

Sigma Frequency Control

SFC Series 8 to 110S

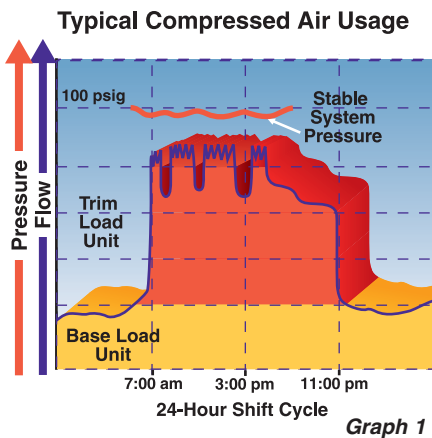
Capacities: from 10 to 675 cfm

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. Our 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 minimizing energy consumption. 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 system calls for an individual solution. Kaeser's Air Demand Analysis is the best way to evaluate your system to determine what combination of equipment will provide maximum reliability with the lowest energy costs.

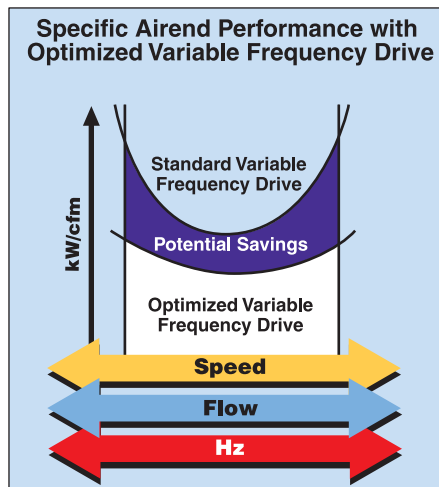
Integrated System Design

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.

$$\text{Airend RPM} = \text{Motor RPM}$$



One-to-One Direct Drive

*SFC 8,11, and 18S have an auto-tensioned V-belt drive



1 Sigma Profile Airend

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



2 SFC Drive

Drive system technology from Siemens provides superior reliability and drive efficiency. Kaeser SFC 18 to 110S drives include 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 airend with a maintenance-free coupling,



providing maximum transmission efficiency. The airend 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. The SFC 8, 11, and 18S come standard with Sigma Control Basic — Sigma Control is available as an option.



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 fan design and the one-to-one drive (see specifications for SFC 8, 11, and 18S) 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 67 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

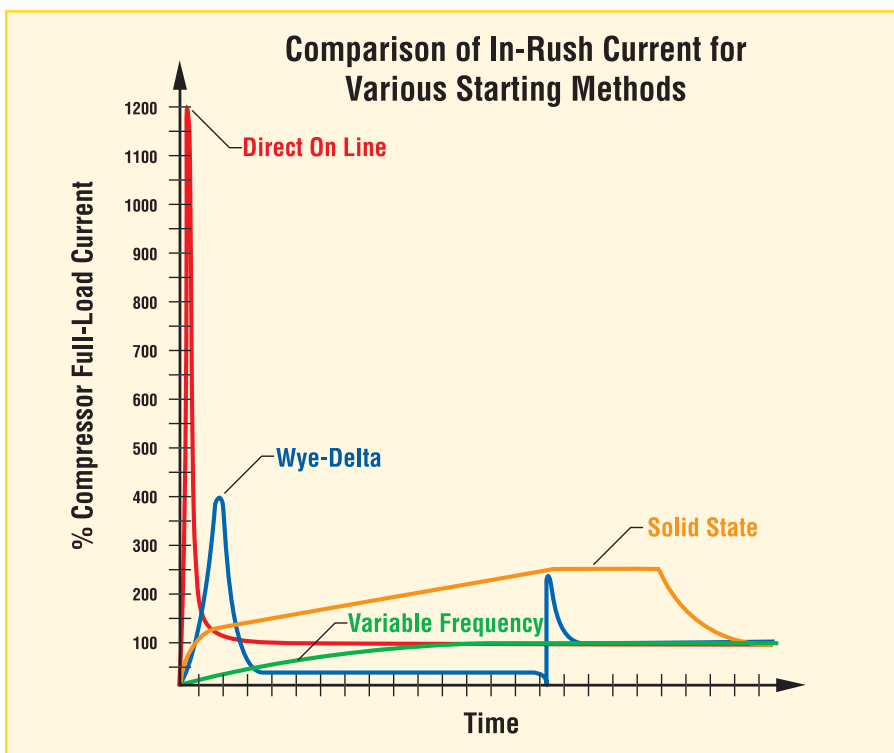
Kaeser SFC units and packages with the optional T series dryer have their own cooling fan to provide adequate cooling for ambient temperatures up to 115°F and 100% load operation. To provide optimal cooling, all cooling air flows directly from ambient to the components without preheating.

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.

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.





1 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 condensed in 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. *



2 Radial Fan

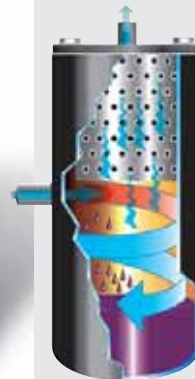
A powerful radial fan* draws cool ambient air through the coolers. It is designed to provide high static pressure which is ideally suited for ducting and heat recovery applications. The radial fan is extremely quiet and consumes less power than conventional axial fans providing additional energy savings.



3 Motor

TEFC, high-efficiency, 460 or 575* V, 3-phase, 60 Hz, 3600 rpm, class F insulation, and EPAct compliant. Other voltages are available. Easily accessible grease fittings make maintenance a breeze (SFC 37-110S).

4 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.



5 Corrosion Free Dryer

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

* See specifications for SFC 8, 11, and 18S

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 or 575 V, 3-phase, 60 Hz, 3600 rpm, class F insulation, 1.15 service factor, EPAAct compliant.
- PTC motor protection (SFC 37-110S)
- Siemens AG MASTERDRIVES frequency converter. (MICROMASTER used on SFC 8, 11, and 18S).
- 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 (SFC 18-110S)
- 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 30 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. The SFC 8, 11, and 18S feature the Sigma Control Basic.

Protective Devices

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

ture rise gradient monitoring. Safety pressure relief valve, emergency stop button and fluid level indicator are also included. The SFC 8, 11, and 18S also use door limit switches.

Compressor Control

The Sigma Control/Sigma Control Basic, 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.
- 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 or CRN 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 (SFC 37-110S).
- A radial cooling fan provides intensive cooling for reliable condensate removal and high static pressure for easy ducting. The SFC 8, 11, and 18S use a low-noise axial fan.
- 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.

Devices for Easy Maintenance

Fluid change pressurization valve complete with drain hose; and easily accessible drive motor grease fittings (SFC 37-110S).

Options

Integrated dryer, water-cooled models (SFC 37-110S), and higher pressures are available.

Accessories

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

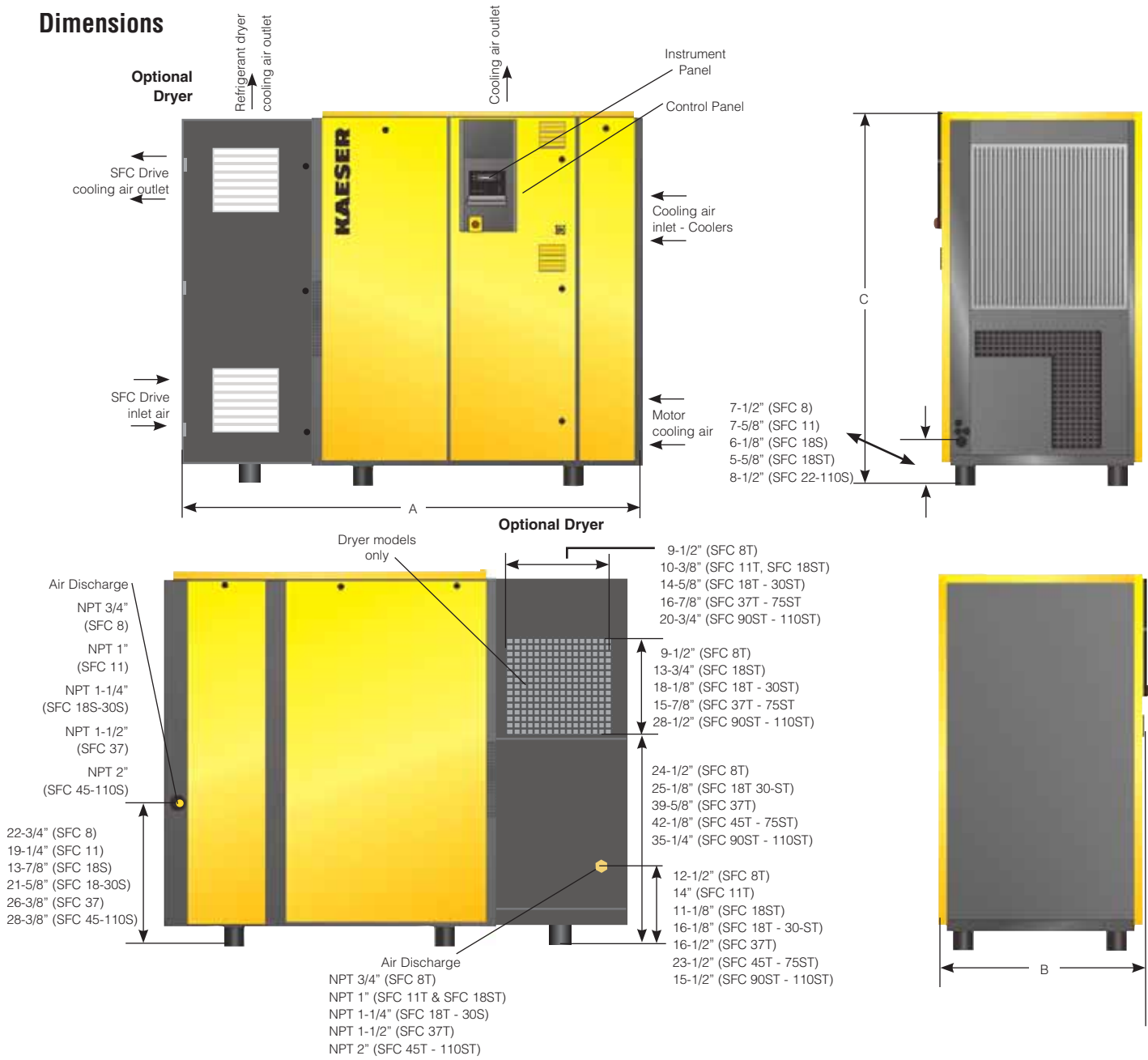
Technical Specifications

Model	Nominal Motor (hp)	Pressure ⁽¹⁾ (psig)	Capacity ⁽²⁾ (cfm)		Dimensions L x W x H (in.)	Weight ⁽³⁾ (lb.)	Noise Level ⁽⁴⁾ (db(A))
			Min	Max			
SFC 8 SFC 8T	10	110	13	48	24¾ x 30 x 43¾ 24¾ x 42¼ x 43¾	460 650	67
		125	12	48			
		145	13	42			
SFC 11 SFC 11T	15	110	18	75	39¾ x 29⅛ x 47¼ 52¼ x 29⅛ x 47¼	730 860	67
		125	17	74			
		145	19	63			
SFC 18S SFC 18ST	25	110	33	113	44½ x 33½ 49½ 58¼ x 33½ 49½	940 1100	70
		125	32	113			
		145	27	98			
SFC 18 SFC 18T	25	110	24	129	72⅞ x 36¼ x 59¼	1580 1820	68
		125	23	125			
		145	22	116			
SFC 22 SFC 22t	30	110	29	158		1740 1980	69
		125	29	149			
		145	28	139			
SFC 30S SFC 30ST	40	110	38	203		1760 2010	69
		125	37	194			
		145	36	180			
SFC 37 SFC 37T	50	110	55	242		82 x 40½ x 67	2510 2820
		125	54	226			
		145	42	201			
SFC 45 SFC 45T	60	110	69	311	86¾ x 41½ x 73½	3150 3530	72
		125	68	291			
		145	53	261			
SFC 55 SFC 55T	75	110	82	381		3240 3620	72
		125	81	367			
		145	66	337			
SFC 75S SFC 75ST	100	110	102	469		3310 3680	74
		125	102	438			
		145	77	399			
SFC 90S SFC 90ST	100	110	120	515		102⅜ x 51⅛ x 79¾	4850 5300
		125	118	476			
		145	100	441			
SFC 110S SFC 110ST	125	110	139	633	5300 5730		76
		125	138	613			
		145	119	546			

(1) Other pressures available. (2) Performance rated in accordance with CAGI/PNEUROP PN2CPTC2 test code. (3) Weights may vary slightly depending on aircend model. (4) Measured at 3 feet according to CAGI. Specifications are subject to change without notice.



Dimensions



KAESER COMPRESSORS

Built for a lifetime.™

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The Air Systems Specialist

With over 85 years of experience, Kaeser is the air systems specialist. Our extensive 100,000 square foot facility allows us to provide unequalled 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.

Certified Management Systems

