KAESER COMPRESSORS®

KAESER MEASUREMENT TECHNOLOGY

KM Series
Intelligent process data capture
Making the invisible visible

www.kaeser.com

KAESER MEASUREMENT TECHNOLOGY

Making the invisible visible

With KAESER KOMPRESSOREN's intelligent sensor technology, process data can be collected, analysed and put to use, allowing the complete compressed air system to be continuously monitored. Reliable sensors and digital "eyes" help to detect and resolve irregularities early – this continual optimisation of your compressed air supply enhances efficiency and eliminates costly downtime.

Centralised monitoring and KPIs provided by the SIGMA AIR MANAGER 4.0 compressed air management system support data visualisation and analysis, whilst anomalies are reported immediately should limit values be exceeded or fallen short of. All data are gathered and distributed from this central point.

Condition monitoring enables you to display specific parameters (such as pressure, temperature, and pressure dew point) and Key Performance Indicators (KPIs), so that you can keep track of the operating conditions for all connected components. This means you always have excellent oversight of your compressed air system, enabling targeted optimisation of energy usage for maximum efficiency and compressed air availability.

A comprehensive and, above all, holistic approach has always been central to the KAESER philosophy – as a compressed air systems provider, KAESER always delivers tailored complete solutions precisely matched to the volume and quality requirements of the application at hand.

The goal is to achieve maximum transparency of processes and their respective correlations, the understanding of which provides the foundation for dependable forecasting models. Our top priorities are always efficiency and the security of supply.

More compressed air for less energy!

Your benefits at a glance

- **Intelligent sensors**
  for focused knowledge transfer
- **Networking via the KAESER SIGMA NETWORK with Power over Ethernet**
  for continuous data capture
- **Conventional signals supported**
  for straightforward tracking
- **Intuitive Plug & Play installation**
  for maximum user-friendliness
- **Dependable and versatile measurement**
  for maximum flexibility
- **Real-time monitoring**
  for increased transparency and short response times
- **Rapid, simple data evaluation**
  for maximum efficiency

We illuminate the system

Your process always in sight

KAESER's KM series MEASUREMENT TECHNOLOGY provides you with a complete overview of your compressed air production at all times, from energy usage to the quantity and quality of compressed air generated.

Measurement alone is no longer enough – with the targeted use of high-performance measurement technology, correlations can be identified and measures instigated in good time before issues arise. This enables you to safeguard availability and prevent production downtime.

Sensors are more than just a data source: combined with enhanced data transparency via the SIGMA AIR MANAGER 4.0 compressed air management system, they not only deliver measured values, but other valuable information as well.

Correlations and logic chains become traceable; smart sensors provide comprehensive condition information from the point of use, which means the number of sensors and interfaces can be reduced. This advantage cuts costs and prevents potential sources of error.

Turn your raw data into information and gain new insights to further optimise your processes, schedule targeted service assignments and – above all – identify new opportunities for cost reduction.

Whether voltage quality, power consumption, generated flow rate, temperature or pressure – we can capture it and display it.

(1) **KM AA/A** (intake or ambient conditions in the room)

(2) **KM EA/A** (energy monitoring of compressed air generation)

(3) **KM FA/P** (generated flow rate upstream of treatment)

(4) **KM PA/B** (inlet or outlet conditions for system components)

(5) **KM PA/A** (quality monitoring / pressure dew point downstream from treatment)

(6) **KM FA/T** (required flow rate and its distribution)

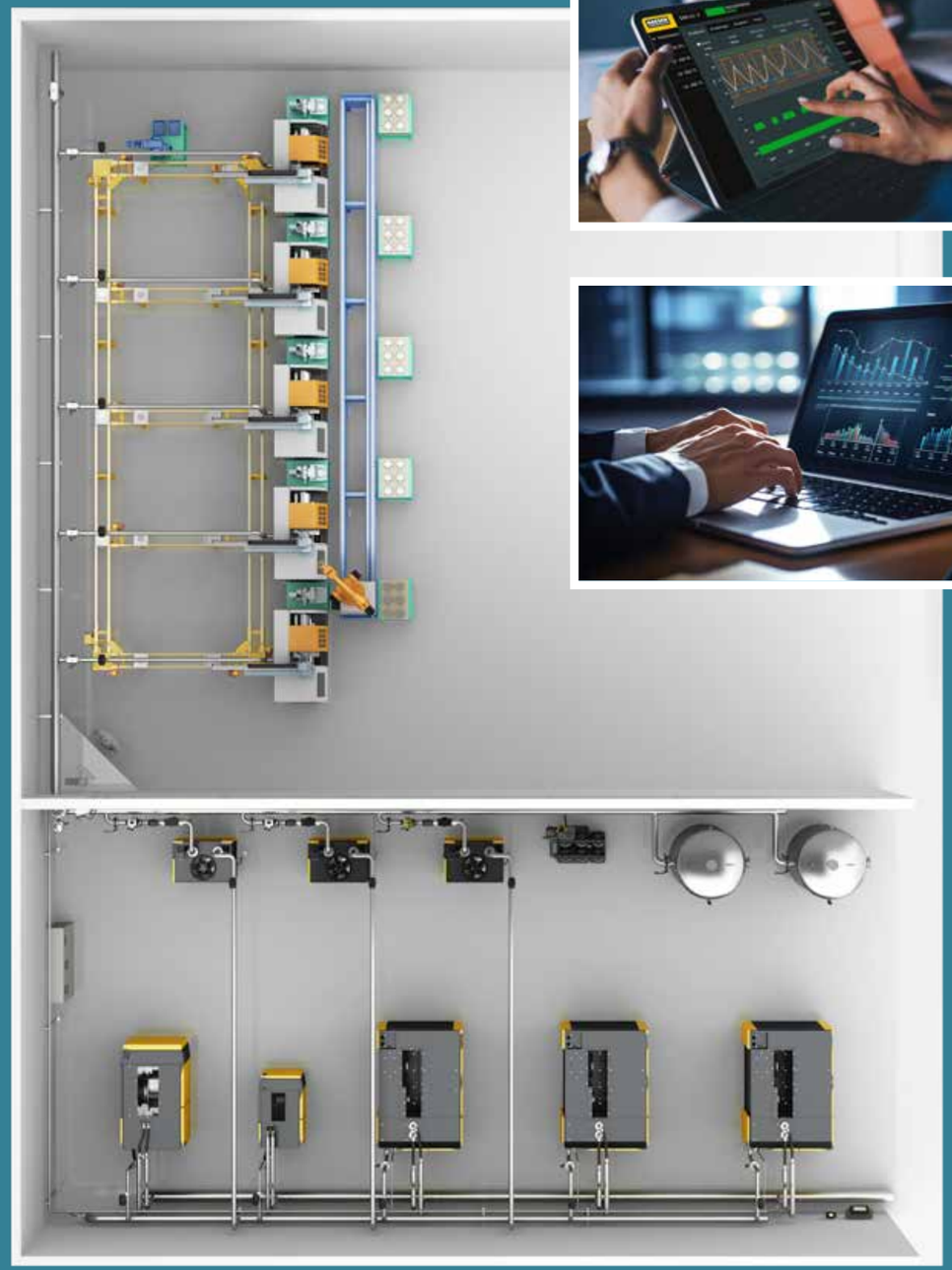
Adapted to operating conditions

Monitor system performance. The devices provide total flexibility and can be used for a variety of pipe diameters.

All-in-one: Intelligent sensors

When you use a sensor – do it properly. Each sensor records multiple values at the respective measurement point, enabling you to identify and improve your efficiency – tailored to any application and every requirement.

All energy data at a glance – on your mobile device or PC

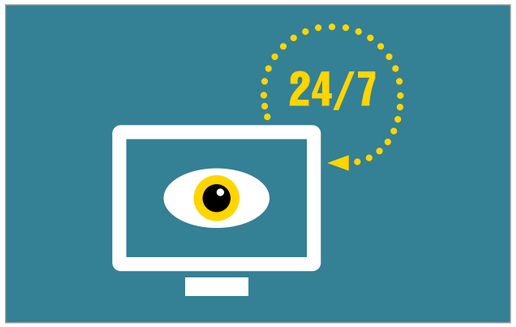


It’s all about the distribution

Get started with the right KAESER MEASUREMENT TECHNOLOGY for comprehensive process data capture. Is the majority of your data currently not recorded or not used intelligently? The solution: cutting-edge measurement technology with smart measured data management.

To meet the widest possible range of requirements for modern measurement technology and individual functions, KAESER hardware technology is the optimal choice – installation and configuration is simple.

Keep an eye on your compressed air consumption: the calorimetric flow rate meter measures almost down to zero and can even detect small quantities such as leakage rates. This means you always know precisely how much compressed air is being lost en route to the application, enabling targeted optimisation of your system. For even more efficient production, high-precision measured values are recorded and then analysed. Output options are varied: for example, you can view a drag indicator or receive a notification message. Thanks to the KAESER SIGMA NETWORK connection, all data are available at a central point and measured values can be accessed online.



Continuous monitoring

Process monitoring is essential when it comes to preventing unnecessary costs and downtime, and is a continuous activity. Keep a constant eye on which processes or production lines are consuming compressed air, whilst monitoring the quality at all times.

Detect leakage rates

Our calorimetric measurement process reliably measures actual compressed air consumption, right down to the smallest quantities.

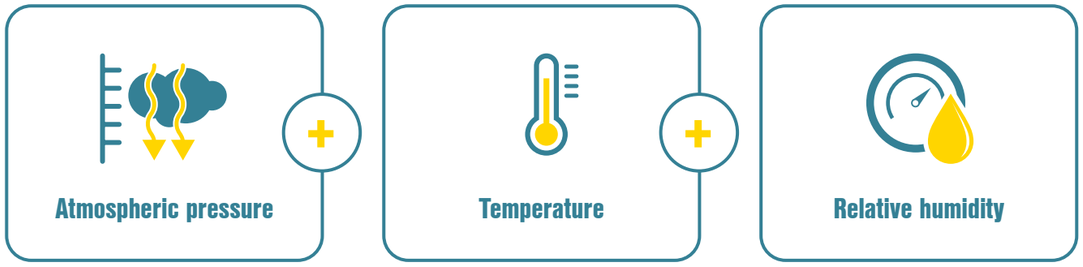
Plug & Play: Simple installation

A G½” ball valve in the piping is all that is required for installation. Power can be supplied to the sensor via the KAESER SIGMA NETWORK interface using Power over Ethernet.

Intake or ambient conditions

KM AA/A (Ambient Analyser Advanced)

This measuring device monitors room and intake conditions. It is ideal for assessing ambient parameters, identifying under which ambient conditions the components in a compressed air station are being operated and the amount of humidity that is entering the system. The operating and intake conditions provide information about the correct functioning of components and enable correlations to be drawn regarding compressed air consumption.



Technical data

Measurement	- Intake conditions
Measured values	- Atmospheric pressure - Temperature - Relative humidity
Temperature range	-20 to 60 °C
Absolute pressure	300 – 1100 hPa(a)
Connection	KAESER SIGMA NETWORK
Relative humidity	5 – 95% r.h.
1 x AIO 4–20mA	
1 x DI alarm output	
18 to 36 VDC or PoE	

Energy monitoring of compressed air generation

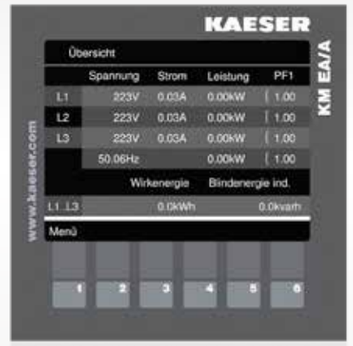
KM EA/A (Energy Analyser Advanced)

This measuring device is a multifunctional mains analyser. It monitors the quality and reliability of the voltage supply, capturing all key measured values and KPIs. It therefore provides a complete system solution for modern energy data management (e.g. in accordance with ISO 50001) and voltage quality monitoring. For your energy data management purposes, the device can be optionally upgraded at any time to include MID (Measuring Instruments Directive) calibration validation.

These devices support you in the documentation of final energy savings and in invoicing using suitable MID-compliant measurement points. They also meet the requirements for verifying voltage quality (for example, in accordance with EN 61000-2-4).

Technical data

Measurement	- Energy - Quality analysis / balance
Measured values	- Power - Voltage - Current - Voltage errors - Harmonic distortion - Up to 800 measured values
Temperature range	-10 – 55 °C
Connection	KAESER SIGMA NETWORK
3 voltage measurement inputs (600 V, CAT III)	
Measurement in networks with nominal voltages	
up to L-L 720 Vrms and L-N 417 Vrms (as per IEC)	
Supports current transformers with secondary currents .../1A and .../5A	
3 current inputs (via user-provided current transformer)	
3 x DI	3 x DO



Generated flow rate upstream of treatment

KM FA/P (Flow Analyser Pressure)

This flow meter is ideal for determining the generated flow rate at high temperatures and when using air with elevated moisture concentrations. It enables measurement directly downstream from the compressors.

Technical data

Measurement	- Flow rate - Dynamic pressure probe
Measured values	- Flow rate - Pressure - Temperature - Volume - Flow velocity
Medium temperature	Up to 180 °C
Connection	KAESER SIGMA NETWORK
Pressure range	Max. 16.0 bar(g)
1 x AIO 4–20mA	
1 x DI alarm output	
18 to 36 VDC or PoE	

Also available as an **in-line variant** for small pipe diameters.

Inlet or outlet conditions of system components

KM PA/B (Process Analyser Basic)

This measuring device is ideal for evaluating system pressure. It enables savings potential to be identified, such as a reduction in system pressure, or filter changes. The inlet and outlet temperatures of components can also be monitored. Early detection of elevated inlet temperatures in treatment components reliably protects against overload.

Technical data

Measurement	- Process data
Measured values	- Pressure - Temperature
Medium temperature	Up to 125 °C
Connection	KAESER SIGMA NETWORK
Pressure range	-1 – 0 bar(g) 1.6 bar(g) 10.0 bar(g) 16.0 bar(g) 50.0 bar(g)
1 x AIO 4–20mA	
1 x DI alarm output	
18 to 36 VDC or PoE	

Quality monitoring / pressure dew point downstream from treatment

KM PA/A (Process Analyser Advanced)

This measuring device is ideal for evaluating compressed air quality. The pressure dew point is reliably determined, whilst the inlet and outlet temperatures of components and the pressure are monitored simultaneously. When using compressed air in production environments, adherence to certain limit values is of critical importance. With the right monitoring in place, malfunctions and production downtime can be prevented.

“Quality – dependably and securely in sight”

Technical data

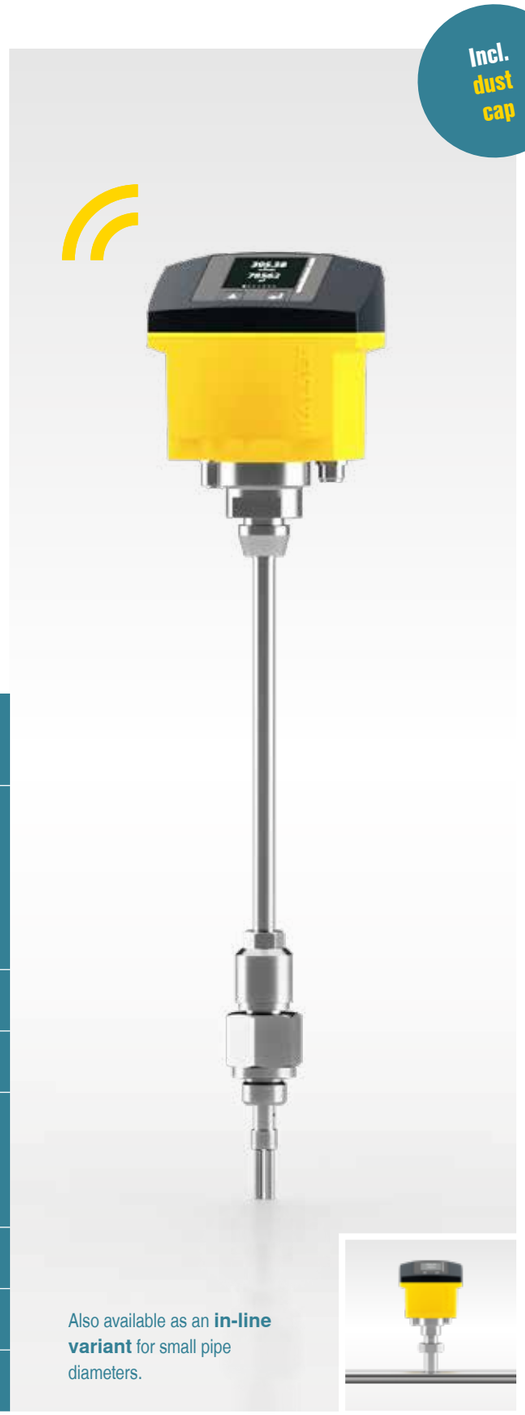
Measurement	- Pressure dew point
Measured values	- Pressure dew point - Pressure - Temperature - Relative humidity - Concentration
Medium temperature	Up to 50 °C
Connection	KAESER SIGMA NETWORK
Pressure range	- Max. 16 bar - Up to 50 bar without pressure measurement
1 x AIO 4–20mA	
1 x DI alarm output	
18 to 36 VDC or PoE	

Required flow rate and distribution

KM FA/T (Flow Analyser Temperature)

This flow meter is ideal for measuring the consumed flow rate at transfer points downstream from the compressed air treatment or upstream of processes. This enables the volume / consumption from the production areas or processes to be determined. Additionally, the high sensitivity of this device enables leakage quantities to be recorded.

“Optimal control over consumption.”



Also available as an **in-line variant** for small pipe diameters.

Technical data

Measurement	- Flow rate - Calorimetric
Measured values	- Flow rate - Pressure - Temperature - Volume - Flow velocity - Leakage flow
Medium temperature	Up to 125 °C
Connection	KAESER SIGMA NETWORK
Pressure range	1.6 bar(g) 10.0 bar(g) 16.0 bar(g) 50.0 bar(g)
1 x AIO 4–20mA	
1 x DI alarm output	
18 to 36 VDC or PoE	

Room monitoring and availability

The unique fingerprint of a compressed air station is always shaped by requirements and how the resulting solution is implemented. KAESER provides practical approaches to data capture for a range of different scenarios. This overview serves as a guide.

The importance of room monitoring, for example, is frequently underestimated. Yet intake and ambient conditions can have a significant influence on both the components of a compressed air station and the quality of compressed air generated.

Moreover, intake and ambient conditions are invaluable for error analysis and play a key role in applications such as flow rate control for blowers, vacuum regulation, and dynamic compensation to standard flow rate. The measured parameters ensure that system malfunction due to irregularities can be reliably prevented.

One of the most important process parameters is the pressure at the transfer point. This has a significant influence on efficient compressor control and provides an indication as to whether your production can continue without risk.

Further analysis options include recording the intermediate circuit temperatures or pressure downstream from the compressed air generators, both before and after treatment. The insights gained from this reveal additional optimisation potential for your compressed air supply. One principle in particular applies to every production process: compressed air availability must be dependable. KAESER MEASUREMENT TECHNOLOGY increases your operational reliability. Used correctly, our measuring devices provide valuable information about generated flow rate, outlet conditions downstream from treatment components, and any pressure drops.

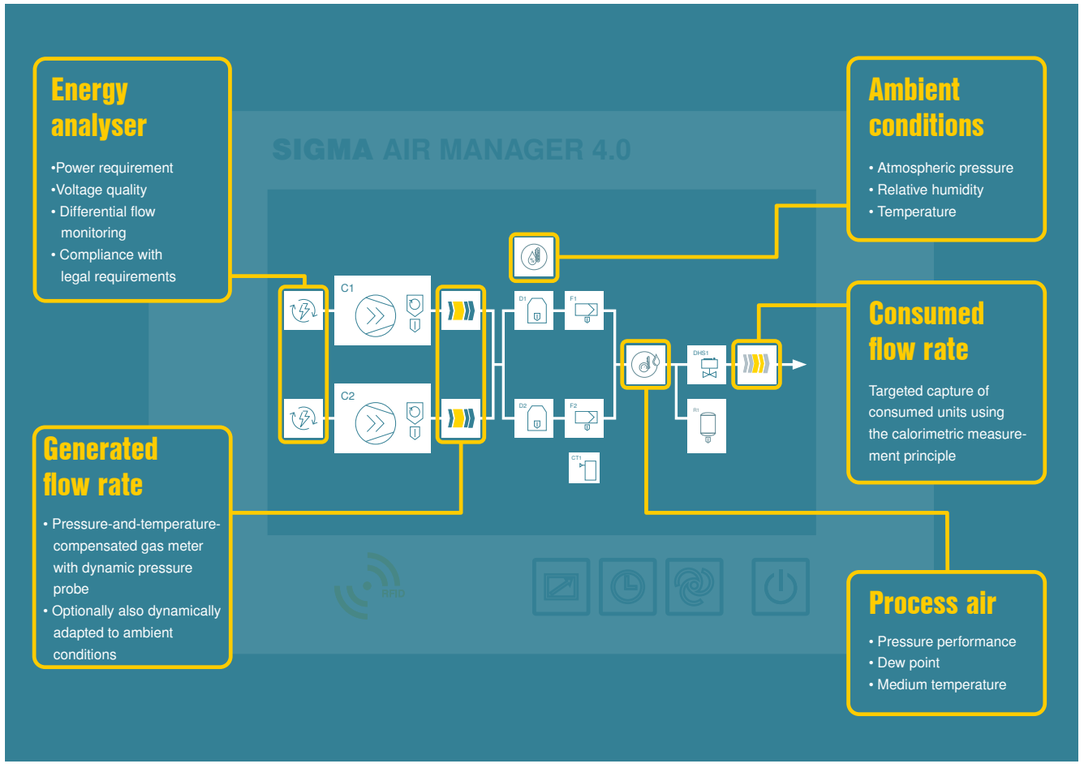
Tailored to your needs

Description	KM AA/A	KM EA/A	KM FA/P	KM PA/B	KM PA/A	KM FA/T	DHS 4.0
Description	Ambient conditions	Energy measurement Voltage quality	Flow rate measurement Process: Differential pressure measurement	Process air	Process air Pressure dew point	Flow rate measurement Process: Thermal measurement process	Safety device Air-main charging system
Measured values	Atm. pressure Humidity Amb. temperature	Voltage Current Power Voltage errors Over 800 measured values	Flow rate Pressure Temperature Volume Flow velocity	Pressure Temperature	Pressure dew point Pressure Temperature Abs. humidity Concentration	Flow rate Pressure Temperature Volume Flow velocity Leakage flow	Pressure
Monitoring packages	**KM AA/A**	**KM EA/A**	**KM FA/P**	**KM PA/B**	**KM PA/A**	**KM FA/T**	**DHS 4.0**
Room monitoring with SIGMA AIR MANAGER 4.0 (standard)	1 x	–	–	Optional	Optional	Optional	Recommendation II Availability
Availability	Min. 1 x	–	–	Min. 2 x	–	Min. 1 x	Recommendation II Availability
Quality monitoring	Min. 1 x	–	–	Min. 2 x	Min. 1 x	–	Recommendation I Reliable supply
Quality monitoring plus	Min. 1 x	Min. 1 x	–	Min. 2 x	Min. 1 x	Min. 1 x	Recommendation I Reliable supply
Energy monitoring & controlling	Min. 1 x	Min. 1 x	Min. 1 x	Min. 1 x	–	Min. 1 x	Recommendation II Availability

In the ideal scenario, you should monitor the distribution between individual lines using flow meters designed for this purpose. These also allow you to detect leakage rates and determine exactly where your compressed air is going.

Optimising the piping network or positioning air receivers at critical points is a frequently proven approach to preventing pressure fluctuations or reducing system pressure. Targeted improvements can be initiated as required – saving costs and enabling you to stay in control.

The route to the point of use can be complex



Quality monitoring and quality monitoring plus

Quality is a commitment for KAESER – and one that underpins operational security. Compressed air is needed in virtually every production environment, which makes it all the more important that the air supply is cost-effective and the required quality is consistently maintained.

KAESER MEASUREMENT TECHNOLOGY helps you to prevent unforeseen malfunctions and the associated production downtime. Our quality monitoring gives you the opportunity to focus attention on the critical points in your compressed air station.

When it comes to generating compressed air for your process, in may be beneficial to keep an eye on residual currents, voltage quality, power consumption, intake / ambient conditions, pressures, temperatures, flow rates, leakage rates, pressure dew point and differential pressures, as well as internal machine values and operating states.

Ultimately, you must have confidence that your system will deliver what you expect of it – KAESER measurement technology alerts you in good time if limit values are no longer being adhered to.

The same applies to compressed air quality. The cause of inadequate compressed air quality is often not immediately apparent; our sensors make the invisible visible. Even the smallest fluctuations in pressure dew point can lead to costly quality losses. Such fluctuations are frequently caused by limit values for the intake conditions not being adhered to.

Our quality monitoring enables fast and effective identification of optimisation potential: using KAESER MEASUREMENT TECHNOLOGY, you can achieve lasting improvements to your compressed air system.

If required, we can also conduct compressed air quality measurements. With the aid of a laboratory, we analyse the composition of your compressed air and any aerosols or particles it may still contain.

We provide specialist quality measurements for every individual application and requirement

Energy monitoring

Compressed air systems are often reduced in people's minds to the compressors alone, which in many businesses are synonymous with compressed air generation. The reality, however, is that a compressed air supply comprises a complete system of generators, consumers, distribution network, and treatment. In many cases, the "weakest" link in the chain is what drives inefficient use of compressed air.

KAESER MEASUREMENT TECHNOLOGY supports energy saving and provides insight into how compressed air can be generated, used, and distributed efficiently.

As your business grows, the demands on your compressed air supply typically grow with it. Our goal is to provide compressed air systems that distribute the air optimally and without losses, thereby maximising cost-effectiveness and minimising maintenance costs.

We ask ourselves the following questions: How is the compressed air distributed? Which quantities are consumed where? What is the leakage rate? What is the total amount of energy used?

KAESER MEASUREMENT TECHNOLOGY provides the answers: our comprehensive array of sensors help to make your compressed air supply more reliable, more maintenance-friendly and more energy-efficient. Whatever the application, whatever the consumption rate – KAESER has the right solution for your individual needs.

With KAESER MEASUREMENT TECHNOLOGY, you save energy and reduce your CO_2 footprint at the same time.

Establish the facts

Our certified and calibrated measuring devices can be installed anywhere. Whether you need to raise invoices or balance your consumption figures, you can draw on the specific KPIs required.

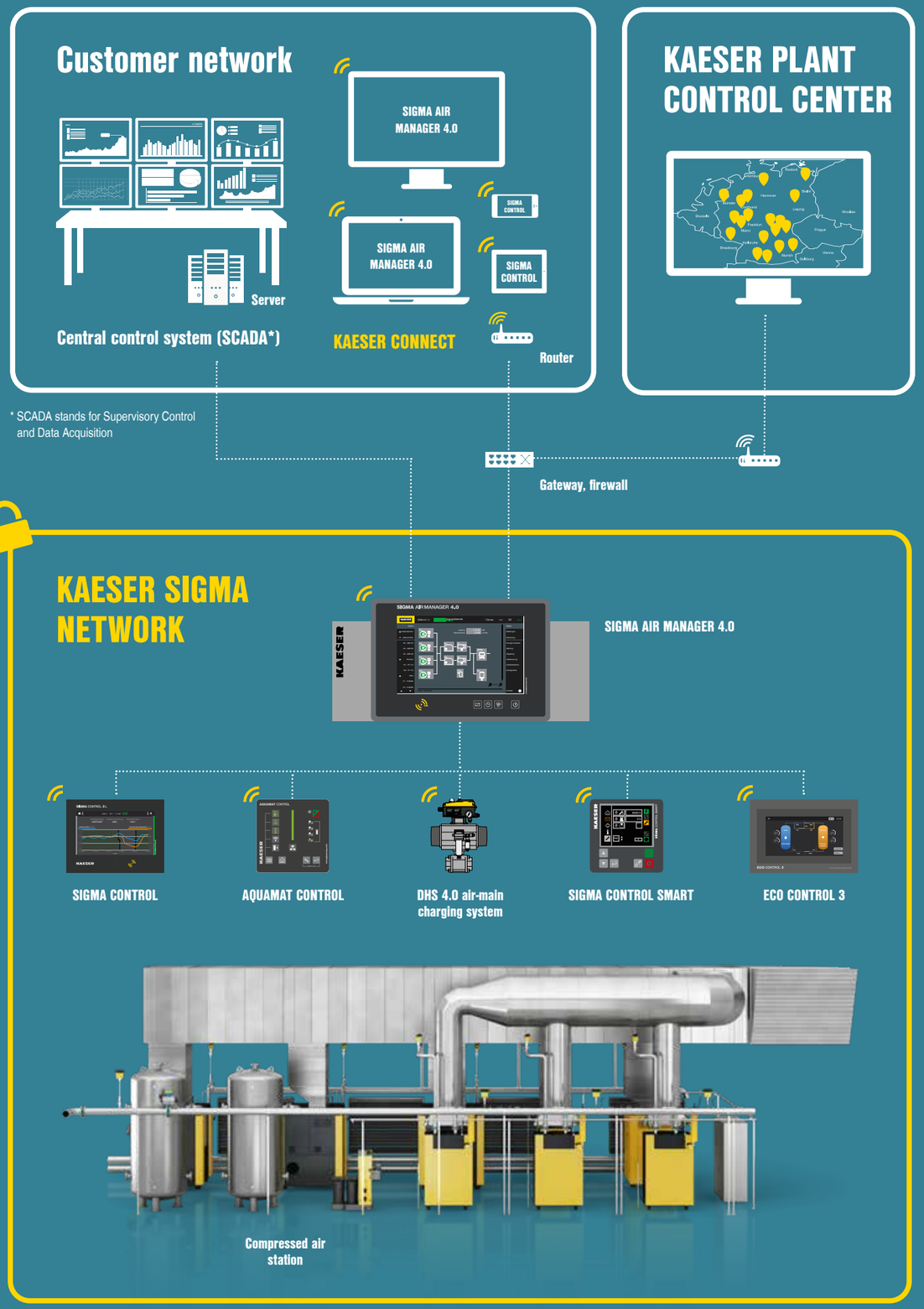
Simple energy optimisation assessment

Energy monitoring gives you insight into your energy flows – in real time. Effective energy saving has never been more straightforward.

Components (compressor, dryer)

Compressed air station

Compressed air distribution



Process data capture

Networking of all components for an efficient system

Capturing and analysing condition and performance data from a compressor makes predictive maintenance possible. Irregularities are detected early and, in the event of a fault, long-term data storage enables troubleshooting to be carried out.

Everything connected, everything in sight: with our KAESER CONNECT interface, you always have an eye on compressor health and every KPI for your compressed air station – in real time, on any device. This allows you to easily monitor the condition of your compressed air supply from a distance. Moreover, comprehensive reporting and simple data downloads support documentation and digitalisation.

Smart compressed air: KAESER is pioneering the networking of all components involved in compressor technology. In an optimally designed compressor station, the connection between decentralised intelligence (the component controller) and centralised intelligence (the SIGMA AIR MANAGER 4.0 master controller) creates the perfect preconditions for data exchange and subsequent evaluation. This makes it possible to analyse past undesirable incidents, forecast them into the future, and resolve them successfully.

Central intelligence: SIGMA AIR MANAGER 4.0 is the hub through which all data and parameters of the compressed air station flow. Transmitted via the secure KAESER SIGMA NETWORK, the compressed air management system has the following information available when needed: compressor operating data, faults, consumption patterns, cost-effectiveness of the complete compressed air system and connected peripheral devices, such as compressed air dryers, condensate drains and treatment systems, as well as ambient conditions and process data.

SCADA-compatible: the efficient system created by combining KAESER MEASUREMENT TECHNOLOGY with the SIGMA AIR MANAGER 4.0 acts not only as a centralised data collector – compressed air station data can be retrieved from the compressed air management system for up to one year – but also enables valuable data to be forwarded to an existing central control system. This can be achieved via standard interfaces.

In the absence of a central control system, the data can easily be sent by web server to conventional devices and visualised via a browser. This provides straightforward access to information such as compressed air consumption, energy usage, operating data, and faults – providing you with a continuous overview of your costs. Exporting data or generating reports for certification purposes is also simple and convenient.

SCAN

The combination of KAESER MEASUREMENT TECHNOLOGY with the SIGMA AIR MANAGER 4.0 compressed air management system forms a single, efficient unit. Scan the QR code for more information about this future-oriented **master controller**.

The foundations of product development

KAESER sets new standards when it comes to dependability, efficiency and sustainability. However, we are not satisfied delivering just that. Our products and services are continuously being optimised, with the objective of achieving ever greater energy efficiency, best possible compressed air availability and optimum cost efficiency for our customers. KAESER products are designed not only to be highly efficient during operation; energy consumption is also minimised as far as possible during the production process. When it comes to our own investments and purchasing, we prioritise the acquisition of energy-efficient products and services. KAESER innovations help to significantly lower energy consumption and reduce operating costs. They also contribute to the preservation of resources and the reduction of emissions. With our energy-efficient solutions, we help our customers to achieve their own sustainability and environmental protection goals.
True to the KAESER philosophy of “More compressed air for less energy”, our products not only operate with exceptional cost efficiency and eco-friendliness, but also minimise the use of valuable environmental resources throughout production, distribution, and service.

RETHINK

Think and rethink anew

Sustainable product development requires new approaches and ways of thinking.

KAESER provides targeted Design Thinking training for employees at the Hasso Plattner Institut, driving new and innovative approaches to product development.

RESEARCH

Develop knowledge

KAESER has continuously advanced its expertise in compressed air technology for over 100 years.

Today, cutting-edge simulation and calculation tools, together with the validation of prototypes, provide the basis for the acquisition of knowledge.

This in turn establishes the basis for a highly efficient, dependable and resource-friendly compressed air supply.

REDUCE

Reduce resource consumption

The highest resource consumption in compressed air technology occurs over long-term operation.

Accordingly, the compressed air supply must be as energy-saving as possible. For KAESER, efficiency is the ultimate goal.

REPAIR

Maintenance-friendly design

Maintenance-friendly design and repairability are evaluated and optimised by KAESER’s service technicians during the development process.

More compressed air for less energy

The world is our home

As one of the world's largest manufacturers of compressors, blowers and compressed air systems, KAESER KOMPRESSOREN is represented throughout the world by a comprehensive network of wholly owned subsidiaries and authorised distribution partners in over 140 countries.

By offering innovative, efficient and reliable products and services, KAESER KOMPRESSOREN's experienced consultants and engineers work in close partnership with customers to enhance their competitive edge and to develop progressive system concepts that continuously push the boundaries of performance and technology. Moreover, decades of knowledge and expertise from this industry-leading systems provider are made available to each and every customer via the KAESER group's advanced global IT network.

These advantages, coupled with KAESER's worldwide service organisation, ensure that every product operates at the peak of its performance at all times, providing optimal efficiency and maximum availability.

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ISO 14001:2015
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ISO 50001:2018
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