# *Top-Control MC*

Pool controller for free chlorine, pH, ORP and Temperature for public pools
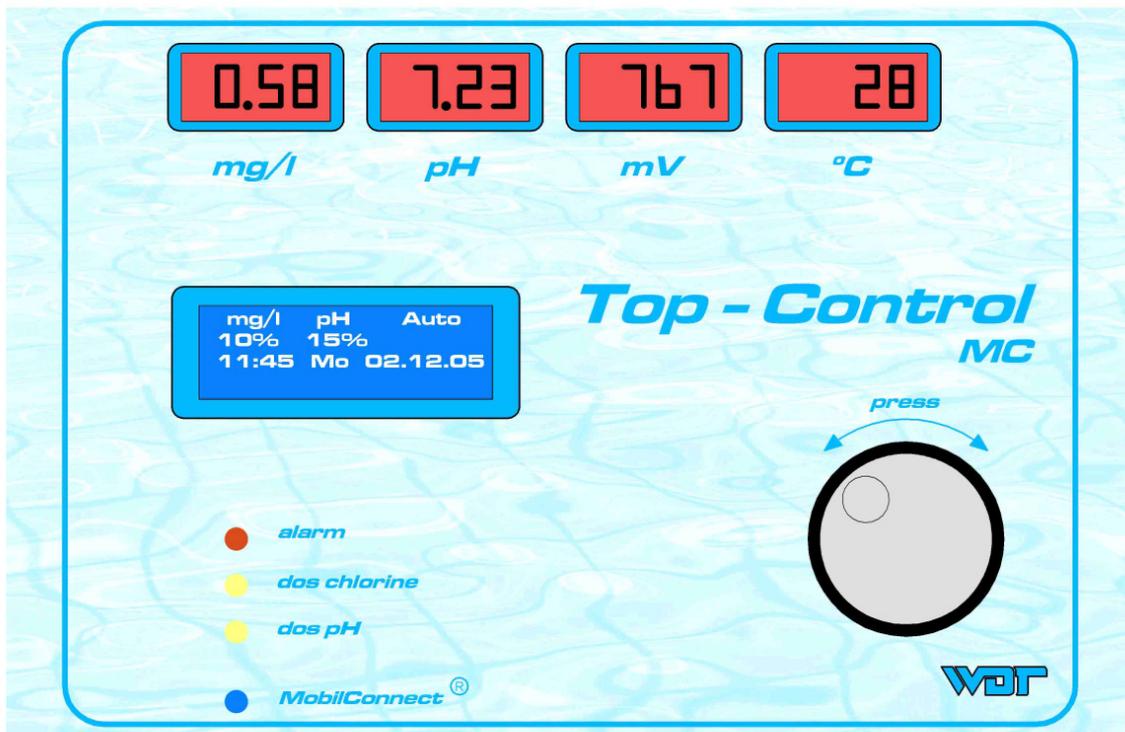
Part 2:   Description of the controller *TopControl MC*

(Part 1:   -   function of the GRANUDOS Top
             -   Installation and start up
             -   Trouble shooting and maintenance

Table of contents page

1. General description for user and safety notes

Please read the following safety notes before the installation and use of the dosing equipment. To disregard the safety notes could lead to personnel injury or property damage as a result.

Attention!

- Avoid personnel injury by electrical power, please ensure that only qualified personnel install the equipment and takes the machine into service.

  Please observe the national rules for the electrical installation.

- Please observe the rules of working with chemicals. Observe the datasheets of the chemical supplier. Don't mix chemicals. Wear personal protective clothing.

- Change of the dosing equipment and improper use is inadmissible.

- The dosing equipment consists of some safety functions against overdosing. E.g. flow monitoring circulation water monitoring (option) dosing time limit, reading value alarms. Only if these monitoring functions work properly and were not switched off, a proper and stable function is guaranteed.

Attention!

- Please check periodically the parameters free chlorine, pH and ORP to ensure the national health regulation.

- Keep unauthorized people away from dosing equipment. Wrong adjustments can lead to chemical overdosing.

- To ensure extended life please check the dosing equipment periodically and perform all necessary maintenance work.

The **TopControl MC** can be used for different dosing equipments. The configuration for Granudos10 Top-MC, Granudos45 Top-MC, Granudos100 Top-MC or TopControl 2S has been factory adjusted. Don't change these adjustments for a proper use.

2. Description of the function

With the controller *TopControl MC* you can measure the parameters of hygiene free chlorine, pH, ORP and temperature.

To use the controller we have provided a simple to use "adjuster wheel switch knob". The adjustment wheel has two functions. To turn the wheel changes the selected menu and changes the selected parameters. To press the wheel enters the selected menu or confirm the changes.

Important!
In the description below we call the *turning* function of the adjustment wheel only *WHEEL* and the *press function* to confirm only *ENTER*

2.1. Display shown in the automatic mode:

```
 mg/l    pH   Auto
   0%    0%   start
 14:12  Mo  02.12.05
DOS blocked:    11:22
```
Stop dosing lock by ENTER.

Cl - pH control, Status **AUTO** mode
0% = no dosing (dosing lock) **start up mode**
Time, weekday, date
Dosing lock 11 minutes and 22 seconds

```
 mg/l    pH   Auto
  80%   55%
 14:16  Mon 02.12.05
```

Cl - pH control, status AUTO **mode**
80% = difference to set value (calculated dosing value)
Time, weekday, date
No interruption

Start main menu by ENTER. (main menu see next page)

2.2. Programming of parameters

There are three levels to change parameters. To change parameters you have to type in a password. The password releases the change of parameters in different levels.
Attention:
You have to type in the password only once. Then it is valid until you leave the menu. To change the level of access, you have to leave the menu and go in again.

```
Password input >  15
```

- *Operator*   normal access
- Password: **15** (factory, adjustable)
(Change of some parameters, e.g. calibration is released)

```
TOPCONTROL guestmode
 The adjustments are
 limited. Plese con-
    firm by ENTER
```

- *Guest access* minimum access
- No password for this level press ENTER with any value
(E.g. change of date, time und calibration is possible)

The **service** password is only for qualified authorised personnel and you will get it only on request. In the service access mode you can change every parameter.
With the service password you can change the password for operator and service. See password menu in the manual. For access authorisation see manual section.
You have to in type the password only once. Then it is valid until you leave the menu. To change the level of access, you have to leave the menu and get in again.

Important!
Until the dosing start delay is released there is no automatic change in the bottom line. After dosing start delay every second the bottom line is scrolled automatically.
Additionally the bottom line is scrollable by *WHEEL*. The indication is switched to: dosing time delay (if active), interruption message (if active), interruption messages (if active), buffer filling messages (if active), start mode message (if active). If there is no mode listed above the bottom line is cleared.
If the dosing start delay is active and **ENTER** is pushed, first the counter for the dosing start delay is shown in the bottom line. The second push de-activates the dosing start delay once (set to zero). The next push starts the menu. If the dosing start delay is not running, the first push starts the menu.

3. The main menu

Detailed menu description on the following pages

```
>back to auto mode
>justify
>status progr.> Auto
>DOS cycle    > 30 s
```

```
>parameter chlorine
>parameter pH
>parameter ORP
>parameter flock
```

```
>filter disinfection
>night values
>interruption list
>event list
```

```
>reading list
>test inputs
>test outputs
>DOS blocked  >10min
```

```
>date    Son 01.11.05
>time        >13:38
>network
>printer
```

```
>system reset
>lang.    >Deutsch
>change password
>MobilConnect
```

```
>audible sound>on



```

```
>audible sound>on
Reset counter:      5
Time meter:        1h
```

The time meter and start counter is only shown in the service access mode. The start counter stores (increments by one) every power supply disconnection of the controller

3.1 Menu: justify

```
>back      (justify)
>Cl DPD1
>Cl zero point
>pH justify program
```

```
>pH Phenol Red
>ORP justify program
>temperature adj.
```

3.1.1. Menu: justify   Cl DPD1 (slope)

```
>back      (01.11.05)
>input   DPD1>  0.63
Cl current     6.30µA
Flow on
```

Important!
The **Cl current** must be **higher 3 µA** and **lower 100 µA.**
The bottom line indicates the status and the error messages.
The **flow** must be **on** in the DPD1 justify mode.

Type of error	error message in the bottom line	
flow is off	*flow off* is shown flashing	the justify function is blocked
Cl current < 3 µA	*reading too small* is shown	the justify function is blocked
Cl current > 100 µA	*reading too large* is shown	the justify function is blocked

(Changes in the flow status and reading values lead to an interruption of the justify function)
How to change:
1. Select the line *input DPD1* and confirm with **ENTER** , adjust the Chlorine value into the DPD1 value by *WHEEL* and confirm with **ENTER**.
2. In the top line on the right side now the justification date is shown.

3.1.2. Menu: justify   Cl zero point

```
>back      (01.11.05)
>input   Zero>  0.09
Cl current     0.92µA
Flow off
```

Important!
The flow must be off for min. 5 minutes!
The bottom line indicates the status and the error messages.
The **Cl current** must be **below 3 µA**.
The **flow** must be **off** in the zero point justify mode.

Type of error	error message in the bottom line	
flow is on	*flow on* is shown flashing	the justify function is blocked
Cl current > 3 µA	*reading too large* is shown	the justify function is blocked

(Changes in the flow status and reading values lead to a interruption of the justify function)
How to change:
1. Select the line *input zero* and confirm with **ENTER** . Adjust the value to zero (don't pay attention on the sign, could be negative when you start). Confirm with ENTER.
2. In the top line on the right side now the justification date is shown.

3.1.3. Menu: justify pH justify program

```
Set zero and slope
To defaults before
You start to justify
Reset values >yes
```

Attention:
When you start the pH justify program, there is no automatic parameter reset of slope and zero to defaults. (Standards: zero point pH7.0 = 0mV & slope ca. –59mV/pH).
If you confirm **yes** by ENTER, zero point and slope would be reset to defaults. If you change by **WHEEL** to **no** and confirm by ENTER no default reset is performed.

How to change:
1. Close inlet measuring valve
2. Select **>pH justify program** in the main menu and confirm with ENTER.
3. Press **ENTER** again to load the defaults (we recommend).

```
>back      (01.11.05)
>pH 7.00    >pH -----
>pH x.xx    >pH -----
stat: wait     94.7mV
```

4. In the top line the last justify date is shown on the right.
5. Remove the ph probe from the acrylic flow cell and wash it only with water. Start always with the zero buffer solution (pH 7.00). The buffer is recognized automatically. As long as the buffer is not recognized the status **wait** is shown in the bottom line. There is a voltage value shown in the bottom line on the right. This is the direct reading of the pH probe. The reading for zero (pH 7,0) must be between ±50 mV.
6. Wait until the counter behind **stat:** is zero (reading was stable over 30 seconds). If there is a change of more than pH 0.10 the counter is reset to 59. When the counter is zero the indicated reading value is set to zero (pH 7.00) automatically and the zero value to correct the reading is stored. After that the message **ok** is shown after pH 7.00 in the display. To speed up this process press **ENTER** . Pay attention that the reading is stable for min. 30 seconds.

```
>back      (01.11.05)
>pH 7.00    >pH  7.15
>pH x.xx    >pH -----
stat:  26  - 14.7mV
```

The buffer solution pH 7.00 is recognized (range: 6.15 – 7.85).

7. Wash the pH probe accurately again and put it into the second buffer solution pH 4.00

```
>back      (01.11.05)
>pH 7.00 ok>pH -----
>pH 4.00    >pH  4.58
stat:  55   155.8mV
```

The buffer solution pH 4.0 is recognized (range: 3.15 – 4.85)

8. Wait until the counter behind **stat:** is zero (reading was stable over 30 seconds). If there is a change of more than pH 0.10 the counter is reset to 59 again. When the counter is zero the indicated reading value is set to recognized buffer value (pH 4.00) automatically and the slope value to correct the reading is calculated and stored. To speed up this process press **ENTER** . Pay attention that the reading is stable for min. 30 seconds.

If the counter is reset to 59 because of reading changes above pH 0.1 more than 50 times, you'll get an error message and the justification is interrupted. The values zero and slope will be not stored in this case. You have to confirm this message by ENTER
Please check if the pH probe is worn out, the connectors (corroded) the cable (could be broken) or the buffer solution (polluted)

If you perform the zero calibration first (ok is indicated after the in the second line after pH 7.00) than the justification is finished after the slope calibration automatically.
There is short message shown in the fourth line not necessary to confirm by ENTER.

```
menu pH Justify
val.:       - 14.7mV
slope val:mV/pH 52.8
accept    >yes
```

Important!
If the zero value is out of range (±50mV) and/or the slope value is out of range (55 – 65 mV/pH) the confirmation procedure is interrupted by an error message and the original values before justification will be maintained.

```
attention
pH electrode failure
too slow reaction
please exchange
```

Please check if the pH probe is worn out, the connectors (corroded) the cable (could be broken) or the buffer solution (polluted)

3.1.4. <u>Menu   Justify   pH Phenol Red</u>

This menu is only for adjusting the pH reading to the reading you get with the Phenol Red test tablet method.

Remark!
The two point calibration is the more accurate way for pH calibration. This method is preferred if possible instead of the Phenol Red method.

```
>back      (12.10.05)
>reading  pH >  7.45
adjustment  pH  0.00
 (range   pH +/-0.20)
```

How to change:
1. Select the line *reading pH* and press **ENTER** , adjust the indicated reading to the readings you've got by the Phenol Red method by **WHEEL**. Confirm with **ENTER**.
2. The justification date is shown in the top line on the right.

Important!
1. The adjustment range is limited to pH ±0.20 . The actual adjustment value is shown in the third line on the right.
2. If there is a bigger difference between the reading and the Phenol Red value, please check the reason before you start to adjust.

Please check if the pH probe is worn out, the connectors (corroded) the cable (could be broken) or the buffer solution (polluted)

3.1.5. Menu: Justify   ORP justify program

```
>back       (02.08.05)
>reading      > 470mV
adjustment       0mV
debit:    475+/−30mV
```

How to change:
1. Shut the measure water valve. Remove the ORP electrode from the bottom of the acrylic flow cell and screw it into the ORP check cylinder. Remove also the pH probe from the flow cell and put it into the check cylinder from the top. Fill the ORP buffer solution (475mV) into the check cylinder. Both electrodes (pH and ORP) must be connected to the controller!
2. Select the line *reading* and press **ENTER** , adjust the reading value to the value of the ORP buffer solution (shown on the bottle) and confirm with **ENTER** .
3. The adjustment date is shown in the top line on the right.

Important!
1. **Attention!** The ORP buffer solution is irritating! Avoid skin contact.
2. The adjustment is limited in the range ± 30mV . The actual adjustment value is shown in the third line on the right.
3. After a pH probe replacement, an ORP justification is necessary too.

3.1.6. <u>Menu:</u>   **Temperature adjustment**

```
>back       (05.04.05)
>Temperature  > 29°C
```

How to change:
1. Select the line *temperature* and press **ENTER**, adjust the reading value to the temperature value you've got by an external temperature measurement system and confirm with **ENTER**.
2. The adjustment date is shown in the top line on the right.

Important!
1. The adjustment is limited in the range of ± 10°C .

3.2. Menu: status progr.

```
>back to auto mode
>justify
>status progr. >AUTO
>DOS cycle    > 30 s
```

Program modes :   AUTO ➔   MANU ➔   OFF
Default value: AUTO

AUTO: automatic mode including measurement, proportional dosing and monitoring of reading alarms based on the adjustments in the menu.

MANU: ***Emergency program*** e.g. if the probes were out of order. The readings and proportional control adjustments in the menu are not taken into consideration for the dosing. The dosing is continuously, controlled only by the values dosing amount (pH and chlorine) and dosing cycle.
You have to select the dosing amounts for the pool dimensions manually.
All reading alarms are de-activated!
Please check the water parameters (free chlorine and pH) manual periodically and more often!

OFF: The complete controller is de-activated including dosing and reading alarms!

3.3. Menu: dosing cycle

```
>back to auto mode
>justify
>status progr. >AUTO
>DOS cycle    > 30 s
```

Upper limit: 600 seconds
Lower limit: 30 s
Adjustment steps: 30 s
Default value: 30 s   (standard)

The dosing cycle is the adjustable time for the length of the periodical dosing. A dosing cycle of 30s is divided into the following parts and dosing is always in the 1st 30 seconds of the set dosing cycle.
The maximum time for chlorine dosing is 15 seconds, the actual dosing time depends on the difference between set value and chlorine reading; the dosing time is shorter if the difference is smaller ➔ indicated by the indicated percentage value for Cl.
After the chlorine dosing cycle (15 sec) there is a fixed rest of 4s.
Next the dosing cycle for pH (acid) is active. The maximum time for acid dosing is 7.5 seconds, the actual dosing time depends on the difference between set value and pH reading, the dosing time is shorter if the difference is smaller ➔ indicated by the indicated percentage value for pH.
After the acid dosing cycle (7,5 sec.) there is another fixed rest of 3.5s.
The rest of the set cycle time (DOS cycle) is pause without dosing – dosing only in the 1st 30 seconds. The

Important!
1. The maximum dosing amount you'll get only with the shortest dosing cycle (30s)
An increase of the dosing cycle reduces the maximum amount of dosing.
2. If the dosing cycle is too large it is possible, that the dosing amount is not enough to supply the required chemicals (e.g. chlorine) into the pool. In this case reduce the dosing cycle.
3. If the dosing cycle is too small, the dosing amount may be too high and overdosing is possible.

3.4. Menu: parameter chlorine

```
>back     (Cl params)
>set value      >0.60
>prop. range    >0.20
>DOS amount     > 500
```

Set value:
Upper limit: 3.00 mg/l
Lower limit: 0.10 mg/l
Adjustment steps: 0.05 mg/l
Default value: 0.60 mg/l   (1.5 ppm = U.K. standard)

Proportional range:
Upper limit: 1.00 mg/l
Lower limit: 0.05 mg/l
Adjustment steps: 0.05 mg/l
Default value: 0.20 mg/l   (standard)
Dosing amount:
Upper limit: the max. dosing depends on the adjustments **DOS configuration**
Lower limit: 100 g/h
Adjustment steps: 10 g/h
Default value: no value
Important!
If there is a change in the menu **DOS configuration** this parameter is set to the maximum dosing amount.

```
>upper alarm   >0.80
>lower alarm   >0.40
>time monitoring >30
>cycle monitoring> 5
```

Upper alarm:
Upper limit: 5.00 mg/l => off (Alarm de-activated)
Lower limit: set value + 0.10 mg/l
Adjustment steps: 0.05 mg/l
Default value: 0.80 mg/l   (1.0 ppm = U.K. standard)

Lower alarm:
Upper limit: set value - 0.10 mg/l
Lower limit: 0.00 mg/l = off (Alarm de-activated)
Adjustment steps: 0.05 mg/l
Default value: 0.40 mg/l   (1.0 ppm = U.K. standard)

Important!
If you change the set values the input cursor jumps after you confirm the change directly to the alarm value adjustment. In this case you have to select the alarm values.

Time monitoring:
Upper limit: 60 min
Lower limit: 1 min
Adjustment steps: 1 min
Default value: 30 min   (standard)

Cycle monitoring:
Upper limit: 20
Lower limit: 1
Adjustment steps: 1
Default value: 5   (standard)

The **TopControl MC** consist of a dynamic dosing time monitoring. The readings are monitored periodically (**time monitoring**) and compared with the reading of the cycle before. If there is no change of the reading triggered by the dosing of chlorine (in the right direction ➜ reading is higher than before) a cycle counter is decreased by one (**cycle monitoring**). If the cycle counter is zero, an alarm is performed, the chlorine dosing stops and an alarm message (**dyn. DOS alarm Cl**) is shown in the bottom line.

Important!
> The only possibility to clear a dynamic dosing alarm is to start the menu **interruption list** or a restart of the controller.

```
>basic dosing    >off
>buffer filling >off
>DOS configuration
```

Basic dosing
Upper limit: 25 %
Lower limit: 0 % = off
Adjustment steps: 1 %
Default value: off   (standard)

The basic dosing is an additional possibility to solve problems with the pool circulation. In normal proportional dosing procedure, dosing is only if there is a difference between set value and reading. If the pool circulation is well the readings always will be near the set value. But if the circulation is poor, there is the high probability for ups and downs in the readings. To make dosings and readings more continuous, in that case we add to the proportional dosing the "basic dosing" amount. This amount is added to every dosing performed in the active dosing cycle of the controller.
Example: **dosing amount** 500g/h; **basic dosing** 5%
25g/h will be added in every dosing cycle to the calculated amount of the proportional controller.
If there is a difference calculated by the proportional controller of 12 %, this value is added and shown in the display ➜ 17% until the set value is get.

Important!
> Don't adjust too much **basic dosing**. An overdosing is possible if there is no bathers load in the pool.

Buffer filling:
Upper limit: 100 %
Lower limit: 50%   -   < 49 % = off
Adjustment steps: 1 %
Default value: off
For the buffer tank filling you need a high dosing power to get high concentration of chlorine in the buffer tank. That is he reason for a min. dosing power of 50%.
Important!
> 1. If you change a parameter in the **DOS configuration**, this parameter is set to **off** .
> 2. To release the buffer filling (output Y8) this value must be above 50%.

3.4.1. <u>Menu:</u>   <u>parameter chlorine</u>   <u>DOS configuration</u>

For the *GRANUDOS Top-MC* (type 10, 45 & 100) are changes of the dosing amount possible:

```
>back     (Cl config)
>D-motor 1/min  >12
>D-worm     mm  >19
DOS amount  g/h: 500
```

D-motor 1/min:

Adjustments:	12	➔	35	➔	60
Default value:	12				(three speeds available)

D-worm mm :

Adjustments:	19	➔	26
Default value:	19		(two worm screw sizes are available)

Theoretical comtankations = dosing amount (amount is rounded!)

12 1/min + 19 mm =   500 g/h   (standard configuration **Granudos10** Top-MC)
12 1/min + 26 mm = 1000 g/h
35 1/min + 19 mm = 1000 g/h
35 1/min + 26 mm = 2000 g/h   (standard configuration **Granudos45** Top-MC)
60 1/min + 19 mm = 2000 g/h
60 1/min + 26 mm = 5000 g/h   (standard configuration **Granudos100** Top-MC)

For *TopControl-MC 2S* (with peristaltic dosing pumps) are following adjustments possible:

```
>back     (Cl config)
>pump  1/min    >80
>tube set       >3.2
DOS amount ml/h:1250
```

Pump 1/min:

Adjustment:	80
Default value:	80	(only one transmission grade available)

Tube set mm:

Adjustment:	0.8	➔	1.6	➔	3.2	➔	4.8
Default value:	3.2				(four tube diameters available)

Possible comtankations = dosing amount (amount is rounded!)

80 1/min + 0.8 mm =   200 ml/h
80 1/min + 1.6 mm =   700 ml/h
80 1/min + 3.2 mm = 2500 ml/h
80 1/min + 4.8 mm = 6000 ml/h

Important!
   1. The dosing amount indicated in the controller is only correct, if the selected parts (motor, worm, dosing tube) have been installed and typed in correctly!
   2. A change of the selectable parts lead to a change of the dosing amount shown in the bottom line of the menu.
   3. If you leave the menu with a change of the dosing amount, the buffer filling is switched off, the values for filter disinfection will be set to defaults and the adjustable dosing amount in the menu (value for manual dosing) is set to the max. value. If these features are active, you have to adjust these parameters.

```
-dosing amount
-buffer re-fill
-filter disinfection
changed please ENTER
```

A message is shown in the display. Confirm by **ENTER.**
The corresponding dosing amounts have to be adjusted again.

3.5. Menu: parameter pH

```
>back     (pH params)
>set value      >7.20
>prop. range    >0.20
>DOS amount     >1250
```

Set value:
Upper limit: pH 8.00
Lower limit: pH 6.00
Adjustment steps: pH 0.05
Default value: pH 7.20   (7.40 UK standard)

Prop. range:
Upper limit: pH 1.00
Lower limit: pH 0.05
Adjustment steps: pH 0.05
Default value: pH 0.20
DOS amount:
Upper limit: the max. dosing amount depends on the **DOS configuration** adjustments
Lower limit: 100 ml/h
Adjustment steps: 10 ml/h
Default value: no value
Important!
If you change parameters in the **DOS configuration** the adjustable dosing amount is set to the max.
dosing amount.

```
>upper alarm    >0.80
>lower alarm    >0.40
>time monitoring >30
>cycle monitoring> 5
```

Lower alarm:
Upper limit: pH 9.00 = off (Alarm de-activated)
Lower limit: set value + 0.10
Adjustment steps: pH 0.05
Default value: pH 8.00

Upper alarm:
Upper limit: set value – 0.10
Lower limit: pH 5.00 = off (Alarm de-activated)
Adjustment steps: pH 0.05
Default value: pH 6.40
Important!
If you change the set value, the alarms are influenced. After you confirm by **ENTER** the cursor jumps
to the alarm values automatically. Change the values if needed.

Time monitoring:

Upper limit:	60 min
Lower limit:	1 min
Adjustment steps:	1 min
Default value:	30 min

Cycle monitoring:

Upper limit:	20
Lower limit:	1
Adjustment steps:	1
Default value:	5

```
>basic dosing    >off
>buffer filling >off
>DOS configuration
```

See basic dosing chlorine page 12

Basic dosing: **(Don't use in the UK)**

Upper limit:	25 %
Lower limit:	0 % = off
Adjustment steps:	1 %
Default value:	off

Buffer filling:

Upper limit:	100 %
Lower limit:	< 49 % = off
Adjustment steps:	1 %
Default value:	off

At buffer tank filling the acid dosing is to neutralize the chlorine solution. At taking into service the buffer filling, the needed acid amount must be adjusted to get a pH of 7,00 +/- 0,2.
The minimum amount of the buffer filling must be 50%.

Important!
  1. If any parameter in the menu **DOS configuration** is changed, the buffer filling is set to *off*.
  2. The release the buffer re-filling (output Y8) the value must be above 50%.

3.5.2. Menu: parameter pH   DOS configuration

```
>back     (pH config)
>pump  1/min    >80
>tube set       >3.2
DOS amount ml/h:1250
```

Pump 1/min:

Adjustment:	80	fixed value
Default value:	80	(only one speed available)

Tube set mm:

Adjustment:	0.8	➔	1.6	➔	3.2	➔	4.8
Default value:	3.2		(four tube sets available)			

Possible comtankations = dosing amount (dosing amounts are rounded!)
80 1/min + 0.8 mm =   100 ml/h
80 1/min + 1.6 mm =   350 ml/h
80 1/min + 3.2 mm = 1250 ml/h
80 1/min + 4.8 mm = 3000 ml/h
Important!

```
-dosing amount
-buffer filling
-filterdisinfection
Changed please ENTER
```

1. Ensure that the installed parts are typed in correctly.
2. A change of the parameters in the menu ***DOS configuration*** changes the dosing amount. If you leave the DOS configuration menu with a change the buffer filling is set to off, the values for filter disinfection are set to defaults and the adjustable dosing amount is set to the max. dosing amount.

A message is shown on the display and has to by confirmed by **ENTER** .
Re-adjust the changed parameters.

3.6. Menu: parameter ORP

You can use the ORP readings for monitoring the chlorine dosing only or to control the chlorine dosing e.g. if free chlorine measuring cell fails. In the case that ORP is only used for alarm, only these values may be set. If ORP is used for chorine dosing control, the dosing parameters have to be set too.

Menu: parameter ORP   (only alarm values)

```
>back    (ORP params)
>Status >AL values
>upper alarm   > 820
>lower alarm   > 600
```

Status:
Upper limit: AL values   ➜   auto mode
Default value: AL values
Important
If you change the status, the set value and the alarm values will be set to defaults.

Upper alarm:
Upper limit: = 1000 mV = off (Alarm de-activated)
Lower limit: lower alarm value
Adjustment steps: 10 mV
Default value: 820 mV

Lower alarm:
Upper limit: upper alarm value
Lower limit: = 400 mV = off (Alarm de-activated)
Adjustment steps: 10 mV
Default value: 600 mV

Menu: parameter ORP   auto mode

The status auto mode is only an emergency mode if the chlorine probe is out of order. The ORP value is used to get the free chlorine value indirectly.
Please check the free chlorine value in this mode more often!

```
>back    (ORP params)
>status >auto mode
>upper alarm   > 820
>lower alarm   > 600
```

Upper alarm
Upper limit: > 1000 mV = off (Alarm de-activated)
Lower limit: set value + 20 mV   (set value see next window)
Adjustment steps: 10 mV
Default value: 820 mV

Lower alarm:
Upper limit: set value – 20 mV   (set value see next window)
Lower limit: 400 mV = off (alarm de-activated)
Adjustment steps: 10 mV
Default value: 600 mV

Important!
If you change the set value, the alarms are influenced. After you confirm by *ENTER* the cursor jumps to the alarm values automatically. Change the values.

```
>time monitoring >30
>cycle monitoring>10
>set value     > 750
>prop. range   > 100
```

Time monitoring:
Upper limit: 60 min
Lower limit: 1 min
Adjustment steps: 1 min
Default value: 30 min

Cycle monitoring:
Upper limit: 20
Lower limit: 1
Adjustment steps: 1
Default value: 5
Set value:
Upper limit: 1000 mV
Lower limit: 500 mV
Adjustment steps: 5 mV
Default value: 750 mV

Prop. Range:
Upper limit: 100 mV
Lower limit: 10 mV
Adjustment steps: 10 mV
Default value: 100 mV

```
>dosing amount > 500
>basic dosing  >aus
>buffer filling>aus
>DOS configuration
```

Dosing amount   ➜ **see chlorine adjustments**

Basic dosing:
Upper limit: 25 %
Lower limit: 0 % = off
Adjustment steps: 1 %
Default value: off

Buffer filling:
Upper limit: 100 %
Lower limit: 49 % = off
Adjustment steps: 1 %
Default value: off

Important!
1. If you change a parameter in the ***DOS configuration***, this parameter is set to ***off*** .
2. To release the buffer filling (output Y8) this value must be above 50%.

3.6.1. Menu   parameter ORP   DOS configuration

See DOS configuration chlorine, details -> see DOS configuration chlorine

Important!
Changes in the ORP menu change the adjustments of chlorine dosing!

3.7. Menu: parameter flocculation

```
>back          (Flock)
>Flock >off
>amount    ml/m3>0.30
>circulat. m3/h> 100
```

```
>back          (Flock)
>Flock >on    30ml/h
>amount    ml/m3>0.30
>circulat. m3/h> 100
```

Flock:
Adjustments: off   ➜   on
Default value: off

Important:
If flocculation is ***off***, no dosing amount is indicated.
If flocculation is on, the actual dosing amount is shown in the second line on the right. After you have confirmed this value by **ENTER** this dosing amount is valid for flocculation. The indicated dosing amount is calculated depending on the value ***amount*** (ml/m³) and pool ***circulation*** (m³/h).

Amount:
Upper limit: 1.50 ml/m³
Lower limit: 0.10 ml/m³
Adjustment steps: 0.01 ml/m³
Default value: 0.30 ml/m³
The amount necessary for your bathing load is given by the manufacturer of the flocculation liquid. Adjust here the specific amount for your pool, each pool can be different. Any change to these parameters influences the dosing amount.

Circulation:
Upper limit: 1000 m³/h
Lower limit: 10 m³/h
Adjustment steps: 5 m³/h
Default value: 100 m³/h

Important!
If the max. amount given by the **Flock configuration** (pump and tube set) is higher than the displayed amount, the display flashes. If you confirm this value, the dosing amount is set to the maximum dosing amount automatically. This value is valid for the flocculation

```
>DOS configuration
```

3.7.1. Menu: parameter flocculation   DOS configuration (service code !)

Important!
If the max. amount given by the **Flock configuration** (pump and tube set) is higher, than the amount in the display flashes. If you confirm this value, the dosing amount is set to the maximum dosing amount automatically.

```
>back        (FLOCK)
>pump  1/min     >80
>tube set        >0.8
DOS amount ml/h: 100
```

Pump 1/min:
Adjustment: 80   fixed value
Default value: 80   (only one transmission speed available)

Tube set mm:
Adjustment: 0.8   ➜   1.6   ➜   3.2   ➜   4.8
Default value: 3.2   (four tube sets available)
Possible combinations = dosing amount (dosing amounts are rounded!)
80 1/min + 0.8 mm =   100 ml/h
80 1/min + 1.6 mm =   350 ml/h
80 1/min + 3.2 mm = 1250 ml/h
80 1/min + 4.8 mm = 3000 ml/h
Important!
1. Ensure that the installed parts are selected and entered in correctly.
2. A change of the parameters in the menu **DOS configuration** changes the dosing amount. If you leave the **DOS configuration** menu with a change, the value amount and circulation need to be changed.

3.8. Menu: filter disinfection

```
>back   (filterdisin)
>status >off
>start   >Di  >20:30
>period      > 20min
```

Status:

Adjustments:	off	➔	external	➔	unique	➔	weekly
Default value:	off						

off: The automatic filter disinfection is de-activated.

external: The **filter disinfection** is in the external mode. There is an external input. If this input is active, the filter disinfection is started as long as this input is active. The dosing (pH and Cl) starts at once independent on the dosing start delay with the adjusted dosing amounts in this menu.

unique: **top up chlorine ➔ TUC**. The dosing is started at once at the adjusted time and date with the adjusted dosing amounts

weekly: **top up chlorine ➔ TUC**. Once a week the dosing is started at the adjusted time and date with the adjusted dosing amounts

Important!
1. For a **time based TUC** it is important that time and date is typed in correctly. The dosing duration and the dosing amount have to be selected to the pool dimensions!
2. If there was a change in one of the **Dos configuration** menus (pH, Cl, ORP) the status is set to *off*. The dosing amounts are set to defaults.
3. If the status is set to **external** the values *start* and *period* are set to **auto** after confirmation by **ENTER**. In the top line *TUC* is replaced by *filterdisinf*. The output Y4 for the 3/2-way control valve is active as long as the external input is active. The 3/2-way control valve is used to switch the direction of the dosing from tapping point after filter to before filter
4. If the status is set to **unique** or **weekly** , a *TUC* is performed. In the top line on the right *TUC* is shown.
5. If the status is set to **unique** , after the TUC *period* the status is set to *off* automatically.
6. The TUC starts only if the controller is in the automatic mode in the beginning of the set start time.
7. If you start the menu and the TUC is active, the TUC is interrupted.

Start:
Adjustments: Mon – Sun, 0:00 – 23:59
Default value: Tue, 20:30

Period:
Upper limit: 240 min
Lower limit: 1 min
Adjustment steps: 1 min
Default value: 20 min

After the TUC normally the readings for free chlorine and for ORP too are above the set alarm values. In the next window alarms may be switched off.

```
>VAL AL after  >auto
>top up cl with
 >     10g/h chlorine
 >     10ml/h acid
```

Value alarm after

Upper limit: 99 h
Lower limit: 0 h = auto
Adjustment steps: 1 h
Default value: auto
Important!
1. In the mode *auto* after the filter disinfection or TUC the *start mode* is active, no reading value alarms until the readings are in the proportional range once.
2. If you use the time depending TUC the reading value alarms are de-activated during the adjusted period. The time left for the TUC is indicated in bottom line. After the period the reading value alarms are active without delay.

Filter disinfection/top up Cl (TUC) dosing amount with:

Upper limit:	Cl	max. dosing amount (see DOS configuration Cl)
	acid	max. dosing amount (see DOS configuration pH)
Lower limit:	Cl	10 g/h
	acid	10 ml/h
Adjustment steps:	10 g/h / 10 ml/h	
Default value:	10 g/h / 10 ml/h	

Important!
1. If the filter disinfection/TUC is active with 10mg/h / 10ml/h 1% for the dosing is shown.
2. If there is a change of any parameter in the menus of **DOS configuration** (pH, Cl, or ORP) to dosing amount values will be set to defaults.

3.9. Menu: night values

In the menu **night values** it is possible to reduce the set values for free chlorine and floccuation to reduce the need of chemicals in the unused periods of the pool. The night values are only active, if the ORP reading values are in a valid range (adjustable) to keep the pool under valid and clean conditions.

```
>back (night values)
>status >off
>Cl set value > 0.30
>flock set on >  50%
```

Status:

Adjustments: off   ➔   on
Default value: off
Important:
1. After a default reset, the status is always *off*.
2. If the night value mode is *on* , the controller activate this mode at any time in the adjusted period even after you left the menu or a TUC e.g. has been performed in this period. Please pay attention that the night value mode will be activated with a delay, depends on a counter in background. It is possible that it takes one Minute after you left the menu e.g. before the night value mode is active.
3. The night value mode is shown in the second line on the right on the display.

4. If the controller status is off, the night mode is blocked

Cl set value:
Upper limit: 5.00 mg/l
Lower limit: 0.10 mg/l
Adjustment steps: 0.05 mg/l
Default value: 0.30 mg/l
Important!
1. The reading value alarms are not changed in this mode. The standard reading value alarm is active over the night.
2. There is no adjustment limit for the set value. So it is theoretically possible to work with a higher Cl set value over night. Pay attention on the ORP value.

Upper limit: 99 h
Lower limit: 0 h = auto
Adjustment steps: 1 h
Default value: auto

Flocculation on:
Upper limit: 100 %
Lower limit: 50 %
Adjustment steps: 1%
Default value: 50 %
Important!
The percentage value depends on the actual value not on the max. dosing amount of the flocculation pump!

```
>active if ORP>750mV
>starts        >20:30
>ends          > 6:30
```

Active if ORP is higher than:
Upper limit: 990 mV
Lower limit: 500 mV
Adjustment steps: 10 mV
Default value: 750 mV
Important!
If the current reading is below the adjusted value, the night mode is blocked.
If the current reading increases during the night mode above the adjusted mode, the night mode is interrupted.
If the night mode was blocked (because of the OPR reading) to the start time and the ORP reading decreases over the night the night mode will be activated when the ORP reading is below the adjusted value (only in the over night period).

Starts:
Adjustments: 16:00 – 23:59
Default value: 20:30

Ends:
Adjustments: 5:00 – 12:59
Default value: 6:30
Important!
The adjustment is daily valid. Hour and minutes are adjustable independent. If the adjustment of hours gets to the limit the complete time is set to the adjustment limit.

3.10. Menu: interruption list

Important!
1. If there is an interruption a message is shown in the bottom line. When you start the menu by *ENTER*, the menu works in the standard way.
2. There are two types of interruptions:
   - hardware (level sensors e.g.): consists of an automatic reset function
   - software (dosing time monitoring e.g.): have to be reset by a controller restart
3. If there is more than one interruption, only the total numbers of interruptions are indicated in the bottom line. When you start the menu by *ENTER* , the cursor jumps to the menu line *interruption list* automatically.
4. In the interruption list, all possible interruptions are listed. With the *WHEEL* you can scroll the list page by page.
5. The numbers of current interruptions are shown in the top line of the first page. The lines of all active interruptions are flashing. If the reason of the interruption is cleared (only hardware) the lines stops to flash and the number of active interruptions is reduced by one.
6. **You can leave this menu only with a restart of the controller**. Select the first line and press *ENTER*. All software and hardware interruptions will be cleared. After six seconds (if the reason for a hardware interruption is not cleared) a new interruption is performed.

```
>RESTART    (act.: 2)
24V power supply ?
Level chlorine
Level pH
```

```
Level flock
Flow measure water
Upper value alarm Cl
Lower value alarm Cl
```

```
Upper value alarm pH
Lower value alarm pH
Upper VAL alarm ORP
Lower VAL alarm ORP
```

```
Dyn. DOS time Cl
Dyn. DOS time pH
Dyn. DOS time ORP
Flow circ. water
```

```
Tube is broken Cl 2S
Tube is broken pH
Tube is broken flock
Chlorine missed
```

```
Water level min.
Water level max.
No water pressure
Flow GR
```

```
Upper buffer level
Buffer empty
Buffer start error
Buffer fill time ?
```

```
Buffer filling error
Buffer switch error
```

3.11. Menu   event list

The event list is a list of all events happened on the controller chronologic assorted and numbered.

Example

```
A01: 01.12 11:59  30
Upper reading alarm
A02: 01.12 11:17  23
Flow measure water
```

Important!
1. No adjustments are possible.
2. In the first line of every entry there is a number followed by date and time. At the end there is a code identifying the alarm. This code will be used for the communication feature. In the second line the alarm reason is shown as text. In the case of an interruption entry it is the same text as shown in the bottom line or printed on the printer (option).
3. The controller stores max. 51 events. The last event is cleared with the next entry. Number one is always the last entry in the chronologic list (No 51 the last).
4. Interruption caused by an interruption before wouldn't considerate especially.

3.12. Menu: reading list   (not installed in this version)

3.13. Menu: test program inputs

For a fast system screening of all inputs you are able to test every input separately. You don't need an external meter to test the connected switches. Every input is shown by a separate line including the status at the end (**on** or **off**). The indication will be updated every 0.8s

Example

```
>back    (test input)
Measure water   :on
Level  Cl        :off
Level  pH        :off
```

```
Level  flock     :off
Filter disinf.  :off
TopControl off:off
Circ. water      :on
```

Additionally in the GRANUDOS model (not shown in the 2S model)

```
Pressure GR     :off
Flow succ. pipe:off
Water level min:off
Water level max:off
```

```
Cl missed       :off
Buffer level UP:off
Buffer level LO:off
AL buffer lev U:off
```

```
AL buffer lev L:off
```

3.14. Menu: test program outputs

For a fast system screening of all outputs you are able to test every output separately. You don't need an external meter to test the connected actuators. Every output is shown by a separate line including the status at the end (*off* or "an on time").

Select the output with the *WHEEL* and press *ENTER*. The duration the actuator is active is shown instead of the message *off* at the end of the selected line. With the *WHEEL* you can increase or decrease the time by 25s. To switch the actuator off faster, decrease the time at the end by *WHEEL*.
The menu is blocked as long as the current actuator is active.
If you start the *Cl rotate dir.* The Cl motor is started in the reverse direction.
The output *24V active* is reverse. If you start, it is off during the indicated time.

```
>back  (Test output)
>DOS alkal Y1/1  off
>DOS acid  Y1/2  off
>DOS Cl    Y1/3  off
```

```
>DOS flock Y2/2  off
>beater      Y3  off
>SV filter  Y4   off
>SV Hypotab Y5   off
```

```
>circ. pump Y6   off
>interrupt. Y7   off
>SV buffer  Y8   off
>output      Y9  off
```

```
>output      Y9  off
>output     Y10  off
>24V active Y11  on
>Cl rotate dir.  off
```

Independend on the model (GR, 2S or HYPOTAB) every output is shown and selectable.

3.15. Menu: dosing start delay (DOS blocked)

```
>reading list
>test inputs
>test outputs
>DOS blocked  >10min
```

Upper limit:	15 min
Lower limit:	off
Adjustment steps:	1 min
Default value:	10 min

The dosing start delay is active after every restart of the controller, menu escape and some special situations like filter disinfection. The outstanding time is shown in the bottom line. The dosing is blocked. This function is very important to get the reading values stable after a switch on and to ensure that the water inside of the measuring cell is fresh water from the pool, before the control mode is active and the dosing starts to work.

3.16. Menu: date

```
>date  Son 01.11.05
>time       >13:38
>network
>printer
```

3.17. Menu: time

```
>date   Son 01.11.05
>time         >13:38
>network
>printer
```

How to change:
Select the line by *WHEEL* and **ENTER**. The cursor jumps to first adjustment value. Adjust the value right of the cursor and press **ENTER** again to store the current value. To cursor jumps automatically to the next value until every value in the line is selected.

3.18. Menu: network   (not installed in this version)

3.19. Menu: printer

The controller model *TopControl MC* is able to send readings and interruption information directly to a **printer** (e.g. EPSON LX300+) or to a **remote IDC** via the integrated RS485 interface. The printing frequency of the readings is adjustable. Interruption and some event are printed immediately as soon as they occur. All data the current time added. Some alarm interruption prints are printed additionally.

```
>zurück (RS485-Konfig)
>status >printer
>output every >  30min
>No of lines  >    50
```

Status
Adjustments:	remote IDC	➔	printer
Default value:	remote IDC		

Output every:
Upper limit:	240 min
Lower limit:	2 min
Adjustment steps:	1 min
Default value:	10 min

No. of lines:
Upper limit:	100
Lower limit:	2
Adjustment steps:	1
Default **value**:	30

3.20. Menu: system reset

The system reset is needed for a controlled reset of every parameter in the **TopControl MC**. The reset with factory values (standards) is only used if there is an abnormal situation and no other possibilities are left.
After every system reset we recommend: to check every parameter to ensure a safe control system.

```
>back      (default)
>parameter load
>parameter store
>load standards
```

1. **Parameter load**
    Loads the optimized parameters which been stored with **parameter store**. If nothing is stored an error message is shown
2. **Parameter store**
    Stores optimized parameters for the pool bathing load. Pay attention: not all parameters are stored. See list at the end of the menu.
3. **Load standards**
    Standards will be loaded into the system. See default table at the end of the manual.
    Pay attention: not all parameters will be reset.

3.21. Menu: adjust language

```
>system reset
>lang.  >Englisch
>change password
>MobilConnect
```

3.22. Menu: change password

```
Password input >   1
```

Only in the service mode !

```
Change password
Operator > 15
Service  > XX
```

Important!
1. You need to have the password level to change the passwords for operator and service.
2. Passwords in the range of 2 … 200 are possible.

3.23. Menu: MobilConnect   (not installed in this version)

For the **MobilConnect** feature a separate manual is used after integrated.

3.24. Menu: adjustment audible sound

```
>audible sound>on
```

Adjustments: on   ➔   off
Default value: on

4. Different indications on the display

Standard mode:
Cl- pH- controlled, status **„AUTO"**,
Dosing start delay on, start mode prepared
No reading value alarms active

```
 mg/l   pH  AUTO
   0%   0%  start
 14:12  Mon 02.12.05
DOS blocked :  11:22
```

Manual dosing:
Cl- pH- continuous dosing, status **„MANU"**
No reading value alarms possible

```
 mg/l   pH  MANU
100%  70%
 14:15  Mon 02.12.05
```

TopControl MC de-activated:
No Cl- pH- control, status **„OFF"**
No reading value alarms possible

```
 mg/l   pH  OFF
   0%   0%
 14:15  Mon 02.12.05
```

Standard mode:
Cl- pH- control, status **„AUTO"**,
Start mode active
(Reading value alarms off = de-activated)

```
 mg/l   pH  AUTO
100%  55%  start
 14:16  Mon 02.12.05
VAL AL  Cl-pH-Rx off
```

Standard mode:
Cl- pH- control, status **„AUTO"**
TopControl MC external de-activated **OFF-CRC**
(CRC = central remote control)

```
 mg/l   pH  OFF-CRC
   0%   0%
 14:18  Mon 02.12.05
DOS blocked :  12:00
```

Standard mode:
Cl- pH- control, status **„AUTO"**
One interruption detected (Level chlorine)

```
 mg/l   pH  AUTO
   0%  55%
 14:22  Mon 02.12.05
Level chlorine
```

Standard mode:
Cl- pH- control, status **„AUTO"**
Three interruptions are detected

```
 mg/l   pH  AUTO
   0%  55%
 14:25  Mon 02.12.05
No of interrupts   3
```

Emergency mode (ORP-control):
ORP- pH- control, status **„AUTO"**,
ORP control active

```
 mg/l   pH  AUTO
  44%   2%  ORP
 14:19  Mon 02.12.05
```

Special condition mode (filter disinfection):
Cl- pH- control, status „**AUTO**",
Filter disinfection is active, external triggered
Output for 3/2-way control valve is active

```
 mg/l    pH   filter
  28%   28%   external
 14:30   Mon 02.12.05
VAL AL   Cl–pH–Rx off
```

Special condition mode (TUC):
Cl- pH- control, status „**AUTO**",
TUC: unique or weekly is active
Left time for TUC: 19 min. 56 s
Output for selectable valve is **not** active

```
 mg/l    pH   filter
  28%   28%   19:56
 14:35   Mon 02.12.05
VAL AL   Cl–pH–Rx off
```

Special condition mode (night values):
Cl- pH- control, status „**AUTO**",
Night values are active
ORP value is monitored

```
 mg/l    pH   Auto
  10%   28%   night
 21:22   Mon 02.12.05
```

Special condition mode buffer filling (only Granudos model)

Special condition mode (buffer filling):
Cl- pH-control, status „**AUTO**"
Buffer tank request detected
Time until start: 16.2s because of dosing cycle

```
 mg/l    pH   Auto
  28%   28%
 14:35   Mon 02.12.05
buffer start    16.2s
```

Special condition mode (buffer filling):
Cl- pH-control, status „**AUTO**"
Buffer filling is running with the adjusted
dosing amount

```
 mg/l    pH   buffer
  55%   75%
 14:35   Mon 02.12.05
```

Special condition mode (buffer filling):
Cl- pH-control, status „**AUTO**"
Buffer filling end request is detected
Time until end: 1,7s because of dosing cycle

```
 mg/l    pH   buffer
  28%   28%
 14:35   Mon 02.12.05
buffer end      1.7s
```

Special condition mode (buffer filling):
Cl- pH-control, status „**AUTO**"
Buffer filling end request is detected ➔ washing
Left washing time: 22.8s

```
 mg/l    pH   buffer
  28%   28%
 14:35   Mon 02.12.05
buffer washing 22.8s
```

Interruptions during the buffer filling mode:

buffer start error	If one of the buffer tank filling values is adjusted to less than 50% (=off)
buffer filling error	The buffer filling start switch must be off after 2 minutes because of the filling procedure. If not, start switch is blocked (?) „buffer fill time"
	The buffer must be filled after 10 minutes. If not, the buffer end switch is blocked or no water has been filled – control valve blocked …
upper buffer level	The safety upper level switch is active. The buffer end switch could be blocked (?) or the buffer filling valve is leaking or …
	Safety feature to avoid buffer tank overflow.
buffer tank empty	The low level switch is active. The buffer tank is empty completely. The start switch is blocked or the re-filling is slower than the usage out of the tank …

5. Description of the connectors and boards

5.1 Processor board
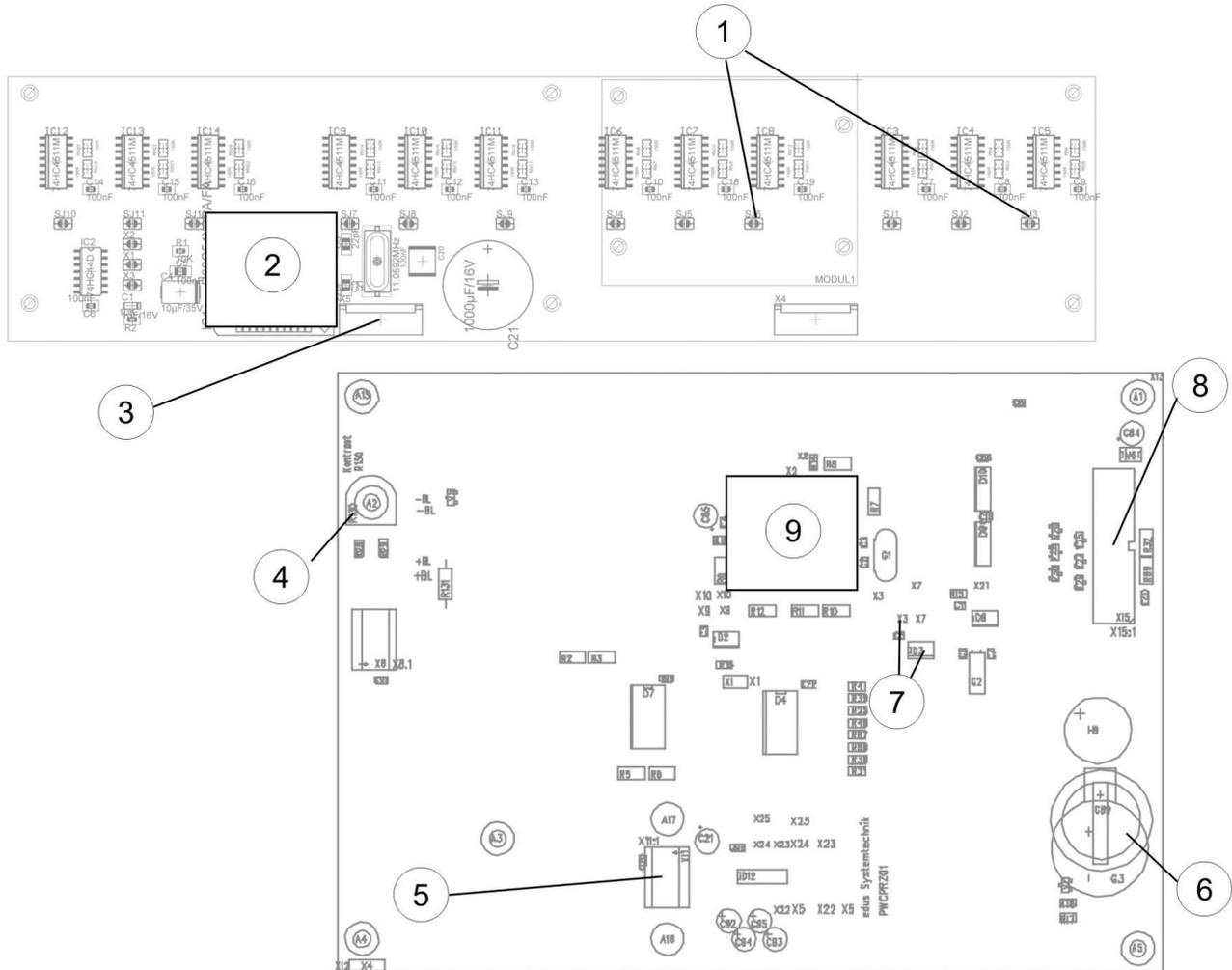
No.	Part description	Pay attention
1	Set the decimal points of the reading indicator board (pH, Cl)	
2	Processor of the reading indicator board	P04 indicated on the top
3	6 pin connector to the main measure and control board	
4	LC display contrast adjustment	
5	Connector for the MobilConnect	
6	Battery to keep parameters	Use only CR2032 type
7	EEPROM to store parameters	Bridge X3 has to be set, if not no parameter can be stored in the EEPROM
8	Flat cable connector to the power supply board	
9	Main processor for menu, calculation and store functions	P01 indicated on the top. Take care on the right version. Otherwise communication problem to the processor of the measure and control board can be caused.

5.2 Main measure and control board
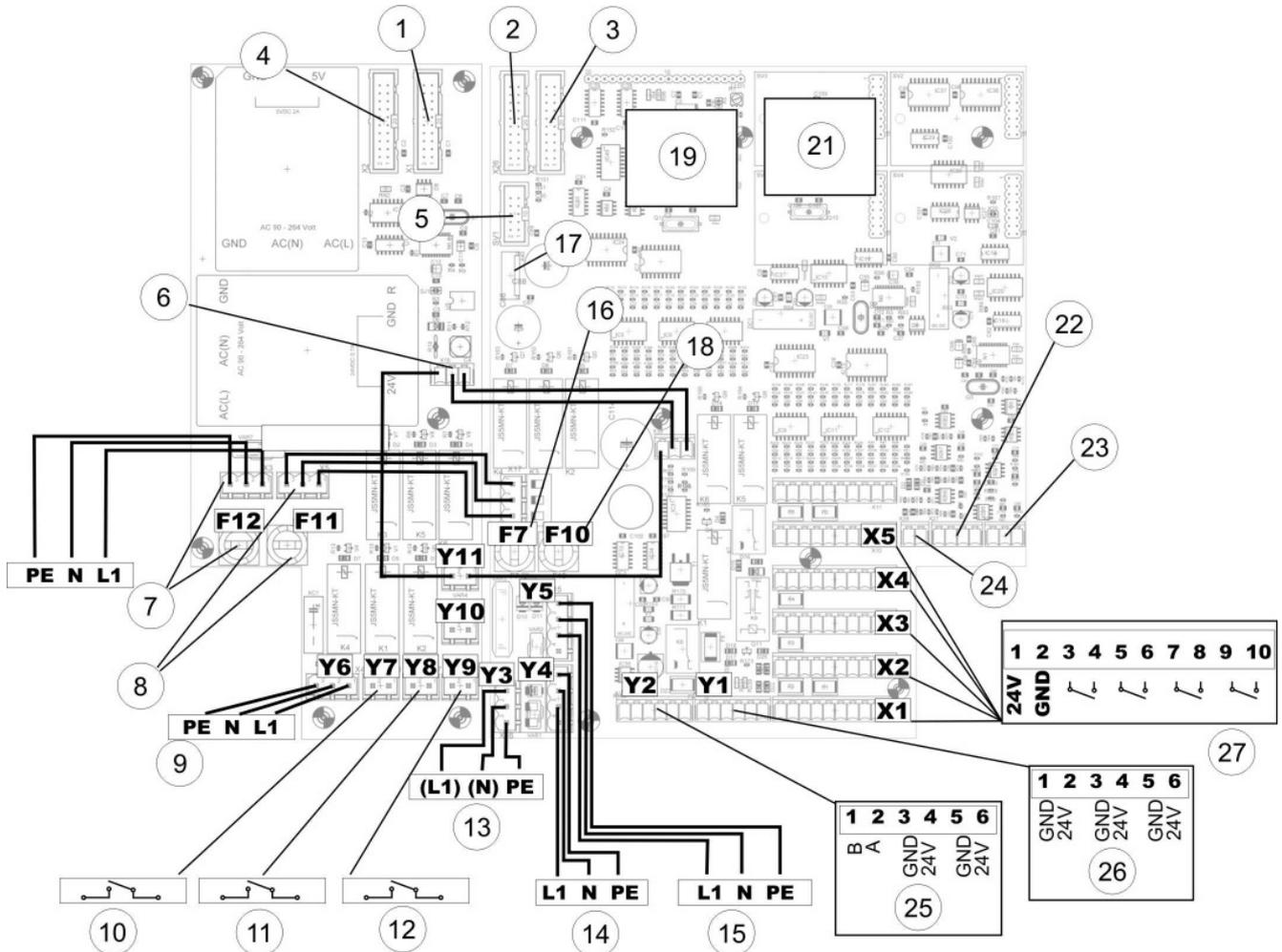
No.	Part description	Pay attention
1	Flat cable connector between measure and control board and the and power supply board	Use only WDT standard cable (special diameter cables)
2	Flat cable connector between measure and control board and the and power supply board	Use only WDT standard cable (special diameter cables)
3	Reserved	Do not connect
4	Flat cable connector between power supply board and the main processor board	
5	Flat cable connector to the **WHEEL**	Don't remove the flat cable at the **WHEEL**
6	24V power supply output for the measure and control board	The middle pin is the detection of the 24V power supply (monitored)
7	230V AC power supply input of the complete controller (includes circulation pump too)	Fuse F12: T 1A (only controller) All other 230V AC power outputs are fused separately
8	230V AC power supply output for the measure and control board	Fuse F11: T 4A (includes circulation pump output)
9	230V AC circulation pump output	Attention: filtered output! If there is no load connected you measure the full voltage.
10	Alarm output	Potential free (max. load 230V/1A)
11	Buffer re-fill output	Potential free (max. load 230V/1A)
12	X9 + X10 = Reserve	Potential free (max. load 230V/1A)
13	230V DC Beater output	
14	230V AC Solenoid output for filter disinfection	
15	230V AC Solenoid output for HYPOTAB	Output 26-5/6 synchronised

16	Fuse for the beater	Fuse F7: T315mA
17	6 pin connector to the reading indicator board	
18	Fuse for solenoid valves (filter disinfection, HYPOTAB)	Fuse F10: T315mA
19	Processor for reading and control of the complete board	P02 indicated on the top Take care on the right version. Otherwise communication problem to the processor of the main processor board can be caused.
21	Processor for flocculation	P03 indicated on the top
22	Connector for pH and ORP probes (pins from the left) pH pH(GND ORP (GND) ORP	The middle pins are connected
23	Connector for the chlorine probe (pins from the left) Bottom-Electrode AU-measure electrode Reference	Don't mix up the pins. Could cause problem in stability and can disturb the reference
24	Connector of the temperature probe	Type: KTY81
25	Output for (from the left): RS485 (B, A); flocculation (GND, 24V max.); heater (GND, 24V)	Pay attention on the polarity
26	Output for (from the left): alkaline output (GND, 24V); acid output (GND, 24V); chlorine output (standard: GND, 24V)	Pay attention on the polarity But chlorine output can be reversed Chlorine output is limited by a temperature fuse (300mA). If the fuse is active switch the controller of and wait a minute to re-start.
27	Inputs for different type of switches (active or passive) Explanations see below	The current of every connector is limited by a temperature fuse (30mA). If the fuse is active switch the controller of and wait a minute to re-start.

5.2.1 Input connectors

X1
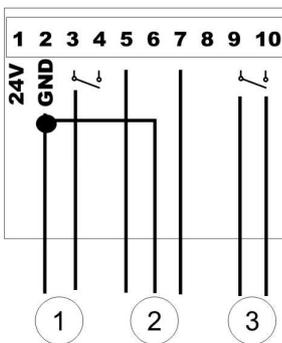
X1 – 1: flow suction tube

X1 – 2: flushing tank level switches
Pin 5 = water level maximum
Pin 7 = water level minimum

X1 – 3: pressure switch GRANUDOS

X2 (2S)
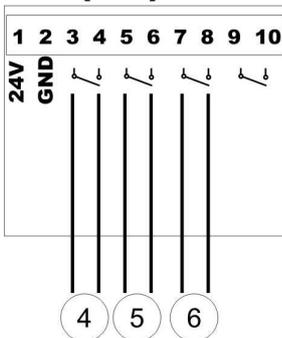
Only used in the model 2S

X2 – 4: level switch chlorine

X2 – 5: level switch pH

X2 – 6: level switch flocculation

X3
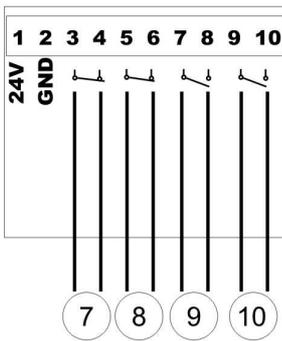
X3 – 7: flow measure water

X3 – 8: flow circulation external monitoring switch

X3 – 9: OFF – CRC (central remote control)

X3 – 10: filter disinfection start external

X5
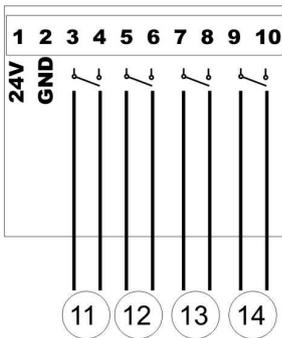
X5 – 11: puffer re-fill stop

X5 – 12: puffer re-fill start

X5 – 13: puffer re-fill upper alarm

X5 – 14: puffer re-fill lower alarm

X2 (GR)
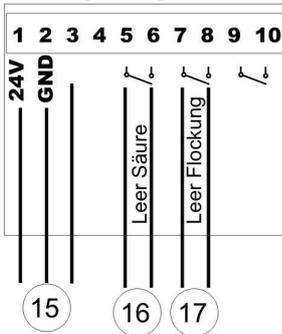
Only used in the model GR

X2 – 15: level switch chlorine

X2 – 16: level switch pH

X2 – 17: level switch flocculation

X4
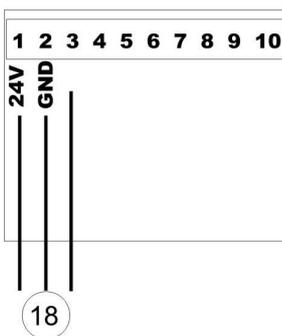
X4 – 18: chlorine missing switch
(only used in the buffer tank filling mode)
- Active after the second dosing cycle
- Active only while the Cl dosing is started (+ 6 s later)

6. Input connector description *TOPCONTROL MC*

The TopControl MC is designed for multifunction use in different applications. Below all inputs are described.
(Blue marked lines ➜ only *TopControl MC 2S*)
(Green marked lines ➜ only TopControl MC GR = Granudos)
(Violet marked lines ➜ only OPTION buffer filling)

| Name of input	connector	Input	Used pins
Flow switch suction tube GRANUDOS	X1	DIF10	1, 2, 3, 4
Flushing tank level switch max.	X1	DIF11	1, 5
Flushing tank level switch min.	X1	DIF12	1, 7
Pressure switch GRANUDOS	X1	DIF13	9, 10
Empty chlorine	X2	DIF14	1, 2, 3 (3, 4 bei 2S)
Empty acid	X2	DIF15	5, 6
Empty flocculant	X2	DIF16	7, 8
Not used	X2	DIF17	9, 10
Flow switch flow cell	X3	DIF20	3, 4
Flow circulation - external monitoring switch	X3	DIF21	5, 6
Switch off TopControl MC by CRC	X3	DIF22	7, 8
Start filter disinfection (external)	X3	DIF23	9, 10
Chlorine missing switch	X4	DIF24	1, 2, 3
Tube broken switch Cl	X4	DIF25	5, 6
Tube broken switch pH	X4	DIF26	7, 8
Tube broken switch flocculation	X4	DIF27	9, 10
Upper buffer tank stop filling switch	X5	DIF26	3, 4
Lower buffer tank start filling switch	X5	DIF27	5, 6
Upper buffer tank alarm switch	X5	DIF28	7, 8
Lower buffer tank alarm switch	X5	DIF29	9, 10

7. <u>Parameter list</u>

Important!
A *„System Reset"* with standards resets all parameters to the factory values. We recommend that you insert the adjusted, optimized values into the list below.

	standards	Adjusted parameters after installation	Optimized parameters (experience)
Status program	AUTO		
Dosing cycle	30 seconds		
Parameter chlorine			
- set value	0,60 mg/l		
- proportional range	0,20		
- dosing amount	500 g/h		
- upper alarm	0,70 mg/l		
- lower alarm	0,20 mg/l		
- time monitoring	30 minutes		
- cycle monitoring	5 cycles		
- basic dosing	Off *(must not be too large !)*		
- buffer filling	Off *(must be >50% !)*		
- dosing configuration	12 1/min & 19mm		
Parameter pH			
- set value	7,20 pH		
- proportional range	0,20		
- dosing amount	1250 ml/h		
- upper alarm	8,00 pH		
- lower alarm	6,40 pH		
- time monitoring	30 minutes		
- cycle monitoring	5 cycles		
- basic dosing	Off *(must not be too large !)*		
- buffer filling	Off *(must be >50% !)*		
- dosing configuration	80 1/min & 3,2mm		
Parameter ORP (Alarm values)			
- status	Alarm values		
- upper alarm	820 mV		
- lower alarm	600 mV		
Parameter ORP (auto mode)			
- time monitoring	30 minutes		
- cycle monitoring	5 cycles		
- set value	750 mV		
- proportional range	100		
- basic dosing	Off *(must not be too large !)*		
- buffer filling	Off *(must be >50% !)*		
- dosing configuration	12 1/min & 19mm		
Parameter flocculation			
- status flocculation	Off		
- dosing amount	0,30 ml/m³		
- circulation	100 m³/h		
- dosing configuration	80 1/min & 0,8mm		

	standards	Adjusted parameters after installation	Optimized parameters (experience)
Filter disinfection			
- Status	Aus		
- Start	Di – 20:30 o'clock		
- period	20 minutes		
- reading value alarm after	auto		
- Filter disinfection with	10g/h chlorine, 10ml/h acid		
Night values			
- Status	Off		
- set value chlorine	0,30 mg/l		
- flocculation on	50% *(reduced dosing amount)*		
- active if ORP >	750mV		
- Starts	20:30 o'clock		
- Ends	6:30 o'clock		
Dosing start delay	10 minutes		
network	Not in this version		
printer			
-status	Remote indicater		
- output every	30 minutes		
- no. of lines	50		
language	German		
Change of password	Operator: 15		
MobilConnect	Not in this version		
Audible sound	On		

Remarks:

....

....

....

....

....

....
Date   town   installation staff   customer