

# Installation, Operation and Maintenance Instructions



## **ROTA-GRATE® & AUTOMATED ROTA-GRATE® MAGNETIC SEPARATORS**

**ERIEZ** WORLD HEADQUARTERS: 2200 ASBURY ROAD, ERIE, PA 16506-1402 U.S.A.  
WORLD AUTHORITY IN SEPARATION TECHNOLOGIES

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# Introduction

This manual details the proper steps for installing, operating and maintaining the Eriez Rota-Grate® and Automated Rota-Grate Magnetic Separator.

Careful attention to these requirements will assure the most efficient and dependable performance of this equipment.

If there are any questions or comments about the manual, please call Eriez at 814-835-6000 for Rota-Grate 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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# Table of Contents

## ROTA-GRATE® & AUTOMATED ROTA-GRATE® MAGNETIC SEPARATORS

GENERAL DESCRIPTION .....	4
INSTALLATION.....	4
GRATE POSITION .....	5
DISCHARGE CHUTE .....	5
PNEUMATIC HOOK-UP.....	5
WIRING .....	5
MOTOR WIRING .....	5
OPERATION .....	6
CLEANING & MAINTENANCE.....	6
REPAIR & ALTERATION.....	7
FACTORS THAT AFFECT MAGNET PERFORMANCE .....	7
REPLACEMENT PARTS .....	8



# General Description

## ROTA-GRATE® MAGNETIC SEPARATOR

The Eriez Rota-Grate is designed for materials that do not flow easily and tend to plug up stationary grate magnets. The rotating magnetic assembly prevents material from packing and plugging up the processing line.

The Eriez Rota-Grate® consists of an arrangement of 1" (25.4 mm) diameter stainless steel tubes held in place by two stainless steel end plates. Each tube contains an assembly of powerful magnets which, under normal conditions, will retain their magnetic strength indefinitely.

At the center of each end plate is a shaft hub, which is bolted to the end plate and keyed to the shaft. The shaft is provided with shaft extensions for bearings, and the drive end is provided with a keyway.

Standard magnet circuits are suitable for temperatures below 150°F (65°C). Special circuits are required for higher temperatures depending upon application criteria. Please review the Eriez order acknowledgment or contact your local salesperson if you have questions about the circuit provided and its temperature limitations.

## AUTOMATED ROTA-GRATE® MAGNETIC SEPARATORS

Automated Rota-Grates are designed for installations that require frequent cleaning in vertical closed chutes and ducts. They are also used for installations in hard-to-reach locations. The grate has a flanged inlet and outlet for easy installation. After each batch or after a specified time setting, the product flow is stopped and the cleaning cycle is activated.

During the cleaning cycle, the magnet tubes retract to a position outside the product area. While the tubes are retracting, the ferrous material is scraped from the magnets and discharged. In some models, vibration and/or an air blast are applied to the retracted magnets to assure complete removal of the ferrous material. The magnet tubes then return to the product area and product flow can resume.

Automated Rota-Grates include a control so the cleaning cycle can be adjusted. The entire cleaning operation takes approximately ten seconds.

# Installation

## ROTA-GRATE® MAGNETIC SEPARATOR

These units may be installed at the discharge of either open or enclosed chutes, or may be enclosed within a housing in either an open or enclosed duct system. They are furnished with shaft extensions for flange type or pillow block type bearings and for a driving pulley. When enclosed within a housing, provision should be made for a clean-out or port for access to clean accumulated ferrous contamination from the magnetic tubes of the Rota-Grate to assure that all material will pass through the magnetic area.

## AUTOMATED ROTA-GRATE® MAGNETIC SEPARATOR

Use care when uncrating and handling to prevent damage to the equipment, particularly the pneumatic drive housing (see Figure 1). Eye bolts are attached for lifting and for additional support when mounting the unit.

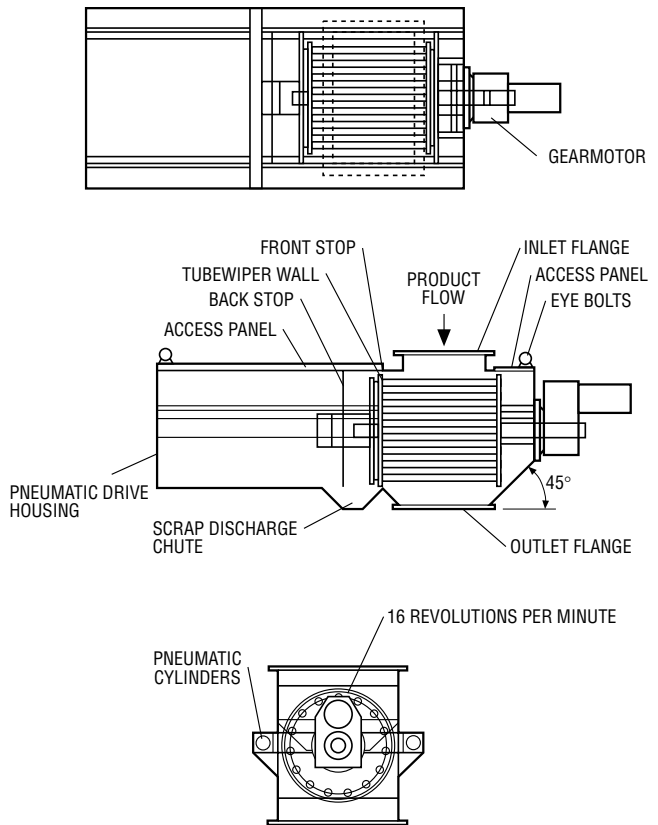


FIGURE 1



Install the magnetic separator in the desired location in the vertical closed chute or duct. Installation is intended to be made by a flange attachment to the inlet and outlet flange of the grate housing. Hole size and spacing will be supplied to the customer's specification, or flanges will be furnished without holes if none are specified.

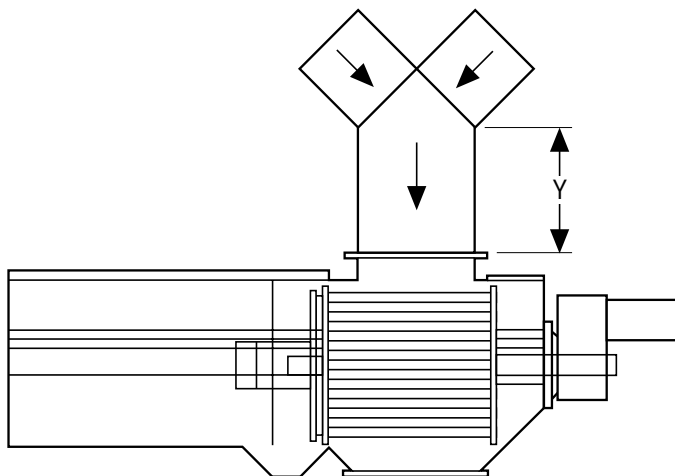
Locate the unit between the flanges of the chute work, and transfer holes from the flanges of the chute work onto the flanges of the self cleaning grate. Install a gasket between each pair of mating flanges to insure a dust-tight seal.

### Grate Position

The Automated Rota-Grate is designed for installation in vertical or inclined flow systems, but the unit itself must be installed horizontally, as shown. For optimum iron separation, a vertical section at least as high as the dimension listed in Table 1 should be used above the inlet of the grate housing (see Figure 2 and Table 1).

**TABLE 1**

GRATE SIZE		HEIGHT (Y) MINIMUM	
IN	MM	IN	MM
12 Dia. x 14	305 x 356	14	356
16 Dia. x 18	406 x 457	18	457
22 Dia. x 24	559 x 610	24	610



**FIGURE 2**

The Automated Rota-Grate is designed for a free falling product. A product shut off valve should be located upstream from the Rota-Grate to prevent potentially destructive material backup.

### Discharge Chute

Space must be provided so that iron discharge can fall clear of the discharge chute and not back up into the unit. Continuation of the 45 degree discharge chute to a collection point is the most common method of eliminating this waste.

### Pneumatic Hook-Up

An 80 psi (5.3 bar) air supply is required to operate the pneumatic Automated Rota-Grate. Connect the air supply to the inlet of the air preparation unit.

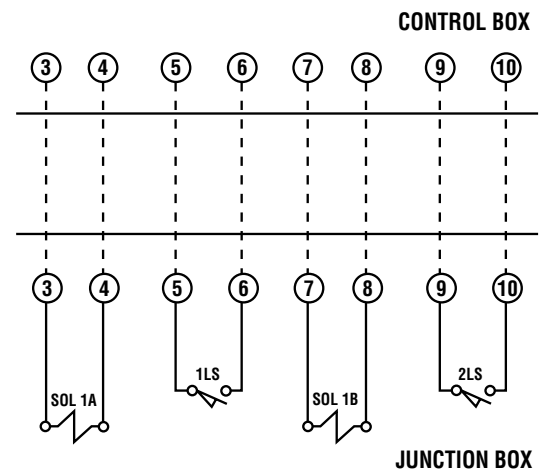
### Wiring

See Figure 3 for wiring the Eriez Automated Rota-Grate. Also refer to the electrical outlet and schematic drawing, 4N-9608105, packed with the unit.

Connect the two AC leads from the AC power source to terminals 1 and 2 in the control box. Make all corresponding connections between the control box location and the junction box on the Self Cleaning Rota-Grate, as shown in Figure 3.

### Motor Wiring

Connect three-phase power supply so rotation of the magnet reel corresponds to the direction arrow on housing.



**FIGURE 3**

## Operation

### ROTA-GRATE® MAGNETIC SEPARATOR

The speed of operation should be 30 rpm or less, depending upon the condition of the material being processed. A good average speed for best results is 16.5 rpm.

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#### WARNING

If your product is abrasive to the point of wearing through the non-magnetic magnet tubing, magnet material may enter the product stream. This exposure could be harmful to the quality of your product. Examine each magnet tube for wear during your cleaning operation.

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### AUTOMATED ROTA-GRATE® MAGNET

1. Be sure the Automated Rota-Grate is rigidly attached to mating flanges in the vertical closed system.
2. Before separating material, turn on the control box power supply and cycle the unit using the manual switch. (Allow ten seconds for the unit to complete the cycle).
3. Continue to cycle three or four times to become familiar with operating the unit.
4. On the control box, set the automatic cycle time as desired. Timer unit can be changed to hours or minutes by removing the timer face and setting lever on the desired increment. A lever behind the face will also set the decimal point. **NOTE:** For optimum iron separation, cycle the unit frequently. Cycle times of fifteen minutes to one hour are standard, but product testing or observation of magnet loading, through the product area access door, will help determine your specific requirement. Fully loaded magnets will have bands of iron particles that are built up from 1/8 to 1/4-inch (3 to 6 mm) above the surface of the tube. Cycle times less than ten minutes are not recommended. Consider adding additional units if extremely short cycle times are required to remove excessive iron buildup.

5. Regulator pressure has been preset at the factory. However, there may be conditions during material separation (sticky or wet material, heavy tramp iron load) that will prevent the magnetic tubes from moving out of product flow for automatic cleaning. If the Automated Grate experiences slow operation, adjust the regulator to increase the air pressure. Increase air pressure in increments of 10 psi (.7 bar), until the unit operates fully, without hang-ups. **DO NOT LUBRICATE MAGNET TUBES.**

## Cleaning & Maintenance

### ROTA-GRATE® MAGNETIC SEPARATOR

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#### WARNING

Never attempt to clean the magnets while the unit is in operation. Bodily injury can occur. **Lockout/Tagout before cleaning.**

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Cleaning is accomplished by removing accumulated ferrous material by hand. Should fine ferrous contamination be involved, the tubes can be wiped clean by means of a rag or gloved hand. Care should be taken to prevent dropping any ferrous particles back into the cleaned material outlet. It is recommended that the tubes be cleaned at the top position so that if any ferrous particles are dropped they may be caught by the lower magnetic tubes.

Blotting the tube with the sticky side of masking tape will also aid in fine iron removal.

The necessary frequency of cleaning will be determined by the amount of ferrous contamination in the material being processed. The unit should be cleaned often to prevent an excessive accumulation of ferrous contamination on the magnetic tubes, as this will reduce the magnetic separation efficiency.

Lubricate bearings on a schedule consistent with other equipment in use with your product and environment. An NGLI No. 2 lithium-based grease is recommended. For motor and gear reducer maintenance, refer to the manufacturer's instructions packed with the equipment.



### **WARNING**

Automated Rota-Grates have pinch points inside the grate and pneumatic drive housing. There are moving mechanical parts driven by the cylinders. Workers must be instructed not to perform maintenance on this equipment unless it is turned off and the air supply and electric power are locked out. Failure to observe this precaution may result in serious personal injury.

Tube magnets are very strong and will instantaneously attract to each other, any iron, steel railing, or beams in the cleaning area. The tube magnets in the Automated Rota-Grate are not intended to be removable. However, if removed from the rotor, the tubes must not be brought within 12" (300 mm) of any iron or steel structure or objects. Failure to observe this precaution may result in property damage, hand crushing or other serious personal injury.

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1. For solenoid valves and air preparation unit maintenance, refer to the manufacturer's instructions packed with the shipment.
2. No adjustments should be made on the pneumatic cylinder take-up or flow valves. These items have been preset at the factory.
3. If the unit does not complete the cleaning cycle, check to see if the support channel is contacting the limit switch on each end of the stroke (refer to Figure 4). The limit switch arm can be adjusted. Move the limit switch roller arm on the grooved spline in the direction of the trip lever or adjust the roller arm length or both. Minor contact between the support channel and mechanical safety stop is normal.
4. Unit is automated not self maintaining. Clean inside the pneumatic drive housing on a regular schedule, depending upon the environment and the material processed. It's important that no product be allowed to build up (caused by dusting or material passing through the tube wipers). Clean magnet tube and product area buildup as necessary.

## Repair & Alteration

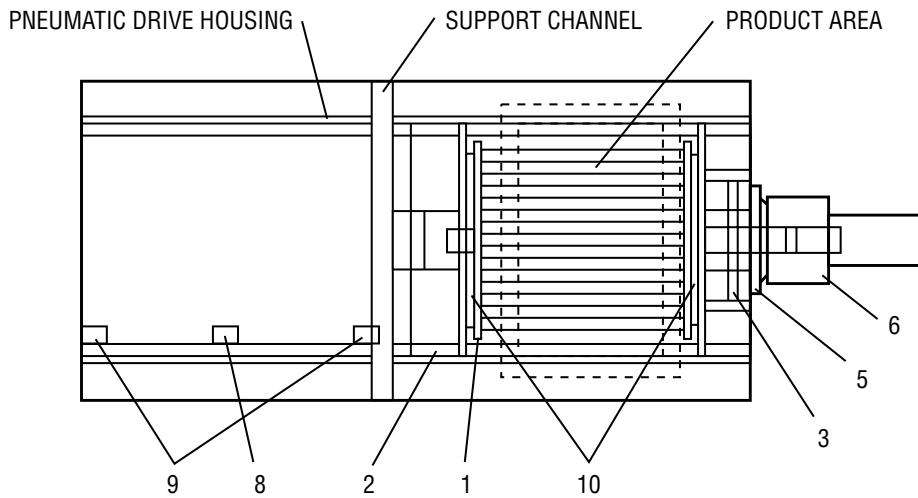
Alteration or disassembly of the assembly would disturb a carefully engineered magnetic circuit which could only be restored by returning the unit to our factory for rebuilding and recharging.

Repair, alteration or disassembly of this magnetic equipment in the field without written authorization and instructions by Eriez nullifies the responsibility and guarantee of the manufacturer.

## Factors that Affect Magnet Performance

1. **High Temperature**  
Standard rare earth magnet circuits should not be subjected to temperatures in excess of 150°F (65°C). Special circuits are available for higher temperatures.
2. **Direct Current**  
Welding equipment should not be used on or in close proximity to Eriez permanent magnet circuits. Demagnetization can result from this.
3. **Moisture**  
The raw magnet material should not be exposed to liquids. This would normally only result from breaching the magnet enclosure.
4. **Physical Abuse**  
The magnet castings are brittle, and when subjected to repeated abuse such as banging on a table or dropping on the floor, the castings may shatter and the tubes may crack. Over time, abuse will cause the magnetic field will diminish.

# Replacement Parts



ITEM	DESCRIPTION	QUANTITY
1*	Tubescraper Disc	1
2*	Bearing Strips (UHMW)	2
3*	Clutch Plate	1
4	Air Cylinder	2
5	Oil Seal	1
6	Gearmotor	1
7	Exhaust Muffler	2
8	Air Control Valve	1
9	Limit Switch	2
10	Bearing	2
11	Magnetic Tubes	Varies - Recommended 2-4 Spares

\*Recommended Spare Parts

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