

HCB 系列磁力驱动单级单吸离心泵

HCB Series Magnetic Driven Single-suction Centrifugal Pump

参照ISO15783、API685、ASME B73.5标准
Conform to ISO15783, API685, ASME B73.5 standard

输送介质温度-40°C~175°C
Operation temperature -40°C~175°C

最大工作压力2.5MPa
Max working pressure 2.5MPa

最大功率 315Kw
Max power 315Kw

滑动轴承35、45、60、75
Sliding bearing 35, 45, 60, 75



Since 1958

磁力驱动单级单吸离心泵

Magnetic Driven Single-suction Centrifugal Pump

主要应用于 Application

- 石油化工
- 精细化工
- 造纸工业
- 制药工业
- 食品加工
- 环境保护
- petrochemical
- fine chemical
- pulp and paper
- pharmaceutical
- food processing
- environment protection

用法 Usage

无泄漏磁力泵用于输送清洁无颗粒且不含铁磁性物质的介质，尤其适用于输送强腐蚀、有毒有害、易燃易爆和贵重液体，符合ISO15783标准。

Leak-free magnetic pump is used for conveying clean medium without particles and nonferromagnetic, especially suitable for transporting highly corrosive, toxic, hazardous, flammable and precious liquids, conform to ISO15783 standard.

法兰标准 Flange standard	EN 1092-1	ASME/ANSI B16.5
公称压力 Nominal pressure	PN16	class150

材料 Material

与介质接触的过流部件，材料符合ASTM标准，常用材料如下：

Wetted parts comply to ASTM standard, common material as follows:

- 不锈钢
- 铸钛
- 哈氏合金
- Cast stainless steel
- Cast titanium
- Cast hastelloy alloy

泵型号说明 Pump model instruction



泵运行数据 Operating data

流量 (0.8~2500) m ³ /h	Flow rate (0.8~2500)m ³ /h
扬程 (4~250) m	Total heads (4~250)m
温度 (-40~175) °C	Operating temperature (-40~175)°C
功率最大 (315) Kw	Max power (315)Kw

现场标准条件 Standard conditions at site

- 连续运行过程中的相对湿度不大于90%
- 环境温度不高于40°C，不低于4°C
- 海拔高度不超过1000m

- Relative humidity during continuous operation max. 90%
- Ambient temperature max.40°C, min.4°C
- Permissible altitude up to 1000m above sea level

当场地条件与上述规定不符时必须加以说明。

Deviations from the site conditions specified herein must already be disclosed in the inquiry.

流量 Flow rate

离心泵的允许运行范围取决于：

The permissible operating range of centrifugal pumps depends on:

- 叶轮形状
- 转速
- 振动
- 介质特性
- 轴承及轴载荷
- 泵壳的散热及材料的抗腐蚀性
- 工况进口净压头与泵汽蚀余量

- Impeller shape
- Speed
- Vibration
- Medium characteristics
- Bearing and shaft load
- Heat dissipation-particularly with regard to insulated volute casings and the corrosion resistance of materials
- The net positive suction head of the working condition and NPSH

适用工作范围在性能曲线和泵数据表中表示。

The operating range applicable to the pump is indicated in the individual characteristic curves and the pump data sheet.

出口压力 Outlet pressure

离心泵出口压力取决于：

The pump outlet pressure at the outlet nozzle depends on:

- 泵入口压力
- 选定叶轮直径的最大总扬程
- 泵送介质的密度

- The pump inlet pressure
- The maximum total head of the selected impeller diameter
- The density of the medium to be pumped

最大泵出口压力 $P_{2max\ op}$ 计算公式如下：

The maximum pump outlet pressure $P_{2max\ op}$ is calculated using the formula:

$$P_{2max\ op} = P_{1max\ ip} + \rho * g * H * 10^{-5}$$

$$P_{2max\ op} = P_{1max\ ip} + \rho * g * H * 10^{-5}$$

$P_{2max\ op}$ 为最大出口压力
 $P_{1max\ ip}$ 为最大进口压力
 ρ 为泵送介质密度
 g 为引力常数

$P_{2max\ op}$ = maximum pump outlet pressure(bar)
 $P_{1max\ ip}$ = maximum pump inlet pressure(bar)
 ρ = density of the medium to be pumped(kg/m³)
 g = gravitation constant(m/s²)

出口压力

Outlet pressure

H为零流量下的最大总扬程或在选定叶轮直径下性能曲线峰值

H = maximum total head at zero flow or at the peak of the pump's characteristic curve at the selected impeller diameter(m)

泵选择和运行必须确保泵出口最大压力绝不能超过工作温度下泵体最大允许工作压力。这也适用于排放阀关闭时的调试。

Pumps must be selected and operated in a way which ensures that the maximum pump outlet pressure does by no means exceed the maximum permissible operating pressure of the casing pall wc at operating temperature. This also applies to commissioning while the diacharge vavle is closed(refer to fig 1).

压力和温度限制

Pressure and temperature limitations

泵体和泵盖最大工作压力取决于工作温度：

The maximum casing operating pressure pall wc of the casing and the casing cover depends on the operating temperature:

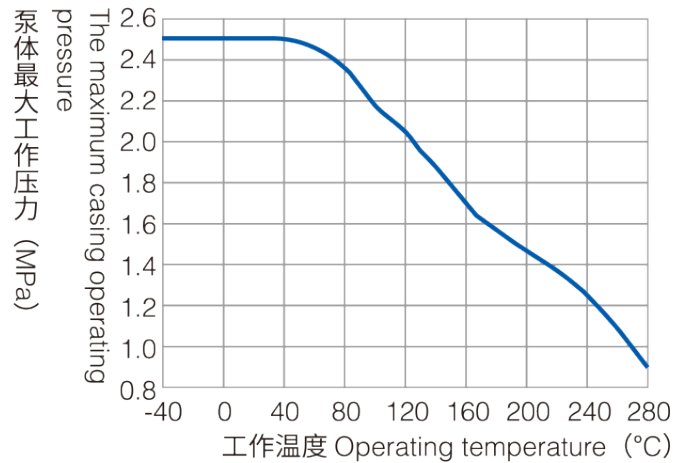


图1：泵最大允许工作压力

Fig.1: maximum permissible casing operating pressure pall wc.

转速和

叶轮直径限制

Speed and impeller diameter limitations

泵轴运行速度不能超过叶轮最大允许周转速度，这相当于62m/s。

The operating speed of the pump shaft must not exceed the maximum permissible peripheral speed of the impeller, which corresponds to 62m/s.

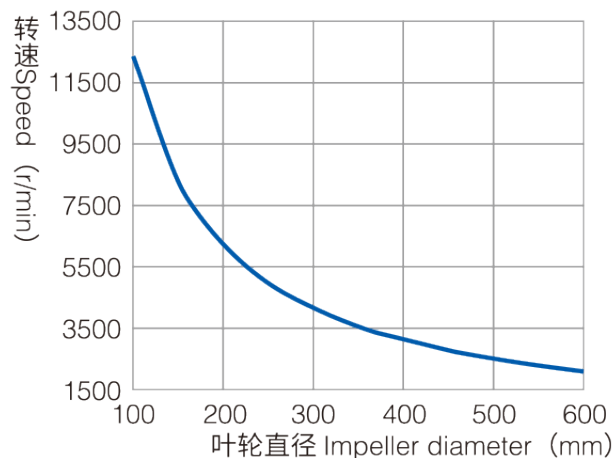


图2：最大允许泵轴运行速度

Fig.2: maximum permissible shaft speed

泵的结构 STRUCTURE

HCB无泄漏磁力泵是将磁力联轴器和单级单吸离心泵结合为一体。磁联轴器利用感应原理传递扭矩，主从动转子不相互接触，中间用隔离套隔开。输送液体被密封在隔离套内，而无一般泵的轴封问题，完全杜绝了介质的泄漏。

泵的结构根据功率的大小分为不带托架和带托架两种。

HCB leak-free magnetic pump is a combination of magnetic coupling and single-stage single-suction centrifugal pump. The magnetic coupling uses the induction principle to transmit torque, the master and slave rotors do not contact each other, and the middle is separated by an isolating sleeve. The conveying liquid is sealed in the isolation sleeve without the shaft seal problem of the general pump, thus completely eliminating the leakage of the fluid.

The structure of the pump can be divided into two types according to the power: with bracket and without bracket.

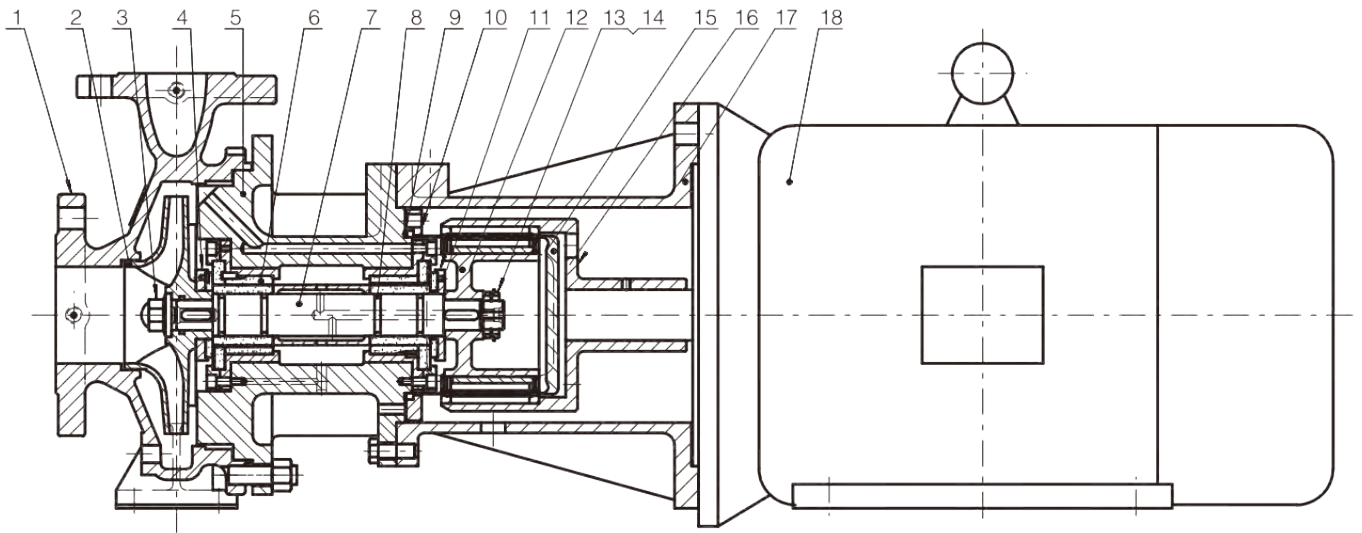


图3: 不带托架结构 fig.3: structure without bracket

- | | | |
|-------------------------------------|-----------------------------|--------------------------------|
| 1 泵体 / pump casing | 7 叶轮轴 / impeller shaft | 13 小圆螺母 / small round nut |
| 2 叶轮 / impeller | 8 O型圈 / o-ring | 14 止动垫圈 / tab washer |
| 3 叶轮螺母 / impeller nut | 9 四氟垫 / PTFE gasket | 15 隔套 / spacer sleeve |
| 4 前座盘 / front tray | 10 隔套法兰 / spacer flange | 16 外磁转子 / outer magnetic rotor |
| 5 轴承箱 / bearing house | 11 后座盘 / rear tray | 17 电机支架 / motor bracket |
| 6 滑动轴承组件 / sliding bearing assembly | 内磁转子 / inner magnetic rotor | 18 电机 / motor |

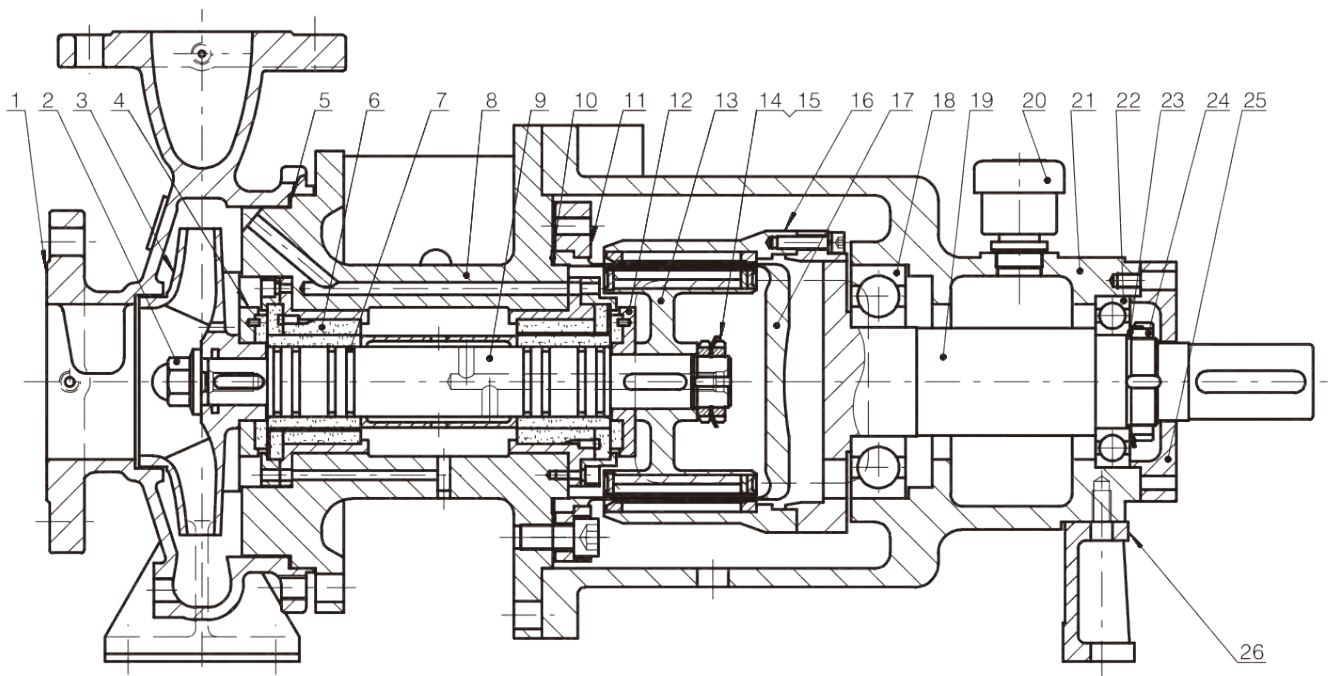


图4: 带托架结构 fig.4: Structure with bracket

- | | | |
|-------------------------------------|----------------------------------|---------------------------------|
| 1 泵体 / pump casing | 10 四氟垫 / PTFE gasket | 19 外转子轴 / outer rotor shaft |
| 2 叶轮螺母 / impeller nut | 11 隔套法兰 / spacer flange | 20 气孔盖 / air vent cover |
| 3 叶轮 / impeller | 12 后座盘 / rear tray | 21 托架 / bracket |
| 4 前座盘 / front tray | 13 内磁转子 / inner magnetic rotor | 22 后滚动轴承 / rear rolling bearing |
| 5 四氟垫 / PTFE gasket | 14 止动垫圈 / tab washer | 23 止动垫圈 / tab washer |
| 6 滑动轴承组件 / sliding bearing assembly | 15 小圆螺母 / small round nut | 24 小圆螺母 / small round nut |
| 7 O型圈 / o-ring | 16 外磁转子 / outer magnetic rotor | 25 轴承后盖 / back bearing cover |
| 8 轴承箱 / bearing house | 17 隔套 / spacer sleeve | 26 支架 / bracket |
| 9 叶轮轴 / impeller shaft | 18 前滚动轴承 / front rolling bearing | |

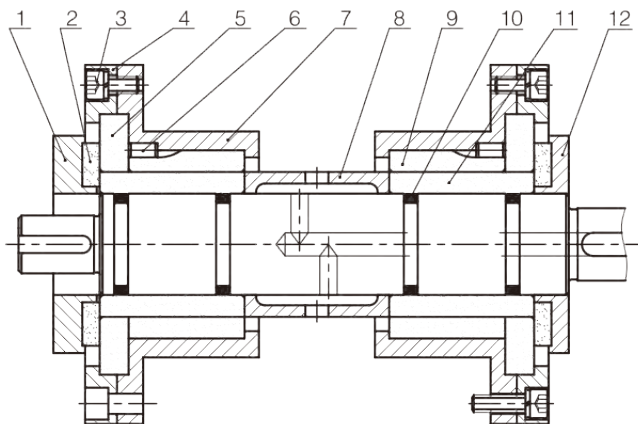


图5: 滑动轴承组件 fig.5: sliding bearing assembly

- | | | |
|-----------------------------|-------------------------------|----------------------|
| 3 前座盘 / front tray | 9 止推环 / thrust ring | 15 轴瓦 / bearing bush |
| 4 推力环 / thrust ring | 10 防转销 / stop pin | 16 O型圈 / o-ring |
| 5 螺栓 / bolt | 11 滑动轴承座 / slide bearing seat | 17 轴套 / shaft sleeve |
| 6 止推环压盖 / thrust ring gland | 12 中间套 / middle sleeve | 18 后座盘 / rear tray |

结构优化设计，操作安全性高 维修方便，使用寿命长

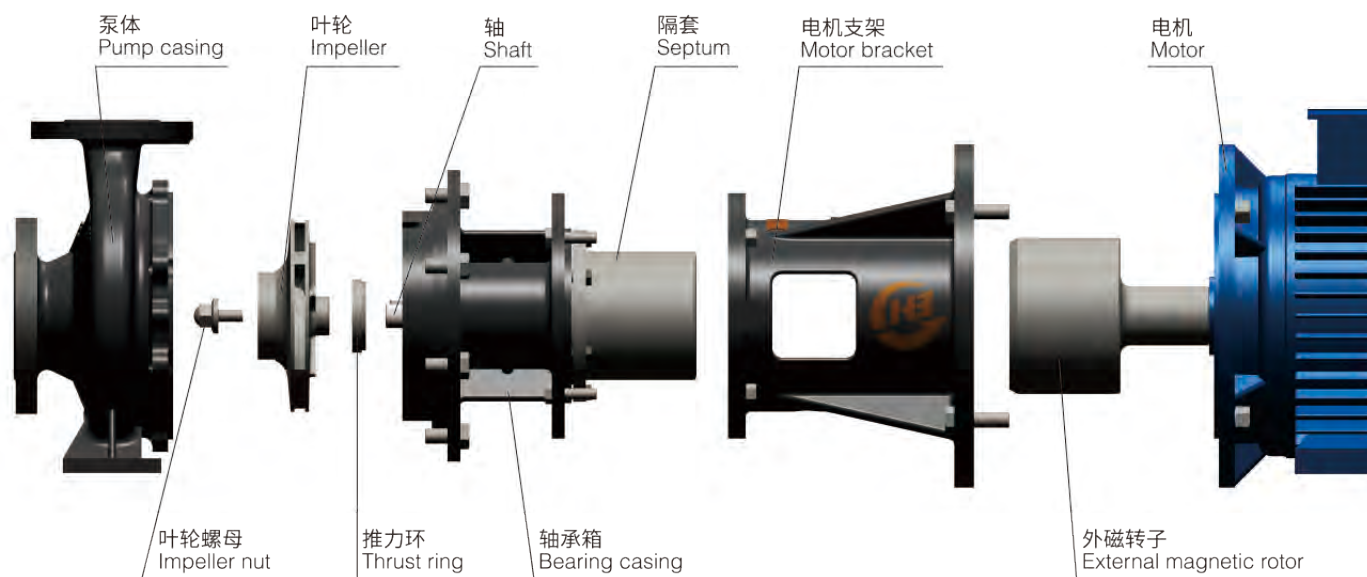
Optimized design, safe operation Easy maintenance, long running life

后开门形式，检修时无需拆卸进出口管道，灵活方便，安装简易。

产品零件高度互换，降低用户备件库存。

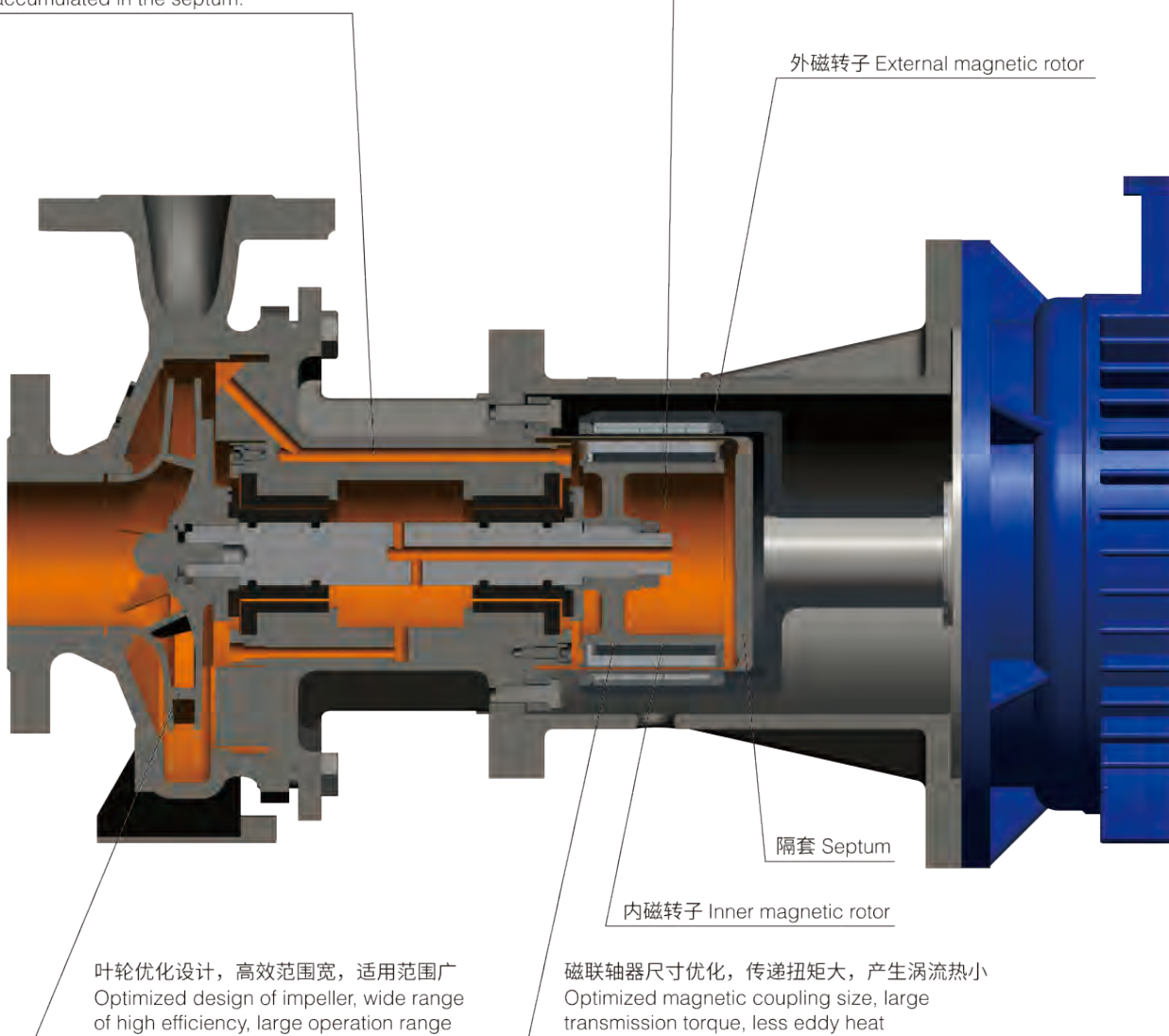
Rear door, no need to disassemble the suction and discharge pipeline during maintenance, convenient and easy installation.

Highly interchangeable in produce parts, to reduce spare parts for customers.



介质自冲洗，防止隔套涡流热积聚
Liquid self-flushing, prevent eddy current heat accumulated in the septum.

利用磁力传递扭矩，无轴封，零泄漏
Using magnetic force to transmit torque ,sealless, zero leakage



叶轮优化设计，高效范围宽，适用范围广
Optimized design of impeller, wide range of high efficiency, large operation range

磁联轴器尺寸优化，传递扭矩大，产生涡流热小
Optimized magnetic coupling size, large transmission torque, less eddy heat

利用磁力传递扭矩，介质被密封在隔离套内，从而避免一般泵存在的轴封泄漏问题，真正做到零泄漏。

By using magnetic force to transmit torque, fluid is sealed in the isolation sleeve, thus avoiding leakage problem, achieving zero leakage.

叶轮优化设计，高效范围宽，使用范围大，降低运行成本。

Optimization design impeller, wide range of efficiency and application, lower operating costs.

专用自锁紧叶轮螺母，提高泵使用可靠性，消除叶轮螺母松脱危险。

Special designed self-locking impeller nut, eliminate risk of release improve reliability.

多种循环方式可选，足量的循环液带走金属隔离套在旋转的磁转子中间受到交变磁场作用产生的涡流热，避免温度升高使磁钢退磁。

A plurality of circulation modes are selectable, sufficient circulation liquid carries away eddy current heat generated by the action of alternating magnetic field in the middle of the rotating magnetic rotor to avoid demagnetization of the magnetic steel due to temperature rise.

结构优化设计，操作安全性高 维修方便，使用寿命长

Optimized design, safe operation Easy maintenance, long running life

全封闭式内磁转子，防止泵在腐蚀介质环境下磁体腐蚀而导致磁性能衰退。

磁联轴器尺寸优化设计，在满足扭矩要求的情况下使其产生的介质粘性损失和涡流损耗最小。

磁联轴器采用高剩磁高矫顽力的钕铁硼或钕钴永磁材料制造，传递扭矩大，尺寸小，结构紧凑。

滑动轴承采用大厚度、重载、强推力、高强度、高耐磨Sic材料作为轴套和轴瓦，耐腐蚀性能好，使用寿命和维护周期长。

叶轮后叶片设计，平衡轴向力，减少作用在推力轴承上的作用力，降低磨损。

泵在偏离设计工况点运行时会产生径向力，叶轮直径和出口压力越大，产生的径向力越大。因此，对于大尺寸的泵体采用双蜗壳设计，消除非设计工况运行时的径向力，延长滑动轴承使用寿命。

Totally enclosed inner magnetic rotor prevents the pump from deteriorating its magnetic performance due to the corrosion of the magnet in the corrosive medium environment.

The optimized design of magnetic coupling size can minimize the medium viscosity loss and eddy current loss under the condition of meeting the torque requirements.

The magnetic coupling is made of high remanence and high coercivity neodymium boron or drill-enough permanent magnet material, with large torque transmission, small size and compact structure.

The sliding bearing uses sic material with large thickness, heavy load, strong thrust, high strength and high wear resistance as the shaft, sleeve and bearing shell, which has good corrosion resistance and long service life and maintenance period.

Impeller rear blade design, balance the axial force, reduces the force acting on the thrust bearing and reduces the wear.

The pump will generate radial force when it runs out of the design operating point, the larger the radial force will be. Therefore, the double volute design is adopted for large-sized pump body to eliminate radial force during off-design operation and prolong the service life of sliding bearing.



大泵双蜗壳设计
Double volute casing design in bigger pump.

合同试验， 保证泵性能的满足

本公司依据合同和标准执行以下测试：

静水压试验

试验基于常温清水，压力为基本设计压力的1.5倍，保压10分钟。

性能试验

依据ISO9906标准测量，试验精度II类，验收类2B。

NPSH试验

依据ISO5199标准测量。

振动试验

依据ISO5199进行振动试验，泵的振动烈度级别控制在A级。

温度测量

在工作温度下，对轴承温升进行测量，测量的结果记录在案。

材料检验

零部件材质检验，铸件无损检测，保证整机可靠性。

*Order-related tests,
confirm the performance of pump conform*

The company carries out the tests below as standard:

Hydrostatic pressure test

Hydrostatic pressure test based on clean water at ambient temperature, test pressure is 1.5 times on design pressure.

Performance test

Measurement according to ISO9906, accuracy class II, acceptance class 2B.

NPSH test

According to ISO5199 standard.

Vibration test

According to ISO5199, vibration lightness level is controlled at class A.

Temperature test

Test the temperature rise of bearing, and keep records.

Raw material inspect

Spare and casting parts inspection, to ensure the reliability of the whole machinery.



订货须知

Notice to Order

(一) 配用电机的额定输出功率与泵的额定轴功率之比应按照下列的百分数：

轴功率	百分比%
22kW以下	125%
(22~75)kW	115%
75kW以上	115%

The ratio of the motor's rated power to the pump's shaft power should be the following:

The shaft power of the pump	the ratio (%)
Below 22kW	125%
(22-75)kW	115%
Above 75kW	115%

(二) 订货时按《泵工作条件》详细填写。

When ordering, please fill in the table "Working conditions of the pump".

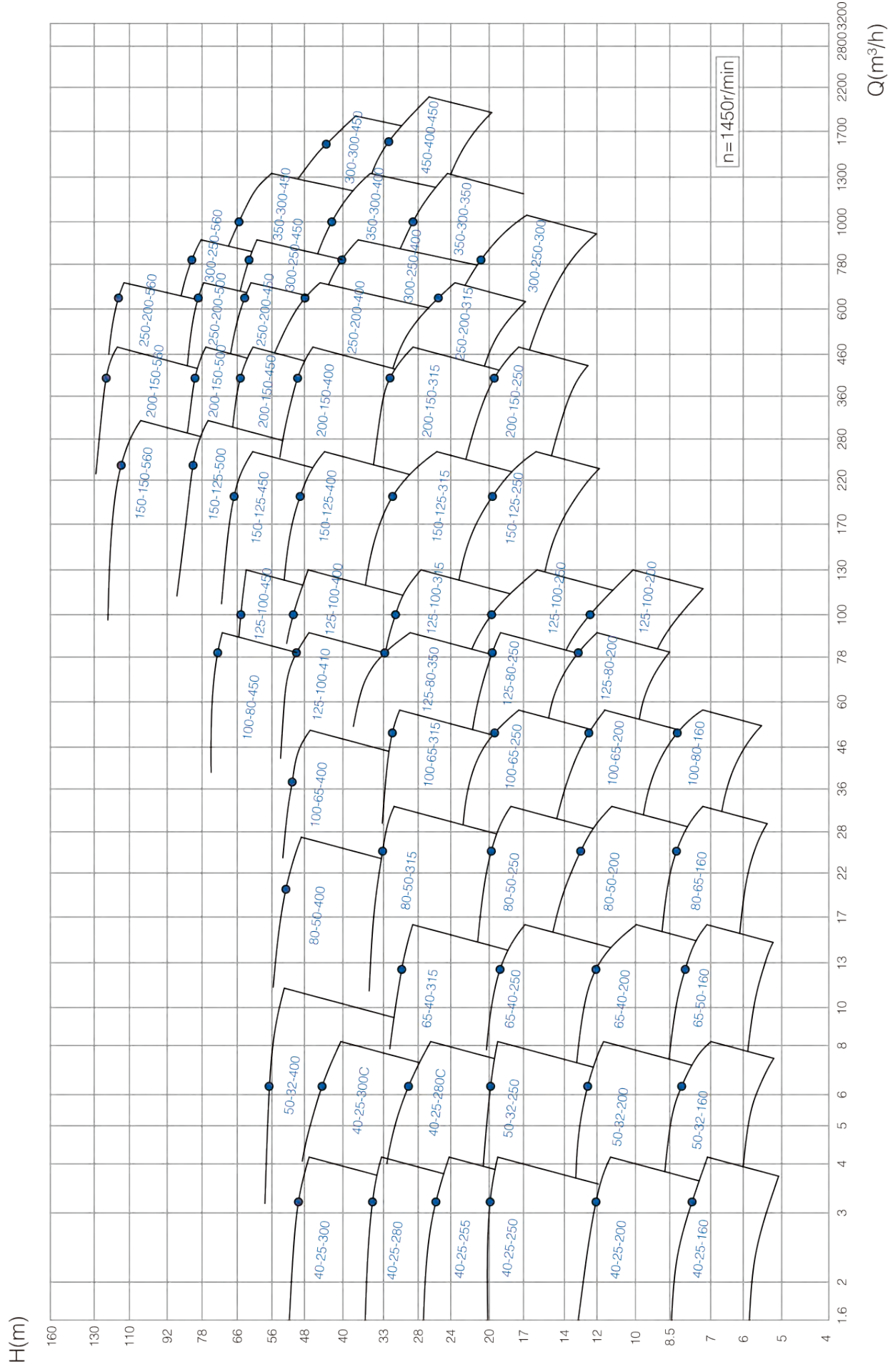
(三) 保修条款只有在使用本公司原厂备件时才有法律效力。

Warranty is valid only when genuine spare parts of our company are used.

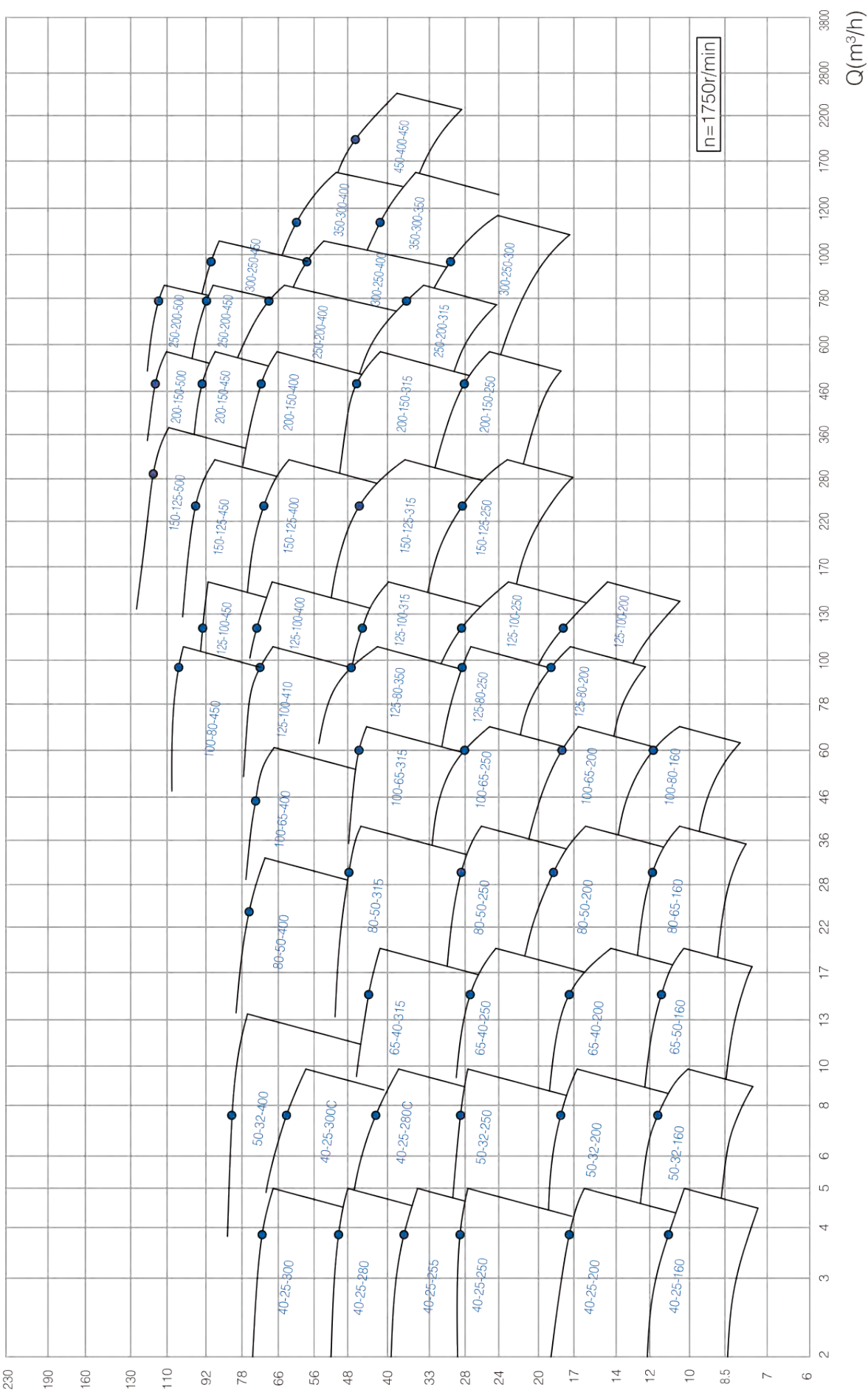
泵工作条件 Working Conditions of the Pump

工作条件 Operating conditions				输送介质 Pumped fluid					
流量 Capacity	m ³ /h	最大 Max	额定 Rated	最小 Min	介质 1 Media	最大比例 Max ratio	最小比例 Min ratio	%	
扬程 Total head	m	最大 Max	额定 Rated	最小 Min	介质 2 Media	最大比例 Max ratio	最小比例 Min ratio	%	
进口压力 Suction pressure	MPa	最大 Max	额定 Rated	最小 Min	介质 3 Media	最大比例 Max ratio	最小比例 Min ratio	%	
出口压力 Discharge pressure	MPa	最大 Max	额定 Rated	最小 Min	固体 Solid	含量 (湿基) Content (humidity) Wt %			
必需汽蚀余量 NPSH required	m					粒度直径 Particle diameter mm			
操作条件 Operating conditions	连续 Continuous		间断 Intermittent		介质特性 Medium characteristics	腐蚀 Corrosion	磨(冲)蚀 Abrasion		
现场资料和公用事业条件 Spot conditions					泵送温度 Operation temp	°C	最大 Max	正常 Normal	最小 Min
位置 Position					密度 Density	在操作温度下 Under operating temp kg/m ³			
室内 Indoor	有采暖 With heating		有遮棚 With shield		粘度 Viscosity	在操作温度下 Under operating temp mPa.s			
室外 Outdoor	无采暖 Without heating		无遮棚 Without shield		汽化压力 Vapor pressure	在操作温度下 Under operating temp MPa(A)			
必须的防寒气候条件 Requirement of Cold-proof					比热 Specific heat		kcal/kg°C		
必须的耐湿热气候条件 Requirement of Damp-heat-proof					氯化物浓度 Concentration of chloride		PPM		
现场资料 Site condition					H2S(硫化氢)浓度 Concentration of H2S		PPM		
海拔高度 Altitude				m	危险程度 Hazardous liquid	易燃 Flammable	易爆 Explosive	有毒 Toxic	
大气压力 Atmosphere pressure				kPa	挥发特性 Volatile characteristics	易 Easy	不易 Not easy		
相对湿度 Relative humidity	最大 Max	最小 Min			%	沸点 Boiling point	°C		
环境温度范围 Ambient temp. Range				°C	结晶温度 Crystallization temp	°C			
异常条件 Abnormal conditions	粉尘 Dust	烟雾 Smoking				熔点 Smelting point	°C		
危险区域 Electrical classification	类 Class	级 Division	组 Group		闪点 Point of flammability	°C			
电源 Power source	伏特 Volt	赫兹 Hz	相 Phase		相溶的液体 Compatible liquid				
冷却水 Cooling water	温度 Temp	压力 °C Pressure		MPa	相溶的橡胶 Compatible rubber				
	氯化物浓度 Chloride concentration			PPM	临界温度 Critical temp	°C			
仪表压缩空气 Compressed air of instrument	最大/最小压力 Max / Min. Pressure			/MPa	临界压力 Critical pressure	MPa			
传动方式 Driving way					其它 Other				
联轴器 Coupling type									

性能范围 Performance range

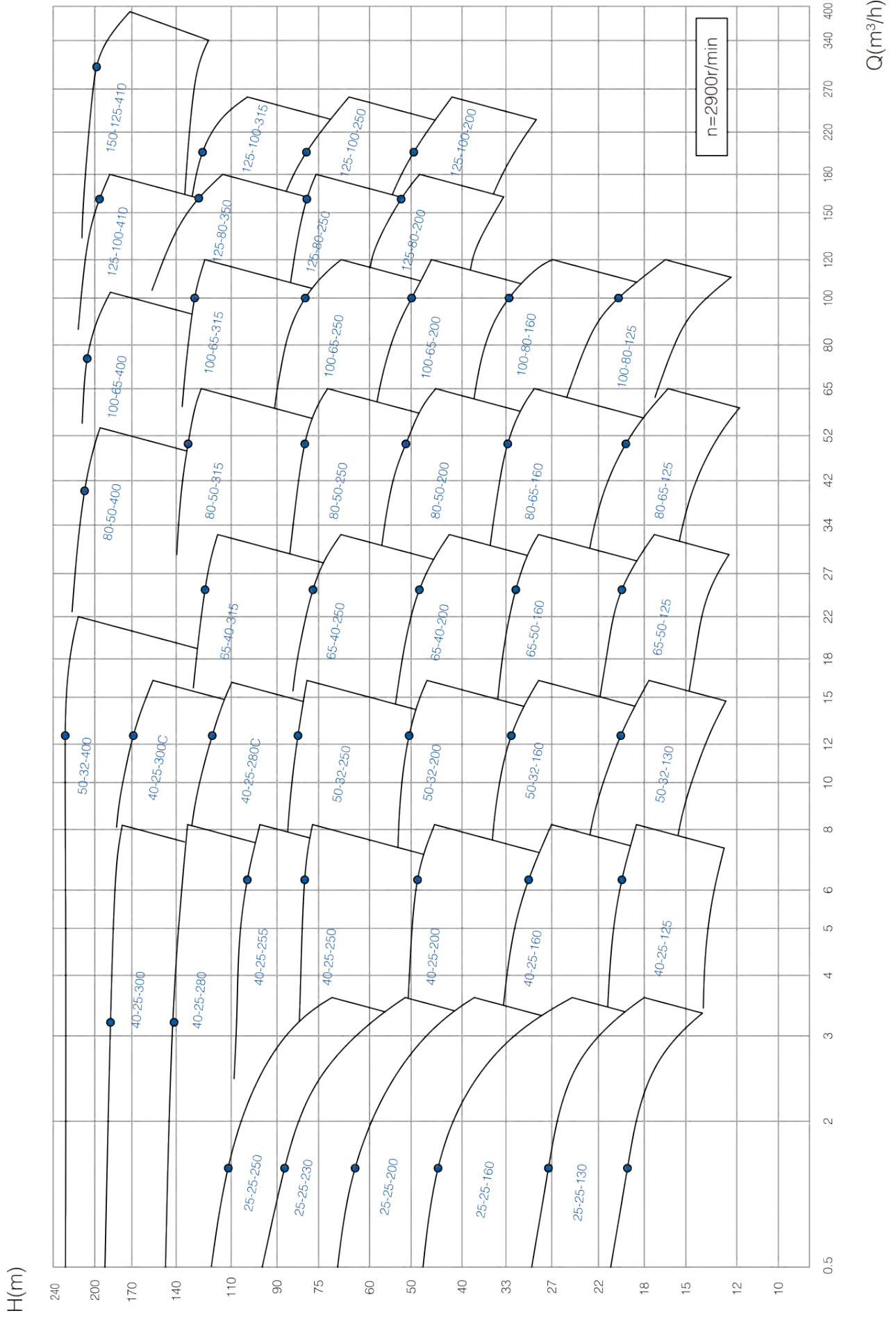


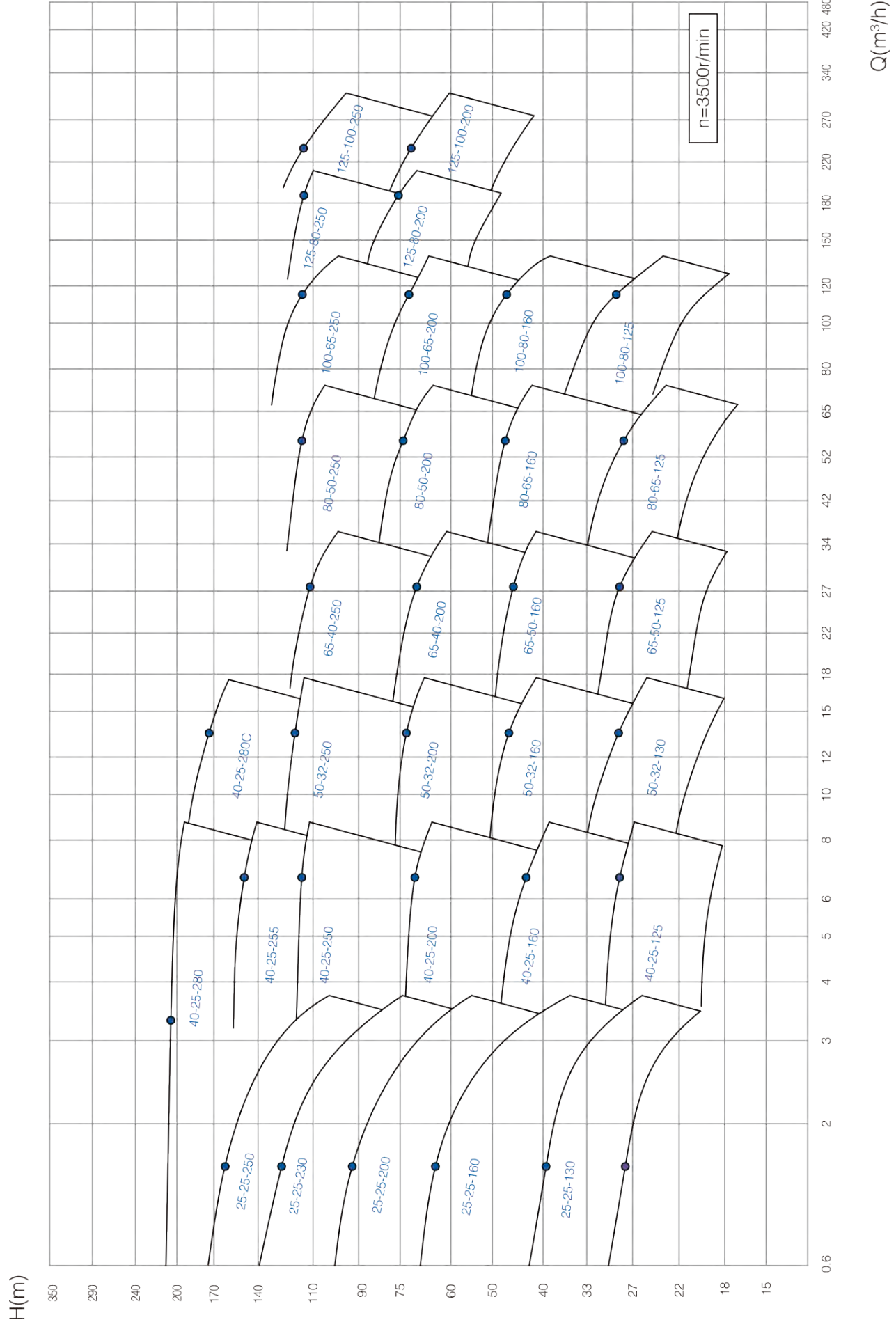
H(m)

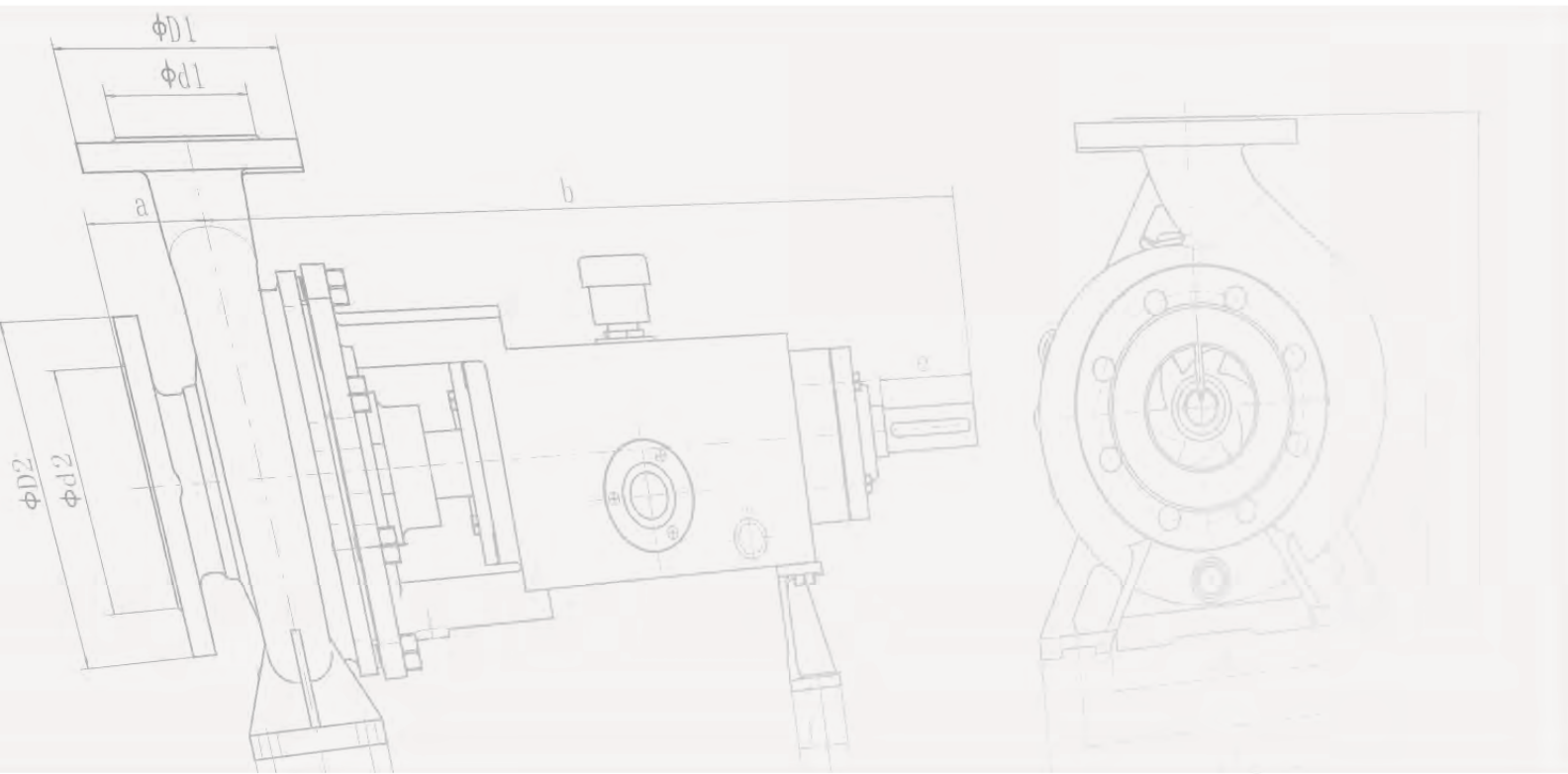


$n=1750\text{r/min}$

$Q(\text{m}^3/\text{h})$







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