

# Safety

## 1.1 Personal safety protection

(1) All the mechanical equipments manufactured by Jiangsu Muyang Holdings Co., Ltd 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) The enterprises are obligated to execute following regulations to guarantee operators' safety.

(3) The belt and chain guard hoods should be amounted and keep close at any moment. It is very dangerous when they are opened or disassembled. It may cause casualty accident. This is also applicable for the preventive device of the manipulator.

(4) The safety limit switch , interlock cylinder, revolutions monitor , as well as solenoid valve or lock electromagnet in the interlock device of access door should always be kept in good condition. Overlap or discard of the safety limit switches is not allowed.

(5) The cover plate, protecting hood or guard grating are usually installed and delivered together with the machine. They can only be disassembled with tools. And the machines with such kind of devices can never be put into work until the above-mentioned devices have been properly installed.

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

(7) 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.

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

(9) 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.

(10) 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.

(11) 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.

(12) 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 have to 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.

(13) 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.

(14) 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 prevent dust explosion.

(15) 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.

(16) 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.

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

(18) Only the trained professionals are allowed to operate the machine and equipment manufactured by our Company.

(19) Environmental protection measure

If you decide not to use the machine any longer, the measures for environmental protection and reutilization should be taken: Drain the liquids inside the machine (like motor oil, gearbox oil, brake oil and coolant etc.) into special containers and send them to the preparation workshop. Special waste (like battery, etc.) must be handled according to related regulations. The plastic parts shall be picked out for reutilization. The metal parts shall be sorted out so as to be ground or scraped.

## **1.2 Explosion protection**

### **Common cleaning work**

- a. Keeping the working site with combustible dust clean is an important condition for safe production.
- b. Try not to baggy or bulk materials between machines.
- c. In order to reduce dust emission to surrounding areas, all conveying devices, cyclone separators , filtering bag should be kept in good condition. Especially, the unsealing of pipes or top covers should be avoided.
- d. In order to reduce dust explosion hazard, dust everywhere must be cleaned out frequently and effectively.
- e. Keep all motors free of deposited dust.

### **Frequency inspection and maintenance work**

- a. Regularly check the working conditions of all V-belt and flat belt to avoid temperature rise caused by belt slipping. Check at least once a week.
- b. Check the safety devices such as speed monitor or the like regularly, at least once a week.
- c. Check and clean the magnetic separator, stoner and sifter at least once a day.
- d. In order to avoid heat generation, it is necessary to regularly check the functions of all main shafts and bearings, at least once a week, and to regularly fill up lubricating oil.

### **- Electric apparatus**

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

- a. It is forbidden to use any flashlights and other lamps without shielding or explosion-proof glass.
- b. It is forbidden to use any lengthened cable or electric furnace.

- c. It is necessary to immediately repair or replace the electric apparatus and equipment if any failure occurs.
- d. The cables without conduits are not allowed to be installed on the floor.
- e. Cut off the power supply of the machine after work.
- f. 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.

**- Smoking and welding**

- a. Smoking is forbidden, which is applicable to all workers and staff of the enterprise as well as guests, customers, foreigners and drivers visiting the factory.
- b. 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.
- c. 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. 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.
- d. 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.

**- Effect of static electricity**

In order to ensure the safety of electric circuits and avoid explosion resulted from spark discharge, the paint coat at the electric connections must be removed.

### **1.3 Description about safety control devices**

The control device supplied by MUYANG is a part of the Safety Plan for preventing accident. The control device must be checked by the expert of MUYANG before starting up and the approval (operation) certificate should be signed by him.

If any control system used for the equipment produced by Jiangsu MUYANG Holdings Co., Ltd is provided by a third party, it shall be manufactured according to the specifications of MUYANG Holdings Co., Ltd and shall be checked carefully and approved in writing by an expert from MUYANG Holdings Co., Ltd before startup.

### **1.3.1 Power supply connection**

- The related regulations of local safety authorities department should be obeyed. For example, a breaker for circuit protection should be installed on power wire according to local regulation.
- Check whether the operating voltage and frequency are in line with the data displayed on the machine nameplate and control cabinet.
- All power wires of control system should be connected as per schematic diagram, so as to realize actual switch of the phase line when using a single-phase source.

### **1.4 Safety program**

- This extruder shall be operated by trained and designated workers.
- All rotary parts should be provided with guard shield to prevent touching at will. The protective device can only be dismantled by spanner.
- A safety switch should be mounted on the driving motor for switching off each phase, and it can be locked. This switch can be mounted nearby the extruder or on control console or control panel of this equipment. This safety switch can be used for shutting down this equipment for maintaining.
- When maintenance, the protective gloves (maximum temperature up to 120°C), safety shoes with steel sheet, and safety helmet should be wore.

### **1.5 Range of application**

To ensure the efficient operation and safe use of the machine, the extruder should be installed at a region that, altitude is less than 1000m, temperature range is within 5°C~40°C, and air relative humidity range is within 90%.

TPH200C extruder is mainly used for the ripening and forming of raw material for feed industry.

### **1.6 Abrasion and corrosion of wearing parts**

- Quite a number of mechanical energy of each extruder is transformed into heat energy through friction according to the working principle.
- Pairs of the wearing parts (such as screw rod and bushing) are correlated with each other through the intermediate materials (i.e. raw mixer) between them, and the mutual stress result in abrasion.
- That is to say, except the reason of machine structure and material, the processed material also has a great influence on abrasion.
- The abrasion caused by material with high ash content or high fiber content is larger than that caused by mixing material with high oil content.
- If the additives of strong corrosion (such as acid) are used, from which the abrasion /corrosion will be several times higher.
- The scrapped machine and its parts should be dealt with according to the local laws.

## 1.7 Description of safety marks

1.7.1 The safety mark for “Be careful of electric shock!”: Never open the terminal box when the motor is not power-off.



1.7.2 Carry out maintenance and repairing in accordance of the instruction manual.



1.7.3 The safety mark for “Be careful of mechanical injury!”: Never open the operating door while the machine is running and has not been stopped completely.



1.7.4 The safety mark for “Be careful to prevent from scalding”: Don't touch the machine while it is in operation.



1.7.5 Don't remove the guard shield while the machine is running.



1.7.6 Please put on your gloves as you carry out maintenance and repairing.



## 1.8 Noise

- ◆ Noise of the machine(sound power level ) $\leq$ 110 dB;

In order to reduce the noise resulted from vibration, the foundation where the equipment is installed should be rigid enough and a shock absorber shall be available.

## Equipment introduction

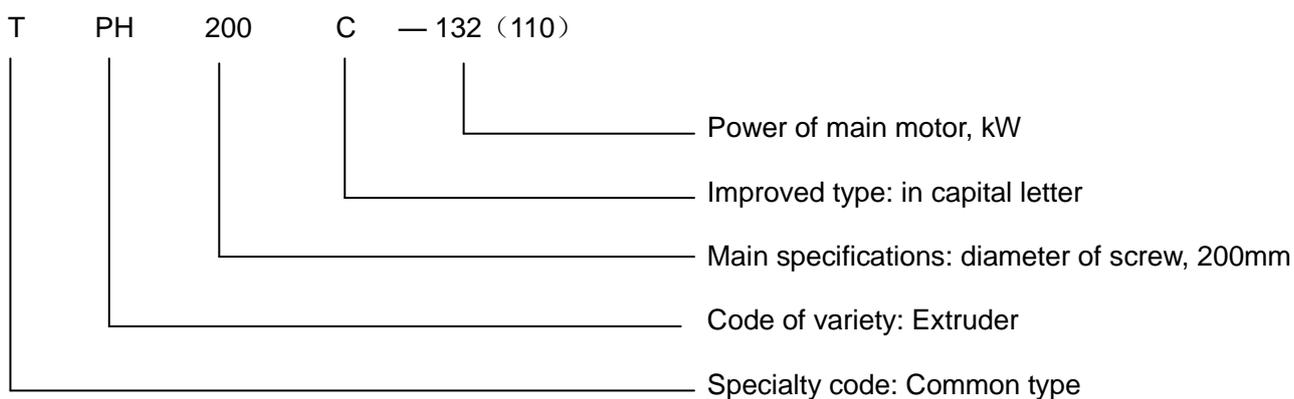
### 2.1 Application

TPH200C Raw Material Extruder (“extruder” for short) is mainly applicable for the processing of full fat soybean powder, corn, flake piglet feed, rice, etc., and it can also be used for pretreatment of oilseed processing industry.

### 2.2 Main technical parameters and performance indexes

#### 2.2.1 Model

Model of the extruder is composed of variety code, product specifications, specialty code, improvement Model (as follows).



## Machine structure

### Main structure

The extruder mainly consists of a feeder, a conditioner, a by-pass, the extruding barrel, discharging guard hood, a machine base, the main motor and lubricating circuit.

## Maintenance and repair

### Maintenance

- (1)The equipment should be cleaned for both inside and outside after each shift of operation. Especially, there shall be no material remained in the extruding chamber, so as to avoid difficult cleaning after the materials cooling down and agglomerating;
- (2)The big belt pulley of extruder main shaft should be usually cleaned for preventing dust accumulation; otherwise, unbalance of the belt pulley will cause extruder vibration;
- (3)After the new equipment used for one week, the tension of belt shall be checked to prevent belt slipping;
- (4)Remove screw head and pressure ring, do not knock heavily. Ensure the flatness and cleanness of the screw and both sides of the pressure ring. Only through this, the material will not be extruded from the contact face, thus to ensure the convenience for the next disassembly.
- (5)Before starting a new production, the three front sections of extruding screws should be dismounted for

cleaning and the main shaft should be lubricated if in the last production shift it produced expanded corn or piglet feed, then to remount the screws, so as to ensure screws can be easily disassembled after long time stoppage.

(6)About lubricating grease

(7)Keep the extruder and its surroundings clean regularly.

## Malfunction and troubleshooting

For malfunction and troubleshooting please see Table12

**Table 12 Malfunction and troubleshooting**

Trouble	Causes	Solutions
1 Material cannot be discharged from the outlet of extruding chamber when processing soybean	Foreign matter is chocked in the die holes, causing blockage. Too slow feeding speed(less than8Hz) Too small steam flow Too much water addition	Stop and clean Increase the feeding speed Increase the steam flow Check the steam and water valve
2.The extruded soy flour mixed with beans when processing soybean	The raw materials have not been grained or the grinding particle size is too big	Change for the sieve with smaller diameter of grinder
3.The temperature of extruding chamber cannot meet the rated temperature	a) Too small diameter of pressure ring or low temperature of conditioning without steam b) pressure ring or screw head is worn	Change for bigger pressure ring or increase the temperature of conditioning, the materials temperature shall be within 80°C-90°C after conditioning, and replace the pressure ring or screw head.
4.Materials cannot be discharged or materials become paste when processing powdery feeds	Too big or too small pressure of steam and water flow or steam flow	Adjust the pressure of water and steam
5.Throughput decreases	Tapered pressure ring or wear ring is worn off; Screw head is serious worn.	a) Replace wear ring or pressure ring b) Replace screw head
6.Material cannot be discharged suddenly after normal operation	a) Excessive short-time feeding b) The discharge hole is blocked by foreign matter	a) Reduce the feeding speed b) Stop, disassembly and clean
7.The diameter of extruded pellets are too small or too big	die holes at feeding section are too small or too big	Choose the suitable size of die hole as required
8 the extruded soy flour squirted out from the feeding inlet when processing soybean.	Too rapid feeding results in blockage and not smooth discharging. Screw head and press ring are improperly assembled. Severe wearing of extruding barrel.	Well control the feeding rate and feeding amount, and adjust the clearance between the discharging plug screw and conical screw on shaft end according the requirement of Problem1; Re-assembly and replace the extruding chamber after inspection.
10. products are blocked before discharging from	a) The pellet size of raw material is bigger relative to the size of die hole	a) grind the raw materials

the die hole	<ul style="list-style-type: none"> <li>b) The water is too little to make the materials flow</li> <li>c) Structural architecture of extruding chamber is irrational</li> <li>d) The diameter of pressure ring may too big</li> </ul>	<ul style="list-style-type: none"> <li>b) increase the initial flowrate and add water before the product entering the chamber</li> <li>c) Layout in an reasonably way</li> <li>d) Change for the pressure ring with smaller diameter</li> </ul>
11. Poor product formability	<ul style="list-style-type: none"> <li>a) Improper raw material formula</li> <li>b) Over-high or low processing Temperature</li> <li>c) Unstable feeding</li> <li>d) Over high or over low moisture content in product</li> <li>e) Blade is worn</li> <li>g) Too large ground particle size</li> </ul>	<ul style="list-style-type: none"> <li>a) Change formula of raw materials</li> <li>b) Recombine the components in machine barrel</li> <li>c) Adjust to even feeding</li> <li>d) Reduce or increase water or steam addition volume</li> <li>e) Replace blade</li> <li>f) Grind the raw materials further to reach the defined particle</li> </ul>