

# IN series DRY-RUNNING PISTON COMPRESSOR



clean – reliable – low maintenance



The image shows a low-angle shot of a modern building with a glass and metal facade. The sun is shining brightly from the left, creating a lens flare effect. On the upper part of the building, the 'sera' logo is visible, consisting of a stylized blue and white square icon followed by the word 'sera' in a bold, sans-serif font. A semi-transparent blue rectangular box is overlaid on the right side of the image, containing white text.

# sera

## A company of the future

**sera** is one of the world's leading companies in the field of dosing and compressor technology. For 80 years, the **sera Group** has been developing and producing application solutions that depend on the precise dosing, pumping and compression of liquids and gases.

**sera** is an independent family-owned company headquartered in Immenhausen. In addition to subsidiaries in Great Britain, Austria, Switzerland, South Africa and Spain, **sera** also operates branches in Italy and the United Arab Emirates. More than 30 strong partners represent **sera** in over 80 countries, ensuring expert support, advice and services locally worldwide.



CLEAN.  
SAFE.  
RELIABLE.

**We create added value for people and the environment.**

**sera** has an extensive product portfolio, providing the right solutions for many of your applications worldwide. We develop, manufacture and sell high-quality gas compression and feeding products at our facilities, and offer a number of system solutions for a wide range of applications involving hydrogen.

Our customers all over the world also benefit from our comprehensive services, which include assistance with planning and commissioning systems, swift and straightforward global after-sales service, and the development of innovative technologies.



## SERVICE

Alongside innovative product and system solutions, providing an exacting and efficient service is also part of who we are. To this end, **sera** offers a wide variety of services ranging from technical support and commissioning through to maintenance and repair.

## HIGH VERTICAL INTEGRATION

Quality without compromise comes as standard at **sera**. To guarantee this, we manufacture most of our key components ourselves. High flexibility and a lower risk of losses in expertise, as well as shared production and development experience enable us to excel in delivering durable and high-quality products.

## IN-HOUSE DEVELOPMENT

With over 80 years of specialist knowledge and technological expertise, **sera** is known for reliability, flexibility and innovation. We consider it important to have a high degree of innovative strength within the company so that we can impress our customers with the best possible solutions and tailor-made products day after day.

# THE RELIABLE SOLUTION FOR CLEAN HIGH-PRESSURE AND EXTREME-PRESSURE COMPRESSION

**sera** has provided reliable gas compression solutions without oil, contamination or leakage for many decades. Our newly developed, innovative dry-running piston compressors with electrohydrostatic drives perfectly complement our established metal diaphragm technology. They enable reliable and energy-efficient compression of particle-free gases such as hydrogen, nitrogen, helium, argon or ethylene to extreme pressures without the use of lubricants. These innovative piston compressors from sera are ideal when large quantities of gas need to be compressed cost-effectively and safely.

Contamination of the medium with hydraulic fluid from the drive system is eliminated by the vertical format and the design of the compressor units. This makes it possible to safely dispense with complex and expensive sensors for detecting drive fluid.

Thanks to the innovative design and special configuration of the seal and guide systems, the usual lubrication is unnecessary even in high-pressure and extreme-pressure applications.

This compressor technology is made particularly reliable, energy-efficient and low maintenance by its design, construction and drive. A long stroke and low piston speeds mean that it runs quietly and with low wear. When required, the easily accessible seal and guide systems can be replaced in no time without the need for compressor units to be completely dismantled.

## ADVANTAGES AT A GLANCE

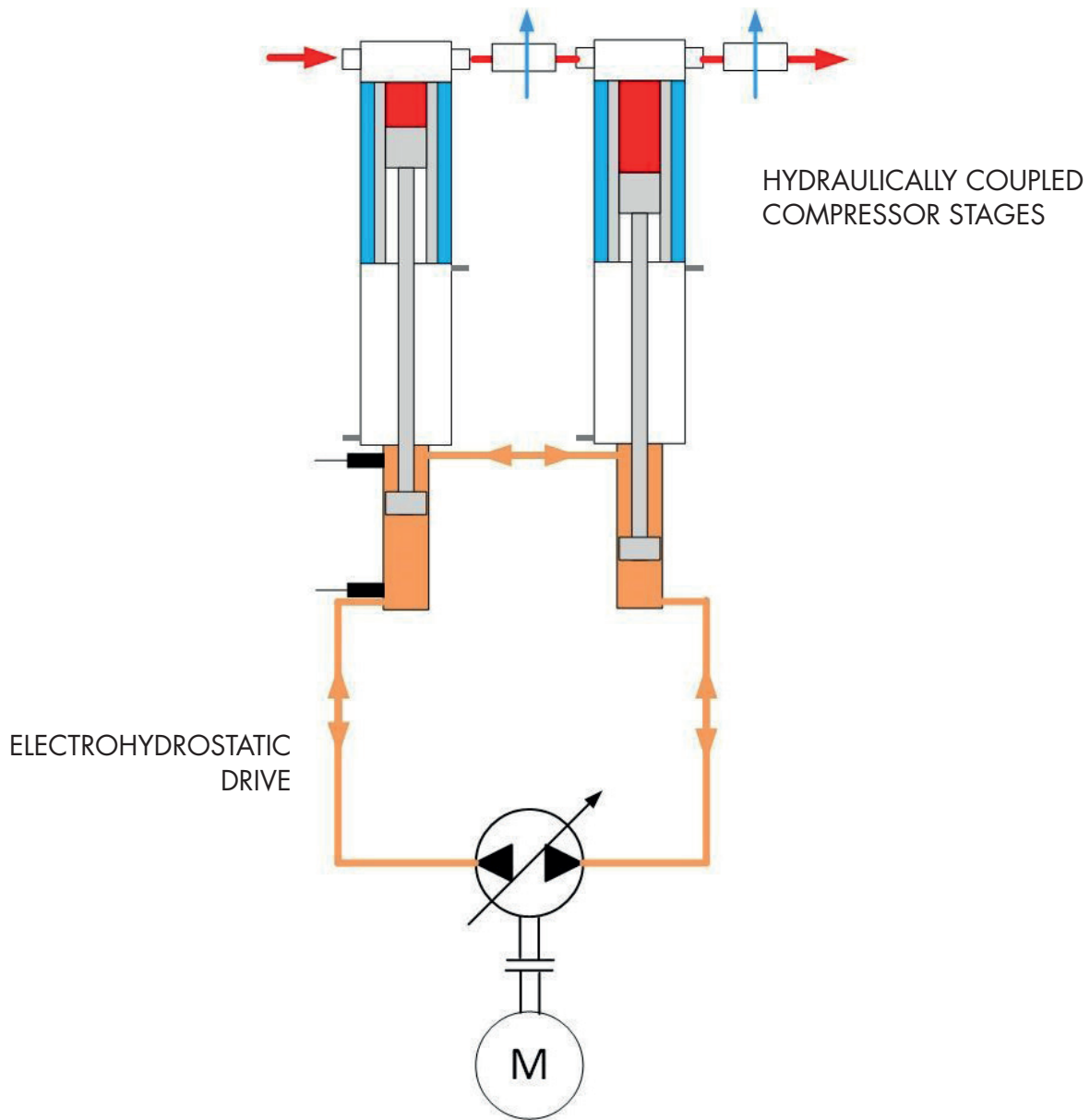
- OIL-FREE, SAFE COMPRESSION
- ROBUST DESIGN
- HIGH AVAILABILITY
- ENERGY-EFFICIENT DRIVE UNIT
- COMPACT FOOTPRINT
- EASY SERVICING

## RANGE OF APPLICATION

- HYDROGEN REFUELLING STATIONS
- POWER-TO-GAS
- TECHNICAL GASES
- AIRBAG INFLATORS
- HOT ISOSTATIC PRESSES
- PRESSURE TESTING TECHNOLOGY



# DESIGN AND MECHANICS



The compressor unit consists of two coaxially arranged vertical gas cylinders, each mechanically connected to and driven by a hydraulic cylinder.

A space between the gas cylinders and drive cylinders safely prevents hydraulic fluid from contaminating the medium. The two drive cylinders are hydraulically coupled with each other via a connecting line.

The gas cylinders are liquid cooled using an outer cooling jacket. This dissipates frictional heat and significantly extends the service life of the seal and guide systems.

The hydraulic cylinders are driven by a hydraulic power unit. Systems with a regulating pump allow infinitely variable control of changes to the number of piston strokes. Changes in stroke direction are controlled by contactless proximity switches.

A particularly advantageous feature is the use of a pivotable axial piston pump which allows the drive cylinder stroke direction to be changed directly by the pump itself. This creates a highly energy-efficient electrohydrostatic drive system. Due to the absence of directional control valves, which are subject to loss, the drive cylinders are pressurised directly by the hydraulic pump oil flow. This creates a robust drive system with integrated overload protection.

# MARKETS AND APPLICATIONS



## HYDROGEN REFUELLING STATIONS

At a time when fossil fuels are running out and environmental protection is becoming increasingly essential to our planet, hydrogen refuelling stations have found their place in the energy revolution. Vehicles powered by fuel cells require gaseous hydrogen for refuelling. Our innovative compressor is ideal in this application, compressing large quantities of H<sub>2</sub> to up to 1,000 bar. The unique design reliably prevents fuel contamination and satisfies the high cleanliness standards required by vehicle manufacturers.



## POWER-TO-GAS

Power-to-gas technology enables excess renewable energy to be converted into other energy carriers such as hydrogen, and then used in other applications. Green hydrogen can be used directly in transportation or, equally, injected into the natural gas grid or H<sub>2</sub> pipelines. Most **sera** power-to-gas compressor stations use our electrohydrostatically powered dry-running piston compressors due to the large quantities of hydrogen that must be reliably and efficiently compressed.



## TECHNICAL GASES

Technical gases are used day and night all over the world. They can be found in every sector – be it for welding, cooling, heating or laboratory analysis. These gases are transported using bottles and cylinders of various sizes and pressures which need to be refilled after the gas is removed. Large load fluctuations during filling are characteristic of this application, making the robust design of our electrohydrostatically powered dry-running piston compressors particularly advantageous.



# MARKETS AND APPLICATIONS



## HOT ISOSTATIC PRESSES

The extreme-strength metal and ceramic components with low dimensional tolerances which are found in the aerospace and automotive industries are often produced using hot isostatic presses. Here, parts are simultaneously hot-pressed and sintered at temperatures of up to 2,000 °C and pressures of 1,000 to 2,000 bar using inert gas. This manufacturing technology generally uses argon, which can be compressed reliably and energy efficiently with our electrohydrostatically powered dry-running piston compressors.



## AIRBAG INFLATORS

Airbags have generally become standard equipment for passenger cars in industrialised countries. They have gas generators to provide the gas that activates the airbag. Filling airbag cartridges with a mixture of helium and argon gas demands the highest standards of cleanliness and purity. sera's electrohydrostatically powered dry-running piston compressors are exceptionally suitable for compressing the gas to levels of up to 1,000 bar as safe production is guaranteed by the robust design of these compressors.

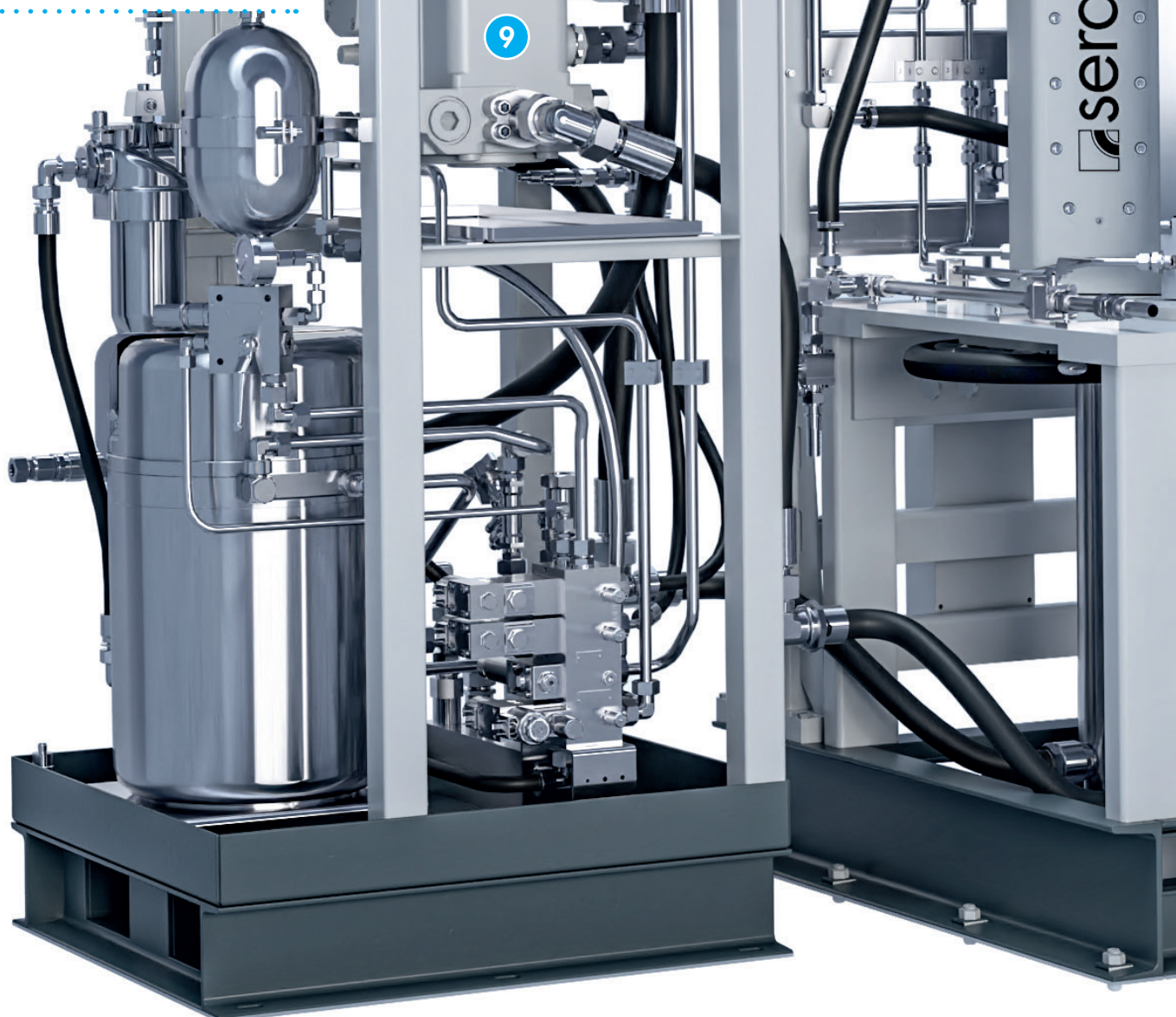


## PRESSURE TESTING TECHNOLOGY

The automotive and mechanical engineering industries employ a wide variety of test methods – both in testing laboratories and in the course of production operations – to verify the functional properties and impermeability of pressurised components under realistic conditions. Gases used for test purposes include helium, nitrogen, argon CO<sub>2</sub> and hydrogen, and often these must be compressed to extreme pressure levels. Dry-running piston compressors with electrohydrostatic drives are ideal for the many different areas of use.

# DESIGN & FEATURES

- 1 Gas valves
- 2 Tie rod
- 3 Gas piston
- 4 Spacer/lantern
- 5 Piston rod
- 6 Drive cylinder
- 7 Sensors
- 8 Electric motor
- 9 Hydraulic pump
- 10 Fitting frame
- 11 Control cabinet







# ADVANTAGES IN DETAIL

## OIL-FREE, SAFE COMPRESSION

Oil-free, safe compression and feeding up to 1,000 bar in the standard model thanks to:

- The vertical arrangement of the gas cylinders
- The gas cylinders being above the drive cylinders
- A long spacer between the gas and drive cylinders
- Spacer flushing to remove leaks
- The special gas piston, seal system and guide system design

## ROBUST DESIGN

The robust design of the individual components, modules and overall system achieves a high degree of reliability. This effectively prevents failures in the field and errors in production.

## HIGH AVAILABILITY

- No lateral forces on the gas pistons due to the absence of a crank drive
- No normal forces due to the dead weight of the gas pistons and piston rods on the guides and seal systems
- No one-sided wear
- Very low piston speeds and quiet operation
- Water-cooled gas cylinders

## ENERGY-EFFICIENT DRIVE UNIT

The electrohydrostatic drive is highly energy-efficient. This is achieved through:

- Lower friction loss due to the small number of moving parts
- The lack of valves to interrupt the oil flow
- Large line cross-sections

## COMPACT FOOTPRINT

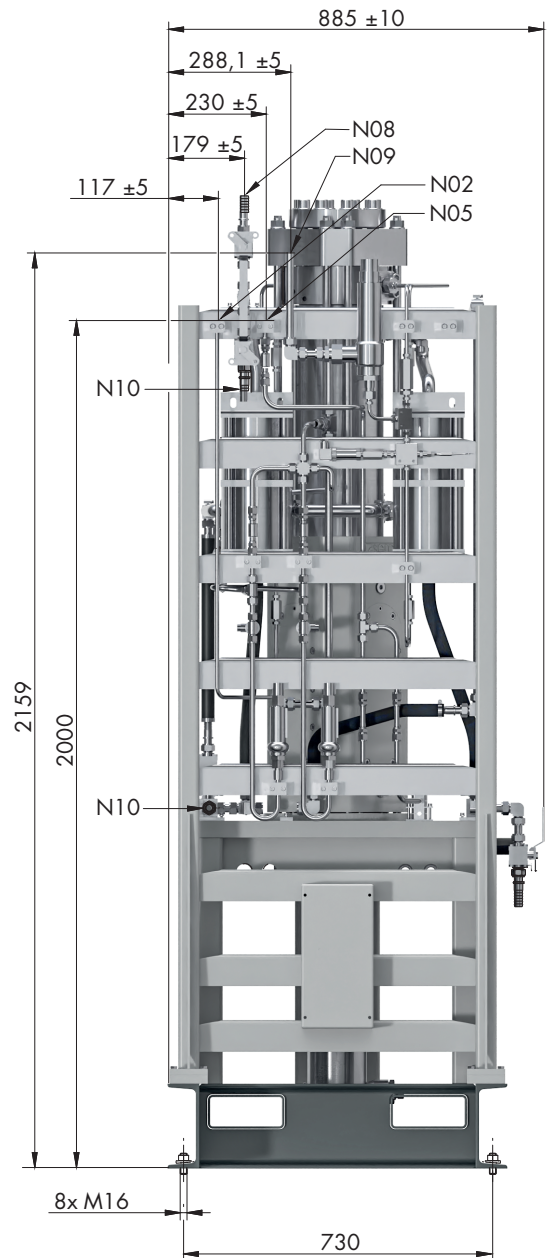
Significantly less floor space is required than with conventional, hydraulically powered compressors. The version featuring a vertical electrohydrostatic drive is particularly compact.

## EASY SERVICING

- Easily accessible maintenance openings
- No need to completely dismantle the compressor to access the seal and guide systems
- Large maintenance openings
- Generous number of maintenance openings in the lantern

Technical drawing of the SERA 6000 system showing side view dimensions:

- Overall width: 1100
- Overall height: 2294 ± 10
- Height from base to top of main body: ~ 1122
- Base mounting holes are spaced at 55, 260, ~ 593, 625, and 990.
- The main body consists of two vertical columns labeled "sera".
- Labels N10 and N11 indicate specific components or connections on the left side.



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# POWERFUL SERVICE DIRECTLY FROM THE MANUFACTURER

Technical equipment, systems and components are the heart of many production and work processes. They often work under extreme conditions, have to meet high standards and function reliably to ensure your operational processes. However, like any technical facility, they are subject to natural wear and tear, which can become a significant risk without regular maintenance.

The consequences of inadequate service range from a gradual loss of efficiency and higher energy and operating costs to sudden, unplanned outages. Such disruptions can cause production downtime, jeopardise delivery times and significantly increase your operating costs. In the worst case, there is a risk of damage that would require the complete renewal of components or systems.

Regular servicing is the key to avoiding such scenarios. It guarantees the long-term reliability and durability of your systems, minimises downtime and protects your investments. In addition, professional maintenance helps to increase the safety of your processes and to comply with legal requirements.

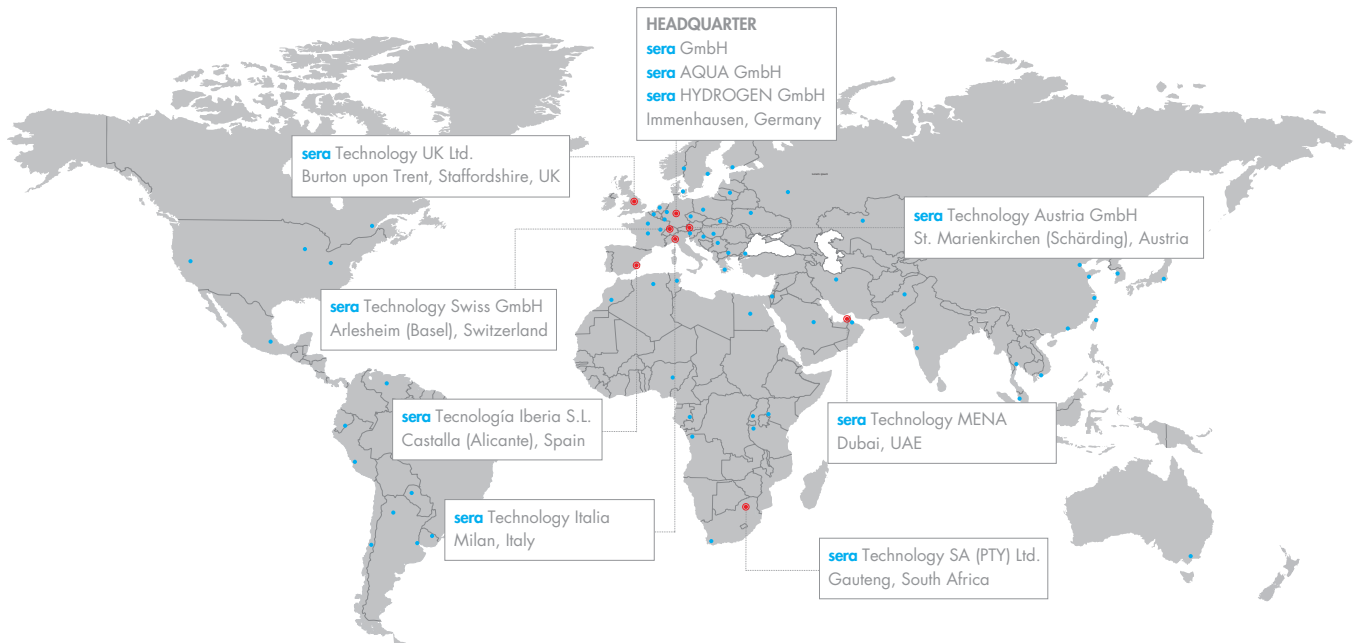
## Your added value with sera service

- **Reliable maintenance**  
Regular inspections and preventive maintenance by our experts ensure a high level of availability and extend the service life of your systems.
- **Fast assistance worldwide**  
With eight of our own locations and over 30 trained trade partners, we offer you service in more than 80 countries – quickly, flexibly and with a focus on solutions.
- **Efficient device replacement**  
Should a device fail, our worldwide replacement service ensures minimal disruption to your operations.
- **Customised support**  
Whether complete systems or individual components – our service adapts to your specific requirements.
- **Expertise on the ground**  
Our technicians are always up to date with the latest technology and work efficiently to minimise downtime.

Our services support you in all areas – from installation and regular maintenance to repairs and the replacement of defective devices. With **sera** service, you have a partner at your side that not only offers quick solutions but also guarantees long-term reliability. This is how we ensure that your plants, systems and components always work optimally.



FOLLOW US



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