SSEP148 TWIN SCREW EXTRUDER

OPERATION MANUAL

ZTMT
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Important instruction:

1 This manual detailedly describes SSEP148 series twin screw extruder of each system structure, function and use and maintenance method. Before installation and use of the machine , customer should read the manual,and have a full understanding of the ministries and its structure and function ,then have operation and maintenance of the machine. Due to the continuous improvement of product structure, after a certain time period, the manual of narrative content and the actual situation of the products will have small changes.Users should pay attention to it.

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

Ⅰ Applicability and Performance Features

1. SSEP148 extruder is a patented product in our company, it adopts four-axis transmission ,which is different from others' three-axis transmission. It mainly applicated to product food or be used for aquatic feed factory to produce swelled pellet feed.

2. This machine can produceΦ1.0、Φ1.5、Φ1.8、Φ2.0、Φ2.2、Φ3、Φ4、Φ5、Φ6、Φ7、Φ8 and other various bore diameters and special shape die feed and the customers can choose arbitrarily according to their different needs.

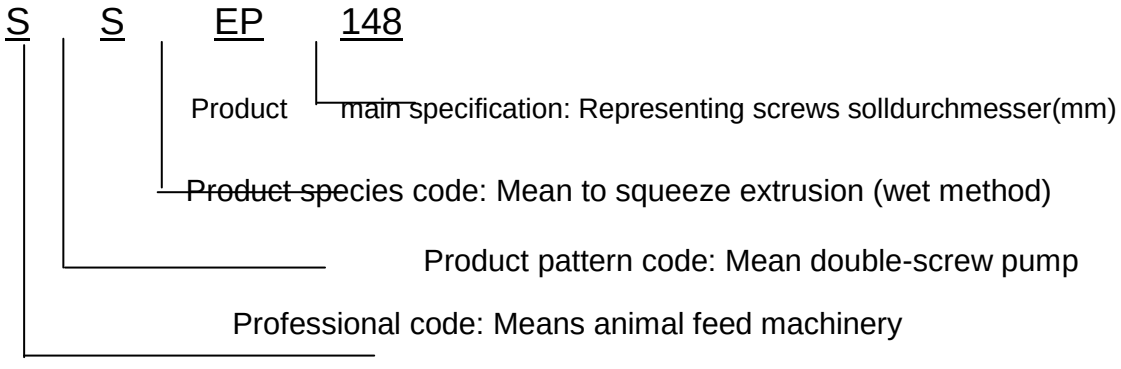
3. It is required that material size should beΦ1.0~Φ2.0 die (raw material should be the partical size for 80), Φ2.2~Φ4 die (raw material should be the partical size for 60), Over than Φ5~Φ7 die (raw material should be the partical size for 60)before putting into uniform feeder.

4.This machine adopts stepless speed motor to feed. There are three -way system which could discharging the material outside,gear oil pump lubrication system and oil temperature cooling system beneath the feed outlet of the conditioner exit

This machine is particulay suited to product aqua pellet feed, pet feed, and piglet swelled feed.

Ⅱ Model implications and technical specification

1.Model Implication



2.2 Technical specicications

S/N	Items	Technical specification
1	Output	1~2t/h
2	Main power	90-110kW
3	Feeder Power	1.5kW
4	Conditioner Power	5.5kw
5	Effective length of screws	1500mm
6	Screw Diameter	Φ118 mm
7	Die Hole Specifications	Φ1.0、Φ1.5、Φ1.8、Φ2.0、Φ2.2、Φ3、Φ4、Φ5、Φ6、Φ7、Φ8
8	Rate of partical formation	≥95%
9	Volume to weight ratio	300-500g/l
10	Noise	≤80dB（A）
11	Expansion chamber temperature	100℃--180℃
12	Steam Consumption	≥0.3t/h
13	Steam working Pressure	0.3MPa
14	Contour Size(L×W×H)	5300×2100×2493

3 Main Structure and Operation Principle

The main structure of the machine show in figure 1, it consists of feeder, conditioner, extrusion, pelletizes and so on. All these institutions have their independent power system, through the electronic control to do servo and

combined relationship with each other.

The work process of this machine is to mix good powder with just the right amount of water anticipate from hopper into hydraulic feeder, through regulate motor speed of stepless speed control to acquire the suitable throughput, then got into conditioner, hardening and tempering through blade agitation to mix steam mist. if needing to add grease, it can join to conditioner with steam and after adjusting, the temperature of mixed powder will be about 90 ℃ , the humidity reaches to 20-30%, then push into extruder through discharge pipes. To make the powder heating booster by screw extrusion、shearing、mixing. Finally, water from the front of the template, and cut into grains by tail-wagging cutter, and become the extruded material in need.

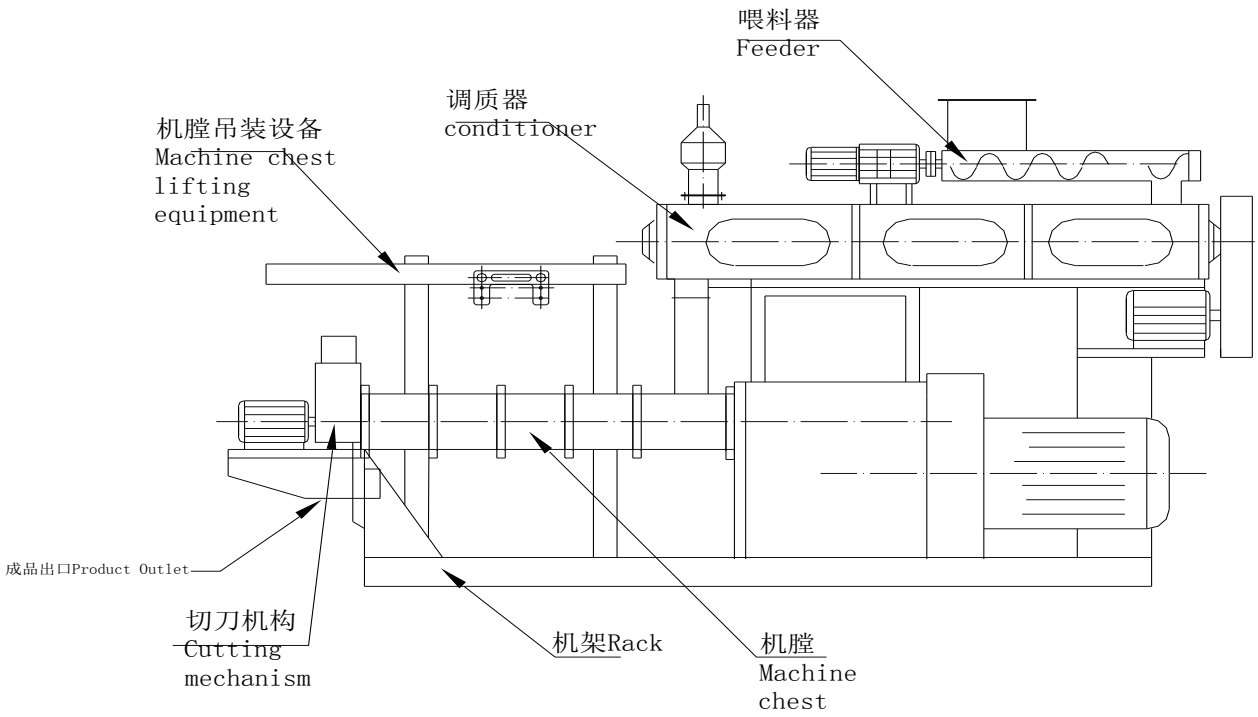


Figure 1 SSEP118 Extruder structure diagram

1. Feeder

Feeder is composed of variable speed motor, sprocket reducer, barrel, auger shaft and so on, the chart in figure 2.

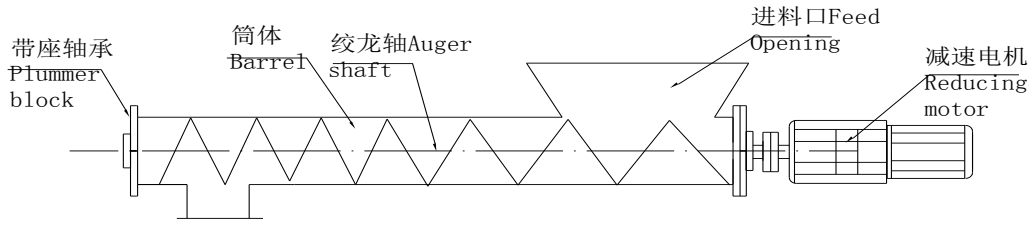
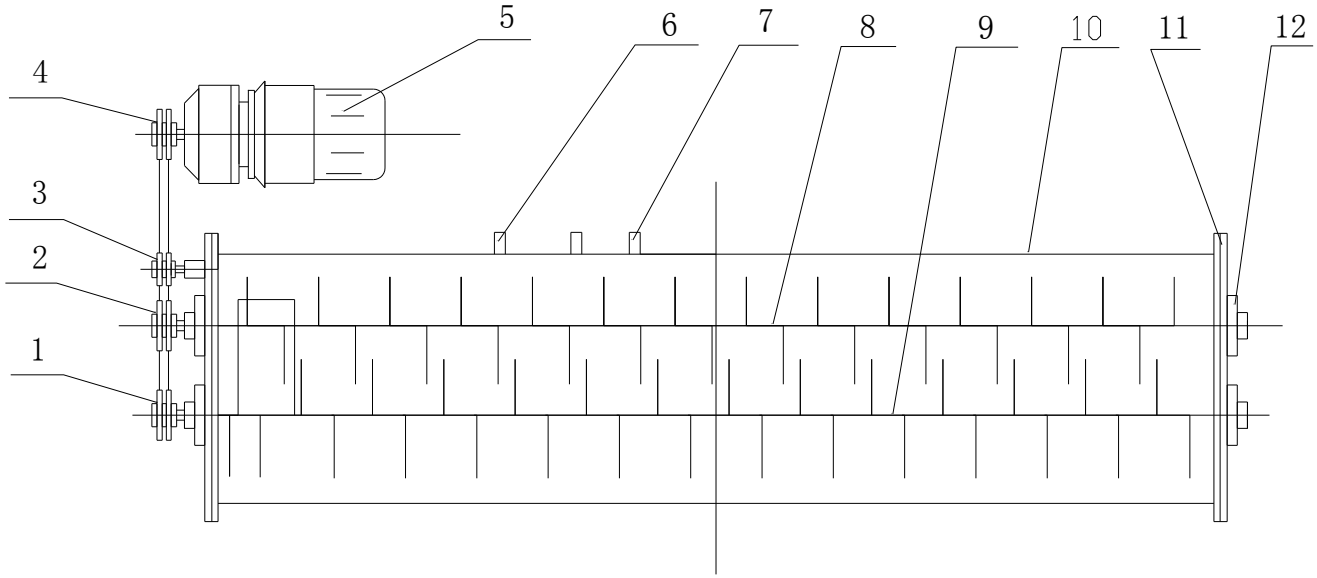


Figure 2 Feeder structure diagram

2. Conditioner



1. Large mixing sprocket 2. Small mixing sprocket 3. Guiding pulley 4. Driving wheel

5. Reducing motor 6. Water or oil filler 7. Steam inlet 8. Small stirring shaft 9.Large stirring shaft 10.Conditioning cylinder 11. End cover 12 Bearing with base

Figure 3 Conditioner structure diagram

Conditioner adopts differential drive theory, its function is to fully mix steam of 0.1-0.4MPa、

water mist (grease and molasses need to be fog-like) and powder, in order to soft materials and reach the temperature and humidity. Conditioner cylindrical shell、conditioner axis and blade are all made of stainless steel, there are four doors on the conditioner cylindrical shell, in order to clean up. Two conditioner axis through cycloid reducer motor driven by a double chain wheel, and then the guide wheel spin it in the opposite rotation. The fast speed of small stirring shaft is in the role of delivery, the slow speed of large stirring shaft is in the role of mixing; in order to extend conditioning time, improve the mixing quality and conditioner coefficient of materials. To adjust the large mixing paddle shaft angle film, the more the number of blades slice reverse, the greater coefficient of material in the conditioner.

3. Main Transmission

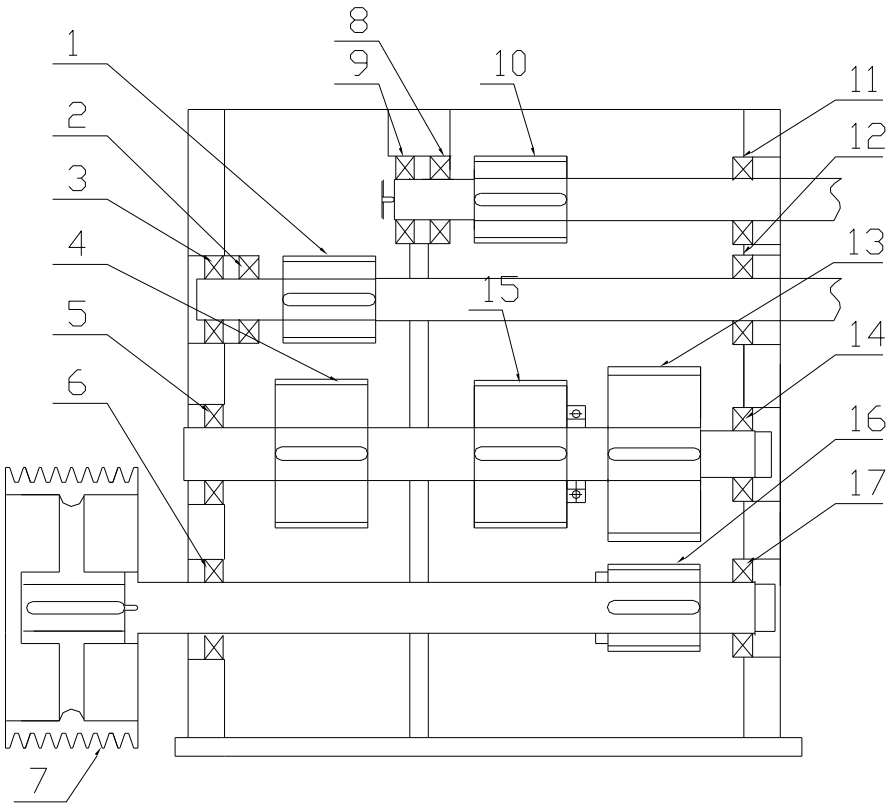
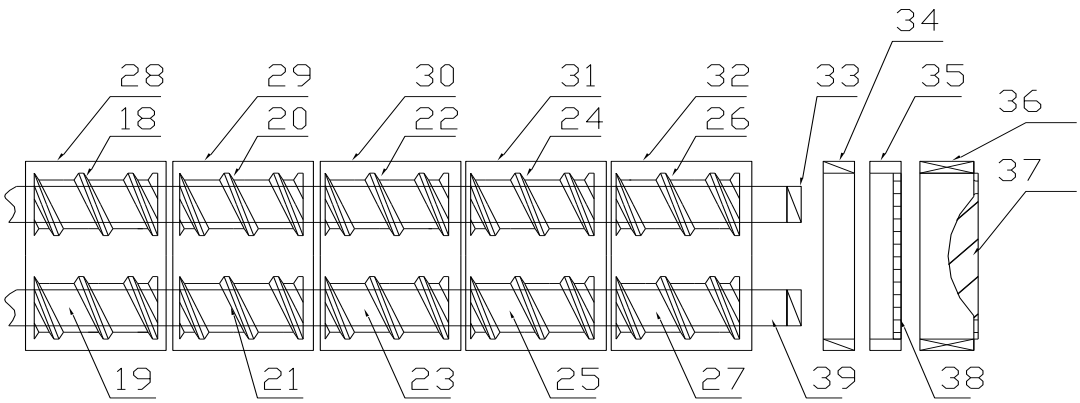


Figure 4 Main Transmission structure diagram

1. Gear 2. Bearing 3.Bearing 4. Gear 5 Bearing 6. Bearing 7. Belt Pulley 8. Bearing 9.Bearing 10. Gear 11. Bearing 12. BearingAxletree 13. Gear 14. Bearing 15. Gear 16. Gear 17. Bearing

4. Expansion Chamber



18-19. Screw 1 20-21. Screw 2 22-23. Screw 3 24-25. Screw 4 26-27. Screw 6 28. Swivel Nut 1 29. Swivel Nut 2 30. Swivel Nut 3 31. Swivel Nut4 32. Swivel Nut5 33. Screw Shaft 1

34. Flange 35. Block streaming film 36. Pressure Ring 37. template 38. spreader plate 39. Screw Shaft 2

Figure 5 Expansion Chamber structure diagram

Raw material enter into the center of the first swivel nut's two screws from the feeding hole, with the rotation of the two screws to make the raw material mix、cut and knead, meanwhile, it can forward transport, when arrive the fifth swivel nut, the temperature can reach to 110℃--150℃ and the pressure is about 30kg/cm^2 , at the time materials were injected from die head holes with the pressure disappeared suddenly, the water in the material were vaporized suddenly. This can prompt the volume of formed materials expanded, and the internal organization presents porous.

4.1 Screw

The screw is modular construction, pitch becomes taper and strengthen the squeeze shearing ability; double screw co-rotating has the characteristics of strong mixing、high efficiency of transport、materials residence time in expansion distribute concentrate、self-cleaning and good processing uniformity.

5. Cutting Grain Mechanism

The figure 6 is cutting grain mechanism construction plant, it is composed of frame(1)、reseller seat(2)、motor cabinet(3)、cutter shelf(5) and motor(6), etc. The function of the mechanism is to cut the material from the template into pellet. The motor adopts endless-speed motor; transform the motor speed can get the grain animal feed of different length.

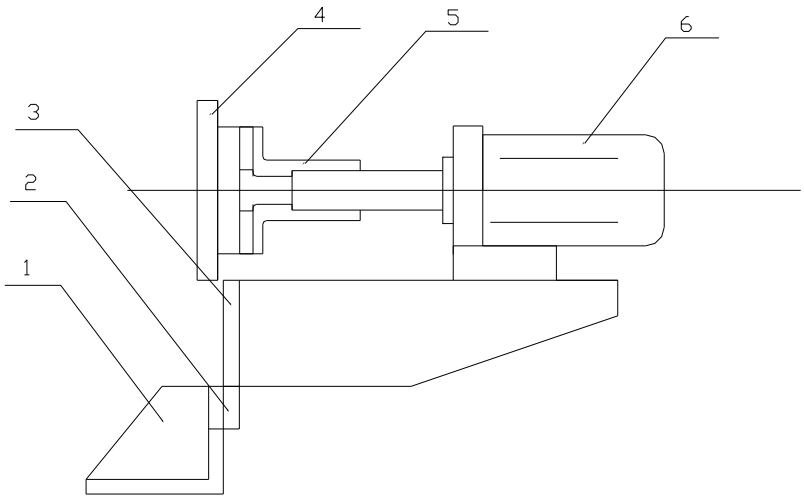


图 6　切粒机构结构图

Figure 6 Cutting Grain Mechanism structure diagram

1. Frame　2. Block resellers　3. motor stand　4. template　5. Cutter frame　6.Motor

6. Lubricating system

Figure 7 is lubricating system structure diagram, the main spare parts are stop valves 1、percolator 2、injection nozzle 3、fuel cooler 4、gear pump 5.

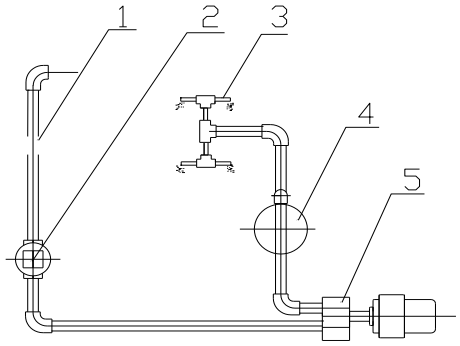


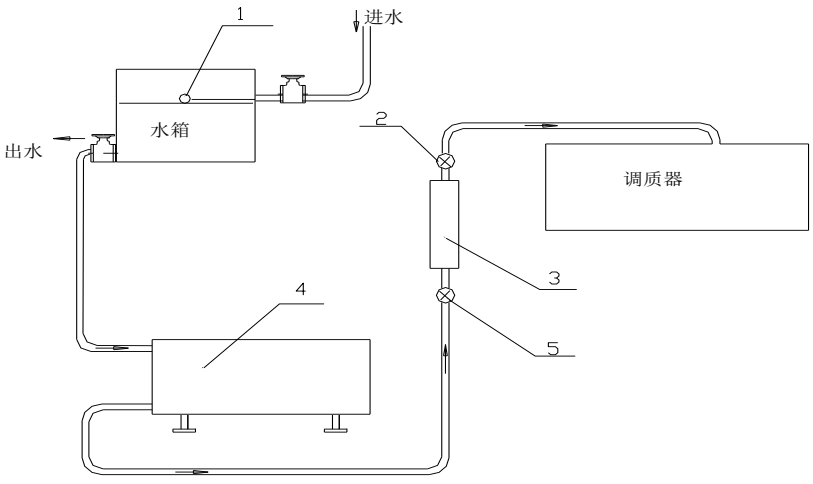
Figure7 Lubricating system structure diagram

1. Stop Valves 2. Filter 3.Spray Nozzle 4.Cooler 5.Gear Pump

The purpose of this set of lubrication device is to oil pumping from transmission case by using gear pump, after filtering and cooling, to spray the oil in the bearing and ensure service life of the bearing.

7. Conditioner with Water System

To guarantee the stability of water pressure and flow, our company requires customers to a set of water system separate as the following mode, shown as diagram:



New water from water inlet into water tank 1, in the water tank there was a set of floater, to ensure the water height. Water is from outlet to cooler 4 and transport oil temperature to cooling water, then stream to flow regulator, adjust the flow quantity of inlet valve can alter the humidity in the material till to reach craft request.

Ⅳ Installation、Adjustment and testing

1. Equipment installation

Equipment installation to be considered craft request (charge stock、discharging and drying and cooling, etc), determine the location. Equipment installation needs to consider the distance from the wall for convenience of working and opening doors. Contour size of the unit is shown in figure 9.

2.Equipment foundation

The equipments foundation can excavation base to perfusion boulder concrete obey device installation diagram. To ensure the foundation is horizontal and the equipment orizzontalmente, if the equipment is placed on floors, it should be placed around welding rib on equipment base.
Extruder are placed on the ground generally, it adopts cooling water volume and can do specific arrangements according to process flows, if it will be placed on floors, the material dimension can be tapped as the size of the foundation plan.

3. Feed hopper

In order to ensure the continuous production, 3, give to anticipate Dou
For promising continuous production, a hopper should be putted on the top of the feeder; its capacity is 0.8 m^3 with the continuous output last 10 minutes. At the bottom of the hopper install an insert door to control conveniently. If conditional, we can install a broken arch device or add a set of forced feeding device on the hopper.

4. Adjustment of clearance between cutter and die face

First of all, each cutting edge of the cutter shelf must be adjusted in the same horizontal by pressure knife screws, secondly, adjust motor base or motor location to keep the plane which made up of blade edges and die face parallelism, at last, locating screw and adjusting arbor to ensure the distance between edge and die face in 0.02-0.05mm.

5. Adjustment and correction about the feeder speed

5.1 Feeder speed determines feeder operational throughput, so only if change the feeder speed can control feeder operational throughput efficiently and meet production capacity o f extruder. But in normal operation, bulking capacity was influenced by many factors (such as material quality、steam quality、material moisture after conditioning、voltage change, etc), so when one of the factors to work a change, we should change feeder operational throughput at any time to make the work in a normal condition all the time. Feeder adopts electromagnetic speed motor or variable frequency motor to control its rotating speed (see the controller specification when using). In normal operation, adjust feeder speed should observe working current changes of main motor, when speed increase, gain in yield, the working current of main motor not exceeding rated current (reference the main motor plate on the rated current).

5.2 After extruder installation, the indicated value of DART tachometer of feeder and cutter should correct based on actual electrical machinery output rotating speed, the adjust method for details sees its instructions.

6. Adjust positions of the two screws

First of all, open the cover of transmission and loose positioning hoop, and then exit a

bridge gear, such as figure 5, when adjust positions of the two screws. This only should turn a can allow and turn a screw shaft with another hold on, then fitted with screw and turned screw shaft, to make a threaded interface into another screw's middle thread groove, such as figure 4, then match the idle gear and output gear(Second), at last tightly solid.

7. Trial run

7.1 To check whether the fastener is reliable or not.

7.2 To check whether nozzle oil on the bearing is normal or not.

7.3 To check whether the clearance between the blade edge and the die head is correct or not.

7.4 Whether there is foreign body in the threaded sleeve cavity and feeding tube or not.

7.5 Turn on the main motor, check whether the turn screw is correct or not (clockwise rotation), whether there are abnormal occurrences or not.

7.6 After running 20 minutes, to check whether the fastener is looseness or not, to check whether there is oil leakage or other abnormal conditions on the covers.

7.7 Start feeding motor, running without load to check the revolving and noise, meanwhile, we should turn off the cutting the door first and then turn on the feeding motor when the silo has material. When open the feeding motor, we should open asynchronous machine of adjustable speed motor first, then connect to the power supply controller, when the pilot tube is on, then adjust the speed to a stable figure.

7.8 Reboot the main engine, watered with a small amount of feed to extrusion till discharging.

7.9 After trial run all the spots are normal, can produce。Any step discovery is unusual, should exclude at any time.

Ⅴ Use the conditions, actions and safety

1. Use conditions

The following conditions should be meted when using a extruder:

1.1 Extruder should be installed indoors, the environmental temperature is 5~40℃.

1.2 Technology is matched wish support equipment of extruder.

1.3 Voltage stability, the deviation is less than ±5%.

2. Steps

First of all, we must prepare well for the work before starting work,

2.1 First, open the pump, then, startup the main motor.

2.2 Turn on feeder motor, to adjust the feeding speed to minimum speed.

2.3 When the materials were putted in swivel nut 1, spray the water to the nut throught the three-way observation hole

2.4 Stop watering into swivel nut 1 after normal discharging from template.

2.5 After turning on the granulate motor, closing the cutter to dicing.

2.6 Adjust feeding speed, to make the main motor current to 80% of the rated current.

2.7 Adjust the cutter motor speed to make proper pellet length.

3. Attentions

3.1 Operator should notice to make the material keep in the controlled condition, and then put the material into extruder.

3.2 After normal start up, we should observe the change of main motor electric and thermometer current and temperature of swivel nut, and control feed quantities by the variation of the two figures, and also observe item stock situation through, if the material too dry or too wet, the electric current raised suddenly and overloaded operation, you should turn the handle to move the material out of machines.

4. Shutdown procedure

When use the expansion, should also obey the shutdown procedure, can not treat it lightly to avoid plant accident by disoperation.

4.1 When observe there is no material through the three -way, you should turn off feeder motors.

4.2 When observe there is no material through granulate out grain port, you should turn off main motor.

4.3 Shut off oil pumps.

4.4 Turn off main dicing machine.

4.5 Turns on dicing machine, and turn down the die head after nut temperature cool into normal temperature, then turn on main motor to clean up rest mill in the threaded sleeve cavity, at last turn off the main motor.

4.6 Clean up the die head.

5. Safe Regulations

5.1 There are no stone, iron complex, twine and other matters

5.2 To clean up accumulation materials in the threaded sleeve cavity after the machine stopped running in time.

5.3 Operation in strict accordance with control steps、attentions、stopping procedures, must not overload, and prevent disoperation to the mechanical failures.

5.4 It is not allowed to open the doors and casing to avoid personal injury.

5.5 Hand can not be inserted into the access gate to take material or other actions, if you want to take material, you should use self-made tools

5.6 Pay attention to the distance between cutter and die head can not greater than 0.55mm when adjusting.

5.7 Any excrescent circumstance or machinery breakdown, should stop the machine in the normal stop steps, after stopping to check the machine troubleshooting, it can continue to work after all will be normal.

5.8 The working current of main motor can not exceed 80% of rated current

5.9 When operating, anyone can only stand、operate or watch at the two sides of swivel nut, must not active and stay in front of template outlet(90℃ sector)

5.10 After stopping the machine, only can remove a template after the swivel nut cool to the normal temperature.

Ⅵ A common fault analysis and removal

S/N	Troubles	Failure cause	Troubleshooting
1	Die holes plugged	1.Die hole sealing material 2.Moisture of material is too much or too less 3.material is too thick	1.Clean up and dredge die hole 2.Adjust the amount of added water correctly 3.Improve the material grinding fineness
2	No material into insert cavity	1. Product material silo 2. Feed auger jam	1. Broken arch 2. Taking the auger to cleanup
3	Main engine can't be started	3. something wrong with circuit	3. Exclude failure circuit
4	Noise、vibration violent	1.Bearing wear failure 2. There are foreign bodies in the feeding 3. There are foreign bodies in the insert cavity	1. Exchange bearing 2. Open to clean up 3. Open the die head to clean up
5	The output can not achieve requirements	1. Inappropriate water 2. There is a problem with original formula 3. The pellet size is too large 4. Current is not to the rated current	1. Adjust the added amount of water 2. Adjust the original formula 3. Increased fineness 4. Increase the feeding speed suitably
6	Oil leakage	1. seal is damaged 2. Joint oil spill	1. Exchange oil seal 2. Exchange or sealing

Ⅶ Maintenance& Attendance

1. Rountine maintenance

1.1 Adding high-temperature grease into conditioner and feeder bearing on time

1.2 Checking whether oil pump operation normally or not before the work.

1.3 Checking the gap between cutter and die head before the work, to make sure it is between 0.05-0.2mm.

1.4 Checking whether each fastener will be loosening or not before the work.

1.5 Checking whether have oil leakages or not at any time.

1.6 Keeping machine appearance to be clean.

2. Regular inspection and maintenance

2.1 Check the joints of each part once a week for looseness

2.2 To clean up the feeder and conditioner once a week.

2.3 After working about 500 hours, the main transmission should be exchanged oil. Change the oil every half a year after continuous work.

2.4 Clean up the conditioner and feeder bearing once every half a year, and add new oil.

2.5 Check the wear pattern of screw、 swivel nut and die head so that we can replace in time.

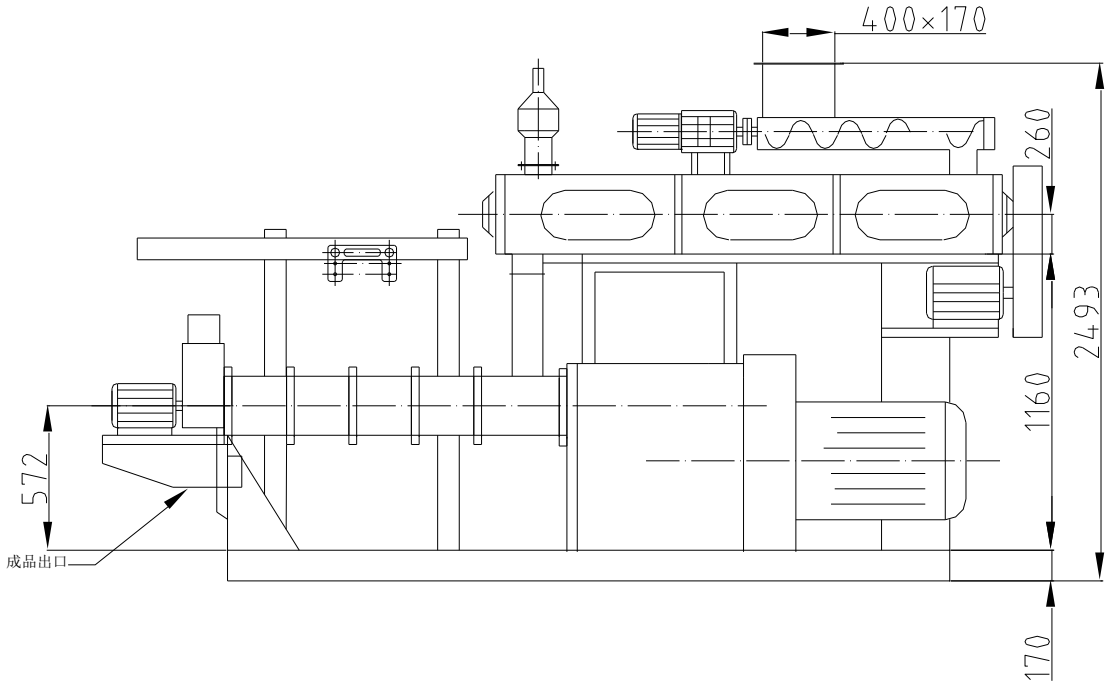
2.6 When the oil return filter raises the alarm, filter element should be turned down and cleaned up.

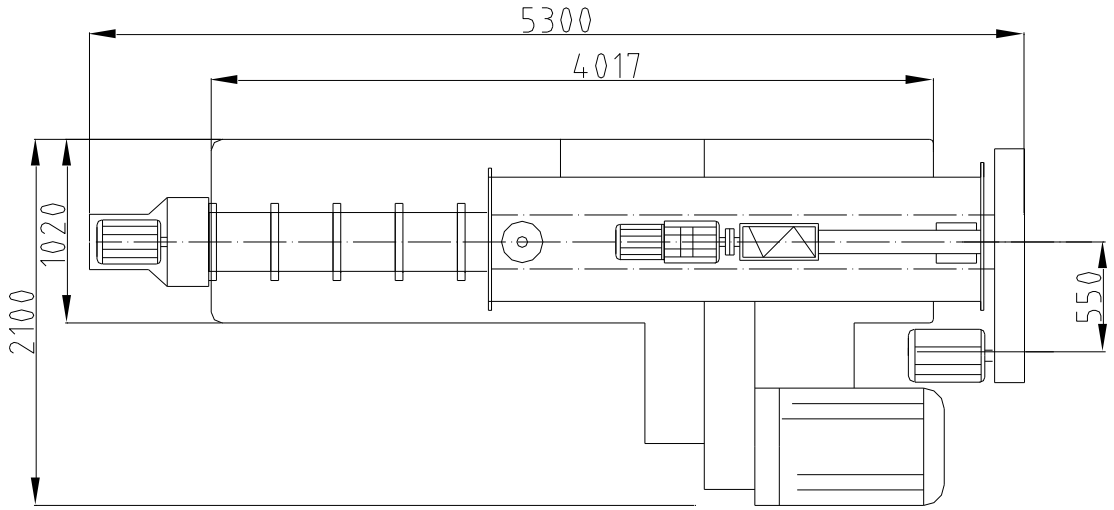
2.7 Check whether blades will be wore or not after work, so that we can replace in time.

Ⅷ Vulnerable parts list

S/N	Name	Qty./ set	Install parts
1	gear	1	See the Fig of main Transmission structure diagram
2	bearing	1	
3	bearing	1	
4	gear	1	
5	bearing	1	
6	bearing	2	
8	bearing	2	
9	bearing	1	
10	gear	1	See the fig. Of main Transmission structure diagram
11	bearing	1	
12	bearing	1	
13	gear	1	See the fig. Of Main Transmission structure diagram
14	bearing	1	
15	gear	1	
16	gear	1	
17	bearing	1	
18-19	Screw Ⅰ	2Nodes	See the fig. Of Expansion Chamber structure diagram
20-21	Screw Ⅱ	2 Nodes	
22-23	Screw Ⅲ	2 Nodes	
24-25	Screw Ⅳ	2 Nodes	
26-27	Screw Ⅴ	2 Nodes	

28	Swivel Nut Ⅰ	1 Node	
29	Swivel Nut Ⅱ	1 Node	
30	Swivel Nut Ⅲ	1 Node	
31	Swivel Nut Ⅳ	1 Node	
32	Swivel Nut Ⅴ	1 Node	
37	Die Plate	1	
38	Spreader Plate	1	
39	Blade	12Pieces	





The Sample Drawing of SSEP148 Twin screw extruder

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