

AMIAD Water Systems

Arkal Spin-Klin

3" Battery Industrial Edition

Serial number:	_____
Order number:	_____
Catalogue number:	_____
Filtration degree:	_____
Tested by:	_____

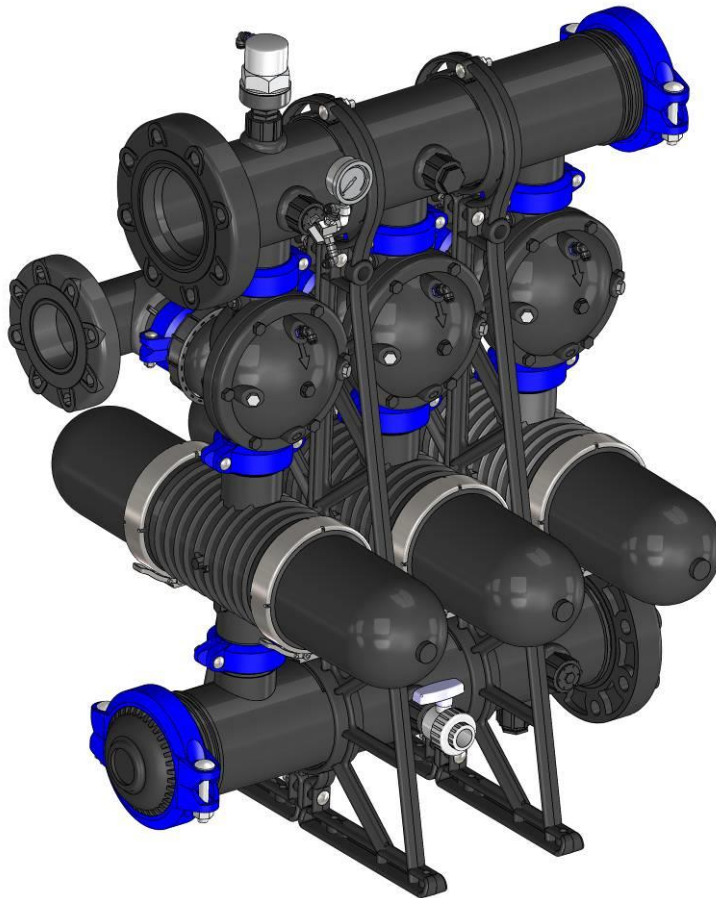
Installation, Operation and Maintenance Instructions

Ref- 910101-000512 / September 2013

AMIAD Water Systems

Arkal Spin-Klin 3" Battery Industrial Edition– User Manual

This Arkal 3" Spin Klin battery is an automatic self-cleaning filter designed for non-hazardous liquids only and within the pressure and temperature framework described in the specifications table.



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TABLE OF CONTENTS

Safety instructions 4

Dimensional drawing 7

Description and filter operation 8

Spin Klin Technology 10

System Installation and Startup 11

Maintenance 14

Cleaning Recommendations 16

Identifying Malfunctions 19

With any inquiry please quote Filter Serial Number, located on the filter housing.

SAFETY INSTRUCTIONS

General Safety Instructions

- Amiad filtration products always operate as components in a larger system. It is essential for the system designers, installers and operators to comply with all the relevant safety standards.
- Prior to installation, operation, maintenance or any other type of action carried out on the filter, read carefully the safety, installation and operation instructions.
- During installation, operation or maintenance of the filter all conventional safety instructions should be observed in order to avoid danger to the workers, the public or to property in the vicinity.
- Please note: The filter enters into a flushing mode automatically, without prior warning.
- No change or modification to the equipment is permitted without a written notification given in advance by the manufacturer or by its representative, on the manufacturer's behalf.
- Always observe standard safety instructions and good engineering practices whilst working in the filter's vicinity.
- Use the filter only for its intended use as designed by Amiad, any misuse of the filter may lead to undesired damage and may affect your warranty coverage. Please consult with Amiad prior to any non-regular use of this equipment.

Installation

General

- Install the filter according to the detailed Installation Instructions provided with the filter by the manufacturer and according to the description given in this manual.
- Make sure to leave enough clearance so as to enable easy access for future treatments and safe maintenance operations.
- The user should arrange suitable lighting at the area of the filter to enable good visibility and safe maintenance.
- The user should arrange suitable platforms, ladders and safety barriers to enable easy and safe access to the filter without climbing on pipes and other equipment. The user should verify that any platform, barrier, ladder or other such equipment is built, installed and used in accordance with the relevant local authorized standards.
- Check and re-tighten all bolts during commissioning and after the first week of operation.
- Use only appropriate standard tools and equipment operated by qualified operators when installing, operating and maintaining the filter.
- When installation is required in hazardous environment sites, underground or high above ground, make sure that the site design and the auxiliary equipment are appropriate and that installation procedures are carried out in accordance with the relevant standards and regulations.
- Ensure walking areas about the installation are slip free when wet.

Shipment and transporting

- Shipping and transporting the filter must be done in a safe and stable manner and in accordance with the relevant standards and regulations.
- For shipping, lifting and positioning the filter, use only approved lifting equipment and authorized employees and contractors.

Electricity

- Electric wiring should be performed by an authorized electrician only, using standardized and approved components.
- Install a **lockable** main power cut-off switch close to the control panel.
- If due to site constraints, the control panel is installed without a clear line-of sight of the filter, an additional **lockable** power disconnect cut-off switch should be installed near each filter unit.
- Installation of the filter should be performed so as to avoid direct water splashing on the electrical components or on the control panel.

Pneumatics

- Install a **lockable** main cut-off switch, **featured with a pressure release mechanism**, on the compressed air supply line close to the control panel.
- If the control panel is installed far away and there is no eye contact with the filter, a **lockable** compressed air cut-off switch, **featured with a pressure release mechanism**, should be installed near each filter unit.
- The user should make sure that the compressed air supplied to the filter never exceeds the maximum designated pressure for this filter. An air-pressure reduction valve should be installed on the compressed air supply line upstream of the filter's pneumatic inlet port.

Hydraulics

- Extra safety devices should be installed on hot water applications to avoid skin burn danger.
- The user should install a manual Water Cut-off Valve next to the filter's inlet port.
- In cases where the downstream piping network downstream of the filter is pressurized an additional manual Water Cut-off Valve should be installed next to the filter outlet port.
- The user should make sure that the system includes a Pressure Release / Drainage Valve to enable release of residual pressure prior to any maintenance procedure performed on the filter.
- The user should make sure that the filter is never exposed to water pressure exceeding the maximum designated pressure for this filter, if needed a Pressure Reduction Valve should be installed upstream of the filter's water inlet port.
- Please note that the maximum working pressure indicated at the filter's specifications table includes the pressure caused by fluid hammer and pressure surge effects.

Civil Engineering

- Make sure that the filter installation is done by Amiad qualified technicians.
- Make sure that any civil engineering work at the installation site such as construction, lifting, welding, etc. is done by qualified workers / technicians / contractors and in accordance with the relevant local standards.
- While using lifting equipment, make sure that the filter or the lifted part is chained securely and in a safe manner.
- Do not leave lifted equipment if there is no necessity. Avoid working below lifted equipment.
- Wear a safety helmet while using lifting equipment.
- Make sure that the flooring is sloped for drainage and to avoid accumulation of liquids.

Commissioning

- Read carefully the Commissioning and the First Start-up Operation instructions prior to any attempt to operate the filter.
- In order to achieve maximum performance and smooth operation of the filter it is crucial to perform the Startup and First Operation procedures exactly as described in this manual.
- Commissioning the filter should be done by an authorized Amiad technician, do not attempt to commission the filter unaccompanied since this may lead to undesired damage and may affect your warranty coverage.

Operation and Control

- Do not operate the filter before reading carefully and being familiar with its operation instructions.
- Observe the safety stickers on the filter and never perform any operation contradicting the instructions given.
- Never operate or use the filter for purposes other than its original design and operational envelope.

Maintenance

Before any maintenance or non-regular operation please read the following:

- Servicing the filter should be done only by technicians authorized by Amiad.
- Disconnect the filter from the power supply and lock the Main Power Switch.
- Disconnect the compressed air supply, release the residual pressure and lock the Pneumatics Main Valve.
- Disconnect the filter from the water system by closing and securing the Manual Inlet Valve. In cases where the downstream piping network is pressurized, close and secure the Manual Outlet Valve also.
- Release the residual water pressure by opening the Pressure Release / Drainage Valve.
- Empty the filter by opening the Drainage Valve.
- In hot water systems wait till the filter components cool off to a safe temperature.
- Place warning signs around the work area as required by the local standards and procedures.
- Inspect the filter's safety stickers and replace any damaged or faded sticker.

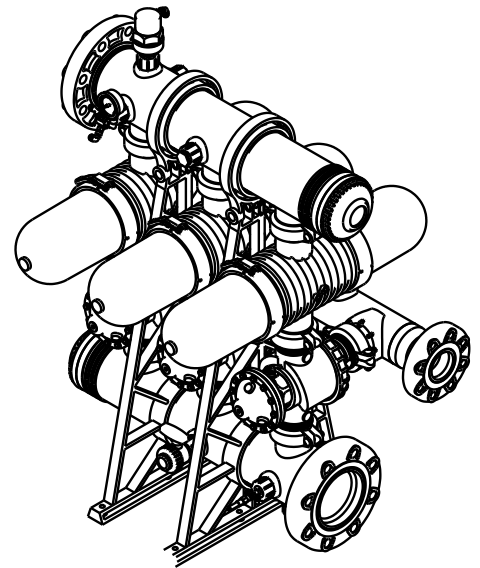
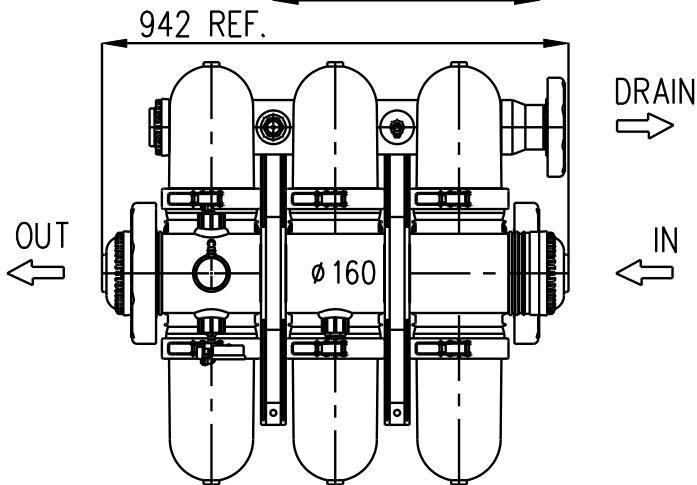
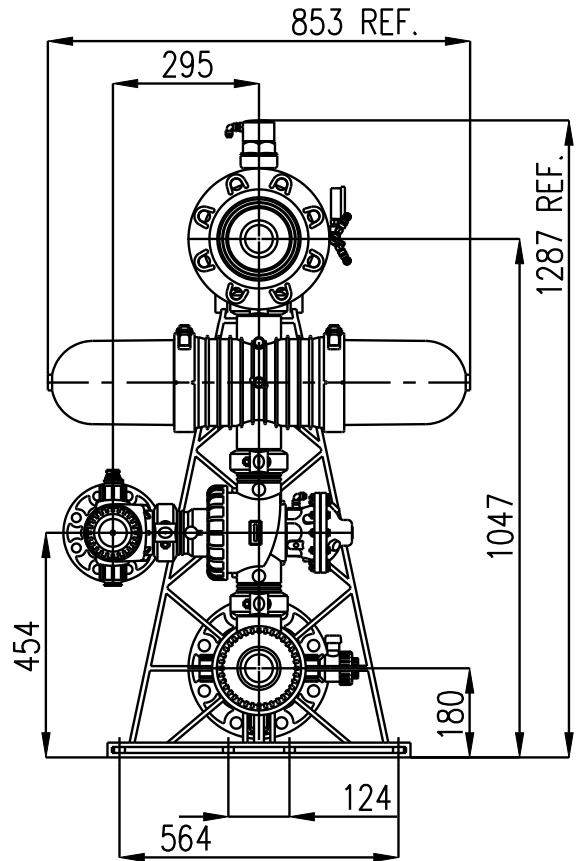
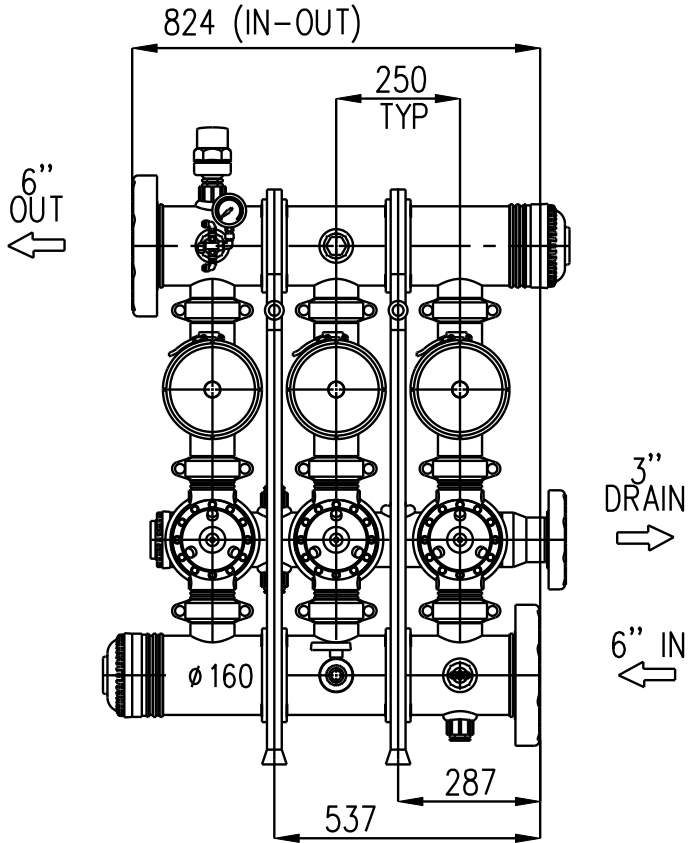
Mechanical

- When working on the filter use only appropriate standard tools.
- Always open and close valves slowly and gradually.
- Remove grease and fat material residues in order to avoid slipping.
- Before disconnecting the filter from the water supply, electricity and pneumatics and before releasing the filter's residual pressure do NOT:
 - loosen or unscrew bolts
 - remove any protection cover
 - open any service port flange
- Avoid splashing and water leakage so as to minimize slippage, electrification or damage to the equipment, caused by moisture.
- While using lifting equipment, make sure that the filter or the lifted part is chained securely and in a safe manner.
- Do not leave lifted equipment if there is no necessity. Avoid working below lifted equipment.
- Wear a safety helmet, goggles, gloves, and any other personal safety equipment required by the local standards and regulations.
- Human entry into a filter must be done in accordance with the relevant local safety instructions, standards and regulations for working in hazardous environment.
- Manual cleaning of filter media using high water pressure or steam should be performed in accordance with the cleaning system instructions, the local standards and regulations and without endangering the operator or the vicinity
- Manual cleaning of filter element using acid or other chemical agents should be performed in accordance with the relevant material safety instructions, the local standards and regulations and without endangering the operator or his vicinity.

Before returning to regular operation

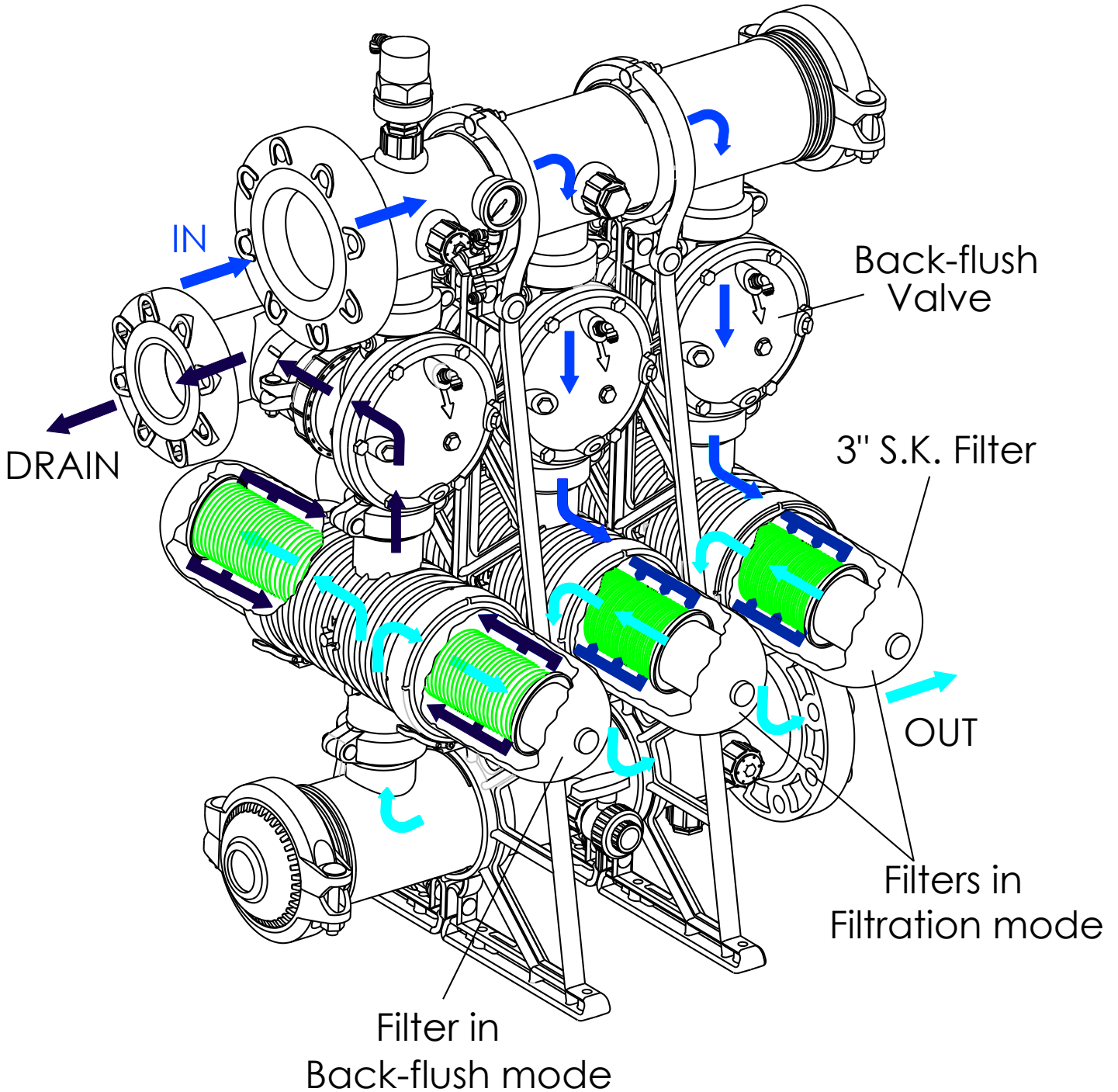
- Re-assemble any protection covers or protection mechanisms removed during service or maintenance operations.
- Make sure that all the tools, ladders, lifting devices, etc. used during the maintenance procedures are taken away from the filter area and stored
- In order to return the filter to regular operation, follow the First Start-up Operation instructions as detailed in your user manual.
- For filters used in potable water systems it is required to disinfect the filter according to the local water authority standards and regulations before putting it back to service.

Dimensional Drawing



Description and filter operation

During the filtration stage, water flows through the INLET manifold and is distributed through the 3" x 2" back-flush valves into the Spin Klin filters. The water then passes through the filter elements to the outlet manifold for consumer use.



Description of the Back-Flushing Process

1. The controller transmits an electrical command to the first solenoid according to either differential pressure or time.
2. The solenoid then sends a pressure command to the back-flush valve, moving it from the filtration mode to the back-flushing mode.
3. Filter #1 is then back-flushed with water from the outlet manifold that has been filtered by the other filters in the system. Contaminated water and impurities flow out through the drain manifold.
4. On completion of the allotted back-flush time the controller releases the back-flush command. Filter #1 return to the filtration mode.
5. Filter #2 then enters the back-flush mode, and the process is repeated until all the filters in the system have been back-flushed.
6. After all the filters have been back-flushed the system returns to the filtration mode, until the next back-flush cycle.

Spin Klin Technology - Spin Klin Spine

General:

The Spin Klin discs are stacked on the Spin Klin spine.

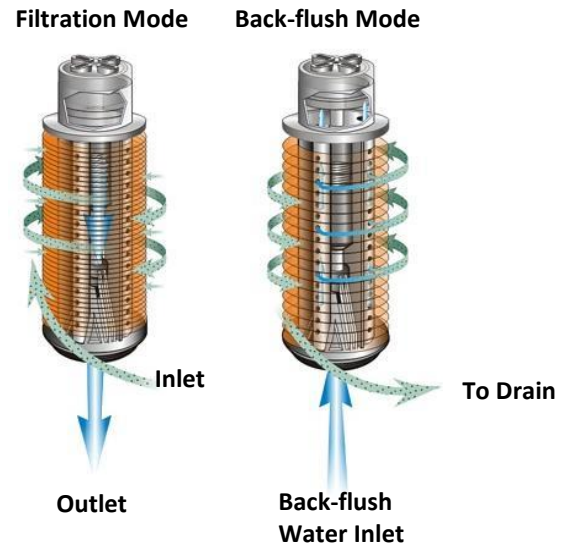
The discs are color-coded by micron size, and are assembled according to your water filtration requirements. The spine assembly has a spring compression unit and an internal piston which are used to alternately compress and release the discs during filtration and back-flush cycles.

Filtration Mode:

During the filtration process the filter discs are tightly compressed together by the spring and the differential pressure, forcing the water to flow through the grooves and traps of the discs.

Back-flush Mode:

During back-flush the discs are released by releasing the inlet hydraulic pressure. Multi-jet nozzles provide tangential spray on the loosened discs, causing them to spin, and release the retained solids, which are flushed out to the drain.



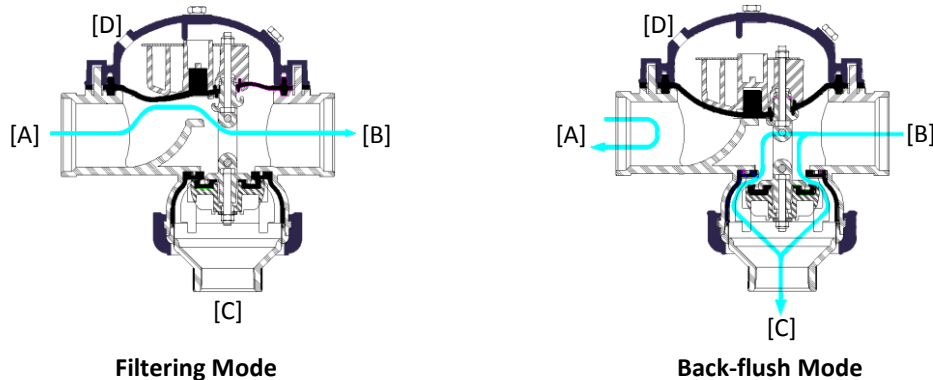
3" x 2" Back-flush Valve

Filtration Position:

Water flows from port [A] (main supply) to port [B] (filter connection). Port [C] (drain water outlet) is closed by the seal.

Back-flush Position:

Command pressure is applied to the top side of the diaphragm through port [D]. The diaphragm moves down, pushing the sealed body by the shaft. Port [A] is closed by the seal, preventing flow to the filter. Port [C] is now open allowing flushing water to flow from port [B] (filter connection) to the drain.



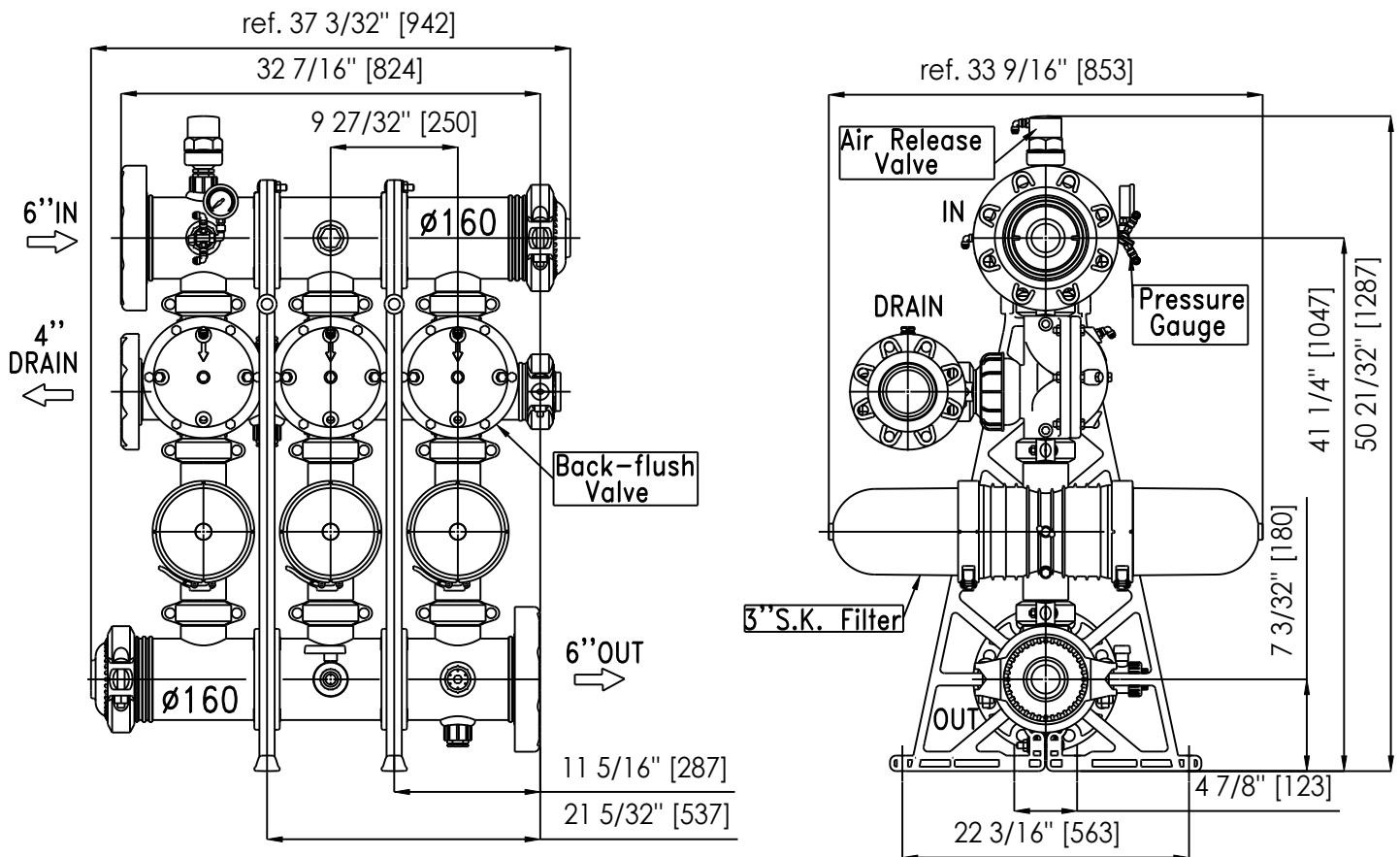
System Installation and Startup

Technical Data

Maximum Pressure	150 psi	10 bar at (25° C)
Minimum Pressure	38 psi	2.8 bar (Depends on filtration degree)
Back-flush Flow Rate per unit	88 gpm	20 m ³ /h
Maximum Temperature	140°F	60°C
pH	4-11	4-11

Installation

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



Start-up Operation

Start the back-flush cycle, making sure that all system components function correctly.

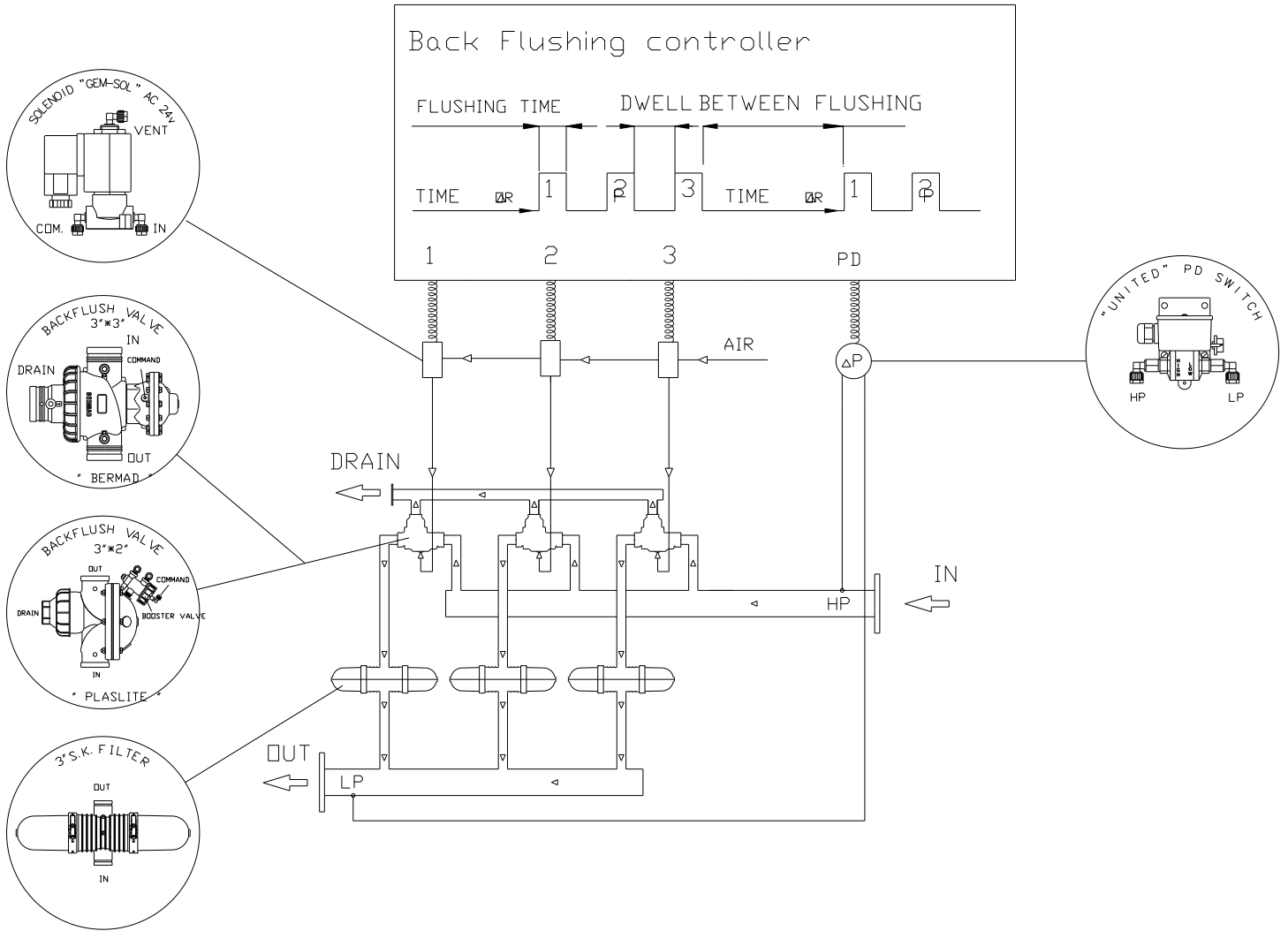
Filter Load-up during Start-up

- Close the downstream (flow control) valve (if available).
- Flush until clean with repeated cycles.
- 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.

Control

- Refer to the controller's manufacturer user manual 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 back-flush switch to ΔP 5meters (6psi).
- Set the controller to a flush time of 30 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 back-flush cycles is recommended.

Control Drawing



Spin Klin – System Maintenance

Monthly Maintenance

Check inlet /outlet pressures:

In case the pressure differential is above 5 m / 7 PSI.
Activate automatic back-flush 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 back-flush valve seals.

Back-flush controller performance:

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

Cleaning of the Command Filter:

Close the command filter inlet valve, release the pressure trapped at the command filter and 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 – Cleaning the Discs

When manual cleaning of the discs is required, please follow the steps described below:

Make sure that system is not under pressure! Release the clamp and remove the cover (Figures 1, 2)

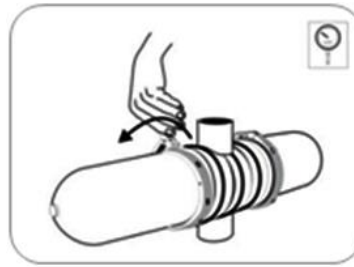


Figure 1

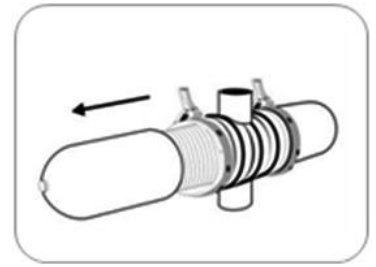


Figure 2

Unscrew the butterfly-nut on the filtration element (Figure 3) Remove the tightening cylinder (Figure 4)

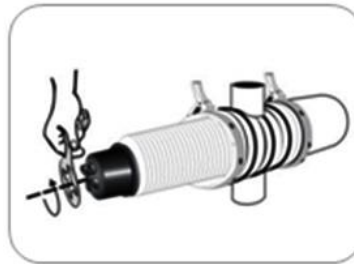


Figure 3

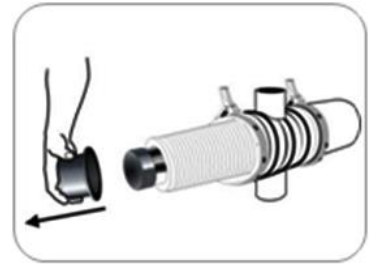


Figure 4

Remove the discs (for convenience we recommend using a plastic bag) (Figures 5, 6)

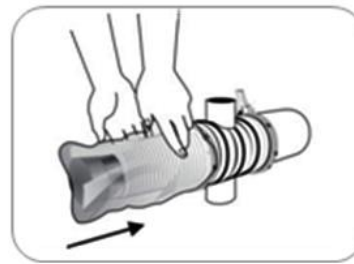


Figure 5



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". Thoroughly wash the discs with fresh water (Figure 7) Reassemble the discs on the spines; check that the correct quantities of discs are assembled on the spine: 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 8)

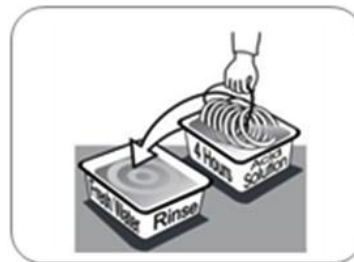


Figure 7

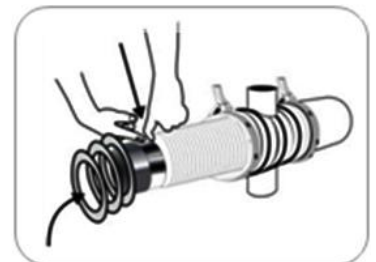


Figure 8

Put on the tightening cylinder and tighten the butterfly-nut, then reassemble the filter cover and tighten the clamp (Figures 9, 10)

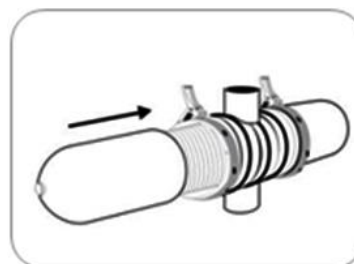


Figure 9

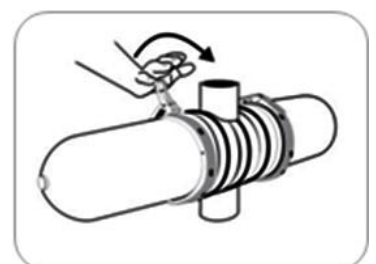


Figure 10

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.

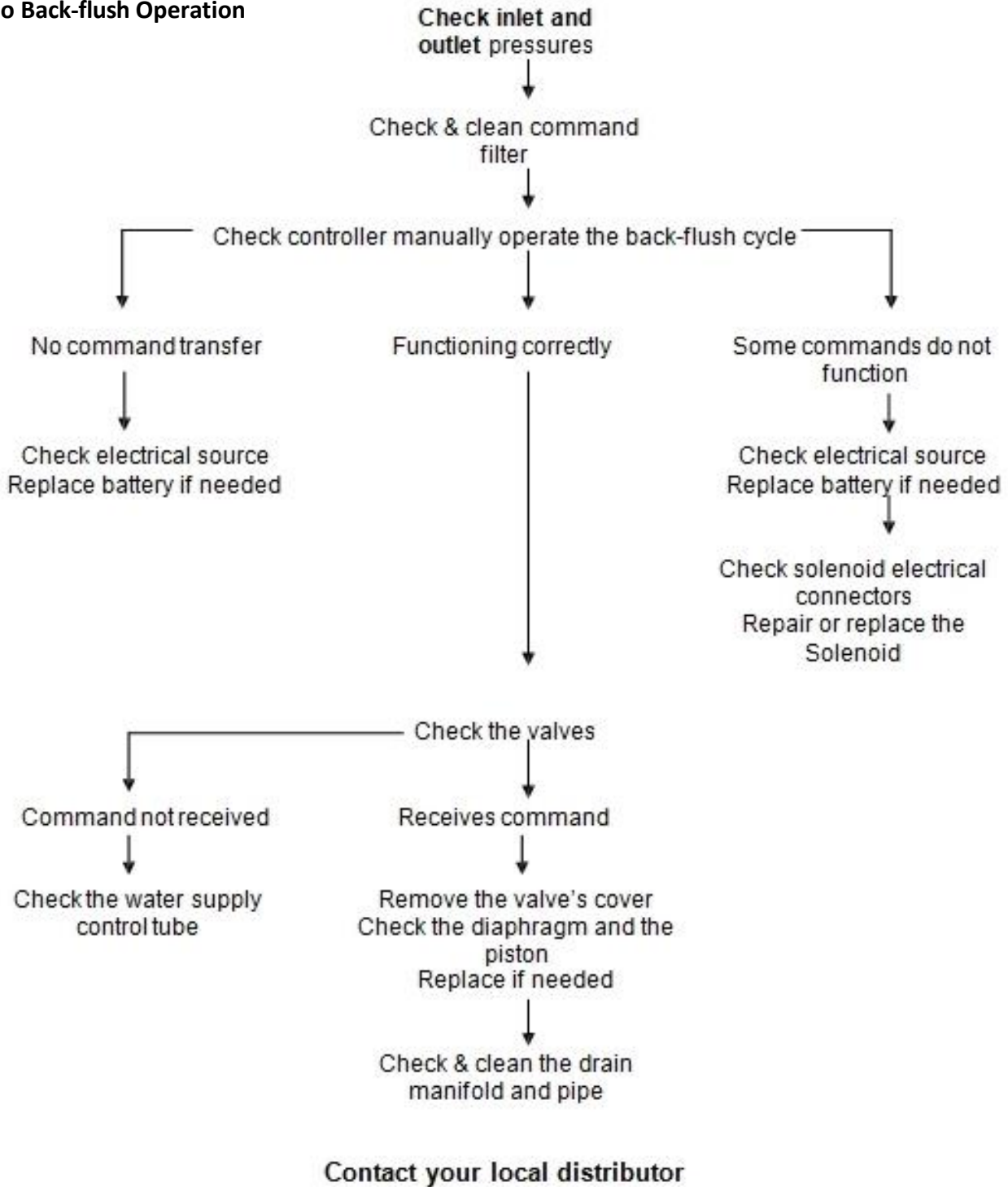
Cleaning Complex Deposits

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

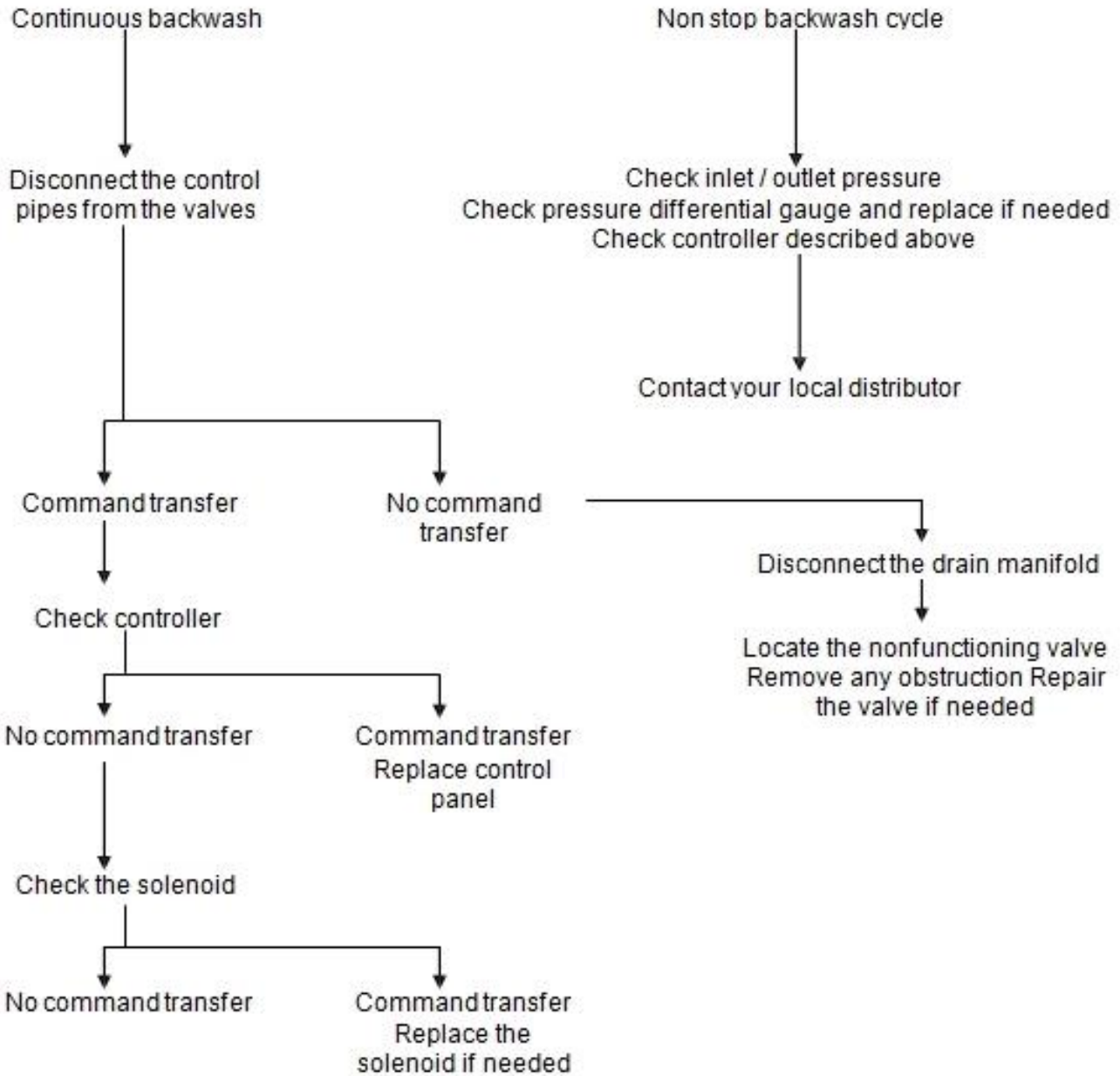
- Take 5 discs for the test.
- Soak 2 discs in a 5% Sodium Hypochlorite Solution.
Preparation of the solution:
Pour 1 cup of water into a small container, then add 1 cup of Sodium Hypochlorite (10% NaOCl)
- Soak 2 discs in a 5% Hydrochloric Acid Solution.
Preparation of the solution:
Pour 2½ cups (= 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.

Identifying Malfunctions in the 3" Spin Klin system

No Back-flush Operation



Continuous or Non-stop Back-flushing



Contact your local distributor

AMIAD LIMITED WARRANTY

This certificate applies to Amiad Products purchased by You from Amiad or an Amiad authorized Distributor ("Distributor"). This limited warranty extends only to the original purchaser, and is not transferable to anyone who subsequently purchases, leases, or otherwise obtains the Product from the original purchaser.

1. Amiad hereby warrants that the Products are and will be free from defects in material and workmanship under normal use and service. Amiad warrants that it will correct manufacturing defects in the Products, in accordance with the conditions set out in this warranty.
2. This warranty is enforceable for a period of 12 months after the date Bill of Lading or equivalent (the "Warranty Period").
3. In the event that during the Warranty Period the Distributor discovers a defect in material and/or workmanship in any Product or part (the "Defective Product"), it shall submit a written complaint to Amiad using Amiad's standard customer complaint form. For the receipt of the customer complaint form, the submission of the complaint or any questions please contact your customer service representative.
4. Upon written demand by Amiad the Distributor shall return the Defective Products – or a sample thereof – to Amiad, at Amiad's cost. If the customer ships any such Product, Amiad suggests the customer package it securely and insure it for value, as Amiad assumes no liability for any loss or damage occurring during shipment. Provided however that in the event Amiad determines that the warranty does not apply to such Product, Distributor shall promptly reimburse Amiad for such cost (including freight and customs). Any returned Product or part must be accompanied by the warranty certificate and the purchase invoice. It is clarified that the Distributor may not return the Defective Product unless such return was coordinate and approved by Amiad in advance.
5. Amiad's obligation under this warranty shall be limited to, at its option, the repair or exchange, free of charge, of the Product or any part which may prove defective under normal use and service during the Warranty Period. The provision of a repaired or replacement Product during the Warranty Period will result in an extension of the Warranty Period by an additional period of 12 months, provided that the total accumulated Warranty Period shall in any event be no more than 18 months from the original Bill of Lading.
6. This warranty is valid on the condition that the Products are installed according to Amiad's instructions as expressed in Amiad's instruction manuals and according to the technical limitations as stipulated in Amiad's literature or as stated by a representative of Amiad.
7. This warranty will not apply to damaged or defective Products resulting from or related to:
 - (i) Fire, flood, power surges or failures or any other catastrophe/and or unforeseen occurrence, such as but not limited to those for which the customers are customarily insured;
 - (ii) Fault, abuse or negligence of the customer;
 - (iii) Customer's responsibilities, including the failure of the intake water to meet the agreed standards, as set forth in a written document, approved by Amiad or improper storage.
 - (iv) Improper or unauthorized use of the Product or related parts by the customer, including the customer's failure to operate the Product in conformity with the recommendations and instructions of Amiad, as set forth in Amiad's manuals and other written materials, the operation of the Product other than by a trained and qualified operator, or improper installation of the Product by a third party not authorized by Amiad;
 - (v) Performance by the customer of maintenance and other services other than by a trained and qualified advanced operator, or other than in conformity with the recommendations and instructions of Amiad, or other than in accordance with procedures defined in the literature supplied for Products;
 - (vi) Any alteration, modification foreign attachment to or repair of the Products, other than by Amiad or its authorized technical representatives.
8. In no event shall Amiad be liable to the customer or any third party for any damages, including indirect, special, exemplary, punitive or consequential damages, or lost profits arising out of or in connection with this warranty, or arising out of or in connection with the Product's performance or failure to perform, even if it has been advised of the possibility of such damages.
9. Amiad will be excused for failure to perform or for delay in performance hereunder if such failure or delay is due to causes beyond its reasonable control or force majeure preventing or hindering performance.
10. The limited warranty set forth herein is the only warranty given by Amiad and is provided in lieu of any other warranties created by any documentation, packaging or otherwise.
11. Amiad makes no warranty whatsoever in respect of accessories or parts not supplied by Amiad. In the event that Amiad is required to correct a defective Product or product not covered by this warranty, it will do so solely in consideration for additional fees.