

# AMIAD Water Systems

## Filtomat MG-110P

Serial Number:	_____
Order Number:	_____
Catalog Number:	_____
Filtration Degree:	_____
Tested By:	_____

### Installation, Operation and Maintenance Instructions

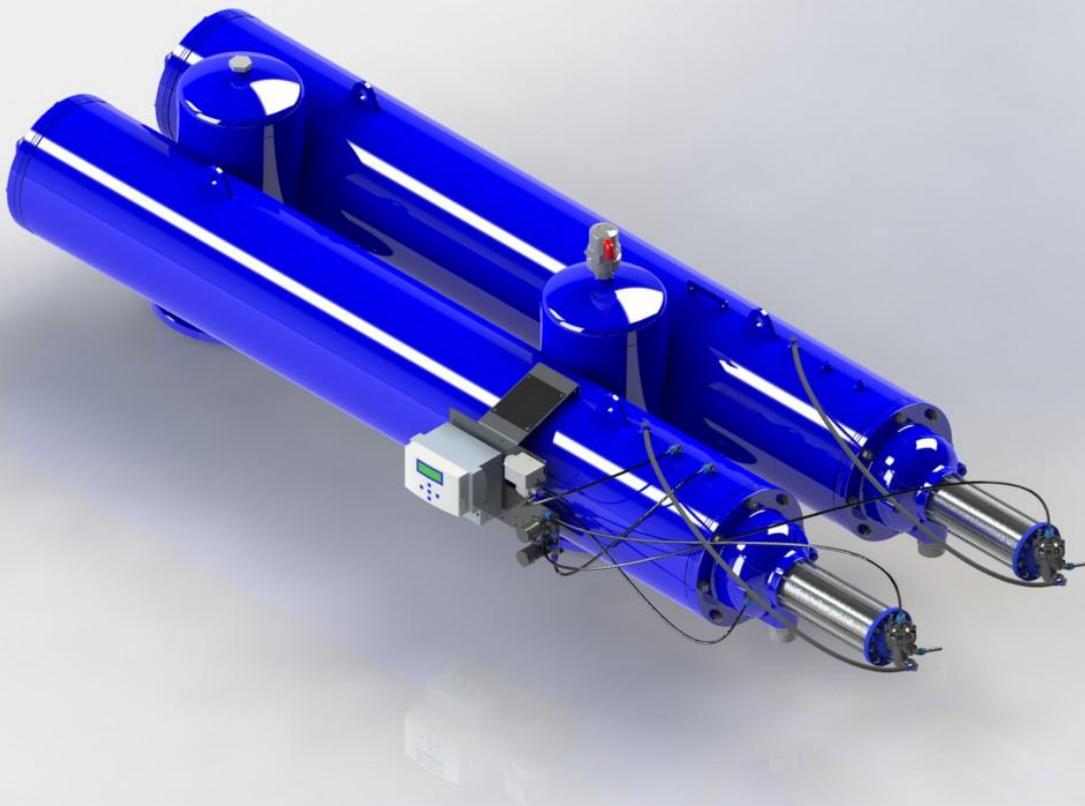
Filtomat orders and support

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## AMIAD Water Systems

### Filtomat MG 110P

## Installation, Operation and Maintenance Instructions



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

## TECHNICAL SPECIFICATIONS

### General

Maximum flow rate	MG-110P	350m <sup>3</sup> /h; 1542USgpm	Consult manufacturer for optimum flow depending on filtration degree & water quality.
Min. Working pressure		2.0bar; 30psi	Or lower if pressure is increased for flushing
Max. Working pressure		10bar; 150psi	
Filter area		13,600cm <sup>2</sup> ; 2108in <sup>2</sup>	
Inlet/Outlet diameter		250mm, 10"	Flange standards as per request.
Max. Working temperature		60°C; 140°F	
Empty weight MG110P		325kg / 717lb	

### Flush data

Exhaust valve	40 mm; 1 1/2"	Two flushing valves
Flushing cycle time	30 seconds	Depending on the working pressure
Wasted water per cycle	250 liter; 70USgallon	at 2bar; 30psi
Minimum flow for flushing	30m <sup>3</sup> /h; 130USgpm	at 2bar; 30psi
Flush criteria	Differential pressure of 0.5 bar; 7psi, time and manual operation	

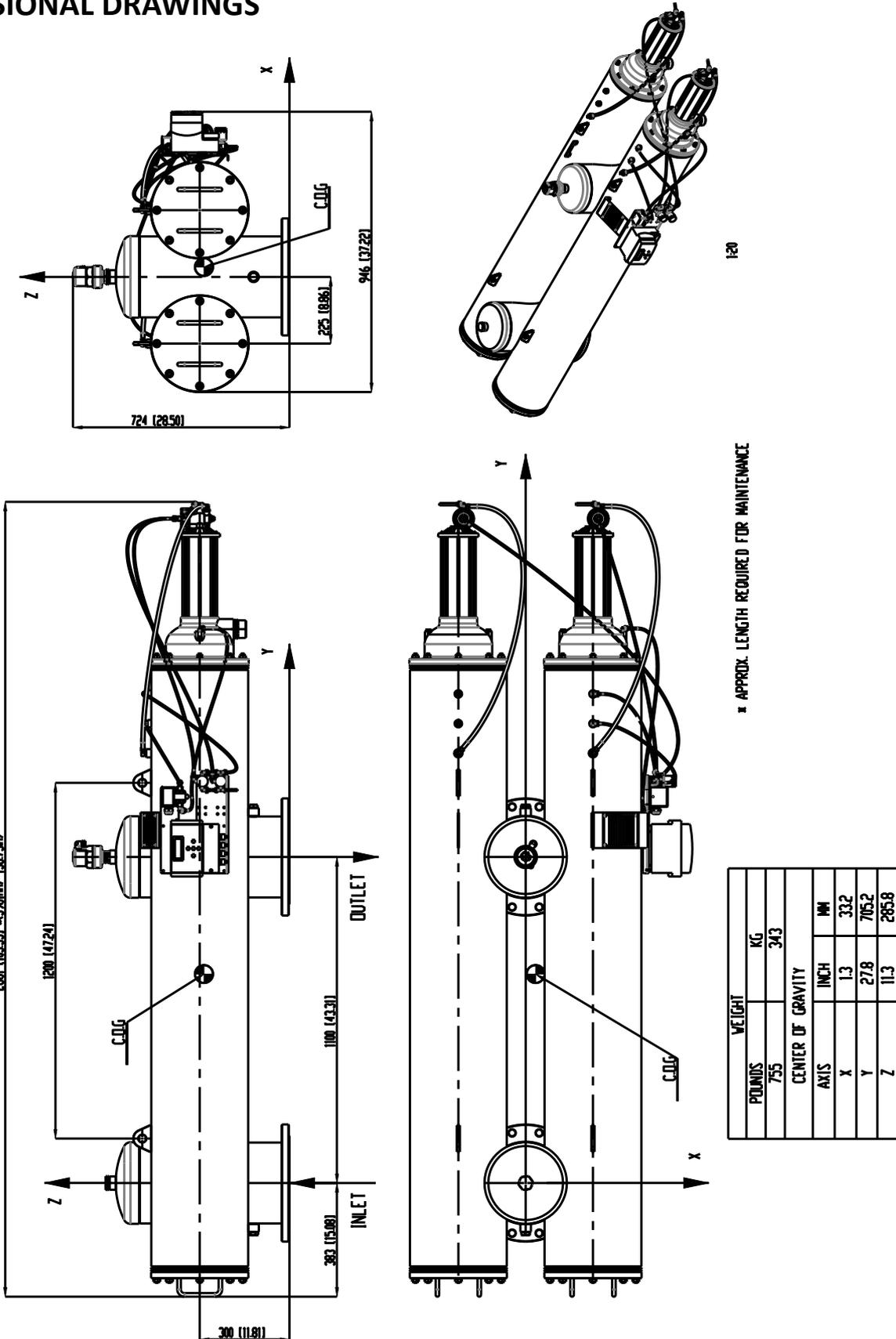
### Construction materials

Filter housing	Epoxy-coated carbon steel 37-2 (St. St. 316 available on request)
Filter lid	Epoxy-coated carbon steel 37-2
Coarse screen	Reinforced nylon
Fine screen	Stainless Steel 316, molded plastic support structure
Cleaning mechanism	PVC and Stainless Steel 316L
Motor assembly	Reinforced nylon, brass, stainless steel
Hydraulic piston	Stainless Steel 316, brass
Control tubing	Polyethylene
Seals	BUNA-N
Control	Aluminum, Brass, Stainless Steel 316, PVC

### Filtration degrees available

Type	Molded screen					
Micron	500	300	200	130	100	80
mm	0.5	0.3	0.2	0.13	0.1	0.08

**DIMENSIONAL DRAWINGS**



## 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.

## INTRODUCTION

### General Description

The **FILTOMAT MG110** is a sophisticated, yet easy-to-operate automatic filter, with a self-cleaning mechanism driven by a hydraulic turbine. It is designed to work with various types of screens in filtration degrees from 800 to 50 micron, and is available in 10" inlet/outlet diameter.

The **FILTOMAT MG110** filter is configured to meet your specific needs according to flow rates and water quality. The filter can be installed as a stand-alone unit for low flow rates, or assembled in a group on a manifold when high flow rates and/or a large screen area are required. The filters are delivered fully assembled, requiring simple connections to the inlet and outlet, and to the drain.

### Basic Filter Operation

Water enters the filter from the inlet pipe, and passes through a coarse screen, which protects the automatic cleaning mechanism from any large particles or debris. The coarse screen is not cleaned automatically, and should not accumulate large quantities of solids. The water then flows through a fine screen which filters out the smaller particles. Water that has passed through the fine screen is clean and passes into the outlet pipe. Particles of dirt accumulate on the fine screen and form a "filtration cake," which starts to restrict water flow. As the restriction, or clogging, increases, the pressure in the outlet pipe becomes lower than in the inlet pipe. When the pressure differential reaches a pre-set value, a self-cleaning cycle is initiated. The self-cleaning cycle takes approximately 45 seconds and does not interrupt the flow of water through the filter.

### How the Self-Cleaning Cycle Works

At a preset pressure differential (0.5 bar —7 psi), which is detected by a pressure differential switch, the flushing controller operates pulse solenoids which allow water to flow to the relay valves, which then activate the hydraulic pistons and open a valve to the rotor chamber (See Figures 2 and 3). The water from the rotor chamber flows out the drain. The pressure in the rotor chamber drops, releasing a strong flushing stream that flows through the filter.

This drop in pressure and corresponding release of the backflush stream create a suction effect at the nozzle inlets. This effect actuates spot cleaning directly in front of the openings of each nozzle at the inner side of the fine screen. The water and particles passing through the hydraulic rotor cause the suction scanner to rotate, and the piston moves in an axial direction to the opposite end of the filter.

The combination of rotational and axial movement of the suction scanner assembly ensures that the nozzles sweep the entire inner side of the fine screen in a spiral pattern.

When the first stroke is completed, the flushing valve closes and after a short interval the flushing controller activates the second backflush stroke. The suction scanner assembly spins, moving with the piston in the opposite direction and returning to its original position.

This self-cleaning process takes about 45 seconds, depending on the operating pressure.

It is essential that there be at least 2 bar pressure at the inlet to the filter for proper cleaning to take place during flushing.

The flushing controller may be operated by pressure differential, manual activation, or by timer.

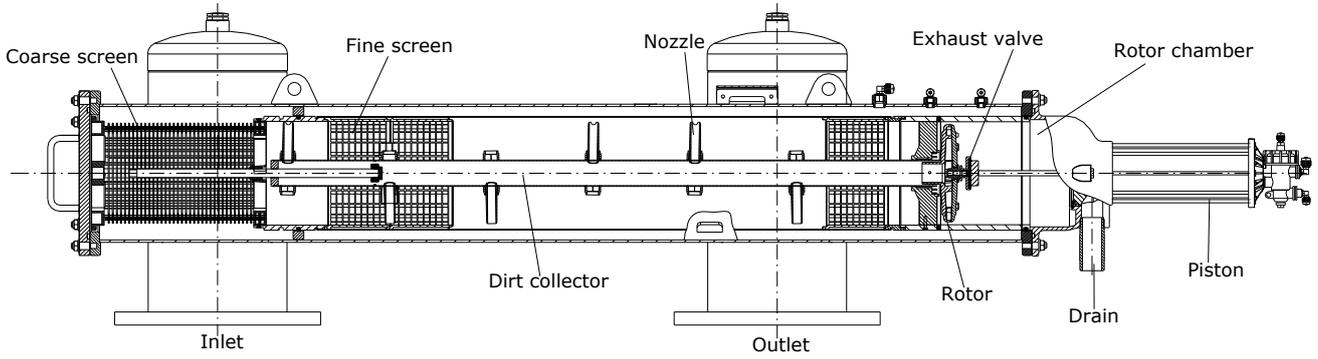


Figure 3: Internal Components of the MG 110

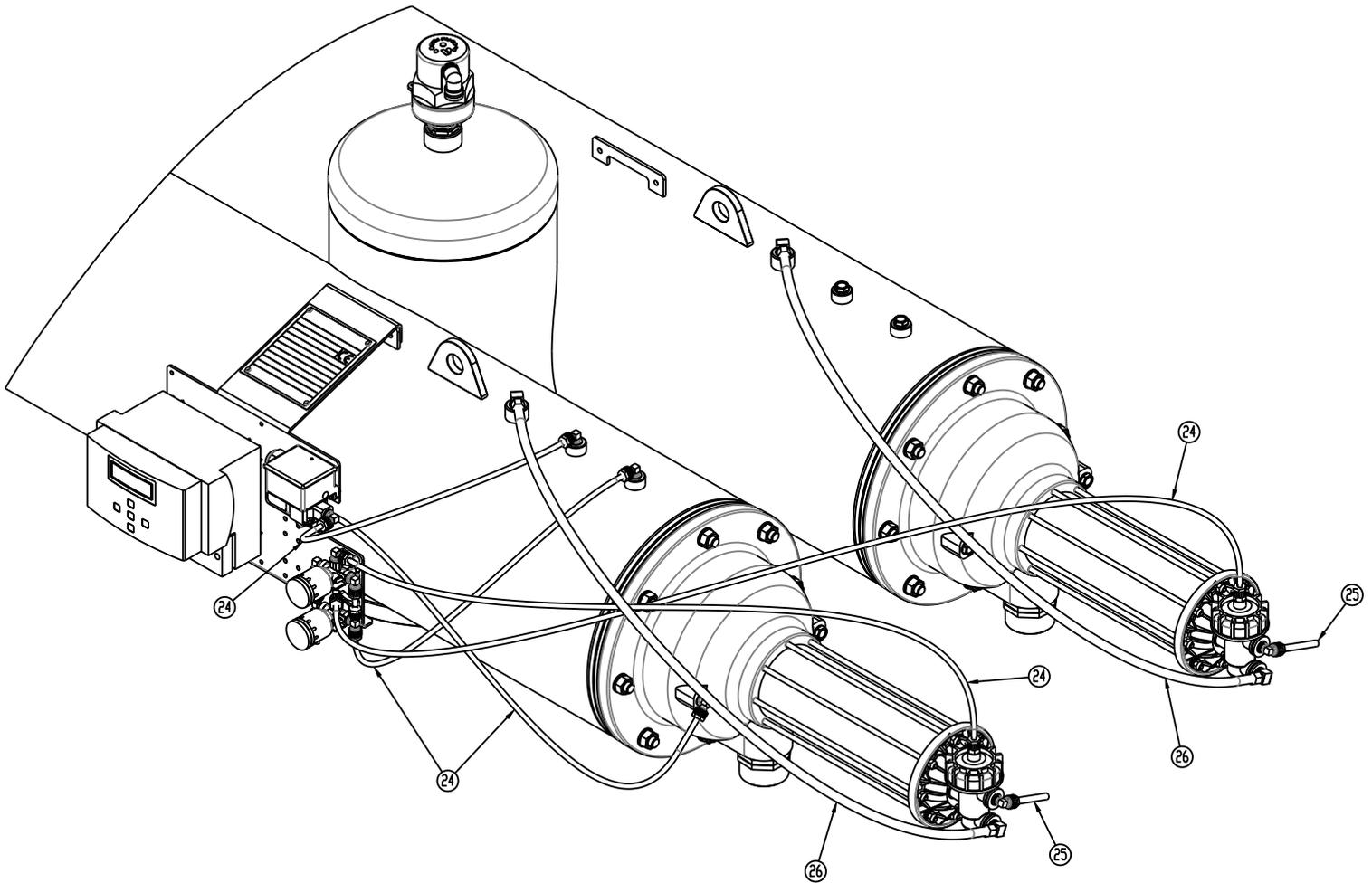


Figure 4: Hydraulic Control Line Routing

## How the Flushing Controller Works

The flushing controller is operated by 12 VDC. It receives a signal from the Differential Pressure Switch when the pressure differential reaches the preset value (0.5 Bar, 7 PSI). The flushing controller then sends a 12 VDC pulse to the Pulse Solenoid, which provides hydraulic pressure to the Hydraulic Relay which actuates the piston. Where there are several ganged filters, there are solenoids to each relay valve and piston and they are activated in turn, not simultaneously, in order to maintain inlet pressure and avoid large pressure drops. The unit can also control a downstream valve, which may be closed while flushing to increase pressure. An optional electronic counter can keep track of the number of flushing cycles.

Parameters which may be set include:

- Mode of operation: Manual, Differential Pressure (DP) only, DP with time override
- Flushing cycle
- Flushing time
- Dwell Time
- DP response delay time
- Number of consecutive flushing cycles by DP, to be considered a fault

## How the Hydraulic Relay Works

The hydraulic relay valve, when not actuated by hydraulic pressure from the pulse solenoid, allows pressure to pass to the hydraulic piston, extending it, and holding the suction scanner away from filter lid. When the hydraulic relay is actuated, pressure to the piston is shut off and the water in the piston flows out to the drain. When the piston is no longer under pressure the suction scanner pushes the piston away from the filter lid.

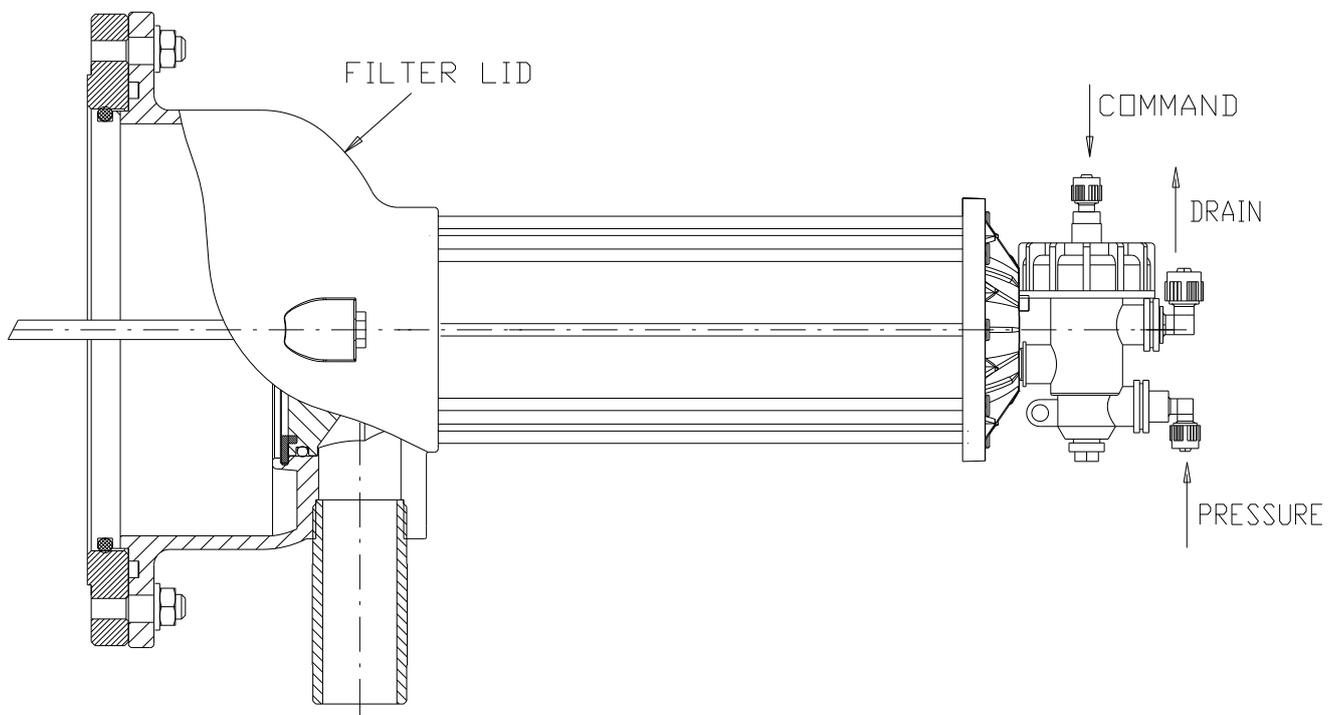


Figure 5: Hydraulic Relay

## INSTALLATION

### Design Recommendations

- The inlet and outlet pipes must be the same or a larger diameter than the inlet and outlet diameters of the filter.
- The upstream pressure source should not drop below 30 psi (2 bar) during the rinse cycle. If this cannot be ensured, consult the manufacturer.
- If a prolonged pipeline fill time causes a temporary high flow and low pressure situation, it is recommended that you install a pressure sustaining valve downstream of the filter. The pressure sustaining valve will ensure a controlled fill-up of the line.
- If continued water delivery is essential even during “down time” maintenance periods, it is recommended that a manual or automatic by-pass be installed, and that isolating valves be installed up and downstream of each filter unit for isolation purposes.
- Shut off valves must be installed in the inlet and outlet lines to enable maintenance.
- A non-return valve should be installed where water hammer or back flow may be a problem.
- The filter must be installed in the direction of flow indicated by the arrow on the filter body.
- Secure the drain pipe so that there is no movement during flushing.
- The highest point of the drain pipe should be no more than one half meter above the filter.
- The drain pipe must allow free flow and be free of restrictions.

### Preparations for Installation

- Ensure suitable lighting at the area of the filter to enable good visibility and safe maintenance.
- Arrange suitable platforms and safety barriers to enable easy, safe access to the filter.
- Allow a convenient approach and enough space for dismantling and maintenance.

### Installation Instructions

- Ensure the direction of flow is according to arrows marked on the filter housing
- Install a drain valve in place of one of the pipe plugs in the inlet or outlet pipe on the installation manifold.

### Important!

- **Prevent static back pressure or reverse flow through the filter.**
- **Install a manual or a hydraulic valve downstream of the filter.**
- **The filter may enter flushing mode automatically, without warning.**

## FIRST-TIME OPERATION

1. Remove a plastic plug from one of the outlet holes on the top of the filter to bleed air from the filter.
2. Open the inlet valve.
3. Close the plastic plug when all the air is bled from the filter.
4. Make sure the filter is clean and dry.
5. Check all fittings and flanges for leaks.
6. Open the outlet valve.
7. Perform manual flushing, by selecting "Manual" in the flushing controller.
8. Check that the inlet pressure does not drop below 2 bar during flushing.

The filter is ready for operation. Observe at least one automatic flushing cycle, activated by time or differential pressure.

## Servicing

### Draining the Filter

1. Close the inlet valve
2. Close the outlet valve.
3. Open the drain valve to release pressure. To avoid water draining onto the area around the filter, install a drain hose onto the drain valve.

### Removing and Installing the Inlet (coarse) Screen

1. Drain the filter.
2. Remove the filter cover nuts and the cover.
3. Remove the inlet screen.
4. Before reinstalling the screen, make sure that the fine filter screen is properly seated.
5. Push the coarse screen into place.
6. The screen must be seated in the base of the fine filter and must be flush with the flange of the filter housing or 1 mm. inside. **It should not project outside the flange.**
7. If the screen does not fit exactly, plastic segments may be removed or added as necessary. The screen is supplied with two spare segments stored as in the following figure.
8. Place the O-ring into the groove into the cover. It may be necessary to apply silicone grease to hold it in place.
9. Close the cover and tighten the nuts evenly in an alternating pattern.
10. Activate the filter as in the section "Operating the Filter for the First Time."

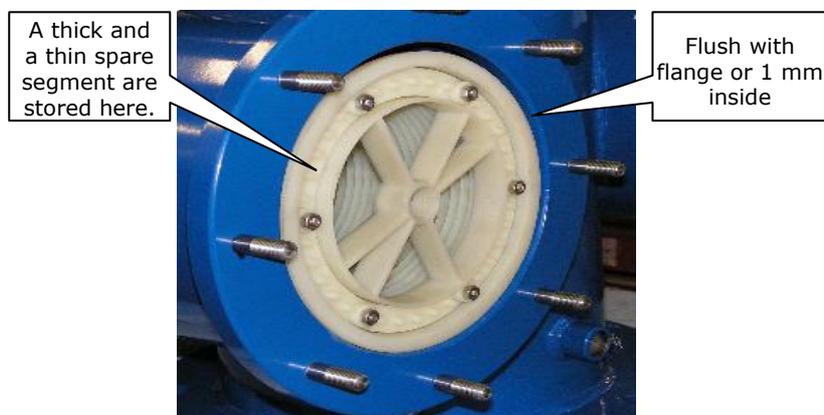


Figure 6: Inlet Screen

## Replacing the Piston

1. Drain the filter.
2. Remove the eight nuts holding the piston and cylinder assembly, and remove the assembly.
3. Inspect the suction scanner to make sure it moves freely in its bearings and the end that mates with piston is not damaged.
4. Apply silicon grease to the O-ring at the base of the piston/cylinder assembly.
5. Push the piston/cylinder onto the eight studs, taking care that the O-ring slides into the opening and seats properly.
6. Place nuts on the studs. Tighten gradually in a criss-cross pattern to avoid binding.
7. Activate the filter as in "Operating the Filter for the First Time."

## Removing and Installing the Filter Screen and the Suction Scanner

1. Drain the filter.
2. Remove the inlet screen.
3. Remove the piston and cylinder assembly.
4. Pull out the filter screen and suction scanner as an assembly.
5. Insert the filter screen/suction assembly making sure it is seated and is flush with the piston end of the filter housing.
6. Make sure that the suction scanner moves freely in its bearings.
7. Install the piston and cylinder assembly.
8. Activate the filter as in "Operating the Filter for the First Time."

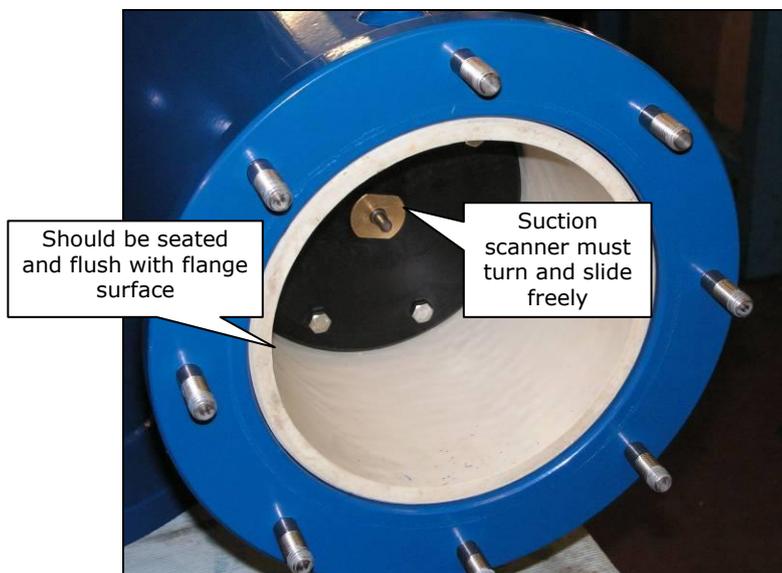


Figure 7: Filter Screen/Suction Scanner Assembly

## Maintenance

It is recommended to inspect the filter once a year, in the off season. Remove the filter as described above and inspect the screen and O-rings, clean as necessary, and lubricate with silicone grease before reassembling.

In cases where clogging of the inlet screen occurs, experience with the local conditions will determine how often the screen should be checked as a routine.

### Preparing the Filter for Long-Term Shutdown or Freezing Conditions

1. Drain the filter.
2. Remove the filter screens as described previously and clean and dry them.
3. Disconnect the hydraulic lines to drain water out of them and reconnect.
4. Push the piston rod inward to remove water from the cylinder.
5. Reassemble.

## PROGRAMMING THE FLUSHING CONTROLLER

Amiad's Flushing-Controllers product line is a family of electronic devices capable of controlling the flushing process of various automatic-filter models. Currently this line consists of three products; one AC controller and two DC controllers.

This document is the user-manual of the 6 solenoids DC Controller and it describes the configuration process and the operation procedures of the V7 controller version.



Note: This picture is for illustration purpose only

## **Introduction & How to use this manual**

Amiad's Flushing-Controllers product line is a family of electronic devices capable of controlling the flushing process of various automatic-filter models. Currently this line is consisting of three products; one AC controller and two DC controllers.

This document is the user-manual of the 6 solenoids DC Controller and it describes the configuration process and the operation procedures of the V7 controller version.

Before operating the controller please read this manual carefully. Make sure that:

- You are familiar with the safety instructions
- You know how to use the control's User-Interface panel

This manual consists of the following chapters:

- A. General description – The controller's capabilities, the various configuration options and the types of filters the controller can serve – Page 17.
- B. Flushing methods – Detailed description of the various flushing sequences possible to operate with the controller – Page 17.
- C. The User Interface Panel - How to use the panel – Page 21.
- D. Entering data - How to modify numbers and parameters – Page 24.
- E. Configuration – How to configure the controller for a specific filter model – Page 26.
- F. Flushing program – How to enter a flushing sequence program - Page 28.
- G. Monitoring – How to monitor the controller operation - Page 30.
- H. Handling faults – How to identify and reset flushing faults – Page 31.
- I. Technical data – Connection drawing, I/O data, etc. – Page 32.
- J. Annex A. – Operating filters that require a Delay Valve

## **Safety instructions**

1. The terminals enclosure lid of the unit must remain closed at all times.
2. Only a qualified technician may remove this lid and only when the controller is properly disconnected from its power source.
3. Servicing the unit can be done only by Amiad's qualified technician.
4. Make sure that the filters controlled by the controller are disconnected from the water system whenever servicing the controller.
5. In case the controller is connected to an external AC power supply unit, make sure that the power supply connection is done properly and complies with your local standards for High Voltage out-doors connection.
6. No alterations or changes of the unit are allowed.
7. Never cut, connect or disconnect any wire at the controller's vicinity.
8. Make sure that the controller is not exposed to water splashes.
9. Keep the keyboard transparent-cover closed at all times when not using the keyboard.

## **A. General Description**

Amiad's DC Controller is an electrical/electronic device designed for controlling the flushing process of various types of automatic filters.

The controller is capable of controlling up to 6 12VDC Latch Solenoids which enables it to operate several types of filtration sites such as:

- ✚ Automatic screen filters batteries, up to 6 units each.
- ✚ Gravel media filters batteries, up to 6 units each.
- ✚ Automatic disc filters batteries, up to 6 units each.
- ✚ One Amiad TAF Electronic Filter.

Unlimited number of controllers can be chained together in order to control large filtration sites.

The flushing process can be triggered by:

- ✚ Differential Pressure (DP) signal
- ✚ Time parameter
- ✚ Manual Start command
- ✚ Remote Start signal (By receiving an End of Cycle input from a chained controller)

Beside the filters outputs and the DP input the controller is also capable of controlling the following additional functions:

- ✚ Main Valve (replaces one of the 6 maximum filter units outputs)
- ✚ Delay Valve (replaces one of the 6 maximum filter units outputs)
- ✚ Dry Contact Auxiliary Output that works in parallel with the main/delay valves
- ✚ Alarm output
- ✚ End of Cycle output
- ✚ Pause input

The controller's enclosure is made of Polycarbonate and is designed for outdoor use (IP 65).

## **B. Flushing Methods**

This chapter lists and describes the sequence of operation of the major flushing methods possible to operate using Amiad Flushing Controller:

### **1. Controlling Amiad TAF Electronic filter:**

#### 1.1 A single TAF filter:

Starting the flushing cycle:

- ✚ **DP signal:** Once a signal from the DP switch is received the controller starts to count down the DP delay time (see [screen number 7](#)). If the signal remains present till the end of the count down a flushing cycle starts.
- ✚ **Time parameter:** By the end of each flushing cycle the controller starts to count down the Time between Flushes Parameter (see [screen number 7](#)). Once this parameter is counted down to zero a flushing cycle starts. Please note that if a flushing cycle is started by a different trigger (i.e. DP signal) the controller re-set the count down of the time between flushes parameter and starts to count it again.

- ✚ **Manual Start:** The user initiates a flushing cycle by pressing Enter in the “For Manual Flush Press <Enter>” screen (see screen number 3).
- ✚ **Remote start signal:** Works the same as a regular DP signal.

The flushing cycle:

- ✚ Solenoid valve number 1 is switched on, the flushing of the filter starts and the controller counts down the Flushing Time parameter (see screen number 5). Once this parameter is counted down to zero the solenoid is switched off and the flushing cycle ends.

### 1.2 TAF filter with Downstream Valve:

Starting the flushing cycle:

- ✚ The same as in “A single TAF filter” above.

The flushing cycle:

- ✚ The Main Valve solenoid is switched on and closes the filter’s downstream valve. The controller counts down the “Delay Main Valve Close” parameter (see screen number 8). once this count reaches zero the process moves to the next stage.
- ✚ Solenoid valve number 1 is switched on, the flushing of the filter starts and the controller counts down the “Flushing Time” parameter (see screen number 5). Once this parameter is counted down to zero the solenoid is switched off and the process moves to the next stage.
- ✚ The controller counts down the “Delay Main Valve Open” parameter (see screen number 8). Once this count reaches zero the Main Valve solenoid is switched off causing the downstream valve to reopen and the flushing cycle ends.

### 1.3 A battery of TAF filters:

A battery of Amiad TAF filters consists of several TAF filters installed in parallel and serves the same water system.

Each one of these filters has its own flushing controller but the actual DP sensor is connected only to the first filter of the battery. The End of Cycle output of the first filter controller is connected to the DP input of the second filter controller. The End of Cycle output of the second filter controller is connected to the DP input of the next filter controller and so on till the last filter in the battery.

This arrangement allows a sequential flushing process where only one filter flushes at a time and the filters are flushed one after the other.

Starting the flushing cycle:

- ✚ The first filter in the battery starts the flushing cycle in the same way as in “A single TAF filter” above.
- ✚ Each one of the other filters of the battery start their flushing cycle by receiving a DP signal which is being sent for 15 seconds by the End of Cycle output of their previous filter in the battery.

The flushing cycle:

- ✚ For each one of the filter of the battery it is the same as in “A single TAF filter” above.

## **2. Controlling a single automatic screen or gravel media filter:**

### 2.1 A single screen or gravel media filter:

Starting the flushing cycle:

- ✚ The same as in “A single TAF filter” above.

The flushing cycle:

- ✚ The same as in “A single TAF filter” above.

### 2.2 A single screen or gravel media filter with a Main Valve:

Starting the flushing cycle:

- ✚ The same as in “A single TAF filter” above.

The flushing cycle:

- ✚ The same as in “TAF filter with downstream valve” above.

## **3. Controlling a battery of automatic screen or gravel media filters:**

A battery of automatic screen or gravel media filters consists of 2-6 filters installed in parallel and serves the same water system, where one Amiad Flushing Controller controls the system.

This arrangement allows a sequential flushing process where only one filter flushes at a time and the filters are flushed one after the other.

**Please note:** The maximal number of filters in a battery controlled by a single controller is 6 where neither Main Valve nor Delay Valve are configured, 5 where a Main Valve or a Delay Valve is configured and 4 where both Main and Delay valves are configured.

### 3.1 A battery of screen or gravel media filters without a Main valve:

Starting the flushing cycle:

- ✚ The same as in “A single TAF filter” above.

The flushing cycle:

- ✚ Solenoid valve number 1 is switched on, the flushing of the first filter of the battery starts and the controller starts to count down the Flushing Time parameter (see screen number 5). Once this parameter is counted down to zero the solenoid of the first filter is switched off and the process moves to the next stage.
- ✚ The controller counts down the “Between Filters Delay” parameter (see screen number 5) and once this count reaches zero the controller switches on the solenoid of the second filter of the battery and starts to count down again the Flushing Time parameter. Once the flushing process of the second filter is finished the controller counts again the delay between filters and starts the flushing of the next filter. This process continues till the last filter is flushed and the flushing cycle is ended.

### 3.2 A battery of screen or gravel media filters with a Main Valve:

Starting the flushing cycle:

- ✚ The same as in “A single TAF filter” above.

The flushing cycle:

- ✚ The Main Valve solenoid is switched on and closes the battery’s Main Valve. The controller counts down the “Delay Main Valve Close” parameter ([see screen number 8](#)). once this count reaches zero the process moves to the next stage.
- ✚ Solenoid valve number 1 is switched on, the flushing of the first filter of the battery starts and the controller starts to count down the Flushing Time parameter ([see screen number 5](#)). Once this parameter is counted down to zero the solenoid of the first filter is switched off and the process moves to the next stage.
- ✚ The controller counts down the “Between Filters Delay” parameter ([see screen number 5](#)) and once this count reaches zero the controller switches on the solenoid of the second filter of the battery and starts to count down again the Flushing Time parameter. Once the flushing process of the second filter is finished the controller counts again the delay between filters and starts the flushing of the next filter. This process continues till the last filter is flushed and its solenoid is switched off, then the process moves to the next stage.
- ✚ The controller counts down the “Delay Main Valve Open” parameter ([see screen number 8](#)). Once this count reaches zero the Main Valve solenoid is switched off causing the Main Valve to reopen and the flushing cycle ends.

### C. The User Interface Panel

Amiad's Flushing Controller User Interface Panel consists of:

- Display screen - a 2 X 16 characters LCD display. (See picture on the front page of this manual.)
- Keyboard – a 5 keys keyboard divided into 4 directional Arrow keys and an Enter key.

When the controller's power supply is switched on the following screen appears:

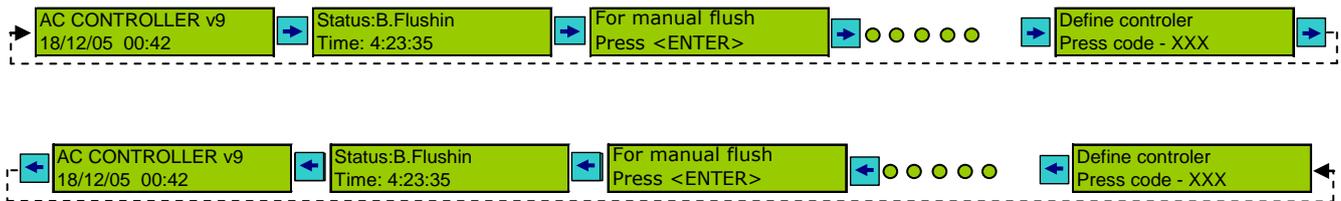


This is the entry point to a series of 13 main screens that each one of them by itself is an entry point to a specific function of the controller.

Use the Left and the Right Arrow keys to move through these 13 main screens as indicated in the following illustration.

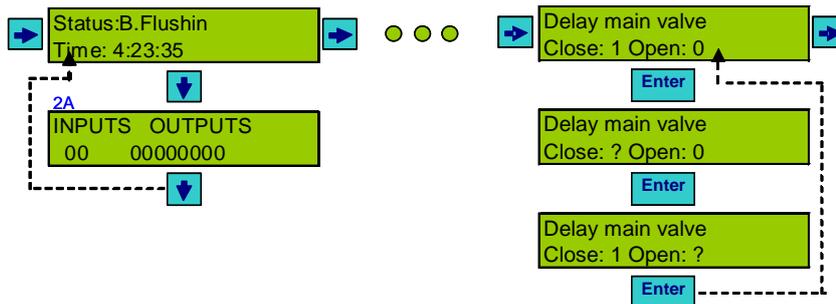
**Please note that:**

- Pressing the Right Arrow Key when the last screen is displayed moves the view point to the first screen.
- Pressing the Left Arrow Key when the first screen is displayed moves the view point to the last screen.



As indicated in the following illustration, in order to operate a specific function move first with the arrow key to the entry point of that function (on the main 13 screens) and then use the Down Arrow or the Enter key (depends on the nature of the specific function) to enter to requested function specific screens.

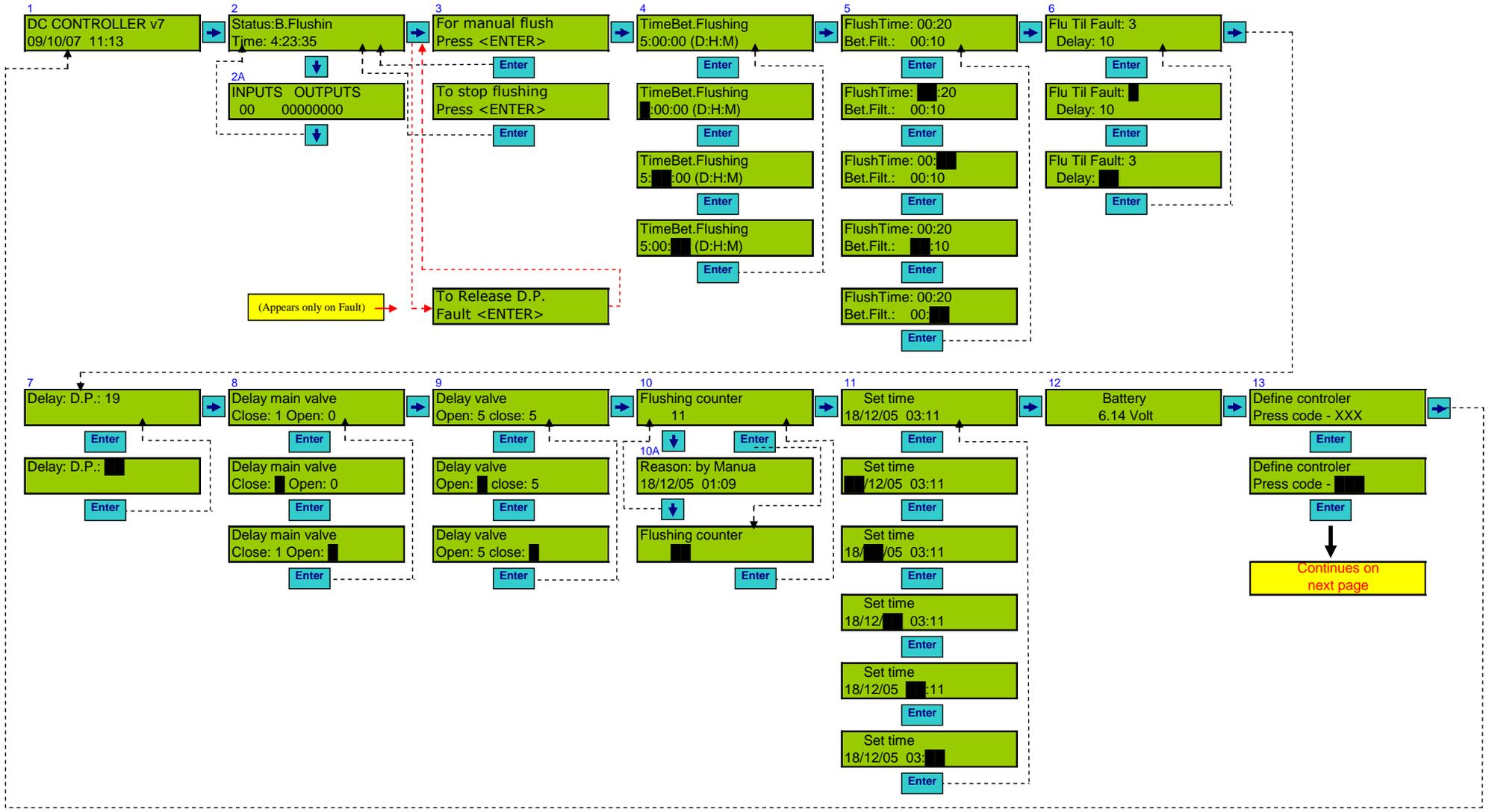
The layout drawing of the controller's screens appears in the following two pages.



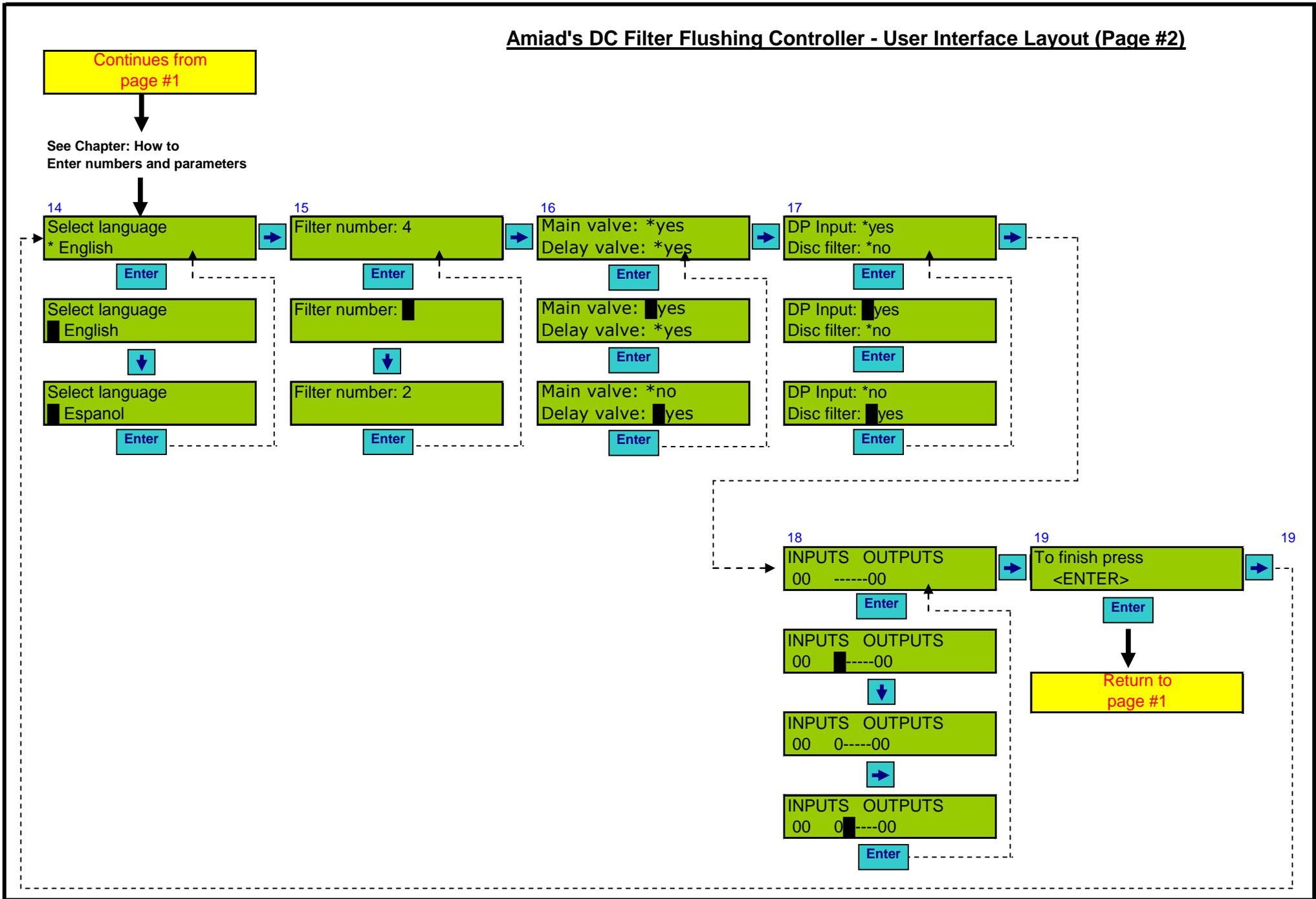
**Please note:** At the upper left corner of each screen in the following drawing there is a number. This number is used to identify the screen in the chapter describing its actual function further down at this manual.

Filtomat self cleaning filters on-line orders

### Amiad's DC Filter Flushing Controller - User Interface Layout (Page #1)



# Amiad's DC Filter Flushing Controller - User Interface Layout (Page #2)



## D. Entering Data

When the controller is first installed it is necessary to enter and/or adjust its basic parameters. These parameters, entered to the controller's nonvolatile memory through a Configuration Process, enable it to perform the suitable flushing method designed for the type of filters it serves.

Once the controller is properly configured a Flushing Program has to be entered. This program defines the parameters according to which the controller performs the actual flushing of the filters.

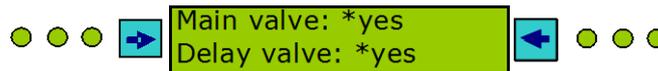
During the Configuration and the Flushing Program Entry procedures the user needs to enter two types of data:

1. Parameter selection – Selecting a required parameter from a predefined list in the controller's memory
2. Entering numbers – Supplying the controller with numeric data

The following paragraph explains the method of entering data to the controller in general. Specific instructions are given in the Configuration and the Flushing Program paragraphs of this manual.

### Selecting a parameter:

1. Using the Left/Right arrow keys move to the screen that contains the parameter to be selected.



2. Press Enter. This will put a blinking cursor over the asterisk near the first parameter to be selected.

Enter

Main valve: █ yes  
Delay valve: \*yes

3. Use the Up and Down Arrow keys to scroll through the list of possible options and select the required parameter. Then press Enter to store the parameter in the controller's memory and to move to the next parameter in the current screen (A). Repeat the selection process with the Up and Down Arrow keys and then press Enter to return to the entry point screen (B). (Please note that if the screen contains only one parameter pressing Enter after the selection process will return you the entry point screen.)

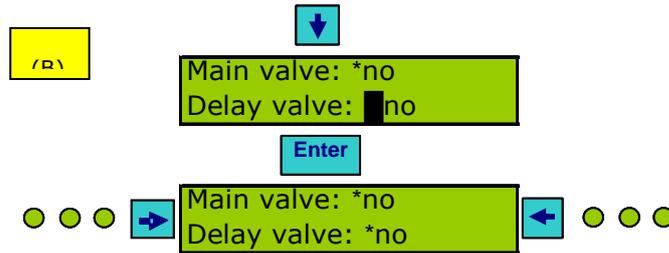
(A)



Main valve: █ no  
Delay valve: \*yes

Enter

Main valve: \*no  
Delay valve: █ yes



Entering a Number:

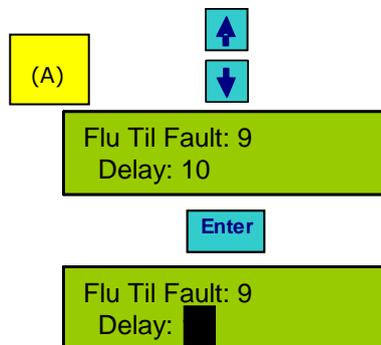
- Using the Left/Right arrow keys move to the screen that contains the number to be changed.



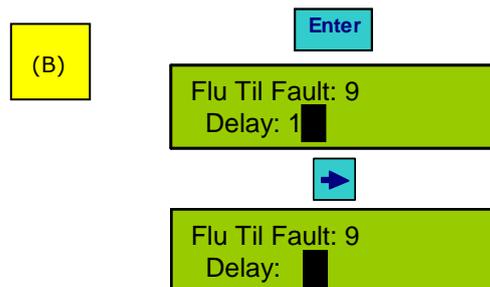
- Press Enter. This will put a blinking cursor over the number to be changed.

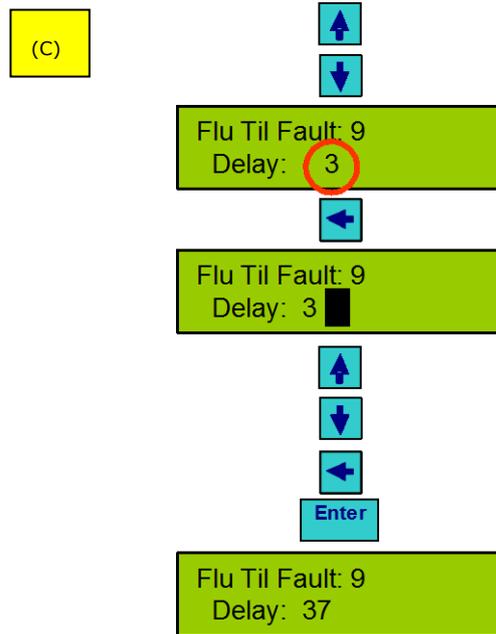


- Entering a Single Digit number: Use the Up and Down Arrow keys to scroll through the 0-9 digits and select the required number. Then press Enter to store the number in the controller's memory and to move to the next parameter in the current screen (A).



- Entering a Multi Digit number: Once the Enter key is pressed the blinking cursor appears over the right-most digit of the number. Press the Right Arrow Key to delete all the digits of the number (B). Use the Up and Down Arrow keys to scroll through the 0-9 digits and select the required one for the left-most digit of the number, then press the Left Arrow Key to push this digit to the left. Repeat the process of selecting the required digit and pushing it to the left till the complete number is set. Press Enter to finish the process (C).





Example: Changing the Delay Parameter from 10 to 37:

- Press the Right Arrow Key to delete the “10” digits.
- Use the Up or the Down Arrow Key to select “3”.
- Press the Left Arrow Key to push the “3” to the left.
- Select “7” by using the Up or the Down Arrow Key.
- Press Enter.

### Setting the Real Time Clock

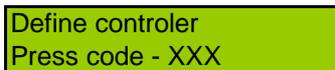
Once power is first connected to the controller the real time clock needs to be set. This is done at screen number 11.

Number	Screen	Description
11		Navigate to this screen, press Enter and set the controller’s clock according to your local time zone and date. <b><u>Note: do not change the clock setting while flushing.</u></b>

### E. Configuration

After the installation of the controller and prior to the first operation it is necessary to perform the configuration process in order to synchronize the controller with the filters it be flushed.

Start the configuration process by navigating to screen number 13 and entering 123 in the code field.



#### Important notes:

- Never change the controller’s configuration while flushing.
- Once the controller is configured EXIT the configuration process, the controller is not operational while in configuration mode.

The layout of the screens involved in the configuration process can be found on page 11 of this manual. The following table describes each one of the screens of the configuration process and it contains three columns.

- ✚ The first column shows the screen number as appears at the upper left corner of the screen drawing in the layout diagram on page 11 of this manual.
- ✚ The second column shows the default setting of the screen.
- ✚ The third column explains the controller-task controlled by this screen.

Number	Screen	Description
14	Select language * English	Select the user interface language of the controller. Currently it is possible to choose English or Spanish.
15	Filter number: 4	<u>Upper line:</u> Defines the number of filters (solenoids) controlled by the controller.
16	Main valve: *yes Delay valve: *yes	<u>Upper line:</u> Defines if the controller activates a Main Valve. <u>Lower line:</u> Defines if the controller activates a Delay Valve. <b>Notes:</b> <ol style="list-style-type: none"> <li>1. See chapter B for a description of the Main Valve operation.</li> <li>2. See Annex A. for a description of the Delay valve operation.</li> <li>3. If only a Main Valve or a Delay Valve is selected the solenoid of this valve is assigned to Output Number 6. However if both Main Valve and Delay Valve are selected the Delay Valve solenoid is assigned to Output Number 5 and the Main Valve is assigned to Output Number 6.</li> </ol>
17	DP Input: *yes Disc filter: *no	<u>Upper line:</u> Defines if in addition to the “start by time” the flushing process may start also by a signal received from a Differential Pressure sensor. <u>Lower line:</u> Defines the type of the controller’s reaction in case where the DP continues to signal at the end of the flushing cycle. <b>Note:</b> See chapter H for DP fault description.
18		This screen helps the technician installing or servicing the controller to verify the status of the controllers I/O.

	<p style="text-align: center;"><b>INPUTS    OUTPUTS</b> 00    -----00</p>	<p><u>Inputs:</u></p> <p>Left digit - DP sensor status:</p> <ul style="list-style-type: none"> <li>✚ 0= no DP signal</li> <li>✚ 1= DP signal is present</li> </ul> <p>Right digit – Pause input status:</p> <ul style="list-style-type: none"> <li>✚ 0=no Pause signal</li> <li>✚ 1= Pause signal is present</li> </ul> <p><u>Outputs:</u></p> <p>The first 6 digits from the left show the status of the filters, the main valve and the delay valve outputs:</p> <ul style="list-style-type: none"> <li>✚ 0= The output is switched off</li> <li>✚ 1= The output is switched on</li> <li>✚ - = There is no solenoid connected to this output</li> </ul> <p>Digit number 7 (from left) – Alarm signal:</p> <ul style="list-style-type: none"> <li>✚ 0= No Alarm signal (the Alarm output is switched off)</li> <li>✚ 1= Alarm signal (the Alarm output is switched on)</li> </ul> <p>Digit number 8 (from left) – End of Cycle (sequence) signal:</p> <ul style="list-style-type: none"> <li>✚ 0= The Sequence signal is off</li> <li>✚ 1= The Sequence signal is on and being sent to activate the flushing process of another controller.</li> </ul>
19	<p style="text-align: center;">To finish press &lt;ENTER&gt;</p>	<p>Press Enter to exit the Configuration process and return to the Main Screen (to Screen number 1).</p> <p><u>Notes:</u></p> <ul style="list-style-type: none"> <li>✚ This is the only exit point of the configuration process, navigate to this screen and press Enter to terminate it.</li> <li>✚ <b>The controller begins automatic operation only after exiting the Configuration process!!!</b></li> </ul>

## F. Flushing program

Once the controller is properly configured and the real time clock is set it is necessary to enter a flushing program in order for the actual operation of the controller to start.

The layout of the screens involved in the Flushing program entry can be found on page 10 of this manual. The following table describes each one of the screens of the Flushing program and it contains three columns.

- ✚ The first column shows the screen number as appears at the upper left corner of the screen drawing in the layout diagram on page 10 of this manual.
- ✚ The second column shows the default setting of the screen.
- ✚ The third column explains the controller-task controlled by this screen.

**Note:** Do not change the program while flushing, stop the flushing first.

Number	Screen	Description
4	TimeBet.Flushing 5:00:00 (D:H:M)	This screen defines the time between scheduled flushing cycles. The entry format is Days (0-99), Hours (0-23) and minutes (0-59).
5	FlushTime: 00:20 Bet.Filt.: 00:10	<p><u>Upper line:</u> Defines the flushing time (the duration of flushing) of one filter. The entry format is Minutes (0-99) and Seconds (0-59).</p> <p><u>Lower line:</u> Defines the delay time between filters (between the end of one filter flushing and the beginning of the next). The entry format is Minutes (0-XX) and Seconds (0-59).</p>
6	Flu Til Fault: 3 Delay: 10	<p><u>Upper line:</u> Defines the number of maximum flushing cycles till fault; the maximum allowed number of continuous flushing cycles when the DP signal remains continually ON (probably due to a filter clog). If this number is exceeded the controller enters into Fault mode and activates the alarm. The entry format is 0-9.</p> <p><u>Lower line:</u> Defines the delay between one flushing cycle and the next when the controller receives a continuous signal from the DP switch. The entry format is Seconds (0-99)</p>
7	Delay: D.P.: 19	Defines the time required for the DP signal to remain ON until the controller responds by activating the flushing cycle. The entry format is Seconds (0-99).
8	Delay main valve Close: 1 Open: 0	<p><b>Note:</b> This screen appears only if a main valve is configured and it defines the main operation as described in chapter B.</p> <p>Close: The time between closing the main valve and activating the flushing cycle.</p> <p>Open: The time between deactivating the flushing cycle and opening the main valve.</p> <p>The entry format is Seconds (0-99).</p>
9	Delay valve Open: 5 close: 5	<p><b>Note:</b> This screen appears only if a Delay valve is configured and it defines the Delay valve operation as described in Annex A.</p> <p>The entry format is Seconds (0-99).</p>

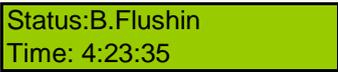
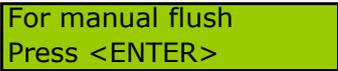
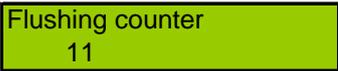
## G. Monitoring

During the regular operation of the controller it is possible to:

- ✚ Monitor the current status of the controller
- ✚ Read information on past activities of the system
- ✚ Perform manual operation and intervene in the flushing process
- ✚ Read and monitor the voltage of the controllers battery

The layout of the screens involved in the controller's Monitoring can be found on page 10 of this manual. The following table describes each one of the controller's Monitoring screens and it contains three columns.

- ✚ The first column shows the screen number as appears at the upper left corner of the screen drawing in the layout diagram on page 10 of this manual.
- ✚ The second column shows the default setting of the screen.
- ✚ The third column explains the controller-task controlled by this screen.

Number	Screen	Description
2		<p>This screen shows the current status of the controller.</p> <p><u>The upper line:</u> - shows the current status, The possible messages are:</p> <ul style="list-style-type: none"> <li>✚ Flushing (the flushing filter number is also displayed)</li> <li>✚ Between filters (counting the delay between filters)</li> <li>✚ Between flushing cycles (counting the time to the next flushing cycle)</li> <li>✚ Delay (counting the D.P. delay)</li> <li>✚ Fault (the controller is at D.P. fault)</li> </ul> <p><u>The lower line:</u> - shows the count down of the time related to the upper line message, for example:</p> <ul style="list-style-type: none"> <li>✚ When the controller is between flushing cycles this line shows the time left to the next flushing cycle.</li> <li>✚ When filter number 1 is flushing this line shows the time left for this filter to flush.</li> </ul>
3		<p>In this screen the user can manually start and stop a flushing cycle.</p> <ul style="list-style-type: none"> <li>✚ Press Enter to immediately initiate a flushing cycle. Once the cycle is started the controller displays the status screen (<a href="#">screen number 2</a>).</li> <li>✚ Press the right arrow key to return to this screen.</li> <li>✚ In order to stop the flushing cycle press Enter again, otherwise the flushing cycle will continue till its regular completion.</li> </ul>
10		<p>This screen displays the number of flushing cycles performed since the last time this filed was cleared.</p> <ul style="list-style-type: none"> <li>✚ The controller stores a record showing the start time and reason (PD, Time or Manual) for each one of the last 50 flushing cycles. Use the Up and Down arrow keys to scroll through these records.</li> <li>✚ Press Enter to edit and clear the flushing counter.</li> </ul>
12		<p>This screen shows the voltage of the controller's battery.</p> <p>The minimum operational level is 4.7 V</p>

### H. Handling faults

Amiad’s flushing controller can detect and respond to filter clogs. This is done by monitoring the status of the D.P. signal. The user can configure the controller’s response through the following two screens:

Number	Screen	Description
6	Flu Til Fault: 3 Delay: 10	<p>If by the end of a flushing cycle the D.P signal remains ON the controller counts down the delay entered in this screen (in seconds), and if by the end of this delay the D.P. is still ON a new flushing cycle starts. In case the D.P. remains permanently ON the delay is counted again and this process repeats till the “maximum number of flushing cycles till fault” entered at this screen is exceeded.</p> <p>Once this happens the controller enters into a Fault Status as described below this table.</p> <p>Please note that if zero is entered at the “maximum flushing cycles till fault”, the controller never enters to “D.P. Fault Status” and continues to initiate new flushing cycles constantly whenever the D.P. signal remains ON.</p>
17	DP Input: *yes Disc filter: *no	<p>If the lower line parameter of this screen is set to “Disc filter *yes” the controller immediately enters to “D.P. Fault Status” whenever the D.P. signal remains ON at the end of the first flushing cycle.</p>

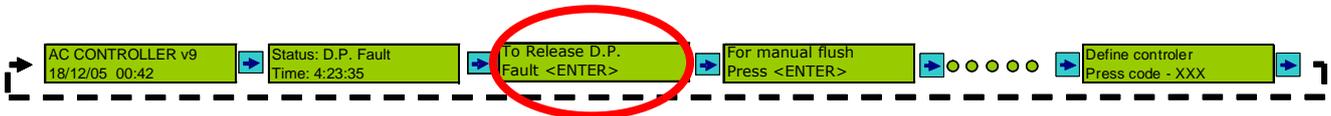
When the controller enters to D.P. Fault the main status screen (Screen number 2) shows the fault status and time.

Status:D.P. Fault  
Time: 4:23:35

A new screen appears to the right of the main status screen (Between screens 2 and 3) displaying the option to reset and release the fault and the controller’s buzzer is activated.

To Release D.P.  
Fault <ENTER>

When the controller enters to D.P. Fault check if the filters are clogged and if needed clean them manually. Check the D.P. switch and then cancel the fault by navigating to and pressing Enter in the “Release Fault Screen” which appears between screens 2 and 3.



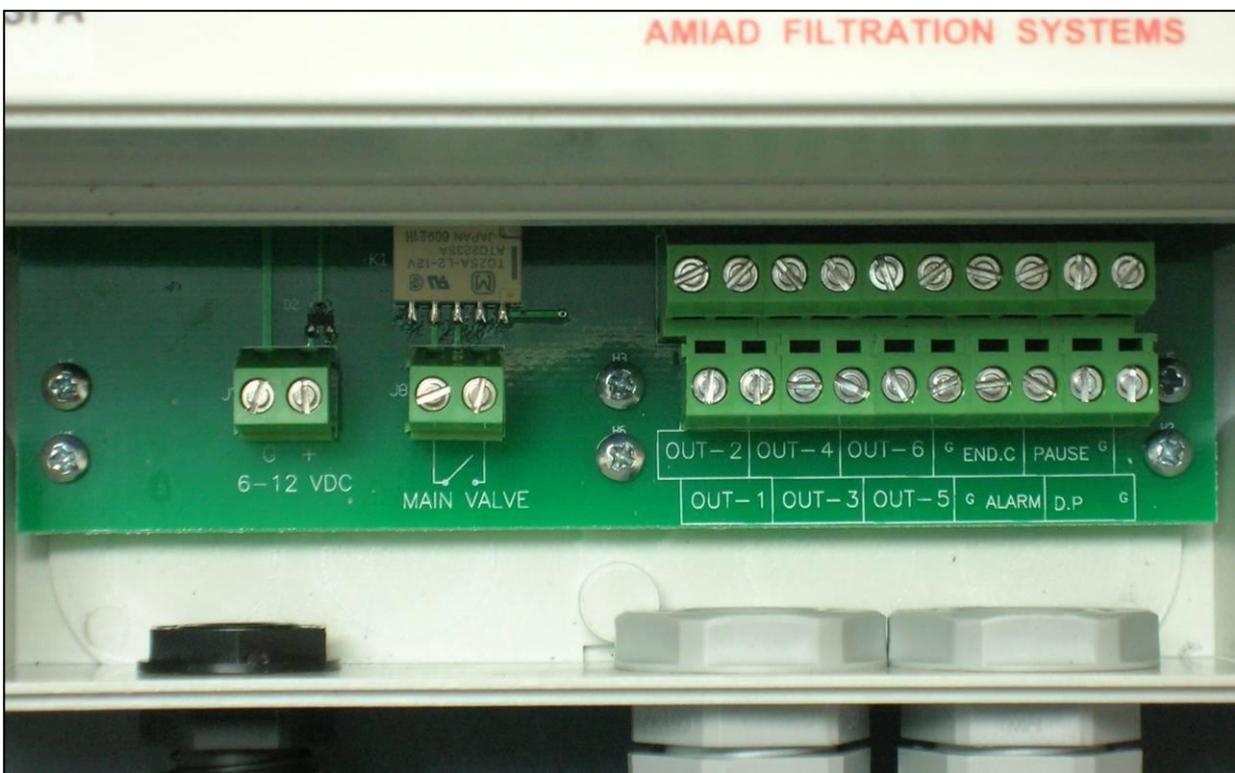
**Battery and power levels:**

In order to prolong the battery life the controller switches off the display screen of the unit once the keyboard is not used. In such case the operation of the unit continues as usual. Press any key to switch on the display screen.

The required voltage level for regular operation is 4.7-12 Volts. Once the voltage level drops below 4.7 V the controller stops its regular operation, switches on the Alarm and enters into Fault status.

**I. Technical data**

**Electrical Connections:**



The Electrical Connections Board

**External Power supply**

**6-12 VDC:**

This connection terminal is used to connect, when available, a 6-12 VDC 500 milliamp external power supply unit to the controller.

Once such external power supply is connected the internal batteries of the controller are used only for a backup and not for the actual operation of the controller.

### **Outputs:**

#### **OUT1-OUT6:**

These are the terminals for the Two Wire 12V DC Solenoids. If a main valve or a delay valve has been designated during the controller's configuration process, its solenoid's output will always be assigned to Output Number 6. For example, if two outputs are defined as filters (OUT1-OUT2), the main valve output will be OUT6.

If both main valve and delay valve are defined, Output Number 5 will be the delay valve output and the Output Number 6 will be the main valve output.

#### **Auxiliary Output (marked on the controller's terminal strip as Main Valve):**

This output is opened and closed automatically by the controller in parallel to OUT-6, i.e. this output is activated whenever OUT-6 is activated.

### **Alarm:**

This output is a Dry Contact Relay (a free potential contact); it provides a command pulse to an external alarm device. The alarm is activated in two cases:

-  When a selected number of consecutive flushing cycles have taken place due to continuous differential pressure input signal, which usually occurs when the filters are clogged.
-  When the battery voltage is lower than **4.7 VDC**

### **End of Cycle (End C):**

This output is a Dry Contact Relay (a free potential contact); at the completion of a flushing cycle it provides a command pulse connected to the D.P. input of an external controller (slave). This pulse lasts 5 seconds and takes place after all the other outputs of the flushing process have been activated and de-activated. See "Chaining Amiad Controllers" drawing at the end of this chapter.

**Note:** This output is marked as SEO in the AC controller, the functionality is the same and therefore it is possible to chain AC and DC controllers.

### **Inputs:**

#### **D.P.:**

This is the connection to the differential pressure switch.

#### **Pause:**

Connecting these two terminals creates a signal which causes the controller to stop operating until the connection between these two terminals is disconnected.

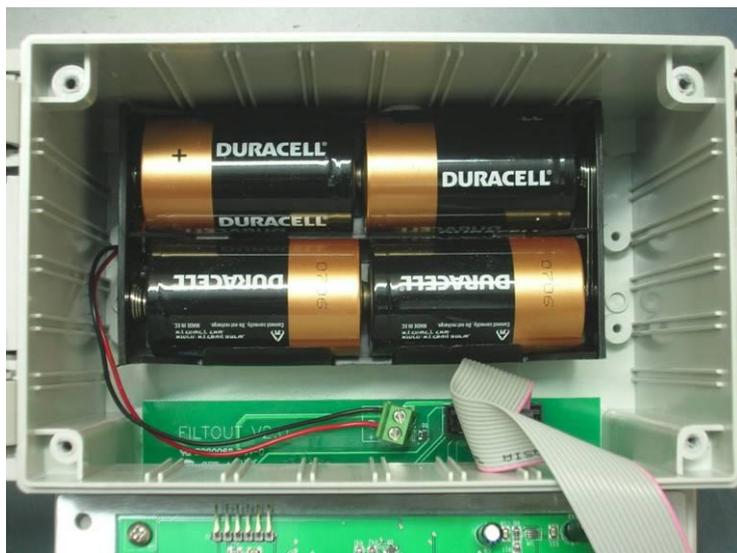
**Installing and replacing the batteries:**

The controller is powered by four D batteries. The unit starts to operate automatically 10 seconds after inserting the batteries. Alternatively, an external 6-12V DC supply can be connected to the power connection terminal; (Labeled as 6-12 VDC on the terminal board circuit board.)

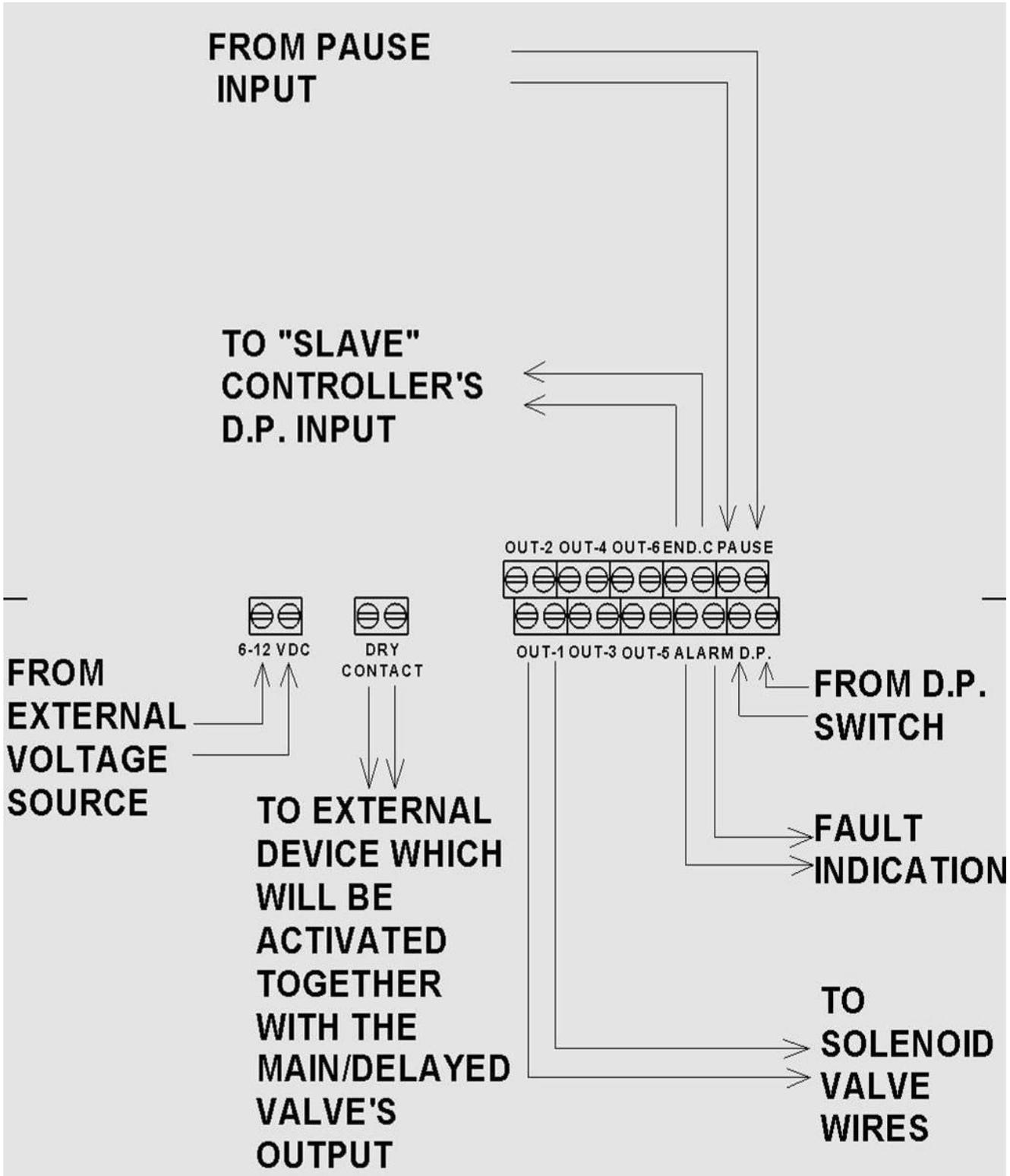
If an external power supply is connected while a set of batteries is installed, the batteries are served as a backup and are not in use as long as the external power supply is connected.

In order to install or replace the batteries:

- ✚ Open the transparent keyboard lid.
- ✚ Unscrew the 4 screws located in the corners of the keyboard and screen panel.
- ✚ Remove the panel from the controller housing to get access to the battery compartment.
- ✚ Insert 4 D type 1.5VDC batteries according to the (+) and (-) marks on the compartment.
- ✚ Insert the panel and cover the battery compartment.
- ✚ Re-screw the 4 screws and close the transparent lid.



I/O Terminal Connections Drawing:

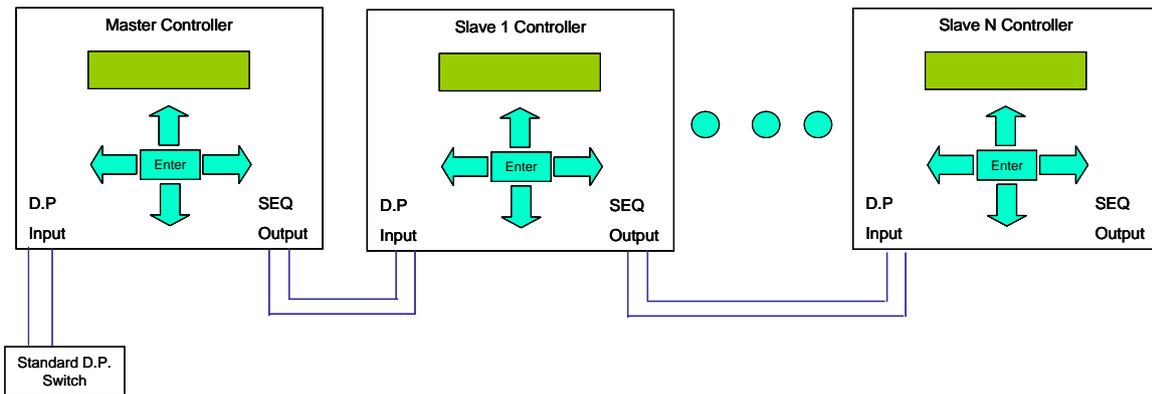


**Chaining Amiad Controllers:**

In order to operate a battery of screen or gravel media filters that include a larger number of filters than one Amiad’s Flushing Controller can handle, it is possible to chain few controllers for the job.

The D.P. switch that reads the pressure drop across the battery is connected to the first controller of the chain (the Master). The SEQ (or End of Cycle) output of the master controller is connected to the D.P. input of the second controller of the chain (the first slave) and this controller SEQ output is connected to the D.P. input of the next. This type of connection can be spanned over as many controllers as needed.

When the actual D.P. switch send a signal the master controller starts a flushing cycle. Once this cycle is completed the master controller sends a signal through its SEQ output to the second controller to start its flushing cycle, and so on till the last controller in the chain as illustrated in the following drawing.



## **J. Annex A. – Operating filters that require a Delay Valve**

In some cases there is a need to control a Delay Valve together with the filtration system, for example in installations where a delay Valve is used for sampling the flushing water.

Amiad's Flushing Controller contains two parameters which allow the user to control a filtration system that requires a Delay Valve; these are the "Delay Valve Open" and the "Delay Valve Close" parameters ([see screen number 9](#)).

### **Please not that:**

- ✚ Each one of these parameters should be shorter than the "Flushing Time" Parameter.
- ✚ The addition of the time set for the "Delay Valve Open" parameter with the time set for the "Delay Valve Close" parameter should be shorter than the time set for the "Flushing time" parameter.

The following is a step by step description of the controller operation in installations that include a delay valve:

#### 1. A single screen or gravel media filter with a Delay valve:

Starting the flushing cycle:

- ✚ The same as in "A single TAF filter" above.

The flushing cycle:

- ✚ Solenoid valve number 1 is switched on and the flushing of the filter starts.
- ✚ The controller starts to counts down two parameters in parallel: The "Flushing Time" parameter ([see screen number 5](#)) and the "Delay Valve Open" parameter ([see screen number 9](#)).
- ✚ Once the "Delay Valve Open" parameter is counted down to zero the Delay solenoid is switched on.
- ✚ During the flushing process when the count down of the "Flushing Time" reaches a value which is equal to the "Delay Valve Close" parameter ([see screen number 9](#)) the controller switches off the Delay Valve solenoid.
- ✚ Once the "Flushing Time" parameter is counted down to zero the solenoid is switched off and the flushing cycle ends.

#### 1.1 A single screen or gravel media filter with both Main and Delay valves:

Starting the flushing cycle:

- ✚ The same as in "A single TAF filter" above.

The flushing cycle:

- ✚ The Main Valve solenoid is switched on and closes the filter's downstream valve. The controller counts down the "Delay Main Valve Close" parameter ([see screen number 8](#)). Once this count reaches zero the process moves to the next stage.
- ✚ Solenoid valve number 1 is switched on and the flushing of the filter starts.
- ✚ The controller starts to counts down two parameters in parallel: The "Flushing Time" parameter ([see screen number 5](#)) and the "Delay Valve Open" parameter ([see screen number 9](#)).
- ✚ Once the "Delay Valve Open" parameter is counted down to zero the Delay solenoid is switched on.
- ✚ During the flushing process when the count down of the "Flushing Time" reaches a value which is equal to the "Delay Valve Close" parameter ([see screen number 9](#)) the controller switches off the Delay Valve solenoid.
- ✚ Once the "Flushing Time" parameter is counted down to zero the filter solenoid is switched off and the process moves to the next stage.
- ✚ The controller counts down the "Delay Main Valve Open" parameter ([see screen number 8](#)). Once this count reaches zero the Main Valve solenoid is switched off causing the downstream valve to reopen and the flushing cycle ends.

#### 2. A battery of screen or gravel media filters with a Delay Valve:

Starting the flushing cycle:

- ✚ The same as in “A single TAF filter” above.

The flushing cycle:

- ✚ Solenoid valve number 1 is switched on and the flushing of the first filter of the battery starts.
- ✚ The controller starts to counts down two parameters in parallel: The “Flushing Time” parameter (see screen number 5) and the “Delay Valve Open” parameter (see screen number 9).
- ✚ Once the “Delay Valve Open” parameter is counted down to zero the Delay solenoid is switched on.
- ✚ Once the Flushing Time parameter is counted down to zero the solenoid of the first filter is switched off and the process moves to the next stage.
- ✚ The controller counts down the “Between Filters Delay” parameter (see screen number 5) and once this count reaches zero the controller switches on the solenoid of the second filter of the battery and starts to count down again the Flushing Time parameter. Once the flushing process of the second filter is finished the controller counts again the delay between filters and starts the flushing of the next filter. This process continues till the last filter starts to flush, then the process moves to the next stage.
- ✚ During the flushing process of the last filter of the battery and when the count down of the “Flushing Time” reaches a value which is equal to the “Delay Valve Close” parameter (see screen number 9) the controller switches off the Delay Valve solenoid.
- ✚ Once the “Flushing Time” parameter of the last filter is counted down to zero the filter solenoid is switched off and the flushing cycle ends.

## 2.1 A battery of screen or gravel media filters with both Main and Delay valves:

Starting the flushing cycle:

- ✚ The same as in “A single TAF filter” above.

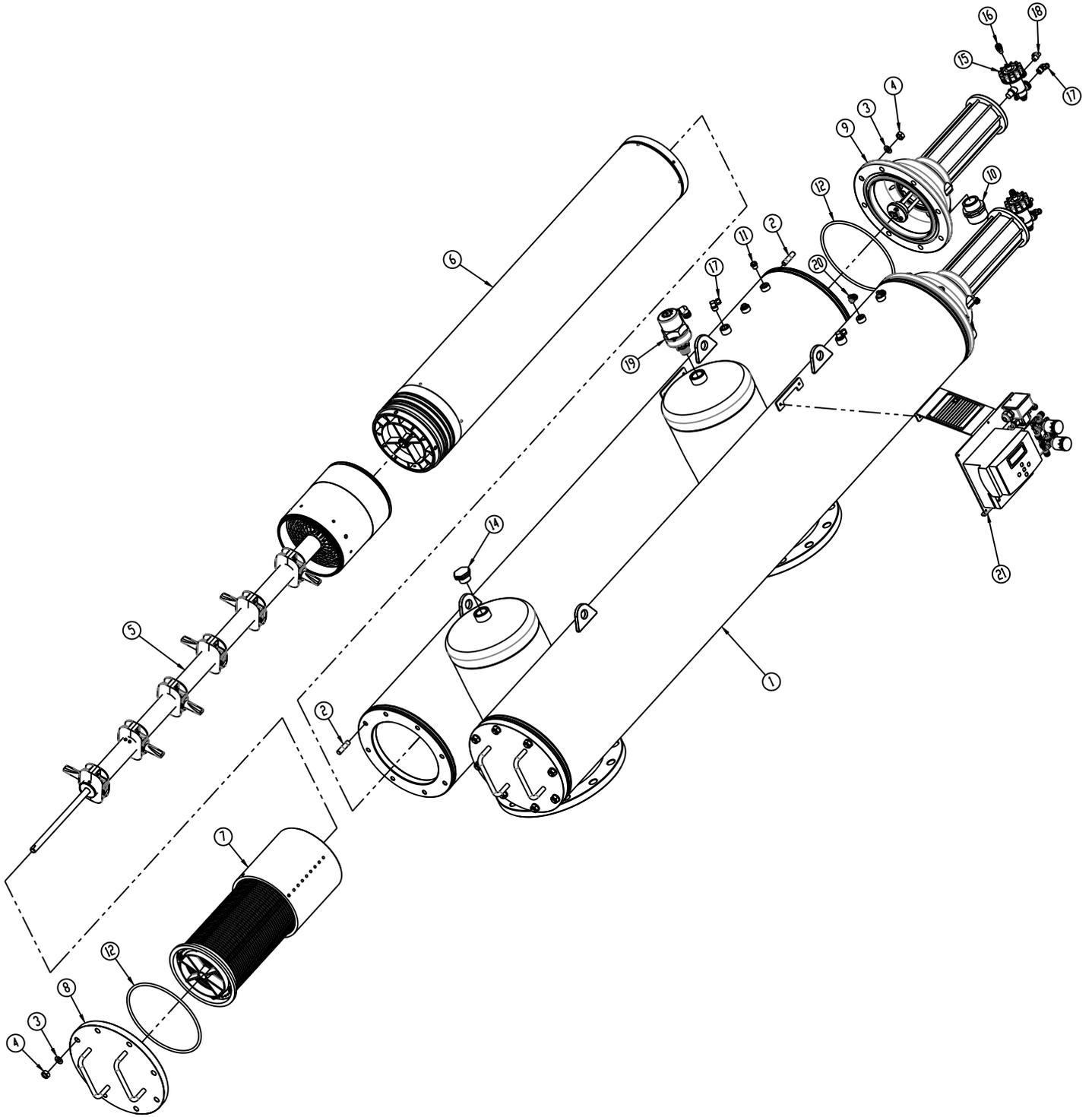
The flushing cycle:

- ✚ The Main Valve solenoid is switched on and closes the battery’s Main Valve. The controller counts down the “Delay Main Valve Close” parameter (see screen number 8). Once this count reaches zero the process moves to the next stage.
- ✚ Solenoid valve number 1 is switched on and the flushing of the first filter of the battery starts.
- ✚ The controller starts to counts down two parameters in parallel: The “Flushing Time” parameter (see screen number 5) and the “Delay Valve Open” parameter (see screen number 9).
- ✚ Once the “Delay Valve Open” parameter is counted down to zero the Delay solenoid is switched on.
- ✚ Once the Flushing Time parameter is counted down to zero the solenoid of the first filter is switched off and the process moves to the next stage.
- ✚ The controller counts down the “Between Filters Delay” parameter (see screen number 5) and once this count reaches zero the controller switches on the solenoid of the second filter of the battery and starts to count down again the Flushing Time parameter. Once the flushing process of the second filter is finished the controller counts again the delay between filters and starts the flushing of the next filter. This process continues till the last filter starts to flush, then the process moves to the next stage.
- ✚ During the flushing process of the last filter of the battery and when the count down of the “Flushing Time” reaches a value which is equal to the “Delay Valve Close” parameter (see screen number 9) the controller switches off the Delay Valve solenoid.
- ✚ Once the “Flushing Time” parameter of the last filter is counted down to zero the filter solenoid is switched off and the process moves to the next stage
- ✚ The controller counts down the “Delay Main Valve Open” parameter (see screen number 8). Once this count reaches zero the Main Valve solenoid is switched off causing the Main Valve to reopen and the flushing cycle ends.

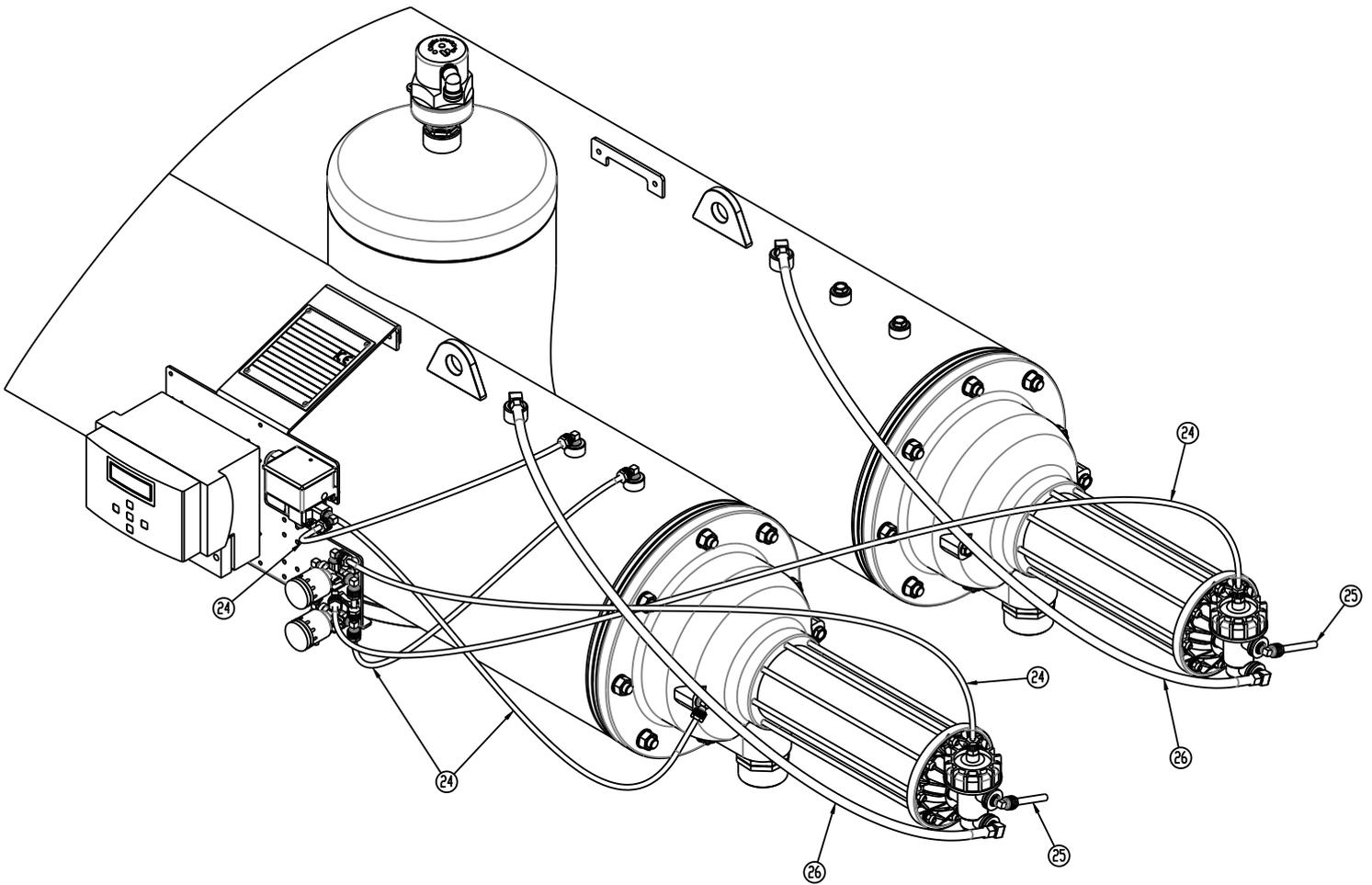
## PARTS SCHEDULE Section 1

No.	CAT. No.	Description	Qty	Material
1	710105-002509	Housing MG110-P ISO16 (2x108LP) POLY PKPK-5010	1	ST. 37-2
2	760104-000075	Stud Bolt Special 1/2" UNCX50 Long 20/12	32	S/ST 303
3	760103-000077	Flat Washer M12 DIN125 Zinc Plated C/ST	32	Z.PLATED C/ST
4	760102-000052	DIN934 Nut UNC Galvanize ANSI 1/2	32	Z.PLATED C/ST
5	700190-001670	Dirt Collector Assembly 6 Nozzles+Partition STD M104XLP/110P	2	Various
6	700101-000599	MOL.316 6800SQ.CM130MI PVCEND-M100-6800B	2	Various
7	700101-000749	Coarse Screen STD MX08-8LP	2	Various
8	710105-000362	Cover M1XX Epoxy PKPK-5010	2	ST. 37-2
9	700190-001541	Cover Assembly Cast-Iron	2	Various
10	780101-000611	Threaded Reducing Nipple 2"x1 1/2"	2	PP
11	720501-000190	Plug 1/4" M Blue	5	PVC
12	770102-000174	O-Ring P2-448 SAF-6000 Drive Unit Adaptor	4	NBR
13	780101-000946	Fitting Plug 3/4" M BSP PP	2	PP
14	780101-000947	Fitting Plug 1" M BSP PP - ND	1	PVC
15	730110-000009	3/8" DOR Plas. Accelerator	2	Various
16	720501-000195	Straight Connector 1/8"x6mm Black-Blue	2	PVC
17	720501-000199	L-Connector 3/8" Mx12mm Blue/Black	4	PP
18	720501-000217	L-Connector 3/8Mx8mm Blue/Black	2	PP
19	730108-000120	1" Air Release Valve D-040-P BSPT	1	PP
20	720501-000200	L-Connector 1/4" Mx6mm Red-Blue	2	PVC
21	700190-001556	Controller Assembly 6VDC (X2) SP MG	1	Various
22	900103-000001	Aluminum Filtomat Nameplate, CE, EN	1	Aluminum
23	760105-000036	Rivet Blind 3x6 DIN7337 S/ST316	4	S/ST 316
24	720502-000019	Pilot Tube 6MM	1	NYLON
25	720502-000020	Pilot Tube 8MM	1	NYLON
26	720502-000021	PE Pilot Tube 12 MM Black	1	PE

**PARTS DRAWING #1 (Page 1)**



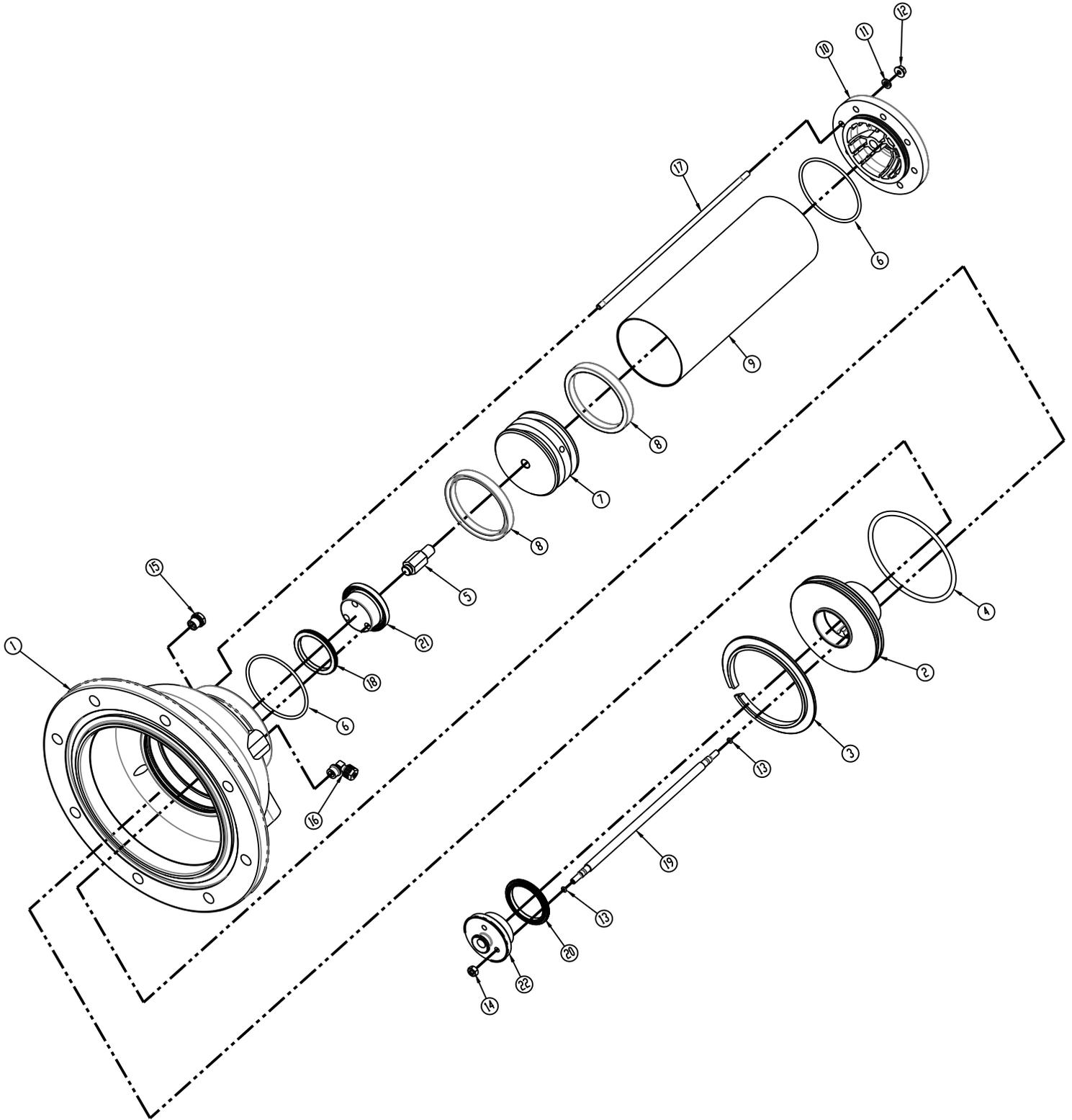
**PARTS DRAWING #1 (Page 2)**



## PARTS SCHEDULE Section 2

No.	CAT. No.	Description	Qty	Material
1	710103-000819	Cover 8 Holes Blue M10X(X)(L)	1	Cast Iron
2	710103-000901	Seat Valve Seal M106 (Cast-Iron Cover)	1	Delrin
3	710103-000902	Ring Retaining Cover Seat Seal M106	1	PVC
4	770102-000156	O-Ring Seal (P2-351) 50+5 NBR	1	NBR
5	710103-000869	Rod Piston M1XX(L)(P) S/St316	1	S/ST 316
6	770102-000126	O-Ring Seal (P2-237) Nat	2	NBR
7	710103-000900	Holder Cylinder Seal M1XX(L)(P) Delrin	1	Delrin
8	770105-000019	Seal U-Ring 95x75x10 65+-5 NBR	2	NBR
9	710103-000843	Cylinder for M10X(L)(P) Piston ID95 S/St316	1	S/ST 316
10	710103-000799	Plug Piston M10X(L)(P)	1	PP
11	760103-000094	Flat Washer M6 DIN125 S/ST316	8	S/ST 316
12	760102-000097	Nylon Insert Lock Nut 1/4"UNC S/ST316 DIN985	8	S/ST 316
13	770102-000058	O-Ring Seal 009 NAT	10	NBR
14	760102-000078	Hex Nut 1/4"UNC S/ST316 B18.2.2	5	S/ST 316
15	720501-000190	Plug 1/4"M Blue	1	PVC
16	720501-000200	L-Connector 1/4"Mx6mm Red-Blue	1	PVC
17	710103-000903	Rod Tie M106 Cover Cylinder S/ST303	8	S/ST 303
18	710104-000039	RL For Valve Seat New	1	NBR
19	710103-000895	Spacer Bolt Valve	3	S/ST 303
20	710104-000040	RL For Bearing Valve Combined	1	NBR
21	710103-001037	Seat Valve Seal	1	Brass
22	710103-001038	Housing Bearing Valve Brass	1	Brass

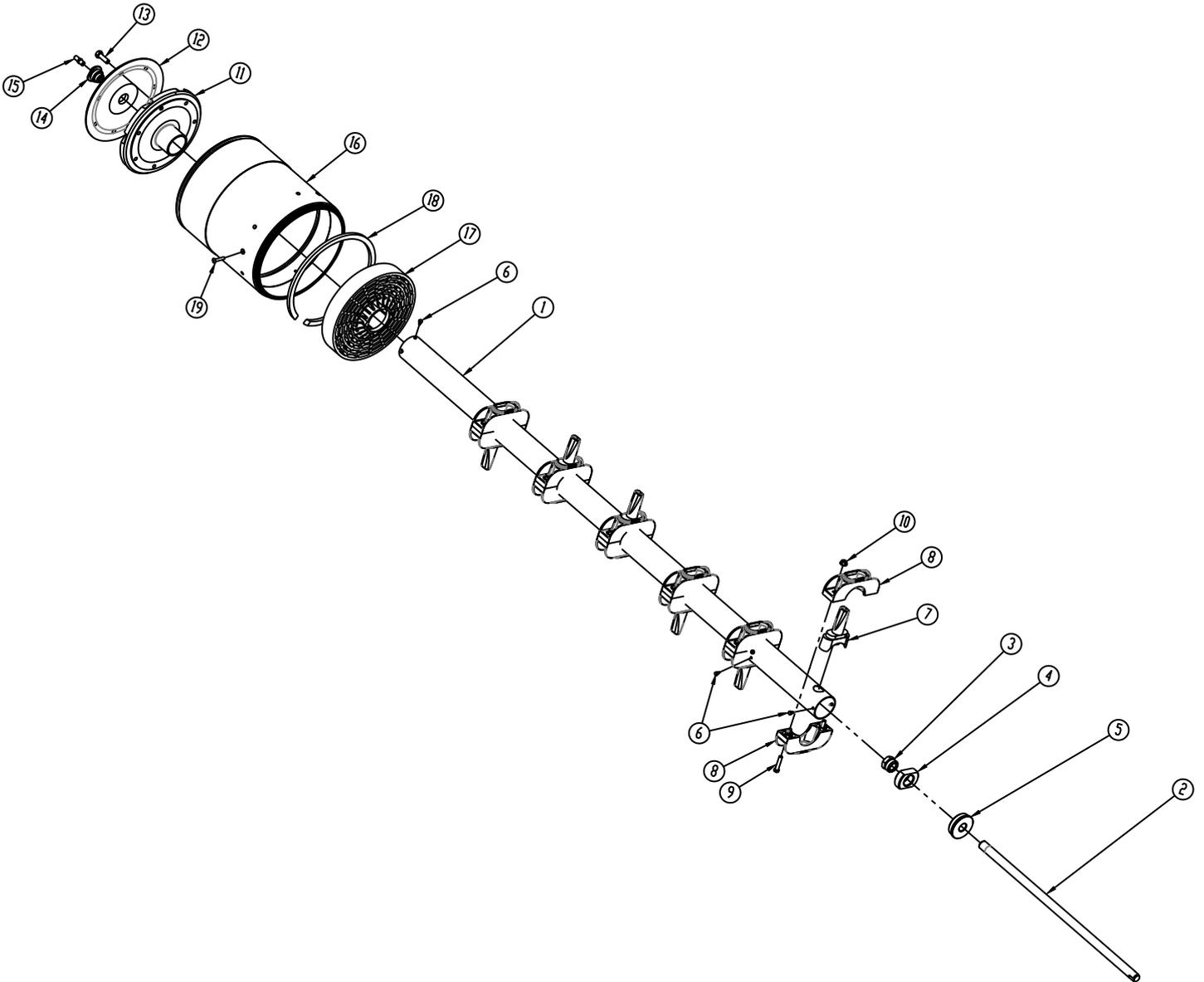
**PARTS DRAWING #2**



### PARTS SCHEDULE Section 3

No.	CAT. No.	Description	Qty	Material
1	710103-000920	Body Dirt Collector S/St304 (6 Noz)	1	S/ST 304
2	710103-001483	Shaft Dirt Collector M-X04L/8L(P) Brass	1	Brass
3	710103-001490	Connector Brass Dirt Col/Shaft MX04L/16P	1	Brass
4	710103-000800	Central Support Collector	1	NYLON 30%GF
5	710103-000802	Upper Plug Collector	1	NYLON 30%GF
6	760101-000688	Phillips Pan Tap Screw #8x3/8" S/St316	10	S/ST 316
7	710101-000704	Nozzle Suction Oval Clamped	6	NYLON
8	710101-000693	Nozzle Suction OD52 Dirt Collector	12	NYLON 30%GF
9	760101-000417	Hex Bolt Partial Thread 1/4"UNCX1 1/4" S/ST304	12	S/ST 304
10	760102-000097	Nylon Insert Lock Nut 1/4"UNC S/ST316 DIN985	12	S/ST 316
11	710103-000809	Rotor Nylon 6/6 M104LP-M110P	1	NYLON
12	710101-000728	Cover Rotor M102/3(B)	1	NYLON
13	760101-000426	Hex Bolt full Thread 5/16"UNCX1" S/ST304	7	S/ST 304
14	710103-001088	Housing Bearing Rotor Brass	1	Brass
15	710103-001333	Lower Bearing Male	1	K110
16	710103-000942	Body Bottom F.Screen F M1XX PVC Piston	1	PVC
17	710103-000798	Partition M100-Piston Model	1	NYLON
18	710103-000944	Ring Backing F.S. M10X(L)(P)PVC Piston Model	1	PVC
19	760101-000504	Phillips Flat Machine Screw #10UNCx1" S/ST304	3	S/ST 304

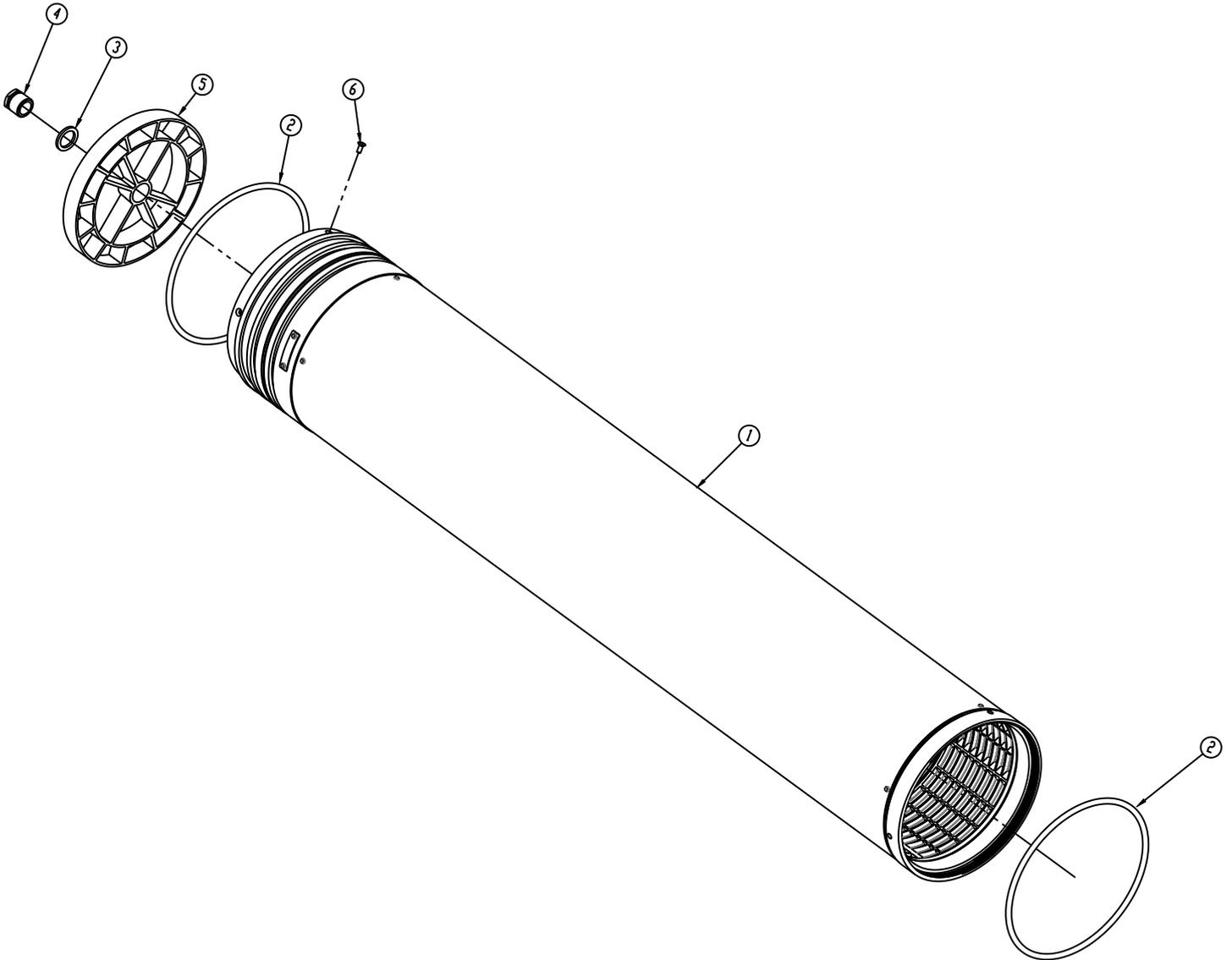
**PARTS DRAWING #3**



## PARTS SCHEDULE Section 4

No.	CAT. No.	Description	Qty	Material
1	700190-001707	M100-6800B Molded Screen 130 Micron	1	Various
2	770102-000217	O-Ring Seal 674 Shore 55-60	2	NBR
3	710103-001369	Ring Spacer For Bearing Assembly S/ST316	1	S/ST 316
4	710103-001424	Bearing Upper F/Screen MX03L/16P S/St 316	1	S/ST 316
5	710101-000717	Handle Screen Type 2 Nylon 6	1	NYLON
6	760101-000706	Phillips Flat Machine Screw #10UNCx3/8"	4	S/ST 316

**PARTS DRAWING #4**



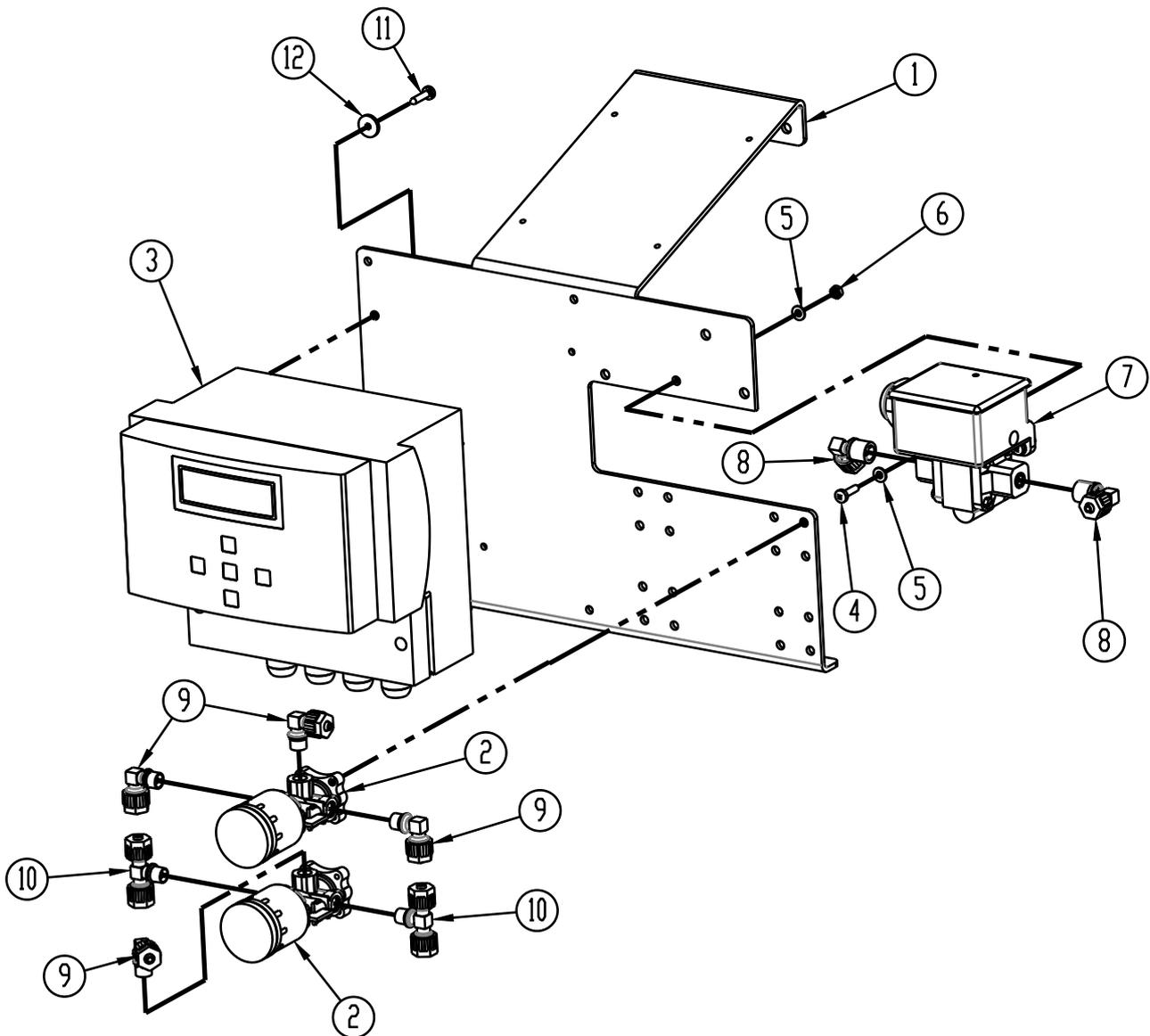
**Filtomat self cleaning filters on-line orders**

## PARTS SCHEDULE Section 5

No.	CAT. No.	Description	Qty	Material
1	710102-000301	Bracket Plate MG Electronic COMP.	1	Various
2	720103-000308	Solenoid Latch Valve Body S982-2L	2	Various
3	720101-000334	AMIAD 6V/DC-6 Controller EN/SP	1	Various
4	760101-000510	Phillips Pan Machine Screw M4x15 S/ST304	2	S/ST 304
5	760103-000092	Flat Washer M4 DIN125 S/ST304	4	S/ST 304
6	760102-000083	Hex Nut M4 S/ST304 DIN934	2	S/ST 304
7	720104-000029	PD Switch UE 24-011	1	Various
8	720501-000194	L-Connector 1/4"Mx6mm Black-Blue	2	PVC
9	720501-000192	L-Connector 1/8"Mx6mm Black-Blue	4	PVC
10	720501-000222	T-Connector 6X1/8"X6 Black/Blue	2	PVC
11	760101-000537	Phillips Pan Tap Screw PT4x20 S/ST316	3	S/ST 316
12	710101-000807	Impeller Washer	3	POM

Filtomat automatic filters on-line orders

**PARTS DRAWING #5**



**Filtomat filters on-line orders**