Compressed Air Management System

SIGMA AIR MANAGER® 4.0

Key technology for Industrie 4.0

Compressed air station core intelligence

www.kaeser.com

SIGMA AIR MANAGER® 4.0

Optimum efficiency

Adaptive, efficient and networked: demand-oriented compressed air management takes on a whole new meaning with the SIGMA AIR MANAGER 4.0. This advanced master controller coordinates operation of multiple compressors, as well as dryers or filters, with exceptional efficiency.

The patented, simulation-based optimisation process calculates future demand based on past compressed air consumption profiles.

Decisions are no longer dictated by a narrow pressure range, but rather by comprehensive energy efficiency optimisation. Saving energy has never been so easy.

Thanks to networking of all compressed air station components via this intelligent master controller and the secure KAESER SIGMA NETWORK, comprehensive monitoring, energy management and predictive maintenance are possible.

This not only minimises downtime, but also maximises manufacturing efficiency.

Monitoring and reporting

The SIGMA AIR MANAGER 4.0 enables comprehensive compressed air station monitoring through the recording, archiving and visualisation of operating data. Complete station parameter tracking means that faults can be detected early on and rectified immediately. Moreover, the SAM 4.0 actively supports energy management in accordance with ISO 50001. The necessary figures and data are automatically output, evaluated and made available as a report.

Availability and maintenance

The SIGMA AIR MANAGER 4.0 provides active support for organisation of service activities. Compressed air station operating data are recorded and processed centrally, which ensures a permanent overview of system maintenance status. Service intervals can therefore be planned and optimised from a future-forward perspective. In addition, all plain text messages from the connected compres-

sors can be viewed in the message history, making it easy to track system status at any time.

Networking and communication

The SIGMA AIR MANAGER 4.0 enables complete compressed air station digitalisation. As the central node point, it connects all station components via the secure KAESER SIGMA NETWORK. Operating data are collected centrally and can be integrated into the existing control technology. The advantage? Information is exchanged in real-time to assure continuous energy and cost optimisation combined with seamless production flow.

Capacity and utilisation

The SIGMA AIR MANAGER 4.0 is designed to grow with your compressed air station. A simple software upgrade allows expansion of the master controller without the need for additional investment in new hardware. Therefore, with a software upgrade, a SAM 4.0 initially capable of controlling only up to four compressors can be updated to control up to eight, or even sixteen, compressors. Accordingly, capacity can easily be adapted to suit actual requirement.

User-friendly operation

Advanced, capacitive touch technology, offset supplementary keys and durable LED illumination make the SIGMA AIR MANAGER 4.0 an exceptionally user-friendly tool, and not just on the haptic level, but also on a global one, since it supports 34 languages.

SIGMA AIR MANAGER® 4.0

What's on the inside. What's in it for you.

Upgrade your compressed air station

Future-dynamic: SIGMA AIR MANAGER 4.0 grows with you.

A simple software upgrade is all that's required to expand your compressed air station to meet future demand. Software updates ensure constant optimisation.

KAESER SIGMA NETWORK

All components securely networked.

All of the compressor station's components can be seamlessly integrated into the KAESER SIGMA NETWORK.

Adaptive 3-D^{advanced} Control

Optimum efficiency.

With the patented simulation-based optimisation process, you can achieve the most efficient performance solution from various potential options. The result? More compressed air for less energy.

KAESER SIGMA SMART AIR

All-round carefree service package.

A unique combination of remote diagnostics and service ensures supply dependability and significant cost savings.

RFID card

Secure login.

The integrated RFID interface ensures secure login for authorised personnel – without the need for passwords.

Live P&I diagram

Everything at a glance.

Your entire compressed air station represented as a flow diagram on a 12-inch display, or on your computer and network-compatible devices.

Industrie 4.0

Communication & data exchange in real-time.

The SIGMA AIR MANAGER 4.0 master controller allows KAESER to take full advantage of the very latest digital information technology and provides complete component networking capability. The advantage: real-time data exchange for continuous optimisation of energy and costs, combined with seamless production flow.

Energy management as per DIN EN ISO 50001

Your energy report quickly and easily.

The SIGMA AIR MANAGER 4.0 is your perfect partner for operating data storage and provides data in accordance with DIN EN ISO 50001.

Variable bus communication

All common interfaces.

All common interfaces are available with the help of the optional plug-in communication module.

Always connected with KAESER: Yesterday – Ethernet IP, Today – OPC UA. We have tomorrow's needs covered too.

Thanks to Plug & Play, the future is just a plug-in connection away.

KAESER CONNECT

Operation, consumption and cost overview. Anytime, anywhere.

All operational and energy consumption data, as well as cost information, can be called up on any network-compatible device anytime, anywhere.

SIGMA AIR MANAGER® 4.0

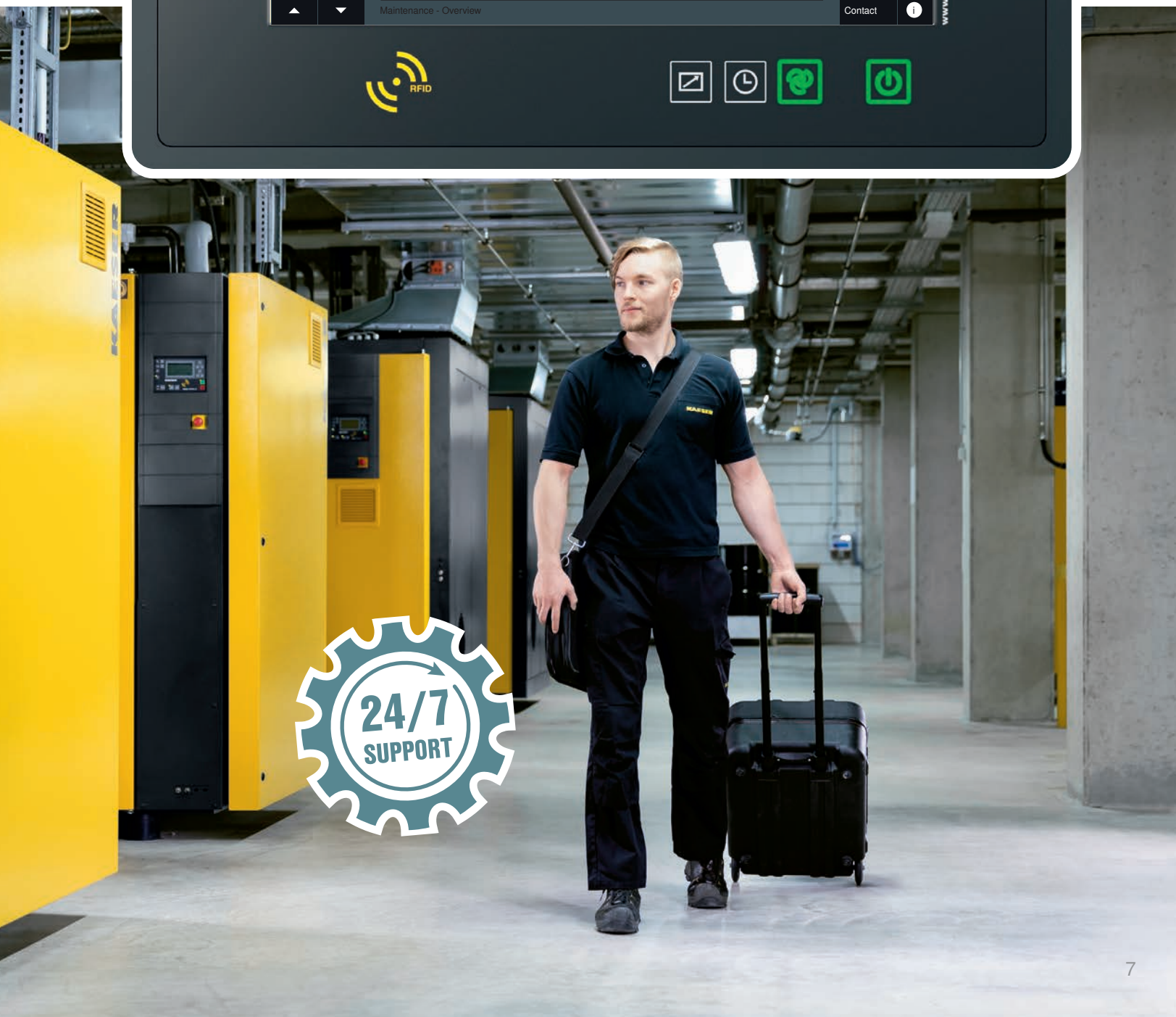
Maintenance / availability

In order to simplify system maintenance, the SIGMA AIR MANAGER 4.0 menu has been expanded to include a “Maintenance” section. This new function allows you to view the maintenance hours counters for the compressors. Counter readings can be called up live, or sent by means of an automatically generated report.

This facilitates predictive planning of maintenance tasks, for a time convenient to your processes. The SIGMA AIR MANAGER 4.0 always loads compressors within a maintenance group evenly, which also has the beneficial effect of ensuring that the maintenance hours for the corresponding systems are evenly distributed. This means that maintenance can be performed on these systems on the same day, or as one job. Maintenance measures can therefore be planned more easily and can be scheduled for non-operating times.

Furthermore, all plain text messages for compressors connected via the SIGMA NETWORK can be viewed in the message history, making it easy to track system status at any time.

SIGMA AIR MANAGER 4.0
KAESER COMPRESSORS
SAM 4.0 / 4
Mode manual
7.95 bar
EN
Station
Compressors
C1 - ASD 60 SFC
C2 - ASD 35
C3 - ASD 60
C4 - ASD 60
Dryer
D1 - TF 174
D2 - TF 174
Filter
F1 - F184KE
F2 - F184KE
Oil filter in 450h 3000h
Air filter in 150h 3000h
Oil separator in 33h 3000h
Belt/coupling inspection in 66h 35000h
Oil change in 112h 3000h
Electric equipment in 277h 36000h
Bearing lube in 527h 36000h
Valves in 2500h 36000h
Bearing change in 2527h 12000h
Group maintenance in 7058h 8550h
Estimated due date for next service measure:
25.12.2020
Maintenance - Overview
Status
Messages
Monitoring
Energy & Costs
Maintenance
Control
Time Control
Initial Start-up
Configuration
Contact
www.kaeser.com
RFID


24/7
SUPPORT

SIGMA AIR MANAGER® 4.0

Energy costs and reporting

Systematic energy management increases the efficiency of the entire compressed air station, thereby reducing both energy consumption and the associated greenhouse gas emissions. This maximised efficiency is reflected in minimised costs.

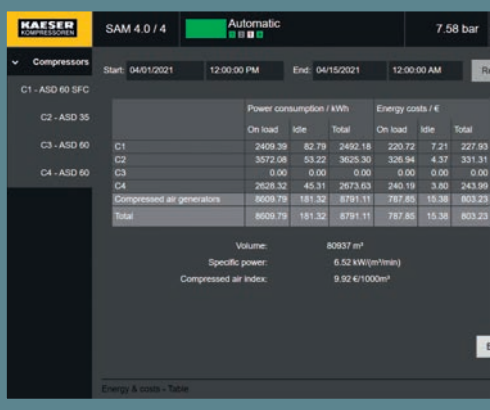
The SIGMA AIR MANAGER 4.0 from KAESER KOMPRESSOREN records, archives and processes the station's operating data and actively supports you with your energy management activities as per ISO 50001. The required key figures – such as delivery volume, specific package input power and energy consumption – are automatically provided at a freely selectable time interval. This enables comprehensive energy performance analysis.

Evaluation of the collected data is sent to a mobile phone, laptop or tablet for browser-based viewing. The SIGMA AIR MANAGER 4.0 automatically creates the reports required for ISO 50001 certification, thereby providing comprehensive documentation relating to energy savings.

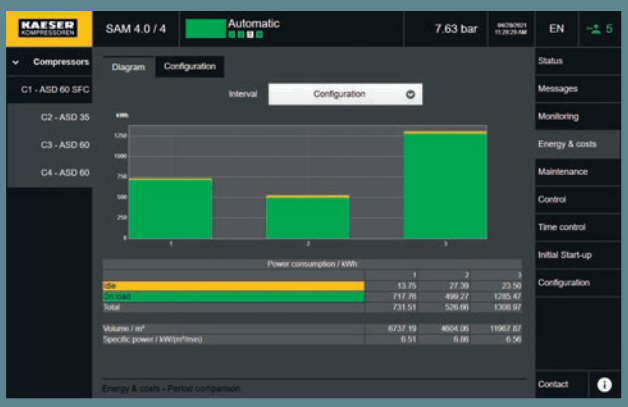
The reports are directly available via KAESER CONNECT and it is also possible to have all relevant information automatically sent to you by email. Furthermore, the CSV data download guarantees individual subsequent processing of the measurement data.

Energy data at a glance

Data preselection allows you to view all key information quickly and easily.

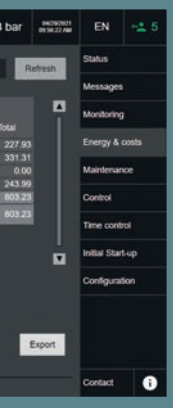


Accessible anytime, anywhere via KAESER CONNECT.



View time periods individually

Would you like to compare individual days, weeks or any period of time? No problem – the SIGMA AIR MANAGER 4.0 takes care of it.



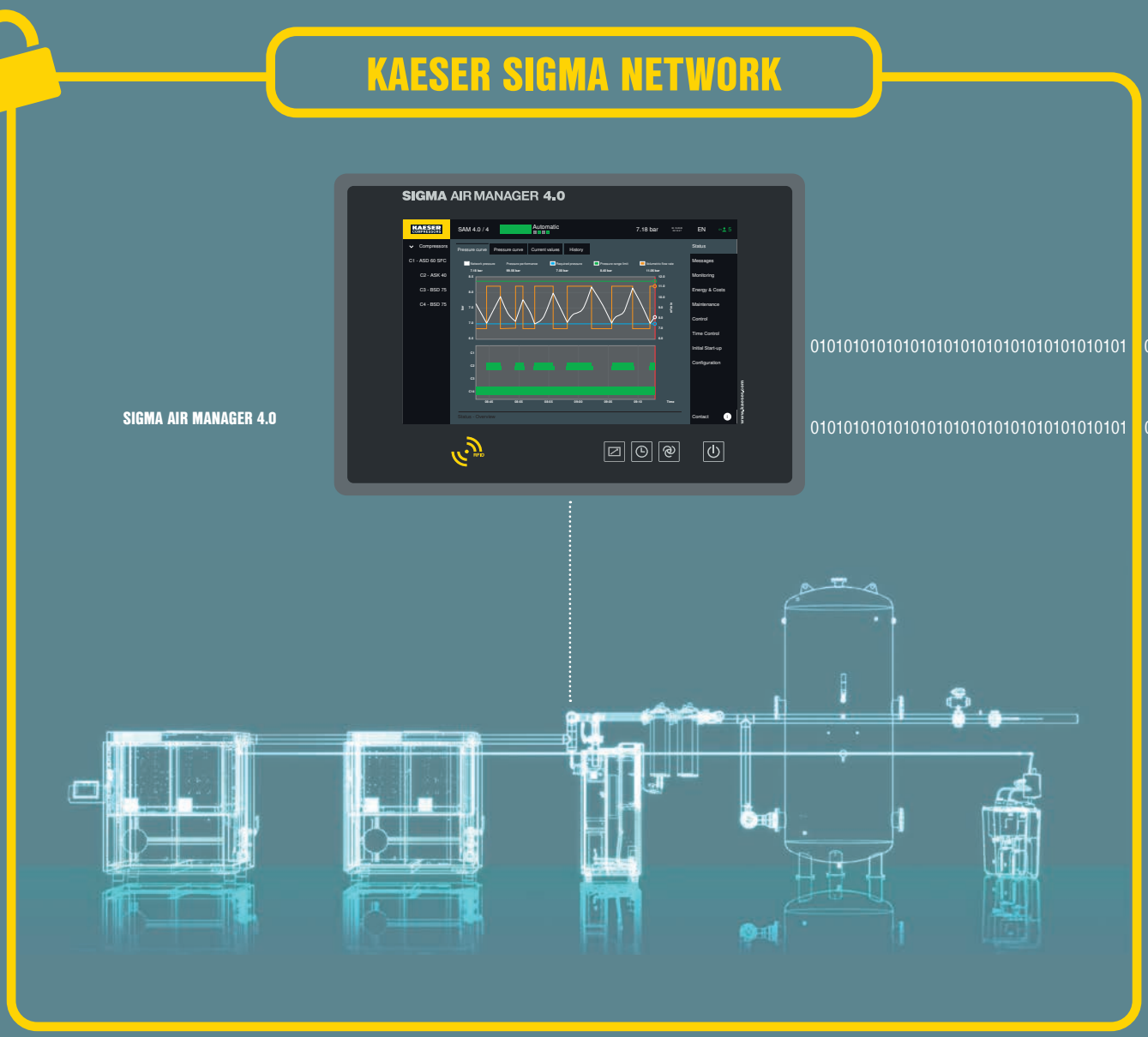
Priorities in focus

Clear menu layout ensures intuitive navigation to provide a comprehensive overview of your compressed air system with maximum ease.

Data processing

Tailored range of services

Tailored to your exact needs, the SIGMA AIR MANAGER 4.0 from KAESER includes everything you need for smooth and efficient operation of your compressed air station.

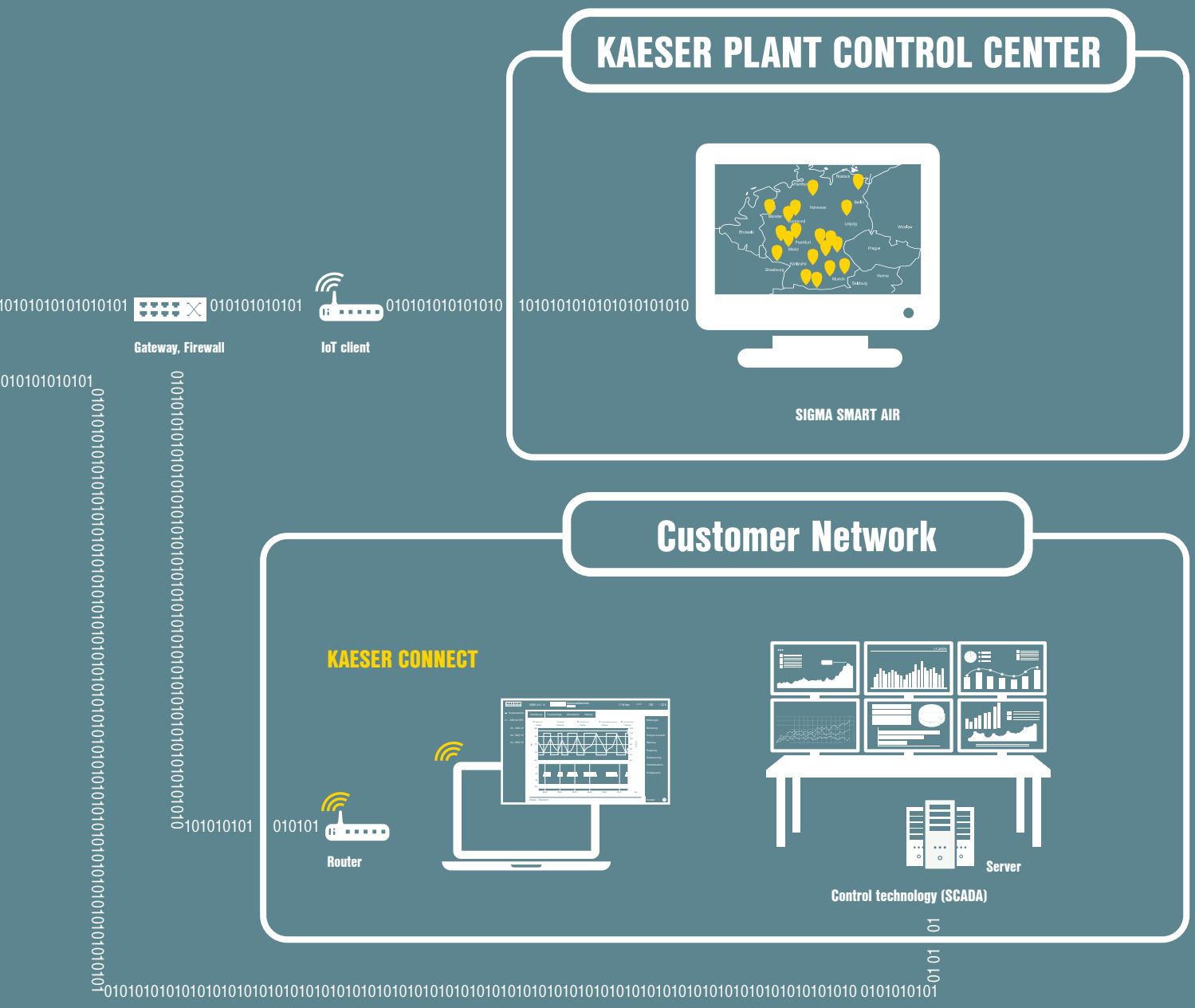


SIGMA AIR MANAGER® 4.0

Communication / networking

Compressed air station digitalisation enhances efficiency and increases reliability. Because all station components are in constant communication with one other, any performance deviations can be detected at an early stage and be addressed as necessary. The SIGMA AIR MANAGER 4.0 connects every component within the compressed air station – including external components – via the secure, IP-based KAESER SIGMA NETWORK.

As the central node point, it gathers the individual operating data and forwards them to mobile phones, laptops or tablets for browser-based viewing via KAESER CONNECT. This not only provides you with comprehensive station monitoring, but also enables operating data to be integrated into existing control technology. Flexible interface modules ensure easy on-site plug and play connection, which means that you always have excellent oversight of your production process and can react in good time as needed.


KAESER PLANT CONTROL CENTER
SIGMA SMART AIR
Gateway, Firewall
IoT client
Customer Network
KAESER CONNECT
Router
Server
Control technology (SCADA)

kW
m²/min
m²
t CO2

SIGMA AIR MANAGER 4.0 – Optimisation process

Go yellow, be green

Today, master controllers are expected to do far more than just take care of demand-oriented compressor operation. **Efficiency** is playing an ever-increasing role – the days of rigid, inflexible rules are over. Fixed switching sequences can no longer be implemented in an energy-optimised manner to meet ever-changing demand requirements, since every fixed rule in an algorithm limits the controller's flexibility and reduces its degree of freedom to act.

Analyse and learn

The simulation-based optimisation process analyses compressed air system status with complete objectivity. In so doing, it learns what key factors influence the performance of the station and its components.

Action, not reaction.

Apply knowledge, don't waste it.

Progress throug

Monitor and record

Monitoring and recording of the compressed air consumption profile, together with associated switching operations, make predictive operation possible.

Simulat evalu

By running limitless energy demand is ev in a cost-oriented m fixed set of rules no lo strategies are used in imum efficiency is a

Way ahead of its time.

Take full advantage of action options

Projections for the future can be created through the combination of unlimited available action options and learned technical and systemic behaviour.

ough innovation.

Think first, then act energy-efficiently.

Know what needs to be done.

late and aluate

ess future simulations, s evaluated and handled d manner. The ties to a o longer apply. Switching d in such a way that max- s achieved at all times.

Implement optimisation

The simulation-based optimisation process operates the compressed air system individually and efficiently in real-time, based on specific package input power – according to every need.

By monitoring and recording past compressed air consumption patterns, projections for future demand can be derived. On the basis of this demand projection, the technical conditions of the components and the learned knowledge regarding the system and its behaviour, the patented simulation-based optimisation process is used to anticipate the **most efficient switching operations**.

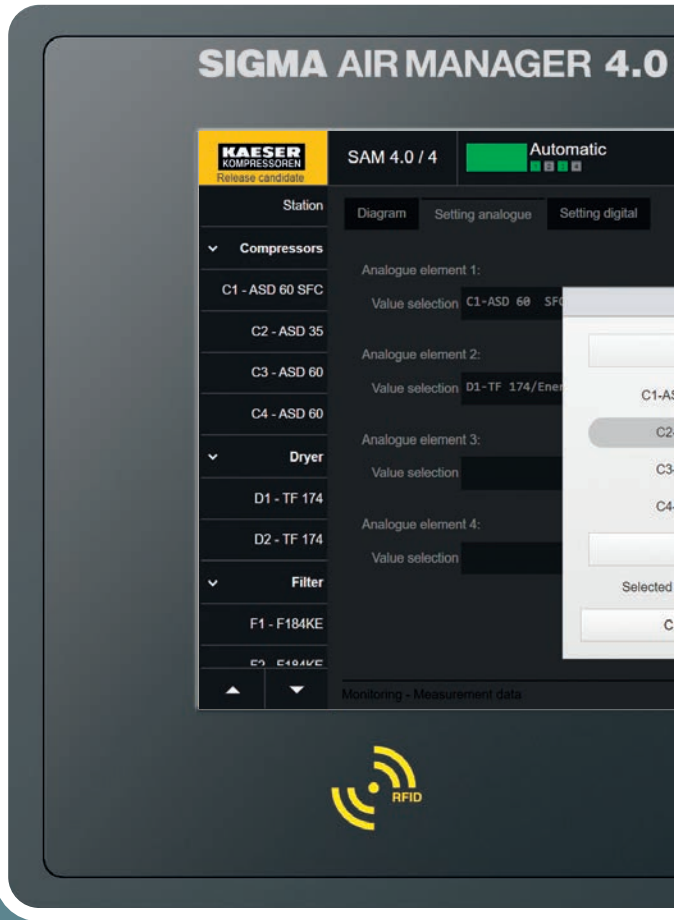
Action, not reaction: decisions are no longer dictated by a narrow pressure band that must be adhered to. Rather, they are determined exclusively by the pursuit of achieving lowest possible compressed air production costs – whilst maintaining the specified demand pressure and maximum pressure. True to our motto: **"More compressed air for less energy".**

SIGMA AIR MANAGER® 4.0

Monitoring

Comprehensive monitoring of your compressed air station saves you both time and money, since any deviation that remains undetected can quickly become an issue. Even small changes can result in increased energy consumption and higher maintenance costs.

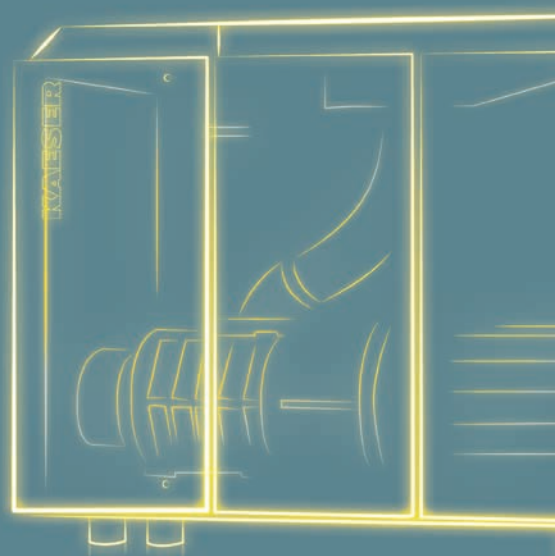
The SIGMA AIR MANAGER 4.0 from KAESER KOMPRESSOREN records, archives and visualises the operating data for every component in the compressed air station that is connected to the SIGMA NETWORK. This enables comprehensive monitoring of station parameters, both in real-time and over an extended period. The ability to export measurement values as a CSV (Comma-Separated Values) file makes evaluation simple.

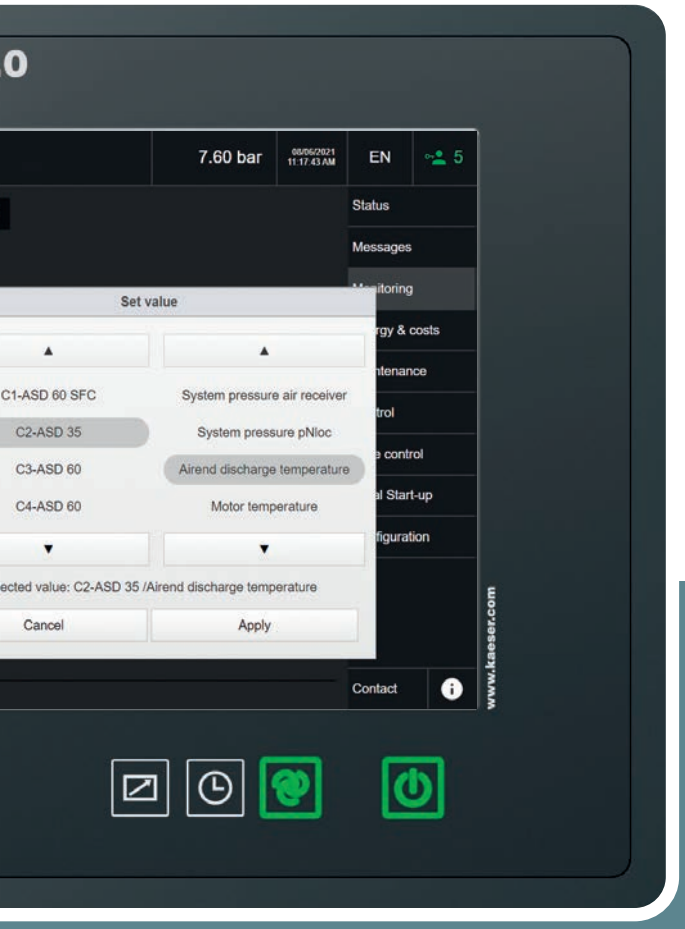


Display of possible fault messages

Forwarding to browser-based devices

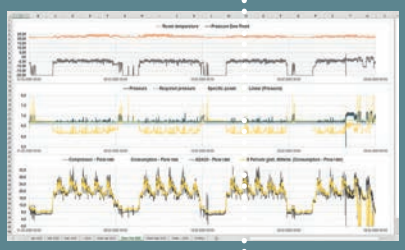
Compressed air station monitoring





Fault messages can be sent to a laptop, mobile phone or tablet for browser-based viewing. This allows any faults to be identified in good time and resolved immediately, ensuring efficient and reliable compressed air station operation.

Export of measurement values as a CSV file



Analysis of measurement values

Easy-read 12-inch colour display

Durable, easy-to-use touchscreen

Advanced, capacitive touch technology, offset supplementary keys and durable LED illumination make the SIGMA AIR MANAGER 4.0 an exceptionally user-friendly tool, and not just on the haptic level, but also on a global one, since it supports 34 languages.

1) Status

- Overview: pressure curve information, pressure display, current values, history
- Manual preselection: select/deselect station participants
- Sources: normal, manual or external parameters
- Station: display of your system in the P&I diagram, measurement values, status details, running hours and serial data

2) Messages

- Display of “unacknowledged” messages
- Display of “current” messages
- Display of history (all messages)

3) Monitoring

- Compressed air consumption
- Specific package input power
- Measurement data
- Data export

4) Energy & costs

- Energy consumption/costs of the compressed air generator
- Energy cost diagram
- Energy and costs in self-defined time-frame comparison
- Tariff configuration
- Report: Send a report to a freely definable email address at a freely definable interval, e.g. key energy management figures as per DIN EN ISO 50001

5) Maintenance

- Overview and individual display of the maintenance hours counters
- Message history via KAESER SIGMA NETWORK
- Maintenance management/groups
- Report: send a maintenance report to a freely definable email address

6) Control

- Pressure control settings
- Pressure monitoring settings

7) Time control

- The compressed air station can be controlled via an integrated timer. 99 switching points are available. A timeline provides an overview of tasks.

8) Commissioning

- Overview of all SIGMA NETWORK inputs and outputs
- Overview of all compressors connected via PROFIBUS and all PBUs (Profibus I/Os)
- Overview of all connected compressors with SIGMA CONTROL 2 via SIGMA NETWORK
- Update to most current software version
- Importing an expanded/customised compressed air station configuration
- Saving of setting data, event history and log files on SD card
- Information and settings for connection to control technology

9) Configuration

- SIGMA AIR MANAGER 4.0 serial data
- Interface settings
- Email settings
- Date, time, language
- User management
- Display settings, key lock
- Language and unit settings

10) Contact

Contact details

11) i-Button

Online operating instructions can be called up via the i-Button.

12) Component-specific information and settings

- Serial and performance data
- Characteristic curves and control behaviour
- Individual maintenance counters

SIGMA AIR MANAGER® 4.0

Technical specifications

	SIGMA AIR MANAGER 4.0 - 4	SIGMA AIR MANAGER 4.0 - 8	SIGMA AIR MANAGER 4.0 - 16
Controller and control modes			
Adaptive 3-D^{advanced} Control	Standard		
Flow rate control	Optional		
Possible air system interconnections			
Total number of controllable compressors/blowers	4	8	16
Compressors with SIGMA CONTROL 2 via SIGMA NETWORK	4	7	7
SNW ports RJ 45	Standard (7 ports, optionally expandable)		
SNW ports RJ 45 / FOC (Fibre Optic Cable)	Optional		
SNW ports RJ 45 / DSL (2/4-wire copper cable)	Optional		
SNW Ports RJ 45 with PoE (Power over Ethernet)	Optional		
Available input signals			
Digital 24V DC (e.g. ECO-DRAIN, compressors without SIGMA CONTROL, remote ON-OFF)	6 (optionally expandable)		
Analogue 4-20 mA (e.g. pressure dew point measuring device, pressure transducer)	4 (optionally expandable)		
Available output signals			
Relay outputs (e.g. third party compressors, compressors with SIGMA CONTROL Basic, group alarm)	5 (optionally expandable)		
Equipment			
Visualisation via integrated web server	Standard		
Operating data long-term memory 1 year	Standard		
Pressure transducer	Standard		
Communications interfaces			
Gigabit Ethernet for remote visualisation (web server)	Standard		
Slot for communications module (e.g. PROFIBUS, Modbus TCP, Ethernet IP, OPC UA)	Standard		
SD HC/XC card slot (e.g. updates)	Standard		
Dimensions, weight			
Width x Depth x Height in mm	540 x 284 x 483		
Weight in kg	20		

Equipment

Control systems

Specially adapted industrial PC with powerful “Quad Core” processor, featuring an operating panel, control and processing unit, communications interfaces and integrated web server.

SIGMA NETWORK ports, digital and analogue input/output signals that can be expanded as required at any time via SIGMA NETWORK bus converter (SBU).

Man/machine interface

Intuitive operation; LED-backlit 12.1-inch TFT, 16:10 ratio industrial colour display with capacitive touch technology, 1280 x 800 pixel resolution, four LED backlit touch keys, RFID read/write device for KAESER Equipment Cards and KAESER RFID keys, 34 selectable languages.

Communications interfaces

Gigabit Ethernet for remote visualisation (web server), email, slot for communications module (for connection to control technology), SD HC/XC card slot (e.g. for updates).

Control cabinet

Stainless steel/polymer control cabinet for wall-mounting, dust and splash proof to IP 54, CE, cULus, international radio licences.

Options

SNW ports RJ 45 (with/without PoE), SNW ports RJ 45/ FOC (Fibre Optic Cable), SNW PROFIBUS Master e.g. for connection of any components, including external ones.

Upgrade (optional)

Software upgrade to expand the number of controllable components. Hardware change not required.

Accessories

The SIGMA NETWORK bus converter (SBU) is available to expand the controller. The SBU can be equipped with digital and analogue input and output modules and SIGMA NETWORK ports. It can seamlessly expand your station using, for example, DSL (2/4-wire copper cable) or RJ 45 with PoE (Power over Ethernet).

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.

KAESER KOMPRESSOREN Philippines, Inc.
Suites 100 & 200 PB Dionisio Bldg. II – No. 27 Don Alejandro Roces Avenue,
Quezon City 1103, Philippines
Tel.: (+632) 8372-6642
E-mail: info.philippines@kaeser.com – www.kaeser.com

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