

-90 -80 -70 -60 -50 -40 -30 -20 -10

-10

-20

# Cooling Water Control KS - 201





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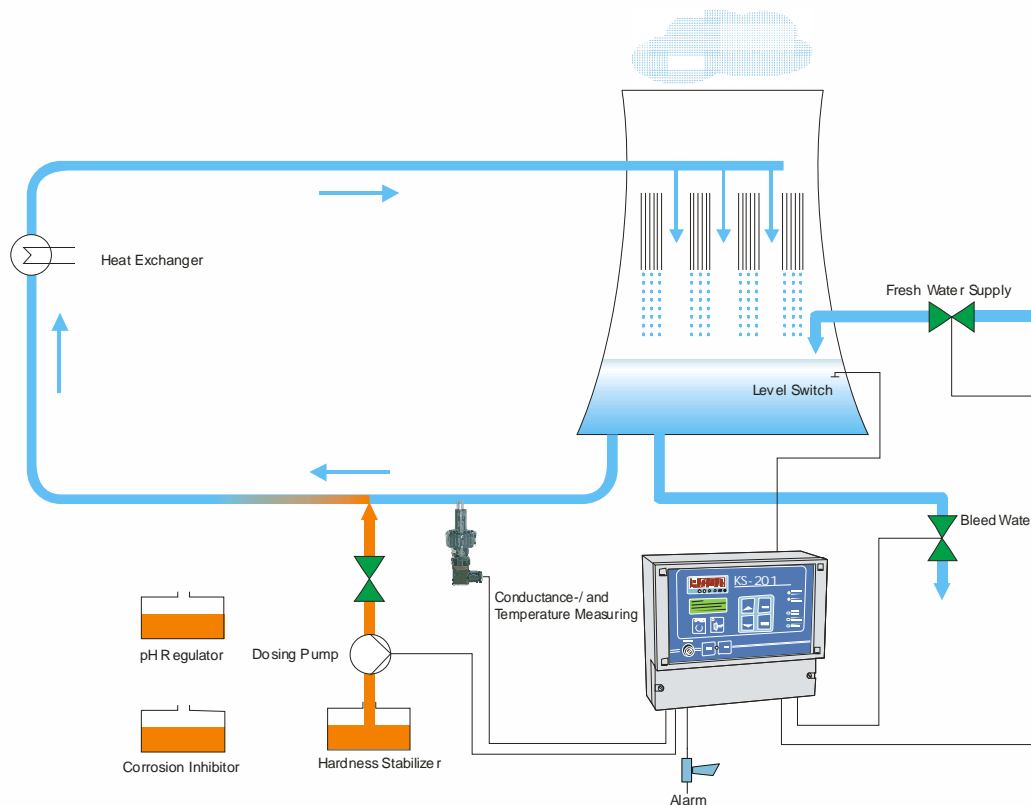
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## 1 General Remarks

The KS-201 optimises the water supply in cooling water circulation systems. With connected level contacts, its control system provides the regulation of the water level and controls reliably the required feeding of water. The KS-201 provides the complete automatic regulation of cooling water concentration by measuring the electrical conductivity and controlling the bleeding off. It captures the feeding and bleeding off volumes. Hardness stabilisers, corrosion protection, and pH regulators can be added in proportion to the given volume. Biocide dosing can be controlled by weekday and time of day or by time interval.

1



### 1.1 Equipment

- Large 7 segment display for the indication of operating values
- 4-line text display for indicating the operating status
- Lasting storage of configuration- / and operating data within internal flash module
- In case of power failure, the clock is buffered for at least 72 hours
- 8 relay outputs, of which 4 with freely choosable function
- Input for monitoring of the water level
- Language of text messages selectable (german or english, others on demand)
- Measuring cards for conductance- or pH-measurement
- Optional communication interface ( RS485 ) e.g. for data exchange with a control room

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-30 -20 -10

10 20 30 40 50 60 70 80 90

Note:

Hints, included in this document, can be identified by its formatting ( here: *general information* ), or by the symbols placed at front of them and have to be observed in relation to their significance.



**Important advice:** If on a circumstance of fundamental relevance or of higher importance shall be pointed out, the symbol of a pointing hand is associated with the bolded text.



**Hazard warning:** The triangular warning symbol is put in front of instructions whose non-observance may lead to hazards or damages.

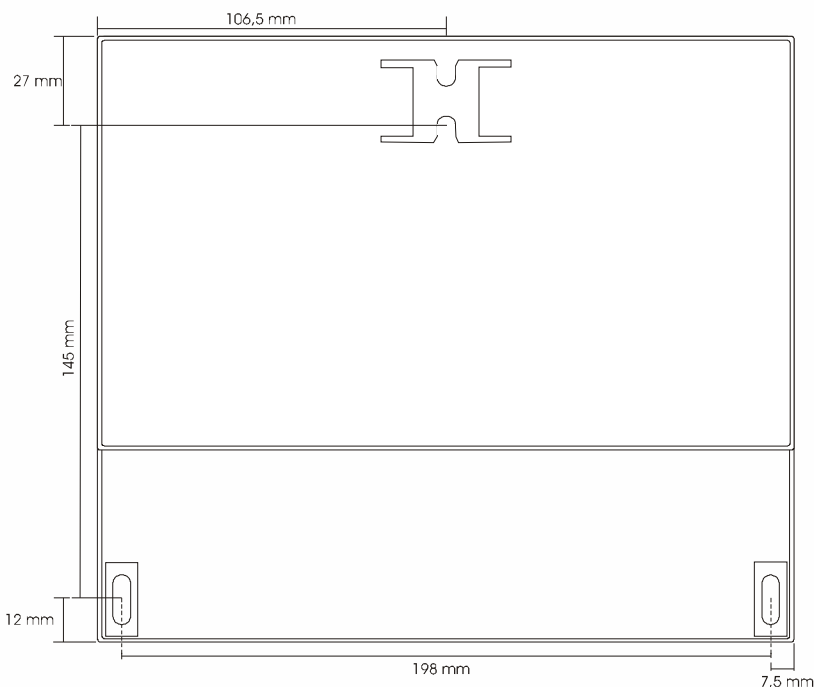
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## 2 Installation

**Mounting and starting up only by well trained professionals  
Connection in accordance to VDE 0160**

### 2.1 Mechanical Installation



### 2.2 Electrical Installation

**Installation and putting into operation only by trained professionals.**

When selecting the cables and electrical connections for the equipment, observe the directives stipulated in VDE 0100 "Directive defining power systems and equipment with nominal voltages lower than 1000 V", VDE 160 "Equipping of power systems with electronic equipment" as well as the appropriate local regulations.

The electrical connection must be carried out only by trained specialist personnel ( VDE 1000 T. 10 ).

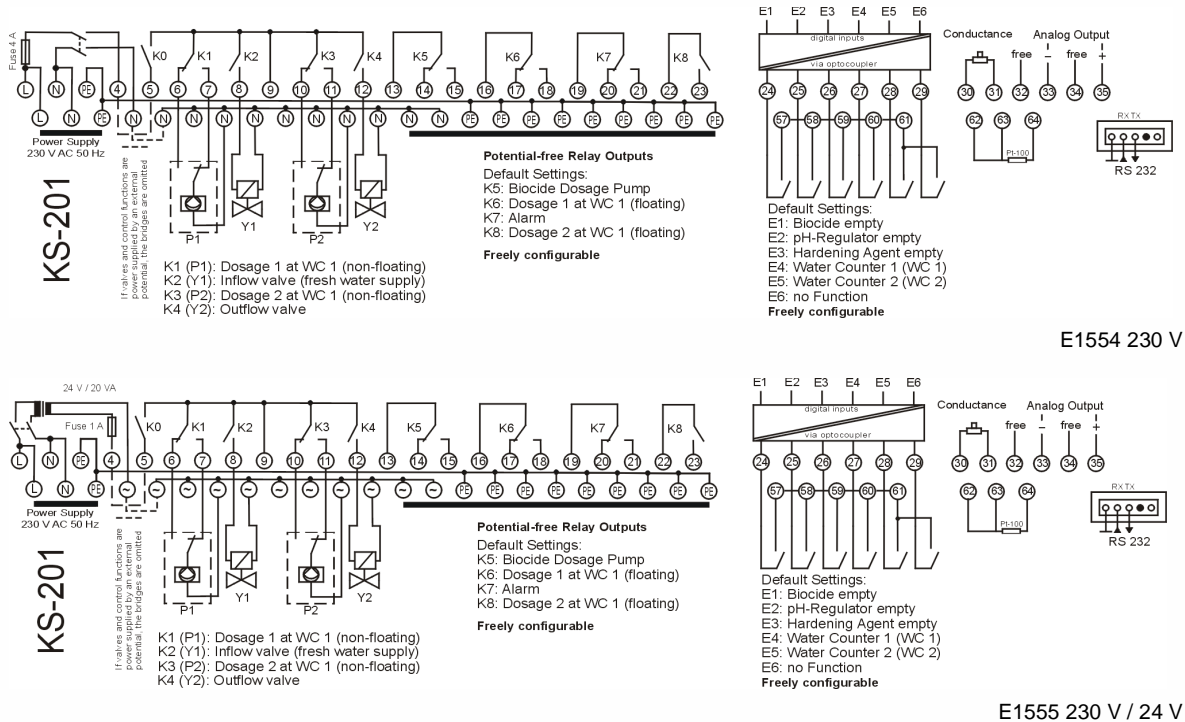
In case of maintenance and installation work, the device must be disconnected from the mains.



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## 2.3 Connection Diagram



**Note:** A valid connection diagram is located within the lid of the respective associated device.

## 2.4 Starting Up

After switching on, some settings have to be made to adapt the cooling water control on to your plant ( see chap. 5 - Configuration of the Device ).

### 2.4.1 Calling up Operation Values / Parameters

By actuating the Enter – key within the operation mode, the display of the device changes over to the selection 'Operation Values' respectively 'Parameters'. The respective menu item is selected using the Up- or Down-key ( see chap. 4 - Operating Concept ), and called up actuating the Enter – key. If the parameter input lock is not activated ( see chap. 2.4.2 – default setting: parameter input lock not activated ), the values to be altered may now be edited, otherwise a prompt appears, requesting the 4-digit PIN code.

### 2.4.2 Parameter Input Lock

Using the parameterisation software 'Geräteverwaltung 2' ( device management GV\_2 ), which is included in the delivery and also available for download on our homepage, a separate parameter input lock can be set for both, the editing of Operation Values and Parameters. This ensures, that only authorised personnel will be able to alter these values. If the Parameter input Lock is activated, a prompt requesting the 4-digit PIN code appears while calling up the respective menu item ( Operation Values or Parameters ). After the respectively assigned PIN is correctly entered, the Operation Values resp. the Parameters can be edited.

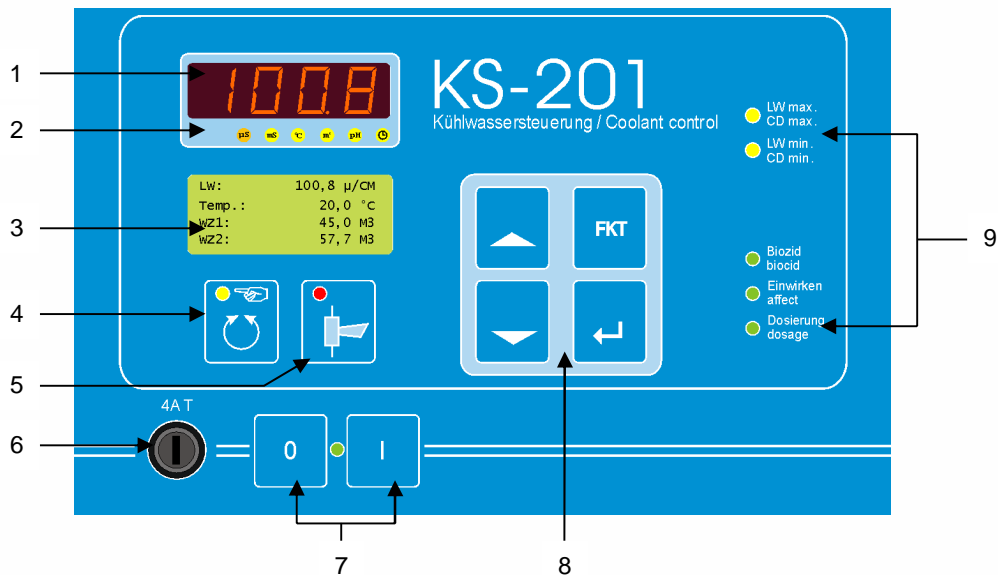


**Note:** If no password or an incorrect PIN is entered, the operating values and parameters will only be displayed, and can not be altered.



### 3 Operation

#### 3.1 Overview of the Display and Operating Elements



- |  |                   |
|--|-------------------|
| 1 7-segment display                      | 6 Device fuse     |
| 2 Units - LEDs for the 7-segment display | 7 On / Off switch |
| 3 LCD display                            | 8 Control panel   |
| 4 Manual / Auto key                      | 9 Status - LEDs   |
| 5 Acknowledgement key                    |                   |

#### 3.2 Function of the keys

		On / Off – switch [ 7 ]	Press the ON – key [ 1 ] to switch on, the OFF – key [ 0 ] to switch off the device.
		Manual / Auto – key [ 4 ]	Switches into -, respectively out of the operating mode MANUAL.
		Acknowledgement – key [ 5 ]	Fault messages are acknowledged by using this key. The contact of the horn relay will be unlocked.
		Up – key [ 8 ]	Scrolling upwards within the menu items. In parametering mode, the input value is increased.
		Down – key [ 8 ]	Scrolling downwards within the menu items. In parametering mode, the input value is decreased.
		Function – key [ 8 ]	In parametering mode, his key [ FKT ] shifts upwards through the menu levels, or cancels entries.

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Enter – key [ 8 ]

Calls up the currently selected menu item ( e.g. 'Operation Values' – ref. to chap. chap. 4 - Operating Concept ) or confirms a carried out input.



*Note:* The Enter – key has to be pressed down for at least 2 seconds to call up the menu item 'Parameters'.

### 3.2.1 Key Combinations



Language switch [ 8 ]

By simultaneously pressing the function- and the up - key, the language on the LCD display is changed.

3

4

### 3.3 LED - Indicators



On / Off – switch [ 7 ] – LED green

Is illuminated, when the device is switched on and the supply voltage is present.



Manual / Auto – key [ 4 ] – LED yellow

Is illuminated, while the control is in MANUAL – operating mode, is off in AUTO – operating mode.



Acknowledgement – key [ 5 ] – LED red

Blinks once per second when a fault has occurred. Is illuminated, when a fault message has been acknowledged, but its cause still is present.



Status – CD max [ 9 ] – LED yellow / red

Is illuminated yellow, when the adjusted upper setpoint of the conductance value is exceeded.

Is illuminated red, when the adjusted upper limit value of the conductance value is exceeded.



Status – CD min [ 9 ] – LED yellow / red

Is illuminated yellow, when the adjusted lower setpoint of the conductance value is undershot.

Is illuminated red, when the adjusted lower limit value of the conductance value is undershot.



Status – biocide [ 9 ] – LED green

Is illuminated green, while the biocide dosage is active.



Status – affecting [ 9 ] – LED green

Is illuminated green, during the reaction time of the biocide dosage.



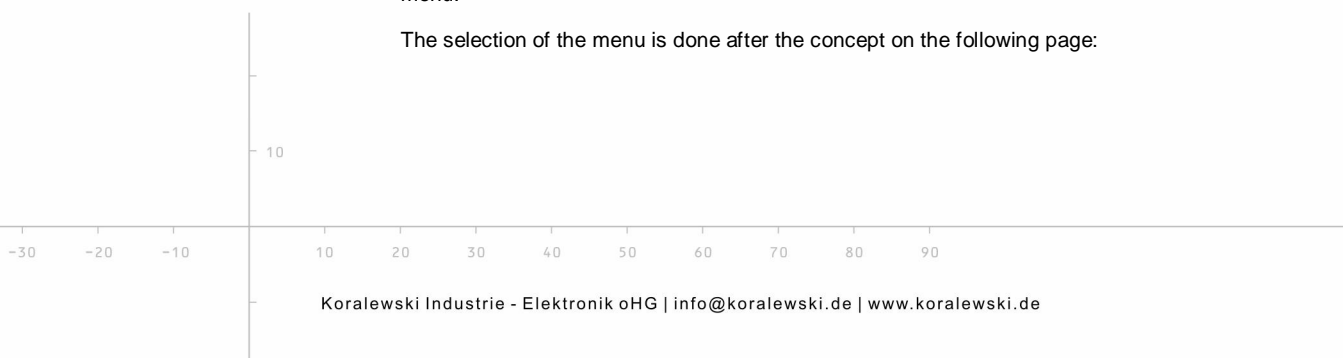
Status – dosage [ 9 ] – LED green

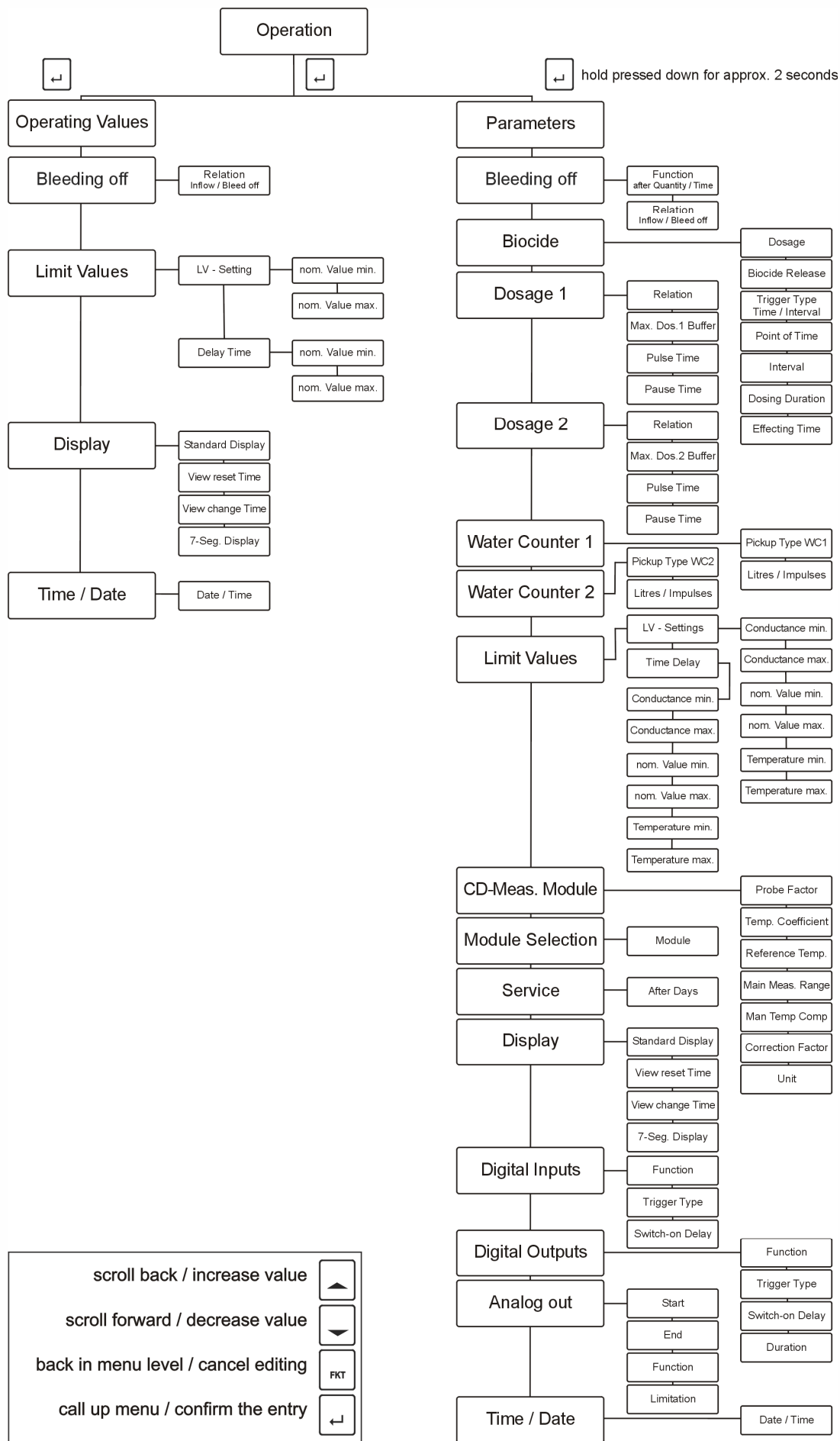
Blinks green in dosing pulse of the biocide-dosage pump, during the dosage.

## 4 Operating Concept

Parameterisation is divided into several levels in menus. The respective parameter items are included within this menus. A parameter / menu, selected by means of the Up- / Down-key, is called up by actuating the Enter – key. Press the FKT – key to exit the respective menu.

The selection of the menu is done after the concept on the following page:









## 5 Configuration of the Device

### 5.1 General Operating Instructions

CD: 123.0  $\mu$ S/CM  
 Temp.: 23.4 °C  
 WC1.: 34.5 M3  
 WC2.: 23.4 M3

After switching on the KS-201, the initialisation of the control is done and a short hint on type and version of the device, as well as on the current language setting is shown on the text display. Then subsequently (if the device is in operative mode) the display changes into outputting the standard display. By actuating the Up - key, several operating values will be shown.

*Note:* The indication of temperature only takes place, if monitoring of the temperature is activated ( see chap. 5.6 - *Limit Values* ) and a temperature sensor is correctly connected.

Parameters  
 scrolling: UP/DOWN  
 Choosing: ENT

Press the Enter - key to switch from the standard display into the setting menus. Within menus, which provide die a multiple selection of sub-menus, the respectively desired item is selected by actuating the Up - resp. the Down - key. By pressing the Enter - key again, the indicated sub-menu is called up. Use the function - key to exit the respective sub-menu.

*Note:* The parameterisation mode is called up by pressing and holding ( approx. 2 seconds ) the Enter - key, if applicable, a password must be emntered ( refer to chap. 2.4.2 ).

Menu item  
 Value  
 1.0 Unit

Actuate the Enter - key within the respective menu item to alter parameterisation values.

If the selected item is a numeric value, the last digit of the parameter which is to be altered, is now blinking ( alternating on dark and light background ). Using the up / down key, the current value is increased respectively decreased. Pressing the Enter - key confirms the new setting. The next digit, which is to be altered, blinks. Analogous to the first done setting of the last digit, all the editable digits of the numeric value can be adjusted one after another. The setting of the value is completed, when - after the last confirming - no digit is flashing any longer. The newly adjusted value is now stored. Exit the menu by means of the FKT - key.

Menu item  
 Choosing  
 Yes

If selection values, e.g. 'yes / no' are to be altered, the last character in the bottom line of the text display is blinking after actuating the Enter - key. Now the value can be altered by pressing th Up- / Down - key. After the setting is confirmed ( Enter - key ), the current value is stored and the flashing stops. Exit the menu by means of the FKT - key.

*Note:* As long as the setting of an individual parameter value is not completed yet ( ie one of the items / characters blinks ), it acn be cancelled at any time by actuating of the FKT - key. The respective parameter value then remains unchanged.

*Please:* If various values are to be altered within the same input menu, such as at the menu 'time' ( minutes / hours ) or on numerical proportion ( confer chap 5.2 - *Bleeding off* ), each of the respectively preceding parameter values is already assumed with the leap to the next parameter.



### 5.2 Bleeding off

Bleeding off  
 Function  
 dep. on Time

In the menu item 'Bleeding off' is set, in which ratio the supply of fresh water and bleeding of shall take place. It is possible to select, whether the opening of the drain valve is controlled dependent on time or on quantity. The parameters set here control the drain valve when the conductance is within the setpoint ( nominal ) limit values ( see chap. 5.6 - *Limit Values* ).

values: dep. on Time / dep. on Quantity

Bleeding off  
 Relation  
 Infl [m3]/Outfl [s]  
 3.0 / 120

With the time control ( ex works setting ) the period is set ( in seconds ) for which the drain valve to remains opened after the preset inflow-quantity is reached.

setting range Inflow-Quantity: 0,0 .... 999,9 m<sup>3</sup>  
 setting range Outflow-Time: 0 .... 9999 s

Bleeding off  
 Relation  
 Infl. - / Outfl. -Quan  
 3.0 / 1.0

If within the menu 'Bleeding off / Function' the option 'dep. on Quantity' is preselected, then bleeding off takes place in the quantitative ratio, which is to define in the related sub-menu.

setting range Inflow- / Outflow-Quantity: 0,0 .... 999,9 / 0,0 .... 999,9 m<sup>3</sup>

*Note:* If one of both values is set to 0, then the bleeding off is not active. In this case, the in- and outflow will only be controlled by means of the setpoint ( nominal ) limit values of the conductance ( refer chap. 5.6 - ).



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## 5.3 Biocide Dosage



**Note: Bleeding off does not take place during the biocide dosage and the Biocide reaction- / affecting-time. The drain valve is closed for this period.**

Bi oci de  
Dosage  
**Yes**

In this menu item the biocide dosage is activated. If the biocide dosage is deactivated in point, none of further settings in the 'Biocide' menu will have any effect.

values: **Yes / No**

*Note:* If both of the described below dosages, 'dep. on Time' and 'dep. on Interval' are deactivated, *no* biocide dosage will take place, even if it is activated in this menu item!

Bi oci de  
Bi oci de Rel ease  
**No**

It is possible to determine, whether an external release is required for the biocide dosage, or not.

values: **Yes / No**



**Note: If the value in menu 'Biocide Release' is set to Yes, then a digital input must be assigned to the function 'release biocide dosage' ( see chap. 6 - Digital Inputs ).**

Bi oci de  
Tri gger Type  
**dep. on TI me**

Here you can select, whether an interval - or clock time - controlled ( ie, at a fixed point of time per day started ) biocide dosage shall take place.

values: **dep. on Time / dep. on Interval**

*Note:* Depending on the trigger type defined in this menu, the settings which are described in the following section under 'Biocide / Point of Time' and 'Biocide / Interval' are used by the KS-201 for the biocide dosage, when it is operating in automatic mode.

Bi oci de  
Poi nt of Ti me  
Start **11: 45 oCl**

To determine the start point for a clock time - controlled biocide dosage, first the time ( hour and minute ) is set in this menu. Using the Up - / Down - key, the subitems in this menu are displayed where it is to define on which days of the week a dosage should take place.

Bi oci d  
Poi nt of Ti me  
Thursday  
**Yes**

settings - time: **hh:mm**; - *weekday*: Monday – Sunday **Yes / No**

*Note:* If the values of all weekdays are set to 'No', no biocide dosage will take place.

Bi oci de  
Interval  
**1 hrs.**

The temporal spacing between two dosages is determined in hours.

setting range: **0 .... 9999** hrs.

*Note:* If this value is set to 0, no 'dependent on Interval' dosage will take place.

Bi oci de  
Dosi ng Durati on  
**7 Mi n.**

The time unit for the adjustable duration of one biocide dosage is predefined in minutes.

setting range: **0 .... 9999** min.

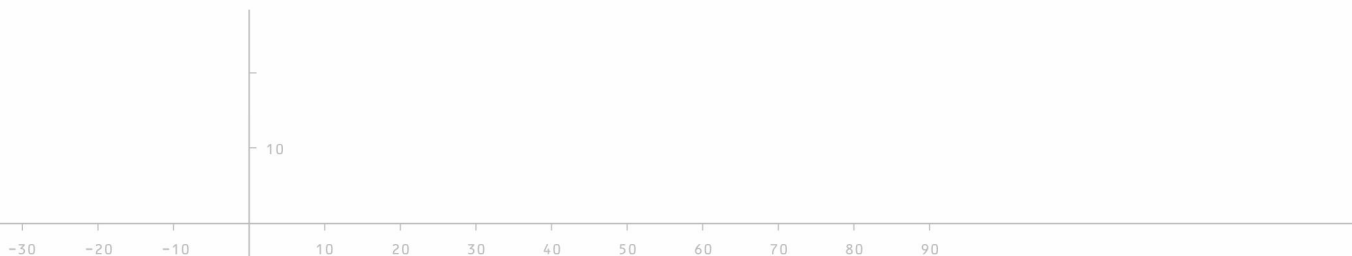
*Note:* If this value is set to 0, *no* biocide dosage will take place.

Bi oci de  
Effecti ng Ti me  
**45 mi n.**

In this menu item, the effecting ( reaction ) time of the biocide is adjusted. After this time has elapsed, the KS-201 switches back again into the normal operating mode.

setting range: **0 .... 9999** min.

*Note:* If this value is set to 0, then the normal operation is started again - immediately after the biocide dosage.





## 5.4 Dosages

For the supplement of additives, such as pH regulator, hardness stabiliser or corrosion protection, two dosing ratios per water counter, ie a total of four dosages, are adjustable in relation to the measured amount of water. The settings are done within the menu items 'Dosage 1' and 'Dosage 2'. The parameter menus for the dosages include each four sub-menus. The adjustment of the values, described in the following, is analogously to accomplish under 'dosage 1' and 'dosage 2'.

Dosage 1  
Relati on  
WC-in / Dos-Imp.  
1 to 10

The adjustment of the ratio of counting pulses from the water counter contact to the respectively dosing pulse can be carried out with reducing or increasing ratio.

setting range: 0 .... 99 to 0 .... 99

Dosage 1  
Max. Dos. 1 Buffer  
30

In the submenu 'Max. Dos.1 Buffer' ( equivalent to 'Max. Dos.2 Buffer' for 'dosage 2' ), the upper limit of dosing quantity is determined.

setting range: 0 .... 9999

Dosage 1  
Pul se time  
0, 5

The time cycles for the dosing pump are adjusted via the the pulse settings:

The Pulse time defines, how long ( *in seconds* ) the signal is present at the dosing pump.

setting range: 0,0 .... 999,9 s

Dosage 1  
Pause time  
0, 5

With the Pause time, the time interval ( *seconds* ) between to signals is adjusted.

setting range: 0,0 .... 999,9 s

Note: If within the dosage settings one of the values from the dosage relation, or the value for the maximum dosage ( Max. Dos.X Puffer ) is set to 0, then the dosage is deactivated.

## 5.5 Water Counter

The KS-201 provides two inputs for contact water meters: 'Water Counter 1' at the 'Input 4' and 'Water Counter 2' at the 'Input 5'. The setting options, here shown on the example of 'Water Counter 1', are analogously available at 'Water Counter 2'.

Water Counter 1  
Pickup Type WC1  
Litres / Impulse

The base, on which the counting pulses of the terminals of 'Water Counter 1' and 'Water Counter 2' and the respectively related quantity of water will be set into relation, is to determine within the submenu 'Pickup Type'. The selection 'Impulses / Litre' permits the setting of a defined number of pulses per liter of water. Accordingly, 'Litres / Impulse' outputs a counting pulse in relation to the adjusted quantity of water.

Water Counter 1  
Li tres / Impul se  
100 l / Imp.

values: **Impulses / Litre** or **Litres / Impulse**

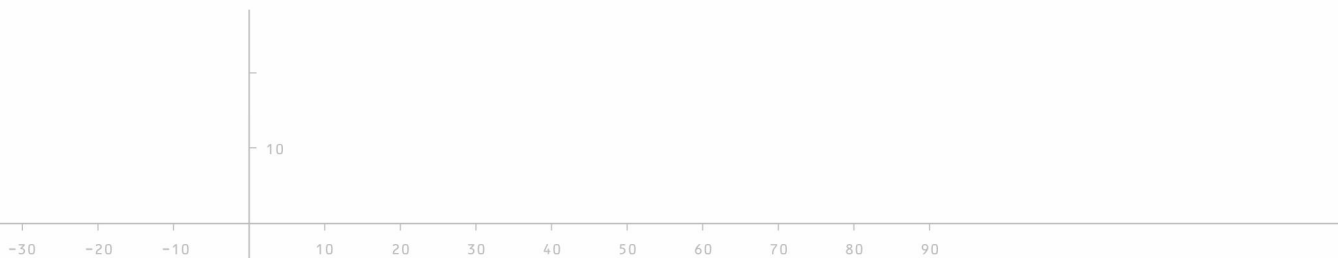
Water Counter 1  
Impul ses / Li tre  
10 Imp. / l

Depending to the pre-selection, which is set within the menu item 'Pickup Type', the assignment of water quantity per counting pulse or the setting of Impulses to be output for one litre arises as the second submenu item.

setting range: 0 .... 9999 l/Imp. resp. 0 .... 9999 Imp./l



Note: If a quantity recording via a water meter shall not take place at input 5, then the unused status indication on the text display ( WC2: ..... 0.0m3 ) can be deactivated by means of the corresponding assignment of function, e.g. '0' - no function, at the digital input ( *see chap. 6 Digital Inputs* ).





## 5.6 Limit Values



**Note: During the biocide dosage as well as the effecting time, the monitoring of the conductance limit values is switched off.**

Limit Values  
Limit Values setting  
Conductance min  
2.0 µS/cm

Under the menu item 'Limit Values' the submenus 'Limit Values setting' and 'switch-on Delay' are located. The selection of the respective value within the submenus is done by scrolling using the Up- / Down- keys.

Limit Values  
Limit Values setting  
Conductance max  
200.0 µS/cm

In this menu items, the setting of the limit values for the conductance is done: When the current measured conductance value exceeds the adjusted limit value of 'Conductance max', or falls below 'Conductance min', the regular operation will be interrupted until the rectification of the fault ( acknowledgment via the Acknowledgment key required). Additionally, an error message is shown on the text-display.

setting range: 0,0 .... 999,9 µS/cm

*Note:* The setting range for the conductance ( Cond. min, Cond. max, nom. Value min and nom. Val. max ) depends on the selected main measuring range ( see chap. 5.7.4 ).

Limit Values  
Limit Values setting  
nomi nal Val ue mi n  
4.0 µS/cm

The nominal values for the conductance, entered in these menu items, affects the bleeding off: When the current measured conductance value exceeds the 'nominal Value max', the drain valve opens, when it falls below nominal Value min', the drain valve closes.

Limit Values  
Limit Values setting  
nomi nal Val ue max  
125.0 µS/cm

setting range: 0,0 .... 999,9 µS/cm

*Note:* If Bleeding Off is activated ( see chap. 5.2 ), the drain valve only operates as per the quantity ratio which is set there, while the conductance remains within the nominal value limits, ie: while the 'nominal Value min' is undershot, the drain valve remains closed, while the 'nominal Value max' is exceeded, the drain valve remains opened.

Limit Values  
Limit Values setting  
Temperature mi n  
2.0 °C

When the current measured temperature falls below or exceeds the adjusted respective value, then an error message is issued.

Limit Values  
Limit Values setting  
Temperature max  
40.0 °C

setting range: 0,0 .... 999,9 °C

Limit Values  
swi tch-on Del ay  
Conductance mi n  
5 s

Analogous to the limit value setting ( refer above ), a delay time in seconds has to be set for each value in the submenu 'switch-on Delay'. This means, that the control only reacts when the limit value is exceeded for the hereby adjusted time ( here exemplified shown for the lower limit value of the conductance: 5 seconds ).

setting range: 0 .... 9999 s

### 5.6.1 Limit Value Settings with pH-Module in place (optionally)

Limit Values  
Limit Values setting  
pH mi n  
4.5 pH

Within these menu items, the adjustment of the limit values for the pH-value is done: When the current measured pH-value exceeds the adjusted value of 'pH max' or falls below of the adjusted value of 'pH min', then an error message is issued.

Limit Values  
Limit Values setting  
pH max  
8.5 pH

Limit Values  
swi tch-on Del ay  
pH mi n  
10 s

The parameterisation of the switch-on delay for the pH-value limits is done analogous to the limit values, as mentioned above.

setting range: 0 .... 9999 s



## 5.7 Conductance – Measuring Module

In this menu, the adjustments for the adaption of the conductance-measurement to the used sensor are carried out.

*Note:* For the conductance measurement we recommend the usage of our 2-electrode-conductivity measuring cell LWS-1 Conductance Probe ( *see chap. 12.1* ).

### 5.7.1 Probe Factor

CD-Measuring Module  
Probe Factor

0.10

Here the probe factor ( aka cell constant ) of the sensor is adjusted. For the respective value to be entered, refer to the documentation of the sensor used.

*setting range: 0,01 / 0,1 / 1,0 / 10*

*Note:* If, for example, a probe with a cell constant of 0,5 is used, then the probe factor of 1,0 and a correction factor of 0,5 ( *see chap. 5.7.6* ) has to be set.

### 5.7.2 Temperature Coefficient

CD-Measuring Module  
Temp. Coefficient

1.0 %/K

With the temperature coefficient which is to set here, the change of conductivity per degree of temperature is stated. If the temperature measurement is connected, a linear temperature compensation takes place.

*setting range: 0,1 .... 10,0*

### 5.7.3 Reference Temperature

CD-Measuring Module  
Reference Temp.

25.0 °C

A reference temperature is prespecified for the temperature compensation. By default preset are here 25 °C.

*setting range: 0,0 .... 999,9 °C*

### 5.7.4 Main Measuring Range

CD-Measuring Module  
Main Meas. Range

3

In this menu item the main measuring range is set. The main measuring range depends on the probe factor and the number of places to be displayed behind the decimal point. For an appropriate range refer to table 'Settings Conductance – Measuring Module' ( *see below* ).

*setting range: 0 .... 3*

### 5.7.5 Manual Temperature Compensation

CD-Measuring Module  
Man. Temp. Comp.

20.0 °C

If no temperature measurement is connected to the control, then the process temperature can be entered here so that conductance measurement can be adapted to the prevailing local conditions.

*setting range: 0,0 .... 999,9 °C*



**Note:** If a temperature sensor is connected, this value is to set on 0.0 °C. A failure of the sensor is then detected as an error and will be indicated in this way. In case of error the osmosis control KS-201 operates with an internal temperature compensation of 25 °C.

If a value others than 0 is set here, the temperature-values will not be displayed and monitoring of the temperature limits will not take place. If in this case a temperature sensor is properly connected the conductance will be continually compensated to the actual temperature.

### 5.7.6 Correction Factor

CD-Measuring Module  
Correction Factor

1.100

The correction factor is used to adapt the conductance to the prevailing local conditions.

*setting range: 0,500 .... 9,000*





## 5.7.7 Unit

CD-Measuring Module  
Unit  
4



In the menu item 'Unit' is to define in which unit the conductance is to be displayed. The unit depends on the set probe factor and the selected measuring range.

setting range: 0 .... 5

**Attention: The selected value has to be balanced with the probe factor and the selected main measuring range ( table: Settings Conductance – Measuring Module )**

### Settings Conductance – Measuring Module

Main Measuring Range with probe factor K=0.01		Unit	Main Measuring Range with probe factor K=0.1		Unit
0	(999,9 µS/cm)	4	0	(9,999 mS/cm)	1
1	(200,0 µS/cm)	4	1	(2,000 mS/cm)	1
2	(50,00 µS/cm)	5	2	(500,0 µS/cm)	4
3	(20,00 µS/cm)	5	3	(200,0 µS/cm)	4
Main Measuring Range with probe factor K=1.0		Unit	Main Measuring Range with probe factor K=10		Unit
0	(99,99 mS/cm)	0	0	(999,9 mS/cm)	2
1	(20,00 mS/cm)	0	1	(200,0 mS/cm)	2
2	(5000 µS/cm)	3	2	(50,00 mS/cm)	0
3	(2000 µS/cm)	3	3	(20,00 mS/cm)	0

5

## 5.8 Module Selection

Module Selection  
Module  
36

Here, the controller can be adapted to different plug-in modules. Currently, the value of 36 for the conductance - Module with 4 ... 20 mA analog output is fixed preset. The usage of alternative measurement modules, which can then be selected at this menu item, is in preparation.

value: 36 ( currently not changeable )

## 5.9 Service

Service  
Information  
scrolling: UP/DOWN  
Choosing: ENT

Actuating the Enter-key, device informations ( designation of device, short designation, manufacturer and firmware version ) are called up. This informations are also displayed during the initialisation of KS-201.

Service  
after Days  
after 0 Days

After elapse of the set time, a service message:request for plant maintenance is displayed.

setting range: after 0 .... 9999 Days

Note: This function is deactivated, if the value is set to 0.

Service  
Reset  
ENTER: OK

Actuating the Enter-key, the counter for the service message is reset manually.

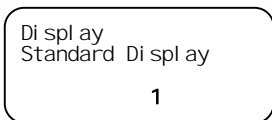
Note: A started reset can be aborted during the reset procedure ( timeout = 5 seconds ) by means of the FKT - key.

10



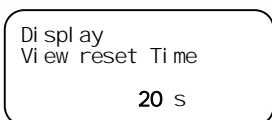
## 5.10 Display View Settings

In this menus, the options for the output indicated on the front plate of the device are set.



This value determines, which view shall be displayed as standard view on the text display ( for example after switching back from another view ).

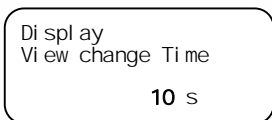
No.	Description
1	Conductance, temperature and total amount at water counter 1 and water counter 2 ( ex-works settings ) are displayed.
2	Date and time are displayed.
3	Consumption for water counter 1 and water counter 2 is indicated.
4	Indicates the operating status of device.



Here is adjusted, after which time, for example after scrolling through the various display contents ( *refer to chap. 5.1* ), the display view shall switch back to the contents, which are determined as standard display.

setting range: 0 .... 200 s

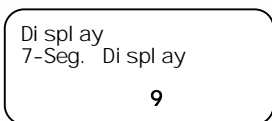
*Note:* This function is deactivated, if the value is set to 0 or a view reset time ( see below ) is adjusted.



If several display views are available to be displayed on the text display, a time interval at which the view is changed can be set here. The view reset time ( see above ) is disabled. The here adjusted value determines the duration for which one view is displayed.

setting range: after 0 .... 100 s

*Note:* The change of display views is deactivated, if the value is set to 0.

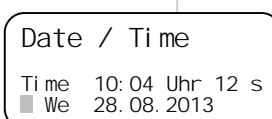


In this menu item is selected, which value shall be indicated at the 7-segment display. The settings are as follows:

No.	Description
0	The display is switched off
1	Temperature
2	Total amount water counter 1
3	Total amount water counter 2
4	Time
5	Conductance in mS/cm with 1 decimal position
6	Conductance in mS/cm with 2 decimal positions
7	Conductance in mS/cm with 3 decimal positions
8	Conductance in mS/cm without decimal position
9	Conductance in µS/cm with 1 decimal position
10	Conductance in µS/cm with 2 decimal positions
11	Conductance in µS/cm with 3 decimal positions
12	Conductance in µS/cm without decimal position

setting range: 0 .... 12

## 5.11 Setting Time and Date



The time and date are set here. Use the enter key, to jump to the appropriate position in the time and date setting.



## 6 Digital Inputs

The configuration of the digital inputs is done in three submenus. Using the Up / Down key switches between the inputs ( incl. associated terminals *KL xx* indicated in the third line of text display ), which are to be set.

Digital Inputs  
Function  
E1 – KL 24  
5

Digital Inputs  
Trigger Type  
E3 – KL 26  
Open Circuit

Digital Inputs  
switch-on Delay  
E5 – KL 28  
6 s

Here the assignment of a function to the respective input is done. Please note, that the functions 254 respectively 255 are only available at input 4 respectively input 5.

*setting range see below: table 'Functions of digital Inputs'*

A switching behaviour ( Trigger Type ) can be assigned to each digital input:  
**values:** **Open Circuit** – The assigned signal is evaluated when the associated contact closes.  
**Closed Circuit** – The assigned signal is evaluated when the associated contact opens, the input is detected as 'not set' while a signal is present.

If a signal which is to be evaluated - as defined with the switching behaviour ( see above ) - is present at the input, then this will be evaluated only after elapse of the preset delay time ( switch-on delay ).

*setting range: after* 0 .... 9999 s

### Functions of digital Inputs:

No.	Function	Description
0	no function	no function assigned
1	Dos.-Reserv. 1 empty ( hardener )	If signal is detected, an error messages takes place
2	Dos.-Reserv. 2 empty ( biocide )	If signal is detected, an error messages takes place
3	Dosage Reservoir 3 empty ( anticorrosive )	If signal is detected, an error messages takes place
4	Dosage Reservoir 4 empty ( pH-regulator )	If signal is detected, an error messages takes place
5	Level full	If signal is detected, the inflow valve closes.
6	Level empty	If signal is detected, the inflow valve opens and fresh water is supplied.
7	free	currently no function assigned
8	Release Biocide Dosage	If biocide release is activated ( refer to chap. 5.3 ), a biocide dosage only takes place, if a signal is detected at the input, which is assigned to this function.
9	Operation stop	If signal is detected, innflow and drain valve closes. If a biocide dosage is pending, then it is switched into the effecting ( reaction ) mode.
254	Water Counter 1	Contact for the water counter 1 ( only input E4 )
255	Water Counter 2	Contact for the water counter 2 ( only input E5 )

6

7

## 7 Digital Outputs

In this menu item the digital outputs 5 up to 8 are configured. Within the submenus, using the Up / Down key switches between the outputs( incl. associated terminals *KL xx* indicated in the third line of text display ), which are to be set.

Digital Outputs  
Funktion  
K5 – KL 13/14/15  
9

Digital Outputs  
Trigger Type  
K6 – KL 16/17/18  
Closed Circuit

Here the assignment of a function to the respective input is done. Please note, that the following settings only can be done for the outputs 5 up to 8!

*setting range see below: table 'Functions of digital Outputs ( 5 – 8 )'*

A switching behaviour ( Trigger Type ) can be assigned to each output:  
**values:** **Open Circuit** – The relay picks up, when the assigned function is active.  
**Closed Circuit** – The relay is permanently picked up. It drops down, when its function is active.





Digital Outputs  
switch-on Delay  
K7 - KL 19/20/21  
1 s

Digital Outputs  
Duration  
K8 - KL 22/23  
9 s

When an event ( e.g. alarm ) occurs, the relay is only accessed after the elapse of the switch-on delay time.

setting range: after 0 .... 9999 s

The duration determines, how long the relay remains accessed.

setting range: 0 .... 9999 s

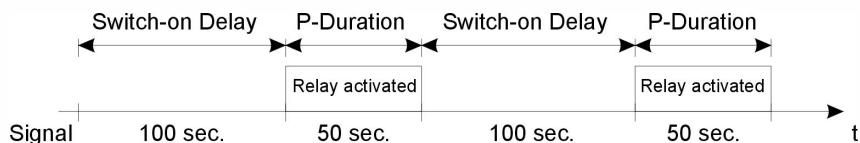
## Functions of the digital Outputs (5 – 8)

No.	Function	Description
0	no function	no function assigned
1	Dosage 1 at Water Counter 1 ( e.g. hardness stabiliser )	With the functions 1 up to 4, the dosing pump is controlled by impulses. The dosage takes place as a function to the respective water counter and the assigned dosing ratio, <i>here</i> : 'Dosage 1' at 'Water Counter 1' ( <i>refer to chap. 5.4 / 5.5</i> ).
2	Dosage 1 at Water Counter 2 ( e.g. pH-regulator )	<i>see above – here</i> : 'Dosage 1' at 'Water Counter 2'.
3	Dosage 2 at Water Counter 1 ( e.g. hardness stabiliser )	<i>see above – here</i> : 'Dosage 2' at 'Water Counter 1'.
4	Dosage 2 at Water Counter 2 ( e.g. pH-regulator )	<i>see above – here</i> : 'Dosage 2' at 'Water Counter 2'.
5	Dosing Pump Biocide	This function accesses the dosing pump by use of impulses. Pulse duration and pause are adjusted by means of duration and switch-on delay of the assigned output. *
6	Inflow Valve	Controlling of the inflow valve, as a function on the level input function ( <i>see chap 6 Digital Inputs</i> ).
7	Drain Valve	Controlling of the drain valve.
8	Alarm	A relay that is configured for alarm, is accessed, when one of the error messages ( <i>see chap. 11</i> ) occurs. If no duration is configured, then the relay remains accessed until the FKT - key is pressed. Where a further error message takes place, while an acknowledged fault is still present, the relay switches again ( new value signalling ).
9 – 14	Input E1-6	If a signal is present at the here assigned input E1-6 ( KI 24-29 ), then the relay ( output ), which is configured with this function, switches after elapse of the adjusted delay:
9	Input E1	Input E1 ( KI 24 )
10	Input E2	Input E2 ( KI 25 )
11	Input E3	Input E3 ( KI 26 )
12	Input E4	Input E4 ( KI 27 )
13	Input E5	Input E5 ( KI 28 )
14	Input E6	Input E6 ( KI 29 )
15	Effecting ( reaction ) Time	The effecting time is active.
16	Biocide Dosage	Biocide dosage respectively effecting time is active.
17	Manual Operation	The relay switches, when the KS-201 operates in manual mode.
18	Automatical Operation	The relay switches, when the KS-201 operates in automatic mode.

\* see below: Schematic of the function biocide dosage



**Schematic of the Function Biocide Dosage ( pulse signal for dosing pumps )**



Pulse frequency and length are determined by means of swith-on delay and pulse duration.

## 8 Analogue Modules

The use of the following analogue modules is provided for the KS-201:

- Conductance module: 1 x input for conductivity with 1 x (0)4 ... 20 mA analogue output
- Conductance module: 1 x input for conductivity ( optionally )
- pH module: 1 x input for pH measurement with 1 x (0)4 ... 20 mA analogue output ( optionally )
- pH module: 1 x input for pH measurement ( optionally )

## 9 Analogue Output

Anal og out  
Start  
0.0  $\mu\text{S/cm}$

Anal og out  
End  
100.0  $\mu\text{S/cm}$

Anal og out  
Functi on  
1

Anal og out  
Li mi tati on  
AUS

The measuring range, in which the current output shal take place, is to determine in the menu items Analog out - Start respectively - End. The values entered here, are corresponding to (0)4 mA for 'Start' and 20 mA for 'End' at the analogue output.

setting range: 0,0 .... 999,9  $\mu\text{S/cm}$

Note: The setting range for the conductance values depends on the adjusted main measuring range ( see chap. 5.7.4 ).

One of four functions can be assigned to the analogue output.

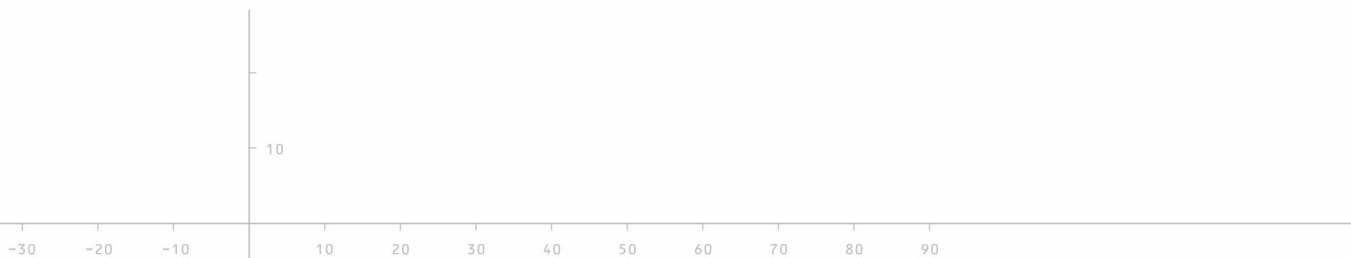
setting range see below: table 'Functions of Analogue Output'

By means of the option 'OFF' in the menu item 'Limitation' it is enabled, that the output of current exceeds 20 mA. This may be used for the evaluation of errors.

values: OFF or at 20 mA

**Functions of Analogue Output:**

No.	Function	Description
0	4 mA	The output emits a fixed value of 4 mA.
1	Conductance	Output of the conductivity via control. The controller can influence the output of the value ( may be used for example for a 'hold-function' → freezing of the output value ).
254	Temperature	Output of temperature values.
255	Conductance	Conductance output, directly from the measuring module. The controller can not influence the output of the value.





## 10 Manual Operation



Operati on  
Manual Swi tchi ng on  
Bi oci de Dosage  
in 3 s

Bi oci de  
Effectuati on  
Term 1 Mi n. 38s

Switching into manual operation is done ba actuating the Manual / Auto – key. The yellow LED lights. Now, the switching between the operating modes biocide dosage, effecting time ( reaction ) and operation is done by means of the Down - key. For this, the Down key must be pressed at least 3 seconds, within the respective mode.

The elapse of the switching procedure is shown in the text display ( see figure left ).

The respective duration of biocide dosage or effecting is indicated on the display, when manual operating mode is active ( see figure left ). When - by pressing the Manual / Auto key again ( LED goes out ) - a switching into automatic operation mode is done while a biocide dosage or effection is still going on, then the dosage, respectively the effecting will be continued using the therefor preadjusted values ( *refer chap. 5.3 - Biocide Dosage* ).



**Attention: In manual operating mode, all monitoring and automatic start / stop - functions are inactive, so that the system must be monitored and controlled by the machine operator!**

## 11 Messages

### 11.1 Faults

\*\*\*\* Faul t! \*\*\*\*  
Conduct. max.  
exceeded

\*\*\*\* Faul t! \*\*\*\*  
Temperature max.  
exceeded

\*\*\*\* Faul t! \*\*\*\*  
pH val ue mi n.  
exceeded

If during the operation one of the measured values exceeds or falls below the preadjusted limit values ( *refer to chap. 5.6* ), then the regular operation is interrupted until the fault is resolved ( acknowledgement with Acknowledgement - key required ) and the fault message which is assigned to the respective event is shown on the text display.

\*\*\*\* Faul t! \*\*\*\*  
Dosage-Tank 1 empty

\*\*\*\* Faul t! \*\*\*\*  
Dosage-Tank 2 empty

\*\*\*\* Faul t! \*\*\*\*  
Dosage-Tank 4 empty

If dosage-medium-tanks are empty, a corresponding fault message is triggered. The following assignments are intended as standard ( *refer chap. 6 - Digital Inputs* ):

Dos.-Tank	Dosage-Medium
1	hardness stailiser
2	biocide
3	anticorrosive
4	pH regulator

*Note:* The fault message 'Dosage-Tank 2 empty' ( biocide ) terminates an active biocide dosage and switches immediately over to 'effecting'.



**Note: Fault messages can be completely reset by pressing of the acknowledgment - key for about 2 seconds. The plant than changes into normal operation again. In this case a renewed fault message is triggered, if a disorder has not been rectified yet.**

### 11.2 Service

\*\*Mai ntenance!  
ri ng up Servi ce

This message is displayed, when the maintenance interval is reached ( *refer chap. 5.9 - Service* ). Operation will **not** be interrupted. The fault message can only be acknowledged by carrying out a 'Service Reset' in the menu item 'Parameters / Service'.

10

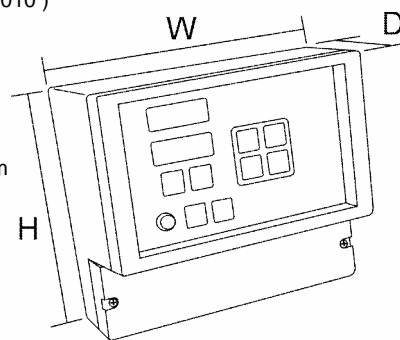
11

## 12 Technical Data



Only properly trained personnel may be deployed for assembly and starting up, connection in compliance with VDE 0160.

<b>Operating Voltage</b>	230 V / 50 Hz ( 10 / + 6 % )
<b>Fuse 230 V Version</b>	4 A slow
<b>Power Consumption</b>	approx. 8 VA ( without external consumers )
<b>Option 24 V Version</b>	24 V AC valve power supply max. 20 VA, fuse 1 A slow
<b>Data Retention following Power Failure</b>	time: min. 72 hours  configuration-, operation- and parameter-data permanently stored in the internal flash memory
<b>Outputs</b>	two phase-assigned change-over contacts ( 230 V AC )  two phase-assigned normally open switches ( 230 V AC )  jointly fused by 4 A slow  three neutral change-over contacts  one neutral normally open switch  relay contact: 230 V AC / A ( AgNi )
<b>Inputs</b>	six inputs via optocoupler  contact load 10 V DC, approx. 8 mA
<b>Analogue Output</b>	one analogue output
<b>Conductance Meas. Range</b>	0 ... 5000 µS/cm
<b>Temperature</b>	PT-100 -20...+120°C, +/- 0,5°C
<b>Optional</b>	pH value measuring module
<b>Climatic Conditions:</b>	according to DIN EN 60204-1 ( 05-2010 )
<b>Ambient Temperature</b>	-20 °C ... +55 °C
<b>in operation</b>	-25 °C ... +55 °C
<b>transport and storage</b>	
<b>Housing</b>	DIN plastic housing for wall installation – IP 54 Dim. W / H / D : 212 x 184 x 94 mm



12

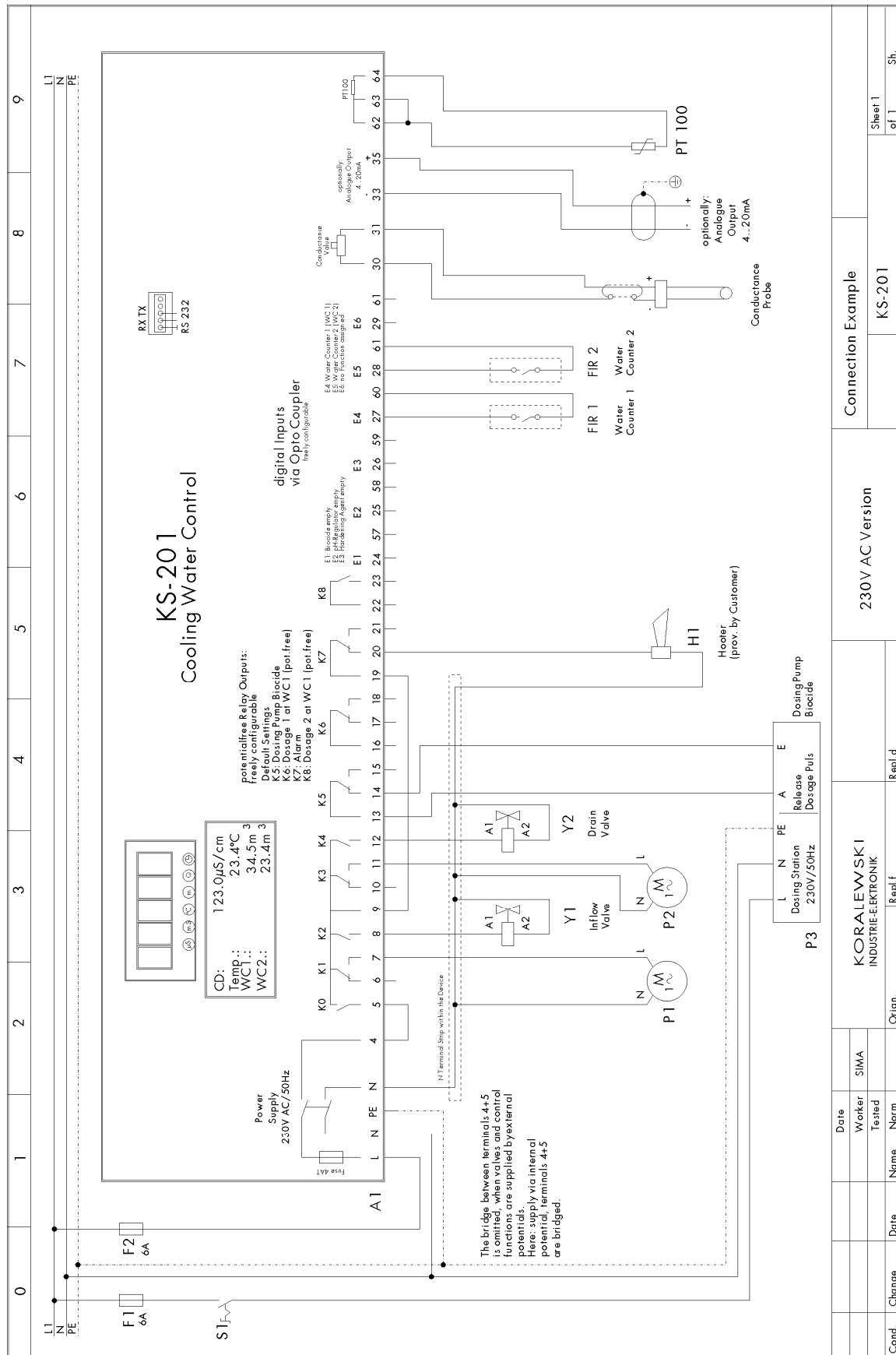
### 12.1 Ordering Information

Cooling Water Control KS-201	Part number
230 V – Version:	E1554
230 V / 24 V – Version:	E1555
Accessories	
Programming cable	KC0034
Conductance Probe LWS-1 PP	E1930
Conductance Probe LWS-1 Pt ( with Pt100 )	E1929
Conductance Probe LWS-1 PV Pt ( with Pt100 )	E1931

10



## 13 Connection Example



Date		SIMA		KORALEWSKI INDUSTRIE-ELEKTRONIK		230V AC Version		Connection Example	
Change	Date	Name	Norm	Tested	Worker	Origin	Repl.f	Repl.d	Sheet 1 of 1
									KS-201
Cond.									Sh.



## 14 Default Settings

Consignment: \_\_\_\_\_ Date: \_\_\_\_\_ Side 1/2

<b>1. Bleeding off</b>	<b>Function</b>	Time dept. <input checked="" type="checkbox"/> <u>or</u> <input type="checkbox"/> Quantity dept.	
	Time controlled	Inflow Quant. / Outfl. Time <b>0,3</b> m <sup>3</sup> / <b>120</b> sec.	
	Quantity controlled	Inflow- / Outflow Quant. <b>0,3</b> m <sup>3</sup> / <b>0,1</b> m <sup>3</sup>	
<b>2. Biocide</b>	<b>Dosage</b>	yes <input checked="" type="checkbox"/> <u>or</u> <input type="checkbox"/> no	
	<b>External Dosage Release</b>	yes <input type="checkbox"/> <u>or</u> <input checked="" type="checkbox"/> no	
	<b>Trigger Type</b>	Time dept. <input checked="" type="checkbox"/> <u>or</u> <input type="checkbox"/> Interval dept.	
	<b>Point of Time</b>	Start <b>23:00</b> Uhr	
	<b>Weekday</b>	<input type="checkbox"/> Mo. <input type="checkbox"/> Tu. <input type="checkbox"/> We. <input type="checkbox"/> Th. <input type="checkbox"/> Fr. <input checked="" type="checkbox"/> Sa. <input type="checkbox"/> Su.	
	<b>Interval</b>	_____ hrs.	
	<b>Dosage Duration</b>	<b>15</b> min.	
	<b>Effecting (Reaction) Time</b>	<b>180</b> min.	
<b>3. Dosierung 1</b>	<b>Dosage activated</b>	yes <input checked="" type="checkbox"/> <u>or</u> <input type="checkbox"/> no	
	<b>Verhältnis</b>	WC in / Dos-Imp: <b>1</b> to <b>5</b>	
	<b>Max. Dos. 1 Buffer</b>	Amount <b>5</b>	
	<b>Pulse Duration</b>	<b>0,5</b> sec.	
	<b>Pause Duration</b>	<b>0,5</b> sec.	
<b>4. Dosierung 2</b>	<b>Dosage activated</b>	yes <input checked="" type="checkbox"/> <u>or</u> <input type="checkbox"/> no	
	<b>Relation</b>	WC in / Dos-Imp: <b>1</b> to <b>3</b>	
	<b>Max. Dos. 2 Buffer</b>	Amount <b>5</b>	
	<b>Pulse Duration</b>	<b>0,5</b> sec.	
	<b>Pause Duration</b>	<b>0,5</b> sec.	
<b>5. Water Counter 1</b>	<b>Type of Transducer</b>	Litres / Impulse <input checked="" type="checkbox"/> <u>or</u> <input type="checkbox"/> Impulses / Litre	
	<b>adjusted Value</b>	<b>100</b> Litres <u>or</u> Impulses	
<b>6. Water Counter 2</b>	<b>Type of Transducer</b>	Litres / Impulse <input checked="" type="checkbox"/> <u>or</u> <input type="checkbox"/> Impulses / Litre	
	<b>adjusted Value</b>	<b>100</b> Litres <u>or</u> Impulses	
<b>7. Limit Values</b>	<b>Designation</b>	<b>Setting</b>	<b>Switch-on Delay</b>
	Conductance min.	<b>500</b> µS/cm	<b>10</b> sec.
	Conductance max.	<b>2000</b> µS/cm	<b>10</b> sec.
	Nominal Value min.	<b>1500</b> µS/cm	<b>10</b> sec.
	Nominal Value max.	<b>1800</b> µS/cm	<b>10</b> sec.
	Temperature min.	<b>6</b> °C	<b>600</b> sec.
	Temperature max.	<b>35</b> °C	<b>600</b> sec.



Consignment: \_\_\_\_\_ Date: \_\_\_\_\_ Side 2/2

<b>8. CD Measuring Module</b>	<b>Probe Factor</b>	Value:	<b>1.0</b>
	<b>Temperature Coefficient</b>	Value:	<b>2.0</b> % K
	<b>Reference Temperature</b>		<b>25</b> °C
	<b>Main Measuring Range</b>		<b>3</b> ( 0 - 2000 µS/cm )
	<b>Manual Temperature Compensation</b>		<b>23</b> °C
	<b>Correction Factor</b>	Value:	<b>1</b>
	<b>displayed Unit</b>	Unit:	<b>3</b> ( µS/cm )
<b>9. Module Selection</b>	<b>Module</b>		<b>36</b> ( fixed preset )
<b>10. Service</b>	<b>after Days</b>	after	<b>0</b> Days
<b>11. Display Settings</b>	<b>Standard Display</b>		<b>1</b> ( Summary )
	<b>View reset Time</b>		<b>20</b> sec.
	<b>View change Time</b>		<b>0</b> sec.
	<b>7-Segment - Display</b>	<b>12</b>	( µS/cm without Decimals )

12. Inputs	Input No.	Function No. Description	Switching Behaviour	Switching Delay
digital	E1	2 Biocide empty	open - <input checked="" type="checkbox"/> or closed circuit <input type="checkbox"/>	0 sec.
	E2	4 pH Regulator empty	open - <input checked="" type="checkbox"/> or closed circuit <input type="checkbox"/>	0 sec.
	E3	1 Härtestabilisator leer	open - <input checked="" type="checkbox"/> or closed circuit <input type="checkbox"/>	0 sec.
	E4	254 Water Counter 1	open - <input checked="" type="checkbox"/> or closed circuit <input type="checkbox"/>	0 sec.
	E5	255 Water Counter 2	open - <input checked="" type="checkbox"/> or closed circuit <input type="checkbox"/>	0 sec.
	E6	0 no Function assigned	open - <input checked="" type="checkbox"/> or closed circuit <input type="checkbox"/>	0 sec.

13. Outputs	Output No.	Function No. Description	Switching Behaviour	Switching Delay	Duration
digital	K5	5 Biocide Dosage	open - <input checked="" type="checkbox"/> or closed circuit <input type="checkbox"/>	1 sec.	1 sec.
	K6	1 Dosage 1 at WC 1	open - <input checked="" type="checkbox"/> or closed circuit <input type="checkbox"/>	0 sec.	0 sec.
	K7	8 Fault / Alarm	open - <input checked="" type="checkbox"/> or closed circuit <input type="checkbox"/>	0 sec.	0 sec.
	K8	3 Dosage 2 at WC 1	open - <input checked="" type="checkbox"/> or closed circuit <input type="checkbox"/>	0 sec.	0 sec.

<b>analogue</b>	<b>Function No.</b>	<b>1</b>	<b>Conductance via Controller</b>
	<b>Start Value:</b>	<b>0</b> µS/cm	<b>End Value:</b> <b>2000</b> µS/cm
	<b>Limitation of analogue Value</b>		OFF <input checked="" type="checkbox"/> / at max. 20 mA <input type="checkbox"/>





## 15 Form for Configuration and Parameter Settings

Consignment: \_\_\_\_\_ Date: \_\_\_\_\_ Side 1/2

<b>1. Bleeding off</b>	<b>Function</b>	Time dept. <input type="checkbox"/>	<i>or</i>	<input type="checkbox"/> Quantity dept.
	<b>Time controlled</b>	Inflow Quant. / Outfl. Time	_____ m <sup>3</sup> /	_____ sec.
	<b>Quantity controlled</b>	Inflow- / Outflow Quant.	_____ m <sup>3</sup> /	_____ m <sup>3</sup>

<b>2. Biocide</b>	<b>Dosage</b>	yes <input type="checkbox"/>	<i>or</i>	<input type="checkbox"/> no
	<b>External Dosage Release</b>	yes <input type="checkbox"/>	<i>or</i>	<input type="checkbox"/> no
	<b>Trigger Type</b>	Time dept. <input type="checkbox"/>	<i>or</i>	<input type="checkbox"/> Interval dept.
	<b>Point of Time</b>	Start _____	o'Clock	
	<b>Weekday</b>	<input type="checkbox"/> Mo. <input type="checkbox"/> Tu. <input type="checkbox"/> We. <input type="checkbox"/> Th. <input type="checkbox"/> Fr. <input type="checkbox"/> Sa. <input type="checkbox"/> Su.		
	<b>Interval</b>	_____	hrs.	
	<b>Dosage Duration</b>	_____	min.	
	<b>Effecting (Reaction) Time</b>	_____	min.	

<b>3. Dosage 1</b>	<b>Dosage activated</b>	yes <input type="checkbox"/>	<i>or</i>	<input type="checkbox"/> no
	<b>Relation</b>	WC in / Dos-Imp _____	to	_____
	<b>Max. Dos. 1 Buffer</b>	Amount _____		
	<b>Pulse Duration</b>	_____	sec.	
	<b>Pause Duration</b>	_____	sec.	

<b>4. Dosage 2</b>	<b>Dosage activated</b>	yes <input type="checkbox"/>	<i>or</i>	<input type="checkbox"/> no
	<b>Relation</b>	WC in / Dos-Imp _____	to	_____
	<b>Max. Dos. 2 Buffer</b>	Amount _____		
	<b>Pulse Duration</b>	_____	sec.	
	<b>Pause Duration</b>	_____	sec.	

<b>5. Water Counter 1</b>	<b>Type of Transducer</b>	Litres / Impulse <input type="checkbox"/>	<i>or</i>	<input type="checkbox"/> Impulses / Litre
	<b>adjusted Value</b>	_____ Litres	<i>or</i>	Impulses

<b>6. Water Counter 2</b>	<b>Type of Transducer</b>	Litres / Impulse <input type="checkbox"/>	<i>or</i>	<input type="checkbox"/> Impulses / Litre
	<b>adjusted Value</b>	_____ Litres	<i>or</i>	Impulses

7. Limit Values	Designation	Setting	Switch-on Delay
	Conductance min.	_____ µScm	_____ sec.
	Conductance max.	_____ µScm	_____ sec.
	Nominal Value min.	_____ µScm	_____ sec.
	Nominal Value max.	_____ µScm	_____ sec.
	Temperature min.	_____ °C	_____ sec.
	Temperature max.	_____ °C	_____ sec.





Consignment: \_\_\_\_\_ Date: \_\_\_\_\_ Side 2/2

<b>8. CD Measuring Module</b>	<b>Probe Factor</b>	Value: _____
	<b>Temperature Coefficient</b>	Value: _____
	<b>Reference Temperature</b>	_____ °C
	<b>Main Measuring Range</b>	_____
	<b>Manual Temperature Compensation</b>	_____ °C
	<b>Correction Factor</b>	Value: _____
	<b>displayed Unit</b>	Unit: _____
<b>9. Module Selection</b>	<b>Module</b>	_____
<b>10. Service</b>	<b>after Days</b>	after _____ Days
<b>11. Display Settings</b>	<b>Standard Display</b>	_____
	<b>View reset Time</b>	_____ sec.
	<b>View change Time</b>	_____ sec.
	<b>7-Segment - Display</b>	_____

12. Inputs	Input No.	Function No. Description	Switching Behaviour	Switching Delay
digital	E1	_____	open - <input type="checkbox"/> <i>or</i> closed circuit <input type="checkbox"/>	_____ sec.
	E2	_____	open - <input type="checkbox"/> <i>or</i> closed circuit <input type="checkbox"/>	_____ sec.
	E3	_____	open - <input type="checkbox"/> <i>or</i> closed circuit <input type="checkbox"/>	_____ sec.
	E4	_____	open - <input type="checkbox"/> <i>or</i> closed circuit <input type="checkbox"/>	_____ sec.
	E5	_____	open - <input type="checkbox"/> <i>or</i> closed circuit <input type="checkbox"/>	_____ sec.
	E6	_____	open - <input type="checkbox"/> <i>or</i> closed circuit <input type="checkbox"/>	_____ sec.

13. Outputs	Output No.	Function No. Description	Switching Behaviour	Switching Delay	Duration
digital	K5	_____	open - <input type="checkbox"/> <i>or</i> closed circuit <input type="checkbox"/>	_____ sec.	_____ sec.
	K6	_____	open - <input type="checkbox"/> <i>or</i> closed circuit <input type="checkbox"/>	_____ sec.	_____ sec.
	K7	_____	open - <input type="checkbox"/> <i>or</i> closed circuit <input type="checkbox"/>	_____ sec.	_____ sec.
	K8	_____	open - <input type="checkbox"/> <i>or</i> closed circuit <input type="checkbox"/>	_____ sec.	_____ sec.

<b>analogue</b>	<b>Function No.</b>	_____
	<b>Start Value:</b>	_____
	<b>End Value:</b>	_____
	<b>Limitation of analogue Value</b>	OFF <input type="checkbox"/> / at max. 20 mA <input type="checkbox"/>

