

Drumfilter HDF - 16/20- Value Series

Operation and maintenance manual

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1. INTRODUCTION

This manual contains instructions for operation and maintenance of Hydrotech Drum Filter Value series, HDF16 & 20V. 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 personnel working with the equipment. It is important that:

- ▶ The manual and other applicable documents are retained throughout the equipment's entire service life. The manual and other relevant documents are included as part of the equipment.
- ▶ The manual is carefully read by all who use the equipment, and that it is always available for future use.

2. SAFETY INSTRUCTIONS

Hydrotech Drum Filter Value series HDF16 & 20V, is designed for safe operation provided that it is 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.
- ▶ Consider 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 when operating the filter and when working in close proximity to the filter.
- ▶ The control cabinet for the filter must be placed in a way that the operator has visual contact with the filter unit while operating the control cabinet.

2.1 Warning symbols

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



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

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



Figure 2.1



Figure 2.2

2.2 CE marking

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 98/37/EU (AFS 1994:48).

2.3 Conversion

The CE marking does not extend to any components that are not approved by Hydrotech AB and

that 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

In order to avoid personal injuries and damage to the equipment, service and maintenance may only be carried out by personnel that are trained on the equipment and conversant in local regulations. 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 a main power switch (see Figure 2.3). To perform an emergency stop, turn the main power switch to the OFF (0) position. In the event of a power failure, turn the main power switch to the OFF (0) position to prevent the filter drum from unintentionally rotating once the power is restored.

2.6 Electrical safety

Electrical installation must be carried out by a qualified electrician and in accordance with local regulations. Also see Appendix D. The filter tank or the frame must be connected to ground. Also see section 5.4. 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 HAND or AUTO with the mode selector on the front of the panel. The filter stops if the mode selector is turned to the 0 (OFF) position.

NB. See the instructions in section 6.1 (Check procedures during start-up).



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

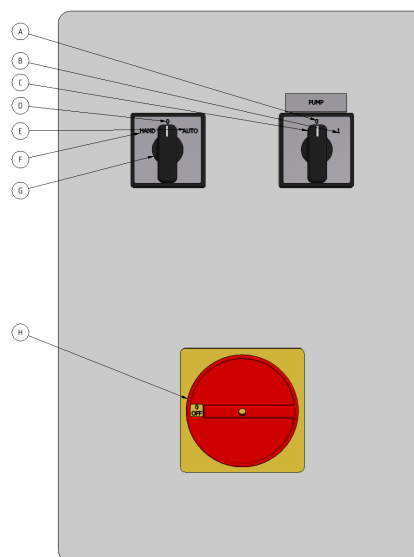


Figure 2.3 Switches in control cabinet (optional)

- A. Pump OFF (0) position
- B. Pump ON (1) position
- C. Pump switch
- D. Mode (0) position
- E. Mode (AUTO) position
- F. Mode (HAND) position
- G. Mode selection switch
- H. Main power switch (ON (1) / OFF(0))



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



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

Safety guards are fitted around the power transmission and in front of the support wheels. Always make sure these are secured and correctly fitted.



The aerosols 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 DRUMFILTER 16 & 20 -VALUE SERIES

3.1 Overview

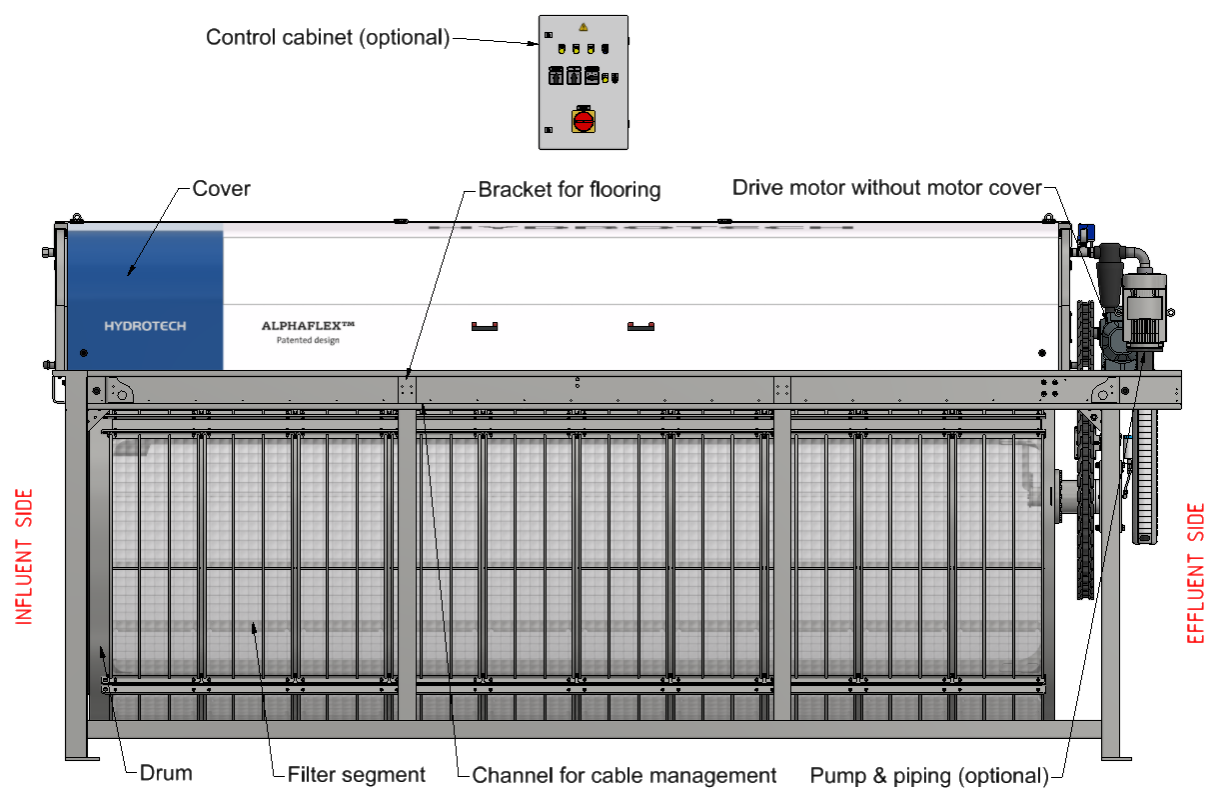
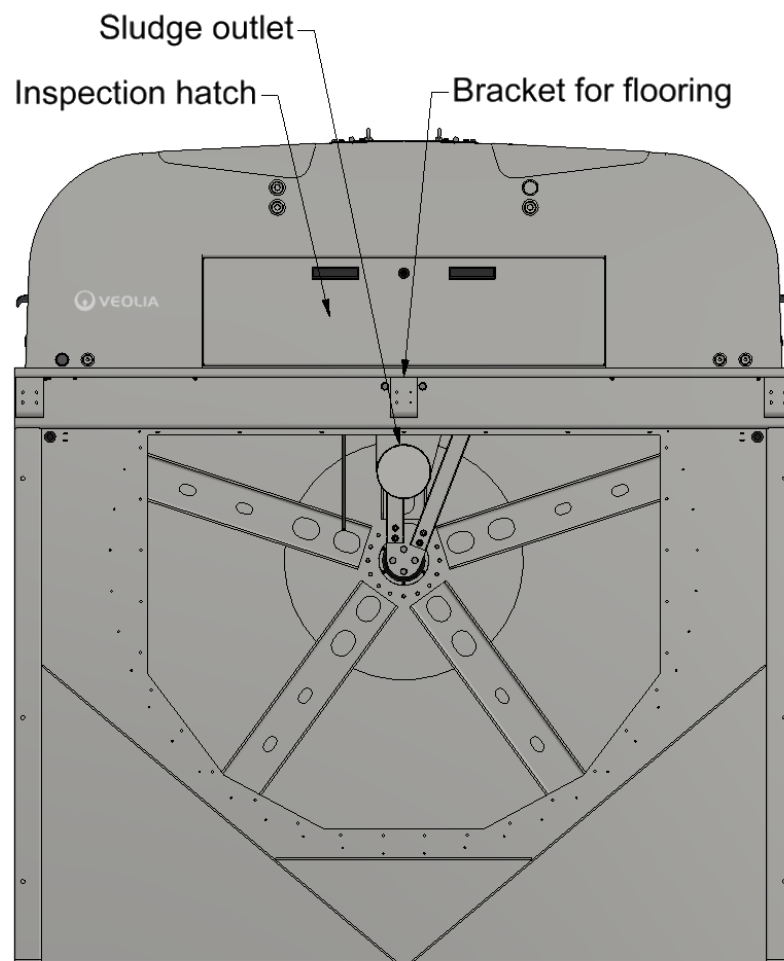
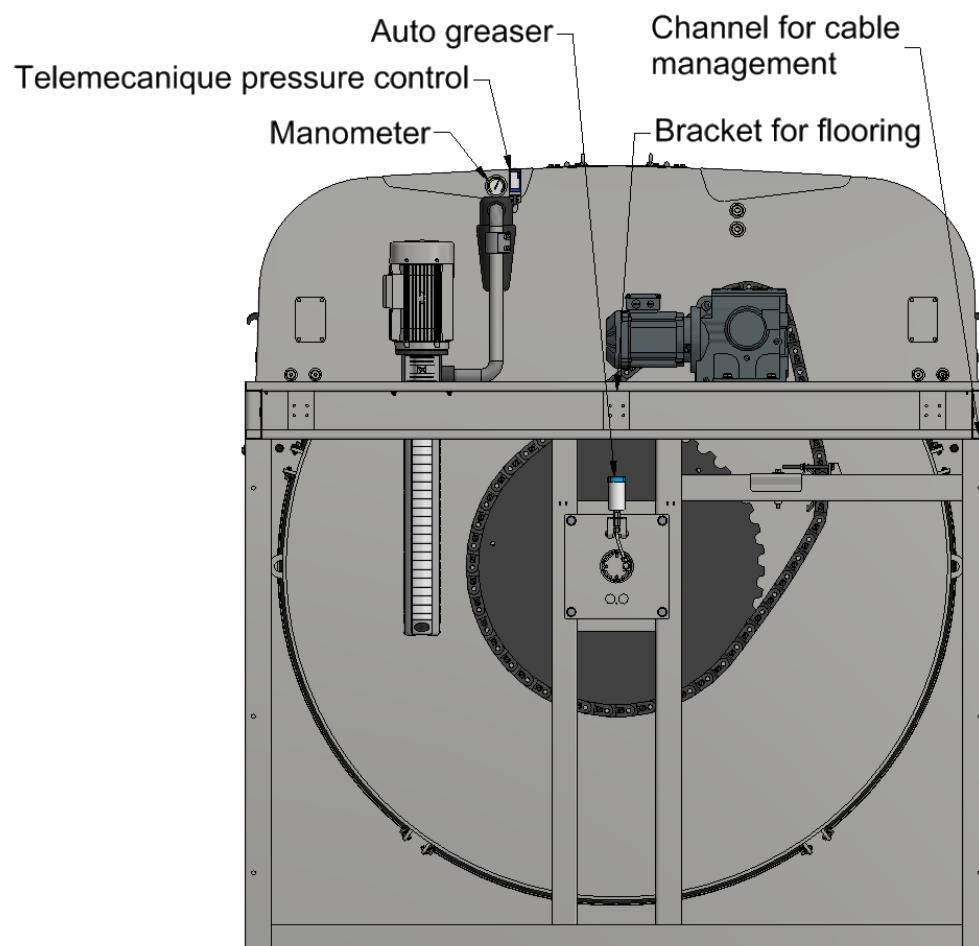


Figure 3.1 HDF 16 & 20V Frame version, side view.



INFLUENT SIDE

Figure 3.1 HDF 16 & 20V Frame version, front view.



EFFLUENT SIDE

Figure 3.1 HDF 16 & 20V Frame version, rear view.

3.2 Identifying the filter

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

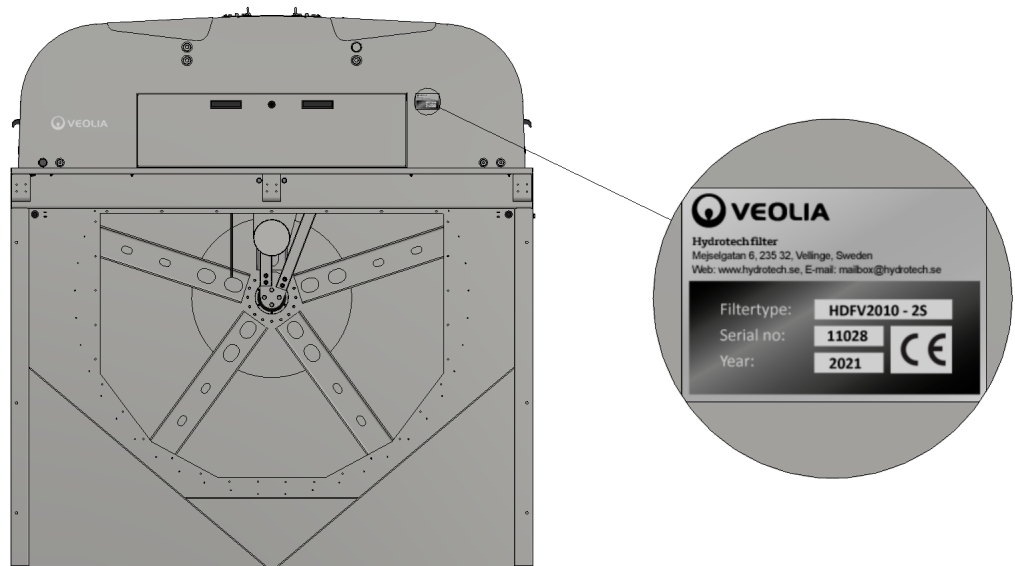


Figure 3.3 Filter identification plate.

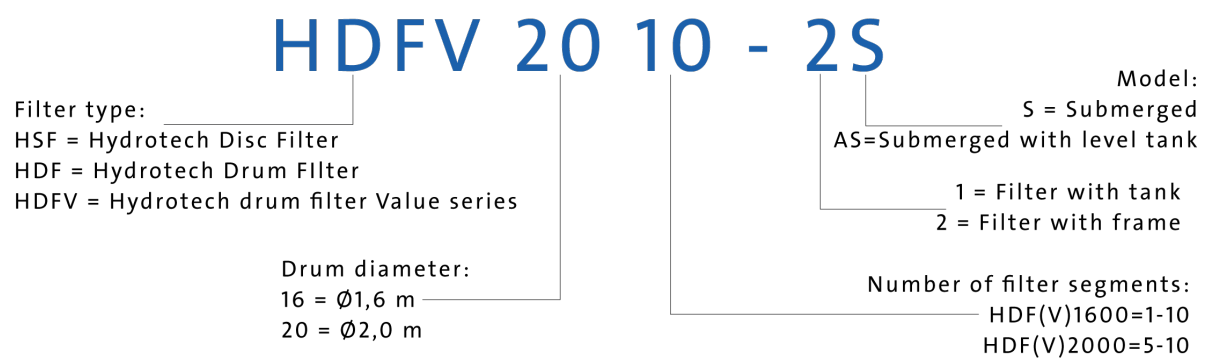


Figure 3.4 Definition of filter type.

4. RECEPTION AND HANDLING

4.1 Reception

Once the equipment has been delivered and received it must be thoroughly 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. Before lifting the equipment, see section 4.3.

4.2 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 elements.
- ▶ If the filters are delivered in plastic-covered wooden crates, a special type of corrosion may 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, the filters must therefore be unpacked immediately upon delivery.

4.3 Lifting the equipment

- ▶ A forklift truck with long forks should be used when lifting filters in wooden crates.
- ▶ An unpacked filter with tank (type 1) can be lifted with a fork lift truck, standard crane or with an overhead crane with lifting straps.
- ▶ An unpacked filter without tank (types 2 & 3) can be lifted with a standard crane or overhead crane and lifting straps. The straps are positioned as set out in



The work area must be cordoned off before unloading in accordance with local regulations to prevent unauthorised access.

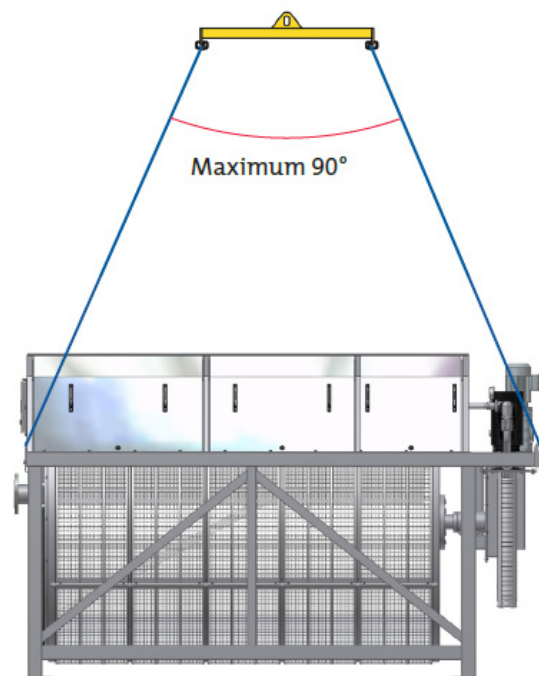


Figure 4.1 Lifting points for filter without tank (type 2/3)

5. GENERAL INSTALLATION INSTRUCTIONS

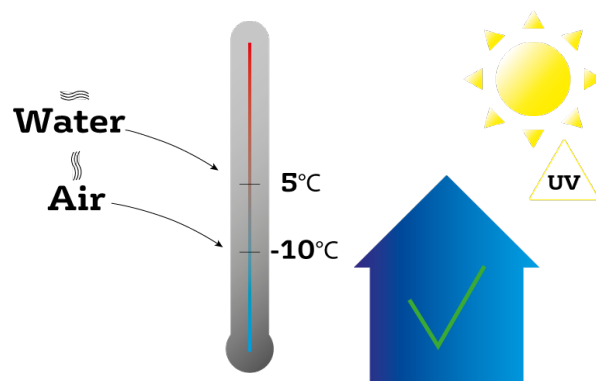
The following requirements must be fulfilled before installation can begin:

- ▶ The electrical specifications for the equipment must be in agreement with the applicable specifications for the available power grid.
- ▶ The equipment is free from damage (no damage incurred during transport or storage).

5.1 Installation site

5.1.1 Outdoor installation

For outdoor installation it is important to protect the filter elements against direct sunlight, as heat and UV radiation can otherwise damage the filter elements. The filter must be protected against frost. The filter cover provides sufficient protection at water temperatures above +5 °C and air temperatures above -10 °C. At lower water and air temperatures, filter installation should be indoors.



5.1.2 Foundations

- ▶ The filter must be installed on a flat surface with sufficient load bearing capacity.
- ▶ The filter is to be bolted to the foundation.
- ▶ The filter must be level in both directions (see Figure 5.1).
- ▶ 600 mm wide aisles should be placed around the filter to permit easy access to the filter during servicing.
- ▶ On type 2 filters (without tanks), the space between the filter frame and concrete structure must be covered to prevent access to moving parts and to prevent loose objects from falling into the filter.

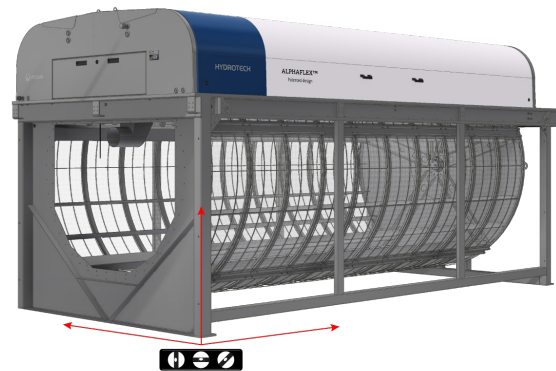


Figure 5.1 Filter installation

5.2 Emergency overflow

In certain configurations, an external emergency overflow is used in the event of electrical power outages, for example, to avoid subjecting the filter fabric to excessively high pressure differences.

5.3 Electrical connection

Electrical connection must be done in accordance with local regulations. Check that the settings on the motor protection device correspond with the motor data (see Appendices A and D).

5.4 Equipotential bonding

The Hydrotech Drum Filter and associated equipment should be protected with a suitable system for potential equalisation. This is very important to prevent galvanic corrosion. Ideally use a cable with a cross section of 10-16 mm². The cable should be connected to the same electrical potential as the drive system.

The filter is equipped with equipotential earth bonding points in every corner of the filter. The decal in figure 5.2 is placed at these points.



Figure 5.2



Qualified and skilled electricians must perform all electrical work.

5.5 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.

5.6 Pipe connections

Nominal pipe dimensions are specified in the section Technical specifications, Appendix A. The water's inlet speed should not exceed 1 m/s. Piping for discharge of sludge water must have a minimum downward tilt of 1%.

5.7 Backwash system

Newly connected piping systems for wash water should be flushed for at least 10 minutes before they are connected to the filter. Carefully check that the nozzles are not blocked. Any particles in the backwash water supply must be removed. A standard wash water filter can normally be used to remove these particles (also see section 8.2).

5.8 Filter placement

When placing the filter it's recommended to have typically 1000 mm of free space on surrounding the filter to allow for easy access. In cases where it isn't possible to have a free space buffer of 1000 mm it's advisable to have not less than 600 mm of free space.

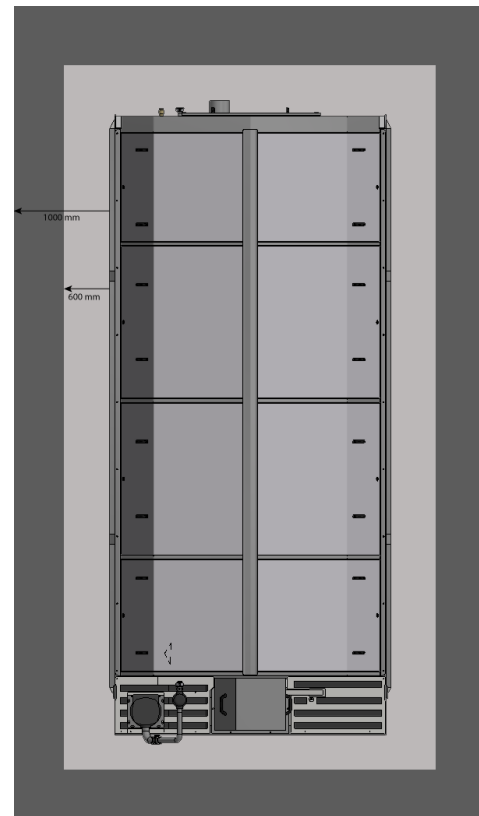


Figure 5.3 Filter seen from above

6. START-UP AND OPERATION

6.1 Check procedures during start-up

1. Check that the drive unit cover is installed correctly.
2. Turn the pump switch to the OFF (0) position (see F in Figure 6.1).
3. Set the main power switch to the ON (1) position (see J in Figure 6.1).
4. Set the mode selector to the HAND position (see E in Figure 6.1).
5. Open the water supply partially so that water slowly flows 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 6.2.1). If the filter fabric becomes clogged, it may be necessary to fill the filter tank/chamber with water from an external source or to remove a filter element and allow unfiltered water to run into the filter tank (chamber).



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 (or concrete chamber) has risen above the pump suction pipe (if a MTR pump is installed), the pump switch must be set to position 1 (ON).

NB. Also read section 2.7 (Safety instructions).



The backwash pump must not be started until the water level has risen above the suction pipe (if a MTR pump is installed), otherwise the pump can run dry and fail.

7. When the water level inside the tank (or concrete chamber) reaches the overflow wall, turn the operation mode selector from the HAND to AUTO position.

8. Fully open the water supply. The filter is now run in the mode for automatic level control. It may be necessary to adjust the level sensor so that the filter can be run optimally (see section 6.2.4).

6.2 Automatic settings

The control system for HDF16, 20V, must always be equipped with a frequency converter. 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.

Hydrotech control systems are available in various configurations. Hydrotech control cabinet type PFC has a simpler control system with a logic module.

If the filter is equipped with a Hydrotech standard PFC controller, the filter has two operating modes:

1. Continuous rotation (HAND mode)
2. Automatic level control (AUTO mode).

Turn the mode selector to select the operating mode (see E in Figure 6.1).

Note! The appearance and layout of the control cabinet may differ depending on application.

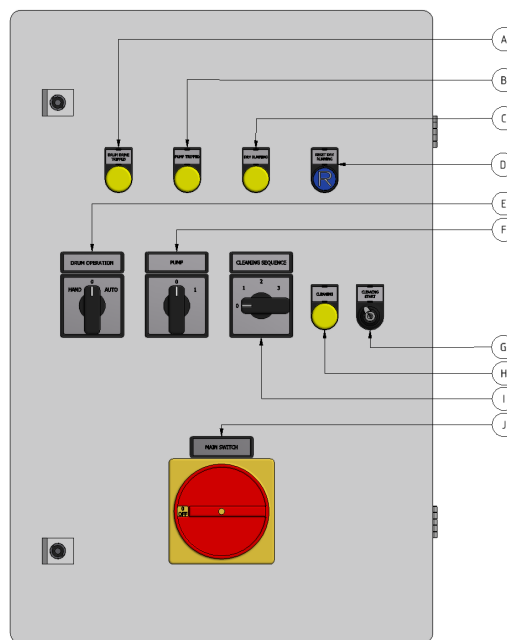


Figure 6.1 Hydrotech control cabinet type PFC (option)
(Appearance of cabinet may differ depending on application)

- A. DRUM DRIVE TRIPPED. LED that indicates when the frequency converter has tripped.
- B. PUMP TRIPPED. LED that indicates when the wash water pump's motor protection device has tripped.
- C. DRY RUNNING. LED that indicates when the dry running protection device for the wash water pump has tripped.
- D. RESET DRY RUNNING. Resetting of wash water pump's dry running protection device.
- E. OPERATION MODE. Mode selector.
- F. PUMP. Pump switch.
- G. CLEANING START. Chemical wash switch, key operated.
- H. CHEMICAL CLEANING. Lamp that indicates when the chemical wash is in progress.
- I. CLEANING SEQUENCE. Selector for number of sequences, chemical cleaning.
- J. Main power switch

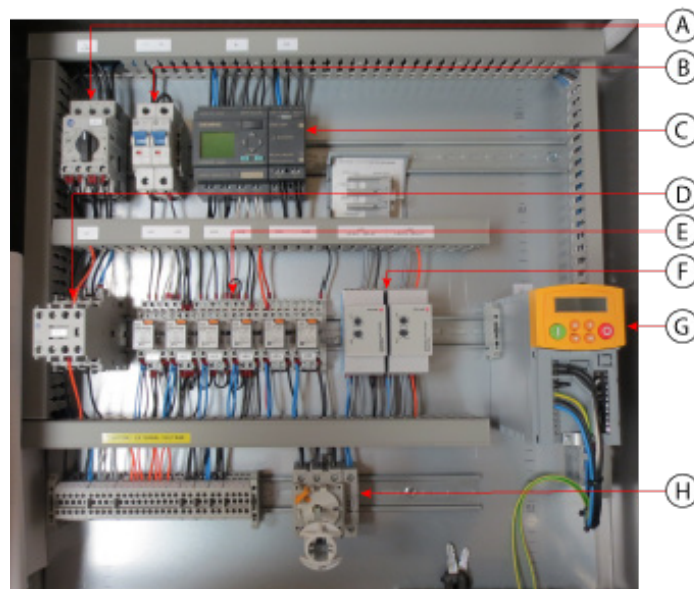


Figure 6.2 Hydrotech standard control cabinet, type PFC (option).
(The control cabinet's construction is in general adapted to the respective application).

- A. Motor protection pump
- B. Fuses
- C. Logic module
- D. Contactor, pump
- E. Control relays
- F. Level relays
- G. Frequency converter
- H. Main power switch

6.2.1 Cleaning with integrated HPC (optional)

If the filter is HPC equipped, a control cabinet like the one in figure 6.2.1 below is used.

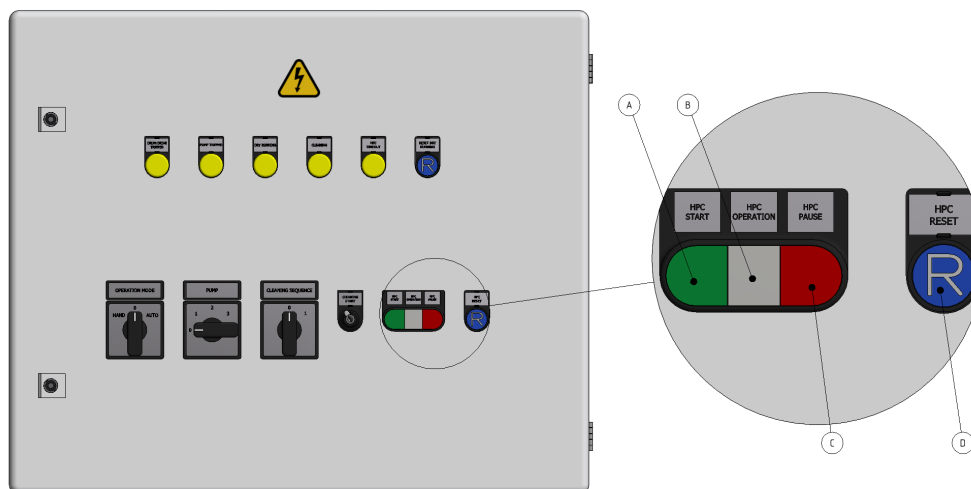


Figure 6.2.1 Control cabinet, filter with integrated HPC.

- A. HPC START. Starts the HPC programme.
- B. HPC OPERATION. Light indicates that the HPC programme is running.
- C. HPC PAUSE. Pauses the HPC programme.
- D. HPC RESET. Resets the HPC to its home position.

The basic function is the same as for the standard control cabinet. The only difference is the added HPC function, operated as described below:

1. Turn the operating mode switch to AUTO mode (see figure 6.2.1)

2. Start the HPC programme with HPC START (see figure 7.9). Indicator light HPC OPERATION indicates that the HPC programme is running.

3. When the cleaning programme has ended, the filter returns to normal operation in AUTO mode.

During the cleaning cycle, the machine continues to continuously filter with the pump in automatic mode.

6.2.2 Level differences

The maximum permitted difference between the water level inside and outside the drum is 250 mm during normal operation (see Figure 6.3). 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.

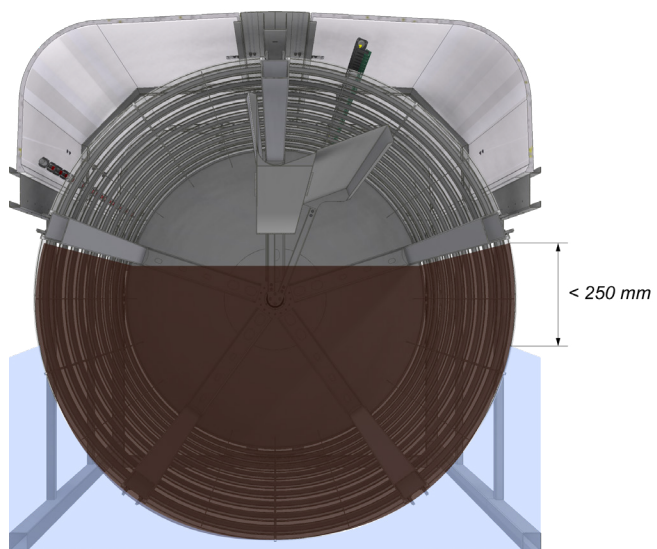


Figure 6.3 Maximum permitted pressure difference during continuous operation.

6.2.3 Operating mode HAND – continuous rotation/washing

Operation with continuous drum rotation and backwash. In this mode, the water level inside the drum is kept virtually constant. The level sensor and the automatic control system are disabled when the HAND operating mode is selected.

6.2.4 Operating mode AUTO – automatic level control

With level control enabled, drum rotation and the backwash pump are activated when the water level inside the drum reaches the level sensor. If an external wash 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 it reaches the level sensor. If a constant water level is required inside the drum, the filter should be run continuously (HAND mode).

6.2.5 Adjusting the level sensor

Place the level sensor 50–100 mm below the recommended operational water level. The optimal placement depends on the turbulence of the water surface. The level sensor can be moved freely by undoing the cable gland that holds it in place. (see Figure 6.4)

NB. Prior to service, read section 2.7 (Safety instructions).

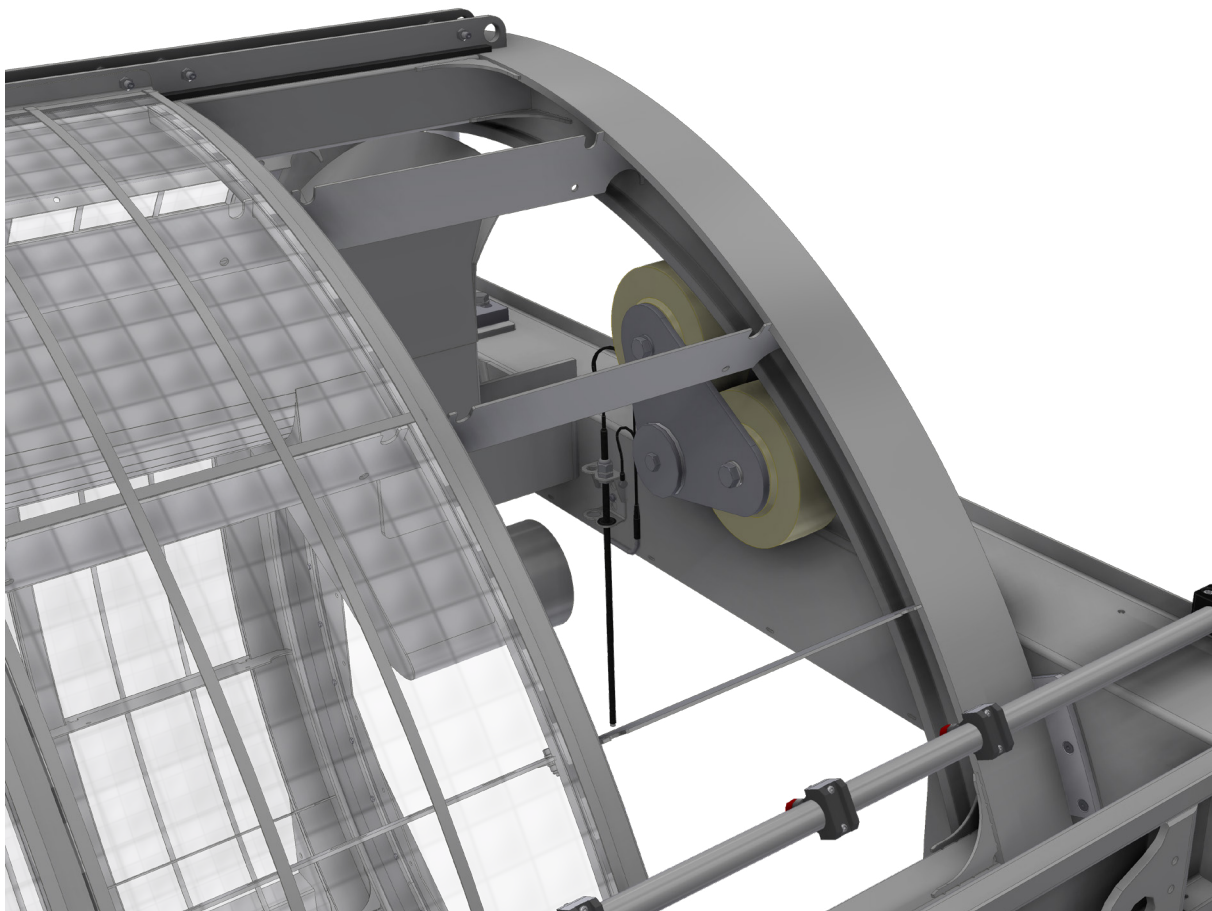


Figure 6.4 Adjusting the level sensor

6.2.6 Adjusting delay time

A time relay/logic module is used to delay the backwash stop after the water level has dropped below the level sensor. The time relay/logic module is pre-set so that the drum is backwashed for one revolution after the water level has dropped below the level sensor. In certain applications it can be necessary to increase the time that the filter is backwashed after the water level has dropped below the level sensor to prevent future clogging.

NB. Prior to service, read section 2.7 (Safety instructions).

6.2.7 Setting the level relay

The sensitivity of the level sensor can be set from MIN to MAX at the level relay's upper adjustment screw (see F in Figure 6.2). The lower adjustment screw must always point to the side marked EMPTY. On this side there are three different sensitivity ranges, H, S and L. If appropriate sensitivity cannot be set using the selected sensitivity range, another sensitivity range can be chosen:

- ▶ For water with high conductivity (low resistance), choose setting L.
- ▶ For water with low conductivity (high resistance), choose setting H.

Salt water for example, has high conductivity (setting L).

NB. Prior to service, read section 2.7 (Safety instructions).

6.3 Backwash system

The system pressure for backwashing must be set to 7-9 bar.

Newly connected pipe systems for external wash water should be flushed before they are connected to the filter. Check that the nozzles are not blocked; see section 8.1.

6.4 Auto greasers

Activate auto greasers prior to start of operations. Turn the knob to desired number. The number corresponds to number of months it takes to empty the container fully. (12 months = default value)

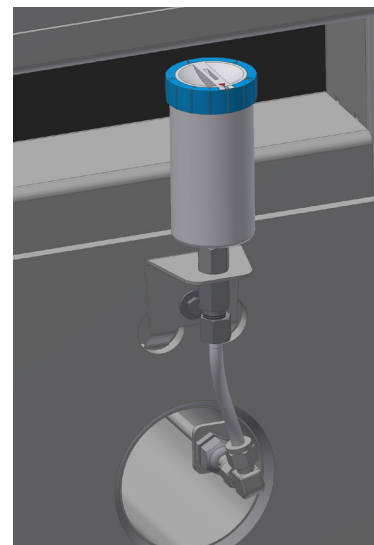


Figure 6.5 Auto greaser

6.5 Retightening bolts

After two working weeks or 80 hours of operation, all bolted joints should be checked for tightness, and tightened if necessary.

NB. Prior to service, read section 2.7 (Safety instructions).

7. FUNCTION

7.1 Intended use

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

7.2 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.

7.3 Filtration and backwash process

1. The water to be filtered flows with gravity from the inside of the filter drum out through the filter elements.

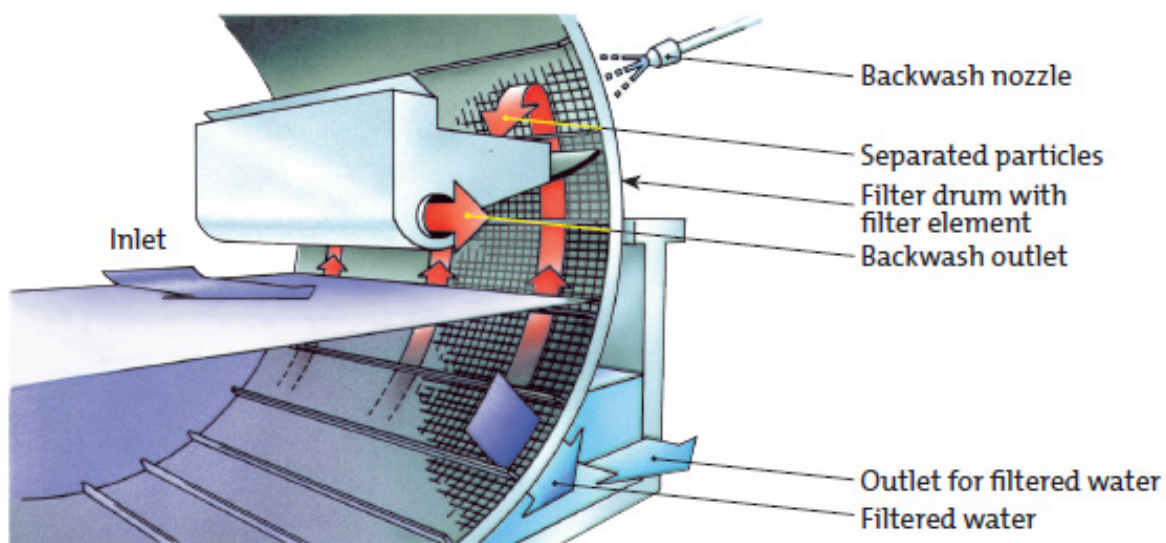


Figure 7.1 Filtering process

2. Solid particles are separated from the water by the filter fabric that is mounted on the outside of the filter elements, while the clean water passes through the fabric to the outside of the drum.

3. Operating mode AUTO – The solid particles entrapped on the inside of the filter fabric gradually reduce the water flow through the drum. The water level on the inside of the drum begins to rise. Once the water reaches the level sensor, drum rotation and backwashing begin. Operating mode HAND – Drum rotation and backwash are continuous.

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

5. With the help of gravity, the removed particles run out from the filter along with the backwash water.

8. MAINTENANCE/SERVICE

8.1 Backwash system

The most common cause of disruption in the wash water system is nozzle clogging. Clogging is caused by particles in the wash water and/or by e.g. biological fouling in the pipe system.

The correct dispersal pattern is shown below for wash water. Clogged nozzles can produce a different dispersal pattern.

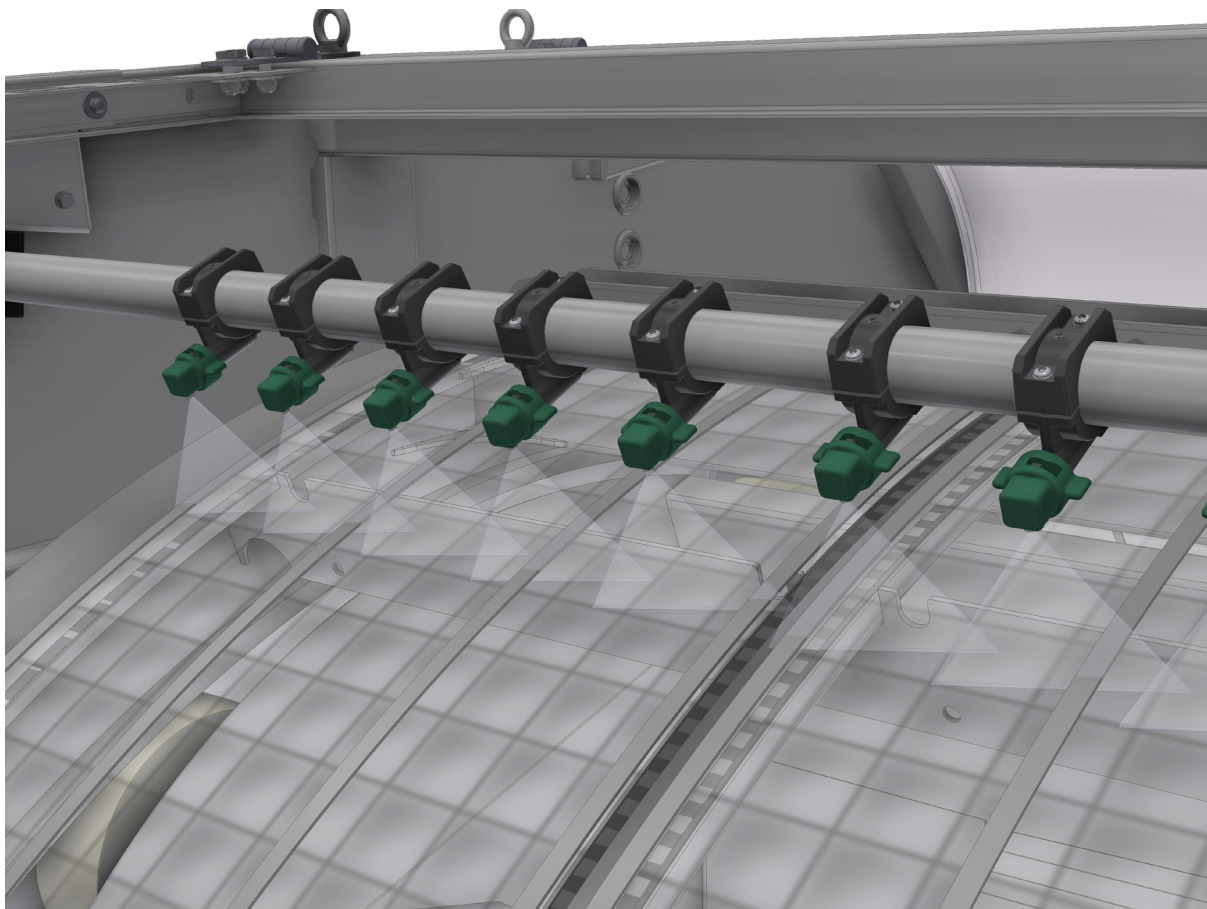


Figure 8.1 Correct dispersal pattern for wash water.

There are also nozzles that are self-cleaning and less sensitive to blocking than the conventional nozzles, see section 8.1.2.

8.1.1 Servicing conventional nozzles

1. Turn the main power switch to the OFF (0) position and the mode selector to the 0 (OFF) position. If the used backwash water supply unit is not from Hydrotech, ensure that the supply of backwash water is turned off.
2. Open the cover on the spray bar side of the filter.
3. Ensure that none of the nozzles are clogged by checking whether water runs through them.

4. Remove the nozzle nut of a clogged nozzle by turning it a ¼ turn anticlockwise. Exercise care so as not to lose the rubber seal.
5. Clean the tip of the nozzle with compressed air or with a plastic brush. Never use a steel brush or metal pins as these may damage the nozzle.
6. Assemble the parts in the reverse order. Make sure the nozzle nut reaches the stop position when turned a ¼ turn, clockwise.
7. Turn the mode selector to the ON (1) position and the main power switch to the ON (1) position.
8. Open the main valve for the wash water.
9. Refit the removed covers and lock them in place.
10. Start operation again as in section 6.1 (Check measures for restart).



It is important that the nozzle nuts (see Figure 8.3.1) are refitted correctly after the nozzles have been cleaned. If a nozzle nut loosens, the nozzle tip will fall out and the water jet created will then destroy the filter fabric.

8.1.2 Self-cleaning nozzle

Figure 8.3 and 8.4 below shows a self-cleaning nozzle.

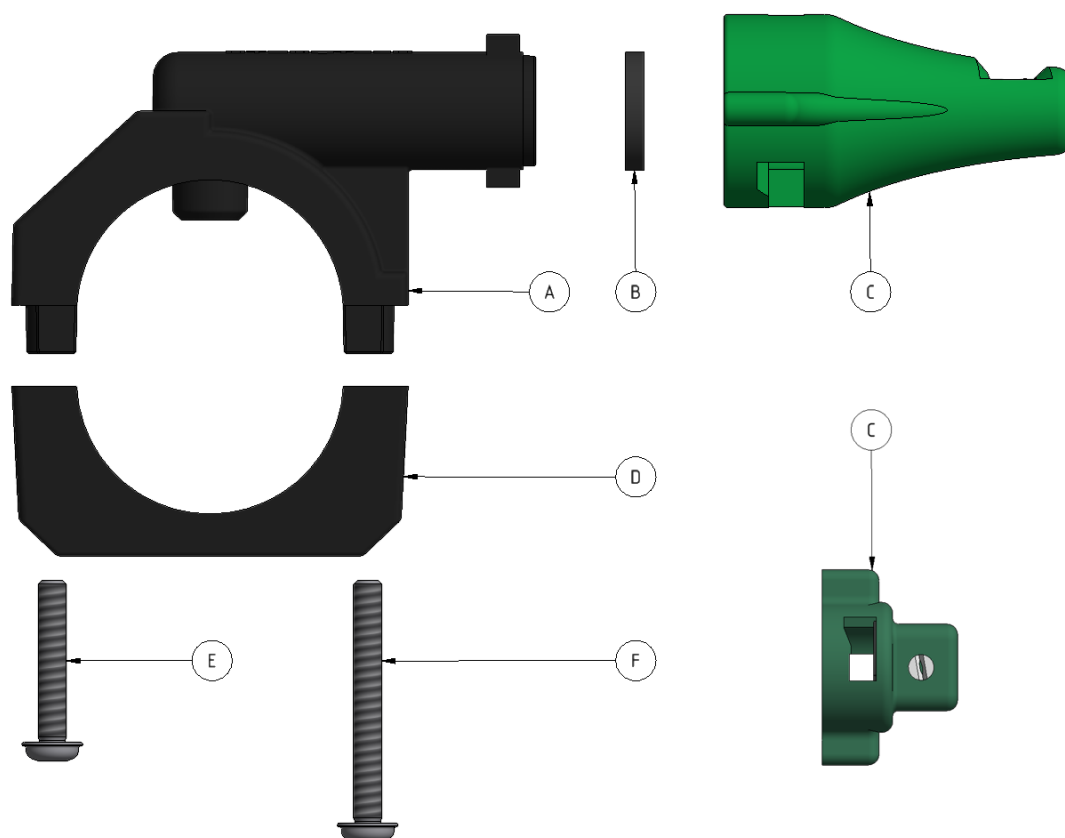


Figure 8.3.1 Lechler nozzle components

A. Top nozzle attachment

B. Rubber seal

C. Top: Nozzle nut, self cleaning (optional)

Bottom: Standard nozzle

D. Bottom nozzle attachment

E. 20 mm screw

F. 30 mm screw

8.2 Wash water filter

A wash water filter should be used to remove particles from the backwash water.



Figure 8.4 Wash water filter (option)

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

1. Turn the main power switch to the OFF (0) position and lock it with a padlock.
2. Drain the wash water filter by removing the cover at the bottom of the filter.
3. Remove the lower part of the filter.
4. Remove and clean the filter insert.
5. Refit the filter in the reverse order.
6. Start operation in accordance with section 6.1.

NB. Prior to service, read section 2.7 (Safety instructions).

NB. A clogged wash water filter can cause a substantial loss of drum filter capacity!

8.3 Bearings

8.3.1 Lubrication

HDF 16 & 20V -series filter:

The drum's centre shaft and support wheels contains bearings that must be lubricated.

The filter is equipped with automatic greasers as standard.

NB. Prior to service, read section 2.7 (Safety instructions).

8.3.2 Checking centre bearings for wear

The centre shaft bearings must be checked for wear in accordance with the maintenance chart.

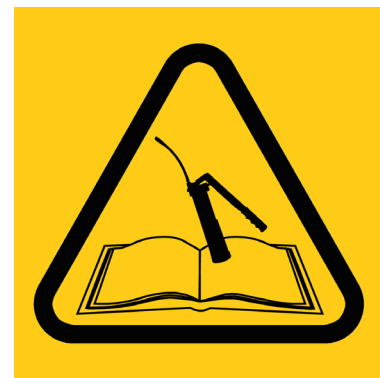


Figure 8.5 Lubrication sticker

8.4 Filter element

8.4.1 High pressure cleaning

It may sometimes be necessary to manually clean the filter elements. An indication that manual cleaning is required is increased frequency of automatic backwashing. Manual cleaning can be done using a high pressure washer.

NB. Prior to service, read section 2.7 (Safety instructions).



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

An automatic high pressure washer, controlled from the operator panel, is available as an optional extra. Please contact your Hydrotech distributor for more information.

8.4.2 Chemical cleaning of filter elements

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



The use of other types of cleaning agents may cause damage to the equipment.



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

For more detailed instructions, please contact your supplier.

A chemical ramp that enables removal of long-term clogging of the filter media is available as an option for the Hydrotech Drum Filter.

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

1. Turn the mode selector to AUTO mode (see Figure 6.1).
2. Set the number of cleaning sequences with the CLEANING SEQUENCE selector (see Figure 6.1).
3. Start chemical cleaning with the CLEANING START switch (see Figure 6.1). Once cleaning is completed the filter automatically returns to normal operation in AUTO mode.

If necessary clean the chemical ramp's nozzles as set out below:

1. Remove the nozzle by turning it a 1/4 turn anticlockwise (see Figure 8.6).
2. 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.
3. Refit the nozzle.

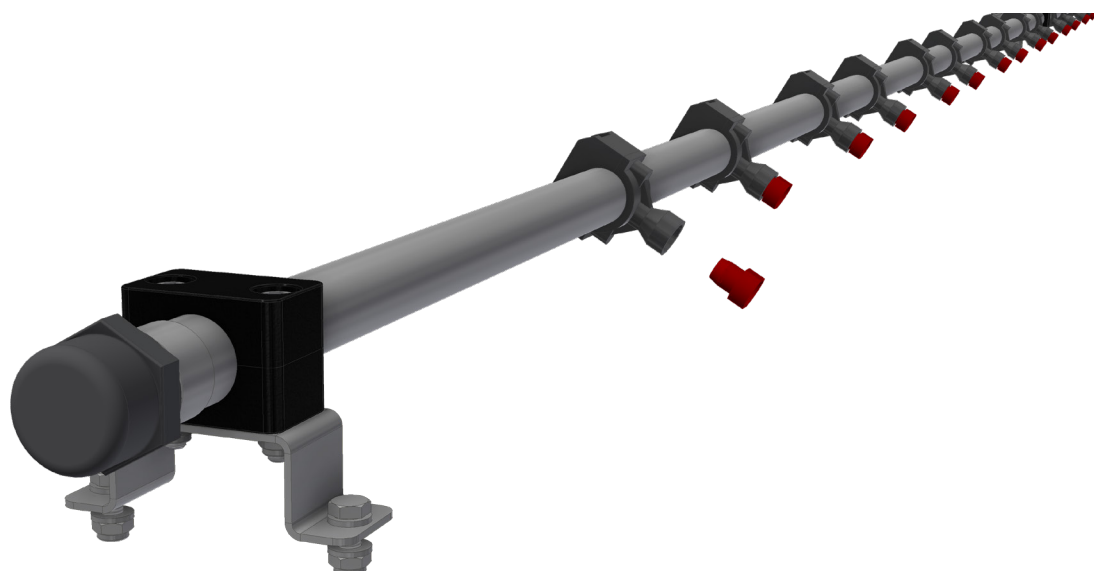


Figure 8.6 Nozzles on chemical ramp

8.4.3 Replacing filter elements

1. Turn the main power switch to the OFF (0) position and lock it in the OFF (0) position with a padlock.

2. Unscrew the nuts that secure the tensioning straps at the drum (see Figure 8.7.a).

3. Pry loose the old filter element and the tensioning strap with a flat and blunt object between the tensioning strap and the drum's angle bracket (see Figure 8.7.b).

4. Lift the tensioning strap with one hand and pull out the filter element with the other (see Figure 8.7.c).

5. Check that the stud bolts are free from damage. Adjust the stud bolts so that they project the same distance on both sides. Lightly tighten both of the tensioning strap's upper nuts.

6. Insert the new filter element under the tensioning strap as far as possible, carefully adjusting it horizontally.

7. Press down the tensioning strap and filter element, aligning the holes in the tensioning strap with the stud bolts. Make sure that the filter element is not damaged by the stud bolts (see Figure 8.7.d).

8. Use tongue-and-groove pliers to tighten the tensioning strap against the drum's flat bracket when the nuts are fitted.

9. Tighten the nuts but sufficiently loose so that you can still move the tensioning strap's steel straps.

10. Adjust the steel straps so that they are parallel to the filter elements' cell structure.

11. Tighten all nuts until the tensioning straps' steel straps are tensioned. Lightly tighten using a socket spanner (13 mm). It is unnecessary to tension until the tensioning straps' angle brackets are even with the drum's flat brackets.

12. Start operation again as in section 6.1 (Check measures for restart).



Figure 8.7 a-d

8.4.4 ALPHA-Flex

Hydrotechs ALPHA-flex panels are designed to be mounted in one of two ways. The panel will either work to scoop and carry water (+ sign in the direction of rotation) each time it breaks the water surface inside the drum, or if it is mounted the other way around (- sign in the direction of rotation), it will rotate passively.

All other panels in the same segment are mounted in the opposite direction. . All panels that is lifting water are mounted in a row along the length of the drum, see figure 8.8.

NOTE! The panels can be mounted in a different orientation/configuration depending on application. Figure 8.8 displays the standard configuration. For optimal performance and function, please advise your local Hydrotech distributor.

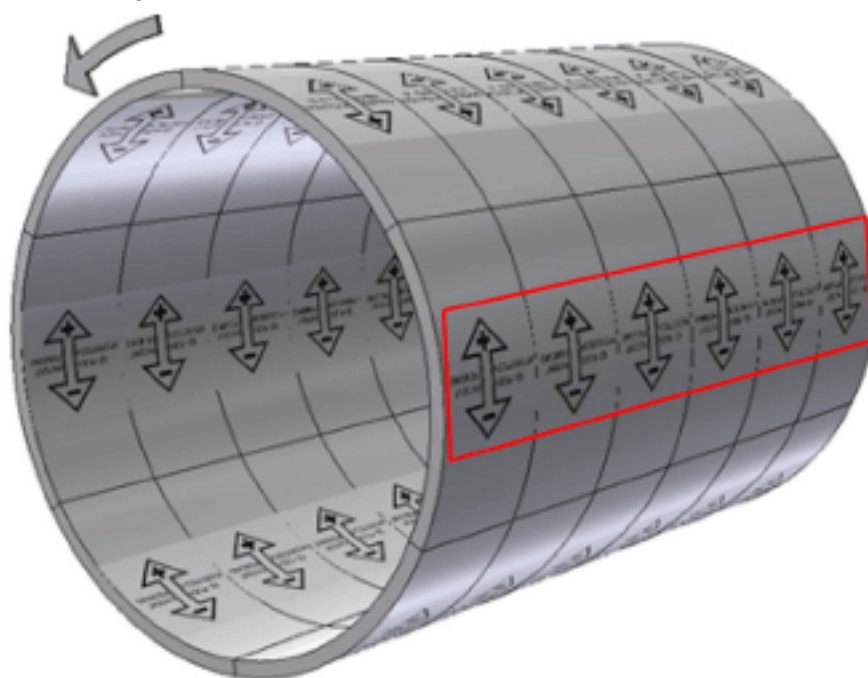


Figure 8.8 ALPHA-Flex panel orientation.

8.5 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.

8.5.1 Checking and tensioning the drive chain

1. Turn the main power switch to the OFF (0) position and lock with a padlock.
2. Remove the motor cover to access the chain.
3. Stretch the chain by turning the drum by hand in the non operational 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 8.9
5. Adjust the chain setting, if necessary, with use of the chain tensioner, see figure 8.10.
6. Start operations again as described in section 5.1.

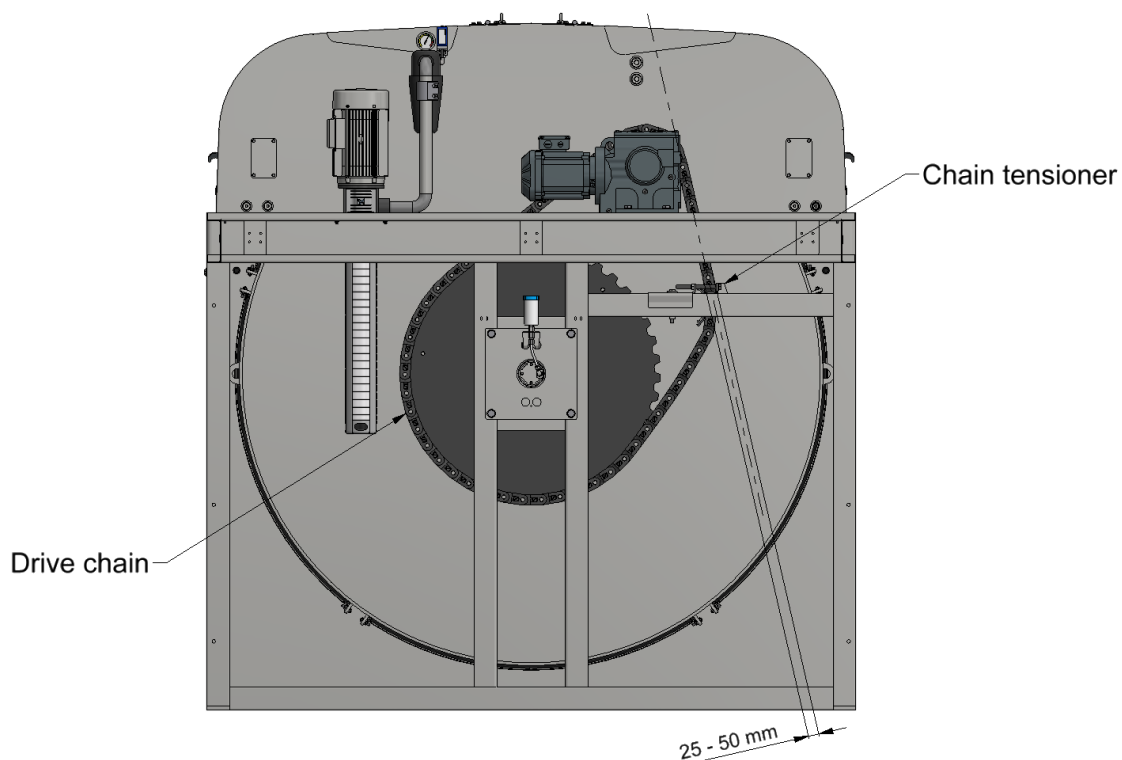
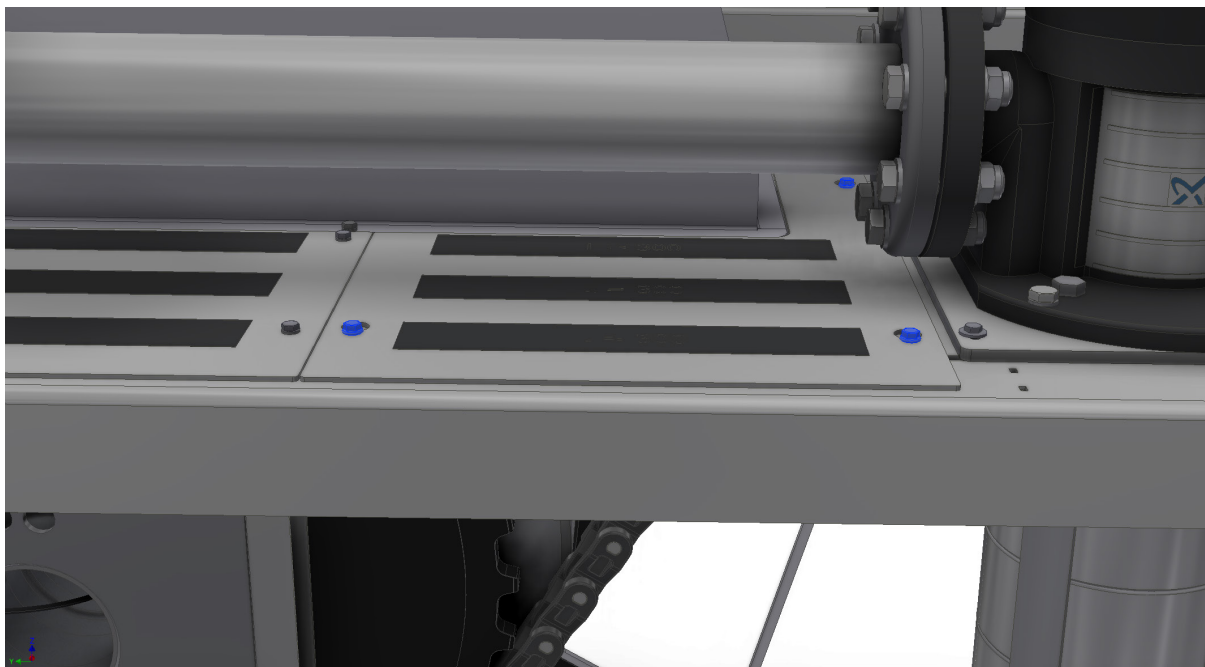


Figure 8.9 Checking drive chain tension

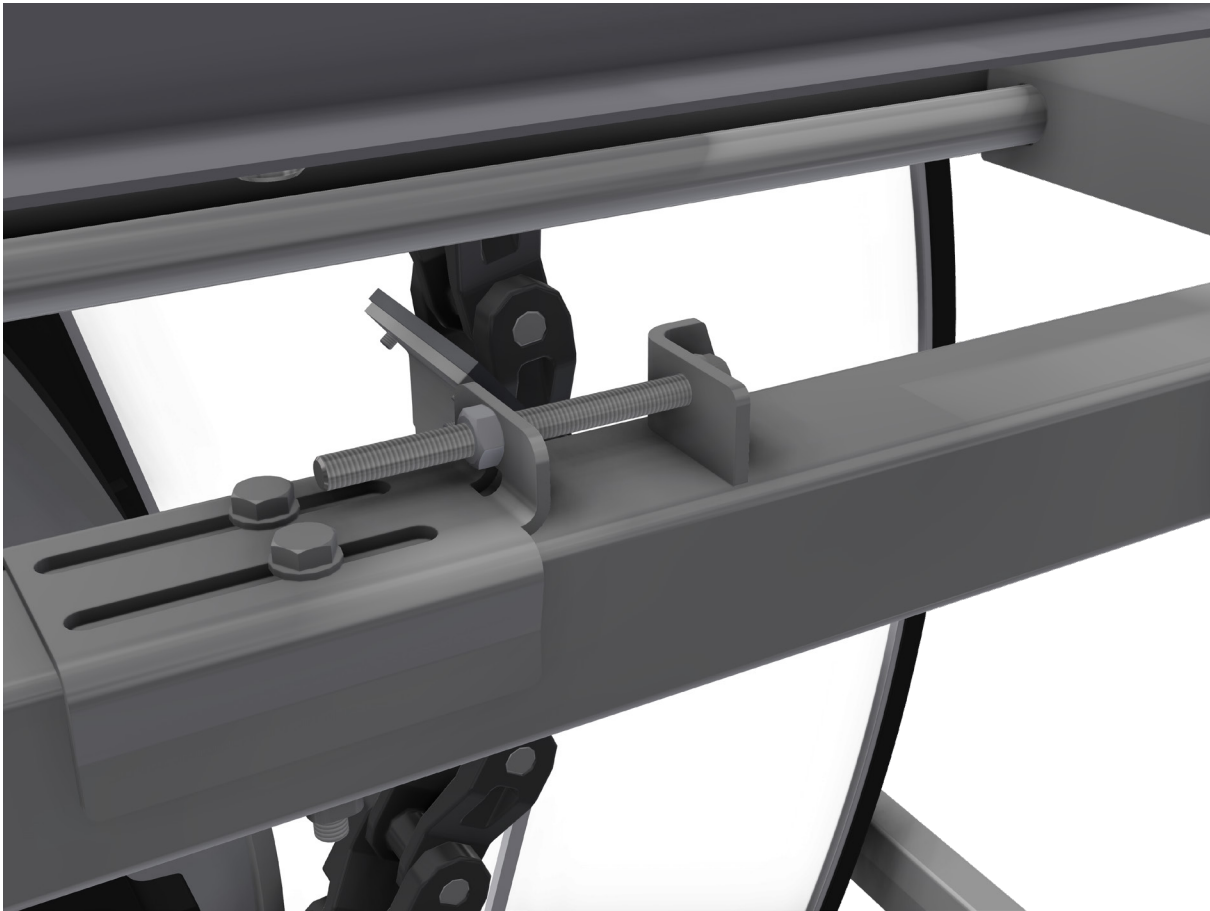
8.5.2 Using the chain tensioner to achieve correct tension

1. Turn the main power switch to the OFF (0) position and lock with a padlock.
2. Remove the motor cover to access the chain.



*Figure 8.10 The three screws holding the flooring tile highlighted in blue.
(figure above is from a discfilter unit, the principle is the same for drumfilters)*

3. Remove the flooring tile with the three screws marked blue in figure 7.22. This is done by releasing the tension of the screw and the sliding the tile towards the end of the filter. Then lift the tile to get access down below.



*Figure 8.11 Detailed view of the chain tensioner.
(figure above is from discfilter, the principle is the same for drumfilters)*

4. Loosen the two screws to the left in figure 8.10. The screws are loosened enough when the chain tensioner is able to move freely. Be careful when loosening the screws so that the bracket underneath the beam doesn't fall off. Loosen the nut on the adjustment screw.
5. Adjust the long screw until the chain gets the correct amount of tension.
6. Secure the chain tensioner by tightening the nut on the adjustment screw, then tighten the screws to the beam again.
7. Start operations again as described in section 5.1.

8.5.3 Replacing the drive chain

1. Turn the main power switch to the OFF position and lock with a padlock.
2. Get maximum amount of slack on the drive chain by using the chain tensioner. For further information of how to use the chain tensioner, read section 8.5.2.
3. Split and remove the drive chain.
4. Fit the new drive chain.
5. Adjust drive chain tension in accordance with section 8.5.2.
6. Start operations again as set out in section 5.1.

8.6 Rubber seal

NB Prior to servicing, read section 2.7.

8.6.1 Checking the rubber seal

The rubber seal for the inlet (between the filter frame and drum) must be checked to ensure that it is free from damage and does not leak, see the maintenance chart.



Figure 8.12 Inlet rubber seal

The drum is equipped with holes that ensures that inspection is possible. These can be removed by unscrewing the fasteners for easier inspection (see figure 8.13).

NB. Prior to service, read section 2.7 (Safety instructions).

8.7 Worm gear motor

For information about maintenance of the worm gear motor, see Appendix F.



Figur 8.13 Inspektionhål trumma.

8.8 Lifting the drum

8.8.1 Rear side

The filter is equipped with four lifting lugs, placed at the rear of the drum. Two lugs are placed at the drum and two lugs are placed at the inside of the frame, see figure 8.14 below.

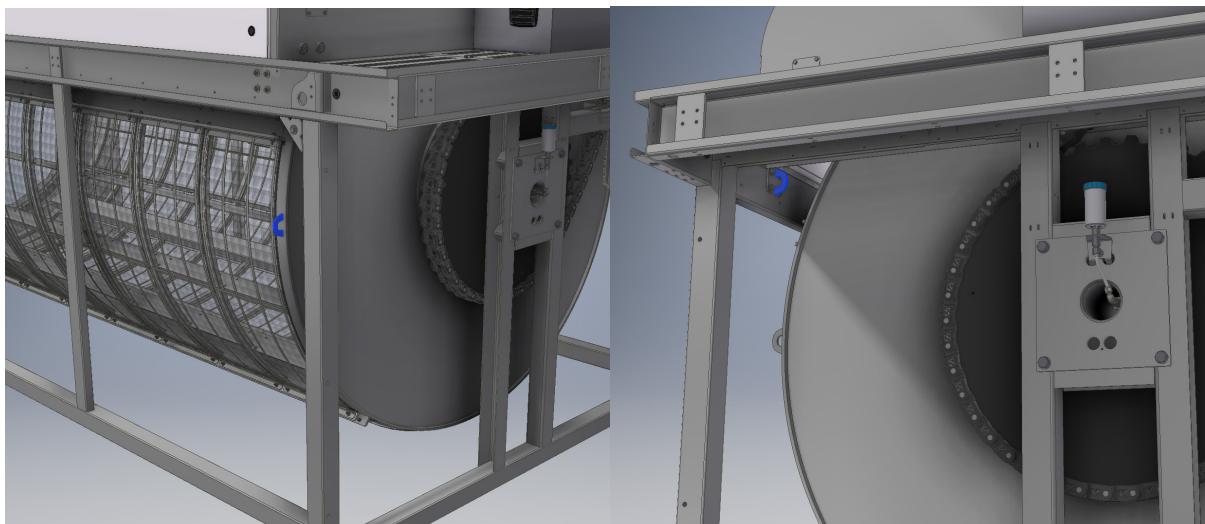


Figure 8.14 The lifting lugs at the drum and inside of the frame shown in blue.

To lift the rear of the drum place two chain block ratchet hoists at each lifting lug and lift the drum, see figure 8.15 below.

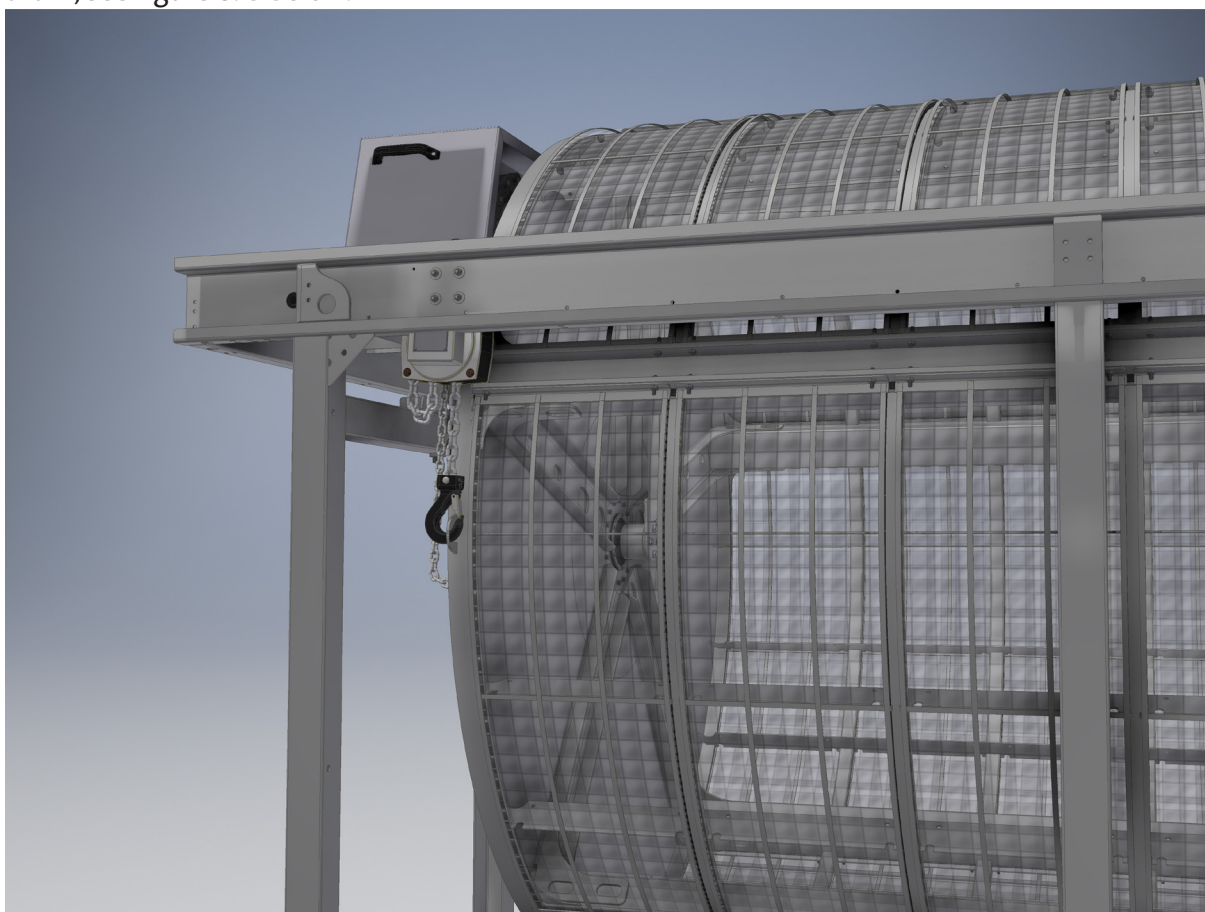


Figure 8.15 Lifting the rear of the filter drum with chain block ratchet hoists.

8.8.1 Front side

At the front side of the filter place a lifting jack along the centerline of the filter. Gently lift the drum, see figure 8.16 below.

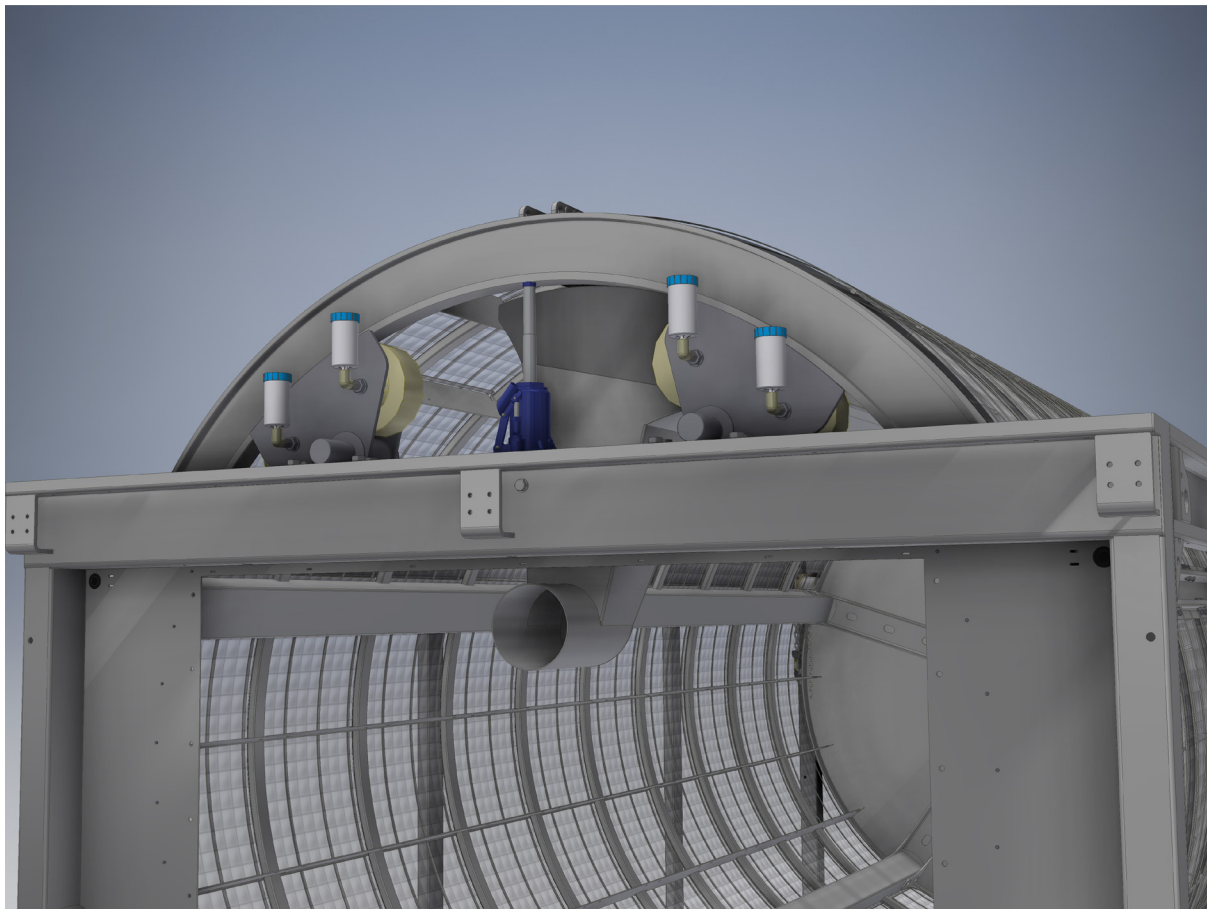


Figure 8.16 Lifting the front side of the drum with a lifting jack.

8.9 Maintenance chart

The maintenance interval shown in the table below is the maximum allowed time interval during typical service conditions.

Note! Your specific service conditions may differ from what Hydrotech considers to be typical conditions. In these cases the time between maintenance needs to be adjusted meet your specific requirements.

Check/Action	Maintenance interval
Check the nozzles (if they are clogged, see section 8.1.1). NB. Prior to service, read section 2.7 (Safety instructions).	Every week or at another interval based on experience from the application in question.
Conduct a visual check of the filter elements for damage. (Also see section 8.4.)	Every week or at another interval based on experience from the application in question.
Inspect the inside of the filter for larger particles that the backwash system cannot wash away, and check that sludge has not accumulated in the sludge trough. Manually remove these particles and wash away any accumulated sludge from the sludge trough. NB. Prior to service, read section 2.7 (Safety instructions). First turn the main power switch to the OFF (0) position and then lock it with a padlock before performing any work on the filter.	Every week or at another interval based on experience from the application in question.
Wash the surface of the stainless steel construction with clean water. Corrosion is kept to a minimum if the surfaces are kept clean, especially in salt water systems.	Every two weeks or at another interval based on experience from the application in question.
Check the auto greasers and replace when needed according to recommendation by the manufacturer. When replacing the auto greaser ensure that compatible grease with similar characteristics are being used.	Every 4 weeks.
Check the drive chain tension; see 8.5.1 and 8.5.2. NB. Prior to service, read section 2.7 (Safety instructions).	Every 6 months.
Visually check the drive chain for damage (if it is damaged, see sections 8.5.4 and 8.6.4).	Every 6 months.
Visually check the centre bearings.	Every 6 months.
Check the rubber seal for the inlet between the filter frame and drum for wear/damage. (Also see section 8.8.) NB. Prior to service, read section 2.7 (Safety instructions).	Every 12 months.
Visually check the support wheel bearings for significant wear.	Every 12 months.

Changing gear box oil. Follow the gear box manufacturers recommendation. Hydrotechs recommendation is to do this using a suction hose due to space restrictions.	See Appendix F.
NB. Prior to service, read section 2.7 (Safety instructions).	
Clean the strainer at the bottom of the MTR pump (optional equipment) using a brush.	Every week or at another interval based on experience from the application in question.
Clean the backwash strainer (optional equipment) using high pressure cleaner.	Every week or at another interval based on experience from the application in question.

9. TROUBLESHOOTING

Problem	Possible cause	Solution
1. The filter does not start despite the water level in the drum having reached the level sensor.	A. The water has low conductivity.	A. Increase the sensitivity by turning the selector for the level relay towards MAX. If this does not help, you can change the sensitivity range to a more sensitive setting (see 6.2.6).
	B. The sensor is not correctly earthed. For detection, the sensor's lower section must have electrical contact with the filter frame via the water. A cable from the level relay is connected to the filter frame.	B. Check that all cables are free from damage and the screw threaded into the filter frame for tightness.
	C. The level relay is defective. The red LED on the level relay should light for as long as the water is in contact with the sensor. The green LED should always be on (when the relay is powered).	C. Replace the defective level relay.
	D. The FILL/EMPTY selector is in the FILL position.	D. Set the selector to the EMPTY position.
2. The filter does not stop after the time set on the time relay.	A. There is permanent contact between the level sensor and the filter tank/frame.	A. Remove anything that could create contact between the sensor and the filter tank/frame, e.g. biological growth.
	B. The level relay is set to excessively high sensitivity.	B. Reduce the level sensor's sensitivity by setting the level relay towards MIN sensitivity. If this is not enough, switch to a lower sensitivity range (see 6.2.6).
	C. The time relay is defective. When the red LED on the level relay is on, the red LED on the time relay should also be on for as long as the water is in contact with the level sensor, plus the time set on the time relay. The green LED should always be on (when the relay is powered).	C. Replace the defective time relay.
	D. The level relay is defective. The red LED does not turn off when the water level drops below the sensor's level.	D. Replace the defective level relay.

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. 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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