LAUDA

CONSTANT TEMPERATURE EQUIPMENT FOR AUTOMOTIVE TESTING

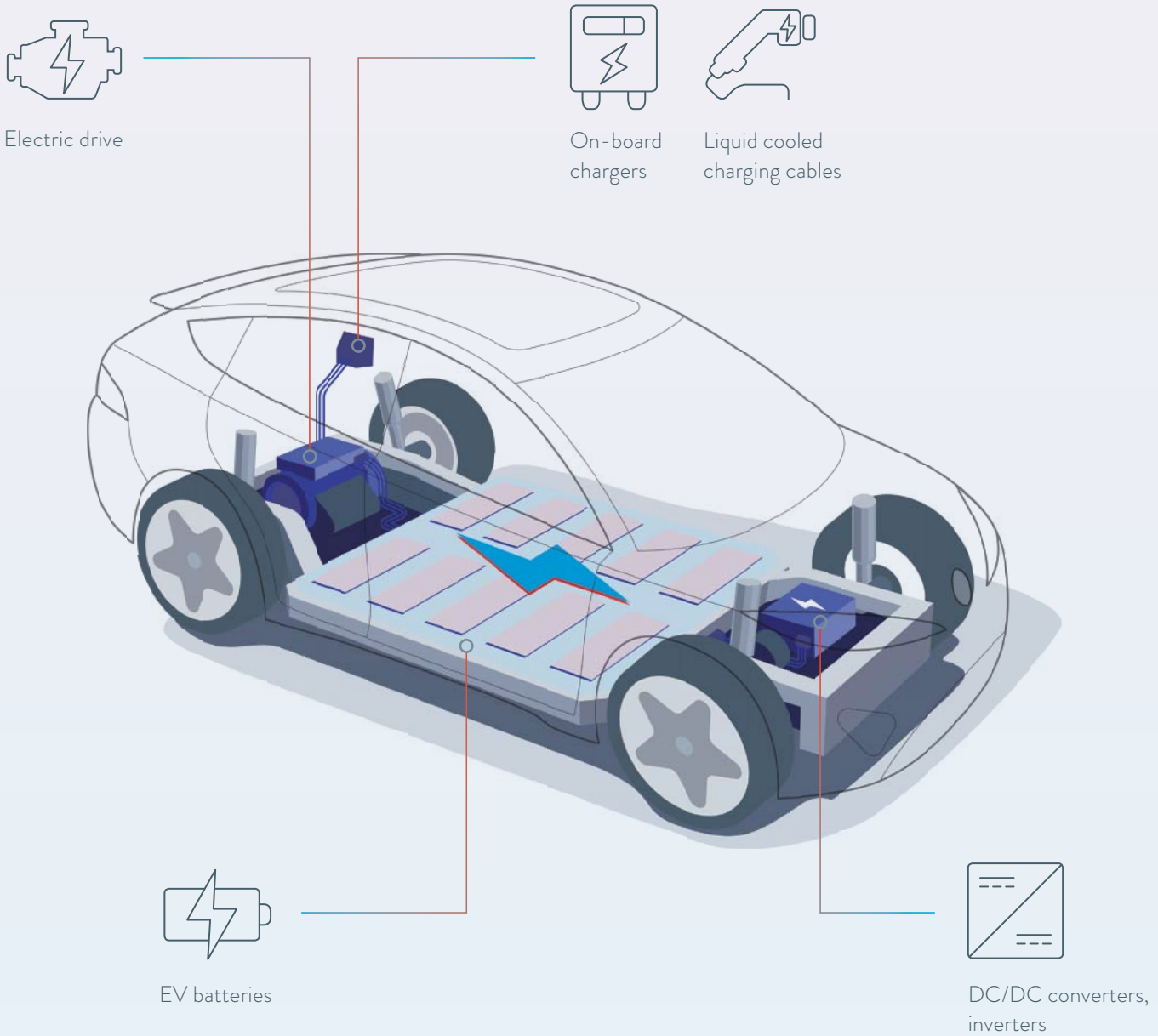
°FAHRENHEIT. °CELSIUS. °LAUDA.

CONSTANT TEMPERATURE EQUIPMENT FOR AUTOMOTIVE TESTING

In the automotive industry, temperature control is mainly found in test and inspection rigs, as well as material tests. All the components of an automobile are exposed to extremely high temperature fluctuations to ensure that they function correctly and reliably during subsequent use. This process of testing many different components in special test rigs makes an important contribution to increasing quality and reliability.

The simulation of extreme environmental conditions across a wide range of different temperatures is an important part of the material tests. Climatic chambers are used to simulate ambient temperatures, while process thermostats control the temperature of the coolant to simulate cooling circuits in the vehicle. The heat flow in the test specimen can be controlled via temperature gradients as a result.

APPLICATION EXAMPLES

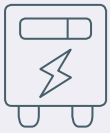


DC/DC CONVERTERS, INVERTERS

Devices such as DC/DC converters and inverters are key components of the drives used in electric mobility. To test their reliability and efficiency, these components are exposed to different climatic influences. LAUDA constant temperature equipment and systems run through the required temperature profiles within a test temperature range of −40 to 140 °C and reliably adjust the load conditions.

ON-BOARD CHARGERS

kürzen möglich?



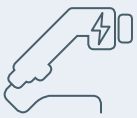
On-board chargers (OBC) in electric vehicles must undergo thermal testing as they are critical to safety and performance. These chargers convert alternating current into direct current, generating heat in the process. Excessive temperatures can damage components, reduce efficiency and shorten the life of the system. Thermal tests simulate extreme operating conditions to ensure that the OBC has sufficient cooling and functions reliably, even in high outside temperatures or intensive use. This ensures compliance with safety standards.

kürzen möglich?

EV BATTERIES

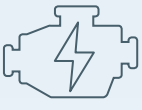
Battery performance is a key element of electric mobility. Charge levels, charging cycles and performance are tested in climatic chambers at varying ambient temperatures. LAUDA Constant temperature equipment and systems control and monitor the temperature to simulate varying operating conditions and determine if this has any impact on battery performance.

LIQUID COOLED CHARGING CABLES



The use of liquid cooling technology in high-power DC charging cables helps maintain a constant low temperature during charging, preventing thermal damage to the cable and connector caused by overheating. To ensure safe and efficient operation of liquid-cooled charging cables, rigorous thermal and electrical performance testing must be conducted.

ELECTRIC DRIVE



The engine and its cooling system must work reliably and efficiently under different operating conditions. Our Integral process thermostat plays a key role in this by providing the precise temperatures required for reproducible and controllable test conditions.

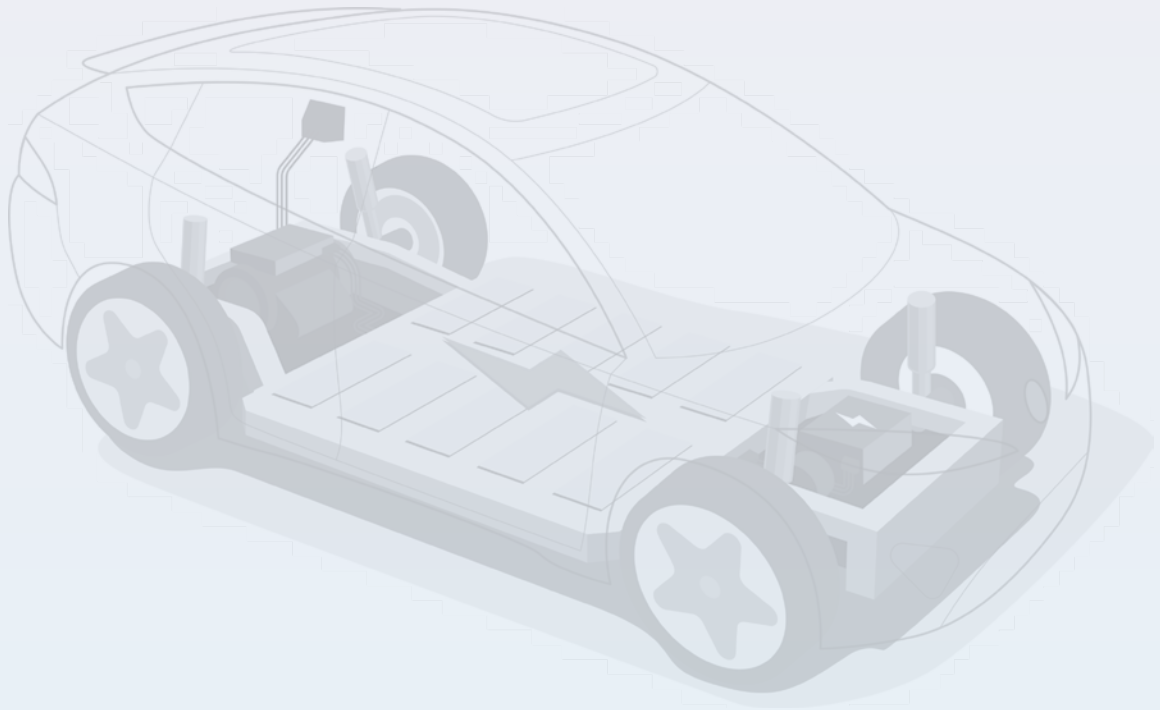
COMPONENT AND MATERIAL TESTS

Parts and components for vehicles are tested for their resilience under extreme conditions using climate and temperature tests. With powerful, variable pressure pumps and direct use of automotive coolant, LAUDA constant temperature equipment and systems pass these stress tests with flying colors. Thanks to the integration of a LAUDA flow control unit, these tests are more precise and can be reproduced more accurately. This ensures the high quality of the components.

The most popular constant temperature equipment of our customers in the automotive sector include circulation chillers and thermostats. These are ideally suited to carry out the following activities reliably and precisely:

- Accelerated life tests in the development of batteries and electronic components
- End-of-line testing of components in e-mobility
- Test benches for electric motors
- Endurance tests in fuel cell testing

On request, you can adapt our temperature control solutions for the automotive sector both to the prevailing requirements and to your own wishes. The individual temperature control systems offered by LAUDA can be flexibly extended and modified and are developed individually according to customer requirements.



THE RIGHT CONSTANT TEMPERATURE EQUIPMENT FOR EVERY APPLICATION

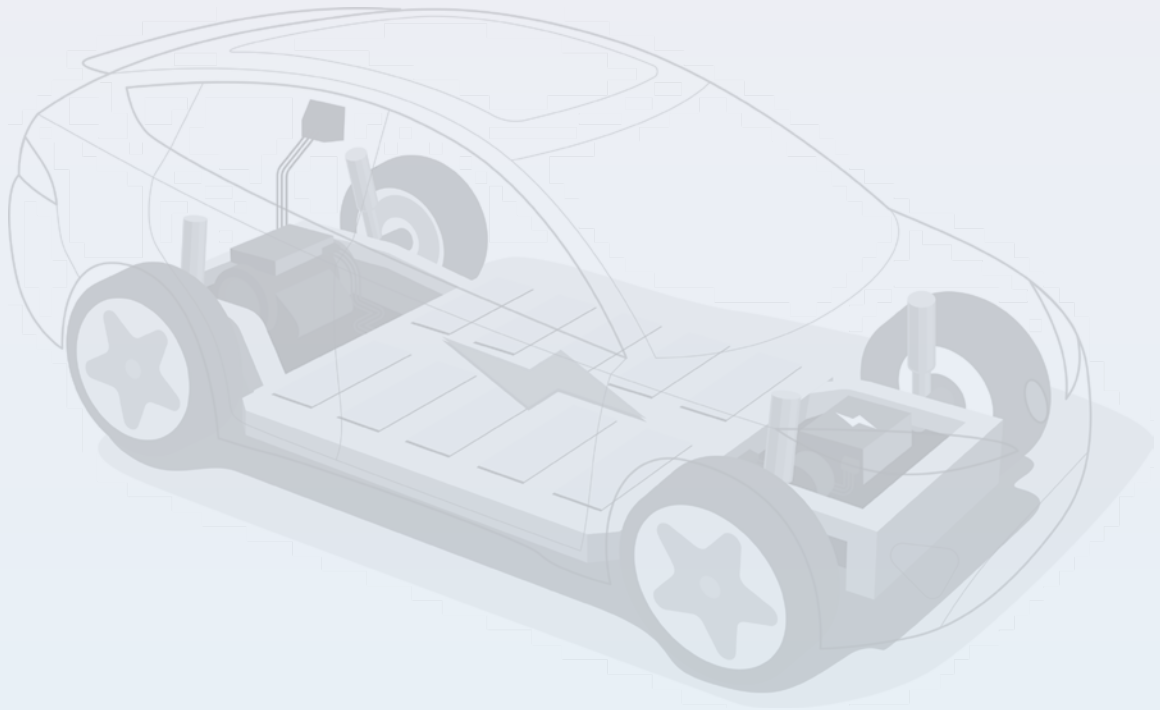
In the automotive industry, test benches, aging tests, quality control and the examination of various engine components are part of daily business. Therefore, for example, you must always be able to rely on correct temperatures during testing, enabling accurate assessment and validation of the device under test. With the temperature control units for the automotive industry from our portfolio, you can achieve this.

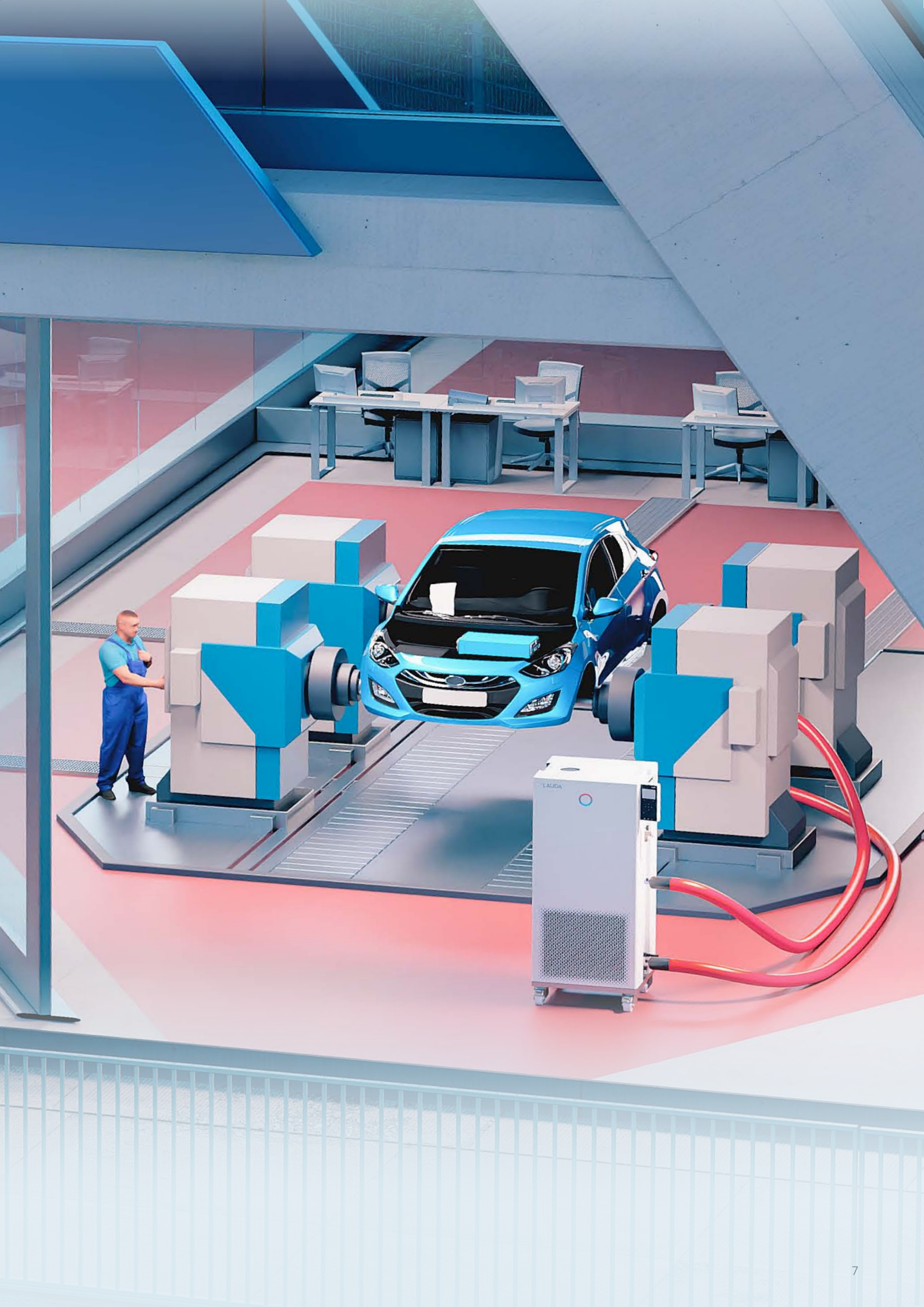
Our product range includes a large number of units to keep your temperature control processes in the automotive industry up to date.

Examples
Integral process thermostats are used in the automotive industry and by a large number of testing service providers to test batteries, power electronics and eDrives, often in combination with LAUDA flow control or LAUDA filling and drain unit.

Our Ultracool circulation coolers are perfect for providing central cooling water for Integral process thermostats and ensure a high cooling capacity – even in continuous operation. They are suitable for outdoor installation and also have a temperature monitor that reliably protects the heat exchanger.

LAUDA plans and builds systems precisely in accordance with the customer's wishes: process-oriented, made-to-measure and precisely in accordance with the regulations, and with compliance with the strict safety standards. Since the requirements for constant temperature equipment are continuously growing, the modern LAUDA heating and cooling modules are also flexible as far as expansion and modification are concerned.





LAUDA INTEGRAL PROCESS THERMOSTATS

1.5 to 25 kW cooling capacity, 3.5 to 24 kW heating capacity

More information:

LAUDA INTEGRAL

−90 °C — 320 °C

Renowned quality

The Integral product line has proven itself in a wide variety of industries and applications for more than 20 years. Thousands of installations ensure the extensive testing and development of innovative components and systems on test benches in the automotive, electronics and aviation industries.

With a modular interface concept, fast temperature changes and a flow rate up to 120 L/min as well as maximum delivery pressures up to 6 bar, LAUDA Integral process thermostats are the perfect choice for demanding temperature control tasks in the automotive industry.

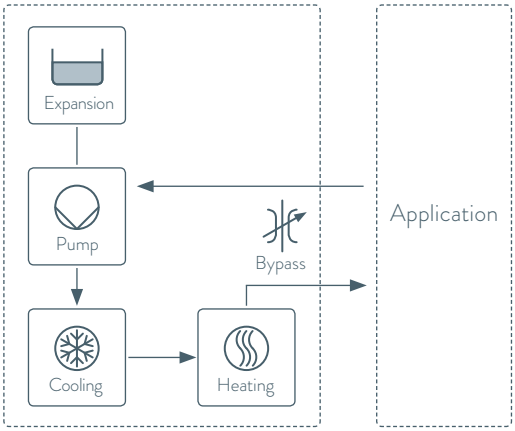
LAUDA INTEGRAL XT

(closed system with cold oil overlay)

LAUDA Integral XT process thermostats operate according to the flow principle with a cold oil overlay which enables the utilization of heat transfer liquids over a significantly larger temperature range – optimal for dynamic temperature control tasks.

−40 °C — Water/glycol mixtures — 90 °C

−90 °C — Oils — 320 °C

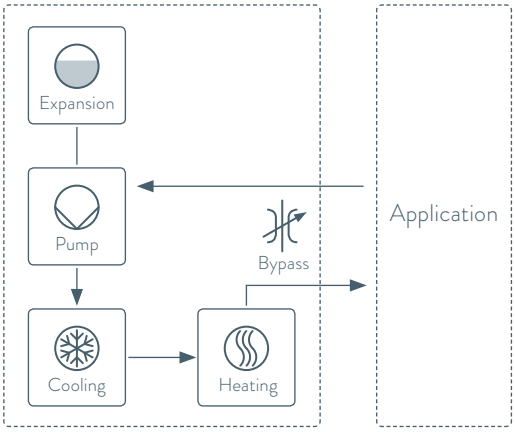


LAUDA INTEGRAL P

(closed system with pressure overlay)

The **LAUDA Integral P** process thermostats function according to the flow principle, with a pressure overlay of up to 4 bar. This allows non-flammable water/glycol mixtures to be used in a temperature range of −40 to 140 °C.

−40 °C — Water/glycol mixtures — 140 °C



WHETHER CO_2 OR HYDROCARBONS – ALWAYS THE BEST SOLUTION

CO_2

Propane

Propene

Butane

Ethane

Refrigerant on request

The future of refrigerants in the world of precision temperature control technology is varied. Depending on the application conditions, installation location and target temperatures, the best temperature control equipment must be designed for a variety of potential refrigerants.

Whether CO_2 refrigeration equipment or innovative refrigeration systems that use hydrocarbons such as propane or butane, LAUDA will provide you with the right solution for your application.

COMPARISON OF AVAILABLE SOLUTIONS AT LAUDA

	Reference: HFC refrigerants / classic fluorinated gases (e.g. R134a)	Equipment using natural refrigerants / hydrocarbons (e.g. R1270 = propene)	Device with natural refrigerant R744 = CO_2	
Safety class	A1	A3	A1	
Toxicity	No	No	No	
Flammability	No	Yes	No	
Danger of asphyxia	Low	Low	Yes	
Specific safety requirements	None	None up to refrigerant charge quantity of 150 g, For refrigerant charge quantities greater than 150 g, minimum room volumes of the installation location with leak sensor and ventilation, if necessary	When installed in basements or above ground without emergency exits: minimum room volumes of the installation location and ventilation, if necessary (risk of suffocation in the event of leaks)	
GWP (Global Warming Potential = CO_2 equivalent)	Normally >1000	<10	1	
COP (Coefficient Of Performance = Ratio of cooling capacity to the electrical power used at full load and tb=20 °C)	approx. 3.3 (decreases steadily at lower temperatures)	approx. 3.6 (decreases steadily at lower temperatures)	approx. 1.7 (twin-stage compressor, decreases steadily at lower temperatures)	approx. 3 (single-stage compressor, long-term stability at lower temperatures)
Temperature range	As low as −100 °C	As low as −100 °C	As low as −50 °C (twin-stage)	As low as −40 °C (single-stage)
Heat discharge	Air and water cooling possible	Air and water cooling possible	Water-cooled only (cooling water <15 °C)	
Conclusion:	Current state of the art, high energy efficiency and minimal safety requirements	Technically ideal replacement for classic fluorinated gases with high energy efficiency. Air and water-cooled design possible for all temperature ranges. Established safety technology	Limited minimum temperature. Only water-cooled design practical, high energy efficiency with ideal working conditions. Additional costs due to higher system pressures. Minimal safety requirements	

LAUDA INTEGRAL PROCESS THERMOSTAT WITH FLOW CONTROL

LAUDA INTEGRAL XT FC
WITH INTEGRATED FLOW CONTROL

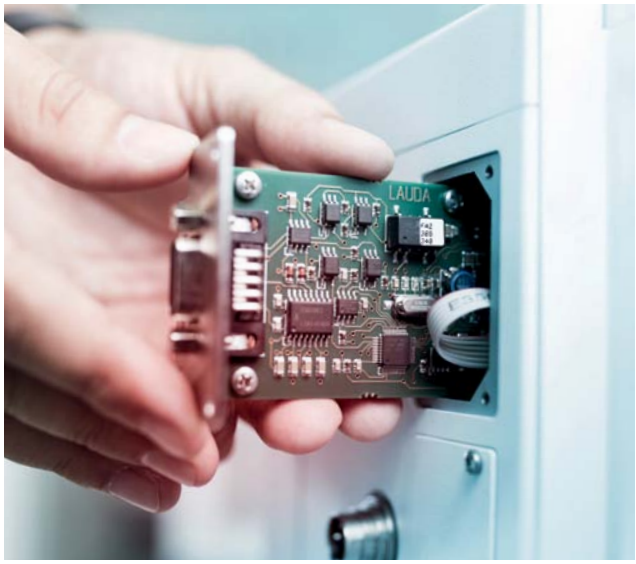
−40 °C 80 °C

LAUDA flow control unit as an add-on solution
LAUDA Integral XT FC devices are extended with a magnetically inductive flow meter and can therefore control the volume flow in a range from 2 to 65 L/min with a very high degree of accuracy.
The arrangement of the relevant components is space-saving and easily accessible for the user.

More information:

Technical features

Pump flow rate max. (pressure)	65 L/min
Flow control range	2.0 ... 65 L/min
Control accuracy flow rate (20 °C; 20 L/min; 1 bar)	±0.2 L/min
Flow measuring range	0.0 ... 99 L/min
Measurement deviation	±1.8 % at 2.0 L/min; ±0.3 % at 65 L/min



CONNECTIVITY

The Integral process thermostats enable maximum networking of user processes, thanks to their modular and future-proof interface concept. The devices feature interfaces such as Ethernet, USB, external Pt100 and malfunction contact as standard. Further interfaces and communication protocols can easily be added via additional modules. A second external Pt100 is also possible. This allows Integral thermostats to be flexibly integrated in various communication scenarios.

LRZ 926
RS-232/485 module Advanced, D-Sub 9-pin

LRZ 927
Contact module NAMUR Advanced, 1 input, 1 output

LRZ 928
Contact module D-Sub Advanced, 3 inputs, 3 outputs

LRZ 929
Profibus module Advanced, D-Sub 9-pin

LRZ 932
Profinet module Advanced, RJ45

LRZ 933
CAN module Advanced, D-Sub 9-pin

ADDITIONAL PRODUCTS

LAUDA FLOW CONTROL MID 80

Features

- Flow control system with magnetic inductive measurement principle
- Permitted heat transfer liquids: water/glycol mixtures
- User-interface allows setting and control of the temperature control unit
- Use in pressurized temperature control units up to max. 140 °C
- Use in open or cold-oil overlay systems up to max. 90 °C
- The maximum controllable volume flow depends on the pump output of the temperature control unit and the pressure drop in the application
- Adjustable pressure limit in application circuit
- With certificate of calibration

LAUDA FILLING AND DRAINING UNIT FD 50

Features

- Active filling and draining system for temperature control circuits
- Useable on LAUDA Integral variants IN XT and IN P
- Setting the parameters via the operating menu of the temperature control unit
- Automatic filling and emptying sequence, status visualized via illuminated keys
- Allowed heat transfer liquids: Water/glycol mixtures
- Pneumatic leak test before filling
- Large tank reservoir with level detection for handling large quantities of liquid
- Full process integration via connectivity temperature control unit

LAUDA FILLING AND FLOW CONTROL SYSTEM

Features

- Combination of FD 50 and MID 80 to reduce the footprint
- Incl. insulated pipe set for connecting MID 80 and FD 50
- For individual functions, see MID 80 and FD 50

LAUDA ULTRACOOL CIRCULATION CHILLERS

COOLING WATER SYSTEM WITH LAUDA ULTRACOOL CIRCULATION CHILLERS

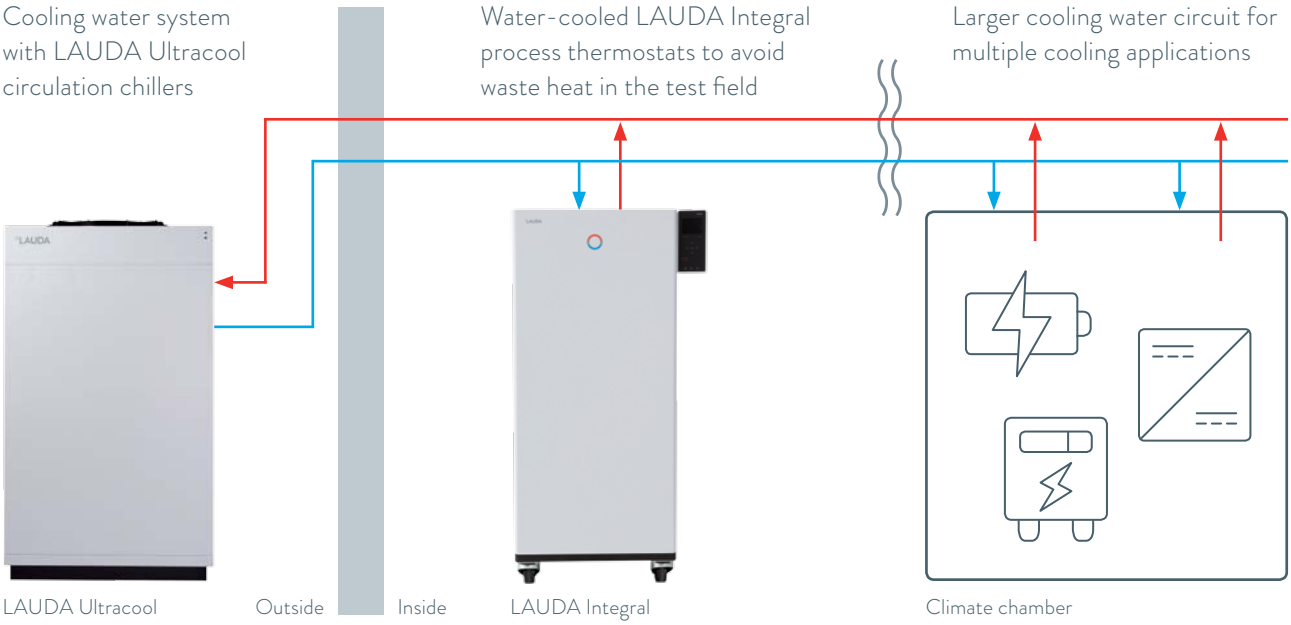
−10 °C 35 °C

LAUDA Ultracool circulation coolers provide precise temperature control in an extended operating temperature range from −10 to 35 °C and a temperature stability of ±0.5 K. The protection class IP54 enables outdoor installation, a fan control as standard allows operation at ambient temperatures down to −15 °C and reduces the noise pollution.

The recirculating chillers are equipped with an Ethernet interface as standard and, thanks to numerous options such as speed-controlled pumps or flow meters, can be customized to any customer specific requirements.

More information:

With the current generation of the Ultracool series, LAUDA offers ultramodern circulation chillers with high energy savings and a short payback time for the supply of cooling water.



INDIVIDUAL HEATING AND COOLING SYSTEMS

LAUDA PROCESS COOLING UNIT

−150 °C 550 °C

Efficiency, precision and flexibility characterize the advanced heating and cooling systems from LAUDA, specialized for the temperature control of components in the automotive industry from typically −40 to 140 °C. The flexible connectivity options of our systems allows for the operation of a large number of test specimens simultaneously at an identical temperature profile, while the volume flow rate remains individually adjustable for each test specimen. The advantages of a LAUDA conditioning plant are the comprehensive automation and the wide temperature range, which ensures continuous operation. Our systems are designed for maximum integration and user-friendliness and effortlessly fulfill the high control accuracy requirements.

More information:

Specially designed for applications in the automotive sector

- Pressure overlay
- Calibrated volume flow measurement
- Variable volume flow control
- Automatic filling and draining
- Supply to several consumers
- Compatible with Fluorinert fluids
- Powerful variable pumps for consumers with narrow cross-sections
- Communication possible via different interfaces, easy integration in control station
- Optional remote service, worldwide
- Nitrogen overlay
- Problem-free use of coolant down to −40 °C

Certifications

LAUDA systems are used all over the world for temperature control. Comprehensive full documentation for all individual parts and the necessary safety units on the installation are necessary to ensure a seamless certification process.

LAUDA Integral and Ultracool

Technical data acc. to DIN 12876

Device type	Working temperature range °C	Temperature stability ±K	Cooling of the refrigerating machine	Max. heating output kW	Cooling capacity kW												
					200 °C	100 °C	20 °C	10 °C	0 °C	−10 °C	−20 °C	−30 °C	−40 °C	−50 °C	−60 °C	−70 °C	−80 °C	−90 °C
LAUDA Integral XT																		
IN 150 XT	−45 ... 220	0.05	Air	3.5	1.50[3]	1.50[3]	1.50[3]	1.50[3]	1.30[3]	1.00[3]	0.70[2]	0.30[2]	0.06[2]	-	-	-	-	-
IN 250 XTW	−45 ... 220	0.05	Water	3.5	2.20[3]	2.20[3]	2.10[3]	2.00[3]	1.80[3]	1.40[3]	1.00[2]	0.55[2]	0.20[2]	-	-	-	-	-
IN 550 XT	−50 ... 220	0.05	Air	8.0	5.00[3]	5.00[3]	5.00[3]	4.80[3]	4.60[3]	3.30[3]	2.30[2]	1.20[2]	0.50[2]	0.10[1]	-	-	-	-
IN 550 XTW	−50 ... 220	0.05	Water	8.0	5.80[3]	5.80[3]	5.80[3]	5.80[3]	5.40[3]	4.00[3]	2.60[2]	1.45[2]	0.55[2]	0.12[1]	-	-	-	-
IN 750 XT	−45 ... 220	0.05	Air	8.0	7.00[3]	7.00[3]	7.00[3]	7.00[3]	5.40[3]	3.60[3]	2.60[2]	1.60[2]	0.80[2]	-	-	-	-	-
IN 950 XTW	−50 ... 220	0.05	Water	8.0	9.50[3]	9.50[3]	9.50[3]	8.50[3]	6.20[3]	4.30[3]	3.00[2]	1.70[2]	0.90[2]	0.35[1]	-	-	-	-
IN 1850 XTW	−50 ... 220	0.05	Water	16.0	20.0[3]	20.0[3]	20.0[3]	15.0[3]	11.5[3]	8.50[3]	6.10[2]	3.60[2]	1.90[2]	1.10[1]	-	-	-	-
IN 2560 XTW	−60 ... 220	0.10	Water	24.0	25.0[3]	25.0[3]	25.0[3]	24.5[3]	22.5[3]	22.0[3]	18.5[2]	12.5[3]	8.70[2]	5.00[2]	3.00[2]	-	-	-
IN 280 XT	−80 ... 220	0.05	Air	4.0	1.60[3]	1.60[3]	1.60[3]	1.55[3]	1.50[3]	1.50[3]	1.70[2]	1.70[2]	1.65[2]	1.40[2]	0.85[2]	0.35[2]	0.15[1]	-
IN 280 XTW	−80 ... 220	0.05	Water	4.0	1.70[3]	1.70[3]	1.70[3]	1.65[3]	1.60[3]	1.60[3]	1.80[2]	1.80[2]	1.80[2]	1.50[2]	0.90[2]	0.45[2]	0.18[1]	-
IN 590 XTW	−90 ... 220	0.05	Water	8.0	4.50[3]	4.50[3]	4.50[3]	4.50[3]	4.50[3]	4.40[3]	4.60[2]	4.60[2]	4.50[2]	4.20[2]	2.70[2]	1.40[2]	0.60[2]	0.20[1]
IN 1590 XTW	−90 ... 220	0.05	Water	12.0	18.5[3]	18.5[3]	18.5[3]	15.0[3]	11.5[3]	8.70[3]	8.50[2]	8.50[2]	7.50[2]	6.00[2]	4.00[2]	2.20[2]	0.90[2]	0.35[1]
LAUDA Integral P																		
IN 2050 PW	−40 ... 140	0.05	Water	16.0	-	20.0[3]	20.0[3]	15.0[3]	10.8[3]	7.80[3]	4.80[2]	3.00[2]	1.60[2]	-	-	-	-	-
IN 2560 PW	−40 ... 140	0.10	Water	24.0	-	25.0[3]	25.0[3]	25.0[3]	24.5[3]	24.0[3]	17.7[3]	11.0[3]	7.50[3]	-	-	-	-	-
LAUDA Integral XT FC																		
IN 1850 XT FC	−40 ... 80	0.05	Water	16.0	20.0[3]	20.0[3]	20.0[3]	15.0[3]	11.50[3]	8.50[3]	6.10[2]	3.60[2]	1.90[2]	-	-	-	-	-
LAUDA Ultracool																		
UC 4	−10...35	0.5	-	-	-	-	6.10	4.80	3.30	2.40	-	-	-	-	-	-	-	-
UC 8	−10...35	0.5	-	-	-	-	13.3	10.2	7.0	4.4	-	-	-	-	-	-	-	-
UC 14	−10...35	0.5	-	-	-	-	20.3	15.8	11.1	7.6	-	-	-	-	-	-	-	-
UC 24	−10...35	0.5	-	-	-	-	30.9	24.3	17.3	12.0	-	-	-	-	-	-	-	-
UC 50	−10...35	0.5	-	-	-	-	65.6	51.2	36.4	25.2	-	-	-	-	-	-	-	-
UC 65	−10...35	0.5	-	-	-	-	85.2	66.9	47.8	33.3	-	-	-	-	-	-	-	-
UC 80	−10...35	0.5	-	-	-	-	101.4	79.0	56.2	39.0	-	-	-	-	-	-	-	-
UC 100	−10...35	0.5	-	-	-	-	121.4	95.3	68.3	47.8	-	-	-	-	-	-	-	-

[1] Pump level 2 [2] Pump level 4 [3] Pump level 8

Max. discharge pressure bar	Max. flow rate Pressure L/min	Pump connection thread mm	Min. filling volume L	Filling volume L	Dimensions (W × D × H) mm	Protection level	Noise level dB(A)	Weight kg	Max. power consumption kW	Mains voltage V; Hz	Part Number	Device type
3.1	65	M30 × 1.5	2.5	8.7	430 × 550 × 760	IP 21	60	102.5	3.7	230 V; 50 Hz	L002673	IN 150 XT
3.1	65	M30 × 1.5	2.5	8.7	430 × 550 × 760	IP 21	57	105.5	3.7	230 V; 50 Hz	L002674	IN 250 XTW
3.1	65	M30 × 1.5	4.8	17.2	560 × 550 × 1325	IP 21	65	176.5	10.5	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L002675	IN 550 XT
3.1	65	M30 × 1.5	4.8	17.2	560 × 550 × 1325	IP 21	64	176.5	10.5	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L002676	IN 550 XTW
3.1	65	M30 × 1.5	4.8	17.2	560 × 550 × 1325	IP 21	68	175.5	11.0	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L002677	IN 750 XT
3.1	65	M30 × 1.5	4.8	17.2	560 × 550 × 1325	IP 21	69	176.0	11.0	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L002678	IN 950 XTW
6.0	120	M38 × 1.5	8.0	28.6	760 × 650 × 1605	IP 21	62	287.5	18.0	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L002680	IN 1850 XTW
6.0	100	M38 × 1.5	12.6	34.4	1100 × 895 × 1865	IP 21	74	615.0	37.0	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L002681	IN 2560 XTW
3.1	65	M30 × 1.5	4.8	17.2	560 × 550 × 1325	IP 21	63	198.0	9.0	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L002684	IN 280 XT
3.1	65	M30 × 1.5	4.8	17.2	560 × 550 × 1325	IP 21	62	194.5	9.0	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L002685	IN 280 XTW
3.1	65	M30 × 1.5	8.0	28.6	760 × 650 × 1605	IP 21	64	279.0	11.0	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L002687	IN 590 XTW
3.1	65	M38 × 1.5	10.0	30.6	760 × 650 × 1605	IP 21	65	356.0	19.0	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L002689	IN 1590 XTW
6.0	120	M38 × 1.5	11.1	36.3	1100 × 895 × 1865	IP 21	58	382.0	18.0	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L003214	IN 2050 PW
6.0	100	M38 × 1.5	12.1	48.1	1100 × 895 × 1865	IP 21	74	647.0	37.0	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L003308	IN 2560 PW
6.0	120	M38 × 1.5	8.0	28.6	950 × 650 × 1605	IP 21	62	313.0	18.0	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L002935	IN 1850 XT FC
5.5	68	Rp ½	-	12	510 × 680 × 1042	IP 32	57.9	115	2.0	230 V; 50 Hz	L003512	UC 4
4.2	130	Rp 1	-	35	720 × 910 × 1280	IP 54	61.0	150	3.8	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L002853	UC 8
4.2	130	Rp 1	-	35	720 × 910 × 1250	IP 54	64.7	175	5.4	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L002854	UC 14
4.2	130	Rp 1	-	35	720 × 910 × 1250	IP 54	64.7	180	9.8	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L002855	UC 24
4.6	230	Rp 1 ½	-	210	1040 × 1435 × 1890	IP 54	68.7	410	15.8	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L002856	UC 50
5.0	250	Rp 1 ½	-	210	1040 × 1435 × 1890	IP 54	69.5	440	20.4	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L002857	UC 65
5.4	367	Rp 2 ½	-	125	1256 × 1706 × 1905	IP 54	67.5	700	23.0	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L003684	UC 80
5.4	367	Rp 2 ½	-	125	1256 × 1706 × 1905	IP 54	69.3	700	29.9	400 V; 3/PE; 50 Hz & 460 V; 3/PE; 60 Hz	L003685	UC 100

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