

SABROE TCMO™/TSMC™ two-stage reciprocating compressor units

Two-stage versions of CMO™ and SMC™ reciprocating compressors, with swept volumes of 150–1000 m³/h

SABROE TCMO/TSMC two-stage reciprocating compressors are an economical operating alternative to single-stage compressors in smaller low-temperature refrigeration installations.

TCMO/TSMC compressor units are also ideal for medium-size industrial refrigeration installations that involve a big temperature range, such as freezer installations. Furthermore, these units are easy to customise with intermediate cooling systems.

Using a two-stage set-up built together as a single unit helps avoid equipment duplication – and thus reduce costs and save space.

Range

Eight different models are available to provide swept volumes of between 146 and 1018 m³/h.



TSMC 108 two-stage reciprocating compressor unit shown with closed flash inter-stage cooling system and Unisab™ III systems controller

Advantages

Splitting the temperature lift into two separate stages reduces overall energy consumption

Relatively small footprint

High coefficient of performance (COP), with excellent performance under part-load conditions

Variable-speed drive (optional) provides stepless capacity control over the entire operating range

Benefits

Two-stage installations are relatively cost-effective, which helps reduce energy costs

Can be installed in relatively small locations, or where space is limited

Low power consumption, which greatly reduces operating costs

Power consumption and operating costs kept to a minimum

Options

- Unisab III systems controller
- Gauges, thermometers and temperature/pressure control switches
- Oil level regulator (for use in parallel systems)
- ATEX-compliant configuration
- Special vibration dampening.

Intermediate cooling system options

In plants with multiple two-stage compressors, TCMO/TSMC units can be connected to a shared intermediate cooler, in a separate installation.

Alternatively, a range of built-on intermediate cooling systems are available, as optional equipment.

- Injection inter-stage gas cooling without liquid subcooling
- Injection inter-stage gas cooling with liquid subcooling in a shell-and-tube heat exchanger
- Closed flash inter-stage cooling in a shell-and-coil intermediate cooler, with liquid subcooling in the coil.

| Model | Number of cylinders low/high-pressure side | Swept volume at 1500 rpm m ³ /h | Swept volume at 1800 rpm m ³ /h | Nominal capacities in kW at 1500 rpm / 1200 rpm * | | Unit dimensions in mm | | | Weight excluding motor kg | Sound pressure level at 1500 rpm db(A) |
|------------|--|---|---|---|-------|-----------------------|------|------|------------------------------|---|
| | | | | -40/+35°C | | L | W | H | | |
| | | | | R717 | R407C | | | | | |
| TCMO 28 | 6 / 2 | 146 | 175 | 20 | 20 | 1400-1750 | 700 | 1000 | 500 | 68 |
| TCMO 38 | 6 / 2 | 170 | 205 | 23 | 23 | 1400-1750 | 700 | 1000 | 500 | 69 |
| TSMC 108 S | 6 / 2 | 339 | 407 | 51 | 40* | 2670-3230 | 1100 | 1250 | 1582 | 80 |
| TSMC 108 L | 6 / 2 | 424 | 509 | 67 | 52* | 2670-3230 | 1100 | 1250 | 1582 | 81 |
| TSMC 108 E | 6 / 2 | 509 | N/A | 82 | N/A | 2670-3230 | 1100 | 1250 | 1582 | 81 |
| TSMC 116 S | 12 / 4 | 679 | 814 | 102 | 81* | 3290-3740 | 1330 | 1440 | 2280 | 81 |
| TSMC 116 L | 12 / 4 | 848 | 1018 | 134 | 104* | 3290-3740 | 1330 | 1440 | 2280 | 82 |
| TSMC 116 E | 12 / 4 | 1018 | N/A | 164 | N/A | 3290-3740 | 1330 | 1440 | 2280 | 83 |

Nominal capacities are at 1500 rpm except for * at 1200 rpm.

Nominal capacities are based on:
1500 rpm at 50 Hz.
1800 rpm at 60 Hz or VSD.

For R717

2K liquid subcooling, 0.5 K non-usable suction superheat and liquid subcooling in intermediate cooler to 10K above intermediate temperature.

For R407C

2K liquid subcooling, 5K non-usable suction superheat and liquid subcooling in intermediate cooler to 10K above intermediate temperature.

For TCMO

Design pressure, HP side: 28 bar
Design pressure, LP side: 18 bar
Differential pressure: 25 bar

For TSMC

Design pressure, HP side: 28 bar
Design pressure, LP side: 18 bar
Differential pressure: 25 bar

Sound pressure levels in free field, over reflecting plane and one metre distance from the compressor block.

| Min./max. speed | R717 | R407C |
|-----------------|--------------|--------------|
| TCMO 20 | 700-1800 rpm | 700-1800 rpm |
| TCMO 30 | 700-1800 rpm | 700-1800 rpm |
| TSMC S | 500-1800 rpm | 500-1500 rpm |
| TSMC L | 500-1800 rpm | 500-1200 rpm |
| TSMC E | 500-1500 rpm | N/A |

PUBL-5640 01.2017

All information is subject to change without notice.

Johnson Controls Denmark ApS · Sabroe Factory
Christian X's Vej 201 · 8270 Højbjerg · Denmark
Phone +45 87 36 70 00 · Fax +45 87 36 70 05
www.sabroe.com

