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Series No.....Customer.....Date of delivery.....

## Operating instructions GRANUDOS 10-V61

### **Safety Devices**

1. Chlorine and acid may not be mixed together or with other chemicals

Pay attention to the safety devices on chemical Containers

2. Close hopper immediately after filling
3. If an adapter to a chemical container is used the hopper must be screwed even and firmly to the container
4. Clean environment with water if chemical was spread
5. Only instructed personnel may work with the GRANUDOS
6. Ensure booster pump does not run dry, always isolate pump when backwashing.

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## 1 Function of GRANUDOS 10V61

### 1.1 Data, Measures, Performance

The GRANUDOS 10-V61 dosing system comprises:

- polyethylene housing one piece
- filling hopper 5 kg (option 10 kg or adapter to 10 kg containers)
- calcium hypochlorite screw feed arrangement
- peristaltic acid pump
- dissolving system

#### Measures:

base: 60 x 50 cm

height: 80 cm

weight: 30 kg

#### Material:

PE, polyethylene

#### Booster Pump

centrifugal pump: SS - 0.3 kW, 230 Volt

supply pressure: 0,2 – 1,2 bar

counter pressure: 0 – 1,2 bar

(depending on supply pressure)

water flow: app. 1000 l/h

#### Dosing performance:

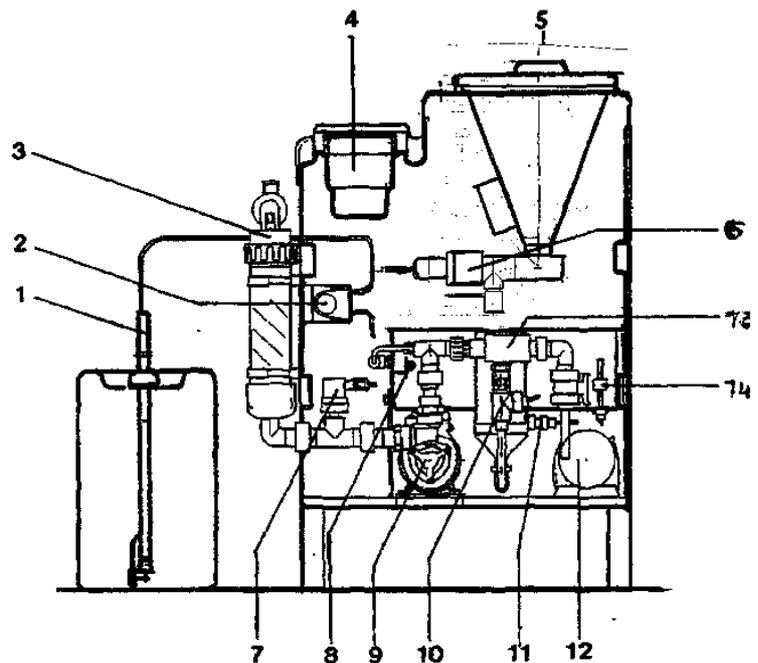
chlorine: 1 kg/h

acid: 1,5 l/h

Fault remote indication

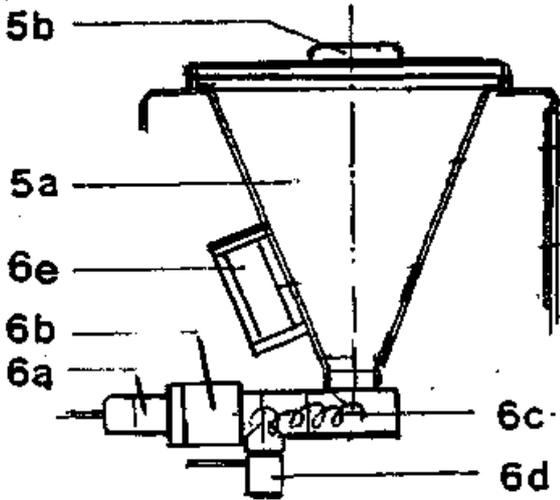
by relay

- 1 supply carboy lance
- 2 dosing pump for acid
- 3 strainer GR 10 complete
- 4 control system
- 5 dosing hopper
- 6 dosing assembly GR 10
- 8 floating valve d25 complete
- 9 booster pump
- 10 suction tube with flow switch
- 11 acid dosing valve GR
- 12 mixing cyclone GR 10
- 13 venturi complete
- 14 level switch GR 10



### 1.2 Dosing Assembly

The dosing assembly, placed into the main housing consists of the dosing hopper (5a) and the dosing unit with dosing motor (6a) pushed into and screwed to the motor holder (6b) the dosing screw (6c) and the dosing nozzle which is heated eliminating condensation of the warm pool water vapour. The dosing unit is screwed into the dosing hopper. The required dosing rate is adjusted at the control board by means of a dosing cycle and dosing time – see para 1.5.



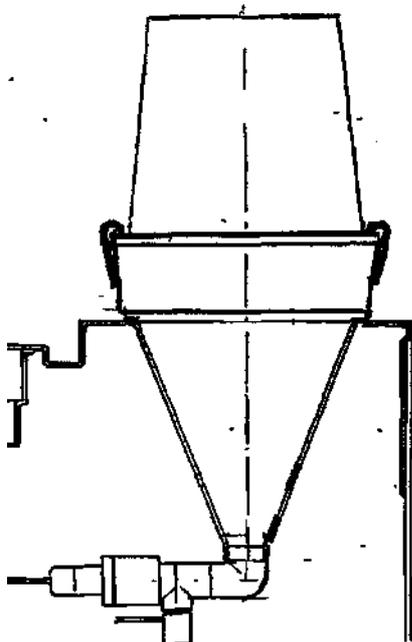
- 5a dosing hopper
- 5b hopper cover
- 6a dosing motor
- 6b motor holder
- 6c dosing screw
- 6d heated dosing nozzle
- 6e knocker

The knocker (6e) gives a stroke to the dosing hopper wall and thus prevents clogging of the chemical.

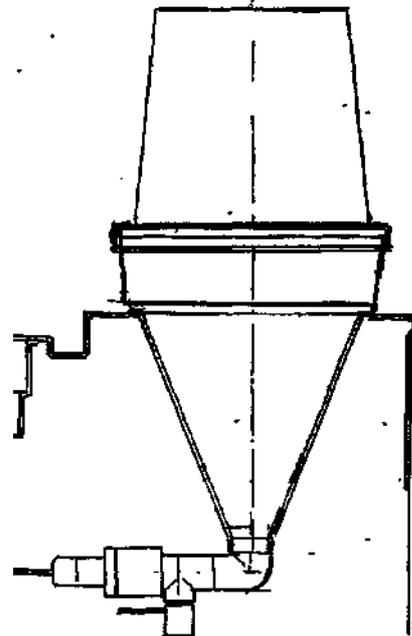
The complete dosing assembly can be taken out of the frame for service.

With the shown fitting systems chemical containers of 10 kg can be fitted directly to the hopper so that the chemical must not be moved from the container to the hopper.

Fitting system to join a 10 kg container with round edge



Fitting system to join a 10 kg HTH container



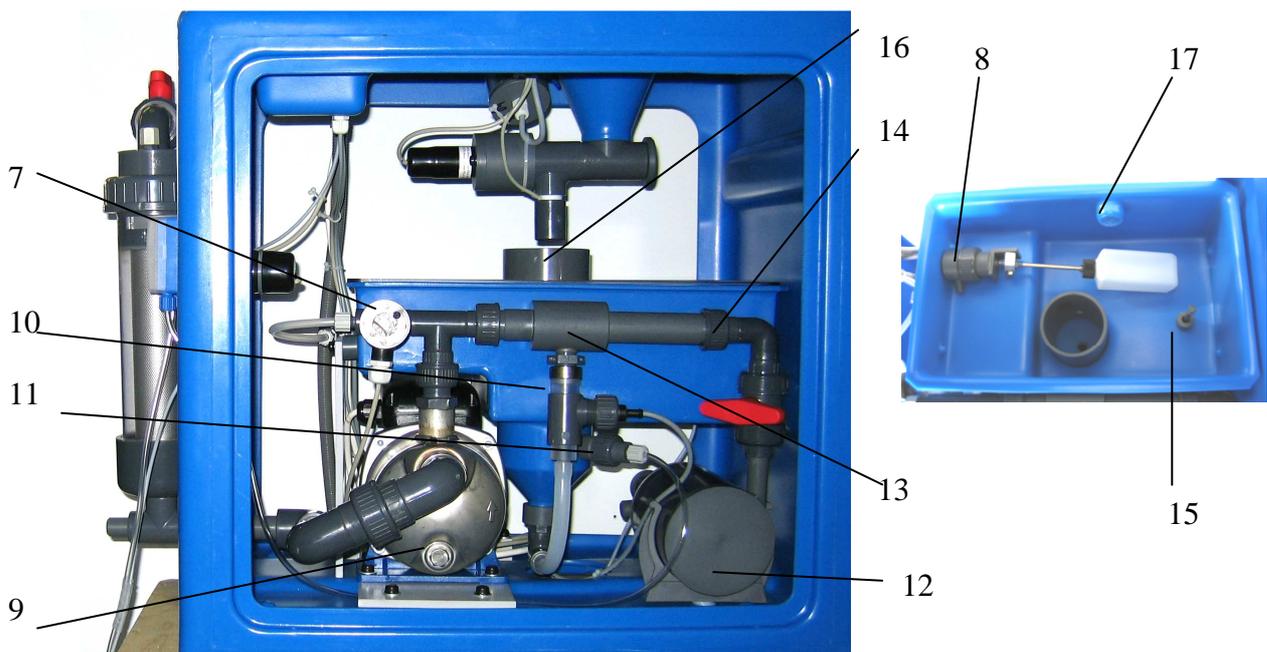
### 1.3 Dissolving System

The dissolving water is normally supplied from before or from behind the filter. **There must be a sufficient supply pressure to avoid dry running and/or cavitation on the booster pump, at least 0.2 bar.** The pump pressure is controlled by the pressure switch (20) fitted on top of the pump. At a pressure below the set switch pressure by sucking air or at pressure drops the machine stops, lamp 1 & 2 will burn. At works 1,5 bar is set.

The supply water is divided at the discharge of the booster pump (26), one way leading to the flushing tank (22), the other branch directed to the venturi nozzle (25), where the water is sucked together with the dosed chemicals out of the flushing tank. The supply water flow is controlled by means of a floating valve (21) and a flow switch (24), the latter being installed in the suction tube of the venturi. To mix the chemicals and to ensure the complete dissolving of the chlorine granules a cyclone mixing chamber (27) is fitted after the venturi.. To ensure that chlorine and acid do not come into contact with each other in the open tank part of the dissolving assembly a sophisticated control system is installed:

- metering of the two chemicals is regulated with pauses between the metering intervals (para 3.7 “Adjusting dosing performance”).
- power supply for chlorine and acid dosing motors are connected by a relay system so that only one or none of them can get power (24VDC) and dose chemical.
- flow switch (24) , level switch (29), pressure switch (20) supervising water supply and flow conditions. If any non-compliance with the given limits occurs, the GRANUDOS will be switched off.

If any non-compliance with the given limits occurs, the chemical dosing will be stopped.



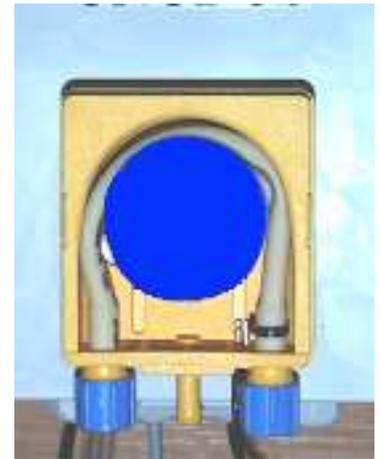
- |    |   |    |  |
|----|---|----|--|
| 7  | pressure switch                                   | 13 | venturi nozzle                                     |
| 8  | floating valve                                    | 14 | orifice washer                                     |
| 9  | booster pump Lo 2HMS3                             | 15 | level switch low/high                              |
| 10 | flow switch holder with flow switch               | 16 | lid on flushing tank with chlorine dust protection |
| 11 | acid dosing valve                                 | 17 | overflow to drain                                  |
| 12 | mixing and dissolving chamber with PVC ball valve |    |  |

The flushing tank is an open system with two ways for a drain of water coming from the circulation to the flushing tank and possibly causing an overflow at switch off times. To avoid this, the flow switch holder as the floating valve are acting as non return valves: The floating valve closes the inlet bore at rising level (proved up to 4 bars at test), in addition a spring loaded non return valve is installed in the elbow fitting into the valve. The switch bobbin has a seal to close this way. Both devices function well if the seal/diaphragm are maintained in a good shape. But as a mechanical seal may leak after any time or by being blocked by impurities a 100% isolation may not be guaranteed. If this is needed for any cases, an electric valve must be installed.

## 1.4 Acid Dosing

The acid required either for pH-control or just for cleaning of the flushing, mixing and dosing system is metered by the peristaltic pump to the flushing water via the dosing injector (11). As the cleaning procedure is vital for the correct function of the complete dosing assembly, chlorine dosing is stopped if the level switch at the supply carboy lance indicates container empty.

Please do not use concentrated hydrochloric acid for this duty as that penetrates the peristaltic hose and will destroy the pump head.



## 1.5 Control Panel

The microprocessor based control of the GRANUDOS has three functions:

- Contains the circuit self check and dosing programmes for chlorine and acid
- Function control and interruption display (1 green + 4 red LED). If any interruption is displayed, the GRANUDOS is switched off - 'Chemicals on reserve' is only indicated. All faults normally activate the fault remote control.

The control system is enclosed within a dust proof and splash proof housing (IP 65). External switches and fault remote indication are to be connected in the lower part of the housing.

### 1.5.1 Programme Selection (GRD 61)

P: Proofing programme for control board, only used by authorised personnel

For test and check of dosing motors:

C5: Continuous dosing of chlorine for 5 minutes

A5: Continuous dosing of acid for 5 minutes

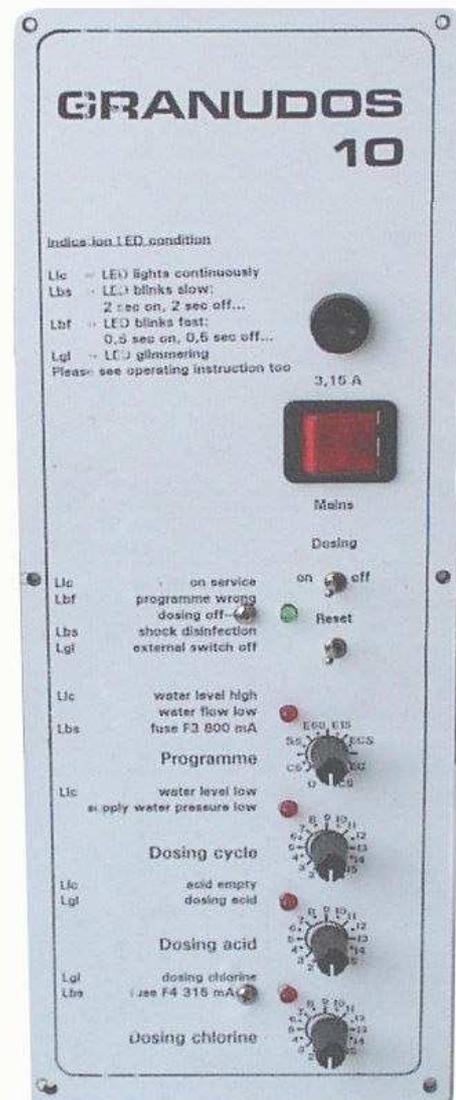
After the 5 minutes dosing the green LED will flash continuously

ECA: External control of chlorine and acid by an auto controller

EC: Auto control only chlorine, acid dosing continuously as set, but only if chlorine is dosed

E15: Monitoring of the external auto controller chlorine and acid: After an excess time of 15 minutes dosing stops.(see next para)

E60: Monitoring of the external auto controller chlorine and acid: After an excess time of 60 minutes dosing stops.(see next para)



When changing a programme there is always a delay of 4 seconds until the new programme is verified. During this time the green lamp will flash.

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### **1.5.2 Monitoring of external controller and dosing with programme E15/E60**

When controlling the GRANUDOS dosing by an external controller the dosing performance must be set high enough to ensure the dosing time of acid and chlorine dosing motors shall not exceed 50% of total time, the actual values are normally near to the set points of free chlorine and pH. If control time exceeds 50% , there must be an interruption in the system:

- too high bathing load
- interruption at the dosing appliance: blocked screw, broken hose, faulty motor etc.
- interruption at the auto control system: hanging relay, faulty electrode etc.

The GRANUDOS controller adds up all ordered dosing time (input time) that exceeds 50% of total time and stops dosing if a certain excess time is reached: 15 minutes with programme E15, 60 minutes with programme E60. Indication by flashing of all 4 red lamps.

**Dosing can be switched off by an additional external switch e.g. a flow or pressure switch in the measuring water tubing or in the circulation to prevent dosing if there is an irritation**

## 2. Installation

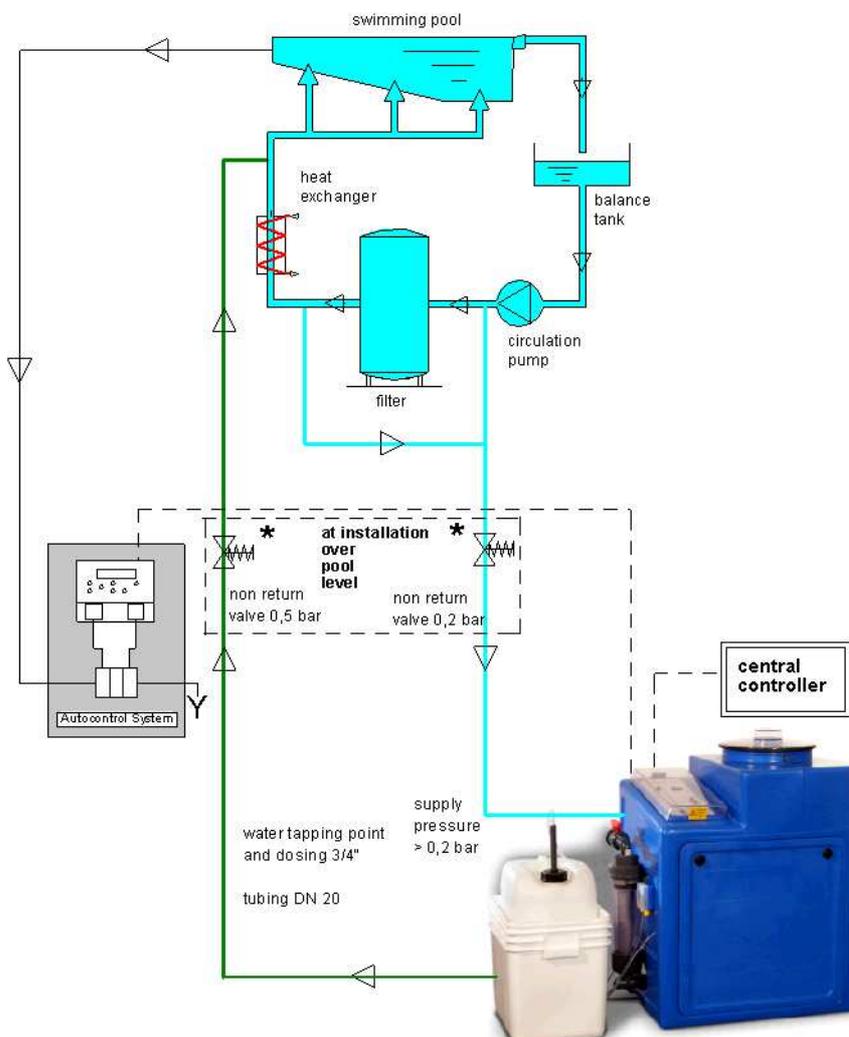
### 2.1 Tubing – please see installation diagram page

For satisfactory water flow through the dissolving system the supply pressure must be at least 0,2 bars. At low service pressure the counter pressure must be low, too. Counter pressure and pressure loss in the dosing line should be as low as possible. At works the GRANUDOS has been tested at following pressure conditions:

Service pressure	1,2 bars	Counter pressure	1,2 bars
	0,6 bars		0,8 bars
	0,3 bars		0,5 bars

Within these ranges the GRANUDOS should function well. In addition please pay attention to the following:

1. Tapping point for supply water to be between filter and heat exchanger, dosing point after heat exchanger.
2. Ensure that the tapping/dosing points are free flowing and not blocked by scale or corrosion.
3. Pipe runs to be kept as short as possible. PVC-tubing 25 mm or hose 1". For longer distances or poor pressure conditions use bigger tubing.
4. Use high quality PVC ball valves.



## 2.2 Electrical connection

The electrical supply of the GRANUDOS has to be controlled by the electrical supply of the circulation pumps that dosing can only be with water circulation and accordingly water supply to GRANUDOS. The GRANUDOS has to be stopped and isolated at back washing, too! See wiring diagram

To connect external systems to the GRANUDOS please use only flexible cable type.

Electrical works are only to be executed by authorised people.

## 3 Start

After having executed points 2.1 and 2.2 open the ball valves at the tapping points and at GRANUDOS. Press floater of floating valve inside the tank down to let water flow into the flushing tank. When the flushing tank is half full switch on the GRANUDOS mains as the booster pump of GRANUDOS should not run dry.

To ensure correct dosing of the chemicals water flow through the flushing tank must run in the correct way as described below.

### 3.1 Check of pump

Check by means of a screw driver at back shaft of the pump whether the shaft is turning easily. If not the slide ring seal is blocked. Try to loosen it by rapid moving of the shaft right and left. If no success, the pump must be dismantled completely and the slide ring loosened. If this is not done, the pump will leak in short time as the O-ring on the shaft will be worn.

### 3.2 Deaeration of the water supply tubing

At switching on the GRANUDOS take care to deaerate the supply water tubing completely. For this please observe the water level inside the pre-filter. If he get's empty switch off the pump/machine and wait till the filter is full again, then switch on again. On operation the filter must be and stay full of water; a little air at top staying steadily does not matter. The deaeration procedure can take some minutes depending on the length of the supply tubing.

**Attention! If electric valves are installed to isolate the machine the supply valve must be opened manually as otherwise the pump can not be deaerated and the pressure switch would not allow the pump to run.**

### 3.3 Water level in the flushing tank

Water level in the tank should be maintained at half full. To obtain a higher level unscrew float rod, for a lower level screw in the float rod. One turn gives about 1 cm in height.

### 3.4 Water flow/Suction performance of the venturi

At stable water level the switch bobbin of the flow switch inside the suction tube (10) should definitely have risen up to the top, the control lamp of the switch may **not** burn.

To adjust the water flow to the pressure conditions of the filter system a nozzle is inserted in the union (13c) behind the venturi. If water level in the tank tends to run low or if switch bobbin is at top without pump running (too high suction at the venturi – high pressure difference between tapping points ) fit the nozzle with the 5,5 mm diameter hole you find in the spare parts kit. If the water level tends to run high and/or suction is too low – switch bobbin does not rise (too high counter pressure?) put in the 7 mm nozzle or use without nozzle.

### 3.5 Adjusting the pressure switch

The pressure switch is fitted pressure side of the booster pump, so monitoring the real pressure. If air is sucked by the pump or at pressure drops the pump is switched off to avoid:

- overdosing if circulation is disturbed
- the booster pump is not destroyed by cavitation or running dry

The pressure switch is working from 1-3 bar. To adjust the switch to the working conditions take off the switch cover, turn clockwise the switch knob till the pump switches off, then turn back a little. As the GRANUDOS is now on fault, the machine must be restarted by switching the machine to “off” till the 2 red lamps are off, then “on” again at the front plate. Now the GRANUDOS runs again and will be stopped if the pump pressure falls down to the set pressure.

If additional pumps are switched on or off in filtering service (e.g. pump from balance tank) the switch must be adjusted without the additional pump. At works the switch is adjusted to 2 bar.

### 3.5 Filling of chlorine into the hopper

Before carrying out any task involving chemicals the operator should put an personal protective equipment to provide adequate protection to eyes, respiratory orifices, hands and clothing.

- Lid of control box is closed. Open the chlorine hopper lid.
- Fill the chlorine into the hopper carefully to the hopper wall with help of a scoop from the drum that no chemical dust will arise.
- Fill in only the consumption of chlorine for appr. 2 weeks.
- After filling the hopper carefully cover the lid of the chemical drum again.
- Close the hopper lid.

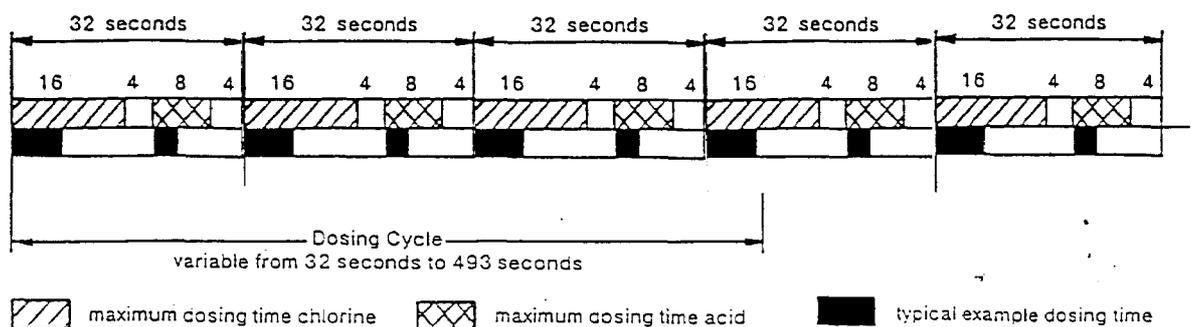
### 3.6 Acid dosing

The acid dosing pump mounted left side of the housing is delivered with loose dosing hose to prevent deformation on stock time. Push the hose back into the yellow housing and turn the roller clockwise some times so that the hose is situated even back in the housing. Then push the safety disc on the shaft and the pump cover –both in the small bag attached above the pump. Position the acid container beside the GRANUDOS, open it and put the acid lance into it. Push the “Test” button for acid. If no fault indicates, acid must now be sucked up through the transparent suction tube to the pump and further to the dissolving system.

As acid use one on base of sulphuric acid (37 – 50 %). Do not use concentrated hydrochloric acid as this damages the peristaltic pump.

### 3.7 Adjusting the dosing performance of GRANUDOS

On principle dosing of the GRANUDOS is working to the following scheme where the dosing cycle is set on 32 seconds – cycle knob on 16:



On the dosing cycle and dosing time knobs the scale of 1-16 is set to give the most appropriate cycle time and dosage to suit the individual pool. The diagram and table below shows the cycle timing and given values for various settings

### Dosing Performance Adjustment

#### 1. Chlorine

In principle the chlorine consumption of a pool depends on a variety of influences: Loading, temperature, required chlorine concentration etc. Normally a standard indoor pool needs about 300 g of calcium hypochlorite per 100 m<sup>3</sup> in volume per day. So a pool of 600 m<sup>3</sup> in volume needs app. 1800 g/day or app. 75 g/h at continuous dosing. These 75 g/h corresponds to app. 3 % of the maximum dosing performance of 2 kg/h. This is achieved with

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a cycle time of 138 seconds –Position 8 at the cycle knob and a corresponding dosing rate of 13 % - position 4 at the dosing time knob.

An outdoor pool needs in good weather conditions about 3-5 times more chemical.

## 2. Acid

The consumption of acid is harder to predict as that of chlorine. For the beginning set the dosing knob similar to chlorine. The actual need has to be found by trial and error. The pH should be at 7,0 – 7,4.

### 3.5 **Dosing Controlled by Auto-Controller**

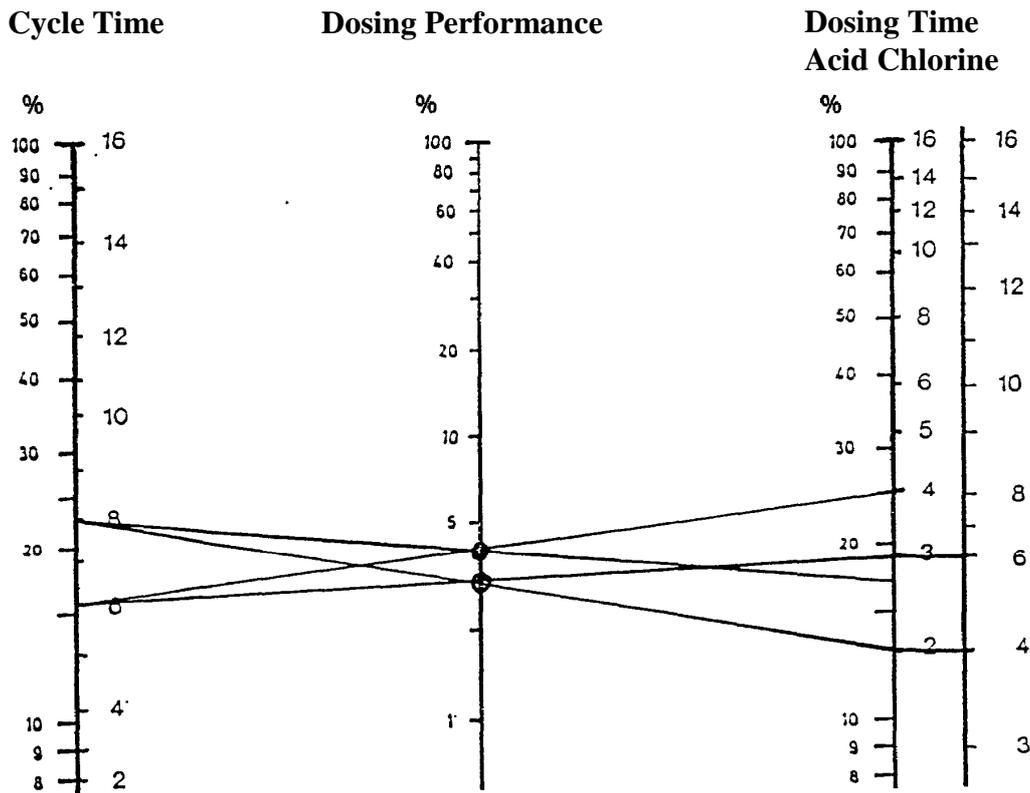
If an auto-controller is used, set an “E-Programme” – see above and use app. 3-5 times higher dosing rate as calculated above. It is to adjust both, cycle and dosing time.

If CO<sub>2</sub> is used for pH-correction, it is proposed to connect the controller output at the GRANUDOS in parallel to the CO<sub>2</sub> control valve and set a low dosing performance for acid. So the acid dosing for cleaning is controlled.

Attention!! If an external auto-controller has a solid state relay (transistor) output there can be an leakage voltage even the controller switches off the dosng. To avoid that the GRANUDOS input relay is switched by this leakage voltage a resistor 15 kohm, 4,5 w must be fitted in parallel.

To connect the auto-controller to the GRANUDOS please see the wiring diagram

**Diagram for the Determination of the Switch Positions for the Cycle and Dosing Time**



**Table for Cycle and Dosing Times**

Switch Position	Cycle Time		Dosing Time			
	Sec.	%	Chlorine		Acid	
			Sec.	%	Sec.	%
1	439	6	0,5	3	0,5	6
2	411	8	1	6	1	13
3	342	9	1,5	9	1,5	19
4	285	11	2	13	2	25
5	238	13	2,5	16	2,5	31
6	198	16	3	19	3	38
7	165	19	3,5	22	3,5	44
8	138	23	4	25	4	50
9	115	28	5	31	4,5	56
10	95	34	6	38	5	63
11	80	40	7,5	47	5,5	69
12	66	48	9	56	6	75
13	55	58	10,5	66	6,5	81
14	46	69	12	75	7	88
15	38	84	14	88	7,5	94
16	32	100	16	100	8	100

The percentage values of the performance table are to be related to the maximum dosing rates:

GRANUDOS 10: Chlorine app. 1. kg/h. acid app. 2 l/

## 4 Diagnosis Programme / LED Signification (GRD 61)

### 4.1 Starting self check programme

When the machine is switched on a diagnosis programme for the control equipment runs. The same happens when the reset key is pressed.

1. All lights burn together 3 seconds
1. Each light comes on one after another for one second
2. If there is no fault, all red lamps go out and the dosing programme commences.

### 4.2 LED Indicators for function and irritations

#### **Green LED – indicates program switch and external inputs**

*on continuously:* GRANUDOS in operation

*no light:* Transformer Tr. 2 or fuse F1 for control system burnt

*fast blink* (0,5 second on, 0,5 second off...)

- Programme knob not on a programme station
- End of test programme A 5, C 5
- Dosing switched off with front fascia switch

*Glimmering:* indicates filling of buffer tank with programme PB

#### **Red LED shows function of dosing and interruptions indicated by the different Sensors. At any interruption dosing stops.**

*Glimmering:* indicates dosing: L3 = acid, L4 = chlorine

*on continuously:* Interruption indicated by a sensor (see below)

*slow blinking:* (2 seconds on, 2 seconds off....) fuse of an output is burnt

LED (red) signal                      Interruption indicated – more detailed below

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L1	on continuously	Venturi suction - water flow too low, water level high (more details see below)
L1 + L4	fast blink slow blink together	Fuse F3 burnt (power 24 VDC–800 m amp slow) or transformer Tr1 faulty
L2	on continuously	water level in tank low. water supply pressure low (more details see below)
L3	on continuously	acid container empty
L4 L4	on continuously slow blink	Chlorine drum empty fuse F4 burnt (chlorine dosing motor – 315 m amp slow)
L1 to L4	all blink together	monitoring of dosing time active: ordered dosing time of controller exceeds 50 % of total times for 15/60 minutes with programmes E15/E60 ( dosing performance too low)

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**L1 on continuously: Water level in flushing tank too high, suction too low**

There is coming more water to the tank as is sucked through by the venturi.

1. Suction power of venturi is O.K.: switch bobbin of flow switch in suction tube is at top of tube. By pressing the supply hose to the suction tube the bobbin goes down and switch LED burns. If loosened again, bobbin goes up quickly and switch LED goes out.  
In this case there should be a fault in the floating valve: check whether by moving the floater slowly up and down the incoming water flow decreases or increases steadily. If so adjust water level by turning the floater rod one turn right. If floating valve does not work steadily, fit a new valve membrane.
2. Suction power of venturi is not enough: switch bobbin of flow switch in suction tube is at bottom of tube. By pressing the connecting hose to the suction tube the bobbin does not move, switch LED burns.

**Possibilities:**

- at installation: service pressure too low – counter pressure too high. tubing faulty or too small: take out orifice washer (13c) from union behind venturi.
- Booster pump performance too low – see pressure limits at para “**Installation – piping**”.  
Fit the supplied pressure gauge to inlet and outlet to check pressure situation.
- Particles inside venturi or at outlet nozzle of flushing tank (good possibility at installation)
- Suction tube and/or mixing cyclone are turbid by calcium: acid dosing too low:  
if there is still a little suction this can be easily cleaned by pouring hydrochloric acid or special cleaning chemical into suction cone of the tank.  
After cleaning increase acid dosing performance.

**L2 on continuously: Water level in tank too low**

Suction power of venturi is higher than water is supplied.

**Possibilities:**

- suction power too high: fit an orifice washer (13c) of 5,5 mm inside union behind venturi.
- supply water tubing is blocked
- too low supply pressure
- floating valve cone into flushing tank is blocked by particles, diaphragm is faulty

### **4.3 Irritations not indicated by monitoring switches**

#### **1. No chlorine dosing: no free chlorine in pool water**

By using the test program chlorine on fascia no dosing

- dosing screw blocked
- dosing screw loose
- dosing nozzle (heated) faulty or blocked
- dosing motor faulty

If dosing works by using the test program see to auto-controller for free chlorine whether the output is correct

#### **2. No acid dosing:** pH in pool water is high, suction tube/mixing chamber is turbid.

If acid container is not empty, no fault indication at the fascia: check dosing function of acid pump use test program for acid. If pump runs, see whether an air bubble is sucked to pump, if not examine the pump roller and pump hose. If all is OK, increase dosing rate and choose lower set point for pH

**3. Continuous dosing of chlorine or acid** on program “auto” without command from the auto-controller: Check whether the output from the auto-controller is correct – no voltage from there. If so, the 130 volt relay of the GRANUDOS input is faulty. Replace the relay or mount a new power plate.

#### **4. Overflow from tank too much at switch off of GRANUDOS**

- switch bobbin of flow switch is blocked on top situation or does not fall down completely
- joint of switch bobbin faulty
- diaphragm of the floating valve faulty
- piston of floating valve is blocked by impurities (sand if diaphragm is faulty)
- supply pressure of an external booster pump too high
- set in spring-loaded check valve in ell of floating valve. Please make sure that because of pressure drop you will need a pressure of at least 0,4 bar

## **5. Maintenance**

It is strongly recommended that a regular maintenance programme is undertaken. Consult your installer/supplier and take up a service/maintenance agreement. This way the machine will be maintained in good operating condition.

**Minimum checks include the following items:**

- maintain the environment of the machine clean
- clean strainer if necessary – a scaled filter causes cavitation and consequently damage of the booster pump

**For cleaning take out the complete filter from the machine and clean the insert outside**

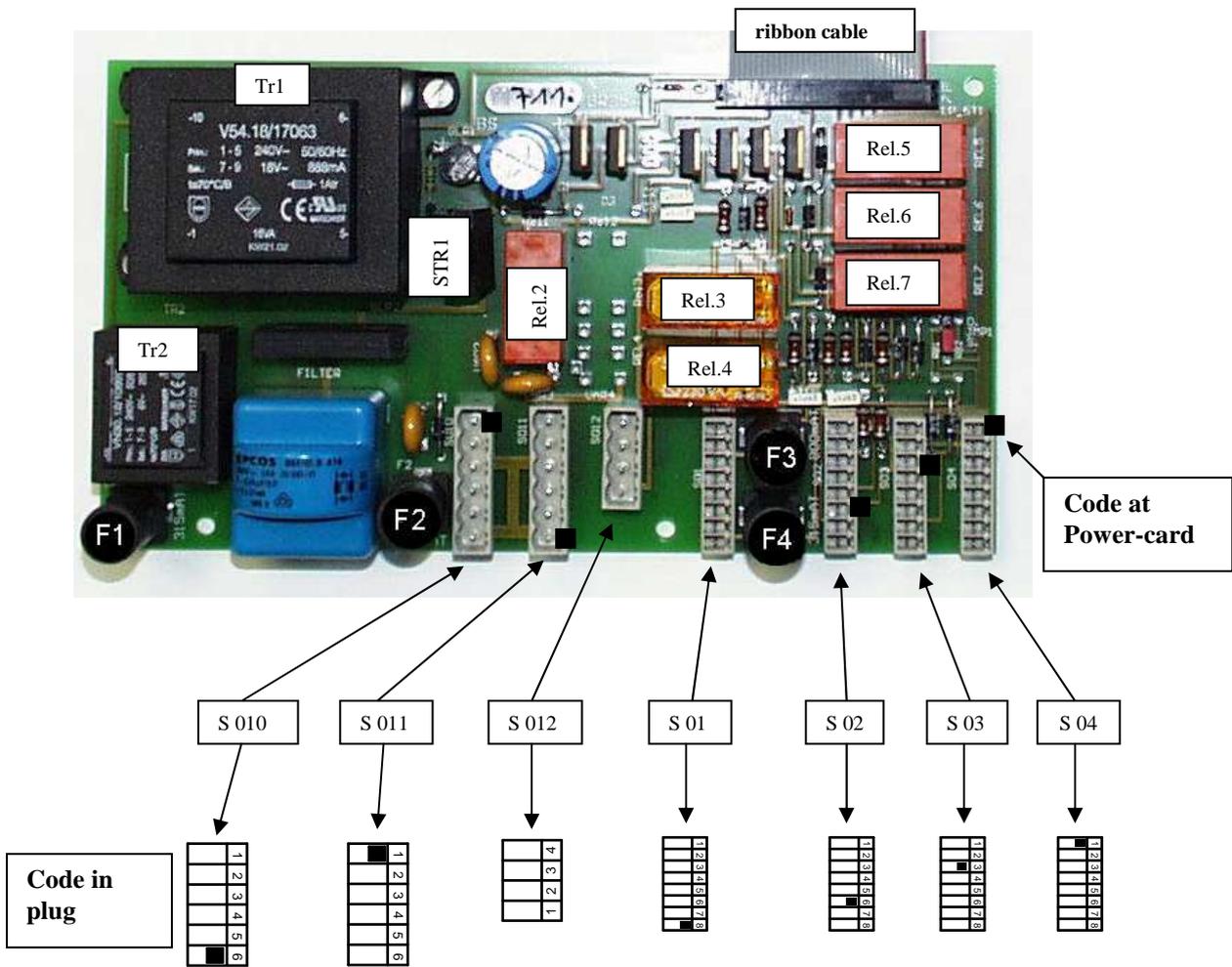
- maintain the machine clean – especially the booster pump
- pay attention to any noise of the pump: cavitation, bearings – if so, contact your supplier
- check monthly for the acid pump whether the springs are o.k. If corrosion can be seen, change the dosing hose. In any case change it once per year.
- monthly or with each new drum check function of all sensors i.e. water flow, level and empty switches
- every 2 months clean the chlorine dosing screw: dismantle the hopper and take out dosing motor with the screw, clean with a brush – do not use water
- change membrane of floating valve once per year
- change seal of flow switch bobbin all ½ year
- check once per year acid dosing valve – change seals

**Taking out of service**

- disconnect acid dosing hose (or use a new one at starting again)
- empty the dosing hopper, take out chlorine dosing screw, clean it thoroughly and store it at a dry place
- clean all parts of GRANUDOS thoroughly.
- leave the GRANUDOS switched on - programme switch on "0"
- clean the environment of the machine thoroughly.

**At taking into operation again  
please pay attention to the para 3. Start up procedure**

**7. Wiring Diagram/Fuses**



**6.2 Fuses, transformers, relays**

**Fuses**

FO	mains fuse in front plate	3,15	amp slow
F1	fuse control plate	315	m amp slow
F2	Fuse booster pump	3,15	amp slow
F3	fuse power output except chlorine dos. motor	800	m amp slow
F4	Fuse chlorine dosing motor	315	m amp slow

**Transformers**

Tr1	transformer for power outputs	18 volt, 16 va
Tr2	transformer for control system	6 volt, 1,5 va

**Relays**

- SSR. 1 solenoid knocker 240 v (solid state relay)
- Rel. 2 booster pump 240 v
- Rel. 3 relay auto control chlorine
- Rel. 4 relay auto control acid
- Rel. 5 fault remote control non volt
- Rel. 6 internal locking chlorine dosing
- Rel. 7 internal locking acid dosing

**clamps for 230 VAC 6 x 5 mm****plug S010** (coding on clamp 1)

1	- 195 VDC knocker
2	+ 195 VDC knocker
3	SL
4	N supply
5	L supply
6	SL

**plug S011** (coding on clamp 6)

1	N	pump
2	L	pump
3	SL	
4	N	solenoid valve
5	L	solenoid valve
6	SL	

**plug S012****external control 230 VAC****Attention !!! external voltage from the controller !!!**

1 – 2	chlorine ext. 230 Volt
3 – 4	pH ext. 230 Volt

**clamps 8 x 3,5 mm low voltage / volt-free****plug S01** (coding on clamp 8)

controlled outputs 24 VDC

1 – 2	heater dosing nozzle
3	chlorine dos. -24 VDC
4	chlorine dos. +24 VDC
5	acid dos. -24 VDC
6	acid dos. +24 VDC
7 – 8	fault remote control volt-free

**plug S03** (coding on clamp 3)switch of dissolving unit  
(normal open)

1	level W max (blue)
2	level W min (brown)
3	mass level switches (black)
4	pressure min
5	+ 24 VDC
6	mass
7	low flow / suction
8	mass

**plug S02** (coding on clamp 6)for external control.  
switch functions are activated by  
the closing of the switch contact

1	chlorine control volt-free
2	pH-control volt-free
3	(-) mass for control switch
4	shock dosing (back flow dis.)
5	ext. switch-off of the dosing
6	ext. Switch for GR off (=W min)
7	+24 VDC
8	- 24 VDC – mass

**plug S04** (coding on clamp 1)

empty switch chlorine / acid

1	mass
2	acid empty
3	mass
4	chlorine empty cap (option)
5	+ 24 VDC for chlorine empty
6	mass
7	free
8	mass

## 8. Spare Parts GRANUDOS 10-V61

	<u>Designation</u>	<u>Item No.</u>
Chlorine dosing	dosing hopper 5 kg	12798
	Cover for dosing hopper GR 10	12353
	dosing motor PLG 30-35	11676
	Motor holder PLG- d25	11541
	dosing screw d6/D19 (GB)	11549
	dosing nozzle heated GR	11556
	knocker GR 10 complete	12868
Acid dosing	Acid pump Sa complete	11628
	Pump housing Sa	12702
	Roller Sa	12609
	Dosing hose 3.2x1,6 Sa	12782
	Supply carbuoy lance	12523
	acid injection valve GR	11633
	Repair set for acid valve	11636
Filter	Filter housing	12746
	Filter top with ball valve d25	12304
	O-ring on top	11258
Control system	Control plate MCU 1c	11505
	Power plate NRGRD-6	11517
	Power transformer, 240/18 volt, 16VA	11665
	Control transformer 240/6V-2VA	10929
	main switch	11338
	fuse holder GR	12324
	Knob 4mm	11757
	Cover control box GR10	10796
	floating valve d25 GR10 complete	17006
	diaphragm for floating valve	16367
Floating valve	non return valve d8 0,4 bar spring loaded GR10	16652
	floater	11621
	level switch GR 10	10497
Booster pump	booster pump Lo 2HMS3-A	10657
	maintenance set: ball bearings, slide ring seal	17019
Flow switch	suction tube GR ½'' – S14-US	12729
	flow switch GR ind. 18x1 long lead	12430
	flow switch bobbin GR ind. ½''	12730
	seal ring Vi 14/8,7 flow switch bobbin	15801
	connecting hose Si 10/2,5/170	11565
Venturi	venturi GR10 complete	11792
	orifice washers for venturi-kit	11594
	venturi-nozzle ½''	12306
Cyclone	venturi-body with connector ½''	12305
	mixing cyclone GR 10	12329
Maintenance kit	For yearly maintenance: seals, diaphragms, fuses all GR	12631

**6. Maintenance List GRANUDOS 10/45/100**

Object:.....

GRANUDOS-Type:..... series no.....

Maintenance executed by ..... date:.....

Sign of pool operator:.....

**This has to be done**



**This was necessary too**



**1 Dissolving system**

- 1.1 check level switch: OK [ ]
- 1.2 check pressure switch: OK [ ]
- 1.3 check flow switch: OK [ ]
- 1.4 cleaning flow switch bobbin, fit new seal [ ]
- 1.5 change diaphragm of floating valve [ ]
- 1.6 check function floating valve OK [ ]
- 1.7 check connecting hose tank-flow switch holder [ ]
- 1.8 check pump end plate (at Calpeda pump only) [ ]
- 1.9 check tightness of pump OK [ ]
- 1.10 check ball bearings: is it noisy? OK [ ]
- 1.11 clean pre-filter, if polluted [ ]

- change switch [ ]
- change switch [ ]
- change switch [ ]
- change bobbin [ ]
- adjust water level [ ]
- change connecting hose if brittle [ ]
- change pump end plate [ ]
- new slide ring seal [ ]
- new bearings [ ]

**2 Dosing chlorine**

- 2.1 check function heating nozzle: OK [ ]
- 2.2 check function empty switch: OK [ ]
- 2.3 check dosing screw, clean it dry OK [ ]
- 2.4 check power dosing motor: OK [ ]
- 2.5 change sealing of dosing motor [ ]
- 2.6 check clamp bands and safety belt [ ]

- change nozzle [ ]
- change switch [ ]
- change screw [ ]
- change motor [ ]
- change [ ]

**3 Dosing acid**

- 3.1 check function empty switch: OK [ ]
- 3.2 check function dosing pump OK [ ]
- 3.3 change dosing hose [ ]
- 3.4 change acid valve insert [ ]

- change empty switch [ ]
- change pump [ ]
- change roller [ ]

**4 Additional jobs**

- 4.1 clean GRANUDOS carefully: [ ]
- 4.2 clean environment of the GRANUDOS [ ]

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