Inspired by **temperature**

Temperature Control Solutions

for the aerospace industry

huber

Precise solutions for the **Aerospace industry**

Temperature control for the aerospace industry

In today's aerospace industry temperature control technology plays a crucial role. Whether in environmental simulations, materials testing, or test bench operations, the requirements for accurate and stable temperature control are exceptionally high. As a leading manufacturer of temperature control systems, we understand the specific challenges of the aerospace sector and provide tailored solutions that meet the highest industry standards.

Our innovative temperature control systems are designed to deliver consistent and precise temperatures—essential for a wide range of applications in development, testing, and quality assurance. From thermal testing of advanced materials to the simulation of extreme operating conditions and support for climate-sensitive production processes, our systems enable engineers and technicians to work under optimal conditions.

A key element of our philosophy is close collaboration with aerospace companies, research institutions, and testing facilities. Through ongoing dialogue with industry experts, we continuously refine our products and adapt them to reflect the latest technological developments and sector-specific demands. This allows us to offer solutions that not only meet current requirements but are also future-ready.

Our temperature control technology is distinguished by its high energy efficiency, robustness, and user-friendly operation. With a comprehensive range of units designed for various temperature ranges and applications, we offer flexible, scalable solutions that integrate seamlessly into existing systems. We also place great importance on sustainability and the responsible use of resources—to support environmental protection while meeting the rigorous demands of the aerospace industry.

Empowering excellence and innovation

Applications

Temperature change tests

Small thermal regulation baths can be used for temperature change tests. Tests and pre-examinations can be carried out on material samples in the bath, quickly and easily. High-performance circulation thermostats are ideal for thermal tests that require a wide temperature range.

Various temperature conditions can be simulated, -40 °C to 85 °C is a common test range but wider ranges are possible to as low as -120 °C up to 425 °C.

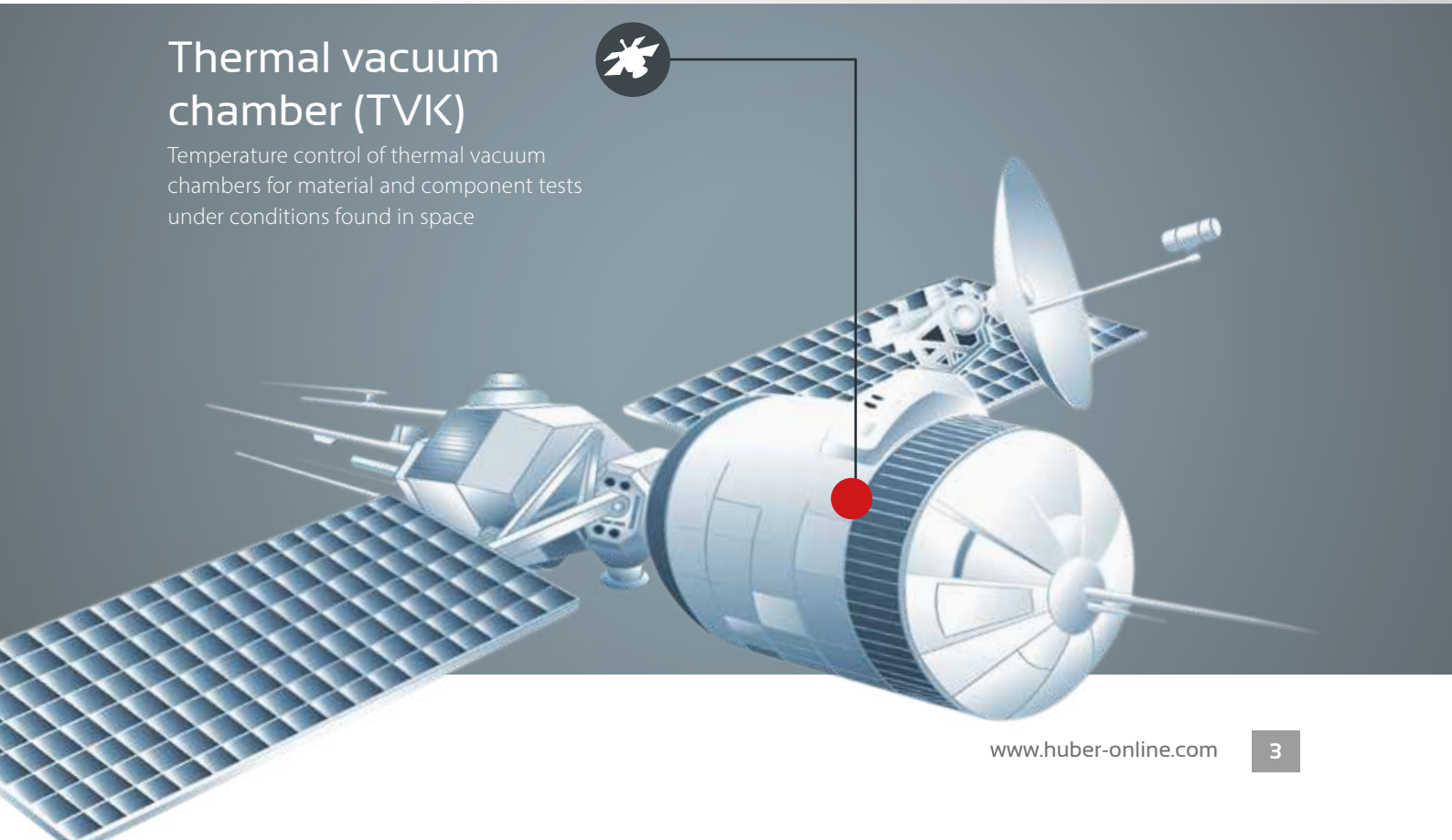
Addition/alternative to environmental chamber

Huber temperature control units are ideal as an alternative or extension to environmental chambers to lower their operational temperature range. Our temperature control units can be used in a wide range of tests, and often cost less than environmental chambers. Yet another benefit is the high temperature control speed which can be achieved with Unistats. Heating and cooling capacity can be transferred quickly and precisely – a critical advantage in many functional and material tests.

The combination of temperature control unit and environmental chamber allows simultaneous simulation of specimen temperatures as a function of environmental temperatures.

Thermal vacuum chamber (TVK)

Temperature control of thermal vacuum chambers for material and component tests under conditions found in space



Our products

Ministats®

Natural Refrigerant

Ministats are the smallest cooling circulators in the world and permit operation in the smallest of spaces, for example in a fume hood or within technical systems. The devices have a wide range of features and are ideally suited for the temperature control of photometers, refractometers, viscometers, distillation apparatus, reaction vessels and Miniplant facilities. The application focus is on external applications – the bath opening, however, also permits the thermoregulation of smaller objects directly in the circulator bath.

Down to -45 °C
Working temperature range

Up to 0,6 kW
Cooling power

Up to 22 l/min
Pump capacity

Ministat 240

Ministat 230

Ministat 125

Option: Drain tap on front (see accessories)

Model	Working temp. range (°C)	Heating power (kW)	Bath volume (ltr)	Bath depth (mm)	Pump data max. pressure (l/min)	Pump data max. pressure (bar)	Pump data max. suction (l/min)	Pump data max. suction (bar)	Cooling power (kW) at (°C) 20	0	-20	-30	Dimensions W x D x H (mm)	Cat.No.	G
Ministat 125	-25...150	0,9 - 1,0	2,7/1,3*	120	22	0,7	16	0,4	0,30	0,21	0,05	–	225 x 370 x 429	2014.0011.01	2
Ministat 125w	-25...150	0,9 - 1,0	2,7/1,3*	120	22	0,7	16	0,4	0,30	0,20	0,10	–	225 x 370 x 429	2014.0006.01	2
Ministat 230	-40...200	1,6 - 2,1	3,5/1,7*	135	22	0,7	16	0,4	0,42	0,38	0,25	0,14	255 x 450 x 476	2015.0005.01	2
Ministat 230w	-40...200	1,6 - 2,1	3,5/1,7*	135	22	0,7	16	0,4	0,42	0,38	0,25	0,14	255 x 450 x 476	2015.0007.01	2
Ministat 240	-45...200	1,8 - 2,1	5,5/2,8*	157	22	0,7	16	0,4	0,60	0,55	0,35	0,125	300 x 465 x 516	2016.0005.01	2
Ministat 240w	-45...200	1,8 - 2,1	5,5/2,8*	157	22	0,7	16	0,4	0,60	0,55	0,35	0,125	300 x 465 x 516	2016.0006.01	2

* with displacement insert Temperature stability: ±0,02 K

w = water-cooled

Our products

Unistats® – series 800

Natural Refrigerant

Unistats of the 800 series are characterised by low-end working temperatures down to -85 °C with compact dimensions. These devices are suited mainly for temperature applications with moderate cooling capacity requirements.

Unistats "P" are equipped with high pressure pumps and are suited for applications with high pressure drops.

Down to -85 °C
Working temperature range

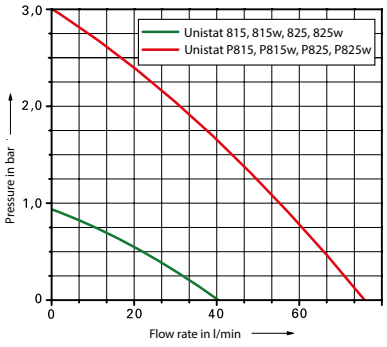
Up to 2,4 kW
Cooling power

Up to 67 l/min
Pump capacity

Pilot ONE
Touch screen controller

Unistat 825

Unistat P815



Pump curve
according to DIN 12876 with water at 20 °C

Model	Working temperature range (°C)	Pump max. VPC (l/min)	(bar)	Heating power (kW)	Cooling power (kW) at (°C) 250	0	-20	-40	-80	Dimensions W x D x H (mm)	Cat.No.	G
Unistat 815	-85...250	40	0,9	2,0	1,3	1,5	1,5	1,4	0,2	460x620x1678[1]	1053.0050.01	35
Unistat 815w	-85...250	40	0,9	2,0	1,5	1,5	1,5	1,4	0,2	460x620x1678[1]	1053.0051.01	35
Unistat 825	-85...250	40	0,9	3,0	2,3	2,2	2,0	2,0	0,3	460x620x1678[1]	1079.0028.01	4
Unistat 825w	-85...250	40	0,9	3,0	2,3	2,4	2,4	2,4	0,3	460x620x1678[1]	1079.0029.01	4
Models with high pressure pump												
Unistat P815	-85...250	67	3,0	2,0	1,3	1,3	1,5	1,2	0,2	460x620x1678[1]	1053.0052.01	35
Unistat P815w	-85...250	67	3,0	2,0	1,5	1,5	1,5	1,2	0,2	460x620x1678[1]	1053.0053.01	35
Unistat P825	-85...250	67	3,0	3,0	2,3	2,3	2,2	1,4	0,3	460x620x1678[1]	1079.0034.01	4
Unistat P825w	-85...250	67	3,0	3,0	2,3	2,3	2,2	1,3	0,3	460x620x1678[1]	1079.0037.01	4

[1] Preliminary dimensions

w = water-cooled | P = high pressure pump

Our products

Unistats® – series 900

The Unistats of 900 series are optimised for low temperature applications down to -90 °C. These devices are suited for temperature syntheses as well as material tests and temperature simulations with very low temperatures.

Unistats "P" are equipped with high pressure pumps and are suited for applications with high pressure drops.

Down to -90 °C
Working temperature

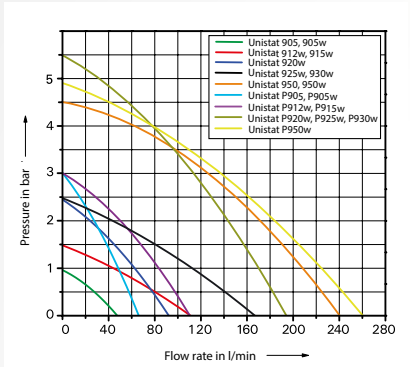
Up to 36 kW
Cooling power

Up to 240 l/min
Pump capacity

Pilot ONE
Touch screen controller

Unistat P905w

Unistat 915w



Pump curve
according to DIN 12876 with water at 20 °C

Natural Refrigerant

Unistat 905

Unistat 912w

Model	Working temperature range (°C)	Pump max. VPC (l/min)	(bar)	Heating power (kW)	Cooling power (kW) at (°C) 250	100	0	-60	-80	Dimensions W x D x H (mm)	Cat.No.	G
Unistat 905	-90...250	48	0,9	6,0	4,0	3,8	3,6	2,2	0,7	540x670x1712[1]	1054.0019.01	4
Unistat 905w	-90...250	48	0,9	6,0	4,5	4,5	4,5	2,5	0,7	540x670x1712[1]	1054.0020.01	4
Unistat 912w	-90...250	110	1,5	6,0	7,0	7,0	7,0	3,5	0,9	630x720x1726[1]	1055.0027.01	4
Unistat 915w	-90...250	110	1,5	6,0	6,5	11,0	11,0	4,2	1,3	630x720x1726[1]	1080.0033.01	4
Unistat 920w	-90...200	90	2,5	12,0	–	11,0	11,0	8,0	2,0	954x1504x1622[1]	1061.0022.01	4
Unistat 925w	-90...200	168	2,5	12,0	–	16,0	16,0	13,5	3,5	954x1504x1622[1]	1081.0013.01	4
Unistat 930w	-90...200	168	2,5	24,0	–	19,0	20,0	15,0	5,0	1504x954x1622	1082.0011.01	5
Unistat 950	-90...200	240	4,0	36,0	–	30,0	30,0	24,0	10,0	3400x2000x3100[1]	1065.0009.01	5
Unistat 950w	-90...200	240	4,0	36,0	–	36,0	36,0	25,0	10,0	2630x1700x1995[1]	1065.0008.01	5
Models with high pressure pump												
Unistat P905	-90...250	65	3,0	6,0	3,6	3,6	3,6	2,0	0,4	540x670x1712[1]	1054.0017.01	4
Unistat P905w	-90...250	65	3,0	6,0	4,2	4,2	4,4	2,3	0,5	540x670x1712[1]	1054.0018.01	4
Unistat P912w	-90...250	110	3,0	6,0	7,0	7,0	7,0	3,5	0,9	630x720x1726[1]	1055.0026.01	4
Unistat P915w	-90...250	110	3,0	6,0	6,5	11,0	11,0	4,2	1,3	630x720x1726[1]	1080.0036.01	4
Unistat P920w	-90...200	191	5,5	12,0	–	11,0	11,0	8,0	2,0	954x1504x1622[1]	1061.0027.01	4
Unistat P925w	-90...200	191	5,5	12,0	–	16,0	16,0	13,5	3,5	954x1504x1622[1]	1081.0015.01	4
Unistat P930w	-90...200	191	5,5	24,0	–	19,0	20,0	15,0	5,0	954x1504x1622[1]	1082.0013.01	5
Unistat P950w	-90...200	260	4,8	36,0	–	36,0	36,0	25,0	10,0	2630x1700x1995[1]	1065.0012.01	5

[1] Preliminary dimensions

w = water-cooled | P = high pressure pump

Our products

Cooling circulators – series CC-500

Natural Refrigerant

Cooling bath circulators of 500 series are equipped with insulated baths made from stainless steel and offer cooling capacities up to 7 kW for demanding temperature control applications down to -55 °C. The circulators are fitted with a temperature-controlled cover plate to avoid the formation of condensation and ice.

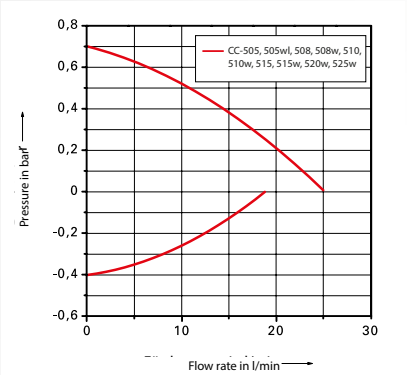
Down to -55 °C
Working temperature range

Up to 7,0 kW
Cooling power

Up to 25 l/min
Pump capacity

CC-510w

CC-505



Pump curve
according to DIN 12876 with water at 20 °C

Model	Working temp. range (°C)	Heating power (kW)	Bath volume (ltr)	Bath depth (mm)	Pump data max. pressure (l/min)	Pump data max. pressure (bar)	Pump data max. suction (l/min)	Pump data max. suction (bar)	Cooling power (kW) at (°C) 100	20	0	-20	-40	Dimensions W x D x H (mm)	Cat.No.	G
CC-505	-50...200	1,3 - 1,6	5	150	25	0,7	18,5	0,4	1,2	1,2	1,0	0,6	0,15	410x480x764	2044.0005.01	2
CC-505wl	-50...200	1,3 - 1,6	5	150	25	0,7	18,5	0,4	1,2	1,2	1,0	0,6	0,15	410x480x764	2044.0006.01	3
CC-508	-55...200	2,7 - 3,0	5	160	25	0,7	18,5	0,4	1,5	1,5	1,5	1,0	0,3	410x480x764	2045.0001.01	2
CC-508w	-55...200	3,0	5	160	25	0,7	18,5	0,4	1,5	1,5	1,5	1,0	0,3	410x480x765	2045.0004.01	2
CC-510	-50...200	3,0	18/11*	200	25	0,7	18,5	0,4	2,1	2,1	2,1	1,0	0,4	605x706x1136[1]	2020.0017.01	2
CC-510w	-50...200	3,0	18/11*	200	25	0,7	18,5	0,4	2,4	2,4	2,4	1,0	0,4	455x515x1014[1]	2020.0015.01	2
CC-515	-55...200	3,0	26/15*	200	25	0,7	18,5	0,4	3,3	3,3	3,3	1,6	0,6	605x706x1136[1]	2021.0008.01	2
CC-515w	-55...200	3,0	18/11*	200	25	0,7	18,5	0,4	3,3	3,3	3,3	1,6	0,6	455x515x1014[1]	2021.0011.01	2
CC-520w	-55...200	3,0	17/10*	200	25	0,7	18,5	0,4	5,0	5,0	5,0	3,0	1,5	539x629x1102[1]	2022.0006.01	3
CC-525w	-55...200	3,0	17/10*	200	25	0,7	18,5	0,4	7,0	7,0	5,0	3,0	1,5	539x629x1102[1]	2023.0006.01	3

* with displacement insert Temperature stability: ±0,02 K [1] Preliminary dimensions

w = water-cooled

Natural Refrigerant

Cooling circulators – series CC-800 / CC-900

Cooling bath circulators of 800 and 900 series are equipped with insulated baths made from high-grade stainless steel and offer low working temperatures down to -90 °C. The devices are ideally suited for e.g. freezing point determination, low temperature calibration and petroleum testing.

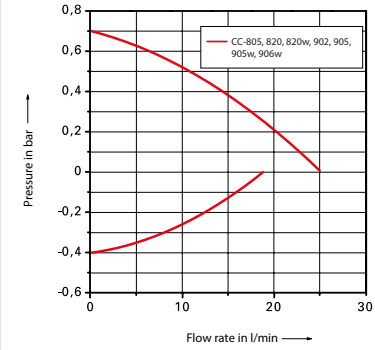
Down to -90 °C
Working temperature range

Up to 3,0 kW
Cooling power

Up to 25 l/min
Pump capacity

CC-902

CC-820w



Pump curve
according to DIN 12876 with water at 20 °C

Model	Working temp. range (°C)	Heating power (kW)	Bath volume (ltr)	Bath depth (mm)	Pump data max. pressure (l/min)	Pump data max. pressure (bar)	Pump data max. suction (l/min)	Pump data max. suction (bar)	Cooling power (kW) at (°C) 100	20	0	-20	-40	-60	Dimensions W x D x H (mm)	Cat.No.	G
CC-805	-80...100	1,3 - 1,6	5	150	25	0,7	18,5	0,4	0,5	0,5	0,5	0,4	0,3	0,3	410x480x764	2024.0008.01	2
CC-820	-80...100	3,0	17/10*	200	25	0,7	18,5	0,4	1,2	1,2	1,2	1,1	0,9	0,6	539x629x1102[1]	2025.0007.01	3
CC-820w	-80...100	3,0	17/10*	200	25	0,7	18,5	0,4	1,2	1,2	1,2	1,1	0,9	0,6	539x629x1102[1]	2025.0008.01	3
CC-902	-90...200	1,5	5	150	25	0,7	18,5	0,4	1,2	1,2	1,2	1,1	0,9	0,6	550x600x911[1]	2026.0013.01	3
CC-905	-90...200	3,0	26/15*	200	25	0,7	18,5	0,4	2,0	2,0	2,0	1,9	1,7	1,0	605x706x1136[1]	2027.0007.01	3
CC-905w	-90...200	3,0	26/15*	200	25	0,7	18,5	0,4	2,0	2,0	2,0	1,9	1,7	1,0	605x706x1136[1]	2027.0008.01	3
CC-906w	-90...200	3,0	30/19*	200	25	0,7	18,5	0,4	3,0	3,0	3,0	2,8	2,4	1,6	605x706x1136[1]	2036.0006.01	3

* with displacement insert Temperature stability: ±0,02 K [1] Preliminary dimensions

w = water-cooled

CHEOPS satellite

European Space Agency ESA tests CHEOPS satellite with Unistats

Since the early days of space travel in the first half of the 20th century, scientists have gained many fascinating insights into our universe. The milestones of space exploration, such as Neil Armstrong's first steps on the moon in 1969, are simply unforgettable. But space still conceals many secrets.

In neighbouring solar systems there are countless planets, which we know almost nothing about. They are outside the gravitational influence of our sun and orbit other stars. This is why they are known as extra-solar planets or "exoplanets". Up to now, we have only been able to research the characteristics of planets in our own solar system using existing examination methods, and the characteristics of planets in other systems remained a mystery.

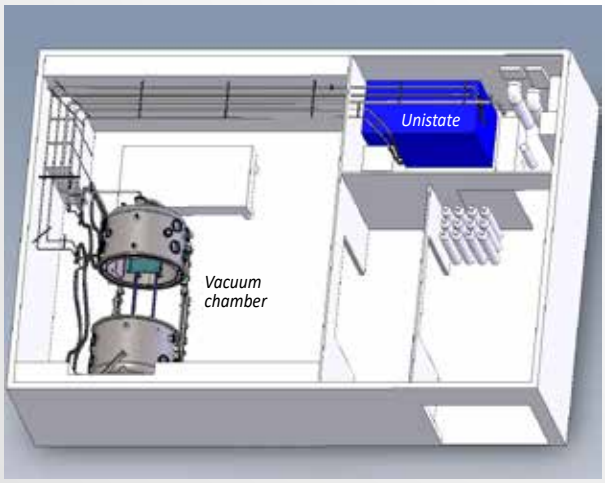
The European Space Agency (ESA) has now initiated a mission to deliver findings about these exoplanets – CHEOPS (Characterisation of ExOPlanet Satellites). Working closely with a research institute in Switzerland, they have developed a 300 kg optical telescope with a 30-centimetre aperture and a length of 1.2 metres.

Since 2017, the telescope has been collecting information about the previously unknown exoplanets using the "transit method": If a planet travels in front of its central star, the latter's brightness decreases because of the shadow cast by the planet. This process is observed by the telescope in the transit method. The diameter of the planet is derived from the reduction in brightness. Using earth-based instrumentation and another method – the "radial velocity method", we can also determine the mass of the planets. If you know the diameter and mass, you can calculate the density. This then provides information about whether the planet consists of gas, ice, or rock. So, CHEOPS can help us gather a number of important indicators about previously unknown planets in other solar systems.

Vacuum chambers for simulating space

For the success of the CHEOPS mission, it is absolutely critical that the telescope operates extremely precisely and reliably. This requires exact preparation with a variety of tests. These can only be carried out on earth in simulation chambers which recreate the conditions found in space. For the tests on the CHEOPS telescope, a vacuum chamber was used, which was specifically designed for this challenging application.

A Unistat 950w controls the temperature in the vacuum chamber, and another Unistat 915w controls the table for the experiments



The vacuum chamber and the two Unistats are connected via a 15-metre-long pipe connection

High technical requirements

The space simulation chamber used to prepare the telescope for deployment in space must meet a high level of requirements:

- Create conditions similar to those found in space
- High temperature spectrum for instrument tests at extreme temperatures
- Rapid temperature change
- Low exhaust chamber surfaces in the vacuum
- Surfaces without particle release for tests under clean room conditions

The vacuum experts at our clients developed a 5.5 tonne calibration and vacuum chamber for the CHEOPS telescope. All the specific requirements for the application were considered right from the start. This means the necessary conditions can be created in order to test and calibrate the telescope and its components under realistic conditions.

Accurate preparation of the chambers began even before the actual delivery. As no reflections should appear on the chamber walls during the optical tests of the telescope components, the interior is coated with a special, black paint. In addition, this paint is optimised for absorption of the heat radiation from the test objects. During the tests in a vacuum, no chemical substances may be released from the interior coating in the chamber. Because of this, the vacuum specialists built the chamber fully before delivery, commissioned it, and heated it to 160 degrees Celsius for several weeks to expel gas from the chamber surfaces.

At the end of this process, the chamber was taken apart again and transported to the end user, along with three Huber temperature control units and the necessary vacuum accessories.

In the cleanroom lab at the research institute the telescope components were gradually exposed to temperatures from -80 °C to +140 °C in the vacuum. Later on, the structural model and then the flight instrumentation were also tested in the chamber.

Demanding vacuum system

The thermal vacuum chamber is three metres long, with diameter of 1.8 metres. The two halves of the chamber can be easily moved apart and together using a rail system. Using the integrated vacuum and valve technology, the chamber can be evacuated to UHV pressure. The interior surfaces of the chamber are electropolished, so they are reflective.

An optical table is positioned in the centre of the chamber to support the telescope. A temperature-controlled shroud surrounds the whole test volume and screens the telescope from the walls of the vacuum chamber. Facing the test ob

ject, the shroud is coated with special black paint which means it is optimised for the lowest possible level of absorption and gas emission. The paint "swallows" the heat radiation from the sample in the same way as space does.

Using cleanroom-compatible insulated heating, the chamber can be heated up to +160 °C. The two Unistats pump a special thermal fluid through channels in the interior an facilitate cooling to -90 °C. The highly accurate regulating technology in the Unistats allows temperature control of the thermal fluid to a few hundredths of a degree.

This vacuum chamber delivers the basis for another, significant step in space exploration. It represents universal test equipment which can also be used beyond the CHEOPS project for future satellite missions.

The thermal vacuum chamber is three metres long, with diameter of 1.8 metres. The two halves of the chamber can be easily moved apart and together using a rail system

Success Stories

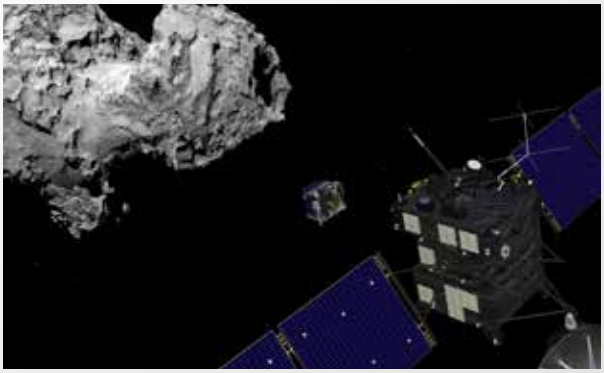
Space probe Philae

Material tests and temperature simulation in space research

In November 2014 the space probe Philae landed successfully on the surface of the comet Tschury. The lander from the German Centre for Air Space Travel had already been en route to the comet 67P/Tschurjumow-Gerassimenko with the space probe Rosetta 10 years before. This means Philae was the first space probe to land gently on a comet. "This is a major step for mankind" says ESA Director General Jean-Jacques Dordain in Darmstadt.

After the spectacular landing, the space probe completed its planned research tasks and then, slightly earlier than planned, it went into sleep mode. Nonetheless, the mission was a great success. In the roughly 60 hours that Philea was active for, numerous measurements were taken. The history of the origin of our solar system can be researched using these results. Temperature control technology from Huber Kältemaschinenbau was involved in the development of the space probe. For this, a high-vacuum environmental chamber was built at the Physical Institute at the University of Bern, which required rapidly changing and very low temperatures for the various tests. Unistat temperature control systems were used for temperature control in the tests and components in Philae.

Huber client Hanspeter Eichelberger (formerly Renggli AG) was responsible for the implementation of the environmental chamber. After the successful landing on the comet over ten years later, he is proud of the work he did. "Most of the tests and temperature simulations for the Philae space probe were completed in the environmental chambers at Bern Uni. We were just a small cog in this huge experiment, but I'm still absolutely delighted that it all kept going in outer space – thanks to the power of innovation and the cooling machinery from Huber. I'm proud that we were part of this major project!"



Decoupling of the lander unit Philae from the Rosetta space probe

Commissioning of the Unistats at Bern University

Simulating Space Conditions on Earth

In the Indian aerospace sector, the qualification of electronics, communication modules, and test components requires the highest level of precision. To ensure these parts can withstand the extreme conditions of orbit, they must undergo realistic ground testing. This is where our thermo-vacuum chambers come into play.

Cylindrical in design, the chambers feature a specially engineered base plate with an integrated heat exchanger. The Device Under Test (DUT) is mounted on this plate, where it can be both accurately heated and efficiently cooled. In addition, thermal shrouds covering 270 degrees of the chamber ensure radiant heat transfer. As a result, the DUT is simultaneously exposed to conductive heating from below and radiative heating from the sides – closely replicating real space conditions.

Once the chamber is sealed, electrical connections to the DUT are safely established through feedthroughs, which maintain full vacuum integrity. The system then achieves ultra-high vacuum in the micro-torr range. Even at extreme temperatures as low as –70 °C, no condensation occurs – a critical advantage for precise thermal testing.

Typical test procedures simulate temperature change rates of 0.5 to 1 °C per minute, enabling endurance and performance testing under strictly defined conditions. With chamber diameters ranging from 0.8 to 1.6 meters and lengths of up to 3 meters, the system accommodates a wide variety of test modules. Temperature stability and reproducibility are ensured by high-performance Huber Unistat units such as the 815, 825, P825, P905, and 912w.

With this technology, a cutting-edge test environment has been established in India, bringing space-like conditions down to Earth. Aerospace components can now be qualified under controlled extremes – making a decisive contribution to the safety and reliability of future missions.

Aeronautics and space travel

Unistat for temperature control of high vacuum system TVAC 2.0

JUST VACUUM GmbH developed the high-vacuum system TVAC 2.0 for a European company of space technology, intended to perform thermal function tests under space conditions. A complete system concept was developed according to the customer's specification. The high-vacuum chamber can be opened via a frame with lift to which the chamber itself, a cryogenic pump, and a backing pump are fastened. With a Unistat 912w it is possible to heat or cool the copper table and copper shroud in the chamber. The vacuum chamber and the Unistat 912w circulation thermostat are connected via two heat-insulating temperature control hoses. To simulate the lighting conditions in space, the copper shroud was painted with a special colour on the inside.

The high-vacuum system TVAC 2.0 for this use works in a temperature range from -75°C to +45°C (200 K to 320 K). With software specially developed for this system by JUST VACUUM, temperature profiles can be reproduced and displayed as a table or graph. This software controls all other functions of the system.

High vacuum system TVAC 2.0 with Unistat 912w

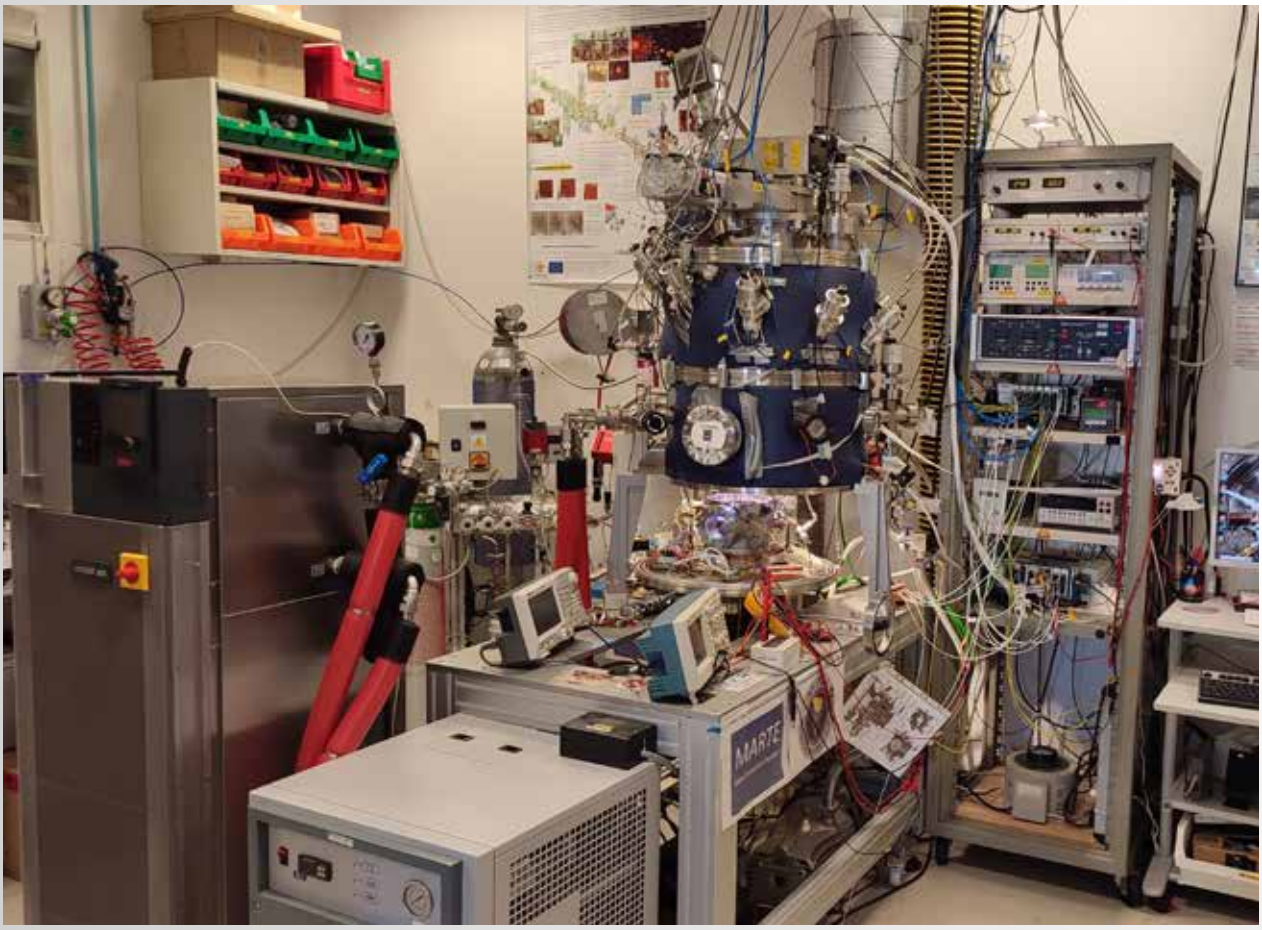
Aeronautics and space travel

Research instrument on Mars rover "Perseverance"

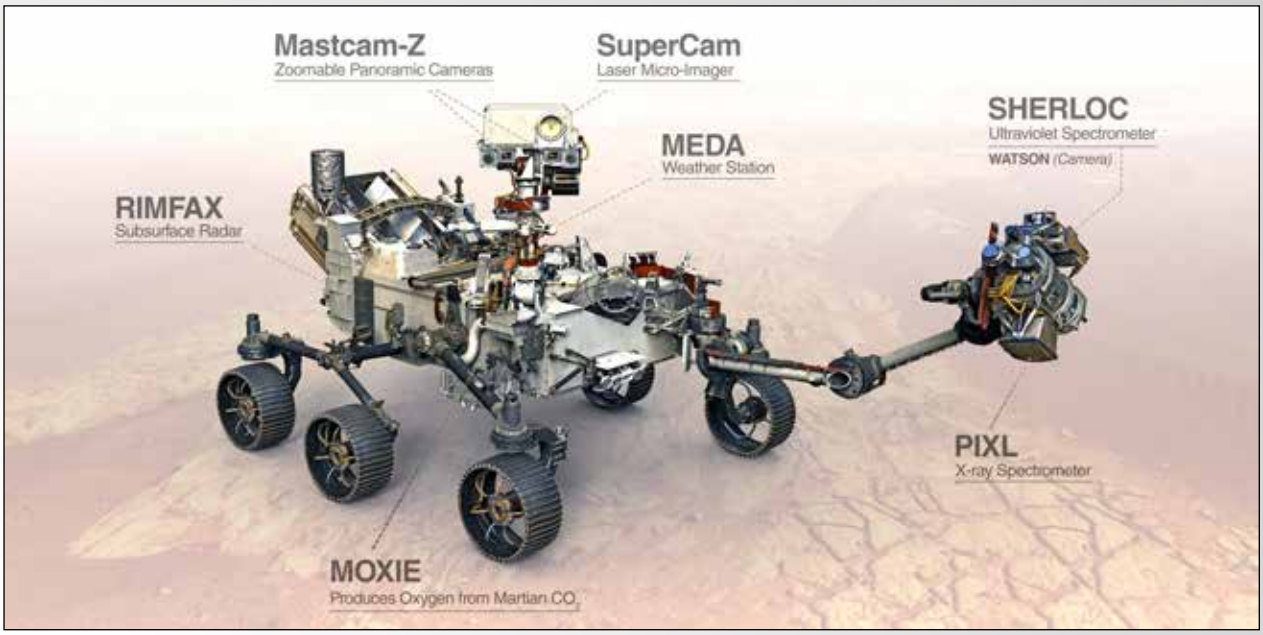
After a journey of almost seven months and more than 470 million kilometers, the rover "Perseverance" landed on the surface of Mars on February 18, 2021. On board is a research instrument in whose development the Unistat P825 played an important role.

The "Mars Environmental Dynamics Analyzer", or MEDA for short, consists of a series of sensors that are responsible for measuring the environmental conditions at the rover's landing site. For this purpose, MEDA contains sensors for measuring wind direction and speed, ground and air temperature, relative humidity, atmospheric pressure, ultraviolet, infrared and visible solar radiation, the properties of airborne dust and also has a camera for capturing images of the Martian sky.

To learn more about Mars and its atmosphere, the Spanish research team has developed various measuring instruments. For this purpose, the so-called MARTE vacuum chamber was constructed, which is able to simulate the environmental conditions prevailing on Mars.



The MEDA instrument was developed at the Spanish Center for Astrobiology CAB (Centro de Astrobiología). The government institute is located in Madrid and is part of the National Institute of Aerospace Technology (INTA) and the Spanish National Research Council (CSIC). It was founded in 1999 and is affiliated with NASA's Astrobiology Institute.



The Mars rover "Perseverance" is the largest and most advanced exploration vehicle ever deployed on the red planet. On board the rover are a total of seven research instruments, including the "Mars Environmental Dynamics Analyzer" manufactured in Spain. The Unistat P825 played an important role in the development of the measuring instrument.

The vacuum chamber also includes a Biological Geological Reactor (BGR), in which the physical conditions of Mars are simulated. The measurement instruments can thus be developed and tested under real environmental conditions. In addition to pressure, gas composition and radiation, temperatures on Mars are also simulated in the vacuum reactor. The Unistat P825 is used to simulate the temperature conditions.

The scientist in charge, Dr. Jesús Manuel Sobrado Vallecillo, says: „The temperatures and thermal changes on Mars are very large and can be as high as 90 Kelvin, with the lowest outside temperature on Mars dropping to -85 °C. The temperature on Mars can be as low as -85 °C, which is the lowest temperature on Earth. Simulating the temperature cycles of day and night requires a temperature control solution that allows us to change the temperature within minutes. Huber's Unistat performs this function brilliantly and also offers cost savings compared to cooling with liquid nitrogen. Moreover, in the event of a leak, the room in which work is being done is not at risk."

The tests and simulations carried out with the Unistat in the run-up to the Mars mission have paid off. According to NASA, rock samples from the Mars rover Perseverance indicate that water may have existed on the planet for a long time. However, it will be some time before researchers can analyze the samples themselves: a joint mission by NASA and ESA is not planned until the 2030s to bring the samples back to Earth.

But the vacuum reactor with the Unistat is by no means out of work because of this. On the contrary, the reactor is already being used to simulate other planets, such as Jupiter's icy moon. The research team led by Dr. Sobrado Vallecillo is working on this as part of the „STAR DUST" project, among others. This project is concerned with the exploration of the nanocosmos. One goal is to study the formation of stardust in the laboratory in order to learn more about the habitability of planetary objects.

Peter Huber Kältemaschinenbau SE wishes the researchers continued success and is pleased that its Unistat technology is helping to realize such forward-looking projects.


4
YEARS
WARRANTY
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PERFORMANCE
OVER 200 CASE STUDIES
MADE IN
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NATURAL
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EASY
OPERATION
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A technology leader with sustainability – Natural refrigerants since 1976

The complete range with natural refrigerants

ONLY FROM HUBER

Synthetic refrigerants are on the brink of extinction. In the race against global warming, a gradual phase a gradual phase-down in which synthetic refrigerants will be banned worldwide. We have alternatives, because natural refrigerants have been standard here for decades.

Only from Huber you can get the entire range from -125 to +425 °C with natural refrigerants – that is unique in the world.

In response to the impending bans on synthetic refrigerants, we say: „Finally, it's about time!" The future belongs to natural refrigerants with a low GWP value. We recognized this as early as 1976 and launched circulation coolers and refrigerated circulators with propane R290 and propene R1270 on the market. In addition, we have consistently expanded our range with high-performance CO_2 solutions, including the new Unistats in the GL series (Green Line). We are the only supplier on the global market that are able to supply the entire spectrum from ultra-compact laboratory coolers to high-performance industrial process thermostats with natural refrigerants – we look forward to hearing from you!

World market leader for temperature control units with natural refrigerant – since 1976

Our products make us an ecological pioneer in environmental protection. Our entire product range for the laboratory already works with natural refrigerants as standard. Our products are made of high-quality materials with high recyclability are durable and sustainable.

The environment has been our focus since the company was founded. One of the company's first goals was to develop alternatives to the then widespread use of fresh water for cooling. Another measure was the voluntary phase-out of CFC/HCFC refrigerants long before legal regulation.

We are pioneers in the temperature control technology industry in the use of environmentally friendly hydrocarbons as refrigerants. All laboratory temperature control units in our range have been available with natural refrigerants for years – at no extra charge as standard.

Our factory and offices demonstrate our commitment and practice of responsible use of water and energy shows that we take environmental protection seriously. The tango factory is an example of environmental conscious architecture. Made of solid concrete with triple-glazed windows, a thick layer of insulation and kilometers of plastic pipes in the floor, ceiling and walls within which water is recirculates to efficiently control the ambient temperature and acts as a gigantic heat exchanger with minimal energy requirements.

In 2016, we were awarded the environmental prize for companies by the state of Baden-Württemberg and in 2023 we were the first company in the whole of Baden-Württemberg to receive the KEFF+ label from the Ministry of the Environment for the resource savings we have implemented.

Our bestsellers
With natural refrigerants

BESTSELLER
for the laboratory since 1976

Investing in a temperature control unit with natural refrigerants is an investment into an environmentally friendly, futureproof and sustainable technology. However, natural refrigerants are only one aspect of environmentally friendly solutions. Our temperature control units combine natural refrigerants with extremely low energy consumption, making them particularly energy and resource efficient.

Back in the 1970s, our company founder Peter Huber developed the first cooling appliances with natural refrigerants and was the first to the market. In the following years the entire range of laboratory temperature control was converted to natural refrigerants. As a result, over 90 % of our temperature control units sold in 2018 were supplied with natural refrigerants.

In practice, natural refrigerants such as R290, R1270 and R744 have considerable advantages, including low pressure losses in pipes and heat exchangers as well as low energy consumption during compression. Disposal is also easier than with synthetic substances. As they are natural substances, these refrigerants can be released into the atmosphere in a controlled manner.

Ministats
Ministats are the smallest refrigerated circulators in the world. With their small dimensions, the devices occupy minimal bench space and can be operated in the tightest of spaces, for example in a fume cupboard.

Compact-cooling circulators
Working temperature -45 ... 200 °C
Cooling power up to 600 W

Minichillers
Minichillers are a space-saving, cost-effective and environmentally friendly cooling solution for numerous laboratory applications. By reducing water consumption to zero, Minichillers pay for themselves within a short time.

Circulation chillers
Working temperature -20 ... 100 °C
Cooling power up to 1200 W

TC
The TC immersion coolers significantly reduce the consumption of dry ice, minimising environmental impact. Additionally, they lower solvent usage, making them an eco-friendly choice for modern laboratories. They are availble with natural refrigerants.

Immersion coolers
Working temperature -100 ... 100 °C
Cooling power up to 300 W

KISS and CC
KISS and CC (Compatible Control) series cooling thermostats are designed for temperature control tasks down to -90 °C. The devices are suitable for many typical heating and cooling tasks such as sample temperature control, material testing and quality control.

Baths/Circulators
Working temperature -55 ... 200 °C
Cooling power up to 1500 W

Free extension
4 year warranty

Comprehensive and free – our 4 year warranty package

We offer an extensive warranty extension with numerous benefits. To take advantage of this option an online registration of the Huber unit is required. The standard warranty is for 12 months from the shipping date (Ex Works Offenburg, Germany).

The 4-year warranty is provided at no extra cost. Registration of the end customer's address must be completed within 3 months from the delivery date.

★★★
WARRANTY EXTENSION
with registration only – see website for details
huber-online.com/register
Register now!

Inspired by **temperature** designed for you

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