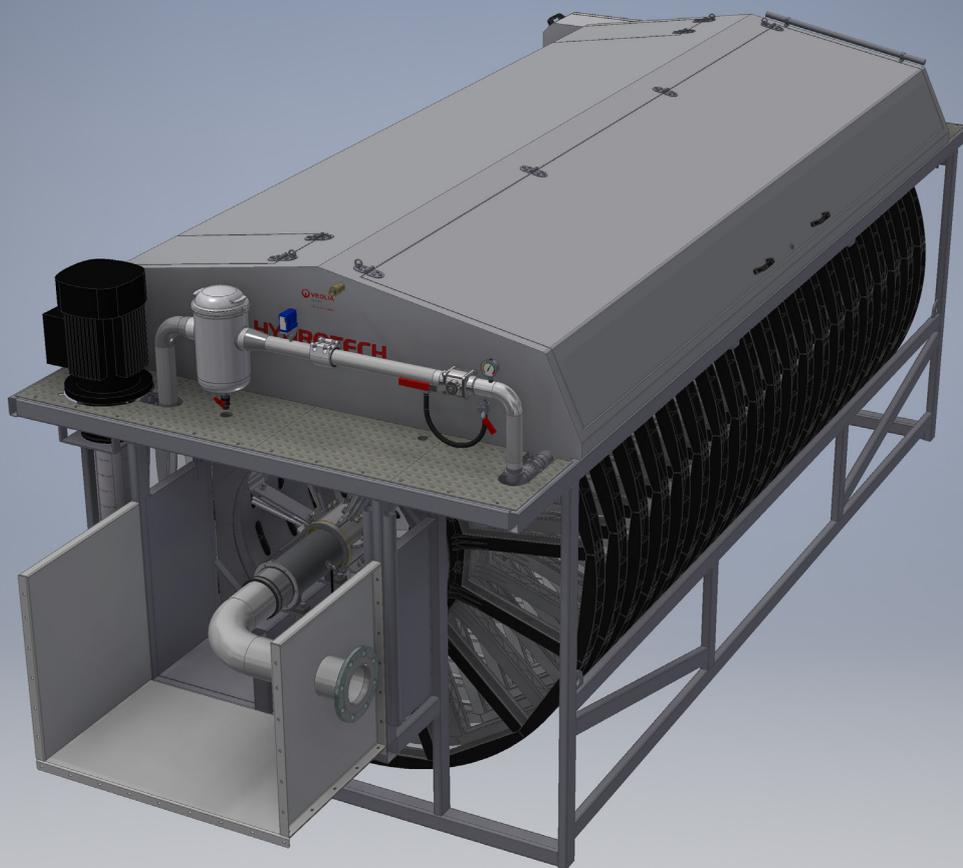


HYDROTECH



## Discfilter HSF2200 - series , PFLC

*Operation and maintenance manual*

Revision: 2020-08-10

 VEOLIA

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# 1. INTRODUCTION

This manual contains instructions for the operation and maintenance of Hydrotech Discfilters in the HSF2200 series with PFLC automation.

Pay attention to all warning symbols that appear in this manual. If this information is ignored it may result in serious personal injury and/or damage to equipment.

The manual must always be available to the personnel working with the equipment.

It is important that:

- ▶ The manual and other relevant documents are kept throughout the life of the equipment.

The manual and other relevant documents are a part of the equipment.

The following documents (manuals) are a part of the equipment:

- ▶ Operation & Maintenance Manual
- ▶ Automatic System Manual
- ▶ All applicable personnel must read the manuals carefully.

## 2. SAFETY INSTRUCTIONS

Hydrotech Discfilters in the HSF2200 series are designed for safe operation provided they are installed correctly and used in accordance with the enclosed instructions. The equipment must be installed correctly and adapted in accordance with local regulations. This equipment is designed for use by one or more operators. You must read the relevant sections of this manual before using the equipment or carrying out maintenance work.

- ▶ Pay attention to all warning symbols that appear in this manual. If this information is ignored it may result in serious personal injury and/or damage to equipment.
- ▶ Assume all electrical equipment to be live.
- ▶ Assume all hoses and pipes to be pressurised.
- ▶ Before carrying out maintenance work, the main power switch (see Figure 2.3) must be turned to the OFF (0) position and locked with a padlock.
- ▶ Maintenance and service may only be performed by authorised personnel.
- ▶ Adequate lighting should be used while operating the filter and when working in close proximity to the filter.

### 2.1 Warning symbols



Figur 2.1

Warning symbols are used in this manual to draw attention to potentially dangerous situations:



Figure 1

*Information that warns you of a potential risk of personal injury and/or damage to equipment.*

Warning stickers (see Figure 2.1) are attached to the filter to warn personnel and act as a reminder to keep hands and fingers away from the filter's moving parts.

### 2.2 CE marking



Figure 2.2

This equipment is CE marked (see Figure 2.2), which guarantees that the equipment is designed, manufactured and described in accordance with the requirements set out in the EU Machinery Directive.

### 2.3 Conversion

The CE marking does not include any components that are not approved by Hydrotech AB and which are used in conversion/reconstruction of the equipment.

The warning symbols and CE marking must be attached where they are fully visible. If any part of

the equipment with a warning symbol is replaced, a new symbol must be attached in the same position. Damaged symbols and CE markings must be replaced immediately.

## 2.4 Personnel requirements

Only personnel trained for the equipment and conversant with local regulations may perform service and maintenance, in order to avoid personal injury and damage to the equipment. Service and maintenance personnel may only handle those parts of the equipment they have been trained for.

The operator may need to work inside the safety barrier and in the safety zone during maintenance and set-up before operation.

## 2.5 Emergency stop

The filter is equipped with an emergency stop and a main power switch (see Figure 2.3).

In the event of a power outage, turn the main power switch to the OFF (0) position to prevent the filter drum from unintentionally starting when the power returns.

## 2.6 Electrical safety

Electrical installation must be carried out by a qualified electrician and in accordance with local regulations.

The filter tank or the frame must be connected to ground. Also see section 4.4.

The main power switch/emergency stop must be fitted in accordance with applicable regulations.

## 2.7 Safety instructions

The filter is activated by turning the main power switch to the ON (1) position and then selecting AUTO, REMOTE or HAND with the mode selector on the front of the control cabinet.

NB See instructions in section 5.1.



Turn the main power switch to the OFF (0) position and lock it with a padlock before performing any work on the filter.



Access to the filter by unauthorised persons is strictly prohibited. Outdoor installations must be fenced in.

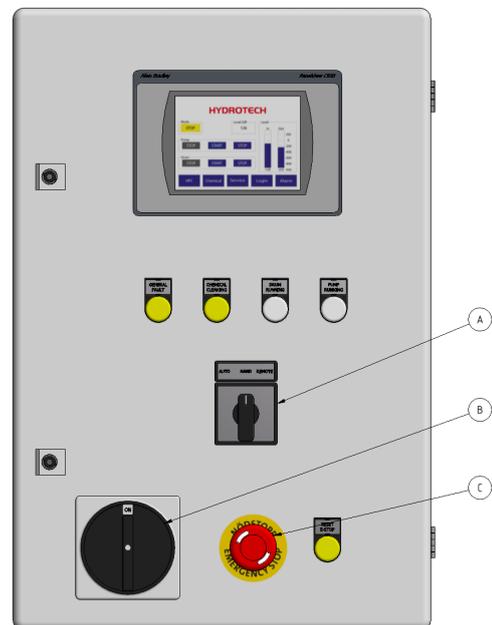


Figure 2.3 Hydrotech control cabinet PFLC.

A. Mode selector

B. Main power switch

C. Emergency stop



*The drum can start rotating without warning if automatic control is activated. Moving parts must not be touched.*

Safety guards are fitted around the power transmission. Make sure these are secured and correctly fitted.



*Spray from the backwash water may contain harmful substances.*

Measured noise levels from the filter are less than 74 dB (A). Personnel should use appropriate protection, when necessary, in accordance with local regulations.

## 3. HYDROTECH DISCFILTER HSF2200 SERIES

### 3.1 Reception

Once the equipment has been delivered and received it must be checked for transport damage. Document any transport damage before further handling of the equipment. The consignment note, manual and spare part kit are attached to the equipment. Check all parts against the consignment note. Some parts may be delivered unassembled. Handle fragile parts with care. Refer to section 4.1 before lifting the equipment.

### 3.2 Storage

Some precautions must be taken to prevent damage to equipment if a long storage time is necessary (several weeks or more):

- ▶ The equipment should preferably be stored indoors, in a frost-free area.
- ▶ The filter must be protected against direct sunlight if stored outdoors. Heat and UV radiation can damage the filter panels and the control panel touch screen.
- ▶ If the filters are delivered inside plastic covered wooden crates, a special type of corrosion can occur if stored outdoors, especially in coastal areas. The moisture inside the plastic acts as an anode and the exposed dry components as a cathode. In these areas, filters must therefore be unpacked immediately upon delivery.

## 3.3 Overview

### 3.3.1 HSF2200 type 1, filter with tank

NB Also see section 3.3.2 (HSF2200 type 2, filter without tank) where several filter parts are shown.

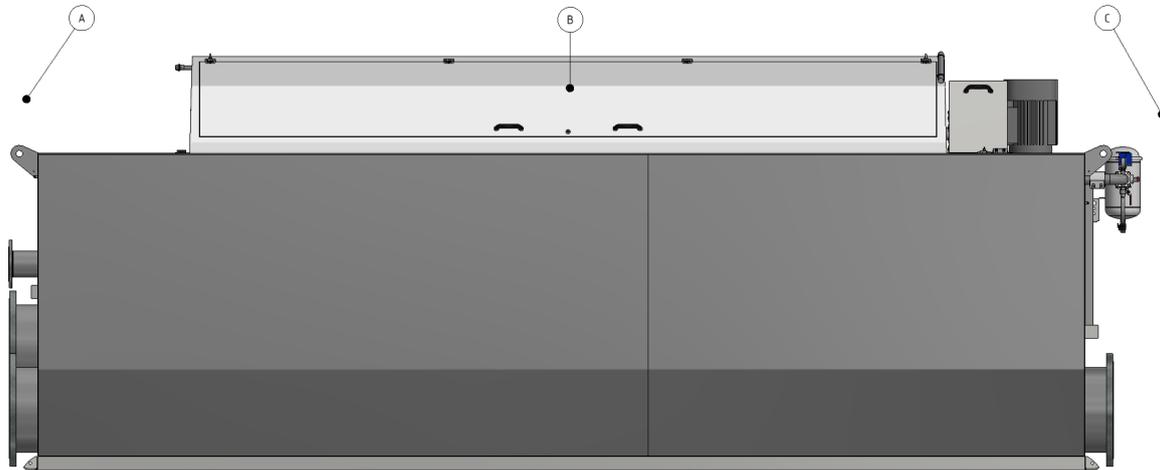


Figure 3.1 Hydrotech Discfilter in HSF2200 series type 1 (side view).

- A. Inlet side
- B. Filter cover
- C. Drive side

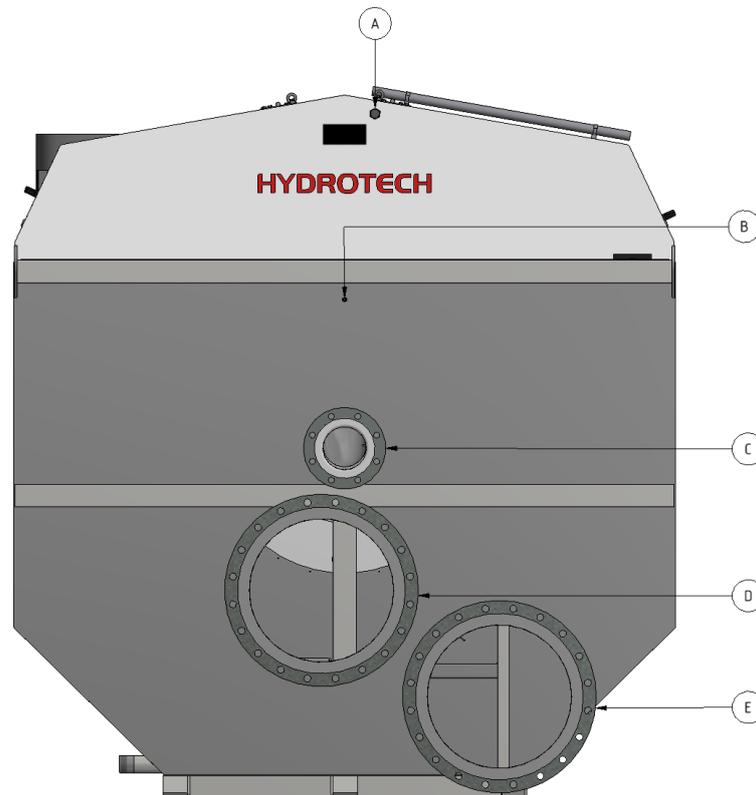


Figure 3.2 Hydrotech Discfilter in HSF2200 series type 1 (inlet side).

- A. Connection, chemical cleaning
- B. Lubrication point
- C. Sludge outlet
- D. Inlet
- E. Outlet, separate emergency overflow (bypass) (optional)

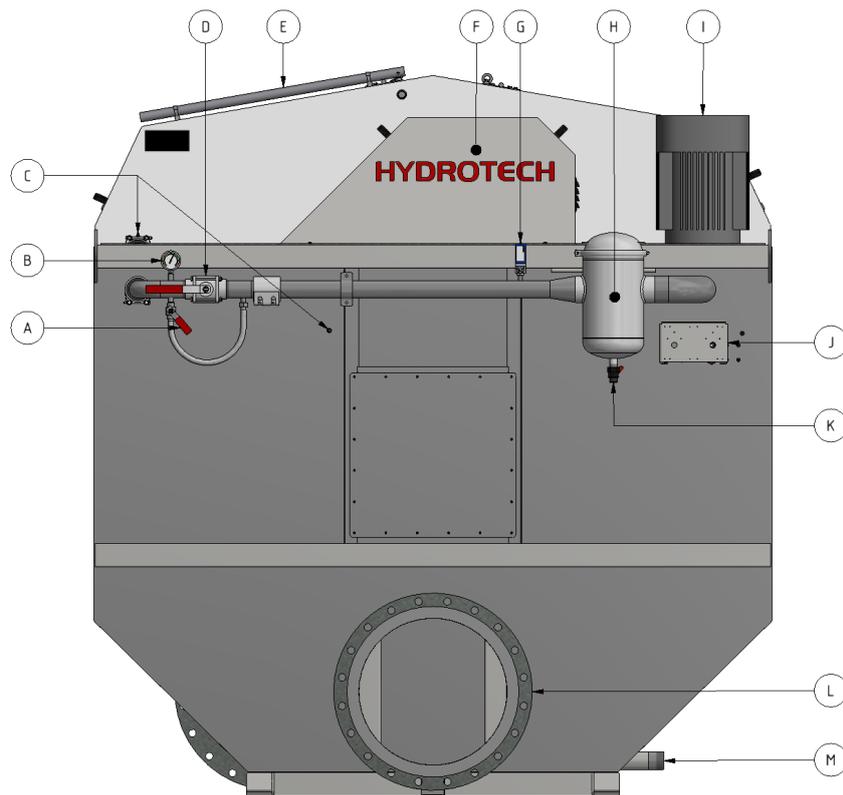


Figure 3.3 Hydrotech Discfilter in HSF2200 series type 1 (outlet side).

- A. Bypass valve for nozzle check
- B. Manometer
- C. Lubrication point
- D. Shut off valve for backwash pipe
- E. Backwash ramp lever
- F. Drive unit
- G. Pressostat - dry running protection for pump (optional)
- H. Wash water filter
- I. Backwash pump
- J. Junction box
- K. Drain valve
- L. Outlet
- M. Drain (tank. tvpe 1)

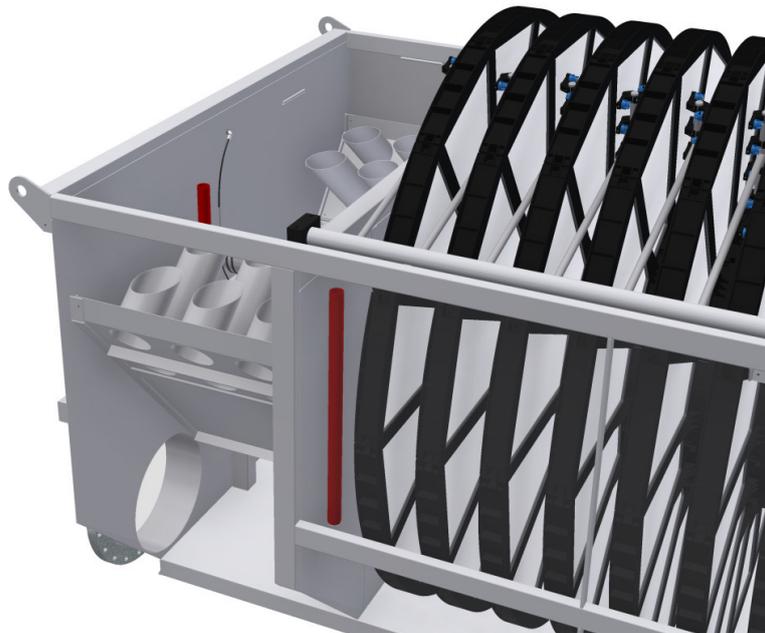


Figure 3.4 Nivågivarna är placerade i de i figuren rödmarkerade hållarna.

### 3.3.2 HSF2200 type 2, filter without tank

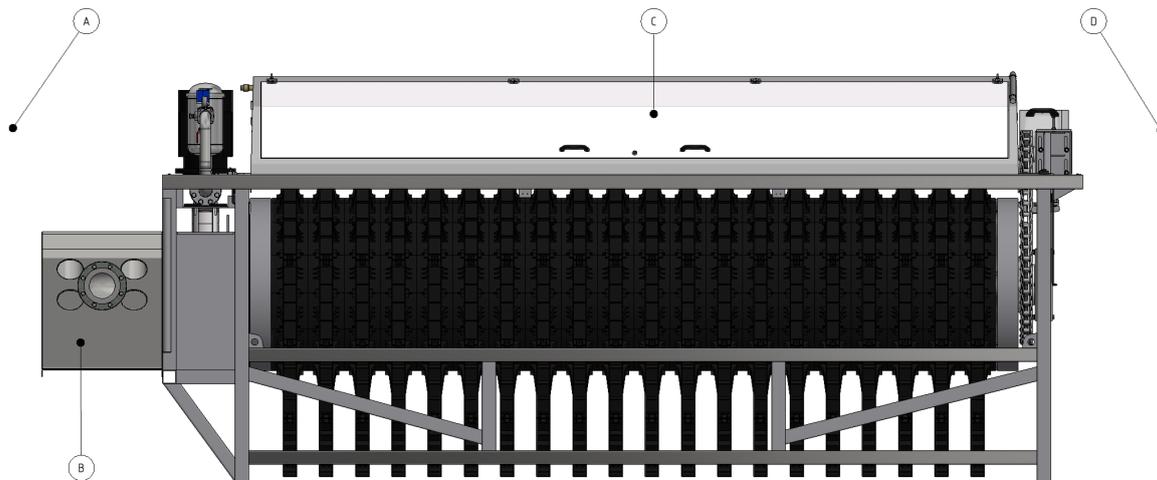


Figure 3.5 Hydrotech Discfilter in HSF2200 series type 2 (side view).

- A. Inlet side
- B. Inlet passage
- C. Filter cover
- D. Outlet side

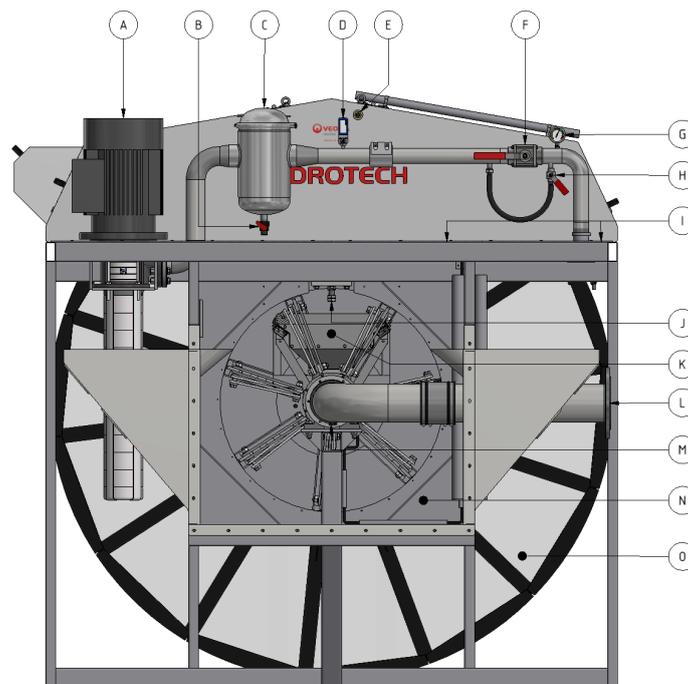
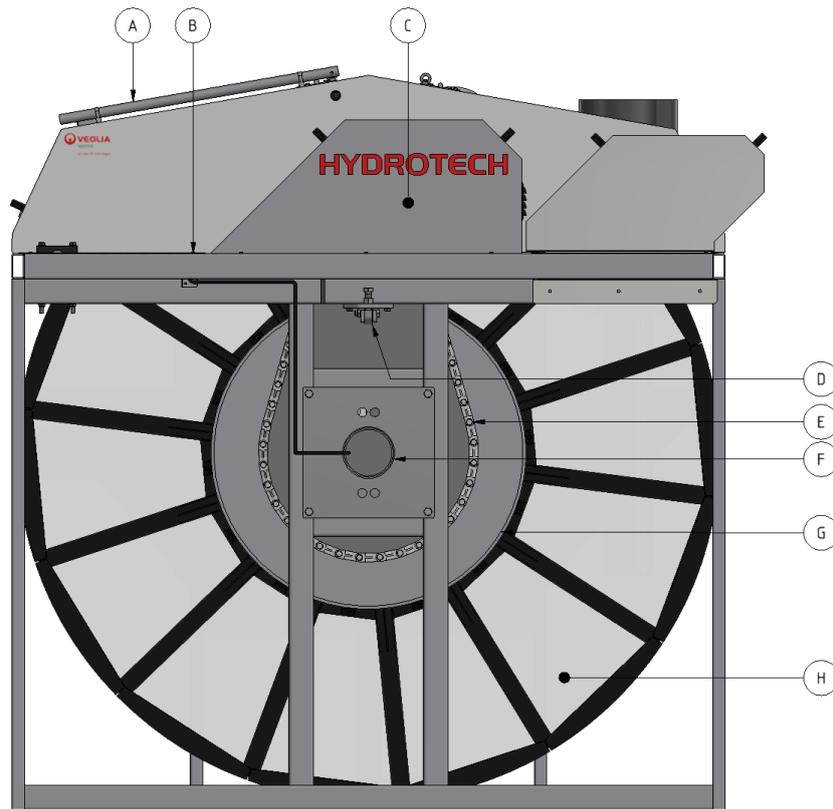


Figure 3.6 Hydrotech Discfilter in HSF2200 series type 2 (inlet side).

- A. Backwash pump (optional)
- B. Drain valve
- C. Wash water filter
- D. Pressostat (protects pump from running dry) (optional)
- E. Connection, chemical cleaning
- F. Shut off valve for nozzle check
- G. Manometer
- H. Bypass valve for nozzle check
- I. Lubrication point
- J. Drum lifter
- K. Sludge through
- L. Sludge outlet
- M. Drum bearing, inlet side
- N. Inlet
- O. Filter panel



*Figure 3.7 Hydrotech Discfilter in HSF2200 series type 2 (outlet side).*

- A. Backwash ramp lever*
- B. Lubrication point*
- C. Drive unit*
- D. Drum lifter*
- E. Drive chain*
- F. Drum bearing, outlet side*
- G. Drum*
- H. Filter panel*

### 3.4 Identifying the filter

Filter type, serial number and year of manufacture are stated on the marking plate. The filter type and serial number are also stated on the front of this manual.



Figure 3.8 Filter marking plate.

#### 3.4.1 Definition of filter type

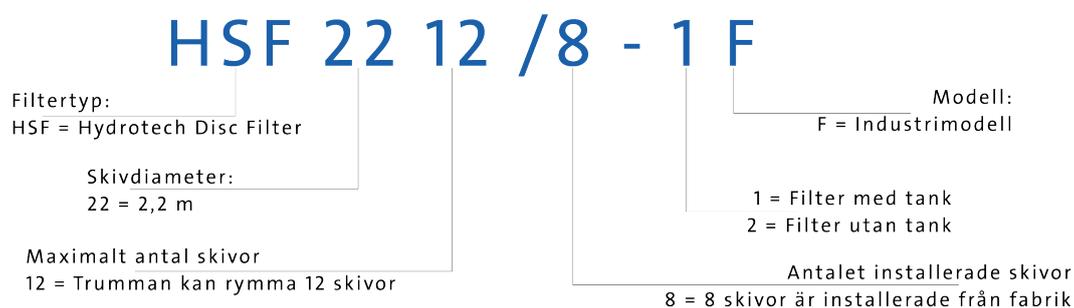


Figure 3.9 Definition of filter type

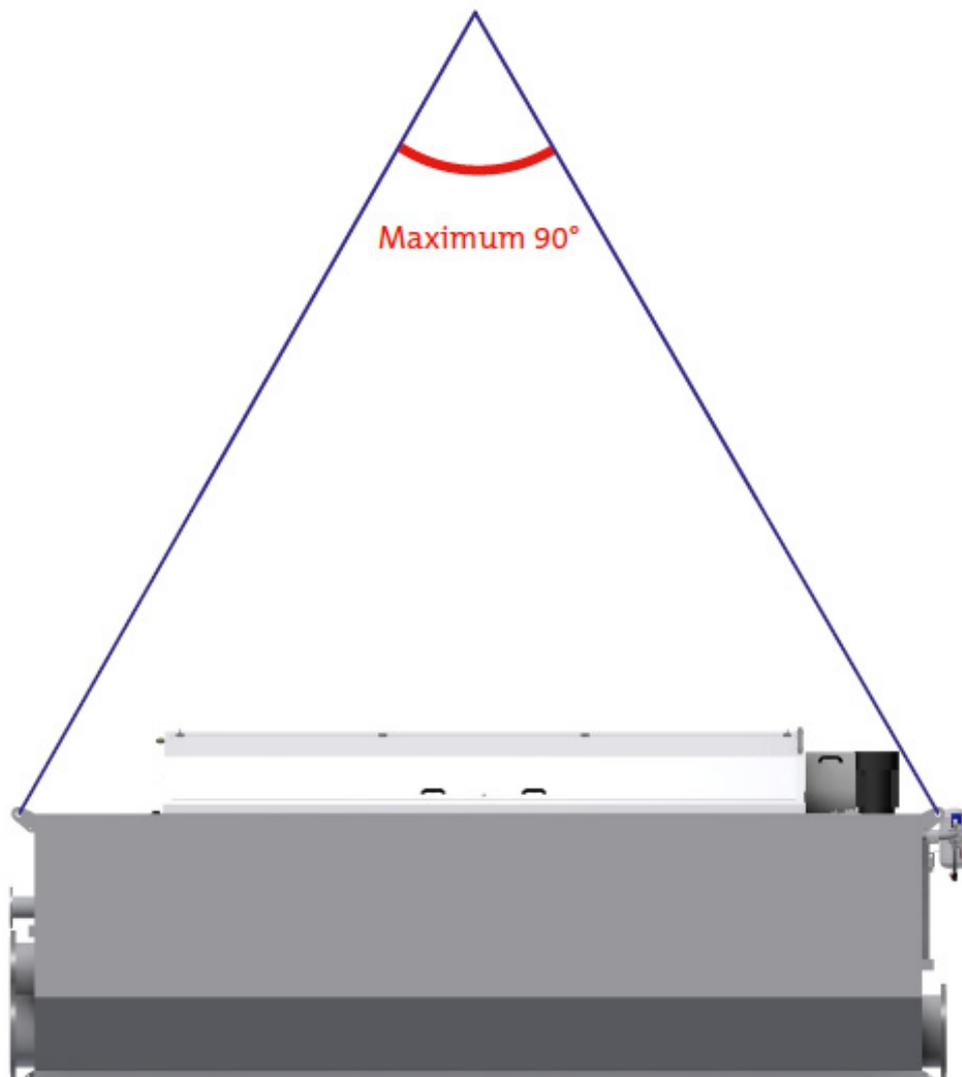
## 4. GENERAL INSTALLATION INSTRUCTIONS

### 4.1 Lifting the equipment

- ▶ A forklift truck with long forks must be used when lifting filters in wooden crates.
- ▶ Filters with a tank can be lifted using a crane or overhead crane by using the filter's lifting lugs, or with a forklift truck.



**WARNING!** *The work area must be fenced off before unloading, in accordance with local regulations, to prevent unauthorised access.*



*Figure 4.1 Lifting Hydrotech Discfilter in HSF2200 series type 1 (with tank).*

- ▶ Filters without a tank can be lifted using a crane or overhead crane by using the filter's lifting lugs.

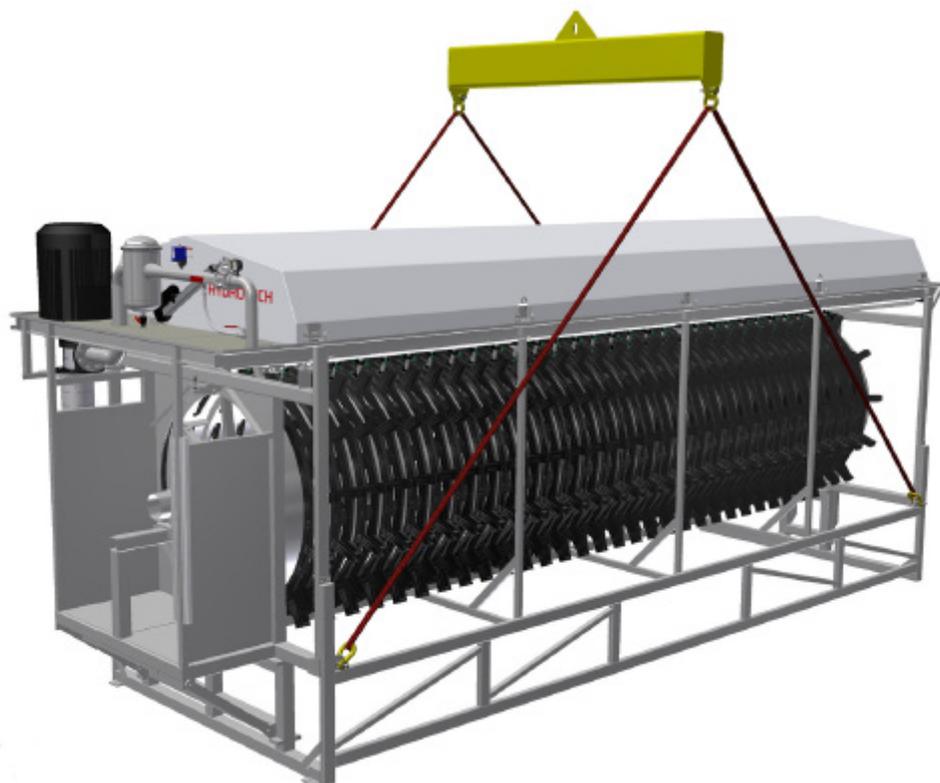


Figure 4.2 Shows how lifting devices are attached (filter without tank).

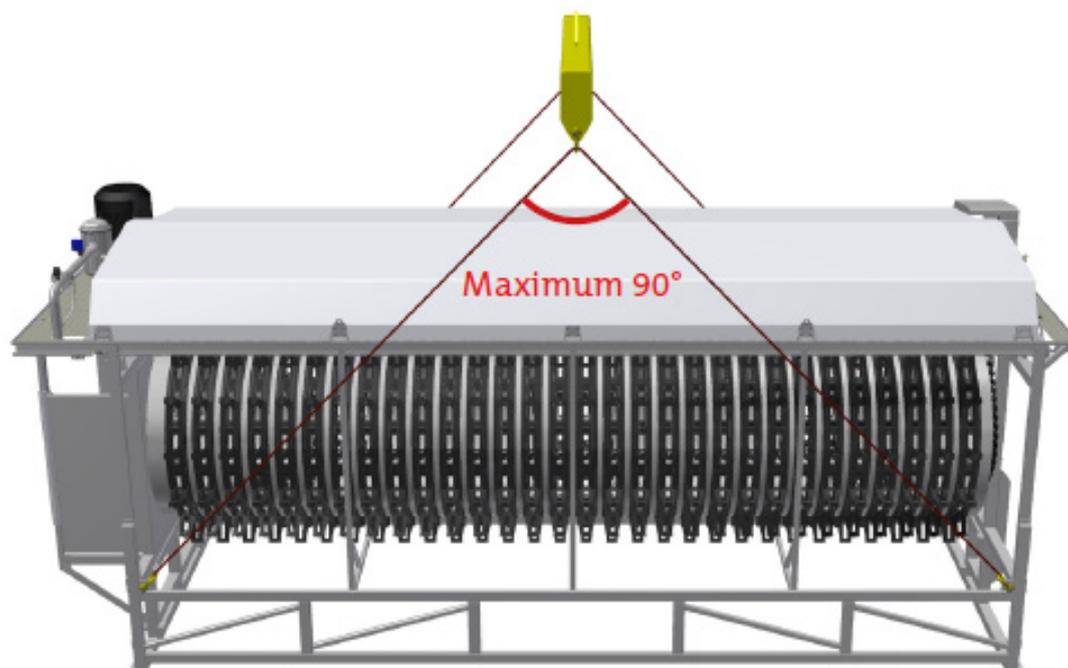


Figure 4.3 Lifting Hydrotech Discfilter in HSF2200 series type 2 (without tank).

## 4.2 Installation site

### 4.2.1 Outdoor installation

In the event of outdoor installation it is important to protect the filter panels against direct sunlight, as heat and UV radiation otherwise can cause damage to the filter panels. The same applies to the control panel touch screen.

The equipment must be protected against temperatures below freezing point. At water temperatures above +5°C and air temperatures above -10°C the filter cover provides sufficient protection. At lower water and air temperatures, filter installation should be indoors.

### 4.2.2 Foundations

- ▶ The filter must be installed on a flat surface that offers sufficient load bearing capacity.
- ▶ The filter is to be bolted to the foundation.
- ▶ The filter must be level in both directions (see Figure 4.4).
- ▶ 600 mm wide aisles should be laid out around the filter to permit easy access to the filter during service work.
- ▶ The gap between the filter and the concrete structure must be sealed for safety reasons and to keep out foreign objects that can cause blockages in the backwash system.

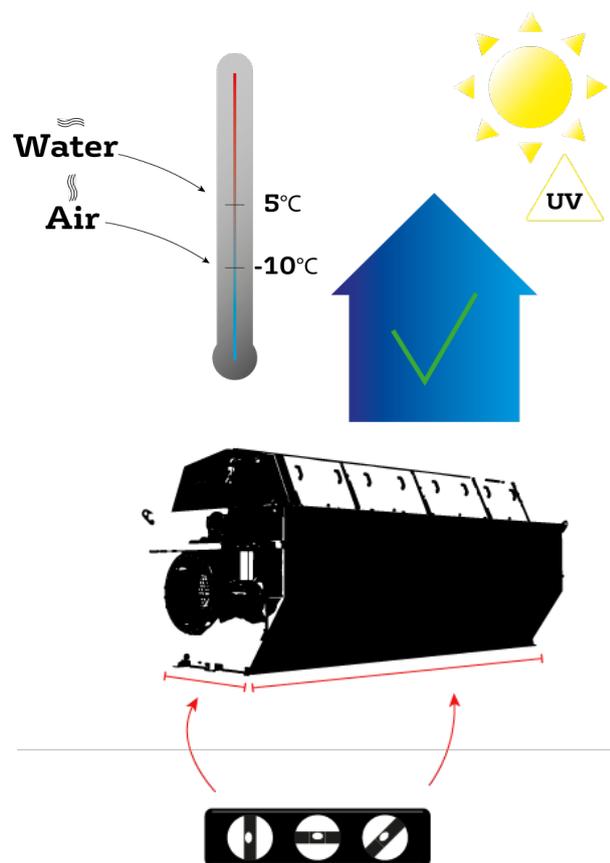


Figure 4.4 Installation av filter

## 4.3 Electrical connection



Qualified electricians must perform all electrical work.

Electrical connection must be done in accordance with local regulations. Check that the settings on the motor protection correspond with the motor data.



Section 4.5 must be read before starting the filter's drum rotation.

## 4.4 Equipotential bonding

The Hydrotech Discfilter and associated equipment should be protected with a suitable system for equipotential bonding. This is very important to prevent galvanic corrosion. Ideally use a cable with a cross section of 10–16 mm<sup>2</sup>. The cable should be connected to the same electrical potential as the drive system.

## 4.5 Checking drum rotation

Start drum rotation and check that the drum rotates in the same direction as the rotation arrow on the drive unit cover.

## 4.6 Pipe connections

Piping for reject should have a minimum inclination of 1%.

## 5. START UP AND OPERATION

### 5.1 Check procedures during start-up

1. Check that the drive unit cover is installed correctly.
2. Set the mode selector to the HAND position (see F in Figure 5.2).

3. Set the main power switch to the ON (1) position (see I in Figure 5.2).

4. Start the drum rotation on the operator panel main menu (see Figure 5.1 and Figure 5.2).

5. Open the water supply a little so that the water can slowly run into the filter drum. Make sure that the difference in water level between the inside and outside of the filter drum does not exceed 450 mm (see section 5.2.1). If the filter cloth becomes clogged, it may be necessary to fill the filter tank/chamber with water from an external source or to remove a filter panel and fill the filter tank/chamber with unfiltered water.

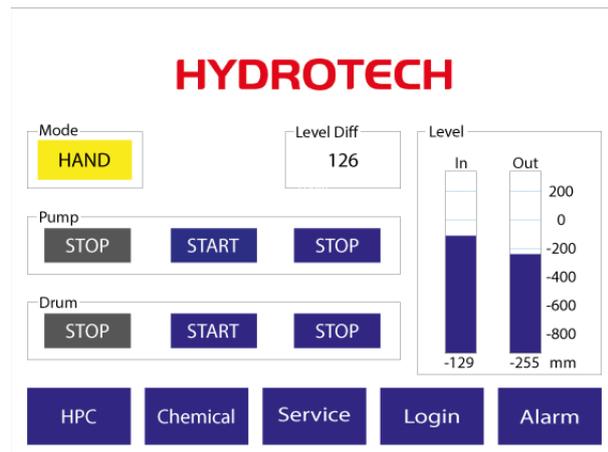


Figure 5.1 Main menu on electrical cabinet operator panel. (Indication of current backwash pressure is an option.)

**WARNING!** A greater difference in water level between the inside and outside of the filter drum than 450 mm will damage the filter.

6. When the water level inside the filter tank/chamber exceeds the pump suction pipe (or, if a CRK or MTR pump has been installed, the pump), the pump must be started by pressing “Start” on the operator panel main menu (see Figure 5.1). NB Also read section 2.7.

**WARNING!** The backwash pump must not be started until the water level has reached the suction pipe (or pump if a CRK or MTR pump is installed), otherwise the pump will run dry and fail.

7. If the water level inside the filter tank/chamber reaches the overflow wall, turn the mode selector from HAND position to either REMOTE or AUTO (see section 5.2).

8. Open the water supply fully.

If the filter is operated using automatic level control, it may be necessary to calibrate the level sensor in order for the filter to be run optimally (see “Automatic System Manual HSF2200”).

## 5.2 Automatic settings

The control system for the HSF2200 series must be equipped with a frequency converter on the drive unit. This is factory calibrated if delivered from Hydrotech. To perform a soft start of the drive motor, the frequency converter settings must be min. 5 sec “ramp up” and min. 3 sec “ramp down”. The filter works with 50 Hz as standard.

If the filter is equipped with a Hydrotech standard control, the filter has three operating modes:

1. Automatic level control (AUTO mode).
2. Remote control (REMOTE mode).
3. Service mode (HAND mode).

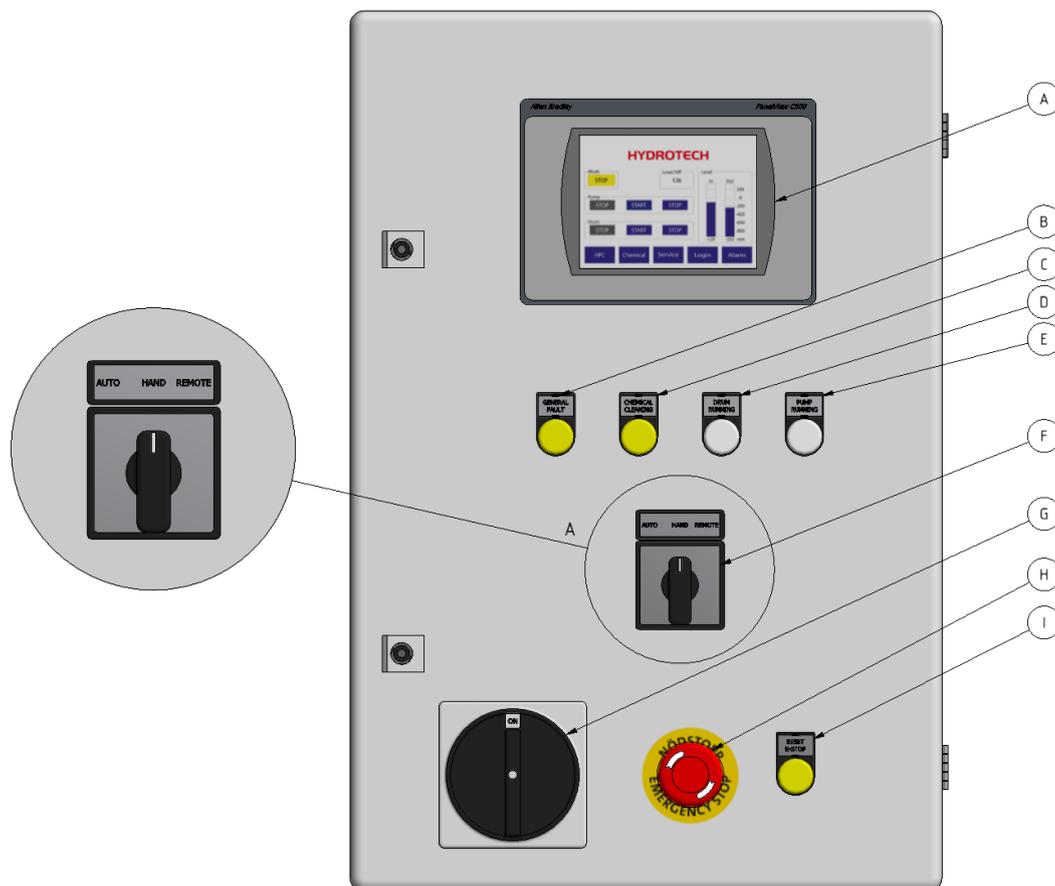
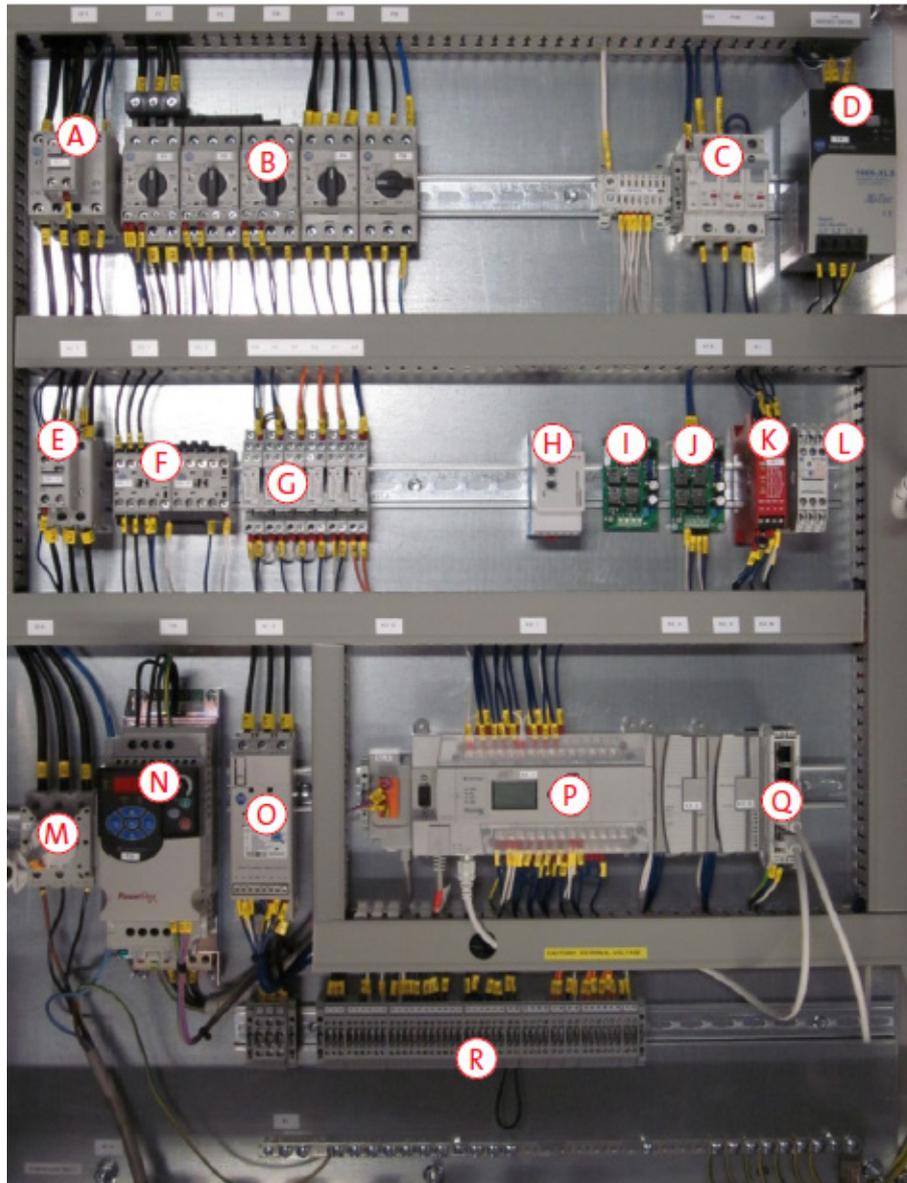


Figure 5.2 Front of the control cabinet.

- A. Operator panel
- B. Warning lamp: Fault indicator
- C. Warning lamp: Chemical cleaning
- D. Indicator lamp: Drum operation
- E. Indicator lamp: Pump operation
- F. Mode selector (Auto/Hand/Remote)
- G. Emergency stop
- H. Reset button for emergency stop
- I. Main power switch

Turn the mode selector to select the appropriate operating mode (see Figure 5.2, detail F).



*Figure 5.3 Component parts of the Hydrotech control cabinet.*

- A. Line breaker*
- B. Automatic circuit breaker*
- C. Fuses*
- D. Mains supply (24 V)*
- E. Contactor, pump*
- F. Contactors, HPC drive unit (optional)*
- G. Relay*
- H. Level relay, flush valve (optional)*
- I. Circuit board, flush valve actuator (optional)*
- J. Circuit board actuator, HPC lever (optional)*
- K. Emergency stop relay*
- L. Thermistor relays, to pump and drive unit (optional)*
- M. Main power switch*
- N. Frequency control, drive unit*
- O. Soft start pump*
- P. PLC*
- Q. Network switch*
- R. Terminal blocks*

### 5.2.1 Level differences

The maximum permitted difference between the water levels inside and outside the drum is 250 mm during normal operation (see Figure 5.4). The recommended level difference is 100–200 mm.

If an even flow after the filter is required, the filter must be run with a small level difference.



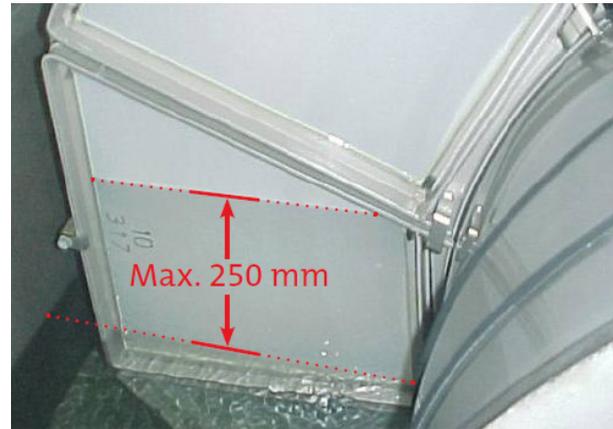
*The filter must be installed so that the level difference in the event of operating disturbances under no circumstances exceeds 450 mm.*



*The filter must be run so that the level difference during normal operation does not exceed 250 mm.*



*Prolonged operation with a greater level difference will significantly shorten the life of the filter panels and other vital parts.*



*Figure 5.4 Maximum permitted level difference during operation.*

### 5.2.2 Operating mode AUTO – Automatic level control

With automatic level control, drum rotation and the backwash pump are activated once the level difference between filtered and unfiltered water exceeds an adjustable value. The filter is force-started if the filter has stood still for an extended period of time. If an external backwash water supply is used, the level sensor can control a solenoid valve instead of a pump.

The water level inside the drum will vary when AUTO mode has been selected. The water level is at its lowest immediately after a backwash cycle and then rises until drum rotation and backwashing start.

### 5.2.3 Operating mode REMOTE – Remote control

In REMOTE operating mode, the filter can be controlled remotely. In remote control mode, the filter can either be controlled as if in AUTO operating mode or using an external controller, see the “Automatic System Manual”.

## 5.2.4 Service mode HAND

HAND is only a service mode.

In order to operate the filter in HAND mode, the following steps must be implemented:

1. Turn the mode selector shown in Figure 5.2 to the HAND position.
2. Once the mode selector has been turned to HAND, “HAND” will be shown in the operator panel main menu, see Figure 5.5. Press the drum “Start” button, see Figure 5.5.
3. Press the pump “Start” button, see Figure 5.5.

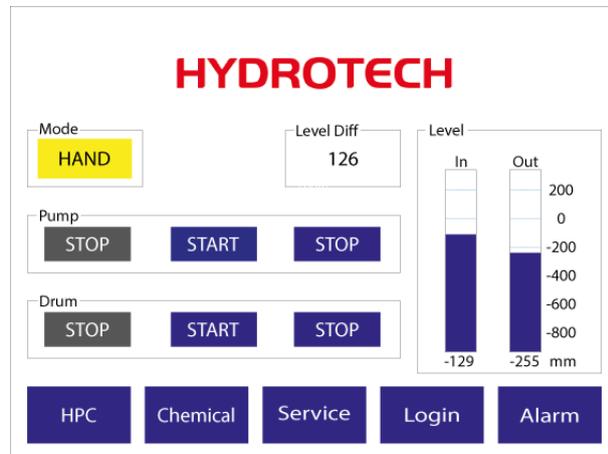


Figure 5.5 Main menu on electrical cabinet operator panel. (Indication of current backwash pressure is an option.)

The operator panel main menu also shows the water levels of unfiltered (In) and filtered water (Out), as well as the level difference between them (Level Diff).

## 5.3 Backwash system

NB Prior to servicing, read section 2.7.

The system pressure for backwashing must be set to 7–9 bar. Newly connected pipe systems for external backwash water should be rinsed through before they are connected to the filter. Check that the nozzles are not blocked, see section 7.1.

## 6. FUNCTION

### 6.1 Intended use

The filter is designed and manufactured to remove solid particles in unpressurised water flow systems. The filter is not a pressure vessel.

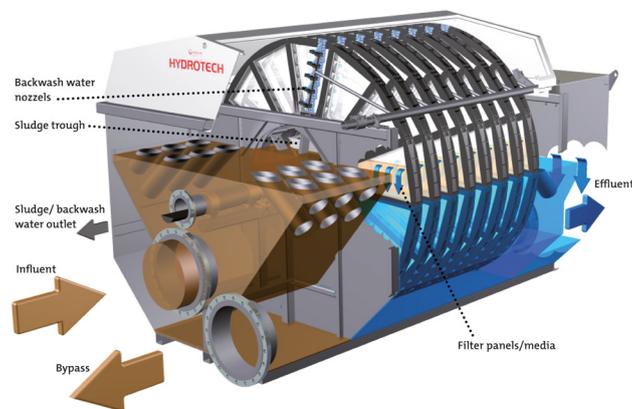
### 6.2 Non-intended use

Unless approved in writing by Hydrotech, the filter must not be used to filter liquids other than water. The filter must not be installed in an environment with an explosive atmosphere or another risk of explosion, such as high concentrations of dust.

### 6.3 Filtration and backwash process

A brief description of the process is given below.

1. The water to be filtered flows with gravity from the inside of the filter drum out to the filter segments.
2. Solid particles are separated from the water using a filter medium attached to both sides of the filter segments, whilst clean water passes through the filter medium to the outside of the filter segment.



*Figure 6.1 Disc filter function.*

3. Operating mode AUTO – The solid particles trapped on the inside of the filter medium gradually reduce the water flow through the filter panel. The water level on the inside of the drum begins to rise. When the level difference between filtered and unfiltered water exceeds the set value, drum rotation and backwashing start. Operating mode REMOTE – The filter is controlled as in AUTO operating mode or using external control (e.g. time-controlled drum rotation and backwashing). Operating mode HAND – Drum rotation and backwashing are started manually.

4. The backwash nozzles spray wash water on the outside of the filter panels. The solid particles that accumulate are washed from the filter panels to the sludge channel, at the same time as the drum rotates.

5. The removed particles and backwash water flow with gravity out of the filter.

## 7. MAINTENANCE/SERVICE

### 7.1 Backwash system

The most common cause of operating disruptions in the backwash system is clogged nozzles. Clogging is caused by particles in the wash water and/or by e.g. biofouling in the pipe system.

There are also nozzles that are self-cleaning and less sensitive to blocking than the conventional nozzles, see section 7.1.2.

#### 7.1.1 Servicing conventional nozzles

1. Turn the main power switch to the OFF (0) position and the mode selector to the HAND position.
2. Open the cover/remove the covers on the side where the backwash pipe is located.
3. Open the bypass valve (see Figure 7.1).

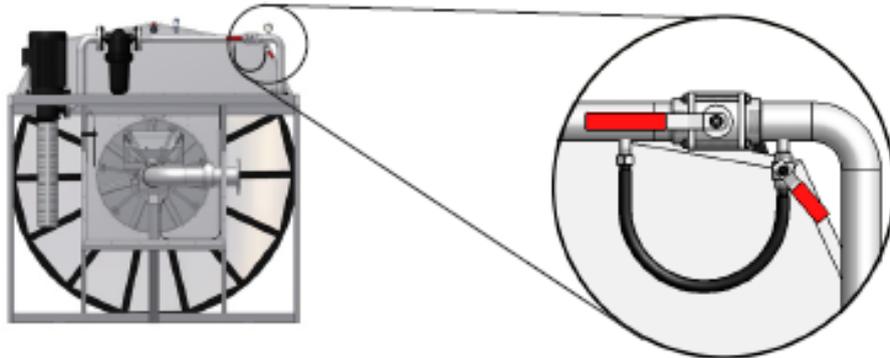
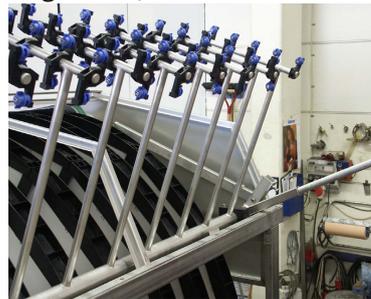


Figure 7.1 Main valve and bypass valve for checking the nozzles.

4. Turn the main power switch to the ON (1) position and the mode selector to the HAND position.
5. Start drum rotation and the backwash pump.
6. Close the main valve and adjust the water flow with the bypass valve so that it flows a little yet with a constant flow through the nozzles. This makes it easy to determine which nozzles need to be cleaned.
7. Fold out the backwash ramp with the loose lever (see Figure 7.2).



Figure 7.2 a) Placera den lösa hävarmen i fästet.



b) Fäll ut spolrampen.

8. Check whether any of the nozzles are clogged by checking whether water runs through them. Clogged nozzles are cleaned as follows:

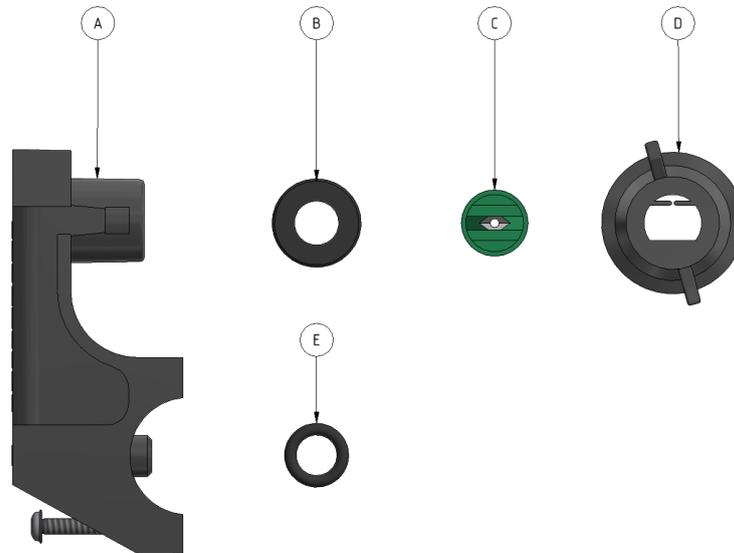


Figure 7.3 Nozzle components.

A. Nozzle attachment

B. Rubber seal

C. Nozzle tip

D. Nozzle nut

E. O-ring

9. Remove the nozzle nut by turning it a  $\frac{1}{4}$  turn anticlockwise. Exercise care not to lose the rubber seal.

10. Clean the tip of the nozzle with compressed air or a plastic brush. Never use a wire brush, metal pins or similar as these can damage the nozzle.

11. Assemble the parts in the reverse order. Make sure the nozzle nut reaches the stop position when turned a  $\frac{1}{4}$  turn, clockwise.

12. Turn the main power switch to the OFF (0) position.

13. Open the main valve to the backwash water.

14. Place the backwash ramp in its original position with the help of the lever.

15. Close the cover/covers and lock them.

16. Start operations again as set out in section 5.1.



**WARNING!** It is important that the nozzle nuts (see Figure 7.3) are refitted correctly after the nozzles have been cleaned. If a nozzle nut becomes loose, the nozzle tip will fall out and the water jet created will then destroy the filter media.

## 7.1.2 Self-cleaning nozzle

Figure 7.4 below shows a self-cleaning nozzle.

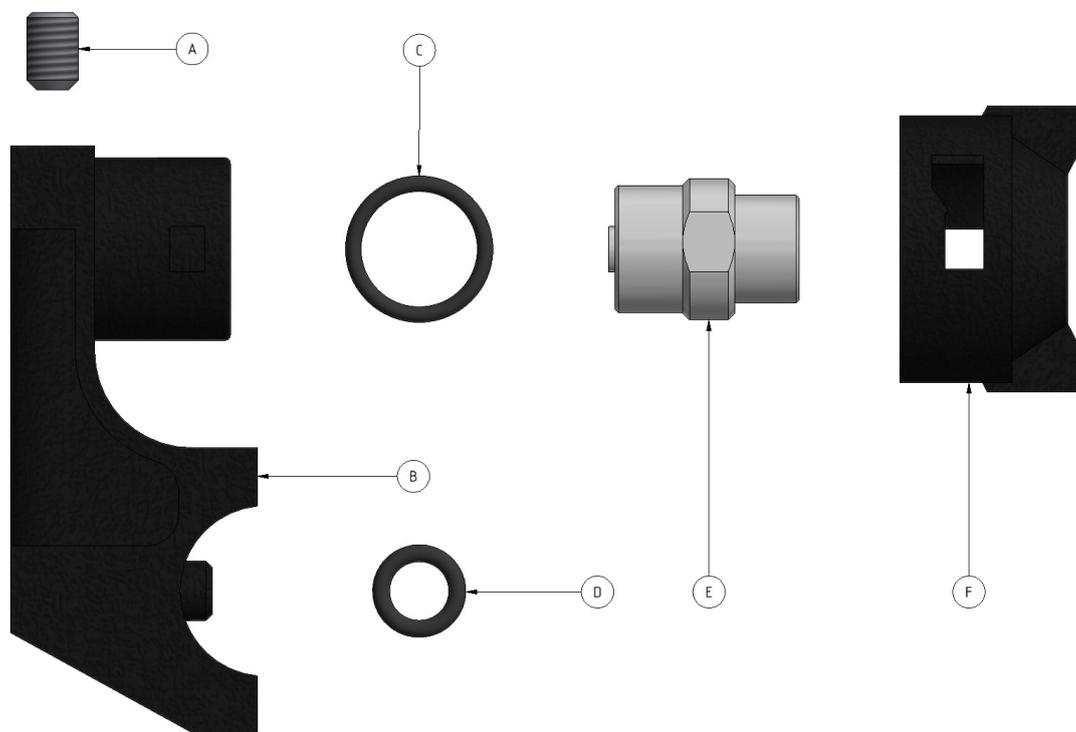


Figure 7.4 Nozzle components, self-cleaning nozzle.

- A. Set screw
- B. Nozzle attachment
- C. O-ring
- D. O-ring
- E. Nozzle tip
- F. Nozzle nut

## 7.2 Cleaning the Hydrotech wash water filter

NB Prior to servicing, read section 2.7.

If the pressure gauge indicates a pressure that is more than 0.5 bar below normal pressure, it's time to clean the wash water filter.

1. Turn the main power switch to the OFF (0) position and lock with a padlock.
2. Drain the wash water filter by opening the valve (A), see Figure 7.5.
3. Loosen the wing nut (C) and remove the clamping ring (B).
4. Lift off the wash water filter cover (D).
5. Remove and clean the filter insert.
6. Secure the filter insert in the cover.
7. Refit the cover/filter insert and the clamping ring.
8. Close the drain valve.
9. Start operation in accordance with section 5.1.



*Figure 7.5 Hydrotech wash water filter.*

- A. Cover*
- B. Wing nut*
- C. Drain valve*

## 7.3 Bearings

NB Prior to servicing, read section 2.7.

Stickers indicating the lubrication points are attached to the filter, see Figure 7.6.



Figure 7.6

### 7.3.1 Lubrication of swivel

The swivel makes up the bearing between the backwash pipe and the connecting pipe for the backwash water (see Figure 7.7).

The swivel's lubrication points are shown in Figure 3.3 and Figure 3.6.



Figure 7.7 Swivel

### 7.3.2 Lubricating drum bearings

The bearings' lubrication nipples are fitted on the outside of the filter. The drum must rotate when the bearings are lubricated.

Lubricate the drum bearings according to the recommendations in chapter 8. The lubrication points are shown in Figure 3.2, 3.3, 3.6 and 3.7.

### 7.3.3 Checking drum bearing wear

1. Turn the main power switch to the OFF (0) position and lock with a padlock.
2. Drain the chamber/filter tank.
3. Check the drum bearings with respect to wear. If the distance between the bearing housing (A) and the shaft (B) is less than 22 mm (see Figure 7.8), the drum bearing must be replaced.
4. Contact your supplier if the drum bearings need to be replaced.
5. Start operations again as set out in section 5.1.

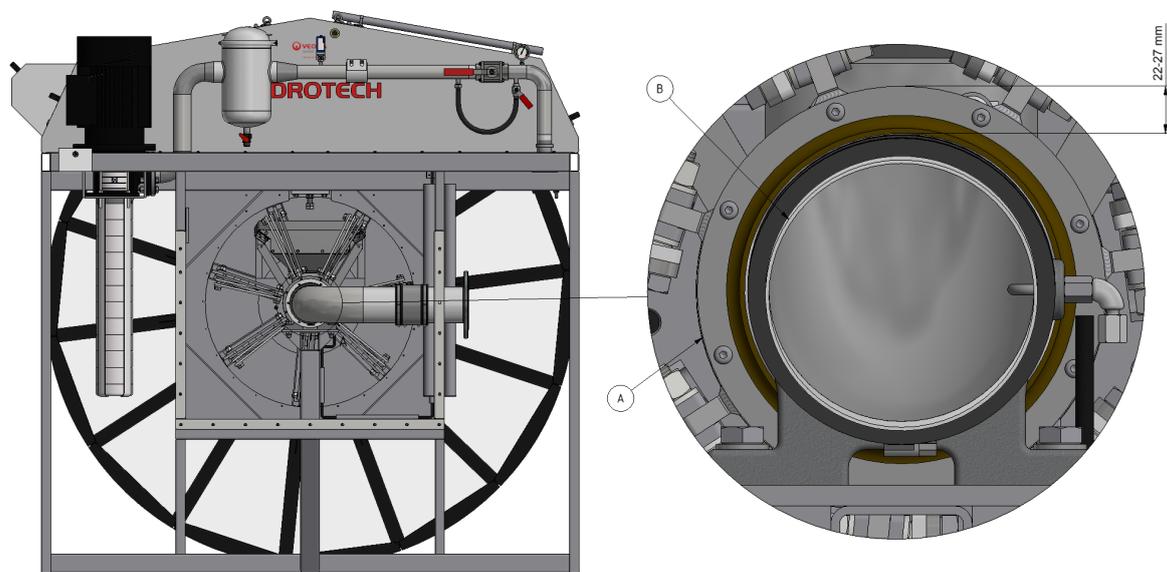


Figure 7.8 Drum bearing housing on inlet side.

## 7.4 Filter panels

NB Prior to servicing, read section 2.7.

### 7.4.1 Additional cleaning

Additional cleaning of the filter panels may be necessary. The need for additional cleaning becomes clear if the frequency of automatic backwash starts increases. Additional cleaning can be chemical cleaning or cleaning with a high pressure washer. If an integrated high pressure washer is not installed on the filter, the filter can be cleaned manually using a separate high pressure washer.



*When using a high pressure washer a wash pressure of max. 80 bar may be used. Maximum allowed water temperature is 60 °C. Never hold the cleaning nozzle directly against the filter media.*

If the filter is equipped with an integrated high pressure washer a high pressure washing programme can be started in accordance with section 7.4.2.

A chemical cleaning programme can be started in accordance with section 7.4.3.

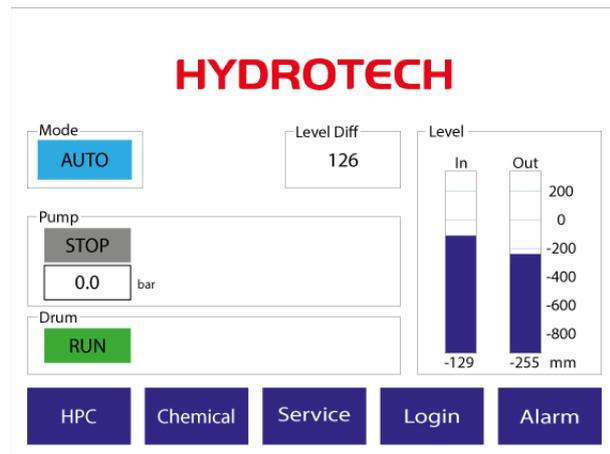


Figure 7.9 Main menu in AUTO operating mode.

### 7.4.2 Cleaning with integrated high pressure washer (option)

1. Turn the mode selector to AUTO position.
2. Select “Login” (if the user is not already logged in) and log in using your user name and password.
3. Select “HPC” on the operator panel, see Figure 7.9.
4. Select “Start” to start the high pressure washing programme, see Figure 7.10. (Settings are found under “Settings”, see Automatic System Manual.)



Figure 7.10 “High Pressure Cleaning” window.

5. When the programme is finished, the machine returns to AUTO mode.

### 7.4.3 Chemical cleaning of filter panels

Long-term clogging of the filter media can be caused by, among other things, iron, calcium or organic fouling. This clogging can normally be removed through chemical cleaning. Three proven products that do not affect the life of the filter media are dilute hydrochloric acid (HCl), dilute sodium hypochlorite (NaClO) and dilute sodium hydroxide (NaOH).



*The use of other types of cleaning agents can cause damage to equipment.*



*The cleaning products must not be mixed. If, for example, HCl and NaClO are mixed this produces toxic chlorine gas. HCl and NaOH are highly corrosive. For safety advice, see applicable local regulations.*

For more detailed instructions, please contact your supplier.

Hydrotech Discfilters in the HSF2200 series as standard are prepared with a chemical ramp to make removal of long-term clogging of the filter media possible.

The Hydrotech chemical trolley HCT (option) is connected to the chemical ramp connection (see Figure 3.2 and Figure 3.6). The control system is prepared and programmed for connection of a dosage system. After completing electrical and mechanical connection, chemical cleaning is started as follows:

1. Turn the mode selector to “HAND”.
2. Select “Login” (if the user is not already logged in) and log in using your user name and password.
3. Select “Chemical” on the operator panel, see Figure 7.11.
4. Set the number of full cleaning cycles to be completed, see Figure 7.12.
5. Select “Start” to start the chemical cleaning programme, see Figure 7.12. (Settings are found under “Settings”, see Automatic System Manual.)
6. Once chemical cleaning has been completed, re-start operation as described in section 5.1.

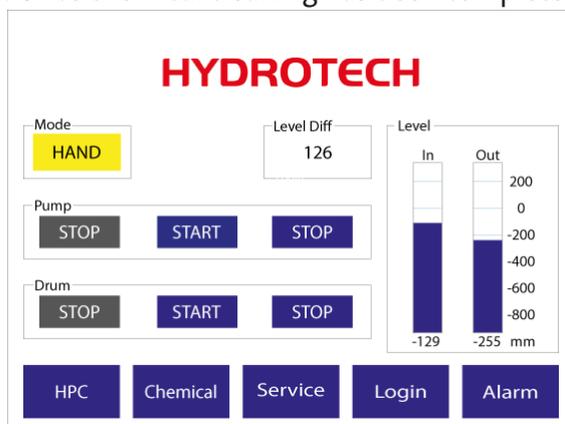


Figure 7.11 Main menu in HAND operating mode.

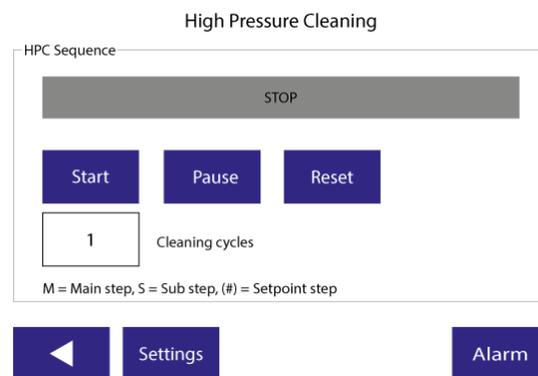


Figure 7.12 “Chemical cleaning” window.

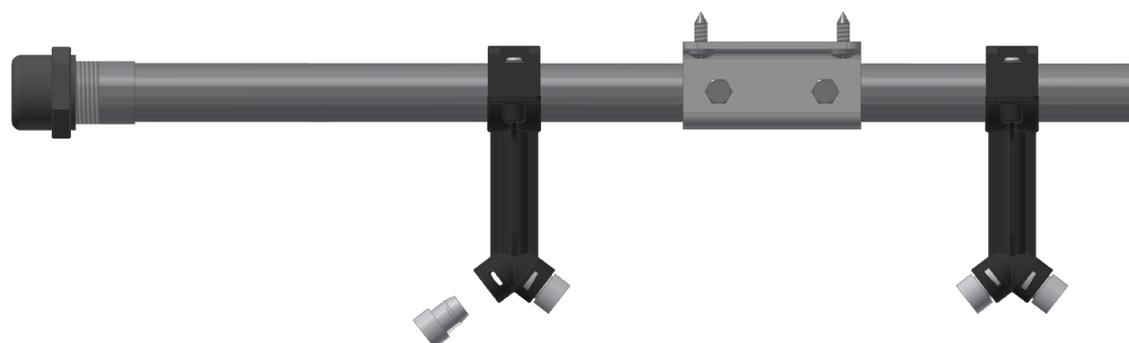
If necessary clean the chemical ramp nozzles as described below:

1. Turn the main power switch to the OFF (0) position and lock with a padlock.
2. Remove the nozzle by turning it ¼ turn anticlockwise (see Figure 7.13).
3. Clean the nozzle with compressed air or a plastic brush.



*Never use a wire brush, metal pins or similar as these can damage the nozzle.*

4. Refit the nozzle on the chemical ramp.
5. Start operations again as set out in section 5.1.



*Figure 7.13 Nozzles on chemical ramp.*

## 7.4.4 Changing filter panels

When replacing the filter panels it is important to maintain the balance of the drum. Remove/refit every other filter panel. This prevents unintentional rotation of the drum and reduces the load on the drive chain and gearbox.

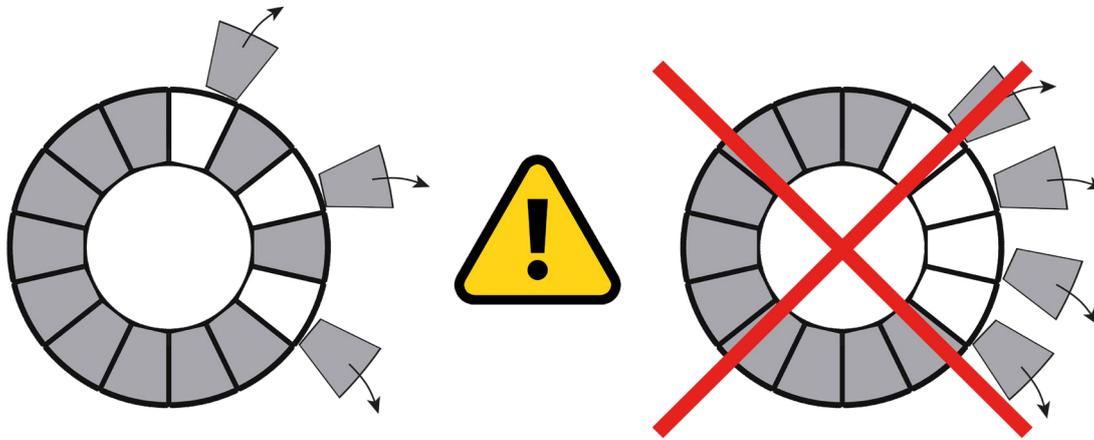


Figure 7.14 Correct way of changing filter panels.



**NEVER** remove or refit all filter panels on just ONE side of the disc (see Figure 7.14).

1. Turn the mode selector to “HAND”.
2. Select “Service” on the operator panel, see Figure 7.15.

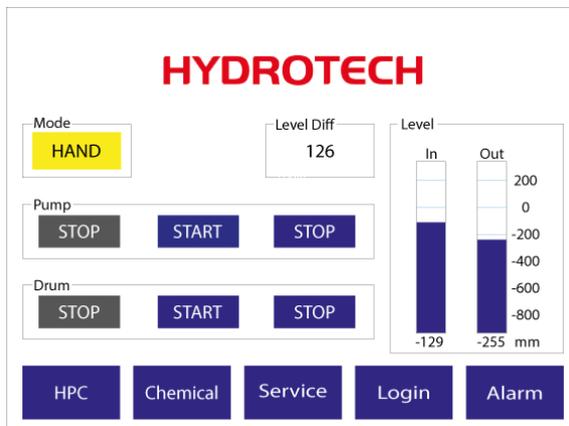


Figure 7.15 Main menu in HAND operating mode.

3. Select “Pump & Drum”, see Figure 7.16. Use the “Jog Fwd” and “Jog Bwd” buttons to set the drum to the desired mode, see Figure 7.17.

4. Turn the safety switch to the OFF (0) position and lock in the OFF (0) position with a padlock.

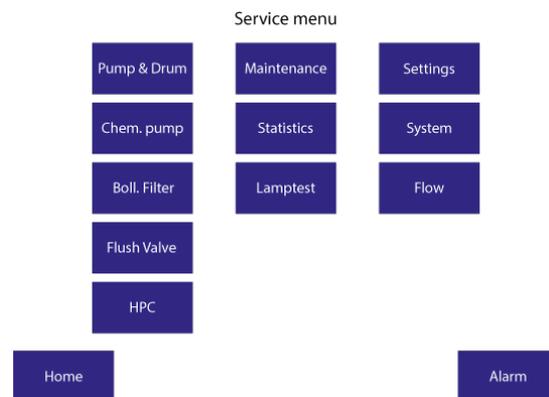


Figure 7.16 Service menu.

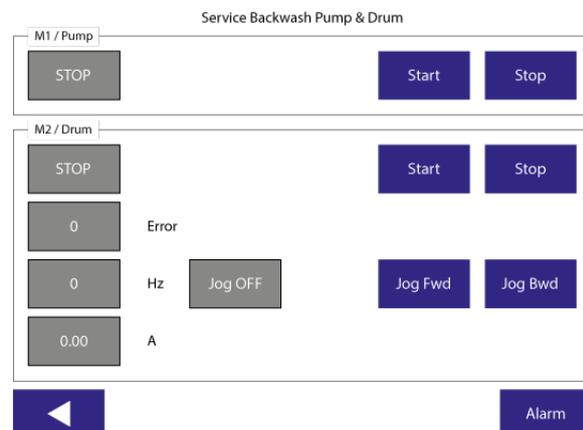


Figure 7.17 “Service Backwash Pump & Drum”.

5. Undo the filter segment cover screws and remove the cover, see Figure 7.18).



*Figure 7.18 The filter segment cover is removed.*

6. Pull out the filter panel (see Figure 7.19).



*Figure 7.19 The filter panel is pulled out.*

7. Insert a new filter panel and press in until it touches the bottom.

NB Filter panels with steel frames must be positioned with the filter cloth facing inwards (see Figure 7.20).



*Incorrect installation of the filter panels can cause damage to the filter segments.*

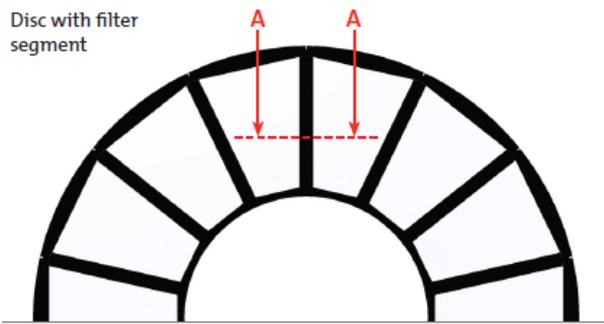
8. Replace the filter segment cover and tighten the screws.



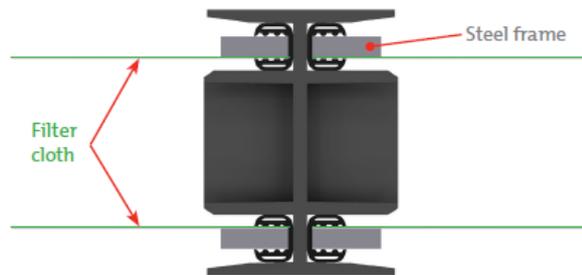
*Maximum tightening torque: 3 Nm.*

9. Fit the remaining filter panels and covers in the same manner.

10. Start operations again as set out in section 5.1.



Cross section A-A: Placement of the filter panel with steel frame



Cross section A-A: Placement of the filter panel with plastic frame

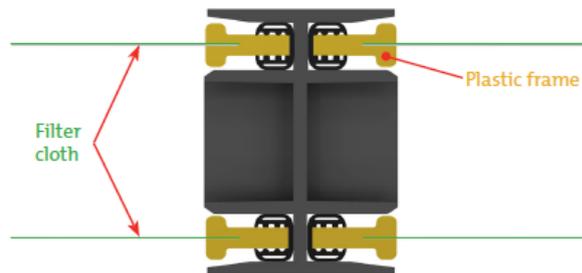


Figure 7.20 Location of filter panel with steel or plastic frame.

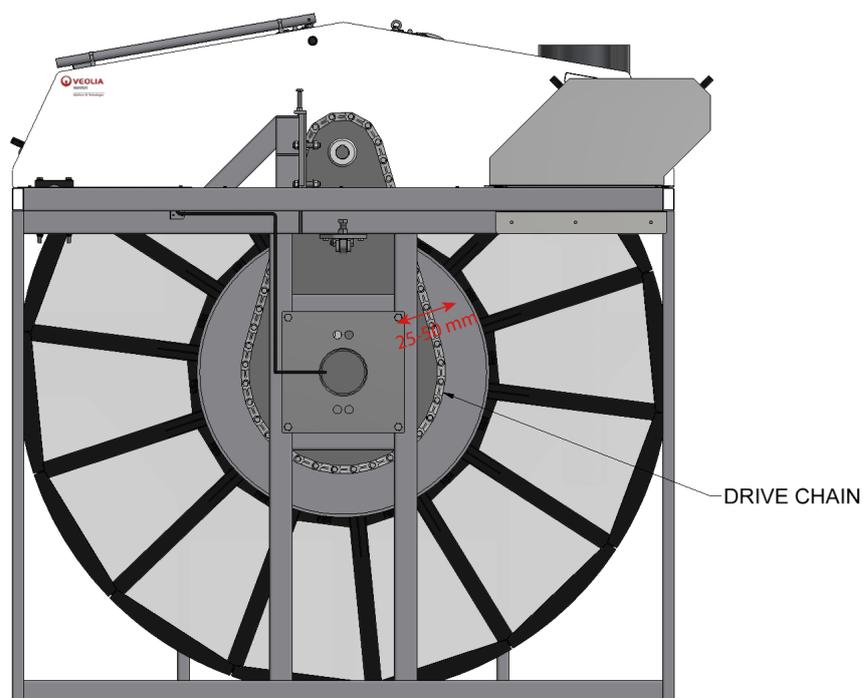
## 7.5 Drive chain

NB Prior to servicing, read section 2.7.

The filter is equipped with a chain drive. For technical data, see Appendices A and D.

### 7.5.1 Checking the drive chain

1. Turn the main power switch to the OFF (0) position and lock with a padlock.
2. Dismantle the motor cover to access the chain.
3. Stretch the chain by turning the drum by hand (in either direction).
4. Check the tension of the chain's return section; it must be possible to move it between 25 and 50 mm, see Figure 7.21.



5. Adjust the chain setting, if necessary, according to section 7.5.2.
6. Start operations again as described in section 5.1.

## 7.5.2 Adjusting drive chain tension

Adjust the drive chain tension as follows:

1. Turn the main power switch to the OFF (0) position and lock with a padlock.
2. Loosen the four nuts (A) (see Figure 7.22).
3. Loosen the nut (B).
4. Adjust the tension of the chain using the screw (C).
5. Secure the screw (C) using the nut (B).
6. Tighten the four nuts (A).
7. Start operations again as set out in section 5.1.

When the drive chain cannot be adjusted any more, the chain is worn out and must be replaced (see section 7.5.3).

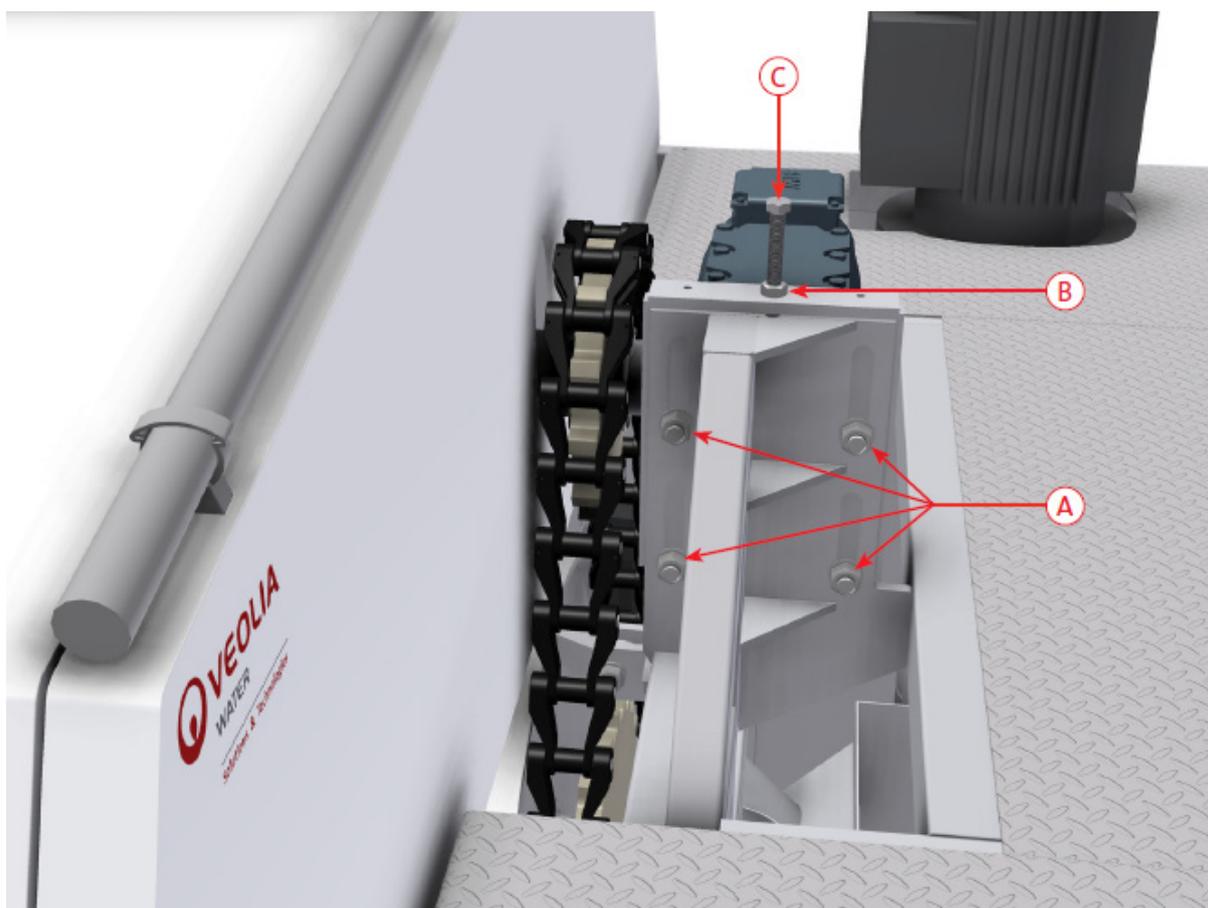


Figure 7.22 Adjusting drive chain tension.

### 7.5.3 Replacing the drive chain

1. Turn the main power switch to the OFF position and lock with a padlock.
2. Lower the drive unit to its lowest position, see section 7.5.2.
3. Split and remove the drive chain.
4. Fit the new drive chain.
5. Adjust drive chain tension in accordance with section 7.5.2.
6. Start operations again as set out in section 5.1.

### 7.6 Drive unit

NB Prior to servicing, read section 2.7.

For information about the drive unit, see Appendix D.

### 7.7 Inlet gasket

NB Prior to servicing, read section 2.7.

#### 7.7.1 Checking the inlet gasket

1. Turn the main power switch to the OFF (0) position and lock with a padlock.
2. Lower the water level in the filter until the whole inlet gasket is accessible.
3. Make sure the inlet gasket rests against the inside of the drum.
4. Inspect the inlet gasket for damage and wear (see Figure 7.23).
5. If necessary, replace the inlet gasket in accordance with section 7.7.2.



Figure 7.23 Inlet gasket.

6. Start operations again as set out in section 5.1.

## 7.7.2 Replacing the inlet gasket

1. Turn the main power switch to the OFF (0) position and lock with a padlock.
2. Lower the water level in the filter until the whole inlet gasket is accessible.
3. Note how the inlet gasket is fitted before it is dismantled.
4. Loosen the screws and nuts holding the inlet gasket in position.
5. Remove the inlet gasket.
6. Fit a new inlet gasket.
7. Start operations again as set out in section 5.1.

## 8. MAINTENANCE SCHEDULE

Check/Action	Maintenance interval
Check whether the wash water filter is clogged. See section 7.2.	The interval is based on experience from the application in question. (When the backwash water pressure drops 0.5 bar below the normal value.)
Check the filter panels for clogging and damage. See section 7.4.	Once a week or another interval based on experience from the application in question.
<p>Inspect the inside of the filter: Make sure no large objects that can get caught in the drum, filter segments or sludge trough have entered the filter. Also check that the reject does not accumulate (sediment) in the sludge trough.</p> <p>NB Prior to servicing, read section 2.7. Remove large objects and rinse the sludge trough.</p> <p> <b>WARNING!</b> Turn the main power switch to the OFF position and lock in the OFF position with a padlock.</p>	Once a week or another interval based on experience from the application in question.
Rinse the metal surfaces of the filter structure with clean water. Clean (uncontaminated) metal surfaces minimise corrosion, particularly in salt water applications.	Twice a month or another interval based on experience from the application in question.
Check the nozzles with respect to clogging. See section 7.1.	Twice a month or another interval based on experience from the application in question.
Lubricate the swivel to the backwash pipe using grease of the type NLGI:2 (e.g. Molykote Multilub, Rembrandt EP or equivalent grease). See section 7.3.1.	Twice a month with continuous drum rotation. Once a month with intermittent drum operation.
Lubricate the drum bearings (on the inlet and drive side) using grease of the type NLGI:2 (e.g. Molykote Multilub, Rembrandt EP or equivalent grease). See section 7.3.2.	Twice a month with continuous drum rotation. Once a month with intermittent drum operation.
Check drive chain tension and condition. See section 7.5.1	Four times a year with continuous drum rotation. Twice a year with intermittent drum rotation.
Check the drive unit's oil level. See section 7.6.	Twice a year.
Check the wear on the drum bearing. See section 7.3.3.	Once a year.
Check the inlet gasket. See section 7.7.	Once a year.
Change the gearbox oil. Oil type: ISO viscosity VG 680 (e.g. Omala oil 680 (Shell) or equivalent gearbox oil). Also see Appendix D.	See Appendix D.

## Symbols used on Hydrotech filters



Symbol is displaying equipotential earth bonding points on the filter.



Symbol shown at lubrication points on the filter. Read the manual for further information about lubrication.



Symbol displaying moving parts. Negligence to comply with safety regulations may lead to injury.



This symbol is placed where certain attention is needed when handling the filter. Read the manual for further information.



Warning for high voltage. Always assume all electrical equipment to be live and



Used as a warning where corrosive fluids is used. Always use appropriate safety equipment when handling corrosive products.

## Manuals & technical information

For further information regarding Hydrotech filters or any other product used together with Hydrotech filters, please visit [www.hydrotech.se](http://www.hydrotech.se). Click on "Manuals & technical information".

Locate the desired product manual and select manual by clicking on one of the language options. The manual will open in a new browser tab where the option to save the manual also can be found.

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