LAUDA small refrigerated thermostats

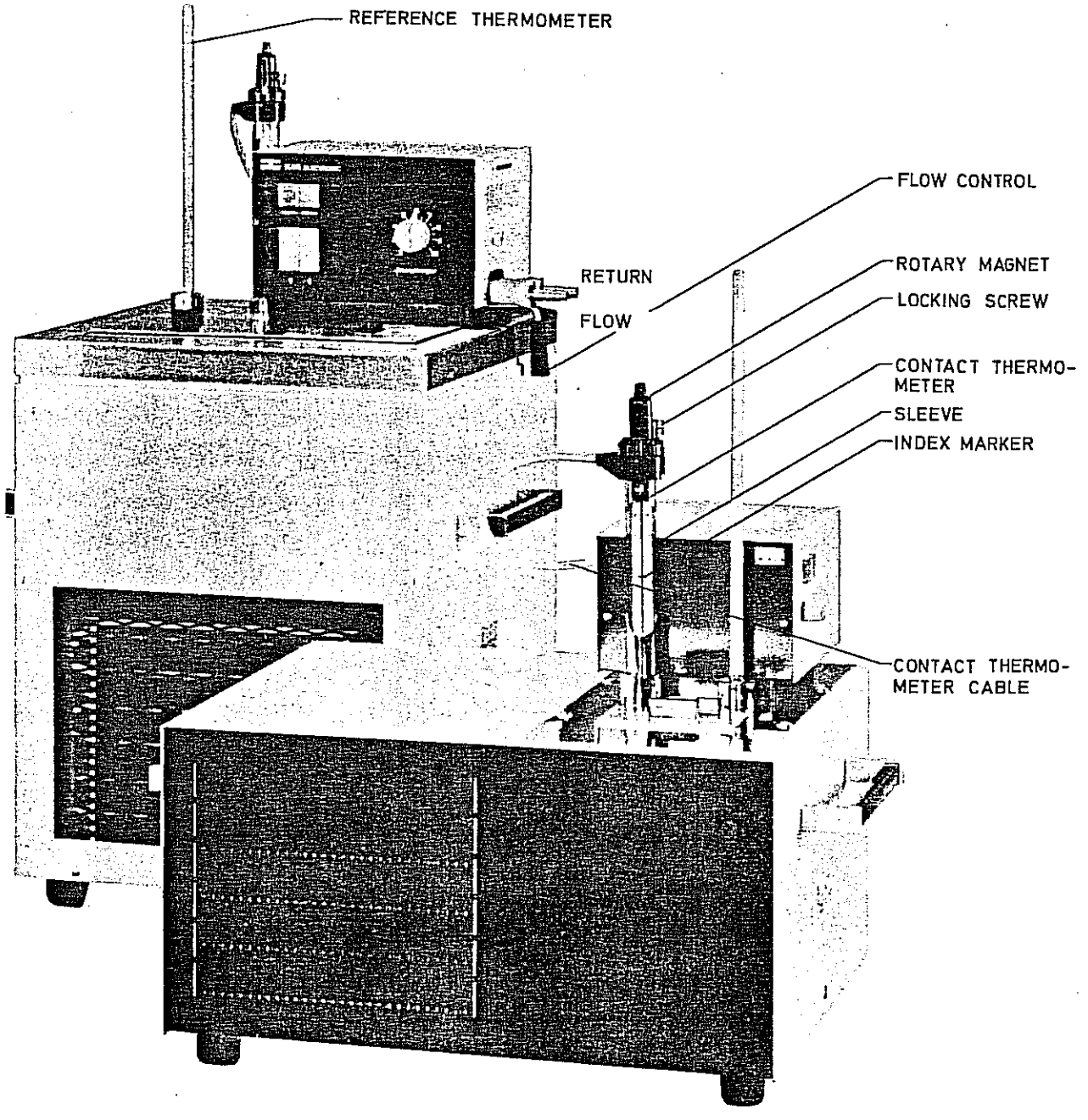
K 2 R Electronic
K 4 R Electronic

TECHNICAL DATA:

	Type K 2 R Electronic	Type K 4 R Electronic
Temperature range:	-15/+150 °C	-30/+150 °C
Control accuracy:	±0,01...0,03 °C	±0,01...0,03 °C
Dimensions:	490 x 410 x 370 mm	400 x 360 x 600 mm
Bath capacity:	3 litres	13 litres
Bath opening:	90 x 60 mm	270 x 150 mm
Bath depth:	160 mm	170 mm
Heater output:	continuously variable, max. 1000 Watt	
SIMPLEX pressure pump:	8 l/min, 3 m W.G.	15 l/min, 5 m W.G.
DUPLEX pressure/suction pump:	8 l/min, 2.5 m W.G.	10 l/min, 3 m W.G.
Refrigerator:	1/4 h.p.	1/3 h.p.
Power supply:	220 Volt, 50 Hz	

Standard accessories:

1 Contact thermometer No. 2.15:-35/+100 °C
1 Short sleeve
1 Reference thermometer No. 1.25:-30/+100 in 0.5 °C
1 m Silicone tubing, insulated.



SETTING UP :

1. Set up the equipment for the intended use, check that the ventilation apertures are not blocked.
2. Close the drain cock.
3. Insert the reference thermometer (flexible Viton rubber sleeve).
4. Place sleeve for contact thermometer into position.
5. Check whether the mercury column on the contact thermometer has broken during transport. If it has, move the index marker of the setting magnet to the highest position, carefully heat the contact thermometer over a flame while rotating it until the mercury column joins up in the expansion bulb.
6. Insert the contact thermometer in its sleeve and connect it up with the contact thermometer cable.

FILLING VOLUMES:

	Type	Bath content
Small refrigerated thermostats	K 2 R Electronic	3 litres
Small refrigerated thermostat	K 4 R Electronic	13 litres

FILLING:

The normal liquid level is about 20 mm (0.8 in) below the rim of the tank.

Methyl or ethyl alcohol is recommended as bath liquid, in certain cases a mixture of water and Glysantin (ratio 1:1) may be used.

Warning!

Do not use silicone rubber tubing when using silicone oil !

Please ask for our "LAUDA Information 1/71" which contains comprehensive information on bath liquids.

The drain cock permits rapid drainage or change of the bath liquid.

CONNECTIONS to external equipment

Even when the thermostat is only used as a bath it is necessary to connect the flow and return connections together by means of the tubing supplied. Please open the flow control to ensure thorough mixing inside the inside the thermostatic bath.

When closed circulating systems are connected to the thermostat, further liquid must be addes after switching on until the level in the bath remains at the correct height.

When thermostating open external baths the connection hoses are simply dropped into the bath, preferably at two opposite ends (improved circulation). Notches at the end of the suction hose prevent the hose being sucked to the wall or to the bottom.

The DUPLEX pump automatically maintains a constant level in the thermostat irrespective of the level in the external bath connected to it. Liquid is poured into the latter until a liquid level is obtained in the thermostat for which the pressure and suction stages have exactly the same output.

When the thermostat and the external bath are not at the same level (±1m max.) the connection hoses should be "vented" after switching off by pulling them out of the liquid to prevent overflowing.

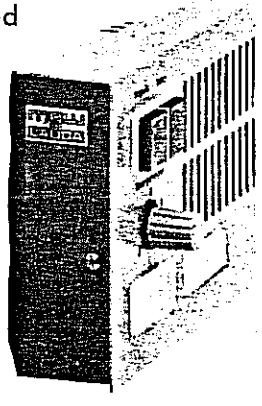
STARTING-UP

Please check that the electrical data marked on the rating label of the equipment agree with the mains, then connect the mains cable to the mains supply.

1. Set the temperature with the rotating magnet on the contact thermometer, using the upper edge of the index marker against the temperature scale underneath it. Tighten the locking screw.

2. The thermostat is started up by means of the slide switch, when it is on, a red dot is visible and the signal lamp marked "NETZ" (mains) lights up. The refrigerator unit is switched on with the second slide switch.

3. Using the energy regulator the heater output can be varied continuously between 20 % and 100 %.



CIRCULATING PUMPS

Two types of pumps are available: SIMPLEX pumps (pressure pumps) and DUPLEX pumps (pressure/suction pumps)

SIMPLEX pumps are used mainly for connection to closed circulations systems. The true DUPLEX pumps with automatic level control are employed for pressure-tight systems or open external baths.

All LAUDA circulating pumps are provided with a FLOW CONTROL from zero to maximum output. All driving motors are fitted with an overload cut-out ("KLIXON") which is embedded in the motor windings. When the pump is overloaded (e.g. extremely viscous bath liquids, blockage) the power supply is cut off so that burning out of the motor is positively prevented.

ELECTRONIC CONTROL

The thermostat is fitted with a fully electronic control unit (with interference suppression) using transistorised printed circuits. Exclusive use of semiconductor elements ensures reliable operation without wear. The load on the contact thermometer is virtually zero so that arcing at the thermometer contact is completely prevented.

The use of the ENERGY REGULATOR allows the heater output to be accurately adjusted to suit the actual demand.

To special order the Small refrigerated thermostats K 2 R/K 4 R can be combined with a fully electronic temperature controller using a platinum resistance thermometer as the temperature probe. The temperature is then set on the actual relay, using two rotary knobs (coarse and fine adjustment).

REFRIGERATION SYSTEM

The refrigeration system consists essentially of a hermetically sealed compressor. The heat from condensation and motor is removed through a fan-cooled condenser, with fresh air drawn in at the front of the equipment and warm air discharged at the back. The ventilation apertures must not be blocked up, to ensure satisfactory air circulation.

While the refrigeration unit runs continuously and extracts a certain amount of heat from the bath, the heater operates in opposition to it under control of the contact thermometer and the electronic relay. The compressor runs almost noiselessly and is free from vibrations. The double-acting bimetal switch protects the driving motor against overloads, the compressor is lubricated with a special refrigerator oil and requires no servicing. Freon 12 is employed as coolant.

SERVICING

1. The Small refrigerated thermostats operate largely without requiring servicing. We only recommend occasional checking for the accumulation of dirt in the bath liquid, the bath liquid should then be run off through the drain cock at the back. If the equipment is operated in a dusty atmosphere it is advisable to clean the refrigerator condenser every 4 to 6 months. This is best done by blowing compressed air or nitrogen into the ventilation apertures.

Overload protection of pump motors:

A double-acting bimetal switch ("KLIXON") is embedded in the winding of the pump motor and responds both to the winding temperature and to the current taken. The supply is interrupted on overload and is reconnected automatically when the winding temperature has fallen again:.

Overload protection of the refrigerator:

The compressor motor is also protected against overload by means of a double-acting bimetal switch ("KLIXON"). The switch responds to the casing temperature and also to the current taken by the compressor motor. Insufficient ventilation causes a rise in the casing temperature and an increase in the condensation pressure. Both result in an excessive load on the driving motor so that the supply is cut off. As soon as the compressor casing has cooled down the power supply is automatically reconnected.

Disconnection of the refrigerator :

The refrigeration unit has also a suitable fuse as additional protection against overload. This is placed next to the thermostat fuse underneath the cover. The cover has to be opened or removed to replace the fuse.

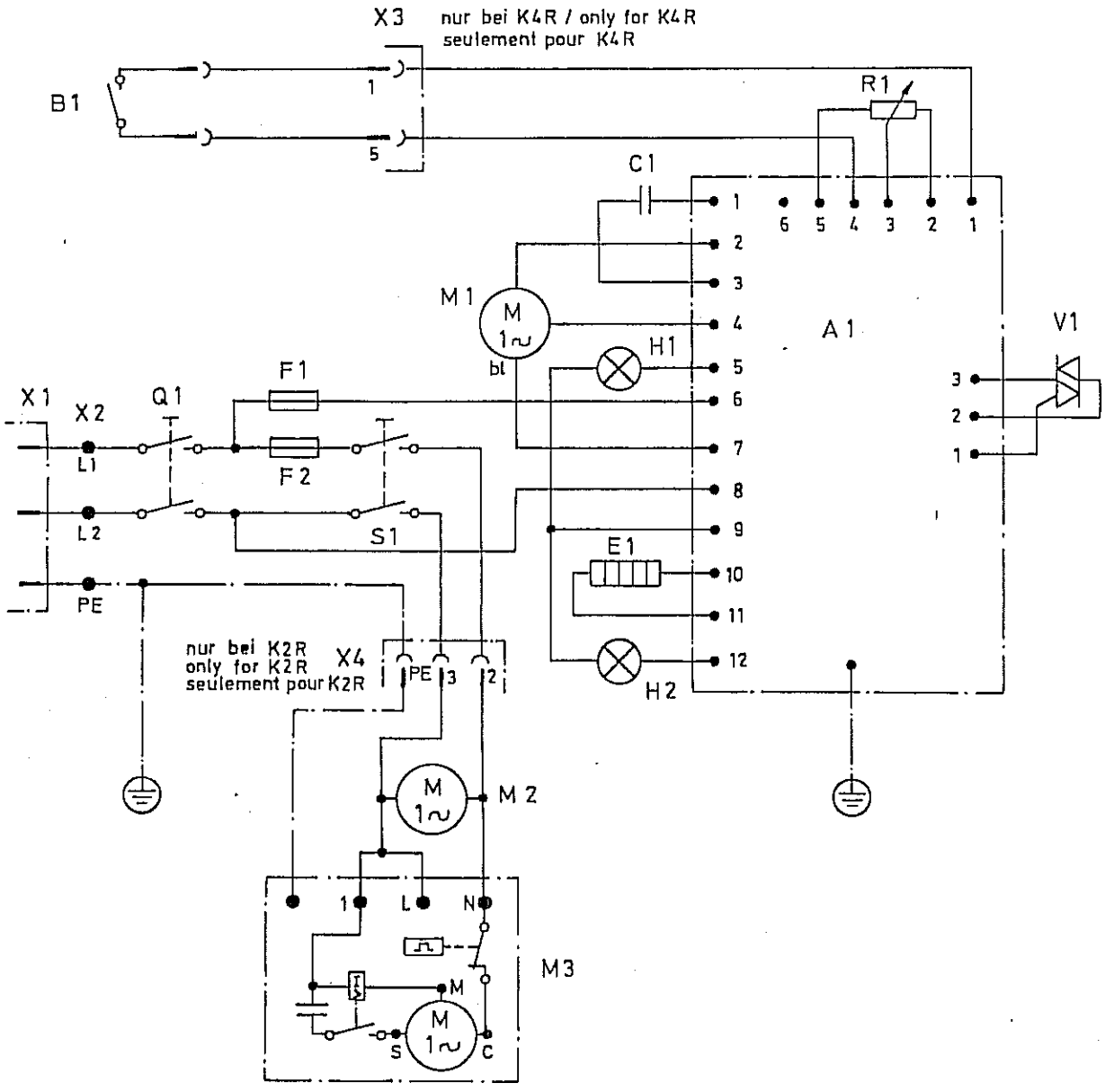
The following fuses are used:

Heater	10 A	(Cat. No.: 2152-02)
Refrigerator	10 A	(Cat. No.: 2152-02)

SPECIAL NOTICE !

LAUDA Ultra Thermostats are specially designed so that the individual elements such as circulating pumps, heaters etc. can be removed quickly. We do not recommend users to carry out their own repairs if any of these components should fail. We always carry a stock of the necessary replacement parts. Send us a telex or give us a ring on the telephone! A replacement is sent to you the same day by Express.

MESSGERÄTE - WERK LAUDA
Dr. R. Wobser KG

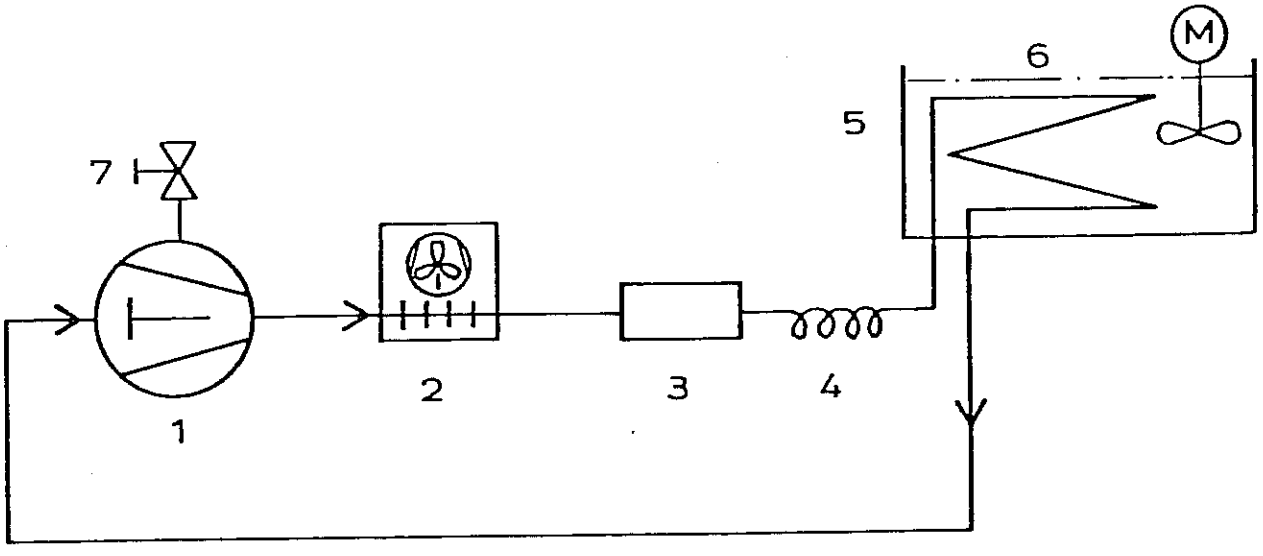


A1 Leiterplatte UL 124/Printed circuit board UL 124/ Circuit imprimé UL 124 (UL 156 / 115V)
B1 Kontaktthermometer/Contact - Thermometer/Thérmomètre à contact
C1 Kondensator/Condenser/Condensateur:K2R: 2 µF(8 µF/115V K4R: 7 µF(24 µF/115V)
E1 Heizung/Heater/Chauffage:K2R:750W , K4R :1000W
F1 Sicherung/Fuse/Fusible FF 6,3 A(FF 10 A/115V)
F2 Sicherung/Fuse/Fusible T 6,3A (T 10 A/115V)
H1 Kontrollampe Netz/Control lamp Mains/Lampe de control Secteur
H2 Kontrollampe Heizung/Control lamp Heater/Lampe de control Chauffage
M1 Pumpenmotor/Pump motor / Moteur de pompe
M2 Ventilator/Fan/Ventilateur
M3 Kompressor/Compressor/Compresseur
Q1 Hauptschalter Netz/Main switch/Interrupteur general
R1 Potentiometer 10 kOhm/Potentiometer 10KOhm/ Potentiomètre 10 KOhm
S1 Schalter Kühlung/Switch cooling/Commutateur Froid
V1 Triac/Triac/Triac
X1 Netzeingang/Mains/Réseau
X2 Klemme/Binder/Borne
X3 Eingang Kontaktthermometer/Input Contact -Thermometer/ Entrée Thermomètre à contact
X4 Eingang Kompressor/Input Compressor/Entrée Compresseur

				Datum	1.8.80		MESSGERÄTE-WERK LAUDA Dr. R Wobser KG	Schaltplan Kälte - Klein - Thermostat	K2R , K4R
				Bearb.	Rauße				
				Gepr.					
Zustand	Änderung	Datum	Name	Norm.		Urspr.	Ers. f.	Ers. d.	220V / 50Hz (115 / 60 Hz) ab / from / à partir Nr. 950 001

Blatt 1
Bl

Schema Kältekreislauf
Diagram refrigerating circuit
Schéma circuit de réfrigération
K 2 R, K 2 R D, K 4 R, K 4 R D



Nr.	Teil / Part / Pièce
1	Kompressor Compressor Compresseur
2	Kondensator Condenser Condensateur
3	Trockner Drying apparatus Sécheur
4	Kapillarrohr Capillary tube Tube capillaire
5	Flüssigkeitsbad Thermostat Liquid bath Thermostat Bain pour liquide du Thermostat
6	Verdampferschlange Evaporator coil Evaporateur à serpentins
7	Handabsperrventil (nur bei K 4 R, K 4 R D) Manual check valve (only für K 4 R, K 4 R D) Soupape manuelle d'arrêt (seulement pour K 4 R, K 4 R D)