

Arkal Spin Klin[®] 4" Battery

Service & Maintenance Manual



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1. Introduction

General

Arkal Filtration Systems congratulates you on purchasing the Spin Klin Galaxy filter. All Arkal's filters are easy to install, use and service and don't require special skills to operate them.

For operation and maintenance of the filter please follow the instructions in this manual.

2. Safety Instructions

Prior to installation or handling of the filter, read carefully the Installation and Operation Instructions carefully.

2. Confirm filter draining prior to service.
3. Take precautions while lifting, transporting or installing the filter.
4. Installation of the filter should be performed so as to avoid direct water splashing on any of the filter parts and especially on the electronic control unit.
5. Confirm that filter weight, when full, meets the support construction requirements.
6. Prior to installation confirm that line pressure matches filter's operational pressure.
7. During installation, use standard flanges and connections only.
8. Check that all filter flange bolts are properly secured.
9. Please note, the filter enters a flushing mode automatically, without prior warning.
10. Use original parts only when servicing the filter.
11. Arkal cannot accept responsibility for any changes or modifications to the equipment.

Special Note

Before opening the filter lock, check that there is no pressure in the filter.

3. Description & Operation

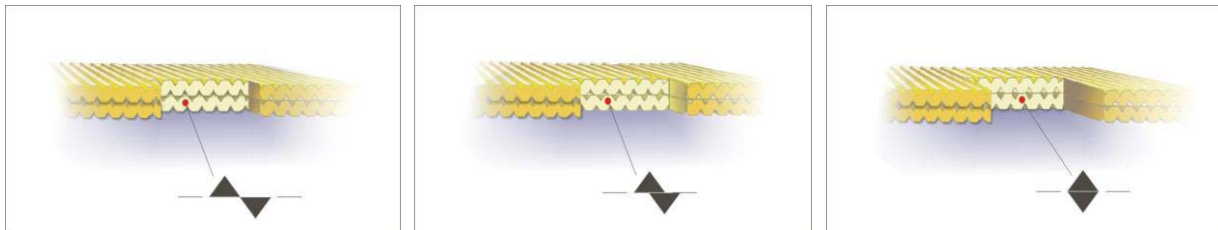
3.1 Disc Filtration Technology

Arkalg Filtration Systems uses a specially designed disc filtration technology. Thin, color-coded polypropylene discs are diagonally grooved on both sides to a specific micron size. A series of these discs are then stacked and compressed on a specially designed spine. When stacked, the groove on top runs opposite to the groove below, creating a filtration element with a statistically significant series of valleys and traps for solids. The stack is enclosed in corrosion and pressure resistant housing.

During the filtration process, the filtration discs are tightly compressed together by the spring's power and the differential pressure, thus providing high filtration efficiency. Filtration occurs while water is percolation from the outer diameter to the inner diameter of the element. Depending on the micron rating, there are from 18 (in 400 micron discs) to 32 (in 20 micron discs) stopping points in each track, thus creating the unique in-depth filtration.

Table of Filtration Grades of the Discs and Color Code

Color Code	Blue	Yellow	Red	Black	Brown	Green	Purple	Gray
Micron	400	200	130	100	70	55	40	20
Mesh	40	80	120	140				
PP								
Nylon								



3.2 Spin Klin Technology – Spin Klin Spine Model II

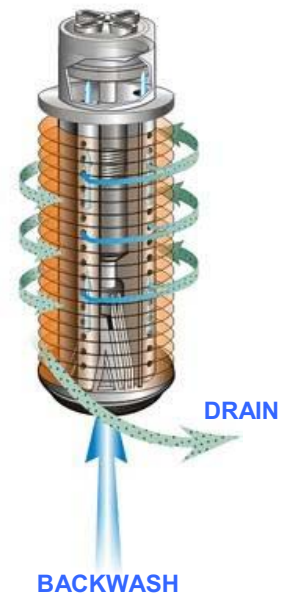
Spin Klin Spine - The Core of the Spin Klin Filtration System

The Spin Klin® discs are stacked on the Spin Klin® spine. The discs are color-coded according to micron size, and are assembled to suit your water filtration requirements. The spine assembly has a spring compression unit and an internal piston, which operate during alternate filtration or backwash modes. The spine assembly is specially designed to compress the micron housing. Inside the housing a spring and the pressure difference compress the discs tightly during the filtration process, forcing the water to flow between the grooves and trap the solids.

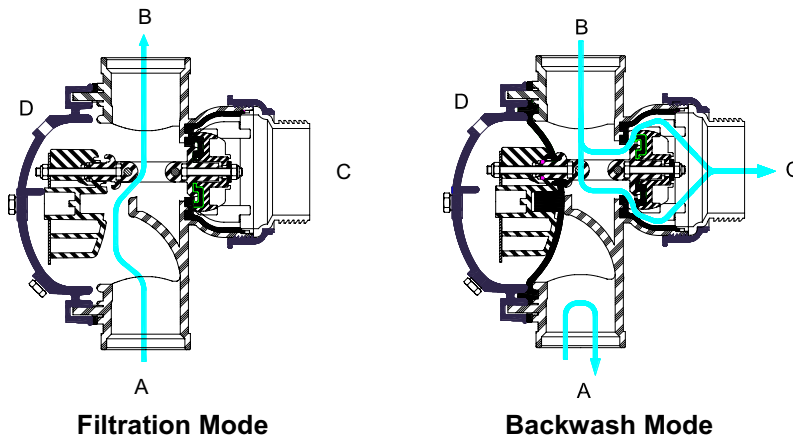


Spin Klin Automatic Backwash Operation

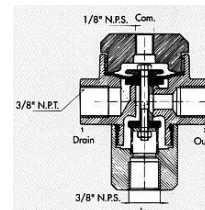
Activated by a predefined command (differential pressure or time) alternate units of the Spin Klin® system go into backwash mode. The inlet valve is shut as the drain is automatically opened. During the backwash process, the compression spring is released and the pressure difference is eliminated. The spine piston rises up, releasing the pressure on the discs. Tangential jets of clean water are pumped at high pressure in the opposite direction through nozzles at the center of the spine. The discs spin free and clear, loosening the trapped solids. Solids are quickly and efficiently flushed out through the drain.



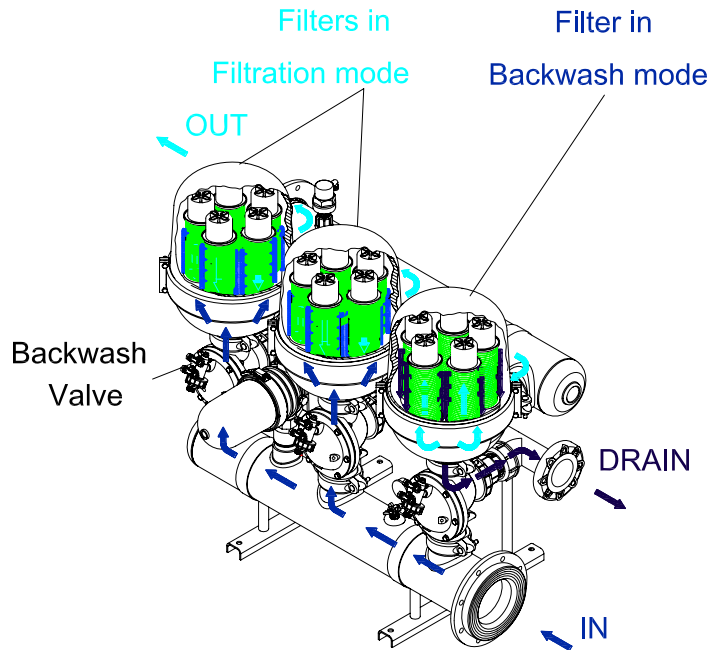
Plaslite Backwash Valve



1/2" Booster Valve



3.3 Mode of Operation



Filtration Process

During the filtration process the water flows through the inlet manifold, reaching the 4" filters through the 4"x3" inlet valves. The filtered water gathers in the outlet manifold into the system.

Backwash Process

The backwash process begins with a signal from the control unit activated by the pressure difference between the inlet and outlet or by time.

This signal is transported to the booster valve (assembled on 4"x 3" inlet valve No.1).

The booster valve opens, causing the No.1 valve to close the 4" inlet to the filter and open the 3" drain port.

Filter No.1 is now in a backwash mode.

The 5 Spin Klin spines in filter No.1 operate simultaneously, releasing the compressed discs. Tangential jets of water are pumped against the discs, causing them to spin fast and free, flushing trapped solids out to the drain.

The filtered backwash water is supplied from the other filters through the outlet manifold.

The contaminated water from the backwashed filter drains through the drainage manifold.

Backwash time per filter is between 20 -25 seconds. When the time elapses the control unit stops the backwash signal to the solenoid.

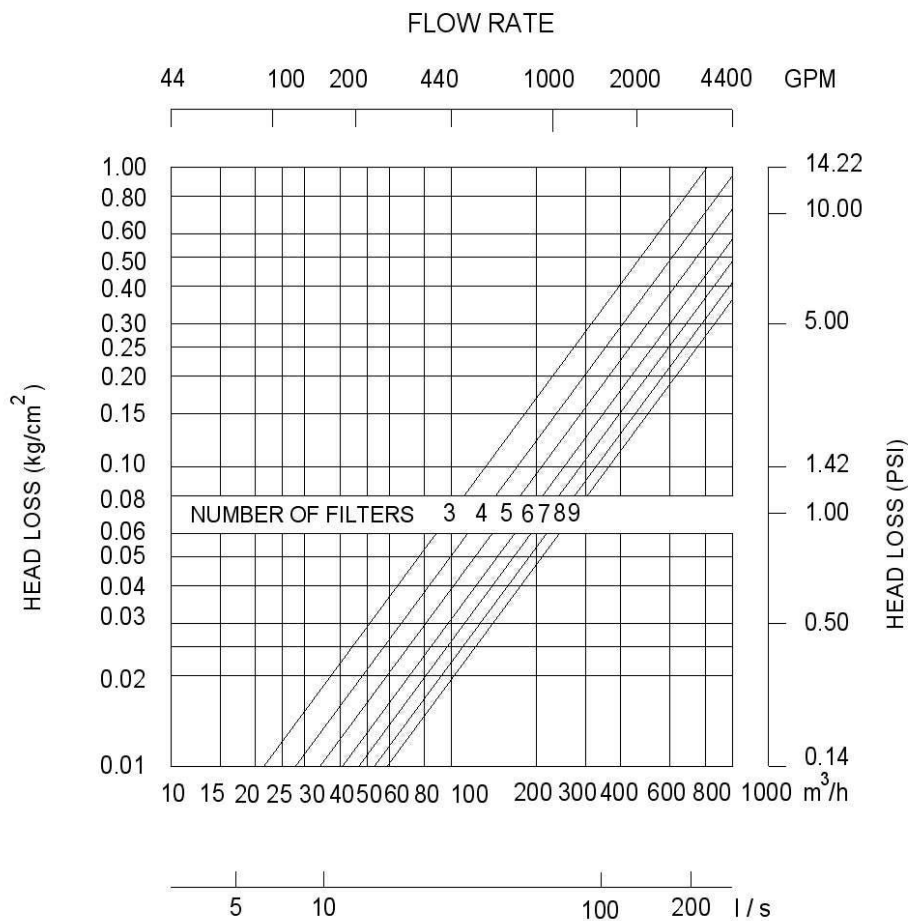
The solenoid releases the water pressure signal allowing the inlet valve and the discs of the 5 spines to return to filtration mode.

Once filter No.1 is in the filtration position again the control unit sends a signal to begin the backwash process in filter No.2.

4. Technical Data

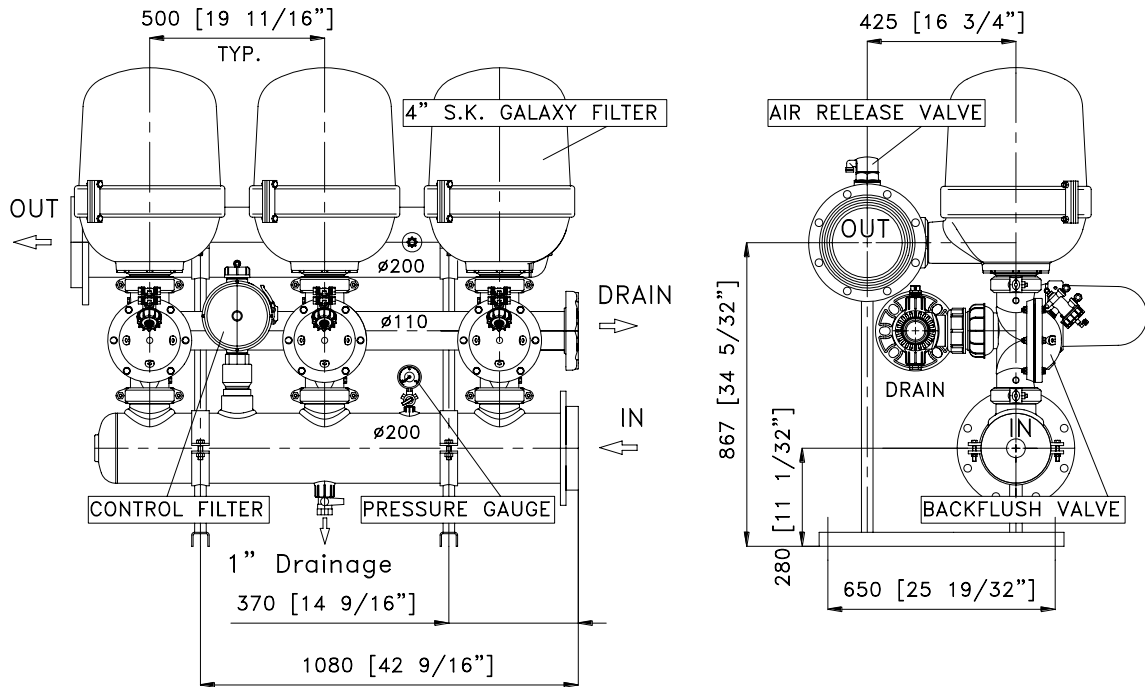
Parameters	Metric	US
Maximum pressure	10 bar	145 psi
Minimum pressure	2.8 bar	38 psi
Backwash flow rate per POD	40 m ³ /h	176 gpm
Water volume per backwash	166 liters	44 gallons
Maximum temperature	70 °C	158 °F

5. Headloss Chart



6. Installation

Galaxy System with Plaslite valves



Installation

- A. Make sure that the inlet and outlet orientation is correct (shown by arrows on filter).
- B. Prior to start-up check for any transport damage to the unit (system operates under pressure!).
- C. Connect backwash drainage line.
- D. Cover clamps need to be properly closed.

Start-up Operation

Start the backwash cycle, making sure that all system components function correctly.

Filter Load-up during Start-up

- Close the downstream (flow control) valve (if available).
- Flush few cycles until clean.
- Slowly reopen the downstream valve.
- If the pressure difference remains high, check and see if the flow rate is too high. An excessive flow rate through the filter causes excessive pressure loss.

7. Backwashing Controller – Filtron 246

The **FILTRON 246** is a very friendly backwashing controller designed and manufactured by **TALGIL** to meet the demands for a low cost easy to use controller. The FILTRON 246 exists in 3 sizes - with 2, 4 or 6 stations. **DC and AC** versions are available. The DC versions are powered by a 12V alkaline battery. The AC versions include transformer for 24V. The program selection is made by two **ROTARY SWITCHES** and an internal **DIP-SWITCH** enables to set the rarely changing parameters. An optional counter can be requested to count the number of backwashing cycles.

List of Features

- **DC or AC** versions available.
- Flushing triggered by Pressure Difference only.
- Flushing triggered by Pressure Difference and/or time intervals.
- User selectable parameters include:
 - Mode of operation: **Manual, DP** only, **DP** with time override.
 - Flushing cycle.
 - Flushing time.
 - Dwell time.
 - Differential pressurstat delay (response time to **DP**).
 - Number of consecutive backwash cycles caused by faulty **DP** that will be considered circular endless looping.
- Optional activation counter.
- Detecting and eliminating circular endless looping.

Program Selection

The two rotary switches on the front panel are used for selecting the desired backwashing program. The right switch selects the **FLUSHING MODE** and the left switch selects the **FLUSHING TIME PER STATION**.

Flushing Time Per Station		Flushing Mode	
	180 SEC		OFF
	140 SEC	10 SEC	24 HOUR
120 SEC		15 SEC	12 HOUR
60 SEC		20 SEC	6 HOUR
60 SEC		25 SEC	3 HOUR
	50 SEC	30 SEC	2 HOUR
	40SEC		1 HOUR
			DP
			MANUAL
			10MIN
			25 MIN
			40 MIN

- When the right switch points to the **OFF** position the controller is switched off and no flushing will take place. The internal buzzer keeps sounding every 4 seconds to indicate that the controller is energized.
- When the right switch points to the **DP** position the controller will start backwashing only when the pressure differential indication is received
- When the right switch points to **MANUAL** position a single flushing cycle is initiated.
- In all the other positions of the right switch, the controller will flush according to the specified cycle or upon detection of the pressure differential signal, the one which occurs first.
- Changing the position of each of the switches will sound the buzzer. The right switch will make a longer beep at the **OFF** position and at the left switch the longer beep will be at the **10 SEC** position. The longer beep helps to adjust the knobs.

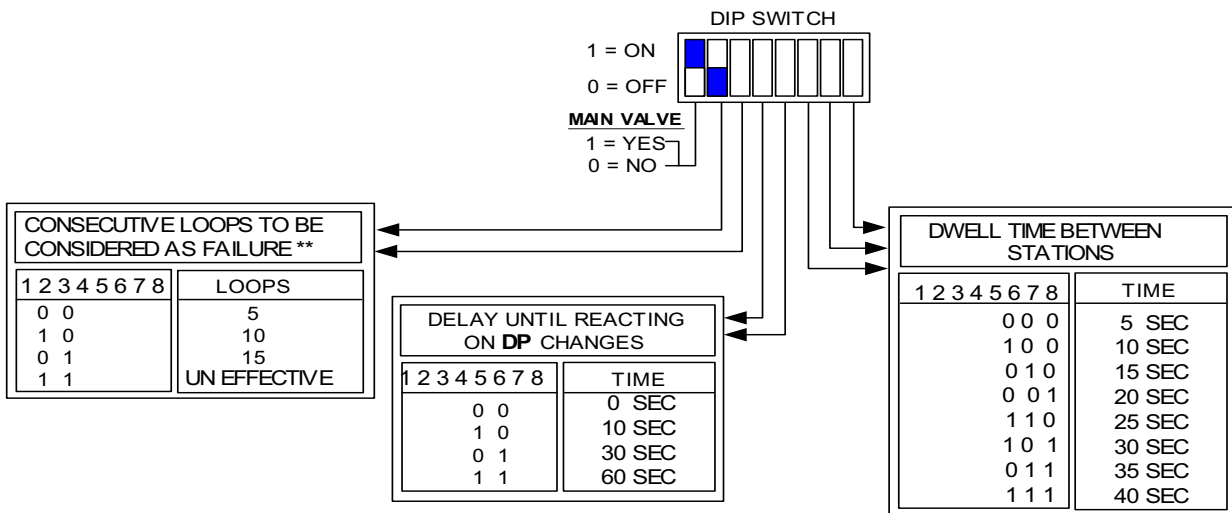
HOW TO READJUST THE KNOBS OF THE ROTARY SWITCHES IN CASE THEY GET LOOSE?

1. Keep turning the rotary switch clockwise until you hear the longer beep.
2. At the right switch, fasten the knob with the arrow pointing on **OFF**.
3. At the left switch, fasten the knob with the arrow pointing on **10 SEC**.

SETTING THE CONSTANT PARAMETERS

Three constant parameters can be set by the internal **DIP-SWITCH**, the following chart describes which of the switches is responsible for each parameter and what are the options.

The **DIP-SWITCH** is located at the bottom right corner of the electronic board.



When the **DP** signal would not stop, then after the specified number of consecutive backwashing cycles it will be considered a failure. An alarm sound will indicate the failure and there will be no more backwashing by **DP** until the **DP** signal is stopped and the right rotary switch turned OFF and back to its normal position. If the selected flushing mode included time override, the time based cycles will continue uninterruptedly with the selected interval.

MAIN VALVE

The unit can control a downstream main valve which is turned off while flushing to increase pressure. When such a main valve is incorporated in the system, **DIP SWITCH** No. 1 will be set **ON**, otherwise it will remain **OFF**. The main valve will be connected to output No.2 in **FILTRON 2**. to output No. 4 in **FILTRON 4** or to output No. 6 in **FILTRON 6**.

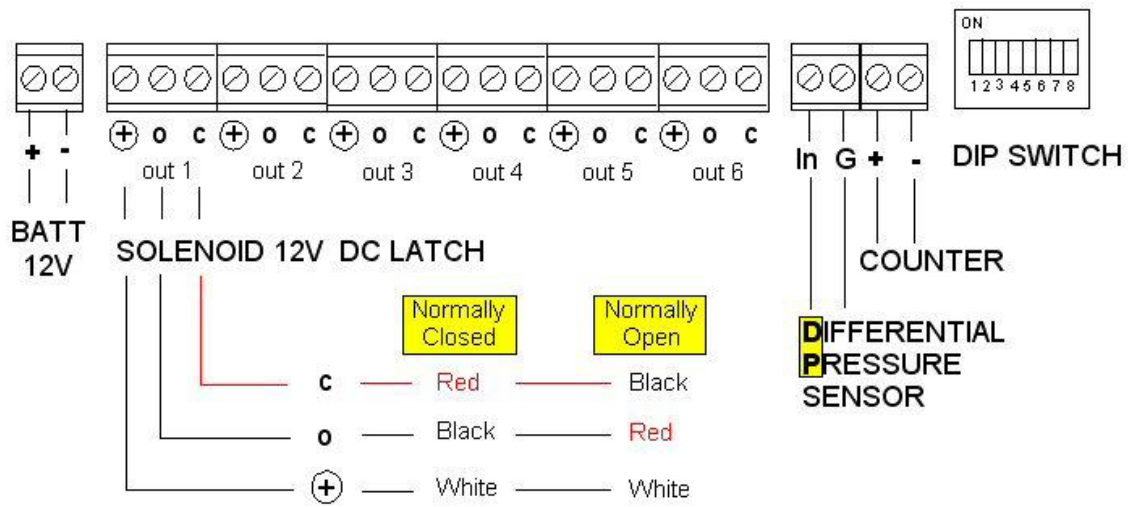
Technical Data

Power sources:

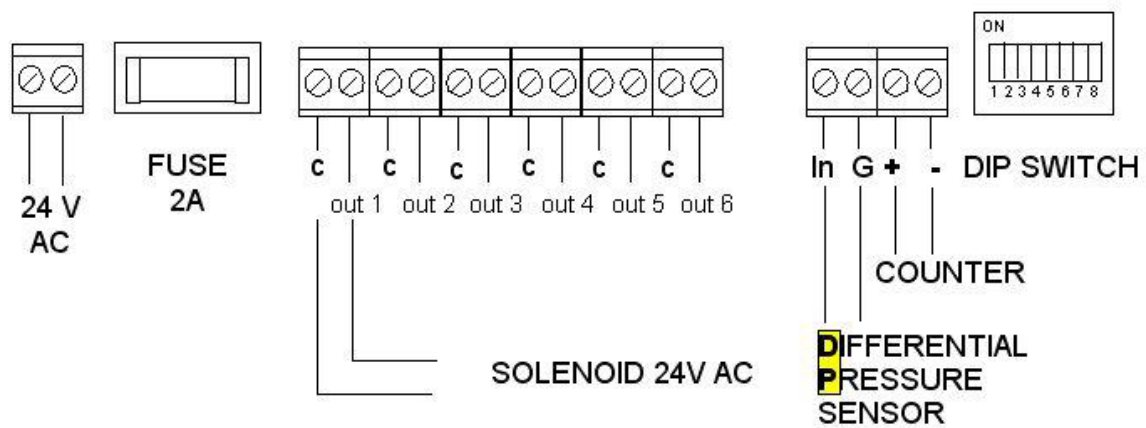
For AC models – 220v / 50Hz or 115v / 60Hz transformed into 24v AC. Maximum power 25w.

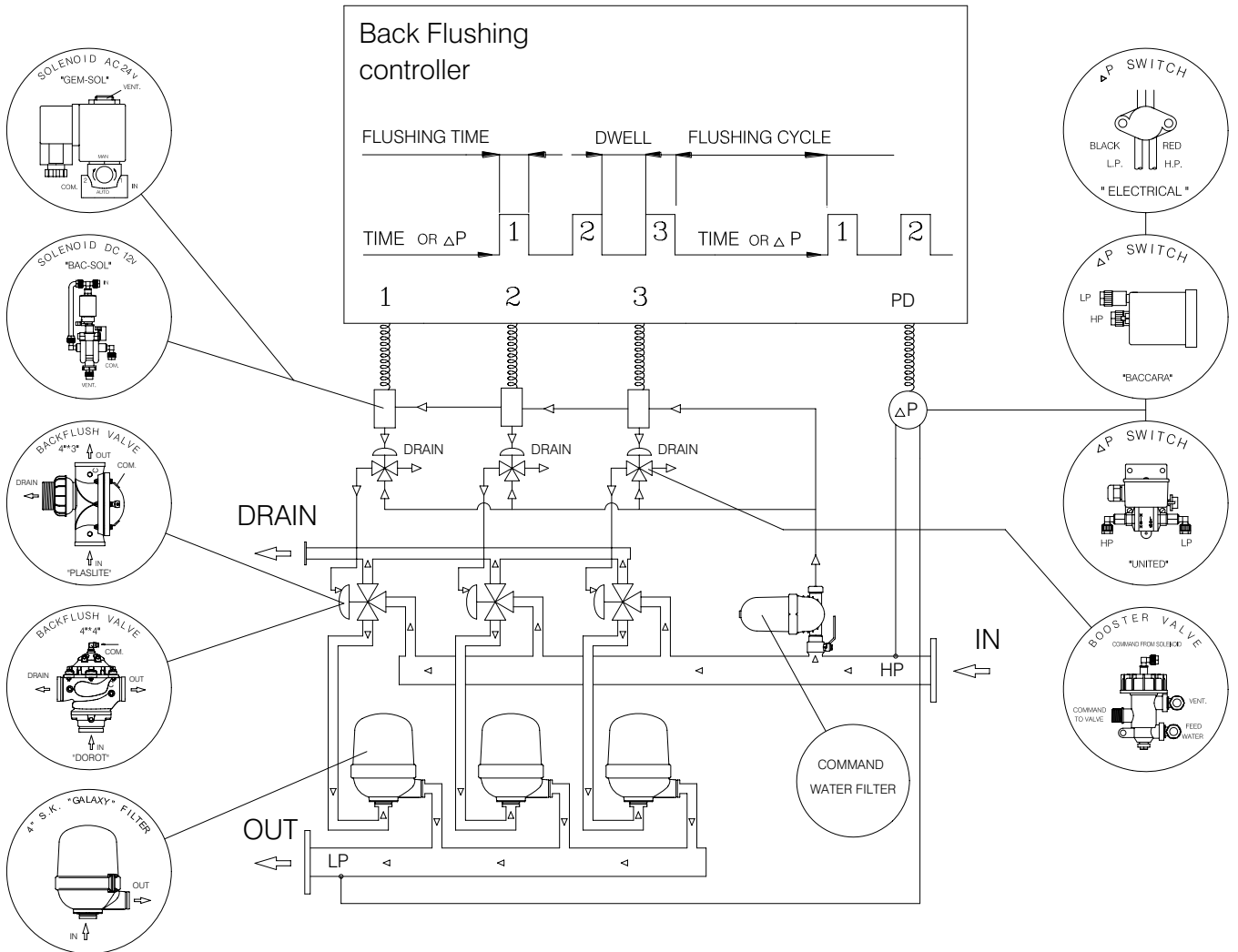
For DC models – 12v / 6Ah dry alkaline battery.

Connection Board (DC Model)



Connection Board (AC Model)





Control

- ❑ Refer to the manufacturer's handbook before installing the controller.
- ❑ Make sure that the voltage of both the solenoid unit and controller are correct.
- ❑ Set the manual operation button to automatic.
- ❑ Check that the ΔP hydraulic switch HIGH and LOW pressure lines are correctly connected to the appropriate ports.
- ❑ Set the starting backwash switch to ΔP 5-7 meters (6 – 8 p.s.i.).
- ❑ Set the controller to a flush time of 20 seconds and a dwell time of 10 seconds. These settings may require adjustment to conform to local water conditions. Typically, a 1 to 3 hour interval between backwashes is recommended.

8. Galaxy Spin Klin - System Maintenance

Monthly Maintenance

Check inlet /outlet pressures:

In case the pressure differential is above 5 m / 7 PSI.

Activate automatic backwash of the Spin Klin filter battery.

In the event that the pressure differential remains high check for possible failures.

Check for leakages from the drain manifold:

In case there is a leakage of water during the filtration stage, check for possible failure at the backwash valve seals.

Backwash controller performance:

Check that the controller timing parameters are correctly adjusted and activate automatic backwash cycle. In the event of possible failure at the backwash controller, check for possible failures.

Cleaning of the Command Filter:

Close the command filter inlet valve, release the pressure trapped at the command filter, remove the cover. Thoroughly clean the filtration element and then reinstall the command filter element and cover, then open the inlet valve.

Winterization:

In order to prevent the filter battery becoming damaged during water freezing – drain all the water from the filter battery and the command filter and leave the drain valve open.

SEASONAL MAINTENANCE - DISCS

To guarantee thorough cleaning the following steps should be taken:

Close the water inlet after backwashing the systems. Make certain that there is no pressure in the system and unscrew the nuts. **(Figure 1)**

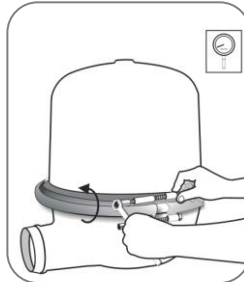


Figure 1

Open the clamp. **(Figure 2)**



Figure 2

Remove the cover. **(Figure 3)**



Figure 3

Unscrew the butterfly nuts on the filtration elements. **(Figure 4)**

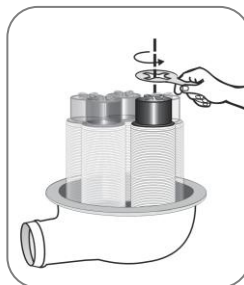


Figure 4

Remove the tightening cylinders. **(Figure 5)**



Figure 5

Remove the disc sets (for convenience we recommend using a plastic bag). **(Figure 6)**

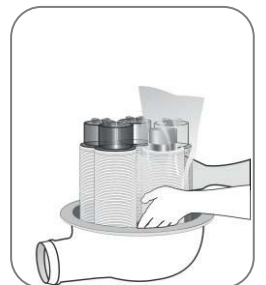


Figure 6

Tie each set on a string and place them in a cleaning solutions (HCL, Chlorine, or other) refer to “Cleaning Recommendations Clogged Filtration Discs”. **(Figure 7-8)**



Figure 7

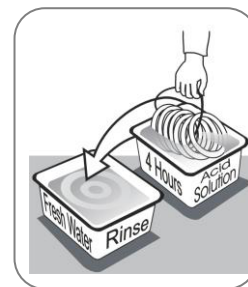


Figure 8

Ensure that the correct quantities of discs are assembled on the spines: when the discs are pressed with two hands, the top disc should be level with the imprinted circle on the outside of the spine. **(Figure 9)**

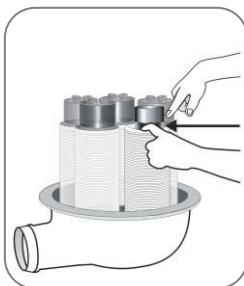


Figure 9

Reassemble the tightening cylinders, return the cover and tighten the clamp. **(Figure 10)**

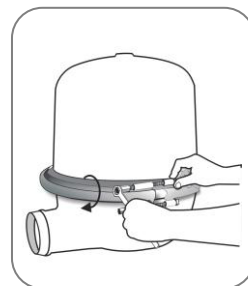


Figure 10

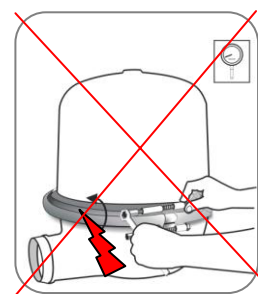
Attention:

When carrying out any of the following seasonal maintenance, service, or cleaning the discs – After backwashing the system and after closing the water inlet, **make certain that there is no pressure in the system!**

Unscrew the nuts and open the clamp.

Please Note:

- Before removing the cover you may experience the vacuum phenomenon – which will make the removing of the cover very difficult or almost impossible.
- **Do Not** - insert any sharp tools (objects) in between the cover and the body! You may damage the hydraulic seal and the cover!
- In order to remove the cover easily – **you should drain the water from the system!**
- You can drain the system through the command filter, or the back flush valves, once the system is empty the cover can then be removed safely and easily.



Cleaning Recommendations for Clogged Filtration Discs

Water-formed deposits may cause clogging of the filter discs. The formation of these deposits depends on the quality of the filtered water and environmental conditions like temperature, pH, light, duration of filtration and more.

Common water-formed deposits are:

- Biological or organic deposits (mostly mucous or oily to the touch, beige, brown or green in color)
- Iron oxide (rust) or other metal oxides
- Carbonates (white or gray deposit)
- Combinations of the above

If these deposits cannot be eliminated by pretreatment of the water, we recommend the following cleaning procedure:

Material and Equipment

- A well ventilated working place.
- 2 small containers (1 liter), 2 large containers (15 liter) and a stirring stick, all resistant to chemicals, preferably of polypropylene.
- Plastic rope to tie up the disc.
- Sodium Hypochlorite NaOCl -
Strong oxidizing liquid, commercial concentration: 10%.
Oxidizes and removes organic and biological deposits.
- Hydrochloric Acid HCl -
Very corrosive liquid, commercial concentration: 30%.
Dissolves and removes carbonates, iron oxide, and other deposits.
- Safety equipment: safety glasses, gloves, long pants, long sleeved shirt and shoes.

ATTENTION!

While working with chemicals protect yourself with the necessary safety equipment:

- Safety glasses, gloves, protective clothing
- Work in a well ventilated area
- Follow the manufacturer's instructions

Cleaning Organic and Biological Deposits

- Open the filter and remove dirty discs.
Attention – Never open the filter before the pressure has been released.
- Arrange the discs loosely on the plastic rope
- Prepare a 5% Sodium Hypochlorite solution:
 - 1) Pour 5 liters of water into one of the large containers.
 - 2) Add 5 liters of Sodium Hypochlorite (10%) into the water.
- Soak the discs in the solution so that both sides are covered. To achieve maximum cleaning, agitate the discs several times with a stirring stick.
- Contact time with cleaning solution: up to 8 hours
- Remove the discs carefully from the solution, put them in the second large container and rinse them very well with clean water before placing them back in the filter.
- We recommend flushing the cleaned discs again in the filter to ensure that all chemical residues are removed.

The cleaning solution can be used for several sets of discs. As the cleaning activity of the solution deteriorates, it may be necessary to soak the discs for a longer time.

Cleaning Carbonates and Iron Deposits

- Open the filter and remove the dirty discs.
- Arrange the discs loosely on the plastic rope.
- Prepare a 5% Solution of Hydrochloric Acid:
 - 1) Pour 10 liters of water into one of the large containers.
 - 2) Carefully add 2 liters of Hydrochloric Acid (30%) into the water.Soak the discs in the solution so that both sides will be covered.

PLEASE NOTE: Carbonates react violently with hydrochloric acid (foaming, gas evolution).
To achieve maximum cleaning, agitate the discs several times with a stirring stick.
- Contact time with cleaning solution: 1 - 8 hours.
- Remove the discs carefully from the solution and rinse them well with clean water before placing them back in the filter.
- We recommend flushing the cleaned discs again in the filter to ensure that all chemical residues are removed.

The cleaning solution can be used for several sets of discs. It may be necessary to soak the discs for a longer period of time as the cleaning activity of the solution deteriorates.

Cleaning Complex Deposits

If the composition of the deposit is not known, perform the following test:

- Take 5 discs for the test.
- Soak 2 discs in a 5% Sodium Hypochlorite Solution.

Preparation of the solution:
Pour 1 cup of water into a small container, then add 1 cup of Sodium Hypochlorite (10% NaOCl).
- Soak 2 discs in a 5% Hydrochloric Acid Solution.

Preparation of the solution:
Pour 2½ cups (= 500ml) of water into a small container, then add carefully ½ cup (= 100ml) of Hydrochloric Acid (30% HCl).
- Keep one disc as a control.
- Observe the cleaning process:

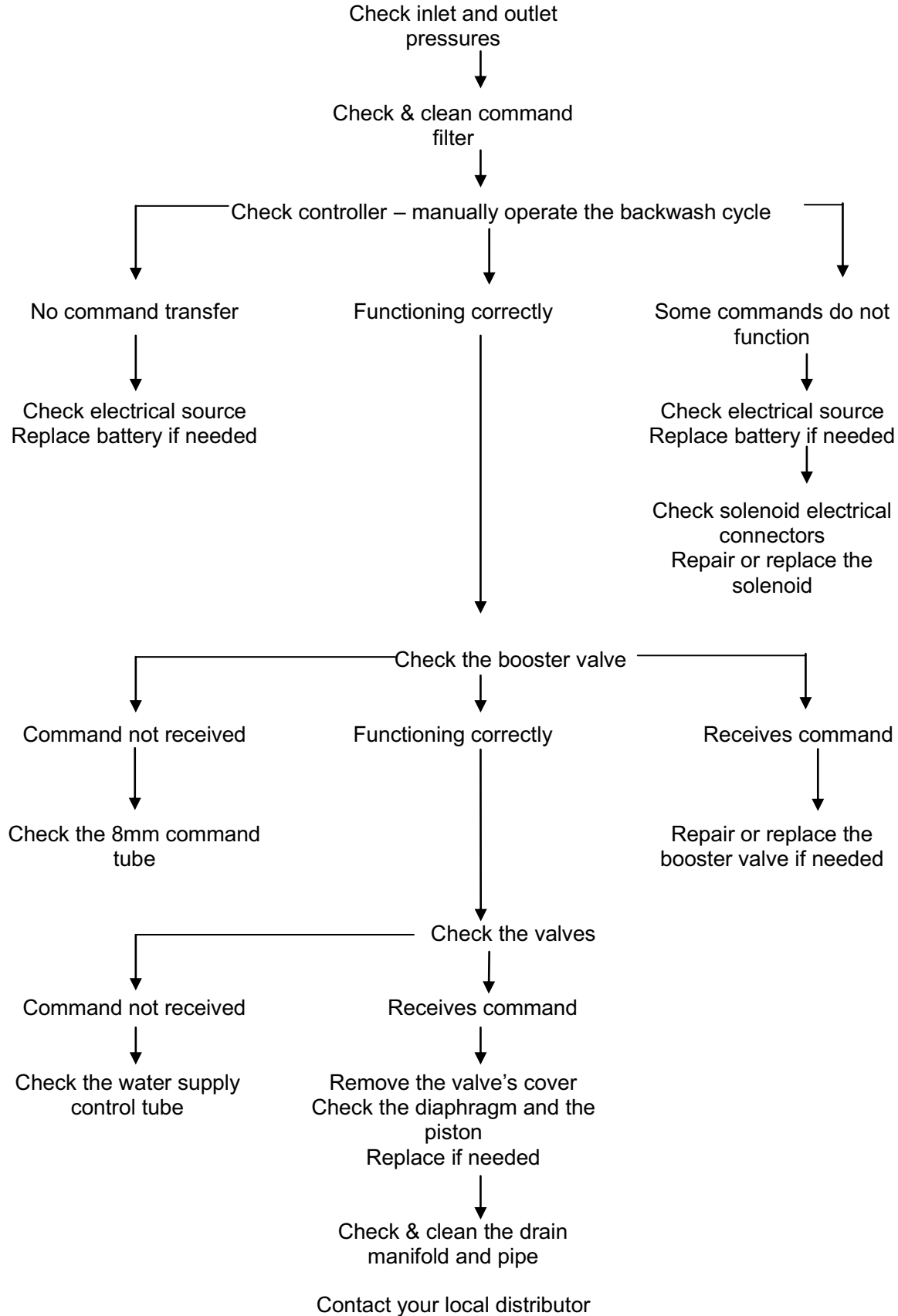
If one of the solutions removes all of the deposit, clean the discs in that solution according to the instructions above.

If neither solution removes the deposit completely, continue with the test procedure.
- Remove the discs from both solutions, rinse them well with water and soak them in the second solution: put the two discs, which have been in the Sodium Hypochlorite Solution, in the Hydrochloric Acid Solution, and the other way round.
- Check the cleaning process:

If one of the treatments removes all of the deposit, clean all of the discs following the same two-step procedure in the exact same order. Rinse the discs well between the two cleaning processes. If the deposit hasn't been completely removed, send a set of untreated discs to the laboratory for further examination.

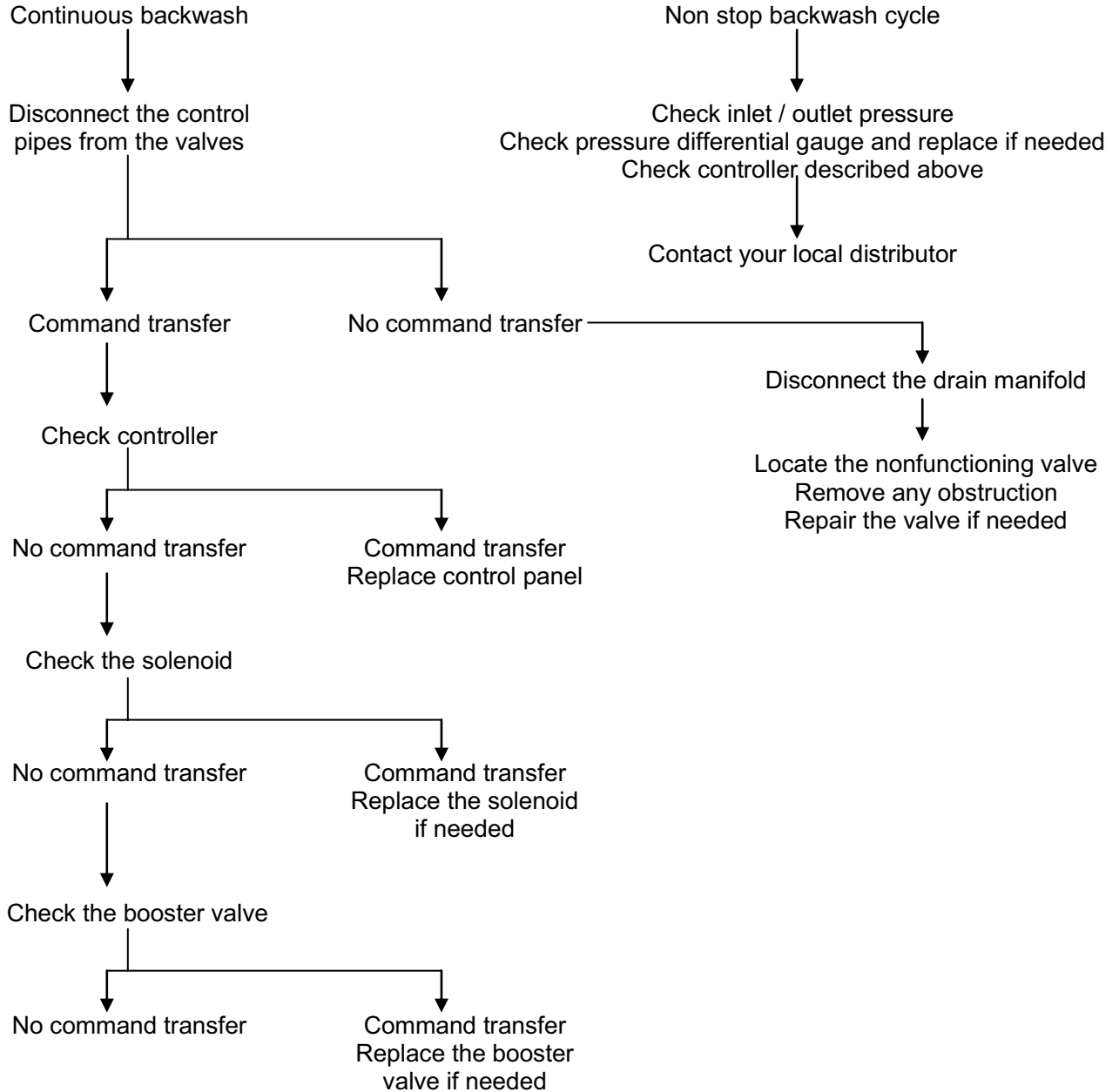
9. Troubleshooting

No Backwash Operation



Identifying Malfunctions in the Galaxy system

Continuous or Non-stop Backwashing



Contact your local distributor

Limited Warranty

ARKAL FILTRATION SYSTEMS ("ARKAL FILTRATION SYSTEMS") warrants to the original end user ("CUSTOMER") who purchased ARKAL FILTRATION SYSTEMS products directly from Arkal or through one of its authorized distributors, that such products will be free from defect in material and/or workmanship for the term set forth below, provide that such products are properly installed, used and maintained in accordance with ARKAL FILTRATION SYSTEMS instructions, written or verbal.

Should such products prove defective within one year from the original purchase date by the customer, and subject to receipt by ARKAL FILTRATION SYSTEMS or its authorized representative, of written notice thereof from the customer within 30 days of discovery of such defect or failure - ARKAL FILTRATION SYSTEMS will repair or replace, at its sole discretion, any item proven to be defective.

ARKAL FILTRATION SYSTEMS shall not be liable, nor does this warranty extend to any consequential or incidental damages or expenses of any kind or nature, regardless of the nature thereof, including without limitation, injury to persons or property, loss of use of the products, loss of goodwill, loss of profits or any other contingent liabilities of any kind or character alleged to be the cause of loss or damage to the purchaser.

This warranty does not cover damage or failure caused by misuse, abuse or negligence, nor shall it apply to such products upon which repairs or alterations have been made by other than an authorized ARKAL FILTRATION SYSTEMS representative.

This warranty does not extend to components, parts or raw materials used by ARKAL FILTRATION SYSTEMS but manufactured by others, which shall be only to the extent warranted by the manufacturer's warranty.

No agents or representatives shall have the authority to alter the terms of this warranty nor to add any provisions to it not contained herein or to extend this warranty to anyone other than ARKAL FILTRATION SYSTEMS customers.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, EXCEPT THIS WARRANTY WHICH IS GIVEN IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.