Unistat 510w

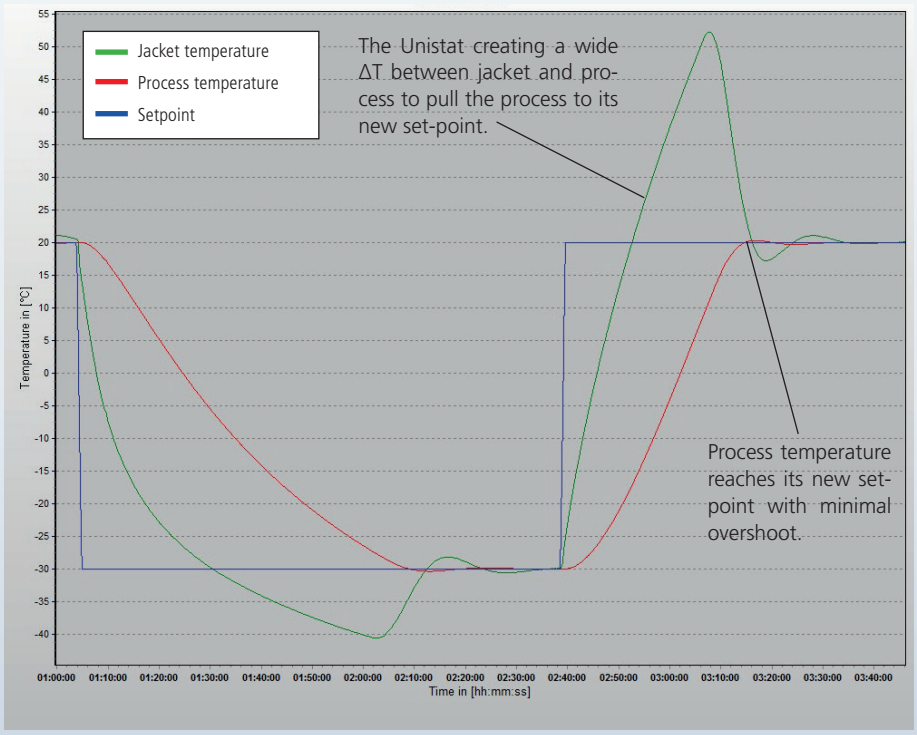
Unistat 510w cycling a 60 litre vacuum-insulated glass Asahi AG reactor

Requirement
This case study demonstrates the ability of the Unistat 510w to cycle the process temperature in a range from +20°C to -30°C. On the second page the case study shows cool down curves from +20°C to -50°C and from +120°C to -30°C. Additionally the measurements demonstrates the closeness of temperature control and the minimum process temperature achievable in the reactor.

Method
The 60 litre reactor was connected to the Unistat 510w using two M30x1,5 1,5-meter flexible hoses. The thermofluid used in the system was M90.055.03. "Process" control was carried out via a Pt100 sensor located in the process mass.

Setup details

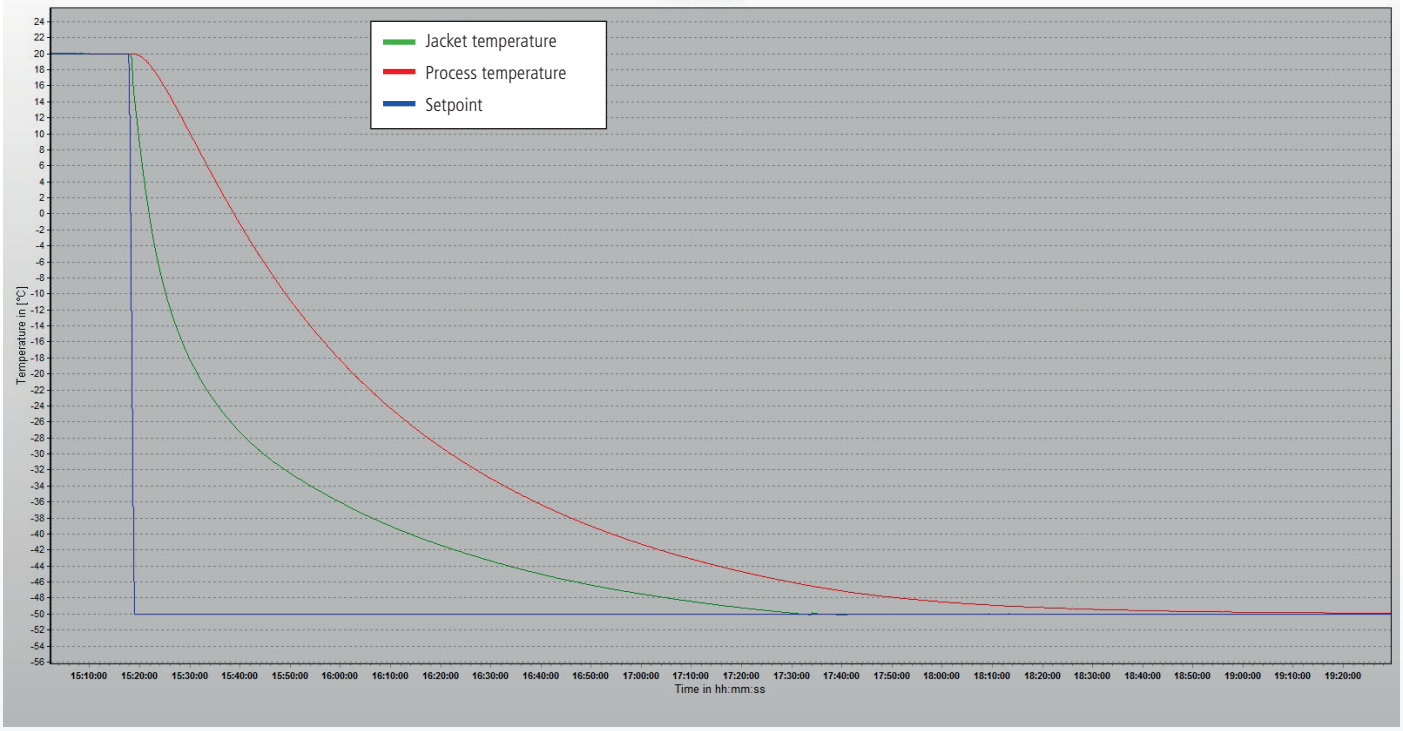
Temperature range:	-50…250°C
Cooling power:	5.3 kW @ 0°C 2.8 kW @ -20 0.9 kW @ -40°C
Heating power:	6.0 kW
Hoses:	M30x1,5 ; 2x1,5 m
HTF:	M90.055.03 (#6259)
Reactor:	60 litre glass reactor vacuum-insulated
Reactor content:	45 litre M90.055.03 (#6259)
Reactor stirrer speed:	230 rpm
Control:	Process



Results

Performance:
The following cooling down and heating up curves demonstrates the performance of the Unistat 510w. It cools down and heats up in a range from +20°C to -30°C. The Unistat 510w needs approximately 65 minutes to cool down the reactor from +20°C to -30°C and approximately 36 minutes to heat it up from -30°C to +20°C.

Efficient heat transfer to the limit:
The Unistat 510w easily cools the reactor content down to -50°C. After approximately 2 hours a process temperature of -45°C is reached. After 3 hours and 50 minutes the Unistat reaching -50°C, which is the lower end of the working temperature range. The cooling curve shows that the Unistat efficiently transfers the cooling power over the entire working temperature range. There is almost no loss of performance in the system. These results confirm both, the optimal heat transfer performance of the Unistat, as well as the excellent insulation of the reactor system.



Cool down in a very wide temperature range:
The Unistat 510w cools the reactor down from 120°C to -30°C in 1 hour and 50 minutes.