

## MAGIO MS-310F Refrigerated / heating circulator

As with all circulators from the MAGIO range, the refrigerated circulators stand out thanks to their premium quality, high performance and intuitive operation. The devices offer extra strong pressure and suction pumps, thus fulfilling the highest demands for temperature control of external applications. Whether in basic research, material testing or technical systems – the MAGIO refrigerated circulators offer high-tech solutions for high customer requirements.

### With natural refrigerant

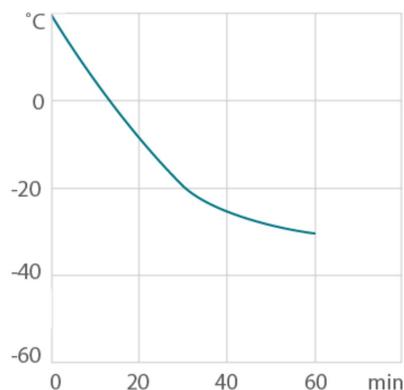
The MAGIO MS-310F with natural refrigerant. Order No.. 9 032 713.N1



### Product features

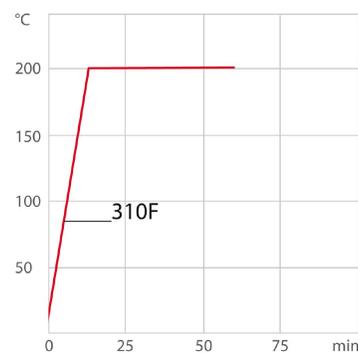
- Ideal for demanding external applications
- Simple control of complex applications
- Continuously adjustable, extremely powerful pressure / suction pump
- Flow rate 16 ... 31 l / min, pressure 0.24 ... 0.92 bar, suction 0.03 ... 0.4 bar
- Large, high-resolution TFT touch display with multilingual user interface
- Parts being in contact with the medium made of stainless steel
- Integrated programmer
- Integrated external Pt100 connection
- USB connection
- RS232 interface for online communication
- Ethernet
- analog interfaces (accessory)
- Class III (FL) according to DIN 12876-1
- Modbus
- Profibus DP (Accessory)
- RS232/RS485 interface for online communication
- Connections for solenoid valve

### Cool-down time



Medium: Ethanol

### Heat-up time



Medium: Thermal

## Performance values

### 115V/60Hz (Nema N5-15 Plug)

Heating capacity kW	1
Viscosity max. cSt	70
Pump capacity flow rate l/min	16 ... 31
Pump capacity flow pressure bar	0.24 ... 0.92
Maximum suction bar	-0.03 ... -0.4
Power consumption A	12

## Refrigerant variants

Order No. 9032713.N1.02

### Cooling capacity 1 (Ethanol)

°C	20	0	-10	-20	-30
kW	0.33	0.28	0.23	0.13	0.05

\* Performance specifications measured in accordance with DIN 12876. 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.

Cooling capacity 1 = capacity at minimum pump level, cooling capacity 2 = capacity at maximum pump level

### Cooling capacity 2 (Ethanol)

°C	20	0	-10	-20	-30
kW	0.26	0.21	0.17	0.1	0.01

\* Performance specifications measured in accordance with DIN 12876. 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.

Cooling capacity 1 = capacity at minimum pump level, cooling capacity 2 = capacity at maximum pump level

#### Note about natural refrigerants:

Temperature control units using natural refrigerants are often subject to regulatory requirements regarding the installation site, operation, transport or disposal of the units. If you have any questions, we will be happy to advise you.

### Refrigerant stage 1

Refrigerant	R290
Filling weight g	25
Global Warming Potential for R290	3
Carbon dioxide equivalent t	7.5E-5

Order No.	9032713.S1.02				
Cooling capacity 1 (Ethanol)					
°C	20	0	-10	-20	-30
kW	0.33	0.28	0.23	0.13	0.05
* Performance specifications measured in accordance with DIN 12876. 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.					
Cooling capacity 1 = capacity at minimum pump level, cooling capacity 2 = capacity at maximum pump level					
Cooling capacity 2 (Ethanol)					
°C	20	0	-10	-20	-30
kW	0.26	0.21	0.17	0.1	0.05
* Performance specifications measured in accordance with DIN 12876. 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.					
Cooling capacity 1 = capacity at minimum pump level, cooling capacity 2 = capacity at maximum pump level					
Refrigerant stage 1					
Refrigerant	R449A				
Filling weight g	60				
Global Warming Potential for R449A	1397				
Carbon dioxide equivalent t	0.08382				

## Technical data

Available voltage versions		Bath	
Order No.	9 032 713	Bath tank	Stainless steel
Available voltage versions:		Bath cover	integrated
9032713.N1.01	100V/50-60Hz (Nema N5-15 Plug) (R290)	Usable bath opening cm (W x L / D)	13 x 15 / 15
9032713.S1.01	100V/50-60Hz (Nema N5-15 Plug) (R449A)		
9032713.N1.02	115V/60Hz (Nema N5-15 Plug) (R290)		
9032713.S1.02	115V/60Hz (Nema N5-15 Plug) (R449A)		
9032713.N1.33	200-230V/50-60Hz (Schuko Plug - CEE 7/4 Plug Type F) (R290)		
9032713.S1.33	200-230V/50-60Hz (Schuko Plug - CEE 7/4 Plug Type F) (R449A)		
9032713.N1.33.chn	200-230V/50-60Hz (CN Plug) (R290)		
9032713.S1.33.chn	200-230V/50-60Hz (CN Plug) (R449A)		
9032713.N1.04	200-230V/50-60Hz (UK Plug Type BS1363A) (R290)		
9032713.S1.04	200-230V/50-60Hz (UK Plug Type BS1363A) (R449A)		
9032713.N1.05	200-230V/50-60Hz (CH Plug Type SEV 1011) (R290)		
9032713.S1.05	200-230V/50-60Hz (CH Plug Type SEV 1011) (R449A)		

Cooling		Other	
Cooling of compressor	1-stage Air	Classification	Classification III (FL)
		IP Code	IP 21
		Pump function	Pressure Suction Pump
		Pump type	Immersion Pump
		User Interface Language	Chinese, Czech, Dutch, English, French, German, Italian, Japanese, Korean, Polish, Portuguese, Russian, Spanish, Turkish
Electronics		Dimensions and volumes	
Interfaces	Ethernet, Modbus, RS232, RS485, Stakei, USB	Weight kg	29
External pt100 sensor connection	integrated	Dimensions cm (W x L x H)	23 x 40 x 65
Integrated programmer	8x60 steps	Filling volume l	3 ... 4
Temperature control	ICC	Pump connections	M16x1 male
Absolute temperature calibration	10 Point Calibration		
Temperature display	7" TFT Touchscreen		
Temperature setting	Touchscreen		
Electronic Timer hr:min	00:00 ... 99:59		
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	-30 ... +200		
Temperature stability °C	±0.01		
Ambient temperature °C	+10 ... +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.



### Condensation protection.

Superb design solution. Integrated ventilation directs air over the bath lid and minimizes condensation.



### Intelligent temperature control.

Intelligent cascade control - automatic and self-optimizing adaptation of the PID control parameters with external stability of +/- 0.05 °C.



### Green technology.

Development consistently applied environmentally friendly materials and technologies.



### Handle with ease.

Makes day-to-day work easy. Comfortably move your JULABO Circulator around by using the ergonomic handles (front and rear).



### JULABO. Quality.

Highest standards of quality for a long product life.



**Internal. External.**  
The pump is controlled via a lever located directly below the display. Easily change between internal and external circulation.



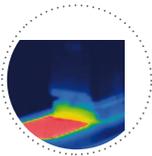
**More bath.**  
Designed for more comfort. Thanks to the recessed cooling coil, the internal bath provides more space.



**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.



**Solid.**  
Minimized energy loss through high-quality insulation.



**Services 24/7.**  
Around the clock availability. You can find suitable accessories, data sheets, manuals, case studies, and more at [www.julabo.com](http://www.julabo.com).



**Space saving. Free up space.**  
Place your JULABO Circulator right next to an application, another unit, or wall. That saves space. This is made possible by eliminating vents and connections on the sides.



**Highest measuring accuracy**  
'Absolute Temperature Calibration' for manual compensation of a temperature difference, 10-point calibration



**Stable.**  
Rubber feet allow for a secured footing of your CORIO to prevent damage to your laboratory equipment.



**Quick support**  
If an error occurs, the integrated Black-Box function permits fast diagnosis by the JULABO service team



**Tidy.**  
The special drain tap for easy draining of bath fluids without tools.



**Touching permitted.**  
Optimum safety. The ergonomic plastic handle protects your fingers from hot surfaces.



**Multi-lingual.**  
Operation in multiple languages.



**Programmer. Integrated.**  
The integrated internal programmer makes it possible to automatically run temperature time profiles.



**Temperature. Under control.**  
External Pt100 sensor connection for precise measurement and control directly in the external application.



**Analog I/O.**  
Analog interfaces for integration into process control systems (optional).



**Fill level. Monitored.**  
Fill level indicator on the display for heat-transfer liquid.



**Process stability.**  
Early warning - visual and acoustic - of critical states increases process stability.



**Stable. Mobile.**  
Rubber feet keep JULABO Circulators standing firm. Larger and more powerful units also have integrated rollers for easy handling.



**Energy-saving.**  
The high-quality insulation of all relevant components saves energy.

**Everything made of stainless steel.**

Quality and material compatibility at the highest level. All parts in contact with the medium are entirely made of stainless steel.

**Wide range.**

Refrigerated and heating circulator in various combinations, circulator in various sizes. Maximum flexibility through a large selection of accessories.

**Connection. Easy.**

Inclined pump connections (M16×1) facilitate the connection of applications. Each unit includes 2 barbed fittings of 8/12 mm diameter each.

**Most powerful pump.**

The integrated pressure/suction pump with performance values of 0.9 bar and -0.4 bar is the most powerful in its class and continuously adjustable.

**Condensation protection.**

Superb design solution. Integrated ventilation directs air over the bath lid and minimizes condensation.

**Many interfaces.**

Straight-forward remote control, data management, and integration into process structures. USB, Ethernet, RS232, SD card, and alarm off are permanently integrated. Further interfaces available as accessories.

**Touch display. Perfect operation.**

With the touch display, the user always has an overview of all values and functions. The intuitive and multilingual menu structure enables perfect control.

**Maximum safety.**

Classification III according to DIN12876-1 enables safe operation, even with flammable fluids. Automatic switch-off in the event of high temperature or low liquid level.

**Process. Under control.**

Full regulation of the dynamics control, access to all important control parameters for individual process optimization.