

**LAUDA**

Operating Instructions

Compact low temperature thermostats  
RM 6 T, RM 20 T, RM 6 B, RML 6 B, RM 20 B

From Series U 01  
10/96 E  
YACE0047

LAUDA DR. R. WOBSEER GMBH & CO. KG  
Postfach 1251, D-97912 Lauda-Königshofen  
Tel. (093 43) 503-0, Fax (093 43) 503222



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Enclosures

Accessories

Circuit diagram

1. Brief operating instructions

- 1.1 Even if these brief instructions are sufficient for you, be sure to read the information below, in particular section 4 "Safety system and warning notes". For safe operation of the units it is necessary to read these Operating Instructions carefully.
- 1.2 Check thermostat and accessories during unpacking for possible transport damage and, if necessary, notify carrier or post office.
- 1.3 Assemble unit according to Section 6 and add items as appropriate.
- 1.4 Connect the tubing at the pump nipples. Remove the plastic screw from the pressure nipple of the pump.

Without external circulation: link together the pump nipples with the silicone tubing supplied.

With external circulation: connect tubing to the external system.

Secure tubing with clips to prevent its slipping off.



- 1.5 Use only deionized water or water-glycol-mixture (see Section 5). Fill the unit up to approx. 2 cm below the top plate.
- 1.6 Check the supply voltage against the data on the rating label. Connect the cable to the supply.
- 1.7 Operation without refrigeration unit (temperature above approx. 30°C)




Mains switch (green)	I ON (green lamp lights up)
Switch "Cooling" (yellow) 	0 OFF

Operating with refrigeration unit (temperature below approx. 30°C)

Mains switch (green)	I ON (green lamp lights up)
Switch "Cooling" (yellow) 	I ON

When starting the refrigeration unit after a longer period of stillstand it could take up to 30 minutes until the rated cooling capacity is available depending on the ambient temperature and model.

- 1.8 Select the required temperature. At B-units the set point is indicated by pressing . Select the desired temperature by turning the knob . Loose the fixing device first.

- 1.9 Overtemperature cutout to be adjusted at rotary switch  above the set point. If the red fault lamp lights up, press the rotary switch  "reset".
- 1.10 When operating with an external system ensure that the level inside the thermostat does not drop too much when the external system is being filled with the bath liquid.
- 1.11 When the bath liquid has reached the set point the yellow indicating lamp "heating"  begins to flash. Check the operating temperature on the reference thermometer (T) or digital display (B) and readjust the setpoint if necessary.
- 1.12 Operating safety

These thermostats must only be operated with non-inflammable liquids (see also Section 5).

WARNING

Parts of the bath cover may heat up to more than 70°C at higher operating temperatures! Pump outflow and return are at the operating temperature.

Compact low temperature thermostats  
 RM 6 T, RM 20 T, RM 6 B, RML 6 B, RM 20 B

2. Table of data according to DIN 58966

		RM 6 T	RM 20 T	RM 6 B	RML 6 B	RM 20 B
Temperature range	(°C)	-20...100	-20...100	-20...100	-30...100	-20...100
Ambient temperature range	(°C)	5...40 (see Item 8.7)				
Temperature setting/resolution	(°C)	analog/0.3		digital setting with 10 turn-potentiometer and numeric indication; display resolution 0.1°C, Potentiometer approx. 0.03°C		
Temperature indication/resolution	(°C)	Reference thermometer -30...100/0.5		incorporated digital thermometer; 0.1°C resolution, absolute accuracy better 0.2 % of reading $\pm 0.2^\circ\text{C}$		
Temperature sensor/control action		PTC/P			Pt 100/PID	
Temperature control (at -10°C)	( $\pm$ °C)	0.05 *)	0.05 *)	0.01 *)	0.02 *)	0.01 *)
Heater capacity	(kW)	1.5				
Cooling capacity, effective with Ethanol at 20°C ambient temperature (cooling activity with refrigerant R 134a)	(kW)	20°C 0°C -20°C -30°C	0.2 0.15 0.05 ---	0.25 0.2 0.1 ---	0.2 0.15 0.05 0.1	0.25 0.2 0.1 ---
Overtemperature protection		adjustable low-level protection according to EN 61010-2-010				
Flow rate	(l/min)	8				
Discharge pressure	(bar)	0.15				
Pump connectors		Olives 10 mm dia.				
Filling volume	(l)	4...6	14...20	4...6	4...6	14...20
Bath opening (WxD)	(mm)	150 x 130	300 x 350	150 x 130	150 x 130	300 x 350
Depth of bath	(mm)	160	160	160	160	160
Usable liquid depth	(mm)	140	140	140	140	140
Height to upper edge of bath	(mm)	400	450	400	400	450
Overall dimensions (WxDxH)	(mm)	200x350x550	350x540x600	200x350x550	200x350x550	350x540x600
Weight, net	(kg)	24	34	24	28	34
Power supply	(V; Hz)	230; 50 / 230; 60				
Total power consumption	(kW)	1.8	1.9	1.8	1.9	1.9

Units are conform to EU Guideline 89/336/EWG (EMV) and 73/23/EWG (low-voltage) and carry the CE mark (230 V; 50 Hz).

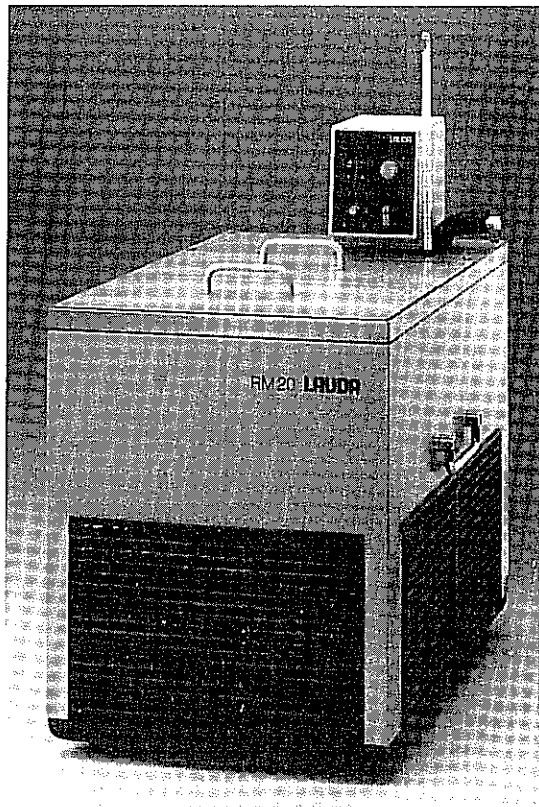
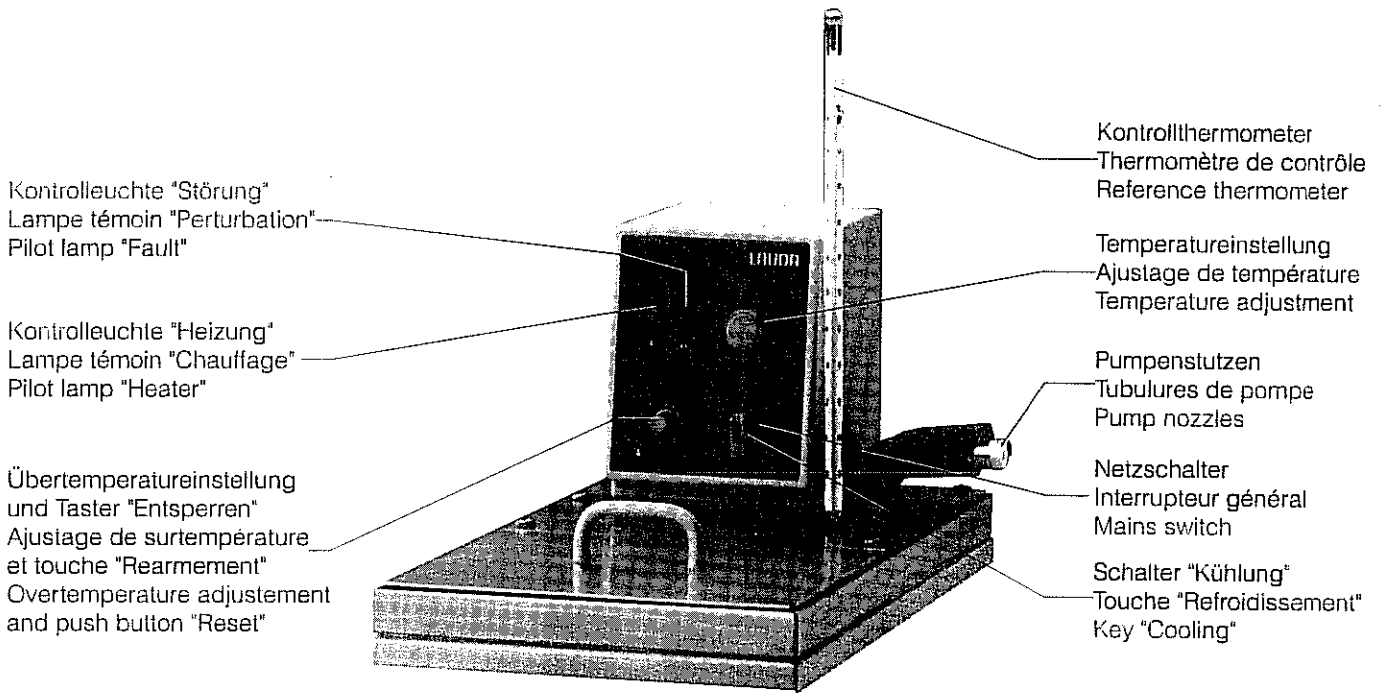
Ref. No.	230 V; 50 Hz	LCK 161	LCK 165	LCK 162	LCK 160	LCK 166
	230 V; 60 Hz	LCK 261	LCK 265	LCK 262	LCK 260	LCK 266

Units of different power supplies may have different heating capacities as well as different values for power consumption (see type lab Technical changes reserved).

\*) see Item 4.3

Compact-Kältethermostate  
 Cryothermostats  
 Compact low temperature thermostats

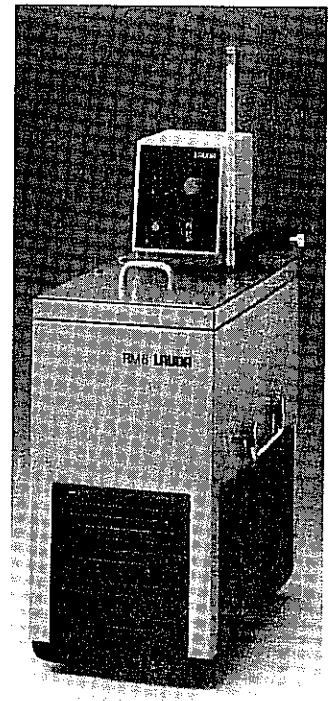
RM 6 T, RM 20 T



RM 20 T

(Baddeckel Zubehör auf Wunsch)  
 (Couvercle de bain accessoire en option)  
 (Bath cover optional accessory)

Entleerungshahn  
 (rückseitig)  
 Robinet de vidange  
 (à l'arrière)  
 Drain cock (rear)

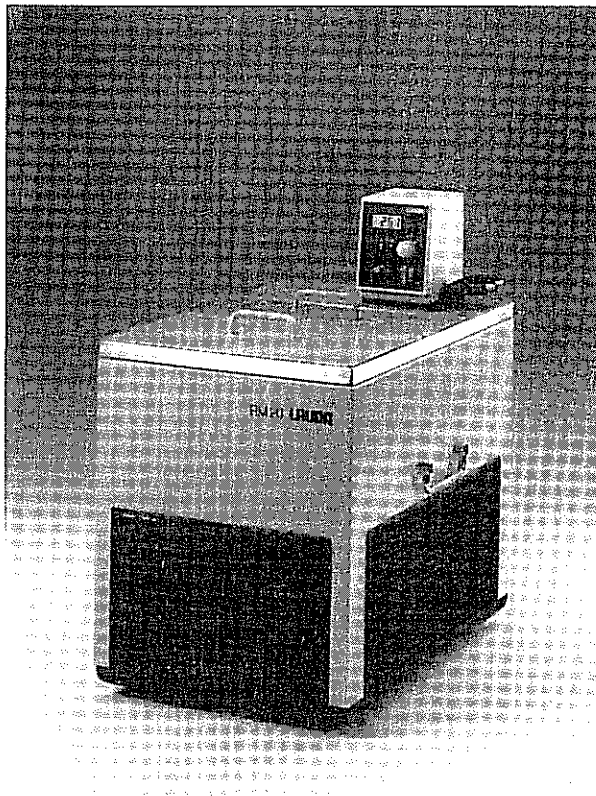
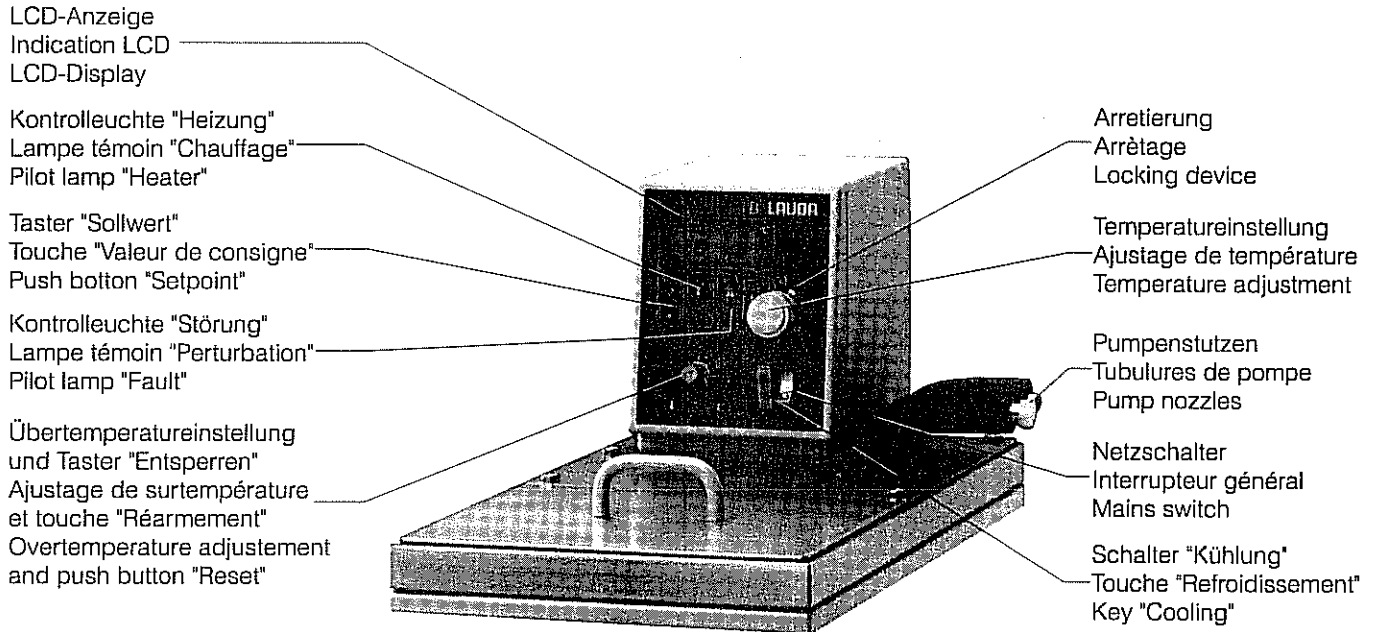


RM 6 T



Compact-Kältethermostate  
 Cryothermostats  
 Compact low temperature thermostats

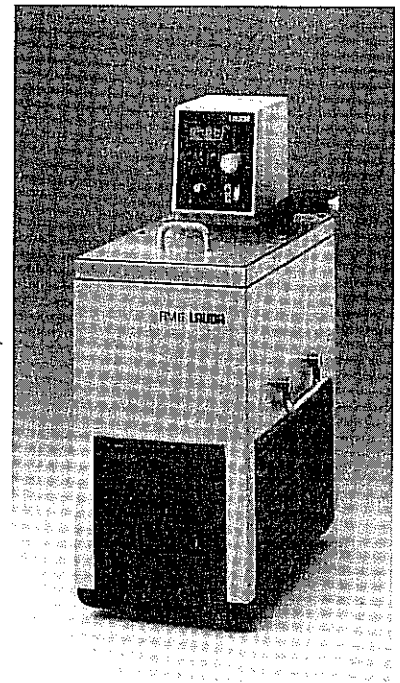
RM 6 B, RML 6 B, RM 20 B



RM 20 B

(Baddeckel Zubehör auf Wunsch)  
 (Couvercle de bain accessoire en option)  
 (Bath cover optional accessory)

Entleerungshahn  
 (rückseitig)  
 Robinet de vidange  
 (à l'arrière)  
 Drain cock (rear)



RM 6 B  
 RML 6 B



### 3. Basic construction and technical description

3.1 These operating instructions is meant for 5 liquid thermostats of different construction and capacity , Series RM:

RM 6-series have a temperature range of from  $-20...+100^{\circ}\text{C}$  and a bath capacity of 6 litres.

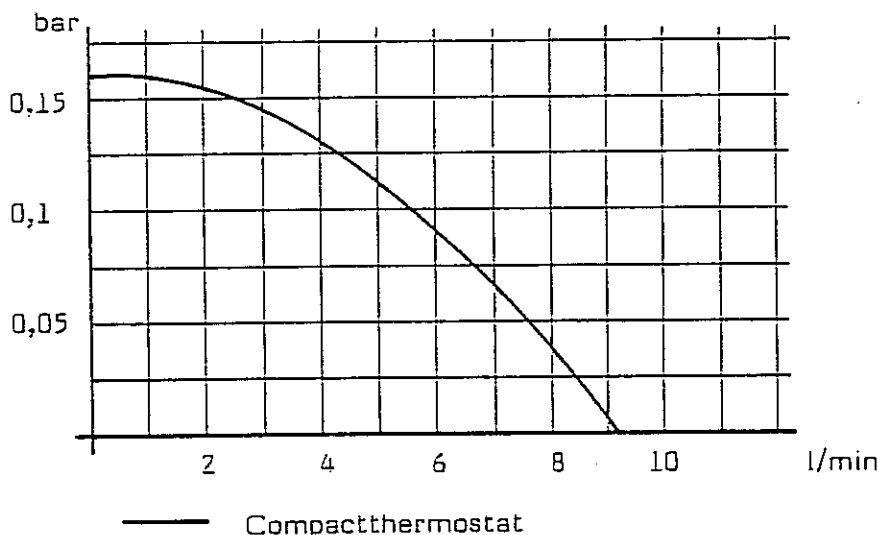
RML 6-series offers an enlarged temperature range from  $-30...100^{\circ}\text{C}$  and a better cooling capacity at a bath capacity of 6 litres.

RM 20-series with a 20 l bath have a large bath opening. The temperature range is from  $-20^{\circ}\text{C} \dots +100^{\circ}\text{C}$ .

3.2 The units are fitted with a submerged centrifugal pump with jets for circulation of the bath medium and for circulation to closed external systems. The pumps are driven by a split pole motor with traversing shaft, bearingless within the bath.

The pressure nipple of the pump can be closed without damage to the pump.

#### Pump characteristic T and B, 230V; 50Hz



3.3 T-units have a P-Controller and a setpoint potentiometer having an analogue temperature setting. The bath temperature (actual temperature) is indicated by the reference thermometer (glass).  
B-units have a PID Controller, temperature setting is done by 10-turn potentiometer. During setting the set point is digitally indicated. Actual bath temperature is indicated on the liquid cristal display (LCD). At both types T and B the heating capacity is electronically controlled by a zero voltage packed switching triac.

We use a tubular heater with a heating capacity of 1.5 kW and a max. surface capacity of approx.  $7 \text{ W/cm}^2$ .

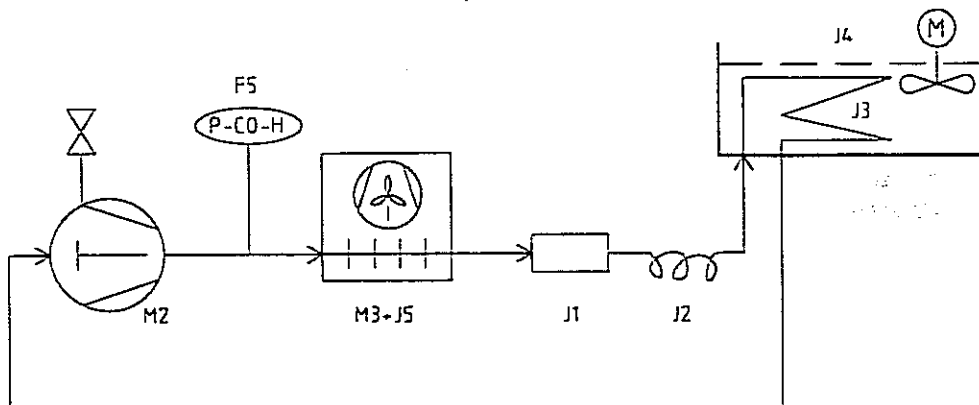
### 3.4 Cooling aggregate

#### Construction

The refrigeration unit consists essentially of a hermetically sealed compressor. Heat of condensation and motor heat are dissipated through a finned condenser with fan cooling. The fresh air is drawn in at the front of the unit, the heated is discharged to the back and to the side. In order to ensure effective air circulation the ventilation openings must not be obstructed.

At temperatures below approx. 30°C the refrigeration unit runs continuously to remove a certain amount of heat from the bath, while the heater operates against this with an output which is adjusted by the control system. The compressor runs virtually noiselessly and vibration-free. The noise level of series RML is a little higher, because more capacity has to be carried-off, and the dimensions of RML types are the same than RM types.

The compressors have a temperature protector, which acts on compressor temperature and current consumption of compressor. Furthermore the cooling system is protected by a pressure protector against overpressure.



F 1 Überdruckschalter / Overpressure switch / Disjoncteur de surpression

J 1 Trockner / Drier / Secheur

J 2 Kapillarrohr / Capillary / Tube capillaire

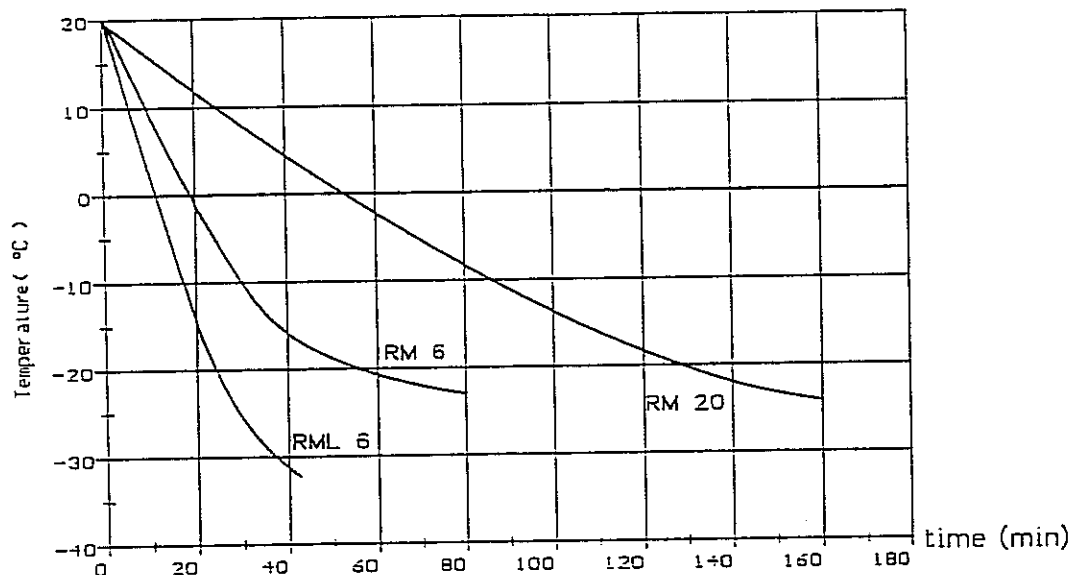
J 3 Verdampferschlange / Evaporateur coil / Evaporateur a serpentin

J 4 Flüssigkeitsbad / Liquid bath / Bain de liquid

J 5 Verflüssiger / Condenser / Condensateur

M 2 Verdichter / Compressor / Compresseur

M 3 Ventilator / Fan / Ventilateur



Bath liquid: ethanol

Coolant

time of diagram

water-glycol 1:1  
 (to -25°C)

= x1,7

#### 4. Safety devices and warning notes $\Delta$

##### 4.1 Safety functions

The units are equipped with an adjustable temperature limiter avoiding the dry run of the heater. The pump motor is equipped with a temperature protector which avoids an overtemperature of the motor winding. Both functions will switch off heater, pump and cooling machine. Also is the temperature indication switched off. The red fault lamp lights up.

##### 4.2 Why can it be dangerous to operate a thermostat?

1. Thermostats are fitted with heaters which provide the necessary heating energy for the thermostating liquid. If the temperature control fails or if the liquid level is too low the heater may reach temperatures which can lead to a fire in the laboratory, especially in combination with flammable liquids.
2. When using the thermostat with external circulation, failure of the tubing can cause discharge of hot liquid and endanger persons and material.

The safety requirements on thermostats therefore depend on whether

- o non-inflammable or inflammable thermostatic liquids are used;
- o the thermostat is operated under supervision or unsupervised.

The units Series RM as described in these Operating Instructions are suitable only

- o for non-inflammable bath liquids, i.e. preferably water; for operation close to zero the non-inflammable water - ethylene glycol mixture can be used (see Section 5).

#### 4.3 Important notes

The user is only protected against hazards from excess temperature and low level.

Further hazards may arise from the type of product being thermostated, e.g. a shift above or below certain temperature levels or breaking of the container followed by reaction with the thermostatic liquid etc.

It is impossible to provide protection against all possible cases and they remain largely within the decision and responsibility of the user.

Values for temperature variation and indication accuracy apply under normal conditions according to DIN 58966. In special cases high-frequency electromagnetic fields may lead to less favourable values. There is no loss of safety.

Warning: The units must only be used according to the descriptions indicated in these Operating Instructions.

This includes operation by properly qualified and instructed personnel.

The units are not designed for operation under medical conditions according to EN 60601-1 or IEC 601-1!

#### 4.4 Warning notes ⚠

At overtemperature of the heater caused by run dry the heater, pump and cooling machine are switched off by the temperature limiter.

Attention, the heater surface may reach temperatures up to +250°C (especially if the thermostat runs completely dry) !

Parts of the bath cover may heat up to more than 70°C at higher operating temperatures. Pump outflow and return reach the operating temperature.

## 5. Bath liquids and tubing

According to Section 4, only non-inflammable liquids can be used.

The operating ranges of the bath liquids and tubing represent general data which may be limited by the operating temperature range of the unit.

### 5.1 Bath liquids

#### Operating range 5 to 90°C

Use deionized water. Make up evaporation losses at higher temperatures. Losses may be reduced by using suitable bath covers (see Accessories).

Distilled or deionised high-purity water is corrosive and should only be used with the addition of about 0.1 g sodium carbonate per litre water. Otherwise its use may lead to corrosion.

#### Temperatures close to zero and below:

Water - ethylene glycol mixture, preferably Glycoshell P 300, ratio 1:1.

Operating range	-30 to 100°C	
Boiling point	110°C	Ultra-Therm G 100
Viscosity at 20°C	4 mm <sup>2</sup> /sec	Cat.-No. LZB 009
Non-inflammable		

When working for extended periods at higher temperatures the proportion of water drops slowly. The mixture then approaches the properties of pure glycol and therefore becomes inflammable (flashpoint 128°C). The mixture ratio must therefore be checked from time to time, e.g. against the original mixture, or with a hydrometer.

Safety data sheets according to EU Guidelines are available on request.

## 5.2 Tubing (continuous lengths)

### Perbunan tubing

Cat.No. RKJ 011

9 mm internal dia. Application range up to 120°C.  
For water and water/glycol mixtures.

### Silicone tubing

Cat. No. RKJ 016

8 mm int. dia. Application range -30...100°C  
For water and water-glycol mixtures

### Silicone tubing, insulated

Cat. No. LZS 001

8 mm int. dia.. With foam rubber insulation  
External dia. approx. 30 mm, Application range -60...100°C  
Use as for uninsulated silicone tubing.

### Silicone tubing (per metre)

Cat.No. RKJ 041

4 mm internal dia. Application range up to 100 °C.  
For water and water/glycol mixtures.

Secure tubing with clips to prevent it slipping off.

## 6. Unpacking, assembly and setting up

- 6.1 Goods are packed carefully to prevent transport damage. If the unit should arrive damaged the carrier or the post office has to be informed so that it can be inspected.

### Standard accessory:

Reference thermometer ET 032: -30...100°C (RM 6 T, RM 20 T only)  
Bath cover (RM 6 only) HDQ 069  
1 m Silicone tubing 8 mm int. diam. insulated  
Operating instructions

## 6.2 Assembly and setting up

The units are set up to suit the application. Ensure that the air circulation for the units through the ventilating openings at the back of the unit and for the cooling aggregate with the filter at the bottom casing is not restricted. A minimum spacing of 40 cm is recommended.

Close the drain cock at the back of the bath!

If no external circulation is required the pump connectors must be linked together with the silicone tubing supplied. First the yellow cap must be removed; it is only intended to prevent the thermostat contents being pumped out unintentionally and is not suitable as a permanent closure. Outflow tube always at the front, return tube or suction tube at the back.

## 7. Connection of external systems

For operation above 10°C use uninsulated perbunan tubing (Cat. No. RKJ 011); for operation below 10°C the insulated silicone tubing (Cat. No. LZS 001) is recommended.

The tubing is connected to the standard pump nipples. Pressure nipple always at the front, return nipple at the back. If necessary use reducer fittings. An adequate flow rate is required to ensure reliable thermostating of the external apparatus. Where the flow cross-section is severely restricted there may be a temperature drop between bath and external system due to the low flow rate. In that case the bath temperature has to be suitably increased.

With external systems placed higher than the thermostat, entry of air in the thermostatic circuit while the pump is stopped may cause the external volume to drain resulting in flooding of the thermostatic bath !

Always ensure maximum flow in the external circulation (connectors, tubing, external system). This produces a larger flow rate and therefore improves thermostating.

Secure the tubing with clips to prevent it slipping off.

## 8. Starting up

Before starting up allow the unit to stand for at least half an hour in its normal operation position so that any oil which may have run out of the compressor during transport can flow back.

### 8.1 Filling

Fill the unit with decalcified water or water-glycol mixture according to Section 5. The capacity is indicated in Section 2 (Table of Data). Generally the thermostats should never be filled higher than 2 cm below the cover.

While the thermostat is in use the heater and the evaporator coil of the refrigerator must always be covered with liquid ! When it is connected up to an external system, check during starting up that the liquid level in the thermostat does not drop too low due to filling up the external system. If necessary, top up with liquid until the correct level is reached.

The bathes RM 20 can be covered with a flat bath cover (see Accessories) or with a gable cover even when there is glassware or other items in the bath. This is advisable especially at higher temperatures.

- 8.2 Connect the unit to an earthed socket (PE) only. Check the details on the rating label against the supply voltage.
- 8.3 Ensure that the pump connectors are linked together when there is no external system.
- 8.4. Operation without refrigeration unit (temperatures above approx. 30°C)

Mains switch (green)      I (ON) green lamp lights up  
switch "cooling" (yellow)       0 (OFF)

If the red fault lamp lights up, see Section 9.2.


At B-series the digital display indicates the actual bath temperature. The yellow lamp "heating"  is on continuously. When the set bath temperature has been reached, the yellow lamp "heating" begins to flash. If the operating temperature is below the actual temperature, the yellow lamp "heating" only begins to flash after temperature is cooled down to set value.

Check on the reference thermometer (T-models) resp. digital display (B-models) that the bath temperature agrees with the selected setpoint. If necessary adjust the setpoint.

8.5 Operation with refrigeration unit (temperature below approx. 30°C)

Mains switch (green)  I (ON) green lamp lights up  
Switch "cooling" (yellow)  I (ON) yellow lamp lights up

The thermostat is switched off with the mains switch (green) The switch "cooling" can remain on.

8.6 Select the required temperature setpoint at the temperature knob.  
At B-types press key  , the set value now is indicated on the display. The set value is adjusted at a 10-turn precision-potentiometer  . The rotary knob includes a locking device by which an unintentional modification of the set value is avoided. Unlocking to left upper side, after adjustment of the set value lock to right lower side.

8.7 The units work up to an ambient temperature of max. +40°C. Depending on the load of the cooling machine it is possible that the compressor is switched off, especially at ambient temperatures above +35°C.  
Furthermore a high ambient temperature leads to a decreased cooling capacity !

When starting the refrigeration unit after a longer period of stillstand it could take up to 30 minutes until the rated cooling capacity is available depending on the ambient temperature and model.


## 9. Operation of the safety circuit

### 9.1 The following faults could occur:

1. The thermostat is started up without bath liquid or with the liquid level too low (heater partly uncovered).
2. The liquid level drops too much during operation, especially at high temperatures. The same fault may be caused by failure of the tubing and liquid being pumped out of the thermostat.
3. Failure of control system resulting in continuous heating. The liquid eventually reaches the boiling point and evaporates.
4. Failure of the control system or switch-off point is adjusted too low. Liquid is heated above switch-off point.

If any of the above faults occur, the safety system comes into operation. A built-in temperature probe measures the surface temperature of the heater and switches off the thermostat if a certain limiting temperature is exceeded. Since the heater surface can reach very high temperatures up to 250°C especially when the thermostat runs completely dry, only water or a water/glycol mixture may be used in the thermostat; otherwise it is impossible to prevent a fire under all circumstances despite the use of a safety system.

### 9.2 Operation of the safety circuit switches off the thermostat (heater, pump and cooling machine) and the red fault lamp "Fault" lights up. The thermostat can only be restarted after

1. the temperature probe of the heater has cooled down to below the adjusted switch-off temperature
2. the fault has been corrected (liquid level too low, faulty control circuit, burst tubing) and
3. the reset button  has been pushed

This ensures that the thermostat cannot start up again automatically, for example through a reduction in the temperature which could suggest that the fault has been rectified.

### 9.3 The safety system should be checked in regular intervals. At unsupervised operation we recommend a daily check, particularly as this is simple. Unit under normal operation (above 20°C). Turn overtemperature knob to the left until unit switches off ( see 9.2). The switch-off temperature should be approximately the same as bath temperature. If unit is not switched off, please shut-down immediately and contact a specialist.

### 9.4 In case of overload or blocking of the pump motor the complete unit is switched off and the red fault lamp lights up. After motor has cooled down, unit is starting again automatically.

## 10. Maintenance

### 10.1 Safety notes in case of repair

Pull out the mains plug for all repair and cleaning operations!  
Repairs on the control unit must only be carried out by a qualified electrician.

Note for the electrician: At units with T-electronics all indication and control units are on unprotected mains supply circuit!

### 10.2 Repair and maintenance

LAUDA thermostats are largely free from maintenance. Contaminated bath liquid should be drained out through the drain cock and replaced with fresh liquid. If there is a fault in the control unit we recommend to remove it and send it in for repair.

The mains fuse at the backside is accessible from outside. When the fuse acts the green lamp in the mains switch does not light up.  
Insert only fuses as indicated (T 12.5 A, size 6.3 x 32).

The cooling machine operates largely without maintenance. If the units operate under dusty conditions we recommend to clean the refrigerator condenser every 4 to 6 months. This is done best with compressed air or nitrogen which is blown into the ventilation openings for a few minutes. If necessary unscrew the front ventilation grill.

#### Remark for disposal

The refrigerating circuit of units type RM is charged with the CFC-free refrigerant R 134a. Units type RML are charged with the HCFC refrigerant R 22. Repair and disposal must only be executed by a qualified refrigeration engineer!

### 10.3 Cleaning

The unit can be cleaned using a cloth moistened with water with the addition of a few drops of (domestic) detergent. No water must find its way into the control unit.

The user is responsible for any necessary decontamination if dangerous materials have been spilled on or inside the unit. This applies in particular if the unit is removed for a different use, repair, storage etc.

The method of cleaning or decontamination is determined by the expertise of the user himself. If the user has any doubts on whether this may damage the unit he has to contact the manufacturer.

### 10.4 Spares ordering

In case of spares requirement please specify type and serial no. as indicated on the type label. This avoids further questions and wrong deliveries.

We shall always be happy to deal with queries, suggestions and complaints.

LAUDA DR. R. WOBSE  
GMBH & CO. KG

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Accessories for Compact Low-temperature thermostat RM-Series

Reference thermometer

0/70°C, graduation 0,5°C	ET 030
0/100°C, graduation 0,5°C	ET 031
-30/100°C, graduation 0,5°C	ET 032

Reference thermometer holder

HKF 036

Stainless steel racks for RM 20

for test tubes, centrifuge tubes etc.  
Bath RM 20, max. 4 racks

RD 13	for 56 tubes 10 to 13 dia., 80 mm immersion	UG 066
RD 18/1	for 33 tubes 14 to 18 dia., 80 mm immersion	UG 067
RD 18/2	for 33 tubes 14 to 18 dia., 110 mm immersion	UG 068
RD 30	for 14 tubes 24 to 30 dia., 110 mm immersion	UG 069

Bath cover (flat,) stainless steel for RM 20  
2 parts

LCZ 009

Rising platform to be mounted subsequently. The bath  
RM 20 can be fitted with max. 2 platforms  
Bench area 250 x 160 mm, height continuously adjustable

LCZ 012

Gable cover stainless steel, for RM 20

LCZ 011

Stainless steel racks for RM 6

RF 18/1	for 20 tubes 14 to 18 dia., 80 mm immersion	UG 074
RF 18/2	for 20 tubes 14 to 18 dia., 110 mm immersion	UG 075

Tubing (continuous lengths)

Silicone tubing, 8 mm int. dia.	RKJ 016
Silicone tubing, 4 mm int. dia.	RKJ 041
Silicone tubing, insulated, 8 mm int. dia.	LZS 001
Perbunan tubing, 9 mm int. dia.	RKJ 011

Reducing fittings for pump, for tubing 4 mm int. dia.

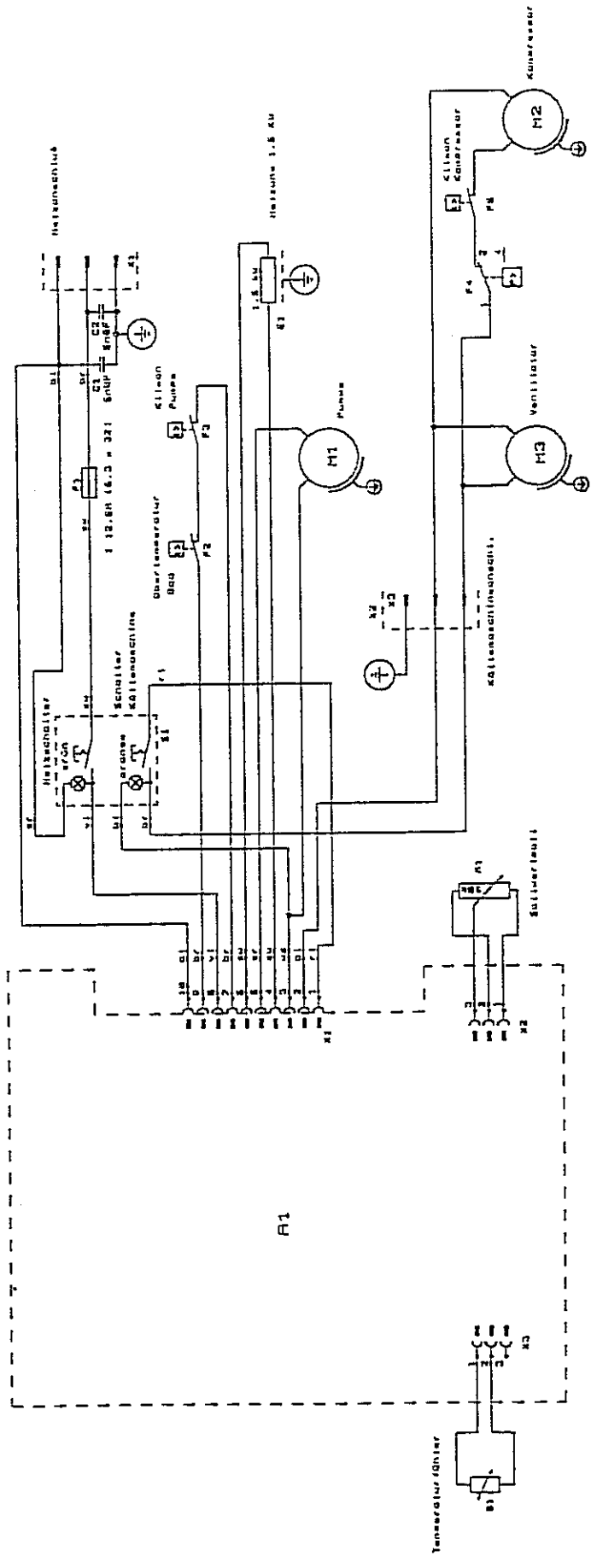
HKO 018

Compact-Low temperature thermostats  
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Special racks for Type RM 6 - Makrolon

<u>Type</u>	<u>Description</u>	<u>Cat. No.</u>
Test tubes 160 mm	20 test tubes 160 x 16/17 mm	UE 020
Test tubes 100 mm	20 test tubes or centrifuge tubes 100 x 16/17 mm	UE 022
Hemolysis tubes	13 int. dia. (30 tubes)	UE 023
Dr. B. Lange cells		UE 005

Für diese Zeichnung behalten wir uns alle nicht ausdrücklich einserklärten Nutzungsrechte ein. Nachträgliche Änderungen vorbehalten. Einmalig der Verteilung und Weitergabe an Dritte vdr. Technische Änderungen vorbehalten.



od Seriennummer U...

1	2	3	4	5	6	7	8
Datum: 07.03.1906 Unters. v. ... Datum: 8.3.06 Unters. v. ...		LAUDA Dr. R. Wobser, Oberl. u. Co. AG E.T.S.G.		Schaltung Schéma de connexions Circuit diagram		RM 6 T / RM 20 T 230V 50Hz / 230V 60Hz	
Zusl. Angelegen.		Urspr.		5		8	







Gerätelista Schaltplan		RM 6 T	RM 6 B	RML 6 B
List of parts Circuit diagram		RM 20 T	RM 20 B	
Liste de pièces schéma de connexions				
230V; 50Hz / 230V; 60Hz				
A	1 Leiterplatte „Regelung / Anzeige“ Printed circuit board „Control / Indication“ Circuit imprimé „Régulateur / Affichage“	UL 387	UL 470	UL 470
B	1 PTC Temperaturfühler PTC Temperature probe PTC Sonde de température	US 050	US 069	US 069
C	1 Anlaufkondensator RML 5 B Starting condenser Condensateur démarrage			
C	2 Betriebskondensator RML 6 B Running capacitor Condensateur de service			
E	1 Heizkörper 1,5 kW Heater Corps de chauffe	EH 152	EH 152	EH 152
F	1 Netzsicherung T 12,5 A Mains fuse Secteur fusible	EES 014	EES 014	EES 014
F	2 Übertemperaturauslöser Overtemperature cut-out Déclenchement de surtempérature	ETS 040	ETS 040	ETS 040
F	3 Klixon Pumpe Klixon Pump Klixon Pompe			
F	4 Klixon Kompressor Klixon Compressor Klixon Compresseur			
F	5 Überdruckschalter Overpressure switch Disjoncteur de surpression	ES 035	ES 035	ES 035
K	1 Anlaufrelais RML 6 B Starting relay Relais de démarrage			
M	1 Pumpenmotor Pump motor Moteur de pompe	EM 039	EM 039	EM 039
M	2 Kompressor Compressor Compresseur	EMV 003	EMV 003	EMK 123
M	3 Ventilator RM 6 T, RM 20 T Fan RM 20 T, RM 20 B Ventilateur	EML 007 EML 011	EML 007 EML 011	EML 032
R	1 Potentiometer Sollwert 10 kOhm Setpoint potentiometer Potentiomètre valeur de consigne	UD 305	UD 306	UD 306
X	1 Netzanschluß / Netzcabel Mains connection / Mains cable Branchement secteur / Câble de secteur	EKN 001	EKN 001	EKN 001
X	2 Anschluß Kältemaschine Connection Cooling unit Branchement Groupe frigorifique			
X	3 Verteilerleiste Terminal strip Borne plate			EQZ 049

