



Diaphragm compressors

Maximum pressure up to 43,000 psi – Oil and Leakage-free.



Hofer
NEUMAN & ESSER GROUP

Hofer Diaphragm compressors

HOFER diaphragm compressors are hermetically sealed towards the outside. Static sealings guarantee a contamination-free compression of different gases, such as nitrogen, hydrogen, helium, argon, ethylene, fluorine, hydrosulphide, chlorine gas, monosilan, NF_3 , etc. as well as for gas mixtures. As per HOFER standard the tightness is 145 psi l/s, in special design up to 14,500 psi 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 processed 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 are nearly free of dynamic forces. 1-stage compressors can also be supplied with mass compensation for foundation-free installation.

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.

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 or reduced with every cycle.

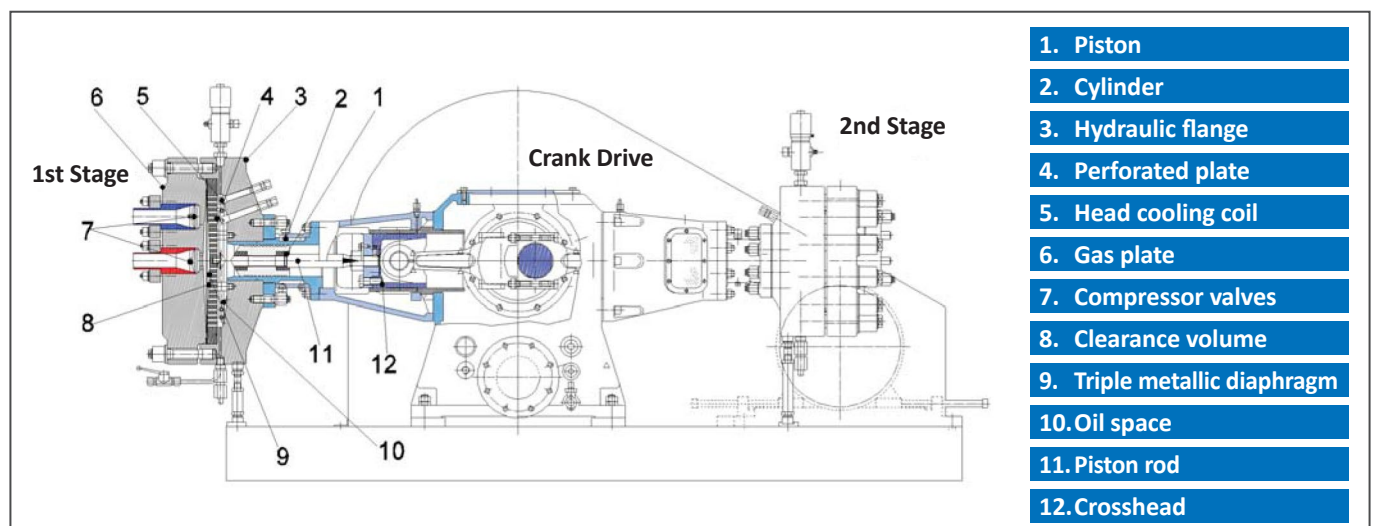
When the compression cycle begins, the process gas enters through the suction valve. As the cycle continues, the available volume in the compression chamber is reduced and the gas reaches its target pressure and moves through the discharge valve.

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 displacement of the piston and the diaphragm head are nearly equal.

With 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. Hereby the diaphragm is bent against the concave surface of the cover. In its return movement, the piston draws the diaphragm back against the also concave surface of the perforated plate.

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.



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 Nm³/h)
Suction pressure: 116 psi (8 bar)
Discharge pressure: 12,760 psi (880 bar)



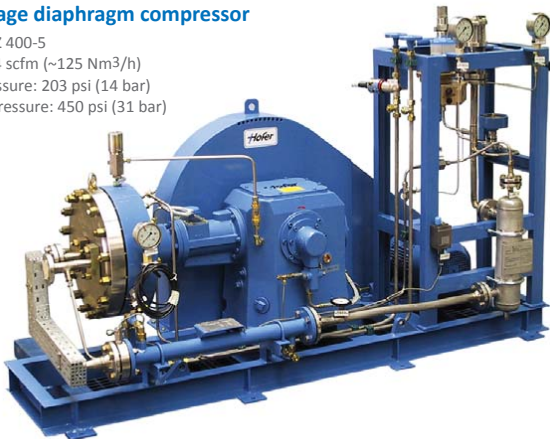
2-stage diaphragm compressor

Model: MKZ 680-10/450-40 for hydrogen service
Capacity: 342 scfm (~580 Nm³/h)
Suction pressure: 261 psi (18 bar)
Discharge pressure: 4,060 psi (280 bar)



Single-stage diaphragm compressor

Model: MKZ 400-5
Capacity: 74 scfm (~125 Nm³/h)
Suction pressure: 203 psi (14 bar)
Discharge pressure: 450 psi (31 bar)



2-stage dry-running piston compressor with final diaphragm stage

Model: 120TK500 / MKZ 350-40
Capacity: 295 scfm (~500 Nm³/h)
Suction pressure: 232 psi (16 bar)
Discharge pressure: 4,350 psi (300 bar)



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 (shut-off, non-return safety valves and connecting elements) and thus, HOFER can complete the valve panels with their own products (bellows-sealed valves included).

Design, engineering and manufacturing are in one hand at HOFER. Hence, maintenance and repair work can be carried out easily.

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

Each compressor is optimized and designed for the required technical parameter.

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

Only by that, a quick and reliable venting can be done. 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 high life length 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 also 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 using HOFER products.

Wear and spare parts are always on the latest level of technology.

The HOFER compressors with mass compensation do almost not have any free dynamic forces.

Foundations are no longer required. A solid foundation plate is suitable.



Industries

HOFER compressors are used in nearly every industry in which high-purity, rare, or hazardous gases are utilized.

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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