

外啮合齿轮定量泵

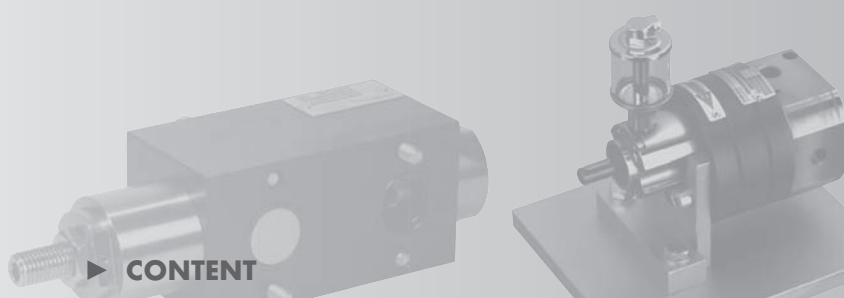
EXTERNAL GEAR DOSING PUMPS

ZPD 系列



六十年齿轮泵设计经验

60 YEARS EXPERIENCE IN PUMP TECHNOLOGY



	页码 Page
ZPD系列简介 General product information ZPD series	3
剖面图 Design	4
版本 Versions	5
轴封类型 Shaft seal	5
特殊设计 Special designs	5
转向标识 Sense of rotation	5
轴承选择 Bearing selection	5
附件及固定 Accessories and assembling options	6
安装方式 Installation options incl. motor	7
应用及介质 Applications and fluids	8
工作条件 Operating conditions	10
排量规格 Displacements cc/rev	10
转向标识 Sense of rotation	10
接口类型 Suction/pressure ports	10
齿轮类型 Type of gears	10
工作转速 Speed	10
工作粘度 Viscosity	10
环境温度 Ambient temperature	10
工作温度 Fluid temperature/operating temperature	10
工作压力及转速 Operating pressures and speed ranges	11
计算基础 Calculation basis	12
粘度系数 Viscosity factors	13
子系列 Versions	14
材料列表 Material combinations	15
轴封类型 Shaft seals	16
规格标识 Specifications, technical indication	18
转速(不含填料) Speed recommendations without fillers	18
转速(包含填料) Speed recommendations with fillers	18
转换关系 Conversions	18
环境温度 Ambient temperature	18
介质温度 Fluid temperature	18
型号编码 Type code	19
全球网络 Worldwide service	20

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百利泵在世界上广泛应用。如液压,造船,航空,化工,塑料,制药,印染和食品行业等;也广泛应用于双组份,多组分混比。

经过六十年的技术沉淀和应对各种复杂介质的经验积累,百利泵公司能为客户提供高效且有效的解决方案。

经过多年系统性的开发,形成目前的定量泵和输送泵系列。我们按最高标准和质量来设计和开发产品。

百利泵公司通过了 DIN EN ISO 9001:2008 认证。

我们提供各种方案满足客户的要求,使我们和客户之间关系更密切。百利泵公司提供全球技术咨询服务,使广大用户受益。

高精度 ZPDA 定量泵的基本信息

除用于液压和过程控制的齿轮泵以外,我们还提供高精度和通用性强的 ZPDA 系列,可集成流量计和连接阀块。该系列技术含量高,特别适用于精密计量的场合。

详细参数请查看“ZPDA 系列外齿轮计量泵”样本

我们将与客户一起根据具体的应用选用合适的系列和决定泵的配置。

Beinlich external gear dosing pumps are applied worldwide in process plants of the chemicals, plastics, pharmaceuticals, dyes, paints and food industries as well as in the areas of oil hydraulics, two- and multi-component machines, but also in shipbuilding and aircraft construction.

Based on extensive experience in dispensing difficult to handle fluids and six decades of technological knowledge, Beinlich develops customized, innovative and efficient solutions.

The actual broad range of Beinlich dosing and transfer pumps is the result of systematic product development. Traditionally, the implementation of the highest possible standards, quality awareness and detailed knowledge of customer industry sectors are the focus of product design and development.

Beinlich is certified according to DIN EN ISO 9001:2008.

The special requirements for single or system solutions are the result of a close partnership and cooperation between producer and user. The worldwide Beinlich service is supplemented by technical consultation based on needs and requirements for the benefit of our customers.

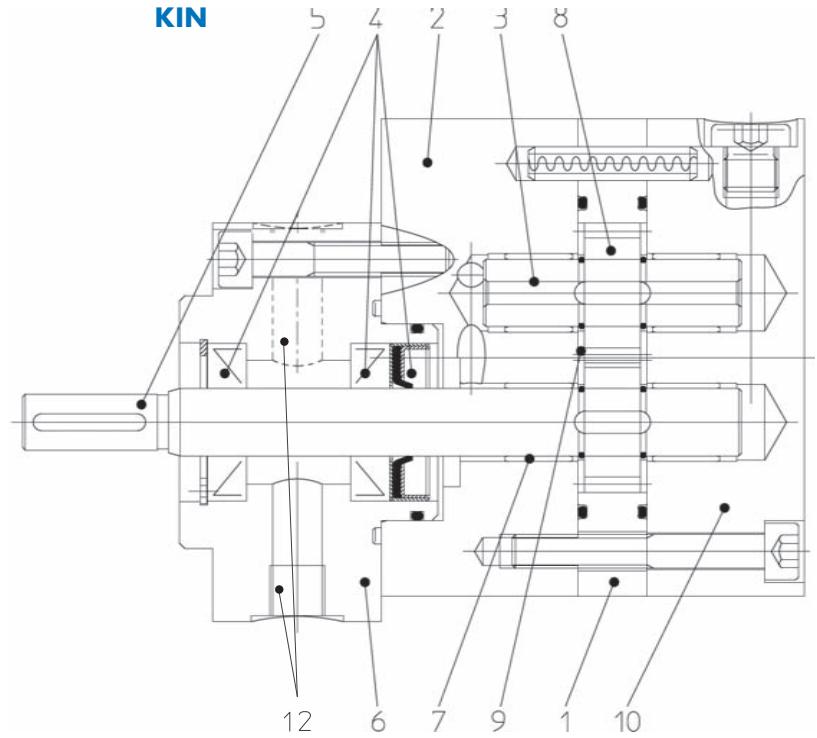
Basic information about our high precision ZPDA dosing pumps

In addition to the gear pumps for dosing, oil hydraulic and process technology described in this catalogue, Beinlich also produces the high precision, adaptable ZPDA series of dosing pumps featuring an integrated flow meter and a connection block. This series meets the highest technical standards in pump design and was specifically developed for applications with highest requirements on precision and accuracy.

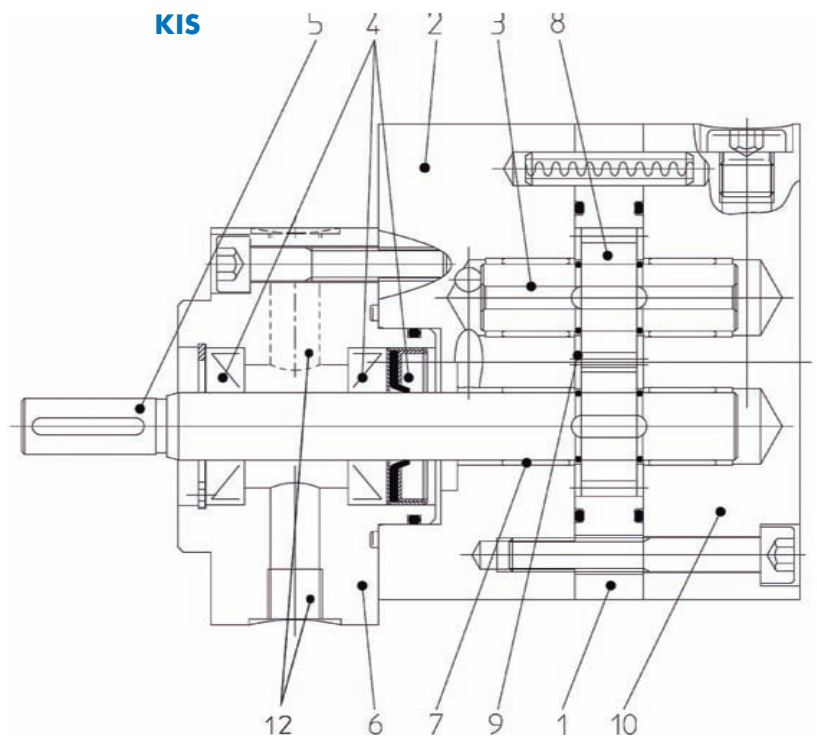
Please refer to the separate „External Gear Dosing Pumps ZPDA“ catalogue for technical details.

The decision, which series or version is to be preferred, is made together with each customer based on specific project parameters.

- 1 中心板
- 2 前板
- 3 被动轴
- 4 轴密封(可选不同形式)
- 5 驱动轴
- 6 密封件支撑座
- 7 轴承套
- 8 齿轮
- 9 滑板(KIN系列)
- 10 背板
- 11 耐磨板(KIS系列)
- 12 油封腔



- 1 Center plate
- 2 Front plate
- 3 Driven shaft
- 4 Seal (can differ)
- 5 Drive shaft
- 6 Seal supporting collar
- 7 Sleeve bearings
- 8 Gear
- 9 Sliding plate (KIN)
- 10 Rear plates
- 11 Wear plates (KIS)
- 12 Block Chamber



轴封类型

轴密封的选取由应用要求决定，主要考虑介质、温度，入口压力和其它因素；主要有以下形式：

- 单层轴封
- 三层密封带油封腔
- 机械密封带油封腔
- 压盖密封
- 磁力密封

SHAFT SEAL

The basic selection on the applicable shaft sealing system is based and depends on the respective technical requirements concerning fluid and temperature consistence, inlet pressure and other factors. The following variations are available:

- Single radial shaft seal
- Triple radial shaft seal with block chamber
- Mechanical seal with block chamber
- Gland packing
- Canister through magnetic coupling

可选 左旋 (ccw) 或右旋 (cw) 形式。若采用同时左+右双向工作,需确认详细应用参数。

Versions ccw/left and cw/right are available on request. In case using L+R please always verify the technical details.

特殊设计

根据应用，可提供特殊设计,如选用不同材料,耐磨涂层，辅助加热装置和不同安装形式或多联泵。请与我们联系。

SPECIAL DESIGNS

According to the requirement and application, special versions are available such as different material combinations, coatings for wear-resistant designs, heating and mounting options, as well as multi-stage variants. Please contact us with your specific requirements. We would be pleased to assist you.

转向标识

请按转向标识操作泵！如“L”代表左旋,从驱动轴往泵看,逆时针转。

S=入料口； **D=**出料口

附图的箭头表示驱动轴的旋向，不是液体的流动方向！

SENSE OF ROTATION

Always operate the pump only in the specified sense of rotation!

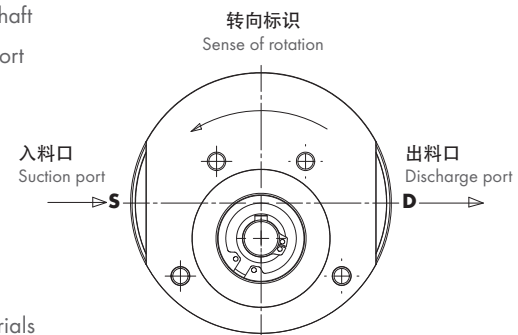
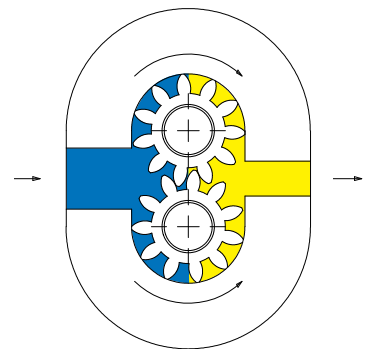
E.g., sense of rotation „L“ LEFT = Standard, counter clockwise (ccw) view on pump shaft

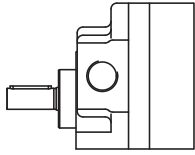
S= Suction port **D=** Discharge port

The attached arrow shows the sense of rotation, NOT the flow direction.

BEARING SELECTION

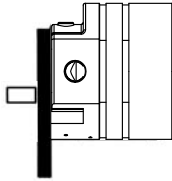
The selection of suitable bearing materials is based on essential criteria such as the properties of the fluid to be transferred (lubricity, viscosity, temperature range), operating conditions (operating pressure, speed range) and pump dimension. Different bearing materials are available, which are selected by Beinlich specifically for each individual application.





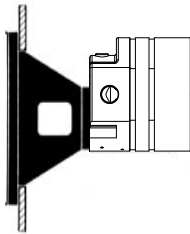
固定方式
F - 泵头(光轴)

MOUNTING OPTIONS
F - Bare shaft pump



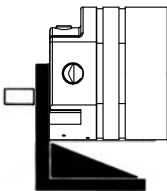
FA - 泵带安装法兰

FA - Pump with mounting flange



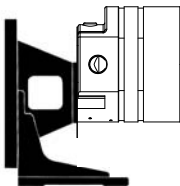
FCV-K - 泵带钟罩和联轴器

FCV-K - Pump with bell housing
and coupling



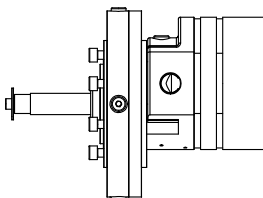
FB - 泵带脚架

FB - Pump with foot bracket



FCB - 泵带钟形罩,联轴器和脚架

FCB - Foot bracket and flange design



VMAG - 泵带法兰 (用于磁联安装)

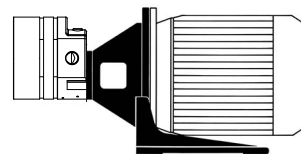
VMAG - Pump with flange preassembled
for mounting magnetic coupling

根据要求,可提供完整泵组
(含电机)
详情请看下一页。

**On request we also deliver
complete units including motor.
Assembling options including motor
on the following page.**

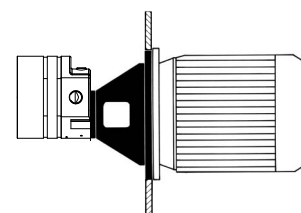
FCB - 泵带钟形罩,联轴器和脚架

FCB - Pump with bell housing, coupling and foot bracket



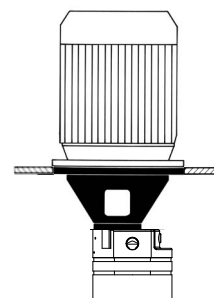
FCV - 水平安装

FCV - Horizontal installation



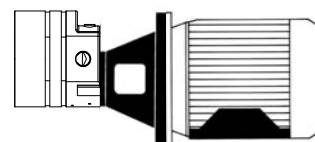
FCV - 垂直安装

FCV - Vertical installation



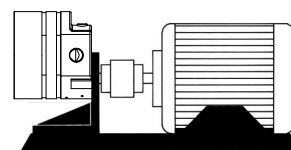
FCV - 带法兰,电机带脚架

FCV - With flange/feet motor



FB - 含泵支座,脚架和底座板

FB - With pump base and foot bracket on base plate



附件

- 三相交流电机
- 减速电机
- 机械联轴器/
- 磁联轴器
- 钟形罩
- 润滑油瓶
- 底座

ACCESSORIES

- Three-phase A.C. motor
- Gear box motor
- Mechanical coupling/ magnetic coupling
- Bell housing
- Drip feed oiler
- Base plate

定量给料应用

- 单组分/双组分 或多组分定量给料设备, 含填料/不含填料介质, 如: 聚氨酯 (PUR), 脂类, 树脂, 固化剂, 异氰酸酯, 多元醇, 苯酚, 添加剂, 油脂等;
- 粘胶剂, 如 热熔胶, 胶水 (甲基丙烯酸)
- 油墨, 涂料应用; 如 油墨加注
- 聚合物应用; 如 预聚物

流程控制应用

- 有机物或无机物; 如酒精, 清洗液, 溶剂, 甲酸, 氢氧化钠, 航空煤油, 甲苯, 光气 (氯化碳-), 盐水, 去离子水
- 食品工业; 如黄油, 人造奶油, 芥末, 巧克力, 蛋白, 食用明胶, 糖浆等;
- 制药及化妆品; 如护肤乳, 洗发水, 面霜, 面油等;
- 高温油泵应用

PUMPS FOR DOSING TECHNOLOGY

- 1K-/2K- or multi-component dosing machines for filled and unfilled fluids, e.g. PUR applications, esters, resins, hardeners, isocyanates, polyols, phenols, additives, fats, etc.
- Adhesive technology, e.g. hotmelt, glues (e.g. methyl acrylate)
- Ink and paint dosing, e.g. ink supply
- Polymer applications, e.g. prepolymers

PUMPS FOR PROCESS ENGINEERING AND TECHNOLOGY

- Transfer and dosing of organic and anorganic chemicals, e.g. alcohols, cleaning fluids, solvents, formic acid, sodium hydroxide solutions, kerosene, toluene, phosgene, brine, deionized water
- Transfer and dosing in the food processing industry, e.g. butter, margarine, mustard, chocolate, egg whites, gelatine, syrup, etc.
- Transfer and dosing of pharmaceutical and cosmetic products, e.g. lotions, shampoos, creams, oils, etc.
- Pumps for thermal oil applications



定量加注泵, 用于含填料的场合,
入口耐压 40 bar
轴向力平衡机械密封含油封腔

Dosing pump for all kind of fillers, inlet pressure up to 40 bar, mechanical seal with block chamber and axial forces equalization

大排量外齿轮泵 (斜齿) 含磁力密封
用于钻井平台天然气压缩机组的润滑回路

High capacity external gear pump (helical geared) with magnetic coupling in application for lubricant circuits of natural gas compressor stations



液压应用

- 液压控制
- 大型液压设备液力驱动系统，如起落桥,变距螺旋桨或大型压铸机

润滑油输送

- 如大型齿轮箱润滑，船用柴油发动机，机床等

泵组举例

- 消防泵，集成流量计和安全阀
- 黄油/芥末/番茄酱 定量给料系统
- 带吸料盘泵组，用于输送粘度高达1.000.000mPa·s 介质
- 定量泵组，包含电机，流量计，转速计，压力和温度传感器，泵带加热/冷却装置

PUMPS FOR HYDRAULIC APPLICATIONS

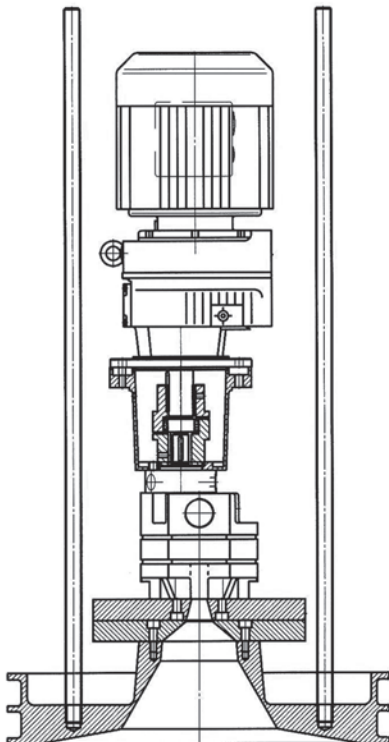
- Hydraulic controls
- Transfer of large forces for hydraulically moved/operated systems such as e.g. lift bridges, variable pitch propellers or large presses

LUBRICATING OIL SUPPLY PUMPS

- Lubrication e.g. of large gear boxes, ship diesel engines, machine tools etc.

SYSTEM TECHNOLOGY, EXAMPLES

- Fire retardant dosing with integrated flow meter and valve
- Butter/mustard/ketchup dosing systems
- Drum pump systems for highly viscous fluids up to 1,000,000 mPa·s for adaption to a follower plate
- Pump units for dosing technology with motor and integrated flow meter, speed detection, pressure and temperature sensors; pumps incl. heating or cooling device



带吸料盘泵组

Drum pump unit for mounting on follower plate

排量规格 毫升/转

- ZPD 1 0,30/0,73/0,87/1,17/1,46/1,90/2,50
3,20/3,80/5,10/7,30
- ZPD 2 3,90/7,80/11,80/15,70/19,60/23,60
- ZPD 3 17,30/22,00/29,40/37,40/45,40/53,00
60,00/72,00
- ZPD 4 44,40/57,90/74,50/89,30/110,00/131,00
149,00/166,80/184,60/223,00/236,00/280,00
316,00/354,00/400,00/434,00/472,00/517,00
- 可达 2600 毫升/转,更多规格请咨询

转向标识

- 逆时针 (CCW), 左转 (标准)
- 顺时针 (CW), 右转
- 左+右转 (CCW+CW) (根据应用决定)

吸料口/出料口

- ZPD 1 螺纹口
- ZPD 2 - 4 螺纹口/SAE法兰口

齿轮类型

- ZPD 1 - 2 正齿轮
- ZPD 3 - 4 正齿轮 (标准),
斜齿轮 (根据应用决定)

工作转速

- 10 - 1.800 升/分钟
(必须综合考虑压力和粘度等因素)

工作粘度

- 0,8 - 1.000.000 mPa·s
(必须综合考虑压力和转速等因素)

环境温度

- -30度至 +60度
(其它温度应用请咨询百利泵公司)

介质温度/工作温度

- -20度至 +150度 (标准)
(根据应用温度选取不同密封材料, 请参考最大温度值。特殊设计可达 -30 度至350度, 请查看16页表格)

DISPLACEMENTS CC/REV

- ZPD 1 0.30/0.73/0.87/1.17/1.46/1.90/2.50
3.20/3.80/5.10/7.30
- ZPD 2 3.90/7.80/11.80/15.70/19.60/23.60
- ZPD 3 17.30/22.00/29.40/37.40/45.40/53.00
60.00/72.00
- ZPD 4 44.40/57.90/74.50/89.30/110.00/131.00
149.00/166.80/184.60/223.00/236.00/280.00
316.00/354.00/400.00/434.00/472.00/517.00
- Sizes up to 2,600 cc/rev available on request

SENSE OF ROTATION

- Counterclockwise (ccw), left (standard)
- Clockwise (cw), right
- ccw + cw (based on application)

SUCTION/PRESSURE PORTS

- ZPD 1 Threaded port
- ZPD 2 - 4 Threaded port/SAE flange

TYPE OF GEARS

- ZPD 1 - 2 External spur gears
- ZPD 3 - 4 External spur gears (standard),
External helical gears (based on application)

SPEED

- 10 - 1,800 rpm
(Operating conditions such as pressure and viscosity must be considered. Higher speed rotation on request)

VISCOSITY

- 0.8 - 1,000,000 mPa·s
(Operating conditions such as pressure and speed must be considered.)

AMBIENT TEMPERATURE

- -30°C up to +60°C
(In case of deviating temperatures, please contact Beinlich. Special designs are available for these applications.)

FLUID TEMPERATURE/OPERATING TEMPERATURE

- -20°C up to +150°C (Standard version)
(Suitable seals are selected based on real operating conditions. Please note the indicated max. operating temperature values. Special designs up to -30°C and +350°C are available, see table page 16.)

规格 Size	排量 毫升/转 Displacements cc/rev	工作压力 Operating pressure bar		最大压力 Max. pressure bar		转速范围 Speed range rpm	
		KIS, KIK, KIH	KIN	KIS, KIK, KIH	KIN	最小值 min.	最大值 max.
1	0,30	180	40	200	60	10	1750
1	0,73						
1	0,87						
1	1,17						
1	1,90						
1	1,46						
1	2,50						
1	3,20						
1	3,80						
1	5,10						
1	7,30						
2	3,90						
2	7,80	180	40	200	60	10	1750
2	11,80						
2	15,70						
2	19,60						
2	23,60						
2	23,60						
3	17,30	160	40	180	60	10	1750
3	22,00						
3	29,40						
3	37,40						
3	45,40						
3	53,00						
3	60,00						
3	72,00						
3	72,00	140		160			
4	44,40	180	40	200	60	10	1750
4	57,90						
4	74,50						
4	89,30						
4	110,00						
4	131,00						
4	149,00						
4	166,80						
4	184,60						
4	223,00						
4	236,00						
4	280,00						
4	316,00						
4	354,00						
4	400,00						
4	434,00	120	40	140	40		
4	472,00						
4	517,00						
4	517,00						
4	517,00	50		60			

操作压力指额定工作压力。最大压力为峰值压力。选用了合适的轴承组合满足表格的数值。以上数据不适合临界值或极端应用条件，如低粘度，低转速或高压等。该类应用请咨询百利泵公司。规格5,6,7,8系列最大可达2600毫升/转的数据不在上述表格，请咨询。

The operating pressure refers to the permissible permanent pressure. Values for the max. pressure apply to maximum, temporary pressure peaks. All parameters refer to the standard values and already take suitable bearing combinations into account. For borderline or extreme operating conditions associated with a low viscosity, low speed and high pressure, these minimum and maximum values are not applicable. Please contact Beinlich for additional assistance. The values for dimensions 5, 6, 7 and 8 up to 2,600 cc/rev. not listed here are available on request.

符号注解

Equation symbols

- P_{erf} = 所需功率 [kW]
- Δp = 工作压力 (压差) [bar]
- p_1 = 入口压力 [bar]
- p_2 = 出口压力 [bar]
- f_v = 粘度系数 [见图表 2]
- 600 = 转换系数常量
- Q_{theor} = 理论流量 [升/分钟]
- Q_{eff} = 有效流量 [升/分钟]
- η_h = 液压传递效率
- V_g = 每转额定排量 [毫升]
- V_u = 每转理论排量 [毫升]
- n = 转速 [/分钟]
- 1.000 = 流量转换常量
- η = 动态粘度 [mPa·s]
- η_{ges} = 总效率 [%，见图表 1]
- η_{vol} = 容积效率
- η_{mech} = 机械效率
- M_{erf} = 所需扭力 [牛米]
- 9550 = 扭力计算常量

- P_{erf} = Required power consumption [kW]
- Δp = Working pressure (differential pressure) [bar]
- p_1 = Inlet pressure [bar]
- p_2 = Discharge pressure [bar]
- f_v = Viscosity factor [see Fig. 2]
- 600 = Conversion constant for powerrange
- Q_{theor} = Theoretical flow [l/min]
- Q_{eff} = Effective rate of flow l/min
- η_h = Hydraulic efficiency
- V_g = Nominal volume per revolution [cm³]
- V_u = Theoretical volume per revolution [cm³]
- n = Speed [min⁻¹]
- 1.000 = Conversion constant for flow
- η = Dynamic viscosity [mPa·s]
- η_{ges} = Overall efficiency [%，s. Fig. 1]
- η_{vol} = Volumetric efficiency [%]
- η_{mech} = Mechanical efficiency [%]
- M_{erf} = Required driving torque [Nm]
- 9550 = Conversion constant for torque

计算容积和最小扭力指引

Guidelines for dimensioning the required drive capacity and minimum torque

$$P_{\text{erf}} [\text{kW}] = \frac{\Delta p [\text{bar}] \times Q_{\text{theor}} [\text{l/min}]}{600 \times \eta_{\text{ges}}} \times f_v \quad \Delta p [\text{bar}] = p_2 - p_1$$

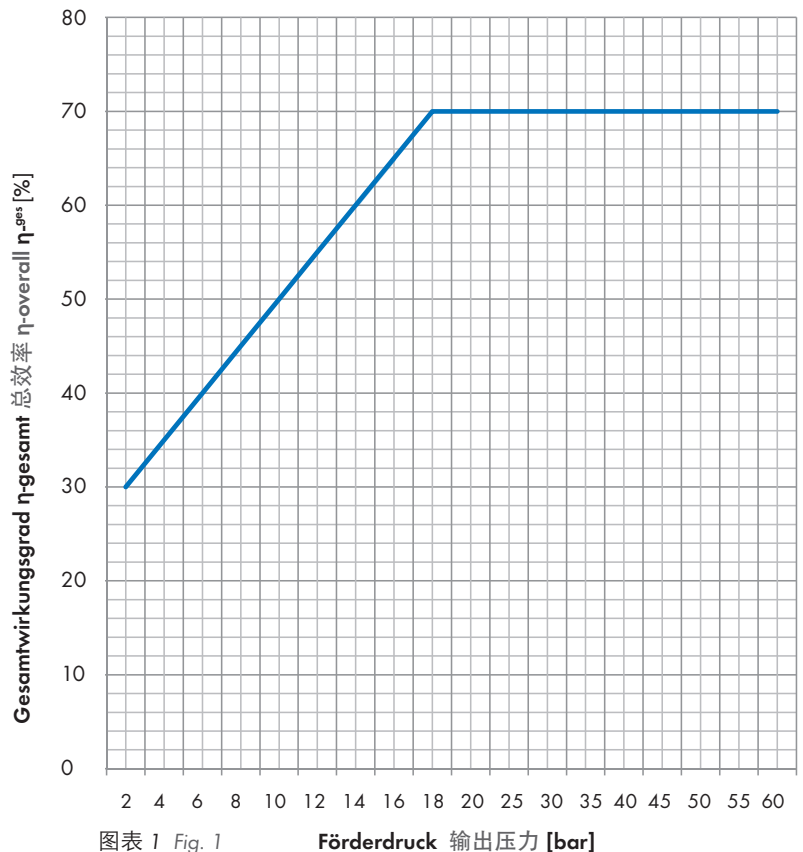
$$Q_{\text{theor}} [\text{l/min}] = \frac{V_g [\text{cm}^3] \times n [\text{min}^{-1}]}{1000} \quad \eta_{\text{ges}} [\%] = \eta_{\text{vol}} \times \eta_{\text{mech}}$$

$$Q_{\text{eff}} [\text{l/min}] = Q_{\text{theor}} \times \eta_h \quad M_{\text{erf}} [\text{Nm}] = \frac{P_{\text{erf}} [\text{kW}] \times 9550}{n [\text{min}^{-1}]}$$

$$V_u \approx V_g$$

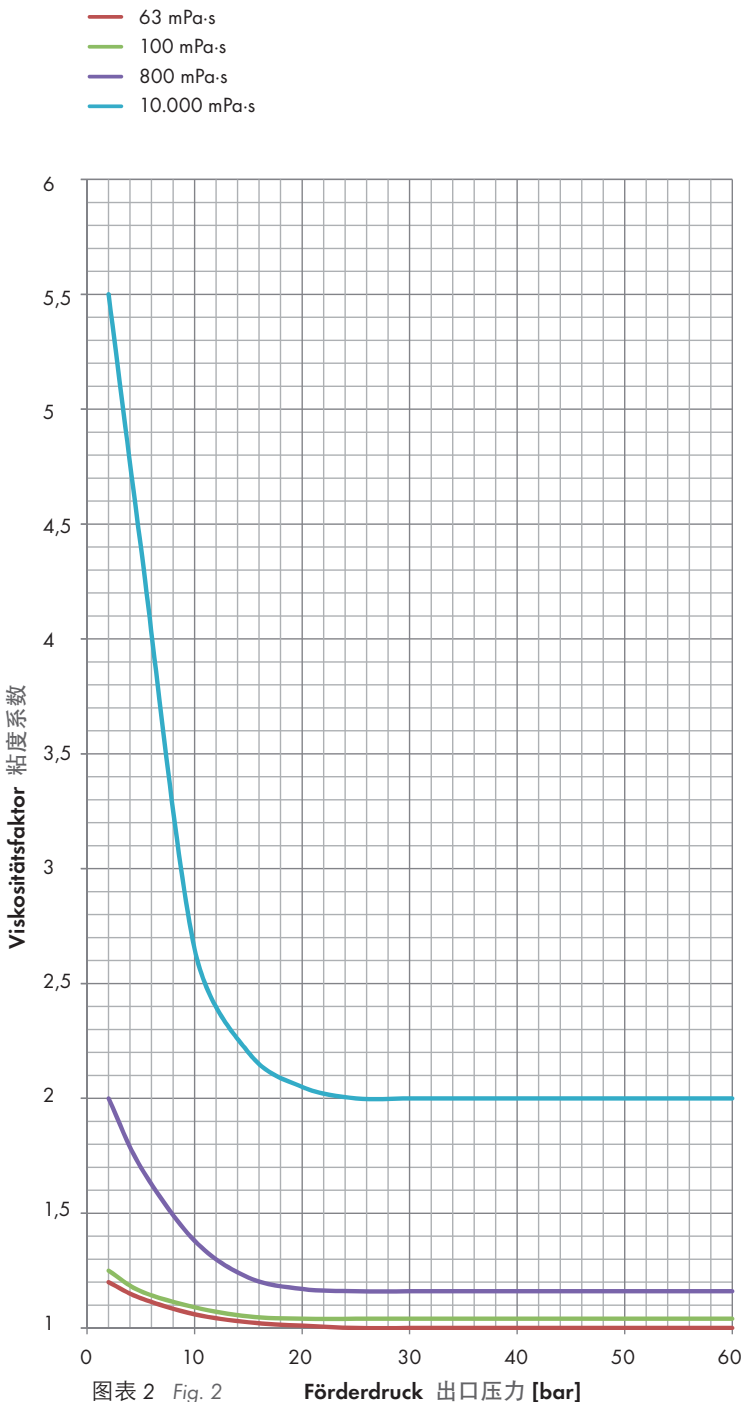
总效率与输出压力关系图

Overall efficiency with delivery pressure



图表 1 Fig. 1

Förderdruck 输出压力 [bar]



计算建议

Recommendation for dimensioning

粘度越高，实际需要的功率的保险系数越大

Higher viscosities in the starting condition require safety margins for the calculation of the actually required motor power.

P_{Mot} = 电机功率 千瓦 Motor power kW
(选取大一级电机功率)
(the next higher value has to be selected according to power ranges of manufacturer)

M_k = 联轴器扭力 牛米 Couplings torque Nm
(选取大一级扭力规格)
(the next higher value has to be selected according to power ranges of manufacturer)

计算举例 Calculation example ZPD 2-7,80 KIN

$\eta = 10.000 \text{ mPa}\cdot\text{s}$; $p_1 = 10 \text{ bar}$; $p_2 = 50 \text{ bar}$; $\Delta p = 40 \text{ bar}$
 $f_v = 2$ (图表 2/ Fig. 2); $n = 350 \text{ min}^{-1}$ (参考第18页/see page 18)
 $V_g = 7,80 \text{ cm}^3$ (参考第10页); $\eta_{ges} = 70 \% = 0,7$ (图表 1/ Fig. 1)

$$Q_{theor} = \frac{7,80 [\text{cm}^3] \times 350 [\text{min}^{-1}]}{1000} = 2,73 \text{ l/min}$$

$$P_{eff} = \frac{40 [\text{bar}] \times 2,73 [\text{l/min}]}{600 \times 0,7} \times 2 = 0,52 \text{ kW}$$

选取减速电机 **P=0,55 千瓦 (kW)**

Selection gear box motor **P=0.55 kW**

泵驱动轴所需扭力

Required torque on pump shaft

$$M_{eff} = \frac{0,52 [\text{kW}] \times 9550}{350 [\text{min}^{-1}]} = 14,19 \text{ Nm}$$

选取联轴器 **$M_k = 15$ 牛米 (Nm)**

Selection coupling with **$M_k = 15 \text{ Nm}$**

ZPD						
	KIS	KIN	KIK	EEN	EES	EEK
基本材料 Basic Material	铸铁 Cast iron	铸铁 Cast iron	铸铁 Cast iron	不锈钢 Stainless steel	不锈钢 Stainless steel	不锈钢 Stainless steel
材料列表 Material Combinations	壳体 0.7050 Housing 0.7050	壳体 0.7050 Housing 0.7050	壳体 0.7050 Housing 0.7050	壳体 1.4571 Housing 1.4571	壳体 1.4571 Housing 1.4571	壳体 1.4571 Housing 1.4571
	中心板 0.7050 Center plate 0.7050	中心板 0.7050 Center plate 0.7050	中心板 0.7050 Center plate 0.7050	中心板 1.4571 Center plate 1.4571	中心板 1.4571 Center plate 1.4571	中心板 1.4571 Center plate 1.4571
	主轴 1.8550 Shafts 1.8550	主轴 1.8550 Shafts 1.8550	主轴 1.8550 Shafts 1.8550	主轴 1.4112 Shafts 1.4112	主轴 1.4112 Shafts 1.4112	主轴 1.4112 Shafts 1.4112
	齿轮 1.8550 Gears 1.8550	齿轮 1.8550 Gears 1.8550	齿轮 1.8550 Gears 1.8550	齿轮 1.4112 Gears 1.4112	齿轮 1.4112 Gears 1.4112	齿轮 1.4112 Gears 1.4112
	轴承套 钢质 Sleeve bearings, steel	轴承套 钢质 Sleeve bearings, steel	轴承套 钢质 Sleeve bearings, steel	轴承套 1.4571/PTFE Sleeve bearings 1.4571/PTFE	轴承套 1.4571/PTFE Sleeve bearings 1.4571/PTFE	轴承套 1.4571/PTFE Sleeve bearings 1.4571/PTFE
	耐磨板 1.8550 Wear plates 1.8550	滑板.钢质 Sliding plates, steel	耐磨板 陶瓷 Wear plates Ceramic	滑板 1.4571/PTFE Sliding plates 1.4571/PTFE	耐磨板 1.4571 Wear plates 1.4571	耐磨板 陶瓷 Wear plates ceramics
	FKM 密封 FKM seals	FKM 密封 FKM seals	FKM 密封 FKM seals	PTFE 密封 PTFE seals	PTFE 密封 PTFE seals	PTFE 密封 PTFE seals

KIK和 EEH 系列描述请看第15页

Description KIH and EEH see page 15.

注解

- 0.7050 = 球墨铸铁 (GGG-50)
- 1.8550 = 氮化钢 (34CrAlNi7)
- 1.4571 = 奥氏体不锈钢 (316Ti)
- 1.4112 = 铁氏体不锈钢 (440B)

- FKM = 氟橡胶
- FFKM = 加强型氟橡胶
- PTFE = 聚四氟乙烯
- EPDM = 三元乙丙橡胶
- NBR = 丁腈橡胶

Explanation

- 0.7050 = Grey cast iron with spherical graphite
- 1.8550 = Nitratated steel
- 1.4571 = Austentic stainless steel
- 1.4112 = Ferritic stainless steel

- FKM = Fluorrubber
- FFKM = Perfluorinated rubber
- PTFE = Polytetrafluorethylene
- EPDM = Ethylene-propylene-diene-rubber
- NBR = Nitril butadiene-rubber

ZPD .. - . - KIN/KIH

- 壳体 球墨铸铁
- 中心板 球墨铸铁
- 主轴 氮化钢
- 齿轮 氮化钢
- 轴承套 碳钢
- 滑板 碳钢

ZPD .. - . - KIS

- 壳体 球墨铸铁
- 中心板 球墨铸铁
- 主轴 氮化钢
- 齿轮 氮化钢
- 轴承套 碳钢
- 耐磨板 氮化钢

ZPD .. - . - KIK

- 壳体 球墨铸铁
- 中心板 球墨铸铁
- 主轴 氮化钢
- 齿轮 氮化钢
- 轴承套 碳钢
- 耐磨板 陶瓷

ZPD .. - . - EEN/EEH

- 壳体 316Ti不锈钢
- 中心板 316Ti不锈钢
- 主轴 440B不锈钢
- 齿轮 440B不锈钢
- 轴承套 316Ti不锈钢/聚四氟乙烯
- 滑板 316Ti不锈钢/聚四氟乙烯

ZPD .. - . - EES

- 壳体 316Ti不锈钢
- 中心板 316Ti不锈钢
- 主轴 440B不锈钢
- 齿轮 440B不锈钢
- 轴承套 316Ti不锈钢/聚四氟乙烯
- 滑板 440B不锈钢

ZPD .. - . - EEK

- 壳体 316Ti不锈钢
- 中心板 316Ti不锈钢
- 主轴 440B不锈钢
- 齿轮 440B不锈钢
- 轴承套 316Ti不锈钢/聚四氟乙烯
- 耐磨板 陶瓷

ZPD .. - . - KIN/KIH

- Housing 0.7050
- Center plate 0.7050
- Shafts 1.8550 hardened
- Gears 1.8550 hardened
- Sleeve bearings Steel
- Sliding plates Steel

ZPD .. - . - KIS

- Housing 0.7050
- Center plate 0.7050
- Shafts 1.8550 hardened
- Gears 1.8550 hardened
- Sleeve bearings Steel
- Wear plates 1.8550 hardened

ZPD .. - . - KIK

- Housing 0.7050
- Center plate 0.7050
- Shafts 1.8550 hardened
- Gears 1.8550 hardened
- Sleeve bearings Steel
- Wear plates Ceramics

ZPD .. - . - EEN/EEH

- Housing 1.4571
- Center plate 1.4571
- Shafts 1.4112 hardened
- Gears 1.4112 hardened
- Sleeve bearings 1.4571/PTFE
- Sliding plates 1.4571/PTFE

ZPD .. - . - EES

- Housing 1.4571
- Center plate 1.4571
- Shafts 1.4112 hardened
- Gears 1.4112 hardened
- Sleeve bearings 1.4571/PTFE
- Wear plates 1.4112 hardened

ZPD .. - . - EEK

- Housing 1.4571
- Center plate 1.4571
- Shafts 1.4112 hardened
- Gears 1.4112 hardened
- Sleeve bearings 1.4571/PTFE
- Wear plates Ceramics

所列材料为各子系列的标准配置，根据应用选用最合适的系列。

其它材料组合请咨询

All material combinations listed here apply to the standard designs.

Selecting the best suited material combination depends on the respective operating conditions and applications.

Other material combinations are available on request.

KIH 或 EEH 系列采用耐高压衬套

Versions KIH and EEH with high pressure groove

密封环 (1F/3F-SP)

Shaft seal with radial shaft seal (1F/3F-SP)

材料 Material	入口压力 Inlet pressure	工作温度 Operating temperature
丁腈橡胶 NBR	-0,4 bar (-0,6 bar) 至/up to 1 bar	-30°C (-40°C) 至/up to +100°C
氟橡胶 FKM	-0,4 bar (-0,6 bar) 至/up to 1 bar	-25°C (-40°C) 至/up to +150°C (200°C)
加强型氟橡胶 FFKM	-0,4 bar (-0,6 bar) 至/up to 1 bar	-15°C 至/up to +260°C (325°C)
聚四氟乙烯 PTFE	-0,4 bar (-0,6 bar) 至/up to 10 bar	-25°C 至/up to +150°C (200°C)
三元乙丙橡胶 EPDM	-0,4 bar (-0,6 bar) 至/up to 1 bar	-30°C (-40°C) 至/up to +150°C

机械密封 (GL-SP/GL-SP-DP)

Shaft seal with mechanical seal (GL-SP/GL-SP-DP)

材料 Material	入口压力 Inlet pressure	工作温度 Operating temperature
氟橡胶 (标准) FKM (standard)	0 bar 至/up to 15 bar ¹⁾	由轴封材料决定 Depends on material combination of the shaft seal
加强型氟橡胶 FFKM	0 bar 至/up to 40 bar ²⁾	

¹⁾ 密封形式 GL-SP

Sealing GL-SP

²⁾ 密封形式 GL-SP-DP

Sealing GL-SP-DP

压盖密封 (ST/STZ)

Shaft seal with gland packing (ST/STZ)

材料 Material	入口压力 Inlet pressure	工作温度 Operating temperature
聚四氟乙烯/石墨 PTFE/Graphit	0 bar 至/up to 50 bar	-30°C (-40°C) 至/up to +280°C

括号内为峰值压力和峰值温度。表格以外的应用要求请咨询百利泵公司

Values in brackets refer to short-term pressure and temperature peaks. For values or operating conditions which differ from those listed here, please contact Beinlich.

磁力密封 (MAG)

Shaft seal with canister through magnetic coupling (MAG)

材料 Material	入口压力 Inlet pressure	工作温度 Operating temperature
FKM	-0,4 bar (-0,6 bar) 至/up to 25 bar	-25°C (-40°C) 至/up to +150°C (200°C)
FFKM		-15°C 至/up to +260°C (325°C)
PTFE		-25°C 至/up to +150°C (200°C)
EPDM		-30°C (-40°C) 至/up to +150°C

单层轴封 (1F)

- 最大入口压力 1 bar;
带卡簧可达 10 bar
- 介质不添加填料
- 各种粘度介质
- 有润滑性介质, 非危险介质

三层轴封带油封腔 (3F-SP)

- 最大入口压力 7 bar
- W轴密封环为聚四氟乙烯
- 油封腔密封环为氟橡胶
- 介质不添加填料
- 各种粘度介质
- 介质是否有润滑性无要求

压盖密封 (ST)

- 最大入口压力 50 bar
- 适合含无磨蚀性填料的介质
- 中高粘度介质
- 耐温最高可达 150°C
- 介质是否有润滑性无要求
- 可选旋拧压盖方式

机械密封含油封腔

(GL-SP)

- 最大入口压力 15 bar
- 适用含各种填料的情况
- 各种粘度介质
- 也适用入口负压的情况

轴向力平衡机械密封含油封腔

(GL-SP-DP)

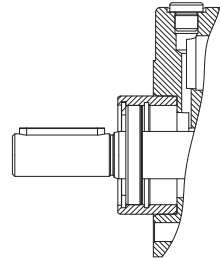
- 最大入口压力 40 bar
- 适合含各种填料的情况
- 各种粘度介质
- 特殊方案用于入口高压的情况
- 也适用入口负压的情况

磁联轴器 (MAG)

- 最大入口压力 20 bar
- 不适合含填料场合
- 最大允许粘度 7,000 mPa·s
- 隔离套筒为静态密封
- 适合危险/腐蚀性介质

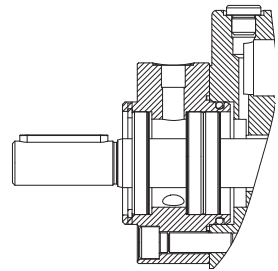
Single shaft seal (1F)

- Inlet pressure max. 1 bar;
10 bar with supporting ring
- No fillers
- All viscosities
- Lubricating, non-critical fluids



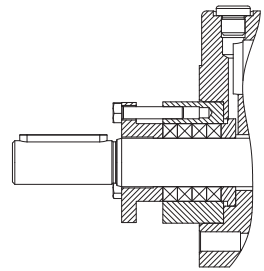
Triple shaft seal with block chamber (3F-SP)

- Inlet pressure max. 7 bar
- Shaft seal made from PTFE
- Block chamber seals made from fluorocarbon rubber
- No fillers
- All viscosities
- Lubricating fluid not required



Gland packing (ST)

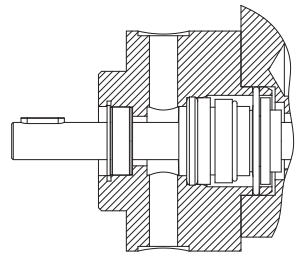
- Inlet pressure max. 50 bar
- Suitable for non-abrasive fillers
- Average to high viscosities
- Temperature resistant up to 150°C
- Lubricating fluid not required
- Central extraction possible



Mechanical seal with block chamber

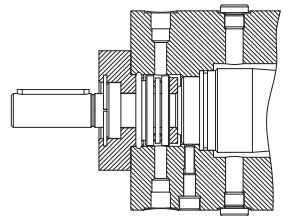
(GL-SP)

- Inlet pressure max. 15 bar
- Suitable for fillers
- All viscosities
- Low pressure applications



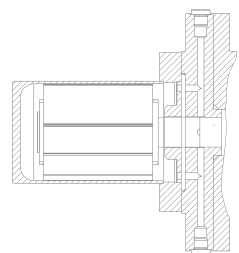
Mechanical seal with block chamber and axial forces equalization (GL-SP-DP)

- Inlet pressure max. 40 bar
- Suitable for all types of fillers
- All viscosities
- Special solution with higher inlet pressure
- Low pressure applications



Magnetic coupling (MAG)

- Inlet pressure 20 bar
- No fillers possible
- Maximum recommended viscosity: 7,000 mPa·s
- Hermetical sealing with static seal (O-ring) in canister
- Suitable for critical/aggressive fluids without fillers



建议转速 (不含填料)

Speed recommendations without fillers

< 500 mPa·s	1.450 转/分钟
< 1.000 mPa·s	1.000 转/分钟
< 5.000 mPa·s	500 转/分钟
< 10.000 mPa·s	350 转/分钟
< 30.000 mPa·s	250 转/分钟
< 100.000 mPa·s	100 转/分钟
> 100.000 mPa·s	≤ 100 转/分钟

建议转速 (含填料)

Speed recommendations with fillers

填料的种类、大小和百分比含量决定了转速。请提供详情给我们，我们以此给建议转速。

The speed depends on sort, size and quantity of the fillers in the fluid. Please contact us with your specific requirements. We would be pleased to assist you.

转换关系

Conversions

1 巴	△	14,5 磅/平方英寸
1 升/分钟	△	0,26 加仑/分钟(美制)
1 升/分钟	△	0,22 加仑/分钟(英制)
1 加仑/分钟(美制)	△	3,785 升/分钟
1 加仑/分钟(英制)	△	4,55 升/分钟
1 牛米	△	0,225 磅
1 千瓦	△	1,36 马力
1 牛米	△	0,7376 磅尺

物理符号

Physical values

η	mPa·s	动态粘度 Dynamic viscosity
p	bar	压力 Pressure
F	N	国际标准力单位 Unit for force compliant with SI
M	Nm	国际标准扭力单位 Unit for torque compliant with SI

环境温度

标准泵工作环境温度为-30度至+60度。该范围以外的请咨询百利泵公司。必须考虑温度对粘度的影响，从而选取大规格的泵和相应容积效率。

Ambient temperature

The pumps are designed for a temperature range of -30°C up to +60°C. Please contact Beinlich for assistance if your values deviate from this range. A possible change of the viscosity must always be considered. This means the pump and the drive pares must be dimensioned for a larger capacity.

介质温度

根据介质温度选取密封材料。特殊温度请咨询百利泵公司

Fluid temperature

The selection of the seal material depends on the fluid temperature. Please contact Beinlich if your temperature range differs or if you need a special seal.

注解

Explanation

帕 Pa	= 国际标准压强单位
1.000 毫帕秒 mPa·s	= 1 帕秒 Pa·s
	Unit for pressure compliant with SI
1帕斯卡 Pascal	$= \frac{1\text{牛顿}}{1\text{平方米}} = \frac{1\text{N}}{1\text{m}^2}$
1巴 bar	= 100.000 帕 = 100 千帕 = 0,1 兆帕 = 100.000 Pa = 100 kPa = 0,1 MPa
1牛顿 N	$= \frac{1\text{公斤} \times 1\text{米}}{1\text{秒平方}} = \frac{1\text{kg} \times 1\text{m}}{1\text{s}^2}$
SI	= 国际标准单位 International system of units
ccw	= 逆时针(左转) counterclockwise (left)
cw	= 顺时针(右转) clockwise (right)

百利泵公司保留修改技术规格的权利。
Beinlich reserves the right to modify technical data at any time.

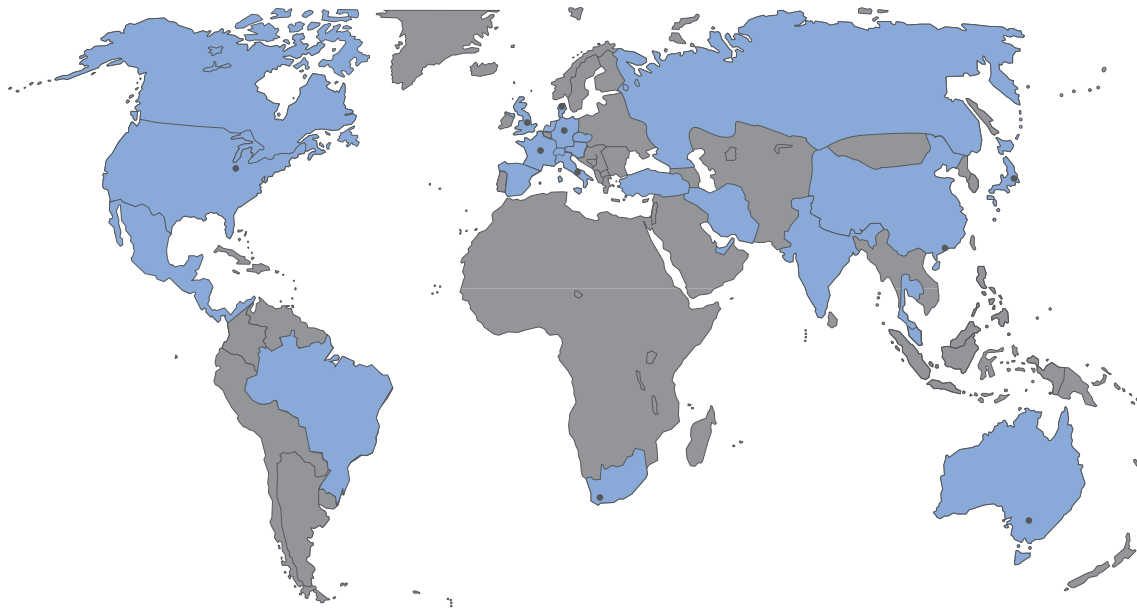
► 型号编码*

► TYPE CODE*



*该编码表适用于”自由轴”

*For pump "free shaft"



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