

## F33-HL Refrigerated - Heating Circulator

The top-of-the-line models with HL circulators offer professional technology and maximum functionality. The additional LCD dialog display interactively assists the user in setting circulator parameters. Intelligent Cascade Control (ICC) and Temperature Control Features (TCF) ensure optimal control behavior. HL circulators also have a Stakei connection.

### 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 behavior
- ATC3 3-Point-Calibration
- Pt100 External sensor connection for measurement and control
- SMART PUMP, electronically adjustable pump stages
- Adjustable pressure and suction pump
- Adjustable high temperature cut-out, visible via display
- Active Cooling Control
- RS232/RS485 interface for online communication
- Optional: analogue interfaces
- Integrated programmer for 6 x 60 program steps
- Connections for solenoid valve and HSP booster pump



### Technical data

Available voltage versions		Bath	
Order No.	9 312 633	Bath cover	integrated
Available voltage versions:		Usable bath opening cm (W x L / D)	23 x 14 / 20
9 312 633.01			
9 312 633.02			
9 312 633.03			
9 312 633.04			
9 312 633.05			
9 312 633.13			
Cooling		Other	
Cooling of compressor	1-stage Air	Sound pressure level dbA	55
		Classification	Classification III (FL)
		IP Code	IP 21
		Pump type	Immersion Pump
Electronics		Dimensions and volumes	
Digital interface	Profibus optional	Weight kg	45
External pt100 sensor connection	integrated	Barbed fittings inner diameter	8/12 mm
Integrated programmer	6x60 steps	Dimensions cm (W x L x H)	36 x 46 x 71
Temperature control	ICC	Filling volume l	12 ... 16
Absolute temperature calibration	3 Point Calibration	Pump connections	M16x1 male
Temperature display	VFD		
Temperature setting	Keypad		
Temperature values			

Setting the resolution of the temperature display °C	0.01
Working temperature range °C	-30 ... +200
Temperature stability °C	±0.01
Ambient temperature °C	+5.0 ... +40.0
Temperature display resolution °C	0.01

### Performance values

100V/50Hz	
Heating capacity kW	0.8
Cooling capacity (Ethanol)	
°C	20 0 -20 -30
kW	0.5 0.32 0.12 0.03
Viscosity max. cST	70
Refrigerant	R134a
Filling volume g	145
Global Warming Potential for R134a	1430
Carbon dioxide equivalent t	0.207
Pump capacity flow rate l/min	22 ... 26
Pump capacity flow pressure bar	0.4 ... 0.7
Maximum suction bar	0.2 ... 0.4

115V/60Hz	
Heating capacity kW	1
Cooling capacity (Ethanol)	
°C	20 0 -20 -30
kW	0.5 0.32 0.12 0.03
Viscosity max. cST	70
Refrigerant	R134a
Filling volume g	145
Global Warming Potential for R134a	1430
Carbon dioxide equivalent t	0.207
Pump capacity flow rate l/min	22 ... 26
Pump capacity flow pressure bar	0.4 ... 0.7
Maximum suction bar	0.2 ... 0.4

230V/50Hz	
Heating capacity kW	2
Cooling capacity (Ethanol)	
°C	20 0 -20 -30
kW	0.5 0.32 0.12 0.03
Viscosity max. cST	70
Refrigerant	R134a
Filling volume g	145
Global Warming Potential for R134a	1430
Carbon dioxide equivalent t	0.207

100V/60Hz	
Heating capacity kW	0.8
Cooling capacity (Ethanol)	
°C	20 0 -20 -30
kW	0.5 0.32 0.12 0.03
Viscosity max. cST	70
Refrigerant	R134a
Filling volume g	145
Global Warming Potential for R134a	1430
Carbon dioxide equivalent t	0.207
Pump capacity flow rate l/min	22 ... 26
Pump capacity flow pressure bar	0.4 ... 0.7
Maximum suction bar	0.2 ... 0.4

Pump capacity flow rate l/min	22 ... 26
Pump capacity flow pressure bar	0.4 ... 0.7
Maximum suction bar	0.2 ... 0.4

#### 230V/50Hz

Heating capacity kW					2
Cooling capacity (Ethanol)					
°C	20	0	-20	-30	
kW	0.5	0.32	0.12	0.03	
Viscosity max. cST					70
Refrigerant					R134a
Filling volume g					145
Global Warming Potential for R134a					1430
Carbon dioxide equivalent t					0.207
Pump capacity flow rate l/min					22 ... 26
Pump capacity flow pressure bar					0.4 ... 0.7
Maximum suction bar					0.2 ... 0.4

#### 230V/50Hz

Heating capacity kW					2
Cooling capacity (Ethanol)					
°C	20	0	-20	-30	
kW	0.5	0.32	0.12	0.03	
Viscosity max. cST					70
Refrigerant					R134a
Filling volume g					145
Global Warming Potential for R134a					1430
Carbon dioxide equivalent t					0.207
Pump capacity flow rate l/min					22 ... 26
Pump capacity flow pressure bar					0.4 ... 0.7
Maximum suction bar					0.2 ... 0.4

#### 230V/60Hz

Heating capacity kW					2
Cooling capacity (Ethanol)					
°C	20	0	-20	-30	
kW	0.5	0.32	0.12	0.03	
Viscosity max. cST					70
Refrigerant					R134a
Filling volume g					145
Global Warming Potential for R134a					1430
Carbon dioxide equivalent t					0.207
Pump capacity flow rate l/min					22 ... 26
Pump capacity flow pressure bar					0.4 ... 0.7
Maximum suction bar					0.2 ... 0.4

## All Benefits



**JULABO. Quality.**  
Highest standards of quality for a long product life.



**Green technology.**  
Development consistently applied environmentally friendly materials and technologies.



**Satisfied customers.**  
11 subsidiaries and more than 100 partners worldwide guarantee fast and qualified JULABO support.



**100% Checked.**  
100% testing. 100% quality. Each JULABO Circulator undergoes thorough quality testing before leaving the factory.



**Quick start.**  
Individual JULABO consultation and comprehensive manuals at your disposal.



**Services 24/7.**



**Intelligent temperature control.**  
Intelligent cascade control - automatic and self-optimizing adaptation of the PID control parameters with external stability of  $\pm 0.05$  °C.



**Connection of additional equipment**  
Stakei connections for solenoid valve, HSP booster pump and HST booster heater



**Early warning system for high/low temperature limits**  
Maximum safety for applications, optical and audible alarm, convertible to automated cut-off function



**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



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



**ATC3. Calibration.**  
'Absolute Temperature Calibration' for compensating a physically caused temperature difference, 3-point calibration.



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



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



**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



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