

## Operating and installation instructions

Electronic controller

Type: 2300 ME

for automatic filter engine Boll 6.49 ME



NOTE:  
Print document on both sides



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# 1 Preamble

## 1.1 General

These operating instructions are intended to assist you in familiarizing yourself with the control box from BOLL & KIRCH and in using it as intended.

These operating instructions provide important information about how to use the control box safely and correctly. Observance of these operating instructions will help avoid danger, reduce maintenance costs and downtimes and increase the reliability and service life of the control box. Read these operating instructions closely and carefully.

Provide supplements to these operating instructions in the form of instructions on the basis of national and international accident prevention regulations and environmental protection regulations. Ensure that the operating instructions are kept permanently available at the place of use of the control box. The operating instructions must be read and applied by every person instructed to carry out the following work:

- Installation
- Operation
- Maintenance
- Disposal

## 1.2 Warranty and liability



The “General Terms and Conditions of Delivery and Service” of Boll & Kirch Filterbau GmbH apply.

Boll & Kirch Filterbau GmbH shall not accept any warranty or liability claims in relation to personal and material damage if they are based on one or more of the following causes:

- improper use of the control box;
- non-observance of information and instructions, mandatory requirements and prohibitions included in the operating instructions;
- improper installation, operation and maintenance of the control box;
- unauthorized structural modifications to the filter;
- Emergencies caused by external influence or force majeure.

All information in these operating instructions is provided taking into account our current experience and findings, and is accurate to the best of our knowledge. Technical changes within the context of further development are reserved.

The text and diagrams do not necessarily correspond with the actual state as delivered. The diagrams are not to scale.

A spare parts list is included in the control cabinet diagrams to enable spare parts to be ordered.

### 1.3 Copyright

These operating instructions are an official document as defined by the law against unfair competition.

The copyright remains with  
Boll & Kirch Filterbau GmbH  
Siemensstraße 10 - 14  
50170 Kerpen  
Germany

These operating instructions are intended for the user of the control box and his employees. They contain texts, images and drawings that, without express approval by the manufacturer, may not be

- duplicated,
- distributed or
- otherwise disclosed, neither in full nor in part.

Any infringement will result in liability for damages.

## 2 Basic safety instructions

### 2.1 Warning signs and symbols

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

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#### **DANGER!**

##### **Danger to life / Serious harm to health!**

Indicates an imminently hazardous situation involving a high risk which, if not avoided, will result in death or severe (irreversible) injury.

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#### **ATTENTION**

##### **Material damage!**

Denotes a situation that could lead to damage to the product itself or to objects in its vicinity.

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#### **NOTE**

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

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#### **DISPOSAL**

Denotes special measures for environmental protection.

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### 2.2 Proper use

The control box has been constructed in accordance with the state-of-the-art in technology and generally recognized rules of safety. However, danger to the life and limb of the user or third parties and/or damage to the control box and other property can arise during use.

The control box may only be used for its intended purpose and if it is in perfect working order, and it must be used with regard to safety and dangers as stated in the operating instructions. Faults, especially those that could adversely affect safety, must be rectified immediately.

The control box is designed to be used for the control of the filter described in these operating instructions only. Any other use or use going beyond this shall be regarded as improper use. The manufacturer/supplier shall not be liable for damage resulting from improper use; the user shall bear the risk alone.

Usage for the intended purpose, i.e. proper use, also includes complying with the operating instructions for the control box and corresponding filter.

Safe and reliable operation can only be guaranteed if all the instructions, settings and performance limits for the control box (see control cabinet diagrams) and corresponding filter are complied with.



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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 (in the case of an opened control cabinet or where there are no covers) must only be made by authorized 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.
- 

**2.3 Target group**

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

**2.4 Obligations of the user/operator**

- Keep the operating instructions at hand at the place of use of the control box at all times.
- In addition to the operating instructions, observe and draw attention to generally applicable legal and other mandatory regulations relating to the prevention of accidents and environmental protection. Such obligations can include, for example, the provision/wearing of personal safety clothing and equipment.
- Provide supplements to the operating instructions in the form of instructions including supervision and reporting responsibilities to account for special operational considerations, e.g. with regard to the organization of work, work sequences and personnel employed.
- Only trained personnel who are familiar with the essential occupational health and safety regulations and have been provided with instruction in the handling of the control box are permitted to be deployed.
- Only personnel who have been specifically appointed by the user for the purpose are permitted to operate the control box or carry out any work of maintenance or repair on it.
- Observe all safety and hazard alerts on the control box (where provided).
- Make sure that all safety and hazard alerts on the control box are complete and legible at all times (where provided).
- Never make any modifications, additions or conversions to the control box which might adversely affect safety, without the manufacturer's approval.
- The spare parts used must conform with the technical requirements specified by the manufacturer. This can be guaranteed by using original spare parts.



## 2.5 Selection and qualifications of staff

- All tasks on the control box must be carried out only by reliable personnel. Personnel must not be under the influence of drugs or medication. Statutory minimum age limits must be observed.
- Employ only trained and instructed personnel and set out clearly the individual responsibilities of the personnel for installation, operation and maintenance.

In these operating instructions the following qualifications are stipulated for the different areas of activity:

- Instructed persons means persons who have been instructed during instruction provided by the user with regard to the work assigned to them and possible hazards arising from improper conduct and about required safety devices and precautions.
- Specialist staff means persons who have the training, knowledge and experience, as well as familiarity with applicable regulations, to be able to carry out the work delegated to them and to recognize and avoid potential dangers themselves.
- An electrician means a person who has the training, knowledge and experience, as well as familiarity with applicable standards and regulations, to be able to carry out work on electrical equipment and to recognize and avoid potential dangers themselves. The electrician is qualified to work at the specific place of use at which they work and is familiar with the relevant standards and regulations.

In-house instruction must be provided, having regard to the technical qualifications of the specific individual concerned.

In addition to the safety instructions set out in these operating instructions, the following rules and regulations must also be complied with:

- the applicable accident prevention regulations
- occupational medicine-related regulations
- generally recognized rules of safety
- country-specific regulations
- proper use

In addition, these rules and regulations can also be supplemented by in-house regulations specified by the plant or company itself.

## 2.6 Organisational measures

### 2.6.1 General

- Follow the respective valid national and international accident prevention regulations.

## **2.7 Safety instructions for operating personnel**

Refrain from any working practices which could

- pose a risk of danger to life and limb of the user or third parties,
- adversely affect the control box or other property,
- adversely affect the safety and operation of the control box,
- infringe the specified safety instructions.

### **2.7.1 Personal protective equipment**

The safety clothing and equipment stipulated by the company for all work on the control box must be worn.

### **3 Technical data of controller and control cabinet components**

#### **3.1 Power components**

##### **3.1.1 Supply**

Supply L1-L2-L3 direct to 3-pole master switch – Q1 (T1-T2-T3)

##### **3.1.2 Motor control**

Motor connection (-M1, -M2, -M3) direct to the motor contactor (-Q2.1, -Q3.1, -Q4.1)

##### **3.1.3 Power supply**

Primary voltages	440 V
Secondary voltages	
0 V DC - 24 V DC	Valve voltage 24 V DC
0 V AC - 20 V AC	Control circuit board supply voltage

##### **3.1.4 Fuse protection**

Fuses in the control cabinet

F1 to F2	each 1 A T
F3 to F4	each 1.6 A T
F5 to F6	each 315 mA T

Fuses on the control circuit board

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

## 3.2 Control circuit board inputs / outputs

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

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

3.2.3 Live relay outputs

Outputs VE1 - VN1 to VE3 - VN3

Terminals 8 - 13

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### NOTE

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

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3.2.4 Potential-free relay outputs

Outputs A1 - A5

Messages 1 - 5 (change-over contact)

Terminals 16 - 30

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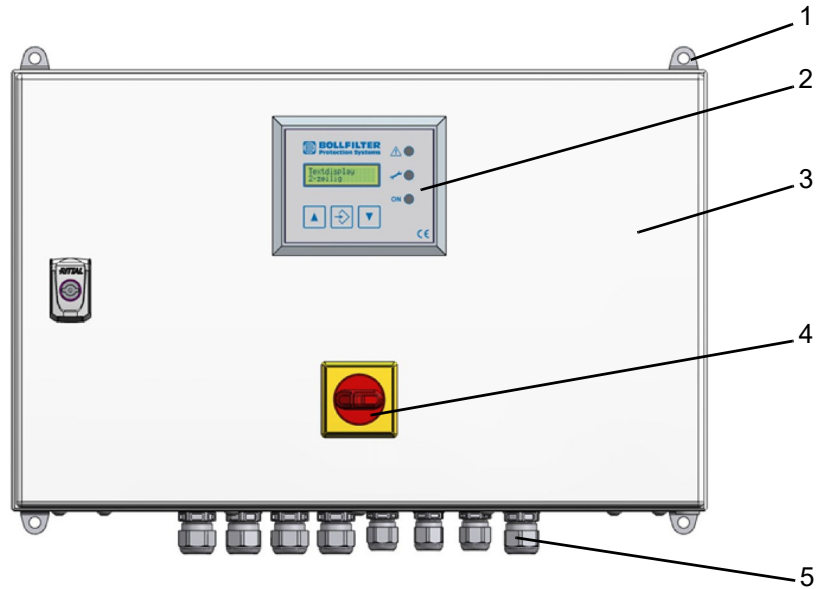
### NOTE

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

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## 4 Operation

### 4.1 Device functions and control sequence



*Fig. 4-1 Electronic controller type 2300 ME*

- 1 Fastening
- 2 Display and operating elements
- 3 Housing
- 4 Master switch
- 5 Connection

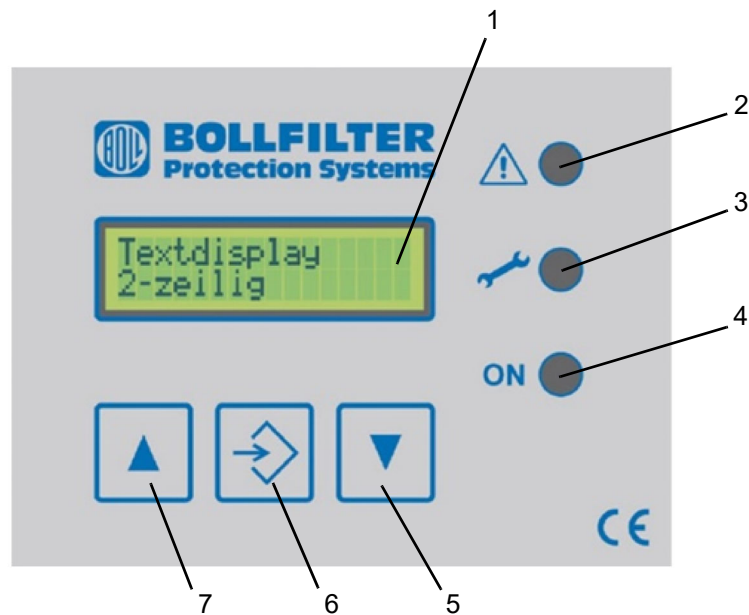


Fig. 4-2 Display and operating elements

- 1 Display screen for text display, 2 lines of 16 characters
- 2 "Alarm" LED (red)
- 3 "Service" LED (yellow)
- 4 "Operation" LED (green)
- 5 The Q key - When pressed, acknowledges the alarm messages
- 6 The F key - When pressed, triggers manual flushing
- 7 The C key - When pressed, shows the number of flushes

#### 4.1.1 Master switch operation feedback contact

When the master switch is in the "On" position, a contact is made.

#### 4.1.2 Control voltage monitoring

As soon as the master switch is actuated, the power supply is activated and the controller is working properly, the green "Operation" LED lights up and the "Control voltage monitoring" relay is activated. In the event of operating voltage failure or a fuse fault on the control circuit board, no LED lights up and the "Control voltage monitoring" relay is no longer activated.

#### 4.1.3 Motor fault

When a motor protection switch has been triggered, a fault is reported on the display.

Once the fault has been remedied, the user has to acknowledge the alarm message by pressing the Q key.

#### 4.1.4 Oil pressure fault

If parameter P22 is used to set that a pressure switch is installed, a fault is reported on the display in the event that there is no operating pressure on the filter. Once the fault has been remedied, the user has to acknowledge the alarm message by pressing the Q key.

#### **4.1.5 DP too high backflushing filter ( $\Delta P$ 100 %)**

The signal transmitter is a pressure switch contact which is connected to the "Differential pressure indicator DP too high, backflushing filter" optocoupler input. If the message is active for longer than 2 seconds, an alarm message appears in the display screen and the red "Alarm" LED lights up. Once the fault has been remedied, the user has to acknowledge the alarm message by pressing the Q key.

#### **4.1.6 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 that 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.

#### **4.1.7 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").

#### **4.1.8 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.

#### **4.1.9 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").

#### **4.1.10 DPT-Alarm**

The alarm message "DPT alarm" is shown on the display when a differential pressure transmitter with 4-20 mA (three-wire) is used, parameter P15 "DPT" has been selected and the minimum current of 4 mA cannot be measured. In addition, the "Alarm" LED (red) lights up and alarm output A5 (terminals 28, 29 and 30, see circuit diagrams) "Collective fault" is activated. Once the fault has been remedied, the user has to acknowledge the alarm message by pressing the Q key.

#### 4.1.11 C key (additional functions display)

When key C (additional function display) is pressed once, the number of flushing cycles which have been performed is shown on the screen for 3 seconds.



##### NOTE

When key C is pressed multiple times, the following additional information is shown each time it is pressed in the indicated order:

- Current differential pressure, provided a differential pressure transmitter is installed and parameter P15 selection "DPT" has been set in the controller.
- Operating hours when controller is switched on.
- DP alarm (flushing frequency monitoring) ON or OFF
- Current remaining time "DP1 time delay", provided a time delay has been set in the controller using parameter "P16 time delay for differential pressure" and the contact from input E1 (terminals 39 + 40, see circuit diagram) has been closed for the flushing differential pressure  $\Delta P75\%$ .
- Current remaining time "DP2 time delay", provided a time delay has been set in the controller using parameter "P16 time delay for differential pressure" and the contact from input E2 (terminals 37 + 38, see circuit diagram) has been opened for the flushing differential pressure  $\Delta P100\%$ .
- Current remaining time "P7 cartridge alarm", provided the contact from input E5 (terminals 31 + 32, see circuit diagram) has been opened for "Differential pressure too high flushing oil treatment cartridge alarm".

#### 4.1.12 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.

#### 4.1.13 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.

#### 4.1.14 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").

#### 4.1.15 The "Flow monitor" alarm

The "Flow monitor alarm" message is shown on the display if the signal from the flow monitor could not be read for 5 seconds in input E3. In addition, the "Alarm" LED (red) lights up and alarm output A3 (terminals 22, 23 and 24, see circuit diagrams) "Flow monitor alarm" is activated.

While this alarm is enabled, both flushing and "Refill oil" mode are locked. Once the fault has been remedied, the user has to acknowledge the alarm message by pressing the Q key.



## 4.2 Display for "Operation" mode

The green "Operation" LED lights up once the power supply has been switched on and the controller is at operation level ("Operation" mode).

## 4.3 Text messages

### 4.3.1 Text display after switching on

<b>BOLL &amp; KIRCH</b>	Company name
<b>xxxxxxxxxx</b>	Programme number

After a short delay, the 6.49 ME controller type is displayed in the second line of the display.

<b>6.49 ME</b>	Controller type 19
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### 4.3.2 Text display in "Operation" mode

<b>forced fl. 00:01</b>	Remaining time till forced flushing is triggered 00 h 01 min
-------------------------	--

<b>C - F - Q</b>	Reference to keys
------------------	-------------------

When flushing has been triggered, the following messages appear in the first line (depending on the source):

<b>mains flushing</b>	When flushing is triggered by "Power supply on"
<b>manual flushing</b>	When flushing is triggered by the F key
<b>forced flushing</b>	When flushing is triggered via time-controlled backflushing
<b>DP flushing</b>	When flushing is triggered by backflushing filter differential pressure

When flushing has been triggered, the following messages may in the second line (depending on the source):

<b>flush. time 3S</b>	Remaining flushing time
-----------------------	-------------------------



#### NOTE

**3S** indicates that the remaining flushing time is 3 seconds.

If the C key is pressed, the following message appears on the display screen:

<b>No.of flushes</b>	
<b>xxxxxx cycles</b>	Number of flushing cycles

The number of flushing cycles is saved and backed up in the event of a mains failure.

### 4.3.3 Alarm messages



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#### 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:

<b>Motor fault</b>	In the event of a "Motor fault" alarm
<b>Oil pressure fault</b>	In the event of "Oil pressure fault" alarm
<b>DP too high</b>	In the event of "Differential pressure high, filter 100 %"
<b>Cartridge alarm</b>	In the event of "Differential pressure too high, flushing oil treatment 100 %"
<b>Flow monitor alarm</b>	In the event the flow monitor signal is lost

If the flushing frequency monitoring is switched on:

<b>DP alarm</b>	DP alarm backflushing triggered by differential pressure 75 % (flushing frequency monitoring)
-----------------	---

In the event the differential pressure is measured using differential pressure transmitter (DPT):

<b>DPT alarm</b>	In the event input signal 4 mA is defective
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## 4.4 Setting and operation

### 4.4.1 Setting level - Viewing and selecting parameters

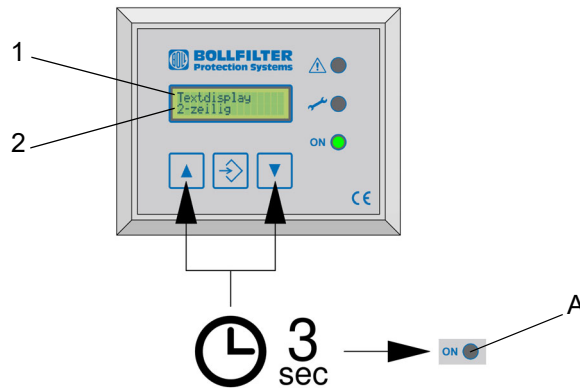


Fig. 4-3 Setting level - Viewing and selecting parameters

- A Green LED turns off
- 2 Parameter value
- 1 Parameter

In order to access the "Selecting and viewing parameters" setting level, press the keys  $\blacktriangle$  and  $\blacktriangledown$  together until the green "Operation" LED turns off (approximately 3 seconds). The first display line shows the parameter and the second line shows the parameter value. All parameters can now be displayed by repeatedly pressing the  $\blacktriangle$  or  $\blacktriangledown$  key.

### 4.4.2 Setting level - Changing and saving parameters

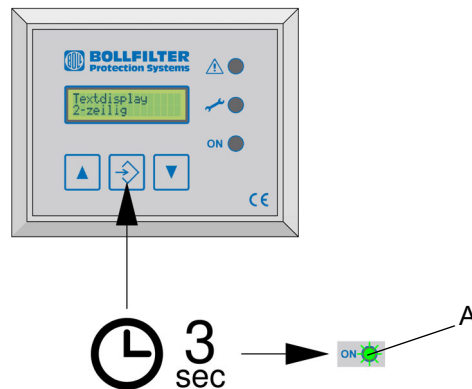
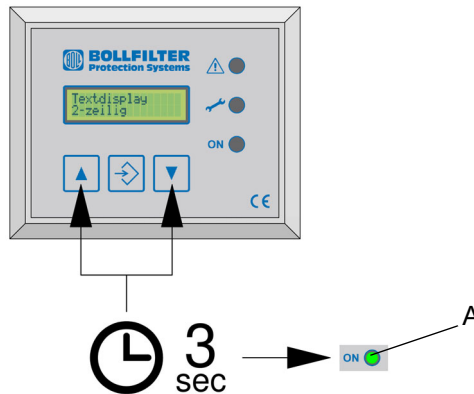


Fig. 4-4 Setting level parameter selection and view

- 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  $\blacktriangle$  or  $\blacktriangledown$  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).

#### 4.4.3 Return to operation level



*Fig. 4-5 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).

## 4.5 List and description of parameters

### 4.5.1 P0 Filter type

Factory setting Initial value 19

Text display, line 1 **P0 filter type**  
Text display, line 2 **6.49 ME**

### 4.5.2 P2 Time-controlled backflushing

Adjustable in steps of one hour Range 0 - 59 h  
Factory setting Initial setting 2 h

Text display, line 1 **P2 forced flush.**  
Text display, line 2 **XXX hours**

### 4.5.3 P3 Time-controlled backflushing

Adjustable in steps of one minute Range 0 - 59 min  
Factory setting Initial value 0 min

Text display, line 1 **P3 forced flush.**  
Text display, line 2 **XXX minutes**

### 4.5.4 P4 Back-flushing time

Adjustable in steps of one second Range 30 - 300 s  
Factory setting Initial value 60 s

Text display, line 1 **P4 flushing time**  
Text display, line 2 **XXX seconds**



#### NOTE

**(Only applies to filter type 6.49 ME DN65 - DN200)**

When adjusting the backflushing time (standard: 60 s) time relay KF1 must also be set to half of the backflushing time.



#### NOTE

**(Only applies to filter type 6.49 ME DN50)**

When adjusting the backflushing time (standard: 30 s) time relay KF1 must always be set to the same backflushing time!

#### 4.5.5 P7 Cartridge alarm delay time

Adjustable in steps of 10 seconds	Range 10 - 600 s
Factory setting	Initial value 180 s
Text display, line 1	<b>P7 cartridge al.</b>
Text display, line 2	<b>XXX seconds</b>

#### 4.5.6 P8 DP alarm (flushing frequency monitoring)

Setting	Off / On
Factory setting	Initial 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>

#### 4.5.7 P11 Language

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

Setting	D German ES Spanish F French EN English
Factory setting	Initial value D German
Text display, line 1	<b>P11 Sprache (language)</b>
Text display, line 2	<b>D Deutsch</b>

#### 4.5.8 P12 Testcode



---

##### NOTE

Test code P12 is divided into two sections:

- **Advanced settings:**  
In the first panel, entering a test code opens an advanced settings level in which additional parameters (e.g. P15, P16, and P17) can be set.  
(For a detailed description, see section “P15 DP selection” and P16 “DP differential pressure time delay”).
  - **Test mode:**  
In the second panel, entering the test code activates test mode, which is only intended for authorized individuals.  
In addition, the internal fault memory can be saved onto a USB stick.
- 

Adjustable in steps of one	Range 0 to 9999
Factory setting	Initial value 0
Text display, line 1	<b>P12 testcode</b>
Text display, line 2	<b>XXXX</b>

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



##### NOTE

**Test code 44** can be used to open an advanced setting which makes it possible to select a differential pressure analysis between the differential pressure switch (DPS = standard) and differential pressure transmitter (DPT = optional). The advanced setting "P15 DP selection" is only required if a differential pressure transmitter (output signal: 4-20 mA and electrical connection type: three-wire) is used to control the filter.

(For a detailed description of settings and operation, see Fig. 4.6)

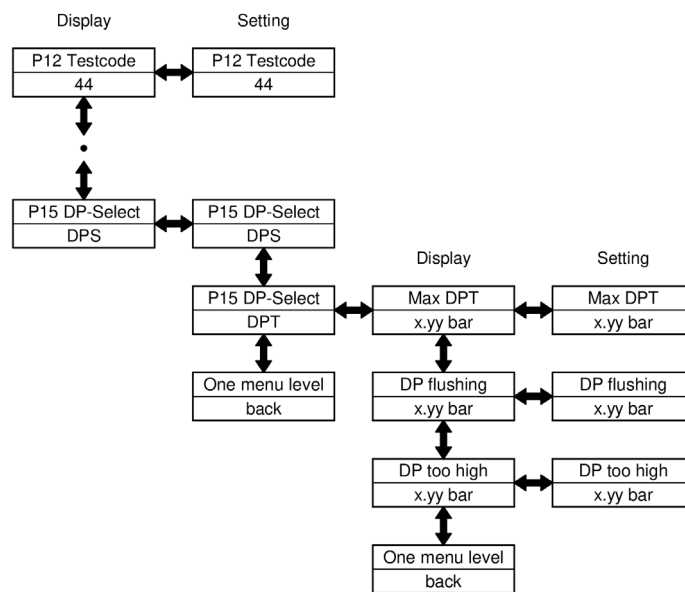


Fig. 4-6 Setting and operation

Setting	DPS / DPT
Factory setting	Initial value DPS
Text display, line 1	<b>P15 DP-select</b>
Text display, line 2	DPS
or	
Text display, line 2	DPT



#### 4.5.9.1 "MAX DPT" setting




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##### 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

#### 4.5.9.2 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

#### 4.5.9.3 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

#### 4.5.10 P16 Differential pressure delay time



##### NOTE

**Test code 10** can be used to open an advanced setting which makes it possible to select a time delay of the differential pressure signals  $\Delta P$  75% and  $\Delta P$  100%. (For a detailed description of settings and operation, see Fig. 4.7)

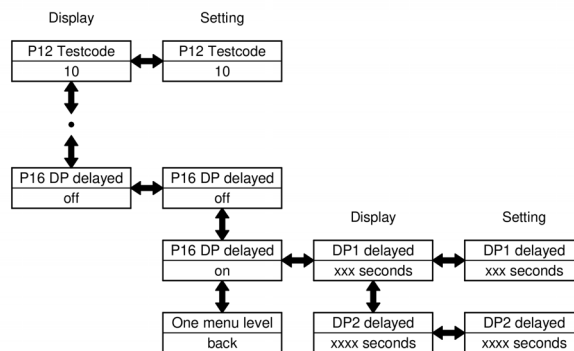


Fig. 4-7 Differential pressure time delay

##### 4.5.10.1 Time delay setting "Differential pressure flushing $\Delta P$ 75%"

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

##### 4.5.10.2 Time delay setting "Differential pressure too high $\Delta P$ 100%"

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

#### 4.5.11 P20 pump delay

Adjustable in seconds	Range 1-10s
Factory setting	Initial value 5s
Text display, line 1	<b>P20 pump delay</b>
Text display, line 2	<b>XXX seconds</b>

#### 4.5.12 P21 refill oil



##### NOTE

Selecting ON for parameter P21 immediately switches the controller to “Refill oil” mode

(For a detailed description of operation, see Fig. 4.8)

Setting	Off / On
Factory setting	Initial value OFF
Text display, line 1	P21 refill oil
Text display, line 2	OFF
or	
Text display, line 2	ON

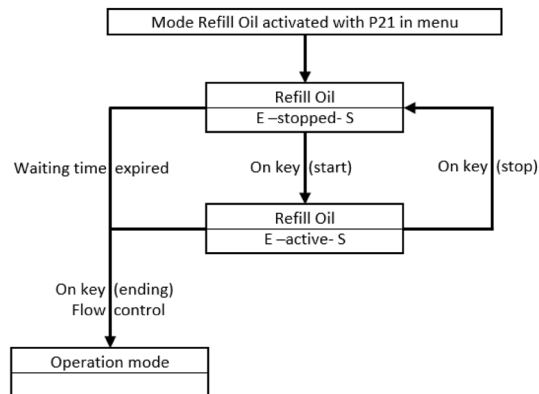


Fig. 4-8 refilloil



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**NOTE**

Pump and solenoid valve stopped initially.  
The process can be switched on using the down key. Pressing the ▼ key again stops the process once more.

The process can be switched on using the ▼ key. Pressing the ▼ key again stops the process once more.

The controller is now back in the initial state for “Refill oil” operating mode.

If no keys are pressed for two minutes while the process is stopped, the controller exits “Refill oil” mode and switches back to regular operating mode. Regardless of the status (stopped or active) the controller switches back to regular operating mode if the ▲ key is pressed, the menu is opened, or the flow monitor is triggered. The pump and solenoid valve are switched off in the process. It is not possible to acknowledge alarms and notifications, to start flushing procedures, or to access operating parameters while “Refill oil” mode is active.

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**4.5.13**

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**P22 pressure switch**

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**NOTE**

This parameter can be used to set whether a pressure switch is installed on the filter. If a pressure switch is installed, the bridges in the terminal box installed by default must be removed, see circuit diagrams:

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Setting	Off / On
Factory setting	Initial value OFF
Text display, line 1	<b>P22 pressure switch</b>
Text display, line 2	<b>OFF</b>
or	
Text display, line 2	<b>ON</b>

## 5 Control box description, function and setting values

When the DDA1 (or the optional differential pressure transmitter) emits a signal, this means that 75% of the permitted  $\Delta P$  value has been reached for the filter. In this case, the backwashing process is triggered. During the flushing process, motors 1 and 2 should run at only nominal speed for the duration of flushing X (in seconds), which can be set from 30-300s.

Each flushing arm motor is secured separately by a motor protection switch.

The pump motor starts (motor 3) with a configurable delay of 1-10s and runs constantly at its nominal speed for the remaining duration of the flushing procedure. With the help of the solenoid valves, the two filter chambers are flushed one after the other. The chamber flushing time can be configured using the integrated time relay.

During the first half of the remaining flushing time (BK2300, parameter P4), valve 1 (MA1) is open and valve 2 (MA2) is closed. During the second half, valve 2 is open and valve 1 is closed.

When no flushing procedure is in progress, both valves remain closed and none of the motors are running.

Parameter 6.49 ME:

Terminal diagram		Type 6.49 ME
P0	Filter type	19 6.49 ME
P1	Multiple flushing	1
P2	Forced flushing	2h
P3	Forced flushing	0min
P4	Flushing time	DN50 = 30s DN65 - DN200 = 60s
P7	Delay time Cartridge alarm	20s
P8	DP alarm	ON
P10	Backflushing time	/
P11	Language	D, EN, FR, ES Default setting D
P12	Test code	/
P20	Pump delay	1 - 10s Default setting 5s
P21	Refill oil mode	The ▼ key can be used to start the pump motor, which runs until it is switched off or until there is no more flow.
P22	Pressure switch	OFF



## 6 Monitoring and fault messages

In order to prevent the pump from running dry and to monitor the valves, the flushing procedure is aborted and a fault message is output whenever the flow monitor fails to emit a signal for more than 5 seconds. For this purpose, the flow monitor is connected to a digital input on controller 2300.

If no  $\Delta P$ -dependent flushing procedure is triggered within a certain period of time, a time-dependent flushing procedure is initiated. The interval can be configured freely.

When the DDA2 (or the optional differential pressure transmitter) emits a signal, this means that 100% of the permitted  $\Delta P$  value has been reached for the filter. In this case, the controller triggers an alarm which can be picked up and forwarded to the ship controller.

If a differential pressure transmitter is being used, the  $\Delta P$  values for 75% and 100% can be set on the controller.

During operation, it is possible to track whether the backflushing was successful for the two filter elements. Because backflushing only works if the motors are operating smoothly, an alarm message is output by the controller as soon as one of the motors 1, 2, or 3 malfunctions. This is done via a collective message; it is possible to determine which motor has malfunctioned based on the motor protection switch. The controller contains only the program for the 6.49 ME.

When the DDA 3 emits its signal for the set  $\Delta P$  value, the "Cartridge alarm" message is shown in the controller. A delay time can be set for this cartridge alarm. The optional pressure switch monitors whether there is any operating pressure on the filter and also outputs a collective message. An LED on the pressure switch turns on when there is pressure on the filter.





## 7 Service

### 7.1 Contact for spare parts and service

Please always quote our order no. when ordering spare parts. You will find the order number on the nameplate of the filter. Please contact our spare parts sales department at [spareparts@bollfilter.com](mailto:spareparts@bollfilter.com).

Should you require service, please contact our service team at +49 2273/562-222 or [service@bollfilter.com](mailto:service@bollfilter.com).

### 7.2 Special safety instructions

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#### **DANGER!**

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

A failure of the device resulting from improper maintenance (replacement of electric components) of the control box could cause the failure of the device, 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 maintenance 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.
- 



#### **NOTE**

Refer to the control cabinet diagrams for the spare parts for the control box.

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#### **DISPOSAL**

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

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## 8 Remediating faults

### 8.1 Trouble shooting

Fault	Possible cause	Remedy
Automatic filter not activated	Defective wiring	Check wiring and transformer supply settings based on circuit diagram
Display keys not working	Keypad damaged	Replace display A1
	Connection cable between circuit board and display loose	Plug cable back in
	Connection cable between circuit board and display defective	Replace connection cable
Display screen not working	Faulty power supply	Check supply and make sure primary voltage is set correctly on transformer T1
	Connection cable between circuit board and display loose	Plug cable back in
	Connection cable between circuit board and display defective	Replace connection cable
	Display A1 defective	Replace display A1
	Transformer T1 defective	Replace transformer T1
	Circuit board A2 defective	Replace circuit board A2
	Fuse(s) F1 and/or F2 (1 amp) defective	Replace fuse(s)
Gear motor not rotating + "motor fault" alarm message	Malfunction on filter (gear motor, etc.)	See operating instructions for automatic filter engineBoll 6.49 ME
	Defective wiring	Check wiring on gear motor
Differential pressure not being processed	Differential pressure indicator faulty	Check/Replace differential pressure indicator
	Parameter P16 time delay for differential pressure set	See descriptions of time delay for differential pressure, settings for parameter P16, and additional function display (key C) in the operating instructions
Solenoid valve incl. coil not working	Incorrect control/valve voltage set	Compare coil voltage with configured secondary voltage on transformer and correct if necessary
	Fuse F2 (2 amps) on circuit board A2 defective	Replace fuse
	Solenoid valve and/or coil defective	Replace solenoid valve and/or coil
Flow monitor alarm	Flow monitor does not detect any flow	Make sure flow monitor is working