

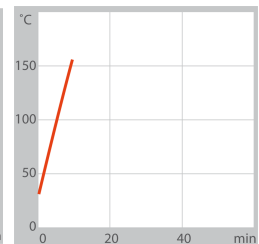
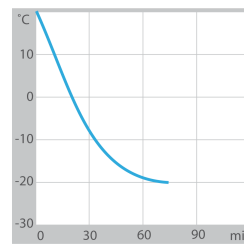
F12-MA Refrigerated/Heating Circulator

The general all-rounder for a broad spectrum of requirements

JULABO Refrigerated & Heating Circulators for heating and cooling are suitable for external temperature tasks and for temperature applications directly in the bath. A model from three different series' with different capacities can be selected. Powerful circulating pump systems and high heating and cooling capacities guarantee short heat-up and cool-down times. The inevitable dust accumulation that occurs in refrigeration systems is solved by means of an easily removed venting grid, which allows for easy cleaning. Depending on the model, the units are equipped with handles or castors for an easy transportation. All models have a drain screw on the front allowing the fluid to be drained easily. The compact assembly of each unit enables space to be saved in the laboratory.

Your advantages

- MULTI-DISPLAY (LED) for actual and setpoint values, warning/safety functions and pump stage
- Keypad for setpoints, warning/safety values and menu functions
- PID2 temperature control with drift compensation
- ATC3 3-Point-Calibration
- Early warning system for low liquid level (DBGM 203 06 059.8)
- Adjustable high temperature cut-out, visible via display
- RS232 interface for online communication
- SMART PUMP electronically adjustable pump stages
- Active Cooling Control



- Cool-down time (Ethanol)
- Heat-up time (thermal)

Technical Data

Order No.	9153612			
Model series	TopTech			
Category	Refrigerated - Heating Circulators			
Working temperature range (°C)	-20 ... +200			
Temperature control	PID			
Temperature stability (°C)	±0.02			
Setting / display resolution	0.01 (-9.99...99.99) / 0.1 °C			
Temperature Display	LED			
Heating capacity (kW)	2			
Cooling capacity (Medium Ethanol)	°C	20	0	-20
	kW	0.16	0.1	0.02
Pump capacity flow rate (l/min)	11-16			

Pump capacity flow pressure (bar)	0.23-0.45
Bath opening / bath depth (W x L / D cm)	13 x 15 / 13
Pump connections	M10x1
Barbed fittings diameter (inner dia. / mm)	8 / 10
Filling volume liters	4.5
Refrigerant stage 1	R134a
Filling volume refrigerant stage 1 (g)	55
Global Warming Potential for R134a	1430
Carbon dioxide equivalent stage 1 (t)	0.079
Digital interface	RS232 Optional: Profibus
Ambient temperature	5...40 °C
Dimensions W x L x H (cm)	20 x 36 x 56
Weight (kg)	23
Classification according to DIN12876-1	Classification III (FL)
Included with each unit	2 barbed fittings suitable for tubing 8 and 10 mm inner dia. (pump connections M10x1 female)
Cooling of compressor	Air
Power requirement V / Hz / A	230/50/11
Available voltage versions	230 V / 50 Hz 115 V / 60 Hz 230 V / 60 Hz 100 V / 50 - 60 Hz

Characteristics

Display



Several values at a glance
Large Multi-Display (LED), easy to read across the room, for actual value and up to 3 setpoints, warning functions, high temperature cut-off, selected pump stages (resolution 0.01/0.1 °C)

Operation



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

Temperature Control



Highly precise
PID Temperature control with drift compensation and adjustable control parameters, temperature stability $\pm 0.01 \dots \pm 0.02$ °C



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

Refrigeration Technology



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



100 % Cooling capacity
'Active Cooling Control' for cooling available throughout the entire working temperature range, fast cool-down even at higher temperatures

Technical Features



Clever pump system
Reliable and consistent pump capacity, electronically adjustable pump stages



Serial connection
RS232 interface for PC connection, e.g. for data communication and recording of measured values

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