SM-141

# Installation, Operation and Maintenance Instructions

# MAGNETIC HUMPS & ROUND PIPE SEPARATORS

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

# Introduction

This manual applies to Eriez' Magnetic Humps and Round Pipe Separators.

A careful reading of these Installation, Operation and Maintenance Instructions will assure the most efficient and dependable performance.

If there are any questions or comments about the manual, please call Eriez Manufacturing at 814-835-6000 for assistance.

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**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 of 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 "workpiece" being lifted.**
- **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.**

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**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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**MAGNETIC HUMPS & ROUND PIPE SEPARATORS AND SELF-CLEANING MAGNETIC HUMP**

# MAGNETIC HUMPS & ROUND PIPE SEPARATORS

## Description

**Magnetic Humps**
Eriez Magnetic Humps consist of two permanent magnets mounted in a rectangular fabricated housing. The housing is “dog-legged” on two sides at 45° from a flat plane. Each leg contains a magnet hinged and latched to the housing, one on the up stream side and one on the downstream side. The rectangular ends of the Hump are flanged for mounting to pneumatic lines or gravity flow chutes. Adapters can be provided by Eriez or others for mounting to round pipe or other shaped outlets. Adapter ends can also be supplied with pipe flange mountings.

**Round Pipe Separators**
Eriez Round Pipe Separators are designed for the simple and economical installation of permanent magnet tramp iron separators in round gravity flow chutes. The unit consists of a magnet hinged and latched to a rectangular fabricated housing which is adapted at both inlet and outlet to a particular pipe size. Flanged pipe ends can be supplied.

In addition to standard Round Pipe Separators, dust-tight units are available where product confinement within the separator is important. For air pressurized applications, special construction is provided.

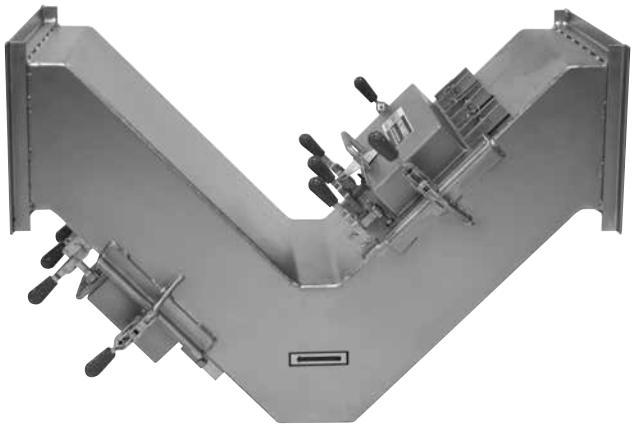


**FIGURE 1**
Magnetic Hump

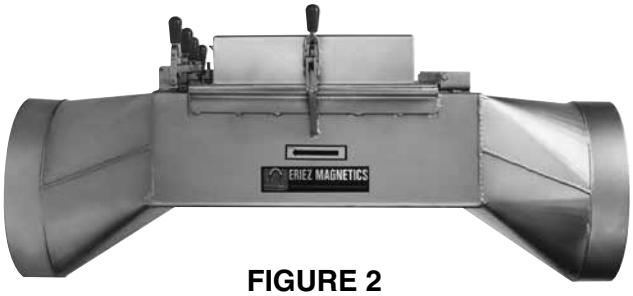



**FIGURE 2**
Round Pipe Separator

## Installation

**Magnetic Humps**
The Hump is installed by bolting the flanged ends of the inlet and outlet to the existing line or chute.

The Hump must be installed so that the magnet on the upstream leg of the Hump is facing the material flow. This directs the material being conveyed directly against the working face of both the magnets.

Pneumatic Humps should be installed on the suction side of the blower. For installation on the pressure side of the blower, where air pressure is above atmospheric, special construction and mounting is available.

Three typical types of installation, with the direction of material flow indicated, are shown below.

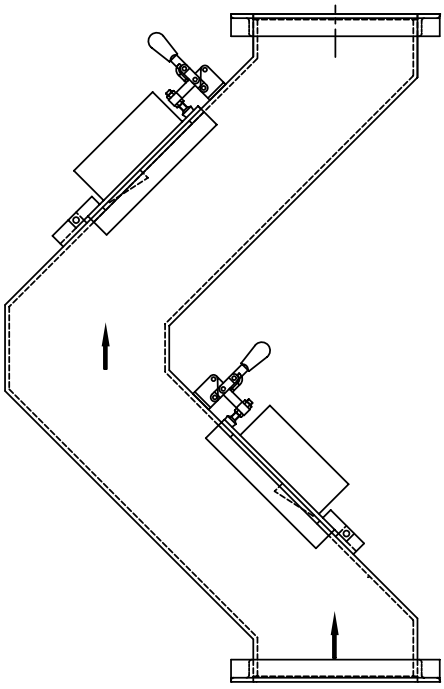


**FIGURE 3**
Magnetic Hump – Vertical-Up (Pneumatic)

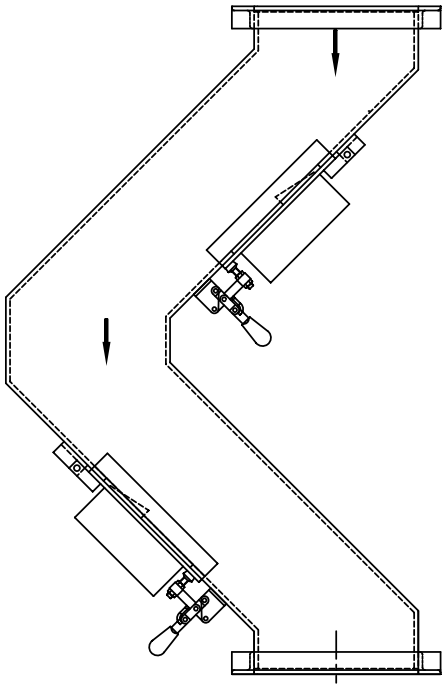


**FIGURE 4**
Magnetic Hump – Gravity

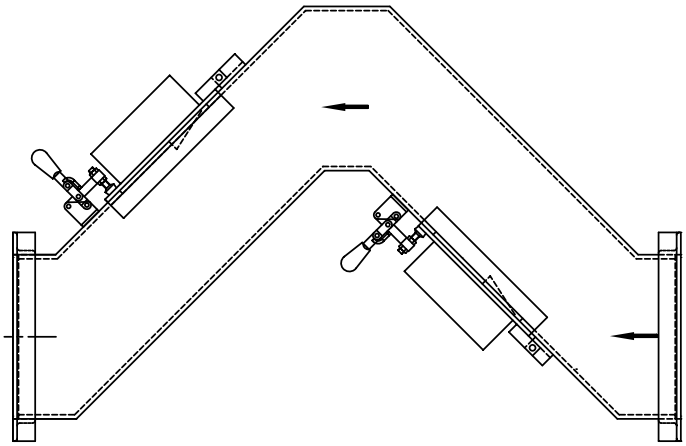


**FIGURE 5**
Magnetic Hump – Horizontal (Pneumatic)

**Round Pipe Separators**
The Round Pipe Separator is installed by cutting out a section of the conveying chute or pipe where magnetic protection is required and slipping the system into position. The system must be installed with the magnet at the bottom of the housing and with the material flow directed into the end of the system containing the neoprene deflector. This deflector automatically directs the material being conveyed onto the magnet face. The drawing below illustrates this installation.

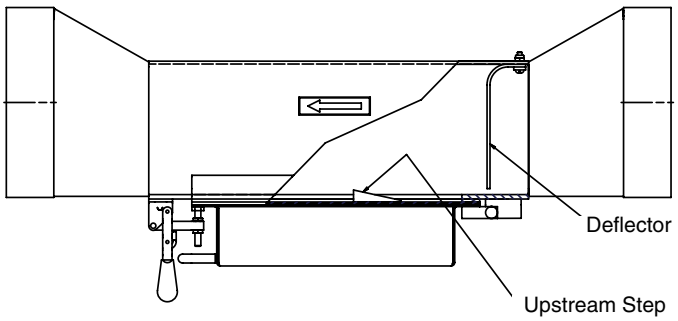



**FIGURE 6**
Round Pipe Separator

# Operation & Maintenance

There are no moving parts in an Eriez Magnetic Humps and Round Pipe Separators. The magnet is the only “working” component. As material flows over the magnet, the powerful magnetic field reaches out to attract and hold ferrous contaminants.

The only maintenance required is periodic cleaning of the magnet face. This cleaning is essential. Overloading the magnet with entrapped ferrous material will impair its efficiency and permit the passage of tramp iron. Frequency of cleaning is determined by the amount of ferrous contamination removed from the material by the magnets.

The magnets are hinged and latched to the housing for easy cleaning. To clean, unlatch the magnet, which will then swing away from the housing. Simply scrape or brush the accumulated iron from the magnet face, push the magnet back against the housing and close the latch.

# Operation & Maintenance *(cont.)*

**Cycle Time Adjustment**
Contamination levels or convenient cycling times can also determine cleaning cycles.

For example:

Very light contamination – 8 hours (each shift)

Average contamination – 2-3 hours

Heavy contamination – 30-60 minutes

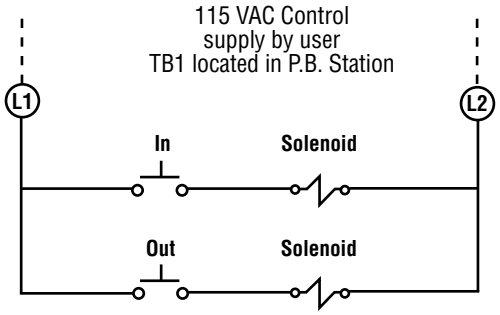
**Air Supply and Connections**
A 60 to 80 psi air supply is required to the 3/8 NPT port connection at the filter regulator.

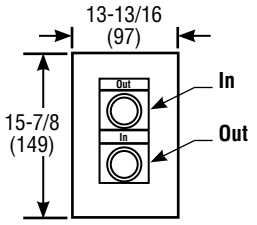
Connect 3/8 tubing from the solenoid valve to the right angle connectors on the product housing.

**Electrical Control to Solenoid Valve**
(Option for NEMA12 push button station.)
This is a double solenoid valve, 120/60VAC.

A signal is required to each solenoid in turn to "spool" the valve in each direction. The solenoid requires a momentary signal and should not be continuously energized.

A certified electrician should complete this correction. The following is the push button control schematic:




Push button station
NEMA-4/13, 3-1/4, (82) deep
Eriez No. 2N-9900579

**FIGURE 7**
Push Button Control Schematic

**Ferrous Discharge Options**
The ferrous (scrap) discharge area is located under the housing. Space must be provided so that scrap discharge can clear the housing and not back up into the unit. Typical scrap collection methods include:

- A tray or hopper. Analysis can be conducted on scrap amount and sources.
- A bucket, bag or barrel for periodic disposal.
- A conveying system for removal to a remote location.

**IMPORTANT: The product flow must be shut off before the cleaning cycle is activated.**

**⚠ WARNING**
**This unit contains moving parts. Turn off and lock out electrical power and pneumatic supply before maintenance other than normal operation.**

# Factors that Affect Magnet Performance

1. **High Temperature**

   Standard rare earth circuits subjected to temperatures in excess of 150°F (65°C). Special circuits are available for higher temperatures.

2. **Direct Current**

   Using welding equipment on or in close proximity to Eriez permanent magnet circuits can result in demagnetization.

3. **Moisture**

   The magnet's stainless steel enclosure is liquid-tight from the factory. If the enclosure is damaged moisture can enter the magnet circuits and cause demagnetization.

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, will cause the castings to shatter and crack tubes. Over time, the magnetic field will diminish.

## Repair & Alteration

Alteration or disassembly of the Round Pipe Separator or Magnetic Hump would disturb a carefully engineered magnetic circuit which can 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 Manufacturing Company nullifies the responsibility and guarantee of the manufacturer.

## Warning

Each plate magnet in the housing consists of a number of powerful magnetic castings contained within the enclosure. If your product is abrasive to the point of wearing through the nonmagnetic face plate, magnet material may enter the product stream. This exposure could be harmful to the quality of your product. When cleaning the magnet, check for signs of excessive surface wear.

# SELF-CLEANING MAGNETIC HUMPS

## Description

The Self-Cleaning Magnetic Hump is designed primarily to remove tramp iron contaminates from free-flowing materials conveyed by gravity in vertical pipes or chutes.

The self-cleaning feature eliminates costly downtime during which the material flow must be shut off and the magnets in the hump body removed to manually remove the trapped iron.

Self-cleaning also eliminates the use of ladders or catwalks necessary to reach certain hump installations.

Two magnets are attached to the hump body by means of bearings and shafts. Air cylinders are mounted to the shafts, and when activated move the magnets away from the hump body. With the magnets away from the body, the collected iron drops free from what was the magnetic area.

The released iron falls to a ferrous discharge housing that has an air cylinder-activated diverter panel (or flop-gate) that directs the iron out a discharge leg. The diverter panel moves into the reject position before the magnets swing away to eliminate any iron discharge into the product area. A push button (in-out) station activates the magnets and the diverter panel all at one time. “Out” means the magnets swing away and the diverter sends the iron out the discharge leg. “In” swings the magnets back to the housing and the diverter to a straight up position allowing material to flow to the next operation.

The three main electrical and air components are attached to a common mounting panel. (This panel is attached to the hump body for shipment.) The panel can be placed at any convenient location simply by removing the two air hoses connected to the solenoid (control valve) and to the air transfer housings on the hump body, and running longer hoses.

Besides the control valve there is an ‘air’ combo and a two-button (in-out) electrical enclosure (115v-60 Hz).

**Optional Feature**
A digital setting general purpose automatic reset timer is available in place of the push button station. Normal voltage & frequency is 120/60 with a range of .1 to 999.9 minutes.

The timer is complete in a Nema 112 molded case.

**FIGURE 8**
Operating Position

## Description *(cont.)*

**FIGURE 9**
Cleaning Position

## Installation

1. Bolt the hump assembly to chute work.
2. Attach maximum 100 psi air line to the filter/ regulator/lubricator ‘combo’.
3. Run two air hoses from the air control valve to air connections on the hump body (remove present air lines that are on the unit).
4. Wire and plug two-button station to a 115v 60Hz electric line.

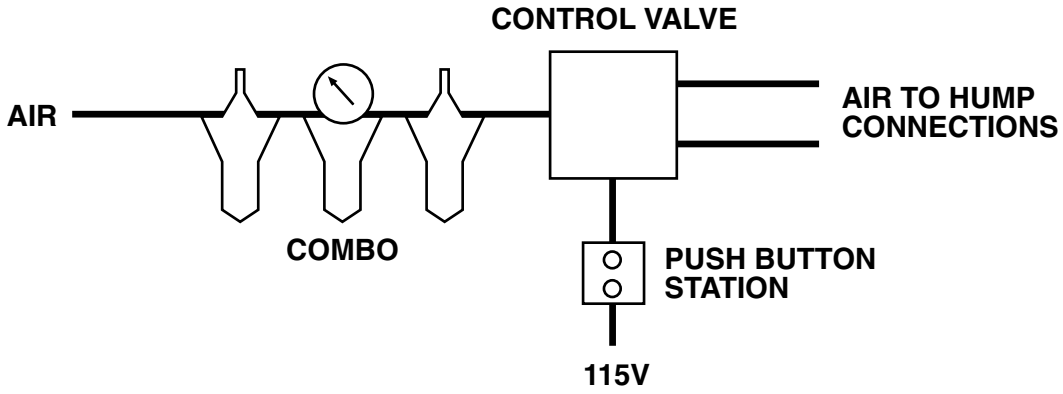



**FIGURE 10**
Air and Electrical Connections

**Auto ETC Round Pipe Separators**
Auto ETC Round Pipe Separators' air cylinders are mounted to the housing. When activated, the air cylinders move the magnet and stripper plate away from the housing allowing the tramp metal to discharge.

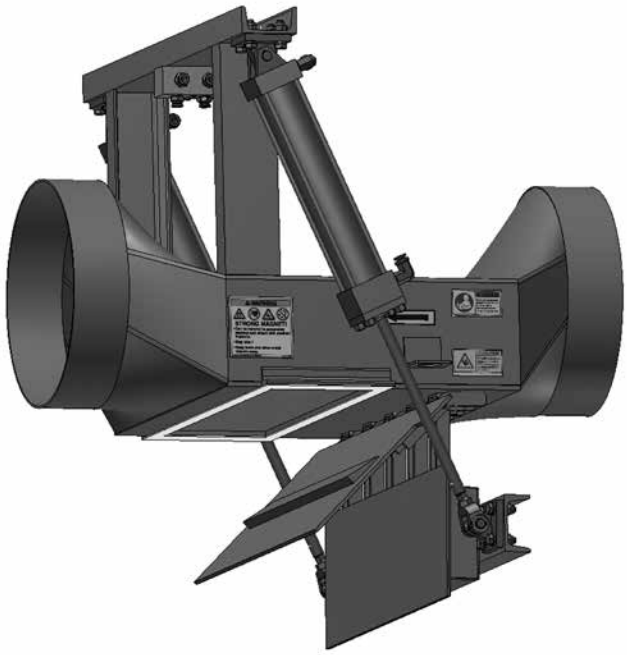


**FIGURE 11**
Auto ETC Round Pipe Separator

After carefully uncrating the unit, notice that there are two sections, the unit itself and the control panel. Two pneumatic hoses connect them. The hoses were used to test the unit at our facility and can be used as-is or new hoses or piping can be used to locate the panel further from the unit.

As material flows over the magnet, the powerful magnetic field reaches out to attract and hold ferrous contaminants. The pressure regulator is pre-set at the factory to cycle the air cylinders smoothly. Adjust the air pressure based on your product and cycling load. A smooth, steady cycle is better than one that slams the drawer in each direction.

The processing steps are as follows:

1. Product flow with contaminants (2-3 hours to start).
2. Ferrous material collect on the hinged stripper plate.
3. Product shut off before cleaning cycle.

The magnet is hinged and latched to the housing for easy cleaning. To clean, activate the air cylinders to move magnet and stripper plate away from the housing. The stripper will stop halfway through the magnet travel allowing the debris to discharge. Activate manual valve to return magnet and stripper plate to housing.

Each individual user can determine the cleaning cycle frequency. The factors that determine the time between cycles are the amount of ferrous contamination in the product and how magnetic the contamination is (how well it will be held by the magnet). The cleaner the magnet surface, the more efficient the magnet will be.

Between batch operations is an ideal time to clean the magnet. Connecting the control in conjunction with the shut off valve or other device upstream is ideal.

# Operation & Maintenance

All air is pre-adjusted at the factory, and a decal at the air entry will specify at what pressure the unit will operate safely. If the customer finds it necessary to increase the air pressure, this may indicate that the magnets are operating at an unsafe level, meaning that too much iron is being accumulated and the magnet needs more air to break loose from the iron. When this occurs, the customer must increase the cleaning cycle frequency or the equipment may be damaged.

The air filter and lubricator should be inspected and serviced according to manufacturer recommendations. The manufacturer's literature is shipped with this hump.

Otherwise, when properly used, the self-cleaning hump assembly is typically maintenance free.

# Repair & Alteration

Alteration and disassembly of the magnetic grate 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.

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



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