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

3 year warranty

Model selection (operating temperature)

Any of the four Grant Optima™ digital heating 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:

-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 centistokes, flash point ≥285°C, fire point ≥340°C)

Heating circulators

T100, TC120, TX150, 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 100°C*	**TC120 ambient +5 to 120°C***	**TX150 ambient +5 to 150°C***	**TXF200 ambient +5 to 200°C***

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 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)	Independant 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**
- **Integral pump for external fluid circulation**
- **Cooling/heating range 0°C to 120°C****
- **Stability ±0.05°C**
- **3 programmable temperature presets**
- **Easy to use rotary dial and two function keys**

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

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

Operating setpoint plus **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

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

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

* see summary table on pp. 1.6–1.7 for accessories and for other models utilising the TC120 thermostat
** operation below ambient temperature requires 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**
- **Stability ±0.01°C**
- **Cooling/heating range -15°C to 200°C****
- **Full colour screen**
- **Easy to program via interface or remotely via PC / Laptop using Labwise™ software**
- **Key functions easily accessed via home screen icons**

TXF200-ST26 model shown

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 1.7 for details

* see summary table on p. 1.6–1.7 for accessories and other models utilising the Grant high performance digital control units
** operation below ambient temperature requires 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**
- **Cooling/heating range ambient +5°C to 99°C**
- **Stability ±0.05°C**
- **3 programmable temperature presets**
- **Low liquid protection and fixed over temperature cut-out**

T100-P12 model shown

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 **120 V and 230 V 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 p. 1.6 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

Heated 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™ thermostats see, p 1.8

Key to symbols

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

Heating circulators

	General purpose digital		Advanced digital	
	T100	TC120	TX150	TXF200
	h: 335mm d: 172 mm w: 120 mm 2.5 kg	h: 335 mm d: 172 mm w: 120 mm 2.5 kg	h: 345 mm d: 172 mm w: 120 mm 3 kg	h: 345 mm d: 172 mm w: 120 mm 3 kg

Tanks

Capacity (L) Outer tank dimensions • Working area (l x w) • Min/max liquid depths • Inner tank dimensions (l x w x h) • Overall dimensions incl. controller (l x w x h)				
	2	2	5	5
ST5 – 5 L stainless steel 3 kg h: 200 mm l: 330 mm w: 180 mm	• 150 x 150 mm • 85/140 mm • 300 x 150 x 150 mm • 330 x 180 x 395 mm	T100–ST5 amb.+15 to 100°C	TC120–ST5 0 to 120°C	TX150–ST5 0 to 150°C	TXF200–ST5 0 to 200°C
ST12 – 12 L stainless steel 4.5 kg h: 200 mm l: 360 mm w: 330 mm	• 205 x 300 mm • 85/140 mm • 325 x 300 x 150 mm • 360 x 330 x 395 mm	T100–ST12 0 to 100°C	TC120–ST12 0 to 120°C	TX150–ST12 0 to 150°C	TXF200–ST12 0 to 200°C
ST18 – 18 L stainless steel 7 kg h: 200 mm l: 540 mm w: 330 mm	• 385 x 300 mm • 75/130** mm • 505 x 300 x 150 mm • 540 x 330 x 395 mm	T100–ST18 0 to 100°C	TC120–ST18 0 to 120°C	TX150–ST18 0 to 150°C	TXF200–ST18 0 to 200°C
ST26 – 26 L stainless steel 7.5 kg h: 255 mm l: 540 mm w: 330 mm	• 385 x 300 mm • 125/180** mm • 505 x 300 x 200 mm • 540 x 330 x 405 mm	T100–ST26 0 to 100°C	TC120–ST26 -15 to 120°C	TX150–ST26 -15 to 150°C	TXF200–ST26 -15 to 200°C
ST38 – 38 L stainless steel 11 kg h: 255 mm l: 730 mm w: 330 mm	• 575 x 300 mm • 125/180** mm • 690 x 300 x 200 mm • 730 x 333 x 405 mm	T100–ST38 0 to 100°C	TC120–ST38 -15 to 120°C	TX150–ST38 -15 to 150°C	TXF200–ST38 -15 to 200°C
P5 – 5 L plastic 2.5 kg h: 180 mm l: 240 mm w: 330 mm	• 120 x 150 mm • 85/140 mm • 240 x 160 x 150 mm • 390 x 200 x 380 mm	T100–P5 amb.+15 to 99°C	TC120–P5 amb.+15 to 99°C	TX150–P5 amb.+15 to 99°C	TXF200–P5 amb.+15 to 99°C
P12 – 12 L plastic 3.5 kg h: 180 mm l: 415 mm w: 350 mm	• 210 x 280 mm • 85/140 mm • 325 x 280 x 150 mm • 415 x 350 x 380 mm	T100-P12 amb.+5 to 99°C	TC120–P12 amb.+5 to 99°C	TX150–P12 amb.+5 to 99°C	TXF200–P12 amb.+5 to 99°C
P18 – 18 L plastic 5 kg h: 180 mm l : 600 mm w: 365 mm	• 280 x 325 mm • 85/140 mm • 510 x 290 x 150 mm • 600 x 350 x 380 mm	T100–P18 amb.+5 to 99°C	TC120–P18 amb.+5 to 99°C	TX150–P18 amb.+5 to 99°C	TXF200–P18 amb.+5 to 99°C

Note: operation at or below ambient temperatures requires accessory cooling or a refrigeration unit on page 2.6

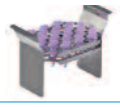
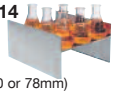
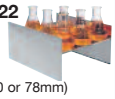
Options and accessories

Labwise™ PC software (optional)				
Allows two-way communication for status display, programming and data capture (see p. 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 12.7 mm **VTP 1** max. pressure 1000 mbar max. flow 9 L/min **VTP 2** max. pressure 1650 mbar max. flow 12 L/min		Required only where application demands a higher pressure than that delivered by the internal pump to maintain flow		

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

Heated circulating baths » Options and accessories

Accessories

Lids* to help reduce evaporation/ heat loss and avoid sample contamination	Lids For continuous use with water above 90°C. Stainless steel.	Polypropylene spheres* 300 spheres in one pack (no. of packs required)	Rack systems† to optimise use of available bath capacity (no. of racks accommodated)	Raised shelves to allow shallow vessels to be accommodated	Accessory cooling systems** 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 to 40°C***)	**C2G** (- 15 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 10-13 mm	65
VR-19	ø 16-19 mm	36
VR-24	ø 24 mm	23
VR-30	ø 30 mm	14
VR-SE	0.5 ml	102
VR-LE	1.5 ml	75

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

Heated circulating baths – technical specifications

Grant Optima™ thermostats

● = standard

			General purpose digital		Advanced digital	
			T100	TC120	TX150	TXF200
						
Stability (DIN 12876)@70°C		°C	±0.05	±0.05	±0.01	±0.01
Uniformity (DIN 12876)@ 70°C		°C	±0.1	±0.1	±0.05	±0.05
Setting resolution		°C	0.1	0.1	0.1 (0.01 with Labwise)	
Display			4 digit LED		full colour QVGA TFT	
Timer function			–	1 to 6000 mins	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, SP	EN, FR, DE, IT, SP
Alarms (can be configured to switch a relay)			–	high (no relay)	high and low	high and low
Heater power	230 V	kW	1.3	1.3	1.9	1.9
	120 V	kW	1.4	1.4	1.4	1.4
Electrical power	230 V	kW	1.4 (50-60 Hz)	1.4 (50-60 Hz)	2.0 (50-60 Hz)	2.0 (50-60 Hz)
	120 V	kW	1.5 (50-60 Hz)	1.5 (50-60 Hz)	1.5 (50-60 Hz)	1.5 (50-60 Hz)
Height above tank rim		mm	200	200	200	200
Depth below tank rim		mm	135	135	145	145

Grant Optima™ thermostat pumps (integral)

Maximum pressure	water	mbar	-	210	310	530
Maximum flow	water	L/min	-	16	18	22 (adjustable flow rate)
Pump connector	6 mm bore*		-	fits 9 mm inner diameter tubing		
Pump connector	11 mm 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 immersion thermostats 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 35 mm 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.

Heated circulating baths » Technical specifications

High pressure pumps (optional)

			VTP pumps					
			VTP1-FLST5	VTP1-FLST12	VTP1-FLST26	VTP2-FLST5	VTP2-FLST12	VTP2-FLST26
								
Fits ST tank			ST5	ST12	ST18/26	ST5	ST12	ST18/26
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		

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/w/h	mm	460/305/225		–
Weight		kg	17	21	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			120 V (60 Hz) or 230 V (50Hz)		–

* 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.

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