

Weltweit die richtige Temperatur



Operating Instructions

LAUDA Through-flow coolers
DLK 10, DLK 20, DLK 40

from series S01
10/94
YAFE0003

LAUDA Through-flow cooler
DLK 10, DLK 20, DLK 40

<u>Contents</u>	<u>Page</u>
1. Brief operating instructions	3
2. Technical data	4
3. General construction and technical description	6
4. Unpacking and setting up	7
5. Connection of external systems	7
5.1 Thermostat and through-flow cooler without external system	8
5.2 Thermostat connected to pressure-tight external system	9
5.3 Thermostat, through-flow cooler and open bath	10
6. Electrical connection	10
7. Starting up	12
8. Maintenance	12

Enclosures

Circuit diagram

Diagram of refrigeration circuit

1. Brief operating instructions

Check through-flow cooler during unpacking for any transport damage, and if necessary, inform the carrier or the post office.

1.1 Set up unit according to chapter 4.

1.2 Connect tubing according to chapter 5.

Thermostat and through-flow cooler without external system - chapter 5.1.

Thermostat and through-flow cooler with pressure-tight external system - chapter 5.2.

Thermostat with through-flow cooler and open bath - chapter 5.3.

1.3 Secure tubing with clips to prevent slipping-off.

1.4 Check the supply voltage against the data on the rating label.
Insert the mains plug.

Attention:

Switching on: First switch-on thermostat, then switch-on through-flow cooler at main power switch (green signal lamp lights up).

Switching off: First switch-off through-flow cooler, then switch-off thermostat.

Never allow the through-flow cooler to run without liquid.

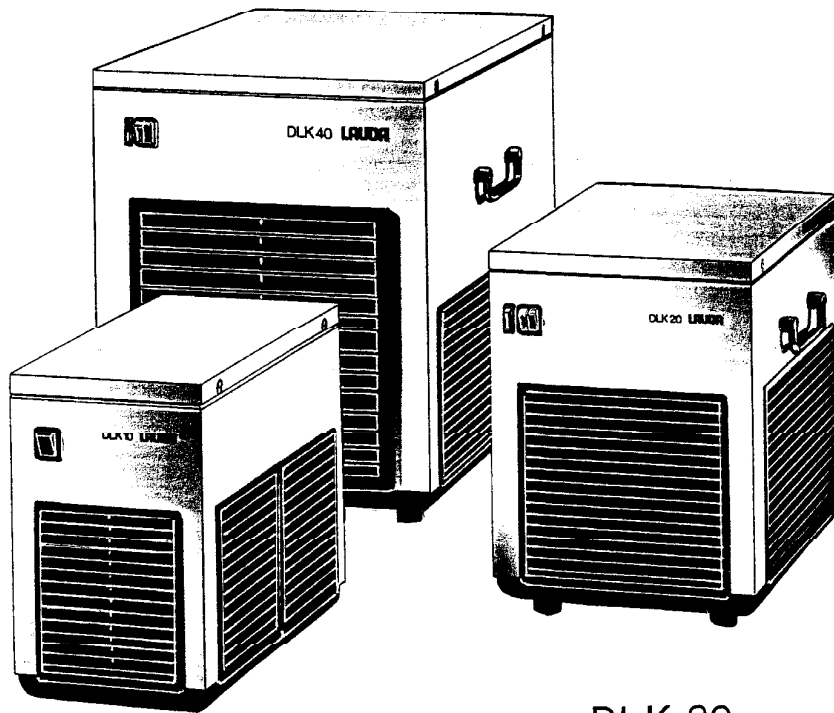
2. Technical data

		DLK 10	DLK 20	DLK 40
Operating temperature range	(°C)	-15...150	-30...150	-40...150
Ambient temperature range	(°C)		5...40	
Gross cooling capacity (to DIN 58966T1)	(kW)			
	20°C	0,22	0,33	0,85
	0°C	0,12	0,25	0,75
	-10°C	0,08	0,22	0,66
	-20°C		0,19	0,42
	-30°C		0,12	0,30
	-40°C			0,15
Heat exchanger connections for heat carrier		M 16 x 1, olives 3 0		
Special feature		control connexion for 230 V; 50/60 Hz		
Overall dimensions W x D x H	(mm)	200x350x320	280x375x375	400x500x500
Weight	(kg)	17	27	50
Power supply		230 V; 50 Hz protection class I to VDE 0100		
Power consumption	(kW)	0,2	0,3	0,6
Ref.-no.	230 V, 50 Hz	LFD 105	LFD 106	LFD 107

Technical changes reserved!

LAUDA Through-flow cooler
DLK 10, DLK 20, DLK 40

DLK 40



DLK 10

DLK 20

3. General construction and technical description

3.1 These operating instructions apply to three through-flow coolers of various cooling capacity.

Common feature of all three units are the air-cooled, fully hermetically sealed and thus maintenance-free refrigeration units, the heat carrier circuit in rustfree stainless steel and the possibility of electrical connection to LAUDA thermostats.

The refrigeration unit consists essentially of a hermetically sealed compressor. Heat of condensation and motor heat are dissipated through a fan-cooled finned tube condenser. 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 problem-free air circulation the ventilation openings must not be obstructed.

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 excessive pressure.

The built-in refrigeration unit continuously cools down a counter-flow heat exchanger (evaporator) insulated with polyurethane foam. The connections of the heat exchanger are to the back and are provided with tube fittings M 16 x 1 to connect olives with a diameter of 13 mm / 11 mm or metal hoses. The pump of the connected thermostat pumps the heat carrier (bath liquid) through the heat exchanger of the through-flow cooler. The through-flow cooler continuously cools down and the thermostat maintains the required temperature by means of controlled counter-heating.

3.2 The cooling capacity indicated in the technical data sheet is gross. To be able to judge the net or effective cooling capacity in case of operation, the heat emission of the pump as well as the losses because of the insulation have to be taken into consideration and deducted. This is also the lowest temperature to be reached if a thermostat is connected. The indicated operating temperature range refers to the combination with a small or medium-sized bath/circulation thermostat (i.e. DLK 10 - M 3 B, DLK 20 - C 6 CS, DLK 40 - DL 15 CP).

4. Unpacking and setting-up

4.1 Unpacking

Carefully packing should prevent transport damage. If, however, the units should arrive damaged, the carrier or the post office have to be informed so that it can be inspected.

Standard accessories

2 Screw caps	Ref.-no. HKM 032
2 Olives 13 0	Ref.-no. HKO 026
1 Power line	Ref.-no. UK 226
Operating instructions	

4.2 Setting up

The condenser of the refrigeration unit is air-cooled. Fresh air is drawn in at the front of the unit and blown out at the back. Thus the unit must be set up so that the free air flow is not obstructed.

Recommended distance: 50 cm at least

It is particularly important that the air drawn in is not excessively warm. The unit must not be placed near a radiator or any other source of heat.

Higher ambient temperatures result in a reduced performance. When the compressor is overloaded because of high refrigerant pressure or high ambient temperature, the power supply is automatically interrupted via a bimetallic strip (KLIXON). The compressor switches on automatically as soon as it has cooled down.

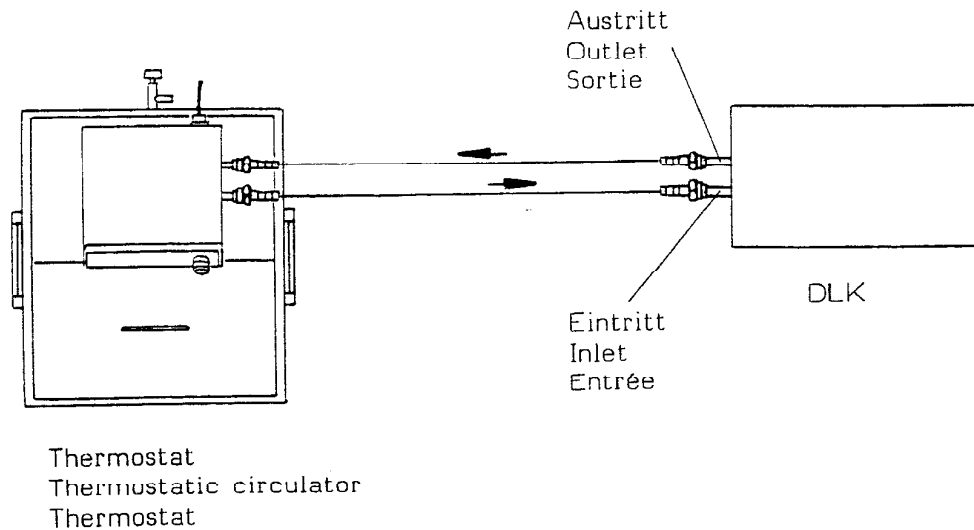
The through-flow cooler DLK 40 is especially created for low operating temperatures. In case of long-term operation at temperatures above ambient temperature being even increased it may happen that the refrigeration unit is switched off. Nevertheless it is possible to cool down from high temperatures.

5. Connection of external systems

A through-flow cooler can be only connected to thermostats which are equipped with a circulating pump and connectors for the connection of external circulating systems. For connection the use of insulated tubings with a maximum possible flow area inside is recommended.

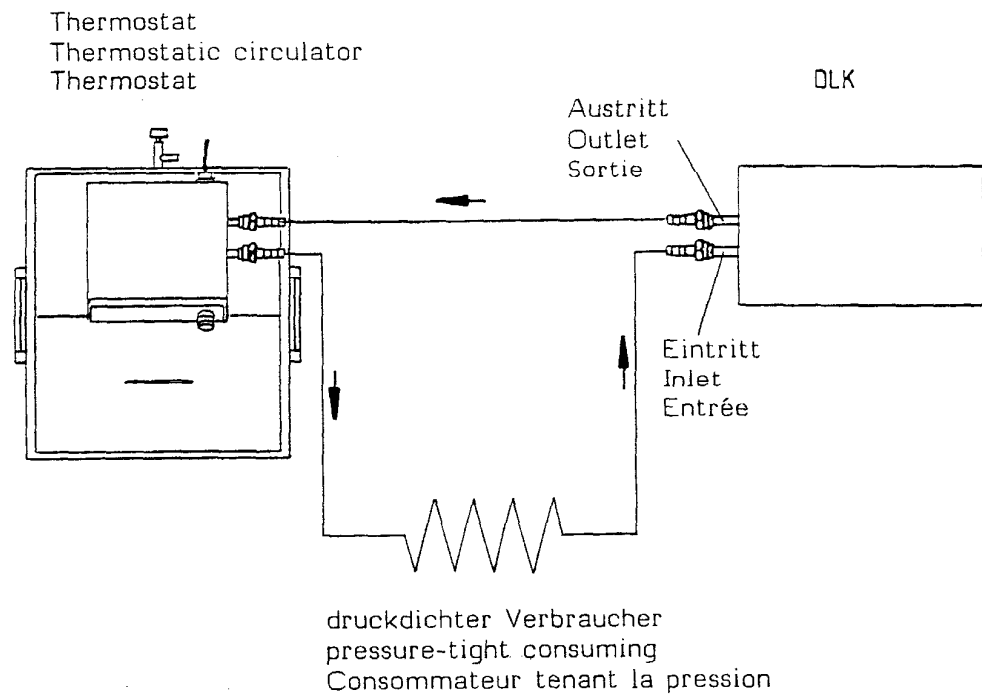
Secure tubing with clips to prevent its slipping off or use stainless steel metal hoses with screwed connections!

5.1 Thermostats without external systems



This figure shows the easiest possibility of connection. The connectors of the circulating pump are connected to the fittings of the through-flow cooler.
Note: Pay attention to the through-flow direction! If the connections are interchanged, the cooling capacity will be reduced as an air cushion may develop in the counter-flow heat exchanger.

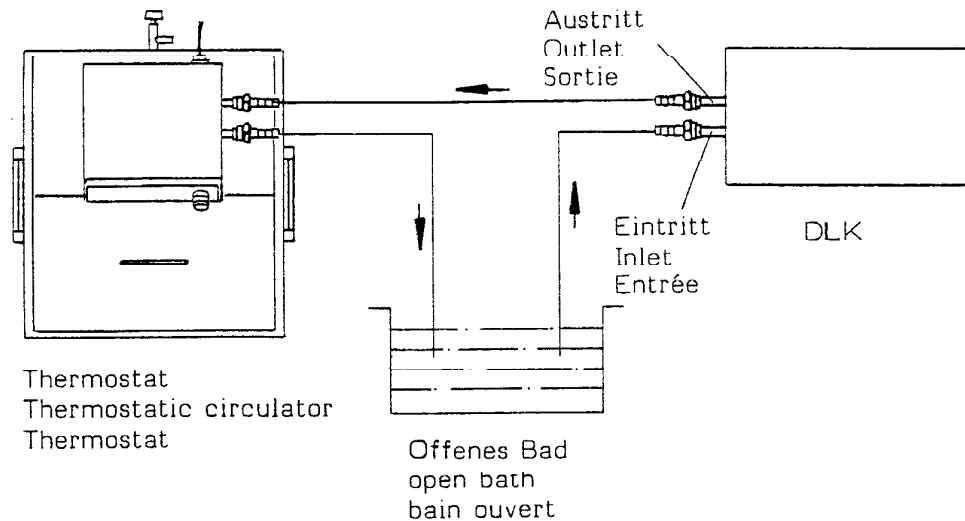
5.2 Thermostats connected to pressure-tight external systems



If a pressure-tight external system is connected to the thermostat, the through-flow cooler must be incorporated in the return line of external system and thermostat.

LAUDA Through-flow cooler
DLK 10, DLK 20, DLK 40

5.3 Thermostats with DUPLEX pump or pressure/suction pump connected to open bath

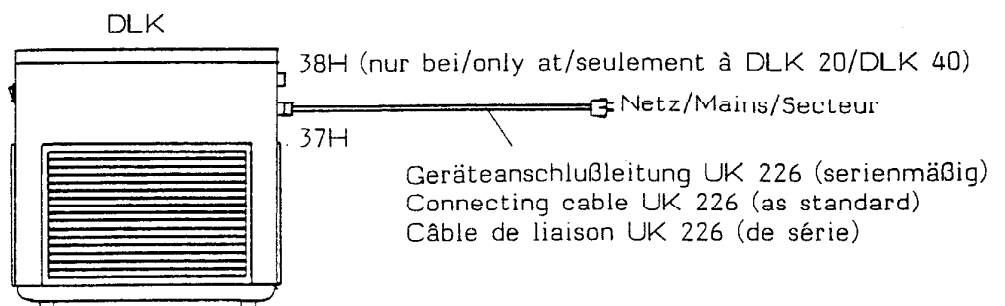


If the thermostat is equipped with a DUPLEX-pump or a pressure/suction pump and an open bath is thermostated, it is also possible to connect the through-flow cooler. The through-flow cooler must be incorporated in the return line (suction line).

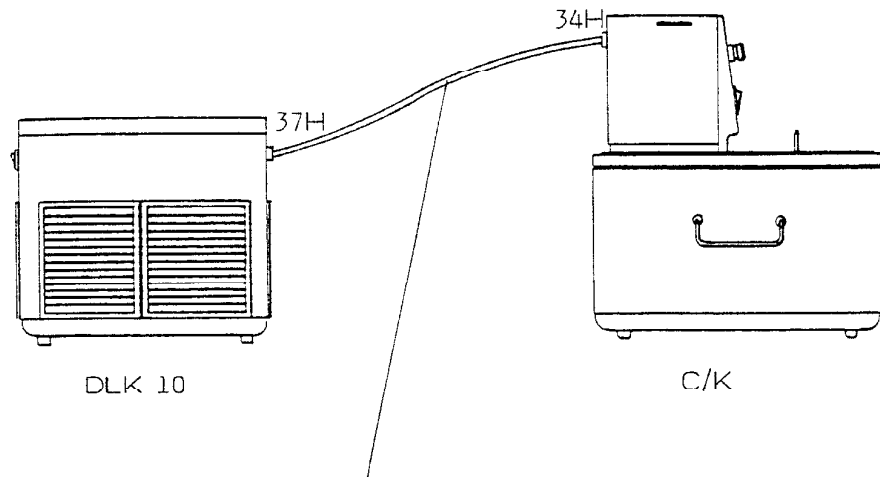
In case of thermostats with pressure/suction pump (i.e. C 6 CS or K 6 KP etc.) the LAUDA Level controller - ref.-no.: LPZ 901 - has to be used and fixed at the external open bath.

6. Electrical connection

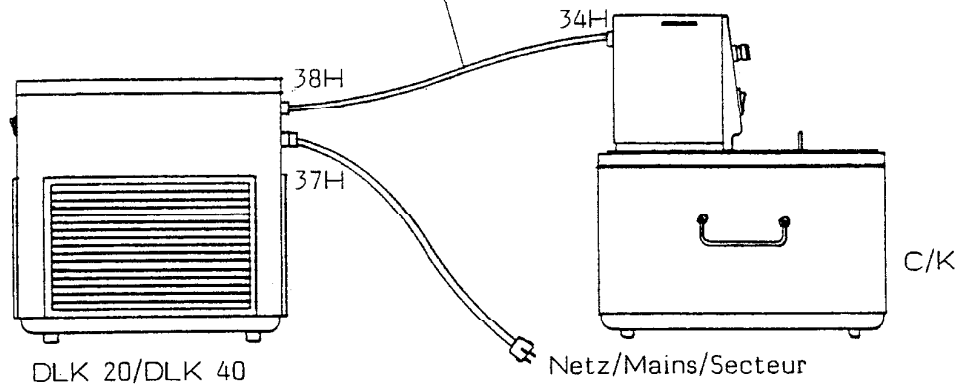
6.1 Thermostat without mains supply output 34 H



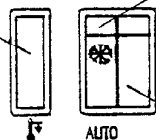
6.2 Thermostat with mains supply output 34 H (i.e. C 6 CS or K 20 KP etc.)



Steuerleitung UK 227 (Zubehör)
Control cable UK 227 (accessory)
Câble de commande UK 227 (accessoire)



Kontrolleuchte Kälteaggregat
Pilot lamp cooling unit
Lampe témoin groupe
frigorifique



AUTO Kälteaggregat schaltet autom. mit Thermostat/
Cooling unit automatically with thermostat/
Operation automatique du groupe frigorifique avec
le thermostat





Kälteaggregat wird von Hand eingeschaltet
Cooling unit to be switched on manually
Groupe frigorifique mis en service manuellement

Netzschalter grün/Mains switch green/Interrupteur
secteur vert

Mains/power line has to be ordered additionally as accessory - ref.-no.: UK 227

7. Starting up

- 7.1 Always connect the unit to a grounded socket only. Check details on the type label against the supply voltage.
- 7.2 Secure tubing with clips to prevent its slipping off.
- 7.3 When a LAUDA thermostat of series C/K with mains supply output 34 H is connected, the mains switch (green) at the DLK has to be switched on and the yellow rocker switch (only at DLK 20/40) has to be switched to position AUTO (see 6.2). The through-flow cooler automatically starts running together with the thermostat. The yellow signal lamp  indicates that the refrigeration unit is switched on. The DLK is protected against freezing because there is no through-flow when pump is not running.

In case of connection to other thermostats without power supply output 34 H the green mains switch (DLK 10) or the yellow rocker switch (DLK 20 and DLK 40) have to be switched-on  . The function AUTO (see 6.1) is no shorted-out.

Attention:

Switching on: First switch-on thermostat, then switch on through-flow cooler by means of the mains switch (green signal lamp lights up).

Switching off: First switch-off through-flow cooler, then thermostat.

Never allow the through-flow cooler to run without liquid as in this case the remaining liquid in the exchanger will excessively be cooled down to lowest temperature. It will freeze resulting in damaging the exchanger.

8. Maintenance

8.1 Safety remarks in case of repair

Before repair or cleaning is done, pull out the mains plug.

Repairs at the control panel and the lower part of the unit should only be executed by a qualified electrician.

8.2 Maintenance of the refrigeration system

The refrigeration unit operates largely without maintenance. If the units operate under dusty conditions we recommend that the refrigerator condenser is cleaned quite often. This is done best with compressed air or nitrogen that is blown into the ventilation openings for a few minutes. If necessary unscrew the front ventilation grill.

Repair and disposal

The refrigeration circuit of the DLK 10 is charged with R 134a, the refrigeration circuit of the DLK 20 is filled with R 404 A and the one of the DLK 40 is filled with H-CFC refrigerant HP 80. Repair and disposal must be executed by a qualified refrigeration engineer.

8.3 Cleaning

Clean the units with a cloth, wetted with water and some drops of tensids (washing-up liquid). No water must enter the control panel.

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, for 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 can contact the manufacturer.

8.4 Spares ordering

When ordering spares please specify the equipment type and number on the label. This avoids queries and prevents supply of incorrect parts.

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

LAUDA DR. R. WOBSE
GMBH & CO. KG

Geräteliste Schaltplan
 List of parts Circuit diagram
 Liste de pièces schéma de connexions

DLK 10
 230V;50/60Hz

Blatt 1

Teil Nr. Part No. Pièce.No	Bezeichnung Designation Désignation	Typ Type Type	Ersatzteilbestell-Nr. Cat.No. for spares No.Réf.pièces détachées
F 1	Überdruckschalter Overpressure switch Disjoncteur de surpression		ES 035
M 1	Ventilator Fan Ventilateur		-----
M 2	Kompressor Compressor Compresseur		EMK 137
S 1	Netzschalter Main switch Interrupteur général		EST 032
X 1	Einbaustecker (Netz/Steuer) Plug (mains/control) Prise (secteur/réglage)		EQS 051

Geräteliste Schaltplan
List of parts Circuit diagram
Liste de pièces schéma de connexions

DLK 20, DLK 40
230V;50/60Hz

ab Serie V01...

Blatt 2

Teil Nr. Part No. Piéc.No.	Bezeichnung Designation Désignation	Typ Type Type	Ersatzteilbestell-Nr. Cat.No. for spares No.Réf. pièces détachées	
			DLK 20	DLK 40
F 1	Übertemperaturschalter Overpressure switch Disjoncteur de surpression		ES 035	ES 035
H 1	Kontrollleuchte Control lamp Lampe témoin		EXS 050	EXS 050
K 1	Steuerrelais Control relay Relais pilote		ER 076	ER 076
M 1	Ventilator Fan Ventilateur		-----	-----
M 2	Kompressor Compressor Compresseur		EMK 139	EMK 167
S 1	Netzschalter Main switch Interrupteur général		EST 082	EST 082
X 1	Einbaustecker (Netz) Plug (mains) Prise (secteur)		EQS 052	EQS 052
X 2	Einbaustecker (Steuer) Plug (control) Prise (secteur)		EQS 051	EQS 051
X 3	Flachsteckverteiler Strip terminal Borne		EQZ 050	EQZ 050

Geräteliste Schaltplan
 List of parts Circuit diagram
 Liste de pièces schéma de connexions

DLK 20, DLK 40
 230V;50/60Hz

bis Serie U99...

Blatt 2

Teil Nr. Part No. Piéc.No.	Bezeichnung Designation Désignation	Typ Type Type	Ersatzteilbestell-Nr. Cat.No. for spares No.Réf. pièces détachées	
			DLK 20	DLK 40
F 1	Übertemperaturschalter Overpressure switch Disjoncteur de surpression		ES 035	ES 035
H 1	Kontrolleuchte Control lamp Lampe témoin		EXS 050	EXS 050
K 1	Steuerrelais Control relay Relais pilote		ER 076	ER 076
M 1	Ventilator Fan Ventilateur		-----	-----
M 2	Kompressor Compressor Compresseur		EMK 139	EMK 113
S 1	Netzschalter Main switch Interrupteur général		EST 082	EST 082
X 1	Einbaustecker (Netz) Plug (mains) Prise (secteur)		EQS 052	EQS 052
X 2	Einbaustecker (Steuer) Plug (control) Prise (secteur)		EQS 051	EQS 051
X 3	Flachsteckverteiler Strip terminal Borne		EQZ 050	EQZ 050