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# Eccentric Eddy Current Separator

## Instruction manual



Shenyang Densen Environmental Machinery Co., Ltd



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## 1.Uses and Features

The eccentric rotor eddy current separator is mainly used to recover copper, aluminum and other nonferrous metals from industrial garbage and household garbage waste or to remove nonmetallic impurities from nonferrous metal waste. It can be widely used in environmental protection fields such as garbage treatment, waste electrical appliance recovery and material treatment in nonferrous metal processing industry.

The eccentric eddy current separator has an eccentricity between its eddy current rotor and outer cylinder, which can effectively avoid the equipment damage caused by ferromagnetic materials entering into the concentric-eddy current separator. It is especially suitable for the occasions of complex working conditions such as the sorting of recycled aluminum raw materials, scrap steel treatment, automobile dismantling, home appliance dismantling and household garbage disposal.

The eccentric eddy current non-ferrous metal separator has excellent sorting effect, strong adaptability and reliable mechanical structure for a variety of non-ferrous metals. It has the characteristics of strong repulsion force (adjustable) and high separation efficiency.

## 2.Main Technical Parameters

Model	Rotor Diameter	Rotor Speed	Belt Width	Belt Speed	Driving Power
WL-40P	494 mm	0-4000 rpm	330 mm	0-2 m/s	3 kW
WL-65P	494 mm	0-4000 rpm	520 mm	0-2 m/s	4 kW
WL-80P	494 mm	0-4000 rpm	670 mm	0-2 m/s	5.5kW
WL-100P	494 mm	0-4000 rpm	840 mm	0-2 m/s	5.5kW
WL-120P	494 mm	0-4000 rpm	1040 mm	0-2 m/s	5.5kW
WL-140P	494 mm	0-4000 rpm	1240 mm	0-2 m/s	7.5kW
WL-160P	494 mm	0-4000 rpm	1440 mm	0-2 m/s	7.5kW
WL-180P	494 mm	0-4000 rpm	1640 mm	0-2 m/s	7.5kW
WL-200P	494 mm	0-4000 rpm	1840 mm	0-2 m/s	7.5kW
WL-220P	494 mm	0-4000 rpm	2020 mm	0-2 m/s	7.5kW

## 3.Working Principle And Structure

### 3.1Equipment Appearance



Figure (1) Real type of eccentric eddy current separator (different models, slightly different appearance)

### 3.2 Working Principle

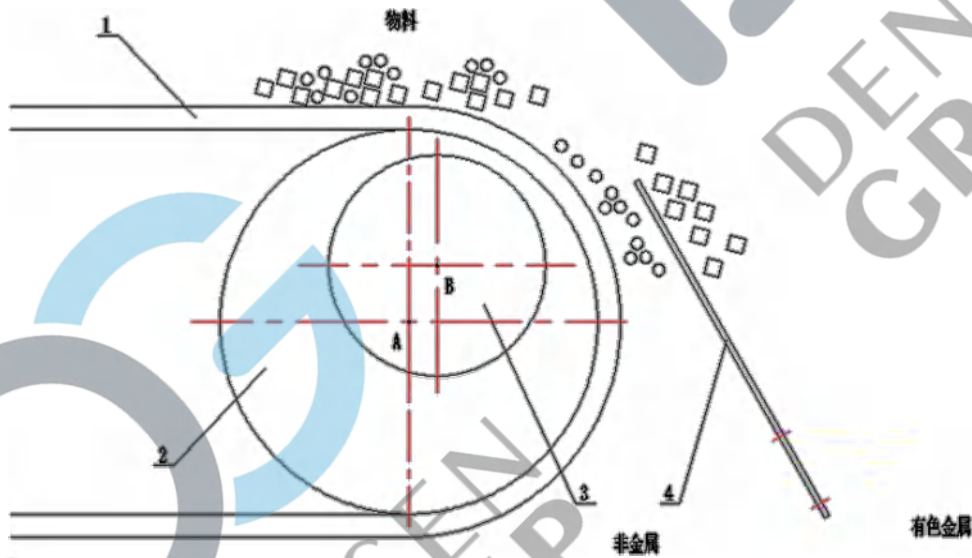


Figure (2) Schematic diagram of internal structure of the eccentric eddy current separator

Figure (2) Eccentric for eddy current separator structure diagram, its working principle is: the belt (1) through the friction drive roller (2) the center A rotation, the rotor (3), with A strong magnetic blocks in high speed rotation around the center of the circle B produces high frequency alternating magnetic field, the belt (1) on the non-ferrous metal materials in high frequency alternating magnetic field produced by the rotor (3) can be induced in vertical direction and the original magnetic field force of Lorentz force, the force of the leaping forward along the conveying direction to plate (4), and nonmetallic material in magnetic field force rather than the more excessive plate (4), so as to achieve the purpose of separation.

### 3.3 Main structure of separator

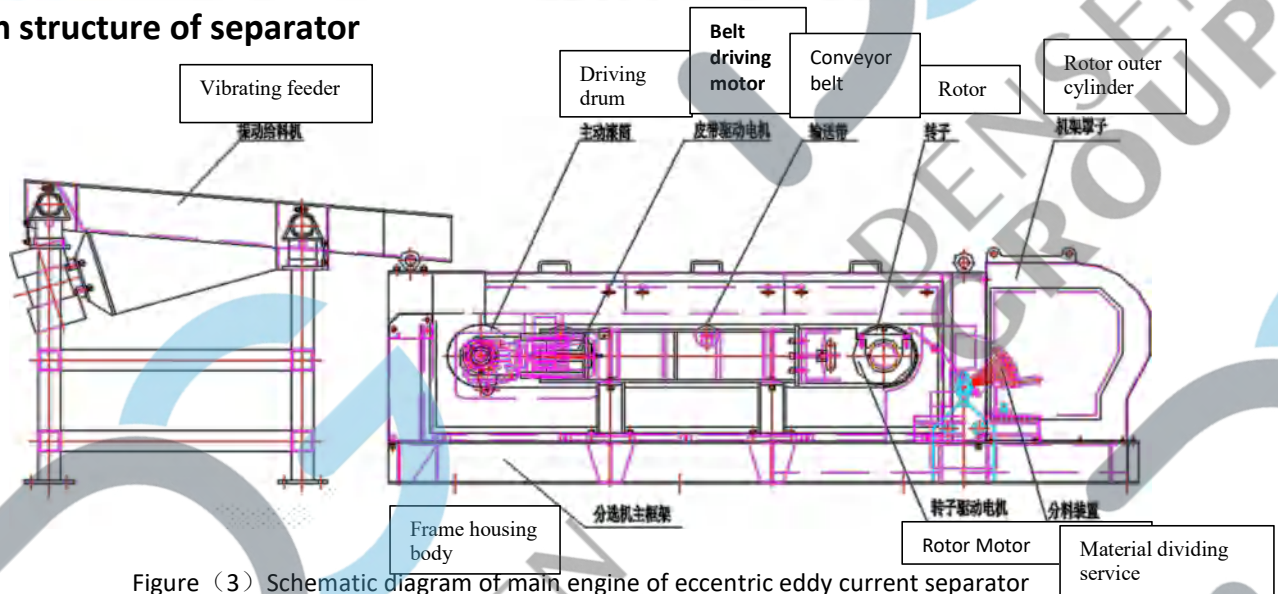


Figure (3) Schematic diagram of main engine of eccentric eddy current separator

1.The frame housing supports the whole equipment.The frame is a structural frame made of welded section steel. It supports the driving drum, driven drum and high-speed rotating rotor to make the conveyor belt of the whole equipment stable during operation.The hood is used to protect the operator and the equipment.

2.The sorting assembly is composed of reducer motor, driving drum, conveyor belt, driven drum and rotor with motor;The belt-driven motor provides power for the driving drum, which drives the driven drum to rotate through the conveyor belt, so that materials can be transported to the rotor evenly and smoothly at one end of the equipment.The rotor is mounted with a strong magnetic block, which generates a high frequency alternating magnetic field when rotating at high speed.

3.Material dividing device includes material dividing plate and material dividing adjusting device; Adjust the height of the front and back of the feeding plate by adjusting the feeding adjusting device, so as to suit different materials.

### 3.4 Electric control cabinet structure

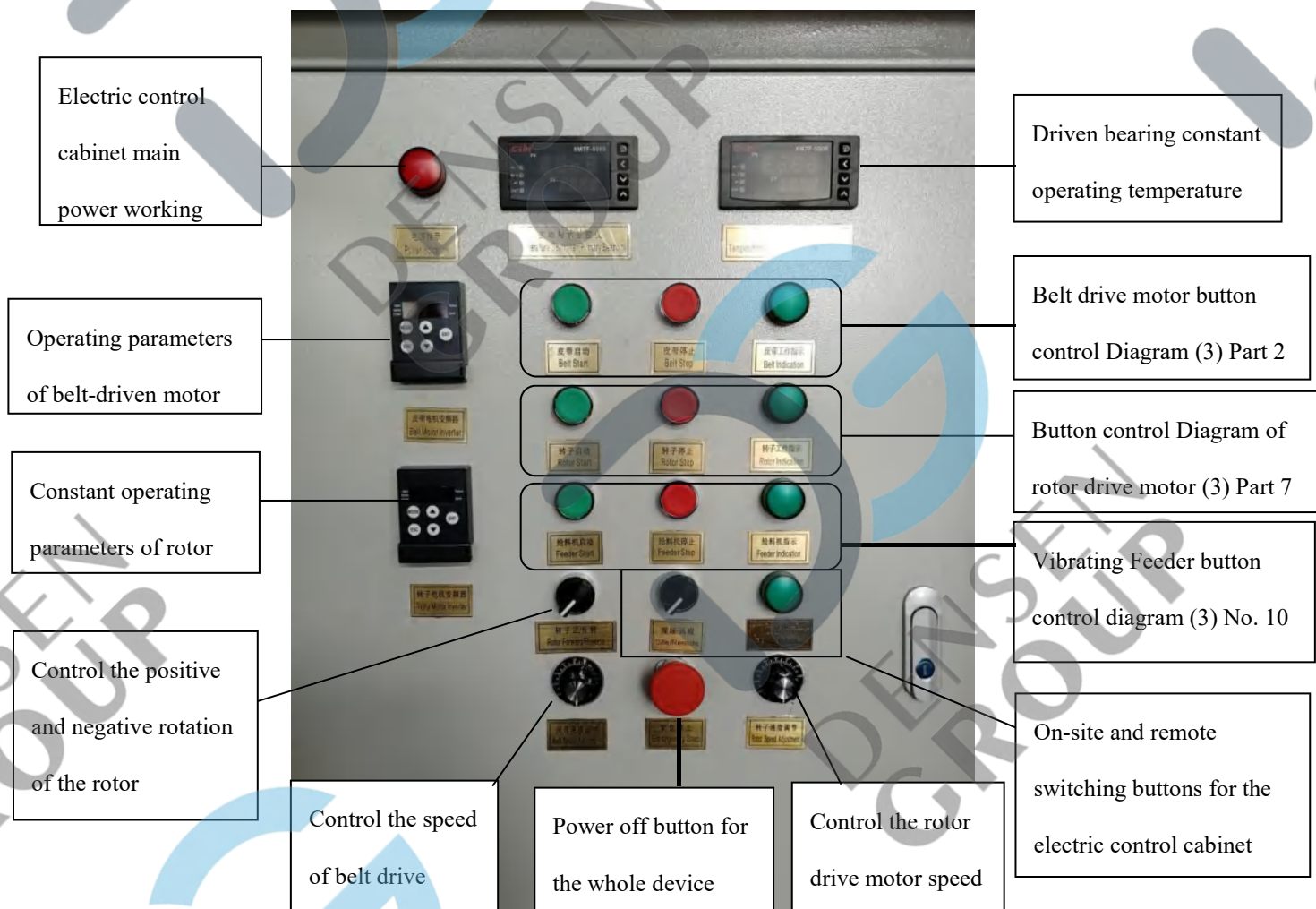


Figure (4) Physical drawing of electric control cabinet assembly (different functions, slightly different)

Figure (4) After the completion of the assembly of the electric control cabinet, the physical appearance of the electric control cabinet has been completed. The reserved wiring terminals are shown in Figure (5). Before the start of the equipment, connect the electric control cabinet with the equipment according to the electrical schematic diagram Figure(6).

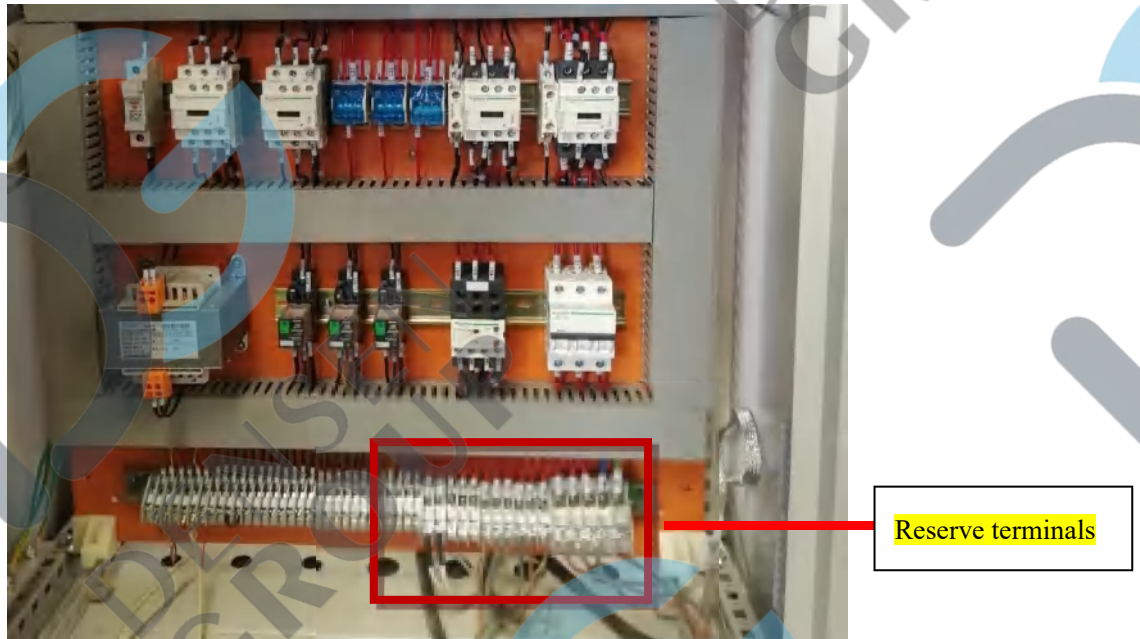


Figure (5) Internal assembly drawing of electric control cabinet (different functions, slightly different)

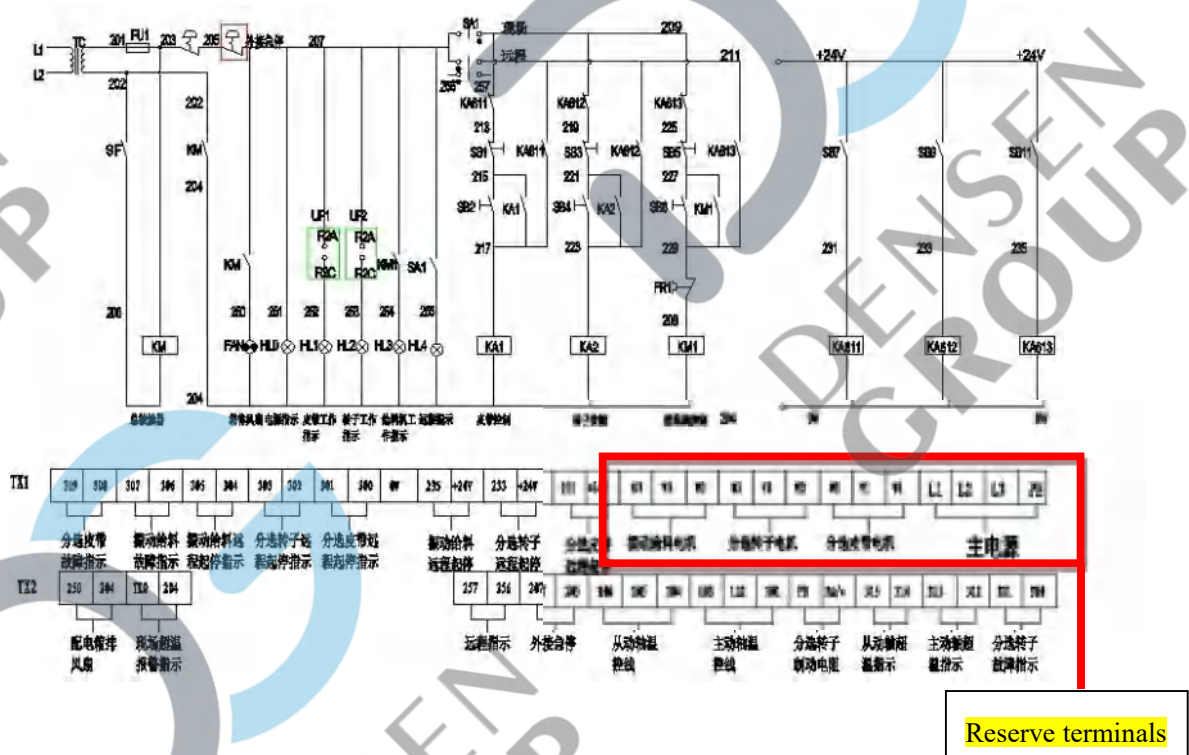


Figure (6) Electrical schematic diagram of the electric control cabinet (different functions, slightly different)



## 4.Operational guidelines

### 4.1Installation

The eccentric eddy current non-ferrous metal separator should be installed on the fixed base, which should have sufficient strength and stiffness.During installation, the foundation should be horizontal and vibration damping pad should be added, and tilt is not allowed.

Fix the control cabinet in an appropriate position, make electrical wiring according to the electrical connection drawing of the control cabinet, and connect the reserved wiring terminals on the power supply of the control cabinet to the wiring terminals of the driving motor of each equipment according to the wiring number.

### 4.2Commissioning of equipment operation

#### 1.The electrified belt drives the motor

See if the running direction is correct after the belt drive motor is powered on, as shown in Figure 7. If the running direction is opposite, switch on any two-phase input line of the drive motor after power off, as shown in Figure 8. Power on again to confirm the correct running direction.

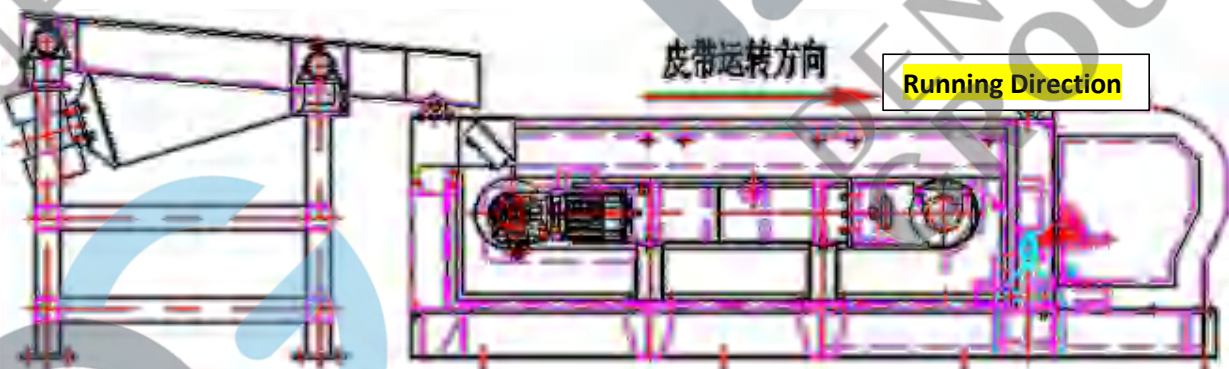
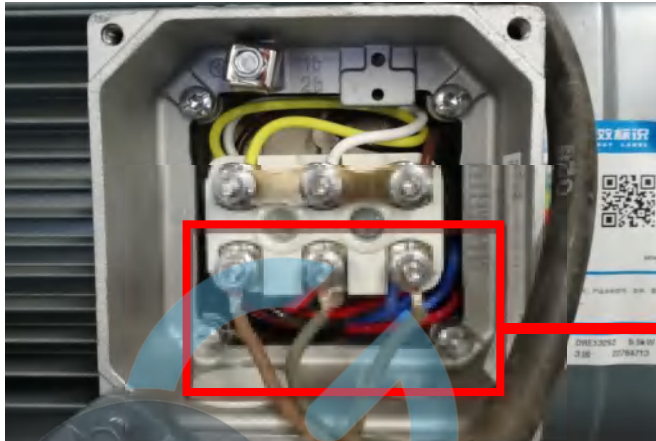


Figure (7) Belt running direction diagram



Replace any two of the terminals

Figure (8) Wiring terminal diagram of belt driven motor

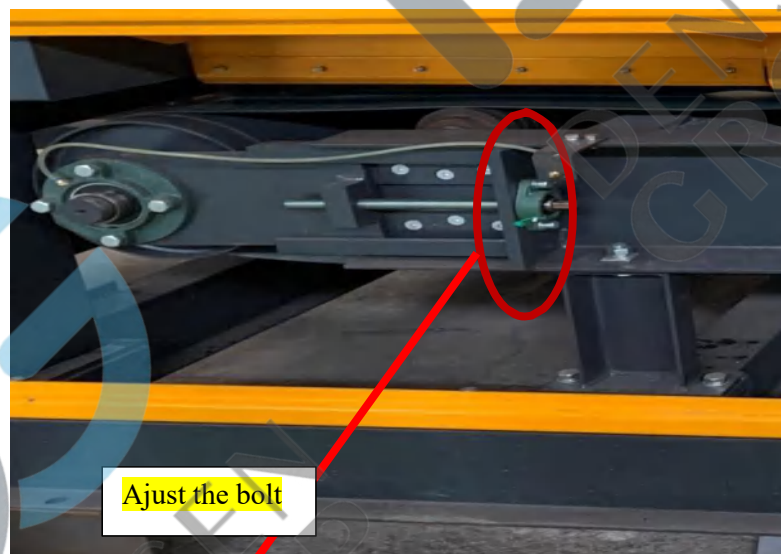
### 4.3 Belt deviation adjustment

After the belt drive motor is started, check whether the belt is running along the center of the driving drum. If the belt is running normally, keep the operation stable for more than 30 minutes before proceeding to the next step.If the belt deviates, it should be adjusted as follows:

Belt deviation adjustment method: Remove the cover plate here and see the position as shown in Figure (9)

Look according to the observation direction in FIG. (10). If the belt runs to the left, adjust the tensioning bolt in FIG. (9) inward, and relax the belt to make the belt run on the normal track.

Look according to the observation direction in Figure (10). If the belt runs to the right, adjust the tensioning bolt in Figure (9) outward to make the belt run on the normal track.



Ajust the bolt

Figure (9) Belt deviation adjustment position diagram

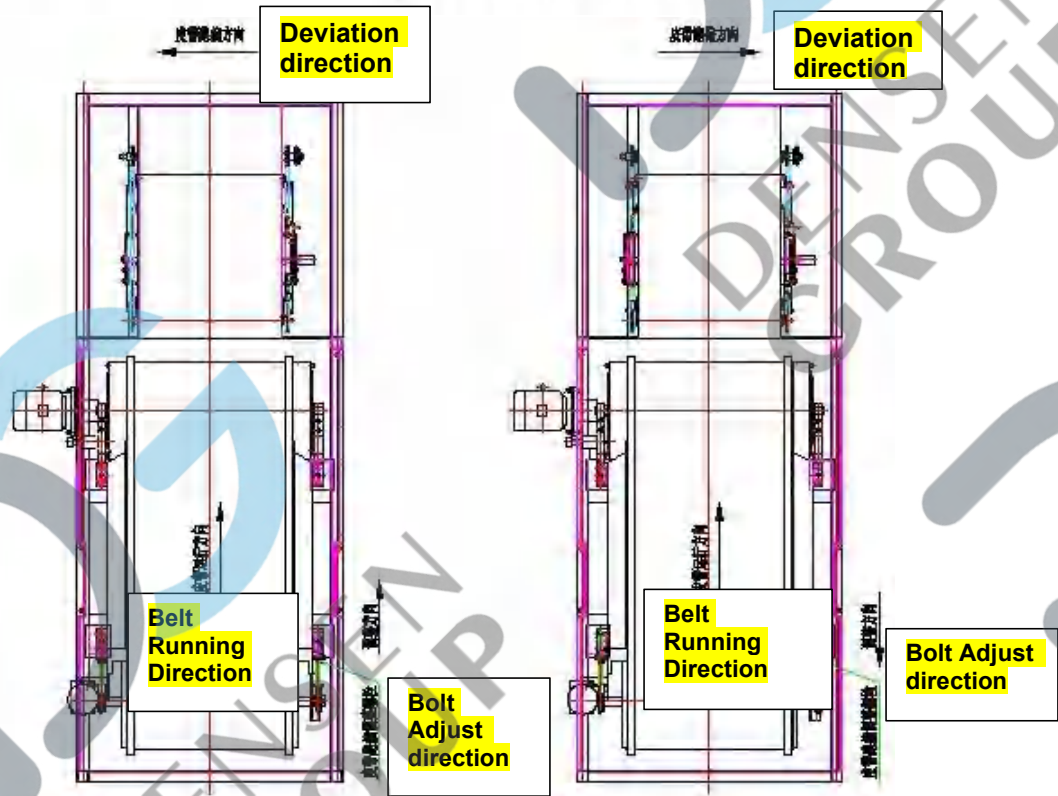


Figure (10)

#### 4.4The rotor drive motor is energized

After the belt is adjusted normally, the rotor drive motor is powered on for operation. The rotor speed adjusting knob in figure (4) is adjusted after power on. The speed should be gradually increased from low to high.

##### 1.Selection of eddy current rotor direction:

When working, the belt speed and the rotation direction of the eddy current rotor should be adjusted according to the handling amount and the specific situation of the nonferrous metal materials (the motor rotation direction should be determined by observing the rotor motor fan) and speed.

When sorting small particle materials (less than 5mm), the direction of the magnetic rotor should be opposite to the running direction of the belt. When sorting large bulk materials (greater than 5mm), the magnetic rotor should run in the same direction as the belt.

##### 2.The deflection position of the eddy current rotor is adjusted as shown in Figure (11).

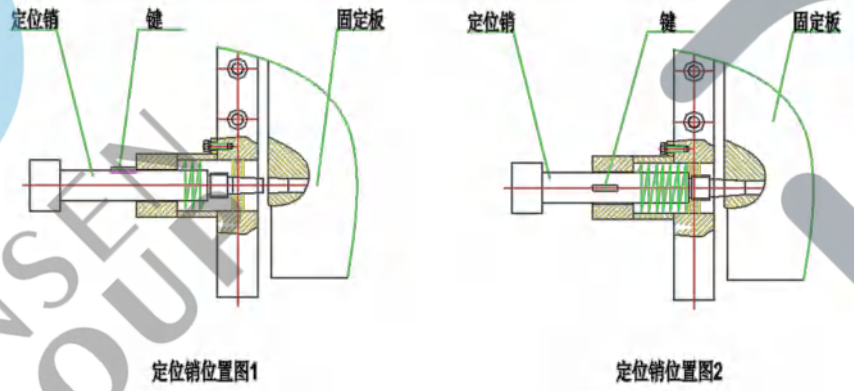
The eddy current rotor of this machine has five working positions (A, B, C, D and E). The parabola of nonferrous metal is different in different positions. It can be adjusted according to different materials

when used.The adjustment method is as follows;

First, pull out the locating pin and rotate it 90 degrees to fix the locating pin position, then rotate the motor. When the position pointer is close to the position to be adjusted, rotate the locating pin in the opposite direction, then slowly rotate the motor, the locating pin will automatically enter the pinhole.



Figure (11) Rotor Angle adjustment diagram



Figure(12)Rotor Angle adjustment diagram

Loosen the bolts on this button, adjust the Angle of the feeding plate along the arc track, and tighten the bolts after the adjustment

The feeding board Angle adjustment button is open

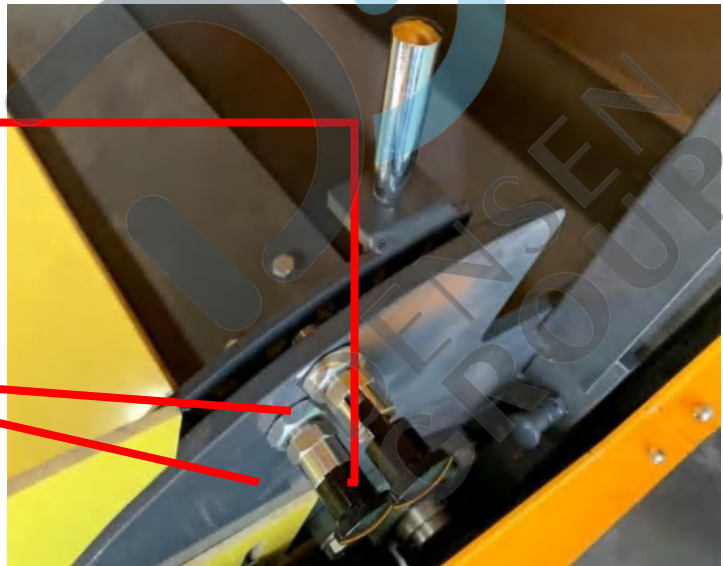


Figure (13) Angle adjustment of feeding plate



Loosen the lock switch, push the parting plate back and forth, and tighten the lock switch after

Lock switch

Figure (14) Adjusting and mounting of the feeding plate before and after

rotor speed regulation;

The eddy current rotor motor can be set between 2600 and 3000 (RPM/min), and the belt motor speed can be set between 800 and 1200, which can be adjusted according to the different processing materials.

#### 4. Adjust the Angle and position of the feeding board

Add a small amount of material to the belt, observe the material through the conveyor belt to reach the separation plate at the separation situation, adjust the Angle and position of the separation plate, to achieve the best separation effect after locking the separation plate locking device. Adjustment methods are shown in Figure (13) and Figure (14) :

## 5. Equipment maintenance

### 5.1 Equipment lubrication

The parts to be lubricated by the eccentric eddy current non-ferrous separator include the reducer and the bearing in the operation mechanism.

#### 1. Bearing lubrication

All bearings of the equipment are provided with oil injection lubrication ports, oil injection port identification figure (15) oil injection cycle and oil injection

The quantity is shown in the oil injection requirements table Figure:



Figure (15) Manual injection port identification

Oil filling requirement table				
Oil injection position	Oiling Brand (Summer / Winter)	Types of oils and fats	Oil injection quantity	Oil injection cycle
High speed filling point	2#/1#	Lithium base grease	15g	1 month
Low speed filling point	2#/1#	Lithium base grease	80g	3 months

note:summer indicates the working environment temperature is more than 20 °C and winter means less than 20 degrees Celsius

## 5.2 Regular maintenance

Parts	Maintenance Work	After First Time	Every 8 hours (daily inspection)	Every 50 hours (weekly inspection)	Every 100 Hour	Every 200 hours (month check)	According to the demand
Bearing	Inspection/lubrication					√	
Fuselage Connecting bolt	Check/tighten	√	√				√
Cable	Check/tighten			√			√
Belt	Check/Replace		√				√
The equipment surface	Clean				√		
Anchor bolt	Check/tighten	√		√			√

### 5.3 Notes for use:

1. Feeding can be started only after the eddy current separator runs steadily
2. Monitor the temperature of scroll current rotor high-speed bearing. The rotor bearing temperature measuring device diagram Figure(16) is installed in the electric control cabinet of this equipment. When the bearing temperature reaches the set value, the alarm indicator light flashes and gives a beeping alarm. If no alarm indication is found, the equipment will continue to operate and the bearing temperature will continue to rise to the excess heat value set by the temperature controller, the equipment will automatically stop.



Figure (16) Testing drawing of bearing

3. There is a very high magnetic field on the surface of the eddy current rotor. Please do not bring ferromagnetic or easily magnetized objects close to the eddy current rotor, otherwise it will hurt people. Watches, mobile phones, magnetic cards and other items should not be close to the magnetic system, otherwise it is easy to be damaged in a strong magnetic field; The eddy current rotor will have a high frequency alternating magnetic field when it works, so please do not approach the pacemaker installed. Press the emergency stop button when an emergency occurs.

## 6. Equipment maintenance

### 6.1 Belt replacement

The conveying belt in the equipment is easy to wear out, and it needs to be replaced when the wear is serious. The specific replacement steps of the equipment are as follows.

- (1) Remove the door panels on both sides and adjust the belt tightening bolts on both sides to loosen

the belt.

(2) The jack worn with the equipment is supported next to the two columns, and the jack is raised to the same height as the outrigger.

(3) loosen the leg bolt and take it out. If the leg is difficult to take out, raise the jack slightly to make the leg out smoothly (**remember not to lift the jack too high, so as not to hurt the overall structure of the equipment**)

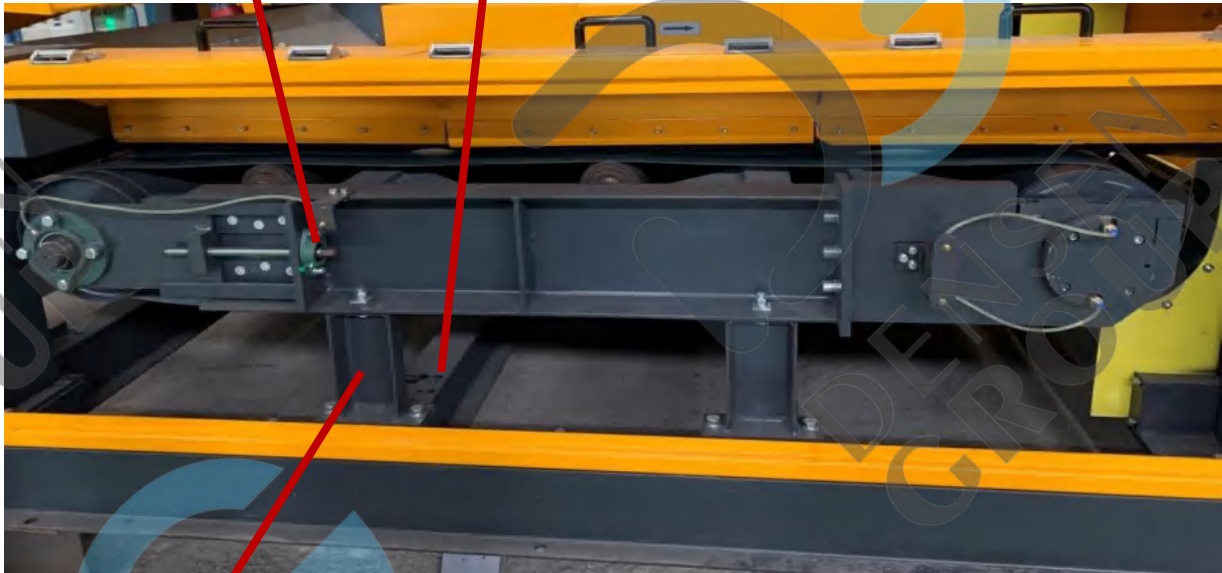
(4) Take back the jack and take it out; Pull the belt out horizontally and install the new belt.

(5) After the installation of the new belt, jack is used to support it in the original position to facilitate the installation of the outrigger.

(6) After the outrigger is installed, tighten the belt, adjust the deviation of the belt and maintain stable operation for more than 30 minutes. Then the door panel can be installed on the rack and work normally.

First: Remove the door panel

Secondly: the jack support in the legs measured on the beam



Finally: Take out the bolt and column, remove the jack, then take out the belt, replace the new belt, and install the leg back to the upright position



## 6.2.Common troubleshooting methods

Serial number	Malfunction	Original cause	Take care of your ideas.
1	Bearing heating	Lack of oil in bearing	Refuel in time
		Refuel too much	Check oil level
		Bearing damage	Replace the bearing
2	Conveyor belt skidding	The belt is too loose	Tighten the belt
		There is a waste between the belt and the drum	Removal of waste
3	The effect is not good.	The position of the parting plate is not correct.	Adjusting parting plate
		Incorrect rotor position	Adjust rotor position
4	Conveyor belt deviation	The belt is not tightened.	Belt tightening
		There is a waste between the belt and the drum	Removal of waste

## List of vulnerable parts

Name	Position in the device	Specifications	Standard number	Qty
NSK bearing	Magnetic rotor high speed bearing	22212EAE4C3	GB/T288-1994	2
Bearing	Magnetic rotor low speed bearing	61872	GB/T276-1994	2
Seat bearing	Active drum bearing	UCFC210		2
Annular skirt ribbon	Conveying belt	Material PVC with thick 3mm		1
Glass steel cylinder	Magnetic rotor outer cylinder	Special specifications of our factory		1



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