

Operating Instructions

iVisc

Capillary Viscometer LMV 830

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First some safety information



Before you operate the device, read all the instructions and safety information thoroughly. If you have any questions or concerns, please feel free to call us.

Follow the instructions about installation, operation, etc., as only then can improper handling of the device be eliminated and the full warranty coverage maintained.

- The device is supplied with voltage from a computer through a USB cable.
- Transport the device with care.
- The device and its internal parts can be damaged by:
- dropping,
- vibration.
- The device may only be operated by appropriately instructed personnel.
- Do not put the device into operation when damaged.
- Only use the device for its intended purpose.
- Do not make technical modifications to the device.
- Have service and repair work carried out only by specialists.

The operating instructions contain additional safety information which is identified with a triangle with an exclamation mark . Read and follow the instructions! Ignoring the instructions can lead to severe consequences, e.g. damage to the device or other property, or to personal injury.

Technical modifications reserved.

Special symbols:

	Caution	This sign is used when improper handling can lead to property dam- age and/or personal injury.
F	Note	Here, something in particular needs the reader's attention. In certain circumstances this includes a note about a hazard.
	Reference	Refers to further information in other chapters.



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1 Safety information

1.1 General safety information

Viscosity measurements normally require very constant sample temperatures which are stabilised by means of laboratory thermostats. Hazards arise from this due to very high or very low measuring temperatures, due to fire and the general hazards arising from the application of electrical energy. The user is extensively protected by the application of the relevant standards.

Further hazard sources can arise from the type of material for which the temperature is to be stabilised or from the sample to be measured, e.g. upon exceeding certain temperature thresholds or with the fracture of the capillary and reaction with the tempering liquid.

In some cases hazardous liquids are used as solvents and cleaning agents when measuring viscosity with the iVisc. Here, it is essential to follow the instructions given in the safety data sheet for the hazardous substances.

In particular, when filling and emptying the viscometer and the reservoir and waste containers, suitable protective gloves and goggles must be worn. Before putting the device into operation, all tubing connections must be tightened to ensure there is no leakage.

Before any servicing operation or conversion all hazardous liquid residues must removed as completely as possible.

The device may only be used as intended, that is as described in these operating instructions. This includes operation exclusively by instructed specialist personnel.

It is not feasible to include all possible situations. They remain essentially subject to the judgement and responsibility of the user or operator.



2 Package contents

After unpacking, first check the unit and accessories for complete scope of delivery and any transport damage that may have been incurred. If the device is found to be damaged, the shipping agent must be immediately informed so that verification and appropriate measures may take place. During this process, please inform the LAUDA Service Centre (\Rightarrow 6.4) or an authorised LAUDA representative.



Damaged devices must not be put into operation.

Please check the package contents for complete scope of delivery:



iVisc Capillary Viscometer



USB 2.0 connecting lead



Allen key, 3 mm AF





CD-ROM

Operating Instructions

3 Device description



- 1. Measuring head
- 2. Connection of capillary to filling tube
- 3. Connection of capillary to aeration tube
- 4. Fault indicator
- 5. Measurement indicator
- 6. Start / stop button
- 7. Clamping slide
- 8. Capillary tube connection

- 9. USB 2.0 connection
- 10. Measuring head aeration
- 11. Upper light barrier set
- 12. Viscometer capillary mounting
- 13. Lower light barrier set
- 14. Adjusting screw for capillary tube connection
- 15. Device base

4 Putting the device into operation

4.1 Installing the software

The iVisc only functions in conjunction with the software "LAUDA iVisc", which must be installed on a PC/ notebook/ netbook with the operating system Windows XP, Windows Vista or Windows 7.

Before putting the device into operation for the first time, the appropriate software must be installed. For the initial installation the program starts automatically when the supplied CD-ROM is inserted. The program is self-explanatory. A maximum of two iViscs may be operated in parallel on one PC. The operating program is always assigned to one iVisc. If you want to operate two iViscs in parallel, you must install the software twice. When the serial number is entered, it is assigned to the corresponding device.



A maximum of two iViscs can be operated in parallel on one PC.

a x

0

Cancel

It is essential to only connect the iVisc to the PC once the software has been installed.

1. Language selection for the installation.

Select Language	8	×
Please select the language that you would like to use d installation.	luring the	3
U.S. English Deutsch		
OK Cancel		



2. Starting the installation program

Company:

Phone number:

Fax number:

Get Registration Information

Please enter all required information in below shown fields

Name:

Phone number:

Fax numbe

< <u>B</u>ack

<u>N</u>ext >

4. Serial number of your iVisc (at rear of device)



3. Registration

e-mail address:

Wise Installation Wizard®

Putting the device into operation



5. Select the destination folder for the software.



6. Backup copies for later rollback.

생활 iVisc 1.01	<u> </u>	×		
Backup Replaced Files	C			
This installation program can create backup copies of all files replaced during the installation. These files will be used when the software is uninstalled and a rollback is requested. If backup copies are not created, you will only be able to uninstall the software and not roll the system back to a previous state.				
Do you want to create backups of the replaced files?				
© ⊻es				
⊂ N <u>o</u>				
Backup File Destination Directory				
C:\Programme\Wisc\BACKUP	e			
Vise Installation Wizard®				
< <u>B</u> ack <u>Next</u> >	Cancel			

7. Select the Program-Manager Group.



9. Finish software installation.



8. Install the software.

🚰 Wisc 1.01	8	X
Start Installation	ø	
You are now ready to install Wisc 1.01.		
Press the Next button to begin the installation or the Back button to reenter the instal information.	lation	
Wise Installation Wizard®	Cancel	

10. iVisc 1.01 icon in your destination folder





4.2 Connecting the device

Once the installation is complete the iVisc may be put into operation. Place the iVisc in a stable position in a thermostatic bath and connect it to the PC using the supplied USB 2.0 cable.



The USB 2.0 interface is located at the back of the device.

4.3 Installing the device

Once the iVisc has been connected to the PC, the Device Manager starts automatically.



3.



4.4 User interface



1.	 Status line stating the serial number of the corresponding iVisc. 			
2.	Measurement status details.			
3.	Duration of the test.			
4.	iVisc display	e green:	certified	d iVisc found
		e red:	no certi	fied iVisc found
5.	Start / stop button.			
6.	Screen enlargement / reduction for paral- lel operation of two systems with	The second secon	Transformed States	
7.	Capillaries tab (⇒ 3.4.1).			
8.	Parameters tab (⇒ 3.4.2).			
9.	Display of capillaries used (\Rightarrow 4.4.1).			
10.	Test temperature.			
11.	Display of measured flow times (\Rightarrow 5.3).			
12.	Display of set capillary parameters.			



13.	Symbol for measurement status	Filling	Measuring I	Drain / Pause
		Å	↓	Å
14.	Designation for unambiguous	Sample	Sample number	Operator
	sample assignment	ident.		
15.	Measurement modes	Kinematic	Dynamic	Relative
		Viscosity	Viscosity	Viscosity
16.	Selected capillary	Capillary number a	and capillary constant	
17.	Other input fields	Relative	Concentration	[g/cm ³]
		Viscosity	Solution viscosity	[mm²/s]
18.	Measurements	Kinematic	Mean of flow time	[s]
		Viscosity	Standard deviation	[s]
			Kin. energy correction	[s]
			Kinematic viscosity	[mm²/s]
		Dynamic	Mean of flow time	[s]
		Viscosity	Standard deviation	[s]
			Kin. energy correction	[s]
			Kinematic viscosity	[mm²/s]
			Dynamic viscosity	[mPas]
		Relative	Mean of flow time	[s]
		Viscosity	Standard deviation	[s]
			Kin. energy correction	[s]
			Relative viscosity	
			Reduced viscosity	[cm³/g]
			Inherent viscosity	[cm³/g]
19.	Further selection menu	Relative	Measure Mode: Relative Viscosity Capillary Number 3 0.030000	▼ Times mm²/s² 63.64 C2.54
		Viscosity	Concentration: g/cm² Solvent Viscosity: mm²/s	63.34 63.71 63.78
			Mean: 63.663 s Standard deviation: 9.146 s Kinetic energy corr.: 9.412 s	63.50
			Helative Visc. 1.89754 Reduced Visc. cm²/g Inherent Visc. cm²/g	rent 💌
			Sample Ident. Sample No. Measur K-V-8 Dynam V-8	rent slue p. <u>Result</u> illmeyer 0,79894
			Dynam V-M Kinema V-M V-S	aron 0,79871 artin 0,82239 chulz-Blaschke 0,90229
20.	Display of test results.			

4.4.1 Managing capillaries

Capillaries are managed in the capillary list. Upon starting for the first time no capillaries are applied. The window is blank.

It is possible to apply new capillaries at any time, to select them and to modify and delete the parameters.

- 1. Capillary number.
- 2. Capillary size.
- 3. Capillary constant
- 4. Device No. or field for remarks.
- 5. The over-pump time assigned to the capillary [s]
- 6. The pause time assigned to the capillary [s]
- 7. The pump pressure assigned to the capillary

1	2	3	4			
\backslash	\backslash	\setminus	\backslash			
	Capillar	∖ utiet In				
			-arameter	 Divise Ne		
	1	oize Ic	1.25	5630087). 7 nem	
	3	lc N	0.030000)		
	6	lc	1	, 5630087		
5 - -						
о —	Overp	umptime				1.6 s
0-			0		10	
0	Pause	time:				20 s
	Dum-				90	20
/	Eump	pressure				30
			Min.		Max.	



4.4.1.1 Applying / changing capillaries

The window delete appears by clicking with the right mouse key in the field Capillary list.

Clicking on opens the window "Capillary input". Here, the appropriate capillary size can be selected and suitable values entered. The parameters are set using the slide controls.

Confirm with and the applied capillary appears in the capillary list.



Capillary Input	e x
Capillary number:	
Capillary size:	Jbbelohde 💌 🛛 💌
Capillary constant:	
Device No. / Remarks:	
[
Overpumptime:	1.6 s
0	10
Pause time:	45 s
0	90
Pump pressure:	30
L L L L Min	May
init.	191 0 %.
0K	Cancel

	Error	e x
The capillary constant specified by the manufac- turer must be entered. If entry is incorrect, an	8	Deviation larger than 20% of standard value
error message is displayed.		OK

With a double click on an already applied capillary the window "Capillary input" appears and the parameters and capillary can be adapted. The capillary number is however retained.



4.4.1.2 Deleting capillaries

Click on delete and a warning message appears.



Capillary List		Parameter	
No.	Size	Constant	Device No. / Remark
1	lc	1.25	5630087
2	0	5	
3 6	ic Ic	0.030000	5630087
-			

Confirming with deletes the capillary and being aborts the action.

4.4.2 Managing parameters

Access to the appropriate menu is obtained by clicking the tab Parameter.

Here, all the necessary parameters can be set.

Changing the input and output units by clicking the pull-down menus.

Desired units for Concentration	
g Desired units for l	Concentration
	Desired units for Concentration
dl Mini nt Para	or g/cm ²
	Measurement Parameter

Capillary List Parame	ter	
Stand Parameter		
Kinetic energy C	orrection	
Automatic Calcu	lation	
Error Calculation		
C December of all		
Percentage devi	lation	
O Percentage (rep	eated)	
Desired units for Cor	ncentration	
-		
	or	g/cm³ 🔻
	,	
Measurement Parame	ter	
Measurement Parame Pre-measurement:	ter	
Measurement Parame Pre-measurement: Main-measurement:	ter 2 3	
Measurement Parame Pre-measurement: Main-measurement: Max. std. dev.:	ter 2 3 0.5	8
Measurement Parame Pre-measurement: Main-measurement: Max. std. dev.:	ter 2 3 0.5	s
Measurement Parame Pre-measurement: Main-measurement: Max. std. dev.: Start delay:	ter 2 3 0.5 0.2	s Min.
Measurement Parame Pre-measurement: Main-measurement: Max. std. dev.: Start delay: K1 or KH:	ter 2 3 0.5 0.2 2.5	s Min.
Measurement Parame Pre-measurement: Main-measurement: Max. std. dev.: Start delay: K1 or KH: Densitu:	ter 2 3 0.5 0.2 2.5 0.998	s Min.
Measurement Parame Pre-measurement: Main-measurement: Max. std. dev.: Start delay: K1 or KH: Density:	ter 2 3 0.5 0.2 2.5 0.998	s Min. g/cm³
Measurement Parame Pre-measurement: Main-measurement: Max. std. dev.: Start delay: K1 or KH: Density:	ter 2 3 0.5 0.2 2.5 0.998	s Min. g/cm³



5 Measurement

5.1 Preparing for a measurement

Insert the selected and filled capillary into the iVisc. The capillary can be used both with a stand or without a stand.



Use Adapter HKB 532 for viscometer types 3 and 4 (Micro-Ubbelohde).



Connect capillary and connect the iVisc to the PC (USB 2.0).



The aeration tubing must be connected to prevent the risk of chemical burns when using hazardous substances







5.2 Starting the measurement

1. Start the "LAUDA iVisc" program

🖸 Lauda iV	isc LMV83	0-09-0010										8-0>
							-	Capil	ary List	Parameter		
iVisc	ſ			•		and a		No.	Size	Constant 1.25	Device No. / 5630087	Bemark
	-			-	ola	ιι		34	0	0.030000		
-		Sample Ident:						6	le	1	5630087	
15		Sample Number: Operator:		Tenpe	ature:	5.0	т					
	i I	Measure Mode:	Kinematic Visc	onity 💌		Times						
	5	Capillary Number		unit/c								
		Mean: Standard deviation: Kinetic energy corr.		8								
J.	1	Kinematic Visc.		mai/s								
ahe	Time	Sample Ident.	Sample No.	Measure Mode	Cap.	Result	-	<u> </u>				
5.07.2009				Kinematic Viscosity	6	0,405	-	I 1				
5.07.2009	18.02:02			Kinematic Viscosity	6	0,402						
5.07.2009	18:07:15	Testprobe	12345678	Kinematic Viscosity	6	0,401		I 1				
5.07.2009	15:54:16	Test heute 1	4711_1	Kinematic Viscosity	6	0,398						
6.07.2009	17:20:57		-	Kinematic Viscosity	6	0,394						
7.07.2009	12:04:33	Test_090717	4711_123	Inhoronk	5	1,332						
							ъČ					
					_		-		_			

3. Add the capillary by drag & drop



2. Enter sample details and select measurement method

Sample Ident.:	test 3		
Sample Number:	123		
Operator:	lab B	Temperature:	25.0 °C
Measure Mode:	Kinematic Viscosity	•	Times
Capillary Number		mm²/s²	
Mean:	S		
Standard deviation:	s		
Kinetic energy corr.:	s		
Kinematic Visc.	mm²/s		

Start the measurement



The measurement runs automatica	Ily and the results are disp	played immediately. The me	asurement can be inter-				
rupted at any time by clicking on	rupted at any time by clicking on Stop or pressing the start button.						
Symbols, description and sec- onds display indicate the status of the measurement.	Pre Measurement: 1 / 2 4.98 s	Main Measurement: 1 / 3	Main Measurement: 3/3				
	Filling	Measuring	Drain / Pause				
Display of flow times and results.		Measure Mode: Kinematic Viscosity Capillary Number 3 0.030000	Times 63.31 63.20 62.89 62.91				
		Mean: 63.050 s Standard deviation: 0.260 s Kinetic energy corr.: 0.420 s Kinematic Visc. 1.87890 mm²/s	63.35				

5.2.1 Relative viscosity

For the measurement of relative viscosity there is the possibility of using the test result of an existing measurement as a reference value in that it is simply transferred by drag & drop from the results table into the field "Solvent viscosity".

However, this procedure is only possible if the desired reference value is the result of a measurement of the kinematic viscosity.

								l
iVisc	-			•	S	Sta	art	
-		Sample Ident.: Sample Number: Operator:			Tempera	ature:	25.0] °C
<u></u>		Measure Mode: Capillary Number Concentration: Solvent Viscosity:	Relative Viscos	sity g/cm² mm²/s	▼ mm²/s²		Times	
		Mean: Standard deviation: Kinetic energy corr.: Relative Visc. Reduced Visc. Inherent Visc.		cm²/g cm²/g	rrent	•		
Date	Time	Sample Ident.	Sample No.	Measure Mo	de	Cap.	Result	[
14.09.2009	21:48:08		1	Kinematic Vi	scosity	4	0,82239	
14.09.2009	21:50:24		/	Kinematic Vi	scosity	4	0,80238	
14.09.2009	21:53:32			Kinematic Vi	scosity	4	0,79688	
14.09.2009	21:56:49			Inherent		4	2,00594	
22.10.2009	07:57:19	test 3	123	Kinematic Vi	scosity	3	1,89754	
22.10.2009	10:13:38	test 3	123	Kinematic Vi	scosity	3	1,8789	_
4								



5.3 Displaying saved measurement results

Results are permanently saved and displayed in the results table. A detailed display is obtained by double clicking on the relevant results row.

Stop showing Result

Clicking on resets the user interface to the starting status.

😨 Lauda i¥i	sc LMV83	0-09-0010										a _ u ×
							-	Capill	ary List	Parameter		
11/100	Γ			•			- 1	No.	Size	Constant	Device No.	/ Remark
IVISC	-				Sta	rt		1 3 5	lc Ic 0	1.25 0.030000 0.001000	5630087	
1		Sample Ident.: Sample Number: Operator:	test 3 123 Iab B	Temp	erature: 2	25	°C	6	lc	1	5630087	
		Measure Mode:	Kinematic Visco	situ 👻		Times						
A-A-	5	Capillary Number	3 0.030	000 mm²/	's²	63.71 63.78 63.50						
		Mean: Standard deviation: Kinetic energy corr.: Kinematic Visc.	63.663 ° 0.146 ° 0.412 ° 1.89754	↓ mm²/s								
Date	Time	Sample Ident.	Sample No.	Measure Mode	Cap.	Result						
14.09.2009	21:48:08			Kinematic Viscosity	4	0,82239						
14.09.2009	21:50:24			Kinematic Viscosity	4	0,80238				Stop sho	wina Result	
14.09.2009	21:53:32			Kinematic Viscosity	4	0,79688				1.00 0110		_
14.09.2009	21:56:49			Inherent	4	2,00594				Print Bes	ult Protocol	
22.10.2009	07:57:19	test 3	123	Kinematic Viscosity	3	1,89754						_
22.10.2009	10:13:38	test 3	123	Kinematic Viscosity	3	1,8789						
•							Ľ					

5.3.1 Printing out the result protocol

Print Result Protocol

result protocol.

Click

to print out a

Dete: 47.07.2000			Time: 49:04:22
Distant for Miss No		1 18/030 00 0040	11118, 12.04.33
Tupo of avaluation	,	Calotive Viscosity	
Semple identification	:	Tent 000747	
Sample identification	•	Test_050717	
Operator Comple number	i	паюц 4744 422	
Sample number	-	4/11_123 c	
Capillary number	i	0 0 020000 mm²/o2	
Capillary constant	÷	0.030000 mm//s=	
Capillary size	-	IC III.I. I.I.	
Type or capillary	;	Oppelonde	
Device-No./Kemarks	:	801150	
Measurement temperature	:	25 °C	
Concentration of solution	;	0.005000 g/cm ³	
Viscosity of solvent	:	0.3035 mm ² /s	
Flow times			
1 18.47 s	5	-18.44 s	
2 15.63* s	6	-18.29 s	
3 18.36 s			
4 18.46 s			
Mean	:	18.404 s	
Standard deviation	:	0.077 s	
Kin. energy corr. acc. Hagenbach	;	4.928 s	
Corrected Mean	:	13.476 s	
Relative viscosity	;	1.33200	
Reduced viscosity	:	66.36700 cm³/g	
Inherent viscosity	:	52.20460 cm³/g	
Date, Signature:			

6 Appendix

6.1 Formulas used

The computational formulas implemented in the iVisc software are given in the following. First the quantities and correction used for the absolute viscosity values (\Rightarrow 6.1.1), then the computations implemented for the solution viscosity values (\Rightarrow 6.1.2) and the current approximation formulas for estimating the intrinsic viscosity values for plastics and other macro-molecules (\Rightarrow 6.1.2).

6.1.1 Computation of absolute viscosity values

Method	Formula	Terms Unit
Kinematic viscosity:	$v = k \times (t - \Delta t)$	v Kinematic viscositymm²/s k Capillary constantmm²/s² t Flow times Δt Kinetic energy correction time
Kinetic energy correction according to Hagenbach	$\Delta t = \frac{E}{k \times t^2}$	<i>E</i> Kinetic energy correc- s mm ² tion factor
Dynamic viscosity	$\eta = \rho \times v$	η Dynamic viscosity g/cm ³ ρ Density

6.1.2 Formulas used for solution viscosity values

Method	Formula		Terms	Unit
Relative viscosity:	$v_{rel} = rac{v_{solution}}{v_{solvent}}$	V _{rel}	Relative viscosity	
Specific viscosity:	$v_{spec} = v_{rel} - 1$	V _{spe} c	Specific viscosity	
Reduced viscosity:	$v_{ral} - 1$	<i>v_{red}</i>	Reduced viscosity	cm ³ /g
(Viscosity number, VZ)	$v_{red} = \frac{R}{C}$			
Inherent viscosity	$\log v_{rel}$	v_{inh}	Inherent viscosity	cm ³ /g
(log. viscosity number)	$v_{inh} = \frac{C}{C}$		Concentration	g/cm°
K-value accord. to Fickentscher	$K = \frac{a - 1 + \sqrt{1 + \left(\frac{2}{C} + 2 + a\right) \times a}}{1 + \left(\frac{2}{C} + 2 + a\right) \times a}$	K C	K-value Concentration	g/cm ³
(PVC), polyvinyl acetate (PVA)	150 + 300C where: $a = 1.5 \times \log v_{rel}$			

6.1.3 Approximation formulas for estimating the intrinsic viscosity

Listed below are the available approximation formulas for estimating the intrinsic viscosity values for plastics and other macro-molecules by using the above solution viscosity coefficients for a specified polymer concentration and polymer-specific adaptation parameters.

In contrast to the LAUDA PVS system, with the iVisc it is not possible to automatically accept a dilution series for the determination of the intrinsic viscosity according to the extrapolation method nor is it possible to graphically display it.

Method	Formula	Terms	Unit
Solomon-Ciuta e.g. for: PMMA and others	$v_{\text{int}} = \frac{\sqrt{2 \times \left(v_{red} \times C - \ln v_{rel}\right)}}{C}$	$\begin{array}{ll} v_{int} & \text{Intrinsic viscosity} \\ v_{red} & \text{Reduced viscosity} \\ C & \text{Concentration} \end{array}$	cm ³ /g cm ³ /g g/cm ³
Schulz-Blaschke e.g. for:PE (polyethylene), PP (polypropylene) and others	$v_{\text{int}} = \frac{v_{red}}{1 + K_{SB} \times C \times v_{red}}$	K_{SB} Schulz-Blaschke constant (e.g.: $K_I = 0.27$ for PE)	
Billmeyer e.g. for: PETP , PBTP (polyethylene(butylene) terephthalate) and others	$v_{\text{int}} = \frac{1}{4}v_{red} + \frac{3 \times \ln v_{rel}}{4C}$	(No other parameters required)	
Huggins e.g. for: PS (polystyrene) and others	$v_{\text{int}} = \frac{\sqrt{1 + 4K_H \times v_{\text{spec}}} - 1}{2 \times C \times K_H}$	<i>K_H</i> Huggins constant	
Martin e.g. for: cellulose, -acetate and others	$\log v_{red} = \log v_{int} + K_{MT} \times v_{int} \times C$	K_{MT} Martin constant (e.g.: K_{MT} =0.13 for CED)	
Maron For special polymers	$v_{\text{int}} = \frac{v_{\text{spec}} + K_{MR} \times \log v_{\text{rel}}}{(1 + K_{MR}) \times C}$	K_M Maron constant R	



6.2 Update

It is possible to install a current firmware update for your iVisc via the LAUDA home page.

😰 i¥isc Updater 1.00	ð	×				
LMV830-09-0010						
Programversion: 1.01	Update Firmwa	are				

P

When updating the software, only one iVisc must be connected to the computer!

6.3 Technical data

iVisc Capillary Viscometer						
Meniscus detection		Optical (near infra-red)				
Light barrier control		μP				
Sample temperature range	°C	-20 to 150				
Ambient temperature	°C	10 to 45				
Time measuring range	S	up to 9999.99				
Recommended measuring range for flow time	s	301000				
Viscosity range	mm²/s	0.3 to 30000				
Time measurement resolution	S	0.01				
Time measurement error	ppm	1				
Overall power consumption	W	1				
Dimensions (WxDxH)	mm	95x96x425				
Voltage supply		USB				
Weight, net	kg	1.4				

6.4 Accessories

Description	Application / function	LAUDA order no.
Stand	Secure mounting of capillary	UG 003
Adapter	Mounting for Micro-Ubbelohde	HKB 532
Connection cap, small	Aeration connection	HKA 147
Connection cap, large	Pressure connection	HKA 148
Viton tubing 3×1.5	Tubing (available by the meter)	RKJ 021
USB 2.0 AB cable	Power supply for iVisc	EKS 083
Centring piece	Overflow connection	HX 630
PC; notebook; netbook	Control of the iVisc	Upon request



6.5 Repair and service information



If you want to send in a device for repair, it is essential to first consult the LAUDA Instrument Service or an authorised representative.

Your contact for maintenance and expert service support: LAUDA Instrument Service SMG

Phone:

+49 (0)9343/ 503-148 Mr. Stastny (Techn. Support) +49 (0)9343/ 503-128 Ms. Brömel (Support)

We are available at any time for questions, concerns, ideas and feedback.

LAUDA DR. R. WOBSER GMBH & CO. KG Postfach 1251 97912 Lauda-Königshofen Germany Phone: +49 (0)9343/ 503-0 Fax: +49 (0)9343/ 503-222 e-mail: info@lauda.de Internet: http://www.lauda.de

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BESTÄTIGUNG / CONFIRMATION / CONFIRMATION

IC	no
	ЫП

An / To / A:

LAUDA Dr. R. Wobser	•	LAUDA Service Center	•	Fax: +49 (0) 9343 - 503-222
Von / From / De :				
Firma / Company / Entrep	rise:			
Straße / Street / Rue:				
Ort / City / Ville:				
Tel.:				
Fax:				
Betreiber / Responsible p	erson /	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):

Тур / Туре / Туре :	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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