

Sigma Frequency Control

SFC Series 18 to 75S

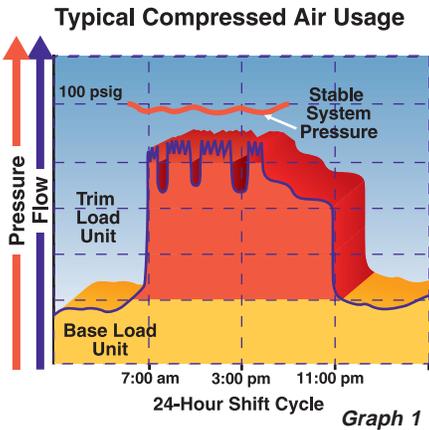
Capacities: from 22 to 469 cfm

Pressures: from 80 to 217 psig



Variable Speed Technology from Kaeser

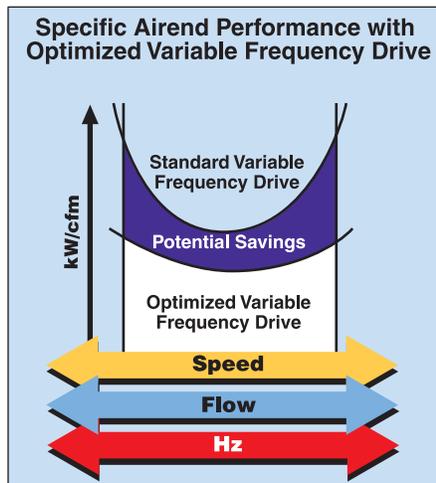
Kaeser Sigma Frequency Control combines Siemens drive technology with our proprietary Sigma Profile airend. Our engineers have optimized airend designs to accommodate a wide flow range with unmatched efficiency. Drive motor and airend operate at low rotational speeds resulting in exceptional reliability, efficiency, and long life.



Analysis Reveals Potential

The advantage of variable frequency drives is obvious: match output to varying demand while optimizing energy consumption. However, only a thorough air system analysis can obtain the

necessary information to optimize system performance. With Kaeser Air Demand Analysis (ADA), the three most critical data points can be analyzed: compressed air demand over time, actual system pressure vs. required system pressure over time, and air purity requirements. Air Demand Analyzers, which are hooked up to an existing compressor system, provide an accurate picture of the application. In order to fully benefit from the Sigma Frequency Control (SFC) technology, it is important to realize that each application is different and has to be treated



accordingly. As graph 1 illustrates, the fluctuating air demand profile of a typical system calls for an individual solution.

Integrated System Design

Even though variable frequency drive compressors can have an effective flow range of 20 to 100%, the efficiency (kW/cfm) is not constant over the whole speed range. The best efficiency is normally between 40 and 85%. As graph 2 illustrates, the Sigma Profile airend has a clear efficiency advantage over a wider flow range than its competition.

Retrofitting existing compressors

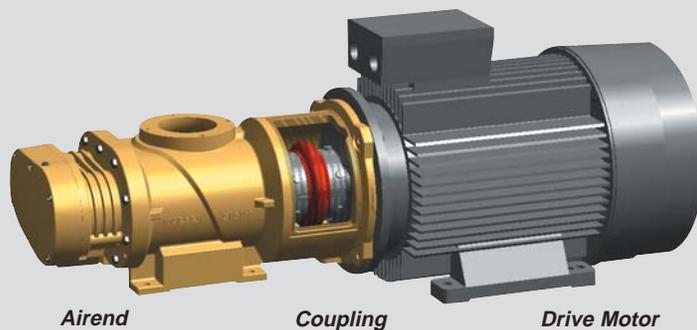
Not all compressors are suited to be retrofitted. The drive motor's cooling requirements and torque output must be adequate at lower and higher frequencies (motor rpm). Kaeser's optimized Sigma Profile airend is designed to efficiently handle the required airend speed (tip speed) range, other airends may not.

Optimized Efficiency

In SFC packages, the one-to-one drive reduces the number of components needed compared to a gear drive unit thus increasing reliability and service life.

Kaeser has selected oversized airends specifically matched to produce the required output in flow and pressure. Compared to compressors using small, high speed gear-driven airends, the SFC one-to-one drive provides *triple* savings: no-loss power transmission, improved power consumption, and reduced maintenance and related downtime costs.

Airend RPM = Motor RPM



One-to-One Direct Drive



1 Sigma Profile Air end

Optimized for variable speed operation, Sigma Profile air ends provide exceptional efficiency over a wide range of flows. See graph 2.



2 SFC Drive

Master Drive system technology from Siemens provides superior reliability and drive efficiency. Kaeser SFC drive includes EMI filters, contactor for galvanic separation and a line reactor providing superior protection. Additional drive cabinet cooling fans ensure proper operating temperature.

3 One-to-One Drive

Some compressors are called direct drive but are really gear driven units. In Kaeser's SFC package, the motor is directly connected to the air end with a maintenance-free coupling,



providing maximum transmission efficiency. The air end and motor are

connected by a casting which is doweled and pinned to assure perfect alignment.

4 Sigma Control

Developed by Kaeser in conjunction with Siemens AG, this patented compressor control features an industrial based PC with an Intel® microprocessor inside. Five different compressor control configurations are available to precisely match compressor performance to air demand and increase energy savings.

With Sigma Control, compressor systems can be monitored and adjusted from any location worldwide. Sigma Control also features extensive capabilities for maintenance trending and air demand tracking.



Integrated Variable Speed Drive and Refrigerated Dryer

Superior Starting Features

Power companies and customers alike appreciate the unique features of Kaeser's SFC. With unlimited motor starts, the lowest inrush current available, and input kW precisely matched to air demand, this unit provides cost savings that directly impact the bottom line. Plus, the SFC drive yields a "near unity power factor" which eliminates power factor penalties and the need for power factor correction capacitors.

Precise Pressure Control

Highly accurate sensors provide operational data to the Sigma Control system. Combined with the responsive SFC drive system, pressure is precisely controlled to ± 2 psig. Wasteful air and power consumption caused by "over pressurizing" the compressed air system is avoided. In addition, stable system pressure increases productivity and results in higher quality.

Extremely Quiet

While the low noise radial fan and the one-to-one drive considerably reduce noise levels, the new "split cooling air flow" design provides superior sound proofing without cooling efficiency losses. With noise emissions as low as 68 dB(A) under any operating conditions the SFC series is about 10 dB(A) quieter than conventional compressors of equal performance.

Unique Air Flow Design

To increase operational reliability and reduce maintenance costs, the cooler is conveniently located on the outside of the unit. Therefore, dust and dirt build-up is easily monitored, accessed, and removed without dismantling the cooler.

Optimized Cooling

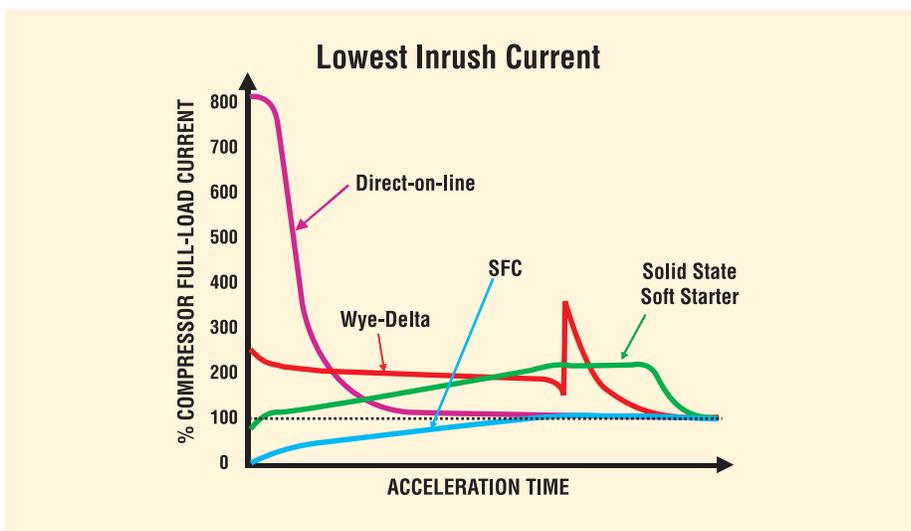
Kaeser SFC units and packages with the optional T series dryer have their own cooling fan to provide adequate cooling for ambient temperatures up to 115°F and 100% load operation. To provide optimal cooling, all cooling air flows directly from ambient to the components without preheating.

Refrigerated Dryer (optional)

All T series models have an integrated refrigerated dryer. The power is provided through the main control cabinet and provides for easy, single-point power hook-up.

The dryer uses environmentally friendly CFC-free R134a refrigerant and provides a 38°F pressure dewpoint.

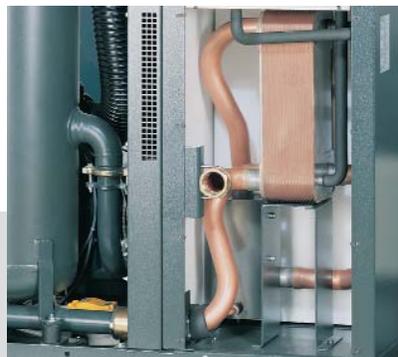
T-series models feature a high-efficiency moisture separator following the aftercooler. The dryer also incorporates a built-in moisture separator and electronic Eco-Drain for reliable and efficient condensate removal. The internal heat-exchangers are made of stainless steel for trouble-free long life. This integrated package is completely piped and ready for installation.





4 Moisture Separator with Eco-Drain

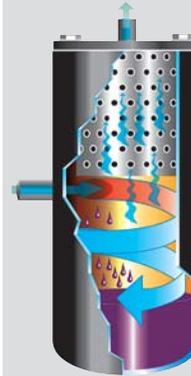
All T models with optional dryer include a highly efficient moisture separator with electronic Eco-Drain. Together they safely and reliably remove all liquid condensate generated by the aftercooler. All Eco-Drains are demand-type and do not waste compressed air. Their proper function is constantly monitored by the Sigma Control system.



5 Corrosion Free

All T models with the optional refrigerated dryer feature stainless steel heat exchangers (air-to-air and air-to-refrigerant). A built-in moisture separator and Eco-Drain reliably remove all condensate created by the refrigerated dryer's low 38°F pressure dewpoint. The cooling circuit uses CFC-free R 134a refrigerant.

1 Efficient Separator System



SFC packages are fitted with a redesigned, high-efficiency separator system. Most of the cooling fluid is initially separated from the air by centrifugal force in the separator tank. Any remaining fluid is separated by a 2-stage filter in the separator cartridge. This

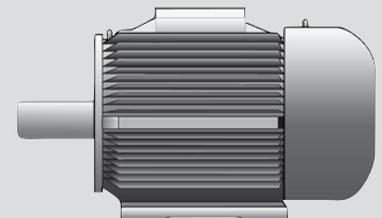


triple action doubles the cartridge service life and reduces fluid carry over to 2 ppm or less. The fluid level is quickly verified by the easy-to-read indicator.

2 Radial Fan

A powerful radial fan draws cool ambient air through the coolers. It is designed to provide high static pressure which is ideally suited for ducting and heat recovery applications.

The radial fan is extremely quiet and consumes less power than conventional axial fans providing additional energy savings.



3 Motor

TEFC, high efficiency, 460 V, 3-phase, 60 Hz, 3600 rpm, class F insulation, and EPA compliant. Other voltages are available. Easily accessible grease fittings make maintenance a breeze (SFC37-75S).

Standard Equipment

Compressor

Single stage, flooded rotary screw airend with the power-saving, proprietary Sigma Profile. The airend maintains its efficiency over a wide flow range.

SFC Drive System

- TEFC motor, high efficiency, 460 V, 3-phase, 60 Hz, 3600 rpm, class F insulation, 1.15 service factor, EPAct compliant.
- PTC motor protection (SFC37-75S)
- Siemens AG Master Drive frequency converter
- Magnetic contactor between power and drive (galvanic separation)
- Pulse width modulation and IGBT Technology
- Soft start for unlimited motor starts
- Power factor correction to near unity
- Incoming AC line reactor
- EMI (electromagnetic interference) filter
- Pressure transducer controlled to +/-2 psig
- Constant torque

Sigma Control System

Sigma Control is a modern, compact, PC-based control system with Intel™ processor and real-time operating system. Sigma Control monitors critical compressor and control system functions, as well as compressor maintenance items. History memory offers easy trouble shooting and record keeping. Integrated database with plain text display in up to 20 languages. Sigma Control has three communication ports built in (RS 232, RS 485, Profibus) with open architecture for communication and integration into master control systems.

Protective Devices

Sigma Control system provides low temperature lock-out, and fluid temperature

rise gradient monitoring. Safety pressure relief valve, emergency stop button and fluid level indicator are also included.

Compressor Control

The Sigma Control, combined with the SFC drive system, efficiently adjusts compressed air output to fluctuating requirements. System pressure is maintained ± 2 psig by reducing or increasing airend speed in a wide flow range without sacrificing efficiency. If the air demand falls below the minimum flow output, the compressor idles for a minimal period of time before it shuts down. The compressor starts up automatically if the pressure drops below a pre-set level.

Air Cooling System

- All units are filled with Sigma Premium Fluid to cool, clean, and lubricate the airend.
- Three separate cooling air inlet zones for the aftercooler, compressor, and drive motor ensure optimum cooling. Drawing ambient air across the coolers and motor through separate zones avoids preheating and results in lower approach temperatures, longer lubricant life, and cooler motor temperatures.
- Pneumatic inlet and vent valve.
- Combined reservoir and separator tank with 3-stage separation system ensures minimal fluid carry over of 2 ppm (by weight). Quick change devices on the separator and cooler allow complete, fast, and easy fluid changes.
- ASME separator tank is equipped with quick disconnect fittings for manual verification of separator element contamination.
- Combination valve incorporates a thermostatically controlled valve, cooler by-pass, and micro fluid filter. The thermostatically controlled valve

ensures perfect fluid temperature regulation. The micro fluid filter utilizes a spin-on cartridge.

- Main fluid and compressed air lines are made of rigid pipe and incorporate flexible pipe connections.
- Standard units are air cooled with high efficiency air and fluid cooler. Optional water cooling is available (SFC37-75S).
- A radial cooling fan provides intensive cooling for reliable condensate removal and high static pressure for easy ducting.
- Moisture separator with Eco-Drain (on T models only).

Enclosure

Compact unit is super soundproofed by a sheet metal enclosure with mineral wool and plastic liners. Enclosure features a durable powder coated finish. Compressor is mounted on solid base frame with a solid steel floor and anti-vibration mounts. Additional vibration isolation for airend, motor, and separator tank is standard. Unit also features hinged and gasketed access doors as well as removable rear and side cabinet panels with key locking lugs.

Devices for Easy Maintenance

Fluid change pressurization valve complete with drain hose; and easily accessible drive motor grease fittings (SFC37-75S).

Options

Integrated dryer, water-cooled models (SFC37-75S), and higher pressures are available.

Accessories

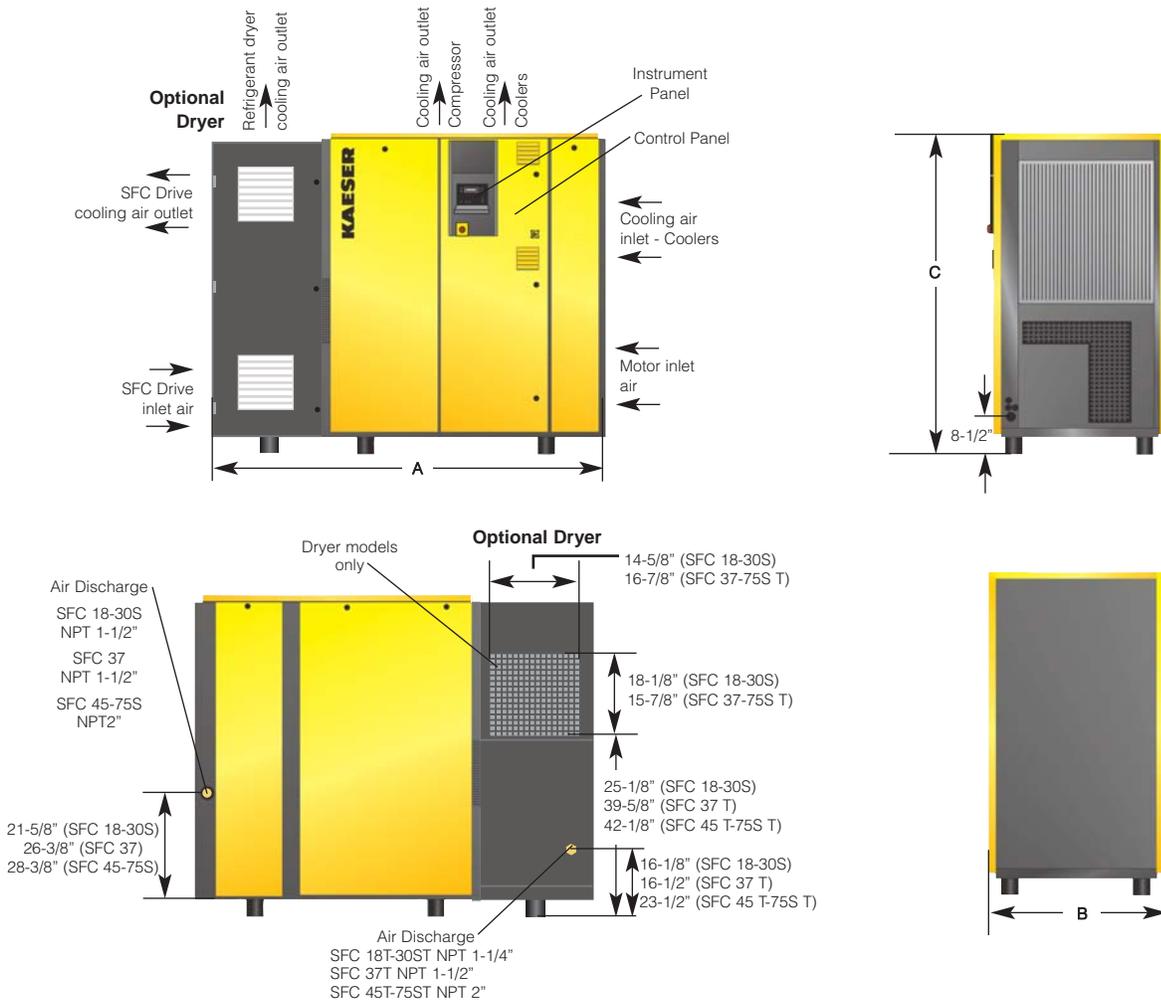
A comprehensive range of clean air treatment products, including dryers, filters, separators, and air receivers are available.

Technical Specifications

Model	Motor		Pressure ⁽¹⁾ (psig)	Capacity ⁽²⁾ (cfm)		Dimensions L (A) x W (B) x H (C) (in.)	Weight ⁽³⁾ (lb.)	Noise Level ⁽⁴⁾ (dB(A))
	(hp)	(kW)		Min	Max			
SFC 18 SFC 18T	25	18	110	24	129	72-7/8 x 36-1/4 x 59-1/4	1580 1820 w/ dryer	68
125			23	125				
145			22	116				
SFC 22 SFC 22T	30	22	110	29	158	72-7/8 x 36-1/4 x 59-1/4	1740 1980 w/ dryer	69
125			29	149				
145			28	139				
SFC 30S SFC 30ST	40	30	110	38	203	72-7/8 x 36-1/4 x 59-1/4	1760 2010 w/ dryer	69
125			37	194				
145			36	180				
SFC 37 SFC 37 T	50	37	110	55	242	82 x 39 3/4 x 67	2510 2820 w/ dryer	70
125			54	226				
145			42	201				
SFC 45 SFC 45 T	60	45	110	69	311	86 3/4 x 41 x 73 1/2	3150 3530 w/ dryer	71
125			68	291				
145			53	261				
SFC 55 SFC 55 T	75	55	110	82	381	86 3/4 x 41 x 73 1/2	3240 3620 w/ dryer	72
125			81	367				
145			66	337				
SFC 75S SFC 75S T	100	75	110	102	469	86 3/4 x 41 x 73 1/2	3310 3680 w/ dryer	73
125			102	438				
145			77	399				

(1) Other pressures available. (2) Performance rated in accordance with CAGI/PNEUROP PN2CPTC2 test code. (3) Weights may vary slightly depending on airend model. (4) Measured at 3 feet according to CAGI.

Specifications are subject to change without notice.





Kaeser's U.S. headquarters in Fredericksburg, Virginia

Mission Statement

We strive to earn our customers' trust by supplying high quality Kaeser air compressors, related compressed air equipment and premium blower systems. Our products are designed for reliable performance, easy maintenance, and energy efficiency. Prompt and dependable customer service, quality assurance, training, and engineering support contribute to the value our customers have come to expect from Kaeser. Our employees are committed to implementing and maintaining the highest standards of quality to merit customer satisfaction. We aim for excellence in everything we do.

Our engineers continue to refine manufacturing techniques and take full advantage of the newest machining innovations. Extensive commitment to research and development keeps our products on the leading edge of technology to benefit our customers.

**KAESER
COMPRESSORS**

Built for a lifetime.™

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Member:



The Air Systems Specialist

With over 80 years of experience, Kaeser is the air systems specialist. Our extensive 100,000 square foot facility allows us to provide unequaled product availability. With service centers nationwide and our 24-hour emergency parts guarantee, Kaeser customers can rely on the best after-sales support in the industry. Kaeser stands committed to providing the highest quality air system for your specific compressed air needs.

