



# VERTICAL HOLOSHAFT MOTOR

INSTALLATION,  
OPERATION &  
MAINTENANCE

**MANUAL**



# VERTICAL HOLLOSHAFT MOTOR

INSTALLATION OPERATION AND MAINTENANCE INSTRUCTIONS



## 1. OPERATION CONDITIONS

Duty Cycle: Continuous (SI)

Ambient Temperature: Not to exceed 50° C

Altitude: Not over 1000 meters above sea level

Field Condition: This type of motor is suitable for outdoor use in relatively dry climate without additional protection.

## 2. CAUTION FOR MOUNTING

The following preparations should be made before mounting:

1. Check carefully all data on the nameplate of the motor; make sure that they are strictly in agreement with the requirements.
2. Inspect carefully that all the motor parts are assembled in good condition and make sure that no fasteners, such as bolts and nuts, become loosened or detached during transportation. Try to turn the motor in the direction by hand so as to determine whether the rotor rotates freely or not.
3. Measure the phase-to-phase and phase-to-ground insulation resistance using a 500 v megger. The reading should not be less 0.5 megohms. Otherwise the stator windings must be dried out. The commonly used drying method is to disassemble the motor and to dry out using incanddescent lamps may be placed inside and around the motor for the same purpose. This is also done by applying a low voltage (about 10% of the rated value) to stator windings with the rotor locked. Drying will be accomplished by the current generated heat. In this case must take precautions not to overheat the windings.
4. Before Mounting, its necessary to run the motor at no load.
  - For the motor of 324TP - 447TP, remove the cover of the oil fill plug on the end-shield; fill with lubricating oil to a middle of the oil gauge circle. Fill to the proper lever and securely tighten.
  - The correct connections are shown in “motor nameplate”.
  - After inspection of the connections of terminals, the motor may be run at no load. If the motor does not start turn off the power immediately and interchange any two of the line connections. If the motor still remains at a standstill state, check carefully the power supply circuit.
  - When the motor is started for the first time, and has reached to the rated speed, cut off the power and reinspect, note that no connections are loose, and there is no scraping between the parts. Make necessary adjustment.
  - Running at no load should continue for 2 to 3 hours. During this period, check for any irregularities or unusual noise. After completion of this trial, inspect the bearings carefully to ensure have not been over heated.
  - For the motors of 324TP - 447TP, let the lubricating oil fill into a clean container through the oil drain on the end shield for reserve.

## 3. MOTOR MOUNTING

1. Make sure that the specifications and the capacity of the starting equipment meet the requirements on the nameplate.
2. For the motor of 324TP - 447TP, drain off the oil in the motor’s oil chamber of the end-shield before lifting. In lifting a motor, must make sure to attach the hooks of the crane to the lifting lugs of the motor.
3. In the course of installation, the motor should be handled gently and placed vertically. Never let it rest upside down or lopsided.

# VERTICAL HOLLOSHAFT MOTOR

INSTALLATION OPERATION AND MAINTENANCE INSTRUCTIONS



- When lifting the motor to the pump, the relative requirements of deep well pumps should be obeyed.
- For the motors of 324TP - 447TP, recoil just as above.

## 4. OPERATION AND INSTRUCTION

- The motor should be grounded properly. An earth-connecting terminal is located in the terminal box.
- The motor windings are connected according to connecting diagram on the motor's nameplate. Thermostats are embedded in the stator windings for thermal protection. The two connection leads marked with TH<sub>1</sub> and TH<sub>2</sub>, coming from thermostats in terminal box should be connected to your control device for motor. This motor is equipped with heater in the end of stator windings as the special requirement of customer. In the terminal box there are two leads marked with H<sub>1</sub> and H<sub>2</sub> form heater, which power supply voltage shall be in accordance with the marking in the terminal box cover of the motor.
- The motor's correct rotating direction should be counter clockwise facing from the top of the motor.
- Starting is carried out at the full voltage. As the motor is started at full voltage, the starting current will be 5 to 7 times of the rated current. If the power supply is insufficient, the motor is permitted to start at reduced voltage. And the locked rotor torque is directly proportional to the square of the voltage.
- In general the power supply control unit should be provided with over current or short circuit protection devices, which should be regulated in correspondance with the rated current on the motor's nameplate.
- The motor can't provide the rated output continuously if the deviation of the frequency between the power supply and the nameplate value is over 5%.
- When the motor operates with load, an intermittent abnormal noise and vibration should not exist.
- The motor are designed with class Bor F insulation. The maximum winding allowable temperature rise is shown as in the following table :

TEST METHOD	STATOR WINDING MAX. ALLOWABLE TEMPERATURE RISE		AMBIENT TEMPERATURE
RESISTANCE	70K (B CLASS)	95K (F CLASS)	≤50°C

## 5. TROUBLESHOOTING CHART

CAUSES	REMEDY
<b>MOTOR FAILS TO START</b>	
Reverse Rotation	Interchange any two of the lines
One Phase Cut-off	Check the switch, fuse and wiring etc
Overload	Reduce the load or select a larger capacity motor
Supply Voltage too low	Adjust up to rated voltage ± 10%

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INSTALLATION OPERATION AND MAINTENANCE INSTRUCTIONS



CAUSES	REMEDY
<b>The Operation speed with load is lower than the rated speed</b>	
Supply Voltage too low	Adjust up to rated voltage $\pm 10\%$
Broken bar of the cage rotor	Replace the rotor
Overload	Reduce the load or select a larger capacity motor
<b>The sound is unusual during operation</b>	
One phase Cut-off	Check the switch, fuse and wiring etc.
Bearing are short of oil	Fill Fresh Oil
Bearings Worn Out	Replace Bearings
<b>The sound rise is too high or motor smoking</b>	
Overload	Reduce the load or select a larger capacity motor
One Phase Cutt-off	Check the switch, fuse and wiring etc.
Air passage are blocked	Remove the greasy dirt and dust in air passages.
High Ambient temperature	Reduce the ambient temperature or reduce load power
Short circuit between turns or phases of windings	Repair the windings
Supply voltage too low or high	Adjust up to rated voltage $\pm 10\%$
<b>Bearing are overheated</b>	
Worn Bearings	Replace the Bearings
Lubricant oil deteriorated or bearing are low on oil	Reoil
<b>Non - Reversed backstop is out order</b>	
There is dirt on the stell ball	remove the dirt
The groove hole of a non-reverse ratchet plate is worn	Replace the non-reverse ratchet plate
<b>There is oil leakage in the oil chamber of the end bracket</b>	
The motor is inclined during transport	Put out the oil in the oil chamber before transport
Over Oil	Reduce the Oil
The Oil conduit s leaking	Check the static seal and oil conduit

## 6. MAINTENANCE

1. The motor should operate in a dry environment. The surface of motor should be kept clean. The air inlet should not be blocked by dust, fiber etc. No heating sources should be kept near motor.
2. In the course of running, the metering instruments should be observed and the readings recorded from time to time. It's necessary to record the time of operation, the results of inspections and the remedies of faults for future refrence.
3. Immediately shut down and inspections to be followed, whenever abnormal noise occur during operation. Check

# VERTICAL HOLLOSHAFT MOTOR

INSTALLATION OPERATION AND MAINTENANCE INSTRUCTIONS



and make sure that the trouble is caused by the motor itself or by overload, or the setting value of the protective devices in controlled unit act continuously Only after the trouble has been shot and remedied, the motor can be put into operation again.

4. Pay constant attention to the non-reverse device of the motor. If it fails to act properly inspect the pins and clean the accumulated dirt.
5. Owing to wearing out of the bearings after long use, the air gap may become uneven. Then the vibration and noise may evidently increase, thus affecting the motor performances and rotor may even scrape against the stator. Therefore, when such affects were been discovered, the bearings should be replaced in time.
6. Attention should be paid to the level of lubricating oil on the oil gauge. When the oil level drop to the bottom of the oil gauge circle, the oil should be added at once.
7. Usually the bearing will not require regreasing or reoiling until they have been in serv fo about 4400 hours. Under the following conditions grease and oil must be changed at once.
  - Caking or Deterioration of the grease.
  - Accumulation of water, impurities or dust in oil
  - After the bearing has overheated.
8. When changing the lubricating grease and oil; first remove the used lubricating grease and oil. For motors of 324 TP - 447 TP, flush out the oil chamber and the angular contact bearing (in the upper end-shield) with gasoline or kerosene, and then fill fresh oil. For Motors of 213 TP - 286 TP, the number of grease to replace the angular contact bearing (base bearing) and radial ball bearing of each frame size, shall be approximately  $\frac{2}{3}$  of the bearing chamber.
9. The angular contact bearing is lubricated with the lubricating oil the kinematic viscosity of which is 13.5 - 16.5 CST at 40°C. The radial ball bearing is lubricated with grease, polyurea grease is recommended.
10. In order to insure normal operation, the motor must be overhauled periodically.

## 7. STORAGE

1. When the motor is to be laid up for a period, the following steps should first be taken:
  - Clean the exterior and interior of the motor thoroughly to free it of accumulated dust. Check all the parts to make sure that they are intact.
  - Cover up all the air inlets and outlets of the motor to prevent dust from getting into it.
  - Coat all the parts that are susceptible to rust with a layer of antirust oil or other rust preventers.
2. In storage, the motor should be packaged in the same manner as that of the manufacture. The storage place must be dry and well ventilated, with its temperature maintained always above 0°C. The motor in storage should be checked periodically for sings of dampness and corrosion ect. So that necessary steps may be taken to improve the storage conditions.

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INSTALLATION OPERATION AND MAINTENANCE INSTRUCTIONS



## NOTES

Project Name : .....

Location : .....

Fire Pump Set Duty Point : .....

Electric Fire Pump Sl. No(s). : .....

Diesel Fire Pump Sl. No(s). : .....

Commissioned By : .....

Date of Commissioning : .....

Signature of Commissioning Engineer : .....

