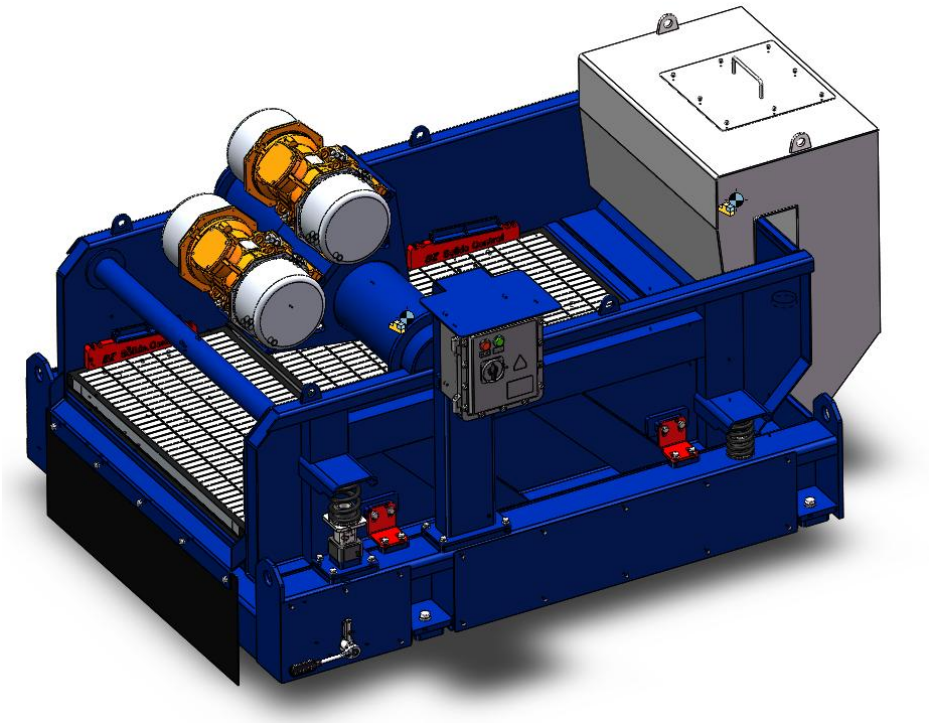
BZ Shale Shaker
Operation Manual



Topland Oilfield Supplies Ltd.

Head Office: 8-1011,Lane 5600, Chuansha Road, Pudong, Shanghai, China. sales@toplandoil.com

Hebei BZ Solids Control Co., Ltd (Brand Name: BZ Solids Control), specialized in manufacturing intelligent solids control equipment & system, the registered capital is CNY 68 million. The factory covers an area of 35,000 square meters. The company is located in Sanhe, Hebei, between Beijing and Tianjin, 50 kilometers away from Beijing Capital Airport and 150 kilometers away from Tianjin Port, integrating scientific and technological innovation research and development, manufacturing and processing, global marketing, technical services, technical consulting.
Adhering to the enterprise spirit of “unify cognition and action, make things just enough”, BZ constantly increases technological innovation investment in the field of intelligent solid control and separation equipment, energy saving and environmental protection equipment, and creates better products, better services and more social and economic benefits on the basis of product research and development and modern management. Based in China and service the world, BZ Solid Control builds a leading brand in intelligent solid control, energy saving, environmental protection and separation industry with our products and services.

BZ Solids Control Specialized in:
Solids Control System for Oil & Gas Drilling Fluids

BZ solids control system can be used in oil rig, workover rig, gas rig, etc.
BZ solids control equipment includes: Drilling fluids shale shaker, vacuum suction shale shaker, high G-drying shaker, vacuum degasser, mud cleaner, desander, desilter, decanter centrifuge, mud agitator, centrifugal pump, shear pump, submersible slurry pump, screw pump, mud gas separator, flare ignition device, mixing hopper, jet mud mixer, vertical cuttings dryer, vacuum solids convey pump, screw conveyor, mud tank, water tank, oil tank, etc.

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Drilling waste management system

Drilling waste management system is also called zero-discharge system or zero-discharge system while drilling. Divided according to use: oil based and water based drilling mud waste management system.
The key equipment of BZ oil based mud (OBM) drilling waste management system includes: cuttings dryer, decanter centrifuge, screw pump, screw conveyor, mud skip container, etc. The key equipment of BZ water based mud (WBM) drilling waste management system includes: high-G drying shaker, decanter centrifuge, screw pump, screw conveyor, mud tank, mud skip container, etc.

Oily sludge treatment system

BZ oil sludge treatment system is specialized in dangerous waste treatment. After recovery and treatment technology, the dirty oil in oil sludge can be recovered and reduced the oil content in the treated solid phase. It can not only achieve environmental treatment and prevent pollution, but also create economic benefit for the oil field. BZ oil sludge treatment system can reach the separation of oil, water and solid in the oil sludge at the same time, so as to achieve the reduction of sludge.

Trenchless / HDD mud recycling system

BZ HDD mud recycling system is designed to meet the trenchless technology requirements, which is used to clean and treat the mud returned from underground during horizontal directional drilling. Separating large particle cuttings out through shale shaker, desander, desilter and other solids control equipment, through the mixing device to add the required additive, Mixed and circulated evenly, to meet the performance requirements of reuse, through the mud pump feed into the horizontal directional drilling system for repeated recycling.

BZ Solids Control is a manufacturer of CBM & Geothermal drilling mud recycling system with rich experience. BZ developed CBM & Geothermal drilling mud recycling system based on the principle of solid control system but more according to the characteristics of coal bed methane drilling and mud features.

Other industrial and construction mud separation system

This kind of products are mainly used in river dredging, environmental protection solid-liquid separation, piling construction, shield construction and other fields.

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Read Before Use!

1. Read the equipment manual carefully before operation!
2. Lift the designated lifting position to move the equipment! Ensure that the equipment installation is tight and reliable; Tighten all assembly bolt groups once a month.
3. Lock the fixing bolt of screen basket before moving; remove the fixing bolt of screen basket before operation!
4. The motor must running as the direction of the rotation arrow. After the first operation for 8 hours, check the tightening torque of the mounting bolt according to the torque value (M20 bolt: 38kgm; M22 bolt: 56kgm), check the shell for cracks and cable wear once a month.
5. Check whether the screen wedge is wedged tightly before starting, and clean the screen with water before stopping; Regularly clean the slag discharge port of mud logging tank.
6. Check once a month whether the heights of the damping springs at the left and right ends are consistent, and check the wear of the bottom frame rubber strip; After every 1000 hours of operation, add the specified lubricating grease for the vibration motor. The brand of the lubricating grease is SKF: LG HP2/18, and lubricate the screw lifter and lead screw once a year. The brand of the lubricating grease is Mobil UX EP2 (Figure 1).

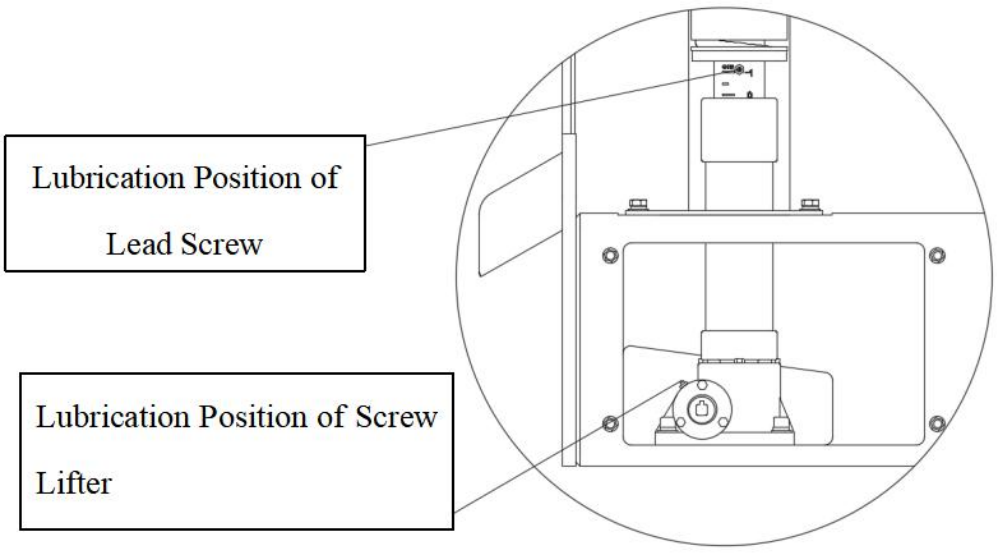

Figure 1. Screw lifter and lead screw lubrication position

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Chapter 1 General Introduction

1.1. Overview

This manual is the operating guide for the installation, operation and maintenance of BZ shale shaker. Covers various shale shaker including 2-screens BZS752, 3-screens BZS583 and 4-screens BZS584. (Figure 1-1). This manual is divided into several parts to help users read.

The person in charge of transportation, installation, operation or maintenance of this equipment must read and understand the instructions provided in this manual. A copy of the manual should be provided and can be obtained at any time in the workplace of the equipment. In order to guarantee the maximum safety and performance, no additions and/or changes may be made to the equipment the explicit written permission of BZ. Repair/replacement parts must be provided by BZ or BZ recommended.

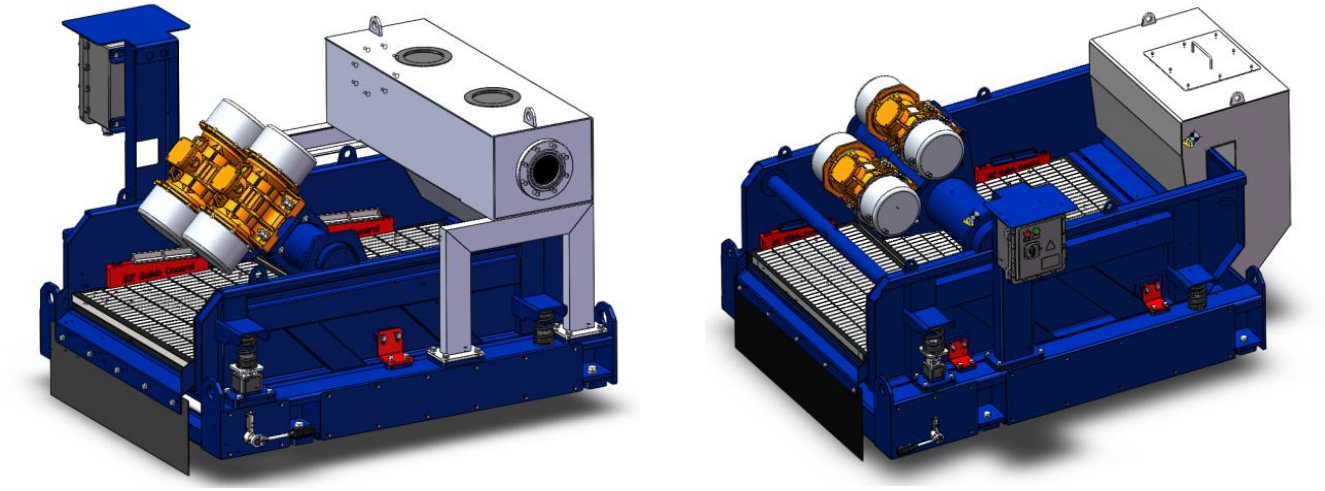

Figure 1-1. Outline Structure of shale shaker

1.2. Safety

The second chapter of this operation manual includes safety information related to equipment operation and maintenance. Make sure that every operator has read and understood this information. **Do not** operate the machine if damage is found to the mechanical or electrical parts.

1.3. Equipment Use

The BZ shale shaker is designed to separate larger solid phase in mud. BZ has not authorized any other use for this series equipment. Equipment operators must follow the operation, maintenance and safety instructions provided in this manual.

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1.4. Equipment Orientation

Through this manual, users can fully understand the BZ shale shaker from the front, rear, left and right, from the feed end to the discharge end.

1.5. Description and Operation

Double vibratory motors, high frequency, designed for oil and gas drilling industry, trenchless directional drilling industry, mining and dredging industry. All models are similar in structure, but different in shape , overall dimensions, screen quantity and screen size. If equipped with a desander and a desilter, the equipment can be used as a mud cleaner.

Adjusting the flow through the screens by change the angle of screen basket, to cope with the changing mud conditions. Double or multiple shaker can also be provided, through the mud distributor the mud can simultaneously enters the parallel shakers.

1.6. Main components and technical parameters

The following paragraphs describe the main components and accessories of BZ shale shaker. Refer to Figure 1-2 for the location of components and Table 1-1 for the names of components.

The vibratory motors are fixed to the vibration crossbeam and positioned over the screening bed to maximize the G-forces transferred to the screen surfaces on the screen. The screen is fixed by the wedges, and the basket angle is adjusted by the ratchet wrench, allowing the basket angle to be adjusted from -1° to 5° (the basket angle of the shale shaker designed with two screens is 0° to 2°).

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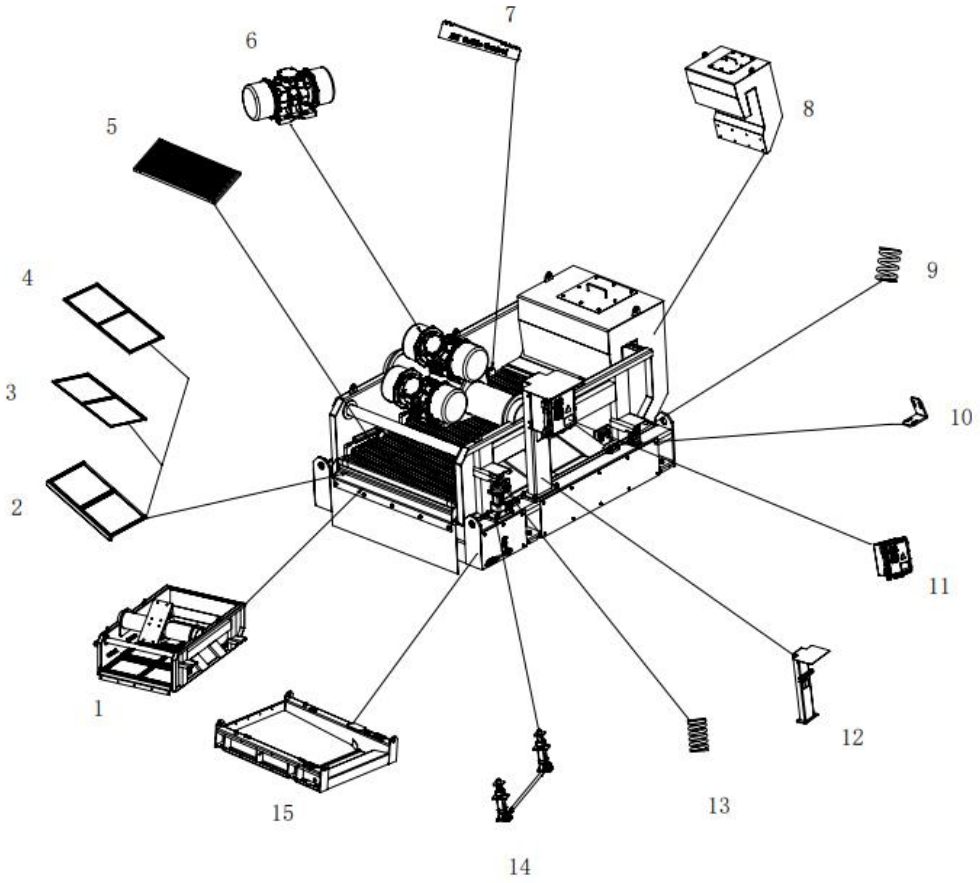

Figure 1-2. Main components of shale shaker

No.	Component Name	No.	Component Name
1	Screen basket assembly	9	Rear steel wire damping spring
2	Rubber strip supporting sealing group	10	Basket fixing block
3	Rubber strip supporting group	11	Explosion-proof electric control panel
4	Bottom frame rubber strip set	12	Support frame for electric control panel
5	Composite frame screen	13	Front steel wire damping spring
6	Vibratory Motor	14	Synchronous lifting device
7	Wedge	15	Base assembly
8	General assembly of feeder		

Table 1-1 Names of main components

Model	BZS752	BZS753D	BZS583	BZS584	BZS585S	BZS585D
Vibration Mode	Linear motion / Linear &Circular motion					

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Capacity (m^3/h)	60m^3/h	60m^3/h	120m^3/h	140m^3/h	165m^3/h	140m^3/h
Vibration Motor(kW)	2x0.8kW	2X1.0kw	2x2.2kW	2x2.2kW	2x2.2kW+1x 1.3kW	2X1.94kW
Screen Qty (Pcs)	2	3	3	4	5	5
Screen Size: L×W(mm)	900x750	Upper 1pc 1165x585 Lower 2pcs 900x750	1165x585	1165x585	1165x585	Upper 2pcs 900x750 Lower 3pcs 1165x585
G Force	≤7.5G (adjustable)					
Vibration Amplitude	4.5～6.0mm	4.5～6.0mm	4.5～6.0mm	4.5～6.0mm	4.5～6.3mm	4.5～6.0mm
Basket Angle	0°～+2°	0°～+2°	- 1°～+5°	-1°～+5°	-1°～+5°	-1°～+5°
Noise	＜85db					
Explosion-proof standard	ExdllBt4/IECEX/ATEX					
Weight	850kg	1025kg	1560kg	1750kg	2050kg	1730kg
Overall dimension L×W×H (mm)	1659x1321x 1040	1680x1320x1 130	2410x1987x 1415	3004x1978x 1415	3597x1978x 1415	2070x1670x 1420
Remarks	The above treatment capacity is for reference, and it will be different according to different mesh sizes and mud conditions.					

Table 1-2 Model and parameters of shale shaker

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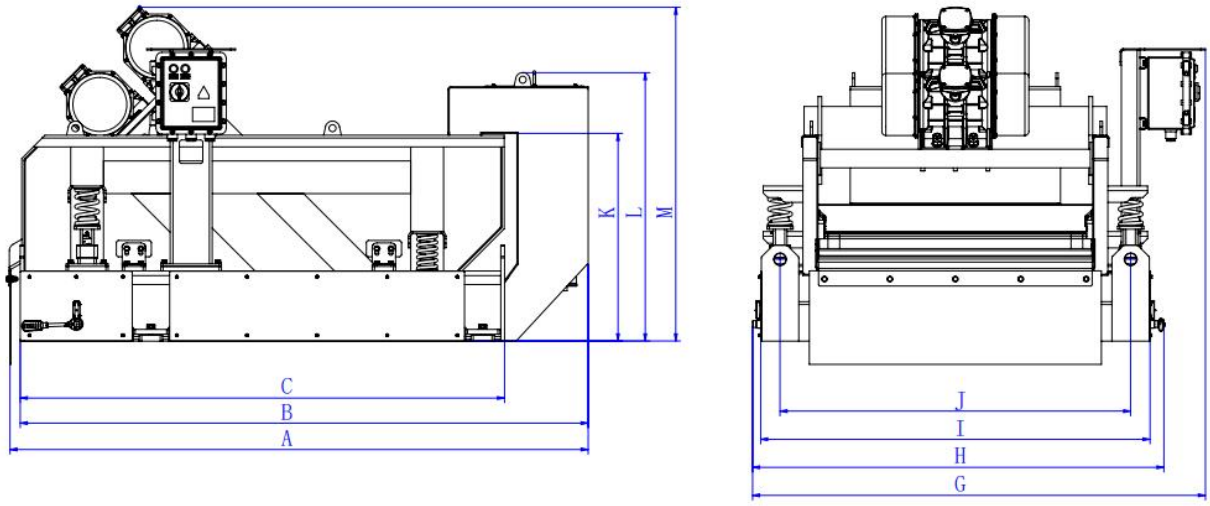

Model	A (mm)	B (mm)	C (mm)	G (mm)	H (mm)	I (mm)	J (mm)	K (mm)	L (mm)	M (mm)
BZS752	1673	1551	1612	1623	1409	1307	1167	568	1060	1130
BZS583	2474	2430	2072	1938	1760	1666	1500	887	1147	1427
BZS584	3078	3015	2657	1938	1760	1660	1500	895	1155	1430
BZS585S	3670	3605	3247	1938	1760	1660	1500	886	1145	1432
BZS753D	1677	/	1612	1595	1407	1307	1167	678	738	1129
BZS585D	2132	/	2072	1938	1759	1660	1500	880	940	1427

Table 1-3 Installation dimensions of shale shaker

1.7. Features

(1) The BZ shale shakers are designed based on the principle of dual motors automatically simultaneous, the shaker basket makes linear motion movement; some of the spare parts are changeable with international brand

(2) Advanced vibratory motor, working reliable and long service life.

(3) Using flat or corrugated screens, the shaker deck can be equipped with 2 to 5 screens; Screens can be used in combination to maximize the efficiency of screen, and 10~300 mesh screen can be selected according to the drilling fluids property and purpose

(4) The screen is fixed by wedge, easy operation and reliable fixation.

(5) The basket angle can be adjusted by mechanical adjustment. The adjustment adopts worm gear device, new structure; There is a worm gear device on each side of the basket, and a shaft in the middle connects the two devices, which can ensure the synchronization and consistency when adjusting. Basket angle adjustment -1°～+5°.

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(6) The shale shaker surface adopts sand blasting technology and marine anti-corrosive painting, it provides good corrosion resistance performance.

1.8. Working principle

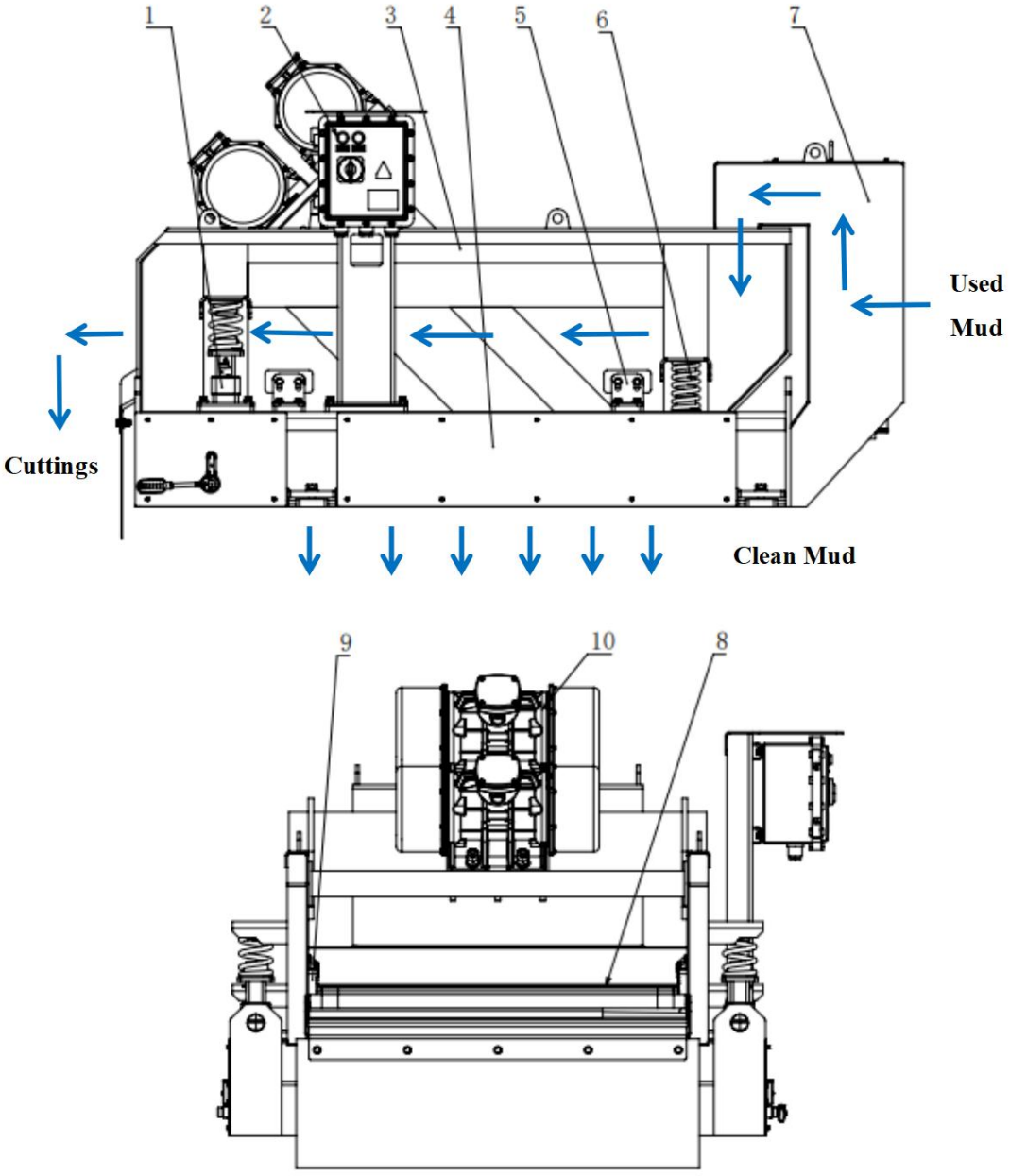

Figure 1-4.

1. Basket adjusting device 2. Control panel 3. Shaker basket 4. Base 5. Basket Fixing device

6. Damper spring 7. Feeder 8. Shaker screen 9.Wedge 10. Vibratory motor

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Working procedure as below:

The drilling fluids from mud return line of the drilling rig feed into the Feeder, then over flow to the shaker basket and shaker screen. The shaker motor motivate the fluids flow from one side to the other side of the shaker. While moving, the fluids will go through the screen and fall into the collection box. The cuttings are discharged at the other end of the shaker.

1.9. Product support

Product support includes replacement of complete sets of equipment and accessories, ordering instructions and maintenance and service. The following is service information.

Hebei BZ Solids Control Co., Ltd
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Fax: +86-316-5163735
Email: sales@bzsolidscontrol.com
Website: www.bzsolidscontrol.com

Chapter 2 Safety

2.1. Warning

Before operating and/or maintaining the equipment, all personnel responsible for the operation and maintenance of this equipment must read and understand all safety information in this manual.
The safety warnings listed below are included in applicable procedures throughout this manual.

Sound
WARNING! TO PROTECT AGAINST HEARING LOSS, HEARING PROTECTION SHOULD BE WORN AT ALL TIMES WHEN WORKING ON OR NEAR BZ MACHINES.
Electrical Hazards
WARNING! TO AVOID SERIOUS PERSONAL INJURY BE SURE THAT EQUIPMENT USED-ENERGIZED,LOCKED OUT,AND TAGGED OUT PRIOR TO PERFORMING MIANTENANCE AND/OR ADJUSTMENTS
WARNING! MOTOR MUST BE OPERATED AT THE DESIGNATED VOLTAGE

 WARNING! HIGH VOLTAGE MAY BE PRESENT. BE SURE THAT FUSED DISCONNECT SUPPLYING ELECTRIC POWER TO THIS EQUIPMENT IS OPEN. LOCK OUT AND TAG OUT POWER SUPPLY TO PREVENT ACCIDENTAL APPLICATION OF POWER WHILE MAINTENANCE AND/OR ADJUSTMENTS ARE IN PROGRESS.

 WARNING! ELECTRICAL CONNECTIONS MUST BE MADE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND ALL APPLICABLE LOCAL CODES. FAILURE TO COMPLY MAY RESULT IN AN UNSAFE CONDITION THAT COULD INJURE PERSONNEL AND/OR DAMAGE EQUIPMENT. ENSURE THAT ALL ELECTRICAL AND CONDUIT CONNECTIONS ARE SECURE.

Equipment Handling

 WARNING! USE SPREADER BARDS TO PREVENT DAMAGE WHEN LIFTING THE EQUIPMENT.

 WARNING! TO ENSURE PROPER BALANCE AND ORIENTATION WHEN UNIT IS RAISED AND PREVENT DAMAGE TO COMPONENTS ,ATTACH LIFTING SLING ONLY AT DESIGNATED LIFT POINTS.

 WARNING!BE SURE THAT HANDLING DEVICES HAVE SUFFICIENT LIFTING CAPACITY TO SAFELY HANDLE THE WEIGHT OF THE EQUIPMENT.

 WARNING! DO NOT REMOVE SHIPPING BRACKETS UNTIL EQUIPMENT HAS BEEN POSITIONED AT FINAL INSTALLATION SITE.

Operation

 WARNING!MOTOR HOUSING BECOMES HOT DURING OPERATION AND MAY CAUSE SEVERE BURNS.DO NOT TOUCH MOTOR HOUSING DURING OR IMMEDIATELY AFTER MOTOR HAS BEEN OPERATING

 WARNING!BE SURE THAT ALL PERSONNEL ARE CLEAR OF THE MACHINE BEFORE

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ADJUSTING ANGLE OF SCREEN BED.HANDS AND FEET CAN BE CRUSHED BY THE MOVING SCREEN FRAME.
WARNING! DO NOT ATTEMPT TO OPERATE EQUIPMENT WITH SHIPPING BRACKETS INSTALLED
Maintenance
WARNING! HIGH VOLTAGE MAY BE PRESENT.ALWAYS OPEN FUSED DISCONNECT SUPPLYING ELECTRIC POWER TO THE EQUIPMENT ,AND LOCK OUT AND TAG OUT POWER SUPPLY BEFORE PERFORMING ANY MAINTENANCE AND/OR ADJUSTMENTS OF EQUIPMENT.
Storage
WARNING! MOTOR MAY BE DAMAGED BY STORING IN A HIGH HUMIDITY ENVIROMENT (GREATER THAN 50% RH). OUT OF SERVICE MOTORS MUST BE STORED INN A LOW HUMIDITY ENVIROMENT.

2.2 Warning Label on the Equipment

Cautions

1. Read the equipment manual carefully before operation!

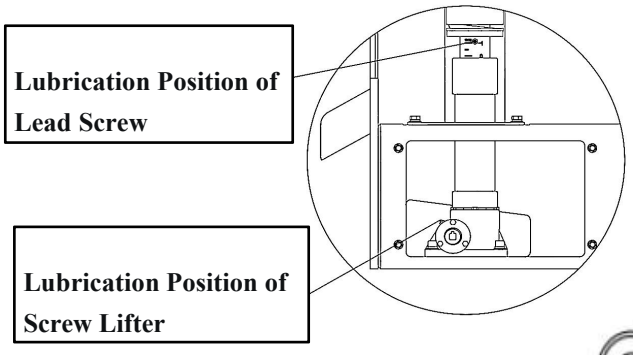
2. Lift the designated lifting position to move the equipment! Ensure that the equipment installation is tight and reliable; Tighten all assembly bolt groups once a month.

3. Lock the fixing bolt of screen basket before moving; remove the fixing bolt of screen basket before operation!

4. The motor must running as the direction of the rotation arrow. After the first operation for 8 hours, check the tightening torque of the mounting bolt according to the torque value (M20 bolt: 38kgm; M22 bolt: 56kgm), check the shell for cracks and cable wear once a month.

5. Check whether the screen wedge is wedged tightly before starting, and clean the screen with water before stopping; Regularly clean the slag discharge port of mud logging tank.

6. Check once a month whether the heights of the



damping springs at the left and right ends are consistent, and check the wear of the bottom frame rubber strip; After every 1000 hours of operation, add the specified lubricating grease for the vibration motor. The brand of the lubricating grease is SKF: LG HP2/18, and lubricate the screw lifter and lead screw once a year. The brand of the lubricating grease is Mobil UX EP2 (Figure 1).

Chapter 3 Installation

3.1 General

This section describes the recommended installation procedure for BZ shale shaker. The equipment may be shipped partially assembled to comply with shipping height restrictions.

3.2 Safety

Read and understand **ALL** safety information presented in this manual **before** installing and operating this equipment. Refer to Section 2 for a summary of Warnings addressing installation, operation and maintenance of this equipment.

Before beginning the installation review the Equipment Handling Procedures in this section. In particular, note the information concerning “lift points” and the use of spreader bars when lifting or moving the equipment.

Failure to observe proper equipment handling procedures may result in serious personal injury and/or damage to the equipment.

3.3 Installation Sequence

3.3.1 Lifting

Four lifting points (Figure 3-1) are attached to the lower outside corners of the machine to allow attachment of an overhead lifting device. Lifting points are labeled **“LIFT HERE ONLY”**. **DO NOT** attempt lifting equipment by attaching slings, or similar lifting aids, to the vibrator motors, or other non-designated portions of the unit. **Use of spreader bars is recommended.**

WARNING! USE SPREADER BARDS TO PREVENT DAMAGE WHEN LIFTING THE EQUIPMENT.

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WARNING! TO ENSURE PROPER BALANCE AND ORIENTATION WHEN UNIT IS RAISED AND PREVENT DAMAGE TO COMPONENTS ,ATTACH LIFTING SLING ONLY AT DESIGNATED LIFT POINTS.DO NOT ATTEMPT LIFTING BY ATTACHMENT TO MOTOR OR ANY OTHER LOCATION.
WARNING! BE SURE THAT HANDLING DEVICES HAVE SUFFICIENT LIFTING CAPACITY TO SAFELY HANDLE THE WEIGHT OF THE EQUIPMENT.
WARNING! DO NOT REMOVE SHIPPING BRACKETS UNTIL EQUIPMENT HAS BEEN POSITIONED AT FINAL INSTALLATION SITE.

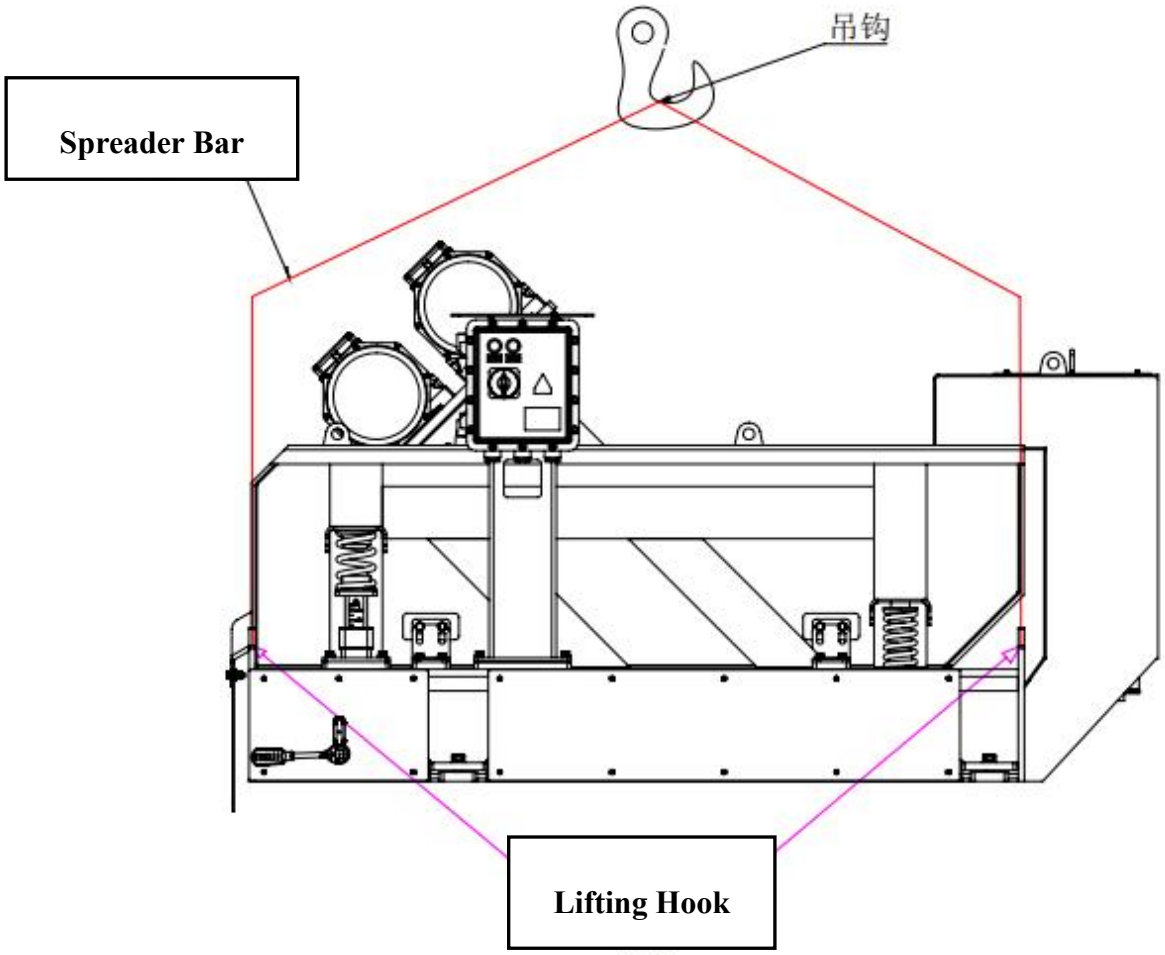

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Figure 3-1.

3.3.2 Transportation

As shown in Figure 3-2, besides the four damper springs, there are four sets of shaker deck lock device, composed of 2 units fixing seat and 3 units fixing bolts. When deliver the shaker, the tension devices are tensioned. This will keep equipment stable and safe during transportation to avoid any broken on shaker. When shale shaker arrive at job site, and finish installation the tension device can be released (Refer to Fig 3-3). When we release it must keep the fixing seat and bolts well to ensure every handling of the shaker will be stable and safe.

Note: When running equipments, the shipping brackets must be uninstalled

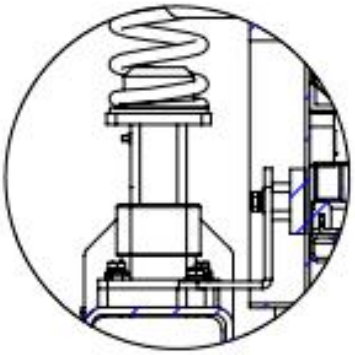

Figure 3-2 The tension bolt locked

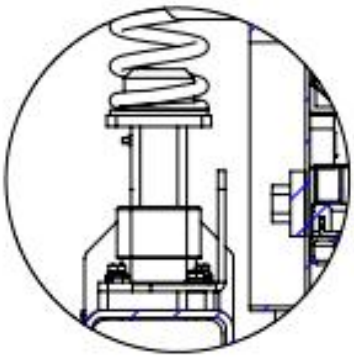

Figure 3-3. The tension bolts released

3.3.3 Installation

3.3.3.1. When shale shaker arrives at job site, put it at proper position. Make mounting hole according to 4-Φ24 installation hole on the shaker (Refer to Fig 3-4), and fixed it. Make fixture, do related position fixing on all aspects to make installation, uninstall. If along with system, we'll provide installation and fixture, user only needs to connect and fix it

3.3.3.2. Connect electric power to shale shaker magnetic starter. Usually, the electric system will be 380V/50Hz. The vibration motor and magnetic starter can be customized according to clients' requirement

3.3.3.3. There is button signed "ON", "OFF" and have certain color for identification.

3.3.3.4. Shale shaker can be installed on even operation plate. The shale shaker can be designed as tandem shaker, and even more. But should make suitable connections and related pipes

3.3.4 Storage

If the machine will not be installed immediately, it should be covered with a tarpaulin (tarp). If unit is

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stored outdoors, use a UV-resistant tarp, or UV-resistant shrink-wrap. Install vents when using shrink-wrap. Seal operating and maintenance manual in plastic, and attach to unit.

3.4 Site Preparation and Clearance Requirements

Prior to placement of equipment, verify that electricity and water are available at the installation site and that feed and discharge lines are provided. Also ensure that clearances around the equipment are adequate. Prepare the installation site as follows:

3.4.1. Provide adequate clearances on all four sides of machine and/or multi-machine installations. Figure 3-5 shows minimum clearances on all sides of machine(s).
3.4.2. Confirm that mounting structure is properly positioned and adequate to support the weight of the BZ shale shaker
3.4.3. Verify that electric power supply at the site agrees with electric power requirements of the equipment.

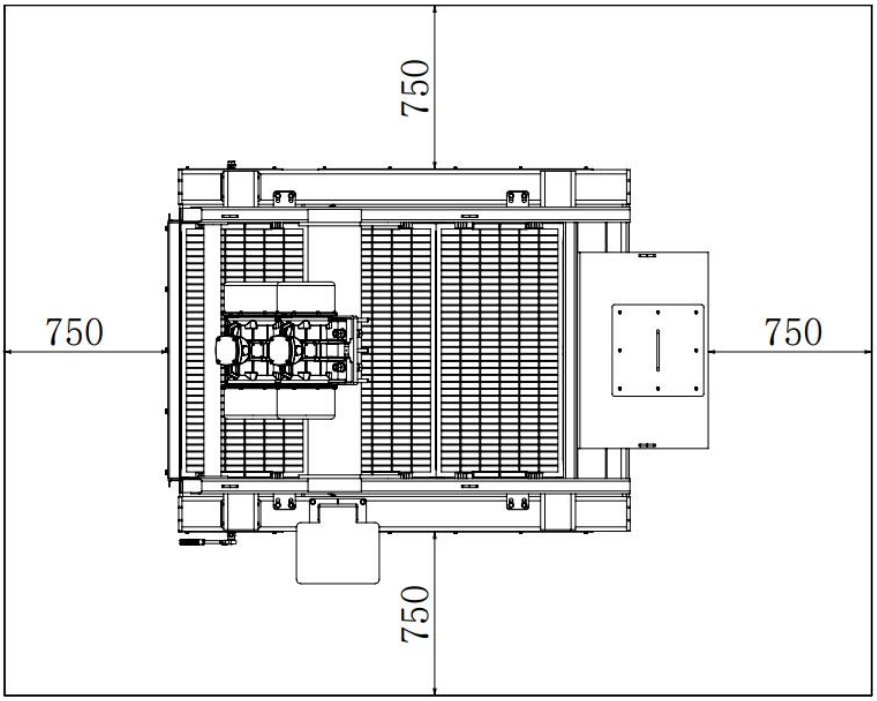

Figure 3-4. Reserved space around equipment

3.5 Equipment Leveling

To ensure even distribution of feed slurry across the screen panels, the BZ Shale Shaker must be properly leveled. Leveling along the length and width of the unit

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3.6 Electric Power Connections

AC 380V 50/60Hz **Circuit diagram of explosion-proof box for double motors shaker**

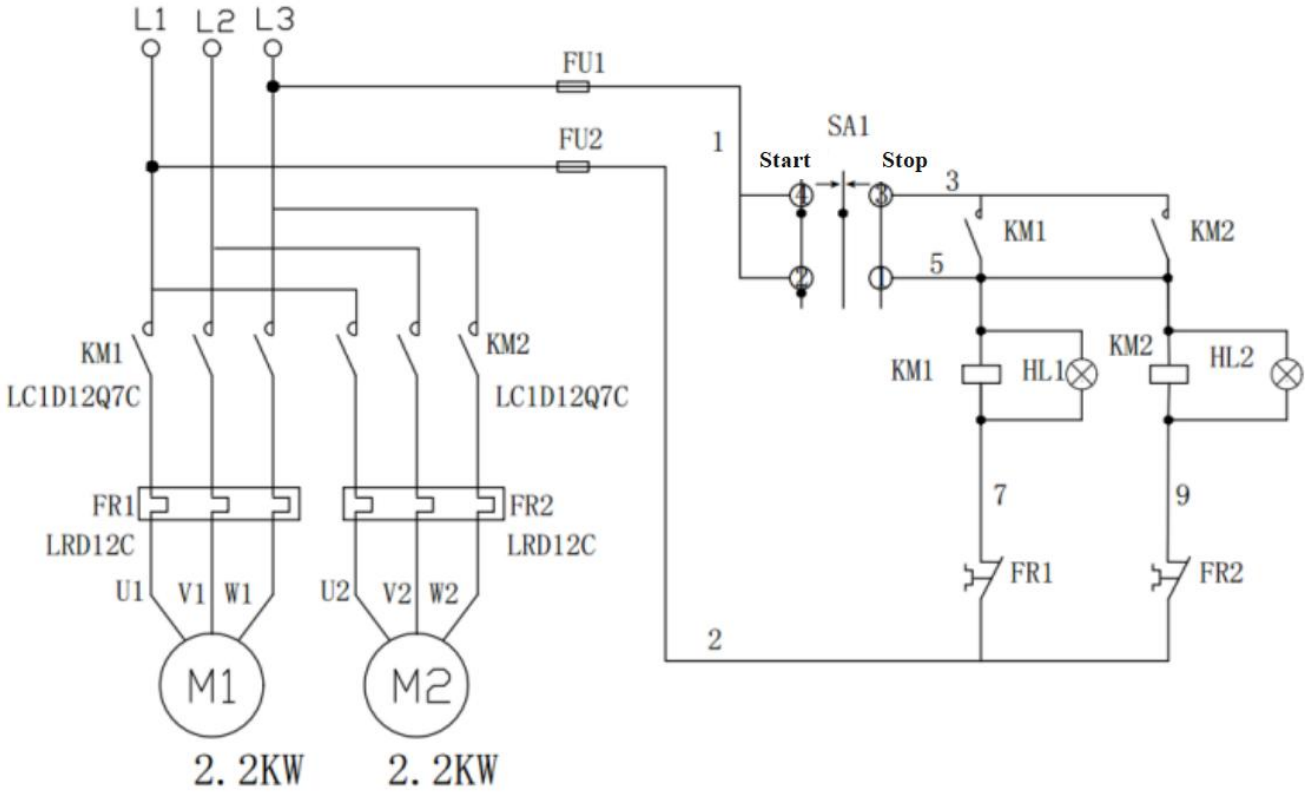

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Figure 3-5. Control panel wire connection

3.6.1. Open the lid of the control cabinet and connected to the power supply on site.
3.6.2. Vibration motor is three-phase, 50 or 60 Hz. Motors must be operated according to the designed voltage. Motor power requirement can be seen on the name plate.

WARNING!VIBRATOR MOTOR MUST BE OPERATED AT THE DESIGNATED SUPPLY VOLTAGE
WARNING! HIGH VOLTAGE MAY BE PRESENT. BE SURE FUSED DISCONNECT SUPPLYING ELECTRICAL POWER TO THIS EQUIPMENT IS OPEN. LOCK OUT AND TAG OUT POWER SUPPLY TO PREVENT ACCIDENTAL APPLICATION OF POWER WHILE MAKING ELECTRICAL CONNECTIONS.
WARNING! ELECTRICAL CONNECTIONS MUST BE MADE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND ALL APPLICABLE LOCAL CODES. FAILURE TO COMPLY MAY RESULT IN AN UNSAFE CONDITION THAT COULD INJURE PERSONNEL OR DAMAGE EQUIPMENT. ENSURE THAT ALL ELECTRICAL AND CONDUIT CONNECTIONS ARE SECURE.

3.7 Shaker Screen Installation and Change, Machine Startup

3.7.1 Screen panel installation

The BZ shale shaker is shipped with screen installed. Installation of screen panels for the first time is described in the following procedure. The screens are fixed with wedge. Prior to installing screen panels, remove all packing and shipping materials from the bed of the screen frame.

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3.7.2 Machine startup

Refer to chapter 4 for initial startup and operating procedures for the BZ shale shaker.

Chapter 4 Instructions for Use

4.1 Overview

This chapter includes initial and normal startup, normal shutdown, and emergency shutdown procedures for the BZ shale shaker. Operating procedures are also included adjustable while drilling (AWD), and screen panel tensioning system.

WARNING!DO NOT ATTEMPT TO RUN THE MACHINE BEFORE TAKING OFF THE SHIPPING BRACKET

Operating safety

WARNING! USE SPREADER BARDS TO PREVENT DAMAGE WHEN LIFTING THE EQUIPMENT.

WARNING! TO ENSURE PROPER BALANCE AND ORIENTATION WHEN UNIT IS RAISED AND PREVENT DAMAGE TO COMPONENTS ,ATTACH LIFTING SLING ONLY AT DESIGNATED LIFT POINTS.

WARNING!BE SURE THAT HANDLING DEVICES HAVE SUFFICIENT LIFTING CAPACITY TO SAFELY HANDLE THE WEIGHT OF THE EQUIPMENT.

WARNING! DO NOT REMOVE SHIPPING BRACKETS UNTIL EQUIPMENT HAS BEEN POSITIONED AT FINAL INSTALLATION SITE.

WARNING! DO NOT REMOVE SHIPPING BRACKETS UNTIL EQUIPMENT HAS BEEN POSITIONED AT FINAL INSTALLATION SITE.

WARNING!KEEP AWAY FROM THE EQUIPMENT WHEN STARTING

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4.2 Startup

4.2.1 Initial Startup

For the initial startup, follow the below procedures, replace spare parts or moving the equipments should also follow the instructions.

Initial startup	
Step	**Procedure**
1	Confirm that all operators and maintenance personnel have read and understand all operating and safety information in chapter 2-Safety
2	Verify that equipment has been installed properly
3	Check that all tools ,documents, and shipping brackets have been removed and there are no obstructions to operation, giving special attention to bed of screen frame
4	Check that services and utilities are available at the installation site
5	Verify that screen panels have been installed properly
6	Start the BZ shaker in accordance with Normal startup procedure below

4.2.2 Normal Startup

Normal startup	
Step	**Procedure**
1	Verify that all personnel are clear of the BZ shaker before applying electric power to equipment
2	Apply power to BZ shaker
3	Press START button and apply electric power to the vibrator motors. Allow motors to reach operating temperature (about 5 minutes)
4	The drilling fluids flow in
5	Observe pool configuration that forms on bed of screen frame, and adjust the AWD as required to achieve desired pooling on screen panels

4.3 Normal Shutdown

4.3.1 The normal shutdown procedure is used for controlled stopping of operation, such as cleaning, lubrication, inspection, adjustment, or screen panel replacement.

Normal shutdown	
Step	**Procedure**
1	Divert or discontinue flow of material to BZ shaker
2	Allow liquid to discharge from screen frame
3	Using water to wash the screen panel and edges of screen panel
4	Press Stop button to stop vibrator motor, disconnect supply electric power to the machine
5	Lock out and tag out machine

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4.3.2 Emergency Shutdown

In case of any emergency or other danger to personnel, shut down the electric power

WARNING!IN CASE OF ANY DANGER TO PERSNNEL,IMMDIATELY SHUTDOWN ELECTRIC POWER TO THE EQUIPMENT

4.4 Angle Adjustment

4.4.1 Due to below reasons may need to adjust the deck to different angle

① The size of the particles
② The density of the drilling fluids
③ Feeding capacity
④ Drilling mud type
⑤ Shaker screen type
⑥ Shaker screen mesh

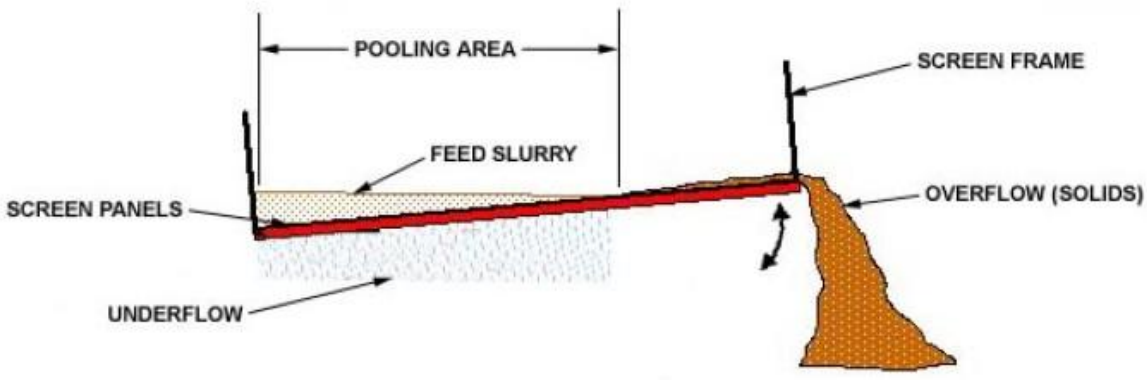

Figure 4-1.

4.4.2 Instruction on shaker deck angel adjustment

4.4.2.1 The shaker deck is normally set at 0 °when leaving BZ factory. As in the Fig. 4-2, shaker deck angel increases when spin clockwise and decreases when spin anticlockwise.
4.4.2.2 The shaker deck angle adjusting device is composed of 1# ratchet spanner, 2# screw lifting device, 3# Guard square tube assembly and 4# Up/down square tube assembly for mechanical changing. The deck angle is -1°to +5°, rated working angle is 0 to +3°。
4.4.2.3 Operation: The operator take the ratchet spanner (1# in Fig. 4-2), The rotating of the ratchet spanner be transferred to the screw device. The screw on the screw device will take the 4# Up/down square tube assembly moved. When the 4# Up/down square tube assembly up or down to the suitable position, stop the operation. Clients choose the suitable shaker deck angle per worksite condition.

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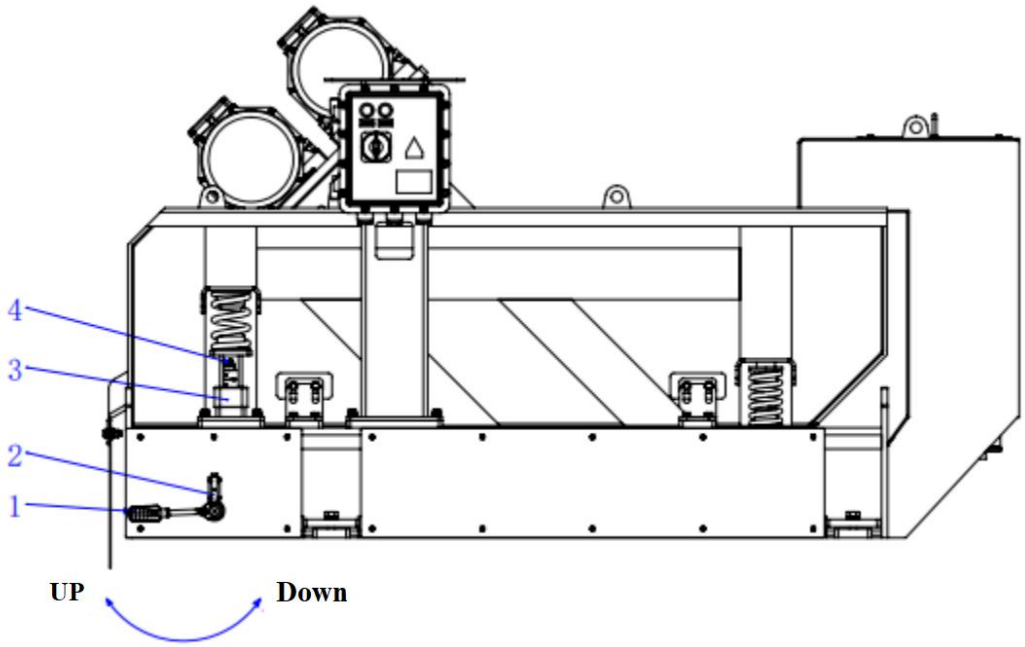

Figure 4-2.

1.Ratchet spanner **2.**Screw lifting device **3.**Guard square tube assembly **4.**Up/down square tube assembly

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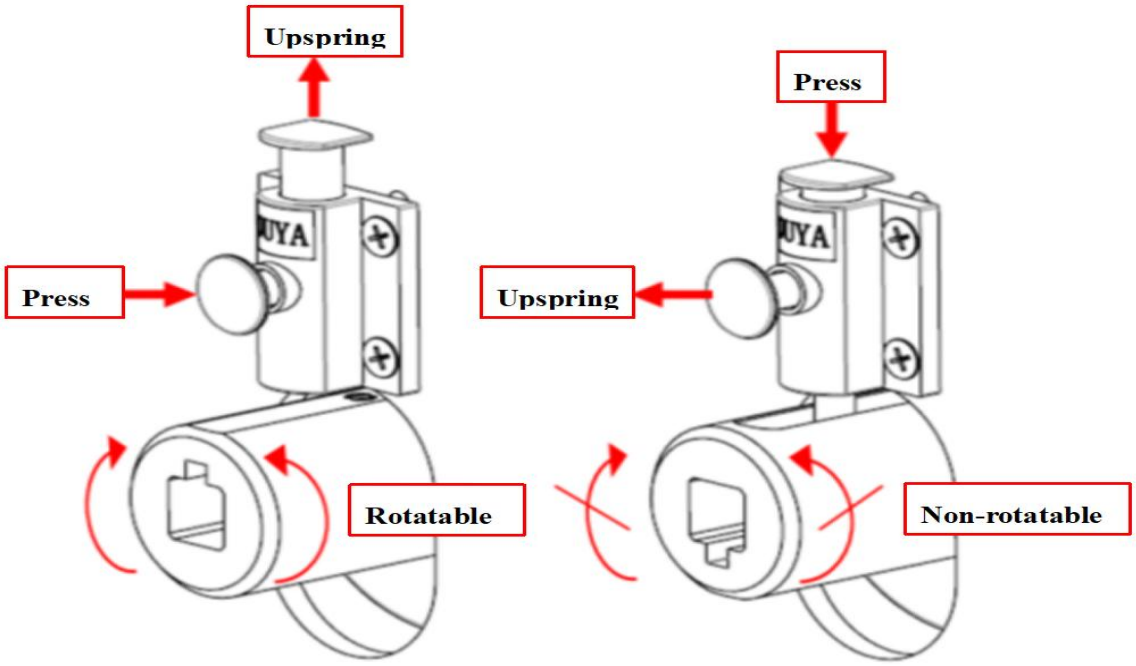
4.4.2.4 Automatic rotation of the screw lifter can be prevented by the limit lock. The operation mode is as follows:



The screw lifter rotatable The screw lifter locked

4.5 Pool Configuration

A better pool configuration can maximize the screen area and such achieve better result. It is hard to set the deck angle at one time ,it needs the operation personnel adjusting several times according to the flow of the mud .The best pool configuration is when the mud covers the first and second shaker screen, refer to Figure 4-3.

Note! A negative screen frame angle is useful for cleaning slurry deposits from interior walls of the screen frame and from the top surfaces of the screen panels.

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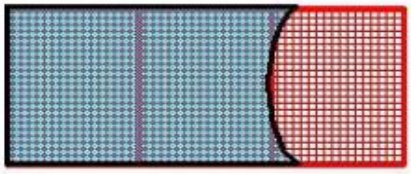
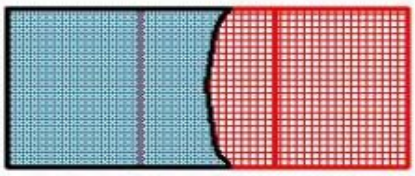
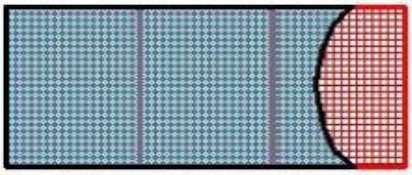
POOL CONFIGURATION	ANGLE ADJUSTMENT	ALTERNATIVE ADJUSTMENT
	Correct screen angle No adjustment required	
	Decrease screen angle	Increase flow
	Increase screen angle	Decrease flow

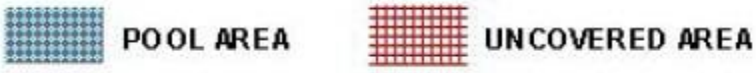


Table 4-1

4.6 Screen Retention System Operation

To make screen installation and uninstall more easily, BZ designed fast installation structure. The structure is a special type use tension wedge to fix screen. Refer to Fig4-3.The structure including shelve strip, wedge. The first time screen installation, you should inspect the screen dimension, After fixed rubber strip, then put screen, shelve strip from shaker back (drilling fluid input), use ratchet spanner to push to tension wedges, make two sides identical. Tension each screens subsequently.

Shaker screen replacement During operation, when screens broken or need to be replaced, get wedge out, then bring out screen, check if rubber strips are sufficient; then put new screen on shaker deck and tension it steadily. The replacement is finished

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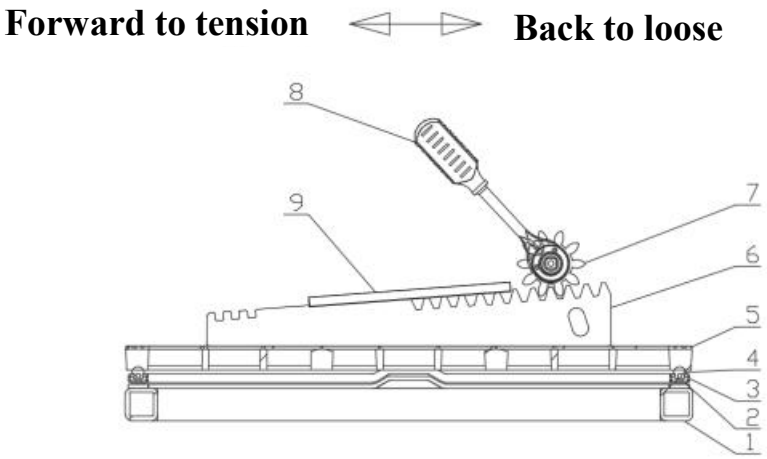

Figure 4-3. Wedge tension device for the shaker screen

1. Shaker deck	2. Rubber strip supporting sealing group	3. Rubber strip supporting group
4. Bottom frame rubber strip group	5. Composite frame screen	6. Wedge
7. Gear	8. Ratchet spanner	9. Wedge clamping plate

Note: During shaker operation, the tension wedge may be loose; operator should inspect shaker screen periodically and hammer to use ratchet spanner to tense the wedge.

4.7 The Treated Results and Causes

The listed below are some possible results, but by changing the feeding capacity, screen mesh, and deck angel, we can achieve better performance.

Performance	Cause
The cuttings are too wet	Feeding material is too wet; Feeding particles are too fine; Feeding material are too complex; The screens are blocked;
The recycled fluids contain too many cuttings	The feeding material is too fine; The screens are broken; The screens holes are too big;

The listed above are ordinary performance, there may be other special situations and causes, please contact BZ for more solutions.

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Chapter 5- Maintenance

5.1 General

These sections include routine maintenance, inspection, replacing the screen, replacing the spare parts and so on. Routine inspection is mainly to ensure the normal operation of the equipment and to prolong its service life. Programs listed in this section are only for reference and can be adjusted by users according to experience. A maintenance log can help realize daily maintenance and adjust and modify maintenance content at the same time.

5.2 Routine Maintenance

Routine maintenance mainly includes routine inspection and cleaning. Following is a recommended maintenance program:

Routine Maintenance	
Maintenance Contents	**Weekly**
Check and clean the dirt on the vibration motor casing.	each shift
Check the shaker motor fixed bolt, tension those released.	each shift
Check if there is any wear on lead-in cable or it's buried or crowded etc.	each shift
Each time, before stopping shale shaker, there should be an idle running for 5-10 minutes. Flush screen frame, screen surface and the inside of sand discharge box with clean water.	each shift
Check if there is any deposit after each procedure. Deposit in sand discharge box and buffer box would reduce the treating capacity.	each week
Check the electric cabinet, if any trouble, turn off electrical power first. Then dispatch electricians or professional person to open electric cabinet for repair.	each shift

5.3 Screen Box Maintenance

Shaker deck includes pedestal, motor vibration bear, screen fixing and supporting parts. When running normally, the shaker deck is vibrating regularly.

Detailed maintenance requirements shown in the chart below.

Screen Box Maintenance Records	
Maintenance	**Cycle**
Check the decrement and resilience value of damper spring is balanced. If any crack or obvious damage occurs, the damper spring should be replaced	Monthly or replace if

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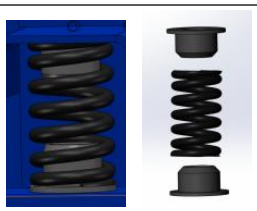
immediately.	after damaged.
	
Check if there is any damage of all rubber strips on the screen back side, if any damaged, replace immediately.	Each shift or every time during the screening changing
	
Check whether the screen is tensioned and attached closely to the bed of screen. Damaged screen should be replaced immediately.	Each shift
Check the screen tension device, if tensioned not complying with the requirement, which may cut short shaker deck and vibration motor lifetime.	Reverse backside of each screen should be checked or replace it when needed
Refer to Section Six for vibration motor inspection	

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Chapter 6 –Vibratory Motor

6.1 General Description

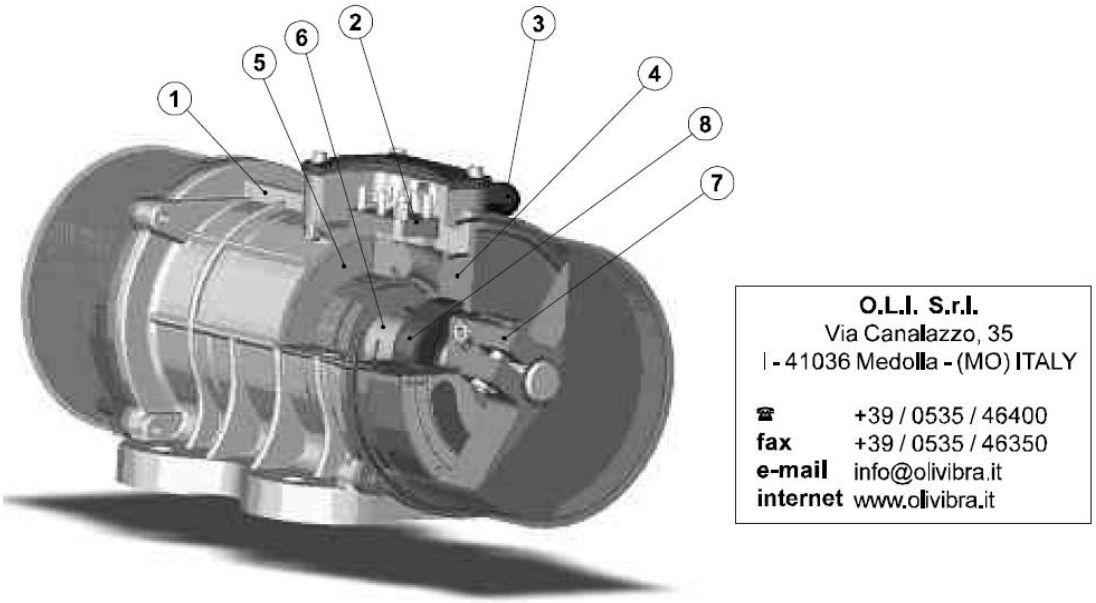

Figure 6-1. General description of vibratory motor

1 Vibrator body 2 Terminal 3 Cable gland 4 Bearing holder flange 5 Stator
6 Rotor shaft 7 Weights 8 Bearing

6.2 Operating Environment

1. Explosion-proof mark: ExIIBT4 (GB3836).
2. Admitted environmental temperature to ensure the indicated performance -20°C ~ +40°C.
3. Altitude: no higher than 1000m.
4. The average maximum relative humidity of the wettest month ≤ 90%;
5. Frequency: 50 Hz or customized, pay attention to the power supply corresponding to the nameplate data.
6. Rating voltage: 220~460V Customized ("△"/"Y" connection, default value 380V and "Y" connection, note that the power supply voltage should correspond to the wiring method in the nameplate or wiring diagram.)
7. Insulation grade: main body class H; junction box class F
8. Protection grade: IP65 or IP66.
9. Working mode: S1 (continuous).

6.3 Storage and movement

6.3.1. Packing in plastic film with wooden pallet or box, it is recommended that do not open the packaging during storage, ensure that the storage environment dry and good ventilation, avoid rapid changes in environmental temperature. The storage temperature should not less than 41°F (5°C) with a relative humidity not more than 60%. If the vibrator has been stored for 2 or more years, remove bearings, wash them, and repack them with new grease.

6.3.2. During storage and transportation, vibration motor cannot be upside-down.

Attention: Inspect packing for damage timely. BZ does not bear the damage caused in the transportation process. If the damage occurs, please contact us in time. We will evaluate the loss as the basis for the buyer to claim compensation from the transportation company.

6.4 Installation

Warning! Before installing vibrator, turn off and lock out all energy sources to mounting structure and make warning signs.

6.4.1 Before installation, check the motor if damaged or got damp during transportation, and whether the fasteners are loose.

6.4.2 Check whether the nameplate data meets the requirements, refer to Figure 6-2.

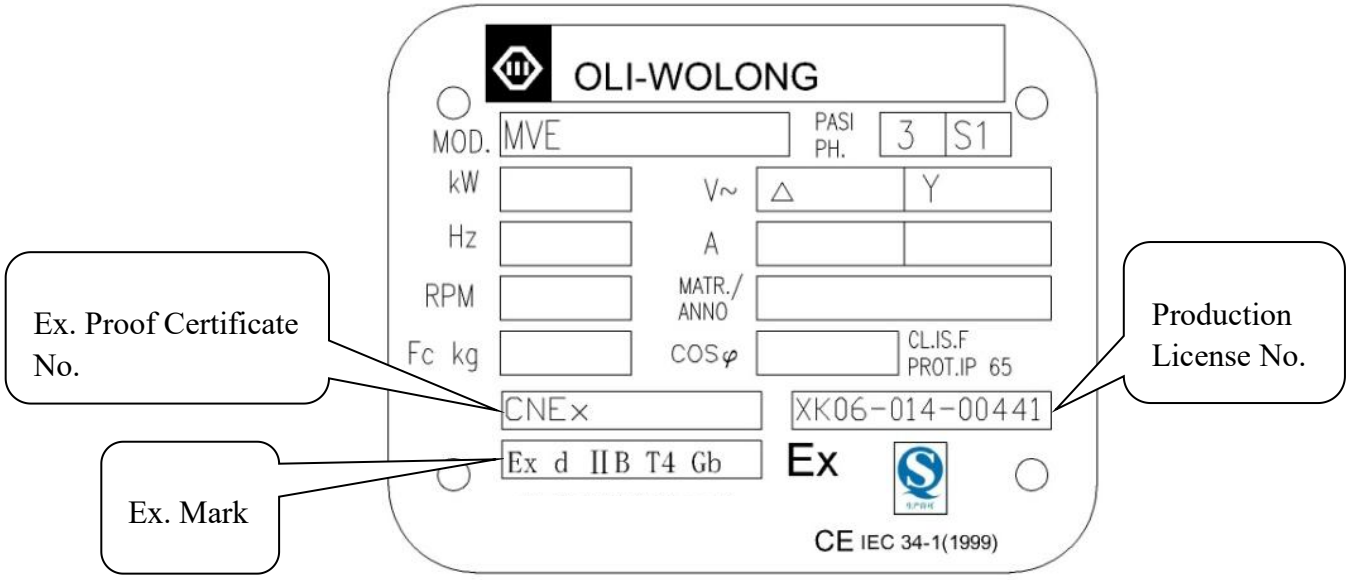

Figure 6-2. Explosion-proof motor nameplate

6.4.3 All inspections must be carried out before installation. If it does not meet the requirements, it is not allowed to be used.

6.4.3.1 There are explosion-proof signs and explosion-proof certificate numbers.

6.4.3.2 The explosion-proof standard must meets the requirements of explosive mixture site.

6.4.3.3 All fastening bolts are tightened, no spring washer lost, all components of flameproof case are properly connected.

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6.4.3.4 All flameproof parts shall be no cracks and defects (such as breakage and corrosion) that affect flameproof performance, and new motors or parts that have not been dismantled shall not be inspected.
6.4.3.5 Insulation resistance between stator winding and frame: when the rated voltage is 380V, it shall not be lower than 0.38 mΩ (this insulation resistance must be measured by megger before the motor is installed after long-distance transportation or long-term unused).
6.4.4 The junction box is located at the top of vibratory motor.
6.4.5 If using a cutting torch or welding, test atmosphere for gas level or dust content.
6.4.6 Make sure mounting surface as shown in Figure 6-3 is strong and flat, The flatness of the mounting surface should be less than 0.08mm (This will minimize internal stress to vibrator casting when tightening mount bolts) and no air holes and cracks on the surface; The mounting surface should not smaller than the footing surface of the motor; Welding in the mounting surface area should be avoided, otherwise the flatness of the mounting surface will be affected.

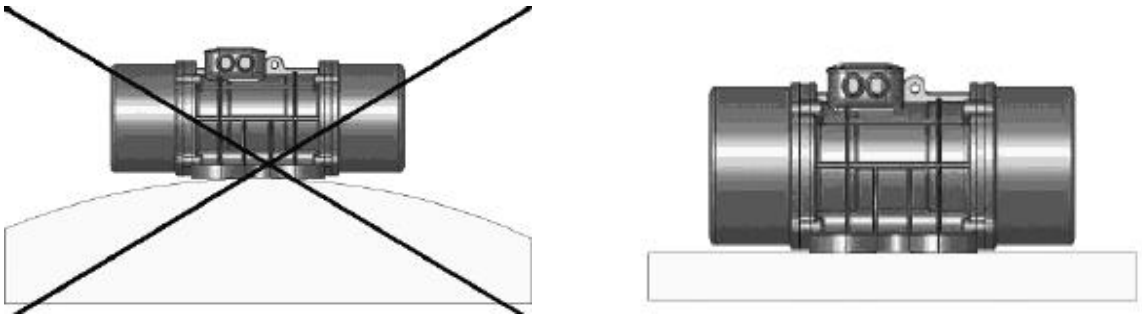

Figure 6-3. Mounting surface

6.4.7 Make sure mounting surface and footing surface of the motor are clean and free of debris, paint, and oxidation.

Warning! When the vibratory motor has been installed and wired, welding shall not be performed on the mounting plate. Welding may cause damage to winding and bearing of vibratory motor.

6.4.8 Four or six anchor bolts of vibratory motor should be selected with corresponding high-strength bolts of not less than grade 8.8 according to the aperture, which should be securely fastened with wrenches and adopt anti-loosening measures without any looseness. Tighten the mounting bolts in the order shown in Figure 6-4. If it is not tightened in the specified order, it may cause damage to the vibratory motor. Before installing the vibratory motor on the mounting plate, all bolts should be coated with thread sealant.

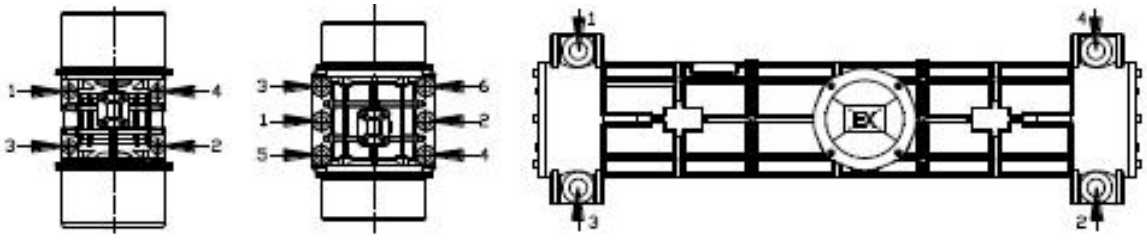

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Figure 6-4. Mounting bolts tightening sequence

6.4.9 The tightening torques of various bolts are given in Table 6-1. Users must tighten the bottom bolts according to the corresponding torques during installation.

Table 6-1. Mounting Bolts and Torque Requirements

Metric	
Bolt Size	Torque (kgm)
M16	19
M20	38
M22	56
M24	71
M30	135

6.4.10 After the vibrator has been operated for 10 to 20 minutes, check bolt torque. Tighten if necessary.

6.5 Electrical Connections

1. Remove terminal board cover, terminal board cover gasket. Install elbow or conduit fitting as appropriate. Install cord so that cord jacket extends into wiring compartment approximately 25mm. complete installation of wiring in accordance with table 6-2

Table 6-2 Cable out-diameter

Frame	Cable section	Wire connector
SIZE50D	4-2.5	2.5-5
SIZE60D、63D、70D	4-4.0	4-5
SIZE76、75D、80D、70L	4-6.0	6-6

2. Trim conductors and strip insulation approximately 8mm. Wire vibrator according to wiring diagram inside terminal box or see Fig 4.Use closed-loop wire connectors only.

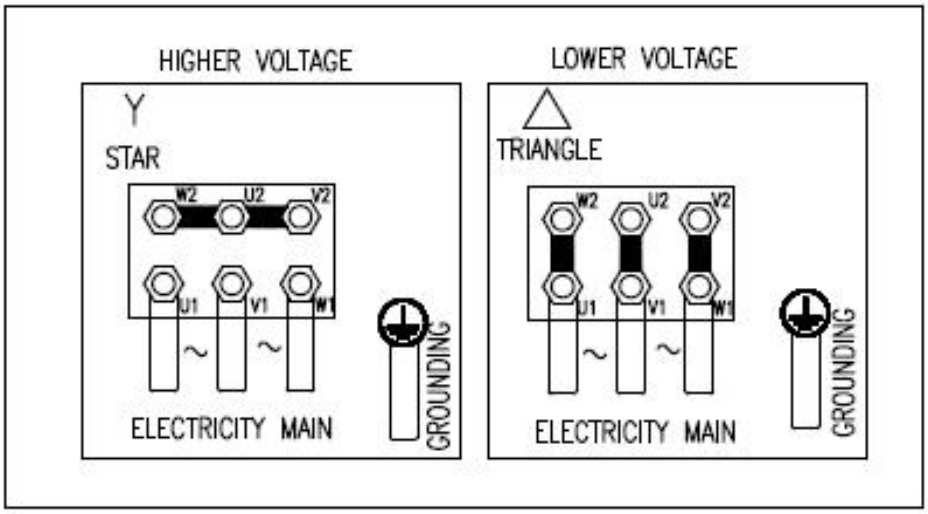

Figure 6-5. Wiring Connection Diagrams

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Install wire connector between the two flat washers. See Figure 6-6.

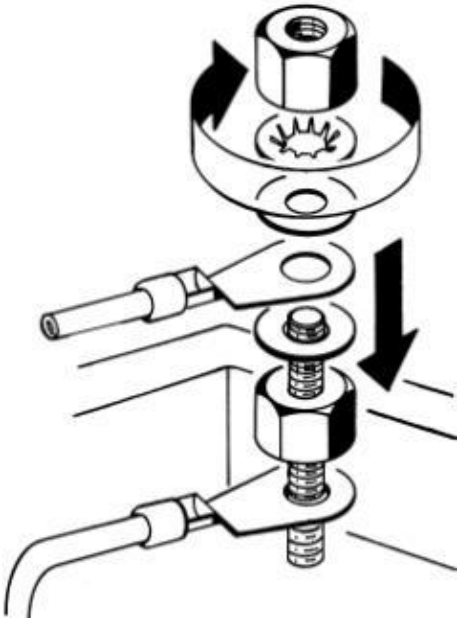

Figure 6-6. Installing Wire Connector

6.6 Check the shaft rotation

1. Checking Shaft Rotation
2. Remove one cover
3. Start vibrator(s) only for a few seconds, and then stop
4. Observe direction of vibrator rotation. If vibrator is not rotating in correct direction, lock out/tag out energy source and reverse rotation. To reverse rotation of three-phase vibrator, reverse any two of the three power supply wires
5. Replace cover, taking care not to pinch O-ring.

6.7 Adjustment of eccentric block

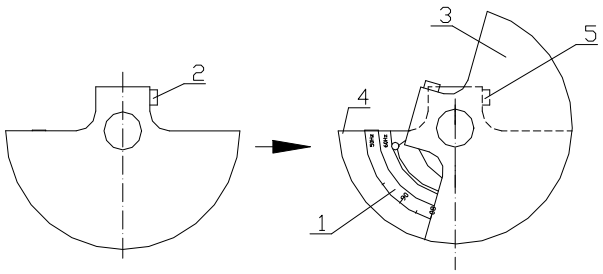

Figure 6-7 Adjustment of eccentric block

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WARNING ！ Before adjusting eccentric force, turn off and lock out/tag out energy source to vibrator.
NOTE: SIZE70L flameproof electric vibrators can't adjust force.
1. Turn off and lock out/tag out energy source to vibrator according to ANSI standards.
2. Remove cover.
3. Loosen nut or screw so adjustable mass will rotate around shaft.
4. Rotate adjustable eccentric mass to proper setting. To produce more force, move mass to higher setting. When set, tighten cap screw or nut according to Table II.
5. Check O-rings for damage. Replace if damaged.
6. Replace covers.
7. Repeat steps 2 through 5 for second set of weights. Set both sets of weights to same setting number so they are mirror images, as shown in Figure 6-8.

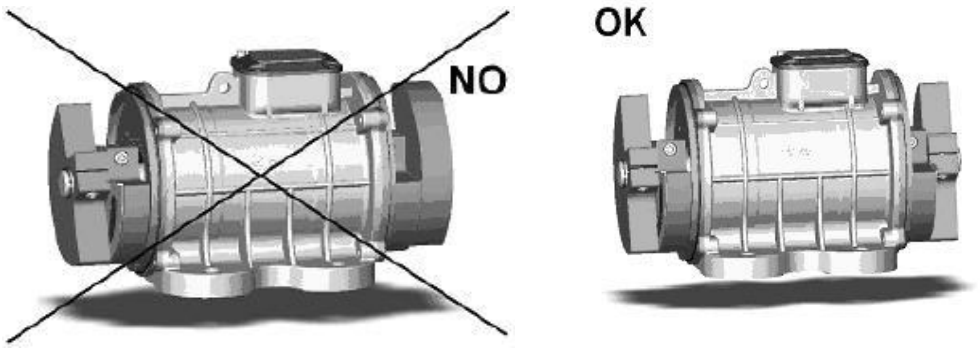

Figure 6-8. Setting sets of masses to mirror images

6.8 First start and current inspection

1. lose power supply disconnect switch and allow vibrator(s) to operate.
2. If vibrator makes unusual or excessive noise, make sure mounting bolts are tight and mount welds are not damaged.
3. Check decibel level of vibrator noise during operation. See determine whether noise exceeds safe limits. If required, wear ear protection to avoid impairment or loss of hearing.

CAUTION！ If vibrator is operated continuously with line current above nameplate rating, vibrator can be damaged.

4. After a few hours of operation, check each line current. If reading is higher than nameplate rating, check for correct phase voltage ensuring that it is correct and balanced. If phase voltages are correct (± 10% of nameplate rating) and balanced, recheck wiring, ensure that mounting bolts are correctly installed, or contact OLI for assistance. After making adjustments, check line current again to ensure line current does not exceed nameplate rating.
5. After first 8 hours of use and periodically thereafter, check mounting bolt torque and tighten if necessary.

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6.9 Maintenance

1. Clean dust on shell regularly
2. Before operating, must check the bolts to confirm whether there is loose or not. Otherwise, we must screw bolts tight before running shaker
3. Inspect the cable, whether there is wear, hold down, crushing, etc.
4. The vibration motor should be under good lubrication during operation:
Motors before fixed on shaker, the bearing is filled with SKF specific lubricate grease, the temperature range is -40 ~ 200℃

During running, every 2000 working hours user should makeup LGHP2 lubricate grease once. Every bearing cannot be filled over 25.8g
During 2000 hours, if any bearing daily temperature increase (temperature increase means motor shell actual one deduct environment temperature, every half one month test on bearing temperature increase is requested) 10° than common situation. This means the lubrication isn't sufficient. At this time, the lubrication schedule and lubrication grease make up quantity should be decreased properly. In principle, every 2000hours, every bearing lubrication grease makeup should be less than 25.8g. Such as, lubrication period will be deducted half of usual quantity (1000 hours) while lubrication grease make up should be less than 12.9g. Usually, bearing daily temperature increase every 10°, lubrication period and make up quantity should be decreased once
To make sure bearing operated well, we must use LGHP2 grade high temperature lubrication grease. Before adding new lubrication grease we should clean the input hole.
Commonly, bearing will have natural temperature increase by 1-2℃ just after lubricating or second lubrication
To avoid dust fall into oil input hole, or wear bearing, usually we'll use oil cup to close oil hole

1. If we operate the shale shaker after long time off status, we need to inspect motor rotary unit on insulation. Use 500V Ω gauge, get resistance is not larger than 0.5MSZ, we can run the shaker
Notice:
① If the motor doesn't run at all, we must shut off the power immediately to avoid motor broken
② After starting motor, to inspect, whether this is any problem. If there is any break off or uncommon noise. If two motors are not running in-phase we need to stop the motors and get rid of problems then turn it on again for operation
③ When motor is under cold status, should not be started 5 times continuously; when motor is turned off under hot status, the restart cannot be over 3 times continuously

6.10 Inspection

Check the vibrator, cable and wire connection seasonally as below.
WARNING:

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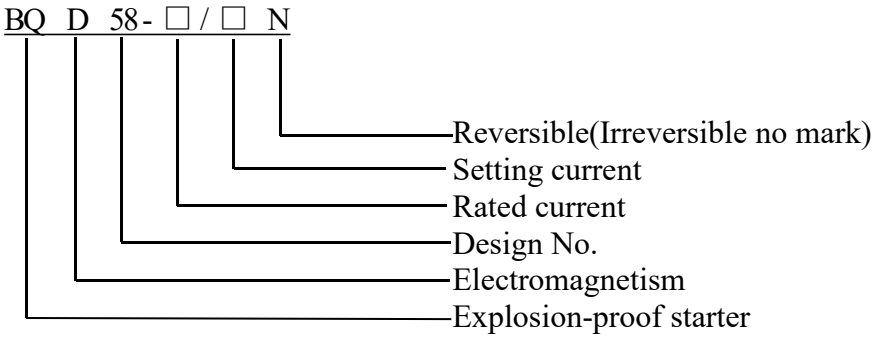
1. Turn off and lock out/tag out energy source to vibrator according to ANSI standards.
2. Inspect cable for damage including cuts and abrasions. Replace if damaged.
3. Inspect ground connection. Make sure resistance from ground connection to vibrator enclosure does not exceed 0.1 ohm. Ensure screw on ground terminal is tightened to proper torque.
4. Make sure all nuts on connections on terminal block are tightened to proper torque. Do not over tighten.
5. Check mounting bolt torque

Chapter 7- Electric Control System

7.1 Application

BZ Explosion proof distribution box can be working in area 1 and area 2. It is used on power distribution and circuit switch on/off on 460V voltage or bellow and has protect over load and short circuit applications.

7.2 Model Meaning



7.3 Working Environment

1. Environment Temperature: -20℃ to +40℃.
2. Pressure: 80KP to110KP； Oxygen Content: 21%
3. Height: ≤ 2000m.
4. Relative Humidity: ≤95%.
5. Not prominent shaking place
6. No gas or steam which may damage insulating
7. Insulation Grade： Grade 3
8. Installation category： II

7.4 Range Of Application and Purpose

This distribution box will be used in Area 1 and area 2, IIB, T1-T4 explosive gases, Area 20-22 explosive

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dust, AC 50/60Hz, 220/380V voltage. It contains over load protection, short circuit protection.

7.5 Main Technical Specification

Model	Main Rated Current	Sub Branch No.	Sub Branch Rated Current(A)
BQD58	≤100A	2,4, 6, 8,	1, 2, 4, 6, 10, 16, 20, 25, 32
	≤250A	10, 12	1, 2, 4, 6, 10, 16, 20, 25, 32, 40, 50, 63
Ex Model	Ex-mark		Rated Voltage
BQD58	Ex d IIB T4 Gb		460V or bellow

7.6 Checking Before Use

1. Check 3 phase power connection before start
2. Check switch, operating mechanism, control press-button, on/off connection
3. Check if control panel install stable
4. If machine stop a long time and re-use, please check insulation test on motor by 500V tramegger. Machine can be used only if resistance larger than 0.5 megohm.

Warning:

1. Stop motor if motor don't rotate after connected power

2. Check motors noise, stop motors if 2 motors not working synchronous.

3. Don't continuous start 5 times when motor in cold condition, don't continuous start 3 times when motor in warm condition.

7.7 Electrical Maintenance

1. Electrical maintenance has to be operated by professional people.
2. Stop power before open control panel
3. Electrical drawing is pasted in control panel
4. Please keep sure electric clearance not lower than 6mm and creep distance not lower than 12.5mm
5. Replace new parts if found rubber packing washer/ring damage or ageing.
6. Choose metal parts material when replacing and keep sure same antiseptic property
7. Checking regularly

1) Check appearance and tidy. Polish by gauze and paint by antirust paint

2) Check electrical performance

3) Suggest maintain every 3 month and repair every 12 months

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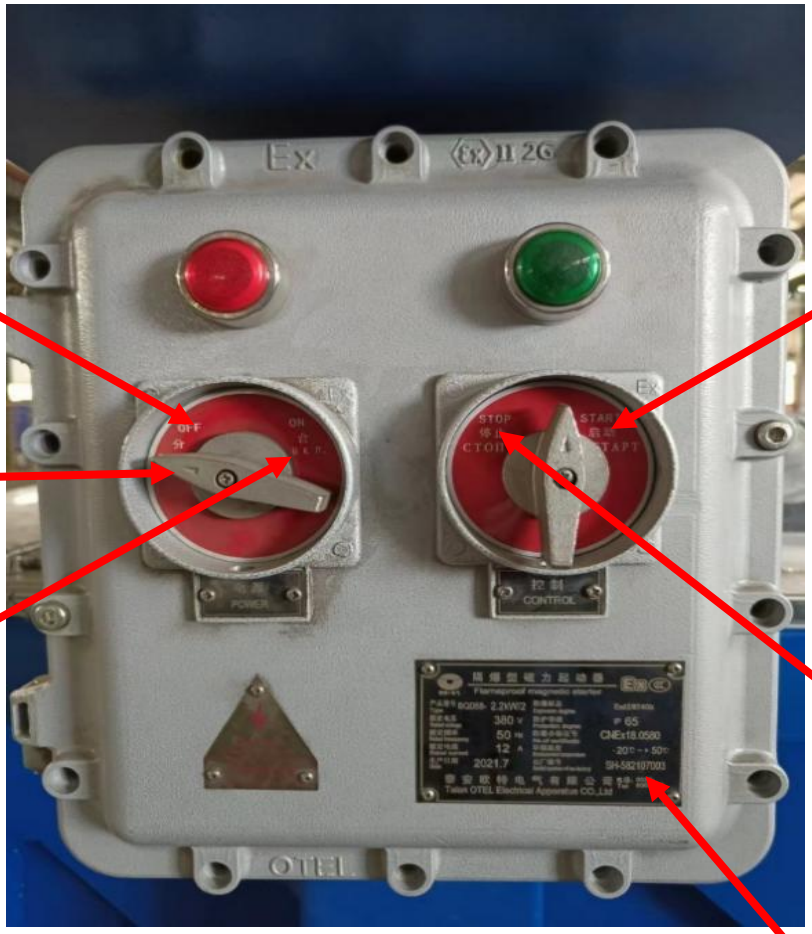
7.8 Operating Instruction



1. Power On
2. Check voltmeter to show correct voltage
3. Press button ON
4. Press “Stop” to stop equipment
5. Press “Power Off”

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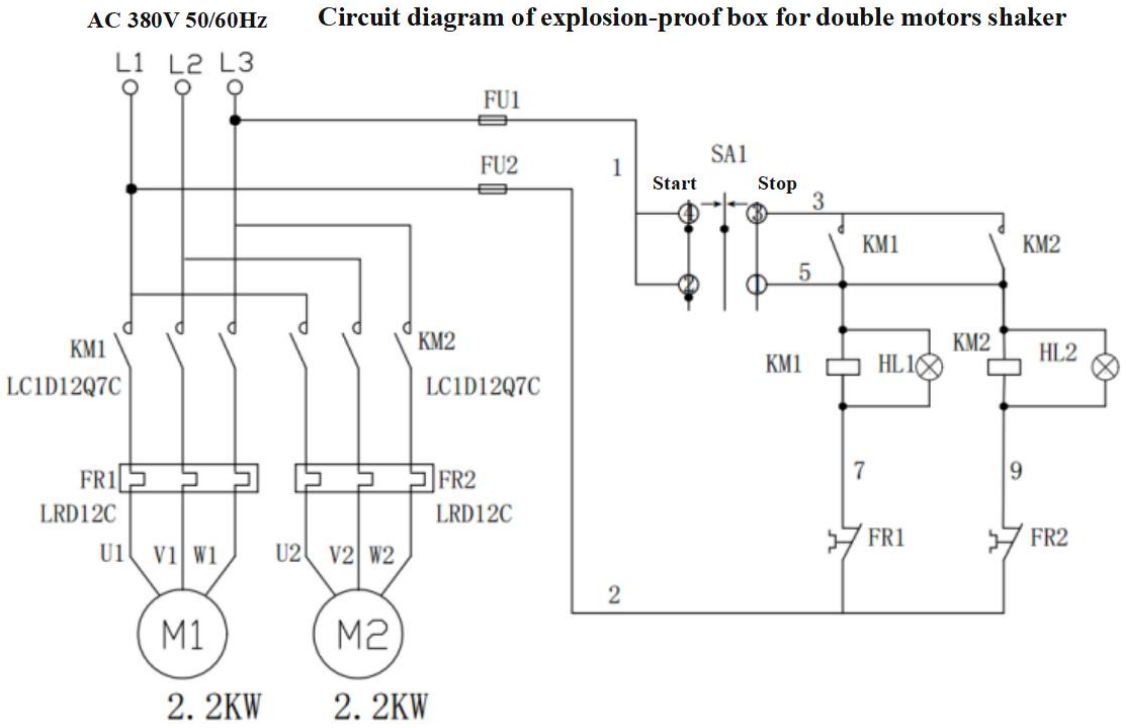
7.9 Circuit Schematic Diagram



Chapter 8 List of Wearing Parts

Linear Motion Shale Shaker BZS752					
No.	Name	Part Number	Qty	Unit	Remarks
1	Screen	900*750	2	ea	900x750x30mm, iron/composite material
2	Rubber strip (sold by the meter)	BZS752-01-02	8	meter	one screen need 3935mm, 4m*2=8m
3	Wedge	BZS-TY-10	4	ea	Red/polyurethane
4	Front steel damping spring	BZS-TY-13	2	ea	Logo F1, black steel -plastic spraying
5	Rear steel damping spring	BZS-TY-13-1	2	ea	Logo B1, black steel -plastic spraying
6	Front damping spring (composite)	BZS752-03	2	ea	Composite spring group
7	Rear damping spring (composite)	BZS752-03	2	ea	Composite spring group
8	Steel damping spring inner sleeve	BZS-DX-02	8	ea	Polyurethane-Black (front and rear universal)
9	Front upper guide sleeve	BZS-TY-06	2	ea	PU (polyurethane)-red
10	Front lower guide sleeve	BZS-TY-07	2	ea	PU (polyurethane)-red
Linear Motion Shale Shaker BZS583					
No.	Name	Part Number	Qty	Unit	Remarks

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1	Screen	585*1165	3	ea	1165x585x40mm, composite/iron frame
2	Rubber strip (sold by the meter)	BZS752-01-02	12	meter	4m*3=12m for 1 shaker
3	Wedge	BZS-TY-10	6	ea	Red/polyurethane
4	Front steel damping spring	BZS-TY-08	2	ea	Logo F4, black steel -plastic spraying /65Mn
5	Rear steel damping spring	BZS-TY-08-1	2	ea	Logo B4, black steel -plastic spraying /66Mn
6	Front damping spring inner sleeve	BZ-DX-03	4	ea	Polyurethane-black, matching F4 steel spring
7	Rear damping spring inner sleeve	BZ-DX-01	4	ea	Polyurethane-black, matching B4 steel spring
8	Front upper guide sleeve	BZS-TY-06	2	ea	PU (polyurethane)-red
9	Front lower guide sleeve	BZS-TY-07	2	ea	PU (polyurethane)-red
Linear Motion Shale Shaker BZS584					
No.	Name	Part Number	Qty	Unit	Remarks
1	Screen	585*1165	4	ea	1165x585x40mm, composite/iron frame
2	Rubber strip (sold by the meter)	BZS752-01-02	16	meter	4m*4=16m for 1 shaker
3	Wedge	BZS-TY-10	8	ea	Red/polyurethane
4	Front steel damping spring	BZS-TY-08	2	ea	Logo F4, black steel -plastic spraying /65Mn
5	Rear steel damping spring	BZS-TY-08-1	2	ea	Logo B4, black steel -plastic spraying /66Mn
6	Front damping spring inner sleeve	BZ-DX-03	4	ea	Polyurethane-black, matching F4 steel spring
7	Rear damping spring inner sleeve	BZ-DX-01	4	ea	Polyurethane-black, matching B4 steel spring
8	Front upper guide sleeve	BZS-TY-06	2	ea	PU (polyurethane)-red
9	Front lower guide sleeve	BZS-TY-07	2	ea	PU (polyurethane)-red
Shale Shaker BZS585S					
No.	Name	Part Number	Qty	Unit	Remarks
1	Screen	585*1165	5	ea	1165x585x40mm, composite/iron frame
2	Rubber strip (sold by the meter)	BZS752-01-02	20	meter	4m*5=20m for 1 shaker
3	Wedge	BZS-TY-10	10	ea	Red/polyurethane
4	Front steel damping spring	BZS-TY-08	2	ea	Logo F4, black steel -plastic spraying /65Mn
5	Rear steel damping spring	BZS-TY-08-1	2	ea	Logo B4, black steel -plastic spraying /66Mn
6	Front damping spring inner sleeve	BZ-DX-03	four	ea	Polyurethane-black, matching F4 steel spring
7	Rear damping spring inner sleeve	BZ-DX-01	four	ea	Polyurethane-black, matching B4 steel spring
8	Front upper guide sleeve	BZS-TY-06	2	ea	PU (polyurethane)-red
9	Front lower guide sleeve	BZS-TY-07	2	ea	PU (polyurethane)-red
Double track motion(Linear/circular) BZS753D					

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No.	Name	Part Number	Qty	Unit	Remarks
1	Screen (lower layer)	SW900*750	2	ea	900x750x30mm, iron frame
2	Screen (upper layer)	SW585*1165	1	ea	1165x585x40mm, composite/iron frame.
3	Rubber strip (sold by the meter)	BZS752-01-02	13	meter	4.1m * 1+4m * 2 = 12.1m for 1 shaker
4	Wedge	BZS-TY-10	8	ea	Red/polyurethane
5	Front steel damping spring	BZS-TY-13	2	ea	Logo F1, black steel -plastic spraying
6	Rear steel damping spring	BZS-TY-13-1	2	ea	Logo B1, black steel -plastic spraying
7	Spring inner sleeve	BZDX-02	8	ea	Rubber-black
8	Front upper guide sleeve	BZS-TY-06	2	ea	PU (polyurethane)-red
9	Front lower guide sleeve	BZS-TY-07	2	ea	PU (polyurethane)-red
Double track motion(Linear/circular) BZS585D					
No.	Name	Part Number	Qty	Unit	Remarks
1	Screen (upper layer)	900*750	2	ea	900x750x30mm, composite/iron frame.
2	Screen (lower layer)	585*1165	3	ea	1165x585x40mm, composite/iron frame.
3	Rubber strip (sold by the meter)	BZS752-01-02	20	rice	4m*2+4m*3=20m for 1 shaker
4	Wedge	BZS-TY-10	8	ea	Red/polyurethane
5	Front steel damping spring	BZS-TY-08	2	ea	Logo F4, black steel -plastic spraying /65Mn
6	Rear steel damping spring	BZS-TY-08-1	2	ea	Logo B4, black steel -plastic spraying /66Mn
7	Front upper guide sleeve	BZ-DX-03	4	ea	Polyurethane-black, matching F4 steel spring
8	Front lower guide sleeve	BZ-DX-01	4	ea	Polyurethane-black, matching B4 steel spring
9	Front upper guide sleeve	BZS-TY-06	2	ea	PU (polyurethane)-red
10	Front lower guide sleeve	BZS-TY-07	2	ea	PU (polyurethane)-red

Chapter 9 Quality Assurance

1. According to the terms, the warranty of BZ shale shaker is 14 months after delivery or 12 months after commissioning whichever comes first. In warranty period, BZ Solids Control will be responsible for problems caused by quality of production or raw material except the wearing spare parts of the equipment and problems caused by incorrect man-made operation. Simultaneously, BZ will offer instructions of BZ shale shaker operation, maintenance and inspection. Besides, using and replacing authorized wearing parts are allowed during the warranty period. Any actions, including abuse, misuse, misapplication and

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improper installation, and shale shaker which is lack of maintenance will not suit for this assurance. In warranty period, if the buyer finds defects in product material or manufacturing process, they should inform BZ Solids Control on paper and the later is responsible for replacement of product or parts. As for cost beyond repairing or replacing defect parts, BZ Solids Control doesn't assure it expressly or impliedly. If technical service personnel who are not authorized by BZ Solids Control repair and maintain BZ shale shaker arbitrarily, all consequences caused by their action are not suitable for this assurance.

2. Situations below are not suitable for BZ Solids Control assurance.

a. Breakdown caused exceeding product warranty period.

b. Breakdown caused by chemical erosion or friction loss.

c. Equipment damage caused by accidents in transit.

d. Quality assurance of products, which BZ Solids Control doesn't do any change and sells to buyers directly, is taken responsibility by original manufacturer.

e. Breakdown caused by abuse, misuse, misapplication and improper maintenance.

f. Equipment damage caused by repairing arbitrarily without getting authorization from BZ Solids Control or using parts without BZ Solids Control's authorization.

3. Above assurance implies "Shale Shaker Assurance" which is only for the buyer.

4. BZ Solids Control., Ltd. does declare that shale shaker assurance only guarantee the buyers' right, and reject any other express guarantees whatever is oral or written ones or commitment or description or occurred because of samples, and all implied warrant including but not limited, non-infringement assurance, any assurance of merchantability and applicability for a particular purpose, and assurance resulted from related action or commercial convention.

5. The buyer does promise to estimate the quality of shale shaker and confirm that BZ shale shakers meet buyer's operation requirements including processing application and the buyer knows how to evaluate and select installation site for BZ shale shaker and is aware of operation approach of BZ shale shaker.

6. BZ Solids Control., Ltd. doesn't assure for any approvals and authentications for BZ shale shaker issued by related management departments for any purpose.

7. According to the assurance, it is made an agreement that the buyer undertake risks, responsibility and/ or cost about BZ shale shaker brought in by related departments or complying other laws and regulations.

8. BZ Solids Control doesn't detect the buyer pre-installing shale shaker on spot, thus BZ doesn't do any assurance to the installation of the shale shaker.

The buyer should guarantee that enterprises and individuals that rent or lease BZ shale shaker know all the assurance contents and exceptions above.

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Chapter 10 Installation and Maintenance Log

This should be used by operating and maintenance personnel to record historical information gathered during the installation and operation of BZ equipment. If properly kept, the log will be useful for altering maintenance intervals and intercepting trends that may indicate the need for changing operating procedures. Each entry in the log should be dated for future reference and tracking. If required, additional pages may be added to the log by copying a blank page or simply inserting ruled paper at the rear of the section.

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