ZERO GRAVITY
FILTERS
Brighton, MI

ONE CORE
MAGNETIC SEPARATOR

Operating and Maintenance Manual

Magnetic Separator – Mini Mag

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Version 1.0
Reference: Mini Mag
April 2006

Standard and Limited Warranty

Seller warrants that title to goods sold hereunder is unencumbered at time of sale. All other warranties are expressly disclaimed including, but not limited to, merchantability, fitness for purpose, and all other warranties, express or implied. Seller expressly disclaims any liability for damages, actual, consequential, incidental or otherwise, for injury to property of buyer, its agent or third persons in custody of goods sold hereunder. Seller may determine to repair or replace any defects in goods of its own manufacture, which arise from defective materials or workmanship during the twelve (12) months, following the date of tender of delivery to the end purchaser if buyer gives seller timely written notice with a description of the basis for claim. Seller may refund amounts paid by buyer without other liability to buyer. The buyer acknowledges and agrees that the limitations of warranty, liability and remedy are fair and not unconscionable and the sole and exclusive remedies afforded at law with all other statutory and common law remedies being hereby waived. A claim under the warranty by the buyer for repair or replacement of goods shall be timely filed with the seller in accordance with the written procedures of the seller in effect at the time of any such claim.

Magnetic Separator
Mini Mag

INSTALLATION GUIDE

POWER SUPPLY

The magnetic separator requires 110 VAC, single-phase supply at 5 Amps or 24 VDC depending on coil voltage. A DIN plug is provided on the base of the ASCO Timer/Air Solenoid valve. The plug is to be wired according to local electrical regulations.

FLOWRATE

Maximum flowrate of 12 gpm when used with water or water based machine coolants. As the viscosity of the fluid increases the flow rate through the Maggie will decrease.

PNEUMATIC CONNECTIONS

A minimum of 60 psi, clean and dry compressed air supply should be made to the ¼" push in connector labeled # 1 on the Asco Solenoid Valve, connections 3 and 5 are exhaust and are fitted with bronze air snubbers, they are not to be removed or tampered with.

PIPE CONNECTIONS

The Magnetic Separator must be mounted in a vertical position with the three way valve at the bottom.

The magnetic separator's Inlet connection is ¾" NPT male fitted to the top of the magnetic separator. The Outlet connection is ¾" NPT female situated on the brass three way valve at right angles to the separator. The Purge connection is the remaining ¾" NPT female port situated on the bottom of the three way valve.

The purge connection should be plumbed to a suitable drain or tank capable of handling the system's pressure. **To avoid excessive pressure drops, which could impair the purge effectiveness, do not run the backwash line more than 10 feet with the ID of the line no less than ¾".**

MAGNETIC SEPARATOR SUPPORT

The magnetic separator can be either supported by the body or its connecting pipework.

DIMENSIONS AND WEIGHT

Weight: Dry = 20 lbs
Wet= 25 lbs

OPERATING REQUIREMENTS

The Magnetic Separator requires a minimum system pressure of 30 psi on the inlet side of the separator at time of purge

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REGULATING VALVE

A regulating valve must be fitted on the discharge of the magnetic separator, enabling the user to regulate the flow rate through the separator.

ISOLATING VALVES

It is recommended that inlet and discharge isolating valves be fitted to the magnetic separator for ease of maintenance.

Magnetic Separator Single Core

OPERATING MANUAL

Description

The Magnetic Separator consists of a 2" stainless steel body. Inside the 2" body supported is a 1" tube containing eight magnet/pole combinations. The operation of the purge sequence is controlled by a small timer situated on a air solenoid valve. This timer controls the frequency at which the purge takes place in minutes and also the duration of the purge (in seconds).

Operating Parameters

Power Supply:	110 VAC, 5 Amp supply or 24 VDC
Maximum Operating Pressure:	100 psi
Static Test Pressure:	150 psi
Maximum Operating Temperature:	165º F
Flow Rate:	**maximum of 12 gpm**
Minimum Air Pressure:	60 psi, self lubricated
Maximum Air Pressure:	100 psi

Materials Composition

Filter Material

Separator Body	Stainless steel
3-Way Valves:	¾" 3-way valve, 'T' ported, brass body, stainless steel 316 ball, and PTFE seats. Stainless steel 316 body is available.
Pneumatic Actuator:	Double acting, developing 156 Lb Ins at 80 psi. Manufactured by Bray, model DAB048.
'O' Rings:	Viton throughout.

1. COMPONENTS

1.1 Magnetic Separator

Manufactured from stainless steel, consisting of a 2” stainless steel tube with eight magnets/pole combinations. Inlet and outlet connection are ¾”.

1.2 THREE-WAY VALVES

Fitted on the outlet of the maggie is a pneumatically operated 3-way, ‘T’ ported valve. During purge, the valve is operated to purge the maggie.

1.3 MAGNETS/POLES

The eight magnets are contained in a 1” diameter tube. Each magnet generates 9,000 Gauss on the tubes surface, giving a total magnetic surface area of 4.0 sq.in.

1.4 CONTROLS IF FITTED.

The magnetic separator’s controls are provided by an ASCO timer. This timer operates an air solenoid valve fitted to the three way ported valve and shuttles the magnets during purge.

2.0 OPERATION GUIDELINES

The Magnetic Separator must not be put on line without POWER and AIR. To do so, will result in malfunction of the unit, which could result in the unit being returned to the factory for complete strip down and reassembly.

Before operating the magnetic separator, ensure that it has been installed per the INSTALLATION GUIDE provided. Failure to do so could affect the separator's performance and void the separator's warranty.

2.1 MAGNETIC SEPARATOR OPERATION

In normal mode fluid enters the separator from the top port and exits via the port on the side of the three-way valve. Metal fines are attracted to the outside of the 1" tube where the magnets are positioned at the bottom half of the pod, below the internal baffle plate.

On a timed interval (factory set at 10 minutes) the ASCO timer will energize the air solenoid valve operating the three-way valve and diverting the pods outlet to the purge port situated at the bottom of the three-way valve. Next, the magnets are driven upwards inside the 1" tube above the internal baffle plate assembly. This causes the metal fines to fall off the outside of the 1" tube and be washed away out the purge port, this position is held by the ASCO timer for approximately 3 – 5 seconds depending on system pressure. When the purge time has expired, the air solenoid valve is de-energized and the magnets are driven down below the baffle plate and the three-way valve is diverted back to normal position. The magnetic debris trapped on the magnets cannot travel upwards due to the baffle plate and the flow of liquid from the top.

2.2 PURGE DURATION TIMER

The purge duration is the length of time that the three-way valve will remain in the purge position. The purge duration timer is located on the ASCO timer and is graduated in seconds. This is how adjustments are made to achieve optimum purge efficiency. The purge duration can be set as low as 5 seconds without hindering purge efficiency. The longer the duration, the longer the magnetic separator remains in purge and the longer flow is diverted out the purge port.

The objective when setting the purge duration is to find the optimum balance between low purge volume and removal efficiency.

For pressures lower than 25 psi the purge time will need to be between 5–8 seconds. For higher pressures the time can be as low as 2-3 seconds.

To alter the backwash duration, simply turn the knob (graduated in seconds) and then press the test button.

2.3 PURGE INTERVAL TIMER

The magnetic separator is operated normally every 15 minutes. This ensures that the purge sequence will clean off the fines collected on the stainless steel tube containing the magnets. For systems with a light load this time could be greater and for systems with a heavy load the time may be shorter.

To alter the interval time, simply turn the knob (graduated in minutes) and then press the test button.

NOTE: If the interval time is too great for the load of the system, there is the possibility that the outside of the metal tube containing the magnets will be overburdened and the clamping force of the magnets to the tube will prevent the magnets from shuttling within the tube. When making adjustments to either timer ensure that the magnets are free to move.

Note: Adjustments to both timers must be done when on line and not in purge mode. Therefore, it is advisable to initiate a manual purge using the TEST button on the ASCO timer.

2.4 ASCO TIMER

The ASCO timer is situated on the asco air solenoid valve mounted to the Bray pneumatic actuator. This timer has two functions as described above. Power supply for the timer is 120 VAC. The timer has two ranges, which are adjustable. One is in minutes (Interval Timer) and the other in seconds (Duration Timer). There is also a TEST button which is used to manually purge the Magnetic Separator.

There are also two visual lamp indicators on the timer. The OFF lamp indicates that there is power to the timer and the ON lamp indicates that the duration timer (Purge) is in operation.

3.0 MAGNETIC SEPARATOR START-UP

Once the magnetic separator has been properly installed, the separator may now be started by following the procedure below.

1. Ensure that there is power and air to the magnetic separator.
2. With the inlet valve to the separator closed, start any pumps serving the system. Slowly open the inlet Isolating valve. Check and correct for any possible leaks.
3. The discharge-isolating valve may now be slowly opened and the regulating valve adjusted to give the desired flow rate.
4. A final, on-line purge should be performed. Manually initiate a purge by depressing the TEST button on the ASCO timer and check for any leaks.
5. During the purge process, visually notice that the indicator on the actuator rotate and listen for the shuttling of the magnets.

4.0 RECOMMENDED MAINTENANCE

The only recommended maintenance required is to verify operation of the magnetic separator on a monthly basis.

5.0 FAULT FINDING

Listed below is a guide to the action required for the following faults.

INDICATION	REASON	ACTION
Timer OFF lamp not illuminated.	Loss of power. Malfunction of timer.	Restore power Immediately take separator off line and replace timer. Upon remedial action, carry out a manual purge and check for correct operation of purge sequence.
Timer ON lamp illuminated but three-way valve or magnets do not move.	Loss of pneumatic air. Malfunction of timer.	Restore air supply. Immediately take separator off line and replace timer. Upon remedial action, carry out a manual purge and check for correct operation of purge sequence.
Pneumatic actuator does not operate	Loss of pneumatic air pressure. Pneumatic air pressure to low. Actuator malfunction.	Immediately take separator off line Restore air pressure or increase air pressure. Replace actuator. Upon remedial action, carry out a manual purge and check for correct operation of purge sequence.
Magnets do not move.	Loss of air pressure. Magnetic tube bound with excessive fines. Loss of power to timer. Malfunction of timer.	Immediately take separator off line. Restore air and check for correct air pressure of 80 psi or more. Purge interval to long. Shorten time. Purge duration to short. Lengthen time. Restore power or replace timer.

6.0 Spare Parts

Recommended spare parts for the Magnetic Separator Single Core are as follows. Please call Zero Gravity Filters for pricing.

Part Description	Part Number
¾", 3-way 'T' ported valve and pneumatic actuator, brass	Contact ZGF
¾", 3-way 'T' ported valve and pneumatic actuator, S/S.	Contact ZGF
¾" Ball valve and pneumatic actuator, brass	Contact ZGF
¾" Ball valve and pneumatic actuator, stainless steel	Contact ZGF
ASCO Timer	Contact ZGF
ASCO air solenoid valve	Contact ZGF