Bell housings with flexible pump mounting and oil/air cooler

PTK Series

1. DESCRIPTION

1.1. GENERAL

Bell housings are connection elements between drive motors and hydraulic pumps.

Both connecting flanges are supplied ready for installation.

The bell housings are made from an aluminium cast alloy.

On the PTK (bell housing with built-in oil/air cooler) the oil is cooled efficiently by an air stream produced by a fan mounted on the motor shaft.

This combination of noise-damping bell housing and oil/air cooler considerably simplifies the construction and reduces the cost of hydraulic systems.

The high cooling capacity of the built-in cooler enables the user to reduce his tank capacity.

This reduction in oil quantity results in a reduction in operating costs and oil disposal costs.

1.2. MODELS

Bell housings with flexible pump mounting and oil/air cooler are supplied with dimensions to the VDMA 24561 standard.

2. TECHNICAL SPECIFICATIONS

2.1. GENERAL

2.1.1 **Mounting position**

No orientation restrictions.

Once both mounting bolts have been removed, the cooler element can be turned through 180° (ports point towards the motor or to the pump).

2.1.2 **Temperature ranges**

During operation of the PTK, ensure that the maximum oil temperature of +100 °C is not exceeded.

Warning! If there is a temperature difference of over 50 °C between the oil inlet on the cooler element and the ambient temperature, large fluctuations in temperature (e.g. by turning on and off frequently) must be avoided. Otherwise this could result in significant reduction in lifetime or direct damage to the element through stress cracking.

Permitted ambient temperature:
-20 °C to 60 °C.

2.1.3 **Noise level reduction**

PTKs have a flexible damping ring as standard between the bell housing and pump flange.

This ensures a complete decoupling of the pump from the motor and bell housing.

The additional use of flexible damping rails reduces the noise level still further.

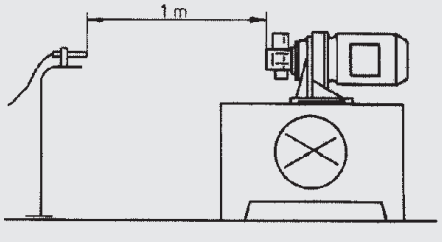
Basically, the noise level reduction achieved depends on many factors such as pump type, operating pressure, type of fitting, design etc.

It is therefore not possible to quote exact figures.

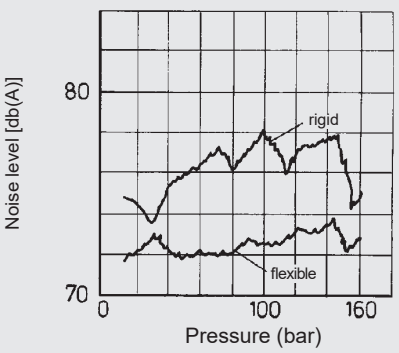
In general, noise level reductions of up to 6 dB(A) can be achieved by using the flexible pump mounting.

The illustration below shows how the test is set up, together with a graph showing typical noise level improvements when using a flexible bell housing compared with a rigid bell housing.

Test set-up



Noise level diagram



2.1.4 Notes on mounting

The bolts used for mounting the motor to the pump must be long enough to fill the available thread depth on the bell housing.
Bolts that are too short may damage the thread and thereby the entire unit.

2.1.5 Weight loading

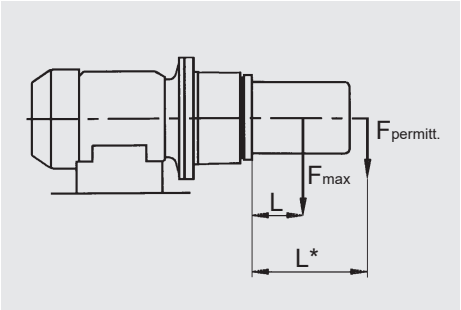
The permitted radial or axial load of the PTK with flexible pump mounting, allowing for an operating temperature of +60 °C:

PTK nom. size	Model damping ring	Permitted force due to gravity F max. [N]	Centre of gravity distance for radial load L [mm]
200/2001	E	400	200
	K	500	
250	E	600	200
	K	800	
300	E	1000	200
	K	1300	
350/3501	E	1500	200
	K	2000	

For a larger centre of gravity distance **L*** the permitted force due to gravity is reduced according to the following formula:

$$F_{permitt.*} = \frac{F_{max.} \bullet L}{L^*} [N]$$

If the centre of gravity distance **L*** of the pump is smaller than the centre of gravity distance **L** in the table, then the permitted force due to gravity $F_{permitt.}$ for the pump is equal to the maximum force due to gravity F_{max} in the table.



2.2. SPECIFICATIONS

2.2.1 Coolant

Mineral oil as per DIN 51524, other fluids on request

2.2.2 Nominal rpm for drive

n = 1500 rpm

(Base rpm for the stated technical data)

(up to 3000 1/min possible)

2.2.3 Direction of rotation

When looking at pump shaft clockwise

2.2.4 Air flow rate

Nom. size	Volume
PTK-200	approx. 72 m³/h
PTK-2001	approx. 72 m³/h
PTK-250	approx. 260 m³/h
PTK-300	approx. 435 m³/h
PTK-350	approx. 780 m³/h
PTK-3501	approx. 780 m³/h

2.2.5 Power requirement for fan

Nom. size	Rot. speed	
	1500 rpm	1800 rpm
PTK-200	20 Watt	30 Watt
PTK-2001	20 Watt	30 Watt
PTK-250	30 Watt	50 Watt
PTK-300	90 Watt	130 Watt
PTK-350	140 Watt	220 Watt
PTK-3501	140 Watt	220 Watt

2.2.6 Noise levels for PTK with electric motor, without pump

(measured as per DIN 45635 Part 1)

Nom. size	Power electric motor at 1500 rpm	PTK with electric motor
PTK-200	1.5 kW	52 db(A)
PTK-250	4 kW	58 db(A)
PTK-300	5.5 kW	69 db(A)
PTK-350	11 kW	70 db(A)

The noise levels with electric motor depend on the make of motor.

The noise levels are only a guide as the acoustic properties of a room and reflections have an effect on the noise level.

2.3. HYDRAULIC DATA

2.3.1 Cooler element

Material
Aluminium

Pressure resistance

- At an operating pressure of ≤ 16 bar and a temperature ≤ 50 °C, 2 million cycles (2 Hz) are achieved. At higher operating pressures and/or temperatures, the life expectancy is reduced.
- Maximum operating pressure at static pressure resistance is 40 bar.

Installation
When installing/removing cooler input/output connection screw, torque must be locked (protects cooling element from warping). Please also observe included installation instructions.

NOTE

The information in this brochure relates to the operating conditions and applications described. For applications and operating conditions not described, please contact the relevant technical department.

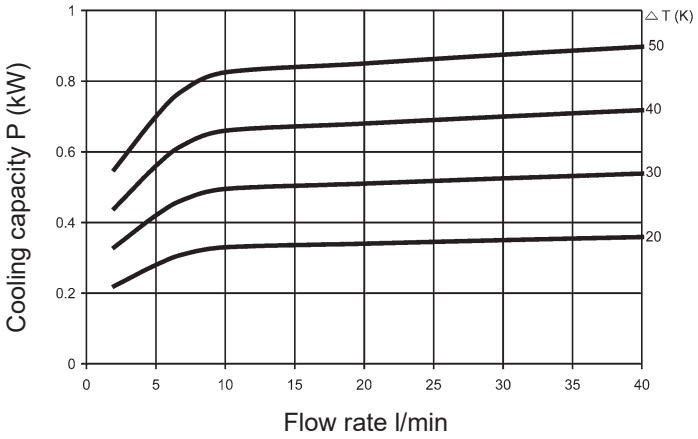
The operator is always responsible for determining the product suitability for the specific application. Quantified values for product characteristics are average values for a new product that undergo a time deterioration process.

Subject to technical modifications and errors.

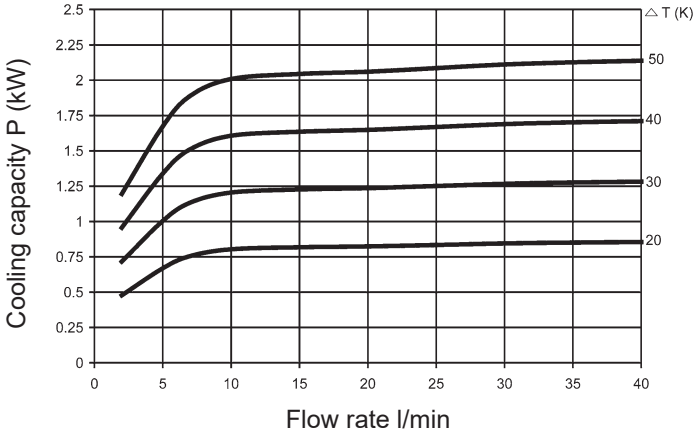
2.3.2 **Cooling capacity**

Cooling capacity against oil flow rate for different temperature differentials ΔT between oil inlet and air inlet (motor speed 1500 rpm).

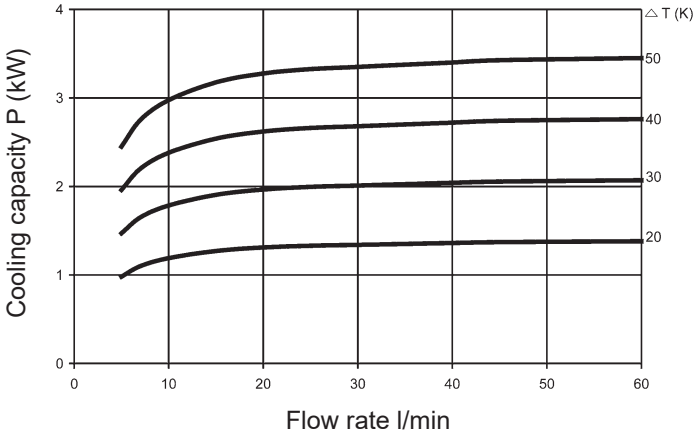
PTK-200/PTK-2001



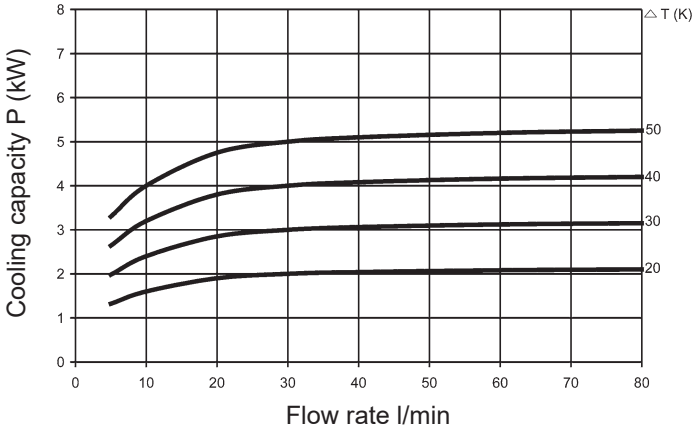
PTK-250



PTK-300



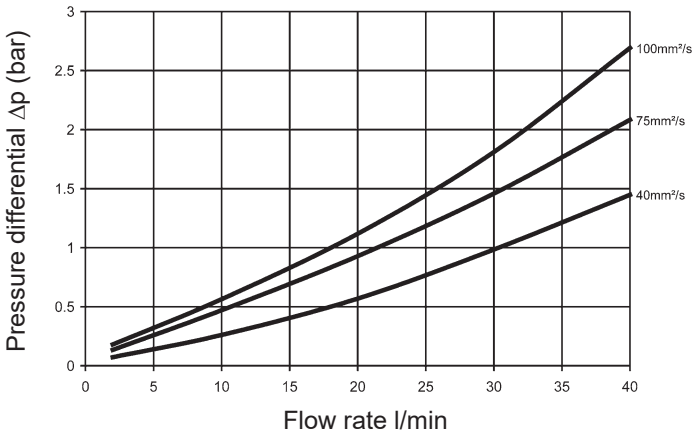
PTK-350/PTK-3501



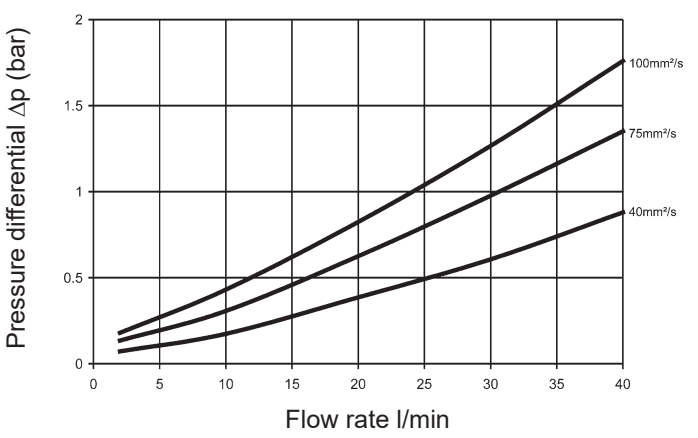
2.3.3 **Pressure drop Δp in the cooler element**

Flow direction is optional. The differential pressure Δp is shown against flow rate for different viscosities.

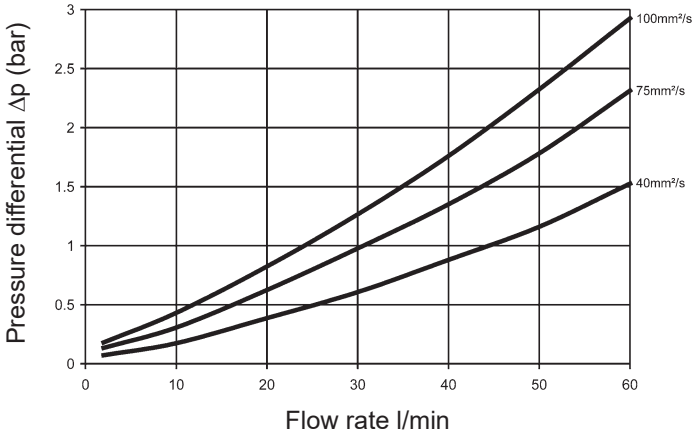
PTK-200/PTK-2001



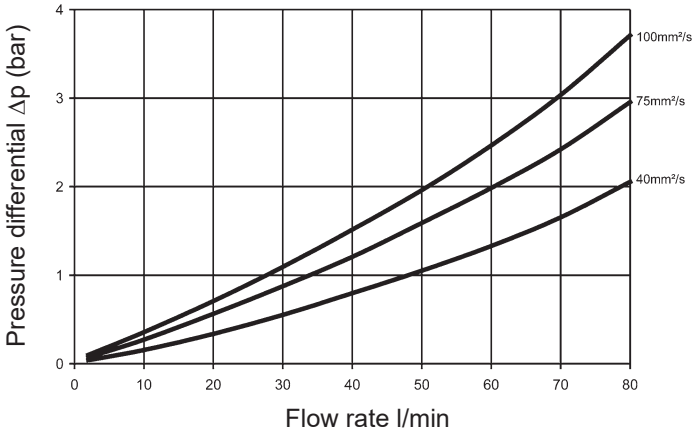
PTK-250



PTK-300



PTK-350/PTK-3501



3. MODEL CODE
(also order example)

PTK – 250 / M / 140 / FB092 – E / F3

Designation
PTK = bell housing with flexible pump mounting and built-in oil/air cooler

Nominal size for IEC standard motor (design B5, B35, V1, V15)

Nom. size	Electric motor size	Power at n = 1500 rpm
2001	80	0.55 - 0.75 kW
200	90	1.1 - 1.5 kW
250	100/112	2.2 - 4 kW
300	132	5.5 - 7.5 kW
350	160	11 - 15 kW
3501	180	18.5 - 22 kW

Mineral oil resistance
M = mineral oil to DIN 51524 (others on request)

Bell housing length N

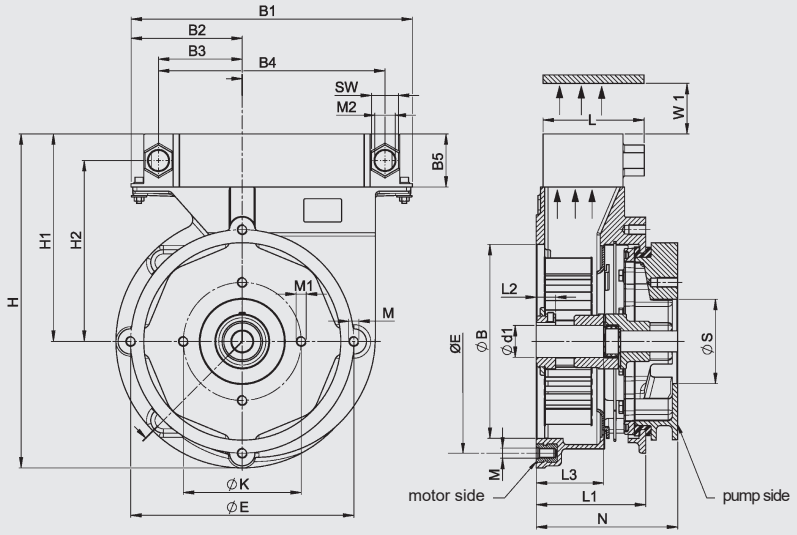
Bore template code for pump connection
(see our sizing program PT-Web light)

Model of damping ring *
E = standard (60 Shore A)
K = damping ring for higher loads (75 Shore A)

Accessories
... = no accessories (no details)
F3 = bell housing foot bracket (light range)
F4 = bell housing foot bracket (heavy range)
SO = special version

* See point 2.1.5 Weight loading

3.1. DIMENSIONS



Electric Motor Size	Output at 1500 rpm [kW]	Electric motor Drive end $d_1 \times L_3$	PTK Nominal size	PTK Foot bracket	PTK Mounting plate	H	H1	H2	B	E	M	B1	B2	B3	B4	B5	SW	M2	L	L1	L2	min. W1
80 80	0.55 0.75	19 x 40	PTK-2001	PTFL-200	PP200	276	175	143.5	130	165	M10	260	110	77.5	195	63	32	G3/4	81	80	21	120
90 S 90 L	1.1 1.5	24 x 50	PTK-200																			
100 L 112 M	2.2 4	28 x 60	PTK-250	PTFL-250	PP250	328	198	166.5	180	215	M12	334	156	123.5	269	63	32	G3/4	120	105	23	160
132 S 132 M	5.5 7.5	38 x 80	PTK-300	PTFL-300	PP-300	396	246	214.5	230	265	M12	334	132	99.5	269	63	32	G3/4	120	130	23	200
160 M 160 L	11 15	42 x 110	PTK-350	PTFL-350	–	438	263	231.5	250	300	M16	334	102	69.5	269	63	32	G3/4	146	170	31	240
180 M 180 L	18.5 22	48 x 110	PTK-3501																			

To identify the bore template code, please use our free-of-charge dimensioning program PT Web light when possible or ask at our Head Office.

Accessories:
For the range of accessories (bell housing foot brackets, bell housing mounting plate, damping rails, damping rings and couplings), please use our supplementary brochure "Bell Housing Accessories". This brochure can be downloaded from our website **www.hydac.com**.

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