Automatic disc filters operation and maintenance manual
TVD and TAD Series

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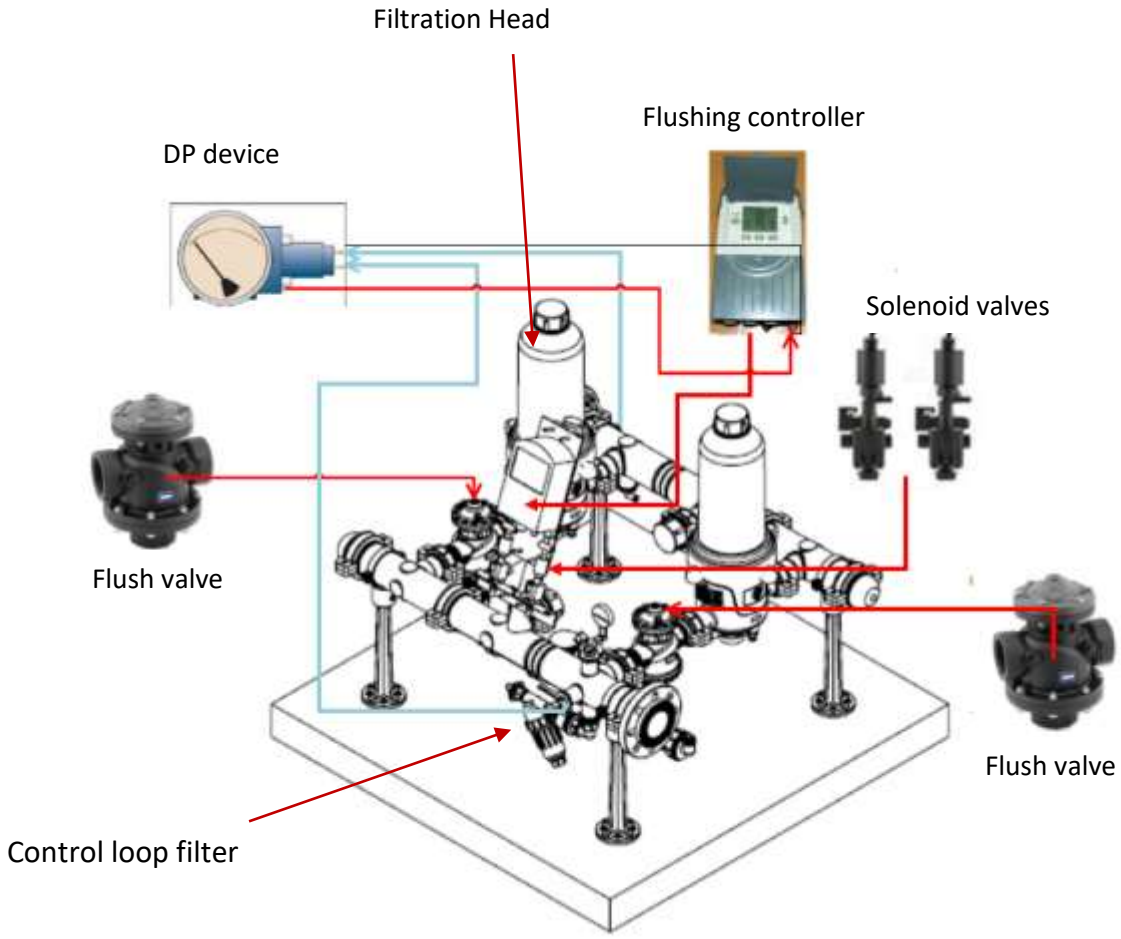
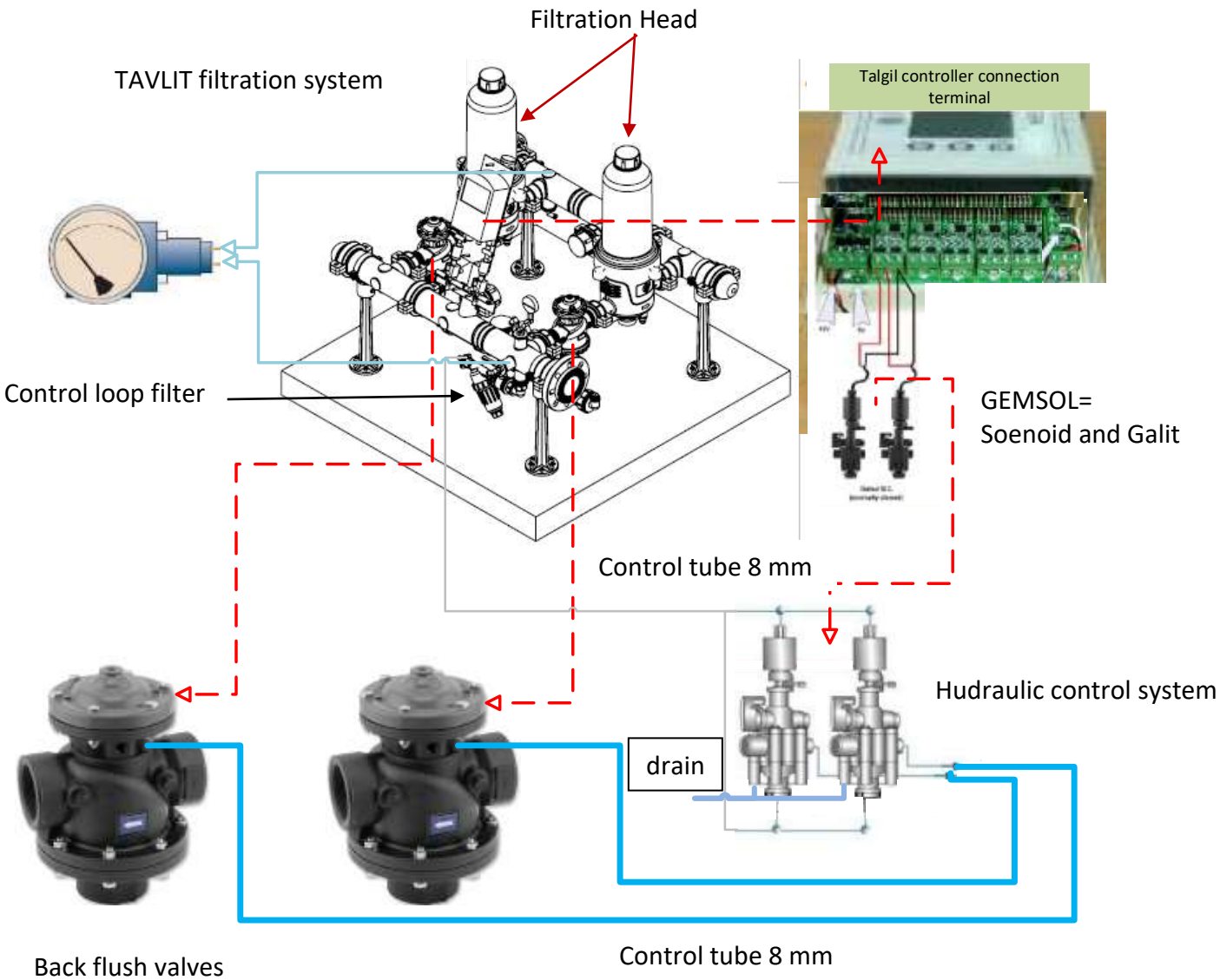
Main filters Battery components



Main components

- Filter heads
- Flushing controller
- Flush valves
- DP device
- Solenoid valves
- Control loop filter

Control tubing scheme



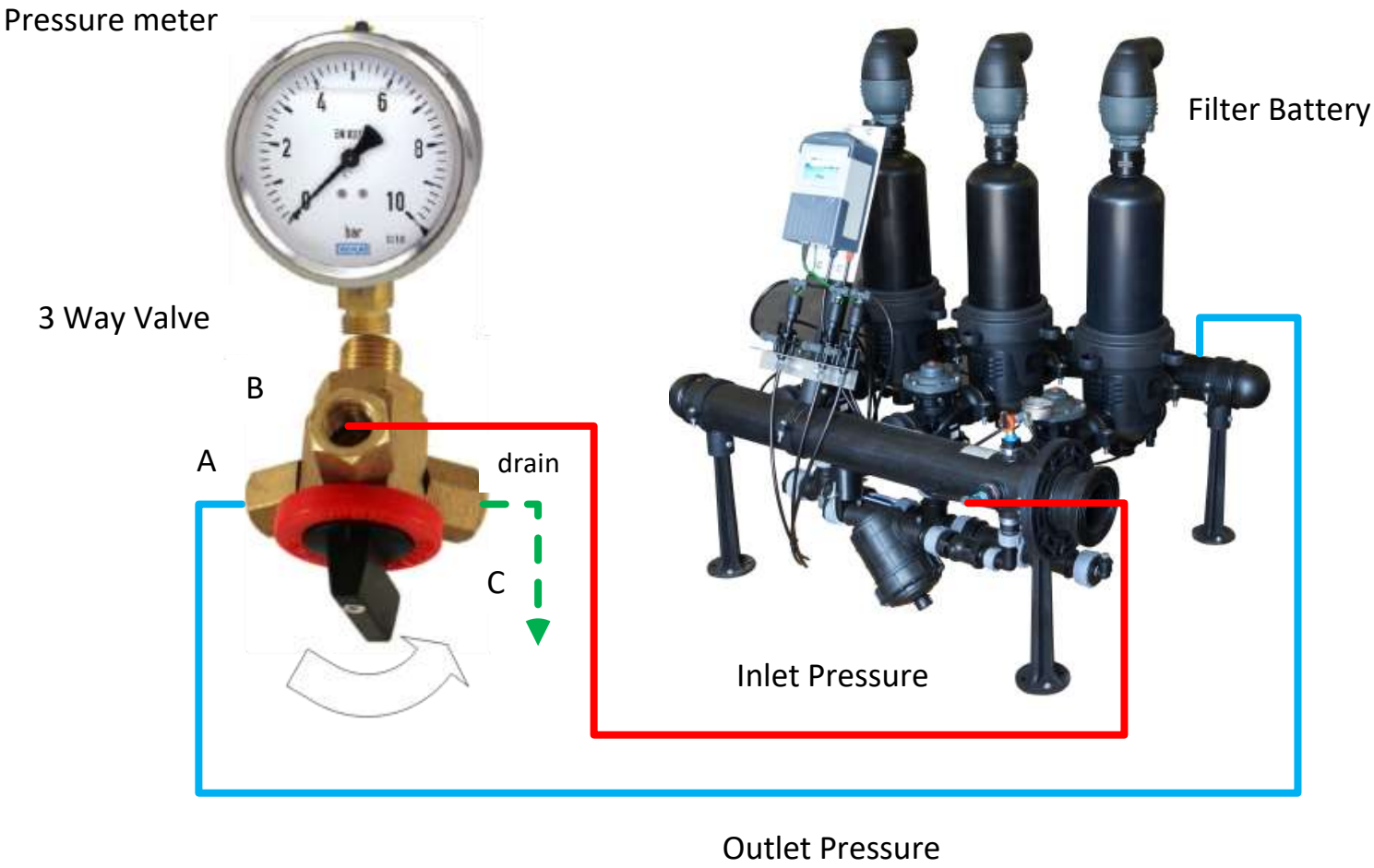
Main components

- Filter heads
- DP device
- Flush valves
- Flushing controller
- Solenoid valves
- Control loop filter

Manual testing of DP

-Point handle of the 3 way valve to B and read inlet pressure.
-Point handle to A and read outlet pressure.
The difference is the head loss (pressure loss) on the filter battery.

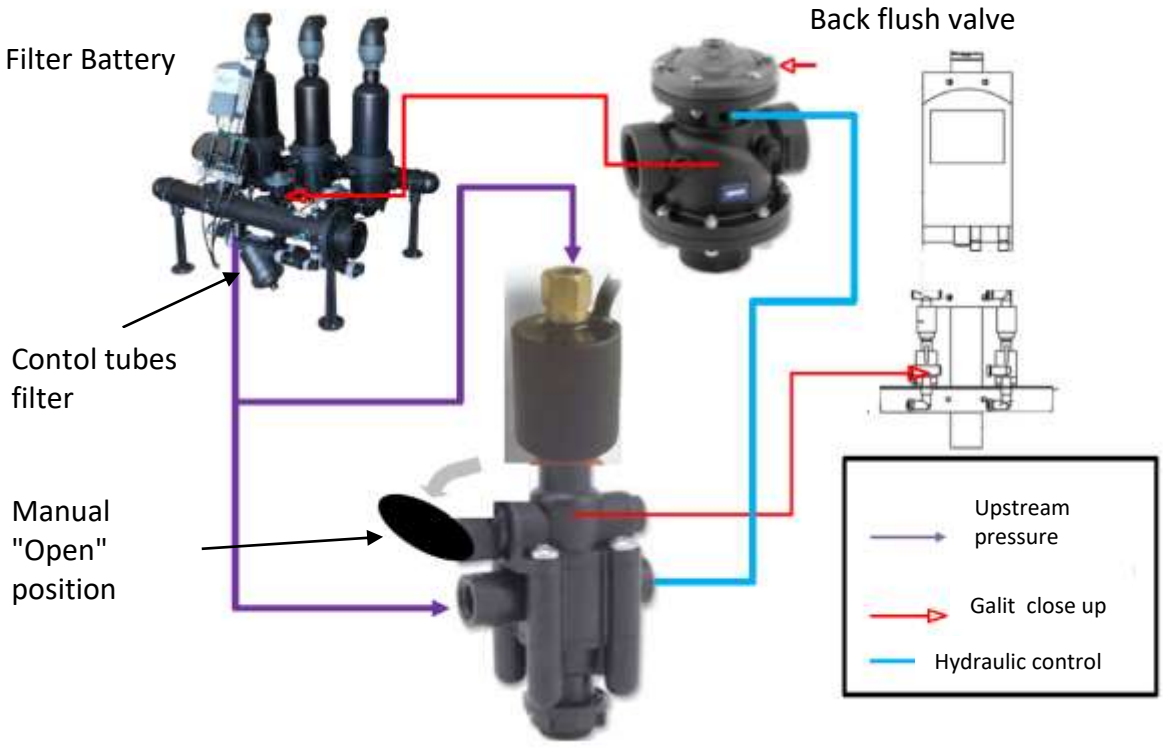
Pressure Meter connections



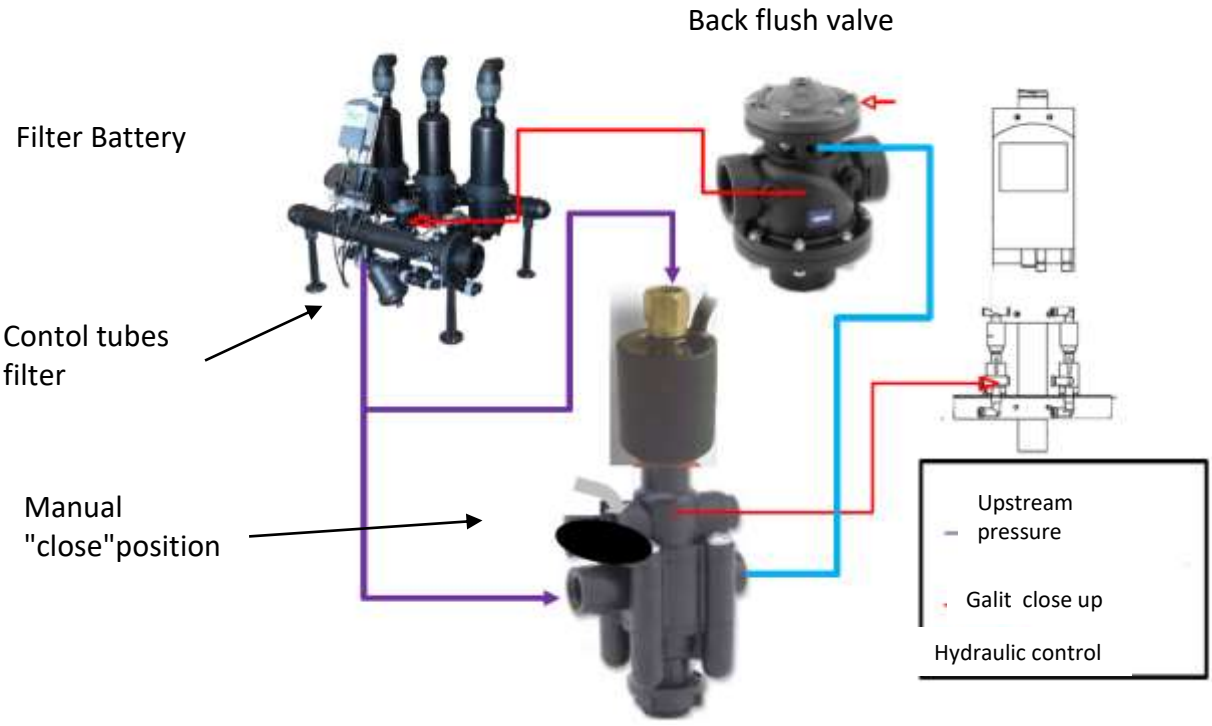
Manual flushing of the filter battery

Manual flushing is performed one filter after the other. In order to perform manual flushing the user should change position of the Galit (the hydraulic relay connected to the solenoid valve), of the filter to be flushed. The user should manually change position of the Galit to "open" (see drawings below), and after flushing to "close" position. Then the user should perform the same with the next filter until all filters are flushed. In order to return to automatic position (flushing preformed by the controller), the user needs to change the position of all the Galits to "auto" position.

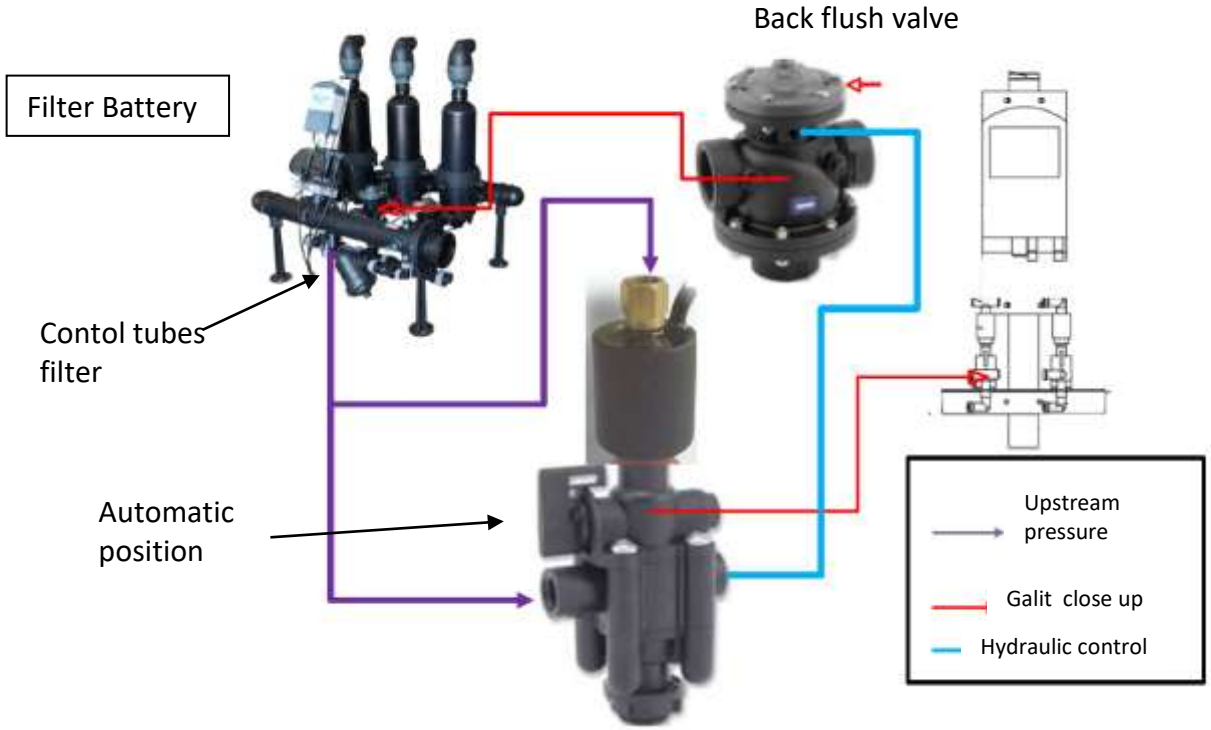
Galit- "Open" position



Galit- "Close" position



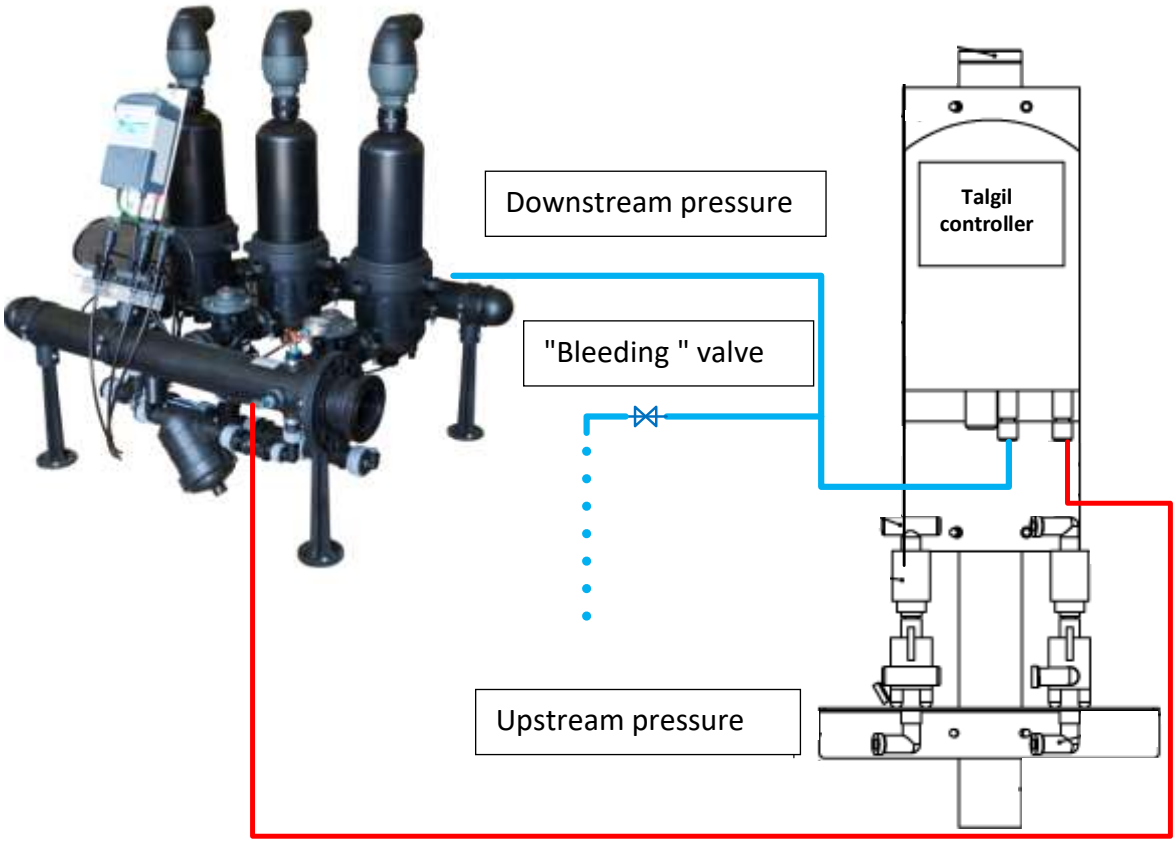
Galit "Automatic" position



Manual activation of flushing cycle (testing DP performance)

In order to create a pressure difference on the filter battery we use a manual valve ($^1/_4$") connected to the downstream side of the control tube.

- Opening it partially to create a pressure difference that activates the DP and the controller preforms a flushing cycle.
- Alternatively open the tube end instead of installing a valve and after the flushing cycle bend it and hold it with a 16 mm drip ring



Proper flushing of discs

It is recommended to clean the discs before and after irrigation season to ensure proper functioning of the filter for many years. Manual flushing is required when the filter is clogged and flushing process does not clean it properly.

- Use high-pressure flow to flush the discs tangentially to the spine.
- Before opening the filter cup close the inlet valve of the system and release the pressure in the filter battery by opening the drain valve.
  NEVER OPEN THE FILTER UNDER PRESSURE.
- Dismentle discs from the spine.
- Visually check for twisted or worn out discs and replace if required.
- In case of chemical deposits on discs grooves, tie each disc set with a nylon rope and soak the discs into an appropriate solution – see below. After treatment, rinse thoroughly with fresh water.
- Reassemble the discs on the spines and back in the filter, then close and tighten filter body. Ensure head loss does not exceed 2-3m.

Detailed explanation of chemical treatment of the discs

Several types of deposits can clog the disc. These can be:

- Organic matter they will be brown or green and will look like mocus.
- Metal oxide - iron in rust color or managanese in black color.
- Carbonaes - white or grey in color
- Combination of several deposits.

Perform cleaning in a well ventilated area and use gloves, safety glasses and protective clothes.

6.1 Preparing the solution for immersing the discs

For organic material use Sodium Hypoclorite

- Mix 5 liters of Hypoclorite (10% concentration) with 5 liters of water. The solution is 5% concentrated.
- Tie the discs with a rope and soak in the solution for 8 hours- then rinse with water thoroughly.
- After installing the discs back in the filter perform several flushing cycles.

For carbonate and iron deposits use Hydroclorite Acid.

- Mix 2 liters of Hypoclorite (30% concentration) with 10 liters of water. The solution is 5% concentrated.
- Tie the discs with a rope and soak in the solution for 8 hours- then rinse with water thoroughly.

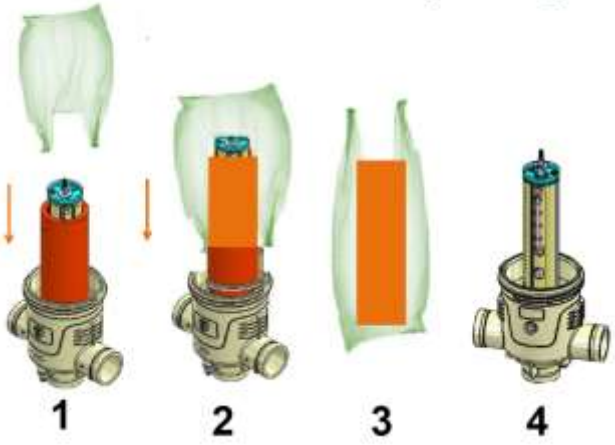
For complex deposits

- In case the user is not sure about the type of the deposits he should run a test.
- Put several discs in Sodium ypocloride solution and seveal in a Hydroclorite Acid solution, (prepare the solution as explained above).
- If one of the dolutions cleans the discs perform cleaning process in that solution.
- If none of the solutions cleaned the discs completely replace the discs that were immersed in the Hypocloride acid into the Sodium Hypocloride and vise versa and watch which treatment cleaned the discs. This is the process to follow with all discs.
- If none of the treatments cleaned the discs properly send several discs to a laboratory to get a diagnosis of th edeposits and the proprer treatment needed in order to clean them.

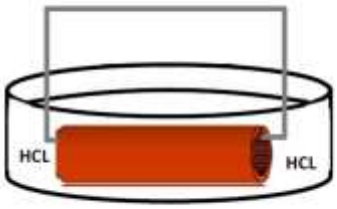
After installing the discs back in the filter perform several flushing cycles.

Step three
Release the Top screw nut lock (counter clockwise), and lift the cup

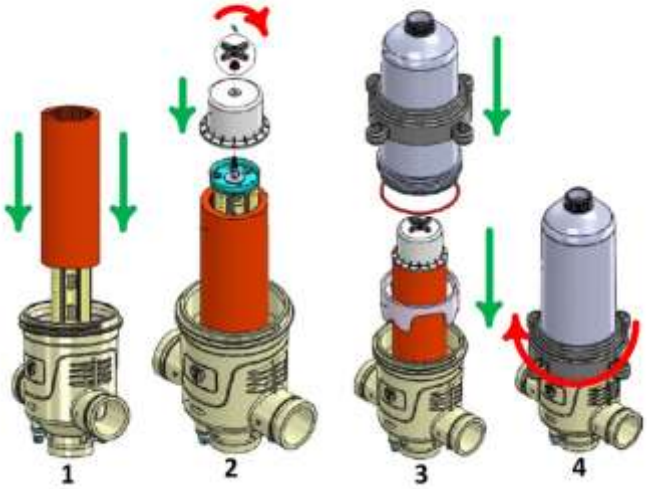
Step four
Remove all Plastic discs Into a plastic bag



Step five
Place the discs in a HCL fluid

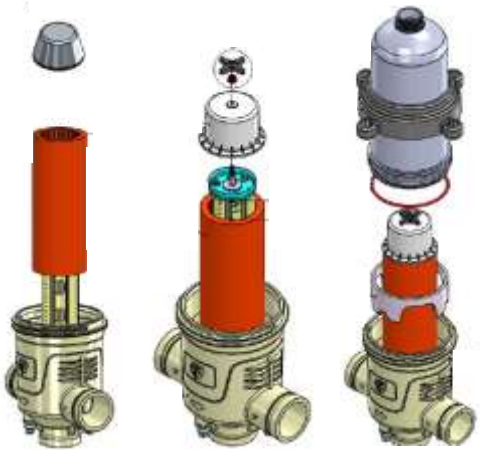


Step SIX
Reassembly the filter.

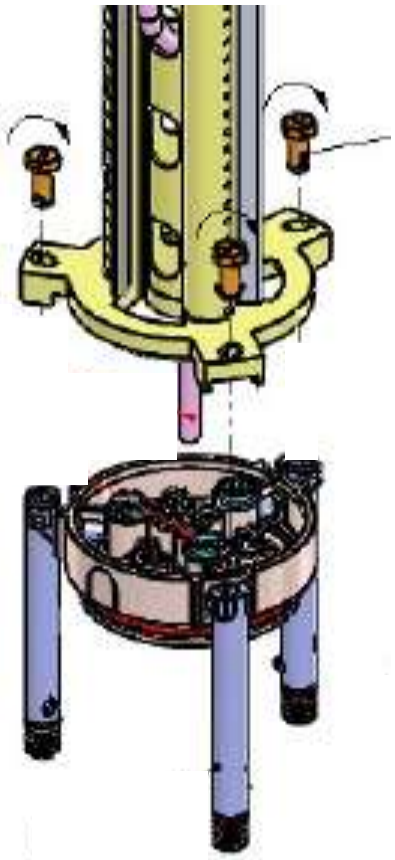


Maintenance instructions Venturi devices and Air release valves

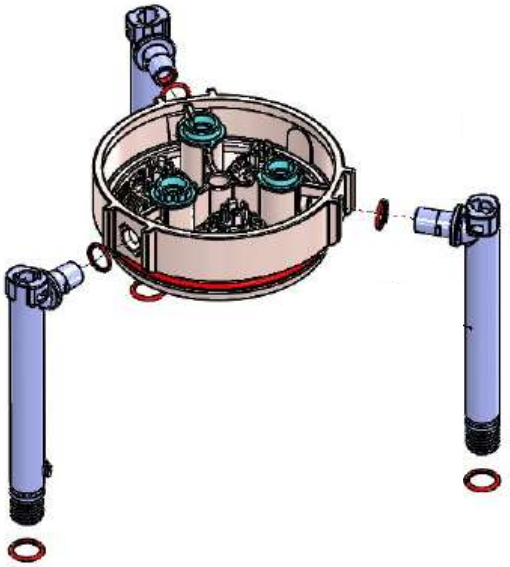
1. Open filter cup and remove discs



2.Separate the two parts of the spine by turning the bayonet screws.
(a quarter of a turn)



3. Separate the lower part

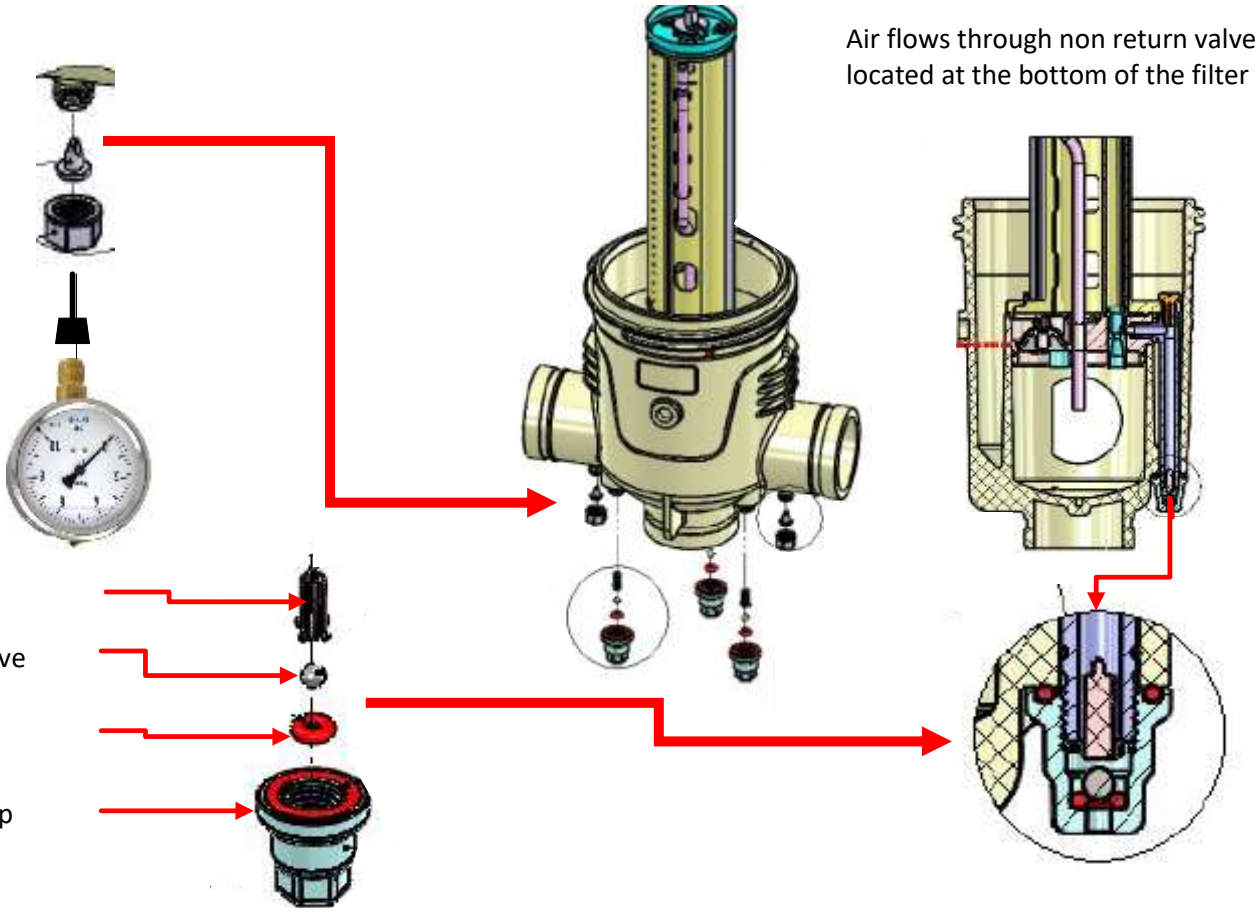


4. Disaasembly of the venturi tubes by turning.

4.1 Turn the tube clockwise 30^{o}

4.2 Pull out. Be careful not to lose the "O" ring

5. Check the tubes and clean from organic matter.
Install the tubes in the lower spine part and be careful not to lose the "o" ring.



Non return assembly for inserting air during flushing

Maintenanace: in case of leakage from the air entrance, release pressure, open the cup and clean the ball and o-ring. When assembling please make sure not to lose parts.

End of season maintenanace

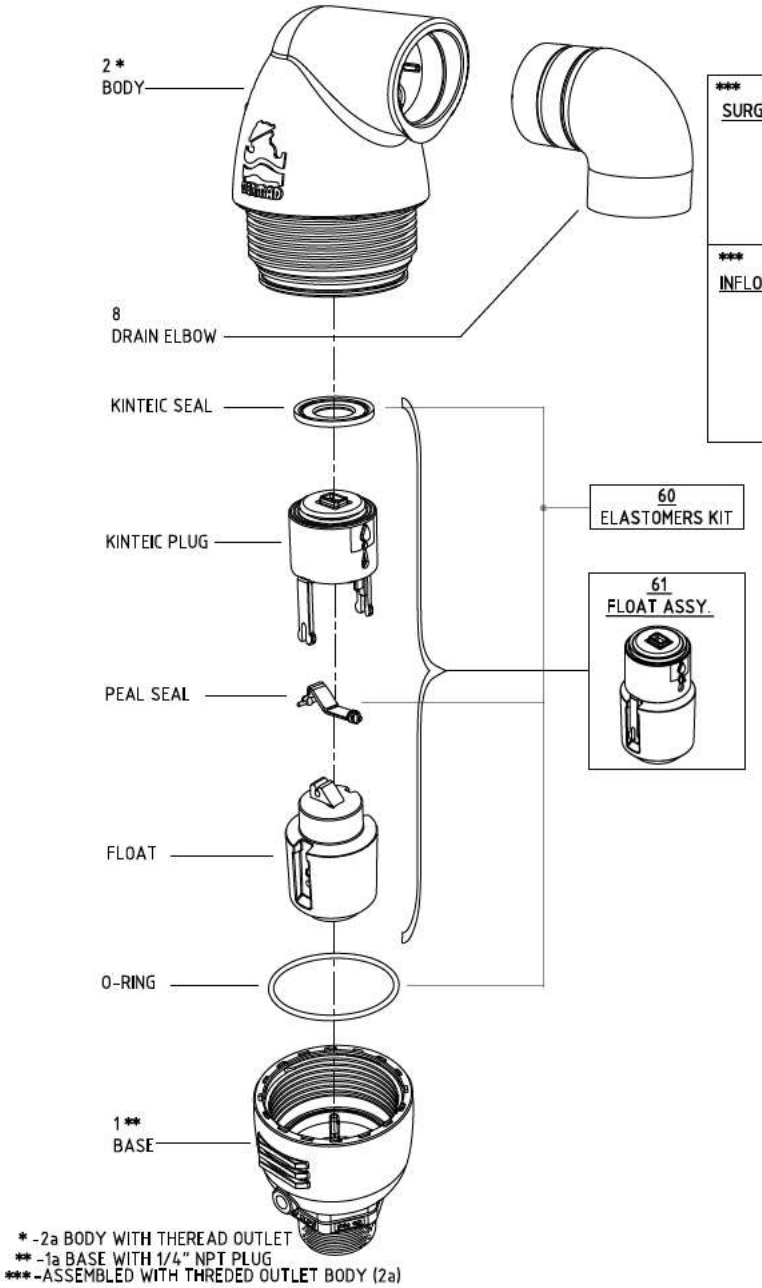
- Proper end of season maintenanace will protect the filtration station and enable the system proper functioning the next season after the winter.
- Perform a long flush 25-30 minutes to the system with the down stream closed.
- It is recommended to perform this flushing with chlorine 15-20 PPM.
- After flushing make sure system is drained of water especially the low areas – make sure to open the command filter.
- It is recommended to disconnect the controller + solenoids put in a dry location.
- In order to prevent the solenoids from jamming, install fresh batteries in the control and program it to perform "flushing" every 3-5 hours.
- It is recommended to mark the tubes before disassembly so it will be easy to connect before next season.
- Lubricate the bolts of the Vic fittings and flanges with anti rust paste.

Air release valve maintenance

In case of leaks the user must disassemble the air release valve, flush all parts thoroughly and reassemble. If the leak continues please check the upper seal and replace if damaged.

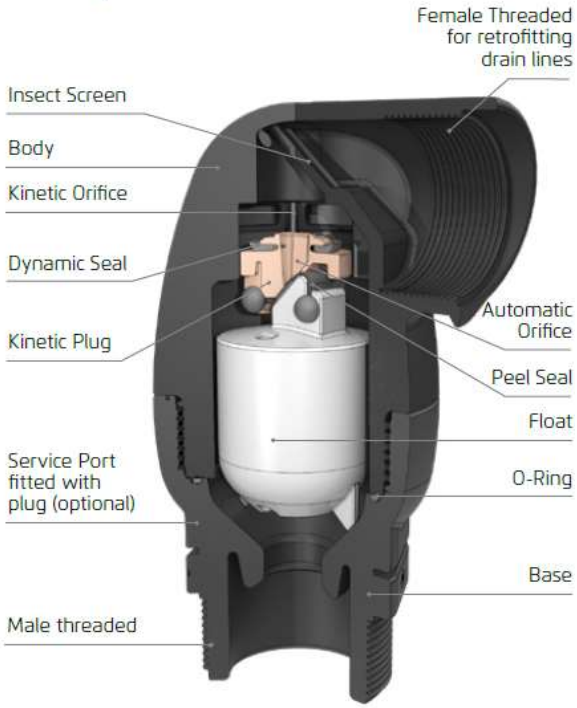
CIO Combination Air Valve

Sizes: 2"; DN50



* -2a BODY WITH THEREAD OUTLET
** -1a BASE WITH 1/4" NPT PLUG
*** -ASSEMBLED WITH THREDED OUTLET BODY (2a)

Cutaway



Effective 10/2014

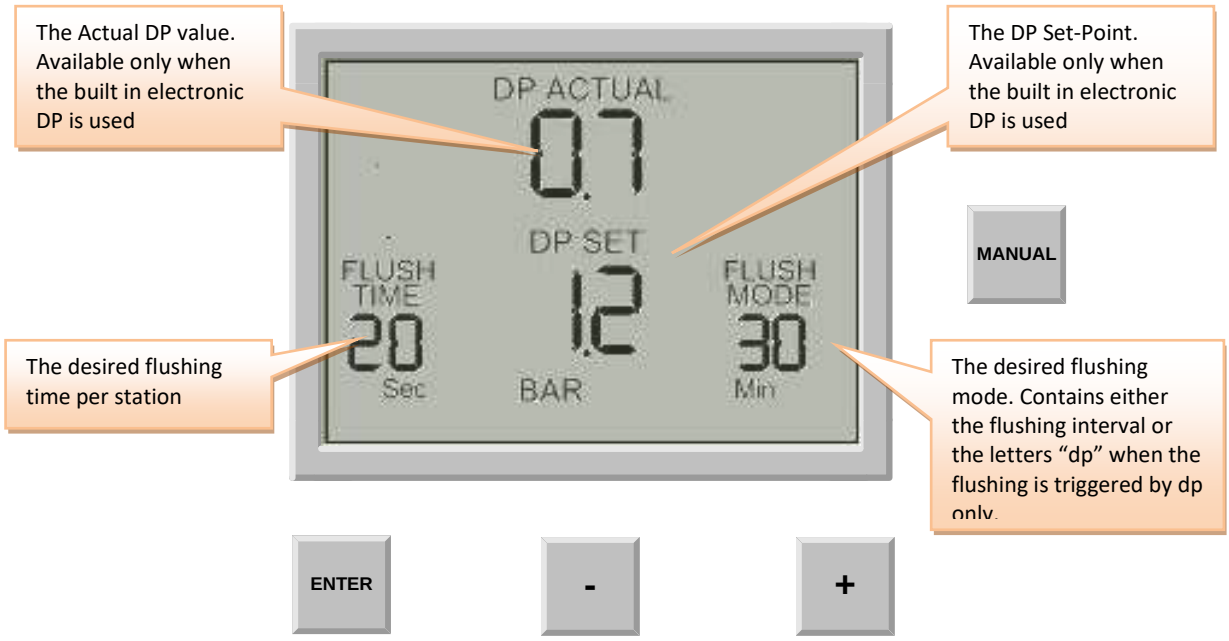
Filtron 1- 10 controller user's manual

List of features

- The “FILTRON 1-10” is a modular backflushing controller for automatic filters of 1 to 10 stations.
- There exist DC and AC models.
- The DC model can be powered either by 6v DC or 12v DC and it activates 2 wired 12v DC latching solenoids. The voltage for the solenoids switching is boosted by a charge pump.
- The AC model contains an internal transformer that can be powered by 110v or 220v from which it generates the 24v AC for the solenoids.
- Flushing cycles may be triggered either by time or by the embedded electronic DP sensor reaching the set point, or by a dry contact signal from an external DP sensor.
- Endless looping problems can be eliminated by detecting repeated consecutive cycles passing beyond a predefined limit.
- The unit can optionally handle a Pressure-Sustaining / Main valve, and an Alarm output.
- The unit is equipped with a customized LCD display and key board.
- The unit counts separately the number of flushing cycles triggered by DP, by time and manually.

How to program the controller

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



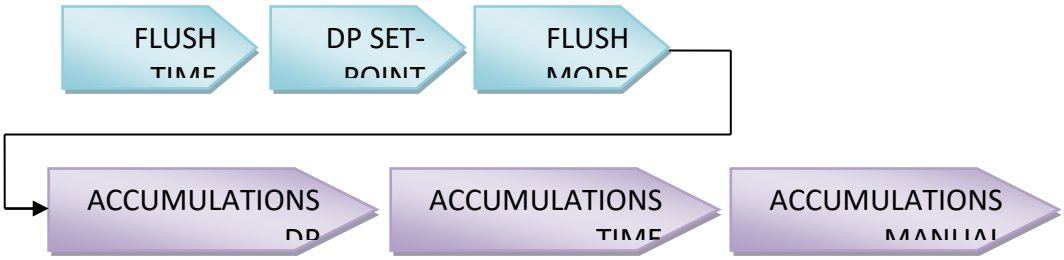
The screen consists of several fields, some of them are editable and some of them are not. For inserting EDIT MODE the ENTER key has to be pushed. The EDIT MODE is indicated by blinking of the characters at the currently editable field. Each time the ENTER key is pushed again, the next editable field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

REMARK

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

The chain of editable fields

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



The Flush Time

Defines the duration of the flushing time per station. The following options are selectable:

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

The DP Set Point

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

Up to version 1.02 of the Filtron 1-10, a nonzero value Set-point would have caused the controller to ignore the Digital DP input completely, but a zero Set-point would make the Digital DP effective and cause the Electronic DP to be ignored.

Starting from version 1.03 a change was made so that a nonzero Set-point does no longer cause the Digital DP input to be ignored, but instead a closed contact Digital DP input will cause the unit to keep on executing flushing cycles as long as the contact remains closed, ignoring the looping limit. When the DP contact reopens, the flushing stops right away without completing the running flushing cycle.

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

When the pressure is expressed in BAR the range of values is 0.1 – 2.0 BAR.
When the pressure is expressed in PSI the range of values is 1- 30 PSI.

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

The Flush Mode

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

OFF - no flushing will take place

By time – In this case the flushing cycles will be repeated in a selected interval or will be triggered by the DP signal depending on what happens first. No matter how was the flushing cycle started the interval to the next cycle will start to be measured again after each ending of a flushing sequence. The selectable intervals are the following:

5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60 minutes
2, 3, 4, 5, 6, 8, 12, 18, 24, 72, 120 hours

dp – flushing will be triggered by DP only.

REMARK

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

The Accumulations

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

The Configuration

In order to enter into the configuration process press and hold down the ENTER key for at least 3 seconds.
The unit will detect how many "plug-in" boards (each of 2 outputs) are used in the particular case.
How will the outputs be allocated depends on the definitions made during the configuration process described below. The following rules apply:

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

Example:

Assuming there are 3 "plug-in" boards, this makes 6 outputs for use. If there are no Alarm-output, no Delay-Valve and no Main-Valve all the 6 outputs will be allocated for backflush valves.
If additionally a Main-Valve is defined, the first 5 outputs will be allocated for backflush valves and output No 6 for the Main-Valve. Output No 5 (of the last backflush valve) can be canceled and left unused. If additionally a Delay-Valve is defined it will be allocated to output 5 right before the Main valve, leaving the first 4 outputs for backflush valves, and once again output No 4 (of the last backflush valve) can be canceled and left unused. If additionally an Alarm-output is defined it will be allocated before the Delay-Valve leaving only 3 of the first outputs for backflush valves. No 3 can again be canceled.

During the configuration process the following features are defined:

Main Valve (sustaining valve) - Yes/ No. When the answer is “Yes” the Pre Dwell delay between the Main Valve opening and the opening of Station No. 1 can be defined. The selectable delay steps are:
5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55 sec
1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6 min

Dwell time - the delay between stations – can be set to 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, or 60 sec.

DP delay - the delay during which the DP sensor reading is expected to remain stable before reaction – 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60 sec.

Looping limit - the number of consecutive flushing cycles triggered by the DP sensor before deciding that there is an endless looping problem. The options are: 1-10 or “no” which means ignoring the looping problem.

Alarm - Yes/No – allocating one output for alarm activation.

Delay Valve - Yes/No – allocating an output for Delay Valve activation.

View Outputs - this is a special mode that enables passing through the list of outputs to see how each output was allocated. Use the + key to change the “no” into “yes” and confirm by “Enter”, then keep using the + key to pass through the list. At the bottom left corner the ordinal number of the output is displayed and its allocated function appears in large letters at the center of the screen. Notice that the number of possible outputs that can be used is always an even number since it results from the number of “plug in” boards (each of 2 outputs) included. However if the number of outputs needed is not an even number,

then the last valve allocated for flushing may be canceled by use of the manual operations key.

Pressure units - deciding about the units to be used for pressure measurement. Selecting between BAR or PSI .

Calibration- Zero calibration of the built in electronic DP sensor. While the sensor ports are disconnected select Calibration = Yes.

Version display- The last screen of the configuration supplies information about the software version of the controller. the version consists of 4 digits like the following:
00
13

Handling Endless Looping problems

As explained above, endless looping problem will be declared when the number of consecutive flushing cycles triggered by the DP sensor exceeds the “Looping limit” defined during configuration. The fact that endless looping problem was detected will be indicated on the display and will cause the activation of the Alarm output, additionally, the DP indication will no longer be considered as a trigger for flushing. The following flushing cycles will be triggered by the interval count down only.

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

Handling Low pressure

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

Connecting the DP sensor to the filter system

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

The small filter to be added between the high pressure inlet and the red point. It is the user's responsibility to add this filter.

Low battery

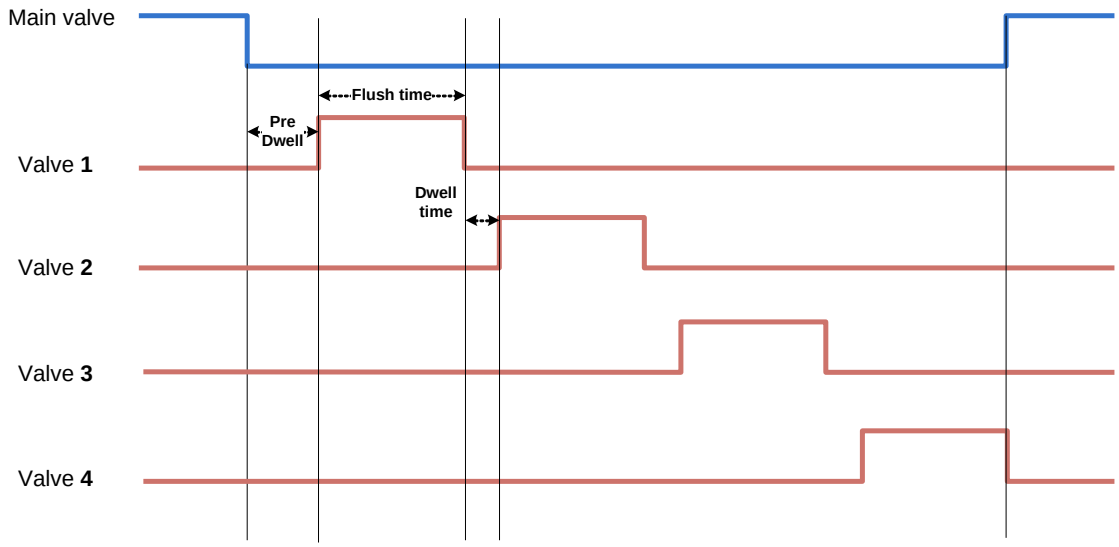
The unit has two levels of low battery indication. At the first level when the battery voltage drops to the first level, the sign will start to appear at the screen. When the battery voltage drops further and reaches the second level, all outputs will shut down, the screen will be cleared leaving only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

Manual activation

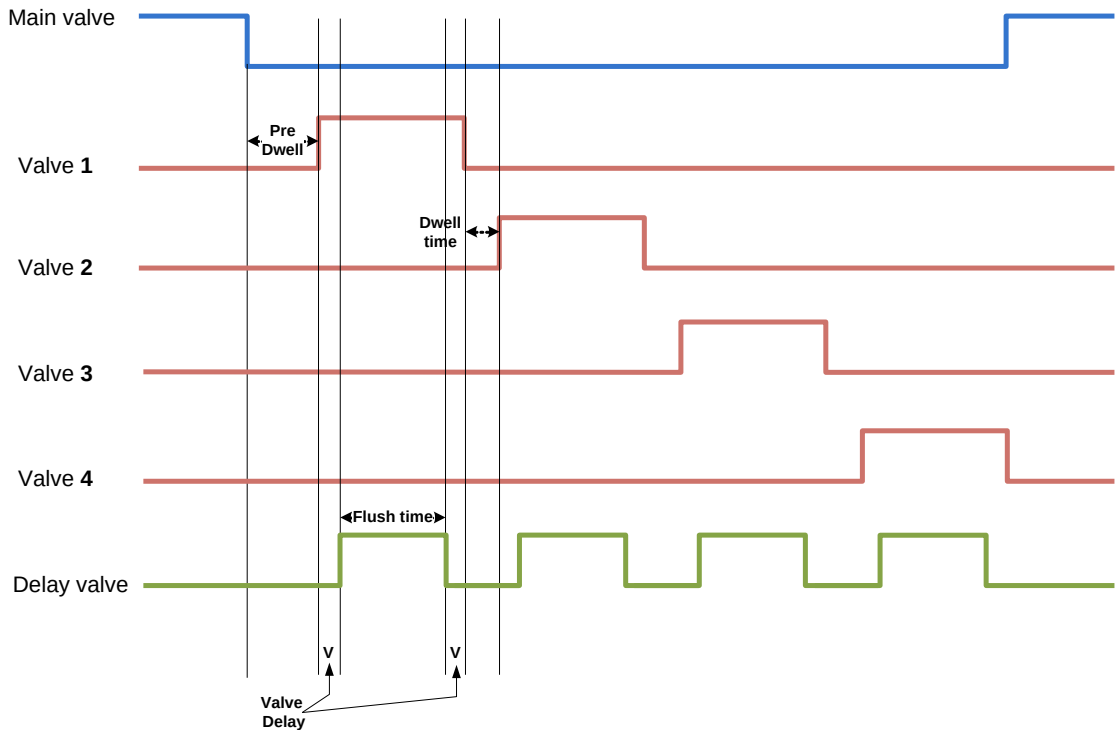
A flushing sequence can be manually activated by the "MANUAL" key. When manually activated the icon will appear on the display. The same key will be used for manually terminating a sequence in progress.

Timing Diagram

Without Delay Valve



Including Delay Valve



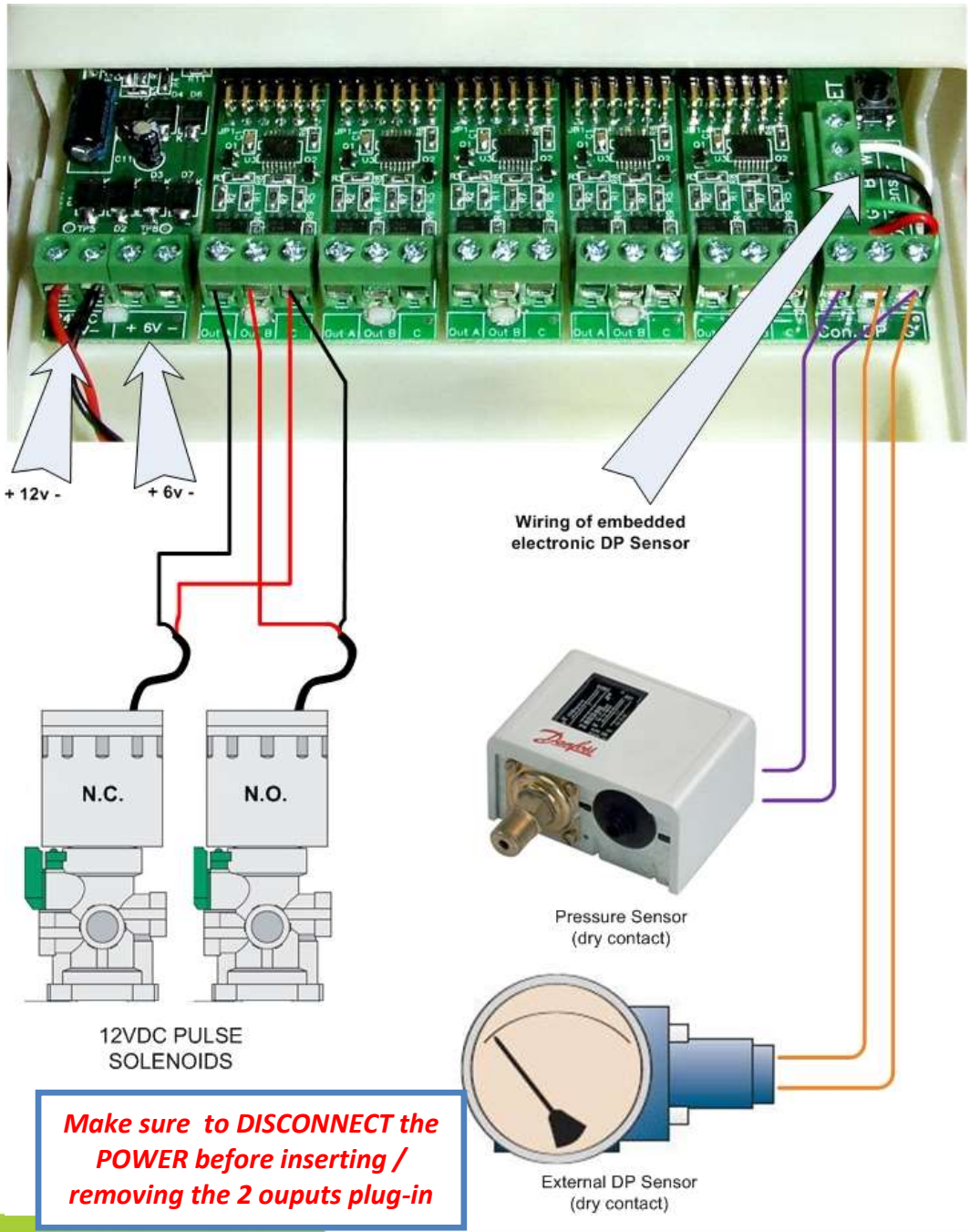
Wiring Diagram

DC MODEL

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

Notice that:

1. The External DP sensor is optional and it is intended for use in cases there is no Embedded Electronic DP included.
2. The powering of the unit can be either by 6v DC or 12v DC.
   The solenoids will be of 12VDC latch



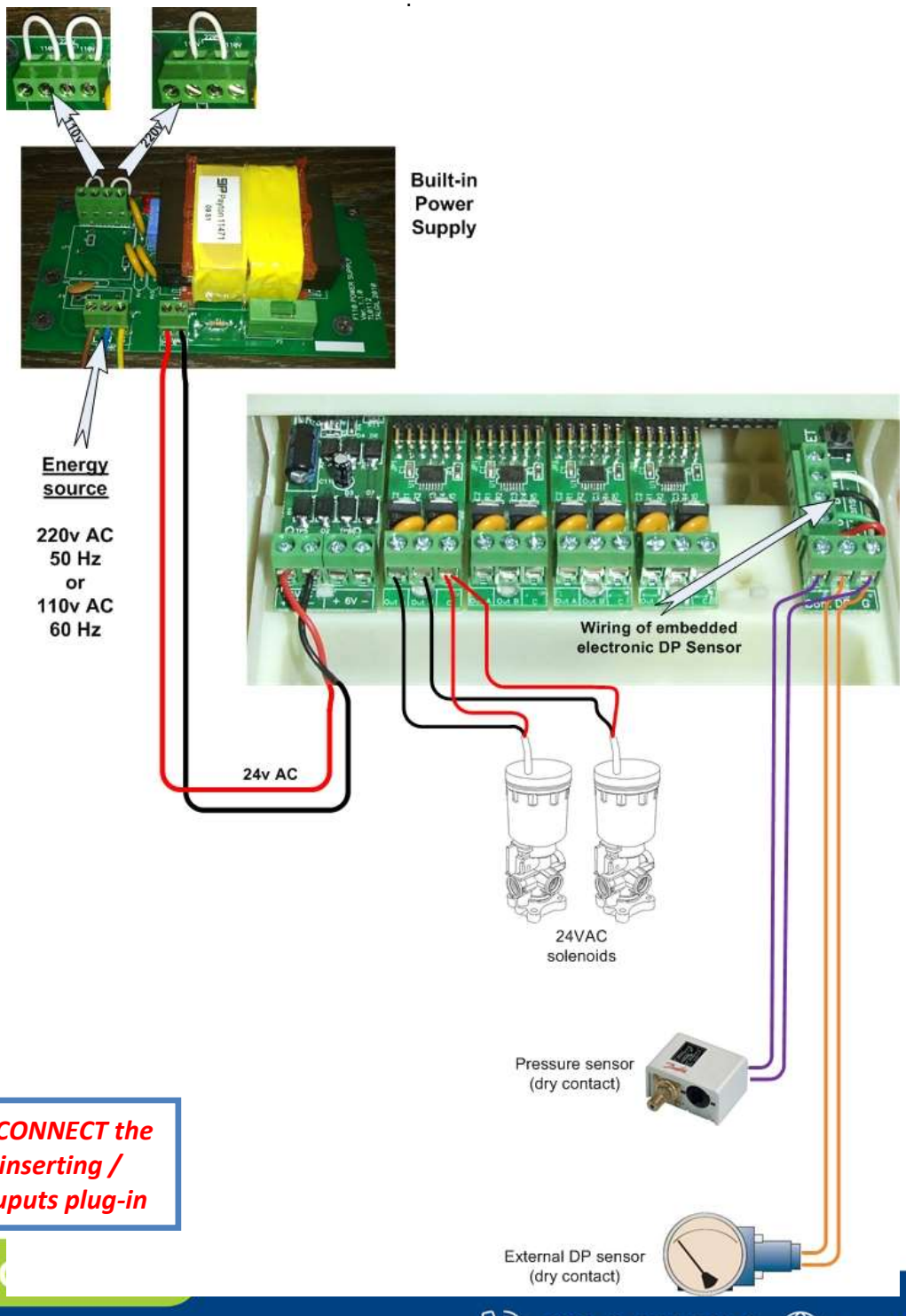
Make sure to DISCONNECT the POWER before inserting / removing the 2 ouputs plug-in

AC MODEL

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

Notice that:

1. The External DP sensor is optional and it is intended for use in cases there is no Embedded Electronic DP included.
2. The powering of the unit is by 24VAC transformed from 220/110 VAC.
3. The solenoids will be of 24VAC



Make sure to DISCONNECT the POWER before inserting / removing the 2 ouputs plug-in

TECHNICAL DATA

DC MODEL

Power source:	6v supplied by 4 x 1.5 “D” size alkaline batteries. or 12v DC dry battery or 12v rechargeable battery with solar panel of 2 watts
Outputs :	12v DC latching solenoids.
DP:	Embedded electronic analog DP sensor or external dry contact DP sensor.
Pressure Sensor:	Dry contact pressure sensor
Operating temperature:	0-60˚ C.

AC MODEL

Power source:	220 or 110 v AC 50 or 60 Hz with built in transformer to 24v AC.
Outputs :	24v AC solenoids.
DP:	Embedded electronic analog DP sensor or external dry contact DP sensor.
Pressure Sensor:	Dry contact pressure sensor
Operating temperature:	0-60˚ C.

Maintenance instructions Flush valves 3"X3":

https://www.bermad.com/wp-content/uploads/2016/05/IR_350-3x3_Maintenance_IOM_English.pdf

Maintenance instructions flush valves 2" x2":

https://www.bermad.com/wp-content/uploads/2016/05/IR_350-A-2x2_Maintenance_IOM_English.pdf