

# BWJBQ 系列泥浆搅拌机使 用说明书

**BWJBQ SERIES MUD AGITATOR  
USER MANUAL**



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# BWJBQ SERIES MUD AGITATOR

# USER MANUAL



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# Chapter 1 Introduction

## 1.1 General

This manual describes the installation, use and maintenance instructions for the drilling mud agitator (Figure 1-1). This manual is divided into several sections for easy reading.

Transport personnel, installers, users, and technical service personnel, need to read carefully to understand this manual. Should have one manual on site for staff easy reading.

In order to ensure safety and equipment operation, the equipment can not be modified and supplemented without prior written consent of Brightway Company. Accessories for replacement or maintenance should be adopted only manufactured by Brightway company.



Figure 1-1 Mud agitators types

## 1.2 Safety

This manual contains safety information during use and maintenance. This information needs to be communicated to all users and can be understood.

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In the event of malfunction and other problems, it is strictly forbidden to use the mud agitator.

### **1.3 Application**

Mud agitator is used to the top open mud tank or cement pond. Brightway company not allow the equipment to be used for other purposes. Should follow the instruction listed in this manual when operate the agitator.

### **1.4 Description and operation**

The mud agitator is an efficient mud agitator, equipped with different types of customization power, size and blade combination arrangement for a variety of tank and various mud. We can supply Horizontal tilting impeller and horizontal stainless steel impeller two types, suitable for a variety of sizes of mud tank. Installed in the top of the smaller mud tank or cement pond above. Horizontal, stainless steel impeller agitator is mainly used in the mud with corrosive media, such as offshore oil field drilling or chemical field.

The agitator stirs the mud to suspend the solid particles in the mud. The agitator is mounted on the top of the mud tank and the single and double impeller sinks into the mud. The agitator is directly connected to the motor rated from 2.2kw (50/60Hz) to 22kw (50 / 60Hz). Each mud agitator is used for specific mud tank, taking into account tank width, length and depth, as well as mud viscosity and density parameters. Brightway offers vertical and horizontal, two different models and sizes. Horizontal agitator with worm gear drive mixing shaft structure. Both types can be fitted with single or double upright or tilted impellers.

The impeller is welded to the tapered screw hub and is bolted to the shaft. The impeller is mounted at a height of 0.75 times the impeller diameter from the bottom of the tank. For example, the impeller diameter is 500mm, the impeller needs to be installed at a height of 380mm from the bottom of the tank. Brightway advice to use an upright impeller when tank height is less than 165mm, and use a tilted impeller when the height is deeper. If a double impeller is used, the vertical impeller is mounted on the bottom and the upper impeller of the tilting impellers needs to be installed at 2/3 height location of mud tank. Motor and passive shaft connect hardly through connecting sleeve. Use a tapered thread locking sleeve to connect the

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agitator shaft. The shaft length is customized according to customer's technical requirement. If the shaft length exceeds 264mm, it is necessary to install the centralizer at the bottom of the tank for stabilizing the shaft.

## **1.5 Main component**

Although components of different configurations and sizes of the agitator are same, but the motor, impeller, shaft length, diameter, reducer, rotation direction depends on the mud agitator type. Figure 1-2 shows the standard configuration of the mud agitator. The horizontal configuration of the rated power is the same, except for the gear transmission. Specialized technical staff and trained personnel to install the mixer on site.

## **1.6 Motor**

The mud agitator is driven by a three-phase asynchronous motor. Power system for the 230 / 460V, 60hz, 2.2-22kw, power 190 / 380V50HZ. The system is configured according to the customer's requirements. Customers provide power, ancillary equipment and protective equipment.

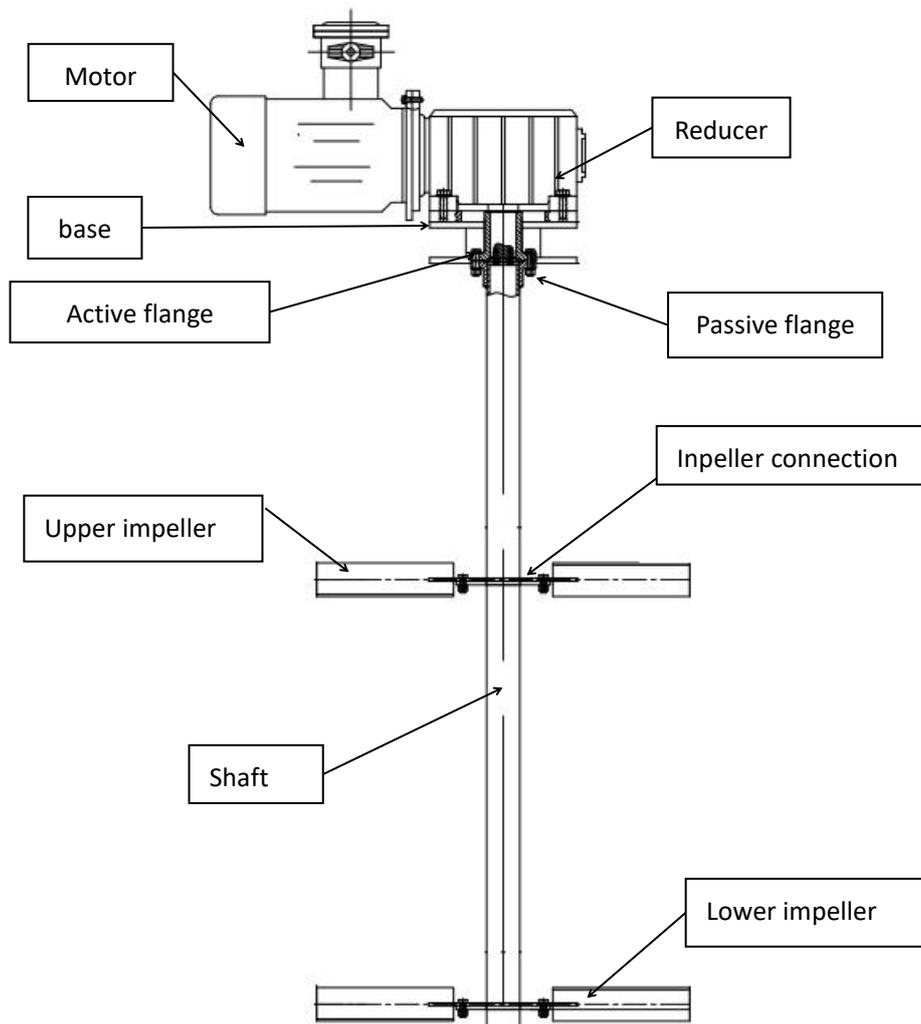


Figure 1-2 Mud agitator main components

## 1.7 Reducer

The rotation of the motor passes through the worm wheel and the worm, drive stirring shaft. The drive unit is motor and reducer connected directly. Which assembled well at the factory. The size of the drive unit allows the use of maximum torque to achieve the stirring shaft speed reach 60r/min or 72r/min (different power will impact the reducer speed).

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## 1.8 Agitator shaft

Agitator impeller diameter ranges from 500mm to 1200mm, can meet the requirements of different sizes of mud tank. The impeller diameter is determined by the tank size. Two layers impellers are used for large tank or deep tank, and the upper impeller is mounted near the mud surface. Use bolts to secure the impeller on the shaft to prevent self rotation.

The impeller in the upright form moves the mud horizontally, while the tilting impeller increases the up and down movement during the mixing process. As Figure 1-3, the inclined impeller is preferably installed at a height of 250-300mm from the bottom of the tank or where there is no agitation force and obstruction in the mud tank.

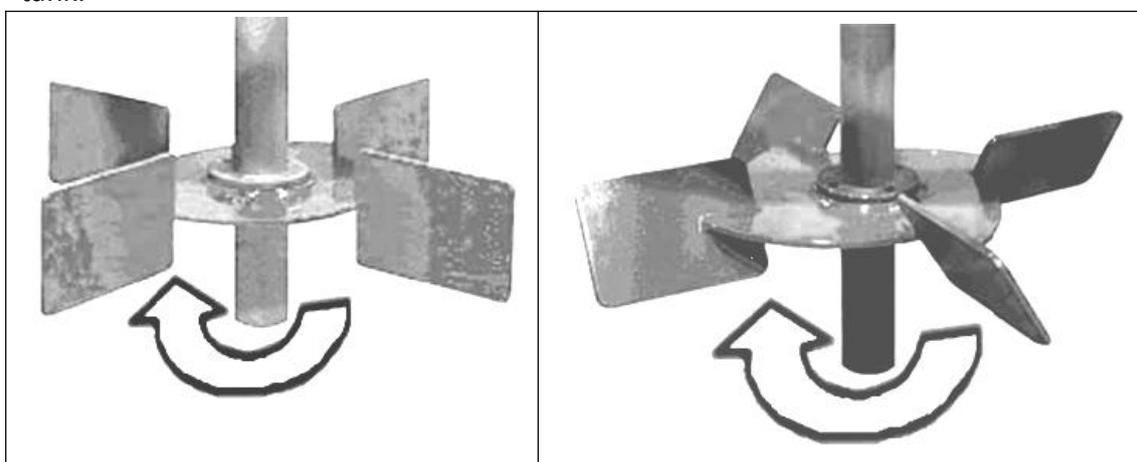


Fig 1-3 Impeller arrangement types

Product technical support and services

Brightway provides 7x24 hours technical support for the products. Including product or order replacement, as well as maintenance and spare parts supply.

## Chapter 2. Safety

### 2.1 Summary

This chapter contains warning information in use and references to material safety information when using equipment. The mud agitator is used to perform the functions specified in the instructions in the safe area.

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## 2.2 Warning

All personnel and equipment maintenance personnel learn and understand safety information before using equipment and maintenance equipment. The following security reminder is part of the job.

Sound effects



Warning! In order to prevent deafness, protective equipment is required during work or near equipment

Power safety

Warning! In order to prevent serious injury before repairs and adjustments, it is necessary to confirm that the equipment power has been cut down.

Warning! The motor needs to operate at the specified voltage.

Warning! High pressure. Make sure to turn off the power transmission switch before servicing. In the maintenance or adjustment period to ensure that the equipment is off, prohibit standby maintenance or adjustment. Keep the motor power cord in the off state when transporting.

Material Safety Information Reference Sheet

The Material Safety Information Reference Sheet informs the user of the use of the material's properties and possible dangerous. Which has a first-hand rescue implementation order, special precautions, emergency calls and other content. This content is provided by the product manufacturer and is responsible for the information accuracy.

The following material safety information reference sheet lists all the materials when produces the equipment. The following listed products or substitutes should be used for this equipment. The dates listed in the table is printing time. The latest reference tables are available from the manufacturer.

product-- use place		Table number / replacement time period
Painting		
Motor, reducer, active disk, base	Jotun orange urethane finish	BW20170101-01
shaft	Jotun epoxy Zinc Rich Primer, epoxy cloud iron gray paint	BW20170101-02

impeller	Hot galvanized primary colors for connecting bolts , Jotun epoxy Zinc Rich Primer, epoxy cloud iron gray paint	BW20170101-02
Lubricant type		
Gear oil N220-N320 (ambient temperature-30° C-40° C)		Change the oil after the first 100 hours, and later change it every 2500 hours.
Gear oil N320-N460 (ambient temperature25° C-65° C)		
Note: When adding lubricating grease, observe the transparent oil window of the reducer, and the height of the grease is above the height (the center of the window). Filling slowly and clean the surface of the equipment after fitting.		
Equipment ---use place		Table number /time
Motor bearing grease (usage and dosage see later "motor bearing lubrication")		
JAX、 Mobil, Kluber、 Esso Polyrex EM		BW20170101-01
Other		BW20170101-02

## Chapter 3 Installation

### 3.1 Summary

This chapter contains installation order description that Brightway recommended, depending on the drawings and equipment model. Equipment can be separated for easy transport.

### 3.2 Safety

The information contained in this chapter and other related documents must be studied and understood before the agitator installing and working. Refer to Chapter 2 warnings (regarding the installation, use, and maintenance) of this equipment. Before installation, learn the disassemble and installation sequence listed in this

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chapter. Before lifting or transferring equipment, pay special attention to information about lifting point and rocker use.

Failure to comply with installation and disassemble may result in serious injury or damage.

### **3.3 Model Chosen**

In order to ensure that the required agitator and solid particles are suspended, the stirrer specifications and installation must be properly determined. Determine the stirrer specifications to the following:

- 1, choose a good type - horizontal
- 2, electric system - 230 / 460V, 60HZ, 3 phase or 190 / 380V, 50HZ, 3 phase
3. Select the power and impeller according to the following parameters:
  - A, the type of tank - round or square
  - B, the size of the tank
  - C, the proportion of mud
  - D, ratio speed

### **3.4 Model Chosen (advice)**

After collecting the relevant information, determine the agitator type, meet with the mixing and power requirements. In order to determine the agitator model more accurately, Brightway recommends using computer software to determine the model, which can be done at any Brightway agency or branch office.

Following advice is the instruction for use

1. Same tank size. Means same or close aspect ratio
2. The equipment should not rotate for more than 85 seconds (60 or 72 rpm / 60 seconds), as it may destroy the solid particles
3. The rotation time of the equipment should not be less than 40 seconds because it may produce a whirlpool that allows air to enter.

### **3.5 Installation order**

Followed by a continuous step of agitator installation. The installation sequence

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Good Attitude, Active Action, Bright Future

listed is a guide to completing the installation, but there is a change in the resources owned by the customer, such as the experience of using the equipment and selected equipment before.

1. Before starting the installation and working of the equipment , to read and learn it safety information in Chapter 2.

ing to lift and move the equipment, read and learn the order of disassemble the equipment in this chapter.

pter 8 of the name of all components of the agitator

e tank top and weld installation station and centralizer (if necessary).

o the tank, install the impeller.

the passive disk and agitator active disk using bolts (bolt specifications ng tips)

ion of motor and reducer and the agitator base ( motor, reducer and the base has been installed in place before delivery, a separate replacement for motor or reducer reference to this article)

8. Power connection ( check direction of motor rotation, normally motor rotation direction is clockwise. The ways to judge as follow:

(1) According to the direction of the arrow on the motor, it is determined that the rotation direction of the impeller . (2). Standing in the rear of the motor to observe the direction of impeller rotation. Which is clockwise rotation).



### 3.6 Stored

Omitted

Brightway mud agitator can be transported by many means. Except for motor, reducer, and base should be transported together. Other parts, except for main shaft, will be packaged with heat shrinkage, iron box or wooden box. Impeller with superposition method, cable ties, the use of heat shrink film, iron box or wooden box packaging. Each package has a label and a mark.

The warning message is omitted

Forklifts, cranes, and driving hoisting can be used for equipment lifting (but proposed crane and driving hoisting, damage for equipment surface paint is small, lifting equipment, the ring with a hanging strap with ring or chain, 2/3 greater weight than equipment itself, should be adopt). And can be lifted as shown in Figure 3-1



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Figure 3-1horizontal agitator lifting

### 3.7 Level adjustment

In order to prevent premature damage to the reducer and passive disk, to ensure long-term stable use, the shaft should be in a strict vertical line rotation. The installation platform requires absolute level. Use the centralizer to match the center of the mounting table. The next section will talk about how to properly install the base and centralizer. See Figure 3-2 Part Use and Installation Information.

### 3.8 Reducer base

The installation location needs to be pre-determined. Select the mounting position and leave the gap between the impeller and the tank wall. Use the level to maintain the absolute level of the tank mounting position. When the base is installed in the tank surface position, use the adjustment washer to keep the level, mark the washer position, and then remove the agitator. It is necessary to mount the passive disk of the agitator shaft on the active disk of the agitator reducer before the agitator base is mounted on the tank surface.

### 3.9 Centralizer(shaft length exceed 2000mm)

If the agitator shaft length exceed 2000mm, need to install the centralizer to stable

the bottom part of agitator shaft. Below ways for your reference.

1. Install the agitator with the base to the tank surface specified location (installation method refer to the installation information for "reducer base", Put one vertical line through the center of the agitator base hole to ensure concentricity.
2. Confirm the right location, weld the centralizer at the bottom of the mud tank.

Warning(omit)

After installing the centralizer (if necessary), put the shaft into the tank and assemble.

1. Place the shaft into the tank, incline the passive disk of the shaft. Upper impellers pass through the passive disk, installed on the agitator upper disk; lower impeller pass through the bottom of the agitator, installed on the agitator lower disk. Use the following specifications bolts to fasten impellers and active/passive disk bolts, keep the shaft upright, install the bolt on the agitator shaft corresponding to the disc screw hole, fitted with flat mat and shrapnel, fastening nut, aligned screw on the agitator shaft, fastening diagonal bolts( two by two)

A. Install M14x50 bolts to impellers and shaft for fasten the disk on screw hole location.As Figure 3-2

B. Install M14x70 bolts to agitator passive disk and reducer disk on the crew hole location.

2. Install impellers and connect the active and passive disk, use open torque wrench or fork torque wrench etc. to fasten bolts.

A. Prepare the specified size of the bolts with nuts, spring pads and flat mats, as well as tools.

B. As the above method, the impeller was fixed on the corresponding position on the shaft, and the corresponding type of blots was put on diagonally, in accordance with the order to bring the pad, flat and nut, and then corresponding to wear other bolts. See Figure 3-2.

C. Use the tool to tighten each bolt in the above shown until the bolt is fully latched, see Figure 3-2 for bolt type and torque force.

Figure 3-2			
Bolts mounting position	Bolt amount (set)	Bolt dimension	Torque Force
Motor, reducer connection	6	M12x35	
Active disk, passive disk connection	6	M14x70	
Upper impeller, upon agitator shaft disk connection	4	M14x50	
Lower impeller, lower agitator shaft disk connection	4	M14x50	

Base connection	4	M22x90	
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### 3.10 Axis Assemble (continued)

Figure 3-2 Horizontal type agitator installation

### 3.11 Motor and reducer installation

1. Install the mounting table on the gear unit. The center of the mounting table should be concentric with the drive shaft, fastening the gasket and bolts (one bolt, one nut, one flat pad, one spring pad). Tighten bolts in sequence, diagonal installation.
2. To keep the assembled shaft upright, the use of lifting equipment to the motor and reducer part together with the installation table into the tank surface.
3. Slowly lower the reducer and the base to the tank surface (with the gasket to keep the balance) on the base, as described in this chapter.

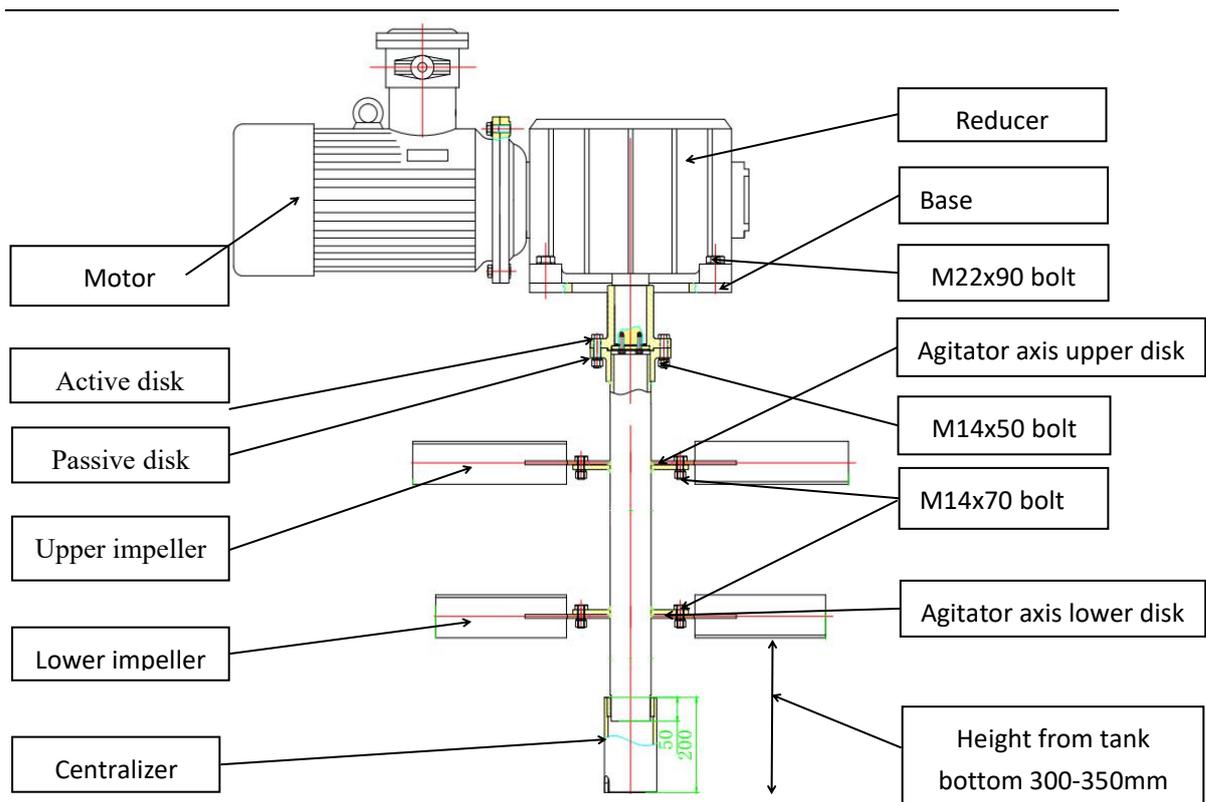


Figure 3-3 Base and Centralizer installation

### 3.12 Moter and reducer installation (continued)

The amount of lubricating oil in reducer.

Make sure that the lubricating oil in the reducer reaches the lowest position of the oil level control plug. See figure 3-6 Oil level plug position

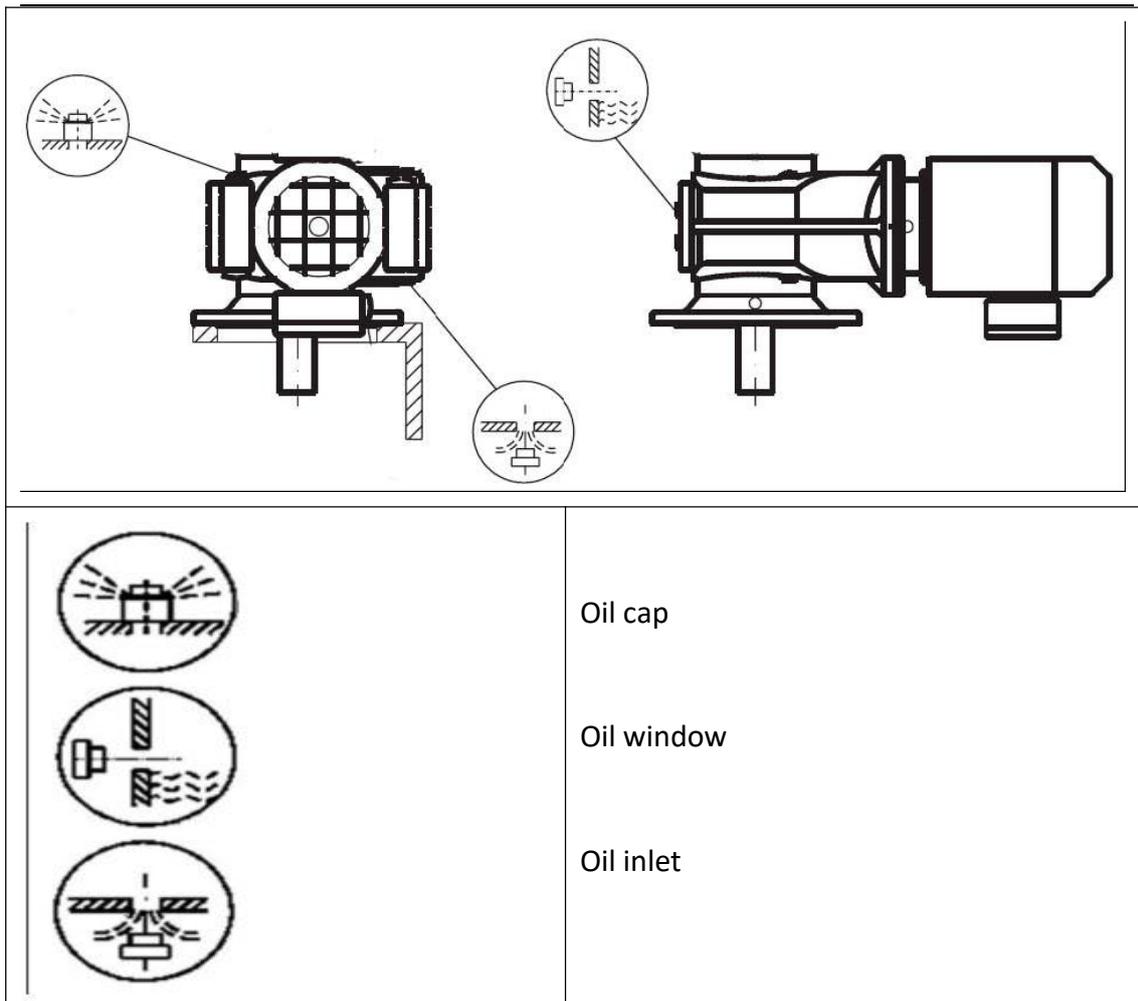


Figure 3-6 Oil level inlet position

#### Power connection

1. There are three wires for connecting the power supply. As shown in Figure 3-7, marked out, each line marked numbers 1-2 and 3, for power supply line connection. As shown in the figure, the motor connector is located under the motor line cover.

Before connection, make sure that the system meets the following requirements:

1. Carefully identify the whether the motor on the nameplate marked with the power voltage (V/Hz) and the access power supply voltage (V/Hz) is consistent.

#### Wire connection and operation sequence

1. When the cable is connected, first disconnect the power supply, ensure the safe operation when connecting the cable, pay attention to the phase sequence of the cable.

2. Before removing the cable from the motor cable, remove the bolts and wire cover on the motor terminal cover, remove the nuts on the bolts inside the terminal box, the flat pad and the spring pad, and use the collection box to collect the removed

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parts.

3. Remove the bolts from the top of the wire cover on the lower end of the wiring cover and pass the flange into the cable that needs to be accessed and through the cable into the junction box.
4. Install the bolts of the cable nose (protruding round hole) into the corresponding position, install the flat pad, spring pad and nut, tighten each bolt, Note: The virtual connection of the cable inside the junction box is strictly forbidden.
5. Close the junction box.
6. When turning on the device, observe the steering of the mixer impeller. If it is found that the impeller does not meet the requirements of the field, adjust the phase sequence of the cable connection in the terminal box.
7. Secure each bolt on the terminal box.
8. Tighten the bolt on cable gland.
9. Before turning on the power switch, check that the equipment ground wire is connected.
10. Normally turn on the device.

Launch agitator

See Chapter 4, launch sequence and work

## **Chapter 4 Instruction for use**

Summary

This chapter describes the sequence of begin and the normal start, stop. In order to ensure the safety of using and stopping the equipment.

Safety in use

The first time turn on

The first time you start, is the first time the device is used, or shut down after a long time and reuse.

## **Chapter 5 Technical maintenance**

### **5.1 Summary**

In order to ensure that the agitator can be used for a long time and without malfunction, routine maintenance is very important. The maintenance rules listed in

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this section are varied, and modifications and changes must be operated by experienced staff. During the use of the equipment, it is necessary to establish in writing the regulations for routine maintenance, control and management of the equipment.

When drafting technical maintenance regulations, the following should be considered:

Work cycle

Environment temperature

Condition of use

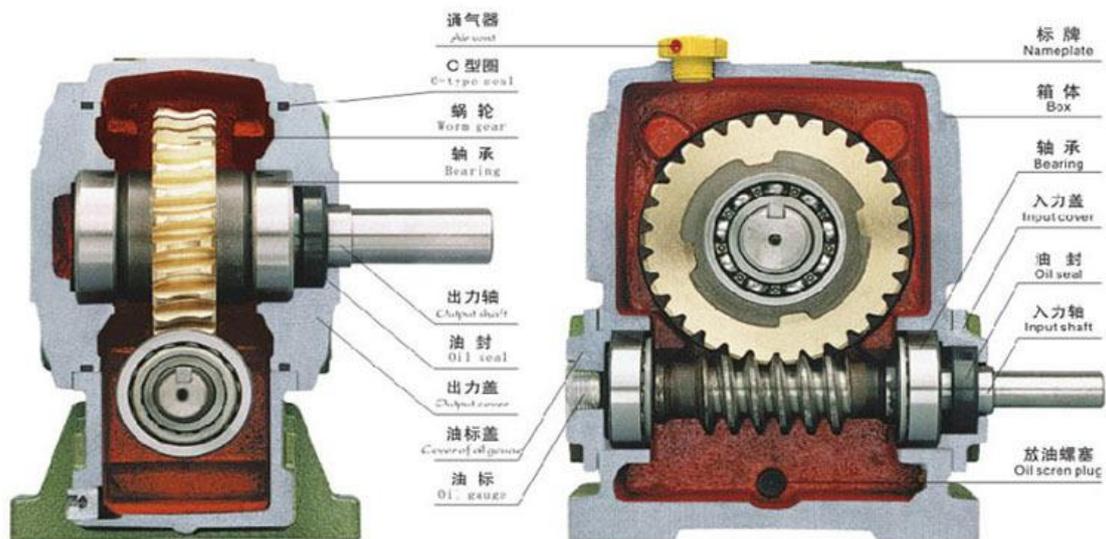
Warning sign

## **5.2 Routine maintenance**

Routine maintenance includes lubricating oil level of reducer, lubricating oil condition, bearing grease.

According to the use of the environment as much as possible to check the reducer oil level and oil. The longest replacement time - 2500 working hours or non-working conditions every two years, whichever comes first. If the working load is large, it is necessary to replace the lubricating oil several times (see Chapter 3 Lubricant Smoothing Requirements). Use synthetic lubricating oil replacement cycle is shorter. Check the oil level See Chapter 3. The following table lists the amount of oil and the available lubricating material. The bearing refueling and cleaning cycles are the same. After cleaning, refuel until to oil window 2/3 volume.

### **Reducer**



Oil usage of Reducer and Power of Motor		
Motor power (kw)	Reducer model	Oil usage (L)
2.2	120	4.0
3.0		4.0
3.0	135	6.3
4.0		6.3
3.0	147	7.2
4.0		7.2
4.0	155	8
5.5		8
5.5	175	11
7.5		11
7.5	200	15
11.0		15
11.0	250	19.2
15.0		19.2
15.0	275	23
18.5		23
18.5	300	25.0
22.0	300	25.0

### 5.3 Motor inspection

The motor inspection shall be carried out every 500 working hours or every 3 months, whichever comes first.

Including the following:

1. Clean the motor and fan holes. Make sure there is no debris, oil traces, water or other dirt inside and outside the motor. Normal operation of the fan should be to prevent overheating and premature engine failure.
2. Regularly check the insulation resistance, and lead to a significant decline in insulation resistance reasons.
3. Check all cable and wire connections.
4. Gas or dust environment to use, to regularly check the motor access point explosion-proof Glen head of the closed and internal rubber aging and timely replacement.

## 5.4 Lubrication of motor bearing

Lubrication of motor bearing use JAX, Mobil, Krupp, Esso Polyrex EM etc. grease, meet with the following technical conditions:

Grease for motor bearing			
Motor power (kw)	Rotating speed (r/min)	Period (h)	Oil usage (g)
2.2、3.0、4.0、5.5	1450/1750	2000-2500h, open cover and check the bearing and oil	10-15
7.5、11.0、15.0	1450/1750	1500-2000h, pen cover and check the bearing and oil	20-30
18.5、22	1450/1750		30-40

Extreme environmental conditions are determined by the manufacturer. In extreme environmental conditions, the manufacturer recommends that the lubricating bearings be changed frequently according to the frequency of use (see Chapter 12)

## 5.5 Fault detection and trouble shooting

The following table lists the possible malfunctions and remedies for the agitator at work:

Malfunction	Reason	Solution
Overheating	Motor, Reducer and power supply equipment connection difficulties	Check the circuit to determine whether the electric current is too high or not.

		<p>Check if the motor and reducer motor connection parts are normal or not. ◦</p> <p>Check that whether the agitator shaft is working at vertical level nor not</p> <p>Check whether the agitated medium is too viscous and the density is too high and the stirring shaft is overload.</p> <p>Check whether the oil level in the gearbox meets the requirements.</p> <p>6. Check whether the motor are maintained in time.</p>
Vibration	<p>Motor, Reducer and base are not be fixed well nor base are not in absolute horizontal level.</p> <p>Gearbox internal worm gear wear, or damage.</p> <p>Bearing wear.</p> <p>4. Fixed bolt loose.</p>	<p>1. Identify the bad parts, the correct method of fixed and refer to the third chapter to ensure that the absolute level of the base. ◦</p> <p>2. Replace the worm gear.</p> <p>3. Replace the bearing.</p> <p>4. Fixed loose bolts</p>
Noise	<p>Bearing damage or interval is too large.</p> <p>Worm gear pinion does not work well.</p> <p>Insufficient lubricating oil</p> <p>Foreign bodies in the body</p>	<p>Replace bearing.</p> <p>Fix gear or replace worm gear (contact us)</p> <p>3. Add lubricating oil according the instruction.</p> <p>4. Empty lubricating oil and find the foreign bodies.</p>
Oil leak	<p>Entrance of oil seal wear.</p> <p>Cover axle of oil seal was wear</p> <p>Too much oil.</p> <p>Screw to discharge oil was not tight.</p> <p>Mark of oil was damaged. ◦</p>	<p>Replace oil seal.</p> <p>Replace axle of output force or input force.</p> <p>Adjust oil usage according the instruction.</p> <p>Add sealant to thread, fasten screw. ◦</p> <p>Replace oil mark.</p>

The supplementary tooth of Worm gear was worn too fast	Overloaded operation. Bad lubrication oil quality。 Insufficient lubricating oil. Does not replace lubricating oil according to instruction. The temperature of rotation is too high.	Check the agitated medium, adjust and reduce the load. Choose the right lubricating oil. Replenish lubricating oil according to instruction. Replace the required lubricating oil according to the instruction. In accordance with the "overheating" fault handling, the use of occlusion, or other appropriate way to reduce the use of equipment, ambient temperature
Motor, axle does not rotate or motor does not rotate.	1. Worm and worm wheel get stuck. 2. Axle of agitator gets stuck. 3. Motor burned or short circuit.	1. Shut down, disconnect the power, and open the reducer to check the worm, if worm is damaged, damaged replace the damage stuff. 2. Check if the medium in the tank is overloaded and too viscous. 3. Check if the motor oil is too saturated, replace the motor or check and adjust the line.
Axles rotate well but do not agitate slurry.	abbreviation	

Figure 5-1 lists the vulnerable part of the agitator

vulnerable part of the agitator	Name	Model	Quantity	
BWJBQ2.2 slurry agitator	Worm	Bearing	30207	2
		Oil seal	35×60×10	1

		Worm gear	Bearing	213	2
			Oil seal	50×90×10	1
BWJBQ3 agitator	slurry	Worm	Bearing	30208	2
			Oil seal	40×65×12	1
	Worm gear	Bearing	213	2	
		Oil seal	55×90×10	1	
BWJBQ5.5 agitator	slurry	Worm	Bearing	30209	2
			Oil seal	45×70×12	1
	Worm gear	Bearing	213	2	
		Oil seal	60×95×12	1	
BWJBQ7.5 agitator	slurry	Worm	Bearing	30210	2
			Oil seal	50×75×12	1
	Worm gear	Bearing	213	2	
		Oil seal	65×95×12	1	
BWJBQ11 agitator	slurry	Worm	Bearing	30211	2
			Oil seal	55×80×12	1
	Worm gear	Bearing	214	2	
		Oil seal	70×95×14	1	
BWJBQ15 agitator	slurry	Worm	Bearing	30212	2
			Oil seal	60×90×12	1
	Worm gear	Bearing	215	2	
		Oil seal	75×110×14	1	
BWJBQ22 agitator	slurry	Worm	Bearing	30215	2
			Oil seal	75×100×16	1
	Worm gear	Bearing	220	2	
		Oil seal	100×130×16	1	

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## 5.6 Troubleshooting technical maintenance

Includes replacement motor, reducer gasket and connector

The motor can be replaced without removing the reducer from the tank. See Table 5-1 and 5-2 for the motor number required for the gear unit and Chapter 12 Motor data.

Warning

## 5.7 Disassemble

1. Fix the rings on the motor.
2. Remove the four hex bolts fixed to the motor connector, see Figure 5-1.
3. Lifting Horizontal Mixer Use lifting equipment to withstand motor weight, disengage from motor and connector.
4. Loosen the motor flange and reducer flange mounting bolts.

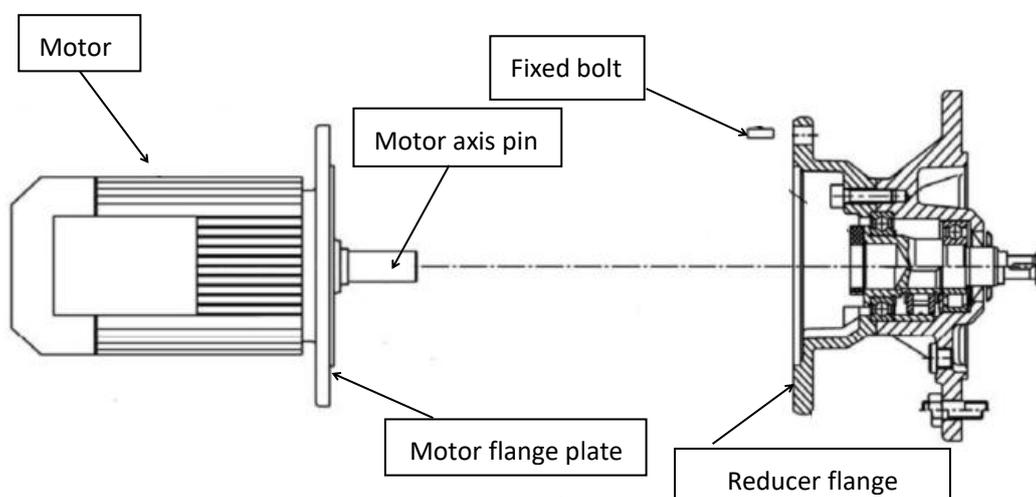
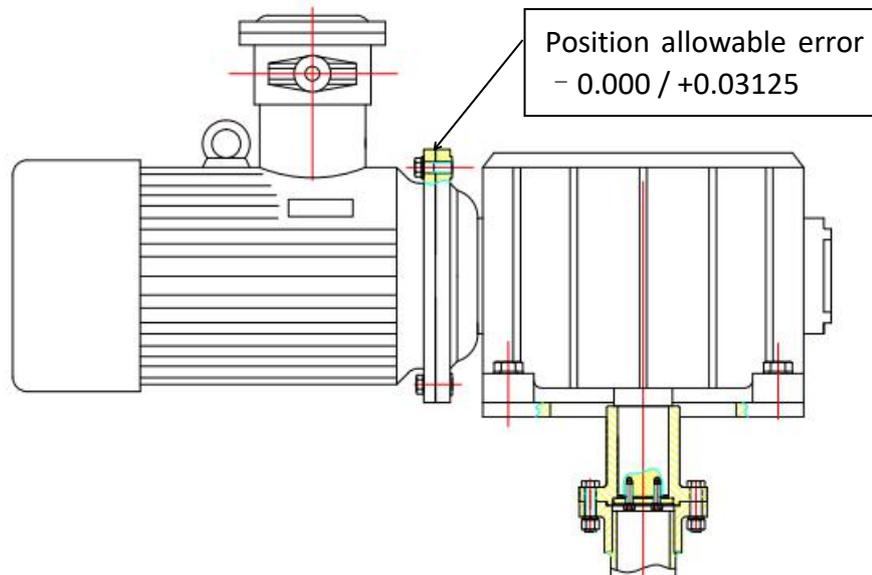


Figure 5-1 Motor - connector composition diagram

## 5.8 Installation

1. Clear debris.
2. Put the new pin to ensure that the pin does not run away.

- 
3. The motor mounting holes and connector mounting holes aligned, fastened.
  4. Diagonal fastening machine flange and reducer flange bolts.



Position allowable error  $-0.000 / +0.03125$

Remark: Check the installation of the motor AH size to ensure the inter-axis gap G. Place the motor shaft bushing on the W and tighten the fixing bolts. Install the motor to ensure that the flange surface does not exert strength.