Optima™ heated circulating baths and circulators

A cost-effective range of multi-purpose systems combining Grant's legendary quality and reliability. Precise temperature control for a wide range of laboratory applications.

- **Accurate and safe temperature control** – for samples and users
- **Intuitive programming and thoughtful design features** – makes working with Grant heated circulating baths and circulators easy
- **Robust, durable construction** – for longevity, reliability and long-term low cost of ownership
- **A complete range** – 32 models to cover basic through to sophisticated needs, each model represents excellent value for money

BUILT IN BRITAIN 3 year warranty

Model selection (operating temperature)

Any of the four Grant Optima™ heated circulators can be combined with any of eight Grant tanks (five stainless steel and three plastic) to provide a choice of 32 models. The colour-coded summary table on page 1.6 shows you the temperature range of each combination.

The following pages showcase examples of popular combinations for different requirements.

Liquids

We recommend the following liquids for use in Grant baths:

-50°C to 30°C:	Silicone oil - low viscosity (Bayer silicone M3)
-30°C to 30°C:	50% water, 50% antifreeze (inhibited ethylene glycol)
0°C to 30°C:	80% water, 20% antifreeze (inhibited ethylene glycol)
5°C to 99.9°C:	Water
70°C to 150°C:	Silicone fluid (viscosity ~20cS, flash point ≥230°C, fire point ≥280°C)
70°C to 200°C:	Silicone fluid (viscosity 50cS, flash point ≥285°C, fire point ≥340°C)

Optima™ Heated circulators

T100, TC120, TX150 and TXF200

The versatile Optima™ heating circulator range consists of 4 models - two general purpose: T100 and TC120 and two advanced models: TX150 and TXF200. Combine any of the four models with a Grant stainless steel or plastic tank or use independently with a clamp.

General purpose digital		Advanced digital	
T100: ambient +5 to 100ºC*	**TC120: ambient +5 to 120ºC***	**TX150: ambient +5 to 150ºC***	**TXF200: ambient +5 to 200ºC***
			

T100 / TC120		TX150 / TXF200	
Features	**Benefits**	**Features**	**Benefits**
Stability ±0.05°C.	Excellent temperature stability and temperature control for demanding applications.	Stability ±0.01°C.	Excellent temperature stability and temperature control for demanding applications.
Clear, bright 4 digit LED display.	Easy to view from a distance for instant reassurance of unit status.	Large, bright full colour display.	All key parameters visible on home screen for instant reassurance of unit status.
Simple, intuitive user interface: dial and two function buttons.	Easy and quick to set temperature and access menus. Minimal product training required.	Icon driven home screen via a dial and two function buttons.	Intuitive, quick and easy, language independent.
Integral pump for external circulation (TC120).	Circulation of temperature control fluids to external apparatus / equipment.	High performance integral pump for external circulation. TXF200 has variable speed.	Conveniently circulate temperature control fluids to external apparatus / equipment.
Model available with/without clamp (T-clamp).	Conveniently converts vessels into a stirred bath, offering excellent versatility.	Programming/temperature profiling (TX150, 1 program with 30 segments, TXF200 10 programs with 100 segments).	Easy and quick to configure temperature profiles to suit basic and advanced applications. Programming direct on TXF200.
Low-liquid detection (float switch).	Unit will cut-out when liquid level is too low for operation.	Model available with/without clamp (T-clamp).	Conveniently converts vessels into stirred bath, offering excellent versatility.
User adjustable over temperature dial (TC120).	Independent safety feature and sample protection.	Low-liquid detection (float switch).	Unit will cut-out when liquid level is too low for operation. Peace of mind that the unit will safely operate unattended.
Fixed over temperature (T100).	Independent safety feature.	5 point user calibration.	Calibrate the TX150/TXF200 at any 5 temperatures against a precision reference thermometer. Provides optimum accuracy at temperatures important to the user.
Visual alarm.	Alerts you when your attention is required.	User adjustable over temperature dial.	Independent safety feature and sample protection.
2 point user calibration.	Provides optimum accuracy at temperatures important to the user.	Display with a choice of 5 languages (EN, DE, FR, ES & IT).	-
Countdown timer (TC120).	Offers convenient reaction timing.	USB/RS232 interface.	Allows connection to PC or laptop for programming or data logging.

Applications:

- Clinical, microbiology and pathology labs - media tempering, thawing & incubating samples
- University research - temperature control of spectrophotometers, refractometers and jacketed vessels
- Industrial labs - temperature probe calibration, water analysis, QC testing product, petrochemical testing, material testing, milk sample testing

Showcase 1 – **mid range** example

Model TC120-ST12* range 0°C to 120°C**, stability ±0.05°C

Versatile mid-range model with digital thermostatic control unit and stainless steel tank and a comprehensive specification to suit most applications for precision temperature control.

- **Optima™ digital thermostat (TC120) for precise temperature control**
- **Cooling/heating range 0°C to 120°C****
- **Stability ±0.05°C**
- **Uniformity ±0.1°C**
- **Integral pump for external fluid circulation**
- **3 programmable temperature presets**
- **Easy to use rotary dial and two function keys**

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TC120-ST12 model shown

Countdown timer with audible alarm – alerts you when your attention is required.

Simple-to-use rotary dial plus two function keys for quick temperature setting and menu navigation.

User calibration facility for optimum accuracy at the required operating temperature.

Powerful integral pump – allows temperature-controlled fluid to be circulated to external equipment (16L/min, 210mbar).

Dual-position bridge plate – ensures visibility/accessibility of the thermostat whilst optimising bench space.

Raised feet – for carrying / repositioning and retort stand access.

Liquid level protection and adjustable over temperature cut-out to protect the samples and the user.

Clear 4 digit display – easy to read from a distance for instant reassurance.

3 adjustable temperature presets for convenience.

Robust construction, corrosion resistant materials, stainless steel tank – durable in demanding environments.

Excellent temperature stability and uniformity ensured by stirred circulation in the bath.

Drain tap allows easy emptying.

Optional insulated gabled, removable hinged lid designed to improve energy efficiency and prevent evaporation.

* see summary table on page 1.6–1.7 for accessories and for other models utilising the TC120 heated circulator
** operation below ambient temperature requires optional accessory cooling

Applications:

- Clinical, microbiology and pathology labs - media tempering, thawing & incubating samples
- University research - temperature control of spectrophotometers, refractometers and jacketed vessels
- Industrial labs - temperature probe calibration, water analysis, QC testing product, petrochemical testing, material testing, milk sample testing

Showcase 2 – **high specification** example

Model TXF200-ST26* range -15°C to 200°C**, stability ±0.01°C

High specification model with high performance digital thermostat and stainless steel tank for sophisticated applications requiring complex programming and/or ultra precise temperature control.

- **Optima™ high performance digital thermostat (TXF200) for ultra precise temperature control**
- **Temperature range -15°C to 200°C****
- **Stability ±0.01°C**
- **Uniformity ±0.05°C**
- **Integral pump for external fluid circulation**
- **Full colour screen**
- **Easy to program via interface or remotely via PC / Laptop using Labwise™ software**
- **Key functions easily accessed via home screen icons**

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Full colour screen – clearly displaying actual and set temperatures, pump speed and clear status icons.

Intuitive screen icons and menus – allow fast and accurate setup.

Socket for optional external probe – allows remote temperature control.

Five-point user calibration facility for optimum accuracy.

Countdown timer with audible alarm alerts when your attention is required.

Drain tap allows easy emptying

Raised feet – for carrying / repositioning and retort stand access.

Memory capacity for 10 programs containing 100 segments.

Program via intuitive user interface or connect to PC/ laptop to program via Labwise™ software.

The programming interface includes set target temperature - a choice of time to target temperature or temperature ramp speed. An additional programmable relay for on/off control of ancillary equipment.

High and low temperature alarm settings – visual, audible and programmable.

Powerful integral pump for external fluid circulation – variable speed, 22L/min, 530mbar.

Optional insulated gabled and removable hinged lid designed to improve energy efficiency and prevent evaporation.

Accessory cooling systems allow operation at or below ambient temperature. See page 1.9 for details.

* see summary table on page 1.6–1.7 for accessories and other models utilising the Grant high performance digital control units.
** operation below ambient temperature requires optional accessory cooling.

Applications:

- Industrial labs - thermostat calibration, haze analysis (brewing), temperature probe calibration and material testing
- University research - temperature control of external equipment such as spectrophotometers and refractometers. Circulation of temperature control fluid to jacketed vessels

Showcase 3 – **budget** example

Model T100-P12* range ambient +5°C to 99°C, stability ±0.05°C

Economy model with digital thermostatic control unit and plastic tank for straightforward applications requiring accurate temperature control.

- **Optima™ digital thermostat (T100) for accurate temperature control**
- **Temperature range ambient +5°C to 99°C**
- **Stability: ±0.05°C**
- **3 programmable temperature presets**
- **Low liquid protection and fixed over temperature cut-out**

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Visual alarm – alerts you when your attention is required.

Simple-to-use rotory dial and two function keys for quick temperature setting and menu navigation.

Optional removable flat lid to minimise evaporation of fluid and avoid contamination of samples.

Choice of **120V and 230V models.**

User calibration facility for optimum accuracy at the required operating temperature.

Low liquid protection and fixed over temperature cut-out.

Operating setpoint plus **3 adjustable preset temperatures** for convenience.

Wide range of optional accessories for different applications, including test tube racks and raised shelves.

Robust plastic construction, double-walled for rigidity, easy to clean.

* see summary table on page 1.6-1.7 for accessories and for other models utilising T100 control units and/or plastic tanks.

Applications:

- Clinical, microbiology and pathology labs - media tempering, thawing & incubating samples
- Teaching labs, higher education/universities - practical demonstration/experimentation, sample preparation

Heating circulating baths - models, options and accessories

Any of the four Grant Optima™ digital thermostats can be combined with any of the Grant stainless steel and plastic tanks. The colour-coded summary table shows you the temperature range of each combination. For more details of Grant Optima™ heated circulator see, page 1.8.

Key to symbols

- fixed over temperature cutout
- adjustable over temperature cutout
- display
- audible alarm
- timer
- pump
- external probe
- USB + RS232
- 2 point recalibration
- relay
- visual alarm
- 5 point recalibration
- enhanced menu system
- program storage
- programmable

Heating circulators

General purpose digital		Advanced digital	
T100	TC120	TX150	TXF200
 h: 333mm d: 172mm w: 120mm weight: 2.1kg	 h: 333mm d: 172mm w: 141mm weight: 2.3kg	 h: 342mm d: 172mm w: 141mm weight: 2.6kg	 h: 342mm d: 172mm w: 141mm weight: 2.6kg

Heating circulating baths - models, options and accessories

Capacity (L) Outer tank dimensions	• working area (d x w) • Min/max liquid depths • Inner tank dimensions (h x d x w)	2	2	5	5
ST5 - 5L stainless steel h: 215mm d: 335mm w: 187mm weight: 2.9kg	• 150 x 150mm • 85/140mm • 300 x 150 x 150mm	T100-ST5 amb.+15°C to 100°C	TC120-ST5 0°C to 120°C*	TX150-ST5 0°C to 150°C*	TXF200-ST5 0°C to 200°C*
ST12 - 12L stainless steel h: 215mm d: 332mm w: 360mm weight: 4.5kg	• 205 x 300mm • 85/140mm • 325 x 300 x 150mm	T100-ST12 0°C to 100°C*	TC120-ST12 0°C to 120°C*	TX150-ST12 0°C to 150°C*	TXF200-ST12 0°C to 200°C*
ST18 - 18L stainless steel h: 215mm d: 545mm w: 340mm weight: 7.3kg	• 385 x 300mm • 75/130**mm • 505 x 300 x 150mm	T100-ST18 0°C to 100°C*	TC120-ST18 0°C to 120°C*	TX150-ST18 0°C to 150°C*	TXF200-ST18 0°C to 200°C*
ST26 - 26L stainless steel h: 270mm d: 535mm w: 340mm weight: 7.7kg	• 385 x 300mm • 125/180**mm • 505 x 300 x 200mm	T100-ST26 0°C to 100°C*	TC120-ST26 -15°C to 120°C*	TX150-ST26 -15°C to 150°C*	TXF200-ST26 -15°C to 200°C*
ST38 - 38L stainless steel h: 260mm d: 733mm w: 338mm weight: 11.9kg	• 575 x 300mm • 125/180**mm • 690 x 300 x 200mm	T100-ST38 0°C to 100°C*	TC120-ST38 -15°C to 120°C*	TX150-ST38 -15°C to 150°C*	TXF200-ST38 -15°C to 200°C*
P5 - 5L plastic h: 180mm d: 323mm w: 220mm weight: 2.2kg	• 120 x 150mm • 85/140mm • 240 x 160 x 155mm	T100-P5 amb.+15°C to 99°C	TC120-P5 amb.+15°C to 99°C	TX150-P5 amb.+15°C to 99°C	TXF200-P5 amb.+15°C to 99°C
P12 - 12L plastic h: 180mm d: 412mm w: 340mm weight: 3.4kg	• 210 x 280mm • 85/140mm • 325 x 280 x 155mm	T100-P12 amb.+5°C to 99°C	TC120-P12 amb.+5°C to 99°C	TX150-P12 amb.+5°C to 99°C	TXF200-P12 amb.+5°C to 99°C
P18 - 18L plastic h: 180mm d: 589mm w: 340mm weight: 5.1kg	• 375 x 280mm • 85/140mm • 510 x 290 x 155mm	T100-P18 amb.+5°C to 99°C	TC120-P18 amb.+5°C to 99°C	TX150-P18 amb.+5°C to 99°C	TXF200-P18 amb.+5°C to 99°C

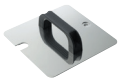
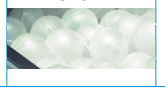
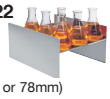
***Note: Operation at or below ambient temperatures requires optional accessory cooling (page 1.7) or a refrigeration unit (section 2.1)**

Options and accessories

Labwise™ PC software (optional)				
Allows two-way communication for status display, programming and data capture (see page. 3.1 for more information) USB/RS232 cables provided.	-	-		
External probes (optional) for monitoring and controlling temperature of remote loads				
TXPEP flexible plastic probe, 3m cable	-	-	●	●
TXSEP stainless steel probe, 3m cable	-	-	●	●
Remote switching device (optional)				
For switching appliances on and off (up to max. 8 Amps)	-	-	1	1
Vertical turbine pumps (optional)*				
Low noise, compact design. Supplied with pipe connections and special lid for fitting to tank, pipe bore 12.7mm.		Required only where application demands a higher pressure than that delivered by the internal pump to maintain flow.		
VTP 1 Max. pressure 1000 mbar Max. flow 9 L/min				
VTP 1 Max. pressure 1650 mbar Max. flow 12 L/min				

* When pump is fitted, available working area is reduced ** maximum depth can be increased by 10mm, by removing the circulation tray in 18, 26 and 38 litre baths, with slight loss of performance.

Accessories

Lids*	Lids	Polypropylene	Rack systems†	Raised shelves	Optional Accessory cooling systems**		
To help reduce evaporation/ heat loss and avoid sample contamination	For continuous use with water above 90°C. Stainless steel.	spheres* 300 spheres in one pack (no. of packs required)	To optimise use of available bath capacity (no. of racks accommodated)	To allow shallow vessels to be accommodated	To allow systems to operate at or below ambient temperature by means of a cooling coil dipped into the bath; designed for minimal impact on working area.		
					Refrigerated immersion coolers Consist of a cooling coil connected to a refrigeration unit by a flexible pipe. Extract heat continuously, with the bath control unit controlling temperature. 		**Heat exchange coil** Designed to be attached to a supply of cooling tap water or a refrigerated circulator.
					C1G (0°C to 40°C***)	**C2G** (-15°C to 40°C***)	**CW5** (2°C above coolant temperature)
STL5  flat stainless steel	–	**1 x PS20** 	**1 x QR** 	–		–	
STL12  gabled, hinged (removable) stainless steel	**LST12** 	**1 x PS20** 	**2 x VR** 	**RS14**  (h 40 or 78mm)		–	
STL26  gabled, hinged (removable) stainless steel	**LST26** 	**2 x PS20** 	**4 x VR** 	**RS22**  (h 40 or 78mm)		–	
STL26  gabled, hinged (removable) stainless steel	**LST26** 	**2 x PS20** 	**4 x VR** 	**RS28**  (h 45 or 135mm)			
STL38  gabled, hinged (removable) stainless steel	**LST38** 	**3 x PS20** 	**6 x VR** 	**RS28** or **RS38**  (h 45 or 135mm)			
PL5  flat, stainless steel	–	**1 x PS20** 	**1 x QR** 	–	–	–	–
PL12  curved plastic	–	**1 x PS20** 	**2 x VR** 	**RS14**  (h 40 or 78mm)	–	–	–
PL18  curved plastic	–	**2 x PS20** 	**4 x VR** 	**RS22**  (h 40 or 78mm)	–	–	–

* Between operating temperatures 60°C and 100°C and below room temperature a lid or layers of polypropylene spheres should be used.

** The cooling coil can be continuously immersed in liquids up to 100°C with the cooler switched off, and may be used to cool liquid down from 100°C, but it is not designed for continuous operation above 40°C.

*** Minimum operating temperature without accessory cooling is ambient +5°C (amb.+ 15°C for P5 and ST5 tanks).

† Rack capacity (no. of test tubes per rack)

VR racks	Tube size	Capacity
VR-13	ø 10-13mm	65
VR-19	ø 16-19mm	36
VR-24	ø 24mm	23
VR-30	ø 30mm	14
VR-SE	0.5ml	102
VR-LE	1.5ml	75

QR racks	Tube size	Capacity
QR-13	ø 10-13mm	30
QR-19	ø 16-19mm	16
QR-24	ø 24mm	10
QR-30	ø 30mm	5
QR-SE	0.5ml	44
QR-LE	1.5ml	35

Heated circulating baths - technical specifications

Grant Optima™ heated circulators

● = standard

			Heated circulators			
			General purpose digital		Advanced digital	
			T100	TC120	TX150	TXF200
			 h: 333mm d: 172mm w: 120mm weight: 2.1kg	 h: 333mm d: 172mm w: 141mm weight: 2.3kg	 h: 342mm d: 172mm w: 141mm weight: 2.6kg	 h: 342mm d: 172mm w: 141mm weight: 2.6kg
Stability (DIN 12876) @70ºC		±ºC	0.05	0.05	0.01	0.01
Uniformity (DIN 12876) @ 70ºC		±ºC	0.1	0.1	0.05	0.05
Setting resolution		ºC	0.1	0.1	0.1 (0.01 with Labwise)	
Display			4 digit LED		full colour QVGA TFT	
Timer function			-	1 min to 99 hrs 59 mins		
No. of temperature presets			3	3	3	3
Re-calibration points			2	2	5	5
Socket for external probe (TXPEP, TXSEP)			-	-	●	●
Communications interface			-	-	USB, RS232	USB, RS232
Programmable			-	-	remote via PC / laptop 1 program / 30 segments	direct via user interface or remote via PC / laptop 10 programs / 100 segments
Relays			-	-	1	1
Safety	Over temperature		fixed	adjustable cut-out		
	fluid level - float		●	●	●	●
Language capability			-	-	EN, FR, DE, IT, ES	EN, FR, DE, IT, ES
Alarms (can be configured to switch a relay)			-	high (no relay)	high and low	high and low
Heater power	230V	W	1290	1290	1840	1840
	120V	W	1440	1440	1445	1445
Electrical power	230V	W	1400 (50-60Hz)	1400 (50-60Hz)	2000 (50-60Hz)	2000 (50-60Hz)
	120V	W	1500 (50-60Hz)	1500 (50-60Hz)	1500 (50-60Hz)	1500 (50-60Hz)
Height above tank rim		mm	200	200	200	200
Depth below tank rim		mm	135	135	145	145

Grant Optima™ heated circulators

Maximum pressure	water	mbar	-	210	310	530
Maximum flow	water	L/min	-	16	18	22 (adjustable flow rate)
Pump connector	6mm bore*		-	fits 9 mm inner diameter tubing		
Pump connector	11mm bore*		-	fits 15 mm inner diameter tubing		

* 6 and 11 mm bore pump connectors supplied as standard. For more options see page 1.9.

Grant heated circulators are suitable for use with Grant stainless steel and plastic tanks. With the addition of a clamp (T-Clamp) they can also be attached to virtually any vertical sided tank with a maximum wall thickness of 35mm for rectangular tanks, 30mm for circular tanks (300 mm diameter), and a capacity of up to 50 litres. Minimum and maximum temperatures achievable are dependent upon the tank insulation and minimum operating temperature depends on the accessory cooling device.

High pressure pumps (optional)

			VTP pumps	
			VTP1	VTP2
				
Maximum pressure	water	mbar	1000	1650
Maximum flow	water	L/min	9	12
Pipe bore	inlet/outlet	mm	12.7	12.7
Electrical connection			10 amp IEC	10 amp IEC
Power consumption		W	30	40
Power output to liquid @ 20°C		W	15*	22*
Safety			thermal fuse	thermal fuse

*The VTP optional pumps will transfer additional heat to the baths, so the minimum temperature achievable with or without accessory cooling will be increased.
Note: When ordering a VTP pump, please specify which Grant tank it is to be used with.

Accessory cooling systems

			Immersion coolers		Heat exchange coil
			C1G	C2G	CW5
					
Cooling power	@ 20°C	W	350	400	–
	@ 0°C	W	110	320	–
	@ -10°C	W	–	170	–
Overall consumption		VA	300	500	–
Dimensions (d x w x h)		mm	485x 305 x 320		130 x 100 x 150
Weight		kg	16.6	19.6	0.1
Flexible pipe	l	mm	925	925	–
Coil	ø/l	mm	77/55	77/55	77/55
Pipe bore inlet/outlet		mm	–	–	7
Electrical supply		V	120 (60 Hz) or 230 (50Hz)		–

Pump connectors (optional)

	Part number
Replacement plastic pump inlet/outlet connector. Fits tubing 9mm inner dia. Temperature range -50 to 200˚C.	**P-M6**
Replacement plastic pump inlet/outlet connector. Fits tubing 15mm inner dia. Temp range -50 to 200˚C.	**P-M11**
Stainless steel pump inlet/outlet connector, M16 x 1 male. Fits M16 hose. Temp range -50 to 200˚C.	**M-M16**
Metal pump inlet/outlet connector, dual seal super rapid 4mm. Fits semi rigid tubing 4mm outer dia. Temp range -20 to 100˚C.	**M-SR4**
Metal pump inlet/outlet connector, dual seal super rapid 6mm. Fits semi rigid tubing 6mm outer dia. Temp range -20 to 100˚C.	**M-SR6**
Metal pump inlet/outlet connector, dual seal super rapid 8mm. Fits semi rigid tubing 8mm outer dia. Temp range -20 to 100˚C.	**M-SR8**
Metal pump inlet/outlet connector, hose barb 7mm. Fits flexible tubing 7mm inner dia. Temp range -40 to 120˚C.	**M-HB7**
Metal pump inlet/outlet connector, hose barb 9mm. Fits flexible tubing 9mm inner dia. Temp range -40 to 120˚C.	**M-HB9**
Metal pump inlet/outlet connector, hose barb 12mm. Fits flexible tubing 12mm inner dia. Temp range -40 to 120˚C.	**M-HB12**
Metal pump inlet/outlet plate, 1/4 " BSP/G1/4 female. Temp range -50 to 200˚C.	**M-UC**