

河北远东泵业制造有限公司

HEBEI YUANDONG PUMPS

MANUFACTURE CO., LTD.

OPERATING MANUAL
SCREW PUMPS TYPE 3G

3G 型三螺杆泵

使用维护说明书

中国 河北 泊头 道东街 NO. 88, Daodong Street, Botou City,
Hebei Province, P. R. China

电话: (0317) 8263980 8266649 传真: (0317) 8265584 邮政编码: 062150
Phone: (0317) 8263980 8266649 Fax: (0317) 8265584 Postcode: 062150

一、概述

3G型三螺杆泵是转子型容积泵，适于输送各种不含固体颗粒，无腐蚀性油类及类似油的润滑性液体、输送液体粘度 2~760mm²/s，温度不超过 80℃，超过 80℃可用高温泵 3GW型。

3G 型三螺杆具有多种结构，一般小流量泵衬套和泵体合为一个，可以卧式和立式安装。进油口方向可相隔 90° 任意安装，轴封多数为机构密封。

中等流量以上泵，衬套为一个单独的零件固定于泵体内，螺杆轴端装有平衡环以液力平衡其轴向力。一般结构为卧式。进油口方向亦可以相隔 90° 任意安装。改变泵体后可制成立式。轴封根据情况有机械密封和软填料密封两种结构。

3G 型三螺杆泵轴伸支承较小，应由原动机经弹性联轴器直接驱动，不得用皮带轮等会产生额外径向力较大的传动方式传动。

3G 型螺杆泵输送各种油类时应注意事项：

- 1、输送 40~150mm²/s的油类最合适，允许按泵的最高工作压力使用。
- 2、输送 40mm²/s以下的油类，为保证泵流量及寿命应降压使用。
- 3、输送 150mm²/s以上的油类，且进油管道过长，弯头过多，泵工作时如产生噪音或振动现象，则应考虑更换低一级转速的电机运转或缩短吸入管道，减少弯头。

I、BRIEF DESCRIPTION

The three Screw pump type 3G, is a rotor type volumetric pump, applicable for conveying various kinds of non-corrosive oil with ort contents of solid granules and liquids similar to lubricating oils The viscosity of liquids to be conveyed ranges from 2-760mm²/s with temperature not exceeding 80° C , When the temperature exceeds 80° please choose the high temperature pump of type 3Gw.

There are various kinds of three of Screw Pump in construction ;generally the sleeve of small flow type is integrated with the pump as one unit, The is integrated with the pump as one unit, The pump may be installed horizontally or vertically, The direction of oil inlet may be installed at 90° apart random , The shaft seal is mostly mechanical seal

The sleeve of pumps above middle flow is an independent part fixed in the casing of the pump; the balance bush is fixed on the screw shaft to balance the axial force by its by hydraulic force its construction is generally horizontal the direction of online may also be installed at 90 apart random. With the change of the pump, it can be converted into vertical model. According to actual condition, the shaft ceal may be of two kind: mechanical and soft packing .

The support for shaft extension of three Screw Pump is comparatively small it should be driven directly by motor through the coupling Driving by belt pulley and other means of comparatively large radial force is not to be employed. The following points are to be noted for conveyance of various of oil by three Screw Pump, type3G.

1. The pump is most suitabl for conveying oils with viscosity of 40-150mm²/s application of the maximum working pressure of pump is permissible .

2. When the oil viscosity is below 40 mm²/s, pressure should be reduced in application to ensure the flow-and life of the pump.

3. When conveying oil with viscosity above 150 mm²/s, and the oil inlet pipe is too long, with too many bends , if noise and vibration was happened when the pump operating con side ration shoulc be taken to use a motor with lower vevolution or to shorten the suction piping and teducce the number of bends.

二、3G 型三螺杆泵安装要求

1、安装前应检查泵的油封是否良好，并检查泵在运输中是否损坏，可用手转动联轴器是否有卡劲现象，如有则应拆泵进行清洗，修理和校正。

2、安装泵的进油和排油管道时，其管径不得小于泵的进油和出油口口径，进油管道不得过长，弯头不得过多，否则将影响泵的工作状态。

3、当有两台以上的泵安装在同一条主管线上，为便于泵的启动，在近泵的排油管上必须安装逆止阀。

4、对于在较高温度（指 60℃以上）下输送粘度大的油类（如：重油）的备用泵，必须是热备用泵，否则泵在低温下启动会造成电机过载或泵损坏。（建议在靠近泵的排油管上的逆止阀旁，并联安装一个小回流阀，对备用泵可微启回流阀，使泵缓慢逆转，其逆转速 ≤ 100 转/分，使部分热油经常流过泵内，达到泵热备用目的）。（图附后）

II. INSTALLATION REQUIREMENTS OF THREE SCREW PUMP, TYPE 3G

1. Before installation, the oil seal of the pump should be checked to see if it is in order, and inspect whether the pump is damaged in transit. Turn the coupling with hand to see if it is blocked; if so, the pump should be dismantled for cleaning, repair and adjustments.

2. When installing oil inlet and oil discharge pipings, the diameters of pipes which should not be smaller than the oil inlet and oil outlet of the pump respectively, The oil inlet piping should not be too long, should not have too many bends; otherwise the function of the pump will be affected.

3. In case two sets or more pumps are installed on one main line valve must be installed close to the oil discharge pipe of the pump so as to facilitate starting of the pump.

4. When conveying oil of comparatively high viscosity (such as heavy oil) under higher temperature (above 60℃) by a spare pump; the spare pump must be heated. Otherwise, starting of pump under low temperature will cause overload of motor or damage to the pump. (It is suggested that a small return valve be installed parallelly beside the check valve close to the oil discharge pipe of the pump so that the return valve may be slightly opened to the spare pump, causing slow reversal of the pump at a speed of ≤ 100 r. P. M, thus allowing part of the hot oil frequently flow through the pump, attaining the object of heating the spare pump ready for use.

5、输送介质内含有机械杂质。将严重影响泵的运转和降低使用寿命，因此在泵安装前，必须仔细清除进油管内的焊渣，沙粒等杂质，并应在进油管道靠近泵处安装滤器，滤器网孔大小，可根据工作情况及介质粘度确定。（一般可用 40~80 目网），过滤面积一般不得小于进油管横截面积的 20 倍。

6、尽量在泵进油和排油口处的螺纹孔上连接压力表和真空表，以便于观察泵的运转状态。

7、原动机与泵的转轴必须在同一中心线上，可用直尺测隙规在联轴器圆周上间隔

90° 处检查。

8、原动机与泵的转向必须一致，严格禁止原动机驱动泵逆转。电机接线时，应先断开电机与泵的联轴器，对电机作试运转。使其转向与泵的转向标志一致。

5. Any mechanical foreign matters containing in the conveyed medium will affect the operation and drop life of application of the pump. Therefore, the inner part of the oil inlet piping must be carefully and thoroughly cleaned of the solder slag, sand and other foreign matters before installation of the pump. Besides a filter should be installed on the oil inlet piping at a point close to the pump the mesh of the filtering screen may be determined according to the working condition and the viscosity of the medium (generally 40-80 mesh may be used). The filtered area should in the main not be smaller than 20 times the area of cross section of the oil inlet pipe.

6. As can as possible to connect a pressure gauge and a vacuum gauge on the threaded hole of the oil inlet and oil out to facilitate observation of the operation condition of the pump.

7. The rotation shafts of motor and the pump must be on the same center line. This may be inspected by using a edge clearance gauge putting on the circumference of the coupling at an interval of 90°

8. The rotation direction of the motor must coincide with the pump. The actuation of pump by motor to rotate in counter direction is strictly prohibited. When connecting wire of the motor, the coupling connecting the motor and the pump must be first disconnected, conduct trial run of the motor, to make its rotation direction same with the pump.

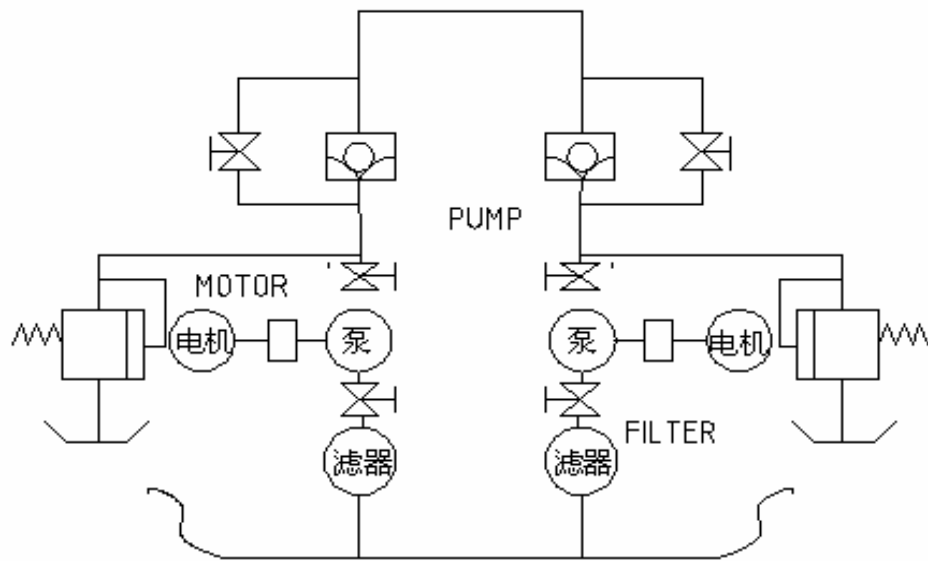
三、3G 型三螺杆泵的使用

- 1、泵启动前，必须全开进油和排油闸阀。
- 2、首次启动泵或再次使用长期封存的泵时，泵内无介质，应在泵的进油腔灌注适量输送介质，避免泵干启动。
- 3、泵启动后，应密切注意电流表，压力表和真空表的数值，超出规定值时，应停泵找出原因后，再行启动。
- 4、轴封处点滴泄露，应属正常现象，当泄露量大量增加时，对软填料密封应压紧填料压盖，对机械密封应停泵修复后，再行启动。
- 5、用高温蒸汽清扫管线时，应避免高温蒸汽通过泵内。
- 6、如果泵长期不工作时，应进行油封，并定期检查油封情况，必要时重新油封。

III、APPLICATION AND MAINTENANCE OF THREE SCREW PUMP TYPE 3G

- 1.The oil inlet and oil outlet gates and valves must be completely opened before starting the pump .
- 2.During initial start the pump or restart of the pump after long period sealed up for safe-keeping form operation, and so medium is inside the pump , appropriate quantity of medium should be filled into the pump through the oil inlet opening in order to avoid dry running .
- 3.After the pump is started, the valued of ammeter , pressure gauge and vacuum gauge should be well noted if exceeding the specified and restarted after the fault is detected.
- 4.Slight ieakage at the point of shaft seal is considered normal condition in case of leakage increasing heavily, the gland box of soft packing should be tightly pressed and the pump is to be restarted after stopping and the mechanical seal repaired.
- 5.When using high temperature steam to biow out the pipe-line, care should be taken not to admit the high temperature steam into the pump .

In case the pump is sealed up for safe keeping form operation for longer period, it should be oil sealed ; sealed the condition of oil seal should be periodically inspected and be replace when necessary.



安装系统示意图（参考）
VIEW FOR INSTALLATION SYSTEM

四、3G 型三螺杆泵的主要故障及消除方法

序号	故障	可能原因	消除方法
1	泵有振动	泵轴与电机轴不同心	检查同心
2	泵有振动、噪音 压力表及真空表指针 剧烈跳动	1.油粘度太大或进油管太窄、太细、弯头过多 2.吸入真空超出规定值（进油管堵塞、过滤器堵塞） 3.进油管吸入空气或油中混入大量空气	按项排除
3	泵不出油	(1) 有大量空气吸入 (2) 电机转向反向 (3) 进、排油管反向 (4) 油粘度太大	按项排除
4	电机超载	(1) 泵的压力高于格定值 (2) 油粘度太大 (3) 电压太低	
5	轴封处大量漏油	(1) 软填料磨损 (2) 机械密封，密封面破坏	(1) 压紧或更新 (2) 修复或更换
6	流量急剧下降	(2) 安全阀失灵或有脏物关闭不严 (3) 转速或油粘度低于格定值 (4) 螺杆的衬套磨损，配合同隙太大	(1) 按项排除 (2) 按项排除 (3) 更换容件

Serial NO	Troubles	Possible Cause	Method of Elimination
1	Pump vibrating	Pump shaft and motor shaft not in concentricity	Inspect the relative concentricity
2	Pump vibrating . Producing noise ; Pressure gauge & Vacuum gauge Pointers jerking violently	1. Oil viscosity too high or oil inlet pipe too long many bends. 2. Suction vacuum exceeding specified value (oil inlet pipe clogged, filter clogged). 3. Air suctioned into oil inlet pipe or big quantity of air quantity of air mixed in the oil	Eliminate item by item
3	Pump not delivering oil	1. Big quantity of air suctioned in. 2. Motor rotating in reverse direction. 3. Oil inlet & outlet pipes being inversely connected 4. Oil viscosity too high	Eliminate item by item
4	Overload of motor	1. Pump pressure exceeding specified value 2. Oil viscosity too high 3. Electric voltage too low	
5	Heavy leakage at point of shaft seal	1. Soft packing deteriorated. 2. The sealing surface of mechanical seal damaged.	1. Press tightly or replace 2. Make repairs or replacements
6	Flow dropping suddenly	1. Safety valve ineffective or with dirt inside , cannot be tightly closed . 2. Rotating speed or be oil viscosity lower than specified value . 3. Wear of screw and sleeve the tolerance clearance much bigger	Eliminate item by item