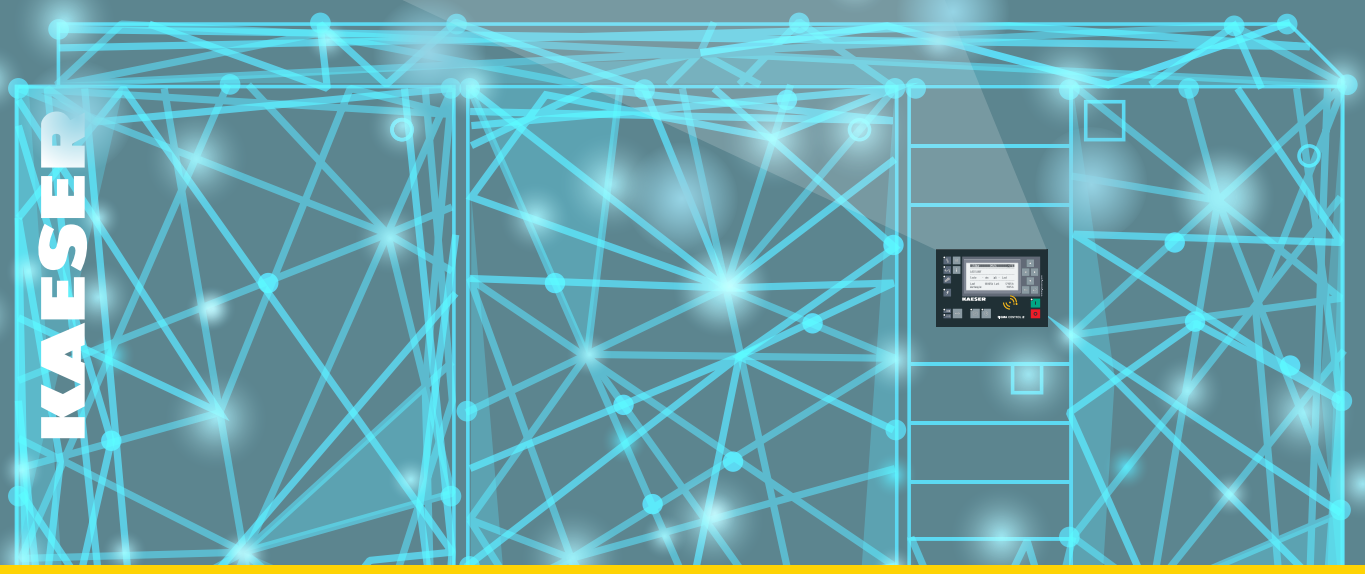
KAESER COMPRESSORS®





Compressor Controller

SIGMA CONTROL® 2
Integrated intelligence.

www.kaeser.com

SIGMA CONTROL® 2

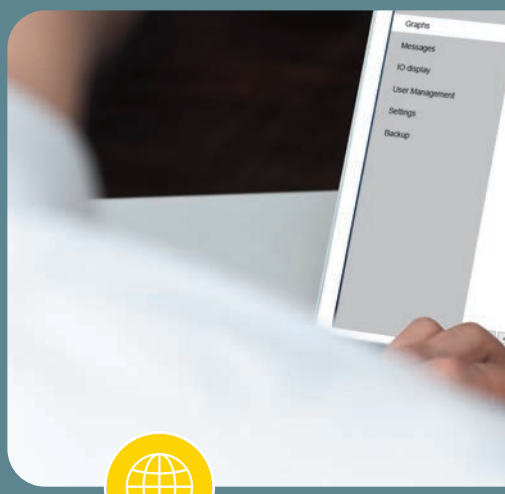
Integrated intelligence

The SIGMA CONTROL 2 control unit coordinates compressed air generation to the highest standards through constant monitoring and evaluation of all the relevant components and operating conditions.

Messages are available to the operator for evaluation directly from the readout display or, thanks to the integrated web server, simply and conveniently from any PC running a standard Internet browser. A multitude of communications functions are available, including the option of connecting the machine to a SCADA master control system, meaning that you can stay connected in any eventuality.

This intelligently-designed controller not only ensures that inefficient energy use is reliably avoided - particularly during partial load operation - but also proactively assists the operator in saving energy. Multiple adjustable compressor control modes, a timer and a base load sequencing function simplify operation and demonstrate the versatility of this remarkable control unit.

Tried and tested, future-proof and incredibly adaptable, the Industrie 4.0-ready SIGMA CONTROL 2 is ideally suited for operation with all KAESER rotary screw compressors, rotary screw blowers, reciprocating compressors, boosters and rotary lobe blowers. It ensures reliable and efficient operation of the machine whilst guaranteeing perfect interplay within the wider system. Multiple compressor units can be connected to and controlled by the SIGMA AIR MANAGER 4.0 master controller via the SIGMA NETWORK.







Rotary screw compressors with fluid-cooling



Oil-free compression rotary screw compressors



Rotary lobe blowers & vacuum pump packages



Image: Operating data can be accessed via web server



The control unit features an easy-to-read display and durable input keys; all relevant information can be viewed at a glance. User-friendliness is further enhanced by a logical menu structure and the ability to display data in any one of 30 selectable languages.

Software updates and operating parameters can be uploaded quickly and easily via the convenient SD card slot, minimising service costs. The SD card can also be used for long-term storage of key operating data.

The RFID interface integrated into the SIGMA CONTROL 2 is another important piece of innovation, enabling secure log-in for authorised personnel and our highly-qualified KAESER service technicians. This serves to safeguard the system, in terms of protection against operator liability, against any unauthorised changes or operation.

The aim of all these advantages is further to standardise servicing, thereby ensuring high quality standards and providing continuous quality assurance for service work.



Rotary screw blowers & vacuum pump packages



Reciprocating compressors



Boosters

SIGMA CONTROL® 2

What's on the inside - and what's in it for you.

No matter what the application may be, the benefits speak for themselves. The outstandingly versatile SIGMA CONTROL® 2 combines all of the features you could ask for in a compressor controller:

Long-lasting reliability

KAESER quality

We understand how the perfect controller should work.

Plug & work

Ready to operate in seconds

All-in-one, intelligent design.



Web server

Always up-to-date

The user interface keeps you constantly updated in real-time.

Data storage

Secure your data

All relevant messages and operational data are recorded.

Identify, analyse, react.

Masterful communication

Simple and versatile data exchange.

The essence of efficiency

Binds all the threads together

Effortlessly holds all models and variants firmly together in its grasp.



Exceptionally versatile

Perfectly matched

All components operating in harmony under one high-performance control unit.

Reliable

Continuous monitoring

Target-oriented sensors provide comprehensive monitoring of all key data.

Clear authorisation

Your security is our priority

You decide which changes can be made and by whom.

SIGMA CONTROL® 2

Rotary screw compressors with fluid-cooling

You can meet virtually any compressed air demand with fluid-injected rotary screw compressors from KAESER. We offer a huge selection of compressors in a wide variety of performance ranges, all of which stand out for their efficient operation and remarkable reliability. All models are equipped with our energy-saving SIGMA Profile rotors and the SIGMA CONTROL 2 controller for a long service life and outstanding energy efficiency.





Identify, analyse, react.

With its wide variety of communications interfaces, the SIGMA CONTROL 2 provides the ideal basis for a data exchange with master control systems. Connecting to the SIGMA AIR MANAGER 4.0 via the SIGMA NETWORK not only ensures that your compressed air system is perfectly matched to your requirements, but also allows you to take advantage of the SIGMA SMART AIR service.

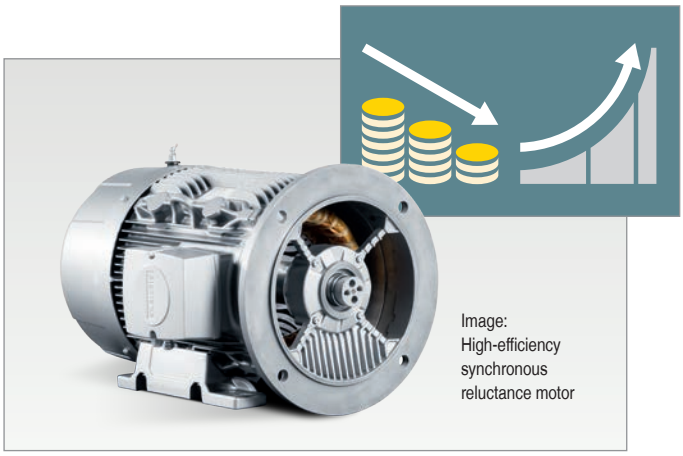
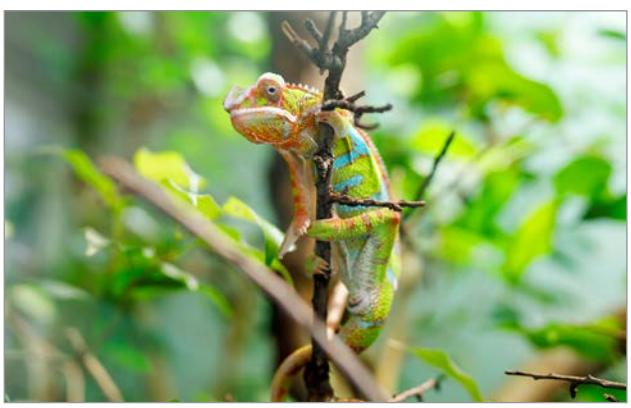


Image:
High-efficiency synchronous reluctance motor

A perfect fit with any drive type

Whether operating in the intelligent Dynamic mode, where the motor windings temperature must be monitored at idle, or in conjunction with a frequency converter and a synchronous reluctance motor, the SIGMA CONTROL 2 demonstrates its quality and guarantees efficient operation.





Intelligent and adaptable

Superior efficiency thanks to integrated functionality. For example, two machines can be connected to one another in Master/Slave operation, or in the case of add-on dryers, the energy-saving control ensures operation is perfectly adapted to your requirements.



The essence of efficiency

The SIGMA CONTROL 2 controller's numerous sensors and actuators work together perfectly. The innovative Electronic Thermal Management feature dynamically controls fluid temperatures in the system. Air inlet and compressor temperatures are monitored so as to activate when necessary the electronically-operated thermostatic control valve integrated into the refrigerant circuit. This also enables the operator to better match the heat recovery system to suit their specific needs.

SIGMA CONTROL® 2

Oil-free compression rotary screw compressors

Our two-stage oil-free compression rotary screw compressors are durable and clean-running for sensitive processes. Whether they are being used in the semiconductor, foodstuff or automotive industries, our two-stage dry-running compressors tirelessly prove that process-appropriate purity and cost-effectiveness really can go hand in hand – even under adverse conditions.

Uncompromisingly efficient, they offer high levels of energy efficiency thanks to their "Ultracoat" coating. Right from the outset, these versatile systems were designed for maximum ease of servicing. Fewer wearing parts and the use of premium-quality materials ensure reduced maintenance requirement, longer service intervals and extended service life.

Even when you have highly specialised requirements, KAESER will have a solution for you.





Efficiency as standard

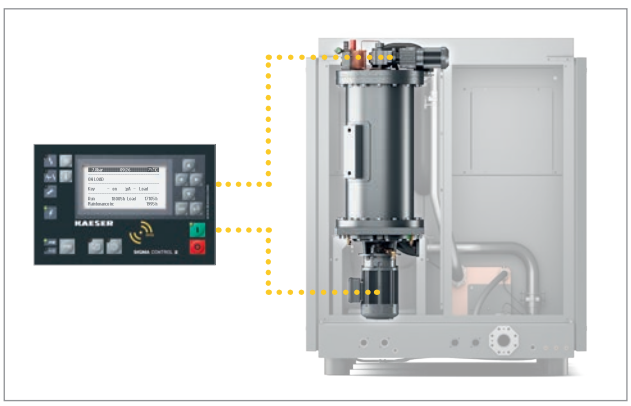
KAESER quality and expertise really count when it comes to those all-important overall system costs for asset investments, such as compressors or complete compressed air supply systems. Lowest possible compressed air costs and maximum availability can be guaranteed only through a combination of perfect interplay between energy efficiency and service/maintenance, and by viewing the compressed air supply system as a whole.

Up to
96%
usable for heating

Even more savings

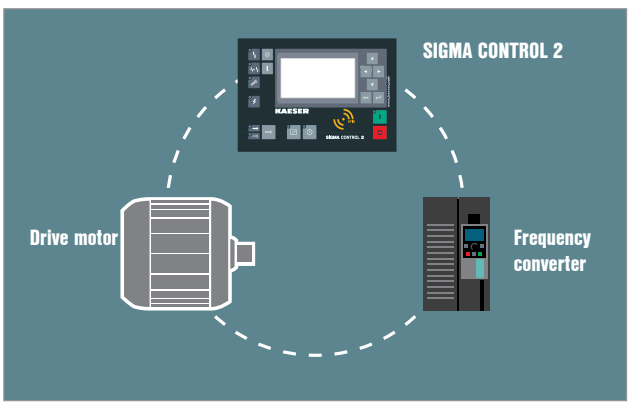
With the correct adjustments through the SIGMA CONTROL 2, even more energy can be saved. Amazingly, 100% of the electrical drive energy supplied to a compressor is converted into heat energy. Of that heat, up to 96% is available for heat recovery purposes. Compressor exhaust heat can be used to produce hot water with temperatures up to +90 °C, which can then be used for a wide range of applications.





Perfect performance

Operating with an integrated refrigeration dryer, or even the more demanding operation with a rotation dryer, pose no problem for the SIGMA CONTROL 2. The i.HOC rotation dryer's intelligent control ensures pressure dew point stability, even with fluctuating flow rates and at partial compressor load. When commissioned, the target pressure dew point is reached after just one rotation of the drum.



SIGMA CONTROL 2: Optimum efficiency

The combination of a perfectly-matched frequency converter, drive motor and controller allows an optimum level of efficiency across a broad operating range and also serves to minimise vibrations in the machine.
Moreover, the thermally-insulated control cabinet permits unhindered operation in ambient temperatures up to +45 °C.

SIGMA CONTROL® 2

Rotary lobe blowers and rotary screw blowers

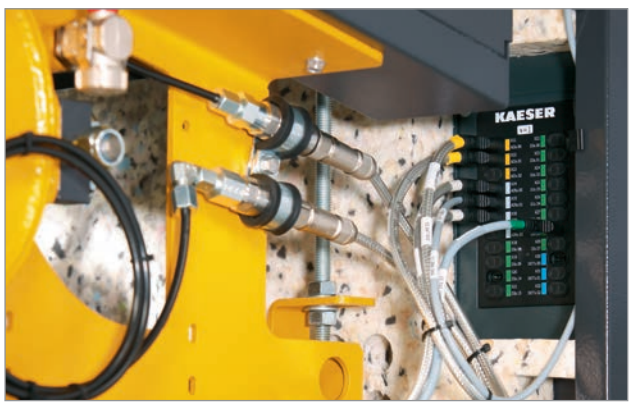
Intelligently designed, compact and ready for immediate operation, KAESER blowers are conceived specifically to meet demanding operating conditions. An integrated controller results in considerable savings in terms of planning, installation, commissioning, data communication and certification. Our blowers are characterised by their simple commissioning and maintenance procedures, as well as their outstanding levels of efficiency and reliability.





The blower controller

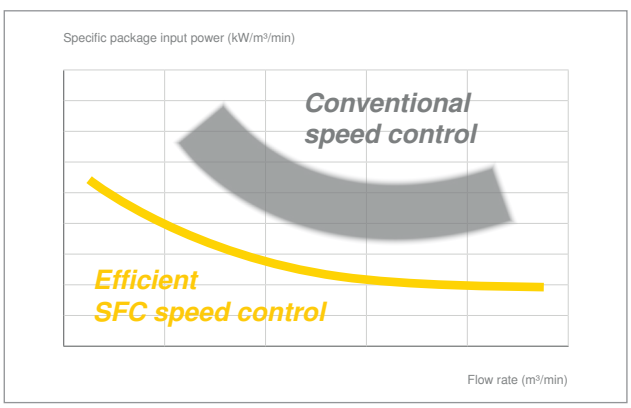
The SIGMA CONTROL 2 ensures efficient blower control and system monitoring. Numerous interface options enable quick and easy communication, allowing messages or setpoints and actual values for process variables to be easily connected and displayed. The SIGMA CONTROL 2 supports connection to all of the communications technologies in common use today. In the event of a fault, the controller switches over to manual operation whilst keeping the process in operation.



Comprehensive sensors

A wide range of sensors and switches continuously monitor pressure, temperature, speed, oil level and filters so as to ensure reliable operation of the blower and to allow remote monitoring and visualisation of the operational status. In keeping with our motto of “Plug and play”, they constitute a complete package, expertly coordinated by the SIGMA CONTROL 2 controller.





Optimised specific power

The blower block or airend plays a pivotal role in ensuring outstanding energy efficiency. This it achieves through seamless interplay with the other perfectly-matched components in the system, all expertly conducted by the SIGMA CONTROL 2 blower controller. The moderate maximum speed, the extra-dense screw profile and the near-constant specific power across a wide, variable-speed control range all combine to achieve significant energy savings at every point throughout the operating curve.



Clear authorisation

The large display and RFID reader provide easy communication and maximum security. The integrated RFID interface ensures secure login for all authorised personnel, without any need for passwords. This ensures that settings and other parameter changes on the machine may only be carried out by authorised persons.

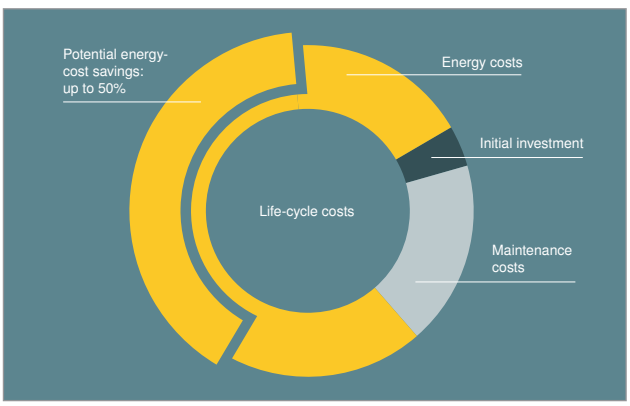
SIGMA CONTROL® 2

Boosters

Targeted operation in high-pressure applications for greater efficiency. This complete system has it all: our latest generation of KAESER boosters has been comprehensively revised inside and out. The new component layout not only ensures optimised cooling air flow, but also provides improved maintenance access.

Moreover, the updated SIGMA CONTROL 2 controller offers multiple new monitoring and control options with numerous interfaces – including for connection to master controllers – with dynamic control.





Energy efficiency: the essential requirement

A KAESER compressor is a purchase for life – a decision that we want you always to look back on with satisfaction. With this in mind, we put all of our energy and passion into the development of our machines and the selection of our components, so as to ensure that you are buying the very best equipment that the market can offer. The SIGMA CONTROL 2 is designed to deliver the most efficient control and monitoring of compressor operation possible.



All-round reliability

The integrated SIGMA CONTROL 2 controller automatically monitors the following key values: initial and final pressure, discharge temperature of the individual cylinders, drive motor windings temperature, oil pressure/level, compressed air discharge temperature, compressor and control cabinet fans, and status of maintenance doors (open/closed).





Operating data storage and web server

The SIGMA CONTROL 2 stores all relevant messages in its event history and retains operating data for one year. This greatly simplifies the diagnostics process for precision service and maintenance work. The user interface displays machine status in real-time, signals from the analogue and digital inputs, and the remaining maintenance hour counter. It also lists warning/alarm messages and graphically displays pressure, temperature and speed trends.



"Plug & work" complete systems

Our boosters are delivered as complete turnkey systems, precisely matched to your requirements. Thanks to the pre-configured SIGMA CONTROL 2 controller, they are ready for connection and self-monitoring – a huge advantage for keeping installation work and costs to a minimum. KAESER is therefore the first manufacturer in the booster sector to offer such user-friendly complete solutions, all neatly contained within one compact enclosure.

SIGMA CONTROL® 2

Reciprocating compressors





Maintenance hours equalisation

Two machines, either identical or of different types, can communicate with one another via Ethernet and so balance out their operating hours automatically through changeover switching operations. The SIGMA CONTROL 2 can distinguish independently between fixed and variable-speed systems.



Long-term reliability

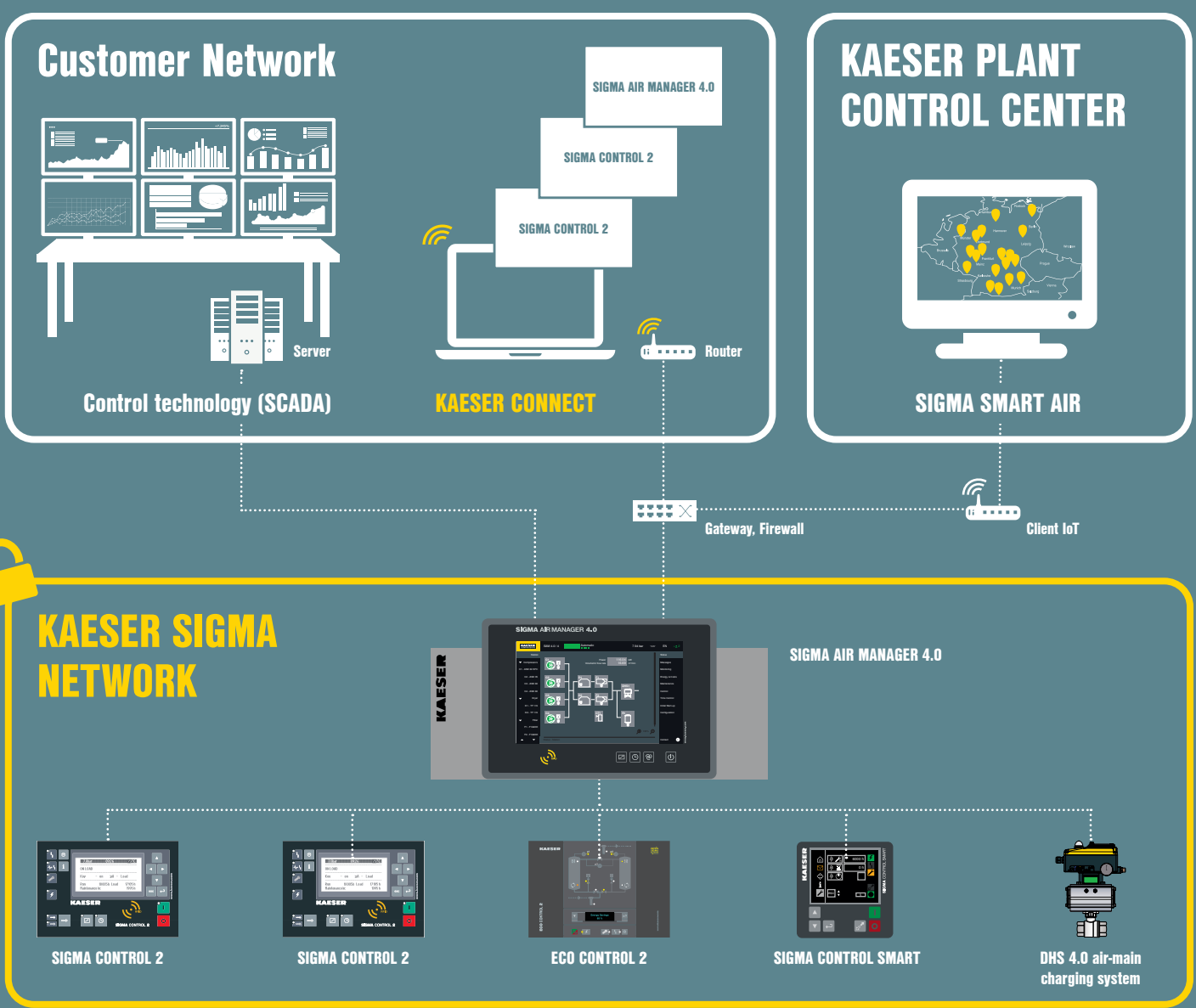
The world-renowned KAESER quality permeates throughout the whole system, from the overall design to its individual components, the workmanship and the long-term durability of both machine and processes. This indisputable quality is clearly demonstrated in features such as durable rotor bearings, robust power transmission, precision-dimensioned drive motors, torsion-free sound enclosure with intelligently-designed cooling air flow and, last but not least, the SIGMA CONTROL 2 machine controller with its efficient and dependable operation.

SIGMA CONTROL® 2 and
SIGMA AIR MANAGER® 4.0

Perfect interplay



The SIGMA AIR MANAGER 4.0 is the core of the SIGMA NETWORK and KAESER's key technology for Industrie 4.0. As the central mastermind, it controls the entire compressed air supply system and matches operating behaviour perfectly to your requirements. The key innovation here is the algorithm in the adaptive 3-D^{advanced} Control, which orchestrates perfect interplay of all components within a KAESER compressed air system. As a result, exactly the right amount of compressed air is delivered to suit the specific needs of the application, thereby assuring maximum energy efficiency at all times. This unique system continuously analyses the relationship between various parameters (e.g. switching and control efficiency), and predictively selects the most efficient switching operations. Not only are starts and stops taken into consideration, but so too are idling and frequency converter losses, along with pressure flexibility. All of the different elements in the system are always operated with maximum energy efficiency in mind and the pressure performance of the compressed air system is optimised so that average pressure is reduced. The KAESER SIGMA NETWORK allows the connection not only of KAESER products — virtually any system and components can be integrated into it via the available interfaces.



SIGMA CONTROL® 2

Function keys in detail

Acknowledge key – confirms alarm messages and, when permitted, resets the alarm memory.

Info key – access to current event information.

Alarm icon – Red LED – indicates 'Compressor alarm'. Compressor is shut down on alarm.

Communication alarm icon – Red LED – indicates 'Data communication to other systems interrupted or faulty'.

Maintenance icon – Yellow LED – indicates 'Maintenance due' or 'Maintenance counter expired' or 'Warning'.

Power ON icon – Green LED – indicates 'Main switch ON, mains and supply voltage present'.

Load icon – Green LED – indicates ‘Compressor on load, air being supplied’.

Idle icon – Green LED – indicates ‘Compressor running, no air supply’.

Clear and intuitive operation of all products via the menus.



Idle mode key switches the compressor from load to idle.



UP key – moves the cursor on the display upwards.

DOWN key – moves the cursor on the display downwards.

RIGHT key – moves the cursor on the display to the right.

LEFT key – moves the cursor on the display to the left.

Escape key – returns to next highest menu level.

Return key – initiates jump to next sub-menu or accepts values.

ON key – Green LED – switches the compressor ‘ON’ -> automatic self-control operation. LED indicates ‘Compressor ON’.

OFF key – switches the compressor "OFF".

Remote ON key – Green LED – switches remote control mode ‘ON’ and ‘OFF’.

Timer ON/OFF key – Green LED – activates / deactivates the set timer function.

Equipment

Control systems

- Modular design comprising control unit, input/output modules, network components and web server
- Central intelligence core for individualised operation
- "Traffic light" LEDs indicate operational status
- Plain text display
- 30 selectable languages
- Fully automatic monitoring and control
- Dual, Quadro, Vario and Dynamic control modes as standard, manual or external speed settings, control of process variables via setpoint/actual value input, integrated PI controller
- Timer
- Base load sequencing function for connection of two compressors in Master/Slave operation

Operating modes

- Plain text display of operating data
- Monitoring of operating modes
- Comprehensive range of sensors for continuous monitoring of pressure, temperature, speed, oil level and filters
- Process data-logging
- Message history display for warning and alarm messages
- Web server with remote display of operating data

Hardware

- Advanced processor hardware
- All components designed for industrial operating conditions
- Graphical display: graphs showing pressure and compression temperature
- LED indicators and tactile membrane keys
- Real-time clock with battery back-up
- Precision electronic pressure transducer

Control cabinet

- Dust & water-resistant, IP 54
- Input/output modules with confusion-free plug-in connectors for the signal sensor connection cable
- Terminal strip for additional floating contacts

Interfaces

- SD card slot for updates and long-term storage of operating data
- USS bus for frequency converter
- RFID reader
- Ethernet for connection to the SIGMA NETWORK, Master/Slave operation or web server for KAESER Connect
- Slot for communications modules

Certification

- CE
- cULus
- EAC
- RoHs
- WEEE2
- RED/EMC
- International radio certification

  (FCC, IC, MIC/KS and RCM)
- Optional marine certification

  (DNV GL, ABS, LRS, RINA)

Web server

Control panel and menu structure visualisation, e.g. event history and display of graphs

Options / accessories

Plug-in communication modules for: Profibus DP-VO, Modbus RTU, DeviceNet, Modbus TCP, PROFINET IO, EtherNet/IP

Functional overview

Model	Used in	Selectable control modes Functions	Web server	Connection to SIGMA AIR MANAGER 4.0	Plug-in communication modules	Marine certification
SIGMA CONTROL 2	Rotary screw compressors with fluid-cooling	●	●	●	○	●
	Oil-free compression rotary screw compressors	●	●	●	○	●
	Rotary lobe blowers	●	●	●	○	●
	Rotary screw blowers	●	●	●	○	●
	Boosters	●	●	●	○	●
	Reciprocating compressors	●	●	●	–	–
SIGMA CONTROL 2 optional for small units	Rotary screw compressors with fluid-cooling	●	●	●	–	–

[1] Dependent on compressor size ● Standard ○ Option

Detailed, customer-tailored planning

Using data gathered by KAESER's unique AIR DEMAND ANALYSIS 4.0 (ADA 4.0) technology, the KAESER ENERGY SAVING SYSTEM 4.0 (KESS 4.0) can provide a comprehensive analysis of your operating data for optimal configuration of your compressed air system. KAESER-designed systems guarantee exceptional efficiency and availability.

By allowing us to individually tailor equipment sizes and operating modes to the specific needs of your application, you will benefit from unrivalled energy efficiency and security of supply. Use our expertise to your advantage, by letting KAESER design your complete compressed air system!



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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