Водяные ванны и циркуляторы FSB-200, CH-400, Polystat, CH-800, CB-200D-IB, CBH-400, RH-800P, RH-400, RH-800, RHC-400, RHC-800, RHC-800P, RHV-400, RC-200-3, WBS-300, IP-400, IC-300, IC-400, WB-200, WB-400, WB-300

Технические характеристики

По вопросам продаж и поддержки обращайтесь:

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Петрозаводск (8142)55-98-37
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polystat®

User Manual

Cole-Parmer® Polystat® Circulating Baths with Programmable Temperature Controller

Model No. 20872-95, 20872-96, 20872-97, 20872-98, 20872-99, 20873-00, 20873-01, 20873-02, 20873-03, 20873-04, 20873-05, 20873-06, 20873-07, 20873-08, 20873-09, 20873-10, 20873-11, 20873-12, 20873-13, 20873-14, 20873-15, 20873-16, 20873-17, 20873-18, 20873-19, 20873-20, 20873-91, 20873-92, 20873-93, 20873-94, 20873-95, 20873-96, 20873-97, 20873-98

Cole-Parmer®
scientific experts

Introduction

Thank you for choosing this Circulating Bath with Programmable Temperature Controller. It is intended for the precise temperature control of suitable liquids in a reservoir. Extremely easy to use and maintain, it combines design innovation with highly intuitive operation to deliver convenient and versatile liquid temperature control for a wide range of applications.

WARNING: Cole-Parmer Circulating Baths are not intended for directly controlling the temperature of foods, pharmaceuticals, medicines, or other objects which may be ingested by or injected in humans or animals. Any such objects must be isolated from contact with the bath fluid and bath surfaces.

Here are some of the features that make your Circulating Bath so user-friendly:

- Intuitive touch screen operation
- Open-mode time/temperature programming (no restriction on the number of programs or steps)
- Selection of seven different temperature displays, including time-temperature graphing
- Powerful variable-speed pressure/suction pump with external circulation capability
- 180° viewing radius rotating control head
- Heat and chemical resistant top plate
- Self-storing reservoir cover (integrated baths only)
- Built-in temperature protection
- Suitable for use with Class III flammable bath fluids per DIN 12876-1

It will take you very little time to get your new Circulating Bath installed and running. This User's Manual is designed to guide you quickly through the process. We recommend that you read it thoroughly before you begin.

Circulating Baths with Programmable Temperature Controller

Model Type	Reservoir Capacity	Temperature Range	
		°C	°F
20873-05 & 20873-06 Refrigerating/Heating	7 liter	-20° to 200°C	-4° to 392°F
20873-09 & 20873-10 Refrigerating/Heating	7 liter	-40° to 200°C	-40° to 392°F
20873-07 & 20873-08 Refrigerating/Heating	7 liter	-20° to 200°C	-4° to 392°F
20873-11 & 20873-12 Refrigerating/Heating	15 liter	-30° to 200°C	-22° to 392°F
20873-13 & 20873-14 Refrigerating/Heating	15 liter	-40° to 200°C	-40° to 392°F
20873-15 & 20873-16 Refrigerating/Heating	20 liter	-30° to 200°C	-22° to 392°F
20873-17 & 20873-18 Refrigerating/Heating	28 liter	-30° to 200°C	-22° to 392°F
20873-19 & 20873-20 Refrigerating/Heating	45 liter	-25° to 135°C (1)	-13° to 275°F (1)
20872-97 & 20872-98 Heating Only	7 liter	Ambient +10° to 200°C	Ambient +20° to 392°F
20872-99 & 20873-00 Heating Only	15 liter	Ambient +10° to 200°C	Ambient +20° to 392°F
20873-01 & 20873-02 Heating Only	20 liter	Ambient +10° to 200°C	Ambient +20° to 392°F
20873-03 & 20873-04 Heating Only	28 liter	Ambient +10° to 200°C	Ambient +20° to 392°F
20873-97 & 20873-98 Stainless Steel Open Tank	10 liter	Ambient +10° to 150°C (2)	Ambient +20° to 302°F (2)
20873-91 & 20873-92 Polycarbonate Open Tank	8 liter	Ambient +10° to 85°C (3)	Ambient +20 to 185°F (3)
20873-93 & 20873-94 Polycarbonate Open Tank	14 liter	Ambient +10° to 85°C (3)	Ambient +20 to 185°F (3)
20873-95 & 20873-96 Polycarbonate Open Tank	23 liter	Ambient +10° to 85°C (3)	Ambient +20 to 185°F (3)
20872-95 & 20872-96 Refrigerating/Heating Calibration Bath	15 liter	-30° to 200°C	-22° to 392°F

1. Maximum operating temperature at which ±0.005°C temperature stability can be maintained; Programmable Controller is capable of higher temperatures.
2. Maximum operating temperature for stainless steel tank. Programmable Controller is capable of higher temperatures.
3. Maximum operating temperature for polycarbonate tank. Programmable Controller is capable of higher temperatures.

Technical Information

Performance Specifications

Operating Temperature Range:	Model dependent; see table below	
Temperature Stability:	±0.005°C (±0.01°F)	
Pump Type:	Variable speed pressure/suction	
	60Hz models	50Hz models
Maximum Pressure:	4.3 psi (0.30 bar)	3.6 psi (0.25 bar)
Maximum Pressure Flow Rate:	5.3 gpm (20.1 lpm)	4.4 gpm (16.7 lpm)
Maximum Suction Flow Rate:	3.9 gpm (14.7 lpm)	3.2 gpm (12.2 lpm)
Heater Wattage:	1100 watts	2200 watts

Model Type	Reservoir Capacity	Temperature Range	Electrical Requirements	
			60Hz	50Hz
20873-05 & 20873-06 Refrigerating/Heating	7 liters	-20° to 200°C -4° to 392°F	120V, 60Hz, 12A	240V, 50Hz, 12A
20873-09 & 20873-10 Refrigerating/Heating	7 liters	-40° to 200°C -40° to 392°F	120V, 60Hz, 12A	240V, 50Hz, 12A
20873-07 & 20873-08 Refrigerating/Heating	7 liters	-20° to 200°C -4° to 392°F	120V, 60Hz, 12A	240V, 50Hz, 12A
20873-11 & 20873-12 Refrigerating/Heating	15 liters	-30° to 200°C -22 to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A
20873-13 & 20873-14 Refrigerating/Heating	15 liters	-40° to 200°C -40° to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A
20873-15 & 20873-16 Refrigerating/Heating	20 liters	-30° to 200°C -22° to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A
20873-17 & 20873-18 Refrigerating/Heating	28 liters	-30° to 200°C -22° to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A
20873-19 & 20873-20 Refrigerating/Heating	45 liters	-25° to 135°C -13° to 275°F (1)	208-240V, 50/60Hz, 13A	208-240V, 50/60Hz, 13A
20872-97 & 20872-98 Heating Only	7 liters	Ambient +10° to 200°C Ambient +20° to 392°C	120V, 60Hz, 10A	240V, 50Hz, 10A
20872-99 & 20873-00 Heating Only	15 liters	Ambient +10° to 200°C Ambient +20° to 392°F	120V, 60Hz, 10A	240V, 50Hz, 10A
20873-01 & 20873-02 Heating Only	20 liters	Ambient +10° to 200°C Ambient +20° to 392°F	120V, 60Hz, 10A	240V, 50Hz, 10A
20873-03 & 20873-04 Heating Only	28 liters	Ambient +10° to 200°C Ambient +20° to 392°F	120V, 60Hz, 10A	240V, 50Hz, 10A
20873-97 & 20873-98 Stainless Steel Open Tank	10 liter	Ambient +10° to 150°C Ambient +20° to 302°F (2)	120V, 60Hz, 10A	240V, 50Hz, 10A
20873-91 & 20873-92 Polycarbonate Open Tank	8 liter	Ambient +10° to 85°C Ambient +20° to 185°F (3)	120V, 60Hz, 10A	240V, 50Hz, 10A
20873-93 & 20873-94 Polycarbonate Open Tank	14 liter	Ambient +10° to 85°C Ambient +20° to 185°F (3)	120V, 60Hz, 10A	240V, 50Hz, 10A
20873-95 & 20873-96 Polycarbonate Open Tank	23 liter	Ambient +10° to 85°C Ambient +20° to 185°F (3)	120V, 60Hz, 10A	240V, 50Hz, 10A
20872-95 & 20872-96 Refrigerating/Heating Calibration Bath	15 liters	-30° to 200°C -22° to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A

1. Maximum operating temperature at which ±0.005°C temperature stability can be maintained; Programmable Controller is capable of higher temperatures.
2. Maximum operating temperature for stainless steel tank; Programmable Controller is capable of higher temperatures.
3. Maximum operating temperature for polycarbonate tank; Programmable Controller is capable of higher temperatures.

Cole-Parmer®

Cole-Parmer® IP-400 Low-Temperature Immersion Chillers with Flexible Cold Finger Probe

USER OPERATION MANUAL

CE

C SA US
155859

Introduction

Your Immersion Probe Cooler can be used to achieve low-temperature capability with non-refrigerated circulating baths or boost the cooling capacity of refrigerated circulators. It is also excellent for trapping and Dewar-type applications, making it an economical alternative to dry ice or liquid nitrogen. A 6-ft. (1.83 m) flexible hose allows convenient placement of the cooling probe.

It will take you very little time to get your Immersion Probe Cooler installed and running. This operator's manual is designed to guide you quickly through the process. We recommend that you read it thoroughly before you begin.

	**NOTE:** The Immersion Probe Cooler operates at maximum cooling performance. Maximum temperature stability will be achieved in an agitated fluid and with a constant heat load. Allow ample time to reach the lowest achievable temperature.

General Information

General Safety Information

When installed, operated, and maintained according to the directions in this manual and common safety procedures, your Immerson Probe Cooler should provide safe and reliable cooling. Please ensure that all individuals involved in the installation, operation, or maintenance of this unit read this manual thoroughly prior to working with the unit.

	This symbol marks chapters and sections of this instruction manual that are particularly relevant to safety. When attached to the unit, this symbol draws attention to the relevant section of the instruction manual.
	This symbol advises you of danger from electricity or electric shock.
	This symbol marks information that is particularly important.
	This symbol indicates alternating current.
	These symbols on the Power Switch / Circuit Breaker indicate that they place the main power supply ON / OFF.
	This symbol on the Power Key indicates that it places the unit in a standby mode. It DOES NOT fully disconnect the unit from the power supply.
	This symbol indicates a protective conductor terminal.

Read all instructions pertaining to safety, set-up, and operation.
Proper operation and maintenance is the user's responsibility.

Technical Information

Performance Specifications

Model	IP-80	IP-100
Temperature Range	-80° to -40°C	-100° to -60°C
Temperature Set Point	Fixed at -80°C	Fixed at -100°C
Readout Accuracy	±1.0°C	
Compressors	Two nominal ½ HP low back pressure reciprocating compressors	
Cooling Probe Assembly	6 ft. / 1.83 m flexible hose	
Cooling Probe	Rigid Coil 1.75 in. / 4.44 cm diameter; 7.0 in. / 17.8 cm length	Rigid Coil 3 in. / 7.62 cm diameter; 9.0 in. / 22.9 cm length Rigid Cold Finger 0.75 in. / 1.91 cm diameter; 3.75 in. / 9.53 cm length Flexible Cold Finger 0.625 in. / 1.59 cm diameter; 15 in. / 38.1 cm length
Dimensions (H x W x D)	21 x 15 x 20.125 in. / 53.34 x 38.1 x 51.12 cm	
Electrical Requirements:	120V, 60Hz, 12A 230V, 50Hz, 7.5A 100V, 50Hz, 12A 100V, 60Hz, 12A (step-up transformer required)	

Environmental Conditions:

For indoor use only
Maximum altitude: 6562 ft. / 2000 m
Relative humidity: 80% for temperatures up to 95°F / 35°C
Over voltage: ±10%
Nominal ambient: 68°F / 20°C
Maximum recommended operating ambient: 95°F / 35°C
Installation Category II
Pollution Degree 2

WARNING: IMPORTANT INFORMATION FOR 100V APPLICATIONS
On 100V 50Hz applications a step-up transformer IS NOT NEEDED and MUST NOT be used.
On 100V 60Hz applications a step-up transformer MUST be used.

Cole-Parmer®

Cole-Parmer RH-800 and RHC-800 Digital Circulators

USER OPERATION MANUAL

Introduction

Thank you for choosing this Circulating Bath. It is intended for the precise temperature control of suitable liquids in a reservoir. Extremely easy to use and maintain, your Circulating Bath combines design innovation with highly intuitive operation to deliver convenient and reliable liquid temperature control for a wide range of applications.

WARNING: Circulating Baths are not intended for directly controlling the temperature of foods, pharmaceuticals, medicines, or other objects which may be ingested by or injected in humans or animals. Any such objects must be isolated from contact with the bath fluid and bath surfaces.

Here are some of the features that make your Circulating Bath so user-friendly:

- Simple, intuitive operation
- Extra-large digital readout that displays actual and set point temperature simultaneously
- Powerful variable speed duplex pump with open- and closed-loop external circulation capability
- 180° viewing radius (Swivel 180™ rotating control head)
- DuraTop™ heat and chemical resistant top plate
- LidDock™ self-storing reservoir cover (integrated baths only)
- Built-in temperature protection
- Suitable for use with Class III flammable fluids per DIN 12876-1

It will take you very little time to get your new Circulating Bath installed and running. This Operator's Manual is designed to guide you quickly through the process. We recommend that you read it thoroughly before you begin.

Circulating Baths with the Advanced Digital Temperature Controller

Model Type	Reservoir Capacity	Temperature Range	
		°C	°F
AD07R-20 Refrigerating / Heating Bath	7 liters	-20° to 200°C	-4° to 392°F
AD07R-40 Refrigerating / Heating Bath	7 liters	-40° to 200°C	-40° to 392°F
AD7LR-20 Refrigerating / Heating Bath	7 liters	-20° to 200°C	-4° to 392°F
AD15R-30 Refrigerating / Heating Bath	15 liters	-30° to 200°C	-22° to 392°F
AD15R-40 Refrigerating / Heating Bath	15 liters	-40° to 200°C	-40° to 392°F
AD20R-30 Refrigerating / Heating Bath	20 liters	-30° to 200°C	-22° to 392°F
AD28R-30 Refrigerating / Heating Bath	28 liters	-30° to 200°C	-22° to 392°F
AD45R-20 Refrigerating / Heating Bath	45 liters	-25° to 135°C	-13° to 275°F
AD07H200 Heating Only Bath	7 liters	Ambient +10° to 200°C	Ambient +20° to 392°F
AD15H200 Heating Only Bath	15 liters	Ambient +10° to 200°C	Ambient +20° to 392°F
AD20H200 Heating Only Bath	20 liters	Ambient +10° to 200°C	Ambient +20° to 392°F
AD28H200 Heating Only Bath	28 liters	Ambient +10° to 200°C	Ambient +20° to 392°F
AD06S150 Open Bath System	6 liters	Ambient +10° to 150°C (1)	Ambient +20° to 302°F (1)
AD10S150 Open Bath System	10 liters	Ambient +10° to 150°C (1)	Ambient +20° to 302°F (1)
AD20S150 Open Bath System	20 liters	Ambient +10° to 150°C (1)	Ambient +20° to 302°F (1)
AD28S150 Open Bath System	28 liters	Ambient +10° to 150°C (1)	Ambient +20° to 302°F (1)
AD29VB5R Polycarbonate Viscosity	29 liters	Ambient +10° to 85°C (2)	Ambient +20° to 185°F (2)
AD29VB3S Polycarbonate Viscosity	29 liters	Ambient +10° to 85°C (2)	Ambient +20° to 185°F (2)

1. Maximum operating temperature at which ±0.01°C temperature stability can be maintained; Advanced Digital Controller is capable of higher temperatures.
2. Maximum operating temperature for polycarbonate tank. Advanced Digital Controller is capable of higher temperatures.

General Safety Information

When installed, operated, and maintained according to the directions in this manual and common safety procedures, your Circulating Bath should provide safe and reliable temperature control. Please ensure that all individuals involved in the installation, operation, or maintenance of this Circulating Bath read this manual thoroughly prior to working with the unit.

	This symbol alerts you to a wide range of potential dangers.
	This symbol advises you of danger from electricity or electric shock.
	This symbol indicates that a hot surface may be present.
	This symbol marks information that is particularly important.
	This symbol indicates alternating current.
	These symbols on the Power Switch / Circuit Breaker indicate that they place the main power supply ON / OFF.
	This symbol on the Power Key indicates that it places the unit in a standby mode. It DOES NOT fully disconnect the unit from the power supply.
	This symbol indicates a protective conductor terminal.

Read all instructions pertaining to safety, set-up, and operation.
Proper operation and maintenance is the user's responsibility.

Technical Information

Performance Specifications

Operating Temperature Range:	Model dependent; see table below	
Temperature Stability:	±0.01C (±0.02°F)	
Pump Type:	Variable speed pressure/suction	
	60Hz models	50Hz models
Maximum Pressure:	4.3 psi (0.30 bar)	3.6 psi (0.25 bar)
Maximum Pressure Flow Rate:	5.3 gpm (20.1 lpm)	4.4 gpm (16.7 lpm)
Maximum Suction Flow Rate:	3.9 gpm (14.7 lpm)	3.2 gpm (12.2 lpm)
Heater Wattage:	1100 watts	2200 watts

Model Type	Reservoir Capacity	Temperature Range	Electrical Requirements	
			60Hz Units	50Hz Units
AD7LR-20 Refrigerating / Heating Bath	7 liters	-20° to 200°C -4° to 392°F	120V, 60Hz, 12A	240V, 50Hz, 12A
AD07R-20 Refrigerating / Heating Bath	7 liters	-20° to 200°C -4° to 392°F	120V, 60Hz, 12A	240V, 50Hz, 12A
AD07R-40 Refrigerating / Heating Bath	7 liters	-40° to 200°C -40° to 392°F	120V, 60Hz, 12A	240V, 50Hz, 12A
AD15R-30 Refrigerating / Heating Bath	15 liters	-30° to 200°C -22° to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A
AD15R-40 Refrigerating / Heating Bath	15 liters	-40° to 200°C -40° to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A
AD20R-30 Refrigerating / Heating Bath	20 liters	-30° to 200°C -22° to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A
AD28R-30 Refrigerating / Heating Bath	28 liters	-30° to 200°C -22° to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A
AD45R-20 Refrigerating / Heating Bath	45 liters	-25° to 135°C -13° to 275°F	208-240V, 50/60Hz, 12A	208-240V, 50/60Hz, 12A
AD07H200 Heating Only Bath	7 liters	Ambient +10° to 200°C Ambient +20° to 392°F	120V, 60Hz, 10A	240V, 50Hz, 10A
AD15H200 Heating Only Bath	15 liters	Ambient +10° to 200°C Ambient +20° to 392°F	120V, 60Hz, 10A	240V, 50Hz, 10A
AD20H200 Heating Only Bath	20 liters	Ambient +10° to 200°C Ambient +20° to 392°F	120V, 60Hz, 10A	240V, 50Hz, 10A
AD28H200 Heating Only Bath	28 liters	Ambient +10° to 200°C Ambient +2°0 to 392°F	120V, 60Hz, 10A	240V, 50Hz, 10A
AD06S150 Open Bath System	6 liters	Ambient +10° to 150°C Ambient +20° to 302°F (1)	120V, 60Hz, 10A	240V, 50Hz, 10A
AD10S150 Open Bath System	10 liters	Ambient +10° to 150°C Ambient +20° to 302°F (1)	120V, 60Hz, 10A	240V, 50Hz, 10A
AD20S150 Open Bath System	20 liters	Ambient +10° to 150°C Ambient +20° to 302°F (1)	120V, 60Hz, 10A	240V, 50Hz, 10A
AD28S150 Open Bath System	28 liters	Ambient +10° to 150°C Ambient +20° to 302°F (1)	120V, 60Hz, 10A	240V, 50Hz, 10A
AD29VB5R Viscosity Bath	29 liters	Ambient +10° to 85°C Ambient +20° to 185°F (2)	120V, 60Hz, 10A	240V, 50Hz, 10A
AD29VB3S Viscosity Bath	29 liters	Ambient +10° to 85°C Ambient +20° to 185°F (2)	120V, 60Hz, 10A	240V, 50Hz, 10A

1. Maximum operating temperature at which ±0.01°C temperature stability can be maintained; Advanced Digital Controller is capable of higher temperatures.

2. Maximum operating temperature for polycarbonate tank. Advanced Digital Controller capable of higher temperatures.

Environmental Conditions	Indoor use only	
	Maximum Altitude:	2000 meter
	Operating Ambient:	5° to 35°C (41° to 95°F)
	Relative Humidity:	80%, non-condensing
	Installation Category:	II
	Pollution Degree:	2
	Ingress Protection:	IP 31
	Climate Class:	SN
	Software Class:	B
	Output Waveform:	Sinusoidal

Specifications subject to change without notice.

Reservoir Fluids

Depending on your needs, a variety of fluids can be used with your Circulator. No matter what bath fluid is selected, it must be chemically compatible with the reservoir and the materials in your Circulator. It must also be suitable for the desired temperature range.

WARNING: When using Class III flammable fluids per DIN 12876-1, the user must attach the following warning labels to the front of the unit so that they are well visible:

Warning Label W09 Colors: Yellow/black		**Danger Area.** **Attention! Observe instructions (operating manual, safety data sheet)**
Mandatory Label M018 Colors: Blue/white or		**Carefully read the user information prior to beginning operation.** Scope: EU
Semi S1-0701 Table A1-2 #9 Colors: Blue/white		**Carefully read the user information prior to beginning operation.** Scope: NAFTA

WARNING: Always use fluids that satisfy safety, health, and equipment compatibility requirements. Be aware of the chemical hazards that may be associated with the bath fluid used. Observe all safety warnings for the fluids used as well as those contained in the material safety data sheet.

For optimum temperature stability, the fluid's viscosity should be 50 centistokes (cSt) or less at its lowest operating temperature. This permits good fluid circulation and minimizes heating from the pump.

For temperatures from 10°C to 90°C, distilled water is recommended. For temperatures below 10°C, a mixture of laboratory grade ethylene glycol and water should be used. Do not use deionized water.

The following chart is intended to serve as a guide in selecting a bath fluid for your application. For optimum temperature stability and low vaporization, be sure to stay within the fluid's normal temperature range.

You are responsible for proper selection and use of the fluids. Avoid extreme range operation.

Fluid Description	Viscosity (cSt) @ 25°C	Specific Heat			Normal Temperature Range	Extreme Temperature Range
		@ Fluid Temperature	BTU/lb°F	KJ/Kg°C		
distilled water	1	50°C	1.00	4.18	10° to 90°C	2° to 100°C
polyclear MIX 30	1	50°C	1.00	4.18	15° to 90°C	2° to 100°C
polytherm S150	50	100°C	0.41	1.71	50° to 150°C	5° to 270°C*
polytherm S200	125	150°C	0.40	1.67	100° to 200°C	80° to 232°C*
polytherm S250	500	200°C	0.39	1.63	150° to 250°C	125° to 260°C*
polytherm M170	40	85°C	0.40	1.67	50° to 170°C	25° to 190°C
polycool HC -50	3	-30°C	0.62	2.59	-50° to 100°C	-62° to 118°C
polycool EG -25 (50/50 mix with distilled H_2O)	20	-20°C	0.78	3.26	-25° to 100°C	-30° to 115°C
polycool EG -25 (30/70 mix with distilled H_2O)	12	0°C	0.89	3.72	0° to 95°C	-15° to 107°C
polycool PG -20 (50/50 mix with distilled H_2O)	20	-10°C	0.83	3.47	-20° to 100°C	-30° to 115°C
polycool PG -20 (30/70 mix with distilled H_2O)	12	5°C	0.92	3.85	5° to 90°C	-10° to 107°C
polycool MIX -25 (50/50 mix with distilled H_2O)	20	-20°C	0.78	3.26	-25° to 100°C	-30° to 115°C
polycool MIX -25 (30/70 mix with distilled H_2O)	12	0°C	0.89	3.72	0° to 95°C	-15° to 107°C

***WARNING:** This is the fluid's flash point temperature.

WARNING: DO NOT USE THE FOLLOWING LIQUIDS:

- Automotive antifreeze with additives**
- Hard tap water**
- Deionized water with a specific resistance > 1 meg ohm
- Concentrations of acids or bases
- Solutions with halides: chlorides, fluorides, bromides, iodides or sulfur
- Bleach (Sodium Hypochlorite)
- Solutions with chromates or chromium salts
- Glycerine
- Syltherm fluids

** At temperatures above 40°C, additives or mineral deposits can adhere to the heater. If deposits are allowed to build up, the heater may overheat and fail. Higher temperatures and higher concentrations of additives will hasten deposit build up.

Cole-Parmer®

Cole-Parmer® RH-400 and RHC-400 Circulating Baths

USER OPERATION MANUAL

Introduction

Thank you for choosing a Circulating Bath with MX Temperature Controller. It is intended for the precise temperature control of suitable liquids in a reservoir. Extremely easy to use and maintain, it combines design innovation with highly intuitive operation to deliver convenient and versatile liquid temperature control for a wide range of applications.

WARNING: Circulating Baths are not intended for directly controlling the temperature of foods, pharmaceuticals, medicines, or other objects which may be ingested by or injected in humans or animals. Any such objects must be isolated from contact with the bath fluid and bath surfaces**.**

Here are some of the features that make your Circulating Bath so user-friendly:

- Simple, intuitive operation
- Displays actual and set point temperature simultaneously
- Powerful pump, easy flow adjustment
- External circulation capability
- Fully enclosed housing prevents direct contact with pump and heater, yet provides quick access for inspection and cleaning
- Suitable for use with Class I non-flammable fluids per DIN 12876-1

It will take you very little time to get your new Circulating Bath installed and running. This Instruction Manual is designed to guide you quickly through the process. We recommend that you read it thoroughly before you begin.

Circulating Baths with the MX Temperature Controller

Model Type	Reservoir Capacity	Temperature Range	
		°C	°F
MX07R-20 Refrigerating / Heating Bath	7 liters	-20° to 135°C	-4° to 275°F
MX7LR-20 Refrigerating / Heating Bath	7 liters	-20° to 135°C	-4° to 275°F
MX15R-30 Refrigerating / Heating Bath	15 liters	-30° to 135°C	-22° to 275°F
MX20R-30 Refrigerating / Heating Bath	20 liters	-30° to 135°C	-22° to 275°F
MX07H135 Heating Only Bath	7 liters	Ambient +10° to 135°C	Ambient +20° to 275°F
MX15H135 Heating Only Bath	15 liters	Ambient +10° to 135°C	Ambient +20° to 275°F
MX20H135 Heating Only Bath	20 liters	Ambient +10° to 135°C	Ambient +20° to 275°F
MX06S135 Stainless Steel Open Tank Bath	6 liters	Ambient +10° to 135°C	Ambient +20° to 275°F
MX10S135 Stainless Steel Open Tank Bath	10 liters	Ambient +10° to 135°C	Ambient +20° to 275°F
MX20S135 Stainless Steel Open Tank Bath	20 liters	Ambient +10° to 135°C	Ambient +20° to 275°F
MX28S135 Stainless Steel Open Tank Bath	28 liters	Ambient +10° to 135°C	Ambient +20° to 275°F
MX08P100 Polycarbonate Open Tank Bath	8 liters	Ambient +10° to 85°C (1)	Ambient +20° to 185°F (1)
MX11P100 Polycarbonate Open Tank Bath	11 liters	Ambient +10° to 85°C (1)	Ambient +20° to 185°F (1)
MX14P100 Polycarbonate Open Tank Bath	14 liters	Ambient +10° to 85°C (1)	Ambient +20° to 185°F (1)
MX17P100 Polycarbonate Open Tank Bath	17 liters	Ambient +10° to 85°C (1)	Ambient +20° to 185°F (1)
MX23P100 Polycarbonate Open Tank Bath	23 liters	Ambient +10° to 85°C (1)	Ambient +20° to 185°F (1)
MX28P100 Polycarbonate Open Tank Bath	28 liters	Ambient +10° to 85°C (1)	Ambient +20° to 185°F (1)
MX17VB6G Glass Viscosity Bath	17 liters	Ambient +10° to 135°C	Ambient +20° to 275°F
MX27VB6G Glass Viscosity Bath	27 liters	Ambient +10° to 135°C	Ambient +20° to 275°F
MX28C135 Coliform Bath	28 liters	Ambient +10° to 135°C	Ambient +20° to 275°F

1. Maximum operating temperature for polycarbonate tank; MX Controller is capable of higher temperatures.

Technical Information

Performance Specifications

Operating Temperature Range:	Model dependent; see table below	
Temperature Stability:	±0.07C (±0.13°F)	
Pump Type:	1-speed pressure	
	60Hz models	50Hz models
Maximum Pressure:	2.3 psi (0.16 bar)	1.8 psi (0.12 bar)
Maximum Pressure Flow Rate:	3.6 gpm (13.5 lpm)	3.1 gpm (11.9 lpm)
Heater Wattage:	1100 watts	1100 watts

Model Type	Reservoir Capacity	Temperature Range	Electrical Requirements	
			60Hz Units	50Hz Units
MX07R-20 Refrigerating / Heating Bath	7 liters	-20° to 135°C -4° to 275°F	120V, 60Hz, 12A	240V, 50Hz, 8A
MX7LR-20 Refrigerating / Heating Bath	7 liters	-20° to 135°C -4° to 275°F	120V, 60Hz, 12A	240V, 50Hz, 8A
MX15R-30 Refrigerating / Heating Bath	15 liters	-30° to 135°C -22° to 275°F	120V, 60Hz, 13A	240V, 50Hz, 10A
MX20R-30 Refrigerating / Heating Bath	20 liters	-30° to 135°C -22° to 275°F	120V, 60Hz, 13A	240V, 50Hz, 10A
MX07H135 Heating Only Bath	7 liters	Ambient +10° to 135°C Ambient +20° to 275°F	120V, 60Hz, 10A	240V, 50Hz, 6A
MX15H135 Heating Only Bath	15 liters	Ambient +10° to 135°C Ambient +20° to 275°F	120V, 60Hz, 10A	240V, 50Hz, 6A
MX20H135 Heating Only Bath	20 liters	Ambient +10° to 135°C Ambient +20° to 275°F	120V, 60Hz, 10A	240V, 50Hz, 6A
MX06S135 Stainless Steel Open Tank Bath	6 liters	Ambient +10° to 135°C Ambient +20° to 275°F	120V, 60Hz, 10A	240V, 50Hz, 6A
MX10S135 Stainless Steel Open Tank Bath	10 liters	Ambient +10° to 135°C Ambient +20° to 275°F	120V, 60Hz, 10A	240V, 50Hz, 6A
MX20S135 Stainless Steel Open Tank Bath	20 liters	Ambient +10° to 135°C Ambient +20° to 275°F	120V, 60Hz, 10A	240V, 50Hz, 6A
MX28S135 Stainless Steel Open Tank Bath	28 liters	Ambient +10° to 135°C Ambient +20° to 275°F	120V, 60Hz, 10A	240V, 50Hz, 6A
MX08P100 Polycarbonate Open Tank Bath	8 liters	Ambient +10° to 85°C Ambient +20° to 185°F (1)	120V, 60Hz, 10A	240V, 50Hz, 6A
MX11P100 Polycarbonate Open Tank Bath	11 liters	Ambient +10° to 85°C Ambient +20° to 185°F (1)	120V, 60Hz, 10A	240V, 50Hz, 6A
MX14P100 Polycarbonate Open Tank Bath	14 liters	Ambient +10° to 85°C Ambient +20° to 185°F (1)	120V, 60Hz, 10A	240V, 50Hz, 6A
MX17P100 Polycarbonate Open Tank Bath	17 liters	Ambient +10° to 85°C Ambient +20° to 185°F (1)	120V, 60Hz, 10A	240V, 50Hz, 6A
MX23P100 Polycarbonate Open Tank Bath	23 liters	Ambient +10° to 85°C Ambient +20° to 185°F (1)	120V, 60Hz, 10A	240V, 50Hz, 6A
MX28P100 Polycarbonate Open Tank Bath	28 liters	Ambient +10° to 85°C Ambient +20° to 185°F (1)	120V, 60Hz, 10A	240V, 50Hz, 6A

Model Type	Reservoir Capacity	Temperature Range	Electrical Requirements	
			60Hz Units	50Hz Units
MX17VB6G Glass Viscosity Bath	17 liters	Ambient +10° to 135°C Ambient +20° to 275°F	120V, 60Hz, 10A	240V, 50Hz, 6A
MX27VB6G Glass Viscosity Bath	27 liters	Ambient +10° to 135°C Ambient +20° to 275°F	120V, 60Hz, 10A	240V, 50Hz, 6A
MX28C135 Coliform Bath	28 liters	Ambient +10° to 135°C Ambient +20° to 275°F	120V, 60Hz, 10A	240V, 50Hz, 6A

1. Maximum operating temperature for polycarbonate tank; MX Controller is capable of higher temperatures.

Environmental Conditions	Indoor use only	
	Maximum Altitude:	2000 meter
	Operating Ambient:	5° to 35°C (41° to 95°F)
	Relative Humidity:	80%, non-condensing
	Installation Category:	II
	Pollution Degree:	2
	Ingress Protection:	IP 31
	Climate Class:	SN
	Software Class:	B
	Output Waveform:	Sinusoidal

Specifications subject to change without notice.

Section 2 General Information

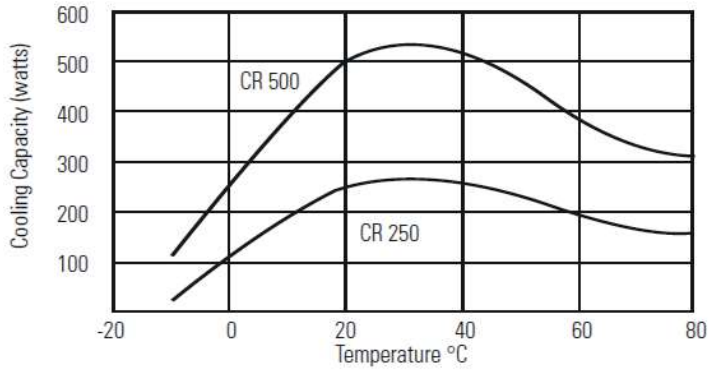
Description

The Cole Parmer Polystat CR Cooling/Heating Recirculating Chillers are designed to provide a continuous supply of fluid at a constant temperature and volume to an external system. The chiller consists of air-cooled refrigeration system, heat exchanger, recirculating pump, polyethylene reservoir, and a microprocessor controller.

Intended Use

Chillers designed for continuous operation and for indoor use on a work bench or table top only, not floor standing. Use the chiller in accordance with all the procedures and requirements stated in this manual.

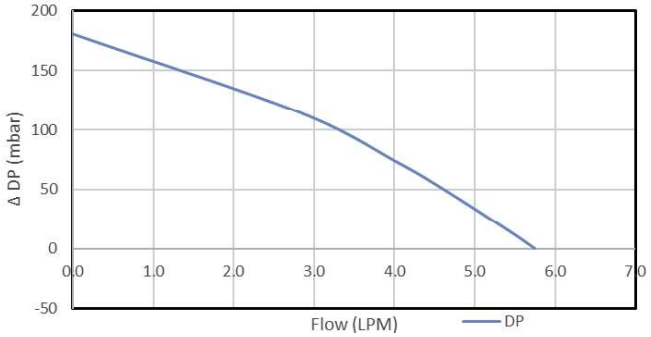
Specifications

	CR250	CR500
Process Fluid Temperature Range	-10°C to +80°C +14°F to +176°F	-10°C to +80°C +14°F to +176°F
Temperature Stability	±0.1°C	±0.1°C
Cooling Capacity[1]		
Heater Capacity at 20°C 60Hz	1.2 Kilowatts	1.2 Kilowatts
Normal Weight lb/kg	66/30	66/30
Pumping Type (see curve on next page)	Force(FP1)/Force-Suction(FP2)	Force(FP1)/Force-Suction(FP2)
Maximum Flow Rate gpm/lpm	4.0/5.5 15/21	4.0/5.5 15/21
Maximum Pressure psi/mbar	4.4/11.7 300/805	4.4/11.7 300/805
Reservoir Volume Gallons/Liters	0.7/2.8	0.7/2.8
Optional Serial Interface	USB	USB

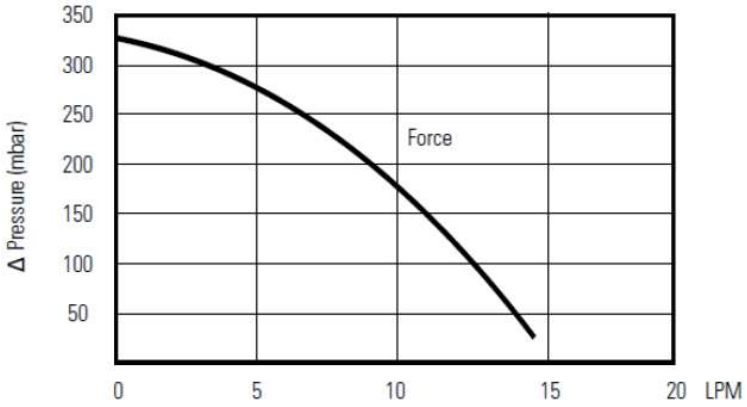
1. Specifications obtained at sea level using water (above 5°C) and 50/50 EG/Water (<5°C) as the recirculating fluid at a 20°C process setpoint, 20°C ambient condition, at nominal operating voltage. Other fluids, process temperatures, ambient temperatures, altitude or operating voltage will affect performance.

- Cole Parmer reserves the right to change specifications without notice

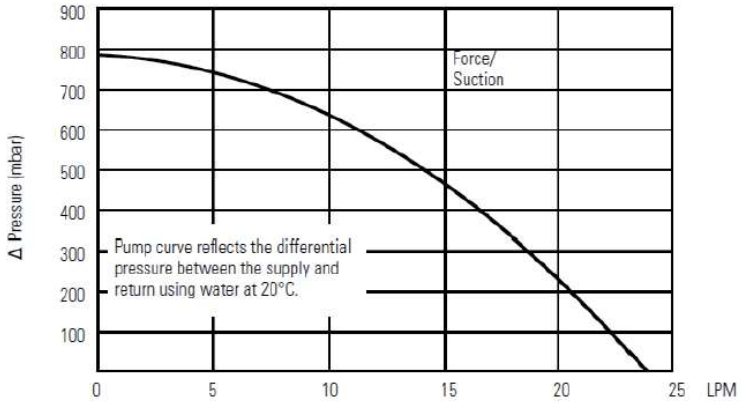
Force Pumping Capacity at minimum speed



Force Pumping Capacity at maximum speed

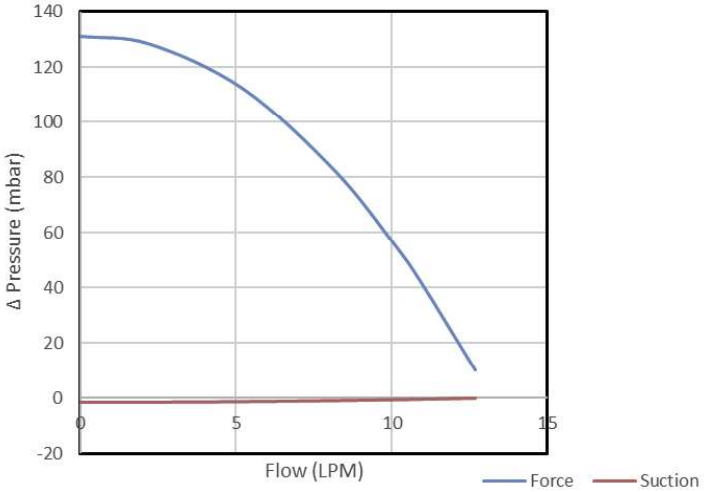


Force-Suction Pumping Capacity at maximum speed

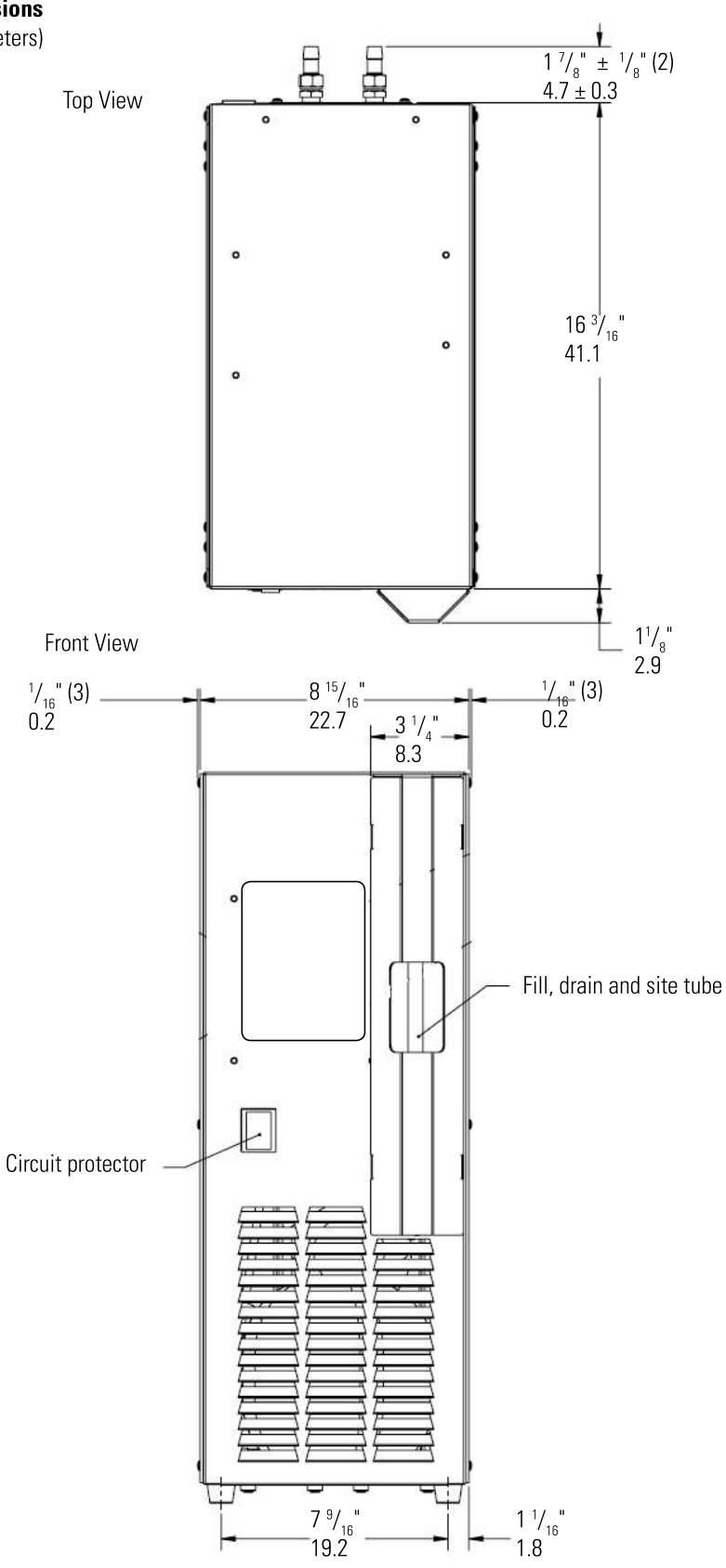


Force-Suction Pumping Capacity at medium speed

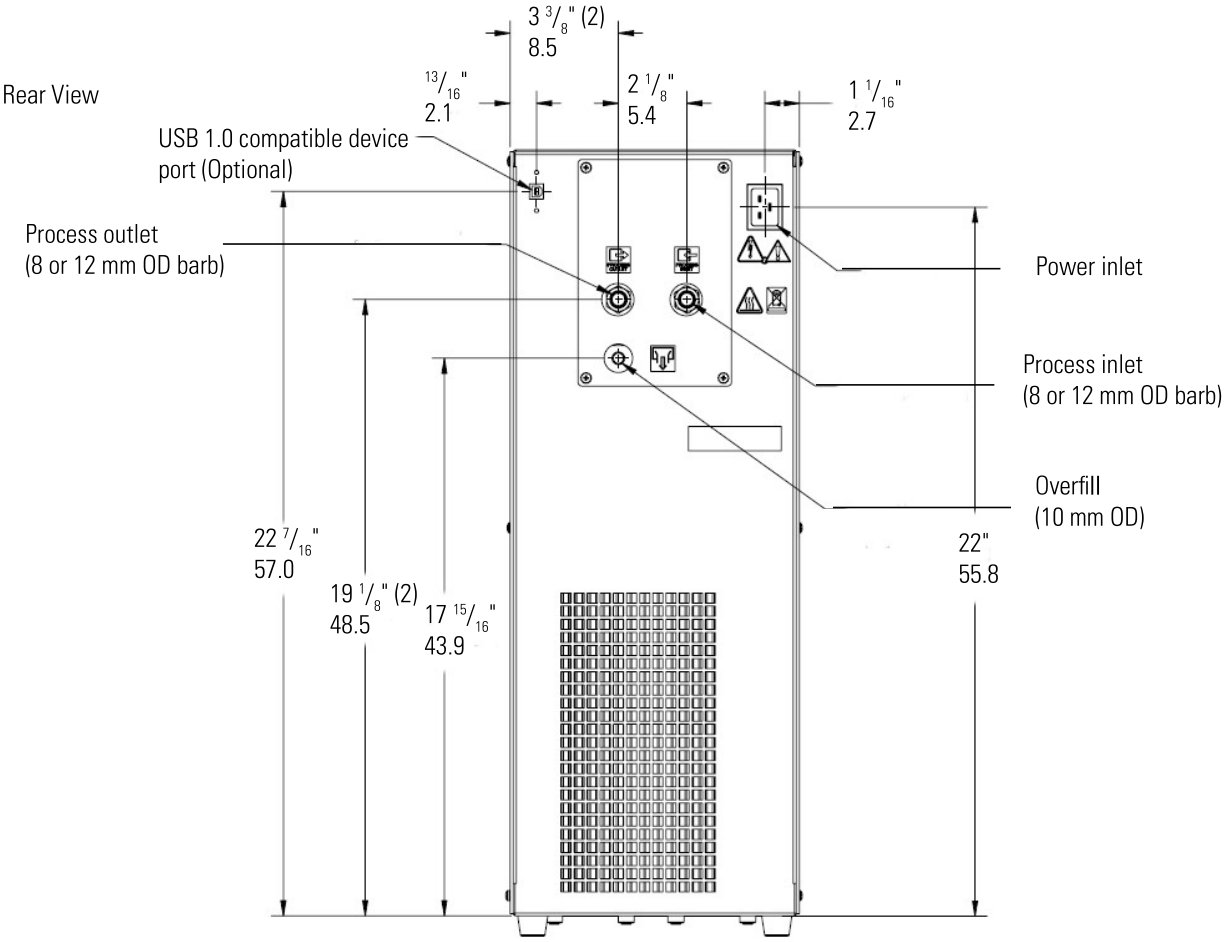
Force-Suction Pumping Capacity at minimum speed



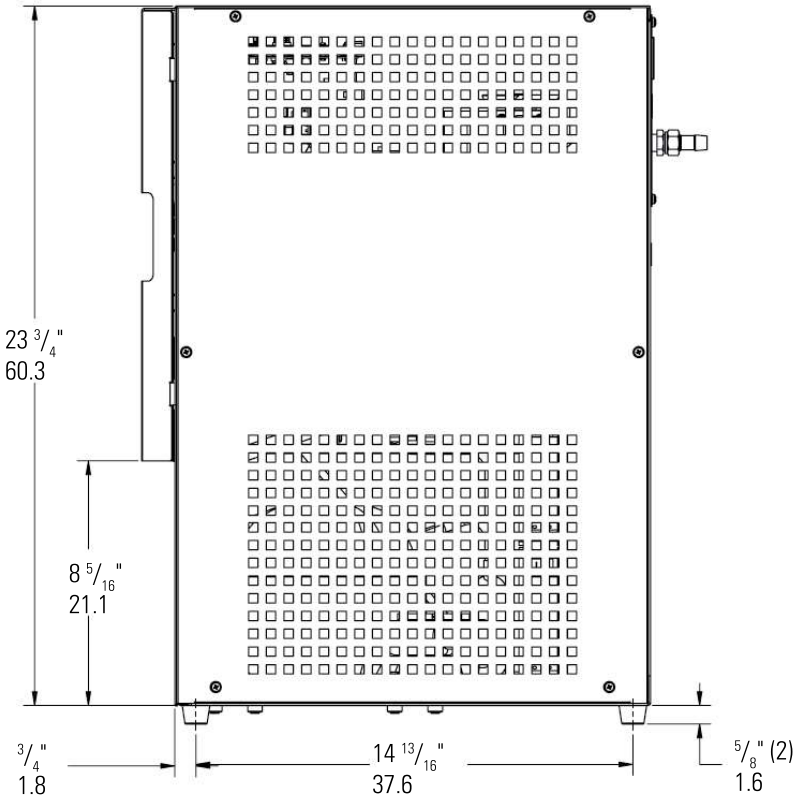
Dimensions
(inches/centimeters)



Rear View



Side View



Equipment Ratings

Compliance	Refer to Letter of Compliance in the back of the manual
	UL File Number E164214
Ambient Temperature Range	10°C to 40°C (50°F to 104°F)
Maximum Relative Humidity (Non Condensing)*	0% to 80% at 31°C (88°F)
Operating Altitude*	Sea Level to 2000 meters (6560 feet)
Overvoltage Category	II
Pollution Degree	2
Degree of Protection	IP 20
Sound Power Level	less than 58 dBA
Refrigerant	6.7 ounces R134A

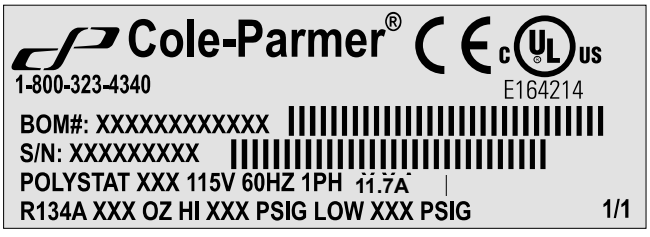
*Limited by ambient temperature, elevation & operating temperature. Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C. Elevation above sea level requires reduction of 1˚C/1000m on maximum ambient and 2%/1000m reduction in rated capacity.

The following power options is available:

Volts[1]/Hertz/Phase	Amps[2]	Total Wattage	Plug Type
115/60/1	11.7	1345	N5-15

1. Vac over the range ± 10%
2. Maximum amp draw
3. Refer to chiller's nameplate for additional information

Sample Nameplate



Cole-Parmer Instrument Company
625 East Bunker Court
Vernon Hills, IL 60061
1-800-323-4340

Approved Fluids

5°C to 80°C — Distilled Water or Deionized Water

-10°C to 80°C — 50/50 Water with Laboratory Grade Ethylene Glycol

Refer to Section 3 for additional information

Wetted Materials

Viton
EPDM
Ryton
Ultem
Vectra
Stainless Steel 316
Stainless Steel 304

Cole-Parmer®

Cole-Parmer RH-800P and RHC Programmable Circulating Baths

USER OPERATION MANUAL

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Introduction

Thank you for choosing this Circulating Bath with Advanced Programmable Temperature Controller. It is intended for the precise temperature control of suitable liquids in a reservoir. Extremely easy to use and maintain, it combines design innovation with highly intuitive operation to deliver convenient and versatile liquid temperature control for a wide range of applications.

WARNING: PolyScience Circulating Baths are not intended for directly controlling the temperature of foods, pharmaceuticals, medicines, or other objects which may be ingested by or injected in humans or animals. Any such objects must be isolated from contact with the bath fluid and bath surfaces.

Here are some of the features that make your Circulating Bath so user-friendly:

- Intuitive touch screen operation
- Time/temperature programming
- Selection of seven different temperature displays, including time-temperature graphing
- Powerful variable-speed pressure/suction pump with external circulation capability
- 180° viewing radius (Swivel 180™ rotating control head)
- DuraTop™ heat and chemical resistant top plate
- LidDock™ self-storing reservoir cover (integrated baths only)
- Built-in temperature protection
- Suitable for use with Class III flammable bath fluids per DIN 12876-1

It will take you very little time to get your new Circulating Bath installed and running. This Operator's Manual is designed to guide you quickly through the process. We recommend that you read it thoroughly before you begin.

Circulating Baths with Advanced Programmable Temperature Controller

Model Type	Reservoir Capacity	Temperature Range	
		°C	°F
AP07R-20 Refrigerating/Heating	7 liter	-20° to 200°C	-4° to 392°F
AP07R-40 Refrigerating/Heating	7 liter	-40° to 200°C	-40° to 392°F
AP7LR-20 Refrigerating/Heating	7 liter	-20° to 200°C	-4° to 392°F
AP15R-30 Refrigerating/Heating	15 liter	-30° to 200°C	-22° to 392°F
AP15R-40 Refrigerating/Heating	15 liter	-40° to 200°C	-40° to 392°F
AP20R-30 Refrigerating/Heating	20 liter	-30° to 200°C	-22° to 392°F
AP28R-30 Refrigerating/Heating	28 liter	-30° to 200°C	-22° to 392°F
AP45R-20 Refrigerating/Heating	45 liter	-25° to 135°C (1)	-13° to 275°F (1)
AP07H200 Heating Only	7 liter	Ambient +10° to 200°C	Ambient +20° to 392°F
AP15H200 Heating Only	15 liter	Ambient +10° to 200°C	Ambient +20° to 392°F
AP20H200 Heating Only	20 liter	Ambient +10° to 200°C	Ambient +20° to 392°F
AP28H200 Heating Only	28 liter	Ambient +10° to 200°C	Ambient +20° to 392°F
AP06S150 Stainless Steel Open Tank	6 liter	Ambient +10° to 150°C (2)	Ambient +20° to 302°F (2)
AP10S150 Stainless Steel Open Tank	10 liter	Ambient +10° to 150°C (2)	Ambient +20° to 302°F (2)
AP20S150 Stainless Steel Open Tank	20 liter	Ambient +10° to 150°C (2)	Ambient +20° to 302°F (2)
AP28S150 Stainless Steel Open Tank	28 liter	Ambient +10° to 150°C (2)	Ambient +20° to 302°F (2)
AP08P100 Polycarbonate Open Tank	8 liter	Ambient +10° to 85°C (3)	Ambient +20 to 185°F (3)
AP11P100 Polycarbonate Open Tank	11 liter	Ambient +10° to 85°C (3)	Ambient +20 to 185°F (3)
AP14P100 Polycarbonate Open Tank	14 liter	Ambient +10° to 85°C (3)	Ambient +20 to 185°F (3)
AP17P100 Polycarbonate Open Tank	17 liter	Ambient +10° to 85°C (3)	Ambient +20 to 185°F (3)
AP23P100 Polycarbonate Open Tank	23 liter	Ambient +10° to 85°C (3)	Ambient +20 to 185°F (3)

AP28P100 Polycarbonate Open Tank	28 liter	Ambient +10° to 85°C (3)	Ambient +20 to 185°F (3)
AP29VB3S Polycarbonate Viscosity	29 liter	Ambient +10° to 85°C (3)	Ambient +20 to 185°F (3)
AP29VB5R Polycarbonate Viscosity	29 liter	Ambient +10° to 85°C (3)	Ambient +20 to 185°F (3)

1. Maximum operating temperature at which ±0.01°C temperature stability can be maintained; Advanced Programmable Controller is capable of higher temperatures.
2. Maximum operating temperature for stainless steel tank. Advanced Programmable Controller is capable of higher temperatures.
3. Maximum operating temperature for polycarbonate tank. Advanced Programmable Controller is capable of higher temperatures.

General Safety Information

When installed, operated, and maintained according to the directions in this manual and common safety procedures, your Circulating Bath should provide safe and reliable temperature control. Please ensure that all individuals involved in the installation, operation, or maintenance of this Circulating Bath read this manual thoroughly prior to working with the unit.

	This symbol alerts you to a wide range of potential dangers.
	This symbol advises you of danger from electricity or electric shock.
	This symbol indicates that a hot surface may be present.
	This symbol marks information that is particularly important.
	This symbol indicates alternating current.
	These symbols on the Power Switch / Circuit Breaker indicate that they place the main power supply ON / OFF.
	This symbol on the Power Key indicates that it places the unit in a standby mode. It DOES NOT fully disconnect the unit from the power supply.

Read all instructions pertaining to safety, set-up, and operation.
Proper operation and maintenance is the user's responsibility.

Technical Information

Performance Specifications

Operating Temperature Range:	Model dependent; see table below	
Temperature Stability:	±0.01C (±0.02°F)	
Pump Type:	Variable speed pressure/suction	
	60Hz models	50Hz models
Maximum Pressure:	4.3 psi (0.30 bar)	3.6 psi (0.25 bar)
Maximum Pressure Flow Rate:	5.3 gpm (20.1 lpm)	4.4 gpm (16.7 lpm)
Maximum Suction Flow Rate:	3.9 gpm (14.7 lpm)	3.2 gpm (12.2 lpm)
Heater Wattage:	1100 watts	2200 watts

Model Type	Reservoir Capacity	Temperature Range	Electrical Requirements	
			60Hz	50Hz
AP07R-20 Refrigerating / Heating Bath	7 liters	-20° to 200°C -4° to 392°F	120V, 60Hz, 12A	240V, 50Hz, 12A
AP07R-40 Refrigerating / Heating Bath	7 liters	-40° to 200°C -40° to 392°F	120V, 60Hz, 12A	240V, 50Hz, 12A
AP7LR-20 Refrigerating / Heating Bath	7 liters	-20° to 200°C -4° to 392°F	120V, 60Hz, 12A	240V, 50Hz, 12A
AP15R-30 Refrigerating / Heating Bath	15 liters	-30° to 200°C -22 to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A
AP15R-40 Refrigerating / Heating Bath	15 liters	-40° to 200°C -40° to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A
AP20R-30 Refrigerating / Heating Bath	20 liters	-30° to 200°C -22° to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A
AP28R-30 Refrigerating / Heating Bath	28 liters	-30° to 200°C -22° to 392°F	120V, 60Hz, 13A	240V, 50Hz, 13A
AP45R-20 Refrigerating / Heating Bath	45 liters	-25° to 135°C -13° to 275°F (1)	208-240V, 50/60Hz, 13A	208-240V, 50/60Hz, 13A
AP07H200 Heating Only Bath	7 liters	Ambient +10° to 200°C Ambient +20° to 392°C	120V, 60Hz, 10A	240V, 50Hz, 10A
AP15H200 Heating Only Bath	15 liters	Ambient +10° to 200°C Ambient +20° to 392°F	120V, 60Hz, 10A	240V, 50Hz, 10A
AP20H200 Heating Only Bath	20 liters	Ambient +10° to 200°C Ambient +20° to 392°F	120V, 60Hz, 10A	240V, 50Hz, 10A
AP28H200 Heating Only Bath	28 liters	Ambient +10° to 200°C Ambient +20° to 392°F	120V, 60Hz, 10A	240V, 50Hz, 10A
AP06S150 Stainless Steel Open Tank	6 liter	Ambient +10° to 150°C Ambient +20° to 302°F	120V, 60Hz, 10A	240V, 50Hz, 10A
AP10S150 Stainless Steel Open Tank	10 liter	Ambient +10° to 150°C Ambient +20° to 302°F (2)	120V, 60Hz, 10A	240V, 50Hz, 10A
AP20S150 Stainless Steel Open Tank	20 liter	Ambient +10° to 150°C Ambient +20° to 302°F (2)	120V, 60Hz, 10A	240V, 50Hz, 10A
AP28S150 Stainless Steel Open Tank	28 liter	Ambient +10° to 150°C Ambient +20° to 302°F (2)	120V, 60Hz, 10A	240V, 50Hz, 10A
AP08P100 Polycarbonate Open Tank	8 liter	Ambient +10° to 85°C Ambient +20° to 185°F (3)	120V, 60Hz, 10A	240V, 50Hz, 10A
AP11P100 Polycarbonate Open Tank	11 liter	Ambient +10° to 85°C Ambient +20° to 185°F(3)	120V, 60Hz, 10A	240V, 50Hz, 10A
AP14P100 Polycarbonate Open Tank	14 liter	Ambient +10° to 85°C Ambient +20° to 185°F (3)	120V, 60Hz, 10A	240V, 50Hz, 10A

AP17P100 Polycarbonate Open Tank	17 liter	Ambient +10° to 85°C Ambient +20° to 185°F (3)	120V, 60Hz, 10A	240V, 50Hz, 10A
AP23P100 Polycarbonate Open Tank	23 liter	Ambient +10° to 85°C Ambient +20° to 185°F (3)	120V, 60Hz, 10A	240V, 50Hz, 10A
AP28P100 Polycarbonate Open Tank	28 liter	Ambient +10° to 85°C Ambient +20° to 185°F (3)	120V, 60Hz, 10A	240V, 50Hz, 10A
AP29VB5R Polycarbonate Viscosity	29 liter	Ambient +10° to 85°C Ambient +20° to 185°F (3)	120V, 60Hz, 10A	240V, 50Hz, 10A
AP29VB3S Polycarbonate Viscosity	29 liter	Ambient +10° to 85°C Ambient +20° to 185°F (3)	120V, 60Hz, 10A	240V, 50Hz, 10A

1. Maximum operating temperature at which ±0.01°C temperature stability can be maintained; Advanced Programmable Controller is capable of higher temperatures.
2. Maximum operating temperature for stainless steel tank; Advanced Programmable Controller is capable of higher temperatures.
3. Maximum operating temperature for polycarbonate tank; Advanced Programmable Controller is capable of higher temperatures.

Environmental Conditions	Indoor use only	
	Maximum Altitude:	2000 meter
	Operating Ambient:	5° to 35°C (41° to 95°F)
	Relative Humidity:	80%, non-condensing
	Installation Category:	II
	Pollution Degree:	2
	Ingress Protection:	IP 31
	Climate Class:	SN
	Software Class:	B
	Output Waveform:	Sinusoidal

Specifications subject to change without notice.

Cole-Parmer®

Cole-Parmer RHV-400 Viscosity Bath

USER OPERATION MANUAL

CE ETL C LISTED US Intertek

Introduction

Thank you for choosing the Cole-Parmer® Standard Immersion Circulator. It is intended for the precise temperature control of suitable liquids in a reservoir. Extremely easy to use and maintain, it combines design innovation with highly intuitive operation to deliver convenient and versatile liquid temperature control for a wide range of applications.

WARNING: Circulating Baths are not intended for directly controlling the temperature of foods, pharmaceuticals, medicines, or other objects which may be ingested by or injected in humans or animals. Any such objects must be isolated from contact with the bath fluid and bath surfaces**.**

Here are some of the features that make the Standard Immersion Circulator so user-friendly:

- Simple, intuitive operation
- Displays actual and set point temperature simultaneously
- Powerful pump, easy flow adjustment
- Attaches securely to both flat and rounded tank walls
- Converts any tank or vessel up to 28 liters into a reliable circulating bath
- Fully enclosed housing prevents direct contact with pump and heater, yet provides quick access for inspection and cleaning
- Suitable for use with Class I non-flammable fluids per DIN 12876-1

It will take you very little time to get your new Standard Immersion Circulator installed and running, This User Guide is designed to guide you quickly through the process. We recommend that you read it thoroughly before you begin.

Technical Information

Performance Specifications

Operating Temperature Range:	Ambient +10° to 135°C Ambient +20° to 275°F	
Temperature Stability:	±0.07°C / ±0.13°F	
Heater Wattage:	1100 watts	
Electrical Requirements:	120V, 60Hz, 10 amps or 240V, 50Hz, 6 amps	
Environmental Conditions	Indoor use only	
	Maximum Altitude:	2000 meter
	Operating Ambient:	5° to 35°C (41° to 95°F)
	Relative Humidity:	80%, non-condensing
	Installation Category:	II
	Pollution Degree:	2
	Ingress Protection:	IP 31
	Climate Class:	SN
	Software Class:	B
	Output Waveform:	Sinusoidal

Specifications subject to change without notice.

Attainable Temperatures:

Your Standard Immersion Circulator can be used with reservoirs of various capacities and shapes as well as different fluids. These variables may adversely affect temperature accuracy and stability. For example, a reservoir with a large surface area loses heat more quickly, which may prevent the Circulator from attaining the desired temperature.

Reservoir Fluids

Depending on your needs, a variety of fluids can be used with your Immersion Circulator. No matter what bath fluid is selected, it must be chemically compatible with the reservoir and the materials in your Immersion Circulator. It must also be suitable for the desired temperature range.

	**WARNING:** Do not use a flammable liquid as a bath fluid as a fire hazard may result.

	**WARNING:** Always use fluids that satisfy safety, health, and equipment compatibility requirements.

For optimum temperature stability, the fluid's viscosity should be 50 centistokes (cSt) or less at its lowest operating temperature. This permits good fluid circulation and minimizes heating from the pump.

For temperatures from 10°C to 90°C, distilled water is recommended. For temperatures below 10°C, a mixture of laboratory grade ethylene glycol and water should be used. Do not use deionized water.

The following chart is intended to serve as a guide in selecting a bath fluid for your application. For optimum temperature stability and low vaporization, be sure to stay within the fluid's normal temperature range.

You are responsible for proper selection and use of the fluids. Avoid extreme range operation.

Fluid Description	**Viscosity (cSt) @ 25°C**	**Specific Heat**			**Normal Temperature Range**	**Extreme Temperature Range**
		@ Fluid Temperature	BTU/lb°F	KJ/Kg°C		
distilled water	1	50°C	1.00	4.18	10° to 90°C	2° to 100°C
Ethylene glycol (50/50 mix with distilled H_2O)	20	-20°C	0.78	3.26	-25° to 100°C	-30° to 115°C
Ethylene glycol (30/70 mix with distilled H_2O)	12	0°C	0.89	3.72	0° to 95°C	-15° to 107°C
Propylene glycol (50/50 mix with distilled H_2O)	20	-10°C	0.83	3.47	-20° to 100°C	-30° to 115°C
Propylene glycol (30/70 mix with distilled H_2O)	12	5°C	0.92	3.85	5° to 90°C	-10° to 107°C

Cole-Parmer®

Cole-Parmer®
IC-400
Standard
Immersion
Circulators

USER OPERATION MANUAL

Introduction

Thank you for choosing the IC-400 Immersion Circulator. It is intended for the precise temperature control of suitable liquids in a reservoir. Extremely easy to use and maintain, it combines design innovation with highly intuitive operation to deliver convenient and versatile liquid temperature control for a wide range of applications.

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Here are some of the features that make the IC-400 Immersion Circulator so user-friendly:

- Simple, intuitive operation
- Displays actual and set point temperature simultaneously
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- Attaches securely to both flat and rounded tank walls
- Converts any tank or vessel up to 28 liters into a reliable circulating bath
- Fully enclosed housing prevents direct contact with pump and heater, yet provides quick access for inspection and cleaning
- Suitable for use with Class I non-flammable fluids per DIN 12876-1

It will take you very little time to get your new IC-400 Immersion Circulator installed and running, This Operator's Manual is designed to guide you quickly through the process. We recommend that you read it thoroughly before you begin.

Troubleshooting Chart

Problem	Possible Causes	Corrective Action
Unit does not run (Digital Display is blank)	No power to unit	Check that the electrical cord is secure and connected to an operating electrical outlet.
Unit does not run (STANDBY appears on Digital Display)	Unit in Standby mode	Press Power Key on front panel.
No fluid circulation	Insufficient fluid in reservoir Pump impeller jammed	Add fluid to reservoir. Inspect pump and remove debris as required.
Insufficient circulation	Fluid viscosity too high Low line voltage	Replace with lower viscosity bath fluid. Check and correct as required.
Unit does not heat	Insufficient fluid in reservoir Temperature set point too low Safety Set Temperature too low	Add fluid to reservoir. Increase temperature set point. Increase Safety Set temperature.
Insufficient heating	Insufficient circulation Low line voltage Ambient temperature too cool Excessive heat loss	See Insufficient circulation, above. Check and correct as required. Increase ambient temperature or relocate unit. Check for vapor/heat loss from internal reservoir.
Temperature unstable	Insufficient circulation Debris or mineral build-up on pump, heater, or temperature sensor.	Check pump flow and operation. Clean as required.

Technical Information

Performance Specifications

Operating Temperature Range:	Ambient +10° to 135°C Ambient +20° to 275°F	
Temperature Stability:	±0.07°C / ±0.13°F	
Heater Wattage:	1100 watts	
Electrical Requirements:	120V, 60Hz, 10 amps or 240V, 50Hz, 6 amps	
Environmental Conditions	Indoor use only	
	Maximum Altitude:	2000 meter
	Operating Ambient:	5° to 35°C (41° to 95°F)
	Relative Humidity:	80%, non-condensing
	Installation Category:	II
	Pollution Degree:	2
	Ingress Protection:	IP 31
	Climate Class:	SN
	Software Class:	B
	Output Waveform:	Sinusoidal

Specifications subject to change without notice.

Attainable Temperatures:

Your IC-400 Immersion Circulator can be used with reservoirs of various capacities and shapes as well as different fluids. These variables may adversely affect temperature accuracy and stability. For example, a reservoir with a large surface area loses heat more quickly, which may prevent the Circulator from attaining the desired temperature.

Reservoir Fluids

Depending on your needs, a variety of fluids can be used with your Immersion Circulator. No matter what bath fluid is selected, it must be chemically compatible with the reservoir and the materials in your Immersion Circulator. It must also be suitable for the desired temperature range.

WARNING: Do not use a flammable liquid as a bath fluid as a fire hazard may result.

WARNING: Always use fluids that satisfy safety, health, and equipment compatibility requirements.

For optimum temperature stability, the fluid's viscosity should be 50 centistokes (cSt) or less at its lowest operating temperature. This permits good fluid circulation and minimizes heating from the pump.

For temperatures from 10°C to 90°C, distilled water is recommended. For temperatures below 10°C, a mixture of laboratory grade ethylene glycol and water should be used. Do not use deionized water.

The following chart is intended to serve as a guide in selecting a bath fluid for your application. For optimum temperature stability and low vaporization, be sure to stay within the fluid's normal temperature range.

You are responsible for proper selection and use of the fluids. Avoid extreme range operation.

Fluid Description	Viscosity (cSt) @ 25°C	Specific Heat			Normal Temperature Range	Extreme Temperature Range
		@ Fluid Temperature	BTU/lb°F	KJ/Kg°C		
distilled water	1	50°C	1.00	4.18	10° to 90°C	2° to 100°C
polyclear MIX 30	1	50°C	1.00	4.18	15° to 90°C	2° to 100°C
polytherm S150	50	100°C	0.41	1.71	50° to 150°C	5° to 270°C*
polytherm S200	125	150°C	0.40	1.67	100° to 200°C	80° to 232°C*
polytherm S250	500	200°C	0.39	1.63	150° to 250°C	125° to 260°C*
polytherm M170	40	85°C	0.40	1.67	50° to 170°C	25° to 190°C
polycool HC -50	3	-30°C	0.62	2.59	-50° to 100°C	-62° to 118°C
polycool EG -25 (50/50 mix with distilled H_2O)	20	-20°C	0.78	3.26	-25° to 100°C	-30° to 115°C
polycool EG -25 (30/70 mix with distilled H_2O)	12	0°C	0.89	3.72	0° to 95°C	-15° to 107°C
polycool PG -20 (50/50 mix with distilled H_2O)	20	-10°C	0.83	3.47	-20° to 100°C	-30° to 115°C
polycool PG -20 (30/70 mix with distilled H_2O)	12	5°C	0.92	3.85	5° to 90°C	-10° to 107°C
polycool MIX -25 (50/50 mix with distilled H_2O)	20	-20°C	0.78	3.26	-25° to 100°C	-30° to 115°C
polycool MIX -25 (30/70 mix with distilled H_2O)	12	0°C	0.89	3.72	0° to 95°C	-15° to 107°C

***WARNING:** This is the fluid's flash point temperature.

Cole-Parmer®

Cole-Parmer® CH-800 Recirculating Chillers

USER OPERATION MANUAL

General Information

General Safety Information

When installed, operated and maintained according to the directions in this manual and common safety procedures, your Chiller should provide safe and reliable heat removal. Please ensure that all individuals involved in the installation, operation or maintenance of this unit read this manual thoroughly prior to working with the unit.

	This symbol alerts you to a wide range of potential dangers.
	This symbol advises you of danger from electricity or electric shock.
	This symbol marks information that is particularly important.
	This symbol indicates alternating current.
	These symbols on the Power Switch / Circuit Breaker indicate that they place the main power supply ON / OFF.
	This symbol on the Power Switch indicates that it places the unit in a standby mode. It DOES NOT fully disconnect the unit from the power supply.
	This symbol indicates a protective conductor terminal.

Read all instructions pertaining to safety, set-up and operation.
Proper operation and maintenance is the user's responsibility.

Safety Recommendations

To prevent injury to personnel and/or damage to property, always follow your workplaces safety procedures when operating this equipment. You should also comply with the following safety recommendations:

	• Always connect the power cord on this unit to a grounded (3-prong) power outlet. Make certain that the outlet is the same voltage and frequency as your unit. • Never operate the unit with a damaged power cord. • Always turn the unit OFF and disconnect Mains power before performing any maintenance or service.

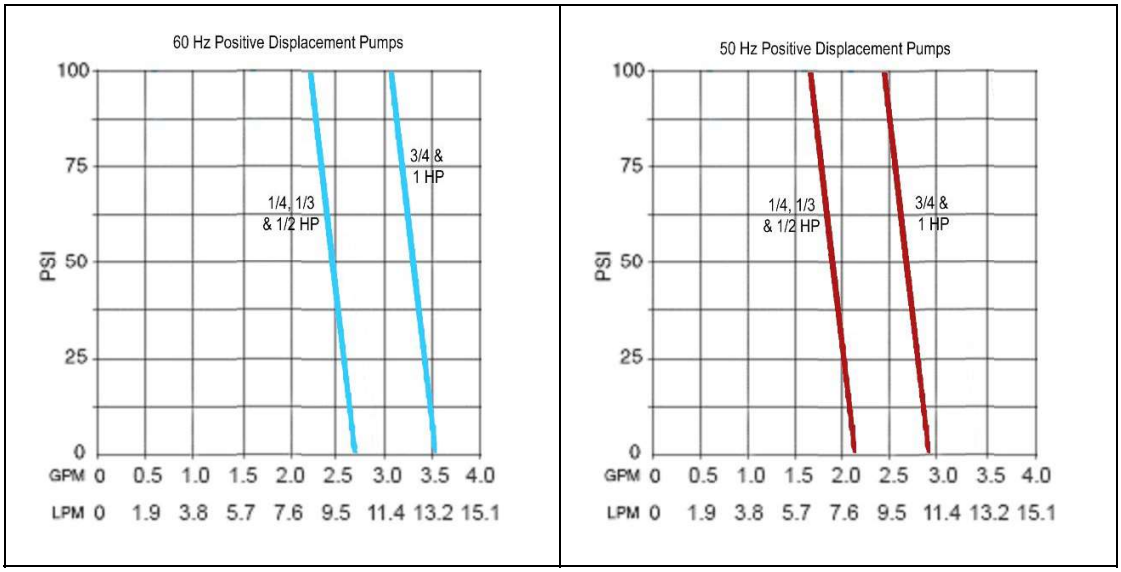
Technical Information

General Specifications (all Chillers)

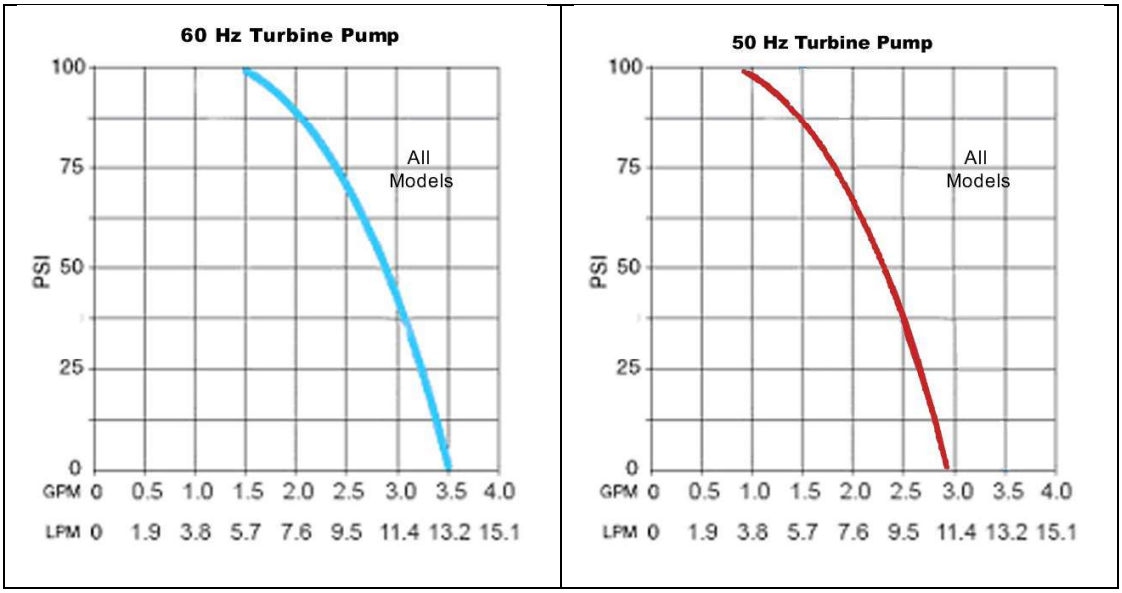
Temperature Set Point Resolution	0.1°C
Temperature Stability	±0.1°C
Temperature Units	°C or °F
Pressure Units	psi or kPa
Pressure Display Resolution Pressure Display Accuracy	1 psi / 6.9 kPa ±3.5% of full scale (100PSI)
Pump Inlet and Outlet	½ inch NPT

Pump Performance

Positive Displacement Pump



Turbine Pump



Performance Specifications — 60Hz Chillers

Air-Cooled 1/4-HP, 1/3-HP and 1/2-HP Chillers

Positive Displacement Pump (60Hz)			
Compressor	1/4 HP	1/3 HP	1/2 HP
Operating Temperature	-10°C to 70°C	-10°C to 70°C	-10° to 70°C
Cooling Capacity @ 20°C 10°C 0°C	850 watts 2902 BTU/hr 600 watts 2049 BTU/hr 400 watts 1366 BTU/hr	1400 watts 4781 BTU/hr 990 watts 3381 BTU/hr 530 watts 1819 BTU/hr	1742 watts 5949 BTU/hr 1286 watts 4392 BTU/hr 770 watts 2630 BTU/hr
Flow Rate @ 0 psi	2.6 gpm / 9.8 lpm	2.6 gpm / 9.8 lpm	2.6 gpm / 9.8 lpm
Pump Pressure (adjustable)	20 to 100 psi 138 to 689 kPa	20 to 100 psi 138 to 689 kPa	20 to 100 psi 138 to 689 kPa
Reservoir Capacity	1.1 gal / 4.2 liters	1.1 gal / 4.2 liters	1.1 gal / 4.2 liters
Shipping Weight	167 pounds 75.7 kg	167 pounds 75.7 kg	170.1 pounds 77.2 kg
Voltage Range	108 to 132V		
Full Load Amps	13.6A	16.2A	17.3A

Turbine Pump (60Hz)			
Compressor	1/4 HP	1/3 HP	1/2 HP
Operating Temperature	-10°C to 70°C	-10°C to 70°C	-10° to 70°C
Cooling Capacity @ 20°C 10°C 0°C	850 watts 2902 BTU/hr 600 watts 2049 BTU/hr 400 watts 1366 BTU/hr	1400 watts 4781 BTU/hr 990 watts 3381 BTU/hr 530 watts 1819 BTU/hr	1742 watts 5949 BTU/hr 1286 watts 4392 BTU/hr 770 watts 2630 BTU/hr
Flow Rate @ 0 psi	3.5 gpm / 13.2 lpm	3.5 gpm / 13.2 lpm	3.5 gpm / 13.2 lpm
Pump Pressure (adjustable)	20 to 90 psi 138 to 621 kPa	20 to 90 psi 138 to 621 kPa	20 to 90 psi 138 to 621 kPa
Reservoir Capacity	1.1 gal / 4.2 liters	1.1 gal / 4.2 liters	1.1 gal / 4.2 liters
Shipping Weight	169 pounds 76.7 kg	169 pounds 76.7 kg	172.1 pounds 78.1 kg
Voltage Range	108 to 132V		
Full Load Amps	13.7A	16.3A	17.4A

Air-Cooled 1-HP Chillers

Pump	**Positive Displacement Pump (60Hz)**	**Turbine Pump (60Hz)**
Compressor	1 HP	1 HP
Operating Temperature	-10° to 70°C	-10° to 70°C
Cooling Capacity @ 20°C 10°C 0°C	2900 watts 9904 BTU/hr 1925 watts 6574 BTU/hr 1000 watts 3415 BTU/hr	2900 watts 9904 BTU/hr 1925 watts 6574 BTU/hr 1000 watts 3415 BTU/hr
Flow Rate @ 0 psi	3.5 gpm / 13.2 lpm	3.5 gpm / 13.2 lpm
Pump Pressure (adjustable)	20 to 100 psi 138 to 689 kPa	20 to 90 psi 138 to 621 kPa
Reservoir Capacity	1.1 gal / 4.2 liters	1.1 gal / 4.2 liters
Shipping Weight	177 pounds 80.3 kg	177 pounds 80.3 kg
Voltage Range	187 to 264V	
Full Load Amps	13.4A	13.5A

Specifications subject to change without notice.

Notes: Refer to the serial number plate on the rear of the Chiller for model and electrical data.
Cooling capacity (watts x 3.41) = BTU/hour. Performance specifications determined at ambient temperature of 20°C (68°F).
External pressure reducing assembly (Cat. No. 060302) steps down high outlet pressure to 10 to 45psi.

Environmental Conditions

Indoor use only	
Maximum Altitude:	2000 meters
Operating Ambient:	5° to 40°C
Relative Humidity:	80% for temperatures to 40°C
Installation Category	II
Pollution Degree:	2
Sound Level:	Less than 70 dB(A) A-weighted emission sound pressure level

Performance Specifications — 50Hz Chillers

Air-Cooled 1/4-HP, 1/3-HP and 1/2-HP Chillers

Positive Displacement Pump (50Hz)			
Compressor	1/4 HP	1/3 HP	1/2 HP
Operating Temperature	-10°C to 70°C	-10°C to 70°C	-10° to 70°C
Cooling Capacity @ 20°C 10°C 0°C	700 watts 2391 BTU/hr 500 watts 1708 BTU/hr 300 watts 1025 BTU/hr	1280 watts 4371 BTU/hr 935 watts 3193 BTU/hr 485 watts 1656 BTU/hr	1836 watts 6270 BTU/hr 1286 watts 4033 BTU/hr 770 watts 2637 BTU/hr
Flow Rate @ 0 psi	2.0 gpm / 7.6 lpm	2.0 gpm / 7.6 lpm	2.0 gpm / 7.6 lpm
Pump Pressure (adjustable)	20 to 83 psi 138 to 572 kPa	20 to 83 psi 138 to 572 kPa	20 to 83 psi 138 to 572 kPa
Reservoir Capacity	1.1 gal / 4.2 liters	1.1 gal / 4.2 liters	1.1 gal / 4.2 liters
Shipping Weight	167 pounds 75.7 kg	167 pounds 75.7 kg	170.1 pounds 77.2 kg
Voltage Range	180 to 264V Category II Over Voltage		
Full Load Amps	8.2A	8.3A	8.5A

Air-Cooled 1/4-HP, 1/3-HP and 1/2-HP Chillers

Turbine Pump (50Hz)			
Compressor	1/4 HP	1/3 HP	1/2 HP
Operating Temperature	-10°C to 70°C	-10°C to 70°C	-10° to 70°C
Cooling Capacity @ 20°C 10°C 0°C	700 watts 2391 BTU/hr 500 watts 1708 BTU/hr 300 watts 1025 BTU/hr	1280 watts 4371 BTU/hr 935 watts 3193 BTU/hr 485 watts 1656 BTU/hr	1836 watts 6270 BTU/hr 1286 watts 4033 BTU/hr 770 watts 2637 BTU/hr
Flow Rate @ 0 psi	2.2 gpm / 8.3 lpm	2.2 gpm / 8.3 lpm	2.2 gpm / 8.3 lpm
Pump Pressure (adjustable)	20 to 75 psi 138 to 517 kPa	20 to 75 psi 138 to 517 kPa	20 to 75 psi 138 to 517 kPa
Reservoir Capacity	1.1 gal / 4.2 liters	1.1 gal / 4.2 liters	1.1 gal / 4.2 liters
Shipping Weight	169 pounds 76.7 kg	169 pounds 76.7 kg	172.1 pounds 78.1 kg
Voltage Range	180 to 264V Category II Over Voltage		
Full Load Amps	8.9A	9.0A	9.2A

Air-Cooled 1-HP Chillers

Pump	**Positive Displacement Pump (50Hz)**	**Turbine Pump (50Hz)**
Compressor	1 HP	1 HP
Operating Temperature	-10° to 70°C	-10° to 70°C
Cooling Capacity @ 20°C 10°C 0°C	2650 watts 9050 BTU/hr 1900 watts 6489 BTU/hr 1000 watts 4098 BTU/hr	2650 watts 9050 BTU/hr 1900 watts 6489 BTU/hr 1000 watts 4098 BTU/hr
Flow Rate @ 0 psi	2.9 gpm / 11 lpm	2.9 gpm / 11 lpm
Pump Pressure (adjustable)	20 to 83 psi 138 to 572 kPa	20 to 75 psi 138 to 517 kPa
Reservoir Capacity	1.1 gal / 4.2 liters	1.1 gal / 4.2 liters
Shipping Weight	177 pounds 80.3 kg	177 pounds 80.3 kg
Voltage Range	180 to 264V Category II Over Voltage	
Full Load Amps	12.0A	12.0A

Specifications subject to change without notice.

Notes: Refer to the serial number plate on the rear of the Chiller for model and electrical data.
Cooling capacity (watts x 3.41) = BTU/hour. Performance specifications determined at ambient temperature of 20°C (68°F).
Positive Displacement Pump Models: External pressure reducing assembly (Cat. No. 060302) steps down high outlet pressure to 10 to 45psi.

Environmental Conditions Indoor use only
Maximum Altitude: 2000 meters
Operating Ambient: 5° to 40°C
Relative Humidity: 80% for temperatures to 40°C
Installation Category: II
Pollution Degree: 2

All 1/4-HP Units	120V, 60Hz	200-240V, 50Hz
Compressor, ¼ HP	750-950	750-951
Positive Displacement Motor (all models)	215-217	215-529
Positive Displacement Pump (all models)	215-105	215-105
Turbine Pump (all models)	215-823	215-823
Fan Assembly	215-923	215-924

All 1/3-HP Units	120V, 60Hz	200-240V, 50Hz
Compressor, 1/3 HP	750-952	750-953
Positive Displacement Motor (all models)	215-217	215-529
Positive Displacement Pump (all models)	215-105	215-105
Turbine Pump (all models)	215-823	215-823
Fan Assembly	215-923	215-924

All 1/2-HP Units	120V, 60Hz	200-240V, 50Hz
Compressor, ½ HP	750-954	750-955
Positive Displacement Motor (all models)	215-217	215-529
Positive Displacement Pump (all models)	215-105	215-105
Turbine Pump (all models)	215-823	215-823
Fan Assembly	215-923	215-924

All 1-HP Units	208-240V, 60HZ	200- 240V, 50HZ
Compressor, 1 HP	750-957	750-956
Positive Displacement Motor (all models)	215-217	215-217
Positive Displacement Pump (all models)	215-106	215-106
Turbine Pump (all models)	215-823	215-823
Fan Assembly	215-924	215-924

Common Parts	
Operator's Manual	110-969
Tubing Adapter Kit	510-288
Air Filter, Dynamic	511-535
Air Filter, Passive	750-967
Circuit Breaker	215-330
UV Module	511-528
Reservoir Cap	301-018
Power Supply, DC	215-922
Fuse (two used per Chiller) 15A Slow Blow 1-1/4 x ¼" Littelfuse 0326015.HXP or equivalent	200-576
P1 Temperature Sensor	200-430-KIT
Water Pressure Transducer	750-993-KIT
Refrigeration Pressure Transducer	750-945-KIT
Refrigeration Suction Temperature Sensor	200-880
Refrigeration Discharge Temperature Sensor	200-879
Flow Sensor	776-337
Display PCB	500-501
Display Module	200-583
Main Control PCB	500-520
Motor Control AC Relay PCB	500-502
Kit, Flow Meter	511-147
Asm, Flow Sensor w/conn	526-020

Fluids		
polycool MIX -25	Case = 5 x ½ gallon (I.9 L)	004-300060
polycool MIX 30 PLUS	Case = 5 x ½ gallon (I.9 L)	004-300063
polycool EG -25	1 gallon (3.8 L)	060340
polycool PG -20	1 gallon (3.8 L)	060320
polycool HC -50	1 gallon (3.8 L)	060330
polyclean CLARIFIER	8 oz (237 ml) Case = 12 x 8 oz (237 ml)	004-300040 004-300041

polystat®

User Manual

Cole-Parmer® Polystat®
Refrigerated Recirculating Chillers

Model No. 12910-00, 12910-05, 12910-20, 12910-25, 12910-30, 12910-35, 12910-40, 12910-45
12910-90, 12910-95, 12920-00, 12920-05, 12920-30, 12920-35, 12920-40, 12920-45, 12930-70
12930-72, 12930-74, 12930-76, 12930-78, 12930-80, 12930-82, 12930-84, 12930-88, 20872-92
20872-93, 20872-94

Cole-Parmer®
scientific experts

Introduction

Your Cole-Parmer® Polystat® Recirculating Chiller provides cooling power for demanding applications and serves as an economical alternative to tap water cooling systems. Extremely easy to use and maintain, it combines technological innovation with precise temperature control to deliver reliable heat removal for a wide variety of applications.

Here are some of the features that make your Chiller so user-friendly:

- Microprocessor-based temperature controller
- Large, easy to read digital temperature display (°C or °F)
- One-touch temperature set point adjustment
- Digital pressure/flow rate display (PSI, kPa, GPM, LPM) with push-button selection
- Modulated refrigeration system for enhanced temperature stability and extended compressor life
- Centrifugal, positive displacement, or regenerative turbine pump

It will take you very little time to get your Recirculating Chiller installed and running. This manual is designed to guide you quickly through the process. We recommend that you read it thoroughly before you begin.

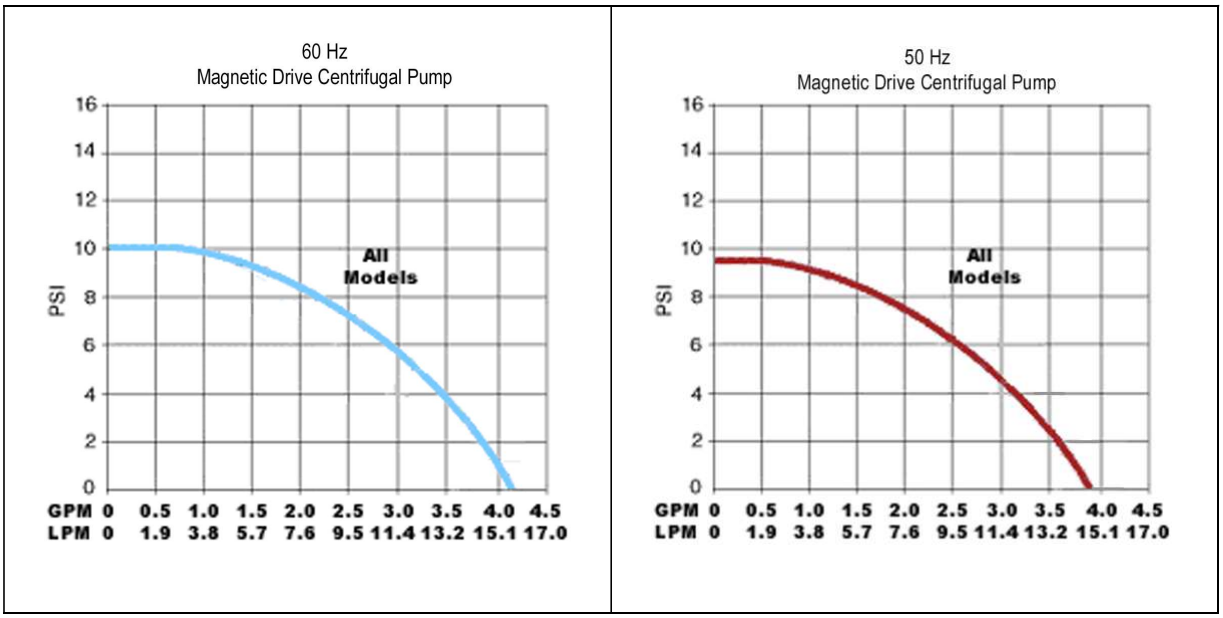
Technical Information

General Specifications (all Chillers)

Temperature Set Point Resolution	±0.1°C
Temperature Stability	±0.1°C
Temperature Units	°C or °F
Pressure Units	PSI or kPa
Pressure Display Resolution Pressure Display Accuracy	1 PSI / 6.9 kPa ±3.5% of full scale (100PSI)
Flow Rate Units	GPM or LPM
Flow Rate Display Resolution Flow Rate Display Accuracy	0.1 GPM / 1 LPM +/- 0.4 GPM / 1.5 LPM
Pump Inlet and Outlet	½ inch NPT

Pump Performance

Magnetic Drive Centrifugal Pump



Performance Specifications — 60Hz Chillers

Air-Cooled 1/4-HP, 1/3-HP and 1/2-HP Chillers

Magnetic Drive Centrifugal Pump (60Hz) Model: Rfg = Refrigerating Only Rfg / Htg = Refrigerating & Heating						
Model Type	**Rfg**	**Rfg / Htg**	**Rfg**	**Rfg / Htg**	**Rfg**	**Rfg / Htg**
Operating Temperature	-10° to 40°C	-10° to 70°C	-10° to 40°C	-10° to 70°C	-10° to 40°C	-10° to 70°C
Cooling Temperature Range	-10° to 40°C	-10° to 50°C	-10° to 40°C	-10° to 50°C	-10° to 40°C	-10° to 50°C
Compressor	1/4 HP		1/3 HP		1/2 HP	
Cooling Capacity @ 20°C 10°C 0°C	950 watts 3244 BTU/hr 700 watts 2391 BTU/hr 300 watts 1025 BTU/hr		1430 watts 4884 BTU/hr 1000 watts 3415 BTU/hr 700 watts 2391 BTU/hr		1842 watts 6291 BTU/hr 1386 watts 4733 BTU/hr 870 watts 2971 BTU/hr	
Pressure at 0 Flow Rate	10 psi / 69 kPa		10 psi / 69 kPa		10 psi / 69 kPa	
Flow Rate at 0 psi	4.1 gpm / 15.5 lpm		4.1 gpm / 15.5 lpm		4.1 gpm / 15.5 lpm	
Reservoir Capacity	1.1 gal / 4.2 liters		1.1 gal / 4.2 liters		1.1 gal / 4.2 liters	
Dimensions (L x W x H)	27.6 x 14.5 x 22.6 in. 70.2 x 36.8 x 57.5 cm.					
Shipping Weight	131 pounds 59.4 kg		143 pounds 64.8 kg		168 pounds 76.2 kg	
120 V, 60 Hz Chillers Volts Range	108 to 132V					
Amps	9.5A	10.0A	10.4A	10.7A	13.5A	13.8A

Positive Displacement Pump (60Hz)

Model: Rfg = Refrigerating Only
Rfg / Htg = Refrigerating & Heating

Model Type	**Rfg**	**Rfg / Htg**	**Rfg P**	**Rfg / Htg**	**Rfg**	**Rfg / Htg**
Operating Temperature	-10° to 40°C	-10°C to 70°C	-10° to 40°C	-10°C to 70°C	-10° to 40°C	-10° to 70°C
Cooling Temperature Range	-10° to 40°C	-10°C to 50°C	-10° to 40°C	-10°C to 50°C	-10° to 40°C	-10° to 50°C
Compressor	1/4 HP		1/3 HP		1/2 HP	
Cooling Capacity @ 20°C 10°C 0°C	850 watts 2902 BTU/hr 600 watts 2049 BTU/hr 400 watts 1366 BTU/hr		1400 watts 4781 BTU/hr 990 watts 3381 BTU/hr 530 watts 1819 BTU/hr		1742 watts 5949 BTU/hr 1286 watts 4392 BTU/hr 770 watts 2630 BTU/hr	
Flow Rate @ 0 psi	2.6 gpm / 9.8 lpm		2.6 gpm / 9.8 lpm		2.6 gpm / 9.8 lpm	
Pump Pressure (adjustable)	20 to 100 psi 138 to 689 kPa		20 to 100 psi 138 to 689 kPa		20 to 100 psi 138 to 689 kPa	
Reservoir Capacity	1.1 gal / 4.2 liters		1.1 gal / 4.2 liters		1.1 gal / 4.2 liters	
Dimensions (L x W x H)	27.6 x 14.5 x 22.6 in. 70.2 x 36.8 x 57.5 cm.					
Shipping Weight	141 pounds 64 kg		153 pounds 69 kg		178 pounds 81 kg	
120 V, 60 Hz Chillers Volts Range	108 to 132V					
Amps	12.8A	13.1A	13.7A	14.1A	16.2A	16.6A

Turbine Pump (60Hz)

Model: Rfg = Refrigerating Only
Rfg / Htg = Refrigerating & Heating

Model Type	**Rfg**	**Rfg / Htg**	**Rfg**	**Rfg / Htg**	**Rfg**	**Rfg / Htg**
Operating Temperature	-10° to 40°C	-10°C to 70°C	-10° to 40°C	-10°C to 70°C	-10° to 40°C	-10°C to 70°C
Cooling Temperature Range	-10° to 40°C	-10°C to 50°C	-10° to 40°C	-10°C to 50°C	-10° to 40°C	-10°C to 50°C
Compressor	1/4 HP		1/3 HP		1/2 HP	
Cooling Capacity @ 20°C 10°C 0°C	850 watts 2902 BTU/hr 600 watts 2049 BTU/hr 400 watts 1366 BTU/hr		1400 watts 4781 BTU/hr 990 watts 3381 BTU/hr 530 watts 1819 BTU/hr		1742 watts 5949 BTU/hr 1286 watts 4392 BTU/hr 770 watts 2630 BTU/hr	
Flow Rate @ 0 psi	3.5 gpm / 13.2 lpm		3.5 gpm / 13.2 lpm		3.5 gpm / 13.2 lpm	
Pump Pressure (adjustable)	20 to 90 psi 138 to 621 kPa		20 to 90 psi 138 to 621 kPa		20 to 90 psi 138 to 621 kPa	
Reservoir Capacity	1.1 gal / 4.2 liters		1.1 gal / 4.2 liters		1.1 gal / 4.2 liters	
Dimensions (L x W x H)	27.6 x 14.5 x 22.6 in. 70.2 x 36.8 x 57.5 cm.					
Shipping Weight	143 pounds 65 kg		156 pounds 71 kg		181 pounds 82 kg	
120 V, 60 Hz Chillers Volts Range	108 to 132V					
Amps	12.2A	12.5A	13.1A	13.5A	16.0A	16.4A

Air-Cooled 3/4-HP and 1-HP Chillers

Magnetic Drive Centrifugal Pump (60Hz) Model: Rfg = Refrigerating Only Rfg / Htg = Refrigerating & Heating				
Model Type	**Rfg**	**Rfg / Htg**	**Rfg**	**Rfg / Htg**
Operating Temperature	-10° to 40°C	-10° to 70°C	-10° to 40°C	-10 to 70°C
Compressor	3/4 HP		1 HP	
Cooling Capacity @ 20°C 10°C 0°C	2350 watts 8026 BTU/hr 1550 watts 5294 BTU/hr 975 watts 3330 BTU/hr		2900 watts 9904 BTU/hr 1835 watts 6267 BTU/hr 1100 watts 3757 BTU/hr	
Pressure at 0 Flow Rate	10 psi / 69 kPa		10 psi / 69 kPa	
Flow Rate at 0 psi	4.1 gpm / 15.5 lpm		4.1 gpm / 15.5 lpm	
Reservoir Capacity	1.1 gal / 4.2 liters		1.1 gal / 4.2 liters	
Dimensions (L x W x H)	27.6 x 14.5 x 22.6 in. 70.2 x 36.8 x 57.5 cm.			
Shipping Weight	187 pounds 84.8 kg		189 pounds 85.7 kg	
208-230 V, 60 Hz Volts Range	187 to 253V			
Amps	9.2A	9.5A	9.5A	9.8A

Positive Displacement Pump (60Hz) Model: Rfg = Refrigerating Only Rfg / Htg = Refrigerating & Heating				
Model Type	**Rfg**	**Rfg / Htg**	**Rfg**	**Rfg / Htg**
Operating Temperature	-10° to 40°C	-10° to 70°C	-10° to 40°C	-10° to 70°C
Compressor	3/4 HP		1 HP	
Cooling Capacity @ 20°C 10°C 0°C	2300 watts 7855 BTU/hr 1550 watts 5294 BTU/hr 875 watts 2988 BTU/hr		2900 watts 9904 BTU/hr 1925 watts 6574 BTU/hr 1000 watts 3415 BTU/hr	
Flow Rate @ 0 psi	3.5 gpm / 13.2 lpm		3.5 gpm / 13.2 lpm	
Pump Pressure (adjustable)	20 to 100 psi 138 to 689 kPa		20 to 100 psi 138 to 689 kPa	
Reservoir Capacity	1.1 gal / 4.2 liters		1.1 gal / 4.2 liters	
Dimensions (L x W x H)	27.6 x 14.5 x 22.6 in. 70.2 x 36.8 x 57.5 cm.			
Shipping Weight	197 pounds 89 kg		199 pounds 90 kg	
208-230 V, 60 Hz Volts Range	187 to 253V			
Amps	11.9A	12.2A	12.2A	12.5A

Turbine Pump (60Hz) Model: Rfg = Refrigerating Only Rfg / Htg = Refrigerating & Heating				
Model Type	**Rfg**	**Rfg / Htg**	**Rfg**	**Rfg / Htg**
Operating Temperature	-10° to 40°C	-10° to 70°C	-10° to 40°C	-10° to 70°C
Compressor	3/4 HP		1 HP	
Cooling Capacity @ 20°C 10°C 0°C	2300 watts 7855 BTU/hr 1550 watts 5294 BTU/hr 875 watts 2988 BTU/hr		2900 watts 9904 BTU/hr 1925 watts 6574 BTU/hr 1000 watts 3415 BTU/hr	
Flow Rate @ 0 psi	3.5 gpm / 13.2 lpm		3.5 gpm / 13.2 lpm	
Pump Pressure (adjustable)	20 to 90 psi 138 to 621 kPa		20 to 90 psi 138 to 621 kPa	
Reservoir Capacity	1.1 gal / 4.2 liters		1.1 gal / 4.2 liters	
Dimensions (L x W x H)	27.6 x 14.5 x 22.6 in. 70.2 x 36.8 x 57.5 cm.			
Shipping Weight	197 pounds 89 kg		199 pounds 90 kg	
208-230 V, 60 Hz Volts Range	187 to 253V			
Amps	11.9A	12.2A	12.2A	12.5A

Water-Cooled 3/4-HP Chillers

Turbine Pump (230 VAC) Model: Rfg = Refrigerating Only Rfg / Htg = Refrigerating & Heating		
Model Type	**Rfg**	**Rfg / Htg**
Operating Temperature	-10° to 40°C	-10°C to 70°C
Cooling Temperature Range	-10° to 40°C	-10°C to 50°C
Compressor	1/2 HP	
Cooling Capacity 230 V, 60 Hz 200 V, 50 Hz	1850 watts @ 20°C fluid temperature 1150 watts @ 20°C fluid temperature	
Flow Rate @ 0 psi	3.5 gpm / 13.2 lpm	
Pump Pressure (adjustable)	20 to 90 psi 138 to 621 kPa	
Reservoir Capacity	1.1 gal / 4.2 liters	
Dimensions (L x W x H)	27.6 x 14.5 x 22.6 in. 70.2 x 36.8 x 57.5 cm.	
Shipping Weight	187 pounds / 84.8 kg	
Facility Water Requirement	Temperature Range: 8° to 30°C Pressure: 20 PSI minimum; 100 PSI maximum Flow: 3 GPM typical with 20°C facility water to achieve specified cooling capacity	
Electrical Requirements	188-253 VAC, 60 Hz single phase 180-220 VAC, 50 Hz single phase	
Amps	11.3 A	

Specifications subject to change without notice.

Notes: Refer to the serial number plate on the rear of the Chiller for model and electrical data.
Cooling capacity (watts x 3.41) = BTU/hour. Performance specifications determined at ambient temperature of 20°C (68°F).
Positive Displacement Pump Models: External pressure reducing assembly (Cat. No. 060302) steps down high outlet pressure to 10 to 45psi.

Environmental Conditions	Indoor use only	
	Maximum Altitude:	2000 meters
	Operating Ambient:	5° to 30°C
	Relative Humidity:	80% for temperatures to 30°C
	Installation Category	II
	Pollution Degree:	2

Performance Specifications — 50Hz Chillers

Air-Cooled 1/4-HP, 1/3-HP and 1/2-HP Chillers

Magnetic Drive Centrifugal Pump (50Hz)

Model: Rfg = Refrigerating Only
Rfg / Htg = Refrigerating & Heating

Model Type	**Rfg**	**Rfg / Htg**	**Rfg**	**Rfg / Htg**	**Rfg**	**Rfg / Htg**
Operating Temperature	-10° to 40°C	-10° to 70°C	-10° to 40°C	-10° to 70°C	-10° to 40°C	-10° to 70°C
Cooling Temperature Range	-10° to 40°C	-10° to 50°C	-10° to 40°C	-10° to 50°C	-10° to 40°C	-10° to 50°C
Compressor	1/4 HP		1/3 HP		1/2 HP	
Cooling Capacity @ 20°C	800 watts 2732 BTU/hr		1180 watts 4030 BTU/hr		1836 watts 6270 BTU/hr	
10°C	600 watts 2049 BTU/hr		960 watts 3279 BTU/hr		1181 watts 4033 BTU/hr	
0°C	400 watts 1355 BTU/hr		600 watts 2049 BTU/hr		772 watts 2637 BTU/hr	
Pressure at 0 Flow Rate	9.5 psi / 66 kPa		9.5 psi / 66 kPa		9.5 psi / 66 kPa	
Flow Rate at 0 psi	3.9 gpm / 14.7 lpm		3.9 gpm / 14.7 lpm		3.9 gpm / 14.7 lpm	
Reservoir Capacity	1.1 gal / 4.2 liters		1.1 gal / 4.2 liters		1.1 gal / 4.2 liters	
Dimensions (L x W x H)	27.6 x 14.5 x 22.6 in. 70.2 x 36.8 x 57.5 cm.					
Shipping Weight	131 pounds 59.4 kg		143 pounds 64.8 kg		168 pounds 76.2 kg	
240 V, 50 Hz Chillers Volts Range Over Voltage	198 to 264V Category II					
Amps	5.6A	5.9A	5.9A	6.2A	7.2A	7.5A

Positive Displacement Pump (50Hz)

Model: Rfg = Refrigerating Only
Rfg / Htg = Refrigerating & Heating

Model Type	Rfg	Rfg / Htg	Rfg P	Rfg / Htg	Rfg	Rfg / Htg
Operating Temperature	-10° to 40°C	-10°C to 70°C	-10° to 40°C	-10°C to 70°C	-10° to 40°C	-10° to 70°C
Cooling Temperature Range	-10° to 40°C	-10°C to 50°C	-10° to 40°C	-10°C to 50°C	-10° to 40°C	-10° to 50°C
Compressor	1/4 HP		1/3 HP		1/2 HP	
Cooling Capacity @ 20°C 10°C 0°C	700 watts 2391 BTU/hr 500 watts 1708 BTU/hr 300 watts 1025 BTU/hr		1280 watts 4371 BTU/hr 935 watts 3193 BTU/hr 485 watts 1656 BTU/hr		1836 watts 6270 BTU/hr 1181 watts 4033 BTU/hr 772 watts 2637 BTU/hr	
Flow Rate @ 0 psi	2.2 gpm / 8.3 lpm		2.2 gpm / 8.3 lpm		2.2 gpm / 8.3 lpm	
Pump Pressure (adjustable)	20 to 83 psi 138 to 572 kPa		20 to 83 psi 138 to 572 kPa		20 to 83 psi 138 to 572 kPa	
Reservoir Capacity	1.1 gal / 4.2 liters		1.1 gal / 4.2 liters		1.1 gal / 4.2 liters	
Dimensions (L x W x H)	27.6 x 14.5 x 22.6 in. 70.2 x 36.8 x 57.5 cm.					
Shipping Weight	141 pounds 64 kg		153 pounds 69 kg		178 pounds 81 kg	
240 V, 50 Hz Chillers Volts Range Over Voltage	198 to 264V Category II					
Amps	7.1A	7.4A	7.6A	7.9A	9.2A	9.5A

Turbine Pump (50Hz)

Model: Rfg = Refrigerating Only
Rfg / Htg = Refrigerating & Heating

Model Type	Rfg	Rfg / Htg	Rfg	Rfg / Htg	Rfg	Rfg / Htg
Operating Temperature	-10° to 40°C	-10°C to 70°C	-10° to 40°C	-10°C to 70°C	-10° to 40°C	-10°C to 70°C
Cooling Temperature Range	-10° to 40°C	-10°C to 50°C	-10° to 40°C	-10°C to 50°C	-10° to 40°C	-10°C to 50°C
Compressor	1/4 HP		1/3 HP		1/2 HP	
Cooling Capacity @ 20°C 10°C 0°C	700 watts 2391 BTU/hr 500 watts 1708 BTU/hr 300 watts 1025 BTU/hr		1280 watts 4371 BTU/hr 935 watts 3193 BTU/hr 485 watts 1656 BTU/hr		1836 watts 6270 BTU/hr 1181 watts 4033 BTU/hr 772 watts 2637 BTU/hr	
Flow Rate @ 0 psi	2.9 gpm / 11 lpm		2.9 gpm / 11 lpm		2.9 gpm / 11 lpm	
Pump Pressure (adjustable)	20 to 83 psi 138 to 572 kPa		20 to 83 psi 138 to 572 kPa		20 to 83 psi 138 to 572 kPa	
Reservoir Capacity	1.1 gal / 4.2 liters		1.1 gal / 4.2 liters		1.1 gal / 4.2 liters	
Dimensions (L x W x H)	27.6 x 14.5 x 22.6 in. 70.2 x 36.8 x 57.5 cm.					
Shipping Weight	143 pounds 65 kg		156 pounds 71 kg		181 pounds 82 kg	
240 V, 50 Hz Chillers Volts Range Over Voltage	198 to 264V Category II					
Amps	6.8A	7.1A	7.3A	7.6A	8.9A	9.2A

Air-Cooled 3/4-HP and 1-HP Chillers

Magnetic Drive Centrifugal Pump (50Hz) Model: Rfg = Refrigerating Only Rfg / Htg = Refrigerating & Heating				
Model Type	**Rfg**	**Rfg / Htg**	**Rfg**	**Rfg / Htg**
Operating Temperature	-10° to 40°C	-10° to 70°C	-10° to 40°C	-10 to 70°C
Compressor	3/4 HP		1 HP	
Cooling Capacity @ 20°C 10°C 0°C	2250 watts 7684 BTU/hr 1600 watts 5464 BTU/hr 1075 watts 3671 BTU/hr		2750 watts 9238 BTU/hr 2050 watts 7001 BTU/hr 1400 watts 4781 BTU/hr	
Pressure at 0 Flow Rate	9.5 psi / 66 kPa		9.5 psi / 66 kPa	
Flow Rate at 0 psi	3.9 gpm / 14.7 lpm		3.9 gpm / 14.7 lpm	
Reservoir Capacity	1.1 gal / 4.2 liters		1.1 gal / 4.2 liters	
Dimensions (L x W x H)	27.6 x 14.5 x 22.6 in. 70.2 x 36.8 x 57.5 cm.			
Shipping Weight	187 pounds 84.8 kg		189 pounds 85.7 kg	
240 V, 50 Hz Volts Range Over Voltage	198 to 264V Category II			
Amps	9.2A	9.5A	9.5A	9.8A

Positive Displacement Pump (50Hz) Model: Rfg = Refrigerating Only Rfg / Htg = Refrigerating & Heating				
Model Type	**Rfg**	**Rfg / Htg**	**Rfg**	**Rfg / Htg**
Operating Temperature	-10° to 40°C	-10° to 70°C	-10° to 40°C	-10° to 70°C
Compressor	3/4 HP		1 HP	
Cooling Capacity @ 20°C 10°C 0°C	2200 watts 7513 BTU/hr 1500 watts 5123 BTU/hr 975 watts 3329 BTU/hr		2650 watts 9050 BTU/hr 1900 watts 6489 BTU/hr 1200 watts 4098 BTU/hr	
Flow Rate @ 0 psi	2.9 gpm / 11 lpm		2.9 gpm / 11 lpm	
Pump Pressure (adjustable)	20 to 83 psi 138 to 572 kPa		20 to 83 psi 138 to 572 kPa	
Reservoir Capacity	1.1 gal / 4.2 liters		1.1 gal / 4.2 liters	
Dimensions (L x W x H)	27.6 x 14.5 x 22.6 in. 70.2 x 36.8 x 57.5 cm.			
Shipping Weight	197 pounds 89 kg		199 pounds 90 kg	
240 V, 50 Hz Volts Range Over Voltage	198 to 264V Category II			
Amps	11.9A	12.2A	12.2A	12.5A

Turbine Pump (50Hz) Model: Rfg = Refrigerating Only Rfg / Htg = Refrigerating & Heating				
Model Type	**Rfg**	**Rfg / Htg**	**Rfg**	**Rfg / Htg**
Operating Temperature	-10° to 40°C	-10° to 70°C	-10° to 40°C	-10° to 70°C
Compressor	3/4 HP		1 HP	
Cooling Capacity @ 20°C 10°C 0°C	2200 watts 7513 BTU/hr 1500 watts 5123 BTU/hr 975 watts 3329 BTU/hr		2650 watts 9050 BTU/hr 1900 watts 6489 BTU/hr 1200 watts 4098 BTU/hr	
Flow Rate @ 0 psi	2.9 gpm / 11 lpm		2.9 gpm / 11 lpm	
Pump Pressure (adjustable)	20 to 83 psi 138 to 572 kPa		20 to 83 psi 138 to 572 kPa	
Reservoir Capacity	1.1 gal / 4.2 liters		1.1 gal / 4.2 liters	
Dimensions (L x W x H)	27.6 x 14.5 x 22.6 in. 70.2 x 36.8 x 57.5 cm.			
Shipping Weight	197 pounds 89 kg		199 pounds 90 kg	
240 V, 50 Hz Volts Range Over Voltage	198 to 264V Category II			
Amps	11.9A	12.2A	12.2A	12.5A

Water-Cooled 3/4-HP Chillers

Turbine Pump (240 VAC) Model: Rfg = Refrigerating Only Rfg / Htg = Refrigerating & Heating		
Model Type	**Rfg**	**Rfg / Htg**
Operating Temperature	-10° to 40°C	-10°C to 70°C
Cooling Temperature Range	-10° to 40°C	-10°C to 50°C
Compressor	3/4 HP	
Cooling Capacity	1550 watts @ 20°C fluid temperature	
Flow Rate @ 0 psi	3.5 gpm / 13.2 lpm	
Pump Pressure (adjustable)	20 to 90 psi 138 to 621 kPa	
Reservoir Capacity	1.1 gal / 4.2 liters	
Dimensions (L x W x H)	27.6 x 14.5 x 22.6 in. 70.2 x 36.8 x 57.5 cm.	
Shipping Weight	187 pounds / 84.8 kg	
Facility Water Requirement	Temperature Range: 8° to 30°C Pressure: 20 PSI minimum; 100 PSI maximum Flow: 3 GPM typical with 20°C facility water to achieve specified cooling capacity	
Electrical Requirements	216-264 VAC, 50 Hz single phase	
Amps	11.3 A	

Specifications subject to change without notice.

Notes: Refer to the serial number plate on the rear of the Chiller for model and electrical data.
Cooling capacity (watts x 3.41) = BTU/hour. Performance specifications determined at ambient temperature of 20°C (68°F).
Positive Displacement Pump Models: External pressure reducing assembly (Cat. No. 060302) steps down high outlet pressure to 10 to 45psi.

Environmental Conditions	Indoor use only	
	Maximum Altitude:	2000 meters
	Operating Ambient:	5° to 30°C
	Relative Humidity:	80% for temperatures to 30°C
	Installation Category:	II
	Pollution Degree:	2

RS232 Communications

Serial Connector — A 9-pin D-connector is provided on the back panel of the Chiller for RS232 data communication. A serial cable that uses only the following pins should be used to connect the Chiller to the computer:

Pin #2 — data read (data from computer)
Pin #3 — data transmit (data to computer)
Pin #5 — signal ground

RS232 Protocol — The controller uses the following RS232 protocol:

Data bits — 8
Parity — none
Stop bits — 1
Flow control — none
Baud rate — selectable (Chiller and PC baud rates must match).

Communications Commands — Commands must be entered in the exact format shown. Do not send a [LF] (line feed) after the [CR] (character return). Be sure to follow character case exactly. A response followed by an exclamation point (!) indicates that a command was executed correctly. A question mark (?) indicates that the Chiller could not execute the command (either because it was in an improper format or the values were outside the allowable range). A response must be received from the Chiller before another command can be sent. All responses are terminated with a single [CR].

Command Description	Command Format	Values	Return Message
Set command echo	SEi[CR]	Echo: i = 1 No Echo: i = 0	![CR]
Set on / off	SOi[CR]	On: i = 1 Off: i = 0	![CR]
Set set point	SSxxx[CR]	x = ASCII digit	![CR]
Read set point temperature	RS[CR]		+xxx.x[CR] or - xxx.x[CR]
Read temperature	RT[CR]		+xxx.x[CR] or - xxx.x[CR]
Read probe 1 temperature	R1[CR]		+xxx.x[CR] or - xxx.x[CR]
Read probe 2 temperature	R2[CR]		+xxx.x[CR] or - xxx.x[CR]
Read temperature units	RU[CR]	C or F	C[CR] or F[CR]
Read status	RW[CR]	1 = Run 0 = Standby	1[CR] or 0[CR]
Read pressure in PSI	RP[CR]		+ xxx.x[CR]
Read pressure in kPa	RK[CR]		+ xxx.x[CR]
Read flow in GPM	RG[CR]		+ xxx.x[CR]
Read flow in LPM	RL[CR]		+ xxx.x[CR]
Read remote control voltage	RC[CR]		+ xxx.x[CR]
Read line voltage	RV[CR]		+ xxx.x[CR]
Read compressor discharge temperature (°C)	RH[CR]		+xxx.x[CR] or - xxx.x[CR]
Read remote probe temperature	RR[CR]		+xxx.x[CR] or - xxx.x[CR]
Read ambient temperature on PCB	RA[CR]		+xxx.x[CR] or - xxx.x[CR]

Cole-Parmer® CH-800 Series Benchtop Chillers

Compact yet powerful chillers can achieve a low temperature of -20°C

- Microprocessor-based temperature controller
- Ideal for use with rotary evaporators, vacuum systems, spectrometers, and other analytical instrumentation
- Cooling at ambient temperatures as high as 30°C
- Large, easy-to-read color touchscreen display
- Continuous fluid level monitoring protects pump and prevents freezing
- Ultraviolet (UV) anti-growth light inhibits biological growth
- RS-232, USB-B, dry contact, and remote probe connectivity
- Self-diagnostic test helps ensure optimal performance

These Cole-Parmer chillers provide excellent temperature ranges and performance in a compact package. The microprocessor-based temperature controller provides excellent temperature stability of ±0.1°C. With a small footprint of 23 cm x 43 cm (9" x 17"), chillers fit nicely on a laboratory benchtop to deliver reliable heat removal for a wide variety of applications. These powerful chillers easily cool fluids even at ambient temperatures as high as 30°C.

Configure chiller settings and view temperatures on the large color touchscreen display. Select to view temperatures in °C or °F and pressures in kPa or psi. Multi-language interface provides operation in five languages—English, Spanish, Chinese, French, and German. Front mounted fluid level gauge helps protect pump and prevent freezing. UV anti-growth light inhibits the growth of biological organisms in the stream ensuring the quality of the fluid.

All models feature RS-232, USB-B, dry contact, and remote temperature probe connections. Use the RS-232 and USB-B interfaces to remotely control the chiller or send the temperature readings to an external device. Remotely turn the chiller on and off with the dry contact closure. Connect a remote temperature probe to control the cooling fluid temperature using an external temperature measurement such as ambient temperature or process temperature. Temperature probe is not included—call to order.

Safety features include a low flow shutoff and high and low temperatures alarms. Variable-speed fan reduces operational noise and decreases energy consumption. Refrigeration stepper valves help provide more precision and efficient cooling while using less energy.

item	Cooling Capacity At 20° C (watts)	Min Temperature (° C)	Power (VAC)
 EW-20874-16	400	-10	120
 EW-20874-17	400	-10	240
 EW-20874-18	1000	-20	120
 EW-20874-19	1000	-20	240

Cole-Parmer Silicone Bath Fluid; 5 Gallons

Zoom Image

Cole-Parmer – Item # EW-78930-20

Ideal for high oxidation applications

- Strong resistance to oxidation up to 204°C (400°F)
- Maximum operating temperature of 316°C (600°F)
- Pumpable down to -50°C (-46°F)
- ASTM D92 flash point at 324°C

Specifications & Description

Max Temperature (° C)	204
Description	Silicone Bath Fluid - 5 Gallon Pail

MORE ABOUT THIS ITEM

This silicon-based transfer bath fluid is best suited for high oxidation applications and can be use in fully exposed systems like open baths. Resistant to fouling, you can expect to get a long service life from the fuel. It is ideal for applications not prone to contamination or leaking. The non-corrosive and non-toxic thermal fluid is safe to use.

Cole-Parmer® Accessories for Cole-Parmer® FSB-200 Series Fluidized Sand Baths

Parts and accessories to meet your application needs and keep your sand bath operating dependably.

item	Compatible With	Description
 EW-01184-52	Industrial fluidized sand baths 01184-10 and 01184-20	Lid for Industrial Fluidized Sand Baths

item	Compatible With	Description
 EW-01184-54	Industrial fluidized sand baths 01184-10 and 01184-20	Extraction Collar for Industrial Fluidized Sand Baths
 EW-01184-64	Industrial fluidized sand bath 01184-10	Standard Basket for 5 L Industrial Fluidized Sand Bath, Steel
 EW-01184-66	Industrial fluidized sand bath 01184-10	Deep Basket for 5 L Industrial Fluidized Sand Bath, Steel
 EW-01184-70	Industrial fluidized sand bath 01184-20	Standard Basket for 12 L Industrial Fluidized Sand Bath, Steel

item	Compatible With	Description
 EW-01184-72	Industrial fluidized sand bath 01184-20	Deep Basket for 12 L Industrial Fluidized Sand Bath, Steel
 EW-01184-78	All FSB-200 series fluidized sand baths	Air Pressure Regulator/Filter for FSB-200 Series Fluidized Sand Baths
 EW-01184-80	Industrial fluidized sand baths 01184-10 and 01184-20	Cyclone & Collection Bin for Industrial Fluidized Sand Baths
 EW-01184-81	Compact fluidized sand baths 01184-00 and 01184-02	Overspill Flange for Compact Fluidized Sand Baths 01184-00 and -02

item	Compatible With	Description
 EW-01184-82	Compact fluidized sand bath 01189-50	Overspill Flange for Compact Fluidized Sand Bath 01189-50
 EW-01184-83	Compact fluidized sand baths 01184-00, 01184-02, and 01189-50	Air Compressor for Compact Fluidized Sand Baths; 230 VAC
 EW-01184-84	SBL-1 Fluidized sand baths	Basket for Fluidized Sand Bath SBL-1
 EW-01184-85	SBL-2 Fluidized sand baths	Basket for Fluidized Sand Bath SBL-2

item	Compatible With	Description
 EW-01184-86	Compact fluidized sand bath 01189-50	Basket for Compact Fluidized Sand Bath 01189-50
 EW-01184-87	Compact fluidized sand baths 01184-00 and 01184-02	Basket for Compact Fluidized Sand Baths 01184-00 and -02
 EW-01184-92	Industrial fluidized sand baths 01184-10 and 01184-20	Extraction Fan for Industrial Fluidized Sand Baths
 EW-01184-93	Fluidized Sand Baths 01184-11, 13, -15, and -17	Lid for Fluidized Sand Baths 01184-11, 13, -15, and -17

item	Compatible With	Description
 EW-01184-94	Fluidized Sand Baths 01184-11, 13, -15, and -17	Basket for Fluidized Sand Baths 01184-11, 13, -15, and -17
 EW-01184-95	Fluidized Sand Baths 01184-19, -21, and -23	Lid for Fluidized Sand Baths 01184-19, -21, and -23
 EW-01184-96	Fluidized Sand Baths 01184-19 and -21	Basket for Fluidized Sand Baths 01184-19 and -21
 EW-01184-97	Fluidized Sand Bath 01184-23	Basket for Fluidized Sand Bath 01184-23

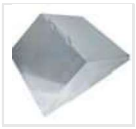
item	Compatible With	Description
 EW-01184-98	Fluidized Sand Baths for 01184-27 and -29	Basket for Fluidized Sand Baths for 01184-27 and -29
 EW-01184-99	Fluidized Sand Baths 01184-19, -21, and -23	Cyclone and Collection Bin for Fluidized Sand Baths 01184-19, -21, and -23
 EW-01191-01	Fluidized Sand Baths	Fluidized Sand Bath Compressed Air Filter
 EW-01191-02	Fluidized Sand Baths	Fluidized Sand Bath Air Pressure Regulator with Gauge

item	Compatible With	Description
 EW-12184-01	Precision fluidized sand baths 12184-03 and 12184-94	Air Compressor for Precision Fluidized Sand Baths
 EW-12184-02	Precision fluidized sand baths 12184-03 and 12184-94	Steel Mesh Basket with Collar for Precision Fluidized Sand Baths
 EW-12184-96	Precision fluidized sand baths 12184-03 and 12184-94	Dust Suppression System with Chimney for Precision Fluidized Sand Baths
 EW-12184-97	Precision fluidized sand baths 12184-03 and 12184-94	Spare Filter for Dust Suppression System for Precision Fluidized Sand Baths

item	Compatible With	Description
 EW-12184-98	Precision fluidized sand baths 12184-03 and 12184-94	Probe Holder for Precision Fluidized Sand Baths, 8 x 281 mm deep
 EW-12184-99	Precision fluidized sand baths 12184-03 and 12184-94	Probe Holder for Precision Fluidized Sand Baths, Multiple Sizes

Cole-Parmer® Accessories for Cole-Parmer® WBS-300 Series Shaking Water Baths and WB-300 Series Water Baths

Choose from these accessories to make your unit more versatile

item	Compatible With	Description
 EW-12122-92	Digital water bath 12122-91	Lid for Digital Water Baths, 6 L, Stainless Steel
 EW-12152-90	Shaking water baths 12152-00 and 12152-02	Reciprocating Platform for Shaking Water Baths

item	Compatible With	Description
 EW-12152-91	Shaking water baths 12152-00 and 12152-02	Orbital Platform for Shaking Water Baths
 EW-12152-92	Shaking water baths 12152-00 and 12152-02	Perforated Platform for Shaking Water Baths
 EW-12152-93	Shaking water baths 12152-00 and 12152-02	Centrifuge Tube Rack for Shaking Water Baths, 25 x 50 mL
 EW-12152-94	Shaking water baths 12152-00 and 12152-02	Micro Tube Rack for Shaking Water Baths, 143 x 1.5 mL

item	Compatible With	Description
 EW-12152-95	Shaking water baths 12152-00 and 12152-02	Culture Tube Rack for Shaking Water Baths, 120 x 13 mm
 EW-12152-96	Shaking water baths 12152-00 and 12152-02	Culture Tube Rack for Shaking Water Baths, 72 x 16 mm
 EW-12152-97	Shaking water baths 12152-00 and 12152-02	Culture Tube Rack for Shaking Water Baths, 56 x 15 mL
 EW-12152-98	Shaking water baths 12152-00 and 12152-02	Culture Tube Rack for Shaking Water Baths, 30 x 26 mm

item	Compatible With	Description
 EW-12152-99	Shaking water baths 12152-00 and 12152-02	Cover for Shaking Water Baths, Polycarbonate

Cole-Parmer® Hollow Polypropylene (PP) Ball Bath Covers

Reduce vapor and heat loss by 75% with one layer of balls

Polypropylene balls form a tight cover over liquids to prevent change in temperature and reduce evaporation. Use instead of a bath lid with any of the baths listed in the section.

item	Description
 EW-06821-00	Hollow PolyPropylene (PP) Ball Bath Covers, 10 mm; 2500/Pk

item	Description
 EW-06821-02	Hollow Polypropylene (PP) Ball Bath Covers, 20 mm; 500/Pk
 EW-06821-04	Hollow Polypropylene (PP) Ball Bath Covers, 20 mm; 1000/Pk
 EW-06821-06	Hollow Polypropylene (PP) Ball Bath Covers, 38 mm; 500/Pk
 EW-06821-08	Hollow Polypropylene (PP) Ball Bath Covers, 38 mm; 1000/Pk

item	Description
 EW-06821-12	Hollow Polypropylene (PP) Ball Bath Covers, 10 mm, 5000/pk
 EW-06821-25	Hollow Polypropylene (PP) Ball Bath Covers, 20 mm, 2000/pk
 EW-06821-38	Hollow Polypropylene (PP) Ball Bath Covers, 38 mm, 1000/pk

Accessories Cole-Parmer® CB-200D-IB Electronic Ice Bucket

Keep your samples cold, clean, and dry

These Techne N°ICE ceramic-coated beads maintain the temperature and support the sample vessels for as long as necessary. The beads are chemically resistant and if required can be autoclaved at 134°C. As a time saving option, the bucket of beads can be incubated in the fridge overnight and simply inserted into the unit as and when required. Compatible with the 24120-00 Electronic Ice Bucket, sold separately.

item	Description
 EW-24120-99	Electronic Ice Bucket Ceramic Beads
 EW-99967-93	Electronic Ice Bucket Spare Bucket

Cole-Parmer® WB-200 Series Digital Water Baths Accessories

Make sampling heating easier with optional accessories

Use the tube racks to hold various tube sizes in the water bath. The number of module spaces listed determine how many fit in each bath. Knobbed handle makes it easy to place or remove the rack in the bath.

Holed plates help prevent glassware from direct contact with heating elements. Remove the rings to accommodate flasks from 33 to 92 mm diameter.

item	Compatible With	Description
 EW-78905-26	6.6 L, 11 L, and 27 L water baths	Tube Rack, 20 x 13 mm dia
 EW-78905-27	6.6 L, 11 L, and 27 L water baths	Tube Rack, 20 x 18 mm dia

item	Compatible With	Description
 EW-78905-28	6.6 L, 11 L, and 27 L water baths	Tube Rack, 5 x 31 mm dia
 EW-78905-29	11 L and 27 L water baths	Tube Rack, 8 x 56 mm dia
 EW-78905-30	6.6 L water baths	Plate with Two Holes for 6.6 L Water Baths
 EW-78905-31	27 L water baths	Plate with Four Holes for 11 L Water Baths
 EW-78905-32	11 L water baths	Plate with Eight Holes for 27 L Water Baths

Cole-Parmer®

Cole-Parmer® WB-200 Series Water Baths

- Digital display with timer and temperature settings
- Corrosion-resistant 304 stainless steel tank
- Built-in overtemperature protection
- Supplied with stainless steel gabled cover
- 2-yea r warranty

Cole-Parmer® WB-200 Series Water Baths

Use these general-purpose digital water baths for a wide range of laboratory applications. Easily set and view current and set temperatures, timer, and bath status on the large LCD. In the event of a fault, the overtemperature protection system activates the alarm mode turning off all heating elements and lighting a red alarm indicator on the screen. Bath automatically resumes operation once the temperature drops back below the overshoot threshold.

Stainless steel interior and powder-coated steel exterior offer excellent durability. Attached 304 stainless steel gable cover reduces heat loss and ensures uniform temperatures. The built-in timer has a range of O to 5999 minutes; delay heating feature can be set to start the cycle when it is convenient for you. An audible alarm sounds intermittently to indicate end of heating cycle.

Perforated bottom plate (included) prevents direct contact with heating elements. Use the optional tube racks to hold various tube sizes in the bath. The number of module spaces listed (see table) determines how many trays fit in each bath. Knobbed handle makes it easy to place or remove the rack. Use the optional holed plates to accommodate flasks in the bath; simply remove the rings to fit flasks from 33 to 92 mm in diameter.

Order optional tube racks and holed plates separately (see next page).

Perforated bottom plate (included)

Capacity	Temperature range	Temperature stability	No. of module widths accepted	Bath opening (W x H x D)	Overall dimensions (W x H x D)	Item weight	Heater	Electrical r,./AC, Hz)	Item number
6.6 L	Ambient +5 to 100 °C	±0.2 °C	2*	11¾,₅ x 6⅛ x 5¹⁵,₅ in (30 x 15.5 x 15 cm)	18¹⁵,₅ x 8¹¹/,₅ x 133⁄s in (48 x 22 x 34 cm)	20 lb (9 kg)	600W	120, 60	78905-20
								220-240, 50/60	78905-21
11L	Ambient +5 to 100 °C	±0.2 °C	4	11¾,₅ x 9⅛6 x Tl⁄a in (30 x 24 x 20 cm)	18¹⁵,₅ x 11¾,₅ x 18¹⁵⁄,6 in (48 x 30 x 48 cm)	29 lb (13 kg)	800W	120, 60	78905-22
								220-240, 50/60	78905-23
27 L	Ambient +5 to 100 °C	±0.2 °C	8	19¹¹/,₅ x 115⁄s x Tl⁄a in (50 x 29.5 x 20 cm)	26¹³,₅ x 143⁄6 x 153⁄s in (68 x 36 x 39 cm)	36 lb (16 kg)	1000W	120, 60	78905-24
								220-240, 50/60	78905-25

*The 6.6 L models do not accept the 78905-29 tube rack.

Cole-Parmer® WB-200 Series Water Baths

Optional Tube Racks

Accommodates	Module width	Fits bath size	Item number
20 x 13 mm diameter tubes	1	6.6, 11, and 27 L	78905-26
20 x 18 mm diameter tubes	1	6.6, 11, and 27 L	78905-27
5 x 31 mm diameter tubes	1	6.6, 11, and 27 L	78905-28
8 x 56 mm diameter tubes	3	11 and 27 L	78905-29

Optional Holed Flask Racks

Accommodates	Fits bath size	Item number
2 flasks (33 to 92 mm diameter)	6.6 L	78905-30
4 flasks (33 to 92 mm diameter)	11L	78905-31
8 flasks (33 to 92 mm diameter)	27 L	78905-32

78905-26

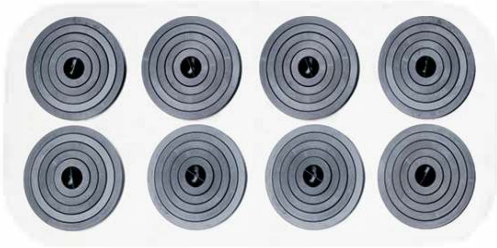
78905-27

78905-28

78905-29

78905-30

78905-31



78905-32

Cole-Parmer®

CB-200 Series
Electronic Ice Bucket

- Ideal for chilling reagents for the entire working laboratory day
- Waterless design means no more wet melting ice
- Ceramic-coated beads maintain a 4 °C temperature
- Aluminum ice bucket holds 60 x 1.5-ml microtubes or a reagent bottle
- Includes removable ice bucket and beads; order extras as needed
- 3-year warranty

CB-200 Series
Electronic Ice Bucket

Our electronic ice bucket is ideal for chilling or incubating any number or size of tubes for long periods of time. It is an excellent alternative to wet ice buckets which can be messy, inconvenient and lead to sample loss or contamination. In addition, the max temperature of 40 °C (104 °F} means that the unit is suitable for other applications such as ligation and enzyme reactions where a constant temperature close to ambient temperatures is required.

The removable bucket that sits inside the unit is filled with ceramic-coated beads that both maintain the user-set temperature and support the sample vessels. The ceramic beads are chemically resistant and can be autoclaved up to 134 °C (273 °F) for reuse.

Unit comes with a dark plastic lid, an aluminum ice bucket, and 17 kg (3.7 lb) of beads.

Specifications

Model no.	CB-200D-1B
Temperature range	0 to 40 'C (32 to 104 'F)'
Temperature accuracy	±1'C
Temperature units	'Cor'F
Cooling technology	Peltier
Temperature display resolution	0.1'C
Temperature display	Orange LED, 5 digits
Bucket dimensions (L x W x H)	15.5 x 10.5 x 7 cm (61 x 41 x 2.8 in)
Bucket capacity	60 x 1.5-mL microtubes (approx)
Dimensions (L x W x H)	19.0 x 24.0 x 22.5 cm (7.5 x 9.5 x 8.9 in)
Power supply	100 to 230 VAC, 50/60 Hz, 75 W
Warranty	3 years

'Please note the cooling plate will reach 4 'C relatively quickly in an ambient temperature of 20 'C, but may take several hours to reach O'C. Like a traditional ice-bucket, the actual sample may not reach O'C due to natural thermal transfer efficiency. Cooling can be speeded up by pre-freezing the aluminum bucket and ceramic beads before use.

Ordering Information

Description	Item no.	Series no.	Model no.	Legacy SKU
Electronic ice bucket and beads	24120-00	CB-200	CB-200D-IB	FNOICE

Accessories

Description	Item no.	Series no.	Model no.	Legacy SKU
Spare aluminum bucket	99967-93	CB-200	N/A	FICEBUCKET
Replacement ceramic beads	24120-99	CB-200	N/A	FTCOOLBE

Cole-Parmer®

Cole-Parmer® Unheated Baths - WBU-200-8, WBU-200-12, WBU-200-18, WBU-200-26, WBU-200-48

- Stainless steel construction
- Seam-free and corrosion resistant stainless steel inners for easy cleaning
- Rugged splash-proof case
- Integrated carrying handle
- Maximum working temperature of 200˚C
- All models come with a 3 year warranty as standard

Unheated Bath WBU-200-8

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Cole-Parmer® Unheated Baths - WBU-200-8, WBU-200-12, WBU-200-18, WBU-200-26, WBU-200-48

These Cole-Parmer® are designed to be used with a clip-on Tempette or Tempunit® thermoregulator, these water baths incorporate carrying handles for added safety. All water baths have stoved enamelled steel outer cases and are supplied with bridge mounting plate to hold the thermoregulator.

Unheated Bath **WBU-200-8**

Unheated Bath **WBU-200-12**

Unheated Bath **WBU-200-18**

Unheated Bath **WBU-200-26**

Unheated Bath **WBU-200-48**

Technical Specification

Specification	WBU-200-8	WBU-200-12	WBU-200-18	WBU-200-26	WBU-200-48
Capacity litres	8	12	18	26	48
Dimensions (mm) Length	265	354	530	530	594
Width(mm)	325	325	325	325	365
Height(mm)	172	172	172	222	298
Internal Dimensions Length (mm)	240	329	505	505	559
Width(mm)	300	300	300	300	330
Height(mm)	150	150	150	200	274
Top of bath to liquid level max depth (mm)	65	65	65	65	65
Working length to thermoregulator (mm)	115	205	380	380	430
Working depth - max/min (mm)	130/100	130/100	130/100	180/150	255/224
Working capacity - max/min (litres)	8.0/6.0	11.6/8.4	18.0/13.2	26.0/20.5	48.5/42.5
Shipping Weight	5.5kg	6.1kg	7.5kg	9.5kg	14.6kg

Ordering Information

Description	Ordering Number	Series No.	Model No.	LegacySku.
Cole-Parmer® Stainless steel bath, 8 litre capacity	16104-53	WBU-200	WBU-200-8	FBATH08
Cole-Parmer® Stainless steel bath, 12 litre capacity	16101-88	WBU-200	WBU-200-12	FBATH12
Cole-Parmer® Stainless steel bath, 18 litre capacity	16112-01	WBU-200	WBU-200-18	FBATH18
Cole-Parmer® Stainless steel bath, 26 litre capacity	16101-89	WBU-200	WBU-200-26	FBATH26
Cole-Parmer® Stainless steel bath, 48 litre capacity	16104-45	WBU-200	WBU-200-48	FBATH48

Cole-Parmer®

Cole-Parmer® Precision Fluidized Baths - FSB-200-P, FSB-200-P-AC

- Create, open and save programs with up to 20 set points
- Specify either ℃ or ℉ plus ramp rates and hold times
- Log data from the instrument while connected to the computer and export the data to an Excel spreadsheet
- Open, save, view and print logged data
- Run a program in real-time mode
- Specifying the logging interval from every 5 seconds to 60 seconds
- Program daily start and stop times to automatically turn unit off and on for weekly schedules

Precision Fluidized Bath FSB-200-P

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Precision Fluidized Bath FSB-200-P

Cole-Parmer® Precision Fluidized Baths - FSB-200-P, FSB-200-P-AC

The Cole-Parmer® FSB-200-P Precision fluidised bath has exceptional temperature stability and uniformity making it the ideal choice for critical temperature calibration and heat treatment processes. Our Fluidised baths have become the markets prefered choice for carrying out shape setting (heat treatment processing) of Stents from Nitinol wire in a safe, precisely controlled and uniform manner. Platinum/tungsten products are now also being processed successfully.

With lower running costs they are a safer alternative to salt baths giving much better results than with conventional ovens. These units offer fast temperature immersions as the fluidised alumina behaves like a liquid.

These unit are suitable for many other applications including thermal testing of sensitive components such as semiconductor devices, wire product testing, delicate transducers and they may also be used as a constant temperature environment for chemical reactions. When used with the optional Probe holder accessory for comparison calibrations of temperature sensors the stability and uniformity are better than 0.010˚C in dead bed mode.

The Dust Suppression System accessory enables the FSB-200-P and FSB-200-P-AC user to bolt-on a probe holder and chimney assembly thus sealing the FSB-200-P and FSB-200-P-AC and making it suitable for use in a calibration lab where airborne dust must be avoided.

The user is then able to insert temperature probes for calibration purposes, whilst all aluminium oxide is fully contained within the bath. This accessory also allows silent running of the FSB-200-P and FSB-200-P-AC. The integrated chimney contains a filter in the upper section and a small exhaust pipe right at the top to prevent pressure build-up. The Dust Suppression System 12184-96 with Chimney is the best solution for calibrating probes in a fluidised bath within a calibration laboratory.

Replacement Alumina (fine, white aluminium oxide) see "FSB-200-P and FSB-200-P-AC Accessories"

To replace sand lost through normal operation and removal of items from the bath. Accept no other substitute as performance and functionality cannot be guaranteed with third party suppliers.

Precision Fluidized Bath FSB-200-P-AC

Cole-Parmer® Precision Fluidized Baths - FSB-200-P, FSB-200-P-AC

The Cole-Parmer® The F949J Precision fluidised bath has exceptional temperature stability and uniformity as well as automatic airflow control and RS-232 com ms. Our most popular Fluidised bath is used to carry out shape setting (heat treatment processing) of Stents from Nitinol wire in a safe, precisely controlled and uniform manner.

This model is specially designed to allow the operating temperature of the fluidised bath to be adjusted from a remote source while the bath is unsupervised. An automatic fluidising air control system is fitted which adjusts the air flow rate accordingly to suit the set temperature of the bath.

Where an ultra stable temperature condition is required a dead bed state can be programmed into the control system. During this condition the air and electrical supply to the fluidised bed are switched off. For a period of up to 6 minutes the fluidised bed becomes an isothermal mass without heat input and very low heat loss. Under these conditions the stability at the centre of the aluminium oxide is ±0.01°C over the range of the unit.

When used with the optional Probe holder accessory for comparison calibrations of temperature sensors the stability and uniformity are better than 0.010°C in dead bed mode.

Technical Specification

Specification	FSB-2[redacted]-P	FSB-200-P-AC
Temperature range	50˚C to 700˚C	50˚C to 700˚C
Dead Bed	-	-
Short Term Temperature stability at 50˚C	±0.2˚C	±0.2˚C
Short Term Temperature stability at 600˚C	±0.3˚C	±0.3˚C
Long Term Temperature stability at 50˚C	±0.5˚C	±0.5˚C
Long Term Temperature stability at 600˚C	±0.5˚C	±0.5˚C
Display resolution	oc	oc
Type of control	3term PID	3term PID
Sensor type	K type thermocouple	K type thermocouple
Heat up time 20˚c to 100˚c	105 minutes	105 minutes
Cool down time 100˚c to 200˚c	165 minutes	165 minutes
Air pressure kPa (psi)	420 (60)	420 (60)
Maximum flow Litresminute	127	127
Nominal heater power at 240V (W)	3000	3000
Weight of medium	16	16
Working volume Diameter x depth (mm)	165 x 385	165x385
Overall size L x W x H (mm)	770 x 515 x 600	770 x 515 x 600
Net weight	76 kg	84kg

Precision Fluidized Bath FSB-200-P

Precision Fluidized Bath FSB-200-P-AC

Ordering Information

Description	Ordering Number	Series No.	Model No.	Legacy Sku.
Cole-Parmer® Precision Fluidized Bath, 230V 50/60Hz. Excludes alumina - 25kg	12184-03	FSB-200	FSB-200-P-AC	F949D
Cole-Parmer® Precision Fluidized Bath with Auto Air Circulation, 230V 50/60Hz. Excludes alumina - 25kg	12184-94	FSB-200	FSB-200-P	F949J

Accessories

Description	Ordering Number	Series No.	Model No.	Legacy Sku.
Cole-Parmer® Dust Suppression System with Chimney	12184-96	FSB-200	-	FFB08DS1
Cole-Parmer Essentials® White Aluminum Oxide 25 Kg	01184-73	FSB-200	-	WHITE/ALO

Cole-Parmer®

Cole-Parmer® Shaking Water Bath -WBS-300

- Choice of platforms produces a reciprocating shaking, orbital shaking, or non-shaking system
- Analog controls for simple operation
- Digital temperature display for increased accuracy
- Overtemperature and low-level cut-offs improve safety
- Shaking speed: 20 to 130 rpm
- Stroke length/orbit size: 3/4" (20mm)
- The integral drain makes it is easy to empty the chamber

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Cole-Parmer®
Shaking Water Bath - WBS-300

This versatile water bath can be a linear or orbital shaker, or use as a static bath, depending on the platform you choose. Changing platforms is easy - strong magnets couple to the drive unit so there's no need for tricky fittings. The stainless-steel shaking platforms come with high-tension springs which accommodate most bottle and flask sizes; with capacity of 8 x 250ml, 6 x 500ml, or 4 x 1L Erlenmeyer flasks. For tubes and smaller vessels, order an optional stainless-steel rack. An accessory bath cover is required to reach temperatures above 90°C {order separately).

Analogue dials make setting speed and temperature quick, and the digital display ensures your samples will maintain optimum temperature. Stainless steel tank with integral drain makes cleaning and maintenance fast and efficient. With a built-in integral drain it is easy to empty the chamber. With low water retention inside the chamber there is a reduced risk of cross contamination.

Technical Specification

Specification	WBS-300
Capacity	24L
Temperature range	Ambient +5°C to 99.9°C
Temperature stability	±0.25°C
Shaking speed	From 20 up to 150rpm
Shaking orbit/amplitude, mm	20
Internal dimensions (w x d x h),mm	300 x 500 x 200
Overall dimensions (w x d x h), mm	335 x 580 x 330
Net Weight, kg	17
Electricity supply	120V, 60Hz 1400W - 230V, 50Hz 1400W
IP Rating	31

Ordering Information

Description	Ordering Number	Series No.	Model No.	LegacySku.
Water bath, shaking (without platform) 120V	12152-00	W8S-300	W8S-300-120	58540/120
Water bath, shaking (without platform) 230V	12152-02	W8S-300	W8S-300	58540
Platform, linear shaking action	12152-90	W8S-300	N/A	58540/1
Platform, orbital shaking action	12152-91	W8S-300	**N/A**	58540/2
Platform, perforated	12152-92	W8S-300	N/A	58540/3
Polycarbonate cover, hinged	12152-99	W8S-300	**N/A**	58540/4
Stainless steel cover	TBC	W8S-300	N/A	SW83/1
Test tube rack, 143 x 1.5ml micro tubes	12152-94	W8S-300	**N/A**	58540/5
Test tube rack, 120 x 13mm culture tubes	12152-95	W8S-300	**N/A**	58540/6
Test tube rack, 72 x 16mm culture tubes	12152-96	W8S-300	**N/A**	58540/7
Test tube rack, 56 x 15ml centrifuge tubes	12152-97	W8S-300	**N/A**	58540/8
Test tube rack, 30 x 26mm culture tubes	12152-98	W8S-300	**N/A**	58540/9
Test tube rack, 25 x 50ml centrifuge tubes	12152-93	W8S-300	**N/A**	58540/10

Cole-Parmer®

Cole-Parmer® Recirculating Cooler - RC-200

- Digitally set temperature
- Easy to read LED display
- Quiet operation
- Powerful 450W cooling capacity
- Safety cut out feature

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Cole-Parmer®
Recirculating Cooler - RC-200

The Cole-Parmer® recirculating cooler offers powerful cooling for an external device. By accurately controlling the temperature of your cooling medium down to -20°C, efficiency of operations such as condensing can be greatly improved. A recirculating cooler is not only much more powerful than conventional water cooling, but is also an ideal alternative when water consumption is an issue for economical, environmental or practical reasons.

The RC-200 provides a powerful cooler with a compact footprint suitable for mounting on or under a bench. The LED digital display clearly shows the current temperature of the cooling medium to ±2°C, while the set temperature is revealed by a one button press.

The unit has a dedicated drain for easy emptying and cleaning. It also incorporates a built in safety alarm to indicate an overload relay for the refrigeration unit. A dust filter is incorporated and can be accessed without tools via the removable front panel.

Technical Specification

Specification	RC-200
Cooling capacity	450Wat10'C
Temperature range	-20 to +30'C
Control accuracy	± 1'C (30 to 0'C), ± 2'C (1 to -20'C)
Bath capacity	3 litres
Pump rate	9 litres minute
Dimensions (w x d x h)	205 x 445 x 545mm
Net weight	28kg
Electrical supply	220V, 50Hz

Ordering Information

Description	Ordering Number	Series No.	Model No.	Legacy Sku.
Recirculating cooler, 3 litre capacity	12152-77	RC-200	RC-200	SRC5

Cole-Parmer®

Cole-Parmer® Digital Water Baths WB-300-6, WB-300-15, WB-300-24

- Choice of sizes: 6, 15 or 24 Litres
- Digital display and selection of temperature
- Low level water sensor
- Integral drain
- Supplied with robust polycarbonate lid

WB-300-6

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WB-300-15

WB-300-24

Cole-Parmer® Digital Water Baths WB-300-6, WB-300-15, WB-300-24

Three robust and reliable water baths, each with easy to clean stainless steel tank and sturdy metal outer casing. Digital water baths with easy to use temperature control and clear to read LED water temperature. Incorporated over temperature protection system that tracks the set temperature and controls the heater in the event of a fault. The heater is mounted underneath the tank to allow easy cleaning. Includes low level water sensor which cuts power to prevent the bath boiling dry. Incorporated drain for easy emptying of the bath. Bath covers are included as standard with each bath to help reduce heat losses and evaporation. The covers are manufactured from robust polycarbonate allowing full visibility of the bath contents.

Technical Specification

Specification	WB-3[illegible]-6	WB-3[illegible]-15	WB-3[illegible] 24
Capacity	6L	15L	24L
Temperature range	25'C to 99.9'C	25'C to 99.9'C	25'C to 99.9'C
Temperature stability	+/- 0.5C	+/- 0.5C	+/- 0.5C
Internal dimensions (w x d x h),mm	300 x 150 x 200	300 x 325 x 200	300 x 500 x 200
Overall dimensions (w x d x h), mm	335 x 230 x 280	335 x 408 x 280	335 x 584 x 280
Net Weight, kg	6.5kg	9.0kg	12.8kg
Heater Power	350W	750W	1400W
Electricity supply	*230V*, 50Hz,	*230V*, 50Hz,	*230V*, 50Hz.
IP Rating	31	31	31

Note: Minimum set temperature on all models is 25"C

Ordering Information

Description	Ordering Number	Series No.	Model No.	Legacy Sku.
Digital water bath 6L	12122-91	WB-300	WB-300-6	SWB6D
Digital water bath 15L	12122-71	WB-300	WB-300-15	SWB15D
Digital water bath 24L	12122-81	WB-300	WB-300-24	SWB24D
Polycarbonate lid for 6L bath	12122-93	WB-300	N/A	SWB6D/1
Polycarbonate lid for 15L bath	12122-73	WB-300	N/A	SWB15D/1
Polycarbonate lid for 24L bath	12122-83	WB-300	N/A	SWB24D/1
Stainless Steel lid for 6L bath	12122-92	WB-300	N/A	SWB6/1
Stainless Steel lid for 15L bath	12122-72	WB-300	N/A	SWB15/1
Stainless Steel lid for 24L bath	12122-82	WB-300	N/A	SWB24/1

Cole-Parmer®

Cole-Parmer® Thermoregulator, IC-300-10DDC - IC-300-20DDC -IC-300-20HDC

- Temperature range of **-40˚C** to **120˚C**
- Please note for sub-ambient cooling a Dip Cooler or Flow Cooler is required
- Applications <0˚C and >100˚C require Techne bath oil
- Excellent temperature stability: **±0.01˚C** at **40˚C**
- 4 digit setting with a bright LED digital temperature display
- Suitable for most routine laboratory applications
- User adjustable over-temperature cut-out
- Low liquid level cut-out as standard

Thermoregulator IC-300-10DDC

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Thermoregulator IC-300-10DDC

Thermoregulator IC-300-20DDC

Thermoregulator IC-300-20HDC

Cole-Parmer® Thermoregulator, IC-300-10DDC - IC-300-20DDC - IC-300-20HDC

Thermoregulators are designed to be used with the Cole-Parmer® unheated water baths or any other suitable laboratory vessels. They will heat, circulate and safely control the temperature of the liquid in the bath within precise limits.

Sub-ambient cooling

This thermoregulator can be used for sub-ambient cooling, right down to -40°C, although a low-temperature liquid is required below 0°C. Sub-ambient cooling can be achieved using the cooling coil accessory {part number 12122-87) connected to an external chilling system, for example a cold tap. Alternatively a Techne dip-cooler or flow cooler could be used as a method of chilling.

External circulation

This thermoregulator can be used in several ways. **(1)** Stand-alone waterbath temperature controller with precision accuracy and stirring action. (2) Pump for recirculating chilled liquid produced in an external chiller allowing sub-ambient water bath temperature. (3) Pump for providing temperature control to an external system or device. (4) A combination of using externally chilled liquid and providing temperature control to an external system. For additional information, please see Application notes under "Downloads".

Technical Specification

Specification	IC-300-10DDC	IC-300-20DDC	IC-300-20HDC
Temperature range•	-40˚C to +120˚C	-40˚C to +200˚C	-40˚C to +250˚C
Temperature selection	Digital	Digital	Digital
Temperature stability using water @ 40˚C	±0.01˚C	±0.005˚C	±0.005˚C
Method of control	PID	PID	PID
Temperature sensor	PRT	PRT	PRT
Adjustable over-temperature cut-out	Yes	Yes	Yes
Low liquid level cut-out	Yes	Yes	Yes
Pump capacity litresminute	10	10	10
PC Interface	-	-	Yes RS232
Pump capacity (mbar)	145	145	145
Nominal heater power at 120V (W)	1000	1500	1500
Nominal heater power at 240V (W)	1000	1800	1800
Cooling coil	No	No	No
Extension below base (mm)	145	145	145
Dimensions L x W x H (mm)	237 x 124 x 260	237 x 124 x 260	237 x 124 x 260
Shipping weight	3.9kg	4.0kg	4.0kg

Ordering Information

Description	Ordering Number	Series No.	Model No.	Legacy Sku.
Cole-Parmer® TE-10D digital thermoregulator, supplied with clamp (230V)	01262-07	IC-300	IC-300-10DDC	FTE10DDC
Cole-Parmer® TE-10D digital thermoregulator, supplied with clamp (120V)	01262-05	IC-300	IC-300-10DPC	FTE10DPC
Cole-Parmer® TU-20D advanced thermoregulator with RS232 and TechneWorks software, supplied with clamp (230V)	01262-15	IC-300	IC-300-20DDC	FTU20DDC
Cole-Parmer® TU-20D advanced thermoregulator with RS232 and TechneWorks software, supplied with clamp (115V)	01262-13	IC-300	IC-300-20DPC	FTU20DPC
Cole-Parmer® TU-20HT advanced high temp thermoregulator with RS232 and TechneWorks software, includes clamp (230V)	16112-55	IC-300	IC-300-20HDC	FTU20HDC
Cole-Parmer® TU-20HT advanced high temp thermoregulator with RS232 and TechneWorks software, includes clamp (120V)	16101-87	IC-300	IC-300-20HPC	FTU20HPC

Cole-Parmer®

Cole-Parmer®
Industrial Fluidized Baths
- FSB-200-I-SL, FSB-200-I-12L

- Removes plastics, paints, epoxy, rubber, adhesives, grease, lubricants, and oils
- No tool damage or abrasion in cleaning
- Fast cleaning minimizes production equipment down-time
- Dry, inert, nontoxic aluminum oxide is a safer alternative than dangerous chemicals or solvents
- Requires one bag of 100 lb brown sand 01184-61
- Bath reservoir measures 16" deep x 10" dia (40.5 x 25.5 cm); when using sample basket: 12" deep x 8-3/8" dia (30.5 x 21.3 cm)

Industrial Fluidized Bath FSB-200-1-SL

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Industrial Fluidized Bath FSB-200-I-SL

Industrial Fluidized Bath FSB-200-I-12L

Cole-Parmer® Industrial Fluidized Baths - FSB-200-I-SL, FSB-200-I-12L

After years of success, plastic manufacturers have come to depend on Cole-Parmer® fluidised baths for safe, efficient and cost effective cleaning of tooling, components, systems and parts {dies, breaker plates, nozzles, tools, tips, spinnerets, extruder screws, manifolds, etc.)

Our Industrial Fluidized Baths will remove almost all polymers, including plastic, paint, epoxy, rubber and adhesives, as well as other hydrocarbon-based products such as oils, fluids, grease, lubricants and coatings.

Parts immersed into the fluidized bath are cleaned by the high temperature (up to 600°C) environment within a bath media of fluidized aluminum oxide that instantly starts to degrade plastic to carbon, which then leaves the bath as CO_2.

This instant heating and minimized quenching gives shorter cleaning times than with conventional ovens, and with the even and consistent heat of the bath, results in greatly reduced metal fatigue and tool damage.

The baths can be fluidized with either compressed house air or an inert gas such as nitrogen or argon. It should be noted that fluidized baths and the action created in the aluminum oxide is not abrasive to items immersed for normal cleaning or heat treatment times.

Typical cleaning times range from 30 minutes to 2 hours depending on bath loading, temperature and amount of material to be cleaned.

Other Applications

The excellent thermal performance of Cole-Parmer® Industrial Fluidized Baths make them a good choice for basic heat treatment, test and calibration as well as reactive analysis.

Some of these applications include tempering, annealing, Nitriding, distillation, curing, exothermic and endothermic reactions, and thermal analysis of devices, components and materials.

Technical Specification

Specification	FSB-200-I-5L	FSB-200-I-12L
Temperature range	50°C to 600°C	50°C to 600°C
Type of Control	3term PID	4term PID
Sensor Type	K type thermocouple	K type thermocouple
Temperature Stability at 450° C	±1°C	±1°C
Display resolution	oc	oc
Working Volume Diameter (mm)	259	259
Working Volume Depth (mm)	305	305
Load Capacity (L)	5	12
Air pressure kPa (psi)	170 to 1030 (25 to 150)	170 to 1030 (25 to 150)
Air Consumption L/min at Ambient (max)	115	115
Air Consumption L/min at 4500 C (max)	48	48
Heat up time 20° C to 450° C	105 minutes	105 minutes
Heat up time 20° C to 600° C	150 minutes	150 minutes
Power consumption (kW)	4	6
Dimensions L x W x H (mm)	521 x 521 x 686	1041 x 609 x 533
Net Weight -(kg)	60	84
Weight incl. alundum (kg)	100	157

Ordering Information

Description	Ordering Number	Series No.	Model No.	Legacy Sku.
Cole-Parmer® Industrial Fluidized Bath 5 Litres, 230V 50/60Hz. Excludes alumina - 25kg	01184-10	FSB-200	FSB-200-I-SL	FIFB51D
Cole-Parmer® Industrial Fluidized Bath 12 Litres, 230V 50/60Hz. Excludes alumina - 25kg	01184-20	FSB-200	FSB-200-I-12L	FIFB52D

Accessories

Description	Ordering Number	Series No.	Model No.	Legacy Sku.
Cole-Parmer Essentials® Lid for SL and 12L Industrial Fluidized Baths	01184-52	FSB-200	-	F6156
Cole-Parmer Essentials® Extraction Collar for SL and 12L Industrial Fluidized Baths	01184-54	FSB-200	-	F6157
Cole-Parmer Essentials® Standard basket SL	01184-64	FSB-200	-	FA624
Cole-Parmer Essentials® Deep basket SL	01184-66	FSB-200	-	FA625
Cole-Parmer Essentials® Standard basket 12L	01184-70	FSB-200	-	7031658
Cole-Parmer Essentials® Deep basket 12L	01184-72	FSB-200	-	7031659
Cole-Parmer Essentials® Cyclone & Collection Bin	01184-80	FSB-200	-	FSCN1
Cole-Parmer Essentials® Brown Aluminum Oxide 45 Kg	01184-61	FSB-200	-	BROWNALO

Cole-Parmer®

Cole-Parmer® Precision Fluidized Baths - FSB-200-120, FSB-200-240, FSB-200-D

- Dry, inert, nontoxic aluminum oxide ensures hazard-free operation
- Safer alternative to high temperature oil and salt baths
- Requires controller (01184-50) in order to be calibrated
- Heats up from 20 to 600˚C in 60 minutes

Precision Fluidized Bath FSB-200-240

Fluidised Bath FSB-200D

Cole-Parmer® Precision Fluidized Baths - FSB-200-120, FSB-200-240, FSB-200-D

The Cole-Parmer® FSB-200 range of fluidized baths offers a safer alternative to the dangers associated with high temperature oil and salt baths.

These units are designed to be bench or floor standing and only require an electrical and air supply for operation. Air passes through the mass of the aluminium oxide {Alundum) particles via a porous plate in the base of the unit separating the individual particles and suspending them in free air, giving the properties of a liquid bath.

Heaters are fitted within the bath which allow temperatures of 500°C to 600°C to be maintained. Both models in the FSB-200 range feature a stainless-steel inner container insulated from the outer wall, a safety air pressure switch to protect against loss of air pressure and also a thermal cut-out.

It is highly recommended that the FSB-200-TC-S and FSB-200-TC-L temperature control unit is used in conjunction with these baths, greatly improving temperature stability and accuracy. Refer to FSB-200-TC-S {part number 01184-50) and FSB-200-TC-L {part number 01184-55) Temperature Controllers dedicated sell-sheet.

To replace alundum lost through normal operation and removal of items from the bath accept no other substitute as performance and functionality cannot be guaranteed with third party suppliers.

Technical Specification

Specification	SBS-4	SBL-2D
Temperature range	50°c to 5oo·c	50°c to 6oo·c
Temperature stability at so•c	±l °c	±l °c
Heat up time 20°C to maximum	60 minutes	105 minutes
Cool down time maximum to 200°C	180 minutes	330 minutes
Air pressure kPa (psi)	2l (3)	2l (3)
Maximum flow Litresminute	57	57
Nominal heater power at 240V (W)	1500	4000
Weight of medium required	9 Kg	32 Kg
Working volume Diameter x depth (mm)	178x140	228 X350
Diameter (excluding tap) x height (mm)	335 X462	385x695
Shopping weight (Kg)	24	59

Ordering Information

Description	Weight of Alundum required (BROWN/ALO)*	Ordering Number	Series No.	Model No.	Legacy Sku.
Cole-Parmer® Precision Fluidized Bath 500°C including overspill flange but excuding alundum, (120V) SBS-4	25kg	01184-00	FSB-200	FSB-200-240	F932P
Cole-Parmer® Precision Fluidized Bath S00°C including overspill flange but excuding alundum, (240V) SBS-4	25kg	01184-02	FSB-200	FSB-200-120	F932D
Cole-Parmer® Precision Fluidized Bath 600°C including overspill flange but excuding alundum, (240V) SBL-2D	50kg	01189-50	FSB-200	FSB-200-D	F946D

Please note that the alundum must be ordered separately, it is no longer included with the product.

Cole-Parmer®

Cole-Parmer® Water Bath Comparison Guide

Specifications	WB-200 Series			WB-300 Series			WB-400 Series				
Item Numbers	78905-20 78905-21	78905-22 78905-23	78905-24 78905-25	12122-91	12122-71	12122-81	12105-84 12105-85	12105-86 12105-87	12105-88 12105-89	12105-90 12105-91	12105-92 12105-93
Capacity	6.6 L	11L	27 L	6 L	15 L	24 L	2 L	5 L	10 L	20 L	28 L
Temperature Range	Ambient +5 to 100 °C			25 to 99.9 °C			Ambient +5 to 100 °C				
Temperature Stability	±0.2 °C			±0.5 °C			±0.2 °C				
Heater Wattage	600W	800W	1000W	350W	750W	1400W	120W	360W	1000W	1400W	1400W
Low Water Sensor	-	-	-	●	●	●	-	-	-	-	-
Drain Valve	●	●	●	●	●	●	●	●	●	●	●
Programmable Timer	●	●	●	-	-	-	●	●	●	●	●
Programmable Presets	-	-	-	-	-	-	●	●	●	●	●
Overtemperature Protection	●	●	●	●	●	●	●	●	●	●	●
Delayed Start	●	●	●	-	-	-	-	-	-	-	-
Visual Alarms	●	●	●	-	-	-	●	●	●	●	●
Multiple Language Interface	-	-	-	-	-	-	●	●	●	●	●
Lid Included	●	●	●	●	●	●	●	●	●	●	●
Electrical	120 VAC, 60 Hz or 220 VAC, 50/60 Hz			230 VAC, 50 Hz			120 VAC, 60 Hz or 240 VAC, 50 Hz				
Warranty	2 years			3 years			2 years				

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