



PLANETARY BALL MILL SERIES

INSTRUCTION



Preface

Thank you for purchasing our products of XQM Planetary Ball Mill series, in order to ensure the normal use of the equipment, please read the following rules carefully before operating the equipment.

1. Safety

The machine has to be operated and maintained in accordance with this Instruction. Any illegal operation may cause damages to the machine and make it stop working.

2. Power

Before connecting the power, make sure if the voltage is consistent with the voltage that the machine requires (allowing a deviation of +/- 10%), and ensure the rated load of power socket has to be more than machine's request.

3. Power Cord

The machine is usually suggested to be used with independent powder cord. If the power cord is broken, it has to be replaced. And the same type and specification of the power cord should be replaced. When it is working, any other item is not allowed to be put on the power cord. Especially do not put the machine in the area where people often walk around.

4. Environment of the machine's location

Cool, ventilated, dry, dust-proof environment

Manufacturer: Changsha Tianchuang Powder Technology Co., Ltd.

Overview

1.1 Main Application

Planetary ball mills are widely applied to production fields of geology, mining, metallurgy, electronics, building materials, ceramics, chemicals, light industry, medicine, environmental protection, such as electronic ceramics, structural ceramics, magnetic material, lithium cobalt oxides, lithium manganate, catalyst, fluorescent powder, long afterglow luminescent powder, rare earth polishing powder, electronic glass powder, fuel cell, ceramic capacitor, Oxygen zinc varistor, piezoelectric ceramics, nanometer materials, wafer ceramic capacitor, MLCC, thermistor (PTC,NTC), ZnO varistor, valve disc of arrester, strontium titanate ring varistor, ceramic filter, dielectric ceramics, piezoelectric transducer, piezoelectric transformer, chip resistor, thick film circuit, potentiometer, alumina ceramics, zirconia ceramics, ZnO powder, cobaltous oxide powder, Ni-Zn ferrite, Mn-Zn ferrite, and etc.

1.2 Working Principle

Planetary Ball Mill has four ball grinding tanks installed on one turntable. When the turntable rotates, the tank axis makes planetary movements, the balls and samples inside the tanks are impacted strongly in high speed movement, and samples are eventually ground into powder. Various kinds of different materials can be ground by the mill with dry or wet method. Minimum granularity of ground powder can be as small as 0.1micron

Part 1 Operation Instructions for Vertical Planetary Ball Mill (XQM Series)

1.1 Main Application

XQM planetary ball mill is a kind of necessary equipment for finely grinding small batch of high – tech material. Due to its advantages of small, full – featured, high efficiency, low noise, it is widely used in fields of geology, mining, metallurgy, electronics, building materials, ceramics, chemicals, light industry, medicine, environmental protection and other scientific research institutes.

1.2 Structure Chart of Vertical Planetary Ball Mill

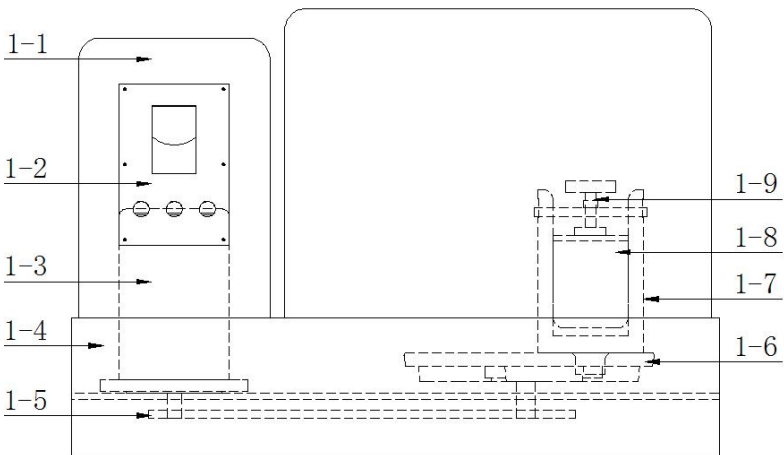
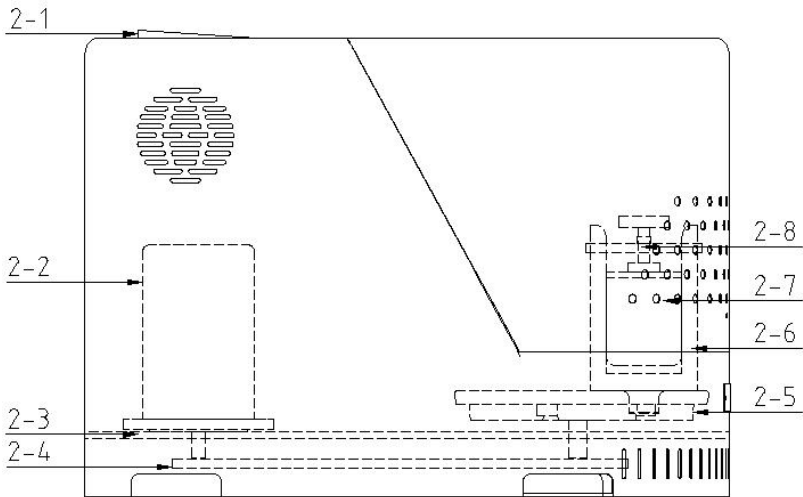


Figure1 Structure Diagram of Vertical Planetary Ball Mill
(Square Type)

1-1 Control Box; 1-2 Control Panel; 1-3 Motor; 1-4 Frame Work;
1-5 Drive Belt; 1-6 Planetary Mechanism; 1-7 Pot Seat, 1-8 Grind Pot
1-9 Fastening Device for Grinding Pots.



**Figure2 Structure Diagram of Vertical Planetary Ball Mill
(Semi-circle Round Type)**

2-1 Control Panel; 2-2 Motor; 2-3 Frame Work of Machine;
2-4 Drive Belt; 2-5 Planetary Mechanism; 2-6 Pot Seat, 2-7 Grind Pot
2-8 Fastening Device for Grinding Pots

Remarks: The above figures are just for conference. There may be differences between different models.

1.3 Main Parameter

Table 1 Main Parameters of Vertical Planetary Ball Mill (Square Type)

Model No.	Power Source	Rated Power (KW)	Adjustable Speed (rpm)		Continuous Working Time (min)
			Revolu-tion	Rotation	
XQM-2	220V/60HZ	0.75	35-335	70-670	1-3600
XQM-4	220V/60HZ	0.75	35-335	70-670	
XQM-6	220V/60HZ	0.75	35-335	70-670	
XQM-8	220V/60HZ	1.5	35-290	70-580	
XQM-10	220V/60HZ	1.5	35-290	70-580	
XQM-12	220V/60HZ	1.5	35-290	70-580	
XQM-20	380V/50HZ	4.0	25-215	50-430	
XQM-40	380V/50HZ	5.5	20-195	40-390	
XQM-60	380V/50HZ	7.5	27-174	40-260	
XQM-100	380V/50HZ	11	27-160	40-240	

Table 2 Parameters of Vertical Planetary Ball Mill (Semi-circle Round)

Model No.	Power Source	Rated Power (KW)	Adjustable Speed(rpm)		Total Setting Time (min)
			Revolu-tion	Rotation	
XQM-0.2A	220V/60HZ	0.09	60-580	120-1160	1-3600
XQM-0.2S	220V/60HZ	0.09	60-580	120-1160	1-3600
XQM-0.4A	220V/60HZ	0.25	45-435	90-870	1-3600

XQM-2A	220V/60HZ	0.75	35-335	70-670
XQM-4A	220V/60HZ	0.75	35-335	70-670
XQM-8A	220V/60HZ	1.5	35-290	70-580
XQM-10A	220V/60HZ	1.5	35-290	70-580
XQM-12A	220V/60HZ	1.5	35-290	70-580
XQM-16A	380V/50HZ	3.0	30-255	60-510

1.4 Operation Steps

Operation Procedure: Checking (Accessory and Machine Testing) → Matching Balls and Loading Material → Pot Loading → Switching On → Setting Parameters → Grinding → Machine Stopping → Unloading Pot and Discharging Powder → Machine Cleaning.

1.4.1 Check

1.4.1.1 Accessory and Outlook Check

First, check the packing list carefully after opening the plywood case, and make sure if there is any missing on the attachment, whether there is any break or damage to the shell off the machine during transportation. If any, please do not hesitate to inform us immediately. If everything is normal, switch on power and let the machine work without any load (mill jars and mill balls).

1.4.1.2 Running Without Load

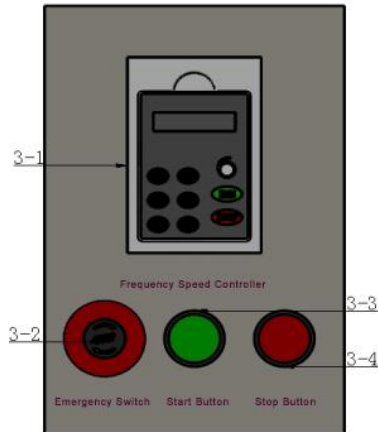


Figure 3 Diagram of Control Panel of Planetary Ball Mill

3-1 Frequency Speed Controller 3-2 Emergency Switch
3-3 Start Button 3-4 Stop Button

Steps of Testing Machine Without Load

- 1) Switch on power source and turn on the air switch;
- 2) Turn the rotate button (white color) on (3-1) at anti-clockwise to the maximum limit;
- 3) Start up the safety switch (3-2). (safety switch is used for emergency,
- 4) It disconnects power if pressed, it is under running condition if rotating the button at clockwise counter). Check if the indicator is lighted or not,
- 5) Turn on the start button (3-3), check if speed indicated on frequency converter is zero, turn slowly the rotate button on (3-1) at clockwise counter and adjust the speed to 50% of the maximum rated rotating speed, and keep the machine run for 5 minutes.
- 6) If no unusual occurs, you may turn the rotate button to zero, press stop button (3-4), emergency switch (3-2) and disconnect the power supply to

stop machine.

Note: There aren't air switches for partial models of XQM planetary ball mills.

1.4.2 Matching Balls & Loading Materials

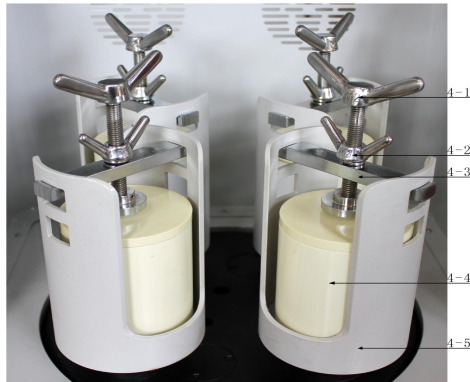


Figure 4

Tank Support Base and Fasten Device for Vertical Planetary Ball Mill

- 4-1 The Top Rod 4-2 Lock nut 4-3 Crossbeam
4-4 Grinding Jar 4-5 Grinding Stand

In order to get best effects of grinding, small, medium, large-sized balls have to be matched and mixed together at proper rate. Large balls are often used for weighing and smashing samples as well as dispersing small balls, while small balls are used for mixing and grinding samples. Generally, total volume of balls and materials has to be less than 2/3 of total volume of grinding jars (4-4).

Notes: Install the loaded pots inside the machine only after materials and

balls are loaded into the pots, lock the device of the top tightly.

1.4.3 Install Jar

Operation Steps of Install Jar:

- 1) Put rubber pad on the grinding base(4-5);
- 2) Put the loaded jar (4-4) on the grinding base (4-5);
- 3) Put the crossbeam (4-3) on the right place of the grinding jars;
- 4) Tighten the fastening rod (4-1), make the grinding jar(4-4) fixed on the grinding stand (4-5);
- 5) Tighten the lock nut in the end and the whole device is under top tight state.

Notes:

- 1) The grinding jar (4-4) has to be installed tightly and symmetrically. Single Jar or three jars are prohibited to be operated. Total loaded weight of both symmetrical jars (including weight of jar, balls and materials) must be almost the same.
- 2) Center of jar (4-4) has to be consistent with center of grinding stand (4-5) .
- 3) When locking tightening the top rod (4-1)and lock nut (4-2), please tighten grub screw first, then tighten the screw cap. You have to make sure that there are enough locking strengths in order to avoid tightening device becoming loose and prevent jars flying out of the machine.

1.4.4 Connecting with Power Supply and Standby

After connecting with powder supply, turn on the air switch and emergency switch (3-2), frequency speed controller (3-1) indicates data, and machine is under state of power on and standby.

1. 4. 5 Parameters Setting for Frequency Converter (Details

are stated in Operation Instructions of Frequency Converter For Planetary Ball Mill)

1.4.6 Grinding Materials

After setting the frequency converter, cover the jar tightly, press the start button(3-3) , rotate the frequency speed controller (3-1) to the set speed and start grinding.

Notes:

1. Please open the machine cover after the machine runs for five minutes, and check if the top-tightening device is loose or not. If loose, it has to be tightened once again.
2. Frequency converter often indicates rotation speed.
High rotation speed does not mean better effect, while high rotation causes easy abrasion of machinery parts and shorten machine's life.
3. Therefore, clients are suggested to lower rotating speed according to actual requests of the materials.
4. When running of the machine, users are often suggested to check the equipment on site, once the machine is found to be in unusual condition, please stop machine immediately for inspection.

1. 4. 7 Stopping Machine

After the machine finishes setting time, rotate the speed controller (3-1) of frequency converter to "0", press stop button (3-4) and emergency switch(3-2), turn off power, and the machine is stopped.

Notes: After speed controller of frequency converter is returned to "0" , the machine stops running but it is still in state of power on and standby. Do remember, at this moment, you have to press stop button(3-4) and emergency switch(3-2), and turn off power.

1.4.8 Unloading Jar

- 1) Open machine cover;
- 2) Release the lock nut (4-2);
- 3) Loosen "T" top rod (4-1), shoulder pole and spacer;
- 4) Take away the top fasten device;
- 5) Get the grinding jar out of the machine.

Notes: For medium-sized and large-sized planetary ball mills, it is not convenient for operator to load and unload jars by hand because of heavy jars. Users can select related hoisting device for the machine.

1.4.9 Discharging Materials

Pour materials and balls into a sieving plate and separate balls from powder materials.

1.4.10 Cleaning Machine

Clean the jars and balls with water, then use cloth to make it dry.

Part 2

Common Fault Diagnosis and Countermeasure

if any fault or unusual occurs, you have to check the machine according to the following instruction chart as below, and make record of faults in detail. You may contact our after-services department or technology department directly, if you need more further services.

Common Fault Diagnosis and Countermeasure

No	Category	Faults	Countermeasures
1	Machinery & Transmission	Strange noise appears suddenly	Turn off power directly, check tightening device if it's loose or not, tighten bolt and restart.
		Metal clashing noise appears when work	Turn off power, check attrition rate of the gear and bearing. If they are worn badly, You'd better replace another new one. If not, fill lubricating oil for bearing and gears.
		Rotation speed of main disc is obviously down or not well-distributed. when working	Turn off power and check if the triangle belt is worn or not, if worn, change another new one.
2	Electrical Part	Ball mill does not start-up	①Turn on power and emergency switch, check if indicator is lighted, if not, firstly check power supply and cable are in good condition, then check if the power switch or

			the emergency switch is damaged.
			<p>② If the indicator is lighted, firstly check whether the mill cover is closed well or not, then check if the frequency converter displays well, finally check if the “Run Key” is damaged or not.</p> <p>③ if the frequency converter indicates unusual, or error code number, do not hesitate to contact our after-sales services.</p>

Part 3

Care and Maintenance

3.1 Daily Care and Maintenance

The machine has to be installed and operated in strict accordance to the instructions. Some potential faults ought to occur due to influence of environment, temperature, humidity, vibrating and aging and wear down of inner components, and etc. In order to ensure the machine operate more steady and longer time, Daily and regular care and maintenance is necessary for the machine.

Daily Care and Maintenance

No.	Category	Checking Items
1	Machinery Part	Check regularly if bolts become loose
		Check if jar seat is loose and dislocated

2	Electrical Part	Motor	Check regularly if cable is damaged or terminals are loose.
			Check regularly if cool fan works in good condition
		Frequency Converter	Check regularly if vibration is stable, and wind-warm syndrome is reasonable
			Check if noise is abnormal
			Check wire connector, terminal and screw, if they are loose.
			Check if electrical instruments are sensitive
		3	Transmission Part
Check if all lubricating points are lubricant			
Put butter to gear frequently			
Check belt regularly to find if it's worn out			
Check if abnormal noise appears when gearing works			

3.2 Guarantee of Planetary Ball Mill

We promise to provide one-year quality guarantee for machines free of charge excluding wearing and consumable parts (From the date when machine leaves factory's warehouse), except for damages caused by abnormal usage or artificial activities.

Part 4

Safety Cautions

- 4.1 Keep electrical parts dry, it is prohibited to operate machine with wet hands.
- 4.2 When the machine is under standby condition, power supply has to be turned off so as to prevent accidents.
- 4.3 Make regular inspection and maintenance for machine to ensure lubricating running parts and good connecting of electrical parts.
- 4.4 Keep clean of equipment.
- 4.5 It is prohibited to operate machine overloaded.
- 4.6 Before the machine starts-up, please make sure whether the locking device of ball pots is well tightened as requested.
- 4.7 Parameters of machine (especially the frequency converter) should not be adjusted randomly unless requirement of production.