Diaphragm Compressors

Diaphragm compressors

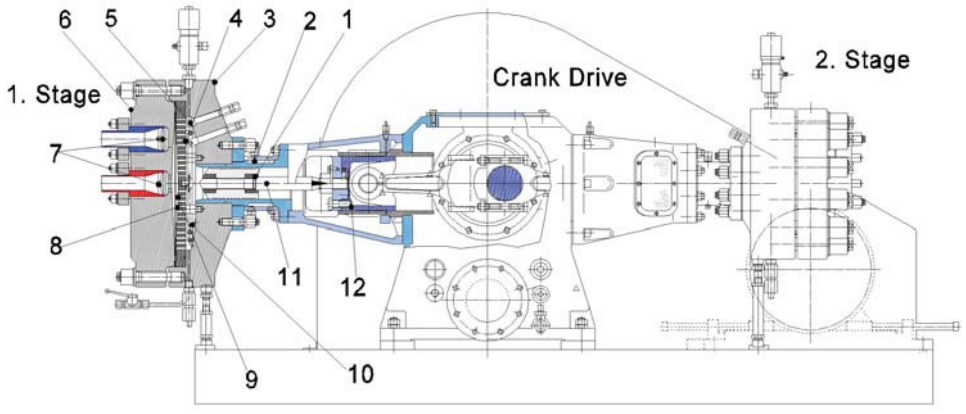
HOFER diaphragm compressors are hermetically sealed towards.
Static sealings guarantee a contamination-free compression of different gases, such as e.g. nitrogen, hydrogen, helium, argon, ethylene, fluorine, hydrosulphide, chlorine gas, monosilan, NF3, etc. as well as for gas mixtures.
As per HOFER standard the tightness is 10-4 mbar l/s, in special design up to 10-6 mbar l/s.
Diaphragm compressors are especially suitable for toxic and hazardous gases for saving the environment and protecting the health.
High purity gases can be proceed without any contamination or losses.

Constructional features

Depending on the operating data, HOFER diaphragm compressors will be manufactured in 1- to 4-stage design with one crank drive. Each diaphragm head is equipped with metal triple diaphragms and diaphragm failure indicator. Multi-stage machines are generally designed for foundation-free installation, i.e. they do almost not have any free dynamic forces. 1-stage compressors can also be supplied with mass compensation for foundation free installation.

3-stage diaphragm compressor with digital oil-pressure indication display and oil-pressure supervision
Model: MKZ 280-10/185-20/120-100 for Helium service
Capacity: 12 scfm (_20 Nm^3/h) Suction pressure: 116 psi (8 bar)
Discharge pressure: 12,760 psi (880 bar)

As per standard, the design of the compressors will be in accordance with the harmonized European safety regulations for machinery, the ATEX regulations and the pressure equipment directive (PED) and thus, will be CE- marked.



1.	Piston
2.	Cylinder
3.	Hydraulic flange
4.	Perforated plate
5.	Head cooling coil
6.	Gas plate
7.	Compressor valves
8.	Clearance volume
9.	Triple metallic diaphragm
10.	Oil space
11.	Piston rod
12.	Crosshead

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Diaphragm Compressors up to 43.500 PSI

Type MKZ

Advantages of HOFER diaphragm compressors

The water cooling does not only enclose the gas coolers and cylinders, but also the diaphragm head on the hydraulic side.

- There are no additional cooling water bores in the diaphragm cover. Thus, the high-loaded diaphragm head is not weakened.

HOFER does not only manufacture compressors, but also valves (shutoff-, non-return- safety valves and connecting elements) and thus, HOFER can complete the valve panels with their own products (bellows-sealed valves included).

- Since design, engineering and manufacturing are all done at HOFER, maintenance and repair work are more easily carried out.

Tailor-made and customized solutions by HOFER offer optimal advantages to our customers.

- Each compressor is optimized and designed for the required technical application.

The horizontal design of the HOFER compressors allows the oil overflow valves at the highest point of the diaphragm head.

- Only by this design can a quick and reliable venting be achieved. HOFER compressors are engineered in crosshead design for continuous operation.
- No lateral forces on the piston guiding rings and sealing rings occur .

Low piston velocities as well as low specific loads on the bearings guarantee a long life of the wear parts.

- There are no lateral forces at the piston of HOFER compressors which are caused by conversion of angular movement of the crankshaft into linear movement.

The special design of HOFER`s crank drives gives the opportunity to combine a dry-running piston compressor and a diaphragm compressor.

- No additional investment for a second compressor is required.
- The advantages of a HOFER diaphragm compressor remain even at higher suction capacities.

Wear and spare parts for HOFER compressors are available for a life span of min. 30 years. This guarantees decades of reliable production.

- Wear and spare parts are always up to date with the latest technology.

The HOFER compressors have nominal dynamic forces.

- Foundations are no longer required. A good bearing base is suitable.

Single-stage diaphragm compressor
Model: MKZ 400-5
Capacity: 74 scfm (≙125 Nm^3/h)
Suction pressure: 203 psi (14 bar)
Discharge pressure: 450 psi (31 bar)

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Type MKZ

Function and operational characteristics

The gas is compressed in a double concave chamber by an oscillating sandwich diaphragm, which is hydraulically set into motion from one side. The diaphragm seals and separates the gas chamber hermetically against the drive unit. At the periphery, it is clamped between diaphragm cover and flange with perforated plate and is set into oscillating motion by the hydraulic pressure.
The displacement of the plates causes the gas chamber between the diaphragm plate and the diaphragm cover to be enlarged respectively reduced with every cycle.

The enlarging of the gas space, results in gas being sucked in from the suction tube via the suction valve, which is installed in the cover. Reducing the gas space, the gas is compressed through the discharge valve – also installed in the cover – into the discharge tube.

The oil pressure, which is required for this bending movement of the diaphragm plates, is generated from the crankcase by the piston moving to and fro. The piston displacement nearly equals the displacement inside the diaphragm head.

During the compression stroke the piston presses the hydraulic oil into the diaphragm head and there through the perforated plate to the rear side of the diaphragm head. Thereby, the diaphragm is bent against the concave surface of the cover. In the suction stroke the piston draws the diaphragm back against the concave surface of the perforated plate.

2-stage diaphragm compressor
Model: MKZ 680-10/450-40 for hydrogen service
Capacity: 342 scfm (_580 Nm^3/h)
Suction pressure: 261 psi (18 bar)
Discharge pressure: 4,060 psi (280 bar)

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Further Hofer products

Combined Compressors

Since diaphragm compressors have limited suction capacity and non-lubricated piston compressors have a limited discharge pressure, HOFER offers a combined compressor type, which realizes the advantages of each type with one crank drive.
The pre-compression is done oil-free in the non-lubricated piston stages and the high-pressure compression in the final diaphragm stage (see opposite photo).

2-stage dry running piston compressor with final diaphragm stage
Model: 120TK500 / MKZ 350-40
Capacity: 295 scfm (~500 Nm^3/h)
Suction pressure: 232 psi (16 bar)
Discharge pressure: 4,350 psi (300 bar)

HOFER high pressure valves

DN 2 to DN 25, 3,625 psi (PN 250 bar) to 145,000 psi (PN 10,000 bar); manual-operated or pneumatically operated, closing or opening by spring force.

Serving Industry

HOFER compressors are found in nearly every industry using high-purity, rare, or hazardous gases. Some specific applications are:

- PTA plants (prod. of terephthalic acid)
- Gas cylinder filling, gas blending and mixing systems
- Chemical, pharmaceutical and petrochemical plants
- Gas transfer, filling and off-loading of tube trailers
- Gases for electronics, semiconductor and fiber optics manufacturing
- Hydrogen filling stations
- Research and development
- Pressure boosting and high-pressure gas storage systems
- Space centers

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