



AUTOMATIC DISC FILTER

OWNER'S MANUAL

OPERATION AND INSTRUCTION GUIDE

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IMPORTANT

Please make certain that persons who are to use this filter thoroughly read and understand these instructions prior to operation. Should you have any questions regarding the operation of this filter, please call (386) 248-0500 and ask to speak with one of our customer service representatives, or email us at sales@millerleaman.com.

Record in the space below the Serial # of your unit. The Serial # is located on the data plate sticker on the face of the housing.

SERIAL # _____



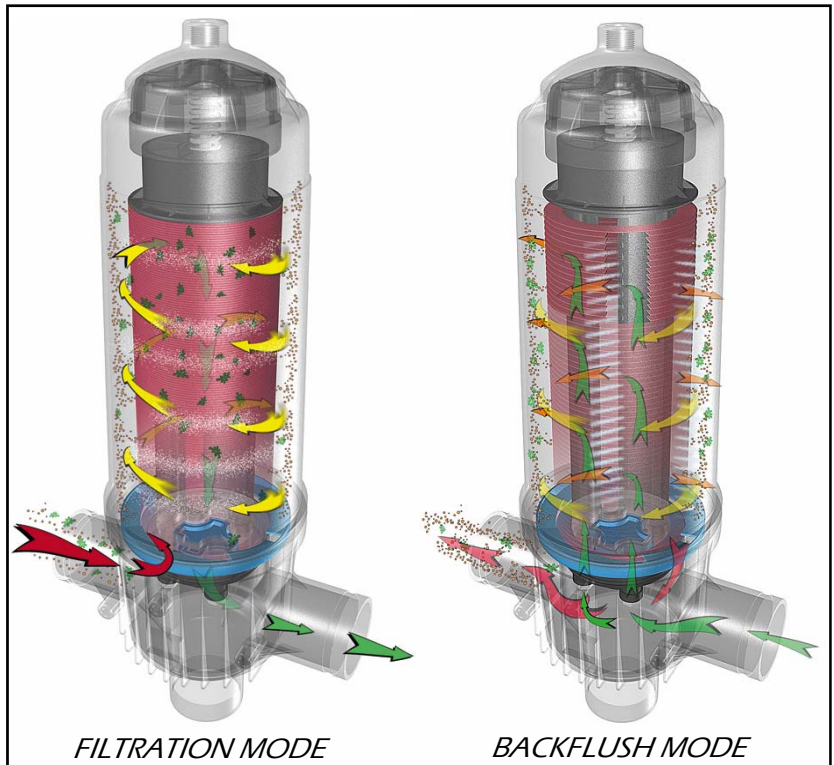
I. INTRODUCTION TO TURBO-DISC AUTOMATIC FILTRATION

Thank you for your recent purchase of a *Turbo-Disc Automatic Filter System*. This manual will provide you with details concerning the function, design, and operation of your filter. Please read through this manual before installing and operating your filter. If you have any additional questions, please call our application specialists at 386-248-0500.

Disc Filtration — Utilizing stacks of compressed, grooved discs, disc filters capture debris not only on the surface of the disc stack, but throughout the depth of the grooved rings. Water is filtered from the outside of the disc stack to the inside.

Turbo-Disc Design — The design of the *Turbo-Disc* enables the efficient removal of debris from the water source while minimizing backflush frequency and backflush flow. Using the patent-pending *Turbo-Disc Element*, located at the base of the disc stack, the *Turbo-Disc* spins incoming water and debris as it enters the filter chamber (see *Filtration Mode* illustration to right). Heavy debris spins along the housing wall and make little contact with the disc stack. This spinning action enables the filter to run much longer between required backflashes.

When the filter element requires cleaning, a pressure differential sensor, within the filter controller, will engage the backflush cycle. During backflush, the disc stack is decompressed and the flow of water is reversed through the filter housing (see *Backflush Mode* illustration above right). During the backflush cycle, filtered water from the other filter pod(s) is used to sequentially backflush one disc cartridge at a time. The filtered water comes back through the outlet of the filter, flowing up through four posts on the interior of the discs. These posts spray pressurized, clean, backflush water tangentially through the disc stack. The spray of water induces a high velocity spinning action, which rapidly cleans the entire disc stack. After the backflush cycle is completed, normal filtration resumes.



II. SAFETY CONSIDERATIONS

Safety precautions are essential when any filtration equipment is involved. These precautions are necessary when using, storing, and servicing your filter. If safety precautions are overlooked or ignored, personal injury or product damage may occur.

Your filter was designed for specific applications. It **should not** be modified and/or used for any application other than originally specified. If there are any questions regarding its application or installation, write or call Miller-Leaman, Inc.

ALWAYS OBSERVE THE FOLLOWING PRECAUTIONS:

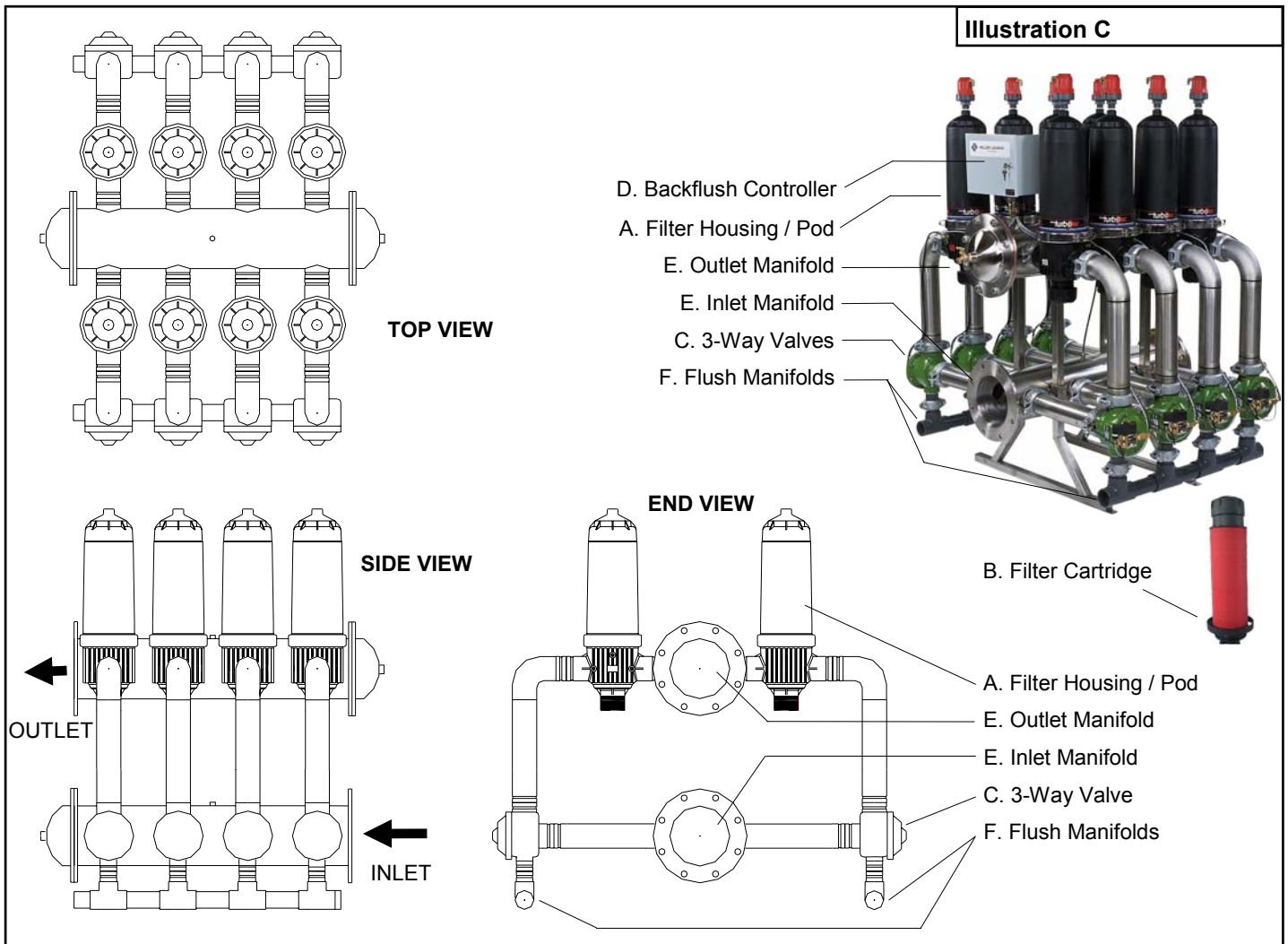
- 1.) Read this manual carefully. Consider the applications, limitations, and the potential hazards specific to your filter.
- 2.) **Absolutely, under no conditions, should the filter pod cover or pressure gauges be removed while the filter is pressurized.**
- 3.) Units with damaged or missing parts should **never** be operated. Contact our customer service representatives for replacement parts.
- 4.) Pressure relief valves of a sufficient size and volume should be installed upstream of the inlet and downstream of the outlet of the filter. They should be set to relieve pressure at 1.2 times your maximum operating pressure (not to exceed the maximum rated pressure of 150 PSI). This will help to prevent damage to the filter housing and filter cartridge if severe stoppage or water hammer occurs.
- 5.) System design should ensure that back flow is avoided. If necessary, back flow prevention devices should be installed upstream of the inlet and downstream of the outlet to prevent back flow or vacuum effects due to pump shut-off or topographical differences. Installation of a check valve (right) also enables the filters to be maintained without draining your entire system.
- 6.) *This filter system is not freeze protected.* If the hydraulic water lines freeze, the unit will not backflush properly. If there is a risk of freezing, install indoors.



AT NO TIME SHOULD THE INTERNAL PRESSURE EXCEED THE MAXIMUM RATED PRESSURE FOR YOUR FILTER

III. TURBO-DISC FILTER SYSTEM COMPONENTS

- A.) **Filter Housing/Pod**
The plastic filter pods between the 3-way valve and the outlet manifold. The pods are secured in place by "Grooved" clamps. The number of pods required is determined by the flow rate, the micron/mesh rating needed, and the water quality of your system. The pods contain the filter cartridge.
- B.) **Filter Cartridge**
The heart of the Turbo-Disc Filter is the patent-pending filter cartridge. The filter cartridge is comprised of a vertical stack of grooved rings/discs and the frame that holds the discs in place. This frame also contains the *Turbo-Element*, disc cap, check valve, and backflush posts that enable automatic operation.
- C.) **3-Way Backflush Valves**
The 3-way valves are located between the filter housing and the inlet manifold. While in filtration mode, water passes from the inlet manifold, through the 3-way valves and into the filter housings. In backflush mode, the inlet opening is closed and the flush line is opened. Water then flows from the outlet manifold, through the filter cartridge and housing, then the 3-way valve and out the backflush line. The valve is controlled by the control panel and opens and closes using the systems air pressure. The valves are actuated by the solenoids mounted behind or near the controller.
- D.) **Backflush Controller / Control Panel**
The control panel monitors your system's inlet and outlet pressure differential and controls the backflush cycle. It can also be set to backflush by time or manual override.
- E.) **Inlet and Outlet Manifold**
The inlet and outlet manifold directs the flow of water to and from the filter housings. Provided manifolds are constructed of type 304 Stainless Steel. (Optional: 316 Stainless Steel, HD Polyethylene)
- F.) **Flush Manifold**
The flush manifold receives backflush water from the filter pod through the 3-way valve. The discharge for this manifold should always be to atmosphere pressure. **Never plumb the discharge against pressure or a vertical rise. This will seriously effect backflush performance.** The flush manifold is constructed of PVC or Stainless Steel.



IV. INSTALLATION GUIDELINES

There are a few tasks that must be accomplished before your *Turbo-Disc Filter System* is ready for operation. Please review the following checklist. When all tasks are complete the filter is ready to be used.

- 1.) The *Turbo-Disc Filter* requires 60 PSI downstream pressure to properly backflush. If downstream pressure is less than 60 PSI, a pressure sustaining valve (right) should be installed directly downstream of the filter outlet manifold or a booster pump could be installed off the outlet manifold. A pressure sustaining valve or booster pump is also recommended on high PPM applications and where the irrigated area is lower in elevation than the filter system. The sustaining valve or booster pump should be set to activate prior to and for the duration of the backflush cycle and should deactivate when not in backflush.
- 2.) Is your Turbo-Disc filter placed on a firm, supporting surface? Failure to do this may cause stress on the weld joints. Miller-Leaman recommends that a concrete pad be poured for the filter legs to rest on.
- 3.) Be sure that the inlet and outlet connections are securely fastened to your system piping. The arrows on the housing clearly depict flow direction.
- 4.) Be sure that a quick pressure relief valve has been installed upstream of the inlet and downstream of the outlet of the filter, set to relieve pressure at 1.2 times your maximum operating pressure. This is to prevent damage to the filter if severe clogging or water hammer occurs. Pressure relief valves are available in various sizes, consult your local distributor or valve manufacturer to obtain the proper valve for your application.
- 5.) Be sure that cartridge covers are securely fastened and the band-clamps are securely latched.



V. CONTROLLER GUIDELINES

Once your filter has been installed, it is necessary to set the backflush controller. Please refer to the Maxim controller owner's manual for set-up instructions.

GENERAL INSTRUCTIONS:

Note your system's normal "when clean" pressure differential. Set the Pressure Differential switch-gauge 1-2 PSI higher than the normal clean differential. This is accomplished by rotating the silver arm in the switch-gauge to the desired setting. For example, if the "when clean" pressure differential is 4 PSI, set the switch-gauge to initiate the backflush cycle at 6 PSI. This will make certain that the when the filter is dirty enough to raise the system pressure differential to 6 PSI, that the backflush cycle will be initiated.

The backflush controller is equipped to engage a backflush cycle both on pressure differential and on a time interval basis or manual override. It is always recommended to set the controller to backflush not only on pressure differential, but on a backflush time interval as well. The time interval setting makes certain that the filter will perform a backflush cycle, over a pre-determined period of time, even if the system's pressure differential set point is not reached. This will ensure that the filter is protected even if the time interval is set too high for the water quality and if the pressure differential gauge fails. In heavy contamination applications, it is advisable to set the time interval to 1-2 hours, where in cleaner applications, the interval can be set to a longer period. As water conditions change, your time interval settings should change as well.

When beginning operation, make sure that the POWER switch in the face of the panel is in the ON position.

VI. PREVENTIVE MAINTENANCE

ROUTINE INSPECTION:

- A.) Ensure that all backflush settings are as desired, that the controller is powered up, and that the controls are set for automatic operation.
- B.) Check inlet and outlet pressures. Be sure that the pressure differential meets your controller settings. If not, check the controller's pressure differential switch-gauge for damage and initiate a manual backflush.

MONTHLY INSPECTION / MAINTENANCE:

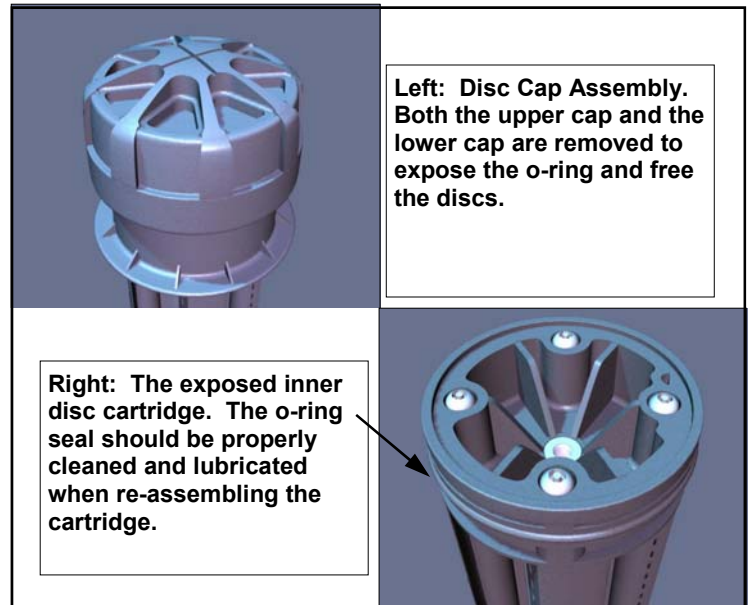
- A.) Initiate a manual backflush and observe all filters backflushing. Ensure that the backflush valves are all operating properly and initiating backflush.
- B.) Open one or all pods to visually inspect the filter cartridges for visible damage and to ensure that all discs are being sufficiently cleaned.

SEASONAL MAINTENANCE:

- A.) Inspect the victaulic couplings for leaks. The victaulic gaskets should be lubricated with silicone gasket grease to prevent them from drying and cracking.
- B.) The o-ring filer seal should be inspected and lubricated periodically. Remove the cartridge from the housing by gently rocking it back-and-forth and lifting it from the housing seat. Unscrew the top cap from the cartridge. Then remove the entire cap assembly by rocking the cap back-and-forth while lifting up on the cap assembly (see illustration). The o-ring seal will be in view after the cap is removed. Lubricate the o-ring seal with silicon lubricant (see illustration) and replace the disc cap assembly. Be sure to screw tight the top cap.

C.) Inspection and cleaning of mineral deposits on discs
Open all pods to visually inspect the filter cartridges for mineral residue in the disc surface or in the disc grooves. If a scale or mineral deposit film is present, remove the discs from the cartridge and dip the loosened discs into a chemical bath (follow above directions for removal of discs).

TIP: A common cleaning solution is 15% sulfuric acid. USE CAUTION WHEN HANDLING ACIDS/ CHEMICALS AND ALWAYS USE PROPER PROTECTIVE GLOVES, CLOTHING, AND GLASSES. Replace the discs on the cartridge.



Left: Disc Cap Assembly. Both the upper cap and the lower cap are removed to expose the o-ring and free the discs.

Right: The exposed inner disc cartridge. The o-ring seal should be properly cleaned and lubricated when re-assembling the cartridge.

VII. INFORMATION CONCERNING WATER HAMMER

WHAT IS WATER HAMMER?

Water hammer is a phenomenon that can occur in fluid systems with long pipes between the fluid source and the outlet. The term itself refers to the sound made when water hammer occurs which resembles banging a hammer on a long pipe. Water hammer is a rapid change of pressure caused by a rapid change in velocity. When the velocity is changed a pressure wave that travels at the speed of sound is initiated and travels in the upstream direction until it reaches some stationary energy level, like a reservoir. A rarefaction wave (at the pressure of the water source) then travels downstream at the same speed. If the flow has been shut off down-stream the pressure wave impacts the blockage and the pressure in the entire system is raised very quickly.

WHAT CAUSES WATER HAMMER?

Any action that can cause a rapid change in the velocity of the flow can set off a water hammer - closing a downstream valve, pipe fracture, pump stoppage, etc. The critical time for which a valve may be closed depends on the length of piping between the valve and the source reservoir. The longer the distance the slower the valve may be shut to cause a water hammer. Typically for short lengths of pipe (below 500 ft) the critical time is less than 1/10 second.

WHAT CAN WATER HAMMER DO?

Pressure spikes from water hammer can raise fluid pressures to very high values (in excess of 1000 PSI depending on the situation). Such pressure spikes can result in mechanical failures such as broken valves, pipes, filters, joints, etc. Water hammer does not have to occur fully to raise the pressure. A partial hammer can occur that raises the pressure to a certain percentage of the theoretical maximum. The *Turbo-Disc Filter* is rated to an absolute maximum pressure of 150 PSI. A water hammer pressure spike that raises the pressure higher than the maximum rated pressure may result in filter damage.

FAILURE TO FOLLOW INSTRUCTIONS AND WARNINGS CAN RESULT IN SERIOUS BODILY INJURY.

WHAT CAN I DO TO PREVENT WATER HAMMER?

There are precautions that can be taken to prevent or decrease the effect of water hammer. A pressure relief valve that leads to a surge tank or accumulator may protect other key components from water hammer. A close adherence to operational policies will also help prevent valves or pumps from being accidentally shut off thereby causing a water hammer. A close examination of a system will inform you where potential hazards are.

VIII. LIMITED WARRANTY

1) Duration:

One year from the date of purchase by the original purchaser: control panel / backflush controller, 3-way valves, solenoids.
Three years from the date of purchase by the original purchaser: Filter housing / pods, filter cartridge, manifold.

2) Who gives this warranty (Warrantor)

Miller-Leaman Incorporated / 800 Orange Avenue / Daytona Beach, FL 32114, (386) 248-0500.

3) Who receives this warranty (Purchaser):

The original purchaser (other than for purposes of resale) of the Miller-Leaman product.

4) What products are covered by this warranty:

Any Miller-Leaman *Turbo-Disc* housing and filter elements manufactured or sold by the warrantor.

5) What is covered under this warranty:

Defects on materials and workmanship, which occurs within the duration of the warranty period.

6) What is not covered under this warranty:

- A) Implied warranties, including those of merchantability and fitness for a particular purpose, are limited to one year from the date of original purchase. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.
- B) Any incidental, indirect, or consequential loss, damage, or expense that may result from any defect, failure, or malfunction of the Miller-Leaman product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.
- C) Any failure that results from an accident, purchaser's abuse, neglect, or failure to operate the products in accordance with the instructions provided in the owner's manual supplied with the product.
- D) Items or service that are normally required to maintain the product, i.e. gaskets.

7) Responsibilities of warrantor under this warranty:

Repair or replace, at warrantor's option, products or components which have failed within the duration of the warranty period.

8) Responsibilities of purchaser under this warranty:

- A) Deliver or ship the Miller-Leaman product to the Miller-Leaman manufacturing facility. Freight costs, if any, must be borne by the purchaser.
- B) Use reasonable care in the operation and maintenance of the product as described in the owner's manual.

9) When the warrantor will perform repair or replacement under warranty.

- A) Repair or replacement will be scheduled and serviced according to the normal workflow at the manufacturing facility, and depending on the availability of replacement parts.
- B) If the purchaser does not receive satisfactory results from the product repair or replacement, the purchaser shall contact Miller-Leaman immediately.

NOTE: THIS WARRANTY IS VOID IN THE EVENT THE PURCHASER FAILS TO COMPLY WITH ANY ONE OF THE REQUIREMENTS FOR INSTALLATION AND USE OUTLINED OR SET FORTH IN THIS MANUAL AND MILLER-LEAMAN INCORPORATED ASSUMES NO LIABILITY WHATSOEVER.

This Limited Warranty gives you specific legal rights and you may also have other rights which vary from state to state.



MILLER-LEAMAN
INCORPORATED

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