

Operating and installation instructions



Dosing system **GRANUDOS**

45/100 PLUS V70 Touch

and

Feed system **GRANUDOS PLUS**



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Imprint

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Subject to technical changes

These operating instructions are based on the German original provided by the WDT company.

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1 Information regarding these instructions / general information

1.1 Scope of validity

These instructions describe the function, installation, commissioning, and operation of the GRANUDOS PLUS V70 Touch dosing system and the GRANUDOS-PLUS feed system with their appropriate accessories,
These operating instructions must be carefully read before use and must be stored near the device for immediate use.

1.2 Target group

Only our authorised partners and persons who were instructed regarding the device functions and have read and understood the operating instructions may work on the system.
Electrotechnical connection work may only be performed by appropriately trained specialist staff!

1.3 Symbols used

The following types of safety instructions and general instructions are used in this document:



DANGER !

“DANGER” identifies a safety instruction that is neglected at the risk of **severe or life-threatening injuries or major damage to goods!**



CAUTION !

“CAUTION” identifies safety instructions that are neglected at the risk of **injuries, damage to health or damage to goods!**



ATTENTION !

“ATTENTION” identifies safety instructions that are neglected at the risk of **damage to goods!**



CAUTIC !

"Caustic" identifies a safety instruction that is neglected during handling of chemicals at the risk of **injuries** or **damage to goods**.



ESD-SENSITIVE !

"ESD SENSITIVE" identifies electronic components that can be damaged by electrostatic discharge. The generally known precautions regarding ESD-sensitive devices must be adhered to when handling these devices!



Hint !

A "HINT" characterises information that may help to improve the operation.



Mandatory sign

Use face protection!



Mandatory sign

Use protective gloves! According DIN EN 374



Mandatory sign

Use protective apron!



Mandatory sign

Use protective boots!

1.4 Warranty

All devices and systems of the WDT company are produced using the latest production methods and comprehensive quality control. Please send your warranty claims according to the general warranty conditions (see below) to WDT should there nevertheless be a reason for complaint.

General warranty conditions

WDT provides a warranty for 2 years from the date of commissioning, a maximum period of 27 months after delivery, assuming correct installation and commissioning with completed and signed commissioning protocol.

Wearing parts such as seals, hoses, membranes, dosing screw conveyors, electrodes, roller carriers and other parts that are subject to mechanical or chemical wear are excluded. We provide a warranty for half a year on those parts.

Our ERP programme requires an invoice for each delivery (also for warranty services). Customers will receive a credit note after returning the faulty part and its inspection as required. Please return goods within 14 days.

Costs for consequential damage and costs resulting from handling warranty claims are excluded.

Warranty claims are not valid when the damage was caused by frost, water, over-voltage or inappropriate handling.



Hint !

Please send a completed commissioning protocol together with the defective part to WDT to maintain your warranty claims. We reserve the right to settle the warranty claim when no commissioning protocol is available.



ATTENTION !

Modification of the device is not permitted. Warranty and product liability claims become void when this requirement is not fulfilled.

1.5 Further information

Further information regarding specific topics such as layout of the dosing performance or description of the operating parameters is available from your specialist dealer or directly from:

Company WDT Werner Dosierttechnik GmbH & Co KG

Hettlinger Straße 17

86637 Wertingen - Geratshofen

Tel. +49 8272 98697-0

Fax. +49 8272 98697-19

<http://www.werner-dosierttechnik.de>

2 Safety

2.1 Appropriate use

The GRANUDOS PLUS Touch dosing system and the GRANUDOS PLUS feed system may only be used for the purpose defined in *Section 3.2, Product description!* The locally applicable regulations regarding accident prevention, worker safety and drinking water protection must be adhered to.

2.2 Safety instructions:

The operating instructions must be carefully read and considered before installation and use!

Work on the system and changes to the settings may only be performed by instructed persons!

2.2.1 Handling of chemicals, risks to persons and the environment

In emergencies relating to the handling of chemicals, you can contact a Poison Emergency Call Centre!

Emergency call number:

Poison Emergency Call Munich (or any other poison centre)

Telephone: +49 89 19240

Extract from the GUV-V D 5 accident prevention regulations

Installation rooms for chlorination systems and storage rooms

§ 3a. (1) Chlorination systems must be installed in lockable rooms and the chemicals intended for chlorination must be installed in lockable rooms.

To § 3a Section 1:

These requirements are intended to protect the chlorination systems and chemicals against weather effects and access by unauthorised parties.

(2) Rooms according to Section 1 may not be intended for permanent use by people.

To § 3a Section 2:

..... "Permanent" use is given when persons remain longer than 2 hours per day in a room. Repair and maintenance work on the chlorinating system are exempt.

2.2.2 Protective measures and behavioral rules



DANGER ! CAUSTIC ! PROTECTIVE EQUIPMENT !

The GRANUDOS PLUS dosing system doses the calcium hypochlorite granulate (generally called: chlorine pellets) as well as the pH-reducer from the dosing canister.

These substances react strongly on contact and produce chlorine gas when combined outside of water. It is therefore essential to perform all work with these chemicals very diligently and to wear personal protective equipment: Face protection, protective gloves, protective apron, and boots.

The chlorine granulate and the sulphuric acid may not be mixed with each other or with other chemicals and substances!



Store the chemicals to ensure that unauthorised persons cannot access them.

The information in **Section 3.5.1, Storage of chemicals** must be taken in account when storing chemicals.



More information is provided in the safety data sheets of the chemical substance producers!



CAUTION !

When water from the drinking water network is used to supply the GRANUDOS dosing system, a system separation according to the locally valid, legal regulations (in Germany and EU DIN EN 1717: 2011-08) must be installed to prevent the reflux of the water in the event of a sudden pressure drop in the network!



ATTENTION !

The electrical components in the control units of the systems are sensitive towards electrostatic discharge. The generally known precautions regarding ESD-sensitive devices must be adhered to when handling these devices!

- Disconnect the system from the power supply
- Discharge the personal static charge

3 Product description - delivery scope

3.1 Delivery scope / accessories

Dosing system for disinfection of multi-basin systems with calcium hypochlorite. The delivery scope includes the "GRANUDOS PLUS V70 Touch" dosing system consisting of the following components:

- Standing column with rotatable drum holder
- Dosing device for chlorine granulate
- Dosing device for acid
- Dissolving system
- Control with 7" Touch colour display

The following options are available for the dosing system

1. **Feed system** for distribution of the chlorine solution to several basin circuits consisting of:
 - a) Buffer container incl. protective tray, integrated into the feed system
 - b) Feed system with pump and pipes
 - c) Distribution system / dosing lines for the chlorine solution. (number freely selectable)
2. **Buffer container** with or without protective tray
3. **pH monitoring** to control the pH value
4. **Dust extraction** for dusty granulates

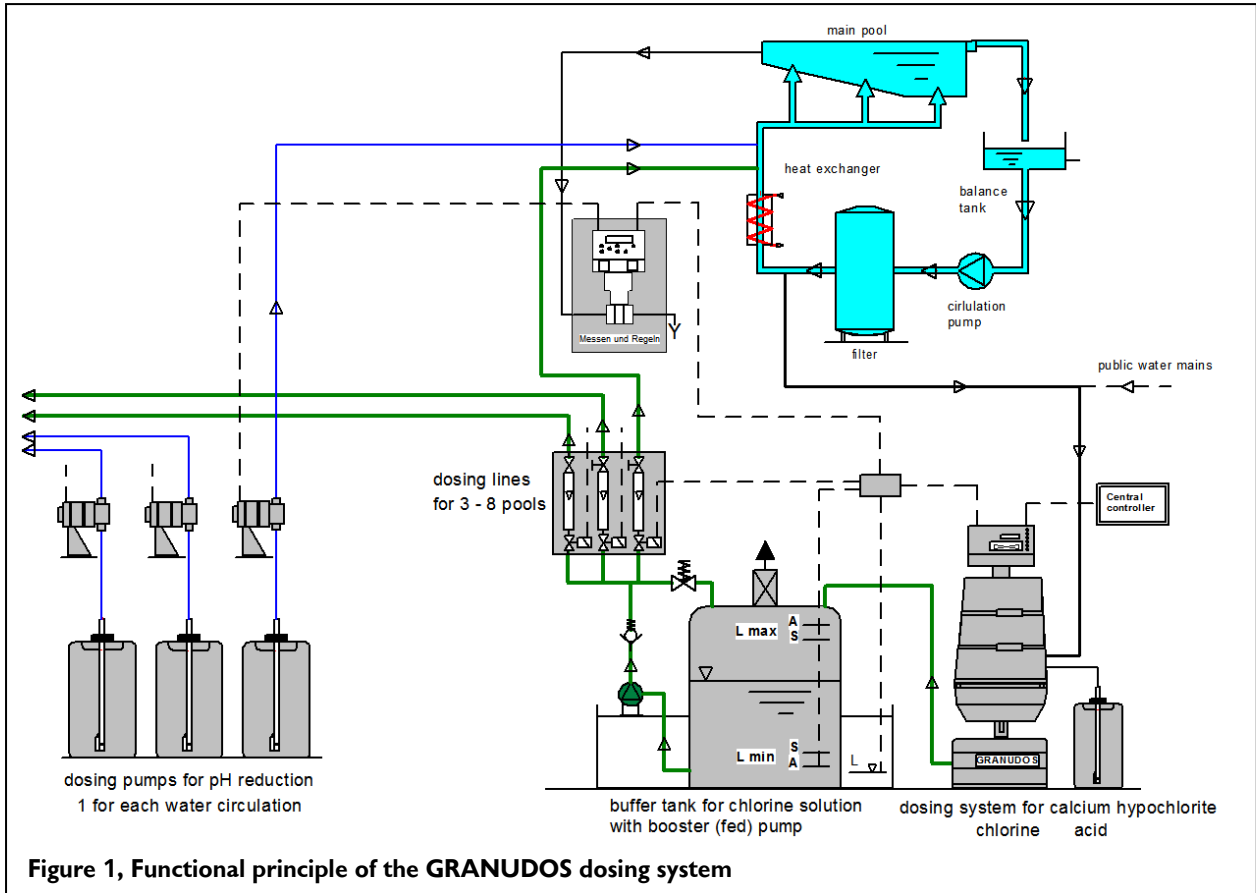
3.2 Product description

3.2.1 The function of the GRANUDOS PLUS system

Dosing device:

The GRANUDOS PLUS Touch dosing system uses calcium hypochlorite granulate and acid to provide a pH-neutral, very weakly concentrated chlorine solution (max. 0.35% chlorine) for disinfection of swimming pool water. The chlorine granulate and the acid required for neutralisation are alternately dosed into the dissolving system, with intermediate pauses. The chemicals dosed are fully dissolved and moved to the buffer container of the feed system using an injector system.

The functional principle of the GRANUDOS PLUS dosing system.



3.2.2 Standing column with drum holder (series)

A drum holder (1) is rotary-mounted in the stable standing column. The chlorine drum (14) is placed onto the drum holder and attached to the back wall with 2 fastening straps (2). The drum is held against the reinforced grip rim by a crossbar. After turning the drum holder with the attached drum, the drum will be in dosing position. The spring lever (9) locks the drum holder in the drum exchange or dosing position. The acid pump (10) for dosing the pH-reducer and the dirt filter for the motive water pump of the dissolving system are attached to the standing column.

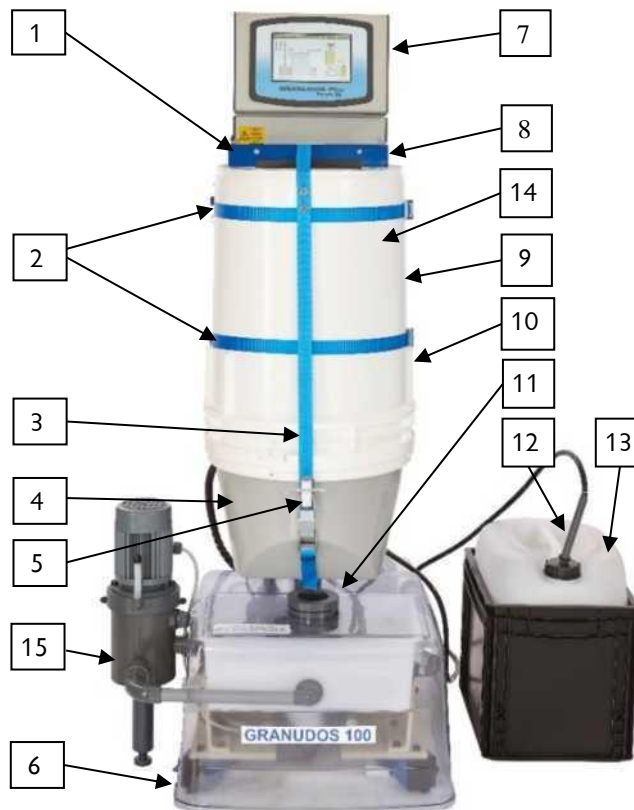


Figure 2, GRANUDOS PLUS V70 Touch

1. Drum holder
2. Fastening straps
3. Safety belt
4. Dosing head
5. Clamping lever for safety belt
6. Dissolving system
7. Control
8. Name plate (right at the stand pipe)
9. Spring lever for reversing device (hidden)
10. Acid pump (hidden)
11. Dust protection
12. Suction lance for acid
13. Acid canister with protective tray
14. Chlorine drum
15. Dust extraction

3.2.3 Chlorine dosing (series)

The dosing head shown is screwed on top of the chlorine drum. It is used for dosing the chlorine granulate into the dissolving system.

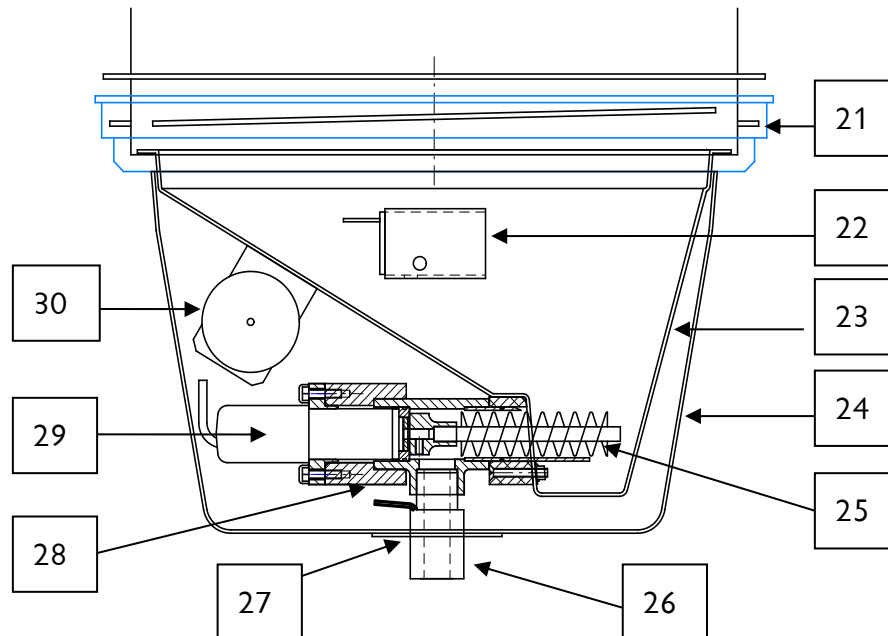


Figure 3, Dosing head for chlorine granulate

- 21. Screw ring (with drum thread)
- 22. Chlorine-empty switch
- 23. Dosing hopper
- 24. Protective hood
- 25. Dosing worm
- 26. Heating pipe (with dosing pipe)
- 27. Sealing disk
- 28. Motor mount with screw pipe
- 29. Dosing motor
- 30. Solenoid knocker

The dosing screw (25) transports the calcium hypochlorite granulate from the Dosing hopper (23) into the Rinsing pipe (34) of the dissolving system located below it. A Solenoid knocker (30) has been installed to loosen up the chlorine. It provides a brief tap on the dosing hopper at every dosing process to prevent the granulate from forming bridges in the dosing line.

The chlorine dosing is arranged alternately with the acid and is monitored. (see Section 3.2.6, Controller) The chlorine content in the drum is continuously calculated by the controller and a flashing Chlorine Reserve message is shown in the flow diagram when the predefined, adjustable amount of chlorine has been consumed. The granulate filling level is shown on the display. The dosing is stopped as soon as the "Chlorine-empty switch" (22) has been triggered.

The dosing performance is adjusted in the menu point Menu → Settings and must be set sufficiently high to ensure that there will be enough chlorine when all the basins require it. **A dose adjustment of less than 50% is not possible!**

3.2.4 Dissolving system (series)

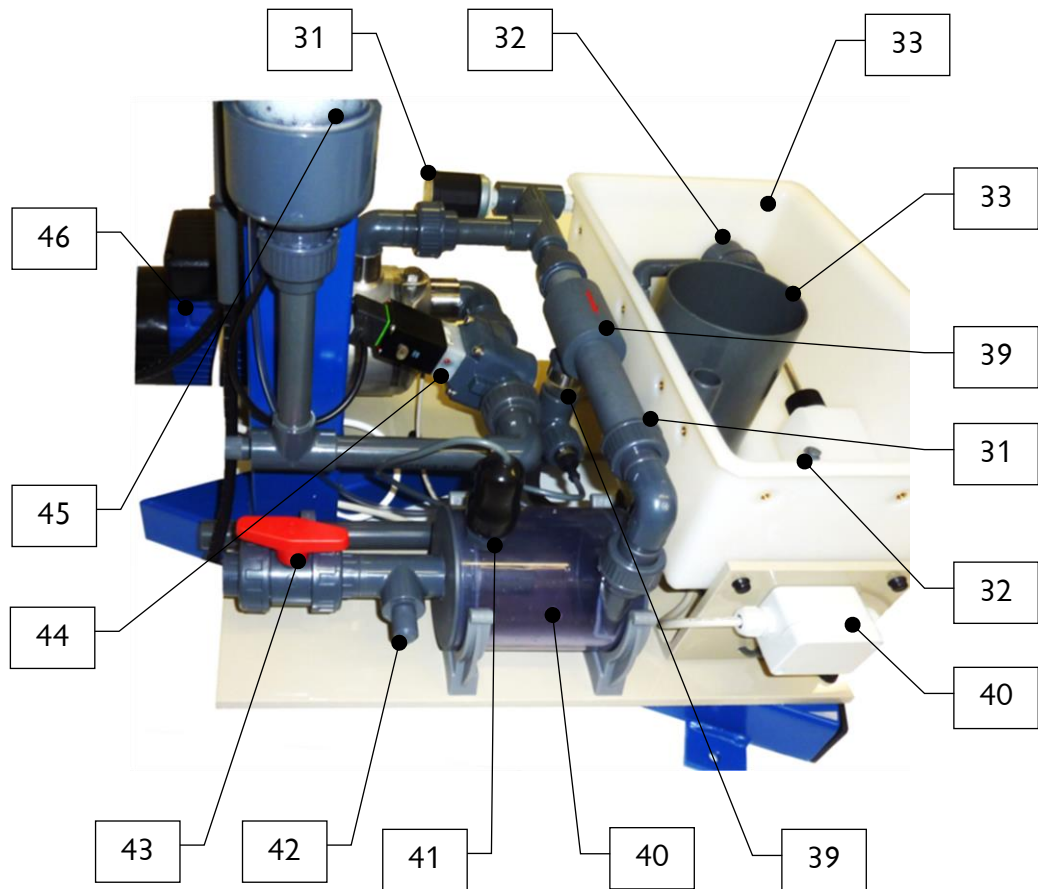


Figure 4, Dissolving system

- 31. Pressure switch
- 32. Rinsing tray inlet float regulator valve
- 33. Rinsing tray
- 34. Rinsing pipe
- 35. Injector
- 36. Screw connection with hole disk
- 37. Level switch min./max. Rinsing tray
- 38. Clamping socket for switch
- 39. Rinsing tray flow switch
- 40. Dissolving cyclone
- 41. Chlorine-missing switch / sensor at cyclone
- 42. Connection for manometer
- 43. Operating water outlet ball valve
- 44. Control valve for dissolving water
- 45. Dirt filter d75mm
- 46. Motive water pump (different versions)

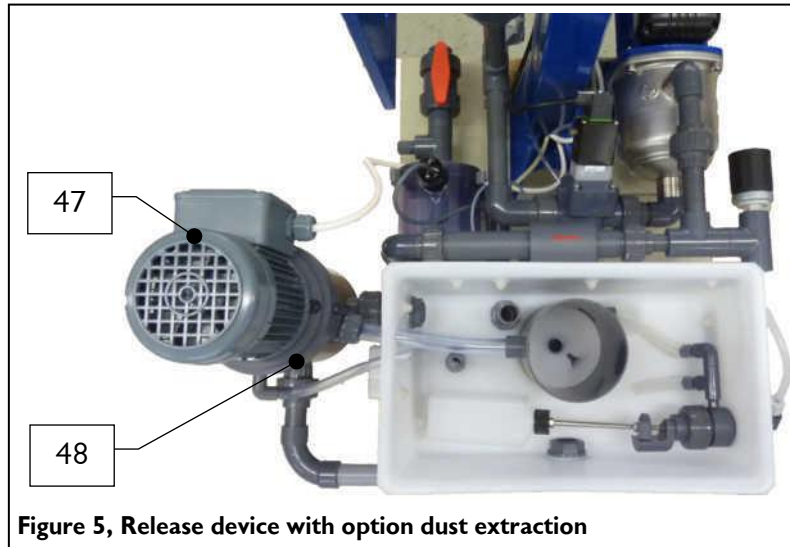


Figure 5, Release device with option dust extraction

- 47. Motor dust extraction
- 48. Blower dust extraction

The chemicals are dissolved separately from each other in the dissolving system. The control valve (44) opens when the starting level in the buffer tank has been reached. The dissolving water is divided downstream of the motive water pump (46). The particle stream is ducted via the float regulator valve (32) into the rinsing tray (33). From there, it is sucked off by the injector (35) together with the chemicals dosed in the rinsing pipe (34). The dissolving cyclone (40) circulates the calcium hypochlorite granulate until it has completely been dissolved. An optical sensor (41) detects the chlorine granulate dosed, which can be seen in the cyclone shortly after the start of dosing. The controller reports a fault and the dosing is interrupted when no chlorine is measured 8 seconds after the start of the 2nd dosing cycle.

The following safety package is installed to ensure that chlorine granulate and acid cannot mix and react with each other in the open part of the dissolving system:

- The dosing of the two chemicals takes place in fixed cycles with pauses between the dosing steps.
The power supplies of the two dosing motors are interlocked by a relay system that ensures that **the two motors can never operate at the same time!**
- The water supply and the water flow is monitored by pressure switches (31), level switches (37) and flow switches (39).
- Dosing only takes place when the water flow is ensured.
- The dosing system is stopped and an appropriate fault message is generated when a deviation from the set target values occurs.



ATTENTION !

The use of sulphuric acid up to a concentration of 50% is generally possible. Changes in the dosing performance and/or increased corrosiveness have to be considered when a higher concentration

or other acids (e.g. nitric acid, dissolved Na-bisulphate or others) are used! It is recommended to contact the manufacturer!

The dissolving water supply must be separated from the filter function of the swimming pool. This can be done in 2 ways: (also see presentation in Section 4.4.1, *Connection of the GRANUDOS PLUS dosing system*).

1. Sampling from the water cycle downstream of the swimming pool filter. The **flow pressure in the intake** of the GRANUDOS PLUS must at least be 0.2 barg for this purpose.
2. Supply with public water mains – **only when Point 1 cannot be implemented!**
 - It is in this case mandatory to install **System separation for drinking water according to DIN EN 1717:2011-2008!** The flow pressure at the pressure reducer must be between 2.5 and 3.0 barg.



ATTENTION !

The flow pressure may not be higher than 1.2 barg when the swimming pool water supply is switched to public water mains supply without de-installing the motive water pump!

3.2.5 Acid dosing (series)

Acid dosing by the GRANUDOS PLUS aims at complete dissolution and neutralisation of the chlorine granulate. This creates hypochloric acid. Each kg chlorine granulate requires the supply of approx. 0.5-1.0 litres of 37% sulphuric acid. For this aim a hose pump is installed standard.

The acid dosing must be adjusted to the chlorine dosing during initial operation so that the pH value of the chlorine solution in the buffer tank is 6.8 to 7.2. The calcium hypochlorite is then completely dissolved. The solution is clear for practical purposes and has no strong chlorine smell. The solution smells strongly of chlorine and is more corrosive when the pH value is too low. The solution is murky and forms sediments/ deposits in the buffer tank and the dosing lines when the pH Value is too high. The correct dosing ratio is set after measuring the pH value.



Figure 6, Dosing pump

The hose pump sucks the acid out of the acid canister. The filling level in the acid canister is measured by a level switch for the empty message. Dosing is switched off when the message **Acid empty** is shown, as the production of hypochloric acid is no longer ensured. The filling level of the canister is calculated on an ongoing basis and a **Reserve** message is shown in the flow diagram when the dosing volume set is exceeded.

The dosing performance, like that for chlorine, is set in the menu point **Menu** → **Settings**.

Use acid based on 37-50% sulphuric acid as pH reducer. Concentrated nitric acid destroys the hose pump - dilute to below 10%. Sodium bisulphate "dry acid" solutions should not have concentrations higher than 20% (corresponds to 10% sulphuric acid). It must be considered whether this acid performance is sufficient for neutralisation.

In special cases, e.g. when water is very hard and/or has a high pH value and/or a very high dosing performance is required, it is recommended to use nitric acid instead of sulphuric acid in order to prevent possible formation of gypsum residues due to high sulphate concentrations in the buffer tank.



CAUTION !

With a hydrochloric acid concentration of more than 10%, a Viton hose must be inserted in the peristaltic pump! This is resistant up to a maximum of 33% acid content. This hose must be replaced every 6 months!

3.2.6 Control (series)

Control (GRANUDOS PLUS V70 Touch)

The controller is located in a dust-proof and splash-water proof housing (protection type IP 54). External switches and remote fault messages are connected in the bottom part of the housing.

The micro-processor-supported controller of the GRANUDOS PLUS V70 Touch can be simply and consistently operated by using the 7" Touch display.

Showing the functions in an active flow diagram provides direct information on operating states and faults.

The start display:

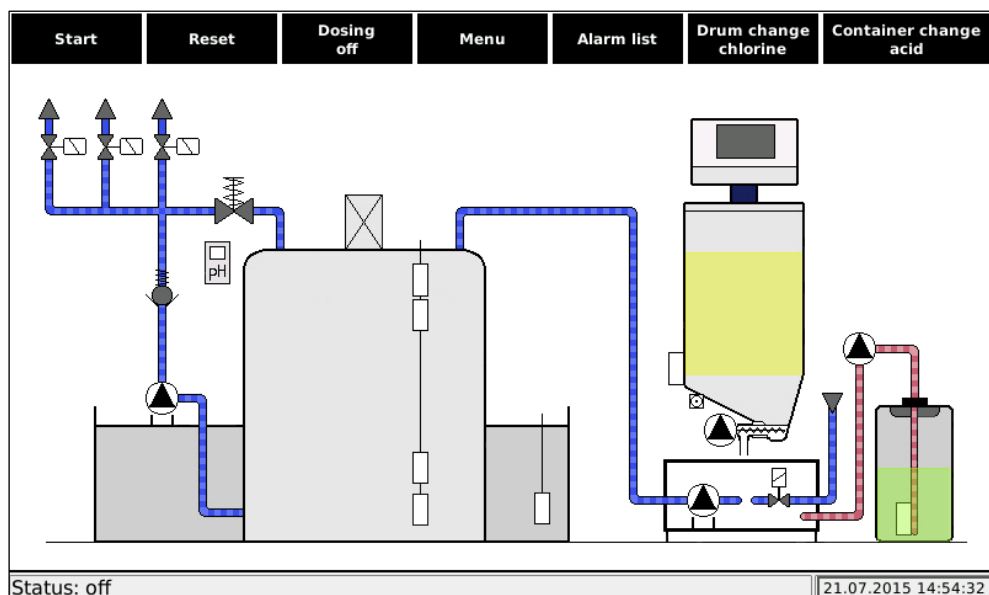


Figure 7, Start display

3.2.7 Feed system (option)

The GRANUDOS PLUS feed system is used to distribute the pH-neutral chlorine solution produced by the GRANUDOS PLUS dosing system to the individual pool circuits. The feed pump in combination with the pressure retention valve creates even preliminary pressure for the supply of the dosing lines, independently of the number of open dosing lines. This implies that the same flow is achieved whenever a control valve is opened.



Figure 8, Feed system

The standard feed system consists of a:

- a) 300 l buffer container including protecting tray
- b) magnetic rotation pump with PVDF head and piping as well as
- c) distribution system / dosing lines for the chlorine solution.

Optional accessories:

- d) pH monitoring

On a) Buffer container integrated into the feed system

The buffer container has a capacity of 300 l and has a 4-way level switch installed. Filling the buffer tank is elusively controlled with a level switch in the buffer tank. The dissolving water supply is blocked by a solenoid valve once the buffer tank has been filled with chlorine solution.

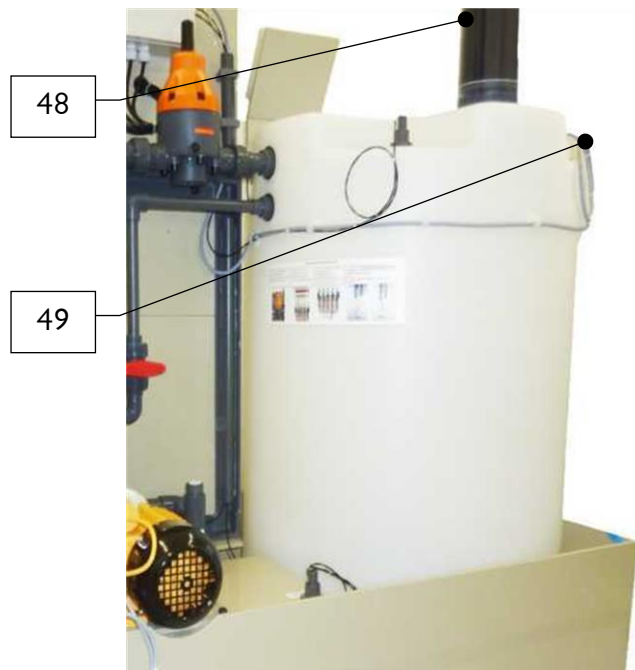


Figure 9, Integrated buffer tank, view from the rear

Also see *Figure 14, Buffertank without protective tray*
A detailed description is provided in *Section 3.2.8.*

On b) Feed pump with pipes

The magnetically coupled feed pump (55) with PVDF head is resistant against corrosive chlorine solution.

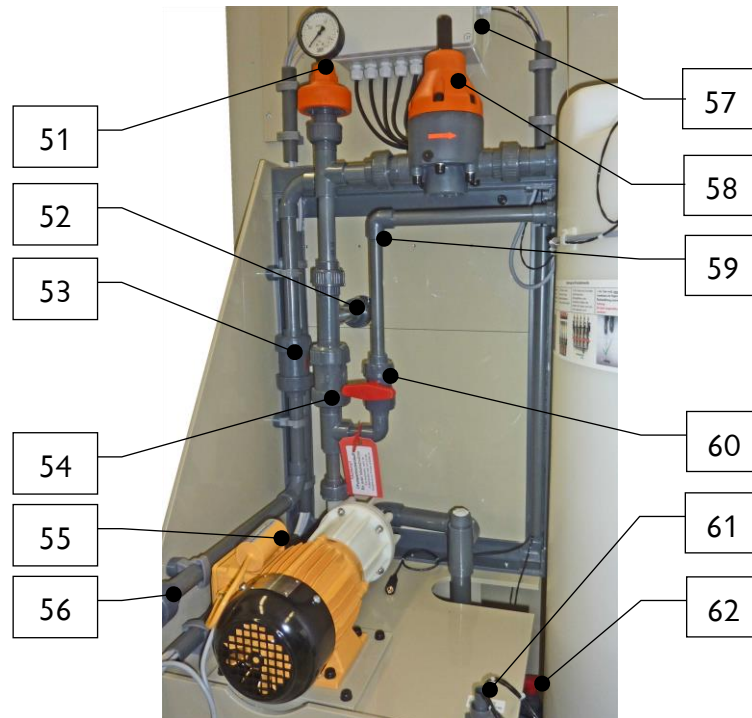


Figure 10, Piping feed pump

- 51. Pressure transmitter with manometer
- 52. T-piece to distribution plate
- 53. Reflux valve in the filling line
- 54. Reflux valve for the feed pump
- 55. Feed pump
- 56. Filling line from GRANUDOS
- 57. Terminal box to connect the control valves
- 58. Pressure retention valve
- 59. Bleeding line for the feed pump
- 60. Ball valve for bleeding
- 61. Alarm switch in the collecting tray
- 62. Suction line of the buffer tank with ball valve

Three feed pumps with and without frequency converter are available for different pressure situations in processing systems (see Technical Data in Section 3.4).

On c) Distribution system / dosing lines for chloride solution

The whole distribution system for the chloride solution is installed on the feed system and ready for use.

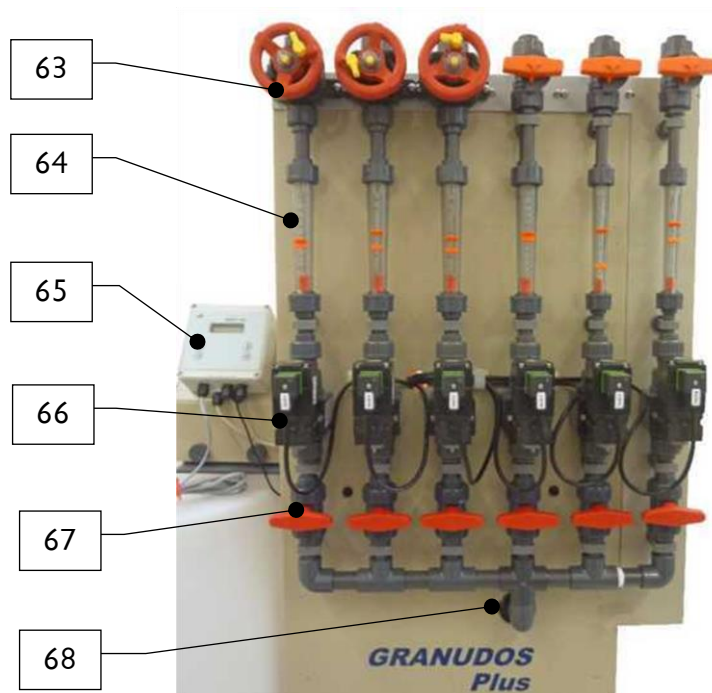


Figure 11, Distribution system

The dosing lines consist of the following components:

- 63. Membrane valves or dosing ball valves for setting the flow or dosing performance required (1)
- 64. Flow meter to indicate the flow performance (1)
- 65. pH monitoring (option)
- 66. Solenoid valves controlled by measuring and control equipment for free chlorine
- 67. Ball valves
- 68. Screw connection of the feed pump

The flow performance required is determined from the chlorine concentration in the solution and the required dosing performance regarding free chlorine. See Section 5.2.11, Dosing performance assessment = Nominal performance of the granulate dosing at the initial operation.

A relay system separates the power supply to the control valves, when the feed pump is switched off due to a fault message in the GRANUDOS system. This causes the control valves to close. The dosing lines must be equipped with reflux valves provided by the customer to prevent reflux from the swimming pool into the buffer tank (in case a control valve does not fully close).



ATTENTION !

Ball reflux valves must in all cases be installed in dosing lines by the customer to provide additional protection!

On d) pH monitoring (option)

When the filling of the buffer tank does not reach the chlorine dosing target value, the acid dosing, which is set to a constant value, will create an acidic chlorine solution that will then be dispensed by the measurement and control system when more chlorine is required. This would reduce the pH value in the basin. The pH value of the chloride solution is measured to prevent this. Filling is stopped and an alarm is reported when the set target range for the pH value is exceeded.

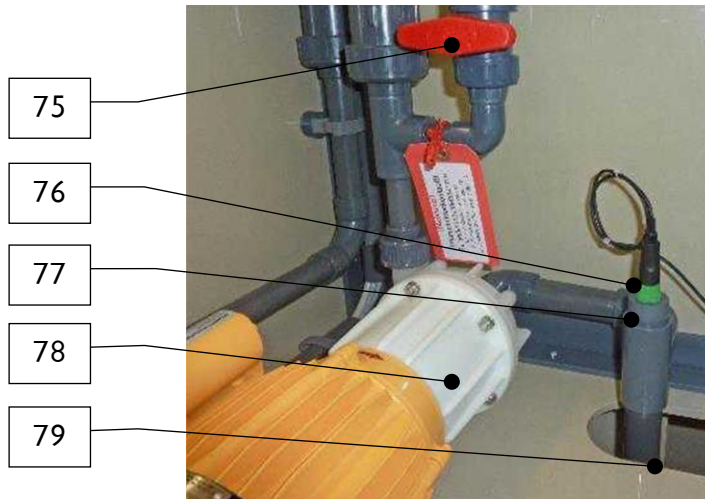


Figure12, pH measuring probe

- 75. Ball valve for bleeding
- 76. pH electrode
- 77. Adapter PG13,5 for the pH electrode
- 78. Head of the feed pump
- 79. Connection to suction tubing in the buffer tank

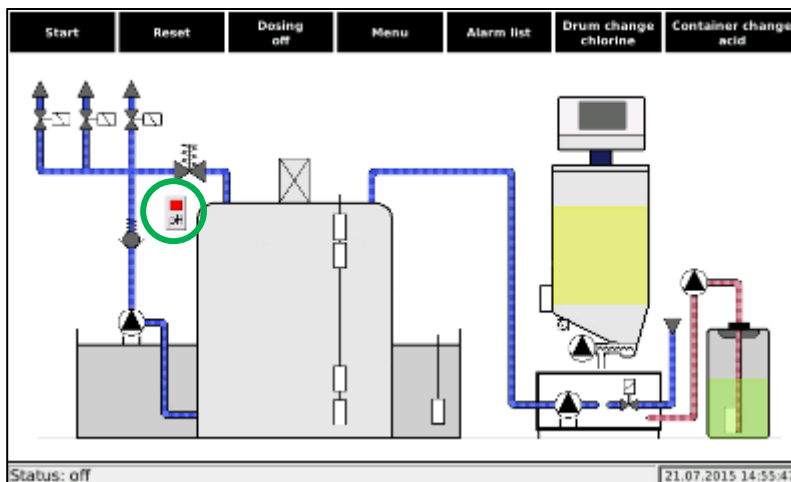


Figure 13, pH value fault message

3.2.8 Buffer container separate, with/without protective tray (option)

- 81. Active carbon filter
- 82. Collecting tray PP, not shown
- 83. 4-way level switch, Level L min. alarm
Level L min.
Level L max.
Level L max. alarm
- 84. Alarm switch in collecting tray (not shown)
- 85. Buffer tank 300 l PE

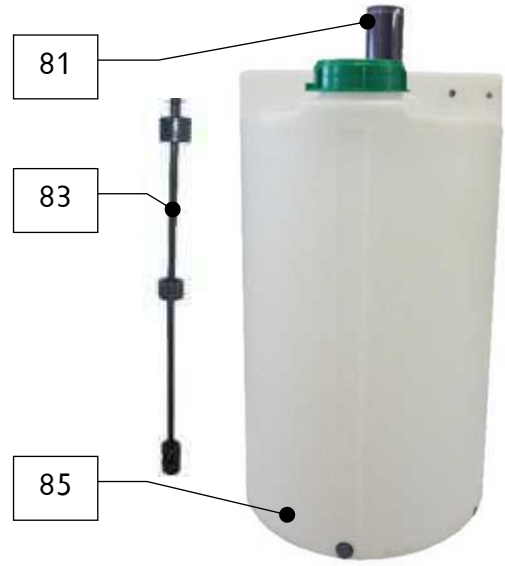


Figure 14, Buffertank without protective tray

1. The lower buffer tank control lever L min. initiates the GRANUDOS PLUS to fill the buffer tank
2. The upper control level L max. terminates filling of the buffer tank by the GRANUDOS PLUS, followed by a rinsing cycle to clean the dissolving system: first 20 seconds with acid, then another 20 seconds with plain water.
3. The feed pump is switched off and the appropriate alarm message is shown on the display in the event of a Level L min. alarm,
4. The filling process is switched off and the feed pump continues running in the event of Level L max. alarm.

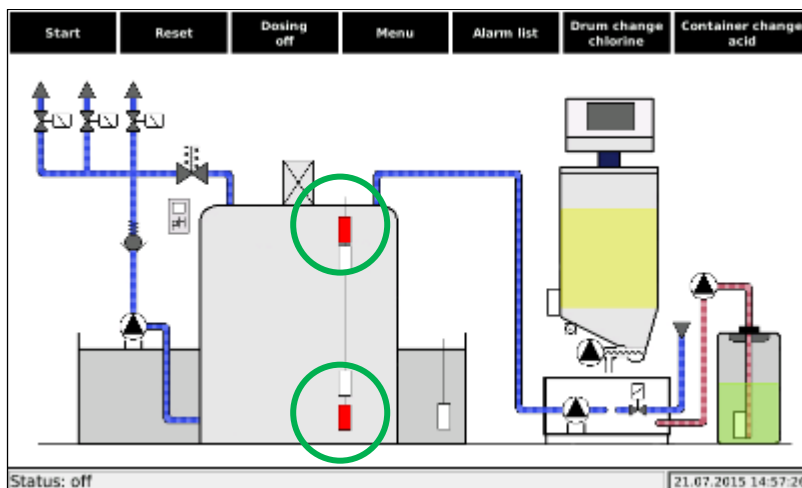


Figure 15, Fault message L min. alarm and L max. alarm regarding the buffer tank

Contact positions

The contacts of the level switches are set as follows when the container is half full:

Level L min.	open
Level L min. alarm	open
Level L max.	open
Level L max. alarm	closed

An active carbon filter (81) is screwed on top of the buffer tank. It is used to clean the chlorine-polluted air during filling of the buffer tank and for ventilating and bleeding.

The buffer tank is located in the collecting tray (82, not shown). The following causes are possible when the level switch (61, Page **Fehler! Textmarke nicht definiert.**) in the collecting tray reports a fault:

1. There is a leak in the buffer tank or in the pipes.
2. The upper level switch in the buffer tank intended to stop the filling process does not work.
3. Reflux out of a dosing line from the swimming pool, when the feed pump is switched off, the solenoid valve is not closing and the reflux valve leaks.

In each of these cases, the GRANUDOS dosing system switches off, the feed pump continues to run or restarts and in cases 2 and 3.

3.2.9 Dust extraction (option)

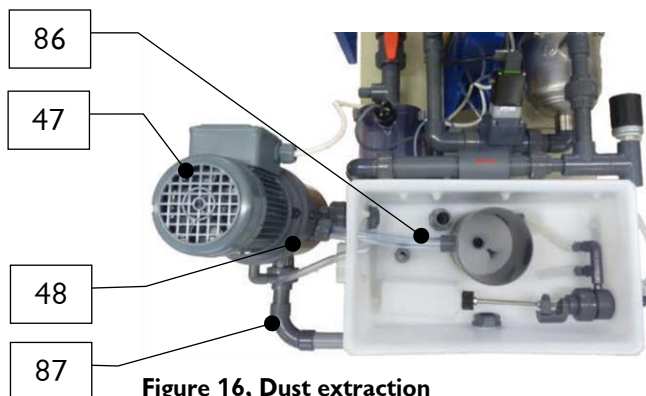


Figure 16, Dust extraction

The dust extraction serves as support to avoid dust in the dosing system GRANUDOS. In case of granulates with a higher dust volume, there can be a small outlet of dust at the device. This dust will deposit itself then on the cover hood. To avoid this, a small vacuum is generated in the blower tank with the aid of a blower (48). Through this hose (86) the dust is sucked into the rinsing pipe and the blower tank. Through the connection (87) with the rinsing tray and the circulating water, the dust stays in the release system of the Granudos.


The mixer is assembled on the cover of the mixing tank. In order to guarantee a ventilation a pipe with bow is installed on the cover at the side of the water return line.

3.3 Identification of the device / name plate

3.3.1 Name plate GRANUDOS PLUS V70 Touch

Enter the data on the name plate of your device here.

- Array 1: Complete the type description
- Array 2: Enter the drum type
- Array 3: Item no.:
- Array 4: Serial no.:
- Array 5: Enter the current
- Array 6: Enter the production date

Typ: GR <input type="text"/> Plus/V70T/ <input type="text"/>
Art.: <input type="text"/> Serien Nr.: <input type="text"/>
230V/AC 1Ph~ 50Hz I_{max.} <input type="text"/> A
Dosierleistung 2kg/h-2l/h Cl/Ph
Herstellung: <input type="text"/>
 WDT - Werner Dosiertechnik GmbH & Co. KG
Hettlinger Str. 17
D-86637-Wertingen

3.3.2 Name plate Feed system GRANUDOS PLUS

Enter the data on the name plate of your device here.

- Array 1: Complete the type description
- Array 2: Enter the item number
- Array 3: Serial no. Enter the serial number
- Array 4: Enter the connecting voltage in Volt
- Array 5: Enter the number of phases (ph)
- Array 6: Enter the maximum current in Ampere
- Array 7: Enter the production date

Typ: FA GR PL300 <input type="text"/>
Art.: <input type="text"/> Serien Nr.: <input type="text"/>
<input type="text"/> V/AC <input type="text"/> Ph ~ 50Hz I max. <input type="text"/> A
Pufferbehälter 300 Liter, 130-1000l/h
Herstellung <input type="text"/>
 WDT-Werner Dosiertechnik GmbH & Co. KG
Hettlinger Str. 17
D-86637-Wertingen

3.4 Technical data

	GRANUDOS PLUS 45/100	Feed system GRANUDOS PLUS
Dimensions and weights:		
Dimensions	W 70cm, D 70cm, H 140cm	W 120cm, D 80cm, H 200cm
Space requirements device (pedestal)	W 130cm, D 80cm	W 120cm, D 80cm
Space requirements incl. operation and maintenance	W 130cm, D 160cm	W 120cm, D 160cm
Empty weight / operating weight	Approx. 50kg / 100kg	Approx. 70kg / 370kg
Connection data		
Electrical connection data	230VAC, 50Hz, 0.4kW Two-pin earthed plug	a) 230VAC, 50Hz, 0.55kW b) 400VAC, 50Hz, 1.1kW
Front plate fuse	Microfuse 6.3A with time lag	
Fuse F1 chlorine dosing motor	Microfuse 315mA with time lag	
Hydraulic connection data	Inlet DN 20 Outlet DN20	Inlet DN 20 Outlet DN 15
Drain connection required	Minimum DN25	
Protection class	IP54	IP54
Operating pressure Required inlet pressure Back pressure	max. 2.5barg min. 0.2barg max. 1.4barg (depending on the inlet pressure)	max. 1.7barg
Dissolving water supply	From the swimming pool cycle with motive water pump (MWP): 0.3kW, 230VAC min. 0.2barg With public water mains and without motive water pump (MWP): minimum 3.0barg (EU: System separation required!)	
Operating data:		
Dosing performance GR 45	Chlorine: 1 - 2kg/h ⁽¹⁾ Acid: max. 3l/h ⁽²⁾	
Dosing performance GR 100	Chlorine: 2-4kg/h ⁽¹⁾ Acid: max. 3l/h ⁽²⁾	
Total water throughput set for all dosing lines		max. 1200l/h
Filling performance of the dosing device	max. 1200l/h	
Motive water pump	0.39kW, 230V, 1.95A	
Feed pump		until 1barg: 0.55kW, 230VAC, 50Hz, 1ph until 1.7bar: 1.1kW, 230VAC, 50Hz, 1ph with FC until 1.5barg: 1.1kW, 400VAC, 3ph ⁽³⁾
Medium temperature Ambient temperature Humidity in utility room	5°C to 35°C 5°C to 3 °C max. : 70% (not condensing)	5°C to 35°C 5°C to 35°C max. : 70% (not condensing)
Concentration of hypochloric acid	Granudos 45: max. 0.2% Granudos 100: max. 0.35%	
Ventilation of the room	According DIN 19643	
Material	Standing column and drum holder: Galvanised and powder-coated steel Other functional parts: PVC or PE Seals: EPDM, Viton	PVC or PE Seals: Viton
Software version	1.2.1	
Hardware version	I/O board: IO-GRD-7-V2 Power supply unit: NT-GRD-7-V3	

Footnotes to technical data

- ⁽¹⁾ The dosing performance for chlorine granulate is dependent on the type of granulate: A high dust component in the granulate or very coarse material > 3 mm or elongated grains can strongly reduce the dosing performance. Granulate with a low dust component is required when maximum dosing performance is needed.
- ⁽²⁾ High chlorine dosing performance requires equivalent neutralisation performance using 37% or 50% sulphuric acid.
- ⁽³⁾ A separate electrical supply with 400VAC, 3ph is required.

The pipes of the dosing lines from the distribution system to the injection points - downstream of the filters or the heat exchangers - are implemented in the dimension d 20 mm (DN16), in PVC PN16 (thick-walled) with ball valve and reflux valve. The pressure drop must be considered when the dosing line is longer than 15 m and the flow is higher than 400 l/h.

3.4.1 Requirements for the calcium hypochlorite granulate

Based on over 30 years of experience with the dosing of calcium hypochlorite granulate it is apparent that the quality of the granulate has a significant impact on the dosing's functional safety. Here, we define our minimum requirements for the calcium hypochlorite granulate. If these quality criteria are met, a proper dosing operation can be assumed in this regard.

The following can be checked upon receiving the granulate to gain an initial impression of the quality:

The granulate must be white. Free of clumps. No strong chlorine smell must be present when opening the drum.

Specification:

Calcium hypochlorite concentration: → higher than 70 %

Water-insoluble (Ca(OH)₂, CaCO₃): → less than 4 %

Humidity: → less than 5%

Grain size:

Dust: → smaller than 0.15 mm (100 mesh) → smaller than 1%

Fraction of coarse particles: → larger than 2.5 mm (8 mesh) → smaller than 5%

3.5 Transport / storage

The devices must be checked for possible transport damage immediately after receipt.

Caution! The systems and devices can be damaged by frost or high temperatures. Prevent exposure to frost during transport and storage! Do not store systems and devices next to objects with high heat radiation or directly exposed to sunlight. The device may only be transported and stored in its original packaging. Careful handling must be ensured.

3.5.1 Storage of chemicals



DANGER !

The safety data sheets of the chemical substance suppliers must be adhered to! The TRGS 510 regulations for the storage of chemical must be considered in addition.

General

- Store chlorine dry and cool
- Keep a chlorine supply at hand for less than 6 months

4 Assembly

4.1 Selecting the place of installation

The following is to be considered regarding the place of installation:

1. The dimensions for the floor drain and the temperature specifications for the environmental air and the medium according to the specifications in *Section 3.4 Technical data* are to be adhered to.
2. The system must be protected against direct sunlight.
3. A mains power connection must be available.
4. The operating room may not be used as a permanent work room. (max. 2 hours per day) - also see the locally valid accident prevention regulations. (Germany: BGR-GUV-R 108).
5. Equipment areas must be ventilated to ensure that hazardous substances cannot reach concentrations that are detrimental to health. (from BGR-GUV-R 108. accident prevention regulations)
6. A collecting tray for the acid canister must be provided.
7. It must comply with the accident prevention regulations and may not be accessible to unauthorised persons. A separate storage room for chemicals must be provided.

4.2 Assembly information / installation suggestion

- Remove transport locks
- Warning and information signs according to the locally valid accident prevention regulations (Germany: BGR-GUV-R 108) are to be provided at the intended positions.

Functional diagram:

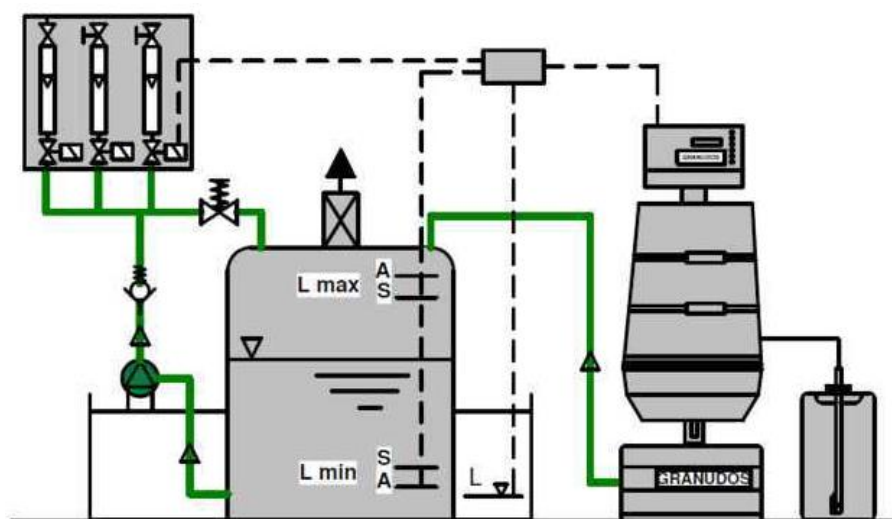


Figure 17, Dosing system GRANUDOS PLUS PLUS V70 Touch with feed system

Layout suggestion:

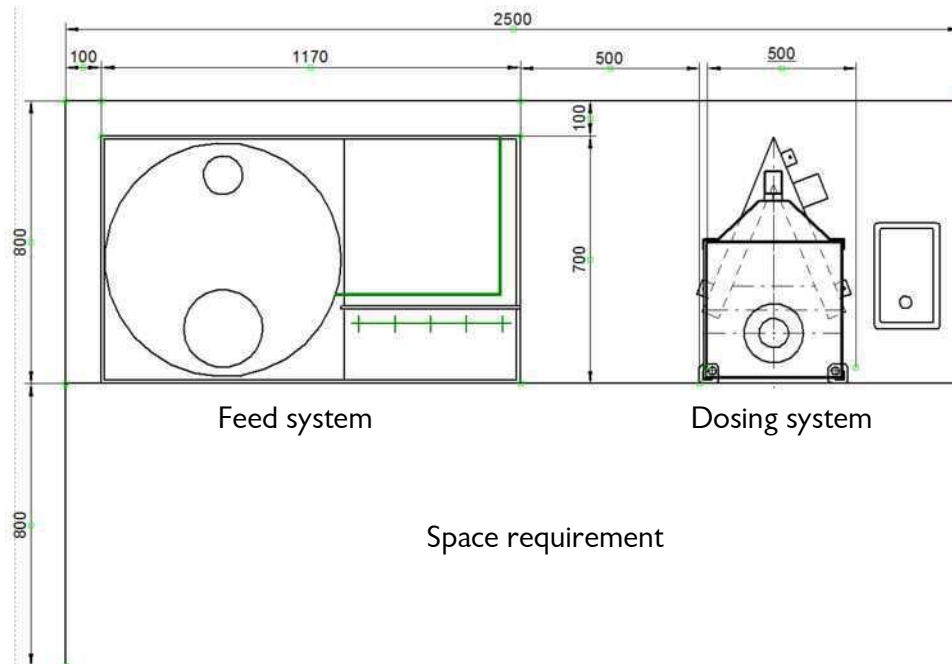


Figure 18, Layout suggestion incl. space requirements

4.3 Mechanical installation

4.3.1 Installation of the GRANUDOS PLUS dosing system

The GRANUDOS PLUS dosing system must be placed and aligned on a suitable, level foundation in an equipment room. Ensure that there is sufficient free space for operation and maintenance of the device.



ATTENTION!

Once the installation of the GRANUDOS PLUS has been completed, fasten it to the floor with the 3 screws provided!

4.3.2 Installation of the GRANUDOS PLUS feed system (option)

The feed system should preferably be installed on the left side of the dosing device (see layout suggestion). If another arrangement is necessary or when the feed system is at a different height than the dosing system, the manufacturer should be contacted before the installation.

Place the feed system onto a suitable, level foundation in the device room and align it.

Ensure that there is sufficient free space for operating and maintaining the device!

Feed system:

- 91. Distribution plate
- 92. Installation plate
- 93. Screw connections to the feed pump
- 94. Manometer with pressure transmitter
- 95. Handle

Procedure:

1. The distribution plate was disassembled for transport. Place the distribution plate (91) onto the lower mounting plate (92) and fasten it to the frame.
2. Connect the screw connections (93) to the feed pump behind the mounting plate.
3. Screw in the pressure transmitter together with the pre-installed manometer (94) into the T-piece.
4. The 4 handles (95) at the corners of the collection tray can be cut off.

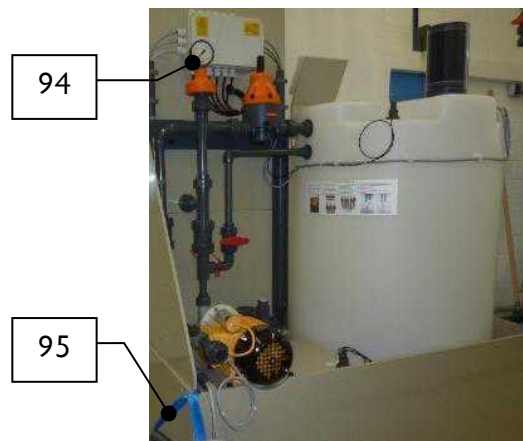
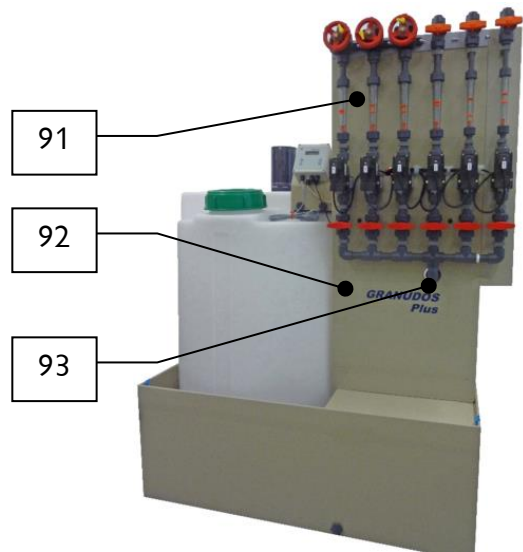


Figure 19, Feed system, front, and rear side

4.3.3 Installation of the buffer tank (buffer tank option) with/without protective tray

Place the protective tray onto a suitable, level foundation in the device room and align it. Place the empty buffer tank into the protective tray and check that it stands firmly. The buffer tank may only be operated with a suitable protective tray. (protective tray possibly provided by the customer)
Ensure that there is sufficient free space for operation and maintenance of the device.

4.4 Hydraulic installation

4.4.1 Connection of the GRANUDOS PLUS dosing system

Integration into the water circulation:

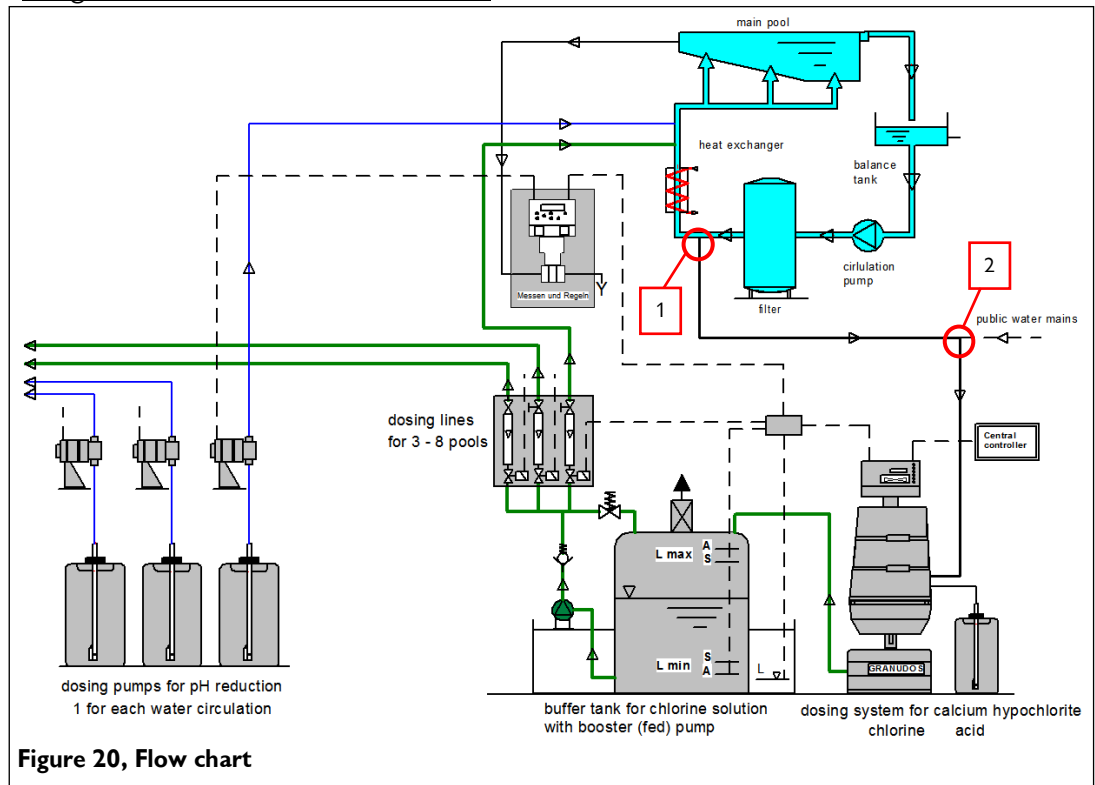


Figure 20, Flow chart

The supply of the GRANUDOS PLUS with solution water must be separated from the filter cycle of the swimming pool to avoid effects of the swimming pool circulation on the otherwise undisturbed supply with solution water.

- Connect the intake connecting piece of the GRANUDOS PLUS to the water supply. There are 2 options to do this:

Water supply 1, swimming pool water:

- Take the dissolving water from the clean water pipe downstream of the swimming pool filter when the flow pressure at the Granudos inlet is at least 0.2 barg.

Water supply 2, public water mains:

- Use supply with public water mains only when Water Supply 1 cannot be implemented!



CAUTION !

A system separation according to the locally valid legal regulations (Germany and EU DIN EN 1717:2011-08) must be installed to prevent reflux of swimming pool water into the water mains in the event of a pressure drop in the mains network in order to protect the mains network when public water mains is used!

Ensure that any connections already installed are not blocked. The pipes must be kept as short as possible. The piping of the supply lines made of PVC must be implemented using dimension d25-3/4" or 1".

A duct from the overflow socket of GRANUDOS PLUS to the drain must be installed.

4.4.2 Connection of the feed system

The pipes of the dosing lines from the distribution system to the injection points (downstream of the filters or the heat exchangers) must be implemented using at least d20mm in PVC PN16 (thick-walled) with ball valve and reflux valve. It is recommended to use the next larger nominal width for longer dosing lines (more than approx. 15m) and flow rates above approx. 400l/h to compensate for possibly increased pressure losses.



ATTENTION !

Reflux valves, preferably ball reflux valves, should be installed at the injection point to prevent reflux of swimming pool water when the feed pump does not work and the control valve does not completely close.

4.5 Electrical installation



DANGER DUE TO HIGH VOLTAGE !

The electrical installation may only be performed by appropriately trained specialist staff! The power supply must be switched to a voltage-free state before any electrical work is performed.



ATTENTION !

The electronic components of the devices are sensitive to electrostatic discharge. The generally known precautions regarding ESD-sensitive devices must be adhered to when handling these devices!

The following needs to be considered:

- Do not pull or insert a live connector.
- Discharge your body for at least 5 seconds before you touch the devices, e.g. by touching a grounded part of the system or by wearing an ESD ground strap that is connected to ground.

Electrical connection:

Also see the terminal plans in the terminal boxes of the GRANUDOS PLUS or in Section 9.2 with regard to the electrical installation.

The control cable, 10x0.5mm² (5m), which is already connected to the feed system, as well as the cable for the feed pump, 3x1mm², are to be connected to the GRANUDOS PLUS controller according to the terminal plan.

The control cables of the measuring and control equipment for control valves 240 VAC are connected to the relay plate (SL2 to SL9) in the terminal box on the reverse side of the mounting plate.

Version with 400 V feed pump or frequency converter:



ATTENTION !

The power supply of the 400 V pump or the frequency converter of the pump must be connected to an external power supply provided by the customer!



Figure 21, Feed pump with frequency converter

Electrical connection / external connection to a control centre:

The GRANUDOS PLUS must be locked by the central control system with the filter system to ensure that no production takes place when the filter pumps are switched off or when the water supply is not ensured.

The 240V supply cable for the control valves of the chlorine dosing system is connected in the terminal box behind the dosing lines. The control lines of the dosing valves are separated by separating relays when the feed pump is switched off. The control valves are then closed.

Signals to external system:

The following signals are provided by the Granudos system for external processing:

- Collective fault to the central control system as floating contact
- Chlorine / acid reserve message
- Chlorine / acid empty message

Signals from external system:

The Granudos system can be controlled by a central control system:

- Chlorine production switched off by central control system, feed pump continues running until Level L min. alarm.
- Feed pump of feed system "OFF" / "ON" by central control system (e.g. to switch off the whole dosing system)

5 Initial operation

5.1 Commissioning, comments

The work described here may only be performed by trained specialist staff or by a specialist company. The systems installed must be inspected for appropriate installation and tightness before commissioning.

The initial operation should be performed according to the initial operation protocol in *Section 9.3*. The device was delivered with specific factory settings. The setting values are provided in the operating data sheet in *Section 9.4*.



ATTENTION !

Alien objects that may have fallen into the rinsing device during the installation of the piping and electrical system may cause failure of the floater valve, injector or the suction tube of the flow switch. Remove alien object!

Remarks

- During start-up, **all fault messages are suppressed for 12 seconds** to ensure constant flow in the rinsing tray. Filling starts thereafter when no fault is pending.
- Faults during the filling process must be pending for more than 6 seconds before the system responds and the GRANUDOS PLUS switches off.
- The "Chlorine missing" switch (41) on the mixing cyclone must detect chlorine granulated 8 seconds after the start of the 2nd dosing interval. The LED in the "Chlorine missing" switch lights up when a sufficient amount of chlorine rotates in the cyclone.
- The current dosing cycle is completed after the message "Buffer tank full". Acid is dosed during the next 20 seconds and thereafter, rinsing with water is performed for 20 seconds.
- The heating of the dosing pipe always remains switched on.

5.2 Initial operation, setting the operating parameters

5.2.1 Install the hose pump, roller carriers

The acid pump is installed on the right side of the standing column of the GRANUDOS PLUS.

Insert roller carriers:

Proceed as follows to install the roller carriers:

1. Remove the clicked-in, transparent pump cover and the blue safety disk. Pull the hose holder towards the front and out of the guide in the housing.

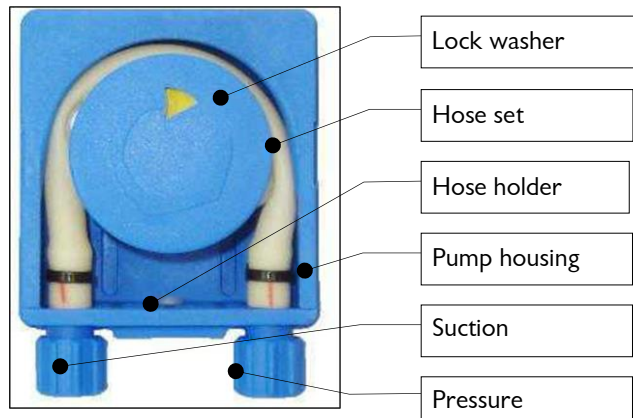


Figure 22, Hose dosing pump

2. Place the yellow roller carrier onto the axle and put the hose into the housing.



Figure 23, Insert roller carriers

3. Turn the roller carrier anti-clockwise while carefully pushing the hose into the housing.



Figure 24, Turn the roller carrier

4. Continue turning the roller carrier until the hose is completely inside the housing.



Figure 25, Turn the roller carrier

- Place the hose holder into the guide inside the housing until it clicks in. Thereafter, replace the lock washer and the transparent pump cover. The roller carrier installation is then completed.



Figure 26, Click in the hose holder

Proceed in reverse order to de-install the roller carrier and the hose holder.

5.2.2 Prepare acid dosing for operation



The specifications in the safety data sheets for the respective chemicals must be adhered to, e.g. protective clothing: Personal protective clothing must be put on before starting work with chemical substances: Protective gloves, apron, face protection, boots.

Connect the acid canister:

Poisonous fumes may be created when handling acids. Do not inhale fumes.

- Unscrew the screw lid with acid lance from the empty acid canister, place the suction lance into the collecting tray, and immediately close the empty canister with the original screw lid.
- Lift the empty canister out of the collecting tray.
- Place a full acid canister into the collecting tray.
- Unscrew the screw lid from the full acid canister and immediately insert the suction lance of the GRANUDOS PLUS dosing system and screw it tight.
- Keep the original screw lid of the acid canister until the next acid change.

5.2.3 Placing the drum / drum change



PROTECTIVE CLOTHING !

Personal protective clothing must be put on before the work is started: Tightly fitting protective goggles, protective gloves, apron, face protection, boots

The safety data sheets for the respective chemicals must be adhered to.



ATTENTION !

The **GRANUDOS PLUS** has been built for a specific chlorine drum according to the order. The dosing head usually does not fit the chlorine drums of other chlorine manufacturers. When the dosing head is inappropriately mounted on another drum, it might detach when the drum is turned around and chlorine granulate may fall onto the floor. Removal of chlorine is unpleasant and takes effort! Take this into account when purchasing the chlorine.

The chlorine granulate and the acid may not be mixed with each other or with other chemicals and substances! Eliminate possible incrustations from the hopper (23) to avoid failures during the chlorine dosing.

Upon delivery, we can check the following as first quality impression:

The granulate must be white, free of lumps and there may not be a stark chlorine smell upon opening the tank.

More Chlorine specification, see *Chapter 3.4.1*.



Hint!

It is recommended to roll the new, locked drum a few times on the ground to loosen possible solidifications in the granulate before mounting the drum.

5.2.3.1 Fastening with clamp band and safety belt

The system is switched off with the **Stop** button before the drum can be exchanged.



DANGER!

Ensure that the dissolving system is covered during the drum exchange. Carelessness and a missing cover may lead to deflagration!

GRANUDOS PLUS overview:

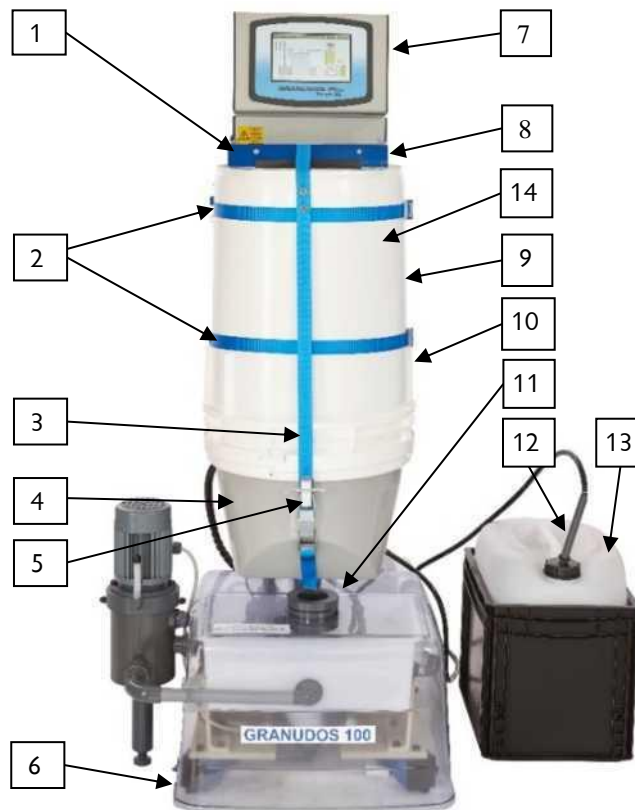


Figure 27, GRANUDOS PLUS V70 Touch

1. Drum holder
2. Fastening straps
3. Safety belt
4. Dosing head
5. Clamping lever for safety belt
6. Dissolving system
7. Control
8. Name plate (right at the stand pipe)
9. Spring lever for reversing device (hidden)
10. Acid pump (hidden)
11. Dust protection
12. Suction lance for acid
13. Acid canister with protective tray
14. Chlorine drum
15. Dust extraction

Proceed as follows:

1. Push the dust protection pipe (11) downwards.
2. To exchange the drum, loosen the latch (9) of the drum holder and move the turning mechanism with the empty drum from the dosing position upwards in a clockwise direction; put one finger onto the dosing pipe so that no granulate can fall out. Lock the turning mechanism. Point 2 is omitted during commissioning.
3. Release the safety belt (3) and the fastening straps (2). Take the empty drum from the turning mechanism. Unscrew the dosing hopper by turning it anti-clockwise and place it next to the GRANUDOS PLUS. Point 3 is omitted during commissioning.
4. Remove the lid of the new drum and remove any pouring cup.
5. Place the dosing hopper onto the drum and screw it tight, ensuring that the grip recesses of the drum are at the sides and the control cable is on the right side.



ATTENTION !

Care must be taken that the dosing hopper correctly fits the threads of the drum, does not jam, and is properly connected after tightening.

6. Ensure that the new drum placed onto the turning mechanism touches the back rails and the bottom spacer and that the holding rod interconnects with the cross ribs of the drum.
7. Then tighten the fastening straps around the drum and close the clamping lever. The clamping lever must close tightly, but don't use considerable force to turn the clamping lever. The length of the clamp band must be set appropriately at the screw-type ends.
8. Insert the security pins into the clamping lever!
9. Pull the carrier belt (101) of the safety belt from the back over the heating pipe, so that the clamping lock (103) of the fastener hangs in front of the hopper. Connect the clamping lever (104) of the tension belt (106) to the clamping lock (103), tighten the belt, and secure it with the securing pin. Adapt the length of the adjustable belt (102) when the tension belt is not tight. Insert the security pin (105)!

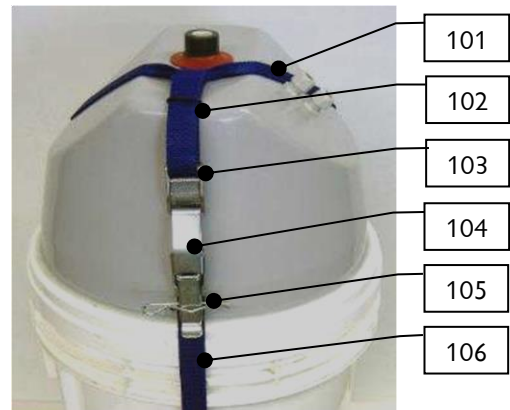


Figure 28, Dosing head



ATTENTION !

Care must be taken that all security pins are inserted!

10. Unlock the drum holder by turning the spring lever (9) upwards. Hold the dosing pipe closed with one finger and turn the drum slowly and anti-clockwise

to the dosing position. Lock the drum holder by turning the clamping lever downwards. Take note that the control cable does not get caught.

11. Arrange the dust protection pipe in the rinsing tray lid to ensure that a possible air draft will not blow away the fine chlorine dust. (Distance from the upper edge of the protective tube to the dosing hopper approx. 1-2cm). Minimise air draft - close the doors!

5.2.3.2 Attachment with FH2 drum holder (option)

1. Loosen the spring lever (9) of the drum holder. Move the turning mechanism with the empty drum upwards in clockwise direction while closing the dosing pipe with one finger so that no granulate can fall out. Lock the turning mechanism. This point is omitted during commissioning.
2. Remove the safety pins (114) at the holding belts in a downward direction and open the clamping lever (113).
3. Push the holding ring (111) upwards over the hood until it clicks in.
4. Remove the empty drum (112) from the turning mechanism, unscrew the dosing hopper (110), and place it sideways onto the floor.
5. Remove the lid of the new drum and remove any pouring cup.
6. Place the dosing hopper onto the drum and screw it tight, ensuring that the grip recesses of the drum are at the sides and the control cable is pointing towards the back.
7. Lift the drum with the dosing hopper onto the turning mechanism.

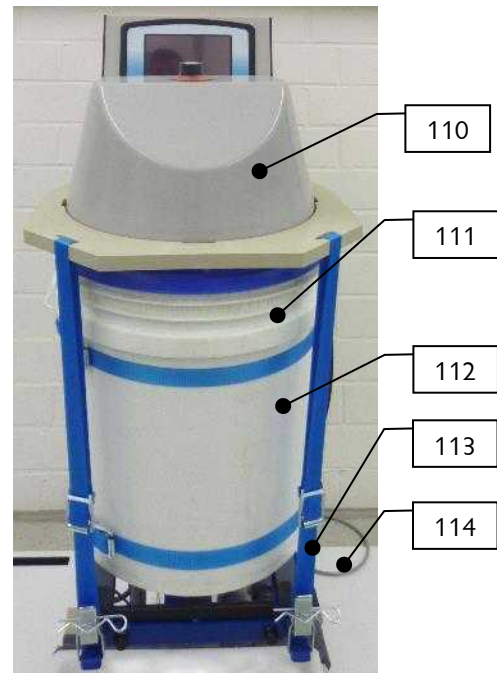


Figure 29, Drum holder Type FH 2



ATTENTION !

The angled sides of the hopper hood must point towards the front and rear, otherwise the holding ring will not fit! – see figure.

Ensure that the protective tube of the dosing hopper control cable is not kinked!

8. Pull down the holding ring (111), so that it lies on the hopper rim, fasten the holding belts and push in the securing pins (114).



ATTENTION !

Care must be taken that all security pins are inserted!

9. Move the turning mechanism with the drum in an anti-clockwise direction downwards into dosing position. Close the dosing pipe by placing a finger onto it. Lock the turning mechanism.

10. Align the dust protection pipe (11) to ensure that possible air drafts cannot blow away the fine chlorine dust. (Distance from the upper edge of the protective tube to the dosing hopper approx. 1-2cm).

5.2.4 Bleeding the motive water pump

Carefully bleed the pump and piping of the GRANUDOS PLUS before switching it on. The following must be considered during installation and commissioning to prevent the operating pump of the GRANUDOS PLUS from running dry:

1. Changes in the incline and decline of the supply line piping must be avoided. This may lead to trapped air that can reach the pump during operation.
2. It must be manually checked whether the rotary pump can easily be turned. Check the shaft for ease of movement by turning the fan wheel at the rear with a screwdriver. The floating ring seal is clogged when the shaft cannot be easily turned. Try to loosen it by jerking it backwards and forwards. The pump must be removed and disassembled in case this is not possible. Failure of the pump is inevitable when the pump is switched on while the floating ring seal is blocked.
3. Open the ball valve at the water intake and the supply valve at the pre-filter when starting up the system. Press the intake solenoid valve by hand until the rinsing tray is half full. This ensures that water has run through the pump and that the pump is bled. Thereafter, open the stop valve upstream of the cyclone. Only then switch on the GRANUDOS PLUS.
4. The piping to the GRANUDOS PLUS must be carefully bled before switching on. Take note of the d75 pre-filter. When the water level in the filter drops significantly after the pump is switched on, switch off the GRANUDOS PLUS, open the bleeding screw on top of the filter, let water run into the filter and then switch on the machine. It might be necessary to repeat the process a few times until the filter remains filled; a few air bubbles in the upper area of the filter are not relevant.

5.2.5 First filling of the buffer tank of the feed system

Requirements:

The GRANUDOS PLUS system has been completely connected and the water supply is ensured. The chlorine drum has been put in position and the suction set for the acid has been connected to the canister.

The start-up programme:

1. Switch on the device at the main switch.
2. Switch off dosing by using the **Dosing off** button. The start-up programme is automatically activated by the Level min. alarm switch. The GRANUDOS PLUS fills the buffer tank without chemicals. Fault messages of the feed system are not taken into account.
3. The **water flow in the dissolving system** and the **water level in the rinsing tray** must be set during this time. (See Section 5.2.6 and 5.2.7).
4. After 10 minutes, the GRANUDOS PLUS automatically switches off. The water level should now be above the pressure socket of the feed pump. The display shows the message: **Has the required level been reached?** **Yes** or **No**.
5. When the required level has not yet been reached, acknowledge with **No** and the buffer tank will be filled for another 10 minutes, when the device will again

enquire regarding the filling level or the "Level full" switch will automatically stop the filling process.

6. Acknowledgement with Yes results in the request: Bleed the feed pump (see Section, 5.2.8, Bleeding the feed pump) Acknowledge the message with OK when your version has no feed system.
7. The operating programme starts once the query has been confirmed.
8. Continue with Section 5.2.10, Calculation of the dosing line flow performance.
This point is omitted when only the buffer tank without the feed system was ordered.

5.2.6 Setting the water flow in the dissolving system

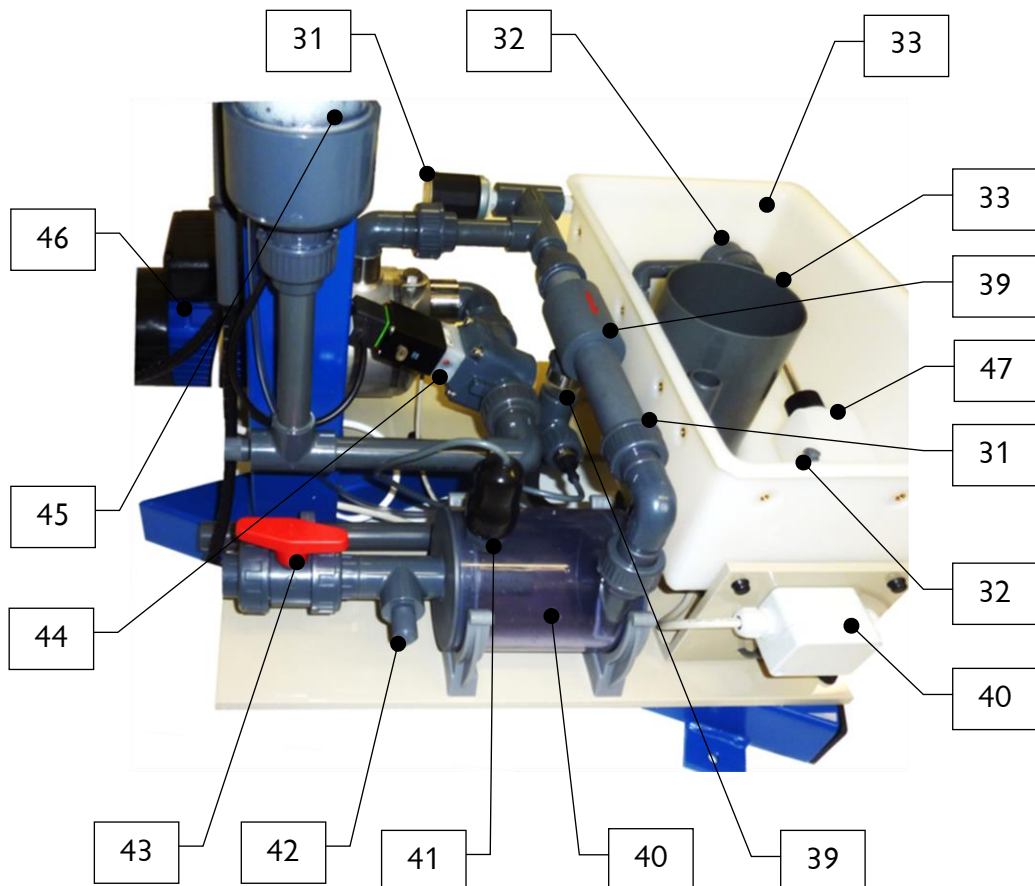


Figure 30, Dissolving system, without dust extraction

- 31. Pressure switch
- 32. Rinsing tray inlet float regulator valve
- 33. Rinsing tray
- 34. Rinsing pipe
- 35. Injector
- 36. Screw connection with hole disk
- 37. Level switch min./max. Rinsing tray
- 38. Clamping socket for switch
- 39. Rinsing tray flow switch
- 40. Dissolving cyclone
- 41. Chlorine-missing switch / sensor at cyclone
- 42. Connection for manometer

43. Operating water outlet ball valve
44. Control valve for dissolving water
45. Dirt filter d75mm
46. Motive water pump (different versions)
47. Floater (of the floater control valve)

The adjustment of the water flow is identical for the version with or without dust extraction. The hole disk in the screw connection (36) downstream of the injector (35) adapts the suction performance of the injector to the pressure conditions. A drop of the water level in the rinsing tray (33) during the initial operation implies that a diaphragm with a smaller hole must be inserted into the screw connection (36).

A diaphragm with a larger hole is required or the diaphragm must be removed, when the water level increases or the switch body of the flow switch (39) is not clearly pushed upwards.

A 6mm diaphragm is installed ex factory; diaphragms with 5.5mm and 7mm are included in the spare parts bag attached.

Setting the pressure switch (31)

The pressure switch installed (31) registers the effective pressure of the motive water pump (46). The GRANUDOS system switches off when the switching power is not reached after air was aspirated or a pressure drop in the water supply. This ensures, in addition to the electrical interlock, that:

- Dosing is switched off when the motive water pump delivers too little water.
- The motive water pump is not exposed to cavitation risk.

The GRANUDOS dosing system must operate in normal mode in order to set the switching point. Remove the lid from the pressure switch for this purpose, turn the adjustment button by 0.25 bar to the right and wait for 6 seconds.

In case the dosing system continues running, repeat the process until the dosing device stops and the "Pressure min." alarm message is shown. The GRANUDOS dosing system stops. Turn the setting button back by 0.25 bar and press the **Start** button. Now the GRANUDOS dosing system starts up. The GRANUDOS dosing system will show a fault when the pressure drops by 0.25 bar.

The switching point is set to 1.5barg ex factory.

5.2.7 Water level in the rinsing tray

The water level in the rinsing tray is changed by turning the floater (47) at the floater control valve (32) in or out. Turning the floater out results in a higher level, turning it in results in a lower level. One rotation corresponds to approx. 1cm. Adjust the floater (47) in the rinsing tray, so that the water level is approx. at the middle of the rinsing tray.

5.2.8 Bleeding the feed pump



ATTENTION !

The feeding pump must be bled before switching on! There is otherwise a risk that the pump overheats.

The feed pump must be bled when the buffer tank is filled for the first time (without dosing of chemicals). The ball valve (Pos. 60 in Figure 10, Page 18) in the bleeding line, which leads back to the container, is opened and the pump is started by pressing the button. The pump is bled after approx. 15 seconds, when the water flows back into the container, and the ball valve must again be closed.

5.2.9 Setting the pump pressure of the feed pump / pressure retention valve (option)

1. Open all stop valves and control valves in the dosing lines
2. Set the calculated flow values at the membrane valves of the feed system.
3. The pressure retention valve is set in the factory. Increase the pump pressure at the pressure retention valve (DHV behind the mounting plate as required, when the necessary performance is not reached. The pressure to the dosing lines can be increased by turning the adjustment screw on the pressure retention valve to the right and it can be reduced by turning the screw to the left. Versions with a frequency converter pump have a potentiometer for setting the rotation speed or pump performance at the side of the pump.



4. Only increase the pressure until constant flow is established through the opened dosing lines!



5. The function of the pressure retention valve must be checked. Close all ball valves in the dosing lines to simulate the situation that no valve is addressed!



6. When all valves are closed, a water jet of at least 1.5cm thickness must flow from the reflux line in the tank!



right

false



ATTENTION !

A wrongly set pressure retention valve can destroy the pump.

7. The total flow through the dosing lines must always be lower than the maximum filling performance of the GRANUDOS PLUS! It means the GRANUDOS PLUS must still slowly fill up the tank at full dosing performance.



Hint !

The buffer tank must still fill up slowly at the dosing performances set and with open control valves. The filling performance of the GRANUDOS PLUS can reach up to 1200l/h.

5.2.10 Calculation of the dosing line flow performance

The maximum chlorine dosing quantity is specified on the name plate. Calcium hypochlorite of 70% concentration is assumed. This value is required to calculate the different flow quantities required for the dosing lines to the different swimming pools.

The flow quantity to be set for the dosing line to a basin is determined from the chlorine dosing performance required and the chlorine concentration of the dosing solution. The concentration is determined at a flow quantity of approx. 1000l/h in the GRANUDOS PLUS dosing system.

Example:

A Granudos 45 Plus (R max. 2kg/h) operated at 100% provides a concentration of 0.2% chlorine = 2g Cl/l; (2000g/h in 1000l/h)

The calculated / required chlorine dosing performance of 300g/h and a chlorine concentration of 0.2% requires a flow quantity of = 150l/h (300g Cl/h / 2.0g Cl/l) to be set at the membrane valve above the flow meter.



ATTENTION !

The total of the flow performances calculated that way may reach up to 1200l/h. Higher values require an increase of the chlorine concentration.

The dosing performance calculated and set for the individual dosing lines are entered into the operating data sheet in *Section 9.4*.

5.2.11 Dosing performance assessment = Nominal performance of the granulate dosing at the initial operation

Entering this programme requires entry of a password when a password was issued! Password allocation is described in *Section 6.2.8, Settings; system*.

The determination of the effective chlorine performance is required for the calculation of the chemical substance consumption and therefore for the calculation of the "Reserve" message for the chlorine granulate.

Check the water level in the buffer tank before the dosing performance assessment is started. It should be at the lower filling level, as the tank is filled with plain water for approx. 10 minutes while determining the dosing performance and the stop may not be reached during this time.

Provide a suitable, flat collection container holding approx. 250ml (e.g. a flat bowl) and a letter scale to facilitate speedy completion of the work.

Proceed as follows to determine the dosing performance:

When the device is in operation, stop it with the **Stop** button.

Press the buttons **Menu** → **Settings**. Dosing performance assessment **Chlorine** in the start menu and follow the menu structure.

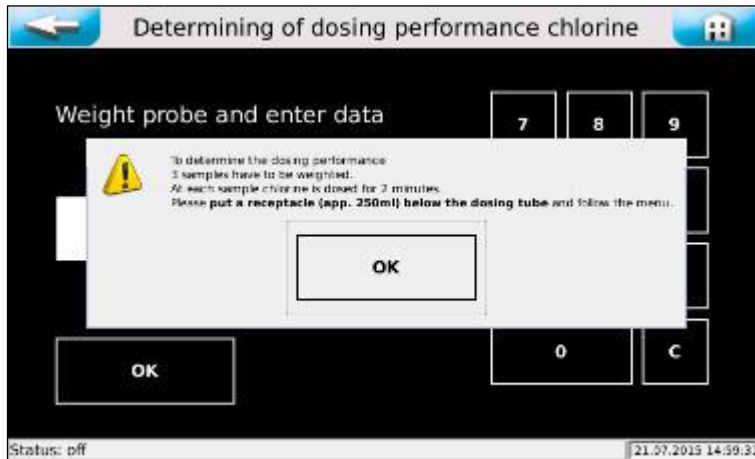


Figure 31, Dosing performance assessment Chlorine 1

Place a collecting container, e.g. a flat bow, under the dosing pipe.

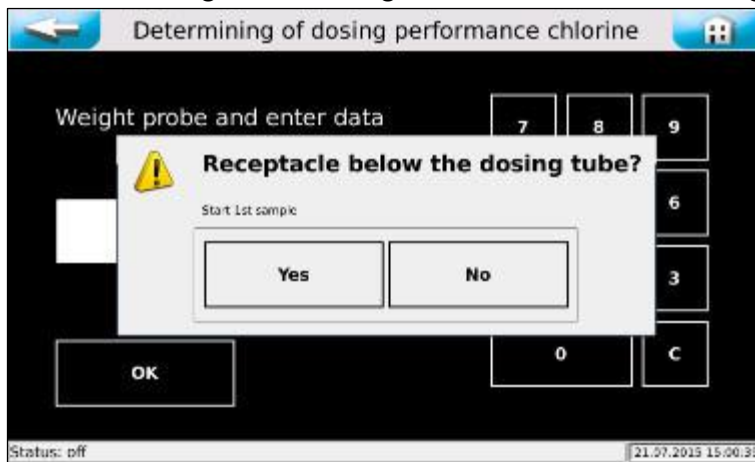


Figure 32, Dosing performance assessment Chlorine 2

Chlorine granulate is transported into the collecting container for 2 minutes.

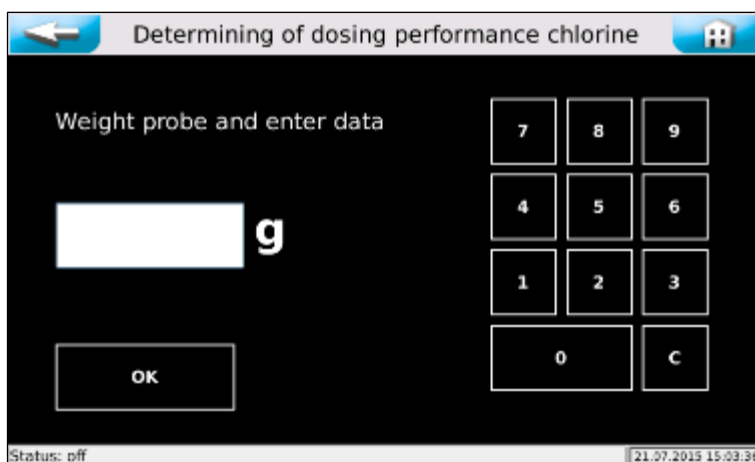


Figure 33, Dosing performance assessment Chlorine 3

The dosing amount in the collecting container is weighed with a letter scale and the weigh in gram determined is entered and confirmed with **OK**.

This process is performed three times. The programme will then calculate the mean of the three samples and thus determine the chlorine consumption of the dosing system.

Once the last weight has been entered, the device shows the dosing performance during continuous operation. Confirm this value with **OK** and change to the start screen using the Return button (white arrow).

5.2.12 Setting the chlorine and acid dosing performance required at the GRANUDOS PLUS

Entering this programme requires entry of a password when a password was issued! Password allocation is described in *Section 6.2.8, Settings; system*.

Appropriate dosing performances for chlorine and acid can be set in the menu. The value for chlorine should not be lower than 50%, due to the sensitivity of the "Chlorine missing" switch on the dissolving cyclone.

The dosing performance for acid must be set to ensure that the chlorine solution is pH-neutral (pH 7.0 +/- 0.2). The chlorine and acid dosing must be matched according to the concentration of the chlorine granulate, the hardness of the dissolving water / swimming pool water, its pH value and the acid concentration.

The acid dosing is initially set to 50% of the chlorine dosing performance (e.g. 50% chlorine and 25% acid) using 37% sulphuric acid. The pH value of the chlorine solution must be measured and evaluated after the first filling and mixing of the tail for approx. 2-5 minutes; pH value too high: more acid; pH value too low: less acid. Repeat this process until the pH value is in order.

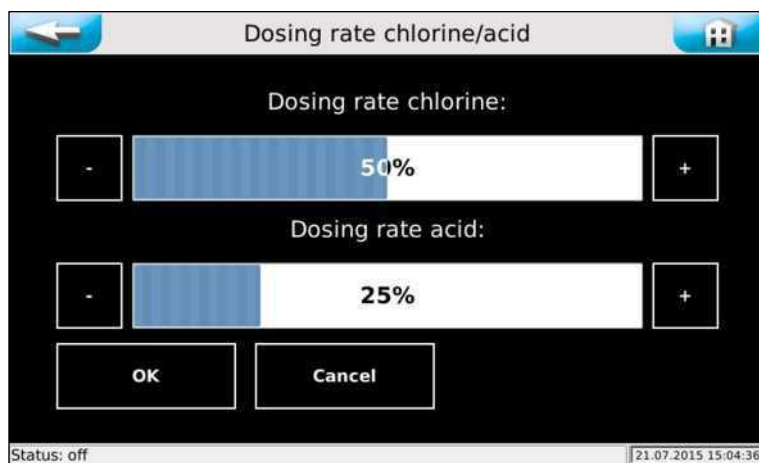


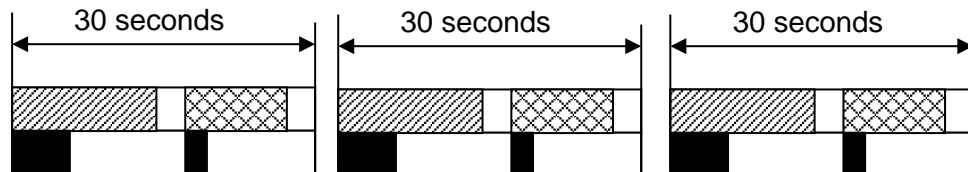
Figure 34, Chlorine/acid dosing performance


The dosing performance is set in **Menu** **Settings** **Dosing rate chlorine/acid**.


The dosing is organised in cycles and one cycle **always takes 30 seconds**.


The dosing time within these cycles (=dosing performance) is set:


- For 50-100% chlorine 7.5-15 seconds
- For 10-100% acid 0.8-8 seconds
- The forced pause between chloride and acid dosing is always at least 3.5 seconds. The pause times automatically change depending on the dosing time length.



 maximal dosing time chlorine

 maximal dosing time acid

 setting dosing time chlorine or acid

 pause time

100% correspond to:

for GRANUDOS 45: Chlorine approx. 2kg/h, acid approx. 3l/h

for GRANUDOS 100: Chlorine approx. 4kg/h, acid approx. 3l/h

The setting of the dosing times for chlorine and acid determine the dosing performance and thereby the concentration of the chlorine solution.



ATTENTION !

The chlorine dosing performance cannot be set to less than 50%, as the chloride dosing is monitored by the optical sensor in the cyclone. The effective dosing performance for chlorine granulate also depends on the quality of the chemical: too much fine matter or too coarse grains reduce the nominal performance.

Accurate assessment of the nominal performance is described in **Section 5.2.11**.



Hint !

A pH-neutral chlorine solution is clear and only smells weakly of chlorine. A turbid solution indicates that the pH value is too high. A clear solution that strongly smells of chlorine indicates that the pH value is too low.

37-50% sulphuric acid is usually used as pH-reducer. Dosing of nitric acid may be advantageous for high dosing performances with very hard water.



ATTENTION !

Sulphuric acid can generally be used in concentrations up to 50%. Changes in the dosing performance and/or increased corrosivity must be considered when higher concentrations or other acids (e.g. nitric acid, dissolved Na-bisulphate or others) are used! We recommend contacting WDT!

5.2.13 Adjusting the "Chlorine missing" switch on the dissolving cyclone.

The adjustment is only possible while the buffer tank is being filled.

8 seconds after the start of the **2nd dosing cycle**, the "Chlorine missing" switch LED must permanently light up for at least for 2 seconds due to the detection of rotating chlorine, otherwise the **Chlorine missing** fault message is shown and the GRANUDOS PLUS switches off.

After pressing the **Reset** button and then the **Dosing off** button, the GRANUDOS PLUS fills only water into the feed system or the tank.

Turn the adjustment screw clockwise until the LED lights up. Thereafter, turn it back until the LED goes off and then another 15°.



Hint !

The "Chlorine missing" switch is pre-set at the factory and only needs to be readjusted after malfunction. The LED of the "Chlorine missing" switch and the adjustment screw become visible after the protective cap of the "Chlorine missing" switch (Pos. 41, Page 41) is pulled off.

The LED at the "Chlorine missing" switch may not light up when there is no chlorine in the cyclone!

5.2.14 Type NE pH-monitoring (optional)

The pH-monitoring is set to pH 6.5 to 7.5 at the factory. Commissioning requires calibration of the pH electrode.

During operation, **calibration must be repeated every quarter** and entered into the maintenance protocol.



CAUTION!

The factory settings may not be changed:

- Lower limit pH 6.5
- Upper limit pH 7.5
- Delay time 5min



Figure 35, pH electrode

instructions for pH calibration in *Section 9.7, pH-electrode calibration*.
Thereafter, reinstall the electrode.

The calibration may only be performed when the GRANUDOS PLUS **is not** in the operating state "Filling the buffer tank!"

After pressing the programme button, the feed pump stops and the manual ball valves in the dosing lines and the suction line to the feed pump close.

Unscrew the connection plug from the electrode to remove the pH-electrode; then turn out the pH-electrode and calibrate it according to the operation

6 Operation / handling

The nationally valid accident prevention regulations (in Germany: Operation of baths BGR/GUV-R 108) must be taken into account.

6.1 Normal filling sequence during operation



Hint !

Take note of the right combination fitting the dosing hopper when ordering the calcium hypochlorite drum!

The GRANUDOS PLUS dosing system may be started once all preparations for the initial operation have been made.

Operating programme:

Press the **Start** button to start the programme.

The start is followed by 12 seconds of rinsing with plain water. This is followed by continuous dosing of chlorine and acid according to the settings. The GRANUDOS PLUS dosing system is only switched on and off by the L-min. and L-max level switches in the buffer tank. After switching off the dosing at L-max = tank full, the dissolving system is rinsed for another 40 seconds to keep the dissolving system clean. Acid dosing is used during the first 20 seconds of this period.

6.2 The controller - GRANUDOS PLUS-V70T version

6.2.1 Operating indicator - display Start menu

The micro-processor-supported controller of the GRANUDOS PLUS V70 can be simply and consistently operated by using the 7" touch display. The function indicator is an active flow diagram that shows operating states and faults: see *Figure 36, Start menu, Page 52*.

Operating instructions:

Relevance of the colours of aggregates, switches and sensors:

- **green** → **in operation**
- **red** → **fault**
- **yellow** → **switched off (e.g. dosing)**

The operating status is indicated in the footer line. The following operating statuses are used:

- Start-up programme, see Section 5.2.5
- Operating programme, see Section 6.1
- Dosing performance assessment, see Section 6.2.6
- Off, resting state, no chlorine solution is produced
- Off (emergency operation), see next heading
- Test programme, see Section 6.2.9



Off (emergency operation):

The level switches "L max. alarm" and/or "Collecting tray leak" are active in this operating state. No chlorine solution is produced. The feed pump of the conveying system continues to run until both switches are deactivated to prevent the tank from overflowing.

The start menu:

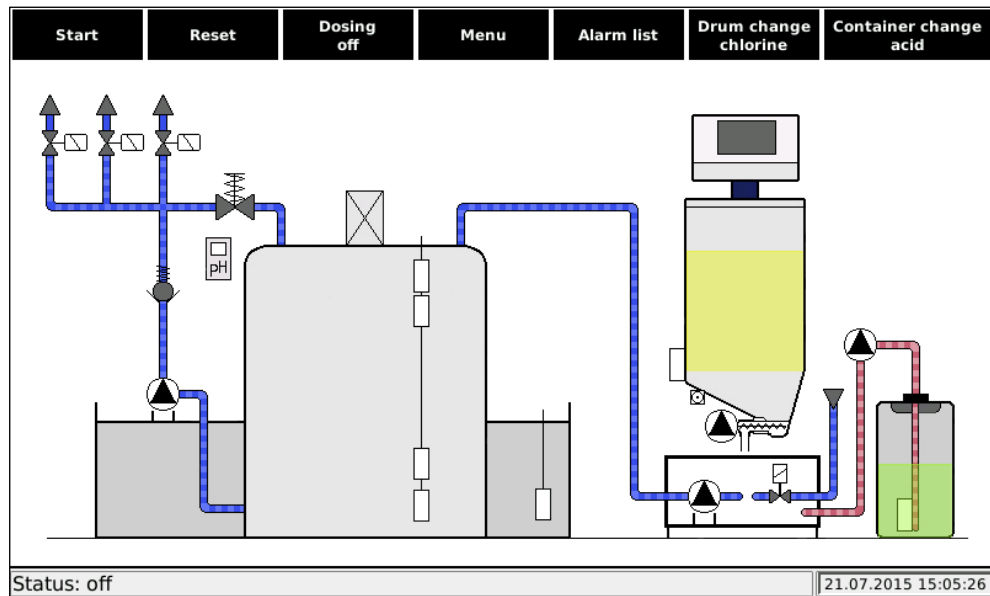


Figure 36, Start menu

Tapping a programme point in the header line opens it in the display.

6.2.2 The shortprogrammes in the header line

Start/Stop

When the **Start** button is pressed, the operating programme starts, the field descriptor changes to **Stop** and lights up in red.

Press **Stop**. The current operating programme is stopped and the field descriptor changes to **Start**.

The base line shows the respective status.

Reset

The current programme is stopped and the fault currently shown is deleted. Then the programme restarts. The fault is again displayed after a delay of 6 seconds when the fault is still pending.

Dosing Off/On

For switching off the dosing during the initial operation, shut-down or maintenance. The dosing of chemicals is switched off, the dosing motors for chlorine and acid flash in yellow, the filling continues running with plain water. The button now shows **Dosing off**. Press this button to resume regular dosing operations.

Menu

Access to the main menu with sub-programmes, settings for test programmes, service requires that the operation is first terminated by using the red **Stop** button.

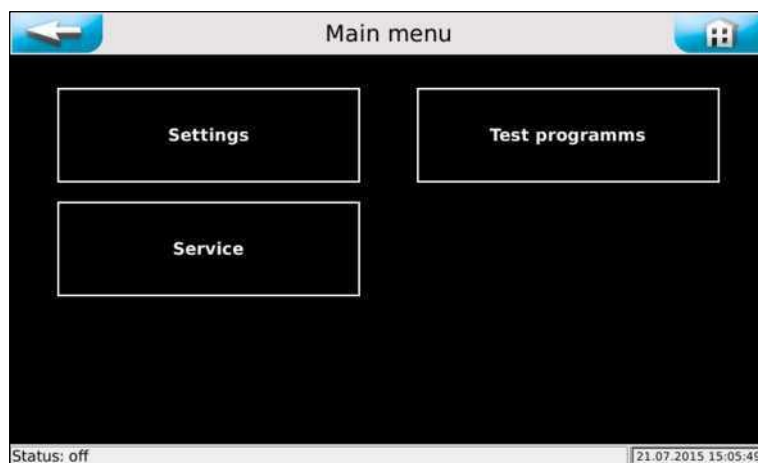


Figure 37, Main menu

A detailed description of the “Main menu” sub-programmes see *Sections 6.2.4 to 6.2.10*.

Alarm list

The full test of fault messages is shown in this alarm list. Example: The rinsing tray symbol on the display is flashing in red when the rinsing tray is faulty and a short descriptor of the first fault that occurred in this context is shown flashing inside the rinsing tray symbol. The alarm list does not contains the full text of the fault message. Once the fault has been removed, use **Reset** to return to the operating mode.

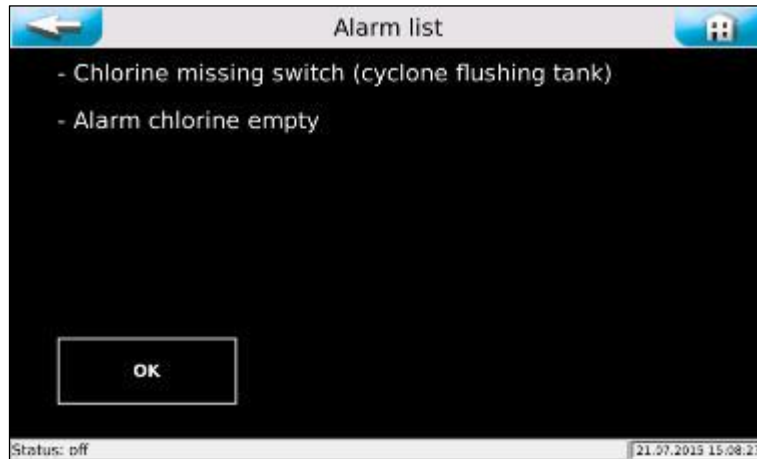


Figure 38, Alarm list

Drum change chlorine

This function is used to reset the "Reserve message so that the reserve status of the new drum, which is calculated based on the chlorine consumption, can be appropriately reported. (see Section 5.2.3)

The drum size and the specifications for the reserve message must be set at Section 6.2.7.

After pressing the **Chlorine drum change** button, the display shows:

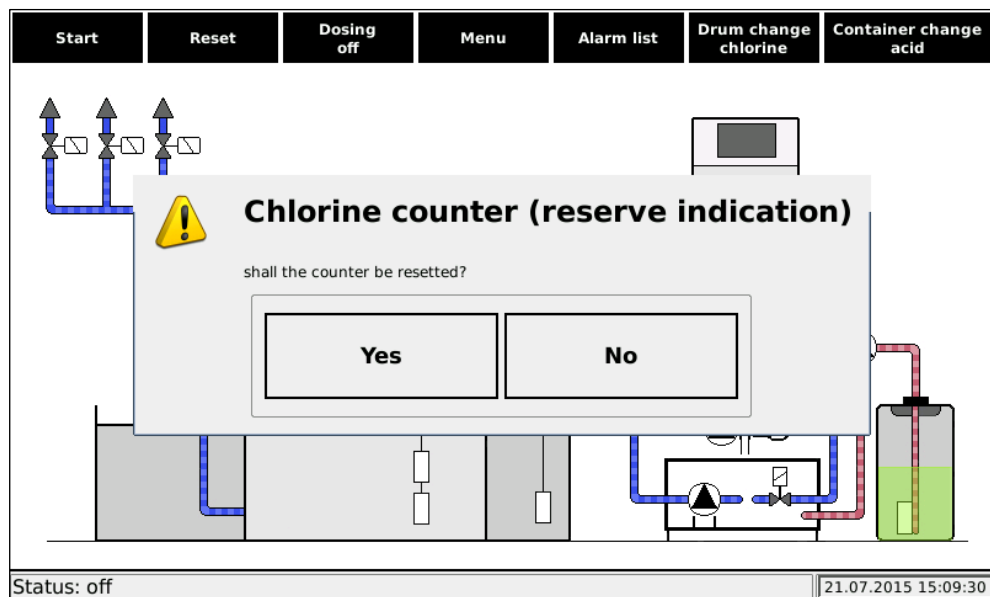


Figure 39, Drum change chlorine

Press **Yes** to confirm that the drum change has been completed.

Container change acid

The procedure is described under "Chlorine drum change"

6.2.3 The sub-programmes

The operation must be stopped to allow access to the sub-programmes menu.

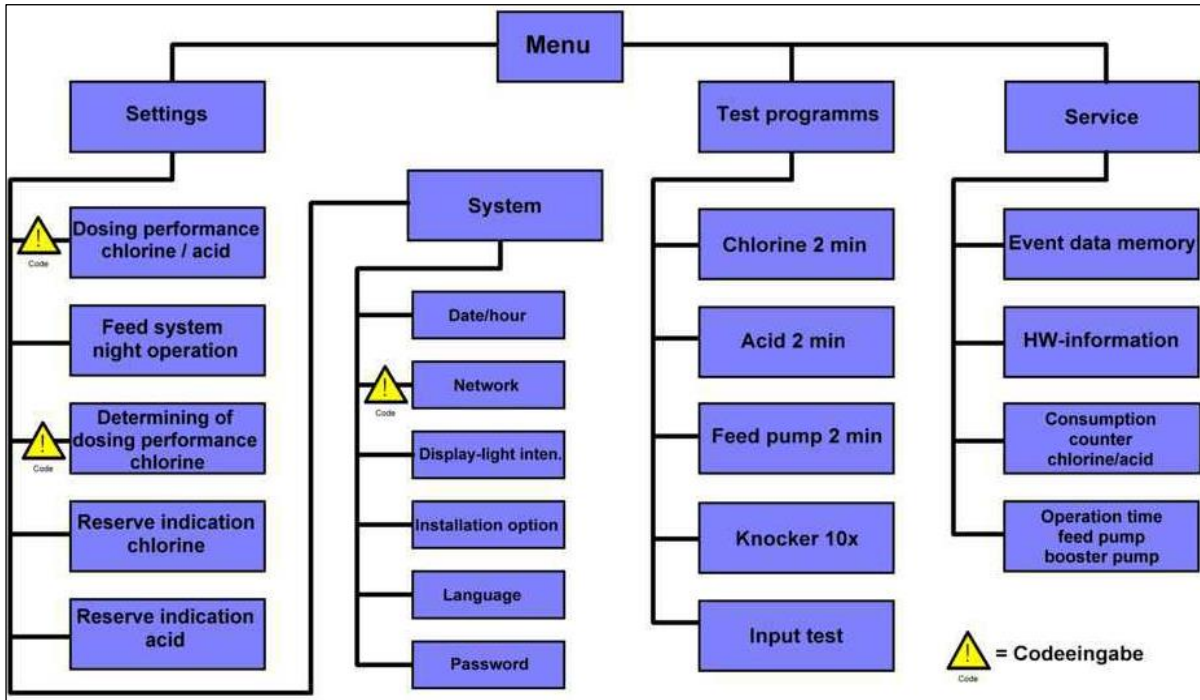


Figure 40, Overview of sub-programmes menu

Basic settings: see operating data sheet Section 9.4, Operating data sheet

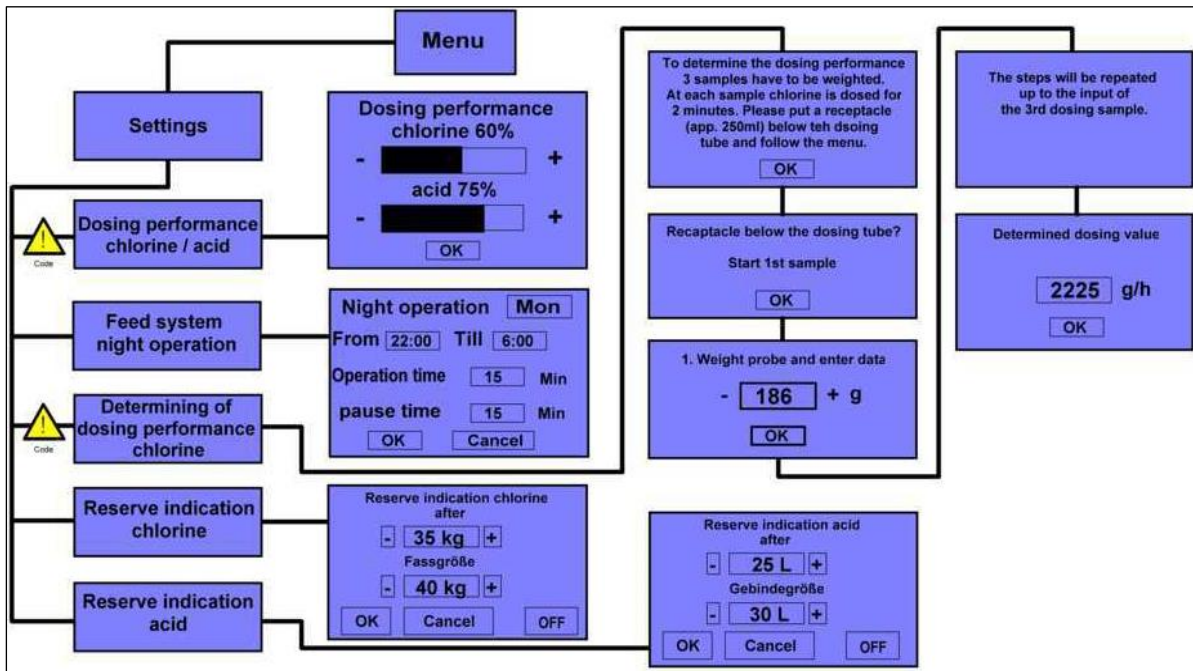


Figure 41, Sub-programmes menu

6.2.4 Settings; dosing performance for chlorine and acid at the GRANUDOS

Entering this programme requires entry of a password when a password was issued! Password allocation is described in Section 6.2.8, Settings; system.

The dosing performance for chlorine and acid must be set, so that the chlorine solution is pH-neutral and the concentration is sufficient for disinfection of the swimming pool. Also see Section 5.2.12, Setting the chlorine and acid dosing performance required at the GRANUDOS PLUS.

6.2.5 Settings; operation of transport system at night

The **Night operation** programme can be activated to save electricity. The **Menu** **Settings** **Feed system night operation** can be used to set pauses for the operation of the feed pump individually for each day of the week.

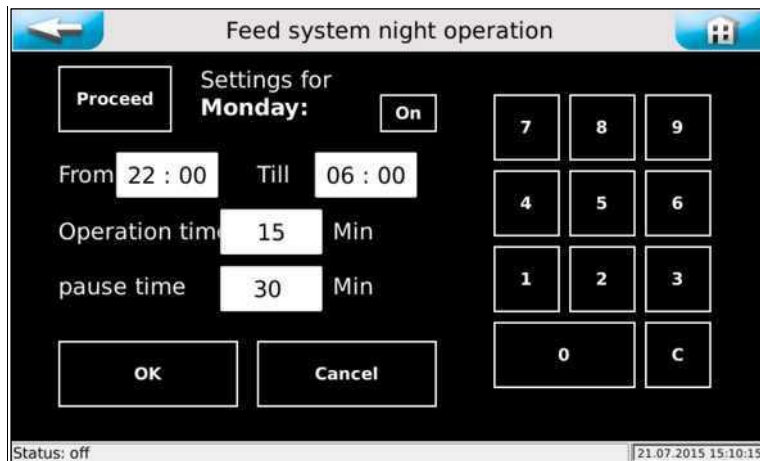


Figure 42, Night operation of feed system

6.2.6 Settings; dosing performance assessment for the chlorine granulate

Entering this programme requires entry of a password when a password was issued! Password allocation is described in Section 6.2.8, Settings; system.

Assessment of the effective dosing performance is required to calculate the use of chemicals that is required to determine the "Reserve" message. For this purpose see Section 5.2.11, Dosing performance assessment = Nominal granulate dosing performance during the initial operation



Hint !

The dosing performance assessment must be repeated when the granulate manufacturer changes or the grain size of the granulate changes significantly in order to ensure that the "Reserve" message is correct.

6.2.7 Settings; Reserve message for chlorine granulate and acid

The quantities used for dosing, which are the basis for calculating the "Reserve" message as well as the size of the full containers are entered here. The two messages indicate that the respective chemicals container will soon be empty.

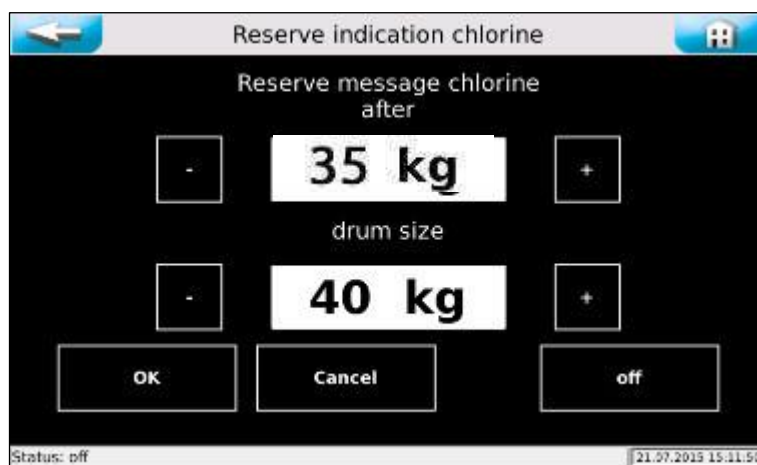


Figure 43, Chlorine reserve message

6.2.8 Settings; system

The following 6 system settings can be entered here.

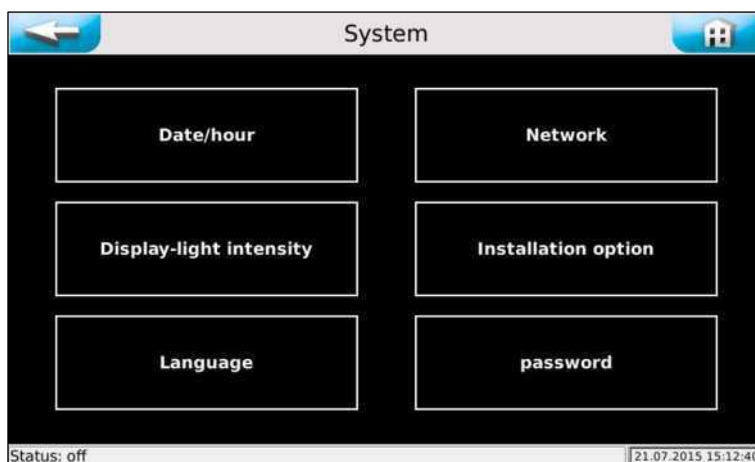


Figure 44, Settings, system

6.2.8.1 Settings; System, Password

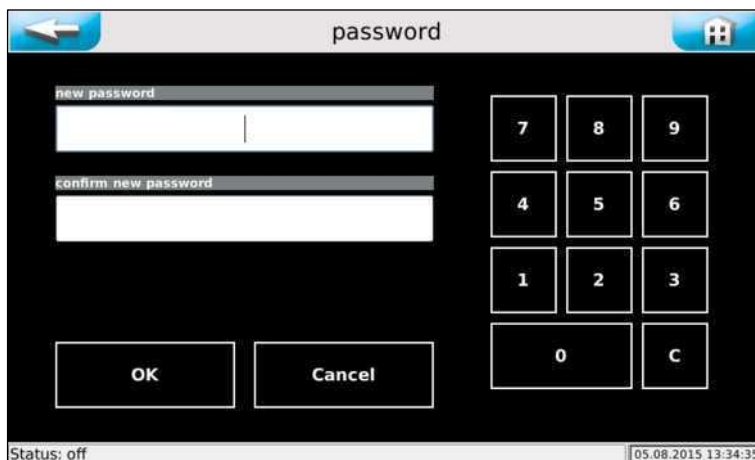


Figure 45, Password

The **Settings menu area** can be protected against unauthorised access by allocating a password. The passwords 1 to 9999 can be individually chosen. No password has been pre-set at the factory.

The desired password must be entered into both lines.



Hint !

Enter allocated passwords in the operating data sheet under Section 9.4! An allocated password can only be reset by the manufacturer's customer service!

Please leave both lines empty and press the **OK** button to remove a password.

6.2.8.2 Settings; System, Network

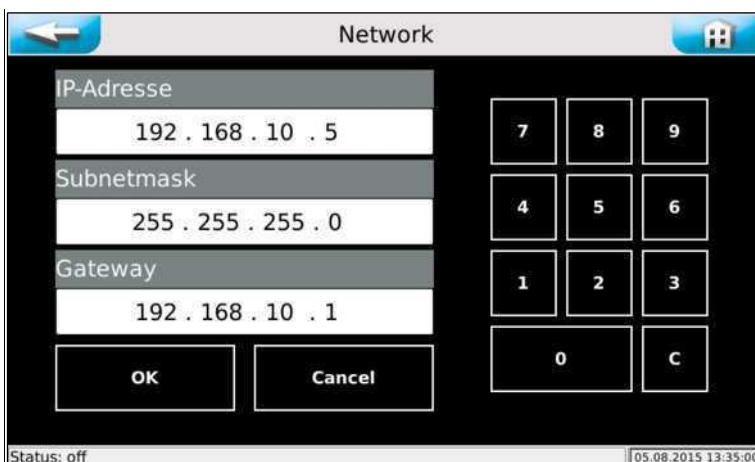


Figure 46. Network

The controller has an interface with RJ45 plug-in socket. The interface can be used to transmit current measuring values and status messages to an external remote

display. A PC monitor, tablet PC or smart phone may, for example, be used as terminal devices.



Hint !

Additional information is available on request.

6.2.9 Test programs

The test programs are used to verify the function of the individual actuators and switching inputs. The **Menu** → **Test programs** option leads to a selection of the individual tests.

5 test programmes are implemented in the controller.

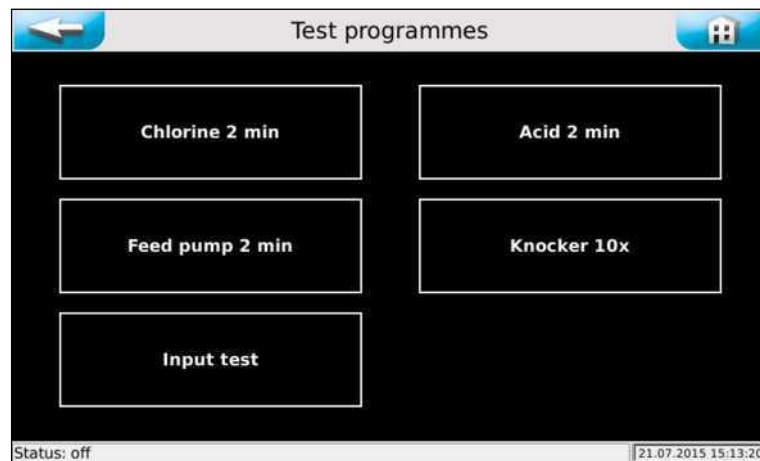


Figure 47, Test programs



Hint !

A test program can be stopped at any time by using the **Stop button. The two test programmes Chlorine and Acid can only be activated when the level in the buffer tank is between the upper and the lower control point, i.e. when filling is possible. Filling can be activated here.**

After touching the programme symbol, the flow diagram with the control signals for the respective actuator are shown. When the symbol lights up in green, the function is in order. Thereafter, the programme jumps back to the test programme menu.

- **Chlorine 2min** : Permanent chlorine dosing for 2 minutes with 10 seconds dosing delay, thereafter post-rinsing programme; during the 2 minutes of permanent dosing, the chlorine falls out of the dosing pipe into the rinsing pipe, i.e. the water supply is running.

- **Acid 2min**: Permanent acid dosing for 2 minutes with 10 seconds dosing delay, thereafter post-rinsing programme. The acid is visible when it is sucked up to the pump and is then pumped on to the injection point at the rinsing tray of the GRANUDOS PLUS.
- **Feed pump 2min**: Feed pump runs for 2 minutes
- **Knocker 10x**: Knocker knocks 10x in a row
- **Input test**: The switching states of the 5 monitoring switches in the rinsing tray and the feed system are shown in the flow diagram on the display. The values are framed in green in *Figure 48, Input test*. In addition, all currently pending fault messages are shown!

Input test:

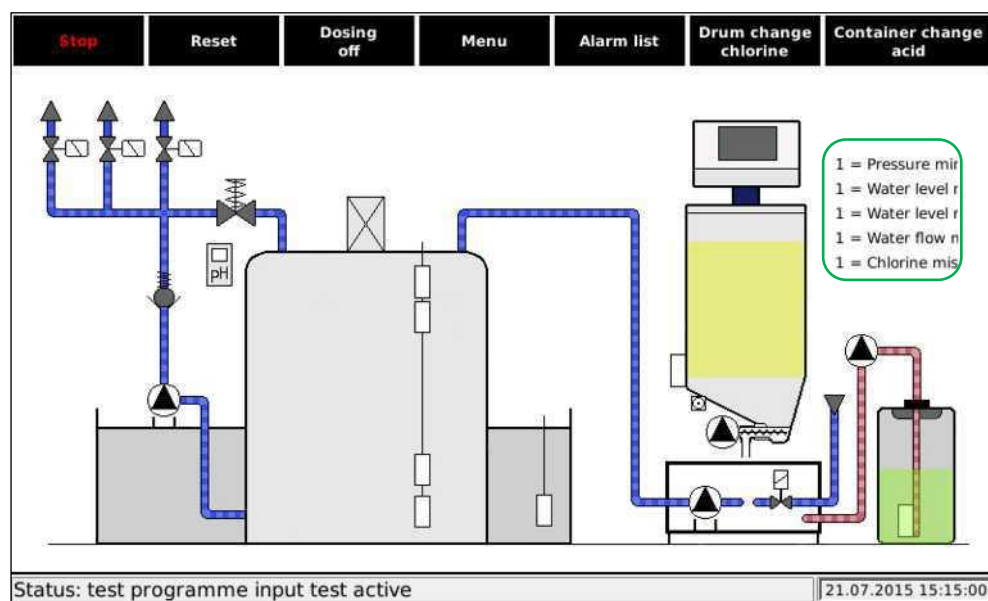


Figure 48, Input test

The switches must be activated by hand to check the switch function. The functional indicators on the display must respond accordingly:

Pressure min. = the pump pressure is lower than the set pressure. As the pump does not run in the test program: The switch is open, display: D-min. = 0

Water Level min. = The floater of the level switch in the rinsing tray is at the bottom. The switch is closed, display: W-min. = 1; when the floater is moved towards the middle position, the display changes to: W-min. = 0; the switch is open.

Water Level max. = The floater of the level switch in the rinsing tray is at the top. The switch is closed, display: W-max. = 1; when the floater is moved to the middle position, the display changes to: W-max. = 0; the switch is open.

Water flow min. = in the resting state without flow, switch closed, display: Df-min = 1.

Chlorine missing = No chlorine in the cyclone, display: Chlorine missing = 1; remove switch for checking purposes and point it towards a white object; the display changes to: Chlorine missing = 0.

Acid empty switch = The switch symbol flashes in red when the acid canister is empty. The switch symbol turns green when the floater switch is pressed upwards.

Chlorine empty switch = The switch symbol flashes in red when the chlorine drum is empty, e.g. when the drum is turned.

Feed system = The switching states are shown when this switch is activated. For example, when the floater of the L-min. switch is pressed down, the switch symbol turns green.

When the floater of the L-min. alarm switch is pressed down, the switch symbol flashes in red.

The same applies to the top two switches, i.e. L-max. and L-max. alarm.

For all other switches see *Section 0, Fault removal, switch contact, from Page 76.*

6.2.10 Service programme

Various operating data can be viewed in the sub-menus of the Service menu.

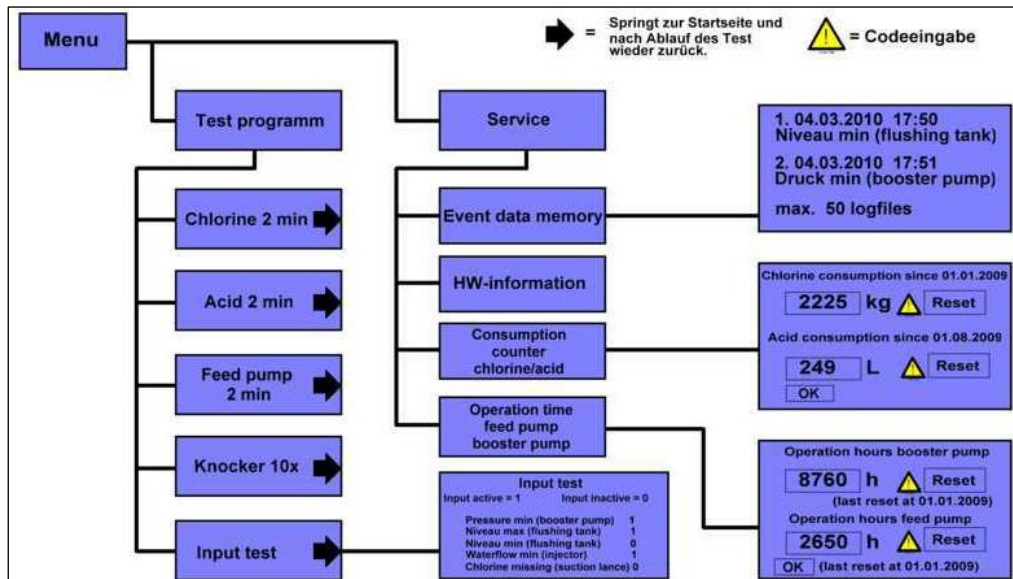


Figure 49, Service sub-programs

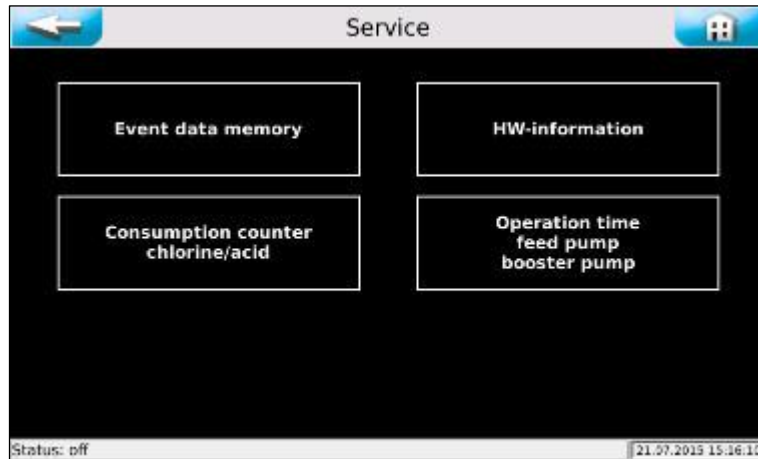


Figure 50, Service programs

Event data memory

The last 50 events / messages can be called up here

HW information

Information to hardware

Consumption counter chlorine/acid

The consumption calculation is based on the dosing performance for chlorine and acid during the whole operating time of the motors, which is determined according to *Section 5.2.11*. Factory settings are used for the calculation when "Dosing performance assessment" is not started.

A code number may be entered to reset the consumption information.

Operating hours counter

The total operating times of the GRANUDOS PLUS motive water pump and the feed pump of the feed system are specified here. This is, for example, relevant for maintenance measures or when the pump must be exchanged.

A code number may be entered to reset the consumption information.

6.3 pH monitoring NE (option)

See the separate manual.

6.4 Top up consumables



PROTECTIVE CLOTHING !

Personal protective equipment must be used when handling chemicals; Tightly fitting protective goggles, protective gloves, apron, face protection, boots

The safety data sheets for the respective chemicals must be adhered to.

- Refilling acid

Exchanging the acid canister is described in *Section 5.2.2*.

The specifications in the safety data sheets for the respective chemicals must be adhered to!

- Refilling chlorine granulate

Exchanging the chlorine granulate drum is described in *Section 5.2.3*

7 Maintenance, service, faults

7.1 Device maintenance

It is recommended to task a specialist company with maintenance.

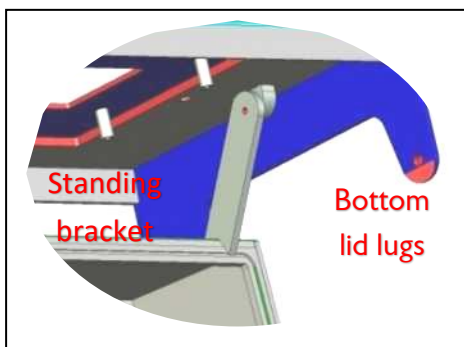
The following points must be considered for problem-free function of the dosing system GRANUDOS PLUS:

Opening and closing the housing:



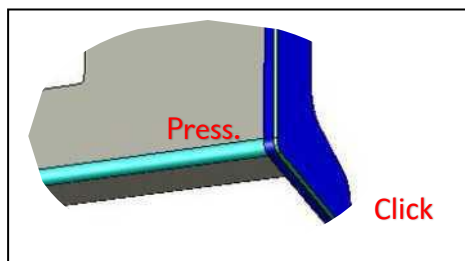
DANGER !

Mortal danger due to high voltage. All electrical work on the device may only be performed by trained specialists who consider the valid safety regulations.



The housing has an **easy latch lock**. The lateral lid lugs must slightly be lifted outwards from the basic housing in order to lift the display lid or the small connection space lid. Thereafter, pull the display lid forwards. The upper lid lugs run in guide grooves to the front latching point.

The display lid is then opened by folding it upwards. The standing bracket can be used to support the display lid on the basic housing and keep it up for work on the terminals.



To close the housing subsequently the standing bracket must be folded backwards and releases and the lid must be folded downwards and closed. The upper lid lugs must then be unlocked and the lid must be slid backwards onto the basic housing. Gentle pressure must be applied to the four corners of the housing

to seal the housing tightly.

The housing lid closes with an easily audible click.

Please ensure that all lid lugs are safely locked with the security bolts.

7.1.1 The GRANUDOS PLUS dosing system

The maintenance work required for smooth operation is described in the maintenance protocol in Section 9.5. It is recommended to document this work in the maintenance protocol as proof of work.



ATTENTION !

The dirt filter (Pos. 45, Page 42) must be kept clean. A dirty filter can cause cavitation at the pump and thus reduce performance and damage the bearing. Clean the filter insert by completely removing the filter and cleaning it outside the housing.



Hint !

Use the maintenance protocol in Section 9.5, Maintenance protocol when performing maintenance work.

7.1.2 Cleaning the preliminary filter

Always close the inlet and outlet valves when working on water-conducting lines. A clean preliminary filter is important for appropriate operation. A dirty filter may cause cavitation at the motive water pump and thus damage the pump.

Loosen the upper and lower union nut at the filter and remove the filter from the holder to clean it. Pull out the filter insert and wash the filter housing and the filter insert under running water.

7.1.3 Exchanging the dosing screw and the dust seal

Exchanging the dosing screw

When only the dosing screw is to be exchanged, the seal in the dust protection cap should be exchanged as well. The sealing disks made of EPDM and felt are part of the delivery scope.

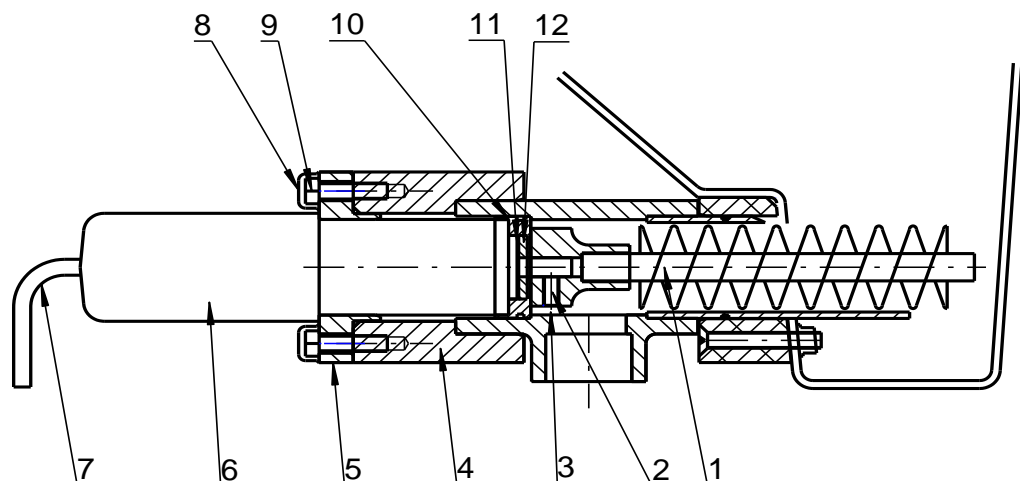


Figure 51, Dosing motor with dosing screw

Tool for exchanging the dosing screw or the dosing motor:

- a) PZ2 cross-head screw driver to loosen the screws at the hood and the controller
- b) 2mm slotted-head screw driver to loosen the cable terminals
- c) 8mm spanner to loosen the dosing motor
- d) Measuring device (multimeter) for voltage measurement
- e) Small blade or small screw driver to clean the headless screw
- f) 2.5mm Allen screw for the headless screw of the dosing screw

Removal of the dosing motor - the dosing screw:

- a) Turn the drum upwards and lock it.
- b) Loosen the fastening screws in the protective hood and remove the hood - pull the cables slightly inwards to ensure mobility of the hood.
- c) Open the terminal box at the dosing hopper when the motor is to be removed.
- d) Remove the protective caps from the M5x20 fastening screws (8) and undo the screws (9) with an SW 8 spanner.
- e) Pull the motor with the dosing screw out of the mount while holding a flat collecting container under the motor mount to ensure that no chlorine granulate is spilt. Clean the motor mount on the insides and remove scattered chlorine granules.
- f) Clean the dosing screw - Is the chlorine granulate in the dosing screw strongly solidified or the granulate easily fall out of the dosing screw when it is pulled out?
- g) The granulate may be humid or its dust component may be too high when it is solidified. The dosing screw may also be worn so that the granulate is no longer appropriately transported.

Removing the dosing motor:

- a) Disconnect the motor cable at the terminal box on the hopper and pull the cable out of the bushing.
- b) Use a small screwdriver, knife or similar to scrape out the sealing putty from the threaded hole of the fastening screw (3) at the PVC flange of the dosing screw.
- c) Loosen the fastening screw with an SW 2.5 Allen key and pull the dosing screw off the shaft.
- d) Pull the dust cap off the dosing motor and remove the old sealing disks.
- e) Grease the felt disk on both sides with silicone grease.
- f) Fill the bearing recess of the dosing motor with silicone grease.
- g) First slide the EPDM (rubber) sealing disk and then the greased felt disk onto the shaft and then firmly slide on the dust cap.
- h) Take the old O-ring out of the groove of the dust cap, insert a new O-ring and apply approx. 2 layers of Teflon tape.
- i) Grease the face sides of the dosing motor / PVC dust cap and the dosing screw with silicon grease.
- j) Slide the dosing screw onto the shaft, so that the fastening screw sits on the flattened part of the motor shaft.
- k) Press the dosing screw against the motor and fasten it with the headless screw (0.8 Nm).



ATTENTION !

Do not tighten too strongly, as the PVC thread may otherwise be stripped.

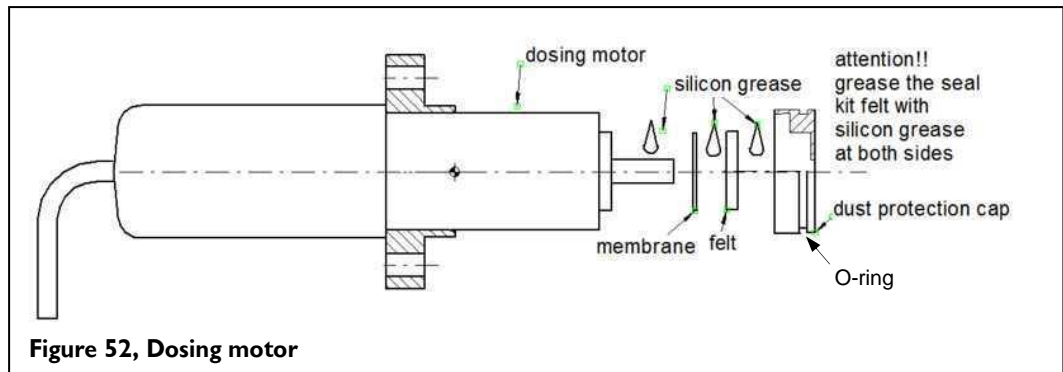


Figure 52, Dosing motor

- l) Properly seal the threaded hole with sealing putty.
- m) Insert the cable in the connection box – if necessary, grease the end of the cable with a bit of silicone grease, clamp the cable: white on white, brown on brown
- n) Check the function of the dosing motor.
- o) Slide the dosing motor into the - cleaned - motor mount, evenly fasten it with new M5x20 screws and press on the protective flaps.



ATTENTION !

The screw would strongly corrode within a short time without the sealing putty and could then no longer be loosened. It will only be possible to exchange both parts together in case the dosing screw or the motor must later be exchanged again!

Exchanging only the dosing motor:

- a) Fully turn the headless screw out of the old dosing screw and insert a new headless screw.
- b) Clean the front side of the adapter of the old dosing screw and grease it with silicone grease.
- c) Open the terminal box on the dosing hopper, loosen the dosing motor cables (brown-white), insert a new motor cable and fasten it (brown on brown, white on white).

Exchanging only the dosing screw:

- a) Remove the dust cap from the dosing motor, take the old set of seals out of the dust cap, thoroughly clean the shaft of the dosing motor, grease the ball bearings with fresh silicone grease and push the 19/4x0,5 EPDM sealing disk (11) onto the shaft. Thoroughly grease the felt disk (12) and slide it on, slide the dust cap with o-ring on top of it, detach the old Teflon tape and put on new tape in approx. 3 layers.
- b) Grease the front of the adapter of the new dosing screw with silicone grease.

Common subsequent steps:

- a) Slide the dosing screw onto the motor shaft so that the headless screw is on top of the flattened part of the motor shaft, press it firmly against the motor and tighten the headless screw.
- b) Slide the motor with dosing screw back into the cleaned (!) holder, screw on the flange - not too tightly - and press the protective caps onto the screw heads.
- c) Place a new O-ring onto the screw guidance pipe, wrap it with Teflon tape (approx. 3 layers), grease and slide the dosing unit into the holder.

7.1.4 Injector with flow switch

Flow switch overview:

131. Flow switch with LED
132. Union nut for flow switch
133. Viton hose to rinsing tray
134. -
135. Switch body (in suction tube)
136. Suction tube
137. Union nut for injector inlet
138. Injector
139. Injector nozzle with integrated flow diaphragm
140. Union nut and injector outlet

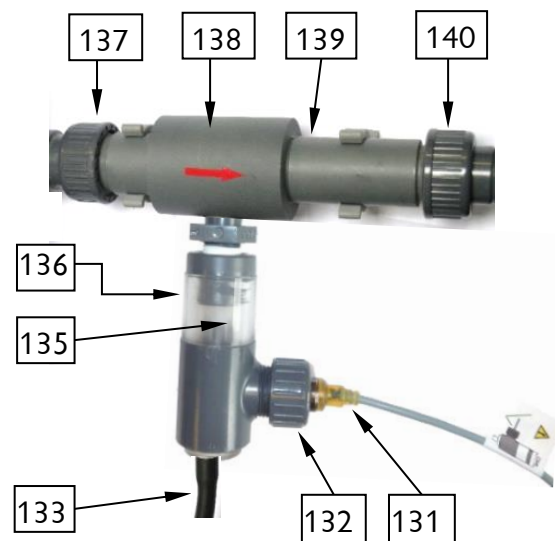


Figure 53, Flow switch

Exchanging the diaphragm:

Loosen the union nuts (137 + 140) and take out the injector. The nozzle is sealed with an O-ring at the end of the internal thread of the injector nozzle (139). Lift the disk with a small screw driver and insert another one or do not install a diaphragm as required.

7.1.5 Maintaining and setting the rinsing tray inlet floater control valve

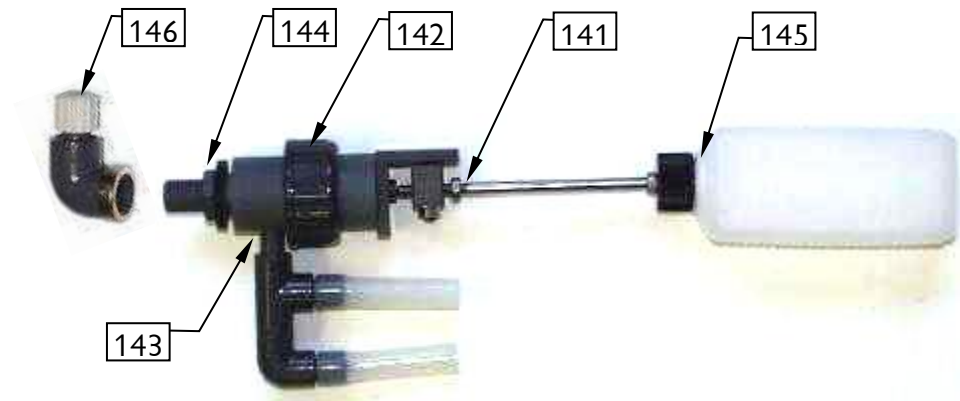


Figure 54, Floater control valve

Complete overview of the floater control valve:

- 141 Fastening nut for filling level adjustment
- 142 Union nut for floater assembly
- 143 Floater valve body
- 144 3/8" nut with seal
- 145 250ml floater
- 146 6x1mm rinsing water hose connector

Overview of floater valve tappet:

- 147 Tappet
- 148 Sealing membrane
- 149 Valve cone with O-ring seal

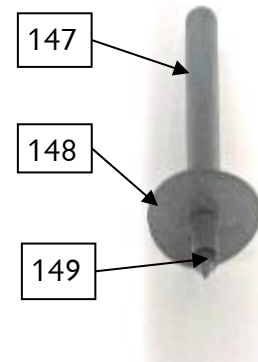


Figure 55, Tappet of valve tappet

Set the water level in the rinsing tray:

The water level in the rinsing tray is changed by turning the floater (145) at the floater control valve in or out. Turning the floater out results in a higher level, turning it in results in a lower level. One rotation corresponds to approx. 1cm. Set the floater in the rinsing tray so that the water level is approx. in the middle of the rinsing tray.

Exchanging the membrane:

Loosen the union nut (142) and remove the upper part of the floater valve. Remove the floater valve tappet assembly (147-149) pull the valve cone (149) off the tappet (147) and place a new membrane onto the valve cone. Also exchange the O-ring on the valve cone (149).

7.1.6 Exchanging and setting the "Chlorine empty" switch at the dosing hopper

The **Chlorine empty** fault is shown although sufficient chlorine is in the drum.



Figure 56, Empty switch for GR 45/100



Figure 57, Empty switch mounted on GR 45/100

The empty switch on the GRANUDOS PLUS is accessible once the protective hood has been removed. The adjustment screw with switch LED can be seen on the narrow side on top of the GRANUDOS PLUS. This LED may **not** light up when the drum is empty or when the dosing hopper with drum have been turned upwards or the **Chlorine empty** fault must be indicated.

When the switch LED is on, turn the adjustment screw to the left until the LED goes off. The **Chlorine empty** fault of the controller responds after a delay. A new switch must be installed when the switch does not respond to the adjustment potentiometer or when the adjustment screw is destroyed.

Adjusting the switch (drum turned upwards):

Turn the adjustment screw to the right until the switch LED lights up, then carefully turn it back until the switch LED goes off, then continue turning it approx. by a further 10°. **Chlorine empty** fault is shown on the controller. After turning a drum that is **not empty** into dosing position, the **Chlorine empty** fault on the controller goes off.

Exchanging the "Empty" switch:

1. The switch is inserted into a holder.
2. Open the terminal box, detach the 3 switch wires and pull out the cable.
3. Press out the old switch.
4. Slide the new switch into the holder.
5. Insert the cable into the terminal box and attach according to the terminal plan.
6. Close the terminal box and fill the screw heads with grease to prevent corrosion.
7. Adjust the switch - see previous page.

7.1.7 Exchanging the dosing hose of the dosing pump

The pump hose in the pump is subject to mechanical and chemical stress. The pump hose must therefore be regularly checked to detect damage in due time and exchange the hose set.

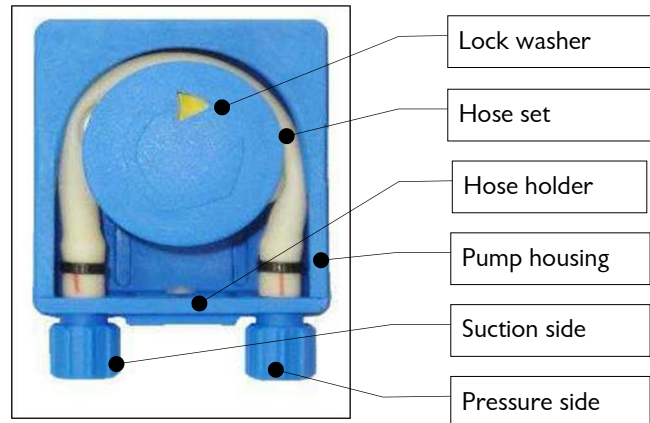


Figure 58, Hose dosing pump

Components of the hose dosing pump:

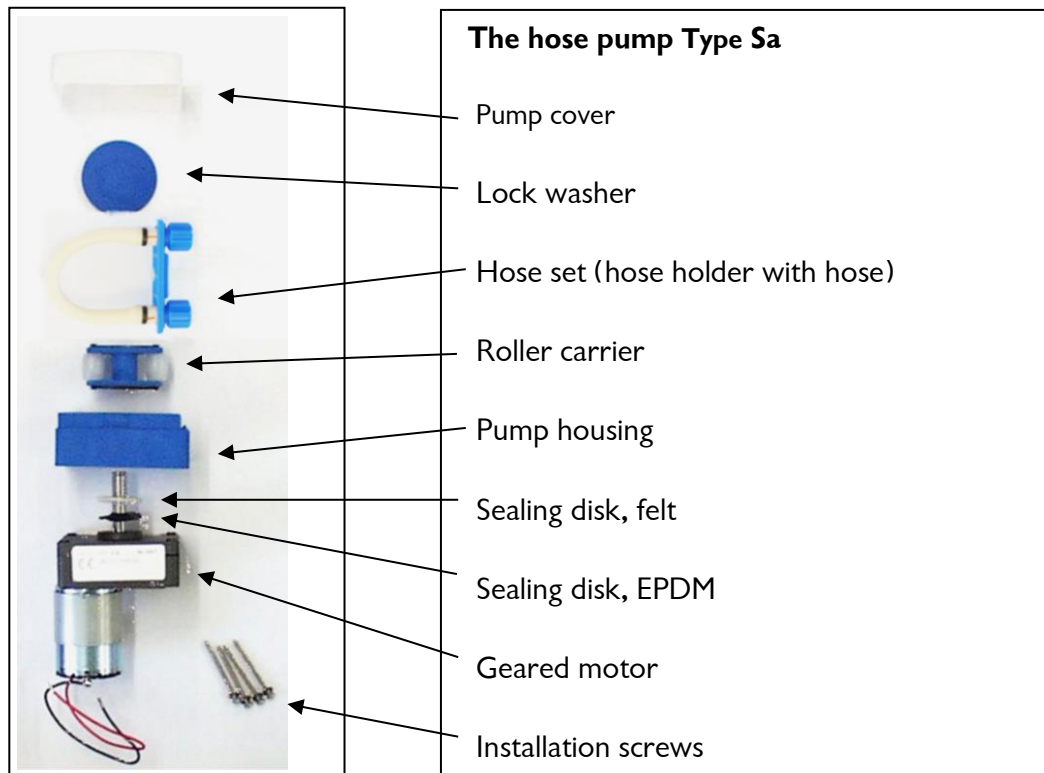


Figure 59, Hose dosing pump, individual parts

Exchanging the pump hose:

Gently pull the hose holder forwards at the suction and pressure connection and remove the transparent pump cover and the lock washer in order to exchange the pump hose. Turn the roller carrier to the left and pull the dosing hose forwards through the recess in the roller carrier. Pull the hose holder with the dosing hose out of the guide and carefully remove the cable ties at the hose connections with a sharp knife or with pliers while taking care that the hose nipple is not damaged. Push the new dosing hose onto the hose nipples up to the limit stop, so that the markers at the hose ends are in front. This ensures that the hose is not twisted.



ATTENTION !

**The hose may not be twisted after insertion.
Take note of the markers!**

Fasten the hose ends with the hose binders and cut off protruding parts of the hose binders. Turn the roller carriers anticlockwise and carefully press the hose into the housing (also see Figures in *Section 5.2.1, Install the hose pump, roller carriers.*) Click back the lock washer and the pump cover.

7.1.8 Cleaning of the dust extraction (option)

- a. Disconnect the device and secure against new connection.
- b. Loosen the two lateral screws.
- c. Lift the motor upwards out of the blower.
- d. Clean blower and tank
- e. Disassemble the transparent hose and clean with the supplied brush.
- f. Assemble in reverse order.

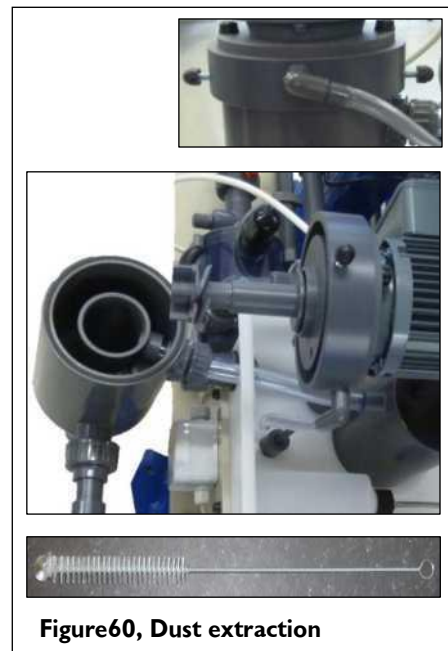


Figure60, Dust extraction

7.2 Regular water inspection

Regular water inspection is essential for problem- and fault free operation of the system. The pH value of the buffer tank must be checked every 2 months.

7.3 Fault removal



Hint !

All faults are indicated on the flow diagram on the touch screen by flashing of the respective monitoring switch. They can further be queried in the "Alarm list" short program.

It is furthermore possible that the switches or sensors are faulty and that it is therefore not possible to transmit an electrical signal.

A fault is only indicated when it has been pending without interruption for at least 6 seconds.



Hint !

Incrustations of chloride granulate at the hopper can cause functional failures. Clean the hopper according to the maintenance protocol

Failure chart, see next page.

Fault indication	Effect	Cause / remedies
1. D-min. ALARM: The pressure switch in the inlet has responded, the supply pressure is too low.	The GRANUDOS stops The stop valve and the motive water pump are switched off.	1. Supply pressure too low 2. Motive water pump faulty 3. Pressure switch faulty 4. Set a lower response pressure at the pressure switch
2. W-min. ALARM: The water level of the rinsing tray is low, as more water is sucked off than flows into the rinsing tray through the floater valve.	The GRANUDOS stops The stop valve and the motive water pump are switched off.	1. Function of the floater valve: The water supply should gently follow the movement of the floater. When OK, adjust the water level according to Section 5.2.7 When not OK, insert a new membrane into the floater valve. 2. Insert hole diaphragm with small hole 3. Preliminary filter dirty?
3. W-max. ALARM: The water level in the rinsing tray is high, as less water is sucked off than flows into the rinsing tray through the floater valve.	The GRANUDOS stops The stop valve and the motive water pump are switched off.	When the suction performance of the injector is OK: 1. Function of the floater valve: The water supply should gently follow the movement of the floater. When OK, adjust the water level according to Section 5.2.7 <i>Water level in the rinsing tray</i> When not OK, insert a new membrane into the floater valve. 2. Look up „Df-min. ALARM“ faulty indication when the suction performance is not sufficient
4. Df-min. ALARM: Min. water flow in the rinsing tray The switching body of the flow switch does not move up, the switch LED lights up.	The GRANUDOS stops The stop valve and the motive water pump are switched off.	1. Check the function of the motive water pump 2. Preliminary filter clogged 3. Intake opening in the rinsing tray blocked 4. Particles introduced during the installation or by the chlorine may be stuck in the injector, the nozzle or the suction pipe 5. Insert hole diaphragm with larger hole or remove the diaphragm completely 6. Blocked reflux valve at the buffer tank 7. Diffuser worn, when $D > 6.5\text{mm}$, exchange diffuser
5. Chlorine missing ALARM: “Chlorine missing” switch on the dissolving cyclone does not respond	The “Chlorine missing” switch indicates that there is not enough chlorine in the cyclone during the 2nd dosing interval	1. Adjust "Chlorine missing" switch 2. Fault during dosing: a) Chlorine granulate forms lumps b) Dosing screw blocked due to bad chlorine quality (too fine, humid) 3. The dosing motor is defective
6. Chlorine reserve MESSAGE:	Only for information purposes, the dosing/filling of the buffer tank continues	Prepare a new chlorine drum for filling the GR PLUS
7. Chlorine empty ALARM: Chlorine drum empty	The GRANUDOS stops The stop valve and the motive water pump are switched off.	1. Position a full drum 2. When the drum is not empty, re-adjust the empty-switch or 3. Install new empty switch
8. Acid reserve MESSAGE	Only for information purposes, the dosing/filling continues	Provide a new acid canister
9. Acid empty ALARM: Acid container empty	GRANUDOS stops The stop valve and the motive water pump are switched off.	1. Exchange empty acid container against a full one 2. When the acid container is not empty, the empty-switch is defective: 3. Check the functional direction of the floater with a new suction lance
10. Fuse dosing motor chlorine ALARM:	The GRANUDOS stops	Check the chlorine motor for blockage, remove blockage as required and replace the fuse
11. Buffer tank Level min. MESSAGE:	Filling starts	The dosing system starts with the production of chlorine solution

Fault indication	Effect	Cause / remedies
12. Niveau max. buffer tank MESSAGE:	The filling stops	The post-rinsing cycle starts, and the dosing system stops producing chlorine solution
13. Level min. ALARM: Buffer tank Level min. alarm	The bottom control switch to start filling has not been triggered. The feed pump is switched off	1. Check the switch function: The switch contact must be closed when the tank is empty (measure at the terminal). When open: Switch or terminal contact faulty 2. The total of the flow capacities of the dosing lines is higher than the filling performance of the GRANUDOS. Increase the chlorine dosing performance setting at the GRANUDOS
14. Level max. ALARM: Buffer tank Level max. alarm	The upper control switch L-max. that stops the filling has not been triggered. The GRANUDOS switches off. Reflux from the dosing lines occurs while the control valves are closed. The feed pump starts as part of an emergency program.	1. Check the switch function: The switch contacts of the L-max. switch must be open when the tank is full (measure at the terminal). When it is closed while the buffer tank is full: Switch or terminal contact faulty 2. Check the tightness of the reflux and control valve when the L-max. switch is in order.
15. Level collecting tray ALARM:	The level switch in the collecting tray reports water in the collecting tray	1. The buffer tank is overflowing or has a leak a) Upper level switch for filling stop and upper alarm switch in the buffer tank defective. b) Chlorine control valve and reflux valve of a dosing line leaking (when the feed pump is not running) 2. Control valve in the water supply of the GRANUDOS leaking.
16. pH monitoring ALARM: Only active in versions with pH monitoring	a) When the pH value is too high: → Turbidity in flow meters b) When the pH value is too low: → The solution strongly smells of chlorine	1. Calibrate pH monitoring 2. When the pH value is high: Check the acid dosing a) Function of the dosing pump/pump relay b) Dosing hose, roller carrier c) Leak in the suction line d) Dosing valve blocked e) Increase the acid dosing performance 3. When the pH value is low: a) Increase the chlorine dosing performance 4. Reduce the acid dosing
17. Motor protection feed pump ALARM:	The motor protection switch of the feed pump was triggered	Check the pump motor and the electrical supply
18. CCS (Central Control System) off, MESSAGE:	The dosing system has stopped	None; as switch-off was external
19. Feed pump externally switched off, MESSAGE	The feed pump stops	None; as switch-off was external

Malfunction without notification on the display:

1. The display is dark and the system is off:

- a) No supply voltage → Re-establish supply voltage
- b) The main fuse at the left bottom of the housing has blown → Replace fuse
- c) Fuse F1 on the power adapter has blown → Replace fuse
- d) The power adapter is defective → Replace power adapter

2. The device does not save the values entered. (e.g. dosing performance):

- a) SD card defective → Replace the SD card with original software on it.

Switch contact to the appropriate fault message:

Description	Situation	Switch contact	Display on touch screen
Dosing device			
1. D-min. alarm, MWP rinsing tray	No pressure on pumps	open	1
2. W-min. alarm, rinsing tray	floaters down,	closed	1
3. W-max. alarm, rinsing tray	floaters up,	closed	1
4. Df-min. alarm, rinsing tray	switching body down,	closed	1
5. Chlorine missing alarm	No granulate in the cyclone	open	1
6. Chlorine reserve message	The amount set has been dosed	—	green
7. Chlorine empty, alarm	No chlorine	open	red
8. Acid reserve message	The amount set has been dosed	—	green
9. Acid empty, alarm acid container	floaters down,	open	red
10. "Chlorine motor" alarm	Chlorine motor fuse triggered	—	red
Feed system			
11. Level min. message buffer tank	floaters down,	closed	green
12. Level max. message buffer tank	floaters up,	closed	green
13. Level min. alarm, buffer tank	floaters down,	closed	red
14. Level max. alarm, buffer tank	floaters up,	open	red
15. Collecting tray level alarm	floaters up,	closed	red
16. pH-monitoring alarm	pH-value not within tolerance range	closed	red
17. Feed pump motor protection alarm	Motor protection switch is triggered	closed	red
Other			
18. CCS (Central Control System) off, message	Input central control system,	open	Central control system externally switched off
19. Feed pump externally switched off, message	Input externally switched off	open	Feed pump externally switched off

8 Shutting down – Storage – Disposal

8.1 General

The systems must be completely drained or protected against frost when they are shut down and there is a risk of frost!

8.2 Shutting down the GRANUDOS PLUS dosing system

1. The dosing hopper must be emptied and thoroughly cleaned.
2. Remove the dosing motor with dosing screw from the dosing hopper, thoroughly clean the dosing motor with dosing screw and store it in a dry place.
3. Remove the roller carrier from the acid pump to release the dosing hose.
4. Thoroughly clean all parts of the GRANUDOS PLUS.
5. Drain all water-filled parts when there is a risk of frost.
6. Keep the GRANUDOS PLUS switched on to prevent possible condensation in the controller box.
7. Remove the remains of calcium hypochlorite in the device. Open all valves, select the **Dosing off** button and let the system run for 2-3 hours without dosing for rinsing and cleaning purposes. Also see Section 8.3

Additionally in case of option dust extraction

8. Loosen the two lateral screws. Disassemble the stirrer motor and keep in a dry place
9. Clean the blower and the stirrer tank.
10. Drain all water-filled parts when there is a risk of frost.
11. Disassemble the transparent hose and clean with the supplied brush.

8.3 Shutting down the GRANUDOS PLUS feed system

1. The feed pump must be in operation and the control valves of the dosing lines must be open while the GRANUDOS PLUS is in operation. The system is in this way rinsed and cleaned.

Procedure:




- a) Start the system with the **Start** button
 - b) Open the control valve at the manual controls.
 - c) The system is now rinsed with water and the residual chemicals are washed out.
2. The bottom sediments of the buffer tank must be sucked out. Possible resilient deposits can be dissolved with diluted nitric acid.

8.4 Disposal of old part and operating materials

De-installed, contaminated parts must first thoroughly be cleaned and then disposed of according to the regulations valid at the place of operation or recycled. The instructions on the packaging of operating materials must be complied with. In case of doubt obtain information from the authority responsible for disposal at your location. The parts/substances must be disposed of as special waste when this is not possible.

9 Documents

9.1 Declaration of conformity

<p>WDT Werner Dosiertechnik GmbH & Co. KG Hettlinger Straße 17 D-86637 Wertingen Tel. 0049 8272 98697-0 Fax 0049 8272 98697-19 info@werner-dosiertechnik.de www.werner-dosiertechnik.de</p>		 <p>Werner Dosiertechnik</p>	
<p>EG-Konformitätserklärung EC declaration of conformity Déclaration de conformité UE</p> <p>im Sinne der EG-Maschinenrichtlinie 2006/42/EG, Anhang II 1.A as defined in the ECMachinery Directive 2006/42 / EC, Annex II, Part 1A selon la directive européenne machines 2006/42 / CE, annexe II 1.A</p>			
<p>Hersteller WDT - Werner Dosiertechnik GmbH & Co. KG Manufacturer Hettlinger Str. 17 Fabricant 866637 Wertingen-Geratshofen</p>			
<p>Beschreibung und Identifikation des Produktes: Description and identification of the product: Description et identification du produit :</p>			
<p>Typenbezeichnung:</p> <ul style="list-style-type: none"> Granudos 10, Granudos 10-CPR Touch, Granudos 10 Touch Granudos 15, Granudos 15 PC, Granudos 45/100 PB, Granudos 45/100 S41, Granudos 45/100 Plus V70 Touch, Granudos 45/100-CPR Touch, Granudos 45/100 Touch Granuds FB 		<p>Art: Maschine</p>	
<p>Funktion: Das Dosiersystem dient zur Desinfektion von Schwimmbadwasser mit Calciumhypochloridgranulat. Function: The dosing system is intended for swimming pool disinfection using calcium hypochlorite granules Fonction: Le système de dosage est utilisé pour la désinfection des piscines avec des granulés d'hypochlorite de calcium</p>			
<p>Es wird ausdrücklich erklärt, dass das Produkt allen einschlägigen Bestimmungen der folgenden EG-Richtlinien entspricht: It is expressly stated that the product complies with all relevant provisions of the following EC directives Il est explicitement dit que le produit est conforme à toutes les dispositions pertinentes des directives CE suivantes :</p>			
<p>2006/42/EG RICHTLINIE 2006/42/EG DES EUROPÄISCHEN PARLAMENTS UND DES RATES vom 17. Mai 2006 über Maschinen und zur Änderung der Richtlinie 95/16/EG (Neufassung)</p>			
<p>Die folgenden harmonisierten Normen nach Artikel 7 (2) wurden angewandt: The following harmonized standards as defined in Article 7 (2) were applied: Les normes harmonisées suivantes selon l'article 7 (2) ont été appliquées :</p>			
<p>EN ISO 12100:2010 Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze - Risikobeurteilung und Risikominderung EN 60204-1:2006 Sicherheit von Maschinen – Elektrische Ausrüstung von Maschinen – Teil 1: Allgemeine Anforderungen EN ISO 14120:2015 Anforderungen an Gestaltung und Bau von feststehenden und beweglich trennenden Schutzeinrichtungen</p>			
<p>Die in der Gemeinschaft ansässige Person, die für die Zusammenstellung der technischen Unterlagen bevollmächtigt ist: The designated person who is authorized to draw up the technical documentation: La personne établie dans la communauté qui est autorisée à constituer le dossier technique:</p>			
<p>Name: Werner Dosiertechnik GmbH & Co KG Straße/Nr.: Hettlinger Straße 17 PLZ Stadt: 86637 Wertingen</p>		 Unterschrift/signature Jochen Rieger, Director	
<p>Wertingen, 21.07.17 Ort/City/Place, Datum/Date</p>			
			
<p>CE 001 Konformitätserklärung Granudos.docx</p>			

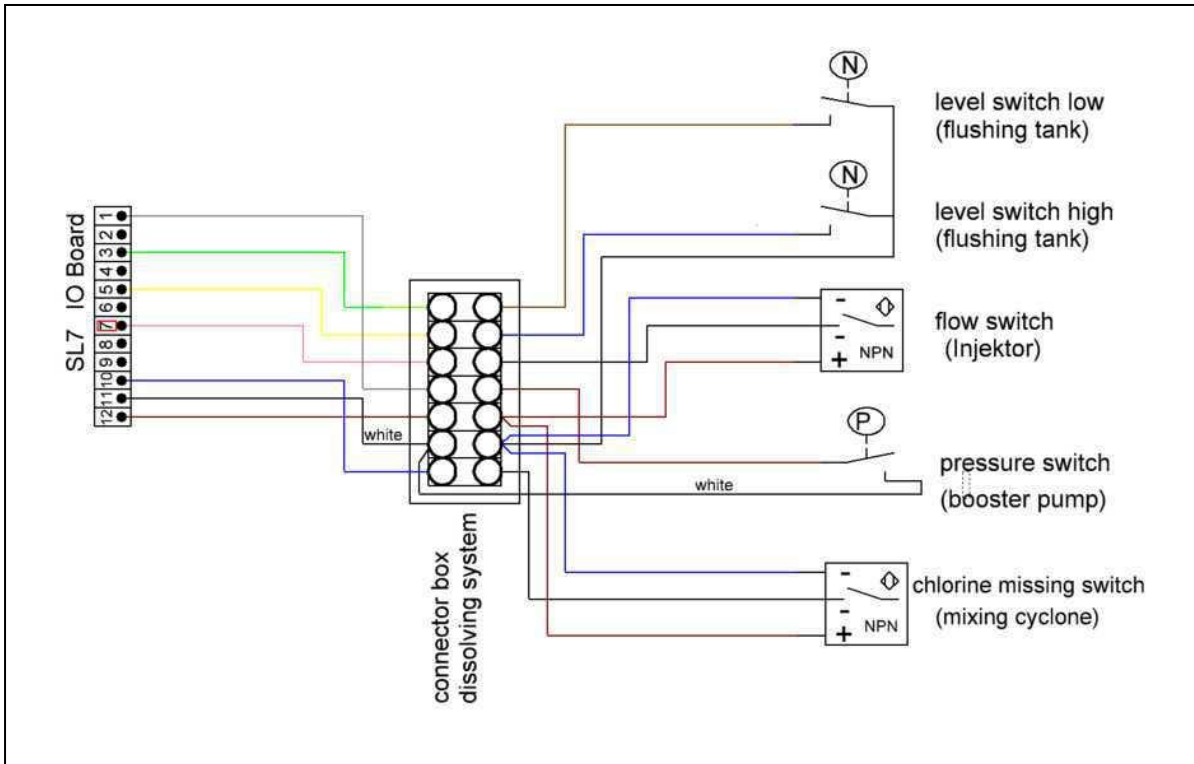


Hint !

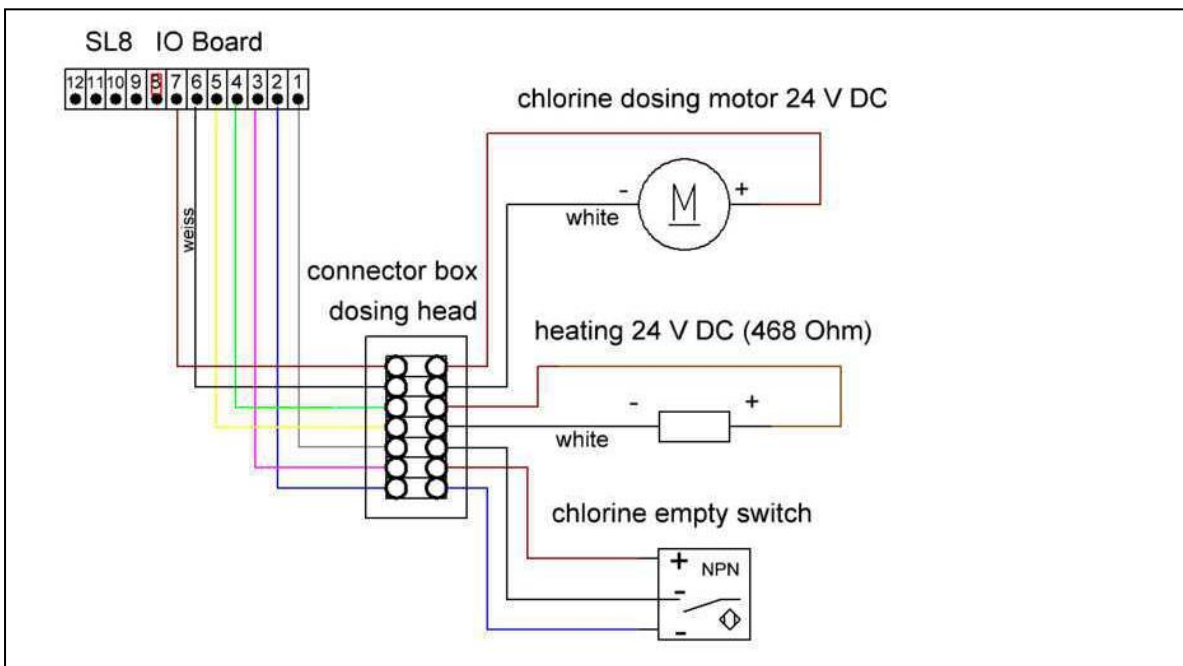
These operating instructions include terminal plans for the standard versions of the devices. The special circuit diagrams that are adjusted to the optional equipment of the **GRANUDOS PLUS dosing system and feed system are inside the terminal boxes of the devices.**

9.2.1 Circuit diagram I/O board for GRANUDOS 45/100 PLUS V70 Touch

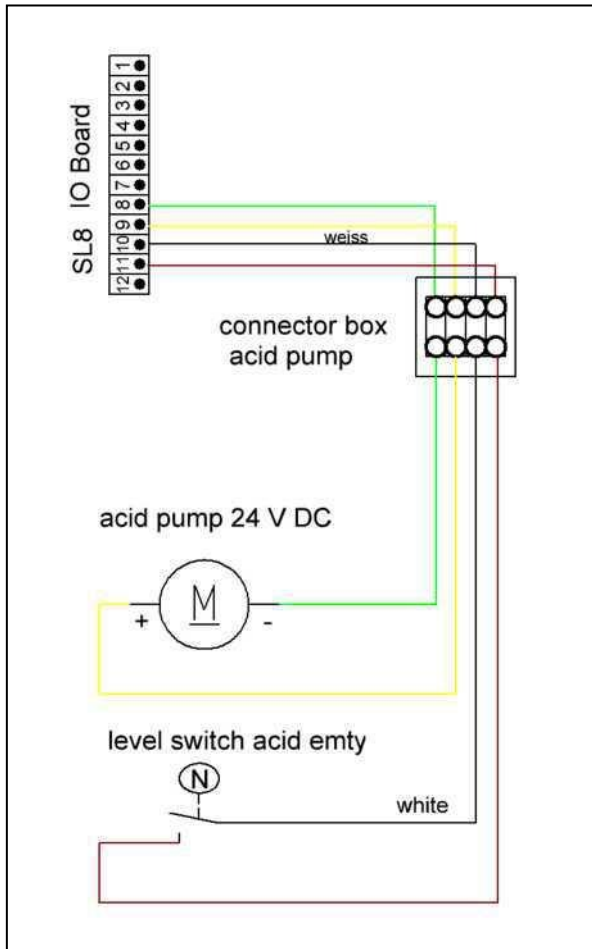
Dissolving system:



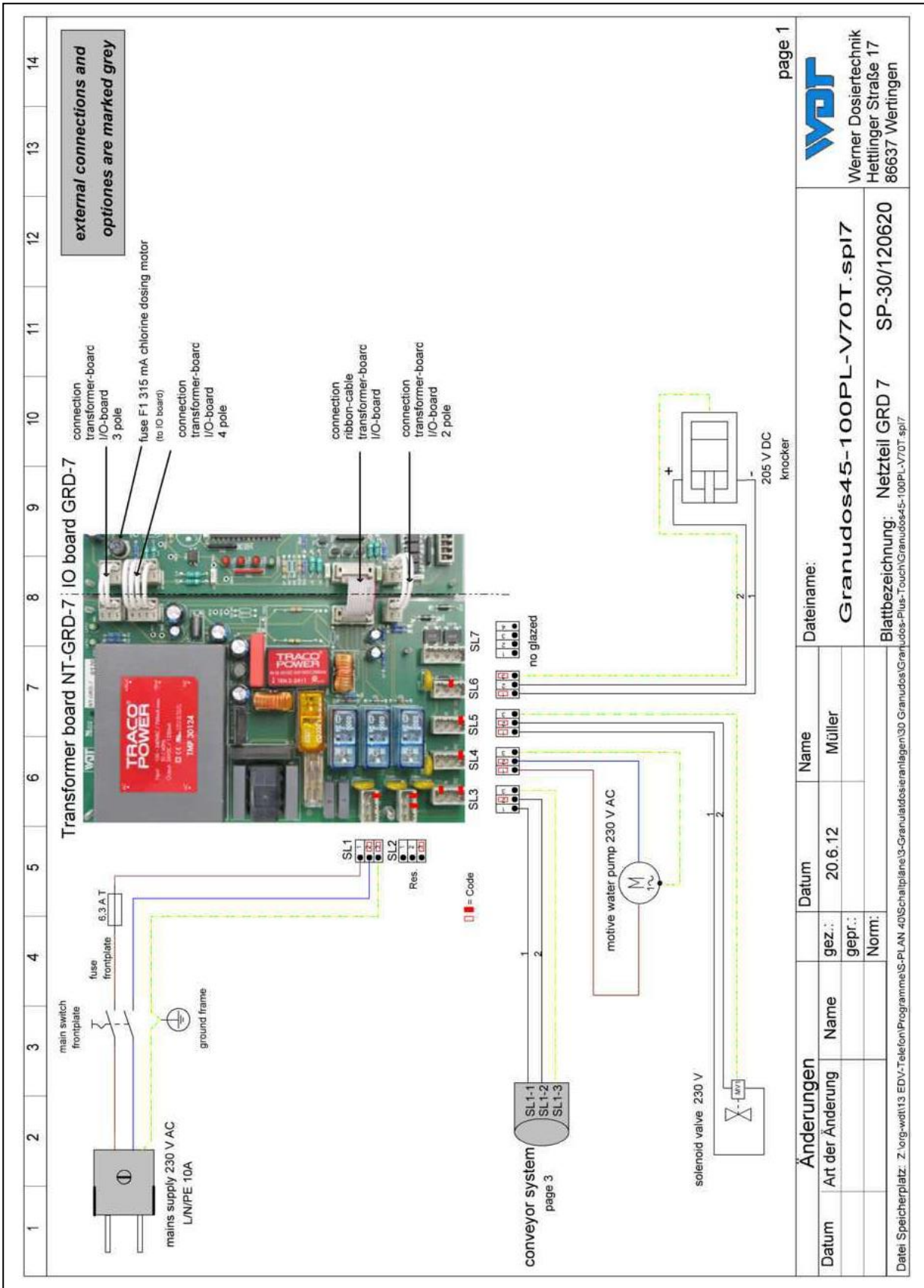
Dosing hopper:



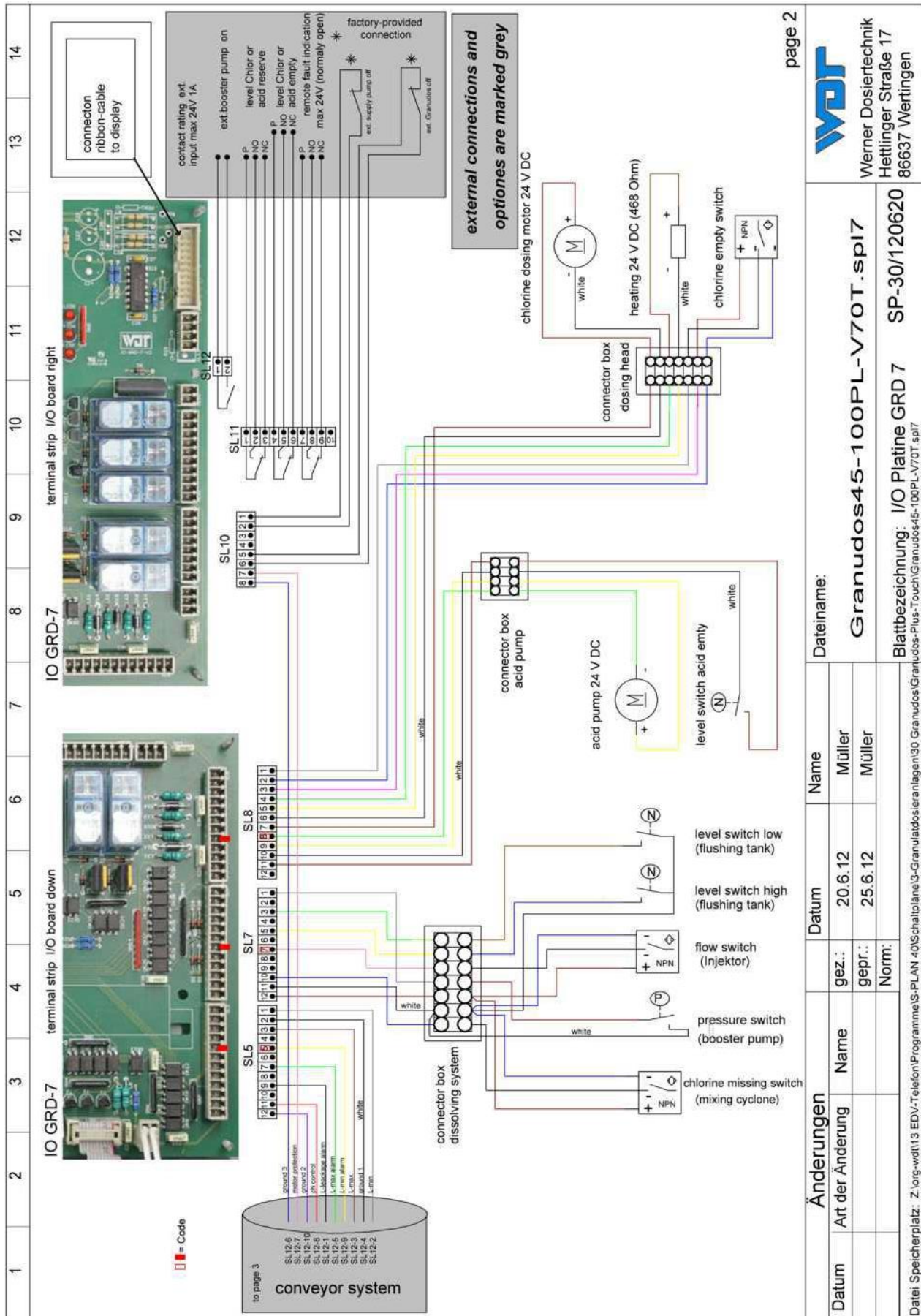
Acid pump:



9.2.2 Terminal diagram network adapter with connection to the I/O board



9.2.3 Terminal diagram I/O board GRD 7

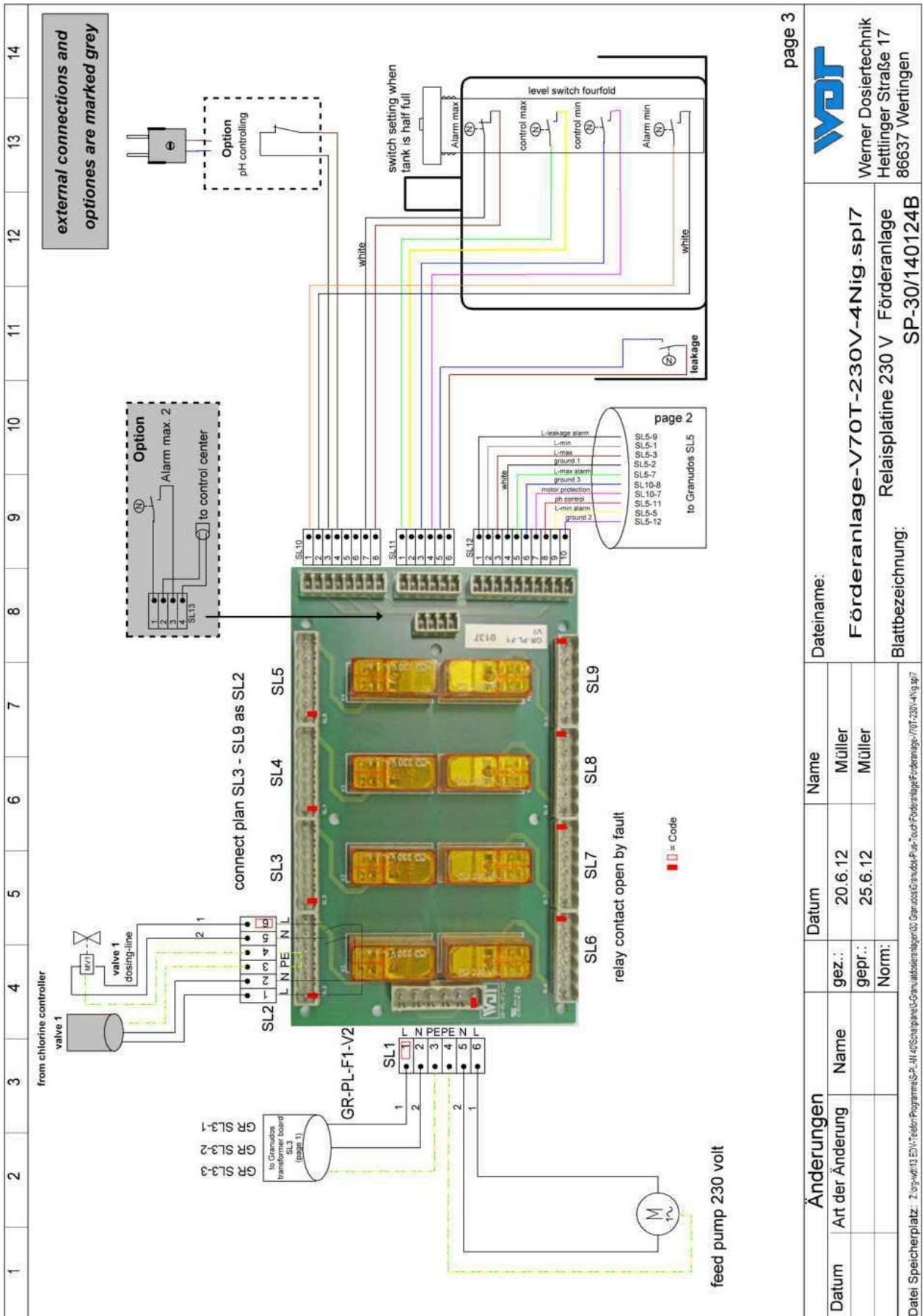


page 2

Änderungen		Datum	Name	Dateiname:
Datum	Art der Änderung	gez.:	Müller	Granudos45-100PL-V70T.sp17
		gepr.:	Müller	
		Norm.:		
Datei Speicherplatz: Z:\org-wdt\13 EDV-T\Telefon\Programme\S-PLAN_40\Schaltpläne\3-Granulatdosieranlagen\30_Granudos\Granudos45-100PL-V70T.sp17				

WDT
 Werner Dosiertchnik
 Hettlinger Straße 17
 86637 Wertingen

9.2.4 Circuit diagram feed system 230V (pump MPN130)



Änderungen

Datum	Art der Änderung	Name
20.6.12	gez.:	Müller
25.6.12	gepr.:	Müller
	Norm.:	

Dateiname:

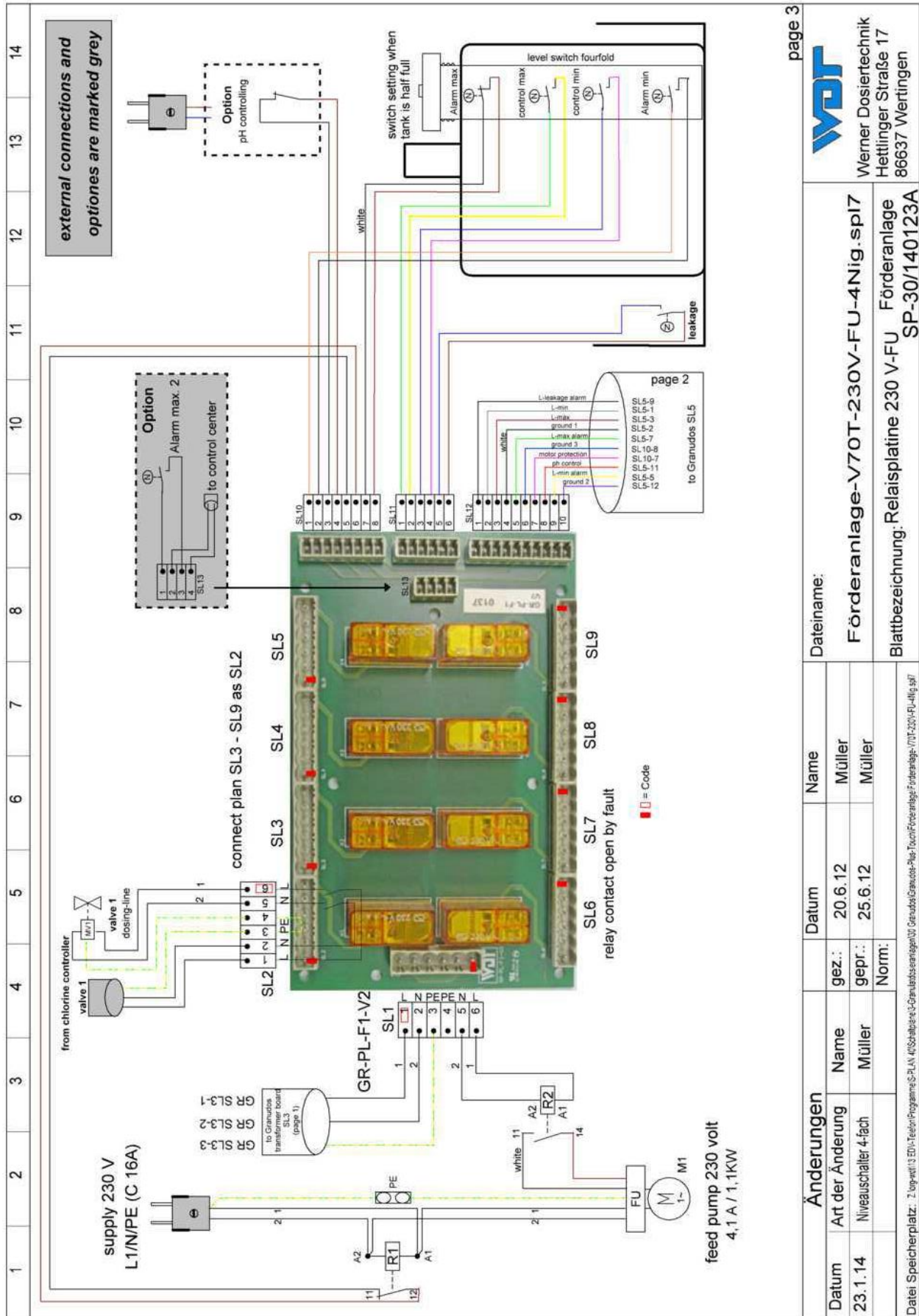
Förderanlage-V70T-230V-4Nig.sp17

Relaisplatine 230 V Förderanlage
SP-30/140124B



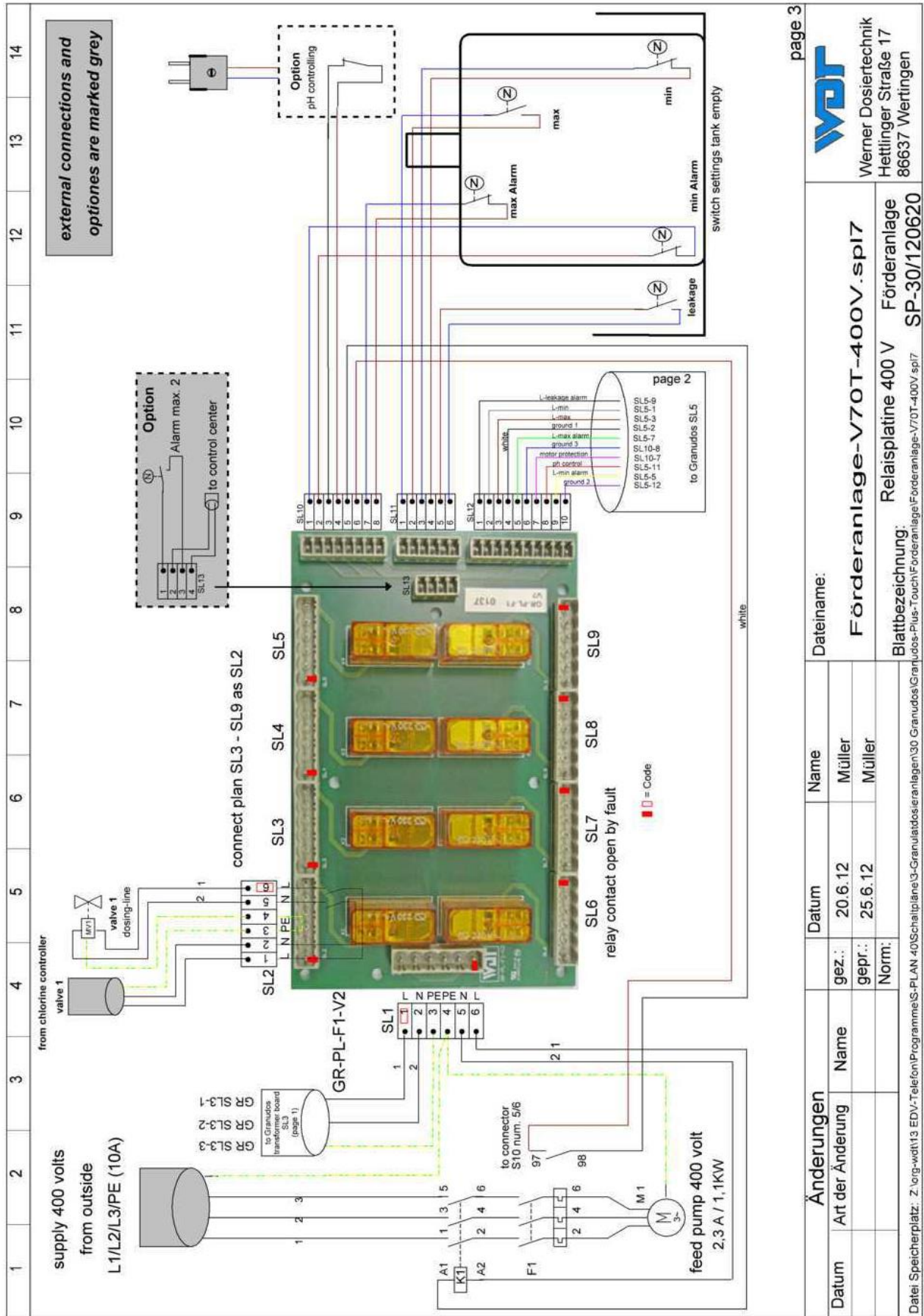
Werner Dosiertchnik
Hettinger Straße 17
86637 Wertingen

9.2.5 Circuit diagram feed system 230V FC (pump MPN130 FC)



Änderungen		Dateiname:	
Datum	Art der Änderung	Name	Name
23.1.14	Niveauschalter 4-fach	Müller	Müller
		gez.:	20.6.12
		gepr.:	25.6.12
		Norm:	
Datei Speicherplatz: Z:\npw\wt\3-EDM-Tiefen\Programme\SP_LAN_40\Schaltpläne\3-Granulos\Granulos-Plus-Touch\Förderanlage_V70T-230V-FU-4lig.spf		Förderanlage-V70T-230V-FU-4Nig.spf	
		Blattbezeichnung: Relaisplatine 230 V-FU Förderanlage SP-30/140123A	

9.2.6 Circuit diagram feed sstem 400V (pump MPN150)



Änderungen		Datum	Name
Datum	Art der Änderung	gez.:	Name
		gepr.:	Müller
		Norm.:	Müller

Dateiname: Förderanlage-V70T-400V.sp17

Blattbezeichnung: Relaisplatine 400 V Förderanlage SP-30/120620

Werner Dosiertchnik
Hettinger Straße 17
86637 Wertingen

9.3 Commissioning report

The commissioning protocol is included in the documents attached.

9.4 Operating data sheet



All parameters are reset to factory defaults during *Programme change*. All parameters must therefore be checked and readjusted after the programme has been changed. We therefore recommend to enter the optimised, swimming-pool specific parameters into this list.

Settings menu	Factory settings	Setting ranges	Step	During commissioning	Optimised during operation
				Date:	Date:
Dosing performance					
Acid	75%	10 – 100%	1		
Calcium hypochlorite	75%	50 – 100%	1		
Cycle time	30 seconds	—		—	—
Pressure switch (31)	1.5barg	1 – 3barg	0.25		
System					
Date / time	MEZ / MESZ	MEZ -12 +11			
Password	—	1 - 9999	1		
Display brightness	80%	9 - 100%	1		
Language	EN	DE, EN, FR, FI, NO, IT,			
System version	Without feed system	With / without feed system			
System network (if present)					
IP address	—	xxx.xxx.xx.x			
Subnetmask	—	xxx.xxx.xxx.x			
Gateway	—	xxx.xxx.xx.x			
Feed system (option)					
Dosing performance line 1	—	50-600l/h			
Dosing performance line 2	—	50-600l/h			
Dosing performance line 3	—	50-600l/h			
Dosing performance line 4	—	50-600l/h			
Dosing performance line 5	—	50-600l/h			
Dosing performance line 6	—	50-600l/h			
Dosing performance line 7	—	50-600l/h			
Settings for pressure maintenance valve	1.2barg				
pH monitoring (option)					
Set-point	pH 6,8 - 7,2				
Alarm low	pH 6,5				
Alarm high	pH 7,5				
Time delay	5 minutes				

Settings menu	Factory settings	Setting ranges	Step	During commissioning	Optimised during operation
				Date:	Date:
Dosing performance					
Acid	75%	10 – 100%	1		
Calcium hypochlorite	75%	50 – 100%	1		
Cycle time	30 seconds	—		—	—
Pressure switch (31)	1.5barg	1 – 3barg	0.25		
System					
Date / time	MEZ / MESZ	MEZ -12 +11			
Password	—	1 - 9999	1		
Display brightness	80%	9 - 100%	1		
Language	EN	DE, EN, FR, FI, NO, IT,			
System version	Without feed system	With / without feed system			
System network (if present)					
IP address	—	xxx.xxx.xx.x			
Subnetmask	—	xxx.xxx.xxx.x			
Gateway	—	xxx.xxx.xx.x			
Feed system (option)					
Dosing performance line 1	—	50-600l/h			
Dosing performance line 2	—	50-600l/h			
Dosing performance line 3	—	50-600l/h			
Dosing performance line 4	—	50-600l/h			
Dosing performance line 5	—	50-600l/h			
Dosing performance line 6	—	50-600l/h			
Dosing performance line 7	—	50-600l/h			
Pressure maintenance valve setting	1.2barg				
pH monitoring (option)					
Set-point	pH 6,8 - 7,2				
Alarm low	pH 6,5				
Alarm high	pH 7,5				
Time delay	5 minutes				

9.5 Maintenance protocol

The maintenance protocol is included in the documents attached.

9.6 Spare parts list

<u>Device component</u>	<u>Description</u>	<u>Item no.</u>
GRANUDOS PLUS	Granudos GR 10-100 complete maintenance set	12631
Chlorine dosing	GR PLUS HTH 40kg dosing hopper (on request for other chlorine drums)	16775
	Hood for GR45 PLUS dosing hopper	12866
	Dosing motor PLG 30-35 GR45	11676
	Dosing motor PLG 30-60 GR100	11546
	Motor holder PLG-d32	11542
	Dosing screw d6/D26	11550
	Heated dosing pipe, GR	11556
	Knocker complete GR 45	11558
Acid dosing	Acid pump Sa, complete	11628
	Pump housing Sa	14140
	Roller carrier Sa	12609
	Hose set Sa 4.8x1.6 Sa	13414
	Suction set, GR45	12523-1
	Acid dosing valve GR	15099
	Spare parts set for acid dosing valve	15764
	pressure switch 1-3 bar M10x1 with housing	23364
Filter	Filter housing d75 GR PLUS	15407
	Filter top part with d25 ball valve	12304
	O-Ring for d75 filter	11258
Control	Control plate IO_GRD_7 V1	21623
	Control board NT_GRD_7 V2, power adapter	21623-1
	Operation Touch 7"	22747
	Main switch	21839
	Fuse holder FPG1 5x20 IP67	21899
Floater valve	Floater valve, complete, d25 GR PLUS	15405
	Membrane for floater valve	16367
	Floater	11621
Rinsing tray	Level switch GR/PAK	10496
GR motive water pump	Motive water pump Lo 1HM04-A	24618
	Floating ring seal Lo-A	12800
Flow switch	Switch pipe GR ½"-S14 GR PLUS	13058
	Flow switch GR/PAK ind. 18x1	11603
	Switch body GR PLUS 18/9/25	11607
	Connection hose Vi- 10/2,5/180	11565-1
Injector	Injector ½" GR/PAK complete	11792
	Hole diaphragm set	11594
	Injector, ½" diffuser nozzle	12306
	Injector, ½" body	12305
Dissolving cyclone	Dissolving cyclone GR 45/100 PLUS	11613
	Chlorine-missing-switch	11609

<u>Device component</u>	<u>Description</u>	<u>Item no.</u>
Feed system	Active carbon, 1 kg for filter on GPL tank	12546
	Level switch in tank, 1 ½“ PVC/PVDF GPL	23846-1
	Feed pump MPN 130 – 1bar	11241
	Feed pump MPN 150 – 1.5bar	11242
	Feed pump MPN 130 PVDF FC – 1.6bar	21983
	Reflux valve d25 Pr	11013
	Pressure transmitter d25-1/4”	10042
	Manometer 1.4bar ¼” glycerine	21937
	Pressure retention valve DHV DN 20	10071
	Maintenance set pressure retention valve DHV DN20	16992
	Control valve ½”-Bü	20294
	Maintenance set for control valve Bü (20294)	21416-1
	Membrane, T4 DN15/20, PTFE-coated	14079
pH monitoring	pH-electrode GR PLUS	12436
	Cable for pH-electrode GR PLUS	11680
Dust extraction	Stirrer motor – gear motor SA	25156
	Ball bearing	25927
	Suction hose	from 19835

Consumables

The safety data sheets of the chemical producers must be adhered to!

10 Appendices

- Commissioning protocol WDT
- Maintenance protocol WDT
- Operating instructions Setting of the pH monitoring

Own notes

Commissioning protocol IP-001-EN

Granudos 45/100 Plus V70 Touch



This protocol is to be completed by the commissioning technician! All warranty claims expire when no completed and signed commissioning protocol is available!

Object: Date: __.__.____

City, Street, Street number:

Device type: Year of construction: Serial no.:

	Activity	Completed	Comment
1	<u>Dissolving system (consider 6 seconds switching delay!)</u>		
1.1	Check pressure switch: KH intake closed, GR stopped, fault display	<input type="checkbox"/>	
1.2	Adjust pressure switch (31): see operating instructions, section 5.2.6	<input type="checkbox"/>	
1.3	Check flow switch: KH outlet closed, dosing stopped, fault indication	<input type="checkbox"/>	
1.4	Check level switch: Switching body high - dosing stopped, fault indication	<input type="checkbox"/>	
1.5	Check level switch: Switching body low - GR stopped, fault indication	<input type="checkbox"/>	
1.6	Set the water level - adjust diaphragm to pressure conditions	<input type="checkbox"/>	
1.7	Check the floater valve function - flow reacts gently	<input type="checkbox"/>	
2	<u>Chlorine dosing technology</u>		
2.1	Heating function: Warm dosing pipe	<input type="checkbox"/>	
2.2	Empty-switch function: Drum turning - fault indication	<input type="checkbox"/>	
2.3	Dosing motor function: Chlorine test program - is dosing	<input type="checkbox"/>	
2.4	Check the tensioning straps and safety belt	<input type="checkbox"/>	
2.5	Introduction to drum changing, see operating instructions, section 5.2.3	<input type="checkbox"/>	
3	<u>pH-reducer dosing system</u>		
3.1	"Empty-switch" function: Suction lance out of canister - fault indication	<input type="checkbox"/>	
3.2	Dosing pump function: Acid test program - is sucking	<input type="checkbox"/>	
4	<u>Control - after opening the controller</u>		
4.1	All connectors: firmly latched	<input type="checkbox"/>	
5	<u>Feed system</u>		
5.1	Check feeding pump: Pressure, tightness, noise	<input type="checkbox"/>	
5.2	Filling - function of the control and alarm switches in the tank	<input type="checkbox"/>	
5.3	Check control valves	<input type="checkbox"/>	
5.4	Check the reflux prevention in the dosing lines	<input type="checkbox"/>	
5.5	Check the reflux prevention in filling system	<input type="checkbox"/>	
5.6	Check the pressure valve	<input type="checkbox"/>	
6	<u>Other</u>		
6.1	Clean the GRANUDOS system	<input type="checkbox"/>	
6.2	Discuss the operating instructions and hand them over	<input type="checkbox"/>	

Commissioning protocol IP-001-EN Granudos 45/100 Plus V70 Touch



Other comments:

Commissioning and instruction performed:

Persons instructed:

Signature of commissioner:

Countersigned by operator:

Maintenance protocol WP-004-EN

Granudos 45/100 Plus V70 Touch



This protocol must be completed by the maintenance technician! We reserve the right to determine the warranty conditions when no completed and signed maintenance protocol is available.

Object: Year of maintenance: 20__

City, Street, Street number:

Device type: Year of construction: Serial no.:

Activity	Maintenance interval in months	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Comment / additional work
1 Granudos Plus dissolving system														
1.1 Check the level switch min + max	6						<input type="checkbox"/>						<input type="checkbox"/>	
1.2 Check the pressure switch, adjust as required	6						<input type="checkbox"/>						<input type="checkbox"/>	
1.3 Check flow switch	6						<input type="checkbox"/>						<input type="checkbox"/>	
1.4 Clean the switching unit	6						<input type="checkbox"/>						<input type="checkbox"/>	
1.5 Replace the sealing ring of the switching unit	12												<input type="checkbox"/>	
1.6 Replace the floater valve membrane and cone seal	12												<input type="checkbox"/>	
1.7 Check the floater function	6						<input type="checkbox"/>						<input type="checkbox"/>	
1.8 Replace the hose to the suction pipe	12												<input type="checkbox"/>	
1.9 Check the pump impeller and lid (only for Calpeda pumps)	12												<input type="checkbox"/>	
1.10 Check floating ring seal for tightness	6						<input type="checkbox"/>						<input type="checkbox"/>	
1.11 Check pump roller bearings for noises	6						<input type="checkbox"/>						<input type="checkbox"/>	
1.12 Clean the dirt filter	3			<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>	
1.13 Replace all O-rings	12												<input type="checkbox"/>	
1.14 Check nozzle diameter diffuser < 6 mm; (use 5.5 mm drill piece to inspect passage)	12												<input type="checkbox"/>	
2 Chlorine dosing device														
2.1 Heating function: Dosing pipe warm	6						<input type="checkbox"/>						<input type="checkbox"/>	
2.2 "Chlorine empty" switch and "Chlorine reserve" switch	6						<input type="checkbox"/>						<input type="checkbox"/>	
2.3 Check, clean dosing screw	6						<input type="checkbox"/>						<input type="checkbox"/>	
2.4 Dosing motor: I max.: 150+/- 30mA	12												<input type="checkbox"/>	
2.5 Dosing motor: Replace the seals	12												<input type="checkbox"/>	
3 Acid dosing system														
3.1 Check function of empty switch / reserve switch	6						<input type="checkbox"/>						<input type="checkbox"/>	
3.2 Replace dosing hose	12												<input type="checkbox"/>	
3.3 Replace the seals of the acid dosing valve	12												<input type="checkbox"/>	
4 Dust extraction (option)														
4.1 Completely check and clean the flushing ring of the suspensor, including the injector and flushing pipe	2		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
4.2 Check the drill holes of the outlet connection for contamination and clean them	2		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
4.3 Check / exchange the disconnect lever of the solenoid valve	12												<input type="checkbox"/>	

Maintenance protocol WP-004-EN

Granudos 45/100 Plus V70 Touch



Activity	Maintenance interval in months	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Comment / additional work
5	<u>Feed system with buffer tank</u>													
5.1	Check function of the level switch, 4x buffer tank + 1x collecting tub	6					<input type="checkbox"/>						<input type="checkbox"/>	
5.2	Check the function of the check valves and pressure control valves	6					<input type="checkbox"/>						<input type="checkbox"/>	
5.3	Clean the pressure control valve	12											<input type="checkbox"/>	
5.4	Check function of the manometer	6					<input type="checkbox"/>						<input type="checkbox"/>	
5.5	Rinse the system with water and thin liquid (clean)	12											<input type="checkbox"/>	
5.6	Check the electrical control valves	12											<input type="checkbox"/>	
5.7	Replace the separating membranes of the control valves	12											<input type="checkbox"/>	
5.8	Replace the membranes of the check valves	12											<input type="checkbox"/>	
5.9	Replace the active carbon in the filter	12											<input type="checkbox"/>	
5.10	Check (and calibrate) the pH-electrode	3		<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>	
5.11	Check the PTFE floating ring seals of the feed pump	12											<input type="checkbox"/>	
5.12	Replace the PTFE floating ring seals of the feed pump	24											<input type="checkbox"/>	
5.13	Check the ball bearings of the feed pump	12											<input type="checkbox"/>	
5.14	Replace the ball bearings of the feed pump	24											<input type="checkbox"/>	
6	<u>Other work</u>													
6.1	Thoroughly clean the GRANUDOS system	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6.2	Replace the membrane of the pressure control valve	24											<input type="checkbox"/>	
7	<u>Maintenance work at each drum exchange!</u>													
7.1	Test chlorine and acid dosing	F	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7.2	Take note of pumping noises	F	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7.3	Check the system for tightness.	F	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7.4	Check the hoses of the dust extraction (option) and clean it if necessary	F	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Other comments:

Maintenance performed by: Date:

Countersigned by operator: