

Rotary Screw Compressors ESD/FSD SFC Series

With the world-renowned SIGMA PROFILE 

Free air deliveries 20.5 to 57 m³/min, Pressure 5.5 to 15 bar



What do you expect from a compressor with variable frequency drive?

As a compressed air user, you expect maximum efficiency and reliability from your air system. That may sound simple,

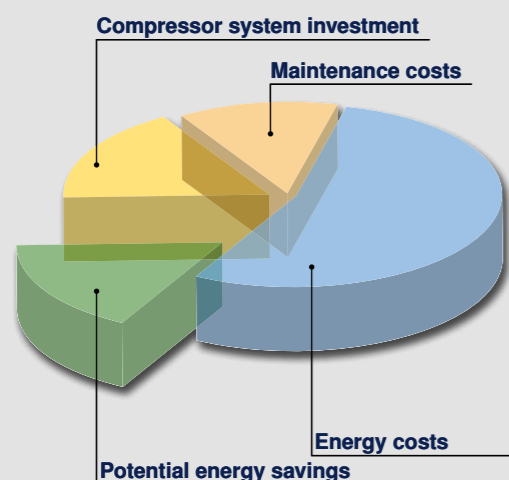
but these advantages are influenced by many different factors:

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

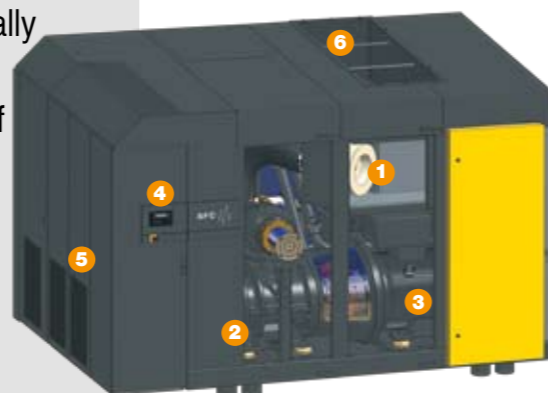
Efficient energy consumption therefore plays a vital role in the production of compressed air, as does reliability of the compressor.

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; two key factors must be taken into consideration: 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.

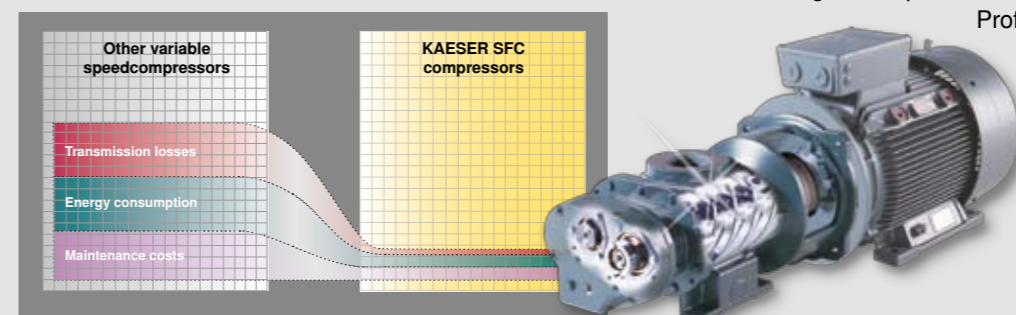
Elimination of 'control gaps' and excessively long idling periods through system integration enables KAESER compressed air systems equipped with variable speed compressors to achieve energy savings of over 50 %.



ESD/FSD SFC – Ultimate Efficiency



- 1 Air filter
- 2 Rotary screw compressor
- 3 Drive motor
- 4 Compressor controller
- 5 Frequency converter
- 6 Radial fan



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.



A solution to meet your needs

Based on the ADA air demand profile and the KESS evaluation, KAESER's engineers decide whether a combination of conventional and variable speed controlled machines is preferable, or a splitting concept with KAESER standard rotary screw compressors. KAESER's wide range of SFC compressors ensures that the most efficient solution can be found for every air requirement.



SIGMA CONTROL

The SIGMA CONTROL compressor controller is a robust PC-based industrial computer with a real-time operating system and update/network capability. 'Traffic light' style LEDs clearly indicate system operational status at a glance. This powerful compressor controller can also display information in any 1 of 30 selectable languages at just the press of a button. The SIGMA CONTROL automatically controls and monitors the compressor package.

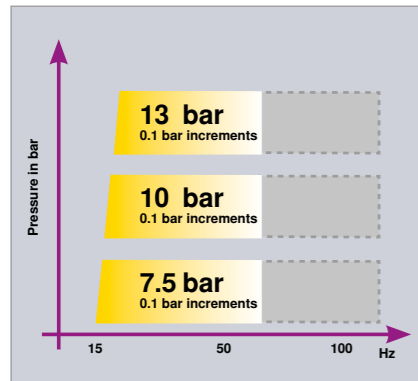


Outstanding performance

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

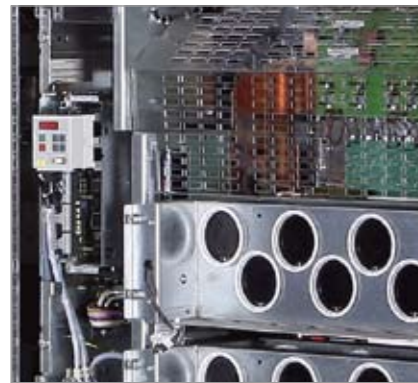


ESD/FSD SFC — Flexibility and Efficiency



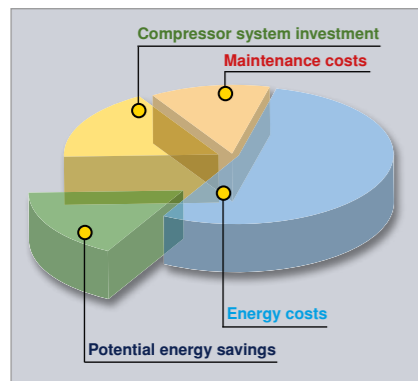
Flexible pressure adjustment

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



SFC module

As with the PC-based SIGMA CONTROL compressor controller, the KAESER SFC's frequency converter is manufactured by Siemens. This enables seamless communication between the two modules to ensure optimum system performance.



Energy savings

Energy costs account for over 70 percent of total compressed air costs. The larger the compressor system, the larger the potential for improved efficiency and operational cost savings. KAESER compressors are therefore designed to provide exceptional efficiency and use the very latest technology. They form the basis for reliable and cost-effective compressed air production as part of a professionally planned compressed air supply system.

Even quieter

The new cooling system combines optimum sound damping with enhanced cooling. Normal conversation can take place right next to a running ESD / FSD compressor.



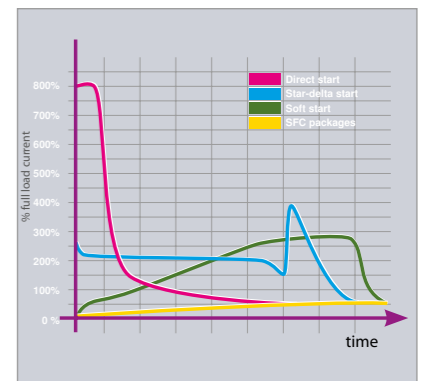
Perfect performance – even at high ambient temperatures

The generously sized SFC module with its efficiently cooled control cabinet allows trouble-free operation even at ambient temperatures of up to +45 °C.



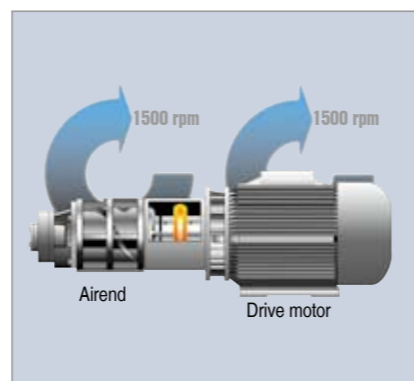
Soft start

Soft start allows a gradual increase in drive motor current from zero to full load, enabling almost unlimited motor switching frequency i.e. the number of times the motor can be switched on within a defined time period without overheating. Current spikes that can potentially cause damage to power systems and equipment are reliably eliminated without the need for additional expensive electronics.



Setting the standard: ESD & FSD

When dealing with consumption of mass volumes of compressed air, not only is air system reliability important, but so too is efficient compressed air production. KAESER's ESD & FSD series compressors ensure outstanding performance and provide highly efficient, modular solutions that are specifically designed to meet these requirements. Moreover, KAESER's innovative cooling system – fitted as standard in each model – helps to further reduce energy consumption and therefore costs.

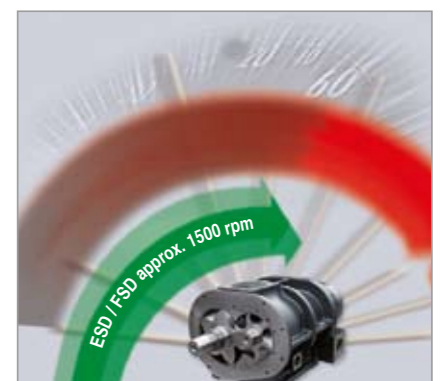


Energy-saving one-to-one drive

The motor and airend are joined by the coupling and its housing to form a compact and durable unit that is virtually maintenance-free. Furthermore, reliability and service life are increased through elimination of wear and transmission losses, as 1:1 drive reduces the number of components needed in comparison with gear drive.

Low speed operation

A specific drive power can be used to turn a smaller airend at high speed or a larger airend at low speed. Larger, low speed airends are more efficient, delivering more compressed air for the same drive power. Further advantages include minimal sound levels, long service life and reduced maintenance requirement.



Equipment

Complete unit

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

Sound insulation

Lined with glass-fibre laminated mineral wool, maximum 76-81 dB (A) to PN8NTC 2.3 at 1m distance, free-field measurement.

Vibration damping

Base frame with dual anti-vibration mountings using rubber bonded metal elements.

Airend

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

Drive

Direct drive via high-flex coupling, without gearing.

Electric motor

High efficiency EFF1-rated motors consume less power for greater output and are standard throughout the range of KAESER compressors. The motors are protected to IP 55 and conform to insulation Class F for greater power reserve. Full motor protection via PT100 temperature sensors (FSD), thermistor sensors (ESD). Motor bearings are lubricated externally.

Connection from motor to airend

Cast coupling flange.

Fluid and air flow

Dry air intake filter with pre-filtration, pneumatic inlet and venting valves, cooling-fluid reservoir with three-stage separator system, pressure relief valve, minimum pressure / check valve,

thermostatic valve and micro-filter in coolant circuit, all fully piped using flexible couplings.

Cooling

Standard versions are air cooled; separate aluminium coolers for compressed air and fluid, radial fan driven by its own motor.

Electrical components

Control cabinet to IP 54 containing automatic star-delta starter combination, motor overload protection, control transformer and volt-free contacts for ventilation control.

SIGMA CONTROL

Interfaces for data communication comprising RS 232 for a modem, RS 485 for a slave compressor in base load sequencing mode and a Profibus DP interface for data networks.



Ergonomic control panel

Red, yellow and green LEDs show system operational status at a glance. Also features a four-line plain text display, 30 selectable languages, touch keys with icons and a duty cycle indicator.

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.

(For further information refer to SIGMA CONTROL/ SIGMA CONTROL BASIC brochure 780)



KESS (KAESER's Energy Saving System) 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 needs. Typically ensuring a 95-98% load capacity, KAESER compressed air systems provide exceptional efficiency and produce application-specific quality compressed air at lowest possible cost. Use this expertise to your

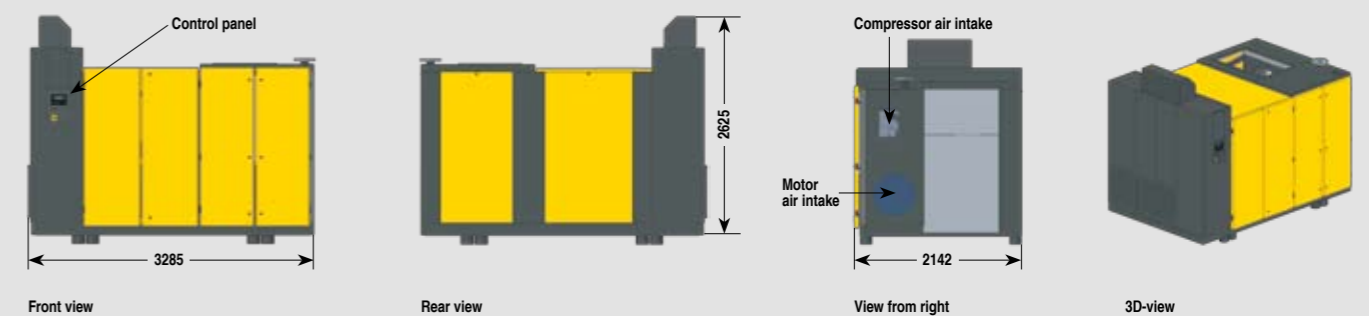
advantage and let KAESER design your compressed air system.

Technical Specifications - ESD SFC Variable speed drive version

Model	Working pressure bar	FAD *) Complete package at working pressure m³/min	Max. working pressure bar	Speed min-max rpm	Rated motor power kW	Dimensions W x D x H mm	Sound level **) dB(A)	Weight kg
ESD 351 SFC	7.5	8.45 - 33.0	6 - 8.5	450 - 1650	200	3285 x 2142 x 2625	76	5800
	10	6.45 - 27.3	9 - 12	450 - 1710				
	13	5.17 - 23.7	13 - 15	450 - 1800				
ESD 441 SFC	7.5	10.2 - 40.5	6 - 8.5	450 - 1725	250	3285 x 2142 x 2625	79	6200
	10	8.5 - 36.4	9 - 12	450 - 1845				
	13	6.13 - 29.5	13 - 15	450 - 1920				

Dimensions

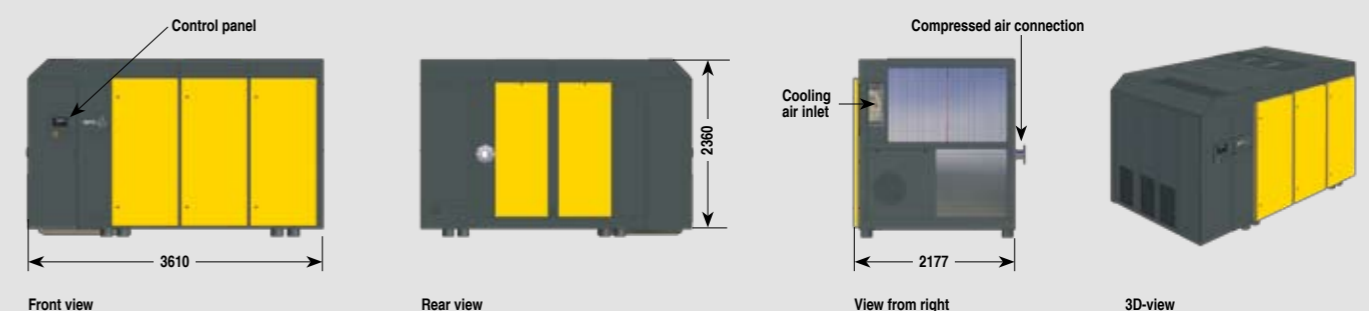
ESD SFC



Technical Specifications - FSD SFC Variable speed drive version

Model	Working pressure bar	FAD *) Complete package at working pressure m³/min	Max. working pressure bar	Speed min-max rpm	Rated motor power kW	Dimensions W x D x H mm	Sound level **) dB(A)	Weight kg
ESD 351 SFC	7.5	13.3 - 52.1	6 - 8	450 - 1620	315	3610 x 2177 x 2360	81 Air-cooled 77 Water-cooled	7700
	10	9.8 - 45.1	9 - 12	450 - 1920				
	13	9.4 - 39.7	13 - 15	450 - 1590				

FSD SFC

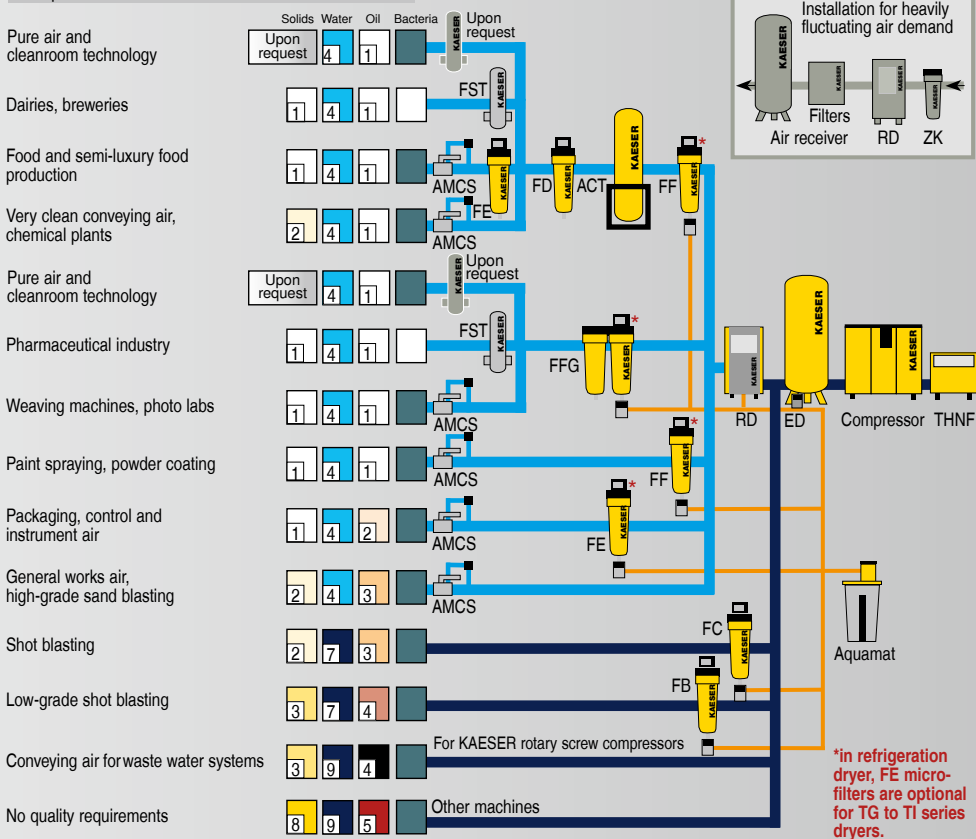


*) FAD to ISO 1217: 1996, Annex C; **) Sound level to PN8NTC 2.3 at 1 m distance, free-field measurement

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 8573-1¹⁾

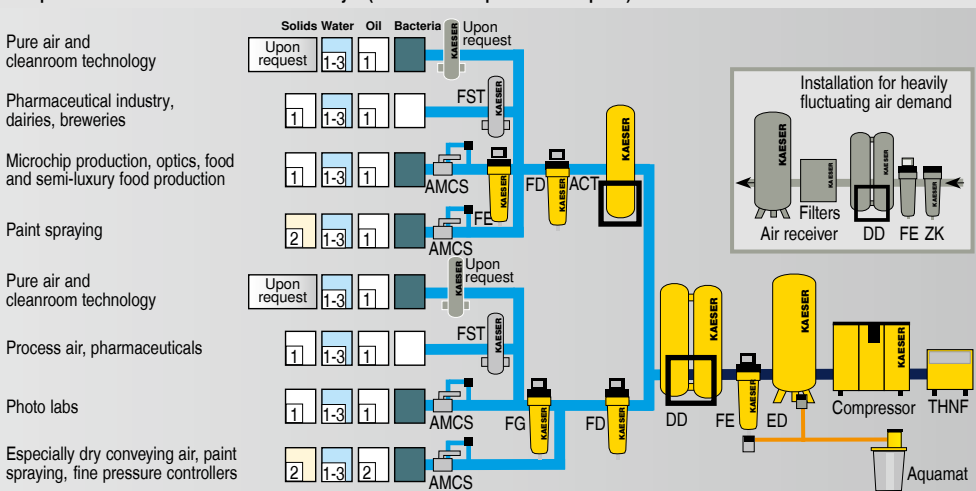


Explanation:

- THNF = Bag filter**
Cleans dusty and heavily contaminated intake air
- ZK = Centrifugal separator**
Separates accumulating condensate
- ED = Eco Drain**
Electronic level-controlled condensate drain
- FB = Pre-filter**
- FC = Pre-filter**
- FD = Particulate filter (attrition)**
- FE = Micro-filter**
Separates aerosol oil and solid particles
- FF = Micro-filter**
Separates aerosol oil and solid particles
- FG = Activated carbon filter**
For adsorption of oil vapours
- FFG = Activated carbon and micro-filter combination**
- RD = Refrigeration dryer**
For drying compressed air, pressure dew point to +3 °C
- DD = Desiccant dryer**
For drying compressed air, pressure dew point to -70 °C
- ACT = Activated carbon adsorber**
For adsorption of oil vapours
- FST = Sterile filter**
For sterile compressed air
- Aquamat = Condensate treatment system**
- AMCS = Air-main charging system**

For air mains subject to sub-zero temperatures:

Compressed air treatment with a desiccant dryer (down to -70 °C pressure dew point)



Degree of filtration:

Class ISO 8573-1	Solid particles ¹⁾		Humidity ²⁾	Total oil content ²⁾ mg/m ³
	Max. particle size µm	Max. particle concentration mg/m ³	Pressure dew point (x = liquid water in g/m ³)	
0	e.g. Consult Kaeser regarding pure air and cleanroom technology			
1	0.1	0.1	≤ -70	≤ 0.01
2	1	1	≤ -40	≤ 0.1
3	5	5	≤ -20	≤ 1
4	15	8	≤ +3	≤ 5
5	40	10	≤ +7	-
6	-	-	≤ +10	-
7	-	-	x ≤ 0.5	-
8	-	-	0.5 < x ≤ 5	-
9	-	-	5 < x ≤ 10	-

¹⁾ As per ISO 8573-1:1991 (The specification for particle content is not measured as per ISO 8573-1:2001, as the limits defined therein for Class 1 are to be applied to 'Clean Rooms')

²⁾ As per ISO 8573-1:2001

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