KERUNDE KDZL Series

Pellet Mill

Operation Manual

Note: Prior to operation, please read over this operation manual carefully and keep it properly for future reference.

YANGZHOU KERUNDE MACHINERY CO.,LTD.

FOREWORD

1. Congratulations, you have selected Kerunde KDZL Series pellet mill.
2. The operating instruction is specially compiled for the safe operation of the pellet mill, technical parameters of equipment running included; It serves for the whole series of the pellet mill, please cooperate with the specific model of the pellet mill you purchased while reading through the operation manual. Do not hesitate to contact with us once there is any question.
3. Prior to operation, please read over this operation manual carefully, well know attention items for safety, different performances, requirements to installation and operation etc. of this hammer mill so that you are able to adroitly operate and use this machine, and create more benefits.
4. Such as improper operation or failure to comply with our operation regulation will result in significant losses.
5. Prior to operation, please read over the marks of matters needing attention, especially those safety cautions.
6. The operator and maintenance personnel of the pellet mill shall read over this operation manual carefully.
7. Please put the operation manual nearby the pellet mill for read it at any time when necessary.
8. Please fully comprehend the operation manual for the operation and maintenance of the pellet mill.
9. Please contact with us to buy a new operation manual if this one is lost or damaged.
10. Please send this operation manual together with the pellet mill once the pellet mill is transferred.
11. Please pay attention to the following notes about equipment application, warranty scope and warranty period and so on
    1) Application: the pellet mill is specialized on the production of animal feed. Normally it is used to treat powdery and fluid materials into feed pellets for poultry, livestock and aquatic animals.
    2) Warranty scope: pellet mill bloc.
    3) Warranty period: one year after purchasing the pellet mill, except easily worn-out parts.

Notes:

(1) The copyright of this operation manual is reserved by Yangzhou Kerunde Machinery Co., Ltd. Without the prior written authorization of Yangzhou Kerunde Machinery Co., Ltd, this manual shall not be provided in whole or in part to a third party , nor will it be used for purposes other than originally specified.

(2) If the contents of this Operation Manual and specifications of this product are to be changed, we would not notify of them further.

Content

1 Safety

1.1 Ambient condition

For the purpose of safe operation of the equipment, please install it according to the following conditions

(1) Indoor installation

- ♣ Ambient temperature: -5～+40℃;
- ♣ Relative humidity: 30~85%;
- ♣ Altitude: ≤1000m
- ♣ Keep the environment clean and air circulating, keep the equipment far away from corrosive gas, flammable gas and steam.

(2) Power source: voltage, frequency please refer to the motor name tag; atmospheric pressure≥0.4MPa.

(3) Reserve enough space for equipment operation, check and maintenance.

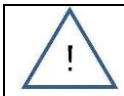
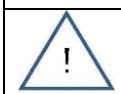
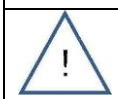
(4) Please place the equipment horizontally.

(5) Under the influence of the many complex conditions, the vibration degree cannot exceed 10mm/s.

1.2 Warning marks explanation

(1) In order to fully comprehend this operation manual, the warning marks are separated into several groups stated as below.

(2) These warning marks are formulated in accordance with the operation manual and safety cautions of this pellet mill in order to avoid accidents. Some precautionary measures are included, too. Please fully comprehend these warning marks before the operation of the pellet mill.

 Danger	This mark indicates that safety cautions and related regulations must be obeyed during the operation of the equipment in order to avoid fatal and major accidents.
 Warning	This mark indicates that safety cautions and related regulations must be obeyed during the operation of the equipment in order to avoid potential and major accidents.
 Notice	This mark indicates that safety cautions and related regulations must be obeyed during the operation of the equipment in order to avoid minor injuries and potentially moderate accidents.

1.3 Safety marks and mark explanation

(1) The parts which are dangerous to personal safety are all marked on the equipment.

(2) Please carefully comprehend these safety marks.

(3) Please place these marks nearby the equipment.

(4) Please replace these marks once they are torn or worn off.

(5) Please contact with us if you need to purchase new marks.

① Security : Do not open the junction box until it is switched off to avoid electrical injury

② Maintaining according to the operation manual

③ Mechanical injury: Do not contact running parts with hands when the machine is running. The inspection, repair, disassembly or replacement etc. shall be carried only after the machine is stopped.

④Burn injury: Do not touch the machine with bare hands when the machine is running.

⑤ Do not remove the safety guard when the machine is running or not completely stopped.

⑥ Wearing gloves during maintenance.

⑦ Do not climb or stand on the machine.

1.4 Precautions

(1) The operator of the pellet mill means the person who involves in the operation, inspection and maintenance of the pellet mill.
(2) The operator of the pellet mill must fully understand the operation manual prior to the operation of the equipment.
(3) The owner of the pellet mill must pass this operation manual to the operator of the equipment.
(4) The operator, while observing the precautions, must comply with the safety rules and regulations to avoid accidents.
(5) The leaders of the enterprise which owns this pellet mill have the duty to carry out safety education to related workers, meanwhile they must comply with the national, local and company rules and regulations on safety production.
(6) The manufacturer and representative of the pellet mill are not liable to any accident and damage of the equipment caused by failure to comply with the regulations of this operator manual.
(7) Please install and use the pellet mill correctly. Anyone who removes the safety guard or make it dysfunctional will be responsible for all the consequences arising therefrom.
(8) Any modification to the equipment should not affect the performance and safety of the pellet mill.
(9) Please strictly keep to all regulations on accident prevention during the operation of the pellet mill.
(10) Our company refuses to take any responsibility for the accident and damage caused by the failure to comply with the operation manual. If our company is required to fix those accidents and damage, we have the right to charge the appropriate maintenance and service fees.

1.5 Safety cautions during transportation, storage and installation

(1) The placement and carrying of the pellet mill must be conducted by the professional personnel.
(2) It must hoist the pellet mill by using specified tools, such as rope, crane and so on, in accordance with arranged order and specified way.
(3) No admission when hoisting the pellet mill.
(4) Nobody is allowed to stand under the pellet mill when it is hoisted in order to avoid fatal accident.
(5) The maximum load of the hoisting machine must be bigger than the total weight of the equipment.
(6) Put the equipment horizontally in an clean indoor room of ordinary temperatures for temporary storage.
(7)No bundling is allowed to the equipment during the delivery in order to avoid any damage to it. Any spare part missed or damaged during the delivery should be notify us.
(8) Reserve enough space for the equipment during the installation for future maintenance and replacement.
(9) Please put the spare parts of the pellet mill in the original packing box before installation. Properly cover those spare parts and packing box and put them in a place without weather stained.
(10) The grate bars, rods or security gate grids are supplied along with the equipment, which can be dismantled by tools. Any equipment with those grate bars, rods or security gate grids can only be started up after they have been installed.

1.6 Safety cautions during operation, inspection and maintenance

(1) The operation, inspection and maintenance can only be carried out by the specially trained technicians in accordance with the instruction of the operation manual. The electrical installation should be conducted by professionals in line with relative electrical safety standards.

(2) The power must be switched off and locked when carrying out maintenance and repair work, in case the motor of the pellet mill starts up accidentally.

3) The power must be switched off and locked when carrying out maintenance and repair work, in case the motor of the pellet mill starts up accidentally; meanwhile put signs in the entrance of the workshop and the electrical control room as well as nearby the pellet mill.

(4) Please pay attention to these parts where are affixed with safety marks.

(5) Any work is forbidden when the safety protection device and operation door of the pellet mill are open. The operation door is not allowed to open until the pellet mill stops completely.

(6) Please repair or replace the safety protection device of the operation door once it is found broken.

(7) The safety protection device should not be removed, covered or lapped at discretion. It can be only opened when the pellet mill stops completely. Only when the safety protection device is in a fully functional state, the pellet mill can be started up.

(8) The operation door is equipped with a safety protection switch, which must be connected strictly in accordance with the requirements so as to ensure that once the door is open, the switch is cut off and the pellet mill cannot be started up. The safety protection switch, which is crucial to life safety, should not be removed or abandoned; Once it has any fault, please repair or replace it immediately.

(9) Care must be taken to prevent the pellet mill from being started up in any unexpected way when it is in the shutdown state.

(10) The guard cover of the belt is not allowed to dismantle, only when carrying out maintenance to the pellet mill.

(11) If it has to remove the guard cover, dismantle the safety protection switch or open the operation door to carry out the inspection, maintenance or spare parts replacement of the pellet mill, the safety measures shall be formulated in advance.

(12) Do not touch the running parts of the equipment with your fingers when it is running. The inspection, maintenance and cleaning of the equipment can only be carried out after the pellet mill is completely stopped.

(13) If a welder or a tool which can creates sparks is needed for maintenance and inspection, safety regulations must be strictly obeyed to avoid dust explosion and fire.

(14) Repair or replace any damaged spare parts immediately.

(15) The connection box of the motor of the pellet mill is not allowed until the power is completely cut off so as to avoid electric shock to ensure the operation safety of electrical system.

(16) The following items must be obeyed for the electrical control system of the pellet mill, otherwise the supplier will be exempted from responsibility for technology security.

①The pellet mill must be checked by our technician before commissioning.

②The electrical control is a part of the safety requirements of accident prevention.

③If the electrical control of the pellet mill does not perform in accordance with the above conditions, the supplier refuse to take the relevant liability arising here from.

1.7 Personal Protection

(1) All the mechanical equipment manufactured by Kerunde are equipped with safety devices, which are consistent with modern technical level and universally effective safety rules prior to ex works, so that the customers can use the machines in accordance with the regulations.

(2) If the operators employed cannot read or write, the owner has the duty to explain to them clearly where dangers exist and warn them that special attention should be paid.

(3) The labor protection appliances, such as gloves, masks and work boots, must be applied during the operation in order to ensure the safety and health of workers

(4) Please execute the special regulations on accidents prevention in the operation manual provided by us.

(5) The enterprises are obligated to execute following regulations to guarantee operators' safety:

① The coupling shield caps of the machine must be mounted and closed at any moment. It is very dangerous to personal safety, if they are open or disassembled. This point is also applicable for the protection device of the manipulator.

② The safety limit switches should always be kept in good order. The safety limit switches may not be overlapped or discarded.

③ The driving motor must be switched off completely when carrying out inspection, commissioning, repair and maintenance. This can be realized through a full-phase separating and lockable switch installed near the machine or on the operation desk and control panel on the site. It is not enough only to screw off the fuse wire!

④ If the machine needs other energy like pneumatic, hydraulic, steam and hot water energy, it is necessary to cut off their energy supply or turn off the switch, and eliminate the pressure in the internal pipeline system of the machine.

⑤ As for handling heated or cooled parts and components of the machine, especial care should still be taken for the danger of burning possibility.

⑥ If you have pressed the emergency stop switch to stop the machine and you want to reset the switch, so it is not permissible to only re-press this button to restart the machine. And the machine can only be started by re-closing the main switch first.

⑦ If some machines are equipped with a local shutdown system, especial care should be taken. Read the instruction manuals attached with the machine carefully. In such machines with a local shutdown system, temperature will rise because pressure or vacuum will occur after they have been used for a period.

⑧ The cleaning, lubricating and oiling of the machine or its parts and components may be carried out only when the machine is stopped. If you must climb on or enter the machine to do such work, the mandatory provisions shall be made without exception: the power supply of motors must be cut off completely and the switch must be locked! Protection measure is needed when climbing.

⑨ Be careful, sampling from inside the machine can never be carried out unless there is not any danger. Usually, the samples can be taken from the pipe under the machine instead of inside machine.

⑩ Clear off the deposited dust, dirties and materials frequently. Keeping the machine clean can enhance production safety and the cleaning level of workshop, and is also beneficial to dust explosion prevention. If oil (grease) leakage occurs, clean it immediately and seal well the place where leakage occurs, for

oil or grease leaked on the floor will easily bring about hazards to the operators. In production operation, the machine must be equipped with safety devices, which may be neither removed and abandoned nor reduced in functions. Otherwise, we are not responsible for any accidents resulted here from, and reserve the right to ascertain where the responsibility lies.

1.8 Explosion protection: Countermeasures against Dust Explosion and Fire Hazard

(1) Common cleaning work

① Keeping the working site with combustible dust clean is an important condition for safe production.

② Try not to pile bagged or bulk materials between machines.

③ In order to reduce dust emission to surrounding areas, all conveying devices, cyclone separators and dust collectors should be kept in good condition to minimize the density of dust in air on site. Make sure that the pipes and covers on these machines are in good sealing conditions.

④ In order to reduce dust explosion hazard, dust everywhere must be cleaned out frequently and effectively.

⑤ Keep motors free of deposited dust.

(2) Regular inspection and maintenance

① Regularly check the safety devices such as speed monitor or the like, at least once a week.

② Regularly check and clean the magnet separator, at least once a day.

③ Inspect and check the functions of main shaft and the bearings of main shaft regularly, thus to prevent them from heating, at least once a week. And fill lubricating oil according to the regulations.

(3) Regularly check the electric apparatus and articles, and special attention should be paid to the following points:

① It is forbidden to use any flashlights and other lamps without shielding or explosion-proof glass.

② It is forbidden to use a lengthened cable and an electric stove on job site.

③ It is necessary to immediately repair or replace the electric apparatus and equipment if any failure occurs.

④ The cables without conduits are not allowed to be installed on the floor.

⑤ Cut off the power supply of the machine when going off work.

⑥ An electrician should be assigned to check the insulation of all the lines of electric network according to relevant regulations on heavy current, at least once a year.

(4) Smoking and welding

① Smoking is forbidden on working site, which is applicable to all workers and staff of the enterprise as well as guests, customers, foreigners and drivers visiting the factory.

② If the tools such as welding machine or soldering lamp (flame soldering lamp) etc. are required for repair or installation, do as best as possible to arrange the work in a special workshop or on a special site.

③ If it is necessary to carry out welding or the like directly in production area or storehouse once in a while, written applications must be submitted to a related supervisor in advance for written approval. The above mentioned operations can be carried out only when special safety measures have been taken,

such as laying pieces of water soaked canvas or canvas special for covering on the surrounding area and preparing fire extinguishers. After completion of the operation, the welding site and the surrounding area are to be monitored at least for 10h.

④ The gas cutting sparks are very dangerous, for people can't see where they will fly on earth. They can cross through the narrow clearance of walls and drop downstairs or to the next rooms, or even fly off 10 m away in distance. If the sparks drop in dusts, fire accidents may occur at any time.

⑤ Welding is prohibited on a running conveyor. If the welding work is necessary, shut down the machine first, and then make a thorough cleaning and isolate both sides of the welding site tightly with materials like mineral wool to avoid connecting with other conveying devices, silos or tanks. If the work is to be done on the chutes or conveying pipes, it is necessary to disassemble them or divert their lower ends and seal them to avoid welding sparks entering the conveying pipes or silos.

(5) Effect of static electricity

① In order to ensure the safety of electric circuits and avoid explosion resulted from spark discharge.

② The paint coated at the electric connections must be removed.

1.9 Measures for environmental protection

Any machine has a certain service life. If you decide not to use the machine any longer because its service life is over or for other reasons, the machine should be disposed according to local relevant laws, and at the same time, the measures for environmental protection and reutilization should be taken:

(1) Drain the liquids inside the machine (like motor oil, gearbox oil, brake oil and coolant etc.) into special containers and sent them to the preparation workshop;

(2) The plastic parts shall be picked out for reutilization.

(3) The metal parts shall be sorted out so as to be crushed or scraped.

2 General

The advanced KDZL Series Pellet Mill of Kerunde is produced exactly in accordance with the international technical standards

2.1 Application of the machine

(1) This machine is specially used for feed processing, generally for processing powdery, flowable and easily pelleted materials.
(2) To ensure safety, this machine shall be used in the areas with an altitude lower than 1000m, a temperature from -5℃ to 40℃ and an air relative humidity from 35％ to 85％.
(3) Do not use it for processing of food.
(4) If the area does not conform to above conditions, please indicate specially when ordering.

2.2 Characteristics of the machine

(1) The dual-motor v-belt driving system is adopted for this machine type, which is characterized by ideal drive ratio, great driving moment, smooth rotation, high throughput, low noise, easy operation and maintenance.
(2) Cone-type ring die assembly is adopted.
(3) Two rollers adopted divided the die into two pelleting areas; Rotary feeding tank equipped with two deflection distribution scrapers is adopted, contributing to well-distributed feeding, high output and good product quality.
(4) This type of machine can be fitted with many kinds of ring dies with φ2-φ10 die holes and different thickness, and the user can select based on demand for achieving the optimum technical and economic efficiency.
(5) The electromagnetic adjustable speed motor or variable frequency adjustable speed motor is selected for this machine type to feed material based on customer demand. The overload protection devices and outside discharging mechanisms and lubrication system are adopted
(6) It is available to select different type of conditioners as required, such as single-layer, double-layer, triple-layer and jacketed type conditioners which are equipped with the function of adding molasses.

2.3 Main structure of the pellet mill

The principal machine consists of a main motor, a V-belt driving mechanism, a rotor, a ring die, press rollers, scrapers, a cutting assembly, a machine body and gates etc. (see Fig.2-1). The materials conditioned by the conditioner are delivered uniformly by the rotary feeding cone and two deflection scrapers into the two pelletizing areas composed by the press rollers and the ring die; the mash is extruded gradually by the ring die and two counter rotating parts of press roller into the die holes, being formed in the die hole and extruded out to outside ceaselessly; the formed pellet is cut off to length by the cutting knife, finally the formed pellet is discharged out of the machine.

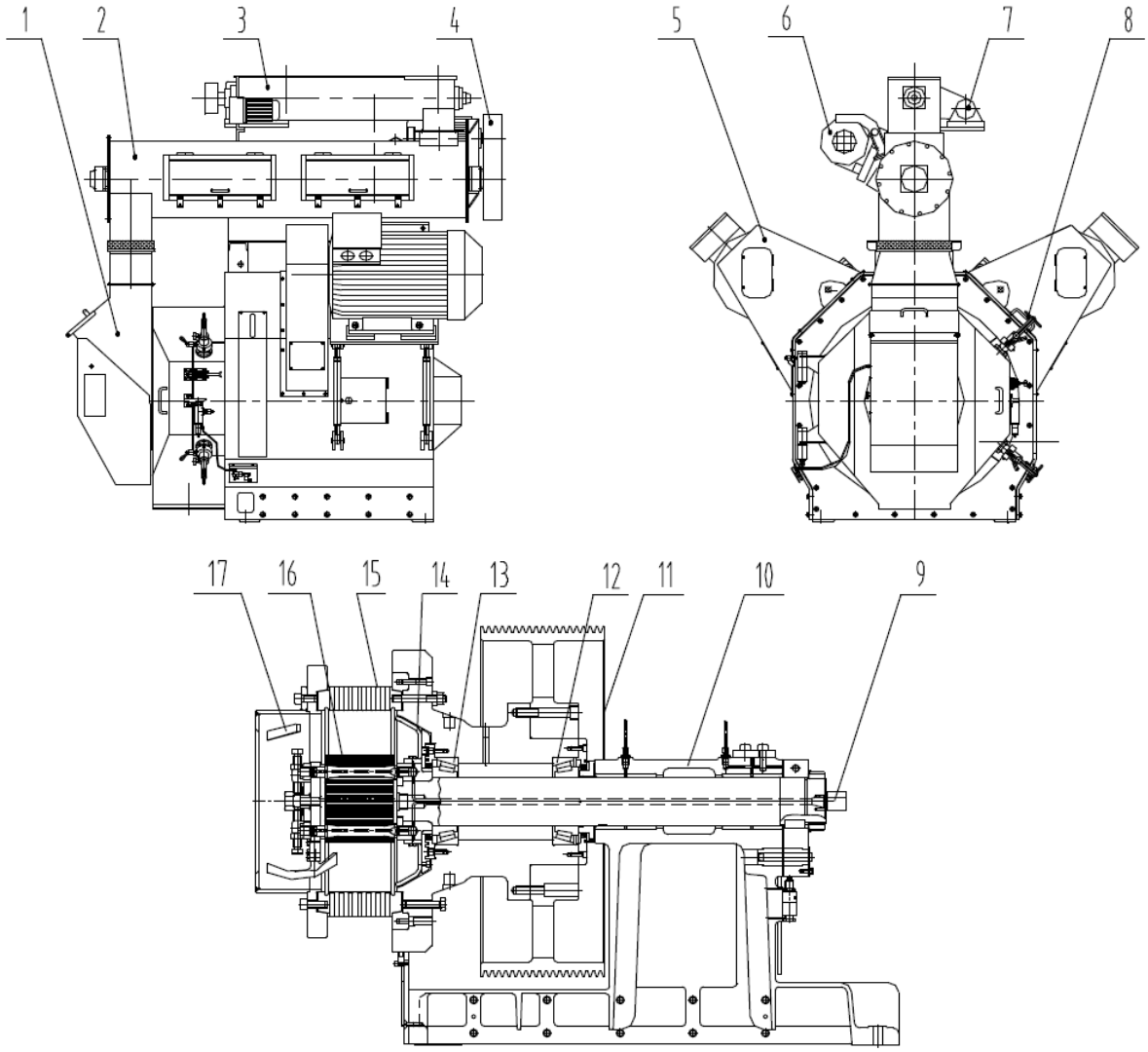


Fig. 2-1

1.Pellet mill bloc 2.Conditioner 3.Feeder 4. Driving system of conditioner 5.Main motor 6. Motor of conditioner 7.Driving system of feeder 8.Cutter assembly 9 Lubrication system 10.Base 11. Rotor assembly 12. Rear end bearing 13. Front end bearing 14.Inner scraper 15.Ring die 16.Press roller assembly 17. Deflection scraper

3. The specification of pellet mill

3.1 Running conditions

(1) Material characteristics

Bulk density: 0.15～0.8 t/m³

Moisture content of raw materials: 10～14%

(2) Circumstance conditions

① Ambient temperature for running: -5～+40℃

② Relative humidity for running: 35％～85％

③ Altitude for running：≤1000m

④ Temperature for transportation: -25～55℃

⑤ Normal air source: ≥0.4MPa

⑥ Normal voltage refers to the motor nameplate

(3) Configuration conditions

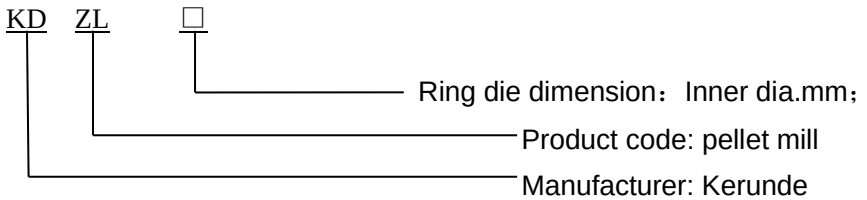
① The pellet mill must match with the upstream equipment and the downstream equipment in process.

② Allowable voltage deviation: ±5%, the frequency deviation: ±1Hz.

③ Overvoltage protection device must be adopted.

3.2 Meanings of model and main technical parameters

3.2.1 Meanings of model

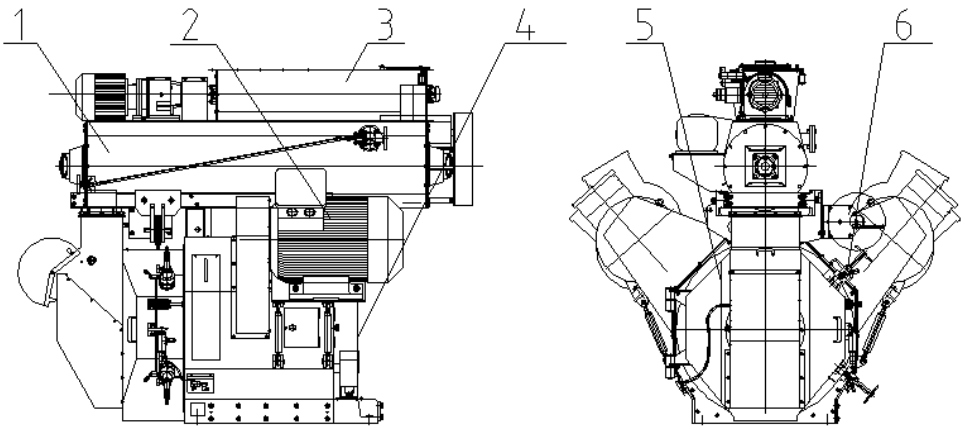


3.2.2 Technical parameters

Item	KDZL350	KDZL420	KDZL550	KDZL630	KDZL800
Power of main motor	37kwX2/30kwX2	55kwX2	75kwX2	90kwX2/110kwX2	132kwX2/160kwX2
Power of feeder	1.5 kW /2.2 kW	2.2 kW /3.0 kW	2.2 kW /3.0 kW	2.2 kW /3.0 kW	3.0kW/4.0kW
Power of conditioner	7.5kW	7.5kW	7.5 kW	7.5kw/15 kW	15kW
Rotating speed of conditioner	300R.P.M	300R.P.M	300R.P.M	300R.P.M	248 R.P.M
Linear speed of ring die	7.85m/s	7.25m/s	8.35 m/s	6.56m/s	6.5m/s
Effective size of ring die	φ350X100	φ420X134	φ550X170	φ630X197	φ800X222
Working temp. of ring die	≤90℃	≤90℃	≤90℃	≤90℃	≤90℃
Steam consumption	50kg/t	50kg/t	50kg/t	50kg/t	50kg/t
Working pressure of steam	0.10~0.4MPa	0.10~0.4MPa	0.10~0.4MPa	0.10~0.4MPa	0.10~0.4MPa
Steam temp.	100-140℃	100-140℃	100-140℃	100-140℃	100-140℃
Roller Qty.	2	2	2	2	2
Capacity	5	10-12	15	5-18	15-30

Note: The power of conditioner refers to the power of single layer conditioner. Any special requirement shall be illustrated

3.3 Auxiliary equipment



1.Conditioner 2.Main motor 3.Feeder 4.Lubrication system 5.Cutter assembly 6. Machine bloc

Fig3-1 Schematic diagram of pellet mill

This machine consists of a feeder, a conditioner, a machine bloc and a lubricating system (see Fig.3-1). Its working procedure: The mash with moisture content less than 18% as required enters the feeding auger from the hopper in a proper feeding rate that is adjusted by the stepless speed adjustment motor, and then enters the conditioner. The material will be sufficiently mixed with steam in the conditioner by the stirring shaft of the conditioner, and molasses or oil can be added through the special feeding inlet if necessary. The temperature of compound mash is normally controlled within 50~90℃ and the humidity 14~18% based on different formulas, and finally the material enters the pelletizing chamber and is pelletized into pellets.

3.3.1 Feeder

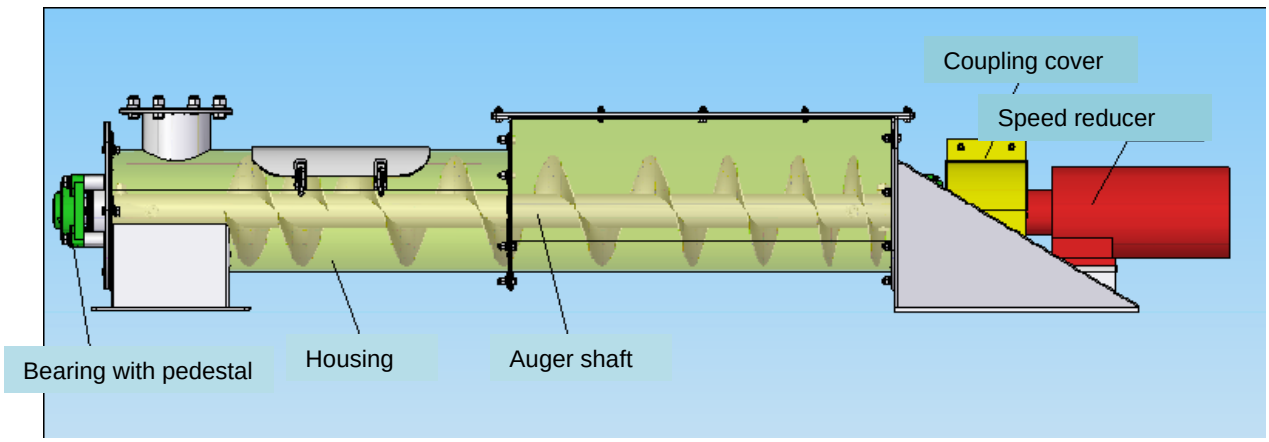


Fig.3-2 Feeder

The feeder is composed of an adjustable-speed motor, a speed reducer, a coupling, an auger shaft and an auger housing.

The speed control motor is composed of an adjustable-speed motor and a speed reducer. It works with the speed excitation regulation principle and its output speed is changed by the controller.

A cycloid pin gear speed reducer with a speed reducing ratio of 1:11 allows the feeding auger to regulate

speed in a range of 0~132 r/min.

The feeding auger is composed of a housing, an auger shaft and bearing with pedestal, and its auger shaft is driven by the speed adjustable motor.

3.3.2 Conditioner

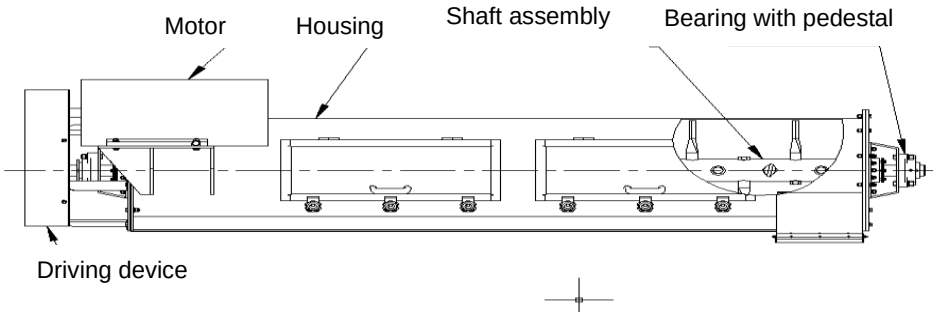


Fig.3-3 Conditioner

The conditioner is composed of a motor, a driving device, a conditioning rotor, a housing and a steam inlet. The conditioner serves the function of introducing steam with 0.1~0.4MPa, the compound feed is conditioned to a certain temperature and humidity and then enters into palletizing chamber.

The temperature of the housing of the conditioner is normally more than 50℃, the maximum can reach more than 95℃, so it is forbidden to touch the conditioner with your hands to avoid scald. If the repair or maintenance is in need, thermal-insulated gloves must be wore by the worker.

3.3.3 Steam system

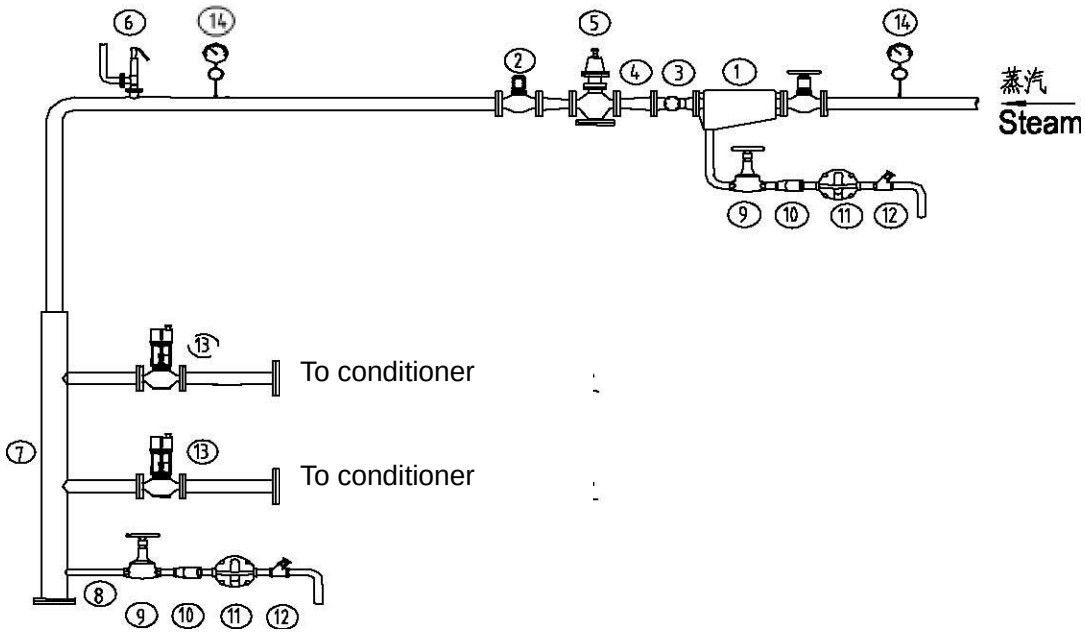


Fig.3-4 Steam pipeline system

The Fig.3-4 shows the pipeline flow sheet for the conditioner. Steam is generated by the boiler. The pressure of steam provided by the boiler shall be not less than 0.7 MPa, and the steam supply amount is calculated according to 50 kg per ton pellet plus loss. Generally, the steam pressure in the main pipe shall be not less than 0.7 MPa, and the pressure of steam entering the conditioner after being depressurized by relief valve

is within 0.1~0.4 MPa; if equipped with jacket conditioner, the pressure of steam into jacket should not exceed 0.1MPa.

Table 3-1 shows the specs of steam pipeline components required according to different steam transmission capacity for selection by user.

Table 3-1 Calibers of steam pipeline for pellet mill

No.	Designation	Qty	Specs of valves and pipelines of related steam supply amount (kg/h)				
			350	420	550	630	800
1	Steam-water separator	1	1-1/2 "	1-1/2 "	2 "	2 "	3 "
2	Stop valve	1	1-1/2 "	1-1/2 "	2 "	2 "	3 "
3	Filter	1	1-1/2 "	1-1/2 "	2 "	2 "	3 "
4	Reducing pipe	2	1-1/2 "	1-1/2 "	2 "	2 "	3 "
5	Relief valve	1	1 "	1 "	1-1/4 "	1-1/4 "	1-1/2 "
6	Safety valve	1	1-1/2 "	1-1/2 "	2 "	2 "	3 "
7	Pipeline		2-1/2 "	2-1/2 "	3 "	3 "	4 "
8	Pipeline		1/2 "	1/2 "	1/2 "	1/2 "	3/4 "
9	Stop valve	2	1/2 "	1/2 "	1/2 "	1/2 "	3/4 "
10	Filter	2	1/2 "	1/2 "	1/2 "	1/2 "	3/4 "
11	Draining valve	2	1/2 "	1/2 "	1/2 "	1/2 "	3/4 "
12	Check valve	2	1/2 "	1/2 "	1/2 "	1/2 "	3/4 "
13	Stop valve	1	1-1/4 "	1-1/4 "	1-1/2 "	1-1/2 "	2-1/2 "
14	Steam pressure gauge and accessories	2	1.6Mpa	1.6Mpa	1.6Mpa	1.6Mpa	1.6Mpa
Remarks	1. The draining pipeline and 3/4 " relief valve can be connected by screws, and others shall be connected by flanges;						
	2. The relief valve shall be installed not less than 4,500 mm away from the steam inlet of the conditioner；						
	3. Steam consumption of the pellet mill shall be calculated based on 50 Kg/ton granular material.						
	4. The filter must be installed in front of the relief valve.						
	5. Steam pipes shall be bought by the owner. In order to ensure the efficient, stable production, it must be strictly in accordance with the steam pipeline flow chart configuration process.						

3.4 Structure of machine bloc

3.4.1 Main motor

There are two main motors respectively arranged on both sides symmetrically of machine bloc.

The two motors shall rotate in the same direction and finally the rotating direction transmitted by them for the ring die shall be clockwise (according to indication of mark).

The two motors shall startup in star form at the same time, while under normal operation speed, one motor is transferred to a triangle connection firstly, and the other also to a triangle operation about five seconds later.

3.4.2 Pelleting chamber assembly

The pelleting chamber assembly is composed of the rotation feeding cone, the rotation cone pulley ring, the roller assembly, the adjustable bolt of roller, the regulator of roller, the front plate assembly, the upper and lower deflection scraper and so on, See Fig 3-5.

Please refer to the section of 6.5.1、6.5.4 for the assembly, disassembly and maintenance of the roller

assembly.

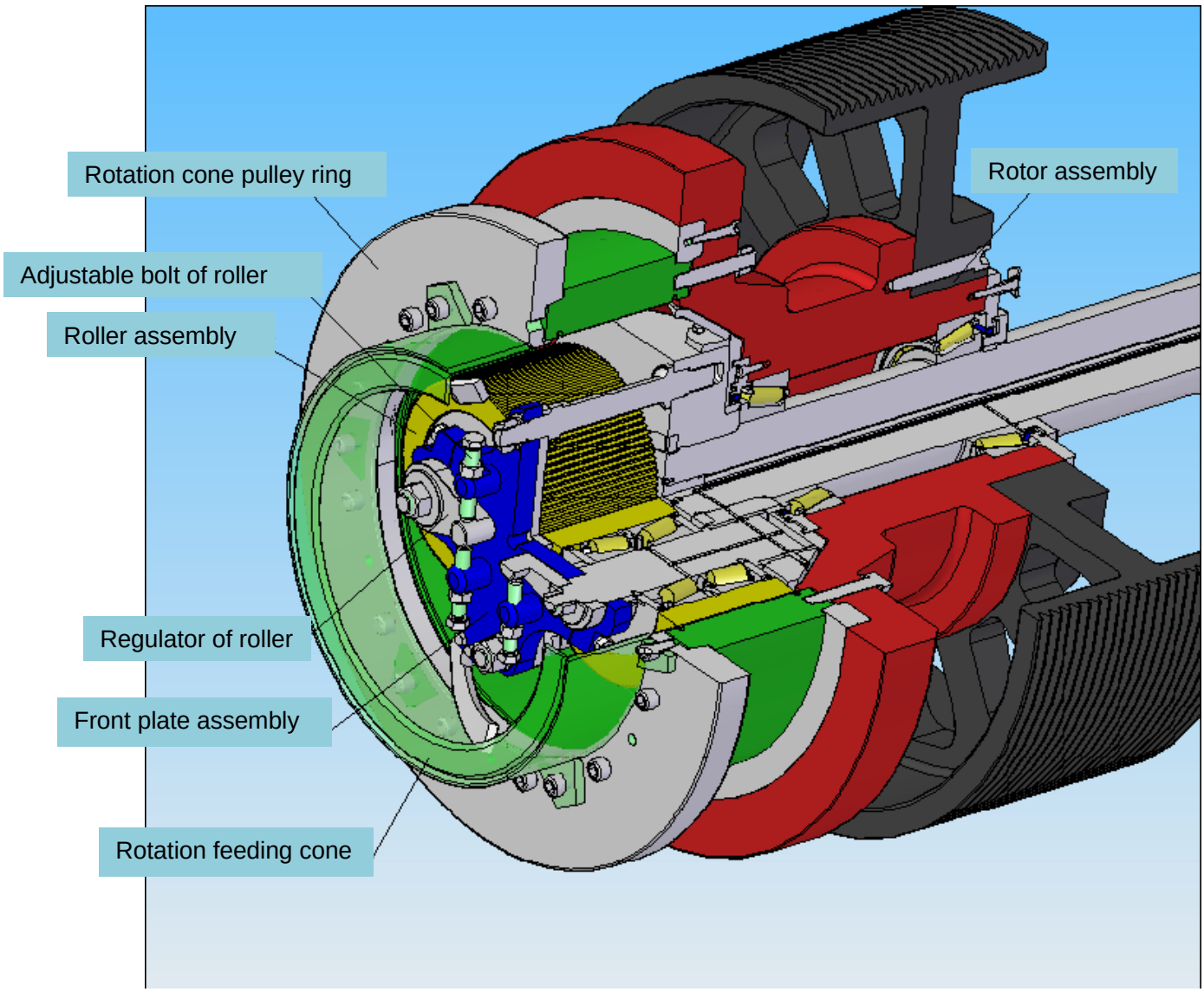


Fig. 3-5 Pelleting chamber assembly

3.4.3 Rotor assembly

Main components of rotor assembly are shown in Fig. 3-6.

The oil way of rotor assembly shall be kept straightway, and lubricating oil leading to press roller bearings shall overflow from the seal plate at the end of the press roller after being filled up, and lubricating oil leading to rotor bearings shall overflow from the clearance between the rotor and main shaft disc after being filled up instead of from the rear end of the big pulley (the installation direction of oil seal of rotor is shown in the Fig).

In good lubrication, the bearings and oil seal of the rotor are uneasy to be damaged. It is suggested to ask pellet mill experts of Kerunde for guide when replacing bearings and oil seal.

3.4.3.1 Specification and type of ring die

It is essential to select ring die with correct material quality, structure, and dimension of die holes for improving the efficiency of the pellet mill.

The ring die is usually made of forged material of high chrome alloy by vacuum heat treatment after being machined, and it is of good abrasion resistance and corrosion resistance.

Types of die hole structure of the ring die include:

- Standard cylindrical holes;
- Holes with a conic inlet ;
- Special die holes such as square holes, conic holes, and special number of holes.

Specifications of the ring die:

Model	Inner dia. Of die （mm）	Effective width of ring die （mm）	Total width of ring die （mm）	Fixing bolt hole
KDZL350	350	100	142	M16x20
KDZL420	420	134	180	M20×20
KDZL550	550	170	235	M20×28
KDZL630	630	197	260	M24×25
KDZL800	800	222	315	M30×30

Pay attention to the wearing condition of the driving rim and locking ring of the die. As for the assembly, disassembly and maintenance of the die, please refer to the section of 6.5.5.

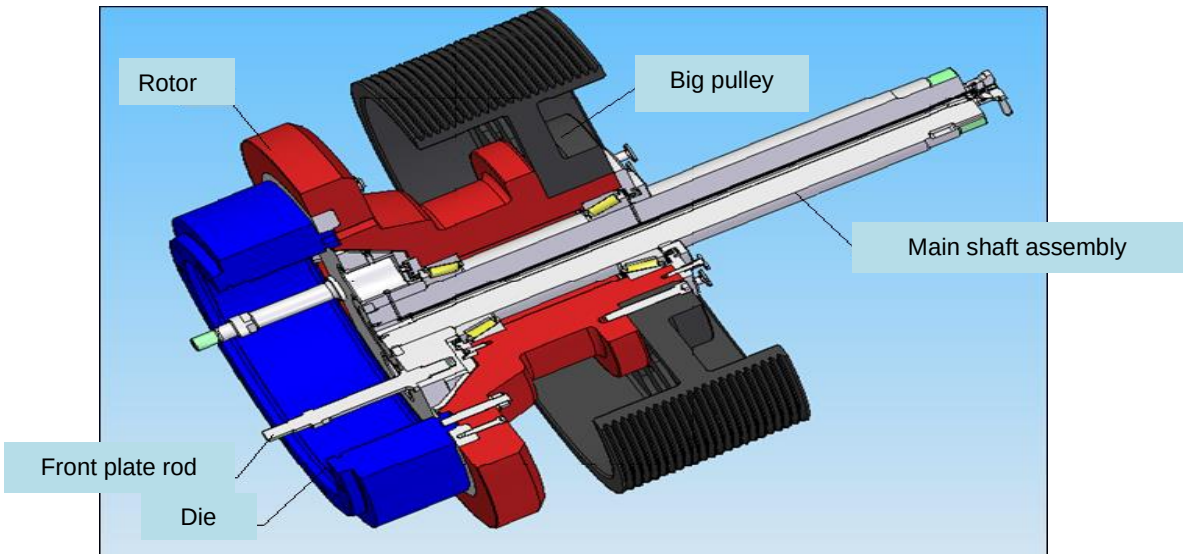


Fig.3-6 Rotor assembly

3.4.4 Roller assembly

Each pellet mill of this type contains two press rollers, and each is mainly composed of an eccentric shaft, a shell, bearings, spacers, seal plates, seal rings, check rings, round nuts, lock washers and small pins (Fig. 3-7).

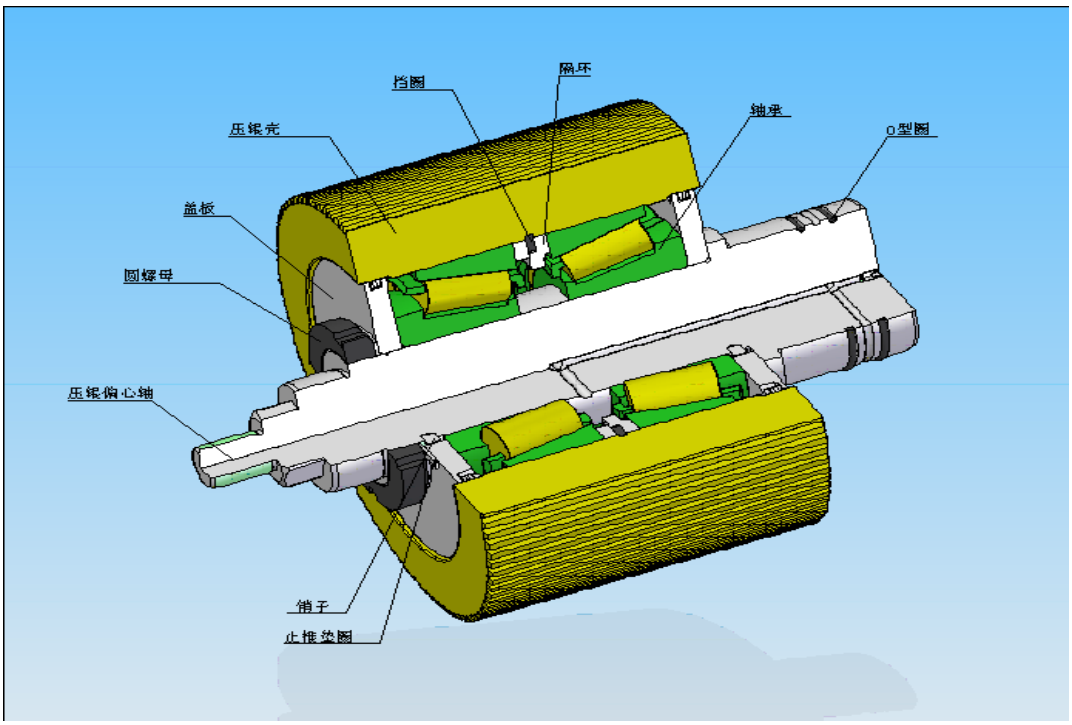


Fig. 3-7 Roller assembly

3.4.4.1 Roller shell

The shell of press rollers is made of wear-resistant alloy by processing and heat treatment. The tooth face of press roller shall have a certain effect on the pelletizing performance.

Our company mainly manufactures the following press roller shell with tooth faces: honeycomb, tooth socket, tooth socket with edge seal and chute.

Honeycomb and tooth socket press roller are mainly used for pelletizing feeds for livestock and poultry.

The honeycomb press roller features itself uniform abrasion of ring die, but poor rolling performance.

The tooth socket press rollers are of good rolling performance, and it is widely used in feed mills; however, the abrasion of the ring die is out of uniformity.

The tooth socket press rollers with edge seal are mainly applicable for pelletizing feeds for aquatic animals, and the extruding feed is uneasy to be moved towards both sides.

Model	Diameter of roller shell (mm)	Width of roller shell (mm)	Tooth face of roller shell
KDZL350	150	106	Honeycomb, gullet, tooth socket with edge seal and chute
KDZL420	205	142.5	Honeycomb, gullet, tooth socket with edge seal and chute
KDZL550	265	175	Honeycomb, gullet, tooth socket with edge seal and chute
KDZL630	310	210	Honeycomb, gullet, tooth socket with edge seal and chute
KDZL800	395	235	Honeycomb, gullet, tooth socket with edge seal and chute

4 Transportation, installation and adjustment

4.1Transportation

(1) Hoisting

① Hoisting device on the machine body shall be correctly used when hoisting (refer to the Fig.4-1).

② The hoisting rope should bear the total weight of the pellet mill, including the conditioner and the feeder.

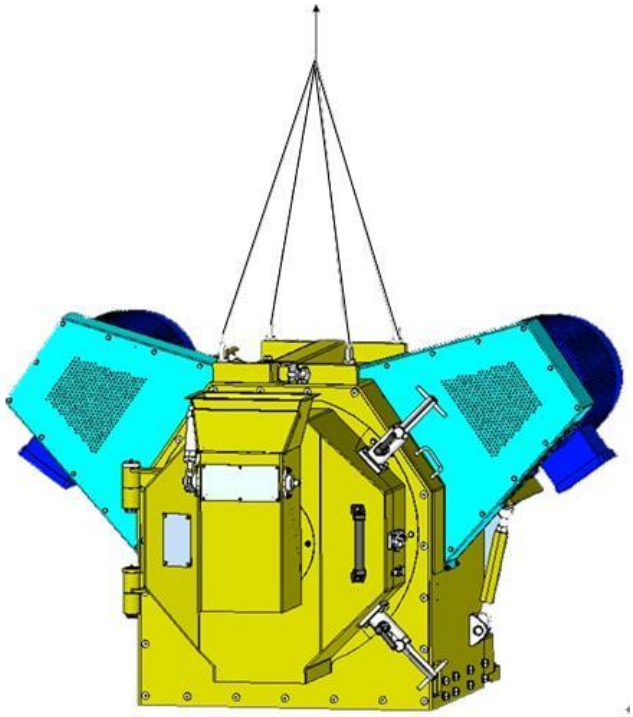


Fig.4-1 Hoisting drawing of pellet bloc

(2) Transportation

①When the machine is to be delivered out of the manufacturer plant, a decision can be made on whether a package box is to be used in accordance with the actual condition.

②If a package box is not to be used, weatherproof measures should be taken in transportation, and the equipment should be protected against collision and overturning.

③ When packing, the machine and accessory parts should be fixed rigidly in the packing box, and clearances should be reserved between them and the walls of the box for avoiding any collision damage in transportation.

④ DO NOT overturn, heavily press and impact the machine body in transportation.

(3) Storage

①Rainproof, sun-proof and anti-seeping facilities shall be equipped when stored in the open air, measures for good ventilation and damp proof shall be taken when stored indoors.

②For long term storage, the machine should be kept in an aerated, dry and cool place, and measures should be taken for protecting the machine from humidity and rain, and the revealed surfaces should be coated with anticorrosive oil.

4.2 Mechanical installation

(1) Unpacking inspection

① When the machine has been delivered to a destination site, open the package and check against the packing

list for any collision and wearing in transportation.

② Carefully check the documents and accessory parts delivered together with the machine, and place on a fine record.

(2) Schematic diagram for installation

①Contact with Kerunde for asking schematic diagram for installation

②Installation

a) Normally, the machine is delivered as a complete set, so when the package is opened, first carefully check if it is damaged in transportation.

b) The ground and frame structure for installing the pellet mill shall be stable and with good supporting capability to bear the fully loaded working of the machine.

c) Refer to the schematic diagram and overall dimension provide by Kerunde for installation

d) The pellet mill should be placed on a horizontal place which is with enough strength to ensure the stable performance of the equipment. The machine base should be connected not only with the mainframe by bolts, but also with foundation bolts firmly, otherwise, the machine will vibrate and even an accident will occur if it vibrates seriously.

e) If the pellet mill is not installed at an operational height level, a working platform shall be provided for easy operation and maintenance.

f) There shall be enough space around the pellet mill for easy operation, repair and maintenance.

g) Both the feeder and conditioner can be directly fixed on to the principal machine of the pellet mill by bolts; meanwhile the conditioner outlet shall be identical with the outlet of the pellet mill.

h) Keep the safety signs clean and do not remove or cover them. The safety guards can never be dismounted, covered or overlapped at will. And the machine can only be started when these safety guards are in good order functionally.

i) If other conditioner or feeder needs to be adopted, the change in installation dimensions should be confirmed by Kerunde.

4.3 Connection of compressed-air piping

The proper supply of compressed air is significant for normal working of the pellet mill. The opening and closing of the cylinder controlled bypass gate on this machine The pressure of compressed air needed for the cylinder of the discharging device at the inlet gate of the pellet mill shall be not less than 0.4 Mpa.

4.4 Installation of steam piping

Refer to the section “**Steam system**” for the installation procedures of steam pipelines and type selection of pipe fittings.

〔Note〕:

1. The steam piping should be laid by a professional steam piping installation company according to local rules and regulations.
2. Abide by the rules and regulations for steam quality and amount specified in this Operation Manual.
3. Cover the steam piping with a thermal insulating layer.
4. Check the steam pipes whether they are sealed or not after connection. And rinse the pipes to remove dirt.

5. After first use, clear all the filters.

4.5 Electric connection

(1) Power connection of the principal machine, control system and control cabinet should be done according to local rules and regulations.

(2) Normal functional power supply range for the machine is (+/-10%V, +/-1Hz);

a. Lay the power cables and install the circuit protection breakers according to power voltage and motor power as well as the stipulations of the supplier. Correctly connect and check all grounding wires.

b. Lay the power cables for the control and electric cabinets on the installation site.

The motors shall be interlocked with each other when laying power cables, and switched on according to following sequence:

(1) Main motor for the pellet mill

(2) Motor for the conditioner

(3) Motor for the feeder

There shall be an unlocking device between the main motor and conditioner motor, so that it needs not startup the main motor when only the conditioner needs to be started. Attention should be paid to motor rotating direction when wiring the motors, no mistake is allowed.

5 Operation

5.1 Cautions

Note: (1) Pay attention to those parts marked with dangerous marks.

(2) The protection device cannot be dismantled, covered or lapped.

5.2 Preparations in prior to operation

Preparations to be done as follows before startup:

(1) Open the pellet mill gate.

(2) Check if there is any foreign matters like tramp iron in the feeder, conditioner and pelletizing chamber.

(3) Turn each movable joint by hands to ensure no blockage in them.

(4) Fill in lubricating oil based on a lubricating chart, the grease can be filled in the press roller after startup of the machine.

(5) Start up the motors of feeder and conditioner for idle running to check the rotating direction, noise and other abnormalities; and then stop the machine when it runs at a low feeding rate.

(6) Check the steam supply system for normality, and the steam pressure should be at 0.1~0.4MPa.

(7) When starting the main motor, firstly check and ensure that all rotating parts in the pellet mill can run freely, especially the clockwise rotation of the ring die, and then adjust and make the surface of two press rollers contacted slightly with the inner surface of rotary ring die, so that the press rollers can rotate smoothly under the action of ring die.

(8) The pellet mill must not run without loaded feed for avoiding the damage of ring die and press rollers.

(9) Close the access door of the pellet mill and ensure the enough feeds in the bin above feeder to flow into the feeder evenly and ceaselessly. Discharge the condensed water in steam pipeline for preventing the water from dropping into the conditioner. Before closing the bypass gate, operate the machine by a proper amount of feed to clear away the impurities like tramp iron etc. inside the machine.

5.3 Pelletizing

A new pellet mill or a pellet mill with a new ring die should be started up according to the following procedure:

(1) The operator of the pellet mill must know well the structure, function and operation of the machine. He or she must be trained by Yangzhou Kerunde Machinery Co., Ltd.

(2) Start up the equipment of the process step just after the pellet mill→Start up the main motors of the pellet mill→Start up the conditioner motor→Start up the feeder motor, adjust the electromagnetic adjustable-speed motor or the frequency conversion motor to a low speed, and allow the feed to enter the conditioner slowly and then into the feeding cone and ring die.

(3) Do not add any steam at the beginning of pelletizing, and slowly quicken the feeding rate based on the current of the main motor.

(4) Open the steam valve a bit, and increase the feeding rate properly when the ammeter's pointer is falling; then when the ammeter's pointer of the main motor reaches the normal load, add steam amount to allow the ammeter's pointer to fall back. Repeat such operation again and again until the best quality of pellet is obtained.

(5) The feeding rate and steam supply amount vary with the die type and feed formulation, so the operator shall be rich in operating experience.

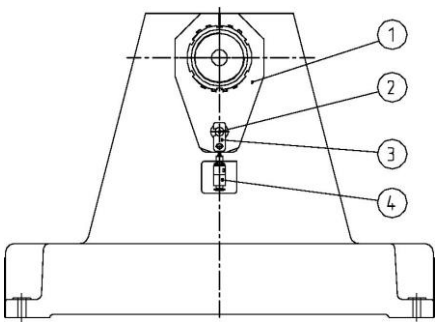
(6) Observe the current difference between the two motors, it should not excess 10A, otherwise the performance of the equipment will be impacted.

5.4 Protective measures for pellet mill

The following safety measures should be ensured for normal and safety operation of the pellet mill:

(1) Overload protection devices

The overload protection device of safety pin structure connected with a limit switch is provided at the tail end of main shaft in this machine. When there is any hard foreign matter enters the pelletizing chamber or when the material flow rate is too high or the steam is not steady, the pressure between the press rollers and the ring die will exceed the normal working load value, the rotor will drive the main shaft. When the torque of the main shaft exceeds the normal design value, the shear force on the safety pin exceeds the shear force limit of the safety pin, thus the safety pin is sheared off and the limit switch acts to cut off the power supply and stop the machine.



1. Shear pin disc 2.Shear pin 3.Stop cushion 4.Drawing for limit switch

Fig.5-1 Shear pin for overload protection

(2) Pneumatic emergency discharging device

A by-pass door is provided at the conic feeding inlet. If the feeding rate into the ring die is too high and the feeds deposited inside the pelletizing chamber are excessive and the motor load increased exceeds the rated value, the pneumatic device will automatically open the by-pass door, hence the feeds will be discharged from the by-pass door; after the motor load is reset normally, the by-pass door will be closed automatically and the

machine will resume its normal operation.

(3) For personal safety, when opening the pellet mill gate, the safety switch of the gate will act to cut off the power supply and stop the entire machine.

6 Maintenance

6.1 Safety cautions for maintenance and inspection

Apart from the safety items for equipment maintenance and inspection stated in chapter, following items should also be compiled:

1) Cut off the power supply in prior to the maintenance, commissioning and inspection of the equipment.
2) Cut off the power firstly, do not open the gate of the equipment with hands until it stops completely.
3) Only the trained technicians can carry out the work of spare parts replacement, equipment maintenance and other potentially dangerous work.
4) 3) Only the trained technicians can carry out the work of the maintenance of control system and the spare parts replacement of control system.
5) The equipment can only put into operation when such protection device as flat grate bar and safety grid are mounted.
6) If the safety cover or the protection device of the operation gate has to be dismounted for equipment maintenance, spare part replacement, Safety operation measures should be laid down in advance.
7) These safety cover and protection devices should be recovered when the above works are finished.
8) Put a sign of “Under maintenance and inspection” in the door of the room where the pellet mill is located, so as to notify other workers.
9) Accidents may occur if the maintenance and inspection of the equipment is not carried out in time.

Note: Do the inspection and cleaning in each shift.

6.2 Cleaning

Cleanness of driving components is very important, so it is necessary to clean the following components of the machine regularly:

Table 6-1 Cleaning position and method

Cleaning position	Cleaning method
Press roller, front plate, deflecting plate, main shaft disc, cutting knife, ring die, driving rim of ring die and pelletizing chamber	Cut off the power first whenever checking or replacing the components or assemblies in the pelletizing chamber or making maintenance, and then clean these components, especially the ring die, clamping block, press rollers and conical surface of main shaft disc.
Feeding bin and bypass gate	Use proper tools to clean away hard matters deposited here weekly.
Pellet mill body (front，fasteners of ring die, rotor and the inlet of the flange)	Clean away dirt, material or fat possibly dropping into the chamber monthly.
Pellet mill body (middle，close to the timing belt)	Clean it every six months.
Inner chambers of conditioner and feeder	Open, check and clean the repair gate of the conditioner or upper cover of the feeder monthly.
V-belt hood	Clean away dirt or material on the hood monthly.

6.3 Lubrication and inspection

6.3.1 Selection of lubricating grease

Lubricating grease selected shall be fit for working of the pellet mill since the machine works with a great load, severe vibration, high temperature in a corrosive environment.

Lubricating greases recommended as follows:

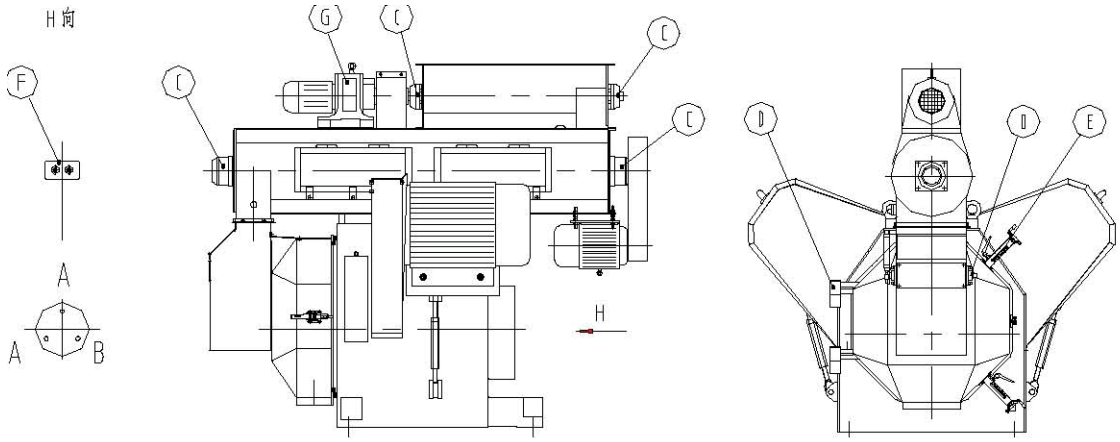
1)SHELL Alvania EP2 lubricating grease；

2)MOBIL Mobilux EP2 lubricating grease；

3)Home-made No. 2 extreme pressure industrial lithium base grease.

6.3.2 Lubricating positions and lubricant amount

Refer to following figures and table for lubricating positions and lubricant amount of the pellet mil and the corresponding table lubricating frequency and lubricant amount of the pellet mill.



代号	润滑部位	润滑周期	数量
A	压辊轴承	每运转 2 小时	95 ml
B	主轴轴承	每运转 12 小时	120 ml
C	喂料器调质器轴承	每运转 200 小时	15 ml
D	门转柱	每运转 200 小时	2 ml
E	切刀	每运转 200 小时	2 ml
F	主轴铜套	安全销断后加一次油	2 ml
G	无级变速装置	参阅该产品说明书	

图 6-1 颗粒机润滑部位图

Code	Lubricating position	Frequency	Lube amount
A	Bearing of press roller	Once every 2 operation hours	95ml
B	Bearing of main shaft	Once every 12 operation hours	120ml
C	Bearing of feeder and conditioner	Once every 200 operation hours	15ml
D	Gate rotating cylinder	Once every 200 operation hours	2ml
E	Cutter knives	Once every 200 operation hours	2ml
F	Bush of main shaft	Once every replacement of the shear pin	2ml
G	Stepless gear device	See operation manual of this product	2ml

Fig.6-1 Lubrication position

6.3.3 Daily checking list（before or during　the running of equipment）

No.	Position	Checking item	Cycle	Method	Solution
1	Steam	Pressure before relief valve higher than 0.6Mpa	Daily	Observe	Increase air pressure
		Pressure after relief valve about 0.4Mpa	Daily	Observe	Adjust relief valve
		Pipeline	Daily	Observe	Repair
		Steam trap valve	Daily	Observe	Repair
2	Machine	Sound	Daily	Listen	Check
3	Temperature sensor	Normal or not	Daily	Observe	Replace
4	Cutting knife	Wearing condition of cutting knife	Daily	Observe	Replace
5	Air bypass	Input air pressure higher than 0.6Mpa	Daily	Observe	Adjust air pressure
6	Bearing	Temperature less than 45°	Daily	Thermometer	Check
7	Motor	Temperature less than 45°	Daily	Thermometer	Check
		Current value	Daily	Galvanometer	Check
		Lubricant amount and sound	Daily	Observe	Check
8	Ring die	Taper-face mounting	Daily	Observe	Check
		Die hole	Daily	Observe	Clean
		Centering pin and bolt of die	Daily	Observe	Check, replace
9	Roller	Roller position	Daily	Observe	Check
		Worn condition	Daily	Observe	Check
10	Rear locking nut	Loosing or not	Daily	Observe	Check

6.3.4 Regular inspection list

No.	**Position**	**Inspection Item**	**Period**	**Method**	**Solution**
1	Belt	Clean condition	6M	Clean	
2	Filter	Clean condition	6M	Clean	
3	Bearing	Clean and refuel	1M	Clean and refuel	Fig.6-1
4	Belt, pulley	Tensioning condition	2W		Adjust
5	Seal	Cleaning and aging condition	1M	Clean	Replace
6	Protection device	Warning marks	1M	Observe	
		Limit switch, shear pin	1M	Clean	

Note: 1) The period is based on the condition that the equipment is used 12 hours per day, 25 days per month. Customer can adjust in accordance with real situation.

2) Power and current list.

Model	Rated power	Rated current	Working current
KDZL350	37X2KW	70.4A	70.4A or below
KDZL420	55X2KW	103A	103A or below
KDZL550	75X2KW	139.6A	139.6A or below
KDZL630	90X2KW	169A	169A or below
KDZL800	160kW×2	292×2A	584A or below

Note: 1) The working current means the motor current when the pellet is under normal running.

2) If the motor current is higher than normal working current, it needs to make sure whether the bearing of the main shaft is under overload operation.

3) The moment current of equipment startup and feeding materials is not included.

6.4 Maintenance tools

No.	Tool	Specification	Usage
1	wrench		Adjust the gap between roller and die
2	Allen wrench	M14	Mount and dismount ring die
3	Allen wrench 1 set	Flat width (mm)：4～22	Tighten bolts
4	Rotation rod	Accompanied with machine	Rotating rotor
5	Nut	M20×40	Mount and dismount ring die
6	Socket spanner 1 set		Adjust roller nut
7	Lifting frame	Accompanied with machine	Mount and dismount roller
8	Chain Blocks （2T）		For heavy spare parts
9	Steel wire		Mount and dismount ring die etc.

10	Lifter	Accompanied with machine	Mount and dismount ring die
11	Screwdriver		Tighten bolts
12	Galvanometer		Measure motor current
13	Thermometer		Measure temperature of motor and bearing
14	Knife		Cut
15	Vernier caliper		Measure length
16	Band tape		Measure length
17	Long ruler		Measure length
18	Grease gun		Fuel
19	Hammer		Beat
20	Rubber hammer		Beat
21	Electric hand drill (0～13mm)		drill
22	Bearing electric heater unit		Heat bearing
23	Circlip pliers		Dismount washer
24	Shears		Cut
25	Multimeter	Resistor, voltage	Check
26	Needle		Inspect
27	Scraper		Clean
28	Steel bush		Clean
29	Gas gun		Clean
30	Barrel	20L	Clean （Bearing etc.）
31	Dial gauge		Measure the gap between roller and main shaft
32	Oiler		Add lubricant for the bearings of main shaft and roller

6.5 Spare parts installation and adjustment

6.5.1 Adjustment of clearance between bearings of press roller

Bearing clearance is adjusted by locknut (2) on the press roller.

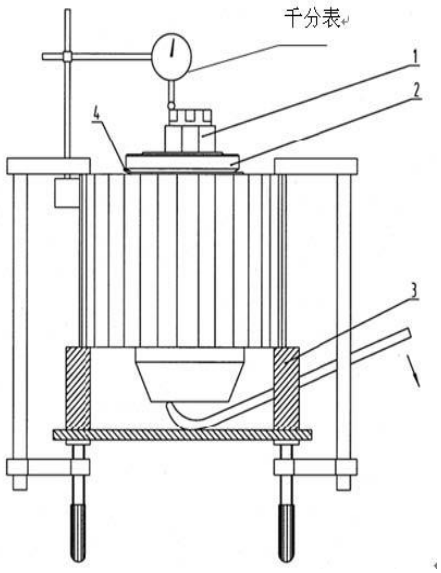
(1) Put the press roller on a working table, put two sizing blocks (3) between the press roller and working table, and the sizing blocks shall be under the shell of the press roller.

(2) Tighten the locknut (2) gradually and turn the eccentric shaft (1) simultaneously.

(3) Press the magnetic leg of the dial gauge on the shell of the press roller.

(4) Lift the eccentric shaft up to measure the bearing clearance, and the normal bearing clearance is 0.03~0.05mm.

(5) Use stopping washer (4) to lock the locknut.



1.The eccentric shaft 2. Locknut 3. Sizing block 4. Stopping washer

6.5.2 Adjustment of the clearance of die holder bearings (based on different models)

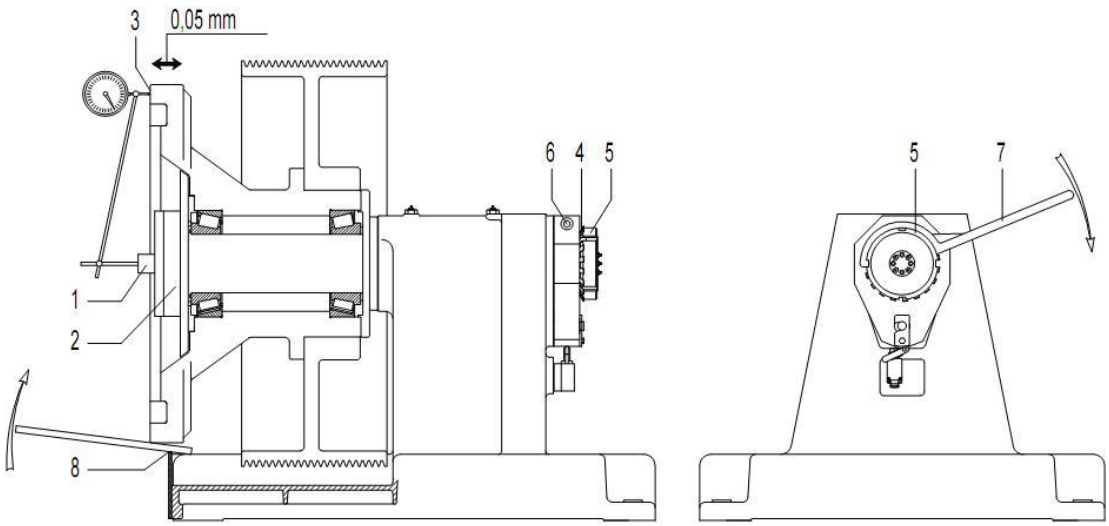


Fig.6-3 Schematic diagram for adjustment of the die holder bearing

The clearance of the die holder bearing is adjusted by means of the round nut at the tail end of main shaft. During operation the user should check the clearance of die holder bearing periodically (once every 1500 working hours, i.e. about 6 months), and timely adjust it if necessary, thus effectively extending its service life.

The adjustment can be carried out as follows:

(1) By means of the magnetic plate 1 fix the dial gauge on the shaft head 2 and lean the sensor on the edge of the quill shaft 3 after completely cleaning the shaft head;

(2) As figure shows, to read the dial gauge by rotating the quill shaft 3 with lever 7. The variation of values on the dial gauge should not exceed 0.05 mm;

(3) Unscrew the part 4 (the stopping washer), and loose the part 6(the fix bolt on the shear pin disc);

(4) Using a special spanner 7 to tighten the ring nut 5 until the correct clearance is restored;

(5) Lock again the part 4(the stopping washer) and tighten part 6(the fix bolt on the shear pin disc).

6.5.3 Adjustment of cutting knives

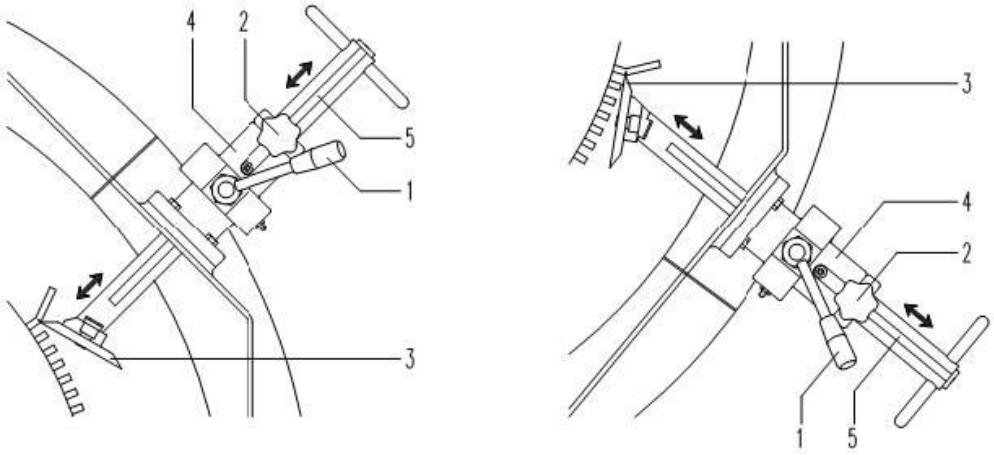


Fig.6-3 Adjustment of the cutting knives

The length of the pellets can be controlled by adjusting the interval between the cutting edge of the knives and the outer surface of the die. Generally, the length of the pellet is about 2-3 times of the pellet diameter.

If you want to approach the knife to the die surface, operate as follows:

(1) Loosen the hand grip 2 of the adjusting ring, move it outwards by the distance wanted, then lock it again;

(2) Loosen the clamp lever 1;

(3) Approach manually the knife 3 to the die and slide the rod 5 until the adjusting ring leans to the support stop 4. Approach the knife slowly without striking against the die;

(4) Lock the clamp lever 1.

If you want to move away the knife from the die, operate as follows:

1) Loosen the clamp lever 1;

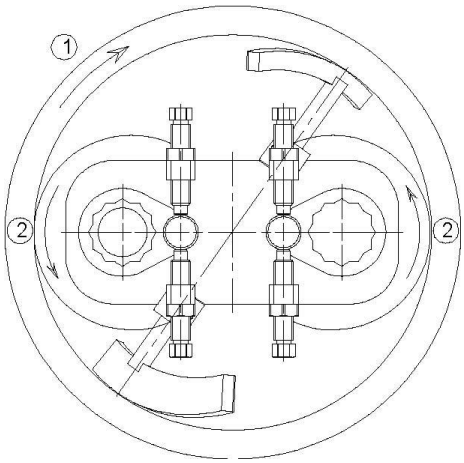
2) Move manually the knife 3 away from the die by pilling the rod 5 to the distance wanted; then fasten the lever 1 again;

3) Loosen the hand grip 2 of the adjusting ring and slide the ring until it leans to the support stop 4;

4) Lock the hand grip 2 of the adjusting ring.

6.5.4 Adjustment of the gap between roller and die

After the press roller is mounted in ring die, the clearance between outer surface of press roller and inner surface of ring die can be adjusted through eccentric shaft of press roller. It is a essential step properly to adjust the position between press roller and ring die. Correctly adjust the pellet mill to obtain the maximum output, reduce the abrasion of press roller and ring die to a minimum degree and also avoid the unnecessary stress caused in pellet mill. Adjust the press roller slightly contacted with ring die to drive the press roller rotated smoothly.



1 Rotating direction of ring die 2 Adjusting direction of press roller

Fig.6-4 Schematic diagram for adjusting press roller

The adjustment method is shown as following:

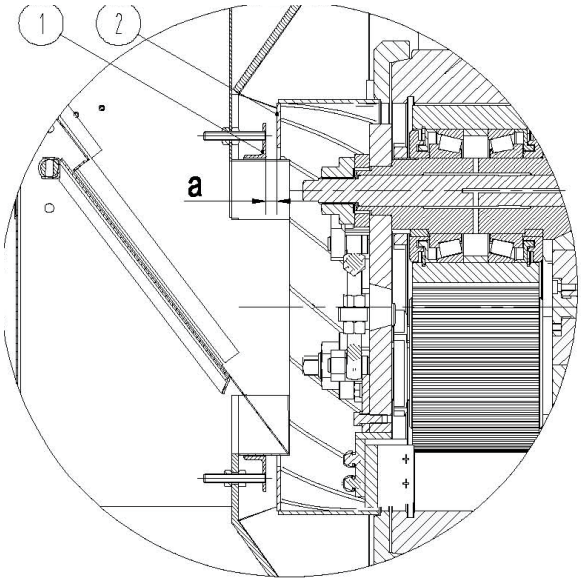
(1) Loosen the adjustable bolt of press roller.

(2) Screw off the adjustable bolt of press roller against eccentric adjustment block rim for adjusting the position of press roller. Note: when the eccentric adjustment block rotates along reverse direction of ring die, the clearance between press roller and ring die should be reduced, otherwise, the press roller is not installed normally, and reinstalled based on above requirements.

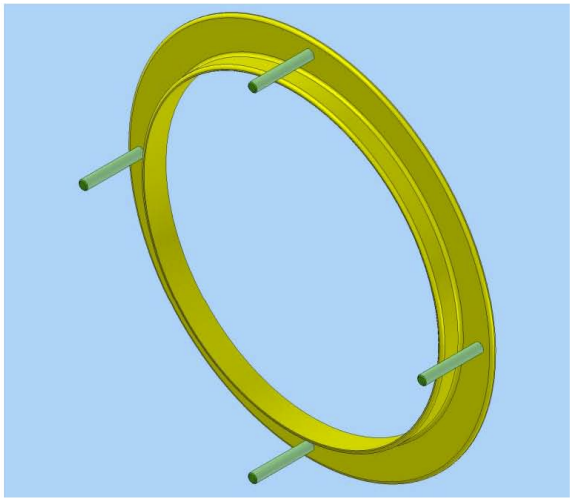
(3) If the eccentric adjustment block rotates to the limit position and cannot be adjusted further, please dismount it and turn it to another position, and then reinstall it, it can be adjusted again to obtain the maximum adjustment amount.

(4) After the press roller is adjusted to the correct position, screw down and lock the adjustable bolt.

6.5.5 Adjustment of seal ring



1.Seal ring 2. Feeding cone



通过螺母调整密封环（件 1，上图）与件 2 喂料锥的距离“a”，可防止或减少颗粒机正常生产过程中的漏料现象。

Fig.6-5 Seal ring

The interval between seal ring (part 1) and feeding cone (part 2) can be adjusted by nut to avoid and/or reduce material leakage during producing.

6.5.6 Installation of ring die

Fig 6-6 Ring die

The ring die is made of forged material of high chrome alloy by vacuum heat treatment after being machined, with high precision of small hole size, high smoothness and long service life, the size of ring die and small hole can be selected as required by the user.

The new ring die cannot bed adjusted to the maximum output state when put into operation at the beginning, and it should run in for a period.

After the new ring die is put into operation for a period, if each operation index of pellet mill is abnormal still, this means that the selected ring die is not suitable for pellet mill. Once occurrence of this case, reselect the ring die or change the formula of product.

Attention points for mounting and dismounting the ring die: cut off power supply, regulate the cutting knife to

the place far away from the ring die；dismount the rotary conic pulley ring for feeding of ring die and fixing conic ring; and keep the maximum clearance between the press rollers and ring die.

After a time of operation, whether stopping the machine or changing the ring die, the die holes should be filled fully with oily anticorrosion compounds. The oily anticorrosion compounds can be prepared by sawdust mixed with 8% vegetable oil or similar materials.

It is suggested that the new ring die should be readjusted based on following procedures after stopping or operating for a quite long time.

a: Adjust the press rollers to a minimum space away from ring die and they are required to rotate smoothly during running.

b: Startup the main motor.

c: After two main motors complete the star-delta changeover, the oil bearing materials are fed to pelletizing chamber till the materials fully in die holes are extruded out completely.

d: Start up the conditioner in pellet mill and motor in feeder respectively.

e: Feed a little of materials into pelletizing chamber, observe the load of main driving motor displayed on two ammeters in control cabinet and properly increase the feeding amount based on load.

f: Gradually add and adjust the molasses, steam, water other additive, and also observe the load of main driving motor from the ammeter.

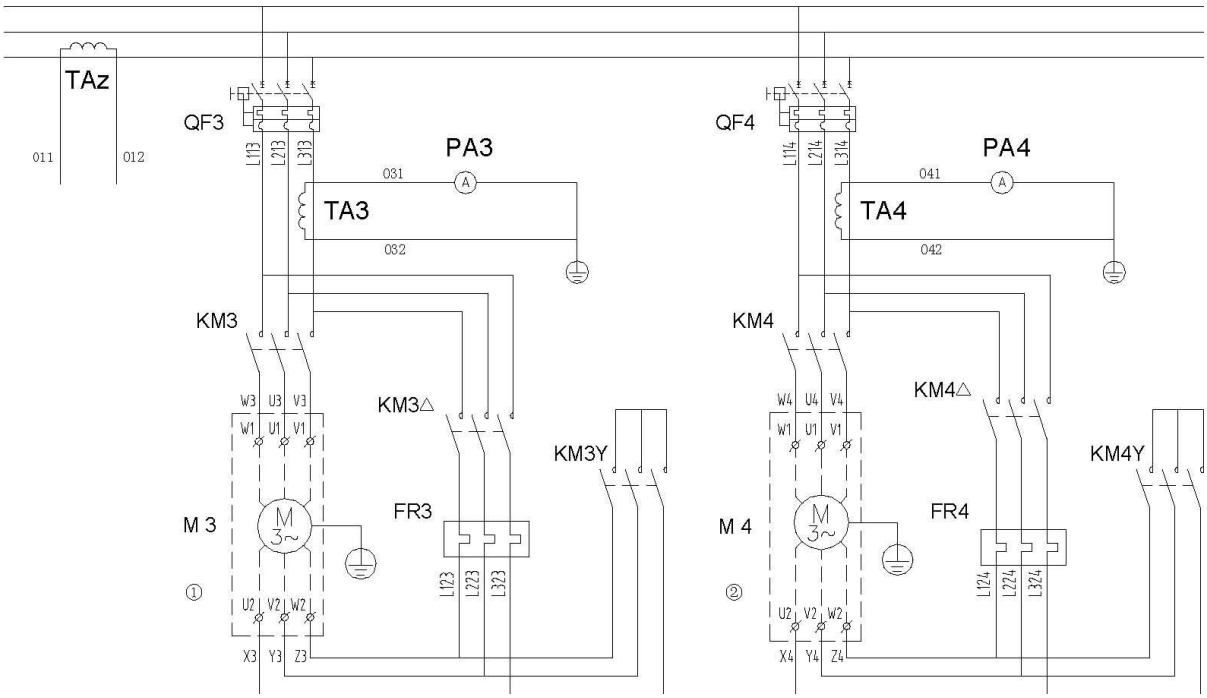
h: if the ring die is blocked, it should be rinsed by the oil bearing materials, in case of not extruding out still, the ring die should be dismounted and cleaned by small hole punch or drill, and then used.

6.6 Analysis of the possible causes of some failures and solutions

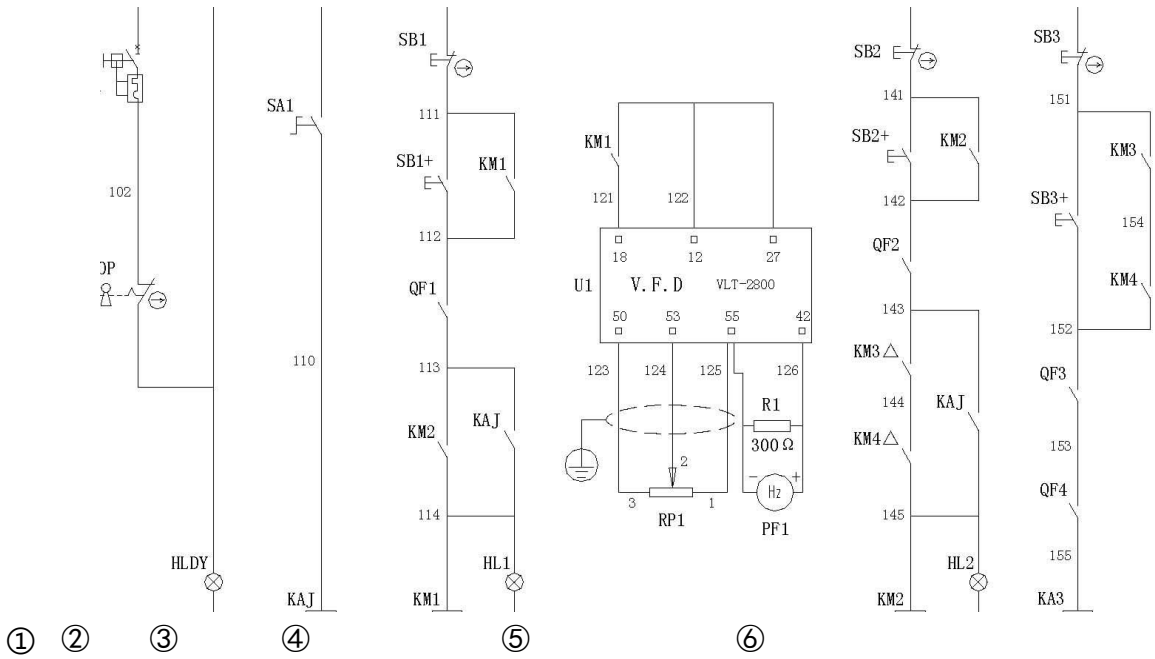
No.	Trouble	Cause	Solution
1	Feed cannot enter the ring die.	1. Bridged inlet of the feeder 2. Clogged conditioner 3. Failure of the feeder's driving device	1. Clean the inlet. 2. Clean the conditioner. 3. Check the driving device for feeder.
2	Material can enter the ring die, but cannot be pelletized.	1. Worn-off of press rollers and ring die 2. Too many die holes are clogged. 3. The feed formula is changed. 4. The clearance between the press rollers and ring die is too large. 5. Improper water content in feed	1. Replace the press rollers and ring die. 2. Remove the feed and impurity from the die holes. 3. Install the ring die properly for the feed formula to be processed. 4. Readjust the clearance between the press rollers and ring die. 5. Adjust steam amount correctly.
3	The pellet mill cannot be started up.	1. The press rollers and ring die in pelletizing chamber are clogged. 2. Limit switches cannot touch the brake plate or the operation bar, or have been damaged. 3. Circuit failure	1. Remove the feed from the pelletizing chamber. 2. Check the limit switches for mounting status. 3. Check the circuit.
4	Load of pellet mill fluctuates unreasonably or the pellet quality is uneven.	1. Steam supply is not enough or the pressure changes sometime. 2. Unstable conveying of material 3. Deflecting plate scrapers are worn which causes uneven feeding.	1. Check the steam pipelines. 2. Adjust the feeding rate. 3. Replace the deflecting plate scraper.
5	Pellet mill stops during working	1. V-belts are not tensioned enough, which makes the speed controller actuate. 2. The parameter of speed controller is not reasonable. 3. V-belts are seriously worn off partially or completely or broken. 4. The main shaft rotates and limit switch escapes because of overload or a foreign matter is entrapped between the press rollers and ring die. 5. Circuit failure	1. Readjust the tension of V-belts or check the pressure value on the pressure gauge of hydraulic system, reset the pressure value if necessary (Be careful when adjusting). 2. Reset the parameter. 3. Replace the V-belts completely, not partially. 4. Reset the main shaft and limit switch. 5. Check the circuit.
6	The pellet mill is clogged frequently	1. Deflecting plate scrapers are worn and material is distributed unevenly. 2. Press rollers are worn off. 3. A press roller gets stuck. 4. The installation positions of the deflecting plate scrapers are incorrect. 5. The moisture content in feed is too high.	1. Replace with new deflecting plate scrapers. 2. Replace with new press rollers. 3. Check the press rollers. 4. Reassemble the deflecting plate scrapers. 5. Decrease the moisture content.

No.	Trouble	Cause	Solution
7	Pellet mill is smoking	1. The scrapers are worn off and there is a layer of hard material formed between the supporting plates of the rotors and the press rollers. 2. Tension of V-belts is not enough. 3. Hard material deposited behind the back supporting plate, which makes the main shaft lack of lubrication.	1. Install a new scraper. 2. Tighten the V-belts. 3. Clear away hard material and lubricate the main shaft till lubricating grease overflows from the back.
8	Ticks are heard when the pellet mill makes each rotation.	Tramp metal in the ring die	Check the inner surface of the ring die and clear away the tramp metal.
9	V-belts are slipping when they are under full loading or overload a bit.	1. Tension of V-belts is not enough 2. The length of V-belt in a group is different. 3. V-belt is contaminated by grease. 4. Wrong location of V-belt 5. The external form of V-belt is incorrect	1. Readjust the tension of V-belts. 2. Replace with a complete set of belts of the same size. 3. Clean the V-belts and pulley. 4. Calibrate the motor and middle pulley. 5. Use qualified V-belts
10	Output of the pellet mill is not enough, while the main motor works under full load.	1. Too much steam added (only for materials sensitive to temperature and humidity) 2. The ring die is too thick 3. Bad steam quality and too much water content 4. Material is not sufficiently conditioned 5. The clearance between the press roller and ring die is too big 6. The press roller and ring die are over worn 7. Bad formula or too big grinding pellet	1. Reduce the steam adding amount. 2. Use the ring die with a depth proper for the material to be processed. 3. Readjust the steam supply system. 4. Increase the steam amount or the extend the conditioning time. 5. Readjust the clearance. 6. Replace the press rollers and ring die. 7. Adjust the formula or replace with a sieve with smaller apertures in the hammer mill.
11	The ring die is broken when worn to a certain extent.	1. Foreign matters in the die 2. Ring die is too thin. 3. Fixing of the ring die is out of order.	1. Perfect the material cleaning operation. 2. Use a thicker ring die with holes with step relieves. 3. Check whether the driving rim of the ring die and the fixing bolts are locked sufficiently or not, and replace the driving rim of the ring die if necessary.
12	The bearings of the press rollers are vulnerable.	1. There are hard foreign matters in the feed. 2. The clearance between the press roller sand ring die is too small. 3. Improper lubricating grease is used. 4. Lubricating grease applied for the press rollers is insufficient. 5. Bad bearing end cover and seal ring are used. 6. Unqualified press roller bearings provided by other suppliers are used.	1. Improving material cleaning performance. 2. Adjust the clearance between the press rollers and ring die. 3. Apply lubricating grease as designated (Section 7.2.1). 4. Apply enough lubricating grease as designated (Section 7.2.2). 5. Replace the end cover of bearing and seal ring. 6. Use the bearings provided by normal manufacturers

6.7 Schematic diagram for electric control

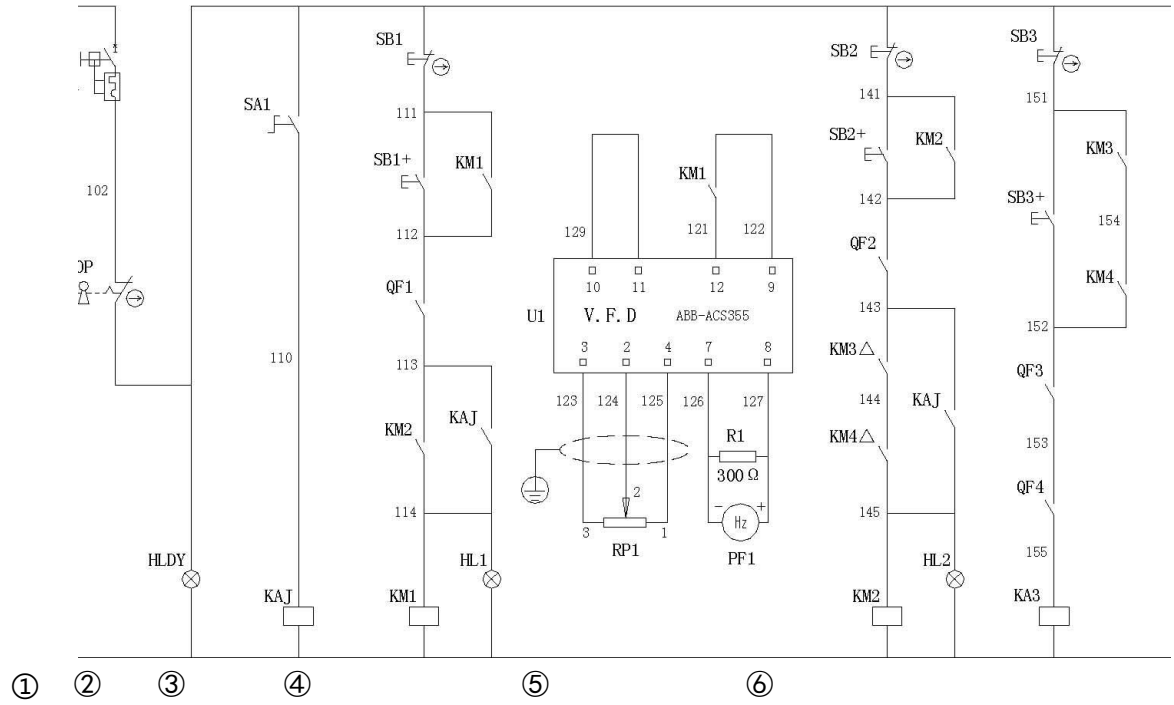


Note: ①.Main motor M3； ②. Main motor M4；



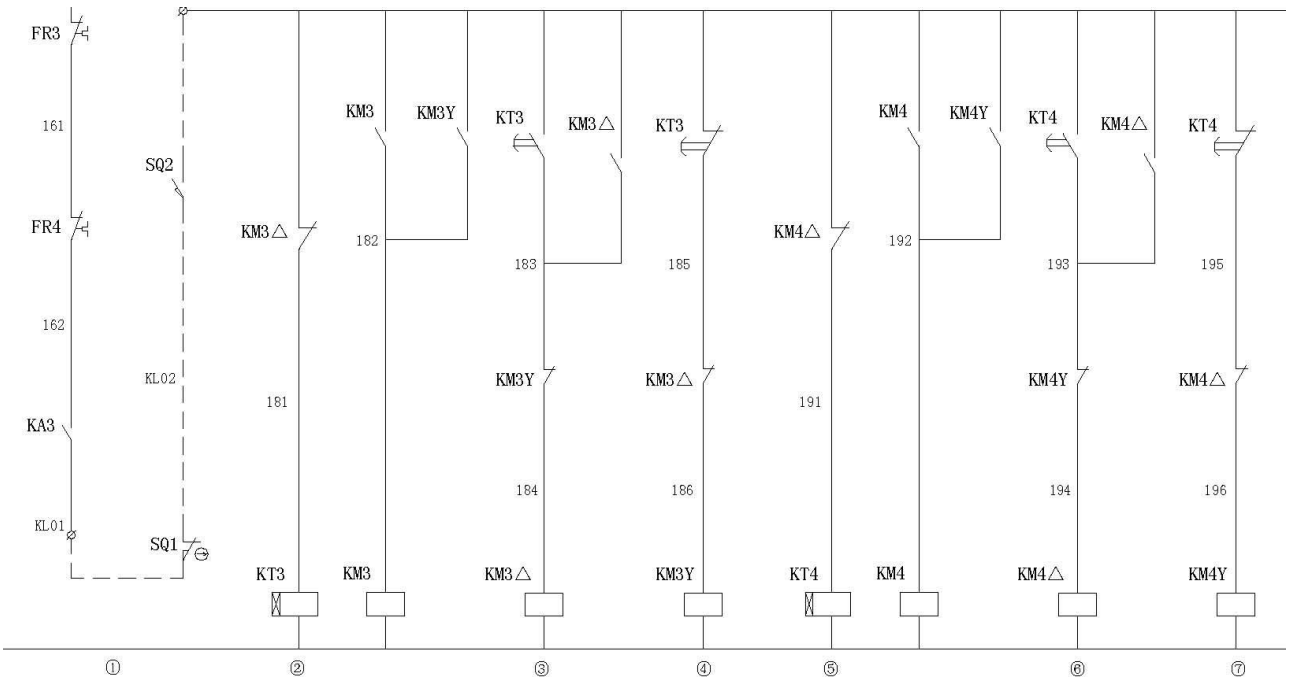
① ② ③ ④ ⑤ ⑥

Note:①.Emergency stop ②.Power indicator ③.Unlock ④.Switch of feeder motor ⑤.Switch of conditioner motor；⑥.Switch of main motor

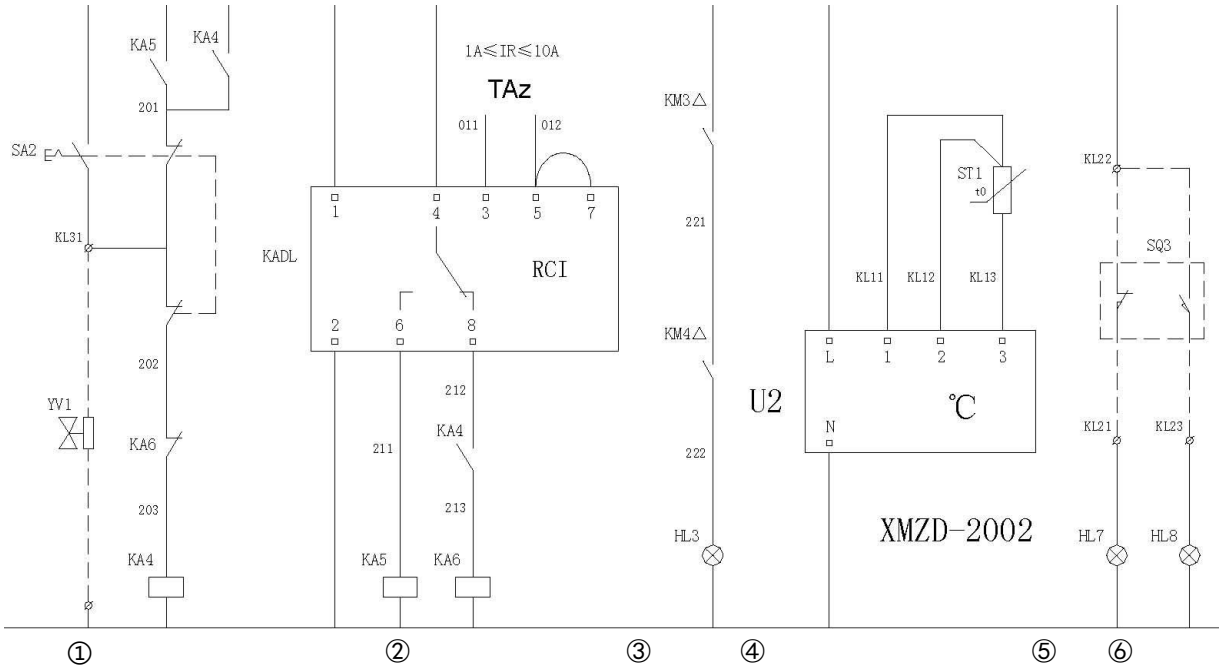


Note:①.Emergency stop ②.Power indicator ③.Unlock ④.Switch of feeder motor ⑤.Switch of conditioner motor；⑥.Switch of main motor

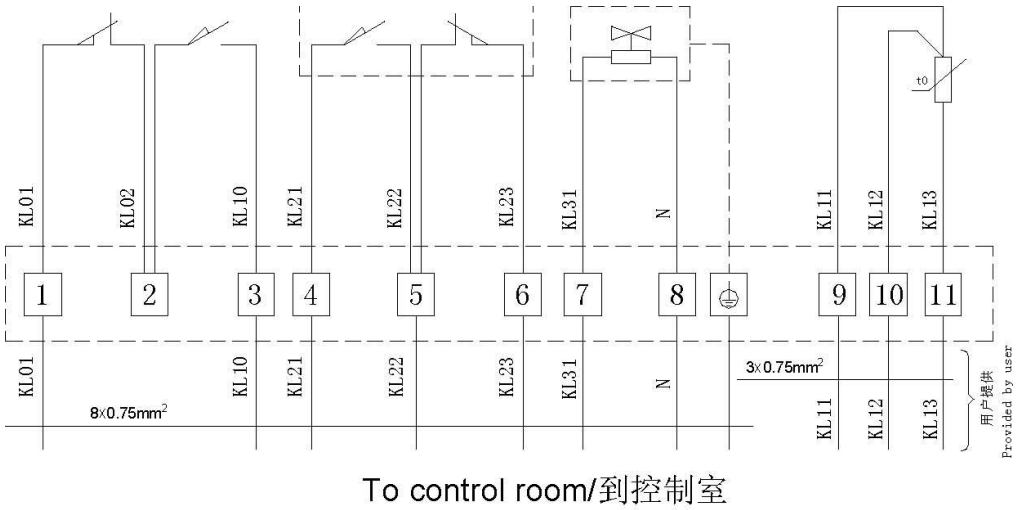
Schematic diagram for electric control(III)（alternative）



Note:①.Limit switch②.Transfer delay M3 Y-△③.M3 △ running；④.M3 Y startup；⑤Transfer delay M4 Y-△⑥.M4 △ running⑦M4 Y startup；



Note:①.Bypass valve②.Overload protection③.Working indicator for main motor④.Temperature indicator for conditioner⑤.Indicator for opening bypass⑥.Indicator for closing bypass



The working principle and operating procedures are as follows:

Commissioning procedures:

First check whether the pellet mill is ready for startup or not, whether the wiring of electric circuit is finished or not.

Then switch on the circuit breakers as per the flowing sequence: QFa、QF1、QF2、QF3、QF4 and QFk；

Released the key emergency stop bottom E-STOP

Turn the unlock switch to the unlocking position, then startup and shutdown the related motors one by one to check whether they are in good working condition or not.

Normal startup procedures:

Turn the unlock switch SAI to the interlock position, trigger the startup bottom SB3+ to start the two main motors M3 and M4, wait for about 1 min until the motors are running stably, then trigger the startup bottom SB2+ to start the conditioner motor M2 and wait for about 30s; after that to trigger the startup bottom SB1+ to start the feeder motor M1.

Explanation for working period:

The feeding frequency can be adjusted by regulating the knob RP21 so as to adjust the feeding rate. The frequency indicator PF21 can indicate the frequency of feeding motor in real-time.

The thermometer U2 can indicate the mash temperature at the outlet of the conditioner. And the temperature here can be adjusted by regulating the steam amount to be added into the conditioner.

Once the working current of the main motor M3 and/or M4 is in excess of the rated current, or the scope of rated current rises up rapidly, the feeding motor should be shut down, and the selector switch SA2 should be set to the location which provide power to the electromagnetic valve to open the by-pass door to let the material flow out through the by-pass so as to reduce the heavy load on pellet mill motors. When the load on the main motors has fallen down less than 50% of the rated value, start the feeder motor again and increase the feeding rate slowly.

Shutdown procedures:

First shutdown the feeder motor, then the conditioner motor 10 min later. Wait until the current of the main motor fall into the current scope of the no-load run, shutdown the main motor and switch off the main switch to cut down power supply.

The solutions for the cases of electric leakage, electric shock, machine blockage as well as heavy load on main motors:

Press the emergency stop bottom as soon as possible to avoid the accidents like personal injury or motor burn -out.

危險 Attention

1. All control cable must be with the specification of 0.75mm^2.
2. Overload protection device must be adopted for the power supply.
3. For sake of safety, a safety switch shall be installed nearby the pellet mill for emergency stop and equipment maintenance.
4. This electric circuit is only for the single pellet mill; as for the whole feed plant, the technical process and all equipment interlock relationship should be taken into account.
5. Check all electric circuit at least once per year for sake of safety.

6.8 Spare Part

【**IMPORTANT**】: Provided the equipment is under normal use and maintenance, our company will be responsible for free repair or spare part replacement (wearing parts excluded) due to quality problem and failure of the equipment within one year from the date of the equipment delivery (Invoice date). The date after one year since the equipment delivery, our company will continue to provide repair and maintenance service for normal operation, while the service cost will be borne by the user.

6.8.1 Spare parts

There are lots of wearing parts in the pellet mill; they are gradually be depleted in the continuous application. The worn parts will impact the performance of the equipment and may cause accidents if they are still used. So

replace the worn spare parts in time.

Whether the spare parts can be ordered timely and accurately will influence your production. So in order to purchase right spare parts, when place an order, please mention the corresponding serial number, code and description of the spare part shown in this chapter, and the quantity needed. And provide us the order list via mailing or e-mail. If possible, please attach a sketch of the spare part you require.

6.8.2 Spare parts list

No.	Description	Qty.	Code	Class	Supplier	Delivery time（month）	Qty.	Replacement frequency
0404	Driving flange	1		1		1	1	2Y
0405	Screw	8		2	GB	1	8	Demand
0406	Skeleton type oil seal1	1		2	GB	1	1	2Y
0407	Rotor	1		1		1	1	/
0408	Main shaft assembly	1		1		2	1	/
0409	Main shaft bearing	2		1		2	2	2Y
0411	Skeleton type oil seal2	1		2	GB	1	1	2Y
0412	Flat key A12×20	1		1		1	1	/
0413	Rear inner bushing	1		1		1	1	2Y
0415	Key	1		1		1	1	/
0501	Cutting knife(normal)	1		1		1	1	1Y
0502	Cutting knife (thin)	1		1		1	200	Every day
0503	Lower press plate	1		1		1	1	/
0504	Screw	2		1		1	2	/
0505	Upper press plate	1		1		1	1	/
0506	Connection block1	1		1		1	1	/
0507	Cutting knife rod	1		1		1	1	/
0508	Cutting knife base	1		1		1	1	/
0509	Special bolt	1		1		1	1	/
0510	Adjustable handle	1		2	GB	1	2	Demand
0511	Locking ring	1		1		1	2	/
0512	Handle	1		2	GB	1	2	Demand
0601	Roller shaft	1		1		1	1	1Y
0602	Seal cover 1	2		1		1	2	1Y
0603	Seal cover 2	2		1		1	2	1Y
0604	Roller shell	1		1		1	1	3M
0605	Roller bearing	2		1		1	2	6M
0606	Distance ring	1		1		1	1	1Y
0607	Circlip for holes	2		1		1	2	Demand
0608	Key	2		1		1	2	/
0609	Stop washer	1		2	GB	1	1	1
0610	Round nut	1		2	GB	1	1	Demand

No.	Description	Qty.	Code	Class	Supplier	Delivery time（month）	Qty.	Replacement frequency
0119	Semi-auto oiler	1	——	1	Kerunde	1	1	/
0120	Special key	1	——	1	Kerunde	1	1	/
0121	Limit Switch SZL-VL-S-H or XCE-102	3	——	2	Honeywell or Schneider	2	3	Demand
0122	Shear pin	1	——	1	Kerunde	1	1	After damaged
0123	Oil filter	1	——	1	Kerunde	1	1	/
0124	Seal ring	1	——	1	Kerunde	1	1	/
0126	Rotation feeding cone	1	——	1	Kerunde	1	1	/
0127	Seal ring	1	——	1	Kerunde	1	1	/
0201	Rotation feeding cone ring	1	——	1	Kerunde	1	1	/
0203	Rotation feeding cone	1	——	1	Kerunde	1	1	/
0206	Adjustment nut of roller	2		1	Kerunde	1	2	/
0207	Screw	8		1	Kerunde	1	8	/
0208	Die(tapered)	1		1	Kerunde	1	1	/
0209	Driving flange	1		1	Kerunde	1	1	2Y
0211	Centering pin	4		1	Kerunde	1	4	1Y
0212	Die(hooped)	1		1	Kerunde	1	1	Demand
0213	Hoop	3		1	Kerunde	1	3	2Y
0214	Bolt	3		1	Kerunde	1	3	Demand
0215	Driving flange of die(hooped)	1		1	Kerunde	1	1	2Y
0216	Key	1		1	Kerunde	1	1	2Y
0217	Screw 12.9	8		1	Kerunde	1	8	Demand
0218	Supporting bolt	2		1	Kerunde	1	2	/
0301	Front bolt	1		1	Kerunde	1	1	/
0302	Upper deflection scraper	1		1	Kerunde	1	1	2Y
0303	Adjustment bolt	4		1	Kerunde	1	4	1Y
0304	Locking nut	4		1	Kerunde	1	4	1Y
0305	Roller adjustment assembly	2		1	Kerunde	1	2	1Y
0306	Lower deflection scraper	1		1	Kerunde	1	1	2Y
0401	Roller adjustment nut	2		1	Kerunde	1	2	1Y
0402	Supporting shaft of roller	2		1	Kerunde	1	2	/
0403	Tighten screw	2		1	GB	1	2	Demand

No.	Description	Qty.	Code	Class	Supplier	Delivery time（month）	Qty.	Replacement frequency
0101	Gate assembly	1		1	Kerunde	2	1	/
0102	Magnet	1		1	Kerunde	1	1	/
0103	Front plate assembly	1		1	Kerunde	1	1	/
0104	Rotation feeding cone ring	1		1	Kerunde	1	1	/
0105	Roller assembly	2		1	Kerunde	2	2	Roller shell:3M，others:1Y
0106	Rotor assembly	1		1	Kerunde	2	1	/
0107	Main pulley	1		1	Kerunde	3	1	/
0108	V-belt			2	Kerunde	1		6 -12M
0109	Lifting beam	1		1	Kerunde	1	1	/
0110	Main motor	2		2	Kerunde	2	2	/
0111	Front bronze cushion	1		1	Kerunde	1	1	Demand
0112	Front bronze bushing	1		1	Kerunde	1	1	/
0113	Machine base	1		1	Kerunde	2	1	/
0114	Rear bronze cushion	1		1	Kerunde	1	1	/
0115	Rear bronze bushing	1		1	Kerunde	1	1	Demand
0116	Shear pin disc	1		1	Kerunde	1	1	/
0117	Special nut	1		1	Kerunde	1	1	/
0118	Washer 110	1		1	Kerunde	1	1	/

7 Annex

1. Appended documents
2. Kerunde KDZL pellet mill (Operation manual)

No.	**Document**	**Unit**	**Qty**	**Remarks**
1	Operating manual of the motor	copy	1	
2	Operating manual of pellet mill	copy	1	
3	Product qualification certificate	copy	1	
4	Spare parts ordering list	copy	1	In the operation manual
5	Appended documents	copy	1	In the operation manual
6	Barring rod		1	
7	Wrench for roller adjustment nut		1	
8	GZ-87(12L) Oil pump		1	

Equipment: Kerunde KDZL

3. Feedback form

Yangzhou Kerunde Machinery Co., Ltd.

Customer's Feedback Information

Product model		Delivery code	
Delivery date		Application date	
User's firm name		Department	
Address		Contact	
Post code		Tel.	
Application situation and existing problems	(Please specify the application process or details) Handler: Date:		
Suggestions and improvement ideas	Handler: Date:		
Comprehensive appraisal on the equipment	Seal affixation of the user's firm: Date:		
Remarks			

YANGZHOU KERUNDE MACHINERY CO., LTD.

People's Republic of China

Add: No. 198 Ji'an Road, Hanjiang Economic Development Zone, Yangzhou, Jiangsu, China

Tel: 0086-0514-80820111-58815 Fax: 0086-0514-80820099

Http: www.kerunde.com Email: kerunde@kerunde.com