BIERI
HYDAC INTERNATIONAL

Pumping elements

Type PEH

1000 bar

0,16 up to 0,91 cm^3/stroke

Features

- Self priming
- High reliability
- Pumping element is filled during outward movement of the element and is discharged during external powered movement (ingoing movement)
- Flow is automatically controlled by the built-in valves
- The pumping element will discharge fluid independently of the direction of rotation

Design

- Consists of a cylinder with built-in non-return valves in the suction and the pressure port, a piston and a piston return spring
- To allow for the relative movements between the pistons and the eccentric, use a ball or roller bearing for the latter, the pistons running directly on the bearing's outer ring

Applications

- Hand driven pumps, the piston being actuated by a rocker arm
- Radial piston pumps, where the piston is being driven by an eccentric fitted to a rotating shaft (the eccentric converts the rotating motion into the alternating movement of the piston)

Technical Data

Hydraulic fluid	Mineral oil according to DIN 51524 (other fluids on request))
Fluid temperature range	-20 up to 80 °C
Viscosity range	12 to 220 mm^2/s
Max. operating pressure	up to 1000 bar, see product information
Filtration (recommendation)	According to NAS 1638 class 6 resp. ISO/DIN 4406 17/15/12
Weight	See product information
Max. speed	2000 rpm
Installation position	Any
Suction	-0.042 bar (gives max. 500 mm of suction height with hydraulic oil)
Fixation screws (not included in the scope of supplier)	M12 Quality 8.8 Tightening torque 40 Nm
Material	Piston: Case-hardened steel Cylinder: Heat treated steel

Ordering code

Example | **PEH** | **05** | - | **0,16** | - | **1000** | - | **V** | - | | | **00**

Pumping elements

Size
05
06
08
09
10
12

Max. geometric displacement [cm³/stroke] see product inform.

Max. operating pressure [bar] see product information

Seal material
V [FPM]
other seal materials on request

Design revision
see dimension drawings (capital letters A-Z; identical letters equal same connecting dimensions)

Part index
Please leave it blank (small letters a-z; different letters do not effect interchangeability)

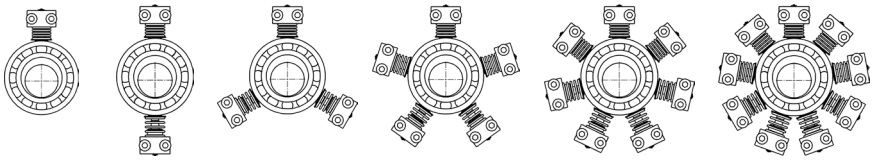
Special design
01 ... 99
(00 for standard)

Product information

Size	Piston Ø [mm]	Stroke max. [mm]	Max. geom. displacement [cm³/stroke]	Max. flow rate at 1‘450 rpm [l/min]	Operating pressure max. [bar]	Piston force per bar [N/bar]	Weight ca. [g]	Part No.
05	5	8	0,16	0,23	1000	1,96	153	4000832
06	6	8	0,23	0,33	1000	2,83	155	4000835
08	8	8	0,40	0,58	1000	5,03	157	4000838
09	9	8	0,51	0,74	1000	6,36	159	4000841
10	10	8	0,63	0,91	900	7,85	161	4000844
12	12	8	0,91	1,31	850	11,31	167	4000850

Layout

Number of pistons



	1	**2**	**3**	**5**	**7**	**9**
k	3.14	1.57	1.05	1.02	1.01	1
f	1	1	1	1.618	2.25	2.879

Calculation of driving motor power

$$P = \frac{p \cdot V_g \cdot n \cdot k}{\eta_t \cdot 600 \cdot 10^3}$$

P	required driving power [kW]
p	system pressure [bar]
V_G	displacement [cm³/stroke]
n	rotation speed [rpm]
η_t	overall efficiency, approx. 0.8
k	kinematic pulsation factor

Calculation of the piston force

Check the Hertzian stress at the contact line between piston and the eccentric bearing. Setthe piston diameter d as diameter of the piston surface.

Force generated by the pressure of each piston:

$$F_H = 0.0785 \cdot d^2 \cdot p = \mathbf{R}\ [\text{N/bar}] \cdot \mathbf{p}\ [\text{N}]$$

F_H	hydraulic force per piston [N]
d	diameter of piston [mm]
p	system pressure [bar]
R	piston force per 1 bar [N/bar]

Calculation of the bearing loads

The resulting load on the eccentric bearing is a function of the number of pistons:

It is required to calculate the bearing‘s expected life.

$$F_R = f \cdot F_H$$

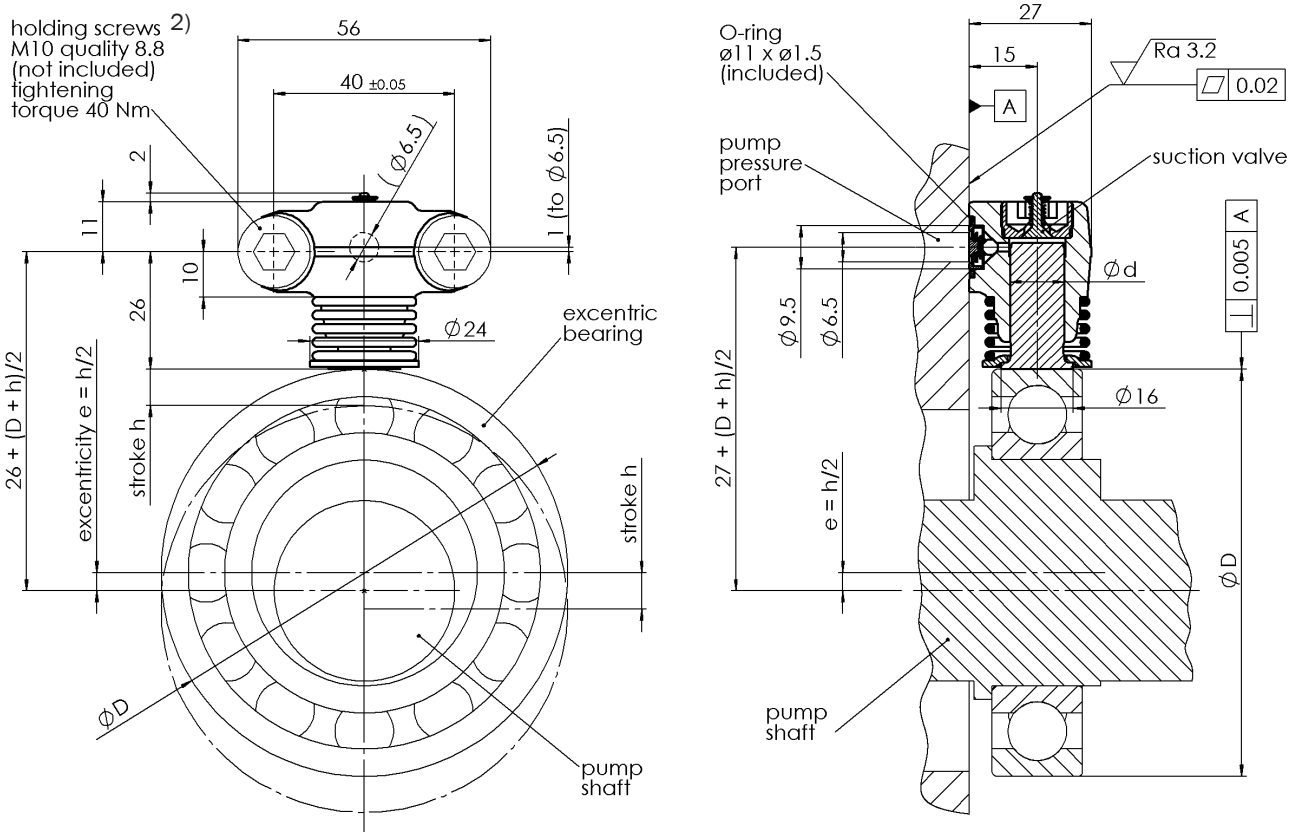
F_R	total load on the eccentric [N]
F_H	hydraulic force per piston [N]
f	geom. load multiplication factor

Piston loads

Keep in mind that the piston forces are concentrated on single points around the outer ring of the bearing, submitting the latter to bending loads. With large piston diameters, high pressure and few pistons it may be advisable to fit a bearing with a thicker outer ring (e. g. cam follower).

Dimensional drawings

Size PEH05, 06, 08, 09, 10 and 12 / Design revision B



2) Not included in the scope of supplier

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