

Unistat® 705w

“Periodic” and “Aperiodic” control of a Radleys 1-litre reactor

Requirement

This case study shows the performance curves of a Unistat 705w controlling the temperature of a Radleys 1-litre glass reactor.

Method

The Unistat and reactor are connected using two 1-metre insulated metal hoses. The reactor is filled with 0.75 litre of “M90.055.03”, a Huber supplied silicon based HTF.

Results

The first graphic “Periodic - Fast, small overshoot” illustrates a heating from 20 °C to 60 °C in a time of 19 minutes. It can be clearly seen that the internal temperature heats to 67 °C, thus the process temperature reaches 60 °C very quickly. The Unistat 705w cools back to 20 °C in 17 minutes.

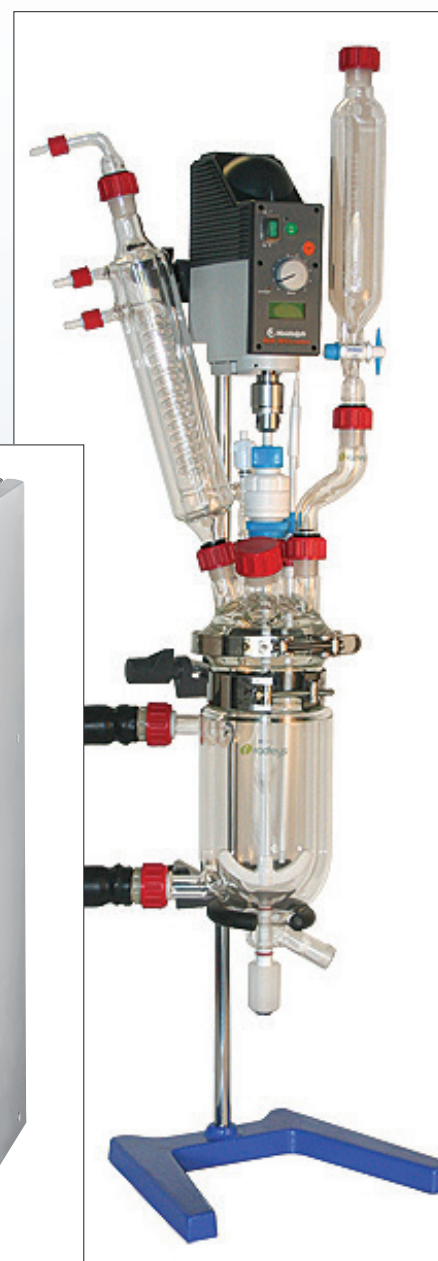
The second diagram shows the same temperature profile but with “Aperiodic - no overshoot”. The Unistat takes slightly longer to heat and cool (30 and 26 minutes for heating and cooling respectively) to avoid any over or undershoot of the set-point.

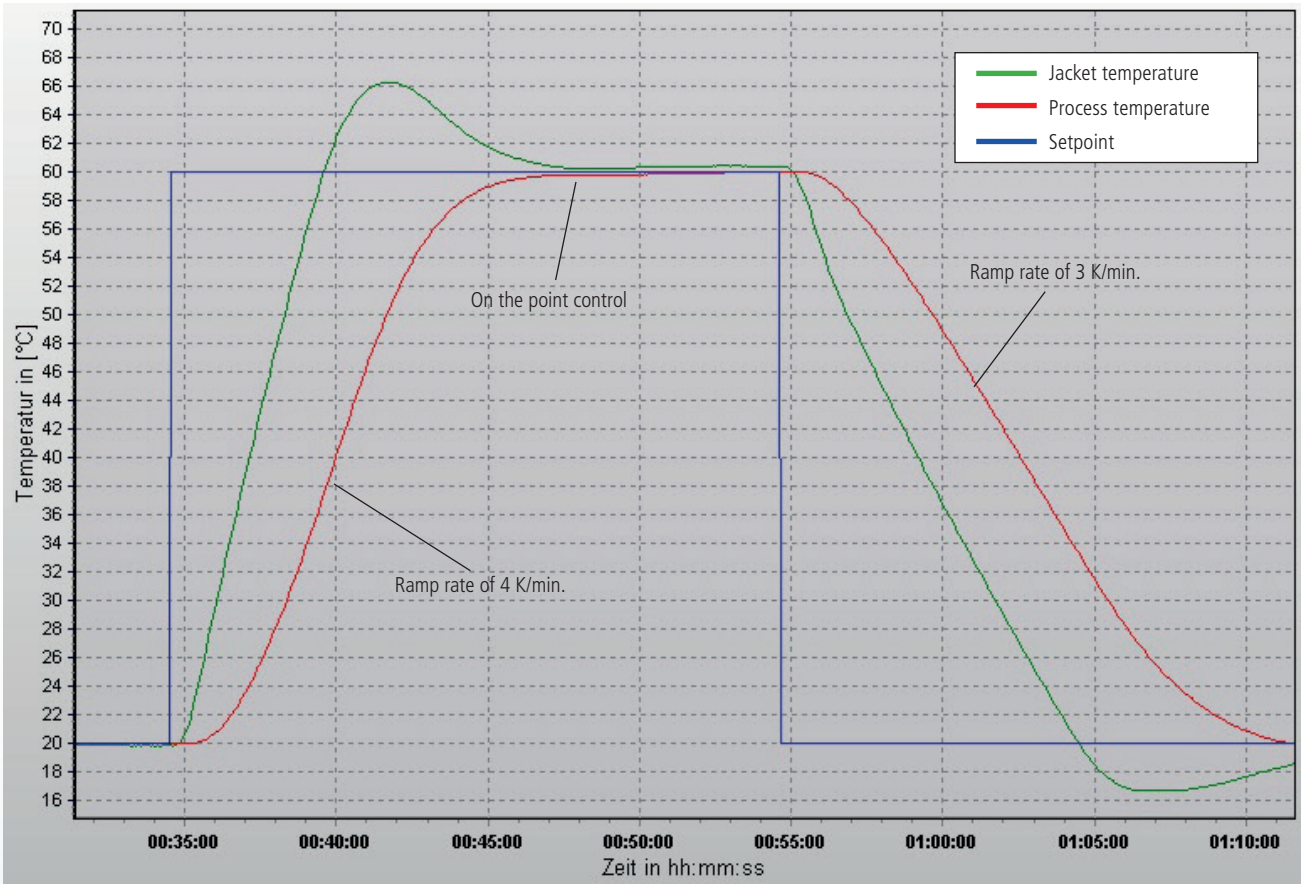
In both cases the control capabilities of the Unistat is well demonstrated.

Setup details

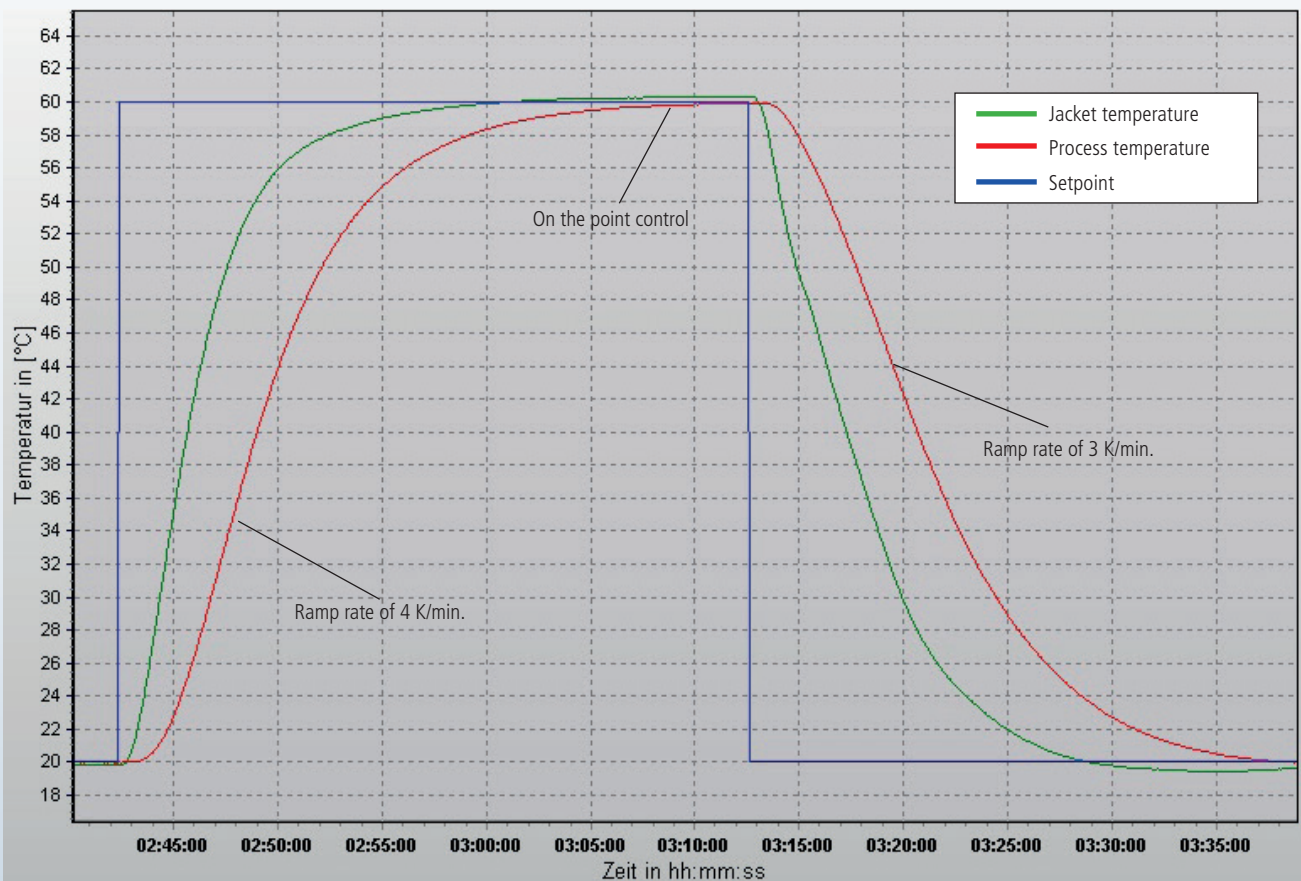
Unistat® 705w & Radleys reactor

Temperature range:	-75...250 °C
Cooling power:	0.6 kW @ 250...100 °C 0.65 kW @ 0 °C 0.6 kW @ -20...-40 °C 0.3 kW @ -60 °C
Heating power:	1.5 kW / 3 kW
Pump speed:	3300 rpm
Hoses:	2x1 m; M24x1.5 (#9325)
HTF:	DW-Therm (#6479)
Reactor:	1-litre un-insulated jacketed glass reactor
Reactor content:	0.75 litre M90.055.03 (#6259)
Stirrer speed:	200 rpm
Control:	process





1) "Periodic – Fast, small overshoot"



2) "Aperiodic – no overshoot"