

Sigma Frequency Control

SFC Series 11 to 110S

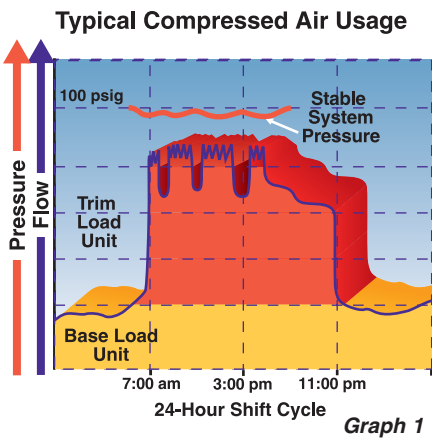
Capacities: from 12 to 675 cfm

Pressures: from 80 to 217 psig



Variable Speed Technology from Kaeser

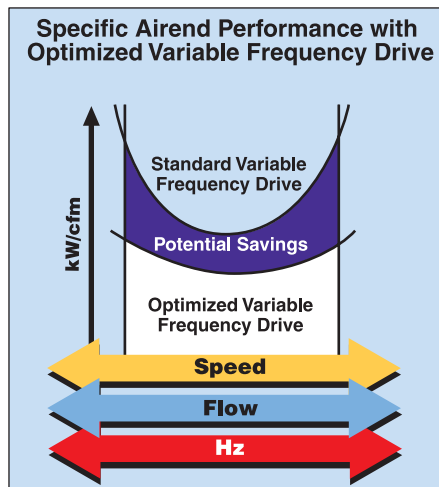
Kaeser Sigma Frequency Control combines Siemens drive technology with our proprietary Sigma Profile airend. Our engineers have optimized airend designs to accommodate a wide flow range with unmatched efficiency. Drive motor and airend operate at low rotational speeds resulting in exceptional reliability,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

*SFC 11 has 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

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 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 11 comes 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 11) 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

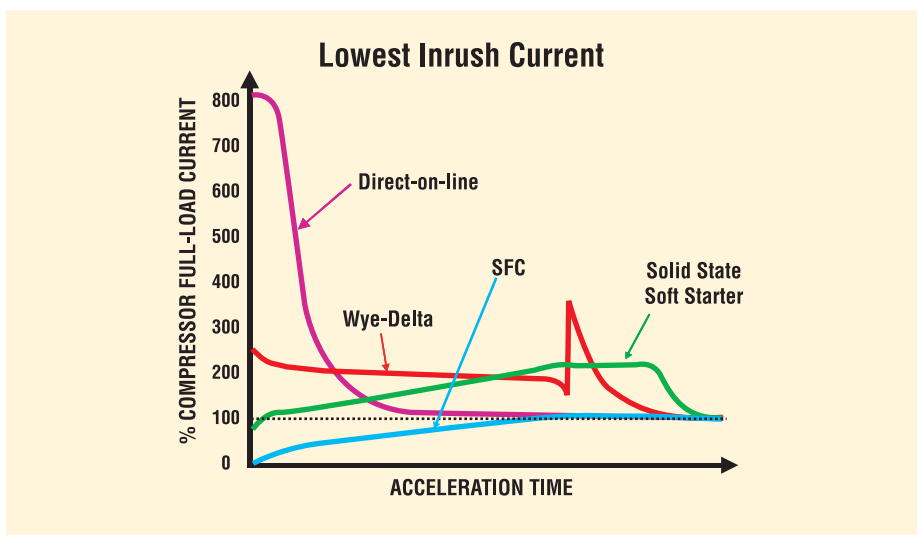
Kaeser SFC units and packages with the optional T series dryer have their own cooling fan to provide adequate cooling for ambient temperatures up to 115°F and 100% load operation. To provide optimal cooling, all cooling air flows directly from ambient to the components without preheating.

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 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.

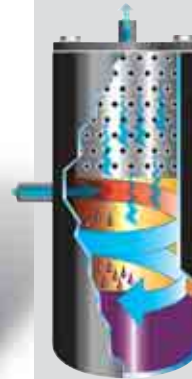




3 Motor

TEFC, high-efficiency, 460 or 575* V, 3-phase, 60 Hz, 3600 rpm, class F insulation, and EPAAct compliant. Other voltages are available. Easily accessible grease fittings make maintenance a breeze (SFC37-110S).

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.



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.



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 38°F pressure dewpoint. The cooling circuit uses CFC-free R 134a refrigerant.

* See specifications for SFC 11

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, EPC compliant.
- PTC motor protection (SFC37-110S)
- Siemens AG Master Drive frequency converter. (Micro Master used on SFC 11).
- 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. The SFC 11 features the Sigma Control Basic.

Protective Devices

Sigma Control system provides low tem-

perature lock-out, and fluid temperature rise gradient monitoring. Safety pressure relief valve, emergency stop button and fluid level indicator are also included. The SFC 11 also uses 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 (SFC37-110S).
- A radial cooling fan provides intensive cooling for reliable condensate removal and high static pressure for easy ducting. The SFC 11 uses 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 (SFC37-110S).

Options

Integrated dryer, water-cooled models (SFC37-110S), and higher pressures are available.

Accessories

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

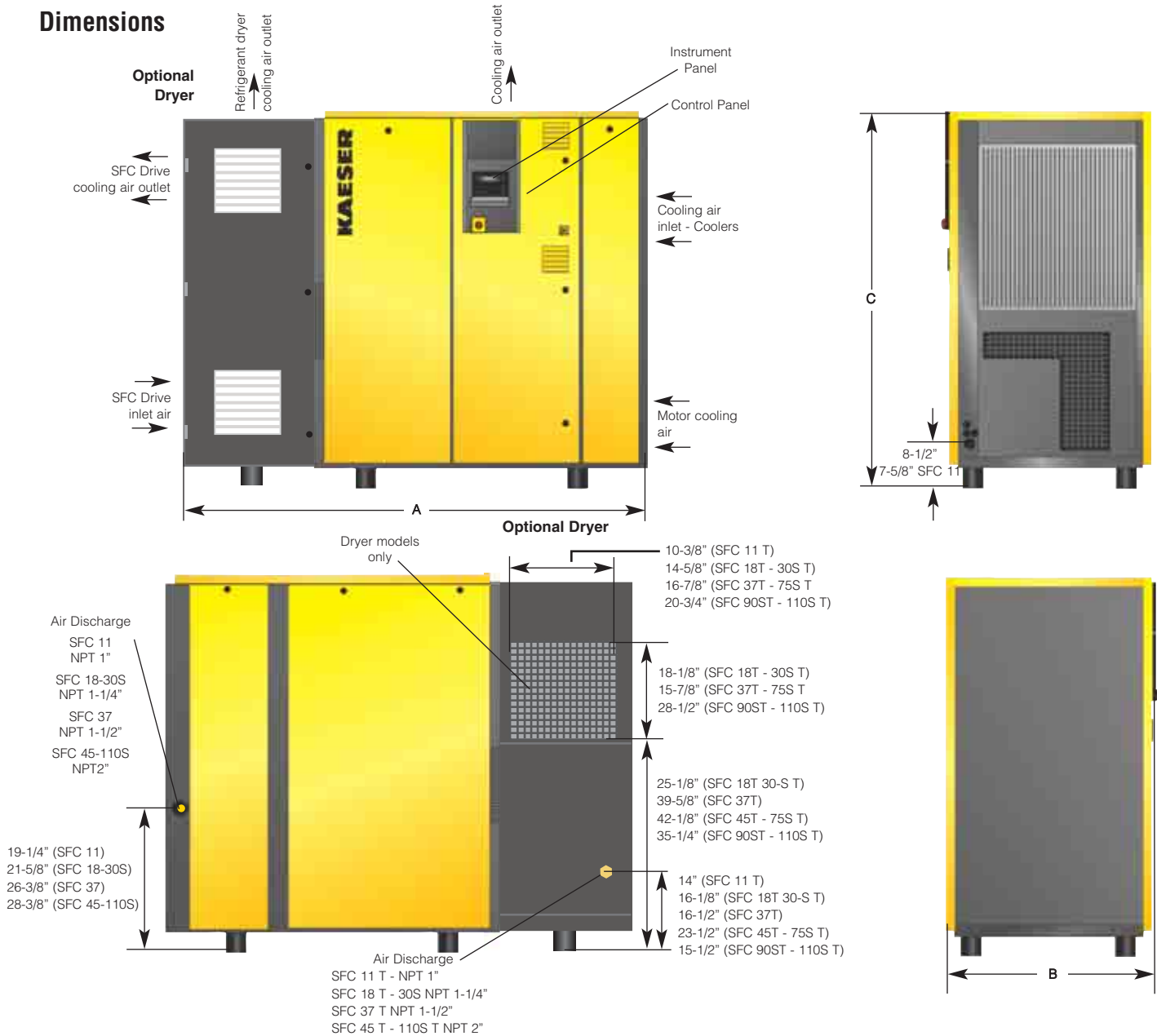
Technical Specifications

Model	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 11 SFC 11T	15	11	110	18	75	39 ³ / ₄ x 29 ¹ / ₈ x 47 ¹ / ₄ 52 ¹ / ₂ x 29 ¹ / ₈ x 47 ¹ / ₄	730 860	67
125			17	75				
145			19	63				
SFC 18 SFC 18T	25	18	110	24	129	72 ⁷ / ₈ x 36 ¹ / ₄ x 59 ¹ / ₄	1580 1820	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	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	69
125			37	194				
145			36	180				
SFC 37 SFC 37T	50	37	110	55	242	82 x 40 ¹ / ₂ x 67	2510 2820	71
125			54	226				
145			42	201				
SFC 45 SFC 45T	60	45	110	69	311	86 ³ / ₄ x 41 ¹ / ₂ x 73 ¹ / ₂	3150 3530	72
125			68	291				
145			53	261				
SFC 55 SFC 55T	75	55	110	82	381	86 ³ / ₄ x 41 ¹ / ₂ x 73 ¹ / ₂	3240 3620	72
125			81	367				
145			66	337				
SFC 75S SFC 75S T	100	75	110	102	469	86 ³ / ₄ x 41 ¹ / ₂ x 73 ¹ / ₂	3310 3680	74
125			102	438				
145			77	399				
SFC 90S SFC 90ST	100	75	110	120	515	102 ⁵ / ₈ x 51 ¹ / ₈ x 79 ³ / ₄	4850 5300	75
125			118	476				
145			100	441				
SFC 110S SFC 110S T	125	90	110	139	633	102 ⁵ / ₈ x 51 ¹ / ₈ x 79 ³ / ₄	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 airtend model. (4) Measured at 3 feet according to CAGI. **Specifications are subject to change without notice.**



Dimensions



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.

