Operating instructions

Aqualine water baths

LAUDA AL 2
LAUDA AL 5
LAUDA AL 12
LAUDA AL 18
LAUDA AL 25

English
Release 06/2012
replaces release 05/09, 03/09, 03/07
YACE0086

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Prefixed safety notes

Before operating the equipment please read carefully all the instructions and safety notes. If you have any questions please phone us!

Follow the instructions on setting up, operation etc. This is the only way to avoid incorrect operation of the equipment and to ensure full warranty protection.

- Transport the equipment with care!
- Equipment and its internal parts can be damaged:
  - by dropping,
  - by shock.
- Equipment must only be operated by technically qualified personnel!
- Device must not be used with any other liquid than water.
- Never operate the equipment without sufficient water level!
- Do not start up the equipment, if:
  - it is damaged or leaking,
  - the supply cable is damaged.
- Switch off the equipment and pull out the mains plug for:
  - servicing or repair,
  - before moving the equipment!
- Drain the bath before moving the equipment!
- Do not make technical modifications to the device.
- Have the equipment serviced or repaired by properly qualified personnel only!

The Operating Instructions include additional safety notes which are identified by a triangle with an exclamation mark. Carefully read the instructions and follow them accurately! Disregarding the instructions may have serious consequences, such as damage to the equipment, damage to property or injury to personnel.

We reserve the right to make technical alterations!

Contents

Explanation of signs

Danger: This sign is used where there may be injury to personnel if a recommendation is not followed accurately or is disregarded.

Note: Here special attention is drawn to some aspect. May include reference to danger.

Reference: Refers to other information in different sections.

1 Safety notes

1.1 General safety notes

A water bath is intended for heating water according to the needs of the user. This leads to hazards by high temperatures, fire, and the general hazards by the use of electrical energy.

The user is largely protected through the application of the appropriate standard specifications.

Additional hazards may arise from the type of material being thermostated, e.g. when going above or below certain temperature levels or through breaking of the container and reaction with the heat carrier liquid (water).
It is not possible to cover all possibilities; they remain largely within the responsibility and the judgement of the user.

The unit must only be used as intended and as described in these Operating Instructions. This includes operation by suitably instructed qualified personnel.

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

Classes of the EMC standard EN 61326-1:

Class A: Operation only on networks without connected domestic areas.
Class B: Equipment for operation on networks with connected domestic areas.

Valid for Europe:
The device according to EMC (electromagnetic compatibility) requirements DIN EN 61326-1 see (⇨ 10)

Use restriction
To EMC standard DIN EN 61326-1:
Class A devices must not be operated in power networks with connected domestic areas!

Instructions for Class A digital devices, USA:

“This equipment has been tested and found to comply with the limits for Class A digital device, pursuant to Part 15 of the FCC (Federal Communication Commission) Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.”
“This device complies with Part 15 of the FCC (Federal Communication Commission) Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.”

Instructions for Class A digital devices, Canada:

“This Class A digital apparatus complies with Canadian ICES-003” (ICES = Interference Causing Equipment Standards).
« Cet appareil numérique de la Classe A est conforme à la norme NMB-003 du Canada ».

1.2 Other safety notes

- The units are designed for operation with non-flammable liquids to DIN EN 61010-2-010.
- Check the device carefully for shipping damage before putting into operation. Never operate the device if you have found shipping damage.
- Connect the unit to a grounded mains power socket.
- Parts of the bath cover may reach surface temperatures above 70 °C when operating at higher temperatures. Take care when touching it!
- Always pull out the mains plug before cleaning, maintenance or moving the water bath!
- Only have specialists carry out repairs requiring the opening of the housing.
- Values for temperature control and indicating accuracy apply under normal conditions according to DIN 12876. High-frequency electromagnetic fields may under special conditions lead to unfavourable values. This does not affect the safety.

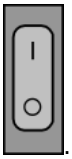
2 Brief operating instructions

This brief instruction shall give you the possibility to operate the unit quickly. For safe operation of the unit it is absolutely necessary to read carefully all the instructions and safety notes!

1. Assemble unit and add items as appropriate (⇨ 6).

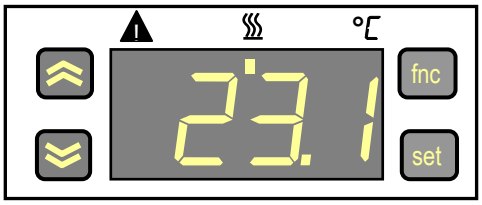
2. Fill the unit with decalcified water (⇨ 6.3). Take care of the level of the bath liquid! (⇨ 6.2).
   The units are designed for operation with non-flammable liquids to DIN EN 61010-2-010.

3. Connect the unit only to a socket with a protective earth (PE) connection.
   Compare the information on the rating label with the supply details.

4. Switch on at the mains switch  .

5. The controller runs a self-test after switching on. For a few seconds all segments are flashing.

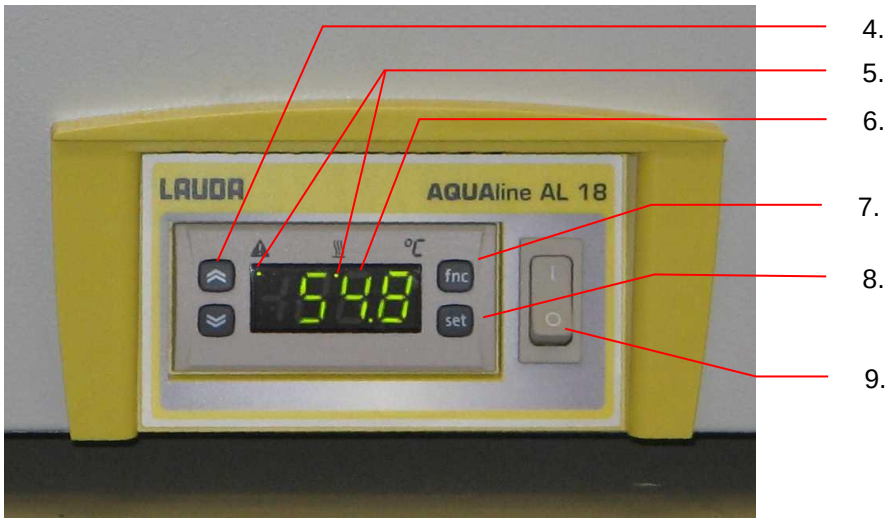
6. Setting the set point temperature



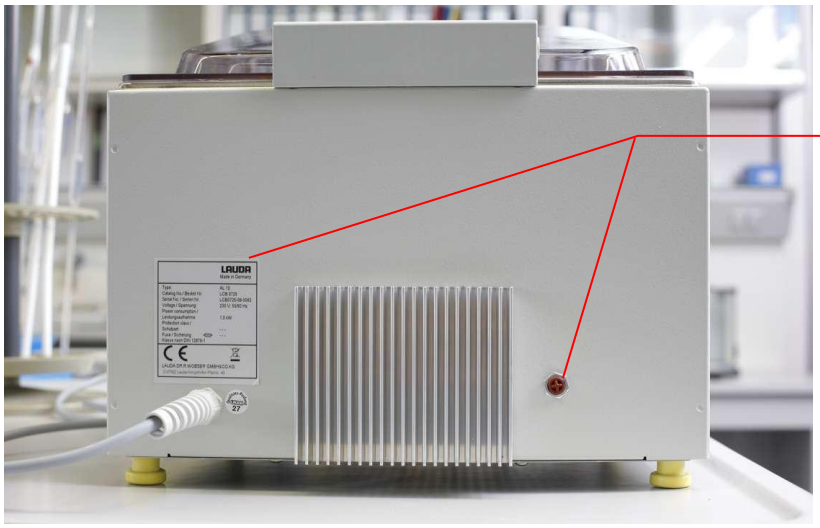
- First the current bath temperature is displayed.
- Press the key set shortly. The display shows SEt. Press set shortly again → the set point will be displayed.
- Adjust the set-point using the keys ⩓ or ⩔.
  After 30 seconds without entry the current bath temperature will be displayed again.
- Save the set value with twice fnc or wait for 30 s till the set point value will be saved automatically.

3 Control and functional elements

1. Gable cover made of plastic material, swiveling and demountable
2. Temperature controller with LED display
3. Mounting feet



4. Control keys
5. Status LED K1 and K2
6. LED display
7. Save key
8. Key for set point settings
9. Mains switch



10. Name plate and resetting button for the safety temperature limiter

4 Unit description

4.1 Environmental conditions

The operation of the thermostats is only allowed under the following conditions as specified in DIN EN 61010-2-010:2003 and DIN EN 61010-1:2001:

- Indoor use.
- Operation up to a height of 2000 m above sea level is admissible.
- Foundation must be dense, even, non-slippery and non-flammable.
- Ambient temperature range (⇨ 10).
  Use only within this range for an undisturbed operation.
- Mains supply voltage fluctuations (⇨ 10).
- Maximum relative humidity (⇨ 10).
- Transient over voltage according to Installation Categories (Over voltage Categories) II.
- Pollution degree: 1.

4.2 Device types

The type designation of the Aqualine water baths is composed of the abbreviation "AL" for Aqualine and the bath volume.

Example: Aqualine bath with 12 liters maximum volume gives LAUDA AL 12.

All water baths are supplied as standard with a fitted bath cover.

4.3 Material

The bath vessel is made of rust-free stainless steel. The gable cover is made of transparent plastic material (Polycarbonate).
The bath cover made of steel is not interchangeable against the bath cover made of plastic material.

4.4 Temperature display, controller and safety circuit

The bath tank is heated from underneath.

The acquisition of the actual value and the control of the bath temperature are carried out with a temperature sensor fitted to the underside of the bath tank.

The units are fitted with a 3-figure 7-segment LED display for indicating the bath temperature and settings as well as the operating status. Entry of the set-point value occurs using adjust keys.

All settings are saved even with a mains failure or with the mains switch set to "OFF".

If the water level in the bath is lower than approx. 20 mm, a safety temperature limiter system will switch off the heater. The LED display goes out. Unlocking the protection system (⇨ 8.1).

If the water bath is operated without water and the temperature on the bottom of the tank reaches 110 °C, an acoustic alarm sounds and the LED display indicates: E 1.
Resetting the alarm (⇨ 7.4).

If the water bath is operated without water and the temperature on the bottom of the tank reaches 150 °C, a safety temperature limiter system switches the device off.
Unlocking the limiter system (⇨ 8.2).

5 Unpacking

After unpacking, first check the unit and accessories for any transport damage. If contrary to expectations the unit is found to be damaged, the shipping company or supplier must be immediately informed so that verification can take place.

Please inform also the LAUDA Service for Constant Temperature Equipment (⇨ 8.6).

Standard accessories:

Article number	Quantity	Designation	
HGH 194	1	Bath gable cover made of transparent plastic material (Polycarbonate) (fitted)	for every Aqualine water baths AL 2 and AL 5
HGH 195	1	Bath gable cover made of transparent plastic material (Polycarbonate) (fitted)	for Aqualine water bath AL 12
HGH 196	1	Bath gable cover made of transparent plastic material (Polycarbonate) (fitted)	for every Aqualine water baths AL 18 and AL 25
EZB 260	1	Warning label 	for all Aqualine water baths
EZ 266	1	Hand pump	for Aqualine water baths AL 12, AL 18 and AL 25 only
YACE0086	1	Operating instructions, this document	for all Aqualine water baths

6 Preparations

6.1 Assembly and siting

- Place the unit on a horizontal and flat surface.
- Do not cover the ventilation opening on the bottom of the unit and the heatsink at the back of the unit. Keep a clear distance of at least 20 cm.

- The gable cover has two positions: Closed or opened.
  In the position shown (see figure left side), the gable cover can be removed.

- At bath temperature above 70 °C the label supplied must be affixed on the bath in a clearly visible position.

6.2 Filling and emptying

Filling

- Maximum level 20 mm below the top edge of the bath.
- Operation down to round about 30 mm minimum level is possible.

Emptying

- Switch off the water bath and withdraw the mains plug.
- Empty the bath with the aid of a suction pump or other extracting device.

Siphon Hand Pump
LAUDA catalogue number EZ 266

- The units are designed for operation with non-flammable liquids to DIN EN 61010-2-010.

- Do not drain the heat transfer liquid (water) in hot conditions!

6.3 Heat transfer liquids

LAUDA designation	Working temperature range	Chemical designation	Viscosity (kin)	Viscosity (kin) at temperature	Size Catalogue number		
	from °C to °C		mm²/s at 20°C	mm²/s	5 L	10 L	20 L
Aqua 90	5...90	decalcified water with water stabiliser	1	--	LZB 120	LZB 220	LZB 320

☞	– IMPORTANT There are different sorts of water! – Tap water may be unsuitable for operation due to the calcium carbonate content → risk of calcification of the stainless steel tank. – High purity water (from ion exchangers) and distilled or bidistilled water are unsuitable for operation due to the corrosive properties of these media. → High purity water and distillates are suitable as a medium after the addition of 0.1 g of soda (Na_2CO_3, sodium carbonate) / liter of water. – TIP: Water baths can be operated ideally with LAUDA Aqua 90, available in container sizes of 5, 10 or 20 liters (order number LZB 120, LZB 220 or LZB 320).
☞	– There is a risk of electrochemical oxidation with the use of racks of non-ferrous metals or non-ferrous metal samples. – The LAUDA Aqualine water bath tanks are produced in stainless steel 1.4301 and are accordingly resistant to mechanical and chemical stresses. – Due to the different electrochemical potentials of metals electrochemical oxidation may occur in the case of direct contact between the tank and a rack (e.g. copper) and the bath may corrode despite the use of the highest quality materials for the tank. – TIP: Avoid the use of this type of rack or the direct contact with this sort of rack or contact with non-ferrous metal samples and the inside of the container. Use original LAUDA stainless steel racks and commercially available racks in temperature-resistant plastics.

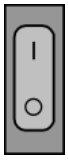
7 Operation

7.1 Mains connection

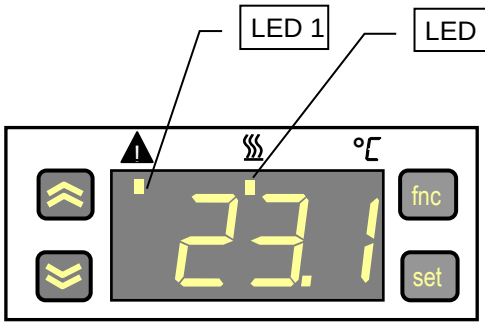
Compare the rating on the name-plate with the mains voltage.

- Connect the unit only to sockets with a protective earth conductor (PE).
- No liability is accepted for incorrect mains connections!
- Please make sure that your mains plug is equipped with at least the following safety fuses see (⇨ 10 Technical Data).
- Ensure that the unit is filled in accordance with Section 6.2!

7.2 Switching on



- Switch on using the mains switch. The green LED indicator is illuminated.

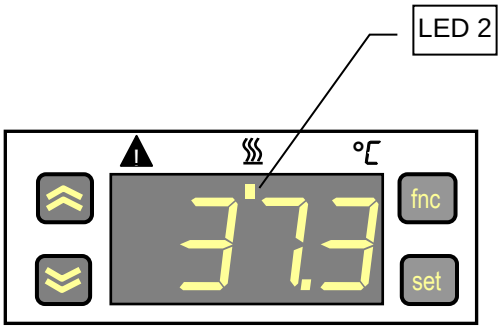


- The controller runs a self-test after switching on. For a few seconds all segments are flashing.
- First the current bath temperature is displayed.
- The values are accepted which were set before the switch-off.

- If an alarm has occurred, the LED 1 is illuminated.
- If the heater feeds heat to the bath, at the normal operation, the LED 2 is illuminated.

7.3 Temperature set-point setting

Display and modification of the operating temperature set-point:



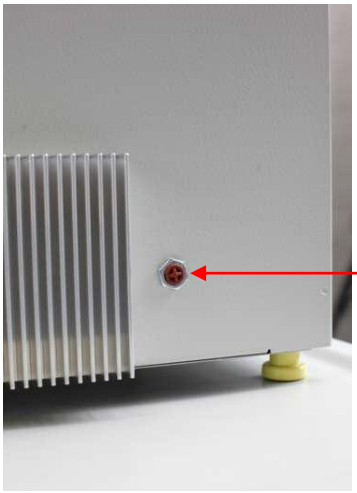
- Press the key set shortly. The display shows SEt. Press set shortly again
  → the set point will be displayed.
- Adjust the set-point using the keys ▲ or ▼.
  After 30 seconds without entry the bath temperature will be displayed again.
- Save the set value twice with fnc or wait for 30 s till the set point value will be saved automatically.
- The LED 2 is illuminated, if the heater feeds heat to the bath.

7.4 Controller error signals

LED display	Visual alarm switch-off	Device status	Cause	Remedy
E 1	Automatic reset when the signal returns to the acquisition range.	Heater is OFF.	No or to less water in the tank.	Topping up with decalcified water.
			Temperature above 110 °C. Temperature sensor, connecting wires or controller is defective.	Contact LAUDA Service Constant Temperature Equipment.

8 Maintenance

8.1 Low level protection

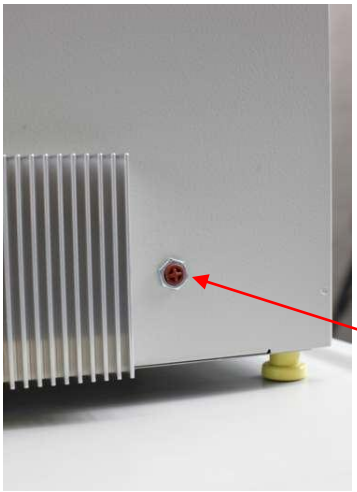


- Evaporation may cause a slowly water loss. If the level is lower than app. 20 mm, a mechanical safety temperature limiter cuts off the complete voltage supply.
- If lack of water was the problem, the limiter can be deactivated once water has been added.
- To do this, press the button at the rear of the water bath until a noticeable latching occurs.

8.2 Unlock the safety temperature limiter

Two sensors monitor the temperature on the bottom of the bath.

If the temperature on the bottom of the tank reaches above 110 °C, the LED display indicates: E 1. Immediately switch off the device with the mains switch and rectify cause of fault. Frequently it is a low water level in the tank (7.4).



- Above approx. 150 °C bottom temperature a mechanical safety temperature limiter cuts off the complete voltage supply. Thereupon the LED display goes out.
  This protective device is not self-cancelling according to DIN EN 61010-2-10.
- First, the cause of the overtemperature must be found. If lack of water was the problem, the limiter can be deactivated once water has been added.
- To do this, press the button at the rear of the water bath until a noticeable latching occurs.

- The safety temperature limiter must not be deactivated when a mechanical or electrical fault is suspected.
  If necessary, contact the authorized LAUDA Service agents or the LAUDA Service Constant Temperature Equipment (⇨ 8.6).

8.3 Cleaning

- Withdraw the equipment mains plug before cleaning!

Cleaning can be carried out with water to which a few drops of surfactant (washing-up liquid), have been added and using a damp cloth.

– Water must not penetrate the control unit!

– Carry out appropriate detoxification if dangerous material has been spilled on or inside the unit.
– Method of cleaning and detoxification are decided by the special knowledge of the user. In case of doubt please contact the manufacturer.

8.4 Maintenance and repair

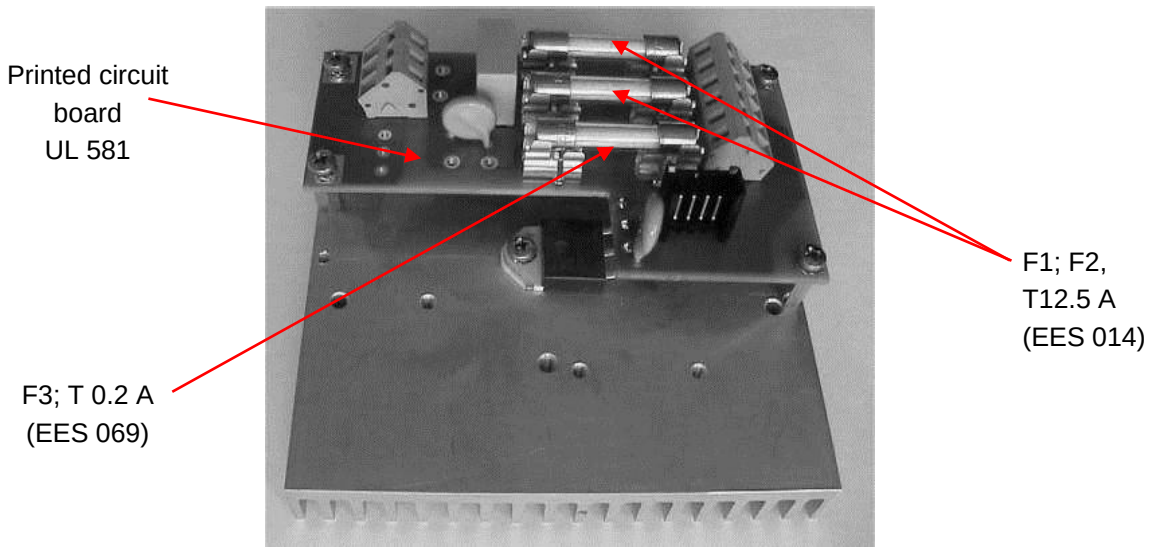
– Withdraw the equipment mains plug before all service and repair work!
– Repair on the control unit must only be carried out by properly qualified personnel!

LAUDA Aqualine water baths are maintenance-free. If the heat carrier liquid becomes dirty it has to be replaced (6.2).

– If a fuse blows (→ supply indication not alight) fit only fuses as specified.
(2 off T (slow blow) 12.5 A (EES 014); 1 off T (slow blow) 0.2 A (EES 069); Size 6.3 x 32 → fuses located in the unit).

Changing the fuses:

– Before opening, withdraw the mains plug, pick up the gable cover and empty the bath.
– Remove the rubber buffer out of the four feet. Release the screws in the feet and in the bottom panel with a cross-head screwdriver, loosen the earthing cable and remove the bottom panel.
– The fuses are located behind the heat sink at the rear of the unit.
– Replace the blown fuse and reassemble the water bath in the reverse sequence.



Before sending us the unit, please contact our technical service. (⇨ 8.6).

– If the equipment has to be returned to the factory, please ensure that it is carefully and properly packed. LAUDA accepts no responsibility for damage due to unsatisfactory packing.

8.5 Disposal of the packaging

The following applies to Europe: The disposal of the packaging must be carried out according to the EC Directive 94/62/EC.

8.6 Ordering spares and name plate

When ordering spares please quote instrument type and serial number from the name plate. This avoids queries and supply of incorrect items.

The serial number is combined like following, for example **LCB0723-12-0001**

LCB0723 = Catalogue number
12 = Manufacturing year 2012,
0001 = continuous numbering.

Your contact for service and support:

LAUDA Service Constant Temperature Equipment
Telephone: +49 (0)9343/ 503-236 (English and German)
Fax: +49 (0)9343/ 503-283
E-Mail service@lauda.de

We are available any time for your queries, suggestions and criticism!

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9 Accessories

Recommended accessories for Aqualine water baths

Description	suitable for	Reference number
Rack RN 13/1	2 x AL 5	UE 033
Rack RN 18/3	2 x AL 5	UE 034
Rack RN 18/4	2 x AL 5	UE 035
Rack RN 30/1	2 x AL 5	UE 036
Rack RN 13	AL 12, 2 x AL 18, AL 25	UE 029
Rack RN 18/1	AL 12, 2 x AL 18, AL 25	UE 030
Rack RN 18/2	AL 12, 2 x AL 18, AL 25	UE 031
Rack RN 30	AL 12, 2 x AL 18, AL 25	UE 032
Rack RQ 13	AL 5, 3 x AL 12, 5 x AL 18, AL 25	UG 105
Rack RQ 18/1	AL 5, 3 x AL 12, 5 x AL 18, AL 25	UG 106
Rack RQ 18/2	AL 5, 3 x AL 12, 5 x AL 18, AL 25	UG 107
Rack RQ 30	AL 5, 3 x AL 12, 5 x AL 18, AL 25	UG 108
Rising platform, 8 steps adjustable	AL 12, 2 x AL 18, AL 25	LCZ 0689

For further accessories please refer to our Accessories Catalog or contact us directly.

10 Technical Data

The figures have been determined according to DIN 12876.

Aqualine water baths			**AL 2**	**AL 5**	**AL 12**	**AL 18**	**AL 25**
Operating temperature range		°C	25 ... 95				
Temperature stability at 37 °C		K	±0.2				
Resolution setting		K	0.1				
Absolute display accuracy		K	±2				
Heater power @	230 V 115 V 100 V	kW	0.45 0.45 0.34	0.45 0.45 0.34	1.0 1.0 0.76	1.2 1.2 0.9	1.2 1.2 0.9
Heater surface loading @ 230 V		W/cm²	2.4	2.4	2.24	1.38	1.38
Power consumption @ 230 V		kW	0.5	0.5	1.0	1.2	1.2
least mains fuse protection @	230 V 115 V 100 V	A A A	3 5 4	3 5 4	6 10 9	7 12 11	7 12 11
Max. bath volume		L	0.9...1.7	1...5	2...12	3...18	3...25
Bath vessel			Deep-drawn inner tank in stainless steel 1.4301 conforming to SAE 30304 AISI 304.				
Bath opening (w x d)		mm	300 x 151		329 x 300	505 x 300	
Bath depth		mm	65	150			200
Footprint (w x d)		mm	347 x 183		375 x 335	550 x 335	
Height of top edge of bath without cover		mm	234				284
Height incl. gable cover		mm	311		333		383
Weight		kg	4.5	5	6.8	9	9.8
Housing			Powder-coated steel sheet.				
Ambient temperature range		°C	5 ... 40				
Humidity			Maximum relative humidity 80 % for temperatures up to 31 °C, decreasing linearly to 50 % relative humidity at 40 °C.				
Storage temperature range		°C	-20 ... 60				
Ingress protection rating → IP Code accord. to IEC 60529			IP 22				
Protection class according to DIN EN 61140; VDE 0140-1			Protection class I				
Class to EMC-standard DIN EN 61326-1 VDE 0843-20-1 notice only valid for EU-countries)			Class B (⇨ 1.1)				
for Canada and the USA			Class A (⇨ 1.1)				

EC Directives		The units are conformable to directives of the European Parliament and of the council: 2004/108/EC electromagnetic compatibility and 2006/95/EC electrical equipment designed for use within certain voltage limits. The units carry the CE mark.

Catalogue number / Electrical supply	AL 2	AL 5	AL 12	AL 18	AL 25
230 V ±10 %; 50/60 Hz	LCB 0723	LCB 0724	LCB 0725	LCB 0726	LCB 0727
115 V ±10 %; 60 Hz	LCB 4723	LCB 4724	LCB 4725	LCB 4726	LCB 4727
100 V ±10 %; 50/60 Hz	LCB 6723	LCB 6724	LCB 6725	LCB 6726	LCB 6727

We reserve the right to make technical alterations!

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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D - 97922 Lauda-Königshofen
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