SM-323X

Installation, Operation and Maintenance Instructions

SUSPENDED ELECTROMAGNETS

ERIEZ HEADQUARTERS: 2200 ASBURY ROAD, ERIE, PA 16506–1402 U.S.A.
GLOBAL LEADER IN SEPARATION TECHNOLOGIES

Introduction

This manual applies to the two basic types of Eriez Magnetics suspended electromagnets: oil cooled and air-cooled. 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 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 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 "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.

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 ELECTROMAGNETS

Warning

Suspended electromagnets 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.

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

Suspended electromagnets with self-cleaning belts 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.

When either a self-cleaning or a manual cleaning electromagnet is energized, workers should never extend parts of their bodies into the magnetic field area between the conveyor and the magnet face. Tramp iron pieces will be attracted suddenly and unexpectedly to the magnet potentially pinning an arm etc. with enough force to cause severe injury.

Warning and Caution plates and decals on the magnet must not be removed or painted over. It is important that these warnings and cautions be legible and that they be followed. Note the magnetic field warning at the front of this document.

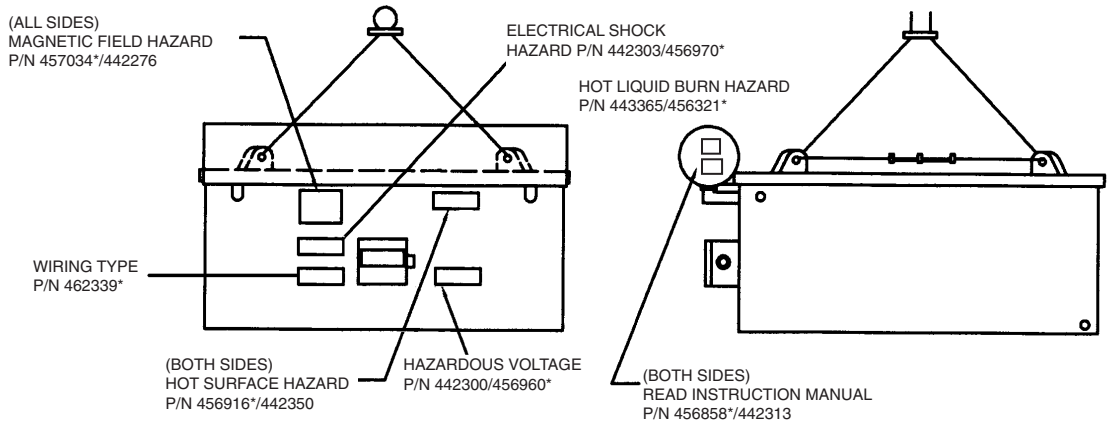


FIGURE 1
Safety decal locations - manual cleaning models
*three language labels

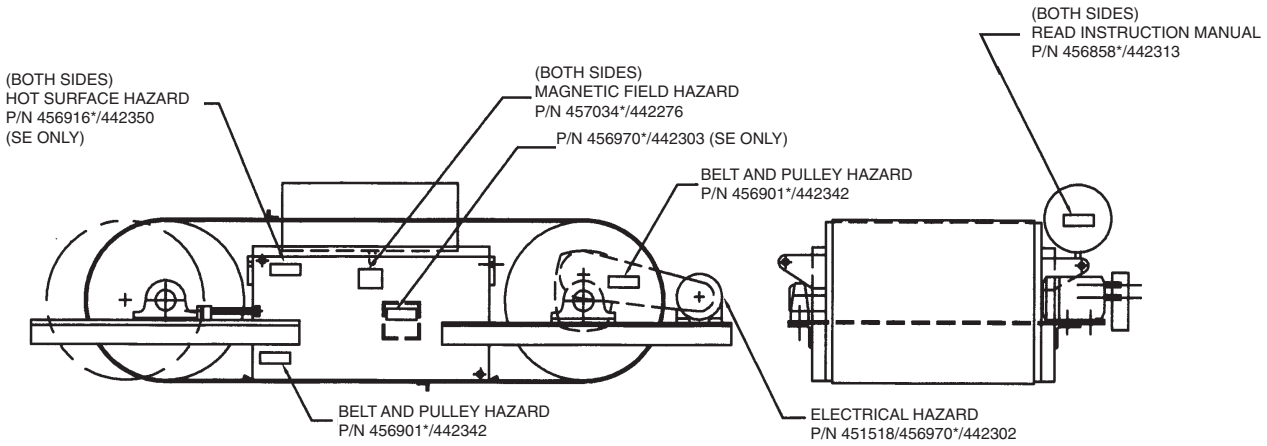


FIGURE 2
Safety decal locations - self-cleaning models

Description

Suspended electromagnets are heavy duty DC powered separators designed for use over a moving bed of material from which iron is to be removed. Basically, they are box-shaped units with coils inside to generate a powerful magnetic field.

There are two basic types available: oil-cooled and air cooled. Both of these types are available as manual or self-cleaning units. Each type has two styles, in-line and cross-belt, to accommodate installation requirements. There is a wide range of sizes available for each type and style.

Manual cleaning magnets are designed for use where small amounts of tramp iron are suspected. They can be furnished with an adjustable cable sling designed for a one-point suspension or adjustable Jaw & Jaw turnbuckles for four-point suspension.

With manual cleaning magnets it is necessary to shut off the power periodically to discharge the accumulated tramp iron. Manual cleaning units may be installed over the head pulley or over the conveyor.

Self-cleaning magnets consist of a manual cleaning unit with a short belt conveyor built around it to provide automatic discharge of tramp iron. These magnets, typically furnished with turnbuckles for four-point suspension, can also be used over the head pulley or over the conveyor.

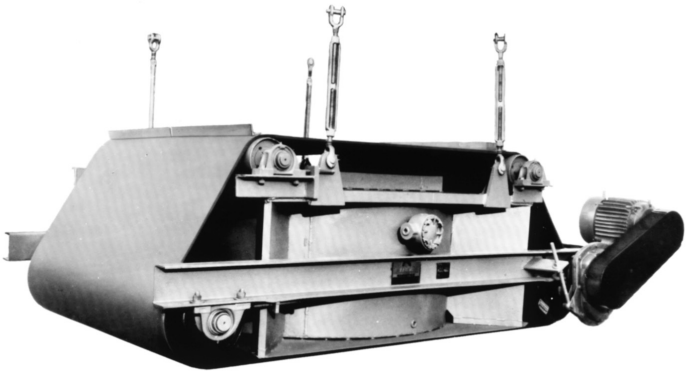


FIGURE 3
Typical air-cooled self-cleaning suspended electromagnet

FIGURE 4
Typical oil-cooled manual cleaning suspended electromagnet

Installation

GENERAL

Use care in uncrating to avoid damage to the equipment.

IMPORTANT: Check the area upstream, downstream, on the sides and underneath the magnet for carbon steel or other ferrous metals. Specifically look for carbon steel conveyor belt idlers, slider beds, side frames or any other metals in the area. All carbon steel or ferrous metals within magnetic field of the magnet (up to 3-feet or possibly more for larger size magnets) will become induced or "magnetized" and <u>will reduce the separation efficiency of the suspended electromagnet.</u>

For this reason, replace all carbon steel or other ferrous metals with 304 or 316 stainless steel, aluminum, plastic, wood or other non-magnetic materials in the area of the magnet for the best magnetic separation efficiency.

For oil-cooled models: Be sure the magnet is oriented properly. In all installations, the external oil expansion chamber must be at right angles to the direction of material flow and on the high side if installed at an angle. Magnets with adjustable expansion tanks must be positioned so the drain is at 6 o'clock. (See page 9).

Check the pressure relief valve located on the high end of the oil expansion chamber to make sure it is free to operate. This is done by pulling the stem and releasing it. It is spring loaded and will re-seat itself when released.

MAGNET POSITIONS

Position 1 (in-Line)

The preferred installation of a suspended magnet is over the trajectory of material discharged from the belt conveyor. This is referred to as POSITION 1 (See Figures 5 and 6).

For optimum separation in Position 1 installations, provision must be made to adjust the location of the magnet to suit the trajectory of the material.

For Position 1 installations with conveyor belt speeds of less than 350 fpm (107 m/min), greater separation will be achieved by using a nonmagnetic head pulley.

If a self-cleaning unit is being installed, examine the area to make sure that the self-cleaning belt around the

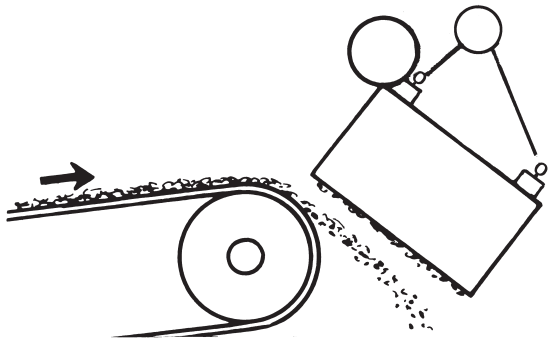


FIGURE 5
Manual cleaning position 1

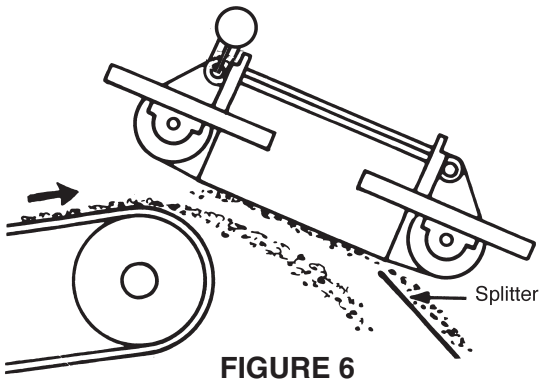


FIGURE 6
Self-cleaning position 1

separator has adequate room to run properly and that provisions have been made to collect the discharged tramp iron. A hinged non-magnetic splitter, adjustable in length, will be required to prevent extracted tramp iron from reentering the product.

Position the magnet so that the face of the belt is approximately 2" (50 mm) from the trajectory of the material being discharged. The centerline of the magnet should be approximately perpendicular to the material at that point.

Position 2 (Cross-belt)

Installation of the separator over the moving bed of material at right angles to the conveyor is referred to as POSITION 2 (See Figures 7 and 8). This location normally presents a more difficult separation problem than Position 1 and usually requires a stronger magnet.

For Position 2 installations, steel conveyor idlers cannot be used in the length of the conveyor beneath the separator. Any conveyor idlers beneath the separator must be made of rubber, wood, or some other non-magnetic material. Both the manual cleaning and the self-cleaning units should be installed on the centerline of the material conveyor and parallel to the slope of the conveyor.

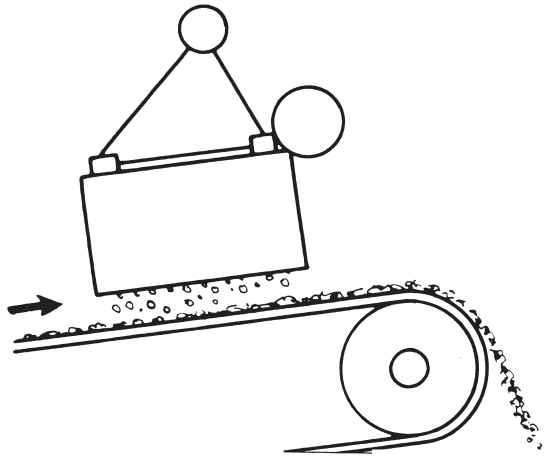


FIGURE 7
Manual cleaning position 2

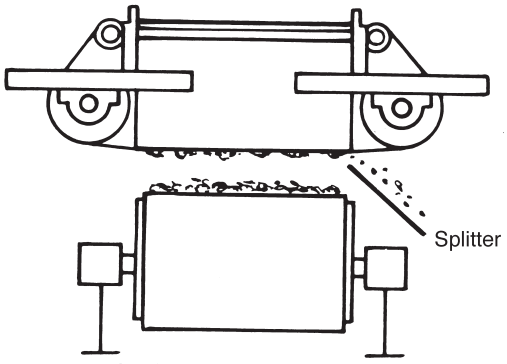


FIGURE 8
Self-cleaning position 2

SUSPENSION HEIGHT

Each size magnet is designed for a specific suspension height. This distance (See Figure 9) is measured from the magnet face to the product conveyor belt.

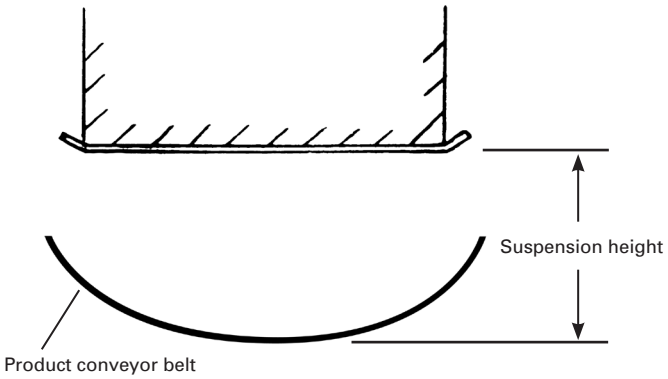


FIGURE 9

Specified suspension height should be considered a maximum and the magnet should be lowered as close to the actual burden as possible. When lowering the magnet to the burden, be sure that plowing of material does not occur. If the unit is a self-cleaning magnet, make sure that the separator belt has room to operate and discharge tramp iron properly. A clearance of 3" (75 mm) between the magnet or belt and the top of the burden is typical for self-cleaning units; this clearance can be reduced to 2" (50 mm) for manual cleaning units.

BURDEN DEPTH

The best separator performance is achieved by controlling the burden depth. A plow or leveler positioned above the conveyor and before the magnet will help level high spots or surges in Position 2 installations. For Position 1 installations, the recommended installation location is calculated on expected tonnage. Any variation from this rate changes the trajectory of the burden with respect to the working surface of the magnet and may result in poor separation.

GUIDELINES FOR MAGNET INSTALLATION

Generally, sufficient application data is available so that we can prepare an installation drawing to show the magnet location that will provide optimum tramp iron removal. However, for those instances where there is not enough information to permit preparation of a drawing, the guidelines that follow should be helpful. Observing these guidelines will not necessarily result in an ideal magnet location but as you approximate these conditions more closely, performance will be improved. **It is important to provide for adjustment of the magnet position so optimum results can be obtained under actual operating conditions.**

Position 1 mounting - magnet over the conveyor head pulley.

Determine where the highest point of the material trajectory occurs and position the magnet so that the face is 2" (50 mm) for a manual cleaning magnet and 3" (75 mm) if unit is self-cleaning type, above material and the magnet center line passes through the high point of the trajectory. See Figure 10.

Installation *(cont.)*

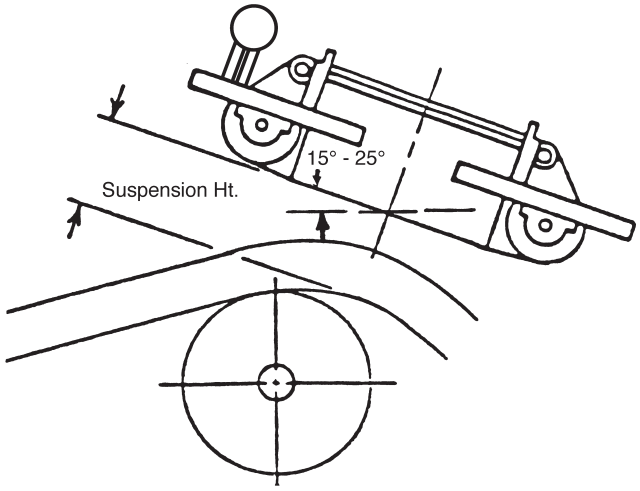


FIGURE 10

Note: The normal magnet angle with respect to a horizontal plane will be in the range of 15-25°. As belt speeds increase, installation angles tend to decrease.

In cases where belt speeds are slower (usually 350 fpm (107 m/minute) or less) the material trajectory will not rise higher than the top of the pulley but, rather, will follow around the periphery of the pulley and "fall-off" the downstream side. For this condition, the magnet centerline should pass through the center of the pulley. **Note: A head pulley of non-magnetic material (series 300 stainless steel) is required to avoid magnetic inducement that would be present with a mild steel pulley.** See Figure 11.

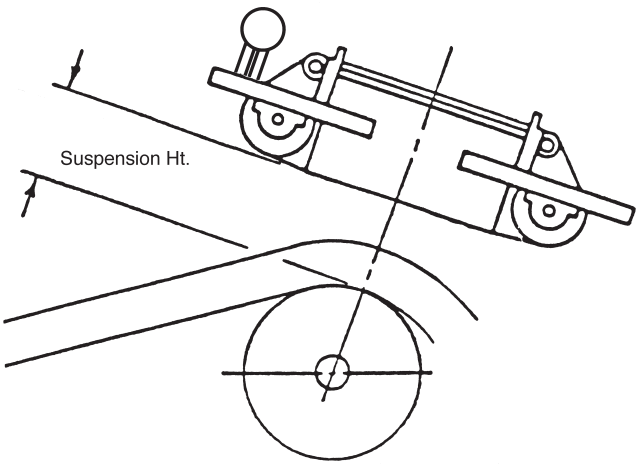


FIGURE 11

Position 2 mounting - magnet across the conveyor belt.

Position the magnet so that it is centered over the width of the conveyor and the face (bottom) is parallel to the slope of the conveyor.

When a self-cleaning magnet is installed over a troughed conveyor belt, the magnet must be high enough so that a piece of iron on the magnet belt will clear the edge of the conveyor belt. However, caution must be exercised so that the rated suspension height of the magnet is not exceeded. See Figure 12.

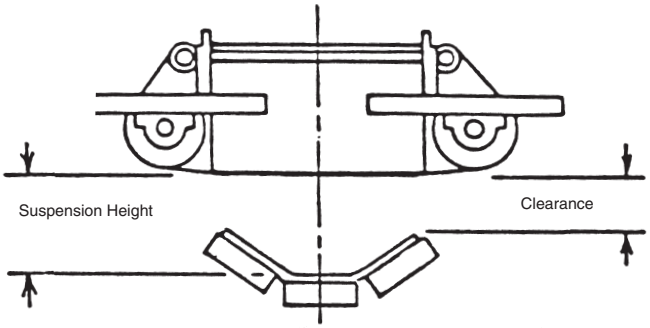


FIGURE 12

For Oil-Cooled Models:

⚠ CAUTION

After installation and prior to start-up, check the oil level at the oil level plug located on the side corner of the magnet near the expansion tank. If the level is low, add oil of the type specified on the plate attached to the top of the magnet beside the oil fill plug.

Oil expansion tanks are mounted with slotted brackets allowing adjustment to the tank. Adjustments are made to keep the relief valve in proper position.

Tanks can be factory adjusted if incline angle is specified when ordering. Otherwise field adjustment will be required.

Tanks are properly adjusted when the orientation arrow is pointing straight down. When hanging a magnet the tank is turned toward the magnet until the arrow points down.

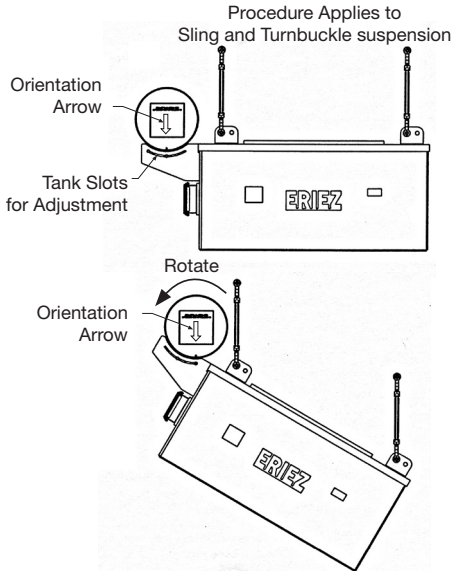


FIGURE 13
Oil Expansion Tank Positioning for oil cooled magnets with Slotted Mounting Brackets.

WIRING (CSA APPROVED)

Wiring for Eriez electromagnets is very simple (see Figure 14). Connect the two DC leads from the DC power source to the two terminal posts in the magnet outlet box. A kit of crimp type terminal lugs is provided for the minimum recommended wire size for the magnet (refer to Table 5.)

The conductor insulation must be rated for 125°C. The CSA-Certified lugs are T&B (Thomas and Betts Co.) or equal and must be crimped with a T&B tool. A recommend T&B crimping tool is also listed for each conductor wire size in Table 5. Only use tools recommended by the terminal lug manufacturer. See Figure 15 for the routing of wires in the outlet box.

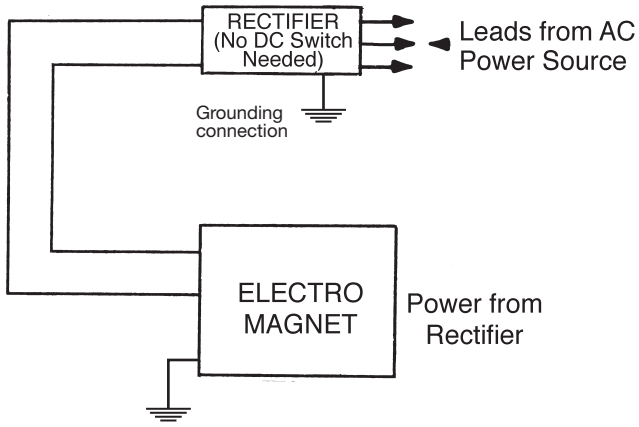


FIGURE 14

⚠ CAUTION

Do not attempt to turn the terminal posts themselves. This may result in internal damage.

Install the terminal lugs between the two brass nuts provided on the terminal posts. Hold the back nut securely in place with a wrench when tightening the front nut.

A ground stud is provided in the outlet box for the ground lug furnished in the kit of terminals. The ground lug is installed between the two brass nuts on the stud. The ground wire must be installed to the ground lug to be a CSA-approved installation.

NOTE: Either wire from the DC power source can be connected to either terminal post in the outlet box, unless indicated on the magnet. Do not break the DC leads from the DC power source with a switch or fuses. The energy from the magnet must have a decay path through the power source.

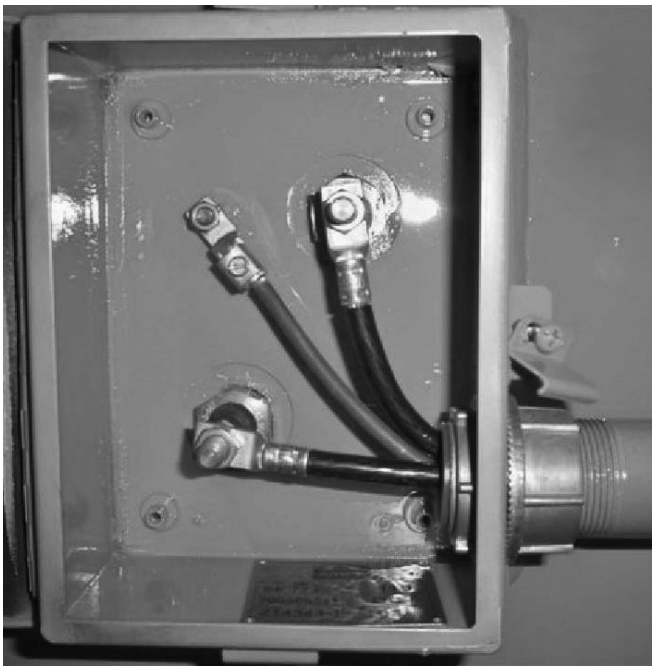


FIGURE 15

Operation

START-UP OF SELF-CLEANING UNITS

1. Be sure the frame is visibly square and has not been damaged or twisted.
2. After installation, momentarily close the AC switch to the belt drive to determine if the belt is running in the right direction. The bottom of the belt should be running toward the motor. Also check to see if the belt tends to wander and, if so, in which direction.
3. Belt Adjustment
   a. The smaller suspended electromagnets utilize a two-pulley design. The tail pulley has approximately 6" (150 mm) of take-up available for both belt stretch and tracking purposes. To track the belt, the tail pulley should be moved in a direction to tighten the belt on the side to which the belt wanders.
   b. The larger magnets have a four-pulley design and have two take-up adjustments. The bottom tail pulley is initially used to take up the slack (adjust both sides evenly). Tracking is achieved by adjusting the small pulley located on the same end so that the belt is tightened on the side to which it wanders.

NOTE: Never start the belt drive and allow it to run continuously until the belt is properly trained.

Maintenance

AIR-COOLED MANUAL CLEANING MODELS:
No maintenance other than periodic removal of tramp iron is required for air-cooled manual cleaning units.

OIL-COOLED MANUAL CLEANING MODELS:

1. The oil level should be checked periodically (check only when magnet is cold). If the oil level is low, fill as required with the same brand and type as noted on the plate beside the oil fill plug. Do not attempt to mix types since many substitutes for the original are not compatible.
2. The oil should be laboratory tested every 12 months for:
   a. Moisture
   b. Contaminants
   c. Dielectric strength (20 KV min.)
   Eriez does not perform this service, but it is suggested that inquiries be directed to:
   a. a reliable testing laboratory
   b. the oil vendor
   c. local electric utility
3. Be sure the expansion tank pressure relief valve is free. This should be checked frequently. (See page 6 general installation instructions).

⚠ CAUTION
The relief valve can release hot oil if excessive heat causes above-normal expansion.

NOTE: Normal external operating temperature of Eriez oil-cooled electromagnets is approximately 185°F (85°C); for air-cooled magnets, approximately 160°F (70°C). Some magnets can operate hotter than others due to ambient temperature, high voltage or low transformer oil. These temperatures are extremely hot to the touch.

FOR SELF-CLEANING MODELS:

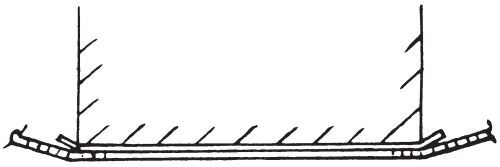
1. Lubricate bearings on a schedule consistent with other equipment in use with your product and environment. An NGL1 No. 2 lithium-base grease is recommended.
2. Check V-belt tension frequently. Adjust by tightening the reducer torque arm as required.
3. For motor and reducer maintenance, refer to the manufacturer's instruction sheets packed with the shipment.
4. If the separator is to be installed inside a fabricated enclosure, provisions must be made to maintain and adjust moving parts as required.
5. After initial run in, check all fasteners for proper tightness. Refer to Torque Table on Page 14.

6. After 250 hours of running check pulley hubs and tighten set screws to 17 lb. ft. (23 Nm) torque.
7. Proper adjustment for belt tension and tracking is vital to trouble free operation of the self-cleaning system, and should be checked frequently. To track these belts you should proceed in the following manner:

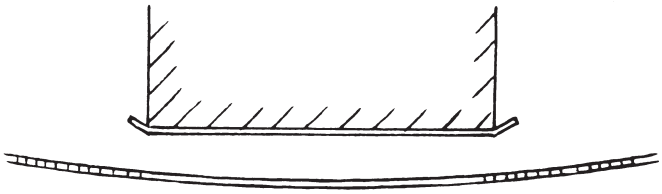
   The smaller suspended electromagnets utilize a two-pulley design. The tail pulley has approximately 6" (150 mm) of take-up available for both belt stretch and tracking purposes. To track the belt, the tail pulley should be moved in a direction to tighten the belt on the side to which the belt wanders.

   The larger magnets have a four-pulley design and have two take-up adjustments. The bottom tail pulley is initially used to take up the slack (adjust both sides evenly). Tracking is achieved by adjusting the small pulley located on the same end so that the belt is tightened on the side to which it wanders.
8. Once the belt has been trained, further adjustment may be required to achieve proper tension. Excess tension applied in an effort to keep the belt flat against the face of the magnet can lead to pulley, shaft or bearing failure. It is normal for the belt to sag due to its own weight and this becomes more prevalent on the larger units. Efficient operation can be achieved without applying excess tension so the belt should be tightened only enough to prevent slipping on the pulleys when it is conveying iron off the face of the magnet. Usually a sag of up to 3" (75 mm) is not detrimental unless it interferes with material flow. See Figure 16.

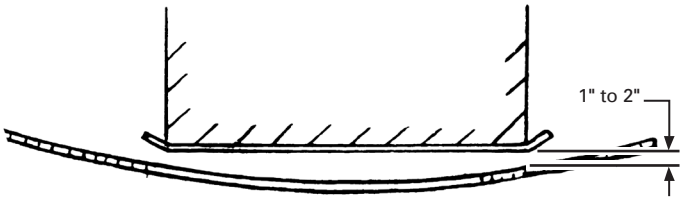
Eriez Belt Tracking video can be found on Eriez' YouTube channel. Search "Eriez" on YouTube to find our channel.



Belt is too tight



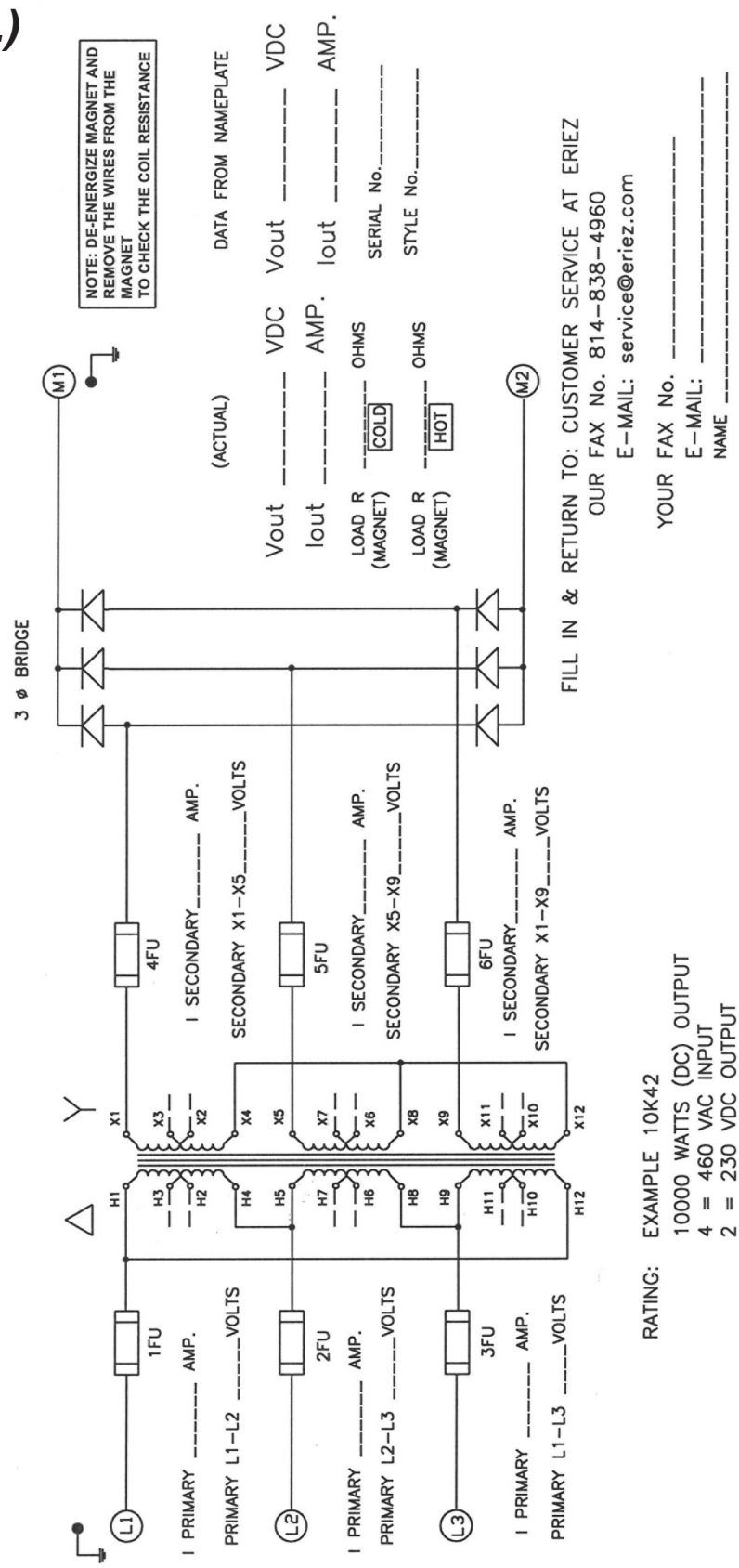
Belt is too loose



Belt should have 1" to 2" (25 - 50 mm) gap at magnet corners. Larger magnets can have a belt sag in the center up to 3" (76 mm).

FIGURE 16

Maintenance *(cont.)*



Troubleshooting

GENERAL

On self-cleaning units, stop the belt before troubleshooting or performing checks and maintenance. Do not allow the belt to remain stationary for more than 30 minutes with the magnet energized; heat may damage the belt.

PROBLEM	PROBABLE CAUSE	SOLUTION
Magnet will not attract iron	a. Magnet is not turned on or the magnet voltage is low b. Magnet is not installed at the proper suspension height c. Parts not being attracted are non-magnetic d. Induced iron in the area of the magnet prohibits the extraction of tramp iron e. Magnet is overheated f. Magnet coils are grounded g. Magnet coil is shorted or open	a. Check power switch and check DC voltage at magnet terminals; adjust as required b. Check location of magnet with respect to burden and confirm that it is within the recommended suspension height at the centerline of the magnet c. Check missed tramp iron with small permanent magnet to confirm that it is magnetic d. Check area around the separator with a small steel probe to see if the structure or conveyor components are themselves acting as a magnet and attracting iron. Replace with a non-magnetic material as required e. Check for proper DC voltage at the magnet terminals and check for proper current. Current should be approximately 30% lower than nameplate current when hot. Correct voltage. Allow magnet to cool f. Take megohm reading between each magnet terminal and ground. 0.5 megohms should be minimum reading g. Check for rated current at rated voltage at magnet OR measure DC resistance of cold magnet. The resistance should equal the nameplate voltage divided by nameplate amperes
Oil Leak	a. Damaged unit b. Excessive internal pressure	a. Check and repair as required. Magnet may be welded or patched as required BUT EXTREME CAUTION MUST BE TAKEN TO PREVENT FIRE DURING ANY WELDING in hazardous locations (coal dust, etc.). The welding should be performed by qualified welders using electric arc welding equipment. Drain the oil from the magnet into clean containers. Purge the magnet of all oil fumes by using an inert gas (argon or C02). Purge for 30 to 45 min. through the drain plug in the magnet to the relief valve in the expansion tank at 5 pounds pressure. Continue to purge when welding. Small pin hole leaks can be more easily welded when peened shut first. A stainless steel plate or angle on a corner can be continuously welded over a crack if required. Care should be taken when welding a magnet containing transformer oil to prevent igniting the oil in the magnet or any spilled oil. After welding is completed, check for leaks at 5 pounds pressure using soapy water. If no leaks are found, then fill the magnet with oil. Use a filter (paint filter) when re-installing oil to eliminate any ferrous particles to enter the magnet box which can cause coil failure b. Check freedom of pressure relief valve and replace if required
Oil Leak	(Terminal Post)	Consult Eriez

TABLE 1

General troubleshooting chart

Troubleshooting *(cont.)*

PROBLEM	PROBABLE CAUSE	SOLUTION
Adjusting Suspension		a. Manual cleaning units - prior to hanging magnet, loosen cable clamps, adjust cable length and tighten clamps. b. Self-cleaning units - adjust turnbuckle length by turning the turnbuckle body.

TABLE 1
General troubleshooting chart *(cont.)*

PROBLEM	PROBABLE CAUSE	SOLUTION
Magnet will not attract iron	a. Magnet face is overloaded with already-extracted iron. b. Magnet set too far from burden. c. Magnet set too close to burden. d. Magnet not aligned with belt.	a. Examine face of the magnet for build-up of excessive quantities of extracted tramp iron. Discharge more frequently as required. b. Check for proper clearance between the magnet and burden. Adjust for proper gap. c. Check for proper clearance between the magnet and the burden. If too close, material surges can occur and the surge may act as a wiper. d. Position magnet with center above centerline of belt and edges parallel to edges of belt.

TABLE 2
Adjustment guide for manual cleaning units.
(All general items also apply)

PROBLEM	PROBABLE CAUSE	SOLUTION
Tramp iron re-entering the product	a. Not enough clearance for the iron to be discharged from the product magnet. b. Splitter improperly positioned.	a. For self-cleaning units in Position 2, check to see that enough clearance has been allowed between bottom of magnet and edge of conveyor belt for maximum sizes to be discharged. Adjust as necessary b. For self-cleaning units in Position 1, check splitter for proper location and clearance with respect to the magnet. Adjust splitter angle and length as required

TABLE 3
Adjustment guide for self-cleaning units.

BOLT SIZE	PLAIN		PLATED	
	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.

TABLE 4
Bolt torque

Copper Conductor Size for Connection of Magnet to the DC Power Source per Canadian Electrical Code, Part I,C22.1-12 Table 2 and Table 16 for 125°C Wire. [4] These magnets must be wired with 125°C conductior insulation.

MODEL [1]	DC Volts	DC Amperes	Mains Wire size AWG	T&B Terminal Lug	T&B Hand Crimping Tool	Ground Wire Size AWG. [2]	Kit of Terminals Part No. [3,4]	Transformer Oil Gallons
71_0	115	14.3	12	10RC-38X	ERG4001	14	2N-201008490	22
71_5	115	20.9	10	10RC-38X	ERG4001	12	2N-201008490	41
72_0	115	23.1	10	10RC-38X	ERG4001	12	2N-201008490	49
72_5	115	31.3	8	54132	TBM4S	10	2N-201008491	78
73_0	115	33.1	8	54132	TBM4S	10	2N-201008491	86
73_3	115	41.7	8	54132	TBM4S	10	2N-201008491	119
73_5	115	42.8	8	54132	TBM4S	10	2N-201008491	120
73_8	115	43.8	8	54132	TBM4S	10	2N-201008491	122
74_2	115	53.7	6	54136	TBM4S	10	2N-201008492	163
74_5	115	54.9	6	54136	TBM4S	10	2N-201008492	166
75_0	115	57.2	6	54136	TBM4S	10	2N-201008492	175
75_5	115	68.4	4	54140	TBM4S	8	2N-201008493	230
76_0	115	71.1	4	54140	TBM4S	8	2N-201008493	246
76_5	115	83.5	4	54140	TBM4S	8	2N-201008493	313
77_0	115	86.5	2	54143	TBM4S	8	2N-201008494	330
77_2	115	88.2	2	54143	TBM4S	8	2N-201008494	333
77_5	115	103.3	2	54143	TBM4S	6	2N-201008494	431
77_7	115	104.9	2	54143	TBM4S	6	2N-201008494	435
78_0	115	106.6	2	54143	TBM4S	6	2N-201008494	436
78_5	230	62.8	6	54136	TBM4S	8	2N-201008492	563
79_0	230	64.4	6	54136	TBM4S	8	2N-201008492	565
79_5	230	74.6	4	54140	TBM4S	8	2N-201008493	708
79_8	230	82.6	4	54140	TBM4S	8	2N-201008493	766

TABLE 5

NOTES:

1. The third digit in the model number denotes in line self cleaning (-1-), cross belt self cleaning (-2-), or manual cleaning (-3-)

   Example: Model 7610 = In-line self-cleaning magnet
   Model 7620 = Cross-belt self-cleaning magnet
   Model 7630 = Manual clean magnet

2. Use grounding lug supplied in kit of terminal parts.
3. Each kit of terminals includes two listed terminal lugs and one ground lug.
4. Reference CSA C22.2 No. 14- most current edition.

Field Service Electromagnet & Control Check List

Disconnect leads at magnet junction box:

- Check ohms resistance across input leads.
- Check MEG ohms to ground (input terminals to ground) We expect a value of 200 to infinity.

  This check will eliminate a coil short as the potential magnet problem.

Reconnect the leads to the magnet junction box:

- Check the D.C. voltage at the magnet and compare to magnet specifications.
- Check D.C. ampere reading at the magnet and compare to magnet specifications.

  This check helps ensure the magnet is seeing the appropriate current and would identify a potential control or customer power source problem.
- Measure line voltage and current to the magnet control panel and compare to control panel requirements.

  This check eliminates your power source as the magnet problem.

Check dielectric strength of fluid within an oil filled magnet As coolant ages it may lose some of its dielectric properties. We expect a minimum KV level of 20 for good magnet performance.

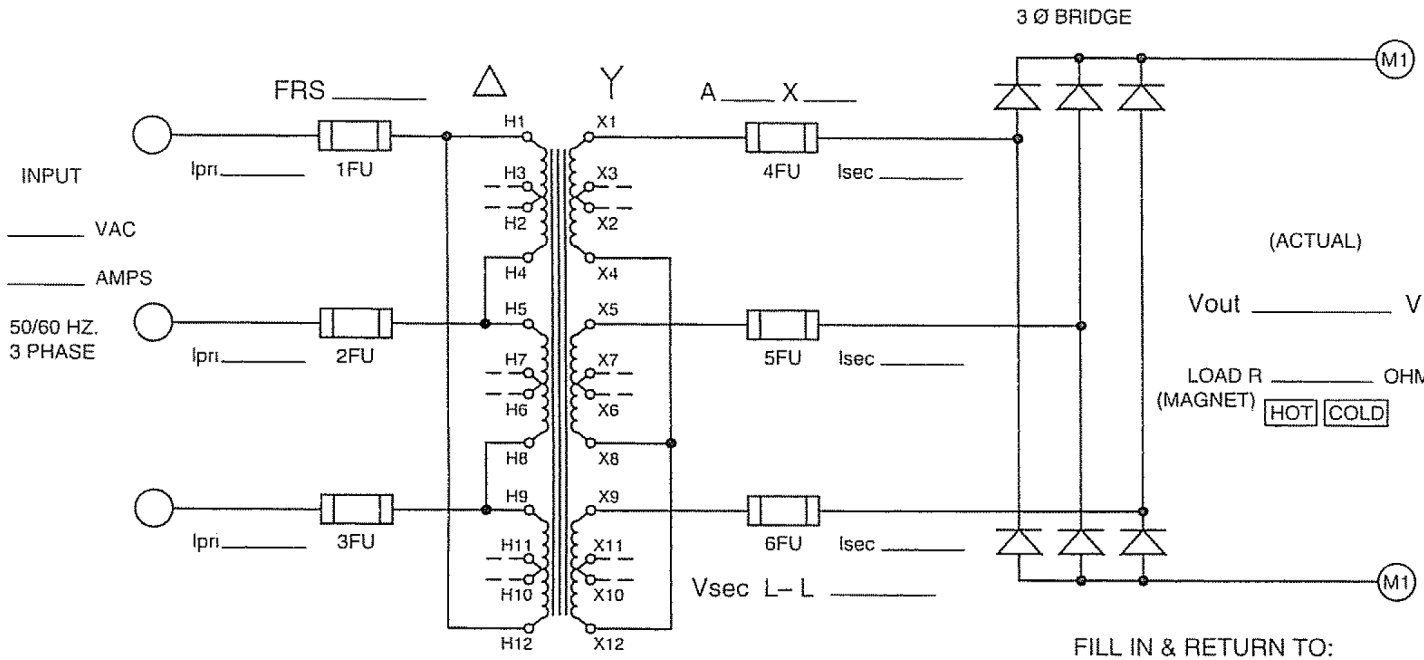
Control

1. Check A.C. input line fuses (Replace if blown)
2. Check D.C. output (If no voltage go to Step 4)
3. Check A.C. and D.C. fuses in control (Replace if blown)
4. Check A.C. input voltage to bridge
5. If no D.C. output, check diodes -use an ohmmeter

Diode Check -one or two diodes may have failed causing low magnetic field

If Rectifier Fails To Operate

1. Open safety switch and check the input fuses. If fuses are blown, attempt to locate short circuit by first checking all of the silicon rectifier diodes. Isolate the rectifier assembly from the transformer by removing 3 output fuses and from the load by disconnecting one of the magnet loads from terminal marked M1 of M2. Then an ohmmeter reading should be taken directly across each diode first with one polarity and then with reversed polarity If the diode is good, the resistance will be very high with one polarity and very low with the reversed polarity. High resistance reading with both polarities indicates an open and low readings indicate a shorted diode. Replace rectifier assembly if short or open is detected.



(ACTUAL)

Vout _____ VDC

LOAD R _____ OHMS
(MAGNET) HOT COLD

DATA FROM NAMEPLATE

Vout _____ VDC

Iout _____ amps

SERIAL No. _____

STYLE No. _____

RATING: Ex. 10K42
10000 WATTS (DC) OUTPUT
4 = 460 VAC INPUT
2 = 230 VDC OUTPUT

FILL IN & RETURN TO:
ERIEZ MAGNETICS
OUR FAX No. 814-838-4960

YOUR FAX No. _____

NAME _____

SYMPTOM: _____

_____

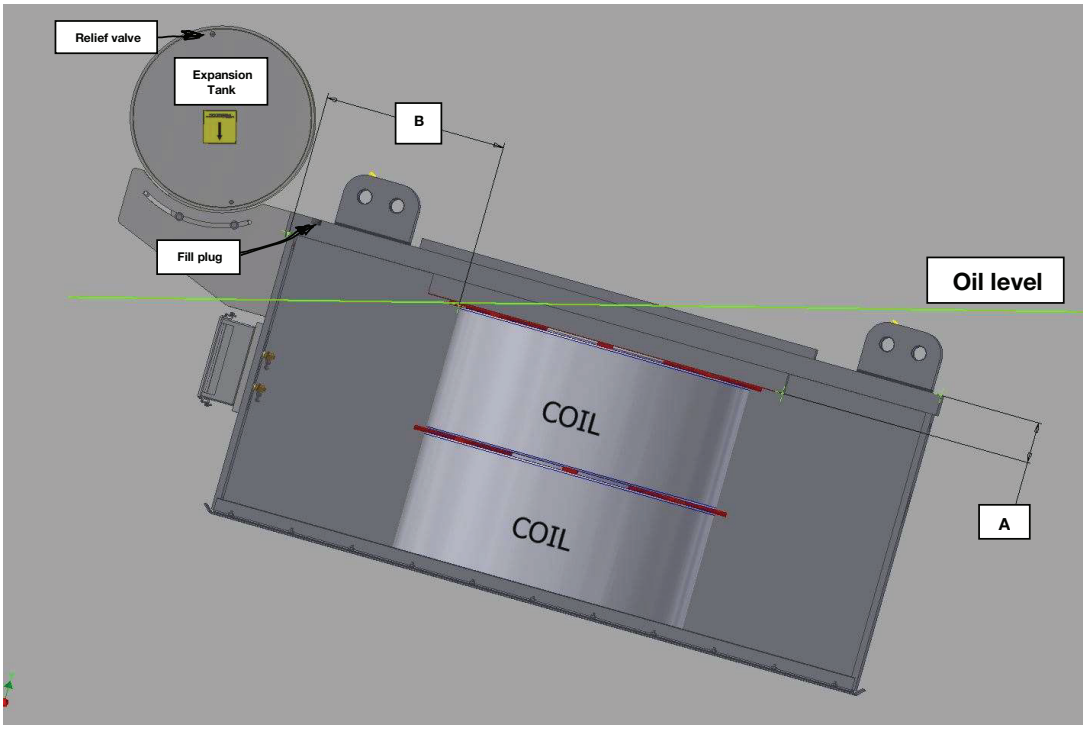
_____

_____

_____

_____

Determining Oil Level in Electromagnets Suspended at an Angle



Eriez Manufacturing - Suspended Magnet models

SE MODEL	71x0	71x5	72x0	72x5	73x0	73x3	73x5	73x8	74x2	74x5	75x0	75x5	76x0	76x5	77x0	77x2	77x5	77x7	78x0	78x5	79x0	79x5	79x8
"A" Dimension	1	1	1.5	1.75	1.75	2	2.25	2.5	2.75	3	3	3.25	3.5	3.75	3.5	4	4.25	4.35	4.75	4.75	5.5	5.75	5.75
"B" Dimension	6.5	9.25	8.85	11.54	10.9	13.45	12.15	11.25	13.85	12.75	11.9	14.65	14.25	16.9	16.35	15.1	18.35	17.6	16.45	18.5	16.6	18.55	15.12

CAUTION

1. Do not remove any plugs unless magnet is off and cold.
2. Locate "A" dimension on the outside of the magnet based on model size listed below.
3. Locate "B" dimension on the outside of the magnet based on model size listed below.
4. Place a level at the intersection of points A & B and draw a horizontal line which indicates required internal oil level.
5. Pull pin on relief valve to release pressure.
6. Remove top oil fill plug.
7. Lower a non-metallic "dip stick" into the fill plug hole while maintaining it in a vertical attitude to determine oil level.
8. Add oil as necessary to bring level to line on outside of magnet.
9. If magnet is equipped with an adjustable expansion tank, loosen bolts to rotate tank so arrow is pointing straight down.
10. The "x" in the chart below represents models 1, 2 or 3.

Standard Oil

Material Safety Data Sheet

CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Hyvolt II C50B
Chemical Name: Hydrotreated Middle Distillate
Chemical Family: Petroleum Distillate
Chemical Formula: Not Applicable
CAS Numbers: 64742-46-7
Other Designations: Contains Oil
Manufacturer: Ergon Refining, Inc., P.O. Box 309, Vicksburg, MS 39181
Company Contact: Will Poe, Phone (601) 630-8319

EMERGENCY TELEPHONE NUMBERS:
Ergon Refining, Inc. (601) 638-4960 Normal Business Hours
Chemtrec (800) 424-9300 After Business Hours

COMPOSITION / INFORMATION ON INGREDIENTS

A complex combination of hydrocarbons obtained by treating a petroleum fraction with hydrogen in the presence of a catalyst. It consists of hydrocarbons having carbon numbers predominantly in the range of C11 through C25 and produces finished oil with a viscosity near 7 cSt @ 40°C (46 cSt @ 0°C).

Ingredient Name	CAS Number	%
Hydrotreated Middle Distillate	64742-46-7	> 99.6
Butylated Hydroxytoluene (BHT) or 2,6-Di-tert-butyl-p-cresol (DBPC)	128-37-0	< 0.4

Trace Impurities:

Ingredient	OSHA PEL		ACGIH TLV		NIOSH REL		NIOSH IDLH
	TWA	STEL	TWA	STEL	TWA	STEL	
Hydrotreated Middle Distillate	5 mg/m^3 (oil mist)	None estab.	5 mg/m^3 (oil mist)	10 mg/m^3 (oil mist)	none estab.	none estab.	none estab.

HAZARDS IDENTIFICATION

Emergency Overview

Not Expected to cause a severe emergency hazard.

HMIS	
H	1
F	1
R	0
PPE†	B

†Sec. 8

Potential Health Effects

Primary Entry Routes: Skin

Inhalation: Inhalation of vapors or mist may be irritating to respiratory passages. Prolonged exposure may result in dizziness and nausea. Target Organ for mineral oil mist is lungs.

Eye: Eye contact may result in slight irritation and redness.

Skin: Short term contact with skin is unlikely to cause any problems; excessive or prolonged and repeated contact and poor hygiene conditions may result in dryness, dermatitis, erythema, oil acne, cracking and defatting of the skin.

Ingestion: May result in nausea or stomach discomfort.

Carcinogenicity: Based on OSHA 1910.1200 and IARC study requirements, this product does not require labeling. NTP and OSHA do not list this product as a potential carcinogen.

Medical Conditions Aggravated by Long-Term Exposure: Personnel with pre-existing skin disorders should avoid contact with this product.

FIRST AID MEASURES

Eye Contact: Wash with water. If irritation or redness persists seek medical help.

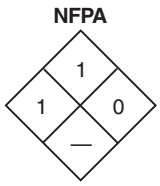
Skin Contact: Wash thoroughly with soap and water. Remove contaminated clothing. Reuse only after cleaning.

Inhalation: Remove to fresh air. Assist breathing if necessary. Seek medical help.

Aspiration: If there is any suspicion of aspiration into the lungs obtain medical advise.

Ingestion: If swallowed, observe for signs of stomach discomfort or nausea. If symptoms persist, seek medical help. Do not induce vomiting.

FIRE-FIGHTING MEASURES



Flash Point: > 295°F (> 145 °C)

Flash Point Method: COC

Burning Rate: Not available

Autoignition Temperature: > 600 °F (> 315 °C)

Lower Explosive Level (LEL): Not determined

Upper Explosive Limit (UEL): Not determined

Flammability Classification: OSHA Class III-B Combustible Liquid

Extinguishing Media: Halon, dry chemical, foam, CO_2 and water mist or fog. Water may be used to cool below flash point.

Unusual Fire or Explosion Hazards: Do not use forced stream as this could cause fire to spread.

Combustion Products: Fumes, smoke and carbon monoxide.

Fire-Fighting Instructions and Equipment: Use water to cool containers exposed to flames. Do not enter enclosed or a confined workspace without proper protective equipment. Fire fighting personnel should wear respiratory protection (positive pressure if available).

ACCIDENTAL RELEASE MEASURES

Spill /Leak Procedures: Stop spill at source if possible without risk. Contain spill. Eliminate sources of ignition. Spill area will be slick. Recover all possible material for reclamation. Use non-flammable absorbent material to pick up remainder of spill.

Spill to Navigable Waters: If this material is spilled into navigable waters and creates a visible sheen, it is reportable to the National Response Center.

HANDLING AND STORAGE

Handling and Storage Precautions: Keep away from flames, sparks or hot surfaces. Never use a torch to cut or weld on or near container. Empty oil containers can contain explosive vapors. NFPA Class IIIB storage. Wash thoroughly after handling.

Work / Hygienic Practices: Wash hands with soap and water before eating, drinking, smoking or use of toilet facilities. Do not use gasoline, solvents, kerosene, or harsh abrasive skin cleaners for washing exposed skin areas. Take a shower after work if general contact occurs. Remove oil-soaked clothing and launder before reuse. Discard contaminated shoes and leather gloves.

Shelf Life: Product should be stored in clean, dry containers at ambient temperatures and it should remain stable with exception of slight color stability loss unless it is contaminated.

EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls: Adequate ventilation is required where excessive heating or agitation may occur to maintain concentration below exposure limits.

Eye / Face Protection: Safety glasses or face shield where splashing is possible.

Skin Protection: As needed to prevent repeated skin contact. Solvent resistant gloves should be used if needed.

Respiratory Protection: Not Normally Needed. Respirator should be used in areas where vapor concentrations are excessive due to high temperatures or where oil misting occurs.

Standard Oil *(cont.)*

Material Safety Data Sheet

PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid

Appearance: Clear & bright

Color: Water white to pale

Odor: Mild Petroleum Odor

Odor Threshold: Not determined

Vapor Pressure: Not applicable

Vapor Density (Air=1): > 5

Specific Gravity (H_2O=1): 0.88

Water Solubility: Nil

Boiling Point: 500-700°F (260-370°C)

Melting Point: - 65°F (- 55°C)

Pour Point: - 46C

% Volatile: Nil LVP-VOC

Evaporation Rate: Not available

pH: Not applicable

STABILITY AND REACTIVITY

Stability: Stable

Polymerization: Polymerization will not occur.

Chemical Incompatibilities: Strong Oxidizers.

Conditions to Avoid (Stability): Sources of ignition.

Hazardous Decomposition Products: Combustion products include carbon dioxide and carbon monoxide.

TOXICOLOGICAL INFORMATION

Acute Studies: Tests on similar materials show a low order of acute oral and dermal toxicity.

Eye Effects: Minimal irritation on contact.

Skin Effects: Practically non-toxic if absorbed. May cause mild irritation with prolonged and repeated exposure.

Acute Oral Effects: Tests on similar materials indicate low order of acute oral toxicity.

Acute Inhalation Effects: Low acute toxicity expected on inhalation.

ECOLOGICAL INFORMATION

Aquatic Release: Advise authorities if product has entered or may enter watercourses or sewer drains.

DISPOSAL CONSIDERATIONS

Follow Federal, State, and Local regulations. Not a RCRA hazardous waste if uncontaminated. If “used”, RCRA criteria must be determined. Do not flush to drain / storm sewer. Contract to authorized disposal service. If permitted incineration may be practical. Consider recycling.

TRANSPORT INFORMATION

Proper Shipping Name: Not regulated by DOT (Contains Oil)

Hazard Class: Not Applicable

DOT ID No.: Not Applicable

DOT Shipping Label: Not regulated by DOT

REGULATORY INFORMATION

U.S. Federal Regulatory Information:

CERCLA / SARA

302/303/304 Categories:	Extremely Hazardous Substances	None
311/312 Categories:	Immediate (Acute) Health Effects	No
	Delayed (Chronic) Health Effects	No
	Fire Hazard	No
	Sudden Release of Pressure Hazard	No
	Reactivity Hazard	No
313 Categories:	Toxic Chemicals (40 CFR 372)	None
Clean Water Act:	If spilled into navigable waters it is reportable to National Response Center, 800-424-8802	
(40 CFR 116; 401.15)	Reportable Quantity = Oil Sheen present on navigable water surface	
OSHA (29 CFR 1910):	This product is not hazardous under Hazard Communication Standard 29 CFR 1910.1200	
RCRA (40 CFR 261.33)	This product does not meet hazardous waste criteria.	
EPA/TSCA Inventory:	The components of this product are listed on the EPA/TSCA inventory of chemicals. CAS No. 64742-46-7	
Foreign Inventories:	The components of this product are listed under the following foreign inventories:	
	European Union's EINICS Listed	
	Korea's ECL Listed	
	Australia's AICS Listed	
	Canada's DSL Listed	
	Philippines' PICCS Listed	

OTHER INFORMATION

NFPA Hazard Rating	- Health	1 Slight
	- Fire	1 Slight
	- Reactivity	0 Least
Prepared By:	Will Poe	Phone: (601) 630-8319
Supersedes MSDS Dated:	January 1, 2007	Changed date
	June 1, 2005	Changed date
	December 3, 2003	Changed Date

This MSDS complies with OSHA Hazard Communication Standard (HCS) 29 CFR 1910.1200 and conforms to ANSI Z 400.1 16-Section Format.

Disclaimer: Ergon Refining, Inc. believes this information is accurate but not all-inclusive in all circumstances. It is the responsibility of the user to determine suitability of the material for their purposes. No warranty, expressed or implied, is given.

Standard Oil *(cont.)*

TRANSFORMER OIL SUBSTITUTES FOR ERGON HYVOLT II (#228501)

- Diala-Ax (by Shell)
- Univolt -N61 (by Exxon)
- Texaco 1515 (was Texaco 55)
- Sunstran II

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