SM-307A

# Installation, Operation and Maintenance Instructions

ERIEZ®

# SUSPENDED PERMANENT MAGNETIC SEPARATOR
## MODEL CP

**ERIEZ MAGNETICS** HEADQUARTERS: 2200 ASBURY ROAD, ERIE, PA 16506–1440 U.S.A.
*WORLD AUTHORITY IN ADVANCED TECHNOLOGY FOR MAGNETIC, VIBRATORY and INSPECTION APPLICATIONS*

# Introduction

This manual applies to the two basic styles of Eriez Model CP suspended permanent magnets. The slight differences in installation and maintenance procedures for these magnets are detailed in the text.

A careful reading of these Installation, Operation and Maintenance Instructions will assure your magnet's most efficient and dependable performance.

If there are any questions or comments about the manual, please call the factory at 814/835-6000 for Eddy Current Separator assistance.

**CAUTION - STRONG MAGNET**

**This equipment includes one or more extremely powerful magnetic circuits. The magnetic field may be much stronger than the Earth's background field at a distance several times the largest dimension of the equipment.**

- **If you use a heart pacemaker or similar device you must never approach the equipment because your device may malfunction in the magnetic field, with consequences up to and including death.**
- **To avoid serious pinch-type injuries caused by objects attracted to the magnet, keep all steel and iron objects well away from the equipment. Do not allow hands, fingers, and other body parts to be caught between the equipment and nearby steel or iron objects.**
- **Keep credit cards, computer disks, and other magnetic storage devices away from the equipment because magnetically stored information may be corrupted by the magnetic field.**
- **Keep electronic devices, such as computers or monitors, away from the equipment because exposure to the magnetic field may result in malfunction or permanent damage to such devices.**

**Contact Eriez if you have a question regarding these precautions.**

**CAUTION**

**Safety labels must be affixed to this product. Should the safety label(s) be damaged, dislodged or removed, contact Eriez for replacement.**

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## ERIEZ SUSPENDED PERMANENT MAGNET - MODEL CP

# General Description

Suspended permanent magnetic heavy duty separators are designed for use over a moving bed of material from which iron is to be removed. Basically, they are box shaped units containing blocks of permanent magnet material, arranged to produce a powerful magnetic field. The block arrangement determines the magnetic circuit configuration designated CP.

Two simple methods of cleaning the extracted ferrous material from the surface of the magnet are available; manual cleaning (Figure 1) or self-cleaning (Figure 2). There is a wide range of sizes available for either style and separators can be mounted in-line with the conveyor belt (Position 1) or across the conveyor belt (Position 2) to suit customer requirements.

Manual cleaned magnets are designed for use when tramp iron contamination levels are small. Periodically, it is necessary to remove the accumulation of tramp iron, either by hand or with a moveable stripper plate.

Where large amounts of tramp iron require separation, self-cleaning magnets are more practical. The construction of the magnet box is the same as the manual cleaning magnet with the addition of a short belt conveyor built around the assembly to provide automatic discharge of the tramp iron.


# Warning

Suspended magnets with self-cleaning belts are normally suspended above conveyor belts away from personnel working areas. Eriez has no control over this location or adjacent areas.

Under certain conditions it may be necessary for the user to install additional safety devices to protect operating personnel.

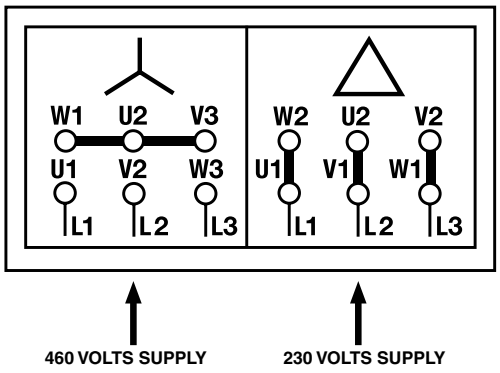
Suspended magnets with self-cleaning belt have pinch points where the belt goes over the pulleys. When the belt is running, this is a hazardous area. Workers should be instructed not to perform duties on this equipment unless it is shut down and the electric supply source is locked out.

Warning plates on the magnet must not be removed. The warnings must always be observed.

# Installation

**GENERAL**

When unpacking, take care to avoid damage to the equipment and possible personal injury. The magnet assembly is very powerful and permanently charged. Remove loose ferrous material closer 2 feet (600 mm) to the magnet box. Wrenches and other tools within the vicinity where the equipment is to be installed could become magnetically induced and be attracted to the magnet box with considerable force.




**Motor Wiring Schematic**

**MAGNET POSITIONS**

**Position 1 (In-Line Installation)**

The preferred installation of a suspended magnet is over the trajectory of the product material where it discharges from the belt conveyor. This position is referred to as Position 1, (Figures 1 and 2).

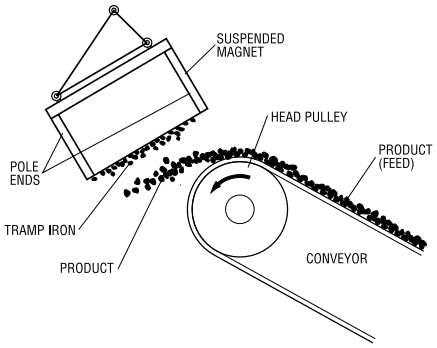



**Figure 1. Position 1 - Manual Cleaning**

For optimum separation in Position 1, there must be provision to adjust the location of the magnet in relation to the material trajectory.

a) For low feed conveyor belt speeds, typically less than 328 FPM (100m/min), greater separation efficiency will be achieved by using a non-magnetic head pulley. NOTE: It is preferable if a non-magnetic head pulley is installed regardless of the speed of the conveyor.

b) When installing a self-cleaning unit, examine the area to ensure there is adequate clearance for the belt to run and that provision has been made to collect discharged tramp iron. A hinged non-magnetic splitter, adjustable in length, will be required to prevent extracted tramp from re-entering the non magnetics.

c) At the working suspension height, the centerline of the magnet should be approximately perpendicular to the trajectory of the material and on the centerline of the conveyor.

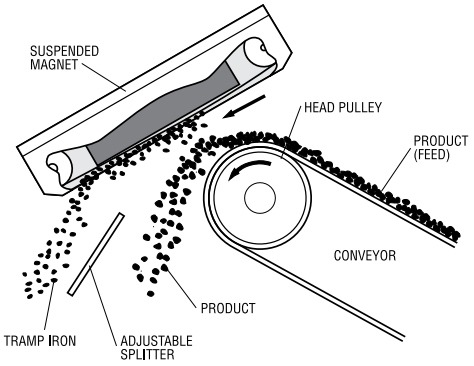



**Figure 2. Position 1 - Self-Cleaning**

**Position 2 (Cross Belt Installation)**

A separator mounted over the moving bed of material at right angles to the conveyor is referred to as Position 2 (Figures 3 and 4). This installation usually requires a stronger magnet than Position 1 since tramp iron at the bottom of the burden is more difficult to extract.

a) The efficiency of magnetic separators in Position 2 is dependent upon the speed of the conveyor carrying the feed. As conveyor speed increases above 328 FPM (l00m/min) separation efficiency may fall.

b) Conveyor idlers beneath the separator in Position 2 must be non-magnetic.

# Installation (cont.)

c) Manually cleaned suspended magnets should be installed on the centerline of the material conveyor (Figure 3). Self-cleaning suspended magnets should be installed with the trailing edge of the magnet box immediately above the outer edge of the conveyor idler (Figure 4).

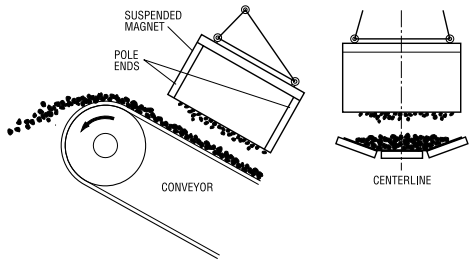



**Figure 3. Position 2 - Manual Cleaning**

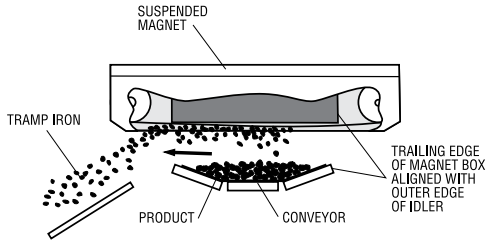



**Figure 4. Position 2 - Self-Cleaning**

**SUSPENSION HEIGHT**

The magnetic strength and configuration of the CP separator is selected for a specific suspension height and application. The suspension height quoted should be considered a maximum.

When setting the suspension height (Figure 5), lower the magnet as close as possible to the top of the burden without interfering with the material flow. If the unit is self-cleaning, ensure that the separator belt is clear to operate freely while carrying tramp iron. Failing to do this could result in tramp iron being knocked back into the non-magnetics.

A clearance of 3 in. (75 mm) between the magnet face and the top of the product burden/trajectory should be maintained for self-cleaning units. This clearance can be reduced to 2 in. (50) mm for manually cleaned units.

**⚠ WARNING**

**Do not overtighten the self-cleaning belt as this could damage the bearings. The equipment is designed to operate with a belt sag of approximately 1 in (25 mm).**

**BURDEN DEPTH**

One factor in achieving optimum separator performance is to control the burden depth.

**Position 1 Installations**

The installation location is calculated on product throughput. Any variation from this will change the trajectory of the product material with respect to the working surface of the magnet and could result in poor separation.

**Position 2 Installations**

A plow or leveller installed before the magnet will remove high spots or surges in material flow.

**COMMISSIONING**

**Self-Cleaning Separators**

After installation, examine for any obvious visual damage. In particular, check that the frame is square and has not been twisted.

Momentarily close the power supply switch to the belt drive and check that the belt is tracking properly and is not wandering laterally. Never start the belt drive and allow it to run continuously until the belt is properly “trained”. If the belt wanders, note the direction and adjust.

Self-cleaning magnet belts run on two pulleys, one fixed and the other adjustable. The adjustable tail pulley has approximately 4 in. (100 mm) of “take up” available for both belt stretch and tracking. To track the belt, the tail pulley should be adjusted to tighten the belt on the side opposite to the direction in which the belt wanders.

# Maintenance

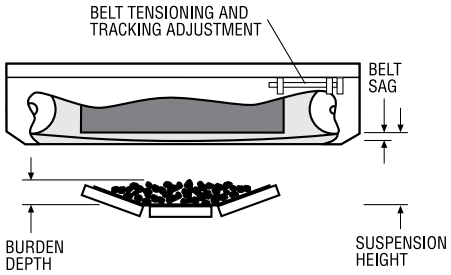



**Figure 5. Suspension Height**

**MANUAL CLEANING SEPARATORS**
No maintenance is required.

**SELF-CLEANING SEPARATORS**
Belt tracking should be checked frequently and adjusted as necessary. Refer to COMMISSIONING

Lubricate the bearings on a schedule consistent with other equipment in use at the site for the product and environment.

For motor and reducer maintenance, refer to the manufacturer's instruction sheets packed with the shipment.

If the unit is installed within a separate enclosure, provision must be made to the construction of the enclosure to gain easy access to moving parts.

Check the self cleaning belt for damage and, if necessary, replace as follows:

After initial run in, check all fasteners for proper tightness. Refer to Torque Table on Page 9.

After 250 hours of running, check pulley hubs and tighten set screws to 17 lb. ft. (23 Nm) torque (if equipped).

**Vulcanized Belt**
Replacing a vulcanized belt requires the self cleaning gear to be dismantled after the separator has been removed from its installation. This is a major operation and is not always practical. An alternative method is to replace the belt in place.

- Loosen the bolts securing the non-drive pulley.
- Loosen the belt tensioners.
- Cut through the damaged belt and remove it.
- Wrap the new belt and vulcanize.
- Re-tension the belt allowing for belt sag. Refer to INSTALLATION.
- Re-track, refer to COMMISSIONING.
- Tighten the bearing securing bolts.

**Laced Belt**
To replace a laced belt, proceed as follows:

- Loosen the bolts securing the non-drive pulley.
- Loosen the belt tensioners.
- Remove the braided stainless steel wire.
- Re-tension the belt allowing for belt sag. Refer to INSTALLATION.
- Re-track. Refer to COMMISSIONING.
- Tighten the bearing securing bolts.

# Troubleshooting

**MANUAL CLEANING UNITS**
**PROBLEM**
Magnet will not attract iron.

**PROBABLE CAUSE**
1. Magnet face is overloaded with extracted iron.
2. Magnet set too far from the burden.
3. Magnet set too close to the burden.

**SOLUTION**
1. Examine the face of the magnet for excessive quantities of extracted tramp iron. Discharge more frequently as required.
2. Check the clearance between the magnet face and the burden. Refer to SUSPENSION HEIGHT and set accordingly.
3. If the magnet is set too close, material surges can act as a wiper and remove iron from the magnet surface. Check the clearance and adjust. Refer to SUSPENSION HEIGHT.

**SELF CLEANING UNITS**
**PROBLEM**
Tramp iron entering the product.

**PROBABLE CAUSE**
1. Not sufficient clearance for the iron to be discharged.
2. Splitter improperly positioned.

**SOLUTION**
1. Position 2 installations: Check the clearance between the bottom of the magnet box and the edge of the conveyor belt for maximum iron size to clear. Adjust as necessary.
2. Position 1 installations: Adjust the splitter angle and length to suit.

| | PLAIN | | PLATED | |
|---|---|---|---|---|
| **BOLT SIZE** | **Lb.-Ft.** | **Newton Meter** | **Lb.-Ft.** | **Newton Meter** |
| 1/4 - 20 | 8 | 11 | 6 | 8 |
| 5/16 - 18 | 17 | 23 | 13 | 18 |
| 3/8 - 16 | 31 | 42 | 23 | 31 |
| 1/2 - 13 | 76 | 103 | 57 | 77 |
| 5/8 - 11 | 150 | 203 | 112 | 152 |
| 3/4 - 10 | 266 | 361 | 200 | 271 |
| 7/8 - 9 | 430 | 583 | 322 | 437 |
| 1 - 8 | 644 | 873 | 483 | 655 |

These values apply to unlubricated grade 5 bolts with flat or no washers under the head.

*Note: Some safety warning labels or guarding may have been removed before photographing this equipment.*

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