

## F81-HL Ultra-Low Refrigerated / Heating Circulator

The Ultra-Low Refrigerated Circulators of the HighTech Series with HL or SL circulator feature powerful pressure and suction pumps. The instruments provide the entire variety of functions of the professional HighTech Series of circulators.

### Product features

- VFD COMFORT DISPLAY
- Keypad for setpoints, warning/safety values and menu functions
- ICC (Intelligent Cascade Control), self-optimizing temperature control
- TCF Temperature Control Features to optimize the control behavior
- ATC3 3-Point-Calibration
- Pt100 External sensor connection for measurement and control
- SMART PUMP, electronically adjustable pump stages
- Unique early warning system for low liquid level
- Adjustable high temperature cut-out, visible via display
- RS232/RS485 interface for online communication
- Integrated programmer for 6 x 60 program steps
- Connections for solenoid valve and HSP booster pump
- Proportional cooling control
- Active Cooling Control



### Performance values

230V/50Hz (Schuko Plug - CEE 7/4 Plug Type F)	
Heating capacity kW	1.3
Viscosity max. cSt	70
Pump capacity flow rate l/min	22 ... 26
Pump capacity flow pressure psi	5.8 ... 10.2
Maximum suction psi	2.9 ... 5.8
Power consumption A	16

Order No.	9312681.33					
Cooling capacity (Ethanol)						
°C	20	0	-20	-40	-60	-80
kW <sup>1</sup>	0.45	0.38	0.36	0.32	0.27	0.07
Refrigerant stage 1			Refrigerant stage 2			
Refrigerant	R404A		Refrigerant	R23		
Filling weight g	500		Filling weight g	120		
Global Warming Potential for R404A	3922		Global Warming Potential for R23	14800		
Carbon dioxide equivalent t	1.961		Carbon dioxide equivalent t	1.776		

<sup>1</sup> Performance specifications measured in accordance with DIN 12876. Cooling capacities up to 20 °C measured with ethanol; over 20 °C with thermal oil unless otherwise specified. Performance specifications apply at an ambient temperature of 20 °C. Performance values may differ with other bath fluids.

## Technical data

<b>Available voltage versions</b>		<b>Cooling</b>	
Order No.	9 312 681	Cooling of compressor	2-stage Air
<b>Available voltage versions:</b>			
9312681.33	230V/50-60Hz (Schuko Plug - CEE 7/4 Plug Type F) (R404A)		
<b>Bath</b>		<b>Other</b>	
Bath cover	integrated	Classification	Classification III (FL)
Usable bath opening in. (W x L / D)	5.1 x 5.9 / 6.3	IP Code	IP 21
<b>Electronics</b>		<b>Dimensions and volumes</b>	
Interfaces	Profibus optional	Weight lbs	194
External pt100 sensor connection	integrated	Dimensions in. (W x L x H)	19.7 x 22.8 x 35
Integrated programmer	6x60 steps	Filling volume l	5 ... 6.5
Temperature control	ICC	Pump connections	M16x1 male
Absolute temperature calibration	3 Point Calibration		
Temperature display	VFD		
Temperature setting	Keypad		
<b>Temperature values</b>		<b>Included in delivery</b>	
Setting the resolution of the temperature display °C	0.01	2 Barbed fittings for tubing 8 and 12 mm ID. (Pump connections M16x1 male)	
Working temperature range °C	-81 ... +100		
Temperature stability °C	±0.02		
Ambient temperature °C	+5 ... +40		
Setting the resolution of the temperature display °C	0.01		

## All Benefits



**For flammable bath fluid**  
Classification III (FL) according to DIN 12876-1



**Process. Under control.**  
Full control of the dynamic, access to all important control parameters for individual process optimization.



**Early warning system for high/low temperature limits**  
Maximum safety for applications, optical and audible alarm, convertible to automated cut-off function



**ATC3. Calibration.**  
'Absolute Temperature Calibration' for compensating a physically caused temperature difference, 3-point calibration.



**100 % Cooling capacity**  
'Active Cooling Control' for cooling available throughout the entire working temperature range, fast cool-down even at higher temperatures



**Energy saving cooling**  
Proportional cooling control for automatic adjustment of cooling power or temporary switch-off of compressor as needed to save up to 90 % energy in comparison to unregulated cooling machines



**Connection of additional equipment**  
 Stakei connections for solenoid valve, HSP booster pump and HST booster heater



**Clever pump system**  
 Reliable and consistent pump capacity, electronically adjustable pump stages



**Control of the external application**  
 External Pt100 sensor connection for precise measurement and control directly in the external application



**Condensation and ice protection**  
 A heated cover plate prevents condensation or ice build-up in the bath



**100% Checked.**  
 100% testing. 100% quality. Each JULABO Circulator undergoes thorough quality testing before leaving the factory.



**Green technology.**  
 Development consistently applied environmentally friendly materials and technologies.



**JULABO. Quality.**  
 Highest standards of quality for a long product life.



**Quick start.**  
 Individual JULABO consultation and comprehensive manuals at your disposal.



**Satisfied customers.**  
 11 subsidiaries and more than 100 partners worldwide guarantee fast and qualified JULABO support.



**Services 24/7.**  
 Around the clock availability. You can find suitable accessories, data sheets, manuals, case studies, and more at [www.julabo.com](http://www.julabo.com).



**Intelligent temperature control.**  
 Intelligent cascade control - automatic and self-optimizing adaptation of the PID control parameters with external stability of +/- 0.05 °C.