

DONJOY looking forward to your visit! Your telecommunications!



东正科技有限公司
DONJOY TECHNOLOGY CO.,LTD.

地址: 温州空港新区港富路25号
总机: 0577-86990888
传真: 0577-86998000

Add: No.25 Gang fu Road, konggang
new District, Longwan Wenzhou, China
Tel: +86-577-86990888
Fax: +86-577-86998000
E-mail: donjoy@cndonjoy.com

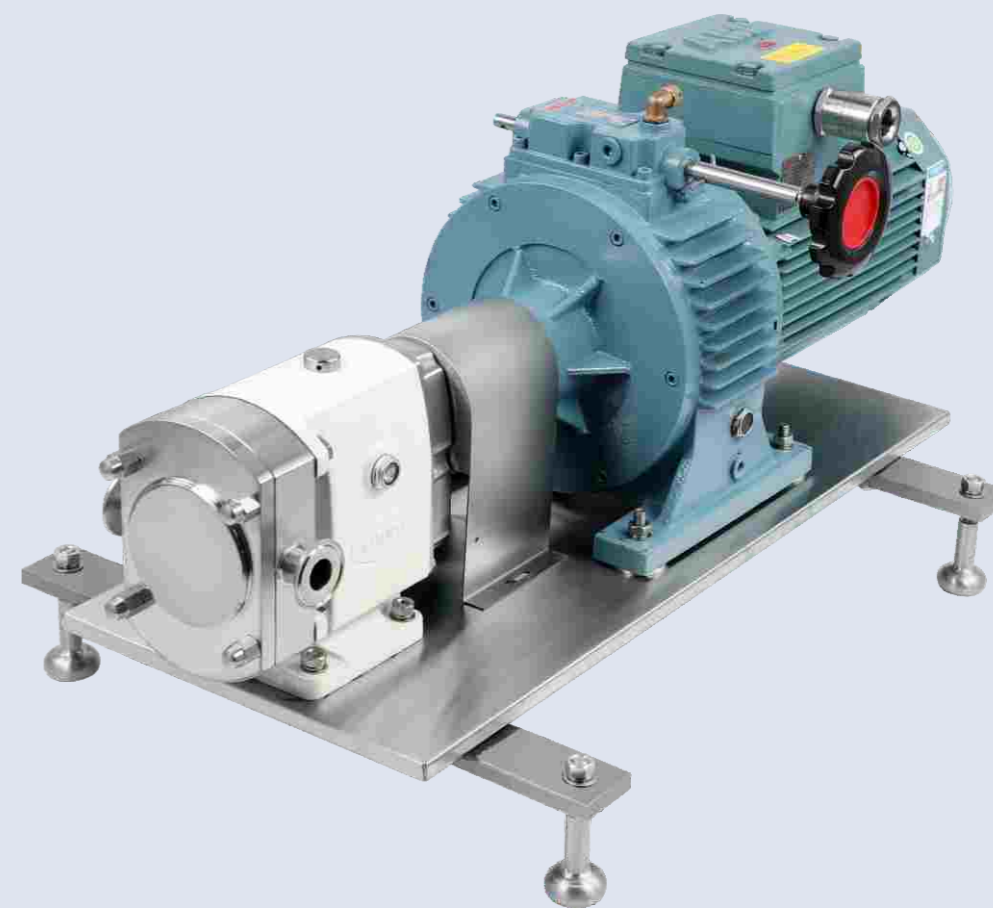
www.cndonjoy.com

法律声明:
目录样册版权归东正所有, 如有抄袭, 必将追究其法律责任和经济赔偿。
东正已获得国家版权局书刊号。东正诸多产品技术, 都具有专利保护, 如有抄袭,
必将追究法律责任和经济赔偿。

Legal statement:
Copyright of the catalogue belongs to Donjoy. If there is plagiarism,
it will be investigated for legal responsibility and economic compensation.
Donjoy has been granted publications number by China's National Copyright.
Donjoy products and technology with patent protection.
If there is plagiarism, it will be investigated for legal responsibility
and economic compensation.

Lobe pumps

2022 / 转子泵 系列



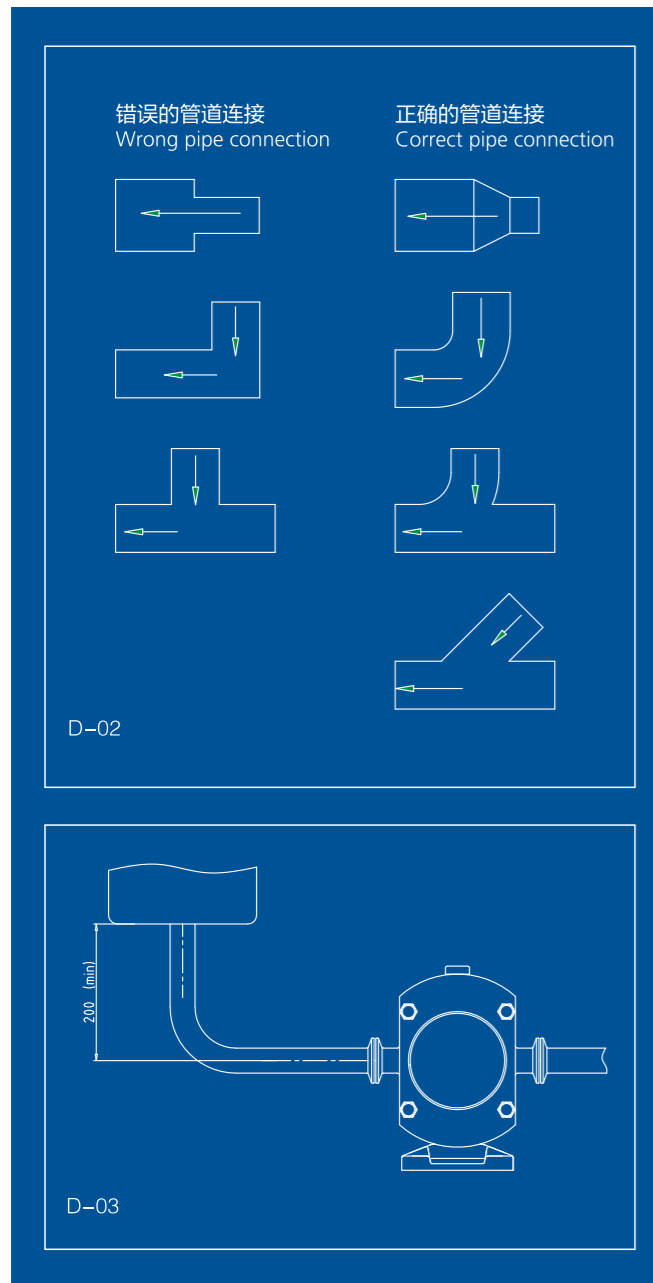
 **DONJOY 东正**

国家高新技术企业 浙江省著名商标

THE EFFECT

OF PIPE CONNECTIONS ON PUMP USAGE

工艺管道连接对泵使用的影响



泵进口/出口的连接建议

液体在管道中会有能量的损失，分为沿程损失和局部阻力损失，这两种的损失最终会影响流量和扬程的损失。因此管道内部越光滑沿程损失越小，管径变化越小局部阻力损失越小。因此尽可能不采用粗糙管道内壁和错误的管道连接方式，不要采用缩径过大、弯曲过多、弯曲过小等工艺管路。为了提高泵的使用寿命和泵的性能请尽量减少工艺管道弯曲和缩径等。(如图(D-02)所示)

Suggestion for pump inlet/outlet connect to pipeline

Liquid in the pipeline will have energy loss, divided into along damage and local resistance damage, which will eventually affect the flow and head loss. Therefore, the smoother the inner part of the pipeline, the smaller the damage along the path; the smaller the diameter change, the smaller the local power loss. As a result, rough inner wall and connection should be avoided as much as possible, do not use the shrinkage diameter too large, too much bending, bending too small and so on process pipelines. In order to improve the service life of the pump and the performance of the pump, please try to reduce the process pipe bending and shrinkage diameter. (As shown in(D-02))

泵进口/出口连接距离的建议

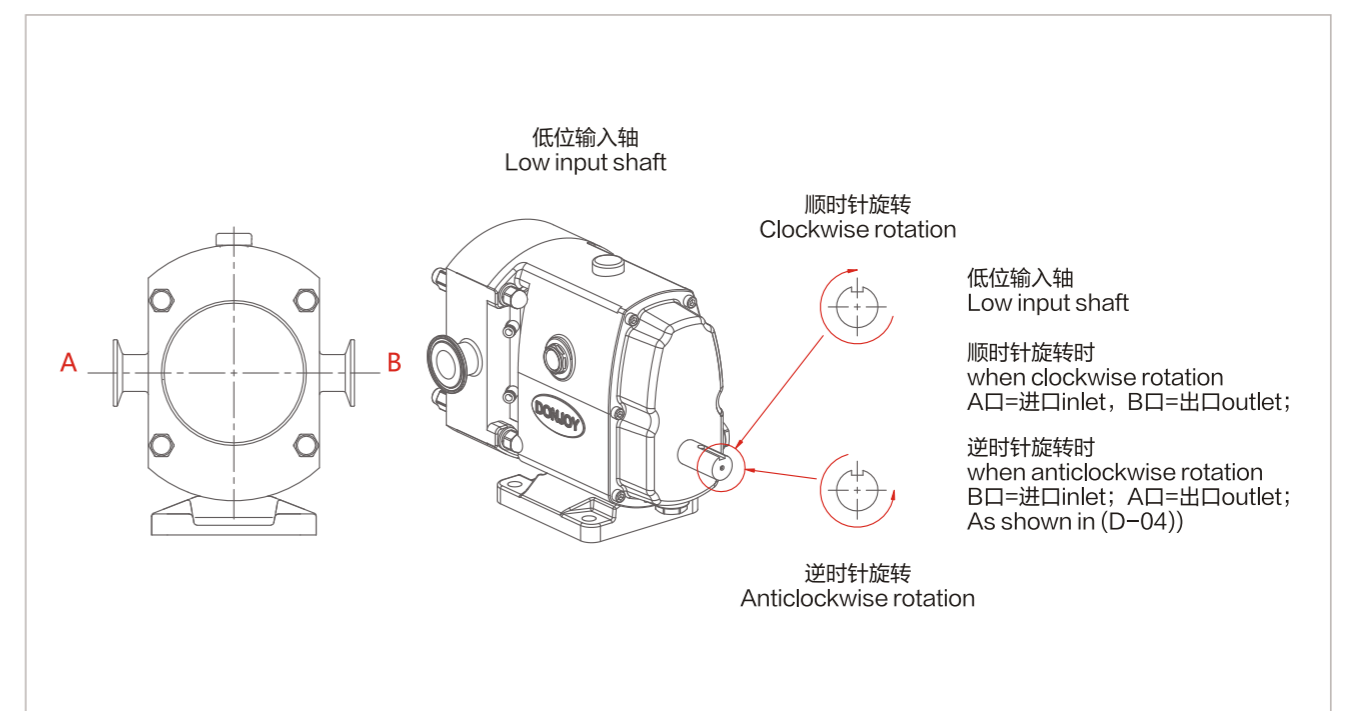
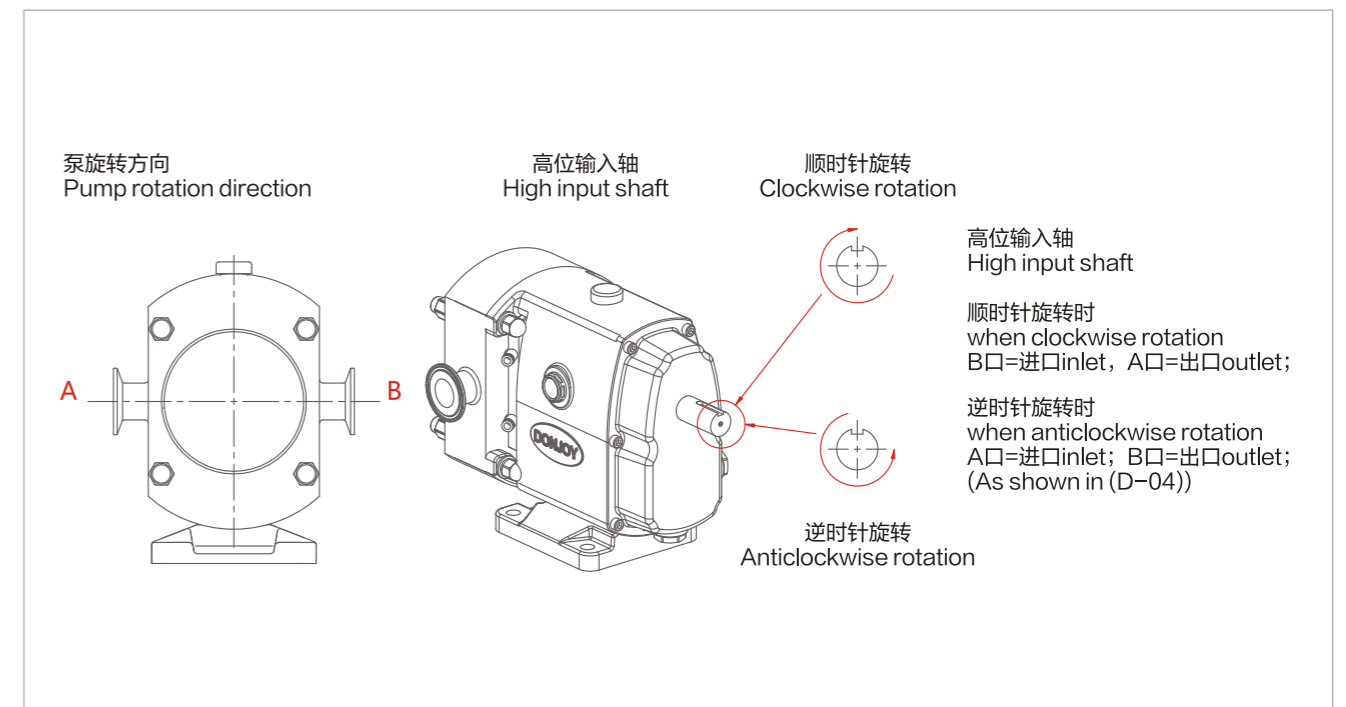
为确保转子泵稳定运行和延长使用寿命，液位须高于等于泵的进口约200mm，否则容易形成泵机封干磨或机封损坏。(如图(D-03)所示)

Suggestions for pump inlet/outlet connection distance

In order to ensure stable operation and prolong the service life of lobe pump, the liquid level must be higher than pump inlet about 200mm, otherwise it will easily cause pump mechanical seal dry mill or damage. (As shown in(D-03))

泵电机和驱动轴旋转方向 Pump motor and drive shaft rotation direction

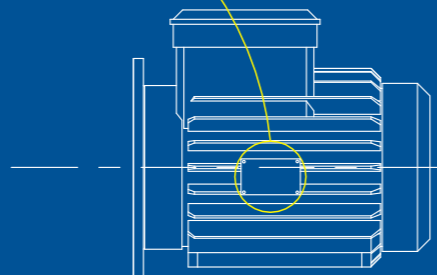
电机和驱动的旋转方向是一致的，安装调试时要注意旋转方向，转子泵输入轴有高位输入轴与低位输入轴两种。Rotation direction of motor and drive shaft is same. Pay attention to rotation direction when installing and debugging. There have two options of lobe pump input shaft, high input shaft and low input shaft.



THE EFFECT

OF PIPE CONNECTIONS ON PUMP USAGE 工艺管道连接对泵使用的影响

ABB						
IE3 IEC 60034-1						
3-Motor		IE3 M2BAX 160MLA4		IMB3/IM1001		
No.	V	Hz	kw	r/min	Ins.cl	F Duty
690Y	50	11	1477	12.3	0.82	S1
400▲	50	11	1477	21.2	0.82	S1
660Y	50	11	1474	12.7	0.83	S1
380▲	50	11	1474	22.0	0.83	S1
440▲	60	11	1778	18.8	0.83	S1
460▲	60	11	1777	18.2	0.82	S1
50Hz:IE3-91.4(100%)						
Prod.code		3GBA 162410-ADFCN				
6209-2Z/C3		6029-2Z/C3		139kg		



说明：铭牌图片仅供格式参考，最终数据以实际铭牌为准。
Remark: The format of the rating plate is for reference only, the final figure will be subject to the actual rating plate.

宽电压电机 Wide Voltage Motor

功率 Power(KW)	电压范围 Voltage	功率 Power(KW)	电压范围 Voltage
0.55	210V-230V/50HZ	4.0-5.5	360V-400V/50HZ
0.75		7.5-11	630V-690V/50HZ
1.1-1.5	360V-400V/50HZ	15-18.5	420V-460V/60HZ
2.2-3.0	420V-460V/60HZ	22-30	

注意：电机采用 IEC EN IE3 能效等级，PTC 热敏电阻。(相当于中国二级能效)
Note: The motor adopts IEC EN IE3 energy efficiency class, PTC thermistor. (Corresponding to China level two energy efficiency)
注意：其他电机功率、电压、频率等，请联系东正。
Note: Other motor power, voltage, frequency, etc., please contact DONJOY

O型圈配置 O-ring Configuration

我们所采用密封橡胶都符合FDA 177.2600；3-A-18-03: Class II；USP Class VI Chapter 88 GB 4806.11；等各种卫生高洁净的要求。

EPDM=标准

适用范围：温度 -10℃到130℃；PH值约 5-9，可耐受各种卫生领域介质及工业化学品，成本低(推荐)。

FKM(Viton)=选项

适用范围：温度 -10℃到 150℃；可耐受各种卫生领域介质及工业化学品、油品等各种介质。

FFKM=选项

适用范围：温度 -30℃到 250℃；可耐受各种卫生领域介质及工业化学品、油品等各种介质，几乎可以涵盖所有介质，成本较高。

HNBR=选项

适用范围：温度 -10℃到 150℃；可耐受各种卫生领域介质及工业油品等各种介质，特别适用于油品。

The sealing rubbers we use are in compliance with hygienic and high purity requirements, such as FDA 177.2600; 3-A-18-03: Class II; USP Class VI Chapter 88 GB 4806.11 and so on.

EPDM=Standard

Scope of application: Temperature -10 °C to 130°C; PH value about 5-9, can tolerate with various media in the health field and industrial chemicals, low cost (recommended)

FKM(Viton)=Option

Scope of application: Temperature -10°C to 150 °C; can tolerate with various media in the health field, industrial chemicals, oils and so on.

FFKM=Option

Scope of application: Temperature -30°C to 250°C; can tolerate with various media in the health field, industrial chemicals, oils, etc., can cover almost all media, higher cost

HNBR=Option

Scope of application: Temperature -10 °C to 150°C; can tolerate with various media in the health field, industrial oils, etc., especially suitable for oil products.



MINI STU-R/L-10 LOBE PUMP

MINI STU-R/L-10 转子泵

双向可逆、高粘稠、低粘稠、低脉冲、液体输送的柔性解决方案

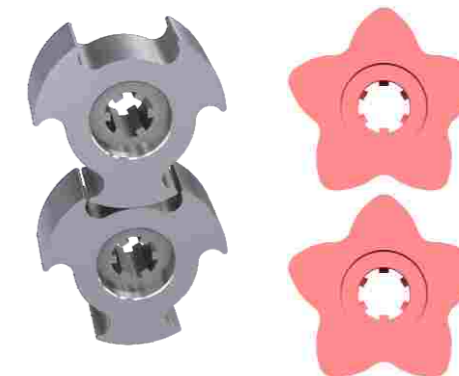
Flexible solution for two-direction reversible, high viscosity, low viscosity, low pulse, liquid transportation



MINI STU-10 转子泵

MINI STU-10 转子泵是一款迷你型凸轮转子泵，它对于高粘度和低粘度的物料输送具有广泛的应用。该泵具有体积小、噪音低、转速范围广、维护简单且经济，全不锈钢外壳(包含齿轮箱)，内部高洁净等设计优点，全不锈钢外观设计可以满足外部冲洗的需求。该泵主要应用于如生物制药、精细化工、啤酒饮料、实验室等各种卫生要求工况环境，也可以应用到各种工业流体输送用途。

MINI STU-10 Lobe Pump is a miniature displacement cam rotor pump, widely applied for transportation of high viscosity and low viscosity medium. Design features of the pump are small size, low noise, wide speed range, simple in maintenance and economical, whole stainless steel exterior, high purity interior and so on. Whole stainless steel exterior can satisfy the requirement of external flushing. The pump is mainly applied for biopharmaceuticals, fine chemicals, beer beverages, laboratories, etc. It is not only applied for various hygienic requirements, but also can be applied to various industrial fluid transportation applications.



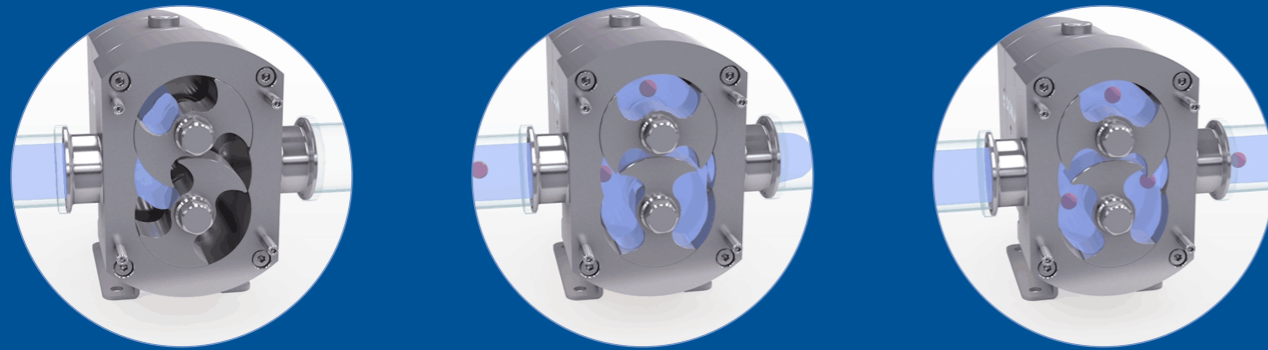
技术参数 Technical Specifications

最大流量 Max flow	3000L/h
最大压力 Max pressure	12bar
转速范围 Speed range	10-1450 R.P.M
工作温度 Temperature	-40°C to 150°C
表面处理 Surface treatment	Ra≤0.6 μm; Ra≤0.4 μm
材质 Material	100%不锈钢, 介质接触部分316L / 100% stainless steel, product contact part 316L
认证 Certification	3-A-02-12 No.1759; FDA 177.2600; CE-MD/06-42 No.705201402401-00

MINI STU-R/L-10

LOBE PUMP TECHNICAL CHARACTERISTICS SELECTION TABLE

MINI STU-R/L-10 技术特性选型表



型号 Model	每转排量 Flow per rotation (L/r)	最高转速 Max speed (RPM/min)	最高转速 流量 Max flow rate (L/h)	建议 转速范围 Suggested speed range (RPM)	建议转速 范围流量 Suggested range flow (L/h)	推荐转速 Recommended speed (RPM)	推荐转速 流量 Recommended flow (L/h)	进出口 尺寸 Inlet/Outlet size	最大压力 Max pressure (bar)	重量 Weight (KG)
-------------	------------------------------------	--------------------------------	--------------------------------------	---	--	---------------------------------------	--	-----------------------------------	----------------------------------	----------------------



三叶转子技术参数-选型表 Technical parameters - Selection table for 3-leaves mini rotor pump

STU/LR-10	0,035	1450	3045	50-700	105	1470	500	1050	1"-DN25	12	10.6
									3/4"-DN15		



五叶转子技术参数-选型表 Technical parameters - Selection table for 5-leaves mini rotor pump

STU/LR-10	0,030	1450	2610	50-700	90	1260	500	900	1"-DN25	12	10.6
									3/4"-DN15		

TYPICAL PRODUCT APPLICATION

典型的产品应用

食品与饮品 Food and Beverage

汤、炖肉、番茄酱、蔬菜、调味品、巧克力、脂肪和油、奶油馅料、啤酒厂、麦芽汁、软/果汁饮料。

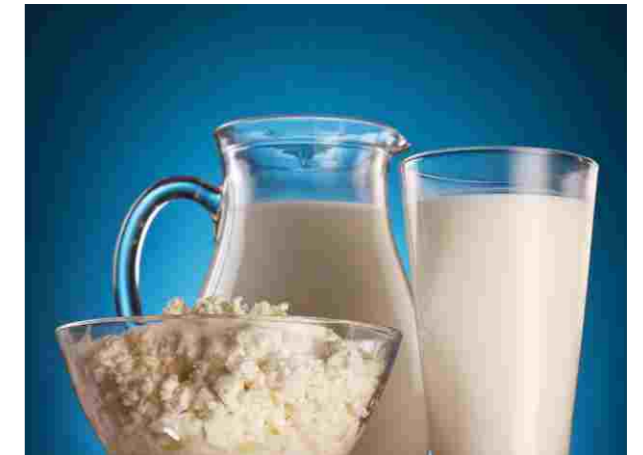
Soup, stew, ketchup, vegetables, condiments, chocolate, fat and oil, cream filling, brewery, wort, soft drink/fruit juice.



乳业 Dairy

奶油、牛奶、奶酪凝乳和乳清、干酪、酸奶。

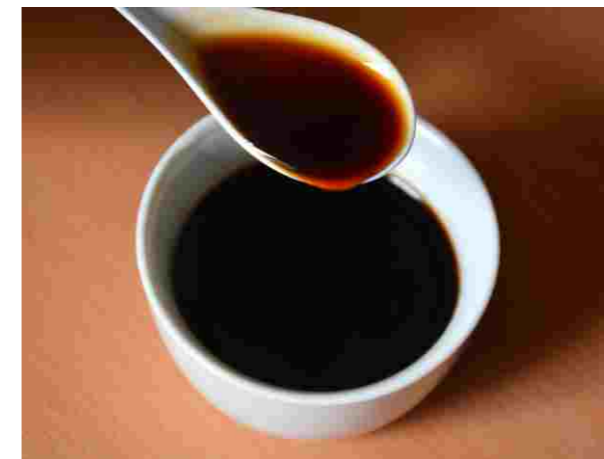
Cream, milk, cheese curd and whey, cottage cheese, yogurt.



医药/化妆品 Medicine/Cosmetic

药膏、糖浆、提取物、浆液、面霜和乳液、头发定型凝胶和液体。

Ointment, Syrup, Extractive, Serum, Face Creams & Lotions, Hair Styling Gels & Liquids, Dyes and alcohols, Soap, Cosmetics.



化工/工业 Chemical/Industrial

溶剂、油漆、燃料、树脂、聚合物和淤泥、石油和润滑油。

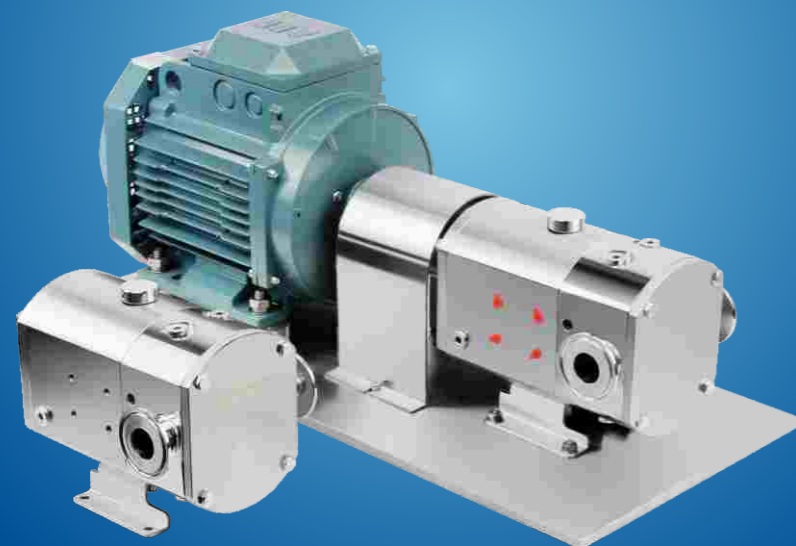
Solvents, paints, fuels, resins, polymers & sludges, oil & lubricants.



MINI STU-R/L-10

LOBE PUMP TECHNICAL CHARACTERISTICS SELECTION TABLE

MINI STU-R/L-10 技术特性选型表



型号 Model	压力 Pressure (bar)	电机功率 Motor power (kw)	进出口 尺寸 Inlet/Outlet size	每转排量 Flow per rotation (L)	建议 转速范围 Suggested speed range (RPM)	建议转速 范围流量 Suggested range flow (L/h)	推荐转速 speed (RPM)	推荐转速 流量 Recommended flow (L/h)	净重量 NW (KG)
-------------	-------------------------	--------------------------------	-----------------------------------	-------------------------------------	---	--	------------------------	--	-------------------



三叶转子技术参数-选型表 Technical parameters - Selection table for 3-leaves mini rotor pump

STU-R/L-10	2	0.75	1"-DN25	0.035	50-700	105	1470	500	1050	24
	3	1.5								31
	5	2.2	34							
	10	3.0	43							



五叶转子技术参数-选型表 Technical parameters - Selection table for 5-leaves mini rotor pump

STU-R/L-10	2	0.75	1"-DN25	0.03	50-700	90	1260	500	900	24
	3	1.5								31
	5	2.2	34							
	10	3.0	43							

注意 Note:

1)建议转速: 是根据多年总结经验给出的建议值;

Suggested speed: It is the suggested value based on years of experience;

2)推荐转速: 是结合效率、寿命、噪音等综合后给出的值;

Recommended speed: It is the value given by considering efficiency, life, noise, etc.;

3)每转排量: 是指旋转一圈(360°)流量, 如指定转速可根据转速*每转排量=流量, 计算时注意单位(L)

Flow per rotation: refers to the flow of one rotation (360°). If speed is confirmed, flow = speed * flow per rotation. Pay attention to the unit, it is "L".

VERY SIMPLE MAINTENANCE

NO SPECIAL TOOLS REQUIRED, NO PROFESSIONALS REQUIRED

非常简单的维护、无需专用工具、专业人员

卫生特点 Hygienic features

- ◆具备 CIP清洗和SIP杀菌
- ◆与介质接触区域的轴是密封连接, 无裸露螺丝;
- ◆所有配置均包含密封冲洗端口, 可选配双机械密封;
- ◆全不锈钢设计包含齿轮箱, 不仅内部洁净, 外观也接近于无死角。

- ◆CIP clean and SIP sterilization.
- ◆Shaft contacting with medium is seal connecting, without exposed screw.
- ◆All selections are with seal flush port, could be assembled with double mechanical seal.
- ◆All parts are in stainless steel, including gear box, not only makes interior highly clean, but also makes appearance close to no dead band.

简单方便、安装、拆卸 Simple installation and disassembly

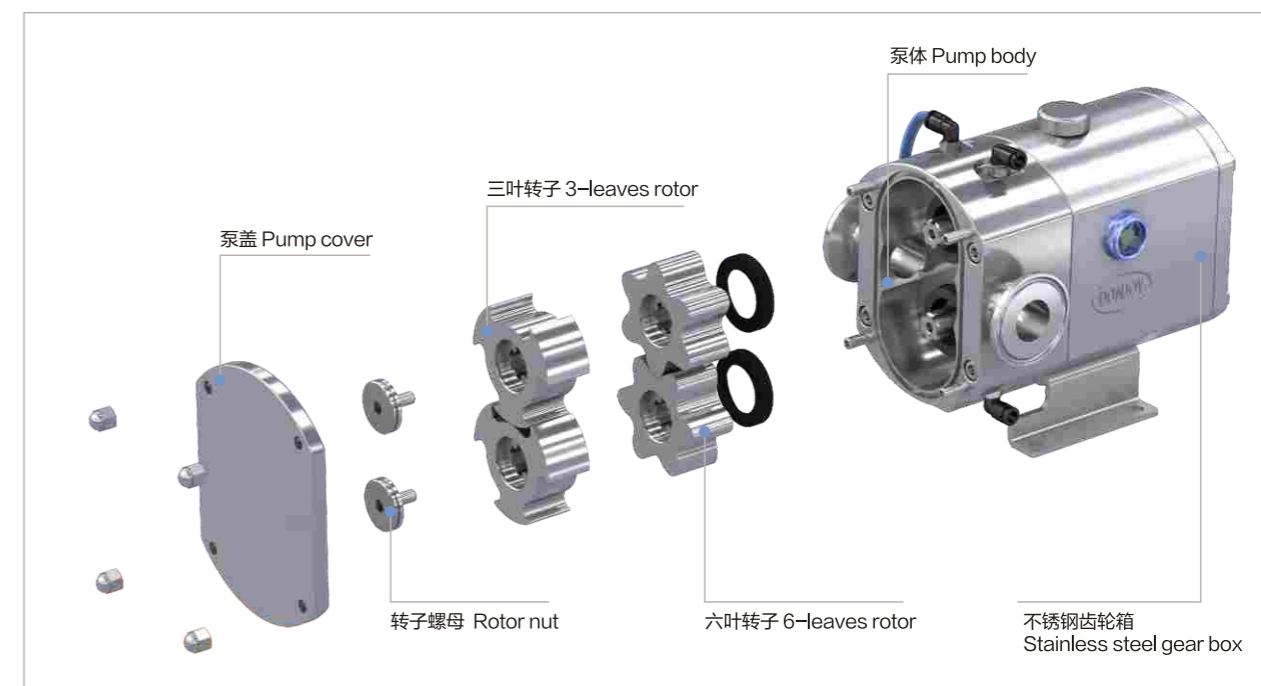
- ◆轴与转子采用花键连接设计、安装、拆卸简单方便;
- ◆进出口双向可逆, 改变电机旋转方向即可实现;
- ◆可在各种高、低粘度下使用该泵, 而无需更换配置等;
- ◆进出口水平或垂直安装, 更换底座即可实现;
- ◆三叶和六叶转子, 可任意更换。

- ◆The shaft and rotor adopt spline connection design, simple installation and disassembly.
- ◆Two-direction reversible, can be achieved just changing direction of motor rotation.
- ◆Can be used for all kinds of high and low viscosity medium, without changing configuration.
- ◆Outlet/Inlet could be horizontal or vertical, realized by changing base only.
- ◆3-leaves rotors and 6-leaves rotors could be replaced without changing configuration.

性能特点 Performance characteristics

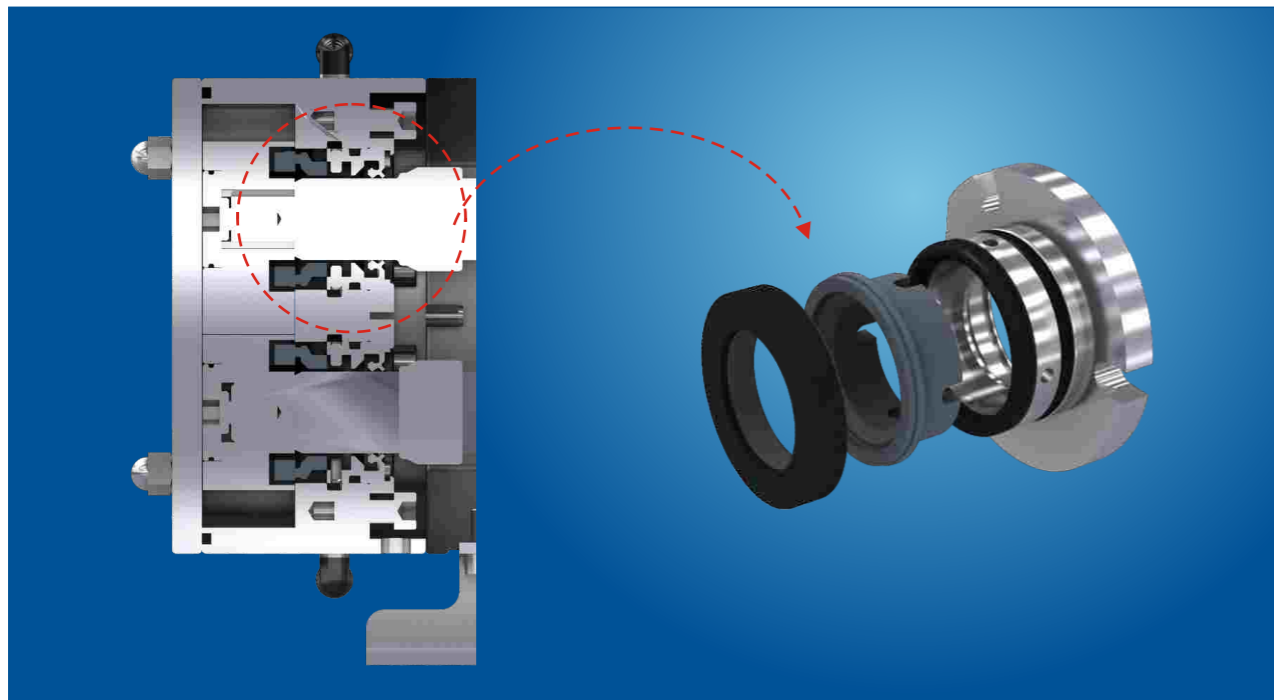
- ◆压力高达: 170Psi (12Bar)
- ◆转速范围: 10~1450RPM
- ◆最高温度: 150℃, 最低温度-40℃
- ◆17-4PH材质大轴径设计, 具有更高的刚性可减少振动并延长密封寿命。

- ◆Max pressure: 170Psi (12Bar)
- ◆Speed range: 10~1450RPM
- ◆Temperature range: -40℃~150℃
- ◆Large shaft diameter 17-4PH, with higher rigidity, to reduce vibration and extend seal life.



MINI STU-10

LOBE PUMP MECHANICAL SEAL DESIGN MINI STU-10 转子泵机封设计



机封配置 Mechanical seal configuration

- ◆ 单机封设计
Single mechanical seal
- ◆ 双机封设计
Double mechanical seal
- 1) SIC/C/FKM
- 2) SIC/SIC/FKM
- 3) TC/TC/FKM



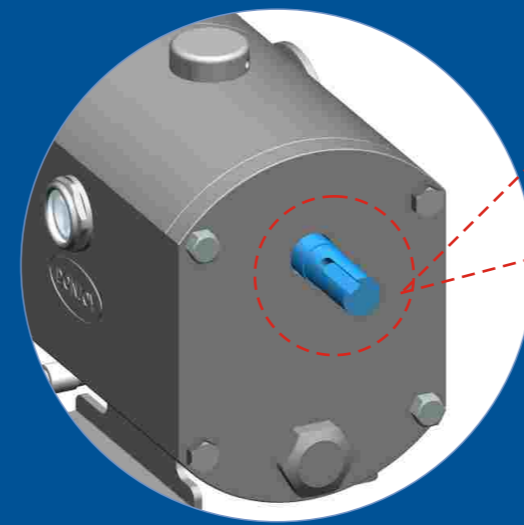
宽电压电机 Wide Voltage Motor

功率 Power(KW)	电压范围 Voltage	功率 Power(KW)	电压范围 Voltage
0.55	210V-230V/50HZ	4.0-5.5	360V-400V/50HZ
0.75		7.5-11	
1.1-1.5	360V-400V/50HZ	15-18.5	630V-690V/50HZ
2.2-3.0	420V-460V/60HZ	22-30	420V-460V/60HZ

注意：电机采用 IEC EN IE3 能效等级，PTC 热敏电阻。（相当于中国二级能效）
 Note: The motor adopts IEC EN IE3 energy efficiency class, PTC thermistor. (Corresponding to China level two energy efficiency)
 注意：其他电机功率、电压、频率等，请联系东正。
 Note: Other motor power, voltage, frequency, etc., please contact DONJOY.

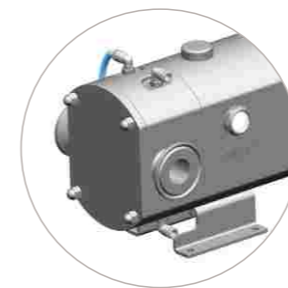
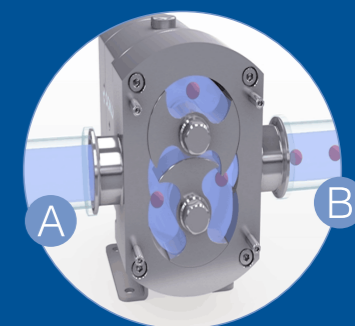
PUMP INLET/OUTLET CONNECTION STANDARD 泵进口/出口连接标准

双向可逆设计 Two-direction reversible design

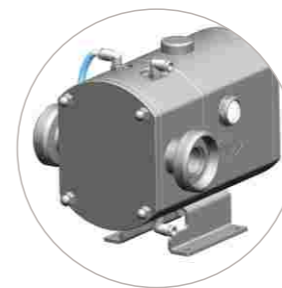


顺时针旋转时“B口”为进口，“A口”为出口。
 When clockwise rotation, "B" is inlet, "A" is outlet.

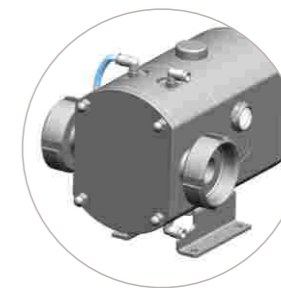
逆时针旋转时“A口”为进口，“B口”为出口。
 When counterclockwise rotation, "A" is inlet, "B" is outlet.



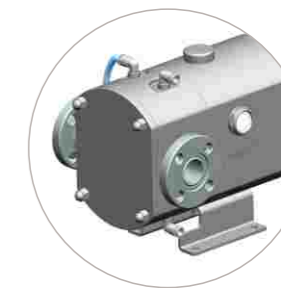
卡箍式 Clamp



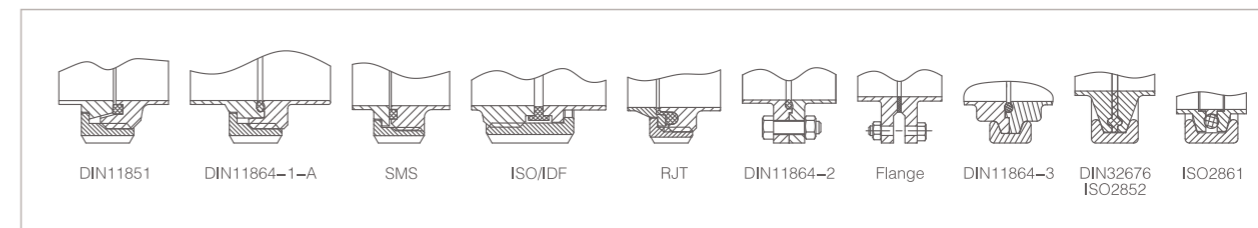
螺母式 Nut



无菌螺母式
Aseptic nut



无菌法兰式
Aseptic flange



STU LOBE PUMP

MODEL DESCRIPTION

STU转子泵型号说明



Example for lobe pump selection: (with motor)
 迷你型转子泵选型(带有电机), 举例: STUL 10-02-M-DN25-D/1-3T-12bar/
 1.5kw-380v-50Hz-WMB
 表示STUL10转子泵-蝶型转子-进出口螺纹连接DN25-DIN标准/流量1-3T-压力12bar/
 电机功率1.5kw-380v-50hz-机械无极变速
 STUL10 lobe pump-butterfly rotor-DN25 threaded inlet/outlet-flow 1-3T-pressure
 1.5kw-380v-50hz-mechanical stepless speed regulation

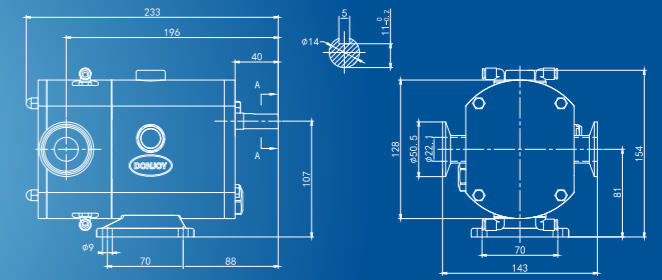
Example for lobe pump selection: (without motor)
 迷你型转子泵选型(不带电机), 举例: STUL 10-02-M-DN25-D
 表示STUL10转子泵-蝶型转子-进出口螺纹连接DN25-DIN标准(不带电机)
 Means STUL10 lobe pump-butterfly rotor-DN25 threaded inlet/outlet (without motor)

MINI STU-R/L-10

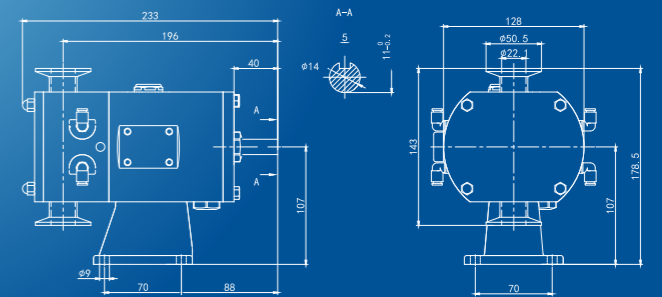
LOBE PUMP OUTLINE DRAWING

MINI STU-R/L-10 转子泵外形图

MINI STU-L-10 转子泵
 MINI lobe pump
 STU-L-10



MINI STU-R-10 转子泵
 MINI lobe pump
 STU-R-10



STUL 10 01 M DN25 D 1-3T 12bar 1.5kW 380V 50HZ

Motor frequency
 电机频率: 50HZ; 60HZ

Voltage
 电压: 220V 380V (详见选型表)(for details, check selection table)

Motor power
 电机功率: 1.1kw 1.5kw 2.2kw.....

Lobe pump pressure (for details, check selection table)
 转子泵压力(详见选型表)

Lobe pump flow (for details, check selection table)
 转子泵流量(详见选型表)

Connection standard
 接口标准: DIN (D) SMS (S) 3A(A) RJT (R) ISO/IDF (I)

Inlet/Outlet dimension
 进出口规格

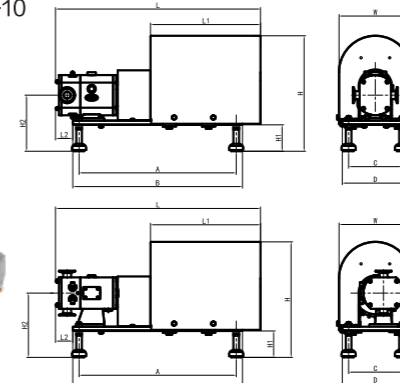
Connection method
 连接方式: 螺纹(M)卡箍(C)threaded (M) clamped (C)

Rotor type code: 01 single butterfly rotor; 02 butterfly rotor;
 03 three leaves rotor; 04 four leaves rotor; 05 five leaves rotor..
 转子类型代码: 01 单蝶型转子; 02 蝶型转子;
 03 三叶转子; 04 四叶转子; 05 五叶转子.....

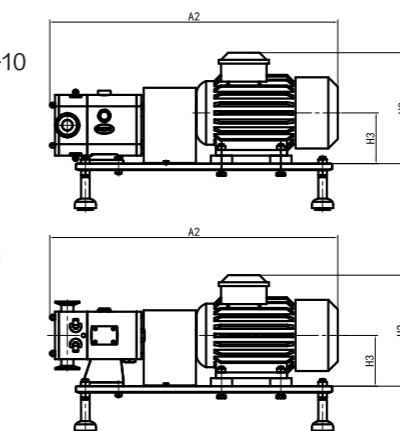
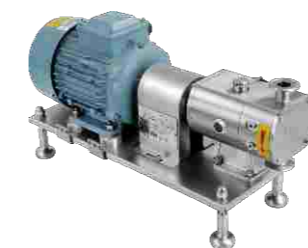
Lobe pump code
 转子泵型号

Lobe pump outlet/inlet direction code: STUL horizontal; STUR vertical
 转子泵进出口方向代码: STUL 水平式; STUR 垂直式;

电机直连式(带防护罩)
 MINI STU-R/L-10 转子泵
 MINI lobe pump STU-R/L-10
 connect to motor directly
 (with cover)



电机直连式(不带防护罩)
 MINI STU-R/L-10 转子泵
 MINI lobe pump STU-R/L-10
 connect to motor directly
 (without cover)



型号 Model	电机功率 Motor power	L	L2	H	H1	H2
STUL-10	0.75KW	655	55	370	85	180
	1.1KW	655	55	370	85	180
	1.5KW	655	55	370	85	180
	2.2KW	716	55	389	85	187
STUR-10	3KW	771	55	430	85	207
	0.75KW	655	55	370	85	206
	1.1KW	655	55	370	85	206
	1.5KW	655	55	370	85	206
	2.2KW	716	55	389	85	213
	3KW	771	55	430	85	233

电机功率 Motor power	L1	W	A	B	C	D
0.75KW						
1.1KW	350	231	500	540	170	210
1.5KW						
2.2KW	410	296	550	590	230	270
3.0KW	450	296	550	590	230	270

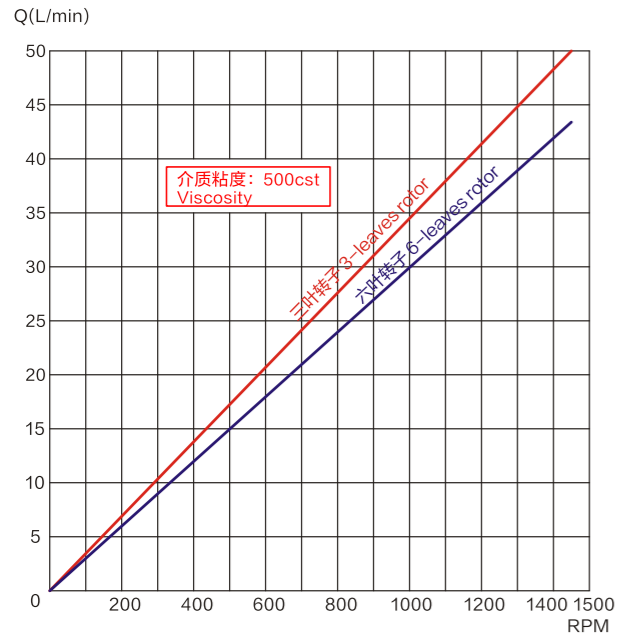
电机功率 Motor power	A2	H2	H3
0.75KW	591	234	107
1.1KW	607	234	107
1.5KW	633	247	107
2.2KW	679	252	112
3.0KW	735	301	132



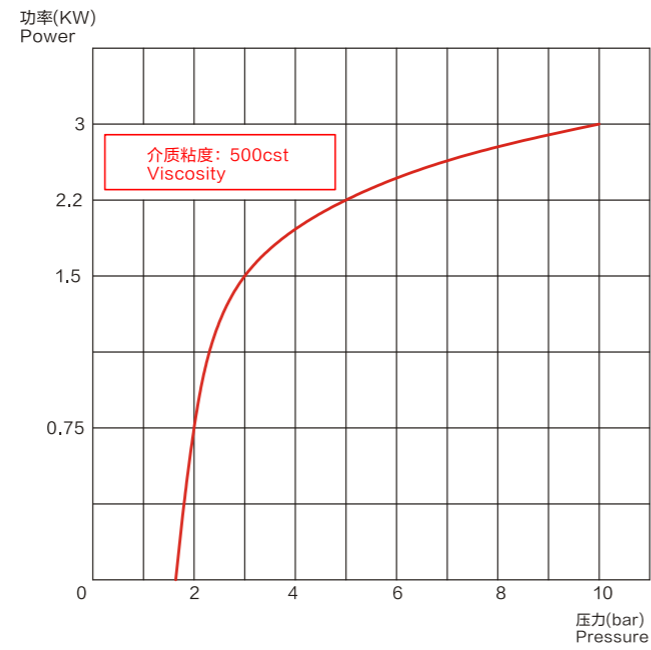
MINI STU-R/L-10

LOBE PUMP COMPREHENSIVE GRAPH MINI STU-R/L-10 转子泵综合曲线图

STU-10-流量/转速曲线图
STU-10-Flow/Speed graph



STU-10-压力/功率曲线图
STU-10-Pressure/power graph



TU SERIES LOBE PUMP

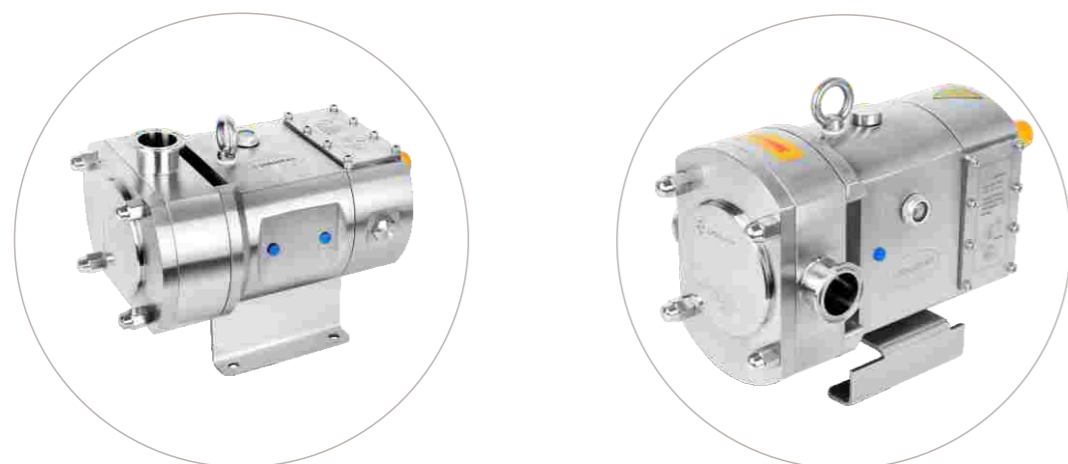
TU系列转子泵

双向可逆、高压、高低粘稠、
固体颗粒输送高洁净的解决方案
Solution for two-direction reversible, high pressure,
high and low viscosity, solid particles, high clean transportation



TU系列转子泵 TU series lobe pump

TU系列，是标准配置的转子泵，齿轮箱为铸铁，其余为不锈钢制造。
TU series is a standard rotor pump with cast iron gearbox. The other parts are made of stainless steel.



STU系列转子泵 STU series lobe pump

STU系列，是全不锈钢材质的转子泵，除去橡胶和机械密封及齿轮和轴承组件外，其余为全不锈钢材质，包含齿轮箱。
STU series is a whole stainless steel rotor pump. Excluding rubber, mechanical seal, gear & bearing assembly, the rest parts including gearbox are made of stainless steel.

转子泵

DONJOY转子泵设计有多种配置，其中分为TU系列为标准配置，STU系列为全不锈钢配置，是一款正位移凸轮转子泵，严格按照美国3A-02-12卫生要求设计，非常适合食品加工，饮料、果汁、乳制品、化妆品、制药工业等各种高粘稠和低粘稠物料的输送，也可以输送含有固体颗粒物料，还可以应用在CIP和SIP系统上。该泵还具有其他容积泵所不具备的性能，如低脉冲、高压、进出口双向可逆、功能组合灵活。

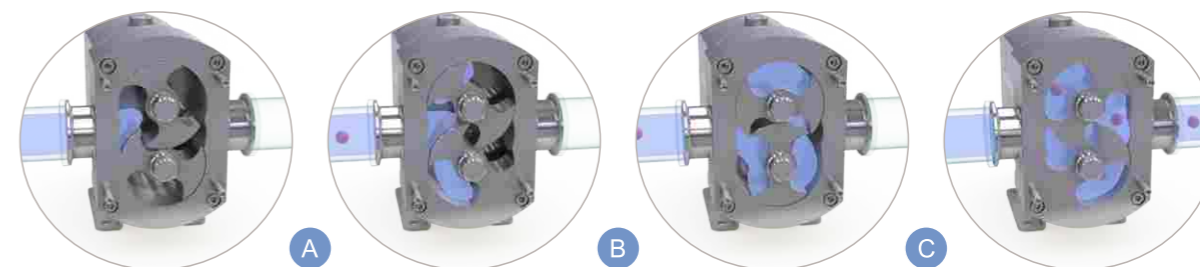
应用范围请查阅典型应用表。
For application range, please check typical application sheet.

技术参数 Technical Specifications

最大流量 Max.flow	90m ³ /h/395 GPM
最高压力 Max.pressure	15bar/220 Psi
最高温度 Max.Temperature	150°C/302° F
最高转速 Max.rev	750 rpm
表面处理 Surface treatment	≤ Ra0.8 μm, ≤ Ra0.6 μm, ≤ Ra0.4 μm
材质 Material	316L, 1.4404, ASME BPE 316L, 1.4435 NB2 Fe≤0.5%
认证 Certification	3-A-02-12 No.1759; FDA 177.2600; CE-MD/06-42 No.705201402401-00

工作原理图

转子泵是一种正位移排量的泵，左凸轮由驱动轴驱动，右凸轮安装在驱动轴上，通过齿轮驱动。两个凸轮同步转动彼此不会干涉。当泵工作时就可以移置出一定容量的溶液。下图显示了凸轮泵的工作原理。



A、当凸轮旋转时，吸入侧空间增大，因为一个凸轮从一侧移动到另一侧，这样就产生真空，把溶液抽到泵腔中。
B、当轴旋转时，每个凸轮都会不断的被充满，液体会移置到排出口一侧。凸轮之间，凸轮和泵体壁之间的小空隙将会很好的闭合。
C、泵体完全被充满，液体通过凸轮移出，由此完成了泵的工作过程。

A. When the lobes rotate, increased distance of two lobes cause space at the suction end to increase thereby causing a partial vacuum to draw fluid into the pump chamber.
B. According to principle of shaft rotation, each lobe consecutively feed air, to bring fluid to transfer end. Gaps between two lobes and between lobe & wall of pump body are duly filled.
C. After pump housing is completely filled, fluid escapes through lobes. This completes entire working process of pump.

Lobe pumps

Donjoy lobe pump has a variety of configuration, TU-series is standard configuration, STU-series is all stainless steel. It is a positive displacement rotary lobe pump designed according to USA 3A-02-12 standard, very suitable for transportation of various highly viscous and low viscous material, such as food processing, beverages, juices, dairy products, cosmetics, pharmaceuticals, etc.. The pump also can be used for CIP & SIP system and transport material with solid particle. This pump also has performance not found in other volumetric pumps, such as low pulse which, high pressure, Bi-directional reversible inlet/outlet and flexible function combination.



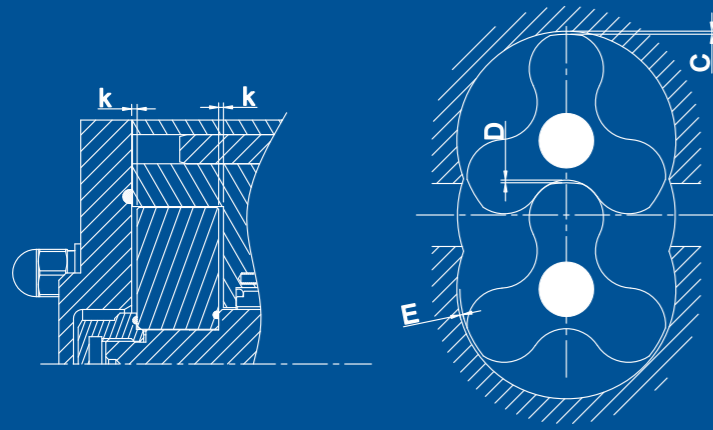
Schematic diagram

The rotor pump is a positive displacement pump. The left cam is driven by the drive shaft and the right cam is mounted on the drive shaft and driven by the gear. The two cams rotate synchronously without interfering with each other. A certain volume of solution can be removed while the pump is operating. The figure below shows how the rotary pump works.

LOBE ASSEMBLING

clearance table

转子安装间隙表



C: 转子外圆与转子箱顶部、底部间隙
 D: 转子与转子间间隙
 E: 转子外圆与转子箱边缘间隙
 K: 转子端面与转子箱前端面间隙

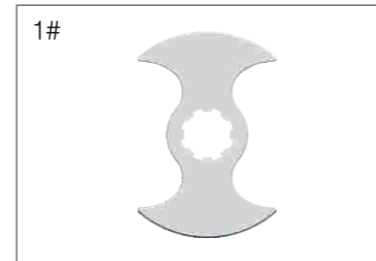
C: gap between rotor and top or bottom of housing.
 D: gap between rotor and rotor
 E: gap between rotor and edge of housing
 K: gap between rotor and front or back of housing

ROTOR CONFIGURATIONS

不同的转子配置

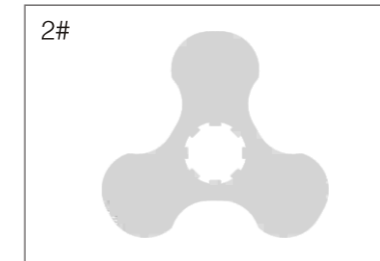


各种款式转子选择 Various Rotor Selection



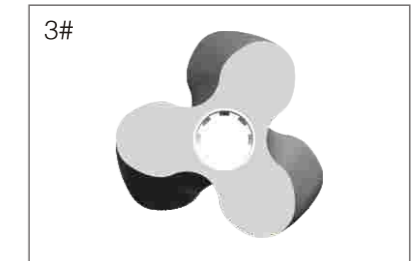
蝶型转子(推荐):
 适用于含有颗粒介质输送, 对于颗粒破碎率较低, 有较小脉动; (推荐使用)

Butterfly rotor (recommended):
 With low particle breakage rate and small pulse, suitable for transporting material with particle; (recommended)



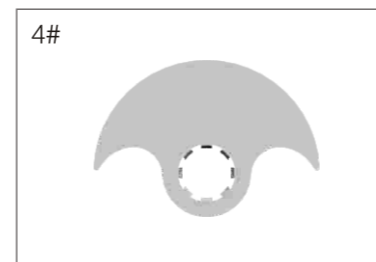
三叶型转子(选型):
 适用于各种介质输送, 对于颗粒有破碎率, 相比较蝶型转子脉动现象更小。

3-leaves rotor (optional):
 With particle breakage rate and smaller pulse than butterfly rotor, suitable for transporting all kinds of material.



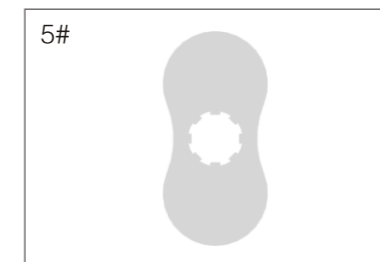
螺旋三叶转子(选型):
 适用于各种介质输送, 对于颗粒物料较小破碎率, 极小的脉动, 成本高。

Spiral 3-leaves rotor (optional):
 With low particle breakage rate, very small pulse and high cost, suitable for transporting all kinds of material.



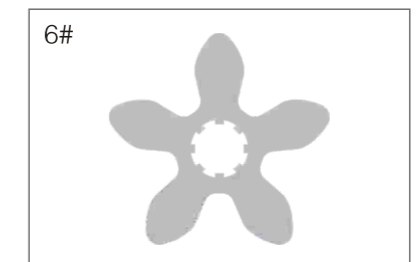
单蝶型转子(选型):
 适用于含有大颗粒物料输送, 对于大颗粒物料破碎率较低, 但其脉冲较大, 压力低, 容积小。

Single butterfly rotor (optional):
 With low particle breakage rate for large particle, large pulse, low pressure and small volume, suitable for transporting material with large particle.



二叶型转子(选型):
 适用于各种介质输送, 对于颗粒物料有破碎率, 但其脉冲较大, 压力低, 容积小。

2-leaves rotor (optional):
 With partial breakage rate, large pulse, low pressure and small volume, suitable for transporting all kinds of material.



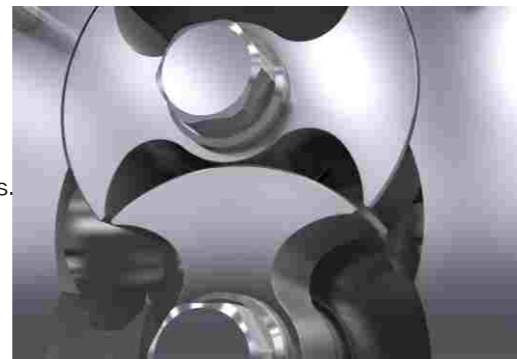
五叶转子(选型):
 适用于各种介质输送, 对于颗粒物料容易破碎, 极小的脉动, 相比较三叶转子流量更小。

5-leaves rotor (optional):
 With high partial breakage rate, very small pulse and smaller flow, suitable for transporting all kinds of material.

SIZE	C (mm)	D (mm)	E (mm)	K (mm)
TUL/TUR 20	0.25±0.05	0.20±0.05	0.25±0.05	0.20±0.03
TUL/TUR 23	0.25±0.05	0.20±0.05	0.25±0.05	0.20±0.03
TUL/TUR 25	0.25±0.05	0.20±0.05	0.25±0.05	0.20±0.03
TUL/TUR 30	0.30±0.05	0.20±0.05	0.30±0.05	0.30±0.05
TUL/TUR 35	0.30±0.05	0.20±0.05	0.30±0.05	0.30±0.05
TUL/TUR 55	0.35±0.05	0.30±0.05	0.35±0.05	0.30±0.05
TUL/TUR 60	0.35±0.05	0.30±0.05	0.35±0.05	0.30±0.05
TUL/TUR 70	0.50±0.05	0.50±0.05	0.50±0.05	0.50±0.05
TUL/TUR 80	0.50±0.05	0.50±0.05	0.50±0.05	0.50±0.05
TUL/TUR 100	0.50±0.05	0.50±0.05	0.50±0.05	0.50±0.05
TUL/TUR 125	0.50±0.05	0.50±0.05	0.50±0.05	0.50±0.05

注意: Notice:

- 1) 以上精度间隙范围, 是我们标准配置。
- 1) The above clearance range is our standard configuration.
- 2) 我们可以提供更高精度等级的间隙要求。
- 2) We can provide clearance requirements with higher precision levels.
- 3) 适用于不同款式的转子间隙。
- 3) Suitable for all kinds of rotors.



ROTOR CONFIGURATIONS

不同的转子配置

7#



螺旋自吸式转子的泵，它具有标准的转子泵所有技术特点和功能，除此之外还具有较强的自吸能力达-0.8bar(吸程8M)。

Lobe pump with spiral self-priming rotor has all technical features and functions of a standard rotor pump, in addition to its strong self-priming capability to 0.8bar (head 8m).

螺旋自吸式转子 Spiral self-priming rotor

具有较强的自吸能力和输送含有颗粒、气液混合物、油品装卸、乳制品转移等。也抽取输送各种污水、污泥、牛粪、猪粪等各种复杂工况的介质。输送压力稳定，无脉冲现象，如配置变频器和流量计，可作为计量泵使用。

With strong self-priming capability co convey gas-liquid mixture, stevedor oil, transfer dairy products, etc. It also extracts and transports all kinds of sewage, sludge, cow dung, pig dung and other complex working conditions. The conveying pressure is stable and there is no pulse phenomenon. If configurate with frequency converter and flow meter, it can be used as a metering pump.

柔性螺旋转子材质有多种供选择

Flexible spiral rotor material selection

FKM= FDA 177.2600 ; 3-A-18-03; USP Class VI Chapter 88 GB 4806.11
 EPDM=FDA 177.2600; 3-A-18-03 : Class II GB 4806.11
 HNBR=FDA 177.2600; 3-A-18-03: Class I

转子每转排量数据表 data sheet for flow per rotation

型号/规格 Model/Size	每转排量(L/R) Flow per rotation
TUL/R-25 & STUL/R-25	0.25
TUL/R-60 & STUL/R-60	0.65
TUL/R-100 & STUL/R-100	1.83



TYPICAL PRODUCT APPLICATION

典型的产品应用



食品与饮品 Food and Drink

汤、炖肉、番茄酱、蔬菜、调味品、巧克力、脂肪和油、奶油馅料、啤酒厂、麦芽汁、软/果汁饮料、肉类加工。

Soups, Stews, Tomato Paste, Vegetables, Dressings, Chocolate, Fats & Oils, Cream Fillings, Brewery, Wort, Soft/Fruit Drinks, Meat Processing.

乳业 Dairy

奶油、牛奶、奶酪凝乳和乳清、干酪、酸奶。

Cream, milk, cheese curd and whey, cottage cheese,

医药/化妆品 Pharmaceutical/Cosmetics

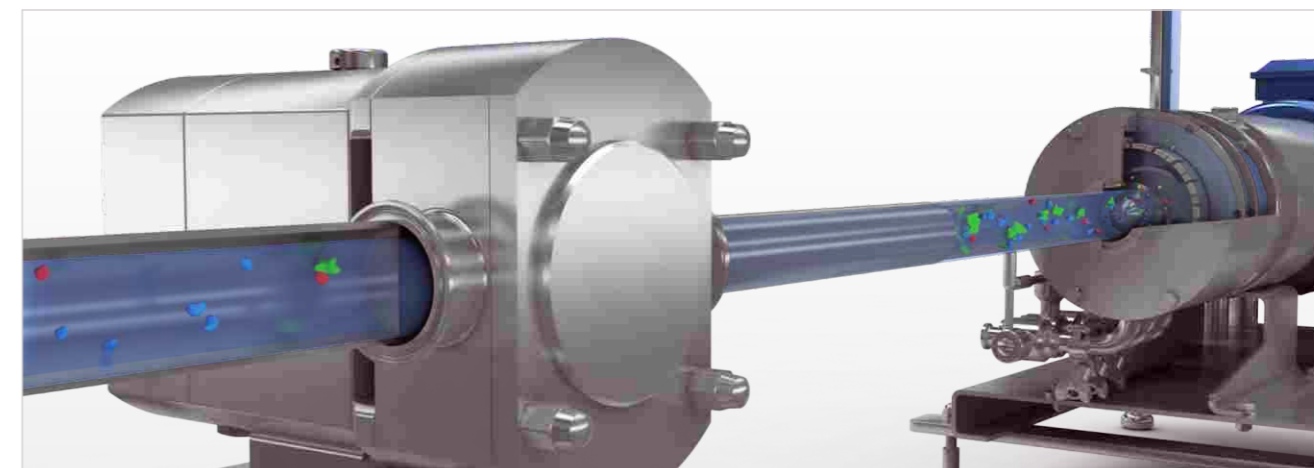
药膏、糖浆、提取物、浆液、面霜和乳液、头发定型凝胶和液体、染料和醇类、肥皂、化妆品。

Pill Pastes, Syrups, Extracts, Slurries, Face Creams & Lotions, Hair Styling Gels & Liquids, Dyes & Alcohols, Soaps, Cosmetics.

化工/工业 Chemical/Industrial

溶剂、油漆、燃料、树脂、聚合物和淤泥、石油和润滑油。

Solvents, Paints, Fuels, Resins, Polymers & Sludges, Oil & Lubricants.



INLET AND OUTLET CONNECTION

各种进出口连接方式

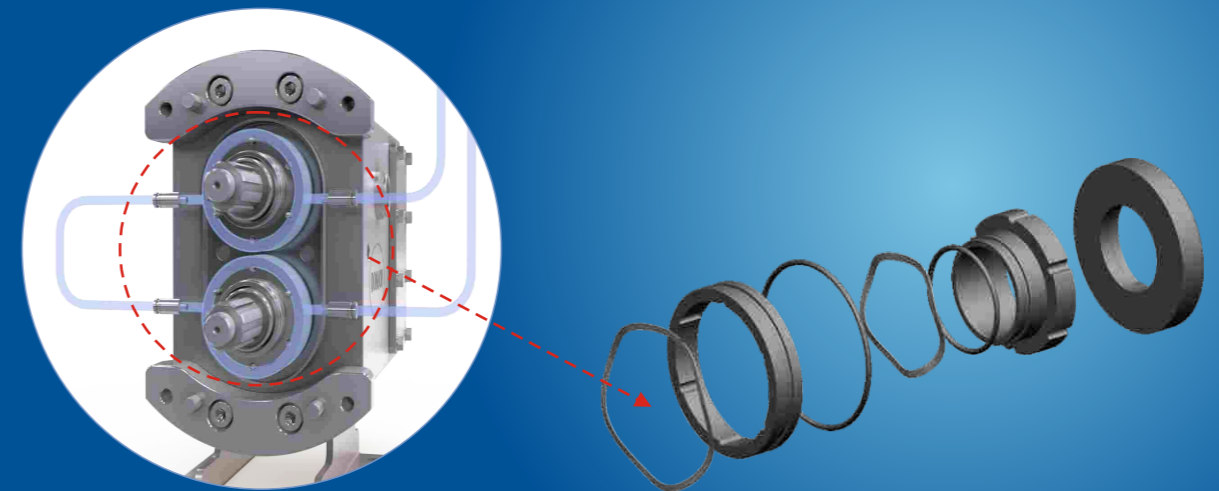


卡箍式 Clamp 螺母式 Union nut 螺纹式 Threaded 法兰式 Flange 无菌法兰 Normal flange

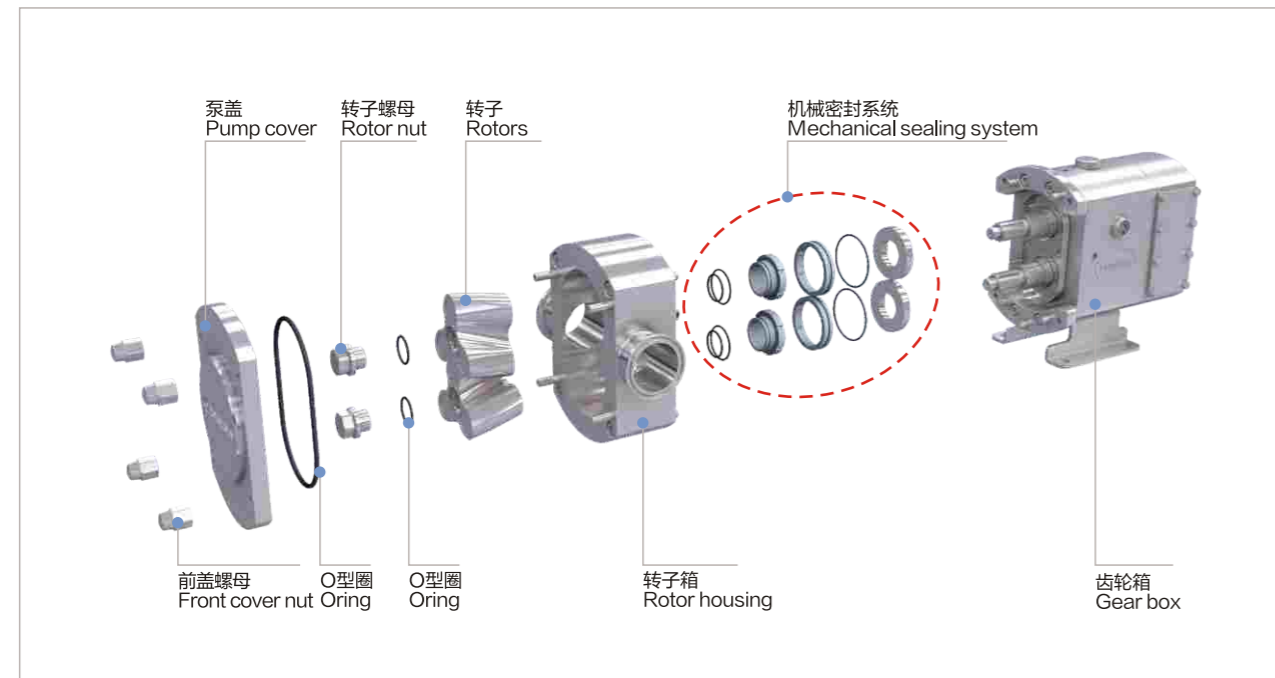
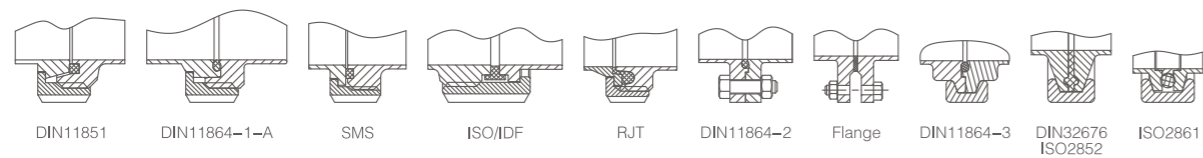
LOBE PUMP

MECHANICAL SEAL DESIGN

典型的产品应用



泵进口/出口连接标准 Pump inlet/outlet connection standard



DONJOY机封设计方案已经优化至无需专业人员、专业工具即可完成维修、维护。这样可节约成本、提高效率，且具有非常丰富的材质配置供选择。

DONJOY mechanical seal design has been optimized to complete repair and maintenance without professional person or tools. This can save costs, increase efficiency, and has lots of material configuration for selection.

机封配置 Mechanical Seal Configuration

- 1) SIC/C/EPDM 4) SIC/SIC/EPDM 7) TC/TC/EPDM
- 2) SIC/C/FKM 5) SIC/SIC/FKM 8) TC/TC/FKM
- 3) SIC/C/HNBR 6) SIC/SIC/HNBR 9) TC/TC/HNBR



注意：以上配置适用于单机封和双机封；
Note: The above mechanical seal material is suitable for single seal and double seal.

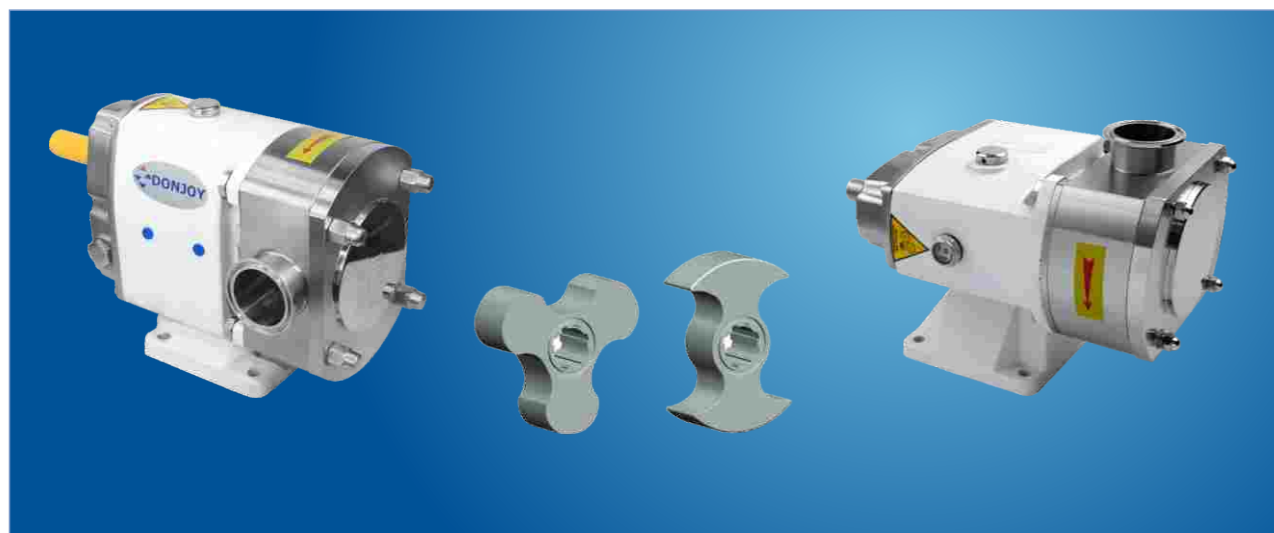
宽电压电机 Wide voltage motor

功率 Power(kw)	电压范围 Voltage	功率 Power(kw)	电压范围 Voltage
0.55kw	210V~230V/50HZ 360V~400V/50HZ 420V~460V/60HZ	4.0~5.5kw	360V~400V/50HZ 630V~690V/50HZ 420V~460V/60HZ
0.75kw		7.5~11kw	
1.1~1.5kw		15~18.5kw	
2.2~3.0kw		22~30kw	

注意：电机采用IEC EN IE3 能效等级，PTC热敏电阻。(相当于中国二级能效)
Note: The motor adopts IEC EN IE3 energy efficiency class, PTC thermistor. (Corresponding to China two energy efficiency)
注意：其他电机功率、电压、频率等，请联系东正。
Note: Other motor power, voltage, frequency, etc., please contact DONJOY

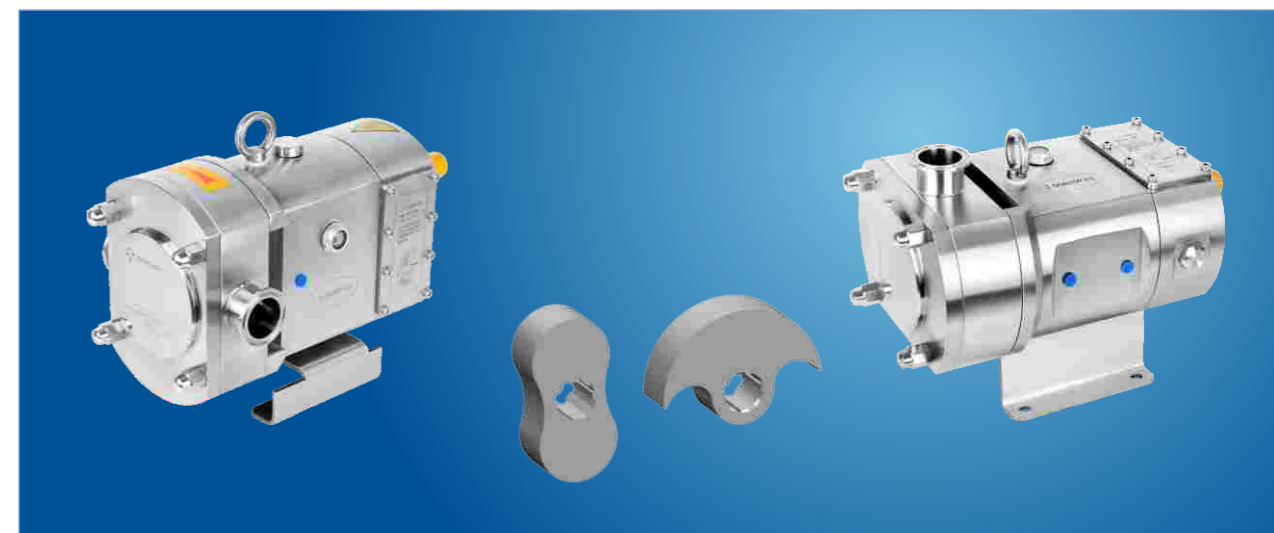
LOBE PUMP SELECTION TABLE

转子泵选型表



TU & STU 系列转子泵，相关参数选型表
TU & STU series lobe pump, parameter selection table

型号/规格 Model	转子泵 进出口尺寸 Inlet/Outlet	压力 Max pressure (bar)	最高转速 每分钟 Max speed per minute	建议转速范围 每分钟 Recommended speed range per minute	每转排量 Flow per revolution (L/R)	最大流量 Max flow (m ³ /h)	流量-每小时 Flow (m ³ /h)	每转排量 Flow per revolution (L/R)	最大流量 Max flow (m ³ /h)	流量-每小时 Flow (m ³ /h)
										
TUL/TUR-20	1"-DN25	15	700	50-450	0.122	5.1	0.37 3.29	0.137	5.8	0.41 3.7
TUL/TUR-23	1.5"-DN40	15	700	50-450	0.171	7.2	0.51 4.62	0.192	8.1	0.58 5.2
TUL/TUR-25	2"-DN50	15	700	50-450	0.240	10.1	0.72 6.48	0.270	11.3	0.81 7.3
TUL/TUR-30	2"-DN50	15	700	50-400	0.374	15.7	1.12 8.98	0.420	17.6	1.26 10.1
TUL/TUR-35	2.5"	12	700	50-400	0.468	19.7	1.40 11.23	0.526	22.1	1.58 12.6
TUL/TUR-55	DN65	12	500	50-350	0.531	15.9	1.59 11.15	0.597	17.9	1.79 12.5
TUL/TUR-60	3"	10	500	50-350	0.586	17.6	1.76 12.31	0.659	19.8	1.98 13.8
TUL/TUR-70	3"	15	500	50-350	1.371	41.1	4.11 28.79	1.511	45.3	4.53 31.7
TUL/TUR-80	DN80	15	500	50-350	1.371	41.1	4.11 28.79	1.511	45.3	4.53 31.7
TUL/TUR-100	4"-DN100	10	500	50-350	1.758	52.7	5.27 36.92	1.938	58.1	5.81 40.7
TUL/TUR-125	5"-DN125	10	500	50-350	2.233	67.0	6.70 46.89	2.461	73.8	7.38 51.7

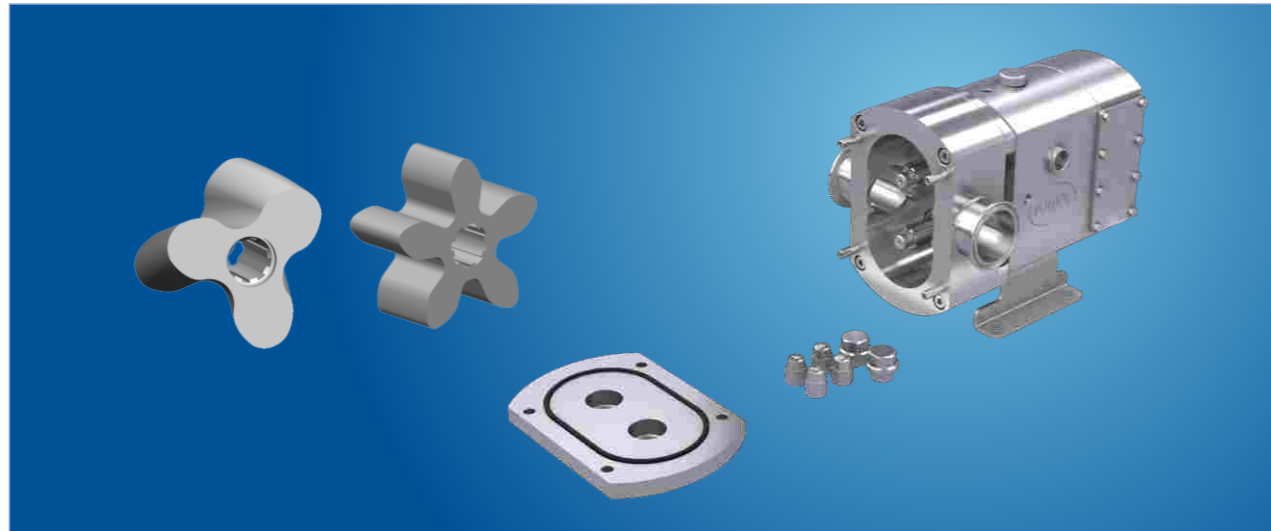


TU & STU 系列转子泵，相关参数选型表
TU & STU series lobe pump, parameter selection table

型号/规格 Model	转子泵 进出口尺寸 Inlet/Outlet	压力 Max pressure (bar)	最高转速 每分钟 Max speed per minute	建议转速范围 每分钟 Recommended speed range per minute	每转排量 Flow per revolution (L/R)	最大流量 Max flow (m ³ /h)	流量-每小时 Flow (m ³ /h)	每转排量 Flow per revolution (L/R)	最大流量 Max flow (m ³ /h)	流量-每小时 Flow (m ³ /h)
										
TUL/TUR-20	1"-DN25	15	700	50-450	0.121	5.1	0.36 3.27	0.136	5.7	0.41 3.7
TUL/TUR-23	1.5"-DN40	15	700	50-450	0.171	7.2	0.51 4.62	0.192	8.1	0.58 5.2
TUL/TUR-25	2"-DN50	15	700	50-450	0.240	10.1	0.72 6.48	0.269	11.3	0.81 7.3
TUL/TUR-30	2"-DN50	15	700	50-400	0.374	15.7	1.12 8.98	0.417	17.5	1.25 10.0
TUL/TUR-35	2.5"	12	700	50-400	0.468	19.7	1.40 11.23	0.522	21.9	1.57 12.5
TUL/TUR-55	DN65	12	500	50-350	0.531	15.9	1.59 11.15	0.593	17.8	1.78 12.5
TUL/TUR-60	3"	10	500	50-350	0.586	17.6	1.76 12.31	0.654	19.6	1.96 13.7
TUL/TUR-70	3"	15	500	50-350	1.365	41.0	4.10 28.67	1.507	45.2	4.52 31.6
TUL/TUR-80	DN80	15	500	50-350	1.365	41.0	4.10 28.67	1.507	45.2	4.52 31.6
TUL/TUR-100	4"-DN100	10	500	50-350	1.750	52.5	5.25 36.75	1.932	58.0	5.80 40.6
TUL/TUR-125	5"-DN125	10	500	50-350	2.222	66.7	6.67 46.66	2.454	73.6	7.36 51.5

LOBE PUMP SELECTION TABLE

转子泵选型表



TU & STU 系列转子泵, 相关参数选型表
TU & STU series lobe pump, parameter selection table

型号/规格 Model	转子泵 进出口尺寸 Inlet/Outlet	压力 Max pressure (bar)	最高转速 每分钟 Max speed per minute	建议转速范围 每分钟 Recommended speed range per minute	每转排量 Flow per revolution (L/R)	最大流量 Max flow (m³/h)	流量-每小时 Flow (m³/h)	每转排量 Flow per revolution (L/R)	最大流量 Max flow (m³/h)	流量-每小时 Flow (m³/h)		
												
TUL/TUR-20	1"-DN25	15	700	50-450	0.137	5.8	0.41	3.70	0.144	6.0	0.43	3.9
TUL/TUR-23	1.5"-DN40	15	700	50-450	0.192	8.1	0.58	5.18	0.203	8.5	0.61	5.5
TUL/TUR-25	2"-DN50	15	700	50-450	0.270	11.3	0.81	7.29	0.285	12.0	0.86	7.7
TUL/TUR-30	2"-DN50	15	700	50-400	0.420	17.6	1.26	10.08	0.442	18.6	1.33	10.6
TUL/TUR-35	2.5"	12	700	50-400	0.526	22.1	1.58	12.62	0.554	23.3	1.66	13.3
TUL/TUR-55	DN65	12	500	50-350	0.597	17.9	1.79	12.54	0.629	18.9	1.89	13.2
TUL/TUR-60	3"	10	500	50-350	0.659	19.8	1.98	13.84	0.695	20.9	2.09	14.6
TUL/TUR-70	3"	15	500	50-350	1.511	45.3	4.53	31.73	1.584	47.5	4.75	33.3
TUL/TUR-80	DN80	15	500	50-350	1.511	45.3	4.53	31.73	1.584	47.5	4.75	33.3
TUL/TUR-100	4"-DN100	10	500	50-350	1.938	58.1	5.81	40.70	2.031	60.9	6.09	42.7
TUL/TUR-125	5"-DN125	10	500	50-350	2.461	73.8	7.38	51.68	2.579	77.4	7.74	54.2

LOBE PUMP SELECTION TABLE


(MECHANICAL STEPLESS SPEED REGULATION)
转子泵选型表(机械无极调速)

机械无极调速转子泵 Mechanical Stepless Speed Regulating Lobe Pump

机械无极减速机配备有标准电机, 机械摩擦式无极调节器, 通过旋转手轮即可改变输出转速, 达到控制转速和流量的目的。

The mechanical stepless speed reducer is equipped with standard motor and mechanical friction type stepless regulator. The output speed can be changed by rotating the handwheel to control and regulate the pump flow.



 注意: 该数据是基于蝶式转子排量的结果。
Note: This data is based on the results of the butterfly rotor displacement.

型号/规格 Model	转子泵 进出口尺寸 Inlet/Outlet (卡箍螺纹)	最大压力 Max pressure (bar)	电机功率 Motor power (kw)	建议转速 每分钟 Suggested speed per minute	每转排量 Flow per revolution (L/R)	流量(m³/h)		重量 Weight (kg)
						建议-转速范围-流量 Flow(m³/h)according to suggested speed		
TUL/TUR-20	1"-DN25	15	2.2KW	200-450	0.122	1.5	3.2	106
		12	1.5KW					79
		9	1.1KW					73
		5	0.75KW					72
TUL/TUR-23	1.5"-DN40	15	4.0KW	200-450	0.171	2.1	4.5	125
		12	3.0KW					121
		9	2.2KW					107
		5	1.5KW					80
TUL/TUR-25	2"-DN50	12	5.5KW	200-450	0.240	2.9	6.4	186
		10	4.0KW					126
		7	3.0KW					122
		4	2.2KW					108
TUL/TUR-30	2"-DN50	15	7.5KW	200-400	0.374	4.5	9.0	219
		12	5.5KW					210
		8	4.0KW					150
		4	3.0KW					146
TUL/TUR-35	2.5"	12	7.5KW	200-400	0.468	5.6	11.2	221
		10	5.5KW					212
		7	4.0KW					152
		3	3.0KW					148
TUL/TUR-55	DN65	12	7.5KW	200-400	0.531	6.4	12.7	222
		9	5.5KW					213
		6	4.0KW					153
		3	3.0KW					149
TUL/TUR-60	3"	10	7.5KW	200-400	0.586	7.0	14.1	224
		7	5.5KW					215
		5	4.0KW					155
		3	3.0KW					151
TUL/TUR-70	3"	9	7.5KW	200-400	1.371	16.5	32.9	304
		5	5.5KW					295
TUL/TUR-80	DN80	7	7.5KW	200-400	1.371	16.5	32.9	304
		4	5.5KW					295
TUL/TUR-100	4"-DN100	5	7.5KW	200-400	1.758	21.1	42.2	310

注: 以上进出口适用于卡箍式、螺纹式、法兰式, 适用标准SMS/DIN/RJT/IDF。Notes: above inlet/outlet apply to SMS/DIN/RJT/IDF clamped, threaded and flanged

LOBE PUMP SELECTION TABLE

(FREQUENCY CONTROL / FIXED SPEED RATIO OUTPUT)
转子泵选型表(变频调速/定速比输出)

可变频调速输出转子泵 Variable Frequency Speed Adjustment Output Lobe Pump

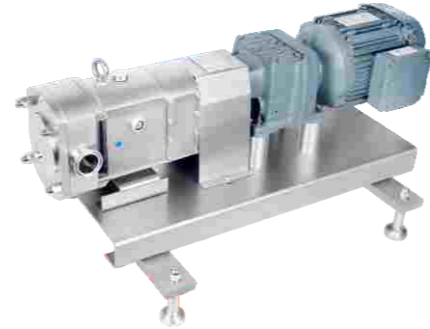
可变频输出减速机，有两种功能应用。


- 1) 定速比输出，转速不可调，选择时一定要注意转速选择。
- 2) 变频调速输出，转速可通过变频器调节，但必须配置变频器，反之转速不可调。

For variable frequency output reducer, there are two functional application.

- 1) Fixed speed ratio output, speed is not adjustable, must pay attention to speed when selecting.

- 2) Variable frequency speed adjustment output, speed can be adjusted by frequency converter. Should be configured with frequency converter, otherwise the speed will not be adjustable.



 注意：该数据是基于蝶式转子排量的结果。
Note: This data is based on the results of the butterfly rotor displacement.

型号/规格 Model	转子泵 进出口尺寸 Inlet/Outlet	最大压力 Max pressure (bar)	电机功率 Motor power (kw)	建议转速 每分钟 Suggested speed per minute	每转排量 Flow per revolution (L/R)	流量(m³/h)		重量 Weight (kg)
						建议-转速范围-流量	Flow(m³/h) according to suggested speed	
TUL/TUR-20	1"-DN25	15	2.2KW	50-450	0.122	0.37	3.3	94.2
		12	1.5KW					86.2
		9	1.1KW					77.2
		5	0.75KW					66.2
TUL/TUR-23	1.5"-DN40	15	3.0KW	50-450	0.171	0.51	4.6	99.5
		12	2.2KW					95.5
		9	1.5KW					87.5
		5	1.1KW					78.5
TUL/TUR-25	2"-DN50	15	5.5KW	50-450	0.240	0.72	6.5	156.4
		10	4.0KW					113.2
		7	3.0KW					100.2
		4	2.2KW					96.2
TUL/TUR-30	2"-DN50	15	7.5KW	50-400	0.374	1.12	9.0	193.4
		12	5.5KW					180.4
		8	4.0KW					137.2
		4	3.0KW					124.2
TUL/TUR-35	2.5"	12	7.5KW	50-400	0.468	1.40	11.2	195.2
		10	5.5KW					182.2
		7	4.0KW					139
		3	3.0KW					126
TUL/TUR-55	DN65	12	7.5KW	50-350	0.531	1.59	11.2	196.4
		9	5.5KW					183.4
		6	4.0KW					140.2
		3	3.0KW					127.2
TUL/TUR-60	3"	10	7.5KW	50-350	0.586	1.76	12.3	197.9
		7	5.5KW					184.9
		5	4.0KW					141.7
		3	3.0KW					128.7
TUL/TUR-70	3"	15	15KW	50-350	1.371	4.11	28.8	446.8
		12	11KW					427.8
		9	7.5KW					278.1
		5	5.5KW					265.1
TUL/TUR-80	DN80	15	15KW	50-350	1.371	4.11	28.8	446.8
		10	11KW					427.8
		7	7.5KW					278.1
		4	5.5KW					265.1
TUL/TUR-100	4"-DN100	12	15KW	50-350	1.758	5.3	36.9	453.3
		10	11KW					434.3
		6	7.5KW					284.6
		3	5.5KW					271.6
TUL/TUR-125	5"-DN125	12	18.5KW	50-350	2.223	6.7	46.7	476.4
		10	15KW					461.4
		7	11KW					442.4
		4	7.5KW					292.7

注：以上进出口适用于卡箍式、螺纹式、法兰式，适用标准SMS/DIN/RJT/IDF。Notes: above inlet/outlet apply to SMS/DIN/RJT/IDF clamped, threaded and flanged

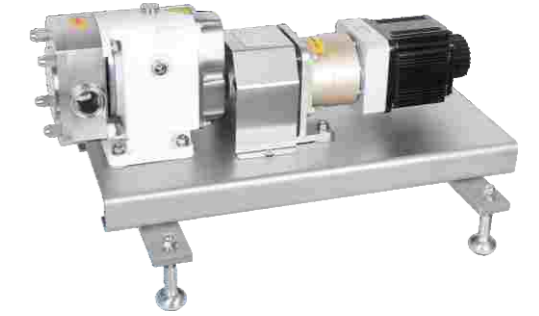
LOBE PUMP SELECTION TABLE


(SERVO MOTOR SPEED REDUCING OUTPUT)
转子泵选型表(伺服电机减速输出)

伺服电机减速输出转子泵 Servo Motor Speed Reducing Output Lobe Pump

伺服电机减速机输出是目前较为先进的控制方法，它具有控制精度高、噪音低、体积小、重量轻、恒力矩等优点。用户可根据需要编辑个性化程序实现多任务、多功能控制。

Servo motor reducer output is a relatively advanced control method currently. It is with much advantage, such as controlling high precision, low noise, small size, light weight, constant torque, etc.. Users can edit personalized program to achieve multi-tasking and multi-function control as needed.



 注意：该数据是基于蝶式转子排量的结果。
Note: This data is based on the results of the butterfly rotor displacement.

型号/规格 Model	转子泵 进出口尺寸 Inlet/Outlet	最大压力 Max pressure (bar)	电机功率 Motor power (kw)	建议转速 每分钟 Suggested speed per minute	每转排量 Flow per revolution (L/R)	流量(m³/h)		重量 Weight (kg)
						建议-转速范围-流量	Flow(m³/h) according to suggested speed	
TUL/TUR-20	1"-DN25	15	2.0KW	50-450	0.122	0.36	3.3	72.3
		12	1.5KW					72
		9	1.0KW					71.5
		5	0.75KW					66.2
TUL/TUR-23	1.5"-DN40	15	3.0KW	50-450	0.171	0.51	4.6	92.3
		12	2.0KW					73.6
		9	1.5KW					73.3
		5	1.0KW					72.8
TUL/TUR-25	2"-DN50	15	5.5KW	50-450	0.240	0.72	6.5	139
		10	4.5KW					98
		7	3.0KW					93
		4	2.0KW					74.3
TUL/TUR-30	2"-DN50	15	7.5KW	50-400	0.374	1.12	9.0	175.5
		12	5.5KW					165.5
		8	4.5KW					124.5
		4	3.0KW					119.5
TUL/TUR-35	2.5"	12	7.5KW	50-400	0.468	1.40	11.2	177.3
		10	5.5KW					167.3
		7	4.5KW					126.3
		3	3.0KW					121.3
TUL/TUR-55	DN65	12	7.5KW	50-350	0.531	1.59	11.2	178.5
		9	5.5KW					168.5
		6	4.5KW					127.5
		3	3.0KW					122.5
TUL/TUR-60	3"	10	7.5KW	50-350	0.586	1.76	12.3	180
		7	5.5KW					170
		5	4.5KW					129
		3	3.0KW					124
TUL/TUR-70	3"	15	15KW	50-350	1.371	4.11	28.8	327.2
		12	11KW					287.2
		9	7.5KW					277.7
		5	5.5KW					267.7
TUL/TUR-80	DN80	15	15KW	50-350	1.371	4.11	28.8	327.2
		10	11KW					287.2
		7	7.5KW					277.7
		4	5.5KW					267.7
TUL/TUR-100	4"-DN100	10	11KW	50-350	1.758	5.3	36.9	293.7
		6	7.5KW					284.2
		3	5.5KW					274.2
		10	15KW					341.8
TUL/TUR-125	5"-DN125	7	11KW	50-350	2.233	6.7	46.9	301.8
		4	7.5KW					292.3

LOBE PUMP

VARIOUS CONFIGURATIONS

转子泵不同配置

转子泵+保温夹套

Lobe pump with heat jacket

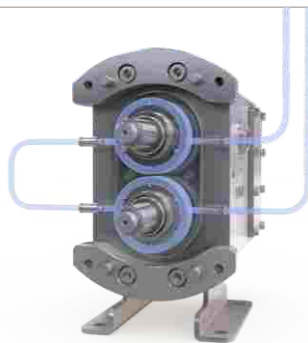


配置保温夹套的转子泵广泛应用于输送各种易凝固的物料，如输送巧克力，糖果，胶体等在常温下凝固或易变质的物料，根据工艺要求配备前盖保温或者四周保温等。

Lobe pump with heat jacket is widely used for transporting materials which are frozen or will freeze or perishable at room temperature, such as chocolate, candy, gum, etc.. According to the process requirements, it can be equipped with front cover insulation or surrounding insulation structure.

双机封密封(水冷冲洗)转子泵

Double mechanical seal (Water-cooled flushing) Lobe pump

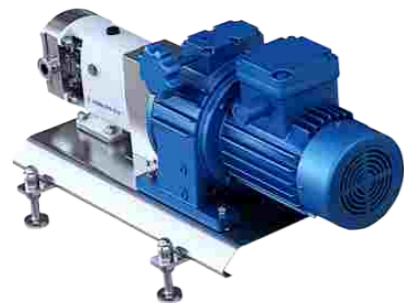


配置有双机封密封(水冷冲洗)的转子泵，适用于高温，高粘稠，长时间不停机，开机时或工作中偶有瞬间缺液工况上较为理想的选择。但一定要注意保持冷却液循环！

Lobe pump with water-cooled flushing mechanical seal is suitable for high temperature, high viscosity and continue working long hours. It is perfect choice for working condition with intermission of liquid. Be sure to keep cooling water circulation.

防爆电机转子泵

Lobe pump with explosion-proof motor

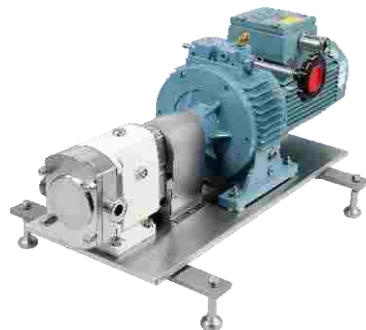


该泵配置了防爆电机和变速箱，防爆等级 EX DII BT4，防护等级 IP55，满足各种易燃易爆工作区域。

The pump is equipped with an explosion-proof motor and gearbox, explosion-proof grade EX DII BT4, protection class IP55, can meet various flammable and explosive working areas.

机械无极调速转子泵

Mechanical stepless speed regulating lobe pump



该泵配置了机械无极变速箱，可通过变速箱的手轮调速器，调控至工况所需要的转速。具有操作简单，方便，成本低。

The pump is equipped with a mechanical stepless gearbox, can be adjusted to the required speed through the gearbox's handwheel governor. It is simple-operating, convenient and low cost.

变频电机斜齿轮转子泵

Lobe pump with frequency converter helical gear

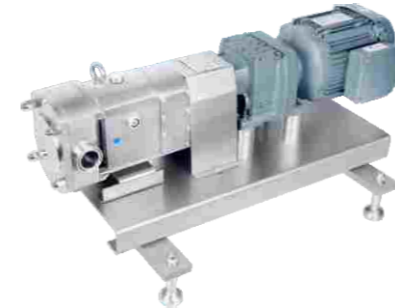


配置了斜齿轮变速箱和变频电机，该配置可根据用户个性化需要，设定、编辑变频器，也可通过PLC编程实现自动控制。

The pump is equipped with helical gear gearbox and frequency variable motor. According to the user's individual needs, can set and edit the inverter, also can be automatically controlled by PLC programming.

可变频调速输出转子泵

Variable frequency speed adjustment output lobe pump



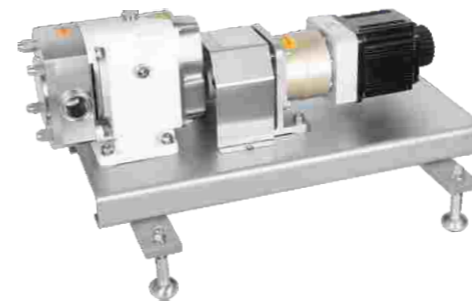
可变频输出减速机，有两种功能应用。

- 1) 定速比输出，转速不可调，选择时一定要注意转速选择。
- 2) 变频调速输出，转速是通过变频器调节，但必须配置变频器，反之转速不可调。

For variable frequency output reducer, there are two functional application.
1) Fixed speed ratio output, speed is not adjustable, must pay attention to speed selection when selecting.
2) Variable frequency speed adjustment output, speed is adjusted by frequency converter. Should be configured with frequency converter, otherwise the speed will not be adjustable.

伺服电机减速输出转子泵

Servo motor speed reducing output lobe pump



伺服电机减速机输出是目前较为先进的控制方法，它具有精度高、噪音低、体积小、重量轻、恒力扭矩等。用户可根据需要编辑个性化程序实现多任务、多功能控制。

Servo motor reducer output is a relatively advanced control method currently. It is with high precision, low noise, small size, light weight, constant torque, etc.. Users can edit personalized program to achieve multi-tasking and multi-function control as needed.

法兰料斗进口转子泵

Lobe pump with flange hopper



该泵设计有方法兰料斗和圆形法兰料斗两种，该装置可有效的解决不易流动的物料输送。

There are two kinds of flange hoppers: Square flange hopper and circular flange hopper. Lobe pump with flange hopper can effectively solve transportation of uneasy flowing liquid.

LOBE PUMP

VARIOUS CONFIGURATIONS

转子泵不同配置

移动式转子泵

Mobile lobe pump



移动式转子泵，配置有移动车子，轮子带有刹车，控制台；
控制台：1)内置变频器；2) 启动、停止电器控制。
Mobile rotor pump, equipped with trolley, console and wheels with brakes;
Console: 1) equipped with built-in inverter; 2) start and stop electrical control.

全防护罩转子泵

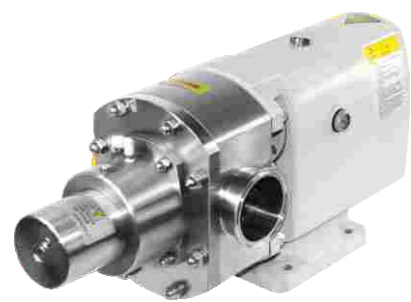
Lobe pump with whole protecting cover



全防护罩可减少因泵驱动装置不规则的卫生死角同时保护电机和人身安全。
Pump with whole protecting cover can reduce dead angle caused by irregular pump driving device. Protecting cover can also protect motor and personal safety.

内置安全系统转子泵

Lobe pump with built-in safety valve



该装置有效的缓解，输送过程中因其他设备故障或管道压力瞬时超过安全值而导致泵和其他仪器故障。
特点：当压力超过预设压力时内置安全阀自动打开，也可通过气体强迫打开安全阀。
选项：气/气，弹簧/气，压力从1bar-6bar
Lobe pump with built-in safety valve effectively reduce possibility of pump breakdown due to pipeline pressure exceeding than the safety value or other equipment's failure during transportation.
Features: Built-in safety valve automatically open when the pressure exceeds preset value. It can also be forced to open by gas.
Options: air/air, spring/air, pressure from 1bar to 6bar

外置安全系统转子泵

Lobe pump with external safety valve



外置安全系统，可有效解决因管路堵塞或其他问题引起的出口压力瞬间增加而损坏仪器和设备。
Lobe pump with external safety valve can effectively solve damage to instrument and equipment caused by the sudden increase of the outlet pressure caused by pipeline blockage or other problems.

TU LOBE PUMP

MODEL DESCRIPTION

TU 转子泵型号说明

TUL 20 01 M DN25 D 1-3T 12bar 1.5kw 380V 50Hz MBW

减速机款式：机械式无极减速机(MBW)；变频电机变频器无极调速(WR-QA)；定速比输出减速机(WR)
Reducer type: mechanical stepless speed regulating reducer (MBW); frequency conversion motor speed regulation (WR-QA); fixed speed output reducer (WR)
电机频率 Motor frequency: 50HZ; 60HZ
电压 Voltage: 220V 380V (详见选型表 refer to selection table)
电机功率 Motor power: 1.1kw 1.5kw 2.2kw.....
转子泵压力 Pressure (详见选型表 refer to selection table)
转子泵流量 Flow rate (详见选型表 refer to selection table)
接口标准 Connection standard: DIN (D) SMS (S) 3A(A) RJT (R) ISO/IDF (I)
进出口规格 Inlet/outlet size
连接方式 Connection: 螺纹threaded(M) 卡箍clamped(C) 法兰flange(F)
转子泵型号 Lobe pump model
转子泵进出口方向代码: TUL水平式; TUR垂直式; STUL水平; STUR垂直
Lobe pump inlet/outlet direction code: TUL horizontal; TUR vertical; STUL horizontal; STUR vertical

Example for lobe pump selection (with motor)

转子泵选型(带有电机)，举例：TUL 20-02-M-DN25-D/1-3T-12bar/1.5kw-380v-50Hz-WMB
表示TUL20转子泵-蝶型转子-进出口螺纹连接DN25-DIN标准/流量1-3T-压力12bar/电机功率1.5kw-380v-50hz-机械无极调速
Means TUL20 lobe pump-butterfly rotor-threaded inlet/outlet DN25-DIN standard/flow 1-3T/pressure 12bar/motor power 1.5kw-380v-50hz-mechanical stepless speed regulation

Example for lobe pump selection (without motor)

转子泵选型(不带电机)，举例：TUL 20-02-M-DN25-D
表示TUL20转子泵-蝶型转子-进出口螺纹连接DN25-DIN标准(不带电机)
Means TUL20 lobe pump-butterfly rotor-threaded inlet/outlet DN25-DIN standard (without motor)

注意：

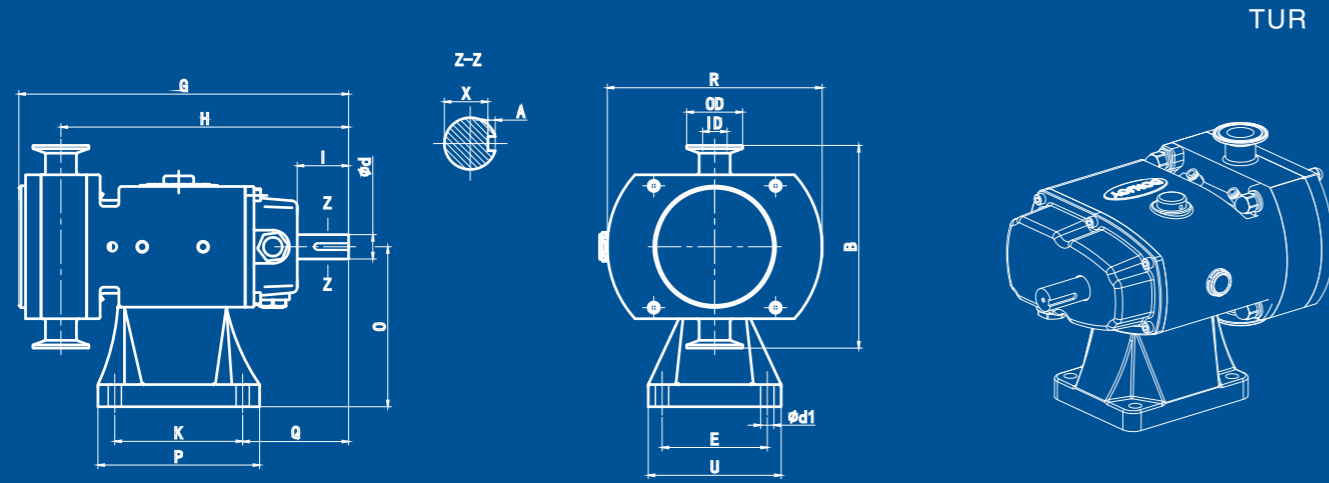
- 1) TUL和TUR系列是铸铁齿轮箱配置
- 2) STUL和STUR系列是不锈钢齿轮箱配置
- 3) 柔性螺旋转子适用于：TUL/R25; TUL/R60; TUL/R100

Note:

- 1) TUL and TUR series are cast iron gearbox configurations
- 2) STUL and STUR series are stainless steel gearbox configurations
- 3) Screw flexible rotor suitable for TUL/R25, TUL/R60, TUL/R100

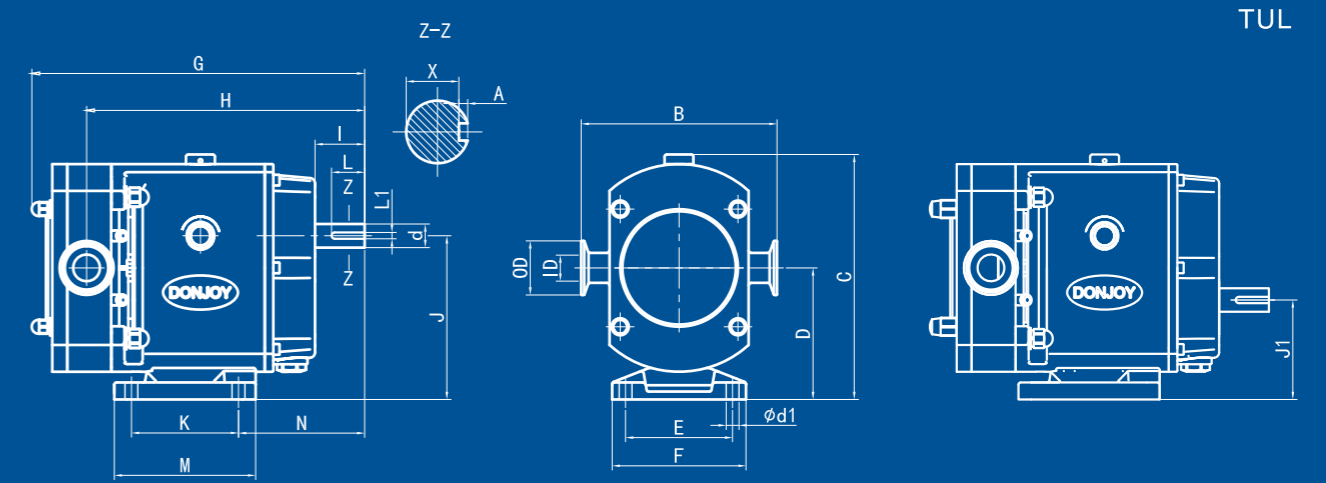
DJ-TUR SERIES LOBE PUMP

DJ-TUR 系列转子泵



DJ-TUL SERIES LOBE PUMP

DJ-TUL 系列转子泵

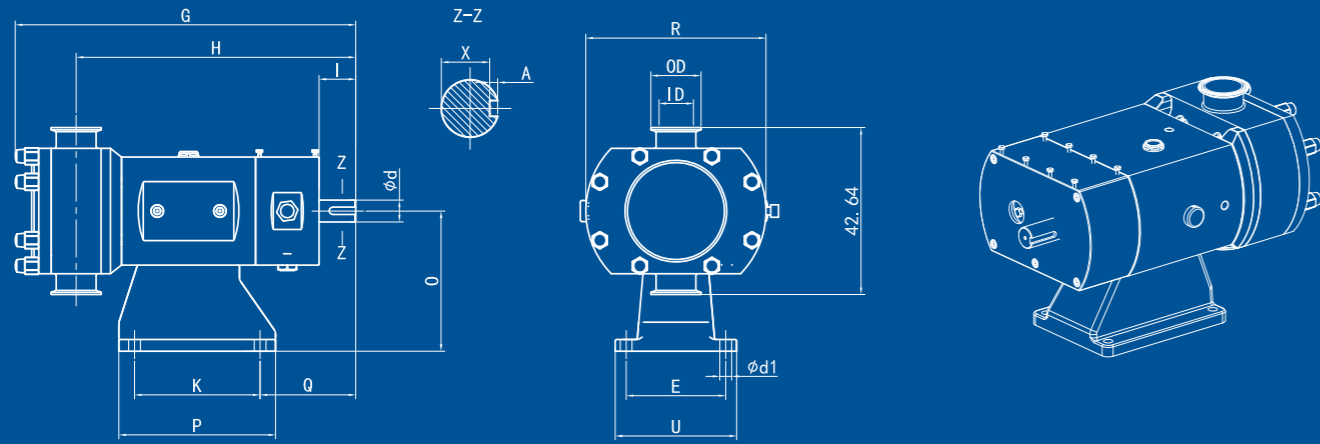


系列 Model	外形安装尺寸(不带电机) Assembly Dimension																						
	OD	ID	B	E	G	H	I	J	J1	K	L	L1	O	P	Q	R	U	OD	ID	d	d1	A	X
TUR-20	50.5	22.4	183	100	317	260	46.5	153	93	100	31	6	144.5	146	96	194	120	50.5	25	22	12	6	18.5
TUR-23	50.5	35	183	100	327	264.5	46.5	153	93	100	31	6	144.5	146	96	194	120	50.5	35	22	12	6	18.5
TUR-25	64	47.8	183	100	341	274	46.5	153	93	100	31	6	144.5	146	96	194	120	64	47.8	22	12	6	18.5
TUR-30	64	47.8	213	125	435	357	56	186.5	112	125	40	8	179.5	210	116.4	230	155	64	47.8	28	12	8	24
TUR-35	77.5	59.5	213	125	447	363	56	186.5	112	125	40	8	179.5	210	116.4	230	155	77.5	59.5	28	12	8	24
TUR-55	91	66	213	125	455	368	56	186.5	112	125	40	8	179.5	210	116.4	230	155	91	66	28	12	8	24
TUR-60	91	72.2	213	125	462	372	56	186.5	112	125	40	8	179.5	210	116.4	230	155	91	72.2	28	12	8	24
TUR-70	91	72.2	276	193	539	439	76.5	/	164	208	64	8	238.5	275	135	332	233.5	91	72.2	42	18	8	38
TUR-80	106	81	276	193	539	439	76.5	/	164	208	64	8	238.5	275	135	332	233.5	106	81	42	18	8	38
TUR-100	119	97.6	276	193	561	448	76.5	/	164	208	64	8	238.5	275	135	332	233.5	119	97.6	42	18	8	38
TUR-125	144.5	125	276	193	588	462	76.5	/	164	208	64	8	238.5	275	135	332	233.5	144.5	125	42	18	8	38

系列 Model	外形安装尺寸(不带电机) Assembly Dimension																						
	OD	ID	B	C	D	E	F	G	H	I	J	J1	K	L	L1	M	N	d	d1	A	X		
TUL-20	50.5	22.4	183	229	123	100	125	317	260	46.5	153	93	100	31	6	132	118	22	12	6	18.5		
TUL-23	50.5	35	183	229	123	100	125	327	264.5	46.5	153	93	100	31	6	132	118	22	12	6	18.5		
TUL-25	64	47.8	183	229	123	100	125	341	274	46.5	153	93	100	31	6	132	118	22	12	6	18.5		
TUL-30	64	47.8	213	271	149	125	155	435	357	56	186.5	112	125	40	8	181	181.5	28	12	8	24		
TUL-35	77.5	59.5	213	271	149	125	155	447	363	56	186.5	112	125	40	8	181	181.5	28	12	8	24		
TUL-55	91	66	213	271	149	125	155	455	368	56	186.5	112	125	40	8	181	181.5	28	12	8	24		
TUL-60	91	72.2	213	271	149	125	155	462	372	56	186.5	112	125	40	8	181	181.5	28	12	8	24		
TUL-70	91	72.2	276	434	224	193	233.5	539	439	76.5	/	164	208	64	8	275	172	42	18	8	38		
TUL-80	106	81	276	434	224	193	233.5	539	439	76.5	/	164	208	64	8	275	172	42	18	8	38		
TUL-100	119	97.6	276	434	224	193	233.5	561	448	76.5	/	164	208	64	8	275	172	42	18	8	38		
TUL-125	144.5	125	276	434	224	193	233.5	588	462	76.5	/	164	208	64	8	275	172	42	18	8	38		

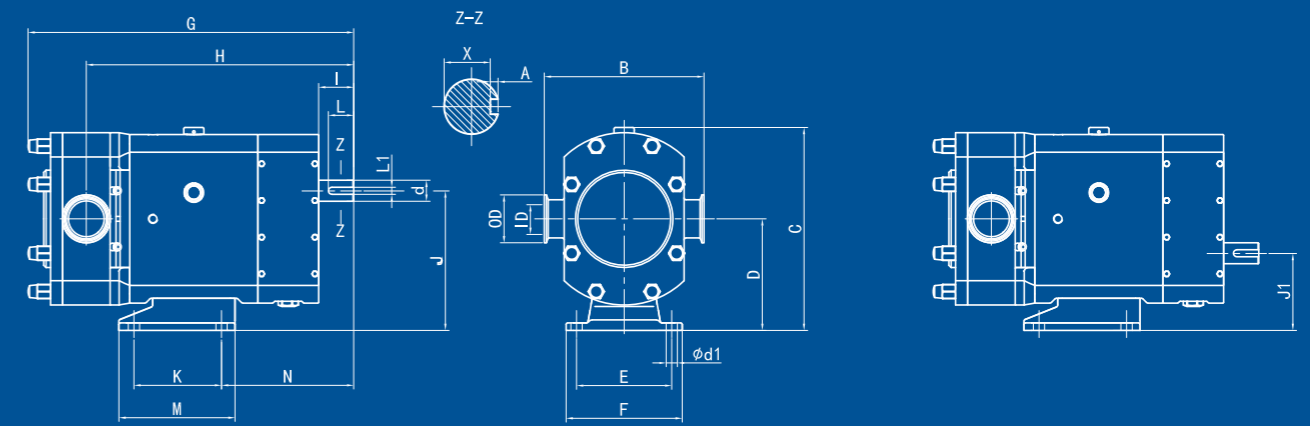
DJ-STUR SERIES LOBE PUMP

DJ-STUR系列转子泵



DJ-STUL SERIES LOBE PUMP

DJ-STUL系列转子泵



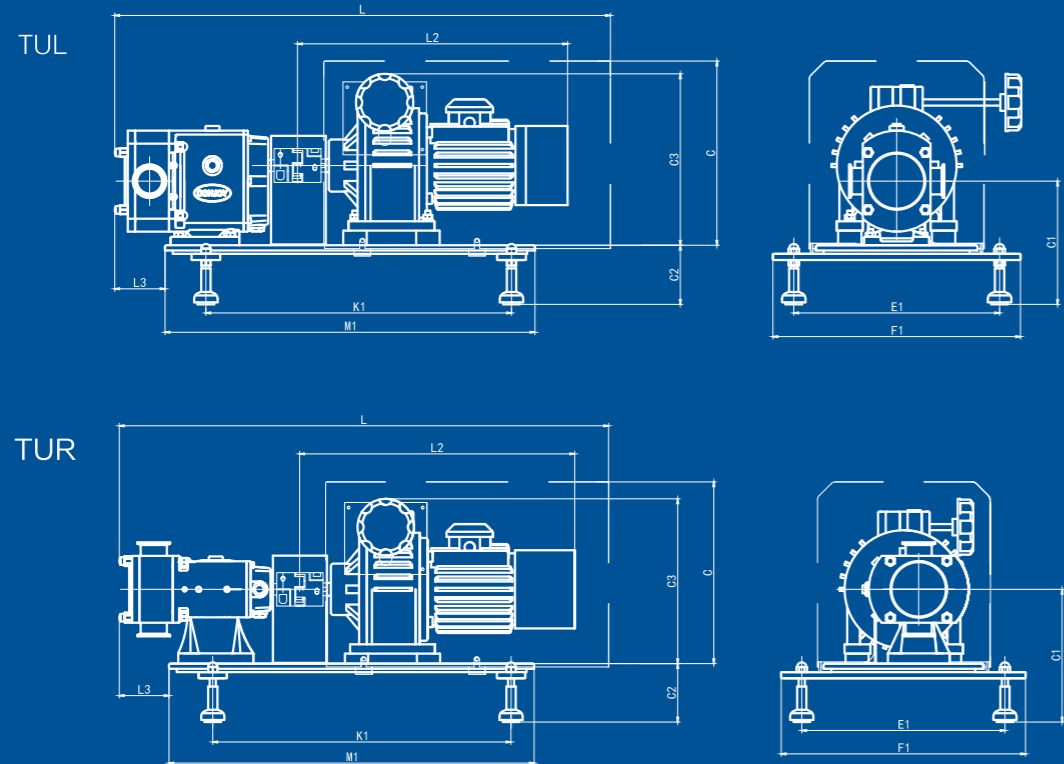
系列 Model	外形安装尺寸(不带电机) Assembly Dimension																						
	OD	ID	B	E	G	H	I	J	J1	K	L	L1	O	P	Q	R	U	OD	ID	d	d1	A	X
STUR-20	50.5	22.4	183	100	317	260	46.5	153	93	100	31	6	144.5	146	96	194	120	50.5	25	22	12	6	18.5
STUR-23	50.5	35	183	100	327	264.5	46.5	153	93	100	31	6	144.5	146	96	194	120	50.5	35	22	12	6	18.5
STUR-25	64	47.8	183	100	341	274	46.5	153	93	100	31	6	144.5	146	96	194	120	64	47.8	22	12	6	18.5
STUR-30	64	47.8	213	125	435	357	56	186.5	112	125	40	8	179.5	210	116.4	230	155	64	47.8	28	12	8	24
STUR-35	77.5	59.5	213	125	447	363	56	186.5	112	125	40	8	179.5	210	116.4	230	155	77.5	59.5	28	12	8	24
STUR-55	91	66	213	125	455	368	56	186.5	112	125	40	8	179.5	210	116.4	230	155	91	66	28	12	8	24
STUR-60	91	72.2	213	125	462	372	56	186.5	112	125	40	8	179.5	210	116.4	230	155	91	72.2	28	12	8	24
STUR-70	91	72.2	276	193	539	439	76.5	/	164	208	64	8	238.5	275	135	332	233.5	91	72.2	42	18	8	38
STUR-80	106	81	276	193	539	439	76.5	/	164	208	64	8	238.5	275	135	332	233.5	106	81	42	18	8	38
STUR-100	119	97.6	276	193	561	448	76.5	/	164	208	64	8	238.5	275	135	332	233.5	119	97.6	42	18	8	38
STUR-125	144.5	125	276	193	588	462	76.5	/	164	208	64	8	238.5	275	135	332	233.5	144.5	125	42	18	8	38

系列 Model	外形安装尺寸(不带电机) Assembly Dimension																				
	OD	ID	B	C	D	E	F	G	H	I	J	J1	K	L	L1	M	N	d	d1	A	X
STUL-20	50.5	22.4	183	229	123	100	125	317	260	46.5	153	93	100	31	6	132	118	22	12	6	18.5
STUL-23	50.5	35	183	229	123	100	125	327	264.5	46.5	153	93	100	31	6	132	118	22	12	6	18.5
STUL-25	64	47.8	183	229	123	100	125	341	274	46.5	153	93	100	31	6	132	118	22	12	6	18.5
STUL-30	64	47.8	213	271	149	125	155	435	357	56	186.5	112	125	40	8	181	181.5	28	12	8	24
STUL-35	77.5	59.5	213	271	149	125	155	447	363	56	186.5	112	125	40	8	181	181.5	28	12	8	24
STUL-55	91	66	213	271	149	125	155	455	368	56	186.5	112	125	40	8	181	181.5	28	12	8	24
STUL-60	91	72.2	213	271	149	125	155	462	372	56	186.5	112	125	40	8	181	181.5	28	12	8	24
STUL-70	91	72.2	276	434	224	193	233.5	539	439	76.5	/	164	208	64	8	275	172	42	18	8	38
STUL-80	106	81	276	434	224	193	233.5	539	439	76.5	/	164	208	64	8	275	172	42	18	8	38
STUL-100	119	97.6	276	434	224	193	233.5	561	448	76.5	/	164	208	64	8	275	172	42	18	8	38
STUL-125	144.5	125	276	434	224	193	233.5	588	462	76.5	/	164	208	64	8	275	172	42	18	8	38

MECHANICAL STEPLESS

REDUCER-LOBE PUMP-SIZE DATA SHEET

机械无极减速机-转子泵-尺寸数据表



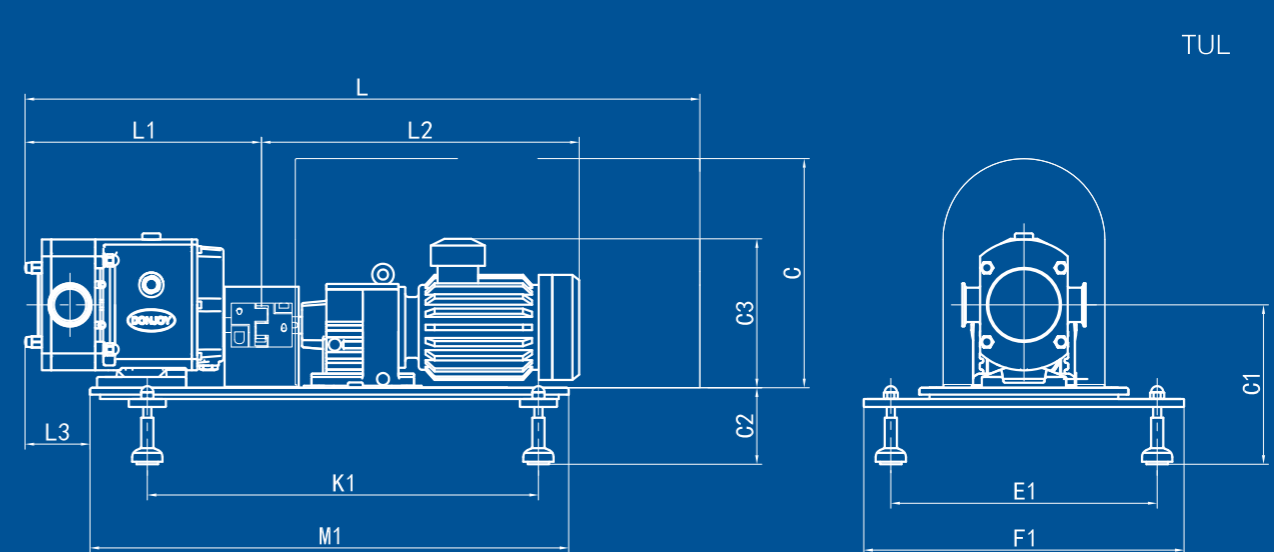
系列 Model	电机功率 Motor power	C	C1	C2	C3	E1	F1	K1	M1	L	L2	L3
TUL-20-25	1.1KW-1.5KW	354	236.5	113.5	330	395	475	580	710	951	516	96.5
	2.2-4KW	399	241.5	118.5	360	475	555	618.5	810	1040	596	96.5
TUL-30-60	3KW-4KW	399	267.5	118.5	389	475	555	630	810	1131	596	106
	5.5KW-7.5KW	496	291	128.5	447	545	625	755	980	1280	768	106
TUL-70-125	5.5KW-7.5KW	496	388.5	128.5	447	545	625	830	980	1396	768	115

系列 Model	电机功率 Motor power	C	C1	C2	C3	E1	F1	K1	M1	L	L2	L3
TUR-20-25	1.1KW-1.5KW	354	258	113.5	320	395	475	580	710	951	516	96.5
	2.2-4KW	399	268.5	118.5	290	475	555	618.5	810	1040	596	96.5
TUR-30-60	3KW-4KW	399	298	118.5	303	475	555	630	810	1131	596	106
	5.5KW-7.5KW	496	328.5	128.5	333.5	545	625	755	980	1280	768	106
TUR-70-125	5.5KW-7.5KW	496	367	128.5	370	545	625	830	980	1390	768	160

VARIABLE FREQUENCY MOTOR

OUTPUT REDUCER-LOBE PUMP-SIZE DATA SHEET

可变频电机输出减速机-转子泵-尺寸数据表



系列 Model	TUL/R-20	TUL/R-23	TUL/R-25	TUL/R-30	TUL/R-35	TUL/R-55	TUL/R-60	TUL/R-70	TUL/R-80	TUL/R-100	TUL/R-125
L1	327	337	351	445	457	465	472	549	549	571	598

系列 Model	电机功率 Motor power	C	C1	C2	C3	E1	F1	K1	M1	L	L2	L3
TUL-20-25	1.1KW	340	236.5	113.5	221	395	475	580	710	1001	471	96.5
	1.5KW	360	261.5	113.5	258	395	475	580	710	1001	483	96.5
	2.2KW	360	261.5	113.5	258	395	475	580	710	1001	503	96.5
	3.0KW	360	261.5	113.5	258	395	475	580	710	1001	538	96.5
	4.0KW	360	272	113.5	284.5	395	475	580	710	1014.5	590	96.5
TUL-30-60	3.0KW	360	262.5	113.5	268.5	395	475	520	710	1089	538	106
	4.0KW	360	276	113.5	281	395	475	450	710	1102	590	106
	5.5KW	360	286	118.5	279	475	555	630	810	1265	680	106
	7.5KW	360	286	118.5	279	475	555	630	810	1265	730	106
TUL-70-125	5.5KW	450	355.5	128.5	313	545	625	830	980	1379	682	115
	7.5KW	450	355.5	128.5	313	545	625	830	980	1379	732	115
	11KW (R97)	540	413.5	128.5	442	545	625	920	1130	1677	913	115
	15KW (R97)	540	413.5	128.5	467	545	625	920	1130	1677	982	115
	11KW-15KW (R97)	560	352.5	128.5	533	545	625	920	1130	1505	866	115

VARIABLE FREQUENCY MOTOR

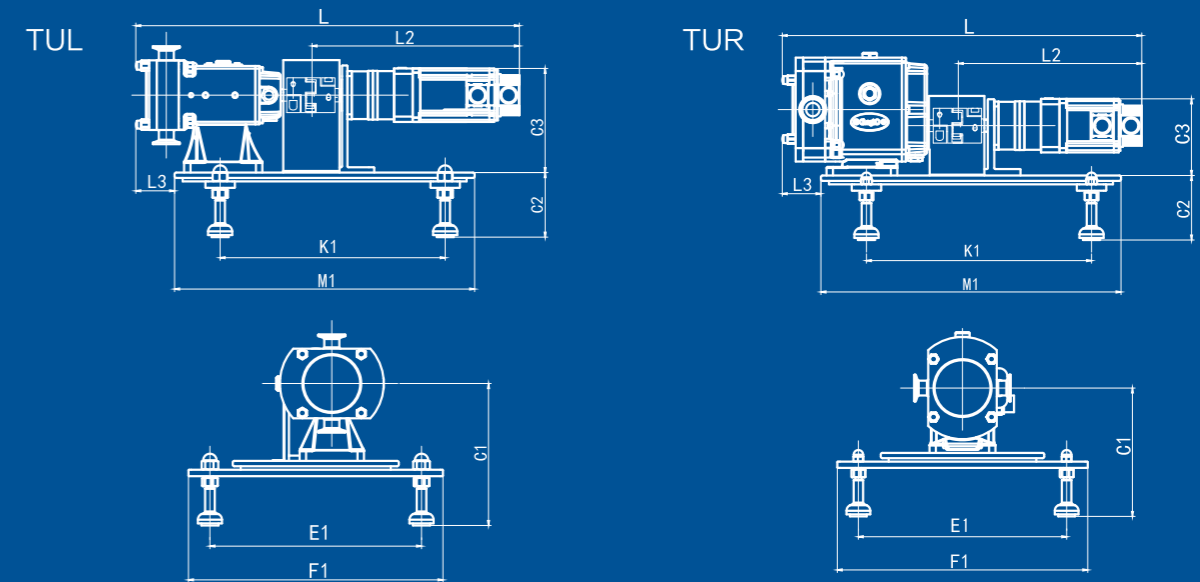
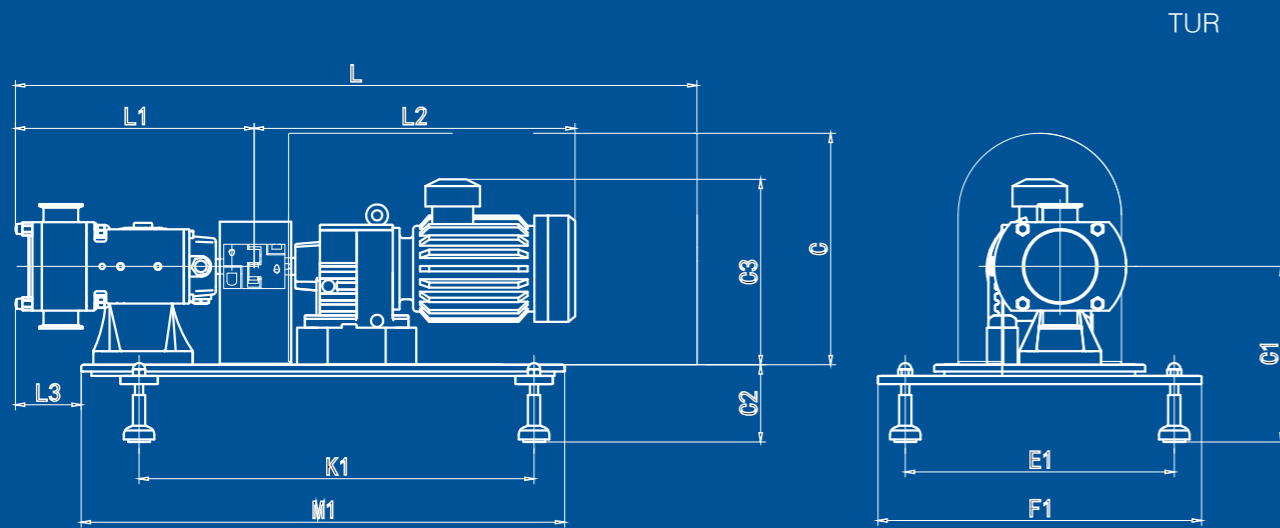
OUTPUT REDUCER-LOBE PUMP-SIZE DATA SHEET

可变频电机输出减速机-转子泵-尺寸数据表

SERVO MOTOR SPEED

REDUCER-LOBE PUMP-DIMENSION DATA SHEET

伺服电机减速机-转子泵-尺寸数据表



系列 Model	TUL/R-20	TUL/R-23	TUL/R-25	TUL/R-30	TUL/R-35	TUL/R-55	TUL/R-60	TUL/R-70	TUL/R-80	TUL/R-100	TUL/R-125
L1	327	337	351	445	457	465	472	549	549	571	598

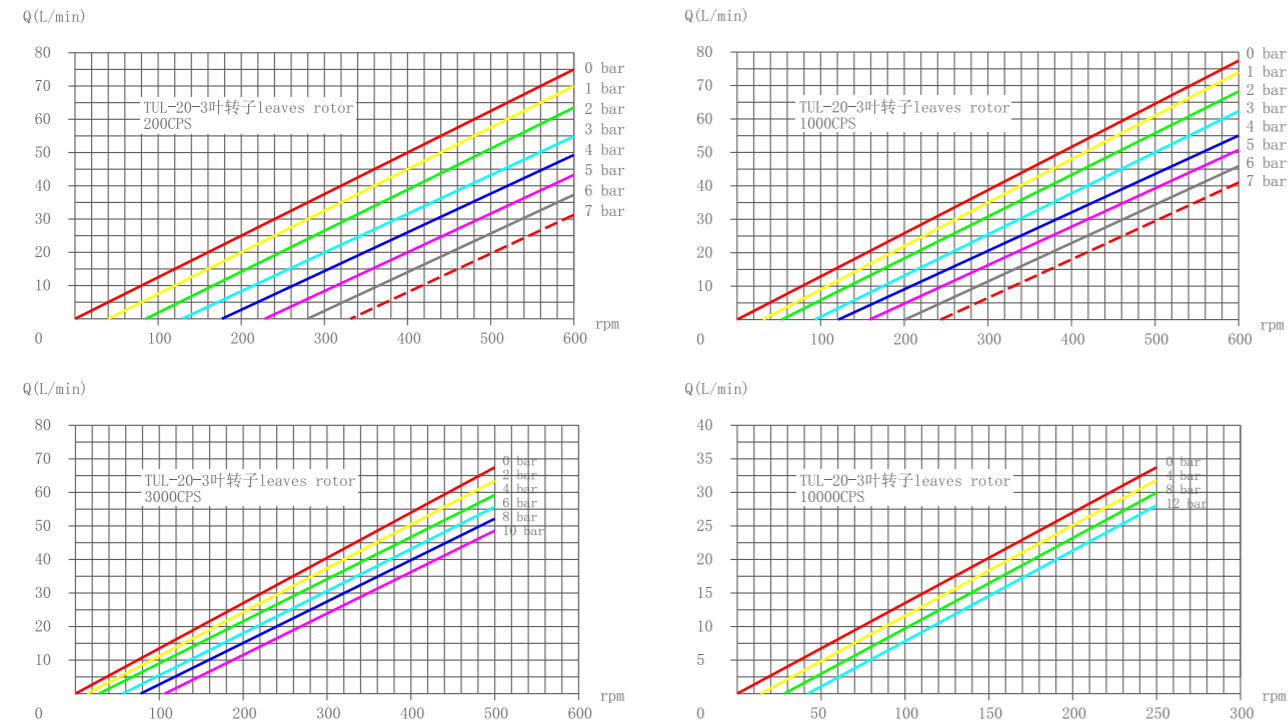
系列 Model	电机功率 Motor power	C	C1	C2	C3	E1	F1	K1	M1	L	L2	L3
TUR-20-25	1.1KW	360	258	113.5	272.5	395	475	580	710	1001	471	96.5
	1.5KW	360	258	113.5	284.5	395	475	580	710	1001	483	96.5
	2.2KW	360	258	113.5	284.5	395	475	580	710	1001	503	96.5
	3.0KW	360	258	113.5	301.5	395	475	580	710	1001	538	96.5
TUR-30-60	4.0KW	360	258	113.5	300.5	395	475	580	710	1014	590	96.5
	3.0KW	360	293	113.5	336.5	395	475	520	710	1089	538	106
	4.0KW	360	293	113.5	335.5	395	475	450	710	1102	590	106
TUR-70-125	5.5KW	360	298	118.5	329	475	555	630	810	1265	680	106
	7.5KW	360	298	118.5	329	475.7	555	630	810	1265	730	106
	5.5KW	450	367	128.5	388	545	625	830	980	1379	682	160
TUR-70-125	7.5KW	450	367	128.5	388	545	625	830	980	1379	732	160
	11KW(R97)	540	367	128.5	456	545	625	920	1130	1676	913	160
	15KW(R97)	540	367	128.5	481	545	625	920	1130	1676	982	160
TUR-70-125	11KW-15KW(R97)	640	367	128.5	607.5	545	625	920	1130	1505	866	160

系列 Model	电机功率 Motor power	C1	C2	C3	E1	F1	K1	M1	L	L2	L3
DJ-TUL-20-25	1.0KW	236.5	113.5	143	395	475	420	560	671	333	96.5
	2.0KW	236.5	113.5	143	395	475	420	560	717	379	96.5
	3.0KW	236.5	113.5	158	395	475	420	560	728	401	96.5
	5.5KW	255	113.5	158	395	475	420	560	927	595	96.5
DJ-TUL-30-60	3.0KW	262.5	113.5	176.5	395	475	550	710	841	401	106
	5.5KW	262.5	113.5	201.5	395	475	550	710	1040	595	106
	7.5KW	262.5	113.5	201.5	395	475	550	710	1102	657	106
DJ-TUL-70-125	5.5KW	342.5	118.5	254	545	625	620	810	1150	595	115
	7.5KW	342.5	118.5	254	545	625	620	810	1212	657	115
	11KW	342.5	118.5	274	545	625	620	810	1267	715	115
DJ-TUR-20-25	15KW	342.5	118.5	274	545	625	620	810	1345	790	115
	1.0KW	258	113.5	194.5	395	475	420	560	671	333	96.5
	2.0KW	258	113.5	194.5	395	475	420	560	717	379	96.5
DJ-TUR-30-60	3.0KW	258	113.5	194.5	395	475	420	560	728	401	96.5
	5.5KW	258	113.5	234.5	395	475	420	560	927	595	96.5
	3.0KW	293	113.5	244.5	395	475	550	710	841	401	106
DJ-TUR-70-125	5.5KW	293	113.5	269.5	395	475	550	710	1040	595	106
	7.5KW	293	113.5	269.5	395	475	550	710	1102	657	106
	5.5KW	357	118.5	328.5	545	625	620	810	1150	595	160
DJ-TUR-70-125	7.5KW	357	118.5	328.5	545	625	620	810	1212	657	160
	11KW	357	118.5	348.5	545	625	620	810	1267	715	160
	15KW	357	118.5	348.5	545	625	620	810	1345	790	160

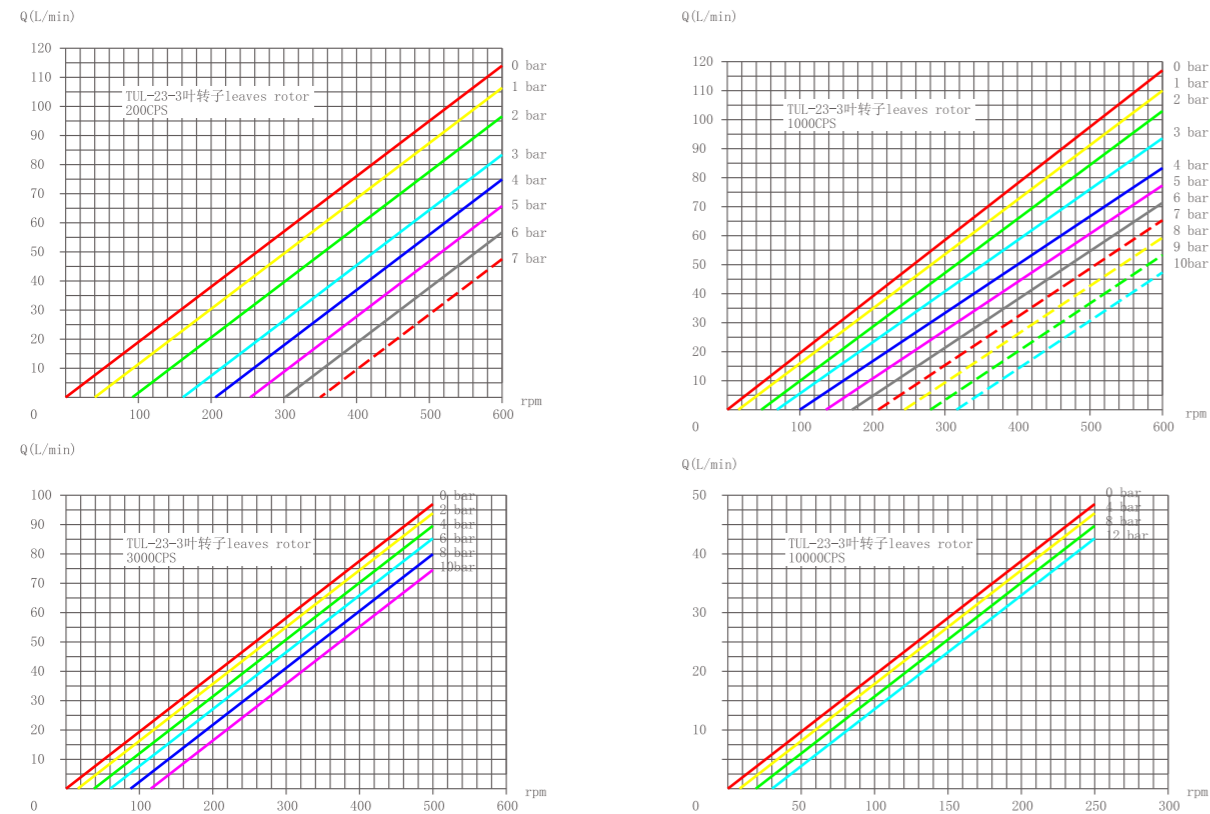
TUL/TUR SERIES

TUL/TUR 系列转子泵综合曲线图

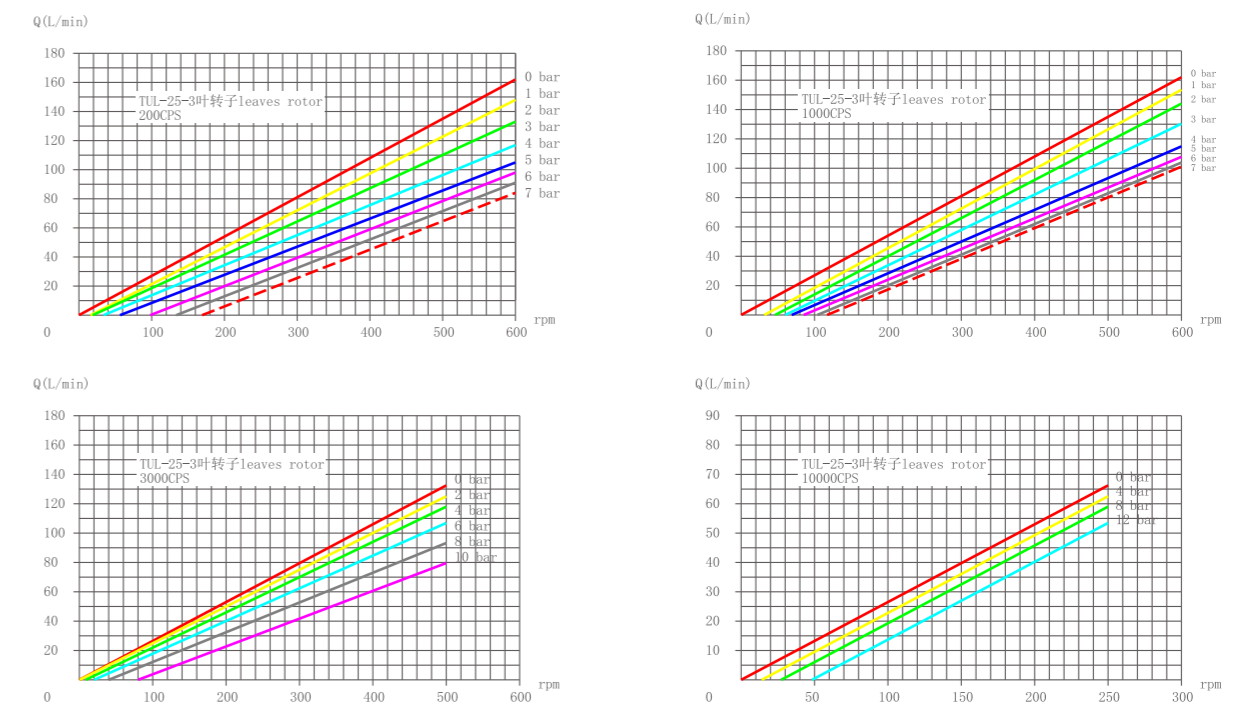
TUR/TUL20转子泵综合曲线图 Lobe pump comprehensive graph



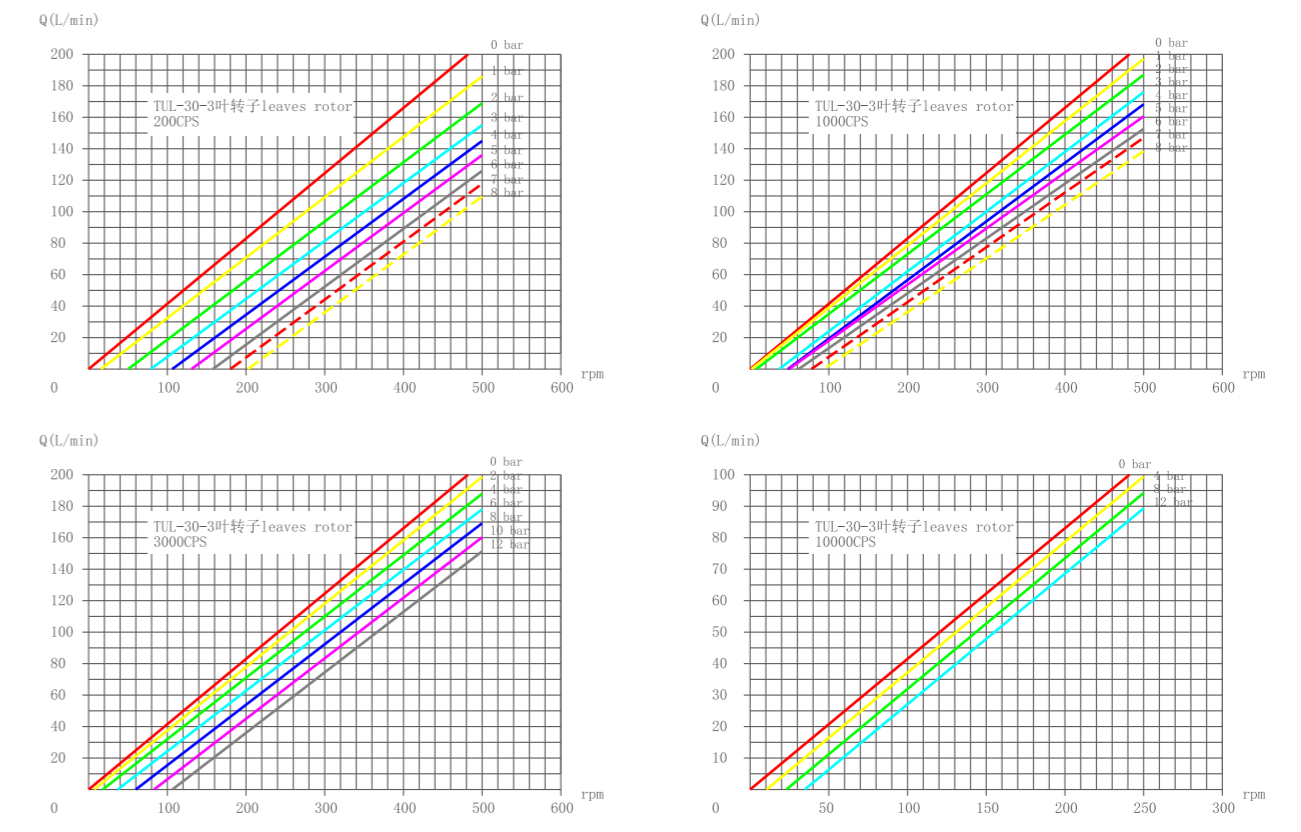
TUR/TUL23转子泵综合曲线图 Lobe pump comprehensive graph



TUR/TUL25转子泵综合曲线图 Lobe pump comprehensive graph



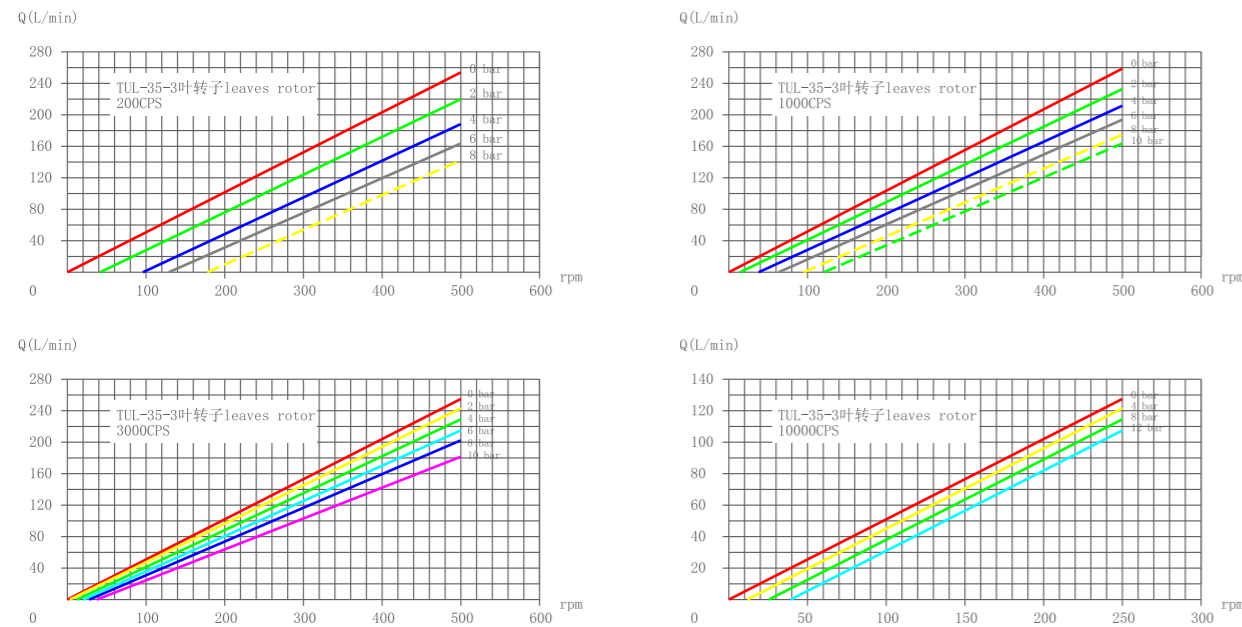
TUR/TUL30转子泵综合曲线图 Lobe pump comprehensive graph



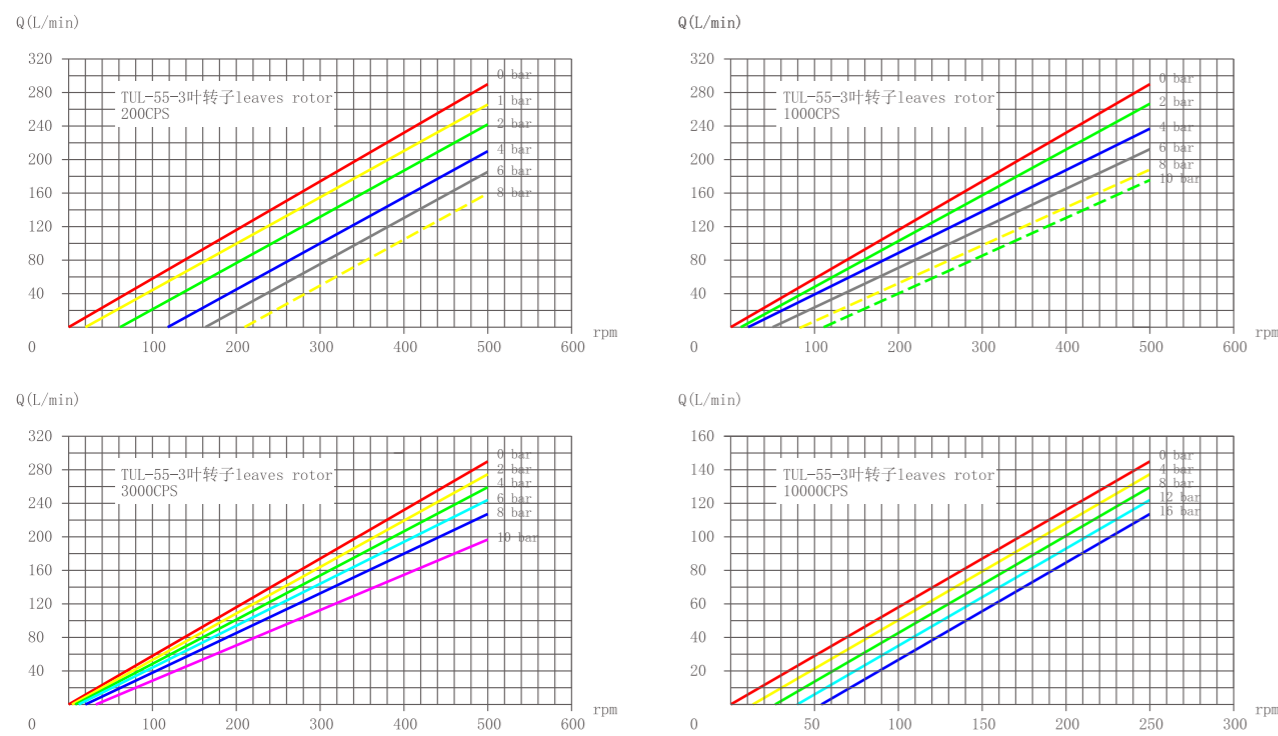
TUL/TUR SERIES

TUL/TUR 系列转子泵综合曲线图

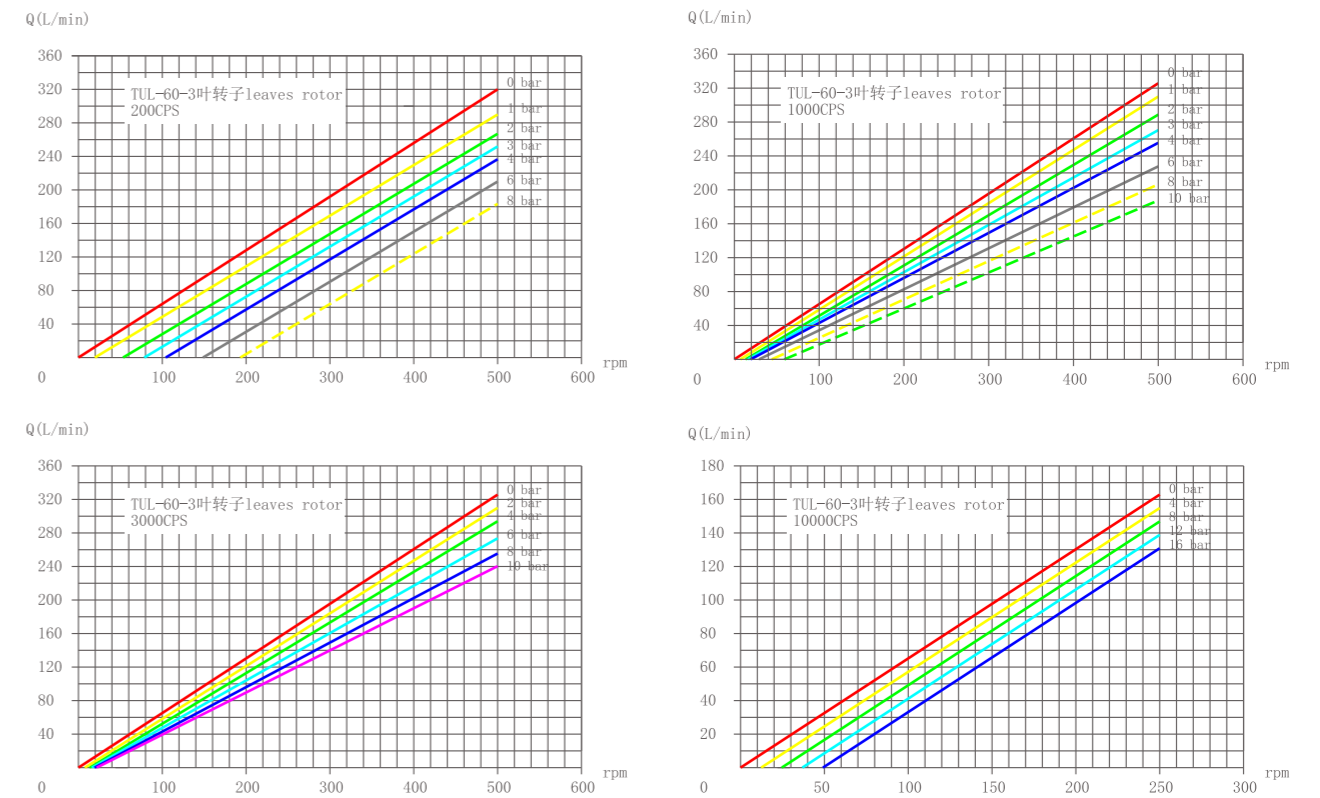
TUR/TUL35转子泵综合曲线图 Lobe pump comprehensive graph



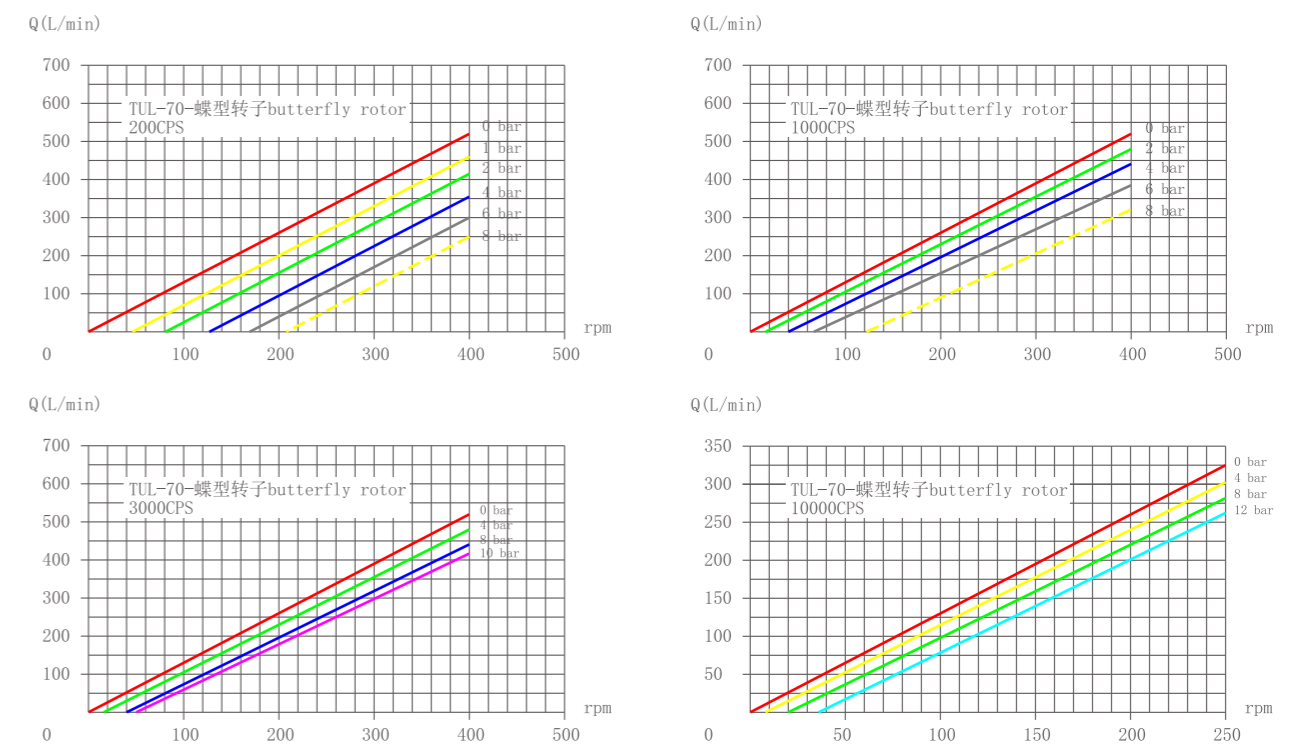
TUR/TUL55转子泵综合曲线图 Lobe pump comprehensive graph



TUR/TUL60转子泵综合曲线图 Lobe pump comprehensive graph



TUR/TUL70转子泵综合曲线图 Lobe pump comprehensive graph



TUL/TUR SERIES

TUL/TUR系列转子泵综合曲线图

TUR/TUL100-125转子泵综合曲线图 Lobe pump comprehensive graph

