

# AMIAD Automatic Filters

## “EBS” FILTER

cat. no. 03-4 (2-24)

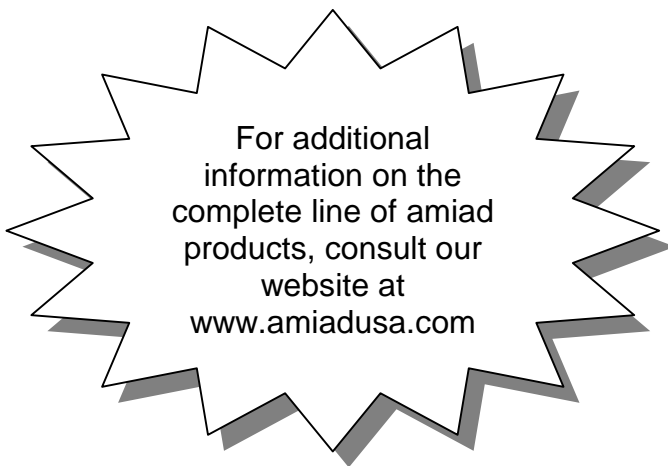
Serial Number: \_\_\_\_\_

Order Number: \_\_\_\_\_

Catalogue Number: \_\_\_\_\_

Filtration Degree: \_\_\_\_\_

Tested By: \_\_\_\_\_



## \*Installation, Operation and Maintenance Instructions

\* Also available electronically

Ref. 95-046-330-002

10.99

**amiad** filtration systems®

2220 Celsius Avenue, Oxnard, CA 93030

Telephone: (800) 969-4055

Fax: (800) 776-3458

E-Mail (General): [info@amiadusa.com](mailto:info@amiadusa.com)

E-Mail (Technical): [tech@amiadusa.com](mailto:tech@amiadusa.com)

# TABLE OF CONTENTS

Technical specifications .....	3
Safety instructions .....	4
Dimensional and recommended installation drawing.....	5
Description and filter operation.....	6
Installation .....	7-8
Maintenance .....	9
Disassembling and reassembling .....	10
Parts schedule .....	11
Parts drawing General view .....	12
Parts drawing - Section 1 .....	13
Parts drawing - Section 2 .....	14
Parts drawing Section 3 .....	15
Appendix A. PLC Control system, Type "D" .....	16 - 21

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

# TECHNICAL SPECIFICATIONS

## General

Maximum flow rate	800 m <sup>3</sup> /h	3500 Usgpm	Consult manufacturer for optimum flow depending on filtration degree & water quality.
Min. working pressure	2.5 bar	35 psi	or lower if pressure is increased for flushing.
Max. working pressure	10 bar	150 psi	16 bar = 240 psi upon request.
Filter area	10,000 cm <sup>2</sup>	1550 in <sup>2</sup>	
Inlet/Outlet diameter	200,250, 300, 350 mm		Flange standards as per request.
Filter housing	500 mm	20"	Epoxy-coated steel, or other on request.
Max. working temperature	80 <sup>0</sup> C	176 <sup>0</sup> F	
Weight	200 mm = 310 Kg 250 mm = 325 Kg 300 mm = 350 Kg 350 mm = 380 Kg	08" = 680 lb. 10" = 715 lb. 12" = 770 lb. 14" = 840 lb.	

## Flushing Data

Exhaust valve	80 mm	3"	
Flushing cycle time	30 - 40 seconds	30 - 40 seconds	
Wasted water per cycle	500 liter	132 gallon	at 2 bar = 30 psi
Minimum flow for flushing	50 m <sup>3</sup> /h	220 USgpm	at 2 bar = 30 psi

## Control and Electricity

Control voltage	24V AC	(12V or 24V DC upon request)
Electric motor	1/2 HP	50 / 60 Hz, 18 / 22 Gear output R.P.M.
Rated operation Voltage	3 phase	220 / 380 / 440 V, 50 / 60 Hz
	Single phase	110 / 220 V, 50 / 60 Hz
	DC	12V or 24V (upon request)
Current consumption	1.5 Amp.	(with 3 phase 380 / 440 V)

## Construction Materials

Filter Housing and Lid	Epoxy-coated carbon steel 37-2 (Stainless Steel 316 available on request).
Screens	Stainless Steel 316
Cleaning mechanism	Stainless Steel 316, POM
Exhaust valve	Epoxy-coated cast iron, Natural Rubber
Seals	Synthetic Rubber, Teflon
Control	Aluminum, Brass, Stainless Steel, PVC

## Standard Filtration Degrees

	Stainless Steel Weavewire Screen								
micron	500	300	200	130	100	80	50	25	10
mm	0.5	0.3	0.2	0.13	0.1	0.08	0.05	0.02	0.01
mesh	30	50	75	120	155	200	300	450	600

# SAFETY INSTRUCTIONS

## General

1. Prior to installation or any treatment given to the filter, read carefully the installation and operation instructions.
2. While treating 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.
3. Please note, the filters enters into a flushing mode automatically, without prior warning.
4. No changes or modification to the equipment are permitted without a written notification given by the manufacturer or by its representative, on the manufacturer behalf.

## Installation

1. Install the filter according to the installation instructions detailed in this manual.
2. Make sure to leave enough clearance so as to enable easy access for future treatments and safe maintenance operations.
3. Electric wiring should be performed by an authorized electrician only; using standardized and approved components.
4. Install main power disconnect cut-off switch close to the control panel.
5. If the control panel is installed far away and there is no eye contact with the filter, a power disconnect cut-off switch should be installed near each filter unit.
6. Installation of the filter should be performed so as to avoid direct water splashing on the electrical components or on the control panel.
7. Extra safety devices should be installed on hot water applications to avoid skin burn danger.

## Operation, Control and Maintenance

1. Disconnect the filter from power supply before maintenance or treatment.
2. Loosening or unscrewing bolts should be done only after the pressure in the filter had been released.
3. Avoid splashing and water leaking so as to minimize slipping electrifying danger or damage to the equipment caused by moisture.
4. Always open and close valves slowly and gradually.
5. Remove grease and fat material residues in order to avoid slipping.
6. After treatment has been completed, re-assemble the protection covers of the drive mechanism.
7. 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 vicinity.
8. 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 vicinity.

## Use of Lifting Equipment

1. While using lifting equipment, make sure that the filter or the lifted part is chained securely and in a safe manner.
2. Do not leave lifted equipment if there is no necessity. Avoid working below lifted equipment.
3. Wear a safety helmet while using lifting equipment.



# DESCRIPTION OF FILTER OPERATION

## Filtering process:

The EBS is a sophisticated yet easy-to-operate automatic filter, with a self-cleaning mechanism driven by an electric motor. The EBS is designed to work with various types of screens in filtration degrees from 500 to 10

The water enters through the inlet pipe into the fine screen from inside out. The "filtration cake" accumulates on the fine screen surface and causes head loss to develop.

## Self-cleaning process:

The EBS will start the self-cleaning process when the pressure differential across the screen reaches a pre-set value or a predetermined lapse of time.

Cleaning of the filter element is carried out by the suction scanner, which rotates in a spiral movement while removing the filtration cake from the screen and expels it out through the exhaust valve.

The scanner rotation is operated by a 2-way (fwd/rev) drive unit which is attached to the scanner by a threaded shaft, providing the linear movement.

The exhaust valve is activated for the duration of the cleaning cycle by a 3-way solenoid. During the self-cleaning process, which takes approximately 35 seconds, filtered water continues to flow downstream of the filter.

## Different modes of filtration:

The filtration system may be found in one of the following modes:

1. Filtering mode: This is the normal function condition. Flushing is not occurring and the power light on the control board is lit.
2. Flushing mode: A mode in which the flushing process is in progress. The motor and the exhaust valve are operating according to the program.
3. Continuous flushing mode: It is possible to activate the self-cleaning mechanism continuously by changing the switch near the timer in the control board to "CONT." position.
4. Malfunction mode: During malfunction mode the self-cleaning operation is stopped, the malfunction light on the control board is turned on and an external output is activated with 24V AC.

## The filtration system may enter a malfunction mode in the following cases:

- 1st. When there is a continuous signal from the pressure differential switch for a duration of more than minutes. This means that the self-cleaning process is not successful.
- 2nd. When the motor protector was activated, either manually or due to overload.
- 3rd. As a result of a malfunction in the limit switches.

## Initiation of self-cleaning:

The filter will enter the self-cleaning process as a result of any of the following causes:

1. A signal from the Pressure Differential Switch (PDS) - The PDS which is situated on the filter body, sends an electric signal when the pressure differential across the screen reaches the pre-set value (usually 0.5 bar =7 psi). The control board registers the signal and operates the flushing process according to its program.
2. Manually pressing the "TEST" push button at the control board.
3. The TIMER installed in the control board allows operation of self-cleaning process at time intervals that can be set up, independent from the head loss factor. The timer resets after every flushing cycle.
4. A signal from Continual flushing switch - This switch in the control board allows operation in continuous flushing mode; meaning, the filter is flushing itself all the time regardless of flow rate or water quality.

## Stages of cleaning cycle:

Under normal operating condition the electrical control panel operates the "EBS" filter in the following manner;

1. The exhaust valve opens to atmosphere.
2. Five seconds delay.
3. The motor starts rotating the suction scanner shaft upward until it reaches the upper limit switch.
4. The exhaust valve closes.
5. Two seconds delay.
6. The motor starts rotating the suction shaft downward until it reaches the lower limit switch.

# INSTALLATION

## Design recommendations

1. If flow increases and pressure drops dramatically for a long period of time during network filling-up, it is recommended that a pressure sustaining valve is installed downstream of the filter. The pressure sustaining valve will ensure a controlled filling-up of the line.
2. If continual water flow is essential even during maintenance period, it is recommended that a manual or automatic by-pass is installed, and the isolating valves will be used to isolate each filter unit.
3. In places where there is an expected temporary worsening of water quality, it is possible to operate an emergency flushing program. In order to do so, a hydraulic controlled valve has to be installed downstream of the filter. For details, please consult the manufacturer.

## Installation instructions

1. Select a convenient location for the installation of the filter where operation and maintenance will be optimum. It is recommended that a lifting auxiliary is available for maintenance.
2. Install the filter vertically. Please note that a minimum clearance of 300 mm (12 In.) (not including a crane) is required in order to allow disassembly of the unit.
3. Ensure the direction of flow according to the arrows marked on the filter housing.(flow outlet will always be from the side; flow inlet is from the bottom).
4. Installation of a mechanical non-return valve downstream of the filter is required.
5. If possible, prior to installing the filter, flush the main line, at the connection point thoroughly, in order to remove large objects which may damage the filters internal mechanism.
6. Install a drainage pipe to the exhaust valve (14). Minimum 3" diameter for a maximum pipe length of 20 meters (60 feet), for longer drainage, 4" pipe diameter must be used for a maximum length of 40 meters (120 feet). Please note that no restriction is allowed on the drainage pipe. For special applications, please consult the manufacturer.
7. If the system is designed to operate with working pressure higher than 6 bar (85 psi), it is recommended that a manual valve is installed on the exhaust pipe, in order to enable regulation of the flushing flow rate.
8. The user should arrange suitable lighting at the area of the filter to enable good visibility and safe maintenance.
9. The user should arrange suitable platforms and safety barriers to enable easy access to the filter without climbing on pipes and other equipment.

## IMPORTANT !!

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

## Electric wiring

1. Install the control board in a dry and protected place (It is possible to order a special control board for out-door installation).
2. Power connection to the control board:
  - a. Connect a three-phase voltage source through a semi-automatic switch, or 16 Amp. fuse to the L1 L2 L3 inlet at the terminal strip in the control board.
  - b. Earth the control board.
3. Power connection to the motor:

Connect the drive unit to the control panel by means of a 4 x 2.5 mm (12 or 14 AWG) wire in flex-conduct. Use a long enough cable to allow removal of the drive unit and placing it near the filter for maintenance, without having to disconnect it from the cable. (It is recommended that this installation meets or exceeds local or national electrical codes, this is a "high" voltage connection).
4. Control wiring:

Connect between the control junction box and the control board by means of 6 x 1.5 mm<sup>2</sup> (16 AWG) wire in flex-conduct. The numbers on the terminals in the board and in the junction box are identical.

## **Start-up and first operation**

1. Make sure all the electric wiring is correct, according to the enclosed drawings.
2. Switch the control & 24V circuit breakers and the motor protector to ON. The motor will start operating.  
The suction scanner shaft should turn clockwise and move downward to the filter housing until it reaches the lower limit switch. If the motor rotates in the opposite direction, disconnect the electricity immediately and change the direction of the motor rotation by changing between two phases.  
The motor must stop when the limit switch plate reaches the lower limit switch and causes it to operate.
3. Operate a "dry" flushing cycle by pressing on the "TEST" push button. Make sure all flushing stages occur as described in the filter description chapter of this manual.
4. Open the inlet valve to the filter, while the outlet valve remains closed or with an open by-pass valve (This will keep the flow in the filter at a minimum), and operate a flushing cycle.  
Make sure the exhaust valve opens and all stages of the flushing cycle are carried out. Attend to leakage, if any.  
Close the 1/4" valve at the low pressure point of the pressure differential switch for 5 seconds. The filter will start the flushing process. Open the 1/4" valve.
5. Gradually open the outlet valve and/or dose the by-pass valve. Operate the filter at the designed hydraulic conditions.
6. Set the timer for 6-8 hours.
7. Check and re-tight all bolts after the first week of operation.

# MAINTENANCE

## General inspection

In order to check the proper operation of the filter, close the low pressure 1/4" valve to the pressure differential switch for a period of 5 seconds. This will initiate the self-cleaning cycle: Check that the exhaust valve opens, that the scanner moves upwards, and when it reaches the top limit switch - verify that the exhaust valve closes.

## Weekly maintenance

1. Check that the filter operates properly, following a general inspection.
2. Clean the 3/4" filter (close the 3/4" valve and operate a flushing cycle in order to release pressure and then open the bowl).
3. Check that there is grease on the drive shaft, and drive bushing. Add grease if necessary.
4. Take care of any leakage from the scanner shaft. If necessary, replace the Sealing flange Internal O-Ring (24.1)

## Changing the sealing flange internal O-ring

1. Close the inlet valve to the filter and release the pressure.
2. Verify that If the Suction Scanner is in the lower position.
3. Remove the Split pin (20.2) and pull out the connecting pin (20.1).
4. Operate a flushing cycle.
5. Stop the motor operation when the drive shaft reaches half way of its movement. The drive shaft is now separated from the Suction Scanner.
6. Unscrew nuts (27) and pull the sealing flange (26).
7. Remove the used internal o-ring and clean the o-ring seat.
8. Insert a new o-ring (24.1)
9. Apply some grease on the external o-ring and on the shaft.
10. Tighten the sealing flange nuts (27).
11. Re-connect the drive shaft to the suction scanner shaft.
12. Operate the control board and open the filter inlet valve.

## Maintenance prior to long term cessation of filter operation

The following must be done if the filter will not operate for more than a month.

1. Operate flushing cycle (If possible, with a closed downstream valve).
2. Disconnect the control board from the power before the limit switch disc reaches the switch.
3. Release pressure from the filter.
4. Grease the drive shaft and the drive bushing.
5. Clean the 3/4" control filter.

## Maintenance prior to re-operation

1. Connect the control board to the mains.
2. Check proper operation of the filter.
3. Grease the drive shaft and the drive bushing.
4. If necessary change the Sealing flange Internal O-Ring.

## IMPORTANT !!

**THE DRIVE SHAFT MUST BE LUBRICATED WITH HEAVY-DUTY, WATER RESISTANT GREASE, THAT WILL NOT OXIDIZE. (SHELL, DARINA EP-2 OR SIMILAR).**

## DISMANTLING AND ASSEMBLING THE FILTER COMPONENTS

Opening the filter and disassembling its inner components is necessary for changing screens, periodic maintenance and repairs.

Prior

### Dismantling:

1. Disconnect electrical power.
2. Close the water and drain the filter housing.
3. Pull the electrical plug from the solenoid valve (13). Disconnect the raccord connector (17.1)
4. Unscrew the bolts (14.1) and remove exhaust valve (14).
5. Unscrew bolts (33) and remove drive unit (34). Put the drive unit on a dry and protected surface near the filter. If the electric cable is not long enough, disconnect it from the motor.
6. Pull out the split pin (20.2) from the connecting pin (20.1) then pull out the connecting pin as well. If the connecting pin is not facing one of the shaft housing windows, turn the drive shaft (20) a little. Use a 17mm or 11/16 spanner.
7. Turn the drive shaft (20) counter clockwise so that it will be separated from the suction scanner shaft (7.4).
8. Unscrew bolts (29.2) and remove the limit switches sling without disconnecting and changing the limit switches position.
9. Unscrew bolts (23) connecting shaft housing (22) to filter lid (10)
10. Pull up the shaft housing. Put it near the filter, make sure not to damage the limit switches electric wires. If necessary, disconnect the wires from the connecting box (19). (Do not forget to mark all wires for proper reconnections).
11. Remove O-ring seal. (21)
12. Unscrew the housing bolts (11) and pull the lid using a crane or other lifting device, which is assembled exactly above the lid center.  
**Note:** the lid must be removed in a horizontal position in order to prevent damage to the suction scanner and the upper bearing seals.
13. Remove and keep the two centering sleeves (9)
14. Remove the housing O-Ring (2)
15. Pull the scanner (7) and the screen (5) (including screen seals 4 and 6).

### Reassembling the "EBS" filter:

Before reassembling, visually check that all components are complete and in good mechanical condition.

1. Install the seals (4 and 6) on the screen (5) and insert the screen into the filter housing. (1)
2. Position the scanner (7) in the filter housing. Make sure the lower shaft (7.1) goes through the bearing (3).
3. Locate the housing O-ring (2) properly in its groove.
4. Apply some grease on the suction scanner shaft (7.4) and on the O-rings (8.2 and 24.1).
5. Lower the filter lid (10) carefully toward the filter housing (1) in a horizontal position. Make sure the lid is centered with the suction scanner.
6. For centering the lid properly use the two centering sleeves (9) together with two bolts (11) in opposite positions.
7. Screw the rest of the housing bolts. (11) Tightening opposite positioned bolts will achieve proper sealing.
8. Locate the O-ring (21) in its groove under the shaft housing (22). Place the bolts (23) but do not yet tighten them firmly.
9. Turn the drive shaft (20) clockwise until it reaches the suction scanner shaft. Insert the connecting pin (20.11) to the hole in the drive shaft through the suction scanner shaft hole.
10. Insert the split pin (20.2) in its original position.
11. Make sure that the drive shaft key (20.3) is in its place. Apply grease on it and reassemble the drive unit (34).
12. Tighten firmly the shaft housing bolts (23) and the drive unit bolts (33) in a controlled and balanced method.
13. Reassemble the limit switches sling (29.3), make sure the limit switches (29 and 29.1) are tight in their place.
14. Reassemble the exhaust valve (14), solenoid plug and pilot tube . (Raccord connector 17.2)
15. Make sure that all bolts are tightened.
16. Switch on the power. The motor will run until limit plate (28) reaches the lower limit switch. (29)
17. Press the "test" push button and make sure that the filter works according to stages of cleaning cycle (page 6).
18. Slowly turn on the water, watch and eliminate any leaking.

# PARTS SCHEDULE

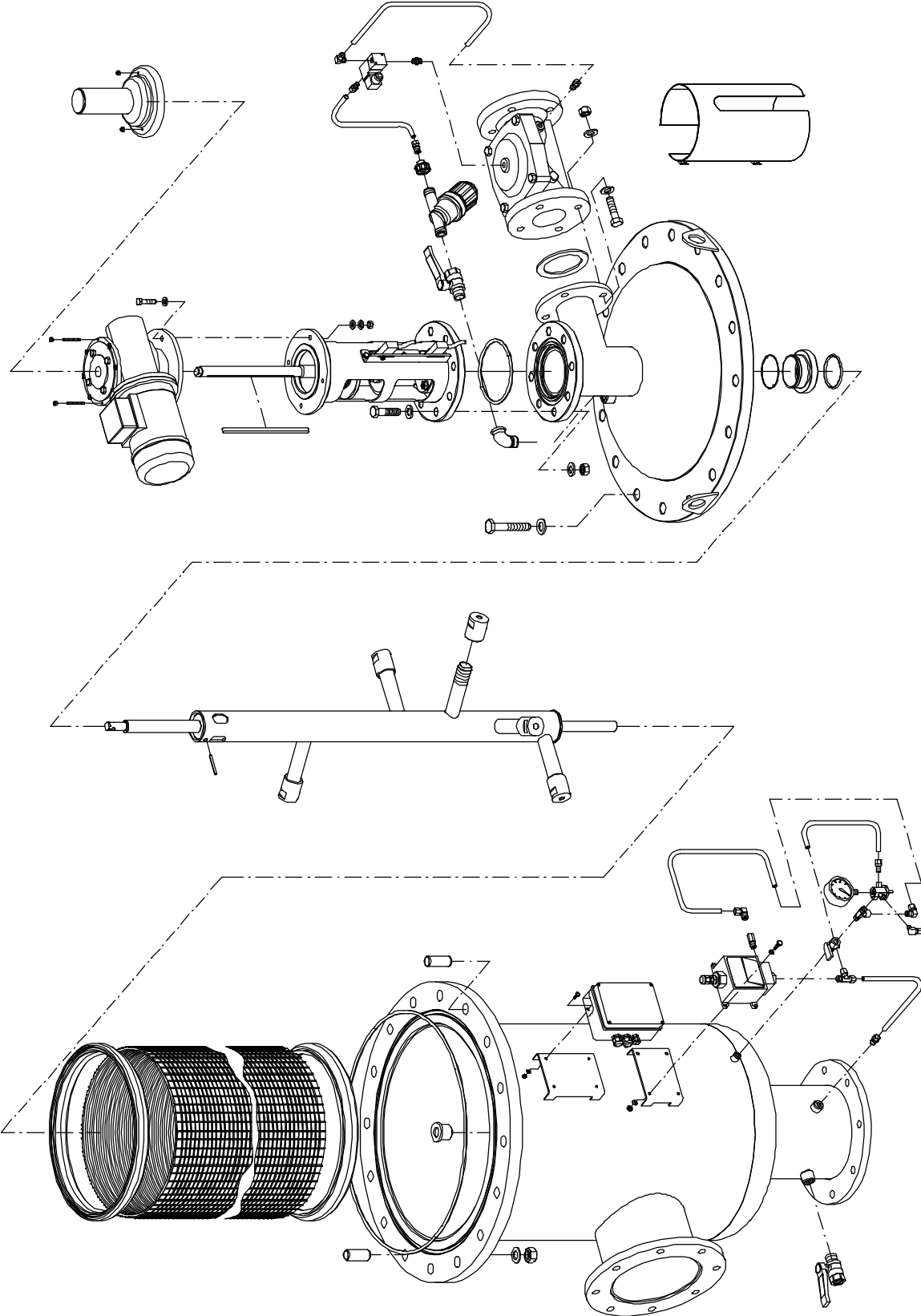
Refer to drawing on pages 13 15

No.	Description	Cat. No.
1		13-4127-1111*
1.1	Ball valve 3/4"	82-32-0007-1000
2	Housing O-Ring	81-41-4000-0471
3	Lower bearing	63-4071-0012
4	Cylinder seal	81-41-4300-0401
5	Filter cylinder	81-14-1000-0XXX
6	Cylinder seal	81-41-4300-0401
7	Suction scanner	13-4074-5000
7.1	Lower shaft	-----
7.2	Slotted Spring Pin 10 X 60	84-32-10-0016
7.3	scanner nozzle (x 6)	53-4074-0132
7.4	Scanner shaft	53-4074-1034
8	Upper bearing	63-4074-1027
8.1	Upper bearing external O-ring	81-41-4100-7615
8.2	Upper bearing internal O-ring	81-41-4100-7150
9	Centering sleeve (x 2)	63-4071-0011
10	Filter lid	14-4077-1111*
11	Bolt M20 x 100 (x16)	85-1112-20-100
11.1	Washer M20 (x16)	85-1311-12-000
11.2	Washer M20 (x16)	85-1311-12-000
11.3	Nut M20 (x16)	85-1212-20-000
12	Exhaust valve seal	81-41-4200-0300
13	Solenoid valve (ASCO)	82-21-0024-0010
	Solenoid valve (GEM-SOL)	82-21-0024-0002
13.1	L-connector 5/16" x 1/4"	82-13-0692-0504
13.2	Connector 5/16"x1/4" (ASCO)	82-13-0682-0504
	Connector 5/16"x1/8"(GEM-SOL)	82-13-0682-0502
13.3	Nipple 1/4"	52-0100-0020
13.4	Copper tube 5/16"	82-13-0000-0050
13.5	Copper tube 5/16"	82-13-0000-0050
13.6	Connector 5/16" x 1/4"	82-13-0682-0504
14	3" Exhaust valve (RAF)	82-31-9310-0000
	3" Exhaust valve (GAL)	82-31-0030-0000
	3" Exhaust valve (RAM)	82-31-5030-0000
14.1	Bolt M 16 x 75 (x 4)	85-1112-16-075
14.2	Washer M16 (x 4)	85-1311-10-000
14.3	Washer M16 (x 4)	85-1311-10-000
14.4	Nut M16 (x 4)	85-1212-16-000
15	3/4" Angle	83322500730000
16	Ball valve 3/4"	82-32-0007-1000
17	3/4" Control Filter 0.2 mm	01070211318020
17.1	Raccord connector	53-0500-9010
17.2	Connector 5/16" x 1/4"	82-13-0682-0504
18	Adjustable P.D switch	84-34-10-0001
18.1	L-connector 5/16" x 1/4"	82-13-0692-0504
18.2	Copper tube 5/16"	82-13-0000-0050
18.3	L-connector 5/16" x 1/4"	82-13-0692-0504
18.4	Manometer valve 1/4	82-32-9002-1000
18.5	T-	82-13-1722-0504
18.6	Copper tube 5/16"	82-13-0000-0050
18.7	Connector 5/16" x 1/4"	82-13-0682-0504
18.8	Bolt M6 x 25 (x 4)	85-2112-06-025
18.9	Washer M6 (x 4)	85-2312-06-000
18.10	Nut M6 (x 4)	85-2212-06-000
18.11	Spring Washer M6 (x 4)	85-2322-06-000
18.12	1/4" Bushing	82-13-1204-0404

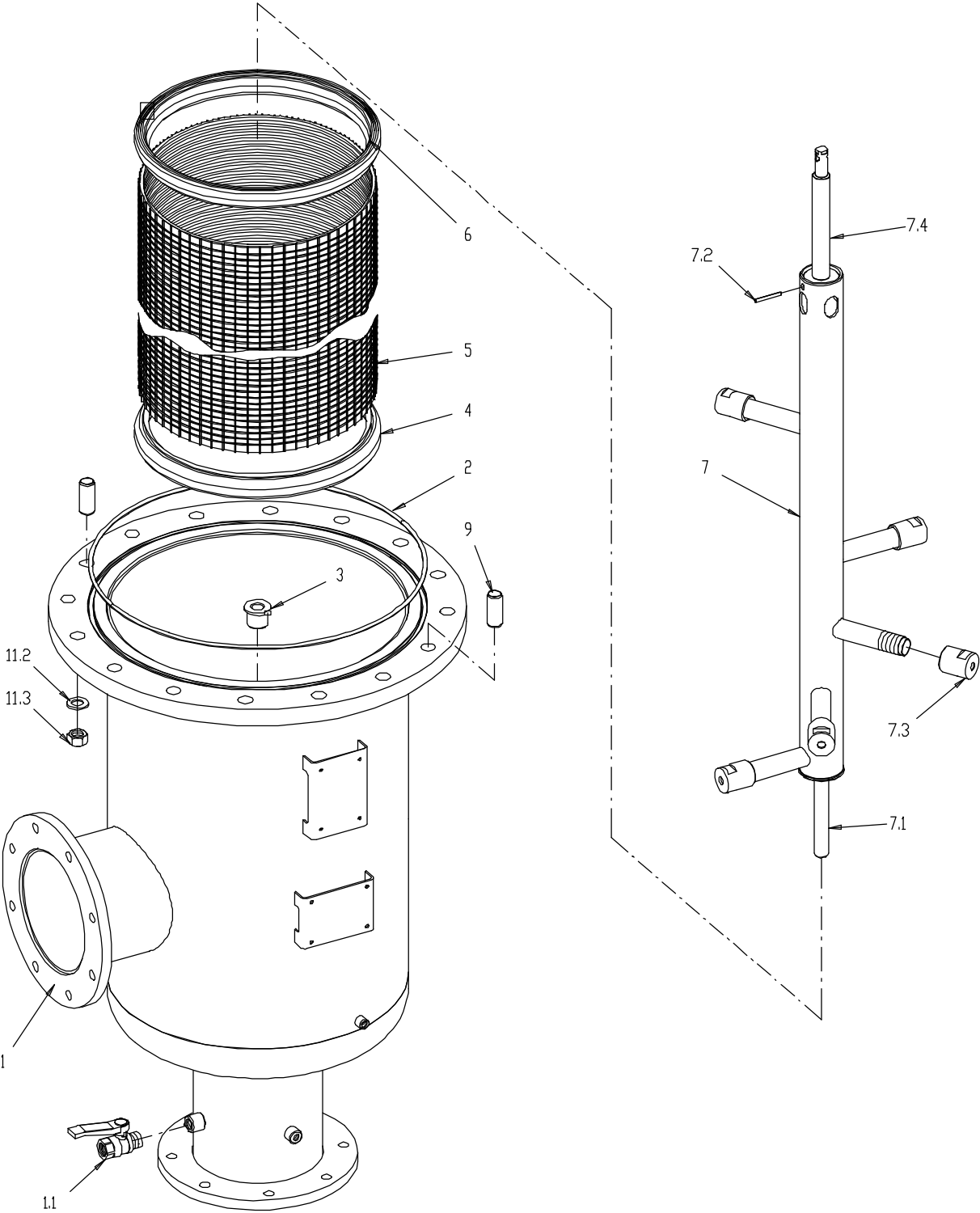
No.	Description	Cat. No.
18.13	3-Way Pilot Valve	63-1073-1006
18.14	Pressure Gauge	63-1073-1007
18.15	1/4" T- Connector M X FX M	82-13-9000-0025
18.16	Connector 5/16" x 1/4"	82-13-0682-0504
18.17	L-connector 5/16" x 1/4"	82-13-0692-0504
18.18	Copper tube 5/16"	82-13-0000-0050
19	Electrical junction box	13-4074-6000
19.1	Bolt M5 x 15 (x 4)	85-2142-05-015
19.2	Nut M5 (x 4)	85-2212-05-000
19.3	Washer M5 (x 4)	85-2312-05-000
20	Threaded drive shaft	53-4074-1022
20.1	Connecting pin	53-4074-1025
20.2	Split pin	63-0403-0003
20.3	Drive shaft key	53-4074-1024
21	Drive Shaft housing seal	81-41-4000-0433
22	Drive Shaft housing	13-4074-1111
22.1	Drive Shaft housing cover	13-4074-1120
23	Bolt M16 x 60 (x 8)	85-1112-16-060
23.1	Washer M16 (x 8)	85-1311-10-000
23.2	Washer M16 (x 8)	85-1311-10-000
23.3	Nut M16 (x 8)	85-1212-16-000
24	External Sealing Flange O-Ring	81-41-4100-4038
24.1	Internal Sealing Flange O-Ring	81-41-4100-4030
25	Socket set screw M10 x 50 (x2)	85-2132-10-050
26	Sealing flange	63-4074-1028
27	Nut M10 (x2)	85-2212-10-000
27.1	Washer M10	85-2312-10-000
28	Limit switch plate	53-4074-1012
28.1	Socket Set Screw M4 x 15 (x2)	85-2132-04-016
29	Lower limit switch (NC)	82-23-0000-0101
29.1	Upper limit switch (NC)	82-23-0000-0101
29.2	Bolt M6 x 20 (x 2)	85-2112-06-020
29.3	Limit switch sling	53-4074-1011
29.4	Nut M6 (x 2)	85-2212-06-000
29.5	Spring washer M6 (x 2)	85-2322-06-000
29.6	Washer M6 (x 2)	85-2312-06-000
29.7	Washer M6 (x 2)	85-2312-06-000
29.8	Bolt M4 x 25 (x 4)	85-2123-04-025
29.9	Washer M4 (x 4)	85-2312-04-000
29.10	St.St. Locknut M4 (x 4)	85-2232-04-000
31	Drive bushing	53-4074-1021
32	Bolt M6 x 35 (x 3)	85-2112-06-035
32.1	St.St. Locknut M6 (x 3)	85-2232-06-000
32.2	Washer M6 (x 3)	85-2312-06-000
32.3	Washer M6 (x 3)	85-2312-06-000
33	Bolt M10 x 40 (x 4)	85-1112-10-040
33.1	Washer M10 (x 4)	85-2312-10-000
33.2	Washer M10 (x 4)	8-03-8501000
33.3	Nut M10 (x 4)	85-1212-10-000
33.4	Spring washer M10 (x 4)	85-1322-10-000
34	Drive unit assembly	53-4074-3500*
35	Drive Shaft Cover	53-4074-0021
35.1	Nut M 6 (x 2)	85-2212-06-000
35.2	Socket Set Screw M6 x 45 (x2)	85-2132-06-045
35.3	Nut M 6 (x 2)	85-2212-06-000
36	Drive Shaft housing assembly	see detailed Drg.

\*Catalogue number might differ according to filter diameter, flange standard or electric specifications.

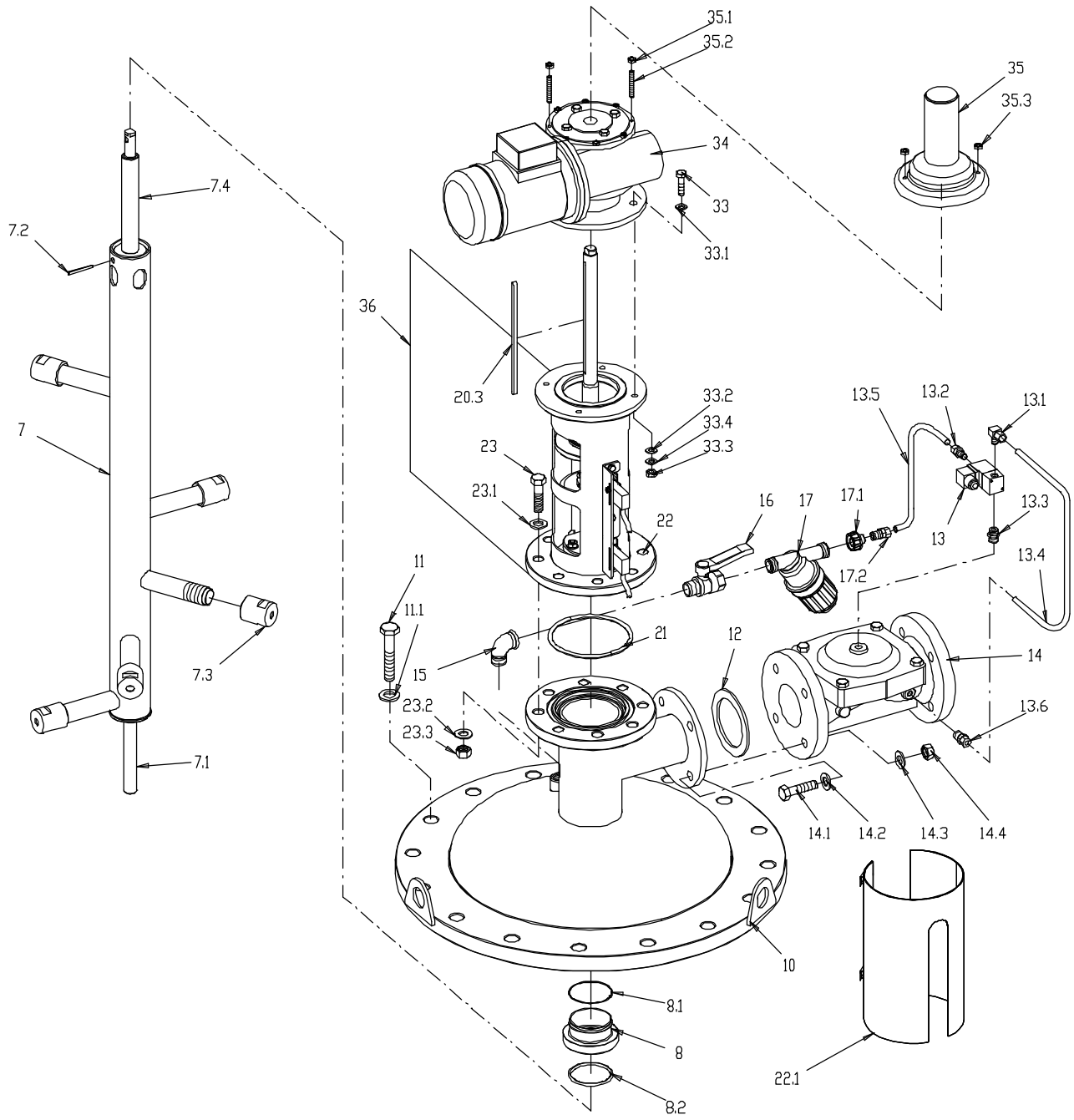
**PARTS DRAWING** General view



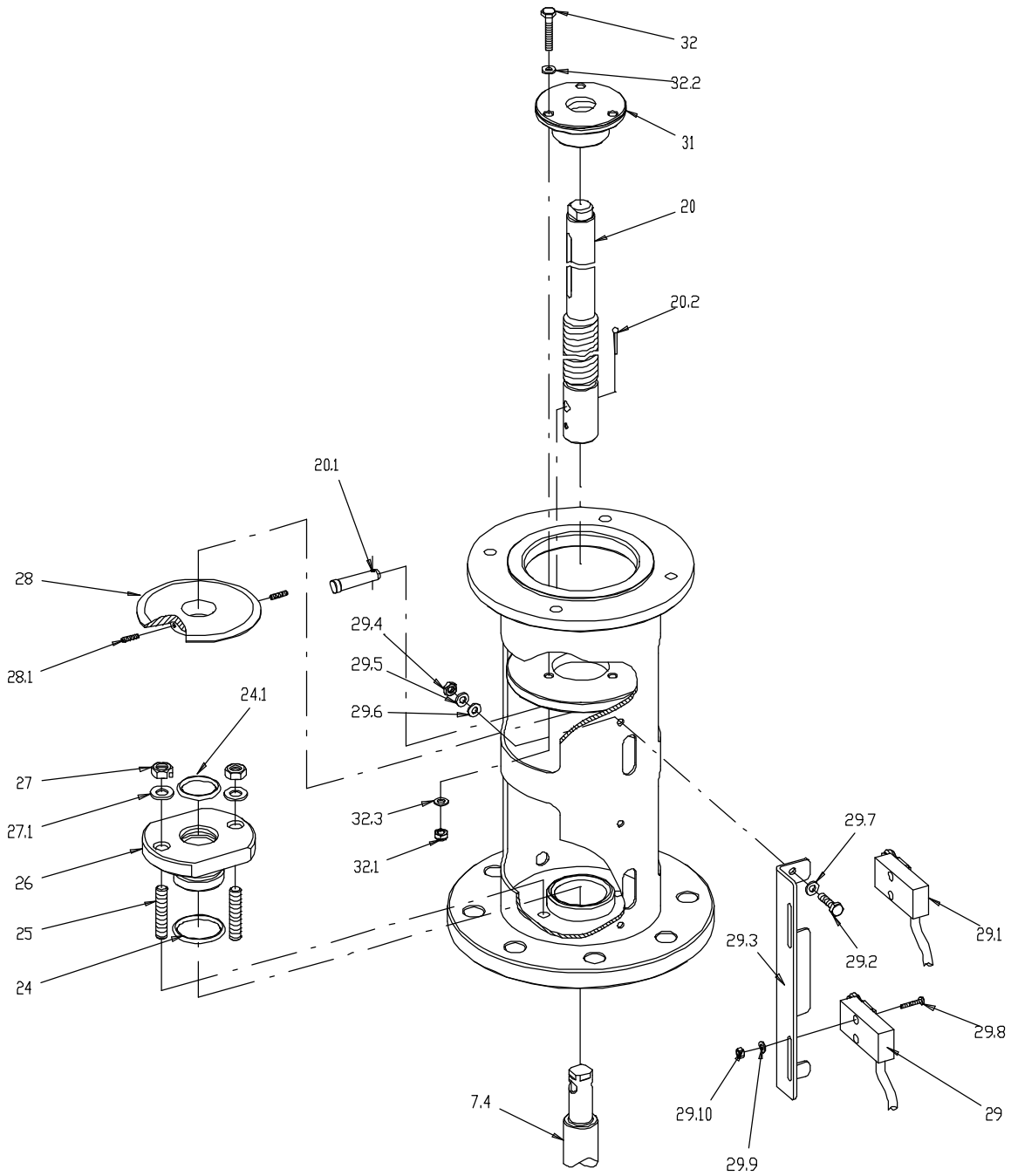
**PARTS DRAWING** Section 1



# PARTS DRAWING Section 2



# PARTS DRAWING Section 3



# APPENDIX A.

## PLC CONTROL SYSTEM (TYPE "D" - EBS)

### Description of control panel components

#### 1. Pilot lights:

- Yellow - lights ON when power is on.
- Red - lights ON when the control panel enters malfunction mode.

#### 2. Push buttons:

- TEST Manual operation of a flushing cycle.
- RESET - clears the malfunction mode.

#### 3. Flushing counter:

- Counts the flushing cycles that occurred. Used for follow-up on the system operation.

#### 4. Timer T1 (0-30 hours):

- Allows timed flushing cycles. The timer is reset with each flushing cycle. To cancel timed flushing, set selector SW1 to "PRESS. ONLY".
- Changing the switch to "CONT." will cause the filter to flush continuously regardless of pressure differential or time.

#### 5. Motor protector:

- This switch protects the motor in case of short-circuit or overload. It is important to set amperage according to the label of the motor. When this switch is tripped, the fault light will blink.

#### 6. Contactors CU and CD:

- Controls direction of motor rotation.

#### 7. Transformer:

- Electric supply to the various control components.

#### 8. 2 x 6 Amp. and 1 x 4 Amp. Circuit breakers:

- Short-circuit protection for the control system.

#### 9. PLC:

- A Programmable Logic Controller responsible for the control panel operation according to a preset program.

### Stages of cleaning cycle

1. The exhaust valve opens to atmosphere.
2. Five seconds delay.
3. The motor starts rotating the suction scanner shaft upward until it reaches the upper limit switch.
4. The exhaust valve closes.
5. Two seconds delay.
6. The motor starts rotating the suction scanner shaft downward until it reaches the bottom limit switch. The exhaust valve remains closed during the downward stroke unless a PD signal exists.

**NOTE:** The limit switches are wired as Normally Closed contacts (NC). Therefore, when the "Limit Switch Plate" reaches the limit switch, the contact opens and the PLC receives "NO SIGNAL".

### Requests for flushing cycle

- a. PDS (Pressure Differential Switch)
- b. Timer 0-30 Hr.
- c. TEST button activation
- d. Continuous flushing

### **PDS operation**

The PDS constantly monitors the pressure differential between the inlet and outlet of the "EBS" filter. When the PDS senses a preset value (usually 0.5 bar=7 PSI) there is a delay of three (3) seconds before the flush cycle begins. At the end of the cleaning cycle, if the pressure differential signal remains, the filter will continue to clean itself for 15 minutes before entering into malfunction mode.

### **Timer operation**

Flush according to time is available through a built-in timer. It is possible to preset the intervals between flush cycles, regardless of the pressure differential.

The recommended default is between 6-8 hours.

In order to cancel the timer operation, simply turn the timer selector SW1 to its middle position.

### **"TEST" operation**

The "TEST" button activates a manual self-cleaning cycle, in order to test the filter operation.

### **Continuous flushing**

The filter flushes continuously regardless of pressure differential or time. It is recommended that this mode be used for a limited duration only - in order to overcome extreme dirt load situations.

### **Malfunction modes**

The system recognizes two malfunction modes:

- 1) Mechanical fault
- 2) Clogging fault (DP Fault).

#### **Mechanical fault**

Occurs under any of the following conditions:

- a. The over load motor protector is tripped.  
Find and correct the fault, clear the fault mode by pressing the O.L. motor protector to the ON position.
- b. Limit switch failure.  
The motor has been activated and there is no signal from a limit switch for more than 35 seconds. The problem might be with one of the limit switches or with the drive mechanism. Find and correct the fault, clear the fault mode by pressing the RESET push-button.
- c. This may be a result of a limit switch failure, wrong wiring or wiring break off.  
Find and correct the fault, clear the fault mode by pressing the RESET push-button.
- d. The motor rotates in the wrong direction.  
The PLC recognizes this mode in case that CD (contactor down) is ON and a signal is received from the top limit switch.  
The following procedure will rectify this situation:  
Manually activate whichever Contactor forces the driveshaft disk to rotate towards the halfway point between the two limit switches. (Pressing the plastic bridge on the contactor with a small screwdriver can do this).  
Turn off power to the control panel and reverse any two phases to change direction of rotation. (In a DC controller, reverse the two wires to the motor).  
Power up the controller and press the RESET button.

**Note: Pressing the RESET button or turning power off and then back on without performing the above-mentioned instructions will NOT release the system from a fault condition!  
In a mechanical fault mode, the fault light blinks.**

#### **Clogging fault (DP Fault)**

DP fault occurs when there is a continuous PDS signal for more than 15 minutes.

In this case the flushing cycle stops, the fault light turns on and the fault output is activated. The fault output of 24 VAC can activate an alarm system, automatic bypass, pump shut-off, etc.

The controller will also enter a DP fault when the filter is both in a mechanical fault mode and receives a flush request.

In order to clear the malfunction mode, press the "RESET" button.

Bridging positions 7A and 7B at the terminal strip will cause the controller to ignore the PDS malfunction; meaning, the filter will continue the cleaning cycle as long as the PDS sends a signal. After 15 minutes, the red light will be lit but the fault output will not be activated. Disconnecting the bridge between 7A and 7B will clear the fault mode and the filter will return to normal operation.

## General information

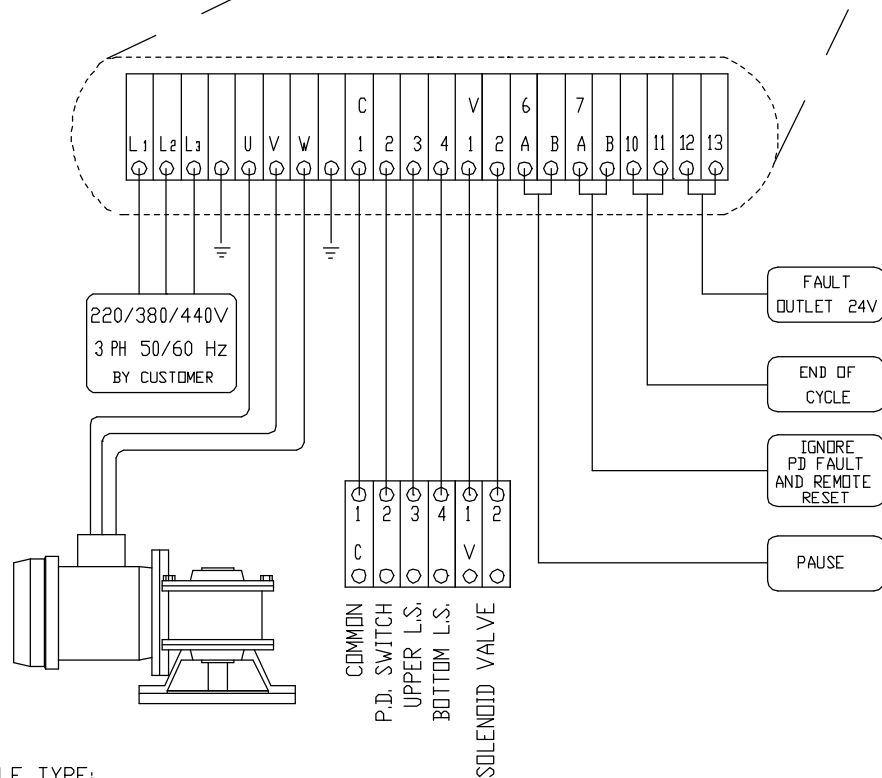
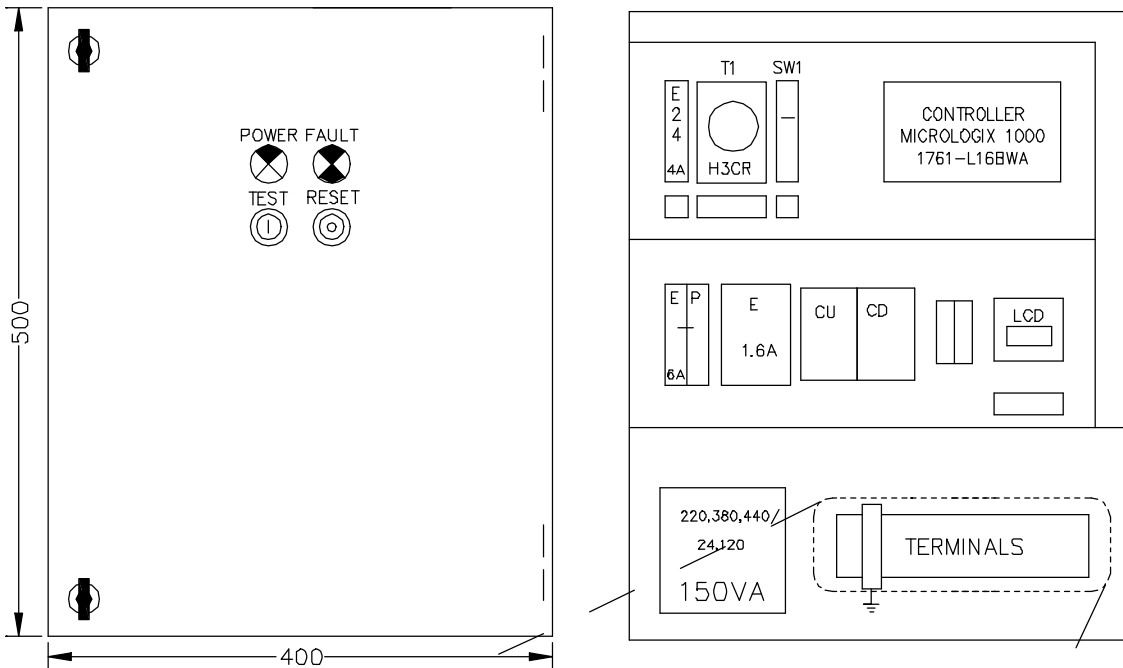
1. When power is first turned on, the PLC will check the bottom limit switch to be sure it is "OPEN", if not the motor
2. The flushing counter will operate at the end of each cleaning cycle. Reset the counter by pressing its red button.
3. **PAUSE:** Bridging positions 6A and 6B on the terminal strip pauses the cleaning cycle immediately. This function applies only for special applications. Please consult the manufacturer or an authorized dealer for further information.
4. **"END OF CYCLE" PULSE:** (Output O/1, terminals 10 & 11)  
A free potential output, which signals at the end of each flushing cycle for 5 seconds. With this pulse it is possible to connect multiple controllers in a series to allow sequential flushing. In this case, connect terminals 10 & 11 to PDS inlet in the next controller of the series. If one of the filters in the series is in malfunction mode the signal will be automatically transmitted to the next filter in line.
5. **"FLUSHING ON" SIGNAL:** (Output O/1 + Input I/9 = ON, terminals 10 & 11) This configuration allows the integration of a downstream pressure regulating valve or peripheral pump operation during the flushing cycle. Output O/1 is activated one second before the beginning of the flushing cycle. This short delay allows a timer and a relay (optional) to activate the PAUSE circuit (input I/6) for the duration required by the downstream valve or the peripheral pump.  
Both optional features of output O/1 may also be used for information transmitting to a remote control center.

**NOTE:** Extra features to the control panel are available according to specific requirements. These features must be defined in advance.

### Startup Procedure

1. Check and verify that wiring between the filter and the control panel is done according to the provided wiring diagram.
2. Verify that the "Limit Switch Plate" is located halfway between the two limit switches and that the motor protector (Over Load) is switched off.
3. Switch "ON" all circuit breakers (except the motor O.L.).
4. Set selector SW1 to the middle position (PD only).
5. Switch on the motor O.L. and watch the rotation direction of the motor. If the motor rotates counterclockwise i.e. the suction scanner moves upward stop it immediately by turning the O.L. to the off position. Change the motor direction by switching between two phases.  
If the motor rotates clockwise i.e. the suction scanner moves downward let it continue until it reaches the lower limit switch and stops.
6. Press the "TEST" push button and verify that the filter is functioning according to the above description.
7. Open the water supply and pressurize the system. It is highly recommended that first "wet" operation is done with static pressure and no flow i.e. the outlet valve is open and the by-pass of the system is open.
8. Operate a flushing cycle by pressing the test push-button. Verify that everything is working properly as described above.
9. Operate a flushing cycle by closing the 1/4 " Manometer Valve of the PD switch for 5 seconds.
10. If everything is functioning as described, open the outlet valve of the filter, and gradually close the by-pass valve.
11. Set T1 to 4 - 8 hours and turn selector SW1 to the upper position (PD & Time). Follow and monitor the functioning of the filtration system, change T1 setting if required.

# Wiring Diagram



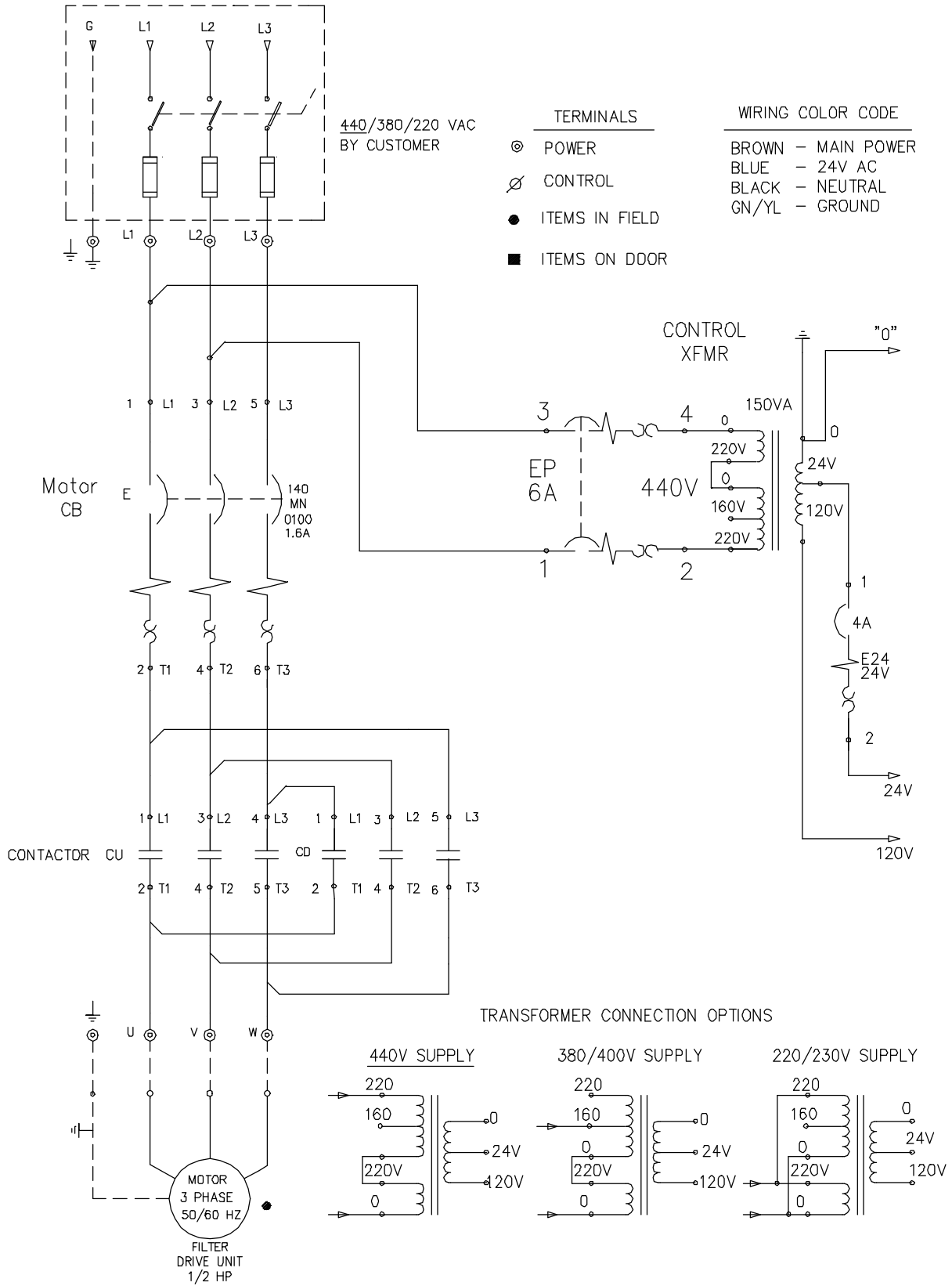
CABLE TYPE:

POWER - XLPE 4 X 1.5 or 2.5 mm (14 or 12 AWG) CABLES

CONTROL - XLPE 6 X 0.75 or 1.5 mm (16 or 14 AWG) CABLES

# Electrical Diagram (page 1 power)

The following diagrams are for reference only. With any inquiry, please refer to the electrical diagrams inside the control panel cabinet.



# Electrical Diagram (page 2 Control)

