

# Assembly and operating instructions

## ProCal

### Calcium hypochlorite system



**Please carefully read these operating instructions before use! · Do not discard!  
The operator shall be liable for any damage caused by installation or operating errors!  
Technical changes reserved.**

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### General non-discriminatory approach

In order to make it easier to read, this document uses the male form in grammatical structures but with an implied neutral sense. It is aimed equally at both men and women. We kindly ask female readers for their understanding in this simplification of the text.

### Supplementary information

Read the following supplementary information in its entirety!

The following are highlighted separately in the document:

- Enumerated lists
- ▬> Instructions
  - ⇒ Results of the instructions

### Information



*This provides important information relating to the correct operation of the system or is intended to make your work easier.*

### Safety information

Safety information are provided with detailed descriptions of the endangering situation, see  *Chapter 2.1 'Explanation of the safety information' on page 8*

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# 1 About this system

## Application

Calcium hypochlorite is the calcium salt of hypochlorous acid and has the formula  $\text{Ca}(\text{OCl})_2$ .

The ProCal is used for disinfection of swimming pool water using calcium hypochlorite. The granulate metering unit of the ProCal can produce a calcium hypochlorite solution from dry calcium hypochlorite. Low-chlorine disinfection solution is prepared with the integrated full automatic metering unit and added to the swimming pool water via a bypass line. Measuring and control units ensure controlled metering. Hence the disinfection of the pool water of small to medium sized swimming pools can be carried out in accordance with to DIN 19643-1.

## Advantages

- Ready-to-use, pre-assembled calcium hypochlorite metering system
- Operation through the production and metering of the disinfection solution with a system
- Simple, quick assembly
- Minimal maintenance effort

## Features

- Disinfection using calcium hypochlorite with little effect on the pH value and very low chlorate input.
- Excellent safety
- Simple operation
- Ready-to-use, complete calcium hypochlorite metering system
- Excellent disinfection effect

## 1.1 Summary of the ProCal components

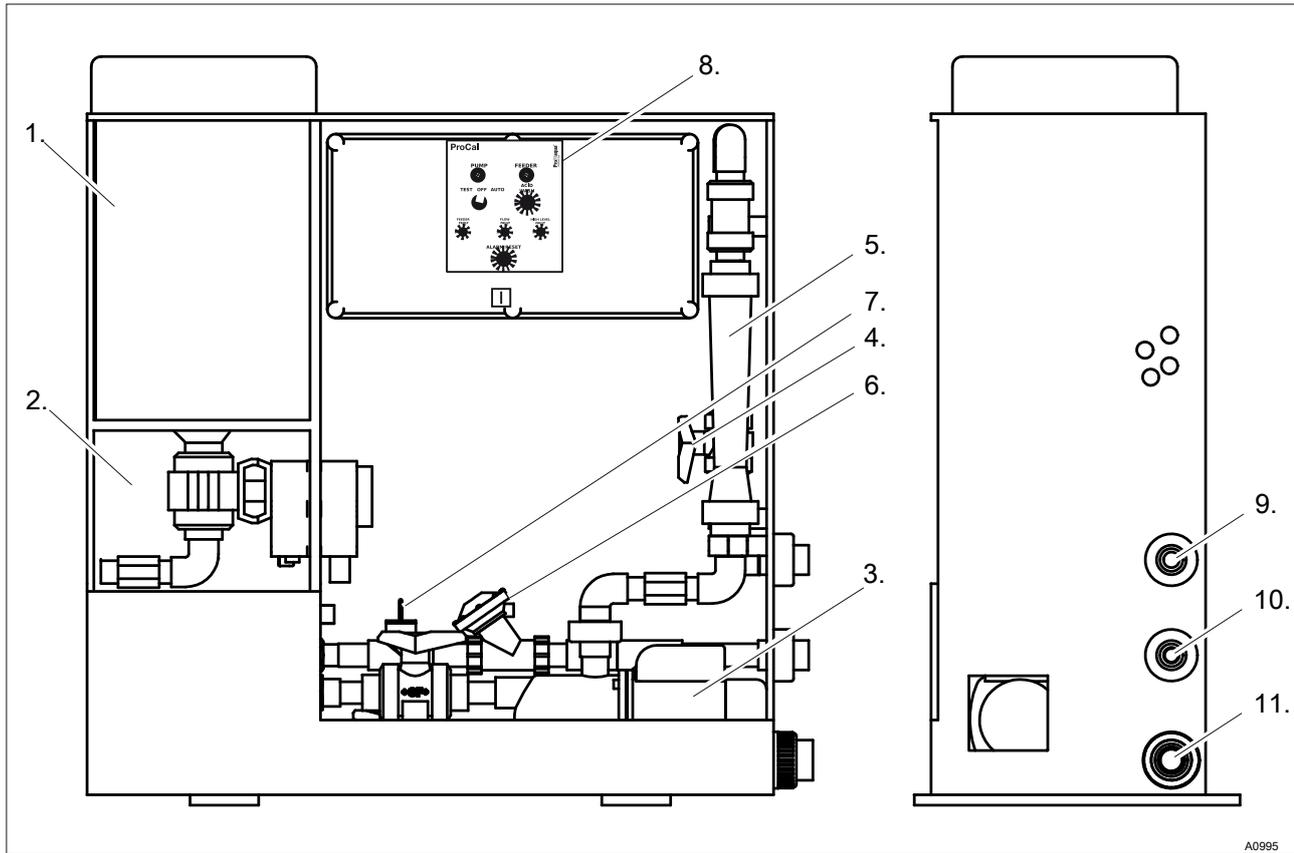
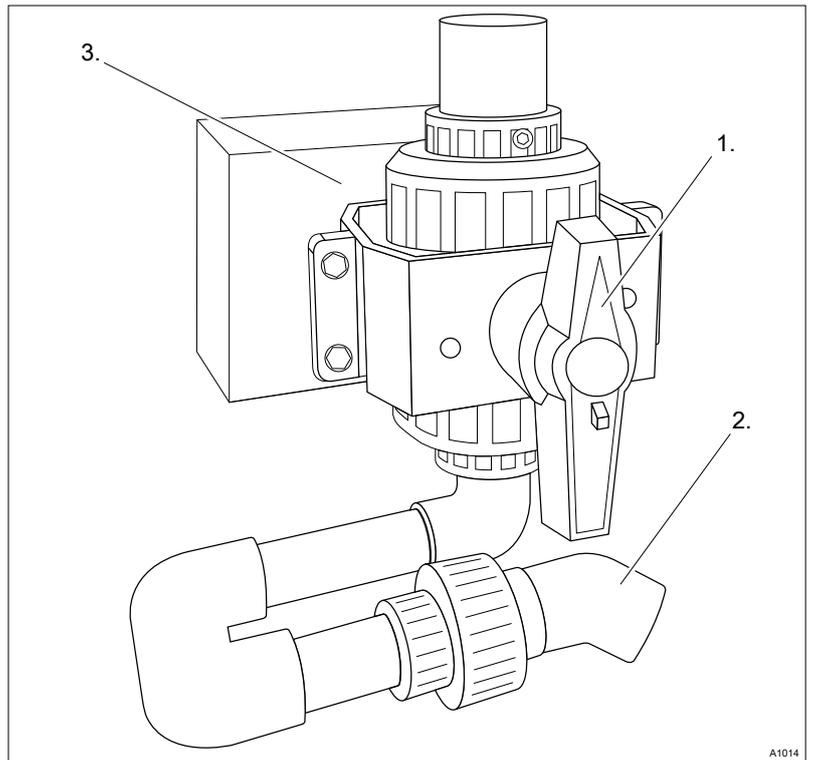


Fig. 1: Summary of the ProCal components

- |                                   |                                 |
|-----------------------------------|---------------------------------|
| 1. Granulate storage tank         | 7. pH rinse/injection point     |
| 2. Mixing chamber                 | 8. Control with control cabinet |
| 3. Feed pump                      | 9. Outlet DN 25                 |
| 4. Ball valve for flow adjustment | 10. Feed DN 25                  |
| 5. Float flow meter               | 11. Overflow/drain DN 40        |
| 6. Inlet-float valve              |                                 |



*Fig. 2: Granulate feeder*

1. Ball valve
2. Angle piece for granulate feed
3. Granulate feeder

## 2 Safety and responsibility

### 2.1 Explanation of the safety information

#### Introduction

These operating instructions provide information on the technical data and functions of the product. These operating instructions provide detailed safety information and are provided as clear step-by-step instructions.

The safety information and notes are categorised according to the following scheme. A number of different symbols are used to denote different situations. The symbols shown here serve only as examples.



#### **DANGER!**

##### **Nature and source of the danger**

Consequence: Fatal or very serious injuries.

Measure to be taken to avoid this danger

Danger!

- Denotes an immediate threatening danger. If this is disregarded, it will result in fatal or very serious injuries.



#### **WARNING!**

##### **Nature and source of the danger**

Possible consequence: Fatal or very serious injuries.

Measure to be taken to avoid this danger

Warning!

- Denotes a possibly hazardous situation. If this is disregarded, it could result in fatal or very serious injuries.



#### **CAUTION!**

##### **Nature and source of the danger**

Possible consequence: Slight or minor injuries, material damage.

Measure to be taken to avoid this danger

Caution!

- Denotes a possibly hazardous situation. If this is disregarded, it could result in slight or minor injuries. May also be used as a warning about material damage.



**NOTICE!**

**Nature and source of the danger**

Damage to the product or its surroundings

Measure to be taken to avoid this danger

Note!

- Denotes a possibly damaging situation. If this is disregarded, the product or an object in its vicinity could be damaged.



**Type of information**

*Hints on use and additional information*

*Source of the information, additional measures*

*Information!*

- *Denotes hints on use and other useful information. It does not indicate a hazardous or damaging situation.*

## 2.2 Users' qualifications



**WARNING!**

**Danger of injury with inadequately qualified personnel!  
The operator of the plant / device is responsible for ensuring that the qualifications are fulfilled.**

If inadequately qualified personnel work on the unit or loiter in the hazard zone of the unit, this could result in dangers that could cause serious injuries and material damage.

- All work on the unit should therefore only be conducted by qualified personnel.
- Unqualified personnel should be kept away from the hazard zone

Training	Definition
Instructed personnel	An instructed person is deemed to be a person who has been instructed and, if required, trained in the tasks assigned to him/her and possible dangers that could result from improper behaviour, as well as having been instructed in the required protective equipment and protective measures.
Trained user	A trained user is a person who fulfils the requirements made of an instructed person and who has also received additional training specific to the system from ProMinent or another authorised distribution partner.
Trained qualified personnel	A qualified employee is deemed to be a person who is able to assess the tasks assigned to him and recognize possible hazards based on his/her training, knowledge and experience, as well as knowledge of pertinent regulations. The assessment of a person's technical training can also be based on several years of work in the relevant field.

Training	Definition
Electrician	<p>Electricians are deemed to be people, who are able to complete work on electrical systems and recognize and avoid possible hazards independently based on his/her technical training and experience, as well as knowledge of pertinent standards and regulations.</p> <p>Electricians should be specifically trained for the working environment in which they are employed and know the relevant standards and regulations.</p> <p>Electricians must comply with the provisions of the applicable statutory directives on accident prevention.</p>
Customer Service department	<p>Customer Service department refers to service technicians, who have received proven training and have been authorised by ProMInent to work on the system.</p>



### **Note for the system operator**

*The pertinent accident prevention regulations, as well as all other generally acknowledged safety regulations, must be adhered to!*

## 2.3 General safety notes



### **WARNING!**

#### **Live parts!**

Possible consequence: Fatal or very serious injuries

- Measure: Before opening the housing or before carrying out installation work, ensure the devices are voltage-free.
- Disconnect damaged, defective or tampered-with devices from the power supply.



### **WARNING!**

#### **Danger from hazardous substances!**

Possible consequence: Fatal or very serious injuries.

Please ensure when handling hazardous substances that you have read the latest safety data sheets provided by the manufacture of the hazardous substance. The actions required are described in the safety data sheet. Check the safety data sheet regularly and replace, if necessary, as the hazard potential of a substance can be re-evaluated at any time based on new findings.

The system operator is responsible for ensuring that these safety data sheets are available and that they are kept up to date, as well as for producing an associated hazard assessment for the workstations affected.



**WARNING!**

**Unauthorised access!**

Possible consequence: Fatal or very serious injuries.

- Measure: Ensure that there can be no unauthorised access to the device



**WARNING!**

**Operating faults!**

Possible consequence: Fatal or very serious injuries.

- The unit should only be operated by adequately qualified and technically expert personnel
- Please also observe the operating instructions for controllers and fittings and any other component groups, such as sensors, sample water pumps ...
- The operator is responsible for ensuring that personnel are qualified

## 2.4 Correct and proper use



**NOTICE!**

**Correct and proper use**

The device is intended for the dissolving of calcium hypochlorite granulate in swimming pool water and for metering it into a swimming pool.

The unit may only be used in accordance with the technical details and specifications provided in this operating manual and in the operating manuals for the individual components (such as, for example, sensors, fittings, calibration devices, metering pumps etc.).

Any other uses or modifications are prohibited.

### 3 System overview and function

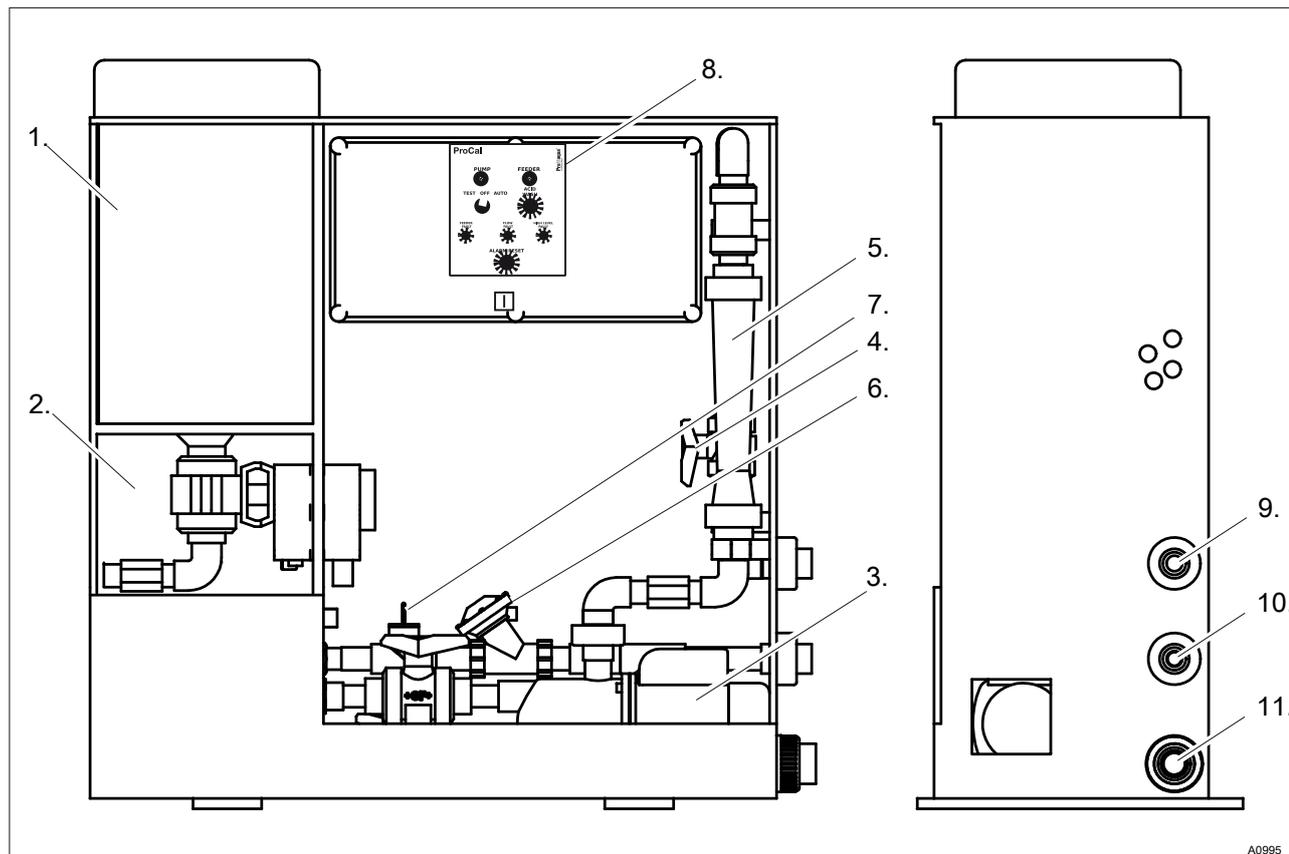


Fig. 3: System overview and function

number	Part number	Description	Specification
1	-	Granulate storage tank	Capacity: 40 kg, material: PE white
2	-	Mixing chamber	Volume: 10 litre, Material: PE white
3	1040730	Feed pump	Lowara, operating voltage 240 VAC
4	1024534	Ball valve	25 mm, PVC, FPM seal
5	1008584	Float flow meter	300 - 3000 l/h
6	-	Inlet-float valve	comprising 6a, 6b, 6c
6a	1040733	Float switch	
6b	1040754	Flow controller	
6c	1040755	Valve	
7	924594	pH rinse/injection point	Injection point - sulphuric acid for acid flushing, PVDF/PTFE
8	1040758	Operating unit	Contains the system control and electrics
9	-	Outlet	DN25
10	-	Feed	DN25
11	-	Overflow/drain	DN40

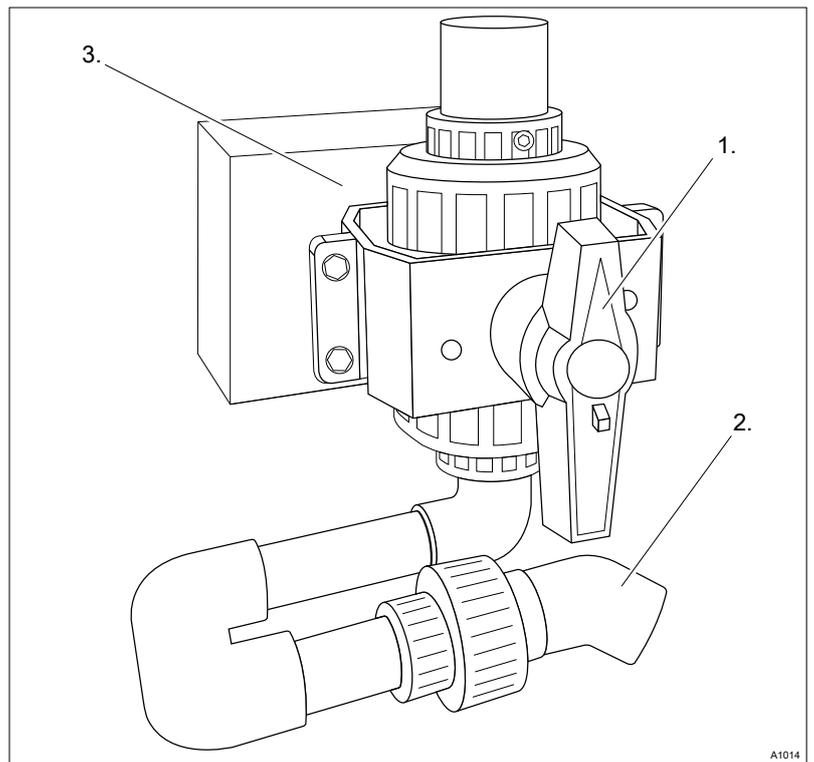


Fig. 4: System overview and function

number	Part number	Description	Specification
1	1040731	Ball valve	Ball valve with bracket (1a)
1a	1040732	Ball valve bracket	
2	-	Metering pipe	
3	1040756	Feeder	Operating voltage: 24 VDC, frequency 3500 rpm

## 4 Control

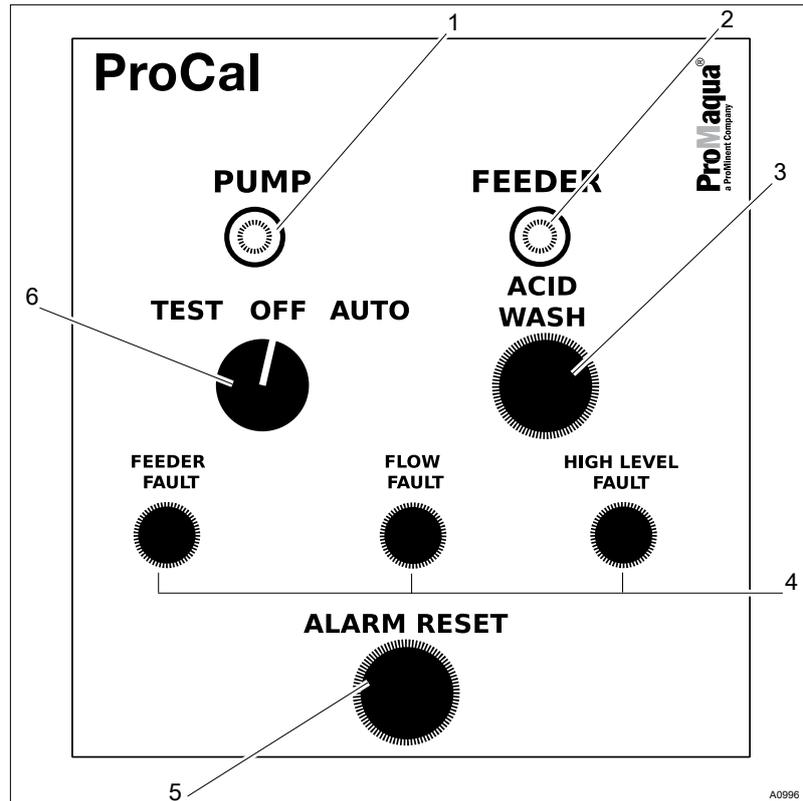


Fig. 5: ProCal control panel

1. Feed pump operating indicator
2. Granulate feeder operating indicator
3. Pushbutton with operating indicator [Acid cleaning]
4. Light indicators for the fault messages
5. Fault acknowledgement button
6. Main switch for [Test operation], [Off], [Automatic]

Lettering	Description
[PUMP]	Feed pump operating indicator
[FEEDER]	Granulate feeder operating indicator
[TEST]	Test operation: System running with 100 % output, no control
[OFF]	The system is completely switched off, but not isolated from the mains voltage
[AUTO]	Automatic: System runs according to the input signal of the external control (e.g. DULCOMARIN® II ...)
[ACID WASH]	Pushbutton with operating indicator: System continues running, additionally acid is metered into the system for cleaning.
[FEEDER FAULT]	Indicator light: Feeder has a fault and is not transporting any granulate
[FLOW FAULT]	Indicator light: No or too low water flow through the ProCal
[HIGH LEVEL FAULT]	Indicator light flashes: Mixing chamber over full.
	Indicator light illuminated continuously: The external leakage sensor is alarmed. Feeder stops
[ALARM RESET]	Pushbutton: All faults are cleared.

## 5 Assembly

- **User qualification, mechanical and hydraulic installation:** trained qualified personnel, see [Chapter 2.2 'Users' qualifications' on page 9](#)
- **User qualification, electrical installation:** Electrical technician, see [Chapter 2.2 'Users' qualifications' on page 9](#)

### 5.1 Storage and transport

Ambient conditions for storage and transport



#### CAUTION!

- Prior to storage or transport, the system must be free from feed chemical and water
- Flush out the media carrying parts including the hoses using clean pure water
- Store and transport the system in its original packaging.
- Also protect the packaged systems against damp, exposure to chemicals and mechanical effects
- Please also observe the operating instructions for controllers and fittings and other units, such as sensors, filters, metering pumps ...

Storage temperature: 0... 50 °C

Air humidity: < 95% relative air humidity, non-condensing



#### NOTICE!

If the system is stored as an assembly with the sensors, pumps, etc., then the storage and transport conditions must be appropriate for the component with the least resistance to external influences.

### 5.2 Hydraulic Installation



#### NOTICE!

##### Hydraulic leaks

Should the system no longer be hydraulically leak-tight there is a possibility that the whole system will run dry. Consider this possibility in the layout and set-up of your system.

Remedy: Provide your system with a suitable alarm system and shut-off devices or place the system above the height level of the swimming pool. In the system installation place there must be a sufficiently dimensioned floor drain, so that in case of hydraulic leaks, the water can flow away.

We recommend the installation of the ProCal over or in a collecting pan with a leak sensor. The ProCal control can process the signal from the leak sensor as an external fault signal. If the leak sensor triggers, then the ProCal reports a fault and switches the feeder off.

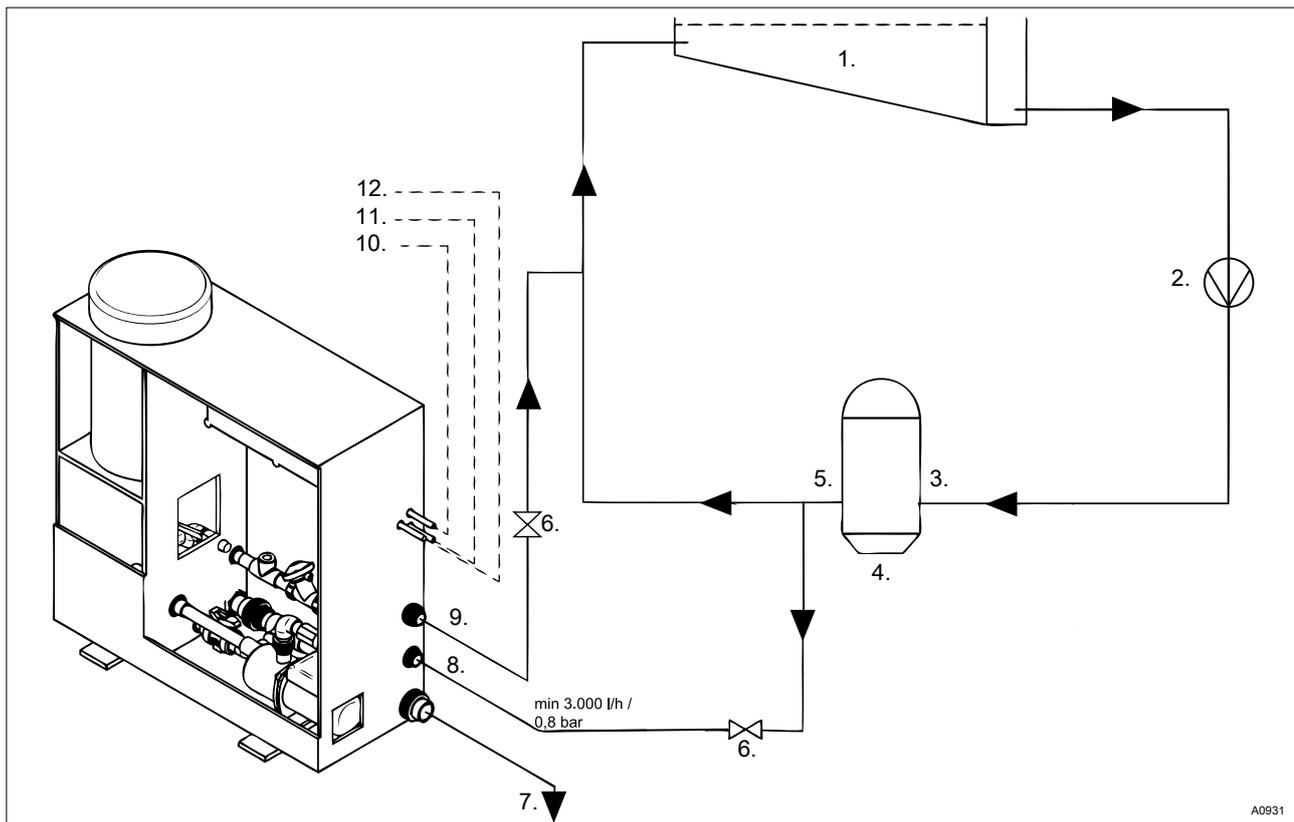


Fig. 6: Hydraulic installation circuit diagram

- |                     |   |
|---------------------|---|
| 1. Swimming pool    | 7. Outlet / overflow (32 mm PVC)                                      |
| 2. Circulating pump | 8. Inlet (25 mm PVC) / nominal 3000 l/h at 0.8 bar                    |
| 3. Filter inlet     | 9. Outlet (25 mm PVC)   |
| 4. Filter           | 10. Start / stop control by the controller (e.g. DUL-COMARIN® II ...) |
| 5. Filter outlet    | 11. Control of the metering pump for acid cleaning                    |
| 6. Stopcock         | 12. Mains connection 240 VAC  |

### 5.3 Electrical Installation

- **User qualification, electrical installation:** Electrical technician, see [Chapter 2.2 'Users' qualifications'](#) on page 9



**WARNING!**

**Live parts!**

Possible consequence: Fatal or very serious injuries

- Measure: Before opening the housing or before carrying out installation work, ensure the devices are voltage-free.
- Disconnect damaged, defective or tampered-with devices from the power supply.

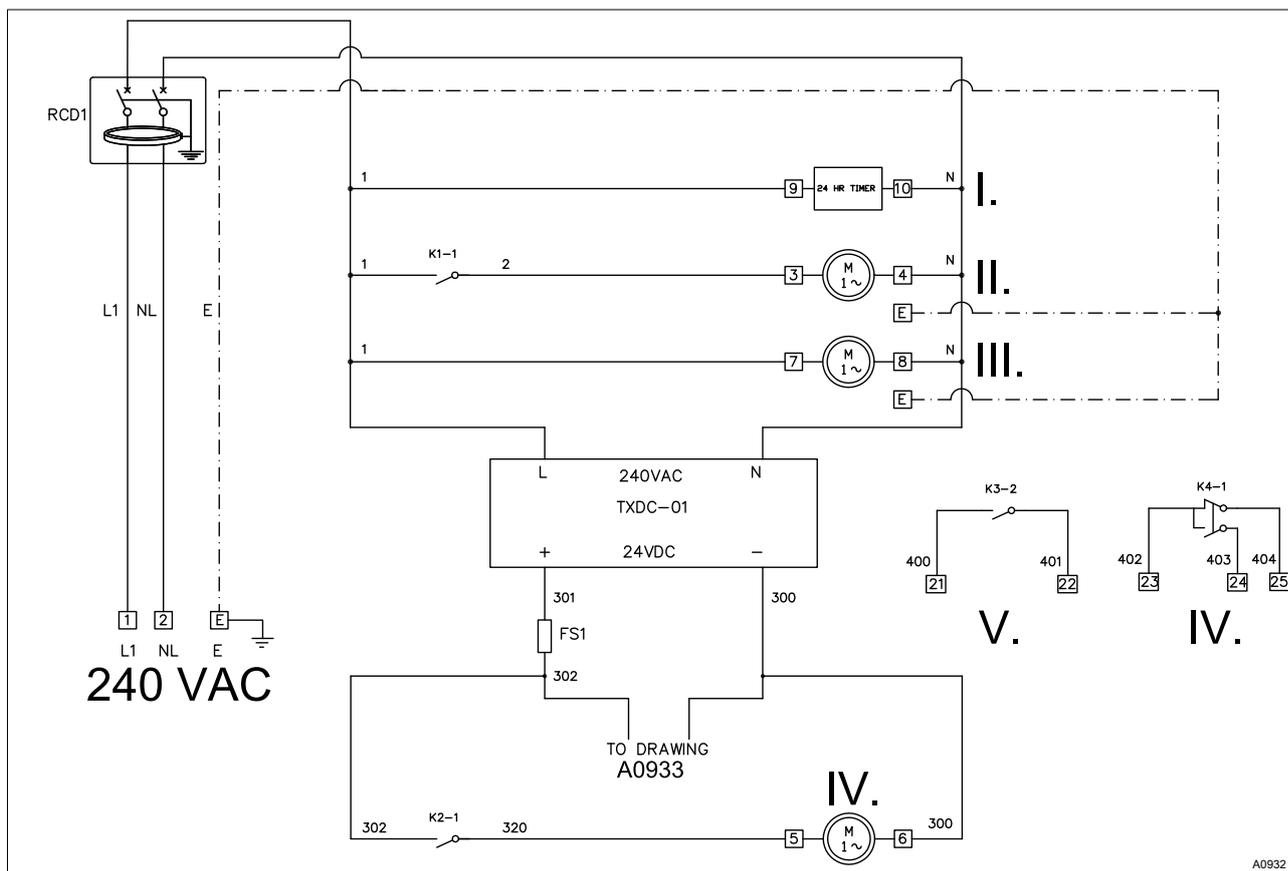


Fig. 7: Electrical installation / original drawing is E01

- |      |                          |     |  |
|------|--------------------------|-----|--|
| I.   | 24 hour timer (optional) | IV. | Collective alarm                         |
| II.  | Circulating pump         | V.  | Switch contact of the acid metering pump |
| III. | Acid metering pump       | VI. | Feeder with 24 VDC                       |

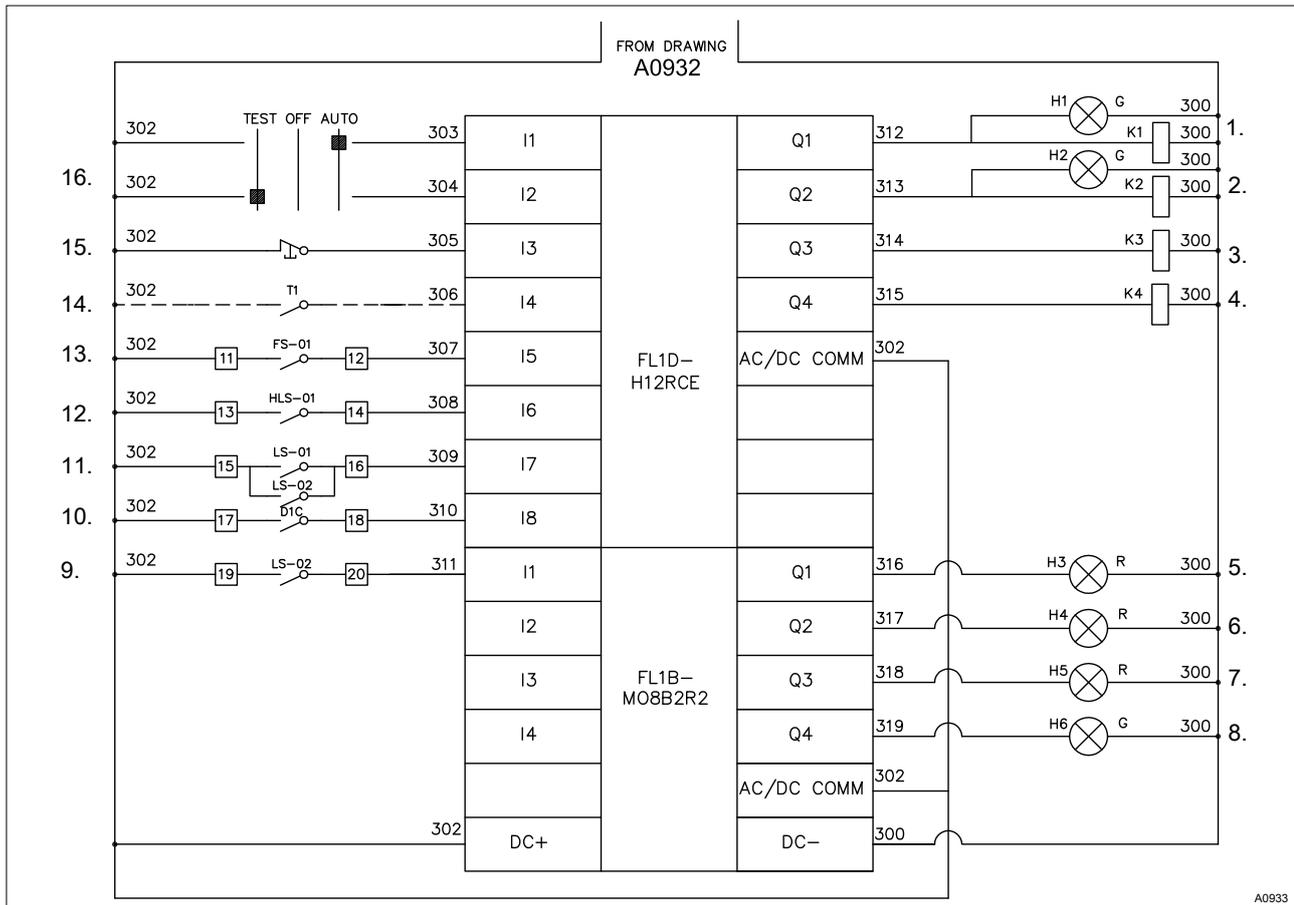


Fig. 8: Electrical installation / original drawing is E02

- |   |   |
|---|---|
| 1. Circulating pump, relay and light          | 9. Remote starter                               |
| 2. Feeder, relay and light                    | 10. Contact to the controller (e.g. D1C)        |
| 3. Acid metering pump, relay                  | 11. Switch, actuator limit                      |
| 4. Collective alarm, relay                    | 12. Switch, high liquid level                   |
| 5. Circulating pump, indicator light, no flow | 13. Switch, circulating pump flow               |
| 6. Indicator light, high liquid level         | 14. Contact, acid introduction timer (optional) |
| 7. Feeder, fault indicator light              | 15. Alarm reset                                 |
| 8. Indicator light, acid introduction         | 16. Operating mode selection switch             |



*If connected to a D1C, XR1 or XR2 can be used dependent upon the relay action.*

## 6 Commissioning



### WARNING!

#### Danger from hazardous substances!

Possible consequence: Fatal or very serious injuries.

Please ensure when handling hazardous substances that you have read the latest safety data sheets provided by the manufacture of the hazardous substance. The actions required are described in the safety data sheet. Check the safety data sheet regularly and replace, if necessary, as the hazard potential of a substance can be re-evaluated at any time based on new findings.

The system operator is responsible for ensuring that these safety data sheets are available and that they are kept up to date, as well as for producing an associated hazard assessment for the workstations affected.

### Adding granulate

1. ➤ Open the storage tank



*Only use dry equipment to add the granulate.*

*No moisture must get into the storage tank, otherwise the granulate will clump together.*

2. ➤ Add granulate to the storage tank
3. ➤ Close the storage tank

### Actions prior to commissioning

1. ➤ Check the water quality of the swimming pool
  - ⇒ The water quality must be within the parameter range planned by the operator.
2. ➤ Set the system supply pressure to  $\geq 0.8$  bar

### Commissioning

1. ➤ Switch the main switch to [OFF]
2. ➤ Close all valves
3. ➤ Open the stopcock, ☞ on page 15, item 6 in the feed line.
  - ⇒ The mixing chamber begins to fill.
4. ➤ Allow the mixing chamber to fill completely, the valve Fig. 3 item 6, controls the feed
  - ⇒ If the mixing chamber is full, the valve must close.
5. ➤ Check the system for leaks, once the mixing chamber has filled
6. ➤ Open the drain valve, ☞ on page 15, item 6 in the drain line.
7. ➤ Switch the controller (e.g. D1C) to [PAUSE] or [STOP]
  - ⇒ This measure prevents the feeder from starting.

8. ▶



*Upon starting operation an alarm [Flow fault] may appear. Clear the alarm by pressing the [ALARM RESET] button. This may have to be repeated several times until a uniform flow of 3000 l/h has been set.*

Switch the main switch to [AUTO]

⇒ The feed pump starts.

9. ▶

During operation with low back pressure, the flow control valve in the area of the feed pump outlet may cause a high frequency noise. You can prevent this by carefully adjusting the back pressure using the outlet shut-off valve until the noise disappears. However this must not cause the flow to fall below 3000 l/h

⇒ The level in the mixing chamber must automatically set itself to a level beneath the overflow. An incorrect or oscillating level is typical for a supply pressure < 0.8 bar. Please check the system supply pressure and set it correctly to  $\geq 0.8$  bar.

10. ▶

Now check all the system lines for leaks.

⇒ System operation should only be started once all the lines are leak-tight.



*Observe the instructions of the chemical manufacturer.*

11. ▶

Now fill the system with calcium hypochlorite granulate

12. ▶

Set the controller (e.g. D1C) to 100 % feed rate for the ProCal. The feeder must feed continuously

⇒ This ensures all feed lines are filled with granulate. This can be seen in the transparent parts of the feed line.



*Daily checking of the granulate level in the storage tank should be carried out until a consumption pattern becomes apparent.*

13. ▶

If necessary, fill the storage tank

14. ▶

Set the controller, e.g. with the D1Cb at output XR1, to a cycle time  $\geq 30$  seconds. This signal directly controls the feeder running time

## Feed rate

**Factory setting**

The factory setting of the angle piece is horizontal.



Before you turn the feed line, close the shut-off valve of the storage tank and ensure that the connector directly under this shut-off valve is correctly fitted.

After you have carried out all settings and checks, you can open the shut-off valve.

- 15.** Set the feed rate by turning the 45° angle piece. The adjustment is made by turning the angle piece towards its horizontal position
- Angle piece horizontal (90 °) = maximum feed rate
  - Angle piece vertically upright (0 °) = minimum feed rate

Tank size (m <sup>3</sup> )	Cycle time at the controller output	Angle piece adjustment	Remarks
10 ... 30	≥ 30 ... 60 seconds	0 °	After commissioning, the chlorine content in the water must be checked at short intervals. Adjust the position of the angle piece based on the results so collected. In this way the system feed rate is optimally set for the overall system.
30 ... 50	1 ... 3 minutes.	30 °	
> 50	3 ... 5 minutes.	45 °	

## 6.1 Setting the local time and date

**Personnel qualification**

This work requires accessing of the electrical control panel and must not be carried out by unqualified users, see [Chapter 2.2 'Users' qualifications'](#) on page 9.

- 1.** Press the key
- 2.** Press the key, until *[SET]* appears on the display
- 3.** Press the key
- 4.** Press the key, until *[SET CLOCK]* appears on the display
- 5.** Press the key
- 6.** Press the or key to set the correct weekday.
- 7.** Press the key
- 8.** Press the or key to set the first hour figure (0 ... 9)
- 9.** Press the key
- 10.** Press the or key to set the second hour figure (0 ... 9)
- 11.** Press the key
- 12.** Press the or key to set the first minute figure (0 ... 9)
- 13.** Press the key
- 14.** Press the or key to set the second minute figure (0 ... 9)
- 15.** Press the key

- 16.▶ Press the  or  key to set the first year figure (0 ... 9)
  - 17.▶ Press the  key
  - 18.▶ Press the  or  key to set the second year figure (0 ... 9)
  - 19.▶ Press the  key
  - 20.▶ Press the  or  key to set the third year figure (0 ... 9)
  - 21.▶ Press the  key
  - 22.▶ Press the  or  key to set the fourth year figure (0 ... 9)
  - 23.▶ Press the  key
  - 24.▶ Press the  or  key to set the first month figure (0 ... 9)
  - 25.▶ Press the  key
  - 26.▶ Press the  or  key to set the second month figure (0 ... 9)
  - 27.▶ Press the  key
  - 28.▶ Press the  or  key to set the first day figure (0 ... 9)
  - 29.▶ Press the  key
  - 30.▶ Press the  or  key to set the second day figure (0 ... 9)
  - 31.▶ Press the  key
  - 32.▶ Press the  key
  - 33.▶ Press the  key
  - 34.▶ Press the  key
- ⇒ You have successfully entered the current date and time in the control.

## 6.2 Setting the duration and frequency of acid cleaning



### **Personnel qualification**

*This work requires accessing of the electrical control panel and must not be carried out by unqualified users, see  Chapter 2.2 'Users' qualifications' on page 9.*

- 1.▶ Press the  key
  - 2.▶ Press the  key
  - 3.▶ Press the  key
- ⇒ until the *[B5]* menu is displayed.
- 4.▶ Press the  key
  - 5.▶ Press the ,  and  key to set the weekday on which acid is to be metered. The initial setting is every day of the week.
  - 6.▶ Press the  key
- ⇒ The start time for acid cleaning starts to flash. The initial setting is 23.00 hours.
- 7.▶ Press the  or  key to set the first hour figure (0 ... 9)
  - 8.▶ Press the  key
  - 9.▶ Press the  or  key to set the second hour figure (0 ... 9)
  - 10.▶ Press the  key

- 11.▶ Press the  or  key to set the first minute figure (0 ... 9)
- 12.▶ Press the  key
- 13.▶ Press the  or  key to set the second minute figure (0 ... 9)
- 14.▶ Press the  key
  - ⇒ The end time for acid cleaning starts to flash. The initial setting is 23.01 hours.
- 15.▶ Press the  or  key to set the first hour figure (0 ... 9). This will be the same as the start time.
- 16.▶ Press the  key
- 17.▶ Press the  or  key to set the second hour figure (0 ... 9). This will be the same as the start time.
- 18.▶ Press the  key
- 19.▶ Press the  or  key to set the first minute figure (0 ... 9). This will be the same as the start time.
- 20.▶ Press the  key
- 21.▶ Press the  or  key to set the second minute figure (0 ... 9). This will be the same as the start time, plus 1 minute
- 22.▶ Press the  key
- 23.▶ Press the  key
  - ⇒ until the *[B7]* menu is displayed.
- 24.▶ Press the  key
  - ⇒ The pre-rinse time is displayed. The initial setting is 5 minutes.
- 25.▶ Press the  or  key to set the first minute figure (0 ... 9)
- 26.▶ Press the  key
- 27.▶ Press the  or  key to set the second minute figure (0 ... 9).
- 28.▶ Press the  key
- 29.▶ Press the  key
  - ⇒ until the *[B8]* menu is displayed.
- 30.▶ Press the  key
  - ⇒ The dosing time of the rinsing is displayed. The initial setting is 6 minutes (5 minutes pre-rinse time and 1 minute dosing time).
- 31.▶ Press the  or  key to set the first minute figure (0 ... 9)
- 32.▶ Press the  key
- 33.▶ Press the  or  key to set the second minute figure (0 ... 9).
- 34.▶ Press the  key
- 35.▶ Press the  key
  - ⇒ until the *[B9]* menu is displayed.
- 36.▶ Press the  key
  - ⇒ The duration of the rinsing time is displayed. The initial setting is 11 minutes (5 minutes pre-rinse time plus 1 minute dosing time plus 5 minutes rinsing time).
- 37.▶ Press the  or  key to set the first minute figure (0 ... 9)

- 38.▶ Press the  key
- 39.▶ Press the  or  key to set the second minute figure (0 ... 9).
- 40.▶ Press the  key
- 41.▶ Press the  key
- 42.▶ Press the  key

## 7 Maintenance

- **User qualification:** trained user, see [Chapter 2.2 'Users' qualifications'](#) on page 9



*Maintenance takes place every three months or earlier, if the application makes this necessary.*

### (Optional) cleaning the filter

1. ➤ Set the selection switch of the control to *[OFF]*
2. ➤ Close the stopcocks upstream and downstream of the filter
3. ➤ Open the drainage cock in the bottom of the filter
4. ➤ Unscrew the filter housing
  - ⇒ Remove the filter.
5. ➤ Clean the filter using a brush or running water
6. ➤ Place the filter in the filter housing and retighten the filter housing.
7. ➤ Close the drainage cock in the bottom of the filter
8. ➤ Open the stopcocks upstream and downstream of the filter
9. ➤ Set the selection switch of the control to *[AUTO]*

### Flushing the system

1. ➤ Switch the controller (e.g. D1C) to *[PAUSE]*
  - ⇒ The feeder stops.
2. ➤ Allow the feed pump to run in order to flush the mixing chamber with the water flow
3. ➤ Switch the controller (e.g. D1C) to *[CONTROL]*
  - ⇒ The feeder starts.

### Emptying the mixing chamber

1. ➤ Set the selection switch of the control to *[OFF]*
2. ➤ Close the stopcock
3. ➤ Open the ball valve
  - ⇒ The mixing chamber empties, however a residual amount of water remains in the mixing chamber.
4. ➤ Close the ball valve

### Checking the feed rate

You require a container of sufficient capacity for 2 minutes continuous filling.

1. ➤ Weigh the empty container
2. ➤ Place the container beneath the granulate outlet
3. ➤



*During this procedure also observe the operating instructions for your controller.*

Set the controller (e.g. D1C) to 1 minute at 100 % capacity of the feeder

4. ➤ End the feed process once one minute has elapsed

5. ▶ Weigh the granulate-filled container
6. ▶ Check whether the weight of the fed granulate quantity corresponds to the quantity necessary for your process
7. ▶ If necessary, adjust the feed rate, see ↗ *'Commissioning' on page 19* and repeat steps 2 - 6
8. ▶ As soon as the desired feed rate is achieved, return the system and controller to normal operation

### Cleaning the granulate feed lines

1. ▶ Set the selection switch of the control to *[OFF]*
2. ▶ Close the feeder stopcock
3. ▶ Unscrew the granulate feed line from the stopcock
4. ▶ Clean the granulate feed line



*The granulate feed line must be completely dry when reconnected.*

5. ▶ Refit the granulate feed line
6. ▶ Open the feeder stopcock
7. ▶ Set the selection switch of the control to *[AUTO]*

## 7.1 Troubleshooting

- **User qualification:** trained user, see ↗ *Chapter 2.2 'Users' qualifications' on page 9*



### **WARNING!**

#### **Danger from hazardous substances!**

Possible consequence: Fatal or very serious injuries.

Please ensure when handling hazardous substances that you have read the latest safety data sheets provided by the manufacture of the hazardous substance. The actions required are described in the safety data sheet. Check the safety data sheet regularly and replace, if necessary, as the hazard potential of a substance can be re-evaluated at any time based on new findings.

The system operator is responsible for ensuring that these safety data sheets are available and that they are kept up to date, as well as for producing an associated hazard assessment for the workstations affected.

## Fault messages

Fault message	Cause
[FEEDER FAULT]	<p>Granulate feeder is faulty</p> <ul style="list-style-type: none"> <li>■ Running time exceeded <ul style="list-style-type: none"> <li>– Acknowledge the fault message and restart the system</li> </ul> </li> <li>■ Granulate feeder defective <ul style="list-style-type: none"> <li>– Contact customer service</li> </ul> </li> </ul>
[FLOW FAULT]	<p>Flow too low</p> <ul style="list-style-type: none"> <li>■ Is the feed pump running?</li> <li>■ Are all ball valves in the feed and drain lines open?</li> <li>■ Is there free flow in all feed and drain lines and are they free from blockages?</li> </ul>
[LEAKAGE / HIGH LEVEL FAULT] (Indicator flashes)	<p>Mixing chamber has reached maximum level</p> <ul style="list-style-type: none"> <li>■ Is the feed pump transporting away sufficient solution?</li> <li>■ Is the float valve closing correctly?</li> <li>■ Is there free flow in all feed and drain lines and are they free from blockages?</li> </ul>
[LEAKAGE / HIGH LEVEL FAULT]	<p>Mixing chamber has exceeded maximum level</p> <ul style="list-style-type: none"> <li>■ Only enter the room wearing protective equipment <ul style="list-style-type: none"> <li>– Calcium hypochlorite has escaped, observe the safety data sheet</li> </ul> </li> <li>■ Observe the operational instructions for an accident involving calcium hypochlorite</li> </ul> <p>We recommend installation of a suitable gas detector. In this respect, note the current national regulations and legal standards which apply in your country</p>



*As soon as the fault is cleared, you can clear the fault message with the [ALARM RESET] key.*

**CAUTION!****Controller faults**

**Cause:** The controller signal defines the chlorine quantity added to the swimming pool water. If faults occur in the measuring and control technology, a too high dosing requirement is applied to the ProCal which results in overdosing of chlorine.

**Consequence:** Skin and airway irritation resulting from the overdosing of chlorine.

**Measure:** You can set the maximum ProCal running time in the ProCal control so that the dosing quantity is limited. A dangerous concentration is then impossible. Additionally you can configure the controller so that if a sample water fault occurs, metering is stopped and an alarm triggered.

Fault description	Cause	Remedy
No chlorine in the water	No granulate in the storage tank	Adding granulate
	Stopcock in the metering line closed	Open stopcock
Too high water level in the mixing chamber	A process component is faulty	Check the water pressure. Setpoint $\geq 0.8$ bar Check the filter Check the flow controller Check the feed and drain lines for blockages Check the float valve
No water flow (float DFM)	Feed pump defective	Check the feed pump
	Outlet blocked	Check the outlet for blockages
Feeder fault	Feed line to the feeder is blocked	Check and clean
	No granulate in the storage tank	Adding granulate
	Storage tank outlet blocked	Check and clean
	Controller defective	See the controller operating instructions A fault in the control can lead to over and under-dosing.

## 7.2 Disposal of used parts

- **Users' qualification:** instructed persons, see  *Chapter 2.2 'Users' qualifications' on page 9*



### NOTICE!

#### Regulations governing disposal of used parts

- Note the current national regulations and legal standards which apply in your country

ProMinent Dosiertechnik GmbH, Heidelberg will take back decontaminated used devices providing that they are covered by adequate postage.

## 8 Technical data

### Technical data

- Granulate metering: max. [Platzhalter] for chlorine metering up to no more than 4 kg/h
- Solution concentration: max. 1.4 g/l at flow = 3 m<sup>3</sup>/h
- Granulate specification: DIN EN 15796
- Process water flow: nom. 3 m<sup>3</sup>/h

### Electrical data

- Supply voltage: 240VAC / 50Hz (1/N/PE)
- Pre-fuse max. 16 A
- Power consumption: max. 1 kW
- Degree of protection control cabinets: IP65

### Switch inputs:

- 3 x potential-free contacts, contact loading: 24 V DC, max. 10 mA
  - 1 x controller input: Pulse-pause signal with any pulse elementary period (\*)
  - 1 x external leak sensor
  - 1 x pause input, external release
- (\*) The suitable pulse elementary period must match the control path, in general this must be chosen so that it is shorter for smaller pools than for larger pools. A pulse elementary period of 30 to 60 seconds is suitable for most swimming pools, however an optimisation is only possible in the overall context of the pool hydraulics.

### Switching power outputs:

- 2 x potential-free relay contacts: max. 230V, 5A
  - 1 x operating report: Contact type N.O.
  - 1 x fault message: Contact type N.C.

### Ambient conditions

- Note the current national regulations and legal standards which apply in your country
- Ensure a vibration, shock and oscillation-free set-up
- Ensure protection against climatic influences is provided
- Ensure protection against tampering is provided, e.g. separate lockable room with corresponding signage
- Ensure there is a clear floor drain in the installation room. The capacity of the floor drain must be greater than the maximum possible water quantity

The system is not suitable for mobile operation.

Storage and transport: Temperature: -10 °C to +70 °C Humidity: < 95 % relative air humidity, non-condensing

Operation: Temperature: +10 °C to +40 °C Humidity: < 95 % relative air humidity, non-condensing.

**Dimensions and weights:**

Description	Values and conditions
Empty weight:	68 kg
Transport weight incl. Euro-pallet:	88 kg
Weight when operating:	approx. 125kg
System dimensions:	900 mm x 1100 mm x 500 mm (W x H x D)
Transport dimensions on Euro-pallet:	1200 mm x 800 mm x 1270 mm (L x W x H)
Installation dimensions:	Width: 900 mm ➔ right space requirement for lines approx. 50 cm
	Height: 1100 mm ➔ clearance space requirement above for filling at least 70 cm.
	Depth: 500 mm ➔ in front of the system at least 1 m clear width for operation and maintenance
Water supply:	Connector DN25, max. priming pressure [Platzhalter}
Solution drain:	Connector DN25, max. back pressure 2 bar
Overflow/channel:	Connector DN 40, at atmospheric pressure/free flow in closed channel with odour trap/siphon trap

## 9 Appendix

### 9.1 Dimensions sheet

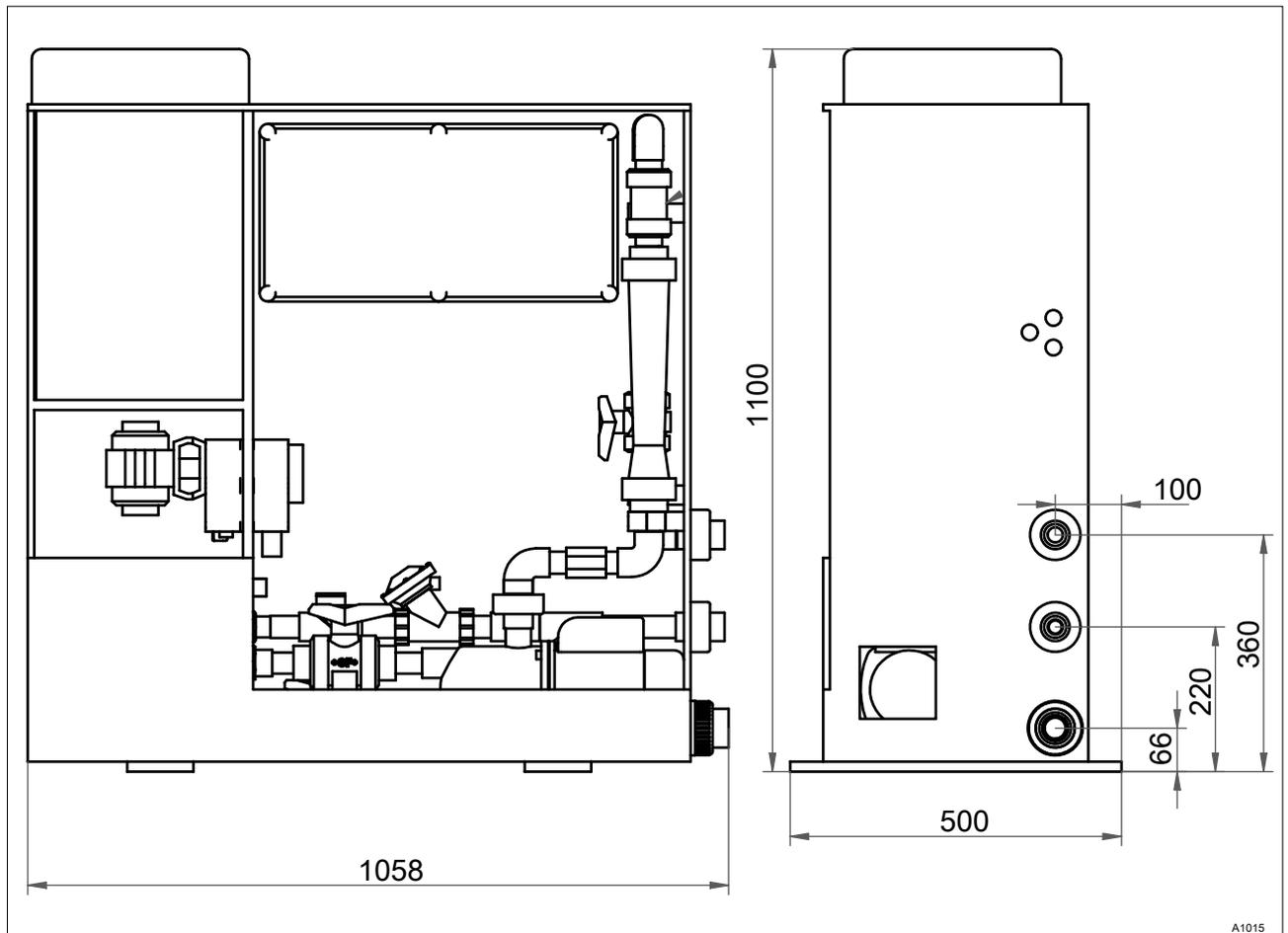


Fig. 9: All values given in millimetres

## 9.2 Declaration of Conformity

**ProMinent Systems s.r.o., Fügnerova ul. 567, 336 01 Blovice  
Czech Republic**

**EC DECLARATION OF CONFORMITY**  
Pursuant to section 13 of the Act no. 22/1997 Coll., as subsequently amended

**Producer:** ProMinent Systems s.r.o., Fügnerova ul. 567, 336 01 Blovice, ID: 48363448

**Product:** Equipment for preparation of calcium hypochlorite solution

**Type:** ProCal

**Year of manufacture:** 2012

**Equipment description:**  
The equipment ProCal is used for preparation of calcium hypochlorite solution (calcium salt of hypochlorous acid with the chemical formula  $\text{Ca}(\text{OCI})_2$ ) for disinfection of swimming-pool water. The granulate feeder ProCal prepares a solution of calcium hypochlorite with the required concentration from the dry granular hypochlorite. The disinfection solution is prepared in an integrated full automatic feeding unit and supplied to the swimming-pool water through by-pass piping. The feeding is controlled automatically.

**Method of conformity assessment:**  
The conformity was assessed in compliance with section 12, par. 3 letters a) and j) of the Act no. 22/1997 Coll. as subsequently amended, in accordance with the below stated technical regulations.

**Identification of the designated conformity assessment body:**  
**Strojirenský zkušební ústav, s.p., TI – technical inspection**  
Accredited inspection body no. 4008  
Hudcova 56b, 612 00 Brno  
Inspection certificate no.: I-63-0315/11/TC/T of 7 February, 2012

**Manufacturer's declaration:**  
The equipment meets the provisions of the relevant regulations of the European Community:

- Directive of the European Parliament and of the Council 2006/42/EC on machinery (corresponds to the government regulation no. 176/2008 Coll., on technical requirements for machinery)
- Directive of the European Parliament and of the Council 2006/95/EC on electrical equipment designed for use within certain voltage limits (corresponds to government regulation no. 17/2003 Coll., on technical requirements for low-voltage electric equipment)
- Directive of the European Parliament and of the Council 2004/108/EC on electromagnetic compatibility (corresponds to government regulation no. 616/2006 Coll., on technical requirements for electromagnetic compatibility of products)

**Czech harmonized and technical standards used:**

- ČSN EN 60204-1 ed.2: 2007	ČSN EN ISO 12100:2011	ČSN EN 61140 ed.2:2003
ČSN EN 60446 ed.2:2008	ČSN EN 61000-2-4 ed. 2:2003	ČSN EN 55011 ed. 3:2010
ČSN EN 953+A1:2009		

Blovice, 10.2.2012

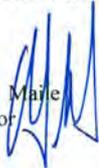
Dipl.-Ing. Stefan Majer  
Company Director 

Fig. 10: Declaration of Conformity

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