HBE hydraulic components

Solutions for Fluid Technology

板式换热器

DOC® BRAZED PLATE HEAT EXCHANGER

DOC 板式加热器
针对石油系统

DOC® STURDY PLATE HEAT EXCHANGER FOR OIL HYDRAULICS

WIDERSTANDSFÄHIG

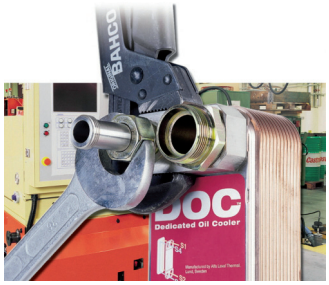
- 高压运行
- 高温运行
- 加热器底板黄铜，安装牢固
- 冷却功率5至360KW
- DOC系列冷却器适用于多数液压领域
- 黄铜底板和加热器连接使得安装更稳固
- DOC 14,30,60 压力 32bar
- DOC 14,30,60 压力 16bar
- 黄铜设计允许最高温度达到225度
- 稳固的连接方式更适用于高扭矩安装

RESISTANT

- High pressure operation
- High temperature operation
- Sturdy connection blocks, brazed on the plate-heat-exchanger
- Cooling capacity from 5 to 360 kW
- Coolers of the DOC® Series are suitable for most industrial hydraulic applications
- Due to the brazed contact points between the plates the cooler has a very sturdy design
- This allows best possible resistance against high operating pressures
- 32 bar for series DOC® 14, 30 and 60, 16 bar for series DOC® 20 and 77
- The brazed design allows temperatures up to 225°C
- The sturdy connection blocks allow high fastening torques for assembling

方便安装

EASY INSTALLATION



连接更牢固
使用扳手即可安装
同样可以直接安装在管路上

STURDY CONNECTION BLOCKS

- With spanner grip for assembly
- Possible to fit directly on the pipes

隔板式安装支架
与冷却器配套
组装方便

SHELF-TYPE MOUNTING-BRACKET

- Supplied with cooler
- Quick assembly

高效冷却能力

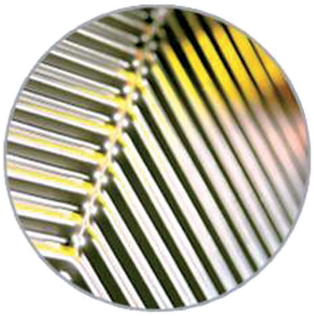
HIGHEST COOLING CAPACITY

- 压力损失小
- 优化底板设计
- 高冷却效果
- 高效的热转换效率（紊流 热转换效率 P=K*a Delta T)
- 先进的整体设计方案，最小降低水流损耗
- 高冷却效率，低水流，低DELTA T

- Low pressure drop over the connectors
- Optimized plate design
- Thereby high cooling capacity and low pressure drop
- Highly efficient heat transfer caused by turbulent flow (high k-value / heat transfer coefficient; P=k*a*Delta T)
- This leads to a compact design and a low water consumption
- High cooling capacity, very low water flow and low Delta T

最佳冷却效果

BEST COOLING EFFICIENCY PERMANENTLY



最大冷却功率，无污垢

- 高湍流
- 板片平滑标准
- 冷却管分流均匀
- 湍流设计可以自行清洗冷却器内部

Maximum cooling capacity without fouling through:

- High turbulent flow
- Smooth and uniform plates
- Equally distributed flow in the cooler
- The turbulent flow given by the design allows a self cleaning effect inside the cooler

DOC® GELÖTETE PLATTENWÄRME-TAUSCHER FÜR DIE HYDRAULIK

工作原理

换热器表面是由金属薄片叠装而成，各种板片形成两者不同流体的交换形通道，通常情况下是全对流。

板边缘的钎焊密封保证了介质独立流通，板与板之间的钎触点也是由焊接保证了承受介质的压力。

标准设计

换热板由薄片叠加而成，连接点位于板的上端，波纹式版面有利于热效转化，并且增加了自身机械强度。

标准材质

盖片 :不锈钢 304
连接 :不锈钢 304
板： 不锈钢 316
钎焊材料：铜

特殊要求

为了满足你一些特殊询价的要求，你的询问需包含以下几个要点：

- 流量要求
- 温度计划
- 液体的物理属性
- 工作压力
- 最大压力损耗

DOC® BRAZED PLATE HEAT EXCHANGER FOR HYDRAULICS

WORKING PRINCIPLES

The heating surface consists of thin corrugated metal plates stacked on top of each other. Channels are formed between the plates and corner ports are arranged so that the two media flow through alternate channels, normally in full counter-current flow.

The media are kept in the unit by a brazed seal around the edge of the plates. The contact points of the plates are also brazed to withstand the pressure of the media handled.

STANDARD DESIGN

The plate pack is covered by the cover plates. The connections are located in the front cover plate. The channel plates are corrugated to improve heat transfer efficiency and to increase the mechanical strength.

STANDARD MATERIALS

Cover plates:	Stainless steel 304
Connections:	Stainless steel 304
Plates:	Stainless steel 316
Brazing material:	Copper

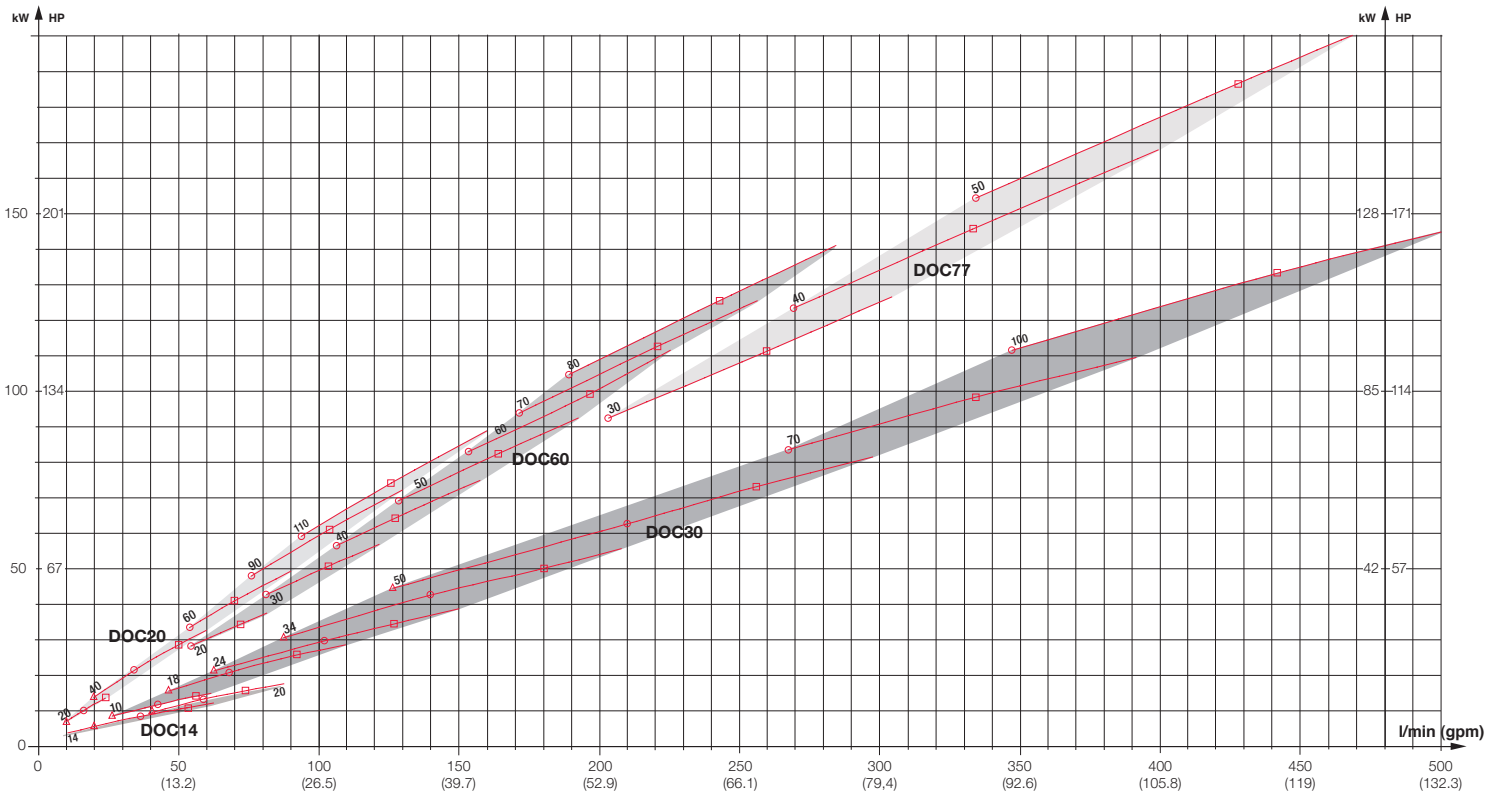
PARTICULARS REQUIRED FOR QUOTATION

In order to provide you with a specific quotation, all enquiries should be accompanied by the following particulars:

- Flow rates required
- Temperature programme
- Physical properties of liquids in question
- Desired working pressure
- Maximum permitted pressure drops

AUSWAHLDIAGRAMM

SELECTION GRAPH



DAS DIAGRAMM

• basiert auf einer Öltemperatur von 60°C und einer Wassertemperatur von 20°C. Bei einer Öltemperatur von 50°C ist die Kühllast mit dem Korrekturfaktor 0,7 zu multiplizieren. Bei abweichender Wassertemperatur siehe Korrekturfaktor auf der rechten Seite.

• ist für zwei verschiedene Öl-/Wasserdurchflussraten berechnet: 2:1 und 4:1. Das bedeutet, dass für jeden Liter Öl, der durch den Ölkühler fließt, mindestens 0,5 Liter (2:1) bzw. 0,25 Liter (4:1) Wasser hindurchfließen müssen, damit die Daten im Diagramm eingehalten werden.

• basiert auf Öl (ISO VG 32). Bei Einsatz anderer Öle müssen Korrekturfaktoren verwendet werden. Die erforderliche Kühllast ist mit dem Kühllast-Korrekturfaktor zu multiplizieren. Nach Wahl des Ölkühlers ist der Druckabfall mit dem Druckabfall-Korrekturfaktor zu multiplizieren.

THE DIAGRAM IS

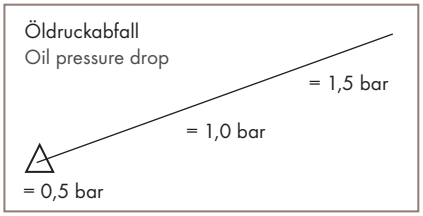
• based on an oil temperature of 60°C and a water temperature of 20°C. For oil temperature of 50°C, multiply with the correction factor of 0,7 on the load. For other water temperatures see the correction factor on the right side.

• calculated for two different oil/water fl ow ratios, 2:1 and 4:1. This means that for every litre of oil circulated through the oil cooler, a minimum of 0.5 litre (2:1) or 0.25 litre (4:1) of water must be circulated to agree with the curve data.

• based on ISO VG 32 oil. For other oils, correction factors must be used. Multiply the required cooling load by the cooling load correction factor. After selecting the oil cooler, multiply the pressure drop by the pressure drop correction factor.

KORREKTURFAKTOREN

CORRECTION FACTORS



WASSERTEMPERATUR °C WATER TEMPERATURE °C	KORREKTURFAKTUREN CORRECTION FACTORS
15	0,91
20	1,00
25	1,12
30	1,20
35	1,50

VISKOSITÄTSKLASSE VISCOSITY CLASS	KÜHLKAPAZITÄT COOLING LOAD	ÖLDRUCKABFALL OIL PRESSURE DROP
ISO VG 22	0,95	0,9
ISO VG 32	1,00	1,0
ISO VG 46	1,05	1,2
ISO VG 68	1,20	1,5
ISO VG 100	1,35	2,1

Für genaue Berechnungen und Angaben zu Kühlkapazitäten oder sonstigen Bedingungen, die nicht Bestandteil dieses Diagramms sind, wenden Sie sich bitte an Ihre HBE Vertretung.

For accurate calculations and cooling capacities or other conditions outside of this diagram, please contact your HBE representative

技术参数

TECHNICAL DATA

STANDARDDATEN

STANDARD DATA

	DOC®14	DOC®20	DOC®30	DOC®60	DOC®77	DOC®77HF
Max. Betriebstemperatur Max. working temperature	225°C	225°C	225°C	225°C	225°C	225°C
Min. Betriebstemperatur Min. working temperature	-196°C	-196°C	-196°C	-196°C	-196°C	-196°C
Max. Betriebsdruck Max. working pressure S1-S2/S3-S4, bar	33/33	16/16	33/33	40/40	16/30	16/30
Min. Betriebsdruck Min. working pressure	Vakuum Vacuum	Vakuum Vacuum	Vakuum Vacuum	Vakuum Vacuum	Vakuum Vacuum	Vakuum Vacuum
Rauminhalt pro Kanal, Liter Volume per channel, litres	0,02	0,028	0,05	0,103	0,25	0,25
Kühlkapazität, kW Cooling capacity, kW	< 16	6-75	10-100	20-140	40-170	120-360
Standardmäßige Plattenzahl Standard number of plates	14, 20	20, 40, 60, 90, 110	10, 18, 24, 34, 50, 70, 100	20, 30, 40, 50, 60, 70, 80	20, 30, 40, 50	60, 70, 80, 90, 100

尺寸

DIMENSIONS

TYP TYPE	a	b	c	d	e	A	TROCKENGEWICHT DRY WEIGHT KG
DOC14	172	42	208	78	22	8 + (n x 2,25)	0,8 + (n x 0,06)
DOC20	270	46	324	94	26	8 + (n x 1,50)	1,5 + (n x 0,08)
DOC30	250	50	313	113	26	9 + (n x 2,35)	2,4 + (n x 0,10)
DOC60	466	50	527	113	26	13 + (n x 2,35)	2,1 + (n x 0,18)
DOC77	519	92	618	191	26	10 + (n x 2,85)	11,0 + (n x 0,44)
DOC77HF	519	92	633	191	26	10 + (n x 2,85)	13,0 + (n x 0,44)

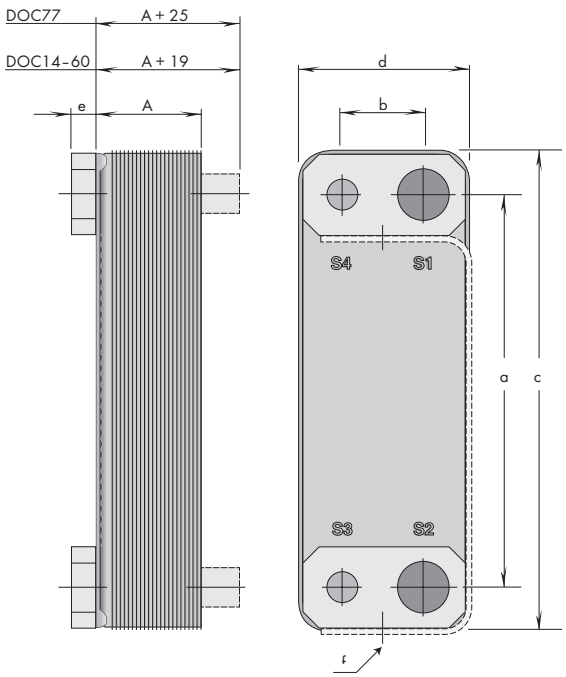
n = Anzahl der Platten

n = number of plates

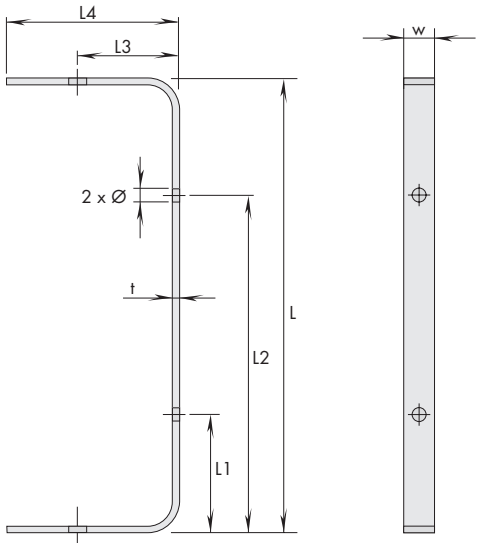
连接

CONNECTIONS

TYP TYPE	S1-S2, ÖL S1-S2, OIL	S3-S4, WASSER S3-S4, WATER	SCHRAUBENSCHLÜSSELGRIFF SPANNER GRIP	F
DOC14	ISO-G ¾"	ISO-G ¾"	32	M8
DOC20	ISO-G 1"	ISO-G ¾"	41	M8
DOC30	ISO-G 1¼"	ISO-G ¾"	50	M8
DOC60	ISO-G 1¼"	ISO-G ¾"	50	M8
DOC77	ISO-G 1½"	ISO-G 1"	50	M8
DOC77HF	SAE 2½"	ISO-G 1¼"	114	M10



DOC® Auslegung
DOC® Dimensioning



Tragkonsole
Support bracket

支架尺寸

SUPPORT BRACKET DIMENSIONS

TYP TYPE	L	L1	L2	L3	L4	w	t	Ø
DOC14	177	57	119	44	78	20	5	9
DOC20	275	85	189	51	94	25	6	9
DOC30	255	75	179	58	100	25	6	9
DOC60	471	75	395	58	100	25	6	9
DOC77	524	149	372	106	180	25	8	11
DOC77HF	524	149	372	106	180	25	8	11

连接方式

NIPPLE CONNECTIONS (OPTIONAL)

TYP TYPE	INNENGEWINDE INT. THREAD
DOC14, 20, 30, 60	ISO-G ½" Innengewinde ISO-G ½" int. thread
DOC77, 77HF	ISO-G 1" Innengewinde ISO-G 1" int. thread

订货实例

ORDERING CODE - EXAMPLE

KÜHLERTYP TYPE	GRÖSSE SIZE	PLATTENANZAHL NUMBER OF PLATES
DOC	30	70

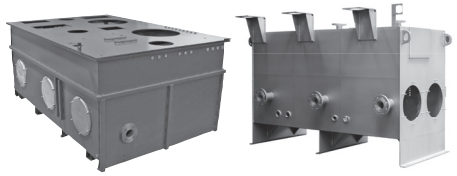
HBE behält sich das Recht vor, jederzeit technische Änderungen durchzuführen.

HBE reserves the right to modify technical data at any time.

GESAMTLIEFERPROGRAMM

DELIVERY PROGRAMME

Ölbehälter aus Stahl / Edelstahl
Oil tanks made of steel / stainless steel



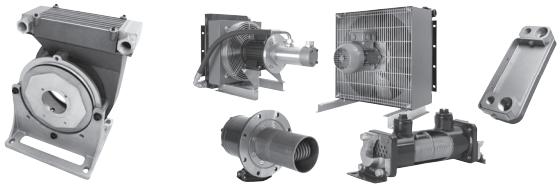
Ölbehälter aus Aluminium
Oil tanks made of aluminium

Reinigungsdeckel und sonstiges Behälterzubehör
Niveau- und Temperaturüberwachung
Cleaning covers and further accessories
Level- and temperature indicators

Tankheizungen
Tank heaters

Pumpenträger und Zubehör
Bellhousings and accessories

Pumpenträger mit Öl-Kühler
Wärmetauscher
Gelötete Platten-Wärmetauscher
Bellhousing with oil-cooler
Heat exchangers
Brazed plate heat exchanger



SOFTEX® elastische und drehspielfreie Wellenkupplungen
SOFTEX® elastic and no backlash shaft couplings

STAREX® flexible Kupplungen
STAREX® flexible couplings

Kupplungen für Verbrennungsmotoren
Diesel engine couplings

HBE hydraulic components

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TÜV NORD CERT GmbH DIN EN ISO 9001

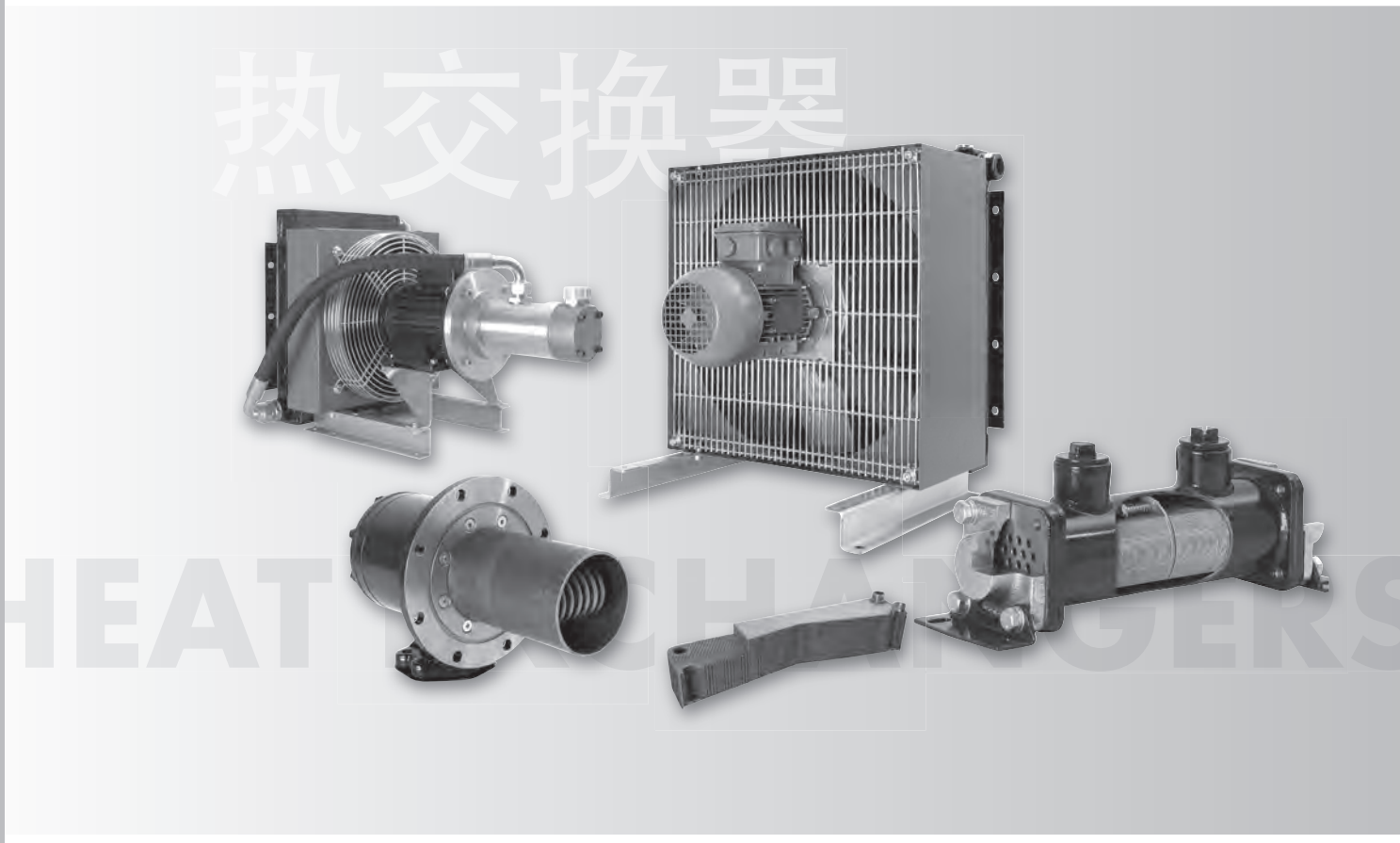
03/14 www.plakart.de

液压配件
联轴器
油箱

HBE

Hydraulic Components
Drive Couplings
Oil Tanks

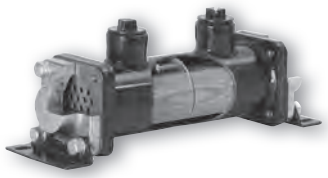
流体技术解决方案 Solutions for Fluid Technology



热交换器
HEAT EXCHANGERS

热交换器
HEAT EXCHANGERS

EKM 系列 管束式油冷却器
SERIES EKM TUBE BUNDLE OIL COOLER



管束带铝鳍，冷却表面是标准管式冷却器的 4 倍。冷却能力高达 230 kW。最大耐压：35 bar。端盖可拆卸，方便清洗管路。可选内置旁路阀（专利）。可选海水版本。

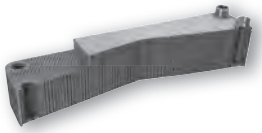
Tube bundle with aluminium fins, providing up to 4-times greater cooling surface compared to a standard shell and tube cooler. Cooling capacity up to 230 kW. Extremely pressure resistant – max.: 35 bar. Removeable end caps for easy cleaning of the water pipes. Optionally available with internal bypass valve (patented). Option: seawater version.

UKTM 系列 管束式油冷却器
SERIES UKTM TUBE BUNDLE OIL COOLER

管束带铝鳍，结构极紧凑，适用于油箱内或油箱顶部安装。基于 EKM 系列，更高效率，高达 29 平米换热表面及 650 升/分钟油体积。该设计针对油箱内置安装，占用最小空间和更少管路。

Tube bundle with aluminium fins. Extremely compact cooler for in-tank and top-tank mounting. Based on the EKM, with a very high performance range up to 29 m^2 heat exchange surface and 650 l/min oil volume. Designed for internal tank installation with minimum space requirement and low piping requirement.

PWT 系列 板式油冷却器
SERIES PWT PLATE OIL COOLER



焊板式换热器材料为不锈钢。紧凑经济。油压高达 30 bar，流量范围 25 至 3,000 升/分钟。工作温度为 -100 至 +195 摄氏度。可选镍焊。安装灵活，采用聚氨酯硬泡材料绝缘。

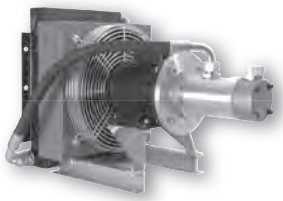
Soldered plate heat exchanger made of stainless steel. Compact and economical. Oil pressure up to 30 bar and oil flow rate from 25 to 3,000 l/min. Operating temperatures from -100 to +195°C. Also available with nickel soldering. Various installation fittings and isolations of PU hard foam.

LKI 系列 油-气冷却器
SERIES LKI OIL AIR COOLER

油-气冷却器为工业用途，有 10 个不同规格可选。块式结构 (最大工作压力 16 bar)，1 路或 2 路，可选SAE法兰。可选海上设备版本。

Oil air cooler for industrial use. Available in 10 different sizes. Block construction (max. operating pressure 16 bar). 1-way and 2-way. Available with SAE flange. Off-Shore version optional.

TFS/A 系列 油-气冷却器
SERIES TFS / A OIL AIR COOLER



紧凑旁路冷却单元。单元由电机，泵组和油-气冷却器组成。该单元独立运作，与主系统动力无关。泵法兰直连在电机。采用内啮合螺杆泵，超低噪音。安装灵活，3 个不同规格。

Compact bypass-flow cooling unit. Combination of motor pump station and oil air cooler in a single unit that operates independently of the actual unit. Pump flange is connected directly to the motor. Extremely low-noise due to internal screw pump. Various installation positions possible. Available in 3 different sizes.

油/水热交换器(工业用途)
OIL / WATER HEAT EXCHANGERS FOR INDUSTRIAL USE

EKM 系列
SERIES EKM

产品介绍

EKM 系列管束式热交换器适用于各种工业应用。该系列冷却效果显著,得益于额外的冷却面积。最大可满足 230 kW 应用的冷却。管束间通过铝鳍实现金属-金属接触。EKM 系列的冷却面积从 0.43 到 18.41 平米。EKM 系列由 20 个基本单元组成,有 1, 2, 4 个流程版本。

PRODUCT DESCRIPTION

The EKM series is a consistent development of a tube bundle heat exchanger for a wide range of industrial applications. This range is particularly effective due to the additional cooling area, and offers a heat exchange performance of 230 kW. This is archieved by aluminium fins, which are pushed over the tube bundle with metal-to-metal contact. The EKM range of heat exchangers have a cooling surface of 0.43 m^2 to 18.41 m^2. The EKM series is constructed of 20 basic units, which are available as single, double and four pass versions.

产品特性

- 铝鳍与铜管(标准)确保最大热交换效果
- 油路大接口减少压损
- 散热效果高达 230 kW
- 流体流速高达 330升/分钟
- 端盖可拆卸,方便清洗管路
- 法兰允许换热器 90 度安装
- 可选内置旁路单向阀 (专利)
- 高品质材料
- 最大压力:油 35 bar / 水 10 bar
- 可选各种附件
- 库存现货,货期短

PRODUCT FEATURES

- Aluminium fins and copper tubes (standard) ensure maximum levels of heat exchange
- Large oil connectors for minimum flow resistance
- Heat dissipation up to 230 kW
- Oil flow rates of up to 330 l/min
- Removable end caps for easy cleaning of the tubes
- Flanges allow a 90°rotation of the heat exchanger
- Optionally available with internal bypass check valve (patented)
- High-quality materials
- Max. pressure: oil 35 bar / water 10 bar
- Full range of accessories available
- Delivery ex-stock

材料 MATERIALS

	标准 / STANDARD
外壳 / SHELL, 安装支架 / MOUNTING BRACKET, 挡板 / BAFFELS	钢质 / Steel
端板 / END PLATES	钢质 / Steel
冷却鳍 / COOLING FINS, 板类型/ TYPE SPECIFICATION PLATE	铝/Aluminium
管路 / TUBES	铜,镀镍/Copper, Nickel
端盖 / END CAPS	铸铁/Cast iron
垫圈 / GASKETS	丁腈橡胶,纤维/Nitrile rubber, cellulose fibre

最大流量 MAXIMUM FLOW RATE

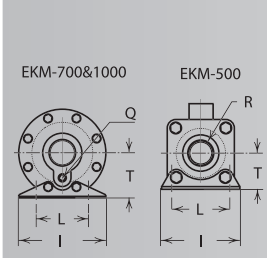
升/分钟 l/min	油/OIL 外壳/SHELL	水/WATER 管/TUBES		
规格/SIZE		O	T	F
EKM-500	75	45	22	-
EKM-700	225	90	46	23
EKM-1000	330	210	106	53

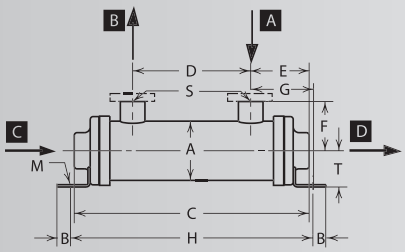
最大工作压力 / Maximum operating pressure: 壳式 / Shell = 35 bar 管式 / Tubes = 10 bar
最大工作温度 / Maximum operating temperature: = 95 度 / 95°C

注意: 不正确安装会损坏冷却器
CAUTION: Incorrect installation may lead to damage to the cooler.

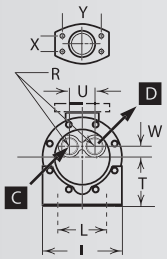
油/水热交换器 (工业用途)
OIL / WATER HEAT EXCHANGERS FOR INDUSTRIAL USE

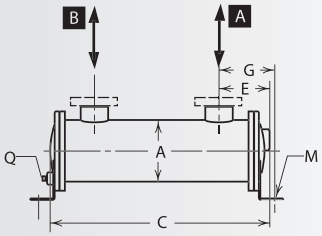
1 流程型 „O“ / 1 PASS TYPE „O“





2 流程型 „T“ / 2 PASS TYPE „T“





A - 被冷却介质
- Medium to be cooled

B - 冷却液
- Cooled Medium

C - 冷却水入口
- Cooling water inlet

D - 冷却水出口
- Cooling water outlet

EKM 系列尺寸 DIMENSIONS EKM

规格/SIZE	C	H	D	E	G	L	U	A	S	R	Q	M	T	F
EKM-505-0	187	189	55	66	66	62,5	-	65	G 3/4"	G 3/4"	—	9	41	53
EKM-505-T				83	67		28			G 3/8"				
EKM-508-0	263	265	97	82	83		-			G 3/4"				57
EKM-508-T	265			83	85		28			G 3/8"				
EKM-510-0	314	316	148	82	83		-			G 3/4"				
EKM-510-T				83	85		28			G 3/8"				
EKM-512-0	365	367	199	82	83		-			G 3/4"				
EKM-512-T				83	85		28			G 3/8"				
EKM-514-0	416	418	250	82	83		-			G 3/4"				
EKM-514-T				83	85		28			G 3/8"				
EKM-518-0	517	519	351	82	83		-			G 3/4"				
EKM-518-T				83	85		28			G 3/8"				
EKM-524-0	670	672	504	82	83		-			G 3/4"				
EKM-524-T	672			83	85		28			G 3/8"				
EKM-536-0	975	976	809	82	83		-			G 3/4"				
EKM-536-T	976			83	85		28			G 3/8"				
EKM-708-0	283	272	76	103	103	76	-	90	G 1 1/2"	G 1 1/4"	G 1/4"	11	66	73
EKM-708-T	258			91	95		41			G 1"				
EKM-712-0	385	373	177	103	103		-			G 1 1/4"	G 1/4"			
EKM-712-T	360			91	95		41			G 1"				
EKM-714-0	435	424	228	103	103		-			G 1 1/4"	G 1/4"			
EKM-714-T	411			91	95		41			G 1"				
EKM-718-0	537	526	330	103	103		-			G 1 1/4"	G 1/4"			
EKM-718-T	513			91	95		41			G 1"				
EKM-724-0	689	678	482	103	103		-			G 1 1/4"	G 1/4"			
EKM-724-T	665			91	95		41			G 1"				
EKM-736-0	994	983	787	103	103		-			G 1 1/4"	G 1/4"			
EKM-736-T	995			91	95		41			G 1"				
EKM-1012-0	389	392	157	116	116	102	-	128	G 1 1/2"	G 1 1/2"	G 1/4"	11	102	92
EKM-1012-T	369			113	110		60			G 1 1/4"				
EKM-1014-0	440	443	207	116	116		-			G 1 1/2"				
EKM-1014-T	420			113	110		60			G 1 1/4"				
EKM-1018-0	541	544	309	116	116		-			G 1 1/2"				
EKM-1018-T	522			113	110		60			G 1 1/4"				
EKM-1024-0	694	697	461	116	116		-			G 1 1/2"				
EKM-1024-T	674			113	110		60			G 1 1/4"				
EKM-1036-0	999	1002	766	116	116		-			G 1 1/2"				
EKM-1036-T	979			113	110		60			G 1 1/4"				
EKM-1048-0	1303	1306	1071	116	166		-			G 1 1/2"				
EKM-1048-T	1284			113	110		60			G 1 1/4"				

EKM 系列计算举例

EXAMPLE CALCULATION EKM

为了区分油出口温度,水入口温度和粘度,
计算如下:

假设:

散热功率(AW)	= 17 kW
油流速 (V)	= 80 l/min
油出口温度 (t 出油)	= 45°C
水入口温度 (t 进水)	= 25°C
油类型	= 68 号液压油
散热效率	= kW eff.

1. 参考粘度系数计算如下:
温度差 ΔT (°C) =

$$\frac{\text{AW (kW)} \times 34{,}1}{\text{Q (l/mm)}} = 7{,}2$$

平均油温 (°C) =

$$\frac{t_{出油} + \Delta t + t_{出油}}{2} = 49°C$$

2. 68 号液压油参数:
49°C 粘度 = 38 cSt
3. 从粘度修正数据表 „A“:
38 cSt = 1,11

$$\frac{\text{AW (kW)} \times 25 \times \text{粘度 (cSt) 图表A}}{t_{出油}(°C) - t_{进水}(°C)} = \frac{17 \times 25 \times 1{,}11}{20} = 23{,}6 \text{ kW}$$

从油/水 2:1 性能图根据 80 升/分钟和 23.6 kW,
查得:
冷却器 No.31 = EKM- 714 -T -CN

For deviating oil outlet temperatures, water inlet temperatures and viscosities, the calculation has to be made as follows:

WHERE:

Heat to be dissipated (AW)	= 17 kW
Oil flow (V)	= 80 l/mn.
Oil outlet temp. (t oil out)	= 45°C
Water inlet temp. (t water in)	= 25°C
Oil type	= ISO 68
Effective heat to be dissipated	= kW eff.

1. The viscosity correction factor is calculated as follows:
Temperature difference ΔT (°C) =

$$\frac{\text{AW (kW)} \times 34{,}1}{\text{Q (l/mm)}} = 7{,}2$$

Average oil temp. therefore (°C) =

$$\frac{t_{oil\ out} + \Delta t + t_{oil\ out}}{2} = 49°\ C$$

2. From oil manufacturer's data for ISO 68:
Viscosity at 49°C = 38 cSt
3. From viscosity correction table „A“:
38 cSt = 1,11

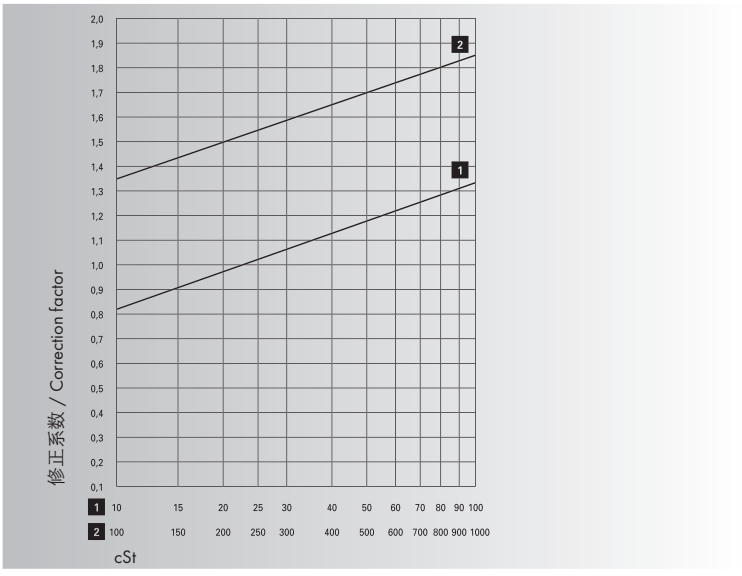
AW eff. =

$$\frac{\text{AW (kW)} \times 25 \times \text{viscosity (cST) Tab. A}}{t_{oil\ out}(°C) - t_{water\ in}(°C)} = \frac{17 \times 25 \times 1{,}11}{20} = 23{,}6 \text{ kW}$$

From oil/water 2:1 performance diagram at an oil flow of 80 l/min and 23.6 kW, the outcome is:
Cooler no. 31 = EKM- 714 -T -CN

选择冷却器

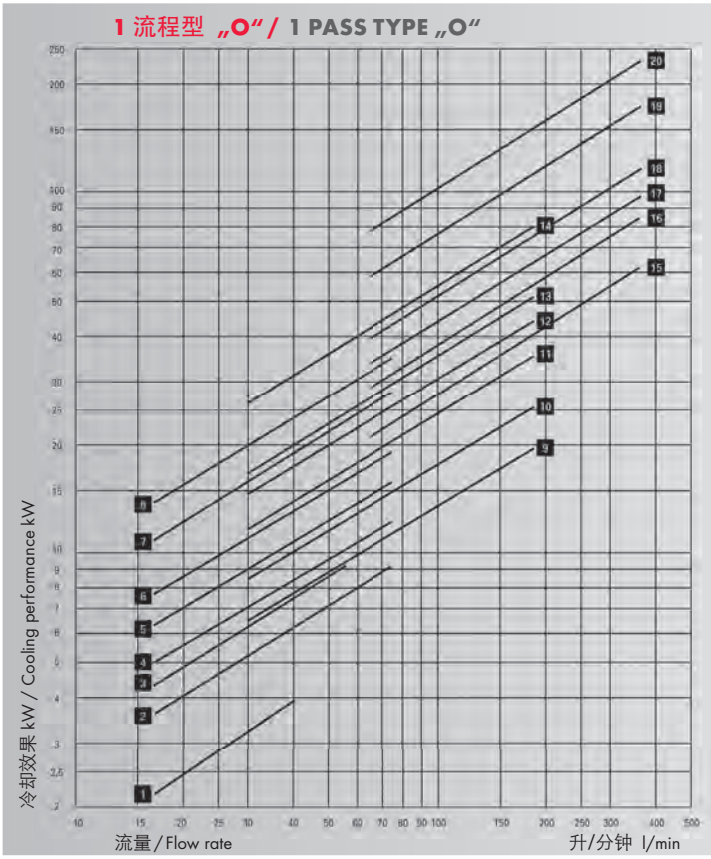
CHOICE OF COOLER



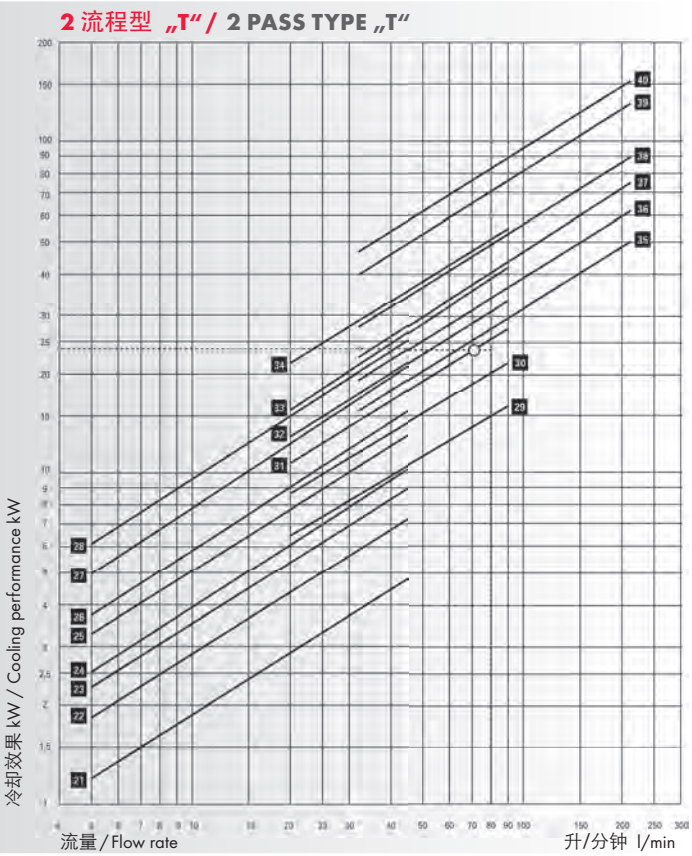
所示性能参数基于水入口温度为 25°C 和油出口温度为 50°C 。及油粘度 20.6 cSt 。不同粘度,修正系数 "A" 可由下图曲线读出。

The performance data shown is based on a water inlet temperature of 25°C and an oil outlet temperature of 50°C, together with an oil viscosity of 20.6 cSt. For different viscosities, the correction factor „A“ can be read off from the performance curve below.

1 流程型 „O“ / 1 PASS TYPE „O“



2 流程型 „T“ / 2 PASS TYPE „T“



图表中的性能曲线图受限于流量范围。
范围以外的请咨询厂家。

The performance data shown in the diagram are limited by the flow rate and may be exceeded after consultation with the manufacturer.

1	EKM-505-O	11	EKM-714-O
2	EKM-508-O	12	EKM-718-O
3	EKM-510-O	13	EKM-724-O
4	EKM-512-O	14	EKM-736-O
5	EKM-514-O	15	EKM-1012-O
6	EKM-518-O	16	EKM-1014-O
7	EKM-524-O	17	EKM-1018-O
8	EKM-536-O	18	EKM-1024-O
9	EKM-708-O	19	EKM-1036-O
10	EKM-712-O	20	EKM-1048-O

21	EKM-505-T	31	EKM-714-T
22	EKM-508-T	32	EKM-718-T
23	EKM-510-T	33	EKM-724-T
24	EKM-512-T	34	EKM-736-T
25	EKM-514-T	35	EKM-1012-T
26	EKM-518-T	36	EKM-1014-T
27	EKM-524-T	37	EKM-1018-T
28	EKM-536-T	38	EKM-1024-T
29	EKM-708-T	39	EKM-1036-T
30	EKM-712-T	40	EKM-1048-T

订货号 ORDERING CODE

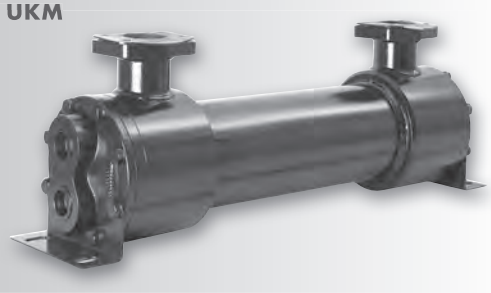
EKM - 1036 - 6 - O - R - CN - W* - SW* - G 11/2“

- **接口类型 Connection type**
  - NPT = -
  - SAE = **S**
  - BSPP = **M**
  - SAE 法兰/ SAE flange = **FM**
- **规格大小 / Unit size**
- **导热片设置 / Guide segment setting**
- **冷却水接口系统 Cooling water connection system**
  - 1- 流程/ 1-pass = **O**
  - 2- 流程/ 2-pass = **T**
  - 4-流程,仅限 700 和 1000 系列/ 4-pass, 700 and 1000 series only = **F**
- **R** = 旁路阀 / Bypass valve
- **CN** = 水管 黄铜/镀镍 / Water tubes Copper/nickel
- **W** = 管板 黄铜/镀镍 / Tube sheet Copper/nickel
- **SW** = 海水 / Seawater
- **G 11/2“** = 油路接口 (第 4 页表格) = Oil connections (Tab. p.4)

* W 仅与 SW 搭配
* W is only available in combination with SW.

油/水热交换器 (工业用途)
OIL / WATER HEAT EXCHANGERS FOR INDUSTRIAL USE

UKM 系列
SERIES UKM



产品介绍

UKM 系列管束式热交换器适用于各种工业应用。该系列冷却效果显著,得益于额外的冷却面积。管束间通过铝鳍实现金属-金属接触。UKM 系列的冷却面积从 0.73 到 29 平米。UKM 系列由 30 个基本单元组成,有 2,4 个流程版本。

PRODUCT DESCRIPTION

The UKM series is a consistent development of a tube bundle heat exchanger for a wide range of industrial applications. This range is particularly effective due to the additional cooling area. This is archieved by aluminium fins, which are pushed over the tube bundle with metal-to-metal contact. The UKM range of heat exchangers have a cooling surface of 0.73 m^2 to 29 m^2. The UKM series is constructed of more than 30 basic units, and is available as double and four pass versions.

产品特性

- 铝鳍与铜管或镀镍铜管确保最大热交换效果
- 油路大接口减少压损
- 流体流速高达 650 升/分钟
- 端盖可拆卸
- 法兰允许换热器90度安装
- 可选内置旁路单向阀(专利)
- 高品质材料
- 最大压力:油 35 bar 水 / 16 bar
- 可选各种附件
- 库存现货,货期短

PRODUCT FEATURES

- Aluminium fins and copper or cupro-nickel tubes ensure maximum levels of heat exchange
- Large oil connectors for minimum flow resistance
- Oil flow rates of up to 650 l/min
- Removable end cap
- Flanges allow a 90° rotation of the heat exchanger
- Optionally available with internal bypass check valve (patented)
- High-quality materials
- Max. pressure: oil 35 bar / water 16 bar
- Full range of accessories available
- Delivery ex-stock

材料 MATERIALS

	标准 / STANDARD
外壳 / SHELL, 安装支架 / MOUNTING BRACKET, 挡板 / BAFFELS	钢质 / Steel
端板 / END PLATES	黄铜 / Brass
冷却鳍 / COOLING FINS, 板类型 / TYPE SPECIFICATION PLATE	铝/Aluminium
管路 / TUBES	铜 / Copper
端盖 / END CAPS	铸铁 / Cast iron
垫圈 / GASKETS	丁腈橡胶,纤维 / Nitrile rubber, cellulose fibre

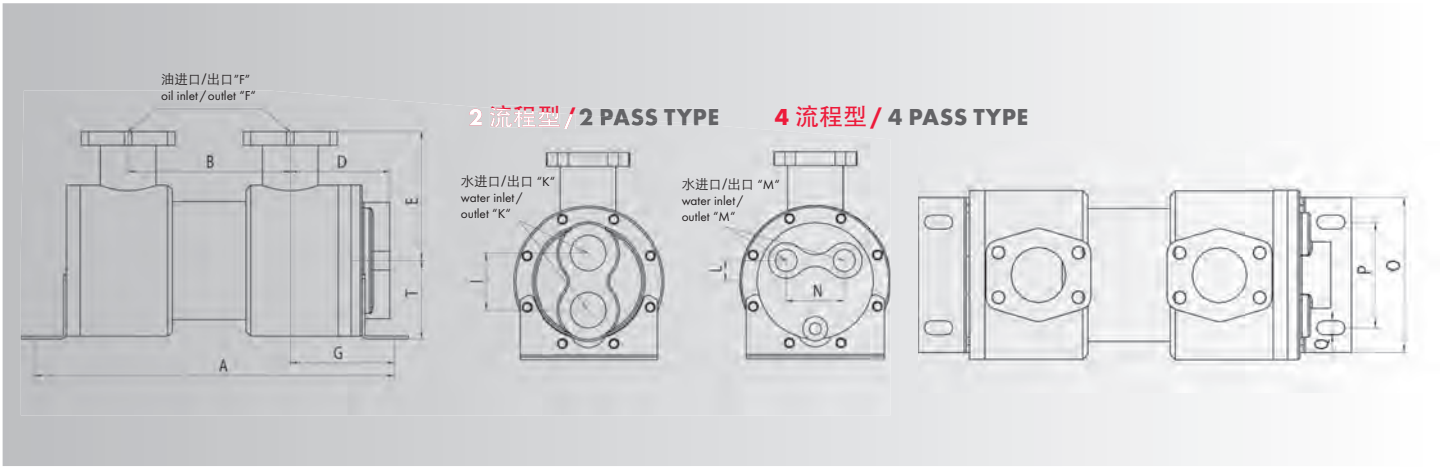
最大流量 MAXIMUM FLOW RATE

升/分钟 l/min	油/OIL 外壳/SHELL	水/WATER 管 CU/TUBES CU		水/WATER 管 CN/TUBES CN	
规格/VERSION		T	F	T	F
UKM-500	75	17	-	26	-
UKM-700	225	34	16	52	24
UKM-1000	400	82	40	122	58
UKM-1200	650	182	91	272	136

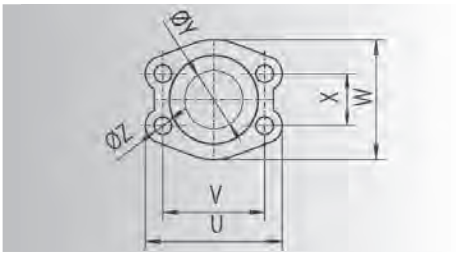
最大工作压力 / Maximum operating pressure: 壳式 / Shell = 35 bar 管式 / Tubes = 10 bar
最大工作温度 / Maximum operating temperature: = 95 度 / 95°C

注意: 不正确安装会损坏冷却器
CAUTION: Incorrect installation may lead to damage to the cooler.

UKM 系列尺寸 DIMENSIONS UKM



法兰尺寸 DIMENSIONS FLANGE



	U	V	W	X	Z
SAE 1"	70	52,4	55	26,2	M10
SAE 1 1/4"	79	58,7	68	30,2	M10
SAE 1 1/2"	93	69,9	78	35,7	M12
SAE 2"	102	77,8	90	42,9	M12

冷却器尺寸 UNIT DIMENSIONS

	尺寸/DIMENSIONS							2-流程/2-WAYS			4-流程/4-WAYS			脚架/FOOT		
毫米mm/BSPP	A	B	D	E	G	F	T	I	K	L	M	N	O	P	Q (Ø)	平方米 m²
UKM-508	310	177,5	66	75	71	G 1"	55	35	G 1/2"	-	-	-	95	63	8,5 x 16	0,73
UKM-512	410	278,8	66	75	71	G 1"	55	35	G 1/2"	-	-	-	95	63	8,5 x 16	1,13
UKM-514	461	329,5	66	75	71	G 1"	55	35	G 1/2"	-	-	-	95	63	8,5 x 16	1,43
UKM-518	563	431,5	66	75	71	G 1"	55	35	G 1/2"	-	-	-	95	63	8,5 x 16	1,74
UKM-524	715	583,5	66	75	71	G 1"	55	35	G 1/2"	-	-	-	95	63	8,5 x 16	2,35
UKM-536	1020	888,5	66	75	71	G 1"	55	35	G 1/2"	-	-	-	95	63	8,5 x 16	3,57
UKM-708	324	155	85	90	89	G 1 1/2"	66	47	G 1"	18	G 1/2"	48	120	76	11 x 25	1,38
UKM-712	425	256	85	90	89	G 1 1/2"	66	47	G 1"	18	G 1/2"	48	120	76	11 x 25	2,18
UKM-714	476	307	85	90	89	G 1 1/2"	66	47	G 1"	18	G 1/2"	48	120	76	11 x 25	2,53
UKM-718	578	409	85	90	89	G 1 1/2"	66	47	G 1"	18	G 1/2"	48	120	76	11 x 25	3,29
UKM-724	730	561	85	90	89	G 1 1/2"	66	47	G 1"	18	G 1/2"	48	120	76	11 x 25	4,44
UKM-736	1035	866	85	90	89	G 1 1/2"	66	47	G 1"	18	G 1/2"	48	120	76	11 x 25	6,73
UKM-1012	464	261	105	140	108	SAE 2"	85	62	G 1 1/4"	22	G 3/4"	63	150	102	13 x 28	4,38
UKM-1014	515	312	105	140	108	SAE 2"	85	62	G 1 1/4"	22	G 3/4"	63	150	102	13 x 28	5,17
UKM-1018	617	414	105	140	108	SAE 2"	85	62	G 1 1/4"	22	G 3/4"	63	150	102	13 x 28	6,73
UKM-1024	769	566	105	140	108	SAE 2"	85	62	G 1 1/4"	22	G 3/4"	63	150	102	13 x 28	9,06
UKM-1036	1074	871	105	140	108	SAE 2"	85	62	G 1 1/4"	22	G 3/4"	63	150	102	13 x 28	13,74
UKM-1048	1379	1176	105	140	108	SAE 2"	85	62	G 1 1/4"	22	G 3/4"	63	150	102	13 x 28	18,41
UKM-1060	1684	1481	105	140	108	SAE 2"	85	62	G 1 1/4"	22	G 3/4"	63	150	102	13 x 28	23,10
UKM-1218	618	390	131	145	116	SAE 2 1/2"	120	87	G 1 1/2"	25	G 1"	70	190	142	13 x 28	6,00
UKM-1224	770	542	131	145	116	SAE 2 1/2"	120	87	G 1 1/2"	25	G 1"	70	190	142	13 x 28	8,06
UKM-1230	923	695	131	145	116	SAE 2 1/2"	120	87	G 1 1/2"	25	G 1"	70	190	142	13 x 28	10,19
UKM-1236	1075	847	131	145	116	SAE 2 1/2"	120	87	G 1 1/2"	25	G 1"	70	190	142	13 x 28	12,25
UKM-1242	1228	1000	131	145	116	SAE 2 1/2"	120	87	G 1 1/2"	25	G 1"	70	190	142	13 x 28	14,38
UKM-1248	1380	1152	131	145	116	SAE 2 1/2"	120	87	G 1 1/2"	25	G 1"	70	190	142	13 x 28	16,35
UKM-1254	1532	1304	131	145	116	SAE 2 1/2"	120	87	G 1 1/2"	25	G 1"	70	190	142	13 x 28	18,48
UKM-1260	1685	1457	131	145	116	SAE 2 1/2"	120	87	G 1 1/2"	25	G 1"	70	190	142	13 x 28	20,52
UKM-1266	1837	1609	131	145	116	SAE 2 1/2"	120	87	G 1 1/2"	25	G 1"	70	190	142	13 x 28	22,63
UKM-1272	1990	1762	131	145	116	SAE 2 1/2"	120	87	G 1 1/2"	25	G 1"	70	190	142	13 x 28	24,74
UKM-1276	2143	1915	131	145	116	SAE 2 1/2"	120	87	G 1 1/2"	25	G 1"	70	190	142	13 x 28	26,88
UKM-1284	2295	2067	131	145	116	SAE 2 1/2"	120	87	G 1 1/2"	25	G 1"	70	190	142	13 x 28	28,99

UKM 系列计算举例

EXAMPLE CALCULATION UKM

为了区分油出口温度,水入口温度和粘度,
计算如下:

假设:

散热功率 (AW)	= 17 kW
油流速 (V)	= 80 l/min
油出口温度 (t 出油)	= 45°C
水入口温度 (t 进水)	= 25°C
油类型	= 68 号液压油
散热效率	= kW eff.

1. 参考粘度系数计算如下:
温度差 ΔT (°C) =

$$\frac{\text{AW (kW)} \times 34{,}1}{\text{Q (l/mm)}} = 7{,}2$$

平均油温 (°C) =

$$\frac{t_{出油} + \Delta t + t_{出油}}{2} = 49°C$$

2. 68 号液压油参数:
49°C 粘度 = 38 cSt
3. 从粘度修正数据表 „A“:
38 cSt = 1,11

AW eff. =

$$\frac{\text{AW (kW)} \times 25 \times \text{粘度 (cSt) 图表A}}{t_{出油}(°C) - t_{进水}(°C)}$$

$$= \frac{17 \times 25 \times 1{,}11}{20} = 23{,}6 \text{ kW}$$

从油/水 2:1 性能图根据 80 升/分钟和 23.6 kW,
查得:
冷却器 No. 31 = UKM- 718 -T

For deviating oil outlet temperatures, water inlet temperatures and viscosities, the calculation has to be made as follows:

WHERE:

Heat to be dissipated (AW)	= 17 kW
Oil flow (V)	= 80 l/mn.
Oil outlet temp. (t oil out)	= 45°C
Water inlet temp. (t water in)	= 25°C
Oil type	= ISO 68
Effective heat to be dissipated	= kW eff.

1. The viscosity correction factor is calculated as follows:
Temperature difference ΔT (°C) =

$$\frac{\text{AW (kW)} \times 34{,}1}{\text{Q (l/mm)}} = 7{,}2$$

Average oil temp. therefore (°C) =

$$\frac{t_{oil\ out} + \Delta t + t_{oil\ out}}{2} = 49°\ C$$

2. From oil manufacturer's data for ISO 68:
Viscosity at 49°C = 38 cSt
3. From viscosity correction table „A“:
38 cSt = 1,11

AW eff. =

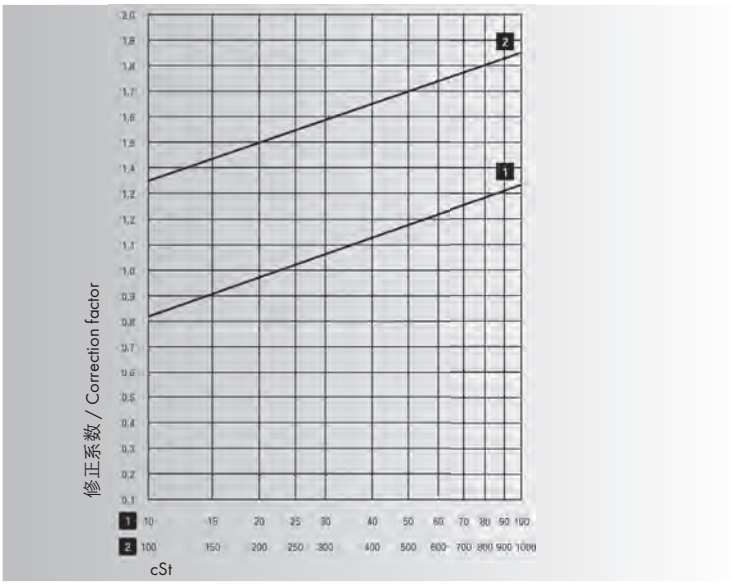
$$\frac{\text{AW (kW)} \times 25 \times \text{viscosity (cST) Tab. A}}{t_{oil\ out}(°C) - t_{water\ in}(°C)}$$

$$= \frac{17 \times 25 \times 1{,}11}{20} = 23{,}6 \text{ kW}$$

From oil/water 2:1 performance diagram at an oil flow of 80 l/min and 23.6 kW, the outcome is:
Cooler no. 31 = UKM- 718 -T

选择冷却器

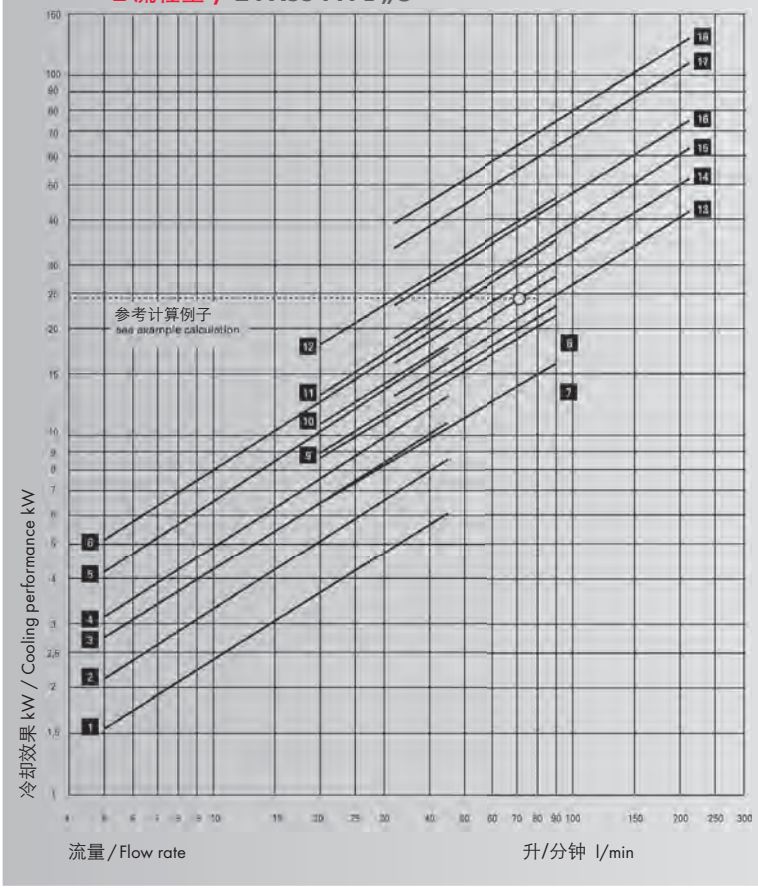
CHOICE OF COOLER



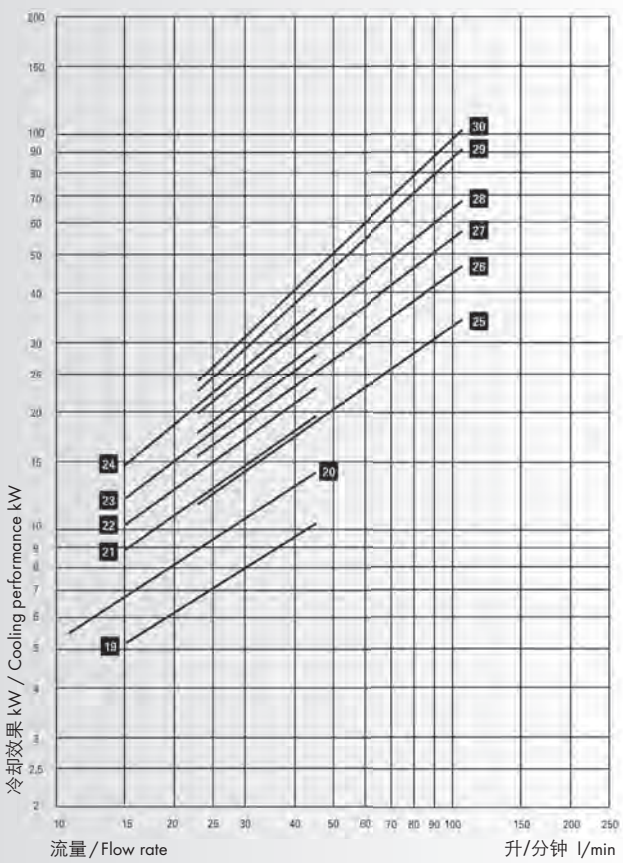
所示性能参数基于水入口温度为 25°C 和油出口温度为 50°C 。及油粘度 20.6 cSt 。不同粘度,修正系数 "A" 可由下图曲线读出。

The performance data shown is based on a water inlet temperature of 25°C and an oil outlet temperature of 50°C, together with an oil viscosity of 20.6 cSt. For different viscosities, the correction factor „A“ can be read off from the performance curve below.

2 流程型 / 2 PASS TYPE „O“



4 流程型 / 4 PASS TYPE



图表中的性能曲线图受限于流量范围。
范围以外的请咨询厂家。

The performance data shown in the diagram are limited by the flow rate and may be exceeded after consultation with the manufacturer.

1	UKM-508-T	10	UKM-718-T
2	UKM-512-T	11	UKM-724-T
3	UKM-514-T	12	UKM-736-T
4	UKM-518-T	13	UKM-1012-T
5	UKM-524-T	14	UKM-1014-T
6	UKM-536-T	15	UKM-1018-T
7	UKM-708-T	16	UKM-1024-T
8	UKM-712-T	17	UKM-1036-T
9	UKM-714-T	18	UKM-1048-T

19	UKM-708-F	25	UKM-1012-F
20	UKM-712-F	26	UKM-1014-F
21	UKM-714-F	27	UKM-1018-F
22	UKM-718-F	28	UKM-1024-F
23	UKM-724-F	29	UKM-1036-F
24	UKM-736-F	30	UKM-1048-F

订货号 ORDERING CODE

UKM - 1014 - 2 - T - R - CN - W - SW - 01 - S

- **接口类型 Connection type**
  - NPT = -
  - SAE = S
  - BSPP = M
  - SAE 法兰/ SAE flange = FM
- **规格大小 / Unit size**
- **导热片设置 / Guide segment setting**
- **冷却水接口系统 / Cooling water connection system**
  - 2 流程/ 2-pass = T
  - 4流程,不含500系列 / 4-pass, without series 500 = F
- **旁路阀 / Bypass valve = R**
- **CU = 管路 铜/ Tubes Copper**
- **CN = 管路 铜/镀镍 / Tubes Copper/nickel**
- **W = 侧板 铜/镀镍 End plates Copper/Nickle / Copper/nickel**
- **SW = 海水 / Sea water**
- **系列01/01 Series**
- **S = 特殊设计 Special design**

油/水换热器(油箱内安装)
OIL / WATER HEAT EXCHANGERS FOR MOUNTING IN TANKS

UKTM 系列
SERIES UKTM

产品介绍

UKTM 系列管束式热交换器适用于各种工业应用。该系列冷却效果显著,得益于额外的冷却面积。管束间通过铝鳍实现金属-金属接触。UKTM系列的冷却面积从 0.73 到 29 平米。UKTM 系列由 29 个基本单元组成,有 2,4 个流程版本。

PRODUCT DESCRIPTION

The UKTM series is a consistent development of a tube bundle heat exchanger for a wide range of industrial applications. This range is particularly effective due to the additional cooling area. This is archieved by aluminium fins, which are pushed over the tube bundle with metal-to-metal contact. The UKTM range of heat exchangers have a cooling surface of 0.73 m^2 to 29 m^2. The UKTM series is constructed of more than 29 basic units, and is available as double and four pass versions.

产品特性

- 铝鳍与铜管或镀镍铜管确保最大热交换效果
- 油路大接口减少压损
- 流体流速高达 650 升/分钟
- 端盖可拆卸,方便清洗管路
- 法兰允许换热器 90 度安装
- 可选内置旁路单向阀(专利)
- 高品质材料
- 最大压力:油 35 bar / 水 16 bar
- 可选各种附件
- 库存现货,货期短

PRODUCT FEATURES

- Aluminium fins and copper or cupro-nickel tubes ensure maximum levels of heat exchange
- Large oil connectors for minimum flow resistance
- Oil flow rates of up to 650 l/min
- Removable end cap for easy cleaning of the tubes
- Flanges allow a 90° rotation of the heat exchanger
- Optionally available with internal bypass check valve (patented)
- High-quality materials
- Max. pressure: oil 35 bar / water 16 bar
- Full range of accessories available
- Delivery ex-stock

材料 MATERIALS

	标准 / STANDARD
外壳 / SHELL, 安装支架 / MOUNTING BRACKET, 挡板 / BAFFELS	钢质 / Steel
端板 / END PLATES	黄铜 / Brass
冷却鳍 / COOLING FINS, 板类型 / TYPE SPECIFICATION PLATE	铝/Aluminium
管路 / TUBES	铜 / Copper
端盖 / END CAPS	铸铁 / Cast iron
垫圈 / GASKETS	丁腈橡胶,纤维 / Nitrile rubber, cellulose fibre

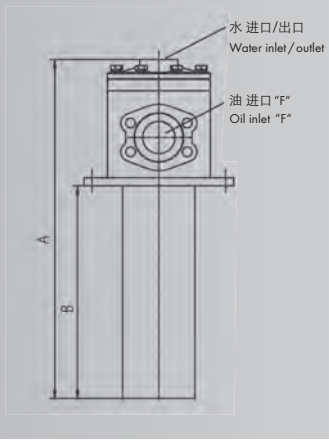
最大流量 MAXIMUM FLOW RATE

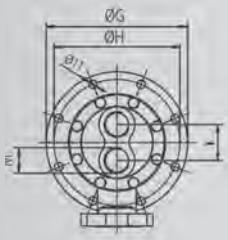
升/分钟 l/min	油/OIL 外壳/SHELL	水/WATER 管 CU/TUBES CU		水/WATER 管 CN/TUBES CN	
规格/VERSION		T	F	T	F
UKTM-500	75	17	-	26	-
UKTM-700	225	34	16	52	24
UKTM-1000	400	82	40	122	58
UKTM-1200	650	182	91	272	136

最大工作压力 / Maximum operating pressure: 壳式 / Shell = 35 bar 管式 / Tubes = 10 bar
最大工作温度 / Maximum operating temperature: = 95 度 / 95°C

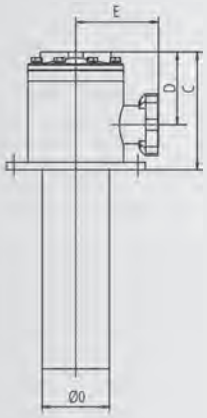
注意: 不正确安装会损坏冷却器
CAUTION: Incorrect installation may lead to damage to the cooler.

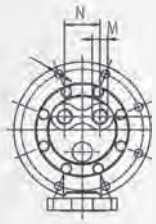
UKTM 系列尺寸 DIMENSIONS UKTM





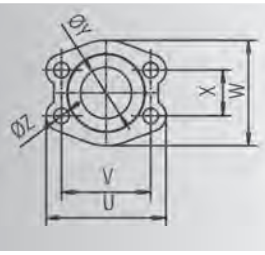
2 流程型 / 2 PASS TYPE





4 流程型 / 4 PASS TYPE

法兰尺寸 DIMENSIONS FLANGE



	U	V	W	X	Y	Z
SAE 1"	70	52,37	55	26,19	25	M10
SAE 1 1/2"	93	69,85	78	35,71	38	M12
SAE 2"	102	77,77	90	42,88	49	M12

冷却器尺寸 UNIT DIMENSIONS

	尺寸 / DIMENSIONS									2-流程 / 2-WAYS			4-流程 / 4-WAYS		
毫米 mm / BSPP	A	B	C	D	E	F*	G	O	H	I	K	L	M	N	平方米 m²
UKTM-508	285	140	145	92	48	G 1"	150	65	130	35	G 1/2"	-	-	-	0,73
UKTM-512	386	241	145	92	48	G 1"	150	65	130	35	G 1/2"	-	-	-	1,13
UKTM-514	437	292	145	92	48	G 1"	150	65	130	35	G 1/2"	-	-	-	1,43
UKTM-518	539	394	145	92	48	G 1"	150	65	130	35	G 1/2"	-	-	-	1,74
UKTM-524	691	546	145	92	48	G 1"	150	65	130	35	G 1/2"	-	-	-	2,35
UKTM-536	996	851	145	92	48	G 1"	150	65	130	35	G 1/2"	-	-	-	3,57
UKTM-708	296	141	155	95	110	SAE 1 1/2"	185	89	165	47	G 1"	18	R 1/2"	48	1,38
UKTM-712	397	242	155	95	110	SAE 1 1/2"	185	89	165	47	G 1"	18	R 1/2"	48	2,18
UKTM-714	448	293	155	95	110	SAE 1 1/2"	185	89	165	47	G 1"	18	R 1/2"	48	2,53
UKTM-718	550	395	155	95	110	SAE 1 1/2"	185	89	165	47	G 1"	18	R 1/2"	48	3,29
UKTM-724	702	547	155	95	110	SAE 1 1/2"	185	89	165	47	G 1"	18	R 1/2"	48	4,44
UKTM-736	1007	852	155	95	110	SAE 1 1/2"	185	89	165	47	G 1"	18	R 1/2"	48	6,73
UKTM-1012	425	240	185	110	125	SAE 2"	230	128	205	62	G 1 1/4"	22	R 3/4"	63	4,38
UKTM-1014	476	291	185	110	125	SAE 2"	230	128	205	62	G 1 1/4"	22	R 3/4"	63	5,17
UKTM-1018	578	393	185	110	125	SAE 2"	230	128	205	62	G 1 1/4"	22	R 3/4"	63	6,73
UKTM-1024	730	545	185	110	125	SAE 2"	230	128	205	62	G 1 1/4"	22	R 3/4"	63	9,06
UKTM-1036	1035	850	185	110	125	SAE 2"	230	128	205	62	G 1 1/4"	22	R 3/4"	63	13,74
UKTM-1048	1340	1155	185	110	125	SAE 2"	230	128	205	62	G 1 1/4"	22	R 3/4"	63	18,41
UKTM-1218	592	390	202	132	145	SAE 2 1/2"	275	160	240	87	G 1 1/2"	25	G 1"	70	6,00
UKTM-1224	744	542	202	132	145	SAE 2 1/2"	275	160	240	87	G 1 1/2"	25	G 1"	70	8,06
UKTM-1230	897	695	202	132	145	SAE 2 1/2"	275	160	240	87	G 1 1/2"	25	G 1"	70	10,19
UKTM-1236	1049	847	202	132	145	SAE 2 1/2"	275	160	240	87	G 1 1/2"	25	G 1"	70	12,25
UKTM-1242	1202	1000	202	132	145	SAE 2 1/2"	275	160	240	87	G 1 1/2"	25	G 1"	70	14,38
UKTM-1248	1354	1152	202	132	145	SAE 2 1/2"	275	160	240	87	G 1 1/2"	25	G 1"	70	16,35
UKTM-1254	1506	1304	202	132	145	SAE 2 1/2"	275	160	240	87	G 1 1/2"	25	G 1"	70	18,48
UKTM-1260	1659	1457	202	132	145	SAE 2 1/2"	275	160	240	87	G 1 1/2"	25	G 1"	70	20,52
UKTM-1266	1811	1609	202	132	145	SAE 2 1/2"	275	160	240	87	G 1 1/2"	25	G 1"	70	22,63
UKTM-1272	1964	1762	202	132	145	SAE 2 1/2"	275	160	240	87	G 1 1/2"	25	G 1"	70	24,74
UKTM-1276	2117	1915	202	132	145	SAE 2 1/2"	275	160	240	87	G 1 1/2"	25	G 1"	70	26,88
UKTM-1284	2269	2067	202	132	145	SAE 2 1/2"	275	160	240	87	G 1 1/2"	25	G 1"	70	28,99

* 选项 / Option: 规格 / Unit size 500 + 700: SAE 1 1/2"; 规格 / Unit size 1000: 螺纹/网 / Thread / Filet
* 选项 / Option: 规格 / Unit size 1200: K - R 1", R 1 1/4", R 2"

UKTM 系列计算举例

为了区分油出口温度,水入口温度和粘度,
计算如下:

假设:

散热功率 (AW)	= 17 kW
油流速 (V)	= 80 l/min
油出口温度 (t 出油)	= 45°C
水入口温度 (t 进水)	= 25°C
油类型	= ISO 68
散热效率	= kW eff.

1. 参考粘度系数计算如下:
温度差 ΔT (°C) =

$$\frac{\text{AW (kW)} \times 34{,}1}{\text{Q (l/mm)}} = 7{,}2$$

平均油温 (°C) =

$$\frac{t_{出油} + \Delta t + t_{出油}}{2} = 49°\,C$$

2. 68 号液压油参数:
49°C 粘度 = 38 cSt
3. 从粘度修正数据表 „A“:
38 cSt = 1,11

AW eff. =

$$\frac{\text{AW (kW)} \times 25 \times \text{粘度(cSt)图表A}}{t_{出油}\,(°C) - t_{进水}\,(°C)}$$

$$= \frac{17 \times 25 \times 1{,}11}{20} = 23{,}6\ \text{kW}$$

从油/水 2:1 性能图根据 80 升/分钟和 23.6 kW,
查得:
冷却器 No. 31 = UKTM-718-T

EXAMPLE CALCULATION UKTM

For deviating oil outlet temperatures, water inlet temperatures and viscosities, the calculation has to be made as follows:

WHERE:

Heat to be dissipated (AW)	= 17 kW
Oil flow (V)	= 80 l/mn.
Oil outlet temp. (t oil out)	= 45°C
Water inlet temp. (t water in)	= 25°C
Oil type	= ISO 68
Effective heat to be dissipated	= kW eff.

1. The viscosity correction factor is calculated as follows:
Temperature difference ΔT (°C) =

$$\frac{\text{AW (kW)} \times 34{,}1}{\text{Q (l/mm)}} = 7{,}2$$

Average oil temp. therefore (°C) =

$$\frac{t_{oil\ out} + \Delta t + t_{oil\ out}}{2} = 49°\,C$$

2. From oil manufacturer's data for ISO 68:
Viscosity at 49°C = 38 cSt
3. From viscosity correction table „A“:
38 cSt = 1,11

AW eff. =

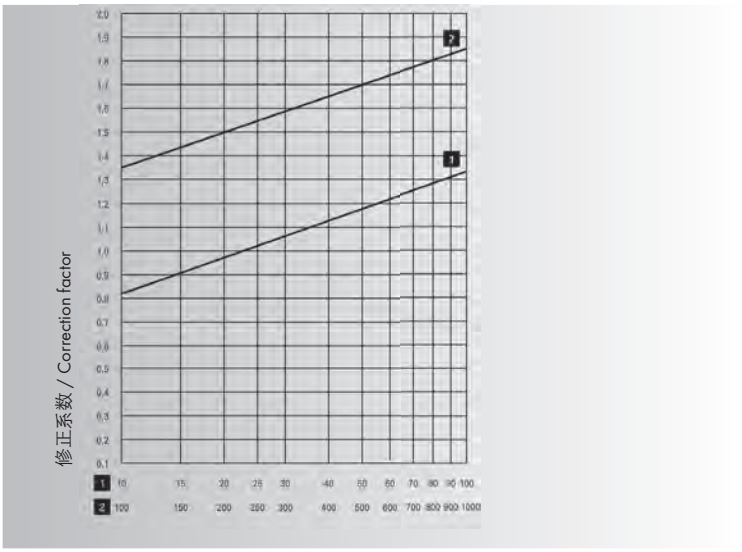
$$\frac{\text{AW (kW)} \times 25 \times \text{viscosity (cST) Tab. A}}{t_{oil\ out}\,(°C) - t_{water\ in}\,(°C)}$$

$$= \frac{17 \times 25 \times 1{,}11}{20} = 23{,}6\ \text{kW}$$

From oil/water 2:1 performance diagram at an oil flow of 80 l/min and 23.6 kW, the outcome is:
Cooler no. 31 = UKTM-718-T

选择冷却器

CHOICE OF COOLER

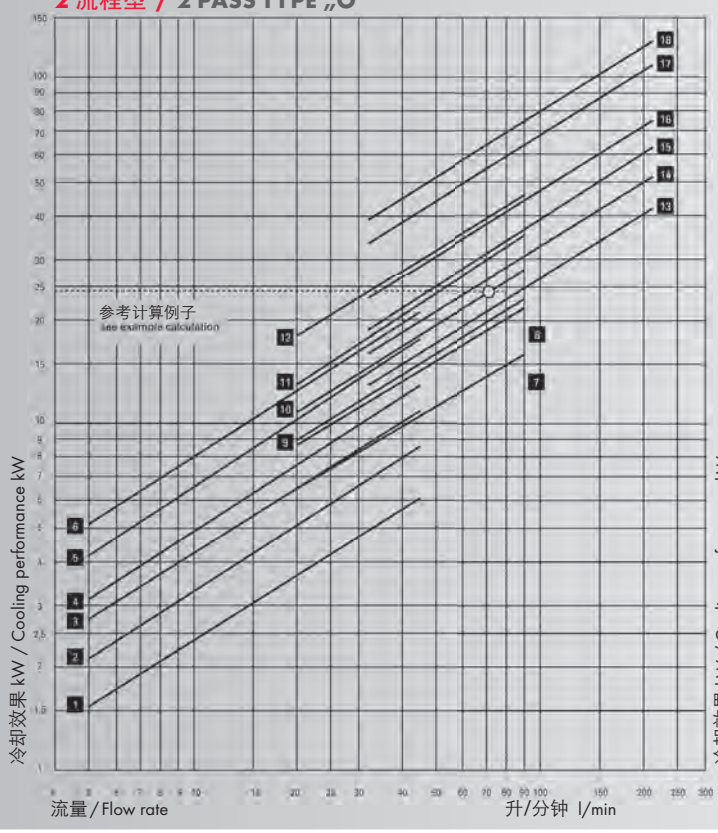


所示性能参数基于水入口温度为 25°C 和油出口温度为 50°C 。及油粘度 20.6 cSt 。不同粘度,修正系数 "A" 可由下图曲线读出。

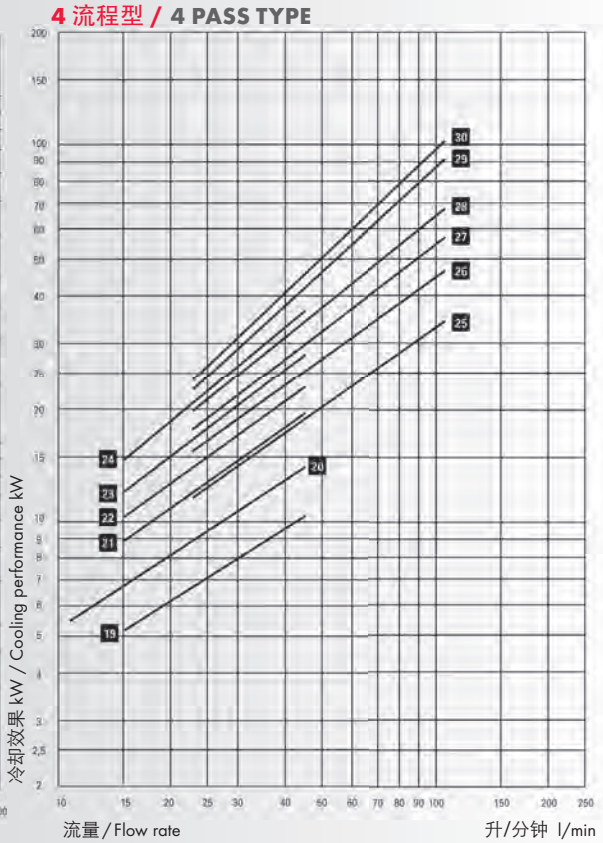
The performance data shown is based on a water inlet temperature of 25°C and an oil outlet temperature of 50°C, together with an oil viscosity of 20.6 cSt. For different viscosities, the correction factor „A“ can be read off from the performance curve below.

UKTM 系列性能参数 PERFORMANCE DATA UKTM

2 流程型 / 2 PASS TYPE „O“



4 流程型 / 4 PASS TYPE



图表中的性能曲线图受限于流量范围。
范围以外的请咨询厂家。

1	UKTM-508-T	10	UKTM-718-T
2	UKTM-512-T	11	UKTM-724-T
3	UKTM-514-T	12	UKTM-736-T
4	UKTM-518-T	13	UKTM-1012-T
5	UKTM-524-T	14	UKTM-1014-T
6	UKTM-536-T	15	UKTM-1018-T
7	UKTM-708-T	16	UKTM-1024-T
8	UKTM-712-T	17	UKTM-1036-T
9	UKTM-714-T	18	UKTM-1048-T

The performance data shown in the diagram are limited by the flow rate and may be exceeded after consultation with the manufacturer.

19	UKTM-708-F	25	UKTM-1012-F
20	UKTM-712-F	26	UKTM-1014-F
21	UKTM-714-F	27	UKTM-1018-F
22	UKTM-718-F	28	UKTM-1024-F
23	UKTM-724-F	29	UKTM-1036-F
24	UKTM-736-F	30	UKTM-1048-F

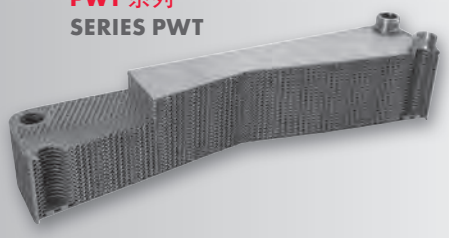
订货号 ORDERING CODE

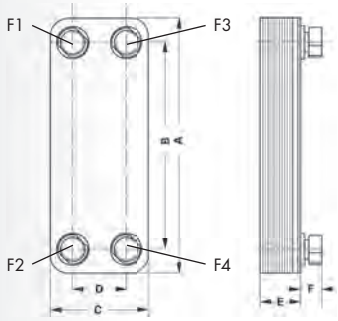
UKTM - 1014 - 2 - T - R - CN - W - SW - 01 - S

- **UKTM** — 接口类型 Connection type: NPT = -; SAE = **S**; BSPP = **M**; SAE 法兰/ SAE flange = **FM**
- **1014** — 规格大小 / Unit size
- **2** — 导热片设置 / Guide segment setting
- **T** — 冷却水接口系统 / Cooling water connection system: 2 流程/ 2-pass / 2-vores = **T**; 4 流程,不含 500 系列 / 4-pass, without series 500 / = **F**
- **R** — 旁路阀 / Bypass valve = **R**
- **CN** — CU = 管路 铜 / Tubes Copper; CN = 管路 铜/镀镍 / Tubes Copper/nickel
- **W** — = 侧板 铜/镀镍 End plates Copper/nickel
- **SW** — = 海水 / Sea water
- **01** — 系列 01/01 Series
- **S** — = 特殊设计 Special design

板式热交换器(工业用途)
PLATE HEAT EXCHANGERS FOR INDUSTRIAL USE

PWT 系列
SERIES PWT





设备接口 / EQUIPMENT CONNECTIONS

F1 = 主管路进口 / Primary on
F2 = 主管路出口 / Primary off
F3 = 副管路出口 / Secondary off
F4 = 副管路进口 / Secondary on

产品介绍

焊板式换热器材料为不锈钢。紧凑经济。油压高达 30 bar, 流量范围 25 至 3,000 升/分钟。工作温度为 -100 至 +195 摄氏度。可选镍焊。安装灵活,采用聚氨酯硬泡材料绝缘。

PRODUCT DESCRIPTION

Soldered plate heat exchanger made of stainless steel. Compact and economical. Oil pressure up to 30 bar and oil flow rate from 25 to 3,000 l / min. Operating temperatures from -100 to +195°C. Also available with nickel soldering. Various installation fittings and isolations of PU hard foam.

技术参数

规格 / SIZE	A	B	C	D	E	F
PWT-10	203	170	73	40	7 + 2,0* n	20
PWT-20	230	182	89	43	7 + 2,3* n	20
PWT-220	325	279	89	43	7 + 2,3* n	20
PWT-240	461	415	89	43	7 + 2,3* n	20
PWT-30	171	120	124	73	7 + 2,3* n	20
PWT-40	332	281	124	73	7 + 2,3* n	20
PWT-50	529	478	124	73	7 + 2,3* n	20
PWT-70L/70M	529	460	269	200	7 + 2,4* n	65
PWT-80	529	421	269	161	7 + 2,4* n	65
PWT-90	798	690	269	161	7 + 2,4* n	65
PWT-100	870	723,3	383	237	22,5 + nx 2,4	65

* PWT-10 至 PWT-90 的尺寸 "E" 由换热板数量和盖板及底座的尺寸组成。

* The dimension „E" for PWT-10 to PWT-90 results from the number of plates and the value of cover plate + base plate.

TECHNICAL DATA

换热板材料 / PLATE MATERIAL	不锈钢 / Stainless steel
焊料 / SOLDER	铜 / Copper
最大工作压力 / MAX. OPERATING PRESSURE	30 bar (镀镍 / Nickel 16 bar)
最大工作压力/ MAX. OPERATING TEMPERATURE	- 100°C – +195°C

技术参数 ACCESSORIES

- 各种螺纹接头
- 聚氨酯硬泡绝缘材料
- 紧凑型隔层
- 支架: - PTW-30规格以上,落地式或悬挂式
  - 根据图纸焊接螺栓
- Various screw connections
- Insulation made of PU hard foam
- Diffusion-tight insulation
- Brackets: - Floor-wall consoles from PWT-30
  - Threaded bolts welded on as per drawing

订货号 ORDERING CODE

结构尺寸 CONSTRUCTION SIZE	换热板数量 NO. OF PLATES	内螺纹 INTERNAL THREAD GI	键宽 KEY WIDTH SW	外螺纹 EXTERNAL THREAD GA	法兰 DN FLANGE DN
PWT-10	10, 14, 20, 24, 30	G 1/2"	-,	G 1/2", G 3/4"	
PWT-20	10, 14, 20, 24, 30, 40, 50	G 1/2", G 3/4"	-, SW 30	G 1/2", G 3/4", G 1"	
PWT-220	10, 14, 20, 24, 30	G 1/2", G 3/4"	-, SW 30	G 1/2", G 3/4", G 1"	
PWT-240					
PWT-30	10, 14, 20, 24, 30, 40, 50	G 1/2", G 1"	-, SW 36	G 3/4", G 1", G1 1/4"	
PWT-40	10, 14, 20, 24, 30, 34, 40, 44, 50, 60, 70, 80, 90,100	G 1/2", G 1"	-, SW 36	G 3/4", G 1", G1 1/4"	
PWT-50					
PWT-70L/70M	10, 14, 20, 24, 30, 34, 40, 44, 50, 60, 70, 80, 90,100, 110, 120, 130, 140, 150	G 1/2", G 1 1/2"	-, SW 55	G 1 1/2", G 2"	DN 40, DN 50
PWT-80	20, 24, 30, 34, 40, 44, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200			G 3"	DN 65*
PWT-90				G 2 1/2", G 3"	DN 65*
PWT-100				G 2 1/2", G 3"	DN 100*

其它接口规格。
Other connection sizes on request.

*紧凑型 / Compact

油/气换热器(工业用途)
OIL / AIR HEAT EXCHANGERS FOR INDUSTRIAL USE

LKI 系列
SERIES LKI

产品介绍

新一代 LKI 系列油冷却器,噪音水平大为降低。该系列冷却器适用于固定安装-用于液压油或润滑油的冷却。该系列壳体特别设计,噪音低,适用于低速通风设备.该系列小规格有单流程和双流程版本,通用性更强,覆盖低流量和高流量范围。

PRODUCT DESCRIPTION

With this new generation of LKI oil coolers, the noise level has been successfully reduced. These coolers are ideally suited for stationary installations – for the cooling of hydraulic or lubricating oils. The range has been extended to include slow-running ventilators and the housings have been optimised in order to archieve the very low noise level. In order to make the cooler range as comprehensive as possible, the smaller models are also available as single or dual versions, thus covering oilcooling requirements for both low and high oil flow rates.

产品特性

- 测试压力: 静态 25 bar, 符合 DIN 50104 规范
- 工作压力: 16 bar
  (2 Hz 和 60°C, 0-16 bar 最少 2 百万次循环)
- 紧凑型油冷却器
- 高换热效率
- 低压损
- 最高工作温度: 120°C
- 高灵活性
- LKI 700 系列以上采用 SAE 2" 接口
- 适用于:液压油, HFA, HFB, HFC, HFD, 粘度高达 v = 100 mm^2/s, 水/乙二醇 最低 65:35 –水无抗腐蚀保护。
- 冷却媒介:空气
- 各种电机; 液压马达/12/24 V

PRODUCT FEATURES

- Testing pressure: 25 bar static according to DIN 50104
- Operating pressure: 16 bar
  (min. 2 Mill. Cycles from 0-16 bar at 2 Hz and 60°C)
- Compact oil-cooler
- High cooling performance
- Low pressure loss
- Max. operating temperature: 120°C
- High flexibility
- 2" SAE flange from LKI 700 upward
- Cooling of: Oil, HFA, HFB, HFC, HFD fluids up to v = 100 x 10^{-6} m^2/s, water/glycol min. 65:35 – under no circumstances water without corrosion prevention
- Coolant: air
- Variable motor; Hydro /12/24 V

材料 MATERIALS

	标准 / STANDARD	海水 /SEA WATER
冷却阀块 / COOLING BLOCK	铝 /Aluminium, RAL 9006	两材料涂装 /2-component paint
外壳 / HOUSING	钢/Steel, RAL 5009	电镀/Electroplated
风扇 / FAN	PPG (聚丙二醇)	
安全防护栅 / SAFETY BARRIER	钢,镀铬,蓝色/Steel with blue-chrome finish	
脚架 / FEET	电镀/Galvanized	

举例1: (假设已知所需冷却功率)
冷却功率 = 65 kW
最高油温 = 70°C
环境温度 = 30°C
油液流量 = 250 l/min
所需冷却效果:

$$\frac{Q}{T_{öl} - T_{umg}} \quad \frac{65}{70 - 30}$$

= 1,63 kW/°C

可选:
LKI-710-400-6 或 LKI 810-400-8.
选型也考虑噪音因素。

举例2:
(假设所需冷却功率未知)
通常,电机应用功率(柴油机或电动机) 的 25-30% 会转化成热,升高油温。
电机功率 = 30 kW
冷却功率:
(0,3 x 30 kW) = 9,0 kW
最高油温 = 70°C
环境温度 = 30°C
油液流量 = 250 l/min
所需冷却效果:

$$\frac{Q}{T_{öl} - T_{umg}} \quad \frac{9}{60 - 30}$$

= 0,3 kW / °C

可选:
LKI-210-400-2 或 LKI 310-400-6.
选型也考虑噪音因素。

油温冷却效果:

$$\Delta t\ Öl = \frac{36 \times Q}{V_{öl}} = \frac{36 \times 9}{35}$$

= 9,26 °C

Q = 冷却功率 [kW]
$T_{Öl}$ = 最高油温 [°C]
T_{umg} = 环境温度 [°C]
$V_{Öl}$ = 油液流量 [l/min]

Example 1: (If required cooling performance is known)
Cooling performance = 65 kW
Max. oil temperature = 70°C
Ambient temperature = 30°C
Oil flow rate = 250 l/min
Special cooling performance:

$$\frac{Q}{T_{öl} - T_{umg}} \quad \frac{65}{70 - 30}$$

= 1,63 kW/°C

Options:
LKI-710-400-6 or LKI 810-400-8. The selection depends on any possible noise restrictions.

Example 2:
(If the required cooling performance is not known).
Normally, there is a heat transfer to the oil of 25-30% of the motor performance (diesel motor or electric motor)
Motor performance = 30 kW
Cooling performance
(0,3 x 30 kW) = 9,0 kW
Max. oil temperature = 70°C
Ambient temperature = 30°C
Oil flow rate = 250 l/min
Special cooling performance:

$$\frac{Q}{T_{öl} - T_{umg}} \quad \frac{9}{60 - 30}$$

= 0,3 kW / °C

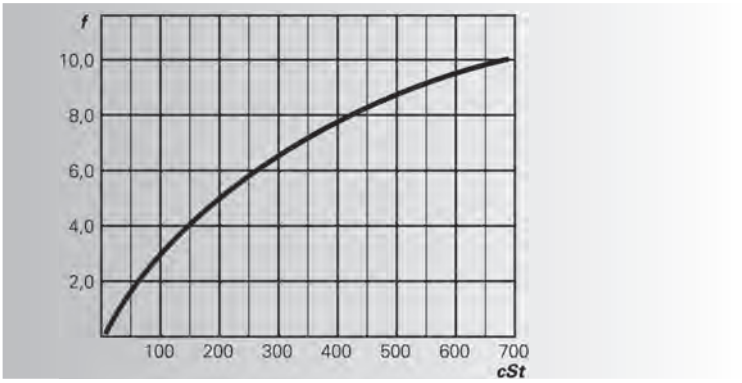
Options:
LKI-210-400-2 or LKI 310-400-6. The selection depends on any possible noise restrictions.

Oil cooling:

$$\Delta t\ Öl = \frac{36 \times Q}{V_{öl}} = \frac{36 \times 9}{35}$$

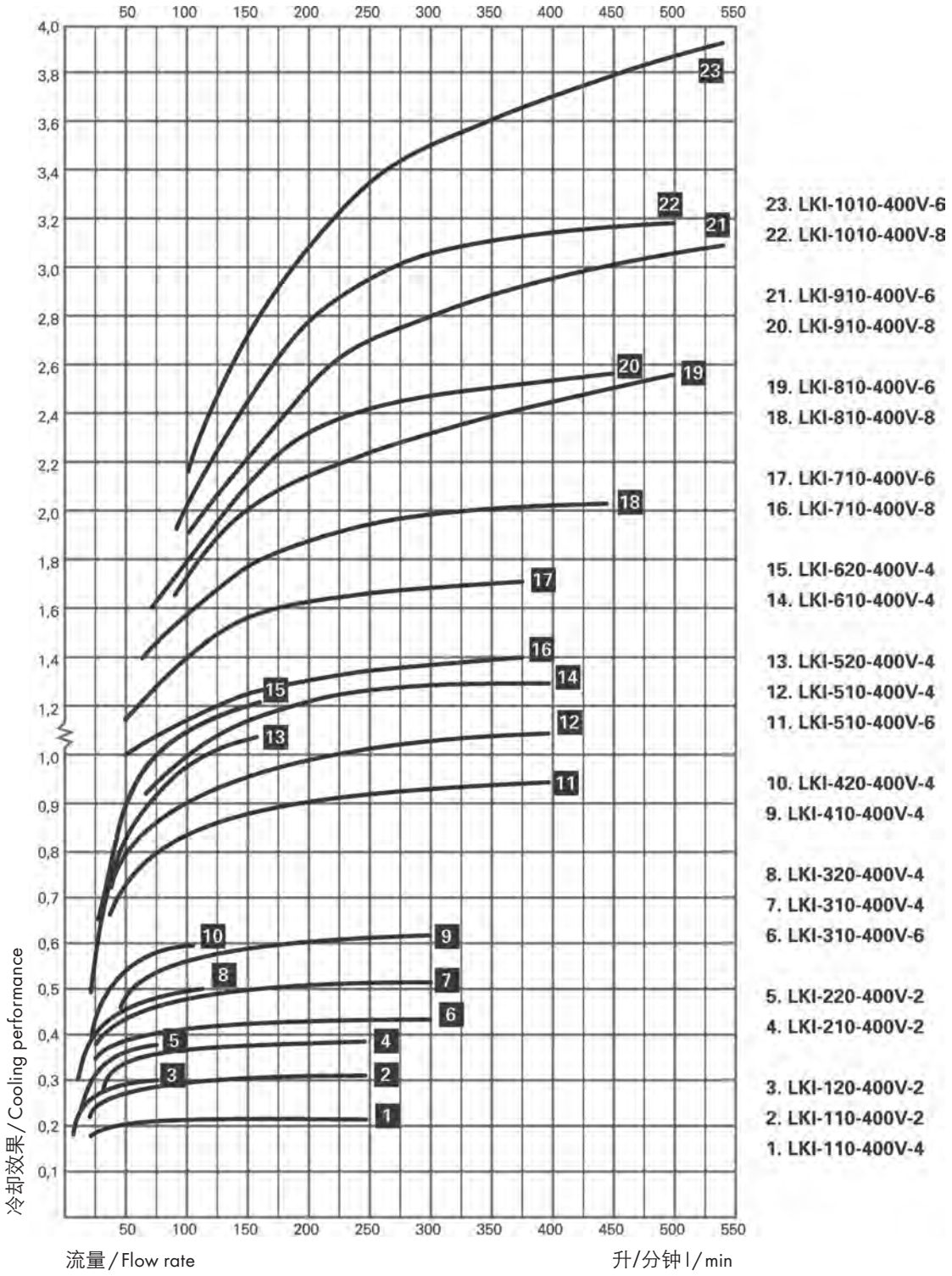
= 9,26 °C

Q = Cooling performance [kW]
$T_{Öl}$ = max. oil temperature [°C]
T_{umg} = Ambient temperature [°C]
$V_{Öl}$ = Oil flow rate [l/min]



不同粘度压损修正系数
CORRECTION FACTOR FOR THE PRESSURE LOSS FOR OTHER VISCOSITIES

$$\Delta p_{öl} = \Delta p\ 30_{cSt} \times f$$

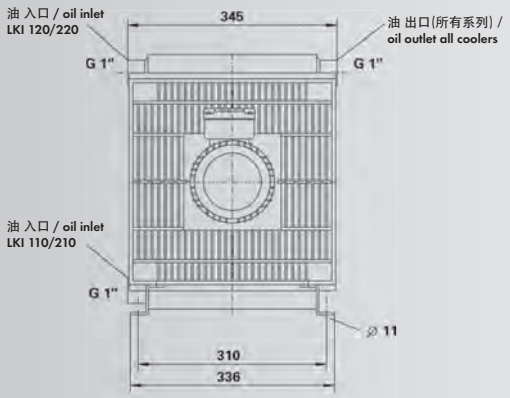


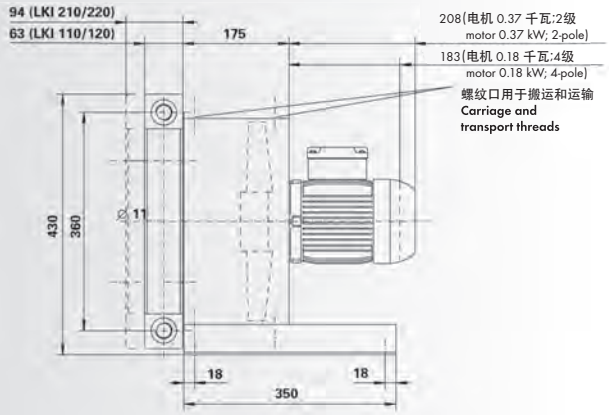
图表中冷却效果计算基于油温 60°C, 环境温度 20°C, 温差为 40°C。图表适用于 32 号液压油,粘度为 30。其它粘度, Δp 需要乘以修正系数,请参考第17页。

The calculation of the specific cooling performance is based on an oil temperature of 60°C, an ambient temperature of 20°C – thus a temperature difference of 40°C. The figures apply to ISO VG32 hydraulic oil with 30 cSt. For variances, Δp is multiplied by the correction factor f from the diagram on page 17.

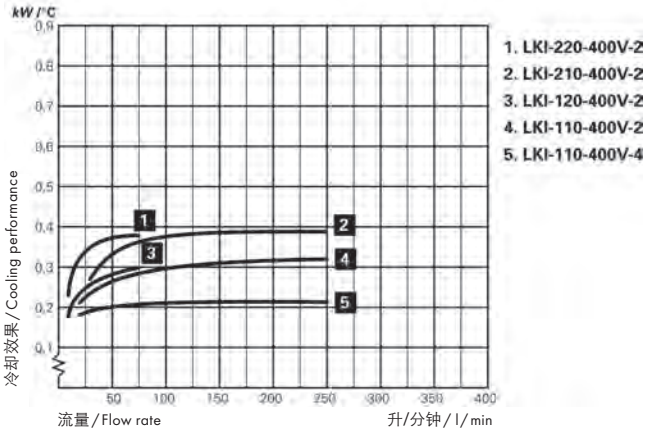
尺寸图/ DIMENSIONS

侧面内螺纹油接口
Lateral internal thread oil connections

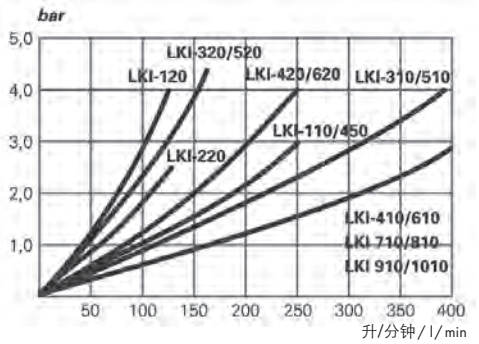




冷却效果 COOLING PERFORMANCE



压损 PRESSURE LOSS



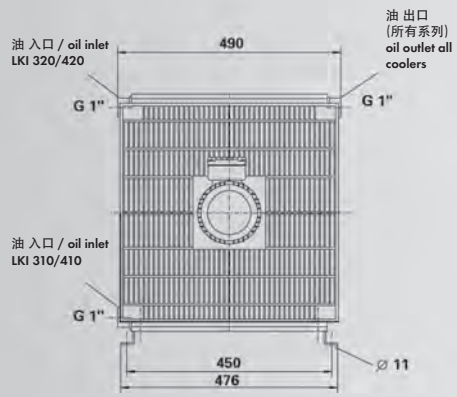
技术参数 TECHNICAL DATA

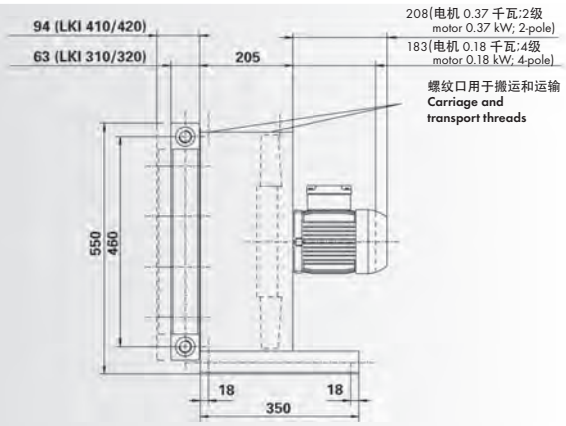
规格/SIZE	电机功率/ MOTOR PERFORMANCE 千瓦 / kW	电流消耗/ POWER CONSUMPTION 安培 A	转速/ REVOLUTIONS 转/分钟 / min⁻¹	空气流速/ AIR FLOW RATE 立方米/秒 / m³/s	噪音等级* / NOISE LEVEL* 1 米 / 7 米 / 1 m / 7 m (dBA)	重量/WEIGHT 公斤/kg
LKI-110-400 V-2	0,37	0,88	3000	1,29	77/62	17
LKI-120-400 V-2	0,37	0,88	3000	1,29	77/62	17
LKI-110-400 V-4	0,18	0,58	1500	0,49	64/50	17
LKI-120-400 V-4	0,18	0,58	1500	0,49	64/50	17
LKI-210-400 V-2	0,37	0,88	3000	1,18	79/64	20
LKI-220-400 V-2	0,37	0,88	3000	1,18	79/64	20
LKI-210-400 V-4	0,18	0,58	1500	0,50	64/50	20
LKI-220-400 V-4	0,18	0,58	1500	0,50	64/50	20

* 可能偏差 ±3 dB(A);由室内环境,交流电频率,油口接头和粘度等决定。
* May vary by ±3 dB(A) due to room characteristics, own frequencies, oil connections, viscosities etc.

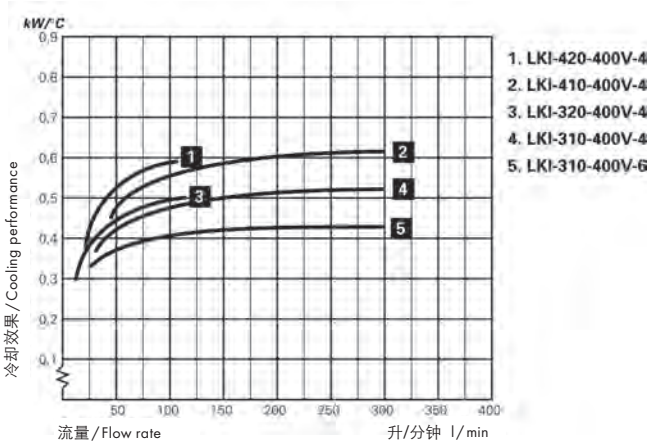
尺寸图/ DIMENSIONS

LKI 100 - 600:
侧面内螺纹油接口
Lateral internal thread oil connections

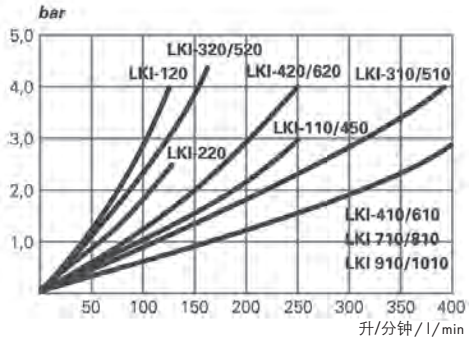




冷却效果 COOLING PERFORMANCE



压损 PRESSURE LOSS



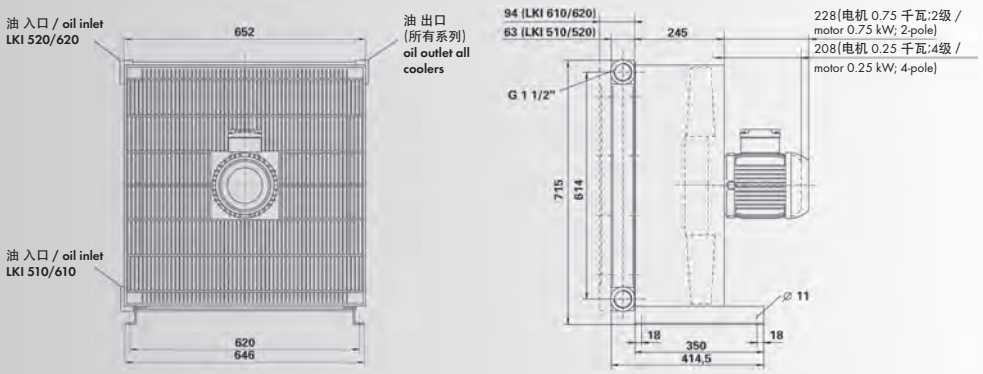
技术参数 TECHNICAL DATA

规格/ SIZE	电机功率/ MOTOR PERFORMANCE 千瓦 / kW	电流消耗/ POWER CONSUMPTION 安培 / A	转速/ REVOLUTIONS 转/分钟 / min⁻¹	空气流速/ AIR FLOW RATE 立方米/秒 / m³/s	噪音等级*/ NOISE LEVEL* 1 米 / 7 米 / 1 m / 7 m (dBA)	重量/ WEIGHT 公斤/kg
LKI-310-400 V-4	0,37	0,89	1500	0,74	73/58	25
LKI-320-400 V-4	0,37	0,89	1500	0,74	73/58	25
LKI-310-400 V-6	0,12	0,48	1000	0,59	65/51	26
LKI-320-400 V-6	0,12	0,48	1000	0,59	65/51	26
LKI-410-400 V-4	0,37	0,48	1500	0,76	75/63	32
LKI-420-400 V-4	0,37	0,48	1500	0,76	75/63	32
LKI-410-400 V-6	0,12	0,48	1000	0,55	67/53	33
LKI-420-400 V-6	0,12	0,48	1000	0,55	67/53	33

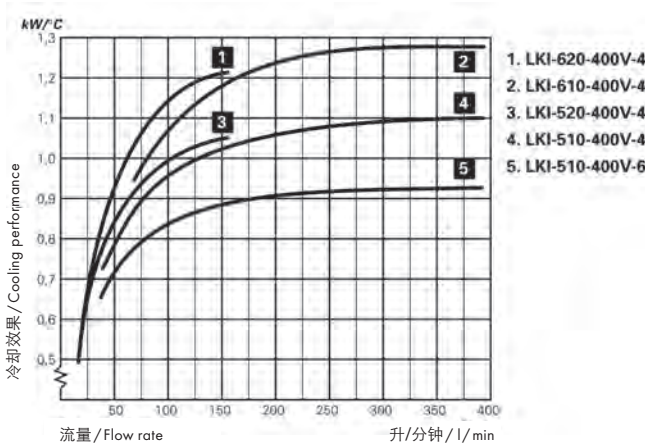
* 可能偏差 ±3 dB(A);由室内环境,交流电频率,油口接头和粘度等决定。
* May vary by ±3 dB(A) due to room characteristics, own frequencies, oil connections, viscosities etc.

尺寸图/ DIMENSIONS

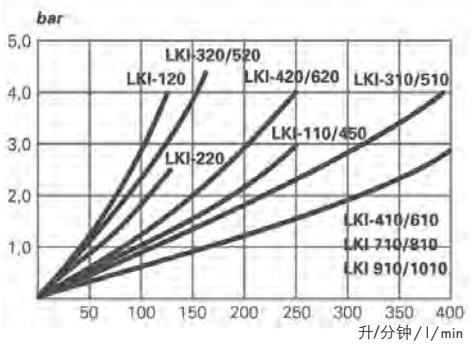
LKI 100 - 600:
侧面内螺纹油接口
Lateral internal thread oil connections



冷却效果 COOLING PERFORMANCE



压损 PRESSURE LOSS



技术参数 TECHNICAL DATA

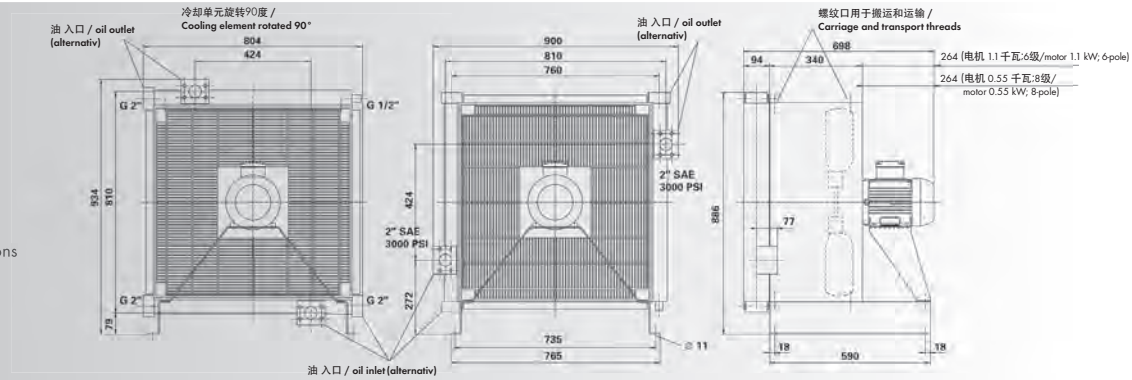
规格/ SIZE	电机功率/ MOTOR PERFORMANCE 千瓦 / kW	电流消耗/ POWER CONSUMPTION 安培 A	转速/ REVOLUTIONS 转/分钟 / min⁻¹	空气流速/ AIR FLOW RATE 立方米/秒 / m³/s	噪音等级* / NOISE LEVEL* 1 米 / 7 米 / 1 m / 7 m (dBA)	重量/ WEIGHT 公斤/kg
LKI-510-400 V-4	0,75	1,71	1500	1,70	80/70	40
LKI-520-400 V-4	0,75	1,71	1500	1,70	80/70	40
LKI-510-400 V-6	0,25	0,99	1000	1,06	70/57	37
LKI-520-400 V-6	0,25	0,99	1000	1,06	70/57	37
LKI-610-400 V-4	0,75	1,71	1500	1,50	80/70	49
LKI-620-400 V-4	0,75	1,71	1500	1,50	80/70	49
LKI-610-400 V-6	0,25	0,99	1000	0,95	70/57	49
LKI-620-400 V-6	0,25	0,99	1000	0,95	70/57	49

* 可能偏差 ±3 dB(A);由室内环境,交流电频率,油口接头和粘度等决定。
* May vary by ±3 dB(A) due to room characteristics, own frequencies, oil connections, viscosities etc.

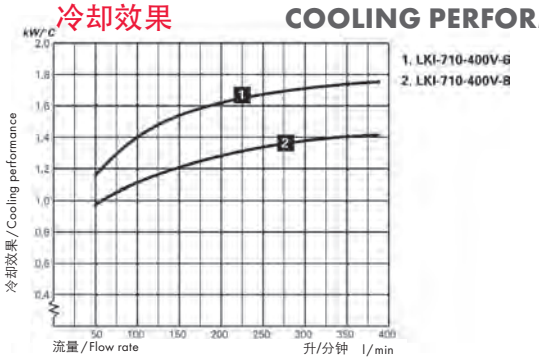
LKI-700系列 LKI-700

尺寸图/ DIMENSIONS

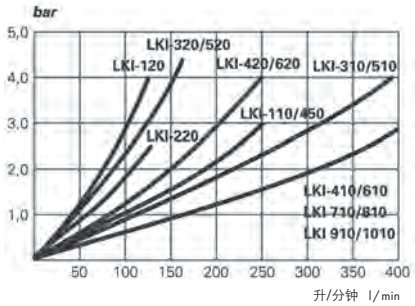
LKI 700 - 1000:
侧面内螺纹油接口,
正面或背面SAE法兰
Lateral internal thread oil connections and SAE flange at front or rear



冷却效果 COOLING PERFORMANCE



压损 PRESSURE LOSS



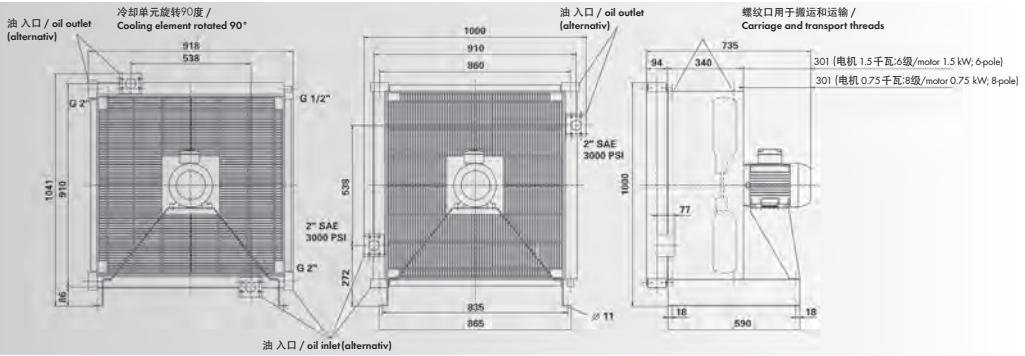
技术参数 TECHNICAL DATA

规格/ SIZE	电机功率/ MOTOR PERFORMANCE 千瓦 / kW	电流消耗/ POWER CONSUMPTION 安培 A	转速/ REVOLUTIONS 转/分钟 / min⁻¹	空气流速/ AIR FLOW RATE 立方米/秒 / m³/s	噪音等级*/ NOISE LEVEL* 1 米 / 7 米 / 1 m / 7 m (dBA)	重量/ WEIGHT 公斤/kg
LKI-710-400 V-6	1,1	2,56	1000	2,14	77/64	91
LKI-710-400 V-8	0,55	2,56	750	1,56	69/56	91

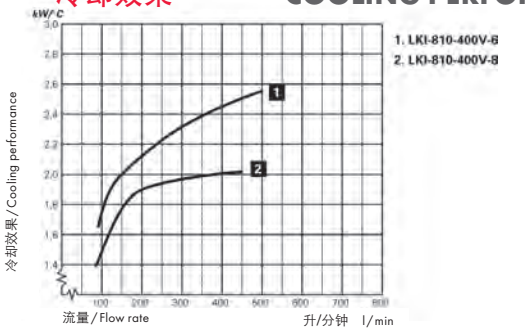
LKI-800 LKI-800

尺寸图/ DIMENSIONS

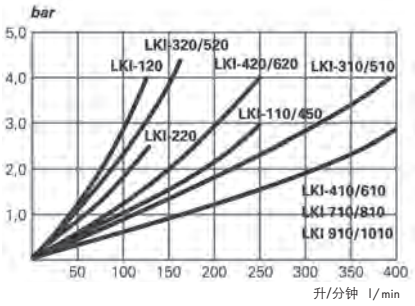
LKI 700 - 1000:
侧面内螺纹油接口,
正面或背面SAE法兰
Lateral internal thread oil connections and SAE flange at front or rear



冷却效果 COOLING PERFORMANCE



压损 PRESSURE LOSS



技术参数 TECHNICAL DATA

规格/ SIZE	电机功率/ MOTOR PERFORMANCE 千瓦 / kW	电流消耗/ POWER CONSUMPTION 安培 A	转速/ REVOLUTIONS 转/分钟 / min⁻¹	空气流速/ AIR FLOW RATE 立方米/秒 / m³/s	噪音等级*/ NOISE LEVEL* 1 米 / 7 米 / 1 m / 7 m (dBA)	重量/ WEIGHT 公斤/kg
LKI-810-400 V-6	1,5	3,78	1000	3,38	79/68	111
LKI-810-400 V-8	0,75	2,42	750	2,64	72/60	111

* 可能偏差 ±3 dB(A);由室内环境,交流电频率,油口接头和粘度等决定。
* May vary by ±3 dB(A) due to room characteristics, own frequencies, oil connections, viscosities etc.

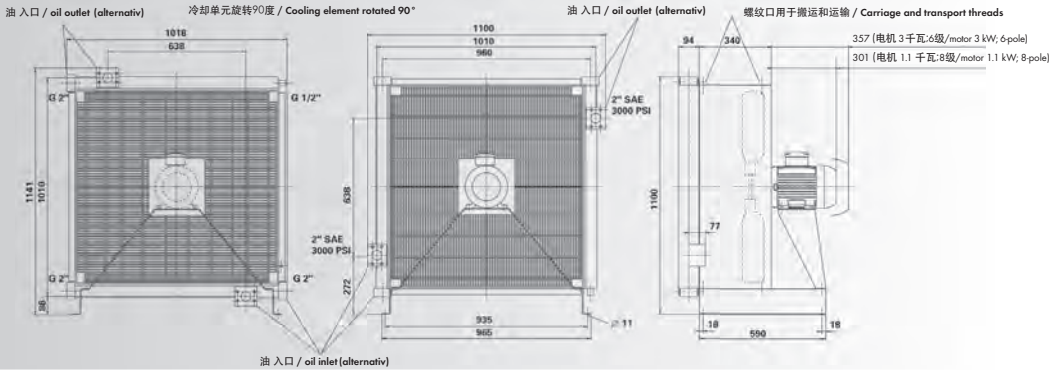
LKI-900 尺寸图

LKI-900

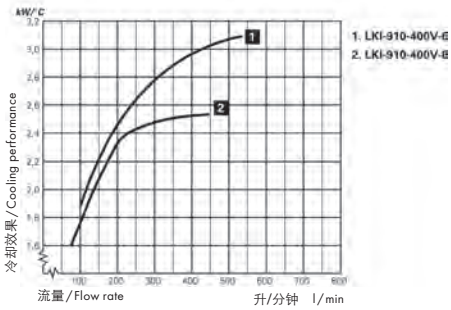
尺寸图 / DIMENSIONS

LKI 700 - 1000:
侧面内螺纹油接口，
正面或背面SAE法兰

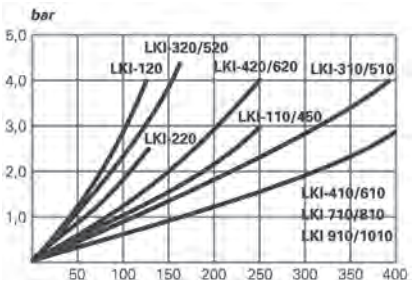
Lateral internal thread oil connections
and SAE flange at front or rear



冷却效果 COOLING PERFORMANCE



压损 PRESSURE LOSS



技术参数 TECHNICAL DATA

规格 / SIZE	电机功率 / MOTOR PERFORMANCE 千瓦 / kW	电流消耗 / POWER CONSUMPTION 安培 A	转速 / REVOLUTIONS 转/分钟 / min⁻¹	空气流速 / AIR FLOW RATE 立方米/秒 / m³/s	噪音等级* / NOISE LEVEL* 1 米 / 7 米 / 1 m / 7 m (dBA)	重量 / WEIGHT 公斤/kg
LKI-910-400 V-6	3	6,28	1000	4,32	85/72	137
LKI-910-400 V-8	1,1	3,78	750	3,07	76/64	131

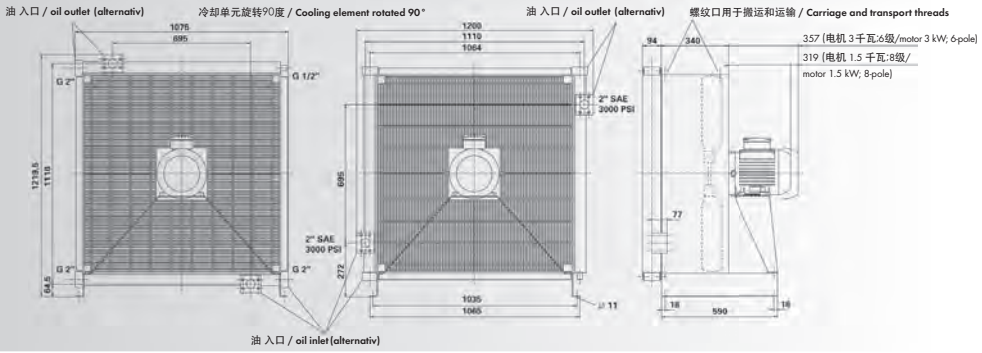
LKI-1000

LKI-1000

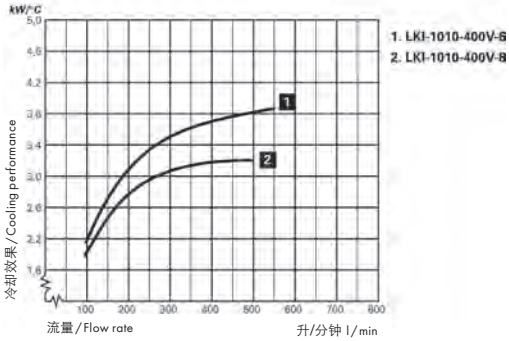
尺寸图 / DIMENSIONS

LKI 700 - 1000:
侧面内螺纹油接口，
正面或背面SAE法兰

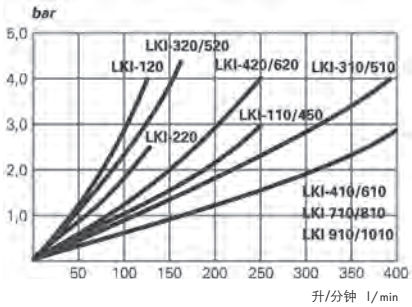
Lateral internal thread oil connections
and SAE flange at front or rear



冷却效果 COOLING PERFORMANCE



压损 PRESSURE LOSS

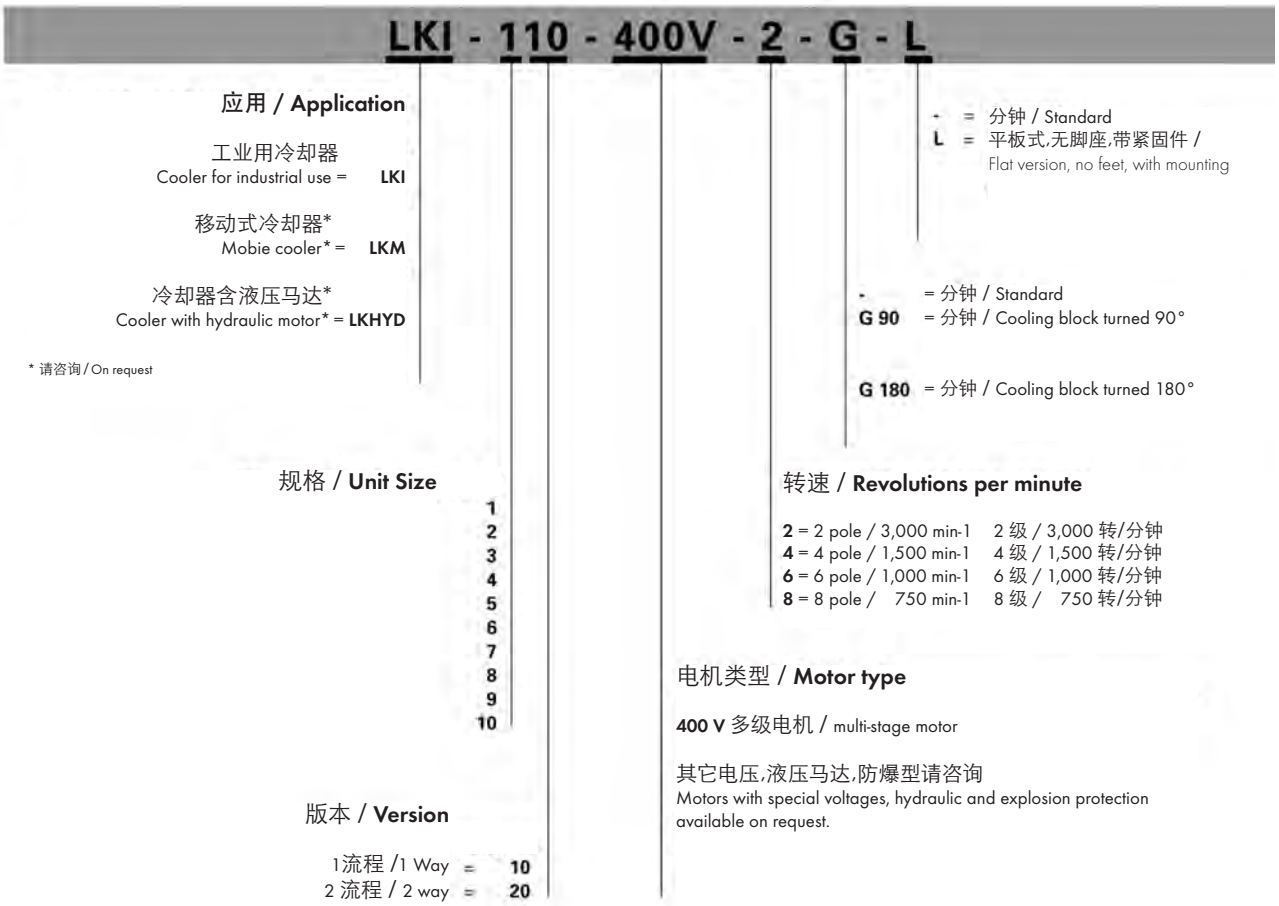


技术参数 TECHNICAL DATA

规格 / SIZE	电机功率 / MOTOR PERFORMANCE 千瓦 / kW	电流消耗 / POWER CONSUMPTION 安培 A	转速 / REVOLUTIONS 转/分钟 / min⁻¹	空气流速 / AIR FLOW RATE 立方米/秒 / m³/s	噪音等级* / NOISE LEVEL* 1 米 / 7 米 / 1 m / 7 m (dBA)	重量 / WEIGHT 公斤/kg
LKI-1010-400 V-6	3	6,28	1000	5,38	84/71	157
LKI-1010-400 V-8	1,5	3,78	750	3,84	76/64	151

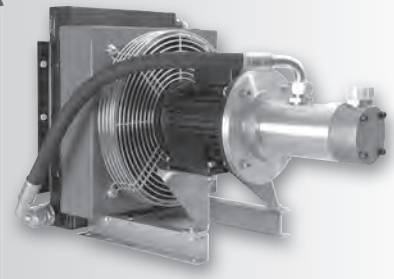
* 可能偏差 ±3 dB(A);由室内环境,交流电频率,油口接头和粘度等决定。

* May vary by ±3 dB(A) due to room characteristics, own frequencies, oil connections, viscosities etc.


LKI - 110 - 400V - 2 - G - L
应用 / Application
工业用冷却器
Cooler for industrial use = LKI
移动式冷却器*
Mobie cooler* = LKM
冷却器含液压马达*
Cooler with hydraulic motor* = LKHYD
* 请咨询 / On request
规格 / Unit Size
1
2
3
4
5
6
7
8
9
10
版本 / Version
1流程 /1 Way = 10
2 流程 / 2 way = 20
电机类型 / Motor type
400 V 多级电机 / multi-stage motor
其它电压,液压马达,防爆型请咨询
Motors with special voltages, hydraulic and explosion protection available on request.
转速 / Revolutions per minute
2 = 2 pole / 3,000 min-1 2 级 / 3,000 转/分钟
4 = 4 pole / 1,500 min-1 4 级 / 1,500 转/分钟
6 = 6 pole / 1,000 min-1 6 级 / 1,000 转/分钟
8 = 8 pole / 750 min-1 8 级 / 750 转/分钟
- = 分钟 / Standard
G 90 = 分钟 / Cooling block turned 90°
G 180 = 分钟 / Cooling block turned 180°
- = 分钟 / Standard
L = 平板式,无脚座,带紧固件 / Flat version, no feet, with mounting

部分流量冷却单元(工业用途)
PARTIAL FLOW COOLING UNIT FOR INDUSTRIAL APPLICATION

TFS/A 系列
SERIES TFS/A



产品介绍

TFS/A 系列为紧凑型部分流量冷却单元。该系列有效提高液压系统的实用性和可靠性。该系列由液压泵和油-气冷却器组合而成，油液动力自主,无需主系统提供动力。因此,可以确保持续冷却。

PRODUCT DESCRIPTION

The TFS/A is a compact partial flow cooling unit. It was developed to improve the availability and reliability of hydraulic systems. Due to its combination of a motor pump unit and an oil air cooler in one device, the TFS/A is an autonomous unit, which can be operated independently of the main system. Thereby, continuous cooling is ensured.

产品特性

- 紧凑设计
- 降低工作噪音
- 维护简易,磨耗件大大减少
- 标配包含多款电机
- 适合各种安装位置
- 选项:低噪音齿轮泵

PRODUCT FEATURES

- Compact design
- Reduced noice operation
- Ease of maintenance since the number of wearing parts has been consequently reduced
- Equipped with multirange motors as standard equipment
- Any mounting position is possible
- Option: Low noise gear pump

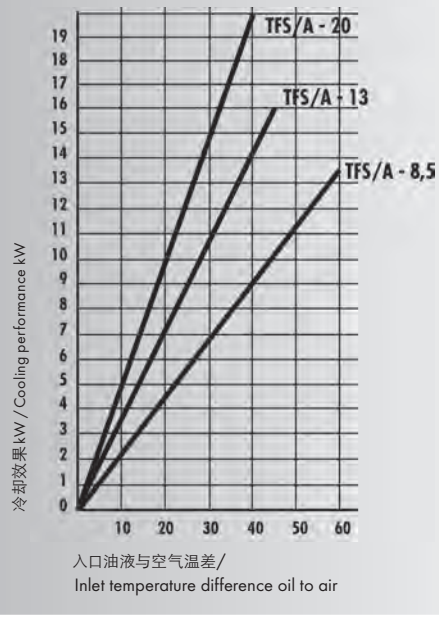
优点

- 延长液压部件工作寿命
- 加强可靠性
- 提高定位精度
- 极容易在现有系统上使用

ADVANTAGES

- Extension of the service life of the hydraulic components
- Enhancement of the application reliability
- Improvement of the positioning accuracy
- Unproblematical retrofitting on existing systems is possible

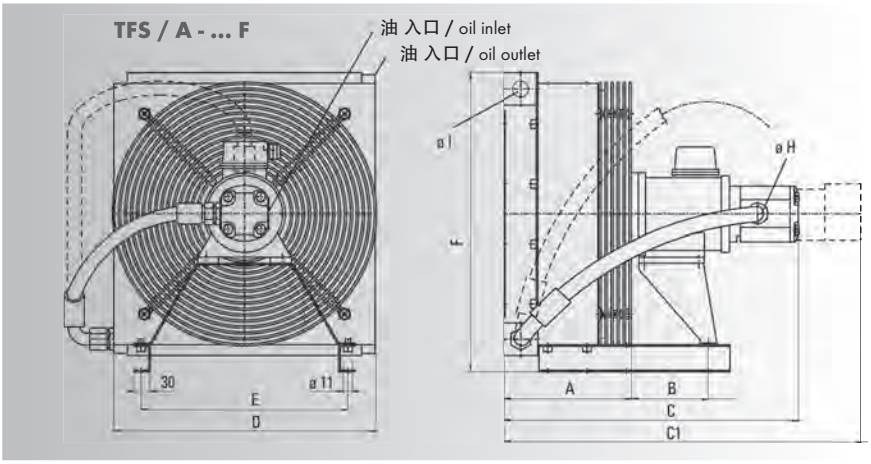
冷却能力图表
COOLING CAPACITY DIAGRAM



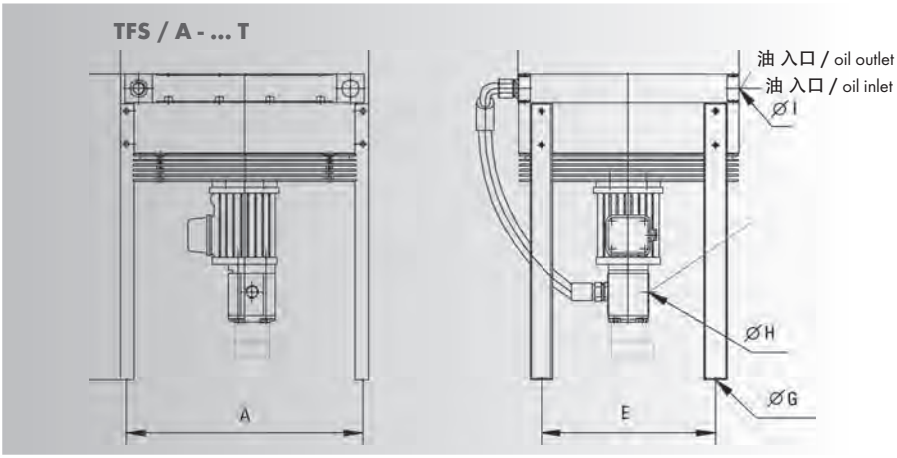
规格 SIZE	ETD (kW Δt 40 °C)	标准 泵 PUMP (升/分钟 L/MIN)
TFS / A - 8,5	8,5	30
TFS / A - 13	13	38
TFS / A - 20	20	50

油-气冷却器 (含输送泵) 冷却能力与油-气温差关系图

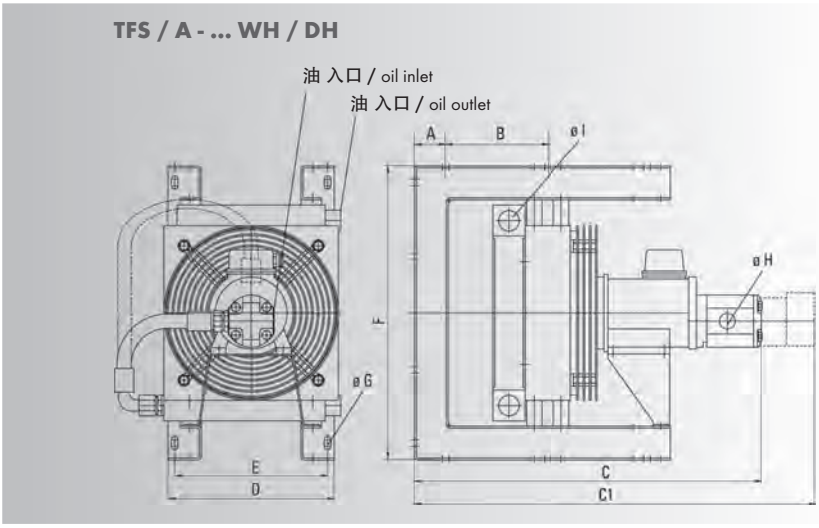
Cooling capacity of the oil-air cooler (with feed pump) as a function of the input temperature difference of oil to air.



毫米 in mm	... -8,5	... -13	... -20
A	204	237	237
B	150	150	150
C	525	552	611
C1	632	660	690
D	342	480	480
E	240	380	380
F	430	547	547
G	11	11	11
H	G1“	G1“	G1“



毫米 in mm	... -8,5	... -13	... -20
W 最小 / min	150	150	150
A	374	514	514
B	420	520	520
D	342	480	480
E	240	380	380
F	627	665	696
G	11	11	11
H	G1“	G1“	G1“



毫米 in mm	... -8,5	... -13	... -20
A	61	70	70
B	200	263	263
C	677	757	816
C1	785	864	923
D	342	480	480
E	298	440	440
F	572	714	714
G	26 x 13	11	11
H	G1“	G1“	G1“

TFS / A 系列订货号　　ORDERING CODE TFS / A

TFS / A - 8,5 - 400 - F - 04 - 19

型号 / **Model**

冷却能力 / **Cooling capacity**

8,5 千瓦 / kW = **8,5**
13 千瓦 / kW = **13**
20 千瓦 / kW = **20**
ETD = 40°C 时

泵规格 / **Device type**

4,5 = 4,5 毫升 / ccm
6,0 = 6,0 毫升 / ccm
8,3 = 8,3 毫升 / ccm
11 = 11 毫升 / ccm
14 = 14 毫升 / ccm
16 = 16 毫升 / ccm
19 = 19 毫升 / ccm - 8,5 千瓦 标准 / kW Standard
27 = 27 毫升 / ccm - 13 千瓦 标准 / kW Standard
36 = 36 毫升 / ccm - 20 千瓦 标准 / kW Standard

系列 / **Series**

04 = 螺杆泵 / Screw pump

电机电压 / **Rated voltage of motor**

多级电机 / Multi range motor **= 400**
230 / 400 V 50 Hz　240 / 420 V 50 Hz
254 / 440 V 60 Hz　280 / 480 V 60 Hz

安装方式 / **Mounting**

F = 标准脚座 / Standard feet
WH/DH = 墙式/吊式 支架/固定螺栓 / Wall/ceiling bracket/fixation mur
T = 面板安装 / Table mounting

技术参数　　TECHNICAL DATA

性能指标	UNIT SIZE		... -8,5	... -13	... -20
电机功率 *	Electrical connected load *	千瓦 / kW	1,1	1,1	1,5
消耗电流 400 V-50 Hz *	Rated current at 400 V/50 Hz *	安培 / A	1,7	2,6	3,6
转速 50 Hz *	Revolutions at 50 Hz *	转/分钟 / U/min	1385	1410	1410
空气流速 *	Air flow *	立方米/小时 / m^3/h	1131	2565	2232
粘度范围	Viscosity range	mm^2/s	10-300		
介质允许温度	Permissible medium operating temperature	°C	100	100	100
介质允许压力 40 mm^2/s	Permissible medium operating pressure at 40 mm^2/s	bar	10	10	5
噪音等级	Sound intensity level	分贝 / dB (A)	64	74	76
最大入口高度	Maximum suction height	米 / m	1	1	1

* 所有参数基于 400V-50Hz.

* All declarations refer to a voltage of 400 V/50 Hz.

HBE 公司保留修改技术指标的权利.
HBE reserves the right to modify technical data at any time.

HBE. hydraulic components

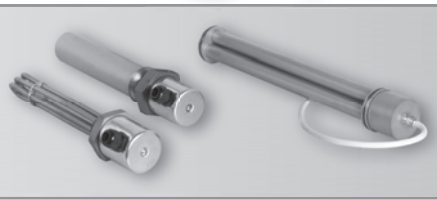
Solutions for Fluid Technology 流体技术解决方案

- 钢质油箱，不锈钢质油箱
- Oil tanks made of steel / stainless steel

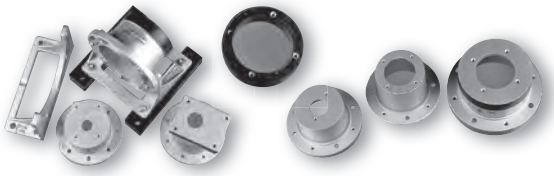
- 铝质油箱
- Oil tanks made of aluminium

- 清洗盖及其他油箱附件
- 液位计和温度计
- Cleaning covers and further accessories
- Level- and temperature indicators

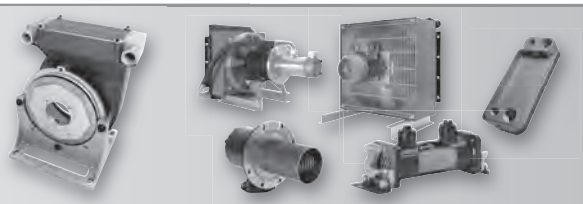
- 油箱加热器
- Tank heaters



- 钟形罩及其附件
- Bellhousings and accessories



- 钟形罩内置油冷器
- 热交换器
- 铜板热交换器
- Bellhousing with oil-cooler
- Heat exchangers
- Brazed plate heat exchanger



- SOFTEX® 弹性联轴器，无齿隙弹性联轴器
- SOFTEX® elastic and no backlash shaft couplings

- STAREX® 曲面齿联轴器，内燃机法兰联轴器
- STAREX® flexible couplings

- 内燃机联轴器
- Diesel Engine Couplings

上海柔肯液压科技有限公司
上海金沙江路1678号6号楼501室

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021-69591845

传真：021-62595096

HBE. hydraulic components

e.holding
FLUID TECHNOLOGY GROUP www.e-holding.de

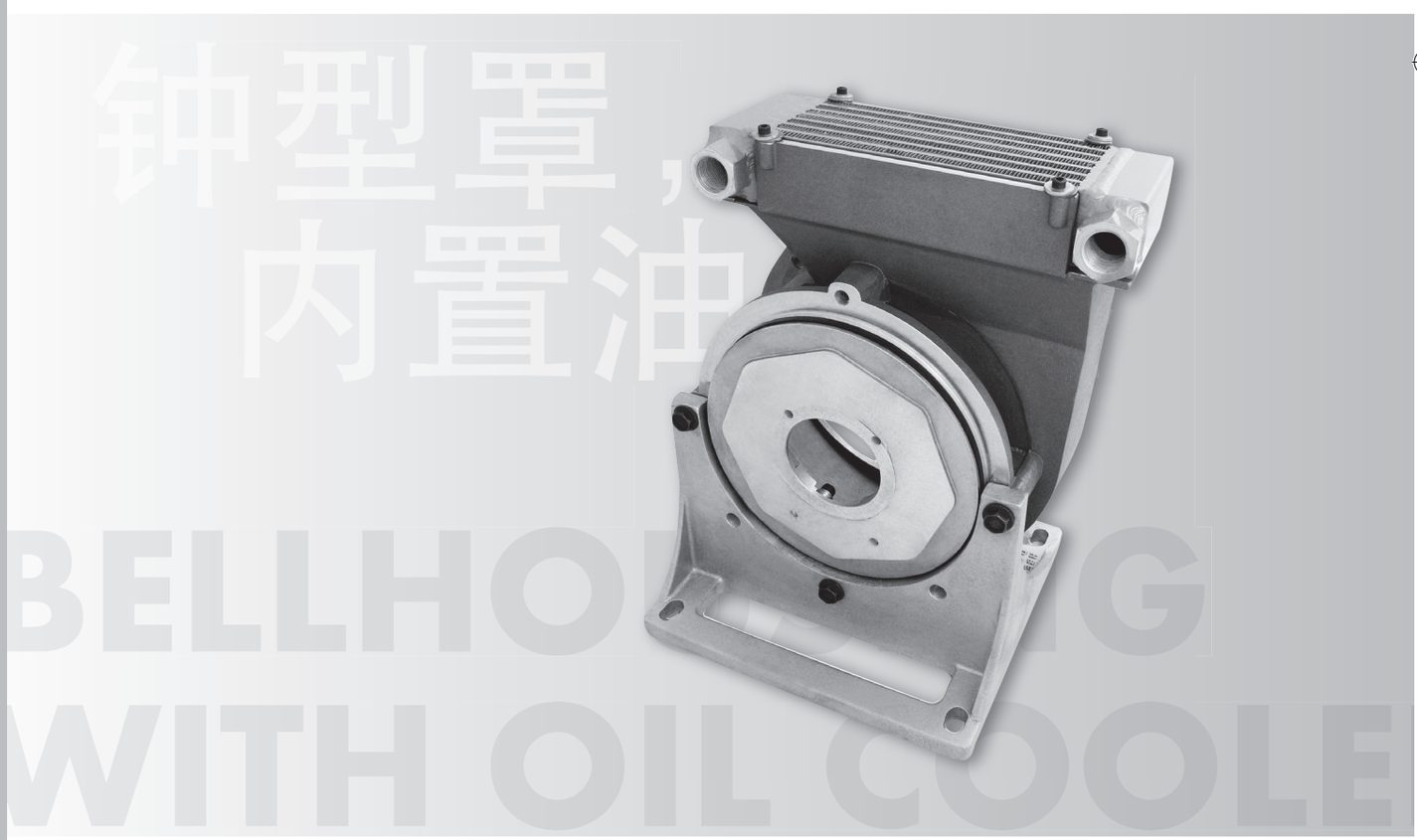
1T06/12 www.plakart.de

液压配件
联轴器
油箱

HBE

Hydraulic Components
Drive Couplings
Oil Tanks

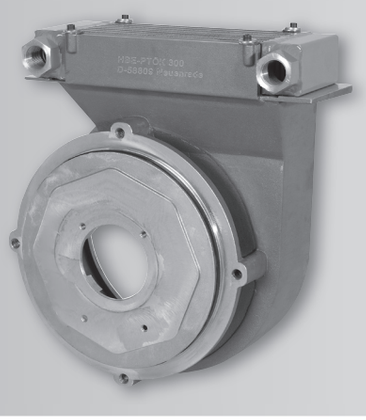
流体技术解决方案 Solutions for Fluid Technology

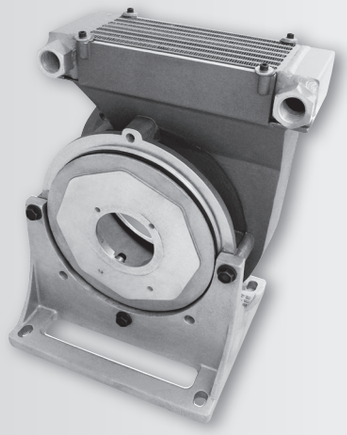


钟型罩，内置油冷器
BELLHOUSING WITH OIL-COOLER

钟型罩，内置油冷器
BELLHOUSING WITH INTEGRATED OIL AIR COOLER

系列 **PTOK**
SERIES PTÖK





产品说明

- 圆形钟罩，内置油冷器，PTOK 系列
- 多个型号，适用于 0.55–22 KW 的电机 (IMB 5/IMB 35/IMV 1)
- 低噪音设计，B型
- 冷却功率 0.95–5.15 KW
- 有4个型号可选 (ø200–ø350)
- 所有钟罩的长度都符合 VDMA 24561 标准
- 由于长度标准相同，所以带内置油冷器的钟罩可以直接替换标准钟罩
- 可以水平安装 (IMB 5/IMB 35) 或者垂直安装 (IMV 1)
- 可适用符合 VDMA 24561 标准的 PTFL 和 PTFS 型脚支架

PRODUCT DESCRIPTION

- Round bell housing with oil air cooler, series PTÖK
- Model series for electrical motors 0.55-22 KW (IMB 5/IMB 35/IMV 1)
- Noise reduced design, form B
- Cooling pipes 0.95 - 5.15 KW
- 4 model series available (ø200-ø350)
- All bell housing lengths comply with VDMA code 24561
- The standard bell housing can be replaced easily with a bell housing with oil cooling at any time due to identical installation lengths
- Can be used horizontally (IMB 5/IMB 35) as well as vertically (IMV 1)
- Foot brackets series PTFL and PTFS mountable acc. to VDMA 24561

技术优势

- 冷却效率高，且噪音低，占用极少的安装空间
- 适用于回油，或者漏油的冷却
- 不需任何电气连接
- 易于维护，安装和移除都非常容易
- 结构坚固，在峰值压力下更安全
- 标准减震结构最大可降低噪音 6db (A)

TECHNICAL ADVANTAGES

- High cooling capacity with low noise output on the smallest installation space
- Suitable as reflux or leak oil cooler
- Requires no electrical installation
- Easy to maintain through simple installation and removal of the cooler element
- Sturdy cooler element for more safety during pressure peaks
- Due to the standard dampening, reduction of noise level up to 6db (A) possible

钟型罩，内置油冷器
BELLHOUSING WITH INTERGRATED OIL AIR COOLER

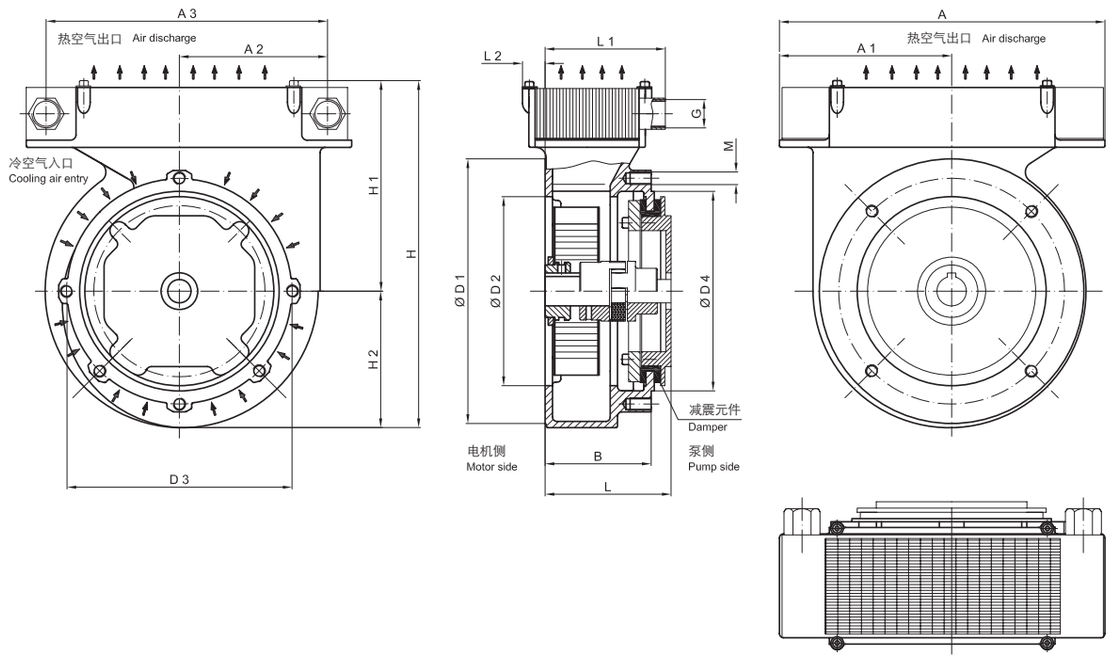
技术参数 TECHNICAL DATA

工作压力 WORKING PRESSURE	负载循环 LOAD CYCLE	最大静态压力 MAX. STATIC PRESSURE
16 bar	1 x 10^6, f = 2 Hz	10 bar

产品型号 / SIZE	冷却功率 COOLING POWER P [kW]Δt = 40 k	标准电机功率 [kW] E-ENGINE POWER [kW] n=1500 ^{1}/min (1)	空气流量 AIR FLOW [m^3/h]	风扇的功率 INPUT POWER [W]	噪音水平(2) NOISE LEVEL(2) [dB(A)]	冷却功率占电机功率比例 CORRELATION COOLING AND E-ENGINE POWER [%]
PTÖK 200	0,95	0,55-1,5	72	20	52	63-100
PTÖK 250	2,1	2,2-4	260	30	58	53-95
PTÖK 300	3,22	5,5-7,5	430	90	69	43-59
PTÖK 350	5,15	11-22	780	140	70	23-46

- 额定转速 (1)1500 rpm。其它转速要求请垂询。
- 噪音 (2)，是电机和带标准减震的油冷钟罩发出的，测试点距离被测物 1 m。具体的噪音值，根据不同电机会有所变化。
- 泵的转向都是顺时针（面对泵的轴端方向）

- Nominal rotation (1) of driven machine 1,500 kW 1/min. In case of different rpm please contact the manufacturer.
- Noise levels (2) of damped version are measured with bellhousing and electric motor. Distance to the tested object 1 m. The stated values of noise level will be various depending on the electric motor
- Direction of pump rotation always clockwise (looking on pump shaft)



钟型罩支架 PTFL 和 PTFS 可选用
相关尺寸请参考另外资料 “钟型罩及其附件”

Foot brackets series PTFL and PTFS used optionally
For dimensions please see catalogue “Pump Housings and Accessories“.

钟罩型号 SIZE	电机规格 FRAME SIZE	电机功率 POWER P [kW]	电机轴 SHAFT DxI	钟罩支架类型 FOOT FLANGES TYPE	尺寸标注 / DIMENSIONS in mm																
					A	A1	A2	A3	B	D1	D2	D3	D4	G	H	H1	H2	L	L1	L2	MW
PTÖK 200	80	0,55	19 x 24	PTFL 200	241	141	122,5	205	70	200	130	165	145	G 1/2	285	180	105	100	88	10,3	M10
		0,75																110			
	90 S + L	1,1	24 x 50															118			
		1,5																124			
																		128			
PTÖK 250	100 L	2,2	28 x 60	PTFL 250 PTFS 250	310	164	144,5	267	102	252	180	215	190	G 3/4	329	199	130	120	101,5	22	M12
		3,0																124			
	112 M	4																128			
																		135			
																		148			
																		175			
PTÖK 300	132 S +M	5,5	38 x 80	PTFL 300 PTFS 300	310	191	168,5	267	126	300	230	265	234	G 3/4	384	234	150	144	128,5	8	M12
		7,5																150			
																		155			
																		168			
																		196			
PTÖK 350	160 M + L	11 15	42 x 110	PTFL 350 PTFS 350	355	230	210,5	316	152	350	250	300	260	G 3/4	426	251	175	188	155	6	M16
																		204			
	180 M + L	18,5 22	48 x 110															228			
																		256			

订货描述示例: 内置油冷器钟型罩 ORDERING CODE: BELLHOUSINGS

PTÖK 350 / 228 / LR 48 / DF

- 钟罩类型 / Bellhousing
- 电机法兰 / motor flange ø
- 钟罩长度 / Length L
- 内部加工代码，泵侧 / Internal boring code, pump side
- 风扇孔径ø (与电机轴对应) / Fan shafts ø (correspond with motor shafts)
- 泵侧带有减震元件/ Inclusive damping to pump side

订货描述示例: 联轴器 ORDERING CODE: COUPLING

24 / 30 22–28

- 联轴器型号 / Size of coupling
- 泵轴径/ ø pump shaft
- 电机轴径/ ø motor shaft

安装说明可从 www.hbe-hydraulics.com下载

Assembly instructions are available for download here: www.hbe-hydraulics.com

冷却效率

在没有外部热源的情况下，泵与电机成套液压传动系统以正常的效率工作时，电机的输出功率中，将有 30%–40% 以热能的形式损失掉。损失的热能中多余的部分，必须通过系统中各个部件散发出去，因此油箱的散热面积就显得很重要。

然而，还是有部分热能留在系统中，可能会使油温过高。为了避免残余热能过多，就需要增加一个冷却器。

在大多数情况下，冷却功率有电机输出功率的 20%–30% 就足够了，同时油箱的散热面积也可以减小。

同时，一个液压系统不配置带冷却器的钟罩是很难想象的。带冷却器的钟罩拆装简单，结构紧凑，可以省掉通风系统，节省了空间，而且大多数情况下，均能满足冷却要求。请看图 1。

从图1中可以得出，温差在 1 K – 40 K 之间时，各型号冷却钟罩，达到最佳冷却效率的最佳油液流量。如果油液流量特别低，或者是不连续，那么就需要使用另外的冷却回路，而该 PTOK 冷却钟罩很容易就能配合这一改装。
图1表示了冷却效率和油液流量的关系。将温差为1K时的冷却效率，乘以实际的温差，既可以算出实际的冷却功率。

COOLING CAPACITY

Should no additional heat sources have an effect on the hydraulic aggregate between 30 and 40 percent of the engine output is lost as heat energy when the engine is operated at an average efficiency. A part of this heat is released outwards from the individual components. Above all, the surface area of the tank plays an important role here. However, some heat energy remains which may lead to overheating of the oil. In order to avoid this, the usage of an additional cooler is required. In the vast majority of cases, a cooling capacity of between 20 to 30 percent of the engine output is sufficient – also with aggregates with a smaller tank surface area.

Meanwhile, it is hard to imagine oil hydraulics without bell housing coolers. They are simple to install, they require very little space – particularly due to the ventilation system no longer being required – and, in most applications, achieve the complete required cooling capacity. See figure 1.

The values from figure 1 apply for an optimal amount of oil flow and applies to one Δt from 40 K. Should the oil flow be notably low or not sufficiently continual, the installation of a separate cooling circuit could be necessary – even this is effortlessly convertible with PTÖK bell housing coolers. Figure 1 shows the dependency of the cooling capacity with the amount of oil flow. You will achieve the actual cooling capacity by multiplying the values for 1K Dt with the relevant Δt.

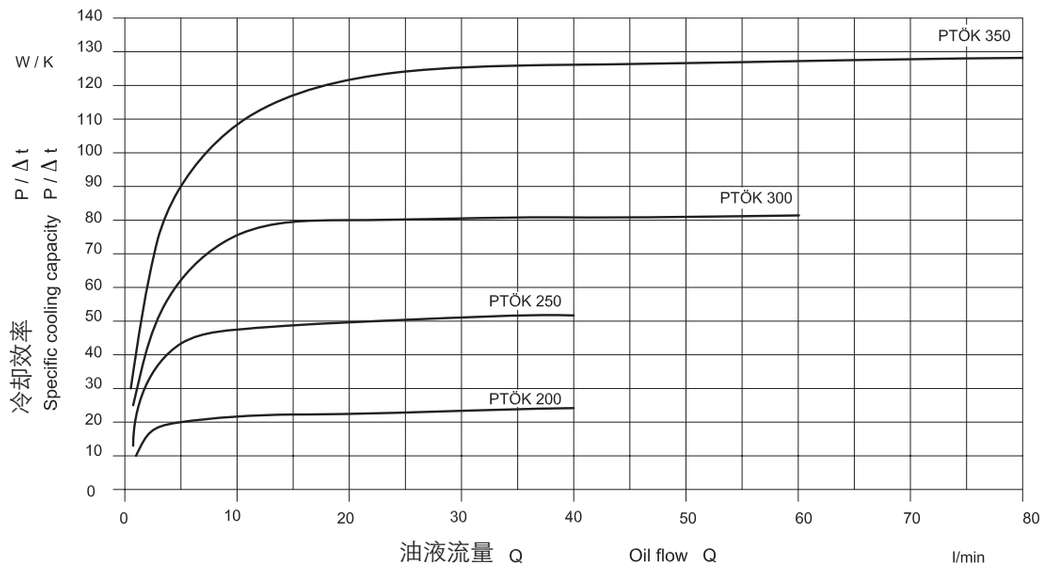


Fig. 1

冷却功率 P/与油液流量，以及入口油温与入口气温之差Δt有关。.
Specific cooling power P / Δt depending on oil flow Q and temperature difference Δt = 1 K (oil inlet to air inlet).

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HBE reserves the right to modify technical data at any time.

产品简介

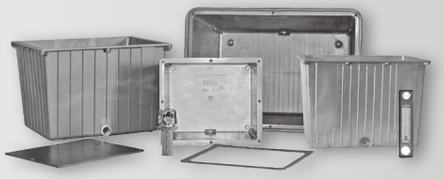
DELIVERY PROGRAMME

Solutions for Fluid Technology

HBE

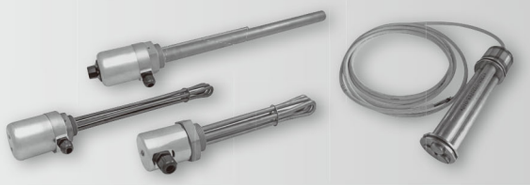
- 钢质油箱，不锈钢质油箱
- Oil tanks made of steel / stainless steel

- 铝质油箱
- Oil tanks made of aluminium



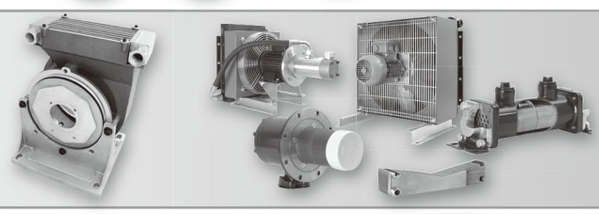
- 清洗盖及其他油箱附件
- Cleaning covers and further accessories

- 油箱加热器
- Tank heaters



- 钟形罩及其附件
- Bellhousings and accessories

- 钟形罩内置油冷器
- 热交换器
- Bellhousing with oil-cooler
- Heat exchangers



- SOFTEX® 弹性联轴器，无齿隙弹性联轴器
- SOFTEX® elastic and no backlash shaft couplings

- STAREX® 曲面齿联轴器，内燃机法兰联轴器
- STAREX® flexible couplings

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