

HPO/HPC high-pressure reciprocating compressors

The Sabroe HPO/HPC range is a unique high-pressure compressor design. It is widely used in conjunction with ammonia heat pumps, and has also become very popular due to the resurgence of the use of CO₂ as a refrigerant, along with high-pressure refrigerants such as R410A.

Sabroe HPO/HPC compressors are now used in CO₂/ammonia cascade plants and R410A chillers all over the world.



HPC 108 compressor block with Unisab III compressor control unit

In ammonia heat pump installations, Sabroe HPO/HPC compressors are often employed to produce hot water at temperatures up to 70°C at very low cost. For such applications, Sabroe HPO/HPC compressors are normally used as an extra “supercharge” stage in traditional ammonia plants.

In CO₂/ammonia cascade plants, Sabroe HPO/HPC compressors are used on the low-temperature side, working very efficiently with evaporating temperatures as low as -55°C. Due to the fact that HPO/HPC compressors using CO₂ feature extremely high efficiency and capacity, such cascade systems are very compact and ensure low operating costs.

There are six models covering capacities between 97 and 452 m³/h swept volume at maximum speed, and with guaranteed ratings for a wide range of different refrigerants at pressures up to 40 bar for HPC and 50 bar for HPO.

Significant advantages

The advantages of the Sabroe HPO/HPC high-pressure compressor design include

- Automatic capacity control and high coefficient of performance (COP), with excellent part-load characteristics.
- Excellent accessibility – including simple-to-clean water covers and externally accessible oil pump/filter (HPC only) – and few requirements for spare parts.
- Any necessary repairs can normally be undertaken without having to remove the compressor.
- Lightweight pistons, chromium piston rings, gas-dampened discharge valves and hardened cylinder liner surfaces.
- Spring-loaded safety heads, balanced refrigerant-tight shaft seal, asbestos-free gaskets and an internal bypass valve to prevent excessive pressure.

Customer benefits

For the customer, the benefits of the Sabroe HPO/HPC high-pressure compressor design include

- ▶ Lower power consumption, especially when operating at part load. This greatly reduces operating costs.
- ▶ Easy maintenance, resulting in low service costs and minimal downtime.
- ▶ All repairs can be carried out on site at the customer's own premises, reducing both repair costs and downtime.
- ▶ Extended service life for key wearing parts.
- ▶ The special design ensures low noise and low vibration levels, with safe, environmentally friendly operation.

Sabroe product description

Standard equipment

Sabroe HPO/HPC compressors are supplied with the following equipment as standard

- Sabroe Unisab III microprocessor control with temperature/pressure sensors
- compressor block with oil pump and oil filter
- solenoid valves for capacity control
- suction and discharge stop valves
- safety valve
- oil-charging valve
- suction filter
- oil-level sight glass
- electric immersion heater in crankcase
- evacuation valve
- pre-lubrication valve.

Optional equipment

A wide range of optional equipment is also available on Sabroe HPO/HPC compressors. This includes

- extended one-cylinder capacity control or standard capacity control with full unloading (HPC only)
- oil level regulator for parallel systems
- explosion-proof equipment
- base frame with coupling and guard for direct-drive unit
- motors
- oil separators with solenoid valve and TLT valve (HPC only) for oil return
- oil charging pump
- vibration dampers and foundation bolts
- tool sets
- sets of genuine Sabroe spare parts.

Compressor and oil cooling

Depending on specific refrigerant and operating conditions, it can be necessary to supplement basic air convection cooling with one of the following options to make sure that the compressor and the lubricating oil are cooled efficiently

- water-cooled head covers
- water-cooled side covers for oil cooling
- refrigerant-based oil cooling.

Model	Number of cylinders	Bore x stroke mm	Max. rpm	Swept volume at 1500 rpm m ³ /h	Normal capacities kW					Approximate dimensions Direct coupled unit mm			Approx. weight excl. motor kg	Sound pressure level dB(A) *)
					Heating	Cooling	Cooling	Cooling	Cooling	L	W	H		
					R717 +35/+72°C	R717 0/+55°C	R410A 0/+35°C	R744 -50/-10°C	R744 -40/-5°C					
HPO 24	4	70 x 70	1500	97	267	71	117	92	138	1580-1930	835	985	510	74
HPO 26	6	70 x 70	1500	146	397	106	176	138	207	1600-1950	940	985	550	76
HPO 28	8	70 x 70	1500	194	529	141	235	184	276	1620-1970	940	985	580	77
HPC 104S	4	100 x 80	1500	226	629	168	284	228	338	1920-2270	1030	1100	850	81
HPC 106S	6	100 x 80	1500	339	942	252	426	343	507	2010-2460	1085	1130	1025	82
HPC 108S	8	100 x 80	1500	452	1256	335	568	457	676	2040-2490	1235	1130	1100	83

Nominal capacities for R744 are based on no subcooling in cascade cooler, 10°K useful suction superheat

Nominal capacities are at 1450 rpm.

*) The sound pressure has been calculated for -50/-10°C with R744 at 1450 rpm

All information is subject to change without previous notice

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