LAUDA

Operating instructions

Immersion thermostat
with stirrer
S/D

Valid from serie B02002
02/03
YAEE 0017

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Enclosures

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 instructions carefully.

1.2 Check thermostat and accessoreis during unpacking for possible transport damage and, if necessary, notify carrier or post office.

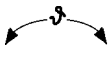
1.3 Mount the unit according to Section 6.

1.4 Use only decalcified water. Fill the unit up to approx. 2 cm below the top plate.

1.5 Check the supply coltage against the data on the rating label. Connect the cable to the supply.

1.6 Switch on the unit through the mains switch (green lamp lights up).

1.7 Adjust temperature to the desired temperature.

Press key  the set point is indicated at the digital display. Select the desired temperature by turning the potentiometer  . Unlocking the fixing device first.

1.8 Overtemperature cut out to be adjusted at rotary switch  above the set point. If the red fault lamp lights up, press the key  “Release“ in order to reset the unit.

1.9 When the bath liquid has reached the set point the yellow indicating lamp “Heating“  begins to flash. After the temperature has settled down, the digital thermometer indicates the selected bath temperature.

1.10. Operating safety

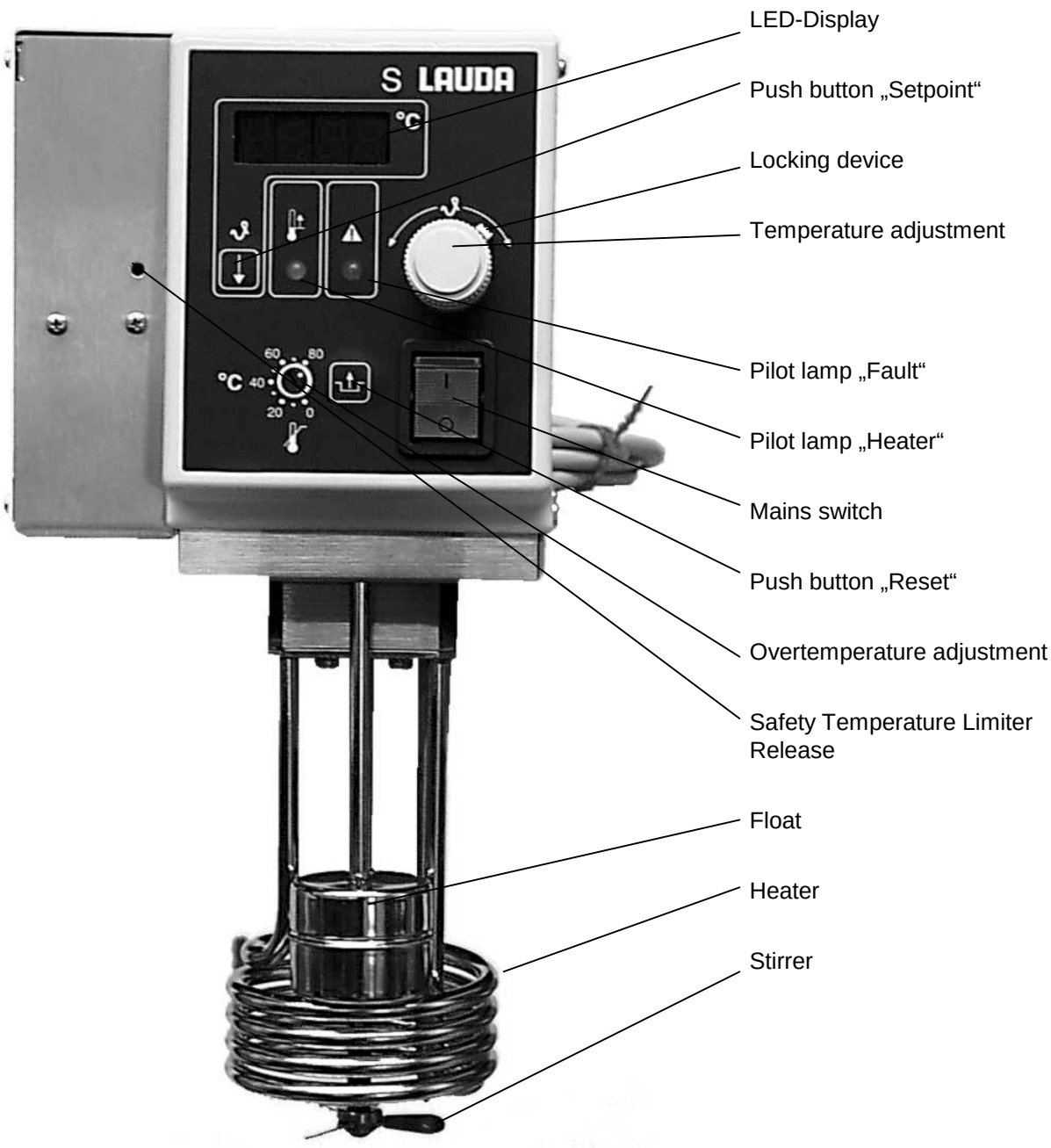
The thermostat must only be operated with non-flammable bath liquids, or with flammable bath liquids up to no more than 25°C below their flashpoint, otherwise there is the possibilitiy that a flammable atmosphere may form (see item 4.2).

2. Technical Data to DIN 58966

			S/D
Operating temperature range		°C	0...70
Working temperature range		°C	25...70 dep. on bath size and insulation
Ambient temperature range		°C	5...40
Temperature setting/resolution		°C	digital setting with 10 turn potentiometer and numeric indication; displ resolution0,1°C, pot. approx. 0,03°C
Temperture indication / resolution		°C	incorporated digital thermometer 0,1°C resolution, absolute accuracy better 0,5% of range, 0,2 % of inidcated value +/- 0,2°C *)
Temperature sensor / Control action			Pt 100/PID
Temperature control (at 70°C)		(±°C)	0,01*)
Safety system			Adjustable overtemperature portection and low level protection, acc. to EN 61010, Safety Temperature Limiter (STL) 85°C adjusted fix
Bath circulation		(l/min)	Stirrer
Power supply		(V;Hz)	230; 50
Minimum bath depth		(mm)	220
Immersion depth		(mm)	min. 120
Overall dimensions (BxTxH)		(mm)	150 x 130 x 320
Weight, net		(kg)	3,7
Heating capacity		(kW)	2,2
Total power consumption		(kW)	2,3
Ref-No.	**230 V; 50Hz**		**LSO 1171**
	208V; 60Hz		**LSO 8171**

Units to EU-Directive 89/ 336/ EWG (EMC) and 73/ 23/ EWG (low-voltage) with CE-mark.

*) see item 4.3


LED-Display
Push button „Setpoint“
Locking device
Temperature adjustment
Pilot lamp „Fault“
Pilot lamp „Heater“
Mains switch
Push button „Reset“
Overtemperature adjustment
Safety Temperature Limiter Release
Float
Heater
Stirrer
S LAUDA
°C
60
80
40
20
0

3. General construction and technical description

These operating instruction is meant for liquid thermostats with Stirrer.

The unit has a stirrer having a propeller for circulation of the bath medium. The stirrer is driven by a split pole motor with traversing shaft, bearingless within the bath.

The temperature is measured by a Pt 100 resistance thermometer and a PID controller. The units have a 10-turn precision potentiometer for set point adjustment. Digital indication of set point during setting. Actual bath temperature is indicated at a LED display. The heating capacity is electronically controlled by a zero voltage packet switching triac.
By the mulitifunction output an external setpoint input and acutal value output of 10 mV/°C as well as a fault signal (Open-Collector) is possible which can be used for further applications.

4. Safety devices and warning notes

4.1 Safety functions

The units are provided with an overtemperature limiter which is adjustable with a tool (screwdriver) between 0°C and 80°C.
The bath temperature is sensed ba a separate Pt 100 resistance thermometer and processed ba a separate electronics.

When exceeding the set switching point the unit is switched off permanentliy (limiter function). The red signal lamp  lights up and at the multifunction connector 19S a signal of Contact 5 the Open Collector output is connected through (max. 30V, 20mA).

A float switch with magnetic coupling acts as low- level cut-out and also switches of the unit (pump and heater) permanently.
The switch-off function of the safety circuit remains stored during a break in the supply or after switching off the supply.

Reset is possible only after rectifying the fault, using the reset key  .

The safety devices are conform EN 61010-2-010.

An additional overtemperature limiter according to DIN 3440 switches off the heater permanently when exceeding a temperature of 85 °C. Release with a tool by opening the front plate.

The stirrer motor is fitted with a temperature monitor which switches off the unit in case of overheating of the motor winding. The heater is also switched off which can be seen as the LED digital display is off.
After the motor winding has cooled down the unit starts up automatically.

4.2 Why can be dangerous to operate a thermostat?

Thermostats are fitted with heaters which provide the necessary heating energy for the thermostatic liquid. If the temperature control fails, or if the liquid level is too low, the heater may reach a temperautre which in combination with inflammable thermostatic liquids can cause a fire in the laboratory.

The safety requirements of thermosats depend on:

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

The units as described in these Operating instruction are protected against overtemperature and underlevel if used according to the descriptions indicated in these Operating instruction.

The units can be operated with non-flammable bath liquids and with flammable bath liquids up to 25°C below their flashpoint (EN 61010). In each case it is assumed that there is correct adjustment and regular testing (see item 7.5) of overtemperature and low-level protection.

4.3 Important notes

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

Filling: maximum filling level 45mm below mounting 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 responsibilitiy 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.

Note:

The units must only be used according to the descriptions indicated in these Operating instruction.
This includes operation by properly qualified and instructed personnel.
The units are not designed for operation under medical conditions according to EN 60601-1 resp. IEC 601-1!

5. Bath liquids and hose connections

The operating ranges of the bath liquids and tubing represent general data which may be restricted by the operating tempreature range of the units or by safety requirements specified in the appropriate standards. (see 4.2).

5.1 Bath liquids

Operating range 5...90°C
Use decalcified water. Make up evaporation losses at higher temperatures. Losses may be reduced by using suitable bath covers (see Accessories).

Only use distilled or deionized water by adding approx. 0,1 g of soda (sodium carbonate) per litre water. Otherwise there may be corrosion.

6. Unpacking, assembly and setting up

Goods are packed carefully to prevent tensport damage. If the units hould arrived damaged the carrier or the post office has to be infomred so that it can be inspected.

Note: Do not charge or touch the shaft of the stirrer motor and propeller during unpacking and assembly !

Operating instructions

Having installed the immersion thermostat into a package system take care that the whole system is in accordance with the corresponding safety standard (e.g. NEC, EU standards).

7. Starting up

7.1 Filling

Fill the unit acc. to chapt 5 with decalcified water The thermostats should never be filled higher than 45mm below the cover.

When using other bath liquids the operator is responsable. The following materials will get into contact with the liquid: stainless steel, epoxy, heat-shrinkable tubing made from polyolefine, crosslinked by irradiation.

7.2 Connect the unit only to mains system with proctective earth (PE) (bl = N, br = L, gn/ge =PE). Check the supply voltage against the data on the rating label. The overcurrent protection must be carried through by the customer by means of overcurrent devices for a current consumption of 12A. Cut-off current 16A max.

The unit corresponds to EMC standard EN 61326-1 Class A (without domestic areas). *

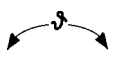
7.3 Set the overtemperature cut-out  max. 10°C higher than the desired operation temperature at least above the bath temperature ehwn the unit is started up.

Switch on mains switch, the green pilot lamp lights up. If the red fault lamp lights up. (see 7.5.)

The digital display indicates the actual bath temperature. The yellow lamp „heating“  is on continuously.

When the set point 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. After the temperature has settled dwon, the digital thermometer indicates the selected bath temperature.
You can further optimize the control paramter by changing the position of the Xp potentiometer on the back side which is set as standard to 4. A lower value indicates a smaller proportional range Xp. For small bath volumina the optimum adjustment is a higher Xp value, for bigger bath volumina it is better to adjust a smaller Xp value. i.e. staronger control amplification.

7.4 Select the disired temperature at the temperature selector knob.

Press key  the set point is indicated at the digital display. The set value is adjusted at a ten-turn precision potentiometer  .

The rotary knob includes a lcoing device by which an unintentional modification of the set value is avoided. Unlocking to left upper side, after adjustment of set value lock to right lower side.

* Notice only valid for EU countries

7.5 Safety circuit

The functioning of the safety devices in the units has already been described under 4.1 beschrieben worden.
After the unit has been started up it is advisable to check t he correct operation of the safety devices. At unsupervices operation we recommend a daily check.

7.5.1 Für eine einwandfreie Funktion des Unterniveaubegrenzers ist es erforderlich, dass der Schwimmerschalter richtig arbeitet. Dies kann dadurch kontrolliert werden, dass das Niveau im Bad durch Ablassen abgesenkt wird. Wenn das Badniveau unter das Minimalniveau sinkt (ca. 20 mm oberhalb Heizkörperwindung), schaltet der Rührmotor und die Heizung ab.

The red LED „Fault“ lights up For putting again into operation refill the bath and press the reset key. .

7.5.2 To check the overtemperature protection lower its swich-off point slowly. As soon as the setting is below the value shon on the digital thermometer the unit mus switch-off as explained under 7.5.1.
In order to distinghuish between the two malfunctions „Overtemperature“ and „level“ which are both indicated on the same display, the far right point on the display will start blinking in case the overtemperature cut-out point is exceeded. Adjust the switch-off point again above the bath temperature and operate the unlocking key.

7.5.3 An additional Safety Temperature Limiter (STL) with fixed cut-off point switches off the heater at 85°C. Unlocking is done by means of a tool (small screwdriver) through an opening at the front plate. For checking, the bath must be heated up to 86 °C with an additional heater. At 85 °C minus 5 °C the Safety Temperature Limiter must switch off the unit. If the bath has been cooled down below 60 °C the heater does not work even after unlocking of the overtemperature protection . The unit must only operate again after unlocking of the Safety Temperature Limiter (STL).

7.5.4 If the safety devices according to 7.5.1 and 7.5.3 do not operate correctly the unit must be sotpped immediately and checked by a specialist otherwise safe operation cannot be guaranteed.

The tests according to 7.5 have to be carried out every three months and have to be documented in a written form.

8. Multifunction output

9-pin plug connection 19 S with threaded sockets for screwing at the back side with multiple function.

Use screened connecting lines and connect the protective screen with the connector shell. Cover unsusd connectors with protecting caps!

Pin 1:	bath temperature recorder connection, correct sign; 10 mV/K; Ri ≈ 100 Ohm; internal recorder resistance ≥1 MOhm min. (0V pin 3)
Pin 2:	0 V load reference potential
Pin 3:	0V reference potential for measurement signals
Pin 4:	programme or external setpoint input 10 mV/K, added to the selected setpoint. The sum of both setpoints is displayed on pressing  . Ri = 20 kOhm (0V pin 3)
Pin 5:	Open Collector Output. Max. +30V; 20mA, if signal lamp lights red, i.e. safety circuit has operated.
Pin 6:	setpoint output 10 mV/K; Ri ≈ 100 Ohm. Load resistance = 10 kOhm (0V pin 3)
Pin 7:	+5 V supply voltage, max. additional loading 10 mA
Pin 8:	free
Pin 9:	-5 V supply voltage, max additional loading 10 mA

In case of faults the signals at this plug connector can be used for an initial fault diagnosis.

9-pole mating connector	Ref. No. EQM 042
Case for above	Ref. No. EQG 027

9. Maintenance

9.1 Safety notes in case of repair

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

9.2 Repair and maintenance

LAUDA Thermostats operate largely without maintenance. Contaminated bath liquid should be drained out through the drain cock and replaced with fresh liquid. If the unit should become defective it is recommendedthat hte thermostat unit should be removed and that you contact your next service deptartment (sales office). Remove the cover plate.

9.3 Cleaning

The unit can be cleaned by 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 dangered 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 has to contact the manufacturer.

9.4 Spares ordering

It is absolutely necessary only to use original spares from the manufacturer in order to guarantee safety.

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

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

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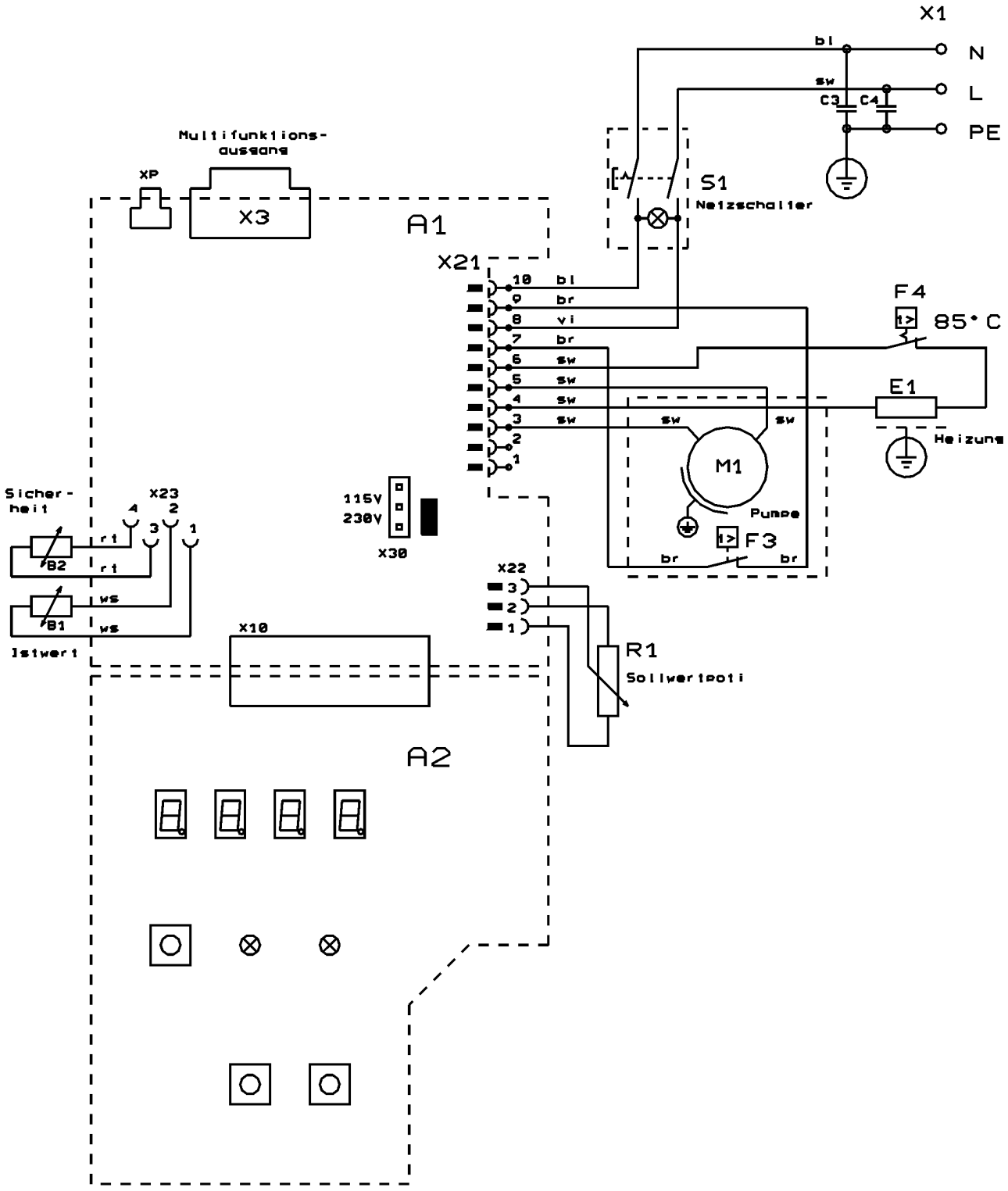

LSO 1171/LSO8171

230V/50Hz 208V/60Hz

				Datum	19.03.2001	LAUDA	S/D
				Bearb.	B.Schmies		
				Datum		Dr.R.Wobser GmbH & Co KG	Schaltplan / Circuit diagram — Blatt 1 / 1 Bl.
Zust.	Änderung	Tag	Name	Gepr.		Art.Nr.	

20.03. 1

Geräteliste Schaltplan **S / D** **gültig ab Serie B02002**
List of parts Circuit diagram **at serial no.**
Liste de schéma connexions **à partir**
230V; 50Hz ◆ 208V; 60Hz

Teil-Nr. Part No. Piéce no.	Bezeichnung	Designation	Désignation	Bestell-Nr. Ref.-No. No.Ref 230V;50Hz	Bestell-Nr. Ref.-No. No.Ref 208V;60Hz
A 1	Leiterplatte „Netz / Reglung“	Printed circuit board „Mains / Control“	Circuit imprimé „ Sechteur / Régulateur	UL 390-3B	---------
A 2	Leiterplatte „Anzeige“	Printed circuit board „Display“	Circuit imprimé „Affichage	UL 422-2B	---------
B 1	Pt100 Fühler Regelung	Pt 100 probe control	Pt 100 Sonde Régulateur	ETP 044	ETP 044
B 2	Pt100 Fühler Übertemperatur	Pt 100 probe overtemperature	Pt 100 Sonde surtémperature	ETP 044	ETP 044
E 1	Heizung 2,2 kW	Heater 2,2 kW	Corps de chauffe 2,2 kW	EH 110	EH 110
F 3	Klixon Pumpe	Klixon Pump	Klixon Pompe	---------	---------
F 4	Sicherheitstemperatur-begrenzer 85°C EMf-40	Over-temperature cut-out 85°C EMf-40	Protection de surtempèrature 85°C EMf-40	---------	---------
M 1	Pumpenmotor	Pump motor	Moteur de pompe	EM 091	---------
R 1	Potentiometer Sollwert	Setpoint potentiometer	Potentiomètre valeur de consigne	UD 306	---------
S 1	Netzschalter	Mains switch	Interrupteur secteur	EST 032	---------
X 1	Netzanschluss / Netzkabel	Mains connection / Mains cable	Branchement secteur / Câble de secteur	EKN 001	---------

BESTÄTIGUNG / CONFIRMATION / CONFIRMATION

An / To / A:
LAUDA Dr. R. Wobser • LAUDA Service Center • Fax: +49 (0) 9343 - 503-222

Von / From / De :

Firma / Company / Entreprise: _____

Straße / Street / Rue: _____

Ort / City / Ville: _____

Tel.: _____

Fax: _____

Betreiber / Responsible person / Personne responsable: _____

Hiermit bestätigen wir, daß nachfolgend aufgeführtes LAUDA-Gerät (Daten vom Typenschild):
We herewith confirm that the following LAUDA-equipment (see label):
Par la présente nous confirmons que l'appareil LAUDA (voir plaque signalétique):

Typ / Type / Type :	**Serien-Nr. / Serial no. / No. de série:**

mit folgendem Medium betrieben wurde
was used with the below mentioned media
a été utilisé avec le liquide suivant

_____

_____

_____

_____

Darüber hinaus bestätigen wir, daß das oben aufgeführte Gerät sorgfältig gereinigt wurde, die Anschlüsse verschlossen sind, und sich weder giftige, aggressive, radioaktive noch andere gefährliche Medien in dem Gerät befinden.

Additionally we confirm that the above mentioned equipment has been cleaned, that all connectors are closed and that there are no poisonous, aggressive, radioactive or other dangerous media inside the equipment.

D'autre part, nous confirmons que l'appareil mentionné ci-dessus a été nettoyé correctement, que les tubulures sont fermées et qu'il n'y a aucun produit toxique, agressif, radioactif ou autre produit nocif ou dangeureux dans la cuve.

Stempel **Seal / Cachet.**	**Datum** **Date / Date**	**Betreiber** **Responsible person / Personne responsable**

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