KAESER COMPRESSORS

Rotary Screw Compressors

# CSDX series

FAD: 9.8 to 16.1 m³/min
Pressures: 5.5 to 15 bar

KAESER COMPRESSORS

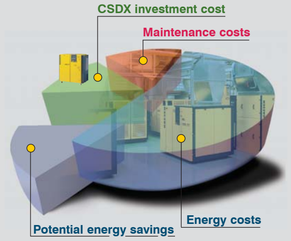
# Power Pack – high performance – small footprint

## What do you expect from a compressor?

You, as a user, expect most of all a maximum of economy and reliability from your air supplies.

That sounds simple but these advantages are influenced by many different factors.

For example, power costs will total many times the investment cost over the life of the system.



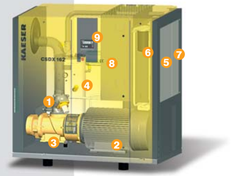

Which means that efficient use of energy is of greatest importance in the production of compressed air.

The reliability of the compressors is of equal importance; in many applications expensive manufacturing processes depend entirely on a sure supply of compressed air.

Reliability is a word that also applies to the quality of air produced and this can only come from efficient air treatment equipment.

Protection from noise pollution is better achieved by quiet compressors rather than subsequent sound containment measures.

And finally, a really efficient compressor is less costly to maintain.




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

### Kaeser's answer - the CSDX series

The new CSDX compressors put the user's requirements into operational practice. They are thrifty in power consumption, quiet, need little maintenance and reliably deliver compressed air of the highest quality. These advantages have been achieved with innovations in compressor design, drive systems, cooling and ventilation, super-silencing and servicing and maintenance methods. The result is a fully developed, reliable product in well-known KAESER quality.

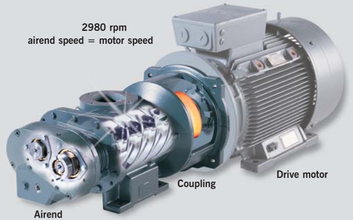

### Good ideas save energy

**Direct intake ...**

- ... of cooling air from the surroundings avoids pre-warming and ensures adequate cooling. The temperature difference between the compressed air and the surrounding air is only 7 K. This means less power consumed by the air treatment equipment downstream.
- **... of motor cooling air from the surroundings** ensures reliable and effective motor cooling even under adverse conditions
- **... of air for compression from the surroundings** improves compression efficiency; the position of the inlet opening prevents pre-warming.

### One-to-one drive - ultimate efficiency

In CSDX compressors the motor drives the airend directly without transmission loss via a maintenance-free coupling. The low speed is made possible by using large-sized airends that are matched to the individual performances and pressures required. Compared to a geared drive, the direct coupling has fewer components, bringing improvements in reliability and operational life. This type of drive also contributes significantly to reduced noise emission.
Compared to compressors with small, high-revving airends, the directly-coupled KAESER CSDX brings triple savings:
no transmission losses, less energy consumption and lower maintenance and downtime costs.




### Small footprint - great performance

The quiet radial fan and direct coupling reduce noise generation at source. This advanced concept should be seen in combination with the new cooling system. The separate cooling air flow path allows hermetic silencing without influencing cooling efficiency. With a sound emission level of not more than 73 db(A) the CSDX is super-quiet as well as powerful and compact. You can converse quite normally next to an operational CSDX..

## Three steps to greater efficiency:

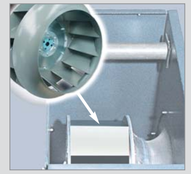
### 1. The SIGMA PROFILE

The KAESER-developed SIGMA PROFILE saves up to 15 percent over conventional screw compressor rotor profiles. The CSDX machines contain airends of the very latest design with even further improved profiles.

### 2. The directly-coupled drive

Some speak of direct drive when they really mean geared drive; make sure you know the difference! The only thing between the motor and the CSDX airend is a coupling, which is why there are no transmission losses. Furthermore, the technique of using a larger airend turning at a slower speed is particularly efficient, delivering more compressed air and consuming less power.

### 3. The radial fan



Quietly and powerfully the radial fan draws surrounding air in through the cooler. Its high residual thrust can deal with partial clogging of the cooler and still have enough reserve to allow connection of a long exhaust duct. By nature of its design the radial fan consumes less drive power than conventional axial fans, saving even more energy.

KAESER COMPRESSORS

# More compressed air for less energy


The rated motor powers given in the technical specifications below are reference points for selecting the right machine for your application.

Please contact KAESER for specific FAD and motor output data relating to other working pressures.

## CSDX series - technical specifications

| Model | Working pressure bar | Delivery* at working pressure $m^3$/min | Maximum pressure bar | Rated motor power kW | Dimensions W x D x H mm | Sound level** dB(A) | Weight kg |
|---|---|---|---|---|---|---|---|
| | 7.5 | 13.7 | 8 | | | | |
| **CSDX 137** | 10 | 11.86 | 11 | 75 | 1950 x 1285 x 2025 | 72 | 1900 |
| | 13 | 9.88 | 15 | | | | |
| | 7,5 | 16.1 | 8 | | | | |
| **CSDX 162** | 10 | 13.5 | 11 | 90 | 1950 x 1285 x 2025 | 73 | 2000 |
| | 13 | 11.7 | 15 | | | | |

* FAD to ISO 1217: 1996, Annex C

** Sound level to PN8NTC 2.3 at 1m distance, free-field measurement

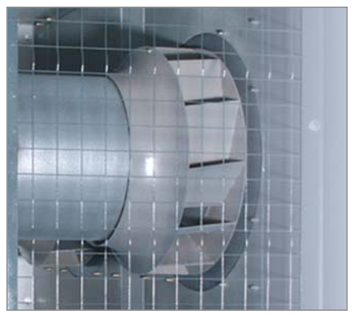
# CSDX – eight decisive advantages

## 1 SIGMA PROFILE airend

A given 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. This motivated KAESER to ignore expense and develope a series of airends especially for the CSDX machines of a size that precisely match the individual drive power at low speeds. The slightly higher cost of the larger airend is quickly recovered by the energy saved during operation.

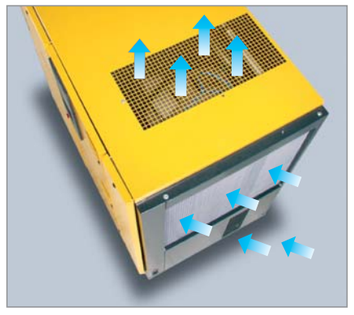

## 2 Energy-saving, directly-coupled drive

The advantage of this drive is not just the elimination of transmission losses. The drive motor and the airend are joined by the coupling and its housing into a compact and rigid unit that needs no regular maintenance apart from greasing the motor bearings. Should the coupling ever need to be replaced it can be done just a few minutes without any disassembly of the unit. The opening in the coupling housing is more than adequate to replace the two coupling sections.. The CSDX airend turns at only 2980 rpm; lower speed means increased efficiency and durability and reduced compressed air costs.



## 3 Innovative radial fan

Quiet and efficient - the most important features of a radial fan. Low peripheral speed means low noise emission! Power consumption is up to 50 percent lower than a comparable axial fan. Another advantage is the high residual thrust developed that allows the use of exhaust ducting with a pressure drop of up to 80 Pa without the need for an additional extractor fan.



## 4 Novel cooling system

In addition to improved cooling efficiency, the system has other benefits to offer. The inside of the cabinet remains clean because surrounding air is drawn through the cooler into the cooler box and then exhausted directly upward out of the machine. Dirt particles in the cooling air collect mainly on the air intake side of the cooler, on CSDX machines that means outside the cabinet. Clogging of the cooler can be easily noticed and cleaned off quickly without any dismantling work. Operational reliability is improved and maintenance work reduced.

## 5 Optimized separation system

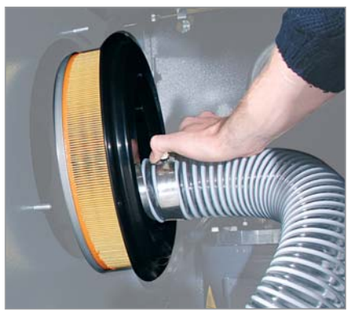
CSDX machines are fitted with a new, even more efficient separator system. The cooling fluid is initially separated from the compressed air by centrifugal force in the separator tank leaving only minimal residue to be removed by the high-capacity, deep-bed filter in the separator cartridge. These two factors double the operational life of the cartridge compared with conventional systems and ensure minimum aerosol content in the compressed air delivery (less than 1 mg per cubic metre). The improved air quality makes less work for the air treatment components. Monitoring of the pressure drop across the separator cartridge and the new fluid level indicator are further contributions to efficient operation.

## 6 Synthetic cooling fluid and special fluid filter

The synthetic cooling medium SIGMA FLUID makes possible an extension of the fluid change interval to over 6000 operating hours. Because of the extremely differing ambient and intake air conditions that can be encountered we recommend, for preventive protection of the machine, that a fluid analysis is carried out at 6000 hours. The use of SIGMA FLUID cooling medium leads to reduced fluid consumption because its water vapour pressure is exceptionally low. Also, its reduced tendency to emulsify contributes to lower costs for condensate treatment. The specially developed glass-fibre filter is characterised by its high, dirt absorbing capacity. It cleans the cooling fluid reliably and thoroughly, enabling the service interval to be extended to 6000 hours. The combination of a long-life fluid and highly efficient filtration reduces service costs and increases operational reliability.


## 7 Easy maintenance up-front

Changing the fluid filter, the air inlet element and the separator cartridge is done, like all other service work, from the front of the machine. This excellent accessibility speeds up service work significantly. More availability and less servicing effort are the positive results of this well thought out design. The  machines can be positioned close to a wall or in a corner for space-saving. The illustration shows the air inlet filter element being changed.



## 8 SIGMA CONTROL

SIGMA CONTROL is based on a robust, updateable industrial computer with a real-time operating system. The operational state of the compressor is quickly ascertained with the help of coloured LEDs. A four-line, plain text display, easily understood icons and touch keys allow fast setting up and operation. SIGMA CONTROL automatically regulates and monitors the compressor. In case of an alarm the safety shutdown sequence immediately switches the compressor off. Dual, Quadro, Vario and Continuous control modes are available for selection of the control mode that saves the most energy. Interfaces are provided as standard for connecting a modem or printer, a second compressor in base load sequencing and for connection to a data network (Profibus DP).

# Equipment

### Complete machine

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

### Sound insulation

Lined with washable plastic foam; 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

Premium-efficiency electric motor of quality German make to IP 55 and Insulation Class F for additional reserve; PTC thermistor sensors (full motor protection) optional.

### Motor/airend union

Cast coupling housing.

### Electrical components

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

### Fluid and air flow

Dry air intake filter with initial separation, 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 newly-developed antivibration couplings.

### Air cooling

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

### SIGMA CONTROL system

Interfaces for data communication comprising 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.

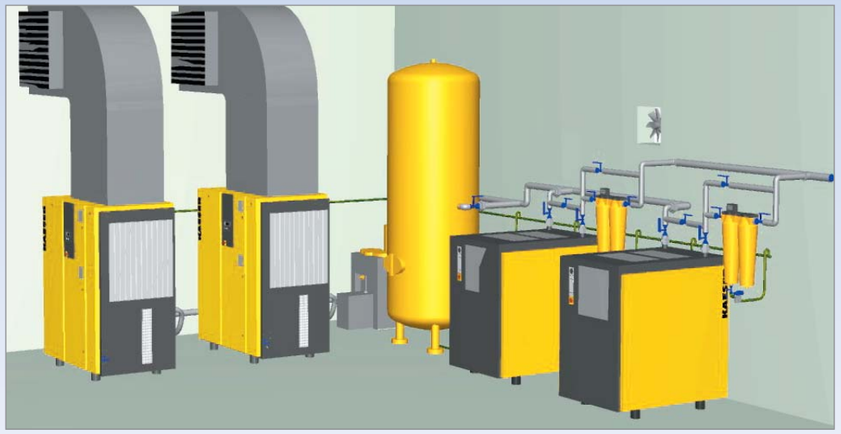

The panel also contains a four-line plain text display, touch keys with pictograms and a duty cycle indicator.

### 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. Selection of Dual, Quadro, Vario and Continuous control modes as required.

(See SIGMA CONTROL/SIGMA CONTROL BASIC brochure P-780)

# Comprehensive design know-how



Depending on the application, compressed air supply systems are often highly complex. They can only be efficiently operated over the long term if just as much importance is placed on this fact during the design, extension or modernisation phases as it is during daily operation. KESS (Kaeser's Energy Saving Service) is available to you as a comprehensive service concept that determines the optimum means of supplying the compressed air needed in your manufacturing facility. This service combines elements such as compressed air components, user advice and services that have proven themselves over years of practice with new ideas made possible by the optimized use of data processing in the compressed air field. Air systems planned and designed by KAESER are characterised by their efficient use of energy. Compressor duty cycles of 95 percent and more are common. Air quality tailored to the application at lowest cost and with high operational reliability is a further characteristic typical of Kaeser air systems. This high standard has been achieved through years of experience in system and plant design, computer-aided analysis and 3-D design aids. Take advantage of this know how.

Why not have your air system designed by KAESER.

Useful advice and interesting information on analysis and planning can be found under 'Services' in the KAESER website - www.kaeser.com.

KAESER COMPRESSORS

# Dimensions

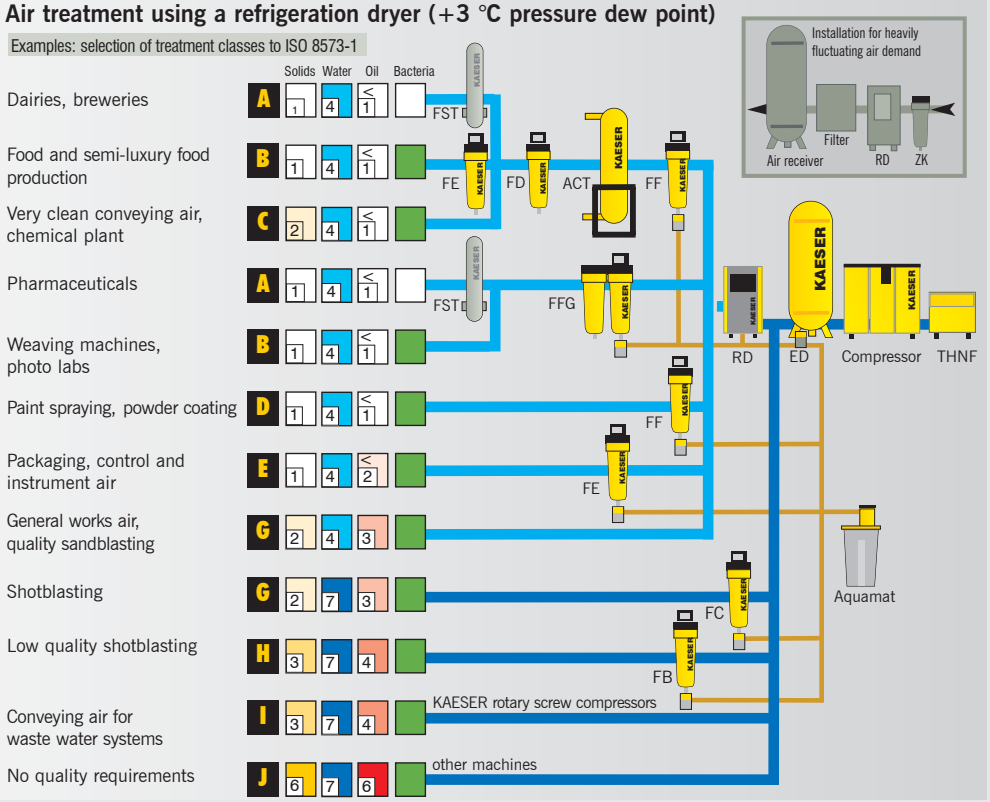

KAESER COMPRESSORS

# Different applications need different grades of treatment

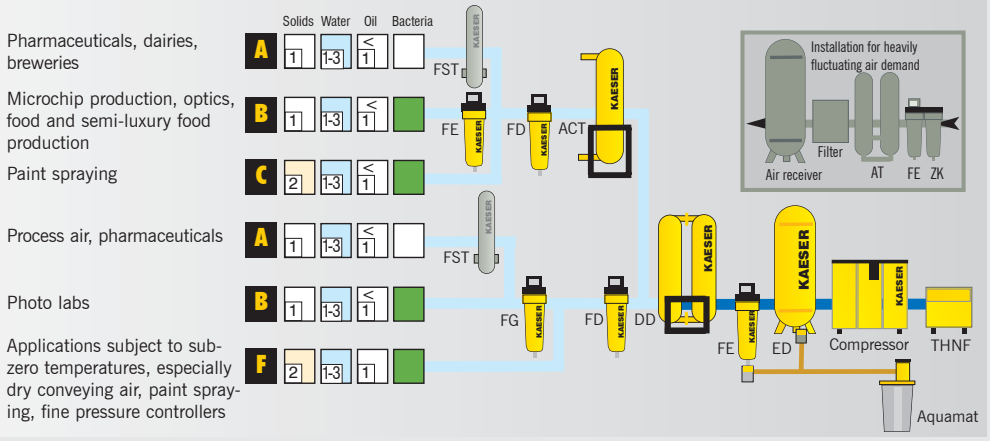
## Choose the required grade of treatment according to your field of application:

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

Examples: selection of treatment classes to ISO 8573-1




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




- **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

### Explanation:

**THNF=bag filter**
Cleans dusty intake air

**ZK=centrifugal separator**
separates accumulating condensate

**ED=ECO Drain**
electronic level-controlled condensate drain

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

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

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

**FE=microfilter** 0.01 µm
separates oil aerosols and solid particles > 0.01µm, aerosol content ≤ 0.01 mg/m³

**FF=microfilter** 0.001 ppm
separates aerosols and solid particles > 0.01µm, aerosol 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

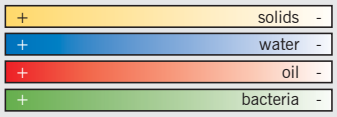
**DD=desiccant dryer**
DC series: heatless regeneration, pressure dew point to -70 °C, DW, DN, DTL, DTW series: heat regeneration, pressure dew point to -40 °C

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

**FST=sterile filter**
provides bacteria-free compressed air

**Aquamat**=condensate treatment system

### Contaminants:




### 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 | Solid particles: Concentration µm | mg/m³ | 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 | | – | | ≤ 5 | ≤ 5 | ≤ + 10 °C | – |
| 7 | | – | | ≤ 40 | ≤ 10 | x ≤ 0.5 | – |
| 8 | | – | | – | – | 0.5 < x ≤ 5.0 | – |
| 9 | | – | | – | – | 5.0 < x ≤ 10.0 | – |

P-651/22ED.2/04 Specifications are subject to change without notice.

LGA Zertifikat QM System ISO 9001

**KAESER KOMPRESSOREN GmbH**
**Postfach 21 43 – 96410 Coburg – GERMANY — Telephone: +49 9561 6400 – Fax: +49 9561 640130**
**www.kaeser.com – email: productinfo@kaeser.com**