction trade association accords.

We guarantee compliance of materials and of any surface treatment as defined in our documents.

In contrast, we will not be responsible for any damages caused by the following given the diversity of parameters beyond our control which could cause them :

- use at voltage 10% greater than nominal,
- wear caused by insufficient maintenance, impact, inappropriate handling or inexperienced users,
- corrosion (including by tap water) or scale.