BGD 770 Series

Three Roller Grinder

INSTRUCTION MANUAL

BIUGED LABORATORY INSTRUMENTS（Guangzhou）CO.,LTD

Add: NO.8, Fuhe Industrial Area, Zhongfu Rd., Zhongxin Town,Zengcheng City, Guangzhou City. 511375. China

Tel：（0086）20-32955999 **Fax**：（0086）20-32955818

E-mail：service@biuged.com **Website**：www.biuged.com

Serial Three Roller Grinder:

BGD 770/1

BGD 770/2

BGD 770/4

BGD 770/5

Safety Information

You should always follow the basic safety and precaution measures mentioned below when using the machine so as to reduce danger of damage of machine and injuries of people.

1. Read and understand all instructions.
2. Pay attention to elementary knowledge of mechanic and electronic equipments.
3. Follow all warns and notes in written materials attached to the product.
4. In case the operation instructions are unconformity with safety instruction, please pay attention to safety information or you may misunderstand the operation instructions. Please contact with sales or service representative for assistance.
5. Before cleaning the machine, please switch off control button of power supply except the switch of power supply of the machine. Do not use corrosive liquid or aerosol cleaner to clean rolls.
6. The machine is unsuitable to mill materials which can cause corrosion of rolls (except those machines with stainless steel roll).
7. Coat anti-rust oil on the roll after processing aqueous materials or the machine is not used continuously.
8. Ensure to use the machine under normal condition of cooling water.
9. Please do not press the object on the switch line of foot emergency stop switch of the machine otherwise it can cause fire or electric strike.
10. Please do not put any object into the machine through the casing as it can contact something such as oil tank or water tank with dangerous voltage thus to cause fire or electric strike to damage driving gears, to block water channel or to damage rolls.
11. In order to avoid occurrence of accident, please do not dismount the machine at your discretion. In case repair is needed please contact professional technician or serviceman. It can make you suffer dangerous voltage or other dangerous threat it open or remove the cover and incorrect reassembly can cause danger in later use of the machine.

1.0 Purpose and Characteristics

The three roll mill is mainly used to mill various kinds of paste-like materials (except those which can cause corrosion of rolls) such as paint, oil ink, ink, oily pigment, coating, foodstuff, cosmetics etc. Recently it has expanded its application range to raw materials of electric cable, manmade leather, plastic, soap and pencil core etc. therefore the machine has become the main equipment for those factories to mill materials.

The material of three rolls adopts centrifugally cast cold-hard alloy roll with thickness of alloy layer of 15 – 25 mm and surface hardness of HS 68 – 75. Three rolls are made by grinding on cambered grinder so its effective working surface has a bit cambered. When the three rolls are milling materials, it has features to make automatic compensation and prolong its service life due to factors of its rigidity and expansion when hot and shrinkage when cold. Meanwhile it can raise up milling efficiency and fineness of materials to be milled. For normal materials to be milled, it can make milling once, twice or more times in the three rolls depending on their original fineness and toughness in order to reach required fineness (normally at about 0.02 mm, measured by the grindometer).

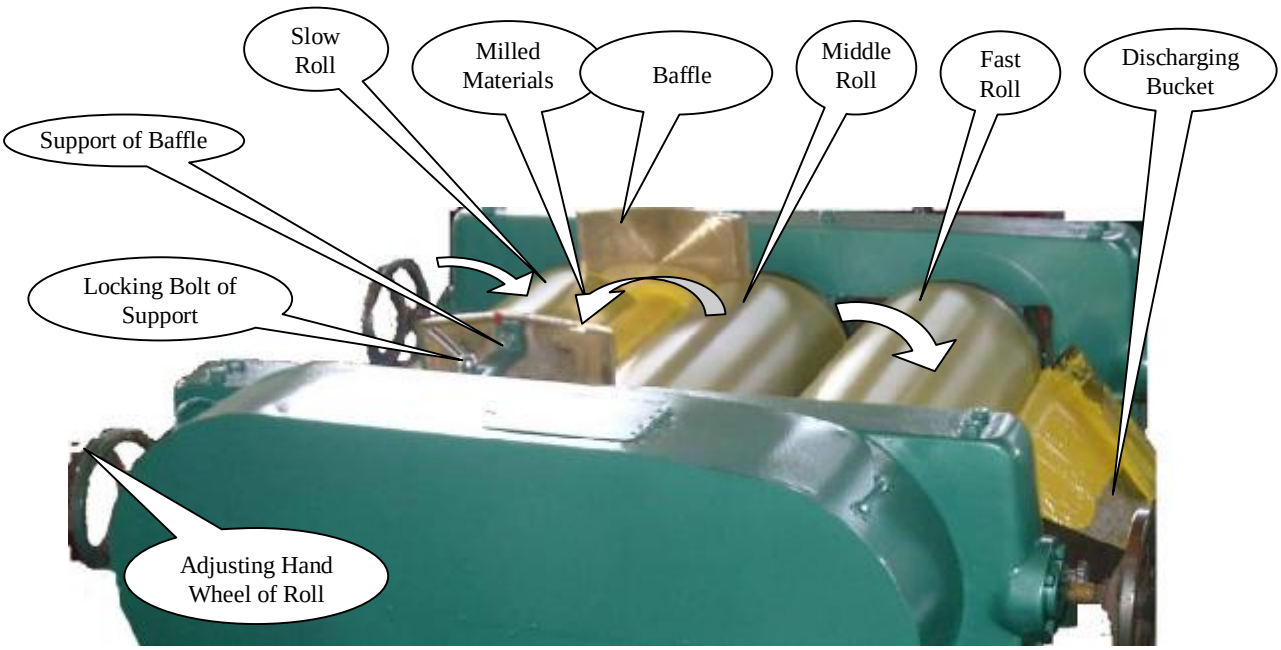
2.0 Main Technical Standard (see the Table below)

Item \ Model / Data		BGD 770/1	BGD 770/3	BGD 770/5	BGD 770/6	BGD 771/6	BGD 772/6
Diameter of Roll (mm)		65	150	260	405	405	405
Length of Working Surface of Roll (mm)		125	300	675	810	810	1000
Height of Discharge Port off Ground (mm)		220	530	530	760	760	760
Speed of Roll (r/min)	Slow Roll	26	34	23	14	14	14
	Middle Roll	70	78	64	42	42	42
	Fast Roll	145	181	183	130	130	130
Motor	Model	YL8014	$Y100L_1$-4	Y160M-6	Y180L-6	Y180L-6	Y180L-6
	Power (kw)	0.55	2.2	7.5	15	15	22
	Speed (rpm)	1400	1420	970	970	970	970
Speed Reducer	Model	Not available	Not available	Not available	JZQH-500-IX-2Z	Not available	Not available
	Speed Ratio				1:8.04		
Speed Ratio of Rollers		1:2.3:5.5	1:2.32:5.38	1:2.85:8.13	1:3:9	1:3:9	1:3:9
Weight (kg)		60	500	2100	5300	5200	5800
Outlined Dimensions (mm)		410×400×450	830×830×930	1680×1320×1100	1950×1800×1300	1950×1800×1300	1950×2000×1300
Export Packing Dimensions (mm)		500×500×520	1000×1000×1150	1800×1450×1300	2100×1900×1700	2100×1900×1700	2100×2050×1700

Note: Model BGD 771/6 three roll mill has also the machine with material of stainless steel and length of working surface of 1000.

3.0 Working Principle

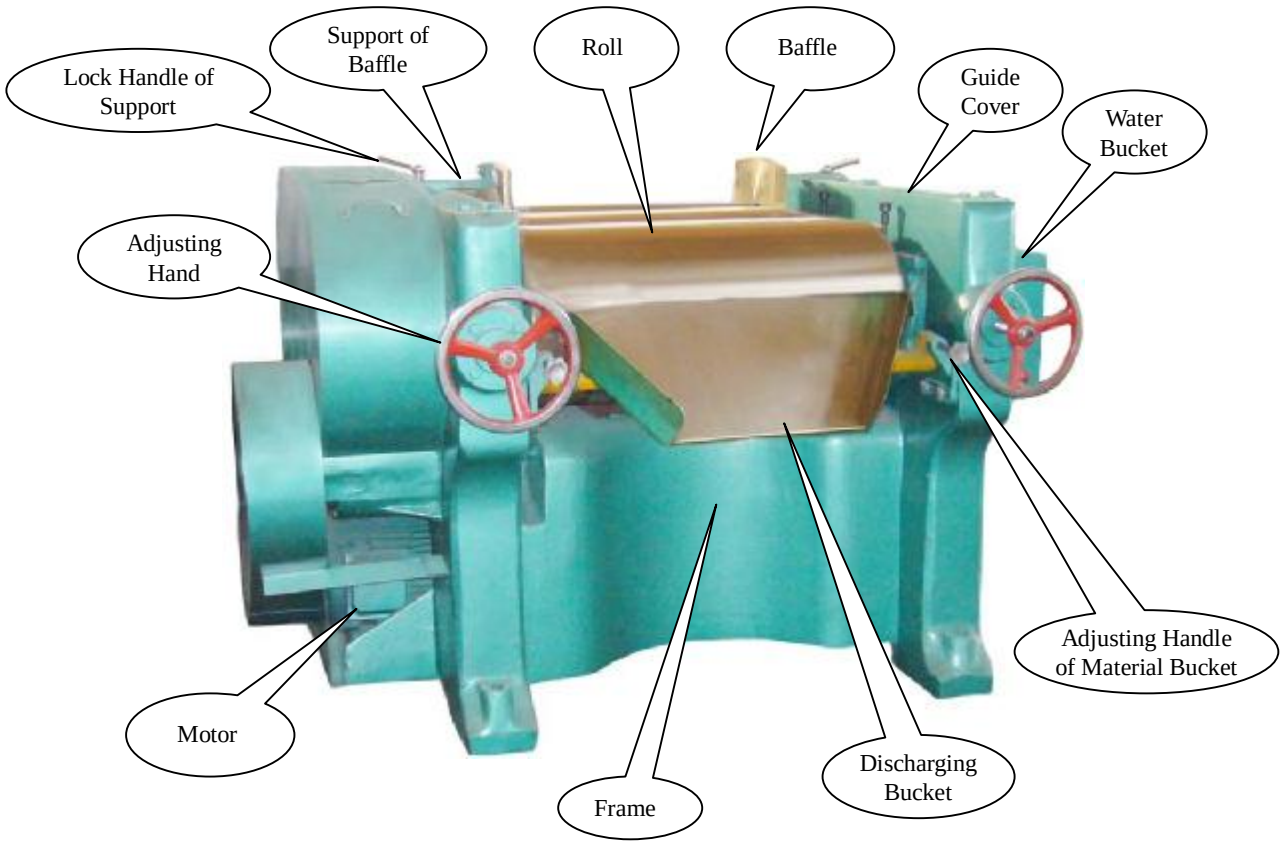
When operating, you can adjust gap between the fast roll and the middle roll and that between the slow roll and the middle roll respectively. Start the machine and feed the materials to be milled between two baffles which are between the middle roll and the slow roll. Materials are squeezed by surfaces of the middle and slow rolls and are then driven by the middle roll to the fast roll for further milling. Meanwhile materials are scraped off by the discharging scraper which is closely contacted with the surface of the fast roll, and flow through the discharging bucket with fenders to the collect drum, therefore a milling circulation is formed.

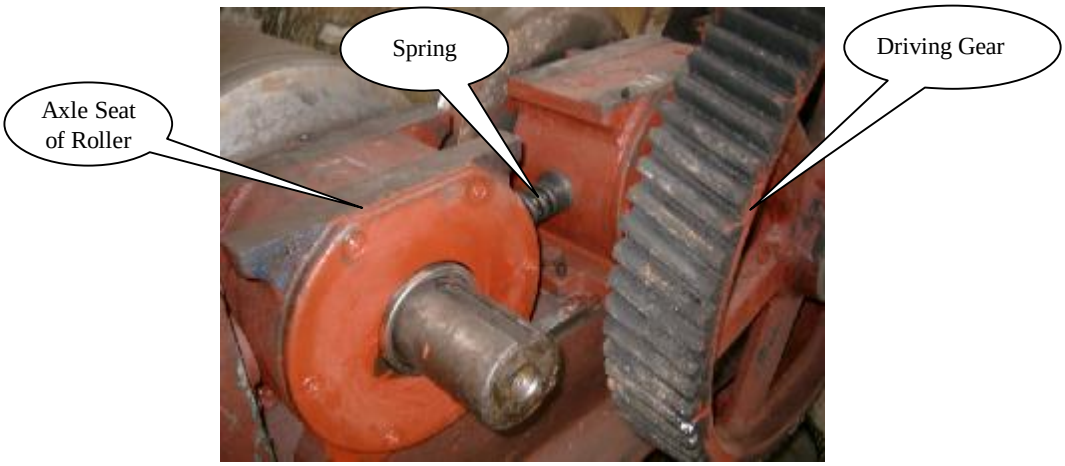


Schematic Drawing

4.0 Structure of the Machine

The machine mainly consists of frame, guide cover, bearing seat of roll, baffle, discharging bucket, cooling device, gear and pulley etc. Six bearing seats for three fast, middle and slow rolls are supported by two guide rails of the frame respectively, in which the bearings seat of the middle roll is fixed with the frame and the guide cover respectively so they have no relative movement while the bearing seats of the fast and slow rolls on two guide rails of the frame can be moved forward or backward respectively by means of compress springs of the hand wheels on the adjusting screws so as to meet required fineness of materials to be milled.





4.1 Driving System

The power motive is outputted from the motor inside the base to the driving shaft via the delta belt, then the gear of the driving shaft drives the fast roll gear; another gear on the fast roll drives the middle roll gear and another gear on the middle roll drives the slow roll gear thus the driving system is constituted.

4.2 Roll Part

The rolls are centrifugally cast by cold-hard alloy (Gr15 for Model S65). The shaft noses at both ends of the roll adopts the cold pressure connection technology with large interference value thus to connect the roll and the shaft nose firmly and stably.

4.3 Feeding Part

It mainly consists of two baffles and the support of material plate, which are mounted respectively between effective working arcs at both ends of the slow roll and the middle roll to prevent overflow of materials milled by three rolls out of both ends. The support of material plate is used to fix the baffles and adjust the joint between the arc of the baffle and the surface of the roll thus to avoid overflow of materials. Moreover, the baffles can be easily taken out for cleaning.

4.4 Cooling Part

In order to remove heat generated from the working surface of the roll due to squeezing and rubbing materials so as not to affect smoothness of the contact surface of the roll, there is the cooling water pipe which is mounted on the one end of the machine and can adjust the flow of cooling water in three rolls so as to keep rolls under the best condition in operation and to rise up milling fineness and efficiency. The return water flows into the sewer via the water bucket.

4.5 Adjustment Part

The adjustment is made by means of hand wheels mounted on four adjustment screws and springs between the axle seats. Rotate the hand wheels to force the spring to be compressed or ejected to make movement of the fast and slow rolls forward or backward so as to adjust fineness of milled materials.

4.6 Discharging Part

The discharging bucket is mounted on the support of the discharging bucket and the blade can be equipped at its exit. Adjust screw of the pressure sheet to make the blade contact closely on the surface of the fast roll. The position of the edge should be a bit higher than the center of the roll thus to easily scrap off milled materials stuck on the surface of the fast roll.

5.0 Installation and Commissioning

5.1 Installation

Based on the foundation drawing of the machine you selected, first of all make the foundation well **(our factory only suggests to make foundation for model S405 three roll mill as follows and gives no requirement for other models)**. Leave square holes for anchor bolts, hoist the machine off the ground when the foundation is about dry, make anchor bolts run through holes of the machine, then put the machine on the foundation slowly with anchor bolts aiming at square holes, correct levelness by the leveler laterally and longitudinally and cast cement in square holes but keep the surface of the

foundation plain and clean. At last, tighten screws when cement is completely dry. Note: the machine should be equipped with grounding wire to avoid accident of electric shock.

5.2 Commissioning

First of all, make well all preparation works before commissioning. Thoroughly clean all anti-corrosive grease and impurities on the machine, then carefully check again all hidden dangers which could affect commissioning and adjust the baffles and the discharging bucket off the surface of rolls, can then trail operation be started. During the course of trial operation, bearings have normal temperature rising, driving gears have good mesh without knocking sound, all rotating and moving parts are normal, can then performance running be carried out. Open the switch of cooling water, adjust suitable gaps between the fast roll and the middle roll as well as the slow roll and the middle roll, feed a bit of paste-like material with dark color to look the straightness of rolls, then adjust gaps smaller among rolls slowly until colors on surfaces of rolls are even or a bit lighter of middle shade, this means the machine runs well. At last measure milled materials by the grindometer and normal production can then be started.

6.0 Operation of the Machine

The machine can be put into operation after it is installed and operated under no-load and no trouble is found, and following points should be paid attention:

6.1 Before Operation

Check surface of rolls to see it they are cleaning; check all lubricating parts if they are lubricated well; check the fast roll and the slow roll to see if they are disconnected with the middle roll and check the discharging scraper to see if it is normal.

6.2 Operation

6.2.1 Open cooling water and start the machine, slowly adjust fast and slow rolls at suitable positions (if raw materials of soap or pencil core are milled, gaps between fast, slow and middle rolls should be 0.5 mm). Feed raw materials and readjust the fineness you require. If paste-like materials with colors (such as paint, ink, coating or pigment etc.) are milled, adjust rolls until color on surface of roll is even or lighter color on the midst but darker colors on both ends. After rolls are adjusted well, push on the discharging blade.

6.2.2 The milling of materials are realized by squeezing and rubbing among fast roll, slow roll and middle roll each other and the fast roll has the role to bring out milled materials. As three rolls have different rotation speeds and linear speeds, wearing on surfaces of rolls are also different, therefore it is absolutely to avoid squeezing and rubbing among three rolls in case no materials are milled in three rolls.

6.2.3 In case discharging materials are thinner on the middle than those on both ends, you can increase flow of cooling water in operation. After a short time of heat expansion of the surfaces of rolls cause by rubbing, it can become straight and cooling water can then be suitably reduced. Anyway control should be made according to actual condition and it is absolutely not allowed to have no cooling water, as when heating up of the surfaces of rolls to a certain degree, they shall be peeled off or cause irregular deformation so that rolls cannot be used any more.

6.2.4 The rolls should avoid to mill materials with corrosiveness (except for stainless steel).

6.2.5 It should adjust gaps among fast roll, slow roll and middle roll each other at any time as they could be seized if they are over heat, or even cause brake of the motor and occurrence of accident.

6.2.6 The baffles couldn't be pressed tightly, and drip lubricant within contacted arcs at any time, and adjust working length of rolls as required. In case both ends of the roll is too hot, put a piece of paper between the support of material plate and the upper cover to reduce friction between the material plate and the roll thus to reduce temperature at both ends of the roll.
6.2.7 Take care of temperature of the bearings in normal operation and its temperature rising couldn't be higher than 35ºC.

6.3 After Operation

First of all, loosen the scraper blade on the baffle no to contact with rolls, then loosen rolls and clean all parts of the equipment and make corrosion-proof treatment one by one.

7.0 Lubrication and Maintenance of the Machine and Points for Attention

7.1 Open the oil filling cover of the gearbox, fill grease to lubricate mesh surfaces of gears.
7.2 Bearing seats have been filled with grease before leaving the factory and no filling is required for the beginning of operation. Fill grease by the grease gun after running for 120 hours.
7.3 Add lubricant oil once every shift via the nipple in driving shafts.
7.4 Add lubricant oil at any time in adjusting screws, bearing seats and two guide rails to avoid wearing and seizure.
7.5 It is suggested to make an inspection if the machine is operated for half a year continuously. Remove and clean all moving parts and replace with clean lubricant oil. Carefully check oil channels of lubricant oil to see if they are unblocked. Make correction in course of removing and washing if trouble is found.
7.6 In case rolls are found to have concave in midst, peeling surface or irregular deformation, they should be stopped to use and ground again.
7.7 In case rolls are ground much times and its diameter is less than its nominal diameter, then tooth butting could occur, gaps between rolls are enlarged and materials could not be milled well. Then gears should be repaired to reduce its diameter of pitch circle or roll should be replaced.
7.8 The edge of the discharging blade should be ground carefully before installing and no spike burr or crack is allowed to exist. In case the blade is shortened, it can be moved outward by loosening its press screw. When new blade is used, it should have a hardness of **30HRC-40HRC.**
7.9 In case the machine shall be not in use for a long term, it should coat anti-corrosive fat on surfaces of rolls and concerned parts to avoid occurrence of pinhole and rust. Before reusing, it should make an overhaul of the machine so as to avoid occurrence of accident.
7.10 If cooling water flows into the machine it means the flow of cooling water is larger and should be reduced. Loosen water drain bolt to discharge water in the gearbox or enlarge the pipe of water discharged.

8.0 Repairing and Disassembling Orders

8.1 Disassembly of Bearing of the Roll

8.1.1 First of all loosen the adjusting hand wheel with the roll and remove the belt cover and upper dust plate;

8.1.2 Loosen bolts of support of the copper blade and take the copper blade out; loosen bolts of discharging plate and take it out;

8.1.3 Loosen the bolts of the cover and take away the cover; remove plastic guide pipe of the cooling pipe, loosen the support of the cooling pipe and take cooling water pipe inside the roll;

8.1.4 Use the tool (tri-paw puller) to remove the gear from the roll shaft, loosen the press plate of the seat of the roll shaft to take out the washer and remove the bearing seat from the roll shaft by the tool (tri-paw puller);

8.1.5 Prop out the bearings from the bearing seat by the sleeve.

Attention: when assembling bearing and the bearing seat on the axle of the roll, it should prop and knock the outer ring of the bearing evenly. If the bearing seat is knocked in much more, pull it out by the tool (tri-paw puller) on the axle of the roll.

8.2 Disassembly of Bearing of Driving Shaft

8.2.1 First of all loosen the adjusting hand wheel with the roll and remove the belt cover and upper dust plate;

8.2.2 Loosen bolts of support of the baffle and take out the baffle; Loosen the bolt rod of the discharging bucket and take the bucket out;

8.2.3 Loosen bolts of the cover and remove it upward, remove plastic guide pipe of the cooling pipe and loosen the support of the cooling pipe and take cooling water pipe inside the roll;

8.2.4 Take out rolls from the frame and place them in order of slow, middle and fast one;

8.2.5 Take out the belt and remove the upper pulley;

8.2.6 Loosen the press plates of the bearing at both ends of the driving shaft and take out the lining ring;

8.2.7 Prop the bearing of the driving shaft from the outside of the machine and knock out the driving shaft;

8.2.8 Prop the driving shaft by the tool (tri-paw puller) and pull out the bearing.

9.0 Troubles hooting

9.1 Surface Damage of Roll Due to improper operation, wearing or dropping of foreign object the surface of the roll is damaged, it should stop operation in time and check the machine.

Repair of Surface of Roll First of all, switch off power supply and open the cover of the machine, remove all connected parts from the bearing seat (make marks well on all removed parts), take damaged roll and put it on the wooden support, remove out the bearing seat (refer to 8.1.1 – 8.1.5 in Sub-Clause 8.1), then grind the surface of the roll in reference to the installing position of the bearing on the shaft nose of the roll.

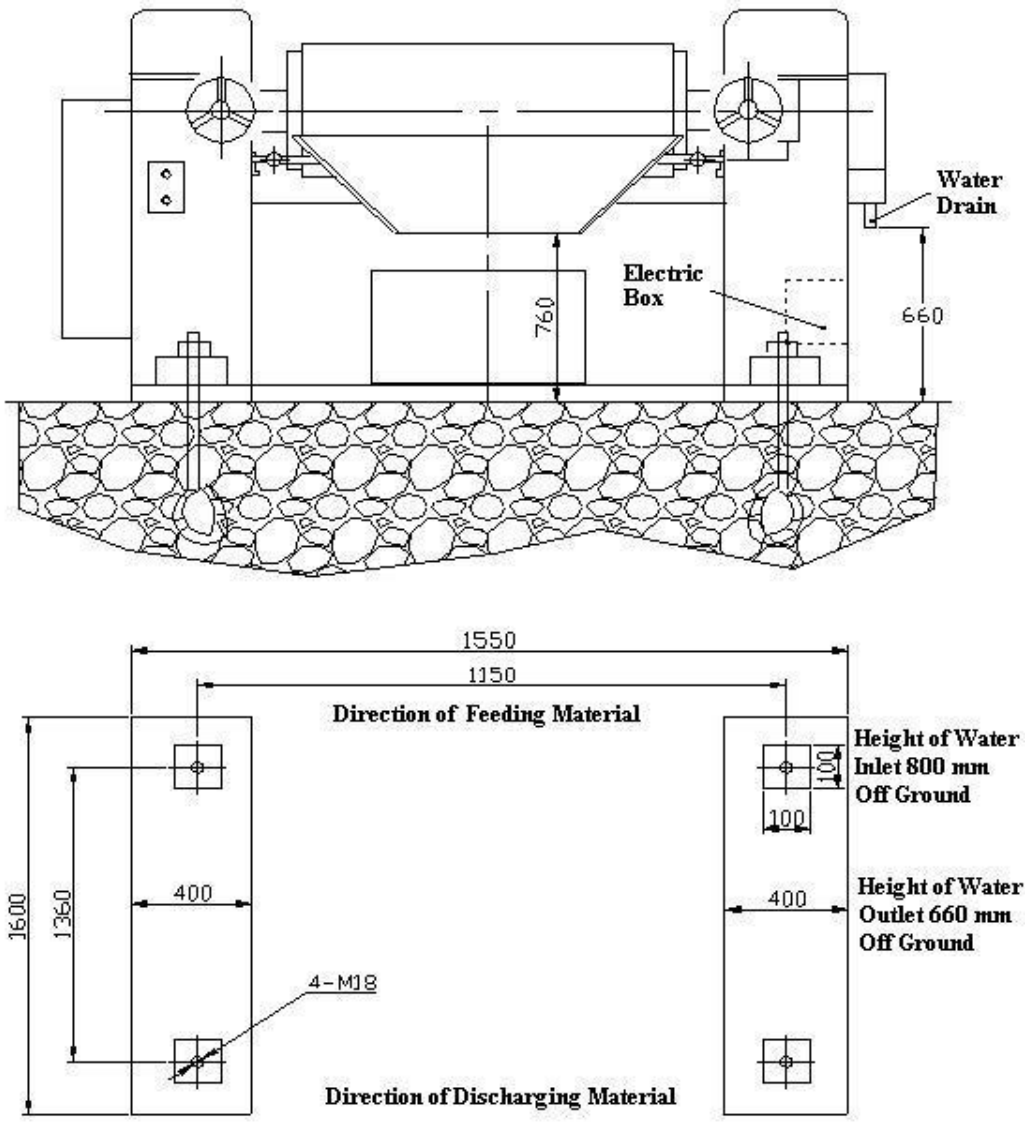
9.2 Breakage of Safety Bolt Due to improper operation or dropping of foreign object into the roll, the safety bolt is broken and the roll is out of control, it should stop operation in time and check the machine.

Replace the Safety Bolt Refer to description in safety device drawing of attachment.

9.3 Materials Leak from both Ends of Roll In case the machine runs for a long time, copper blades are worn out and the gap between the copper blades and the roll becomes larger and materials leak occurs. Adjust the fixing screws of the copper blades on the support of the copper blades to eliminate leaking of materials.

10.0 Attachments

BGD 770/6

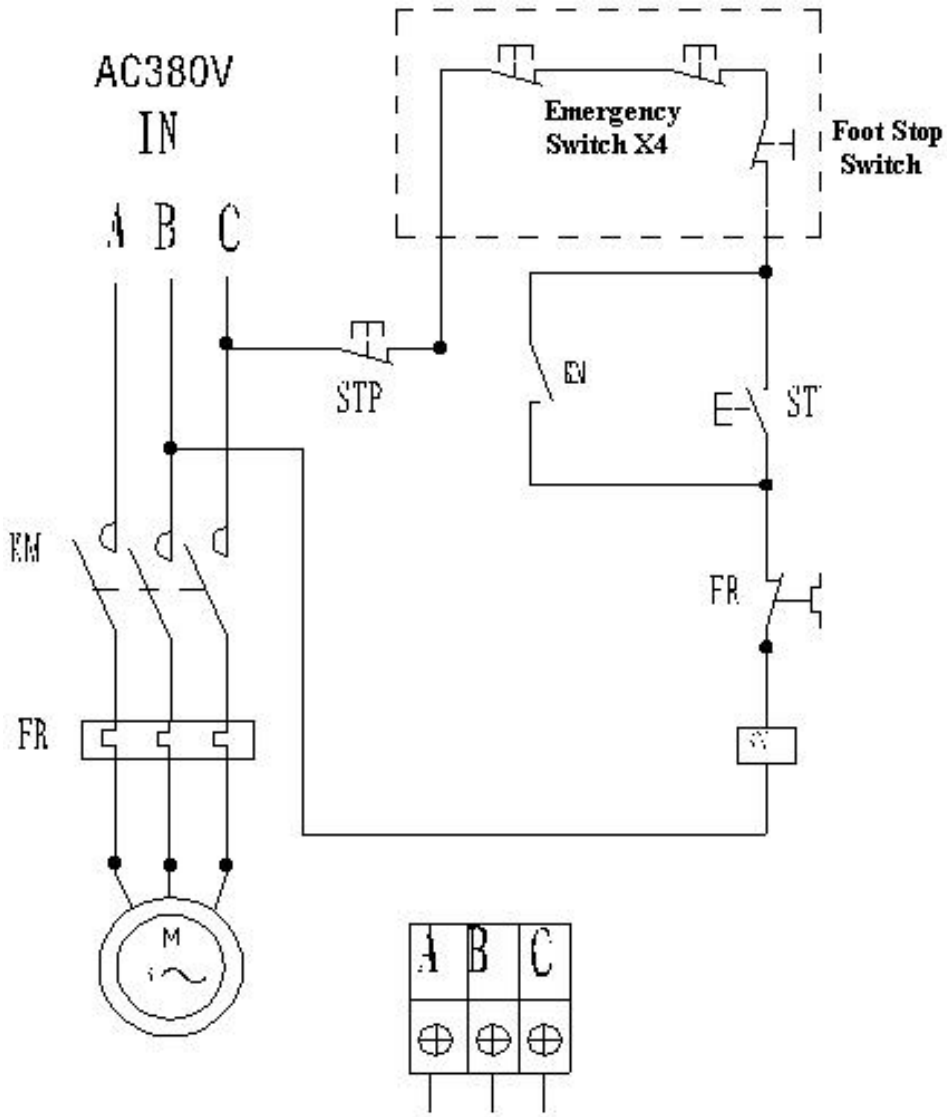


Remarks:

1. It is suggested to preserve square holes 4-100×100 with depth of 350 mm, and cast the hole after the equipment is located.
2. In case the height of the discharging plate off the ground cannot meet customer's demand, the assembling foundation of the equipment can be risen up according to the foundation drawing.
3. The foundation drawing is not in proportion and is only for reference.

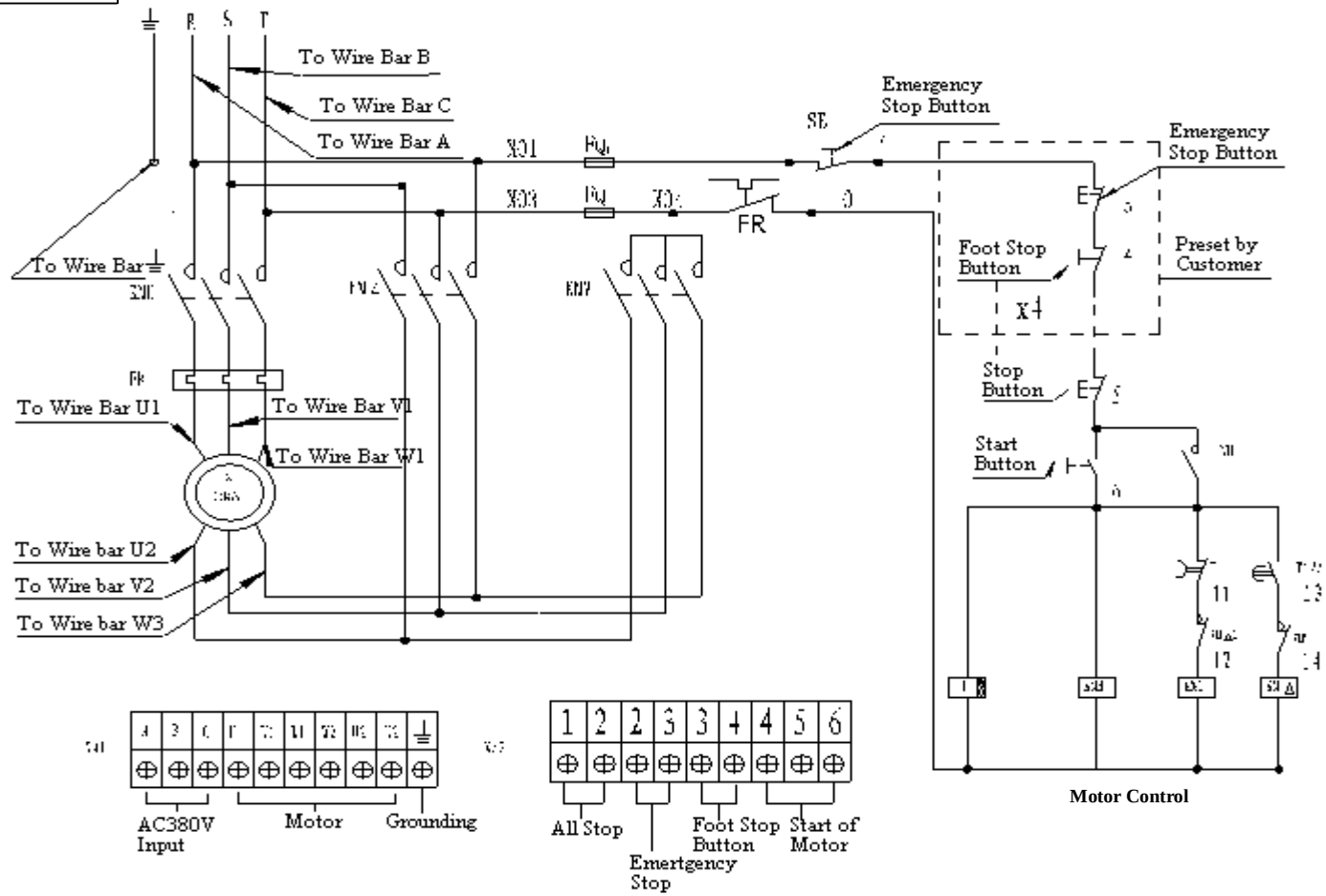
Registry of Applying (Borrowing)						Foundation Drawing of BGD 770/6	Biuged Laboratory Instruments (Guangzhou) Co.,Ltd	
Old General No.								
							Mark of Drawings	Weight / Ratio
General No.								
Signing								
	Mark	Points	Altered File No.	Signature	Date			
Date	Design					General Type		
Registry Officer / Date								
				Date				

BGD 770/6

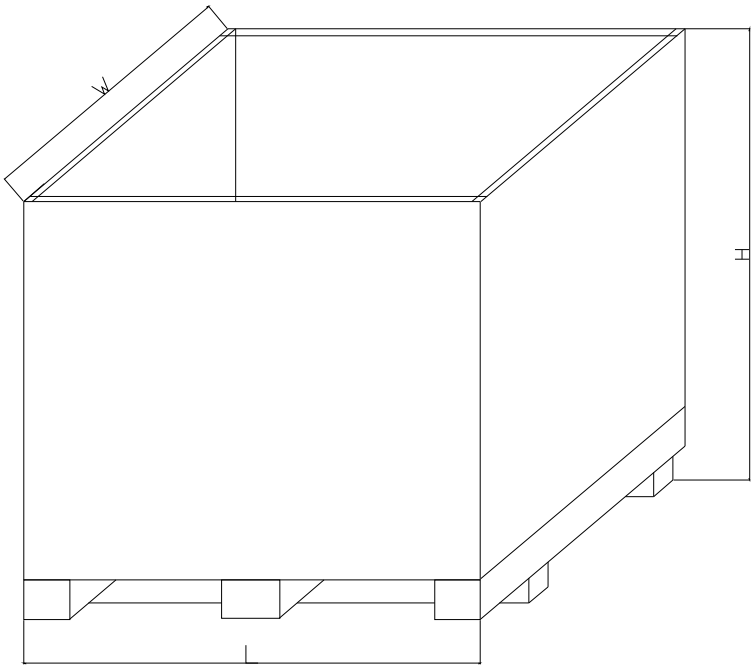


Registry of Applying (Borrowing)								
Old General No.								
						Electric Drawing for Model BGD 770	Biuged Laboratory Instruments (Guangzhou) Co.,Ltd	
General No.								
							Mark of Drawings	Weight / Ratio
Signing								
	Mark	Points	Altered File No.	Signature	Date			1:1
Date	Design							
Registry Officer / Date								
				Date				

BGD 770- Attached Drawing



Registry of Applying (Borrowing)		M	15 KW										
		KM	3-CJX2-3210/380	FR	JR36-63/32A			Drawn by	Wang Gang	2007.04.08	Electric Schematic Drawing		
Old General No.		SB	BLA53-2(EX)	XA	XA1=63Ax10 XA2=5Ax8			Checked by	Tian Hui	2007.04.10			
General No.		T1	3TPY-60s	FQ1/FQ2	RT18-32			Biuged Laboratory Instruments Guangzhou Co.,Ltd			BGD 770	Attached Drawing	
Signing													
Date													
Registry Officer	Date												



Export Packing Box

Ex-Works Inspection Report of Three Roll Mill

Model of Product: _____

Manufacturing No.:_____

S/N	Inspection Item		Technical Requirement	Measured Data	Result
1	Hardness of Roll	Slow Roll	HSD：68～70	HSD：	
		Middle Roll		HSD：	
		Fast Roll		HSD：	
2	Jumping of Roll	Slow Roll	≤0.015mm		
		Middle Roll			
		Fast Roll			
3	Trial Run with Actual Material		No clear ink flying		
			Even discharging		
4	Water Cooling Part		No water leakage		
5	Operation Noise of Idling		≤78db		
6	Operation Noise under Load		≤82db		
7	Electric Part		Safety and reliable		
8	Appearance of Paint		No obvious defects		
9	All Attachments		Mounted in place		

Tester: _____

Inspectors: _____

Acceptance Date: _____

Conclusion: _____

Packing List of Three Roll Mill

Model: _____

S/N	Type	Name & Size	Unit	Qty	Remarks
1	Main Frame	Three Roll Mill	Set	1	
2	Documents	Operation Manual of Product	Piece	1	
3		Certificate of Conformity	Sheet	1	
4	Attachments	Blade	Piece	2	
5		Plastic Water Pipe	Piece	3	
6		Material Plate	Piece	1	

Length (cm)	Width (cm)	Height (cm)	Volume (M^3)	Net Weight (kg)	Gross Weight (kg)	
						Packing Dimensions

Quality Inspector (Signature/Stamp):	Packer (Signature/Stamp):
_____ _____ Date:	_____ Date: