HPC Compressed Air Systems

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.hpccompressors.co.uk

ASD Series

ASD – Even more efficient

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

ASD – Multiple savings

The newly refined ASD systems save energy in multiple ways: the compressor airends feature further refined SIGMA PROFILE rotors and are controlled and monitored via the industrial-PC-based SIGMA CONTROL 2 compressor controller. This advanced controller matches compressed air delivery to actual demand and uses dynamic control to keep costly idling time to an absolute minimum.

Variable speed with reluctance motor

The new synchronous reluctance motor combines the advantages of asynchronous and synchronous motors in one drive system. The motor contains no aluminium, copper or expensive rare earth magnets, which makes the drive durable and service-friendly. In addition, the functional principle keeps heat losses in the motor to a minimum, resulting in significantly lower bearing temperatures. This ensures significantly extended bearing and motor service life. In conjunction with the perfectly matched frequency converter, the synchronous reluctance motor also delivers superior performance compared to an asynchronous motor when it comes to losses, especially in the partial load range.

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, which allows seamless communication with advanced master controllers, such as KAESER's SIGMA AIR MANAGER, and in-house centralised control systems. This enables simple setup and achieves unprecedented levels of efficiency.

Electronic Thermo Management (ETM)

Powered via an electric motor, the sensor-controlled temperature control valve integrated into the cooling circuit is the heart of the innovative Electronic Thermo Management (ETM) system. The new SIGMA CONTROL 2 compressor controller monitors intake and compressor temperature in order to prevent condensate formation, even with differing air humidity conditions. The ETM dynamically controls fluid temperature – low fluid temperature enhances energy efficiency. This system also enables end users to better adapt heat recovery systems to suit their specific needs.

Up to
96 %
usable for heating

Why choose heat recovery?

The question should in fact be: Why not? Amazingly, up to 100 % of the (electrical) energy input 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 applicable company's total 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 help KAESER ASD systems set the highest standards for efficiency.

SIGMA CONTROL 2: Assured 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.

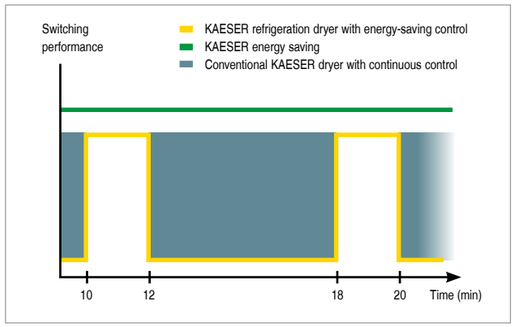
Tomorrow's technology, today: IE4 motors

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.

Required temperature assured

According to operating conditions, the innovative Electronic Thermo Management (ETM) system dynamically controls fluid temperature to ensure safe prevention of condensation accumulation and also boosts energy efficiency.

Premium compressed air quality with an add-on refrigeration dryer



Energy-saving control

The integrated refrigeration dryer in ASD-T units provides high-efficiency performance thanks to its energy-saving control. The dryer is therefore active only when compressed air actually needs to be dried: as a result, this approach achieves the required compressed air quality with maximum efficiency.

Dependable KAESER centrifugal separator

A KAESER centrifugal separator fitted with an electronic ECO-DRAIN condensate drain installed upstream from the refrigeration dryer ensures that condensate is reliably pre-separated and drained, even when ambient temperatures and humidity are high.

Refrigeration dryer with ECO-DRAIN

The refrigeration dryer also features an ECO-DRAIN. The advanced level-controlled condensate drain eliminates the compressed air losses associated with solenoid valve control, thereby saving energy and considerably enhancing operational dependability.

Minimal refrigerant requirement

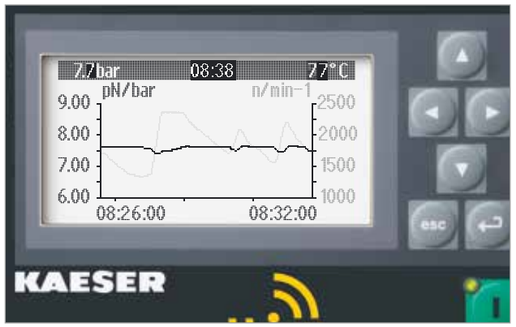
The refrigeration dryers in the new ASD-T units require approximately 36 % less refrigerant than previous generation dryers. This not only saves costs, but is also significantly more environmentally friendly.

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. Operating pressure is kept constant to within ±0.1 bar. This allows maximum pressure to be reduced, which, in turn, leads to significant energy and money savings.

Durable and service-friendly

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

The new EN 50598 standard

The European eco-compatible design standard EN 50598 defines the requirements for drive systems in electrically driven production machines. It specifies system efficiency, taking into account losses from the motor and frequency converter. With 20 % lower losses compared to the benchmark, KAESER systems meet the standard with ease.

Maximum energy efficiency

For the variable frequency systems in the ASD series, KAESER meets the IES2 system efficiency standard, which indicates the highest possible level under the EN 50598 standard. IES2 designation indicates 20 % lower losses compared to the benchmark.

Separate SFC control cabinet

The SFC variable speed drive is housed in its own control cabinet to shield it from heat from the compressor. A separate fan keeps operating temperatures in the optimum range to ensure maximum performance and service life.

Entire system 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.

ASD (T) SFC series

Maximum efficiency with variable frequency synchronous reluctance motor

Efficient synchronous reluctance motor

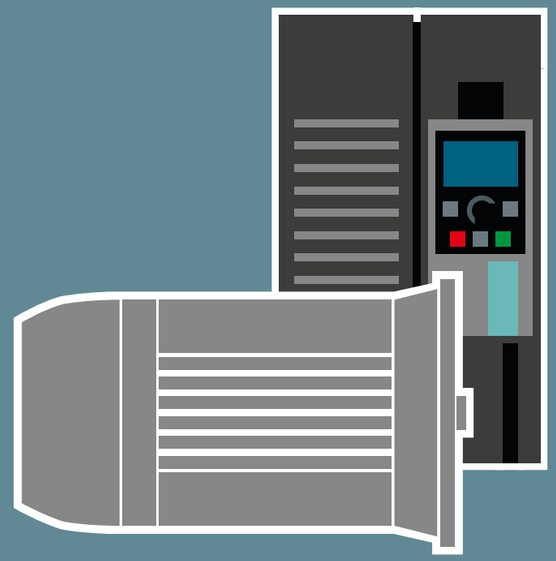
This motor series combines the advantages of asynchronous motors and synchronous motors in one drive system. The rotors do not use aluminium, copper or expensive rare earth magnets. Instead they are made of electrical steel with a specialised profile and arranged in series. This makes the drive highly durable and service-friendly.

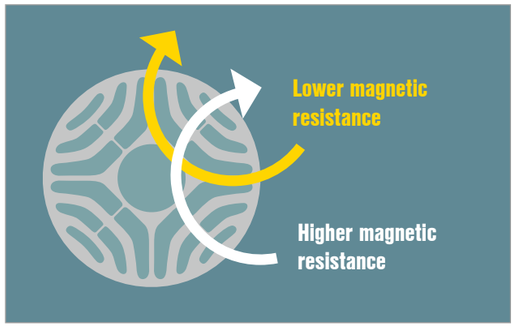
Combined with a high-performance frequency converter

The Siemens frequency converter has a motor-matched control algorithm. With the fine-tuned combination of a frequency converter and a synchronous reluctance motor, KAESER achieves the top system efficiency level IES2 under the EN 50598 standard.

Your benefits at a glance:

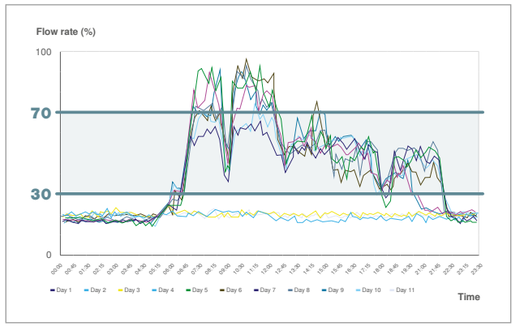
- Best system efficiency: IES2 as per EN 50598
- Maximum energy efficiency throughout the control range
- Durable and service-friendly drive
- Advanced drive technology
- Minimal operating costs, high productivity and availability
- Industrie 4.0 ready
- Entire system EMC-certified





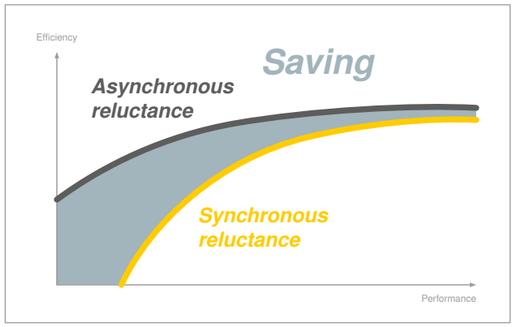
How the reluctance motor works

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



Minimal operating costs – exceptional productivity

Significantly greater efficiency – especially in the partial load range – than comparable asynchronous systems helps achieve considerable energy savings. The low moment of inertia of synchronous reluctance motors allows high cycle rates, thereby boosting machine and system productivity.



Applications for speed-controlled compressor systems with synchronous reluctance motors

A recent study shows that the typical compressed air consumption profile is in the 30-70 % range of the maximum. This is where a speed-controlled rotary screw compressor with synchronous reluctance motor can display its energy efficiency advantages in the partial-load range to the fullest.

High efficiency in partial-load operation

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

Savings calculation example for warm air heat recovery in terms of fuel oil (ASD 60)

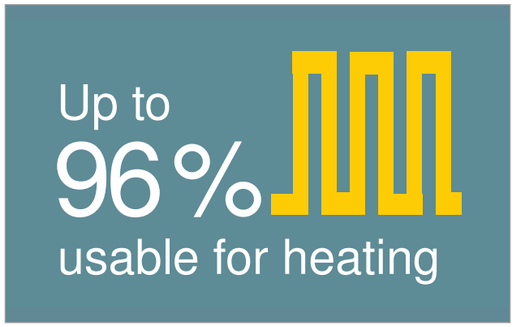
Maximum available heat capacity:	34.9 kW
Fuel value per litre of fuel oil:	9.86 kWh/l
Fuel oil heating efficiency:	90 % (0.9)
Price per litre of fuel oil:	0.60 €/l

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/int-en/products/rotary-screw-compressors/heat-recovery/

Heat recovery system

Cost-effective heating

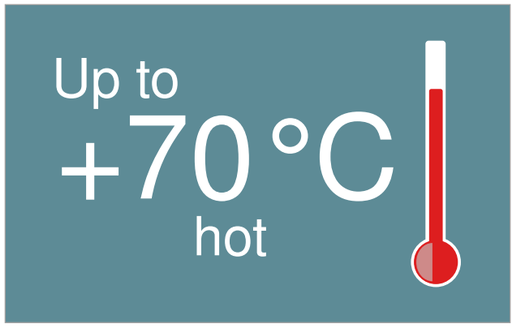


Heat recovery simply makes sense

Amazingly, 100 % of the electrical drive energy input to a compressor is converted into heat energy. Of that heat, up to 96 % is available for heat recovery purposes.
Use this potential to your advantage!

Space heating with warm exhaust air

It's heating made easy: thanks to the high residual thrust radial fan, exhaust (warm) air can be easily ducted away to spaces that require heating. This simple process is thermostatically controlled.



Process, heating and service water

Hot water, up to 70 °C, can be produced from reusable compressor heat via PWT* heat exchanger systems. Please contact KAESER regarding higher temperature requirements.

*) optionally installed within the package

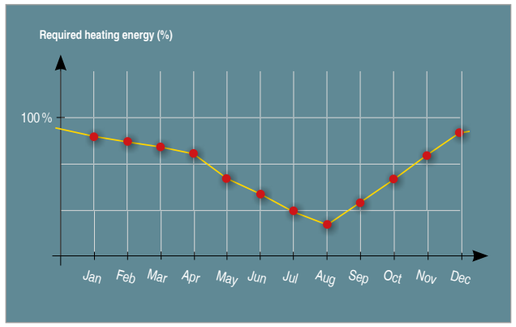
Clean hot water

If no other water circuit is interconnected, special fail-safe heat exchangers meet the highest demands for the purity of the water being heated, as with cleaning water in the food industry, for example.

Energy-saving, versatile and flexible

PTG plate heat exchanger system

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



Required heating energy over the course of a year

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

Conserve energy resources

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

Feed heat energy to a heating system

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

Equipment

Complete unit

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 mountings using 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

Direct, high-flex coupling, without gearing.

Electric motor

Standard system with premium efficiency IE4 motor, quality German manufacture, IP 55, ISO F class insulation for additional reserve; PT 100 winding temperature sensor for motor monitoring; externally lubricated bearings.

SFC option

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.

Fluid and air flow

Dry air filter; pneumatic inlet and venting valve; cooling fluid reservoir with three-stage separator system; pressure relief valve, minimum pressure check valve, Electronic Thermo Management (ETM) and eco-fluid filter in the cooling fluid circuit; fully piped connections, 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-134a refrigerant, fully insulated, hermetically sealed refrigerant circuit, scroll refrigerant compressor with energy-saving shut-off feature, hot-gas bypass control, electronic condensate drain and 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 automated 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 recording and updates; RFID reader, web server.

SIGMA AIR MANAGER 4.0

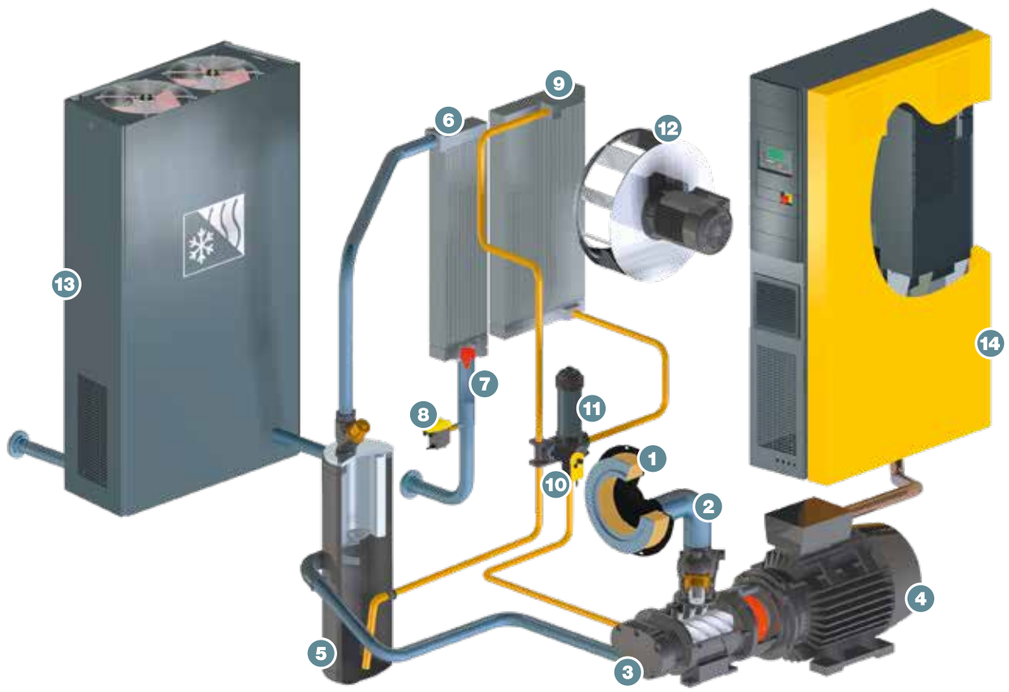
The further-refined adaptive 3-D^{advanced} Control predictively calculates and compares various operating scenarios and selects the most efficient to suit the compressed air application’s specific needs. The SIGMA AIR MANAGER 4.0 therefore automatically optimally adjusts flow rates and compressor energy consumption in response to current compressed air demand. This powerful feature 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 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 in the fluid separator (5). The integrated fan ensures cooling of the compressor package and also provides sufficient flow of cooling air through the oil cooler and compressed air aftercooler (6 and 9).

The controller ensures that the compressor produces compressed air within the set pressure limits. Safety functions protect the compressor against failure of key systems via automatic shutdown capability.

(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 version

Model	Operating pressure bar	Flow rate *) Overall package at operating pressure m³/min	Max. working 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 ¼	65	610
	10	2.63	12					
ASD 40	7.5	3.92	8.5	22	1460 x 900 x 1530	G ¼	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 ¼	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 ¼	69	750
	10	4.49	12					
	13	3.71	15					

T - Version with integrated refrigeration dryer (refrigerant R-134a)

Model	Operating pressure bar	Flow rate *) Overall package at operating pressure m³/min	Max. working pressure bar	Drive motor rated power kW	Refrigeration dryer power consumption ***)	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	0.8	1770 x 900 x 1530	G ¼	65	705
	10	2.63	12						
ASD 40 T	7.5	3.92	8.5	22	0.8	1770 x 900 x 1530	G ¼	66	750
	10	3.13	12						
	13	2.58	15						
ASD 50 T	7.5	4.58	8.5	25	0.8	1770 x 900 x 1530	G ¼	66	790
	10	3.85	12						
	13	3.05	15						
ASD 60 T	7.5	5.53	8.5	30	0.8	1770 x 900 x 1530	G ¼	69	845
	10	4.49	12						
	13	3.71	15						

SFC - Version with variable speed drive

Model	Operating pressure bar	Flow rate *) Overall package at operating pressure m³/min	Max. working 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	(Prospectively available from mid-2018)							
ASD 40 SFC	7.5	1.05 - 4.64	8.5	22	1540 x 900 x 1530	G ¼	68	755
ASD 50 SFC	7.5	1.07 - 5.27	8.5	25	1540 x 900 x 1530	G ¼	68	757
	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 ¼	70	795
	10	1.00 - 4.76	15					
	13	0.93 - 4.14	15					

T SFC - Version with variable speed drive and integrated refrigeration dryer

Model	Operating pressure bar	Flow rate *) Overall package at operating pressure m³/min	Max. working pressure bar	Drive motor rated power kW	Refrigeration dryer power consumption ***)	Dimensions W x D x H mm	Compressed air connection	Sound pressure level **) dB(A)	Mass kg
ASD 35 T SFC	(Prospectively available from mid-2018)								
ASD 40 T SFC	7.5	1.05 - 4.64	8.5	22	0.8	1850 x 900 x 1530	G ¼	68	850
ASD 50 T SFC	7.5	1.07 - 5.27	8.5	25	0.8	1850 x 900 x 1530	G ¼	68	852
	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	0.8	1850 x 900 x 1530	G ¼	70	890
	10	1.00 - 4.76	15						
	13	0.93 - 4.14	15						

*) Flow rate complete system as per ISO 1217: 2009 Annex 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

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.

HPC KAESER COMPRESSORS®

HPC Compressed Air Systems, Victoria Gardens, Burgess Hill, West Sussex RH15 9RQ
Tel: 01444 241671 **Fax:** 01444 247304 **E-Mail:** info@hpcplc.co.uk **www.hpccompressors.co.uk**

P-6512HPC Specifications are subject to change without notice. .4/18