# FPW91-SL Ultra-Low Refrigerated-Heating Circulator

## Superior models for most demanding applications

JULABO Ultra-Low Refrigerated Circulators for heating and cooling are suitable for external temperature tasks. Powerful circulating pump systems and high heating and cooling capacities guarantee short heat-up and cool-down times. ACC 'Active Cooling Control' provides active cooling control across the whole temperature range. An energy saving feature with only minor loss of heat is provided by the proportional cooling capacity control in the 'FP' refrigeration units. The inevitable dust accumulation that occurs in refrigeration systems is solved by means of an easily removed venting grill, which allows for easy cleaning. The units are equipped with handles or castors for an easy transportation. All models have a drain tap on the front allowing the fluid to be drained easily. Additionally the instruments are equipped with an improved insulation to help avoid ice-formation, and have a visual liquid level display.

## Your advantages

- 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 behaviour
- ATC3 3-Point-Calibration
- · Pt100 External sensor connection for measurement and control
- SMART PUMP, electronically adjustable pump stages
- Early warning system for low liquid level (DBGM 203 06 059.8)
- · 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

## **Technical Data**

Order No.	9352793N
Model series	HighTech
Category	Ultra-Low Refrigerated-Heating Circulators
Working temperature range (°C)	-91 +100
Temperature stability (°C)	±0.2
Setting / display resolution	0.01 °C
Integrated programmer	6x60 steps
Temperature Display	VFD, LCD
Heating capacity (kW)	3
Cooling capacity (Medium Ethanol)	°C 20 0 -20 -40 -60 -80 kW 4.5 4.1 3.7 3.1 2 0.75







22-26
5.8-10.2
2.9-5.8
Ø = 2.7 / 7.9
M16x1
8 / 12
22
R23, R404A
integrated
RS232, RS485 Optional: Profibus
540 °C
33.5 x 29.9 x 45.7
653
Classification III (FL)
2 each barbed fittings for tubing 8 and 12 mm inner dia. (pump connections M16x1 female). Cooling water connection G 3/4" male with barbed fittings for tubing 1/2" inner dia.
Water
3x 230/60/32
400 V / 3 Ph. / 50 Hz 230 V / 3 Ph. / 60 Hz

The most powerful JULABO ultra-low refrigerated circulator with an extended temperature range and 2-stage cascade cooling - suitable for high-volume reactors (up to 80 liters)

## Characteristics

### Display

# A perfect view

Ample, easy to read VFD Comfort display for simultaneous display of 3 values, warning functions, high temperature cut-off, pump stages (resolution 0.01 °C)



Additional plain text information Comfortable LCD dialog display for interactive operation with plain text display



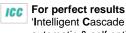
Pump stage and liquid level Backlit indicator for selected pump stages and filling volume on Presto® PLUS, Magnum 91 & Forte HT

#### Operation



Comfortable keypad with additional menu functions for pump stages, calibration, control parameters, programmer, warnings, etc.

#### **Temperature Control**



'Intelligent Cascade Control', automatic & self optimizing adjustment of PID control parameters, temperature stability ±0.005 °C internal, <±0.05 °C external

## TCF Full control

'Temperature Control Features' for individual optimization, access to all important control parameters, additional settings for band limit, limits, Co-Speedfactor etc.



ATC<sup>3</sup> Highest measuring accuracy 'Absolute Temperature Calibration' for manual compensation of a temperature difference, 3-point calibration

#### **Refrigeration Technology**



tnergy 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





Consistent cooling capacity Easily removable venting grid for quick and easy cleaning



## ACC 100 % Cooling capacity

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

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

## Early warning system for high/low temperature limits Maximum safety for applications,

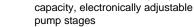
optical and audible alarm, convertible to automated cut-off function



#### Enhanced protective functions Maximum safety, adjustable high temperature cut-off or dry-running protection, additional display of setpoints permits easy and precise adjustments



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



**Technical Features** 

pump stages Pt 100 Control from the external

Reliable and consistent pump

Clever pump system

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

Connection compliant to standard RS 232 RS 485 RS232/RS485 dual-interface for serial data transmission according to EIA-485 industry standard (2-wire bus technology), upgradable with Profibus DP

## **Optimal program control**

For the execution of time and temperature dependant profiles, 6 temperature profiles with 60 steps max., with real time clock



State Automatic control of operating time

Electronic countdown-timer function for timer-programmed unit shut-down, standby mode after programmed time expires

## Warning & Safety Functions

## Early warning system for low

liquid level Maximum safety for applications, optical and audible alarm, allows user to refill bath fluid before the unit shuts down