

Magnetic Filtration

Sub-micron filtration for industrial fluids in precision applications



Driving competitive edge into precision processes

Reduce downtime, costs and protect the environment

Magnetic filtration operating principle

Magnetic filtration is the most effective means of removing problem ferrous particles from industrial fluids such as coolants, lubricants and wash solutions.

All the benefits of Magnetic filters are based on their ability to remove almost 100% of ferrous particles including sub-micron particles from the process. Traditional filtration systems typically leave particles smaller than 5-10 microns circulating in fluid causing damage to process equipment and finished products.

Magnetic filtration systems are ideal for either new build projects or they can be fitted to enhance existing filtration systems.

Ideal for high precision manufacturing

Magnetic filtration enables a cleaner cut or grind, improves surface finish and reduces reject rates.

Significantly lower operating costs

Longer lasting fluids

Magnetic filters remove particles smaller than one micron in size. Traditional barrier filters typically leave particles smaller than 5-10 microns circulating in the fluid. These particles significantly affect the performance of fluids and also act as a focus for bacterial build up.

NO consumables

Unlike other types of filtration, once magnetic filtration is installed there is nothing else you need to buy to ensure effective filtration over the filter's lifetime, which can be typically greater than 20 years.

Minimal fluid loss

Contamination is removed from the filter as a semi-dry 'cake'. Fluid loss is considerably less than that of traditional filter media.

NO disposal costs

The cake itself can be recycled, eliminating expensive specialist disposal costs.

Minimal running costs

Manually cleaned magnetic filters require no additional power. Magnetic self-cleaning filters only require a small amount of power for the cleaning process.

24/7 operation

Fully automated magnetic filtration systems are ideal for continuous manufacturing lines.

Rapid return on investment

Magnetic filtration is perfect for cost reduction and continuous improvement programmes providing a rapid return on investment through:

Increased productivity

Maintain flow rates

High flow rates can be maintained without affecting filtration efficiency. Fluid does not flow through filter media, so flow is uninterrupted. Flow rates are determined by your process requirements, not by your filter.

NO back pressure

Even when the filter is 'full' there is no blinding or risk of burst filters, reducing downtime.

Reduced wear / precision finish

Particles that pass through traditional filters act as an abrasive, wearing parts, machinery and product. Magnetic filters remove these damaging particles.

Fine filtration

Conventional filtration media, at 5 microns and below, can strip oils of anti-foaming, anti-bacteria and other additives. Magnetic filtration enables sub-micron filtration without affecting the oil's properties, and can actually aid the effective control of bacteria.



A close-up photograph of green grass blades, slightly out of focus, creating a soft, natural background. The blades are vibrant green and have a textured, ribbed appearance. The lighting is bright, suggesting a sunny day, and the overall tone is fresh and organic.

Reduced environmental impact

A major consideration for any business is its responsibility to the environment. Magnetic filtration is a positive contribution to companies' environmental policies and ISO14001 accreditation.

Reduced waste

Magnetic filtration requires no consumable or disposable products. It extracts almost 100% of ferrous contamination, drastically reducing the use of disposable filter media. Less fluid is used as its effectiveness is maintained for longer.

Recycled waste

Ferrous particles are separated from fluid and filtration media so can be recycled rather than disposed of.

Magnetic filtration

Driving competitive edge in demanding applications

Automotive



Magnetic filtration is widely used in the automotive industry within OEMs and tier 1 and 2 suppliers for the manufacture of powertrain and engine components.

ADVANTAGES

- High precision finish
- Reduced downtime
- 100% effective with cast iron particles
- Ideal for 24/7 operation
- Flow rates up to 5000 litres: multi-use to increase flow capacity.
- Can be retrofitted on existing systems
- Rapid return on investment
- Reduced waste – ISO14001

TYPICAL APPLICATIONS

- Ring & pinion gear lapping
- Turbocharger balancing machines
- Crank shaft gun drilling
- Valve face grinding
- Cam shaft grinding
- Cylinder liner honing
- Engine liner grinding
- Gear cutting and finishing
- Valve seal ring lapping
- Wash systems
- Fuel injector drilling and grinding
- Brake pad grinding
- Cast iron piston bushing milling

Case study

Company

Bombardier (Austria)

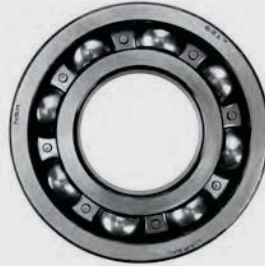
Application

Cast iron piston bushings

Process

Milling and gun drilling
Filtramag removed sub-micron particles reducing abrasive wear on tools and parts. Tool changes and product reject rates were reduced to virtually zero.

Bearings



Magnetic filtration is used by some of the world's largest bearing manufacturers to ensure sub-micron accuracy in the production of bearing components.

ADVANTAGES

- High precision product finish, concentricity and consistency
- Reduced downtime
- Sub-micron filtration
- Ideal for high volume processes
- Can be retrofitted to existing lines
- Rapid return on investment
- Reduced waste – ISO14001

TYPICAL APPLICATIONS

- Hub honing
- Ball grinding
- Super-finish/polishing
- Ring grinding
- Raceway grinding
- Wash systems

Case study

Company

Tsubaki-Hoover (Poland)

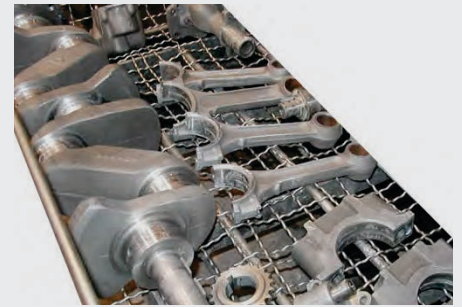
Application

Steel ball and rollers

Process

Super-finishing
Micromag improved on 20 micron paper filters by extracting sub-micron ferrous particles. Surface finish was improved and reject rates fell dramatically.

Wash systems



It is vital that wash solutions are kept free from ferrous particles. Many wash systems have benefitted from installation of magnetic filtration which ensures the finished product is clean and complies with quality inspection.

ADVANTAGES

- Flow rates up to 5000 litres per minute
- Filters do not degrade in wash solutions
- Removes ferrous deposits from finished product
- Reduces reject rates

TYPICAL APPLICATIONS

- Rotary wash systems
- Transfer wash stations
- Degreasing equipment
- Multi-stage washers
- Spray wash stations

Case Study

Company

Permoid (UK)

Application

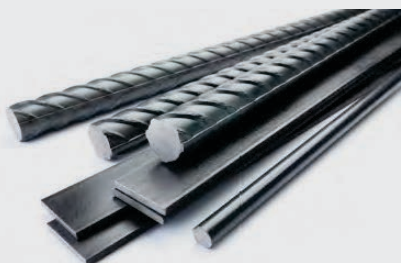
Automotive fuel tanks

Process

Flushing rig
Reduced product reject rates to zero, reduced disposal and purchase of barrier filters by 95%.



Steel processing



Magnetic filtration can improve efficiency in most steel processing operations such as steel production, both hot and cold.

ADVANTAGES

- Automated cleaning ideal for heavy contamination
- Improved surface finish
- Reduced downtime
- Suitable for arduous environments
- 24/7 operation

TYPICAL APPLICATIONS

- Steel rolling mills
- Sawing machines
- Steel pipe cutting
- Tube threading equipment
- Steel quenching tanks
- Surface treatment processes
- Spray bars
- Roller lubrication
- Final wash process
- Deep hole drilling

Case Study

Company
Steelscape (USA)

Application
Steel rolling and pickling

Process
Surface spray system
Heavy contamination blocked barrier filters within hours. Automag extracts 12000 Kg contamination / month – reject rates have fallen to zero.

Machine tool OEMs



Magnetic filtration enhances performance on a variety of machine tools. It offers a competitive edge to machine tool manufacturers particularly when servicing high precision applications.

ADVANTAGES

- Can be retrofitted to enhance existing filtration systems
- Reduces machine maintenance/downtime
- Ideal for 24/7 operation
- Flow rates 70 to 5000 litres per minute
- 100% effective with low magnetic materials e.g. cast iron and tungsten carbide
- Increases the equipment, value provides a solution for the customer.

TYPICAL APPLICATIONS

- VMC, HMC, and CNC machines.
- Multi-axis vertical turning centres
- Grinding
- Honing
- Lapping
- Deep hole/gun drilling
- EDM machines
- Laser cutters

Case study

Company
Schautd Mikrosa (Germany)

Application
CNC Manufacture

Process
Camshaft Grinding

Reduced downtime by 50% and increased the life of grinding wheels by 30%.

Tool cutting



High intensity magnetic filtration is the only option available to guarantee a high precision finish on tool cutting operations. It is widely used in the manufacture and refurbishment of high speed steel and tungsten carbide cutting tools. High intensity magnets ensure outstanding performance even with particles which have only 20% magnetic permeability.

ADVANTAGES

- Enables tolerances of < 1 micron
- Enables manufacture of “mirror” finish tools
- Can increase the value of tools by 300%
- 100% effective with low magnetic materials e.g. tungsten carbide materials
- Reduces wear on grinding wheels
- Ensures clear grinding contact
- Ideal for 24/7 or unmanned operations
- Significantly extends fluid life

TYPICAL APPLICATIONS

- Multi axes CNC machines
- Tungsten carbide drills and endmills
- Radius grinding
- Wood working tool superfinish
- “Mirror” finish plastic cutters

Case study

Company
Pro-Cut Tooling (UK)

Application
Carbide cutting tools manufacture/repair

Process
Super-finish/grinding
Enabled manufacture of “mirror” finish cutting tools, reduced machine cleaning downtime by 75% and extended fluid life by 250%.

Give your business the edge...

A few of our many satisfied customers...



Borg Warner Turbocharger Balancing Machines

Product: Micromag / Filtramag

Maintenance Engineer "Before fitting Micromag we were changing filters every few days. We invested about £1200 in 4 MM5s we estimate this saves us around £28,000 annually in cartridge filter costs, not to mention the resultant downtime. Following the success we have now fitted Filtramags to our grinding machines which have cut our product reject rates to virtually zero."



Milacron Machines Sub-Contract Machining

Product: Double AM12 Skid

Facilities Manager "The Double AM12 Skid has increased our efficiency. We work 24 hours a day and our 18" heads cut some big pieces of steel. Magnetic filtration has dramatically cleaned up our fluids and improved the surface finish we can offer. It extracts around 50Kg per day of ferrous waste and easily handles the flow and contamination generated by the multi-machine cell."



Collison Goll Steel Stock Deep Hole Drilling

Product: Micromag

Plant Manager "Micromag has paid back in just a few weeks, previously we could only take out particles of 50 micron or over, which caused the fluid channels to get plugged and drills to crash. Now I have fitted Micromag, my purchase of drill bodies has fallen by 100%. I am planning to fit Micromag to all my machines."



Leitz Group Grinding & Polishing of Cutting Tools

Product: Filtramag

Chief Maintenance Engineer "Filtramag has increased our fluid life by 20%, reduced our downtime and our product reject rates have fallen dramatically. Filtramag extracts approximately 12Kg of ferrous particles every week and has dramatically cut our costs in replacement paper filters and damaged pumps."



Scania Grinding and Honing Automotive Gears

Product: Filtramag

Engineering Manager "Magnetic filtration has been a great positive for our production. With the sub-micron filtration Filtramag offers, we have minimised our product reject rates and tool changes. In addition I estimate our oil lifespan has increased by about 30%."



Cascade Heat Treatment of Fork Lift Parts

Product: Automag AM12

Plant Engineer "We had a real problem with downtime as our quenching tank regularly filled up with ferrous contamination – we had to halt production and clean out the tank. Automag has been a smart investment. The automated cleaning frees up my maintenance team and we will get rapid payback through reduced process downtime."



NSK Super-finishing of Bearing Hubs

Product: Micromag

Operations Manager "When we used only barrier filtration we had a constant problem with 'blinding' of the honing stone due to a build-up of ferrous particles. Fitting Micromag has been a real positive step, we can now guarantee a uniform high quality finish and our reject rates are minimal."



Honda Engine Valve Machining (UK)

Product: Micromag

Engineering Manager "Micromag's outstanding filtration capability and short investment payback period exactly matched our needs. Since incorporating Micromag into our process our machine downtime has fallen dramatically compared to our previous filtration system and our filtration effectiveness is much better as we can extract the smallest particles."

Micromag

Compact magnetic filter for standard machine filtration, smaller wash stations.

- Patented design
- High collection capacity relative to size
- Non block design
- Minimal pressure drop
- Easy clean
- 3 sizes, versions available

Unmatched capacity

Micromag is compact in size but has massive holding capacity. Units hold 1kg, 2kg and 4kg of contamination respectively, resulting in less downtime and increased productivity.



MM
12 bar version



MM/HP/50
50 bar version



MM/HP
80 bar version



How Micromag works

Contaminated fluid enters the inlet port where flow is equally split via tapered radial flow channels which slows the flow velocity ready for the fluid to be filtered.

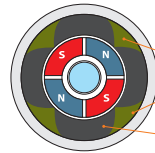
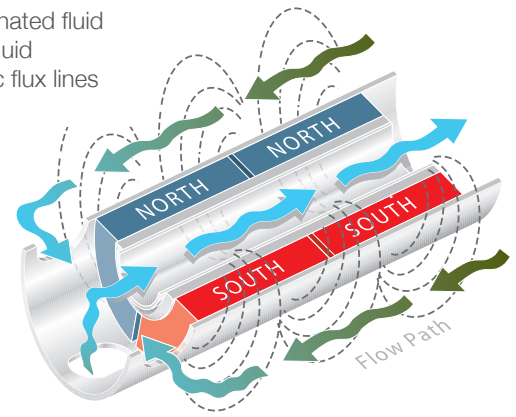
It then passes up the outside of the centrally mounted 'rare earth' magnetic core where contamination particles are attracted and retained.

The magnetic flux circuit geometry ensures a controlled build up of contamination so the filter can never block.

Filtered fluid then flows through slots at the top of the core then down and through the centre of the core, exiting through the outlet port.

Key

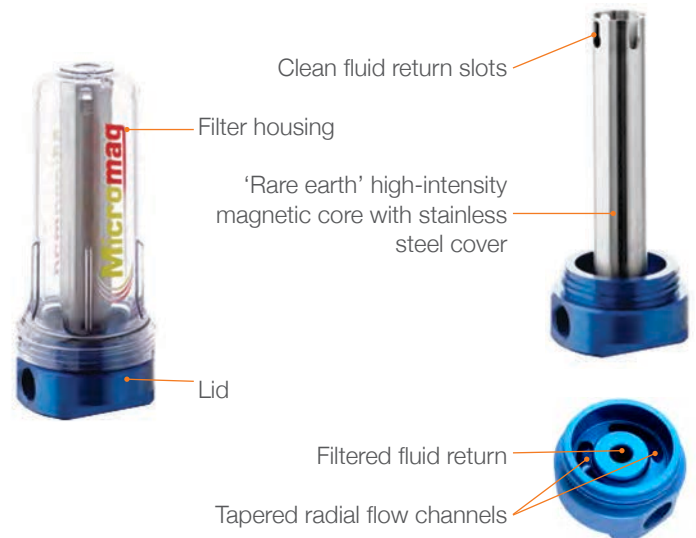
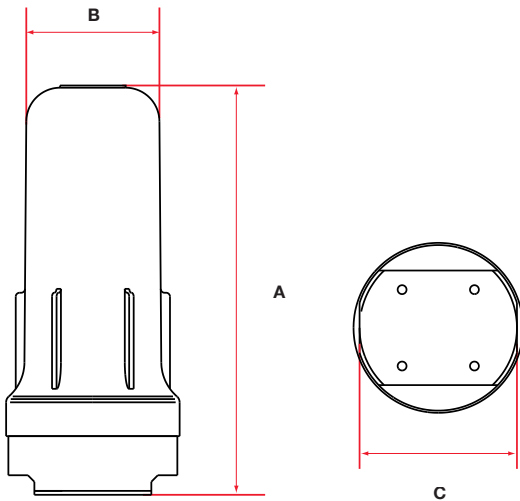
- Contaminated fluid
- Filtered fluid
- Magnetic flux lines



Fluid continues to flow when filter is fully loaded with contamination

Contamination

Technical Data



Product number	Flow rate ltrs./min.	Contamination capacity kgs	Max. operating pressure bar	Connection " BSP	Temperature range °C	Construction	Dimensions mm		
							A	B	C
MM5	70	1	12	1	5 – 50	SAN housing, aluminium lid	190	105	95
MM10	100	2	12	1	5 – 50		315	125	100
MM20	150	4	12	1½	5 – 50		605	135	100
MM5/HP/50	70	1	50	1	5 – 140	Aluminium housing and lid	247	138	116
MM10/HP/50	100	2	50	1	5 – 140		365	138	116
MM20/HP/50	150	4	50	1½	5 – 140		625	138	116
MM5/HP	70	1	80	1	5 – 70	Full stainless steel construction	215	137	100
MM10/HP	100	2	80	1	5 – 70		345	137	100
MM20/HP	150	4	80	1½	5 – 70		610	137	100

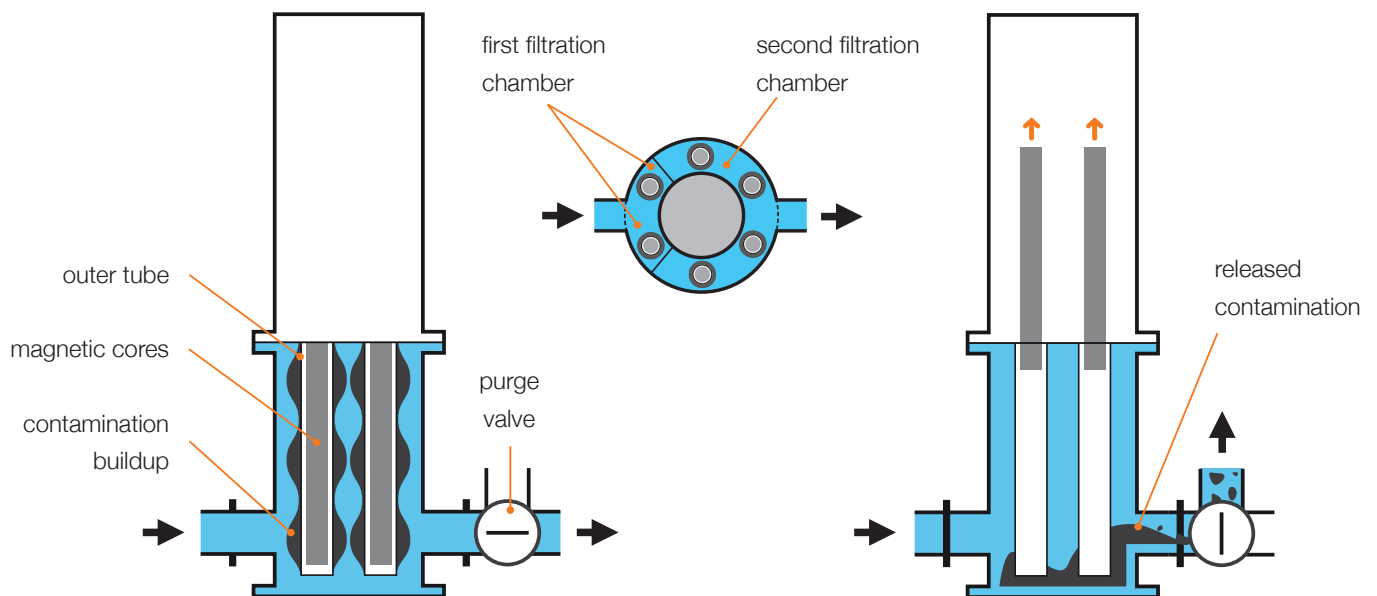
Automag 24/7 Operation

Fully automated for non-stop 24/7 operation. High flow and high contamination capacity. Automag is ideal for harsh chemical environments.

- Patented design
- No user intervention required
- PLC compatible
- No consumables used
- No block design
- Very low operational costs
- 3 sizes available
- Ultra fast cleaning



How Automag works



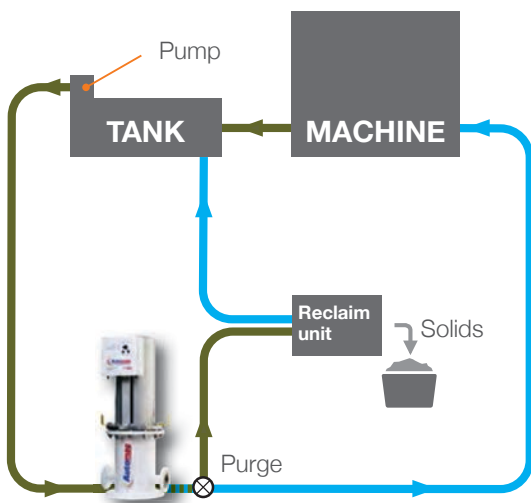
Contamination is attracted to the tube of the cores. Cleaned fluid is re-circulated.

Compressed air lifts the cores from the tubes and the purge valve is opened. Contamination is released and washed away for collection.

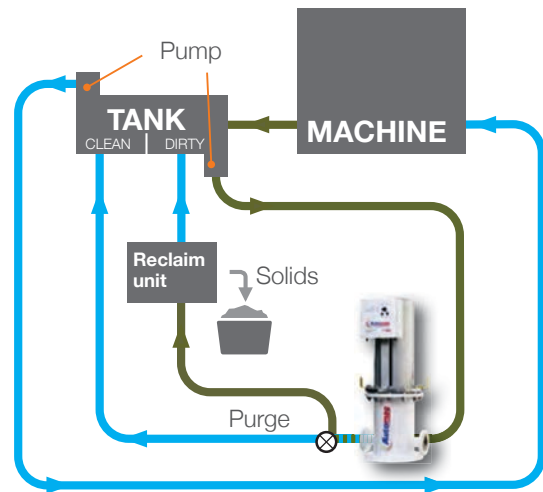


Automag can be installed inline/in process or offline/off process

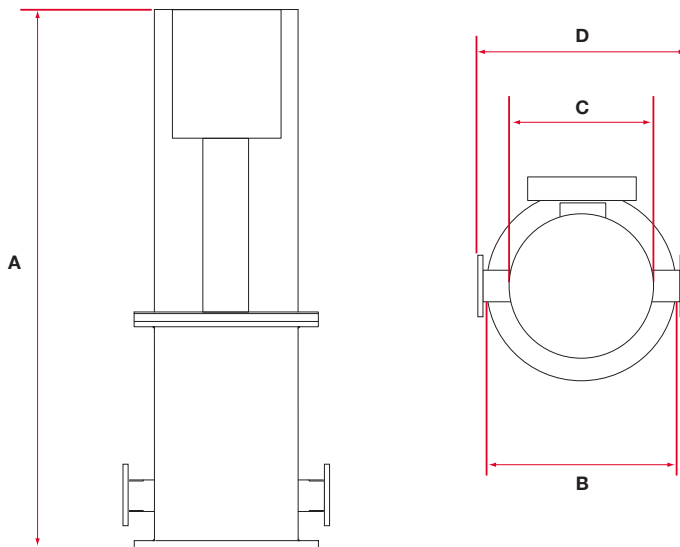
Inline operation



Offline operation



Technical Data



Product number	Max. flow rate litres/min	Contamination capacity kgs	Max. operating pressure bar	Connection	Dimensions mm			
					A	B	C	D
AMC	200	2.5	10	1½" PN16 flange	740	290	200	300
AM6	450	7	10	2" PN16 flange	1065	395	275	450
AM12	900	14	10	3" PN16 flange	1145	565	405	620

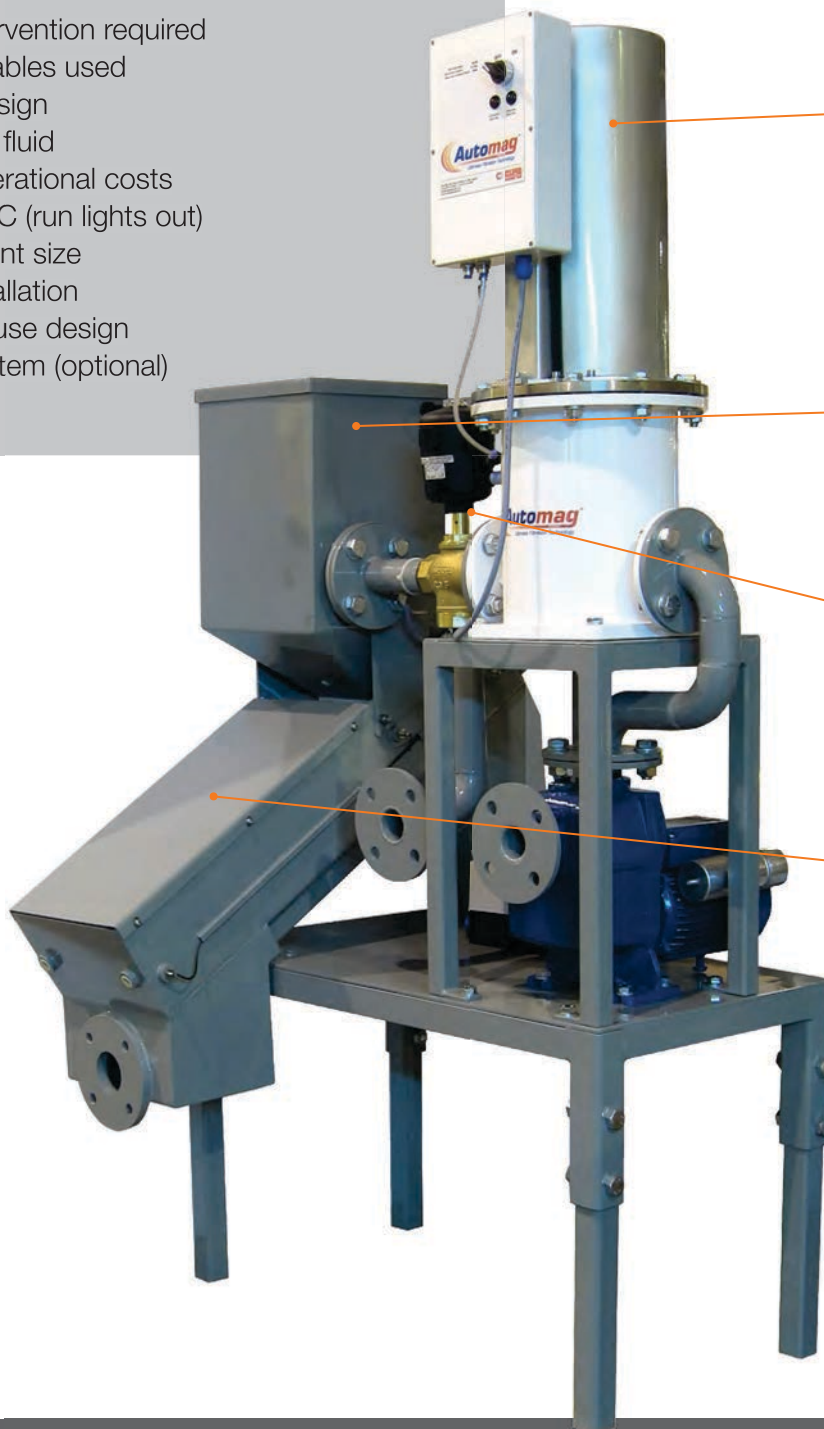
Automag Compact Skid

24/7 Operation

A cost effective solution for small/medium sized applications where fluids are fed from a dedicated self-contained tank.

Self contained filtration and fluid recovery system for higher flow, higher contamination applications. 24/7 automated operation.

- No user intervention required
- No consumables used
- No block design
- Recovers all fluid
- Very low operational costs
- Onboard PLC (run lights out)
- Small footprint size
- Minimal installation
- Plug in and use design
- Full tank system (optional)



Automag magnetic filter

2-stage filter removes contamination down to sub-micron size. Automated cleaning process

Purge tank

Holds purged fluid and contamination before it is fed to the reclaim system

Purge valve

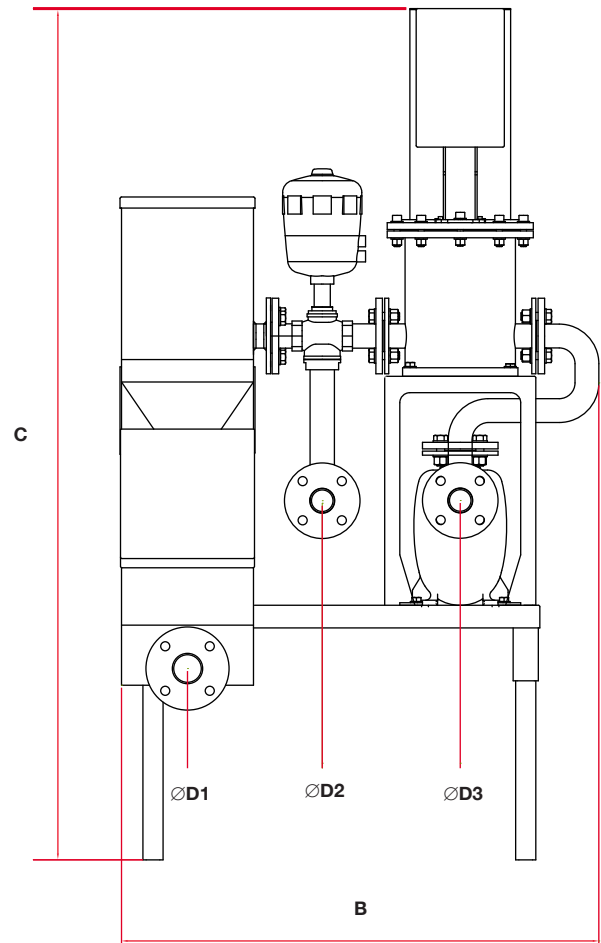
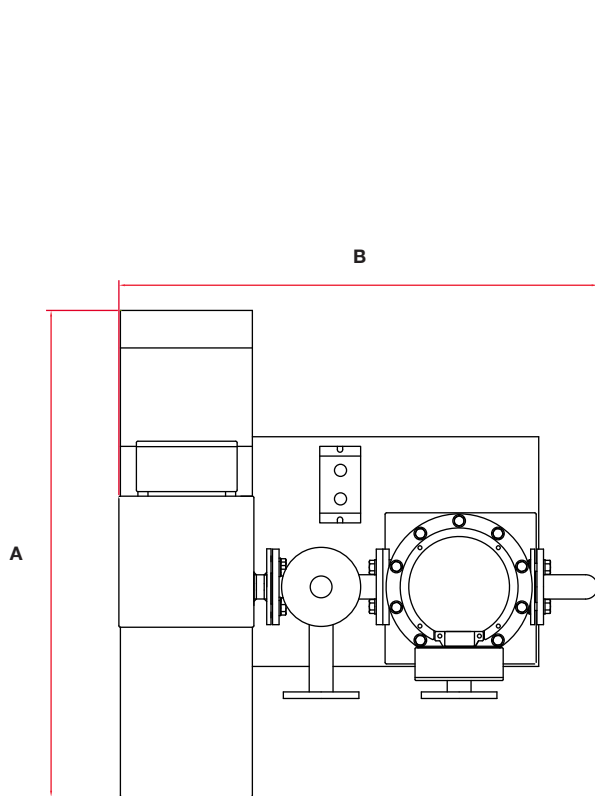
Automatically switched during the 'purge' process to send purged fluid and contamination to the purge tank

Magnetic reclaim

Separates contamination from the 'purge fluid', feeds clean fluid back into the system. Contamination is removed as semi-dry cake which can then be recycled



Technical Data



Product number	Number of cores	Maximum flow rate		Contamination capacity	Max. operating pressure	Dimensions						
		Litres/min.	m ³ /hour			mm	D1	D2	D3	Flanges		
AMCS1	8	200	12	2.5	10	A	B	C	D1	D2	D3	Flanges
						970	950	1350/1700	50 (2")	38 (1½")	38 (1½")	PN16

PATENTED

Automag Skid 24/7 Operation



Self-contained, free-standing magnetic filtration system providing uninterrupted 24/7 magnetic filtration. Can be used in-line or, with the optional integral pump, off-line.

An Automag magnetic filter removes magnetic and para-magnetic contamination and holds it until it is released during the automated 'purge' process. Then, the filter's output is briefly diverted so that fluid

carries the contamination to the purge tank. The purge tank then feeds the contaminated fluid to the magnetic reclaim which removes the contamination, putting clean fluid back into circulation. The contamination is extracted in a form ready for disposal or recycling.

Units can be supplied with a single filter or double filters for duplex operation.



Automag magnetic filter

2-stage filter removes contamination down to sub-micron size. Automated cleaning process

Purge tank

Holds purged fluid and contamination before it is fed to the magnetic reclaim system

Magnetic reclaim

Separates contamination from the 'purge fluid', feeds clean fluid back into the system. Contamination is removed as semi-dry cake which can then be recycled

Height adjustable legs

Purge valve

Automatically switched during the 'purge' process to send purged fluid and contamination to the purge tank



Options

AM6 Skid		Skid	PLC	Purge Valves	Reclaim Recovery
AM6S1	Single AM6 Skid	✓		✓	✓
AM6S1/P	Single AM6 Skid inc. pump	✓	✓	✓	✓
AM6S2	Double AM6 Skid	✓		✓	✓
AM6S2/P	Double AM6 Skid inc. pump	✓	✓	✓	✓

AM12 Skid		Skid	PLC	Purge Valves	Reclaim Recovery
AM12S1	Single AM12 Skid	✓		✓	✓
AM12S1/P	Single AM12 Skid inc. pump	✓	✓	✓	✓
AM12S2	Double AM12 Skid	✓		✓	✓
AM12S2/P	Double AM12 inc. pump	✓	✓	✓	✓



Double Automag Skid units are available for large flow rate/heavy contamination applications

Technical Data

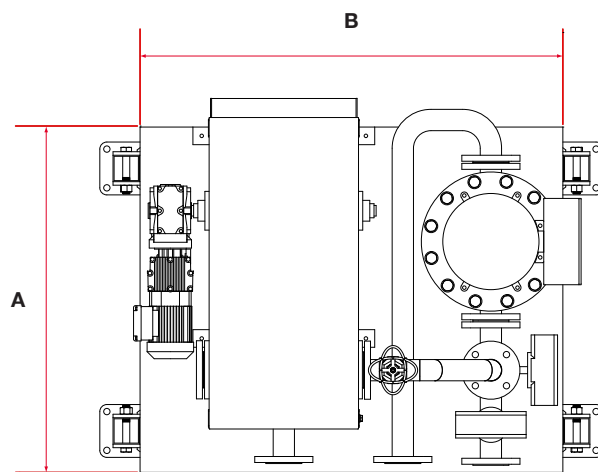
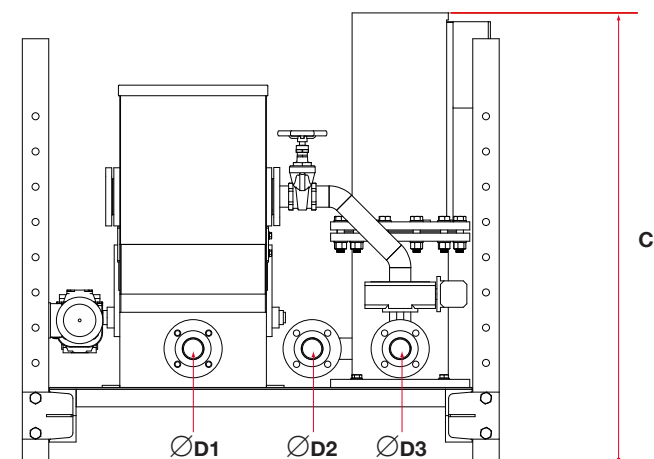


Diagram shows inline unit without integral pump

Model	Number of cores	Maximum flow rate		Contamination capacity	Max. operating pressure	Dimensions						
		Litres/min.	m ³ /hour			kgs	bar	mm				
						A	B	C	D1	D2	D3	Flanges
AM6 Skid Single	6	450	27	7	10	1000	1250	1300	75 (3")	50 (2")	50 (2")	PN16
AM6 Skid Double	12	900	54	14	10	1134	1855	1300	75 (3")	50 (2")	50 (2")	PN16
AM12 Skid Single	12	900	54	14	10	1200	1400	1400	75 (3")	75 (3")	75 (3")	PN16
AM12 Skid Double	24	1800	108	28	10	1486	2225	1644	75 (3")	75 (3")	75 (3")	PN16

Outperforms other filters

Magnetic filtration can be used as a replacement for, or in conjunction with, other forms of filtration to optimise filtration efficiency. There are many types of filtration media, Eclipse magnetic systems are the most efficient.

The table below shows how magnetic filtration compares to other forms of filtration in key performance criteria.

	Filter Type							
	Automated clean magnet	Manual clean magnet	Magnetic rollers	Hydrocyclone/centrifugal	Barrier (cartridges, paper)	Candle, powder	Settlement tanks	Vacuum
Costs								
Capital investment	medium	low	medium	very high	low	very high	high	high
Running costs	zero	zero	low	low	high	high	low	low
Return on investment (years)	< 1	< 1/2	2-5	5	never	10	5	10
Performance								
Filtration capability (micron)	< 1	< 1	> 20	> 10	> 20	> 10	> 100	>20
Process accuracy	very high	very high	low	medium	medium	high	low	medium
Flow rates (ltrs/min.)	very high	very high	medium	low/medium	low	low	medium	medium

Note. This is general information for guidance purposes only. Please consult Eclipse Magnetics for application specific information.



Application data selector



Percentage reduction required from stated maximum flow rate to obtain good filtration results

Part No	Flow rates (ltrs/min.)	Fluid Type				Material Type						Material Loading			
		Coolant	Thin oil	Medium oil	Thick oil	Mild steel	Hard steel	Cast iron	Stainless steel	High speed steel	Tungsten carbide	Heavy	Medium	Light	Wear
Micromag															
MM5	70	0	20	n/a	n/a	0	n/a	20	n/a	n/a	n/a	n/a	n/a	n/a	✓
MM10	100	0	20	n/a	n/a	0	30	20	n/a	n/a	n/a	n/a	n/a	✓	✓
MM20	150	0	20	30	60	0	30	20	70	n/a	n/a	n/a	✓	✓	✓
Filtramag															
FM1.5	250	0	10	20	40	0	20	20	50	60	70	n/a	✓	✓	✓
FM2.5	500	0	10	20	40	0	20	20	50	60	70	✓	✓	✓	✓
Automag															
AMC	200	0	10	20	30	0	20	20	40	50	60	✓	✓	✓	n/a
AM6	450	0	10	20	30	0	20	20	40	50	60	✓	✓	✓	n/a
AM12	900	0	10	20	30	0	20	20	40	50	60	✓	✓	✓	n/a
Automag Skid															
AMCS1	200	0	10	20	30	0	20	20	40	50	60	✓	✓	✓	n/a
AM6S1	450	0	10	20	30	0	20	20	40	50	60	✓	✓	✓	n/a
AM12S1	900	0	10	20	30	0	20	20	40	50	60	✓	✓	✓	n/a
AM6S2	900	0	10	20	30	0	20	20	40	50	60	✓	✓	✓	n/a
AM12S2	1800	0	10	20	30	0	20	20	40	50	60	✓	✓	✓	n/a

Example:

Filter **FM2.5**
 Flow **500 ltrs/min.**
 Material **Cast iron**
 Fluid **Medium oil**
 500 ltrs/min □ Medium oil (20%) = 400 ltrs/min.
 400 ltrs/min □ Cast iron (20%) = 320 ltrs/min.
Suggested flow rate = 320 ltrs/min.

Centipoise

Thin oil 20–300
 Medium oil 300–700
 Thick oil 700+