

# **INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS**

**ORDER NO:**

**JOB NO:**

**MECHANI MAG (PTY) LTD**

**MODEL:**

**CROSSBELT SUSPENDED ELECTROMAGNET**

# **INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS FOR MECHANICAL ELECTROMAGNETIC SEPARATORS**

MODEL :

INSTALLATION STYLE :

MASS : Kg (Approx)

WATTS :

GEARMOTOR DRIVE : KW

SITE :

MAGNET DC VOLTS :

MAGNET DC AMPS :

MAINS SUPPLY : VAC

## **GENERAL DESCRIPTION:**

Mechani Mag Crossbelt and In – Line Electromagnetic Separators are all custom designed to suit each particular application, and are therefore ideally suited to work with your required parameters,

The magnet designs and choice of materials are updated whenever it is felt that this will improve the quality of performance

The magnet has 8 plummer block bearings for pulleys and these require regular greasing only. Pulleys are crowned for good belt tracking which is ALWAYS achieved initially by steering the belt with the two top idlers, then using the take-up pulley for tension and finer tracking.

Our Crossbelt and In-Line magnets can run at an angle of 45° or more if required.

Pulley hubs should be checked for security within the first ten days of continuous running,

The geared motor is foot mounted and needs very little maintenance apart from occasional oil level checks. If the magnet is suspended “In-Line” with the conveyor then it MUST have sufficient back, front up and down adjustment to basically follow the material trajectory.

If the magnet is suspended across the conveyor “Crossbelt Style” then it MUST have it’s CENTRELINE on the conveyors CENTRELINE and must have sufficient up and down adjustment to achieve the correct operation gap for which it was designed.

The older magnets have an oil level dipstick, and the more recent units have an oil level sight glass. The magnets all have a water drain plug and this should be checked at least every 6 months to ensure that no water accumulates.

The magnet belt has special combined joints / slats which wipe off even large tramp metal.

With proper installation and reasonable care, the magnet will give reliable service over many years and perform the duty for which it was intended, namely to provide ADEQUATE INSURANCE against damage to process equipment, conveyor belting, etc.

# DO'S AND DON'T'S

## THE FOLLOWING **MUST** BE DONE TO ENSURE GOOD OPERATION:

**DO:** Have adequate adjustment for magnet position and angle for parallel gap on Crossbelt installations or good following of trajectory angle at discharge point for In-Line installations.

**DO:** Set the belt tension for equal slag on each side of the magnet. Do initial training of the belt by steering the belt with small adjustments to the bottom idlers, then control tension / training with the take-up adjusting screws.

**DO:** Set the magnet operation gap to a minimum for best results. Check the nameplate stating "Magnet Operating Gap". Note that increasing the gap only 5% can result in 15% performance loss.

**DO:** Grease the pulley bearings regularly (**once a month**) and replace when damaged. Bearings are actually over rated and will give exceptional life with reasonable care.

**DO:** Check the gearbox oil regularly (**once a month**) and top up when necessary with the correct grade of gearbox oil – **Shell Omala 220/320**

**DO:** Order the recommended maintenance spares (belts etc.) to prevent excessive magnet "down time" resulting in possible damage with high costs. The magnet was installed for insurance against damage, so it is essential to keep it in operation.

**DO:** Check the Rectifier / Transformer output voltage to see that it is the same as the nameplate voltage on the magnet. If the magnet appears to be cooler than normal, then suspected diode failure could have occurred on one of the phases resulting in much reduced performance.

**DO:** Keep the magnet casing clean to prevent reduced heat release from the surface, especially on the top of the casing.

**DO:** Maintain the oil level in the circulation tank sight glass so that it is ALWAYS HIGHER THAN THE TOP COIL CIRCULATION PIPE where it enters the circulation tank, this is essential to ensure proper oil circulation. **Check once monthly when magnet is hot as oil rises when it is heated.** Oil level may drop in the first few months of operation as the stainless steel magnet wear plate tends to sag slightly, especially on large magnets. Top up with approved grade transformer oil – **SABS555**.

**THE FOLLOWING MUST NOT BE DONE AS POOR PERFORMANCE AND / OR DAMAGE TO MAGNET COULD RESULT:**

**DON'T:** Tighten the magnet belt excessively as hub / shaft damage could result. Belt joints could also be damaged.

**DON'T:** Use extra heavy belting, order the correct belting from Mechani Mag (Pty) Ltd..

**DON'T:** Change voltage taps without consulting Mechani Mag (Pty) Ltd. As guarantee could be invalidated.

**DON'T:** Hold large metal objects near the magnet, and take care when using tools as injury could result. Take care not to get clothing or hands in the magnet belt.

**DON'T:** Install with conveyor idlers and deck plate directly under magnet. Pulleys can occur under the sides of the magnets without affecting its performance.

**DON'T:** Ever operate the magnet without its belt running continuously as excessive tramp metal build up will stall motor, resulting in a motor burn out. Metal build up causes a loss in separation efficiency as well. An overband magnets belt movement assists cooling; belt can also be “spiked” by metal if it’s not running.

**DON'T:** Use incorrectly rated fuses/circuit breakers for AC and DC.

**DON'T:** Operate magnet without oil in the Rectifier Tank. Fill with transformer oil to cover the Transformer Core / Rectifier. Use normal Transformer Oil – SABS555.

**DON'T:** Operate without a chute plate on a Crossbelt installation as metal could be extracted then pulled under the conveyor belt.

## **GENERAL:**

If the magnet is stored for extended periods of time, particularly outdoors, then drying out may become necessary.

Check occasionally for pulley side movement, hub security, belt damage and gearbox wear (noisy operation).

## **OPERATION:**

It is good practice to always interlock the magnet with the main conveyor. The magnet belt motor should also be interlocked to ensure that it runs before the main conveyor belt.

## **SPARES:**

See recommended spares list for requirements to ensure continuous magnet operation.

### **REFER TO US ANY PROBLEMS YOU MAY ENCOUNTER:**

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## **PROCEDURE SCHEDULE**

### **OFF-LOADING AT SITE:**

- Fix “D” shackles to the four lifting lugs on the magnet.
- Magnet should be lifted at all four points.
- Slings should not be used.
- All obstructions around the magnet should be removed so that no danger is caused whilst lifting.
- The magnet can be stored outside. Two pieces of wood approximately the same length as the magnet box should be positioned below the magnet on set down so that the belt is not crushed below the magnet. The wood is to space the magnet above the ground.
- Controls should be stored under cover until ready for installation.
- Control cabinet should be lifted using the lifting bars provided. This is a very delicate piece of equipment and should be treated as fragile. It should be stored above ground i.e on a pallet if possible.

### **INSTALLATION PROCEDURE:**

- The magnet must be lifted into position using the same hole on all four of the lifting lugs.
- The lifting chains, turnbuckles, eyes, etc. should be proportioned as required and fitted to the centre hole of each lifting lug.
- Two trolleys should be fitted onto each crawl beam and the support tackle fixed to the trolleys as shown on our suggested lay out drawing.
- Height and position adjustment will be finalized during supervision of installation.
- Extended height adjustment should be made by reducing the number of chain links on the four support arms.
- Small height adjustment can be made using the turnbuckles.
- This is an oil cooled magnet and the oil level should be checked against the level gauge, top up if necessary.

## **CONTROL OPERATING PHILOSOPHY:**

### **Control Philosophy is to protect the magnet:**

- Circuit breaker isolator on input to protect the control circuitry and personnel.
- Magnet contactor to ensure safe and reliable switching of magnetic elements.
- Transformer / Rectifier system to convert AC Voltage to the required DC Voltage for the operation of the magnet with fuses incorporated to protect the circuit.

## **MAGNET OPERATING PHILOSOPHY:**

At magnet switch on the following procedure should be followed to protect the magnet and auxiliary equipment.

- **Turn on magnet belt motor.**
  - **Energise magnet coils.**
  - **[OR both on at the exact same time.]**
  - **THEN Switch on main conveyor belt.**
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- **This procedure will ensure that the magnet is switched on before the main conveyor belt so that no tramp iron is missed as the magnet ramps up to maximum operating strength.**