

## FPW91-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
- 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

230V/3PPE/60Hz (Without Plug)	
Heating capacity kW	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
Current Draw A	32

Order No. 9352793N.16

#### Cooling capacity (Ethanol)

°C	20	0	-20	-40	-60	-80
kW	4.5	4.1	3.7	3.1	2	0.75

\* Performance specifications measured in accordance with DIN12876. 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.

Refrigerant stage 1		Refrigerant stage 2	
Refrigerant	R404A	Refrigerant	R23
Filling volume g	900	Filling volume g	1000
Global Warming Potential for R404A	3922	Global Warming Potential for R23	14800
Carbon dioxide equivalent t	3.53	Carbon dioxide equivalent t	14.8

## Technical data

Available voltage versions		Bath	
Order No.	9 352 793N	Bath cover	integrated
Available voltage versions:			
9352793N.07	400V/3PNPE/50Hz (Plug 63A CEE) (R404A)		
9352793N.16	230V/3PPE/60Hz (Without Plug) (R404A)		
Cooling		Other	
Cooling of compressor	2-stage Water	Classification	Classification III (FL)
Cooling water temperature max. °C	20	IP Code	IP 21
Cooling water pressure max. psi	87		
Cooling water difference pressure psi	50.8		
1.0Cooling water consumption l/min	7.5		
Electronics		Dimensions and volumes	
Digital interface	Profibus optional	Weight lbs	668
External pt100 sensor connection	integrated	Cooling Water Connection in	G¾
Integrated programmer	6x60 steps	Dimensions in. (W × L × H)	33.5 x 29.9 x 45.7
Temperature control	ICC	Filling volume l	22
Absolute temperature calibration	3 Point Calibration	Pump connections	M16x1 male
Temperature displayTemperature display	VFD		
Temperature settingTemperature setting	Keypad		
Temperature values		Included in delivery	
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	-91 ... +100	2 each barbed fittings for tubing 8 and 12 mm inner dia. (pump connections M16x1 female).	
Temperature stability °C	±0.2		
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.us](http://www.julabo.us).



**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 control of the dynamic, 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.