MASTERMAG

A Bunting® Magnetics Company

MASTER MAGNETS
OVERBAND SEPARATOR

Master Magnets range of permanent and electro overband magnets is one of the widest available. They are used for the continual and safe removal of tramp metal from conveyor lines, vibratory feeders and chutes.

In mining, quarrying, recycling and allied industries overbands remove metal contamination from a product stream, upgrading the quality of the final product and protecting processing equipment.

Overband Magnets can be installed in-line or across the feed line and are used where a high level of contamination is expected and a self cleaning device is required.

The principle of operation is relatively simple: The overband magnet is suspended above the feed line. As tramp metal passes under the magnet, it is lifted out of the product feed, and then swept out of the magnetic field to a discharge point by the cleated overband magnets. Depending on the application, permanent or electro magnets can be utilised.

PERMANENT OVERBAND SEPARATORS

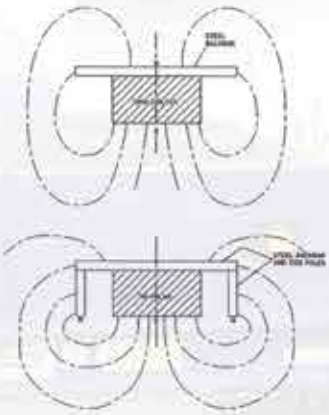
Type K

The Master Mag Type K overband separator is an economic and highly versatile alternative to more expensive electro magnet separators. Master Magnets pioneered the permanent overband separator specifically for the removal of steel rebar from crushed concrete back in the 1980's.

With a permanent magnet block, the separator is considerably lighter and more compact than electro magnets and requires no power source to the magnet, saving on cost and cabling. The permanent magnetic block is non-deteriorating and barring mistreatment, will have an unlimited operating life. It is designed to be virtually maintenance free and is available with either electric or hydraulic drives.

The Type K self cleaning magnet is mainly used in the quarrying and recycling applications where it can be positioned either inline over the head pulley or across a conveyor belt. It is designed to be virtually maintenance free and is available in either electric or hydraulic drive. It is the most popular product in the Master Magnets range for the removal of ferrous contamination.

Master Magnets supply overband magnets to operate over conveyor belts up to 2 meters wide. They can be custom designed to suit the application and additional support structures can also be custom designed and manufactured.



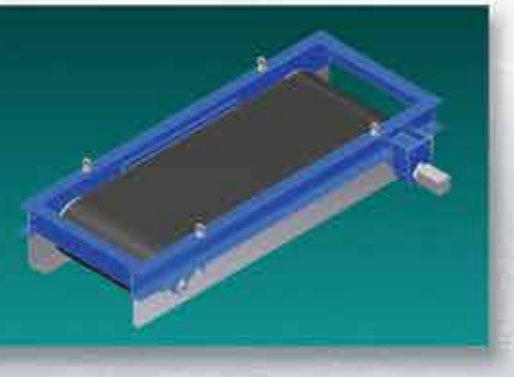
If the operating gap is 300mm or higher, the Type K incorporates a Tri-polar design as standard. The tri-polar design utilizes massive steel side members to effectively give three poles across the bottom face of the magnet, intensifying the field in the centre of the magnet block. Master Magnets also recommend a tri Polar design for operating heights below 300mm, where there is need to separate small ferrous contaminates such as nails and screws.

The Tri Polar Advantages;

- Prevents magnetic leakage
- Produces a cleaner frame
- Achieves a better extraction
- Reduces belt damage

Type R

The Type R Overband Separator is the latest type of overband in the Master Magnets product range, designed using the latest CAD software, knowledge and expertise. It was developed for recycling operations to separate larger pieces of ferrous contamination from oversize material.



The Type R uses a single pole magnet, benefiting from a reduced magnet block size but retains the Master Magnets high quality and separation efficiency.

This development will provide a client with:

- Economical means of separating ferrous from waste materials
- A separator that is lighter in weight
- A more compact separator

ELECTRO OVERBAND SEPARATORS

Electro Overbands

Electro magnetic overbands are normally used at greater operating gaps where the magnetic strength required can not be achieved by permanent magnets. They can also be used at lower gaps where there is a requirement to de-energise the magnet or a specific extraction is called for. Magnet selection takes into account full application parameters, including extractions. This ensures that the most economical design is proposed to meet the required performance.

The magnet can be air or oil cooled, in both cases computer design techniques ensure that the coil remains at its optimum working temperature.

All of our oil cooled magnets benefit from a special coil design that ensures that the cooling medium reaches all areas of the winding which in turn maximises the life and efficiency of the coil.

Specific designs are available to cope with continuous operation in high ambient temperatures. Coils are wound in nomex covered aluminium around high permeability steel cores and are encased in substantial steel fabrications. The casing design takes into account structural and magnetic design factors to ensure the field is concentrated in the working area of the magnet.

The overband framework is of heavy duty construction and uses high quality bearings and conveyor belting to give a long and reliable operating life. Purpose designed suspension mountings make site installation simple and straightforward.

HEAVY DUTY OVERBAND SEPARATORS

SCB

The SCB series has been developed by Master Magnets as an up rated permanent overband separator. The SCB incorporates many features that are similar to the Type K design, such as tri-polar magnetic circuitry.

The design has specifically taken into account ease of belt change. The Magnet block is fixed within the structure of the framework and the pulleys are mounted on the extremities of the frame. Belt removal is achieved by simply removing guards and slackening its tension screws which allows the belt to slide off. Fitting a new belt is a simple reversal of this process: a new endless belt is placed over the framework of the magnet and tightened. This reduces downtime significantly during maintenance.

Where the SCB is required to handle hot or abrasive materials, for additional protection it features an optional armour clad belt. Constructed from individually replaceable stainless steel plates, the armoured covering increases the operational life of the belt and reduces damage to the magnet system base. Drive motor and other component parts have also been up rated and re-designed for an increased service life and reliability.

Availability

Master Magnets hold in stock Overband Separators ready for a next day delivery. Only common sizes and models will be held in stock, so please contact the Master Magnets Sales team to check stock availability. More uncommon sizes and bespoke designs can still be produced on short delivery periods.

Master Magnets is now listing current stock items online. Updated weekly, the site shows items available and ready for despatch – with many more stock items coming on stream throughout 2008. Please check website for latest availability.

Master Magnets have over thirty years experience providing innovative magnetic solutions to industries involved in recycling, demolition and reclamation, mining and quarrying, food processing, ceramics production and powders and minerals processing. The MasterMag range of systems are known for high performance and reliable operations including magnetic separators for metals reclamation, tramp metal protection and high intensity mineral separation.

Please visit our Website at **www.mastermagnets.com** to view the entire range of Master Magnets Equipment where brochure and video downloads are available.

Master Magnets Ltd Incorporating Integrated Recycling Systems Ltd and Metal Detection Ltd.
Burnt Meadow Road, North Moons Moat, Redditch, Worcestershire, B98 9PA England.
Tel: +44 (0) 1527 65858 Fax: +44 (0) 1527 65868
Email: info@mastermagnets.co.uk Web: www.mastermagnets.com

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MAGNETIC CONVEYOR PULLEYS

Master Magnets Permanent and Electro pulleys for continuous extraction at the head of a conveyor for use in Mining and Recycling applications and where tramp metal needs to be continually and safely removed from the product stream.

The Master Magnets permanent and electromagnetic conveyor pulleys are designed for continuous ferrous tramp metal extraction and are positioned at the discharge end of a conveyor to safely remove tramp metal from the product stream.

The Permanent Magnetic Pulley, type PPH, incorporates a magnet system constructed from powerful fully stabilised, non-deteriorating, strontium ferrite magnet blocks, mounted onto a high-permeability steel back bar and fitted with a heavy duty non-magnetic stainless steel crowned cover. The magnet system is a 360 degree design and is mounted on a high tensile steel shaft, which is keywayed to suit a customer's drive requirements.

When applications require the separation of fine iron particles, a high strength Rare Earth Magnetic Pulley can be supplied. Constructed with a Neodymium Iron Boron magnet system, the Mastermag Rare Earth Pulleys can remove much smaller pieces of ferrous contaminants from the material being processed.

The Mastermag Electro Magnetic Pulley, type EPH, is of heavy duty design and has a shaft-mounted magnet unit which revolves with the Pulley, ensuring that the entire face is magnetised whenever the pulley is energised. This magnet unit is a totally enclosed system, with the magnet yoke, cores and poles being of high permeability steel that are keyed and positively located on a high tensile steel shaft. The fully impregnated magnetising coils are wound in high-conductivity enamelled copper wire and are designed for continuous duty.

The Electro Magnetic Pulley is supplied with a transformer rectifier, which can be fitted with variable flux control, allowing the strength of the magnetic field to be adjusted according to the application.

OPERATION

The magnetic pulley is used at the end of a conveyor system and operates by retaining the magnetic content of the conveyor burden for discharge behind the pulley as the belt leaves the pulley face, whilst non-magnetics are discharged in the normal trajectory. Typical applicational positions are shown in the diagrams.

Fig 1

Conventional method, fitted as head pulley of standard conveyor.

Fig 2

Installed in slow moving conveyor system with pulley separator speed greater than main conveyor.

Fig 3

Pulley separator mounted above inclined conveyor.

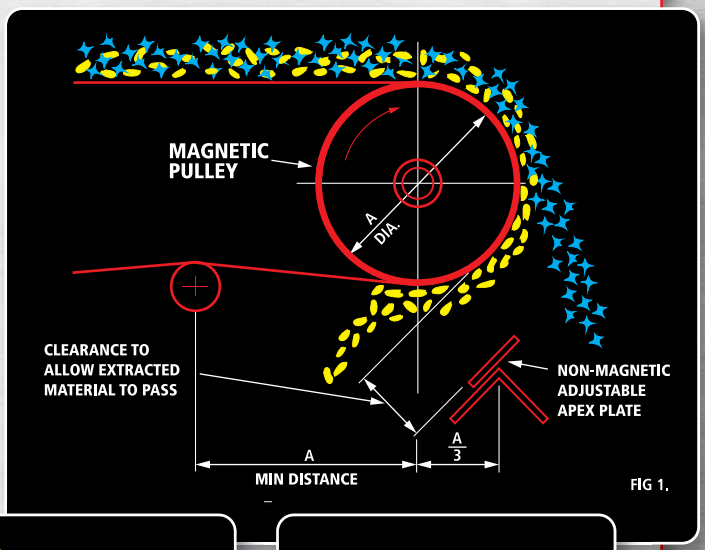

FIG 1.

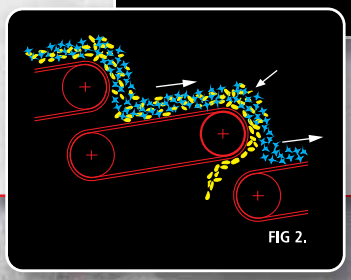
FIG 2.

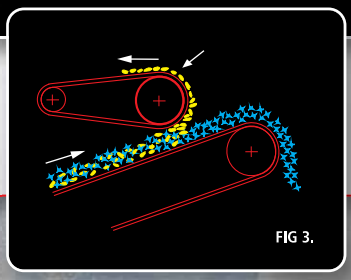
FIG 3.

CONVEYOR PULLEY TYPE SEPARATORS

The Mastermag conveyor pulley type separator is a self-contained unit which can be supplied either open or enclosed and is normally used where there is no existing conveyor or space restrictions preclude the use of a pulley in the normal terminal head position. It is a complete unit, utilising space to the full.

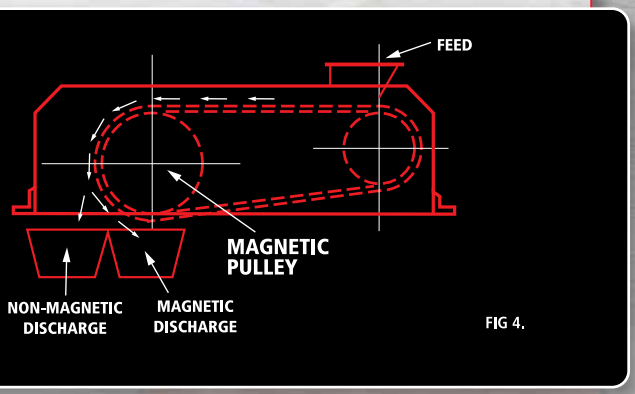

FIG 4.

Master Magnets have over thirty years experience providing innovative magnetic solutions to industries involved in recycling, demolition and reclamation, mining and quarrying, food processing, ceramics production and powders and minerals processing. The MasterMag range of systems are known for their high performance and reliable operations.

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Metal Detection

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Burnt Meadow Road, North Moons Moat, Redditch, Worcestershire, B98 9PA England.
Tel: +44 (0) 1527 65858/65432 Fax: +44 (0) 1527 65868
Email: info@mastermagnets.co.uk Web: www.mastermagnets.com www.metaldetection.co.uk

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EDDY CURRENT SEPARATOR

www.mastermagnets.com

BUNTING Magnetics Co.

OPERATING PRINCIPLES

Eddy Current Separators (ECS) are designed to separate non-ferrous conducting metals such as aluminium, copper and magnesium from a given product stream.

The Eddy Current system consists of a short belt conveyor with its drive located at the return end. The ECS rotor, which is fitted at the discharge end of the conveyor is constructed using a high-intensity rare earth (neodymium iron-boron) magnet system and sits inside a non-metallic rotor cover. The rotor, when spinning at high speeds, induces an electric current into conducting metals. This induced electric current produces a magnetic field, which opposes that of the rotor, repelling non-ferrous metals over a splitter plate. The remaining materials free-fall over the rotor, separating them from the repelled materials.

APPLICATIONS

Eddy Current Separators are increasingly used wherever separation of non-ferrous metals from a product stream can give a more valuable end product. Whether the end use is in recycling, waste reduction, raw material production or any other process where separation would prove beneficial. Typical examples of applications are:

- Separation of non-ferrous metals in auto shredder residue.
- Separation of non-ferrous metals from solid waste incinerator ash.
- Sorting of aluminium beverage cans from dry recyclables.
- Removal of non-ferrous metals from shredded wood.
- Removal of contamination from crushed glass cullet.
- Separation of non-ferrous dross from foundry sand.
- Non-ferrous metal removal in WEEE recycling plants.
- Removal of aluminium components in UPVC window recycling.
- Separation of non-ferrous metals from domestic, industrial and skip waste in Material Recycling Facilities.

COMMON DESIGN FEATURES

All of the Master Magnets ECS units are built to combine the highest separating ability with a long and trouble-free operating life.

The Master Magnets ECS units are all manufactured using a concentric rotor design to allow for maximum separation over the entire outer drum face. This ensures that particles, which may be released through material free fall can also be separated.

The rotors used on the Master Magnets range of ECS units are all dynamically balanced at 3600 RPM to ensure a trouble free operating life, even at the highest operating speeds.

Abrasion resistant PVC belts are used on the ECS units and to further improve the separation capabilities of the Eddy Current, they are specially designed to be very thin, minimising the gap between the product and the rotor. The epoxy resin cover, which protects the rotors magnet system, is also designed to be as thin as possible whilst still giving the required strength. The cover has a blue outer layer and a clear under layer which acts as a wear indicator.

To increase the performance of our ECS units and enable optimum separation, Master Magnets offer optional vibratory feeders for spreading the material evenly across the ECS belt conveyor, producing a 'mono-layer'.

EDDY CURRENT SEPARATOR

HIGH INTENSITY ECS UNITS

The High Intensity ECS units are specifically designed for the separation of small and difficult particles, which require high repulsive forces. High Intensity Units can be manufactured to operate on belt widths up to 1500mm, enabling them to handle very large throughputs. The technical features that are specific to the High Intensity ECS design are as follows:

- **300mm diameter rotor** - The Master Magnets standard ECS units are manufactured with a 300mm diameter rotor constructed using the highest grade of neodymium iron-boron magnets. This provides a very high strength magnetic field for optimum repulsion.
- **High Strength rotor** - To allow for the separation of fine non-ferrous particles, The High Intensity Eddy Current Separators are fitted with 24 pole rotors.
- **Variable rotor and belt speeds** - The High Intensity ECS has variable rotor and belt speed features to allow customers to tailor their units in order to achieve specific separation requirements.
- **Belt change jacks** - Belt changes can be a time consuming and physically difficult task to carry out. In order to make belt changes much easier, High Intensity ECS units can be fitted with a hydraulic jacking system. To further assist clients during belt changes, the High Intensity ECS units have also been designed with hinged frames.

ECS 'R' TYPE

Many ECS applications involve high throughput rates that can only be handled by the large High intensity units due to their belt widths. If however, applications do not require the separation capabilities of the larger and higher specification units, then purchasing a machine of this type for its belt width alone, would not be cost effective.

To eliminate this problem, Master Magnets designed the ECS 'R' Type. The new 'R' Type fits into the Master Magnets ECS range between the Can Sorter and the High Intensity ECS units, incorporating features of both machines. Specific features of the 'R' Type ECS include:

- **High Throughput Capabilities** - The 'R' Type has a rotor diameter of 190mm and can be manufactured to fit belt widths of up to 1250mm.
- **Variable Rotor Control** - The 'R' Type ECS has variable rotor controls to allow customers to set the rotor at the correct speed for meeting their specific separation requirements.
- **12 pole Rotor** - A 12 pole rotor is used on the ECS 'R' Type. The 12 pole rotor is capable of achieving a better separation than the 6 pole rotor used on the Can Sorter.

THE CAN SORTER

The Can Sorter is specifically designed for the separation of non-ferrous beverage cans from dry recyclable applications. The Can Sorter ECS is a low-cost alternative to larger Eddy Current units when applications do not require higher specification machines. Technical features that are specific to the Can Sorter units are as follows:

- **Simplistic and Cost Effective Design** - The Can Sorter has a 122mm diameter, 6-pole rotor and is available with an effective width of up to 600mm. The Can Sorter is designed to be a more compact and simplistic unit than the larger machines in the range, whilst still providing efficient separation of aluminium cans.
- **Pre-set Belt and Rotor Speeds** - The belt and rotor speeds, which are usually variable on standard ECS units, are pre-set on the Can Sorter models to give optimum can separation.

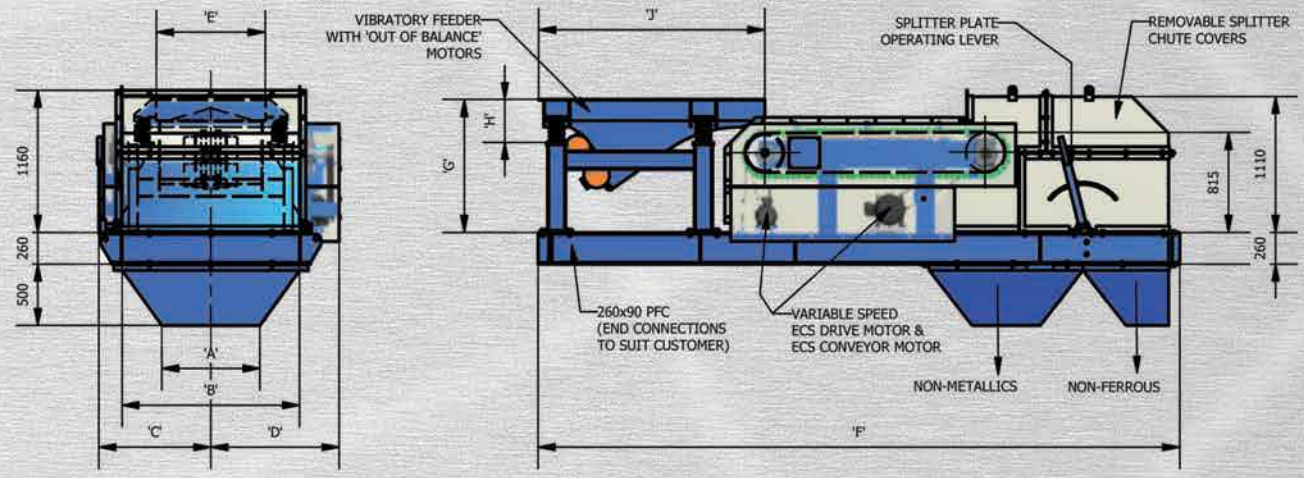
OPTIONAL EXTRAS

Ferrous materials can sometimes get caught between the rotor and the belt, causing substantial damage to the rotor cover. The key to avoiding this type of damage is to remove the ferrous materials present in the product stream. Master Magnets often advice that this is done by installing a rare earth drum magnet.

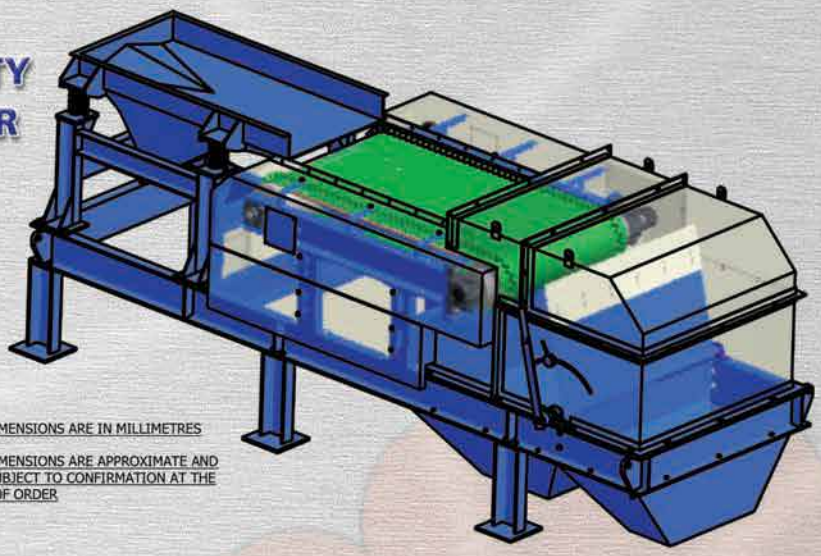
Master Magnets can supply complete 'turn key' plants to meet specific customer requirements. The plants can include in-feed conveyors, diverter chutes and additional magnetic separation equipment such as Overband Separators.

Master Magnets are able to provide supports to ground level should they be required. Custom designed walkways can also be provided around the ECS unit to allow for greater access to the machine and its components.

Rotary or static cleaning brushes can be installed to remove product, which may get stuck to the Eddy Current Separators' belt. Master Magnets would advise customers to have this option if their product is particularly wet.



OUTLINE OF HIGH INTENSITY EDDY CURRENT SEPARATOR WITH FEEDER



SEPARATOR REF.					
	ECS 50	ECS 75	ECS 100	ECS 125	ECS 150
DIM 'A'	300	550	800	1050	1300
DIM 'B'	950	1200	1450	1700	1950
DIM 'C'	665	790	915	1040	1165
DIM 'D'	800	925	1050	1175	1300
DIM 'E'	400	650	900	1150	1400
DIM 'F'	4560	4670	5240	5570	5900
DIM 'G'	1020	1045	1345	1345	1345
DIM 'H'	315	447	450	470	690
DIM 'J'	1000	1250	1500	2000	2500
ROTOR DRIVE	5.5kW	5.5kW	7.5kW	7.5kW	11.0kW

ALL DIMENSIONS ARE IN MILLIMETRES

ALL DIMENSIONS ARE APPROXIMATE AND ARE SUBJECT TO CONFIRMATION AT THE TIME OF ORDER

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Email: info@mastermagnets.co.uk Web: www.mastermagnets.com www.metaldetection.co.uk

Metal Detection

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