



# SUBMITTAL SHEET

Dondlinger Construction  
120035- - COW -Cheney Pump Station Ozone Strainer Replacement

**Project:** 120035-  
COW -Cheney Pump Station Ozone Strainer Replacement

**Spec Section Num:** 44 10 00  
**Submittal:** 441000-02a

**Revision:** 0  
**Package:** Automatic Strainer  
**Date:** 2/10/2021 UTC


**Received From:**

**Submittal Title:** O&M Manual  
**Submittal Detail:**  
**Response Due By:** 1/31/2021 UTC

**Contractor:**  
Eric Swenson  
Dondlinger Construction

<b>Contractor's Stamp</b>	
DONDLINGER AND SONS CONST. CO., INC.	
<input checked="" type="checkbox"/>	Reviewed <u>Eric Swenson</u>
<input type="checkbox"/>	Reviewed as Noted _____
<input type="checkbox"/>	Revise and Resubmit _____
<input checked="" type="checkbox"/>	Date <u>02/10/21</u>
<input type="checkbox"/>	Submittal No. <u>441000-02a</u>
REVIEW OF ITEMS DOES NOT RELIEVE VENDOR FROM COMPLYING WITH REQUIREMENTS OF CONTRACT PLANS AND SPECIFICATIONS, CONTRACT AND CITY, STATE AND LOCAL CODES.	

**Architect:**  
Aidan Gearhart  
PEC

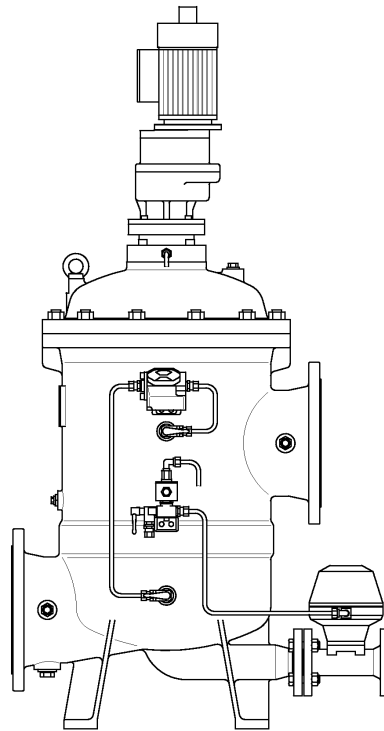
SUBMITTAL REVIEW	
<input checked="" type="checkbox"/> APPROVED	Approval is only for general conformance with the design concept of the project. Contractor at all times remains responsible for compliance with the Contract Documents. Deviations are not approved unless Contractor has in writing called Engineer's attention to such deviation at the time of submission and Engineer has in writing approved the specific deviation. No acceptance by Engineer relieves Contractor from responsibility for errors or omissions in Compliance Submittals.
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 PROFESSIONAL ENGINEERING CONSULTANTS, P.A. BY <u>Nicole Franken</u> DATE <u>2/16/21</u>	

**Response:**

- Comment:**
- Warranty information included at end looks like it's for another project. PEC and Dondlinger discussed including final warranty with date inserted into hard copy O&M after installation
  - Installation inspection and startup report to be included in final hard copy O&M
  - QC info was taken out of revised document, please include in final

## Operating instructions for automatic filter

Type 6.18  
Nominal diameter DN 50 - DN 1000  
Filter element Filter candle



Siemensstraße 10 - 14  
50170 Kerpen  
Germany  
[www.bollfilter.com](http://www.bollfilter.com)

Date	Version	Language	Order no.	Item no.
06.2016	001	en	4175620	01

NOTE:  
Print document on both sides

Translation of the original operating instructions



## Table of Contents

<b>1</b>	<b>Preamble</b>	<b>5</b>
1.1	General	5
1.2	Warranty and liability	5
1.3	Copyright	6
<b>2</b>	<b>General safety instructions</b>	<b>7</b>
2.1	Basic safety instructions	7
2.1.1	Proper use	7
2.1.2	Warning signs and symbols	7
2.1.3	Target group	8
2.1.4	Obligations of the user/operator	8
2.1.5	Selection and qualifications of staff	8
2.1.6	Organisational measures	9
2.1.6.1	General	9
2.1.6.2	Maintenance and servicing	9
2.1.7	Consumables	9
2.1.7.1	Filtered media	9
2.1.7.2	Cleaning agent	9
<b>3</b>	<b>Transportation and storage</b>	<b>11</b>
3.1	Transportation	11
3.2	Storage	11
3.3	Packaging material	11
<b>4</b>	<b>Scope of delivery</b>	<b>13</b>
<b>5</b>	<b>Technical data</b>	<b>15</b>
5.1	Type plate	15
5.2	Tightening torques	15
5.3	Overview of automatic filter assembly group	15
<b>6</b>	<b>Installation</b>	<b>19</b>
6.1	Special safety instructions	19
6.2	Filter installation	20
6.2.1	Floor fastening	20
6.2.2	Installation diagram	21
6.2.3	Identifying the flow direction	22
6.2.4	Filter inlet/outlet pipe connections	22
6.2.5	Backflush discharge pipe connection	23
6.2.6	Compressed air supply connection (on pneumatically actuated backflushing discharge valves only)	23
6.2.7	Control medium (external medium) connection (on hydraulically controlled backflushing discharge valves only)	23
6.2.8	Electrical connections	24
6.2.9	Potential equalisation	25
<b>7</b>	<b>Operation</b>	<b>27</b>
7.1	Functional description of the filter	27
7.1.1	Filter housing	27
7.1.2	Controller	27
7.1.3	Differential pressure monitoring system	27
7.1.4	Gear motor	28
7.1.5	Backflushing discharge valve	28

7.1.6	Backflushing discharge valve control (pneumatic or hydraulic) . . . .	28
7.1.7	Filtration stage . . . . .	29
7.1.8	Backflushing stage . . . . .	31
7.2	Filter insert . . . . .	33
7.2.1	Filter insert with filter candles . . . . .	33
7.2.2	Functional description of the filter insert with filter candles . . . . .	34
7.3	Commissioning . . . . .	35
7.4	Removal from service . . . . .	37
7.4.1	Short-term removal from service . . . . .	37
7.4.2	Longer term removal from service / removal . . . . .	37
7.4.3	Disposal . . . . .	37
<b>8</b>	<b>Maintenance and servicing . . . . .</b>	<b>39</b>
8.1	Special safety instructions . . . . .	39
8.2	Cleaning agent . . . . .	40
8.3	Special tool . . . . .	40
8.4	Maintenance intervals . . . . .	41
8.5	Cleaning/replacing filter elements . . . . .	43
8.5.1	Preparatory work . . . . .	43
8.5.2	Removing the filter insert with filter candles . . . . .	47
8.5.3	Cleaning the filter insert with filter candles . . . . .	47
8.5.4	Installing the filter insert with filter candles . . . . .	49
8.5.5	Checking the sacrificial anode (if available) . . . . .	49
8.5.6	Concluding work . . . . .	50
8.6	Manually backflushing the filter in the event of power failure . . . . .	51
8.7	Remedying faults . . . . .	52
8.7.1	Trouble shooting . . . . .	52
<b>9</b>	<b>Appendix . . . . .</b>	<b>53</b>
9.1	Filter . . . . .	53
9.1.1	Technical data . . . . .	53
9.1.2	Technical data sheet . . . . .	54
9.1.3	Spare parts . . . . .	55
9.1.3.1	Spare parts drawing . . . . .	55
9.1.3.2	Spare parts list . . . . .	56
9.2	Supplier's documentation . . . . .	60
9.3	Cleaning devices . . . . .	60
9.4	BOLL CLEAN 2000 cleaning agent product information . . . . .	61
9.5	Worldwide sales and service network, subsidiaries and representatives . . . . .	62

# 1 Preamble

## 1.1 General

These operating instructions are designed to make it easier to get to know the BOLL & KIRCH filter and make use of its proper intended uses.

The operating instructions contain all important instructions on how to operate the filter safely, properly and economically. Adherence to the operating instructions helps to prevent hazards, repair costs as well as to reduce down times, increase the reliability and even the serviceable life of the filter. Read the operating instructions carefully and attentively.

Supply the operating instructions with any instructions required due to existing national and international regulations for the prevention of accidents and environmental protection. Make sure that the operating instructions are always available in the place of use for the filter. The operating instructions must be read and applied by every person given the task of performing the following work:

- transportation,
- installation,
- operation,
- maintenance and servicing,
- Disposal.

## 1.2 Warranty and liability

The "General Terms and Conditions" of BOLL & KIRCH Filterbau GmbH apply. BOLL & KIRCH Filterbau GmbH shall not recognise any warranty or liability claims for personal and material damages if they can be attributed to one or more of the following causes:

- improper use of the filter,
- failure to comply with the information and instructions in the operating instructions,
- arbitrary constructional modifications to the filter,
- insufficient monitoring of parts which are subject to wear and tear,
- maintenance/repair work performed improperly or too late,
- disasters caused by external influences or an act of God.

All the information in these operating instructions is provided to the best of our knowledge based on our prior experience. We reserve the right to make technical changes as part of further technical development.

The text and graphic illustrations do not necessarily correspond exactly to the actual delivery. Reference to any deviations is made in the respective place if required for comprehension. The graphic illustrations are not true to scale.

A list of spare parts is enclosed with the operating instructions for spare parts orders.

### 1.3 Copyright

These operating instructions are a certified document as per the terms of the law against unfair competition.

The copyright of the document is held by  
BOLL & KIRCH Filterbau GmbH  
Siemensstraße 10 - 14  
50170 Kerpen  
Germany

These operating instructions are for the user of the filter and the user's staff. They contain text and drawings which, without the express permission of the manufacturer must not be

- reproduced,
- distributed or
- otherwise made available to others, either in full or in part.

Failure to comply will require compensation.

## 2 General safety instructions

### 2.1 Basic safety instructions

#### 2.1.1 Proper use

The filter is constructed with state-of-the-art technology and according to the recognised rules of safety. However, use of the filter may result in risks to the life and limb of the user or third parties and/or damage to the filter or other objects of material value.

Only use the filter if it is in a technically perfect condition and only use it properly; paying due attention to safety and hazards, and in adherence to the operating instructions. It is particularly important to remedy any faults (or have them remedied), which may compromise safety.

The filter is designed only for liquid media filtration. The filter is designed for installation in pipes. The type of medium agreed in the order, and the limit values for operating pressure and temperature as set out in the "Technical data", must be adhered to. Any other type of use or use going beyond this use, is regarded as improper use. The manufacturer/supplier shall not be liable for any damage caused as a result of improper use. The user bears the sole risk.

Proper use includes observance of the operating instructions and adherence to the inspection and maintenance conditions.

Operationally safe function is only ensured if all the instructions, settings and performance limits for the filter, are adhered to.

#### 2.1.2 Warning signs and symbols

The following designations and symbols are used in the operating instructions to denote particularly important information:



##### **DANGER!**

Denotes immediate hazard with high risk which will cause death or serious physical injury if not avoided.



##### **WARNING!**

Denotes possible hazard with medium risk which may cause death or serious physical injury if not avoided.



##### **CAUTION!**

Denotes a hazard with low risk which could cause light or medium physical injury or material damages if not avoided.



##### **NOTE**

Denotes special user tips and other particularly useful or important information.



##### **DISPOSAL**

Denotes special measures for environmental protection.

### **2.1.3 Target group**

The operating instructions apply for use by qualified specialist staff only.

### **2.1.4 Obligations of the user/operator**

- Always keep the operating instructions at hand at the place of use of the filter.
- Adhere to general legal and other binding accident prevention regulations and environmental protection, and provide supplementary instructions in the operating instructions accordingly. This type of obligation can apply to the handling of hazardous substances or the provision / wearing of personal safety clothing and equipment, for instance.
- Supplement the operating instructions with your own instructions, including supervision and reporting obligations for specific operational matters, e.g. with regard to organisation of work, working sequences and the appointed staff.
- Observe all existing safety instructions and hazard warnings on the filter.
- Keep all existing safety instructions and danger signs on the filter complete (in number) and in a legible condition.
- Do not make modifications of any kind to the filter which may compromise safety, without the permission of the manufacturer.
- The spare parts which are used must comply with the technical requirements set out by the manufacturer. This is always guaranteed by the use of original spare parts.
- The user is responsible for the selection of materials and the chemical resistance of the installed components, internal linings and coatings. The user must specify the technical details when ordering the filter.

### **2.1.5 Selection and qualifications of staff**

- All work on the filter must be performed exclusively by reliable staff. Staff must not be under the influence of drugs or medication. Adhere to the legal minimum age requirement.
- Only employ qualified or trained staff. Clearly define the staff responsibilities for assembly, operation, as well as maintenance and servicing.

## **2.1.6 Organisational measures**

### **2.1.6.1 General**

- Follow the respective valid national and international accident prevention regulations.
- Avoid direct contact with the surfaces. Depending on the operating temperature, there may be a risk of burns.

### **2.1.6.2 Maintenance and servicing**

- Adhere to the maintenance tasks and intervals set out in the operating instructions, including instructions on the replacement of parts/equipment.
- Only use original spare parts.
- If the filter is subject to a regular inspection by an inspection and testing organisation, with regard to temperature, steam pressure and the dangerousness of the medium, the inspection periods must be adhered to by the user.

## **2.1.7 Consumables**

- Observe the regulations for environmental protection. Make sure that consumables are disposed of properly and in an environmentally friendly manner.

### **2.1.7.1 Filtered media**

- When handling media which are to be filtered, make sure you follow the respective safety regulations for the media.

### **2.1.7.2 Cleaning agent**

- When handling the cleaning agents, make sure you follow the respective safety regulations for the cleaning agents.



## 3 Transportation and storage

### 3.1 Transportation

---



#### **DANGER!**

##### **Risk of accidents from falling loads**

During transportation of the filter, accidents may occur due to sizes and weights.

- Exercise extreme caution when transporting the filter in order to prevent damage to or deformation of the filter.
  - Only use suitable means of transport and lifting gear with sufficient load-bearing capacity.
  - Do not stand underneath suspended loads. Do not work underneath suspended loads.
  - Wear the appropriate protective clothing.
- 

### 3.2 Storage

---



#### **CAUTION!**

##### **Improper storage will cause damage to the filter and filter elements**

If stored incorrectly and improperly, moisture and soiling, for example, may cause damage to the filter and the filter elements.

- Protect the filter and filter elements from moisture and soiling during storage.
  - Do not store the filter and filter elements below the frost line.
  - If the filter and the filter elements have been stored for more than one year, check that all seals are fully functional before installation.
- 

### 3.3 Packaging material

---



#### **CAUTION!**

##### **Risk of explosion from electrostatic charge**

Packaging material, such as paper or plastic, can become statically charged and generate sparks when discharged.

- Remove the packaging material before transportation into an explosive atmosphere.
- 



#### **DISPOSAL**

Observe the regulations for environmental protection. Make sure that the packaging material is disposed of properly and in an environmentally friendly manner.

---



## 4 Scope of delivery

Immediately after receiving the delivery, check that the content is not damaged and that it corresponds to the scope of the order. In case of discrepancies, contact the manufacturer.



## 5 Technical data

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### NOTE

You will find the technical data in the appendix of these operating instructions.

---

### 5.1 Type plate

The type plate is placed on the filter. You can read the maximum permitted operating pressure and the maximum / minimum operating temperature from the type plate.

---



### NOTE

When making enquiries or ordering spare parts, always indicate the information mentioned on the type plate.

---

### 5.2 Tightening torques

The tightening torques for screws can be found on our website [Bollfilter.com](https://www.bollfilter.com) under Downloads/Tightening torques or via the following link:  
<https://www.bollfilter.com/downloads/service-documents.html>

### 5.3 Overview of automatic filter assembly group

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### NOTE

The description of assembly groups can be found in the "Operation" chapter of these operating instructions.

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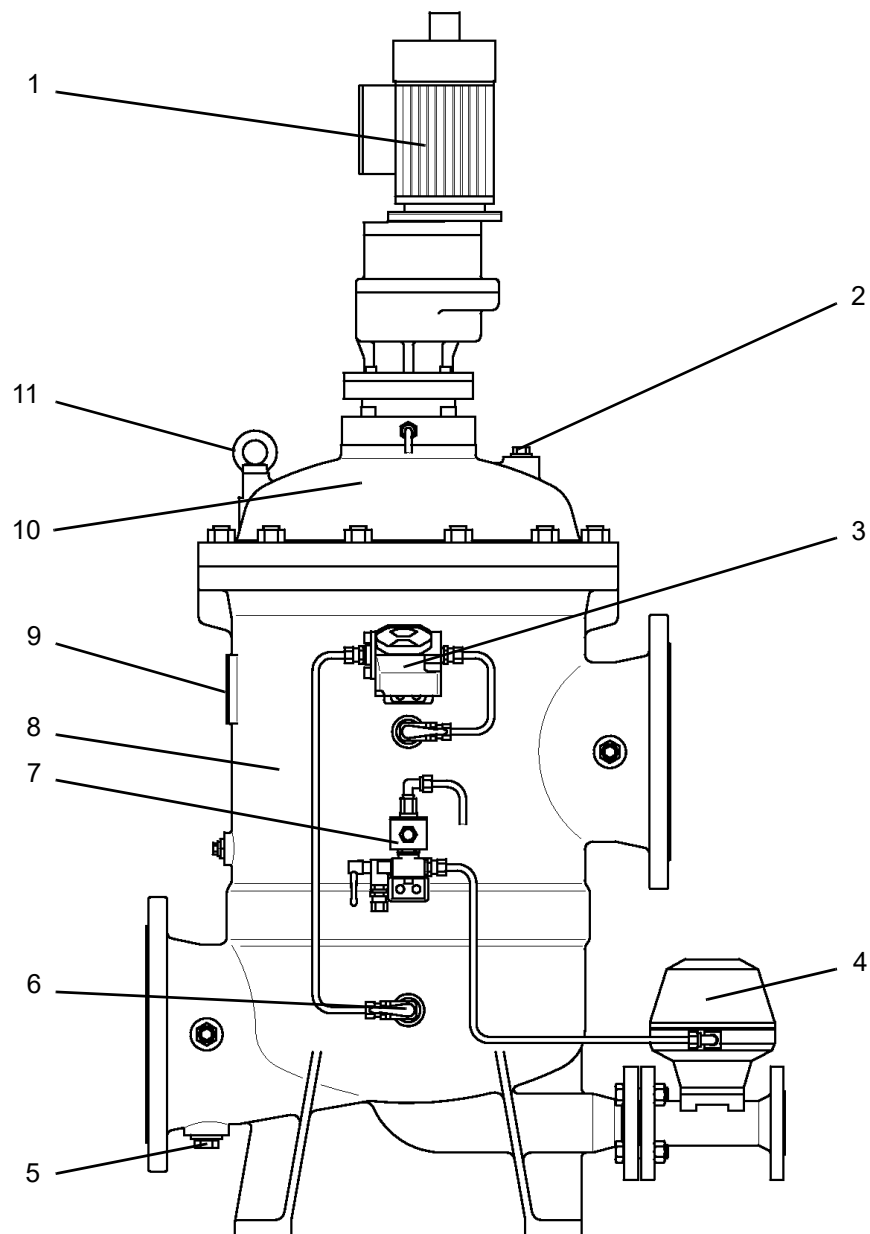


Fig. 5-1 Overview of assembly groups (view)

1	Gear motor	7	Solenoid valve
2	Vent	8	Housing
3	Differential pressure monitoring system	9	Type plate
4	Backflushing discharge valve	10	Cover
5	Draining	11	Suspension point
6	Ball valve		



**NOTE**

The filter can be fitted with an optional automatic vent.

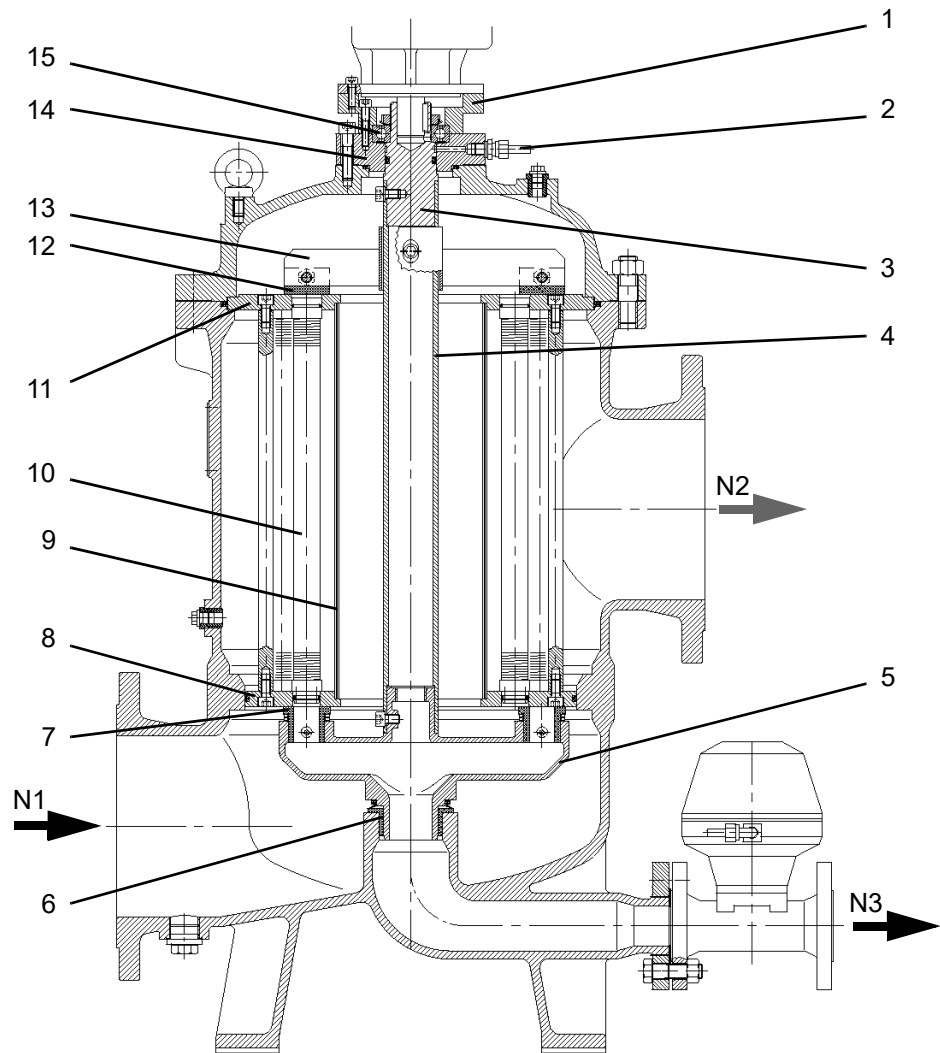


Fig. 5-2 Overview of assembly groups (cross sectional view)

1	Motor flange	10	Filter candle
2	Line (leak)	11	Top sieve plate
3	Coupling	12	Cover plate
4	Connecting shaft	13	Cover arm
5	Flushing arm	14	Flange
6	Bearing bush	15	Bearing
7	Flushing bush	N1	Filter inlet
8	Bottom sieve plate	N2	Filter outlet
9	Spacer pipe	N3	Backflush discharge



## 6 Installation

### 6.1 Special safety instructions

---



#### **DANGER!**

##### **Risk of accidents from improper installation**

Incorrect installation and failure to follow the listed safety instructions can lead to accidents or damage to property.

Make sure of the following:

- The filter must be installed by qualified specialist staff or persons who have received appropriate instruction.
- Wear the appropriate protective clothing.
- Use of the lifting gear is only permitted for authorised persons who have received appropriate instruction.
- Cordon off the working and suspending area against access before lifting the load.
- Only use suitable lifting gear with sufficient load-bearing capacity.
- Only use lifting gear on the provided suspension points (if available).
- Proceed with extreme caution when handling the loads.
- Use lifting gear in such way that the filter does not become damaged.
- Raise the filter evenly. Avoid tilting.
- Do not stand underneath suspended loads. Do not work underneath suspended loads.
- As there is a risk of crushing, all limbs must be kept away from separating joints.
- Additional devices to prevent maximum temperatures being exceeded and temperatures dropping below the minimum and for compensation and relief of overpressure, must be provided by the user throughout the entire system of the plant. Observe the minimum and maximum permitted operating temperatures and pressure values for the filter.
- Additional devices for monitoring the ambient temperature of the filter must be provided by the user throughout the entire system of the plant.
- Install a ground cable with a cross section of at least 10 mm<sup>2</sup> as a potential equalisation for the filter.



---

#### **NOTE**

Contact the manufacturer with any special questions you may have regarding the installation. The contact data for the respective national subsidiaries can be found in the appendix of the operating instructions.

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## 6.2 Filter installation



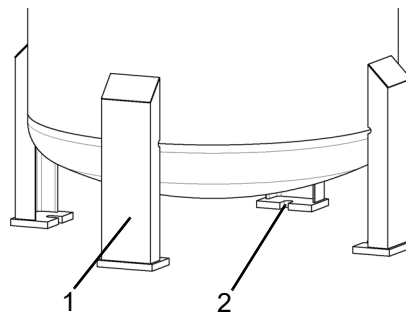
### CAUTION!

#### Risk of damage to the filter housing

The filter housings are designed exclusively for internal overpressure.

- The housing and connection flanges of the filter must not be exposed to any external force or moment.

### 6.2.1 Floor fastening



*Fig. 6-1 Automatic filter with support leg for floor fastening*

- 1 Support leg
- 2 Fastening point

- ▶ Make sure the foundation has sufficient load-bearing strength.
- ▶ Make sure that there is sufficient space in the vicinity of the filter for maintenance and servicing work.
- ▶ Align the filter.
- ▶ Screw the filter housing to the fastening points. When fastening the filter in place, the filter housing must not be twisted.

6.2.2 Installation diagram

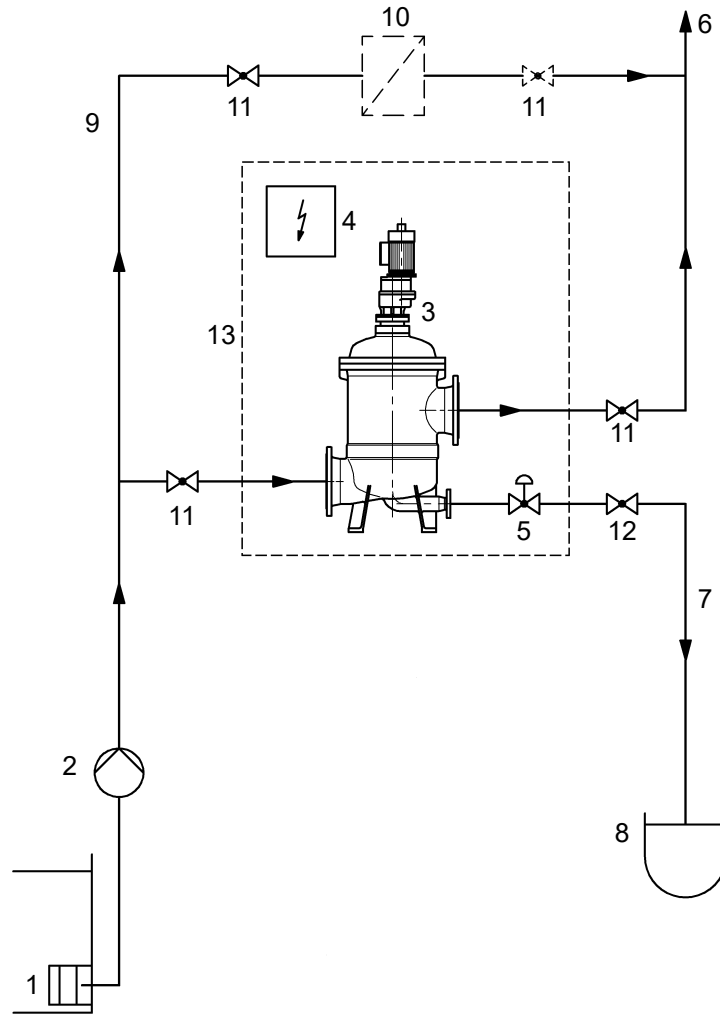


Fig. 6-2 Installation diagram

- |   |                              |    |                              |
|---|------------------------------|----|------------------------------|
| 1 | Grating/suction strainer     | 8  | Waste water                  |
| 2 | Pump                         | 9  | Bypass line                  |
| 3 | Filter                       | 10 | Bypass filter (optional)     |
| 4 | Controller                   | 11 | Shut-off valve               |
| 5 | Backflushing discharge valve | 12 | Control valve                |
| 6 | to the consumer              | 13 | Scope of delivery (standard) |
| 7 | Backflushing discharge line  |    |                              |



---

**NOTE**

- Depending on the type of contamination BOLL & KIRCH Filterbau GmbH recommends using a grating or suction strainer for pre-filtering.  
Filter up to ND 300: 10 mm pre-filter  
Filter with ND of more than 300: 15 mm pre-filter
  - For applications/operation of the automatic filter with an operating pressure of >16 bar, a suitable adjustable valve or throttle (e.g. pipe coil for valve DN 25) has to be fitted downstream of the backflushing discharge valve. The valve/throttle must cause the pressure difference between the filter inlet and the outlet of the backflushing discharge valve to be <16 bar. This is intended to prevent the high forces of the flow from being able to damage the internal parts and the backflushing discharge valve.
  - There is a risk that longish and floating particles, such as foliage or twigs, enter the prefilter. We then recommend to either relocate the suction line into open water below the surface of the water, or to separate the surface of the water from open water at the filter inlet.
- 

**6.2.3****Identifying the flow direction**

---

**NOTE**

- The filter inlet/outlet and backflushing discharge are indicated by the inscriptions (Ein/In), (Aus/Out) and (Schlammablass/mud drain).
  - The direction of flow is also shown in the technical data sheet which is included in the appendix of these operating instructions.
- 

**6.2.4****Filter inlet/outlet pipe connections**

- ▶ Make sure that there is sufficient space in the vicinity of the filter for maintenance and servicing work.
- ▶ Establish the connections between the filter and piping.
- ▶ Use the appropriate seals.
- ▶ The pipes for the filter inlet and outlet may need to be provided with additional supports, depending on the installation conditions. When installing the piping, the filter housing must not be twisted.

### 6.2.5 Backflush discharge pipe connection

- ▶ Establish the connection between the backflushing discharge valve and piping.
- ▶ Use the appropriate seal.
- ▶ The pipe may need to be provided with additional supports, depending on the installation conditions. When installing the piping, the filter housing must not be twisted.
- ▶ Select a pipe cross section which is at least equal in size to the pipe cross section shown in the technical data sheet. A cross section which is too small may cause backpressure. The pipe must also be laid with an inclination and without any counterpressure.



---

#### NOTE

BOLL & KIRCH Filterbau GmbH recommends the installation of a control valve (e.g. ball valve or shut-off flap) to regulate the backflushing quantity better, in particular in case of high pressure.

---

### 6.2.6 Compressed air supply connection (on pneumatically actuated backflushing discharge valves only)

- ▶ Connect the plant's compressed air supply to the solenoid valve.

### 6.2.7 Control medium (external medium) connection (on hydraulically controlled backflushing discharge valves only)

- ▶ Connect the control medium supply to the solenoid valve.

## 6.2.8 Electrical connections



### DANGER!

#### Risk of accidents from electric shock

When connecting to the power supply, the supply voltage can cause accidents from electric shock.

- All the electrical connections on the filter must be made by a qualified electrician and in line with the rules of electrical engineering.

---

### Controller



### NOTE

If you are using a Boll & Kirch Filterbau GmbH controller, you will find more detailed information in the documentation for the controller.

If you are using your own controller or another manufacturer's controller, the respective documentation must be followed.

---

### Differential pressure monitoring system, electrical



### NOTE

You will find more detailed information on the differential pressure monitoring system in the appendix of these operating instructions or in the manufacturer's documentation.



### NOTE

Boll & Kirch Filterbau GmbH differential pressure indicators have potential-free contacts.



### ATTENTION

#### Risk of malfunction or damage to the filter or plant

Failure to react to the alarms can lead to malfunctions or damage to the filter or the plant.

- Connect the differential pressure monitoring system so that the alarms are issued.
- It is imperative to react to any active alarms and remedy the cause immediately.

---

### Gear motor



### NOTE

The gear motor is enclosed with the filter as necessary.

- ▶ Fit the gear motor before connecting to the power supply.
- ▶ Set the value for the electrical fuse protection in the controller.

### 6.2.9 Potential equalisation

- ▶ For potential equalisation, install a ground cable with a cross section of at least 10 mm<sup>2</sup> on the filter.
- ▶ Connect the ground cable to the fastening screw on the filter. If necessary, prior to the installation of the ground cable, remove the paint from the fastening point to ensure sufficient electrical contact.



---

#### NOTE

Filters with an ATEX rating are fitted with an earthing plate. Connect the ground cable to this earthing plate.

---



## 7 Operation

### 7.1 Functional description of the filter

The filter is used for particle filtration from media in order to protect the downstream parts of the plant.

It can be used as a main flow filter or partial flow filter.

The filter candles are cleaned automatically so that the plant does not have to be switched off for cleaning.

#### 7.1.1 Filter housing

The filter housing contains all the pipe connections, the venting, drain hole and the connection points for the pressure monitoring system. The lower section of the housing is screwed to the cover. The gear motor is fastened to the cover using flanges.

Depending on the housing material and the area of application the inside of the filter can be fitted with an internal lining/coating. Depending on the housing material a sacrificial anode can be installed in the filter to protect the internal parts.

#### 7.1.2 Controller

The controller regulates and monitors all automatic filter functions.



##### NOTE

If you are using a Boll & Kirch Filterbau GmbH controller, you will find more detailed information in the documentation for the controller.

If you are using your own controller or another manufacturer's controller, the respective documentation must be followed.

#### 7.1.3 Differential pressure monitoring system

The differential pressure monitoring system measures the pressure difference between the filter inlet and filter outlet. As the soiling in the filter candles increases, the differential pressure in the filter also increases.

The controller processes the electrical signals from the differential pressure monitoring system and triggers a backflushing procedure or issues an alarm if the differential pressure continues to rise despite backflushing having been performed. In case of an active alarm the filter has to be taken out of service and cleaned and/or serviced.



##### NOTE

- You will find more detailed information on the differential pressure monitoring system in the appendix of these operating instructions or in the manufacturer's documentation.
- The differential pressure can also be displayed optically on the differential pressure monitoring system.
- The control line for the differential pressure monitoring system is fitted with shut-off valves (e.g. ball valves).

#### 7.1.4 Gear motor

If the pressure gradient between the dirty side and the clean side reaches a set value due to the growing layer of dirt on the filter material, the automatic filter candles cleaning is triggered.

To do so, the gear motor turns the flushing arm and cover arm approximately 1.25 turns at constant speed until the gear motor automatically switches off.

#### 7.1.5 Backflushing discharge valve

The pneumatically, hydraulically or electrically actuated backflushing discharge valve opens and closes the backflushing discharge line at the start and end of the backflushing phases respectively.



---

#### NOTE

Depending on the type of actuation used for the backflushing discharge valve the backflushing discharge valve can be actuated manually if required, e.g. to manually backflush the filter in case of power failure. For more detailed information, see section 8.6 of these operating instructions.

---

#### 7.1.6 Backflushing discharge valve control (pneumatic or hydraulic)

Pneumatically and hydraulically actuated backflushing discharge valves are controlled by a solenoid valve.

Depending on the filter design/control medium shut-off valves, one-way restrict or valves or pressure controllers, for instance, can be connected upstream of the solenoid valve.

7.1.7 Filtration stage

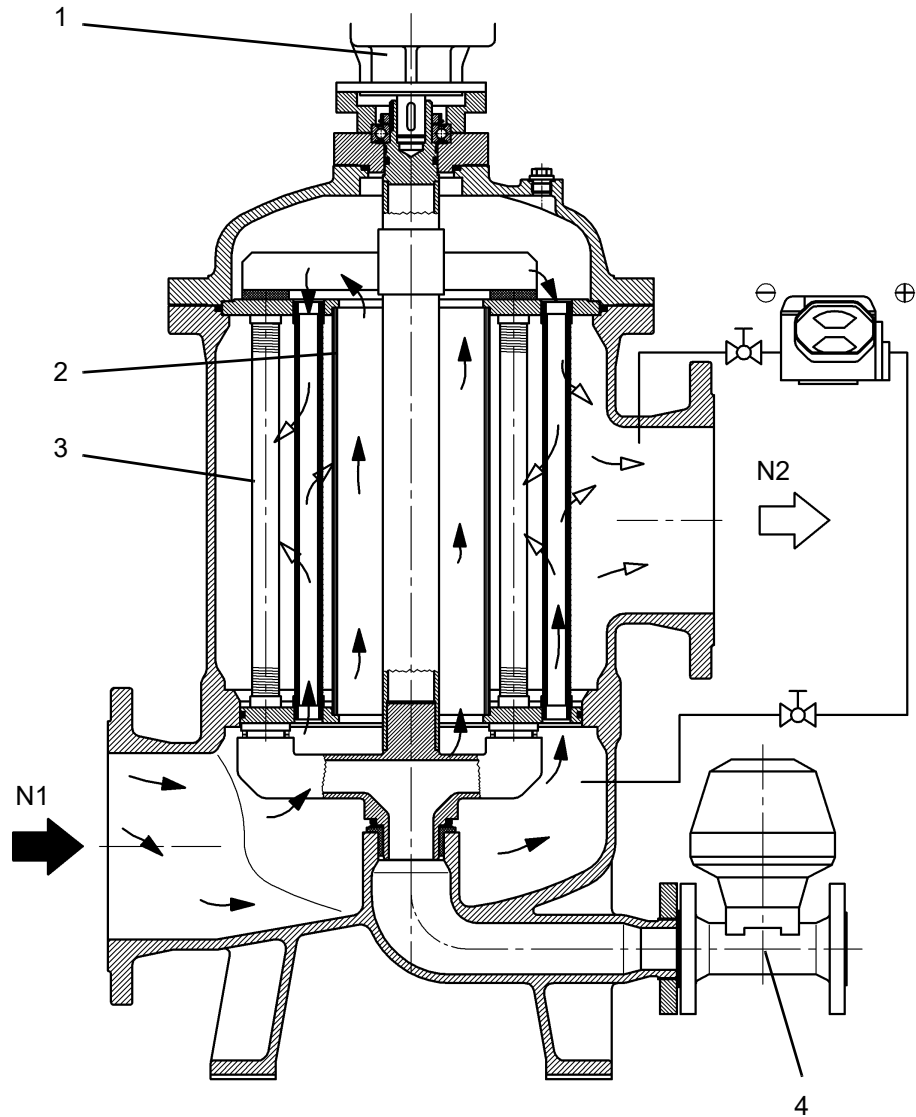


Fig. 7-1 Filtration stage

- |   |               |    |                              |
|---|---------------|----|------------------------------|
| 1 | Gear motor    | 4  | Backflushing discharge valve |
| 2 | Spacer pipe   | N1 | Filter inlet                 |
| 3 | Filter candle | N2 | Filter outlet                |

The medium being filtered flows into the housing via the inlet flange.

The spacer pipe guides a partial current of the unfiltered medium into the upper area of the housing. The unfiltered medium flows into the filter candles via the two open ends. The medium flows through the filter candles from the inside to the outside and the particles in the medium are held back on the filter material of the filter candles.

The cleaned medium proceeds to the filter outlet.

The backflushing discharge valve is closed.

The gear motor is switched off.

7.1.8 Backflushing stage

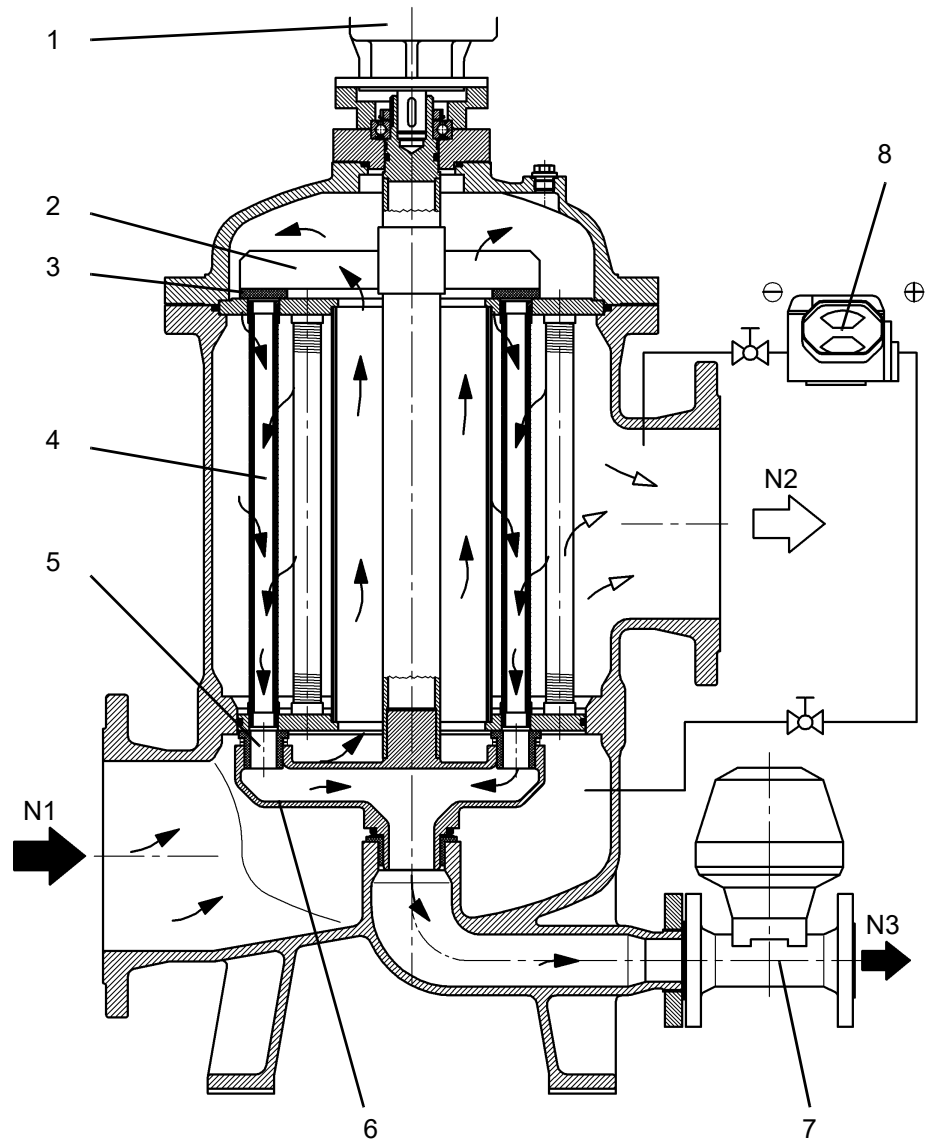


Fig. 7-2 Backflushing stage

- |   |               |    |   |
|---|---------------|----|---|
| 1 | Gear motor    | 7  | Backflushing discharge valve            |
| 2 | Cover arm     | 8  | Differential pressure monitoring system |
| 3 | Cover plate   | N1 | Filter inlet                            |
| 4 | Filter candle | N2 | Filter outlet                           |
| 5 | Flushing bush | N3 | Backflush discharge                     |
| 6 | Flushing arm  |    |   |

The foreign substances held back on the filter candles generate a growing differential pressure between filter inlet and outlet.

Backflushing is triggered by the controller when the differential pressure reaches a certain value.



---

**NOTE**

Backflushing is triggered by the controller at set time intervals in order to prevent the backflushing device from seizing up and prevent incrustations on the filter candles, even when the maximum permitted differential pressure is not reached.

---

When backflushing is triggered, the gear motor is switched on. It turns the flushing arm with the flushing bushes past the individual filter candles. At the same time the backflushing discharge valve is opened. This causes a high axial flow in the filter candle and the particles of dirt which are held back are flushed off.

The pressure gradient which is created allows a small quantity of medium to flow through the filter candle from above at the same time. The cover arm (with the cover plates) which circulates at the same time ensures that at the top end of the filter candles the cross-flow backflushing is directed and the backflushing energy is distributed evenly over the entire length of the candle.

At approximately 1.9 bar and above the dimensions of the internal parts and the additional cross-flow backflushing generate a sufficiently strong high backflushing effect to ensure that the filter candles are regenerated properly. After approximately 1.25 turns of the backflushing device the controller switches the gear motor off. The backflushing discharge valve is closed.

The filter is cleaned.

Flushing the individual filter candles ensures that the full throughput rate is maintained even during the regeneration phase.

---

**NOTE**

- With displacement pumps the throughput is reduced by the backflushing quantity. This backflushing quantity is only effective during the backflushing stage.
  - With centrifugal pumps or buffered systems there is no drop in throughput at the filter outlet during the backflushing stage.
- 

The control valve (installed by the customer) installed in the backflushing discharge line allows the backflushing quantity to be optimised depending on the pressure and type of contamination.

---

**NOTE**

If the conditions of use of the filter change, e.g. too low operating pressure or stubborn soiling in the filter candles, there are various conversion options for optimising the backflushing capacity.

Contact the manufacturer with any questions. The contact data for the respective national subsidiaries can be found in the appendix of the operating instructions.

---

7.2 Filter insert

7.2.1 Filter insert with filter candles

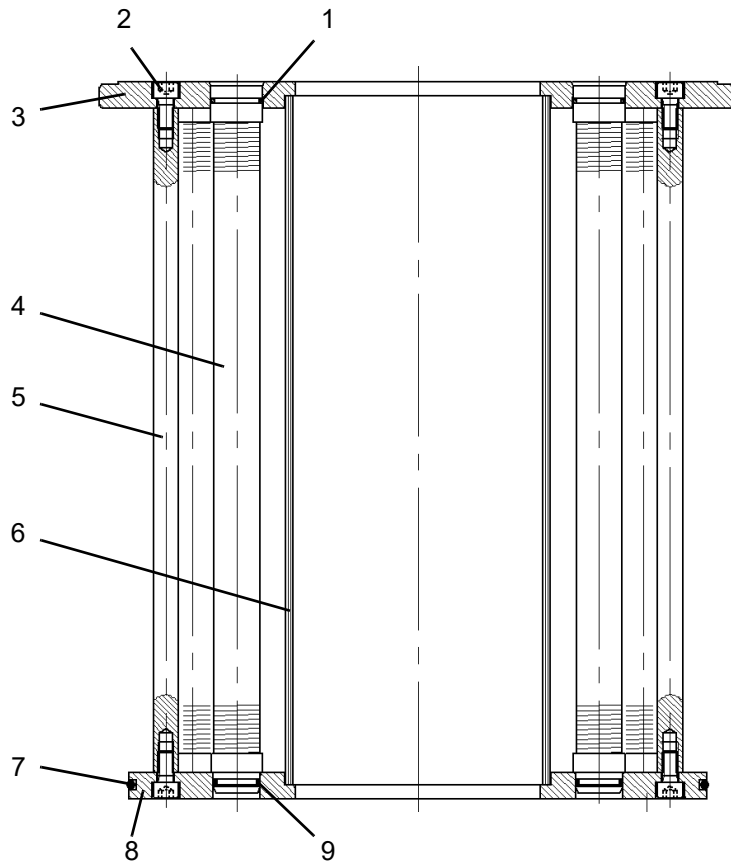


Fig. 7-3 Construction of the filter insert with filter candles

1	Seal	6	Spacer pipe
2	Screw	7	Seal
3	Top sieve plate	8	Bottom sieve plate
4	Filter candle	9	Seal
5	Anchor		

### 7.2.2 Functional description of the filter insert with filter candles

Filter inserts with filter candles are used for filtration. The flow runs from the inside to the outside through the individual filter candles.

Particles of dirt in the flow are thus filtered off by the filter candles. The cleaned medium exits from the side of the filter candles and is fed back into the plant.

The filter insert with filter candles comprises several filter candles arranged in parallel. The filter candles all have the same dimensions; they are interchangeable and can also be removed separately. The open ends of the filter candles are pressed into the bottom sieve plate and top sieve plate.

The type, version and number of filter candles used depends on the medium being filtered.

The gap between the top sieve plate and the bottom sieve plate is determined by the length of the spacer pipe and the anchors.

The dirty side is sealed off from the clean side by seals on the top and bottom sieve plate or at the ends of the filter candles.

### 7.3

## Commissioning

---



### CAUTION!

#### Risk of damage to the filter from improper filling

If the filter is filled improperly, the filter elements may be damaged.

- Filling the filter against the indicated direction of flow of the filter elements is not permitted.
- 



### NOTE

If you are using a Boll & Kirch Filterbau GmbH controller, you will find more detailed information in the documentation for the controller.

If you are using your own controller or another manufacturer's controller, the respective documentation must be followed.

---

- ▶ Check whether all connections have been made properly.
  - ▶ On filters with a pneumatically or hydraulically controlled backflushing discharge valve open the shut-off valves (if fitted) which are installed upstream of the solenoid valve.
  - ▶ On filters with a pneumatically or hydraulically (external medium) controlled backflushing discharge valve check the pressure of the control medium and adjust it as necessary.
  - ▶ Open the shut-off valves in the control line to the differential pressure monitoring system.
  - ▶ Open the control valve in the backflushing discharge line.
  - ▶ Switch on the filter controller.
- 



### DANGER!

#### Risk of accidents from expelled medium

Hot medium may be expelled when opening the vent.

- Proceed with extreme caution.
  - Wear the appropriate safety equipment and clothing.
- 



### DISPOSAL

Leaks must be caught immediately. Make sure that expelled medium is disposed of properly and in an environmentally friendly manner.

---

- ▶ Bleed the filter as follows:
    - ▶ Open the vent by slowly unscrewing the vent screw using a manual key.
    - ▶ Close the shut-off valve in the bypass line.
    - ▶ Open the shut-off valve at the filter outlet.
    - ▶ For displacement pumps: Completely open the shut-off valve at the filter inlet.
    - ▶ For centrifugal pumps: Open the shut-off valve at the filter inlet only partially and after switching on the centrifugal pump gradually open the shut-off valve at the filter inlet completely. This way you prevent pressure surges in the plant.
    - ▶ Close the vent as soon as medium is expelled from the vent without any bubbles.
-

- ▶ On filters with a hydraulically (external medium) controlled backflushing discharge valve check the pressure of the control medium and adjust it as necessary.
- ▶ Manually trigger backflushing on the controller. The gear motor turns in accordance with the set time and the backflushing discharge valve is activated.
- ▶ If the pressure downstream of the filter is less than 1.9 bar, throttle the shut-off valve downstream of the filter until the appropriate operating pressure has been built up.
- ▶ If the pressure downstream of the filter is higher than 1.9 bar, you can throttle the control valve in the backflushing discharge line until the reduced backflushing quantity hardly causes any increase in the frequency of flushing. If you detect a constant increase in initial differential pressure despite backflushing, open the control valve in the backflushing discharge line a little once more (greater backflushing energy).
- ▶ The filter is ready for operation.



---

### DISPOSAL

Leaks must be caught immediately. Make sure that expelled medium is disposed of properly and in an environmentally friendly manner.

---

- ▶ After each time you commission the filter, check the filter for leaks and eliminate them as necessary.
- ▶ If the differential pressure between the filter inlet and filter outlet increases during operation, backflushing is triggered automatically. The backflushing procedure ends automatically once the set time elapses.



---

### NOTE

Backflushing is triggered by the controller at set time intervals in order to prevent the backflushing device from seizing up, even when the maximum permitted differential pressure is not reached.

---

- ▶ If the differential pressure is not reduced by any great degree once backflushing has been performed, either the pressure downstream of the filter is too low or the backflushing quantity is too low as a result of excessive throttling by the control valve in the backflushing discharge valve.
- ▶ If the differential pressure increases again despite correct backflushing, an alarm is issued. If this is the case, remove the filter from service by opening the shut-off valve in the bypass line and closing the shut-off valves on the filter. Remove and thoroughly clean the filter insert.

## 7.4 Removal from service

### 7.4.1 Short-term removal from service

► Depressurise and drain the filter, see chapter 8, section "Preparatory work".  
When using the filter in watery media, it is imperative to adhere to the following:



#### NOTE

- Do not allow the filter to run to empty after switching off the supply pump. Dirt may otherwise be allowed to harden.

### 7.4.2 Longer term removal from service / removal

► Depressurise and drain the filter, see chapter 8, section "Preparatory work".  
When removing the filter and removing it from service for longer periods, pay attention to the following points in order to prevent crevice corrosion:



#### NOTE

- The filter must be completely drained.
- Disconnect all connections from the filter.
- The filter must be thoroughly cleaned.
- The filter must be sealed by applying an appropriate anticorrosive, if necessary.
- The connection flange openings must be sealed with plastic (or similar) dummy plugs.



#### DISPOSAL

Make sure that when the filter or individual components and consumables are finally disposed of that all components are disposed of in an environmentally friendly manner.

### 7.4.3 Disposal



#### DISPOSAL

When the filter or individual components and consumables are finally disposed of, make sure that they are disposed of in an environmentally friendly manner.



## 8 Maintenance and servicing

### 8.1 Special safety instructions

---



#### **DANGER!**

#### **Risk of accidents from improper maintenance and servicing**

Incorrect maintenance and servicing as well as failure to observe the listed safety instructions can lead to accidents and damage to property. Make sure of the following:

- Maintenance and servicing work must only be done by qualified specialist staff or persons who have received appropriate instruction.
  - When performing any work on the filter, always wear the appropriate safety clothing.
  - The use of lifting gear is only permitted for authorised persons who have received appropriate instruction.
  - Cordon off the working and suspending area against access before lifting the load.
  - Only use suitable lifting gear with sufficient load-bearing capacity.
  - Only use lifting gear on the provided suspension points (if available).
  - Proceed with extreme caution when handling the loads.
  - Use lifting gear in such way that the filter or the components do not become get damaged.
  - Raise the filter or the components evenly. Avoid tilting.
  - Do not stand underneath suspended loads. Do not work underneath suspended loads.
  - As there is a risk of crushing, all limbs must be kept away from separating joints.
  - Only perform maintenance and servicing work when the filter is cooled, depressurised and drained. Depending on the operating temperature, there may be a risk of burns.
  - Ensure the highest levels of cleanliness when opening the filter. No foreign substances, e.g. tools, cleaning cloths, impurities, etc., must be allowed to remain in the filter.
  - Visually inspect all seals during maintenance and replace them if necessary.
  - Clean all sealing surfaces thoroughly before assembly.
  - On completion of the maintenance work, re-fit all available safety equipment properly.
  - Filling the filter against the indicated direction of flow of the filter elements is not permitted.
  - Remove the filter from service if the inspection periods (if indicated) have elapsed.
  - Filter elements are sensitive to pressure and impact. Always exercise extreme caution when installing and removing the filter elements. Before installation, check all filter elements/seals and replace any damaged filter elements/seals if necessary.
-

## 8.2 Cleaning agent



### CAUTION!

#### Risk of damage to the filter from incorrect use of cleaning agents

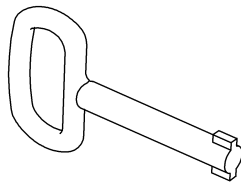
The components of the filter may become damaged if cleaning agents are used incorrectly. The correct cleaning agent is selected in accordance with the type of medium being filtered and the associated soiling.

- Boll & Kirch Filterbau GmbH recommends BOLL CLEAN 2000 cleaning agent. For more detailed information, see the appendix of these operating instructions.
- With liquid cleaning agents, ensure that after cleaning, the filter components are only reinstalled when completely dry.

## 8.3 Special tool

The manufacturer provides the following special tool (example illustration) for the filter:

Key for opening the controller (if it is not included in the scope of delivery)



Hand winch for actuating the filter in case of mains failure



## 8.4 Maintenance intervals

Even automatic filters have to undergo regular checks and maintenance.

It is particularly important to note that the filter material on the filter elements may become blocked over time despite regular backflushing. This depends largely on the quality of medium and the available partial flow cleaning function. The soiling can be removed by cleaning the filter elements by hand using a suitable cleaning agent. Descale any calcified filter elements.



---

### NOTE

Boll & Kirch Filterbau GmbH recommends BOLL CLEAN 2000 cleaning agent. For more detailed information, see the appendix of these operating instructions.

---

You can tell that the filter elements are becoming increasingly blocked because the flushing intervals become shorter and shorter.

The number of backflushing cycles performed is recorded by the controller.

---



### CAUTION!

#### **Risk of damage to the filter and the plant from damaged filter elements**

If the flushing intervals suddenly become longer, this may indicate that the filter elements are damaged.

- In such an event, check all filter elements for damage immediately. Replace any damaged filter elements as necessary.
-

In order to make sure the filter continues to operate properly, observe the following points for maintenance:

- Regularly check:
  - the differential pressure,
  - the leak tightness of the filter, especially all connections and seals and
  - the filter for corrosion and other damage and
  - the condition of all screw connections and whether they are firmly tightened.
- Check the condition of the sacrificial anode (if fitted) at least 2x per year. Replace the sacrificial anode when the zinc mass has worn in such a way that the carrier frame can be seen.
- On filters with an ATEX rating check at least 1x or 2x per year.
  - the condition of all seals,
  - the condition of all lines,
  - the condition of the filter elements,
  - the condition of the bearing and the bearing bush,
  - the condition of all flushing bushes and cover plates and
  - the condition of the potential equalisation and its fastening.Replace any damaged components.
- The filter must be inspected annually for leaks.
- Check filters with an inner lining/coating check for internal corrosion and any material abrasion caused by medium contamination each time you open the filter element or at least 1x annually. BOLL & KIRCH Filterbau GmbH has to be consulted in event damaged surfaces have to be repaired. The contact data for the respective national subsidiary can be found in the appendix of the operating instructions.
- Replace all seals when overhauling the filter.



---

#### NOTE

The filter elements are subject to wear from two-way strain. It is therefore recommendable to keep a complete set of filter elements in stock.

---

## 8.5 Cleaning/replacing filter elements

### 8.5.1 Preparatory work

---



#### NOTE

If you are using a Boll & Kirch Filterbau GmbH controller, you will find more detailed information in the documentation for the controller.

If you are using your own controller or another manufacturer's controller, the respective documentation must be followed.

---

- ▶ Take the plant out of operation or open the shut-off valves of the by-pass line.
  - ▶ Switch off the controller.
- 



#### DANGER!

##### Risk of accidents due to controller being switched on unintentionally

During maintenance accidents may be caused if the controller is switched on unintentionally, e.g. by starting up the drives or from expelled medium.

- Secure the controller to prevent it from being switched on unintentionally, e.g. by attaching a lock.
- 

- ▶ On filters with a pneumatically or hydraulically controlled backflushing discharge valve close the shut-off valves (if fitted) for the control medium. Secure the control line to prevent it from being switched on unintentionally.
  - ▶ Close the shut-off valves on the connection lines. Secure the shut-off valve to prevent it from being switched on unintentionally.
- 



#### DANGER!

##### Risk of accidents from expelled medium

Hot medium may be expelled when opening the vent.

- Proceed with extreme caution.
  - Wear the appropriate safety equipment and clothing.
- 



#### DISPOSAL

Leaks must be caught immediately. Make sure that expelled medium is disposed of properly and in an environmentally friendly manner.

---

- ▶ Depressurise the filter by slowly unscrewing the vent screw using a manual key.
- 



#### DANGER!

##### Risk of accidents from expelled medium

Hot medium may be expelled when opening the drain hole.

- Proceed with extreme caution.
  - Wear the appropriate safety equipment and clothing.
  - Collect the expelled medium in a suitable container.
-



---

#### DISPOSAL

Leaks must be caught immediately. Make sure that expelled medium is disposed of properly and in an environmentally friendly manner.

---

- ▶ Drain the filter. Carefully open the drain hole.
- ▶ The filter is now drained and depressurised.

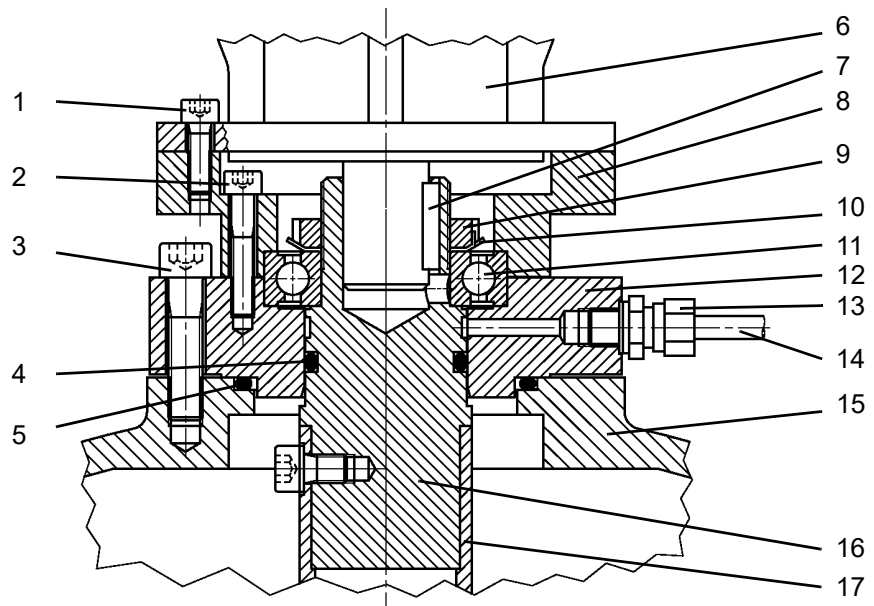
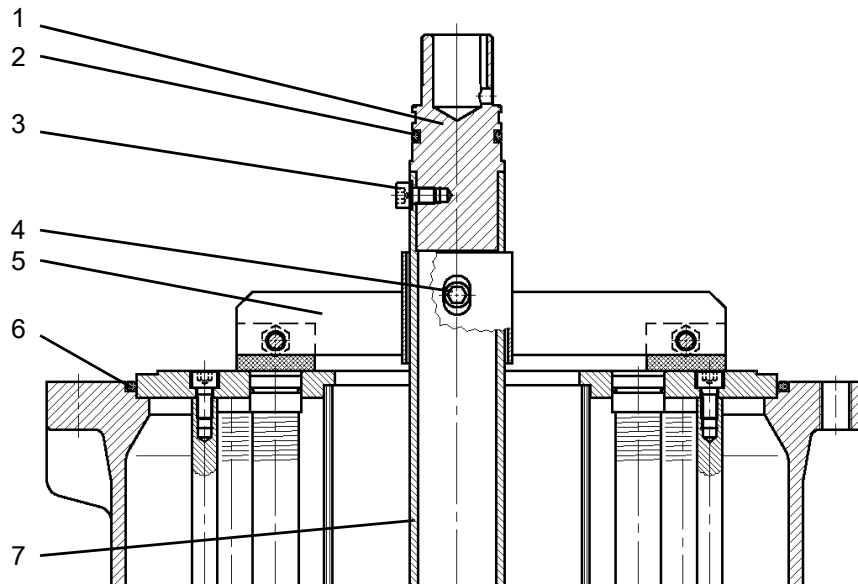


Fig. 8-1 Removing the drive for the backflushing device and flanges on the cover

1	Screw	10	Securing plate
2	Screw	11	Bearing
3	Screw	12	Flange
4	Seal	13	Threaded connector
5	Seal	14	Line (leak)
6	Gear motor	15	Cover
7	Feather key	16	Coupling
8	Motor flange	17	Connecting shaft
9	Shaft nut		

- ▶ Unscrew the screws which fasten the gear motor.
- ▶ Lift the gear motor off the motor flange. Disconnect all connection lines from the gear motor beforehand as necessary.
- ▶ Unscrew all the screws on the motor flange.
- ▶ Lift off the motor flange.
- ▶ Release the shaft nut which is secured by a securing plate.
- ▶ Unscrew and remove the shaft nut from the coupling. Remove the securing plate from the coupling.
- ▶ Unscrew all the screws on the flange.
- ▶ Remove the flange, including the bearing, from the coupling. If necessary, pull out the line (leak) after unfastening the screw connection.
- ▶ Unfasten the screw connection on the cover.
- ▶ Raise the cover off the housing. Use appropriate lifting gear as necessary.



*Fig. 8-2 Remove the cover arm*

1	Coupling	5	Cover arm
2	Seal	6	Seal
3	Screw	7	Connecting shaft
4	Screw		

- ▶ Unscrew and remove the screw from the coupling.
- ▶ Pull the coupling out of the connecting shaft.
- ▶ Unscrew and remove the screw from the cover arm.
- ▶ Remove the cover arm from the connecting shaft.

### 8.5.2 Removing the filter insert with filter candles

- ▶ Applies to filters with DN 50 only:  
Screw the lifting eyes into the threaded holes provided on the top sieve plate.
- ▶ Attach suitable lifting gear to the two lifting eyes (DN 50 only) or to the spacer pipe on the filter insert.
- ▶ Remove the filter insert from the housing by pulling it vertically upwards.
- ▶ Allow the filter element to drip dry in a suitable container.

### 8.5.3 Cleaning the filter insert with filter candles



---

#### CAUTION!

Under normal operating conditions it is not necessary to clean the filter insert manually. The automatic filter cleaning function keeps the pressure loss in the filter constant. If the pressure loss increases above the permitted value, the filter elements need to be cleaned manually.

---



---

#### CAUTION!

##### **Risk of damage to the filter insert from improper cleaning**

If the filter insert is cleaned or handled improperly, the filter insert may become damaged. Observe the following safety instructions:

- Proceed with extreme caution when performing all cleaning work.
  - The soaking time in the "BOLL CLEAN 2000" cleaning agent must not exceed 24 hours.
  - The cleaning temperature, when using "BOLL CLEAN 2000" must not exceed 60 °C.
  - When cleaning using a high-pressure cleaner, the pressure must not exceed a maximum of 60 bar. When cleaning using a high-pressure cleaner, keep a sufficient distance (at least 20 cm) from the surface of the filter material to prevent damage.
  - Particles of dirt must not be allowed to enter the clean side of the filter element.
  - Do not place the filter elements on top of each other as you may otherwise cause damage.
-

### Cleaning filter elements

- ▶ Push all the filter elements out of the filter insert from below and carefully remove them from the filter insert.



---

#### NOTE

Boll & Kirch Filterbau GmbH recommends BOLL CLEAN 2000 cleaning agent. For more detailed information, see the appendix of these operating instructions.

---

- ▶ Place the filter elements in a container of cleaning agent.
- ▶ Remove loose particles which float on the top of the cleaning agent during the soaking stage.



---

#### NOTE

Boll & Kirch Filterbau GmbH recommend the use of the BOLL & KIRCH cleaning unit with rotating nozzle and flat-jet nozzle for cleaning purposes.

---

- ▶ Clean the individual filter elements using a high-pressure cleaner over the entire length and in both directions. From the outside to the inside in the final working process.
- ▶ Then rinse out the filter elements in fresh cleaning agent.
- ▶ Allow the filter elements to dry with one opening pointing downwards or blow the filter candles dry with compressed air.
- ▶ Remove any soiling from the other components of the filter element before inserting the filter insert.
- ▶ Then check all filter elements and seals for damage. Replace any damaged filter elements or seals as necessary.
- ▶ Insert the cleaned filter elements into the filter insert from above with the chamfered end first and push the filter elements all the way into the filter insert. Make sure you do not damage the filter elements as you do so.
- ▶ Make sure that the seals are properly in place.

#### 8.5.4 Installing the filter insert with filter candles

- ▶ Clean any soiling which has collected on the inside of the filter.
- ▶ Check the flushing bushes on the flushing arm for damage. Replace any damaged flushing bushes as necessary.
- ▶ Check all the seals for damage. Replace any damaged seals as necessary.
- ▶ Insert the filter insert vertically into the housing from above.
- ▶ Make sure that the seals are properly in place.



---

#### CAUTION!

##### Applies to filters with DN 50 only: Risk of damage from the lifting eyes

Lifting eyes screwed into the filter insert can block or damage the backflushing device. Any resultant reduction in the filter capacity can cause damage to downstream parts of the plant.

- After inserting the filter insert into the housing, remove the screwed-in lifting eyes.

- 
- ▶ Applies to filters with DN 50 only:  
Unscrew and remove the two lifting eyes from the top sieve plate.

#### 8.5.5 Checking the sacrificial anode (if available)

- ▶ Unscrew and remove the screws from the sacrificial anode inspection opening.
- ▶ Remove the cover from the sacrificial anode.
- ▶ Check the condition of from the sacrificial anode. The sacrificial anode has to be replaced when the zinc mass has worn in such a way that the carrier frame can be seen.
- ▶ Check all the seals for damage. Replace any damaged seals as necessary.
- ▶ Insert the checked sacrificial anode or a new one.
- ▶ Make sure that the seals are properly in place.
- ▶ Screw the cover of the inspection opening cover gradually tightening opposite screws step-by-step.

### 8.5.6 Concluding work

- ▶ Check the cover plates on the cover plate for damage. Replace any damaged cover plates as necessary.
- ▶ Attach the cover arm to the connecting shaft.
- ▶ Fasten the cover arm in place with the screw.
- ▶ Insert the coupling into the connecting shaft. Check the seal for damage. Replace any damaged seals as necessary.
- ▶ Fasten the coupling in place with the screw.
- ▶ Check that the flushing device moves easily.
- ▶ Fit the cover. Check the seal for damage. Replace any damaged seals as necessary. Tighten the threaded connector evenly, gradually tightening opposite screws step-by-step.
- ▶ Attach the flange and the bearing to the coupling. Check the seal for damage. Replace any damaged seals as necessary.
- ▶ Fasten the flange in place with the respective screws. Tighten the threaded connector evenly, gradually tightening opposite screws step-by-step.
- ▶ Place the securing plate on the coupling and screw the shaft nut onto the coupling.
- ▶ Firmly tighten the shaft nut and secure it with the securing plate.
- ▶ Fasten the motor flange in place with the respective screws. Tighten the threaded connector evenly, gradually tightening opposite screws step-by-step.
- ▶ Place the gear motor on the motor flange. Fasten the gear motor in place with the respective screws. Tighten the threaded connector evenly, gradually tightening opposite screws step-by-step. Re-connect all connection lines as necessary.
- ▶ If necessary fit the line (leak) to the flange.
- ▶ Close the drain hole.
- ▶ Close the vent.
- ▶ Put the filter back into operation. See the section "Commissioning".

## 8.6

### Manually backflushing the filter in the event of power failure

---



#### WARNING!

##### Risk of accidents caused by the filter starting back up

When the electrical power returns, the filter may start up again and the rotating movement of the hand winch attached to the gear motor may injure you.

- Before manually actuating the filter, first switch off the controller.
  - Before switching on the controller, remove the hand winch from the shaft end of the gear motor.
- 



#### DANGER!

##### Risk of accidents due to controller being switched on unintentionally

When manual backflushing is being performed accidents may be caused if the controller is switched on unintentionally, e.g. by starting up the drives.

- Secure the controller to prevent it from being switched on unintentionally, e.g. by attaching a lock.
- 

- ▶ Switch off the controller.
  - ▶ Open the backflushing discharge valve on filters with
    - ▶ a pneumatically or hydraulically actuated backflushing discharge valve by turning the emergency actuation screw on the solenoid valve or
    - ▶ an electrically actuated backflushing discharge valve - see further information on manual actuation in the appendix to these operating instructions or in the manufacturer's documentation.
  - ▶ Attach the hand winch to the shaft end of the gear motor.
  - ▶ Carry out filter backflushing by turning the hand winch.
- 



#### NOTE

Approximately 300 - 400 turns are required to completely backflush the filter depending on the gear motor.

---

- ▶ As soon as the differential pressure has been reduced, remove the hand winch from the gear motor.
  - ▶ Close the backflushing discharge valve on filters with
    - ▶ a pneumatically or hydraulically actuated backflushing discharge valve by turning the emergency actuation screw on the solenoid valve back into the original position or
    - ▶ an electrically actuated backflushing discharge valve - see further information on manual actuation in the appendix to these operating instructions or in the manufacturer's documentation.
- 



#### CAUTION!

##### Damage to the filter

Turning the gear motor with the hand winch, for instance, to remove a blockage in the backflushing device, may damage the filter.

- A blockage in the backflushing device can only be remedied safely after removing the filter from service and opening the filter.
-

## 8.7 Remediating faults



### NOTE

In case of any faults or repairs which are not listed here, contact the BOLL & KIRCH customer services department.

### 8.7.1 Trouble shooting

Fault	Possible cause	Remedy
Flushing performed often	High level of soiling in the medium	Determine the cause of soiling in the plant
	Filter elements blocked	Change / clean the filter elements
The gear motor does not turn	Flushing/cover arm blocked	Open the filter and remove the cause of the blockage
	No power supply	Check the power supply
	Controller is set incorrectly or is faulty	Correct the setting or replace the controller
Differential pressure will not reduce	Filter elements blocked	Change / clean the filter elements
	The pressure downstream of the filter is too low or the backflushing quantity is too low	Set the pressure, increase the backflushing quantity
	The backflushing discharge valve does not open	Check function / clean / replace
No differential pressure indicator	Shut-off valves in control line closed	Open shut-off valves
	Differential pressure monitoring system faulty	Check/replace the differential pressure monitoring system
Filter with pneumatically / hydraulically actuated backflushing discharge valve		
The solenoid valve does not activate	Shut-off valve in the supply line closed	Open shut-off valve
	Control pressure too low	Check / set the pressure
	Controller is set incorrectly or is faulty	Correct the setting or replace the controller
Filter with electrically actuated backflushing discharge valve		
The backflushing discharge valve does not activate	No power supply	Check the power supply
	Controller is set incorrectly or is faulty	Correct the setting or replace the controller

## 9 Appendix

### 9.1 Filter

#### 9.1.1 Technical data

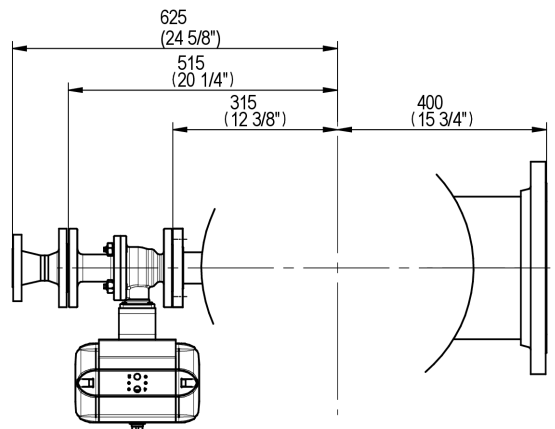
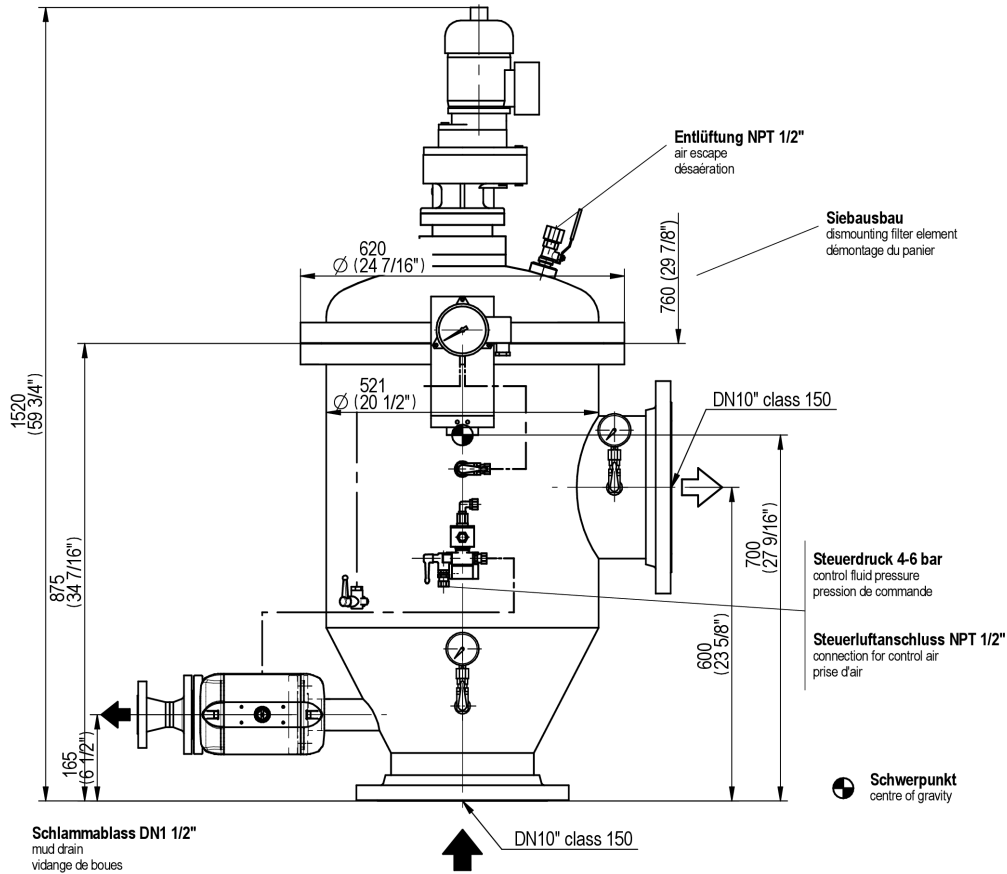
##### Filter

Filter type	6.18
Nominal connection diameter DN	10"
Housing size	250
Fluid to be filtered	Untreated water
max. flow rate	3500.00 gpm/US
Fine filter units	500 µm
Maximum allowable pressure	145.00 psi
permitted min. operating temperature	32.00 °F
permitted max. operating temperature	95.00 °F
Operating voltage	3 ph 480 Volt
Frequency	60 Hz
Control voltage	115 Volt
Motor output	0.090 kW
Backflushing medium	Internal medium
Minimum operating pressure after filter	2.00 bar
Control medium	Air 4-7 bar ISO8573-1:2010(7/4/4)
Flushing time	20 s
sound emission (DIN 45 635)	< 70 dB(A)

##### Filter element

Element type of filter	Longitudinally slotted candle/triangular section
Number of filter elements	60

9.1.2 Technical data sheet



- Gewicht leer  
net weight  
poids net } 370 kg
- Betriebsdruck  
working pressure  
pression de service } max. 10 bar  
max. 145 psi
- Betriebstemperatur  
working temperature  
température de service } max. 35°C  
max. 95°F
- Toleranzen  
tolerance  
tolérance } EN ISO 13920-C
- Anschlussflansche  
connection flange  
brides desirées } ASME B16.5  
class 150
- Gehäuse geschweißt  
housing welded  
corps soudé

subject to alterations

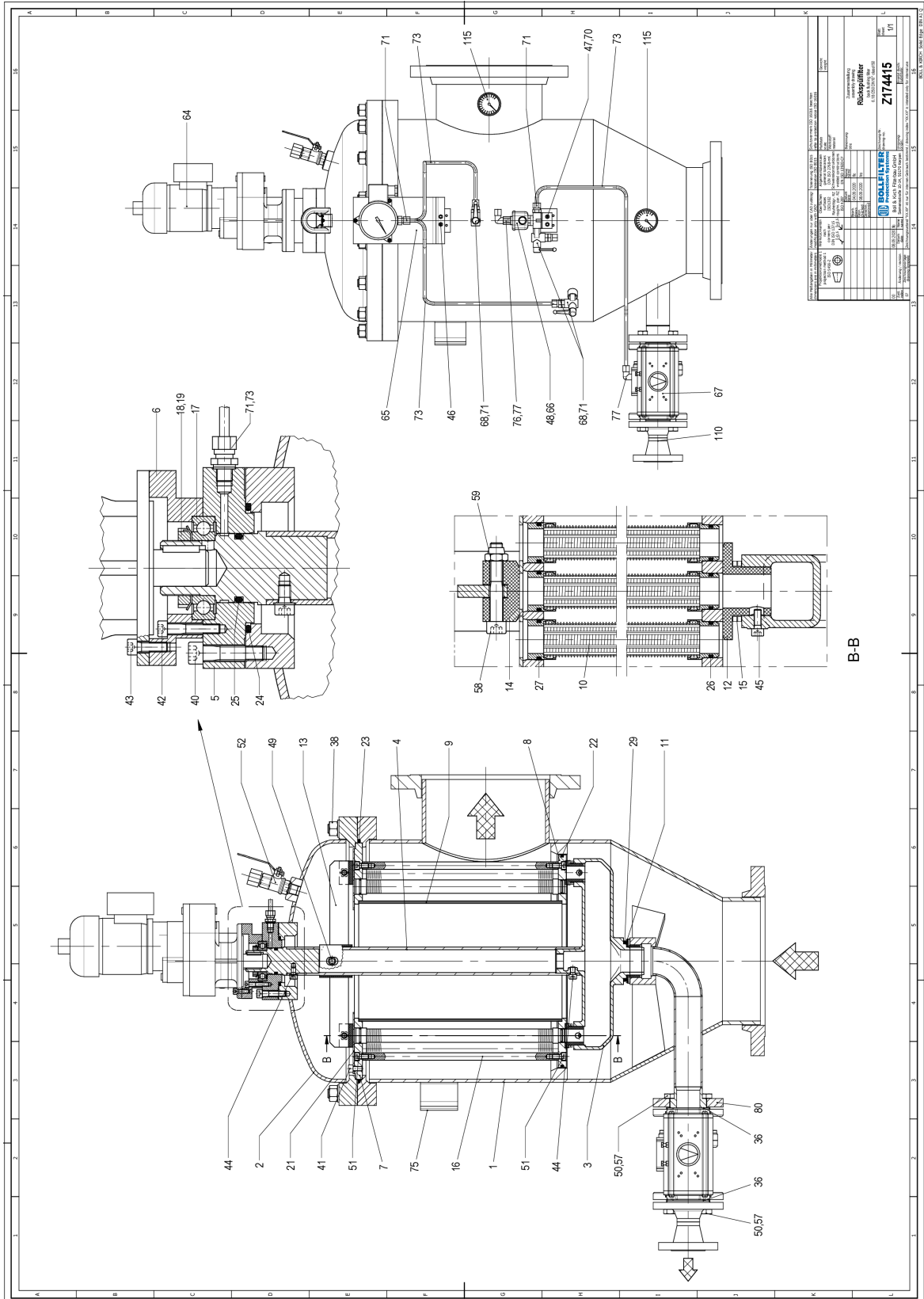
Änderungen vorbehalten!

**Rückspülfilter 6.18 /250 DN10" class 150**  
backflushing filter

**Z174223** Zust. index 00  
Blatt sheet 1/1  
Datum date 20.08.2020

9.1.3 Spare parts

9.1.3.1 Spare parts drawing



### 9.1.3.2 Spare parts list

Document	Description	Date
359998	automatic filter Dimension drawing: Z174223 Assembly: Z174415	09.12.20

Item	ID no.	Description	Quantity	Unit
00001	6501540	housing	1	pcs.
00002	6509902	cover	1	pcs.
00003	5741825	flushing arm	1	pcs.
00004	5011629	coupling	1	pcs.
00004	6811633	connecting shaft	1	pcs.
00005	5612618	flange	1	pcs.
00006	5030156	motor flange	1	pcs.
00007	5010939	sieve plate top	1	pcs.
00008	5015211	sieve plate bottom	1	pcs.
00009	5014444	distance tube	1	pcs.
00010	1340497	wedge wire candle	60	pcs.
00011	5376182	bearing bush	1	pcs.
00012	5376181	flushing bush	2	pcs.
00013	5013760	covering arm	1	pcs.
00014	2550104	covering plate	2	pcs.
00015	2310110	shaft spring	2	pcs.
00016	5012375	anchor bolt	6	pcs.
00017	2708036	deep groove ball bearing	1	pcs.
00018	2705076	lock nut	1	pcs.
00019	2700475	safety plate	1	pcs.
00021	5710036	covering plate	1	pcs.
00022	3041400	o-ring	1	pcs.
00023	3040156	o-ring	1	pcs.
00024	3041122	o-ring	1	pcs.
00025	3044203	o-ring	1	pcs.
00026	3040023	o-ring	60	pcs.
00027	3140003	o-ring	60	pcs.
00029	3542192	truarc inverted ring	1	pcs.
00036	3380066	flat gasket	2	pcs.
00038	2110020	hexagon nut M20 Material: A4-70 EN ISO 3506-2	16	pcs.
00038	2215758	disc	16	pcs.

Item	ID no.	Description	Quantity	Unit
00038	2010905	stud bolt M20x70 Material: A4-70 EN ISO 3506-1	16	pcs.
00040	2013300	hexagon socket head cap screw M12x50 Material: A4-70 EN ISO 3506-1	4	pcs.
00041	2010310	hexagon socket head cap screw M8x20 Material: A4-70 EN ISO 3506-1	8	pcs.
00042	2010897	hexagon socket head cap screw M8x40 Material: A4-70 EN ISO 3506-1	6	pcs.
00043	2016174	hexagon screw M8x20 Material: A4-70 EN ISO 3506-1	4	pcs.
00044	2010318	hexagon socket head cap screw M10x16 Material: A4-70 EN ISO 3506-1	2	pcs.
00045	2010307	hexagon socket head cap screw M6x16 Material: A4-70 EN ISO 3506-1	2	pcs.
00046	2000122	hexagon socket head cap screw M6x16 Material: 10.9 EN ISO 898-1	2	pcs.
00047	2000120	hexagon socket head cap screw M6x10 Material: 10.9 EN ISO 898-1	2	pcs.
00048	2015432	slotted cheese head screw M5x6 Material: A4-70 EN ISO 3506-1	2	pcs.
00049	2010318	hexagon socket head cap screw	1	pcs.

Item	ID no.	Description	Quantity	Unit
		M10x16 Material: A4-70 EN ISO 3506-1		
00050	2010030	Hexagon Screw M16x60 Material: A4-70 EN ISO 3506-1	8	pcs.
00051	2010288	hexagon socket head cap screw M10x20 Material: A4-70 EN ISO 3506-1	12	pcs.
00052	2510002	threaded pipe fitting	1	pcs.
00052	2510217	ball cock	1	pcs.
00052	5315621	adapter	1	pcs.
00057	2110019	hexagon nut M16 Material: A4-70 EN ISO 3506-2	8	pcs.
00058	2010589	hexagon socket head cap screw M10x60 Material: A4-70 EN ISO 3506-1	2	pcs.
00059	2115515	self-locking hexagon-head nut M10 Material: A2-70 EN ISO 3506-2	2	pcs.
00064	4500099	gear motor	1	pcs.
00064	2380014	crank handle	1	pcs.
00065	4200404	Diff. Ressure Contact Indic.	1	pcs.
00065	6700218	mounting sheet	1	pcs.
00065	2200003	disc	6	pcs.
00065	2100001	hexagon nut M4 Material: 8 EN ISO 898-2	3	pcs.
00065	2000649	hexagon socket head cap screw M4x16 Material: 10.9 EN ISO 898-1	3	pcs.
00066	2660011	solenoid valve	1	pcs.
00066	4207117	coil	1	pcs.

Item	ID no.	Description	Quantity	Unit
00066	5313892	adapter	1	pcs.
00067	2610021	Ball Valve with Drive	1	pcs.
00067	4200219	limit switch	1	pcs.
00068	2560063	angle ball valve	3	pcs.
00070	6702365	mounting sheet	1	pcs.
00071	2510035	screwing	7	pcs.
00073	7319792	stainless steel pipe, seamless	1	m
00075	9401690	nameplate	1	pcs.
00076	2600264	sound absorber	1	pcs.
00077	2510036	screwing	2	pcs.
00080	6402378	threaded flange	1	pcs.
00100	4302300	Control Box	1	pcs.
00110	5601085	adapter	1	pcs.
00115	2610725	pressure gauge	2	pcs.
00115	3546786	gasket	2	pcs.
00115	2510239	thread extension	2	pcs.
00115	2510311	mini ball valve	2	pcs.
00300	9400997	label	1	pcs.
00301	9407569	label	1	pcs.
00302	9800100	label	1	pcs.

## 9.2 Supplier's documentation

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### NOTE

Documentation for any components or assembly groups purchased externally by Boll & Kirch Filterbau GmbH is enclosed with these operating instructions. Adhere to the information contained, in particular information on the subject of safety.

---

## 9.3 Cleaning devices

For particularly good cleaning results, Boll & Kirch Filterbau GmbH recommends the filter element cleaning unit type 5.04 with rotating nozzle and flat jet nozzle or optionally, the type 5.05 ultrasonic cleaning unit.

## 9.4 BOLL CLEAN 2000 cleaning agent product information

### Product description:

BOLL CLEAN 2000 is a liquid cleaning and degreasing agent with a broad range of applications. It can be used practically for all cleaning and degreasing needs. BOLL CLEAN 2000 cleans quickly and thoroughly and is extremely economical. The use of BOLL CLEAN 2000 renders all safety precautions unnecessary. BOLL CLEAN 2000 has all these excellent characteristics without the disadvantages of solvent-based cleaners.

BOLL CLEAN 2000 is:

- not inflammable
- not subject to compulsory identification markings
- not strong smelling
- not corrosive
- physiologically harmless
- biodegradable
- Umweltbundesamt (Federal German Ministry of Environment) reg. no. 04860019

BOLL CLEAN 2000 can be overcooled or overheated during storage but is then fully useable when at normal temperature again.

### Sieve mesh contaminated with heavy oil:

Sieve meshes which are contaminated with heavy oil must be soaked in normal, commercially available solvent. After soaking, the sieves are cleaned in the BOLL & KIRCH cleaning device type 5.04 with BOLL CLEAN 2000 and high-pressure pump.

### Instructions for use:

BOLL CLEAN 2000 is not processed for any specific cleaning method. BOLL CLEAN 2000 can be used in a soaking bath, in a spray unit, in a steam jet cleaner or be applied by hand, using a cloth, brush or sponge, depending on the operational conditions.

It can be used cold or warm.

BOLL CLEAN 2000 can be mixed with water - even with sea water.

- Concentration for mesh cleaning: 1 : 2,5
- Maximum temperature up to 60 °C

The concentration depends on the type and extent of the collected dirt particles which have to be removed. When using a concentration of 1 : 30 and above, rinsing is usually not necessary. No visible film is left on the surface.

## 9.5 Worldwide sales and service network, subsidiaries and representatives

If you require service or spare parts, please contact the main site or our subsidiaries, representatives or service points.



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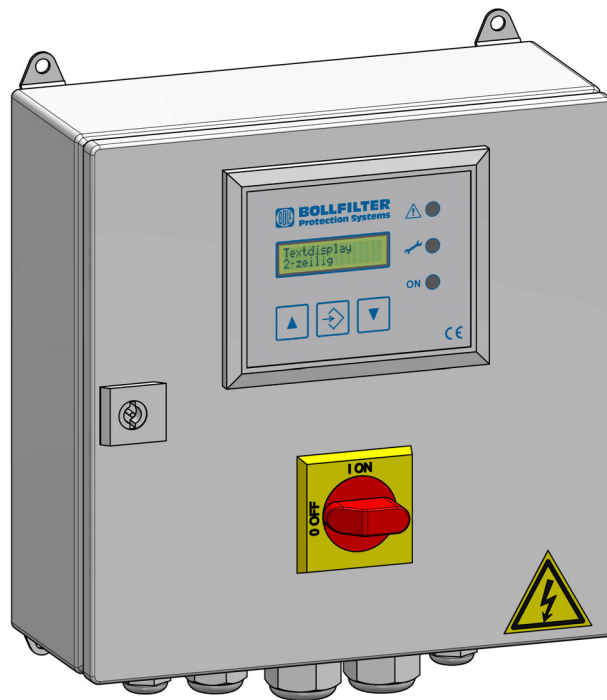
**1** Verkaufsbüro      Agency  
**2** Lager              Stockist  
**3** Service             Service

Juni 2020



# Operating and Installation Instructions

## Electronic Control Box Type: 2300



Siemensstraße 10 - 14  
50170 Kerpen  
Germany  
[www.bollfilter.de](http://www.bollfilter.de)

Date	Version	Language	Order no.	Item No.
06.2019	001	en	-	-

NOTE:  
Print document on both sides

Translation of the original operating instructions



## Table of Contents

<b>1</b>	<b>Basic safety instructions for the electronic control box</b>	<b>5</b>
<b>2</b>	<b>Technical data of the control box and control cabinet components</b>	<b>7</b>
2.1	Power components	7
2.1.1	Supply	7
2.1.2	Motor actuation	7
2.1.3	Voltage supply	7
2.1.4	Fuses	7
2.2	Control circuit board inputs/outputs	8
2.2.1	Optocoupler inputs (E1-E5), terminals 31 - 40	8
2.2.2	Analogue input 4-20 mA, terminals 41 -42	8
2.2.3	Live relay outputs	8
2.2.4	Floating relay outputs	8
<b>3</b>	<b>Operation</b>	<b>9</b>
3.1	Device functions and control flow	9
3.1.1	Main switch operating feedback contact	10
3.1.2	Control voltage monitoring	10
3.1.3	Motor fault	10
3.1.4	Differential pressure too high, flushing oil treatment cartridge alarm	11
3.1.5	DP too high backflushing filter ( $\Delta P100\%$ )	11
3.1.6	Operating hours counter	11
3.1.7	Error memory	11
3.1.8	Differential pressure transmitter 4-20 mA	11
3.1.9	DPT-Alarm	11
3.1.10	Z key (additional functions display)	12
3.1.11	Multiple flushing	12
3.1.12	DP-Alarm (flushing frequency monitoring)	12
3.1.13	Message A4 "Flushing Active"	12
3.1.14	Time delay differential pressure $\Delta P75\%$ and $\Delta P100\%$	12
3.1.15	Function Remote On/Off (remote switching)	13
3.1.16	Initialisation with filter type 6.18/6.19/6.44	13
3.1.17	Limit switch alarm	13
3.2	"Operation" mode display	13
3.3	Text messages	14
3.3.1	Text display after switching on	14
3.3.2	Text display in "operation" mode	14
3.3.3	Alarm messages	15
3.4	Adjustment and operation	16
3.4.1	Setting level - parameter selection and view	16
3.4.2	Setting level - parameter change and storage	16
3.4.3	Jump back to the operating level	17
3.5	Parameter list and description	18
3.5.1	P0 Filter type	18
3.5.2	P1 multiple flushing	18
3.5.3	P2 time-dependent backflush triggering	18
3.5.4	P3 time-dependent backflush triggering	18
3.5.5	P4 Backflushing time	19
3.5.6	P5 Filling time	19
3.5.7	P6 After-blowing time	19
3.5.8	P7 Delay time cartridge alarm	20

3.5.9	P8 DP-Alarm (flushing frequency monitoring) . . . . .	20
3.5.10	P9 Motor fault. . . . .	20
3.5.11	P10 Backflushing time . . . . .	21
3.5.12	P11 Language . . . . .	21
3.5.13	P12 Testcode . . . . .	22
3.5.14	P14 Pressure equalisation time . . . . .	22
3.5.15	P15 DP-Select "Differential pressure switch or differential pressure transmitter" . . . . .	23
3.5.15.1	"MAX DPT" setting . . . . .	24
3.5.15.2	Setting "DP flushing" . . . . .	24
3.5.15.3	Setting "DP too high" . . . . .	24
3.5.16	P16 Differential pressure delay time . . . . .	24
3.5.16.1	Time delay setting "Differential pressure flushing $\Delta P75\%$ " . . . . .	25
3.5.16.2	Time delay setting "Differential pressure too high $\Delta P100\%$ " . . . . .	25
3.5.17	P17 Alarm relay A2, A3, A4 (configurable alarm outputs) . . . . .	25
<b>4</b>	<b>Control box description, function and setting values . . . . .</b>	<b>27</b>
4.1	Control box of type 6.18 / 6.19 / 6.44 and aquaBoll®6.18.3 . . . . .	27
4.1.1	Setting values filter type 6.18/6.19/6.44 and aquaBoll®6.18.3 . . . . .	28
4.2	Control boxes of type 6.21/6.22/6.23 / 6.24 . . . . .	29
4.2.1	Filter type setting values 6.21/6.22 . . . . .	30
4.3	Control boxes of type 6.60 . . . . .	32
4.4	Control boxes of type 6.61 . . . . .	35
4.5	Control boxes of type 6.62 . . . . .	38
4.6	Control boxes of type 6.64 . . . . .	40
4.7	Control boxes of type 6.72 . . . . .	43
<b>5</b>	<b>Remedying faults . . . . .</b>	<b>47</b>
5.1	Trouble shooting . . . . .	47

# 1 Basic safety instructions for the electronic control box

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## **DANGER!**

### **Risk of accidents due to improper installation**

A failure of the device resulting from improper installation of the electronic control box or the connected equipment could cause severe personal injury or even fatal injury. Therefore, in addition to the general safety rules for equipment in industrial power installations, comply with the following points in particular:

- The installation of the control box should only be performed by qualified specialist staff in accordance with the conditions of IEC 364 and DIN VDE 0105 for electrical equipment.
  - All applicable laws, conditions, regulations and instructions relating to the installation of electrical equipment must be observed in relation to the installation location.
  - Settings for IP00 protection class devices without covers must only be made by authorised specialist staff, with the devices switched off and in compliance with the local safety and accident prevention regulations.
  - The control box may only be operated in the permitted area of use.
-



## 2 Technical data of the control box and control cabinet components

### 2.1 Power components

#### 2.1.1 Supply

Supply L1-L2-L3 directly to the 4-pole main switch - Q1 (T1-T2-T3)

#### 2.1.2 Motor actuation

Motor connection U-V-W direct at the motor contactor - K1 (2-4-6)

#### 2.1.3 Voltage supply

Primary voltages	0 - 220 V, 380 V, 400 V, 440 V, 500 V, 550 V
Secondary voltages	
0 V AC - 230 V AC	Valve voltage 230 V AC
0 V AC - 115 V AC	Valve voltage 115 V AC
0 V DC - 24 V DC	Valve voltage 24 V DC
0 V AC - 20 V AC	Control circuit board supply voltage

#### 2.1.4 Fuses

Fuses in the control cabinet

F1 to F3	Each 1 A
----------	----------

Fuses on the control circuit board

Fuse F1	0.8 A slow-blow
Fuse F2	2.0 A slow-blow

## 2.2 Control circuit board inputs/outputs

2.2.1 Optocoupler inputs (E1-E5), terminals 31 - 40

2.2.2 Analogue input 4-20 mA, terminals 41 -42

2.2.3 Live relay outputs

Outputs VE1 - VN1 to VE3 - VN3

Terminals 8 - 13



### NOTE

The connections and designations are to be taken from the respective control cabinet diagrams, according to filter type.

2.2.4 Floating relay outputs

Outputs A1 - A15

Messages 1 - 5  
(changeover contact)

Terminals 16 - 30



### NOTE

The connections and designations are to be taken from the respective control cabinet diagrams, according to filter type.

### 3 Operation

#### 3.1 Device functions and control flow

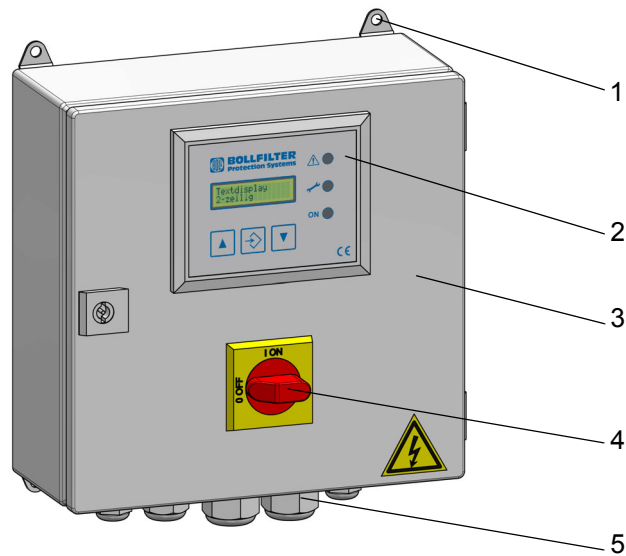


Fig. 3-1 Electrical control box type 2300

- 1 Fastening
- 2 Display and operating elements
- 3 Casing
- 4 Main switch
- 5 Connection

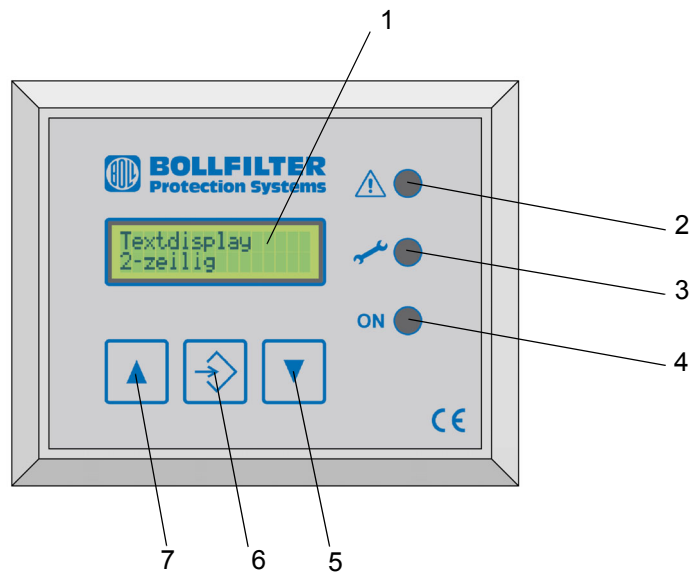


Fig. 3-2 Display and operating elements

- 1 Text output display, 2 lines of 16 characters
- 2 "Alarm" LED (red)
- 3 "Service" LED (yellow)
- 4 "Operation" LED (green)
- 5 Key Q - When pressed, acknowledges the alarm messages
- 6 Key S - When pressed, initiates a manual flush
- 7 Key Z - When pressed, indicates the number of flushes

### 3.1.1 Main switch operating feedback contact

If the main switch is set to position "On", the contact is closed.

### 3.1.2 Control voltage monitoring

As soon as the main switch is actuated, the mains voltage is applied and the control box is operating correctly, the "Operation" LED (green) comes on and the relay "control voltage monitoring" is actuated. In the event of loss of the operating voltage or a defective fuse on the control circuit board, no LED comes on and the "control voltage monitoring" relay is no longer actuated.

### 3.1.3 Motor fault

If the measured motor current exceeds the set setpoint of the P9 parameter, a message is output to the display and a floating signal is output to the relay outputs. The motor and backflushing are immediately switched off. After clearing of the fault, the operator must acknowledge the alarm message by pressing the Q key.

### **3.1.4 Differential pressure too high, flushing oil treatment cartridge alarm**

Signal encoder is a pressure switch contact that is connected to the optocoupler input "Differential pressure indicator DP too high flushing oil treatment". If the message exists for longer than set via parameter P7, an alarm message is output to the display. After clearing of the fault, the operator must acknowledge the alarm message by pressing the Q key.

### **3.1.5 DP too high backflushing filter ( $\Delta P_{100}$ %)**

Signal encoder is a pressure switch contact that is connected to the optocoupler input "Differential pressure indicator DP too high backflushing filter". If the message exists for longer than 2 seconds, an alarm message is output to the display and the "Alarm" LED (red) comes on. After clearing of the fault, the operator must acknowledge the alarm message by pressing the Q key.

### **3.1.6 Operating hours counter**

The operating hours counter records the operating hours when the control box is switched on. The operating hours are displayed by multiple pressing of the Z-key (explanation - see section "Z key").

### **3.1.7 Error memory**

The internal error memory records all errors and events including specification of the operating hours. Reading out of the error memory is only allowed for authorised persons.

### **3.1.8 Differential pressure transmitter 4-20 mA**

If a differential pressure transmitter (three-wire) is operated with 4-20 mA, the control box can be changed from a digital differential pressure measurement device (DPS = differential pressure switch) to an analogue differential pressure measurement device (DPT = differential pressure transmitter) (for a detailed setting explanation, see the section "P15 DP-Select").

### **3.1.9 DPT-Alarm**

The alarm message "DPT-Alarm" is output to the display if a differential pressure transmitter (three-wire) is used with 4-20 mA, the parameter P15 "DPT" has been selected and the minimum current of 4 mA cannot be measured. In addition the "Alarm" LED (red) comes on and the alarm output A4, A5 and A6 "General Fault" is activated. After clearing of the fault, the operator must acknowledge the alarm message by pressing the Q key.

### 3.1.10 Z key (additional functions display)

If key Z (additional functions display) is pressed once, the number of flushes that have been performed is output to the display for 3 seconds.



#### NOTE

If the Z key is pressed repeatedly, each pressing causes the following additional information to be displayed in the specified sequence:

- Currently measured differential pressure provided a differential pressure transmitter is installed and the parameter P15 "DPT" Select has been set in the control box.
- Operating hours with the control box switched on.
- Currently measured motor current, provided a filter type with a gear motor is installed and has been set in the control box.
- DP-Alarm (flushing frequency monitoring) → on or off
- Actual remaining time "DP1 delayed", if a time delay has been set in the control box "Parameter P16 differential pressure delay time" and the contact of input E1 (terminals 39 + 40, see control cabinet wiring diagrams) has been closed for the flushing differential pressure  $\Delta P75\%$ .
- Actual remaining time "DP2 delayed", if a time delay has been set in the control box "Parameter P16 differential pressure delay time" and the contact of input E1 (terminals 37 + 38, see control cabinet wiring diagrams) has been closed for the flushing differential pressure  $\Delta P100\%$ .
- Actual remaining time "P7 cartridge alarm", if a filter type with a flushing oil treatment is installed, in the control box filter type P0 = 4, 8, 14 has been set and the contact of input E3 (terminals 35 + 36, see control cabinet wiring diagrams) for "Differential pressure too high flushing oil treatment cartridge alarm" has been opened.

### 3.1.11 Multiple flushing

Each flushing command causes the configured number of chambers to be processed.

### 3.1.12 DP-Alarm (flushing frequency monitoring)

If a "DP flushing" has been activated before the "Time-dependent backflush trigger" period elapses, the message "DP-Alarm" appears on the display and the "Service" LED (yellow) lights up.

### 3.1.13 Message A4 "Flushing Active"

Output A4 "Flushing active" (terminals 25, 26 and 27, see control cabinet wiring diagrams) is activated as soon as a flushing has been triggered at the filter.

### 3.1.14 Time delay differential pressure $\Delta P75\%$ and $\Delta P100\%$

The differential pressure signals "DP flushing [75%]" and "DP too high [100%]" of the connected differential pressure measuring device (differential pressure switch [DPS] or differential pressure transmitter [DPT]) can be delayed dependent on the application (for a detailed setting explanation see the section "P16 DP delayed").

### 3.1.15 Function Remote On/Off (remote switching)

If the contact of input E4 ("Filter Blockage" (terminals 33 and 34, see control cabinet wiring diagrams) has been closed, outputs A13, A14, A15 (terminals 28, 29 and 30, see control cabinet diagrams) are activated and the control box switches to off condition. All outputs and control time meters (e.g. forced flushing time) are reset.

The remote function can only be activated once the message "Flushing active" is no longer present.

Typical representation on the display if remote control is activated:

"6.18/6.19/6.44"	Text display line 1
"Off"	Text display line 2

### 3.1.16 Initialisation with filter type 6.18/6.19/6.44

Software initialisation is a tool for avoiding errors during commissioning at the customer's site, which is started with the pre-set control box type "6.18/6.19/6.44", in that the gear motor is actuated for 20 seconds with the solenoid valve not activated. During this time a check is performed as to whether a limit switch signal (terminals 31 + 32, see control cabinet diagrams) can be detected.

An error message "P0 filter type" is only output if a limit switch signal is detected because the filter type 6.18/6.19/6.44 is actuated without a limit switch. Then the necessary filter type (with limit switch) must be set (see section "Setting and operation").



#### NOTE

Initialisation is not started if an operator has previously set the necessary control box type according to the operating instructions.

### 3.1.17 Limit switch alarm

The alarm message "Limit switch alarm" is output to the display after a so-called position flushing, if the limit switch signal could not be measured at input E5 after 20 seconds. In addition the "Alarm" LED (red) comes on and the alarm output A4, A5 and A6 "General Fault" is activated. After clearing of the fault, the operator must acknowledge the alarm message by pressing the Q key.

## 3.2 "Operation" mode display

The "Operation" LED (green) comes on after switching on of the mains voltage, if the control box is in the operating level ("Operation" mode).

### 3.3 Text messages

#### 3.3.1 Text display after switching on

**BOLL & KIRCH**      Company name  
 xxxxxxxxxx          Program number

After a short time, the configured control box type is output to the second line of the display.

<b>6.18/6.19/6.44</b>	Control box type 0
<b>6.21/6.22/6.23/6.24</b>	Control box type 1
<b>6.60</b>	Control box type 2
<b>6.60.07/6.72.07</b>	Control box type 4
<b>6.61</b>	Control box type 6
<b>6.61.07</b>	Control box type 8
<b>6.62</b>	Control box type 10
<b>6.64</b>	Control box type 12
<b>6.64.07</b>	Control box type 14
<b>6.72</b>	Control box type 16
<b>aquaBoll@6.18.3</b>	Control box type 18 (*)

(\*) Control box type 18 has the same function as control box type 0.



#### NOTE

To simplify operation, control box types 3, 5, 7, 9, 11, 13, 15 and 17 of the preceding control box type 2200 have been removed to simplify operation.

The function "DP-Alarm" (flushing frequency monitoring) is still available and can still be set (see section "P8 DP Alarm").

#### 3.3.2 Text display in "operation" mode

**Forced flushing**      Remaining forced flushing trigger time 00 h 01 min  
 00:01

**Z - S - Q**              Key tips

If a flushing process has been initiated, the following messages appear in the first line of the display, depending on the source:

**Mains flushing**      For flushing triggering via "Mains voltage on"

**Manual flushing**      For flushing triggering via key S

**Forced flushing**      For flushing triggering via time-dependent backflush triggering

**DP flushing**            For flushing triggering via backflushing filter differential pressure

**Position flushing**      Flushing triggering if the limit switch signal is lost

If a flushing process has been initiated, the following messages appear in the first line of the display, depending on the source:

**Flushing time 3S**      Remaining flushing time  
**After-blowing time 3S**    Remaining after-blowing time



**NOTE**

**3S** Means the remaining flushing or after-blowing time equals 3 seconds.

Pressing key z causes the following message to appear in the display:

**Flushing number**  
 xxxxxx Pc                  Number of flushes

The number of flushes is saved and backed up for protection against mains failure.

**3.3.3 Alarm messages**



**NOTE**

- The "Alarm" LED (red) comes on for each alarm message.
- All alarm messages are saved and backed up to protect against mains failure.
- In alternation with the operating messages, the alarm message is output every 2 seconds to the second line of the display.
- Once the Q key is pressed, the alarm messages are deleted, however, only once the source of the alarm has been cleared. If the source of the alarm has not been cleared, the alarm message reappears.

Alarm messages in the display:

**Motor fault**                  In the event of a "Motor fault" alarm  
**DP too high**                  If "High differential pressure Filter 100 %" exists  
**Cartridge alarm**              If "Differential pressure too high flushing oil treatment 100 %" exists  
**Limit switch alarm**          In the event of loss of the limit switch signal

If flushing frequency monitoring is switched on:

**DP-Alarm**                      DP-Alarm triggering of backflushing due to differential pressure 75 % (flushing frequency monitoring)

During differential pressure measurement using the differential pressure transmitter (DPT):

**DPT-Alarm**                    In the event of an incorrect 4 mA input signal

### 3.4 Adjustment and operation

#### 3.4.1 Setting level - parameter selection and view

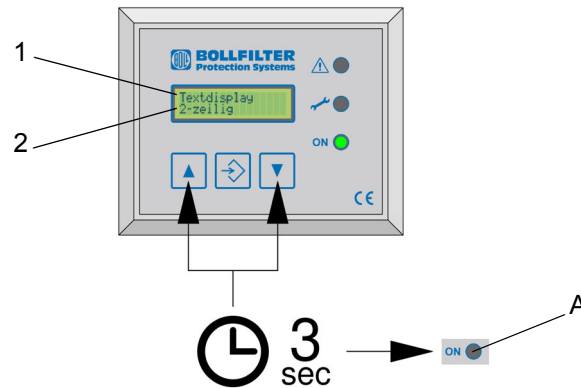


Fig. 3-3 Setting level parameter selection and view

- |   |                 |   |                    |
|---|-----------------|---|--------------------|
| 1 | Parameter       | A | Green LED goes off |
| 2 | Parameter value |   |                    |

To access the setting level "Parameter selection and view", the keys ▲ and ▼ are pressed simultaneously until the "Operation" LED (green) goes out (approximately 3 seconds). The first line of the display shows the parameter, the second line the parameter value. Now all parameters can be displayed by repeated pressing of the ▲ or ▼ key.

#### 3.4.2 Setting level - parameter change and storage

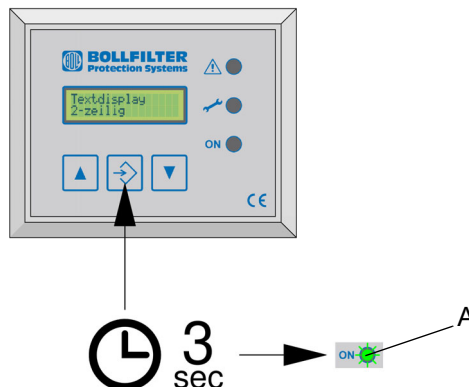
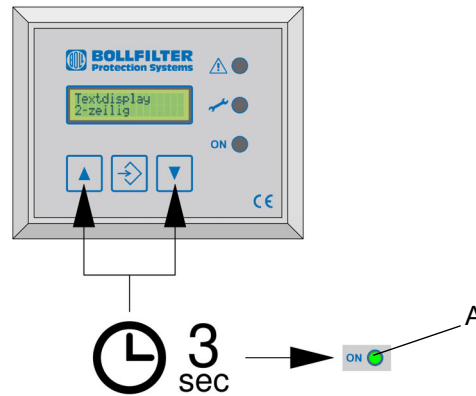


Fig. 3-4 Setting level parameter selection and view

- |   |                   |
|---|-------------------|
| A | Green LED flashes |
|---|-------------------|

To access the setting level "Parameter change and storage", the middle key is pressed until the "Operation" LED (green) flashes (approximately 3 seconds). Now the parameter can be changed by repeated pressing of the ▲ or ▼ key. To save the set value and return to the "Parameter selection and view" setting level, the middle key is pressed until the "Operation" LED (green) goes out (approximately 3 seconds).

### 3.4.3 Jump back to the operating level



*Fig. 3-5 Back to the operating level*

A Green LED comes on

To access the operating level, the keys ▲ and ▼ are pressed simultaneously until the "Operation" LED (green) comes on (approximately 3 seconds).

### 3.5 Parameter list and description

#### 3.5.1 P0 Filter type

Adjustable in single steps	Range 0 - 18
Factory setting	Basic value 0
Text display, line 1	<b>P0 Filter type</b>
Text display, line 2	<b>6.18/6.19/6.44</b>

#### 3.5.2 P1 multiple flushing



##### NOTE

This parameter is **only** visible for filter type P0 = 6, 8, 10, 12, 14.

Adjustable in single steps	Range 1 - 99 pc.
Factory setting	Basic value 1
Text display, line 1	<b>P1 multiple flushing</b>
Text display, line 2	<b>XXX chambers</b>

#### 3.5.3 P2 time-dependent backflush triggering

Adjustable in hour steps	Range 0 - 59 h
Factory setting	Basic value 2 h
Text display, line 1	<b>P2 Forced flushing</b>
Text display, line 2	<b>XXX hours</b>

#### 3.5.4 P3 time-dependent backflush triggering

Adjustable in minute steps	Range 0 - 59 min
Factory setting	Basic value 0 min
Text display, line 1	<b>P3 Forced flushing</b>
Text display, line 2	<b>XXX minutes</b>

### 3.5.5 P4 Backflushing time



#### NOTE

This parameter is **not** visible for filter type P0 = 1.

Adjustable in second steps	Range 5 - 100 s
Factory setting	Basic value 20 s

Text display, line 1	<b>P4 Backflushing time</b>
Text display, line 2	<b>XXX seconds</b>

### 3.5.6 P5 Filling time



#### NOTE

This parameter is **not** visible for filter type P0 = 0 and P0 = 1.

Adjustable in 10 second steps	Range 10 - 600 s
Factory setting	Basic value 180 s

Text display, line 1	<b>P5 Filling time</b>
Text display, line 2	<b>XXX seconds</b>

### 3.5.7 P6 After-blowing time



#### NOTE

This parameter is **only** visible for filter type P0 = 4, 8, 14.

Adjustable in second steps	Range 5 - 100 s
Factory setting	Basic value 30 s

Text display, line 1	<b>P6 After-blowing time</b>
Text display, line 2	<b>XXX seconds</b>

### 3.5.8 P7 Delay time cartridge alarm



#### NOTE

This parameter is **only** visible for filter type P0 = 4, 8, 14.

Adjustable in 10 second steps	Range 10 - 600 s
Factory setting	Basic value 180 s

Text display, line 1	<b>P7 Cartridge alarm</b>
Text display, line 2	<b>XXX seconds</b>

### 3.5.9 P8 DP-Alarm (flushing frequency monitoring)



#### NOTE

This parameter can be set for all filter types. For the alarm DP filter types P0 = 3 (6.60 Alarm DP), 5 (6.60.07/6.72.07 Alarm DP), 7 (6.61 Alarm DP), 9 (6.61.07 Alarm DP), 11 (6.62 Alarm DP), 13 (6.64 Alarm DP), 15 (6.64.07 Alarm DP) and 17 (6.72 Alarm DP) of the preceding controlbox type Type 2200 "P8 DP Alarm" must be activated.

Adjustable	Off/on
Factory setting	Basic value Off

Text display, line 1	<b>P8 DP-Alarm</b>
Text display, line 2	<b>Off</b>
or	
Text display, line 2	<b>On</b>

### 3.5.10 P9 Motor fault

Adjustable in 0.01 A steps	Range 0.10 to 0.99 A
Factory setting	Basic value 0.4 A

Text display, line 1	<b>P9 Motor fault</b>
Text display, line 2	<b>0000 mA</b>



#### NOTE

The motor fault setting is dependent on the installed and approved standard gear motors 0.09 kW, 0.12 kW or 0.18 kW.

Star connection settings:

0.09 kW - Standard - Gear motor = 0.4 amp
0.12 kW - Standard - Gear motor = 0.65 amp
0.18 kW - Standard - Gear motor = 0.8 amp

### 3.5.11 P10 Backflushing time




---

#### NOTE

This parameter is **only** visible for filter type P0 = 1, type 6.21/6.22/6.23/6.24.

Setting: With ND 32 = 1 / ND 40 = 2 / ND 50 = 3 (ND = nominal diameter)

A particular control time is assigned from a table dependent on the nominal diameter.

For the setting P0.... 1 the parameter is not required.

---




---

#### NOTE

With filter type 6.21/6.22, the backflushing time is generally set to ND 50=3.

---

Adjustable in single steps	Range 0 to 2
Factory setting	Basic value ND 32 = 1 s
Text display, line 1	<b>P10 ND flushing time</b>
Text display, line 2	<b>ND=XX =XX sec</b>

### 3.5.12 P11 Language

German, English, French and Spanish are available as operating languages.

Adjustable	D German ES Spanish F French EN English
Factory setting	Basic value EN English
Text display, line 1	<b>P11 Language</b>
Text display, line 2	<b>EN English</b>

### 3.5.13 P12 Testcode




---

#### NOTE

This parameter is visible for all P0 filter types.

The testcode is divided into two areas:

- **Advanced settings:**  
In the first area, entry of a testcode grants access to an advanced setting level, in which additional parameters (such as P15, P16 and P17) can be set. (Detailed description see "P15 DP-Select", P16 DP Differential pressure delay time" and "P17 Alarm relay A2, A3, A4")
  - **Test mode:**  
In the second area, entry of the testcode provides access to a test mode, which is only intended for authorised persons. Additionally, the internal error memory can be read out to a USB stick.
- 

Adjustable in single steps	Range 0 to 9999
Factory setting	Basic value 0

Text display, line 1	<b>P12 Testcode</b>
Text display, line 2	<b>XXXX</b>

### 3.5.14 P14 Pressure equalisation time




---

#### NOTE

This parameter is **only** visible for filter type P0 = 12 and 14.

---

Adjustable in second steps	Range 0 to 99 s
Factory setting	Basic value 10 s

Text display, line 1	<b>P14 PET</b>
Text display, line 2	<b>XXX seconds</b>

### 3.5.15 P15 DP-Select "Differential pressure switch or differential pressure transmitter"



#### NOTE

Entry of **Testcode 44** opens an advanced setting, which allows selection of the differential pressure evaluation between differential pressure switch (DPS = standard) and differential pressure transmitter (DPT = optional).

The advanced setting "P15 DP-Select" is only required if a differential pressure transmitter (output signal: 4-20mA and electrical connection type: three-wire) is used to control the filter.

(Detailed explanation of setting and operation, see Fig. 3.6)

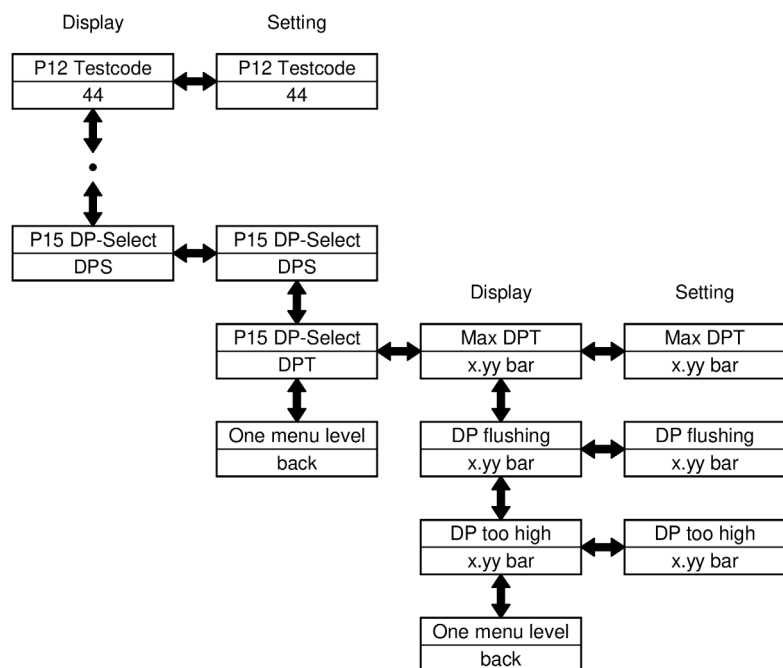


Fig. 3-6 Adjustment and operation

Adjustable	DPS / DPT
Factory setting	Basic value DPS
Text display, line 1	<b>P15 DP-Select</b>
Text display, line 2	DPS
or	
Text display, line 2	DPT

### 3.5.15.1 "MAX DPT" setting



#### NOTE

The maximum measurable differential pressure of the installed differential pressure transmitter must be set prior to commissioning.

Adjustable	Range 0.00 - 9.99 bar
Factory setting	Basic value 1.00 bar

Text display, line 1	MAX DPT
Text display, line 2	X.YY bar

### 3.5.15.2 Setting "DP flushing"



#### NOTE

The differential pressure signal "Differential pressure flushing  $\Delta P$  75%" must be set prior to commissioning.

Adjustable	Range 0.00 - 9.99 bar
Factory setting	Basic value 0.60 bar

Text display, line 1	DP flushing
Text display, line 2	X.YY bar

### 3.5.15.3 Setting "DP too high"



#### NOTE

The differential pressure signal "Differential pressure too high  $\Delta P$  100%" must be set prior to commissioning.

Adjustable	Range 0.00 - 9.99 bar
Factory setting	Basic value 0.80 bar

Text display, line 1	DP too high
Text display, line 2	X.YY bar

### 3.5.16 P16 Differential pressure delay time



#### NOTE

Entry of **Testcode 10** opens an advanced setting, which enables selection of a time delay for the differential pressure signals  $\Delta P$  75% and  $\Delta P$  100%. (Detailed explanation on setting and operation see Fig. 3.7)

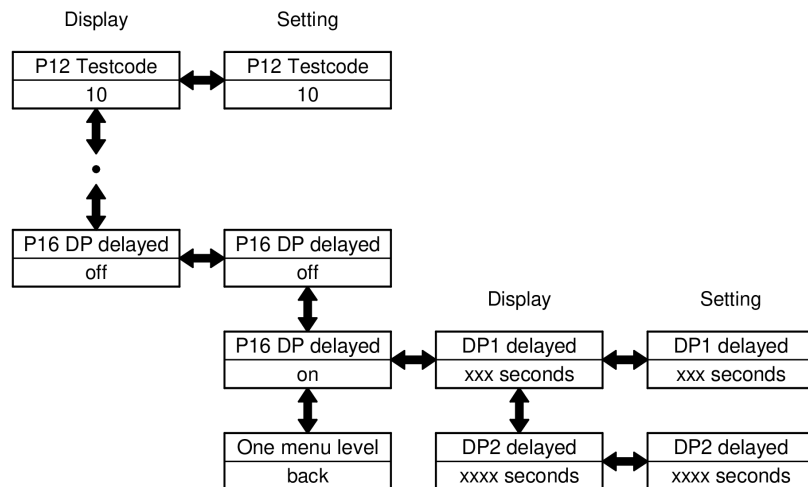


Fig. 3-7 Delay time differential pressure

### 3.5.16.1 Time delay setting "Differential pressure flushing $\Delta P75\%$ "

Adjustable in second steps	Range 1 - 600 sec
Factory setting	Basic value 20 sec
Text display, line 1	DP1 delayed
Text display, line 2	XXX seconds

### 3.5.16.2 Time delay setting "Differential pressure too high $\Delta P100\%$ "

Adjustable in second steps	Range 1 - 1800 sec
Factory setting	Basic value 1200 sec
Text display, line 1	DP2 delayed
Text display, line 2	XXX seconds

### 3.5.17 P17 Alarm relay A2, A3, A4 (configurable alarm outputs)



#### NOTE

Entry of **Testcode 75** opens an advanced setting that enables configuration of the alarm outputs A2, A3 and A4.

The advanced setting "P17 Alarm Relay A2, A3, A4" is necessary if the customer requires alarm outputs that differ from the standard at the system level (see standard control cabinet diagrams).

(See Fig. 3-8 for detailed explanation of Adjustment and operation)

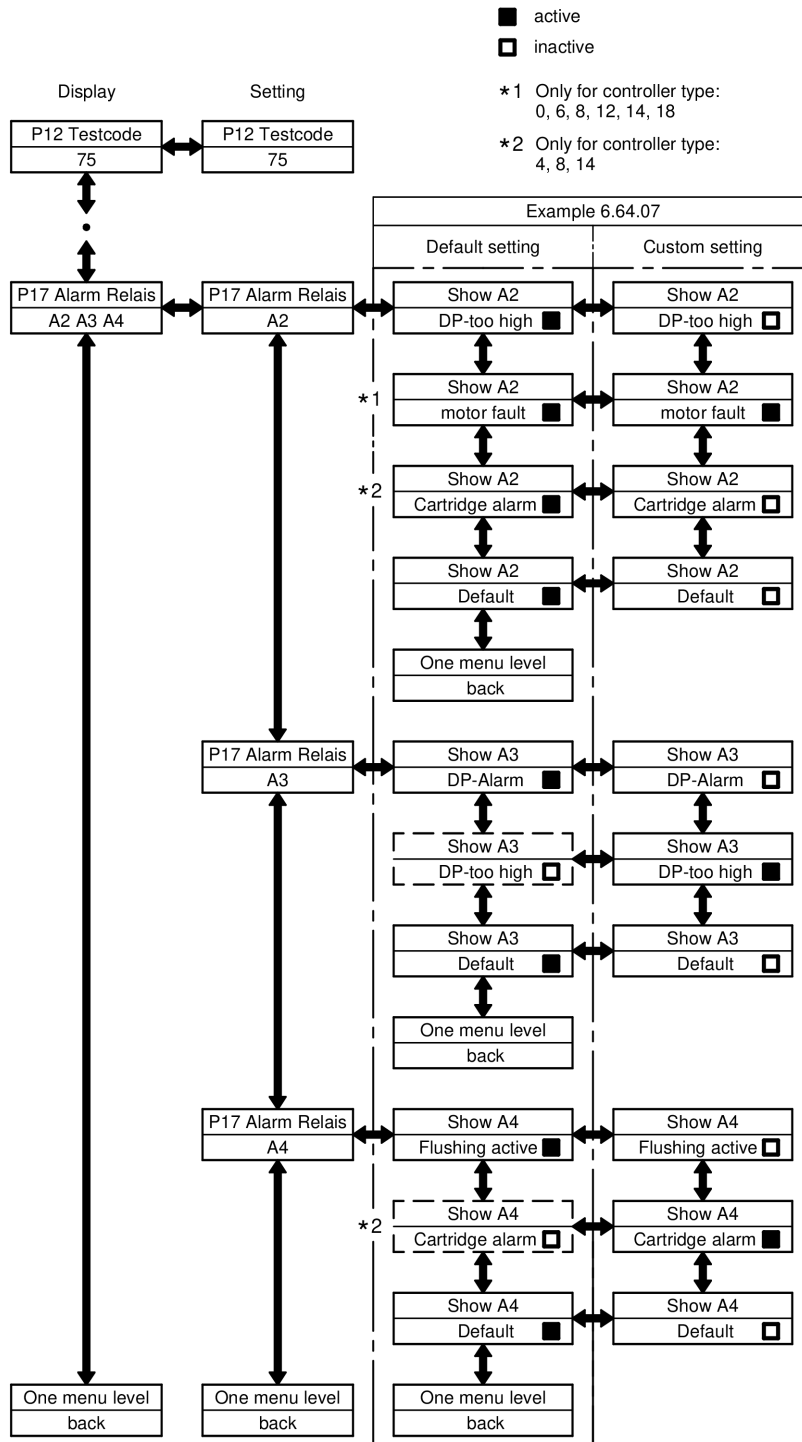


Fig. 3-8 P17 Alarm relay A2, A3, A4

## 4 Control box description, function and setting values

### 4.1 Control box of type 6.18 / 6.19 / 6.44 and aquaBoll®6.18.3

#### Inputs

Pressure switch "DP reached backflushing filter" → 75 %

Pressure switch "DP too high backflushing filter" → 100 %

Customer input → Filter blockage (Remote On/Off)

#### Outputs

Motor

Flushing valve

#### Floating contacts

- |  |                      |
|--|----------------------|
| 1) Alarm, "Control voltage monitoring"   | Output A1, A2, A3    |
| 2) General fault, comprising:<br>- Alarm "Maximum differential pressure reached"<br>and<br>- Alarm "Motor fault" | Output A4, A5, A6    |
| 3) Alarm "Motor fault"   | Output A7, A8, A9    |
| 4) Message "Flushing Active"   | Output A10, A11, A12 |
| 5) Message "Filter blockage (Remote On/Off)"   | Output A13, A14, A15 |

#### Functional description 6.18, 6.19, 6.44 and aquaBoll®6.18.3

See the operating instructions for details on filter functioning.

#### Flushing is triggered via:

- 1) Key S
- 2) The elapsed forced flushing time
- 3) Pressure switch "DP reached backflushing filter"

#### Additional functions in the DP-Alarm is switched on (flushing frequency monitoring)

If, before the forced flushing time elapses, flushing is triggered via the "DP reached backflushing filter", a DP-Alarm is signalled (flushing frequency alarm) (setting See Section "P8 DP-Alarm").

Parametrisation of the alarm outputs is performed in section "P17 Alarm Relay A2, A3, A4".

#### Peculiarities

- All alarms are displayed, signalled over floating contacts and saved.
- If the control box is in configuration mode, manual triggering of flushing is not possible.
- If the "Control box type" parameter is changed, the functions are restarted.

#### 4.1.1 Setting values filter type 6.18/6.19/6.44 and aquaBoll®6.18.3

Terminal plan (Standard) Z46600		6.18 / 6.19 / 6.44	aquaBoll®6.18.3
P0	Filter type	0	18
P1	Multiple flushing	/	/
P2	Forced flushing	2h	2h
P3	Forced flushing	0min	0min
P4	Flushing time	20s	20s
P5	Filling time	/	/
P6	After-blowing time	/	/
P7	Delay time Cartridge alarm	/	/
P8	DP-Alarm	Off	Off
P9	Motor fault	0.4A	0.4A
P10	Backflushing time	/	/
P11	Language	D	D
P12	Testcode	/	/
P14	Pressure equalisation time	/	/



#### NOTE

Setting values can be matched to the respective requirements as necessary.

## 4.2 Control boxes of type 6.21/6.22/6.23 / 6.24

### Inputs 6.21/6.22/6.23 and 6.24

Pressure switch "DP reached backflushing filter" → 75 %

Pressure switch "DP too high backflushing filter" → 100 %

Customer input → Filter blockage (Remote On/Off)

### Outputs 6.21/6.22/6.23 and 6.24

Flushing valve

### Floating contacts and messages 6.21/6.22/6.23 and 6.24

- |  |                      |
|--|----------------------|
| 1) Alarm, "Control voltage monitoring"       | Output A1, A2, A3    |
| 2) Alarm "Maximum DP reached"                | Output A4, A5, A6    |
| 3) Message "Flushing Active"                 | Output A10, A11, A12 |
| 4) Message "Filter blockage (Remote On/Off)" | Output A13, A14, A15 |

### Functional description 6.21/6.22/6.23 and 6.24

See the operating instructions for details on filter functioning.

### Flushing is triggered via:

- 1) Key S
- 2) The elapsed forced flushing time
- 3) Pressure switch "DP reached backflushing filter"

### Additional functions in the DP-Alarm is switched on (flushing frequency monitoring)

If, before the forced flushing time elapses, flushing is triggered via the "DP reached backflushing filter", a DP-Alarm is signalled (flushing frequency alarm) (setting See Section "P8 DP-Alarm").

Parametrisation of the alarm outputs is performed in section "P17 Alarm Relay A2, A3, A4".

### Peculiarities

- All alarms are displayed, signalled over floating contacts and saved.
- If the control box is in configuration mode, manual triggering of flushing is not possible.
- If the "Control box type" parameter is changed, the functions are restarted.

#### 4.2.1 Filter type setting values 6.21/6.22

Terminal plan (Standard) Z46611		6.21 / 6.22
P0	Filter type	1
P1	Multiple flushing	/
P2	Forced flushing	Filter unit: < 10 µm = 0.5 h = 10 µm = 1 h > 10 µm = 2 h
P3	Forced flushing	0min
P4	Flushing time	/
P5	Filling time	/
P6	After-blowing time	/
P7	Delay time Cartridge alarm	/
P8	DP-Alarm	Off
P9	Motor fault	/
P10	Backflushing time	3
P11	Language	D
P12	Testcode	/
P14	Pressure equalisation time	/



#### NOTE

Setting values can be matched to the respective requirements as necessary.

Terminal plan (Standard) Z46601		6.23 / 6.24
P0	Filter type	1
P1	Multiple flushing	/
P2	Forced flushing	2h
P3	Forced flushing	0min
P4	Flushing time	/
P5	Filling time	/
P6	After-blowing time	/
P7	Delay time Cartridge alarm	/
P8	DP-Alarm	Off
P9	Motor fault	/
P10	Backflushing time	1
P11	Language	D
P12	Testcode	/
P14	Pressure equalisation time	/



**NOTE**

Setting values can be matched to the respective requirements as necessary.

### 4.3 Control boxes of type 6.60

#### Inputs 6.60 and 6.60 Alarm DP (flushing frequency monitoring)

Limit switch "Position reached"

Pressure switch "DP reached backflushing filter" → 75 %

Pressure switch "DP too high backflushing filter" → 100 %

Customer input → Filter blockage (Remote On/Off)

#### Inputs additional with 6.60.07 (flushing oil treatment)

Pressure switch "DP too high Flushing oil treatment" → 100 %

#### Outputs 6.60 and 6.60 Alarm DP

Flushing valve

Chamber valve

#### Outputs additional with 6.60.07 and 6.60.07 Alarm DP

After blowing valve

#### Floating contacts and messages 6.60

- |   |                      |
|---|----------------------|
| 1) Alarm, "Control voltage monitoring"          | Output A1, A2, A3    |
| 2) General fault:                               | Output A4, A5, A6    |
| - Alarm "Maximum differential pressure reached" |                      |
| - Limit switch alarm                            |                      |
| 3) Message "Flushing Active"                    | Output A10, A11, A12 |
| 4) Message "Filter blockage (Remote On/Off)"    | Output A13, A14, A15 |

#### Floating contacts and messages 6.60 Alarm DP

- |   |                      |
|---|----------------------|
| 1) Alarm, "Control voltage monitoring"          | Output A1, A2, A3    |
| 2) General fault:                               | Output A4, A5, A6    |
| - Alarm "Maximum differential pressure reached" |                      |
| - Limit switch alarm                            |                      |
| 3) Alarm "Backflush triggering by DP"           | Output A7, A8, A9    |
| 4) Message "Flushing Active"                    | Output A10, A11, A12 |
| 5) Message "Filter blockage (Remote On/Off)"    | Output A13, A14, A15 |

### Floating contacts and messages 6.60.07

- |   |                      |
|---|----------------------|
| 1) Alarm, "Control voltage monitoring"  | Output A1, A2, A3    |
| 2) General fault, comprising:<br>- Alarm "Maximum differential pressure reached"<br>and<br>- Alarm "Cartridge"<br>(DP-Alarm flushing oil treatment)<br>- Limit switch alarm | Output A4, A5, A6    |
| 3) Message "Flushing Active"  | Output A10, A11, A12 |
| 4) Message "Filter blockage (Remote On/Off)"  | Output A13, A14, A15 |

### Floating contacts and messages 6.60.07 Alarm DP

- |   |                      |
|---|----------------------|
| 1) Alarm, "Control voltage monitoring"  | Output A1, A2, A3    |
| 2) General fault, comprising:<br>- Alarm "Maximum differential pressure reached"<br>and<br>- Alarm "Cartridge"<br>(DP-Alarm flushing oil treatment)<br>- Limit switch alarm | Output A4, A5, A6    |
| 3) Alarm "Backflush triggering by DP"   | Output A7, A8, A9    |
| 4) Message "Flushing Active"  | Output A10, A11, A12 |
| 5) Message "Filter blockage (Remote On/Off)"  | Output A13, A14, A15 |

### Functional description 6.60

See the operating instructions for details on filter functioning.

### Flushing is triggered via:

- 1) Application of the mains voltage
- 2) Key S
- 3) The elapsed forced flushing time
- 4) Pressure switch "DP reached backflushing filter"

### Additional functions for 6.60 Alarm DP (flushing frequency monitoring)

If, before the forced flushing time elapses, flushing is triggered via the "DP reached backflushing filter", a DP-Alarm is signalled (flushing frequency alarm).

### Peculiarities

- All alarms are displayed, signalled over floating contacts and saved.
- If the control box is in configuration mode, manual triggering of flushing is not possible.
- If the "Control box type" parameter is changed, the functions are restarted.

Terminal plan (Standard) Z46602 Z46603		6.60	6.60.07
P0	Filter type	2	4
P1	Multiple flushing	/	/
P2	Forced flushing	Filter unit: < 10 µm = 0.5h = 10 µm = 1h > 10 µm = 2h	
P3	Forced flushing	0min	0min
P4	Flushing time	8s	8s
P5	Filling time	> 5 bar = 240s < 5 bar = 300s	
P6	After-blowing time	/	18s
P7	Delay time Cartridge alarm	/	180s
P8	DP-Alarm	Off	Off
P9	Motor fault	/	/
P10	Backflushing time	/	/
P11	Language	D	D
P12	Testcode	/	/
P14	Pressure equalisation time	/	/



**NOTE**

Setting values can be matched to the respective requirements as necessary.

## 4.4 Control boxes of type 6.61

### Inputs 6.61 and 6.61 Alarm DP (flushing frequency monitoring)

Limit switch "Position reached"

Pressure switch "DP reached backflushing filter" → 75 %

Pressure switch "DP too high backflushing filter" → 100 %

Customer input → Filter blockage (Remote On/Off)

### Inputs additional 6.61.07 and 6.61.07 Alarm DP (flushing oil treatment)

Pressure switch "DP too high Flushing oil treatment" → 100 %

### Outputs 6.61 and 6.61 Alarm DP

Flushing valve

Motor

### Outputs additional with 6.61.07 and 6.61.07 Alarm DP

After blowing valve

### Floating contacts and messages 6.61

- |   |                      |
|---|----------------------|
| 1) Alarm, "Control voltage monitoring"          | Output A1, A2, A3    |
| 2) General fault, comprising:                   | Output A4, A5, A6    |
| - Alarm "Maximum differential pressure reached" |                      |
| and   |                      |
| - Alarm "Motor fault"                           |                      |
| - Limit switch alarm                            |                      |
| 3) Message "Flushing Active"                    | Output A10, A11, A12 |
| 4) Message "Filter blockage (Remote On/Off)"    | Output A12, A14, A15 |

### Floating contacts and messages 6.61 Alarm DP

- |   |                      |
|---|----------------------|
| 1) Alarm, "Control voltage monitoring"        | Output A1, A2, A3    |
| 2) General fault, comprising:                 | Output A4, A5, A6    |
| Alarm "Maximum differential pressure reached" |                      |
| and   |                      |
| Alarm "Motor fault"                           |                      |
| - Limit switch alarm                          |                      |
| 3) Alarm "Backflush triggering by DP"         | Output A7, A8, A9    |
| 4) Message "Flushing Active"                  | Output A10, A11, A12 |
| 5) Message "Filter blockage (Remote On/Off)"  | Output A13, A14, A15 |

### Floating contacts and messages 6.61.07

- |   |                      |
|---|----------------------|
| 1) Alarm, "Control voltage monitoring"  | Output A1, A2, A3    |
| 2) General fault, comprising: <ul style="list-style-type: none"><li>- Alarm "Maximum differential pressure reached",</li><li>- Alarm "Motor fault" and</li><li>- Alarm "Cartridge" (DP-Alarm flushing oil treatment)</li><li>- Limit switch alarm</li></ul> | Output A4, A5, A6    |
| 3) Message "Flushing Active"  | Output A10, A11, A12 |
| 4) Message "Filter blockage (Remote On/Off)"  | Output A12, A14, A15 |

### Floating contacts and messages 6.61.07 Alarm DP

- |   |                      |
|---|----------------------|
| 1) Alarm, "Control voltage monitoring"  | Output A1, A2, A3    |
| 2) General fault, comprising: <ul style="list-style-type: none"><li>- Alarm "Maximum differential pressure reached",</li><li>- Alarm "Motor fault" and</li><li>- Alarm "Cartridge" (DP-Alarm flushing oil treatment)</li><li>- Limit switch alarm</li></ul> | Output A4, A5, A6    |
| 3) Alarm "Backflush triggering by DP"   | Output A7, A8, A9    |
| 4) Message "Flushing Active"  | Output A10, A11, A12 |
| 5) Message "Filter blockage (Remote On/Off)"  | Output A12, A14, A15 |

### Functional description 6.61

See the operating instructions for details on filter functioning.

### Flushing is triggered via:

- 1) Application of the mains voltage
- 2) Key S
- 3) The elapsed forced flushing time
- 4) Pressure switch "DP reached backflushing filter"

### Peculiarities

- In the event of flushing triggered by application of the mains voltage and with the limit switch open, flushing starts directly with the flushing valve.
- If the control box is in configuration mode, manual triggering of flushing is not possible.
- If the "Control box type" parameter is changed, the functions are restarted.

Terminal plan (Standard) Z46604 Z46605		6.61	6.61.07
P0	Filter type	6	8
P1	Multiple flushing	1	1
P2	Forced flushing	Filter unit: < 10 µm = 0.5h = 10 µm = 1h > 10 µm = 2h	
P3	Forced flushing	0min	0min
P4	Flushing time	8s	8s
P5	Filling time	Up to DN150 - 120s From DN200 - 150s	
P6	After-blowing time	/	18s
P7	Delay time Cartridge alarm	/	180s
P8	DP-Alarm	Off	Off
P9	Motor fault	0.4A	0.4A
P10	Backflushing time	/	/
P11	Language	D	D
P12	Testcode	/	/
P14	Pressure equalisation time	/	/



**NOTE**

Setting values can be matched to the respective requirements as necessary.

## 4.5 Control boxes of type 6.62

### Inputs 6.62

Limit switch "Position reached"

Pressure switch "DP reached backflushing filter" → 75 %

Pressure switch "DP too high backflushing filter" → 100 %

Customer input → Filter blockage (Remote On/Off)

### Outputs 6.62

Flushing valve

Chamber valve clocked

### Floating contacts and messages 6.62

- |  |                      |
|--|----------------------|
| 1) Alarm, "Control voltage monitoring"   | Output A1, A2, A3    |
| 2) General fault:<br>- Alarm "Maximum differential pressure reached"<br>- Limit switch alarm | Output A4, A5, A6    |
| 3) Message "Flushing Active"   | Output A10, A11, A12 |
| 4) Message "Filter blockage (Remote On/Off)"   | Output A12, A14, A15 |

### Floating contacts and messages 6.62 Alarm DP (flushing frequency monitoring)

- |  |                      |
|--|----------------------|
| 1) Alarm, "Control voltage monitoring"   | Output A1, A2, A3    |
| 2) General fault:<br>- Alarm "Maximum differential pressure reached"<br>- Limit switch alarm | Output A4, A5, A6    |
| 3) Alarm "Backflush triggering by DP"  | Output A7, A8, A9    |
| 4) Message "Flushing Active"   | Output A10, A11, A12 |
| 5) Message "Filter blockage (Remote On/Off)"   | Output A12, A14, A15 |

### Functional description 6.62

See the operating instructions for details on filter functioning.

### Flushing is triggered via:

- 1) Application of the mains voltage
- 2) Key S
- 3) The elapsed forced flushing time
- 4) Pressure switch "DP reached backflushing filter"

### Peculiarities

- In the event of flushing triggered by application of the mains voltage and with the limit switch open, flushing starts directly with the flushing valve.
- If the control box is in configuration mode, manual triggering of flushing is not possible.
- If the "Control box type" parameter is changed, the functions are restarted.

Terminal plan (Standard) Z46606		6.62
P0	Filter type	10
P1	Multiple flushing	1
P2	Forced flushing	Filter unit: < 10 µm = 0.5 h = 10 µm = 1 h > 10 µm = 2 h
P3	Forced flushing	0min
P4	Flushing time	8s
P5	Filling time	> 5 bar = 240s < 5 bar = 300s
P6	After-blowing time	/
P7	Delay time Cartridge alarm	/
P8	DP-Alarm	Off
P9	Motor fault	/
P10	Backflushing time	/
P11	Language	D
P12	Testcode	/
P14	Pressure equalisation time	/



**NOTE**

Setting values can be matched to the respective requirements as necessary.

## 4.6 Control boxes of type 6.64

### Inputs 6.64 and 6.64 Alarm DP (flushing frequency monitoring)

Limit switch "Position reached"

Pressure switch "DP reached backflushing filter" → 75 %

Pressure switch "DP too high backflushing filter" → 100 %

Customer input → Filter blockage (Remote On/Off)

### Inputs additional 6.64.07 and 6.64.07 Alarm DP (flushing oil treatment)

Pressure switch "DP too high Flushing oil treatment" → 100 %

### Outputs 6.64 and 6.64 Alarm DP

Flushing valve

Motor

Relief valve

### Outputs additional with 6.64.07 and 6.64.07 Alarm DP

After blowing valve

### Floating contacts and messages 6.64

- |  |                      |
|--|----------------------|
| 1) Alarm, "Control voltage monitoring"   | Output A1, A2, A3    |
| 2) General fault, comprising:<br>- Alarm "Maximum differential pressure reached"<br>and<br>- Alarm "Motor fault"<br>- Limit switch alarm | Output A4, A5, A6    |
| 3) Message "Flushing Active"   | Output A10, A11, A12 |
| 4) Message "Filter blockage (Remote On/Off)"   | Output A12, A14, A15 |

### Floating contacts and messages 6.64 Alarm DP

- |  |                      |
|--|----------------------|
| 1) Alarm, "Control voltage monitoring"   | Output A1, A2, A3    |
| 2) General fault, comprising:<br>- Alarm "Maximum differential pressure reached"<br>and<br>- Alarm "Motor fault"<br>- Limit switch alarm | Output A4, A5, A6    |
| 3) Alarm "Backflush triggering by DP"  | Output A7, A8, A9    |
| 4) Message "Flushing Active"   | Output A10, A11, A12 |
| 5) Message "Filter blockage (Remote On/Off)"   | Output A12, A14, A15 |

### Floating contacts and messages 6.64.07

- |   |                      |
|---|----------------------|
| 1) Alarm, "Control voltage monitoring"  | Output A1, A2, A3    |
| 2) General fault, comprising:<br>- Alarm "Maximum differential pressure reached",<br>- Alarm "Motor fault" and<br>- Alarm "Cartridge" (DP-Alarm flushing oil treatment)<br>- Limit switch alarm | Output A4, A5, A6    |
| 3) Message "Flushing Active"  | Output A10, A11, A12 |
| 4) Message "Filter blockage (Remote On/Off)"  | Output A12, A14, A15 |

### Floating contacts and messages 6.64.07 Alarm DP

- |   |                      |
|---|----------------------|
| 1) Alarm, "Control voltage monitoring"  | Output A1, A2, A3    |
| 2) General fault, comprising:<br>- Alarm "Maximum differential pressure reached",<br>- Alarm "Motor fault" and<br>- Alarm "Cartridge" (DP-Alarm flushing oil treatment)<br>- Limit switch alarm | Output A4, A5, A6    |
| 3) Alarm "Backflush triggering by DP"   | Output A7, A8, A9    |
| 4) Message "Flushing Active"  | Output A10, A11, A12 |
| 5) Message "Filter blockage (Remote On/Off)"  | Output A12, A14, A15 |

### Functional description 6.64

See the operating instructions for details on filter functioning.

### Flushing is triggered via:

- 1) Application of the mains voltage
- 2) Key S
- 3) The elapsed forced flushing time
- 4) Pressure switch "DP reached backflushing filter"

### Peculiarities

- In the event of flushing triggered by application of the mains voltage and with the limit switch open, a flushing process starts with the flushing valve after the pressure equalisation time has elapsed.
- If the control box is in configuration mode, manual triggering of flushing is not possible.
- If the "Control box type" parameter is changed, the functions are restarted.

Terminal plan (Standard) Z46607 Z46608		6.64	6.64.07
P0	Filter type	12	14
P1	Multiple flushing	1	1
P2	Forced flushing	Filter unit: < 10 µm = 0.5h = 10 µm = 1h > 10 µm = 2h	
P3	Forced flushing	0min	0min
P4	Flushing time	8s	8s
P5	Filling time	Up to DN150 - 180s From DN200 - 360s	
P6	After-blowing time	/	18s
P7	Delay time Cartridge alarm	/	180s
P8	DP-Alarm	Off	Off
P9	Motor fault	0.4A	0.4A
P10	Backflushing time	/	/
P11	Language	D	D
P12	Testcode	/	/
P14	Pressure equalisation time	Up to DN150 - 1s  From DN200 - 10s	



**NOTE**

Setting values can be matched to the respective requirements as necessary.

## 4.7 Control boxes of type 6.72

### Inputs 6.72 and 6.72 Alarm DP (flushing frequency monitoring)

Limit switch "Position reached"

Pressure switch "DP reached backflushing filter" → 75 %

Pressure switch "DP too high backflushing filter" → 100 %

Customer input → Filter blockage (Remote On/Off)

### Inputs additional with 6.72.07 (flushing oil treatment)

Pressure switch "DP too high Flushing oil treatment" → 100 %

### Outputs 6.72 and 6.72 Alarm DP

Flushing valve

Chamber valve

### Outputs additional with 6.72.07 and 6.72.07 Alarm DP

After blowing valve

### Floating contacts and messages 6.72

- |   |                      |
|---|----------------------|
| 1) Alarm, "Control voltage monitoring"          | Output A1, A2, A3    |
| 2) General fault:                               | Output A4, A5, A6    |
| - Alarm "Maximum differential pressure reached" |                      |
| - Limit switch alarm                            |                      |
| 3) Message "Flushing Active"                    | Output A10, A11, A12 |
| 4) Message "Filter blockage (Remote On/Off)"    | Output A12, A14, A15 |

### Floating contacts and messages 6.72 Alarm DP

- |   |                      |
|---|----------------------|
| 1) Alarm, "Control voltage monitoring"          | Output A1, A2, A3    |
| 2) General fault:                               | Output A4, A5, A6    |
| - Alarm "Maximum differential pressure reached" |                      |
| - Limit switch alarm                            |                      |
| 3) Alarm "Backflush triggering by DP"           | Output A7, A8, A9    |
| 4) Message "Flushing Active"                    | Output A10, A11, A12 |
| 5) Message "Filter blockage (Remote On/Off)"    | Output A12, A14, A15 |

### Floating contacts and messages 6.72.07

- |  |                      |
|--|----------------------|
| 1) Alarm, "Control voltage monitoring"   | Output A1, A2, A3    |
| 2) General fault, comprising: <ul style="list-style-type: none"><li>- Alarm "Maximum differential pressure reached" and</li><li>- Alarm "Cartridge" (DP-Alarm flushing oil treatment)</li><li>- Limit switch alarm</li></ul> | Output A4, A5, A6    |
| 3) Message "Flushing Active"   | Output A10, A11, A12 |
| 4) Message "Filter blockage (Remote On/Off)"   | Output A12, A14, A15 |

### Floating contacts and messages 6.72.07 Alarm DP

- |  |                      |
|--|----------------------|
| 1) Alarm, "Control voltage monitoring"   | Output A1, A2, A3    |
| 2) General fault, comprising: <ul style="list-style-type: none"><li>- Alarm "Maximum differential pressure reached" and</li><li>- Alarm "Cartridge" (DP-Alarm flushing oil treatment)</li><li>- Limit switch alarm</li></ul> | Output A4, A5, A6    |
| 3) Alarm "Backflush triggering by DP"  | Output A7, A8, A9    |
| 4) Message "Flushing Active"   | Output A10, A11, A12 |
| 5) Message "Filter blockage (Remote On/Off)"   | Output A12, A14, A15 |

### Functional description 6.72

See the operating instructions for details on filter functioning.

### Flushing is triggered via:

- 1) Application of the mains voltage
- 2) Key S
- 3) The elapsed forced flushing time
- 4) Pressure switch "DP reached backflushing filter"

### Additional functions for 6.72 Alarm DP (flushing frequency monitoring)

If, before the forced flushing time elapses, flushing is triggered via the "DP reached backflushing filter", a DP-Alarm is signalled (flushing frequency alarm).

### Peculiarities

- All alarms are displayed, signalled over floating contacts and saved.
- If the control box is in configuration mode, manual triggering of flushing is not possible.
- If the "Control box type" parameter is changed, the functions are restarted.

Terminal plan (Standard) Z46609 Z46610		6.72	6.72.07
P0	Filter type	16	4
P1	Multiple flushing	/	/
P2	Forced flushing	Filter unit: < 10 µm = 0.5h = 10 µm = 1h > 10 µm = 2h	
P3	Forced flushing	0min	0min
P4	Flushing time	8s	8s
P5	Filling time	DN40: > 5 bar = 120s < 5 bar = 200s DN65: > 5 bar = 200s < 5 bar = 320s DN80: > 5 bar = 240s < 5 bar = 400s	
P6	After-blowing time	/	18s
P7	Delay time Cartridge alarm	/	180s
P8	DP-Alarm	Off	Off
P9	Motor fault	0.4A	0.4A
P10	Backflushing time	/	/
P11	Language	D	D
P12	Testcode	/	/
P14	Pressure equalisation time	/	/



**NOTE**

Setting values can be matched to the respective requirements as necessary.



## 5 Remediating faults



### NOTE

In case of any faults or repairs which are not listed here, contact the BOLL & KIRCH customer services department.

### 5.1 Trouble shooting

Fault	Possible cause	Rectification
Actuation of the automatic filter does not occur	Faulty wiring	Check the wiring, power supply and transformer configuration according to the control box diagram
	Incorrect control box type set	Set the control box type according to the operating instructions
Display keys do not operate	Key membrane damaged	Change Display -A1
	Connecting cable between PCB and the display is loose	Remake the plug connection
	Connecting cable between PCB and display defective	Change connecting cable
Display does not work	Power supply faulty	Check power supply and in particular check for the correct setting of the primary voltage at the transformer - T1
	Connecting cable between PCB and the display is loose	Remake the plug connection
	Connecting cable between PCB and display defective	Change connecting cable
	Display -A1 defective	Change Display -A1
	Transformer -T1 defective	Change transformer -T1
	PCB -A2 defective	Change PCB -A2
	Fuse(s) F1 and/or F3 (1 amp) defective	Change fuse(s)
Gear motor does not turn + alarm message "Motor fault"	Incorrect control box type set	Please set the control box type according to the operating instructions
	Fuse F2 (1 amp) defective	Change fuse
	Filter operating fault (gear motor etc.)	See automatic filter operating instructions
	Faulty wiring	Check the wiring of the gear motor
Alarm message "Limit switch alarm"	Limit switch signal missing	Check the setting and wiring of the limit switch
	Limit switch defective	See automatic filter operating instructions

Fault	Possible cause	Rectification
Alarm message "P0 Filter type" after initialisation of filter type 6.18/6.19/6.44	During the "Filter type 6.18/6.19/6.44" initialisation, it was identified that a limit switch signal (terminals 31+32, see control cabinet wiring diagrams) was present and consequently the incorrect filter type had been set. (Background: control box type 0 set to operation without limit switch)	Set the control box type according to the operating instructions
Differential pressure is not be processed	Differential pressure indicator defective	Check/change differential pressure indicator
	Parameter P16 differential pressure delay time set	See explanations about the differential pressure time delay, P16 parameter setting and additional functions display (Z key) in the operating instructions
Solenoid valve including coil does not function	Incorrect control box type set	Set the control box type according to the operating instructions
	Incorrect control / valve voltage set	Equalise the coil voltage with the set secondary voltage set at the transformer and correct as necessary
	2 amp fuse F2 on the PCB - A2 defective	Change fuse
	Solenoid valve and/or coil defective	Change solenoid valve and/or coil
Display "off"	Remote On/Off function (remote switching) has been activated by closing the E4 input (terminals 33+34, see control cabinet wiring diagrams)	This function can be deactivated by opening the contact of the input E4

# Elektrodokumentation Electrical documentation

**Hersteller:**  
**Manufacturer:**  
Boll & Kirch Filterbau GmbH  
Siemensstraße 10-14  
50170 Kerpen

**Algemeine Daten:**  
**General informations:**  
BK-Artikel-Nr.: 4302300  
BK-Article-No.:  
**Projektdaten:**  
**Project data:**  
Zeichnungs-Nr.: Z46600  
Drawing-No.:  
Typ: Filtertyp 6.18/6.19/6.44/aquaBoll 6.18.3  
Type: Filter type 6.18/6.19/6.44/aquaBoll 6.18.3  
Bezeichnung: Vollautomatischer Rückspülfilter  
Designation: Fully automatic back flushing filter

Anzahl Seiten: 13  
Number of pages:  
Bearbeiter: gruenwald  
Edited by:  
Datum: 16.05.2019  
Date:

**Normen:**  
**Specifications:**  
Ausführung der Schaltanlage nach DIN VDE 0660 Teil 5 bzw. IEC 439.  
Bestimmungen für fabrikfertige Schaltgerätekombinationen mit  
Nennspannung bis 750V. Nennisolationsspannung 450/750V  
und Nennspannung 450/750V.  
Execution of the switchgear according to DIN VDE 0660 part 5 or IEC 439.  
Regulations for factory-fabricated switchgear combinations with  
rated voltage up to 750V. Rated insulation voltage 450/750V  
and rated voltage 450/750V.

## **Technische Kenngrößen** **Technical characteristics**

**Gehäuse:**  
**Housings:**  
Bezeichnung: EB 1555.500  
Designation:  
Materialtyp: Stahlblech  
Material: Carbon steel  
Abmessungen: 300 x 300 x 120mm  
Dimensionings:  
Schutzart: IP65  
Degree of protection:  
Farbe: RAL7035  
Color:  
Türanschlag: Rechts  
Door stop: Right  
Montage: Wandabstandshalter  
Mounting: Wall spacer  
Gewicht: 15kg  
Weight:

**Spannungen:**  
**Voltages:**  
Betriebsspannung: 3~/PE  
Operating voltage: 230-575V +/- 5%  
Frequenz: 50/60Hz  
Frequency:  
Steuerspannung: 230V AC  
Control voltage: 115V AC  
24V DC  
Hauptschalter:  
Main switch:  
 vorne Front  
 links left  
 rechts right  
Kundenvorschriften:  
Customer specifications:  
 Ja Yes  
 Nein No

**Sonstiges:**  
**Miscellaneous:**  
Aderbeschriftung: -  
Wire labeling:  
Kabeltyp: H07V-K  
Cable type:  
Netzform: TN  
Network types:  
Umgebungstemperatur: 55°C  
Environment temperature:  
Kurzschlussfestigkeit (SCCR): 50kA  
Short-circuit strength (SCCR):

**Steuergerät:** BK2300  
**Control device:**  
**Getriebemotorleistung:** 0,09 - 0,18kW  
**Gear motor power:**

## **Leitungsfarben:** **Wire colors:**

Arbeitsstromkreis: Schwarz  
Load circuit: Black

Schutzleiter: Grün/Gelb  
PE conductor: Green/Yellow

Steuerstromkreis: Rot  
Control circuit: Red


Fremdspannung: Orange  
External voltage: Orange

## **Verdrahtung** **Wiring**

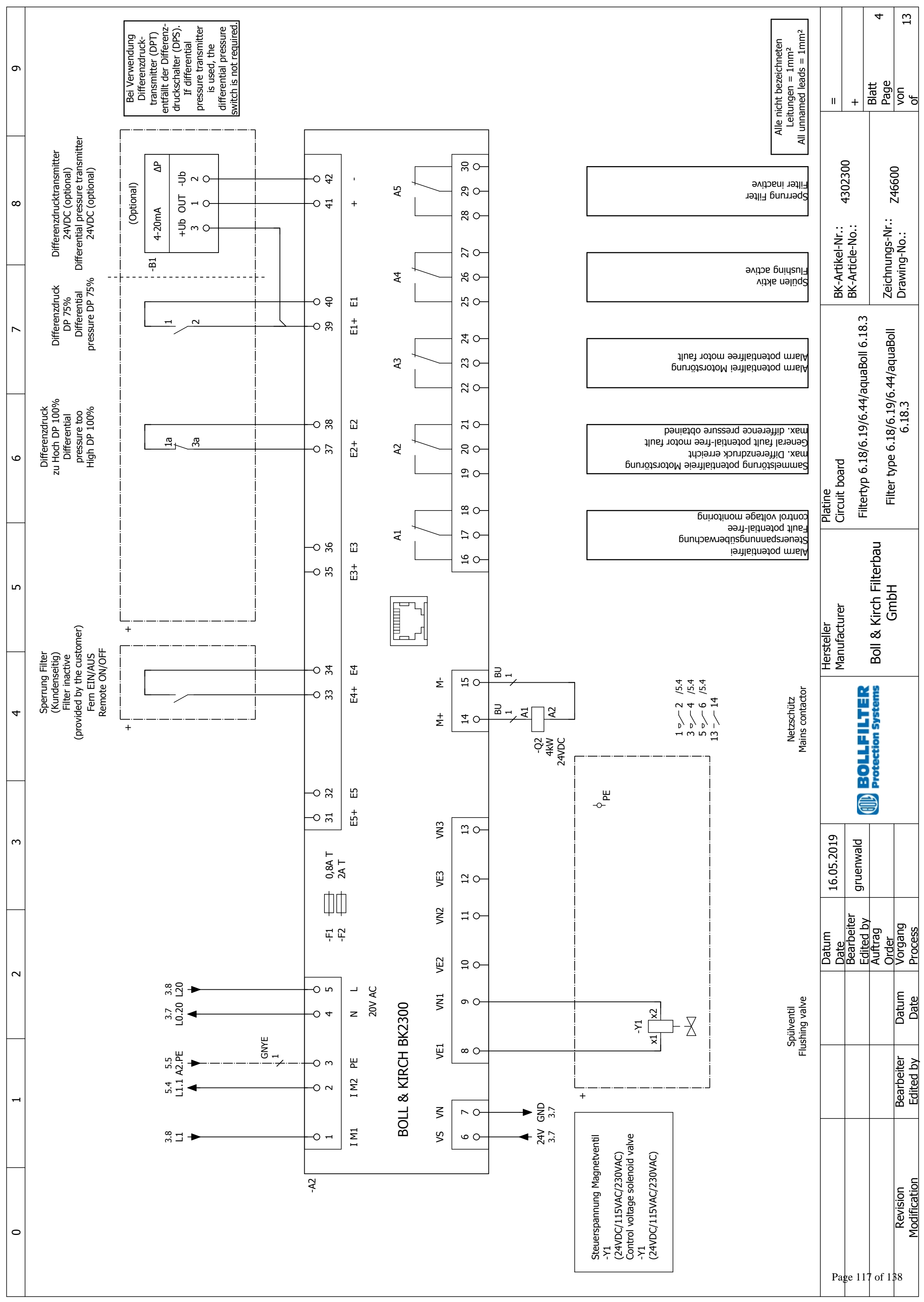
Hauptstromkreis wird mit 1,5mm<sup>2</sup> und Steuerstromkreis mit 1mm<sup>2</sup> verlegt.  
Die Verdrahtung erfolgt von oben nach unten bzw. von links nach rechts gemäß den Stromlaufplänen.  
The main circuit is laid with 1.5mm<sup>2</sup> and the control circuit with 1mm<sup>2</sup>.  
The wiring is carried out from top to bottom or from left to right according to the circuit diagrams.

# Inhaltsverzeichnis Table of contents

Anlage Plant	Einbauort Mounting location	Dokumententart Document type	Seite Page	Seitenbezeichnung Page designation	Datum Date	Bearbeiter Edited by
		Schaltplan Wiring diagram	1	Deckblatt Cover sheet	11.07.2019	gruenwald
		Schaltplan Wiring diagram	2	Inhaltsverzeichnis Table of contents	11.07.2019	gruenwald
		Schaltplan Wiring diagram	3	Einspeisung und Stromversorgung Feed-in and power supply	05.07.2019	gruenwald
		Schaltplan Wiring diagram	4	Platine Circuit board	10.07.2019	gruenwald
		Schaltplan Wiring diagram	5	Getriebemotor Gear motor	03.07.2019	gruenwald
		Schaltplan Wiring diagram	6	Bedienfeld Control panel	03.07.2019	gruenwald
		Schaltplan Wiring diagram	7	Aufbauplan Assembling diagram	11.07.2019	gruenwald
		Materialliste Part list	8	Materialliste Part list	11.07.2019	gruenwald
		Materialliste Part list	9	Materialliste Part list	11.07.2019	gruenwald
		Klemmenplan Terminal diagram	10	Klemmenplan Terminal diagram	11.07.2019	gruenwald
		Klemmenplan Terminal diagram	11	Klemmenplan Terminal diagram	11.07.2019	gruenwald
		Klemmenplan Terminal diagram	12	Klemmenplan Terminal diagram	11.07.2019	gruenwald
		Klemmenplan Terminal diagram	13	Klemmenplan Terminal diagram	11.07.2019	gruenwald

Revision Modification	Datum Date	16.05.2019		Hersteller Manufacturer	Inhaltsverzeichnis Table of contents	BK-Artikel-Nr.: 4302300	=
	Bearbeiter Edited by	gruenwald					
	Auftrag Order			Boll & Kirch Filterbau GmbH	Filtertyp 6.18/6.19/6.44/aquaBoll 6.18.3	Zeichnungs-Nr.: Z46600	Blatt Page
	Vorgang Process				Filter type 6.18/6.19/6.44/aquaBoll 6.18.3	Drawing-No.:	von of
	Datum Date						2
							13





Revision Modification	Bearbeiter Edited by	Datum Date

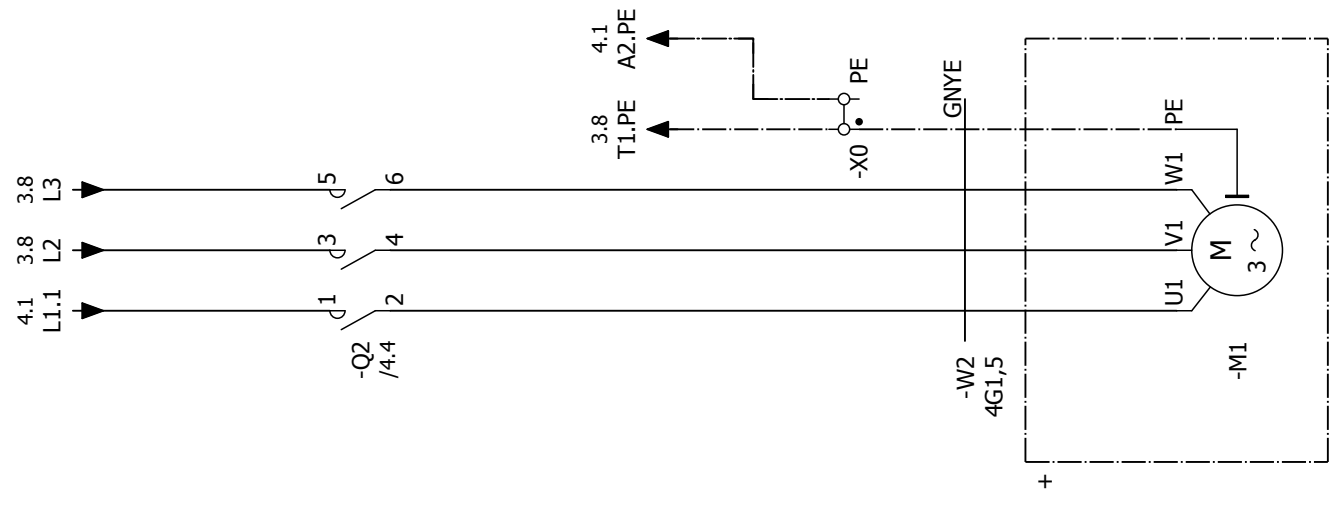
Datum Date	16.05.2019
Bearbeiter Edited by	gruenwald
Auftrag Order	
Vorgang Process	

**BOLLFILTER**  
Protection Systems

Hersteller Manufacturer  
**Boll & Kirch Filterbau GmbH**

Platine Circuit board  
Filtertyp 6.18/6.19/6.44/aquaBoll 6.18.3  
Filter type 6.18/6.19/6.44/aquaBoll 6.18.3

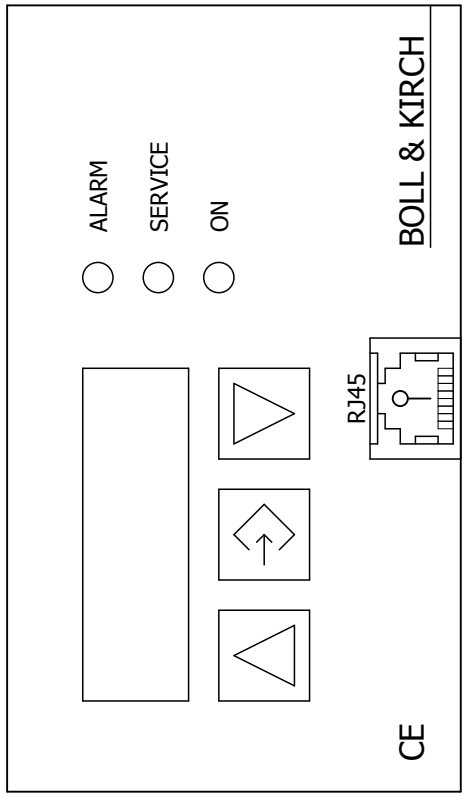
BK-Artikel-Nr.: 4302300  
BK-Article-No.:  
Zeichnungs-Nr.: Z46600  
Drawing-No.:




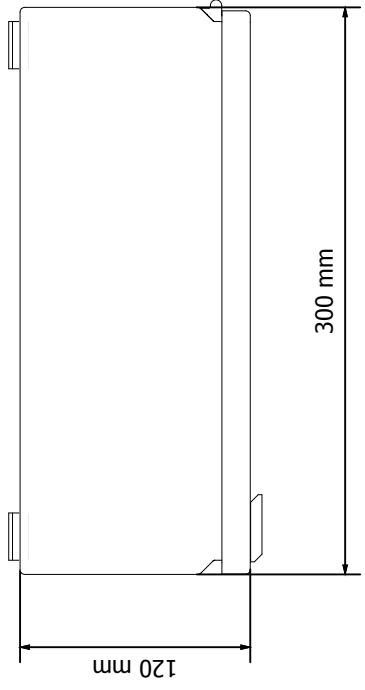
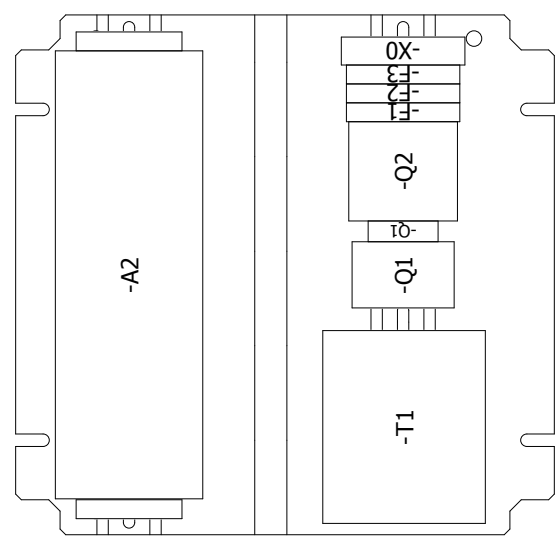
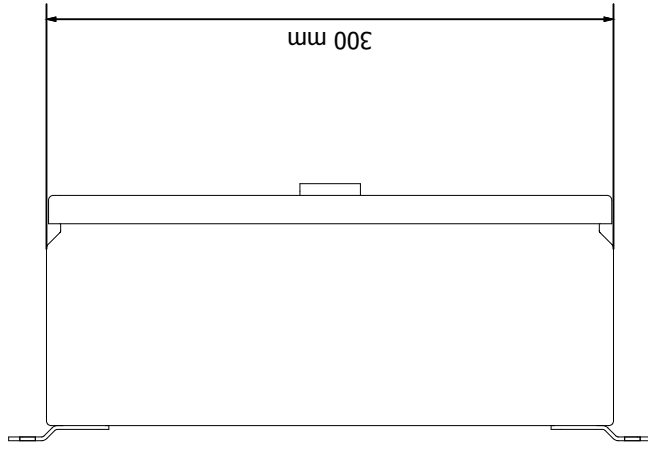
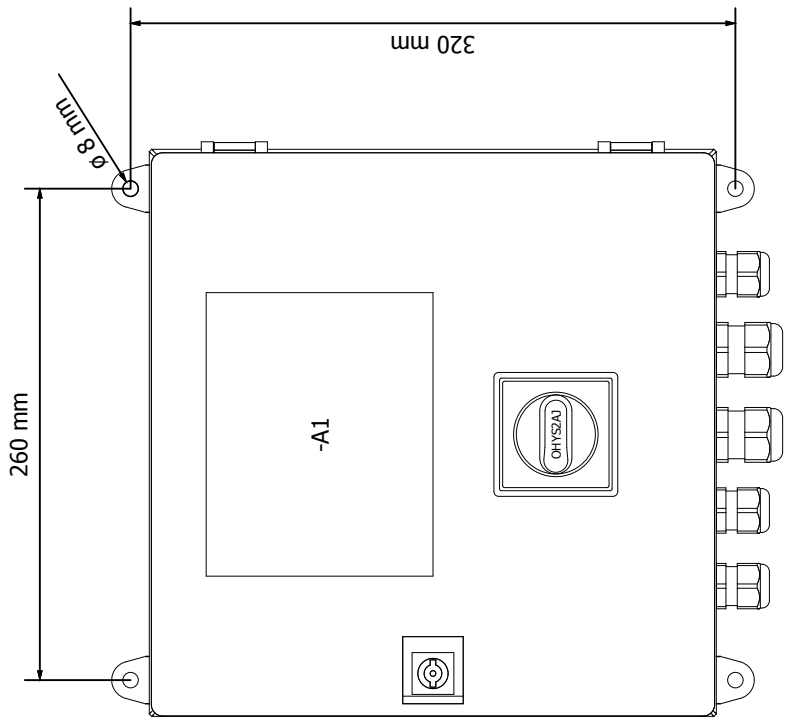
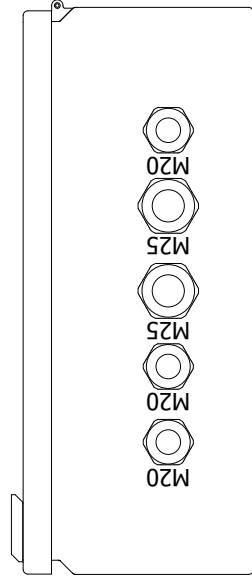
Getriebemotor  
Gear motor


Revision Modification	Bearbeiter Edited by	Datum Date	16.05.2019		Hersteller Manufacturer	Getriebemotor Gear motor	BK-Artikel-Nr.: BK-Article-No.: 4302300	=
			Bearbeiter Edited by	gruenwald				
					Boll & Kirch Filterbau GmbH	Filter type 6.18/6.19/6.44/aquaBoll 6.18.3		

-A1



Revision Modification	Bearbeiter Edited by	Datum Date	Datum Date	16.05.2019		Hersteller Manufacturer  Boll & Kirch Filterbau GmbH	Bedienfeld Control panel  Filtertyp 6.18/6.19/6.44/aquaBoll 6.18.3  Filter type 6.18/6.19/6.44/aquaBoll 6.18.3	BK-Artikel-Nr.: 4302300 BK-Article-No.:	= + Blatt Page von of



Revision Modification	Bearbeiter Edited by	Datum Date			Hersteller Manufacturer	Aufbauplan Assembling diagram Filtertyp 6.18/6.19/6.44/aquaBoll 6.18.3 Filter type 6.18/6.19/6.44/aquaBoll 6.18.3		BK-Artikel-Nr.: BK-Article-No.:	4302300	=
			16.05.2019	gruenwald	Boll & Kirch Filterbau GmbH		Zeichnungs-Nr.: Drawing-No.:	Z46600	+	Blatt Page von of


# Materialliste Part list

Nr. No.	BMK DT	Anzahl Quant.	Bezeichnung Designation	Hersteller Manufacturer	Typ Type	Beschreibung Description	BK-Artikel-Nr.: BK-Article-No.:
1	-A1	1	Display	BOLL & KIRCH	BK2300	2 zeiliges universelles Display 2 lined universal Display	4300706
2	-A1	1	Patchkabel Patch cable	Reco	SFTP	Doppelt geschirmt, 0,5m, RJ 45, cat 6, gerade - gewinkelt Double shielded, 0,5m, RJ 45, cat 6, straight - angled	4100308
3	-A2	1	E/A-Modul I/O-Modul	BOLL & KIRCH	BK2300	IN 20VAC, 6DI, 5 Relaisausgänge, 3 Ventilausgänge, Steuerung für BK2300 IN 20VAC, 6DI, 5 Relay outputs, 3 Valve outputs, Control for BK2300	4300706
4	-A2-F1	1	Schmelzsicherung Safety fuse	ESKA	522.516	0,8A, 5x20mm, Träge 0,8A, 5x20mm, Passive	4200162
5	-A2-F2	1	Schmelzsicherung Safety fuse	ESKA	522.520	2A, 5x20mm, Träge 2A, 5x20mm, Passive	4200163
6	-F1	1	Sicherungsklemme Fused terminal	Conta-Clip	SIK 10/Z BG	10 mm <sup>2</sup> , NS35, Beige, Schraubanschluss 10 mm <sup>2</sup> , NS35, Fawn, Screw terminal	4200526
7	-F1	1	Schmelzsicherung Safety fuse	ESKA	632.717	1A, 6,3x32mm, Träge 1A, 6,3x32mm, Passive	4200146
8	-F2	1	Sicherungsklemme Fused terminal	Conta-Clip	SIK 10/Z BG	10 mm <sup>2</sup> , NS35, Beige, Schraubanschluss 10 mm <sup>2</sup> , NS35, Fawn, Screw terminal	4200526
9	-F2	1	Schmelzsicherung Safety fuse	ESKA	632.717	1A, 6,3x32mm, Träge 1A, 6,3x32mm, Passive	4200146
10	-F3	1	Sicherungsklemme Fused terminal	Conta-Clip	SIK 10/Z BG	10 mm <sup>2</sup> , NS35, Beige, Schraubanschluss 10 mm <sup>2</sup> , NS35, Fawn, Screw terminal	4200526
11	-F3	1	Schmelzsicherung Safety fuse	ESKA	632.717	1A, 6,3x32mm, Träge 1A, 6,3x32mm, Passive	4200146
12	-Q1	1	Haupt-/Not-Aus-Schalter Main / Emergency stop switch	ABB	OT16F3	3 Polig, 16A, Bodenbefestigung 3 Core, 16A, Bottom mounting	4200149
13	-Q1	1	Hilfskontakt Auxiliary contact	ABB	OA1G10	INO, seitlich, für OT16...OT125 Hauptschalter, bis 16A INO, side mounting, for OT16...OT125 Main switch, to 16A	4200149
14	-Q1	1	Hauptschaltergriff Main switch handle	ABB	OHYS2AJ	für Hauptschalter OT16...125F, Rot/Gelb, IP65, NEMA 1 for Main switch OT16...125F, Red/Yellow, IP65, NEMA 1	4200149
15	-Q1	1	Hauptschalterwelle Main switch shaft	ABB	OXS6X95	für Hauptschalter OT16...125F, 95mm lang for Main switch OT16...125F, 95mm long	4200149
16	-Q2	1	Leistungsschutz Power contactor	ABB	BC6-30-10	4kW, 1NO, 24VDC, Schraubanschluss 4kW, 1NO, 24VDC, Screw connections	4200148
17	-T1	1	Steuertransformator Control transformer	MDEXX	TAM3496-0EJ00-0FA2	einphasig, 65VA, IN 220-550VAC, OUT 20VAC 220VAC 24VDC, 50/60Hz, IP00, Schraubanschluss single-phase, 65VA, IN 220-550VAC, OUT 20VAC 220VAC 24VDC, 50/60Hz, IP00, Screw terminal	4200524
18	-X0	2	Schutzleiterklemme Protective conductor terminal	Phoenix Contact	UT 2,5-QUATTRO-PE	4mm <sup>2</sup> , NS35, Grün/Gelb, Schraubanschluss 4mm <sup>2</sup> , NS35, Green/Yellow, Screw connections	4100073
19	-Z1	1	E-Box	Rittal	EB 1555.500	300 x 300 x 120mm, Stahl, RAL7035, 1 Türig, Bearbeitet 300 x 300 x 120mm, Steel, RAL7035, 1 Door, Edited	4306540
20	-Z1	4	Wandbefestigungshalter Wall mounting bracket	Rittal	KL 1590.000	Stahlblech verzinkt, Wandabstand 8 mm Carbon steel zinc-plated, Projection 8 mm	4507593

Page 121 of 138	Hersteller Manufacturer	Materialliste Part list	BK-Artikel-Nr.: BK-Article-No.:	=
	Boll & Kirch Filterbau GmbH	Filtertyp 6.18/6.19/6.44/aquaBoll 6.18.3 Filter type 6.18/6.19/6.44/aquaBoll 6.18.3	4302300	+
Revision Modification	Datum Date	Datum Date	Zeichnungs-Nr.: Drawing-No.:	Blatt Page
	Bearbeiter Edited by	Bearbeiter Edited by	Z46600	8
	Vorgang Process	Vorgang Process		von of
				13

# Materialliste Part list

Nr. No.	BMK DT	Anzahl Quant.	Bezeichnung Designation	Hersteller Manufacturer	Typ Type	Beschreibung Description	BK-Artikel-Nr.: BK-Article-No.:
21	-Z1	3	Kabelverschraubung Cable gland	WISKA	EMSKV 20-25 EMV-Z	M20, Messing, vernickelt, EMV-fest, Kabeldurchmesser 9-17mm M20, Brass, nickel-plated, EMC-proof, Cable diameter 9-17mm	4100097
22	-Z1	3	Gegenmutter Locknut	WISKA	EMMU 20	M20, Messing, vernickelt M20, Brass, nickel-plated	4100309
23	-Z1	2	Kabelverschraubung Cable gland	WISKA	EMSKV 25-32 EMV-Z	M25, Messing, vernickelt, EMV-fest, Kabeldurchmesser 13-21mm M25, Brass, nickel-plated, EMC-proof, Cable diameter 13-21mm	4100098
24	-Z1	2	Gegenmutter Locknut	WISKA	EMMU 25	M25, Messing, vernickelt M25, Brass, nickel-plated	4100310
25	-Z1	3	Reduzierdichteinsatz Reduced seal insert	WISKA	RDE 25	Kabeldurchmesser 7-12mm, für M25 Kabelverschraubung Cable diameter 7-12mm, for M25 Cable gland	3250001
26	-Z1	2	Reduzierdichteinsatz Reduced seal insert	WISKA	RDE 32	Kabeldurchmesser 9-14mm, für M32 Kabelverschraubung Cable diameter 9-14mm, for M32 Cable gland	3250002
27	-Z1	2	Endwinkel End angle	Conta-Clip	ZES 35/2 BG	Beige, für NS35 Tragschiene Fawn, for NS35 Mounting rail	4100311

Revision Modification	Bearbeiter Edited by	Datum Date			Hersteller Manufacturer	Materialliste Part list	BK-Artikel-Nr.: BK-Article-No.:	=
			16.05.2019	gruenwald	Boll & Kirch Filterbau GmbH	Filtertyp 6.18/6.19/6.44/aquaBoll 6.18.3 Filter type 6.18/6.19/6.44/aquaBoll 6.18.3	4302300	+
							Zeichnungs-Nr.: Drawing-No.:	Blatt Page
								von of
								9
								13









# PESCH-DAFRAM KUGELHAHN PESCH-DAFRAM BALL VALVE

SERIE VTD.X  
SERIE VTDE.X

TYP 16 TE.X/TL.X · TYP 40 TE.X/TL.X



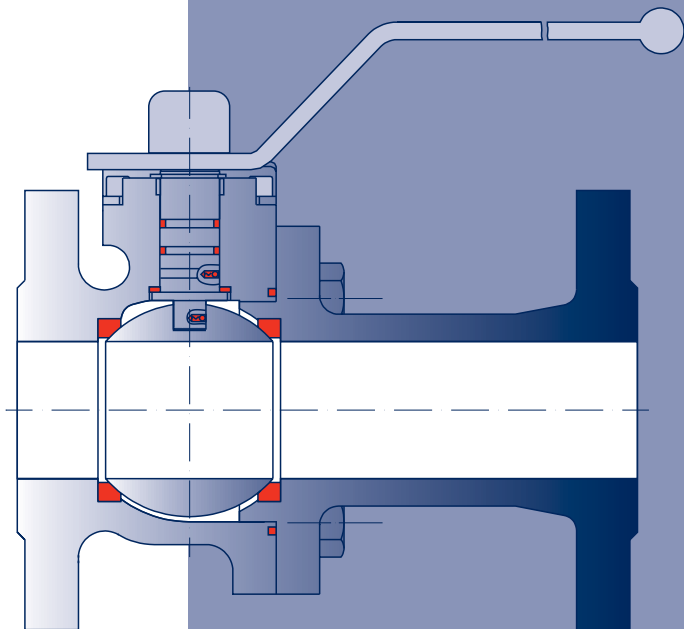
SERIES VTD.X  
SERIES VTDE.X

TYPE 16 TE.X/TL.X · TYPE 40 TE.X/TL.X

DIE **PESCH**GRUPPE



PESCH  
ARMATUREN



## PESCH - DAFRAM BALL VALVE

SERIES VTD.X/VTDE.X

TYPE 16 TE.X/TL.X · TYPE 40 TE.X/TL.X

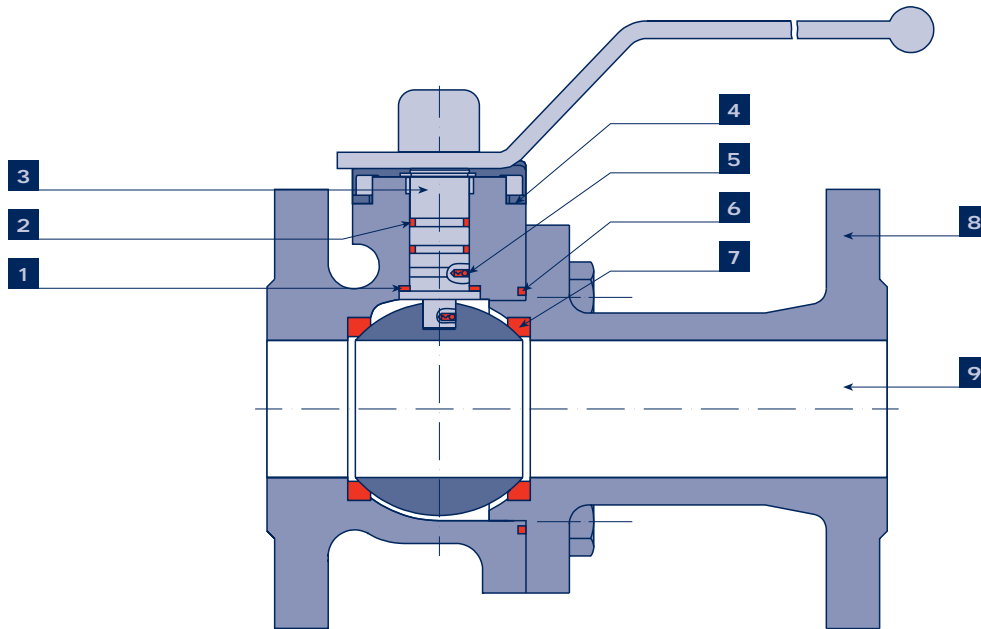
## PESCH - DAFRAM KUGELHAHN

SERIE VTD.X/VTDE.X

TYP 16 TE.X/TL.X · TYP 40 TE.X/TL.X

### CONSTRUCTION FEATURES

### KONSTRUKTIONSMERKMALE



**1** Double stem seal  
with PTFE/Grafoil rings and

**2** Safety seal with o-ring

**3** Blowout - proof stem

**4** Connection flange acc. to  
DIN ISO 5211 part 1 for automation

**5** Anti-static safety device

**6** PTFE body gasket, chambered

**7** PTFE/GF seat  
(other materials available)

**8** Two-piece body (split-body)  
face to face acc. to EN 558-1  
flanges dimensions acc. to EN1092-1

**9** Full bore acc. to DIN 3357 part 2,  
machined

**1** Doppelte Schaltwellenabdichtung  
mit PTFE/Grafoil Wellendichtringen und

**2** Runddichtring

**3** Ausblassichere Schaltwelle

**4** Aufbauflansch nach DIN ISO 5211 T.1  
für die Automatisierung

**5** Elektrostatische Ableitung

**6** Gehäusedichtung PTFE, gekammert

**7** Kugelsitzringe PTFE/GF  
(andere Qualitäten auf Anfrage)

**8** Zweiteiliges Gehäuse  
Baulängen nach EN 558-1,  
Flansche nach EN 1092-1

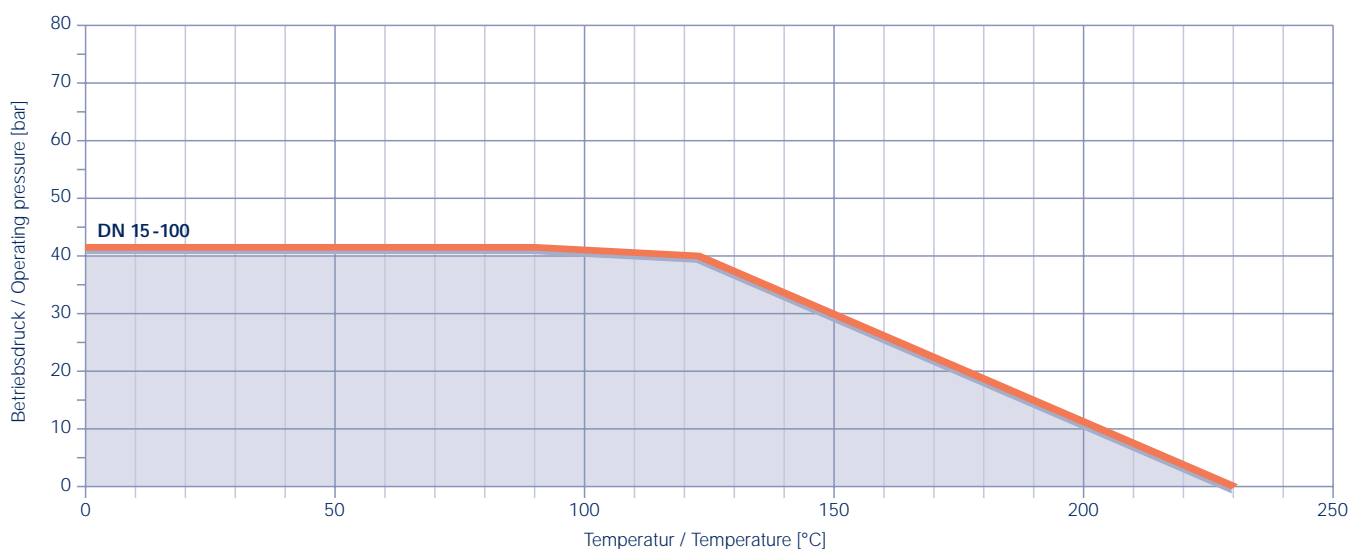
**9** Volldurchgang nach DIN 3357 Teil 2

**DRUCK-TEMPERATUR-DIAGRAMM**

**PRESSURE TEMPERATURE RANGE**

Die zulässigen Betriebsdrücke werden durch das Druck-Temperatur-Diagramm begrenzt.

The admissible operating pressure values are limited by the pressure-temperature diagram.



**DREHMOMENTE [Nm]**

**TORQUES [Nm]**

DN	$\Delta p$ (bar)	15	20	25	32	40	50	65	80	100
Losbrechmoment $M_{I_{OS}}$ Breakaway torque $M_{I_{OS}}$	0	6	9	12	15	21	35	50	85	125
Losbrechmoment $M_{I_{OS}}$ Breakaway torque $M_{I_{OS}}$	5	6,5	9,5	12,5	17	24	39	59	99	156
Zulässiges Drehmoment $M_{Zul}$ der Schaltwelle Admissible torque $M_{Zul}$ of stem		60	60	90	90	205	205	400	650	750

Die Losbrechmomente  $M_{I_{OS}}$  sind Durchschnittswerte laufender Messungen mit Luft oder Stickstoff.

Abweichungen sind bei anderen Dichtwerkstoffen und durch Einflussgrößen im Betriebszustand wie Druck, Temperatur, Viskosität des Mediums und Schalthäufigkeit möglich.

Deshalb empfehlen wir, die Automatisierung mit einem entsprechenden Sicherheitsfaktor vorzunehmen.

The breakaway torques  $M_{I_{OS}}$  are average values of continuous measurements carried out with air or nitrogen.

When using other sealing materials these values may vary depending on different operating factors such as pressure, temperature, medium viscosity and actuation frequency.

Therefore, we recommend to take into consideration a safety factor for actuation.

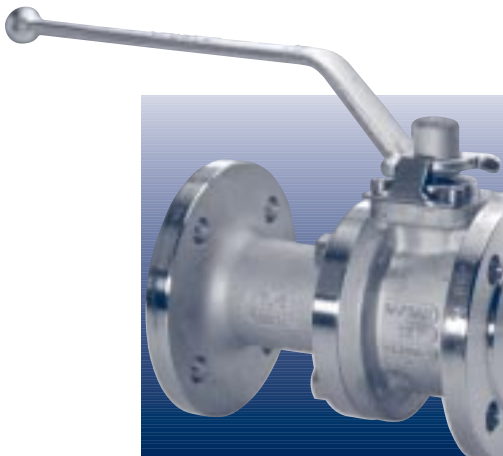
## PESCH-DAFRAM BALL VALVE

### SERIES VTD.X/VTDE.X

TYPE 16 TE.X/TL.X · TYPE 40 TE.X/TL.X

#### TECHNICAL DATA

Diameters:	DN 15 up to DN 100
Pressure rate:	PN 10 up to PN 40 Other sizes on request
Face to face:	acc. to EN 558-1 FTF 1 (DIN 3202 F1) FTF 27 (DIN 3202 F4/F5)
Connection:	Flanges dimensions acc. to DIN 2501 (EN 1092-1) PN 16 DIN 2543 PN 25 DIN 2544 PN 40 DIN 2545
Seal surface:	EN1092-1 B1 (DIN 2526, form C )
Temperature range:	acc. to pressure-temperature range
Leakage rate:	acc. to DIN 3230 part 3 BO1
Vacuum:	up to $10^{-3}$ bar standard
Marking:	Pressure Equipment Directive (PED)
Material body:	Series VTDE.X – Stainless steel – 1.4408 – pickled  Series VTD.X – Carbon steel – C22.8/GP240GH – primed
Inner parts:	acc. to the list of parts



#### CONSTRUCTION FEATURES

- Floating ball
- Two-piece body (split-body)
- Full bore acc. to DIN 3357 part 2, machined
- Bi-directional flow
- Anti-static safety device
- All parts in contact with the medium are free from non-ferrous metal
- Connection flange acc. to DIN ISO 5211 part 1

#### OPTIONS

- Special material  
e.g. Hastelloy
- Seats  
e.g. pure PTFE
- Steam type
- Relief bore in the ball
- Ball valve for vacuum up to  $10^{-4}$  bar
- metal/metal seated ball valve

#### INSPECTION-QUALITY ASSURANCE

- Production and testing acc. to Pressure Equipment Directive 97/23/EG AD2000 rules
- Certified acc. to Module H by Bureau Veritas
- Certification acc. to EN 10204
- Quality management system acc. to ISO 9001

#### ACCESSORIES

- Heating jacket
- Stem extension
- Position indicator
- Gear
- Hand lever – lockable
- Hand lever – with spring return
- Pneumatic actuators  
Please ask for our brochure on AMG Rack-and-Pinion actuators.
- Electrical drives
- Special designs according to customer's specifications

## KONSTRUKTIONSMERKMALE

- Schwimmend gelagerte Kugel
- Zweiteiliges Gehäuse
- Volldurchgang nach DIN 3357 Teil 2
- Durchflussrichtung beliebig
- Elektrostatische Ableitung
- Alle medienberührten Teile sind buntmetallfrei
- Aufbauflansch nach DIN ISO 5211 Teil 1

## OPTIONEN

- Sonderwerkstoffe  
z.B. Hastelloy
- Kugelsitzringe  
z.B. PTFE rw
- Dampf-Ausführung
- Entlastungsbohrung in der Kugel
- Kugelhähne für Vakuum bis  $10^{-4}$  bar
- Metallische Dichtsysteme

## ABNAHMEN - QUALITÄTSSICHERUNG

- Herstellung und Prüfung nach Druckgeräterichtlinie 97/23/EG AD2000 Regelwerk
- Zertifiziert nach Modul H durch Bureau Veritas
- Bescheinigungen nach EN 10204
- Qualitätsmanagementsystem nach ISO 9001 zertifiziert

## ZUBEHÖR

- Heizmantel
- Schaltwellenverlängerung
- Stellungsrückmeldung
- Getriebe
- Handhebel – abschließbar
- Handhebel – Totmannschaltung
- Pneumatische Antriebe  
Bitte fordern Sie unseren Prospekt über AMG Schwenkantriebe an.
- Elektrische Antriebe
- Sonderkonstruktionen nach Kundenspezifikation

## TECHNISCHE DATEN

Nennweiten:	DN 15 bis DN 100
Druckstufen:	PN 10 bis PN 40 Weitere Nennweiten auf Anfrage
Baulänge:	nach EN 558-1 FTF 1 (DIN 3202 F1) FTF 27 (DIN 3202 F4/F5)
Anschluss:	Flansche nach DIN 2501 (EN 1092-1) PN 16 DIN 2543 PN 25 DIN 2544 PN 40 DIN 2545
Dichtfläche:	EN 1092-1 B1 (DIN 2526, Form C)
Temperaturbereich:	siehe Druck-Temperatur-Diagramm
Leckrate:	nach DIN 3230 Teil 3 BO1
Vakuum:	Standard bis $10^{-3}$ bar
Kennzeichnung:	Druckgeräterichtlinie (PED)
Gehäusewerkstoff:	VTDE.X – Edelstahl – 1.4408 – gebeizt  VTD.X – Stahl – C22.8/GP240GH – grundiert
Innenteile:	siehe Stückliste

**PESCH - DAFRAM BALL VALVE**

SERIES VTD.X/VTDE.X

TYPE 16 TE.X/TL.X · TYPE 40 TE.X/TL.X

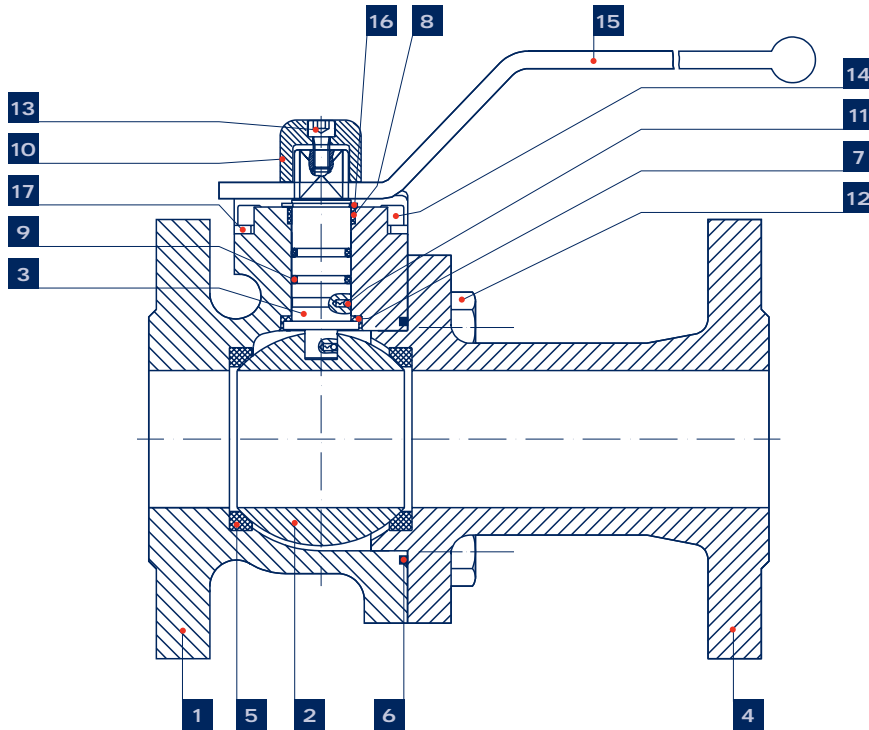
**PESCH - DAFRAM KUGELHAHN**

SERIE VTD.X/VTDE.X

TYP 16 TE.X/TL.X · TYP 40 TE.X/TL.X

**LIST OF PARTS AND MATERIALS**

**STÜCKLISTE UND WERKSTOFFE**



Position Item	Anzahl Piece	Benennung	Designation	Werkstoffe Materials of constructions	
				VDT.X	VDTE.X
1	1	Gehäuse	valve body	C22.8/GP240GH <sup>1</sup>	1.4408
2	1	Kugel	ball	1.4401/1.4408	1.4401/1.4408
3	1	Schaltwelle	stem	1.4571	1.4571
4	1	Seitenflansch	valve body	C22.8/GP240GH <sup>1</sup>	1.4408
5	2	Kugelsitzring	seat	PTFE/GF	PTFE/GF
6	1	Gehäusedichtung	body gasket	PTFE	PTFE
7	1	Führungsbuchse unten	lower stem bush	PTFE/GF	PTFE/GF
8	1	Führungsbuchse oben	upper stem bush	PTFE/GF	PTFE/GF
9	2	O-Ring	o-ring	VITON	VITON
10	1	Befestigungskappe	stem cap	Stahl verzinkt steel galvanized	Stahl verzinkt steel galvanized
11	2	Antistatik	antistatic device	1.4310/1.4401	1.4310/1.4401
12	4-12	Gehäuseschrauben	bolts	A4/70	A4/70
13	1	Befestigungsschraube	cap screw	A4/70	A4/70
14	2	Anschlagschraube	stop screw	A4/70	A4/70
15	1	Handhebel	wrench	Stahl verzinkt steel galvanized	Stahl verzinkt steel galvanized
16	1	Sicherungsring	Seeger ring	Edelstahl	stainless steel
17	1	Anschlagwinkel	stop	1.4401	1.4401

Andere Werkstoffe auf Anfrage

other materials on request

<sup>1</sup> GP240GH nach EN 10213-2.1 ersetzt GS-C25

<sup>1</sup> GP240GH acc. to EN 10213-2.1 replaced GS-C25

**PESCH - DAFRAM KUGELHAHN**

SERIE VTD.X/VTDE.X

TYP 16 TE.X/TL.X · TYP 40 TE.X/TL.X

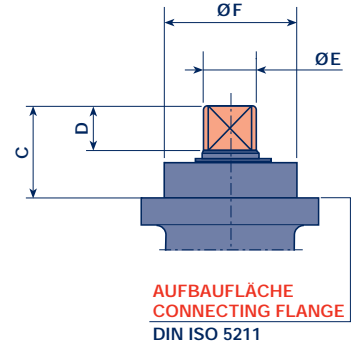
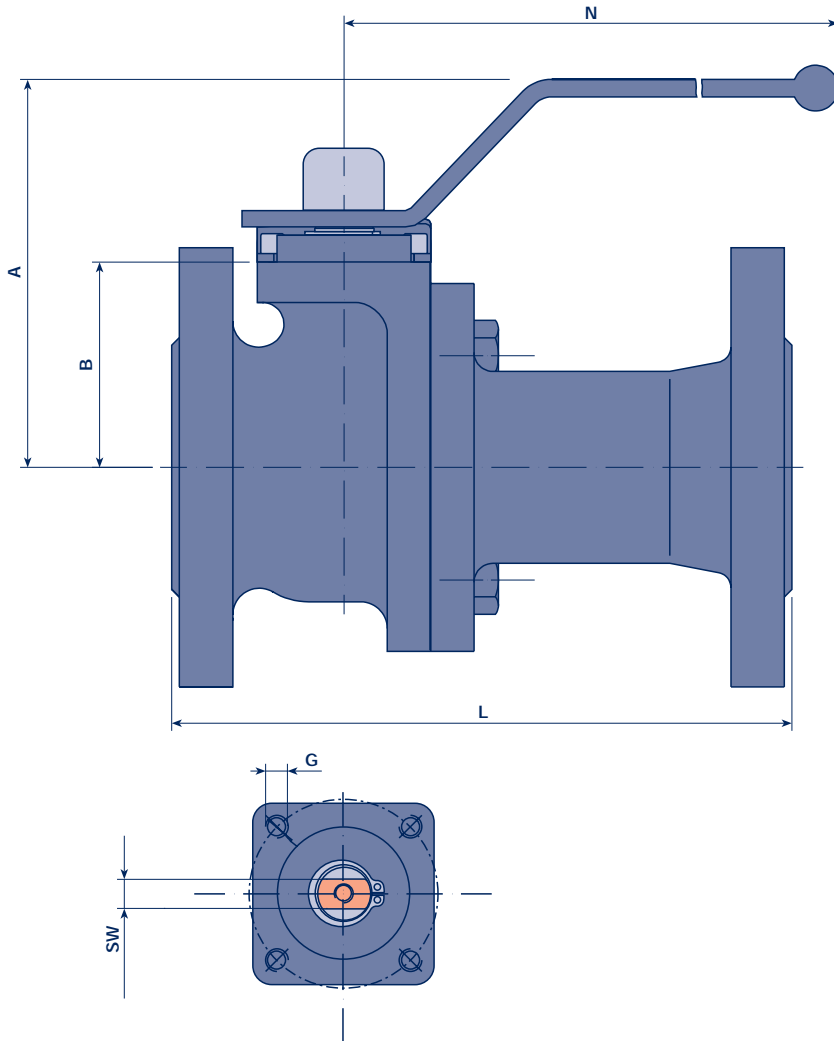
**PESCH - DAFRAM BALL VALVE**

SERIES VTD.X/VTDE.X

TYPE 16 TE.X/TL.X · TYPE 40 TE.X/TL.X

**BAU- UND ANSCHLUSSMASSE**

**DIMENSIONS AND CONNECTIONS**



**BAULÄNGEN**  
**LENGHT**

- FTF 1 EN 558-1
- FTF 27 EN 558-1

**ANSCHLUSSMASSE**  
**DIMENSIONS**

Flansche: DIN 2501 (EN 1092-1)  
Flanges: DIN 2501 (EN 1092-1)

- PN 16 DIN 2543
- PN 25 DIN 2544
- PN 40 DIN 2545

Form der Dichtfläche:  
Seal surface:  
EN 1092-1 B1

DN	Baulänge length		A	B	C	D	Ø E d10	Ø F f8	G	DIN ISO 5211	N	SW -0,1	Gewicht weight [kg]					
	L												VTD.X		VTDE.X			
	FTF 1	FTF 27											FTF 1	FTF 27	FTF 1	FTF 27		
15	130	—	115,5	—	31	—	19	10	12	35	M6	F05	158	8	3,5	—	3	—
20	150	—	115,5	—	41	—	24,5	12	12	35	M6	F05	158	8	6	—	4,5	—
25	160	125	129,5	129,5	46	46	24,5	12	14	35	M6	F05	260	8	7	6,5	5,5	5
32	180	—	132	—	48,5	—	24,5	12	14	35	M6	F05	260	8	9,5	—	8	—
40	200	140	157	157	69	69	31	18	20	55	M8	F07	332	12	15,5	9	10	9,5
50	230	150	164	164	76	76	31	18	20	55	M8	F07	332	12	19,5	12,5	14,5	13,5
65	290	170	184	184	94	94	40	25	29	55	M8	F07	332	16	21,5	18	18,5	17,5
80	310	180	214,5	214,5	110	110	41,5	25	29	70	M10	F10	400	20	32,5	33	30	26
100	350	190	229,5	229,5	125	125	41,5	25	29	70	M10	F10	400	20	39	39	39,5	34,5

[mm]

DIE **PESCH**GRUPPE



PESCH  
ARMATUREN

## DIE PESCH GRUPPE

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### DIE PESCH GRUPPE

#### IM NETZ - IN THE WEB

[www.peschgruppe.de](http://www.peschgruppe.de)

**Boll Filter Corporation 24 Month Warranty Certificate**  
**Beneficiary: Cherry Point**  
**Start Date: Installation Date.**

**General Terms and Conditions of Delivery and Service of Boll & Kirch Filterbau GmbH**

**1 General**

**1.1** These general terms and conditions of delivery and service apply for all contracts that involve the ordering of goods and services by the contract partner (hereinafter referred to as the "customer") from Boll & Kirch Filterbau GmbH (hereinafter referred to as "Boll & Kirch").

**1.2** These general terms and conditions of delivery and service apply for all future contracts with the customer, even if the general terms and conditions of delivery and service are not agreed separately again.

**1.3** Conflicting, differing or supplementary terms and conditions of the customer are not recognised by Boll & Kirch, unless Boll & Kirch has expressly recognised them in writing in a given case in place of these general terms and conditions of delivery and service with the signature of one of the managing directors who are authorised to do this.

**1.4** The general terms and conditions of delivery and service of Boll & Kirch also apply if Boll & Kirch provides its services without reservation in the knowledge of conflicting or differing contract terms and conditions of the customer.

**1.5** Unless otherwise expressly stated in these general terms and conditions of delivery and service, all declarations and notifications made in the course of the contractual and business relationship with the customer need to be made in writing (including by fax) or electronic form.

**1.6** These general terms and conditions of delivery and service constitute conclusively together with the respective contract (i.e. the order and/or order confirmation) the agreements of the parties in relation to the respective object of the contract. No additional verbal agreements have been made.

**1.7** Amendments and additions to these general terms and conditions of delivery and service and the contracts, additional agreements, declarations and any other agreements need to be made in writing in order to be effective. This also applies for any amendment of this clause requiring the written form.

**2 Conclusion of contract**

**2.1** Unless otherwise is expressly stated in writing, Boll & Kirch's offers are non-binding and without obligation, this applies in particular for any prices and times stated in the offers.

**2.2** An order placed by the customer (order) is a binding offer to enter into a contract with Boll & Kirch. Unless otherwise is stated in the order, Boll & Kirch has the right to accept this offer to enter into a contract within fourteen (14) days of its receipt.

**2.3** The order will be confirmed to the customer by Boll & Kirch in writing (including by fax or in electronic form). The customer has to check the order confirmation carefully. Boll & Kirch has to be notified immediately of any deviations from the order.

**2.4** The details concerning the services will be specified in the respective order confirmations.

**2.5** Cost estimates and information provided by Boll & Kirch concerning the scope, nature and duration of the services to be performed and the expected costs are non-binding and can only be approximate. They do not constitute an undertaking. They can only become a binding part of the contract if Boll & Kirch provides such cost estimates and information in writing without any reservation. Detailed cost estimates are only provided at the express wish of the customer. There will be a charge for this.

**3 Duties of cooperation of the customer**

**3.1** The customer has to inform Boll & Kirch of any circumstances that are relevant for the performance of the services that are the object of the contract. Unless otherwise is expressly agreed in writing, Boll & Kirch is under no obligation to check data, information or any other performance provided by the customer for completeness and accuracy.

**3.2** If cooperative acts need to be performed by the customer in order for Boll & Kirch to provide its services, it has to perform these at its own cost. Unless otherwise is expressly agreed in writing, Boll & Kirch will not refund any costs to the customer.

**3.3** If the customer needs to provide equipment and/or components in order for Boll & Kirch to provide its services, the customer will make these available to Boll & Kirch in good time at its own cost. Unless otherwise is expressly agreed in writing, Boll & Kirch will not refund the costs of supplying the equipment and/or components to the customer.

**3.4** If the customer fails to meet its duties of cooperation or fails to meet them in good time or properly, Boll & Kirch will be released from its own obligation to perform. Boll & Kirch will also have the right to charge the customer for the additional cost incurred as a result. The right to make further claims is expressly reserved.

**3.5** If Boll & Kirch carries out work on the premises of the customer, the customer will have a duty to implement all of the measures required in order to maintain safety, unless the nature of the business or an agreement with the customer requires otherwise. So long as the customer has not taken the necessary measures, Boll & Kirch will be released from its duty to provide the service.

**3.6** If Boll & Kirch provides services or goods on behalf of the customer, the customer must, at the request of Boll & Kirch, perform the cooperative acts required for export and import at its own cost.

**3.7** The customer must, upon written request by Boll & Kirch, issue a confirmation of arrival and send this to Boll & Kirch.

**3.8** Further duties of cooperation may be stated in the respective order confirmations.

**4 Performance time**

**4.1** The performance time will be stated in the respective order confirmation. If the service is to be performed within a period of time allowed for performance, the period of time will be calculated from the date of the order confirmation by Boll & Kirch or from the start of the period stated in the order confirmation, but not before all of the cooperative acts to be performed by the customer have been performed in full, the receipt of an agreed instalment or advance payment or before an agreed letter of credit has been opened.

**4.2** Performance times are only binding if it has been expressly confirmed in writing, by fax or in electronic form that they are binding by the contact designated by Boll & Kirch.

**4.3** If a binding performance time cannot be met for reasons for which Boll & Kirch is responsible, the customer may grant Boll & Kirch a reasonable extended deadline in order to perform the service, stating that it will reject the performance after the extended deadline has passed. The extended deadline set by the customer must not be less than four (4) weeks.

**5 Delivery of goods**

**5.1** Unless otherwise agreed in writing, all deliveries by Boll & Kirch are EXW (Incoterms 2010) Boll & Kirch. Unless otherwise agreed in writing, the place of fulfillment for all obligations arising from these general terms and conditions of delivery and service is the registered office of Boll & Kirch.

**5.2** Boll & Kirch has the right to make partial deliveries and deliveries are also subject to Boll & Kirch itself being supplied in good time and correctly.

**5.3** The goods will be packed in accordance with commercial practice as Boll & Kirch chooses taking into account the mode of transport (transport by sea, air or land). The cost of packaging will be borne by the customer.

**5.4** Deliveries and where applicable the return transport of items provided by the customer will be made at the cost and risk of the customer. The return transport of items provided by the customer will only be made at the customer's express request in writing.

**5.5** The customer has to check the goods delivered and services performed by Boll & Kirch immediately upon their delivery or performance if this is possible in the ordinary course of business. It has to notify Boll & Kirch in writing of any noticeable defects immediately, and within no more than five (5) working days of delivery and or performance. The customer has to notify Boll & Kirch in writing of any defects that are not noticeable and are discovered at a later date immediately, and within no more than five (5) working days of their discovery. The customer has to describe the respective defects in as much detail as possible. If the customer fails to notify the defects, the goods or service performed will be considered to be approved in respect of the defect concerned.

**5.6** If the goods are delivered by a carrier contracted by Boll & Kirch, the customer has to notify any damage and/or losses in transit and late deliveries as described below:

**5.6.1** The customer has to inspect the goods upon delivery for any externally identifiable damage and/or losses in transit and notify the carrier in writing of any damage and/or losses at the time of delivery.

**5.6.2** The customer has to notify the carrier of any damage and/or losses in transit that are not externally identifiable immediately at the time of delivery, and within no more than 5 working days of discovery of the damage in transit.

**5.6.3** The customer has to describe the damage in detail and send immediately a copy of the notification to Boll & Kirch.

**5.6.4** The customer has to notify Boll & Kirch immediately in writing of any late deliveries.

**5.7** If the customer fails to notify in good time as per 5.6, it will be assumed that the goods have been delivered in a condition as required under the contract.

**5.8** Unless otherwise has been expressly agreed in writing and if permitted by law, the packaging material will become the property of the customer upon receipt of the goods. This concerns in particular outer packaging, transport and product packaging.

## **6 Prices**

**6.1** The prices for the services to be provided and goods to be supplied by Boll & Kirch are stated in the respective order confirmation.

**6.2** If no price is stated in the order confirmation, the services to be performed by Boll & Kirch will be provided based on the standard pricelist as amended.

**6.3** Unless otherwise is expressly agreed, the customer will be charged transit time (including waiting time) and travel costs separately. Travel costs include in particular, but not only, the actual transport and accommodation costs and the statutory meal allowances.

**6.4** Unless otherwise is agreed in writing or stated in these general terms and conditions of delivery and service, all prices are net in euros and do not include shipping or packaging costs.

## **7 Payment terms**

**7.1** Unless otherwise expressly agreed in writing, the invoice shall be paid immediately. Payment has to be made within thirty (30) calendar days of the invoice date unless otherwise agreed in writing. If applicable, the customer must pay the applicable statutory VAT. Any other taxes or duties, such as source tax or import duties that Boll & Kirch is charged in relation to the services or goods will be borne by the customer. If any claims are made against Boll & Kirch for such taxes and duties, the customer will indemnify Boll & Kirch against these claims.

**7.2** Regardless of the means of payment used, the payment will not be considered to have been made until the full amount has been irrevocably credited to Boll & Kirch's account.

**7.3** If the customer defaults on its payment, Boll & Kirch has the right to claim interest in the amount of eight (8) percentage points above the applicable base rate of the Deutsche Bundesbank from the customer.

**7.4** If the customer falls into arrears by more than three (3) months with its outstanding payments, Boll & Kirch may notify the customer in writing of its termination of the contract without notice and/or withdrawal from the contract. Boll & Kirch's right to make further claims remains unaffected.

**7.5** If, after the conclusion of a contract, reasonable doubts emerge concerning the customer's ability to perform its obligations, in particular its ability to pay or its creditworthiness, and if the customer, despite having received a corresponding request in writing, is not willing to pay in advance or provide a suitable security, Boll & Kirch will have the right, after a reasonable extended deadline has passed without success, to terminate the respective contract without notice and/or withdraw from the contract.

## **8 Retention of title**

**8.1** The delivered goods will remain the property of Boll & Kirch until all receivables from the business relationship have been paid in full.

**8.2** If the goods are processed, combined or mixed with other goods, Boll & Kirch will acquire joint ownership of the new item in proportion to the invoice value of the goods provided by Boll & Kirch to these other goods at the time of the processing, combining or mixing. The goods will always be processed or combined by the customer on behalf of Boll & Kirch. For joint ownership, 8.1 above applies accordingly.

**8.3** The customer may only dispose of, and in particular sell, assign as security or pledge the goods that are subject to retention of title with Boll & Kirch's prior consent in writing.

**8.4** If the value of the securities to which Boll & Kirch is entitled exceeds the outstanding receivables to be secured by more than 20%, Boll & Kirch will be obliged to release securities to this extent as it chooses. The value will be based on the net invoice value that Boll & Kirch has charged the customer.

**8.5** In the event of default of payment, the risk of cessation of payment, unsatisfactory information about the solvency and/or financial position of the customer, or if the customer is the subject of seizure by way of execution or protests against bills of exchange or an application is made to open insolvency proceedings for the customer's assets, Boll & Kirch will have the

right to terminate the contract or withdraw from the contract and take possession of the goods that are subject to retention of title without further ado. The customer will be obliged to hand over the goods.

**8.6** If Boll & Kirch's ownership rights are impaired by a third party, in particular by way of confiscation or seizure of the goods that are subject to retention of title, the customer has to inform Boll & Kirch immediately sending the documents in its possession (e.g. pledge document) and advise the third party of Boll & Kirch's ownership rights. The customer has to bear all of the costs that are necessary to remove the impairment of Boll & Kirch's rights.

**8.7** The customer has to store with care, keep in good condition and repair the goods that are subject to retention of title and insure them against deterioration, destruction and loss with the due diligence of a prudent businessman. The customer herewith assigns any insurance claims or other claims for compensation due to deterioration, destruction or loss to Boll & Kirch. Boll & Kirch accepts this assignment.

**8.8** The customer will inform Boll & Kirch immediately in writing of any changes to the set-up site or installation site of the goods that are subject to retention of title.

## **9 Acceptance**

**9.1** If acceptance is required by law or has been expressly agreed in writing, the customer has to declare its acceptance or rejection within fourteen (14) calendar days of completion of the work by Boll & Kirch.

**9.2** The customer does not have the right to reject due to minor defects.

**9.3** If the customer declares its rejection, it has to inform Boll & Kirch of the reasons for this in writing and, so far as possible, state the changes required for acceptance. If a defect actually exists, Boll & Kirch will make the changes required under the contract within thirty (30) calendar days of receipt of the customer's declaration in writing.

**9.4** If the customer again declares its rejection, the procedure as described in 9.1 is to be followed again.

**9.5** If the customer again refuses to accept the goods after the second rework, the customer may declare its acceptance under protest with a reduction in the price to be charged by Boll & Kirch. This acceptance under protest will be considered to be acceptance as defined by § 640 of the German Civil Code (BGB). Boll & Kirch may refuse a request by the customer for a further rework.

**9.6** Declarations of acceptance have to be made in writing. Rejections have to be made in writing with the reasons stated in writing.

**9.7** If partial acceptance has been agreed in writing, the above provisions apply accordingly for the respective partial acceptance.

**9.8** Boll & Kirch's performance will be considered to have been accepted, even if the customer has not expressly declared its acceptance and if Boll & Kirch has not requested acceptance,

**9.8.1** if the customer uses the work performed, or

**9.8.2** with payment, unless the customer has justifiably rejected the work performed, or

**9.8.3** if the customer neither accepts nor rejects the work performed by the deadline stated in 9.1.

## **10 Liability for defects**

**10.1** The quality, nature and scope of the goods and services are defined exclusively and conclusively in the respective order confirmation or any product description attached to the order confirmation. The information included in the respective order confirmation and/or in the product description does not constitute any guarantee.

**10.2** Boll & Kirch provides no guarantee for quality, durability or any other guarantee, unless Boll & Kirch has made a written commitment referred to as a guarantee in a given case.

**10.3** When an order for goods is placed, Boll & Kirch does not guarantee that the delivered goods are suitable for the purpose intended by the customer, unless the purpose is expressly stated in writing in the respective order confirmation.

**10.4** In the event of a slight reduction in the value and/or suitability of the goods or service, the customer will not have the right to make a claim for liability for defects.

**10.5** In the event of any defects that are attributable to external influences, operator error or changes, additions, installations, extensions, attempted repairs or any other manipulations not made by Boll & Kirch and also not approved by Boll & Kirch, the customer will not have the right to make a claim for liability for defects.

**10.6** If a justified defect is notified in good time, Boll & Kirch will either rectify the defect or deliver a defect-free item, as it chooses. Boll & Kirch is entitled to at least three attempts at supplementary performance.

**10.7** For the rest, the customer is entitled to its statutory rights subject to 10.8 below.

**10.8** For claims for compensation, the general limitations of liability defined under no. 11 apply.

**10.9** The liability for defects expires 18 months after delivery or, where relevant, after acceptance. If Boll & Kirch is liable for damages defined in 11.7 of the general liability provisions, the statutory limitation periods will apply.

**10.10** The customer has to provide Boll & Kirch with the necessary support free of charge in the course of the work to rectify the defects.

## **11 Liability**

**11.1** Subject to the provisions in 11.2 - 11.8 below, Boll & Kirch will only be liable, regardless of the legal grounds, for damage and/or costs due to the willful intent or gross negligence of Boll & Kirch, its legal representatives or executives.

**11.2** For damages and costs due to the gross negligence of other vicarious agents, Boll & Kirch's liability will be limited to the damage and costs that can be typically expected in the respective contract.

**11.3** For damages and costs caused by Boll & Kirch, its legal representatives, executives or any other vicarious agents without willful intent or gross negligence, Boll & Kirch will only be liable in the event of the culpable breach of an obligation that is of particular importance for the achievement of the purpose of the contract (cardinal obligation). In the event of a breach of a cardinal obligation, the limitation of liability of 11.2 of these liability provisions apply.

**11.4** Liability for loss of data will be limited to the typical cost of recovery that would also have been incurred if the data were backed up regularly and in a manner appropriate for the level of risk.

**11.5** Maximum liability limits may be defined in the respective offer by Boll & Kirch.

**11.6** Any liability of Boll & Kirch for damages due to injury to life, limb or health, the assumption of a guarantee or a procurement risk and under the German Product Liability Act (Produkthaftungsgesetz) remains unaffected.

**11.7** In the event of the willful intent or gross negligence of Boll & Kirch, its legal representatives or executives and in the event of the willful intent of other vicarious agents and in the event of damages due to injury to life, limb or health, the statutory limitation periods will apply in place of the limitation period for liability for defects stated in 10.9.

**11.8** If Boll & Kirch's liability is excluded or limited under the above 11.1 - 11.7, this also applies for Boll & Kirch's staff in the event of the customer making a claim directly against Boll & Kirch's staff.

**11.9** The customer has to notify Boll & Kirch immediately in writing if there is the threat of a product liability claim by a third party or if a product liability claim is made by a third party that concerns or might concern work to which Boll & Kirch has contributed. The customer will give Boll & Kirch the opportunity to make a statement in writing by a reasonable deadline before taking further measures such as in particular product recalls or replacement actions.

#### **12 Force majeure**

**12.1** If Boll & Kirch is temporarily prevented from providing its service due to force majeure and as a result agreed performance times cannot be met, Boll & Kirch will have the right to catch up on its performance at a later date. The agreed performance time will be extended appropriately as a result of the force majeure. In this respect the customer does not have the right to make any claims for non-performance or late performance. Boll & Kirch will inform the customer immediately should force majeure occur. In particular the following events are considered to be force majeure: war, disasters, pandemics, epidemics and/or plagues, sabotage, riot, strike and lock-outs in the company's own plants, distribution facilities, suppliers or transport carriers and intervention by public authorities, regardless of whether this intervention is in the territory of the Federal Republic of Germany or territories from which and/or through which Boll & Kirch itself is supplied.

**12.2** If one of the events listed in 12.1 occurs before or after the contract is concluded, it will only entitle Boll & Kirch to suspend the performance of its contractual obligations in this respect if its effects on the performance of the contract could not be foreseen at the time of the contract was concluded.

**12.3** If the force majeure event lasts continuously for longer than six (6) months, each party will have the right to withdraw from the respective service specification by informing the other party in writing.

#### **13 Granting of rights**

**13.1** If this is necessary for the agreed use of the work performed by Boll & Kirch, and unless otherwise is expressly agreed in writing, Boll & Kirch grants the customer a non-exclusive and non-transferrable right to use the work protected by copyright after payment has been made by the customer to the extent that this is necessary for the agreed use of the work performed by Boll & Kirch.

**13.2** The passing on and use of Boll & Kirch's work for purposes other than those specified in the contract, in particular its publication, is only allowed with Boll & Kirch's prior consent in writing.

#### **14 Confidentiality**

**14.1** The parties agree to maintain strict confidentiality concerning any information that they obtain in writing, verbally or in any other form in connection with these general terms and conditions of delivery and service and the contracts of Boll & Kirch, in particular, but not limited to, technical documents, documents, drafts, plans, data, know-how and any other form of business secret.

**14.2** The parties will use this information exclusively for the purpose of meeting the obligations under these general terms and conditions of delivery and service and the contracts. The parties will also suitably place their staff and other persons who are involved in the meeting of these obligations under obligation to maintain confidentiality.

**14.3** The obligation to maintain confidentiality will no longer apply if the party under obligation to maintain confidentiality proves that

**14.3.1** it knew a particular piece of information before the cooperation began,

**14.3.2** it obtained his information from another third party entitled to use the information,

**14.3.3** the information was generally available, and the party under obligations to maintain confidentiality was not responsible for this generally availability,

**14.3.4** it has developed the information itself independent from the current cooperation,

**14.3.5** or it was obliged to disclose the information due to an official order or legal requirement.

**14.4** The obligation to maintain confidentiality will continue indefinitely after the contract has come to an end. The parties will be liable for all losses incurred by the other party due to a breach of one of these obligations.

#### **15 Miscellaneous**

**15.1** The customer does not have the right to offset claims against Boll & Kirch. This does not apply for claims against Boll & Kirch that are undisputed, established in law or have been recognised by Boll & Kirch.

**15.2** Rights of retention or other rights to refuse performance can only be asserted against Boll & Kirch if they are based on claims by the customer relating to the respective contract under which Boll & Kirch is claiming payment from the customer.

**15.3** The assignment and/or transfer of rights and/or obligations under these general terms and conditions of delivery and service and the contracts by the customer requires Boll & Kirch's prior consent in writing.

**15.4** Boll & Kirch will decide as it sees fit on the deployment and exchange of its own staff in the course of the performance of its obligations under the terms and conditions of delivery and service below. If performance takes place at the customer, Boll & Kirch will remain the sole party authorised to issue instructions to the staff it deploys. Boll & Kirch's staff will not be integrated into the customer's operations.

**15.5** German law applies exclusively to these general terms and conditions of delivery and service, to all contracts and to all disputes arising from and/or relating to these general terms and conditions of delivery and service and the contracts, including their formation, to the exclusion of the provisions of the United Nations Convention on Contracts for the International Sale of Goods (CISG) of 11.04.1980.

**15.6** The sole place of jurisdiction for all disputes arising from and/or relating to these general terms and conditions of delivery and service and the contracts, including their formation, and for all types of legal action is the location Boll & Kirch's registered office. Boll & Kirch also has the right to bring an action against the customer at its general place of jurisdiction.

**15.7** Boll & Kirch reserves the right to make amendments or additions to these general terms and conditions of delivery and service from time to time. For continuing obligations, the general terms and conditions of delivery and service will apply as amended. Other obligations are governed by the version applicable at the time the respective contract was formed. The current version can be viewed at and downloaded from [www.bollfilter.de](http://www.bollfilter.de).

**15.8** If any provision in these general terms and conditions of delivery and service or the respective contract should be or become ineffective in whole or in part, this will not affect the validity of the remaining provisions. Any ineffective provision is to be replaced by a provision that is legally possible and is as close as possible in terms of content to the ineffective provision and the well-understood economic interests of the parties in the ineffective provision. The same applies for any gap in the provisions.