Water Filtration Systems

FMA – 1000

CPF1-10 24 & 220

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

01. – TABLE OF CONTENTS

IMPORTANT WARNINGS

READ CAREFULLY AND FOLLOW THE DEVICE MANUAL INSTRUCTIONS. THE MANUFACTURER IS NOT RESPONSIBLE FOR THE DAMAGES OCCURED OR THE NEGLIGENCES HAPPENED AS A RESULT OF NOT READING THE MANUAL

This device has been manufactured in such a way that its performance does not bring about any risks for the designed usage, provided that:

Both the installation and the management, as well as the maintenance have to be carried out according to the manual instructions.

The facilities conditions and the supply voltage have to follow the specified instructions.

Any different usage from this will be incorrect, as well as the non authorized modifications made by the manufacturer. The damages occurred because of an incorrect usage will be the user responsibility what will automatically determine the warranty cancellation.

Remember that the device will contain electric components with voltage, and therefore, all the service operations or maintenance will be performed by qualified and skilled personnel, aware of the necessary precautions. Before having access to the interior parts, the electric supply has to be dismantled.

READ AND KEEP THIS INSTRUCTIONS

We really want you to save time and money!
We assure that this entire manual reading will guarantee the correct installation and a safe product usage.

BEWARE!

ELECTRICAL DISCHARGE RISK. THE OPERATIONS INDICATED WITH THIS SYMBOL WILL HAVE TO BE PERFORMED ONLY BY SKILLED TECHNICAL PERSONNEL

BEWARE!
 ESSENTIAL INFORMATION AND ASPECTS. HAVE THE DEVICE DOCUMENTATION AS A REFERENCE.

SISTEMAS DE FILTRADO Y TRATAMIENTO DE FLUIDOS S.A.U

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EU Declaration of Conformity

Declaración de Conformidad UE

Declaration de conformité UE

As defined by "Machinery Directive 2006/42/EC, Appendix IIA", "Pressure Equipment Directive 2014/68/EU" and "Electrical Equipment Directive 2014/35/EU".

Conforme a las Directivas Europeas 2006/42/CE sobre Máquinas-Anexo IIA, Directiva 2014/68/UE sobre Equipos a Presión y Directiva 2014/35/UE sobre Material Eléctrico.

Conforme aux Directives Européennes 2006/42/CE des Machines-Annexe IIA, Directive 97/23/CE des Appareils sous Pression et Directive 2006/95/CE pour Materiel Electrique

We hereby declare, that the products specified below meet the basic health and safety requirements, according to the next directives.

Por el presente documento declaramos que los productos especificados a continuación cumplen los requisitos básicos de seguridad y salud conformes a las siguientes directivas que le son de aplicación:

Par ce document nous declarons que les produits decrits ci-dessous repondent aux demandes basiques de securité et santé confrome à la directive suivante qui s'y applique:

MACHINERY DIRECTIVE 2006/42/EC, Appendix II A
DIRECTIVA SOBRE MÁQUINAS 2006/42/CE, Anexo II A
DIRECTIVE SUR MACHINE 2006/42/CE, Annexe II A :

Machinery Description / *Descripción de la máquina* / Description de la machine	**Automatic Screen Filter Electrical Driver** / *Filtro de Malla Autolimpiante Eléctrico* / Filtre à decolmatage automatique
Function / *Función* / Fontion	**Solid on suspension retention** / *Retención de sólidos en suspensión* / Retenir les solides en suspension
Models, Type / *Modelos, Tipo* / Modèles, Type	FMA-1000; FMA-1000(E); FMA-2000; FMA-3000; FMA-4000; FMA-5000; FMA-6000; FMA-7000UV; FMA-9000; FMA-10000; FMA-12000
The machine are included in Appendix IV?: *¿La máquina se encuentra en el anexo IV?:* La machine est elle dans le parragraphe IV?	**NO** / *NO* / NON

DIRECTIVE 2014/35/EU TO ELECTRICAL EQUIPMENT DESIGNED FOR USE WITHIN CERTAIN VOLTAGE LIMITS
DIRECTIVA SOBRE MATERIAL ELÉCTRICO DESTINADO A UTILIZARSE CON DETERMINADOS LÍMITES DE TENSIÓN 2014/35/UE
DIRECTIVE SUR MATERIEL ELECTRIQUE DESTINÉ À S'UTILISER AVEC CERTAINS LIMITES DE TENSION 2014/35/UE

Where compliance of electrical equipment with the safety objectives referred to in Article 3 and set out in Annex I has been demostrated by the conformity assesment procedure, manufacturers shall draw up an EU declaration of Conformity.

Cuendo mediante el precedimiento de evaluación de la conformidad se demuestre que el material eléctrico cumple los objetivos de seguridad a que se refiere el Artículo 3 y establecidos en el Anexo I, se elaborará la presente Declaración UE de Conformidad.

Lors de la procedure d'evaluaton de la conformité, il a été demontré que le materiel electrique repond aux objectifs de securité selon l'articule 3 de l'Annexe I, il y aura cette Declaration UE de Conformité.

PRESSURE EQUIPMENT DIRECTIVE 2014/68/UE
DIRECTIVA SOBRE EQUIPOS A PRESIÓN 2014/68/UE
DIRECTIVE SUR EQUIPMENT SOUS PRESSION 2014/68/UE

Based on Section 2 f) i) iii) or Article 1, of this directive, the pressure equipment classifed as no higher than category I, are excluded from the scope of this Directive.

Con arreglo al Apartado 2 f) i) iii) del Artículo 1, de la Directiva 2014/68/UE, los equipos que correspondan a lo sumo a la Categoría I, quedan excluidos de los requisitos de la presente directiva.

Selon le parragraphe 2 f) i) iii) delde l'article1, de la Directive2014/68/UE, les equipements qui correspondent à la Categorie I, sont exlcus de cette directive.

Equipment / *Descripción del equipo* **/** Equipement	**Automatic screen filter** / *Filtro de Malla Autolimpiante* / Filtre à decolmatage automatique
Design Pressure & Temperature / *Presión y temperatura de* diseño **/** Pression et temperature de design:	PN: 10 – 16 bar / 50ºC
Fluid to contain Acc. to Rgto. 1272/2008 / *Fluido a contener, S/ Rgto. 1272/2008* **/** Fluide, S / Rgto. 1272/2008/:	**Water, Group 2** / *Agua, Grupo 2* / Eau, Groupe 2
Equipment category a. 2014/68/UE / *Categoría del equipo* / Categorie de l'equipement:	**SEP (Section 3 of Article 4)** / *SEP (Apartado 3 Artículo 4)* / SEP (Parragraphe 3 Article 4)
Module / *Módulo del equipo* **/** Module de l'equipement:	**None** / *Ninguno* / Aucun

The Technical Construction File for these equipments are maintained at our corporate address, mentioned above.

El Dossier Técnico de Fabricación de estos equipos se encuentran en nuestro domicilio social arriba indicado.

Le dossier technique de fabrication de ces equipements est dans notre domicile social indiqué en haut.

The machinery, product, assembly or sub-assembly covered by this Declaration of Conformity must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the applicable Directive(s).

La maquinaria, equipo, montaje o su-montaje al que se refiere esta Declaración de conformidad no debe ponerse en funcionamiento hasta que la unidad a la que se incorpore haya sido declarada de conformidad con las disposiciones de la(s) Directiva(s) que le resulte(n) aplicable(s).

La machine, produit, montage et son montage qui se refere à cette Declaration de conformité ne doivent pas se mettre en fonctionnement jusqu'à ce qu'il soit inclu à l'unité declarée conforme selon la ou les Directive(s) qui lui sont applicables.

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1. – INTRODUCTION

STF – FILTROS congratulates you on the acquisition of the self backwashing automatic filters.

All the products manufactured by STF – FILTROS are easy to install, use and maintain.

If you have any doubts about its performance after reading this manual, please contact the STF-Filtros Technical Department.

CONTACT

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WARRANTY CERTIFICATE

SISTEMAS DE FILTRADO Y TRATAMIENTO DE FLUIDOS S.A.U.

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1. Sistemas de Filtrado y Tratamiento de Fluidos S.A.U. (hereinafter, "STF") has invested in quality manufacturing processes in order to ensure that its products (hereinafter, the "Product") comply with all of STF's technical specifications and requirements, thereby enabling the company to guarantee their good condition and functionality (hereinafter, the "Warranty"). The Warranty that STF provides is subject to the limitations and conditions specified in this Warranty Certificate.

2. The Warranty shall remain valid for a period of twenty-four (24) months, beginning on the date the Product is delivered to the customer (hereinafter, the "Warranty Period"). If, during this Warranty Period, the customer should observe any faults or defects in the Product, STF shall, at its own discretion, choose to replace or repair the defective Product without additional cost to the customer. Notwithstanding the foregoing, the customer shall only have a period of thirty (30) days from delivery of the Product in order to notify STF of any defects that may be observable upon examination of the Product (apparent defects).

3. In the event that the defective Product is repaired or replaced, the warranty that applies to the repaired or replaced Product shall be subject to the same conditions specified in this Warranty Certificate, for up to (i) six (6) months following its replacement or repair, or (ii) the completion of the Warranty Period (whichever occurs first).

4. This Warranty does not cover any costs related to shipping, customs and excise, taxes and duties, or any other costs arising from the return, re-sending or replacement of the Product. Nor does it cover any costs related to the installation, removal or reinstallation of the Product.

5. The Warranty provided for in this Warranty Certificate shall not apply under the following circumstances:
   (i) in the event of misuse, negligence, accident, or improper storage conditions;
   (ii) if unauthorised modifications are made to the Product; if the Product has been installed incorrectly as a result of failure to follow the instructions; or if the Product has been modified by persons who are not qualified to do so;
   (iii) if the Product has not been correctly maintained;
   (iv) in the event of damage, breakdown or defects caused by *force majeure*, e.g. flood, fire or other occurrences that are beyond the control of STF;
   (v) if the Product is exposed to conditions that are considered extreme or are incompatible with its correct operation, e.g. water currents, corrosive liquids, chemical compounds, etc.;
   (vi) in the event of claims in which the Product's type or serial number has been altered, removed or is otherwise illegible.

6. This Warranty does not cover Products destined for special facilities, such as petrochemical, maritime or nuclear facilities, facilities where slopes are present, or any other facilities that operate under conditions

considered outside of the norm (hereinafter, “Special Facilities”). However, provided a corresponding agreement is reached with the customer, STF shall provide a specific warranty for Products installed at Special Facilities.

7. Notwithstanding any other agreement between STF and the customer, and regardless of whether the claim in question is based on an agreement (including a warranty or indemnity agreement), on the principle of tort liability, or any other basis, the following shall apply:
   (i) STF shall only be obliged, at its sole and exclusive discretion, to replace or repair the defective Product;
   (ii) under no circumstances shall STF be held liable for loss of earnings, loss of production, inability to use equipment or services or related elements, disruption to business activities, downtime costs, claims from buyers or clients for similar damage or detriment, damage to reputation, or damage of a special, consequent, incidental, indirect or punitive nature;
   (iii) in the event that the customer is supplying the Product to a third party, the customer must demand that the third party adheres to the terms and conditions of this Warranty. If, for whatever reason, the third party does not agree to do so, the customer shall indemnify STF and hold it harmless for any and all liabilities that may arise from any claims made by the third party that do not fall within the limitations and exclusions specified in this Warranty Certificate.

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FILTER SAFE USE INSTRUCTIONS

THE INCORRECT USE AND MAINTENANCE OF THE EQUIPMENT MAY CAUSE PHYSICAL INJURIES.

IT IS STRONGLY RECOMMENDED TO RESPECT THE FOLLOWING INSTRUCTIONS IN ORDER TO AVOID RISKS.

USE ACCIDENT PREVENTION MEASURES THAT GUARANTEE YOUR SAFETY AND THE EQUIPMENT SAFETY.

1. Do not touch parts in motion.

Never place your hands, fingers or any other body parts near the filter parts in motion.

2. Do not touch the filter without protections.

Never use the filter without the protections are not perfectly settled in its place. If the maintenance operations require their renoval making sure that before using the new filter the protections are well fixed in its corresponding place.

3. Get protected in case of electric shocks.

Avoid equipment electric part accidental contacts with the metallic parts.

4. Switch off the filter.

Switch off the filter before performing any assistance, inspection, maintenance, backwashing, replacement or control of pieces.

5. Discharge filter pressure.

Remove the equipment pressure before performing any assistance, inspection, maintenance, backwashing, change or control of pieces.

6. Working area.

Keep the working area clean and from time to time remove the unnecessary tools. Never use the equipment if there is polish, petrol or any other fuel or explosive material.

7. Filter maintenance.

Follow this manual instructions, revise the greasing, inspect the supply wire periodically, if it is damaged get it repaired by skilled personnel. Check that the external appearance has not got visual faults.

8. **Check that screws, bolts and covers are firmly fixed.**

Check that they are adjusted from time to time.

9. **Make the equipment to run at a nonimal tension**

Pay attention to the specified voltage in this manual and the characteristics plate in the filter.

10. Never use the filter if it is faulty.

If the filter runs making weird noises, a lot of vibrations or it looks faulty, stop its running immediately and check its functionality.

11. Use only original spare pieces.

The use of no original spare pieces invalidates the warranty.

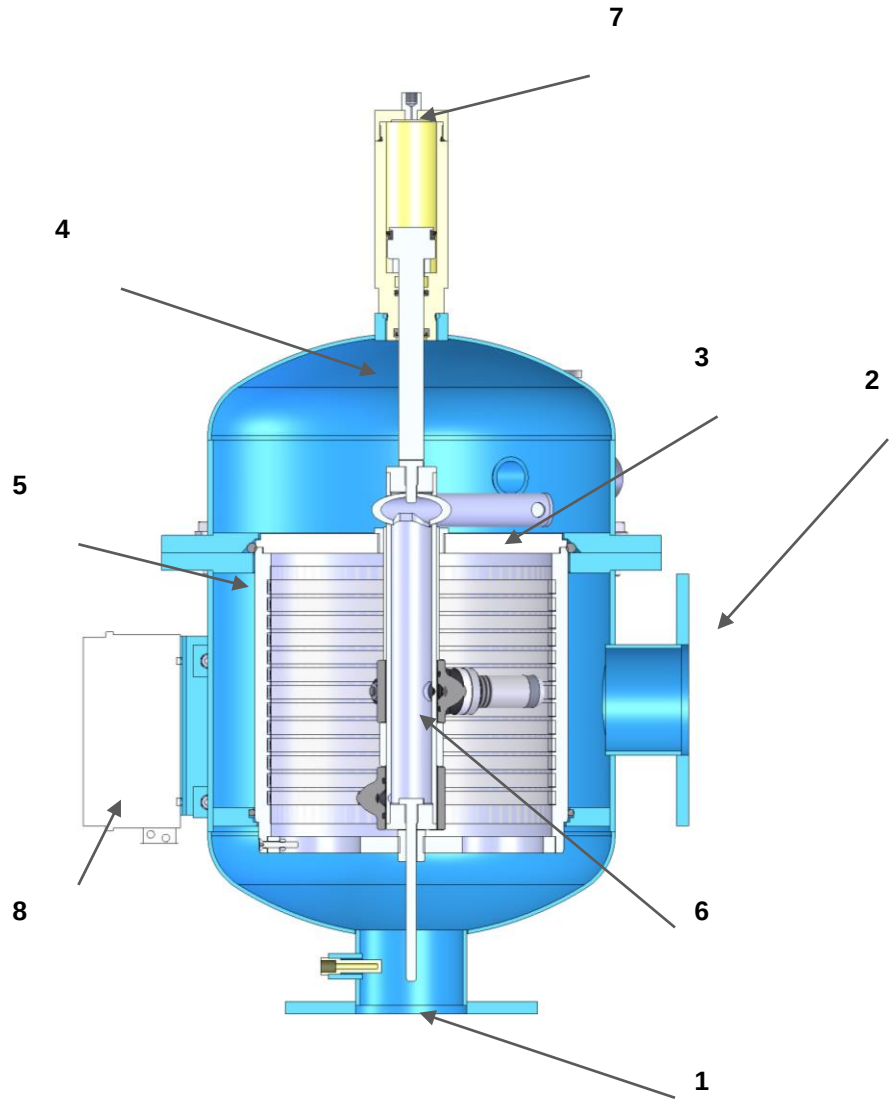
12. Do not modify the filter.

A non authorized modification can diminish the equipment performance qualities and produce harsh accidents if people have not the appropiate technical knowledge.

13. Switch off and drain off the equipment.

When the filter is not running switch off the supply equipment and drain off the filter to get its life extended.

The filter consists of an outer casing which houses two distinct chambers. The first one is a filtering chamber which coincides with the filter water inlet, and where the Filter Mesh is located and the second one which is a cleaning chamber.



1.	Water inlet	5.	Filtering cartridge
2.	Water outlet	6.	Scanner set
3.	Filtering chamber	7.	Actuation mechanism
4.	Cleaning chamber	8.	Control panel

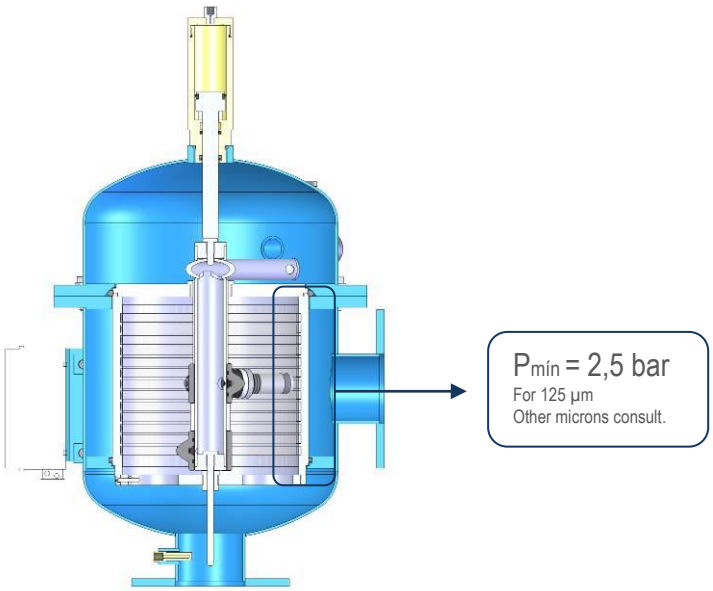
The water flows outwards from inside the filtering body. Suspended solids (dirt) are retained in the filtering element, ie in the mesh. This chamber coincides with the filtered water outlet to the desired application: drinking water, process water, cooling water, etc.

The dirt retained gradually forms a cake on the mesh, which generates a given pressure drop. Cleaning the filter is supported by a second chamber, the **cleaning** chamber, whose outlet is connected to the **drain valve** allowing evacuation of the wash water when generating the **self-cleaning** process. The cleaning chamber is separated from the filtration chamber by means of a specialseal.

Finally, the **suction scanner** is a vital element of this technology. This scanner occupies the exact position that the central axis of the filtering cartridge would occupy, and is hydraulically connected to the cleaning chamber. In turn, the **suction nozzles** are arranged perpendicularly in the zone that it occupies in the filtration chamber.

The location of these nozzles in the suction scanner has been designed to come into contact with the entire inner surface of the mesh, thanks to the spiral movement provided to the scanner by the electric motor by combining longitudinal displacement and rotation.

The minimum pressure is 2 bar for a micronage of 125 µm, the rest of microns is necessary to consult.



1. Water gets into the filtering chamber, goes through from inside to outside the **filtering screen**, producing the **surface mechanic**. High quality water is obtained according to the filtration degree choosen for the filtratrion screen which can vary from 10 microns to 2000 microns.

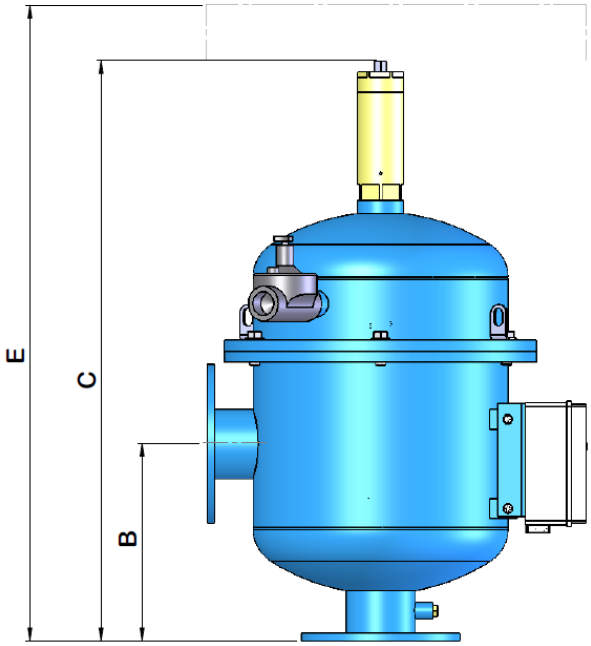
(*) Consult manual: section 6 "Technical characteristics", corresponding to each filter.

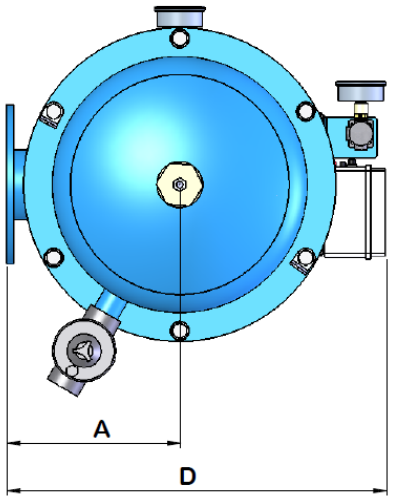
2. Dust remains on the thin screen interior what produces head loss between the filter inlet and outlet gradually. Two analogic transducers will indicate the backwashing sequence when the DP becomes 0.3 (3 m.c.a). There are other possibilities to make the filter backwashing: Time backwashings, time and pressure combination, continuous backwashing option.

3. When the pressure switch indicates 0.3 bar, the drain valve receive the opening order, then it generates a pressure difference between outside (atmospheric pressure) and the inside of the filter (working pressure) that is why fast running water which is produced, goes through the screen and then goes outside through the nozzles internal orifice. Besides this, at this very moment the starting order is also sent to the engine.

4. The result of these actions is: the suction effect of the nozzles on the screen dust and the suction scanner spiral movement in the inside of the filter.

5. During the backwashing process, see at “Technical Characteristics”, in section 6 page 2: duration of wash cycle, water is still being filtered and goes on flowing to the system or application. This fact whis is is due to the filters design allows that the backwashing water consumption is **minimum** and the working system is **continuous.**





MODEL	Dimensions (mm)				
	A	B	C	D	E
FMA – 1002	220	220	600	480	730
FMA – 1003	220	250	690	480	730
FMA – 1004	260	320	800	570	820
FMA - 1006	260	470	1075	570	1015

MODEL	**1002**	**1003**	**1004**	**1006**
		GENERAL FEATURES		
Diameter Inlet/Outlet (1)	DN-50 (2”)	DN-80 (3”)	DN-100 (4”)	DN-150 (6”)
Max./mín. working pressure		2 bar / 10 bar		
Max. fluid temperature		50 ºC		
MESH SUPPORT				
Maximum flow rate (m^3/h)	50	90	150	280
Gross filtering area (cm^2)	910 (1)	1.600 (1)	2.475 (2)	4.950 (2)
Dry weight (kg)	35	45	60	84
Filtration sizes		1.500, 1.000, 500, 300, 200, 125, 100, 74 microns		

MODEL	1002	1003	1004	1006
BACKWASH				
Backwash valve	G-1” Thread			G-2” Thread
Duration of wash cycle	4-13 seconds		15-20 seconds	
Duration of wash cycle (seconds)	16	20	20	20
Wash flow (m^3/h)	2,4	3	3	9
Water consumption per wash (liters)	5	12.5	12.5	53
ELECTRICAL DATA				
Operating voltage	4 x 1.5 V LR 14-C batteries / (optional 220 V AC 50 Hz)			
Control voltage	6 V DC / (24 V DC optional 220 V AC)			

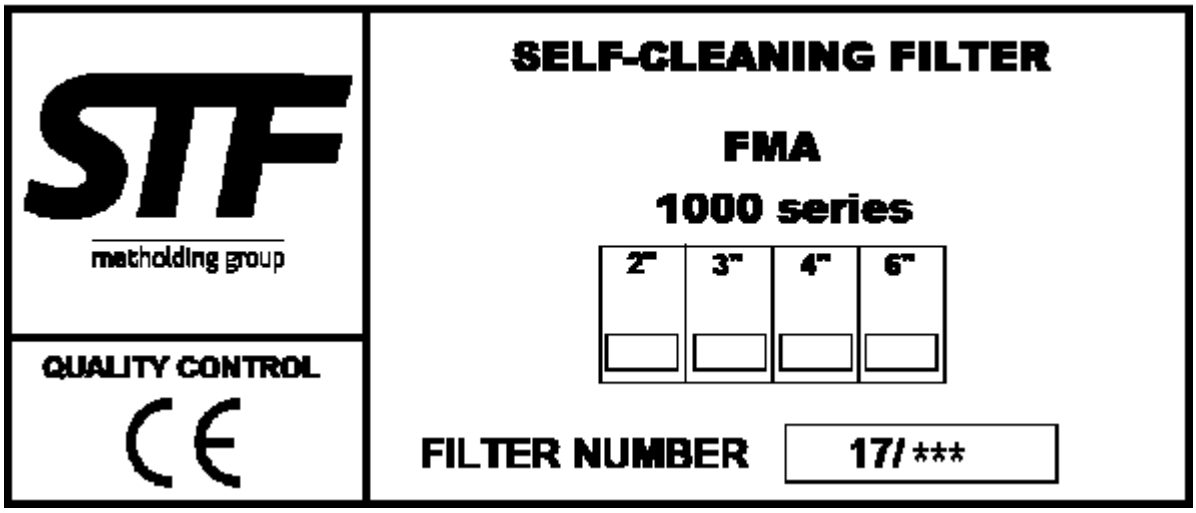
(¹) PVC support cartridge.
(²) Stainless steel cartridge. Injection.

STANDARD MATERIALS	
Filter body and caps	S-235-JR Carbon steel
Finish treatment	Oven-cured epoxy polyester powder paint coating
Suction scanner	Plastic
Filtering mesh	AISI-316 Stainless steel
Suction nozzle	PVC with AIS 316 stainless steel ring and nylon bristles
Cleaning valves	Polypropylene
Spacer disc	Aluminium
Screws	A2 Stainless steel
Gaskets	NBR – EPDM - Viton
SPECIAL MATERIALS (OPTIONAL)	
Filter body and caps	A-516 Carbon steel / AISI 304 / AISI 316 / SuperDuplex Stainless steel
Finish treatment	Inner coating suitable for sea water, outer coating suitable for marine environment.
Suction scanner	Duplex or Superduplex Stainless steel
Filtering mesh	254 SMO Avesta Stainless steel
Suction nozzle	Complete, made of Duplex or Superduplex Stainless steel and nylon bristles
Cleaning valves	“Please consult about optional materials”
Spacer disc	A2 or A4 Stainless steel
Screws	A4 Stainless steel
Gaskets	Please consult

7. – IDENTIFICATION STICKER FMA-1000

FMA-1000 equipment is identified by an identification sticker affixed to the filter.

- FMA-1000



One of the sizes is selected by placing a check mark in the corresponding box, and the corresponding filter number is indicated.

- Filter number:
  The number 17 indicates: the year of manufacture, in this case 2017.
  The asterisks " *** " indicate: the manufacturing position from filter 001, in that year.

Available sizes are the following:

FMA-1000
2 ''
3 ''
4 ''
6 ''

1. Take precautions to prevent the filter from striking, the equipment lifting by means of the upper anchor points.

2. Make sure that the installation point has the minimum operation pressure.
   - The backwashing pipe has to be measured so that it gets a minimum flow head loss of 25 m³/h.
   - In installations with a working pressure superior to 6 bar, it is advisable to install a ball valve in the backwashing pipe to adjust the backwashing flow.

NOTE	
	THE MINIMUM WORKING PRESSURE IS 2,5 BAR BETWEEN THE FILTER OUTLET AND THE DRAIN VALVE. IN CASE THE DRAIN IS RECONDUCTED, IT IS NECESSARY TO INCREASE THE WORKING PRESSURE IN ORDER TO COMPENSATE FOR THE HEAD LOSS THAT MAY APPEAR IN THE DRAIN PIPE

3. Install the filter, check that there is enough room so that the filter can be easily accessed in safe conditions for future treatments and for its maintenance. See se section 6.

4. Position the filter in the driving obeying the arrows indicating the water running direction.

5. Inlet and outlet shut-off valves are recommended to be installed in order to insulate it. It is recommended to install a by-pass in order to avoid power cuts during the maintenance.

6. It is recommended to install an outlet backflow in order to avoid water hammer on the filter.

7. According to section 12.1 the electrical wiring can only be installed by a skilled electrician (if required).

8. In the filter installation it has to be avoided that water splashes over the electrical components or the control panel.

1. Check previous section instructions.

2. Start with the following valve configuration:
   - Inlet valve: OPEN
   - Outlet valve: CLOSE.
   - By – pass (If it exists): CLOSE

3. Connect the filter to the corresponding power supply, indicated in section 6: technical characteristics.

4. Make sure that the programmer is operational.

5. Manual backwash by pressing the limp button.

6. Open outlet valve.

7. A drop in pressure and water flow increase is produced when the water mains is filled in. That is why it is advisable to install an outlet pressure valve, making sure that the water mains filling is controlled.

NOTE

IN CASE A SUPPORTING PRESSURE IS NOT INSTALLED, DURING THE WATER MAINS FILLING, CLOSE THE OUTLET VALVE UNTIL GETTING 2,5 BAR IN THE CLEAN WATER PRESSURE GAUGE.

ONCE THE WATER MAINS IS PRESSURIZED, OPEN THE OUTLET VALVE TO GET A CORRECT OPERATION.

8. Make sure that water flow and pressure installation correspond with the maximum values defined for this manual model. See section 6

9. Check the equipment operation and the head loss when the starting up is finished.

1. Switch off the enery supply filter that corresponds, indicated in section 6: technical characteristics, before any maintenance operation.

2. Make sure that the filter is unpressurized before loosening the screws.

3. Avoid splashes and water leaks by minimizing the personnel risk sliding or being electrocuted and the damage that humidity can cause to the equipment.

4. Make the manual backwashing of the filtering cartridge by using pressurized. If necessay acid or any other chemical products will be used. This process has to be done following the material instructions and not putting the operator or the rest of the people at risk.

5. Drain the equipment when it is not used for long time.

Note

Open and closethe valves slowly and gradually.

11. – PREVENTIVE MAINTENANCE SCHEDULE – HYDRAULIC

HYDRAULIC FMA			
MAINTENANCE	**TIME**	**ELEMENT**	**ACTION**
EXTERNAL			
Working check over	1000 backwashing cycles	Complete filter	Filter on + manual backwashing button. Control: Valve opening Efective backwashing cycle ($P_1 = P_2$)
Anticorrosion treatment	12 months	FMA casing	Check over the anticorrosion treatment in the necessary points. Apply Epoxi - Polyester treatment
INTERNAL			
Anticorrosion treatment	12 months	FMA casing	Check over the anticorrosion treatment in the necessary points Apply Epoxi - Polyester treatment
Suction nozzle	12 months	Suction nozzle	Suction nozzles condition revision, nylon fibers condition, cartridge proximity.
Filtering cartridge	Inactivity period	Filtering cartridge	Backwash manually by using water under pressure, if necessary, acid or any other chemicals products will be used
Joints	12 months	Inside joints	Check over the inner joints. In case they are deteriorated, they will be replaced.
Overhaul of turbine	12 months	Turbine Motor arm	Check over that the conductions aren't plugged and it can be operated.
Overhaul of piston	12 months	Internal joints Plunger Stop cap Piston	Check over the elements that make up the mechanism of the piston: the plunger, the guide bush and the piston. If any is deteriorated, the replacement will proceed.

List of features

- The “CPF1-10 24 & 220” 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 9-40v DC latching solenoids. The voltage for the solenoids switching is boosted by a charge pump.

- The AC model contains an internal transformer that 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.

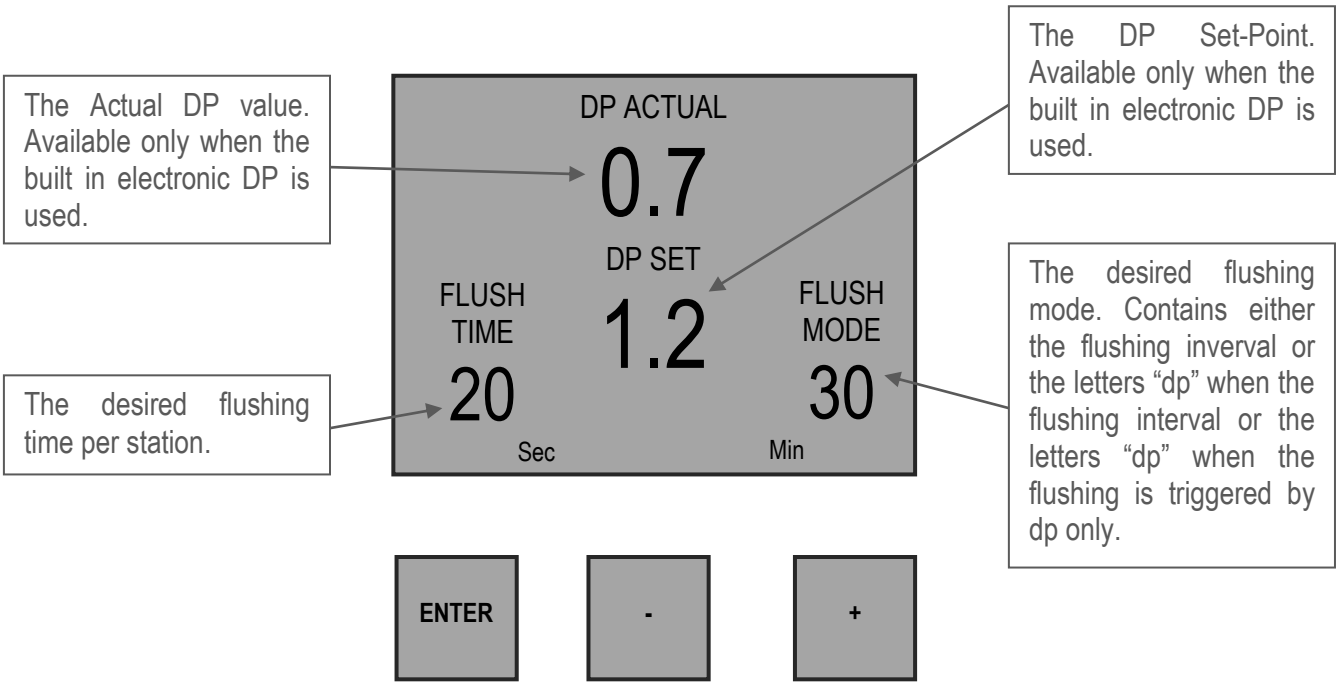
- Endless looping problems can be eliminated by detecting repeated consecutive cycles passing beyond a predefined limit.

- 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 contraller

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



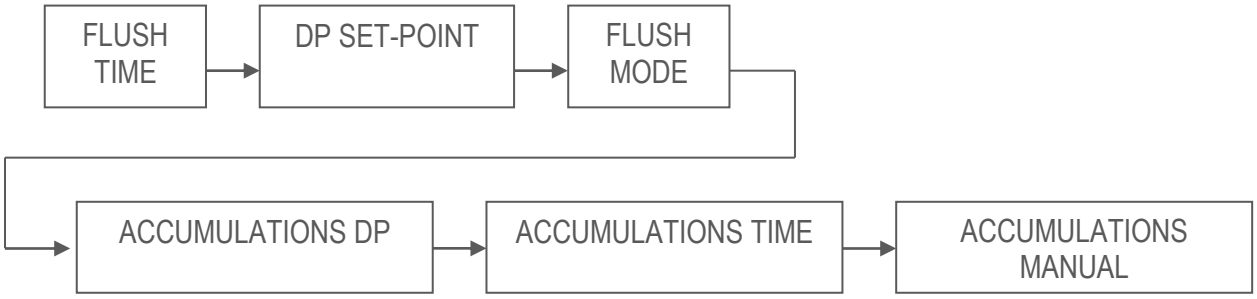
The screen consists of several fields, some of them are editable and some of them are not. For inserting **edit mode** the **enter** key has to be pushed. The **edit mode** is indicated by blinking of the characters at the currently editable field. Each time the **enter** key is pushed again, the next 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 edible fields, the user has no way back but by pushing the **enter** key repeatedly, he passes through the chain of edible 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 configuratin process is described below.

The chain of editable fields

Following is the chain of edible 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. This field appears only when the system includes the built in electronic DP sensor.

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.

When the system does not include the built in electronic DP sensor but is connected to an external DP sensor, the flushing request signal arrives in the shape of a closed dry contact.

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 3 seconds. The unit will detect how many "plug in" boards (each of 2 outputs) are used in the particular case. 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 sec
1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6 min

Dwell time - the delay between stations – 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 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 lopping 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.

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. When endless looping problem was detected, 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.

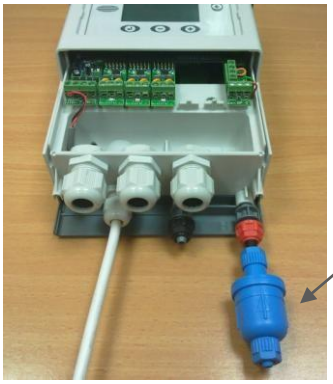
Handling Low pressure

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.

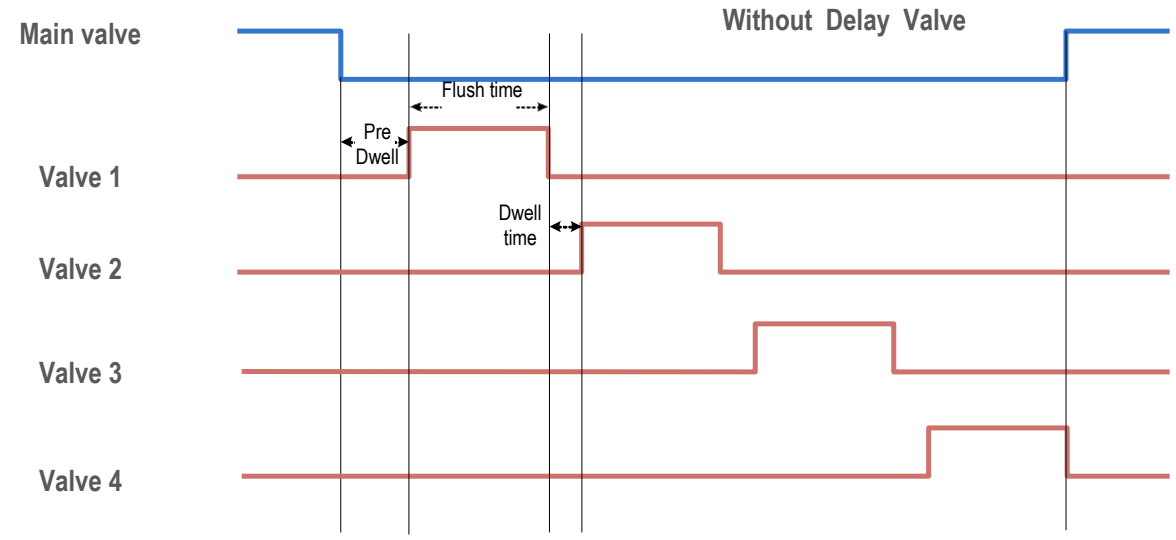
Low battery

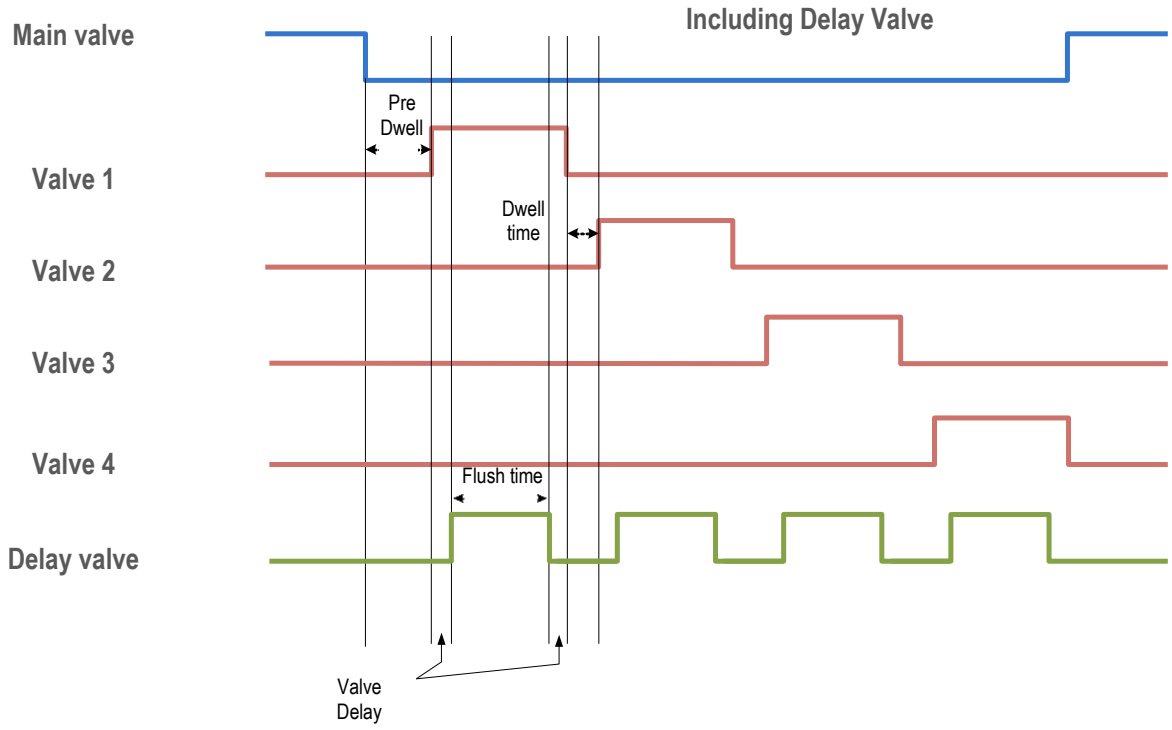
The unit has two levels of low battery indication. At the first level when the battery voltage drops to the first level, the sign will start to appear at the screen. When the battery voltage drops further and reaches the second level, all outputs will shut down, the screen will be cleared leaving only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





Wiring Diagram

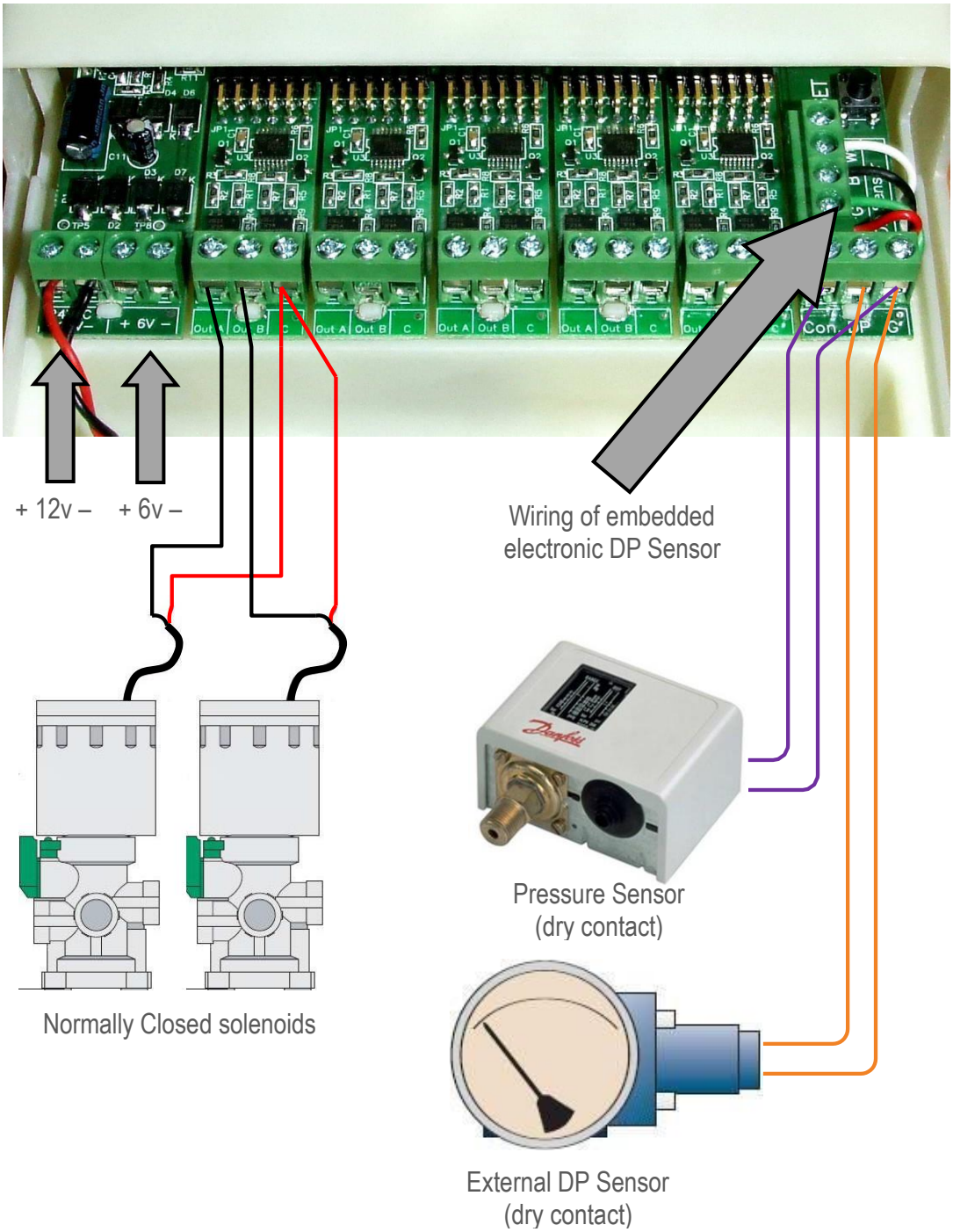
DC MODEL

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.

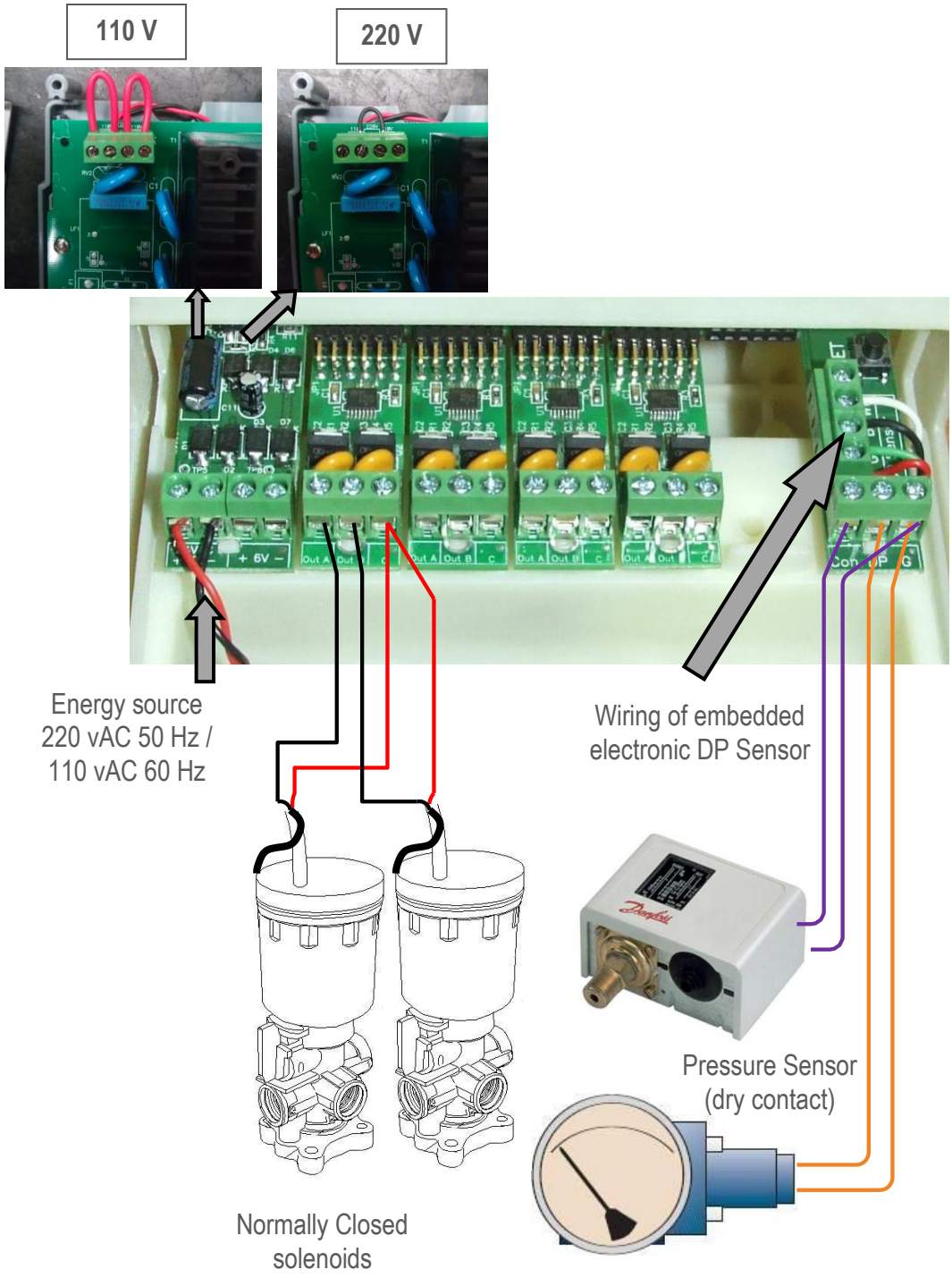
3. The solenoids will be of 12v DC latch.



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 intender for use in cases there is no Embedded Electronic DP included.
2. The powering of the unit is by 24v AC transformed from 220/110 v AC
3. The solenoids will be of 24 v AC.



External DP Sensor
(dry contact)

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 – 50 ºC

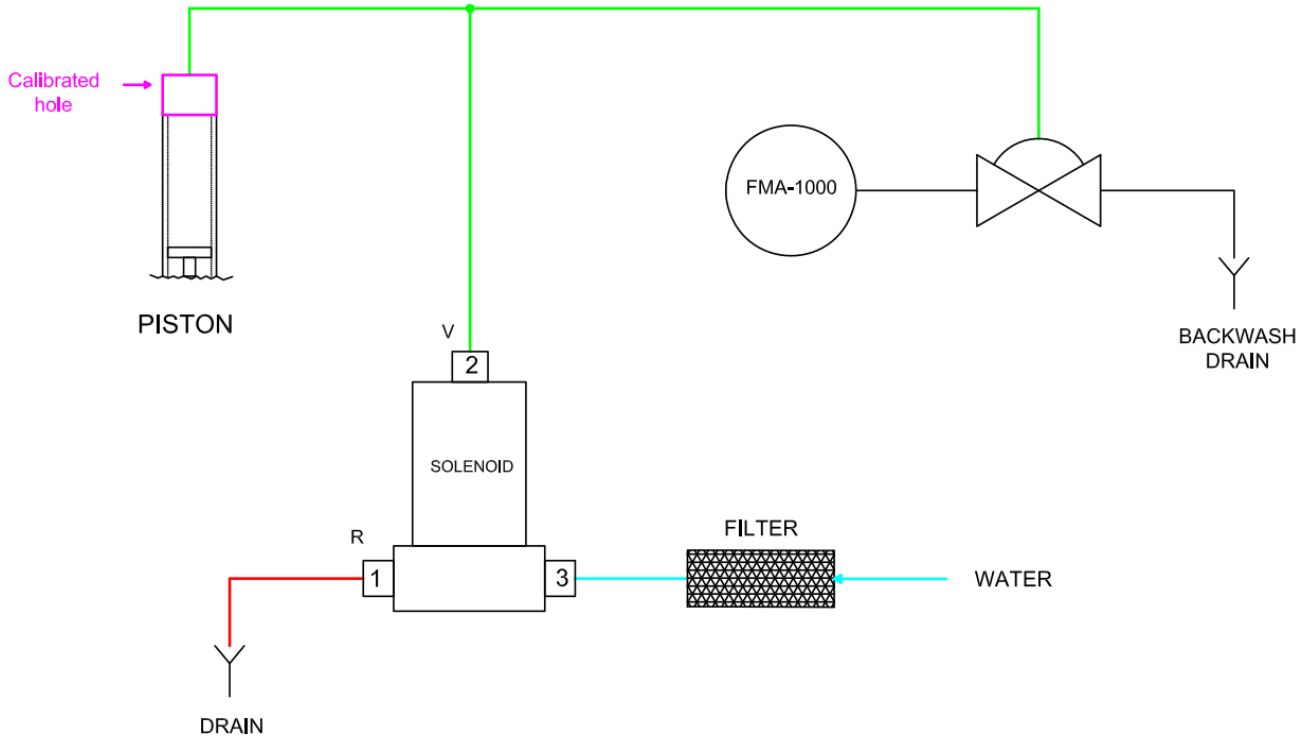
AC MODEL	
Power source	220 OR 110 v AC 50 or 60 Hz with built in transformer to 24v AC
Outputs	24v AC solenoids
DP	Embedded electronic analog DP sensor Or external dry contact DP sensor
Pressure Sensor	Dry contact pressure sensor
Operating temperature	0 – 50 ºC

VALVE WITH ONE CHAMBER

The filter has a hydraulic valve in charge of evacuating the cleaning flow. The valve remains closed when water is received in the diaphragm chamber, it proceeds to open it by evacuating water in the chamber, closing when filling the chamber.

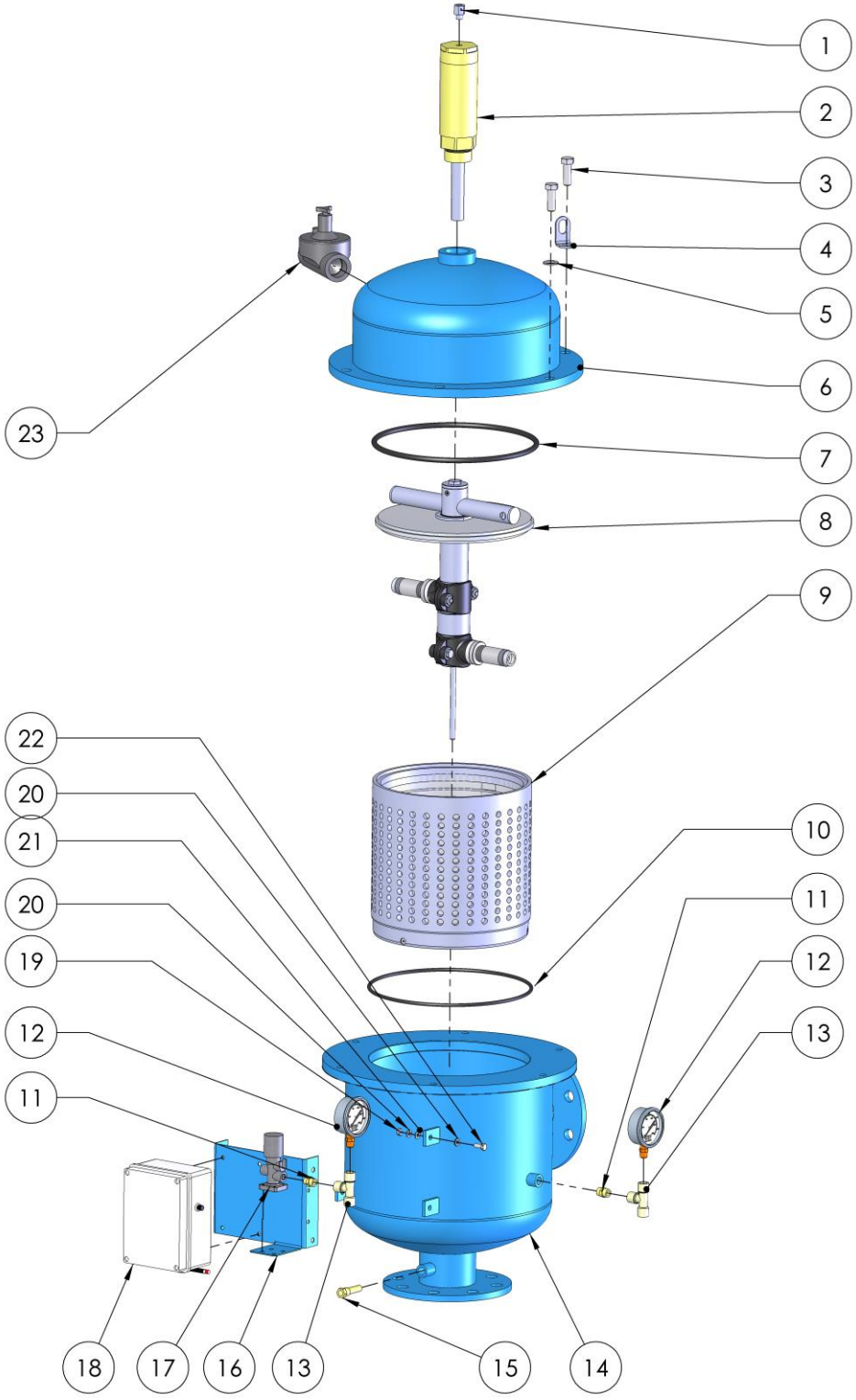
The valve has a mechanical adjustment, allowing to adjust the flow of cleaning, in installations above 6 bar pressure.

The opening and closing process is automated by a solenoid. As specified in the attached diagram.



Position	Equipment Model	Description
1	FMA-1002 - FMA-1006	Type A Calibrated Orifice
	FMA-1002 - FMA-1006	Type B Calibrated Orifice
	FMA-1002 - FMA-1006	Type C Calibrated Orifice
2		PISTON SET
2.1	FMA-1002 - FMA-1006	Piston Cap
2.2	FMA-1002 - FMA-1006	ø46x2,5 Ring
2.3	FMA-1002 - FMA-1006	NAP-300 40x30x7 Gasket
2.4	FMA-1002	Plunger
	FMA-1003 - FMA-1006	Plunger
2.5	FMA-1003	Piston stop bushing
2.6	FMA-1003	M4x6 Screw
2.7	FMA-1002	Piston Body
	FMA-1003 - FMA-1006	Piston Body
2.8	FMA-1002 - FMA-1006	EQ-16 Square gasket
2.9	FMA-1002 - FMA-1006	NI-150 20x28x5,5 Gasket
2.10	FMA-1002 - FMA-1006	ø37x4 Ring
3	FMA-1002 - FMA-1006	M12x35 Screw
4	FMA-1002 - FMA-1006	Lift Ear
5	FMA-1002 - FMA-1006	Washer M12
6	FMA-1002 / FMA-1003	Cap
	FMA-1004 / FMA-1006	Cap
7	FMA-1002 / FMA-1003	ø245x8 Ring
	FMA-1004 / FMA-1006	ø312x8 Ring
8		SCANNER SET
8.1	FMA-1002 - FMA-1006	Motor arm clamping screw
8.2	FMA-1002	Flap
	FMA-1003 - FMA-1006	Flap
8.3	FMA-1002 - FMA-1006	Guide bushing
8.4	FMA-1002 / FMA-1003	Cleaning chamber disc
	FMA-1004 / FMA-1006	Cleaning chamber disc
8.5	FMA-1002	Sliding bushing
	FMA-1003	Sliding bushing
	FMA-1004 - FMA-1006	Sliding bushing
8.6	FMA-1002 - FMA-1006	A4x12 Chipboard screw
8.7	FMA-1002	Scanner
	FMA-1003	Scanner
	FMA-1004	Scanner
	FMA-1006	Scanner
8.8	FMA-1002 / FMA-1003	Motor arm
	FMA-1004	Motor arm
	FMA-1006	Motor arm
8.9	FMA-1002 - FMA-1006	Motor arm cap
8.10	FMA-1002 - FMA-1004	Nozzle nut
	FMA-1006	Nozzle nut
8.11	FMA-1002	Nozzle
	FMA-1002	Nozzle
	FMA-1004 – FMA-1006	Nozzle
8.12	FMA-1002 - FMA-1006	M8x35 Screw
8.13	FMA-1003 - FMA-1006	Reinforced Intake Collar Top

8.14	FMA-1003 - FMA-1004	Stop bushing
	FMA-1006	Long stop bushing
8.15	FMA-1002	Centering shaft
	FMA-1003 - FMA-1006	Centering shaft
8.16	FMA-1003 - FMA-1006	M8 Nut
8.17	FMA-1003 - FMA-1006	Reinforced Intake Collar Bottom
9		FILTERING CARTRIDGE SET
9.1	FMA-1002	Filtering Cartridge …… microns
	FMA-1003	Filtering Cartridge …… microns
	FMA-1004	Filtering Cartridge …… microns
	FMA-1006	Filtering Cartridge …… microns
9.2	FMA-1002 - FMA-1006	Centering Bushing
9.3	FMA-1002 / FMA-1003	Centering Disc
	FMA-1004 / FMA-1006	Centering Disc
9.4	FMA-1002 - FMA-1006	M5 Nut
9.5	FMA-1002 - FMA-1006	M5x30 Screw
10	FMA-1002 - FMA-1003	ø248x4,5 Ring
	FMA-1004 - FMA-1006	ø315x5 Ring
11	FMA-1002 - FMA-1006	1/4" Male
12	FMA-1002 - FMA-1006	Gas 1/4" Male Glycerine Gauge
13	FMA-1002 - FMA-1006	TE 1/4" Socket
14	FMA-1002	Body
	FMA-1003	Body
	FMA-1004	Body
	FMA-1006	Body
15	FMA-1002 - FMA-1006	1/4" Water Intake Filter
16	FMA-1002 - FMA-1006	Electrical Box Support
17	FMA-1002 - FMA-1006	Latch Solenoid (battery box)
	FMA-1002 - FMA-1006	NO 24v 50Hz Solenoid (220v box)
18	FMA-1002 - FMA-1006	BATTERY box with differential pressure switch
	FMA-1002 - FMA-1006	220v Electrical box with differential pressure switch
19	FMA-1002 - FMA-1006	M6 Nut
20	FMA-1002 - FMA-1006	M6 Washer DIN 125
21	FMA-1002 - FMA-1006	M6 Washer DIN 127
22	FMA-1002 - FMA-1006	M6x15 Screw
23	FMA-1002 - FMA-1006	Gas 1" S-200 Globe Valve
	FMA-1002 - FMA-1004	Gas 2" S-200 Globe Valve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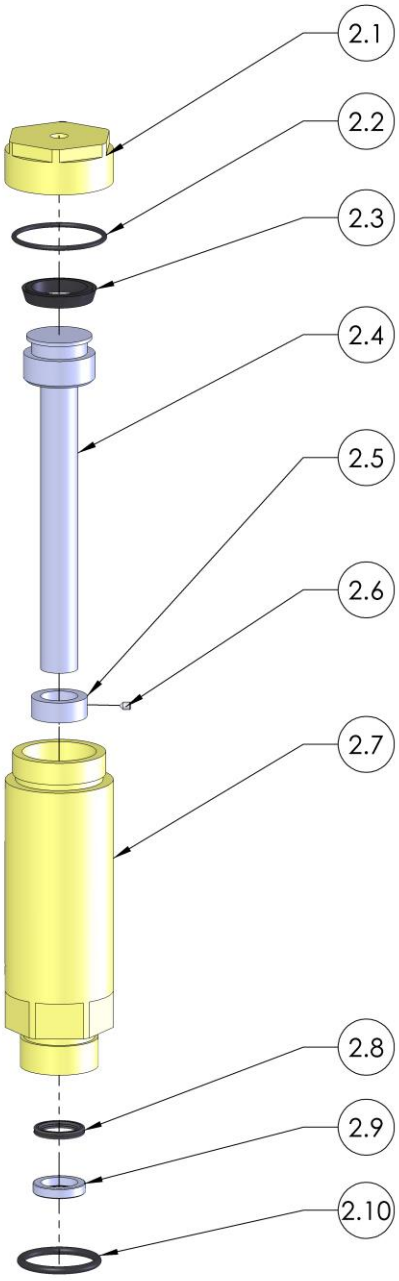
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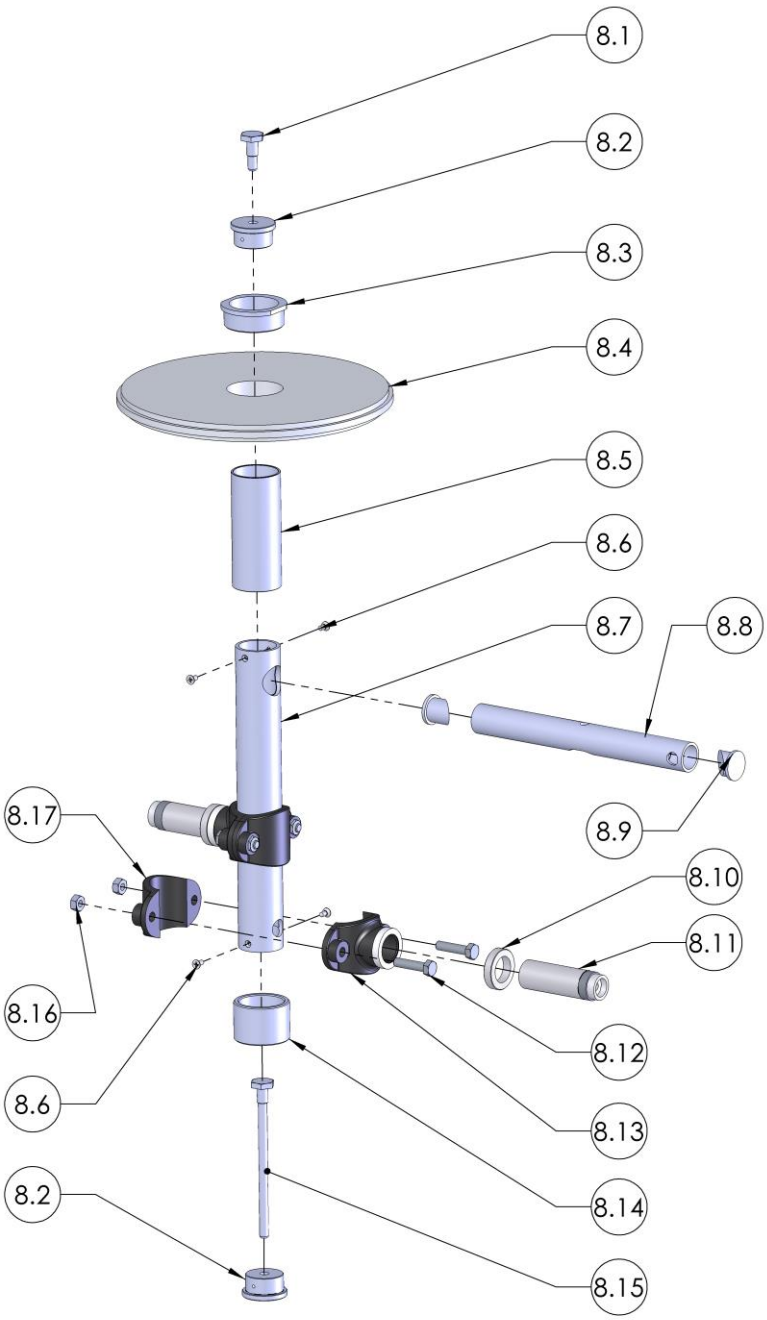
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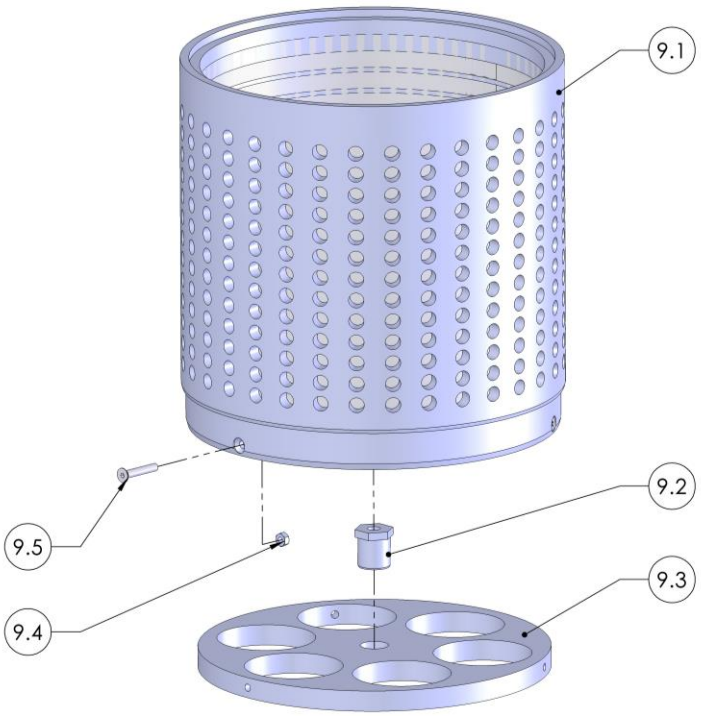
9.1
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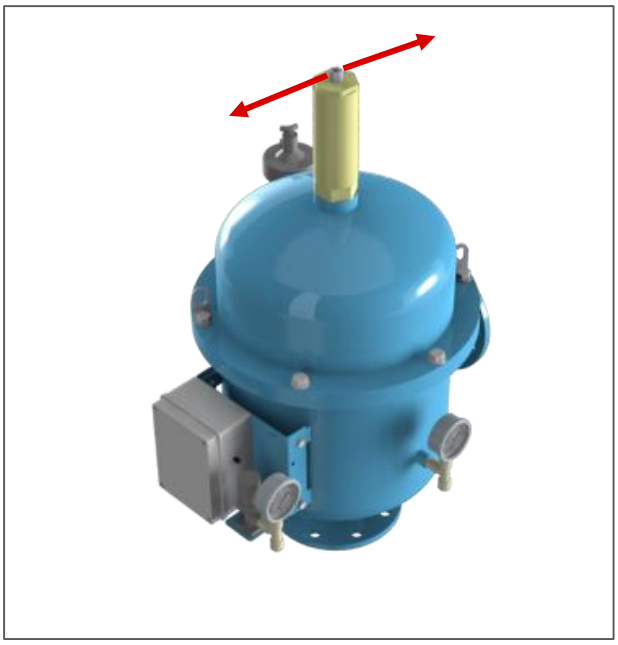
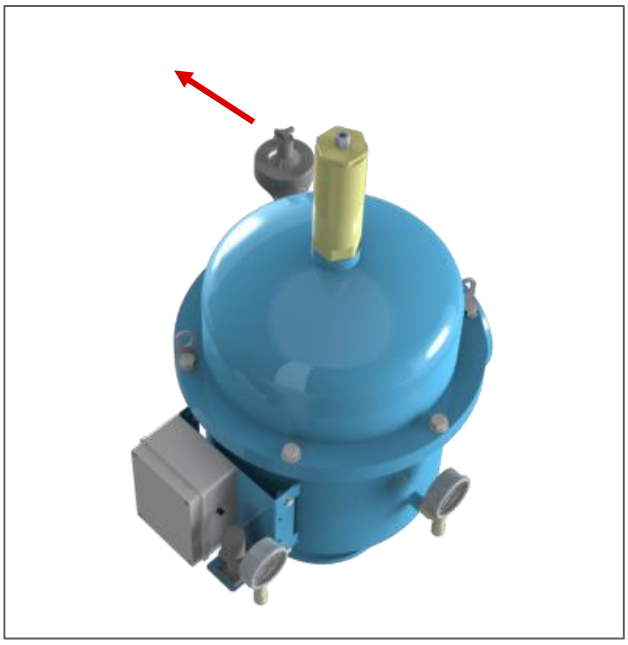
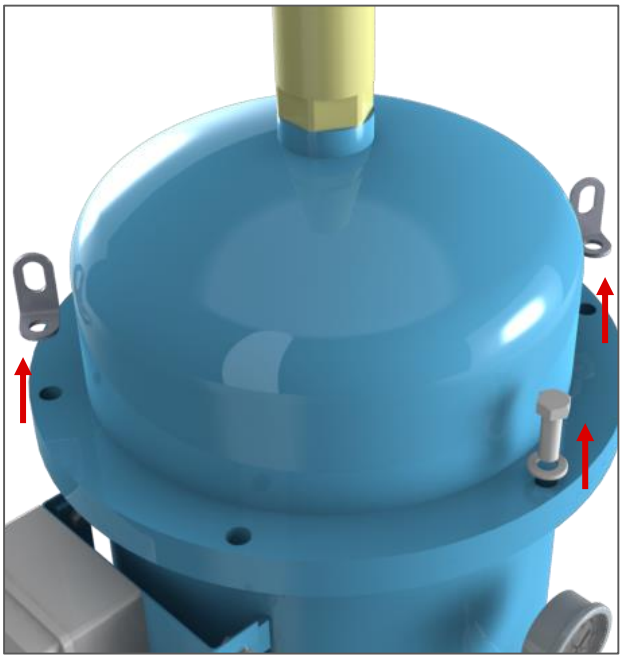


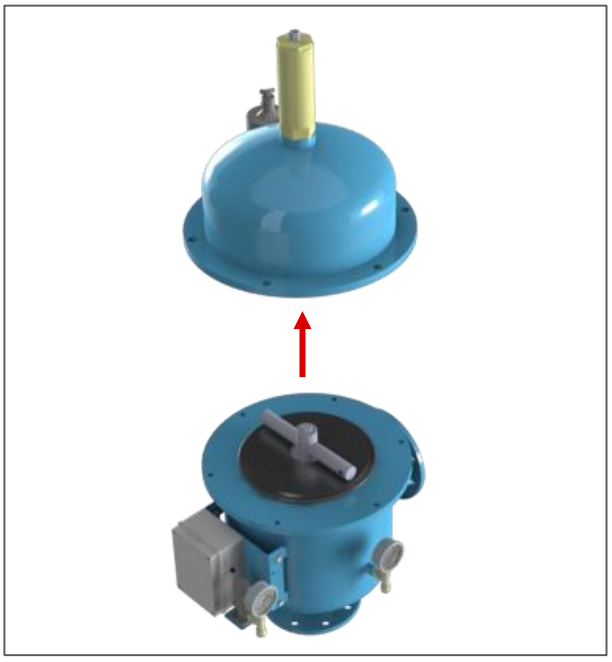
1 Remove the piston tubes 2.



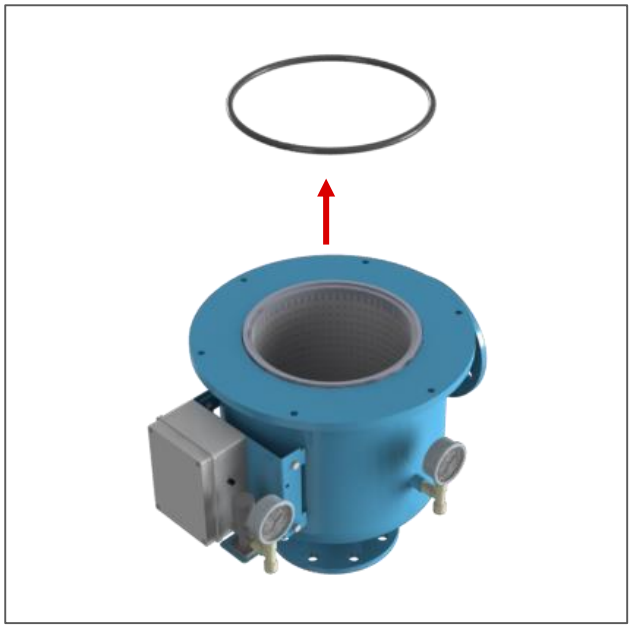
2 Disconnect the drain pipeline from the valve 23.



3 Remove screws, washers and lugs 3, 4, 5 from the cover.



4 Remove the cover 6.



5 Remove the O-ring 10.

6 Remove the scanner 8.

7 Remove the filtering cartridge 9.

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