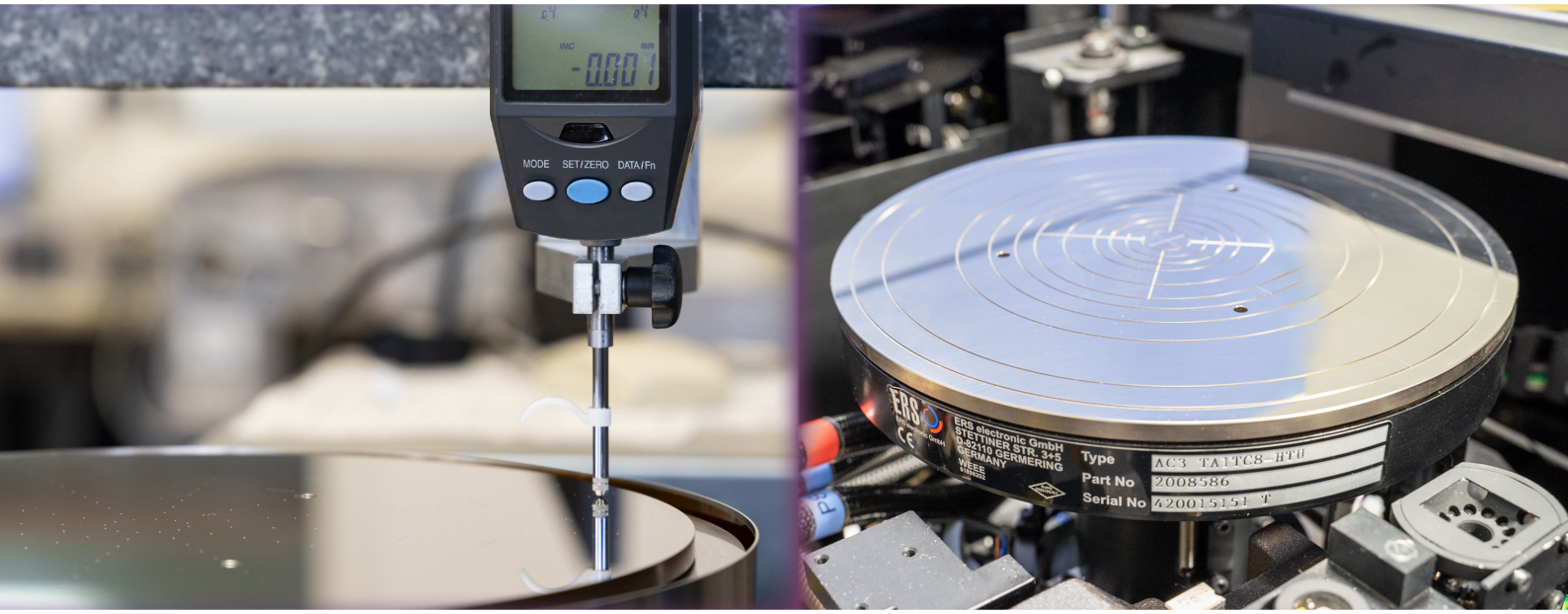
ERS



Thermal Chuck System

More than 50 years of innovation in temperature wafer probing

THERMAL CHUCK SYSTEMS

ERS electronic's history started in 1970 when our founder, Erich Reitinger, accepted the challenge to build the first-ever thermal chuck for wafer probing. At the time, wafer test was at its infancy and temperature test was only done in final test. In each decade since its founding, ERS has enabled significant advancements in the field of semiconductor wafer test with its cutting-edge thermal chuck systems. For more than 50 years, our focus lies on developing cost-efficient, time-saving and sustainable solutions, that push the boundaries of what is possible in thermal management.

Today, temperature is a key parameter in semiconductor wafer probing. As the devices are becoming more complex, the requirements for thermal management and regulation are subsequently increasing. Our commitment to excellence and our drive to succeed have made us a leader in our field, and we're excited to continue taking on new challenges to stay at the forefront of innovation and drive the industry forward.

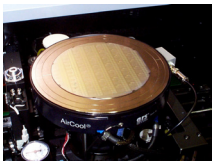
1970s

ERS invented the first ever thermal chuck for wafer probing

1980s

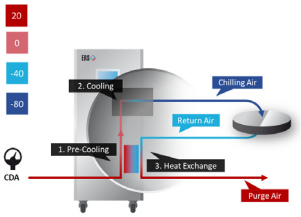
SuperCool enabled **coldest temperature** (-55°C) ever recorded for a wafer chuck

1990s



Replaced liquids with Clean Dry Air as the only coolant with **AirCool®**

2000s



AirCool® plus - the first ever air-only cold chuck system for production probers

Why choose an ERS chuck system

1. Superior chuck flatness (5 µm)
2. Wide temperature ranges (-65°C - 550°C)
3. Rapid temperature ramping
4. High temperature precision
5. Low electrical noise, short settling times (fA level)
6. Reliability and exceptionally long lifetime
7. Minimum space requirements
8. Low COO and energy consumption

2017

AirCool®PRIME - co-developed with MPI Corporation

2019

High Uniformity and Accuracy Chuck Systems

2022

AC3 Fusion

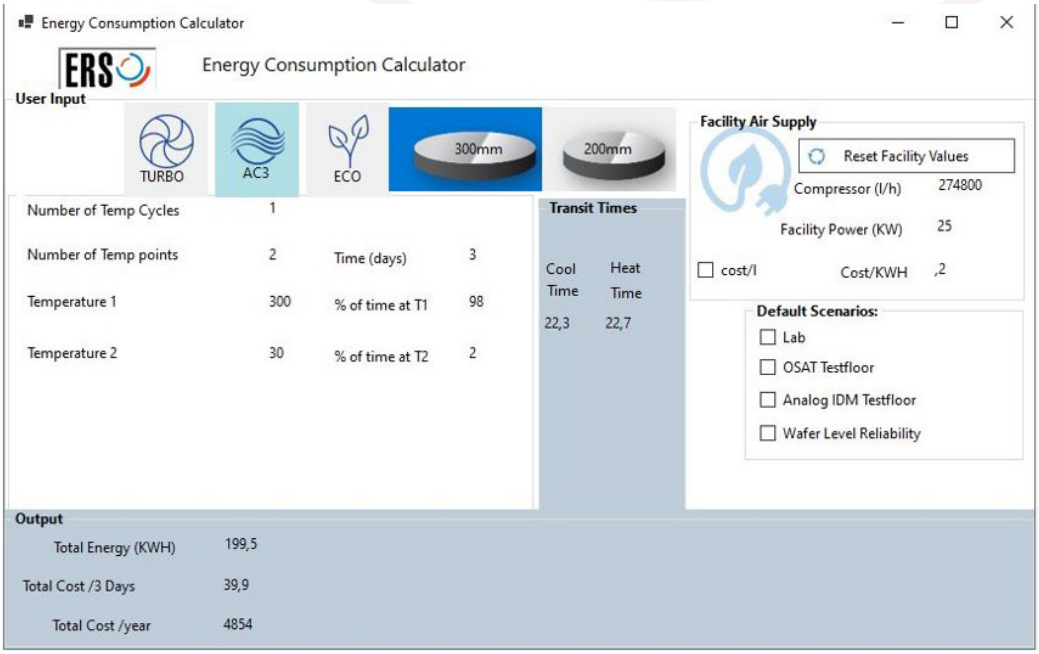
2023

High Power Dissipation system

AC3 Fusion

- Air only - no liquids or peltier elements
- Temperature range from -60°C to +400°C
- Compatible with all major production and analytical probers
- Unrivalled efficiency thanks to the patented ACP Technology
- Modular system, adaptable to individual testing requirements

ENERGY CONSUMPTION CALCULATOR



ECO mode

Optimal performance cost ratio - saving up to 65% energy

AC3 mode

Best suited for balanced performance - also for facilities with limited air supply

Turbo mode

Maximum efficiency for transition times - up to 40% faster than AC3

COMPARISON OF THE FOUR MODES

	AC3	ECO	Turbo	Fusion*
Airflow mode 300mm 200mm	AFE (AirFlow Eco) 330l/min 220l/min	AFE (AirFlow Eco) 330l/min 220l/min	AFT (AirFlow Turbo) 400l/min 300l/min	
Temperature mode	AT mode (All Temperatures) Compressor on/ off depending on temperature	HT mode (High Temperature) Air is shut off in controlling when set temp. is over 90°C or when heating (no purge air) <30°C goes to AT mode	LT mode (Low Temperature) Compressor is always on	Can be combined to meet your special requirements
Heating mode	MP Standard Heating mode 100% heating power	OP Optimized Heating mode 80% heating power of temp. < 100°C 100% heating power of temp. >100°C	MP Standard Heating mode 100% heating power	
Power dissipation mode	Standard Power Dissipation mode Standard air controlling mode			Standard Power Dissipation mode or High Power Air Mode

*Fusion mode: Best suited for individual test requirements

ERS

SPECIFICATIONS OVERVIEW

Available upper temperature limits	+150°C up to +300°C, +400°C option available
Available lower temperature limits	-60, -40, +20, +35°C
Chuck temperature display resolution	0.01°C
Smallest temperature selection step	0.1°C
Temperature accuracy	±0.1°C
Surface flatness and base parallelism	-60°C up to +300°C < ±12µm (tighter range on request)
Temperature uniformity	-60°C to +200°C < ±0.5°C > 200°C < ±0.5 %
Control method	Low noise DC/PID with Temperature Dynamic Control TDC
Heating rates for 300mm system	-60°C to +25°C: 12 min -40°C to +25°C: 10 min +25°C to +150°C: 20 min +25°C to +200°C: 28 min +25°C to +300°C: 40 min
Cooling rates for 300mm system	+150°C to +25°C: 25 min +200°C to +25°C: 30 min +300°C to +25°C: 40 min +25°C to -20°C: 15 min +25°C to -40°C: 35 min +25°C to -60°C: 65 min

* Please be advised that the data represents the typical values observed during test, and that they may vary depending on other factors.

PROBER COMMUNICATION

Communication between ERS's AC3 Fusion controller and the prober is done via an RS232 3-wire cable. A detailed command and request guide will be supplied with the thermal chuck system. This will show how you can switch between the different modes.

Operations will be only done in the prober user interface.

APPLICATIONS SPECIFIC SOLUTIONS

Temperature and its regulation continue to be key parameters in wafer test, and as new and more intricate semiconductor applications are being developed, thermal management is more important than ever before. To address the common challenges in temperature wafer test, ERS has leveraged its 50 years of experience to develop the following solutions:

High Uniformity and Accuracy Chuck Systems

- Available in 200mm and 300mm format
- Temperature uniformity of ±0.1°C
- Temperature accuracy <50mk
- ITS 90/ISO 17025 calibration offered
- For sensors and high-precision analog

	Temperature sensors	Temperature uniformity	Accuracy
300mm	7 sensors, 4-line wired, multi zone monitoring	-60°C to -20°C: ≤ ±0.5°C -20°C to +30°C: ≤ ±0.2°C +30°C to +60°C: ≤ ±0.1°C +60°C to +90°C:≤ ±0.2°C +90°C to +200°C: ≤ ±0.5°C	<50mk or ±100mK
200mm	5 sensors, 4-line wired, multi zone monitoring		

Please be advised that the data represents the typical values observed during test, and that they may vary depending on other factors.

Anti-Magnetic

- Available in 200mm and 300mm format
- Made of low- or non-magnetic materials
- Magnetic field <10µT

AM1	AM2	AM3
+/-30µT Nickel-plated surface Little brass, very little stainless steel, some copper, and aluminium	+/-10µT Gold plating without magnetic influence No brass, nickel or stainless steel contained	Non-conductive Additional non-conductive layer to avoid electromagnetic induction

Please be advised that the data represents the typical values observed during test, and that they may vary depending on other factors.

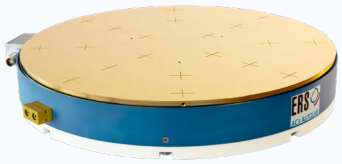
High Voltage/Current

- Accurate/consistent RDSon data
- Safe thin wafer autoloading
- Low inductance for dynamic power tests
- Ultra low leakage
- Taiko option available

Max. test voltage	10kV
Max. pulse current	600A
Temperature range	-60°C to +300°C
Wafer handling	Gold plating/Taiko Interchangeable top plates, >700 holes
Leakage	fA level

Please be advised that the data represents the typical values observed during test, and that they may vary depending on other factors.

Low Noise Specifications



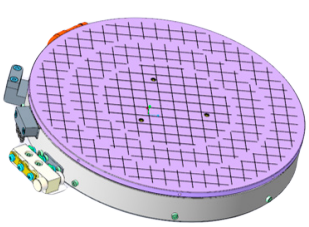
- Available in 200mm and 300mm format
- Ultra Low noise: <2.5 fA/V

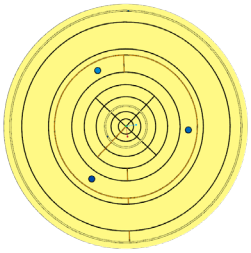
Low Noise	Coaxial Connected: Electrical Isolation : > 2,5 TOhm @ +25 °C
Lab Low Noise	Triaxial Connected:
	Leakage @ +25 °C : < 50 fA/V Leakage @ +200 °C : < 200 fA/V
Ultra Low Noise	Triaxial Connected:
	Leakage @ +25 °C : < 2.5 fA/V Leakage @ +200 °C : < 5 fA/V

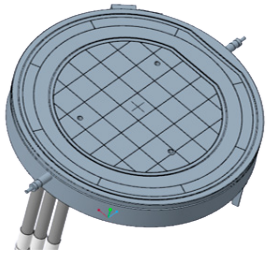
* Please be advised that the data represents the typical values observed during test, and that they may vary depending on other factors.

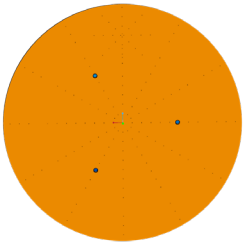
Special Vacuum Design

- Available in 200mm and 300mm format
- Warpage handling max. 6mm









All the above chucks are adapted to AC3 Fusion chiller for low temperature wafer probing

High Power Dissipation

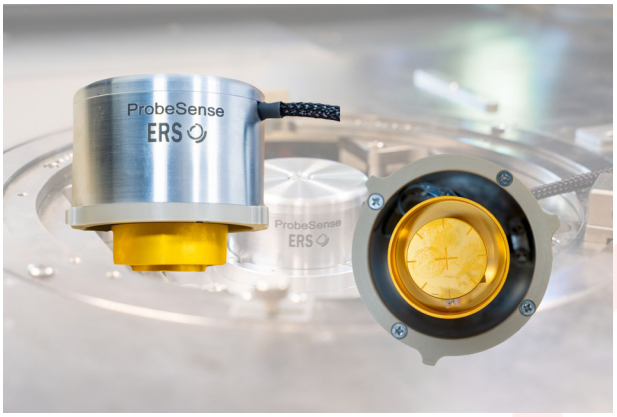
ERS's "High Power Dissipation" liquid-cooled chuck system can dissipate up to 2500W of power at -40°C with a temperature uniformity of 0.2°C. This makes it most versatile, accurate and efficient solution for wafer testing in applications involving high-end processors, microcontrollers, and devices requiring a high level of parallelism.

Temperature control method	Liquid/Resistance Heater		
Coolant	Novec 7200; Novec 7500 or on request		
Surface flatness	±5µm		
Temperature stability	±0.08°C		
Temperature accuracy	±0.1°C		
Temperature sensors	Qty. 9		
Temperature uniformity	Temperature	Standard	HTU option
	-60°C to -41°C	≤ ±0.5°C	≤ ±0.3°C
	-40°C to -21°C		≤ ±0.2°C
	-20°C to +85°C		≤ ±0.1°C
	+86°C to +100°C		≤ ±0.2°C
	+101°C to +120°C		≤ ±0.3°C
	+121°C to +150°C		≤ ±0.4°C
	+151°C to +200°C		≤ ±0.5°C
Transition time	Heating rate: +25°C to +200°C: 35 mins Cooling rate: +25°C to -60°C: 35 mins		
Max. power dissipation at -40°C	2500W		

* Please be advised that the data represents the typical values observed during test, and that they may vary depending on other factors.

For special requirements please contact us: info@ers-gmbh.de

ProbeSense™ is a robust temperature calibration tool for wafer probing with a temperature accuracy down to 0.03°C. It is suitable for evaluation and characterization of temperature accuracy on the chuck surface. Its compact and flexible design makes it easy to install in any prober, and the measurement position enables it to accurately reflect the probing conditions. The ProbeSense™ consists of a single sensor, thereby reducing the measurement deviation. Additionally, it comes with an automation function that allows for easy calibration of sensors inside the chuck, temperature offset adjustments, or temperature uniformity measurements.



- Can be fully automated
- Robust and easy to recalibrate offline
- Highly repeatable calibration processes according to ITS90 and ISO17025
- Temperature range: -60°C to +200°C, ice-free at cold temperatures
- Temperature accuracy below 30mK

PROBER INTEGRATION AND SEALING

ERS offers this service for all production and analytical probers, on-site and off-site, with an exceptionally fast turnaround time. To date, our thermal chucks have been integrated in many different probers from numerous well-established companies, including: Accretech/TSK, Tokyo Electron (TEL), Cascade, SEMICS, MPI, and more.

ERS provides comprehensive technical supports globally through our international service team.

CONTACT US

To request a quotation, please visit: www.ers-gmbh.com

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