Industrial Temperature Control System

Unistat® Hybrid

-150...+400 °C

huber

Industrial solution Unistat® Hybrid

Large scale pharmaceutical and chemical manufacturing plants traditionally use a centralised system of heating and cooling with inaccurate temperature control and a restricted temperature range. These traditional methods have the following disadvantages:

		Heating / Cooling type	Max. process temperature	Disadvantages	
	1	Heating by steam	typically limited to +180 °C (depending on steam pressure)	Limited temperature range	
	2	Heating by electrical heater	+400 °C	Very high cost of consumed electricity	
	3	Cooling by water (water/glycol, brine) with the help of cooling tower or powerful Chiller	Ambient ... down to -20 °C	Limited temperature range	
	4	Cooling by liquid nitrogen (dispensing into the chemical process directly)	-196 °C	Difficult to control temperature, handling, consumption, running cost, safety	

It is possible to eliminate the disadvantages of traditional temperature control systems by the integration of a hydraulically sealed thermostat-circulator, the Unistat® (pic.1).
Max. cooling capacity of the Unistat®: 150 kW @ 0 °C, 10 kW @ -80 °C, 4 kW @ -100 °C (2-3 stage cooling system). Max. heating capacity 100 kW (see Catalogue for standard range).

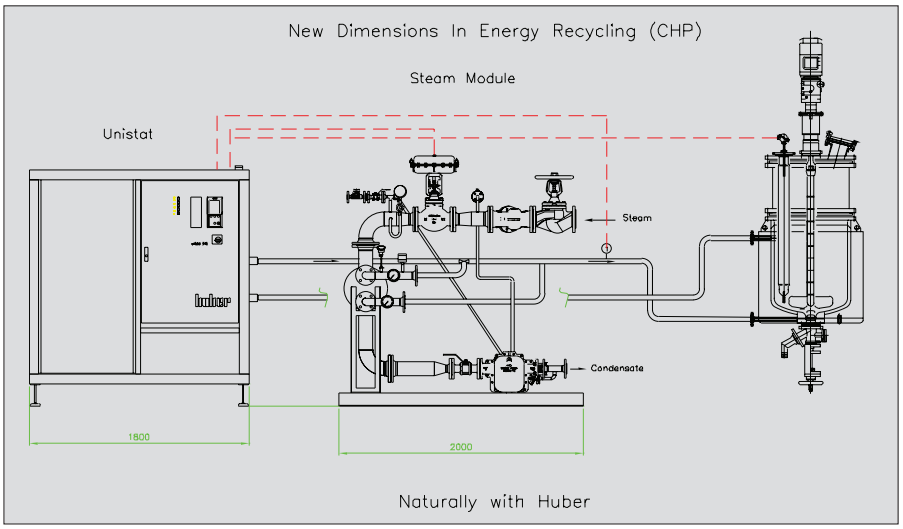
No.1. the heat is transferred to the thermofluid through the external heat exchanger (pic. 2). If necessary, the Unistat® can raise temperature up to +400 °C.

Working with waste steam produced by generation of electricity
Steam is often used as an independent source of electricity for production plants. In this case the Unistat® and external heat exchangers can effectively process steam which is produced as a by-product of electric power generation. It will considerably save enterprise resources.

The Unistat® is connected to the reactor's jacket via an external heat exchanger (system 1 and pic. 2). HTF circulates through the thermostat, heat exchanger and jacket of reactor.

Pic. 1: Unistat® 615w.
Unistat® Technology was developed by Germany Peter Huber Kältemaschinenbau GmbH in 1990.

System 1:
Simplified installation scheme; the Unistat (on the left) is connected to the reactor (on the right) via an external heating steam module in the centre.

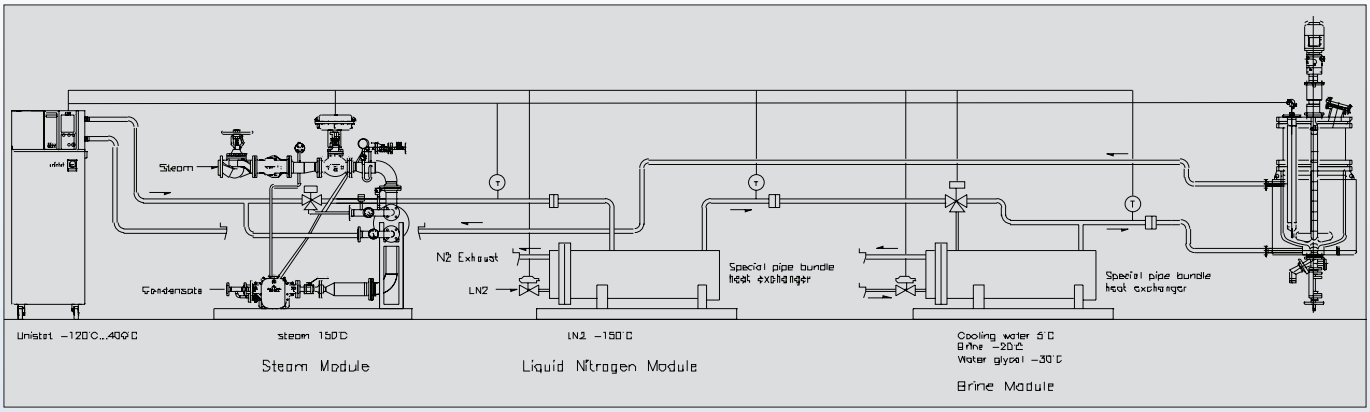


No.2. The use of electrical heaters is inadvisable because of the high cost of consumed electricity. We consider electrical heating to be limited to 200 kW, because of high installation (infrastructure) and running costs.

No.3. The cooling system works in a similar method to system 1; cooled heat transfer fluid (down to -20 °C) is transferred from the plant chiller* through the external heat exchanger, and lower temperatures (-90 °C…-120 °C) can be achieved with the Unistat®.
*If required, Huber can supply a powerful chiller with a cooling capacity of up to 400 kW @ 0 °C.

No.4. Liquid nitrogen enters the external (LN2/thermofluid) heat exchanger conducts cooling capacity at low temperatures.
The Unistat® controls and regulates the dosing of nitrogen into the heat exchanger. The Unistat ® controls all systems (steam module, chiller, nitrogen) automatically and monitors reactor temperature by means of an external Pt100 sensor.

Pic.2: External heat exchanger for the steam generator.



System 2:
The Unistat® Hybrid with external exchangers.
Heat exchanger (steam, LN2, cooling water) can be also built into the Unistat®.

One advantage of the Huber Unistat® Hybrid system is that it enables an affordable partial modernization, not an expensive and time consuming complete replacement of existing central plant cooling/heating systems. The Hybrid system can significantly increase cooling/heating capacity and broadens the temperature range of an existing system, giving more responsive, more accurate temperature control of the process.

Unistat® Hybrid:
the individual solution for process control

Controller function	
Interface functions – External control signal / ECS STANDBY – Programmeable volt free contact / ALARM – digital interfaces RS232, RS485 – AIF (Analogue interface) 4-20 mA – Level monitoring	 ✓ ✓ ✓ ✓ ✓
Profibus	✓
Modbus	✓
Digital Interface RS232	✓
Language: D / E / F / IT / ESP / RUS	✓
True Adaptive Control (TAC)	✓
Variable Speed Pump (VPC)	✓
Cooling sources	**cooling capacity**
HUBER Unichiller® down to -20 °C	up to 400 kW @ 0 °C
HUBER Unistat® down to -120 °C	up to 150 kW @ 0 °C (see catalogue)
Possible additional cooling sources	
Cooling water (+5 °C) Brine (-20 °C) Water glycol (-30 °C)	depending on heat exchanger* and cooling source
LN2 (-150 °C)	depending on heat exchanger*
Heating sources	**heating capacity**
HUBER heating thermostat up to +300 °C	up to 200 kW
Possible additional heating sources	
Steam module	depending on heat exchanger*
Thermofluid	
DW-Therm Fluids with other temperature ranges	-90...+200 °C available

* heat exchangers are available for capacities up to 500 kW

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