# Feature Bag Filter

## Installation, Operation and Maintenance instructions

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# Catalogue

## 1.0 General Instructions

**The operating manual is part of the filter equipment and instructions contained herein must be followed.**

However, the filter may become a hazard if not used or installed properly.

**Feature** bag filters are carefully constructed and manufactured using the stringent quality controls of our ISO 9001:2008 certification.

The operator must evaluate the impact of filter failure on the environment within the framework of his own safety guidelines and decide whether additional measures are necessary to ensure operator and facility safety. The filter must be operated in a safe manner.

For the operation of the filter vessel the existing national regulations need to be followed.

No work on a filter should be performed without first shutting it down completely and releasing the pressure.

The operating manual is part of the pressure equipment (filter) and has to be kept for the equipment life cycle. It must be available at all times to the operator and in case of loss or damage it must be immediately replaced. Operating manuals are available from the manufacturer or its authorized dealer.

### 1.1 Residual risks due to pressure and temperature

If the maximum pressure is higher than atmospheric pressure, then the vessel must be equipped with an adequate and accurate pressure-measuring device, such as a pressure gauge. Should the temperature of the medium be a safety hazard (e.g. by exceeding the boiling point), a temperature-measuring device has to be installed.

Depending on the operating conditions, the surface of the filter vessel may become very hot. Adequate safety measures must be taken by the customer when operating the filter to protect against the danger of getting burned.

Appropriate precautions can be:

Isolation, protection against contact and access restrictions.

### 1.2 Residual hazard due to pressure

Exceeding the rated operating pressure must be prevented by means of suitable devices or equipment located either at the pressurized equipment or at the assembly (if the pressurized equipment cannot be cut off).

The protective devices or equipment must properly fulfill their safety functions, and only these functions, which means they cannot also provide other functions.

Safety devices and equipment must operate in a manner that is foolproof, reliable and suitable for the intended mode of operation.

### 1.3 Residual hazard due to corrosion or chemical effects

In general, filters are used to filter many different types of liquids. The user must take into consideration the effects of the liquid being filtered on the filter housing and accessories. These effects may include corrosion, dissolving or weakening of the filter housing. This applies to all material in contact with the liquid being filtered, especially parts under pressure and including gaskets, seals and bolted connections. The user must select an appropriate housing material for the intended use and confirm its suitability. Regular inspections must be performed while the equipment is in service. It is recommended to record the inspections and to keep the record.

### 1.4 Residual hazards due to external loads

Possible external loads from wind, snow, earthquake or traffic as well as impact forces on nozzles, legs and supports have to be identified and an assessment made on consequences to the pressure equipment. If not specifically mentioned the equipment is not designed for, nor should it be subjected to these types of load.

### 1.5 Residual hazard due to filling or emptying

The user must take suitable measures to ensure that liquids under pressure cannot escape in an uncontrolled manner from open degassing (exhaust) lines, for example, whilst the pressurized equipment (filter) is being filled. This applies to both draining and emptying the equipment.

If emptying (also faulty emptying) can cause positive operating pressure, then this risk needs to be secured through a bursting disc or connected emptying and venting equipment.

### 1.6 Residual hazard due to wear

Under certain conditions, failure of material due to known chemical effects (corrosion) or mechanical effects (wear) must be taken into consideration. This is often dealt with by using increased wall thicknesses, casings or coatings. For operational continuity, the user must employ suitable means to ensure that planned, periodic inspections are performed. Any damage must be immediately corrected.

### 1.7 Residual hazard due to external fire

External fire can damage the equipment and cause safety issues. The user must evaluate the potential for this type of damage and take suitable precautions to limit or prevent it.

1.8 Residual hazards due to decomposition of unstable fluids

An assessment of the risk of damage to the equipment from decomposition of unstable fluids has to be made and protected against.

1.9 Residual hazards due to the character of operating and during maintenance

Filtration of flammable fluids could be dangerous during filter element change out.

Textile filter media tends to have an electrostatic charge. This has to be observed if explosive atmospheres are present in the filter or the area around the filter (i.e. filtration of flammable solvents). Reactions between filter media and filtrate or the trapped solids (auto ignition) are also possible.

The filter element normally contains product residue.

If the fluid is dangerous (caustic, corrosive, carcinogenic, mutagenic, toxic, flammable etc.) suitable protection for operators must be provided.

Examples as described above have to be assessed by the user and prevented with appropriate procedures.

Counter measures may include appropriate earthing, venting, flushing with harmless fluids, drying, inert gas flushing, minimizing of residual fluid, etc.

## 2.0 Specification, functional principle, typical designs

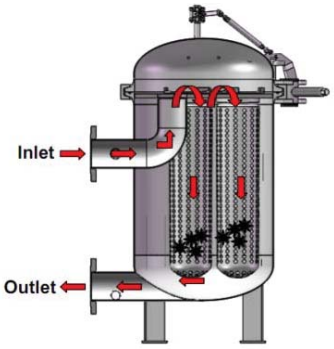
### 2.1 Functional principle

The main element of the bag filter systems is the filter bag.

The filter bag is typically made of textiles like needle-felt, melt-blown materials or woven materials of mono- or multi-filament fibers.

The filter bag is inserted into a restrainer basket. This basket supports the bag and holds up to the pressures applied with increasing differential pressures. The restrainer basket is seated in position inside the housing between the incoming unfiltered liquid (inlet side) and the clean filtrate (outlet side). The filter bag is held in place by a bag hold-down device. The dirty liquid flows through the filter material where dirt is trapped. The fact that particles are collected and retained inside the filter bag is one of the significant characteristics of the bag filter system. These systems are simple.

secure and extremely operator friendly.

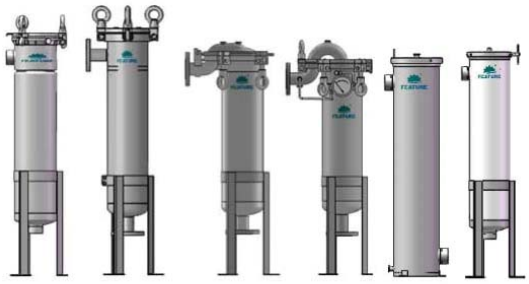



Bag filter housings may contain between 1 and 23 filter bags, depending on type and design. The designs take into consideration operating conditions, materials of construction, connection types and positions as well as surface finish and operating parameters.

### 2.2 Typical design

3# Filter

1#Filter



2# Filter

Multi-bag Filter

## 3.0 Storing and transport, installation

### 3.1 Storing and adjustment

Equipment must be stored in a secure location.

Equipment should not be stored in a corrosive environment.

Necessary steps to ensure a clean housing interior should be taken. Openings at the connections should be plugged, if this is not already done by the manufacturer. If extreme cleanliness of the housing is necessary, a safety atmosphere with inert gas (i.e. nitrogen) should be used.

### 3.2 Transport

Appropriate means are to be used for any transport of equipment. If a filter needs to be lifted with a carrying belt (without original packaging) adequate lifting points need to be chosen. If extra carrying elements are available, these must be used. Security precautions should be taken to protect people and equipment.

e.g. adequate security distances.

no person or equipment below suspended equipment.

adequate secure lifting attachments.

### 3.3 Installation and adjustment

**Notice**

Before installing the bag filter, check that the operating parameters have been met.

The specifications on the bag filter label must be checked against operating conditions. Do not exceed the listed operating pressure and temperature.

Please remain enough space for filter before install, to make sure space for maintaining filter, changing and cleaning filter element.

Excess of operating conditions are to be avoided by the operator through adequate equipment (e.g. installation of reassure relieve valve).

Please check work temperature, work pressure, medium and other condition on the nameplate whether according to working condition. No working in wrong temperature, pressure, medium.
Also, make sure that the materials which are going to come into contact with the product are chemically suitable. This applies to the materials used for the filter housing, the gaskets and the filter media.

Because of the unlimited number of operating conditions only general guidance can be given. The responsibility for the choice of materials for specific applications lies exclusively with the operator. **Feature** is not responsible for and provides no guarantee for the suitability of materials.

**Installation instructions:**

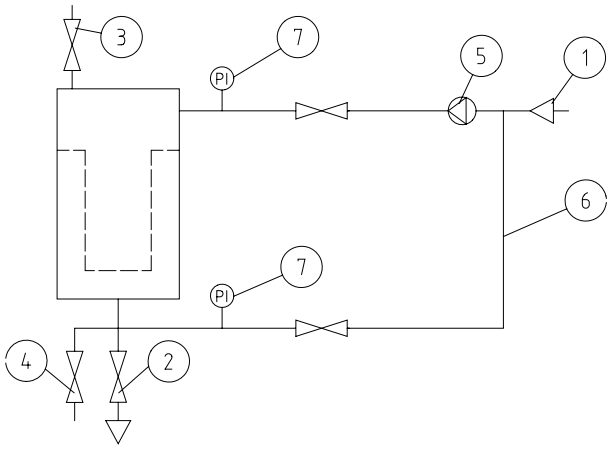
Carefully unpack and check for damage.

Remove all enclosed operating instructions, data sheets, illustrations etc., read carefully and set aside for future use. Make sure all accessories are enclosed. Remove the plastic

protective caps from the flanges.

Here is a diagram of a typical filter installation:

1. Inlet
2. Outlet
3. Vent
4. Drain
5. Pump
6. Circulation line
7. Pressure gauge

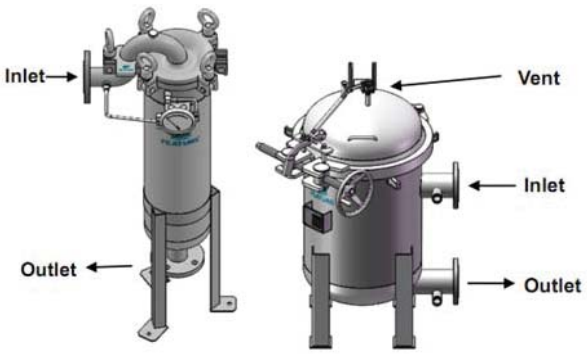



The filter housing in the example given is equipped with shut-off devices for discharge and venting. Pressure gauges for measuring the differential pressure are installed in the inlet and outlet connections. There should be a re-circulation line for cleaning the system if this is feasible and suitable.

**Note**

**The parts described above are not included with the equipment.**

When installing, take care not to reverse the inlet and outlet. The direction of flow is not always marked, but can be determined by noting that the inlet lies above the outlet. The outlet is usually at the bottom. The inlet allows for the liquid to flow into the filter bag so that the direction of flow is from the inside to the outside.




General regulation

Filter bags are used with flow from inside to outside. Observe national and local regulations when setting and running the pressure vessel, especially: Establishing security areas and distances where necessary for the protection of employees and others.

Ensuring an easy access and secure work area for the housing. Ensuring secure installation (bolting) to prevent shifting or other movement by external forces; such as the housings own weight, pressure or the fluids entering the housing.

**Important Notice**

Pipe connections must be made so that they are stress free.

Additional weight on the connections is not allowed unless explicitly stated. It is expected that the installation of the filter housing into the piping system, including additional accessories, is executed professionally and according to national and local codes and regulations.

## 4.0 Start up

**Notice**

Normally, after the installation of the filter housing, a pressure seal test as well as a cleaning of the housing is done.

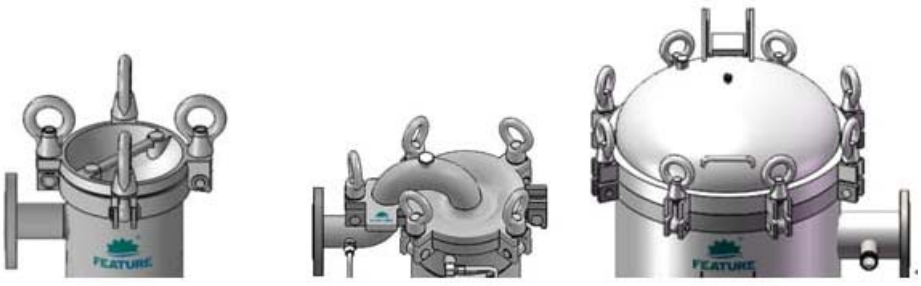
**Cleaning of**

1. Particles inside the housing. Filter housings are usually cleaned afterwards. It is unavoidable that some beads may remain in the housing. It is suggested to clean the filter housing with a process suitable cleaning liquid. In certain cases filter housings are treated with pickling acid and cleaned with water( chloridion should be less than 25mg/l ).
2. Anti-corrosives. In some cases parts may be protected with anti-corrosives; for example, carbon steel filter housings with paint.

### 4.1 Cover lid - opening

4.1.1 Bolted joint design

Filter type: ECS, ECT, Multi-bag Filter-VM



To open the housing, first loosen the eye nuts on the top. The eye nuts can be loosened

using a small bar. Where hexagon nuts are used, the appropriate wrench should be used. If eye bolts are used, the nuts should be loosened enough to allow for them to be swung clear of the cover. If stud bolts are used, the nuts must be removed completely.

The cover-lid of the housing may now be hinged back against the end-stop.

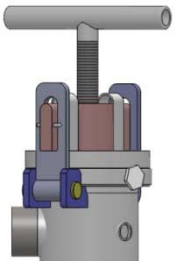
Multi-bag filter housings have a spring-lift or davit mechanism to aid the opening of the cover. These mechanisms, where appropriate, are described on the following pages.

Notice that depending on the size of the filter housing the cover may have significant weight. Opening quickly can therefore cause great forces and significant damages can be caused by striking other objects. (A similar process is the rapid opening or closing of door, which can cause personal injuries).

Therefore the cover must be opened and closed slowly.

### 4.1.2 Centre bolt closure (T-bolt closure)

Filter type: T-HANDLE

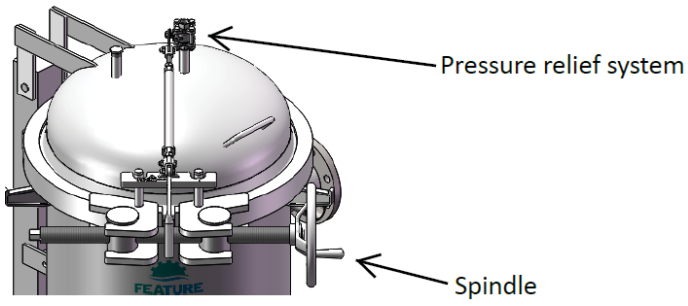


T-handle Filter housings with a centre bolt closure should only be opened and closed by hand.

Depending on style and design, these filter housings may be equipped with an additional security device. This device is to be opened first to enable the main opening mechanism.

### 4.1.3 Design with QV-LOCK spindle closure

Filter type: Multi-bag filter -QV



The QV-LOCK mechanism is a two piece C-shaped clamp that can be opened and closed using a hand operated spindle mechanism. The C-shape closes the housing, covering the flange which seals with an O-ring. The C-clamp is then locked by closing a handle that closes a pressure relief device. This device needs to be opened first in order to operate the spindle.

Therefore the cover must be opened and closed slowly.

**4.2 Filter bag insertion**

Previous special instructions for the preparation and installation of filter bag into the filter housing should be followed first. Filter housings are normally not shipped with filter bags installed. Without support filter bags are not able to withstand the differential pressure that occurs during operation. This support is provided by the restrainer basket.

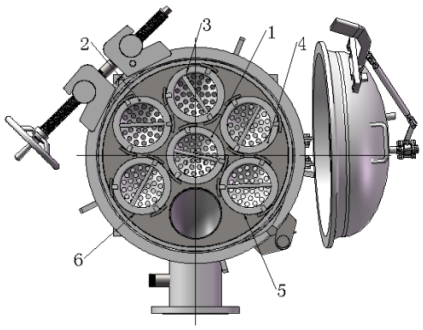
If not pre-installed, the restrainer baskets must be installed into the filter housing. With the restrainer basket installed, the filter bag can now be inserted into the basket. Remove the filter bag label and retain for tracking and reordering information.

Multi-bag filter-QV and BVM, multi-bag filter housings are equipped with bag-fixing rings that are locked by bayonets. A special tool is available to lock the ring. This tool is supplied with the filter housing.

**Filter Bag Installation Instruction of 6-bag Filter**

Our 6-bag Filter has a compact design structure, please follow the below instructions to use the filter properly.

Before usage, you need to open the cover-lid and secure (lock) it properly, then open up the Bag-fixing ring anti-clockwise by a special wrench as the sequence 6→5→4→3→2→1, then install 6 filter bags into the baskets properly, then lock the bag-fixing ring clockwise by the special wrench as the sequence 1→2→3→4→5→6. Please tilt the Bag-fixing ring a little bit when interference happens during the operation. After all these steps, close up the cover-lid and lock it.




**4.3 Cover lid - closing**

Before closing the cover ensure that the sealing surfaces along with the gasket are clean

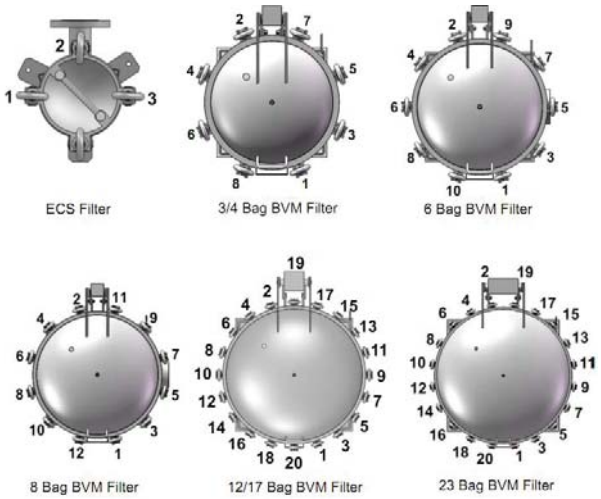
and damage free. Check that the gasket is sitting in its correct position. Replace gasket if faulty.

Remove and discard damaged gaskets !

Bag filter housings are usually equipped with one or on special designs with more than one O-ring. Depending on the application, special housing designs may also be equipped with flat gaskets.

Less cover bolt torque is required on housings with O-ring gaskets than with flat gaskets.

To avoid stress in the cover-lid, tighten the bolts in accordance with the following sequence:




When using maximum allowable torque, the bolts are to be tightened in three steps.

1. Step: 50 % of torque

2. Step: 80 % of torque

3. Step: max torque

To close T-handle bag filters with a centre bolt closure, hand-tight pressure on the centre bolt will be sufficient to seal the housing. Tools to give extra leverage must not be used, otherwise the mechanism is likely to be damaged.

Filter housings with a QV-LOCK quick closure mechanism are closed by hand. Where a hex-nut is used in place of the spindle wheel, the applied torque must not exceed 200 Nm. The pressure-release device must be locked down in place to complete the closure. The C-clamp is now locked.

## 4.4 Start up

### 4.4.1 Install

1. First, please make sure the inlet and outlet should be closed, vent should be opened.
   首先确认过滤器进出液口为关闭状态，排气阀为开启状态；
2. Please open cover-lid by eye-bolt or spindle. 12,17,23-bag filter could open cover-lid aided by assist assemble(see 6.3), please fix cover-lid in specific angle by pin, to avoid cover-lid closed inattention.
3. Please install the filter bag in place, screw compress assemble. Then keep the gasket in place, close the cover-lid, screw the eye-bolt(see 4.3) or rotate spindle.

### 4.4.2 Working

1. Slowly open the valve on the inlet. Avoid opening too fast as shock loads can damage the filter media and the housing. The vent valve should be open to ensure that no air is locked in the top of the filter housing. The valve should be closed as soon as liquid runs out. In all cases (whether or not hazardous liquids are being filtered) precautions should be taken to prevent injury from spraying liquid.
   If the filter is not vented, any air in the filter will reduce the efficiency of the filter media. Generally, if air gets into the system, it should be vented off immediately. When filtering gaseous fluids, the filter should be vented at regular periods. The outlet valve is now to be opened slowly.
   Due to the fact that filter bags may release some particles when first used, we recommend re-circulation of the filtrate. The length of time for re-circulation will depend on the individual filter bag and level of filtration. This will ensure that particles from newly installed filter bags will be collected and safely removed from the filtrate.

2. Please observe different pressure gauge frequently, change the filter element immediately, when reach the maximum pressure drop(the difference in pressure before and after the filter).
3. Please halt filter and relief pressure immediately, when work pressure equal to design pressure.

**Note**

Please change the gasket in time, if the gasket broken, to avoid media leakage.

Filter element is one-time element, clean filter element by user make the filter element breakdown;

Filter element is cycle use, wrong clean method make the filter element breakdown;

Maximum pressure drop is in theory, user could estimate by working condition.

Feature will not be responsible for above filter element breakdown.

4.4.3 Stop

1. Close inlet and outlet.
2. Open vent and drain, release residue media in filter house.
3. Please make sure residue media release completely, open cover-lid, take out or change filter element, screw compress assemble, take the clean and intact gasket in place. Close the cover-lid, screw the eye-bolt or rotate spindle.

Please keep filter house and element clean, to extend working life.

## 5.0 Use, handling and maintenance

### 5.1 Use and Handling

To achieve maximum results from the equipment, we recommend that adequate training is provided to all users and maintenance personnel. This manual should be part of this training. The training should include the correct and safe operation of the equipment. Training should also cover process requirements, type of filter, types of media, and special treatment of fluids and general safety rules.

The equipment must not be incorrectly used and measures should be taken to prevent this. Incorrect use includes:

• exceeding the permissible pressure rating or temperature

• filtration of non-compatible fluids

• use of incorrect spare parts (e.g. bolts and gaskets)

• exceeding the permissible component load

• operating errors like opening under pressure or improper emptying or filling

Possible consequences with damage to persons or property may be:

- failure of the pressure equipment (bursting or exploding)
- emission of hazardous fluids (toxic, caustic, flammable).
- leakage and corrosion

Control systems (pressure and temperature) must be checked regularly for proper function. If the use of the pressure equipment has an associated risk due to the nature of the fluid and/or the operating conditions, it is recommended to record the inspections. The operator should have access to the file (pressure equipment book) at any time.

### 5.2 Maintenance of the filter housing

The filter itself does not need any special maintenance with normal use. All parts should be regularly checked for corrosion and other damage.

Install a new filter bag at every product change or if the bag becomes dirty and is no longer efficient. Differential pressure will determine if this point has been reached.

**Feature** recommends changing the filter bag at a differential pressure of 1.5 bar but a maximum of 2 bar is permissible.

To remove the filter bag, release the pressure in the housing by opening the pressure relief valve. The procedure for opening and closing the housing is described in Section 4.

Attention should always be given to the gaskets and sealing surfaces, ensuring that they are clean and undamaged. Damaged gaskets should be replaced.

**Note**

**Feature** joins many gasket manufacturers in recommending that gaskets be replaced whenever a pressurized container is opened. In practice, gaskets are often used many times. This may result in a faulty seal and a defect in the system.

It is important to verify that the correct gasket is being used. This applies to the size and the material of the gasket.

If the filter housing is protected from corrosion through an applied coating, a regular check of the surface to identify possible damage is important. Any damage to the coating should be repaired professionally.

Security equipment, such as pressure monitoring equipment, pressure relief systems on quick-closure mechanisms, locking devices, seal breaking devices, pressure measurement equipment, temperature control devices, leakage warning systems, etc. must be regularly tested for proper operation and repaired immediately in the case of malfunction.

The QV -LOCK closure mechanism is equipped with an enforced locking device at the spindle. This device is linked to the pressure release vent.

### 5.3 Recurring inspections

This section describes the scheduled maintenance and operation of pressure vessels. Maintenance schedules may be defined by national or local codes and regulations or plant norms. The operator must ensure that governing regulations are known and adhered to. We recommend that all servicing and maintenance be documented.

## 6.0 Maintenance of the spring-assisted lid lift (only Multi-bag Filter)

The spring lifting device operates mechanically and can be adjusted. It is made of stainless steel. Even heavy housing covers can balance almost weightless with its support

while the cover remains still in position.

### 6.1 Maintenance

The quick closing mechanism does not require any special maintenance.

Sounds made by the spring lifting device (jarring or grating) have no influence on the function of the lifting device, but can be reduced by spraying with a lubricant. In adverse conditions, there may be risk of corrosion of weight bearing parts and a failure of the spring. The spring is only under tension when the housing is closed and relaxes when the housing is opened.

Should the closure fail, it would usually be under full tension when the cover is closed.

It would be a rare occurrence for the closure to fail. Should the spring-assisted lid lift fail unexpectedly, the housing cover may not be opened unless secured with a rope or chain.

### 6.3 Assist Assemble

Assist Assemble apply to 12 Bag Filter, 17 Bag Filter, 23 Bag Filter, it's selectable assemble for filter. We can open or close cover lid easily by assist assemble.

Opening Instruction

1. Keep exhaust open. Do not insert pipe into liquid.
2. Unscrew the eye-bolts to open cover-lid.
3. Push open cover to 3-6° ,angle.
4. Turn hand wheel in marked direction
5. Insert bolt to secure cover.

### 6.4 Caution

The spring lift device must be protected against aggressive and corrosive materials.

If the spring lift device is in a high humidity environment (such as cleaning operations with steam cleaners) there is risk of corrosion. If this risk exists please contact the manufacturer to be consulted further.

We recommend the filter be installed so that no personnel can reach under the spring lift device. Never place your head under the spring lift device for maintenance work.

The spring lift device is very safe, but during operation no body parts should be placed under the lifted weight, which is true for all heavy items.

## 7.0 Technical Data

Measurements, details, spare parts and other materials can be found on the current datasheets and sales drawings and full drawings if these are part of the full documentation package furnished with the housing. Missing information can be requested from **Feature** by providing the serial number of the housing.

## 8.0 General operating instructions

Filter bags that are used in the filter housings are usually made from industrial felt, monofilament mesh or melt-blown micro-fibers. In addition, strainer baskets are also used for coarse filtration. For technical details, please refer to the appropriate literature.

The velocity of the flow of the process fluid through the filter is a major factor in achieving good as well as economic filtering results. The goal, with a few exceptions, is to keep the velocity as low as possible. Low pressure on the filter enhances filtration and increases the service life of the filter bag, thus reducing the operating cost of the whole system.

At the same time the flow should be as even as possible, for a feed pump a centrifugal pump is a better choice than a piston-driven one which delivers pulsating velocities. As a rule, it is better to avoid uneven feed or intermittent operation as much as possible to prevent backup-up in the filter housing.

Such conditions could cause the filter bag to lift up and float with pressure changes in the filter housing so that it no longer fits exactly in the restrainer basket. At worst, this could result in a bursting of the filter bag. Filter bag lift up can be effectively prevented by the use of an optional evacuation balloon device.