

# IKA

designed for scientists

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MEASURING VISCOSITY | IKA ROTAVISC

## Stepless measurement of viscosities

/// The IKA workflow - now including viscosity measurement

You have been manufacturing, stirring and shaking with IKA laboratory devices for a long time. Thanks to the new ROTAVISC series, you can now process your samples with the proven IKA laboratory device structure right up to the viscosity measurement stage. And we're taking a significant step forward here: With the four ROTAVISC models, you measure steplessly from 0,01 to 200 rotations per minute. There's no need to get used to something new. We'll install your new viscometer exactly where you want it. In addition, the measuring process is intuitive, standardized and complies with the familiar IKA menu structure for laboratory devices.

Simply switch it on and start measuring!

10 YEARS  
WARRANTY\*



## Innovative Viscometer Portfolio

Four devices for four viscosity ranges - but a single, huge functional scope for all: IKA ROTAVISC lo-vi, me-vi, hi-vi I, and hi-vi II precisely and reliably determine the flow curves of your fluids.

## Personalized Application Advice

You can test all of the viscometers yourself at the IKA Application Center. Our experts will analyze your measuring processes and work with you to find out how best to determine the viscosity of your samples.

## Worldwide Service

To opt for an IKA viscometer is also to opt for the excellent IKA technical service in your region. Our team is available worldwide for your service and application needs. Spare parts for your viscometer are guaranteed for 10 years.



\*2+8 years after registering at  
[www.ika.com/register](http://www.ika.com/register),  
wearing parts excluded



## IKA ROTAVISC

/// with the largest range of functions in its class

The new ROTAVISC series determines the liquid viscosity in all areas of application ranging from the laboratory to quality control. The four devices measure in different viscosity ranges. Regardless of a simple or demanding viscosity measurement – the ROTAVISC delivers rapid and accurate results. The scope of delivery includes an ISO standard spindle set, a protective bracket, temperature sensor and stand system.

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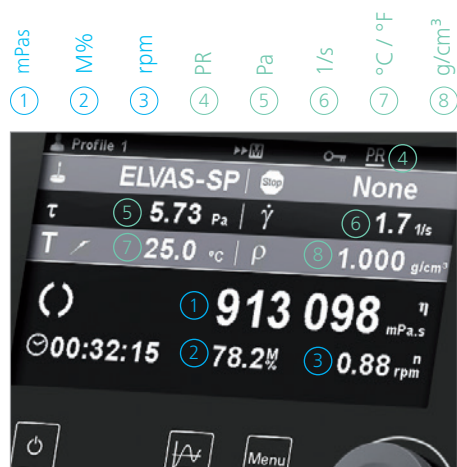
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## Features

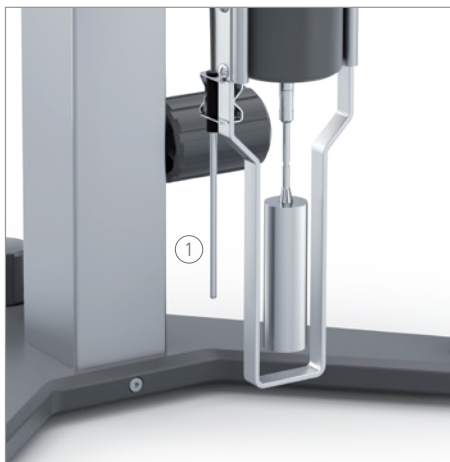
### Parameters / Display

The display shows the following parameters:

- ① viscosity
- ② torque
- ③ rotational speed
- ④ program status
- ⑤ shear stress
- ⑥ shear rate
- ⑦ temperature
- ⑧ density

### Temperature sensor

The temperature sensor is always included in the scope of delivery, because it is recommended to measure the viscosity in relation to a temperature value.



### Temperature control

By using suitable accessories it is possible to measure samples from -100 °C to 300 °C.

### Stepless positioning

The ROTASTAND ensures perpendicular stability. The height of the viscometer can be adjusted steplessly.

The motorized HELISTAND allows you to measure the viscosity of highly viscous samples with a high level of reliability. It moves the mounted viscometer and its rotating body slowly and uniformly up and down in the sample.

### Multiple mountings

Thread adaption, quick connector or hook connector: You attach the spindle to the device in the way that you find most convenient.





## 3 measuring modes

Three measuring modes are available for different applications: accurate, balance and fast.

## Different programs

Ten different programs and ramps can be stored.

## Functions

The starting and stopping of a measurement can be defined individually: With a timer, once a certain torque has been achieved, or once the viscosity has been measured. Labworldsoft® enables any number of program and data recordings.



## Interfaces

There are connection possibilities available for USB and RS 232. This means that control via a PC and data capture are possible.



## Spindles

Four spindles are included in the delivery of ROTAVISC lo-vi; six spindles are included in the me-vi and hi-vi packages.

The HELISTAND packages additionally include a set of six T-spindles for non-flowing samples.

## Viscosity measurement as usual. But better.



### OPERATE THE DEVICE INTUITIVELY ON THE 4,3" TFT DISPLAY.

The large color display offers multilingual menu guidance that is as intuitive as for all other IKA devices.

**YOUR ADVANTAGE:** The tried-and-tested IKA laboratory device structure is now available for your viscometer too.

### PRECISE RESULTS FROM 0,01 – 200 RPM

The accuracy lies at +/- 1% of the maximum value of the measurement range. The reproducibility is +/- 0,2%.

**YOUR ADVANTAGE:** You get results of highest accuracy.

### TAKE STEPLESS MEASUREMENTS

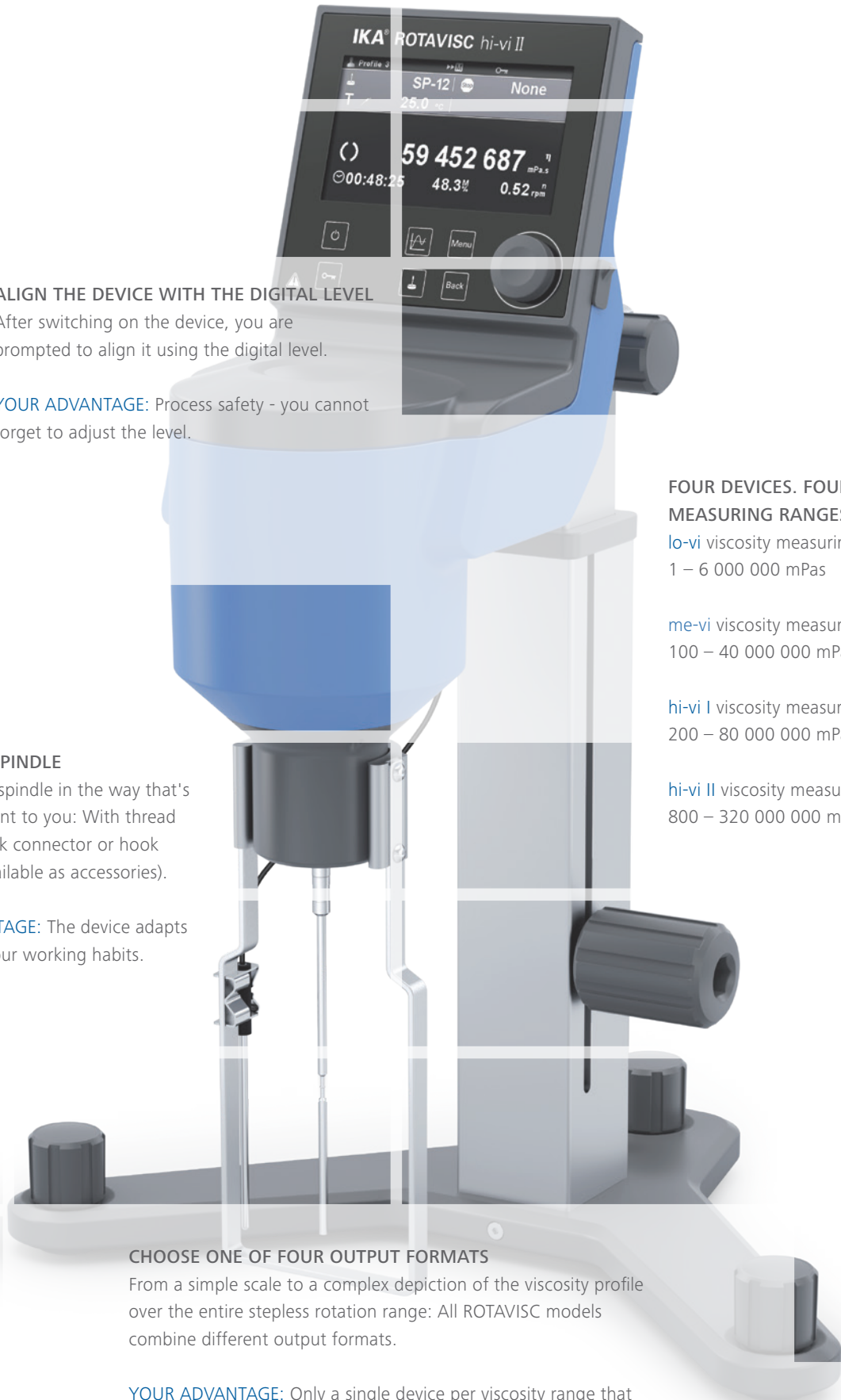
The rotation rate can be set steplessly over the entire measurement range. This allows the stepless programming of a flow curve.

**YOUR ADVANTAGE:** The only seamless viscosity measurement offered by entry-level viscometers.

### EASY SET UP

Delivered in a practical transport case: The viscometer is secured to the ROTASTAND or HELISTAND in no time at all.

**YOUR ADVANTAGE:** Immediately ready to use - even in different locations.



**ALIGN THE DEVICE WITH THE DIGITAL LEVEL**

After switching on the device, you are prompted to align it using the digital level.

**YOUR ADVANTAGE:** Process safety - you cannot forget to adjust the level.

**FOUR DEVICES. FOUR MEASURING RANGES.**

**lo-vi** viscosity measuring range:  
1 – 6 000 000 mPas

**me-vi** viscosity measuring range:  
100 – 40 000 000 mPas

**hi-vi I** viscosity measuring range:  
200 – 80 000 000 mPas

**hi-vi II** viscosity measuring range:  
800 – 320 000 000 mPas

**INSERT THE SPINDLE**

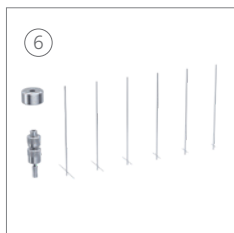
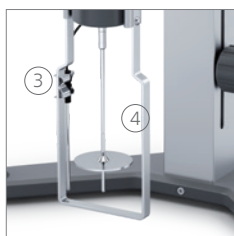
Insert the ISO spindle in the way that's most convenient to you: With thread adaption, quick connector or hook connector (available as accessories).

**YOUR ADVANTAGE:** The device adapts itself to suit your working habits.

**CHOOSE ONE OF FOUR OUTPUT FORMATS**

From a simple scale to a complex depiction of the viscosity profile over the entire stepless rotation range: All ROTAVISC models combine different output formats.

**YOUR ADVANTAGE:** Only a single device per viscosity range that can deliver all output formats.



## Your laboratory, our package

What kind of laboratory do you have? With us, you are sure to find the right package for viscosity measurement.

What do you need? Come and talk to us!

### ROTAVISC Complete

The scope of delivery includes:

- ① ROTASTAND stand
- ② standard spindle set
- ③ temperature sensor
- ④ protective bracket

[ROTAVISC lo-vi Complete](#) | Ident No.: 0025000310

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[ROTAVISC me-vi Complete](#) | Ident No.: 0025000311

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[ROTAVISC hi-vi I Complete](#) | Ident No.: 0025000312

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[ROTAVISC hi-vi II Complete](#) | Ident No.: 0025000313

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### ROTAVISC HELI Complete

The scope of delivery includes:

- ⑤ HELISTAND stand
- ② standard spindle set
- ③ temperature sensor
- ④ protective bracket
- ⑥ T-spindle set

[ROTAVISC lo-vi HELI Complete](#) | Ident No.: 0025008225

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[ROTAVISC me-vi HELI Complete](#) | Ident No.: 0025008226

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[ROTAVISC hi-vi I HELI Complete](#) | Ident No.: 0025008227

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[ROTAVISC hi-vi II HELI Complete](#) | Ident No.: 0025008228

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## Technical data

### TECHNICAL DATA

Viscosity accuracy	1 %
Viscosity repeatability	0,2 %
Display	TFT
Motor rating output	4,8 W
Working temperature	min.: -100 °C max.: +300 °C
Speed	0,01 – 200 rpm
Setting accuracy speed	0,01 rpm
Temperature measurement resolution	0,1 K
Connection for ext. temperature sensor	PT 100
Graph function	Yes
Calibration option (temperature)	Yes
Overload protection	Yes
Operating mode	Timer and continuous operation
Attachment on stand	Extension arm
Interfaces	USB, RS 232, Analog output

### GENERAL DATA

Weight	7,1 kg
Dimensions (W x H x D)	351 x 629 x 372 mm
Permissible ambient temperature	5 – 40 °C
Permissible relative humidity	50 %
Voltage	100 – 240 V
Frequency	50 / 60 Hz
Power input	24 W, Standby: 0,06 W
Protection class according to DIN EN 60529	IP 40

### FOUR DEVICES. FOUR MEASURING RANGES.

#### ROTAVISC lo-vi

Viscosity measuring range	1 – 6 000 000 mPas
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#### ROTAVISC me-vi

Viscosity measuring range	100 – 40 000 000 mPas
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#### ROTAVISC hi-vi I

Viscosity measuring range	200 – 80 000 000 mPas
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#### ROTAVISC hi-vi II

Viscosity measuring range	800 – 320 000 000 mPas
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### STAND FOR ROTAVISC

#### ROTASTAND

Stroke max.	200 mm
Diameter	16 mm
Dynamic load	5 kg
Dimensions (W x H x D)DD)	351 x 318 x 246 mm
Weight	4,8 kg

#### HELISTAND

Stroke max.	142 mm
Diameter	16 mm
Dynamic load	3.2 kg
Overload protection	yes
Height adjustable safety switch	yes
Dimensions (W x H x D)	351 x 343 x 252 mm
Weight	5,5 kg
Permissible ambient temperature	0 - 40 °C
Permissible relative humidity	80 %
Protection class according to DIN EN 60529	IP 40
Voltage	220 - 230 / 100 - 115 V
Frequency	50/60 Hz
Power input/ Power input max.	7 W

## HRC 2 refrigerated and heating circulator



HRC 2 basic  
Ident No.: 0025003742  
HRC 2 control  
Ident No.: 0025004524

Precise tempering to prepare your samples: The compact refrigerated and heating circulator HRC 2 control is renowned for its high energy efficiency, a working temperature range from -30 °C to 100 °C and a powerful and infinitely variable pressure and suction pump. The on-demand and speed-controlled compressor reduces noise and operating costs.

The HRC 2 control in combination with an external temperature sensor is perfectly suitable to precisely temper external closed or open applications.

The high-quality isolation of the 4 l bath allows fast heating and reduces heat input when cooling.

Using the external temperature control circuit is possible for up to 2,5 l thermofluid without a refill. The integrated hopper and drain valve ensure a safe and clean handling of the thermofluid. The easy-to-open front flap allows an easy cleaning of the cooling unit's air filter. There is a drain valve on the front side of the bath. A hose can be connected to empty the bath, so the user does not get in direct contact with the thermofluid.

## STARVISC 200-2.5 control measuring stirrer



STARVISC 200-2.5 control  
Ident No.: 0025003604

Display viscosity even during product development: The IKA STARVISC 200-2.5 control measuring stirrer makes it possible. The result can be read in real-time on the display. STARVISC therefore has a broad range of applications. This is particularly helpful during product development: STARVISC already clearly indicates while running research programmes as to whether the stirred substance can be used as desired.

- > High-precision measurement
- > User-friendly menu for immediate viscosity calculation
- > Removable control unit
- > Powerful stirrer



## Master Plant MP

The IKA Master Plant homogenizing and emulsifying system is a universal mixing system developed for the production of emulsions and suspensions in the pharmaceuticals industry in particular, but also in the food, beverages, cosmetics and chemical industries. The plant is GMP-compliant and guarantees a high degree of precision, safety and reproducibility of the results.

The Master Plant system enables the direct feed of solids and liquids, mixing and dispersing of the vessel contents, heating or cooling of the product and processing under vacuum or under pressure.

## Standard Production Plant SPP

For the production of emulsions and suspensions the Standard Production Plant (SPP) has proven itself in many application areas. Depending on its execution, the Standard Production Plant can be used for cosmetic creams and lotions, for mayonnaise or dressings in the food industry as well as for suspensions and emulsions in the chemical industry or for production of paints and lacquers.

The SPP is an innovative and highly advanced, but cost-effective mixing plant used for all standard process operations like mixing, stirring, homogenizing and dispersing. Due to its simple design, it allows easy operation and guarantees a constant mixing quality.





## Laboratory Reactors

IKA lab reactors are the most unique systems when it comes to optimizing and reproducing chemical reaction, mixing, dispersing, and homogenization processes on a lab scale. The lab reactors can be individually customized to perform numerous tasks, including: production of creams and lotions, the grinding and disintegrating of solids and fibers in liquids or polymers, etc.

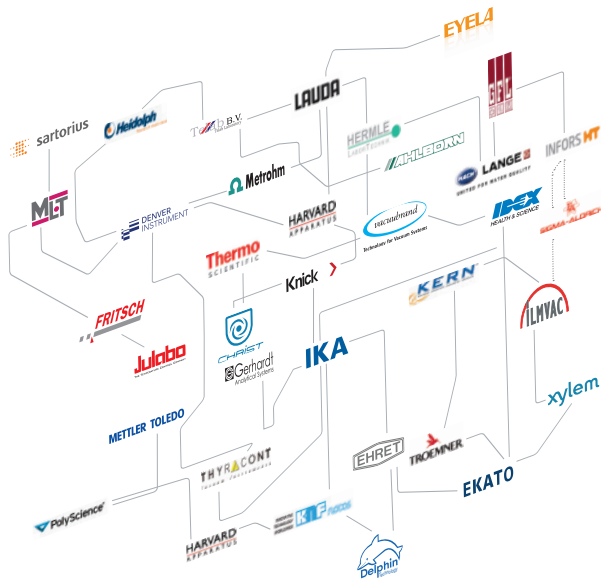


## IKA Overhead Stirrers

Stirrers with perfect basic functions; compact and easy to use: The space-saving high performers of the IKA MICROSTAR and IKA MINISTAR series.

More robust variants can be found in the EUROSTAR series. For example, the new EUROSTAR 100 control P4 offers particularly strong and flexible stirring thanks to its reduction gear. Additionally, it is a great choice for use in laboratory reactors.





## labworldsoft® 6

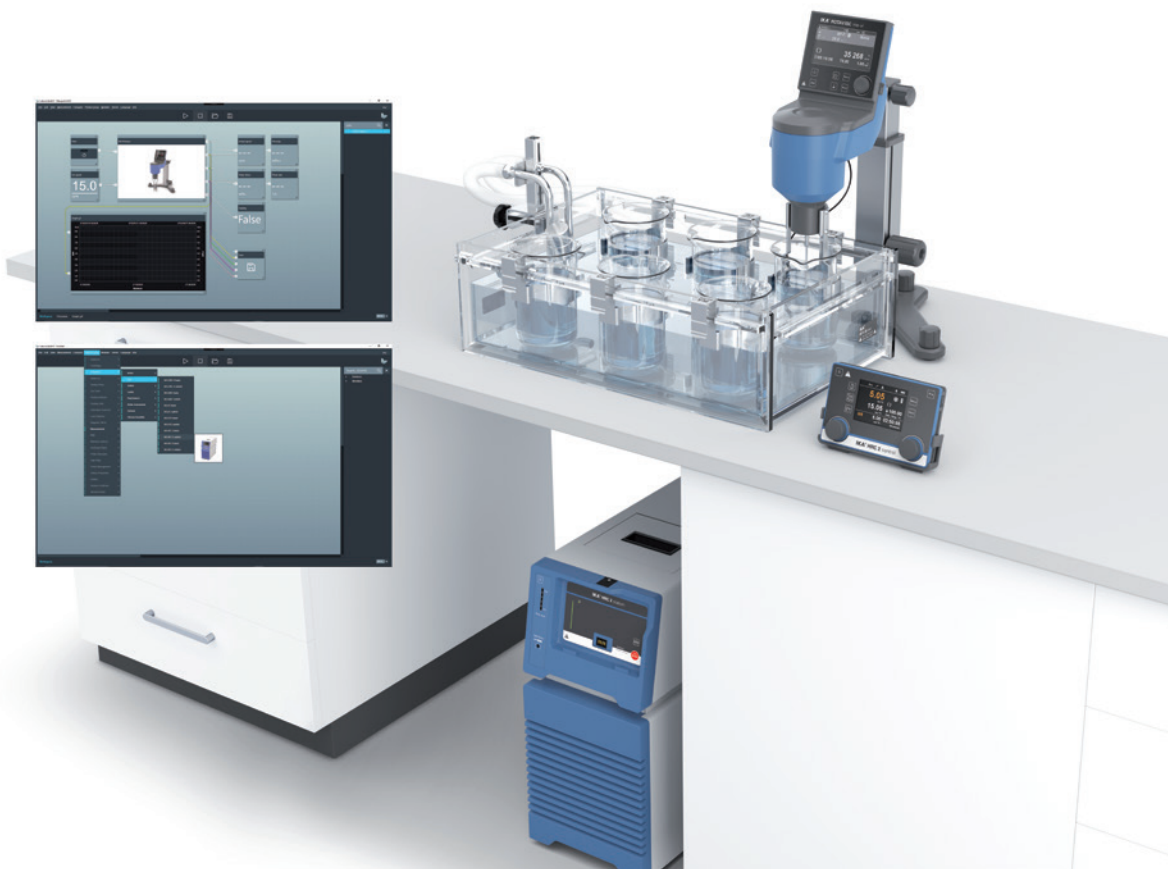
The universal laboratory software labworldsoft® 6 controls your lab devices, automates processes and documents measurements and results. labworldsoft® 6 can simultaneously network any number of laboratory devices using a PC. This makes the automation of your laboratory experiments and procedures easier and more efficient. Communication between the PC and the laboratory equipment is possible via various interfaces, such as RS 232, USB, Bluetooth or via network interfaces.

labworldsoft® 6 allows rapid recording of numerous physical parameters, such as torque, temperature, speed and pH-value. This can be displayed in various ways for ease of analysis and documenting e.g. on a y/t-diagram.

## labworldsoft® 6 Visc

The downsized version labworldsoft 6 Visc software enables the automation of laboratory processes by connecting the ROTAVISC viscometers to other devices, such as a thermostats, through a PC. The software is available as accessory.

Ident No.: 0020101872



## Accessories



### DINS-1 DIN adapter

Adapter to measure the viscosity according to DIN 53019. The set includes a double jacket to quickly heat up or cool down the sample as well as a coaxial cylinder system for the analysis of the sample at a specific shear rate.

Ident No.: 0025000387



### VOLS-1 adapter

Adapter to measure the viscosity of especially valuable and expensive samples. A double jacket with temperature sensor to quickly heat up or cool down the sample as well as a coaxial cylinder system for the analysis of the sample at a specific shear rate is included. Further spindles and chambers for different volumes can be purchased separately.

Ident No.: 0025000352



### ELVAS-1 adapter

Adapter to measure very low viscosities, which are not measured by the standard spindle. A double jacket to quickly heat up or cool down the sample as well as a coaxial cylinder system for the analysis of the sample at a specific shear rate is included.

Ident No.: 0025000390

### ELVAS-C-C stainless steel chamber

Closed stainless steel chamber for the adapter spindle set ELVAS-1.

Ident No.: 0025008373



### O DIN S-1 open DIN spindle set

The set includes a single-wall-open-jacket to quickly dive into the sample liquid as well as a coaxial cylinder system for the analysis of the sample at a specific shear rate and shear stress is included. The maximum measurable viscosity is 50 000 mPas.

Ident No.: 0025000326



### VAN-1 vane spindle set

The vane spindle set allows the viscosity measurement of suspensions. Four vane spindles are included in the delivery.

Ident No.: 0025000407



### SAS-1 spiral adapter

Spiral adapter to measure the viscosity of very sticky and other viscous samples. Additionally, it is possible to analyse the fluid behavior of different shear rates.

Ident No.: 0025000377



### labworldsoft® 6 Starter

Laboratory software for small configurations. Up to three devices of the device library can be controlled simultaneously.

Ident No.: 0020019397

### labworldsoft® 6 Pro

Laboratory software for all configurations. With the Pro version you have limitless access to the device library and can control any number of devices simultaneously.

Ident No.: 0020017366

### labworldsoft® 6 Advanced

Lab software is unique on the market and the cockpit for your digital laboratory.

Ident No.: 0020105873

### labworldsoft® 6 Visc

Lab software enables the automation of laboratory processes by connecting ROTAVISC viscometers to other devices, such as a thermostat, through a PC.

Ident No.: 0020101872

# Accessories



### Standard silicone oil

With the certified standard silicone oil you are able to check the measurement accuracy of your ROTAVISC. The certificate is part of the delivery. Standard silicone oil with different viscosities or temperature conditions can be ordered customer-specifically.

**CAL-O-5** standard silicone oil  
5 mPas  
Ident No.: 0025000397

**CAL-O-10** standard silicone oil  
10 mPas  
Ident No.: 0025000398

**CAL-O-50** standard silicone oil  
50 mPas  
Ident No.: 0025000399

**CAL-O-100** standard silicone oil  
100 mPas  
Ident No.: 0025000434

**CAL-O-500** standard silicone oil  
500 mPas  
Ident No.: 0025000435

**CAL-O-1000** standard silicone oil  
1000 mPas  
Ident No.: 0025000436

**CAL-O-5000** standard silicone oil  
5000 mPas  
Ident No.: 0025000437

**CAL-O-12500** standard silicone oil  
12 500 mPas  
Ident No.: 0025000466

**CAL-O-30000** standard silicone oil  
30 000 mPas  
Ident No.: 0025000467

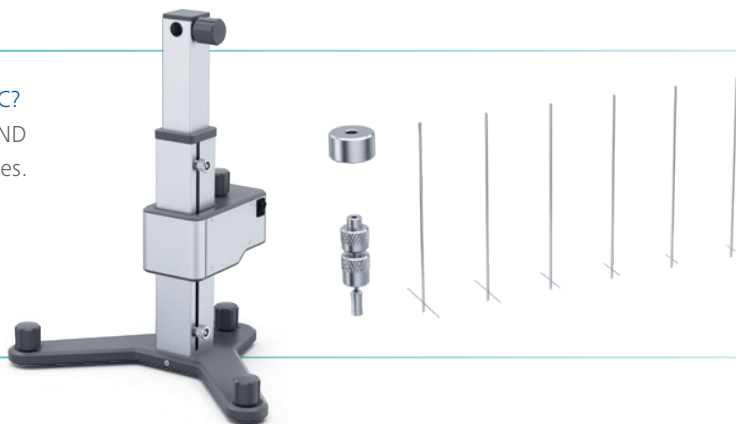
**CAL-O-60000** standard silicone oil  
60 000 mPas  
Ident No.: 0025000468

**CAL-O-100000** standard silicone oil  
100 000 mPas  
Ident No.: 0025000469

### YOU ARE ALREADY WORKING WITH ROTAVISC?

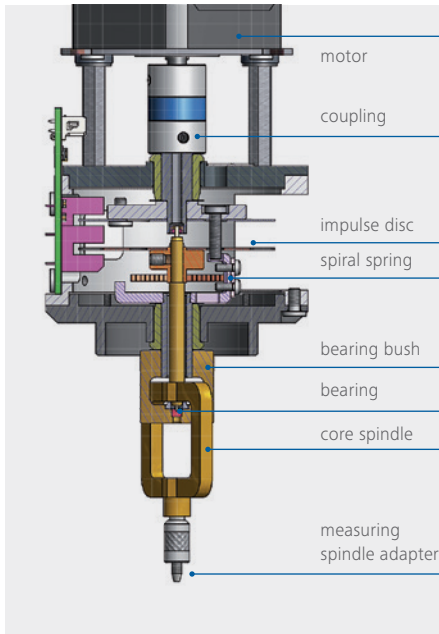
Extend its application range with the HELISTAND Set including an electric stand and six T-spindles.

**HELISTAND SET**  
Ident. No. 0025008224



## Good to know

### Infinitely variable measurement according to the SEARLE principle



The ROTAVISC measurement of viscosity is based on the SEARLE principle.

A measuring spindle rotates in the substance being examined. The viscosity of the sample is determined from the torque required to achieve a given speed, taking into account the spindle used. All this happens automatically without users having to make manual adjustments to the settings.

The viscosity of a substance is often not a constant factor; it depends on the temperature, pressure and other influences. Therefore, different viscosity values will be recorded for the same substance at different shear rates and temperatures, for instance.

### Usability

Using the appropriate accessories, any fluid sample, even down to the low-viscosity range, can be measured properly and reproducibly. This also applies to making relative comparisons. It is also possible to adapt the device to user-specific measuring containers, so that decanting the sample - and thus possibly changing the sample structure - is not required.

Due to the extensive range of measuring geometries, ROTAVISC is suitable for all common measuring requirements and all conceivable free-flowing media. Measurement results can be provided in both relative and absolute terms. The extensive range of accessories and an intuitive user interface ensure that ROTAVISC is fully usable. The necessary parameters can be set in no time, meaning that the staff responsible for the rheological measurements hardly require any training.





## Good to know

### Technical features

Measurements according to DIN 53019, ISO 2555 and relative measurements are possible with the ROTAVISC and the corresponding measuring spindles. ROTAVISC detects the sample temperature, which is important for the viscosity measurement, from a PT 100 sensor that can be immersed in the substance. You can store measurement methods and automate processes without even connecting to a computer. This makes it possible to define both step and ramp programs, which can then be standardized over and over again. The results displayed on the device as a graph.

### Temperature control

The viscosity of a sample is always dependent on its temperature. Therefore, the sample should always be measured isothermally. The IKA tempering equipment meets this requirement by using immersion circulators as well as cryostats for temperatures ranging from -30 °C to 250 °C.

This widens ROTAVISC's field of application, since the IKA laboratory software (see above) for controlling the thermostats can be used to specify rheological temperature ramps and record the change in viscosity.

### Verification / calibration

The ISO 17025 standard requires that measuring instruments be verified. ROTAVISC offers users the option of carrying out this verification themselves. Thanks to the extensive range of appropriate standard fluids, users are fully autonomous, i.e. able to check their device without external maintenance costs. This allows them to check whether all specified readings are within the specified measurement accuracy range.





Personal care  
Environment  
Sewage



Food industry  
Research  
Teaching  
Materials sciences



Nanotechnology  
Commodities  
Textiles



Paper  
Oil industry  
Chemical industry

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## Industries

Viscosities play a role in the most diverse of industries. Our product portfolio is ideally oriented for viscosity measurement in the following fields of application:



Electronics industry  
Beverages  
Cosmetics



Pharmaceutical industry  
Medicines  
Biotechnology

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## Viscometer standards

ROTAVISC measures according to international standards, e.g. according to ISO 1652, ISO 2555 and GB 10247.

## FAQ

### 1. Which IKA rotational viscometer is the most suitable for my sample?

*lo-vi*: for juices, solvents, edible oils, inks, liquid soap.

*me-vi*: for paints / varnishes, mayonnaise, dairy products, ketchup.

*hi-vi I* & *hi-vi II*: for pastes, ointments, molasses, gels.

### 2. How can the accuracy of the ROTAVISC be checked?

IKA sells standard liquids with a viscosity determined at 25 °C. The user can check the device using these fluids.

### 3. How is the spindle mounted on the device?

The delivery includes three different adaptations.

1. The spindle is screwed onto the device.
2. The spindle is attached to the device by means of a quick-fitting adapter.
3. The spindle is attached to the device by means of a hook adapter.

### 4. How long does a measurement take?

To obtain a stable viscosity value, the spindle should have completed 3 to 4 full revolutions in the medium. The lower the speed, the longer a measurement takes.

### 5. How deep does the spindle have to be immersed into the test medium?

Each spindle has a mark on the shaft. The spindle must be immersed into the medium up to this point.

### 6. What is the smallest viscosity that can be measured using ROTAVISC?

1 mPas with *lo-vi* and ELVAS-1 at 60 rpm.

### 7. How exactly does the IKA ROTAVISC work?

The rotational viscometer measures the torque required to turn the spindle immersed in a medium. The spindle is driven by a motor that uses a calibrated spring. The deflection serves as a measurement of the torque and is shown in the display as M%.

### 8. How much sample volume is needed?

The standard spindles in the scope of delivery are suitable for a volume of approx. 500 ml in the 600 ml beaker (low form). Smaller sample volumes can be measured with the absolute measuring systems (coaxial measuring system), such as with the VOLS-1 adapter.

### 9. Why does ROTAVISC measure different viscosities for the same sample?

Generally, viscosity is not a substance-specific constant. The viscosity describes a substance in a well-defined state, for instance at temperature X and speed Y. There are samples which reduce their viscosity with increasing speed, for example ketchup (shear thinning / pseudoplastic). For other samples, the viscosity increases with increasing speed, for example starch solutions (shear thickening / dilatant). Also there are samples that do not change their viscosity either as the speed increases or decreases, such as silicone oil (Newtonian fluid).

### 10. Which measured values does ROTAVISC output?

Temperature:	°C or °F
Speed:	rpm
Measuring time:	hh:mm:ss
Torque:	M%
Viscosity:	mPas, cP, m <sup>2</sup> /s, cSt
Stop conditions:	Time, torque, temperature, viscosity
Density:	g/cm <sup>3</sup>
Shear rate:	1/s (when using a coaxial measuring system)
Shear stress:	Pa (when using a coaxial measuring system)

### 11. How high should the maximum speed be?

Here it is important that the speed and the spindle are chosen so that the laminar flow range is not deviated from. Otherwise, the viscosity values will be too high. For the geometries SP-1, SP-2, SP-6 and ELVAS-SP, the following transition points to a turbulent flow were determined.

1. SP-1 *lo-vi*, 15 mPas at 60 rpm > rpm / mPas = 4
2. SP-2 *lo-vi* 100 mPas at 200 rpm > rpm / mPas = 2
3. SP-6 *me-vi* 100 mPas at 50 rpm > rpm / mPas = 0,5
4. ELVAS-SP 0,85 mPas at 60 rpm > rpm / mPas = 70,6

If the ratio of rpm / mPas exceeds these values, turbulent conditions can occur with the spindles listed. Artificially higher viscosity values can occur with the geometries VAN-SP-1 to VAN-SP-4, due to turbulence at speeds of more than 10 rpm.



designed for scientists

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