KAESER COMPRESSORS®

Rotary Screw Compressors

ASD Series

With the world-renowned SIGMA PROFILE

Flow rate 0.89 to 6.39 m³/min, Pressure 5.5 to 15 bar

www.kaeser.com

ASD series

ASD – Even more efficient

With its latest generation of ASD (ASD.4) series rotary screw compressors, KAESER KOMPRESSOREN once again pushes the boundaries of compressed air efficiency and availability. Not only do these optimised systems deliver more compressed air for less energy, they also combine simple operation and maintenance-friendliness with exceptional versatility and environmentally responsible design.

ASD – Multiple savings

The newly improved ASD systems save energy in a number of ways: equipped with further-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 air demand and keeps costly idling time to an absolute minimum, thanks to its Dynamic control mode.

Perfect partners

ASD series rotary screw compressors are the perfect partners for high-efficiency industrial compressed air stations. The internal SIGMA CONTROL 2 compressor controller offers various 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 helps achieve unprecedented levels of efficiency.

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. Together with a perfectly matched frequency converter, the synchronous reluctance motor delivers superior performance compared to an asynchronous motor when it comes to losses, particularly in the partial load range.

Electronic Thermo Management (ETM)

Powered by an electric motor and integrated into the cooling circuit, the sensor-controlled temperature control valve is the heart of the innovative Electronic Thermo Management (ETM) system. The new SIGMA CONTROL 2 compressor controller monitors the inlet air and compressor temperature in order to prevent the formation of condensate, even at varying air humidity levels. The ETM system dynamically controls 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 the specific requirements.

Up to
96 %
usable for heating

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

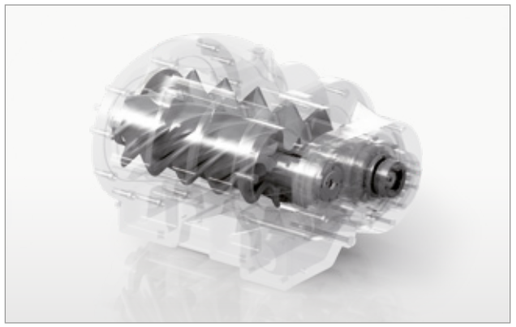
Image: ASD 60

POWER DRIVE SYSTEM IES2 EFFICIENCY

SUPER PREMIUM EFFICIENCY IE4 MOTOR

ASD series

Uncompromising efficiency



Save energy with the SIGMA PROFILE

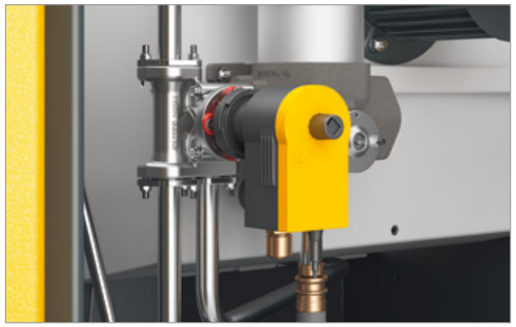
At the heart of every ASD system lies a premium-quality airend featuring Kaeser's SIGMA PROFILE rotors. Flow-optimised for impressive performance, these advanced rotors enable ASD systems to set new standards in terms of specific package input power.

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 assure clear communication and maximum security. Variable interfaces enable seamless networking capability, whilst the SD card slot makes updates quick and easy.

Tomorrow's technology, today: IE4 motors

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

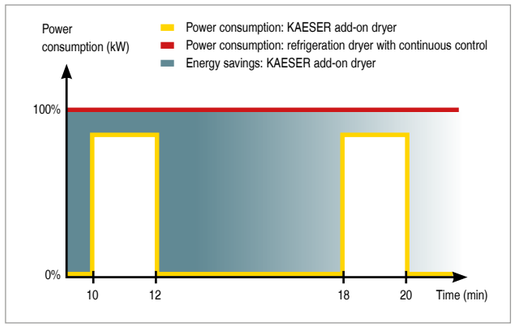


Dynamic temperature control

The innovative Electronic Thermo Management (ETM) system dynamically controls fluid temperatures according to the prevailing operating conditions. This not only ensures reliable prevention of condensate accumulation, but also boosts energy efficiency.

ASD T series

Premium compressed air quality with add-on dryer



Energy-saving control

The integrated refrigeration dryer in ASD T units provides highly efficient performance, thanks to its energy-saving control. The dryer is therefore only activated when compressed air drying is actually required: as a result, the desired 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.

Reduced refrigerant volumes

The refrigeration dryers in new ASD T units require approximately 36% less refrigerant than their predecessor models. This not only saves costs, but is also significantly more environmentally friendly.

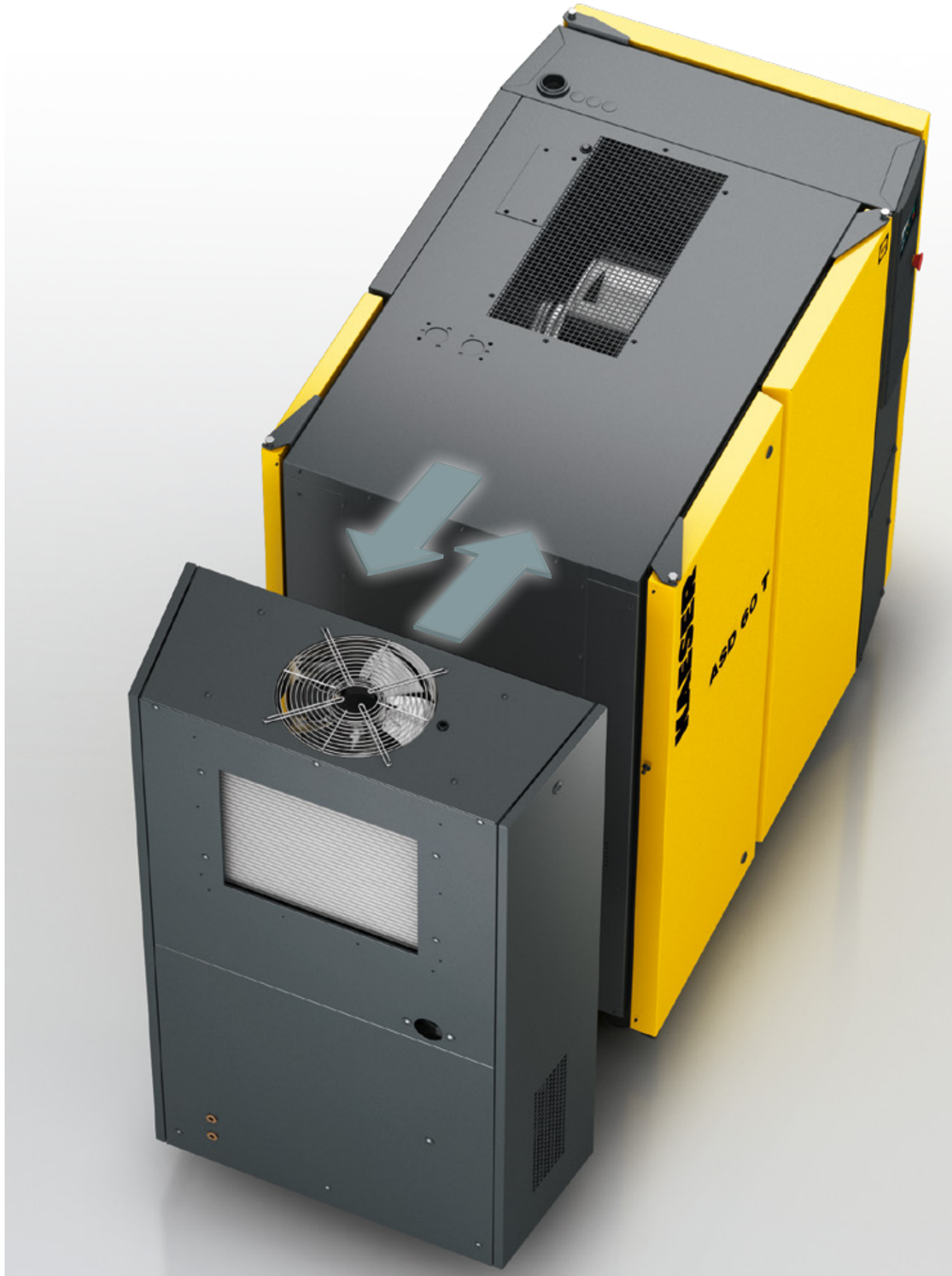
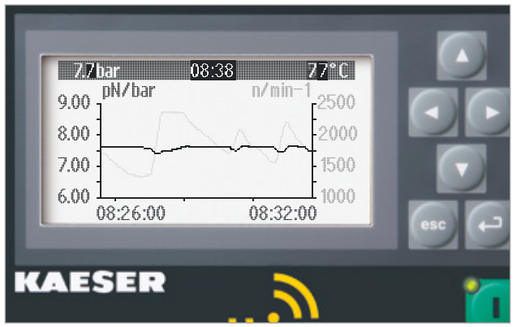


Image: ASD 60 T

High-efficiency drive system: Efficiency class IES2

ASD (T) SFC series

Speed-controlled compressor with synchronous reluctance motor



Precision pressure control

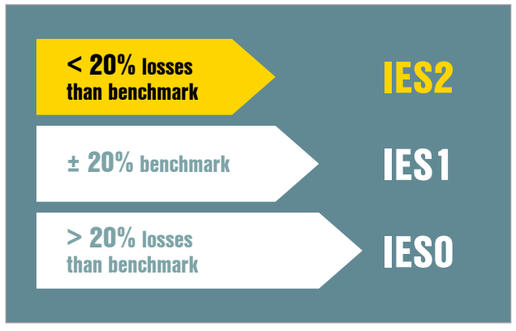
The flow rate can be adjusted within the control range, according to pressure. Working pressure is kept constant to within ±0.1 bar. This allows maximum pressure to be reduced, thereby saving energy and costs.

Durable and service-friendly

Durable and service-friendly: The rotors in the synchronous reluctance motor do not contain aluminium, copper or rare earth magnetic 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 motor and bearing service life.

The new EN 50598 standard

The European Ecodesign Standard EN 50598 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 compared to the benchmark, KAESER systems meet this standard with ease.



Maximum energy efficiency

For frequency-controlled systems in the ASD series, KAESER meets the IES2 efficiency standard, which represents the highest possible level of efficiency in a drive system under EN 50598. The IES2 standard indicates 20% lower losses in comparison to the benchmark.

Separate SFC control cabinet

The SFC frequency converter is housed in its own control cabinet to shield it from heat arising from the compressor. A separate fan maintains optimum operating temperature at all times to ensure maximum performance and long service life.

EMC-certified complete system

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

ASD (T) SFC series

Maximum efficiency with frequency-controlled synchronous reluctance motor

High-efficiency synchronous reluctance motor

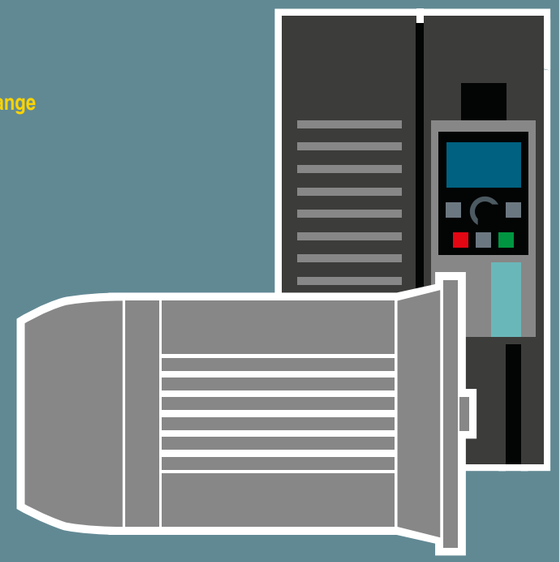
This range of motors combines the advantages of both asynchronous and synchronous motors, all within a single drive system. The rotors contain no aluminium, copper or rare earth magnetic materials. They are constructed from electrical steel, feature a special profile and are arranged in series. This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

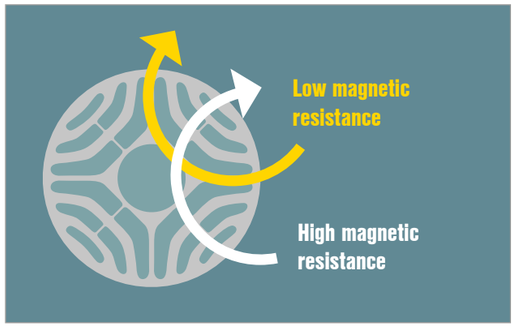
High-performance frequency converter

The Siemens frequency converter features a control algorithm specifically adapted to the motor. With this perfectly matched combination of frequency converter and synchronous reluctance motor, KAESER achieves the highest system efficiency class of IES2 as per the EN 50598 standard.

Your benefits at a glance:

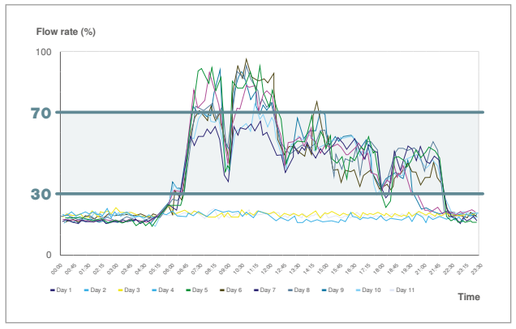
- Best system efficiency: IES2 as per EN 50598
- Maximum energy efficiency throughout the control range
- Durable, service-friendly drive system
- Advanced drive technology
- Minimal operating costs, high productivity and availability
- Industrie 4.0-ready
- EMC-certified complete system





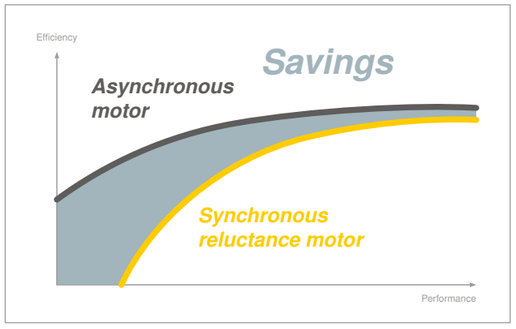
How the reluctance motor works

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 made possible thanks to significantly higher efficiency – especially in the partial load range – compared to systems equipped with asynchronous drive motors. The low moment of inertia in synchronous reluctance motors allows very short cycle times, thereby boosting the productivity of the machine and the system as a whole.



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 fully demonstrate its energy efficiency advantages in the partial load range.

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% compared with conventional variable-speed systems.

Example savings calculation for hot air heat recovery for fuel oil (ASD 60)

Maximum available heat capacity:	34.9 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: $\frac{\text{34.9 kW x 2000 h per year}}{\text{0.9 x 9.86 kWh/l}}$ x € 0.60/l **= € 4,719 per year**

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

Heat recovery system

Cost-effective heating

Up to 96 % usable for heating

Heat recovery simply 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 hot exhaust air

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

Up to +70 °C heat

Process, heating and service water

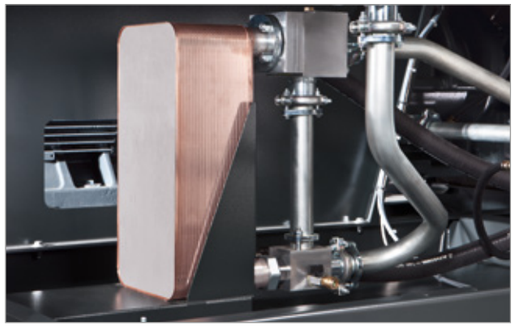
Thanks to the plate-type* heat exchanger system, compressor exhaust heat can be used to produce hot water with temperatures up to +70 °C, which can then be used for a wide range of applications. Higher temperatures are available upon request.

*) optionally available integrated into the package

Clean hot water

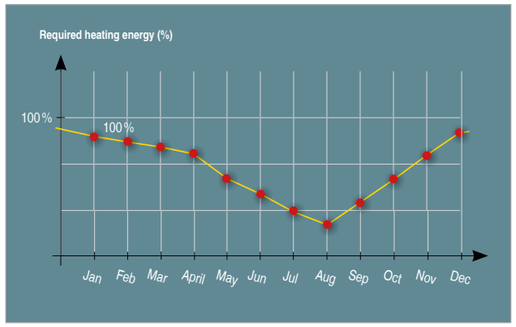
When no other water circuit is connected, special fail-safe heat exchangers meet the highest demands for water purity, such as those required for cleaning water in the food industry.

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 combine excellent heat exchange characteristics with exceptionally compact design. PTG heat exchangers can be integrated into existing hot water supply systems and are suited for industrial applications.



Required heating energy throughout the 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 both important for the environment and an economic necessity. Heat recovered from compressors can not only be used for space-heating purposes during the winter months, but can also reduce energy costs throughout the year when used for other processes.

Feed heat into your heating systems

Up to 76 percent of the energy originally 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 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

Direct, high-flex 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

SFC option

Synchronous reluctance motor, quality German manufacture, IP 55, with Siemens frequency converter; meets IES2 system efficiency class; externally lubricated motor 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 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, fully insulated, 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 operating 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

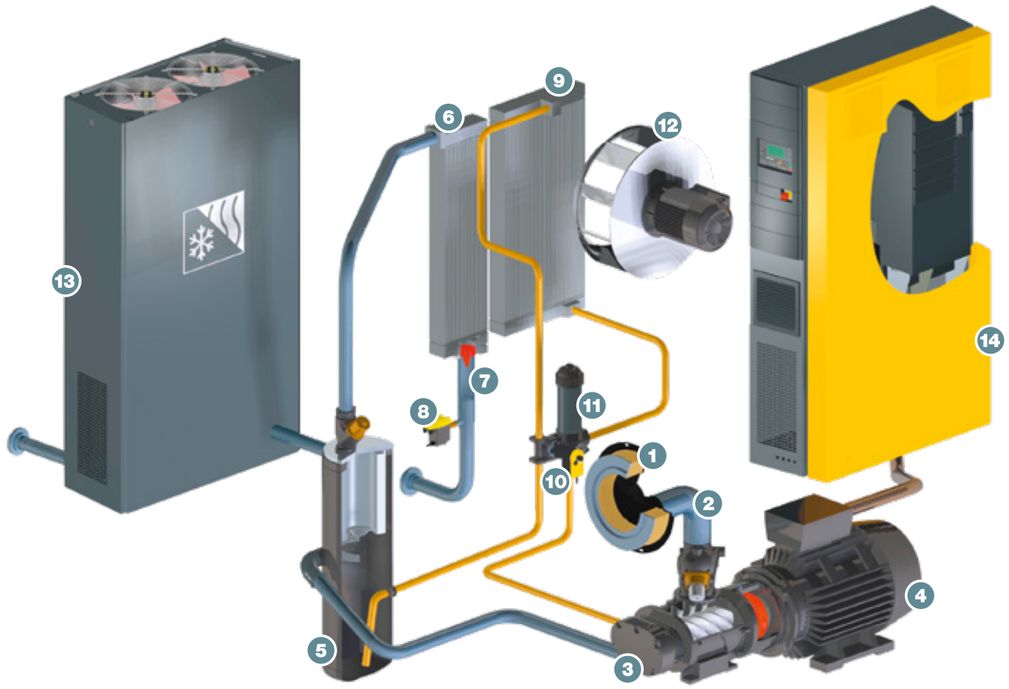
The further-refined, adaptive 3-D^{advanced} Control predictively calculates and compares the various operating options and selects the most efficient one to suit the specific needs of the application. On this basis, the SIGMA AIR MANAGER 4.0 constantly adjusts flow rates and compressor energy consumption in response to current compressed air demand. This optimisation is made possible by the integrated industrial PC with multicore processor, in combination with the adaptive 3-D^{advanced} Control. Furthermore, the SIGMA NETWORK bus converter (SBC) provides a host of possibilities for enabling the system to be individually tailored to meet specific 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, performance or alarm message information.

How it works

The airend (3) is driven by an electric motor (4). The fluid injected primarily for cooling purposes during the compression process is re-separated from the air inside the fluid separator (5). The integrated fan provides cooling for the compressor package and also ensures the necessary flow of cooling air through the oil cooler and compressed air aftercooler (6 and 9).

The controller ensures that the system generates compressed air within the defined pressure limits. Safety functions protect the compressor in the event of a key systems failure via an automatic shutdown.

(1) Intake filter
(2) Inlet valve
(3) SIGMA PROFILE airend
(4) IE4 drive motor
(5) Fluid separator tank
(6) Compressed air aftercooler
(7) KAESER centrifugal separator
(8) ECO-DRAIN condensate drain
(9) Fluid cooler
(10) Electronic Thermo Management
(11) ECO fluid filter
(12) Radial fan
(13) Add-on refrigeration dryer
(14) Control cabinet with integrated SFC frequency converter



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
ASD 35	7.5	3.16	8.5	18.5	1460 x 900 x 1530	G 1¼	65	610
	10	2.63	12					
ASD 40	7.5	3.92	8.5	22	1460 x 900 x 1530	G 1¼	66	655
	10	3.13	12					
	13	2.58	15					
ASD 50	7.5	4.58	8.5	25	1460 x 900 x 1530	G 1¼	66	695
	10	3.85	12					
	13	3.05	15					
ASD 60	7.5	5.53	8.5	30	1460 x 900 x 1530	G 1¼	69	750
	10	4.49	12					
	13	3.71	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
ASD 35 SFC	7.5	0.88 - 4.00	8.5	18.5	1540 x 900 x 1530	G 1¼	67	700
ASD 40 SFC	7.5	1.05 - 4.64	8.5	22	1540 x 900 x 1530	G 1¼	68	710
ASD 50 SFC	7.5	1.07 - 5.27	8.5	25	1540 x 900 x 1530	G 1¼	68	755
	10	1.00 - 4.58	13					
	13	0.93 - 3.82	13					
ASD 60 SFC	7.5	1.26 - 6.17	8.5	30	1540 x 900 x 1530	G 1¼	70	795
	10	1.00 - 4.76	15					
	13	0.93 - 4.14	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
ASD 35 T	7.5	3.16	8.5	18.5	ABT 60	1770 x 900 x 1530	G 1¼	65	705
	10	2.63	12						
ASD 40 T	7.5	3.92	8.5	22	ABT 60	1770 x 900 x 1530	G 1¼	66	750
	10	3.13	12						
	13	2.58	15						
ASD 50 T	7.5	4.58	8.5	25	ABT 60	1770 x 900 x 1530	G 1¼	66	790
	10	3.85	12						
	13	3.05	15						
ASD 60 T	7.5	5.53	8.5	30	ABT 60	1770 x 900 x 1530	G 1¼	69	845
	10	4.49	12						
	13	3.71	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
ASD 35 T SFC	7.5	0.88 - 4.00	8.5	18.5	ABT 60	1850 x 900 x 1530	G 1¼	67	795
ASD 40 T SFC	7.5	1.05 - 4.64	8.5	22	ABT 60	1850 x 900 x 1530	G 1¼	68	805
ASD 50 T SFC	7.5	1.07 - 5.27	8.5	25	ABT 60	1850 x 900 x 1530	G 1¼	68	850
	10	1.00 - 4.58	13						
	13	0.93 - 3.82	13						
ASD 60 T SFC	7.5	1.26 - 6.17	8.5	30	ABT 60	1850 x 900 x 1530	G 1¼	70	890
	10	1.00 - 4.76	15						
	13	0.93 - 4.14	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 60	0.80	+3	R-513A	0.80	629	0.50	–

More compressed air for less energy

The world is our home

As one of the world's largest manufacturers of compressors, blowers and compressed air systems, KAESER KOMPRESSOREN is represented throughout the world by a comprehensive network of wholly owned subsidiaries and authorised distribution partners in over 140 countries.

By offering innovative, efficient and reliable products and services, KAESER KOMPRESSOREN's experienced consultants and engineers work in close partnership with customers to enhance their competitive edge and to develop progressive system concepts that continuously push the boundaries of performance and technology. Moreover, decades of knowledge and expertise from this industry-leading systems provider are made available to each and every customer via the KAESER group's advanced global IT network.

These advantages, coupled with KAESER's worldwide service organisation, ensure that every product operates at the peak of its performance at all times, providing optimal efficiency and maximum availability.

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