Setup details
Unistat® 610w & Radleys reactor

Temperature range:	-60...200 °C
Cooling power:	7.0 kW @ 200…0 °C 6.4 kW @ -20 °C 3.3 kW @ -40 °C 0.8 kW @ -60 °C
Heating power:	6.0 kW
Hoses:	2x1.5 m; M30x1.5 (#6386)
HTF:	DW-Therm (#6479)
Reactor:	10-litre jacketed glass reactor
Reactor content:	7.5 litre M90.055.03 (#6259)
Stirrer speed:	200 rpm
Control:	process

Unistat® 610w

Controlling simulated exothermic reactions at -40 °C in a Radleys 10-litre reactor

Requirement
This case study looks at the response of a Unistat 610w working to control exothermic reactions in a 10-litre glass reactor at -40 °C.

Method
M30x1.5 hoses are used to connect the setup and the working fluid is DW Therm. The exothermic reactions are conducted with a heating power of 50 W and 100 W.

Results
The 50 W heat results in approximately 1 K of temperature rise. With a cooling power of 3.3 kW the unit takes 9 minutes to bring the process temperature back to its set-point. Meanwhile the process temperature rises up to approximately 2 K with the 100 W of heat addition. The internal temperature cools to approximately -57.5 °C in order to pull the process temperature back to -40 °C.
When the heater is switched off, the temperature of the process falls and the thermostat starts heating the jacket in order to return the process temperature to the set point.

Figure 1: Exothermic reaction of 50 W

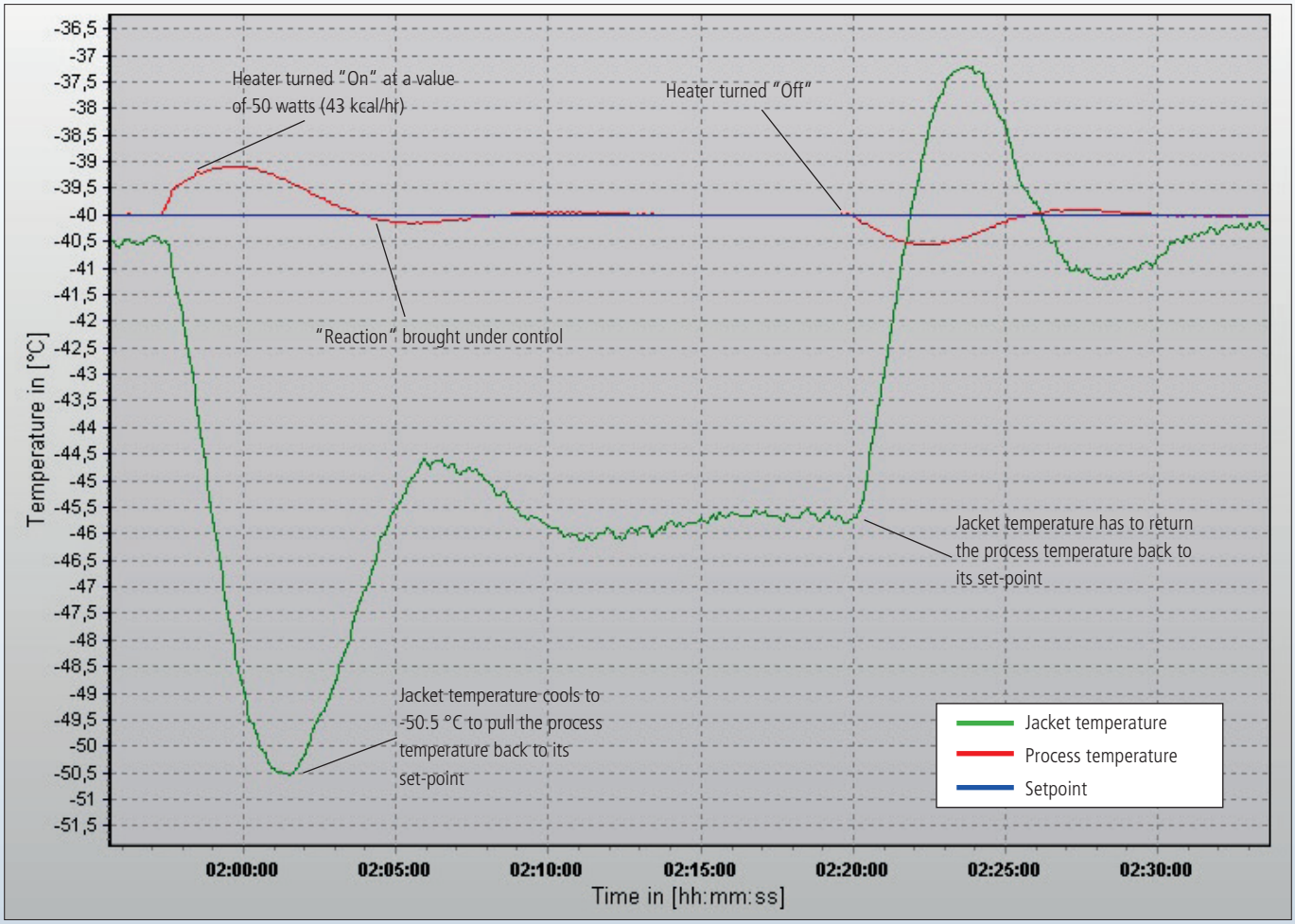

Figure 2: Exothermic reaction of 100 W