

KPV系列冷却钟罩 *Cooler bellhousing, series KPV*



- VDMA 24 561标准尺寸
- 刚型/降噪型可选
- 符合VDMA 24 561标准，刚型/减振型替换方便
- 符合VDMA 24 561标准，可选带支架组合

- Dimensions acc. to VDMA 24 561
- Rigid and noise damping versions in identical lengths
- Easy replacement of rigid/dampened bellhousing acc. to VDMA 24 561
- Optional combination with footbrackets acc. to VDMA 24 561

型号 Model type

KPV 250 /		120 /		200 -		D 28		DF			
冷却钟罩型号 Type of cooler bellhousing		冷却钟罩长度 Lengths of cooler bellhousing				风扇轴直径 ^① Fan-shaft-Ø		类型 Version			
0.55 - 1.5 kW	KPV200	KPV200	100			D19	0.55 - 0.75 kW	‡	刚型 Rigid		
2.2 - 4 kW	KPV250		110			D24	1.1 - 1.5 kW				
5.5 - 7.5 kW	KPV300		118			D28	2.2 - 4 kW	DF	减震型 Damped		
11 - 22 kW	KPV350		124			D38	5.5 - 7.5 kW				
			128			D42	11 - 15 kW				
		KPV250	120			D48	18.5 - 22 kW				
			124			泵连接孔代码 Boring-code for pump connection		XXXX			
			128								
			135			内部代码 Internal code					
			148								
		KPV300	175								
			144								
			150								
			155								
			168								
		KPV350	196								
			188								
			204								
			228								
			256								

技术参数 Technical data

工作压强 Working pressure	负载周期 Load cycle	最大静态压强 Max. static pressure
16 bar	1 x 10 ⁵ ; f = 2 Hz	40 bar

型号 Type	冷却功率 Cooling power p [kW] Δt=40k	电机功率 [kW] E-engine power [kW] n=1500 1/min ⁽¹⁾	气流 Airflow [m³/h]	风扇输入功率 Fan input power [W]	噪音量 ⁽¹⁾ Noise level ⁽²⁾ [dB(A)]	冷却功率/电机功率相关性 Correlation cooling power/E-engine power [%]
KPV200	0.95	0.55 - 1.5	72	20	52	63 - 100
KPV250	2.1	2.2 - 4	260	30	58	53 - 95
KPV300	3.22	5.5 - 7.5	430	90	69	43 - 59
KPV350	5.15	11 - 22	780	140	70	23 - 46

KPV 系列冷却能力与电机功率有关。

Cooling capacity of the series KPV in correlation to the capacity of the installed engine.

„⁽¹⁾ 从动机名义转速为每分钟1500转。如果需要不同的转速，请垂询生产商。

• Nominal rotation⁽¹⁾ of driven machine 1500 1/min. In case of different rpm please contact the manufacturer.

„⁽²⁾ 减震型的噪音值测定带钟罩和电机。测定距离为1米。噪音值会因使用不同电机而产生差异。

• Noise levels⁽²⁾ of damped version are measured with bellhousing and electric motor. Distance to the tested object 1 m. The a. m. values of noise level will be various depending on used electric motor.

„ 泵的旋转方向为顺时针(面对泵轴)

• Direction of pump rotation always **clockwise (looking on pump shaft)**.

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FLUIDWARE®3D 软件能使设计工程师每一天的工作变得非常容易并节省大量时间。该软件有别于普通的配置工具，因为它支持设计工程师，通过少数明显的选择步骤和执行仅有的可行选项，就能找到正确的元件。

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冷却钟罩兼容VDMA标准, 抗压力峰值

冷却钟罩在液压领域早已应用。R+L HYDRAULICS 公司推出一款全新筒约型冷却钟罩, 经过较大改进, 给用户带来实在利益。

R+L HYDRAULICS 推出的新型KPV系列冷却钟罩使其成为首家在冷却钟罩上使用棱形标准冷却元件的厂商。

由于市场上第一款冷却钟罩通常采用翅片管来作为温度交换器的, 除了冷却功率不令人满意, 主要会发生漏油, 现在都被先进的棱形冷却元件所替代。

冷却钟罩通常与回路管连接, 因此大体上是没有压力的。然而标准测量装置很难测量的压力峰值可能会损坏冷却器。

经常会发生这种情况, 例如, 当一个油缸受压力时, 通过一个电磁阀, 在几毫秒内将载荷释放到回路管, 由于惯性和摩擦, 会产生压力峰值, 所以我们无法保护冷却器免受压力峰值的影响, 过去, 在反复出现压力峰值的情况下, 会导致温度交换器偶尔故障。

动态抗压

因此, 当研发新KPV系列时, 首要考虑的问题是要集成能够承受动态压力负载的冷却元件, 同时不损失冷却功率。根据用户需要及动态疲劳应变测试, 我们设计出能够持续承受高达16bar压力峰值的冷却元件。(图1)

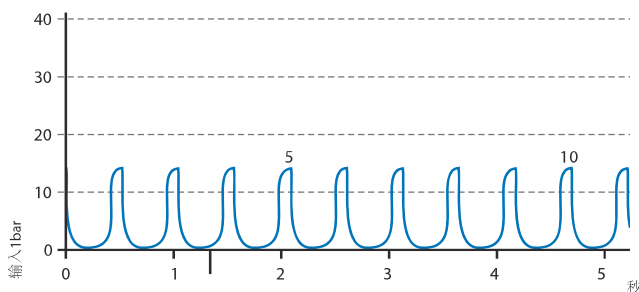
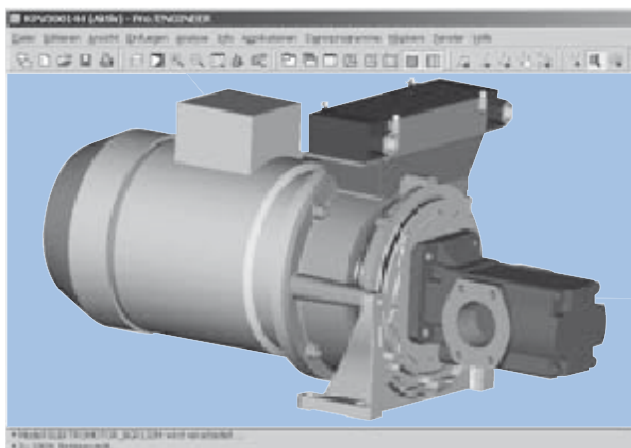


图1) 在16 bar, 1×10^6 应力循环和 $f = 2$ Hz条件下, R+L KPV系列冷却元件的动态疲劳应变测试。
Fig.1) Dynamic fatigue strain tests with cooling elements for R+L Hydraulics- series KPV at 16 bars with 1×10^6 stress cycles and $f = 2$ Hz



KPV 系列冷却钟罩
Cooler bellhousing, series KPV

Cooler bellhousing VDMA compatible, resistant to pressure peaks

Cooler bell housings are meanwhile well established in the oil hydraulic. The company R+L Hydraulics GmbH presents a new series of compact coolers, which reaches far beyond a plain "face-lifting" and offers the users substantial advantages.

R+L Hydraulics, who was the first manufacturer to bring in cooler bell housings with prismatic standard cooling elements from catalogue, presents a new series of cooler bell housings, namely the Series KPV.

Since the first cooler bell housings on the market were usually equipped with a finned tube as temperature exchanger, which – regardless of the unsatisfactory cooling power – chiefly limited to leakage oil cooling, is the application of prismatic cooling elements state-of-the-art today.

The herewith given possibility to build the cooler in the mainly pressureless return pipe can however be the cause for pressure peaks, which cannot be detected with customary pressure measuring devices.

This is often the case, for instance, when a cylinder under pressure will be unloaded within milliseconds by means of an electromagnetic valve to the return pipe. Because of inertia and friction, it is frequently not possible to protect the cooler from the resulting pressure peak, which has in the past led to occasional breakdowns of the temperature exchanger in the case of recurring pressure peaks.

Dynamic resistance to pressure

It became therefore top priority, during the development of the new series KPV, to integrate a cooling element, which withstands dynamic pressure loads without loss of cooling power. According to users' requirements and by means of dynamic fatigue strain tests, a cooling element has been developed, which continually withstands pressure peaks up to 16 bars. (Fig.1.)

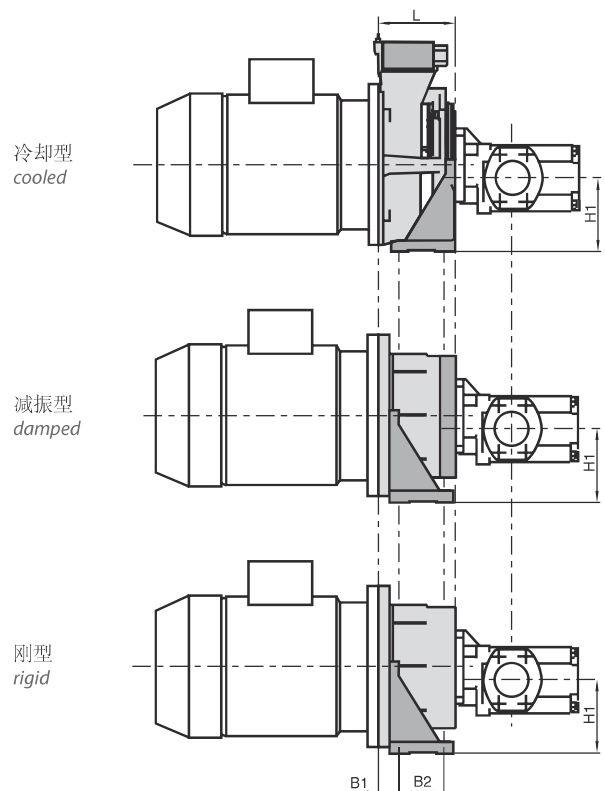


图2) 符合VDMA 24 561标准, 冷却型, 减振型, 刚型可互换。
Fig. 3) Interchangeability of configurations rigid, damped, cooled acc. to VDMA 24 561

通常, 1×10^6 应力循环就足够了。然而, 在一些不同的案例中, 在相同时间周期内, 出现压力峰值的次数差异很大, 所以, 在 10^6 应力循环情况下, 冷却器相应的寿命就难以确定。从这一点出发, 一些测试的应力循环已经增加到 3.5×10^6 , 在这些案例中, 都得出让人满意的结果。

除此之外, 在生产过程中, 每个热交换器都要通过40bar/压力测试, 达到了冷却元件要符合的最高审定静态压力值。而且, 在设计新产品时, 为了防止冷却元件遭到外部破坏, 我们将其嵌入KPV冷却器坚硬的铸铁内。

冷却能力

由于安装方便, 结构简易, 无需电力通风驱动, 并且能够满足绝大部分冷却方面的需求, 因此, 冷却钟罩在液压领域得到了广泛应用。

在没有外部热量输入, 以及泵和电机工作在平均效率的情况下, 内置引擎性能的温度损失估计为30至40%。所有热量不能通过装置中(特别是油箱)的单独元件进行散发, 因此只能通过额外的冷却器进行散热, 才能防止油温过高。即使是使用较小的油箱容量, 例如用于机床或在移动操作工况下, 其平均冷却功率(相当于20至30%的内置引擎功率)已证明是足够的。

如图3所示, 温差 Δt 为40K和最佳油的流量时, R+L KPV系列新型冷却钟罩的冷却功率能够完全满足需求。在油流量较少或不连续时, 需要分开冷却系统, 采用KPV冷却器能够很容易实现。

冷却功率和油流量的关系见图3。

每 $1\text{K}\Delta t$ 特定值乘以各自的 Δt 系数, 能很容易地转换成实际的冷却功率。

As a rule, 1×10^6 stress cycles will be considered sufficient. However, since the number of pressure peaks per time period can be extremely variable in isolated cases, it is difficult to determine which service life 10^6 stress cycles correspond to. From that point of view, some of the testing have been extended to 3.5×10^6 stress cycles. In these cases as well, all established results have been satisfactory.

In addition to that, each single temperature exchanger will be tested at 40 bar during production, which is equivalent to the highest authorized static pressure for cooling elements. Furthermore, when it came to developing a new concept, great attention has been brought to protecting the cooling element against external damages by embedding it in the sturdy cast-iron casing of the KPV-cooler.

Cooling capacity

Since as a rule they amply fulfil the cooling requirements, cooler bellhousings are meanwhile well established in the oil hydraulic, on account of the easy installation, the space-saving construction and upon the fact that no electric ventilation drive is required.

In the absence of an extern source of thermal input, temperature lost of 30 to 40 % of the installed engine performance will be estimated by pump and motor units of average efficiency. All heat, which is not already radiated by the individual components of the unit, especially the tank, will therefore have to be carried off by means of an additional cooler in order to avoid an overheating of the oil. Even by smaller tank capacities, for instance in machine tooling or in mobile operational cases, an average cooling power of 20 to 30 % of the installed engine's power has proved to be largely sufficient.

As shown in fig. 3, the cooling power of the new R+L Hydraulics- cooler bellhousing of the series KPV fulfils this requirement to the full. The values apply to a Δt of 40 K and to an optimum flowing quantity of the oil. In the case of lower or discontinuous oil flow, a separate cooling system will eventually be necessary, which can also easily be done with the KPV-cooler.

The interdependence between the cooling power and the flowing quantity of the oil follows out of fig. 3. The specific values per $1\text{K}\Delta t$ allow the simple conversion of the actual cooling power by multiplication with the respective Δt .

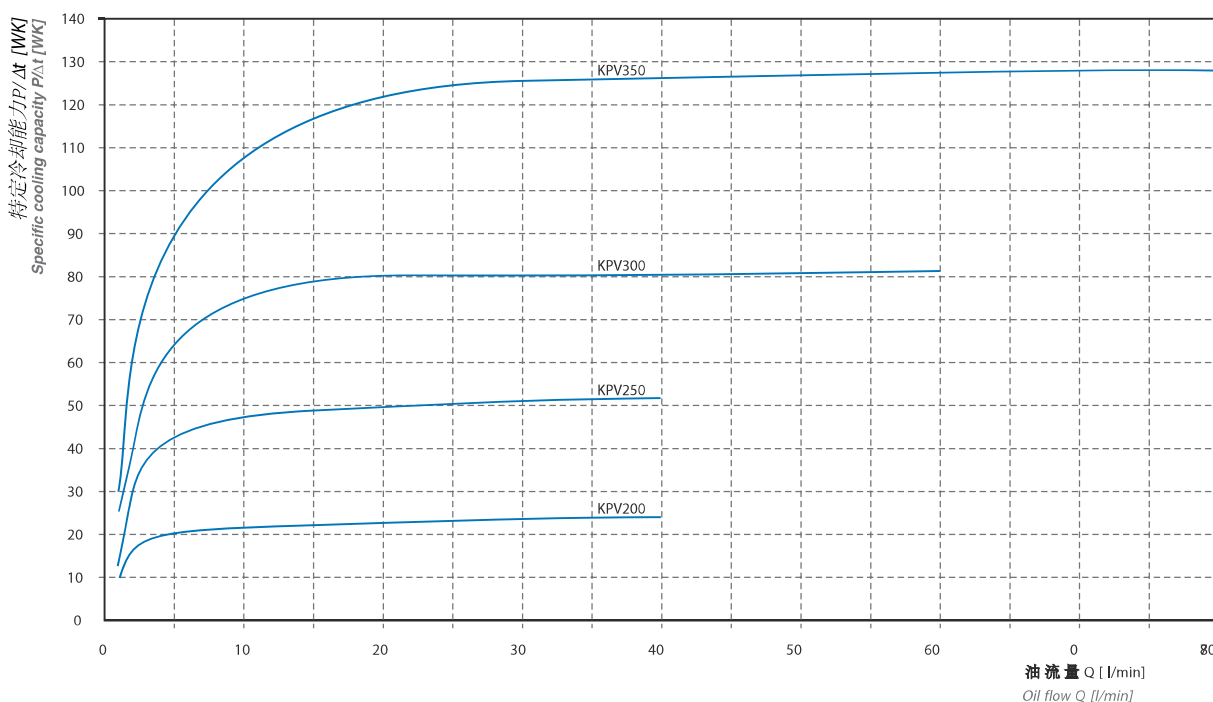


图3
KPV 系列冷却钟罩特定冷却功率 P/t 基于油流量和温度差 $\Delta t = 1\text{K}$ (油进口/空气进口)。

Fig. 3
Specific cooling power P/t of the series KPV depending on oil flow Q and temperature difference $\Delta t = 1\text{K}$ (oil inlet to air inlet).

符合VDMA24 561标准可互换

新型R+L KPV系列冷却钟罩设计概念是符合VDMA24 561标准，能够实现配合尺寸上的完全互换，不仅长度合适，而且脚支架的固定位置也合适。

这不仅能保持原来完整的安装，包括液压管和如果今后要使用冷却器，而且能允许规划液压安装，决定今后是否要求冷却器带降噪(见第3页图2)。

KPV系列冷却钟罩可以是刚型的，或者是带集成减振功能。然而这两种类型都有相同的安装尺寸。

KPV系列冷却钟罩可水平安装IMB35电机或者IMB5电机，以及在垂直方向和侧面安装冷却空气排气口。但KPV系列同样可以垂直安装IMV1型，就像其前身KP系列。

尽管具备减振功能，更坚固的冷却系统以及VDMA标准脚支架，但是，新系列冷却钟罩并没有比前一系列KP贵，这是顾客愿意听到的。无须讳言，在冷却功率方面，任何时候新型号都能替代老型号，在冷却器防漏油方面，实际上，可以说是有显著的改进。

Interchangeability acc. to VDMA 24 561

A further guideline in the conception of the new R+L Hydraulics-series KPV was the full interchangeability of the fitting dimension acc. to VDMA 24 561 and that, not only according to the fitting length, but also according to the fastening position of the foot brackets.

This does not only make it possible to keep the complete installation, hydraulic piping inclusive, should the use of a cooler be later necessary. It also allows someone planning hydraulic installations, to decide on the requirements for a cooling with and without noise damper at a later point (see fig. 3, page 2).

The cooler bellhousing series KPV will be built either as rigid version or as version with integrated noise damping. However, both versions have the same frame dimensions.

The cooler bellhousing series KPV can be mounted horizontally IMB 35-version and IMB 5-version, and with vertical as well as with lateral cooling air exhaust. But the KPV can just as well be mounted vertically IMV1-version – as it already was possible with the previous execution, the KP version.

The customer will be pleased to hear, that in spite of the integrated noise damper, the more rugged cooling system and even in spite of the VDMA foot brackets, the new series has not become more expensive than the former series KP. It goes furthermore without saying that, as far as the cooling power is concerned, the new generation can take the old one on any time and, in the case of leakage oil cooling, it can in fact even boast with a distinct improvement.

根据其它粘度cSt， Δp 值的校正系数k

Correction factor for the Δp -values depending on other viscosity in cSt

kSt	15	22	32	46	68	100	150	220	460
k	0.64	0.73	1	1.28	1.62	2.65	3.9	6.9	17.1

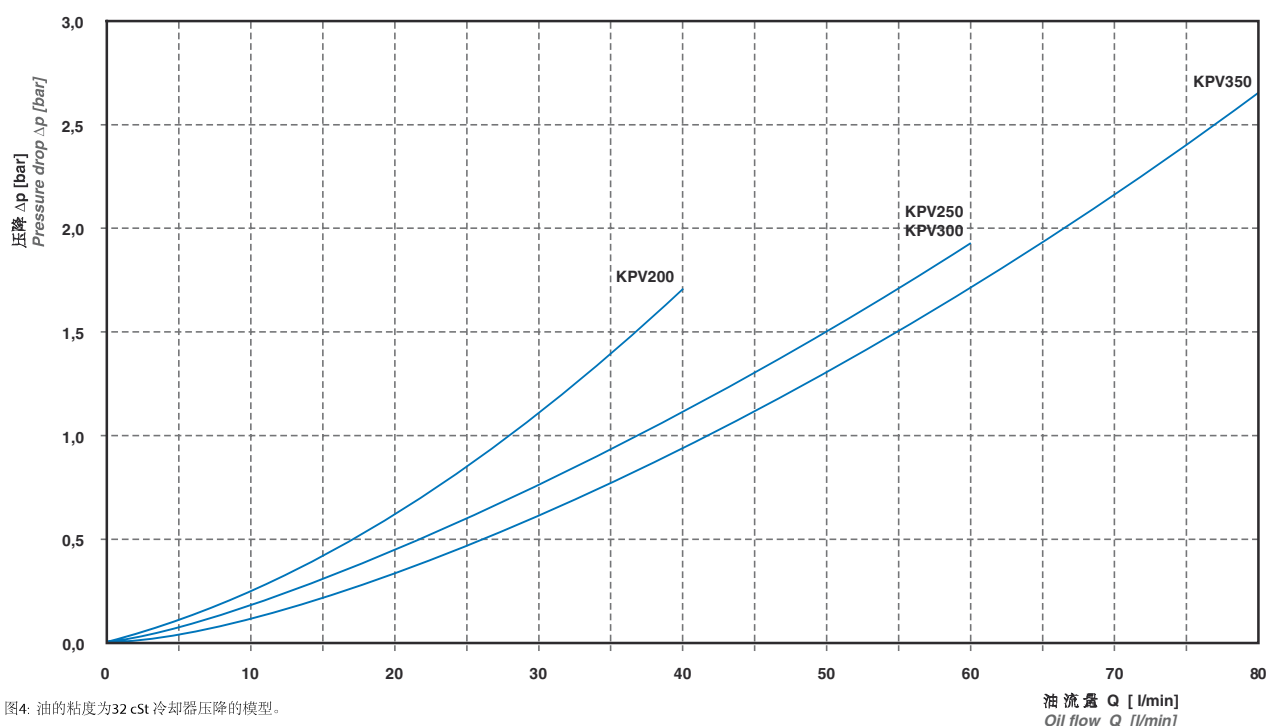
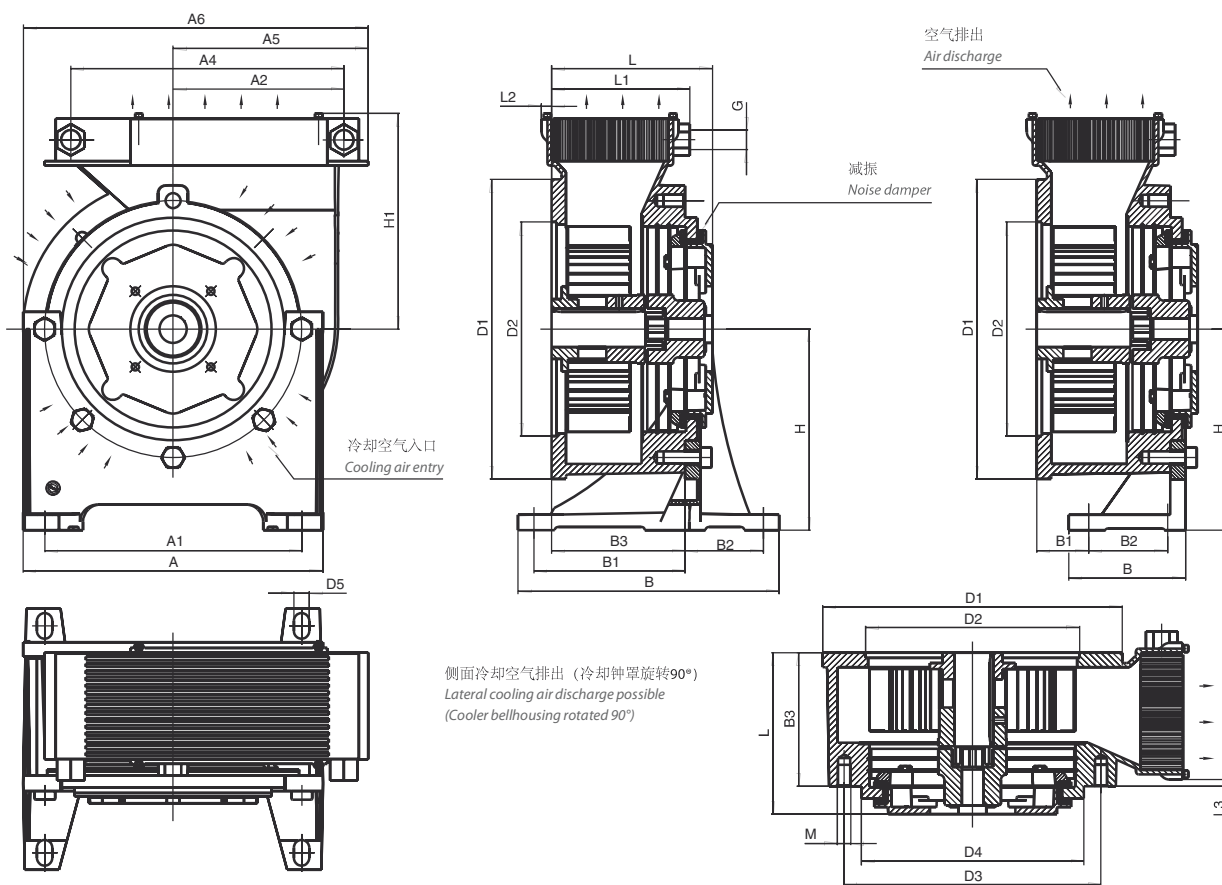


图4: 油的粘度为32 cSt 冷却器压降的模型。

Fig.4 Pressure drop of cooler matrix at the oil viscosity of 32 cSt.

尺寸 Dimensions



支架可选 Footbracket optional

型号 Type	PTFS 支架 Footbracket PTFS						PTFL 支架 Footbracket PTFL					
	A	A1	B	B1	B2	H	A	A1	B	B1	B2	H
KPV200	±	±	±	±	±	±	210	180	90	20	60	112
KPV250	250	215	230	125	60	155	250	220	110	40	60	132
KPV300	300	265	270	150	75	185	290	260	120	40	80	160
KPV350	350	300	305	175	90	235	±	±	±	±	±	±

型号 Type	电机机座规格 Frame size	功率 Power P[kW]	轴 Shaft D x l	L	L1	L2	L3	A2	A4	A5	A6	B3	H1	D1	D2	D3	D4	D5	M	G
KP200	80	0.55	19 x 24	100	88	10.3	-6°	122.5	205	141	241	70	180.5	200	130	165	145	11	10	G¼
		0.75		110																
	90 S+L	1.1	24 x 50	118																
		1.5		124																
KP250	100 L	2.2	28 x 60	120	108.5	26	6	144.5	267	174	326	102	199	250	180	215	190	14	12	Gø
		3.0		124																
	112 M	4		128																
				135																
KP300	132 S+M	5.5	38 x 80	144	128.5	6	10	168.5	267	200	350	126	234.5	300	230	265	234	14	12	Gø
		7.5		150																
				155																
				168																
KP350	160 M+L	11	42 x 110	188	161	4	7.5	198	316	228	403	156	253	350	250	300	260	18	16	Gø
		15		204																
	180 M+L	18.5	18 x 110	228																
		22		256																

*垂直安装只能使用连接法兰 *Vertical installation only with connection flange

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