

# FP89-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 in-struments provide the entire variety of functions of the professional HighTech Series of circulators.

## Your advantages

- VFD COMFORT DISPLAY
- LCD DIALOG DISPLAY backlit for convenient interactive operation
- ICC (Intelligent Cascade Control), self-optimizing temperature control
- TCF Temperature Control Features to optimize the control behavior
- ATC3 3-Point-Calibration
- · SMART PUMP, electronically adjustable pump stages
- · 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



#### Technical data

Available voltage	versions		Bath				
Order No.	9 312 689		Bath cover	integrated			
Available voltage versions:			Usable bath opening cm (W x L / D)	13 x 15 / 16			
9 312 689.03							
9 312 689.13							
Cooling			Other				
Cooling of compressor		2-stage Air	Classification	Classification III (FL)			
			IP Code	IP 21			
Electronics			Dimensions and volumes				
Digital interface		Profibus optional	Weight kg	135			
External pt100 sensor connection		integrated	Dimensions cm (W $\times$ L $\times$ H)	55 x 60 x 92			
Integrated programmer		6x60 steps	Filling volume l	5.5 8			
Temperature control		ICC	Pump connections M16x1 male				
Absolute temperature calibration		3 Point Calibration	on				
Temperature display		VFD					
Temperature setting		Keypad					
Temperature valu	es						
Setting the resolution of the temperature 0.01 display °C		0.01					
Working temperature range °C -9		-90 <b>+</b> 100					
Temperature stability °C ±		±0.02					
Ambient temperature °C		+5.0 +40.0					
Temperature display resolution °C		0.01					

## Performance values



# 230V/50Hz (Schuko Plug - CEE 7/4 Plug Type F)

230V/50Hz							
Heatin	ıg capa	acity k\		1.3			
Cooling capacity (Ethanol)							
°C	20	0	-20	-40	-60	-80	
kW	1	0.92	0.88	0.75	0.58	0.2	
Viscos	sity ma	ax. cST	70				
Refrig	erant			R404A			
Filling	volum	ie g		500			
Global	l Warm	ning Po	3922				
Carbo	n dioxi	ide equ		1.961			
Refrig	erant		R508B				
Filling	volum	ie g		270			
Global	l Warm	ning Po	13396				
Carbo	n dioxi	ide equ		3.617			
Pump	capac	ity flov	22 26				
Pump	capac	ity flov	0.4 0.7				
Maxim	num sı	uction l	0.2 0.4				

## 230V/60Hz (Nema N6-20 Plug)

230V/60Hz							
Heating capacity kW							1.3
Cooling capacity (Ethanol)							
°C	20	0	-20	-40	-60	-80	
kW	1	0.92	0.88	0.75	0.58	0.2	
Viscosity max. cST							70
Refrigerant							R404A
Filling volume g							500
Global Warming Potential for R404A							3922
Carbon dioxide equivalent t							1.961
Refrigerant							R508B
Filling volume g							270
Global Warming Potential for R508B							13396
Carbon dioxide equivalent t							3.617
Pump capacity flow rate I/min							22 26
Pump capacity flow pressure bar							0.4 0.7
Maximum suction bar							0.2 0.4

# All Benefits



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



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





#### Satisfied customers.

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



#### 100% Checked.

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



#### Quick start.

Individual JULABO consultation and comprehensive manuals at your disposal.



#### Services 24/7.

Around the clock availability. You can find suitable accessories, data sheets, manuals.



## Intelligent temperature control.

Intelligent cascade control - automatic and self-optimizing adaptation of the PID control parameters with external stability of +/- 0.05  $^{\circ}\text{C}.$ 



## Connection of additional equipment

Stakei connections for solenoid valve, HSP booster pump and HST booster heater



# Early warning system for high/low temperature limits

Maximum safety for applications, optical and audible alarm, convertible to automated cut-off function



#### Clever pump system

Reliable and consistent pump capacity, electronically adjustable pump stages



## Control from the external application

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



#### For flammable bath fluid

Classification III (FL) according to DIN 12876-1



#### ATC3. Calibration.

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



#### Process. Under control.

Full regulation of the dynamics control, access to all important control parameters for individual process optimization.



#### 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



## Condensation and ice protection

A heated cover plate prevents condensation or ice build-up in the bath