KAESER COMPRESSORS

Rotary Screw Compressors

with variable speed drive

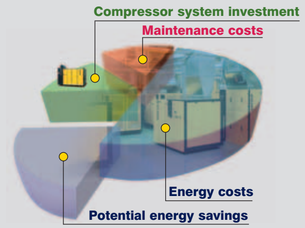
DSD SFC Series

FAD from 3.25 to 26.6 m³/min
Pressures 5.5 to 15 bar

KAESER COMPRESSORS

What qualities do users look for in a compressor with variable frequency drive?

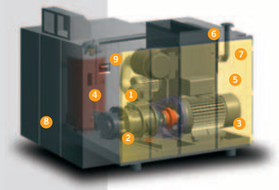
As a compressed air user, you expect maximum efficiency and reliability from your air system. This sounds simple, but these advantages are influenced by many different factors:



Energy costs, for example, taken over the lifetime of a compressor, add up to a multiple of investment costs.

Efficient energy consumption therefore plays a vital role in the production of compressed air, as does reliability of the compressor.

Variable drive compressors provide users with the best possible match of air production to air demand. However, it's not as simple to actually satisfy this requirement as is often claimed; it depends on two main considerations: Firstly, a comprehensive knowledge of air system design is needed and secondly, individually tailored system configurations can only be realised if there's a correspondingly comprehensive range of products which allows the compressors in the system to be used to their full potential. Elimination of control gaps and excessively long idling periods through system integration enables KAESER compressed air systems equipped with variable speed compressors to achieve energy savings of over 50 %.



1. Inlet valve
2. Airend
3. Electric motor
4. Fluid separator with cartridge
5. Fluid cooler
6. Fluid filter
7. Compressed air aftercooler
8. Control cabinet – frequency controller
9. Controller with industrial computer

DSD SFC – ultimate efficiency

KAESER's Solution: The DSD SFC Series

The new DSD SFC rotary screw compressors fulfil every customer requirement: they are highly energy efficient, quieter than quiet, require minimal maintenance, are extremely reliable and deliver the very best in air quality.

All of these advantages are aided through innovations in compressor design, drive systems, cooling and ventilation, silencing and maintenance methods.

Furthermore, the comprehensive range of KAESER products enables precisely tailored variable speed compressors to be used as part of a fully integrated system, allowing potential energy savings of over 50%.

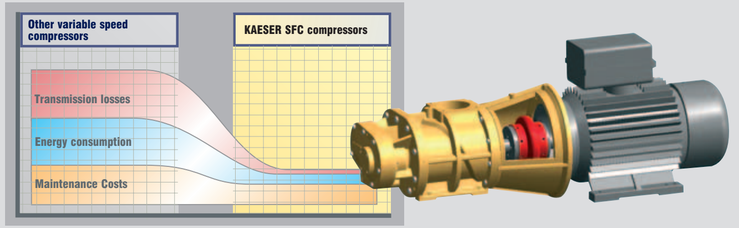
Direct communication path
The SFC cabinet and the DSD compressor form a compact unit. This reduces the amount of floor space required and ensures that the communication paths between the control electronics and the drive motor are kept as short as possible. There is no need for any additional cabling work to be carried out.

No interference
The electro-magnetic compatibility (EMC) of the components and of the complete machine has been tested and certified in accordance with all applicable regulations.

Outstanding performance

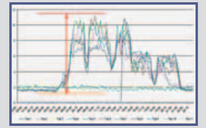
The DSD SFC (SIGMA Frequency Control) series is a range of highly efficient variable speed direct drive compressors. With outstanding performance throughout the control range, large, low speed airends featuring the energy saving SIGMA Profile have significant advantages over smaller, high speed airends.

Triple savings with 1:1 drive – Significantly increasing reliability and service life, 1:1 drive reduces the number of components needed in comparison with gear drive and eliminates the associated transmission losses. Sound levels are also considerably lower. The benefits speak for themselves: **efficient** power transmission, **optimal** power consumption and **reduced** servicing / downtime costs.



Analysis reveals potential

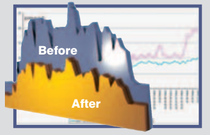
Air Demand Analysis – ADA



Developed by KAESER, the computer-aided "Air Demand Analysis", or ADA for short, allows meaningful and accurate data to be gathered to aid compressed air system optimisation. From the resulting air consumption profiles, KAESER's Energy Saving System (KESS) can then help determine the best system solution for the individual air application.

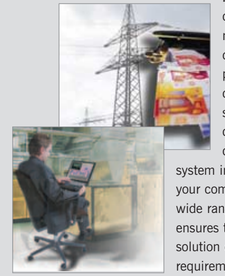
KAESER Energy Saving System – KESS

KESS processes the data acquired by ADA so that a state-of-the-art compressed air system can be designed and individually tailored to meet the customer's compressed air needs. A cost comparison between the possible installation designs ensures that the most appropriate system with regards to operation and energy consumption is chosen.



A solution to meet your needs

With the ADA air demand profile and the KESS evaluation in mind, KAESER's engineers decide on a case-by-case basis whether a combination of conventional and variable speed controlled machines is preferable, or a splitting concept with KAESER standard rotary screw compressors. Let KAESER design a compressed air system individually suited to meet your compressed air needs. Our wide range of SFC compressors ensures that the most efficient solution can be found for every air requirement.



KAESER COMPRESSORS

More air, more savings...

Please contact KAESER for non-standard air delivery and motor output power data.

DSD SFC Series - Technical Specifications

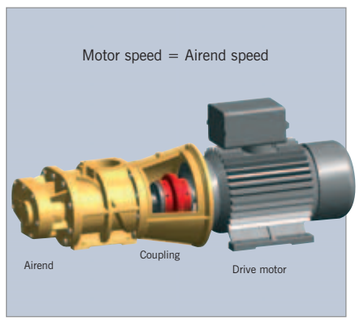
Model	Working pressure bar	FAD*) overall package at working pressure m³/min	Pressure range min.–max. bar	Rated motor power kW	min. pressure band width bar	Speed range min.–max. rpm	Frequency range min.–max. Hz	Dimensions L x W x H	Sound level**) dB(A)	Weight kg
	7.5	4.29 – 20.45	6 – 10			450 – 1905	15 – 63.5			
DSD 201 SFC	10	3.99 – 17.85	6 – 10	110	±0.1	450 – 1680	15 – 56	2825 × 1930 × 2270	72	3680
	13	3.25 – 15.20	11 – 15			450 – 1770	15 – 59			
	7.5	6.03 – 23.10	6 – 10			450 – 1680	15 – 56			
DSD 241 SFC	10	5.90 – 20.70	6 – 10	132	±0.1	450 – 1500	15 – 50	2825 × 1930 × 2270	73	3940
	13	3.56 – 16.88	11 – 15			450 – 1620	15 – 54			
	7.5	6.03 – 26.60	6 – 10			450 – 1950	15 – 65			
DSD 281 SFC	10	5.90 – 23.70	6 – 10	160	±0.1	450 – 1740	15 – 58	2825 × 1930 × 2270	73	4210
	13	3.56 – 19.30	11 – 15			450 – 1860	15 – 62			

* FAD to ISO 1217: 1996, Annex C; **)Sound level to PN8NTC 2.3 at 1m distance, free-field measurement

DSD SFC – Eight Decisive Advantages

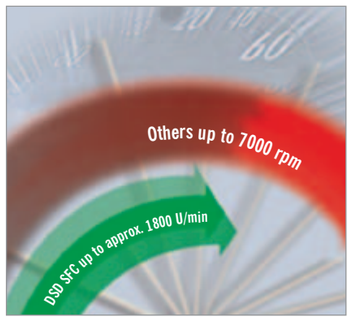
1 SIGMA PROFILE airend

A specific drive power can be used to turn a smaller airend at high speed or a larger airend at slow speed. Larger, low speed airends are more efficient, delivering more compressed air for the same drive power. That is why KAESER developed airends especially for the DSD series that precisely match the individual drive power and motor speed of each machine in the range. The slightly higher cost of the larger airend is quickly recovered by the energy saved during operation.



2 Energy-saving one-to-one drive

The advantage of this drive is not just the elimination of transmission losses. The motor and airend are joined by the coupling and its housing to form a compact and durable unit that, apart from greasing of the motor bearings, requires no regular maintenance. Should the coupling ever need to be replaced it takes just a few minutes without any disassembly of the unit; the opening in the coupling housing is more than large enough to replace the two coupling sections.



3 Large, low speed airends

Each DSD SFC compressor has exactly the same mechanical components as those used in fixed speed compressors. This not only ensures unrivalled reliability and compressed air availability, but also guarantees optimum energy efficiency. The most efficient method of producing compressed air is by using large, low speed airends – airends in DSD SFC compressors have a typical maximum rotation speed of approximately 1900 rpm. Further advantages include long service life and reduced maintenance requirement. The use of standardised drive motors also contributes to long-lasting compressed air availability.

4 Specific energy requirement is the key

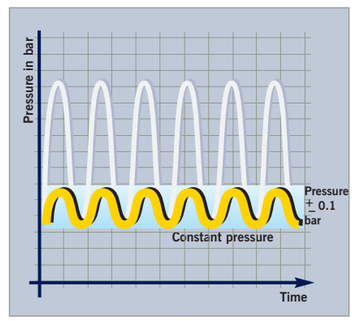
Large, low speed airends are more efficient than small high speed airends because they supply more air for the same drive power. This is not just the case at full load, but also applies throughout the entire control range, which is particularly important for variable speed machines. The specific energy requirement of 6.2 kW per m³/min for KAESER DSD SFC compressors at 7.5 bar can be considered as an excellent indication of the machine's efficiency. Variable frequency controlled compressors are only truly efficient if they are able to achieve optimum specific power throughout their control range.

5 SFC module

Siemens frequency inverters are used exclusively in KAESER's speed controlled compressors for several reasons: Siemens manufacture the industrial PC-based SIGMA CONTROL compressor controller, which enables seamless communication with the SFC control cabinet. Furthermore, the worldwide presence of Siemens ensures outstanding service. The SFC control cabinet and SIGMA CONTROL are tested and certified in accordance with all applicable electromagnetic compatibility regulations, both as individual components and as an integrated system.

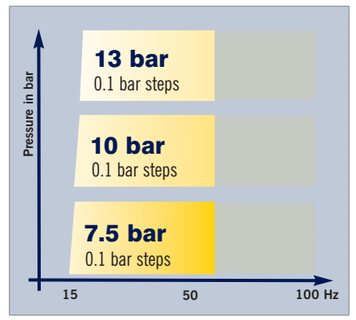
6 Precise pressure control

Air delivery from a DSD SFC compressor can be matched to actual air demand according to required system pressure by continuously adjusting the speed of drive motor (and therefore the airend) within its control range. Depending on the buffer capacity of the downstream air network, it is therefore possible to precisely maintain working pressure to within ±0.1 bar and, as a result, to reduce maximum system pressure. This can lead to significant savings, as each 1 bar reduction in pressure amounts to a 7 percent reduction in energy consumption. A correctly designed SFC system can be operated in sequence with standard rotary screw compressors without any problem.



7 Flexible pressure adjustment

The wide range of 1:1 drive airends available makes it possible to select the one that works most efficiently within the pressure and performance range required. This ensures that every DSD SFC compressor operates with the most efficient pressure-frequency profile. Furthermore, the SIGMA CONTROL compressor controller is equipped with a pressure-to-frequency profile that guarantees maximum flexibility for air delivery and pressure whilst providing best possible efficiency.



8 SIGMA CONTROL

Based on robust PC architecture, the SIGMA Control offers the possibility of Dual, Quadro, Vario and Continuous control. Clearly marked navigation and input keys on the user interface are used to move around within the menu options of the alpha-numeric display. The SIGMA Control automatically controls and monitors the compressor package. The Profibus interface enables exchange of data and operational parameters allowing the SIGMA Control to communicate with other air management systems such as the SIGMA Air Manager. Connection of a modem even allows maintenance and alarm messages to be sent via SMS to relevant service locations.

Equipment

Complete unit

Ready for operation, fully automatic, super silenced, vibration damped, all panels powder coated

Sound insulation

Lined with glass-fibre laminated mineral wool, maximum 73 dB(A) to PN8NTC 2.3 at one metre distance, free-field measurement

Vibration damping

Dual antivibration mountings using rubber bonded metal elements.

Airend

Genuine KAESER rotary screw, single-stage airend with SIGMA PROFILE and cooling fluid injection.

Drive

Direct, torsional-elastic coupling, without gearing

Electric motor

High efficiency CEMEP EFF1 motors consume less power for greater output and are standard throughout the range of KAESER compressors. The motors are protected to IP55 and conform to insulation Class F for greater power reserve. Also available with PTC thermistor sensors for full motor protection.

Connection from motor to airend

Airend with integral coupling flange

Electrical components

Control cabinet to IP 54, control transformer, Siemens MASTERDRIVE with control unit, volt-free contacts for ventilation control

Fluid and air flow

Dry air intake filter with pre-filtration, pneumatic inlet and venting valves, fluid reservoir with three-stage separator system, pressure relief valve, minimum pressure/check valve, thermostatic valve and fluid microfilter, all fully piped using flexible couplings

Cooling

The standard version is air cooled, separate aluminium coolers for compressed air and fluid, radial fan driven by its own motor.

Controller

Interfaces: RS 232 for a modem or printer, RS 485 for a slave compressor in base load sequencing mode and a Profibus DP interface for data networks. Prepared for Teleservice.

Ergonomic control panel

Red, yellow and green LEDs show the operational state of the machine at a glance. The panel also contains a four-line plain text display, touch keys with pictograms and display of current motor speed.

Prime functions

Fully automatic monitoring and regulation of airend discharge temperature; monitoring of motor current, direction of airend rotation, air filter, fluid filter and fluid separator cartridge; display of performance data, service intervals of primary components, operating hours, status data and event memory data. Selection of Dual, Quadro, Vario and Continuous control modes as required.

(For further information see SIGMA-CONTROL brochure P-780).

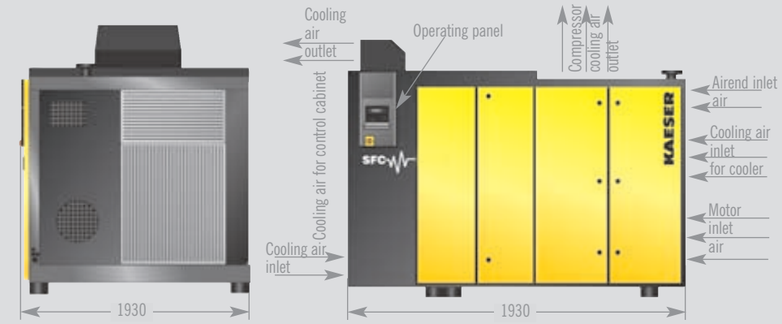
Comprehensive design know-how

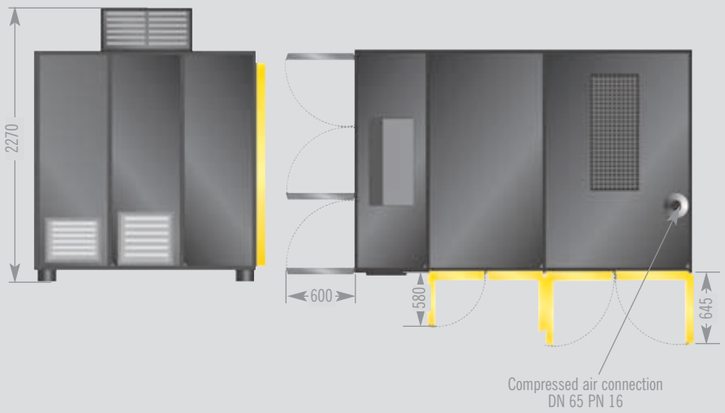
Compressed air supply systems are often highly complex and can only be efficiently operated in the long term if careful planning is implemented during each stage of design, system expansion and modernisation. KESS (KAESER's Energy Saving Service) provides comprehensive analysis of your compressed air usage, enabling KAESER's experts to plan and design a system that is specially tailored to meet all of your compressed air requirements. The service combines tried and tested compressed air components, user advice and services with cutting-edge technology to ensure maximum efficiency - KAESER air systems typically operate at 95 percent load capacity or more. Every KAESER compressed air system illustrates KAESER's commitment to producing application-specific quality compressed air with unsurpassed reliability and at the lowest possible cost. This standard is achieved with products of the highest quality and through decades of experience in design and construction of compressed air systems.

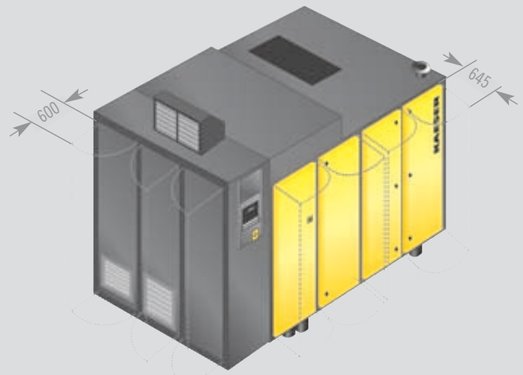
Use this expertise to your advantage and let KAESER design your compressed air system. Valuable information and advice regarding KAESER services, planning and analysis can be found under 'Services' on the KAESER website – www.kaeser.com.

KAESER COMPRESSORS

Dimensions:





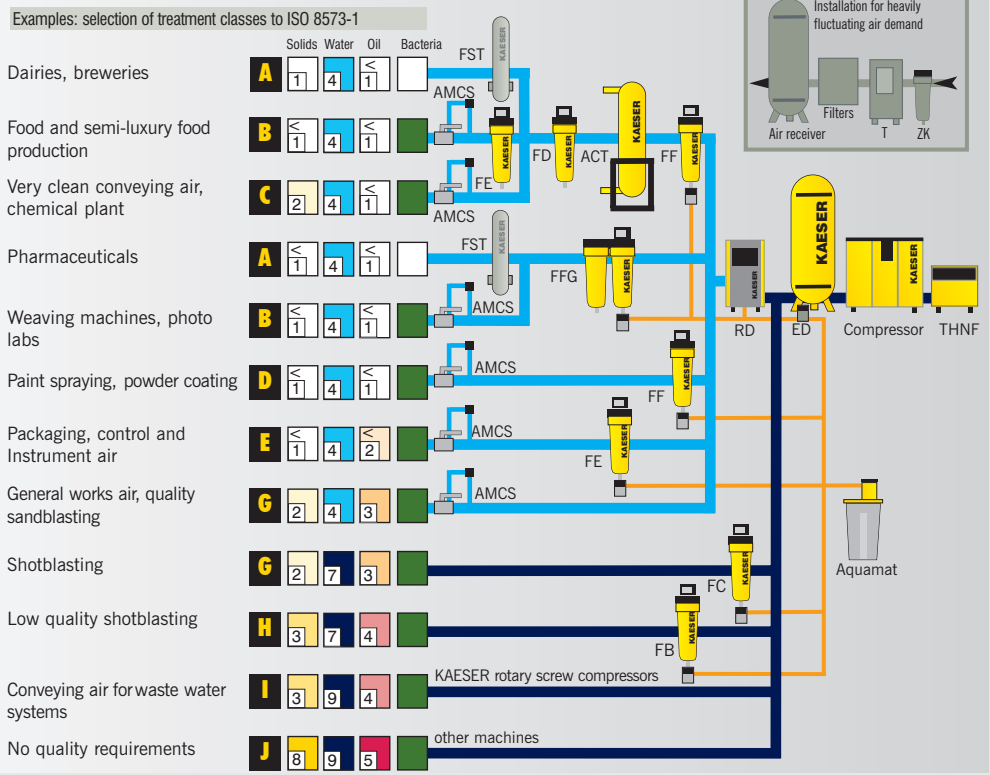


KAESER COMPRESSORS

Choose the required grade of treatment according to your field of application:

Air treatment using a refrigeration dryer (+3 °C pressure dew point)

Examples: selection of treatment classes to ISO 8573-1



Explanation:

THNF = bag filter
cleans dusty and highly contaminated intake air

ZK = centrifugal separator
removes condensate

ED = ECO Drain
electronic level-controlled condensate drain

FB = prefilter 3 µm
separates liquid droplets and solid particles >3 µm, oil content ≤5 mg/m³

FC = prefilter 1 µm
separates oil droplets and solid particles >1 µm, oil content ≤1 mg/m³

FD = particulate filter 1 µm
separates dust particles (attrition) >1 µm

FE = microfilter 0.01 ppm
separates aerosol oils and solid particles >0.01 µm, aerosol content ≤0.01 mg/m³

FF = microfilter 0.001 ppm
separates aerosol oils and solid particles >0.01 µm, oil content ≤0.001 mg/m³

FG = activated carbon filter
for adsorption of oil vapours, oil vapour content ≤0.003 mg/m³

FFG = combination filter
comprising FF and FG

RD = refrigeration dryer
pressure dew point to +3 °C

DD = desiccant dryer
for compressed air drying; DC series - heatless regeneration, pressure dew point to -70 °C; DW, DN, DTL and DTW series - heat regeneration, pressure dew point to -40 °C

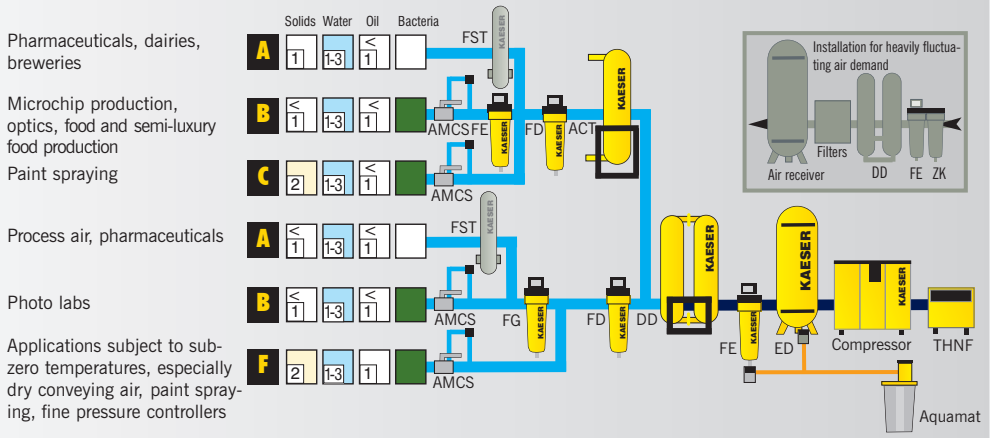
ACT = activated carbon adsorber
for adsorption of oil vapours, oil vapour content ≤0.003 mg/m³

FST = sterile filter
for bacteria-free air

Aquamat = condensate treatment system

AMCS = air-main charging system

For air mains subject to sub-zero temperatures: treatment systems with desiccant dryers (pressure dew point to -70 °C)



Contaminants:

+ solids -
+ water -
+ oil -
+ bacteria -

Degree of filtration:

ISO 8573-1 Class	Solid particles: Max. no. of particles per m³ with size d (µm) 0.1 < d ≤ 0.5	0.5 < d ≤ 1.0	1.0 < d ≤ 5.0	Humidity: Pressure dew point (x = liquid water in mg/m³)	Overall oil content mg/m³
0	as specified by user				
1	100	1	0	≤ -70 °C	≤ 0.01
2	100000	1000	10	≤ -40 °C	≤ 0.1
3	–	10000	500	≤ -20 °C	≤ 1.0
4	–	–	1000	≤ +3 °C	≤ 5.0
5	–	–	20000	≤ +7 °C	–
6		–		≤ +10 °C	–
7		–		x ≤ 0.5	–
8		–		0.5 < x ≤ 5.0	–
9		–		5.0 < x ≤ 10.0	–

A Oil vapour content ≤ 0.003 mg/m³, particle retention > 0.01 µm, sterile, odourless and tasteless

B Oil vapour content ≤ 0.003 mg/m³, particle retention > 0.01 µm

C Oil vapour content ≤ 0.003 mg/m³, particle retention > 1 µm

D Aerosol oil ≤ 0.001 mg/m³, particle retention > 0.01 µm

E Aerosol oil ≤ 0.01 mg/m³, particle retention > 0.01 µm

F Aerosol oil ≤ 0.01 mg/m³, particle retention > 1 µm

G Aerosol oil ≤ 1 mg/m³, particle retention > 1 µm

H Aerosol oil ≤ 5 mg/m³, particle retention > 3 µm

I Aerosol oil ≤ 5 mg/m³, particle retention > 1 µm

J Untreated

LGA InterCert Certified QM-System ISO 9001:2000
LGA InterCert Certified EM-System ISO 14001

KAESER KOMPRESSOREN GmbH

P.O. Box 2143 – 96410 Coburg – GERMANY – Tel: +49 9561 640-0 – Fax: +49 9561 640130
www.kaeser.com – e-mail: productinfo@kaeser.com