

OWNER'S MANUAL

VACLEEN® AUTOMATIC FILTRATION™ MODEL 7003



VACLEEN®



OLSON
IRRIGATION
SYSTEMS

U.S. Pat 6,959,818, US 8,028,841;
EU 1,446,213, and 1,758,667; Israel 161727,
and Germany 602 13 277, 0-08
Other US and foreign patents pending.

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VACLEEN® FILTER
Model 7003

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SECTION 1 INTRODUCTION

1.1 Description

The Olson VACLEEN® 7003 is an automatic, self-cleaning, screen-type filter. The filtration system consists of a tank body, 3" NPT or BSP inlet and outlet connections, a 1.5" NPT or BSP flush valve and a filter controller.

1.2 Theory of Operation

Pressurized dirty water enters the filter inlet and passes through the inside of a fine screen where contaminants (down to 10 micron) are filtered out. The clean water then exits the outlet.

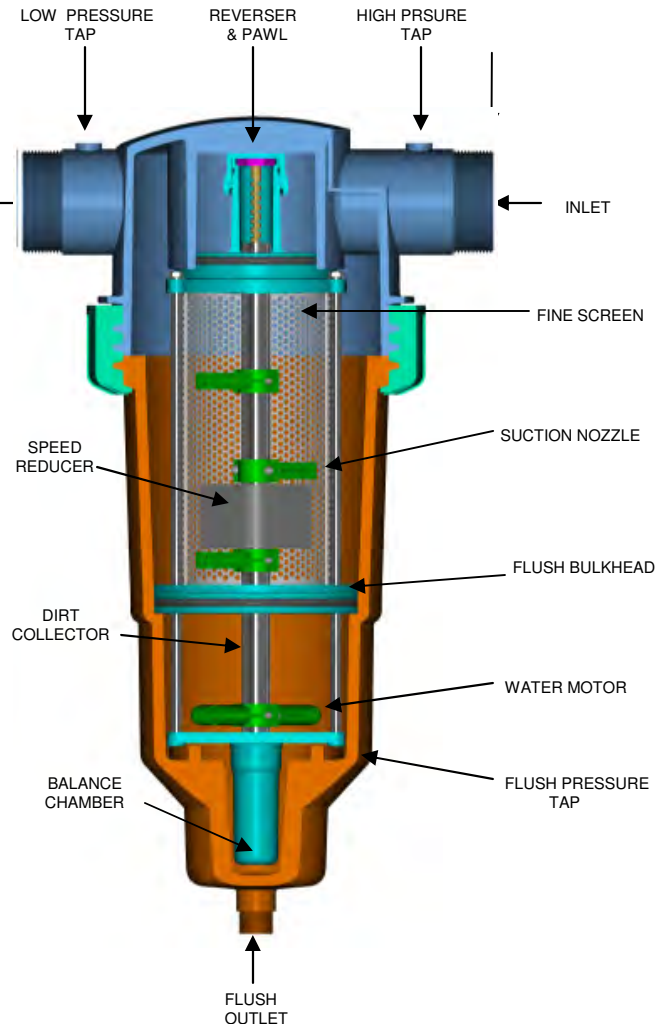
When the fine screen becomes contaminated, a pressure differential is sensed, causing the automatic controller to open the flushing valve. When the flushing valve opens, the pressure differential is reversed on the area being swept by the rotating cleaning nozzles. This causes the clean water to flow through the filter element as the reciprocating nozzles rotate back and forth across the entire screen surface, removing contaminants through the nozzles, then passing through the water-driven reactionary motor and out through the flush valve.

The Olson VACLEEN® system uses small flush nozzles that reciprocate across the filter screen allowing the use of a small flush valve. A reversing screw causes the traversing of the nozzles back and forth across the screen insuring 100% screen coverage. An important advantage of the small flush valve is that the pressure drop is less, thereby increasing the filter's efficiency and using less flush water.

The entire cleaning cycle may take as few as six seconds and uses a minimal amount of water due to the highly controlled cleaning process. ***It should be noted that even during the backflush cycle, the filtration process continues uninterrupted.***

1.3 Recommended Applications

The Olson VACLEEN® filter is appropriate for use in both agricultural irrigation and industrial applications. It is effective in filtering out silt, scale, sand, rust, dirt and organic material, like algae, from virtually all types of water sources.

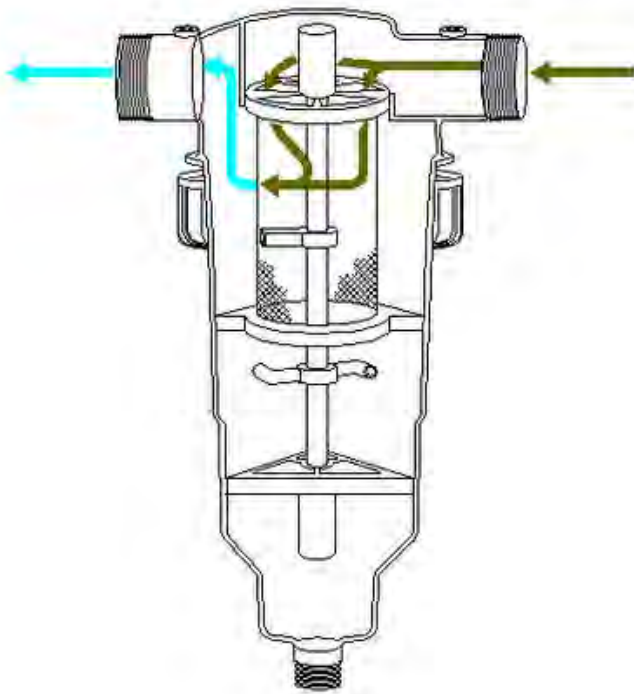


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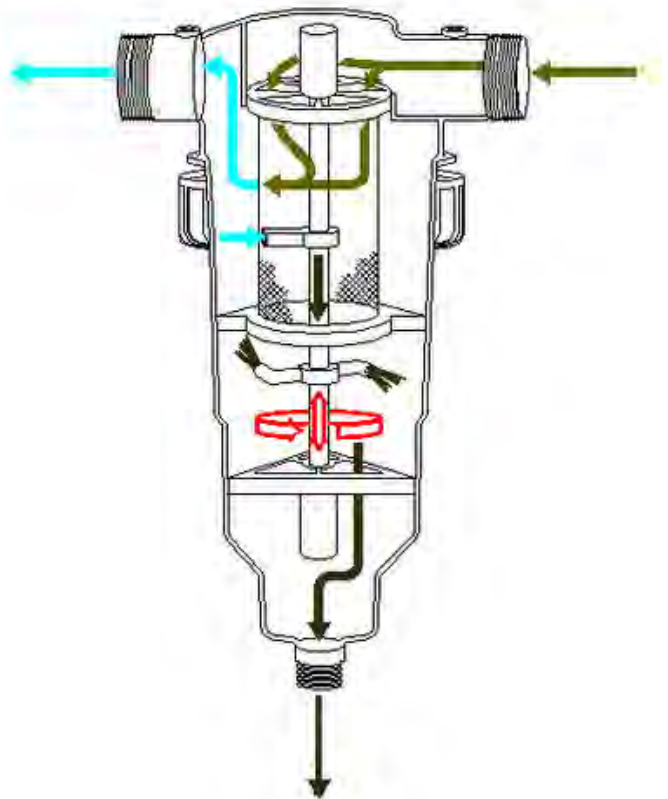
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1.3 Filtering and Flushing Sequence



FILTERING MODE

Dirty water enters the filter and flows into the filter chamber and passes through the fine mesh filter element. Clean water exits the filter.



FLUSHING MODE

During filtration, debris accumulates inside the filter element, reducing the pressure across the screen. This reduction of pressure is sensed by the controller which opens the flush valve, reducing the pressure at the cleaning nozzles. This causes reverse flow across the screen, taking the dirt into the nozzles.

The forceful flow of dirt and water through the nozzles drives the reactionary motor causing nozzles to rotate and reciprocate, cleaning 100% of the screen surface. **Filtration continues uninterrupted throughout the cleaning process.**

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SECTION II DESIGN FEATURES AND SPECIFICATIONS

2.1 Design Features

Among the many features of the Olson VACLEEN® filter is its avoidance of the danger of forcing contaminated water back into the system, which often happens with sand media filters. The Olson filter will deliver **clean** water or **no** water.

The filter can remove organics such as algae and other suspended particles.

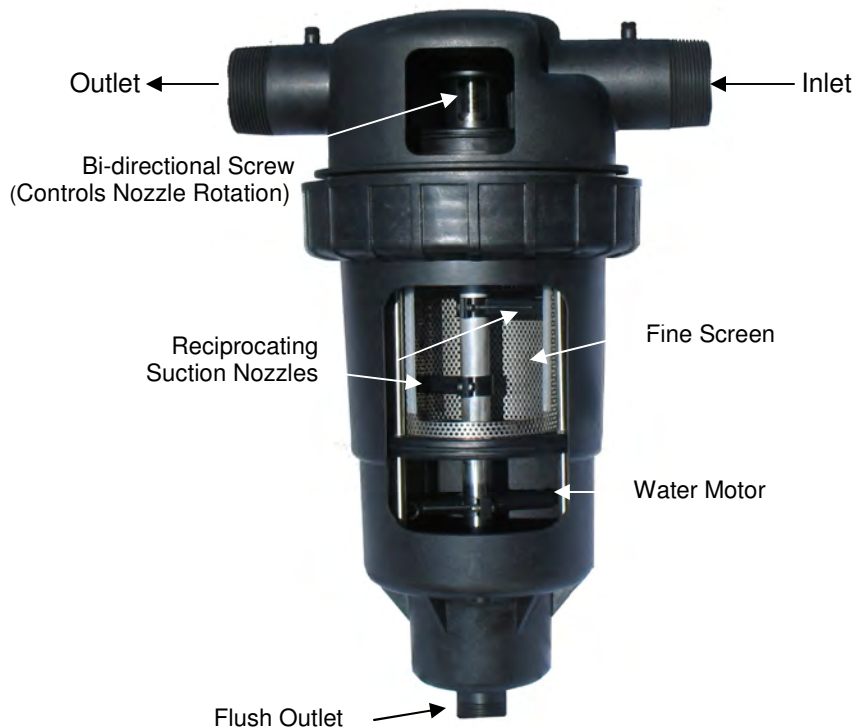
Note: Filtering large quantities of heavy sand or large stringy algae, is not recommended for this filter. Heavy sand or debris may wedge itself into the fine screen and jam nozzles, preventing motor rotation and proper cleaning.

The controlled reciprocating action of the cleaning nozzles ensures 100% cleaning coverage of the screen.

Flows are uninterrupted, even during the backflush cycle, making the Olson VACLEEN® is especially suited for sustaining operability in flow-critical applications.

The entire back-flushing mechanism and fine screen assembly are modular and can be removed from the filter body without disruption of the plumbing, with a possible exception should the flush connection need to be disconnected. This design allows easy maintenance outside the filter body.

The cleaning mechanism is driven hydraulically by a water motor and requires no outside power source for operation.

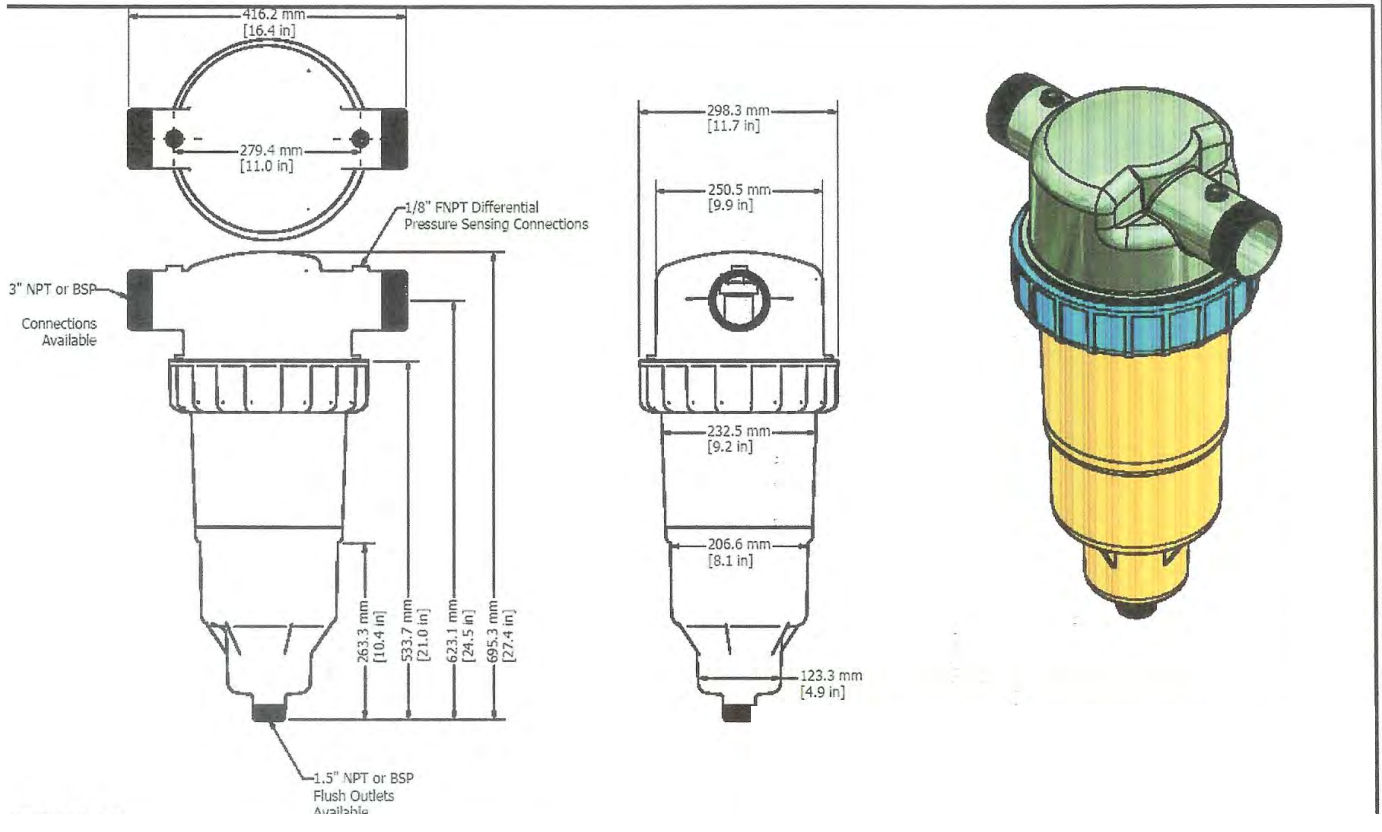


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2.2 Design Specifications

Materials:	Tank Reaction Motor and Nozzle Assembly Filter Screen	Glass reinforced nylon Glass-filled Noryl Type 316L stainless steel
Pressure Loss Across Filter:	Adjustable DP flush set point at which backflush is initiated. Less than 1 psi loss with a clean screen element. Recommended flush set point is 7-8 psid.	
Controls:	Various options are available. These options include: Manual, completely hydraulic controls, AC, DC, and solar Powered controllers and battery powered controllers.	
Pressure Range:	35 psi to 120 psi maximum (240 kPa to 827 kPa)	
Temperature Range:	32° F to 176° F maximum (0° to 80° C)	

2.2 Specification Drawing



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2.3 Design Requirements

When designing and/or considering the system in which the VACLEEN® 7003 will be installed, evaluate the following:

Line Size The filter should be sized for the application. The velocity, pressure and flow rate are nominally maintained as water flows through the filter. A filter sized hydraulically too small for the application results in a relatively high flow rate through the filter, dirt builds up quickly on the filter screen, causing frequent backwash cycling.

Configuration It is highly recommended that the filter be installed with a piping arrangement allowing full bypass, flow, especially for flow-critical applications. In this way, service and maintenance can be performed on the filter without shutting down process flow.

Multiple filters may be used hydraulically in parallel or in series to accommodate larger flow rates or high loading characteristics. In applications where the dirt load is relatively high and the particle size is relatively uniform, a bank of filters in parallel (all with the same screen size) is recommended. In applications where the dirt load is relatively high and the particle size is non-uniform, installing filters in series with decreasing micron size in the direction of flow may be effective. Whether filters are configured in parallel or in series, one filter will be flushed at a time to minimize disruption of flow to the system.

Pressure Properly size a pump to maintain the operating pressure within the design limits of the filter. The pressure inside the filter must stay below the 120 psig (827 kPa) maximum safe pressure limit. **The pump must maintain a MINIMUM pressure of 35 psig (240 kPa) at the filter outlet DURING THE BACKFLUSH CYCLE for the filter to backwash efficiently.** If the filter is to be installed within an existing piping system, determine whether or not the existing pump will be sufficient to maintain the 35 psig minimum pressure requirement. For filter installations within low pressure systems (less than 35 psig), modifications can be made to boost pressure during the backwash mode, allowing proper flushing operation. Modifications to boost pressure include booster pumps, sustaining valves and downstream valves. Consult Olson Irrigation Systems at 1-800-776-5766 with inquiries on pressure requirements.

During normal filtering mode, keep the pressure differential across the filter below 10 psid to prevent:

- (1) pushing particulate through the fine filter screen
- (2) embedding particulate in the filter screen mesh.

Flow Keep the flow rate through the filter below the maximum nominal flow rate specified to insure optimum performance of the filter. Contact Olson engineers for flows higher than the nominal ratings.

Temperature Keep the temperature of the water below 176° F (80° C) to prevent damage to the filter internals. Keep water within the filter above 32° F (0° C) to prevent freezing.

Dirt Load The 7003 will filter out many types of particulate. In special applications, it may be necessary to modify the standard filter to achieve optimal filtration. Olson Irrigation Systems can test representative samples of filtered and unfiltered water to determine the effectiveness of the filter in your application. Filters placed into existing loop systems having relatively high particulate concentration (load), typically backflush often at first. In time, as dirt is removed from the water, the frequency will decrease. In these applications where existing systems are extremely dirty, it is recommended that you initially equip the filter with a screen having relatively large micron openings. After the frequency of backflushing decreases, then stabilizes, replace with a screen having smaller micron openings, continue this process until a satisfactory level of filtration is achieved.

Industry Until recently water has been readily available, relatively inexpensive and easily discharged when contaminated. With onset of diminished supply, rising cost and increasingly stringent environmental regulation VACLEEN® filters have found increasing application across many industries.

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SECTION III SAFETY AND REGULATION

3.1 Requirements

Abide by applicable ASHA and industrial standards for your particular application. Wear, as required, hard hat, safety goggles, rubber gloves, steel-toed boots, respirator mask and protective clothing when servicing the filter unit. Olson VACLEEN® filters are designed for safe operation when used according to instructions, specifications, procedures and requirements contained in this manual. It is the responsibility of the filter owner to verify that the filter is operating accordingly. Assure that all applicable rules, regulations, requirements, standards and codes, either local, national or industrial, are followed in installation, erection, operation, maintenance, servicing and moving of the filter. Consult our technical staff with your questions on safe operation of the filter.

3.2 Structural Support and Retention

Depending upon your filtration system's components, the 7003 can weigh over 60 pounds when flooded with water. Exercise caution when transporting, installing or taking the filter out of service, as the weight of the unit may cause serious injury or death from falling on persons. When erecting the filter during installation (or taking filter out of service), make sure the filter is properly supported by the retention system. Remove retention systems only after the filter has been properly secured to piping and adequately supported. If the existing piping arrangement is used as structural support for the filter, check to assure that it is structurally adequate considering the flooded weight of the filter.

Due to the methods used to construct the 7003 filter, it is recommended that the filter be supported primarily by the inlet and outlet piping.

3.3 Operating Pressure

Periodically check connections and sealing points for leakage, tighten connections or seal with Teflon tape if leaks occur. The main body seal will become water tight when pressure is supplied to the filter. Keep the operating pressure below the 120 psig (827 kPa) maximum safe pressure limit. In applications requiring a higher pressure limit, consult the manufacturer regarding a design that will safely satisfy higher pressure requirements. Assure that the body nut has been hand tightened fully until it reaches the stop molded into the thread. Before servicing filter internals, slowly open the filter bypass valve (if available), slowly close the filter isolation valves. Manually backflush the filter to depressurize, and partially drain the filter. Before servicing the filter, always make sure the filter is depressurized.

DO NOT REMOVE THE BODY NUT OR ANY PRESSURE FITTING UNTIL YOU ARE SURE THE PRESSURE IN THE FILTER IS ZERO

3.4 Discharge of Flush Waste Water

Conform to all applicable standards, codes and regulations for your particular industry and Application. Follow environmental regulations when discharging backflush water.

3.5 Electrical

When wiring the electronic backwash controller, follow the instructions in the manual along with local code and National Electrical Code. An explosion-proof solenoid (available as an alternate part) is required when the filter is used in a potentially flammable atmospheric environment. A filter installed with a general-purpose solenoid can ignite combustible fluids. Avoid touching a solenoid that has been electrically energized as heat from operation may cause burning of the skin. Turn off electrical power to the controller and solenoid before servicing either the controller or the filter.

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SECTION IV INSTALLATION AND HOOKUP

4.1 Mechanical Hookup and Orientation

The positioning of the filter should be determined in order to allow easy access and removal of the filter internals. The filter will operate in any orientation. Always install the filter on the discharge side of the pump, 35 psi minimum is required during the flush cycle.

The use of unions or companion flanges on the inlet, outlet, and flush connections is recommended to ease installation and maintenance of the filter.

The location of the flushing valve should provide no obstruction to its operation.

The tank can be supported by the inlet/outlet connections. Alternatively it can be mounted on a stand if desired.

4.2 Plumbing Hookup

The flush line should be the same diameter, or larger, than the flush valve. If it is the same diameter, it should have no more than one elbow, and should be on a downward slope to the sump or drain. Restrictions in the backflush line may reduce the cleaning efficiency of the filter.

Tubing connecting the inlet and outlet of the filter to the differential pressure switch/gage, hydraulic controller or pressure transducers must be installed for automatic operation. The inlet is connected to the high pressure port. Carefully check to ensure these connections are not reversed. Consult your controller manual for more information.

If using a diaphragm type flush valve with solenoid actuator, the supply to the solenoid must be connected to a pressure source, typically on the inlet of the filter or upstream of the valve. The solenoid must also be connected to the controller.

Other flush valve options are available, consult factory for details.

When designing piping to and from the filter, consider installing bypass piping and valves along with isolation valves. This allows the filter to be taken offline without interrupting the flow.

SECTION V OPERATION AND ADJUSTMENTS



Screen filters require back pressure (pressure on the outlet side of the screen) in order to clean the screen. When pressurizing the system, if the screen plugs before the system is pressurized, the filter cannot clean itself and *damage will occur*. During the initial filling of the main pipeline, there may not be enough back pressure at the outlet. Therefore, it is necessary to install a valve on the outlet line.

A pressure-sustaining valve is recommended. Alternatively, a manually-operated valve may be used. The valve should be partially closed when pressurizing, creating minimum pressure of 35 psi on the clean water (outlet) side of the screen, then open when the system pressure is attained. **During normal startup and normal operation, it is always necessary to maintain 35 psi outlet pressure.**

The flush valve should remain open during system filling and there should be zero pack pressure on the flush line.

Avoid a water-hammer effect which could exceed the pressure rating of the filter.

WHEN FILLING THE SYSTEM, THE FLOW SHOULD NOT EXCEED THE RECOMMENDED FLOW AND PRESSURE RATING FOR THE FILTER.

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SECTION VI MAINTENANCE

6.1 DISASSEMBLY

Required Tools: 3/32" Allen key wrench.
5/16 Allen wrench
7/16" Box wrench
O-ring lubricant (silicon or glycerine based)

1. Isolate the filter by first turning the outlet valve off, then turning the inlet valve off.
2. Relieve the pressure inside the filter body by initiating a manual flush or opening a drain valve.
3. Ensure that no pressure is present in the filter. First, check the pressure gauges, then either open the flush valve or disconnect the tube from the valve bonnet (if equipped with a diaphragm style valve). (Figure 1)

6.1.a Removal of Filter Internals

4. Slowly loosen the main body nut. The nut should be hand tight. Hang body nut after completely loosened. No tools are required. (Figure 2)



Figure 1 Disconnect tube from valve



Figure 2 Remove main body nut

5. Completely loosen flush line union (if equipped).
6. Rotate bottom of filter body free of flush union. Pull body to separate lid from body.
7. The internal assembly can now be removed from the filter body. The lower bulkhead o-ring is all that restrains the internals. Pull the internals from the body. Tilting may help to unseat the O-ring. (Figure 3)



Figure 3 Remove internal assembly

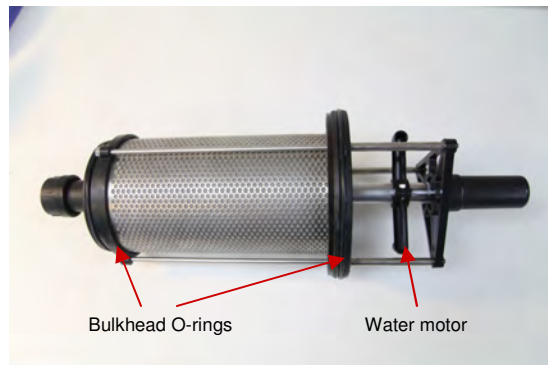


Figure 4 Internal Assembly

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6.1 DISASSEMBLY (CONTINUED)

8. Rotate the water motor by hand until it reaches the bottom of its travel range. Rotation should be smooth and relatively free of resistance. If not, diagnose source of resistance. (Figure 4)
9. The bulkhead o-rings should be inspected for wear and tear. A poorly sealing o-ring will Adversely affect the operation of your filter. (Figure 4)

6.1.b. Removal of Element for Inspection and Cleaning

10. Remove the three 7/16"-1/4 nuts and washers from the support rods that secure the upper bulkhead. (Figure 5)
11. Remove the water motor screws using a 5/16 Allen wrench. (Figure 6)
12. Grasp the upper bulkhead and slide out with the dirt collector (Figure 7)
13. The screen can now be removed, inspected and cleaned if necessary. (Figure 8)
14. A pressure washer can be used to thoroughly clean the filter internals. Pressure washing the screen from the outside in will remove any accumulated particulate.
15. Inspect the suction nozzles and water motor for any damage. (Figure 7)
16. Suction nozzles can be removed using an Allen key if required. To remove the lower bulkhead, slide the three spacers from the carriage frame then remove the bulkhead. (Figure 8)

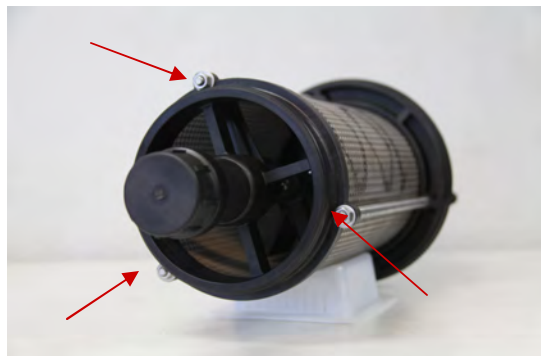


Figure 5 Remove nuts and washers



Figure 6 Remove water motor screws

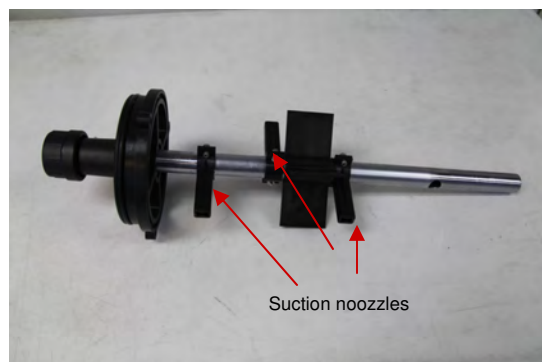


Figure 7 Remove upper bulkhead and dirt collector

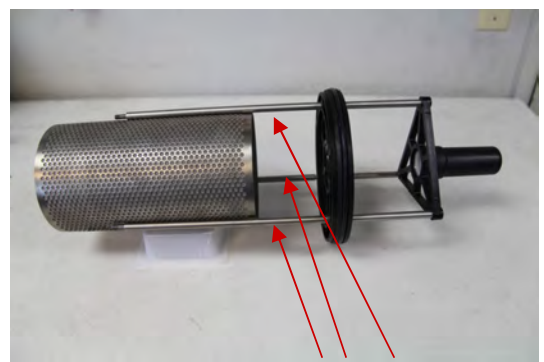


Figure 8 Remove lower bulkhead spacers

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SECTION VI MAINTENANCE

6.1 DISASSEMBLY (continued)

6.1.c. Removal of Screw and Pawl

17. Remove reverser cap. (Figure 9)
18. Push water motor to topmost position. (Figure 10) This will expose the reverser (Figure 11)



Figure 9 Remove reverser cap



Figure 10 Push water motor to top position



Figure 11 Exposed reverser

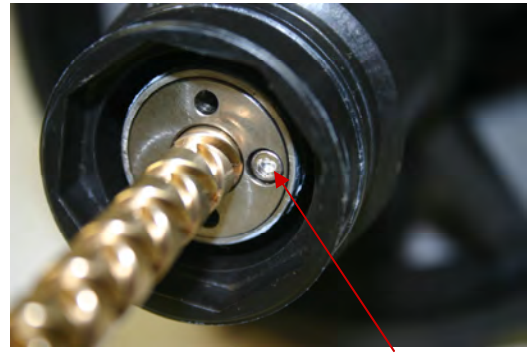


Figure 12 Remove pawl bushing screw

19. Using a 3/32" Allen key wrench, remove the pawl bushing screw. (Figure 12)
20. Remove the reverser, pawl, and pawl retainer from the shaft by pulling on the hexagonal reverser restraint. (Figure 13)
21. Inspect pawl and reverser for wear. Reverser should rotate very smoothly with very little resistance. Corners and transitions should be well defined and not rounded. (Figure 14)



Figure 13 Remove reverser, pawl and retainer

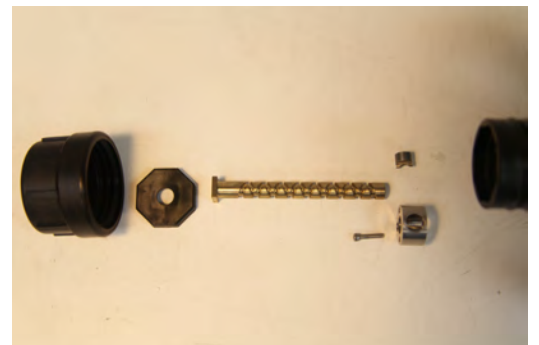


Figure 14 Inspect pawl and reverser

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6.2 REASSEMBLY

When assembling the Olson 7003 Filter, the following **MUST** be considered:

1. The floating seal (washer) in the lower bulkhead must be free floating and properly secured by the by the retainer and retainer screws.
2. Filter elements must fit into the bulkhead's screen grooves before securing the filter assembly to the filter frame. If this step is done incorrectly, the bulkheads may misalign causing the rotor Assembly to rub and/or not rotate.
3. Before installing the complete filter assembly into the tank, one **must** lubricate the bulkhead seals. Silicon based lubricant will work well unless prefiltering for a reverse osmosis system. In that case, use a glycerine based lubricant. Failure to do so could result in seal failure and difficulty in removing the internal assembly later.
4. Do not use tools to secure the main body nut. This nut is hand tightened. Tighten by hand until it reaches the thread stop.
5. When installing the pawl, hold it in place by applying pressure with your thumb, with teeth aligned correctly. Rotate the shaft until the pawl is seated properly in the reverser threads. Once the pawl is installed, rotate the shaft several times ensuring that it is functioning properly. (Fig 15-16)



Figure 15 Install pawl and reverser



Figure 16 Final installation of pawl and reverser

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SECTION VII TROUBLE SHOOTING GUIDE

7.1 PROBLEMS AND SOLUTIONS

PROBLEM	Flushing diaphragm valve is not closing during startup.
POSSIBLE CAUSES	(1) System pressure is too low to close the valve. (2) An object has lodged in the valve preventing full closure. (3) Solenoid is not installed properly.
SOLUTIONS	(1) Partially close a valve downstream of the filter to maintain 35 psi (172 kPa) on filter gauges. This pressure will ensure valve closure and also supply Back pressure necessary to clean the screen. (2) Disassemble the flush valve and remove the object. Check to ensure that the valve actuates properly. (3) Check solenoid installation diagram provided with installation instructions.
PROBLEM	Differential pressure never decreases, only builds.
POSSIBLE CAUSES	(1) Flush valve is not opening. (2) Flushing valve is installed backwards. (3) Filter is installed backwards.
SOLUTIONS	(1) Verify connections to filter controller and power (hydraulic and/or electrical) to flush valve. (2) Install according to directional arrow. (3) Ensure filter inlet connected to (unfiltered) incoming water supply.
PROBLEM	Flush valve chatters
POSSIBLE CAUSE	(1) Air in the valve bonnet.
SOLUTIONS	(1) Manually flush filter several times to flush air from bonnet, the controller tank and the filter tank. (2) Add a 1/2" (13 mm) or 1" (25 mm) air vent/vacuum relief to the flush line.
PROBLEM	Frequent or continuous flushing
POSSIBLE CAUSES	(1) Downstream pressure is not available to provide adequate cleaning power. (2) Filter may have been shut down "dirty" with a contaminant that is difficult to remove after it has set on the screen. (3) The differential pressure setting on the PD gauge at the base of the Controller is set too low or the adjustment knob on the face of the dial mal functions, allowing continuous electrical signal to the solenoid. (4) Particle load is too high and/or flow rate exceeds maximum specified flow. (5) Screen may be partially plugged. (6) Rotor may be jammed resulting in only cleaning the screen area that is Directly in front of the nozzles. (7) A relatively large object or obstruction at the inlet is causing appreciable pressure drop, or a significant amount of large hard debris has collected. (8) Dirt particles are not being removed from the fine filter screen due to: particle embedment; particle bonding; the dirt collector does not function during backflush; The dirt collector does not rotate during backflush.

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SECTION VII

TROUBLE SHOOTING GUIDE (Continued)

SOLUTIONS

- (1) Partially restrict (close) downstream valve. Filter gauges should read 35 psi (242 kPa) DURING the flush cycle.
- (2) A power flush needs to be performed as follows: a downstream valve should be closed or partially closed, providing that the static pressure against the valve does not exceed 80 psi (552 kPa). After the valve is adjusted, cycle the filter through several long flush cycles. This process uses the entire available system pressure in the filter cleaning process.
- (3) Adjust the PD gauge to a higher differential pressure setting (7psid is recommended). If the adjustment does not stay at the desired setting, but falls down to 0 psid, replace the PD gauge.
- (4) Reduce flow rate through the filter. If reducing the flow rate reduces back flush frequency, it may be advisable to install a fine screen with larger openings and/or install additional filters to provide additional screen area.
- (5) Perform power flush as described previously.
- (6) Open tank and check for free movement of rotor mechanism. If rotor does not rotate freely, find the cause of jamming and eliminate it. If not cause can be found, inspect pawl for wear or damage.
- (7) Depressurize and drain the filter. Wash and rinse all debris from the screen. Check the filter inlet for objects and remove any if found.
- (8) Depressurize and drain the filter. Remove the filter cover and pull the internal assembly. Check rotation and transverse movement of the dirt collector. Remove the filter screen and check for blockage. Consider the following solutions based on your observations:

Particle Embedment—the size, shape and type of particle may be imbedding into the pores of the screen. Analyze the dirt particles for size, shape and type and then determine whether or not a different screen design or screen mesh size would be more appropriate for your application. Contact Olson Irrigation Systems for consultation.

Particle Bonding—the particles may be bonding to the surface of the screen. Analyze the dirt particles and then determine whether or not a different screen design or mesh size would be more appropriate for your application. Contact Olson Irrigation Systems for consultation.

Resistance to Dirt Collector Movement—Upon checking for movement of the dirt collector, if resistance was detected, check for contact between the dirt collector nozzles and the filter screen. Remove any obstructions.

Resistance to Dirt Collector Rotation—Upon checking for rotation of the dirt collector, if resistance was detected, check for contact between the dirt collector nozzles and the filter screen. Nozzles should clear the fine screen by approximately 1/8". If the nozzles are rubbing the screen, contact Olson Irrigation Systems for possible solutions. A damaged or dented screen will restrict rotation.

PROBLEM

Water exiting the filter outlet is not sufficiently clean.

POSSIBLE CAUSES

- (1) The pore size of the screen mesh is larger than particles in the water.
- (2) The pressure differential for flushing across the filter is set too high.
- (3) The filter screen has developed a sizable hole through which the dirty water can pass.
- (4) The O-ring seal between filter body and one of the bulkheads is damaged or not properly seated on the sealing surface.

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SECTION VII TROUBLE SHOOTING GUIDE (Continued)

SOLUTIONS

- (1) Try a new filter screen with a mesh size that captures enough particles, bringing the outlet water to a sufficiently low level of dirt concentration.
- (2) The pressure differential setting at the PD gauge is too high, resulting in excessive pressure on the particles. This forces them through the screen. Adjust the PD gauge to a maximum 7 psid pressure differential.
- (3) Replace the damaged filter screen with a new screen; determine how the screen was damaged and correct the problem.
- (4) Replace O-rings at the top and bottom of the internal assembly and properly install the screens within the screen grooves.

7.2 TROUBLE SHOOTING HINTS

External Observations

1. Check the PD gauge during backflush to verify that the needle returns to near zero at the end of the backflush cycle.

Reason: If the needle on the face of the DP gauge does not return to near zero after the rinse cycle, the filter screen is probably not being thoroughly cleaned. Check the cleaning pattern left on the fine screen immediately after a backwash cycle to determine the cause of the malfunction.

2. Check the discharge piping to verify that dirty water is discharged only during the backflush cycle.

Reason: If the flush valve does not open, then either the flush valve is not being energized or an obstruction prevents the flush valve from opening. Check the electrical and hydraulic signaling that actuates the flush valve. Also check for obstructions in the flush valve and discharge piping.

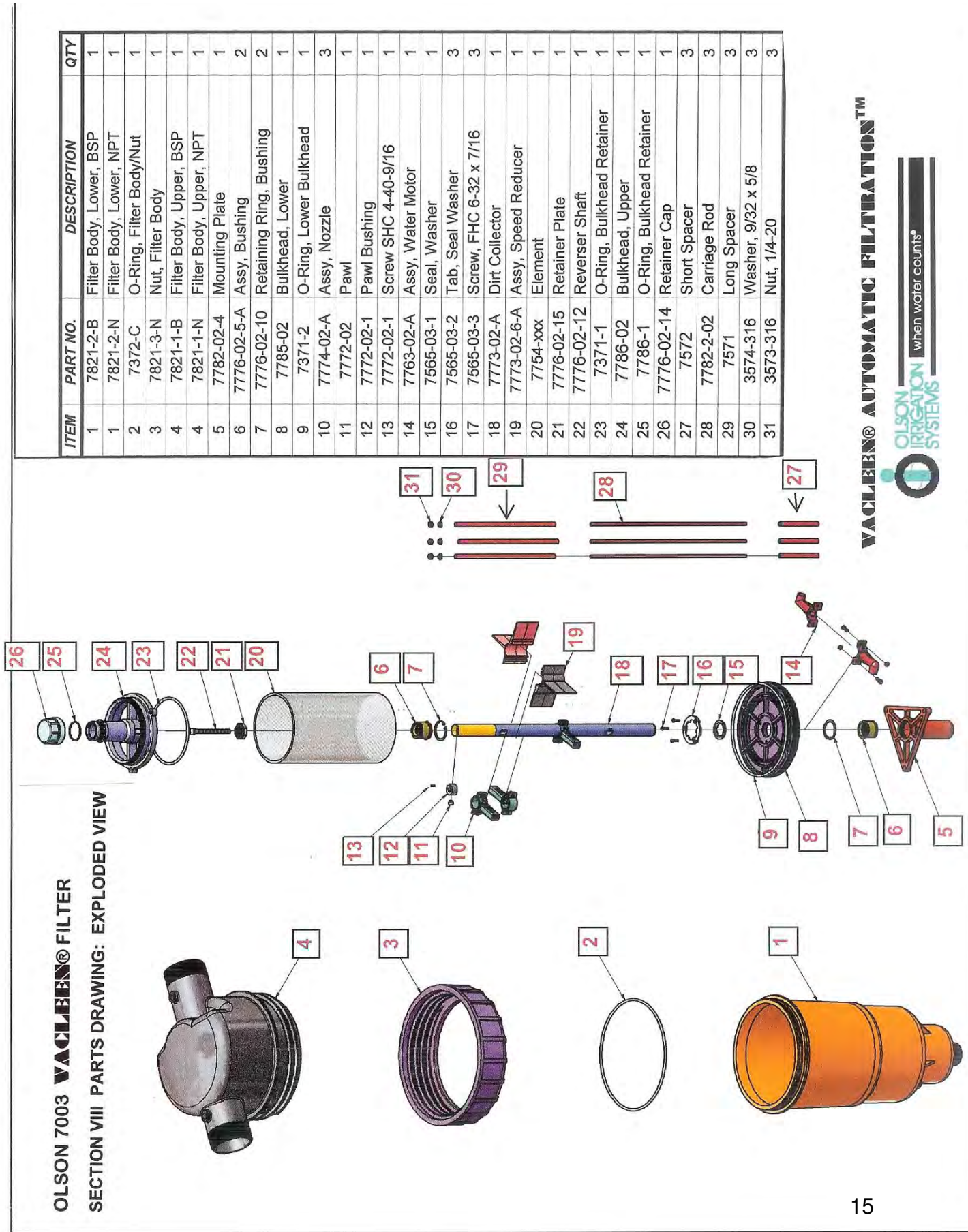
7.3 TROUBLE SHOOTING DIAGNOSTICS

1. Check for actuation of the solenoid valve by listening for two distinct clicking sounds at the Solenoid, once upon energizing and a second time when de-energizing.
2. Temporarily disconnect the hydraulic tubing at various fittings (one fitting at a time) on the filter body during normal filtration mode and backflush mode to determine whether or not pressurized water is available when it is supposed to be available.

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SECTION VIII PARTS DRAWING: EXPLODED VIEW

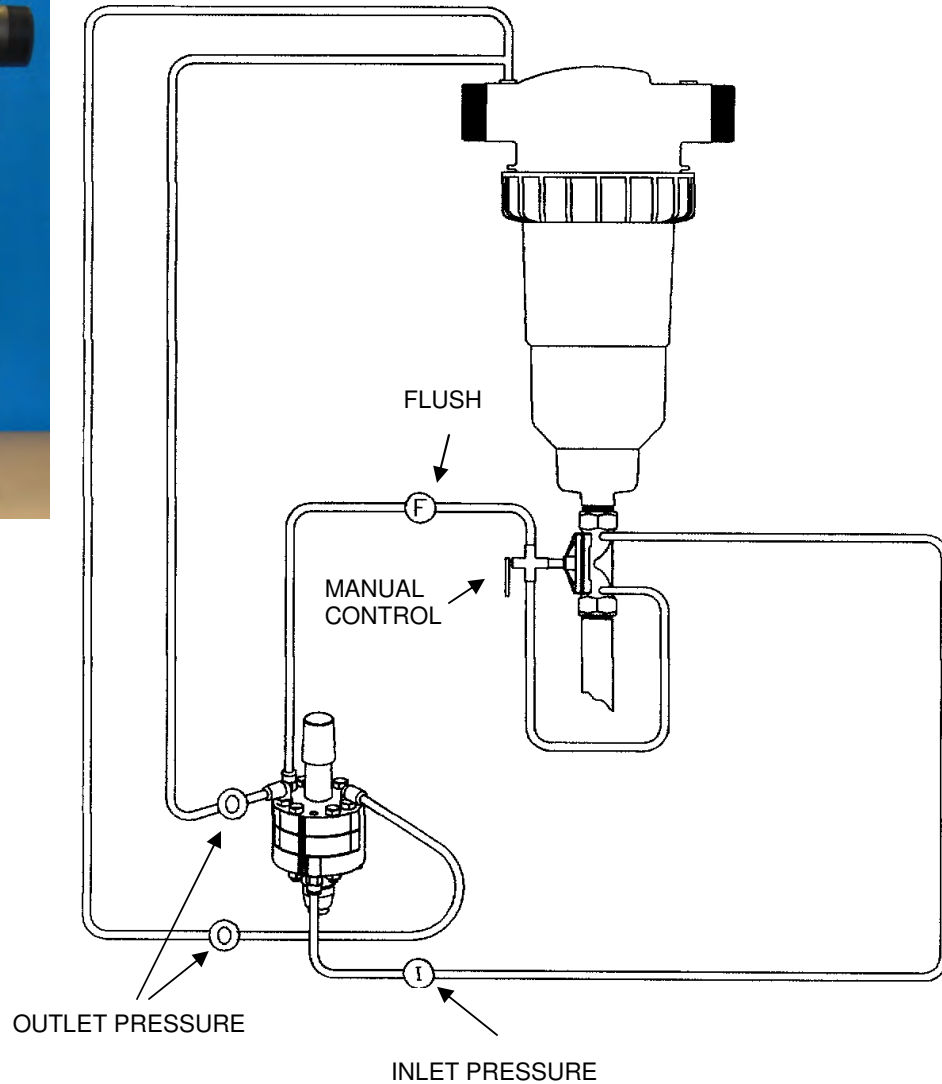
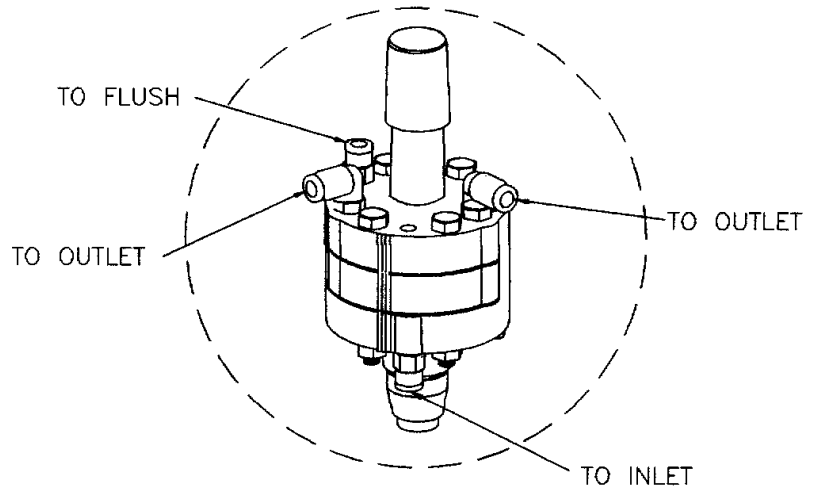


ITEM	PART NO.	DESCRIPTION	QTY
1	7821-2-B	Filter Body, Lower, BSP	1
1	7821-2-N	Filter Body, Lower, NPT	1
2	7372-C	O-Ring, Filter Body/Nut	1
3	7821-3-N	Nut, Filter Body	1
4	7821-1-B	Filter Body, Upper, BSP	1
4	7821-1-N	Filter Body, Upper, NPT	1
5	7782-02-4	Mounting Plate	1
6	7776-02-5-A	Assy, Bushing	2
7	7776-02-10	Retaining Ring, Bushing	2
8	7785-02	Bulkhead, Lower	1
9	7371-2	O-Ring, Lower Bulkhead	1
10	7774-02-A	Assy, Nozzle	3
11	7772-02	Pawl	1
12	7772-02-1	Pawl Bushing	1
13	7772-02-1	Screw SHC 4-40-9/16	1
14	7763-02-A	Assy, Water Motor	1
15	7665-03-1	Seal, Washer	1
16	7665-03-2	Tab, Seal Washer	3
17	7665-03-3	Screw, FHC 6-32 x 7/16	3
18	7773-02-A	Dirt Collector	1
19	7773-02-6-A	Assy, Speed Reducer	1
20	7754-xxx	Element	1
21	7776-02-15	Retainer Plate	1
22	7776-02-12	Reverser Shaft	1
23	7371-1	O-Ring, Bulkhead Retainer	1
24	7786-02	Bulkhead, Upper	1
25	7786-1	O-Ring, Bulkhead Retainer	1
26	7776-02-14	Retainer Cap	1
27	7572	Short Spacer	3
28	7782-2-02	Carriage Rod	3
29	7571	Long Spacer	3
30	3574-316	Washer, 9/32 x 5/8	3
31	3573-316	Nut, 1/4-20	3

VACLEEN® AUTOMATIC FILTRATION™



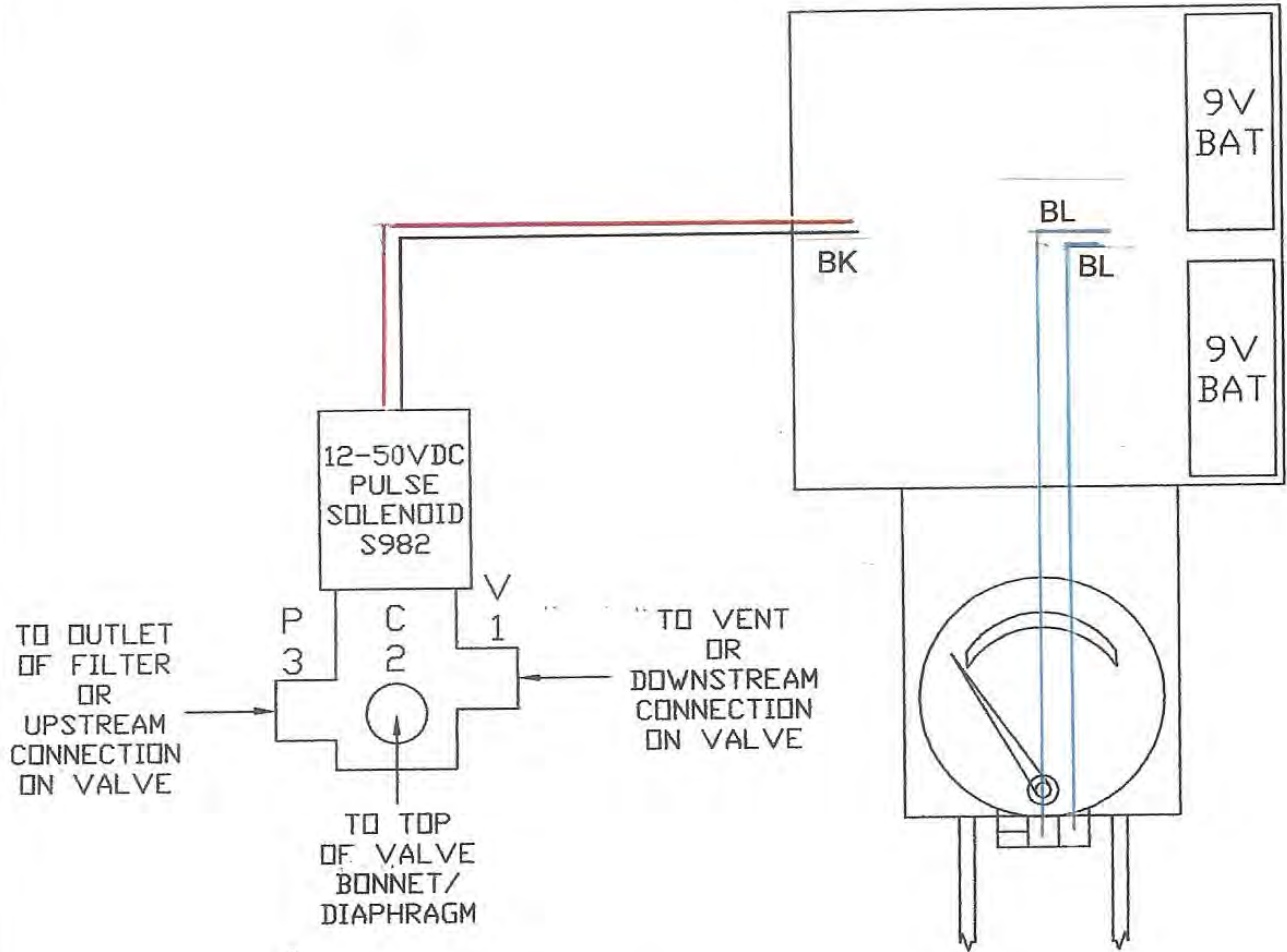
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SECTION VIII

8.3 BATTERY-OPERATED CONTROLLER HOOKUP



NOTES:

7 PSI IS RECOMMENDED DP SETPOINT

'H' CONNECTION ON DP GAGE CONNECTS TO FILTER INLET PRESSURE TAP.
'L' CONNECTION ON DP GAGE CONNECTS TO FILTER OUTLET PRESSURE TAP.

DP GAGE PRESSURE CONNECTIONS MUST BE HELD WITH A WRENCH WHILE TIGHTENING FITTINGS. FAILURE TO DO SO WILL RESULT IN DAMAGE.

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NOTES

OLSON 7003 VAGLEEN® FILTER

TERMS AND CONDITIONS OF SALE

General: All quotations and orders are subject to the following conditions of sale. Clerical errors are subject to correction. All prices are subject to change without notice. Orders become contracts only upon acceptance by Olson Industrial Systems (herein called Olson), at Santee, CA, USA. Any terms and conditions contained in the Purchaser's purchase order or request for quotation, written or oral, which differ from Olson's terms and conditions shall not be binding upon Olson. Any agreements or other understandings modifying the conditions of the contract resulting from Olson's acceptance of a customer's order will not be binding unless made in writing by Olson's home office.

Changes in Orders: Purchaser shall not have the right to change quantities and items on orders prior to the date of shipment, unless: 1) Olson agrees to such changes in writing; 2) time for delivery is extended as required by Olson; 3) items being changed are not specially constructed for Purchaser and, if so, a cancellation charge acceptable to Olson has been agreed upon in writing.

Cancellations: Purchaser shall not have the right to cancel items on order prior to the date of shipment unless: 1) Olson agrees to such cancellation in writing; 2) items being cancelled are not specially constructed for Purchaser and, if so, a cancellation charge acceptable to Olson has been agreed upon in writing.

Returns: Olson will not accept any return of any product unless such return has been authorized by Olson in writing. All such authorized returns of good material must be shipped freight prepaid and, upon their receipt and inspection, if they are found to be saleable, credit will be issued on the basis of invoiced price or the current selling price, whichever is lower, less a 20% handling and restocking charge. If found to be unsaleable, returnee will be given the option of paying for return of goods to his place of business or accepting scrap value from Olson.

Limited Warranty: Products are warranted to be free from material or manufacturing defects for a period of one (1) year from date of installation or 18 months after shipment, whichever occurs first. Any alleged defect must be reported to Olson, in writing, within 5 days after discovery thereof or this warranty shall be void. If, upon inspection, Olson determines that the product is defective and has not been subject to abusive treatment or faulty installation, or used with fluids, gases or in atmosphere not compatible with the materials of manufacture, the product, at Olson's option, will be repaired or replaced at no charge to the customer. This warranty does not apply to any consequential damages, including, but not limited to lost profits, labor charges, in and out charges, freight charges, or any other such expenses or loss resulting from an allegedly defective product and such damages are not the responsibility of Olson. Olson shall not be liable for any injury or damages other than to the goods themselves. In the event that a defect is claimed, the alleged defective product must be received, freight prepaid, by Olson. Olson, in its sole discretion, shall determine whether such product was defective and not damaged by misuse or improper installation or use. The preceding sole warranty is given by Olson. Any implied warranty of merchantability and fitness for a particular purpose are specifically excluded from the transaction. Any warranty made by the Purchaser or any successor-in-interest to the Purchaser shall be the responsibility of that party and Olson shall have no duties with respect to such warranty.

Promises of Delivery: The delivery date is only an estimate of the date of shipment. Olson does not guarantee shipping dates and notwithstanding anything contained herein to the contrary, Olson will not be responsible for damages suffered by the Purchaser because of late delivery. Olson will not be responsible for delays due to reasons beyond its control such as fire, flood, earthquake, strikes, Acts of God, war, material shortages, insurrection, government regulations, etc.

Product Modification: Olson reserves the right to modify its products at any time without notice. Olson also reserves the right to deliver such modified products, as long as they meet the original performance specifications of the Purchaser.

Claims: All claims regarding product or shortages must be received in writing by Olson within 10 days of receipt of the product by Purchaser. All shipments are made F.O.B. the carrier at Olson's dock, with risk of loss passing to the Purchaser at that point.

Terms: Payment will be due net 30 days after date of invoice on all orders with appropriate credit. A 1.5% per month service charge will be added to the unpaid balance to all accounts in excess of 30 days from date of invoice.

Price: All prices are subject to change without notice unless guaranteed by Olson in writing. In the event that it becomes necessary to increase prices after acceptance of Purchaser's order, Purchaser's approval will be obtained before shipment is made, otherwise the order will be cancelled.

Freight: Charges for transportation of the goods are the responsibility of the Purchaser unless specifically agreed to in writing by Olson. If Olson accepts responsibility for shipping charges, Olson reserves the right to ship by any carrier of its choice. If special transportation is requested by the Purchaser, all such related charges shall be for the Purchaser's account.

Taxes: No deductions are allowed for federal, state or other taxes. Any manufacturers or sales tax applicable to any order will be added to prices and terms on Olson's price and discount schedule.

Collection: In the event it becomes necessary to incur any expense for collection of any overdue account, reasonable collection charges, including reasonable attorney's fees will be added to the balance due and Purchaser shall pay any such charges.

Applicable Law: The laws of the State of California shall govern any transaction.

Number: The singular shall include the plural and plural shall include the singular.



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