

Installation, Operation and Maintenance Instructions



LIFTING MAGNETS

ERIEZ MAGNETICS HEADQUARTERS: 2200 ASBURY ROAD, P.O. BOX 10608, ERIE, PA 16514-0608 U.S.A.
WORLD AUTHORITY IN ADVANCED TECHNOLOGY FOR MAGNETIC, VIBRATORY and METAL DETECTION APPLICATIONS

Introduction

This manual details the proper steps for installing, operating and maintaining Lifting Magnets.

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 Manufacturing at 814/835-6000 for assistance.

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General Description

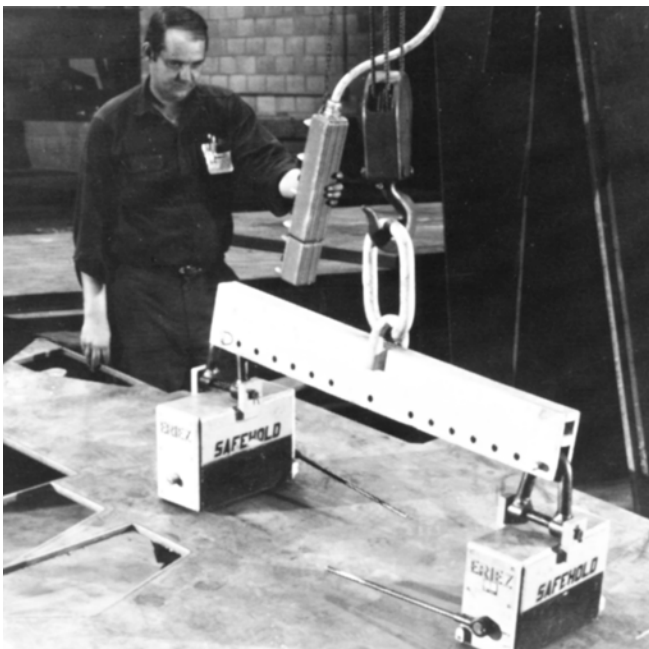
There are two types of lifting magnets in the Eriez product line and, although there are variations that apply to installation, operation and maintenance, the magnets all perform a similar function.

The following instructions apply to all types except where specifically noted. A general description of these types is:

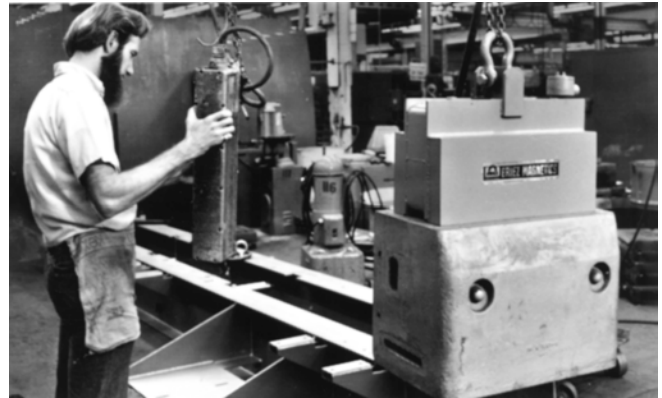
1. Electromagnets – powered by DC or rectified AC.
2. Manually or mechanically operated permanent magnets. (Eriez trade name for this type is “Safehold”).



Multiple Selecto electromagnets on a lift beam.



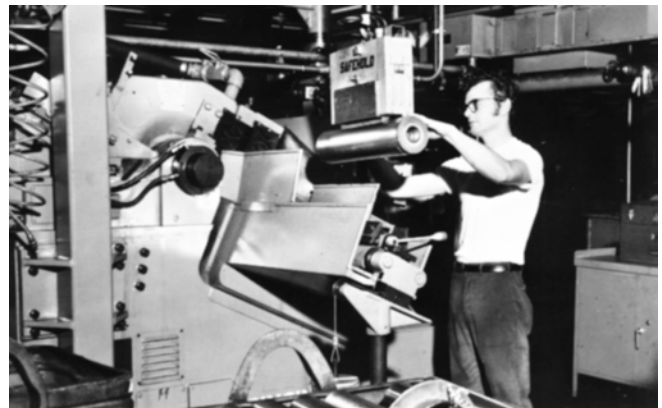
Manually operated Safehold permanent magnets.



Bi-Polar electromagnet.



Rectangular electromagnets.



Mechanically operated Safehold.
Note countoured pole faces.

Important - Safe Operation

Suspending equipment inherently involves risk of damage to property or injury to personnel located under or near the equipment, should a suspension component fail. In the case of suspended magnets, there is an additional hazard associated with unexpected dropping of the load, as a result of conditions that could not be anticipated by the magnet supplier. **As with all suspended equipment, personnel access to the area under and around suspended magnets should be restricted.**

Ratings for Eriez magnets are based on maximum capacity under ideal conditions, reduced by a safety factor of two. If ideal conditions for the lift are not present, determine an application-specific rating for the magnet(s) by trial and error, under carefully controlled conditions simulating the planned lifting procedure. **This rating should be based on the measured maximum capacity of the magnet(s) under the simulated conditions, reduced by a factor of at least two for normal production.** The appropriate reduction factor may be much larger than two, for situations including multiple magnets; extended, flexible, or off-center loads; or loads with variable surface conditions.

The user is responsible for determining the appropriate reduction factor, based on knowledge of the variation in conditions to be encountered during production.

Illustrations of suspension components given in this manual are examples only, and the user is entirely responsible for final design of his installation. Select and properly use suspension components with rated capacities (including all appropriate reduction factors) that provide adequate safety when the weight of the equipment and all possible loading conditions and upsets are taken into account.

A person responsible for safety should review lifting magnet ratings and procedures periodically to assure that safe procedures are observed.

This manual covers the factors to be considered by the user in most common lifting magnet applications. However, not every application may be addressed. If the instructions are not clear, or if some aspect of your lifting operation is not covered in this manual, or if you have any questions about magnetic lifting, call Eriez Magnetics *before attempting the lift.*

Installation

Handling

All lifting magnets are packed for shipping in a manner that provides adequate protection for the pole faces and other critical areas. Electromagnets and Safeholds do not present any potential hazards for magnetic attraction in the "as shipped" condition.

Inspection

Inspect the pole faces carefully for evidence of damage in shipment. Nicks or burrs that would prevent the poles from fully contacting a flat, smooth plate should be sanded, filed or machined if necessary. Determine whether or not any parts are obviously missing or broken and, if so, do not attempt to use the magnet until corrective action is taken.

Suspension or Mounting

For normal lifting applications, some flexibility in the mounting is desirable. This is particularly beneficial when more than one magnet is on a beam or fixture because, if the workpiece is not level, the magnets can align themselves to the workpiece as they are moved into position. The degree of flexibility should be controlled so that no damage will occur to the magnet, beam or wiring if the load should suddenly break away from the magnet. The suspension design should consider and prevent situations in which one or more magnets may actually be lifted by the remaining magnets due to flexing of the beam or the load. There are numerous ways of achieving flexibility and it is suggested that Eriez be consulted on a method best suited for the specific application.

Installation (cont.)

Suspension or Mounting (cont.)

If the installation is of the multiple-magnet type, it is important for safety that the pole faces of all magnets be in firm contact with the load. Usually this requires that the pole faces lie in exactly the same place when unloaded.

Wiring

Always use wire of adequate size to conduct electric power to the magnet. Undersized wiring will create a potential fire hazard due to excess heating and ultimate failure of the insulation.

Be sure the power connected to the magnet matches **all** the electrical characteristics on the nameplate. Otherwise, components may be damaged and failures will occur.

Eriez magnets have provision for grounding through the power cord or in the junction box. Electrical short circuits are always a possibility wherever electricity is used but the damaging consequences of a short will be much less if proper grounding is provided.

Wire size, grounding techniques and circuit protection can be determined by a competent electrician. Don't take chances on improperly wired systems.

Operation

Contact With Work

Lifting magnets, regardless of type, have two things in common:

- 1. Pole plates must be in full contact with the work to develop all the magnetic lifting potential for the piece being handled.**
- 2. There is a given thickness of workpiece upon which any magnet will develop its maximum lifting capability. When it is used on thinner material, the lifting capacity is reduced. The capability of Eriez magnets is specified on the Safety decal.**

Multiple-magnet beams must be used in a manner that will permit all magnets to contact the work. If the end magnet on a beam for long narrow loads is not in contact, the leverage created by the overhanging weight can overload the next magnet and cause the load to progressively strip away from every magnet on the beam. The same action can take place when handling plates. For thinner plates and sheets

the material is more likely to sag from its own weight and cause a peeling action. When Eriez recommends a magnet distribution plan for a multiple system the above factors are considered. However, Eriez is not always made aware of the intermediate sizes of loads that will not permit use of all magnets on the beam.

Multiple Thickness Sheet Handling

Many lifting magnets have a magnetic field that will reach through one or more thin sheets or plates. If more than one sheet is to be handled in a single lift, condition of the material is extremely important. As an example, a given magnet may lift five perfectly flat, clean sheets whereas it might lift only two of the same sheets if they are warped, bent, covered with scale, etc. **It is good practice to lift a load, stop just a short distance above the pile and use the magnet controller to release the bottom sheet.** Safehold magnets cannot be controlled in this manner and consequently are not recommended for multiple sheet handling.

Operation (cont.)

Irregular Surfaces

Pole faces can often be configured to fit irregular or shaped surfaces so that more of the magnet face is in contact. This is generally done with single magnets except where there are long objects with a contour in one direction only (example: pipe). For one given size of smooth pipe, poles machined to a contour that fits the pipe perfectly will insure that the magnet is operating at nearly full efficiency. However, if assorted sizes are handled on one set of poles, the magnet must be derated to account for loss of contact area. Tests should be carried out under realistic operating conditions to determine the appropriate derating factor.

Environmental Conditions

Elevated temperatures will affect performance and life of all magnets. Electromagnets can be designed to tolerate higher temperatures than permanent types, but in all cases the determining factors are:

1. Air Temperature
2. Material Temperature
3. Frequency of use
4. Duration of exposure in hot atmosphere and/or to hot material

For magnets of standard design, both permanent and electro, Eriez should be consulted on their use on materials or in air temperatures that exceed 110°F (43°C).

Standard electromagnets (except style ST Selecto) are weatherproof. The ST type can be made weatherproof by special assembly procedures.

Manually operated Safeholds are weatherproof but the remotely operated Safehold is not weatherproof.

Outside operation in winter weather is common practice. However, a layer of snow or ice on top of a steel plate will reduce magnet capacity as effectively as an air gap of the same thickness. **Always remove such accumulations to be assured of optimum magnet performance.**

Ratchet Operated and Manually Operated Safehold

The handle extension **must be fastened in place** when operating either of these magnets. **Do not operate with the handle unfastened.**

CAUTION - The handle on manually operated Safehold magnets will tend to override the operator's control through part of the stroke. Failure to grip the handle firmly could result in injury.

Manual Safehold magnets have a safety latch pin which locks when the magnet is turned on. This is for the operator's benefit and should never be removed. If damaged it should be replaced.

Maintenance

General

Inspect pole faces frequently for burrs, nicks, imbedded foreign objects or accumulation of tramp metal.

Examine suspension hardware at regular intervals. Do not use the magnet if there are defective, badly worn or missing parts. Look for:

1. Worn pins
2. Frayed cables
3. Missing cotter pins
4. Worn chain and shackle links
5. Damaged safety latch or worn hole
6. Loose or broken handle

Electromagnets and Remotely Operated Safehold

Power cables should be inspected regularly for evidence of cut or torn insulation. Switches must be in good operating condition and guards should be in place. Plugs, connectors, sealing glands, strain reliefs and outlet box covers are important items and should not be overlooked.

Remotely Operated and Ratchet Operated Safehold

Normal lubrication of drive parts is required at regular intervals. Frequency of service will depend on severity of use but in any case should not be less frequent than:

1. Remote Safehold – weekly application of oil to chain by brush or spout can.
2. Ratchet Safehold – monthly application of grease to gears.



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