

## I. summary

GMS series grinder is used for liquid material's precision processing, it integrates the multifunction of homogenizer, impact mill, ball mill, three-rollers mill, shearing mill and mixer etc, it has predominant advantage on superfine grinding, emulsification, homogenization and mixing. The finished products can reach to 2-50um after processing.

## II. Application

- Food industry: Aloe, pollen, pineapple, peanut, sesame, fruit tea, icecream, moon cakes stuffing, butter, jam, juice, soybean, soy sauce, bean paste, peanut milk, Protein milk, soy mil, all kinds of Beverages, essence, chicken bones, pigskin etc.
- Chemical industry: paintings, Pigment, die, paint, lubricants, grease, diesel, oil catalyst, emulsified asphalt, Adhesive, detergent, Plastic, Explosives, FRP, leather, emulsified explosives etc.
- Daily chemical: toothpaste, detergent, shampoo, shoe polish, Cosmetics, Bathing precision, soap etc.
- Medicine: syrup, herbage medicine, Paste pharmaceutical, Biological Products, fish liver oil, Vaccine etc.
- Construction industry: All kinds of pigment
- Others : Plastic industry, textile industry, paper Industry, bio chemical Industry, Environmental Protection& energy saving etc.

## III. Working Principle

By means of the relative movement of the different geometric shaped stator and rotor in high revolving speed, material enters the mill due to the gravity, ambient pressure and centrifugal force and comes under the action of strong shearing, rubbing, impacting, high frequency vibration and whirling forces during the variable annular grinding gap between rotor and stator. Then the material will be effective dispersed, pulverized, emulsified, homogenized and uniformed, thereby the product with ideal size and quality will be fulfilled.

The grinding room has 3-step grinding area, 1<sup>st</sup> is coarse grinding area, 2<sup>nd</sup> is fine grinding area, 3<sup>rd</sup> is superfine grinding area, through adjust the distance between rotor and stator, it can reach to ideal grinding result.(recycle-grinding is available)

## IV. Constructional Characteristics

The GMS Type Grinder is mainly composed of three parts, namely the milling head, pedestal driving parts and the motor. All the components that contact with the processed material are made of high-quality stainless steel. The static and rotating grinding plates are the critical parts of this machine, the shape of the plate tooth may differ according to the features of the processed materials, but it is always made of stainless steel: Stator and rotor be made by 2CR13 stainless steel; nose section, with the material inlet and outlet and a spiral of SUS304; SUS304 manufactured by external, other parts made of carbon steel, the base is welded steel plate and stainless steel SUS304 outsourcing. The motor part is specially designed according to the standards of the grinder; a water-blocking plate is added onto the bulge of the cover for the motor to prevent leakage.

GMS-130 grinder keeps up all the merits of traditional colloid mills such as well-designed construction, simple operation, low noise, easy servicing, small in size and light in weight etc. Moreover, it has also the advantages of wide adaption, easy variation in speed, and a different type of motors may be replaced to suffice the demands for special materials to be processed.

1. The main parts of this machine are made of high-grade stainless steel, hence are corrosion-proof and nonpoisonous.
2. The critical parts of the mill, i.e. rotor and stator, are processed precisely by adopting of advanced technology. The grinding gap (clearance between rotor and stator) may be micro-adjusted by means of gap-regular ring, on which an index dial is prepared for easily reading of scales. This mechanism can be controlled conveniently and so the quality of products will be ensured satisfying.
3. According to the different products processed, the rotor and stator made of different material may be selected. The whole machine could be assembled or disassembled easily.
4. The nominal revolving speed and its variable range may be ordered by customer according to different uses of this machine.
5. There is fixing device on the main grinding base, the gap-regulating ring, to ensure the stable distance during the machine working.
6. It is matched with the water cooling system, to ensure the nature of material
7. The customer can choose to use common motor or explosion-proof motor.
8. The colloid grinder has the character of reasonable structure, stable performance, simple operation and maintenance.

### Principal Technologic Parameters

Type		GMS-130 (B)
Fineness of processed Effluent materials (Single or multi-cycle)		2-50 $\mu$ m 20-120 mesh for peanut/nuts butter
Productive capacity(kg/hr) (Varies according to material properties)		100-300 (0.2-2t/hr for other materials)
Motor	Type	Y160M
	Power(kw)	11
	Speed(rpm)	2930
External dimension(mm)		1000*480*1060
Overall weight(kg)		420
Remarks		With cooling system

## V. Mounting & Operating Rules: Routine Servicing

1. Mount the mill on a perfect leveling surface of concrete foundation and screw down into a permanent position by foundation bolts.(according to the operating site and conditions, it may also be put on even surface only without any fixing.)
2. Check every screw whether it is fastened.(Note: the motor central screw is left-handed.)
3. Turn the rotor slightly by accessory wrench before switching on of the drive motor to check if it touch or catch the stator. If so it is, strictly forbid to take into operation.
4. Inspect the power supply system. It must be 3-phase alternating current, and with the mill body grounding properly. The rotating direction of motor should correspond to the arrow marked on the mill base(clockwise)
5. Put through cooling water on to the inlet nozzle 2, but if the speed does not exceed 4000rpm, cooling is unnecessary in general.
6. Start the motor at a touch and go in order to check if any abnormal noise or vibration exists. If so, stop immediately and repair, then test again.
7. Clean the mill after processing timely, Cleaning must be carried out in the running condition, and firstly, turn the gap-regulating ring 6 counterclockwise to an angle not less than 90C
8. Regulate the grinding gap according to the required particle size of product processed. Regulating must be carried out in the running condition.
  - a) Loose the two fixing rods 7 counterclockwise
  - b) Turn the handles of fixing rods 7 to drive the regulating ring 6, then the grinding gap may be regulated. Rotating of the handle in clockwise direction will decrease the gap and particle size of product becomes finer; rotating in counterclockwise direction will increase the gap and particle size of product becomes coarser.
  - c) After the grinding gap regulated, tighten up(clockwise) the two handles simultaneously.
  - d) Once the best gap is determined, a set screw 22 may be used to fix it if material and batch process keep constantly.

9. Never connect cooling water to the spill nozzle 11 or the electric motor may be burn out.
10. Requirements of materials before grinding:
  - a) This mill can only grind the wet materials but not the dry solid.
  - b) Materials must be filtered or selected before entering into the mill if impurities exist in it. Particle size of material should be less than 1mm after filtering and hardness not higher than HV309. Strictly forbid the iron or stone particles getting into the mill head, or may cause damage.

11. Feed raw material into hopper and mill chamber only on running condition of rotor. Stop the

Motor only after all material drained away from outlet. According to material properties and particles size required, the grinding process may be once-over(single cycle) or over and over again(multi-cycle). Before all, several times of trial test should be carried out to determine and ensure the best grinding gap and most reasonable flow rate.

12. Constantly pay attention to the conditions in operation and running period. Stop the mill to check it if any abnormality appears.

13. Demounting of the stator assembly 9:

(The stator assembly is composed of 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> stages, they are firmly tightened together, never try to separate them!)

Remove the hopper 1 first, then water inlet nozzle 2. Loose the cap screw 25 to remove the fixing collar 3. Hold the fixing rods 7 by handles to screw out the gap-regulating ring 6 counterclockwise. Lift horizontally the stator carrier 5, then the stator assembly may be taken out.

14. Demounting of the rotor assembly 21:

(Note: the rotor assembly is composed of 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> stages, they are firmly tightened together, never try to separate them! )

After took out the stator assembly, remove the outlet 20. Screw out the left-handed screw 24, then the rotor assembly and centrifugal disk 10 may be taken out.

Installation of rotor and stator may carry out in reverse order. Clean them before installing. Meanwhile, all contact surfaces and threaded parts should be lightly oiled with vegetable oil or lubricating-oil accordance with the demands.

15. Just after processing, clean the grinding chamber at once to prevent corrosion(see art.7 above)

Choose the suitable cleaning agent according to the processed material for the sake of protecting of sealing material against damage.(The sealing material is butadiene nitrile rubber) Blow to dry up with compressed air cleaning wherever possible.

16. Pay attention to the sealing washers during the demounting and installing processes. The tetrafluoroethylene washer 4 and tetrafluoroethylene fixing washer 8 should not be damaged, misarranged and lost.

17. After long time operation, the stator and rotor may be worn down reasonably. Whether to work continuously or change a new part, the zero mark line must be corrected in time.

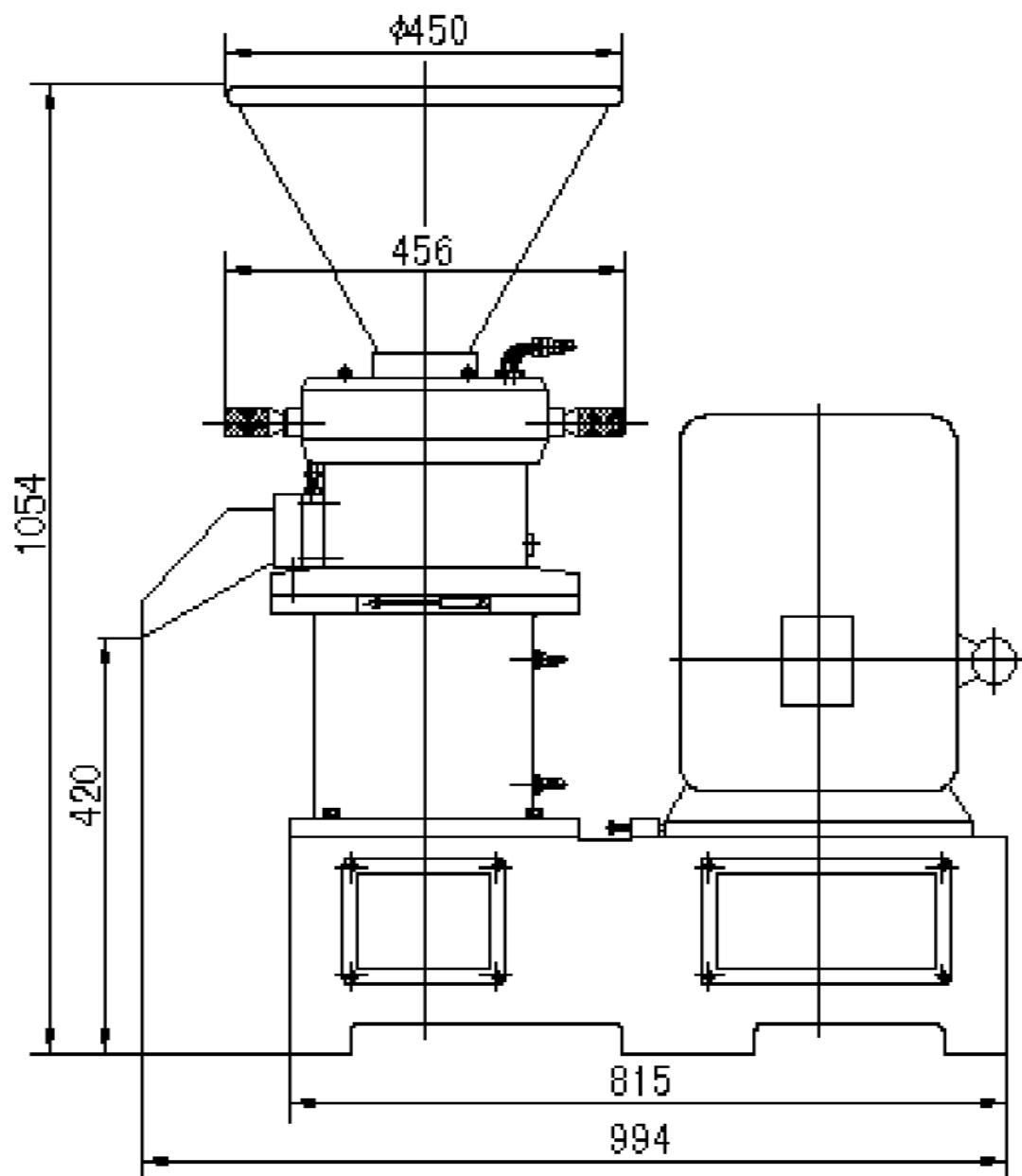
18. Replacing or pulleys in order to vary the speed:

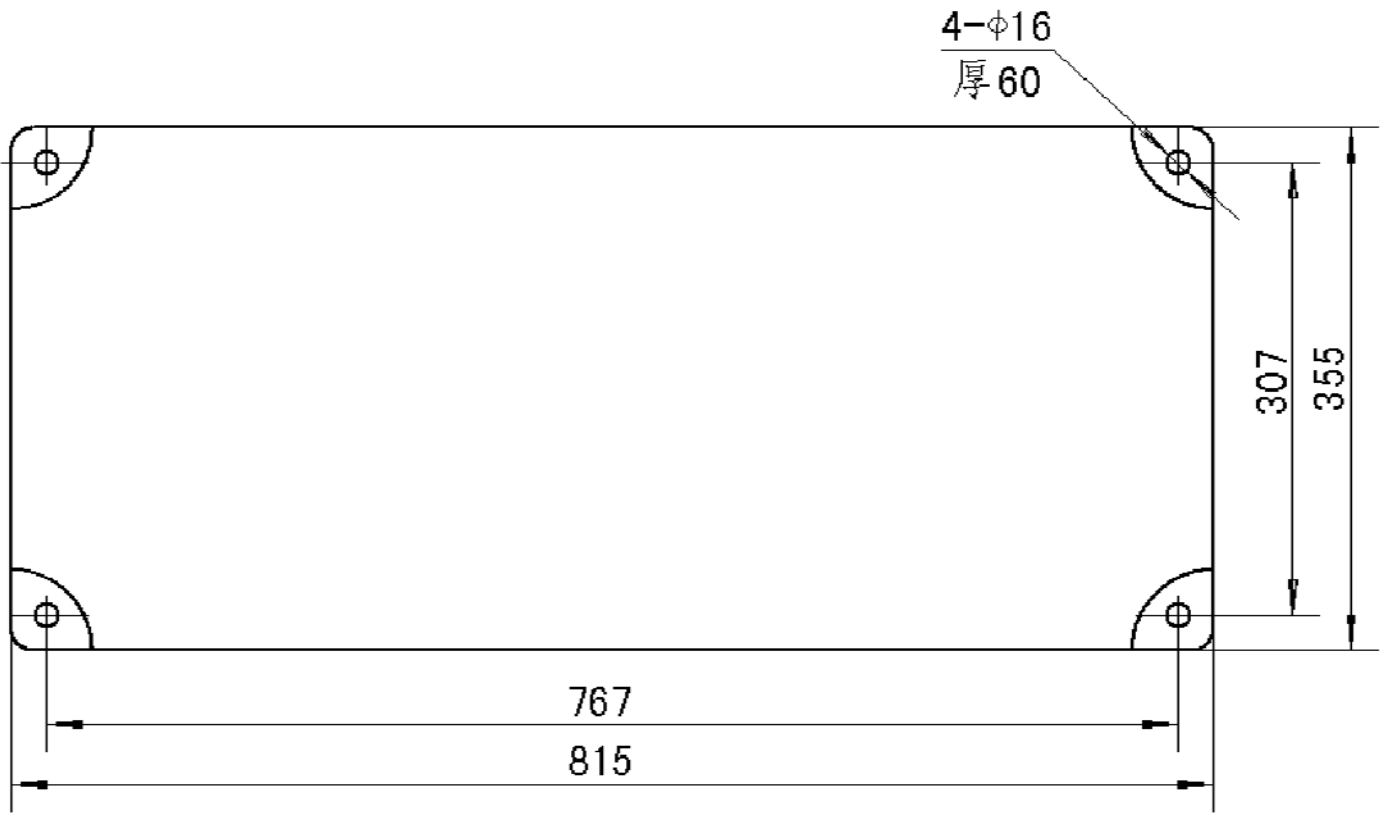
Loose all nuts on end cover of motor 12, loose the tension screw 15 leftward. Push motor toward the mill horizontally to loose the V-belt 16.

Remove the cover plate 17. Lie the machine on it's side then screw out the nut on main shaft of mill and the nut on motor shaft, now the original pulleys may be removed.

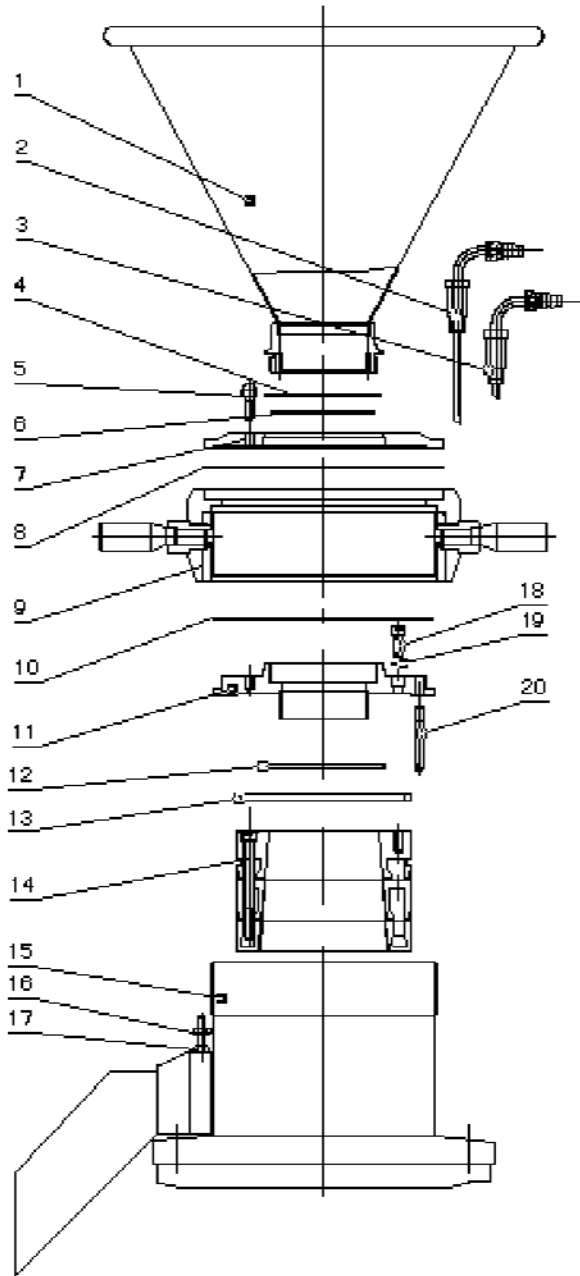
In order to mount the pulleys required, a light hammering is allowable But whenever heavy knock is forbidden in order to avoid any damage of pulleys and reducing of machine precision. After pulleys replaced, tighten the nuts and erect the machine again carefully. Then push motor away from the mill horizontally. Screw in the tension screw 15 to tighten the V-belt, then replace the cover plate17.

## VI. Drawing

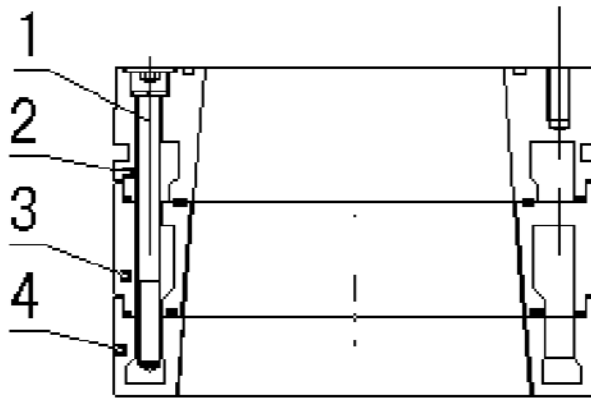




Installation size



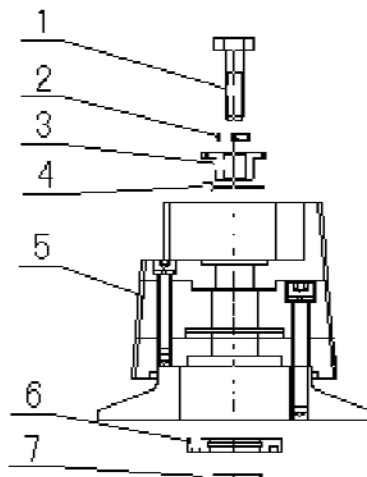
1. Hopper
2. Water inlet nozzle
3. Water outlet nozzle
4. Otype seal ring
5. Acorn bolt
6. Seal
7. Fixing collar
8. Seal
9. Adjusting collar
10. Seal
11. Rotor supports
12. O type ring
13. O type collar
14. Rotor assembly
15. Grinder base
16. Stop bolt
17. Lock nut
18. Hex socket cap bolt
19. Spring lock
20. Guide Pillar



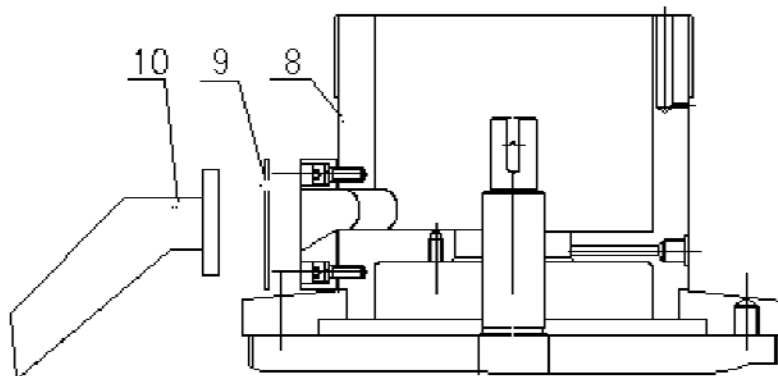
**Note: Item 1,2,3,4 can't be disassembled**

- 1. Hex socket cap bolt
- 2. 1<sup>st</sup> stator
- 3. 2<sup>nd</sup> stator
- 4. 3<sup>rd</sup> stator

### Stator assembly



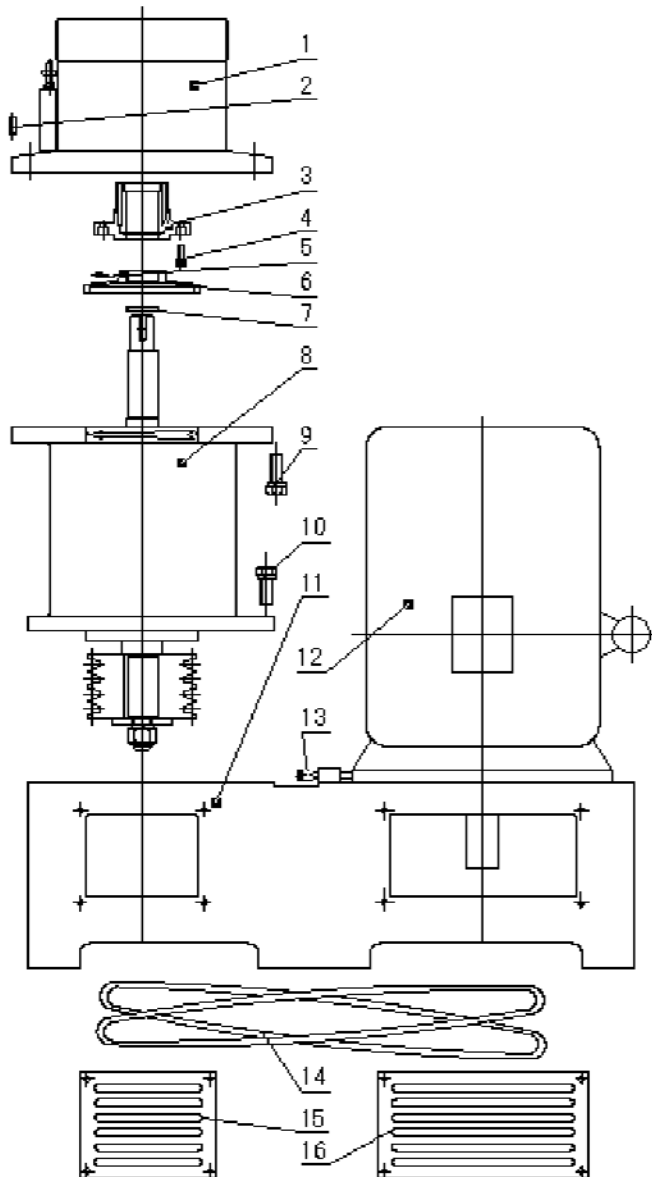
- 1. right-hand bolt
- 2. Spring Washer
- 3. Rotor cap
- 4. Otype seal rings
- 5. Rotor assembly
- 6. bracket rings
- 7. O type seal
- 8. Grinder base
- 9. outlet flange
- 10. material outlet



**Note: the rotor assembly item 1, 2, 3 can't be disassembled**

### Rotor assembly





1. grinder base
2. fixing rod
3. seal collar
4. Hex socket cap bolt
5. Slotted set screws with cone point
6. Centrifugal sheet
7. O type seal ring
8. machine base
9. Hexagon bolt
10. Hexagon bolt
11. Mounting base
12. Motor
13. Puller bolt
14. Triangle adhesive tape
15. Shutter
16. Shutter

### Machine base assembly