

TCMO/TSMC two-stage reciprocating compressors

In all low-temperature refrigeration installations, two-stage reciprocating compressors are an economical operating alternative to single-stage screw compressors. Sabroe TCMO/TSMC two-stage reciprocating compressors are therefore ideal for medium-size industrial and marine refrigeration installations. They are the most reliable and economical option for a range of heavy-duty applications on this particular scale, where an extended service life is required. The TCMO/TSMC range includes eight two-stage models that provide capacities between 175 and 1283 m³/h low-pressure swept volume at maximum speed.

Compatible and upgradable

The Sabroe TCMO/TSMC design is future-compatible because ongoing changes and improvements are designed so that they can also be implemented on earlier TCMO/TSMC models. This makes it easy to upgrade and retrofit older compressors to the latest standard.



TCMO 28 direct coupled unit with shell-and-tube intermediate cooler

Significant advantages

The advantages of the Sabroe TCMO/TSMC compressor design include

- High coefficient of performance (COP), with excellent part-load characteristics.
- Excellent accessibility – including simple-to-clean water covers and externally accessible oil pump/filter (TSMC 100 only) – and few requirements for spare parts.
- Any necessary repairs can normally be undertaken without having to remove the compressor.
- 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 TCMO/TSMC 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 all moving parts.
- ➔ • The special design ensures low noise and low vibration levels, with safe, environmentally friendly operation.



Standard equipment

Sabroe TCMO/TSMC compressors are supplied with the following equipment as standard

- 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 for Sabroe TCMO/TSMC compressors. This includes

- gauges, thermometers and temperature/pressure control switches
- Sabroe Unisab II microprocessor control with temperature/pressure sensors
- extended one-cylinder capacity control or standard capacity control with full unloading (TSMC 100 only)
- oil level regulator for parallel systems
- explosion-proof equipment
- base frame with coupling and guard for direct-drive unit
- base frame with pulleys, belts and guard for V-belt drive unit
- motors
- oil separators with solenoid valve and TLT valve

(TSMC 100 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 ¹⁾
- thermo-pump system (for use with R717 only). ¹⁾

¹⁾ Not available for TSMC 188

Intermediate cooling systems

The two-stage compressors are available for connection to a common intermediate cooler in plants with multiple two-stage compressors. Alternatively, the following intermediate cooling systems are available in built-on form, as optional equipment:

- injection interstage gas cooling without liquid subcooling
- injection interstage gas cooling with liquid subcooling in a shell-and-tube heat exchanger
- closed flash interstage cooling in a shell-and-coil intermediate cooler with liquid subcooling in the coil.

Technical data

Model	Number of cylinders Low/High-pressure side	Bore x stroke mm	Max. rpm	Low-pressure side swept volume at max. rpm m ³ /h	Nominal capacities kW					Dimensions in mm Direct-coupled unit without intermediate cooler			Weight excl. motor kg	Sound pressure level dB(A)
					R717	R22	R134A	R404A	R507	L	W	H		
					-40/+35°C	-40/+35°C	-40/+35°C	-40/+35°C	-40/+35°C					
TCMO 28	6 / 2	70 x 70	1800	175	20 *)	24 *)	11 *)	27 *)	28 *)	1400-1750	700	1000	500	71
TSMC 108 S	6 / 2	100 x 80	1500	339	50	61	30	66	70	1900-2500	1050	1125	1000	82
TSMC 108 L	6 / 2	100 x 100	1500	424	66	63 **)	31 **)	68 **)	72 **)	1900-2500	1050	1125	1000	83
TSMC 108 E	6 / 2	100 x 120	1500	509	82	NA	NA	NA	NA	1900-2500	1050	1125	1000	83
TSMC 116 S	12 / 4	100 x 80	1500	669	100	122	60	132	139	2475-3200	1150	1335	1800	84
TSMC 116 L	12 / 4	100 x 100	1500	848	133	126 **)	62 **)	136 **)	144 **)	2475-3200	1150	1335	1800	84
TSMC 116 E	12 / 4	100 x 120	1500	1018	163	NA	NA	NA	NA	2475-3200	1150	1335	1800	84
TSMC 188	6 / 2	180 x 140	1000	1283	205	183***)	90***)	198***)	209***)	2800-3400	1750	1700	3600	85

Nominal capacities are based on 2°C subcooling from condenser, 2°C superheat and liquid subcooling in intermediate cooler to 10°C above intermediate temperature.

Nominal capacities are at max. rpm except of:

*) at 1500 rpm, **) at 1200 rpm, ***) at 750 rpm.

All information is subject to change without previous notice.

