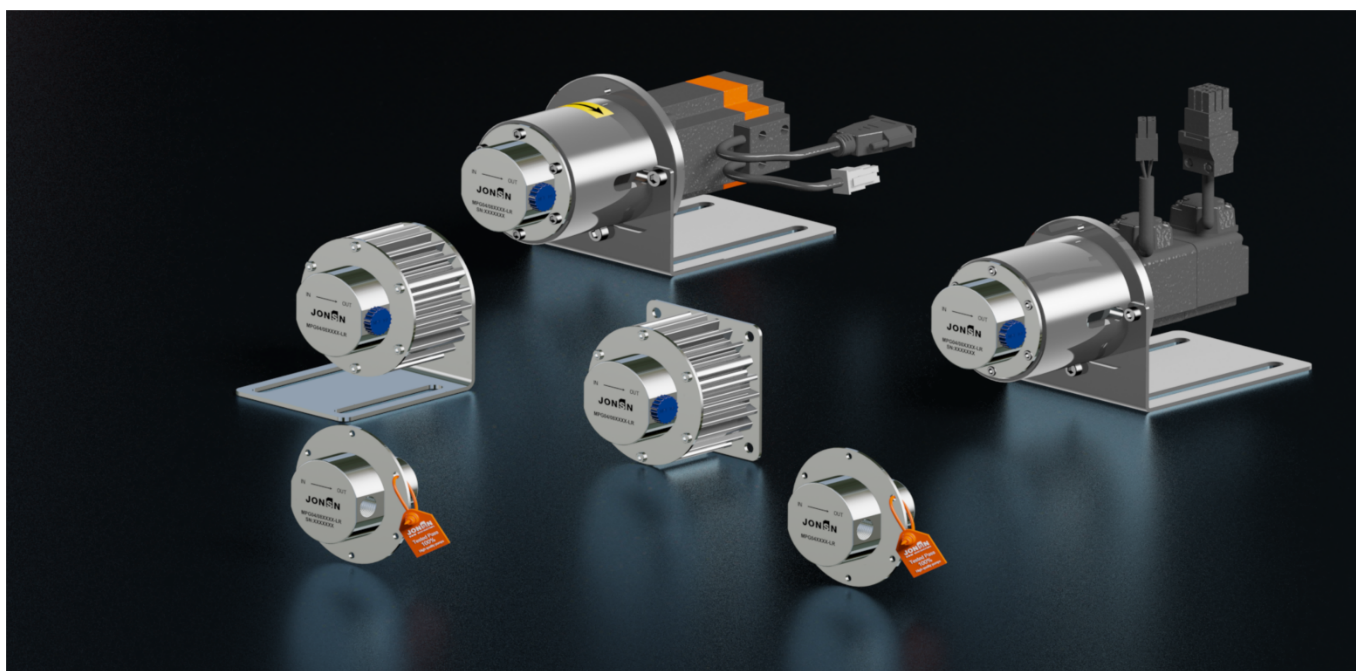


## MPG 系列精密级磁力齿轮泵操作手册



请妥善保管此手册。

Please safekeep this manual.

请确保先阅读此产品的使用说明，再按照其中的要求安装及使用此产品。

Be sure to read the instructions of this product first, and then follow the instructions to install and use this product.

本手册适用于：**MPG 系列精密磁力齿轮泵**

This manual is applied to: MR Series Precision Magnetic Gear Pumps

版本号：2021

Version No.: 2021

## 警告告誡注意

Warning and Note



**警告：**表示可能会引起人身伤害或设备损坏及其他安全事故。

Warning: indicates that could cause personal injury or damage to equipment and other accidents etc.



**告誡：**必须认真遵守，以免损坏设备。

Caution: must be observed to avoid damage to the device.

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### 1. 声明 / Statement

任何人在使用、安装、维护、维修 MR 系列齿轮泵时，必须完整阅读本手册。

Anyone to use, install, maintain, repair MR series gear pump, must read this manual entirely.



收到设备，投入使用前，请检查包装是否完好，齿轮泵是否有损坏，同时核对清单，任何配件的缺失，可能引起使用问题或安全问题。制造商不承担因此引起的设备损坏和人身伤害的责任。

Upon receipt of equipment and before putting into use, check if the packaging is intact or not, the gear pump damage or not, while checking the list, any missing parts, can cause use problems or security issues. The manufacturer assumes no responsibility for equipment damage and personal injury caused.

使用者有责任遵守本手册提到的安全要求，同时使用者必须遵循相关法律，法规对安全的要求。制造商不承担违反此类要求而引起的设备损坏和人身伤害的责任。

Users are responsible for complying with the safety requirements mentioned in this manual, while the user must follow the relevant laws and regulations on safety requirements. Manufacturer is not responsible for violation of these requirements caused equipment damage and personal injury liability.

本设备只适用于订货时的使用条件，如果变更使用条件，必须经过制造商或制造商授权的代理商认可，才能投入使用。

This device is designed for conditions of use when ordering, if conditions change, you must get the approval from the manufacturer or the agent authorized by the manufacturer, it can be put into use.

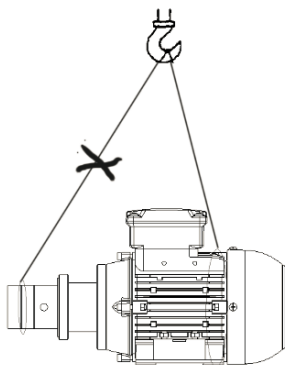
本设备只适用于本手册规定的使用条件和使用范围，任何超范围使用所导致的设备损坏或人员伤亡，制造商不对此承担责任。

This equipment is only suitable for the use conditions and scope of this manual, any use of equipment beyond the scope resulting equipment damage or personal injury, the manufacturer doesn't have to bear the responsibility.

## 2. 注意事项 / Attention

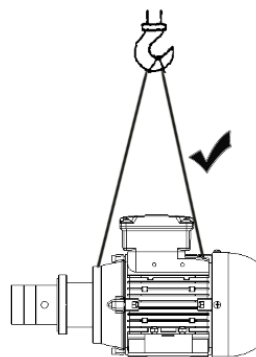
### 2.1 搬运

搬运泵和电机时，双手应抱紧电机主体整体搬运，不可以一手抱泵头，一手抱电机，这样容易把泵头压板拉变形，容易导致泵体泄漏。



### 2.1 TRANSPORT

When carrying the pump and motor, hands should hold the motor body whole carrying, not one hand holding pump head, one hand holding motor, it is easy to pull the pump head plate deformation, cause pump leakage.



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### 2.2 安装

2.2.1 泵的安装 - 将泵的安装位置尽可能的靠近液体源，出入口管线尺寸不能小于泵接口尺寸，并尽量缩短长度。如果入口管线必须很长，请加大管径。尽量减少泵入口的阀门，弯管的数量。

### 2.2 INSTALLATION

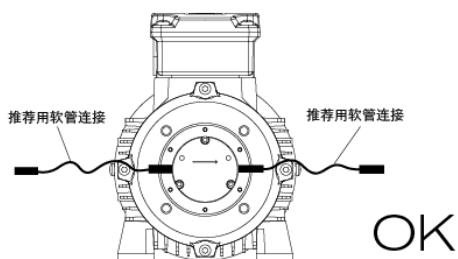
2.2.1 Pump installation - the pump is installed as close as possible to the liquid source, inlet and outlet pipeline size can't be smaller than the pump connection size, and try to shorten the length. If the inlet line must be very long, please increase the diameter. Minimize the pump inlet valve, the number of bends.

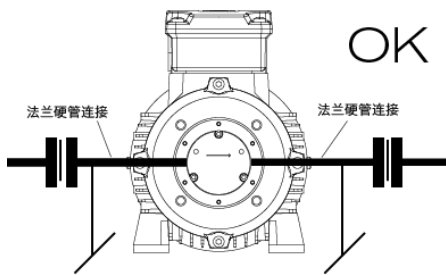


2.2.2 管道安装 - 使用螺纹密封胶或特氟龙密封胶作为管道联结的密封，在安装过程中不要损坏泵头，不要影响泵的对中。在用扳手紧螺纹的时候，要用手握住泵头。由于泵体体积较小，进出口管道优先使用软管连接，减小管道力量附加到泵体上，管道应力或拉力过大容易将泵体压板拉伸变形，容易导致泵体泄漏。当进出口管路是带法兰硬管连接时，管道上需装好支撑管架固定，中心对准，要确保配对法兰拧紧时不会把泵头侧的管路拉动，尽可能消除管道应力变形，以下为安装示意图：

2.2.2 Piping Installation - Use a thread sealant or a Teflon sealant as a seal for the pipe connection.

Don't damage the pump head during installation, don't affect the pump centering. When tightening the thread with a wrench, hold the pump head with your hand. Due to the small size of the pump, the inlet and outlet pipeline priority to use hose connection to reduce the pipeline power attached to the pump body, the pipe stress or tension too large is easy to pull the pump plate deformation, easily lead to pump leakage. When the pipe is connected with a flanged pipe, the pipe must be fitted with a support bracket fixed, center alignment, to ensure that when tightening the matching flange, will not pull the pump side of the pipeline, as far as possible to eliminate the pipeline deformation by stress, below is the installation instruction:





2.3 过滤器 - 在泵的入口应该安装 25 $\mu$ m 或精度更高的过滤器。

### 3. 运行

3.1 磁力驱动环 - 磁力驱动可以让泵达到零泄漏的要求，它也能够对系统的过压和颗粒的进入提供保护。当内外磁环在极端外力的作用下发生错位，就会发生脱转现象。

3.2 泵堵转时，电机可能会继续运转，但泵将停止运行。

3.3 要恢复运转，请将电机完全停止再启动。

3.4 如果继续堵转，请检查系统是否超压。如果系统压力正常，必须拆开泵体检查是否有外部颗粒进入泵体，造成齿轮堵转。清理完内部部件后，重新组装泵组。在重新启动前，请转动电机风扇的叶片，此时泵和电机应该平稳无阻碍的旋转。

3.5 操作压力 - 过大的进出口压力差会使磁力联轴脱转，系统压力会有波动，并发出震动噪音。

3.6 输送有粘度物料 - 粘度过大转速又很高会使磁力联轴器脱转，请按选型时提供的转速运行。

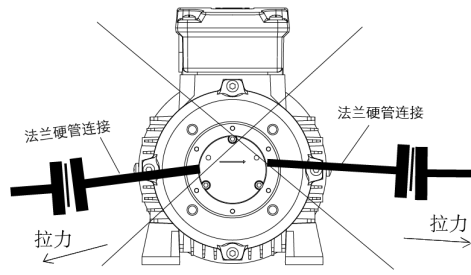
3.7 输送高温物料 - 泵出厂前齿轮和滑动轴承留有安全膨胀间隙，因此输送时请将泵加热至需要的温度，否则泵在常温下会出现，内泄漏过大、压力有波动。

3.8 自吸 - 泵具有自吸功能，但在启动前确认齿轮被泵送的液体润湿过。

3.9 干转 - 干转会导致泵的永久损坏，请确认泵在运转时泵腔内有液体。

4.0 反转 - 泵应该顺时针旋转，短时间的反转是可以接受的，但长时间连续的反转会缩短泵的寿命。

4.1 工程塑料齿轮泵 - 严禁用于含二氯甲烷、四氢呋喃、丁基锂、二甲基乙酰胺的溶剂及物料输送或清洗，输送以上物料会使我们的工程塑料齿轮和轴套发生溶胀卡死。



2.3 Filter - at the inlet of the pump should be installed 25 $\mu$ m or higher precision filter.

### 3. RUN

3.1 Magnetic drive ring - magnetic drive lets pump achieve zero leakage requirements, it also can provide protection for overvoltage to system and particle entering. When the internal and external magnetic loop occur dislocation under the extreme force, the decoupling phenomenon occurs.

3.2 When the pump locking rotor, the motor may continue to run, but the pump will stop running.

3.3 To resume running, please stop the motor completely before restarting.

3.4 If continue stalling, check whether the system overpressure. If the system pressure is normal, the pump must be disassembled to check if outer particles enter the body, resulting in gear stall. Clean internal parts, reassemble the pump. Before restarting, turn the motor fan blades, the pump and motor should be rotate smooth unimpeded.

3.5 Operating pressure - excessive inlet and outlet pressure difference causes the magnetic coupling slip. System pressure will have fluctuations and vibration noise.

3.6 Deliver viscous materials - too high viscosity and high speed will turn off the magnetic coupling, please run as per the selection speed.

3.7 Deliver high temperature materials - before leaving factory the pump gear and sliding bearing have safe expansion gap, so heat the pump to required temperature when delivering, otherwise, the pump will appear excessive leakage and pressure fluctuations at normal temperature.

3.8 Self-suction - pump has self-suction, but confirm the gear wetted by liquid before starting.

3.9 Dry-running - Dry-running will cause permanent damage to the pump, make sure that the pump has liquid when running.

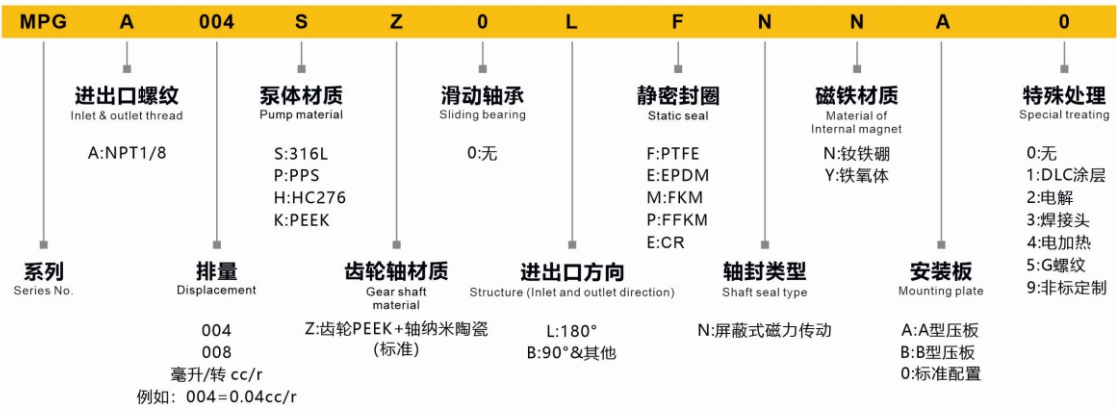
4.0 Reverse - pump should rotate clockwise, short reversal is acceptable, but long continuous reversal will shorten the life of the pump.

4.1 Engineering plastic gear pump - is prohibited for solvent containing dichloromethane, tetrahydrofuran, butyl lithium & dimethylacetamide and material delivering or cleaning, delivering above materials will make plastic gears and bearing sleeve swells stuck.

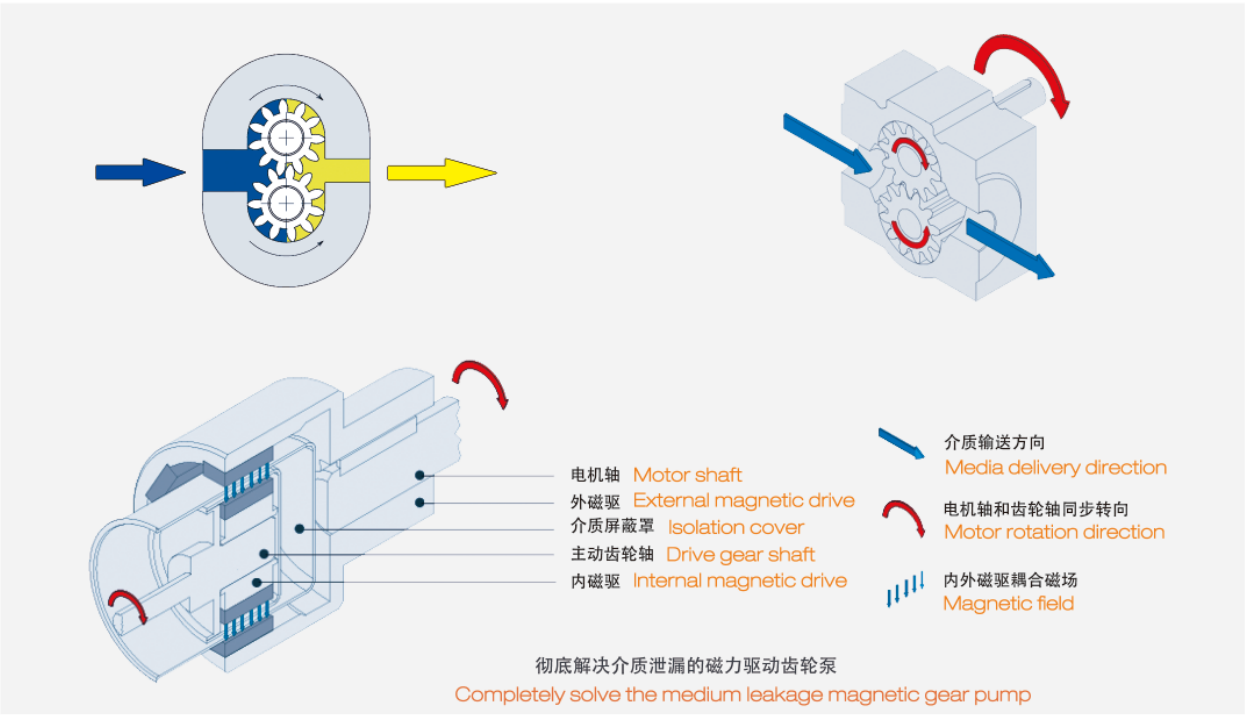
3.技术参数 / Technical Parameters

流量范围	Flow range	1-320ml/min	
入口压力	Inlet pressure	-0.95~20bar	
压差	Differential pressure	0~25bar 取决于物料粘度	Depends on material viscosity
耐压	Pressure resistance	PTFE密封圈 3Mpa ,橡胶密封4Mpa	for PTFE O-ring is 3 Mpa, for Viton O-ring is 4 Mpa
温度	Temperature	常规温度-20~80 ,低温-40, 高温160可定制	Other temperatures can be customized
粘度范围	Viscosity range	0.4-3000cps	
最大密度	Maximum density	1.8	
电机可配	Motor can be equipped	交流电机、直流无刷、伺服、变频防爆电机	AC motors, Brushless DC, Servo Frequency conversion explosion-proof motor
进出口螺纹	Import and export thread	NPT1/8、G1/8	
非标定制	Non-standard customization	OEM机械设备配套、伺服系统定制	OEM mechanical equipment matching servo system customization

4.配置编码 / Configuration Code

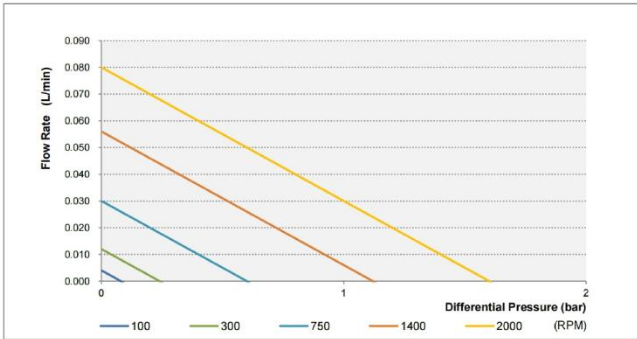


5.工作原理图 / Working Principle

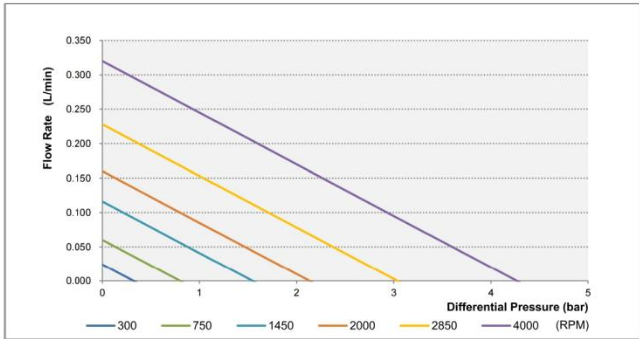


6.性能曲线图 / Performance Curve

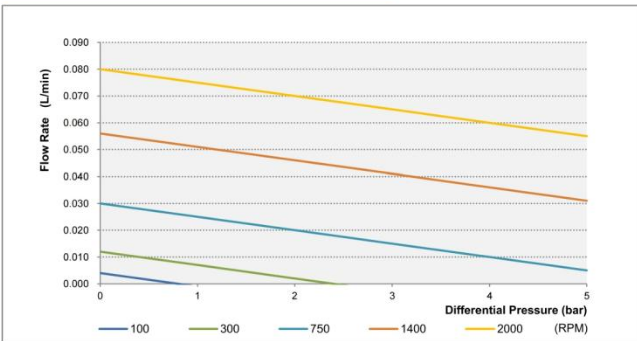
Pump Head MPG04  
Measured with water 1 mPas



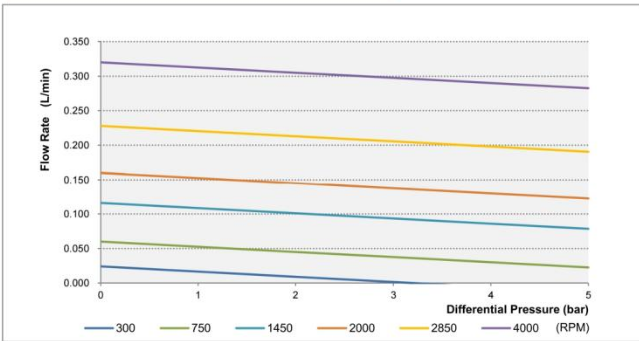
Pump Head MPG08  
Measured with water 1 mPas



Pump Head MPG04  
Measured with oil 100 mPas



Pump Head MPG08  
Measured with oil 100 mPas

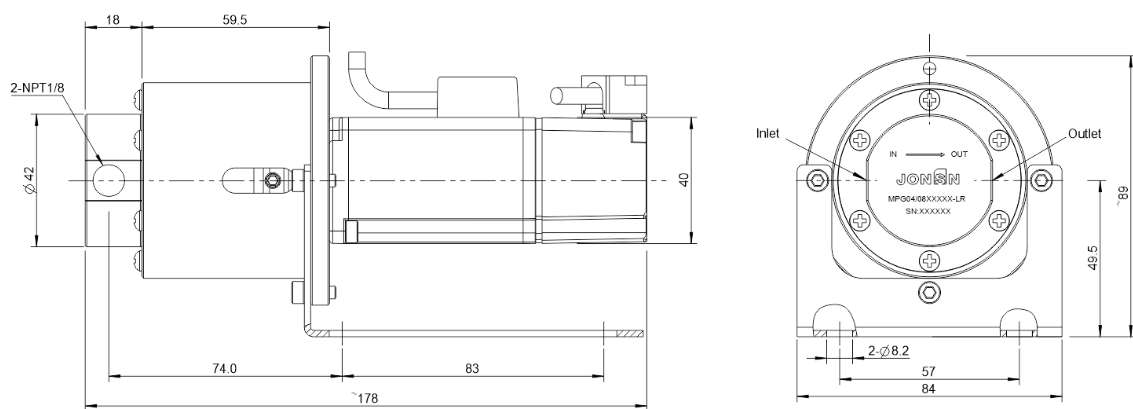


7.尺寸图/ Dimensional Drawing

➤ **MPG Gear Pumps**

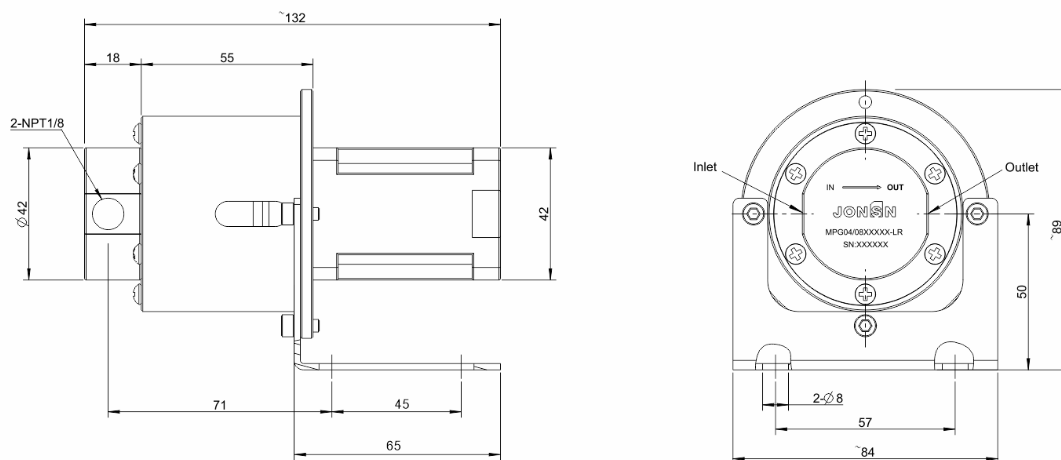
Pumps order NO.	
MPG04	外形尺寸统一 head uniform dimensions
MPG08	

## ➤ MPG Servo Motor 220V/110V 40 Frame



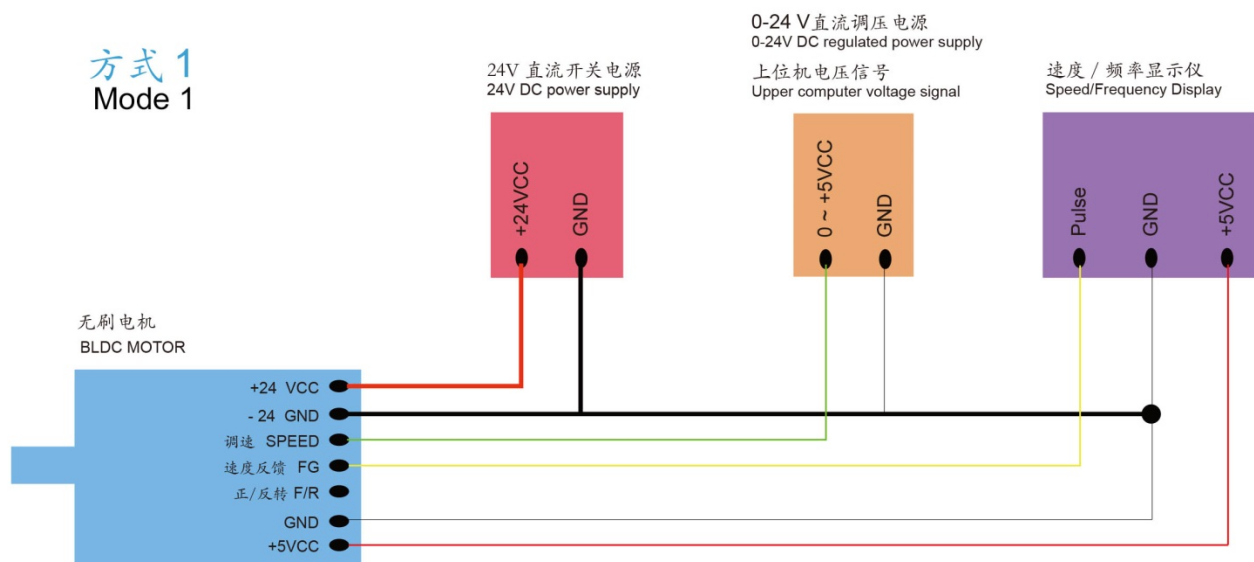
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## ➤ MPG Stepper Motor 24V 42 Frame

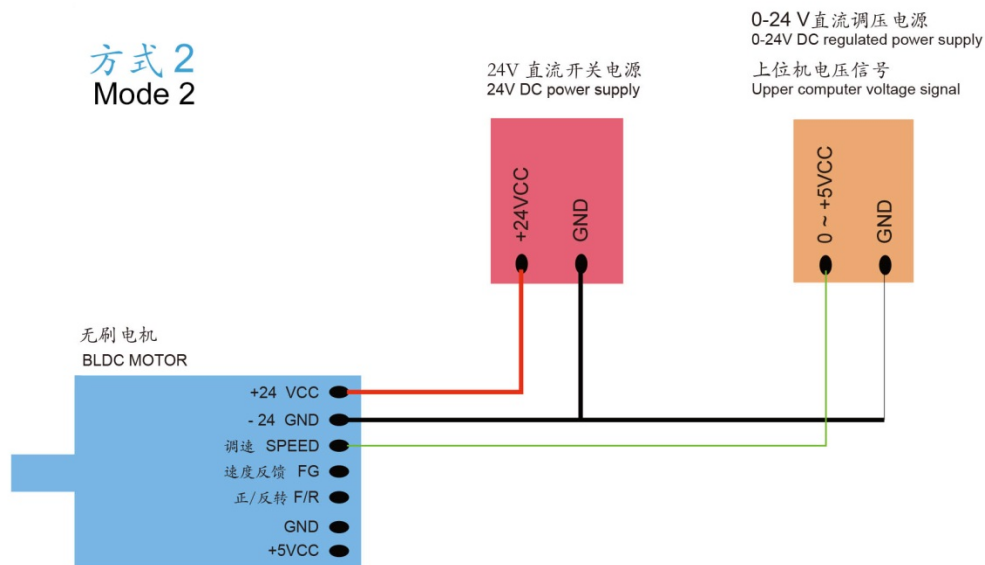




## 方式 1 Mode 1

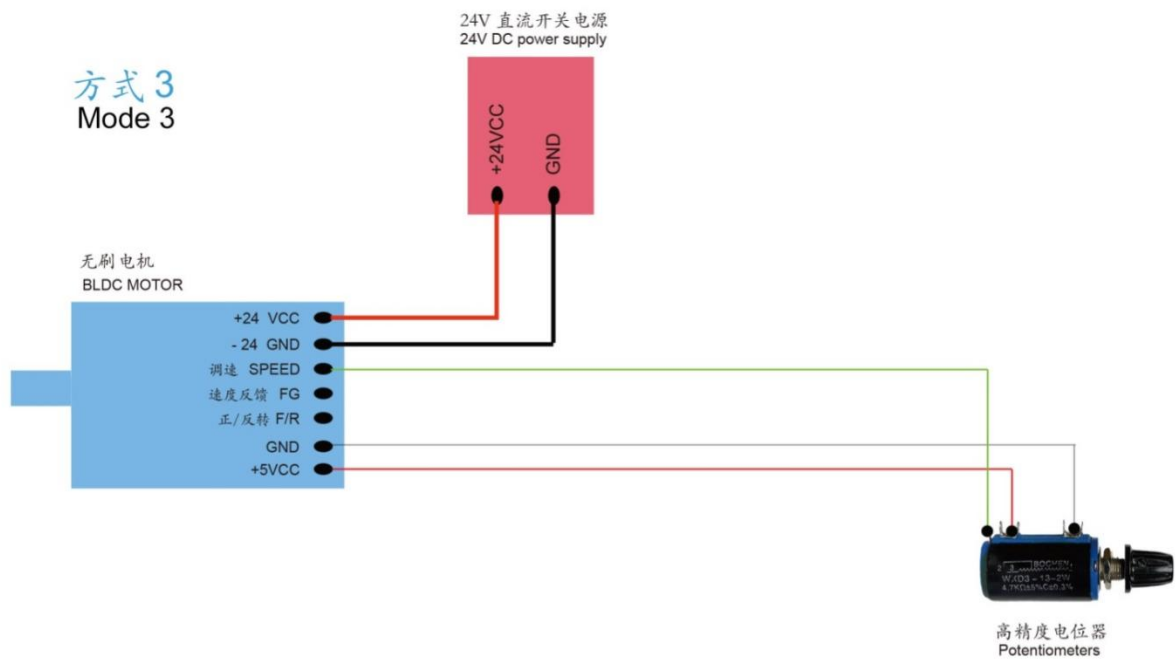


## 方式 2 Mode 2

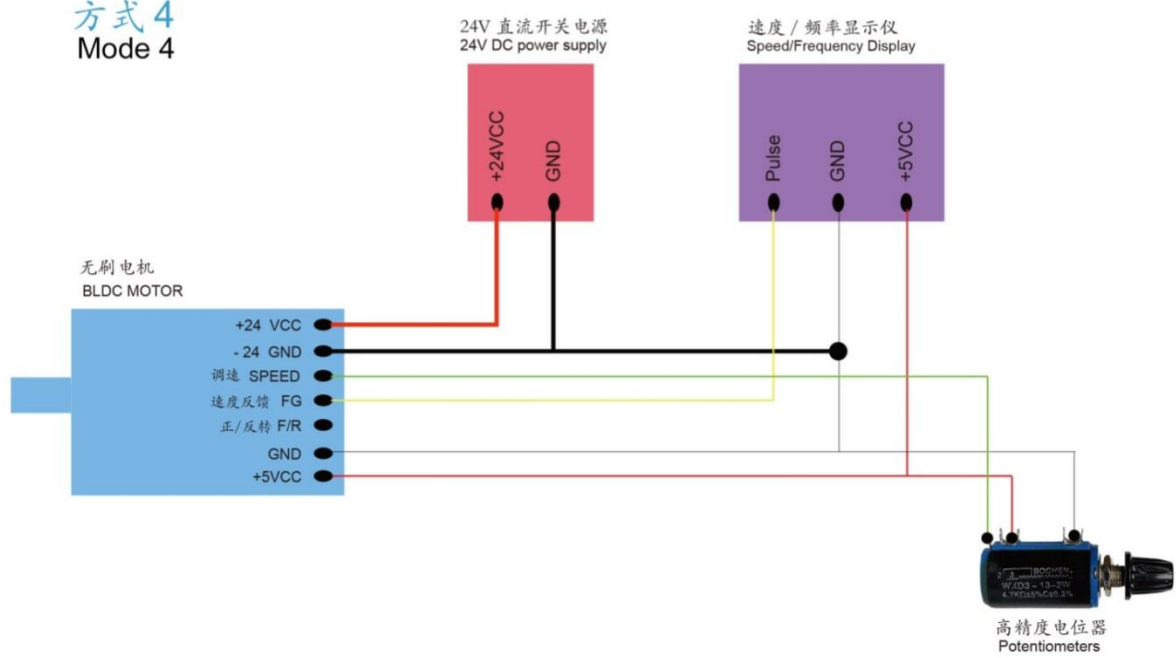




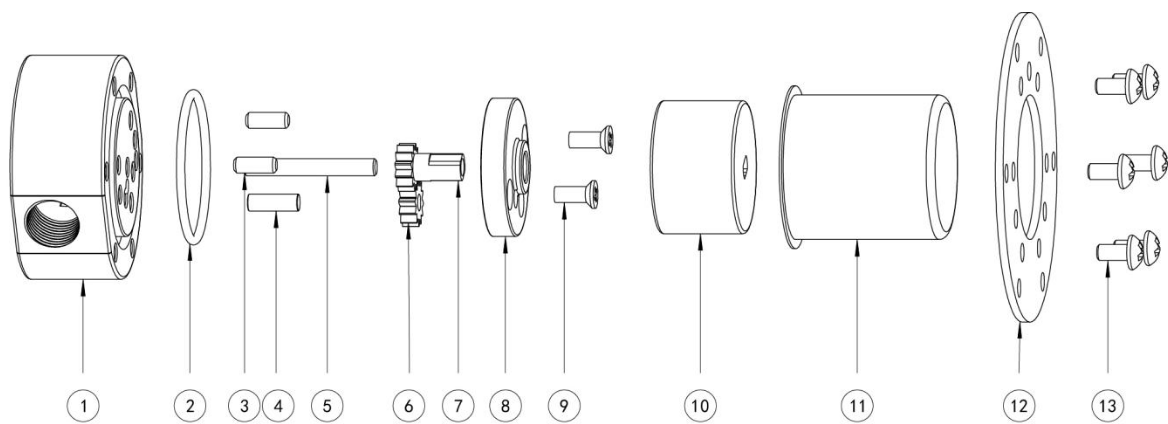
### 方式3 Mode 3



### 方式4 Mode 4



8.分解图/ Exploded View



序号 Item No.	零件名 Part Name	数量 Quantity
1	泵体 Pump case	1
2	密封圈 O-ring	1
3	定位销 Locating pin	2
4	从动陶瓷轴 Drive ceramic shaft	1
5	主动陶瓷轴 Idle ceramic shaft	1
6	从动齿轮 Drive gear	1
7	主动齿轮 Idle gear	1
8	齿轮腔板 Gear cavity plate	1
9	十字沉头螺丝 Cross countersunk screw	2
10	内磁驱 Inner magnet	1
11	屏蔽罩 Shielding case	1
12	压板 Pressing plate	1
13	十字圆头螺丝 Cross round screw	6

## 9.故障分析/ Malfunction Analysis

项目	故障	新泵故障排查项目	旧泵故障排查项目	解决方案
关于流量	电机正常工作，但没有流量	1. 接头密封不好 2. 新装管路未清洗，导致焊杂颗粒或密封带进入泵体内，导致齿轮卡死 3. 超压或粘度太大，导致内磁驱扁方磨损或主动轴断裂 4. 介质高或低温超过选型温度，导致齿轮抱死或齿轮间隙过大 5. 泵内部过流件材质被介质腐蚀。	1. 内磁驱塑料扁向磨损，导致内磁驱干转 2. 过滤器是否堵塞 3. 齿轮、泵腔、轴套磨损，内泄漏很大	1. 检测系统压力、温度、介质粘度 2. 清洗过滤器 3. 更换齿轮、内磁驱、轴套备件
	流量很小	1. 转速太低， 2. 管接头密封不好 3. 选型不对，选型粘度与实际工作粘度相差太大		1. 提高转速 2. 重新密封 3. 粘度大需要更换大泵头，降低转速
	流量变小		齿轮磨损	更换齿轮
	流量不稳定	1. 入口管径太细 2. 电机转速不稳定 3. 齿轮运转不顺畅 4. 泵入口接头密封不好 5. 泵入口过滤器太脏 6. 出口压力不稳定 7. 工作温度不稳定	检查齿轮，看看有没有磨损	1. 检查管件各处密封性 2. 检查齿轮、泵腔、管径 3. 清洗过滤器 4. 更换齿轮
关于压力	有流量，但没有压力	出口压力太小	齿轮、泵腔、滑动轴承磨损，内泄漏很大	1. 检测系统压力 2. 旧泵更换相关易损件
	压力跳动很利害	出口压力太高或管径与流速不匹配	齿轮、泵腔磨损	检查齿轮、泵腔、管径
关于气泡	出口有气泡	1. 接头密封不好 2. 入口管太小，流速与管径不匹配 3. 入口管路过滤器堵塞		1. 重新密封 2. 检查齿轮、泵腔、管径 3. 清洗过滤器
关于电机	电机有震动	1. 安装管路时用力过大或管道应力过大，导致外磁驱与屏蔽罩不对中，外磁驱摩擦屏蔽罩的声音 2. 阀门没开，压力太大 3. 电机轴承损坏		1. 管道重新安装，同时管路安装固定支架，减少施加应力 2. 开机前，前后阀门打开 3. 更换电机轴承
	电机不转	接线不对		检查线路
	直流电机不转	直流电源开关打开瞬间电流过大，烧坏驱动器元器件	电机驱动器烧坏	更换电机
	直流电机忽然停止	泵过载，电机温升过高，触发驱动器温控开关	泵内有异物、齿轮卡死	1. 更换大功率电机 2. 清洗泵内齿轮
关于异响	压力太高，过载	出口管路堵住		清洗出口管路
	齿轮卡死，脱磁	异物进入		前端加过滤器
	电机功率不够	电机超载，电流过大		换大功率电机
	齿轮间隙过大		齿轮磨损	更换新齿轮

Items	Malfunction	New Pump Troubleshooting Items	Old Pump Troubleshooting Items	Solutions
About flowrate	Motor normal working but without flowrate	1. Joint sealing not good. 2. New pipelines not cleaned, welding slag particle or sealant entering pump body, cause gear jammed. 3. Overpressure or high viscosity, cause internal magnetic drive flat abrasion or driving shaft breakage. 4. Medium high or low temperature exceed selection temperature, cause gear damaged or large gear gap. 5. Inside wetted parts corroded by medium.	1. Internal magnetic drive plastic flat abrasion, cause magnetic drive dry rotating. 2. Filter jammed or not. 3. Gear, pump body, shaft sleeve abrasion, internal leakage heavy.	1. Detecting system pressure, temperature, medium viscosity. 2. Clean filter. 3. Replace gear, internal magnetic driving, shaft sleeve.
	Small flowrate	1. Low rotating speed. 2. Pipeline joint sealing not good. 3. Model selection not right, big difference between selection viscosity with actual working viscosity.		1. Improve rotating speed. 2. Redo sealing. 3. Change big pump head and reduce rotating speed.
	Flow decreases		Gear abrasion	Replace gear
	Instable flowrate	1. Inlet pipe size too small. 2. Instable motor rotating speed. 3. Gear running not smoothly. 4. Inlet joint sealing not good. 5. Inlet filter dirty. 6. Instable outlet pressure. 7. Instable working temperature.	Inspect if gear abrasive or not.	1. Inspect pipes sealing. 2. Inspect gear, pump body, pipe diameter. 3. Clean filter. 4. Replace gear.
About pressure	Have flowrate but without pressure	Outlet pressure is too small.	Gear, pump body, sliding shaft bearing abrasion, heavy internal leakage.	1. Detecting system pressure. 2. Change vulnerable parts.
	Pressure jumps severely	Outlet pressure too high or mismatch between pipe diameter and flow speed.	Gear, pump body abrasion	Inspect gear, pump body, pipe diameter.
About bubbles	Outlet has bubbles	1. Joint sealing not good. 2. Inlet pipe too small, mismatch between pipe diameter and flow speed. 3. Inlet pipe filter jammed.		1. Redo sealing. 2. Inspect gear, pump body, pipe diameter. 3. Clean filter.
About motor	Motor vibration	1. When assemble pipes over stress, cause external magnetic drive not centering with shielding case, then have friction sound. 2. Valves not open, overpressure. 3. Motor shaft bearing damaged.		1. Reassemble pipes and fixed bracket to reduce the stress. 2. Front & back valves open before start. 3. Change motor shaft bearing
	Motor doesn't run	Wrong connection.		Inspect circuit.
	DC motor doesn't run	DC motor open overcurrent, driver components burn out.	Motor driver burn out.	Change motor.
	DC motor stops suddenly	Pump overloading, motor temperature rise too high, trigger driver temperature control switch.	Have foreign matters, gear jammed.	1. Change high power motor. 2. Clean internal gear.
About abnormal sound	Overpressure	Outlet pipe jammed.		Clean outlet pipe.
	Gear jammed, trip magnet	Foreign matters entering.		Add filter at pump front.
	Power shortage	Motor overload, overcurrent.		Change high power motor.
	Large gear gap		Gear abrasion	Replace gear.

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