

ZPW17D Rotary Tablet Press

Instructions Manual

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1. Applications

- 1). This machine integrates automatic rotation, frequency-conversion, speed—adjusting with continuous tablet-pressing. It is mainly used for the manufacture of tablet in pharmaceutical industry, it also applies to press the granular material into tablet in the industry of chemical, food, electronic etc.
- 2). This machine applies to the pressing of granular material of which powder content (over 100 hole) is below 10% and it can't be used for the pressing of half solid, damp granular, low melting point, easy damping material and the powder without granular.
- 3). this machine can produce round, special-shaped and character-engraved tablets, $\Phi 4\text{---}20\text{mm}$;

Main technical data

Number of filling of rotary table	17 pairs
Maximum working pressure:	60KN
Maximum tablet diameter:	20mm
Maximum tablet thickness:	6 mm
Maximum filling depth:	20 mm
Maximum production:	0.04million tablet/hour
Diameter of stamp:	34mm
Height of middle stamp	22+5mm
Diameter of upper/lower stamping lever	22mm
Length of upper /lower stamping lever	115mm
Machine's coverage area:	615×890mm
Height of machine:	1415mm
Net weight of machine:	1000kg
Motor model:	Y112M-6
Power:	3kw
Voltage:	220v/60hz

2. Transportation and installation

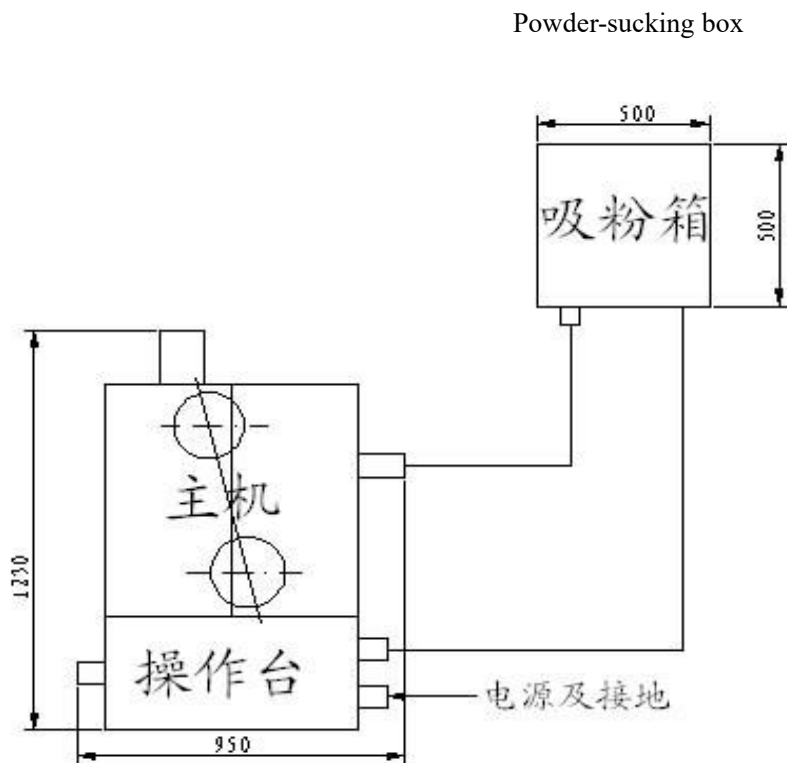
ZPW17D Rotary Tablet Press and powder-sucking auxiliary machine are installed in two wooden cases separately to avoid being damaged by impact during transportation.

The transportation and installation of machine must comply with the following rules:

1. The rules of transportation and loading /unloading
The marks on wooden cases are made according to “GB191 Indication Mark of Packaging and Transportation”. The machine should be lifted with a crane or handled according to the designated position marked on wooden case when lifting with a crane and it should be kept in vertical position and handle with care.
2. Unloading and restore.
When opening wooden case, the top board and side board should be torn off firstly. When the machine is completely uncovered, two bucket and bucket rack have to be torn down, then use

a crane to hook the top ring bolts. Prior to lift, the bolt connecting the machine with base foot of wooden case. The first lift should be 400mm far from the ground, tear off the base holder of wooden case, then use a spanner to tear down the corner-iron slips embedded on the baseboard of machine, finally, lift the machine to the designated position.

3. Plane figure of installing machine:



To power and grounded

- The standard of leveling for the installation of machine is the plane of rotary table.
 - There must be enough space to be left between the main unit and wall for the leaf of organic glass window to open
 - The base foot of this machine is shockproof rubber cushion, it is not necessary to equip with subfloor bolt.
4. Electric installation

The working voltage of frequency converter in this machine is 1 phases 240 V AC voltage. If the power supply and voltage in your region is not the same as that of our machine, please contact us immediately. The power supply system of this machine is TN-S system, that is to say the inlet line of power is 3 phases 4 wires system (middle wire is marked at the line end). There is a grounded screw beside the plug-ins of the power system, and the grounded screw must be grounded securely to ensure the safe operation. The total consumption of power is 2.2kw, the section of inlet conducting wire should be more than 1mm².

4. Main structure of machine.

1) The feature of machine structure

This machine is driven by motor through synchronous teeth belt linking with worm and rotation of rotary table drive 17 pairs stamps clockwise when each stamp passes through

flow-grid feeder, the mechanism of upper/lower rail and upper/ lower press wheel will form the continuous tablet-pressing process of feeding, filling, tablet-pressing and output-tablet.

The peripheral cover is fully-sealed and made of Auce stainless steel (see appendix). The table of internal pressing chamber and flow channel of tablet-pressing are all made of stainless steel and easy to clean without dirty corner. Through the transparent glass window leaf, we can observe clearly the status of tablet-pressing.

The side door board under the machine is very easy to open completely, and easy to clean, maintenance and repairing.

The tablet-thickness adjusting handle wheel and filling-controlling handle wheel are located at the front side, and the electrics operation panels is also right beneath the machine, which adopts frequency-conversion speed-adjusting, smooth and stable rotation, safe and correct.

The safe unloading unit of upper pressing wheel make the setting of working pressure be adjusted freely. (There is a hand hole which can be opened on the top of the machine). When the working pressure of impact lever is over the set value, the displacement of balanced spring make the upper press wheel push off the upper impact lever, and the buzzer will give out a signal of sound and light. The machine will stop automatically to avoid overpressure at the impact lever to break.

The drive system is sealed in the oil tank under the main body of the machine, and it is an independent component which is fully separated, thus, they can't be contained each other and the drive worm and worm wheel is dipped into the oil reservoir, the heat is easy to dissipate and wear-resist, thus the life of drive system is extended.

This machine is equipped with special vacuum auxiliary unit which can such up the rising dust in the pressing chamber, thus the pressing chamber is always under the negative pressure all the time, which is easy to form a clean circulation up to down circulating air to reduce the rising of powder dust.

2) The structure of rotary table

The rotary table is a main component which consists of set of upper/lower bearings and main shaft. There are 17 pairs of stamp is distributed evenly around the rotary table, the torque is delivered by power button between rotary table and main shaft, and it revolves only at clockwise (the stipulation is made by manufacture who has preset the motor's rotation controlled by frequency converter, it never result in reverse rotation regardless of the arrangement of internal power supply phase sequence).

3) The structure of rail

The rail is cylinder cam and plane concaved wheel consisting of upper/lower rail, as well as the track of movement of upper/lower impact lever.

On the top of rotary table, the upper rail consists of upper/lower traveling rail of upper impact lever and parallel rail, which is fixed on the upper rail disc respectively and upper rail disc is fixed on the upper pressing wheel rack by screw. There is a revolve inlay tongue at the center o parallel rail, which is specially designed for dismantling or installing stamps. To avoid the damage to the machine, the machine can't start until the inlay tongue have restored to its

original position).

The lower rail consists of upper/lower traveling rail, filling rail and bridge board which are installed on the main unit holder respectively. At the outlet of lower traveling rail, there is a round cushion which is specially designed for dismantling or installing lower impact lever (at the rear of machine, the lower impact lever can be dismantled or installed after the panel has been dismantled). For the purpose of easy exchange of wear-out parts, the modularly constructed lower rail can be dismantled or installed directly under the main unit.

4) Filling-adjustment unit

The filling adjustment unit is designed for adjusting the weight of tablets, which consists of a pair of worm wheel and a pair of spiral. When revolve the adjusting handle wheel (installed on the peripheral cover of machine), the small worm drive worm wheel, which make worm move up/down, thus the filling rail installed on the bolt shaft will go up/down, and the volume of filling will be increased or decreased.

5). Tablet-thickness adjustment unit

This unit is designed for adjusting the thickness of tablet. It is perfected by means of adjusting the center position of lower pressing wheel, and it consist of eccentric shaft (lower press wheel shaft) supporting lower press wheel, spiral gear, and when revolve the tablet-thickness adjusting handle wheel, the adjusting bolt will drive spiral gear and make the eccentric shaft revolve, thus the lower pressing wheel will change at the deviating distance, the center position of pressing wheel has been changed, and the distance between upper/lower pressing wheel will be changed correspondingly to meet the requirements of changing tablet thickness. After adjusting the filling and tablet thickness, the lock nut of adjustment handle wheel must be seared tightly to avoid the change of parameter during the period of maintenance.

6) Feed unit

Feed unit consists of feeder, bucket rack, column, adjustable screw and bucket. Both the space between feeder and the surface of rotary table and the height of bucket can be adjusted.

7) Drive components

The motor drive worm and worm wheel through teeth synchronous belt transmission and transfer to the motion of main shaft, there is a trial operation handle wheel installed on worm shaft. The degree of tightness of teeth synchronous belt can be adjusted by motor, and the degree of tightness of belt is subject to less than 10mm bend after the thumb has pressed the surface of belt.

The worm and worm wheel is lubricated soak, and the level of oil can be observed through worm wheel box visual window, refill 20# mechanic oil until 1/3-2/3 of worm has been soaked. There is an oil-draining bolt installed on the side of worm wheel box.

5. The Adjustment and Operation of Machine

- 1) The installation and adjustment of stamps.

- 1.1) Prior to install stamps, the working surface of rotary disc, upper/lower stamp hole, middle stamp hole and all stamps to be installed should be cleaned gradually. Open the door board beneath the left or right side of machine, and observe the dial on the tablet-thickness adjustment unit, and the thickness of upper-tablet should be adjusted at 3, if not, we can use adjustment handle wheel to adjust it, and resume the position of left and right door board. Then, open the window board at back of machine in sequence, and loosen the fixing bolt of impact tablet nozzle, dismantle the tablet-output nozzle, then open the lower rear door board, and screw down the stainless steel hexagon screw fixed on the two sides of table board of tablet-pressing chamber, take out table board after opening it with a key.
- 1.2) The installation of middle stamp
Screw the fixing screws of the middle stamp on rotary table out about 1mm far from the surface of rotary table gradually (It should be subject to the middle stamp will not touch the head of screw when installing the middle stamp). The middle stamp and hole is transitionally fit, thus the middle stamp must be positioned horizontally. In this case, turn up the inlay tongue, and thread the strike bar into upper impact hole, use a hand hammer to knock it into middle stamp slightly, and regard that the level of middle stamp is not higher than that of rotary table as a standard, and then screw the screws on tightly.
- 1.3) The installation of upper impact lever
The inlay tongue of upper rail has to be still turned up, a little plant oil can be applied to the end of impact lever, then, insert the upper impact lever into the upper impact hole of rotary table, revolve the impact lever by fingers and the up/down slide should be smooth and check whether the quality of stamp is conformity with the requirements, then, revolve the trial handle wheel until the upper impact lever have been engaged into parallel traveling rail. The inlay tongue must be turned down after all upper impact levers have been installed one by one.
- 1.4) The installation of lower impact lever
Use fingers to hold up the cushion which is used to dismantle or install the lower impact lever on the main unit, the lower impact lever can be installed. The method is the same as that of above mentioned. But the cushion must be restored to its original position after installation.
- 1.5) After the complete set stamp have been installed, rotate the trial handle wheel and make rotary disc revolve 2 revolutions in the direction of the sequence of digital on the rotary disc, observe that upper/lower impact lever engage into middle stamp hole and the status of running on rail. It can be regarded as qualified only there mustn't any touch or hard friction. Additionally, make sure when the lower impact has gone up to the highest point (i.e the position of output tablet), it should be 0.1-0.3mm over the working table of rotary table.
Finally, start up motor and make it operate without a load for 5 minutes. It can be regarded as an end until the operation is stable and smooth without abnormal sound.
- 2) The Installation and adjustment of feeder
Install the components of moon-shaped grid feeder on the supporting column (In this case, the fixing screw of supporting column should be loosen), then put a layer of paper

(about 0.05-0.1mm) on the working surface of rotary table, screw tightly on the screws on tablet guard and powder scraper of feeder components, and stick the feeder on paper tightly. Then screw on the embossed screws fixing feeder, stick tablet guard on the paper tightly. Screw on the embossed screws fixing feeder, stick tablet guard on the paper tightly. Screw on the M4 fixing screws; finally tighten up inner hexagon screw on supporting column to ensure the enough space between the bottom of feeding & tablet guard and the working surface of rotary table. Then loosen the embossed screws, pull out the paper and tighten it up, and adjust the height of rubber powder-scraper, and make it stick to the working surface of rotary table tightly.

3) The Adjustment of filling

The filling adjustment unit is installed in the two adjustment handle wheel control in the front of machine, left adjustment handle wheel control .When handle wheel revolve clock wise, the amount of filling will increase, other wise, it will reduce, and it will be indicated by graduation.

4) The adjustment of tablet thickness

The thickness adjustment of tablet is controlled by two adjustable handle wheel on right of machine, When the handle wheel revolves clockwise the thickness of tablet will increase, otherwise, it will decrease, and it will be indicated by graduation. When the filling volume defined by the weight of tablet has been adjusted, the thickness of tablet can be adjusted appropriately after checking the hardness of tablet (the index of the degree of tablet disintegration)

5) The adjustment of the volume of input powder

To stable the idle corner accumulated by granular material in flow-grid feeder and keep the filling volume of input stamp hole constant, the flow of powder fed according to the gravity must be adjusted. Firstly, loosen the embossed screws on the side of bucket rack, then revolve the embossed screws on the top of bucket rack, adjust the distance between the feeding outlet and the working surface of rotary table, thus the flow of powder is controlled, when the machine is in operation, regard the volume of accumulated powder in feeding outlet without overflow as a standard at a certain distance, tighten up the embossed screw after adjustment.

6) The adjustment of working pressure:

For the different material, tablet shape and tablet diameter, the working pressure for pressing & formation is different, the purpose of setting working pressure is for the hard tablet because of material adhesive impact and the damage of the head of Impact lever, the damaged tablet due to the irregular formation, even the damage to the impact lever caused by overpressure resulted from the unexpected overlapping tablet.

In the upper pressing wheel unloading unit consisting of pressing wheel shaft, mixing lever and spring supporting, when the upper pressing wheel received the reverse force of impact lever, and the force on the spring is over the set value, the spring will displace of itself and make the upper pressing wheel go up, meanwhile the traveling switch on one end is triggered, then, the machine stop automatically and give out the signal of light

and sound.

Open the hand hole cover on the top of machine, loosen the outer sleeve pressing the spring, just tighten the calm nut after the working pressure has been adjusted according to the graduations on scale.

7) The adjustment of speed

The method of adjusting speed is very simple, just press the button for speed .true right adjust quick, turning left adjust slow. On the operation panel of frequency conversion, the frequency conversion of speed should be preceded in sequence from low to high.

The choice of speed has a direct affluence on the service life of machine, the weight of tablet, and the quality of tablet. The uniform stipulation can't be made due to the feature, viscosity, humidity and granularity of material and the different diameter of tablet, pressure, which only can be defined depend on the actual situation and working experience. Normally, we should adopt low speed to press minerals, plant essence, the material with big diameter, bad viscosity, quick and hard to formation; Otherwise, we can select higher speed to press the material which provide good viscosity and lubrication, small diameter of tablet, easy to formation.

6. Electric operation

1) The description of operation panel

The electric box operation panel consists of graphical symbol, light & signal indicating area, power supply control, display of rotation speed, frequency-conversion, speed-adjusting button.

2) The procedures of operation

2.1) Firstly, check whether the emergency stop button on the left side of operation table is loosen to the normal position after switching on the outer power supply, open the organic glass cover on the electric operation panel (lift the cover mouth slightly and slide it down), use a special key to turn on the power supply switch, in this case, the LED of general power supply lights up, the frequency LCD of motor will flash, the LCD of rotary speed read “O” and no display for the other components.

2.2) When the tablet-pressing is ready to operate, there should be no fault displayed on the panel, in this case, the normal operation can be performed, i.e turn the button for speed .and the main motor will start up and press tablets, observe whether the display of rotation speed is conformity with the required rotation speed, if not, we can adjust by speed button to make it reach the rotation speed for pressing tablet, and then press down the start button of sucking-powder auxiliary machine.

2.3) if you want to change the displayed content and run program of frequency conversion LCD, please read carefully the document “Operation manual of frequency-converter” delivered with the machine.

- 2.4) when the machine has to be stopped, press make speed button left, under the frequency conversion LCD, and the machine will stop normally. When there is an emergency, press down the red mushroom emergency stop button on the left side of operation table, and the machine will stop immediately. The power supply of machine has been cut off completely, meanwhile the emergency stop LED will light up. The power supply inside the machine can't be resumed until the emergency stop button has been restored to its normal position after the trouble has been solved.
- 2.5) While machine is under operation, if alarm of overpressure raise and the signal lights up, then machine will automatically stop the operation. This means the actual pressure is over the designated operation pressure. You need to press the emergency stop button before you check the machine, and then cut off the power, you can check whether the granular is normal or not, and whether the rigidity and weight of the tablet are proper or not, after that, open the ohand hole setting operation pressure on the top of the machine and check whether the pressure setting is proper or not and the switch is secured or not, and then adjust the settings accordingly.
- 2.6) The malfunction indicating of main motor
Once the machine run improperly and the frequency converter stops working and malfunction indicator lights up, the type of malfunction and the working parameter of malfunction will be displayed on the LCD of frequency converter, in this case, the appropriate check should be made according to the operation manual of frequency converter, then restart the machine.

7. Lubrication of machine

1. For the lubrication of ordinary components of this machine, there are oiling nozzle on the surface of the each parts, lubrication grease and mechanic oil should be filled into nozzles according to the type of oil cup. You need to lubricate once before each shift and appropriate oil should be added depend on the temperature rising of bearings and operation during the period of operation.
2. To add mechanic oil into the worm wheel head, normally, use N46 in summer and N32 in winter. The amount of the added oil should be subject to 1/3 (height of a teeth) of the worm wheel is soaked. And the oil should be changed every half year.
3. Two round covers on the top of the machine are designed to oil the surface to the upper press wheel, the dropped oil amount should be subject to the absorbed by a felt without overflow.
4. For the lubrication of lower bearing of the main shaft, we should open the right side board of the machine, and then we find an extended oiling nozzle near lower press wheel, lubrication oil can be refilled once half year.

5. The impact lever and rail should be lubricated with N32 mechanic oil, in order to prevent the pollution caused oil dirt, the amount can't be too much.

8. Maintenance of the machine

1. Check the parts of the machine periodically, once ~ twice per month. Check the flexibility of worm wheel, worm, bearing, press wheel, upper and lower rail etc. to see whether they run smoothly, if serious wear or damage have been found, we can't operate the machine until troubleshooting has been completed. Especially the service life of press wheel and top of the impact lever are limited within one million contacts, otherwise it will result in damage caused by fatigue.
2. Once after use, the reminding power inside machine should be taken out and clean off the residual powder on each parts of the machine. If the machine won't be used for a long time, all press stamps must be torn down and apply anti-rust oil to the surface of components and cover it with tarpaulin.
3. The press stamp should be kept in the soaked steel cage with lid, and should be kept clean to avoid rust and scraps.
4. We should pay attention to the working conditions (e.g temperature and humidity) when using electric components, especially the frequency converter should be handled more carefully, in case of malfunction, it should be send to manufacturer for repairing.
5. Before making insulation check on electric components of machine, make sure to remove main loop and controlling circuit, which are connected with frequency converter to avoid the damage caused by testing high voltage.
6. Pay attention to the ground of machine, for you safety, make sure the machine must be grounded securely.