MRH Series

Radial Piston Hydraulic Motor

Product Operate Guide

Tianshu Hydraulic Technology （NingBo） Co., Ltd.

The products meet the following criteria:

CB / T 3565-1993 Marine crankshaft connecting rod type radial piston hydraulic motor

JBT_8728-2010 Llow speed high torque hydraulic motor

1 Use and Scope of application

1.1 MRH series hydraulic motor can be matched with various pump, valve and other hydraulic components into hydraulic transmission device, and be used for various needs to perform the fixed rotary motion or walking type hydraulic machinery equipment.

1.2 This product has a wide range of applications, especially in ship anchors, ship hydraulic winches, injection molding machine screw drive and other Hydraulic drive system. In the Ship anchor winch, towing winch, mooring winch and so on are extremely ideal hydraulic rotary drive accessories.Widely used in piling ships, cranes ships, dredgers, bulk carriers, Container ships, tugs, offshore oil platforms, large warships and other marine vessels and platforms, and injection molding machine and other applications。

2 Structure principle

2.1 MRH series motor structure is shown in figure 1. It is consists of work part and distributor .Work part is consists of shell, crankshaft,plunger piston, connecting rod and other parts. The distributor is the its consists of shell and distributor shaft. Hydraulic motor shell is a star-shaped radiate appearance with uniform distribution into five (or seven) plunger cylinder;Piston has a ball and socket,the connecting rod through the ball and socket in the ball depends on ring to connect the piston.there is the sealing ring.The arc surface at the other end of the connecting rod clings to the eccentric round of crankshaft, can slide on the eccentric round.There is the Damping choke in the connecting-rod,the static pressure supporting structure is adopted between the connecting rod and crankshaft .One end of the crankshaft is the output shaft that is responsible for connected outside ,and the other end connects the distributor through the cross joint to drive the distributor valve synchronous rotation,the crankshaft support on tapered roller bearings;The distributor can rotate inside its casing based on static balance.

2.2 The working principle of the motor as shown in figure 2.Only draw the motion of a piston cylinder as shown, it is equivalent to a crank connecting rod mechanism. piston cylinder passed pressure fluid which bear the liquid pressure, to generate thrust P in piston , this force act on eccentric gear by connecting rod, due to eccentric distancee, the tangential force F rotate shaft, also the distributoris rotated together at the same time.The plunger cylinder in turn connect to high and low pressure fluid, which meanwhile continously creates a driving force superposition to make the

hydrualic motor output shaft to obtain the stable torque .The direction of rotation of the motor also can be changed while fluid direction is changed. such as when the installation of the distributor is turn to 180 ° ,the hydraulic motor also can achieve reversal.

3 Product Feature

The series motor is radial piston hydraulic motors, has simple structure, good processing ability,reliable operation, convenient maintenance etc, due to the main friction pair adopt the static pressure support and use the new material, new technology, new structure, so as to improve the work pressure and the sealing performance along with low speed stability, meanwhile it enlarges the speed range, has high mechanical efficiency, volume efficiency and starting efficiency

4 Technical description

4.1 Product specifications and technical parameters can be found in the relative motor technical parameter table .

4.2 Model annotation see page 10:

5、Instruction

5.1 Selection Principle

5.1.1 It is bases on the actual need of host to determine the effective output torque, working pressure, working speed, controlled motor technology parameter table then to select the corresponding motor Models.The torque value is listed in the table of the technical parameters and power value that is calculated by the index efficiency of product standard regulation.Users may select the products refer to the parameter data range .

5.1.2 Selection shall meet the following requirements:

a） Pressure: long-term continuous operation, the recommended use of pressure than the nominal pressure reduction of 25% , because the use of lower pressure to improve the life of the motor. The pressure for periodic intermittent operation shall not be greater than the rated pressure, and the maximum peak pressure shall not be greater than the maximum pressure specified by the motor.

b） Speed: long-term continuous speed should not be greater than the rated speed. Working speed should be within the speed range specified by the motor, should be based on the working pressure and use of power to be considered comprehensively.

5.1.3 If reliable braking is needed, a brake must be installed.

5.2 Operating requirements

Hydraulic motor is a precision components.To give full play to its due functions , to ensure reliable operation, prolong its service life, the users must comply with the following requirements:

5.2.1.1 Installation

a）Hydraulic motor should be check whether it is damaged or not before installation ,and check whether the output shaft is flexible or not.For the motor with long resting period , the rest oil should be emptied and make the washing , and need to renew oil to avoid the sticking phenomenon on internal moving components.

b） The bracket hold up the motor must have enough stiffness in case the vibration happen when rotation .

c）To ensure transmission shaft connected with motor and output shaft is on concentric line, the spline shaft is also concentric with the spline hole of host to ensure both slip fit .when pull the output shaft ,it should not have yet too-loosely aligned phenomenon. the motor output shaft only allow to bear the torque.

d）Installation bolts must be Tighten-up every one , if at the usage occasion easy to cause bolt shears,suggested that the parts of bolts switch to the corresponding articulation hole bolts in order to ensure the reliable positioning .

e）The motor can be installed in any orientation, but before starting and the system connection,please refer to the article 5.2.1.2 and article 5.2.3.1

5.2.1.2 System join

a） Usually,there are 3 for leakage screw hole on hydraulic motor, you can install according to the need to choose one of them, the rest can be pluged up by plug swrew.

b） The drain pipe solely drain oil drage back into fuel tank,and it not allowed to directly connect with the oil return pipe.Drain pipe should not be too long and too much resistance. Whatever motor's position Installation, drainage mouth must be above the motor, and the highest liquid level of drain pipe should be higher than the highest liquid level in the motor liquid position, in case of the oil discharge in the castings.

c） It must firmly believe the relationship between motor input & output port and sense of rotation,if user needs to work in the opposite direction, A and B oil port can be exchange installation or to remove the rear cover then rotate the distributor at 180 ° .

5.2.2 Operating conditions

5.2.2.1 The options of normal working parameters

a） Please refer to article 5.1.2 to choose the pressure and rotational speed parameter .

b） Back pressure: generally takes 3-5 bar, the higher speed, the higher back pressure. It should be paid attation to oil return back pressure and prevent the component of piston & connecting rod in tension or in case damage from the connecting rod baffle ring which can affect the normal work.

5.2.2.2 The pressure of motor casing generally should not be exceed 5 bar, if you need motor casing with higher pressure resistance, please contact us .

5.2.2.3 The filter fineness of hydraulic oil is not more than 10 mu

5.2.2.4 Too high or too low working temperature that will effect the performance and service life of the hydraulic motors,its normal working oil temperature be controled in 30 ℃ - 55 ℃,and the working temerature is less than 80℃ in the short period .

5.2.2.5 To Reasonably chooce hydraulic liquid according to the season and the environment temperature, it is generally recommended to use N46 or N68 anti-wear hydraulic oil, the oil viscosity of 20-100 CST (40 ℃).

5.2.3 Starting and running

5.2.3.1 Preparation for starting

a) It should to check wether the motor installation connection is correct and firm or not ,and whether the system is correct or not befor starting .and must fill the qualified hydraulic oil from the highest drainage port of motor into the body case .

b) To check between the direction of input & output oil and motor rotation whether meet with the working conditions.

5.2.3.2 Running,employ

a) The motor should be tested under no-load condition to reconfirm the correct rotation direction, and it is forbidden to run with load without confirming the correct rotation direction

b) Starting shall be carried out under the condition of no-loading , gradually speed up to work.The running time of No-loading is not less than 20 minutes, then gradually increase pressure to the working pressure.During running process ,user should observe the hydraulic motor at any time whether it is running normally.

c) During Operation process,usre should check the working situation for motor and system, It should stutdown immediately if you find the abnormal temperture rising ,leakage,vibration and noise or abnormal pressure pulsation ,and need to find out the reason and repait it.

c) To detect termly the quality index of hydraulic oix .Such as discover beyond brand oil value,it should be replaced .It is not allow to adopt the mix oil made from different types of hydraulic oil , the cycle renewing new oil depending on the different working conditions that is stipulated by users themselves.

6 Overhaul

Afer confirm that there is something wrong with the motor or can not work, it must be timely obtained maintenance, This product is a kind of precision component, if users have not overhauling Conditions, Pleaes don't overhaul or repair by yourself,kindly please contact us or other professional maintenance department.Maintenance should be performed according to the below requirements.

6.1 Decomposition requirement

When decomposing, pay attention not to bruise and bruise the parts, especially to protect the moving surface and sealing surface of the parts. The parts that are decomposed should be placed in a clean container, so as to avoid colliding with each other, do not strike with a hammer while decomposing. Connecting rod plunger assembly after decomposition should be placed in groups, not to be confused with each other, and with the shell cylinder bore.

6.2 Requirement of assembling

All parts should be cleaned and dry before assembling .It is not allow to use cotton yarn or rag wiping .The tools should be clean in assembly place .The matching place need to be joined a little of filterable lubricating oil .Never use hammer knock during assembling. Output shaft should be flexible no clamping stagnation phenomenon after assembling.

6.3 Maintenance requirements

The components scraped should be inspected and repaired carefully .Overly damaged compoent should be replaced by new one, in principle , the all seals should be replaced,too.

6.4 The test after inspecting

The necessary performance test need to be taken after inspecting to verify whether the recondition is qualified .Also our factory is albe to accepte consignment test by user .

6.5 The common failures and troubleshooting methods (see chart 1)

7 Handling & carrying

It should convey as per the remarks on the packing case when convey the motor along with its packing ,Using the rope suitable weight as motor after dismantling the box to trap its fit position. It is forbidden to convey through the input and output port of motor or drainage port.Carry by civilization, never throw and fall.

8 Storage

8.1 The motor should be stored in dry and non-corrosive gases warehouse, be sure not affected by high temperature and long stored under - 20 ℃ environment, in case of seals accelerated aging .

8.2 If motor is stored in long time or not be used,it is necessary to empty the rest oil and fill turbine oil with lower acid value ,wipe the anti-rust oil on exposed surface,and block every port with bolt or cover the plate.

9 Guarantee

Under the conditions of normal conveying, storage, installation and use conditions, Within one year as of the date of the user pick up the goods (subject to the invoice data),our factory is responsible for the "three

guarantee"(Repair,Replacement,Return)for all manufacturing quality problems occ uring in the damage or not work normally.

10 Accompanying documents

One instruction manual, one product certification

11 Ordering instructions

11.1 When placing order, please refer to the table of "type annotation" requirement to indicate the type of the motor, shaft type, input and output port connection.

11.2 If users have special requirements for our products, Please propose it when placing the order.After consulting,we are willing to supply custom designed for you.

11.3 If there is any modification in this manual, no notice.

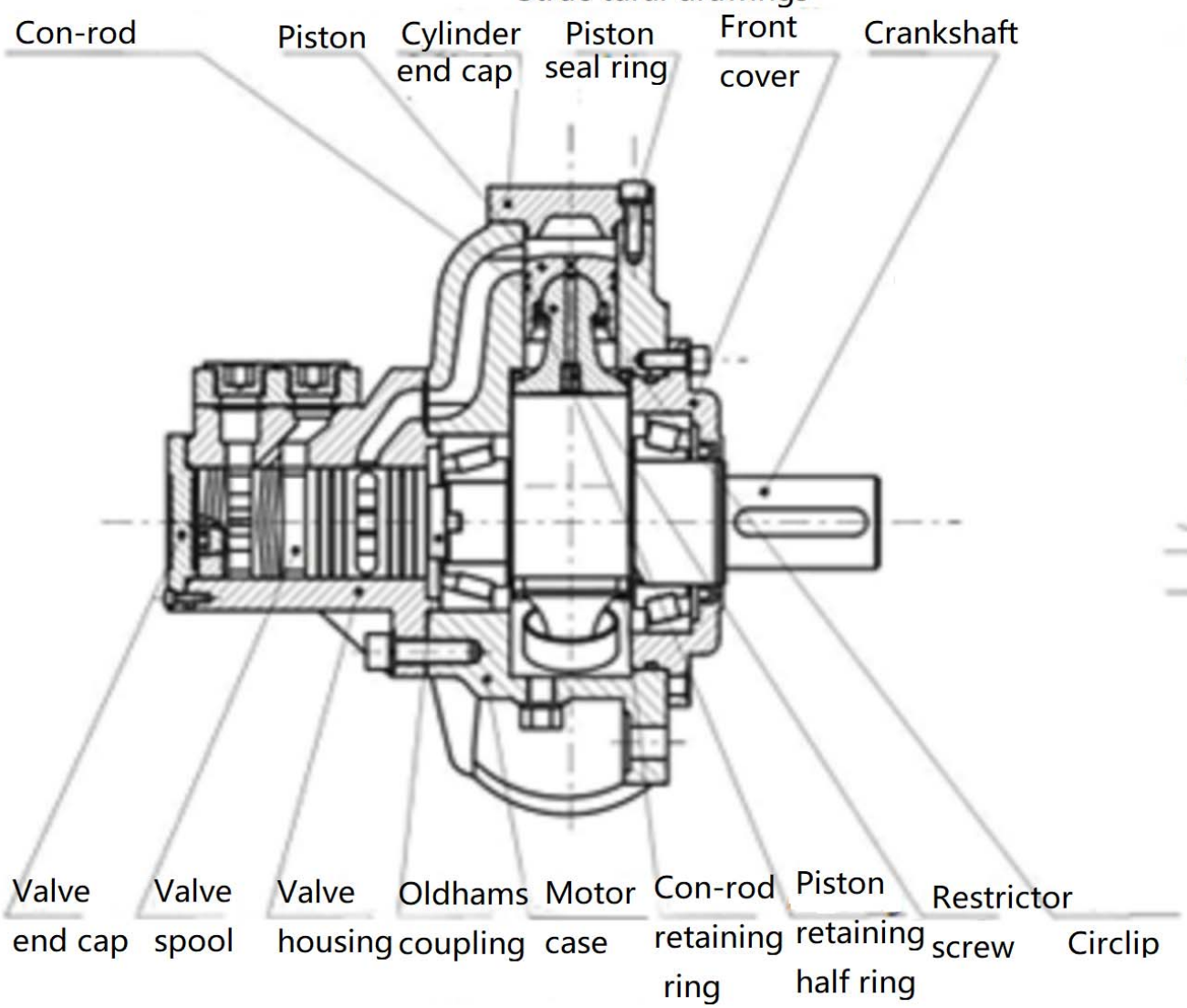
Table 1: common faults and method of troubleshooting

NO.	Fault phenomenon	Failure reason	Method of troubleshooting
1	Hydraulic motor speed down	a Pump oil shortage, outlet pressure is too low, pump damage b Supply and return oil system is not smooth, the control system is out of order. c The part of work is large leak . d The part of distribution is large leak	a Check the pump source supply system or change the pump b Check valve, relief valve system. c Check whether the plunger piston and cylinder hole clearance is too large, piston ring is damaged, the connecting rod bearing, ball joint connection is normal. d Check valve shaft and valve hole clearance is too large and the seal ring is damage
2	Hydraulic motor operation is not stable, a crawling state.	a Hydraulic motor, Friction resistance is uneven, instability, friction pair of oil film damaged, loss of static pressure balance. b Damage to the fuel distribution components c The air in the system d pump or hydraulic valve failure	a Hydraulic motor,Check whether damping hole is blocked, the friction pair surface is damaged or gap is too large, and the lubrication is well. b Repair or replace the distribution parts c Try to eliminate the air. d Inspection of the pump or valve

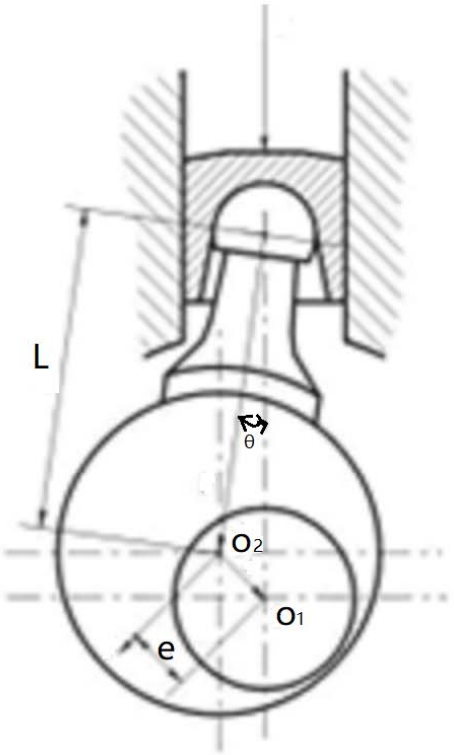
3	Hydraulic motor temperature rise is not normal	a Not enough cooling system. b Connecting rod tile face and eccentric wheel pull c Damage to the fuel distribution	a Check the cooling system. b Grind strain surface or replace parts c Repair or replace the distribution parts
4	Hydrauic motor output toruqe	a oil pressure is insufficient. b The oil viscosity is not proper, the oil pollution is serious. c The ball ground or bearing damaged . d Damage to the fuel distribution components	a See failure 1 troubleshooting method. b Check the oil temperature and oil brand. c Overhaul. d Repair or replace the distribution parts
5	Combining with the surface and the shaft seal leakage	a Relevant type O ring, oil seal is damaged or aging b Shell cavity pressure is too high. c Oil drain pipe blockage	a Replace the seal. b Switch to pressure oil seal if it in necessity c Check and recover the oil leakage pipeline
6	Hydraulic motor has abnormal sound	a External vibration. b The sensitivity of the balancing valve action is problematic c The part of distribution is large d Hydraulic motor housing bore scarring leak	a Check and solve external vibration; b Clean or adjust the balance valve control screw c Repair or replace the distribution parts d Maintenance or replacement of hydraulic motor

FIG.1

Struc tural drawings



Schenatic diagram



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