

Equipment introduction

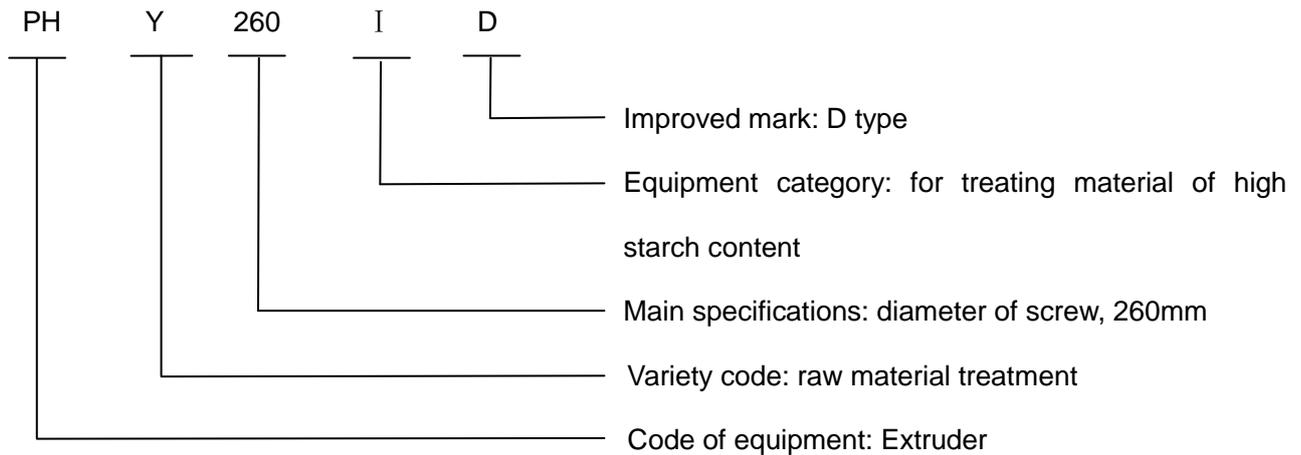
1.1 Application

PHY260 I D Extruder ("Extruder" for simple) is mainly used for the extruding processing of corn, rice, rice bran and other raw materials in food and feed industries.

1.2 Main technical parameters and performance indexes

1.2.1 Model

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



Equipment structure and installation

2.1 Working process

- The material to be extruded after entering into the feeding bin will pass through the feeder and come into the conditioner.
- After conditioning with steam, the conditioned mash will be conveyed into the extruding chamber.
- The mash of a certain moisture content enters into the extruder, and is pushed forward helically by the extruding screw.
- Due to the friction of screw against feed mash, feed mash against extruder barrel inner wall and the internal friction of feed mash, the feed mash will be strongly pressed, mixed and cut, resulting more fineness and higher homogenization level.
- As the pressure in the extruding barrel increased, the temperature of feed mash increased, and the properties of feed mash is changed under the high temperature, high pressure and high shearing force condition. Powder feed will be turned into paste, protein will be modified, the fiber will be degraded and the pathogenic bacteria are killed, which contribute to higher hygienic level and toxic ingredient inactivated.
- At the instant of the paste material sprayed out of the die holes, under the impact of heavy pressure, the feed mash will be expanded, dewatered and cooled, and finally obtain expanded products which of loose structure, porous, crispy and have good palatability and flavor.

2.2 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 is used for one week, the tension of belt shall be checked.
- 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) Keep the extruder and its surroundings clean regularly.

Malfunction and troubleshooting

For malfunction and troubleshooting please see Table13

Table 13 Malfunction and troubleshooting

Trouble	Causes	Solutions
The gelatinization level of the extruding products is not as high as required.	<ol style="list-style-type: none"> a) The diameter of pressure ring is too small. b) The area of discharging hole is too large. c) Too much water included in steam. d) Add too much water e) Pressure ring or screw head is worn 	<ol style="list-style-type: none"> a) Change for the pressure ring with larger size b) Replace with die of smaller holes or reduce the amounts of the die holes. c) Install the pipeline as requirement. d) Reduce water adding amount. e) Replace the pressure ring or screw head
Over gelatinized.	<ol style="list-style-type: none"> a) The diameter of pressure ring is too big b) Too small opening area of the discharging die c) Too little moisture content of materials in expanding chamber 	<ol style="list-style-type: none"> a) Change with the pressure ring of smaller diameter b) Replace with die of larger holes or increase the amount of holes c) Increase the water adding amount and conditioning temperature.
Throughput decreases	<ol style="list-style-type: none"> a) Pressure ring or wear ring is worn off; b) Screw head is serious worn. 	<ol style="list-style-type: none"> a) Replace wear ring or pressure ring b) Replace screw head
Material cannot be discharged suddenly after normal operation	<ol style="list-style-type: none"> a) Too short feeding time b) The discharge hole is blocked by foreign matter 	<ol style="list-style-type: none"> a) Decrease the feeding speed b) Stop the machine for disassembly and clean

	<p>c) Material bridged in extruding bin</p> <p>d) The extruding bin is empty of material.</p>	<p>c) Knock the bin and observe, and stop production if necessary.</p> <p>d) Stop the machine for disassembling and cleaning</p>
<p>The diameter of extruded pellets are too small or too big</p>	<p>die holes at feeding section are too small or too big</p>	<p>Choose the suitable size of die hole as required</p>
<p>Products are blocked before discharging from the die hole</p>	<p>a) The impurities size of raw material is bigger relative to the size of die hole</p> <p>b)The water is too little to make the materials flow</p> <p>c) Structural architecture of extruding chamber is irrational</p> <p>d)The diameter of pressure ring may too big</p> <p>e) Extruding chamber or discharging device is not cleaned up.</p>	<p>a) Crush and clean out the material.</p> <p>b) Increase the initial flow rate and add water before the product entering the chamber</p> <p>c) Layout in an reasonable way</p> <p>d)d) Change for the pressure ring with smaller diameter</p> <p>e) Clean extruding chamber and discharging device.</p>

Personnel Protection: countermeasures against accident

- (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 measure for environmental protection and reutilization shall be taken into consideration: drain the liquid inside the machine (such as motor oil, gearbox oil, brake oil and cooling water) 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.

Explosion Protection: Countermeasures against dust explosion and fire hazard

1. Common cleaning work

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

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

1.3 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.

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

1.5 Keep all motors free of deposited dust.

2 Regular inspection and maintenance

2.1 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.

2.2 Check the safety devices such as speed monitor or the like regularly, at least once a week.

2.3 Check and clean the magnetic separator, stoner and sifter at least once a day.

2.4 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.

3. Electric apparatus

3.1 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.

4. Smoking and welding

4.1 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.

4.2 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.

4.3 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. 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.

4.4 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

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.