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Operating instructions

UWT circulation heat exchangers

UWT 3000, UWT 6000, UWT 10000

YAWE0029

English

Translation of the original operating instructions

Read the instructions prior to performing any task!

release 06/2018 i

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03/2006

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Prefixed safety information



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!
- Never operate the equipment without the heat transfer liquid!
- 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!
- Do not carry out any technical changes on 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!

Contents

Prefixed safety information	3
Contents.....	4
1 Safety notes.....	5
1.1 General safety notes	5
1.2 Other safety notes	6
2 Operating and functional controls.....	7
3 Unit description.....	9
3.1 Environmental conditions	9
3.2 Unit types	9
3.3 Principle of operation	9
3.4 Pump	9
3.5 Temperature display, controller and safety devices.....	10
3.6 Interfaces (remote socket 15N).....	10
3.7 Substances / materials in the liquid circuits	10
4 Unpacking.....	11
5 Preparations	12
5.1 Siting and connection	12
5.2 Filling	13
5.3 Draining / frost protection	14
6 Starting up	15
6.1 Mains connection	15
6.2 Switching on	15
6.3 Adjusting the outflow pressure with the bypass valve.....	16
7 Maintenance	17
7.1 Cleaning	17
7.2 Servicing and repair	17
7.3 Spare parts ordering and rating label.....	18
8 Technical data and circuit diagram.....	19
8.1 Technical data	19
8.2 EU conformity.....	20
8.3 List of components with circuit diagram	21

Confirmation

Explanation of signs:



Caution: 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 circulation heat exchanger is used to cool and circulate heat transfer liquids as specified. This leads to hazards due to the emission of heat transfer liquid and / or of cooling liquid and to general hazards due to the use of electrical energy.

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

Classification in accordance with EMC requirements			
Device	Immunity	Emissions class	Customer power supply
Circulation heat exchangers UWT 3000, UWT 6000, UWT 10000	Type 2 in accordance with DIN EN 61326-1	Emissions Class B in accordance with CISPR 11	Worldwide No limitation

For the USA only:

Instructions for Class A digital devices

"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."

For Canada only:

"This Class A digital apparatus complies with Canadian ICES-003" (ICES = Interference Causing Equipment Standards).

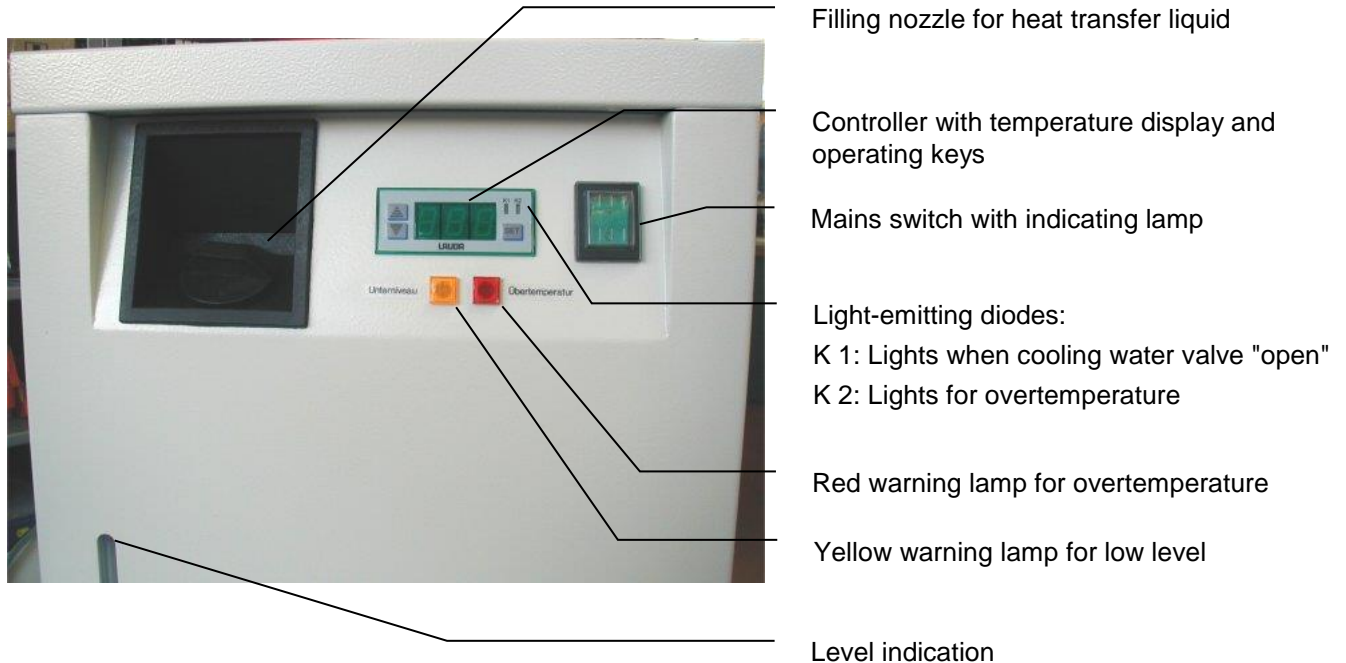
« Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada ».

1.2 Other safety notes

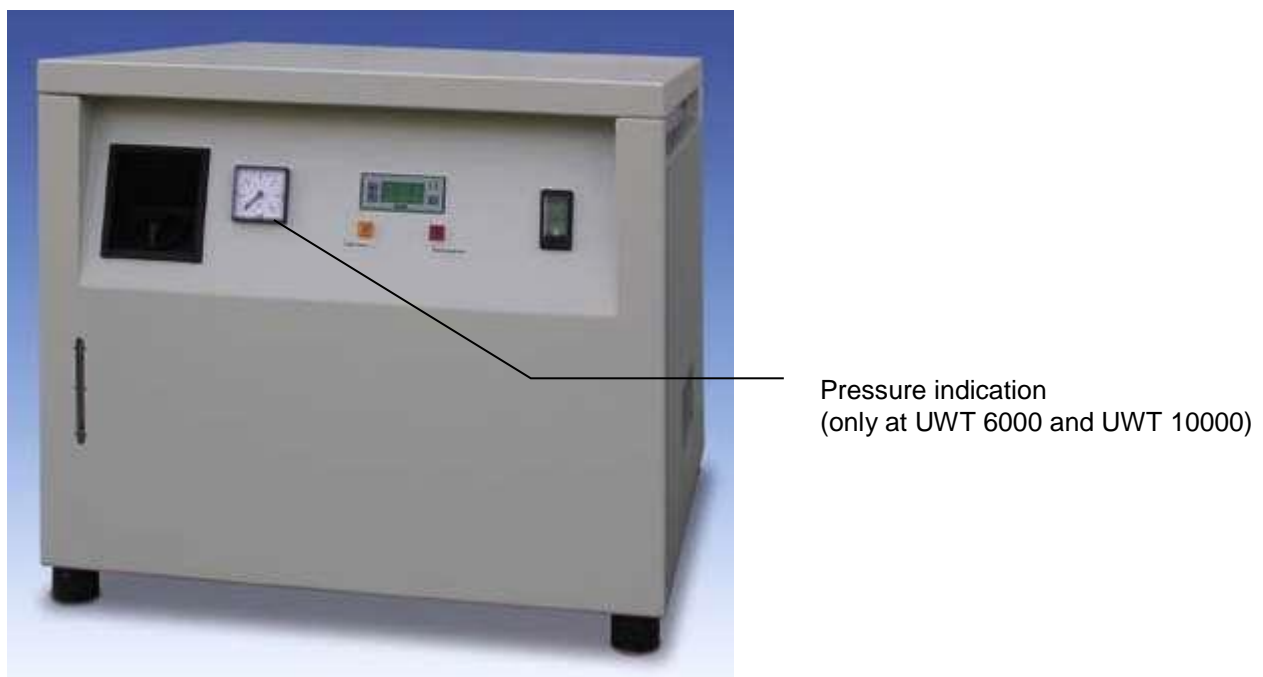
- Connect the unit only to grounded mains power (PE).
- Use suitable hoses.
- Protect tubing with hose clips against slipping off. Prevent kinking of tubing!
- Check tubing from time to time for possible material defects!
- Allow for expansion of the heat transfer liquid at elevated temperatures!
- Always pull out the mains plug before cleaning, maintenance or moving the device!
- Repairs must be carried out by properly qualified personnel only.
- 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 Operating and functional controls

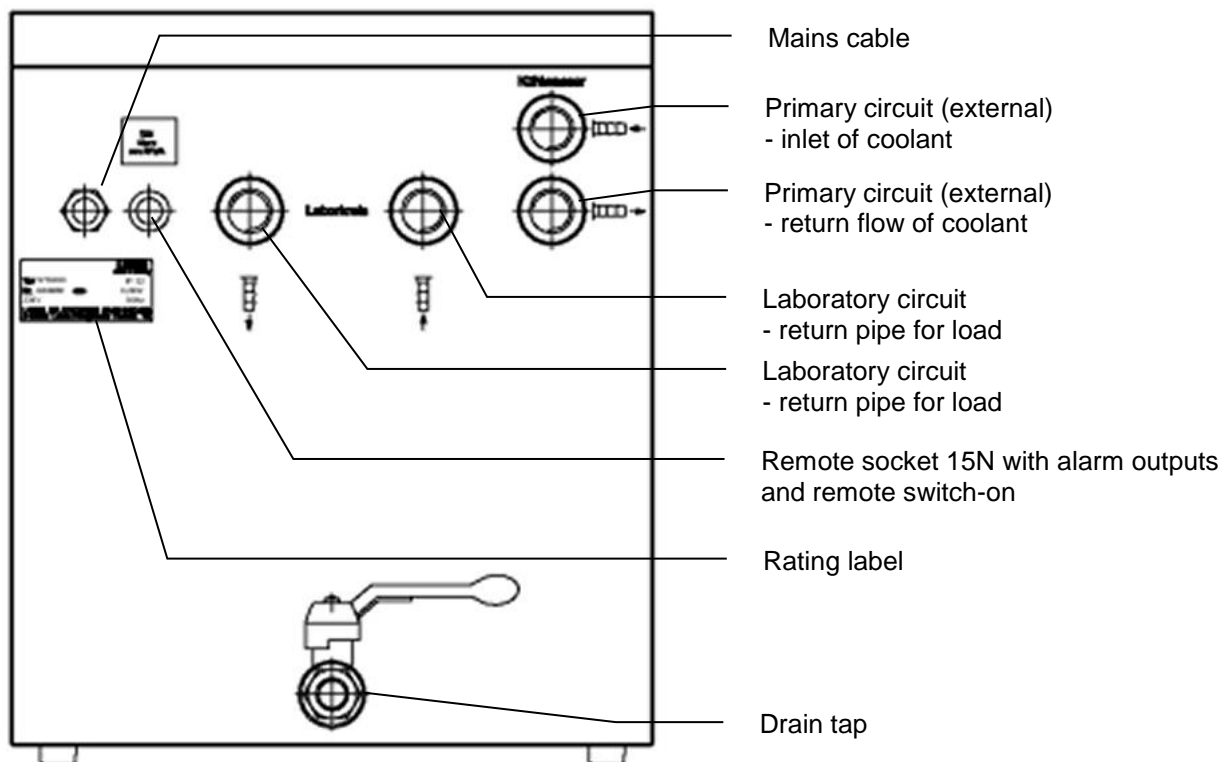
Front of UWT 3000



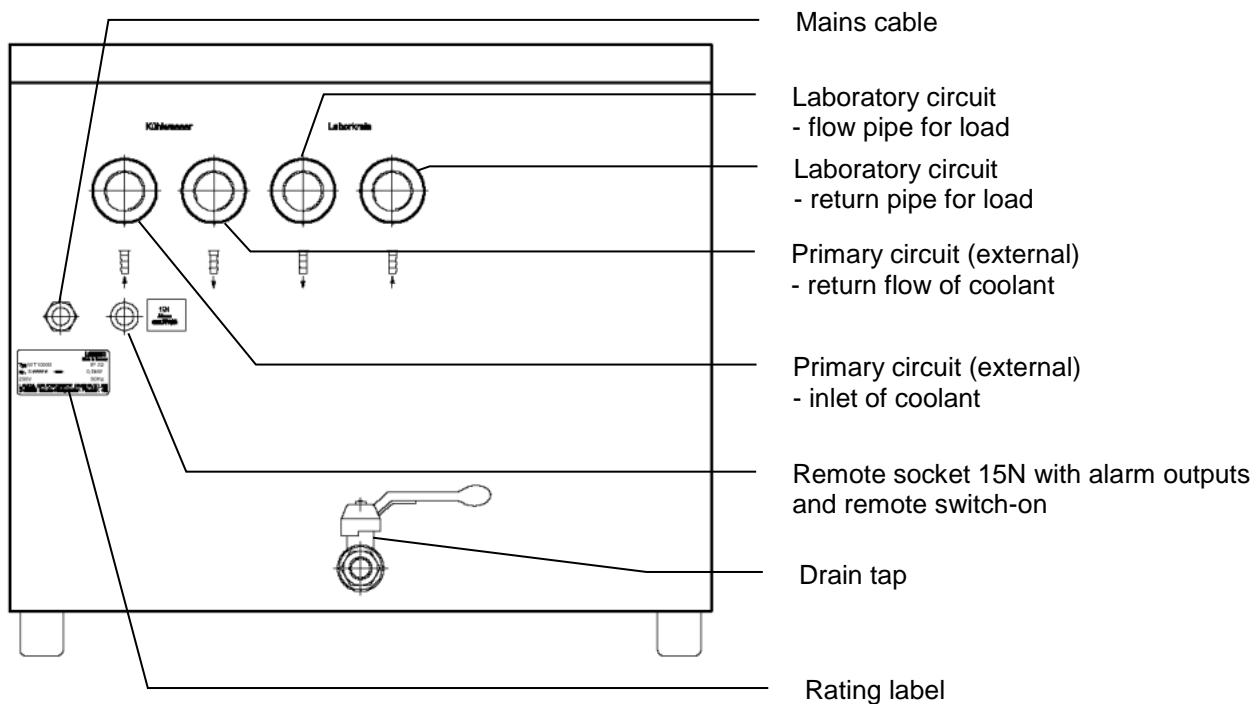
Front of UWT 6000 and UWT 10000



Back of UWT 3000



Back of UWT 6000 and UWT 10000



3 Unit description

3.1 Environmental conditions

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

- Indoor use.
- Altitude up to 2000 m above sea level.
- Foundation must be dense, even, non-slippery and non-flammable.
- Ambient temperature range (\Rightarrow 8.1).
Use only within this range for an undisturbed operation.
- Mains supply voltage fluctuations (\Rightarrow 8.1).
- Maximum relative humidity 80 % for temperatures up to 31 °C, decreasing linearly to 50 % relative humidity at 40 °C.
- Transient over voltage according to Installation Categories (Over voltage Categories) II.
- Pollution degree: 2.

3.2 Unit types

The type designation of the circulation heat exchangers in the Series UWT is composed of the prefix designation UWT and the nominal transfer power of the heat exchanger.

Example: The UWT 6000 has a nominal transfer power of 6000 watts.

3.3 Principle of operation

The circulation heat exchanger dissipates heat from a laboratory circuit (secondary circuit) into an external cooling circuit (primary circuit).

To achieve this, the circulation heat exchanger is connected to a supply of cooling liquid available at the customer's premises (maximum pressure \Rightarrow 8.1). In the circulation heat exchanger the cooling liquid is passed through the primary side of a plate-heat exchanger. Its secondary side is connected to the circuit of the circulation heat exchanger. It consists of an open bath vessel and a pressure pump. When required, a temperature controller opens a solenoid shut-off valve in the primary circuit and dissipates heat through the heat exchanger until the selected set-point temperature is reached.

3.4 Pump

The circulation heat exchanger has an integral pressure pump which provides the transport of the heat transfer liquid in the secondary circuit.

3.5 Temperature display, controller and safety devices

The circulation heat exchanger can be switched on and off externally via contacts on the signal connector 15N.

The units are equipped with a two-state controller on which the set-point temperature of the bath circuit can be set. The momentary actual temperature can be read off the green, three-figure digital display.

At the configuration level an overtemperature alarm threshold can be set (\Rightarrow 6.2).

When this value is exceeded, the light-emitting diode K 2 (next to the temperature display) and the red overtemperature warning lamp illuminate. This signal is also output on a contact on the remote socket 15N.

The bath level is monitored by a float switch. A yellow warning lamp is switched on if the level is too low.



– With a low level or overtemperature in the bath the pump is not switched off!

The mains feed cable is protected inside the unit by one or more safety fuses.

The pump is switched off by a winding temperature detector or overcurrent circuit breaker.

3.6 Interfaces (remote socket 15N)

The following signals (at mains voltage level) are provided on the remote socket 15N: (Pin 4) Unit On, (6) Temperature too high and (5) Low water level. The unit can be switched off via the Pins 1 and 3.

3.7 Substances / materials in the liquid circuits

All of the parts which come into contact with the heat transfer liquid or the coolant are made of: stainless steel, brass, copper, buna EPDM, PVC, polyamide, silver solder.

Suitable heat transfer liquids or coolant are water and glycol/water mixture.

4 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 must be immediately informed so that verification can take place. Please also inform the LAUDA Service Constant Temperature Equipment (Contact ⇒ 7.3).

Standard accessories:

Number	Description	For units	LAUDA Cat. No
1	Operating instructions (this document)	All UWT's	YAWE0029
1	Plug for filling opening	All UWT's	EZV 086
1	Adjusting wheel for bypass valve	All UWT's	not available separately
4	Hose olive G $\frac{3}{4}$ for $\frac{3}{4}$ " hoses	UWT 3000	EOA 004
4	Hose olive G $1 \frac{1}{4}$ for 1" hoses	UWT 6000, UWT 10000	EOA 003
4	Hose clips for $\frac{3}{4}$ " hoses	UWT 3000	EZS 015
4	Hose clips for 1" hoses	UWT 6000, UWT 10000	EZS 016
1	Remote plug with soldering jumper	All UWT's	UD 641

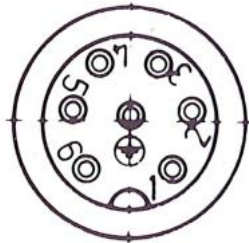
Optional accessories:

Description	For units	LAUDA Cat. No
Overflow valve with range 1.0 – 1.5 bar; connections G1" internal thread, brass -10 to +150 °C	UWT 10000	EV 066 With spring EVE 023

5 Preparations

5.1 Siting and connection

6 + PE



View on the solder side of the contact assignment of the remote plug for socket 15N:

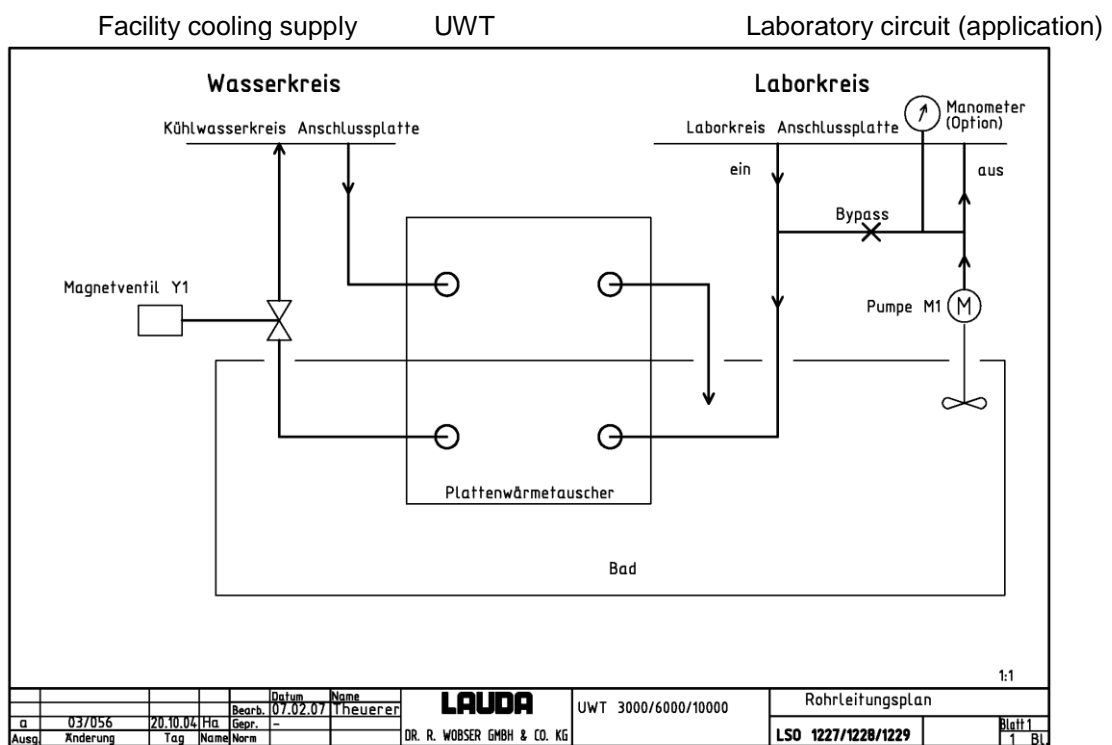
- 1 Remote switch-on
- 2 Common for 4, 5, 6
- 3 Remote switch-on
- 4 Pilot lamp ON
- 5 Overtemperature warning
- 6 Low level warning
- PE Unit safety earth conductor



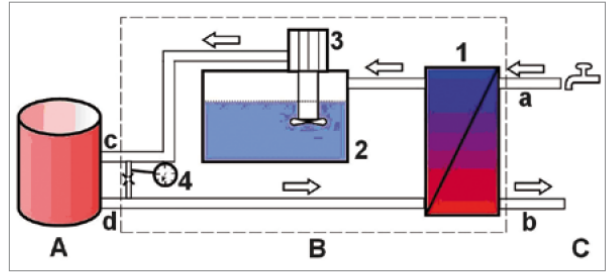
- Site the unit on a level surface.
- The unit must not be put into operation if its temperature due to storage or transport has been reduced below the dew point. Wait approx. 1 hour.
- For operation, contacts 1 and 3 on the remote socket 15N must be joined. To do this, use the remote plug from the accessories supplied with the unit.
- Further status signals are present on contacts 4, 5 and 6 of the remote socket 15N.
- Connect the external coolant inlet and return (maximum pressure (\Rightarrow 8.1)).
- Connect the load to the laboratory circuit.
- Always ensure the largest possible inside diameter in the external circuit (olives, hoses, loads). This gives larger flow rates and therefore better temperature stabilisation.
- Secure hoses against slippage by using hose clips.



- Mains voltage is present on the contacts on the socket 15 N.



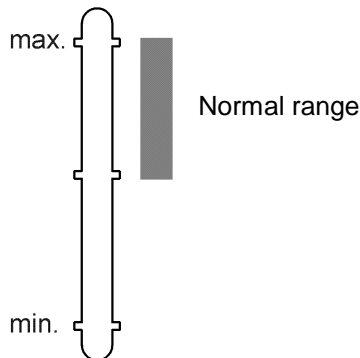
A: Application
 B: UWT
 C: Facility cooling supply
 a: Inlet of coolant
 b: Return flow of coolant
 c: Flow pipe for application
 d: Return pipe for application
 1: Heat exchanger
 2: Bath vessel with heat transfer liquid
 3: Immersion pump for circulation
 4: Pressure indication for UWT 6000 and UWT 10000



Schematic circuit diagram of LAUDA circulation heat exchangers

5.2 Filling

The circulation heat exchangers in the primary and laboratory circuits are designed for operation with water or a glycol/water mixture.



- Close the drain tap (located right at the bottom on the back panel).
- Remove the plug from the filling opening at the front. Use a funnel for filling, if required.
- Fill the unit with heat transfer liquid up to the top level mark.
- A low level warning occurs if the level is outside of the normal range.
- For easier venting of the pump, the outflow to the laboratory cooling circuit (pump outflow) should be open when first filling; otherwise the pump may be permanently damaged.
- The units are intended for use with water or glycol/water mixture in the coolant circuit and laboratory circuit.
- Only pressure-sealed loads can be connected.
- Make sure that when connecting an external load, the liquid level does not fall impermissibly through filling the load → refill with liquid, if required.



- Contaminated cooling liquid in the cooling circuit can lead to blockage of the heat exchanger.
- With unintentional closure of the laboratory circuit return, then with units with a maximum discharge pressure > 1 bar pressures can arise which can damage glass apparatus!
- Observe the maximum permissible pressures for the connected apparatus.
- With loads situated at a higher level and with the pump stopped and air seeping into the thermostatic circuit, then even with enclosed circuits the external volume can run empty, resulting in overflowing of the reservoir.

5.3 Draining / frost protection

If the unit is to be taken out of operation for a longer period of time or if ambient temperatures below 0 °C are to be expected, the unit must be drained. This must be carried out in two steps:

Draining the cooling liquid circuit:

- Remove the cooling liquid hoses.
- Reduce the set-point temperature. This causes the solenoid valve "Cooling liquid" to open (LED K 1 next to the temperature display illuminates).
- Using compressed air or a similar gas applied to the cooling liquid inlet, drain the cooling liquid circuit.
- Alternatively: With the solenoid valve "Cooling liquid" switched on apply suction to the connection "Cooling liquid outlet" using a waterproof industrial vacuum cleaner.

Draining the unit:

- Switch off the circulation heat exchanger, withdraw the mains plug.
- Let out the heat transfer liquid through the drain tap; fit a hose for this. The drain tap is located right at the bottom on the back panel.
- Unclip the hoses on the laboratory circuit.
- Open the filling nozzle at the front.
- With compressed air or similar gas blow strongly into the laboratory circuit to empty the heat exchanger.
- Alternatively: First drain the bath contents into a suitable container and then apply suction to the connection "Laboratory circuit return" with a waterproof industrial vacuum cleaner (with the filling nozzle on the front of the unit open).
- Switch off the unit before removing the hose connections.
- Longer periods of dry running, i.e. with operation below the minimum level of the bath, leads to bearing damage on the pump.



6 Starting up

6.1 Mains connection

Compare the details on the rating label (back of the unit) with the mains voltage.





- Only connect units to sockets having a safety earth conductor (PE).
- No liability is accepted for incorrect mains connection.
- Ensure that a cooling liquid connection and the external load are correctly connected.
- Ensure that the unit is filled according to Chapter 5.2.







Note for electric installation on site:

The devices must be protected with a 16 ampere circuit breaker fitted during installation.
Exception: Devices with 13 ampere UK plugs.

6.2 Switching on

- The circulation heat exchanger is already filled and connected.
- Switch on the mains switch at the right side of the control section. The digital display indicates the momentary bath temperature.
- If despite a sufficient level no bath liquid is passed, an air cushion in the laboratory circuit may be preventing the pump filling with liquid. → Vent the laboratory circuit at its highest point.
- The prevailing discharge pressure is indicated on the pressure gauge at the front of the unit (only UWT 6000 and UWT 10000). This enables conclusions to be made regarding the delivery rate and any disturbances.
- Press the set-point indicator key **SET**.
- Changing the set point: While the set point is being displayed, adjust the set point with the keys  and . Then confirm the new value with the key **SET** (press for at least 2 s). Then the actual value is displayed again.
- The LED "K 1" (next to the temperature display) illuminates when the solenoid valve "Cooling liquid" is switched on.
- The red alarm lamp illuminates when the overtemperature threshold is reached. Factory setting 25 °C. The yellow alarm lamp illuminates when the level falls below the minimum bath level. These disturbance signals as well as an operating signal and a "Remote on" contact are present on the remote socket (back of the unit). For starting up, the unit must be connected to a remote plug (connection on socket 15N between PIN 1 and 3). **The pump in the unit continues to run even with a fault condition.**
- To limit the switching frequency of the solenoid valve a minimum stop period (delay time) of 12 s has been programmed at the factory.

- Setting the switching threshold for overtemperature:
Factory setting is 25 °C. Setting in the complete temperature range of the unit is possible. The setting takes place at the configuration level. Programming (setting) of the operating parameters is possible at the configuration level. To do this, press the **SET** key for 10 s. First **SEt** is displayed and then after 10 s **St1**.
- The menu points can be selected with the keys  and . Select the menu point **St2** to set the overtemperature. The entry is activated with the **SET** key. Then select the value with  and . Confirm the changed or new value with the **SET** key (press for at least 2s). The return to the normal menu occurs automatically by a timeout of 10 s.

6.3 Adjusting the outflow pressure with the bypass valve



- The internal bypass valve is set at the factory to 0.5 L/min.
- Adjustment is only necessary if the bath temperature does not reach a new, lower set point with a closed laboratory circuit (no flow).

Only adjust the internal bypass if the flow is unsuitable.

- Withdraw the mains plug and open the unit.
- Close the laboratory circuit (no flow now present).
- Release the side of the bypass valve connected to the laboratory circuit return and extends it with a hose which leads into a beaker.
- Connect the mains again and switch on the unit.



- **Dangerous electrical voltage inside the unit.
This adjustment may only be carried out by specialist personnel!**

- The valve is located inside on the back panel of the unit.
- Adjust the valve with the enclosed hand wheel to 0.5 L/min. Return the heat transfer liquid to the bath.
- Disconnect the mains and close the housing.

7 Maintenance

7.1 Cleaning



- Withdraw the mains plug before cleaning the unit!

Cleaning can be carried out with water with a few drops of a surfactant (washing-up liquid) added and with the aid of a damp cloth.



- No water should penetrate into the control section!



- Carry out appropriate decontamination if dangerous material is spilt on or in the unit.
- The cleaning or decontamination method is determined through the user's specialist knowledge. In case of doubt contact the manufacturer.

7.2 Servicing and repair



- Withdraw the mains plug before all servicing and repair work!
- Have repairs in the control section carried out only by specialists!

LAUDA circulation heat exchangers need practically no servicing. If the temperature stabilising liquid in the laboratory circuit becomes contaminated, it should be renewed.



- **Contaminated cooling liquid in the cooling circuit can lead to blockage of the heat exchanger, pump and bypass valve.**

The following safety fuses are located on the mains circuit board. If a fuse blows, replace it only by a fuse with the specified data:

- Mains fuse F2 and F3 6.3A slow-blow (EEF 006) (→ mains indicator lamp no longer illuminates).
- Low voltage fuse F1 0.2A quick-blow (EEF 002) (→ temperature display does not illuminate).

7.3 Spare parts ordering and rating label

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



Your contact for service and support

LAUDA Service Constant Temperature Equipment
Telephone: +49 (0)9343 503-350 (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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Fax: +49 (0)9343 503-222
E-mail info@lauda.de
Internet <http://www.lauda.de>

8 Technical data and circuit diagram

8.1 Technical data

The figures were determined according to DIN 12876.

		UWT 3000	UWT 6000	UWT 10000	UWT 10000 with stronger pump
Ambient temperature range	°C	5 – 40			
Primary circuit and laboratory circuit connections		G ¾ with hose olive for ¾ " hos- es	G 1 ¼ with hose olive for 1" hoses		
Primary circuit data:		the primary circuit supplies cooling liquid provided by the customer			
Cooling liquid		water or glycol/water mixture			
Operating temperature range	°C	-10 – 20			
Pressure absolute	bar	maximum 10			
Pressure difference	bar	minimum 0.2			
Laboratory circuit data:		the laboratory circuit (secondary circuit) supplies a load			
Heat transfer liquid		water or glycol/water mixture			
Temperature display		green 7-segment LED			
Operating temperature range	°C	8 – 25			
Setting resolution	°C	0.1			
Display resolution	°C	0.1			
Temperature stability	K	±1			
Bath volume from to	L	7 – 12	35 – 45	35 – 45	35 – 45
Factory setting for volume flow through bypass valve for closed laboratory circuit	L/min	0.5	0.5	0.5	0.5
Pump type		Pressure pump			
Discharge pressure, max.	bar	1.0	1.0	2.2	5.5
Discharge flow, max.	L/min	30	30	33	40
Safety devices		Overtemperature alarm, low level alarm, winding overtemperature and overcurrent cut-off for the pump			
Cooling power ①	kW	3	6	10	10
at primary circuit temperature	°C	9			
for primary cct. pressure drop	bar	0.12	0.05	0.07	0.07
for primary circuit volume flow	L/min	6	16	20	20
for laboratory cct. feed temperature	°C	14			
for flow rate UWT	L/min	6	6	20	20

		UWT 3000	UWT 6000	UWT 10000	UWT 10000 with stronger pump
Unit height	mm	410	480	480	520
Overall dimensions W x D	mm	350 x 480	550 x 650	550 x 650	550 x 650
Weight	kg	34	68	74	77
Power consumption 230 V; 50 Hz	kW	0.2	0.2	0.5	0.9
Ingress Protection DIN EN 60529 (IP-Code International Protec- tion)		IP 2 1			
Protection class according to DIN EN 61140 (VDE 0140-1)		Protection class I			

① The supplied cooling power depends significantly on the volume flow in the primary and laboratory circuits. The temperature difference between the primary cooling circuit and the laboratory circuit should be at least 5 K.

Technical modifications reserved.

8.2 EU conformity



The device complies with the basic health and safety requirements outline in the Directives listed below.

- Machinery Directive 2006/42/EC
- EMC Directive 2014/30/EU

LAUDA DR. R. WOBSEER GMBH & CO. KG – Pfarrstraße 41/43 –
97922 Lauda-Königshofen – Germany

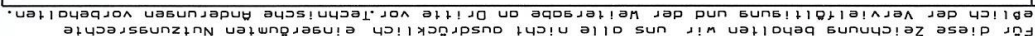


The device does not fall under Pressure Equipment Directive 2014/68/EU because the device is only classified as high as Category 1 and is covered by the Machinery Directive.

8.3 List of components with circuit diagram

Teil-Nr. Part No. Pièce no.	Bezeichnung	Designation	Désignation	Best.-Nr. Cat. No N° Réf. UWT 3000	Best.-Nr. Cat. No N° Réf. UWT 6000	Best.-Nr. Cat. No N° Réf. UWT 10000
A 1	Leiterplatte Niveau/Störung	Printed circuit board Level/Fault	Circuit imprimé Niveau/Perturbation	UL 519-B	UL 519-B	UL 519-B
B 1	PTC-Fühler	PTC-Probe	PTC-Sonde	ETP 023	ETP 023	ETP 023
B 2	Niveau	Level	Niveau	EKS 034	EKS 034	EKS 034
C 1	MKP Kondensator 5mµF	MKP Condenser	MKP Condensateur	ECA 007	ECA 007	ECA 007
F 1	Steuersicherung F0,2A	Control Fuse	Fusible commande	EEF 002	EEF 002	EEF 002
F 2	Sicherung T6,3A	Fuse	Fusible	EEF 006	EEF 006	EEF 006
F 3	Sicherung T6,3A	Fuse	Fusible	EEF 006	EEF 006	EEF 006
H 1	Signallampe Störung	Pilot lamp Fault	Lampe témoin Per- turbation	EXS 059	EXS 059	EXS 059
H 2	Signallampe Störung	Pilot lamp Fault	Lampe témoin Per- turbation	EXS 060	EXS 060	EXS 060
M 1	Pumpenmotor	Pump motor	Moteur de Pompe	EM 101	EM 101	---
	Pumpe kpl.	Pump cpl.	Pompe cpl.	BPS 066	BPS 066	EMP 095
N 1	Regler mit Anzeige	Controller with dis- play	Contrôleur de protec- tion de réseau	EOA 094-1	EOA 094-1	EOA 094-1
T 1	Transformator	Transformer	Transformateur	EIT 109	EIT 109	EIT 109
X 1	Klemmleiste	Strip terminal	Borne plate	EZK 071	EZK 071	EZK 071
X 2	Klemmleiste	Strip terminal	Borne plate	EZK 071	EZK 071	EZK 071
X 3	Steckverbindung REMOTE	Connector REMOTE	Connecteur REMOTE	EQD 056	EQD 056	EQD 056
Y 1	Magnetventil	Solenoid valve	Vanne solénoïde	EVM 025	EVM 089	EVM 089
Z 1	Entstörglied	Interference capacitor	Condensateur d'antiparasitage	ECF 003	ECF 003	ECF 003
Z 2	Entstörglied	Interference capacitor	Condensateur d'antiparasitage	ECF 003	ECF 003	ECF 003
	Netzkabel	Mains cable	Câble secteur	EKN 001	EKN 001	EKN 001

Teil-Nr. Part No. Pièce no.	Bezeichnung	Designation	Désignation	Best.-Nr. Cat. No N° Réf. UWT 10000 mit stärkerer Pumpe UWT 10000 with stronger pump
M 1	Pumpe kpl.	Pump cpl.	Pompe cpl.	EMP 108



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 dangereux dans la cuve.

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

