

## FP90-SL Ultra-Low Refrigerated / Heating Circulator

Ultra-Low Refrigerated Circulators with SL circulator impress with their high heating, cooling and pump capacities for external temperature control applications.

### Product features

- VFD COMFORT DISPLAY
- LCD DIALOG DISPLAY backlit for convenient interactive operation
- 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
- 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



### Performance values

400V/3PNPE/50Hz (Plug 32A CEE)	
Heating capacity kW	3
Viscosity max. cST	70
Pump capacity flow rate l/min	22 ... 26
Pump capacity flow pressure bar	0.4 ... 0.7
Maximum suction bar	0.2 ... 0.4
Power A	22

Order No.	9352790N150.07					
Cooling capacity (Ethanol)						
°C	20	0	-20	-40	-60	-80
kW	1.8	1.7	1.6	1.35	0.75	0.15
Refrigerant stage 1			Refrigerant stage 2			
Refrigerant	R404A		Refrigerant	R23		
Filling volume g	850		Filling volume g	380		
Global Warming Potential for R404A	3922		Global Warming Potential for R23	14800		
Carbon dioxide equivalent t	3.334		Carbon dioxide equivalent t	5.624		

## Technical data

Available voltage versions		Bath	
Order No.	9 352 790N150	Bath cover	integrated
Available voltage versions:			
9352790N150.07	400V/3PNPE/50Hz (Plug 32A CEE) (R404A)		
9352790N150.16	208V/3PPE/60Hz (Without Plug) (R404A)		
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	201
External pt100 sensor connection	integrated	Dimensions cm (W × L × H)	59 x 76 x 116
Integrated programmer	6x60 steps	Filling volume l	22
Temperature control	ICC	Pump connections	M16x1 male
Absolute temperature calibration	3 Point Calibration		
Temperature display	VFD		
Temperature setting	Keypad		
Temperature values			
Setting the resolution of the temperature display °C	0.01		
Working temperature range °C	-90 ... +150		
Temperature stability °C	±0.05		
Ambient temperature °C	+5 ... +40		
Temperature display resolution °C	0.01		

## All Benefits



**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.



**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



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



**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



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



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