Compressed Air Management System

SIGMA AIR MANAGER® 4.0

Compressed air station core intelligence

kaeser.com

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 controller coordinates operation of multiple compressors and dryers, blowers or vacuum pumps. Our patented simulation-based optimization process calculates future demand based on past compressed air consumption profiles and dynamic real time response to create a superior combination of reliable flow and pressure with low energy usage. Comprehensive monitoring and predictive maintenance are made possible via the secure KAESER SIGMA NETWORK to minimize downtime.

Monitoring and reporting

The SIGMA AIR MANAGER (SAM) 4.0 enables comprehensive compressed air station monitoring through the recording, archiving and visualization 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 550001. 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 organization of service activities. Compressed air station operating data are recorded, which ensures a permanent overview of system maintenance status. Service intervals can therefore be planned and optimized from a future-forward perspective. In addition, all plain text messages from the connected compressors 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 digitalization. As the central node point, it connects all station components via the secure KAESER SIGMA NETWORK. Operating data from compressors and dryers, blowers, vacuum pumps and KAESER Measurement Technology sensors 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 optimization combined with seamless production flow.

Capacity and utilization

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 with 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

DIGITAL TWIN

KAESER

SIGMA AIR MANAGER® 4.0

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

Safe and secure network.

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

Upgrade your compressed air system

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

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

**Adaptive 3D^{advanced} Control**

Optimum efficiency.

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

RFID card

Secure login.

The integrated RFID interface ensures secure login for authorized personnel - without the need for passwords.
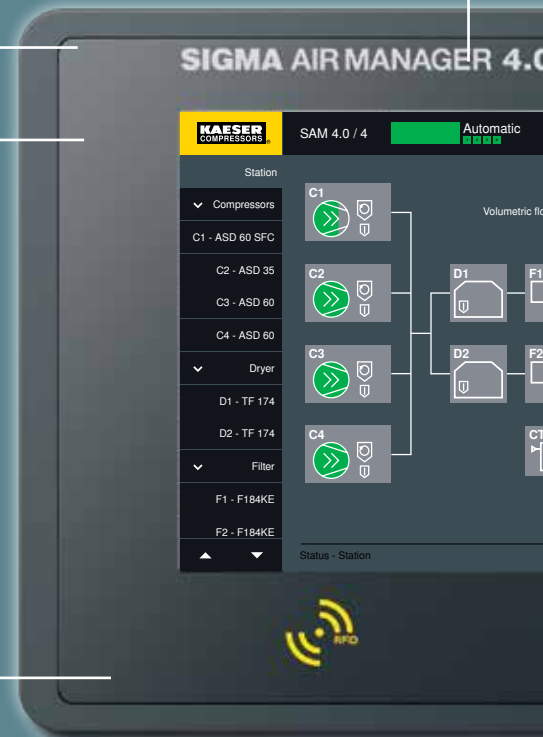
Live P&I diagram

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.

Industrial Internet of Things (IIOT)

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 optimization of energy and costs, combined with seamless production flow.

Energy management per 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 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:
Ethernet IP, – OPC UA, either option available.
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.

Display panel

115 psi   13.01.2021 13:54:49   EN   2

Power   116.04   kW
Flow rate   16.69   m³/min

DHS1

R1

Status
Messages
Monitoring
Energy & Costs
Maintenance
Control
Time Control
Initial Start-up
Configuration

Contact

100%

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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 MANGER
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	115 psi	12.01.2021 10:01:13	EN	2

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

24/7 SUPPORT

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 maximized efficiency is reflected in minimized costs.

The SIGMA AIR MANAGER 4.0 from KAESER COMPRESSOR 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.

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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.
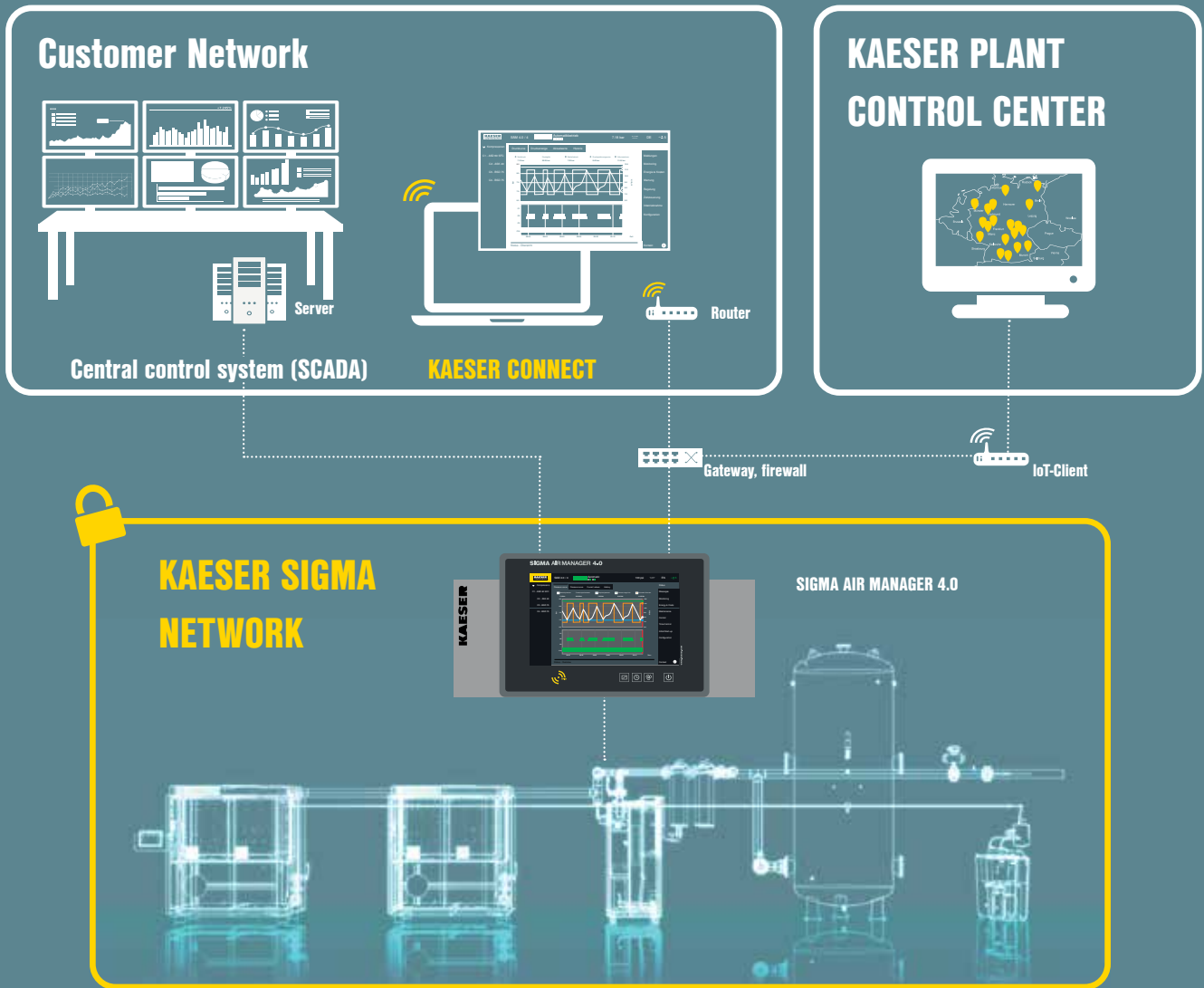
Priorities in focus

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.

Customer Network

Server

Central control system (SCADA)

KAESER CONNECT

Router

KAESER PLANT CONTROL CENTER

Gateway, firewall

IoT-Client

KAESER SIGMA NETWORK

SIGMA AIR MANAGER 4.0

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Communication / networking

Compressed air station digitalization 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.

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 COMPRESSOR records, archives and visualizes 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.

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.

Display of possible fault messages

Export of measurement values as a CSV file

Compressed air station monitoring

Forwarding to browser-based devices

Analysis of measurement values

Applying SIGMA AIR MANAGER 4.0

SAM 4.0 is your round-the-clock compressed air expert—a simple solution to ensure optimum performance and record detailed information to inform your operational decisions.

Compressed air usage frequently changes in the dynamic production environment and simply purchasing efficient compressors won't ensure long term efficiency and reliability. A master controller is necessary to continually optimize the operation of the compressors. Further, compressed air is one of your largest utility costs yet, you probably have very little detail on how it is used and how efficiently you are creating it. With SAM 4.0, you have detailed data on your use of compressed air and the cost of making it. SAM 4.0 gives you insight into the ongoing energy costs that you can tie to production costs overall. Without the SAM 4.0, it is easy to lose sight of the high cost of compressed air and how production changes have impacted your system performance.

Benefits of Applying SAM 4.0

1. Reduce the initial costs for new projects and expansions by up to 20%.

2. Increase the productivity of your facility by creating greater flexibility and lowering redundancy costs.

3. Provide real time monitoring of your system both locally and remotely.

4. Provide detailed historical air demand information allowing for simple and accurate expansion planning as well as operating cost changes.

Optimizing system design with SAM 4.0

Reduce initial costs and increase productivity: SAM 4.0 eliminates the need for costly frequency drive compressors to provide peak efficiency. A SAM 4.0 installation replaces single large unit systems with multiple smaller unit systems providing for greater productivity, inherent redundancy and lower costs for expansion.

Reduce operational costs: SAM 4.0 manages both the flow and pressure of your system. This allows you to operate your system at the minimum pressure necessary to meet the demands of production. Operational costs are saved as compressors operate more efficiently at lower pressure and artificial demand from leaks and unregulated uses are reduced.

Real time monitoring: The connectivity options available with a SAM 4.0 installation allows for real time system monitoring and evaluation of alarms from any authorized laptop. One key advantage to this feature is the ability to diagnose issues remotely reducing the frequency of late night trips back to your facility.

Historical performance: The detailed information the SAM 4.0 provides you will feed more knowledgeable decision-making. For example:

- Changes in production and their effect on compressed air consumption and costs. Are there expensive inappropriate uses of compressed air? How has your compressed air leak load changed over time?

- Allocation of unit production costs. Generally compressed air is the single largest contributor to your overall energy costs yet without SAM 4.0, it's difficult to track your real costs. Knowing how your compressed air system changes when production changes can help you better allocate costs within your organization.

How SAM 4.0 reduces costs

System Design	Option 1: Single 125 hp Variable Frequency Drive Compressor	Option 2: 2 x 60 hp Fixed Speed Compressors with SAM 4.0	Option 3: 75 hp Variable Frequency Drive and 40 hp Fixed Speed Compressors with SAM 4.0
Annual Energy Cost [1]	$45,444	$49,492	**$44,239**
Peak Power	93.74 kW	95.97 kW	**89.73 kW**
System Specific Power	17.60 kW/100 cfm	19.21 kW/100 cfm	**17.14 kW/100 cfm**
Footprint [2]	**348 ft²**	425 ft²	415 ft²
Recommended System Storage[3]	3,000 gal.	**1,440 gal.**	1,775 gal.
Equipment Cost	$90,000	**$75,000**	$90,000
Redundancy [4]	0%	**50%**	30%
Cost for Growth or Backup [5]	$90,000	**$34,000**	$55,000
Annual Parts Cost [6]	$4,000	**$2,100**	$4,825
5-Year Life Cycle Cost	$337,220	**$332,960**	$335,318

(1) Assuming a typical industrial compressed air system with a max flow of 500 cfm, average of 280 cfm and minimum flow of 125 cfm. Operating 24/7 at 100 psig with a power cost of $0.10/kWh.

(2) Footprint: Includes the necessary area for compressors, storage, air treatment, and ventilation with sufficient clearance for maintenance.

(3) Recommended system storage: Based on the Compressed Air Challenge guideline of 5 gallons per cfm of the largest compressor.

(4) Redundancy: Compressed air system capacity if a single unit fails.

(5) Cost for growth: Cost for an additional compressor to create 100% redundancy.

(6) Annual parts cost: Preventive maintenance filters and oil based on 8,760 hours a year and the system profile described above.

Option 1: smallest footprint, but most expensive and offers no redundancy

Option 2: lowest initial equipment cost and annual parts cost, offers redundancy, lowest 5-year life cycle costs, but not as efficient as option 3

Option 3: most efficient and offers some redundancy

Easy-read 12-inch color 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.

SIGMA AIR MANAGER® 4.0

Technical specification

	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 (for blowers)	Optional		
Possible air system interconnections			
Total number of controllable compressors/blowers	4	8	16
Compressors with SIGMA CONTROL 2 via SIGMA NETWORK	4	6	6
SNW ports RJ 45	Standard (6 ports, optionally expandable)		
SNW ports RJ 45 / FOC (Fiber 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)		
Analog 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			
Visualization via integrated web server	Standard		
Operating data long-term memory 1 year	Standard		
Pressure transducer	Standard		
Communications interfaces			
Gigabit Ethernet for remote visualization (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	21 1/4" x 11 3/16" x 19"		
Weight	44.1 lbs		

The world is our home

As one of the world's largest compressed air systems providers and compressor manufacturers, KAESER COMPRESSORS is represented throughout the world by a comprehensive network of branches, subsidiary companies and factory trained partners.

With innovative products and services, KAESER COMPRESSORS' experienced consultants and engineers help customers to enhance their competitive edge by working in close partnership to develop progressive system concepts that continuously push the boundaries of performance and compressed air efficiency. Every KAESER customer benefits from the decades of knowledge and experience gained from hundreds of thousands of installations worldwide and over ten thousand formal compressed air system audits.

These advantages, coupled with KAESER's worldwide service organization, ensure that our compressed air products and systems deliver superior performance with maximum uptime.

KAESER COMPRESSORS ®
Built for a lifetime.

Management System
ISO 9001:2015
ISO 14001:2015
TÜVRheinland
CERTIFIED
www.tuv.com
ID 9108616471

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Compressed Air & Gas Institute

ENERGY STAR PARTNER

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