KAESER COMPRESSORS®

Rotary Screw Compressors

BSD Series

With the world-renowned SIGMA PROFILE

Flow rate 1.12 to 8.19 m^3/min, Pressure 5.5 to 15 bar

www.kaeser.com

BSD Series

BSD – More efficient than ever

With its latest generation of BSD series rotary screw compressors, KAESER pushes the boundaries of compressed air availability and efficiency even further. Not only do they deliver more compressed air for less energy, but they also combine user-friendliness and ease of maintenance with exceptional versatility and environmentally responsible design.

BSD – Multiple savings

New BSD series compressors from KAESER save energy in numerous different ways. Equipped with newly refined SIGMA PROFILE rotors, the airends are controlled and monitored by the industrial PC-based SIGMA CONTROL 2 compressor controller. This advanced controller matches compressed air delivery to actual current demand and keeps costly idling time to an absolute minimum, thanks to its Dynamic control mode.

Perfect partners

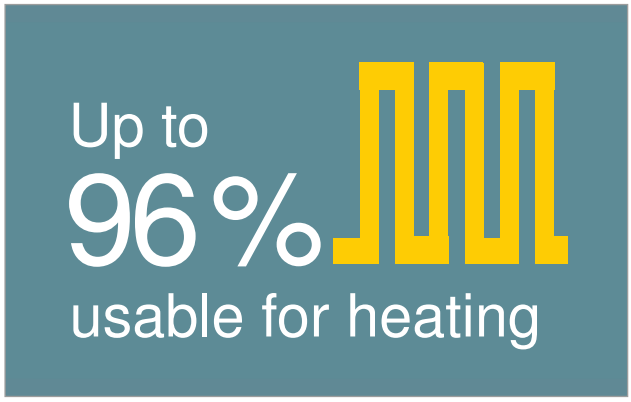
BSD series rotary screw compressors are the perfect partners for high-efficiency industrial compressed air stations. The internal SIGMA CONTROL 2 controller offers numerous communication channels, allowing seamless integration into master control systems such as KAESER's SIGMA AIR MANAGER, as well as in-house central control systems. This allows unprecedented levels of efficiency to be achieved.

Variable speed control with reluctance motor

The new synchronous reluctance motor combines the advantages of both asynchronous and synchronous motors, all within a single drive system. The motor contains no aluminium, copper or expensive rare earth materials, making the drive system durable and easy to service. Furthermore, the functional principle keeps heat losses in the motor to a minimum, which results in significantly lower bearing temperatures, thereby ensuring extended service life for the motor and bearings. In terms of losses, the synchronous reluctance motor, coupled with a perfectly-matched frequency converter, delivers superior performance over asynchronous motors — especially in the partial load range.

Electronic Thermo Management (ETM)

Powered via an electric motor and integrated into the cooling circuit, the sensor-controlled temperature control valve is at the heart of the innovative Electronic Thermo Management (ETM) system. The new SIGMA CONTROL 2 compressor controller monitors inlet air and compressor temperature so as to prevent the formation of condensate, even at varying air humidity levels. The ETM system dynamically control fluid temperatures, ensuring they remain as low as possible for greater energy efficiency. It also enables the operator to adapt the heat recovery system better to suit their specific requirements.



Why choose heat recovery?

In fact, the question should be: Why not? Amazingly, up to 100% of the (electrical) energy supplied to a compressor is converted into heat. Up to 96% of this energy can be recovered and reused for heating purposes. This not only reduces primary energy consumption, but also improves the company's overall energy balance.

Service-friendly design

MADE BY KAESER

Image: BSD 65


SUPER PREMIUM EFFICIENCY
IE4
MOTOR
Anmeldung erfolgreich
Kennwort ändern mit Taste:
Name: K00000100
Level: 5
Gültig bis: 02/20XX
KAESER
RFID
SIGMA CONTROL 2
www.kaeser.com
KAESER
KOMPRESSOREN
02/20XX

BSD Series

Uncompromising efficiency

Energy savings with SIGMA PROFILE

At the heart of every BSD rotary screw compressor lies a premium-quality airend featuring Kaeser's energy-saving SIGMA PROFILE rotors. Flow-optimised for impressive performance, these advanced rotors help KAESER BSD systems set the highest standards in terms of specific output.

SIGMA CONTROL 2: Optimum efficiency

The internal SIGMA CONTROL 2 controller ensures efficient compressor control and monitoring at all times. The large display and RFID reader provide easy communication and maximum security. Variable interfaces enable seamless networking capability, whilst the SD card slot makes updates quick and easy.

Tomorrow's technology, available today: IE4 motors

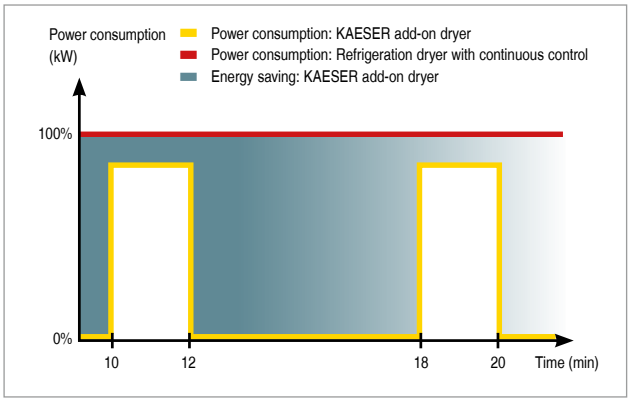
KAESER is currently the only compressed air systems provider to equip some of its compressors with Super Premium Efficiency IE4 drive motors as standard, thereby delivering unrivalled levels of performance and energy efficiency.

Required temperature assured

The innovative Electronic Thermo Management (ETM) system dynamically controls fluid temperatures according to the prevailing operating conditions, so as to ensure reliable prevention of condensate accumulation and also to boost energy efficiency.

BSD T series

Premium compressed air quality thanks to add-on refrigeration dryer



Energy saving control

BSD T units are equipped with a highly efficient integrated refrigeration dryer featuring energy saving control. This means that the dryer is only activated when compressed air actually needs to be dried: as a result, the required compressed air quality is achieved with maximum energy efficiency.

Dependable KAESER centrifugal separator

A KAESER centrifugal separator with electronic ECO-DRAIN condensate drain is installed upstream from the refrigeration dryer, ensuring reliable condensate pre-separation and drainage, even at high ambient temperatures and humidity levels.

Refrigeration dryer with ECO-DRAIN

The refrigeration dryer also features a level-controlled ECO-DRAIN electronic condensate drain, which reliably eliminates the compressed air losses associated with units using solenoid valve control. This saves energy and considerably enhances operational reliability.

Future-proof refrigerant

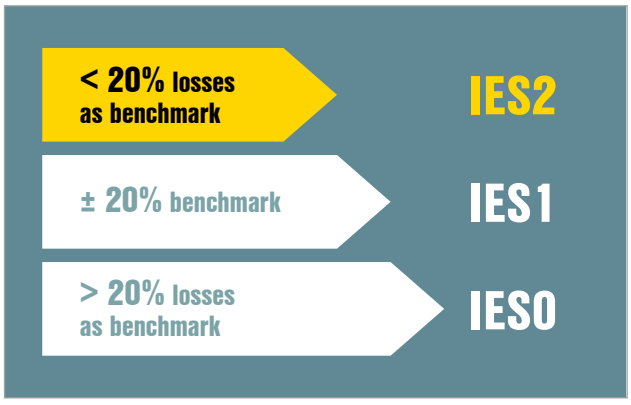
The new EU 517/2014 F-Gas Regulation is intended to minimise emissions of fluorinated greenhouse gases and therefore contribute to limiting global warming. KAESER's new T-systems are designed to use R-513A refrigerant, which has a very low GWP (Global Warming Potential) value. This means that these efficient dryers will be future-proof for their entire life cycle.

Image: BSD 83 T

High-efficiency drive system: Efficiency class IES2

The new standard: IEC 61800-9-2

The European eco-compatible design standard IEC 61800-9-2 defines the requirements for drive systems in electrically driven production machines. It specifies a required level of system efficiency, taking into account losses from the motor and frequency converter. With 20% lower losses as compared to the benchmark, KAESER systems meet this standard with ease.

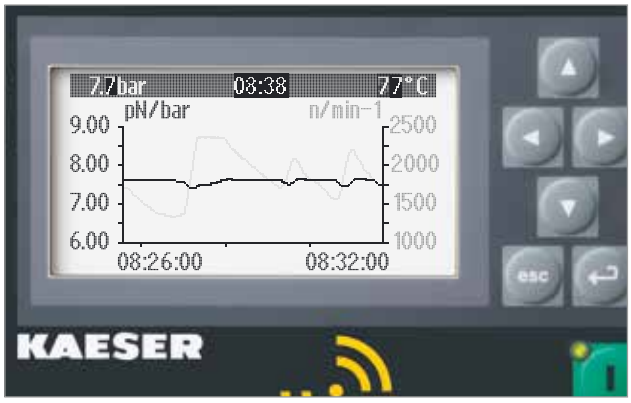


Maximum energy efficiency

KAESER's frequency-controlled systems meet the IES2 efficiency standard, which is the highest achievable level of efficiency as per IEC 61800-9-2. The level IES2 indicates that losses are 20% lower than the required benchmark.

BSD (T) SFC series

Rotary screw compressors with variable speed control and synchronous reluctance motor



Precision pressure control

The flow rate can be adjusted within the control range, according to pressure. The working pressure is kept constant to within ±0.1 bar. This allows the maximum pressure to be reduced, thereby saving energy and therefore costs.

Durable and service-friendly

Durable and service-friendly: The rotors in the synchronous reluctance motor do not contain aluminium, copper or magnetic rare earth materials. This makes the bearings and rotors as easy to replace as those in asynchronous motors. The functional principle keeps heat losses in the motor to a minimum, which results in significantly lower bearing temperatures, thereby ensuring extended service life for the motor and bearings.

Separate SFC control cabinet

The SFC frequency converter is housed within its own control cabinet, in order to shield it from heat arising from the compressor. A separate fan keeps operating temperatures in the optimum range, so as to ensure maximum performance and longest possible service life.

EMC-certified

It goes without saying that the SFC control cabinet and SIGMA CONTROL 2 are tested and certified, both as individual components and as a complete system, to EMC directive EN 55011 for Class A1 industrial power supplies.

BSD (T) SFC series

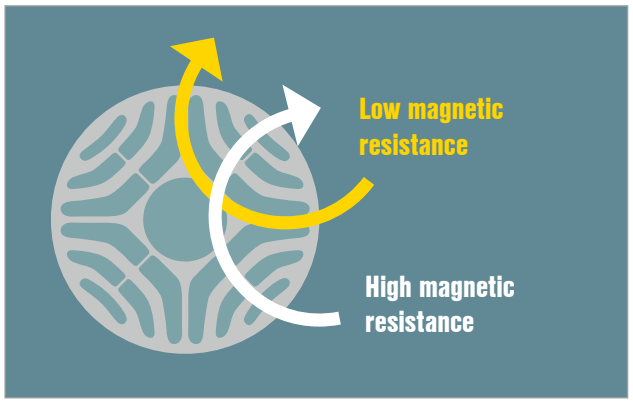
Maximum efficiency with frequency-controlled synchronous reluctance motors

High-efficiency synchronous reluctance motor

This range of motors combines the advantages of both asynchronous and synchronous motors, all within a single drive system. The rotors contain no aluminium, copper or magnetic rare earth materials. They are constructed from electrical steel, feature a special profile and are arranged in series. This makes the drive highly durable and easy to service.

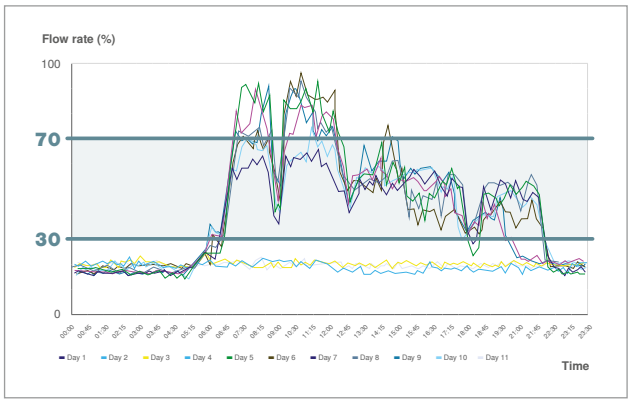
High-performance frequency converter

The Siemens frequency converter has a control algorithm specifically adapted to the motor. With the perfectly-matched combination of frequency converter and synchronous reluctance motor, KAESER achieves the highest possible system efficiency class of IES2 as per IEC 61800-9-2.



How the reluctance motor works

In a synchronous reluctance motor, the torque is generated by magnetic reluctance. The rotor features salient poles and is made of a soft magnetic material, such as electrical steel, which is highly permeable to magnetic fields.

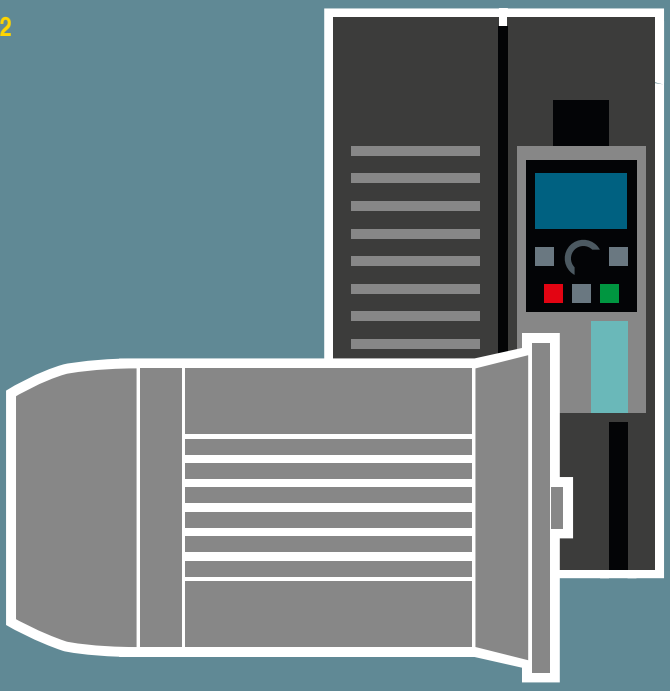


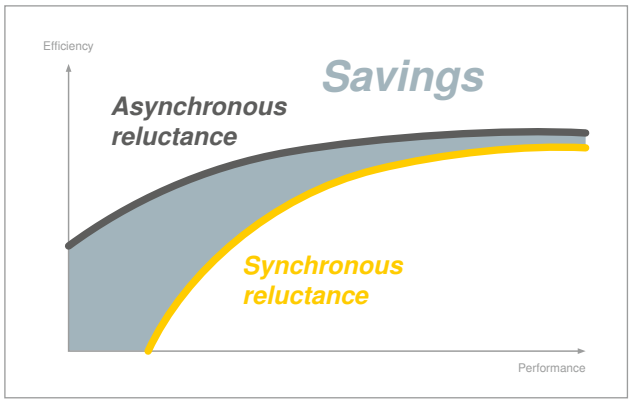
Minimal operating costs – exceptional productivity

Considerable energy savings are possible thanks to significantly higher levels of efficiency – especially in the partial load range – as compared to systems using asynchronous drive motors. The low moment of inertia of synchronous reluctance motors allows very short cycles, thereby boosting the productivity of the machine and the system as a whole.

Your benefits at a glance:

- Best system efficiency class: IES2 as per IEC 61800-9-2
- Maximum energy efficiency across the whole control range
- Durable, service-friendly drive system
- Advanced drive technology
- Minimal operating costs, high productivity and availability
- Industrie 4.0-ready
- Complete system EMC-certified





Applications for compressors with variable speed control and synchronous reluctance motor

A recent study shows that the typical compressed air consumption profile is in the range of 30–70% of the maximum. This is where a rotary screw compressor equipped with variable speed control and a synchronous reluctance motor can demonstrate its energy efficiency advantages in the partial load range to the full.

High efficiency in partial load operation

Synchronous reluctance motors achieve significantly higher efficiency in the partial load range than asynchronous motors. This allows savings of up to 10% when compared to conventional variable-speed systems.

Savings calculation example for warm air heat recovery in terms of fuel oil (BSD 65)

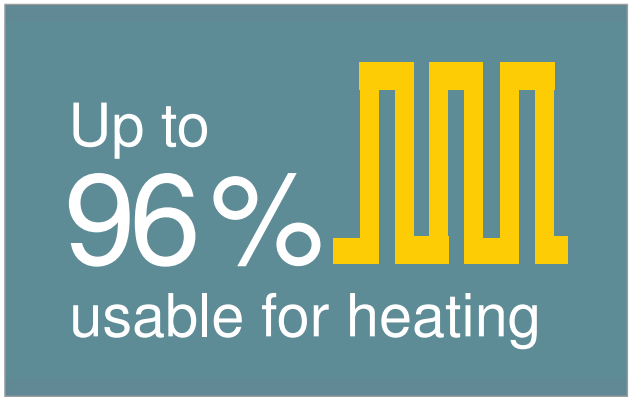
Maximum available heat capacity:	35.2 kW
Calorific value per litre of fuel oil:	9.86 kWh/l
Fuel oil heating efficiency:	90% (0.9)
Price per litre of fuel oil:	0.60 €/l

Cost saving: $\frac{35.2 \text{ kW} \times 2000 \text{ h per year}}{0.9 \times 9.86 \text{ kWh/l}}$ x 0.60 €/l **= € 4,759 per year**

Further information regarding heat recovery:
http://www.kaeser.com/products/rotaryscrewcompressors/heatrecovery/

Heat recovery system

Cost-effective heating

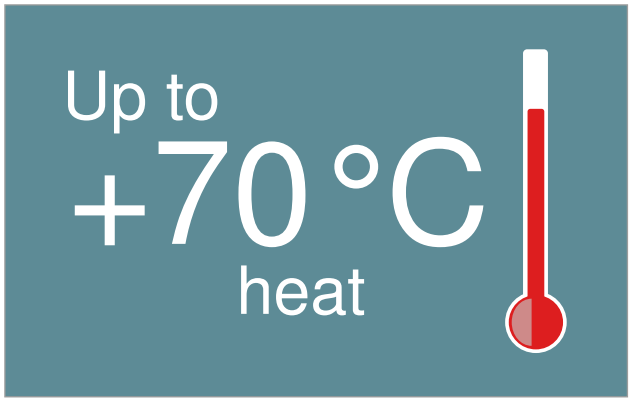


Heat recovery just makes sense

Amazingly, 100% of the electrical drive energy supplied to a compressor is converted into heat energy. Of that heat, up to 96% can be recovered and reused for heating purposes. Use this potential to your advantage!

Space heating with warm exhaust air

Heating made simple: Thanks to the radial fan with high residual thrust, (warm) exhaust air can easily be ducted away to spaces that require heating. This simple process is thermostatically controlled.



Process, heating and service water

Thanks to the plate-type* heat exchanger system, compressor exhaust heat can be used to produce hot water with temperatures up to +70 °C, which can then be used for a wide range of applications. Higher temperatures are available upon request.

*) optionally available integrated into the package

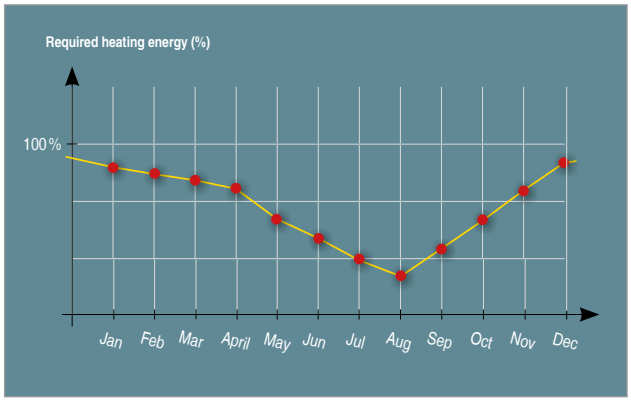
Clean hot water

When there is no other water circuit connected, special fail-safe heat exchangers meet the highest demands for water purity, such as those required for cleaning water in the foodstuff industry.

Energy-saving, versatile and flexible

PTG plate-type heat exchanger system

PTG plate-type heat exchangers consist of a package of pressed stainless steel plates. They provide excellent heat exchange characteristics from an impressively compact design. PTG heat exchangers can be integrated into existing hot water supply systems and are suited for industrial applications.



Required heating energy across the whole year

It goes without saying that heating is essential during the winter months. However, it is also needed to a greater or lesser extent at other times of the year, such as in the spring and autumn. In fact, energy for heating purposes is actually required for approximately 2000 hours per year.

Conserve energy resources

In view of steadily rising energy costs, conservation of energy resources is not only important for the environment, but also an economic necessity. Heat recovered from rotary screw compressors can not only be used for space-heating purposes during the winter months, but can also reduce energy costs when used for other processes.

Use heat energy for your heating systems

Up to 76 percent of the original energy supplied to the compressor can be recovered and reused in water heating systems and service water installations. This significantly reduces the primary energy demand required for heating purposes.

Equipment

Complete system

Ready-to-run, fully automatic, super-silenced, vibration damped, all panels powder coated. Suitable for use in ambient temperatures up to +45°C.

Sound insulation

Panels lined with laminated mineral wool.

Vibration damping

Double insulated anti-vibration mounts with rubber bonded metal elements.

Airend

Genuine KAESER single-stage airend with energy-saving SIGMA PROFILE and cooling fluid injection for optimised rotor cooling; 1:1 direct drive.

Drive

1:1 direct drive with highly flexible coupling, without gearing.

Electric motor

Standard system with Super Premium Efficiency IE4 drive motor, quality German manufacture, IP 55, Iso F class insulation for additional reserve; Pt100 temperature sensor in windings for monitoring of the motor; externally lubricated bearings.

Optional SFC frequency converter

Synchronous reluctance motor, quality German manufacture, IP 55, with Siemens frequency converter; meets IES2 system efficiency standard; externally lubricated bearings.

Electrical components

IP 54 control cabinet, control transformer, Siemens frequency converter, floating contacts for ventilation systems.

Cooling fluid and air flow

Dry air filter; pneumatic inlet and venting valve; cooling fluid reservoir with three-stage separation system; safety valve, minimum pressure check valve, Electronic Thermo Management (ETM) and eco-fluid filter in the cooling fluid circuit; fully piped, flexible line connections.

Cooling

Air-cooled; separate aluminium cooler for compressed air and cooling fluid; radial fan with separate electric motor, Electronic Thermo Management (ETM).

Refrigeration dryer

CFC-free, R-513A refrigerant, hermetically sealed refrigerant circuit, scroll refrigerant compressor with energy-saving shut-off feature, hot gas bypass control, electronic condensate drain, upstream centrifugal separator.

Heat recovery (HR)

Optionally available with integrated HR system (plate-type heat exchanger).

SIGMA CONTROL 2

"Traffic light" LED indicators show operational status at a glance, plain text display, 30 selectable languages, soft-touch keys with icons, fully automatic monitoring and control. Selection of Dual, Quadro, Vario, Dynamic and Continuous control as standard. Ethernet interface; additional optional communications interfaces for: Profibus DP, Modbus, Profinet and Devicenet; SD card slot for data-logging and updates; RFID reader, web server.

SIGMA AIR MANAGER 4.0

The refined adaptive 3-D^{advanced} Control predictively calculates and compares the various operating options and selects the most efficient one to suit the specific needs of the application. The SIGMA AIR MANAGER 4.0 constantly adjusts flow rates and compressor energy consumption in response to current compressed air demand.

This optimisation is made possible by the integrated industrial PC with multi-core processor, in combination with the adaptive 3-D^{advanced} Control. Furthermore, the SIGMA NETWORK bus converters (SBC) provide a host of possibilities to enable the system to be individually tailored to meet exact user requirements. The SBC can be equipped with digital and analogue input and output modules, as well as with SIGMA NETWORK ports, to enable seamless display of pressure, flow rate, pressure dew point, power or alarm message information.

How it works

The air for compression passes through the inlet filter (1) and the inlet valve (2) into the SIGMA PROFILE airend (3). The compressor airend (3) is driven by a high-efficiency electric motor (4). The cooling oil injected for cooling purposes during compression is separated from the air in the fluid separator tank (5). The compressed air flows through the 2-stage oil separator cartridge (6) and the minimum pressure check valve (7) into the compressed air aftercooler (8). Following cooling, any accumulating condensate is removed from the compressed air by the integrated centrifugal separator (9) and is then drained away via the add-on ECO-DRAIN condensate drain (10). The condensate-free compressed air then leaves the system via the compressed air connection (11). The heat generated during the compression process is removed from the cooling oil via the fluid cooler (12) and dissipated into the surrounding ambient air by a separate fan with fan motor (13). The cooling oil is then cleaned by the ECO fluid filter (14). The Electronic Thermo Management (ETM) system (15) ensures lowest possible operating temperatures. The control cabinet (16) houses the internal SIGMA CONTROL 2 compressor controller (17) and, depending on the compressor model, the star-delta starter or frequency converter (SFC). Versions are available featuring an add-on refrigeration dryer (18) for cooling the compressed air down to +3 °C, thereby effectively removing all moisture.

(1) Inlet filter

(2) Inlet valve

(3) SIGMA PROFILE airend

(4) IE4 drive motor

(5) Fluid separator tank

(6) Oil separator cartridge

(7) Minimum pressure check valve

(8) Compressed air aftercooler

(9) KAESER centrifugal separator

(10) ECO-DRAIN condensate drain

(11) Compressed air connection

(12) Fluid cooler

(13) Fan motor

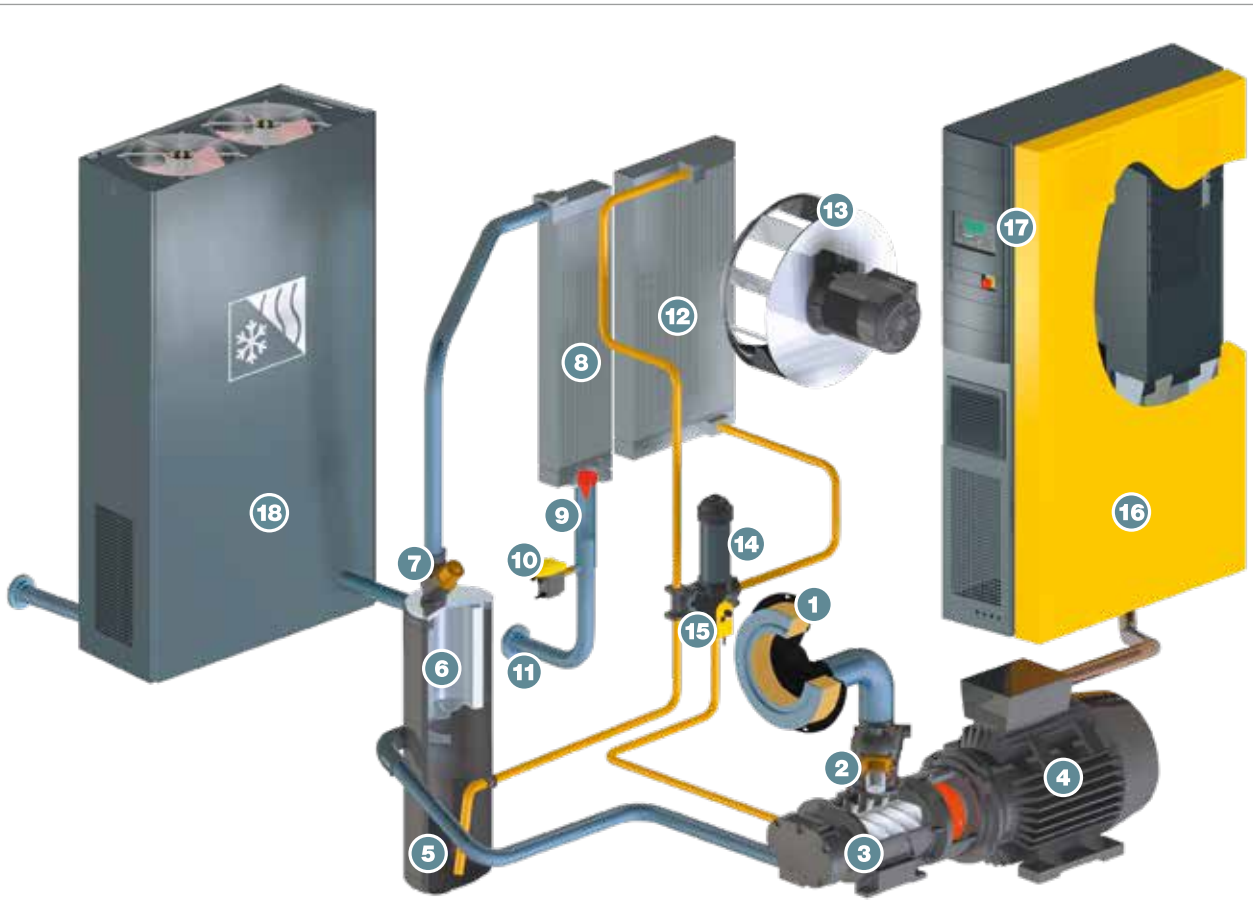
(14) ECO fluid filter

(15) Electronic Thermo Management

(16) Control cabinet with integrated SFC frequency converter

(17) SIGMA CONTROL 2 compressor controller

(18) Add-on refrigeration dryer



Technical specifications

Standard versions

Model	Gauge working pressure bar	Flow rate *) Complete system at gauge working pressure m³/min	Max. gauge pressure bar	Drive motor rated power kW	Dimensions W x D x H mm	Compressed air connection	Sound pressure level **) dB(A)	Mass kg
BSD 65	7.5	5.65	8.5	30	1590 x 1030 x 1700	G 1 ½	69	970
	10	4.52	12					
	13	3.76	15					
BSD 75	7.5	7.00	8.5	37	1590 x 1030 x 1700	G 1 ½	70	985
	10	5.60	12					
	13	4.43	15					
BSD 83	7.5	8.16	8.5	45	1590 x 1030 x 1700	G 1 ½	71	1060
	10	6.85	12					
	13	5.47	15					

SFC - Versions with variable speed control

Model	Gauge working pressure bar	Flow rate *) Complete system at gauge working pressure m³/min	Max. gauge pressure bar	Drive motor rated power kW	Dimensions W x D x H mm	Compressed air connection	Sound pressure level **) dB(A)	Mass kg
BSD 75 SFC	7.5	1.54 - 7.44	10	37	1665 x 1030 x 1700	G 1 ½	72	1020
	10	1.51 - 6.51	10					
	13	1.16 - 5.54	15					

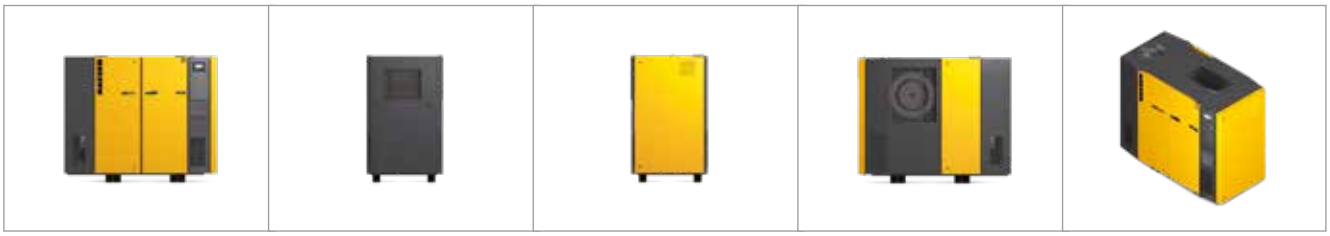
*) Flow rate complete system as per ISO 1217: 2009 Annexe C/E: inlet pressure 1 bar (a), cooling and air inlet temperature +20 °C
**) Sound pressure level as per ISO 2151 and basic standard ISO 9614-2, tolerance: ± 3 dB (A)
***) Power consumption (kW) at ambient temperature +20° C and 30% relative humidity

T - Versions with integrated refrigeration dryer (refrigerant R-513A)

Model	Gauge working pressure bar	Flow rate *) Complete system at gauge working pressure m³/min	Max. gauge pressure bar	Drive motor rated power kW	Refrigeration dryer model	Dimensions W x D x H mm	Compressed air connection	Sound pressure level **) dB(A)	Mass kg
BSD 65 T	7.5	5.65	8.5	30	ABT 83	1990 x 1030 x 1700	G 1 ½	69	1100
	10	4.52	12						
	13	3.76	15						
BSD 75 T	7.5	7.00	8.5	37	ABT 83	1990 x 1030 x 1700	G 1 ½	70	1115
	10	5.60	12						
	13	4.43	15						
BSD 83 T	7.5	8.16	8.5	45	ABT 83	1990 x 1030 x 1700	G 1 ½	71	1190
	10	6.85	12						
	13	5.47	15						

T SFC - Versions with variable speed control and integrated refrigeration dryer

Model	Gauge working pressure bar	Flow rate *) Complete system at gauge working pressure m³/min	Max. gauge pressure bar	Drive motor rated power kW	Refrigeration dryer model	Dimensions W x D x H mm	Compressed air connection	Sound pressure level **) dB(A)	Mass kg
BSD 75 T SFC	7.5	1.54 - 7.44	10	37	ABT 83	2065 x 1030 x 1700	G 1 ½	72	1150
	10	1.51 - 6.51	10						
	13	1.16 - 5.54	15						



Technical specifications for add-on refrigeration dryer

Model	Refrigeration dryer power consumption kW	Pressure dew point °C	Refrigerant	Refrigerant charge kg	Global warming potential GWP	CO_2 equivalent t	Hermetic refrigeration circuit
ABT 83	0.90	+3	R-513A	1.20	631	0.76	–

The world is our home

As one of the world's largest compressed air system providers and compressor manufacturers, KAESER KOMPRESSOREN is represented throughout the world by a comprehensive network of branches, subsidiary companies and authorised partners in over 100 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 every product operates at the peak of its performance at all times and provides maximum availability.

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