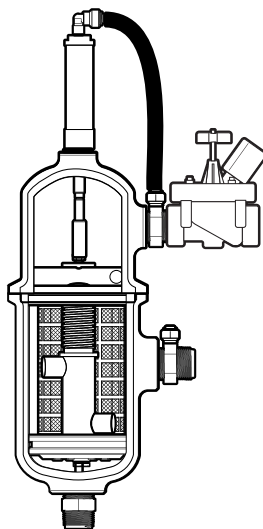




## HN-G-01/ 02 Filter Series

### Manual



#### NOTICE

Changes or modifications not expressly approved by Rain Bird could void the user's authority to operate the equipment.

#### ⚠ WARNING

It is extremely dangerous to open the filter, or control tubing while under pressure. Always depressurize before performing any maintenance or troubleshooting.

Rain Bird Corporation  
6991 East Southpoint Rd.  
Tucson, AZ  
85756

# 1. Introduction

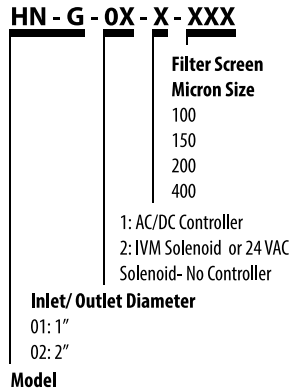
Congratulations for purchasing the HN-G automatic self-cleaning filter. Rain Bird filters are being used in various irrigation applications as well as industrial water applications. The HN-G filter is easy to install, does not require special skills or tools to operate and is ideal for filtering out silt, scale, sand, rust and dirt from a variety of irrigation water sources.

## NOTICE

PLEASE READ THE INSTRUCTIONS BEFORE INSTALLING THE HN-G FILTER.

### 1.1 Models

This document relates to multiple models of the HN-G filter system, sections that relate to specific models are indicated as such.



### 1.2 In the Box

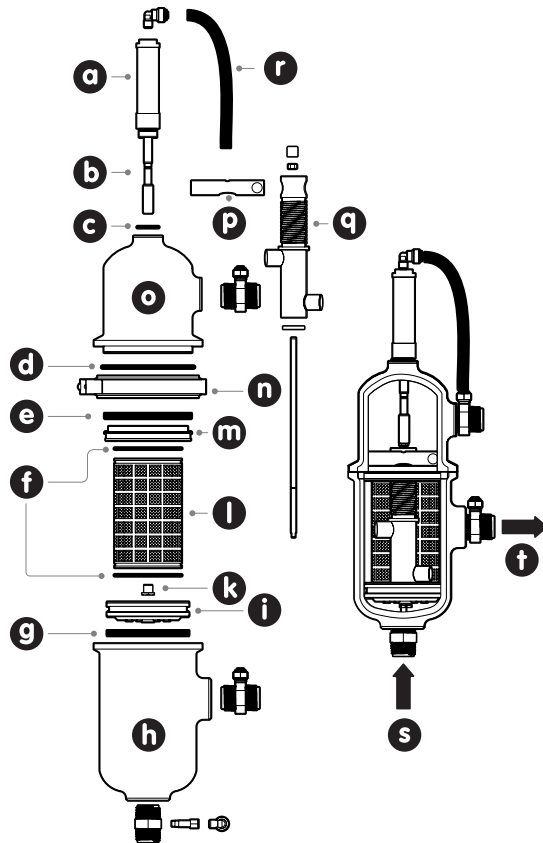
Please check that you have received the following items:

- 1x Filter Assembly:
- 1x HN-G-01 Filter with 1" Inlet, 1" Outlet and 1" Drain valve assemblies attached  
or
- 1x HN-G-02 Filter with 2" Inlet, 2" Outlet and 1" Drain valve assemblies attached
  - 1x Hydraulic Piston with 1/4" plastic tube
  - 1x Quick Start Guide <https://www.rainbird.com/nh-filter>
  - 1x Backwash Controller Unit (HN-G-01-1-XXX, HN-G-02-1-XXX models only)

### 1.3 Overview Filter Components

HN-G models are automatic, self-cleaning screen-type water filters. The filtration system consists of a filter body, hydraulic piston, filter screen, Self-Clean mechanism and drain valve.

<b>a</b>	Piston
<b>b</b>	Piston Shaft
<b>c</b>	Piston O-Ring
<b>d</b>	Filter Cover O-Ring
<b>e</b>	Plate Seal
<b>f</b>	Screen O-Rings
<b>g</b>	Inlet Disc Seal
<b>h</b>	Housing
<b>i</b>	Inlet Disc
<b>k</b>	Inlet Bearing
<b>l</b>	Filter Screen
<b>m</b>	Plate
<b>n</b>	Clamp
<b>o</b>	Cover
<b>p</b>	Hydraulic Motor
<b>q</b>	Collector Assembly
<b>r</b>	1/4" Tubing
<b>s</b>	Inlet
<b>t</b>	Outlet



### 1.4 Operation

Pressurized water enters the filter inlet **s** and travels through a filter screen **l** where contaminants are filtered out. The clean water then exits through the outlet **t**.

The build-up of contaminants on the filter screen creates a differential pressure across the filter. Based on a preset Differential Pressure (DP) programmed into the Backwash Controller (HN-G-01-1-XXX, HN-G-02-1-XXX models only), the drain valve will open and the backwash of the filter screen will take place. After 7 seconds, the drain valve is closed to resume normal water filtering. A backwash of the filter screen can also be initiated by a programmable timer.

The minimum pressure required for Self-Clean is 40 PSI (2.8 Bar).

#### NOTICE

**Large particles may prevent the self cleaning mechanism from working properly. In that case, we recommend installing a coarse strainer (10-14 mesh) prior to the filter.**

## **2. Installation**

### **2.4.1 Location:**

#### **IMPORTANT**

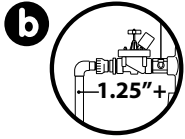
**The HN-G filter should be installed vertically**

- 1.** Allow a minimum clearance of 10" (ten inches) above the HN-G for safe removal of the filter cover.
- 2.** Locate the HN-G filter as close to a drain as possible. This will maximize the efficiency of the automatic self-cleaning.
- 3.** An AC to 12VDC power source is required for the Backwash Controller if batteries are not used (HN-G-01-1-XXX, HN-G-02-1-XXX models only).

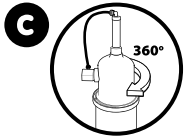
## 2.4.2 Installation requirements



When installing the 1/4" plastic tubing into the appropriate fittings – push the tubing in hard, it should go in about a 1/4". It should be tight into the fitting and does not come out when you pull on it.



The drain pipe should be a minimum of 1.25" in diameter. The length of drain pipe to the drain should be as short as possible, with no more than two elbows. Any restrictions in the drain pipe will reduce the self-cleaning efficiency of the filter.



The HN-G filter cover can be rotated to best fit existing plumbing. To rotate the cover, release the clamp, rotate the cover, and close the clamp.

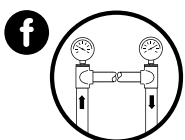


Unions are required for ease of maintenance and in order to make installation easier. With unions, at all recommended spots, the filter may be removed for service and any threaded connections can also be easily accessed if any of these need to be tightened up or resealed due to movement during shipping or installation.



Install an isolating valve (not supplied) between:

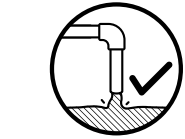
- Inlet and the water supply.
- Outlet union and the irrigation system.



Gauges on the inlet and outlet are highly recommended to be able to monitor pressure differential visually.

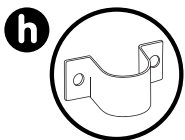


Drain should not discharge under water level, or in any way that would provide back pressure, as this will impede performance

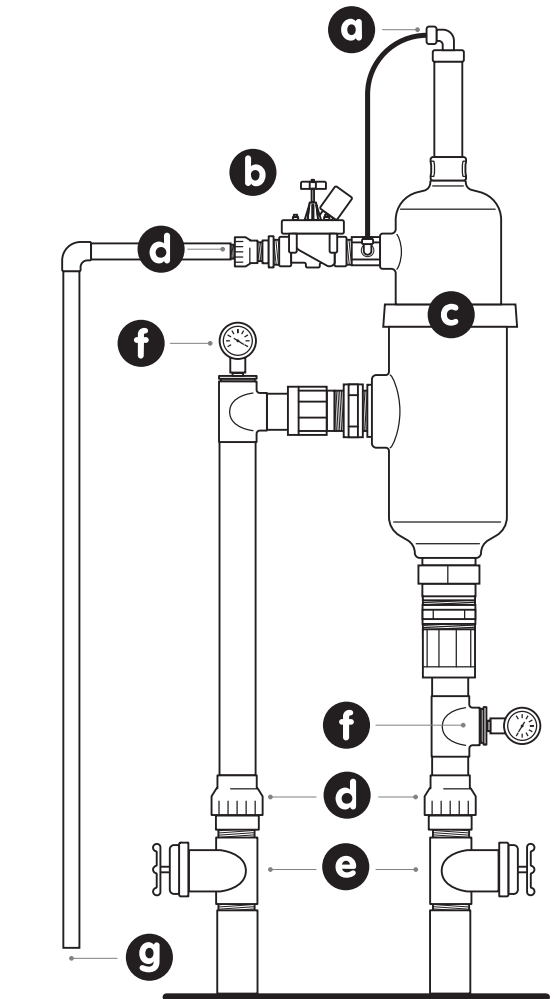


The drain needs to be unobstructed.

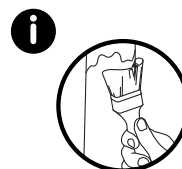
If the drain line is longer than 20 feet then it should be up-sized to 1.5" PVC.



All plumbing (inlet, outlet and drain) should be supported so stress is not transferred to the filter.

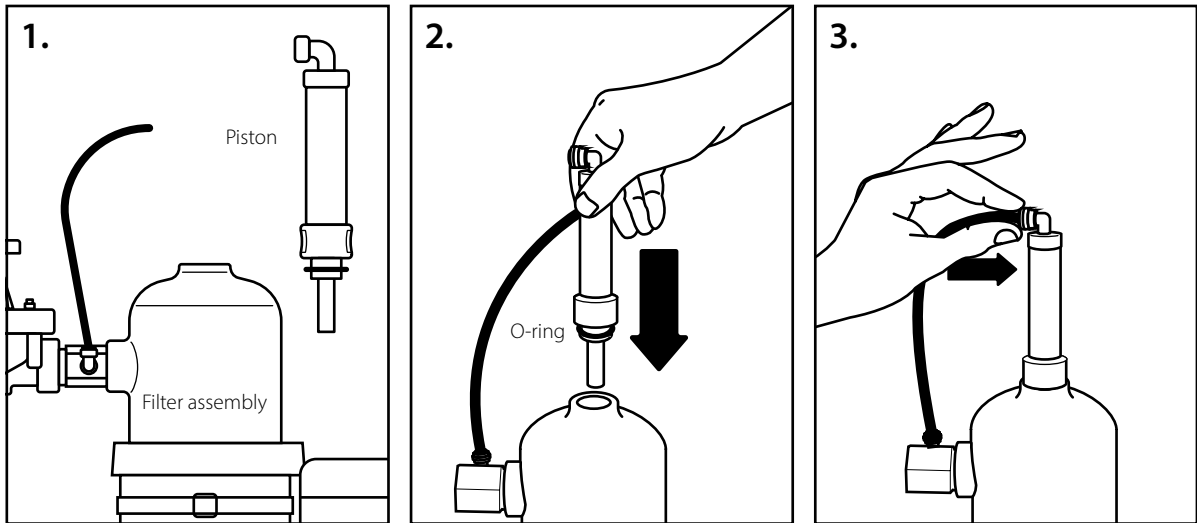


**Drain** (to drain)      **Outlet** (to irrigation)      **Inlet** (from pump)



It is highly recommended that any PVC fittings (including the ones included with the filter) in outdoor installations are painted to block UV exposure from the sun. Enclosed installations with no sun exposure do not require the PVC to be painted for protection.

### 3. Mechanical Installation

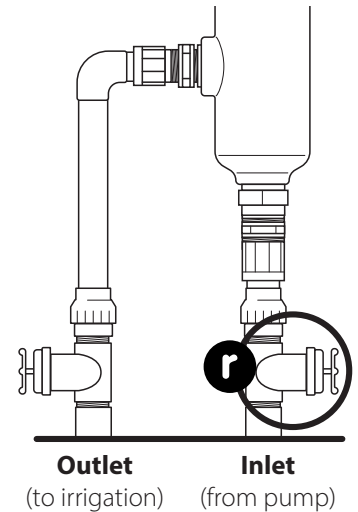


#### 3.4.1 Piston Installation

1. The Filter unit ships without the piston installed
2. Ensure that the o-ring is in place on the threads of the Piston. Push the piston into the main body of filter. Ensure that the push to connect fitting at the top of the piston lines up with the 1/4" black tubing.
3. Push the 1/4" tubing into the push to connect fitting at the top of the Piston.

#### 3.4.2 Backwash Controller installation

1. The controller is mounted to the filter and pre-programmed (HN-G-01-1-XXX, HN-G-02-1-XXX models only).
2. If relocation is necessary, cut the strap and remount to a suitable location. Connect a length of 5/16" plastic tube (not supplied) into the HP (high pressure) and LP (low pressure) fittings.
3. Read the instructions in the following [Filtron 1-10 \(DC\) Manual](#)



#### 3.4.3 Turning On Water Supply:

1. Ensure Drain pipe is securely in the drain
2. Carefully open the isolation valve connected to the HN-G Inlet **!**
3. You are now filling the HN-G and charging the water system.
4. Check the system for leaks – If there is a leak that needs fixing – close Inlet and outlet isolation valves. Follow the steps [5.1.1 De-Pressurize System](#) to release the pressure and empty the HN-G. Fix the leak. Re-connect the Low Pressure (LP) 5/16" plastic tube and repeat this section.

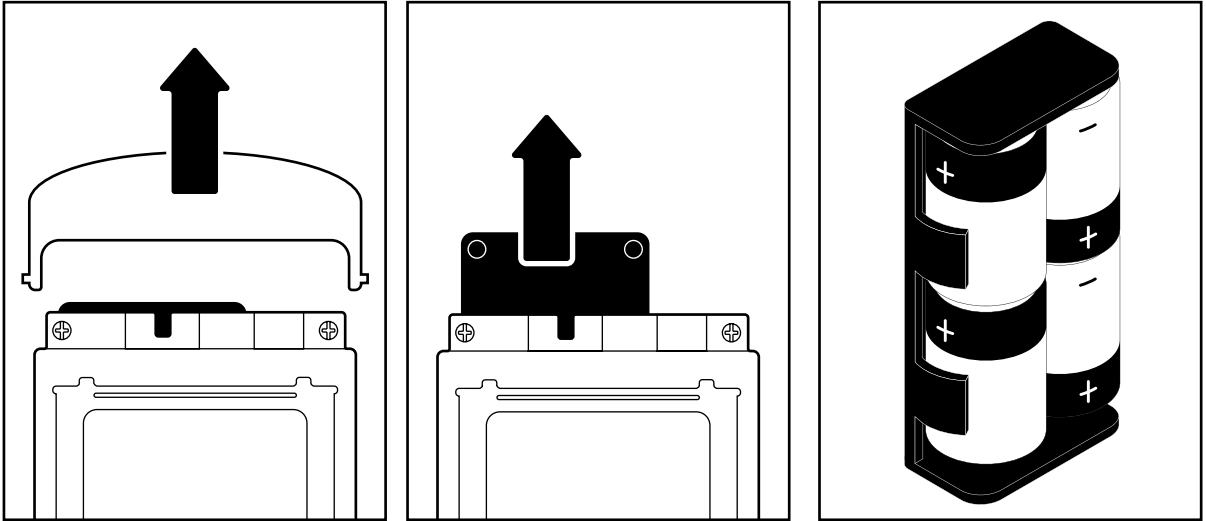
This section relates to the following models only: **HN-G-01-1-XXX, HN-G-02-1-XXX**

#### 3.4.4 Power Connection

1. WHEN READY – connect the controller to the power source
2. Follow the instructions in the Filtron 1-10 manual if programming modifications are required.

This section relates to the following models only: **HN-G-01-1-XXX, HN-G-02-1-XXX**

## 4. Electrical Installation



### 4.4.1 If 110 VAC is Available

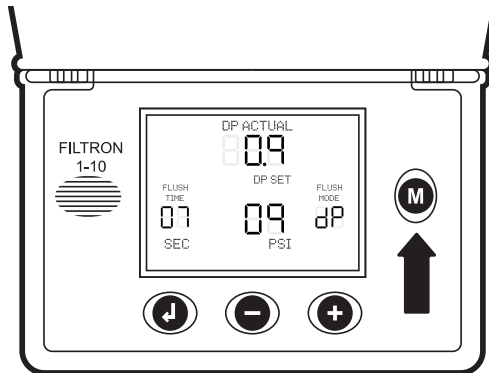
Plug in AC power adapter.

#### IMPORTANT

If installed outdoors power adapter must be plugged into a weather protected outlet.

### 4.4.2 If Battery Powered

1. Remove the top gray cover (push up the sides over the indent).
2. Remove the black battery tray and install the 4x "D Cell" batteries as shown.
3. The controller will come to life. It goes to sleep quickly, holding down any of the three lower buttons for a few seconds' wakes it back up.
4. Press the far right (M) button on backwash controller to test that the installation has been successful, a Backwash sequence should occur.



## 5. Maintenance

This filter, while automatic in function, is not maintenance free. It is expected that the screen will require pressure washing on a periodic schedule to remove contaminants that have stapled into the screen. Depending on the contaminant, the frequency can vary from once a week to twice a year. This schedule will have to be determined based on the effectiveness of the backwash on the contaminants being filtered. The filter must be de-pressurized to remove the screen.

### 5.1 Cleaning Filter Screen

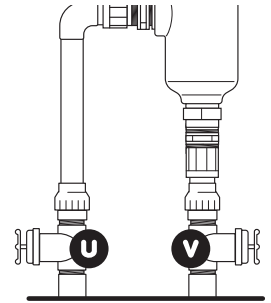
The HN-G Filter Screen **1** should be inspected every 3 months for wear and tear and be cleaned using a pressure washer directed alternately on the outside and inside of the screen (3-4 times each). If the Filter Screen shows signs of damage, it should be replaced. Periodic cleaning of the filter screen is necessary for removal of trapped particles.

#### WARNING

It is dangerous to open the filter while under pressure

#### De-Pressurizing the System

1. Close Inlet **V** and Outlet isolation valves **U**.
2. Perform Manual Backwash from the Filtron 1-10 Backwash controller by pressing the M button [or from the irrigation controller \(HN-G-01-2-XXX HN-G-02-2-XXX models only\)](#).
3. Verify pressure has been released running a second backwash and observing no backwash flow, or by checking the reading on the pressure gauges (if installed).
4. (HN-G-01-1-XXX HN-G-02-1-XXX models only) - Remove Low Pressure  $\frac{3}{16}$ " plastic tube from the Inlet to release the pressure and drain the HN-G filter.
5. (HN-G-01-2-XXX HN-G-02-2-XXX models only) - Remove the  $\frac{1}{4}$ " Tubing **r** from filter flush port.
6. Disconnect the drain pipe from the Drain valve at the union connection.



#### 5.1.1 Disassembly

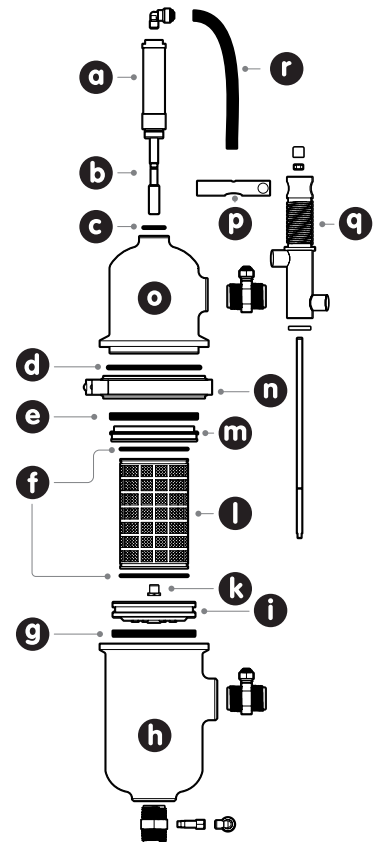
7. Disconnect the  $\frac{1}{4}$ " Plastic Tubing **r** connecting the Piston **q** to the drain outlet.
8. Release and remove the Clamp **n**.
9. Carefully remove the filter Cover **o**.
10. Carefully hold and pull up on the Hydraulic Motor **p**.
11. This will remove the collector assembly, giving you access to the Filter Screen **l**, and Inlet Disc **i**.
12. Remove the Filter Screen **l**.
13. Inspect and clean the Filter Screen **l**, using a pressure washer as necessary.
14. Inspect and remove any foreign objects or large particles from the Collector Assembly **q** and the Housing **h**.

#### 5.1.2 Lubrication

15. Grease (silicone recommended) all rubber parts: **g, d, e, f, g**.
16. Carefully unscrew the Piston **q** from the Cover **o**, clean and grease Piston Shaft **b** (silicone grease recommended). Make sure the Piston Shaft moves freely.
17. The Piston Shaft **b** should be cycled in and out a few times to get the grease distributed to the inner O-ring seal. Two applications of grease and cycling is adequate.
18. Clean and grease the Piston O-Ring **c** on the Piston **q**.
19. Replace the Piston **q** on the Cover **o**, hand tighten only, no tools.

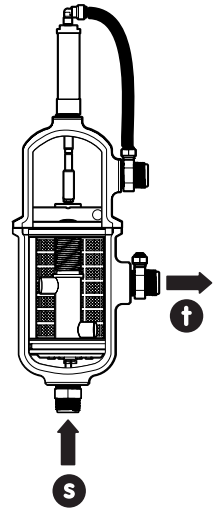
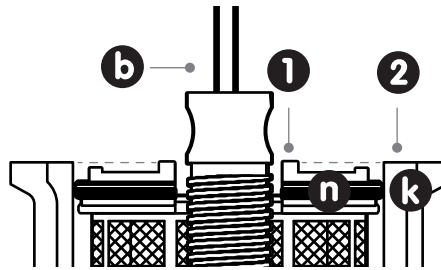
#### 5.1.3 Re-assembly

20. Replace the Filter Screen **l** into the Inlet Disc **i**





21. Carefully replace the **Hydraulic Motor** **(p)** and **Plate** **(n)** into the **Filter Housing** **(h)**, ensuring that the **Piston Shaft** **(b)** is inserted into the hole in the middle of the **Inlet Disc** **(i)**.
22. Push down firmly on the **Plate** **(p)**. When correctly in place the **central collar** of the **Plate** **(n)** will be flush with the top of the **Housing** **(h)**. Make sure the **Shaft** **(b)** can move up and down, and rotate / spin freely.



23. Ensure the rubber **Filter Cover O-ring** **(c)** is in place in the **Cover** **(c)**
24. Replace the filter cover assembly on to the filter **Housing** **(k)**, rotating the **Cover** **(c)** slightly to seat the **O-Ring** **(c)**
25. Replace and fasten the **Clamp** **(d)**

### WARNING

Use caution when fastening the clamp, avoid injury to your fingers

26. Re-connect the Drain pipe to the Drain valve assembly
27. Reinstall the **Piston** **(p)**, making sure the **O-Ring** **(c)** is in place on the **Piston** thread. Rotate it clockwise by hand only – as per [3.4.1 Backwash Controller Installation](#), do not use any tools.
28. Re-attach the  $\frac{1}{4}$ " **Plastic Tubing** **(t)** into the **Piston** **(p)** – push in hard.
29. Follow instructions in – [3.4.2 Turning On Water Supply](#)
30. Follow instructions in – [3.4.3 Power Connection](#)

## 5.2 Piston Maintenance

The piston shaft requires lubrication on a quarterly schedule.

1. [De-pressurize the system](#)
2. Remove the  $\frac{1}{4}$ " **Tubing** **(t)** from the push to connect fitting on the top of the **Piston** **(p)**.
3. Unscrew the **Piston** **(p)** (counter clockwise)
4. A silicon grease should be applied to the **Piston Shaft** **(b)** which should be cycled in and out a few times to get the grease distributed to the inner O-ring seal. Two applications of grease and cycling is adequate.
5. The **Piston** **(p)** may drip water from the lower vent hole. This is normal during the course of operation. If the lower vent hole continually flows water, the piston should be replaced.

## 5.3 Winterization

If you have unions on the inlet and outlet, storing the HN-G Filter in a room that is above freezing (and will not freeze) is the best way to winterize it. This would minimize the thoroughness required of the steps below (but still recommended before storage).

1. Run a cleaning cycle by pressing the M button on the Filtron 1-10 (**HN-G-01-1-XXX**, **HN-G-02-1-XXX** models) or from the irrigation controller (**HN-G-01-2-XXX**, **HN-G-02-2-XXX** models), [de-pressurize](#), empty completely.
2. Empty the **Piston** **(p)** of excess water by removing it and then cycling the **Piston Shaft** in and out. Lubricate the piston shaft with silicone grease and cycle the shaft in and out a few times while adding grease each time (the idea is to get the grease to the lip of the internal seal). Store the piston in a plastic zip lock so the water does not completely evaporate (keeps the seals lubricated). It is best to store the piston inside and block off the hole in the filter cover.
3. Blow out all of the  $\frac{1}{4}$ " and  $\frac{5}{16}$ " control tubing.
4. Gently blow out each side of the DP switch on the controller (remove the  $\frac{5}{16}$ " tubing at the red and black connectors).
5. Unscrew the solenoid on the 1" Rinse valve (**PESB Scrubber**) and make sure that any excess water is removed from the diaphragm

area and solenoid. It is usually easier to just unscrew the top of the valve cover and drain the diaphragm area that way.

Manually cleaning the Filter Screen **1** element before storage is also a good idea. That will prevent debris from drying on the screen and becoming difficult to remove the following season.

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This section relates to the following models only: **HN-G-01-2-XXX HN-G-02-2-XXX**

#### **5.4 Backwashing without a Filtron 1-10 Controller**

For filters that are ordered without a Filtron 1-10 controller, programming of the backwash is based on time off of the irrigation controller. The irrigation controller must be able to program station run times in seconds (or a 24 VAC one shot relay capable of delivering a 7 second signal to the filter must be added).

The backwash time (station run time) should be programmed for 7 seconds. If adequate flow and pressure is not available to backwash the filter and run irrigation, the filter must be scheduled to run alone (without irrigation) to ensure all flow and pressure can be utilized for backwash.

Since there is no differential pressure switch on this model, an adequate amount of backwash cycles will have to be programmed to ensure pressure in the system is maintained. It is recommended that the filter is flushed before the irrigation cycle, at least once during the irrigation cycle (may take more), and then after the irrigation cycle.

## 6. FILTRON 1-10 (DC) Manual

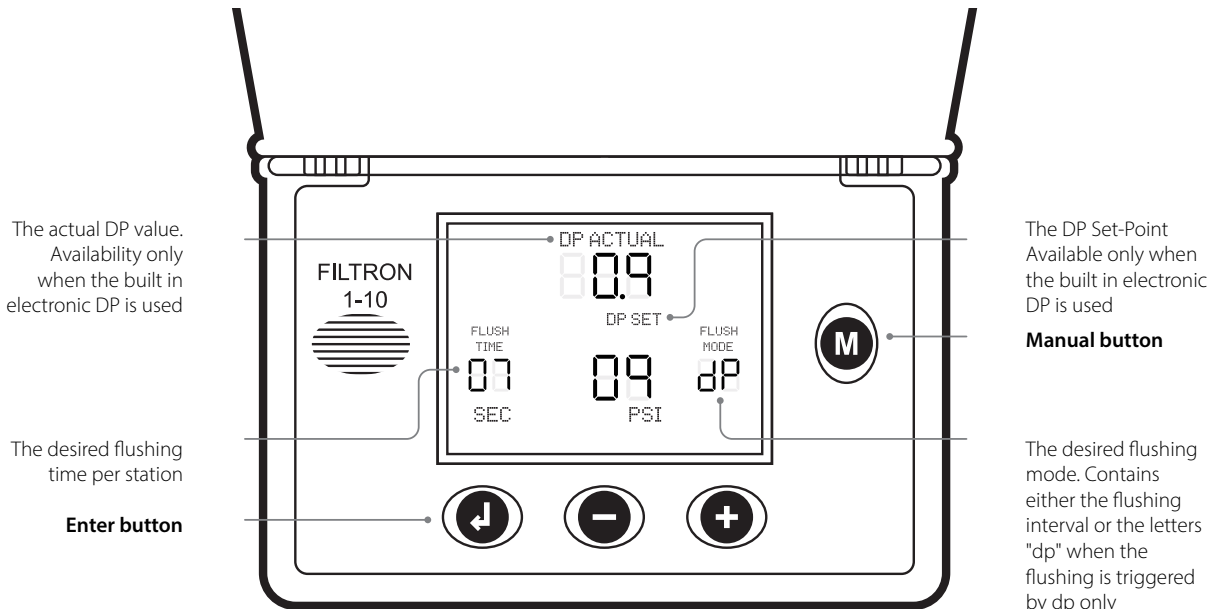
The Filtron 1-10 requires minimal to no user programming, the following sections are only related to site specific programming requirements.

### 6.1 Features

- Modular backflushing controller for automatic filters of 1 to 2 stations.
- DC controller which also comes with an AC adapter to 12 VDC.
- The DC model can be powered either by four 1.5V "D" Batteries or 12v DC (via the AC adapter) and it activates up to 2 wired DC latching solenoids. The voltage for the solenoids switching is boosted by a charge pump.
- Flushing cycles may be triggered either by time or by the embedded electronic DP sensor reaching the set point, or by a dry contact signal from an external DP sensor.
- [Endless looping problems can be eliminated by detecting repeated consecutive cycles passing beyond a predefined limit.](#)
- The unit can optionally handle a Pressure-Sustaining / Main valve, and an Alarm output.
- The unit is equipped with a customized LCD display and key board.
- The unit counts separately the number of flushing cycles triggered by DP, by time and manually.

### 6.2 How to program the controller

The controller is equipped with an LCD display and 4 keys as displayed below. When the unit is left untouched for a minute the display is switched off and the only life signal is given by a beep sound that can be heard every 20 seconds. The beep can be disabled in the programming section. Holding down any of the keys for a few seconds will bring the screen back to life.

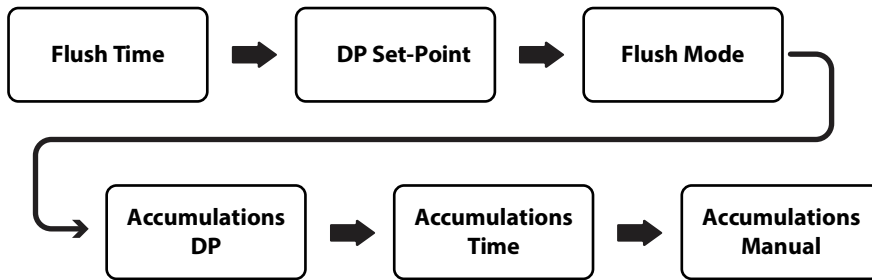


The screen consists of several fields, some of them are editable and some of them are not. For inserting EDIT MODE the ENTER key has to be pushed. The EDIT MODE is indicated by blinking of the characters at the currently editable field. Each time the ENTER key is pushed again, the next editable field becomes editable and starts blinking. While in EDIT MODE the "+" and "-" keys can be used for changing the value under focus. Pushing the ENTER key again will set the selected value to the current field and move the focus to the next editable field which will start blinking. Once entering this process of passing through the editable fields, the user has no way back but by pushing the ENTER key repeatedly, he passes through the chain of editable fields until arriving back to the FLUSH TIME field, meeting no more blinking fields.

Notice that before the first use of the unit, it may be necessary to pass through the configuration process prior to defining the flushing program in order to adjust the features of controller to the specific application. The configuration process is described below.

### 6.2.1 The chain of editable fields

Below is the chain of editable fields. The existence of the DP SET-POINT field depends on whether the system contains a built-in electronic DP or not.



### 6.2.2 The Flush Time

Flush Time defines the duration of the flushing time per station. The following options are selectable:

- 5-20 sec in steps of 1 sec
- 20-55 sec in steps of 5 sec
- 1-6 min in steps of 0.5 min

### 6.2.3 The DP Set Point

**NOTE:** The controller is pre-set to a 9 PSI differential pressure. This value can be adjusted up or down based on water quality and screen size to adequately keep the screen clean. Lower differential pressure values will decrease the amount of contaminant that imbeds into the screen, especially with finer screens. A balance between differential pressure and the backwash frequency must be established based on site conditions. The lower the differential pressure, the more backwashes will occur. The higher the differential pressure, the harder the screen will become to clean. Typical differential set point is generally set somewhere between 6 and 9 PSI.

At this field the user defines the pressure difference between the filter's inlet and outlet that when reached, a flushing cycle will take place. The DP set-point field will disappear if there is no Electronic DP connected. In this case the Digital DP input can be used.

#### Up to version 1.02 of the Filtron 1-10,

A non-zero value Set-point would have caused the controller to ignore the Digital DP input completely, but a zero Set-point would make the Digital DP effective and cause the Electronic DP to be ignored.

#### Starting from version 1.03

A change was made so that a non-zero Set-point does no longer cause the Digital DP input to be ignored, but instead a closed contact Digital DP input will cause the unit to keep on executing flushing cycles as long as the contact remains closed, ignoring the looping limit. When

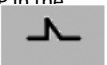
the DP contact reopens, the flushing stops right away without completing the running flushing cycle.

Starting from version 1.03 if there is no Analog DP connected or when the set-point equals zero the unit refers to the Digital DP in the normal way, namely when the contact of the Digital DP is constantly closed it will execute consecutive flushing cycles until re. Looping Limit and then declare an endless Looping problem.

When the pressure is expressed in BAR the range of values is 0.1 – 1.0 BAR.

When the pressure is expressed in PSI the range of values is 1- 15 PSI.

The closed Digital DP contact will be indicated by the symbol :



## 6.2.4 The Flush Mode

The Flush Mode defines how the flushing cycles is triggered. The selectable options are as follows:

<b>OFF -</b>	No flushing will take place
<b>By time -</b>	In this case the flushing cycles will be repeated in a selected interval or will be triggered by the DP signal depending on what happens first. No matter how was the flushing cycle started the interval to the next cycle will start to be measured again after each ending of a flushing sequence. The selectable intervals are the following: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60 <b>minutes</b> 2, 3, 4, 5, 6, 8, 12, 18, 24, 72, 120 <b>hours</b>
<b>dp -</b>	Flushing will be triggered by DP only.

### NOTE

If the "+" and "-" keys are pressed and held down simultaneously the "Flush Mode" field will show the left time until next cycle, alternately hours and minutes.

## 6.2.5 The Accumulations

The unit accumulates and displays the number of flushing cycles caused by DP, by time, or manually at each of the accumulation fields, the "+" or "-" keys may be used for clearing the accumulated value.

## 6.2.6 The Configuration

In order to enter into the configuration process press and hold down the ENTER key for at least 3 seconds.

The unit will detect how many "plug-in" boards (each of 2 outputs) are used in the particular case.

How will the outputs be allocated depends on the definitions made during the configuration process described below. The following rules apply:

1. Backflush valves will be allocated starting from output 1 and up.
2. The last backflush valve can be cancelled and then its allocated output will be left unused.
3. Alarm output, Delay-Valve and Main-Valve when defined, will be allocated in this order, right after the last backflush valve (whether in use or not).

### Example:

Assuming there are 3 "plug-in" boards, this makes 6 outputs for use. If there are no Alarm-output, no Delay-Valve and no Main-Valve all the 6 outputs will be allocated for backflush valves.

If additionally a Main-Valve is defined, the first 5 outputs will be allocated for backflush valves and output No 6 for the Main-Valve. Output No 5 (of the last backflush valve) can be canceled and left unused. If additionally a Delay-Valve is defined it will be allocated to output 5 right before the Main valve, leaving the first 4 outputs for backflush valves, and once again output No 4 (of the last backflush valve) can be canceled and left unused. If additionally an Alarm-output is defined it will be allocated before the Delay-Valve leaving only 3 of the first outputs for backflush valves. No 3 can again be canceled.

During the configuration process the following features are defined:

<b>Main Valve (sustaining valve)</b>	Yes/ No. When the answer is "Yes" the Pre Dwell delay between the Main Valve opening and the opening of Station No. 1 can be defined. The selectable delay steps are: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55 sec 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6 min
<b>Dwell time</b>	the delay between stations – can be set to 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, or 60 sec.
<b>DP delay</b>	the delay during which the DP sensor reading is expected to remain stable before reaction – 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60 sec.

<b>Looping limit</b>	the number of consecutive flushing cycles triggered by the DP sensor before deciding that there is an endless looping problem. The options are: 1-10 or “no” which means ignoring the looping problem.
<b>Alarm</b>	Yes/No – allocating one output for alarm activation.
<b>Delay Valve</b>	Yes/No – allocating an output for Delay Valve activation.  This is a special mode that enables passing through the list of outputs to see how each output was allocated. Use the + key to change the “no” into “yes” and confirm by “Enter”, then keep using the + key to pass through the list. At the bottom left corner the ordinal number of the output is displayed and its allocated function appears in large letters at the center of the screen. Notice that the number of possible outputs that can be used is always an even number since it results from the number of “plug in” boards (each of 2 outputs) included.  However if the number of outputs needed is not an even number, 13 then the last valve allocated for flushing may be canceled by use of the manual operations key.
<b>Pressure units</b>	deciding about the units to be used for pressure measurement. Selecting between BAR or PSI .
<b>Calibration</b>	Zero calibration of the built in electronic DP sensor. While the sensor ports are disconnected select Calibration = Yes.
<b>Version display</b>	The last screen of the configuration supplies information about the software version of the controller. the version consists of 4 digits like the following:

### 6.2.7 Handling Endless Looping problems

As explained above, endless looping problem will be declared when the number of consecutive flushing cycles triggered by the DP sensor exceeds the “Looping limit” defined during configuration.

The fact that endless looping problem was detected will be indicated on the display and will cause the activation of the Alarm output, additionally, the DP indication will no longer be considered as a trigger for flushing. The following flushing cycles will be triggered by the interval count down only.

The problem will be considered as solved when the constant indication of the DP sensor will be removed.

### 6.2.8 Handling Low pressure

When a closed contact indication is received at the low pressure input of the controller, the P symbol will start to appear blinking at the display. All activities will stop including the countdown to the next flushing cycle. If the low pressure happened while a flushing sequence was in progress, when the low pressure condition terminates the flushing sequence will start from the beginning rather than continue from the stop point.



Connecting the DP sensor to the filter system The DP sensor is connected to the filter system by 2 command tubes, the one which comes from the filter inlet (High pressure) will be connected to the red point, and the one that comes from the outlet (Lower pressure) will go to the black point. It is important to put a small filter of 120 mesh (not supplied) between the red point and the high pressure connection point.

### 6.2.9 Connecting the DP sensor to the filter system

The DP sensor is connected to the filter system by 2 command tubes, the one which comes from the filter inlet (High pressure) will be connected to the red point, and the one that comes from the outlet (Lower pressure) will go to the black point. A small Finger Filter is added to the High Pressure inlet Fitting to protect the digital DP Switch.

### 6.2.10 Low battery

The unit has two levels of low battery indication. At the first level when the battery voltage drops to the first level, the sign Low Battery will start to appear at the screen. When the battery voltage drops further and reaches the second level, all outputs will shut down, the screen will be cleared leaving only the low battery icon



### 6.2.11 Manual activation

A flushing sequence can be manually activated by the “MANUAL” key. When manually activated the hand icon will appear on the display. The same key will be used for manually terminating a sequence in progress.



# **A. Appendix**

## **A.1 DC MODEL**

The drawing below shows the wiring of the DC model of the controller.

Notice that:

1. The External DP sensor is optional and it is intended for use in cases there is no Embedded Electronic DP included.
2. The powering of the unit is by (4) D Cell Batteries or 110/ 220 AC to 12 VDC adapter or 12 VDC battery
3. The solenoids will be of 9-12 VDC.

## **A.2 HN-G - Controller Filtron 1-10**

### **Programming with Rinse Valve only (No Sustaining Valve on Filter Outlet)**

1. Press and hold ENTER for 3 seconds
2. MAIN VALVE – No
3. ENTER - Dwell – 05 seconds
4. ENTER - DP DELAY – 30 seconds
5. ENTER - LOOPING – 10
6. ENTER - ALARM – No
7. ENTER - DELAY VALVE – No
8. ENTER - VIEW OUTPUT – No
9. ENTER – Pressure - PSI
10. ENTER - BEEP – Yes / No (set to No to prevent sign of life beep every 20 seconds)
11. ENTER – back to operation

## **A.3 HN-G - Controller Filtron 1-10**

### **Programming with Sustaining Valve on Filter Outlet**

1. Press and hold ENTER for 3 seconds
2. MAIN VALVE – Yes
3. ENTER –1" filter = 5 seconds, 2" filter =10 seconds.
4. ENTER - Dwell – 05
5. ENTER - DP DELAY – 30 seconds
6. ENTER - LOOPING – 10
7. ENTER - ALARM – No
8. ENTER - DELAY VALVE – No
9. ENTER - VIEW OUTPUT – No
10. ENTER – Pressure - PSI
11. ENTER - BEEP – Yes / No (set to No to prevent sign of life beep every 20 seconds)
12. ENTER – back to operation

## **A.4 Operation**

1. Press ENTER
2. Set FLUSH TIME to 7 seconds
3. ENTER – set DP to 09 PSI

4. ENTER – FLUSH MODE – DP
5. Press ENTER 4 times to go back to operation (Accumulation Counters may be reset during these entries).

## A.5 TECHNICAL DATA

<b>Power source:</b>	6v supplied by 4 x "D" size alkaline batteries. or 12v DC dry battery or AC to DC plug in adapter or 12v rechargeable battery with solar panel of 2 watts
<b>Outputs :</b>	12v DC latching solenoids.
<b>DP:</b>	Embedded electronic analog DP sensor or external dry contact DP sensor.
<b>Pressure Sensor:</b>	Dry contact pressure sensor
<b>Operating temperature:</b>	0-60 °C.

## A.6 Troubleshooting

### A.6.1 Problem: Excessive pressure drop across the filter

Possible causes:

1. Filter Screen is clogged due to lack of pressure during Self-Clean

Solution

- Make sure water pressure during Self-Clean is at least 40 psi.
- Close the isolation valve on Outlet pipe of the HN-G
- Press the (M) button on the Backwash Controller
- HN-G will perform a backwash
- Re-open isolation valve on Outlet pipe of the HN-G-02

2. Filter Screen is still clogged.

Solution:

- Remove the Filter Screen and manually clean it. Follow instructions in Section 5a above

3. Wait Time between Self-Cleaning cycles is too long.

Solution:

- Adjust Interval timer in Backwash Controller
4. Problems with Solenoid/Backwash Controller Unit.
    - Solution: Contact Rain Bird [GSPpumpteam1@rainbird.com](mailto:GSPpumpteam1@rainbird.com)

### A.6.2 Problem: Valve malfunction

Possible causes:

1. Ruptured Diaphragm
  - Replace Diaphragm
2. Solenoid malfunction
  - Replace Solenoid
3. Backwash Controller malfunction
  - Solution: Contact Rain Bird [GSPpumpteam1@rainbird.com](mailto:GSPpumpteam1@rainbird.com)

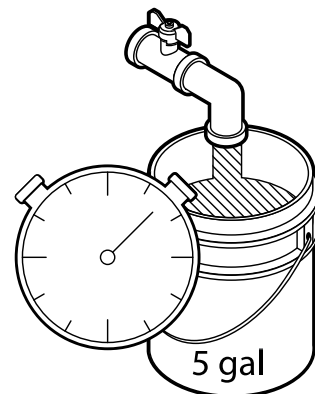


## B. Appendix C (System Specification)

### B.1 Estimate flow rate and record pressure

Place a 5 gallon bucket at the water source and allow it to flow without restriction into the bucket.

Time how long it takes to fill to the 5 gallon point.



$$\begin{array}{l} \text{Volume of Bucket (in gallons)} \\ \text{Time to fill bucket (in seconds)} \end{array} \begin{array}{l} \text{Example} \\ \frac{5}{7} \end{array} \times 60 = 43 \text{ GPM}$$

#### Backwash requirements

A 1" filter requires 30 GPM at 40 PSI to backwash properly.

A 2" filter requires 40 GPM at 40 PSI to backwash properly.

If this flow and pressure for backwash can't be maintained while irrigating, the flow to irrigation must be stopped (using a controlled outlet valve) while the filter backwashes.

Static (and dynamic) pressures over 100 PSI require a pressure regulator.

### B.2 Rank your water source

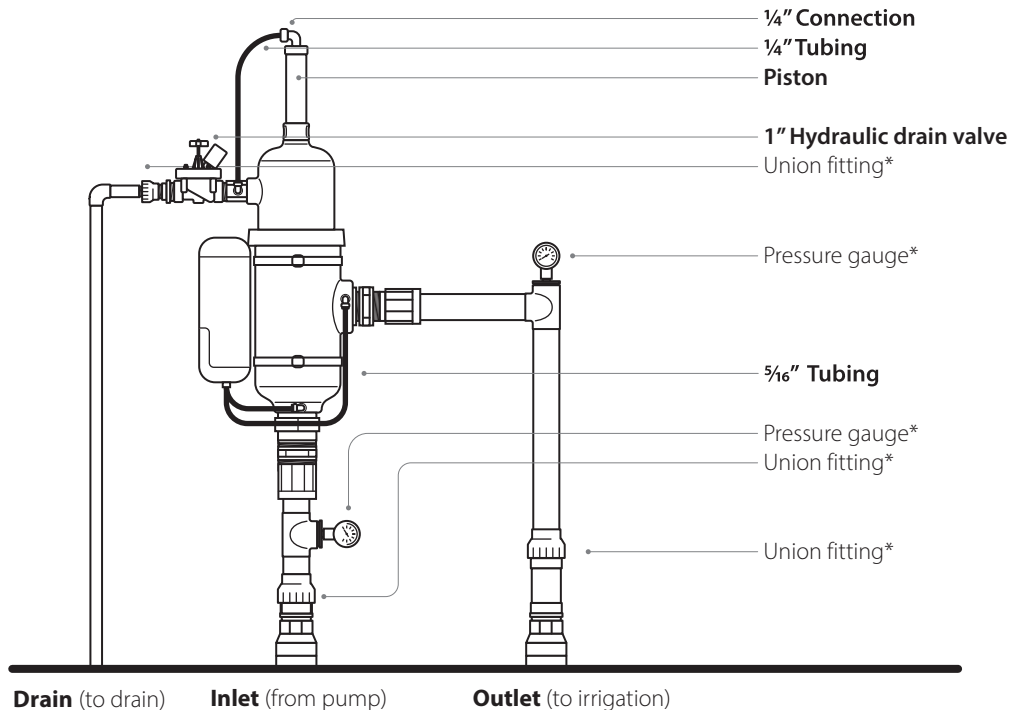
Flow is dependent on Water Source Quality and the micron size of the screen. The following chart defines the maximum flows allowable based on Water Source Quality and screen micron size. Most applications will follow the Average, Poor or Very Poor lines. Water source should be rated at worst case scenario if water quality varies during the year (such as algae blooms during summer). A general guide to Water Quality is also shown below.

		Good		Average		Poor		Very Poor			
		<b>Solids</b>		< 40 ppm		< 80 ppm		< 110 ppm			
		<b>Example</b>		Clear lake water or equal		River water.		Brown or green water (mud/algae).			
		<b>Contamination</b>		95% clear water, small contaminants. No real discoloration of the water.		Light to medium discoloration.		Heavy discoloration. Medium algae, visible silt/dirt etc.			
<b>Maximum Flow</b>											
		<b>Filter Size</b>		1"		2"		1"		2"	
<b>Screen size</b>	400 micron (47 mesh)		40 GPM	100 GPM	40 GPM	100 GPM	36 GPM	55 GPM	Not recommended	35 GPM	
			9 m <sup>3</sup> /h	22.7 m <sup>3</sup> /h	9 m <sup>3</sup> /h	22.7 m <sup>3</sup> /h	8.2 m <sup>3</sup> /h	12.5 m <sup>3</sup> /h		8 m <sup>3</sup> /h	
	200 micron (88 mesh)		40 GPM	100 GPM	37 GPM	85 GPM	33 GPM	50 GPM	Not recommended	30 GPM	
			9 m <sup>3</sup> /h	22.7 m <sup>3</sup> /h	8.4 m <sup>3</sup> /h	19.3 m <sup>3</sup> /h	7.6 m <sup>3</sup> /h	11.4 m <sup>3</sup> /h		6.8 m <sup>3</sup> /h	
150 micron (100 mesh)		40 GPM	95 GPM	33 GPM	70 GPM	Not recommended	40 GPM	Not recommended	Not recommended		
		9 m <sup>3</sup> /h	21.6 m <sup>3</sup> /h	7.5 m <sup>3</sup> /h	15.9 m <sup>3</sup> /h		9 m <sup>3</sup> /h				
100 micron (150 mesh)		30 GPM	75 GPM	25 GPM	45 GPM	Not recommended	Not recommended	Not recommended	Not recommended		
		6.8 m <sup>3</sup> /h	17 m <sup>3</sup> /h	5.7 m <sup>3</sup> /h	10.2 m <sup>3</sup> /h						

## C. Installation Example 1

How your filter is installed will depend on how your system is structured and the specific requirements of your site. This example illustrates a stand-alone filter installation with minimal added components in discharge plumbing like what is located on a municipal feed water source (or pumped water where the pump is located remotely).

Pipe support is attached to pipe with a pipe attachment.

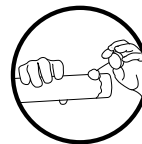


\* User to supply

Unions are required for ease of maintenance and in order to make installation easier. With unions, at all recommended spots, the filter may be removed for service and any threaded connections can also be easily accessed if any of these need to be tightened up or resealed due to movement during shipping or installation.

*It is recommend to install PVC unions on the inlet, outlet and drain. The drain will be a 1" union. The inlet and outlet will be either 1" or 2" unions depending on the model ordered. Unions will make servicing and winterizing the filter much easier. A bypass loop with bypass valve is also recommended so that the filter can be bypassed during service if required.*

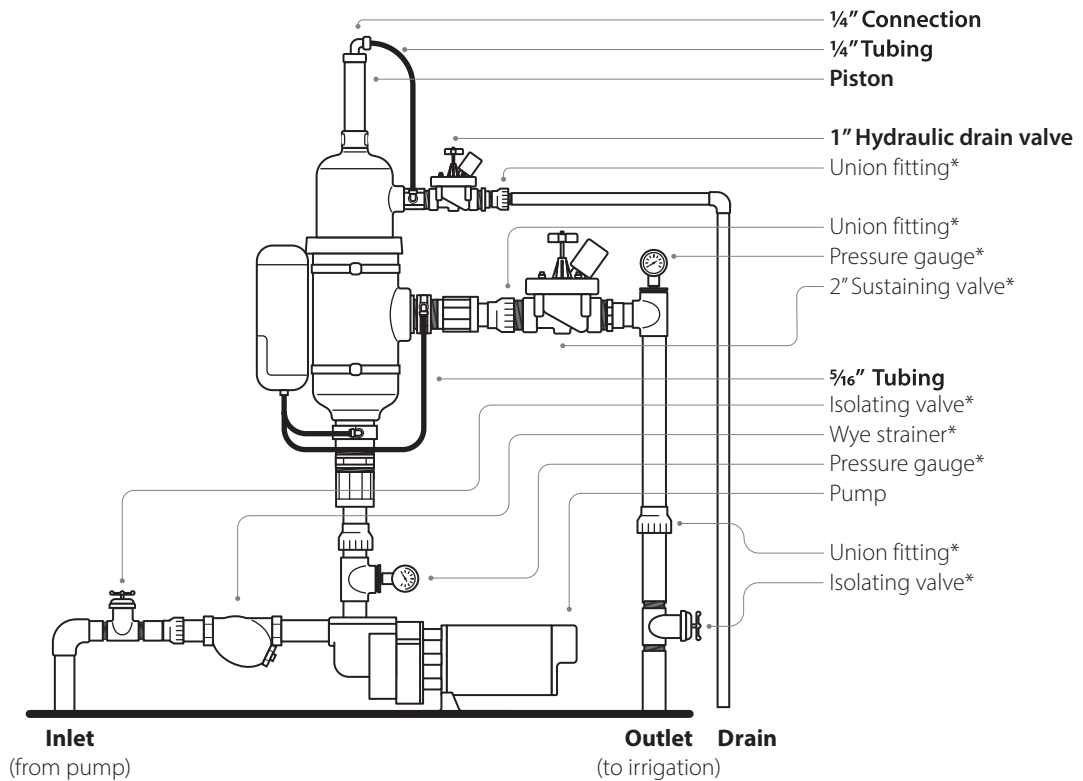
Follow standard PVC solvent welding procedure to plumb the filter into the irrigation line.



*The Inlet, Outlet and Drain line pipes need to be supported so that no stress is transferred to the filter. Pipe support is attached to pipe with a pipe attachment.*

## D. Installation Example 2

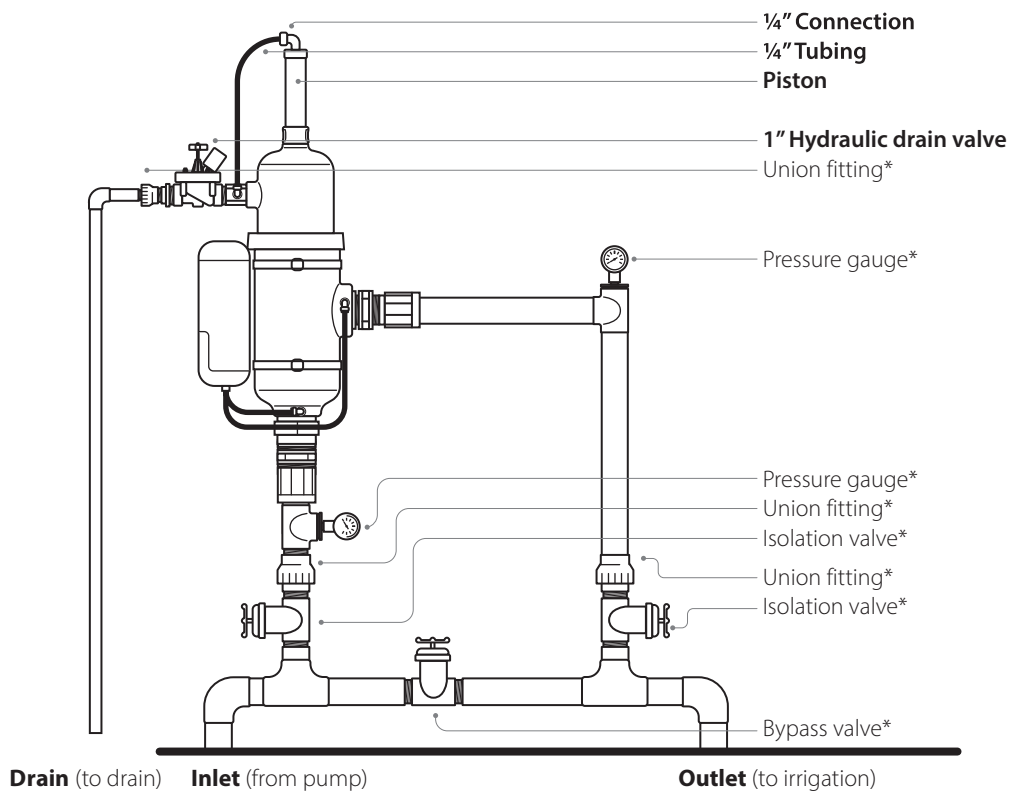
This example illustrates a filter installation in discharge plumbing located on the output of a pump and also a controlled outlet valve on the discharge of the filter to accommodate low flow rate applications where all pressure and flow must be utilized for backwash (the controlled outlet valve can also be applied in installation example A and C).



\* User to supply

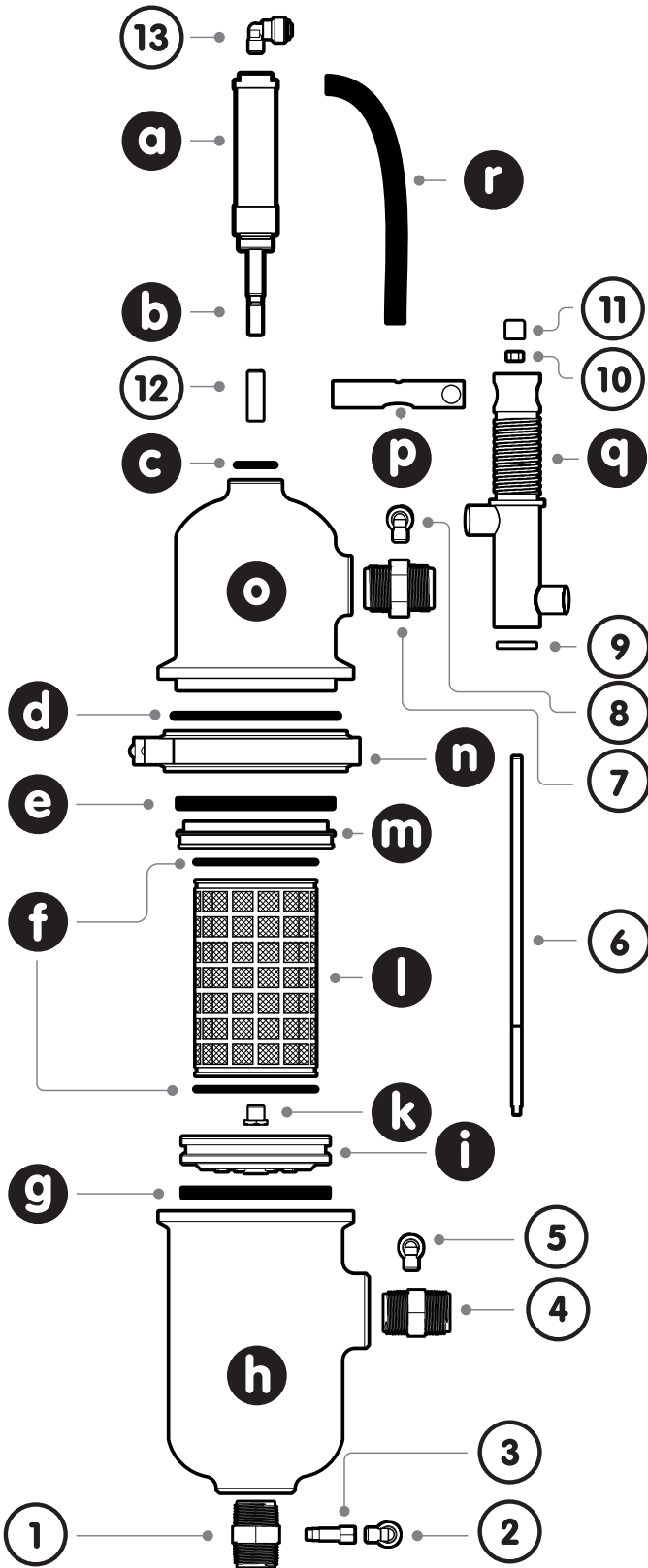
## E. Installation Example 3

This example illustrates a bypass configuration.



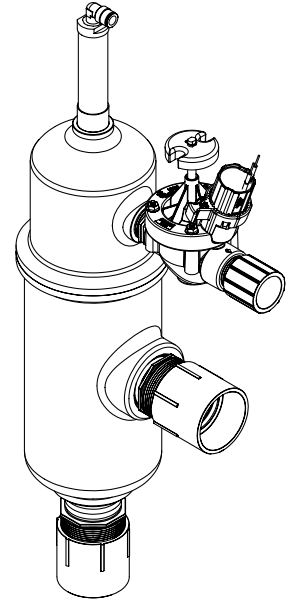
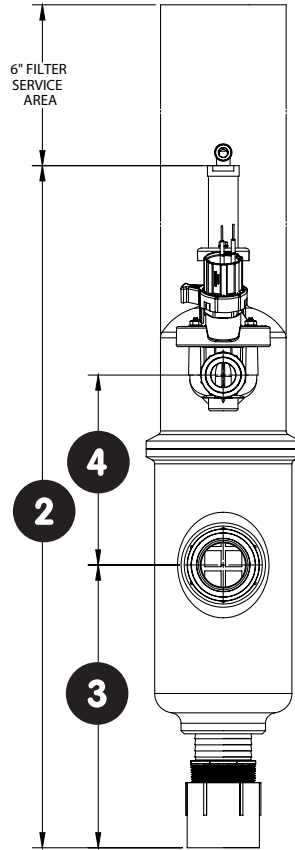
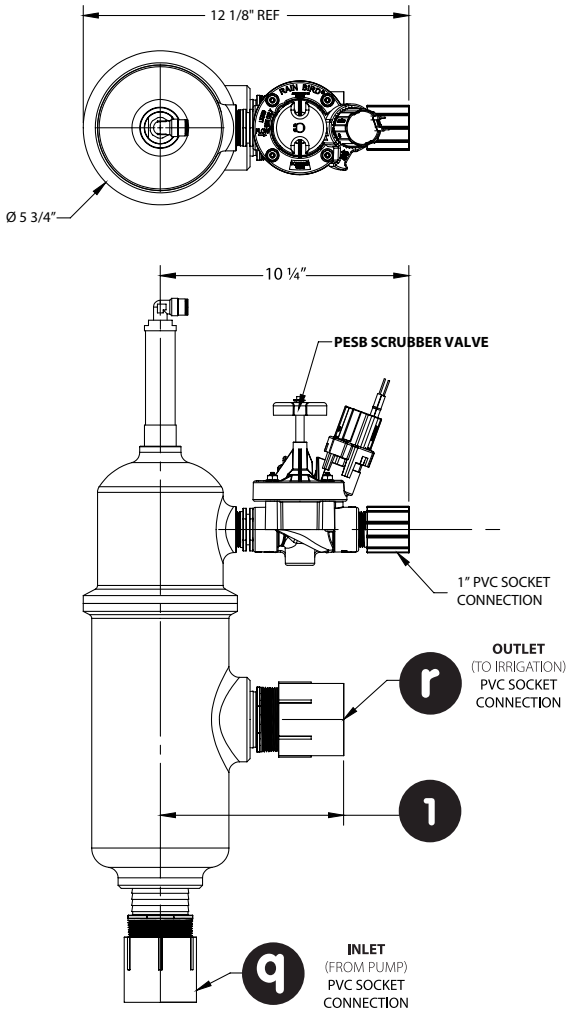
\* User to supply

## F. Parts List



<b>a</b>	Piston	MTFC-09
<b>b</b>	Piston Shaft	MTFC-09
<b>c</b>	Piston O-Ring	MTFC-014
<b>d</b>	Filter Cover O-ring	MTFC-015
<b>e</b>	Plate Seal	MTFC-012
<b>f</b>	Screen O-ring	MTFC-013
<b>g</b>	Inlet Disc Seal	MTFC-011
<b>h</b>	Housing	MTFC-10-01
<b>i</b>	Inlet Disc	MTFC-02
<b>k</b>	Inlet Bearing	MTFC-03
<b>l</b>	Filter Screen	MTFC-10-04-X
<b>m</b>	Plate	MTFC-10-06
<b>n</b>	Clamp	MTFC-08
<b>o</b>	Cover	MTFC-07
<b>p</b>	Hydraulic Motor	MTFC-10-51
<b>q</b>	Collector Assembly	MTFC-10-51
<b>r</b>	¼" Tubing	6mm Plastic Tube
<b>1</b>	MTFC Hex Nipple 1"	MTFC Hex Nipple 1"
<b>2</b>	CI010821W	Streight Fitting ⅛" x 8mm
<b>3</b>	MTFV Finger Filter	MTFV Finger Filter
<b>4</b>	Hex Nipple 1in	70831
<b>5</b>	Streight Fitting ⅛" x 8mm	CI010821W
<b>6</b>	Shaft	MTFC-10-53
<b>7</b>	Hex Nipple 1in	70831
<b>8</b>	Orifice Fitting ⅛" x 6mm	SRF420
<b>9</b>	Collector Cap	MTFC-55
<b>10</b>	Hex Nut	MTFC-56
<b>11</b>	Cup	Cup
<b>12</b>	Adapter - Delrin	MTFC-010
<b>13</b>	Elbow Fitting ⅛"x 6mm	CI480422W

# G. Dimensions



	1" Models	2" Models
<b>q</b>	1"	2"
<b>r</b>	1"	2"
<b>1</b>	7 1/8"	7 1/4"
<b>2</b>	22 13/16"	25 5/8"
<b>3</b>	9 15/16"	10 9/16"
<b>4</b>	6"	7 1/16"