LAUDA

WHITEPAPER

OPTIMIZED MACHINE COOLING THROUGH CLOUD-BASED REMOTE MONITORING

Contents

- Optimization of the machine cooling through remote monitoring
- More energy-efficient circulation chillers for extreme ambient conditions
- Cloud connection enables rapid error diagnosis

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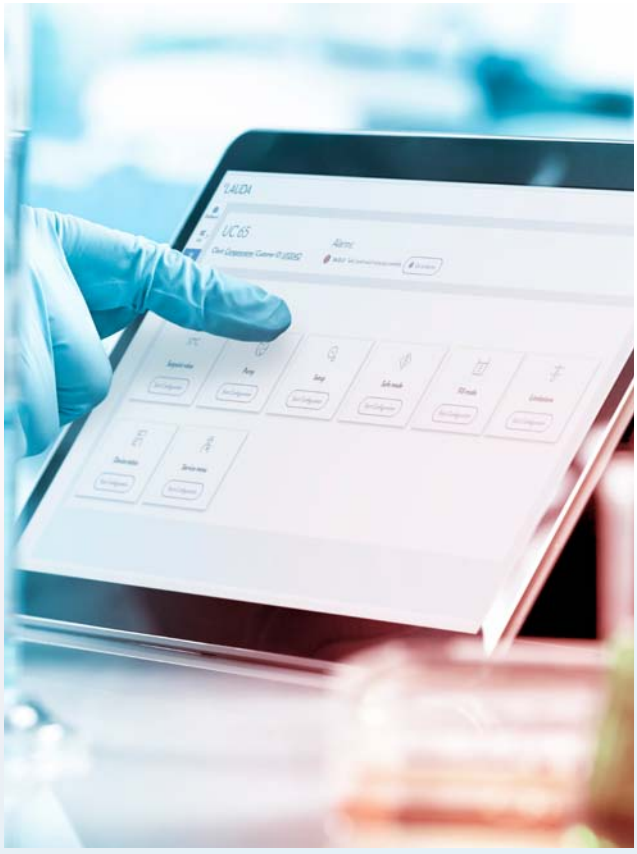


1 Heat dissipation under extreme ambient conditions

The machine of a customer in the printing industry was cooled with a standard conventional process circulation chiller. These conventional chillers do not have a speed-controlled compressor or electronic expansion valve and operate with classic refrigeration technology. They control the output by switching the refrigerating machine on and off.

In this particular case, the chiller was operated outdoors in Arizona, USA. Temperatures there can reach more than 50 °C in a dusty environment. The chiller model had a sufficiently high cooling capacity of 67 kW at a cooling water temperature of 10 °C. The maximum ambient temperature specified for this model is up to 45 °C. However, the circulation chiller kept failing over a period of several weeks. Based on the alarm messages (high condensation pressure), LAUDA service technicians assumed that the extreme ambient conditions were the reason for the failures. But this hypothesis was difficult to substantiate without real-time data from the application. The customer was skeptical and replaced the chiller with a new unit. But this also failed with an identical error message after a short time in the extreme ambient conditions.

Sufficient cooling capacity even at an outdoor temperature of more than 45 °C

2 Problem analysis and troubleshooting through remote monitoring

LAUDA Service came to the conclusion that the defect was not in the chiller and that the installation conditions were the reason for the failures. The customer was therefore advised to test a chiller of the new Ultracool generation with the latest refrigeration technology. This was the energy-efficient UC 50 model with a cooling capacity of 51 kW at a cooling water temperature of 10 °C.

LAUDA provided the customer with this chiller free of charge for a test. The chiller was equipped with a 4G gateway for connection to the LAUDA.LIVE cloud platform, in order to enable the remote monitoring of application data. The Ultracool chillers of the new generation are also specified for an ambient temperature of up to 50 °C. The customer was very impressed by the performance of the UC 50. The chiller was installed and ran reliably for several weeks, even and especially during the hot summer period. The operating data could be read and evaluated in detail via the cloud. It was found that the maximum ambient temperature was sometimes significantly above the maximum permissible value of 50 °C. However, the chiller was able to reliably dissipate the process heat of the printing machine, even at a maximum temperature of 56.2 °C.

The interaction of the speed-controlled compressor, electronic expansion valve and the condensation management software specially developed for this purpose enabled the application to continue operating, even under these extreme conditions. One measure to prevent the condensation pressure from rising excessively at such high temperatures is to reduce the cooling capacity. This is only possible with speed-controlled components such as those used in the new Ultracool product line. Nevertheless, it was still possible to operate the printing machine despite the reduced capacity. The remote monitoring also showed that the less powerful type with a cooling capacity of 51 kW was better suited to the application than the chiller with 67 kW. In addition to avoiding further system downtimes, this means that the customer also saves energy and can therefore cut costs.

Thanks to the new remote monitoring and the advanced technology of the new LAUDA Ultracool circulation chillers, the application could be implemented and guaranteed to the full satisfaction of the customer. The UC 50 has been in operation for quite a while now and runs in continuous operation without any problems.

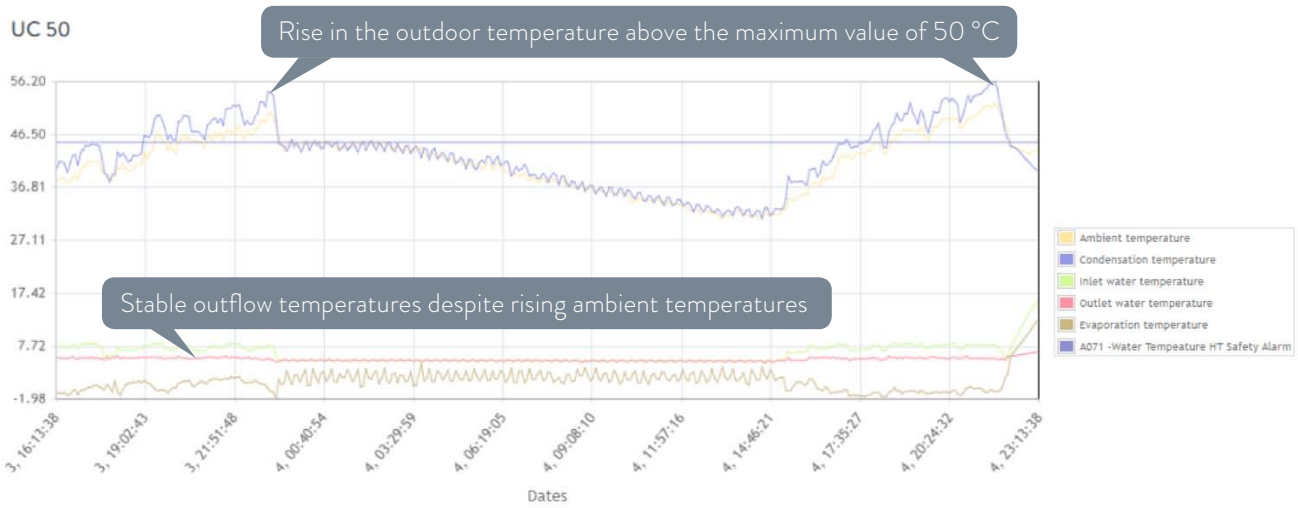


Fig.: Temperature profiles in the UC 50, transmitted via LAUDA.LIVE

3 Cloud connection for optimized temperature control

Monitoring and prevention: The new generation of energy-efficient Ultracool industrial circulation chillers offers the possibility of cloud connection for monitoring the device parameters via LAUDA.LIVE. This allows machine cooling optimization as well as predictive and preventive maintenance for many applications.

Other advantages of cloud-supported temperature control

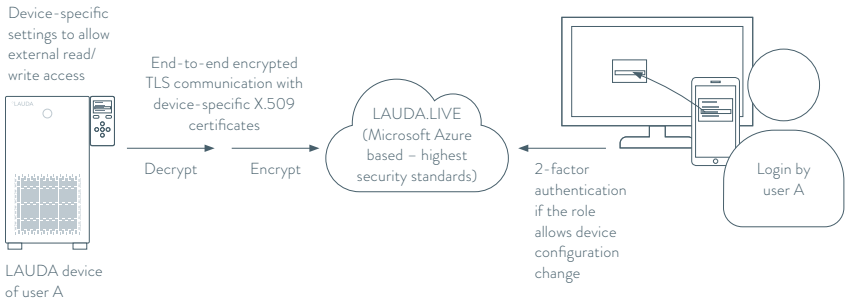
- Global decentralized monitoring: Remote monitoring and control of all operating equipment
- Data storage: Secure data logging enables graphical analysis of device data and export for external documentation, analysis and test reports
- Alerting: Flexibly configurable notifications of alarms or limits via SMS, email or in the cloud
- Analytics: KPIs help in the visual benchmarking of the devices in comparison with ideal applications and each other

Connectivity: Optimized for Industry 4.0

The new LAUDA Ultracool UC 8, UC 14, UC 24, UC 50 and UC 65 process circulation chillers are equipped with an LCD remote control as standard. An Ethernet interface for connection to a computer or local network (LAN) is also integrated as standard. In addition, the Ultracool devices can be controlled by means of a web server via a PC or even mobile devices – an internet connection is not necessary. All you need to do is to configure an IP address for the circulation chiller, which must be in the same network as the terminal device. LAUDA.LIVE enables the monitoring and analysis of the device from any computer with an Internet connection – irrespective of the location.

4 LAUDA.LIVE: Temperature control with fully networked IIoT devices

LAUDA is creating a new platform for digital products with LAUDA.LIVE. This ensures transparency over the fleet of temperature control systems in companies as well as their individual condition and maintenance requirements and enables highly qualified remote diagnosis. The range of digital applications is constantly being expanded. All LAUDA constant temperature equipment - even without IIoT connectivity – can be managed and documented online with the free fleet management.



For maximum data security:
Encrypted data transfer

FLEET MANAGEMENT

✓ **Asset Management**
Manage your fleet of devices and monitor their condition

✓ **Product documentation**
Easy access to product-specific product documentation

✓ **Maintenance log**
Keep track of your maintenance schedule for each device and record important information

✓ **Warranty management**
Create transparency for the warranty status of your devices

✓ **Ticket System**
Create, monitor and look up historical support tickets

REMOTE SUPPORT

✓ **24/5 remote maintenance**
Our service hotline in five service centers helps you 24 hours a day

✓ **Multilingual**
Support provided by German, English and Chinese native speakers

✓ **Cost minimization**
Reduction of costs for service calls by analyzing the causes of errors before personnel are needed on site

✓ **Updates**
Remote firmware and function updates save costs and increase system performance

MONITORING & ANALYTICS

✓ **Global monitoring**
Remote monitoring and control of all operating equipment from home, while traveling or in the factory

✓ **Data storage**
Secure data logging enables graphical analysis of device data and export for external documentation, analysis and test reports

✓ **Alerting**
Flexibly configurable notifications of alarms via SMS, email or in the cloud

✓ **Analytics**
KPIs (Key Performance Indicators) support benchmarking and device optimization

About LAUDA

We are LAUDA – the world leader in precise temperature control. Our constant temperature equipment and heating and cooling systems are at the heart of many applications. As a complete one-stop supplier, we guarantee the optimum temperature in research, production and quality control. We are your reliable partner, particularly in the fields of automotive, chemical/pharma, semiconductor and laboratory/medical technologies. We have been inspiring our customers for more than 65 years with our competent mentoring and innovative, environmentally-friendly concepts – new every day and all over the world.

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