

Optima™

Refrigerated baths and circulator range

High-performance refrigeration unit easily combined with any of our four Optima™ heated circulators. Offers flexibility and delivers outstanding temperature performance for routine and more sophisticated applications requiring accurate temperature control in the range of -30°C to 100°C. Also available as a kit, Grant offer the LTC4 (TX150-R4) with the heated circulator, refrigeration unit and insulated tubing* offering a complete ready-to-use system.

Choice of two base refrigeration units and four heated circulators, temperature range -30°C to 100°C** (vary on model choice)

Stability: Up to $\pm 0.01^\circ\text{C}$

No spill drain valve located on the front of the unit

Safe - water freeze protection thermostat and 27 bar high pressure switch

Three pre-set programs

3 years warranty, 4 years with the LTC4

Custom units are available

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

Low fluid protection and over-temperature cut-out.

Easy accessible power switch.

5°C thermostat on/off switch - stops tank freezing when operating with water.

Removable grille - easy access to drain valve and condenser for routine maintenance.



The image shows a Grant Optima R4 refrigerated bath and circulator unit. It is a stainless steel, rectangular unit with a digital display and control panel on top. The display shows a temperature of -5.00°C. The unit has a carrying handle on top and a power switch on the front. The front also features a large grille for ventilation. The unit is labeled 'R4' and 'Grant'.

3 year warranty

Built in Britain

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

Adjustable over-temperature protection.

Convenient carrying handles front and rear for repositioning the unit.

Powerful efficient cooling, ozone-friendly refrigerant.

* Temperature range of tubing supplied: -40°C to 100°C (can be cut to length as required).

** Lower temperatures are available. Contact +44 (0) 1763 260 811 or email salesdesk@grantinstruments.com to find out more.

Grant R series base refrigeration units

Technical specifications

		 	
		R4	LTC4
Dimensions	h x d x w mm	550 x 515 x 393	755 x 515 x 393
Capacity	L	20	20
Temperature range (T100)	°C	0-100	-
Temperature range (TC120)	°C	-20 to 100	-
Temperature range (TX150)	°C	-30 to 100	-30 to 100
Temperature range (TXF200)	°C	-30 to 100	-
Refrigerant		R134a	R134a
Working area	d x w mm	230 x 305	230 x 305
Min/Max fluid level	mm	85/140	85/140
Cooling power (typical)	@20°C W	900	900
	@0°C W	500	500
	@-10°C W	300	300
	@-20°C W	180	180
	@-30°C W	40	40
	@-40°C W	-	-
	@-47°C W	-	-
Electrical power (max) W	120V	780 (50-60Hz)	2280 (50-60Hz)
	230V	850 (50Hz)	2850 (50Hz)
Relay control*		•	•
Weight	kg	40.6	42.9

* relay to enable switching off the refrigeration system in a program

Applications

- University research/teaching - temperature control of external equipment including: spectrophotometers & refractometers. Circulation of temperature control fluid to jacketed vessels, cooling crystallisation vessels
- Industrial laboratories - temperature probe calibration, product testing, product QC, temperature control of external equipment.

Grant Optima™ heated circulators

Technical specification



					
		Grant Optima Heated circulators and Immersion thermostat			
		T100	TC120	TX150	TXF200
Dimensions	h x d x w mm	333 x 172 x 120	333 x 172 x 141	342 x 172 x 141	
Stability (DIN 12876)	water @10°C ±°C	0.1			
Setting resolution	°C	0.1		0.1 (0.01 with Labwise®)	
Programs		-		1 x 30 segments Labwise® required	10 x 100 segments
Safety	over temperature	Fixed	Adjustable cut-out		
Alarms (can be configured to switch a relay)		-	High (no relay)	High and low	
Language capability		-		EN, FR, DE, IT, ES	
Height above tank rim	mm	200			
Depth below tank rim	mm	135			
Display		4 digit LED		Full colour QVGA TFT	
Timer		-	1 minute to 99 hours, 59 minutes		
Calibration points		2		5	
Communication interface		-		USB, RS232, remote temperature probe	
Heater power	W 120V/230V	1440/1290		1445/1840	
Electrical power	(50/60Hz) W 120V/230V	1500/1400		1500/2000	
Weight	kg	2.1	2.3	2.6	2.6

For more information on the Grant Optima heated circulators, please see page 1.8.

Options and accessories

Labwise® PC software

Allows two-way communication for status display, programming and data capture (see page 3.1 for more information) USB/RS232 cables provided.

Compatible with TX150, TXF200 and LT ecocool 150 models.

External probes for monitoring and controlling temperature of remote loads

TXPEP flexible plastic probe, 3m cable (Din plug)

Compatible with TX150 and TXF200 models.
Compatible with LT ecocool 150 models

TXSEP stainless steel probe, 3m cable (Din Plug)

Compatible with TX150 and TXF200 models.
Compatible with LT ecocool 150 models

Vertical turbine pumps*

Low noise, compact design. Supplied with pipe connections and special lid for fitting to tank, pipe bore 12.7mm.

VTP 1
Max pressure 1000 mbar
Max. flow 9 L/min

230V
50Hz

VTP 2
Max pressure 1650 mbar
Max. flow 12 L/min

230V
50Hz

Required only where application demands a higher pressure than that delivered by the internal pump to maintain flow.

Note: The optional VTP pumps will transfer additional heat to the baths and reduce the net cooling power of the refrigeration unit. The above figures must be taken into consideration when choosing the refrigeration unit. When order a VTP pump, please specify which refrigeration base unit it is to be used with.

Note: Other sizes of heat exchange coil can be made to your specification, contact Grant for further information.

Heat exchange coil

CW5 Other sizes of heat exchange coil can be made to your specification, contact us for further information.

Temperature range: 2°C above the temperature of the coolant
Coil Øxl: 77 x 55mm
Pipe bore inlet/outlet: 7mm

Hose kits

HOSE100 General purpose tubing and insulation kit: -40°C to 100°C

HOSE200 High temperature tubing and insulation kit: -50°C to 200°C

Tube kit 2 x 2m, assembled with Optima pump outlet plate and simple tube clips, no tools required.

High pressure pumps

Optional

		VTP pumps		Heat Exchange Coil
		VTP-ILT	VTP2-LT	CW5
Maximum pressure	water mbar	1000	1650	-
Maximum flow	water L/min	9	12	-
Pipe bore	inlet/outlet mm	12.7		7
Electrical connection		10 amp IEC		-
Power consumption	W	30	40	-
Power output to fluid	W	15	22	-
Safety		Thermal fuse		-
Temperature range	°C	-		2°C above coolant temperature
Coil ØxL	mm	-		77 x 55

Grant refrigeration units

Optional

							
	LT ecocool 100	LT ecocool 150	TI100-R4	TC120-R4	TX150-R4	TXF-200-R4	LTC4
Labwise® Software (see section 3 for further information)	-	•	-	-	•	•	•
CW5 Heat exchange coil	•	•	•	•	•	•	•
IQOQ Documentation	IQOQ LT ecocool 100	IQOQ LT ecocool 150	IQOQ TI100 + IQOQ R4	IQOQ TC120 + IQOQ R4	IQOQ TX150 + IQOQ R4	IQOQ TXF200 + IQOQ R4	IQOQ LTC4
PQ Documentation	PQ LT ecocool 100	PQ LT ecocool 150	PQ TI100 + PQ R4	PQ TC120 + PQ R4	PQ TX150 + PQ R4	PQ TXF200 + PQ R4	PQ LTC4
Extended warranty 1 year EWC1	•	•	•	•	•	•	•
Extended warranty 2 years EWC2	-	-	•	•	•	•	-

Temperature probes - 3m cable

TXPEP Plastic probe	-		•	•	•
TXSEP Stainless steel probe	-		•	•	•
PEP Plastic probe	-	•	-		
SEP Stainless steel probe	-	•	-		

Pumps - optional

VTP1-LT Maximum pressure 1000 mbar Maximum flow 9 L/min	•	-
VTP2-LT Maximum pressure 1650 mbar Maximum flow 12 L/min	•	-
VTP1-PLR4 Maximum pressure 1000 mbar Maximum flow 9 L/min	-	•
VTP2-PLR4 Maximum pressure 1650 mbar Maximum flow 12 L/min	-	•

Pumps

P-M6		Replacement plastic pump inlet/outlet connector. Fits tubing 9mm inner dia. Temperature range -50°C to 200°C.
P-M11		Replacement plastic pump inlet/outlet connector. Fits tubing 15mm inner dia. Temperature range -50°C to 200°C.
M-SR4		Metal pump inlet/outlet connector, dual seal super rapid 4mm. Fits semi rigid tubing 4mm outer dia. Temperature range -20°C to 100°C.
M-SR6		Metal pump inlet/outlet connector, dual seal super rapid 6mm. Fits semi rigid tubing 4mm outer dia. Temperature range -20°C to 100°C.
M-SR8		Metal pump inlet/outlet connector, dual seal super rapid 8mm. Fits semi rigid tubing 4mm outer dia. Temperature range -20°C to 100°C.
M-HB7		Metal pump inlet/outlet connector, tube barb 7mm. Fits flexible tubing 7mm inner dia. Temperature range -50°C to 200°C.
M-HB9		Metal pump inlet/outlet connector, tube barb 9mm. Fits flexible tubing 9mm inner dia. Temperature range -40°C to 120°C.
M-HB12		Metal pump inlet/outlet connector, tube barb 12mm. Fits flexible tubing 12mm inner dia. Temperature range -40°C to 120°C.
M-UC		Metal pump inlet/outlet plate, 1/4" BSP/G1/4 female. Temperature range -50°C to 200°C.
HOSE100		General purpose tubing and insulation kit, includes 2 x 2m general purpose insulated tubing -40 to 100°C, assembled with LT ecocool/Optima™ pump outlet plate and simple tube clips, no tools required. Can be cut to length. 10mm ID, 14mm OD.
HOSE200		General purpose tubing and insulation kit, includes 2 x 2m general purpose insulated tubing -50 to 200°C, assembled with LT ecocool/Optima™ pump outlet plate and simple tube clips, no tools required. Can be cut to length. 8mm ID, 11mm OD.

RC Series

Recirculating chillers

A choice of two robust recirculating chillers delivering a constant flow of temperature-controlled fluid to provide powerful, regulated cooling at -10°C for many types of industrial machinery and scientific apparatus. Suitable for circulation through closed systems.

Temperature range -10°C to 60°C

Stability: $\pm 0.25^{\circ}\text{C}$ or $\pm 0.5^{\circ}\text{C}$ (model dependent)

Choice of models with different cooling power - from 1300 to 3000W

Efficient, reliable and cost-effective alternative to cooling with mains water

Customised units with bespoke specifications also available

Lockable wheels allow RC units to be moved easily and ensure that they stay once put in position.

Digital controller for accurate and reproducible temperature setting. User-selectable high and low temperature alarms.

Robust construction using corrosion resistant materials - long term durability and reliability in demanding applications.



Useful TUNE facility enables automatic optimisation of the chillers closed-loop temperature control parameters to meet specific user requirements.

Inbuilt safety features protects the user, equipment and application from over temperature, under temperature and flow failure.



Applications

- Electronics - cooling system for etch baths, glass coating for top-up display in aircrafts
- Industry - print head cooling for textile industry, calibration system probe
- Academia - physics and astronomy lab equipment cooling, sea water cooling for producing ikatite minerals
- Research - seed research, cooling of scientific X-ray analytical units, SEM cooling

Grant RC recirculating chillers

Technical specifications

				
			RC1400G	RC3000G
Dimensions	h x d x w	mm	655 x 936 x 483	
Capacity	L		2.5	1.1
Temperature range	°C		-10 to 60	
Stability	±°C		0.25**	0.5***
Flow rate (max)	L/min		15	
Pump pressure (max)	mbar		1.6	
Cooling power (typical)	@20°C	W	1300	3000
	@0°C	W	600	1500
	@-10°C	W	150	575
Heater power		W	1500	–*
Overall consumption	220/240V	W	3000	2000
Display			LED	
Display resolution	°C		1.0	
Electrical supply	V		230 (50Hz)	
Safety:				
temperature	switchable under temperature thermostat		•	
temperature	fixed over temperature cut-out		•	–
level	flow-fail device		•	
Refrigerant			R134a	
EMC emissions	Class		A	B
Weight	kg		53	88

* RC3000G has no heater so can only control against a heat load

** With 10 litres of water in the system

*** With 25 litres of water in the system

Options and accessories

RC BYP	Bypass to overcome flow restrictions (flow <1 L/min), e.g. in narrow tubes or small cells.
RC PR	Pressure gauge to assist with setting up cooling systems and monitoring performance.
PRES	Priming reservoir to simplify priming in a closed loop system which has no filling port available on the RC inlet.
External probe	For remote sensing temperature control. On request only. Specify when ordering.
RC HF9	Rear connecting fittings (pair) 9mm internal diameter tube sizes respectively.
RC HF12	Rear connecting fittings (pair) 12mm internal diameter tube sizes respectively.
RC HF17	Rear connecting fittings (pair) 17mm internal diameter tube sizes respectively.

Contact us today

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Six points to consider when choosing your system

Do you need to immerse samples within a tank?

Consider the working area required. The table on page 27 shows the dimensions of the top opening and the min/max fluid depths.

Cooling power required at a given temperature

For example, if your operating temperature is 0°C and you need 500W cooling power, you need the R4 refrigeration unit with any of the controllers. Alternatively to calculate the power required use the following formula:

$$W = V \times T \times K / 60 \times t \text{ (mins)}$$

Cool-down time required to reach that temperature

Calculate the cool-down time required according to the following formula and refer to the cool down curved for individual performance.

$$W \text{ (mins)} = V \times T \times K / 60 \times t \text{ (mins)}$$

W = average cooling power	Water	K = 4180
V = total system fluid volume L	50/50 water/glycol	K = 3800
T = temperature difference °C	Alcohol	K = 2100
K = fluid heat capacity (J/L°C)	Silicone oil	K = 1800

Do you need to control the temperature of or remove the heat from an external device?

1. Consider the pump requirement. Fluid flow rate is critical in order to maintain adequate exchange of heat within the external system. Flow rate is dependent on the restrictions within the system. Factors which cause a pressure drop are height, length, pipe bore and the number and angle of bends within the system. To maintain sufficient flow in a highly restricted system, a high pressure pump is required. The integral pumps in the Optima™ and LT ecocool series thermostats are satisfactory for most laboratory applications; for more powerful pump requirements select either of the Grant accessory vertical turbine pumps (VTP).

2. Consider whether you need to control the temperature within the external apparatus. For external temperature control choose the TX150, TXF200 or LT ecocool 150 controllers and an external temperature probe.

Do you require temperature ramping?

If yes, choose the TX150, TXF200 or LT ecocool controller and Labwise® accessory software. For refrigeration on/off choose refrigeration units LT ecocool 150 or R4.

What other features do you require?

Compare the wide range of features offered by the four Optima™ series or LT ecocool 150 controllers and select the controller that meets your needs.

Need more help?

If you need help choosing the correct system, please contact: salesdesk@grantinstruments.com or call +44 (0) 1763 260 811.

