SZLH420 PELLET MILL

OPERATION MANUAL

ZTMT
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Important instruction:

1 This manual detailedly describes SZLH420 series pellet mill of each system structure, function and use and maintenance method. Before installation and use of the machine , customer should read the manual,and have a full understanding of the ministries and its structure and function ,then have operation and maintenance of the machine. Due to the continuous improvement of product structure, after a certain time period, the manual of narrative content and the actual situation of the products will have small changes.Users should pay attention to it.

2 Please propose your advice to us for melioration when finding quality problem or others.Thanks !

1.APPLICABLE SCOPE AND FEATURES

1.1 SZLH420D pellet mill is a machine which is used to produce hard pellets and is applicable to medium-sized and small feed mill with a capacity of 20,000 TPY per shift for producing high quality pellet feed.

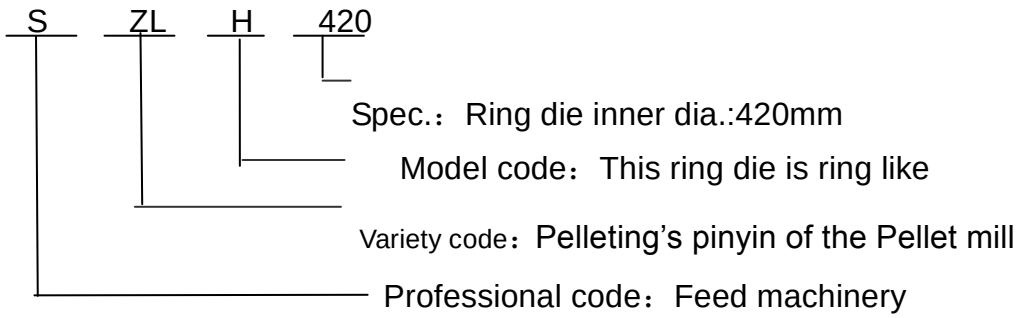
1.2 This machine features of compact structure, fine appearance, high capacity, low power consumption, convenient operation, and reliable performance.

1.3 Dies of various hole diameter are available for this machine. Dies of different hole diameter can be made for users and users can choose freely according to different requirements.

1.4 This machine adopts a system of conversion speed-adjustable feeding and a strengthened conditioner with big opening, and also systems of overload protection, external discharging and pressure oil pump lubrication system.

2. TECHNICAL SPECIFICATION AND PERFORMANCE INDEXES

2.1 Model implication



2.TECHNICAL SPECIFICATION AND PERFORMANCE INDEXES

No.	Description	Performance Indexes & Technical Parameters
1	Capacity	3-14t/h
2	Main Motor Power	110KW
3	Feeder Motor Power	1.5KW
4	Conditioner Motor Power	5.5KW
5	Pellet Forming Rate	≥95%
6	Pellet Powdering Rate	≤10%

7	Noise	≤85dB(A)
8	Steam Usage	≥0.84t/h
9	Overall Dimension (LxWxH)	3300x1200x2478mm
10	Weight	About 3t

3. MAIN STRUCTURE AND WORKING PRINCIPLE

See Figure 1 for the main structure of the machine and Figure 2 for the schematic drawing. It mainly consists of systems of the feeding, conditioning, pelleting, driving and lubrication. Mixed material of less than 15% moisture content is fed from the hopper into the feeder screw through magnetic separator and enters into the conditioner with proper flow rate adjusted by the conversion speed-adjusting motor. The iron impurities in the material are removed by the safety magnet. The material is mixed with steam in the conditioner. Molasses or oil, if needed, can be added and mixed with steam to be conditioned. (The oil adding volume should not be more than 2%, otherwise, it's hard to form pellets.) The conditioned material temperature can be 64-85℃ and moisture content 14-16%. Then the material enters into the pellet chamber through the chute and is pelleted.

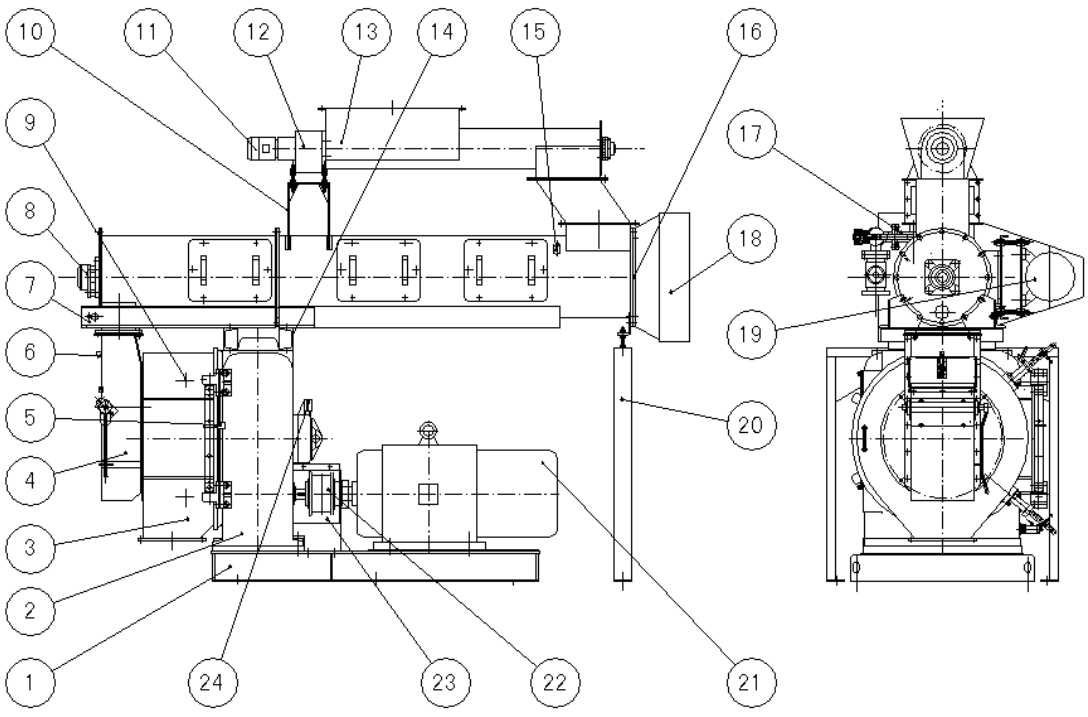


Figure 1 SZLH420 PELLET MILL STRUCTURE

1. Base 2. Gearbox 3. Pellet Chamber Door 4. Feed Chute 5. Limit Switch 6. Sight Glass 7. Hoist Guide 8. Bearing with Housing 9. Knife Assembly 10. Support 11. Speed-adjusting Motor 12. Reducer 13. Feeder Screw 14. Support 15. Molasses Inlet 16. Bearing 17. Steam Inlet 18. Guard 19. Motor 20. Support 21. Motor 22. Coupling 23. Guard 24. Limit Switch

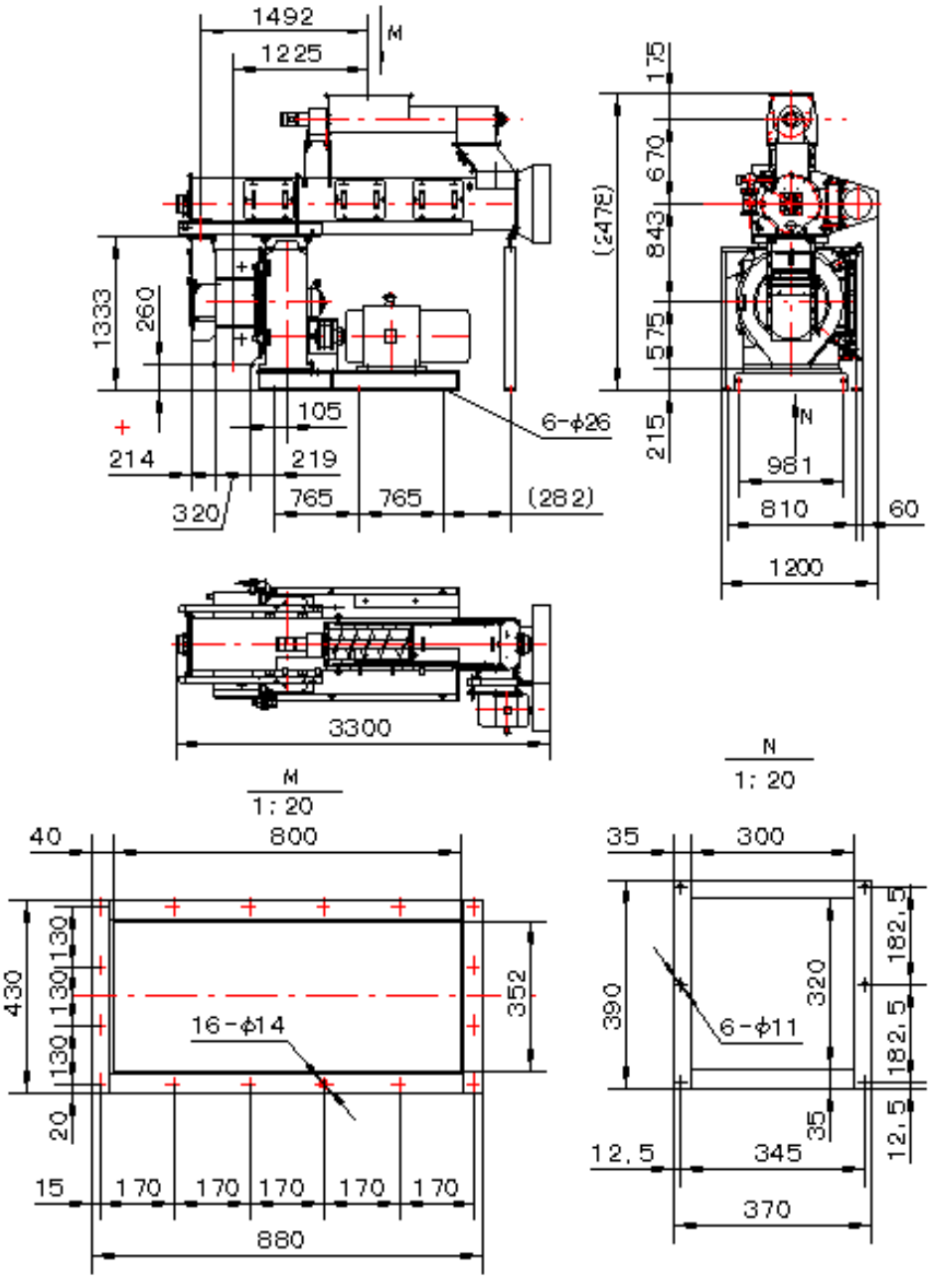


Fig.2 SZLH420 Pellet Mill Sample

3.1 Feeder

Feeder mainly consists of conversion speed-adjustable motor, reducer, screw shell and screw shaft.

3.1.1 Reducer

Cycloidal pin gear reducer is used for feeder reducer with the reducing ratio of 1:11. It's directly coupled with speed-adjusting motor so that the effective rotational speed of feeder screw is regulated between 12-120 rpm.

3.1.2 Feeder Screw

See Figure 3 for the structure of the feeder screw. It consists of screw shell, screw shaft and bearing with housing. The screw is used for feeding and the rotational speed can be adjusted so that the feeding volume can be changed to reach the rated current and capacity. Screw shaft can be drawn out from the right end of the screw shell for cleaning and inspection.

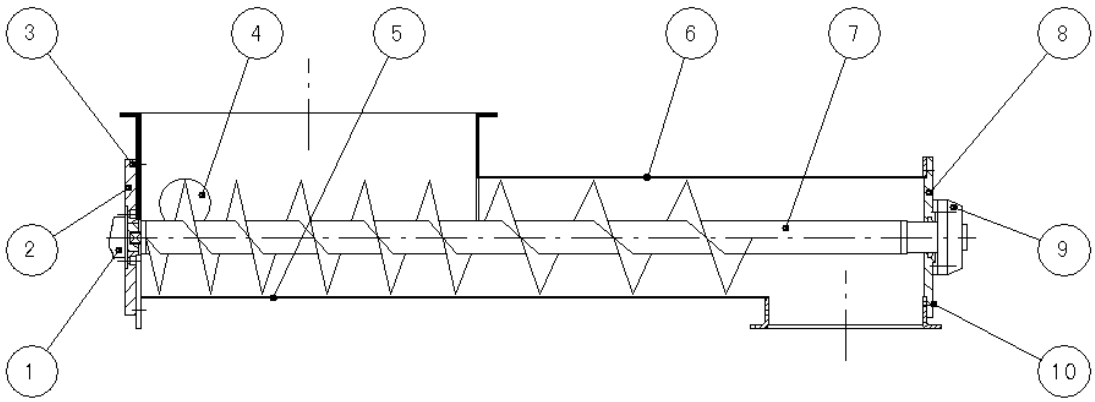


Figure 3 FEEDER SCREW

1. Driving Shaft 2. Front End Plate 3. Nut 4. Cover 5. Screw Shell 6. Inspection Door 7. Screw Shaft 8. Rear End Plate 9. Bearing with Housing 10. Nut

3.2 Conditioner (See Figure 4)

Conditioner mainly consists of conditioning shell (3), mixer shaft (7), bearing with housing (1), pulley, motor (10), steam inlet (6), oil inlet (5) and paddle (8). Conditioner shell is pieced together with two sections whose length can be added properly according to the requirements of users. There is inspection and cleaning doors for convenience of maintenance and cleaning. Dry steam of 0.2-0.4Mpa is injected into the conditioner shell to mix thoroughly with the feed so that the material is softened. A moderate amount of oil or molasses heated up to 80-100℃ can be compressed into fog and sprayed into the conditioner shell through the oil or molasses inlet. On the left side of the conditioner there is a valve to control the steam.

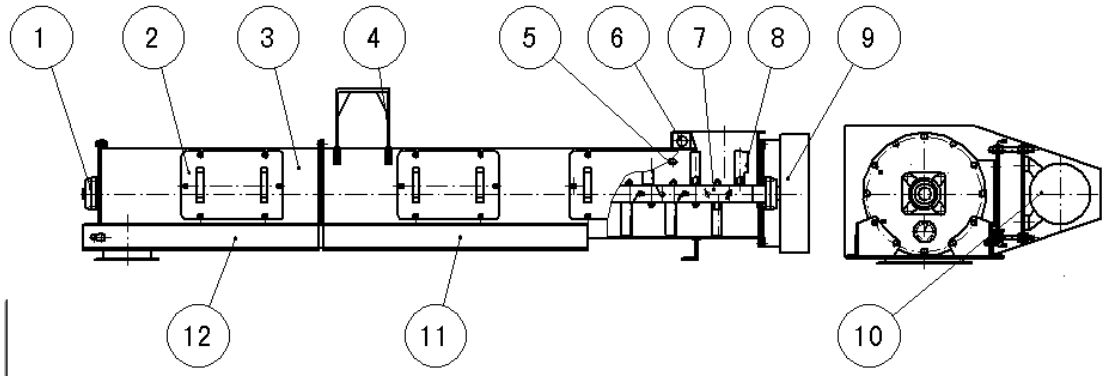


Figure 4 CONDITIONER

1. Bearing with Housing 2. Cleaning Door 3. Shell 4. Base 5. Oil Inlet 6. Steam Inlet 7. Conditioning Shaft 8. Paddle 9. Guard 10. Motor 11. Support 12. Hoist (Option)

3.4 Die Hoist (Option)

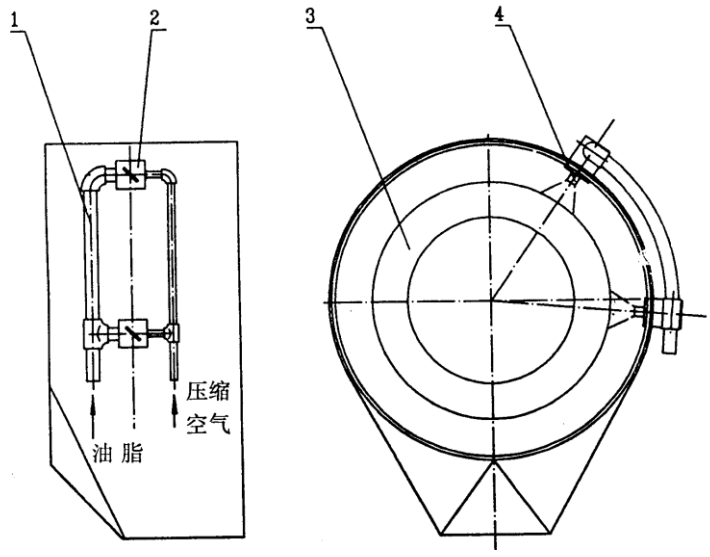
This device is used for user's convenience of disassembling and assembling die and roller. Worm gear and worm are used for driving. When in use, pull out the guide, connect the hole of hoist and the screw hole on die with bolt for hoisting.

3.5 Feed Chute

Feed chute consists of chute, lever arm, inspection door, shell, etc. It adopts full stainless steel. You can inspect the conditioning quality of feed at every time by opening the inspection door. The inspection door can be used as a manual feeding port for abrading the die and feeding the greasy materials. External discharging lever arm of feed chute can prevent feed from entering the pelleting chamber for the convenience of trial run and breakdown removal.

3.6 门盖

门盖采用全不锈钢结构。它主要由门盖、切刀机构等组成。在门盖处可设置自动液体喷涂系统。需添加的油脂等液体经一定数量的喷嘴与压缩空气混合呈雾状喷在颗粒表面， 一般添加量为当时产量的 3%～6%的范围内。见图 5



1.Pipeline 2.Nozzle holder 3.ring die 4.Nozzle

Fig.5 Liquid spray system after pelletizing

3.7 Pellet Chamber

See Figure 12 for the structure and working principle of the pellet chamber. It mainly consists of a die, two rollers, deflectors, knives and screw for adjusting the clearance between die and rollers.

The material is fed into the two pressing zone through the feed cone and deflector. The quill flange drives the die and the material is rolled between the die and rollers. The two parts rotate oppositely and press the material into the die holes. The material is pelleted in the die holes and pressed out from the holes and cut to the needed length by the knife. The pellet feed is discharged out of the machine.

See Figure 6 for the mounting of the roller. The roller (12) is mounted on the roller shaft (16) by two bearings (10). The inner end of the roller is fixed with the main Shaft (17) by the liner (14) and the outer end is fixed with the roller support (4). As the roller shaft is eccentric, the clearance between the die and roller can be adjusted by the rotation of the roller. The clearance can be adjusted by rotating the roller adjusting gear.

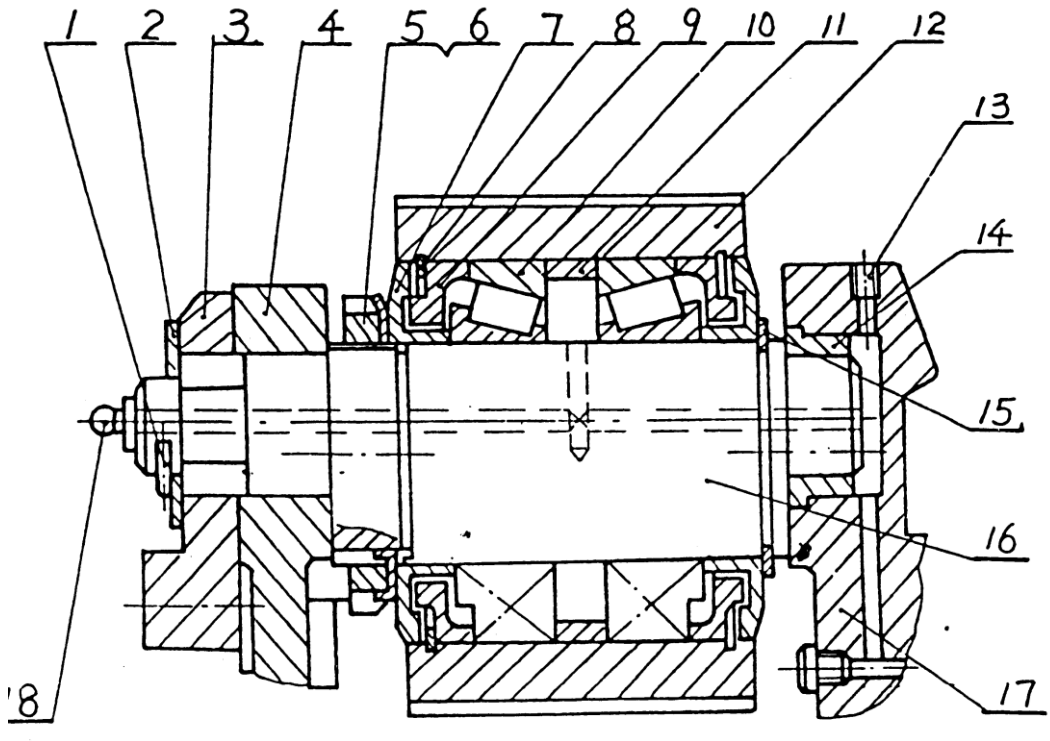


Figure 6 ROLLER ASSEMBLY

1. Retaining Pin 2. Retaining Ring 3. Roller Adjusting Gear 4. Front Roller Support 5. Locknut 6. Retaining Ring 7. Gland 8. Retaining Ring 9. Oil Splash Collar 10. Bearing 11. Spacer 12. Roller 13. Screw 14. Roller Shaft Bushing 15. Retaining Ring 16. Roller Shaft 17. Main Shaft 18. Oil Cup

3.8 Gearbox

See Figure 7 for the structure of gearbox which consists of pinion shaft (17), main gear (12), main shaft (4), quill shaft (7), gearbox body (19), bearing etc. A motor drives pinion shaft to rotate through flexible coupling and meshes with driven gear so that the quill shaft (7) is driven to rotate. The quill shaft is fixed with die by clamp (23) and driving key (10), thus the die (8) is driven to rotate.

Main shaft does rotate (except overload) during the normal run, the front end is stationary support of roller and deflector, the rear end is equipped with overload protection system.

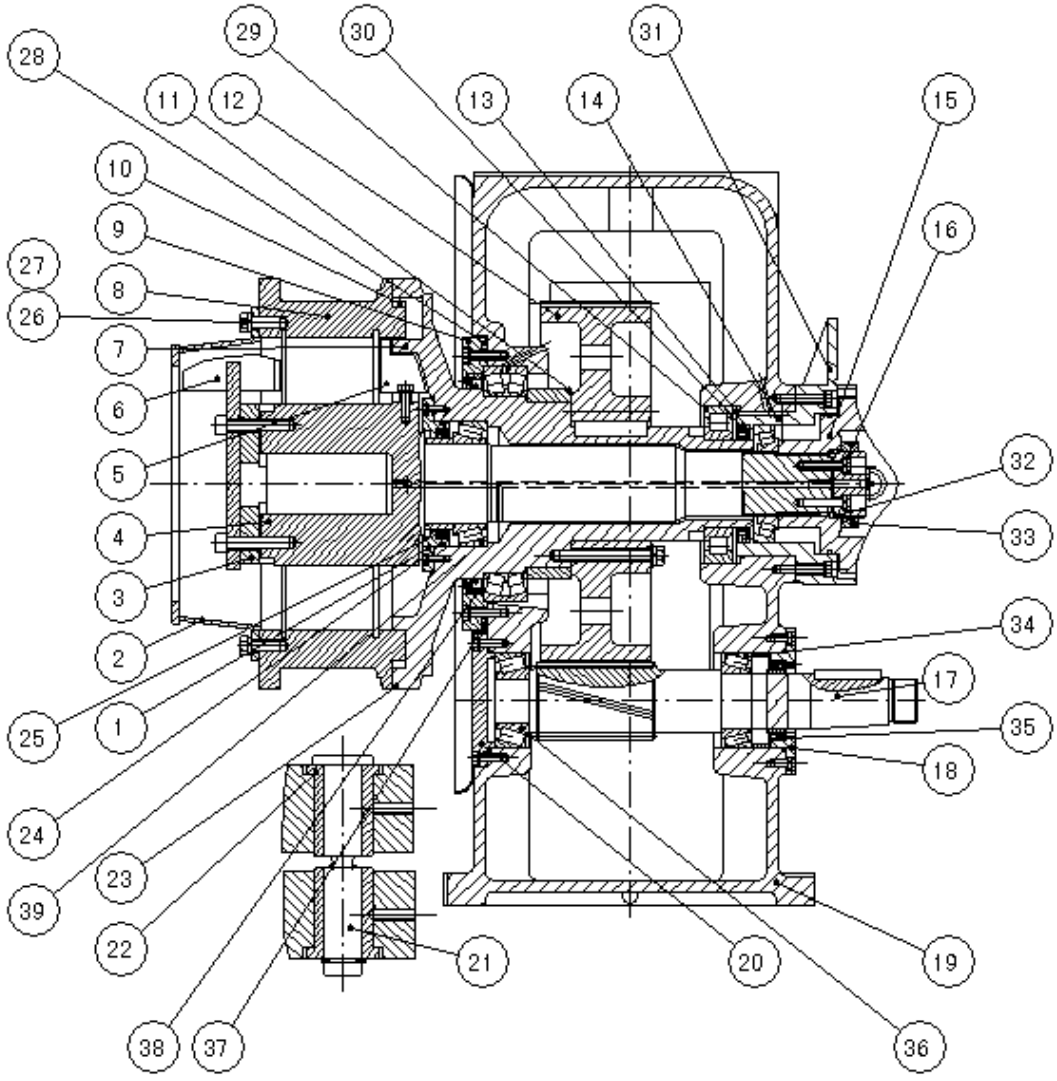


Figure 7 MAIN GEARBOX STRUCTURE

1.Main Shaft Seal Cover 2. Feed Cone 3. Front Roller Support 4. Main Shaft 5. Wiper 6. Deflector 7. Quill Shaft 8. Die 9. Quill Shaft Seal Cover 10. Driving Key 11. Gear Retaining Ring 12. Main Gear 13. Oil Splash Plate 14. Bush 15. Main Shaft Splined Hub 16. Main Gland 17. Pinion Shaft 18. End Cover 19. Gearbox 20. Gearbox Front Liner 21. Shear Pin 22. Shear Pin Sleeve 23. Fastening Screw 24. Clamp 25. Oil Seal 26. Hexagon Socket Screw 27. Washer 28. Seal 29. Bearing 30. Oil Seal 31.Limit Switch 32. Clamp 33. Round Nut 34. Bearing 35. Oil Seal 36. Bearing 37.Clamp 38. Oil Seal 39. Bearing

3.9 Safety System

This safety system includes overload protection, safety magnet, protection switch for pellet chamber door and discharger outside the machine.

3.9.1 Overload Protection System

When the foreign materials such as iron, stone, flaxen thread enter pellet chamber or the

feed flow is excess, and rollers do not rotate along with die any more, the torque main shaft bears will exceed the normal torque resulting in that the shearing force transmitted to shear pin exceeds the allowable strength limit of its own, then shear pin break so that the shear pin housing (15) rotates and touches limit switch to stop the machine.

3.9.2 Protection Switch for Pellet Chamber Door

In order to avoid body injury caused by the fast rotating die during operation after opening the pellet chamber door, a safety limit switch is mounted on the right support of the door. When the door is open, the limit switch shutdown all the control circuit of the pellet mill in the system and the pellet mill stops running or cannot be started so that operator's safety is guaranteed.

3.9.3 Discharger outside the machine

When discharging outside the machine is needed, push the discharge handle to make the feed chute move. The material in the conditioner flows out of the machine without entering into the pellet chamber. This unit is mainly used for trial run of the machine before the pellet mill start to run normally. Or when the pellet mill is found operating abnormally and you are going to remove the trouble without enough time to stop the machine, or with the machine running, you can make the material discharged out of the pellet chamber. When the machine runs normally, push the handle on to reset feed chute so that the material is discharged normally.

3.10 Electric Control System

See Figure 8 for electric control principle. It is only used in the installation of a single machine. Separate design is needed for the use in the complete project.

3.11 Lubrication System

The grease is pressed into the oil hole of the main shaft by the manual oil pump or electric oil pump to lubricate the roller bearing or quill bearing.

4. INSTALLATION, ADJUSTMENT AND TRIAL RUN

4.1 Installation

4.1.1 For equipment installation, the technological process (feeding, discharging, cooling, etc) should be thought over, floor should be determined and distance from the wall should be considered to make it easy for worker to operate and open the pellet chamber.

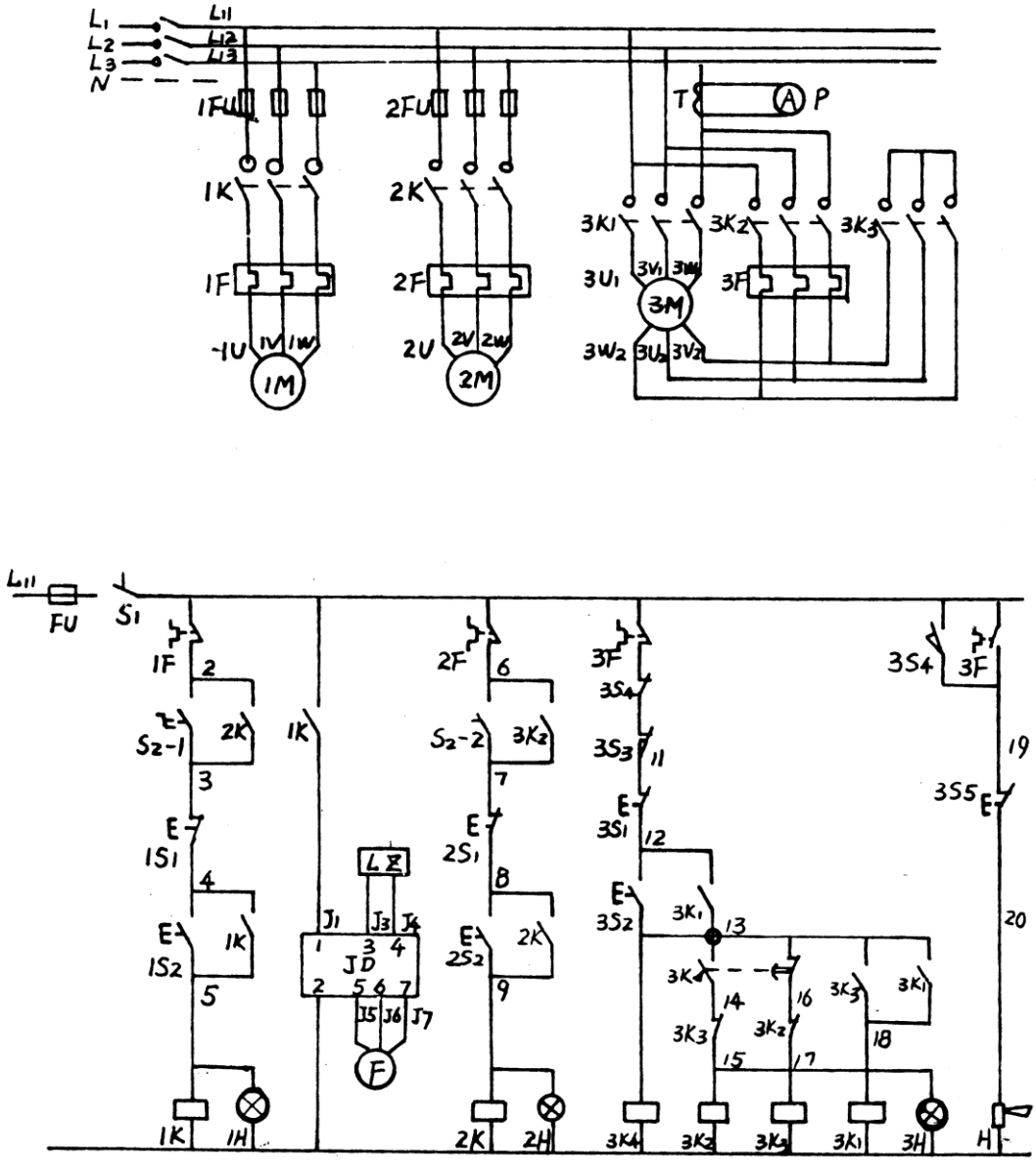


Fig. 8 Electric schematic diagram

Table of Electric Components (Table 1)

No.	Code	Description	Specification	Unit	Qty	Remarks
1	1FU	Fuse	RL1-15-6A	pc	3	

2	FU	Fuse	RL1-15-10A	pc	1	
3	2FU	Fuse	RL1-15-15A	pc	3	
4	1K, 2K	AC Contactor	CJ10-10A 220V	pc	2	
5	3K1, 3K2	AC Contactor	CJ10-250A 220V	pc	2	
6	3K3	AC Contactor	CJ20-160A 220V	pc	1	
7	Q	Auto On/Off	DZ10-250/330 220A	pc	1	
8	1F	Thermal Relay	JRO-20/3D 2.4A	pc	1	
9	2F	Thermal Relay	JRO-20/3D 7.2A	pc	1	
10	3F	Thermal Relay	JRO-150/3D 120A	pc	1	
11	T	Current Transformer	LMZ1-0.5 300/5A	pc	1	
12	P	Galvanometer	42L6-A	pc	1	
13	3K4	Time Relay	0.4-60S JSK1-2 220V	pc	1	
14	S1	Main Command Button	LA18-22Y	pc	1	
15	S2, 3S5	Selection Button	LA18-22X	pc	2	
16	H	Alarm	DDJ1/22V	pc	1	
17	1S1, 2S2, 3S1	Stop Button	LA19-11 Red	pc	3	
18	1S1, 2S2, 3S1	Start Button	LA19-11 Green	pc	3	
19	1H-3H	Indicating Lamp	NDDH16-5 Green	pc	3	Can be replaced by DX8/220V
20	3S3	Pellet Chamber Door On/Off	3SE3/303-100-0GA	pc	1	On the machine
21	4S4	Safety On/Off	3SE3/303-100-0GA	pc	1	On the machine
22	JD	Speed Controller		unit	1	On the machine
23	F	Speed-measuring Generator		pc	1	On the machine

24	LZ	Exciting Coil		pc	1	On the machine
25	1M	Feeder Motor	JZTY12-4L-1.5KW	pc	1	On the machine
26	2M	Mixer Motor	Y132M2-6 5.5KW	pc	1	On the machine
27	3M	Main Motor	Y315S-4 110KW	unit	1	On the machine

4.1.2 The equipment must be installed on the firm foundation. Dig the foundation according to the base size on the schematic diagram (see Figure 9), pour cobble concrete and screw the foundation bolt on. Some good practice should be followed when installing the pellet mill on the floor to make sure that vibration of machine during the normal run can be absorbed after the installation.

4.1.3 Generally pellet mill is positioned on the floor where dimension should be digged with proper size of 500x300mm. See Figure 10 for the outlet.

4.1.4 In order to ensure continuous operation of 10 minutes, mount a feeding hopper of 3 cubic meters on the top of the feeder. Assemble a slotted plate at the bottom of the hopper for convenient control. Condition permitting, assemble a lump-breaker on the hopper.

4.1.5 Steam should be injected in when the machine is working. See Figure 11 and Table 2 for the steam piping system. The steam is generated by the boiler. 2'' galvanized pipe can be used as the steam pipe connecting with the conditioner. Moisture separator should be installed in the steam piping line to prevent the condensate from entering the conditioner. Relief valve must be installed to ensure that the steam pressure is not too high but stable. Steam is required to be supersaturated and with high temperature and less moisture content.

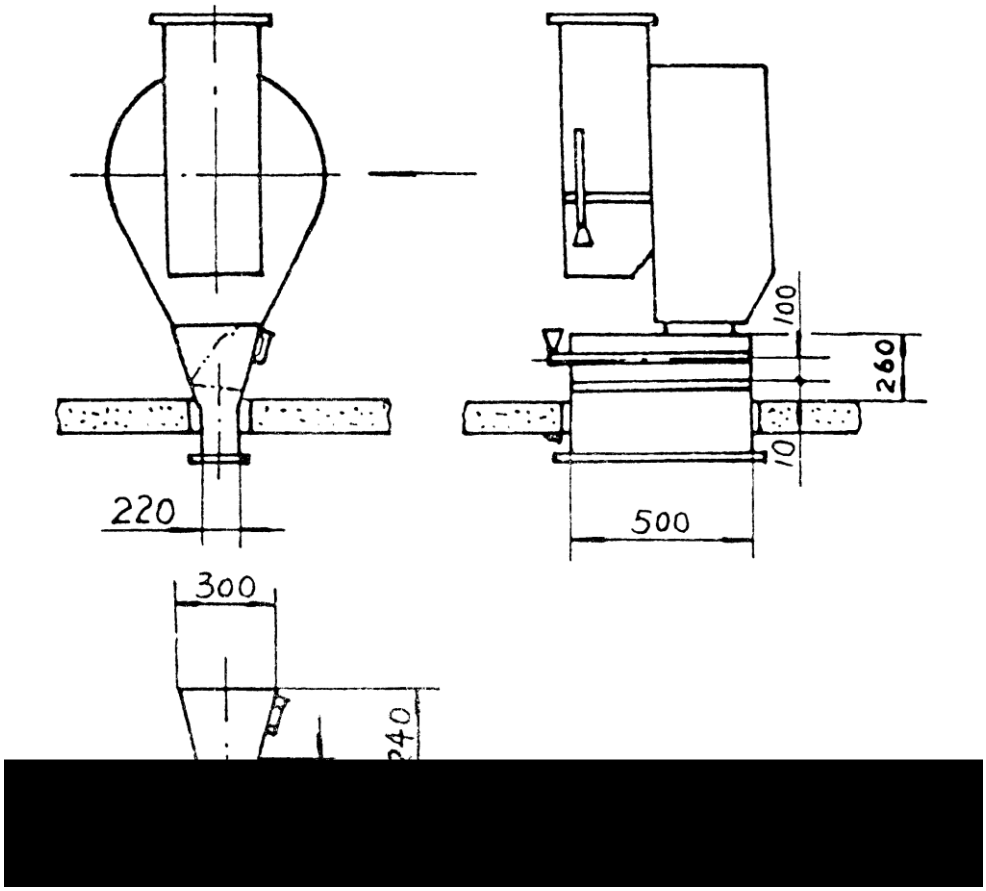


Fig.9 Feed outlet

4.1.6 Oil and molasses adding system can be installed according to the user's requirements, however, oil and molasses must be atomized and added not exceeding 2%. Otherwise, it will adversely affect the pelleting effect.

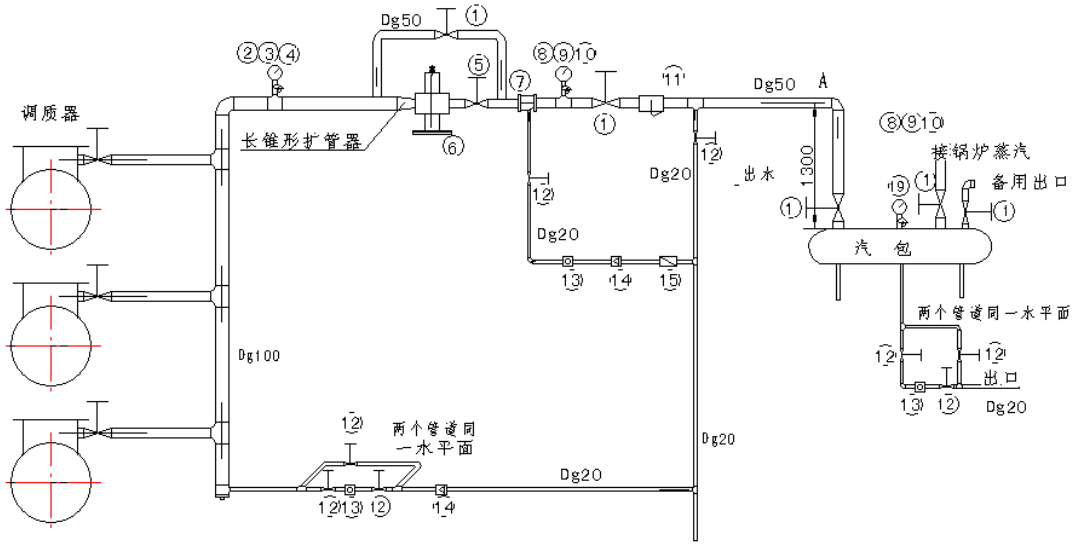


Fig.10 Steam pipeline process flow

Note: 1. The drained water goes back to the water supplying system of boiler or the water is to be completely drained.

2. Pipes are taped according to the actual conditions. (Threads are in British system)

3. Steam tank is not included in the steam pipeline, but can be made to order.

No	Name	Model	Specification	Qty	Remarks
1	Stop valve	J41T-16	Dg50	4	
2	Pressure gauge		3/8”	1	Nominal pressure 0-10bar; Dial dia. 100mm
3	Gauge cock		3/8”	1	
4	Siphon		3/8”	1	Ring siphon
5	Stop valve	J41T-16	Dg40	1	
6	Regulator	DP17	Dg40	1	Outlet pressure 0.05-0.4Mpa (yellow spring)
7	Moisture separator	S3	DN65	1	Flange (connecting DIN PN16)
8	Pressure gauge		3/8”	2	Nominal pressure 0-16bar; Dial dia. 100mm
9	Gauge cock		3/8”	2	
10	Siphon		3/8”	2	Ring siphon
11	Strainer		2”	1	With 100 mesh stainless steel filtering screen
12	Stop valve	J41T-16	Dg20	8	
13	Steam trap	HM10-8	3/4”	2	
14	Sight glass		3/4”	2	
15	Check valve		3/4”	1	
16	Safe valve			1	

4.2 Adjustment of die-roller clearance (see Figure 11)

Open the pellet chamber door, screw eight fastening bolts off the feed cone and remove feed cone and remove feed cone to clear away the accumulated feed on the inside surface of die (1) and outside surface of rollers (2). Loosen the retaining nut (6) and twist the adjusting screw (5) to make adjusting gear to turn. Make adjustment according to the arrow direction of roller adjusting gear. When the clearance becomes smaller, adjust to the opposite direction; when the clearance becomes bigger, if it is checked that the adjustment cannot be carried out in the shown direction, that mans rollers are wrongly assembled and must be reassembled correctly. It is very important to control the clearance between die and roller. Too small clearance will severely wear rollers and die; too big clearance will result in difficulty of pelleting. Generally, proper clearance is 0.05-0.3mm. judge through visual inspection and take it as appropriate that rollers just touch the surface of die and rotation of die can just drive rollers to turn round without feed. Attention, do not forget to screw the retaining nut and lock screw on after the adjustment of clearance between die and roller.

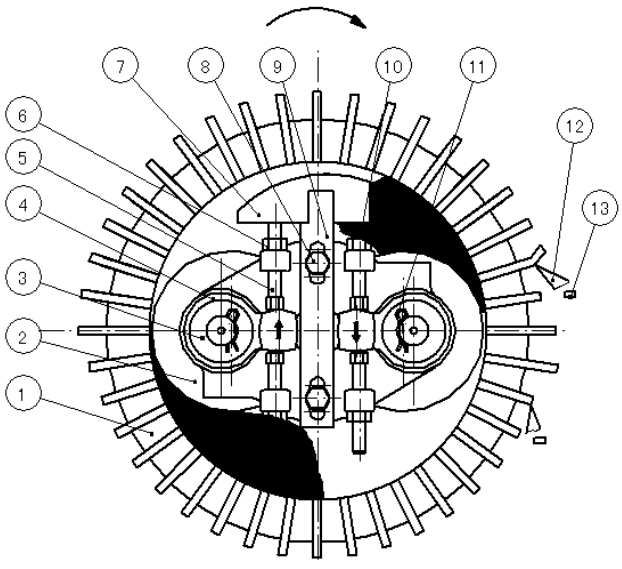


Figure 11 PELLET CHAMBER WORKING PRINCIPLE

1. Die 2. Roller 3. Roller Shaft 4. Retaining Pin 5. Adjusting Screw 6. Retaining Nut 7. Deflector 8. Deflector Screw 9. Deflector Base 10. Pelleting Area 11. Bolt 12. Knife 13. Pellet Feed

4.2.1 Knife Adjustment (See Figure 12)

Pellets with different diameter have different length, generally, pellet length is 1.5-3 times longer than pellet diameter. To make adjustment, loosen the lock handle (11) on the knife

post (7) first, pull out knife post, and loosen the lock handle on the positioning bushing (13), set the positioning bushing at a proper place according to the graduation of knife post, then lock the positioning bushing and move the knife post to make the positioning bushing and fixing sleeve touch (8), and lock the knife post handle. Note that distance between knife and the surface of die cannot be smaller than 3mm to avoid the touch of knife and die.

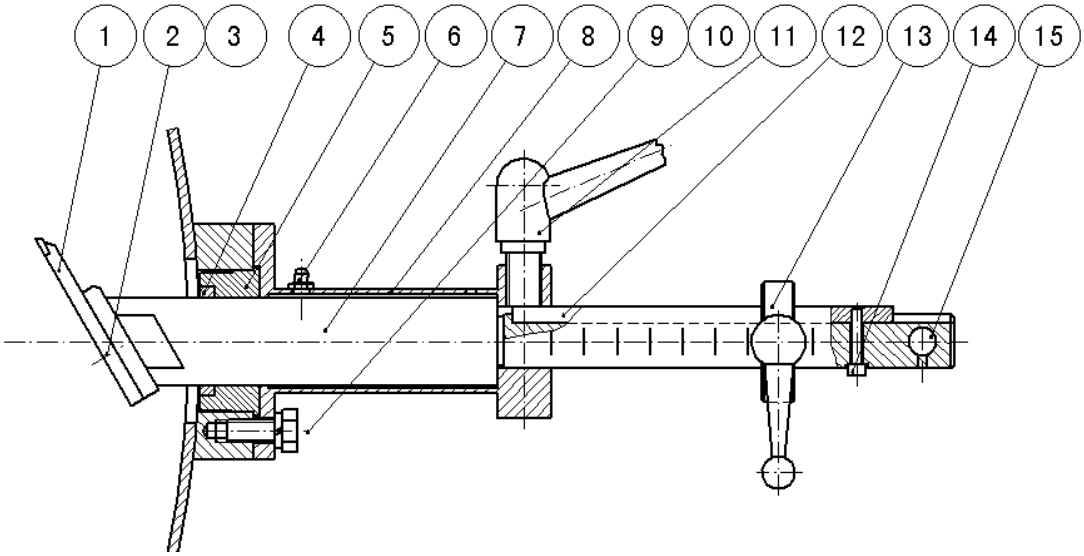


Figure 12 KNIFE ASSEMBLY STRUCTURE

1. Knife 2. Bolt 3. Washer 4. Copper Sleeve 5. Sleeve 6. Oil Cup 7. Knife Post 8. Bushing 9. Bolt 10. Washer 11. Lock Handle 12. Key 13. Positioning Bushing 14. Screw 15. Knife Handle

4.2.2 Adjustment of Rotation Speed of Feeder

The rotation speed of feeder determines the conveying volume of feeder. The conveying volume of feeder can be effectively controlled by changing the rotation speed of feeder to meet the pelleting capacity. During the normal operation, the pelleting capacity is affected by many factors, such as material quality, steam quality and voltage fluctuation. Therefore, when one of the factors changes, the conveying rate of feeder should be varied accordingly so that the machine is working normally all the time. Frequency-conversion speed-adjusting motor is used for the feeder. Turn the speed-adjuster of the controller to change the rotation speed of feeder. During the normal operation, observe the change of working current of main motor when adjusting the feeder speed. The working current of the main motor should not exceed the rated value indicated on the marking plate of main motor.

4.2.3 Adjustment of Mixer (Conditioner) Paddle Angle

The conditioner paddle angle affects the material filling coefficient in the conditioner and the conditioning time of the material. Adjust the paddle angle to control the material conditioning time according to the production requirements and material quality and the filling coefficient in

the conditioner. When the paddle angle (See Figure 13) is larger, the filling coefficient is smaller and the conditioning time is shorter; vice versa.

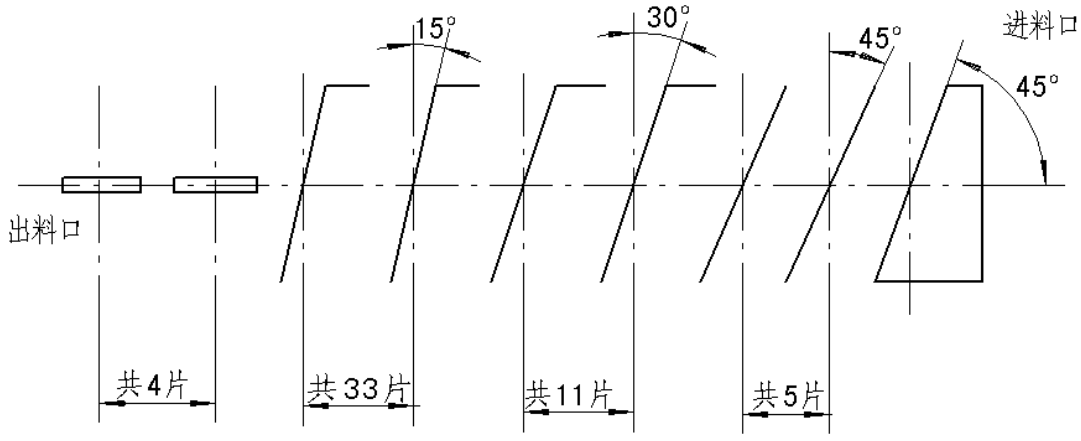


Fig.13 Conditioner blade angle installation system

When adjusting, disassemble the mixing shaft first, loose slightly the fastening screw of the paddle, pull the paddle with a spanner or knock the paddle with a wooden hammer to increase or reduce the angle. Fasten all the nuts after adjusting. Only after carefully checking that nothing is loosened can it be replaced.

4.3 Trial run

After the installation of the machine, a trial run is required firstly. The steps for trial run are as following:

4.3.1 Check that all the fasteners of each part are reliable, especially inside the pellet chamber.

4.3.2 Fill in grease according to the lubrication diagram. The grease can be filled into the roller after turning on the machine.

4.3.3 Check that the clearance between die and rollers is appropriate.

4.3.4 Check that there is no foreign matters inside the feeder, conditioner and pellet chamber.

4.3.5 Check that the steam supplying system is normal and the steam pressure is 0.1-0.4Mpa.

4.3.6 Start the main part of the machine to check that the die turns clockwise and there is no abnormality.

4.3.7 Check the limit switch. Power should be able to be turned off when you push the limit switch.

4.3.8 Turn on the main parts of the machine for 20 minutes and stop. Check that the fasteners of each part are tight and that there is no oil leakage at the seals or abnormal conditions.

4.3.9 Turn on the feeder motor and the conditioner motor respectively and make trial run without loading to check the rotation direction and abnormal noise. If there is material in the hopper, the discharge opening should be closed first before starting the feeder motor. To start the feeder motor, start the asynchronous motor of speed-adjusting motor first, then turn on the power of controller and the indication lamps, adjust the speed-adjusting controller. The data on gauge for the rotation speed rises gradually. Adjust the rotation speed to a certain value and make it suitable according to requirements.

4.3.10 Restart the main machine. Make a trial pelleting with a little greasy material (e.g. green bran). When making a trial pelleting, you can feed the material through the inspection door of feed chute. Try your best to feed evenly till most holes can produce pellets.

4.3.11 Only after the trial run of all parts of the machine is normal can you start formal production. Whenever abnormality at any step is found, remove it at once. Don't make pellet mill run for a long time without feed. It will result in the wear of die and rollers due to the excess surface touch.

Warning: Do not place any object (including hand) into the pellet mill when the pellet mill is running.

5. USE CONDITIONS, OPERATION AND SAFETY RULES

5.1：Use Conditions

Follow the conditions below when operating the pellet mill:

5.1.1 The pellet mill should be installed in a room or and open shed with ambient temperature of 5-40℃.

The equipment in front of and behind the pellet mill should match each other.

The working voltage should be stable with deviation not more than +-5%.

The moisture of mash material should not be more than 15% before it enters the machine.

The pressure and temperature of supplied steam should be in accordance with the stipulations of this manual.

Galvanometer and operation switch should be installed on the site of pellet mill for the convenience of observation and operation.

5.2 Operation

5.2.1 Starting Steps

Make preparation as indicated in items from 4.3.1 to 4.3.9 and make sure that all parts of the machine are all right. After that, start the machine according to the following steps.

5.2.1.1 Turn on the main motor.

5.2.1.2 Turn on the conditioner motor and the feeder motor, adjust the feeder to the lowest rotation speed.

5.2.1.3 Adjust steam pressure and let the condensate water out of the steam pipe.

5.2.1.4 Open the discharging door and open the admission valve at the same time. Slightly adjust the rotational speed of feeder motor. After pellet is produced, gradually adjust the rotational speed of feeder and steam adding volume to a proper level.

5.2.1.5 Adjust knife to make the pellet length appropriate.

5.2.1.6 Further adjust the rotational speed of feeder to make the working current reach the rated current value, and relevantly adjust the steam flow to make the temperature and humidity appropriate.

5.2.2 Points for Attention

5.2.2.1 For the unskilled operator, when carrying out the step of 5.2.1.4, you can open the pellet chamber door or adopt the external discharging system to make the initial feed not enter the pellet chamber but fall on the ground. When you feel by hand that steam content and conditioning temperature are proper, that is, when you firmly grasp the feed, it can shape into a ball, and when you loosen your grip, it can fall apart, that means the conditioning effect is good. At this moment, let the feed enter the pellet chamber for pelleting.

5.2.2.2 After it runs normally, observe the current of the main part of machine at every time, adjust the feeing volume and admission volume in time according to the current fluctuation and open the inspection door of feed chute to observe the conditioning quality of material and discharging condition at every time. If material is found too dry or too wet, and the current of the main part of machine rises suddenly resulting in the overload running, pull out the external discharging handle for outside discharging.

5.2.3 Stopping Steps

Follow the stipulated sequence to stop the machine without lowering your guard to avoid the equipment accident caused by wrong operation.

5.2.3.1 Close the discharging door

5.2.3.2 Adjust feeder to the lowest rotation speed and gradually close the steam valve.

5.2.3.3 When seeing no feed from the inspection door, turn off the feeder motor and conditioner motor.

5.2.3.4 Feed the greasy feed through the inspection door to fill up the die holes.

5.2.3.5 Turn off the main motor.

5.2.3.6 After the main part of machine stops, open the pellet chamber to remove accumulated feed inside.

5.3 Safety Rules

5.3.1 There should not be foreign matters such as stone, iron impurity and flaxen thread in the mash material.

5.3.2 Turn on the main motor first when starting the machine; turn off the feeder motor first when stopping the machine.

5.3.3 Feed the greasy feed before turning off the main motor, because the pelleted greasy feed is loose and not easy to block the die holes. This should be done even more, especially when the machine will be left unused for a long time.

5.3.4 Remove the accumulated feed in the pellet chamber after stopping the machine.

5.3.5 Operate strictly in accordance with the operation steps and safety rules. It's not allowed to overload so as to prevent the machine failure caused by wrong operation.

5.3.6 During operation, it's not allowed to open the pellet chamber door to avoid body injury.

5.3.7 Don't stretch out your hands into the inspection door for receiving the feed or other action. To receive the feed, the self-made special-purpose tool should be used.

5.3.8 When adjusting the knife, make sure that distance between knife and outer diameter of die is not shorter than 3mm.

5.3.9 When any abnormal condition is found or machine failure occurs, the normal stopping steps should be followed. After stopping the machine, check it and remove the trouble. Only after everything is normal can you go on with your work.

5.3.10 To obtain good quality pellets and high output, besides every driving part of the machine should run normally and there should be a good feed formula, the most important thing is to adjust the rotation speed of feeder and steam volume correctly to make the main motor work under the rated current and meanwhile ensure proper temperature and humidity for the material conditioned. Different formula has different requirements on the steam adding volume, thus operator should try his best to find out and accumulate experience and control flexibly by feeling and eyesight. In addition, basically stable steam pressure should be ensured and pressure fluctuation cannot be larger than 0.05Mpa generally.

6.COMMON TROUBLE ANALYSIS AND REMOVAL

Item	Trouble	Cause	Removal Method
1	Raw material can enter the pellet chamber normally, but pellet cannot be produced.	1) Die holes block. 2) Too much or too little moisture. 3) Too big roller clearance. 4) Deflector is damaged.	1) Clear die holes with corresponding drill. 2) Adjust steam volume correctly. 3) Adjust roller clearance. 4) Replace

			deflector.
2	No raw materials enter the pellet chamber.	1) Hopper bridges. 2) It blocks in the feeder.	1) Break the lump. 2) Remove feeder screw for cleaning.
3	Shear pin breaks.	Hard foreign materials enter the pellet chamber.	Clear away the foreign materials, replace shear pin.
4	Main part of machine cannot be started.	1) The accumulated materials in the pellet mill are not cleared away. 2) There is trouble with circuit.	1) Clear away the accumulated materials. 2) Fix the circuit breakdown.
5	Roller moves up and down.	Butterfly spring on rear gland of main shaft loses effectiveness, or gland fasteners loosen.	1) Tighten the fasteners. 2) Replace butterfly spring.
6	Noise and vibration are serious.	1) Bearing is worn and loses its effectiveness. 2) Die or roller wears seriously. 3) Clearance between die and rollers are too small. 4) There are foreign materials in the mixer and feeder. 5) Small hard foreign materials enter the die holes.	1) Replace the bearing. 2) Replace die and rollers. 3) Adjust the clearance. 4) Pull out feeder shaft or mixer shaft for cleaning. 5) Clear away the foreign materials in die holes.

7	Output does not meet the requirements.	1) Moisture is not proper. 2) There is problem with raw material formula. 3) Fineness of raw material is not proper. 4) Pellet are too hard. 5) Current does not reach the rated value.	1) Adjust steam volume rationally. 2) Change raw material formula. 3) Improve the quality of meal material. 4) Replace die and reduce effective length of die holes. 5) Increase the rational speed of feeder screw, material flow and steam flow properly.
8	Pellet is too soft.	Die specification is not suitable to feed formula.	If formula cannot be changed, use the die with large effective length for die holes.
9	Oil leaks.	Oil seal is damaged.	Replace oil seal.

7. MAINTENANCE AND REPAIR

7.1 Routine Maintenance

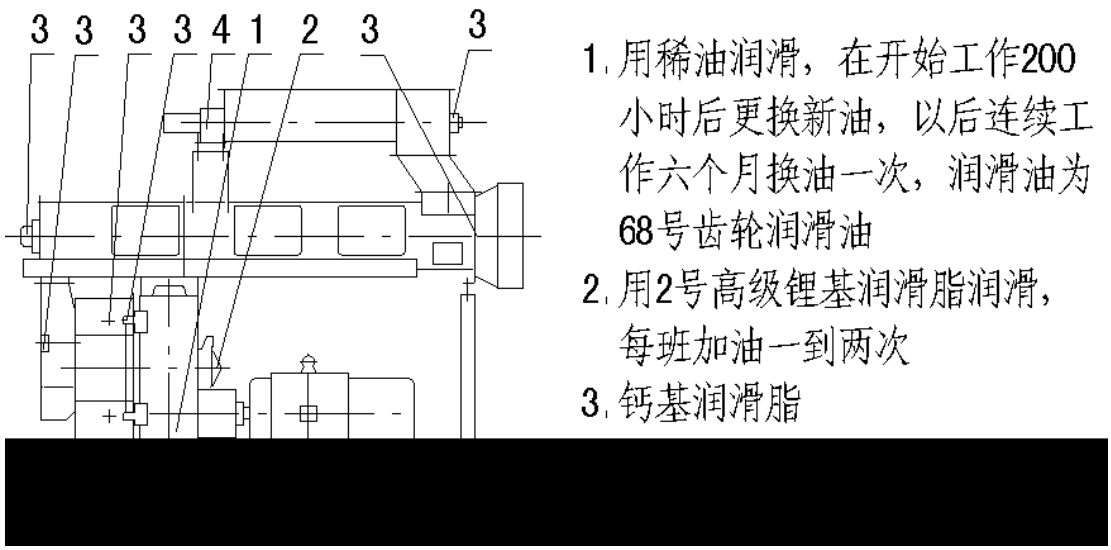


Fig.14 SZLH420 Lubrication chart

7.1.1 Strictly follow the lubrication diagram (See Figure 15) to inject lube to each lubrication point. Add high temperature resistant grease from the rear of the main shaft for the roller.

1. Lubricate with dilute oil, renew it after 200 hours' working and then change it every 6 months;(Use #68 machine oil)
2. No.2 high-grade lithium radical lube. (Inject once or twice every shift).
3. Calcium radical lube

7.1.2 Check that the bolts, screws and deflectors in the pellet chamber are tight before operating the machine.

7.1.3 Check the distance between knife and die every shift to make sure that it's not shorter than 3mm.

7.1.4 Check the clearance between the rollers and die and adjust rationally to ensure an identical clearance before starting the machine.

7.1.5 Check every time that there is no leakage and change the oil seal in time.

7.1.6 Keep the outside surface of the machine clean.

7.1.7 Inject about 30g lube to each roller bearing every four hours. Inject 50g lube to the main shaft bearing every 8-10 hours.

7.2 Regular Check and Maintenance

7.2.1 Check the tightness of all connection parts every week.

7.2.2 Clean the feeder screw and conditioner once a week. It's also necessary to clean when the machine will be lain idle for a short term.

7.2.3 Replace oil for the gearbox and the reducer after the initial run of 200 hours, and replace oil once every half a year (about 1000 hours) of continuous operation.

7.2.4 Disassemble and clean the bearings of feeder shaft, conditioner shaft and inject new oil every half a year.

7.2.5 Check the wear of die wear ring and driving key every week and replace in time.

7.3 Die Replacement Method

When the inner surface of die wear seriously or pellet diameter need to be changed, it's necessary to replace die. The replacing steps are as following:

7.3.1 Open the pellet chamber door

7.3.2 Loosen feed cone and eight screws to remove feed cone.

7.3.3 Adjust the clearance between die and rollers to be not less than 0.5mm. Remove 3 high strength bolts connecting clamp and quill flange, and then pull out die.

7.3.4 To mount die, follow the sequence opposite to the above steps and note that die notch should align with die driving key on the quill flange.

7.3.5 Carefully get rid of filth and impurities at every positioning face of die before mounting

the die.

7.3.6 Trial run of new die

Holes of new die had been polished before it left the factory, but the precision of the die holes is still low. To reach the highest output, it's necessary to polish with materials. Die holes were polished with material (ingredient: 2/3 greasy feed and 1/3 fine sand make up 50kg mixture for 15-30 minutes trial run of new die) before it left the factory, but it's still necessary to be polished properly with materials.

Use the greasy feed (material with oil) for running first. After it's confirmed that all die holes can produce pellets (at least 95% of holes produce pellets), mix materials with higher friction for pelleting and recycle repeatedly for not less than 15 minutes.

7.4 Roller Replacement

Roller is also an easily-worn part. It should be replaced when it is worn seriously. The removing steps for rollers are as following (See Figure 6):

7.4.1 Open the pellet chamber door and remove feed cone and deflector.

7.4.2 Remove the retaining pin and roller adjusting gear, loosen the fasteners of front roller support and remove the front roller support.

7.4.3 Remove roller assembly from main shaft.

7.4.4 Straighten the stop clip of retaining ring on lock nut to screw off lock nut.

7.4.5 Hit the left side of roller shaft with wooden hammer and remove it from its right end.

7.4.6 Remove the glands on both sides.

7.4.7 Disassemble the spring retaining rings on both sides and take out the oil splash collar.

7.4.8 Hit the outer ring and spacer out of two bearings with special-purpose bush and hammer.

7.4.9 Check the use conditions of bearing and other parts. Replace bearing or other parts according to the damage degree.

7.4.10 Clean the full set of roller assembly and assemble roller according to the steps opposite to the above steps. Note that, when tightening the nut, control the tightening degree of bearing to a degree, not too tight or too loose. Generally it is proper that roller turns without axial motion when you keep turning manually.

7.5 Removal and Cleaning of Feeder Shaft

According to the requirements of Item 7.2.2, the inside of feeder should be cleared regularly. To clear, pull out the shaft according to the following methods:

7.5.1 Loosen the cap nut at the right end cap of feeder (See Figure 1).

7.5.2 Remove end cap, bearing with housing and feeder shaft together from the right end.

7.5.3 When mounting after the clearing, align the square tenon at the end of feeder shaft with the square hole of driving shaft of the feeder reducer, (The square hole can be seen from the caplug and the inside of square hole is coated with a little edible oil), meanwhile mount the fastening bolts of end cap and tighten them.

7.6 Assembling and Disassembling of Conditioner (See Figure 5)

a. Loose the fixing bolts of the guard and remove the guard.
b. Adjust the bolts to loose the belt and remove the belt.
c. Remove the belt pulley and motor belt pulley with proper “puller” and remove the key.
d. Remove the bearings with housing at both sides.
e. Loose the bolts and remove the right end cover.
f. Pull the mixer shaft out to the left side.

To assemble the mixer, follow the steps opposite to the above.

Clean the conditioner through the big door of the shell.

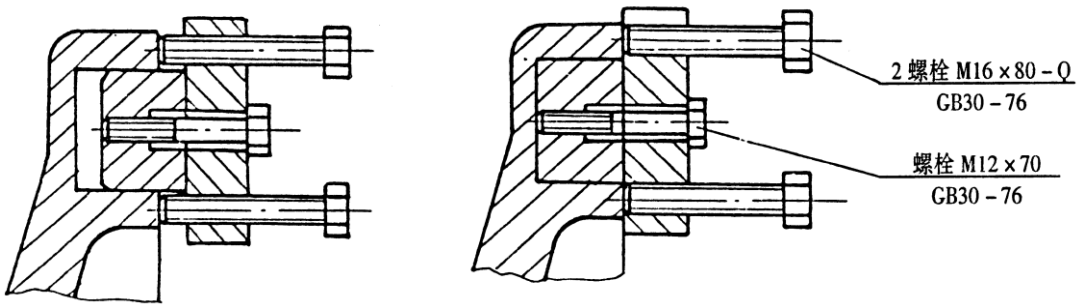


Fig15. Ring die driving key assemble and disassembly

7.7 Disassembling and Assembling of Driving Key

Replace the deformed or loosened die driving key mounted on the quill flange in time after being used for some time. As shown in Figure 16, tighten the purpose-made key-disassembling support onto the thread in the middle of driving key with a M12x70 bolt, and pull out the driving key through the thread hole at both ends of support with two M16x80 bolts. To assemble, key should be aligned to its position.

7.8 Die Repairing

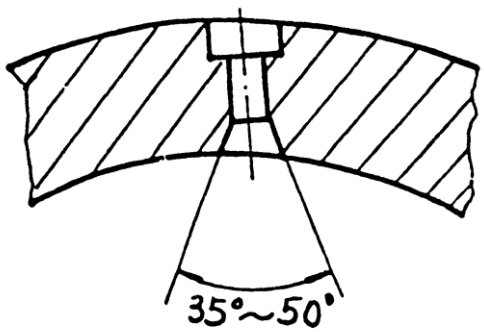


Fig.16 Die hole

When the inner surface of die wear seriously and the reverse taper of die hole wears to flat, the inner surface of die can be ground. When mounting, try best to ensure the coaxial degree and vertical degree of die mounting datum plane and inner hole. After repairing the inner surface, ream a 35-50℃ taper hole at the inlet of die hole with hard alloy drill. (See Figure 17)

8. Rules for Transportation, Storage and Maintenance

8.1 During transportation, when hoisting and loading the machine, pay attention to the package marks of transportation and storage, especially the mark of center of gravity on the package box. Don't dump or hit or convert the machine.

8.2 When installing and hoisting the machine, fasten rope to the hoisting stakes available on the machine base. Do not fasten rope to other positions for hoisting and never make rope touch the external fragile parts and avoid the rub on paint surface.

8.3 When unfolding the package box, check the outside components of pellet mill, and sort and count the components, the spare parts and documents according to the container loading plan.

8.4 When the machine will be left unused for a long time, it should be stored properly. When it is stored outdoors, there should be facilities preventing rain, sun and water accumulation. When it is stored indoors, there should be fine ventilation and facilities preventing damp and dust.

8.5 See Figure 17 for hoisting.

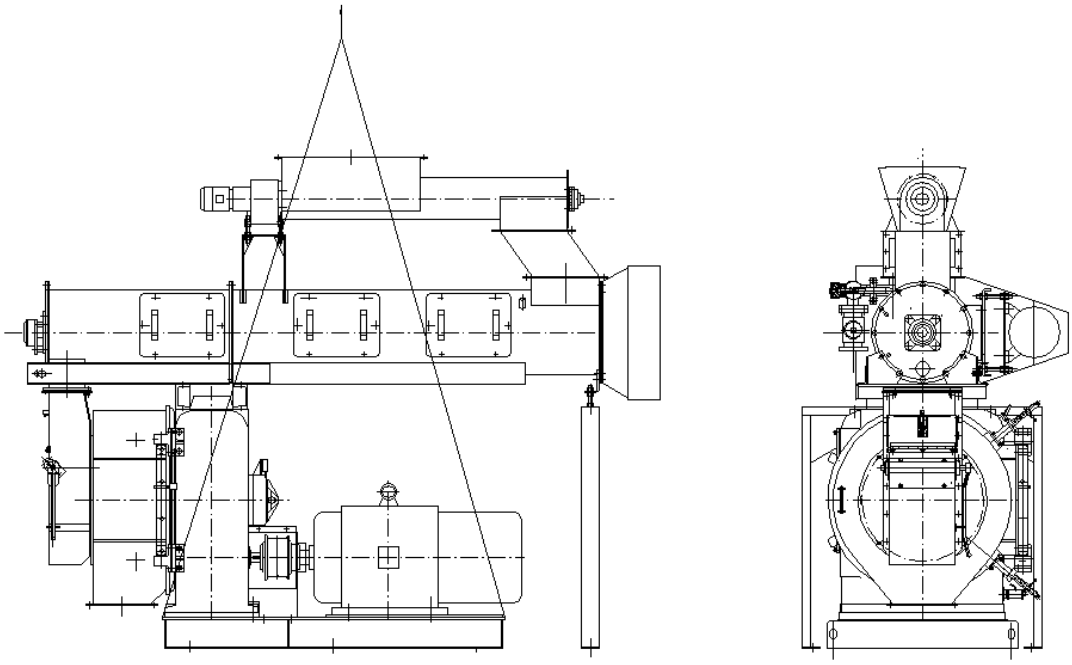


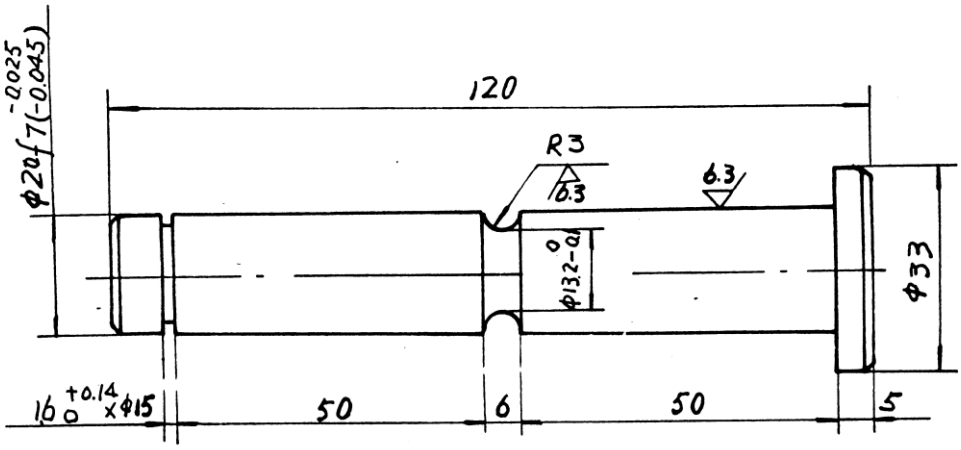
Fig17 Hoisting

1. LIST OF MAIN EASILY-WORN PARTS

Item	Code	Description	Qty/Unit	Mounting Parts
1	.3-7	Die	1	Pellet Chamber
2	.3-36	Roller	2	Pellet Chamber
3	.3-35	Roller Shaft	2	Pellet Chamber
4	.3-21	Fastening Screw	1	Pellet Chamber
5	.3-6	Wear Ring	1	Pellet Chamber
6	.3-36	Driving Key	1	Pellet Chamber
7	.3-15	Shear Pin	2	Shear Pin Bush
8	.6-1	Knife	2	Knife Post Assembly
9	.3.2	Deflector	1	Pellet Chamber
10		Bearing	2	Hinge Support of Pellet Chamber Door
11		Bearing with Housing	1	Feeding Reducer
12		Bearing with Housing	2	Conditioner
13		Bearing	1	Main Gearbox (Rear End of Pinion Shaft)

14		Bearing	1	Main Gearbox (Rear End of Quill Shaft)
15		Bearing	1	Main Gearbox (Front End of Pinion Shaft)
16		Bearing	1	Main Gearbox (Front End of Main Shaft)
17		Bearing	1	Main Gearbox (Rear End of Main Shaft)
18		Bearing	1	Main Gearbox (Front End of Quill Shaft)
19		Bearing	4	Pellet Chamber (Roller)
20		Oil Seal	1	Main Gearbox (Front End of Quill Shaft)
21		Oil Seal	1	Main Gearbox (Rear End of Quill Shaft)
22		Oil Seal	1	Main Gearbox (Rear End of Pinion Shaft)
23		Oil Seal	1	Main Gearbox (Left Side)
24		Clamp	2	Main Gearbox (Front and Rear End of Pinion Shaft)
25		Clamp	1	Main Gearbox (Main Cover)
26		Clamp	1	Main Gearbox (Main Shaft Splined Hub)
27		Clamp	1	Main Gearbox (Quill Shaft Cover)
28		Clamp	1	Main Gearbox (Main Shaft Cover)
29		Clamp	1	Main Gearbox (Main Shaft Splined Hub)
30		Round Nut	2	Pellet Chamber (Roller Shaft)
31		Retaining Washer	2	Pellet Chamber (Roller Shaft)
32		Retaining Ring	4	Pellet Chamber (inside Roller)
33		Shaft Retaining Ring	2	Pellet Chamber (inside Roller)

Warranty period: 1 year warranty from the date of sale of this product (except vulnerability parts)In case any quality shortage and damage are found out, we will supply free repair. If not quality shortage and damage, we will supply parts and service that are not cost-free.



Note:Bracket size for 90kW motor)

Fig.18 Safety pin (Material Q235-A)

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