Product data sheet

FP90-SL-150C 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.	9352790N150
Model series	HighTech
Category	Ultra-Low Refrigerated-Heating Circulators
Working temperature range (°C)	-90 +150
Temperature stability (°C)	±0.05
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 1.8 1.7 1.6 1.35 0.75 0.15



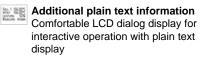


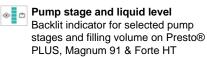
Pump capacity flow rate (I/min)	22-26
Pump capacity flow pressure (bar)	0.4-0.7
Pump capacity flow suction (bar)	0.2-0.4
Bath opening / bath depth (W x L / D cm)	Ø = 7 / 20 cm
Pump connections	M16x1
Barbed fittings diameter (inner dia. / mm)	8 / 12
Filling volume liters	22
Refrigerant stage 1	R404A
Filling volume refrigerant stage 1 (g)	850
Global Warming Potential for R404A	3922
Carbon dioxide equivalent stage 1 (t)	3.334
Refrigerant stage 2	R23
Filling volume refrigerant stage 2 (g)	380
Global Warming Potential for R23	14800
Carbon dioxide equivalent stage 2 (t)	5.624
External Pt100 sensor connection	integrated
Digital interface	RS232, RS485 Optional: Profibus
Ambient temperature	540 °C
Dimensions W x L x H (cm)	59 x 76 x 116
Weight (kg)	195
Classification according to DIN12876-1	Classification III (FL)
Included with each unit	2 each barbed fittings for tubing 8 and 12 mm inner dia. (pump connections M16x1 female).
Cooling of compressor	Air
Available voltage versions	400 V / 3 Ph. / 50 Hz 230 V / 3 Ph. / 50 Hz 230 V / 3 Ph. / 60 Hz

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)





Operation



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

Temperature Control

For perfect results ICC '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.

ATC³ Highest measuring accuracy

'Absolute Temperature Calibration' for manual compensation of a temperature difference, 3-point calibration

Refrigeration Technology

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

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

ACC 100 % Cooling capacity

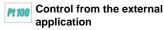
'Active Cooling Control' for cooling available throughout the entire working temperature range, fast cool-down even at higher temperatures

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

Technical Features

Clever pump system

Reliable and consistent pump capacity, electronically adjustable pump stages



application

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

Connection compliant to standard 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



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



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