

The right temperature worldwide

LAUDA



- Extreme power
- Rapid temperature changes
- User-friendly operation concept

LAUDA Integral XT

Introduction



LAUDA Integral XT process thermostats – for professional external thermostating across a temperature range from -90 up to 300 °C


With more than 350 employees, more than EUR 60 million in annual turnover and seven foreign subsidiaries, LAUDA is the global leader in the manufacture of innovative thermostatic equipment and systems for science, application technology and production, as well as for high-quality measuring devices. With more than 50 years of experience and a unique product portfolio ranging from compact laboratory thermostats, to industrial circulation chillers to customised heating and cooling system projects with more than 400 kilowatts of cooling power, LAUDA is the only company that can guarantee optimized temperature throughout the entire value-added chain for its 10,000 plus customers worldwide.

With their high heating, cooling and pump performances, LAUDA Integral XT process thermostats achieve a new dimension of temperature control in process technology from -90 to 300 °C. The basic principle comprises a circulation thermostat with a very small internal volume and an expansion vessel with no through-flow.

In the Integral XT, a cold liquid overlay prevents direct contact between the thermally active heat transfer medium and the ambient air. This considerably expands the operating temperature range upwards (no contact with atmospheric oxygen) and downwards (no condensation of atmospheric humidity). This cold liquid overlay is achieved in the expansion vessel, which is thermally uncoupled for this purpose and in which volume equalization takes place in the case of temperature changes. This function principle has numerous advantages for the user:

- Working above the fire point of the heat transfer liquid is permitted, as contact between atmospheric oxygen and the heat transfer medium takes place only in the expansion vessel. As long as this surface temperature of the heat transfer medium is below the permitted individual fire point (in accordance with DIN EN 61010-1 at least 25 K below), safe operation is possible. → Temperature range considerably expanded upwards
- At low temperatures, the condensation of atmospheric humidity is minimized. → Temperature range is considerably expanded downwards, as there is no ice/ice crystal formation. Therefore no reduction of flow of the heat transfer medium and internal cold transfer performance
- The odor nuisance at high temperatures is reduced. → Raised heat transfer medium temperatures can be navigated.
- As a result of low evaporation and oxidation, long lifetimes for the heat transfer medium are guaranteed. → Cost reduction through long durability
- With no change of medium, operation can be conducted over an expanded temperature range (depending on the heat transfer medium)

This all simplifies the temperature control process and is reflected in significantly reduced operating costs.



Order the detailed LAUDA overall brochure Thermostats, Circulation chillers, Water baths and the LAUDA brochure heating and cooling systems free of charge. This and additional information can also be found at www.lauda.de

Your advantages at a glance



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Control elements and functional components



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Range of capacity and mounting forms



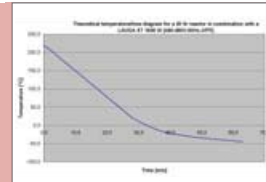
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Application examples



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Choosing a device



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Heat transfer liquids



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Installation and maintenance

Integral XT Set-up and instruction	
This page has to be filled out by the Buyer (only white areas).	
Set-up within the scope of conditions described under 1. and 2. and approved under 3. see appendix at end of the manual!	
Device to be installed:	XT 250 W Cat.No.
1. Required technical specifications at installation site	
1.1 Electrical power supply	
- Voltage, Cycle (V, Hz)	230/50
- Number of phases	3
- Breaker type (T = thermal magnetic, E = electronic)	T 10A
- Type of connection (parallel, series)	parallel
1.2 Conditions for set-up	
- Equipment suitable for weight of coil (kg)	50
- Ambient temperature range (°C)	5...40
- Required clearance to surrounding (mm)	300/200

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Integral XT accessories



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Technical data and power supply variants

LAUDA Integral XT	
Technical data	
Model	XT 1000
Power (W)	2000
Capacity (l)	100
Temperature range (°C)	5...40
Weight (kg)	50
Dimensions (mm)	300x200x100
...	...

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LAUDA Integral XT

Extremely broad temperature range and rapid temperature changes: **LAUDA Integral XT**



Application examples

- Temperature control of stirrer tanks
- Temperature control of reactors in chemistry, pharmacy or biotechnology
- Thermal tests on test stands in the automotive industry
- Use in material tests
- Thermostating of scale-up processes in micro reactor technology
- Simulation of temperature profiles in processes



LAUDA Integral XT process thermostats allow extremely rapid temperature changes, resulting from the small, internal, thermally active heat transfer medium. The instruments work according to the highly

efficient flow principle with a broad working temperature range. The process thermostats are used where rapid temperature changes or high refrigeration and heating performance are required.

Your advantages at a glance



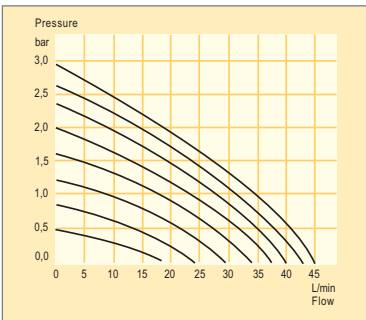
The Integral XT advantages

Your benefits



- Removable Command remote control with graphic LCD
- Automatic adjustment of the control parameters via integrated software for adaptive control
- Also available as explosion-proof version

- Easy and intuitive operation, quick setting changes
- Saves time-consuming calculation of control parameters
- Operation in ex-zones



- Eight-level Vario pump adjustment
- Infinitely variable control of pump pressure
- Magnetically coupled pump

- Application-specific adaptation of flow and pressure to the application
- Pressure reduction to protect pressure-sensitive applications
- No sealing problems at the pump shaft across the entire temperature range



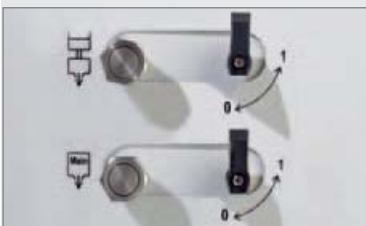
- Two slots for interface modules available
- RS 232/485 interface included

- High flexibility for the user for the broadest range of system integrations



- Recessed filler nozzle on the top of the equipment
- Practical drain taps on the sides of the equipment

- Simple filling with heat transfer liquid from the top of the unit
- Quick and complete drainage of the heat transfer liquid from the system



- Software-based/controlled filling and draining
- Automatic degassing after filling process

- Professional and safe start-up
- Temperature control of external application without gas introduction



- SelfCheck assistant shows equipment status clearly on the display

- High level of operating safety and constant monitoring of all equipment functions

LAUDA Integral XT

Applications Advantages Devices Application examples Accessories

Recessed filler nozzle for easy filling



Detachable Command remote control with RS 232 interface
Also available as ex-proof version



Two slots for interface modules.
Connections for Pt100 and LiBus (2 x) available as standard



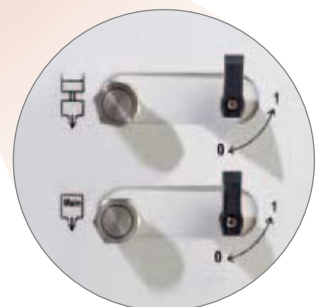
RS 232/485 interface integrated as standard



Large pump connections
M30 x 1.5 or M38 x 1.5



Mobile on castors



Drain taps for all levels on the sides of the device

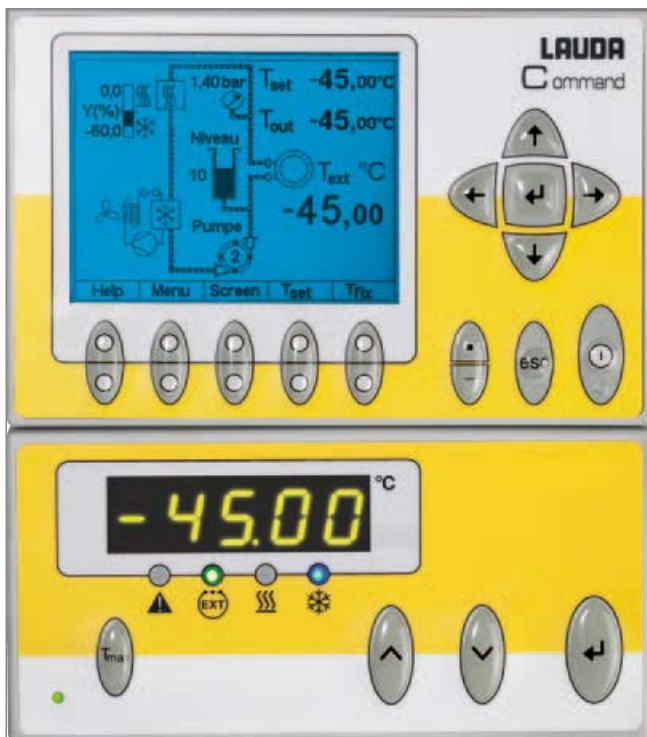


Control elements and functional components

Command remote control

The process thermostats are operated with the Command remote control. The simple menu navigation makes operation intuitive and facilitates quick changes of settings. With an optional extension cable, equipment operation and process monitoring can be carried out from a distance of up to 50 meters. For the PC connection, an opto-decoupled RS-232-/485-interface is integrated into the control unit as standard.

The Command remote control is also available as an explosion-proof variant (details on page 11). Cable lengths of 10 and 25 meters are available for this variant.



Display functions

The multifunctional graphic display on the Command remote control offers many individual forms of representation for all of the relevant information. The following two pages show examples of the most important display functions.



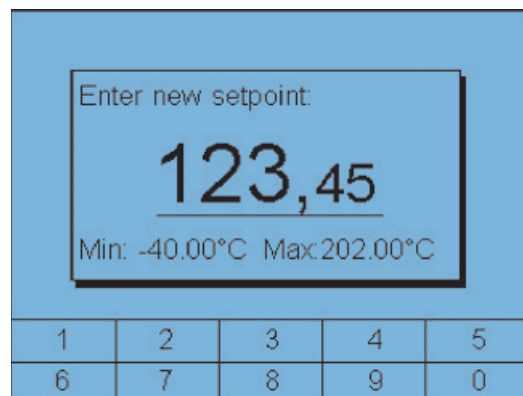
- 10-key console for setpoint adjustment of temperature
- Programmer with real-time clock, 150 temperature/time segments, for use in up to 5 programs, editable segments with loop and tolerance band function
- High resolution, back-lit, graphic LCD display with various display possibilities
- Detachable Command remote control for use up to 50 m
- Eight freely selectable fixed temperatures with memory function
- Resolution of actual value display up to 0.001 °C
- RS 232/485 interface e.g. for LAUDA Wintherm Plus software
- Menu guidance in German, English, French and Spanish

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Examples display functions

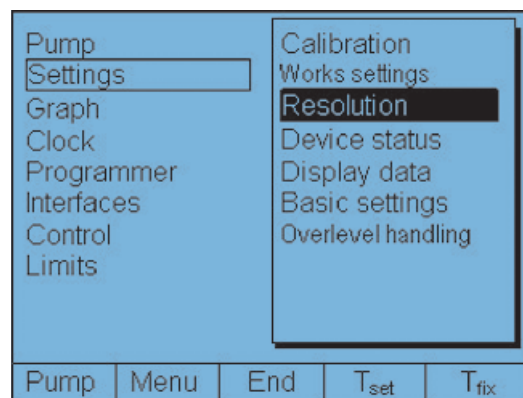
Easy numerical entry

Direct entry of numerical values with soft keys via a keypad within the display



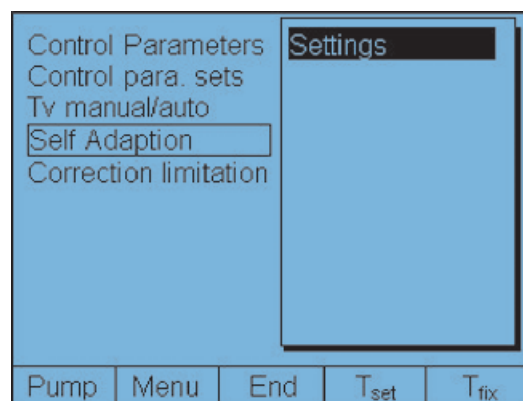
Clear menu navigation

Easy menu navigation in plain text, programmer with 150 temperature/time segments, divided into five programs, menu navigation in German, English, French and Spanish.



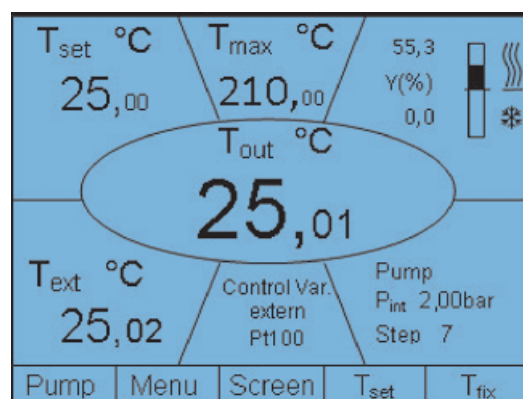
Automatic adjustment of control parameters via adaptive control

The self-adaption (adaptive control) is a software function, which automatically detects the best internal and external control parameters for the system connected. Elaborate searching for the parameters is therefore no longer necessary. The self-adaptation determines the parameters by test running the thermostat. After completing the test run, the control parameters determined are automatically adopted.



Versatile configuration

Clearly arranged display of the most important information. Easy configuration by the user. The display can be shown as a basic window with three, as a normal window with five, or as a super window with seven pieces of information.



Examples display functions

Optimal display

Graphic display of temperature values for control also without computer. It can be specified whether the graphic should constantly run concurrently as an online graphic or whether recording should be started and stopped at a defined point in time.

Time saving trouble shooting

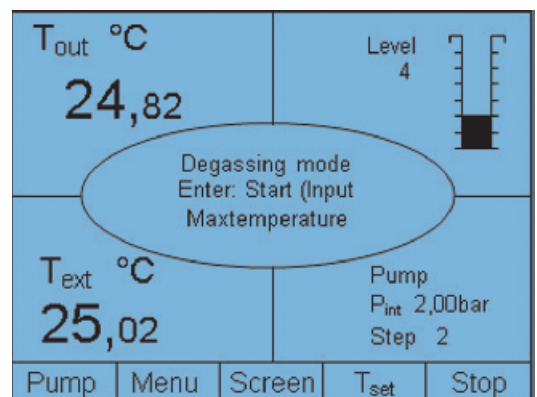
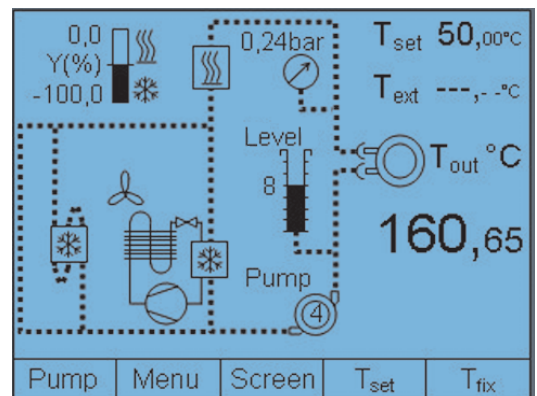
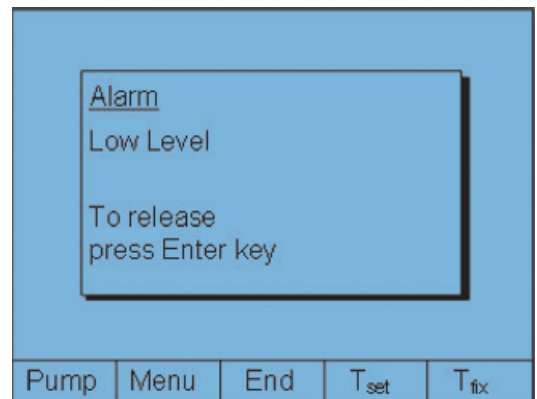
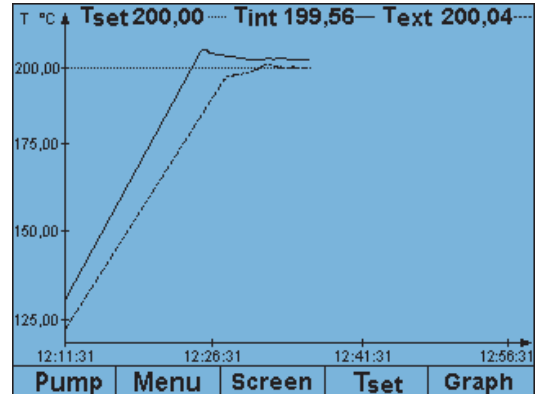
In case of failure clear indication to the user. Alarms signal critical situations. Thereby downtimes are prevented.

Process at a glance

The process overview window shows all of the relevant parameters at a glance. Information is displayed about temperatures, control, system pressure, pump level and heat transfer liquid level.

Automatic filling and degassing mode

The filling program starts automatically if a low level is found when the device is switched on. After the filling process, any air or gas present in the system is removed. This is done by means of an automatic degassing program with set parameters.



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Vario pump

With magnetic coupling of the pump and electric motor, sealing problems on the pump shaft are eliminated. The pump is adjustable in eight levels. Excellent flow from the application connected is therefore guaranteed. For pressure sensitive consumers, e.g. such as glass equipment, the supply pressure can be adjusted.



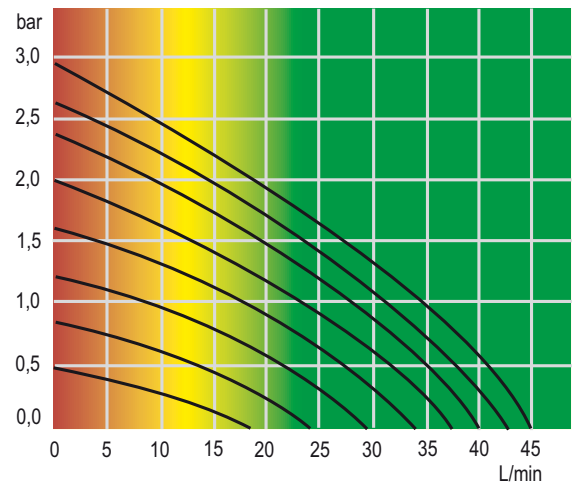
Bypass

If a pressure drop of over 2.0 bar and thereby a flow rate of less than 15 liters per minute is anticipated in the hydraulic system due to the consumer, it is advisable to employ a bypass system. Only in this way is the Integral XT also able to realize its cooling and heating performance at 100 percent in the heat transfer liquid and to work at maximum output.

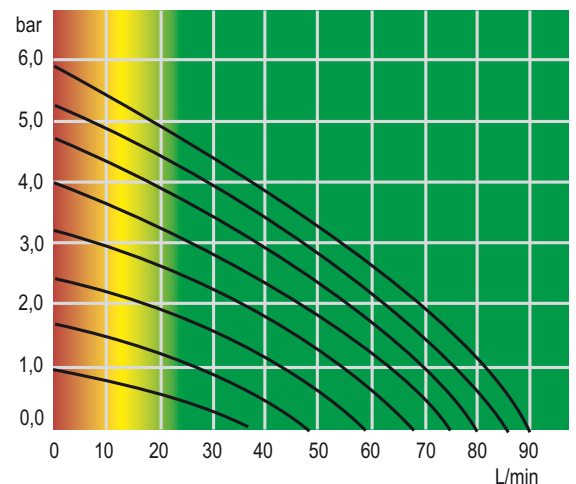


- Maximum pressure up to 2.9 bar (5.8 bar with XT 1850 W(S))
- Maximum pump flow 45 L/min (90 L/min with XT 1850 W(S))
- In the heating range the pump operates up to cinematic viscosities of 200 mm²/s.
- In normal operation 50 mm²/s should not be exceeded.
- From 30 mm²/s the temperature control is optimum

Operating ranges of the vario pump for Integral XT



Operating ranges of the vario pump for the models Integral XT 1850 and XT 1850 WS



Operation and measurement in Ex-zones

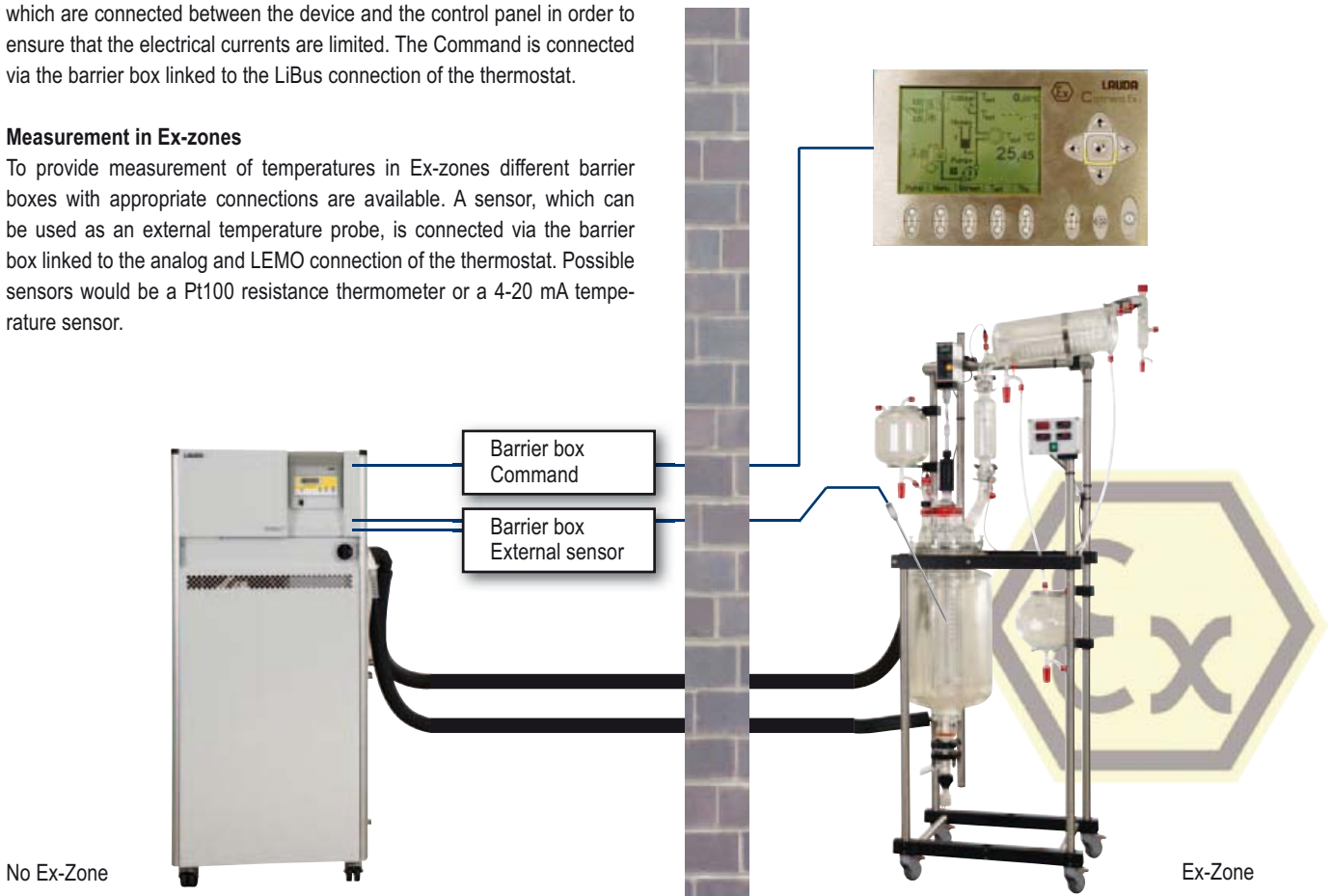
For work in explosion-proof areas, LAUDA offers solutions that allow operation and measuring in ex-zones. Here, the thermostat and operating/measuring units are spatially separated from each other.

Operation in Ex-zones

The Command remote control is available as an explosion-proof version. In addition to the actual remote control, barrier boxes are also supplied, which are connected between the device and the control panel in order to ensure that the electrical currents are limited. The Command is connected via the barrier box linked to the LiBus connection of the thermostat.

Measurement in Ex-zones

To provide measurement of temperatures in Ex-zones different barrier boxes with appropriate connections are available. A sensor, which can be used as an external temperature probe, is connected via the barrier box linked to the analog and LEMO connection of the thermostat. Possible sensors would be a Pt100 resistance thermometer or a 4-20 mA temperature sensor.



Command Ex i remote control
Explosion protection II 2G Ex ia IIC T4 Gb

Cat.-No.	Designation
LRT 915	Command Ex i remote control including 10 m cable and barrier box
LRT 916	Command Ex i remote control including 25 m cable and barrier box

Barrier boxes for connection of external temperature probes
Explosion protection II (1)G [Ex ia] IIC

Cat.-No.	Designation
LRT 917	Barrier box external sensor including 4-20 mA connection
LRT 918	Barrier box external sensor including Pt100 connection
LRT 919	Barrier box external sensor including two 4-20 mA connections
LRT 920	Barrier box external sensor including 4-20 mA connection and Pt100 connection

LAUDA Integral XT

Range of capacity and mounting forms

Integral XT process thermostats

Type	Temperature range °C					
	-100 °C	-50 °C	0 °C	100 °C	200 °C	300 °C
LAUDA Integral XT from -50 to 220 °C						
XT 150	-45					220
XT 250 W	-45					220
XT 350 W	-50					220
XT 550	-50					200
XT 550 W	-50					200
XT 750	-50					220
XT 750 S	-50					220
XT 950 W	-50					220
XT 950 WS	-50					220
XT 1850 W	-50					220
XT 1850 WS	-50					220
LAUDA Integral XT from -90 to 200 °C						
XT 280	-80					200
XT 280 W	-80					200
XT 490 W	-90					200
XT 1590 W(S)	-90					200
LAUDA Integral XT from -50 to 300 °C						
XT 350 HW	-50					300
XT 750 H	-50					300
XT 750 HS	-50					300

Type	Compressor cooling	Effective cooling output							Heater power*	Mounting form (A, B, C)
		200 °C with thermal oil	20 °C with ethanol	0 °C with ethanol	-20 °C with ethanol	-40 °C with ethanol	-60 °C with ethanol	-80 °C with ethanol		
		KW	KW	KW	KW	KW	KW	KW		
XT 150	Air	1.50	1.50	1.10	0.62	0.06	-	-	3.5	(A)
XT 250 W	Water	2.10	2.10	1.30	0.62	0.06	-	-	3.5	(A)
XT 350 W	Water	3.10	3.10	3.10	1.20	0.25	-	-	3.5	(B)
XT 550	Air	5.00	5.00	4.60	2.20	0.60	-	-	5.3	(B)
XT 550 W	Water	5.40	5.40	5.40	2.90	0.80	-	-	5.3	(B)
XT 750	Air	7.00	6.70	4.80	2.20	0.60	-	-	5.3	(B)
XT 750 S	Air	7.00	6.70	4.80	2.20	0.60	-	-	8.0	(B)
XT 950 W	Water	9.00	9.00	6.60	3.00	0.90	-	-	5.3	(B)
XT 950 WS	Water	9.00	9.00	6.60	3.00	0.90	-	-	8.0	(B)
XT 1850 W	Water	18.50	18.50	10.30	5.90	2.20	-	-	10.6	(C)
XT 1850 WS	Water	18.50	18.50	10.30	5.90	2.20	-	-	16	(C)
XT 280	Air	1.50	1.50	1.40	1.30	1.30	1.00	0.10	4.0	(B)
XT 280 W	Water	2.00	2.00	2.50	1.80	1.60	1.00	0.10	4.0	(B)
XT 490 W	Water	4.40	4.40	4.40	4.40	4.00	2.30	0.70	5.3	(C)
XT 1590 W(S)	Water	15.00	15.00	10.50	8.50	7.00	3.70	0.90	8.0	(C)
XT 350 HW	Water	12.00	3.10	3.10	1.20	0.25	-	-	3.5	(B)
XT 750 H	Air	7.00	6.70	4.80	2.20	0.60	-	-	5.3	(B)
XT 750 HS	Air	7.00	6.70	4.80	2.20	0.60	-	-	8.0	(B)

Mounting form



* Heater power at 230 V; 50 Hz or 400 V; 3/PE; 50 Hz respectively

Application examples

Practical examples with LAUDA Integral XT process thermostats



Application examples

- Temperature control of reactors
- Micro reactor technology
- Material testing
- Temperature simulation

Integral XT process thermostats are especially suited to the external temperature control of reactors, mini-plants and calorimeters as well as for temperature stress tests and simulations. The process thermostats are used wherever rapid temperature changes as well as high cooling and heating performances are required. Sectors in which the process thermostats are used range from the chemical industry through the metal and electrical industry,

optics and precision mechanics to service providers and public buildings. The Integral XT offer broad temperature ranges and quick temperature changes. The temperatures of external consumers can be controlled precisely with defined heating and cooling speeds. The devices work with cold oil overlay, according to the flow principle. This makes it possible to achieve significantly greater temperature ranges and quicker temperature changes.

LAUDA Integral XT 490 W for temperature control of reactors

For many syntheses or crystallizations in the chemical or pharmaceutical industry, an accurately defined temperature range is vital for an efficient reaction. Process thermostats reliably ensure optimum reaction temperature both in the cryogenic and upper temperature range. In the example shown, the temperature of a 20-liter triple clad glass reactor is set to -50 °C.

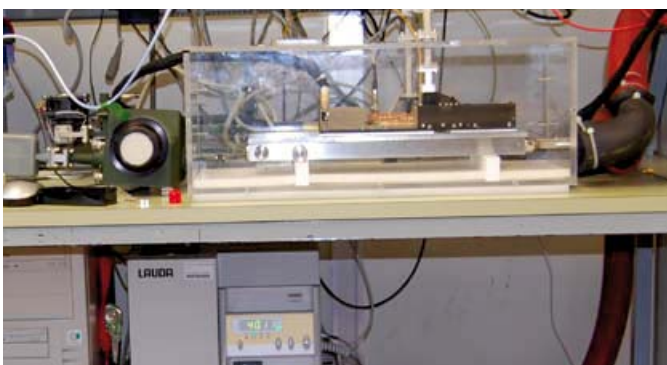


Temperature control of chemical reactors

LAUDA Integral XT process thermostats are the ideal solution for the temperature control of reactors in chemistry, pharmacy or biotechnology. Rapid adjustment is possible in the temperature range from -90 to 300 °C. High heating and cooling performances ensure a constant temperature within the application, even in the case of great temperature changes.

LAUDA Integral XT 250 W for temperature stress tests

In satellite technology, travelling wave tubes are used as amplification systems for microwave signals. In orbit, their average period of use, e.g. in geostationary satellites such as Astra, is around 15 to 18 years. Intensive function and load tests take place even in advance, in order to guarantee fault-free use. Cyclical temperature stress tests ensure that the signal amplification is always in the tolerance range between -40 °C and 90 °C, even under fluctuating external conditions



By courtesy of Thales Electron Devices GmbH



Material testing

Particularly in the automotive and electrical industry, materials and test stands are subject to stress tests. The changing loads between low and high temperatures can be achieved very well with process thermostats.

LAUDA Integral XT

LAUDA Integral XT 150 in micro reactor technology

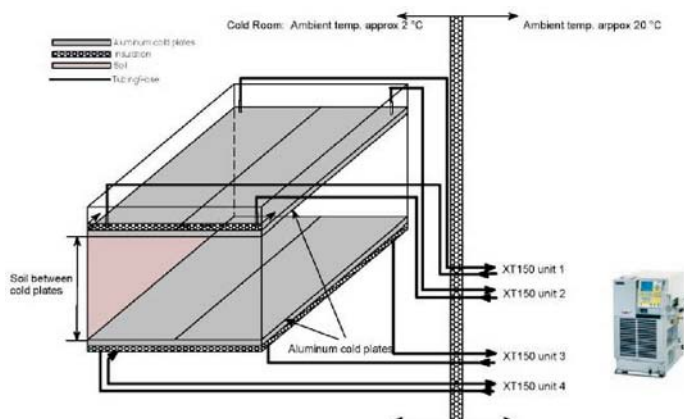
One important step in pharmaceutical and chemical development is the transfer of the processes from the laboratory to production scale. In this context, the method of micro reactor technology gains even greater significance. The flow reactors used allow a continuous process, which significantly reduces the chemical consumption. With a corresponding combination of several reactors, multi-layer processes can be conducted simply or flow rates can be significantly increased.



By courtesy of INPT and MEPI

LAUDA Integral XT 150 for temperature simulations

Frost heaves are a specific type of physical weathering of stones and other solids. They are caused by frequent alternation of frost and thaw periods. The best known visible results are the deformation and bulging of the ground. At the University of Alaska, artificially created frost heaves are being investigated on model scale. LAUDA Integral XT 150 process thermostats are used to simulate the temperature fluctuations.



Micro reactor technology

In micro reactor technology, glass or metal flow reactors are used, which have very narrow channels through which the reaction and heat transfer liquid has to be pumped. The Integral XT thermostats with their high performance pumps are ideally suited to these applications.



Temperature simulations

In certain applications, the temperatures and temperature profiles of processes need to be simulated as exactly as possible. The high heating and cooling performances and the temperature accuracy of the Integral XT allow simulation that is very close to practice.

Schematic composition of the test set-up with four Integral XT 150 process thermostats

Choosing a device

Essential aspects of the equipment selection, which should be considered, are listed below. However, these are only aids. Selection of the most suitable process thermostat for your application cannot be made by this document. As every application is individual and the exact general conditions must be known, you should always seek the assistance of the LAUDA experts worldwide.

In general: the more precisely the application is described and the more details are known, the better the appropriate process thermostat can be found.

Always ensure **sufficiently large cross sections in the external circuit**. A small reduction in diameter results in a drastic increase in flow resistance R , as the radius r enters the corresponding equation at the power of four.

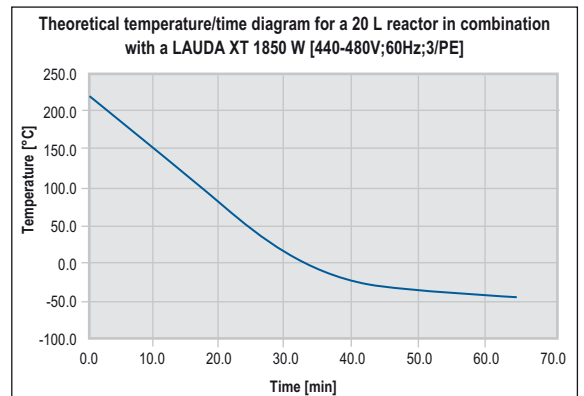
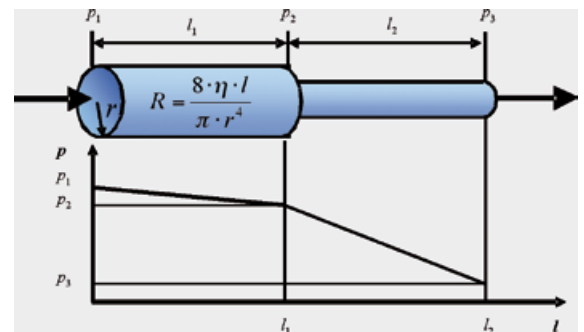
$$R = \frac{8 \cdot \eta \cdot l}{\pi \cdot r^4}$$

Your contacts at LAUDA have a software tool, which helps them to determine the required performances and other relevant parameters.



Basically consider:

- Temperature range
- Cooling and heating capacity
- Interfaces for process automation
- Installation conditions
 - Ambient temperatures
 - Waste heat → air or water cooled device
 - Humidity
- Distance between thermostat and application
- Restrictions, e.g. pressure limitation at application
- Volume expansion of heat transfer liquid
- Tubing
 - Temperature range
 - Diameter
 - Length



LAUDA Integral XT

Heat transfer liquids

For the safe and reliable operation of your thermostats, selection of the right heat transfer liquid is of vital importance. It must be designed for the temperature range of the application. Moreover, you should also ensure the use of suitable hoses.

Heat transfer liquids are available in the three container sizes of 5, 10 and 20 liters. In the order quantity, please consider the volume of the external circuit and the pipes in addition to the fill volume of the thermostat.

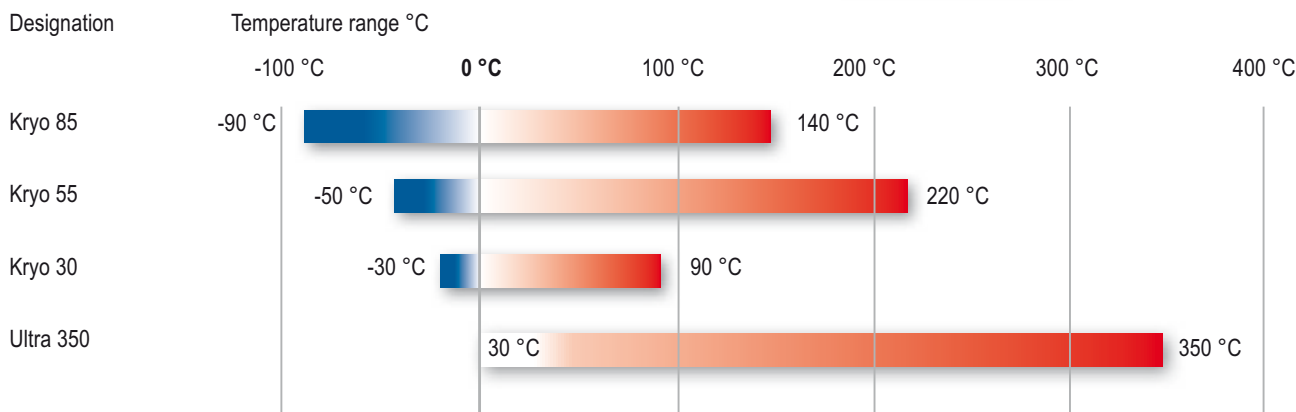


With heat transfer liquids, consider:

- The viscosity should not exceed 30 mm²/s over the entire temperature range for continuous operation.
- The volume increases as the temperature rises.



Order the detailed LAUDA brochure heat transfer liquids free of charge. This and additional product information can also be found at www.lauda.de



Specifications		Kryo 85	Kryo 55	Kryo 30	Ultra 350
Temperature range	°C	-90...140	-50...220	-30...90	30...350
Chemical charecterisation		Polydimethylsiloxane	Polydimethylsiloxane	Monoethylene glycol/water	Dibenzyltoluene
Color		colorless	colorless	light yellow	yellowish clear
Kinematic viscosity	mm ² /s	1.76	5	4	47
Density at 20 °C	kg/m ³	854	920	1085	1044
Solidifying point	°C	< -101	< -96	< -70	< -34
Flash point	°C	> 52	> 121	—	> 224
Fire point	°C	≥ 56	< 162	—	≥ 240
Boiling point (Starting boiling point)	°C	≤150	< 275	≥ 99.97	≥ 385
Ignition temperature	°C	> 350	> 350	—	> 450
Cat. No.	5 L	LZB 113	LZB 124	LZB 109	LZB 107
Cat. No.	10 L	LZB 213	LZB 224	LZB 209	LZB 207
Cat. No.	15 L	LZB 313	LZB 324	LZB 309	LZB 307

Installation and maintenance

Installation process – IQ/OQ

LAUDA always strives to support the customer in the best way possible before, during and after installation of a thermostat. Particularly in the case of process thermostats, intensive communication with the customer is important, as an external application is always connected to the equipment. The application, peripheral equipment and process thermostat must be coordinated with each other.

In the context of a qualification, LAUDA offers initial start-up. This includes an installation qualification (IQ), which checks the necessary conditions provided by the customer. In the operation qualification (OQ), the equipment is activated by trained LAUDA employees or agents in the business.



Ambient conditions
Temperature, humidity, pressure

°C
%
bar

Electrical connections



Floor loading capacity



Minimum spacing
40 cm on all sides



Fuse protection



Water connections
For water cooled devices



LAUDA Integral XT

Installation documents

The form for the IQ/OQ process includes checking of the installation conditions provided by the customer. The electrical supply, installation conditions, cooling water supply and other preparations provided by the customer, which are required for installation and initial operation are ensured.

The services provided by LAUDA are recorded on another part of the form. These include connection of the liquid pipes to the Integral XT, creation of the electrical connection and filling of the temperature control system as well as a system check and an operating briefing.

The entire IQ/OQ process is documented with the signatures of the customer and of LAUDA.

Server-based remote maintenance

LAUDA allows remote maintenance of the thermostats via a so-called Ethernet interface. The remote maintenance is carried out over the internet on the basis of a web server. User access to the web server is by means of a web browser. The data from the temperature control equipment can be available in various formats (graph, tables). The data link is formed only if the user has issued permission and confirmed the access.



Installation conditions
– Provided by the customer

Services
– Provided by LAUDA

Certificate



The web server system is suitable for:

- Detailed fault diagnostics
- Software updates
- Continuous monitoring of an unlimited number of thermostats
- Monitoring of the temperature control process by customers
- Systematic troubleshooting using statistical analyses
- Worldwide usability

Integral XT accessories

Adapters M30 x 1,5

Cat.-No.	Designation	Description
HKA 161	Connector	1/2" connector
HKA 162	Connector	3/4" connector
EOV 196	Screw cap	M30 x 1.5
HKA 152	Adapter	M30 x 1.5 O to M16 x 1 I
HKA 170	Adapter	M30 x 1.5 I to G 3/4" O
HKA 172	Adapter	M30 x 1.5 I to NPT 3/4" O
HKA 156	Flange adapter	M30 x 1.5 O to DIN 2633/DN25
HKA 153	Angle adapter with screw cap	M30 x 1.5 I to M30 x 1.5 O
EOV 208	Double connector	2 x M30 x 1.5 O
UD 660	Reduction	M30 x 1.5 I to M16 x 1 O
HKN 232	Welding stud	M30 x 1.5 O
EOV 194	Double connector	M30 x 1.5 O to G 3/4" O
EOV 206	Double connector	M30 x 1.5 O to G 1" O
EOV 207	Double connector	M30 x 1.5 O to NPT 3/4" O
EOV 204	Ball lining	In combination with screw cap EOV 196 for M30 x 1.5 ID for soldering 22.2 mm
HKN 248	Adapter	M30 x 1.5 O

O = Outer; I = Inner

Adapters M38 x 1,5

Cat.-No.	Designation	Description
HKA 168	Connector	1" connector
EOV 197	Screw cap	M38 x 1.5
HKA 164	Reduction	M38 x 1.5 O to M30 x 1.5 I
UD 663	Reduction	M38 x 1.5 I to M30 x 1.5 O
EOV 225	Double connector	M38 x 1.5 O
HKN 241	Welding stud	M38 x 1.5 O - 33.7 mm ID
EOV 195	Double connector	M38 x 1.5 to G 1" O
EOV 223	Double connector	M38 x 1.5 to G 1 1/4" O
EOV 224	Double connector	M38 x 1.5 to NPT 1" O
HKA 163	Flange adapter	M38 x 1.5 O to DIN 2633/DN40
EOV 213	Ball lining	In combination with screw cap EOV 197 for M 38 x 1.5 ID for soldering 28.2 mm
HKA 165	Angle connector	M38 x 1.5 I to M38 x 1.5 O
HKN 249	Adapter	M38 x 1.5 O

O = Outer; I = Inner



HKA 161

HKA 162

EOV 196



HKA 152

HKA 170

HKA 172



HKA 156

HKA 153

EOV 208



UD 660

HKN 232

EOV 194



EOV 206

EOV 207

EOV 204



HKN 248



HKA 168

EOV 197

HKA 164



UD 663

EOV 225

HKN 241



EOV 195

EOV 223

EOV 224



HKA 163

EOV 213

HKA 165



HKN 249

LAUDA Integral XT

Adapters G 3/4"

Cat.-No.	Designation	Description
HKN 244	Double connector	G 3/4" to G 3/4"



HKN 244

Tubing

Metal hoses with cold insulation

For connections with thread M16 x 1

Cat.-No.	Designation	Length/cm	d _i (mm)	d _e (mm)	Temp. range °C
LZM 052	MK 50	50	10	44	-90...150
LZM 053	MK 100	100	10	44	-90...150
LZM 054	MK 150	150	10	44	-90...150
LZM 055	MK 200	200	10	44	-90...150
LZM 045	Pump link	18	10	44	-90...150



LZM 081

For connections with thread M30 x 1,5

Cat.-No.	Designation	Length/cm	Thread	d _i (mm)	d _e (mm)	Temp. range °C
LZM 081	MXC 100S	100	M30 x 1.5	20	62	-50...300
LZM 082	MXC 200S	200	M30 x 1.5	20	62	-50...300
LZM 083	MXC 300S	300	M30 x 1.5	20	62	-50...300
LZM 087	MXK 100	100	M30 x 1.5	20	78	-90...150
LZM 088	MXK 200	200	M30 x 1.5	20	78	-90...150
LZM 089	MXK 300	300	M30 x 1.5	20	78	-90...150

d_i = internal diameter ; d_e = external diameter

For connections with thread M38 x 1,5

Cat.-No.	Designation	Length/cm	Thread	d _i (mm)	d _e (mm)	Temp. range °C
LZM 084	MX2C 100S	100	M38 x 1.5	25	80	-50...300
LZM 085	MX2C 200S	200	M38 x 1.5	25	80	-50...300
LZM 086	MX2C 300S	300	M38 x 1.5	25	80	-50...300

d_i = internal diameter ; d_e = external diameter

For connections with thread G 3/4" and G 1 1/4"

Cat.-No.	Designation	Length/cm	Thread	d _i (mm)	d _e (mm)	Temp. range °C
LZM 075	MTK 100	100	G 3/4"	20	47	-50...150
LZM 076	MTK 200	200	G 3/4"	20	47	-50...150
LZM 078	MTK 101	100	G 1"-G 1 1/4"	25	50	-50...150
LZM 079	MTK 201	200	G 1"-G 1 1/4"	25	50	-50...150

d_i = internal diameter ; d_e = external diameter

Reinforced EPDM tubings

Special tubings for high pressure. Not suitable for Ultra 350 and mineral oils.

Cat.-No.	Designation	d _i (mm)	d _e (mm)	Temp. range °C	Pressure range
RKJ 103	EPDM tube, with textile inlay	13	20	-40...120	max. 9 bar
RKJ 104	EPDM tube, fiber-reinforced	19	26	-40...120	max. 9 bar
RKJ 105	EPDM tube, with textile inlay	25	32	-40...120	max. 3 bar



RKJ 103

Insulation tubing for increased insulation, length 1 m

Cat.-No.	Wall thickness/mm	d _i (mm)	max. temp °C	Suitable for tubings with max. external diameter of (mm)
RKJ 023	19	13	105	12
RKJ 058	19	19	105	18
RKJ 009	10	23	105	22
RKJ 017	11	36	105	35
RKJ 008	9	13	125	12
RKJ 024	9	16	125	15
RKJ 030	9	19	125	18
RKJ 064	19	16	125	15
RKJ 013	10.5	29	125	27
RKJ 097	19	54	150	52



RKJ 024

Cooling water tubes, EPDM

Not suitable for Ultra 350 and mineral oil

Cat.-No.	Designation	d _i (mm)	d _e (mm)	Temp. range °C	Pressure range
RKJ 031	EPDM tube, fiber-reinforced	13	19	-40...100	max. 20 bar
RKJ 032	EPDM tube, fiber-reinforced	19	27	-40...100	max. 20 bar
RKJ 033	EPDM tube, fiber-reinforced	25	34	-40...100	max. 20 bar



RKJ 031

Tube clips, stainless steel

To secure tubings

Cat.-No.	Description
EZS 012	Tube clip for 8-16 mm external Ø
EZS 013	Tube clip 12-22 mm, 1/2" external Ø
EZS 032	Tube clip 16-25 mm, 1/2" external Ø
EZS 015	Tube clip for 20-32 mm external Ø
EZS 016	Tube clip for 25-40 mm external Ø



EZS 012

d_i = internal diameter ; d_e = external diameter

LAUDA Integral XT

Fast couplings for cooling water connection

Cat.-No.	Designation	suitable for
EOA 006	Fast coupling 3/4" internal thread	Cat.-No. EOA 007
EOA 007	Connector for 1/2" tube	Cat.-No. EOA 006
EOA 027	Fast coupling 1" internal thread	Cat.-No. EOA 026
EOA 026	Connector for 3/4" tube	Cat.-No. EOA 027
EOA 001	Connector 1/2" with screw cap 3/4"	
EOA 053	Connector 3/4" with screw cap 1"	
LWZ 016	Connector 3/4" with screw cap 1.1/2" Connector	
LWZ 040	Connector 3/4" with screw cap 1.9 mm Connector	



Interface modules

Interfaces

Insertable modules enable easy upgrades for thermostats with interfaces for different peripheral devices

Cat.-No.	Designation
LRZ 912	Analog module
LRZ 913	RS-232-/485-interface
LRZ 914	Contact module with 1 input and 1 output (NAMUR)
LRZ 915	Contact module with 3 inputs and 3 outputs
LRZ 917	Profibus module



Additional accessories

Ball valve

Cat.-No.	Designation	Connection	Temp. range °C
LWZ 047	Ball valve	M16 x 1 I to M16 x 1 O	-30...180
LWZ 073	Ball valve	M30 x 1.5 I to M30 x 1.5 O	-30...180
LWZ 074	Ball valve	M38 x 1.5 I to M38 x 1.5 O	-30...180



LWZ 073

Bypass

Cat.-No.	Designation	Connection	Male thread	Temp. range °C	suitable for
LWZ 046	Bypass	M30 x 1.5	M30 x 1.5	-40...350	XT 150...950 W
LWZ 071	Bypass	M38 x 1.5	M38 x 1.5	-40...350	XT 1850, XT 1850 WS
LWZ 089	Bypass	M30 x 1.5	M30 x 1.5	-90...220	XT 280, XT 490 W, XT 1590 W



LWZ 046

Screw caps

Cat.-No.	Designation	Thread
EZV 132	Stopper, PE-HD yellow	M30 x 1.5 O
EZV 101	Screw cap, PE-LD natural	M30 x 1.5 I
EZV 131	Protective sleeve, PE-LD natural	G 3/4"
EZV 133	Stopper, PE-HD yellow	M38 x 1.5 O
EZV 129	Screw cap, PE-LD yellow	M38 x 1.5 O

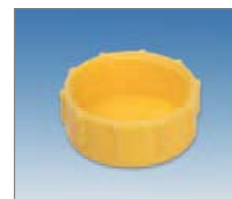
O = Outer; I = Inner



EZV 131



EZV 133



EZV 129

High-pressure pump

Resulting max. pump pressure 5,8 bar

Cat.-No.	Designation	suitable for
LWZ 077-1	High-pressure pump	XT 150 to XT 950 W (230 V; 50 Hz)



LWZ 077-1

LAUDA Integral XT

Technical data

Type	Working temperature range (equal to ACC -range)		Ambient temperature range	Resolution of setting	Compressor cooling	Temperature stability	Heater power	Effective cooling output (measured with pump step 4 at 20 °C ambient temperature/ 15 °C water temperature and 3 bar water pressure)													
	°C	°C						°C	±K	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
LAUDA Integral XT																					
XT 150	-45...220	5...40	0.01	Air	0.05	3.5	-	1.50 ^①	1.50 ^①	1.50 ^①	1.30 ^①	1.10 ^①	1.00 ^①	0.62 ^①	0.28 ^①	0.06 ^①	-	-	-	-	-
XT 280	-80...200	5...40	0.01	Air	0.10	4.0	-	1.50	1.50	1.50	1.50	1.40	1.40	1.30	1.30	1.30	1.20	1.00	0.40	0.10	-
XT 550	-50...200	5...40	0.01	Air	0.05	5.3	-	5.00	5.00	5.00	5.00	4.60	3.40	2.20	1.25	0.60	0.15	-	-	-	-
XT 750	-50...220	5...40	0.01	Air	0.05	5.3	-	7.00	7.00	6.70	6.10	4.80	3.40	2.20	1.25	0.60 ^①	0.30 ^①	-	-	-	-
XT 750 S	-50...220	5...40	0.01	Air	0.05	8.0	-	7.00	7.00	6.70	6.10	4.80	3.40	2.20	1.25	0.60 ^①	0.30 ^①	-	-	-	-
XT 750 H	-50...300	5...40	0.01	Air	0.05	5.3	5.5	7.00	7.00	6.70	6.10	4.80	3.40	2.20	1.25	0.60 ^①	0.30 ^①	-	-	-	-
XT 750 HS	-50...300	5...40	0.01	Air	0.05	8.0	5.5	7.00	7.00	6.70	6.10	4.80	3.40	2.20	1.25	0.60 ^①	0.30 ^①	-	-	-	-
XT 250 W	-45...220	5...40	0.01	Water	0.05	3.5	-	2.10 ^①	2.10 ^①	2.10 ^①	1.80 ^①	1.30 ^①	1.00 ^①	0.62 ^①	0.28 ^①	0.06 ^①	-	-	-	-	-
XT 280 W	-80...220	5...40	0.01	Water	0.10	4.0	-	2.00	2.00	2.00	2.00	2.00	1.90	1.80	1.70	1.60	1.40	1.00	0.40	0.10	-
XT 350 W	-50...220	5...40	0.01	Water	0.10	3.5	-	3.10	3.10	3.10	3.10	3.10	2.00	1.20	0.70	0.25 ^①	0.02	-	-	-	-
XT 350 HW	-50...300	5...40	0.01	Water	0.10	3.5	12	12.00	6.00	3.10	3.10	3.10	2.00	1.20	0.70	0.25 ^①	0.02 ^①	-	-	-	-
XT 550 W	-50...200	5...40	0.01	Water	0.10	5.3	-	5.40	5.40	5.40	5.40	5.40	4.30	2.90	1.60	0.80	0.15	-	-	-	-
XT 950 W	-50...220	5...40	0.01	Water	0.10	5.3	-	9.00	9.00	9.00	7.50	6.60	4.60	3.00	1.70	0.90 ^①	0.35 ^①	-	-	-	-
XT 950 WS	-50...220	5...40	0.01	Water	0.10	8.0	-	9.00	9.00	9.00	7.50	6.60	4.60	3.00	1.70	0.90 ^①	0.35 ^①	-	-	-	-
XT 1850 W	-50...220	5...40	0.01	Water	0.30	10.6	-	18.50	18.50	18.50	12.50	10.30	7.70	5.90	3.80	2.20 ^①	1.20 ^①	-	-	-	-
XT 1850 WS	-50...220	5...40	0.01	Water	0.30	16.0	-	18.50	18.50	18.50	12.50	10.30	7.70	5.90	3.80	2.20 ^①	1.20 ^①	-	-	-	-
XT 490 W	-90...200	5...40	0.01	Water	0.10	5.3	-	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.00	3.30	2.30	1.35	0.70 ^①	0.20 ^①
XT 1590 W	-90...200	5...40	0.01	Water	0.30	5.3	-	15.00	15.00	15.00	13.00	10.50	9.20	8.50	8.50	7.00	5.30	3.70	1.80	0.90 ^①	0.35 ^①
XT 1590 WS	-90...200	5...40	0.01	Water	0.30	8.0	-	15.00	15.00	15.00	13.00	10.50	9.20	8.50	8.50	7.00	5.30	3.70	1.80	0.90 ^①	0.35 ^①

① On pump output step 2

Power supply variants

Type	Cat. No.	Heater power kW	Loading kW	Cat. No.	Heater power kW	Loading kW	Cat. No.	Heater power kW	Loading kW	Cat. No.	Heater power kW	Loading kW	Cat. No.	Heater power kW	Loading kW
230 V; 50 Hz															
LAUDA Integral XT – single phase															
XT 150	LWP 112	3.5	3.68	LWP 512	2.65	3.2	LWP 812	2.9	3.5						
XT 250 W	LWP 113	3.5	3.68	LWP 513	2.65	3.2	LWP 813	2.9	3.5						
XT 350 W	LWP 117	3.5	3.68	LWP 517	2.65	3.2	LWP 817	2.9	3.5						
XT 350 HW	LWP 119	3.5	3.68	LWP 519	2.65	3.2	LWP 819	2.9	3.5						
200 V; 50/60 Hz															
LAUDA Integral XT – three phase															
XT 280	LWP 334	2.9	7.0	LWP 434	2.65	6.5	LWP 534	4.0	9.0						
XT 550	LWP 324	5.7	7.6	LWP 424	5.3	6.9	LWP 524	5.3	7.8						
XT 750	LWP 320	5.7	7.6	LWP 420	5.3	6.9	LWP 520	5.3	7.8						
XT 750 S	-	-	-	-	-	-	LWP 552	8.0	9.7						
XT 750 H	LWP 322	5.7	7.6	LWP 422	5.3	6.9	LWP 522	5.3	7.8						
XT 750 HS	-	-	-	-	-	-	LWP 553	8.0	9.7						
XT 280 W	LWP 335	2.9	7.0	LWP 435	2.65	6.5	LWP 535	4.0	9.0						
XT 490 W	LWP 339	5.7	9.5	LWP 439	5.3	8.6	LWP 539	5.3	9.0						
XT 550 W	LWP 325	5.7	7.6	LWP 425	5.3	6.9	LWP 525	5.3	7.8						
XT 950 W	LWP 321	5.7	7.6	LWP 421	5.3	6.9	LWP 521	5.3	7.8						
XT 950 WS	-	-	-	-	-	-	LWP 554	8.0	9.7						
XT 1850 W	-	-	-	-	-	-	LWP 532	10.6	13.8	LWP 632	14.0	20.8	LWP 732	10.6 & 14.0	20.8
XT 1850 WS	-	-	-	-	-	-	LWP 533	16.0	17.3	-	-	-	-	-	-
XT 1590 W	-	-	-	-	-	-	-	-	-	LWP 642	7.0	16.6	LWP 742	5.3 & 7.0	16.6
XT 1590 WS	-	-	-	-	-	-	LWP 551	8.0	13.8	-	-	-	-	-	-

Pump pressure max.	Pump flow max. (pressure)	Pump connection thread	Filling volume min.	Filling volume expansion vessel	Dimensions (WxDxH)	Pressure measurement/parameter	Protection level	Additional features	Weight	Loading	Power supply	Cat. No.	Type
bar	L/min	i. d. (mm)	L	L	mm				kg	kW	V; Hz		
LAUDA Integral XT													
2.9	45	M30 x 1.5 (DN 20)	2.6	5.5	335x550x660	digital	IP21C	Level indication	87	3.68	230; 50	LWP 112	XT 150
2.9	45	M30 x 1.5 (DN 20)	5.0	6.7	460x550x1285	digital	IP21C	Level indication	180	9.00	400; 3/PE; 50	LWP 534	XT 280
2.9	45	M30 x 1.5 (DN 20)	5.0	6.7	460x550x1285	digital	IP21C	Level indication	150	7.80	400; 3/PE; 50	LWP 524	XT 550
2.9	45	M30 x 1.5 (DN 20)	5.0	6.7	460x550x1285	digital	IP21C	Level indication	155	7.80	400; 3/PE; 50	LWP 520	XT 750
2.9	45	M30 x 1.5 (DN 20)	5.0	6.7	460x550x1285	digital	IP21C	Level indication	155	9.70	400; 3/PE; 50	LWP 552	XT 750 S
2.9	45	M30 x 1.5 (DN 20)	5.3	6.7	460x550x1285	digital	IP21C	Level indication	160	7.80	400; 3/PE; 50	LWP 522	XT 750 H
2.9	45	M30 x 1.5 (DN 20)	5.3	6.7	460x550x1285	digital	IP21C	Level indication	160	9.70	400; 3/PE; 50	LWP 553	XT 750 HS
2.9	45	M30 x 1.5 (DN 20)	2.6	5.5	335x550x660	digital	IP21C	Level indication	90	3.68	230; 50	LWP 113	XT 250 W
2.9	45	M30 x 1.5 (DN 20)	5.0	6.7	460x550x1285	digital	IP21C	Level indication	180	9.00	400; 3/PE; 50	LWP 535	XT 280 W
2.9	45	M30 x 1.5 (DN 20)	5.0	6.7	460x550x1285	digital	IP21C	Level indication	150	3.68	230; 50	LWP 117	XT 350 W
2.9	45	M30 x 1.5 (DN 20)	5.0	6.7	460x550x1285	digital	IP21C	Level indication	150	3.68	230; 50	LWP 119	XT 350 HW
2.9	45	M30 x 1.5 (DN 20)	5.0	6.7	460x550x1285	digital	IP21C	Level indication	155	7.80	400; 3/PE; 50	LWP 525	XT 550 W
2.9	45	M30 x 1.5 (DN 20)	5.0	6.7	460x550x1285	digital	IP21C	Level indication	160	7.80	400; 3/PE; 50	LWP 521	XT 950 W
2.9	45	M30 x 1.5 (DN 20)	5.0	6.7	460x550x1285	digital	IP21C	Level indication	160	9.70	400; 3/PE; 50	LWP 554	XT 950 WS
5.8	90	M38 x 1.5 (DN 25)	9.0	17.4	700x550x1600	digital	IP21C	Level indication	250	13.80	400; 3/PE; 50	LWP 532	XT 1850 W
5.8	90	M38 x 1.5 (DN 25)	9.0	17.4	700x550x1600	digital	IP21C	Level indication	250	17.30	400; 3/PE; 50	LWP 533	XT 1850 WS
2.9	45	M30 x 1.5 (DN 20)	9.5	17.4	700x550x1600	digital	IP21C	Level indication	245	9.00	400; 3/PE; 50	LWP 539	XT 490 W
2.9	45	M30 x 1.5 (DN 20)	10.5	17.4	700x550x1600	digital	IP21C	Level indication	280	13.80	400; 3/PE; 50	—*	XT 1590 W
2.9	45	M30 x 1.5 (DN 20)	10.5	17.4	700x550x1600	digital	IP21C	Level indication	280	13.80	400; 3/PE; 50	LWP 551	XT 1590 WS

* in 400 V; 3/PE; 50 Hz available as XT 1590 WS (LWP 551)

Our product lines:

Thermostats · Circulation chillers · Water baths
Process cooling systems · Heat transfer systems · Secondary circuit systems
Viscometers · Tensiometers



3-313-e-1/12.11 · Subject to technical changes.

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