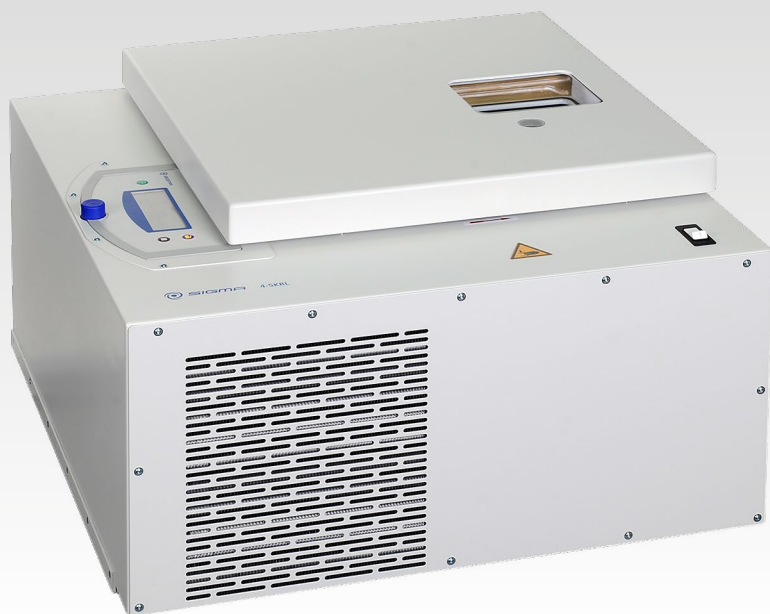




Sigma 4-5KRL



Automated
centrifuge
• Refrigerated

The efficient solution for lab automation



Sigma is a leading international manufacturer of laboratory centrifuges for diverse sectors, including biotechnology, pharmaceutical, medical and environment analysis. Laboratories, institutions and companies everywhere in the world have been relying on premium Sigma quality – Made in Germany – for more than 40 years. The company stands for innovative products and development of durable, energy-efficient and especially user-friendly devices.

The innovative Sigma 4-5KRL is specifically designed for integration into laboratory automation systems (total lab automation). This refrigerated centrifuge is laid out for robot loading / unloading and control via the integrated serial interface. It is ideal for a very high capacity of tubes for clinical in vitro diagnostics (IVD) and for use with microtiter plates and custom tubes and bottles. Its compact

construction facilitate easy integration into workflows, thereby making a significant contribution to higher efficiency the lab. Based on Sigma's many years of experience with centrifuges suitable for robot operation, the Sigma 4-5KRL boasts noteworthy innovations and advanced features. The patented bucket lifting device is one of its unique features. This innovative bucket levelling function ensures that after each centrifugation run, the buckets return to horizontally and vertically reproducible positions at the loading/unloading port. This innovation makes a decisive contribution to boosting process reliability.

Consistent minimisation of non-productive process time enables very high throughput, which is increasingly important in clinical chemistry and haematology. The universally deployable Sigma 4-5KRL is also widely used in research labs for biotechnology and pharmaceuticals.

High performance, universally deployable

Safe, versatile and efficient

The Sigma 4-5KRL features impressively low non-productive process times. For example, lid opening and closing takes less than 2 seconds, and the rotor indexing time is just 8 seconds. Combined with the innovative bucket levelling function for precise positioning of the buckets, this enables quick loading and unloading of the centrifuge, helping to boost throughput.

The low-profile centrifuge lid allows the Sigma 4-5KRL to be placed directly beneath the work platform, enabling minimisation of the robot Z axis length.

The high-performance drive of the Sigma 4-5KRL ensures short braking and acceleration times of just 23 and 24 seconds, respectively. Smooth running allows reproducible centrifugation results to be achieved.

Along with room for 50 stored programs, the advanced Spincontrol L controller offers ten pairs of acceleration and braking curves for optimisation of separation processes. Automatic rotor lifetime monitoring increases operational safety. In automatic mode, the centrifuge is controlled via the integrated RS232 interface, with the control panel optionally being locked.

Sigma 4-5KRL

- Robot-operable centrifuge
- Speed range up to 4,700 rpm
- Maximum RCF 4,470 x g
- Maximum capacity: 140 blood collection tubes or 16 microtiter plates per run
- Automatic rotor identification
- Minimal non-productive process times
- Lid opening and closing in less than 2 seconds
- Rotor indexing from position 1 to position 2 within 8 seconds
- Bucket levelling for extremely high rotor and bucket positioning accuracy
- 10 pairs of braking and acceleration profiles
- Noise level at maximum speed ≤ 59 dB(A)
- High-performance cooling
- Temperature setting range: -10°C to $+40^{\circ}\text{C}$
- Pre-cooling program
- Standstill cooling
- Rotor life monitoring for high safety
- Reliable imbalance: 20 g
- Robust device designed for continuous duty
- Control via RS 232 interface



Rotors and accessories

Custom solutions for system integration

The sturdily built Sigma 4-5KRL is specifically designed for operation with swing-out rotors. With the standard accessories, for example, up to 140 blood collection tubes or 16 microtiter plates can be centrifuged per run with a maximum RCF of 4,470 x g.

Taking into account customer-specific loading concepts, Sigma develops solutions matched to the relevant tube types and throughput

requirements. The maximum capacity of the usable tubes, plates or racks is determined individually and adapted to the general conditions and constraints in each case. All accessories are made from certified high-grade materials and are able to withstand very high stresses.

Standard swing-out rotors and buckets

Swing-out rotor 91318 with bucket 91319

- Max. capacity: 100 x 15 ml*
- Max. load per bucket: 900 g
- Max. speed: 4,700 rpm
- Max. RCF: 4470 x g
- Angle: 90°

* Theoretical maximum value with maximum packing density



MTP swing-out rotor 91318 with bucket 91320

- Max. capacity: 16 microtiter plates*
- Max. plate height: 60 mm
- Max. load per bucket: 500 g
- Max. speed: 4,700 rpm
- Max. RCF: 3,877 x g
- Angle: 90°

* Theoretical maximum value with maximum packing density



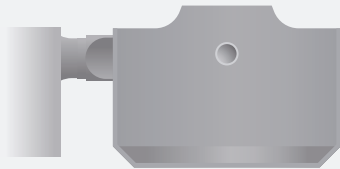
Bucket levelling function

Innovative feature for maximum process reliability

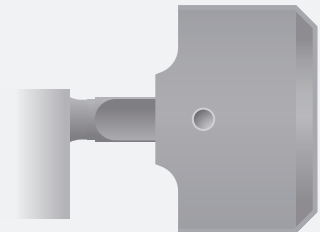
Particularly for loading and unloading, exact positioning of the tubes or adapters to be picked up is critically important. The robot arm attempts to grasp them at a defined position. If the mating surface for the gripper is not at the prescribed position, malfunctions and/or downtime can occur. The innovative bucket levelling function pro-

vides a high degree of safety and reliability for centrifuge loading and unloading. Three movable metal pins in the bottom of the centrifuge chamber lift the bucket located below the removal port to a defined position. This way the bucket position is always the same each time, regardless of which bucket or adapter is used.

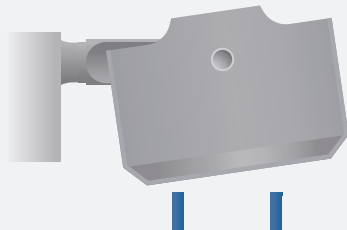
The centrifuge is at rest and the buckets are oriented horizontally (0° angle).



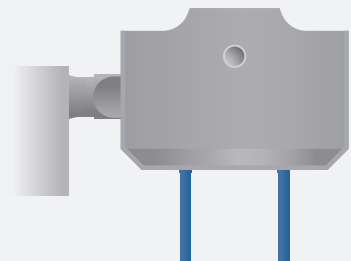
During the centrifugation run the buckets are swung out vertically (90° angle).



After the end of the centrifugation run, the buckets may not swing completely back to their original position (for example, due to insufficiently lubricated rotor support bolts or asymmetric loading).



Three metal pins emerge from the chamber bottom and raise the bucket slightly to achieve exact positioning.



More on the Web! View our video to learn more about the Sigma 4-5KRL. Scan the QR code or go directly to the website:

www.sigma-zentrifugen.de/en/sigma-4-5krl

Premium quality

Made in Germany

The Sigma 4-5KRL centrifuge meets the highest technical requirements of laboratory standards. Developed and produced at our facility in Osterode, Germany, it is a high-performance, durable and energy-efficient quality product and conforms to the latest safety, emissions and environmental standards. Sigma guarantees the availability of spare parts and wearing parts for at least 10 years. Furthermore,

you benefit from our extensive services portfolio, including commissioning, maintenance, device calibration and more.

Our qualified service technicians are ready to provide professional maintenance and repair as well as loaner devices if necessary. All support services are designed to maintain reliability and optimise system availability.

Sigma Service

For maintenance and repairs please contact our Service department at www.sigma-zentrifugen.de/en/service

Sigma 4-5KRL

Max. capacity [ml]	
Swing-out rotor	140 blood collection tubes / 16 microtiter plates
Max. RCF	4,470
Maximum speed [rpm]	4,700
Minimum speed [rpm]	100
Noise level at maximum speed (approximate) [dB(A)]	
Swing-out rotor 91318 with bucket 91319	≤ 59
Max. acceleration time [s]	
Swing-out rotor 91318 with bucket 91319	≤ 23
Max. braking time [s]	
Swing-out rotor 91318 with bucket 91319	≤ 24
Power consumption [W]	2,200
Height x width x depth [mm]	406 x 677 x 680
Height with open lid [mm]	890
Weight without rotor [kg]	135

Calibration

Documented proof of compliance with essential technical parameters.

Speed or run time (Item no. 17713)
Speed and run time (Item no. 17714)
Speed, run time, temperature (Item no. 17715)

Device qualification (IQOQ)

This comprehensive device qualification includes installation qualification and metrological checking of all functional parameters with a rotor.

IQOQ package for:

Unrefrigerated centrifuges (Item no. 17710)
Refrigerated centrifuges (Item no. 17711)
An additional rotor (Item no. 17712)

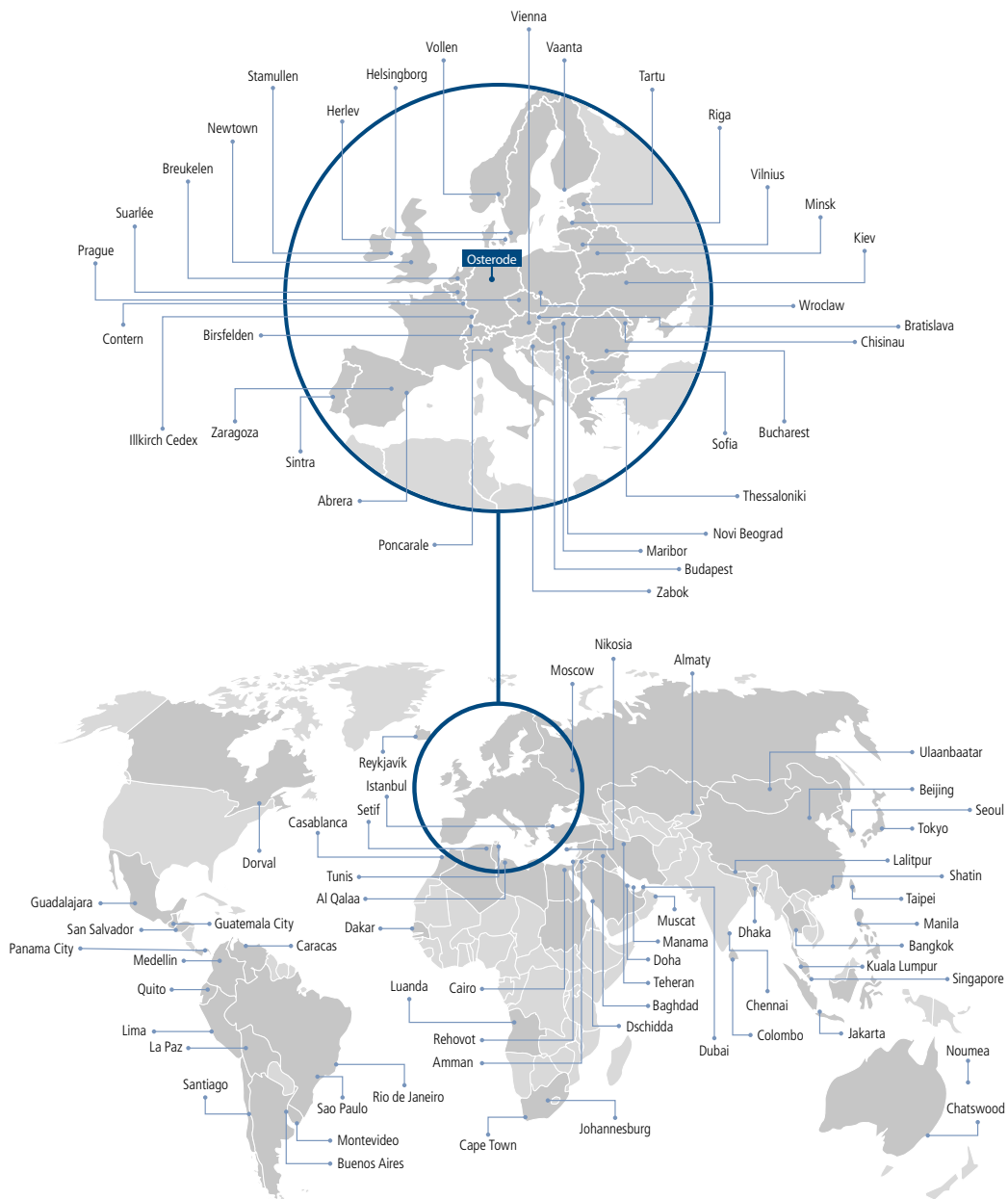
Sigma 4-5KRL centrifuge
208–240 V, 50/60 Hz (Item no. 91309)
Other voltages available upon request.



Global service

For local product security

Our trained service partners in over 100 countries ensure consistently high quality in accordance with national regulations. Our specialists can also be engaged quickly around the world, either remotely or on site in person.



Selected locations of our representatives.

An overview of all representatives with detailed contact information can be found at www.sigma-zentrifugen.de/en/sales-partners/



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