

Compressed air management systems

SIGMA AIR MANAGER



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Sigma Air Manager

Integrated performance for maximum energy savings

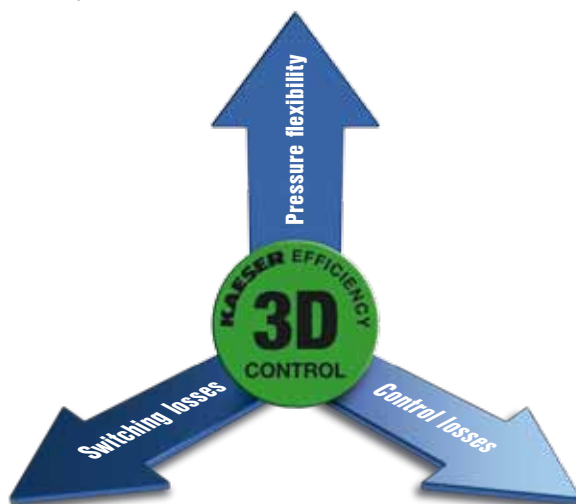
An orchestra is far more than simply a collection of musicians. It is the conductor who brings together the individual players to create a single powerful and harmonious sound. The Sigma Air Manager (SAM) from Kaeser plays a very similar role within a compressed air supply system: Utilising the very latest master control and web server technology, the SAM is an invaluable tool for ensuring optimised air system availability and energy efficiency.

Adaptive 3-D-Control

With a powerful industrial PC at its core, the Sigma Air Manager features Kaeser's adaptive 3-D-Control (patent pending) which enables compressor delivery volume and energy consumption to be precisely adjusted to match actual compressed air demand. Unlike other master control systems that have been available up until now – which simply rely on operation within a narrow pressure range and with lowest possible switching pressure differential – Kaeser's 3-D-Control delivers unrivalled performance by optimising energy efficiency throughout the entire compressed air system.

Exceptional versatility

The SAM is a highly flexible compressed air management system that can be used to meet the needs of virtually any compressed air application. Not only is it able to control, analyse and monitor performance of the latest generation of Kaeser compressors, it can also do the same for older third party compressors and components within the compressed air station.



Compressed air station visualisation

The **Sigma Air Control Basic** visualisation tool is provided as standard: The integrated web server is able to display current operational status data via automatically generated HTML pages. Information includes real-time compressor status, current SAM control panel status, a network pressure log for the previous operating phase, as well as maintenance and alarm messages. All that's required to access and view the data is a PC with standard web browser, an analogue modem and a telephone line or an Ethernet connection. Moreover, data from the SAM's long-term memory can be displayed in graphical format using the optionally available **Sigma Air Control Plus** version of Kaeser's advanced visualisation software. A password-protected function enables information such as on-load and off-load status, system pressure, power consumption and compressor duty cycles to be displayed and evaluated from various aspects over longer periods. This capability therefore provides the basis for detailed compressed air audits and allows the user to keep a constant eye on compressed air costs and system performance. All operating hours counter information can also be called up to enable easy maintenance coordination.

Optimised performance

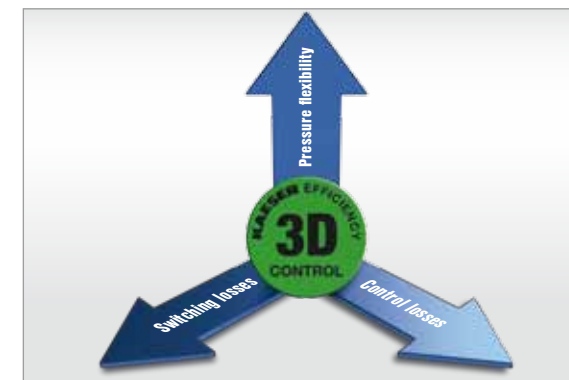
The innovative 3-D-Control not only takes switching losses (starts/stops) into account, but also considers others factors which affect compressed air system efficiency, such as energy requirement for control losses (idling and FC losses) and pressure flexibility. In order to ensure optimum performance, the SAM constantly analyses the relationship between these factors, calculates the best possible result and controls the compressors accordingly. Needless to say the required pressure is a key determining factor for adaptive calculation of the switching frequency. 3-D-Control optimises compressed air station pressure performance and enables average pressure to be reduced.

Optimises transparency, conserves resources



Sigma Air Manager

Enhanced energy savings



Adaptive 3-D-Control

The adaptive 3-D-Control detects switching losses (starts/stops), control losses (idling and FC losses) and pressure flexibility (average increase over required pressure), optimises the ratios between these determining factors and minimises the associated energy requirement. Pressure performance is also improved and average pressure is reduced.



Integrated web server

Using powerful industrial PC-based technology, the SAM is an all-in-one master control system and web server. This versatile system not only ensures energy-saving control, but – thanks to advanced communication technology – also provides unrivalled transparency relating to key data such as operational status, energy consumption and compressed air system costs.



Built-in efficiency

The SAM automatically ensures optimum energy consumption. Users therefore benefit from outstanding energy efficiency and user-friendly operation: Just input the required pressure and compressor performance data – the rest is done for you.



Teleservice-ready

The SAM can be easily connected to Kaeser's 'Teleservice' remote diagnostics and demand-oriented maintenance service. Using the modem interface, data is sent to the Kaeser Service Centre via SMS or a standard telephone line. This feature further enhances system availability.



Compressed air stations operate at peak efficiency with the SAM master control system. Key operational data are displayed in automatically generated HTML pages. Long-term memory capability is also available.

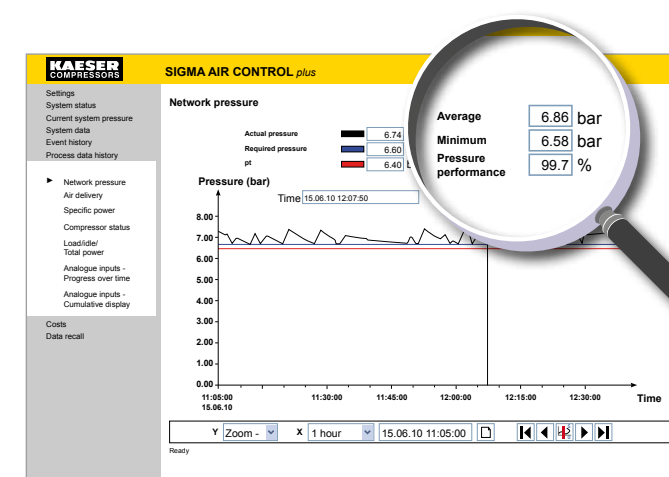
Compressed air system data stored and processed in the Sigma Air Manager can be transferred via an analogue modem and a telephone line or computer network (Ethernet). SMS messages, for example, can be forwarded to a service technician's mobile telephone as part of Kaeser's 'Teleservice' facility.



Compressed Air System

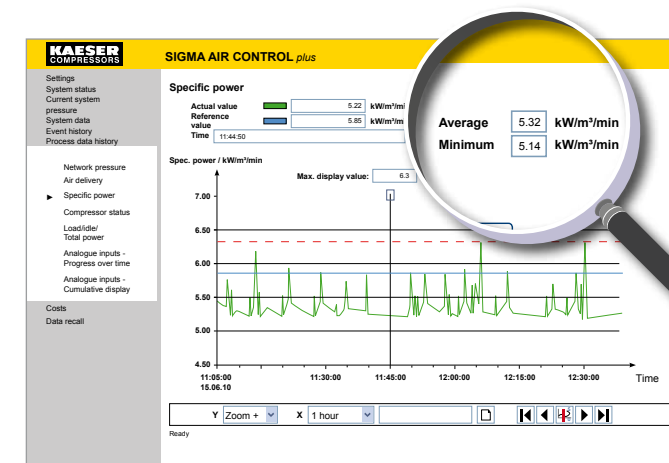
Sigma Air Manager

Three-dimensional control for perfect balance and efficiency



Sigma Air Control Plus: Display of system pressure

Network pressure over a specific time period is also shown together with pressure performance (in %). The less often the pressure deviates from the required pressure, the higher the pressure performance.



Sigma Air Control Plus: Graphical display of specific power

The graph shows the specific power of the compressors within the compressed air station compared to the so-called reference value – this value is the specific power of all connected compressors at maximum working pressure.

Adaptive 3-D-Control: The key to enhanced efficiency

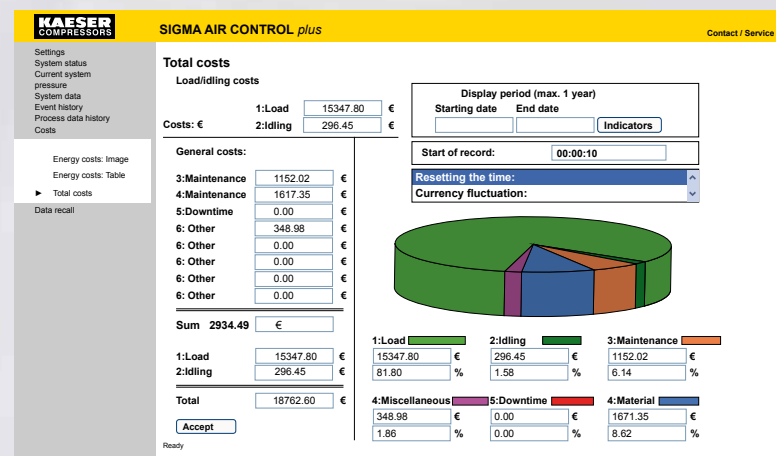
The adaptive 3-D-Control detects the three dimensions of **control losses** (idling and FC losses), **switching losses** (starts/stops) and **pressure flexibility** (average increase above demand pressure), as well as their associated energy expenditure.

In addition to optimisation of compressed air station energy consumption, the Sigma Air Manager is able to achieve best possible pressure performance. Needless to say the required pressure for the application is a key determining factor.

When operating compressors with conventional control systems there is a certain inherent lag in system response, but the adaptive 3-D-Control takes care of this with intelligent predictive switching. As is usual for any optimisation calculations, the Sigma Air Manager also requires some room for manoeuvre – in this case the so called "pressure range".

Even with varying compressed air consumption the Sigma Air Manager automatically matches the compressor delivery rate to match actual requirement and thereby ensures minimal energy consumption at all times.

Kaeser's **Sigma Air Control Plus** visualisation software also provides detailed information regarding compressed air system energy consumption, as well as many other aspects, so the operator can instantly tell whether the system is operating within the desired parameters.



Your compressed air costs at a glance

Sigma Air Control Plus provides a meaningful, detailed **cost centre report**. It is also suitable for in-house cost allocation purposes (following installation of decentralised flow rate measuring sensors).

The following information is provided:

- Compressor load data, delivery, performance, specific power requirement
- Total costs
- Graphical display of cost overview (with possibility for manual value input e.g. for maintenance and repair costs)
- Operating data from the long-term memory (over an elapsed period of up to one year)
- Energy cost settings

The data can also be exported. The cost centre report can be called up as required on any PC with internet access via Ethernet, modem or an RS232 connection. The Sigma Air Manager's integrated web server provides easy access to all data.

Connection to Kaeser Teleservice also ensures that a Kaeser service technician is able to attend the compressor station as required.



Equipment

Control system

Specially designed industrial PC comprising control panel and control and processing unit. Module for communication interfaces, web server (not SAM Basic). Digital and analogue input/output signals, menu navigation via multi-function keys (soft keys).

Hardware

Industrial processor, metal housing, all components designed for use in industrial environments. Graphical display, LED indicators and tactile membrane keys.

Control cabinet

Protected from dust and water, IP 54 compliant. Terminal strip for connection of compressors that are to be controlled via floating contacts.

Interfaces

Analogue and digital inputs/outputs. Also with SAM 4/4 to SAM 16/8: Ethernet, Profibus DP Master, PCMCIA-Slot, RS 232.

Certification

CE, cULus, EMC.

Options / Accessories

SIGMA AIR CONTROL PLUS long-term data visualisation tool, modem kit (analogue), GSM radio modem , send/ receive protocols, MODBUS interface, sub-network control, uninterruptible power supply (UPS), Profibus converter, bus connector, bus cable, signal doubler, Ethernet-profibus DP converter, optical link module for fibre optic cable.

ADAPTIVE 3-D-CONTROL
Also available via update

Dimensions



Technical Specifications

Model	Pressure control	Possible air system interconnections				Available output signals			Available input signals		SIGMA AIR CONTROL visualisation with integrated internet server		Communication interfaces				Dimensions W x H x D mm	Weight kg
	Adaptive 3-D-Control	Total controllable compressors	via Profibus DP		via floating contacts													
			Compressors with Sigma Control	Profibus converter	Compressors without Sigma Control (incl. other makes)	Digital	Analogue		Digital	Analogue	basic	plus	RS 232	Ethernet (for company VPN)	Profibus DP (Master)	Modem		
SAM Basic	●	4x	–	–	4x (DO)	1x (DO) change-over contact	1x 0-20 mA		4x	–	–	–	–	–	–	–	380 x 500 x 220	15
SAM 4/4	●	4x	4x	4x	4x (DO)	1x (DO) change-over contact	1x		4x	–	●	○	●	●	●	○	380 x 500 x 220	15
SAM 8/4	●	8x	8x	8x	4x (DO)	1x (DO) change-over contact	1x		4x	–	●	○	●	●	●	○	380 x 500 x 220	15
SAM 8/8	●	8x	8x	8x	8x (2xDO+2xDI)	8x (DO) change-over contact	1x		8x	1x /2x	●	○	●	●	●	○	500 x 700 x 250	40
SAM 16/8	●	16x	16x	8x	8x (2xDO+2xDI)	16x (DO) change-over contact	2x		32x	3x / 4x	●	○	●	●	●	○	800 x 1200 x 300	150

1) Possible Profibus converters: PBU 4+4, PBU 8, PBU 8R, PBU 8K, PBU 32, PBU 8/4+4K, PBU 8R+ (signal doubler); max. 80 inputs
2) Unused compressor contacts are free for other use
3) RS 232 available for direct use of Sigma Air Control Basic and Plus visualisation:
- max. cable length 15 m
- connection of an interface converter to RS 485, max. cable length 800 m
4) For Sigma Air Control Basic and Plus within an in-house VPN
5) For connection of screw compressors with Sigma Control and Kaeser Profibus converter

System requirements for using SIGMA AIR CONTROL visualisation: PC with Internet Explorer version IE 7 and later, or Mozilla Firefox 3.6 and later with installed Java plug in
● Standard
○ Optional, can also be retrofitted
– Not applicable
DO: Digital output
DI: Digital input

KAESER – The world is our home

As one of the world's largest manufacturers of rotary screw compressors, KAESER KOMPRESSOREN is represented throughout the world by a comprehensive network of branches, subsidiary companies and authorised partners in over 90 countries.

With innovative products and services, KAESER KOMPRESSOREN's 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. Moreover, the decades of knowledge and expertise from this industry-leading system provider are made available to each and every customer via the Kaeser group's global computer network.

These advantages, coupled with KAESER's worldwide service organisation, ensure that all products operate at the peak of their performance at all times and provide maximum availability.

**KAESER COMPRESSORS Australia Pty. Ltd.**

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