

## F33-ME Refrigerated/Heating Circulator

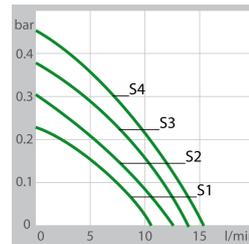
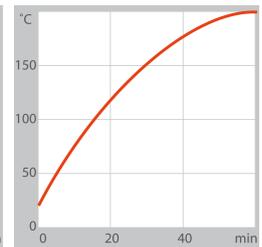
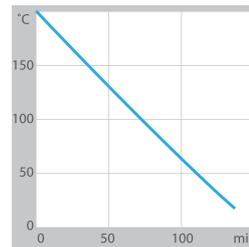
### The advanced all-rounder with a Pt100 external sensor connection

JULABO Refrigerated and Heating Circulators are suitable for temperature application to external systems with simultaneous operation in the bath tank. Models in different performance classes are available. The units provide high heating/cooling capacities to ensure rapid heat-up and cool-down times. With 'Active Cooling Control' to +200 °C (not on ED models). 'FP' models offer proportional cooling control to ensure energy-saving performance and to reduce heat generation to the environment. Convenient cleaning of dust by removable venting grid. Some models have a handle or castors to allow easy transport. All models provide a drain port on the front for conveniently draining the bath fluid. Typical applications: Temperature applications to external, closed systems, such as for example photometers, refractometers, viscometers, etc. For simultaneous application to small objects in the circulator bath.



### Your advantages

- VFD COMFORT DISPLAY
- Keypad for setpoints, warning/safety values and menu functions
- PID3 cascade temperature control
- 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 interface for online communication
- Integrated programmer for 10 program steps
- Active Cooling Control



- Cool-down time (Ethanol)
- Heat-up time (thermal)
- Pump capacity (Water)

### Technical Data

Order No.	9162633
Model series	TopTech
Category	Refrigerated - Heating Circulators
Working temperature range (°C)	-30 ... +200
Temperature control	PID, cascade
Temperature stability (°C)	±0.01
Setting / display resolution	0.01 Å°C
Integrated programmer	1x10 steps
Temperature Display	VFD
Heating capacity (kW)	2

Cooling capacity (Medium Ethanol)	°C	20	0	-20	-30
	kW	0.5	0.32	0.12	0.05
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)	23 x 14 / 20				
Pump connections	M10x1				
Barbed fittings diameter (inner dia. / mm)	8 / 10				
Filling volume liters	16				
Refrigerant stage 1	R134a				
Filling volume refrigerant stage 1 (g)	145				
Global Warming Potential for R134a	1430				
Carbon dioxide equivalent stage 1 (t)	0.207				
External Pt100 sensor connection	integrated				
Digital interface	RS232 Optional: Profibus				
Ambient temperature	5...40 °C				
Dimensions W x L x H (cm)	36 x 46 x 69				
Weight (kg)	44				
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	230/50/12				
Available voltage versions	230 V / 50 Hz 115 V / 60 Hz 230 V / 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.



#### Highest measuring accuracy

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



#### Pump stage and liquid level

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

### Temperature Control



#### For higher demands

PID Temperature control with drift compensation and adjustable parameters, improved temperature stability for external applications, temperature stability ±0.01 °C internal, <±0.1 °C external



#### Consistent cooling capacity

Easily removable venting grid for quick and easy cleaning

### Refrigeration Technology

**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

**Control from the external application**

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

**Serial connection**

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

**Easy program control**

Integrated programmer for the execution of time and temperature dependant profiles, 1 temperature profile with 10 steps max., with real time clock

### 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