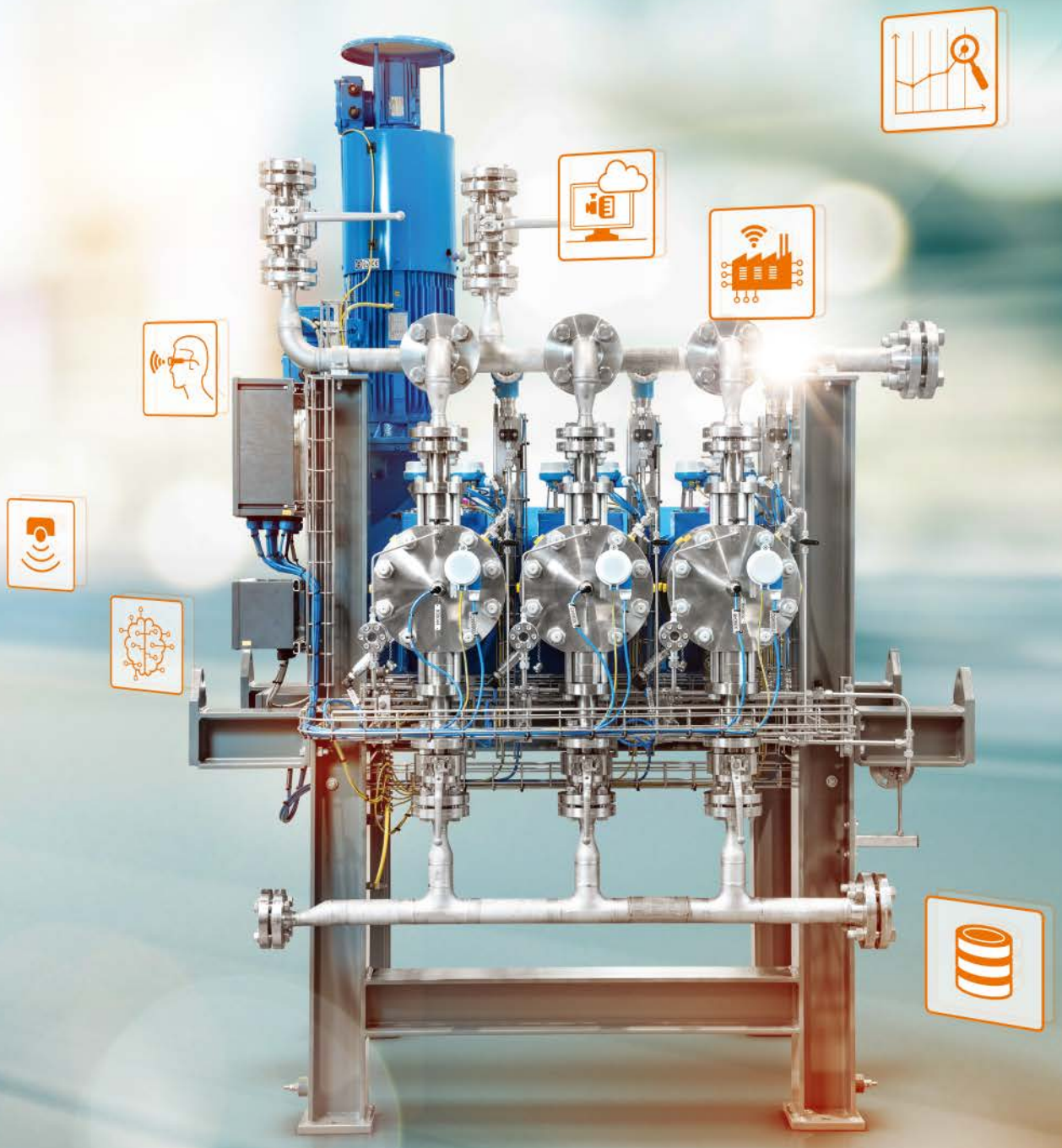
LEWA
Creating Fluid Solutions

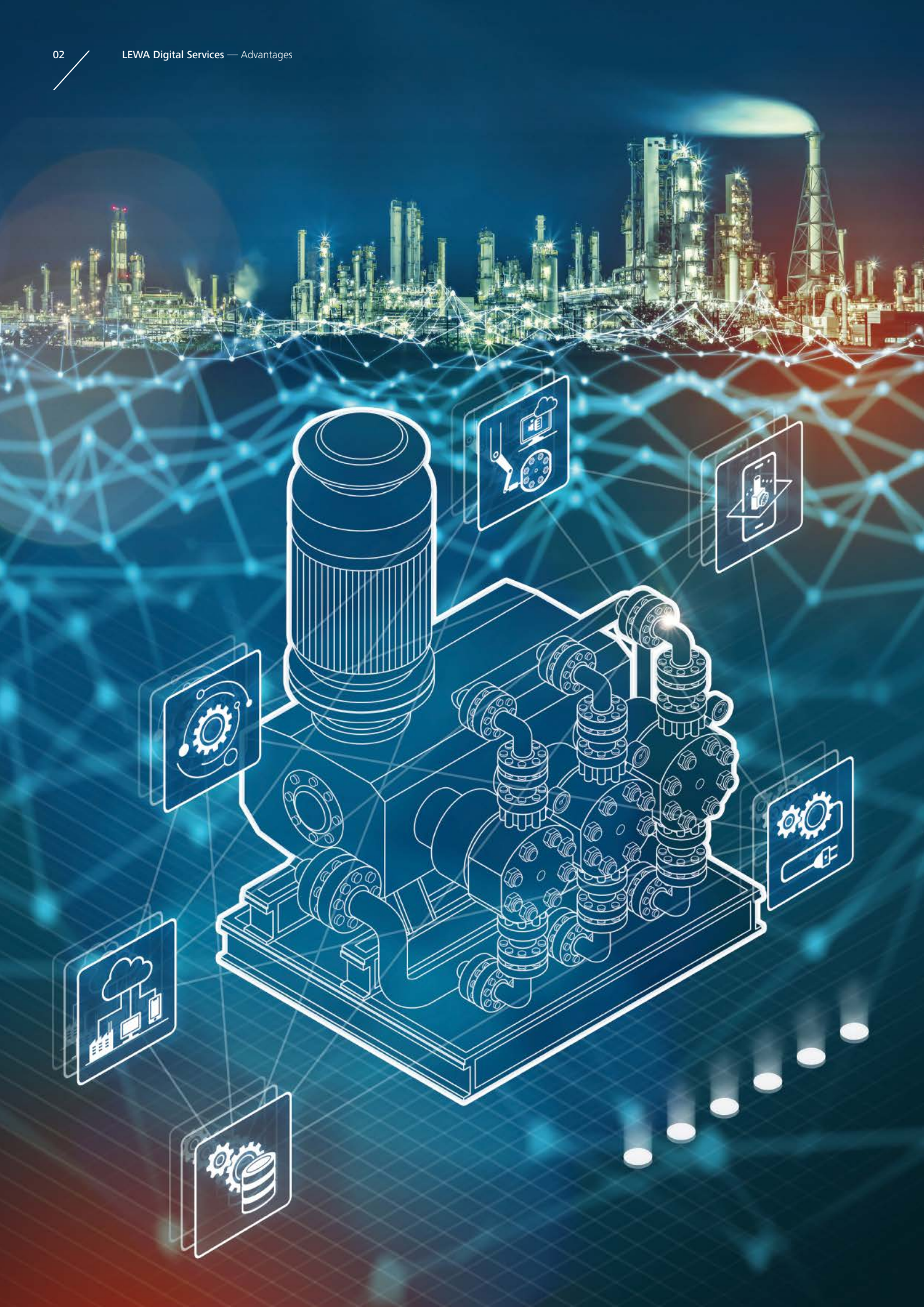
LEWA Digital Services

Condition monitoring, asset management and remote support.



Contents

Pump and plant availability is a key factor for success in manufacturing companies. Production downtime means sales losses. Due to more complex production systems and increasing requirements for specific operator know-how, support from digital monitoring and analysis systems is necessary for remaining competitive in the future. LEWA offers a portfolio of digital services to support customers as they convert to the digital factory.



LEWA Digital Services.
Advantages at a glance.

1

Condition monitoring and characteristic values for pumps

Monitor process-critical pumps on-site, in the control center or via cloud connection from anywhere. Based on multiple characteristic values, you can keep an eye on your pump and system.

2

Predictive maintenance and clear diagnoses

Permanent condition monitoring makes it possible to measure wear and thus plan maintenance in advance. Error conditions can be clearly classified and quickly corrected.

3

Performance analysis and economic feasibility study

With regular reports, you will learn how to optimize the operation of your pumps and find out how economically your system is working.

4

Smart factory enablement

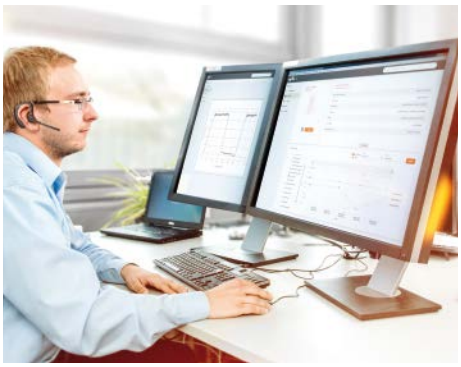
LEWA relies on generally applicable industry standards and interfaces. In this way, we ensure that our products can be easily integrated into a holistic smart factory concept.

5

Digital asset management

In the LEWA customer portal, you have access to your pump's digital twin with design data, documents and operating data.

6



Remote support with augmented reality

Quickly available remote support through live analysis of operating data in collaboration with LEWA service engineers. Inspection and diagnostics with the aid of augmented reality smart glasses.

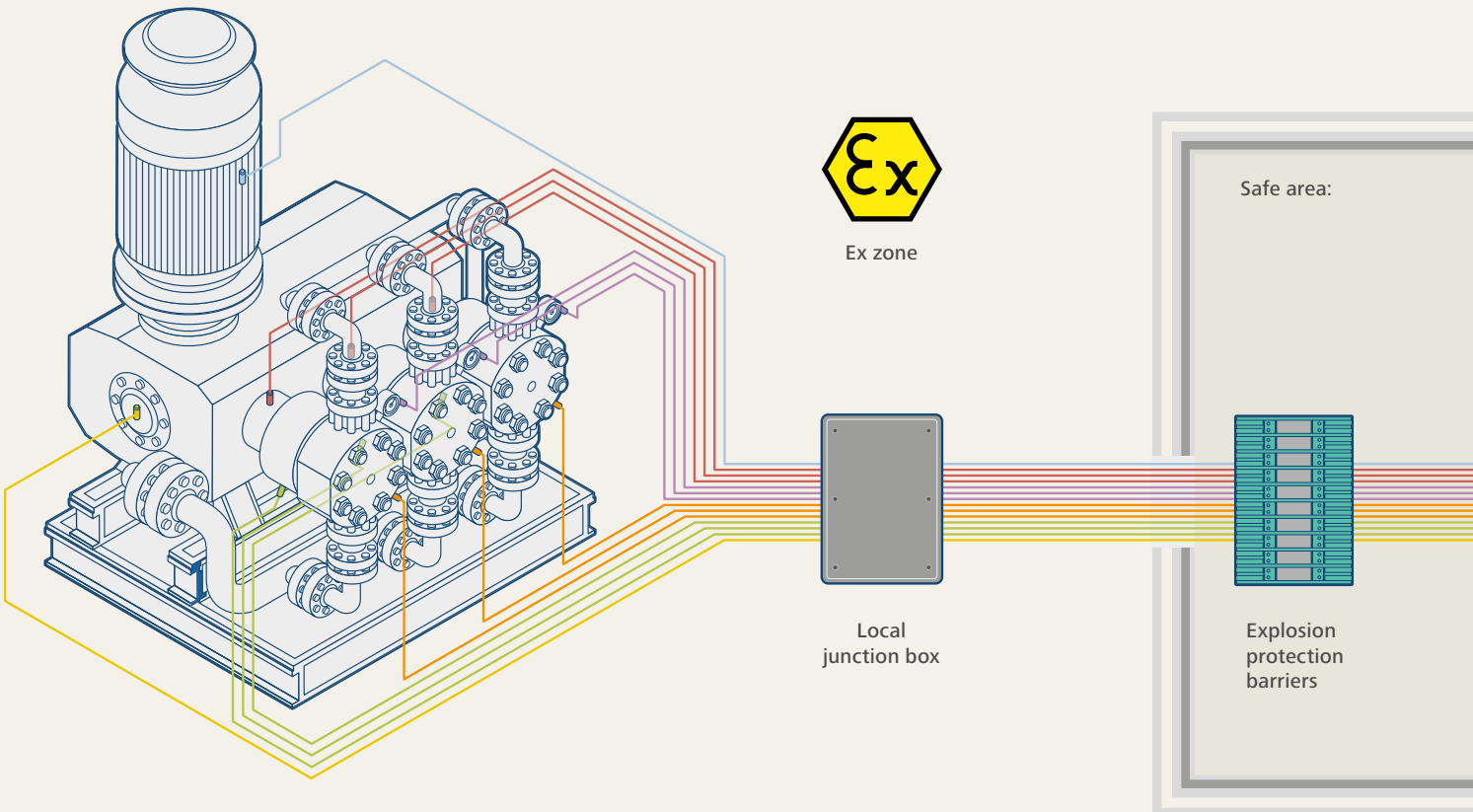
LEWA Smart Monitoring.

With digital pumps for more efficiency, system availability and profitability of the entire production.

LEWA Smart Monitoring is a monitoring system consisting of sensors, a programmable logic controller (PLC), an industrial PC (IPC) and data analysis for new and existing pumps. The system determines characteristic values and key performance indicators. There is no intervention in process control or direct contact between the sensor system and the conveyed fluid. With key performance indicator-based condition monitoring, you detect and monitor operating statuses proactively. You can also optimize the overall output and robustness of your pump and pipe systems. This will increase the efficiency of your entire production plant. You can access the data conveniently via your corporate network. Or you use the LEWA cloud with extended analysis and service offers.

Advantages:

- Permanent monitoring of key performance indicators
- Output of error states in plain text with exact error localization
- Characteristic values for assessing the pipe system and conveyed fluid status
- Historical data for operating analysis and profitability calculation, energetic efficiency and CO_2 balance based on pump efficiency
- Data connection to the local control center via standard OPC UA interface
- Connection to LEWA customer portal for additional services
- Exclusive service offers for our Smart Monitoring customers



Technology and Operation Principle.

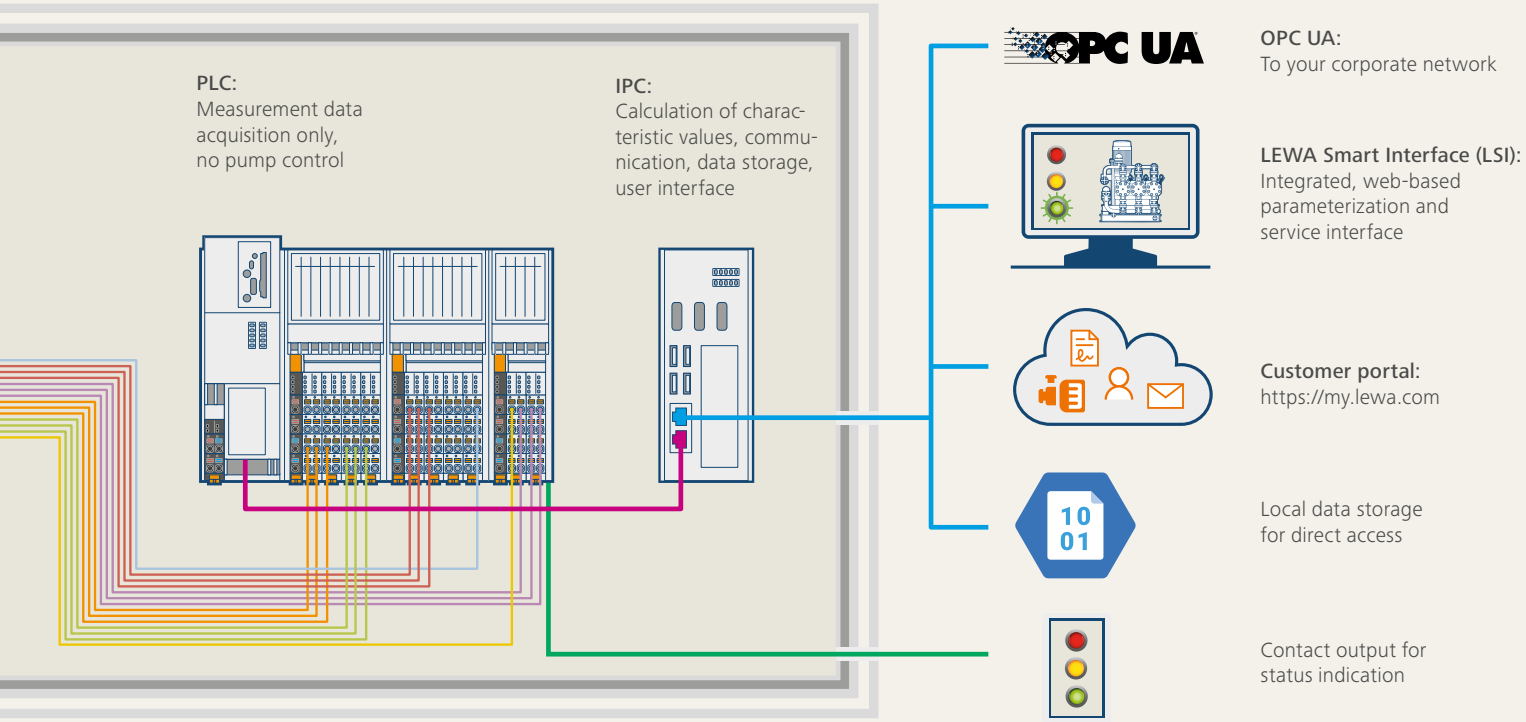


Sensor technology with sampling rates up to 1 kHz and in version for Ex zones

How raw data becomes characteristic values:

Characteristic value determination is based on the recording of measured variables such as vibration, hydraulic pressure and trigger. To get results, 2000 signals per pump head are processed per second. These signals are measured by the connected PLC.

The output and transmission of the characteristic values and diagnostics is carried out via various interfaces: The IPC has a web-based interface where settings can be made and the determined characteristic values and diagnostics are visualized. An OPC UA server is provided for transmission to a control center. In addition, characteristic values and diagnoses can be sent to the LEWA cloud and the LEWA customer portal via an Internet connection.



OPC UA:
To your corporate network

LEWA Smart Interface (LSI):
Integrated, web-based parameterization and service interface

Customer portal:
https://my.lewa.com

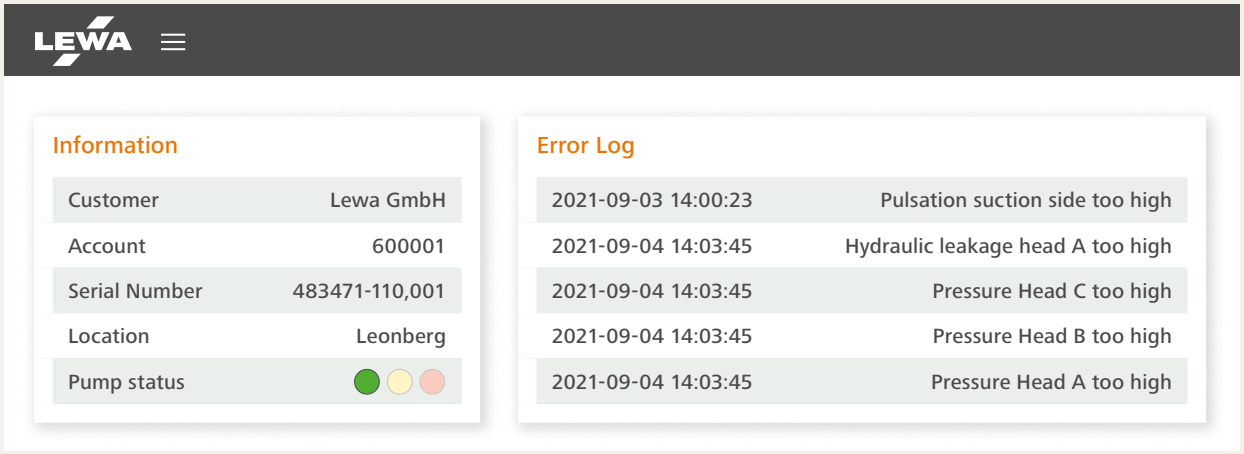
Local data storage for direct access

Contact output for status indication

Diagnostics and Performance Metrics.

With LEWA Smart Monitoring you have access to various diagnostic and performance parameters for your pump and the connected pipe system. This enables you to detect undesirable conditions in the process and the condition of the wear parts at an early stage using a simple traffic light system.

Diagnostic dashboard with status traffic light and error log.

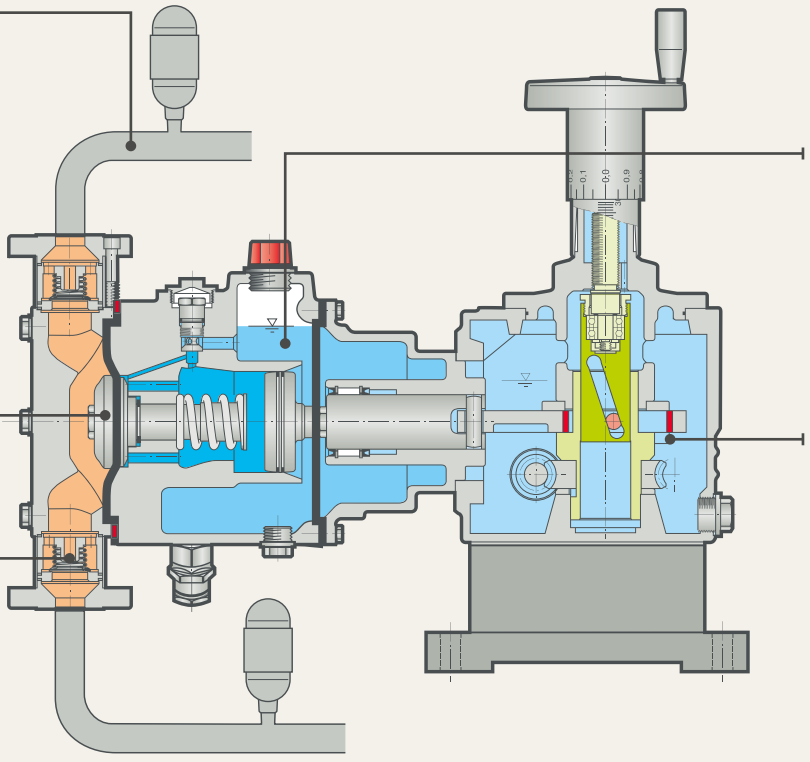


Diagnostics overview

8 system diagnostics:
- Pulsation discharge side too high
- System pressure too high
- System pressure too low
- Pulsation suction side too high
- Discharge side closed
- Suction pressure too low
- Suction side closed
- Flow rate too low

6 pump head diagnostics:
- Maintenance necessary
- Pump head efficiency too low
- Temperature too high
- Diaphragm rupture
- Gas in fluid
- Volumetric efficiency too low

8 valve diagnostics:
- Discharge valve does not open
- Discharge valve does not close
- Discharge valve closes too late
- Leakage pressure valve
- Suction valve does not open
- Suction valve does not close
- Leakage suction valve
- Suction valve closes too late



4 hydraulics diagnostics:
- Snifting phase missing
- Snifting valve closes too early
- Snifting valve closes too late
- Hydraulic leakage

4 drive diagnostics:
- Drive unit efficiency too low
- Overall efficiency too low
- Maintenance necessary
- CO_2 balance

At a Glance.
Technical data.

Technical data

Properties	Expression
Supported pump types	LEWA ecoflow LEWA triplex
Sensor technology (for applications up to 150 °C operating temperature)	Vibration Hydraulic pressure Trigger Optional: temperature, diaphragm rupture and motor power
Hardware	16 bit A/D converter with 1 kHz sampling rate OEM hardware (PLC, IPC) installed in control cabinet in industrial version or as controller box
Cloud	Cloud connectivity via Microsoft Azure cloud for value-added services
Security	Encrypted communication Hardware-based security via TPM chip SSL encryption Rights and role model for data access
Operating zones	Sensors certified up to zone 1
Interfaces	Direct data access via OPC UA interface and TCP/IP protocol

Operational Analyses and Reports.

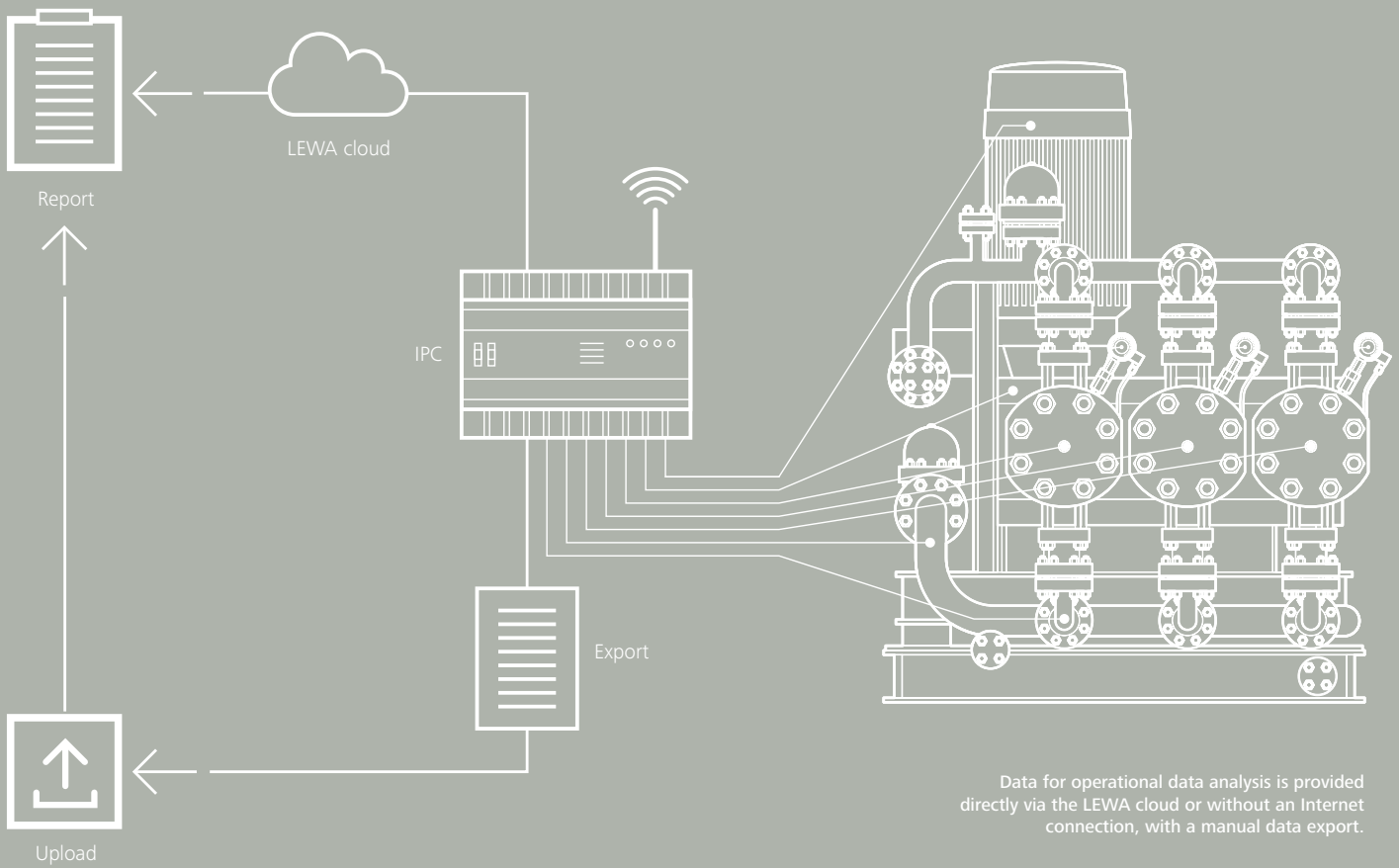
Analysis of the operating data from LEWA Smart Monitoring.

With LEWA Smart Monitoring you get access to exclusive services: We analyze the operating data of LEWA Smart Monitoring at the level of Research & Development. You receive significant reports from us on the performance of your pump in the period under assessment. We also make specific recommendations for optimizing operation and maintenance. In addition to evaluating characteristic values, we create load spectra and phase statistics as well as CO_2 balance to evaluate the efficiency of your pump. We not only find out whether your pump is running safely and stably, but also whether its optimum operating point is being reached.

The report is based on data from the LEWA Smart Monitoring system and is analyzed and interpreted by our service engineers.

Data transfer for reporting purposes is very simple:

- If the LEWA Smart Monitoring system has Internet access, data is transferred to the LEWA cloud via a secure SSL connection. In the LEWA customer portal, as a result you will receive a report document of the considered pump.
- If the system does not have Internet access, you can download the data for the observation period via the graphical user interface and send us the file for analysis.



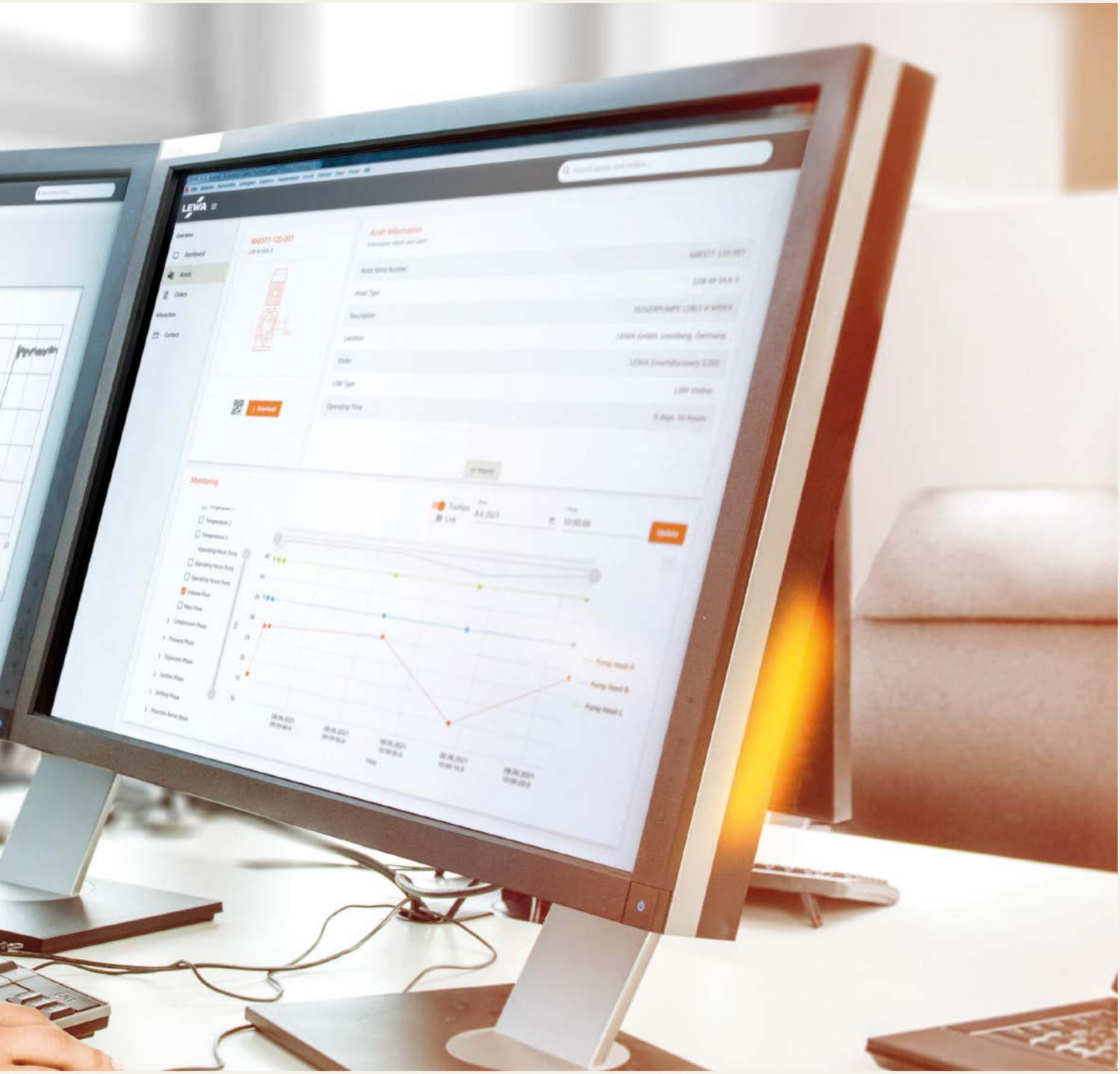
Data for operational data analysis is provided directly via the LEWA cloud or without an Internet connection, with a manual data export.

Remote Support.
Remote maintenance with LEWA Smart Monitoring.

Data-based remote support by the LEWA service center

The LEWA service center supports you with fault diagnosis and data analysis. Together with you, our service engineers check the operating data of the LEWA Smart Monitoring system via remote connection. In this way, error conditions are quickly identified and remedial measures initiated.

We offer service contracts that provide you with all-round support, including inspection and maintenance support, and spare and wear parts packages tailored specifically to your needs.


LEWA
Overview
Dashboard
Asset
Order
Interaction
Contact
Asset Information
Monitoring
Update

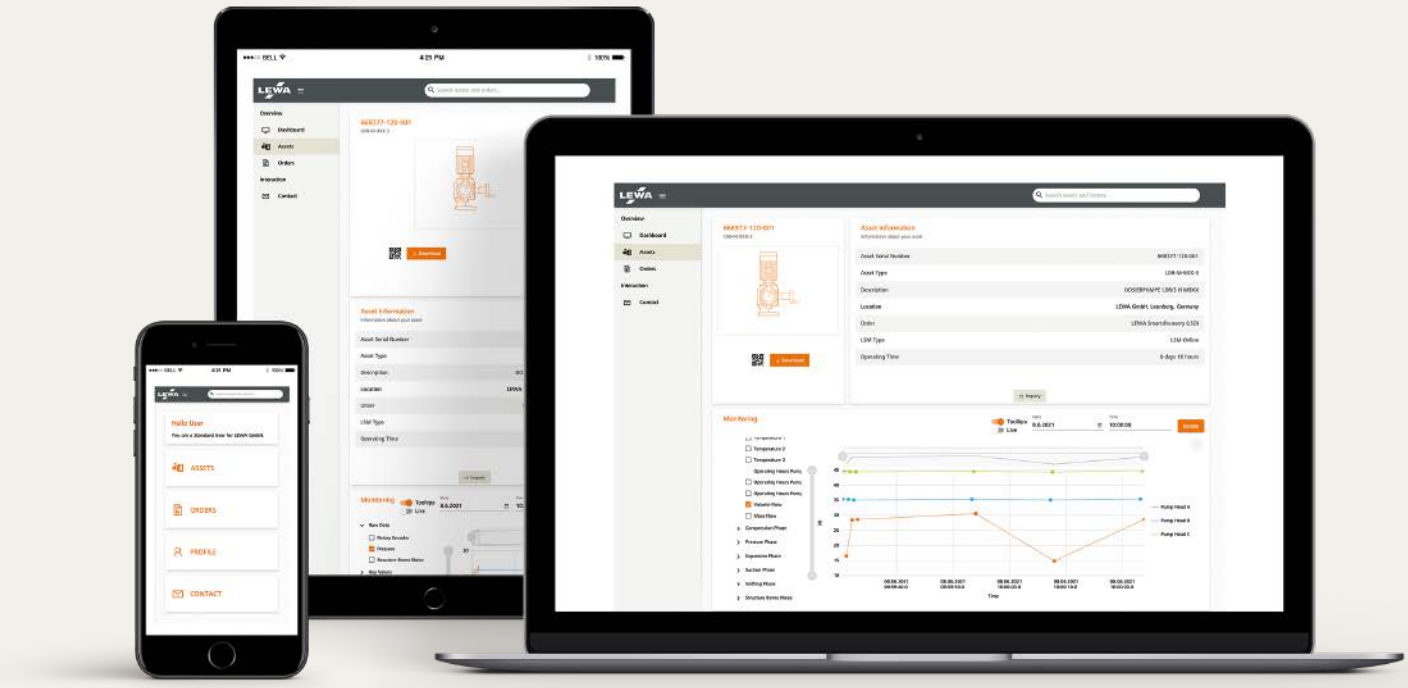
LEWA Customer Portal.

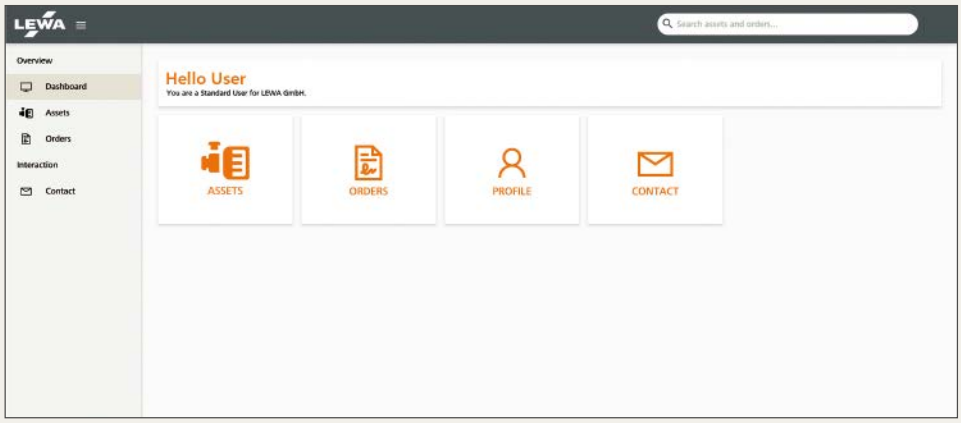
Digital asset management with life cycle file, document and maintenance management.

The LEWA customer portal provides you with more than just an overview of your existing pumps. The associated digital documents, a life cycle file, and additional services such as digital spare parts catalogs and operating data analyses are also available. Each pump has its own profile page: the digital twin. There, data from various sources are combined to create a 360° view of the pump. In addition to design data, material characteristics and documents, you will find operating data from LEWA Smart Monitoring and interaction data such as maintenance reports from the life cycle of the pump. This data can be accessed by users at any time via a web browser-compatible terminal device.
A QR code on the pump enables direct access to the pump profile page.

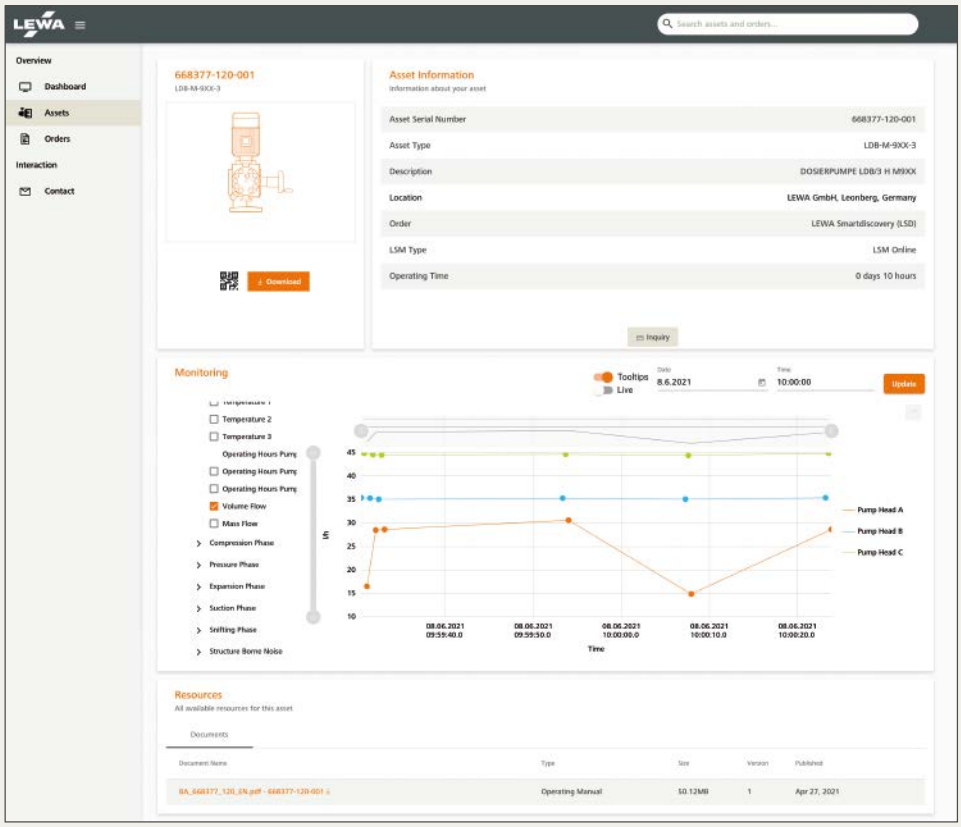
Available documents for each pump

- Operating manual
- Documentation
- Certificates
- Maintenance parts list
- Accessories documents





A secure rights and roles concept allows you to determine who within your company can see what content in the LEWA customer portal and which transactions can be triggered.

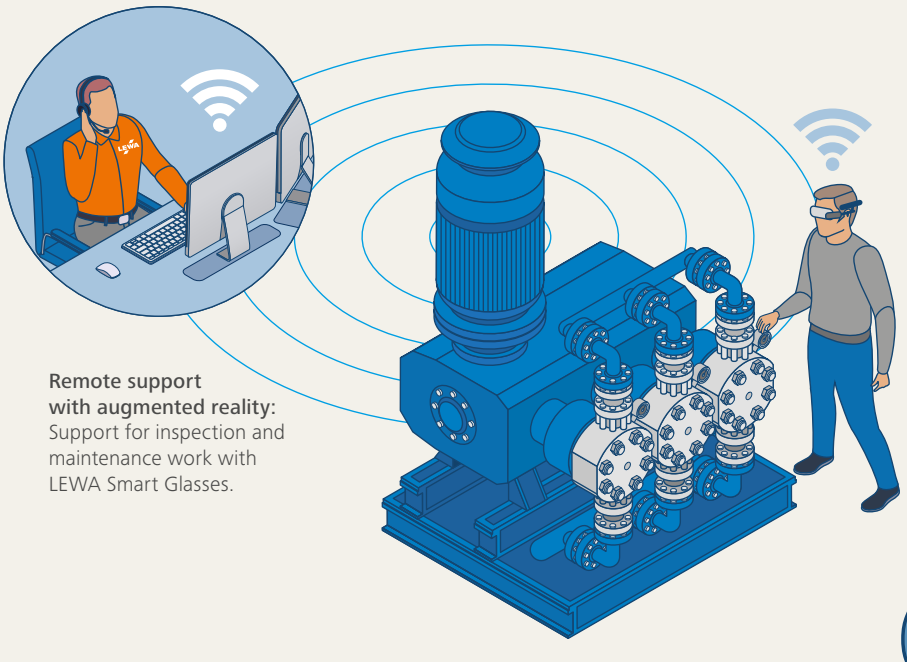


Connection to your own ERP system is also possible: secure data transfer is possible via REST interfaces. Life cycle data and maintenance parts lists are available for download in neutral formats such as .csv.

LEWA Smart Factory Enablement.

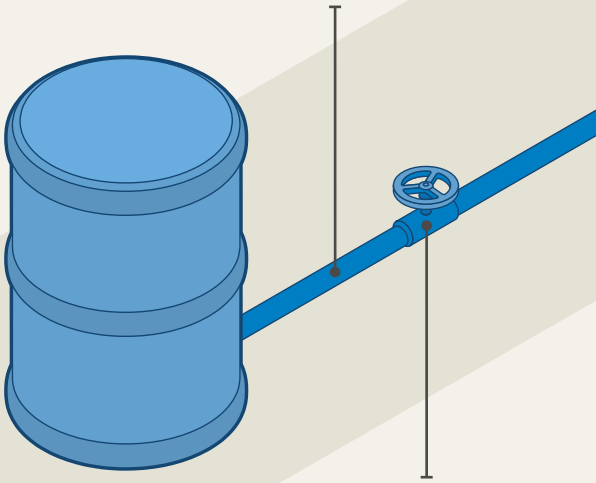
LEWA supports modern smart factory concepts. Production systems are networked and individual components such as pumps are available as virtual industrial IoT devices. We rely here on generally valid standards for data models, transmission paths for data flows and security architecture developed by VDMA and VDI. Let us work togehter on this vision by taking the next steps in your production towards the smart factory.

Pump operating characteristics:
Monitoring pump operating parameters.

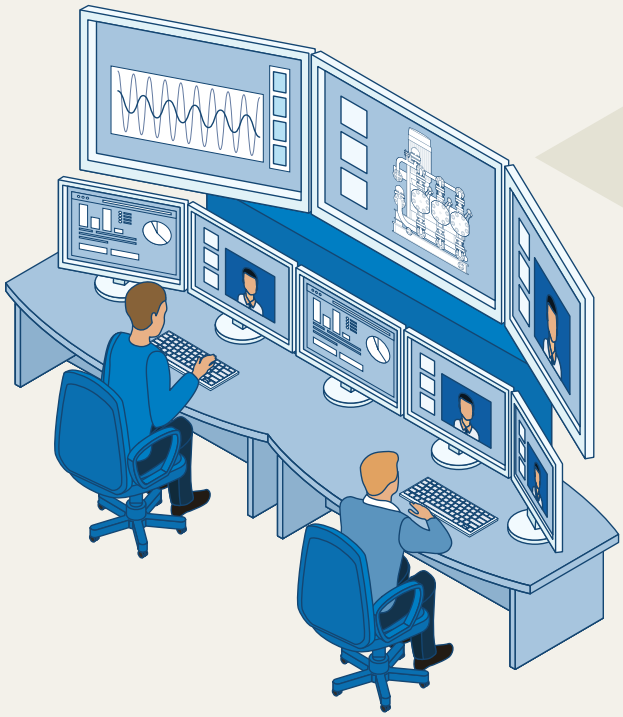


Remote support with augmented reality:
Support for inspection and maintenance work with LEWA Smart Glasses.

Fluid rating:
Indirect evaluation of the fluid condition.

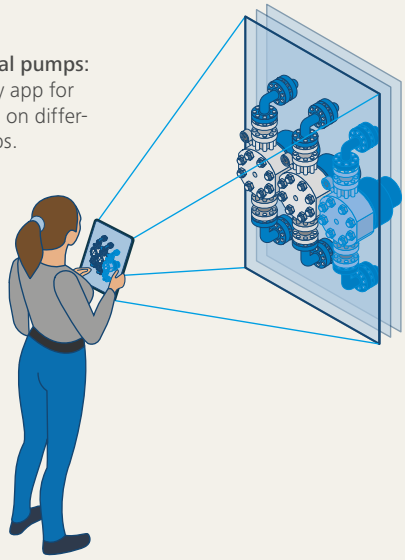


Suction line:
Statement whether the suction line is closed.



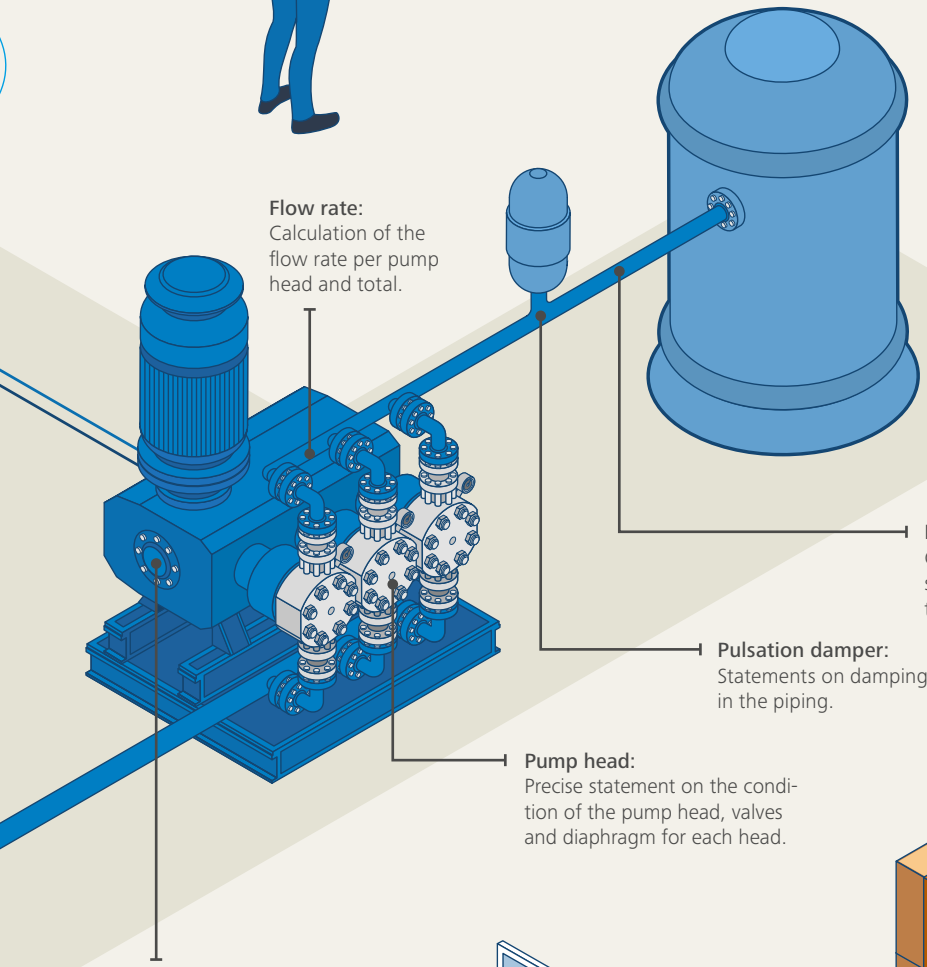
Process monitoring at the control center:
Transfer of characteristic values and diagnostics to your system via standardized interfaces.

Training on virtual pumps:
Augmented reality app for employee training on different types of pumps.



Digital asset management:
Digital life cycle file for each pump in the LEWA customer portal.

Flow rate:
Calculation of the flow rate per pump head and total.



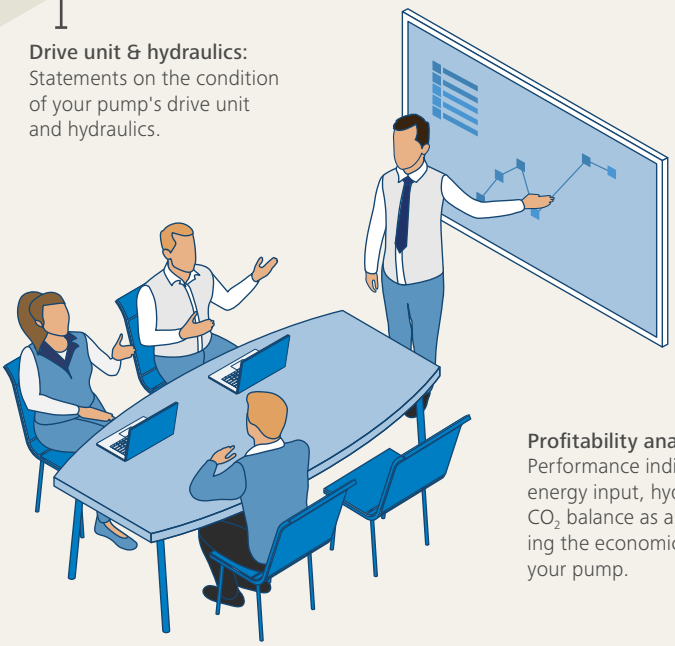
Piping:
Condition assessment of the suction and discharge sides in the system.

Pulsation damper:
Statements on damping in the piping.

Pump head:
Precise statement on the condition of the pump head, valves and diaphragm for each head.

Drive unit & hydraulics:
Statements on the condition of your pump's drive unit and hydraulics.

Spare parts and maintenance management:
Maintenance parts lists for each pump available online. Export to local ordering systems possible.



Profitability analysis:
Performance indicators such as energy input, hydraulic power and CO_2 balance as a basis for evaluating the economic efficiency of your pump.

LEWA Smart Glasses.
Smart glasses for diagnostics, maintenance and repair work.

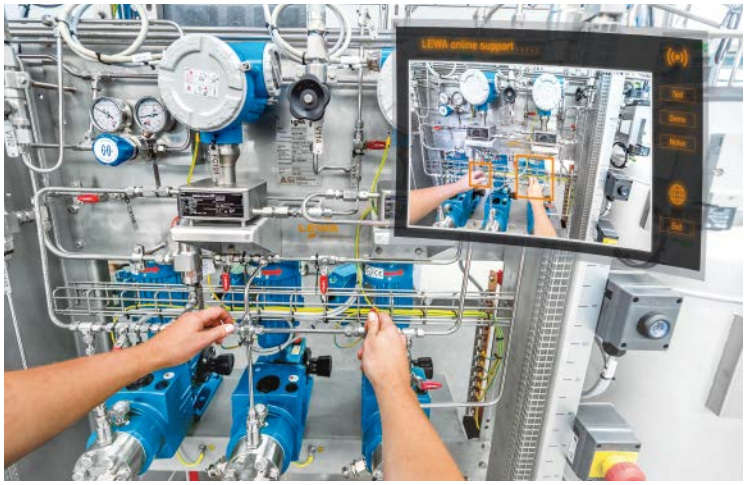
Reduce downtime, increase availability

Pump and plant availability is a key factor for success in manufacturing companies. Production downtime means sales losses. For this reason, prompt and precise fault diagnostics are essential. With LEWA Smart Glasses, you have access to a LEWA expert with whom you can create a joint initial diagnosis in case of failure within a few minuets. This enables you to frequently correct minor faults on your own with expert assistance. You benefit by minimizing downtimes and cutting down on preventable on-site service calls. What this ultimately means for you is more revenue and fewer costs.

Using the smart glasses, you can quickly contact the LEWA service center. Together with a LEWA expert, you inspect the system or the pump and make an initial diagnosis. With the help of the smart glasses, the LEWA expert can view the situation through your eyes and provide instructions on how to check the pump/system and perhaps even remedy the problem yourself. In addition to two-way image and sound transfer, the smart glasses also make it possible to transfer documents such as operating manuals. A maintenance report is created for each incident and sent to you. This means complete transparency and reliability.

Advantages of LEWA Smart Glasses:

- Quick assistance from LEWA experts in case of a fault
- Collaboration on initial diagnostics and remedying minor faults
- The ability to bring LEWA experts into the process for maintenance and repair work
- Image, sound and document transfer
- Shorter waiting times and fewer on-site calls by service technicians
- Increased system availability and security
- Approved for ATEX and IECEx Zone 1 and CSA C1-D1

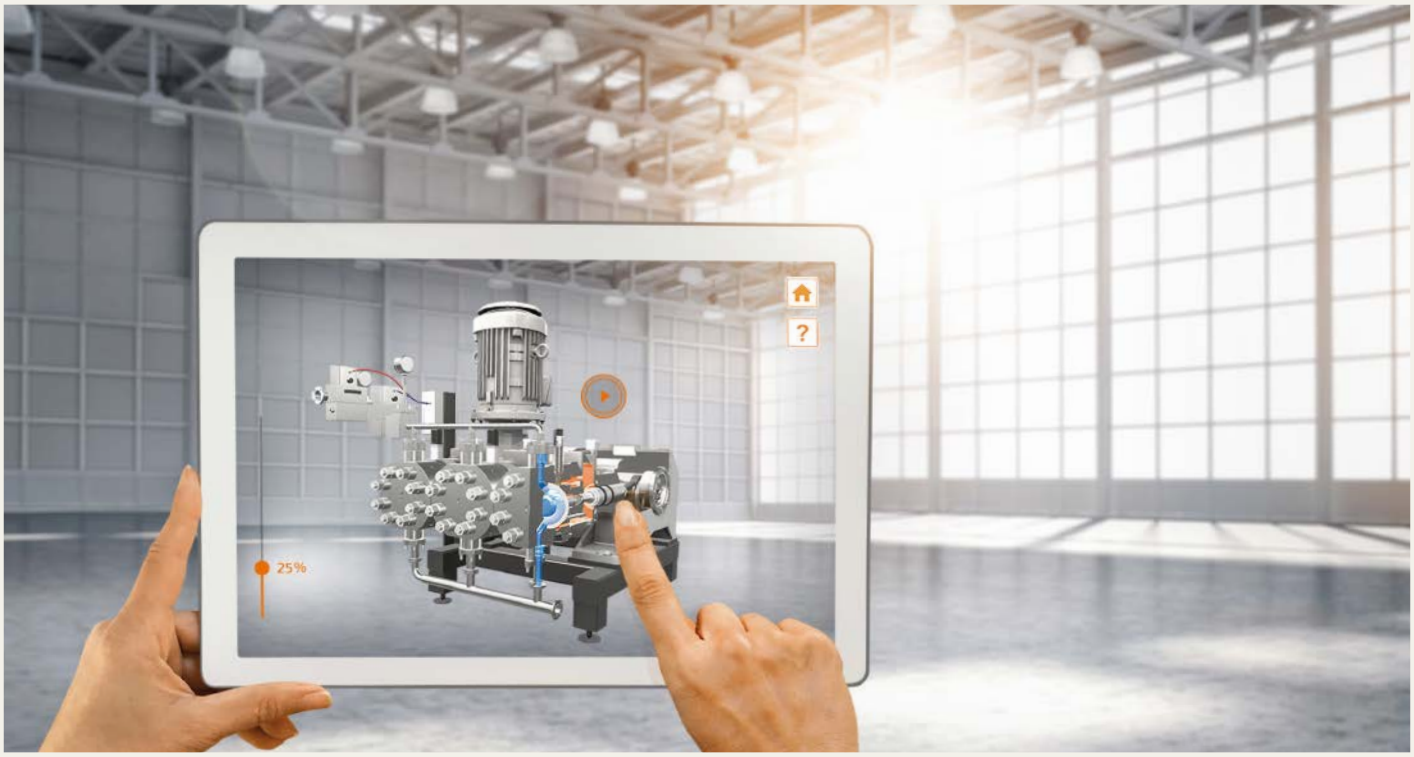


With LEWA Smart Glasses, quick and easy help is possible in case of malfunction.

Orange showroom.
Augmented reality app for displaying 3D pump models.

Present processes in an understandable way, explain them clearly and experience them first-hand: LEWA has achieved this with its orange showroom AR app. It enables 3D pump models to be demonstrated on any Apple iPhone or iPad. Learn about LEWA pump technology and train your staff with animated models of our latest pump types.

The app runs on all Apple iPhones, as well as iPads with iOS 12.0 or later.



Perfect insight:

With the orange showroom augmented reality app, LEWA creates a special kind of perspective: the 3D interior view of various pumps.

The virtual representation enables optimal visualization of the functionality. Using ground plane detection, the floor of the relevant room is captured via the tablet or smartphone camera and the model is positioned on the screen in the space. This makes it possible to view the pump from all directions and angles.

Show the complex internal structure of LEWA pumps in 3D representation. The model is also freely scalable, enabling the pump size to be adjusted to the available space. On the app you will also find animations on how the pumps work and how to behave in exceptional situations.

Click here for the free orange showroom app: Scan code and install app.

The latest LEWA pumps available as models on smartphones.

The orange showroom app can represent remote head pumps with thermal image in the piping.

Models in the orange showroom app

LEWA ecoflow process diaphragm pump with three different pump heads

LEWA triplex process pump with a homogenization valve and with a view of the inner workings of the crank mechanism in mono-block design

NIKKISO NON-SEAL* pump with e-monitor and simulation of temperature increases and malfunctions

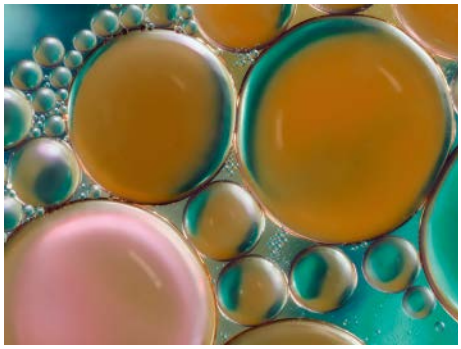
LEWA ecosmart plus integrated in a metering system for various applications

LEWA is planning to successively add other pump types to the application. The virtual exhibit can be used in more then just training courses or at trade fairs. Applications in the service and maintenance segment are also possible.

* NIKKISO NON-SEAL is a registered trademark of NIKKISO CO.,LTD.

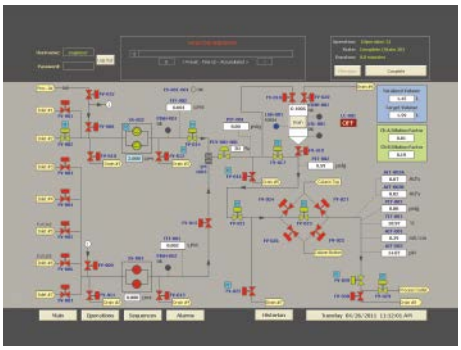
Creating Fluid Solutions.
For more value created.

Technical consulting

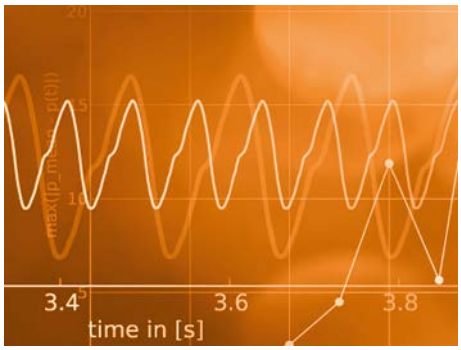


Fluid and process engineering tests

Life cycle concepts and energy optimization



Process automation

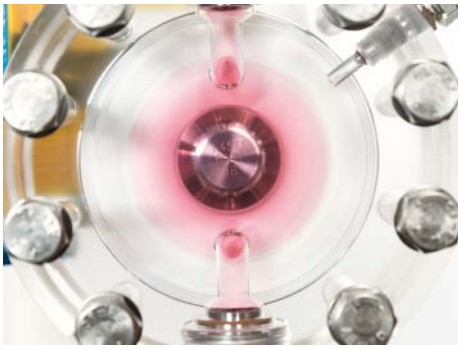


Pulsation studies and piping calculations

System layout and integration

Creative development and refinements

Commissioning and maintenance service



Spare part and service concepts

Creating Fluid Solutions.

Driven by our conviction, we have set standards for diaphragm pumps, process pumps and metering systems with forward-looking products and innovative technologies for more than 70 years. We solve complex tasks from a single source. They range from custom pump design, basic and system engineering, global project management, and process pretesting to commissioning and maintenance on site. With our consistent goal to always develop the best customer solutions, we offer competitive advantages and tangible added value.

LEWA

Creating Fluid Solutions

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