

CA Series

Cam-Lobe 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 Low speed high torque hydraulic motor



## 1、 Use and Scope of application

1.1 CA 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 The range of application of this product is extremely wide, it is widely used in hydraulic winch, screw drive of injection molding machine, star wheel and drive of excavator, Metal Packer, Crusher, Shredder, shield machine, double wheel milling, power head of dredger and other heavy Hydraulic drive system.

## 2、 Structure and working principle

2.1 The structure of CA series motor is shown in Figure 1. The rotor (cylinder block) is installed on the shell through the cylindrical roller bearing. Even number of plunger holes are distributed in the radial direction of the rotor (cylinder block), the distributor distributes the incoming and outgoing oil to the bottom of the working plunger hole. When hydraulic pressure is applied to the bottom of the plunger, the plunger pushes the roller onto the stator cam ramp, and the cam ramp reaction the roller to the side of the plunger, the side of the plunger pushes back against the cylinder wall of the rotor, thus producing torque to the rotor, and continuous and effective output, output torque and hydraulic pressure is proportional. The main oil circuit is connected to the hydraulic motors a and C oil ports, and the drain pipe is connected to the housing housing D 1, D 2, or D 3.

## 3、 Product Feature

3.1 It can run continuously under high speed and high pressure with high output power;

3.2 Small volume, light weight design, output power, high power-to-mass ratio;

3.3 Small volume, light weight, solid overall structure, impact resistance;

3.4 Center through-hole design;

3.5 Any angle towards the installation;

## 4、 Technical description

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



## 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 It can be optional if users need the hydraulic brake .

### 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 plugged 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) When the system is connected, the rotation relationship between the oil inlet and outlet of the motor and the motor should be considered. If the user needs to work in the opposite direction, the oil inlet of A and C can be replaced or the whole rotation of the motor can be installed 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 take 3 -5 bar, the higher the speed, the higher back pressure should be, for frequent intermittent work should pay attention to the use of oil back pressure.

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 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  $^{\circ}\text{C}$  - 55  $^{\circ}\text{C}$ , and the working temerature is less than 80 $^{\circ}\text{C}$  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  $^{\circ}\text{C}$ ).

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.
- c) To transfer the overflow valve pressure for supply line to the lowest value , and it is need to gradually transfer to the required pressure after operation.

5.2.3.2 Running, employ

- a) 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.
- b) 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.

### 6.3Maintenance 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 ,



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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  $-20^{\circ}\text{C}$  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 occurring 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.

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.



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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 Oil 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 piston roller surface is pulled, whether the piston ring wear; d、 Check the oil distribution plate and rotor oil distribution surface is pulled;
2	Hydraulic motor operation is not stable, a crawling state.	a、 The part of work is large leak . b、 The part of Oil distribution is large	a、 Check whether the piston roller surface is pulled; b、 Check the oil distribution plate and rotor oil distribution surface is pulled;
3	Hydraulic motor temperature rise is not normal	a、 Not enough cooling system. b、 The part of work is large leak . c、 The part of Oil distribution is large	a、 Check the cooling system. b、 Check whether the piston roller surface is pulled; c、 Check the oil distribution plate and rotor oil distribution surface is pulled;
4	Hydraulic motor output torque	a、 oil pressure is insufficient. b、 the oil viscosity is not proper, the oil pollution is serious. c、 The part of work is large leak . d、 The part of Oil distribution is large	a、 See failure 1 troubleshooting method. b、 Check the oil temperature and oil brand. c、 Check whether the piston roller surface is pulled; d、 Check the oil distribution plate and rotor oil distribution surface is pulled;
5	Combining with the surface and the shaft seal leakage	a、 Screw does not tighten, tighten level uneven b、 Relevant type O ring, oil seal is damaged or aging c、 Shell cavity pressure is too high.	a、 Retightened after inspection b、 Replace the seal. c、 Check whether the piston roller surface is pulled; d、 Check the oil distribution plate and rotor oil distribution surface is pulled;
6	Hydraulic motor has abnormal sound	a、 The oil pump inlet filter clogged. b、 The air into the interior. c、 Bubbles into the oil cause the oil contaminated. d、 The part of work is large leak . e、 External vibration.	a、 Clean filter screen and filter cartridge b、 Check for sealing of the inlet. c、 Filter or change oil. d、 Check whether the piston roller surface is pulled; e、 Vibration control measures

