Operating and installation instructions

Electronic controller
Type: 2210
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1 Basic safety instructions for the electronic controller

DANGER!

Risk of accidents from improper installation

Installing the controller or the connected equipment improperly may cause the device to fail and lead to serious or even fatal personal injuries. You must therefore follow the general safety regulations for equipment in industrial electrical systems and pay particular attention to the following points:

• The controller must be installed by qualified specialist staff only (as defined by the guidelines IEC 364, DIN VDE 0105 for electrical equipment).

• The laws, guidelines, directives and regulations for the installation of electrical equipment which are valid at the location for installation must be adhered to.

• Settings on devices with protection class IP00 without covers must only be made by authorised specialist staff when the devices are switched off. The local regulations for safety and the prevention of accidents must be observed.

• The controller must only be operated within the permitted area of application.
2 Technical data of controller and control cabinet components

2.1 Power components

2.1.1 Supply
Supply L1-L2-L3 direct to 4-pole master switch – Q1 (T1-T2-T3)

2.1.2 Motor control
Motor connection U-V-W direct to motor contactor – K1 (2-4-6)

2.1.3 Power supply

- Primary voltages: 0 - 208 V, 230 V, 380 V, 400 V, 440 V, 500 V, 550 V
- Secondary voltages:
  - 0 V AC - 230 V AC
  - Control voltage 230 V AC
  - 0 V AC - 20 V AC
  - Control circuit board supply voltage

2.1.4 Fuse protection

- Fuses in the control cabinet
  - F1 to F4: 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 Potential-free relay outputs

| Outputs A1 - A15 | Messages 1 - 5 (change-over contact) | Terminals 16 - 30 |

NOTE
The connections and designations can be found in the control cabinet diagram.

2.3 Circuit diagram

The circuit diagram for the controller is contained in the appendix of these operating and installation instructions.
3 Operation

3.1 Device functions and control sequence

Fig. 3-1 Electronic controller type 2210

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

Fig. 3-2 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 Keypad
NOTE
The three keys on the keypad are assigned to the key references displayed above them in the second line of the display as follows:
Key C: When pressed, shows the number of flushes
Key F: When pressed, triggers manual flushing
Key Q: When pressed, acknowledges the alarm messages

3.1.1 Master switch operation feedback contact
When the master switch is in the "On" position, a contact is made.

3.1.2 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.

3.1.3 Motorstörung
If the measured motor current exceeds the set setpoint value for parameter P9, a message appears in the display and a potential-free signal is sent to the relay outputs. The motor and the backflushing function switch off immediately. Once the fault has been remedied, the user has to acknowledge the alarm message by pressing the Q key.

3.1.4 DP – too high, backflushing filter (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.

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

3.2 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).
3.3 Text messages

3.3.1 Text display after switching on

Boll & Kirch  
xxxxxx  
Company name  
Programme number

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

6.18  
Controller type 0  
→  
Circuit diagram Z46327
### 3.3.2 Text Display in "Operation" Mode

#### forced fl. 00:01
Remaining time till forced flushing is triggered 00 h 01 min

#### C - F - Q
Reference to keys

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

- **Manual flushing**: When flushing is triggered by the F key
- **Forced flushing**: When flushing is triggered by time-controlled backflushing
- **DP flushing**: 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):

- **Flush. time 3S**: 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:

- **No. of flushes**: Number of flushing cycles

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

### 3.3.3 Alarm Messages

#### NOTE

- The red "Alarm" LED lights up every time an alarm message is issued.
- All alarm messages are saved and backed up in the event of a mains failure.
- The alarm message and the operation messages are shown alternately in the second line of the display, switching every 2 seconds.
- When the Q key is pressed, all alarm messages are deleted, but only if the respective cause of the alarm has been remedied. If the cause of the alarm is not remedied, the alarm message appears again.

Alarm messages in the display:

- **Motor fault**: In the event of a "Motor fault" alarm
- **DP too high**: In the event of "Differential pressure to high Filter 100%"
3.4 Setting and operation

3.4.1 Setting level - Viewing and selecting parameters

In order to access the setting level "Selecting and viewing parameters" press keys Δ and ▼ together until the green "Operation" LED is extinguished (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 key Δ or ▼.

3.4.2 Setting level - Changing and saving parameters

In order to access the setting level "Changing and saving parameters", press the middle key until the green "Operation" LED flashes (approximately 3 seconds). The parameter can now be changed by repeatedly pressing the key Δ or ▼. In order to save the value and return to the setting level "Selecting and viewing parameters", press the middle key until the green "Operation" LED is extinguished (approximately 3 seconds).

3.4.3 Return to operation level

In order to access the operation level, press keys Δ and ▼ together until the green "Operation" LED lights up (approximately 3 seconds).
3.5 List and description of parameters

3.5.1 P0 Filter type

Adjustable in steps of one
Factory setting

Text display, line 1: P0 Filter type
Text display, line 2: 6.18

3.5.2 P2 Time-controlled backflushing

Adjustable in steps of one hour
Factory setting

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

3.5.3 P3 Time-controlled backflushing

Adjustable in steps of one minute
Factory setting

Text display, line 1: P3 forced flush
Text display, line 2: XXX minutes
3.5.4 P4 Back-flushing Time

Adjustable in steps of one second             Range 5 - 100 s
Factory setting                             Initial value 20 s

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

3.5.5 P9 Motor Fault

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

Text display, line 1                        P9 Motor fault
Text display, line 2                        0000 mA

3.5.6 P11 Language

You can select from German, English, French and Spanish.

Setting                                     D    German
                                            ES   Spanish
                                            F    French
                                            GB   English

Factory setting                             Initial setting D German

Text display, line 1                        P11 Language
Text display, line 2                        GB English
3.5.7 P12 Test Code

NOTE
This parameter is only visible with filter type P0 = 0.

NOTE
The test code switches the controller to a test mode which is provided for authorised persons only.

Adjustable in steps of one
Factory setting
Range 0 to 250
Initial value 0

Text display, line 1
Text display, line 2
P12 Testcode
XXX
4 Description and function of controller

4.1 Controller type 6.18

Inputs
Pressure switch "DP reached, backflushing filter" → 75 %
Pressure switch "DP too high, backflushing filter" → 100 %

Outputs
Motor
Flushing valve

Potential-free contacts

1) "Control voltage monitoring" alarm Output A1, A2, A3
2) Collective fault, comprising:
   - "Maximum differential pressure reached" alarm
   and
   - Alarm "Motor fault: Actuator or gear motor"
3) "Actuator closed" alarm Output A7, A8, A9
4) "Actuator closed" message Output A10, A11, A12
5) "Flushing active" message Output A13, A14, A15

Functional description 6.18
See the operating instructions for the filter's function.

Flushing is triggered by:

1) Key F
2) The forced flushing time elapsing
3) Pressure switch "DP reached, backflushing filter"

Special attributes

• All alarms are displayed and signalled and saved via potential-free contacts.
• If the controller is in parameterisation mode, flushing cannot be triggered manually.
• If the "Controller type" parameter is changed, the functions are re-started.