



EDDY CURRENT SEPARATOR

“Original Instructions ”



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From the magnetic capital of China to service all around the world.

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Principles of Operation

The Eddy current separator consists of an external drum, an internal permanent magnetic rotor, a drive, a belt conveyor and vibrating feeder.

The external drum shell of glass fiber rotates at conventional speed. The internal full diameter Rare Earth alternating polarity rotor turns at much higher RPM than the external shell.

Through the induction of eddy currents and the resulting repelling forces, the alternating magnetic field selectively repels the nonferrous metals and physically separates them from other materials with minimum product loss.

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General Description

The **Eddy Current Separator (ECS)** is furnished with a 20" diameter eddy current rotor, tail pulley, pillow block bearings, conveyor belt side guides, protective hood, and product discharge hoppers and splitter assemblies. The frame is of welded structural steel construction.

The rotor driven by an electric motor. The rotor speed can be variable speed depending on the VFD.

The conveyor belt driven by an electrical motor. The belt speed can be variable speed depending on the VFD.

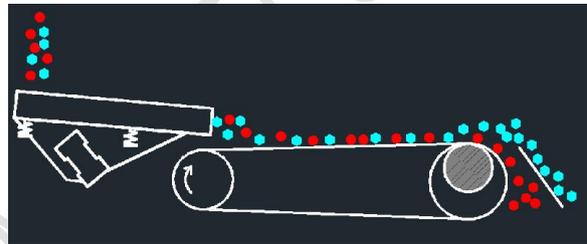
The ECS is shipped completely assembled. The control panel is separate and requires hook-up.

The Eddy Current Separator is designed to operate with a minimum amount of ferrous material in the waste stream. If necessary, Tianli Drum magnet, magnet Pulleys and overband Magnets should be placed upstream to remove this material.

Tianli supplies two types of different Eddy current separators.

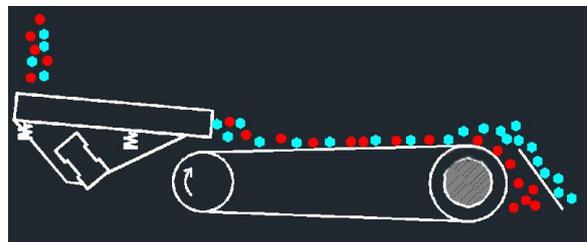
A. TLFXP Model (Eccentric rotor)

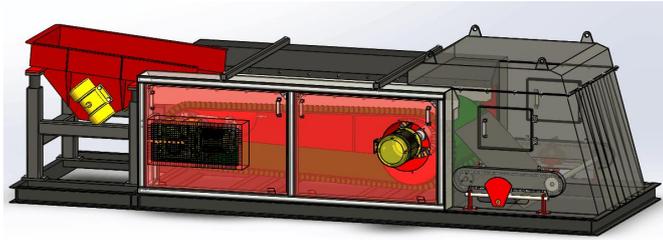
Features an inner permanent magnetic rotor in an eccentric position assembled inside the outside drum. It is suitable for sorting particles of tiny copper and aluminum particles.



B. TLFY Model (Concentric rotor)

Features an inner permanent magnetic rotor in a concentric position assembled inside the outside drum. It is suitable for sorting coarse copper and aluminum particles.





Application:

※ Industrial waste、Building materials waste recycling:	※ living garbage recycling
※ In the non-ferrous metal processing materials handling	※ Automobile pieces of copper, aluminum, zinc recycling
※ Recycling of waste electrical appliance	※ Remove Aluminum ring and bottlenecks in the broken glass
※ Other related copper aluminum recycling industry	

Technical parameter												
Model	Feeding width (mm)	Feeding Length (mm)	Feeding size(mm ²)	Capacity (m ³ /h)	Power (kw)	Weight (kg)	Size					
							L(mm)	W(m m)	H(m m)			
TLFX(P)-5	500	1500	≥1mm	6	5.9	730	4600	1760	1700			
TLFX(P)-6	600			10		895				1860		
TLFX(P)-6.5	650			15		950				1910		
TLFX(P)-8	810			20	1225	2060						
TLFX(P)-10	1015			25	1555	2260						
TLFX(P)-12	1215			30	1875	2460						
TLFX(P)-14	1420			1800	35	10.7				2275	4900	2660
TLFX(P)-16	1600			2000	40	11.7				2850	5100	2860
TLFX(P)-18	1800			2000	45					3500		3060
TLFX(P)-20	2000			2200	50					4000	5300	3260
TLFX(P)-22	2200	2500	55	4500	5600		3460					
TLFX(P)-24	2400	2500	60	15.7	5000	5600	3660					
Remark	We supply the magnetic rotor with the magnetic intensity 3500Gs, 4000Gs.4500Gs.											

WARNING



PROVISION MUST BE MADE TO SHUT DOWN THE USER FEEDCONVEYOR BEFORE STOPPING THE EDDY CURRENT SEPARATOR. THIS WILL PREVENT MATERIAL LAYING ON THE SEPARATOR CONVEYOR BELT WITH THE ROTOR STILL COASTING. STRAY FERROUS LAYING IN THE ROTOR AREA COULD HEAT UP AND CAUSE DAMAGE TO THE BELT AND ROTOR.



Do not allow people with pacemakers near the device! This equipment is a strong magnetic product. Please use magnetic tools carefully around and above the equipment. All maintenance operations should be carried out after the equipment stops running.

INFORMATION REGARDING RESIDUAL RISKS

The eddy current separator is equipped with a permanent magnetic rotor that generates strong stationary magnetic fields. it is important to respect the following indications:

Do not approach magnetic rotor function area with ferromagnetic components: they can cause crushing.

Do not approach the area with electronic appliances, computers, monitors, measurement instruments, magnetic cards, precision mechanical parts; in order to prevent damage remain at a minimum distance of 4 m.

The magnetic fields can interfere with PACE-MAKERS and other medical devices.

Reference values detected in the active 10 Gauss at the distance of 4m

area of the magnet 5 Gauss at the distance of 5m

Staff in charge must inform uninformed staff regarding dangers

TABLES AFFIXED TO THE MACHINE (notable)

- 1) Wearers of Pace makers must not approach sign
- 2) Grease adding sign
- 3) Electrical shock sign
- 4) Reading manual sign
- 5) Strong magnetic field sign



Periodically check the presence of the plates, replace them if they are missing or deteriorated.



INSTRUCTIONS REGARDING PROTECTION MEASURES

Staff in charge of running operations must be qualified and must have examined the manual and be appropriately trained.

During the various maintenance and installation operations, the operators must wear the necessary IPD, such as:



Gloves



helmet



accident-prevention shoes

Instruction of emergency button

In case of emergency, the E-stop button should be pressed for intervention. E-stop is located in the door board of the distribution cabinet, which supplied together with the machine. When necessary, the power supply can be cut off to stop the operation of the equipment. Installation drawing of emergency stop button is shown in electrical drawing.

Installation

Unloading:

Use care in uncrating to avoid damage to the equipment. Check immediately when the eddy current separator is received for possible shipping damage. Report damage to the delivering carrier.

The forklift should be properly used for the equipment moving. Unit has been adjusted and tested at the factory prior to shipment. Pulleys have been installed with care to provide alignment of shafts and bearings.

If there is a question of damage to the separator from rough handling in shipment, shaft alignment and belt adjustment should be checked. Particularly check the Electrical Control for any concealed damage to terminal boards, etc.

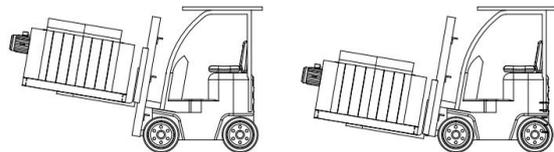
When preparing to bolt the unit in the installation, shims should be used to ensure that all legs are sitting on a firm surface. The ECS should be leveled square. Do not pull bolts to frame by tightening,

but shim from mounting surface to legs to prevent any twisting of the frame when hold down bolts are tightened. Note that all support legs should be supported rigidly from below.

Vibrating feeder shall be shipped either loose or secured on frame work. If loose, feeder shall be lifted and placed onto mounting pads. If on frame work, release securing cables/straps that hold feeder.

*The rotor bearing blocks are equipped with thermocouple plug sensors. They should be wired with thermocouple wire to a temperature controller supplied by the customer. The controllers should be set at a maximum temperature of 100°C.

Equipment moving drawing:



Operation

A. Clear the installation area of any loose tools or other materials which may be attracted to the magnetic rotor.

The main disconnect and Eddy Current Separator hatch panels, if supplied, must be closed. The Emergency Stop switch must be pulled out.

B. Manual Mode (Local)

The hand mode of operation is primarily intended for maintenance. The rotor will not run in this mode as it is possible to damage the shell or conveyor belt if the rotor is running with the conveyor off. Move the auto-hand selector switch into the hand mode. Push the conveyor start button to start the conveyor belt. Note that the conveyor start/stop push buttons only work in this mode. Momentarily start the conveyor drive in the "Hand Mode" and observe the direction of the belt. If belt rotation is incorrect, check the motor leads. If belt adjustment is necessary, due to misalignment during shipping, reposition the bearings on the tail pulley by take-up screws on either side of the pulley. Do not over tighten, as it is possible to pull the rotor shell into the rotor. It may be necessary to loosen one side rather than tighten the other to track the belt. The belt should only be tightened enough to allow the belt to run and track properly. Check the guides along the lower edges of the side guide. They should be within 1/8" of the belt. Improperly adjusted guides can cause damage to the belt.

C. Auto Mode (Local) Push System

Start push button. The conveyor starts first followed by the rotor.

Note: The start button must be held for a second or two for the speed switch to close. With the conveyor tracked and running, observe the direction of rotation of the rotor. If the rotation is wrong, check motor leads. To stop, push the Emergency Stop Button.

C. Automatic Mode (Remote)

The system operates the same as in Local Automatic. The system will not run in remote mode if the hand-auto selector switch is in the hand mode.

Splitter Setting

The splitter setting will vary depending on material being sent to the machine. Ideally a factory representative should be present during start-up to set the splitter and explain the various adjustments that may be required to optimize recovery. If one is not present and you are dealing with MSW or mixed recyclables, start with the splitter set 2/5" horizontally from the rotor surface and vertically set at the rotor centerline. Fine tune from this point. Typical splitter gaps for aluminum beverage cans are 20-24". Alternate method: Run product on conveyor with rotor off, and set splitter approximately 1-2" in front of material trajectory.

DONGYANG TIANLI MAGNET EQUIPMENT

Control Panel Operation

1. System main interface.



After starting up (power on), the touch screen will automatically display the above system interface. The operation mode of the eddy current separator is divided into 'Auto Mode' and 'Manual mode'.

Click 'Manual Mode' for the first debugging, and normally, the first debugging is made by the engineer of Tianli Company. After entering normal production, equipment maintenance personnel please click 'Auto Mode' to automatically run the equipment.

Note: the equipment should be checked below items before starting up.

Check the wire line is safety.

Check the fuselage is stable

Check the material distribution board not touched the belt.

(The first two items are very import. Which related to the life and property safety, the third item impact the efficiency when material distribution board reach to the belt.)



2. Manual debugging interface.

Manual debugging mode, mainly used for equipment (used for pre-production) adjustment and trial run, is not suitable for production.

'POWER' -- start the equipment, and all debugging shall be carried out after the power supply is turned on;

'SPINDLE'-- Check the spindle before startin. First, the speed should be within 1-2 HZ. Second, test the positive and negative rotation of spindle motor to ensure that the spindle starts with positive rotation. After checking, start the conveyor belt.

'CONVEY'-- The belt should be checked before starting. First, the conveying speed is controlled at (5-10) HZ. Second, test the positive and negative rotation of the belt motor to ensure that the belt starts with positive rotation. After checking, start the conveyor belt.

'FEEDING'-- Check the automatic feeder before starting. First, the protective cover of the vibrating feeder is open. Second, test the feeding direction of the vibration feeder to ensure that the two vibration motors are positive and negative and the material is transported forward. After the inspection is completed, start the vibration feeder.

'RESET' -- Check the equipment when it is stationary (all motors are out of operation). 1. In case of failure alarm, the alarm contents displayed on the panel shall be recorded; 2. If the frequency converter alarms, the code displayed on the frequency converter shall be recorded. According to the alarm prompt to complete fault repair, and then reset after starting, can restart. After debugging is completed, click to turn off manual mode. After debugging this time, click next time to start the device.

3. Feed debugging

Make sure the value of spindle motor VFD shall be 50HZ, the value of conveyor motor VFD shall be (40-45) HZ, then the feed debugging can start on.

When feeding, it can observe whether the vibrating feeder meets the feeding requirements of the equipment. (if the feeding demand cannot be met, the balancing block of the feeding motor should be adjusted, and the more overlapping the two balancing blocks are, the faster the feeding speed will be);

Adjust the feeding plate according to the feeding effect (under the condition that the conveying speed remains stable) (the feeding plate is used to isolate the metal from the dividing metal);

When material particles are 2.5-10mm squared, the distance between the material plate and non-metal is about 10-15mm (fine adjustment can be made after that to achieve the best effect of material separation).

When the material particles are 10-25mm squared, the distance between the material plate and the non-metal shall be more than 15mm (fine adjustment can be made thereafter to achieve the best effect of material separation).

4. Automatic control interface



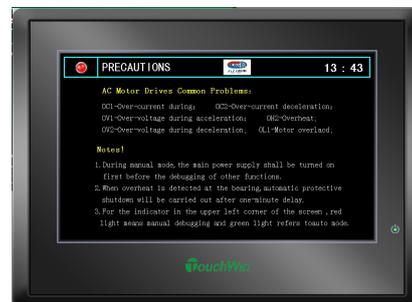
'RUN'-- Start up the equipment.

'STOP'-- Stop the equipment.

'VEER'-- Magnetic roll positive, reverse conversion, non - commissioning personnel are prohibited to click! (please click after debugging personnel confirm that the magnetic roller stops completely)

'REST'-- After the indicator light alarms, handle the fault displayed in the standby position and restart the machine

5. Precaution.



Maintenance

A. Pulleys and Rotor

The ECS is designed to operate with a minimum amount of ferrous material in the feed. For this reason, the rotor shell must be checked daily for any metallic particles stuck to the O.D. This is done by turning the machine off, opening the access door and rotating the rotor shell by hand to view the entire circumference. Remove any foreign matter immediately. Serious damage to the rotor shell will occur if cleaning is not done on a regular basis.

The magnetic rotor in an Tianli Eddy Current Separator incorporates high strength permanent magnets arranged in a special circuit. These magnets are bolted to the rotor hub using a proprietary process. Tianli has analyzed and tested the bolting processes and the resulting rotor structure (including a test to destruction) to assure the integrity of the complete assembly. Because the rotor operates at high speed in close proximity to personnel and other equipment, failure could result in severe damage and/or personnel injury or death. It is important that the rotor structural integrity not be compromised by third party repairs. Any repair affecting the structural integrity of the ECS high speed rotor should be carried out only by Tianli or Tianli technicians.

CAUTION!

**NEVER ATTEMPT TO CLEAN THE
MACHINE WHILE IT IS RUNNING!**

B. Conveyor Belt

Check the conveyor belt for holes, cuts etc. that go all the way through. Patch immediately as fine materials will go through to the shell and cause severe damage. Worn areas of the belt should also be repaired to prevent the eventual formulation of holes.

Belt Repair - The ECS is furnished with a urethane conveyor belt with cleats and sidewalls. Most rips, punctures, cuts, etc can be quickly repaired with the optional belt repair kit which includes heat gun, urethane, fabric, tools, clamps, instructions and plastic case. The kit is highly recommended. Check the guides along the lower edges of the side guides regularly. They should be within 1/8" of the belt. If they have taken a set or are full of material, clean and readjust or replace. Improperly adjusted guides can allow contaminants to work into the rotor assembly causing damage.

Observe the belt tracking while the machine is warm and running. If necessary, adjust.

Note: An endless belt is supplied with the unit. If replaced with a spliced belt, make sure the lacing is non-metallic and is covered both top and bottom with a flexible flap cold vulcanized to the belt.

C. Gear Reducer

1. The machine before delivery has been add grease, after the machine working properly, oil level height in the circular oil standard mid line position shall be maintained.

2. The speed reduce must keep the oil in the oil level height, neither too much nor too little. Open frame or the flange plate of the vent cap to replenish the oil.

3. The grease gets emulsified by mixed with impurity or water, should be replaced in a timely manner.

4. Rubber aging results in the decrease of sealing function and the micro oil leakage, A new oil seal should be replaced, add oil.

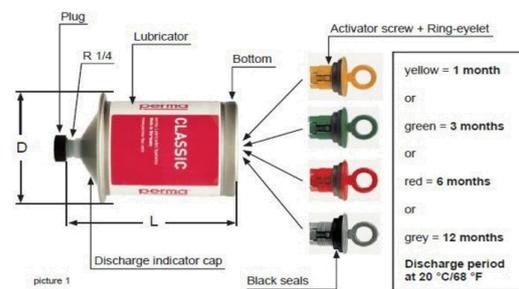
D. Bearings

1. Tail Pulley Pillow Blocks. This part lubrication using 2 # calcium grease and replacement cycle according to usage and experiences, generally no more than nine months, with a full replacement bearing shell within 1/2 - a third space is advisable.

2. Rotor Pillow Blocks. This Internal high-speed bearing use our specified high-speed bearing grease, to ensure the safe and smooth operation of the equipment.

The lubrication of the bearing on the main shaft is divided into two kinds of bearing conditions. The large bearing needs to be refueled every 300 hours when the equipment is running, and it is advisable to refueling at 5-8g each time. The small bearing needs to be refueled every 50 hours when the equipment is running, each time at 1-2. Use the bearing grease specified by our factory to ensure the safe and smooth operation of the equipment.

Beside, our main shaft bearing lubricate adopting special device-self oil feeder. which can effectively prevent the failure of the equipment caused by improper lubrication, thus reducing the maintenance time and cost of the equipment. Screw the plastic reaction ring of the automatic oiler into the oiler before use until the ring is broken and the metal ball inside the ring is pressed into the electrolyte and chemical reaction occurs. Chemical reactions produce gases. The more gases there are, the greater the pressure. This causes the piston to move forward. When the lubricating oil is used up, the red color of the piston will be seen on the plastic cover of the outlet end, indicating that the grease in the oiler has been exhausted. A new oiler should be replaced in time.



Required Maintenance

IMPORTANT! TURN OFF AND LOCK OUT POWER TO THE EDDY CURRENT SEPARATOR WHILE CARRYING OUT ALL PROCEDURES WHICH INVOLVE CONTACT WITH THE MACHINE. FAILURE TO DO THIS MAY RESULT IN SERIOUS PERSONAL INJURY OR DAMAGE TO THE EDDY CURRENT SEPARATOR.

DAILY:

- Check for and remove any metal particles stuck to the belt or the outer surface of the rotor shell.
- Check for and remove debris build-up on and around the motors.
- Check for and remove debris build-up on the splitter and discharge chutes.
- Check for and patch holes and worn spots on the conveyor belt.
- Adjust side guides and brushes for minimum clearance to the conveyor belt (plastic guides 1/4"). Remove any material build-up in the side guide brushes (if fitted).
- Observe and adjust conveyor belt tracking after the machine warms up.
- Check the vibrating feeder (if any) for material build-up

EVERY TWO WEEKS:

- check the self oil feeder if functional, when the oil feeder is run out, replace it immediately.
- Check and lube the tail pulley bearings .

CAUTION!

Door must be closed while unit is running. Failure to observe this precaution may result in damage to the machine and/or serious personal injury.

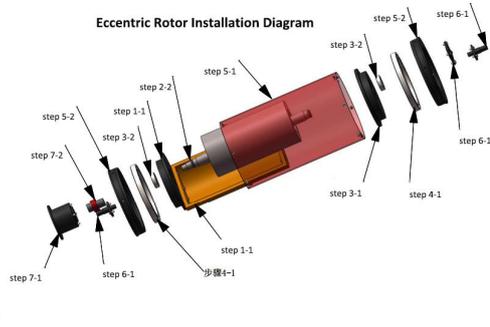
IMPORTANT!

With unit turned off check rotor shell for ferrous contamination on a daily basis

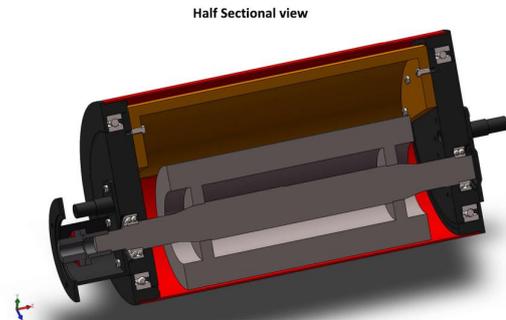
MAXIMUM ROTOR SPEED

2860 RPM

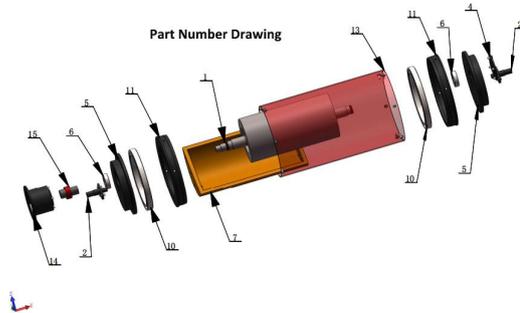
Rotor Maintenance Drawings



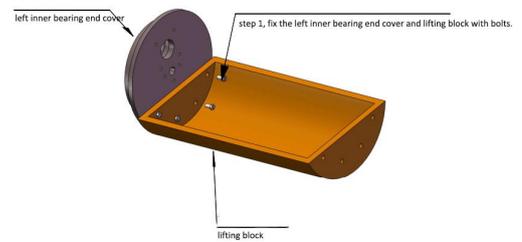
Eccentric rotor installation diagram



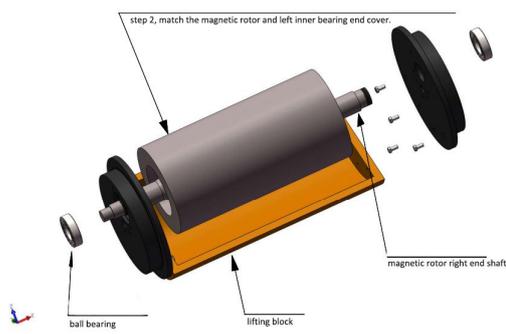
New half sectional view



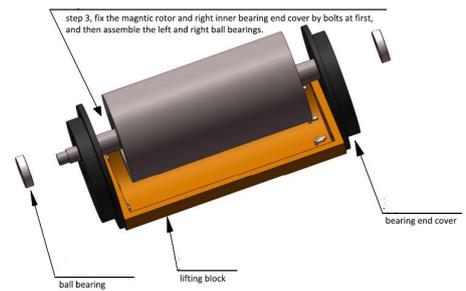
New part number drawing



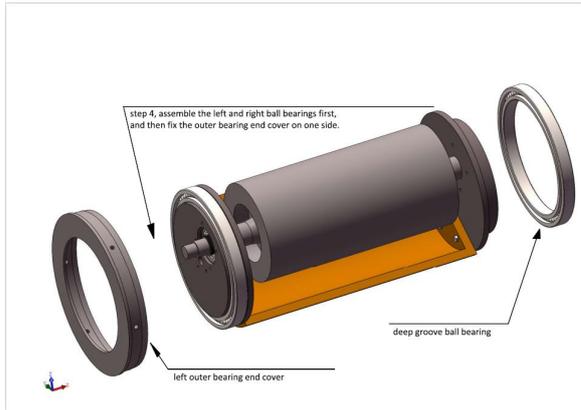
Step 1



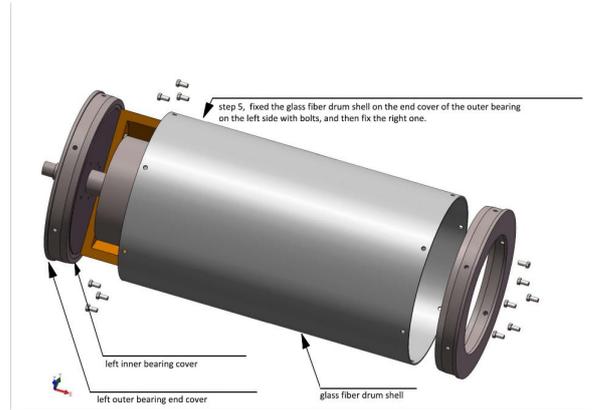
Step 2



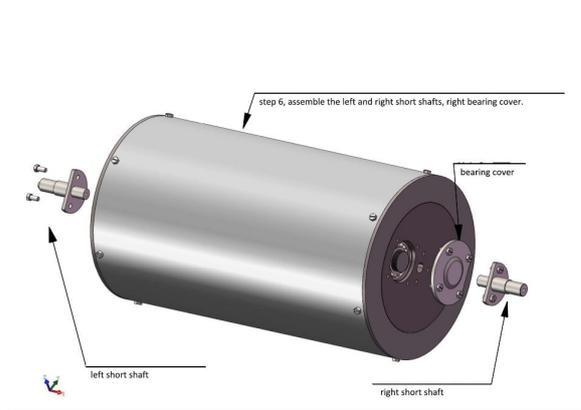
Step 3



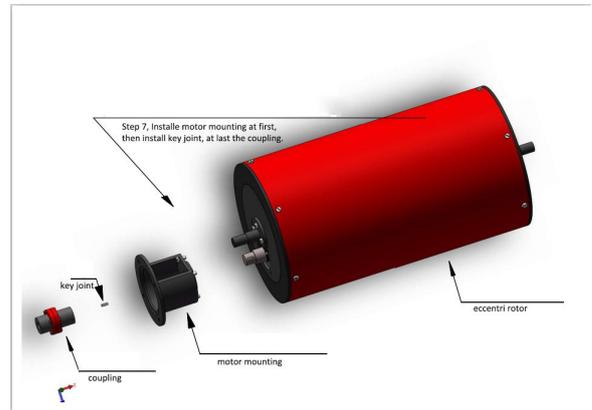
Step 4



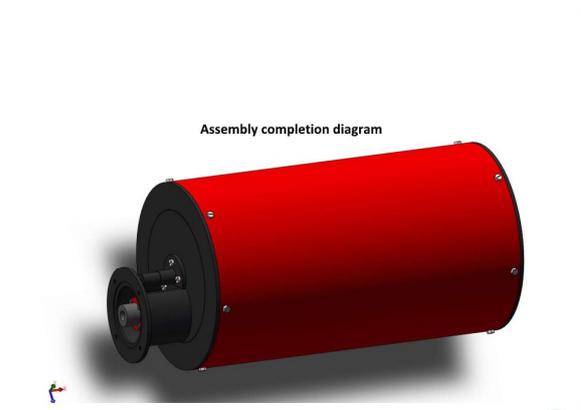
Step 5



Step 6



Step 7



Step 8

Troubleshooting

Recommendations to improve the performance of the eddy current separator:

1) On most units a belt speed of 1000RPM will give optimum separation.

2) If equipped with a variable speed drive and the belt is set too fast, the material may not be in the magnetic field long enough over the magnetic rotor to be affected by the repulsion force. If the belt is set too slow, the difference in trajectory of the non-ferrous and non-metallic material will not be great enough to properly split the two material streams.

3) Install a longer vibratory feeder. Burdens which have a high volume of material but little weight are more difficult to separate. Material such as auto fluff is very light - normally about 10 pounds per cubic foot in density. It's important to provide enough travel distance on the vibratory feeder to level out the surges and reduce the overall depth of the fluff before it reaches the eddy current separator.

4) Determine whether the nonferrous metal being missed is truly "recoverable." The size, type, and configuration of the nonferrous affects its ability to be separated:

◆ Nonferrous metal entrapped in nonmetallic material may be impossible to separate. Small scraps of aluminum that are embedded or entrapped in fabric, foam or plastic usually are not recoverable. And although aluminum cans are very easy to separate, a full soda can is not recoverable - the weight of the soda or nonmetallic material is much greater than the repelling force affecting the aluminum.

◆ Although aluminum, copper, and die-cast metal are recoverable with an eddy current separator, there are other nonferrous metals which are very difficult or impossible to separate. For example, although they are nonferrous metals, stainless steel 302 and 304 are very difficult to separate. Their high resistance to current flow usually prevents any significant repelling force from being developed.

Belt Tracking

If the belt is difficult to track, check the following:

◆ Are all bearings bolted down tightly to the frame? Have they moved or shifted?

◆ Are the eddy current pulley and drive pulley at right angles to the frame?

◆ Is the eddy current frame twisted or bent in any way?

◆ Has the belt been stretched so that one side is longer than the other?

◆ If the belt has been replaced, have the ends been cut square to the edges of the belt prior to the splice being installed?

◆ Are all the bearings in proper operating condition?

ORDERING PARTS

Replacement belts or other parts can be purchased from the Tianli. Call +86-579-86816586. Please have nameplate information ready to supply while on the phone. The nameplate is located on the frame.



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