

1 Select the thermostat



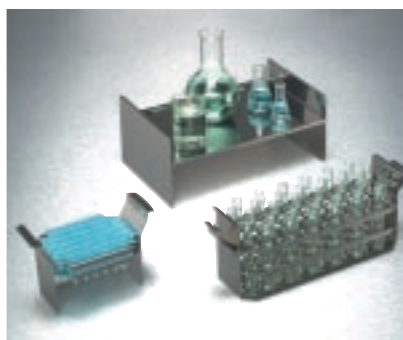
First select the temperature range and performance required and then compare the functions of the five thermostats. These are detailed overleaf and range from the simple efficiency of the analogue GA100 to the sophistication of the powerful, programmable GP200. All the digital thermostats in the Optima series offer the unique navigator and interactive display which makes set-up and calibration a straightforward task. Lastly decide between a version without clamp, for use with the plastic or stainless steel tanks, or with a clamp, for use with almost any type of vessel. And for the ultimate sophistication, the optional **Labwise™** PC software package allows two-way communication for status display, programming and data capture in the most demanding applications.

2 Select the tank



Quality is the keynote in the development of this range of baths from Grant. Choose between the P plastic, or S stainless steel baths, depending on the application. There is a wide choice of sizes to cope with the varying demands of the modern laboratory. Together with the Optima thermostats they provide the ideal solution for most laboratory applications.

3 Select the accessories



Finally, no system is complete without the vital accessory items. Purpose designed lids, racks, coolers etc. help to optimise the performance of high quality laboratory equipment. Choose from the full range of Grant accessories.

The thermostats

There are five models, each available in two versions. Without clamp for use with Grant S stainless steel and P plastic tanks or with clamp, for use with almost any type of vessel.

Temperature range

The temperature range is dependent on the type of bath used: see the specification table for details. Accessory cooling is required around and below ambient temperature.

Analogue control for simple, effective performance, model GA100

- ambient + 5°C to 99°C
- setting dial with analogue scale, resolution better than 1°C (20 to 80°C)
- a reference thermometer is required (not supplied) for accurate temperature setting
- dual position fitting in S tanks for convenient access
- stirred circulation within the tank for good temperature stability and uniformity
- low liquid protection by float switch
- visual alarm

dual position fitting in S tanks for convenient access



GA100-P12

Specification comparison table

		GA100	GD100	GD120	GR150	GP200
Temperature range ² – without tank	°C	20 to 99	0 to 100 ¹	0 to 120 ¹	-50 to 150 ¹	-50 to 200 ¹
Temperature range ² using S tanks	°C	20 to 99	0 to 100 ¹	0 to 120 ¹	0 to 150 ¹ (5/12/18L) -15 to 150 ¹ (26/38L)	0 to 200 ¹ (5/12/18L) -15 to 200 ¹ (26/38L)
Temperature range ² using P tanks	°C	amb + 5 to 99	amb + 5 to 99	amb + 5 to 99	amb + 5 to 99	amb + 5 to 99
Stability, S tanks, (Din 58966)	@37°C ±°C	0.1	0.02	0.02	0.005	0.005
Uniformity, S tanks	@37°C ±°C	0.1	0.05	0.05	0.02	0.02
Setting resolution	°C	better than 1	0.1	0.1	0.1 (0.01 using Labwise)	0.1 (0.01 using Labwise)
Display		none	4 digit 13mm LED	4 digit 13mm LED	4 digit 13mm LED 2 line 16 character LCD	4 digit 13mm LED 2 line 16 character LCD
Display resolution	°C	n/a	0.1	0.1	0.01 (LCD)	0.01 (LCD)
No. stored temperature values		1	4	4	4	4
Two point re-calibration		n/a	yes	yes	yes	yes
Offset adjustment		no	no	no	yes	yes
External probe		none	none	none	PT1000	PT1000
RS232		no	no	no	yes	yes
Programmable		no	no	no	remote via PC	remote via PC/direct
No. stored programs		none	none	none	1 x 30 segment	5 x 30 segment
Relays		none	none	none	1	2
Heater power	240V kW	1.4	1.4	1.4	2	2
	115V kW	1.3	1.3	1.3	1.3	1.3
Pump	max pressure mbar	no pump	no pump	310	310	530
(water)	max. flow L/min	no pump	no pump	17	17	21 adj. flow rate
Pipe bore	inlet/outlet mm	n/a	n/a	6, 11	6, 11	6, 11
Safety	overtemperature	no	no	adjustable cut-out	adjustable cut-out	adjustable cut-out
	level - float switch	yes	yes	yes	yes	yes
Alarms		no	no	high	high and low	high and low
Electrical power	220-240V kW	1.5(50-60Hz)	1.5(50-60Hz)	1.5(50Hz)	2.2(50Hz)	2.2(50-60Hz)
	110-120V kW	1.4(50-60Hz)	1.4(50-60Hz)	1.4(60Hz)	1.4(60Hz)	1.4(50-60Hz)
Overall dims. excl. clamp	w/d/h mm	115/145/315	115/145/315	115/145/315	115/145/315	115/145/315
Height above tank rim	mm	180	180	180	180	180
Depth below tank rim	mm	135	135	135	135	135

¹ Minimum operating temperature without accessory cooling is room temperature plus 5°C, except in S5 tank, which is room temperature plus 15°C; achievable temperature range depends on the immersion cooler selected, see page 7 for details.

² A lid or layer of polypropylene spheres must be used when operating between 60°C and 100°C, and is recommended for use below room temperature. Above 100°C, a lid must always be used. A clamp allows the immersion thermostat to be attached to any vertical sided tank with a maximum wall thickness of 35mm for rectangular tanks, 30mm for circular tanks (300mm dia.), and a capacity of up to 50 litres; the maximum temperature achievable is dependent upon the tank insulation.

Microprocessor controlled digital units

Features common to all digital models:

- **Intelligent Control Optimisation™**, "ICO", for adaptive intelligent PID temperature control
- digital display and simple user interface
- operating setpoint, plus three adjustable preset temperature values
- user recalibration facility, for optimum accuracy at the required operating temperature
- dual-position fitting in S tanks for convenient access
- stirred circulation within the tank for good temperature stability and uniformity
- low liquid protection by float switch
- fault indication display
- visual alarm



GR150-S12

General purpose digital models GD100, GD120

Features common to both models:

- digital display: 4 character bright LED
- exceptionally simple user interface based on a novel, sensitive rotor plus two keys

GD100

- 0 to 100°C

GD120

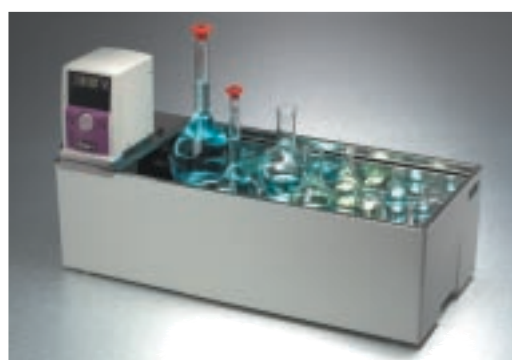
- 0 to 120°C
- two pump connector plates supplied as standard, choice of pipe bore: 6mm and 11mm
- powerful pump for external circulation, maximum flow rate 17 L/min, maximum pressure 310 mbar
- timer function for reaction timing, 0 to 9999 minutes
- variable high temperature alarm setting
- user-adjustable overtemperature cut-out
- temperature range and heater power are automatically limited according to the liquid type selected
- audible alarm

High performance models GR150, GP200

Features common to both models:

- novel soft-touch rotor for fast, intuitive navigation through the powerful, layered menu system
- dual display: 4 character bright LED, plus two line 16 character LCD
- twin heaters, for compliance with Flicker standard EN61000-3-3
- heater power 2kW, for fast heat up
- timer function for reaction timing, 99 hours, 59 minutes, with audible alert and heater control
- convenient and safe heater timer for early morning start-up and evening shut-down
- two pump connector plates supplied as standard, choice of pipe bore: 6mm and 11mm
- fault indication display
- external Pt1000 temperature probe socket
- two-point user recalibration of internal and external probes
- off-set adjustment for optimal isothermal performance
- programmable relay, particularly useful for refrigeration on/off control, and control of ancillary equipment during program execution
- the temperature range and the heater power are automatically limited according to the liquid type selected
- variable high and low temperature alarm settings, choice of fixed temperature or deviation modes
- alarms can be configured to switch a relay
- choice of language: English, French, German
- RS232 interface
- optional **Labwise** PC software for program set-up, data-logging and real-time graphing
- adjustable over-temperature cut-out
- audible alarm

thermostat with clamp, for use with almost any type of vessel



GD120-S38

GR150

- -50 to 150°C
- powerful pump for external circulation, maximum flow 17 L/min, maximum static head 310 mbar
- memory capacity for one program of up to 30 segments

GP200

- -50 to 200°C
- powerful pump for external circulation, multi-stage variable flow rate, max. flow 21 L/min, max. pressure 530 mbar
- two programmable relays
- storage for five programs of up to 30 segments
- front-panel programming interface, featuring:
 - set target temperature
 - set heating or cooling time to target temperature
 - up to 30 segments per program

The software

A **LabVIEW™** software package – **Labwise** – can be used to set all parameters, including programs, via the PC. **Labwise** also features real-time status windows, a graphic display of the controller's performance as a program is run, and allows data to be logged for future recall and analysis.

Labwise set-up features:

- set temperature
- set high and low alarms; alarms can be configured to switch a relay
- set reaction timer
- set delayed start and stop time
- control of output relays for operating ancillary equipment
- control of pump speed for GP200
- choice of language: English, French, German Spanish and Italian

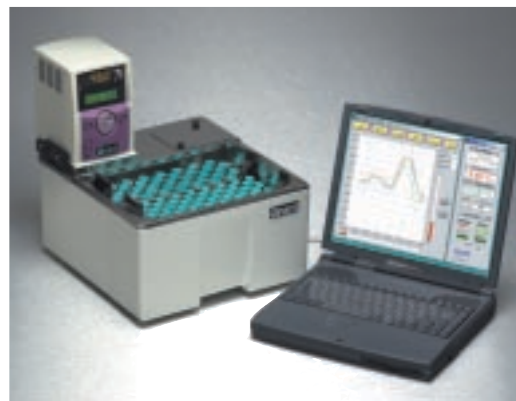
Labwise programming features:

- program values may be set graphically or numerically
- up to 30 segments per program
- set heat or cool time to target
- set number of loops 1, to 254 or infinite looping between selected way points
- programmed control of output relays for each segment, for operating ancillary equipment
- control of pump speed for GP200

Labwise display and logging features:

- display of temperature/time profile on screen in real time
- real time zoom and scaling of graphical display
- logging of temperature profiles to disk for storage and subsequent analysis
- store programs to disk

The **Labwise** software runs on a PC (Pentium II with Windows 95 or higher) and is suitable for use with the GR150 and GP200 controllers.



The tanks

All tanks are supplied with bridge plate for mounting the controller

P series

- cost effective plastic tanks, designed for use with water, for applications up to 99°C
- rugged construction in robust plastic, double walled for rigidity
- P series tanks are easy to clean

S series

- configured to allow dual-position fitting of the control unit for convenient access
- stainless steel tank is easy to clean and resists corrosion
- outer casing of glass reinforced plastic is resistant to common laboratory acids and solvents

S series tanks

			S5	S12	S18	S26	S38
Operating range	°C		0 to 200	0 to 200	0 to 200	-15 to 200	-15 to 200
Suitable immersion cooler			C1G	C1G	C1G	C1G, C2G	C1G, C2G
Tank capacity	L		5	12	18	26	38
Top opening	l/w	mm	150/150	210/300	390/300	390/300	580/300
Liquid depth	min/max	mm	80/140	80/140	70/130	120/180	120/180
Inner tank dimensions	l/w/h	mm	300/150/150	325/300/150	505/300/150	505/300/200	690/300/200
Outer case dimensions	l/w/h	mm	325/175/175	350/325/175	530/325/225	530/325/225	720/395/225
Overall dims. inc. controller	l/w/h	mm	325/175/355	350/325/355	530/325/405	530/325/405	720/395/405

P series tanks

			P5	P12	P18		
Operating range	°C		amb + 5 to 99	amb + 5 to 99	amb + 5 to 99		
Tank capacity	L		5	12	18		
Top opening	l/w	mm	120/150	210/280	280/325		
Liquid depth	min/max	mm	80/140	80/140	80/140		
Inner tank dimensions	l/w/h	mm	280/130/150	325/280/150	390/280/150		
Outer case dimensions	l/w/h	mm	390/200/170	415/350/170	600/350/170		
Overall dims. inc. controller	l/w/h	mm	390/200/355	415/350/355	600/350/355		

The accessories

Lids

Between 60°C and 100°C and below room temperature a lid or layers of polypropylene spheres should be used. Above 100°C a lid must be used. Lids help to reduce evaporation and heat loss, and to avoid contamination of samples. Hinged lids can be opened to a stable, vertical position, or lifted off completely.

Bath	P5	P12	P18	S5	S12	S18	S26	S38
Suitable lid	PL5	PL12	PL18	FG5	LG12	LG26	LG26	LG38
Type of lid	flat	curved	curved	flat	gabled, hinged	gabled, hinged	gabled, hinged	gabled, hinged
Material	stainless	plastic	plastic	stainless	stainless	stainless	stainless	stainless

Polypropylene spheres

Polypropylene spheres are an alternative to lids for temperatures up to 100°C, allowing easy access to vessels in the bath, and are particularly useful for tall vessels.

Bath	S5, P5	S12, P12	S18, P18	S26	S38
Spheres required	1 x PS20	1 x PS20	2 x PS20	2 x PS20	3 x PS20

Rack systems

Our range of robust, stainless steel racks enable you to make the best use of the available bath capacity.

Bath	Racks per bath	Test tube		Tubes per rack		Microfuge tubes		Tubes per rack	
		Tube size	VR	QR	Tube size	VR	QR		
S5, P5	1 x QR	10-13 mm	65	30	0.5 ml	102	44		
S12, P12	2 x VR	16-19 mm	36	16	1.5 ml	75	35		
S18, P18	4 x VR	30 mm	14	5					
S26	4 x VR								
S38	6 x VR								

Raised shelves

Raised shelves reduce the effective liquid depth to allow shallow vessels to be placed in the baths. The effective liquid depth may be between 0 and 90 mm in 12 or 18 litre baths, and between 0 and 50 mm or 85 and 135 mm in 26 and 38 litre baths.

Bath	P12, S12	P18, S18	S26	S38
Suitable raised shelf	RS14	RS22	RS28	RS38 or RS28

Accessory cooling systems

Cooling systems allow thermostatic baths, circulators and immersion thermostats to operate at or below room temperature, by means of a coil dipped into the bath. The coil is made of nickel-plated copper, and is designed to fit in the bath such that it doesn't impinge on the working area (except S5).

CG refrigerated immersion coolers: consist of a cooling coil connected by a flexible pipe to a refrigeration unit, which is housed in an outer case; immersion coolers extract heat continuously, with temperature control carried out by the bath's control unit.

CW5 heat exchange coil: is designed to be attached to a supply of cooling tap water, or a refrigerated circulator.

		C1G	C2G	CW5
Temperature range	°C	0 to 40*	-20 to 40*	2°C above coolant temperature
Min. temp. with S series tanks	°C	0	S26, S38: -15	2°C above coolant temperature
Cooling power	@20°C	350	400	n/a
	@0°C	110	320	n/a
	@-10°C	n/a	170	n/a
Overall consumption	VA	300	500	n/a
Dimensions	d/w/h	460/305/225	460/305/225	
Flexible pipe	l	925	925	
Coil	dia/l	77/55	77/105	77/55
Pipe bore inlet/outlet	mm	-	-	7
Electrical supply		220-240V 50Hz	220-240V 50Hz	n/a

* Note: The cooling coil may 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.

External probe

For use with GR150 and GP200, for remote temperature control. FF17 flexible nylon probe has a very fast response; 100mm long, 4.5mm dia. LL17 robust stainless steel probe, slower response; 125mm long, 5mm dia. Fitted with two metres of cable. Special probes can be supplied for use in corrosive liquids.

Remote switching device

The RSD remote switching device can be used by the GR150 and GP200 models to control, by switching on and off, any mains powered appliance (up to a maximum of 8 Amps). This can be programmed on the GR150 and GP200 controllers under the alarms - relay section of the Navigator control menu, or alternatively with **Labwise** software. The GR150 can control one relay and the GP200 can control two. A separate RSD is required for each relay on the GP200.

