

## Unistat 410w

### Unistat 410w controls 10l Normag Glass Reactor

#### Requirement

This case study demonstrates the ability of the Unistat 410w to control the process temperature in non-insulated 10l glass jacketed reactor from Normag.

#### Method

The Unistat 410w was connected to a 10l Normag non-insulated glass jacketed reactor via 2 x 1.5m metal insulated tubes. The HTF used was Huber's M40.165/220.10 and the process mass simulated with 7l of Huber's M40.165/220.10 silicon oil.

Under "Process Control" from a Pt100 (Teflon covered) located in the process mass, different set-points were entered and the performance of the Unistat 410w was recorded using Huber's service software and recorded onto a USB thumb drive inserted in the USB interface on the Pilot ONE controller. The agitator speed was set to 200 rpm.

#### Setup details

Temperature range: -45°C...+250°C  
 Heating power: 3.0 kW  
 Cooling power: 1.3 kW @ +250°C  
 2.5 kW @ +100°C  
 1.5 kW @ 0°C  
 0.8 kW @ -20°C  
 0.17 kW @ -40°C

Hoses: 2 x M16 Metal Insulated  
 HTF: M40.165/220.10  
 Reactor: Normag 10l  
 Reactor content: 7 l M40.165/220.10  
 Control: process  
 Stirrer speed: 200 rpm  
 Amb. temperature: +25°C

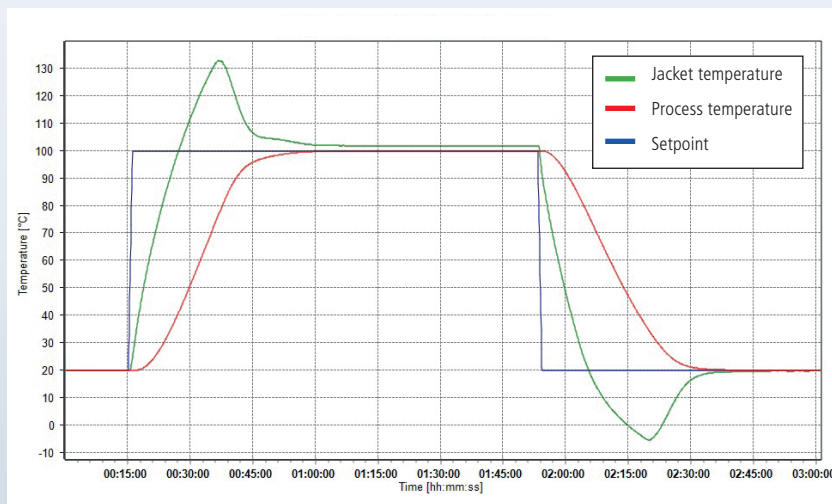


## Results

### 1. Temperature Control: from +20°C to +100°C

This test demonstrates the speed and accuracy that the Unistat 410w control the process temperature from +20°C to +100°C and back to +20°C.

Start (°C)	End (°C)	Approximate time (min)	Average Ramp Rate (K/Min)
+20	+100	51	1.57
+100	+20	45	1.78



## 2. Temperature Control: -20°C to +100°C to -20°C

This test demonstrates the speed and accuracy that the Unistat 410w control the process temperature from -20°C to +100°C and cooling down to -20°C.

Start (°C)	End (°C)	Approximate time (min)	Average Ramp Rate (K/Min)
-20	+100	56	2.14
+100	-20	89	1.35

