

**IKA**®

# Laboratory Reactors LR 1000



**designed**  
to work perfectly

# Laboratory Reactor | LR 1000 system

The IKA® LR 1000 system is a modular, expandable laboratory reactor designed for optimizing chemical reaction processes as well as for mixing, dispersing and homogenization applications at the laboratory scale. The system can be adapted for a wide range of applications and specific requirements, especially for applications suitable for the cosmetic and pharmaceutical industries.

Both the basic and control versions of this modular system are conceptually similar, except that the control version comes equipped with the following enhanced features: TFT display, USB interface for PC control via labworldsoft®, the possibility to connect a pH electrode and many more user friendly features.

**3** Year warranty\*

\* 2+1 years after registering at [www.ika.com/register](http://www.ika.com/register), glassware and wearing parts excluded

Protection class according to DIN EN 60529: IP 21



reddot design award  
winner 2013

## LR 1000 basic



Digital display for monitoring of speed and temperature



C/T selector button for choosing between the counter or the timer function



Heating block or medium temperature control via attachable PT 100



Hot surface warning to prevent burns



Adjustable safety circuit



Integrated safety shut down when vessel or lid is removed from the base



Connections to attach a cooling source to the back of the unit



IKA+

### Special safety features

#### Integrated safety shutdown!

The stirrer is automatically stopped when the reactor vessel or lid is removed.

## LR 1000 basic Package



The LR 1000 basic system enables the operator to stir, heat, cool and control the temperature inside the reactor vessel. The PT 100.5 temperature sensor and the sensor receptacle LR 1000.61 are included with this basic package. Just like its bigger brothers, the LR 2 ST series reactors, the LR 1000 can be adapted to your application by adding accessories for operation under vacuum or for homogenization and dispersing requirements.

Additionally, the NS 14 and NS 29 standard joint fittings on the lid allow for the easy attachment of all kinds of glassware (e.g. reflux cooler).

## LR 1000 control



**Large, easy-to-read TFT display** for better image quality and easy navigation



**Torque trend measurement** indicates changes in viscosity of the product



**reddot design award**  
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Possibility to connect **pH electrode**



**USB interface** to control and document rheological changes and other parameters using labworldsoft® software and for updating the firmware



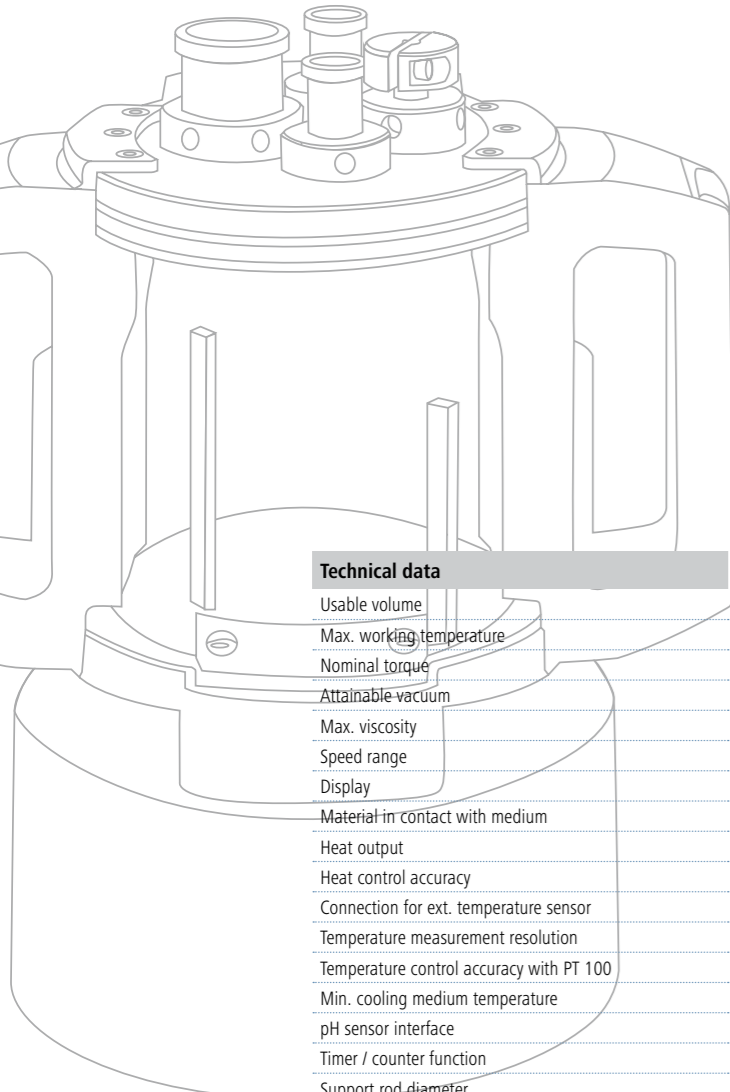
**Expanding on the features of the LR 1000 basic**, the control model is equipped with a number of additional features that allow even further enhancement of your application requirements. The LR 1000 control can be connected to a PC running with labworldsoft®. All measurement data can be monitored and stored conveniently on a PC. The LR 1000 control package also includes the PT 100.5 temperature sensor and the LR 1000.61 sensor receptacle. A USB cable is also supplied with this package.

## LR 1000 control | Hassle-free homogenization

By including the T 25 digital ULTRA-TURRAX® homogenizer along with one of the 3 possible dispersing element configurations, creating application-specific emulsions for cosmetic industry products has never been so easy. After the homogenization process is finished, the T 25 digital ULTRA-TURRAX® drive unit can conveniently be placed at the back of the unit.



# Technical data



### Technical data

Usable volume
Max. working temperature
Nominal torque
Attainable vacuum
Max. viscosity
Speed range
Display
Material in contact with medium
Heat output
Heat control accuracy
Connection for ext. temperature sensor
Temperature measurement resolution
Temperature control accuracy with PT 100
Min. cooling medium temperature
pH sensor interface
Timer / counter function
Support rod diameter
Dimensions (W x D x H)
Weight
Permissible ambient temperature
Permissible relative moisture
Protection class according to DIN EN 60529
USB and RS 232 interface
Voltage
Frequency
Power input



LR 1000 basic Package

300 – 1000 ml
120 °C
3 Nm
25 mbar
100,000 mPas
10 – 150 rpm
LED
AISI 316L, borosilicate glass 3.3, PTFE, FKM
1000 W
± 1 K
yes
0.1 K
± 0.2 K
3 °C
no
yes
16 mm
443 x 295 x 360 mm
16 kg
5 – 40 °C
80%
IP 21
no
230 V
50/60 Hz
1200 W

Ident. No. 0008040100



LR 1000 control Package

300 – 1000 ml
120 °C
3 Nm
25 mbar
100,000 mPas
10 – 150 rpm
TFT
AISI 316L, borosilicate glass 3.3, PTFE, FKM
1000 W
± 1 K
yes
0.1 K
± 0.2 K
3 °C
yes
yes
16 mm
443 x 295 x 360 mm
16 kg
5 – 40 °C
80%
IP 21
yes
230 V
50/60 Hz
1200 W

Ident. No. 0008040200

# LR 1000 | Packages



## LR 1000 basic Package

Ident. No.  
0008040100

Description		Ident. No.
LR 1000 basic base	①	0003600099
LR 1000.1 Laboratory reactor vessel	③	0003602000
LR 1000.61	④	0004664400
PT 100.5	⑤	0002506800
H 11 Mains cable		0001091500

## LR 1000 control Package

Ident. No.  
0008040200

Description		Ident. No.
LR 1000 control base	②	0003601099
LR 1000.1 Laboratory reactor vessel	③	0003602000
LR 1000.61	④	0004664400
PT 100.5	⑤	0002506800
H 11 Mains cable		0001091500
USB Cable - USB A to Micro-B, 2 m		0004335000



# LR 1000 basic and control | Accessories

## Reactor vessel and Stirring elements



LR 1000.1 Laboratory reactor vessel

- > Anchor stirrer LR 1000.11
- > Material of seal: FKM
- > Lid equipped with: 3x NS 14 receptacles, 1x NS 29, including 2x NS 14, 1x NS 29 ground-in glass stoppers and clamps, 1x NS 14 ground joint for vacuum valve
- > Max Volume: 1000 ml
- > Material in contact with medium: AISI 316L, borosilicate glass 3.3, PTFE, FKM
- > Max. working temperature of product inside the vessel: 120 °C

Ident. No. 0003602000



LR 1000.11 Anchor stirrer

Min. usable volume when homogenizing: 300 ml

Ident. No. 0004663000



LR 1000.10 Anchor stirrer with PTFE scrapers

Min. usable volume when homogenizing: 500 ml

Ident. No. 0004663100



LR 1000.20 Flow breaker / baffle

Ident. No. 0004663200

## Dispersing / Homogenization



T 25 digital ULTRA-TURRAX®

High-performance dispersing instrument for volumes from 1 – 2000 ml (H<sub>2</sub>O)  
Adjustable speed range: 3000 – 25,000 rpm

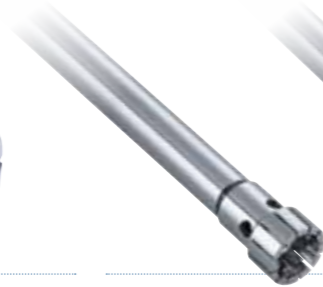
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LR 1000.41 Shaft receptacle

To install the dispersing elements S 25 KV  
Material of seal: FKM

Ident. No. 0004664300



S 25 KV - 25 F Dispersing element

Ultimate fineness, suspensions: 5 – 25 µm  
Ultimate fineness, emulsions: 1 – 5 µm

Ident. No. 0002404000



S 25 KV - 25 G Dispersing element

Ultimate fineness, suspensions: 15 – 50 µm  
Ultimate fineness, emulsions: 1 – 10 µm

Ident. No. 0002466900



S 25 KV - 18 G Dispersing element

Ultimate fineness, suspensions: 10 – 50 µm  
Ultimate fineness, emulsions: 1 – 10 µm

Ident. No. 0002348000

## Temperature measurement



PT 100.5 Temperature sensor

Ident. No. 0002506800



LR 1000.61 Sensor receptacle

To install the temperature sensors PT 100.25 and PT 100.5  
Material of seal: FKM

Ident. No. 0004664400

## pH Measurement

LR 1000.64 pH Electrode

Ident. No. 0004663300

LR 1000.65 pH Electrode receptacle

Ident. No. 0004663400

## Add-on units



KV 600 digital

KV 600 digital is an air-cooled chiller with a small footprint, a large temperature display and a temperature accuracy of ± 1 K

Ident. No. 0003410500

Temperature range	-20 to 40 °C
Temperature display	digital
Cooling power at 15 °C	0.3 kW
Temperature sensor internal	PT 100
Pump connection	M16 x 1
Refrigerant	R290
Max. flow rate	12 l / min
Bath volume	4 l
Weight / Dimensions (W x D x H)	23 kg / 225 x 360 x 380 mm



SC 920 Vacuum pump

The SC 920 vacuum pump system supports remote control over a portable hand terminal, thus ensuring maximum flexibility in the laboratory

Ident. No. 0004583600

Mains connection	100 – 240 V, 50 – 60 Hz
Power consumption	max. 135 W
Current consumption	max. 1.7 A
Dimensions (W x D x H)	423 x 366 x 294 mm
Weight	15 kg

labworldsoft®

labworldsoft® is a multi-purpose software program for measuring, controlling and regulating laboratory devices

Ident. No. 0002970000



Our accessories allow for the reactor system to be adapted in order to accommodate a variety of application needs.



## Food

- Sauces
- Dressings
- Mayonnaise
- Liquid spices
- Cheese spread
- Ready-to-serve meals
- Baby food
- Jams
- Pet food
- Starch solutions
- Alginate



## Beverage

- Fruit juices
- Vegetable juices
- Milk shakes
- Protein drinks
- Liquers
- Sugar solutions
- Flavors



## Pharma

- Ointments
- Gels
- Eye drops
- Eye ointment
- Cough mixtures
- Sugar / salt solutions
- Suppository masses
- Coatings
- Antiseptics
- Lipid emulsions



## Chemical

- Cleaning agents
- Polishing agents
- Sliding agents
- Lubricant
- Hotmelt adhesive
- Polymer emulsions
- Wax emulsions
- Ceramic suspensions
- Silicone emulsions
- Catalyst suspensions
- Impregnating agents
- Pesticides, Fungicides



## Cosmetics

- Creams
- Sun protection products
- Perfumes
- Shaving cream
- Decorative cosmetics
- Shampoo
- Body care products
- Conditioners
- Hand lotion
- Liquid soap
- Tooth paste
- Collagen suspensions
- Carbopol emulsions

## Typical Dynamic viscosity values (Range 1 – 100,000 mPa\*s)

Substance	Viscosity $\eta$ in mPa*s
Water	1
Milk	2
Coffee whipped cream	10
Olive oil	100
Lubricant oil	200
Motor oil	650 – 900
Shampoo	3000
Hand cream	8000
Honey	10,000
Ketchup	50,000
Toothpaste (40 °C)	70,000
Asphalt	100,000

Unless otherwise stated, the values refer to the viscosity at 20 °C and atmospheric pressure

## Torque

Torque is mathematically defined as the vector product of force and lever arm. It is therefore calculated as  $M = F \cdot r$ , where  $M$  is the torque,  $r$  is the lever arm and  $F$  is the force. The magnitude of the force is based on the perpendicular distance from the axis of rotation to the line of action of the force.

The unit of measurement of torque is Nm. For example, in mixing systems, the drive power of an electric motor is delivered to the rotating drive shaft or the drill chuck fixed to the mixing tool. What matters is the transfer of power in the drive to the rotating mixing tool. Torque is the key to the relationship between the mixing tool geometry, viscosity of the medium to be mixed and the speed of rotation. The power is transferred from the motor to the shaft and then to the mixing tool. The torque acts on the mixing tool at the drill chuck.

## Viscosity

The "viscosity" shown in our brochure always refers to the dynamic viscosity  $\eta$ . Viscosity is a measure of the fluid's resistance to flow or change in shape due to internal friction between the molecules. If a fluid has high viscosity, then it strongly resists flow. This is an important parameter to be considered when it is required to create product emulsions and suspensions by mixing and homogenizing or merely in the transfer of fluids from one location to another.

$$1N = [\eta] \cdot (m^2 m / m s) \Rightarrow [\eta] = Ns / m^2 = Pa*s$$

Fluids are either Newtonian or Non-Newtonian. Fluids whose viscosity is constant at all shear rates are called Newtonian fluids (e.g., pure fluids, ideal fluids / water, oil and most gases which have a constant viscosity). Fluids whose viscosity is not constant at all shear rates are called Non-Newtonian fluids (e.g., blood, sand-water mixtures, dough, puddings, asphalt cement, etc.).

Oil is a good example of a highly viscous liquid. It does not flow easily and affects parameters such as the thickness of the lubricating film in bearings, motors, gear units, leakage losses in the hydraulics, pump efficiency and friction losses in pipes.



**labworldsoft®**

IKA® laboratory software labworldsoft® is an advanced software for all your laboratory needs. With the help of this software, you can network up to 64 laboratory devices via one PC. All test parameters can be documented ensuring complete automation of your laboratory experiments. Measurements and processes may be run independently. Long waits and processing times are reduced, which increases productivity.



**Comprehensive Worldwide Service!**

Our dedicated team of engineers provides comprehensive worldwide technical service. Please feel free to contact your dealers or IKA® directly in case of any service queries. Hotline: In the event of an equipment malfunction or technical questions regarding devices and spare parts: call 00 8000 4524357 (00 8000 IKAHELP)



**IKA® Application Support**

Our Application Center spans 400 sqm and offers modern facilities for presenting and testing lab devices and processes. This brings us even closer to our customers and improves our service. Here, prospective buyers and customers can test out processes that involve stirring, shaking, dispersing, grinding, heating, analyzing and distilling. In addition, it also further extends the opportunity to test your own devices and to develop new models.



**Can I connect a reflux cooler to the reactor?**

The NS 14 standard inner ground taper joint receptacles allow for the attachment of any glassware to the reactor with the same corresponding outer standard ground taper joint fitting. If the T 25 digital homogenizer is not used, the NS 29 standard ground taper joint (inner) receptacle can be used as well.

**Can the reactor be equipped with a bottom drain?**

No, this feature is only available starting with our 2 liter reactor series LR 2 ST and up.

**Can I apply any pressure above atmospheric pressure to the LR 1000 reactor systems?**

No, the reactors are designed for operation under atmospheric or vacuum-pressure only. We can provide other solutions in case specific pressures are required. Please contact us for further information.

**Can the reactor be operated with an inline homogenization chamber?**

The LR 1000 is a batch reactor. Inline homogenization is possible with other IKA® reactor and pilot products. Please contact us for further information.



**Application Support!**

For questions regarding applications and processes, you can call our hotline number: **00 8000 4522777 (00 8000 IKAAPPS)\***  
E-Mail: [applicationsupport@ika.de](mailto:applicationsupport@ika.de)

\* Monday – Thursday from 8:30 – 16:30  
Friday from 8:30 – 15:30

**More IKA® Reactors**  
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Subject to technical changes  
Indications not binding for delivery

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