amiad FILTRATIONSYSTEMS

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AMIAD Automatic Filters

Filtomat M100-6800 Series

Models: M104XLP, M106XLP, M108LP, M110P
Hydraulically-Controlled

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

Installation, Operation and Maintenance Instructions

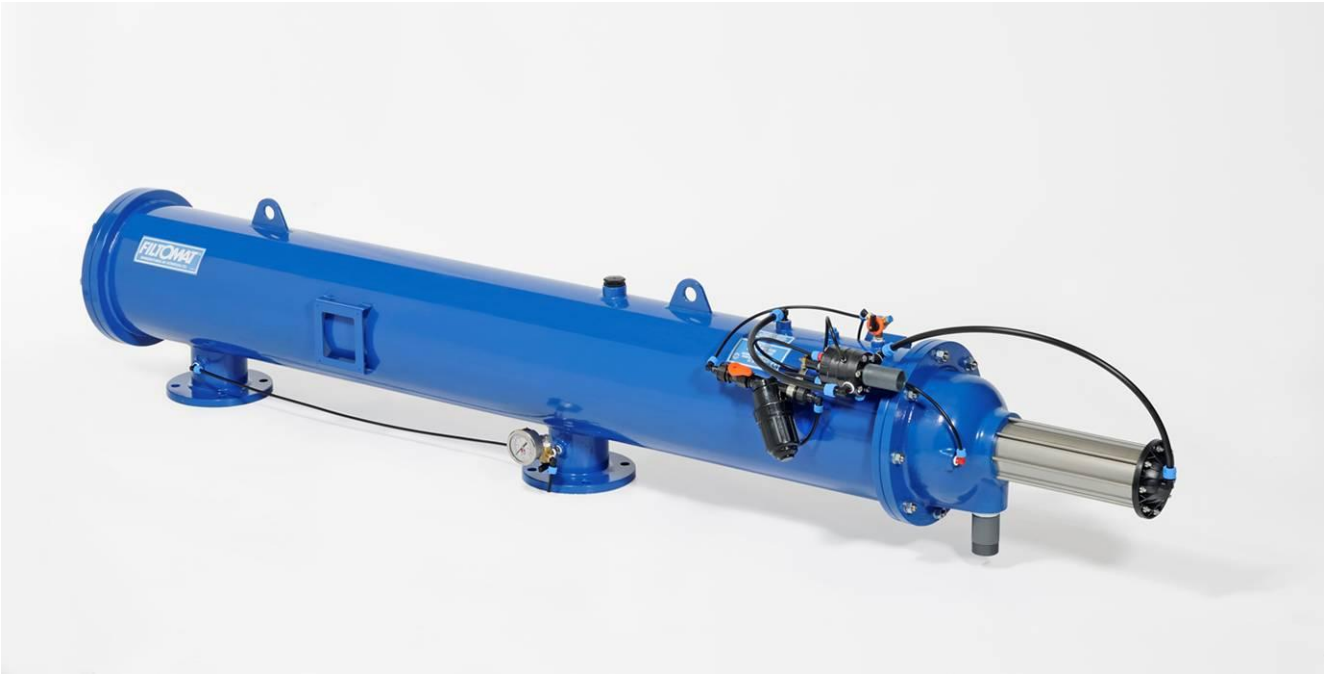
October 2009

Ref. 95-046-610-403/10.2009

Amiad Automatic Filters

M100-6800 Series
Models: M104XLP, M106XLP, M108LP, M110P Hydraulically-Controlled

This document is the user-manual of the Filtomat M100 Hydraulically Controlled Series and it describes the installation, the operation and the maintenance procedures of the filters.



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

SPECIFICATIONS

General

Maximum flow rate		400m^3/h; 1760USgpm	Consult manufacturer for optimum flow depending on filtration degree & water quality.
Min. working pressure		2.5bar; 38psi	
Max. working pressure		10bar; 150psi	
Filter area	Flat screen	4600cm^2; 713in^2	
	Molded screen	6300cm^2; 976in^2	
Inlet/Outlet diameter		100,150,200, 250mm; 4", 6", 8", 10"	Flange standards as per request.
Max. working temperature		60^{0}C; 140^{0}F	
Empty / Full weight – M104XLP		121kg / 225kg; 270lb / 500lb	
Empty / Full weight – M106XLP		131kg / 241kg; 290lb / 535lb	
Empty / Full weight – M108LP		151kg / 330kg; 335lb / 735lb	
Empty / Full weight – M110P		170kg / 362kg; 375lb / 805lb	

Flush data

Exhaust valve	40 mm; 11/2"	
Flushing cycle time	15 seconds	Depending on the working pressure
Wasted water per cycle	125liter; 35USgallon	at 2bar; 30psi
Minimum flow for flushing	30m^3/h; 130USgpm	at 2bar; 30psi
Flush criteria	Differential pressure of 0.5 bar; 7psi 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 (St. St. 316 available on request)
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, Acetal

Filtration degrees available

Type	Molded screen						Flat screen							
micron	500	300	200	130	100	80	800	400	200	150	130	100	80	50
mm	0.5	0.3	0.2	0.13	0.1	0.08	0.8	0.4	0.2	0.15	0.13	0.1	0.08	0.05

SAFETY INSTRUCTIONS

General

- Carefully read the installation and operation instructions prior to installation or handling of the filter.
- While working with 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.
- Note that the filter may begin a flush cycle automatically, without prior warning.
- No changes or modifications to the equipment are permitted without written consent provided by the manufacturer or by its representative, on the manufacturer's behalf.

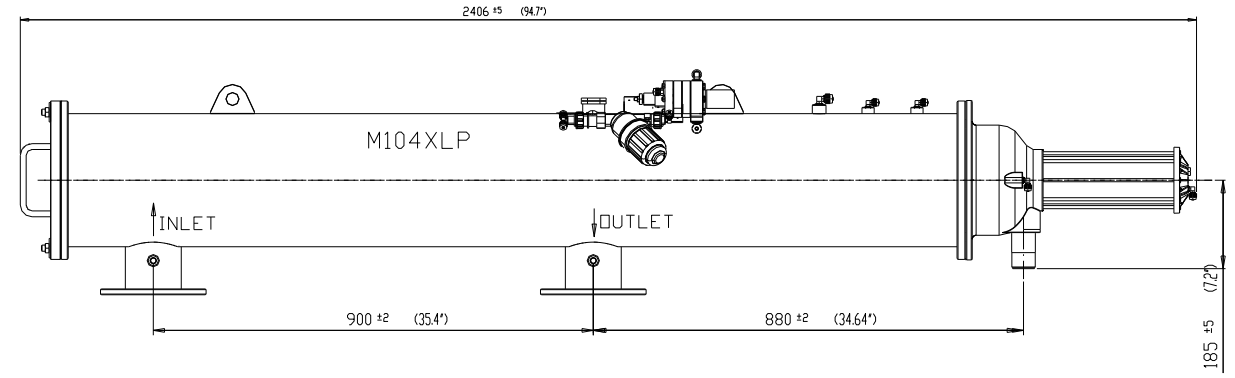
Operation, Control and Maintenance

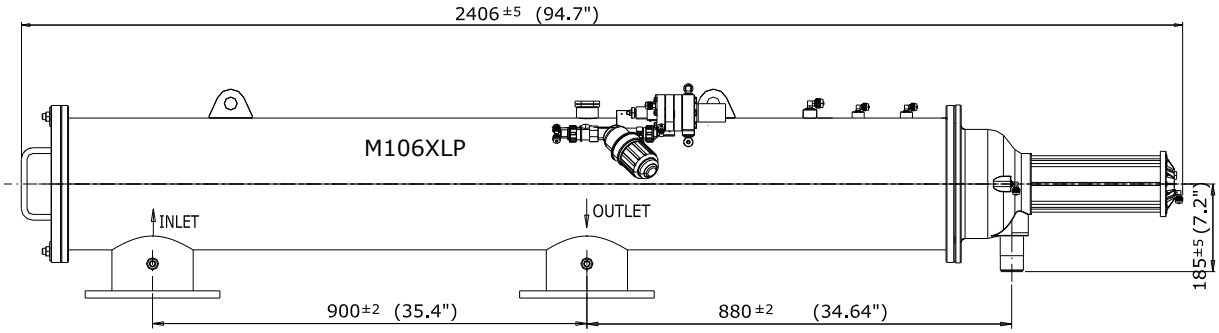
- Loosening or unscrewing bolts should be done only after the pressure in the filter has been released.
- Avoid splashing and water leakage in order to reduce danger of slipping, electrical danger or damage to the equipment caused by moisture.
- Always open and close valves gradually.
- Remove grease and fat material residues in order to avoid slipping.
- Manual cleaning of filter element using high water pressure or steam should be performed in accordance with the cleaning system instructions and without endangering the operator or his working area.
- Manual cleaning of filter element using acid or other chemical agents should be performed in accordance with the relevant material safety instructions and without endangering the operator or his working area.

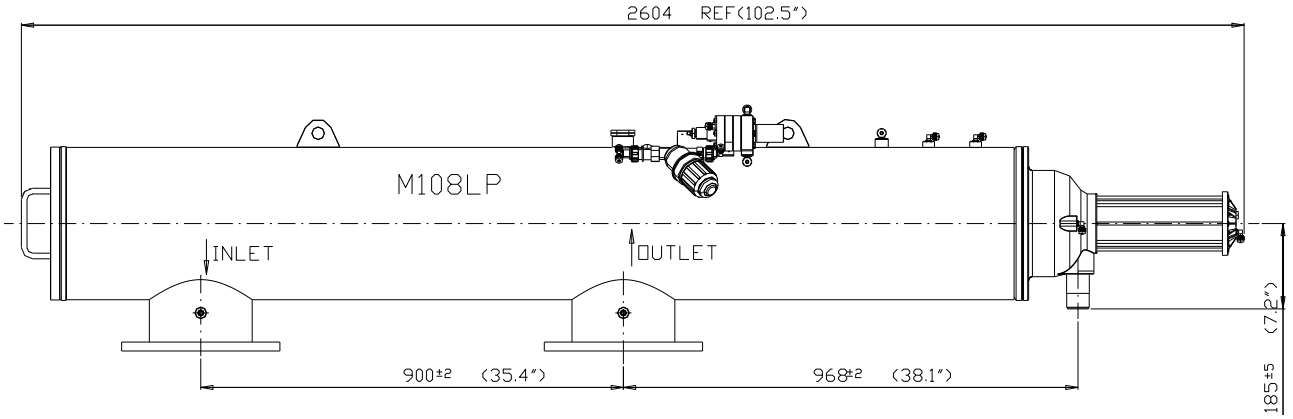
Use of Lifting Equipment

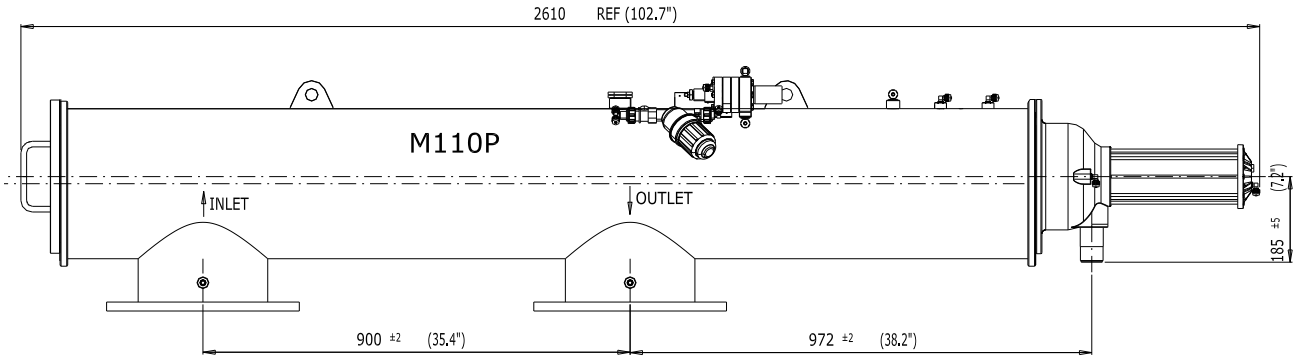
- While using lifting equipment, make sure that the filter or the lifted part is chained securely and in a safe manner.
- Avoid working below lifted equipment.
- Wear a safety helmet while using lifting equipment.

DIMENSIONAL DRAWING









INTRODUCTION

The **FILTOMAT M100-6800 Series** are sophisticated, yet easy-to-operate automatic filters, with a self-cleaning mechanism driven by a hydraulic turbine. The **FILTOMAT M100-6800 Series** is designed to work with various types of screens in filtration degrees from 800 to 50 micron, and is available in 4", 6", 8" and 10" inlet/outlet diameter.

The **FILTOMAT M100-6800 Series** filters are configured to meet your specific needs according to flow rates and water quality. These filters can be installed as stand-alone units 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 a simple connection to the inlet and outlet and to the drain.

General Description

Water enters the filter through the inlet pipe and passes through a coarse screen which is designed to protect the cleaning mechanism from large dirt particles. It should not accumulate large quantities of suspended solids and is not cleaned automatically. The water then flows through a fine screen that filters out the smaller particles. Clean water then flows from the filter through the outlet. The particles form a "filtration cake" which accumulates on the fine screen surface. The cake build-up increases the pressure differential across the fine screen, and at a pre-set value (0.5bar; 7psi) the automatic self-cleaning cycle begins. Clean water continues to flow through the outlet. The clean water flow is maintained during this backflush cycle. Suction nozzles sweep across the surface of the fine screen pulling debris off and exhausting it out of the drain port.

This innovative self-cleaning process, utilizes the backflush technique and dirt collector to effectively remove the dirt particles from the fine screen, and provide an uninterrupted downstream flow during the cycle.

The **M100-6800 Series** filters are hydraulically operated units. No external power source is required. This type of control enables operation at remote installation sites. Alternatively, where electricity is available, an electronic controller can also be incorporated into the filter.

Self-Cleaning Cycle

The automatic flushing cycle described below takes a few seconds and does not interrupt the supply of process water.

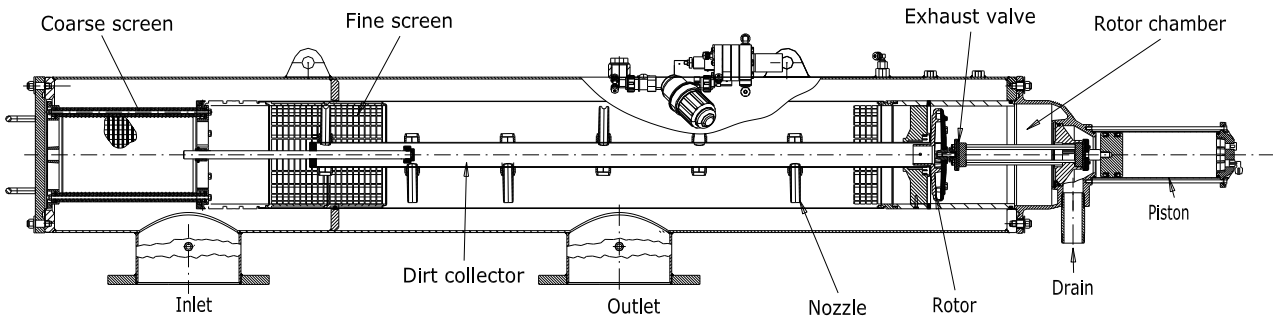
Water flows from the inlet through the coarse and fine screens to the outlet. At a pre-set pressure differential (0.5 bar —7 psi), the rinse controller activates the piston and opens the flushing valve. The water from the rotor chamber flows out the drain. The pressure in the rotor chamber drops, releasing a strong flushing stream that flows through the filter.

This drop in pressure and corresponding release of the backflush stream create suction at the nozzle tips. This effect actuates spot cleaning directly in front of the openings of each nozzle on the inner surface of the fine screen. The water and particles passing through the hydraulic rotor cause the dirt collector 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 dirt collector assembly ensures that the nozzles sweep the entire inner surface of the fine screen.

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

This self-cleaning process takes between 8–15 seconds, depending on the operating pressure.



INSTALLATION

Read these instructions carefully before installing and operating the filter.

Design Recommendations

- 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.
- The upstream pressure source should not drop below 38 psi (2.5 bar) during the rinse cycle. If this cannot be ensured, consult the manufacturer.
- 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.
- Avoid placing the drainage pipe on a rising slope to minimize backpressure.
- Secure the open end of the drain pipe to prevent movement during the rinse cycle.
- It is recommended to install a mechanical non-return valve downstream of the filter to prevent backflow damage to the screen.
- It is recommended to install a pressure gauge on the three-way valve.
- Check that there is sufficient space to remove the cover assembly and the screen from the filter for troubleshooting.

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 Procedure

Ensure the direction of flow is according to the arrows marked on the filter housing.

1. Connect a minimum of 3" (75 mm) pipe to the exhaust valve. The exhaust pipe should be designed so that it creates minimal resistance to flow of 20 m3/h (88 US-gpm). Water should be allowed to flow to atmosphere freely from the exhaust pipe.
2. Connect a minimum of 1" (25 mm) flexible tube to the rinse controller drain port. Ensure this drain line is open to atmosphere.

IMPORTANT!!

- **Prevent static back pressure or reverse flow through the filter.**
- **Install a manual or a hydraulic valve downstream of the filter.**

NOTE: The filter may enter flushing mode automatically, without prior warning.

PREPARATIONS

Before using the filter for the first time, go through the following check-list carefully. No special training is required to carry out these activities.

- Check that the upstream pressure at the filter inlet is more than 2.5 bar (38 psi) during the rinse cycle.
- Check that the filter is mounted in the correct flow direction.
- Check that all the control tubes are connected properly and that all connections are tight.
- Check that the three-way mini-valve is turned to the automatic position. The arrow on the knob should point to AUTO, and the sticker **O** on the filter.
- The nominal diameter of the drainpipe should be at least 3" (75mm).
- If the recommended upstream and downstream isolation valves have been installed, check that they are shut.

GETTING STARTED

First operation of filter

After completing the preparation check-list above, perform the following steps:

1. Slowly open the isolating valve at the filter inlet. Water will flow into the filter.
2. Check for leaks and repair if necessary.
3. Check that the minimum inlet pressure remains 2.5bar (38psi) or higher.
4. Slowly open the isolating valve at the outlet of the filter.
5. If there is a by-pass valve, close it slowly.
6. Ensure the flow through the filter does not exceed the filter's published maximum flow rate.
7. Start a manual flush by turning the three-way valve to the **OPEN** position for a few seconds, and then turn it back to **AUTO**.
8. During the self-cleaning cycle, check the pressure at the filter inlet and in the rotor chamber.

   NOTE: The minimum pressure in the rotor chamber should be 1.5bar (22psi) lower than the inlet pressure.

TROUBLESHOOTING

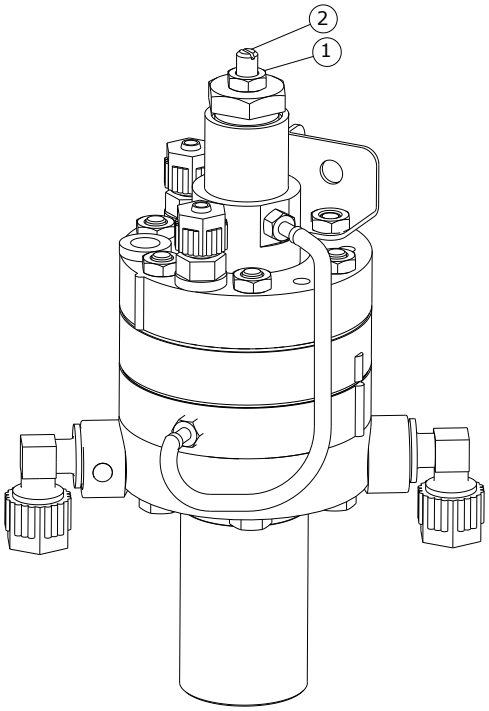
Problem	Possible Cause	Solution
The filter does not flush	Valves are closed	Open valves
	Pressure differential is not correct	Perform a manual flush as follows: 1. Close the filter outlet valve 2. Check that the filter outlet and inlet pressures are equal 3. Perform a manual flush as in item 7, page 9. 4. Check the pressures at the inlet valve and in the rotor chamber
	Rinse controller dripper blocked	Change dripper
	Rinse controller has been adjusted incorrectly	Check and readjust screw on rinse controller (see below)
Excessive pressure in the rotor chamber	Drain pipes are not clear	Check if drain lines are clear. If necessary replace with a larger (diameter) flush drain line, or shorten the existing lines.
Insufficient inlet pressure (less than 2 bar—30 psi)	Inlet valves not fully open	Open inlet valves to maximum. Increase the inlet pressure or throttle the outlet to increase pressure during the flush cycle.
Pressure differential exceeds 0.7 bar (10 psi) during normal operation	Coarse filter is blocked	Check coarse filter
	Rinse controller needs adjusting	Adjust rinse controller (see below) Check for blockage at high pressure sensor connection.
Water does not flow through the filter	Inlet lines blocked	Check inlet lines
	Isolating valves are closed	Open isolating valves

ADJUSTING THE RINSE CONTROLLER

NOTE: Improper adjusting of the rinse controller may cause the filter to malfunction.

1. Disconnect the rinse controller drain line.
2. Loosen the locking nut on the long nose (1) and loosen (CCW) the adjusting screw (2) until a flush cycle begins.
3. Turn the adjusting screw (2) clockwise 1.5 times, and then tighten the locking nut (1). This adjusts the rinse controller for a differential pressure of 5m (7psi).
4. Observe at least one automatic self-cleaning cycle, if possible.

The rinse controller is originally pre-set for a differential pressure of 0.5bar (7psi).



MAINTENANCE

NOTE: Depressurize the filter before maintenance (close inlet, and then outlet valve).

Checking the Filter

1. Remove the filter cover by unscrewing the fastening nuts.
2. Extract the fine screen and clean if necessary. Cleaning may be performed by hosing the screen from outside-in, and/or with a nylon brush.
3. Check the coarse screen and clean if necessary.
4. Check the O-rings of the fine screen and apply grease, if necessary.
5. Reassemble the fine screen.

   NOTE: Check that the dirt collector shaft is properly aligned in the bearing.
6. Return the cover and fasten the nuts.
7. Perform **First Operation of Filter** as on page 10.

Winterization

Filter operations should be suspended in climates where the filter is exposed to freezing temperatures.

1. Check that the outlet isolating valve is closed and perform two manual rinses.
2. Close the inlet valve to the filter and release the pressure.
3. Remove all drain lines from the valves and rinse controller. These should be drained of water and re-connected.
4. Remove the following items from the filter and store in a dry place:
   - Top cover assembly
   - Coarse and fine screen assembly
   - Rinse controller
5. Apply grease to the O-rings of the fine screen before storing.

At the beginning of the operation season, reassemble the filter elements and check **Preparations** (on page 10) and **First Operation of Filter** (page 10).

SERVICING

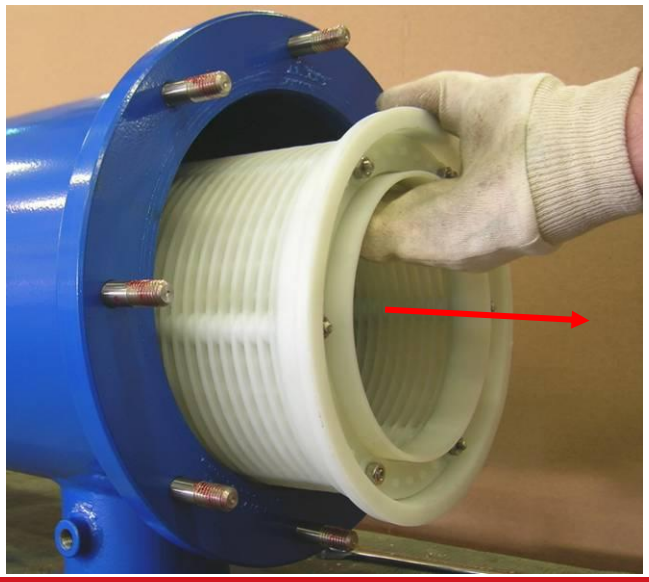
Draining the Filter

1. Close the filter's upstream (inlet) valve.
2. Close the filter's downstream (outlet) valve and isolate the filter from the water system.
3. Use the manual start function of the electronic flushing controller and start a flushing cycle to release the pressure of the filter housing.

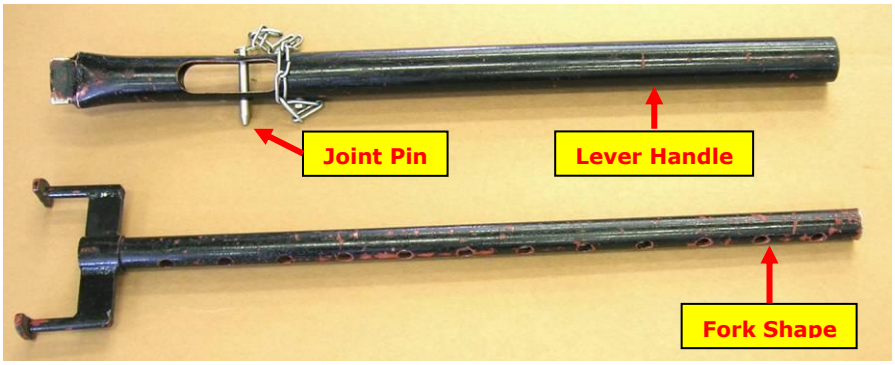
Removing the Screen and the Dirt Collector

1. Drain the filter as described above.
2. Remove the filter cover nuts and the cover. **Note: Attempting to remove the screen from the piston-side of the filter will cause damage to the system.**

3. Pull the coarse screen out of the filter housing.



4. Pull the fine screen out of the filter housing. If it is difficult to release the screens use Amiad's Push Pull Tool (Catalog Number 15-3000-0011) to extract the screen by performing the following procedure:
   A. Assemble the tool by inserting the fork shape part into the lever handle.
   B. Insert the fork shape part over the dirt collector shaft.
   C. Turn the tool clockwise till the fork teeth catch the fine screen handle.
   D. Lay the tip of the tool's lever handle on one of the filter's housing cover bolts (in order not to damage the filter paint coating) and secure the joint pin.
   E. Pull the handle firmly to release the screen.
   F. Pull the screen out of the filter housing.



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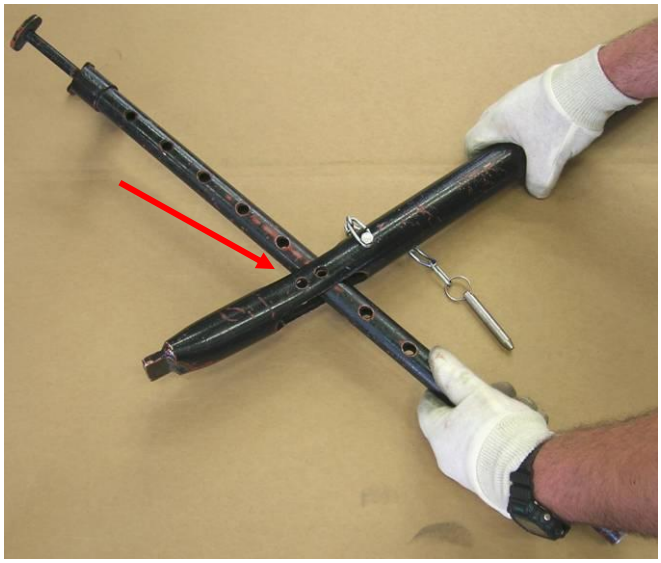

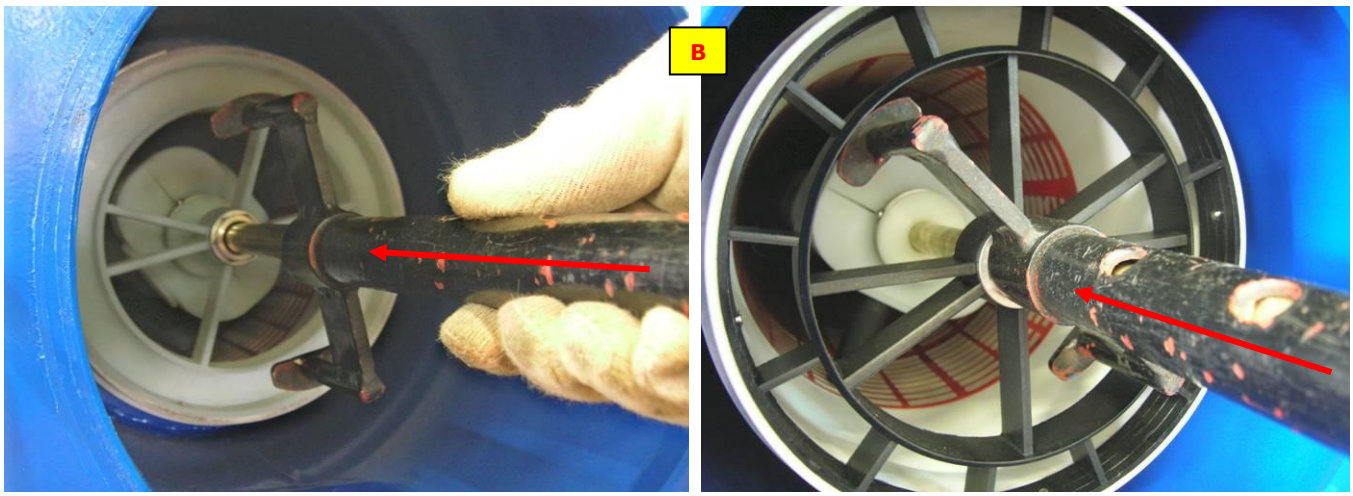
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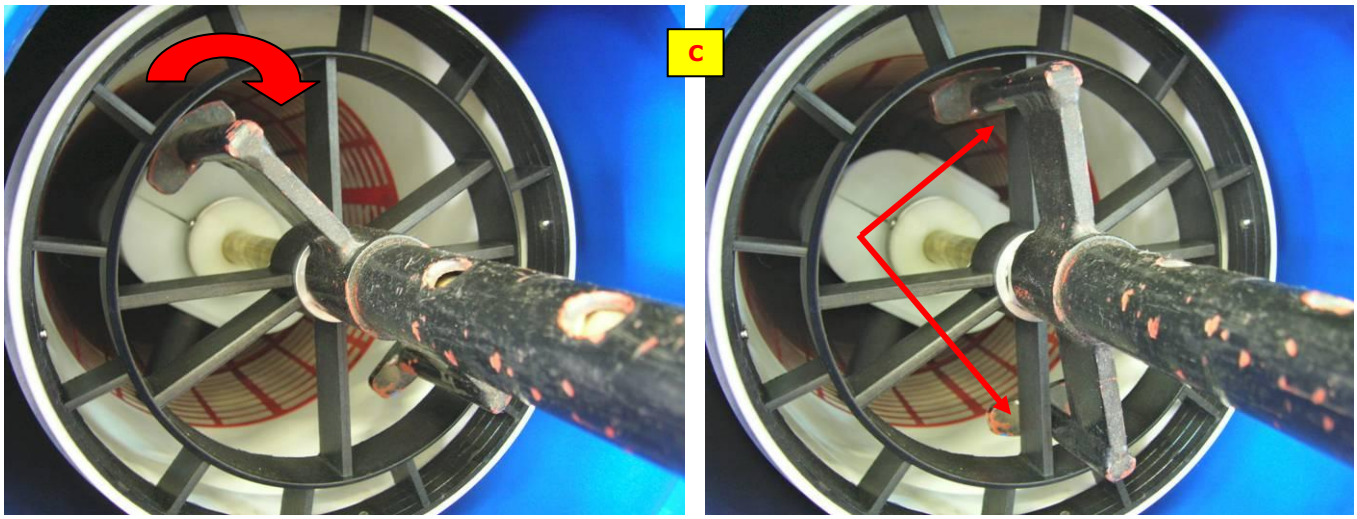
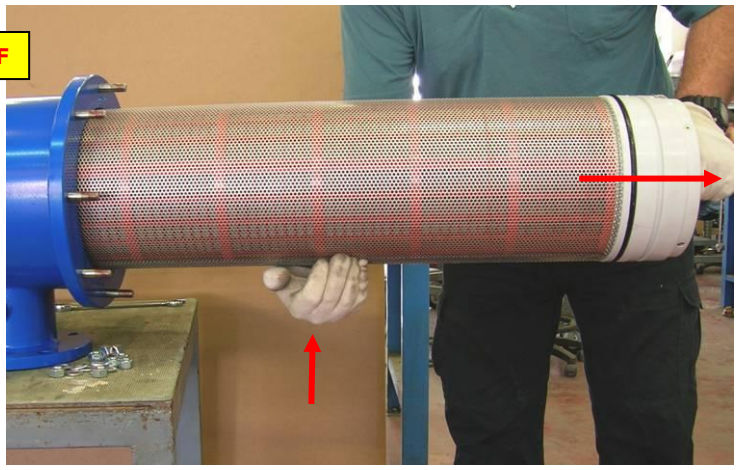
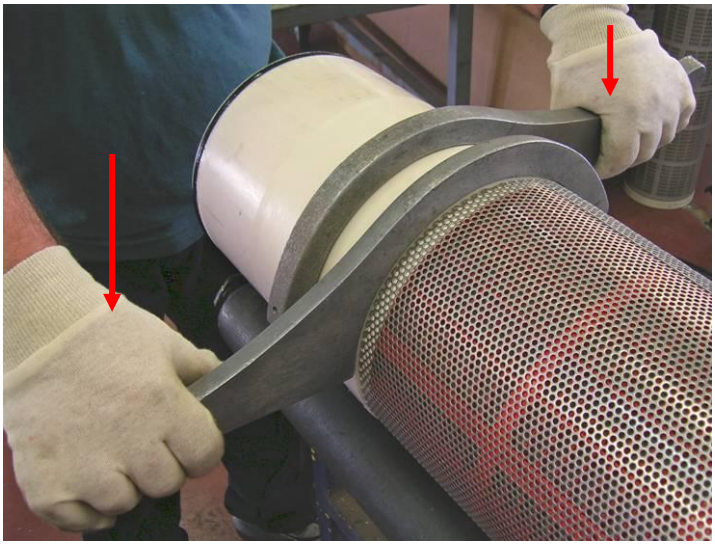
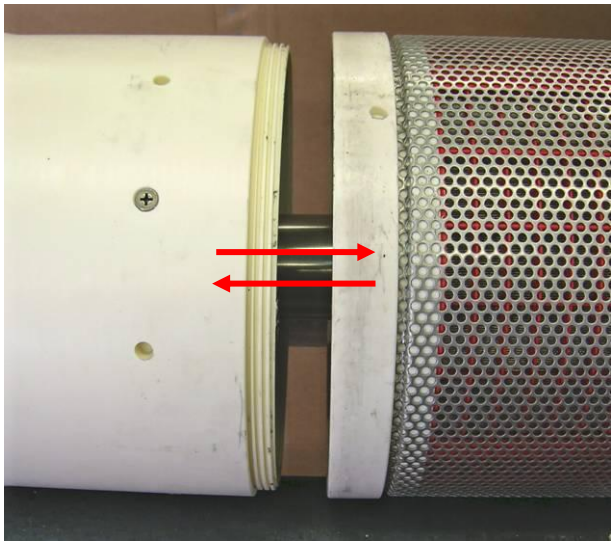

C

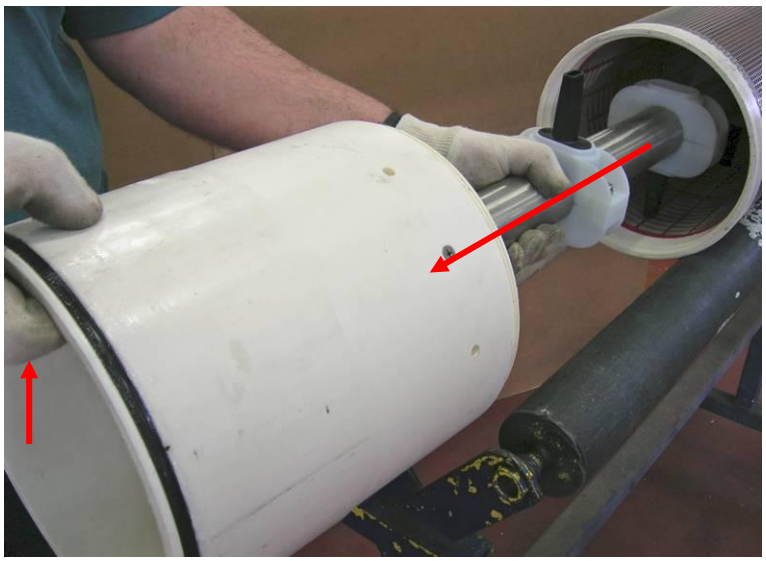

D
E



5. Depending on the actual diameter of your filter use two units of Amiad's Screen Separation Tool (Catalog Number 65-9999-0203 for 2"-8", 65-9999-0204 for 10"-12" or 65-9999-0205 for 14"-16" filters) to separate the Chamber Flat Screen and the Dirt Collector from the Fine Screen.

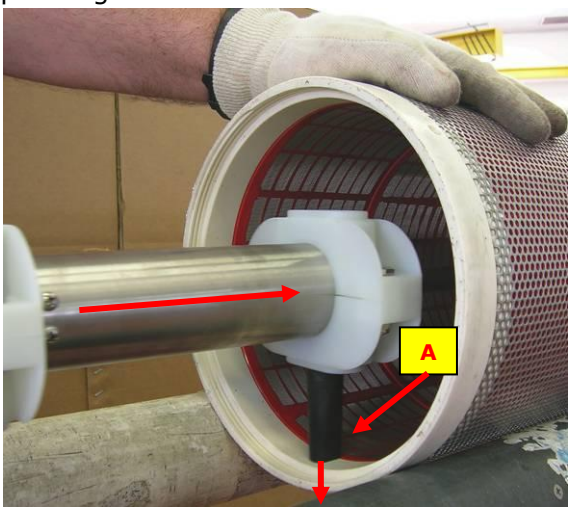




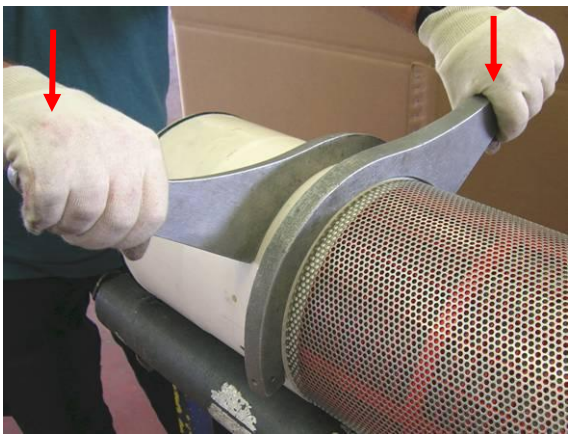


Re-installing the Screen and the Dirt Collector

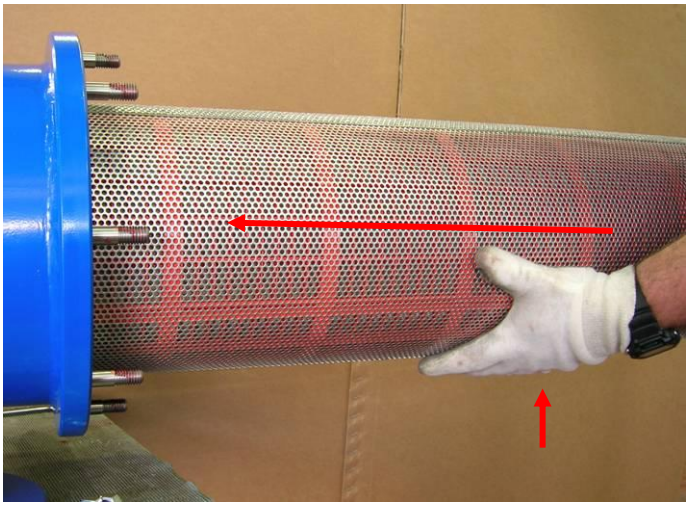
1. Insert the Dirt Collector to the Fine Screen. Make sure that the first suction nozzle of the Dirt Collector (A) is pointing downwards when inserted into the Fine Screen.

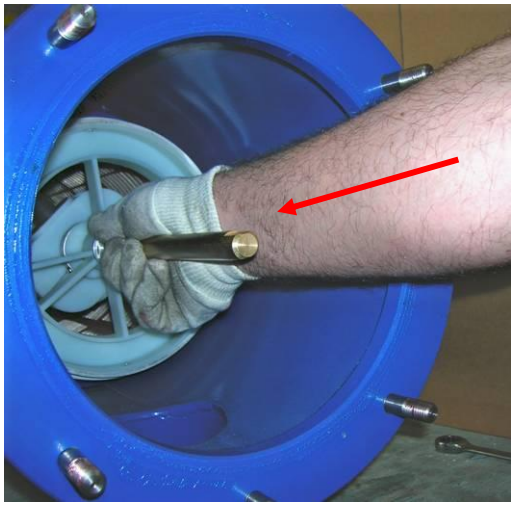


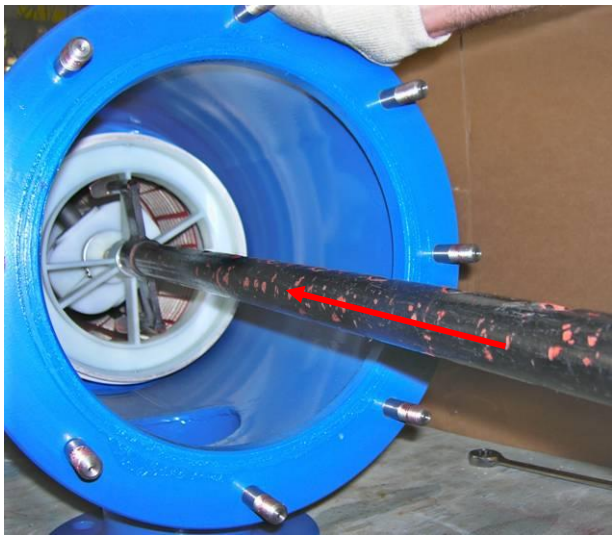
2. Use the two Amiad's Screen Separation Tools to reconnect the Chamber Flat Screen and the Fine Screen.

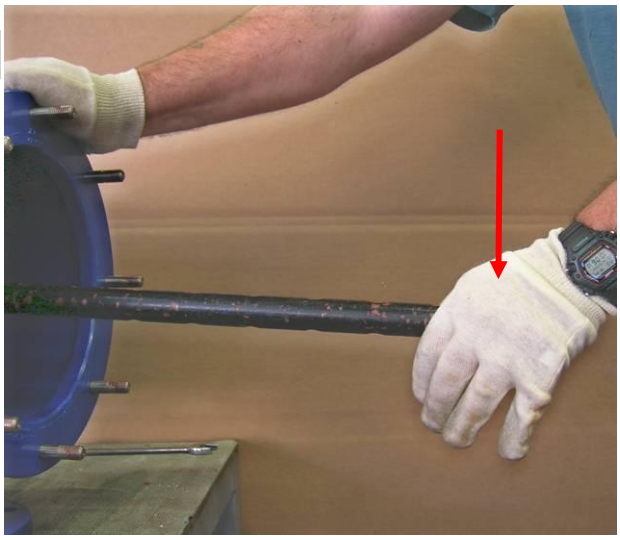


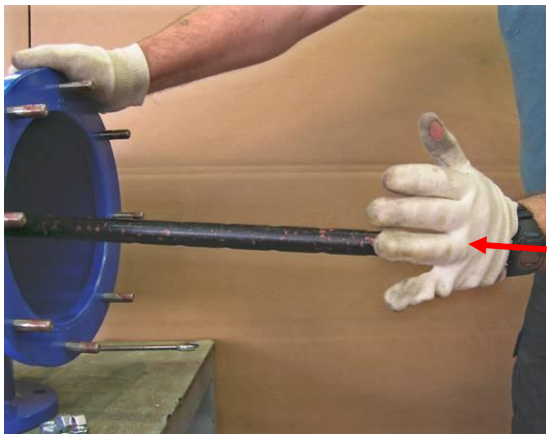
3. Insert the fine screen back to the filter housing (A). Use the fork part of the Push Pull Tool to lift the screen and push it through the last few centimeters till it is correctly seated in the filter housing (B).



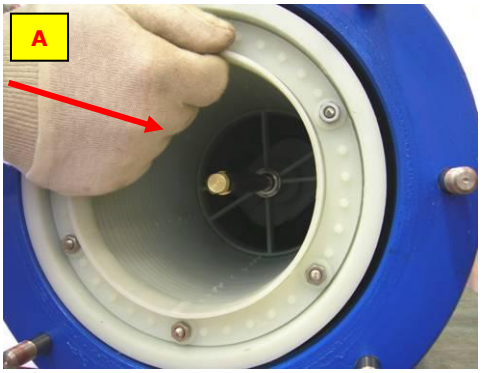


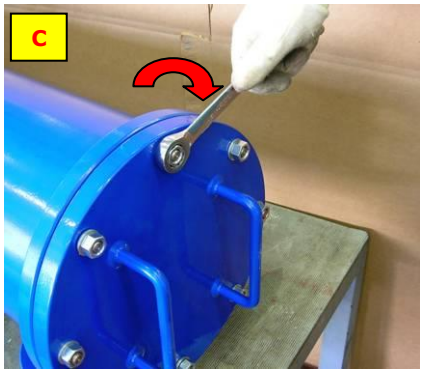






4. Insert the Coarse Screen back to the filter housing (A), install the filter's cover (B) and re-tighten the cover bolts nuts (c).



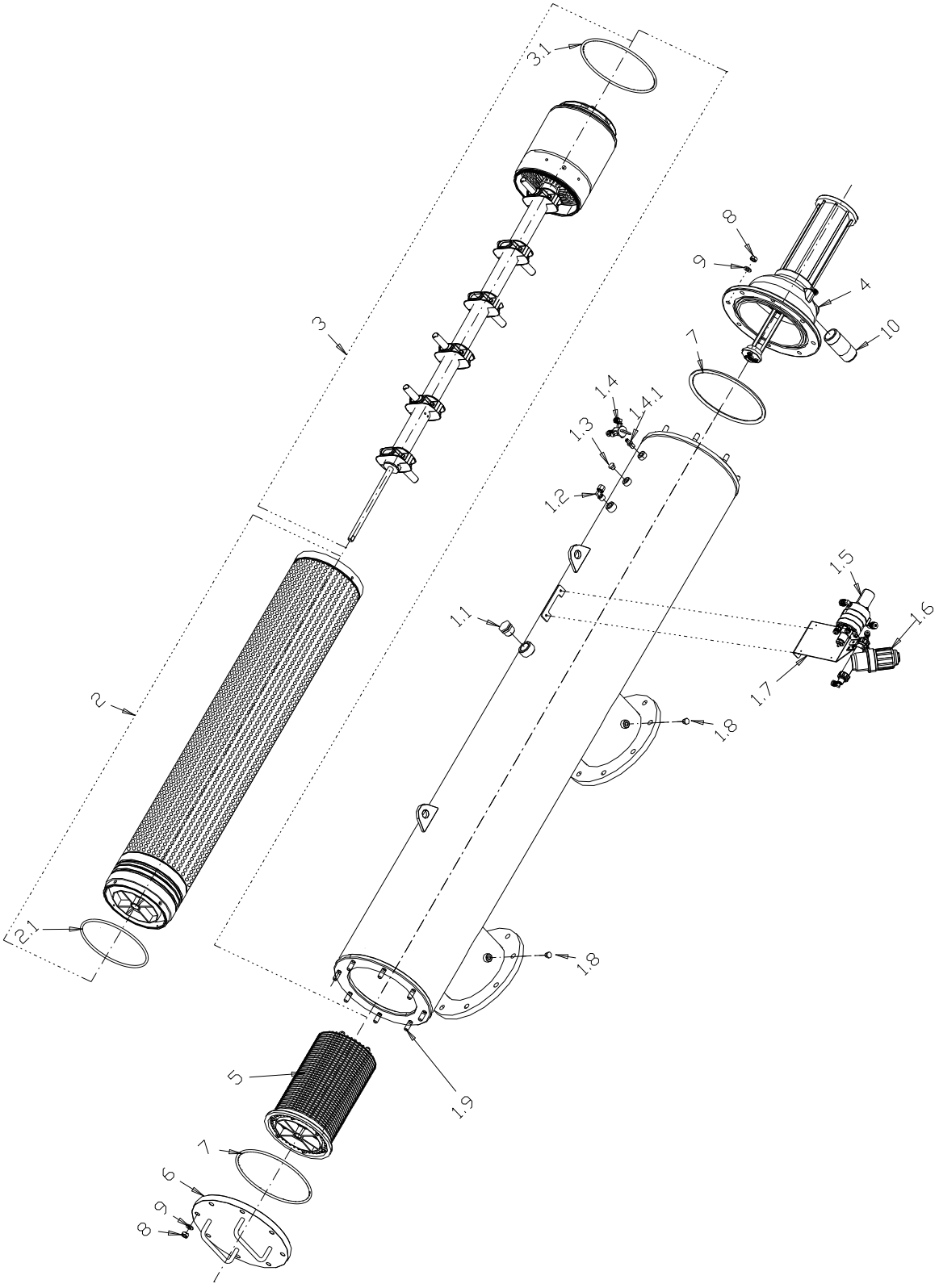


PARTS SCHEDULE

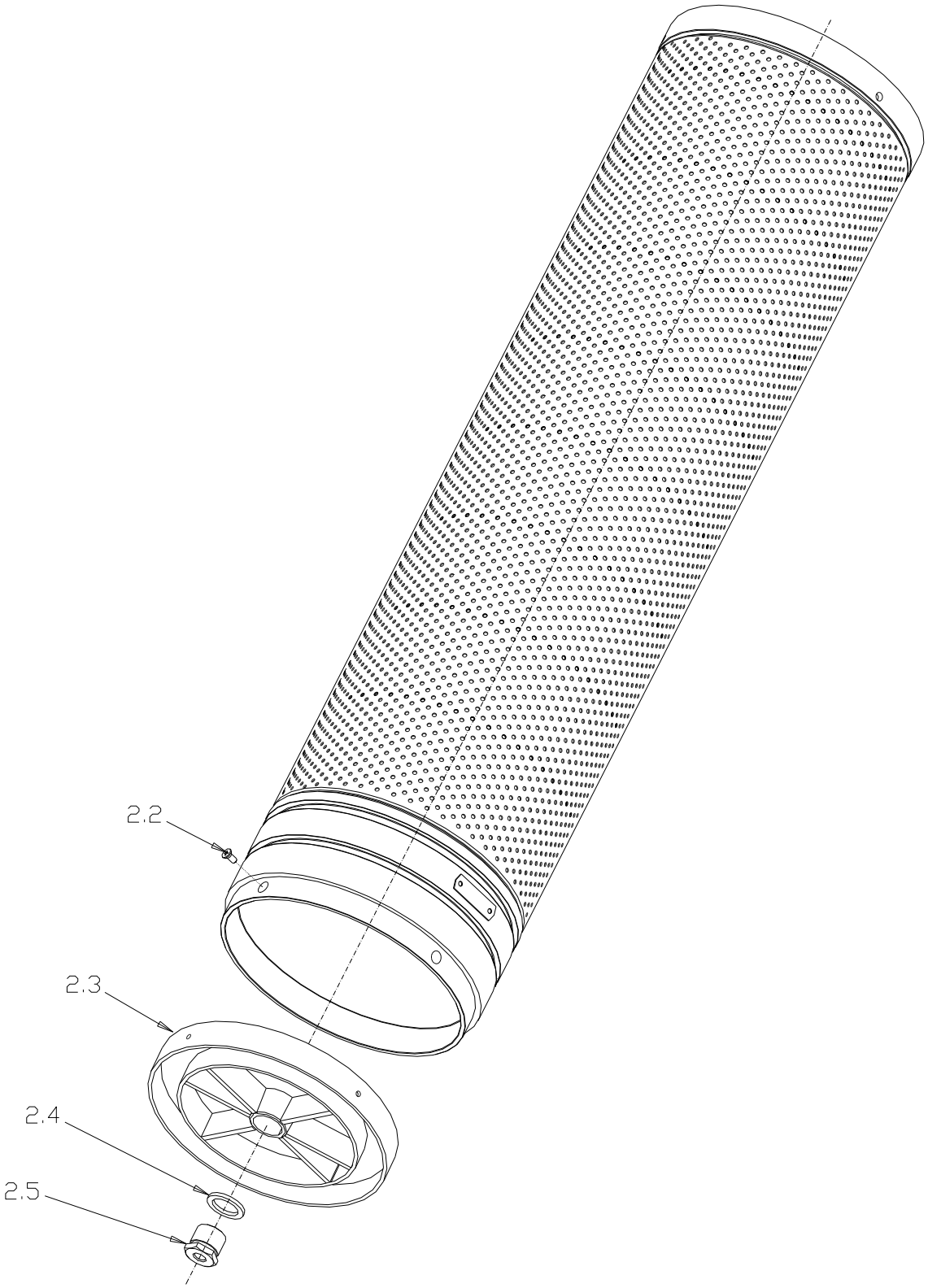
No.	Description	Cat. No.
1	Filter housing 104XLP	15-14XX-XXXX
1	Filter housing 106XLP	15-16XX-XXXX
1	Filter housing 108LP	15-18XX-XXXX
1	Filter housing 110P	15-110X-XXXX
1.1	Plastic plug 1"	8398-1001-003-000
1.2	Fitting 3/8" x 12	82-1174-6952-06
1.3	Plastic plug 1/4"	8211-0121-0400
1.4	3-Way valve	84-3170-0011
1.4.1	Nipple 1/4" X 1/8"	83-4324-1012-1925
1.5	Rinse controller	15-1007-0050
1.6	3/4" plastic filter	55-1000-0001
1.7	Bracket	63-6044-0023
1.8	Plastic plug 1/4"	8211-0121-0400
1.9	Stud bolt 1/2" X 50 (X16)	85-2431-08-050
2	Fine screen 104-106XLP	15-1603-XXXX
2	Fine screen 108LP/110P	15-1803-XXXX
2.1	O-Ring 647	81-41-4001-0674
2.2	Handle bolt 104-106 LP/XLP	8521-2101-008
2.2	Handle bolt 108LP/110P	8541-2101-008
2.3	Handle 104-106 LP/XLP	61-5510-0152
2.3	Handle 108LP/110P	61-5510-0154
2.4	Spacer disc	65-3903-0123
2.5	Fine screen bearing	65-3003-0204
3	D. collector assembly	15-1004-1046
3.1	O-Ring 647	81-41-4001-0674
3.2	Rotor assembly	55-1006-0011
3.2.1	Rotor	DAG1.00015
3.2.3	Rotor bearing housing	65-1024-0026
3.2.4	Lower Bearing	65-1004-0601
3.3	F. chamber flat screen	15-1070-0506
3.3	F. chamber ZZ screen	15-1070-0508
3.4	Dirt collector	15-1004-0016
3.4.1	Bolt 3/8" X 8	85-4125-08-009
3.4.2	Dirt collector pipe	65-1064-0547
3.4.3	Nozzle assembly	DKF1.00269
3.4.4	Collector connecting bolt	65-3044-0451
3.4.5	Support bolt	51-5510-0010

No.	Description	Cat. No.
3.4.6	Dirt collector shaft	65-3044-0110
3.4.7	Dirt collector top plug	51-5510-0024
4	Piston lid assembly (CI)	15-1070-0591
4.1	Piston lid	55-1070-1093
4.2	Plastic plug 1/4"	82-11-0121-0400
4.3	L-Connector 1/4" X 6	82-11-6469-4604
4.4	Piston shaft	65-1005-0522
4.5	Exhaust valve seat	DPF1.00006
4.7	O-Ring P2-009	81-41-4000-0009
4.8	Rod	DAF1.00150
4.9	O-Ring P2-009	81-41-4000-0009
4.10	Exhaust valve seat	65-1006-0591
4.11	O-Ring P2-351	81-41-4000-0351
4.12	Locking ring	65-1006-0592
4.13	Disc seal seat	DPF1.00005
4.15	St.St. Nut 1/4"	85-2211-04-000
4.16	O-Ring P-237	81-41-4000-0237
4.17	U-Ring 95X75X10	81-41-4561-0530
4.18	Seal holder	65-1006-0539
4.19	U-Ring 95X75X10	81-41-4561-0530
4.20	St.St. Cylinder	65-1006-0527
4.21	Piston rod tie	65-1005-0593
4.22	O-Ring P-237	81-41-4000-0237
4.23	Piston lid	65-5510-0006
4.24	St.St. Lock nut 1/4"	85-2231-04-000
4.25	St.St. Washer M6	85-2312-06-000
4.26	Plastic plug 1/4"	82-11-0121-0400
4.27	Fitting 3/8" x 12	82-1174-6952-06
5	Coarse screen 104XLP/106XLP	15-3002-0003
5	Coarse screen 108LP/110P	15-3002-0001
6	Filter lid	55-1070-1091
7	O-Ring P 2-448	81-41-4000-0448
8	Nut 1/2" (X 16)	85-1211-08-000
9	Washer 1/2" (X 16)	85-1312-12-000
10	Nipple 11/2" NPT	83-2920-0151-0105
10	Nipple 11/2" BSP	83-2920-0150-0105

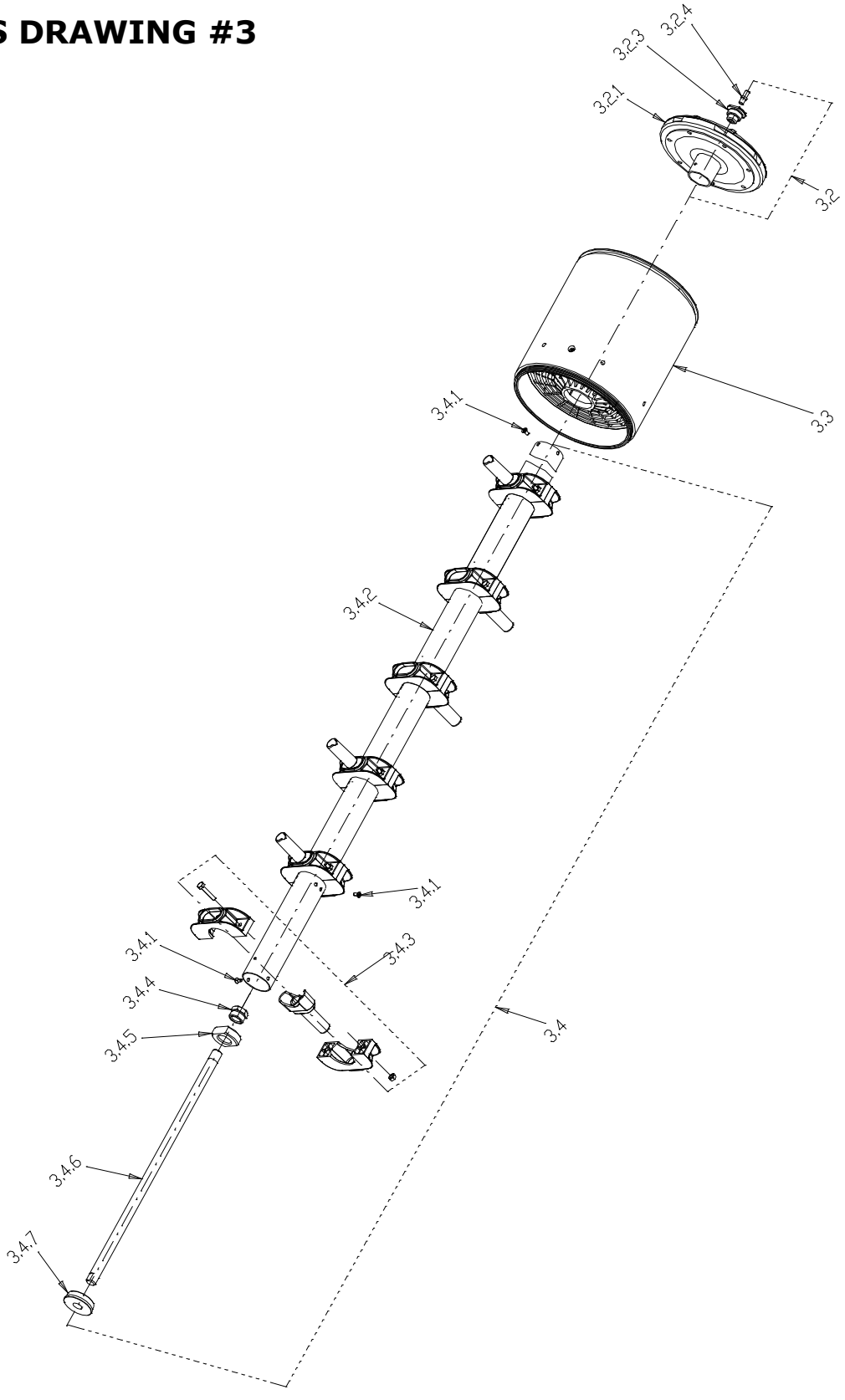
PARTS DRAWING #1



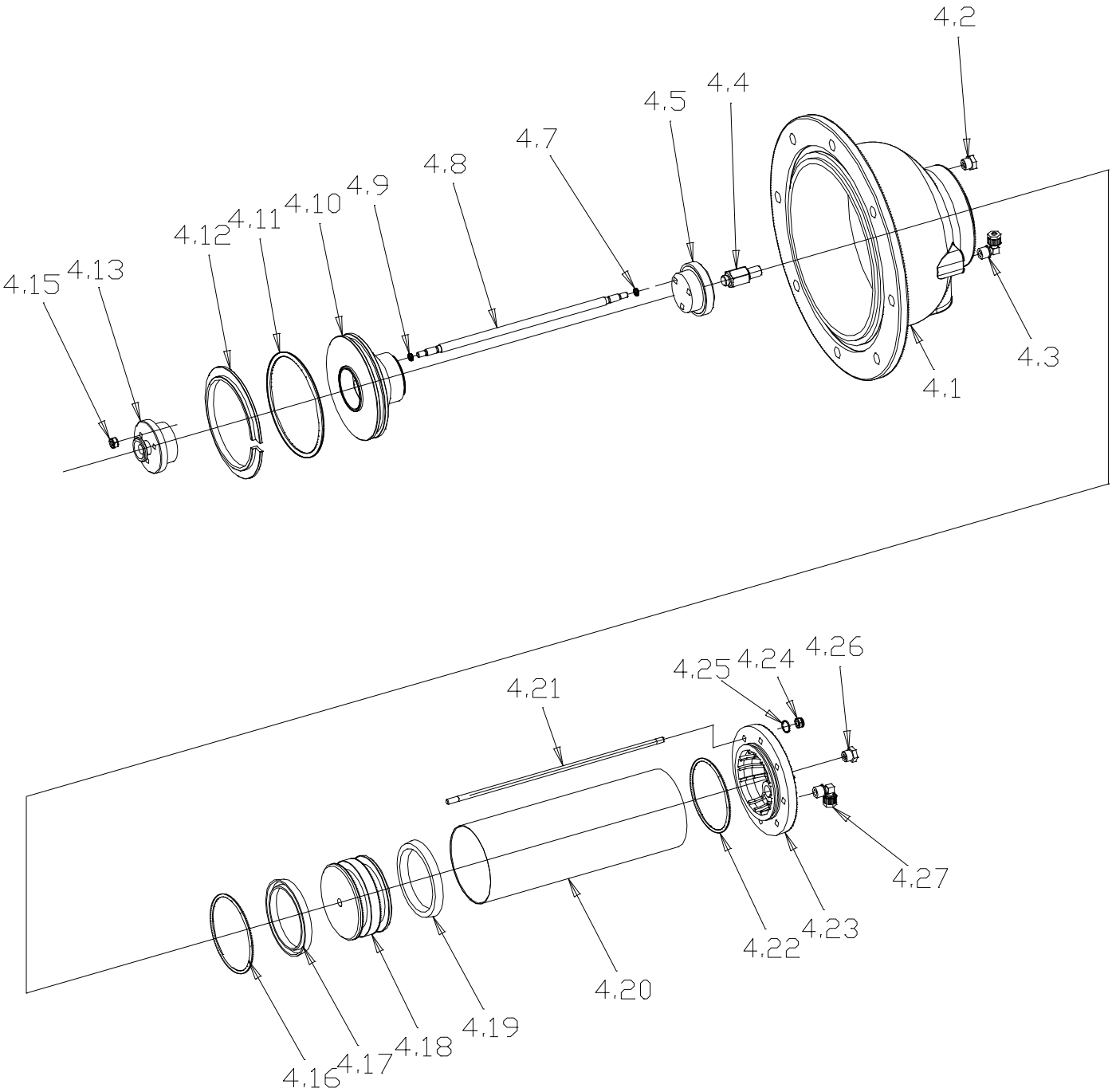
PARTS DRAWING #2



PARTS DRAWING #3



PARTS DRAWING #4



CONTROL DRAWING