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CQB不锈钢磁力泵

CQB Stainless Steel Magnetic Pump



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使用该产品前，请仔细阅读说明书！

Please read the instructions carefully before using this product!

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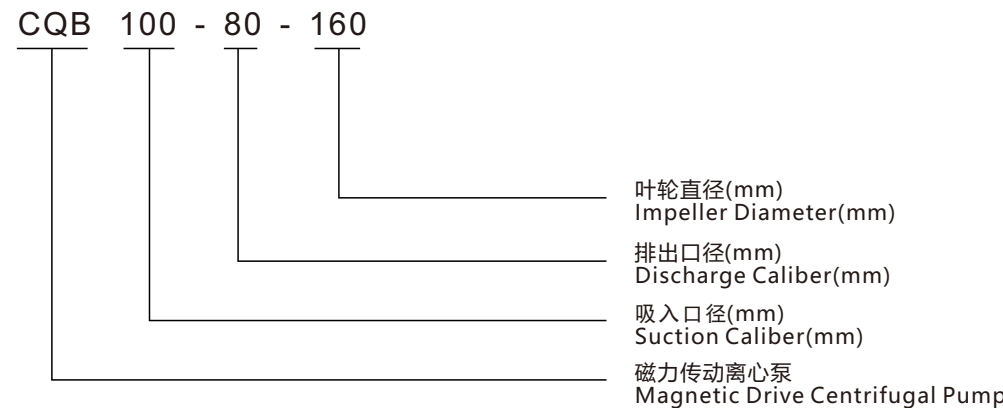
■ 概述

磁力传动离心泵（简称磁力泵）通常由电动机、磁力耦合器和耐腐蚀离心泵组成。其主要特点是利用磁力耦合器传递动力，完全无泄露，当电动机带动磁力耦合器的外磁钢旋转时，磁力线穿过间隙和隔离套。作用于内磁钢上，使泵转子与电动机同步旋转，无机械接触地传递扭矩，在泵轴的动力输入端，由于液体被封闭在静止的隔离套内，没有动密封因而完全无泄漏。

CQB系列磁力泵是全国联合设计组开发的新型完全无泄漏耐腐蚀泵，其技术经济指标与国外同类产品的水平相当，CQB系列磁力泵型式及基本参数等效采用JB/T7742-95《小型磁力传动离心泵》标准，符合Q/BTB01-2006《磁力离心泵》企业标准。

CQB系列磁力泵适用于石油、化工、制药、电镀、环保、食品、影视洗印、水处理、国防等行业，是输送易燃、易爆、挥发、有毒、稀有贵重和各种腐蚀性液体的理想设备，适用于输送吸入压力不大于0.2MPa，最大工作压力1.6MPa，温度不超过100℃。密度不大于1600kg/m³，粘度不大于30X 10⁻⁶m²/s的不含硬颗粒、纤维及含有磁性物质的液体。

■ 型号意义 Model Meaning



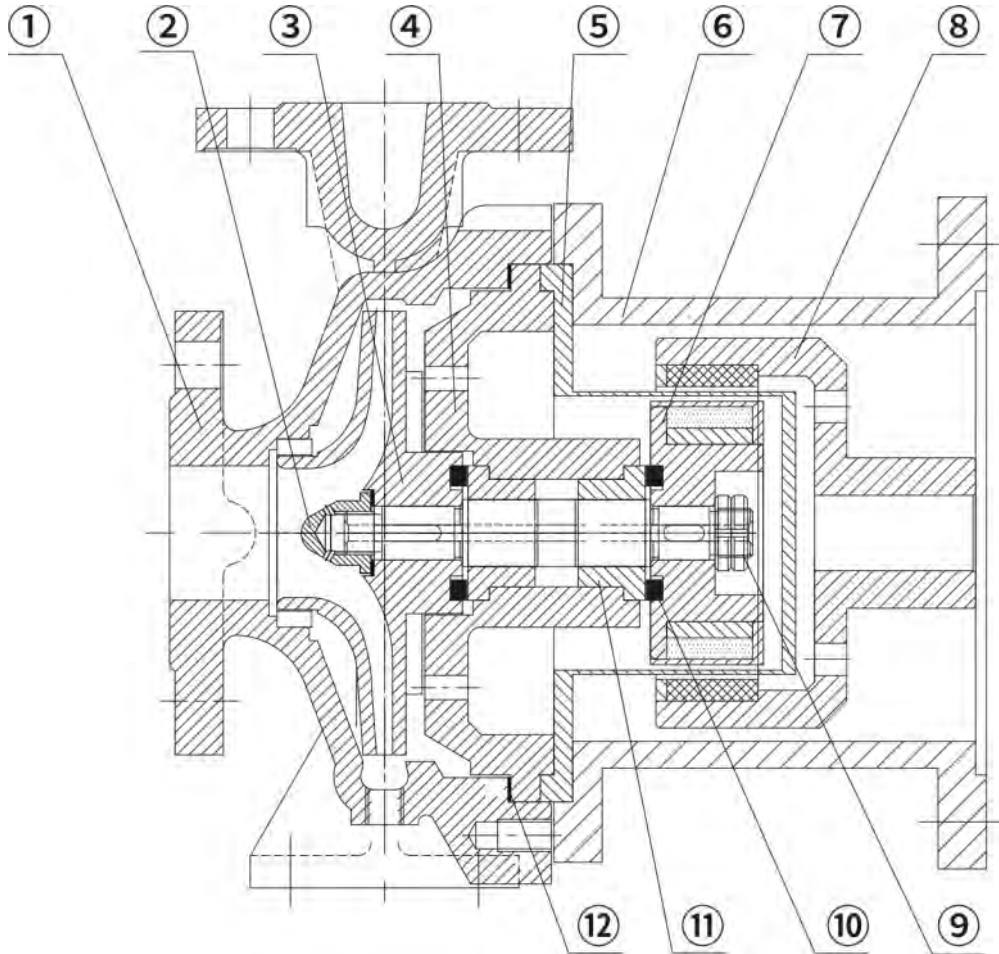
■ Summary

Magnetic drive centrifugal pump(magnetic pump for short)is generally consisted of motor,magnetic coupling and anticorrosive centrifugal pump.It is mainly to feature drive transferred by coupling and completely leak tightness. When motor drives theexternal magnet steel of magnetic coupling to rotate, the magnetic force line passes through the clearance and spacer sleeve to act on the internal magnet steel, making the rotor and motor rotating synchronously, thus to transfer the torque with out any mechanical contact. At the end of dynamic input of pump shaft, as liquid has been enclosed in the stationary spacer sleeve without dynamic seal, thus to actualize complete leak tightness.

CQB series magnetic pumps are late model fully leak tight anticorrosive pumpsdeveloped by National Design Group for Magnetic Pumps, with their technical and economical criteria in parallel with the level of their counter parts abroad at the end of 1980's.The type and basic parameters of CQB series magnetic pumps apply the standard of JB/T7742-95 Minitype Magnetic Drive Centrifugal Pump,and are in accordance with the enterprise standard of Q/BTB01-2006 Magnetic Drive Centrifugal Pump.

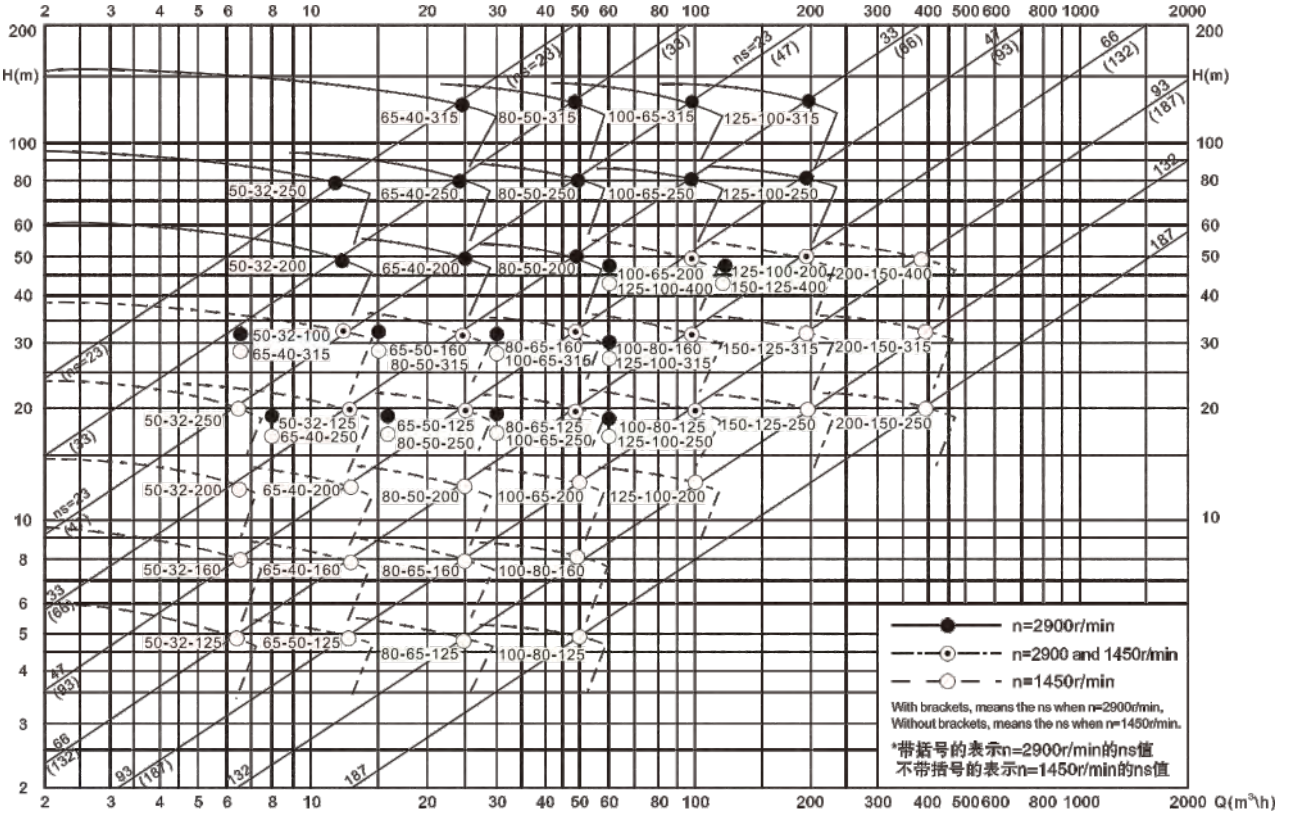
COB series magnetic pumps are used in the industries of petroleum,chemical, pharmaceutical, electroplating environmental protection,food stuff,photographing,water treatment and national defense etc. to deliver inflammable explosive,volatile,toxic rare and various corrosive liquid,suitable for liquid not containing solid particles,fibre and magnetic materials,suction pressure not greater than 0.2Mpa,maximum working pressure up to 1.6Mpa,

■ 结构图 Structure



序号NO.	名称 Name	序号NO.	名称 Name
1	泵体 Pump Shell	7	内磁钢 Inner Magnetic Coupling
2	叶轮螺母 Impeller Nut	8	外磁钢 Outer Magnetic Coupling
3	叶轮 Impeller	9	锁紧螺母 Locknut
4	泵盖 Pump Cover	10	动环 Rotating Ring
5	隔离套 Isolation Canister	11	轴套 Shaft Sleeve
6	支架 Frame	12	垫圈 Gasket

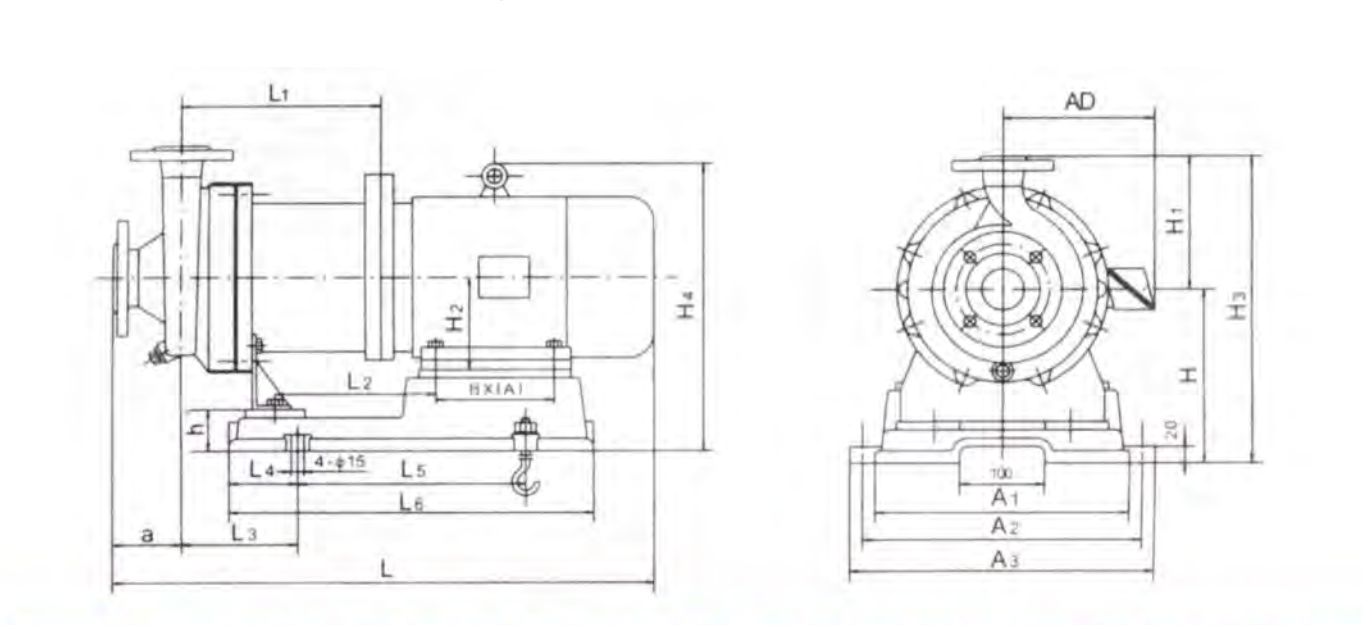
■ 性能曲线图 Performance Curve



■ 性能参数表 Performance table

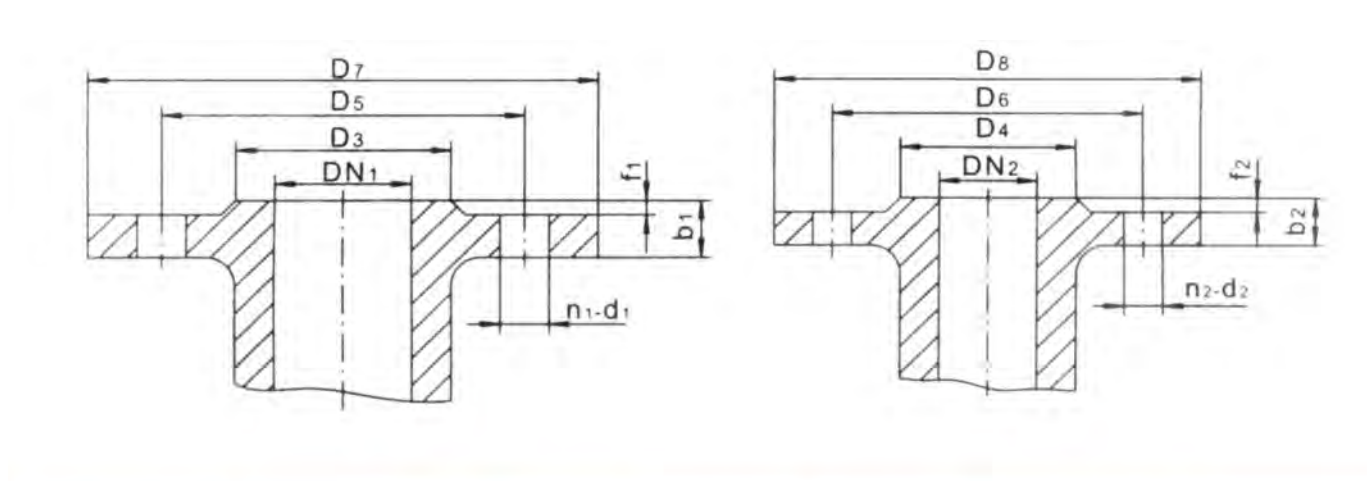
型号 Type	进口 Inlet (mm)	出口 Outlet (mm)	流量 Flow (m³/h)	扬程 Head (m)	汽蚀余量 Positive suction heat (NPSH)r(m)	功率 Power (KW)	转速 Rotating speed	效率 Efficiency %	电压 Voltage (V)
CQB32-20-125	32	20	3.2	20	5.0	1.1	2900	22	380
CQB32-20-160	32	20	3.2	32	3.5	1.5	2900	15	380
CQB40-25-125	40	25	6.3	20	5.0	2.2	2900	27	380
CQB40-25-160	40	25	6.3	32	3.5	3	2900	24	380
CQB40-25-200	40	25	6.3	50	3.5	5.5	2900	17	380
CQB50-32-125	50	32	12.5	20	3.5	3	2900	35	380
CQB50-32-160	50	32	12.5	32	3.5	4	2900	31	380
CQB50-32-200	50	32	12.5	50	3.5	7.5	2900	27	380
CQB50-32-250	50	32	12.5	80	3.5	15	2900	21	380
CQB65-50-125	65	50	25	20	4.0	4	2900	38	380
CQB65-50-160	65	50	25	32	4.0	7.5	2900	35	380
CQB65-40-200	65	40	25	50	4.0	15	2900	32	380
CQB65-40-250	65	40	25	80	4.0	18.5	2900	28	380
CQB80-65-125	80	65	50	20	4.0	7.5	2900	41	380
CQB80-65-160	80	65	50	32	4.0	15	2900	37	380
CQB80-50-200	80	50	50	50	4.0	18.5	2900	36	380
CQB80-50-250	80	50	50	80	4.0	37	2900	34	380
CQB100-80-125	100	80	100	20	4.0	15	2900	48	380
CQB100-80-160	100	80	100	32	3.9	18.5	2900	48	380
CQB100-65-200	100	65	100	50	3.9	37	2900	44	380
CQB100-65-250	100	65	100	80	4.0	55	2900	42	380

■ 安装外形图和安装尺寸
 Installation outline drawing and installation dimensions



型号Model	A	B	AD	L	L1	H1	H2	a	A1	A2	A3	H	H3	H4	L2	L3	L4	L5	L6	h
CQB32-20-125	125	100	150	443	133	120	90	65												
CQB32-20-160	140	100	160	498	173	150	105	65												
CQB40-25-105	125	100	150	443	133	120	90	65												
CQB40-25-125	140	125	160	528	178	150	105	65												
CQB40-25-160	160	140	180	630	230	160	100	80	300	330	360	210	370	355	190	140	80	270	430	50
CQB40-25-200	216	140	210	728	253	180	132	80	350	380	410	230	410	413	236	140	80	320	480	50
CQB50-40-85	125	100	150	443	133	120	90	65												
CQB50-32-105	140	125	160	528	178	150	105	65												
CQB50-32-125	160	140	180	630	230	160	100	80	300	330	360	210	370	355	190	140	80	270	430	50
CQB50-32-160	190	140	190	650	230	160	112	80	300	330	360	210	370	363	194	140	80	270	430	50
CQB50-32-200	216	140	210	728	253	180	132	80	350	380	410	230	410	413	236	140	80	320	480	50
CQB50-32-250	254	210	265	898	308	225	160	100	410	440	470	260	485	485	308	161	120	440	680	80
CQB65-50-125	216	140	210	728	253	160	132	80	350	380	410	230	390	413	236	140	80	320	480	50
CQB65-50-160	216	140	210	728	253	160	132	80	350	380	410	230	390	413	236	140	80	320	480	50
CQB65-40-200	254	210	265	898	308	180	160	100	410	440	470	260	440	485	308	161	120	440	680	80
CQB65-40-250	279	241	285	968	308	225	180	100	410	440	470	280	505	530	321	161	120	440	680	80
CQB80-65-125	216	140	210	728	253	160	132	80	350	380	410	230	390	413	236	140	80	320	480	50
CQB80-65-160	254	210	265	898	308	180	160	100	410	440	470	260	440	485	308	161	120	440	680	80
CQB80-50-200	254	254	265	943	308	200	160	100	410	440	470	260	460	485	308	161	120	440	680	80
CQB80-50-250	318	305	315	1108	318	225	200	125	470	500	530	300	525	575	333	171	120	520	760	100
CQB100-80-125	254	210	265	898	308	180	160	100	410	440	470	260	440	485	308	161	120	440	680	80
CQB100-80-160	254	254	255	943	308	200	160	100	410	440	470	260	460	485	308	161	120	440	680	80
CQB 100-65-200	318	305	315	1083	318	225	200	100	470	500	530	300	525	575	333	171	120	520	760	100
CQB 100-65-250	356	311	345	1108	318	250	200	125	470	500	530	300	550	575	333	171	120	520	760	100

■ 进出口法兰示意图及尺寸 Drawing and dimensions of pump inlet and outlet ranges



型号 Model	进口法兰 Inlet flange							出口法兰 Outlet flange						
	DN ₁	D ₃	D ₅	D ₇	b ₁	f ₁	n ₁ -d ₁	DN ₂	D ₄	D ₆	D ₈	b ₂	f ₂	n ₂ -d ₂
CQB32-20-125	32	69	90	120	16	3	4-φ14	20	48	65	90	14	2	4-φ11
CQB32-20-160														
CQB40-25-105	40	78	100	130	16	3	4-φ14	25	58	75	100	14	3	4-φ11
CQB40-25-125														
CQB40-25-160														
CQB40-25-200	50	88	110	140	16	3	4-φ14	40	78	100	130	16	3	4-φ14
CQB50-40-85														
CQB50-32-105														
CQB50-32-125														
CQB50-32-160														
CQB50-32-200														
CQB65-50-125	65	108	130	160	16	3	4-φ14	50	88	110	140	16	3	4-φ14
CQB65-50-160														
CQB65-40-200														
CQB65-40-250														
CQB80-65-125	80	124	150	190	18	3	4-φ18	65	108	130	165	16	3	4-φ14
CQB80-65-160														
CQB80-50-200														
CQB80-50-250														
CQB100-80-125	100	144	170	210	18	3	4-φ18	80	124	150	190	18	3	4-φ18
CQB100-80-160														
CQB 100-65-200														
CQB 100-65-250														

■ 泵的拆卸与装配

轴转动式磁力泵的拆卸顺序

拆下泵体上的放液管堵,放净泵内液体, 拆下进出口 | 法兰联接螺栓, 拆下电机和底座螺栓。

拆下联接架和电机法兰盘联接螺栓, 将泵体同联接架一起取下。

松开外磁钢转子总成紧定螺钉, 取下外磁钢转子总成。

拆下联接架同泵体联接螺栓, 取下联接架、隔离套 及内转子总成和轴承体、叶轮组成部件。

松开内转子总成端螺母, 取下内转子总成, 松开叶轮 螺母, 取下叶轮, 取出轴, 卸下轴键。

取下内转子总成止推环、叶轮止推环、轴承体两端轴承。取止推环及轴承时要将零件加热至80~100℃。

轴不转动式磁力泵的拆卸顺序

拆下泵体上的放液管堵,放净泵内液体, 拆下进出口法兰联接螺栓。

拆下联接架同电机法兰盘联接螺栓, 将泵体同联接架一起取下。

松开外磁钢转子总成紧定螺钉, 取下外磁钢转子总成。

拆下联接架同泵体联接螺栓, 取下联接架、隔离套、止推环、从动转子部件、泵轴。

旋下叶轮上口环, 取下泵体上止推环、从动转子 部件上的轴承。

泵的装配

泵的装配顺序基本上可按照拆卸顺序的反方向进行, 但装配时要注意止推环端面不要装反, 要检查各密封面垫片应完好, 不要遗落小件如键、管堵等。在内外转子总成偶合时, 由于强大的磁性吸力, 要特别注意, 以免砸伤手指或撞坏零件。带有心脏起搏器、信用卡、计算器、计算机磁盘、手表等时要注意保持距离。

■ 泵的安装与调试

泵的安装是否合理, 对泵的正常运行和使用寿命有重要影响, 所以安装和校正必须仔细进行。

安装泵的地点应便于巡回检查和检修。

开箱后检查泵和电机, 如果证实没有任何因装、卸和运输过程中造成的损坏和紧固件松动, 泵没有尘土、污物等进入泵内, 则不必重新拆卸和装配, 直接送到现场去安装。

安装泵的基础平面应用水平仪找平, 待基础水泥凝固后, 将泵安放基础上, 并用水平仪检查泵和电机轴的水平情况, 如

■ Disassembly and assembly

Disassembly Sequence of Magnetic Pump with Rotational shaft

Take off the plug of discharge pipe on pump body to let out the liquid inside, and the coupling bolt of inlet and outlet flanges, and then motor and base bolt.

Remove the coupling frame and the coupling bolt of motor flanged disc, and take off the pump body and coupling frame together.

Unfasten the set screw of external magnet steel assembly to take it off.

Remove the coupling bolt between coupling frame and pump body to take off the coupling frame, spacer sleeve, internal rotor assembly, bearing body and impeller components.

Unfasten the nut at the assembly end of internal rotor to take off the internal rotor assembly, unscrew the impeller nut to take off the impeller, and take out the shaft and shaft key.

Take off the thrust collar of internal rotor assembly, thrust collar of impeller, and the bearings at the both ends of bearing body. Upon removing the thrust collar and bearings, the parts shall be heated up to 80~100℃.

Disassembly Sequence of Magnetic Pump with Nonrotational

Take off the plug of discharge pipe on pump body to let out the liquid inside, and the coupling bolt of inlet and outlet flanges.

Remove the coupling bolt between coupling frame and motor flanged disc, then take off the pump body and coupling frame together.

Unfasten the set screw of external magnet steel rotor assembly to take it off.

Remove the coupling bolt between coupling frame and pump body to take off the coupling frame, spacer sleeve, thrust collar, driven rotor, and pump shaft. Screw off the ring on impeller and take off the thrust collar on pump body and the bearing on driven rotor.

Pump Assembly

The assembly sequence of pump can be done in contrary to the disassembly sequence above. Upon assembling, note that the end face of thrust collar shall not be mounted reversed. Check to make sure that the gaskets of all sealing faces shall be in good conditions without missing of small pieces like key or pipe plug etc. Upon the coupling of internal and external rotor assemblies, special attention shall be paid to the strong magnetic attraction, as it may hurt your fingers or damage the components. And keep it away from heart pacemaker, credit card, calculator, computer disc, watch and etc.

■ Installation and commissioning

Reasonable installation relates very much to the normal operation and service life of pump. Therefore, installation and adjustment shall be done with great care.

Pump shall be installed in a place easy for the work of check and repair.

Check the pump and motor after unpacking. If it is sure that there is no damage and loosening of fasteners during the process of loading, unloading and transportation, and no dust and dirt inside the pump, then it will be unnecessary to disassemble and assemble just take it to job site for installation.

The base plane of installation site shall be measured by gradienter. After the base cement has solidified, place the pump on the base and check the levelness of pump and motor shaft by

不水平, 应用垫铁调正,直到水平为止。然后通过灌浆孔用水泥浇灌底座和地脚螺栓孔眼(灌浆孔直径应不小于100mm 或与此相当面积)。

水泥干固后, 应检查底座和地脚螺栓孔眼是否松动, 合适后拧紧地脚螺栓, 重新检查水平。

配1.1~2.2kW电机的磁力泵不用底座, 通过电机座直接安装在基础上。

泵的吸入管路和吐出管路应有各自的支架, 不允许管路的重量直接由泵来承受, 以免把泵压坏。

泵的安装位置高于液面(在泵的吸程允许范围内)时, 应在吸入管路端部装上底阀, 并在吐出管路上设置灌液螺孔或阀门, 供起动前灌泵之用。泵的安装位置低于液面(灌注情况)时, 应在吸入管路上装控制阀门和过滤装置, 以防杂物吸入泵内。

■ 泵的使用 (启动、运行和停车)

启动

准备必要工具

应在机泵联接前确定电动机的旋转方向是否正确, 泵的转动是否灵活, 基础螺栓有无松动。

泵的安装位置低于液面(灌注情况)时, 起动前打开吸入管路的闸阀使液体充满泵体。如泵的安装位置高于液面(真空情况)时, 起动前要灌泵或抽真空, 使泵内和吸入管路内充满液体, 排净空气。

关闭进出口压力(或真空)表和出水阀门, 如有旁通管, 此时也应关闭。

起动电机(最好先点动, 确认泵转向正确后, 才开始正式运行), (电机功率大于11kW时优先选配减速起动装置, 对电源和泵的使用寿命都有好处)。然后打开进出口压力(或真空)表, 当泵达到正常转速, 且仪表指出相应压力时, 再慢慢打开出水阀门, 调节到需要的工况。在吐出管路关闭的情况下, 泵连续工作时间不能超过3分钟。

运行

在起动及运行过程中, 必须注意观察各仪表读数、泵的振动和杂音是否正常, 如果发现异常情况应及时处理, (如密封环与叶轮配合部位的间隙磨损过大, 应更换新的密封环)。

停车

逐渐关闭吐出管路上的闸阀。(如果泵在倒灌情况下使用, 还要关闭吸入管路的闸阀)并关闭各种仪表的开关。

切断电源。

如果环境温度低于液体凝固点时, 要放净泵内液体, 以防冻裂。

gradienter. If not leveled, fill up iron to adjust the level. Pour in cement to the base and the hole of anchor bolt through the grout hole. (The diameter of grout hole shall not be less than 100mm, or equivalent to this area).

After cement has solidified, check the holes of base and anchor bolts to see whether there is any looseness. Screw down the anchor bolt adequately and recheck the level.

Magnetic pump with 1.1~2.2kw motor doesn't have a base itself, and can be directly mounted onto the base through the motor base.

The suction pipe and discharge pipe shall have their own frame. The weight of pipeline shall not be directly borne by the pump, as it can damage the pump.

When the installation position of pump is higher than the liquid level (within the permissible range of suction head), bottom valve shall be mounted to the end of suction pipeline, and grout hole or valve shall be mounted to discharge pipeline for priming before starting. When the installation position is lower than the liquid level (upon priming), control valve and filtering device shall be mounted to suction pipeline to avoid foreign substances into the pump.

■ Operation of pump(start,operation and stop)

Start

Preparation of necessary tools.

Before the connection of motor and pump, check whether motor runs in a right direction, pump throughs flexibly or base bolt loosened or not.

When the installation position of pump is lower than the liquid level (upon priming), open the gate valve of suction pipeline before start to make the pump body filled up with liquid. When the installation position is higher than the liquid level (upon vacuum), pump shall be primed or vacuumized before start to make pump and suction pipeline filled up with liquid, thus to fully let out the air inside.

Close the inlet and outlet pressure (or vacuum) gauges and discharge valve. If there is a bypass pipe, then it shall also be closed.

Start the motor (optimally inched to make sure of direction rotation of pump, and then make it running normally). Speed-down starting device should better be used for motor power greater than 11KW, as this can be good to power supply and the service life of pump. And then, turn on inlet and outlet pressure (or vacuum) gauges. When pump reaches the normal speed and the gauges point out the relative pressure, open the discharge valve slowly to adjust it to the required working conditions. When discharge pipeline is closed, pump cannot work continuously for over 3 minutes.

Run

In the process of starting and running, notice the reading of gauges, and the vibration and noise of pump. If any abnormal conditions occur, timely solutions shall be taken out. (In case of excessive abrasion in the clearance between sealing ring and impeller, a new sealing ring shall be used to replace the old one).

Stop

Close the gate valve on discharge pipeline slowly. When pump is used under backward flow, the gate valve on suction pipeline shall also be closed, and turn off the switches of all gauges.

Cut off the power supply.

When ambient temperature is lower than the freezing point of liquid, let out the liquid inside completely to avoid freezing.

■ 维护与保养

泵不允许用吸入管路上的闸阀调节流量，以免产生汽蚀。

泵不宜在低于30%设计流量下连续运转，如果必须在该条件下连续运转，则应在出口处安装旁通管，排放多余流量。

对于输送液为易沉淀结晶的介质，使用后应及时清洗，排净泵内积液。

磁力泵正常运行1000小时后，应拆检轴承、止推环、口环磨损情况，并更换不宜再用的易损件。

如长期停止使用，应将泵拆卸清洗上油，包装保管。

■ Maintenance

Pump flow cannot be adjusted through the gate valve on suction pipeline, thus to avoid cavitation.

Pump shall not run continuously below the 30% of designed flow. If it is obliged to run continuously under this condition, abypass pipe shall be mounted at its outlet to discharge the excessive flow.

When it is used to deliver depositional and crystallizable liquid medium, it shall be cleaned immediately after use to clean oft the deposited liquid in the pump.

After magnetic pump has worked normally for 1000 hours, its bearing, thrust collars and rings shall be taken off to check their abrasion, and replace the wearing parts that cannot be used anymore.

If it is to be left unused for a long time, the pump shall be disassembled, cleaned, oiled, and then packed for storage.

■ 故障原因及排除方法 Failures causes and troubleshooting

故障 Failure	原因 Causes	消除方法 Troubleshooting
泵不出水 No water pumped out	1.水泵反转 2.进水管漏气 3.泵腔蓄水不足 4.电压太高，启动时磁力偶合器打滑 5.吸程太高 6.阀门没有打开 1.Reverse of pump 2.Air leakage in inlet pipeline 3.Insufficient water storage in pump chamber 4.Excessive voltage, slip of magnetic coupling upon starting. 5.Excessive suction head 6.Valve not opened.	1.改变电机接线 2.杜绝漏气 3.增加舒水量 4.调正电压 5.降低泵安装位置 6.校正或更换阀门 1.Change motor connections 2.Stop air leakage 3.Increase water storage 4.Adjust the voltage 5.Lower the mounting position of pump 6.Adjust or replace the valve.
流量不足 Insufficient flow rate	1.吸入管径太小或淤塞 2.叶轮流道阻塞 3.扬程过高 4.转速不够 1.Suction pipe too small in diameter or clogged. 2.Impeller channel clogged 3.Excessive head 4.Substandard speed.	1.调换或洁洗进水管 2.清洗叶轮 3.开大出水阀 4.恢复额定转速 1.Replace or clean the inlet pipe. 2.Clean the impeller 3.Open discharge valve further 4.Resume the rated speed
扬程过低 Head too low	1.流量过大 2.转速太低 1.Excessive flow 2.Speed too low	1.关小出水阀 2.恢复额定转速 1.Lessen the opening of discharge valve 2.Resume the rated speed
噪音太大 Excessive noise	1.轴严重磨损 2.轴承严重磨损 3.外磁钢或内磁钢与隔离套接触 4.密封环与叶轮研磨 1.Shaft seriously worn out 2.Bushing seriously worn out 3.External or internal magnet steel in contact with the spacer sleeve. 4.Sealing ring in attrition with the impeller.	1.更换泵轴 2.更换轴承 3.拆除泵头重新组装 4.更换止推环、密封环 1.Replace the pump shaft 2.Replace the bushing 3.Remove the pump head to reassemble 4.Replace the thrust collar and sealing ring.
漏液 Liquid leakage	F4垫片损坏 F4 gasket damaged.	更换F4垫片 Replace the F4 gasket.

■ 泵主要材料的耐腐蚀性能（供参考） Anticorrosion performance of main materials(for reference)

介质名称 Name of Medium	浓度 Conce-ntration (%)	聚丙烯Polypropylene		浓度 Conce-ntration (%)	ABC	
		25℃	50℃		25℃	50℃
硫酸 Sulfuric Acid	60	√	√	<30	√	×
硝酸 Nitric Acid	25	√	√	20	√	○
盐酸 Hydrochloric Acid	<36	√	√	<38	√	√
氢氟酸 Hydrofluoric Acid	35	√	√	40	√	
醋酸 Acetic Acid	<80	√	√	<20		
氢氧化钠 Sodium Hydroxide	100	√	√		√	√
重铬酸钾 Potassium Dichromate	25	√	√		√	√
溴水 Bromine Water		×	×		○	×
乙醇 Ethanol		√	○	<50	√	√
丙酮 Acetone		√	○	10	○	
四氯乙烷 Tetrachloroethane		○			○	×
氟利昂22 Freon 22		√	√		○	○
漂白水 Bleaching Liquid	Cl13%	√	√	Cl12.5%	○	○
电镀液 Electroplating Solution		√	√		○	×
照相液 Photographing Liquid		√	√			√
硫酸 Sulfuric Acid	<5	√	×		≈	≈
硝酸 Nitric Acid	70	≈	√		≈	≈
盐酸 Hydrochloric Acid		×			≈	≈
氢氟酸 Hydrofluoric Acid		×		0~100	×	
醋酸 Acetic Acid	<20	√	√		≈	≈
氢氧化钠 Sodium Hydroxide	70	√	√		○	
重铬酸钾 Potassium Dichromate	40~60	≈	≈	10~20	≈	≈
溴水 Bromine Water		○			≈	≈
乙醇 Ethanol		≈	√		≈	≈
丙酮 Acetone		≈	≈		≈	
四氯乙烷 Tetrachloroethane	50	≈	≈		≈	≈
氟利昂22 Freon 22		≈	≈		≈	≈
漂白水 Bleaching Liquid	Cl12%	×			≈	≈
电镀液 Electroplating Solution					≈	≈
照相液 Photographing Liquid		≈			≈	≈

符号说明：≈—优良，√—良好，○—可用，但腐蚀明显，×—腐蚀严重，不适用。
Symbol description: ≈— excellent, √— good, ○—ousable, but obvious corrosion, X— serious corrosion, not applicable.