KORALEWSKI
INDUSTRIE - ELEKTRONIK

Osmosis Control OS-201

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1 General Remarks

The Osmosis Control OS-201 is used for automatic monitoring and control of a water-desalination plant on the principle of reverse osmosis. Basically, the OS-201 is available in two different versions:

- direct power supply of the valves via the voltage supply of the device, e.g.:
  OS-201 / 230 V (order code: E1328 or E1639);
- power supply of the valves by means of a separate 24 V voltage supply, e.g.:
  OS-201 / 230 V / 24 V (order code: E1329 or E1640).

In its standard version the device is equipped with a measuring module for conductance measurement with temperature measurement. Optionally the OS-201 Osmosis Control is also available with conductance measuring module with an (0)4 ... 20 mA analogue output.

1.1 Please Note

Note: The within this document contained notes will be indicated by their format (this: *general note*) and leading symbols. These notes have to be observed according to their importance.

***Important Note*: if a fact of fundamental meaning or greater importance shall be referred, the symbol of a pointing hand is assigned to the bold formatted text.**

***Hazard Note*: The triangular warning symbol indicates a note which, if not complied, to hazards or damage may result.**

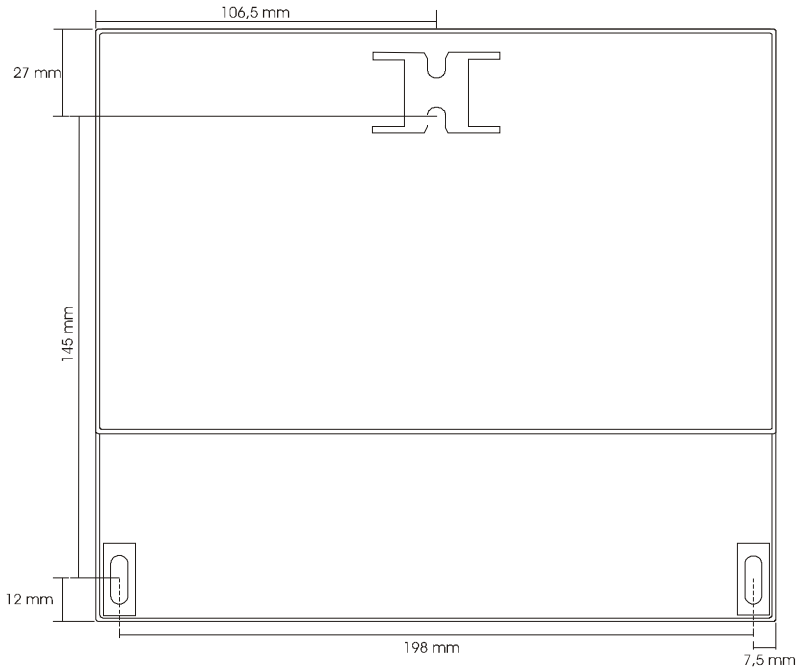
1.2 Equipment

- Large 7-segment display indicating the operating values;
- 4-line text display indicating the operating states;
- Permanent storage of the configuration and operating data in an internal flash memory;
- The time is buffered for at least 72 hours in the event of a power failure;
- 6 inputs which are freely configurable with predefined functions;
- 8 relay outputs, 4 of which are freely configurable with predefined functions;
- Optional (0)4 ... 20 mA analog output ;
- Selectable language for the text messages (german or english, others upon request);
- Interface for connection to a PC. The supplied program ensures that all configuration data can be set in a simple manner;
- Conductance measurement with temperature measurement;
- Optional second conductance input as 4...20 mA input;
- Optional communications interface (RS 485), e.g. for data exchange with a control room;

2 Installation

2.1 Mechanical Installation

Mounting dimensions:



2.2 Electrical Installation

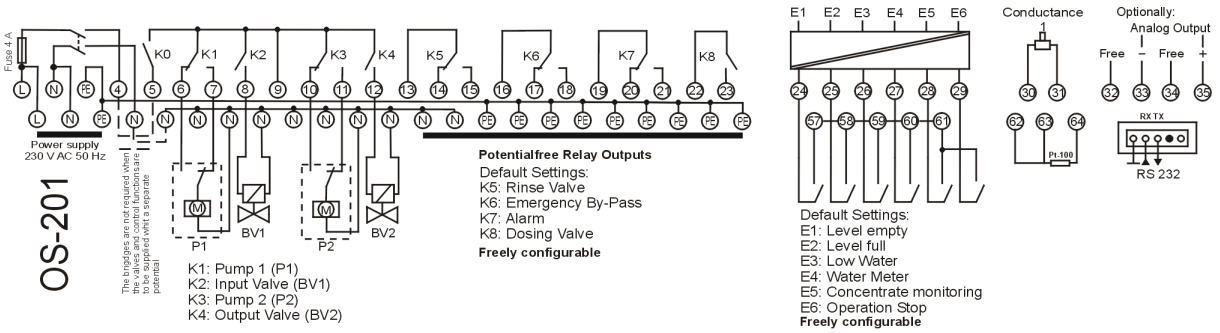
Only trained personnel are authorised to assemble and start up the device.

When selecting the cables and completing the electrical connections of the device, ensure that the regulations of VDE 0100 'Stipulations governing the construction of a power installation with rated voltages of less than 1000 V', VDE 0160 'Equipping power installations with electronic facilities', as well as the respective national regulations, are observed.

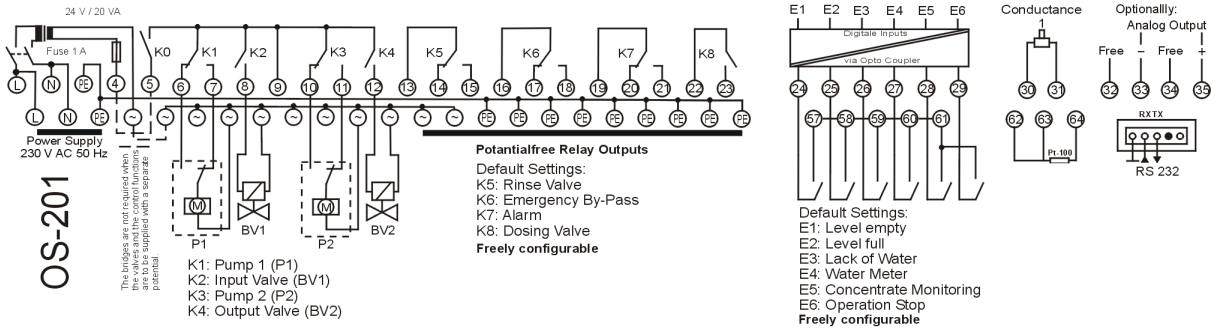
The electrical connection may only be completed by correspondingly trained skilled personnel (VDE 1000 T. 10).

The device must always be disconnected from the mains for maintenance and repair.

2.2.1 Connection Diagrams



E1328 / E1639 – 230 V

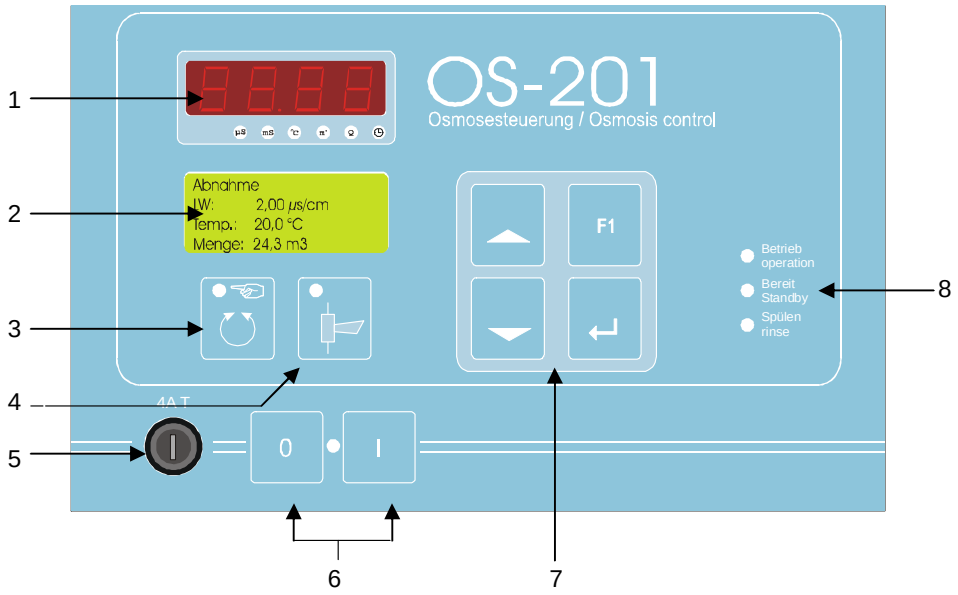


E1329 / E1640 - 230 V / 24 V

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

3 Operation

3.1 Overview of the Display and Operating Elements



1	**7-segment display**	**5**	**Device fuse**
2	**LCD Display**	**6**	**On / Off Switch**
3	**Manual / Auto key**	**7**	**Control Panel**
4	**Acknowledgement key**	**8**	**Status – LED display of osmosis plant**

3.1.1 The LED – Indicators

On / Off – Switch
[6] – LED green

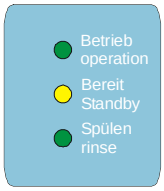
Remains continuously illuminated while device is switched on and power is supplied.

Manual / Auto – key
[3] – LED yellow

Remains continuously illuminated while the control is in MANUAL mode.
Is OFF while the control is in AUTO mode.

Acknowledgement – key
[4] – LED rot

Flashes in a seconds cycle when there is a fault.
Remains illuminated when a fault has been acknowledged but the cause still exists.



Status – Display [8]
I. – LED green

Remains continuously illuminated while osmosis is operating, i.e. acceptance is running.

II. – LED yellow

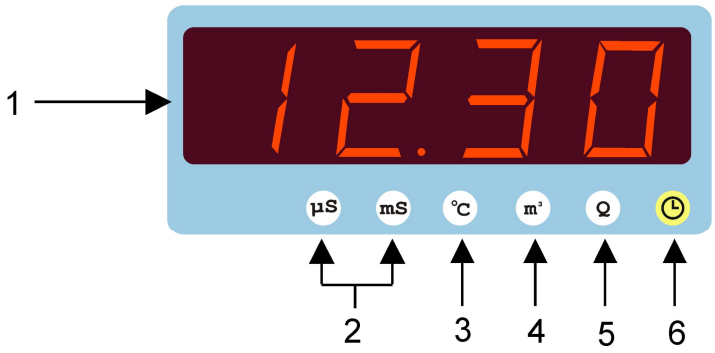
Remains continuously illuminated while osmosis is in standby, i.e. osmosis awaits a new request.

III. – LED green

Remains continuously illuminated while osmosis is in rinse mode, i.e. osmosis is in 'Rinse after Operation' or 'Interval Rinse' mode.

3.2 The 7 - Segment Display

The background - illuminated symbols below the 7-segment display indicate the given measuring range or display mode:



1 Displays the current value (*for details see chap. 3.2*)

2 Unit when displaying the conductivity value (*only with conductance measurement*)

3 Indicates the temperature in °C that is associated with conductance measurement

4 Indicates the amount of water in m³ during an operating cycle

5 Indicates the entire flow quantity in m^3

6 Indicates the actual time or the operating time

3.3 The LCD Display

The LCD display indicates the operating states (operation mode) and the parameters (configuration mode).

3.3.1 In Operating Mode

```
Acceptance
CD:          5.0 µS/cm
Temp.:        19.0 °C
Quantity:   109.0 m3
```

Example: Display in operating mode: Line 1: Plant status; Line 2: Current conductance; Line 3: Current water temperature (with connected temperature measurement); Line 4: Flow quantity.

The following messages can be shown on the display:

- the amount of flowed water during this operating cycle (the quantity metered depends on where the water meter contact was installed in the plant);
- meters the total amount of water since the last quantity RESET (the quantity metered depends on where the water meter contact was installed in the plant);
- current conductance value;
- current water temperature;
- operating time of the pumps;
- time and date;

3.3.2 In Parameter Mode

The entry image of a menu position is as follows:

```
Pumps
Mode
scrolling: UP/DOWN
Choosing:  ENT
```

Actuate the Enter key to transfer to the sub-position of this menu.

```
Pumps
Mode

one Pump
```

In parameter mode the given parameter menu position is shown in the 1st line, while the 2nd line shows the parameter to change. The 4th line shows the adjustable value or selection. The parameterisation is activated with Enter-key. This is indicated by a blinking cursor on, resp. aside of the modifiable value.

3.4 Function of the Keys

	ON – key	The device is switched on with this key.
	OFF – key	The device is switched off with this key.
	Manual – key	Manual mode is switched ON and OFF with this key.
	Acknowledgement - key	Faults are acknowledged with this key and the alarm horn relay is once again cleared.
	Upward – key [UP]	Used in displaying Menus, this key scrolls upwards through the displayed pages. In Configuration of parameters, this key is used to scroll upwards or increase the input values.
	Downward – key [DOWN]	Used in displaying Menus, this key scrolls downwards through the displayed pages. In Configuration of parameters, this key is used to scroll downwards or decrease the input values.
	Function – key	When in Parameter mode this key will change one level upwards or cancel an input.
	Enter – key [ENT]	This key is used to call up the currently selected menu item (*e.g. 'Operation Values' – ref. to chap. 3.5 Operating Concept*) or to confirm input.
		*Note*: The Enter – key has to be pressed down for at least 2 seconds to call up the menu item 'Parameters'.

3.4.1 Key Combinations

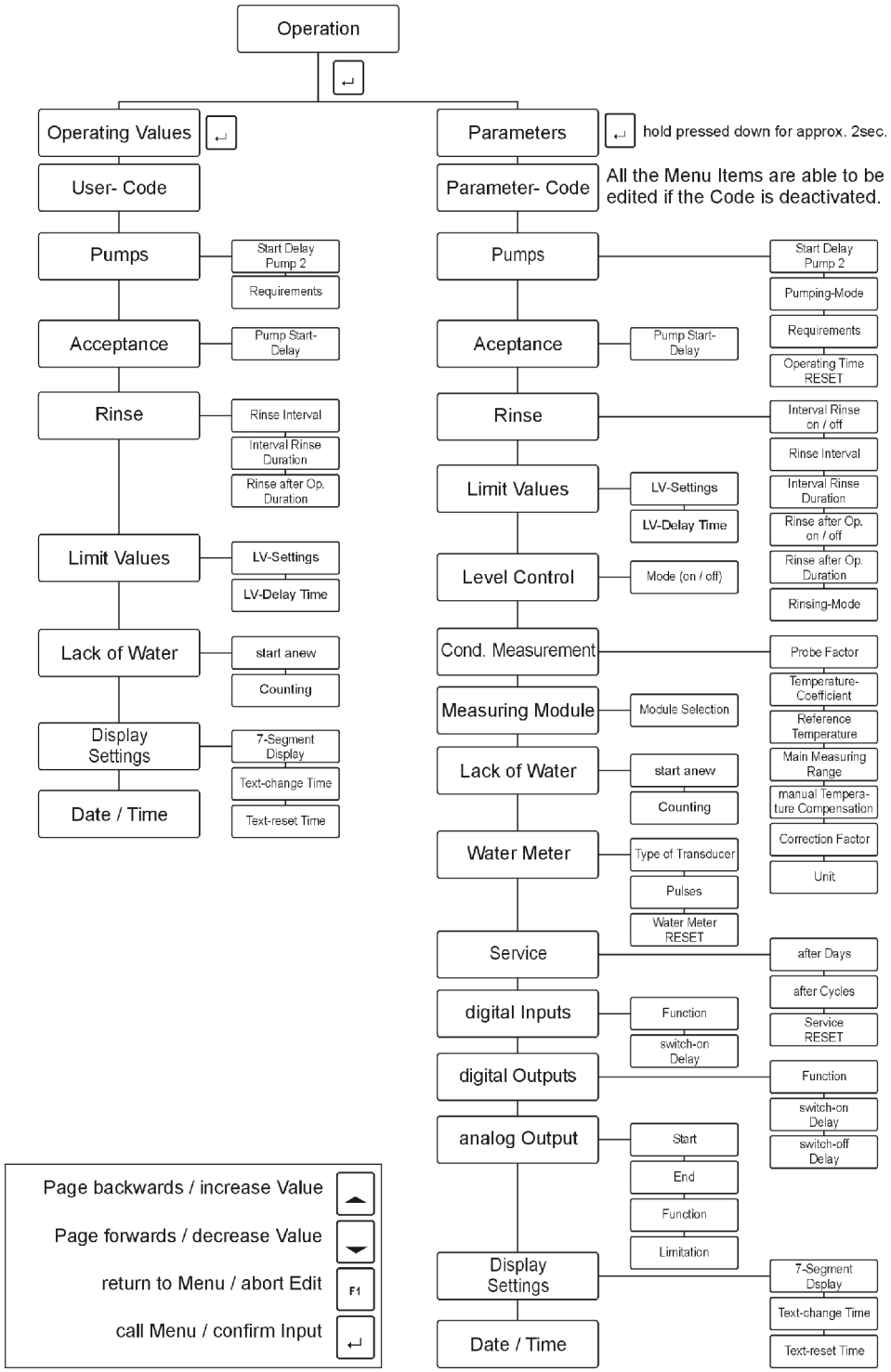
	Change languages	Change the language by pressing the Function – and the Upward – key simultaneously.

3.5 Operating Concept

Parameter configuration is subdivided into several configuration menus which contain the respective parameter points. The parameter points can be reached by pressing the Enter key when in a menu; to leave the menu press the F1 key.

***Note*: Not all parameters can be set via the manual input of the device. The entire parameter extent can only be edited with the configuration software 'Gerätever-waltung 2' (Device Manager 2).**

The menus are selected according to the operating concept illustrated below:



3.5.1 Editing Parameters

After having selected a parameter point where you intend to change a value, you can proceed in the following manner:

- Press Enter key → The last figure in the line flashes;
- Set the value with the arrow keys;
- 'Enter' initiates jump to next figure;

After all figures have been changed, or the last figure that can be edited has been accepted with 'Enter', all values are stored. If editing is prematurely terminated with the F1 key, then the previous value remains unchanged.

Exit from the parameter point with the F1 key initiates advance to the next parameter point.

Note: If parameter input has not yet been initiated, then the given parameter point can be immediately left with the F1-key, to advance to the next parameter point - without changing the parameter. Not all parameters can be set with the manual input of the device.

4 Starting Up

After switching on, some settings have to be made to adapt the control to your osmosis plant if the default settings do not apply to your plant.

Some settings may manually be entered at the device. A faster and more convenient input is possible with the supplied parameterisation software 'Geräteverwaltung 2' (device manager 2). This software is, in ist latest version also available as download at our homepage www.koralewski.de.

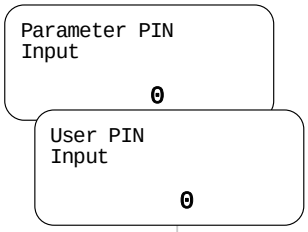
Note: For editing of parameters by means of the parameterisation software 'Geräteverwaltung 2' (device manager 2), the serial interface of the OS-201 osmosis control (*RS 232, see:* '*Connection Diagrams*' – *chap. 2.2.1*) is to connect to the COM – interface of the PC - system, which is intended for parameterisation, using the programming cable (*not included in delivery!*).

4.1 Configure Parameters with the Device

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. 3.5 - Operating Concept*), and called up actuating the Enter – key. If the parameter input lock is not activated (*default setting - see below*), the values to be altered may now be edited, otherwise a prompt appears, requesting the 4-digit PIN code.

4.1.1 Parameter Input Lock

Using the parameterisation software 'Geräteverwaltung 2' (device managagement 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.

Similarly, for the users access to the operating values (*see chap. 5 Operating Value Settings*) a separate PIN-code (User - PIN) is used if password lock is activated.

Setting range for PIN - Codes: **0 .... 9999**

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

The following describes the setting possibilities for the OS-201.

4.1.2 Pumps

```
Pumps

scrolling: UP/DOWN
Choosing:  ENT
```

All necessary settings for the operation of the pumps are made in 'Pumps' menu. A maximum of two osmosis pumps can be selected.

Transfer with Enter key from 'Pumps' menu item to the sub items of the given menu.

4.1.2.1 Pumps Delay Time

```
Pumps
Start delay pump 2

Duration:   10 s
```

If 'Two pumps: Series' is selected, then the delay time is adjusted, then the delay time by which the P2 pump starts to operate is set here.

Setting range: **0 .... 9999** s

4.1.2.2 Pumps Operating Mode

```
Pumps
Mode

one Pump
```

The number of pumps, and the operating mode when two pumps are selected, are chosen in the 'Mode' menu. The following choices are available:

one Pump – The osmosis plant is operated with one pump. Pump 1 (P1) is always controlled.

two Pumps: alternate – The osmosis plant is operated with two pumps operating alternatively, i.e. only one pump is operating at any given time. The number of pump requirements, made before change – over, is set in the 'Requirements' menu item (*see chap. 4.1.2.3 - 'Pumps Requirements'*). If the motor protection monitor of the pumps is connected to OS-201, then the pump change is done automatically if a fault arises with the currently operating pump.

two Pumps: series – Both pumps operate during acceptance. Pump 1 (P1) starts first, followed by Pump 2 (P2) after a time delay (*see chap.4.1.2.1* - '*Pumps Delay Time*').

4.1.2.3 Pumps Requirements

```
Pumps
Requirements

          5
```

If 'Two Pumps: Alternate' has been selected as operating mode, then the number of pump requirements in pump alternation can be entered here.

Setting range: **0 .... 9999**

4.1.2.4 Pumps Operating Time and Reset of Operating Time

```
Operation Time Reset
Pump 1:
   1 days
 2 hrs  20 min  25 s
```

The operating time of the respective pump can be seen here and the time can be reset.

```
Operation Time Reset
Reset Pump 1
           4
cancel with F1
```

Actuate the Enter key to transfer to the reset icon. If the Enter key is actuated in this menu, then the operating time of the given pump resets. The resetting can be cancelled within the next 5 seconds by actuating the F1 key.

4.1.3 Acceptance of Pump Start Delay

```
Acceptance
Pumping start Delay

Duration:   10 s
```

The input valve is always the first to be opened when switching into operation (acceptance). The osmosis pumps start after a delay period. The duration of this start delay period is adjusted here.

Setting range: **0 .... 9999** s

4.1.4 Rinse

```
Rinsing

scrolling: UP/DOWN
Choosing:  ENT
```

The plant can be rinsed after operation to avoid deposits on the modules. Interval rinsing can be conducted at fixed intervals (provided that there was no acceptance during the given period) to prevent encrustation. All the parameters necessary for this purpose can be set in this menu.

4.1.4.1 Interval Rinse On / Off

```
Rinsing
Interval dep. Rinse

ON
```

This is where plant interval rinsing can be set.

Values: **On** / **Off**

4.1.4.2 Rinse Interval

```
Rinsing
Rinsing Interval

Duration:    12 hrs
```

Set the number of hours after which interval rinsing is to be started. The interval is only activated, if there was no operation throughout the entire period.

Setting range: **0 .... 9999** h

4.1.4.3 Interval Rinse Duration *

```
Rinsing
Interval rinse Time

Duration:    10 s
```

Set the interval rinse duration at this menu item. *

Setting range: **0 .... 9999** s

4.1.4.4 Rinse after Osmosis On / Off

```
Rinsing
Rinse after Op.

ON
```

This is where plant rinsing after the osmosis can be set. OS-201 operation will always be followed by a rinsing when 'ON' is selected.

Values: **On** / **Off**

4.1.4.5 Rinse after Osmosis / Duration *

```
Rinsing
Rinse after Op. Time

Duration:     5 s
```

Set the time for duration of rinse after operation. *

Setting range: **0 .... 9999** s

4.1.4.6 Rinsing Mode Pumps

```
Rinsing
Mode

without Pumps
```

Set whether or not the osmosis pumps are to operate during rinse.

without pumps → The pumps are switched off when a rinse is to be carried out.
Pump 1 + 2 → Pump 1 and Pump 2 remain operating during rinse.
Pumps 1 → One pump remains operating during rinse.

* *Note*: If a rinsing valve is assigned to an digital output (*function 3*), its operating time can additionally be restricted by the settings of switching-on delay and running time of this output. The interval rinse duration, respectively rinse after osmosis duration is fully effective on the rinsing valve, if the values for switching-on delay and running time of this output amounts 0 s. On this see also *chap. 7 – 'Digital Outputs'*.

4.1.5 Limit Values

```
Limit Values
Limit-Value Setting
scrolling: UP/DOWN
Choosing:  ENT
```

Set the limit values for conductance and temperature measurement.

Scroll through the different setting points of the sub-menu with UP/DOWN. (*see also 'Limit Values Delay' chap. 4.1.6*).

4.1.5.1 Lower Limit Value of Conductance

```
Limit Values
Limit-Value Setting
Conductance min
        0.0 µs/cm
```

A fault message is triggered, if the conductance is below this limit; the osmosis plant will *not* be switched off.

Note: If the value 0 µs/cm is set as the limit value, then monitoring the lower conductance limit value is inactive so that there is no alarm message.

Setting range (depends on selected main measuring range): **0,00 .... 999,9** µS/cm

4.1.5.2 Upper Limit Value of Conductance

```
Limit Values
Limit-Value Setting
Conductance max
       15.0 µs/cm
```

A fault message is triggered when the limit value is exceeded; the osmosis plant is switched off to protect the modules and the subsequent equipment.

Note: If the value 0 µs/cm is set as the limit value, then monitoring the upper conductance limit value is inactive so that the plant will not be switched off.

Setting range (depends on selected main measuring range): **0,00 .... 999,9** µS/cm

4.1.5.3 Lower Limit Value Temperature

```
Limit Values
Limit-Value Setting
Temperature min
         5.0 °C
```

A fault message is triggered, if temperature is below this limit value.

Note: If 0 °C is set as limit value, then limit value monitoring of this limit is inactive, so no fault message will be displayed.

Setting range: **0 .... 100** °C

4.1.5.4 Upper Limit Value Temperature

```
Limit Values
Limit-Value Setting
Temperature max
        40.0 °C
```

A fault message is triggered when this temperature limit value is exceeded.

Note: If 0 °C is set as limit value, then limit value monitoring of this limit is inactive, so no fault message will be displayed.

Setting range: **0 .... 100** °C

4.1.6 Limit Values Delay

```
Limit Values
Time-Delay
scrolling: UP/DOWN
Choosing:  ENT
```

Set in this menu the delay times for the limit values of limit value setting (*see: 'Limit Values' chap. 4.1.5*).

4.1.6.1 Lower Limit Value of Conductance Delay

```
Limit Values
Time-Delay
Conductance min
Duration:  120 s
```

The fault message is triggered only, if conductance is below its lower limit value for longer than the time set here.

Setting range: **0 .... 9999** s

4.1.6.2 Upper Limit Value of Conductance Delay

```
Limit Values
Time-Delay
Conductance max
Duration:  120 s
```

The fault message is triggered only, if conductance exceeds its upper limit value for longer than the time set here.

Setting range: **0 .... 9999** s

4.1.6.3 Lower Limit Value Temperature Delay

```
Limit Values
Time-Delay
Temperature min
Duration:  120 s
```

The fault message is triggered only, if temperature is below its lower limit value for longer than the time set here.

Setting range: **0 .... 9999** s

4.1.6.4 Upper Limit Value Temperature Delay

```
Limit Values
Time-Delay
Temperature max
Duration:  120 s
```

The fault message is triggered only, if temperature exceeds its upper limit value for longer than the time set here.

Setting range: **0 .... 9999** s

4.1.7 Level Control

```
Level Control
Mode

ON
```

Set whether or not the plant is to be automatically started / stopped via two level contacts.

Note: If level control has been activated then one input has to be assigned with the function 'Level FULL' and one input with the function 'Level EMPTY' (*see chap. 6 – 'Digital Inputs'*). The 'Level FULL' signal has priority over all other state signals, even when level control is deactivated.

4.1.8 Conductance Measurement

```
Cond. Measurement

scrolling: UP/DOWN
Choosing:  ENT
```

Set the adaptations for the employed sensor for conductance measurement. *Note*: For the conductance measurement we recommend the usage of our 2-electrode-conductivity measuring cell LWS-01 Conductance Probe (*see chap.12.1*).

Note: Using the parameterisation software a hold function for conductance can be set. If activated, the current conductance is 'frozen' by this function, when osmosis goes into standby mode, i.e. the last value, measured before the change into standby mode, is put on hold.

4.1.8.1 Probe Factor

```
Cond. Measurement
Probe Factor

        0.10
```

The sensor's probe factor (also referred to as cell constant – listed in the documents for the employed sensor) is entered here.

Setting range: **0.01**; **0.1**; **1.0**; **10**;

Note: If a probe with a probe factor of 0.5 is used, then the probe factor 1.0 has to be selected, and 0.5 is then entered as a correction factor (*see chap. 4.1.8.6*).

4.1.8.2 Temperature Coefficient

```
Cond. Measurement
Temp. Coefficient

        2.0 %/K
```

The temperature coefficient, that's entered here, defines the change of conductivity per degree temperature change. A linear temperature compensation is carried out when temperature measurement has been connected.

Setting range: **0,1 .... 10,0** %/K

4.1.8.3 Reference Temperature

```
Cond. Measurement
Reference Temp.

        20.0 °C
```

Enter the reference temperature for temperature compensation. 20 °C is standard.

Setting range: **0,0 .... 999,9** °C

4.1.8.4 Main Measuring Range

```
Cond. Measurement
main measur. Range

           3
```

Enter the main measuring range of conductance measurement. The main measuring range depends on the probe factor and the number of places to be displayed behind the decimal point. The appropriate range is shown in table 1 (*see chap. 9*).

Setting range: **0 .... 3**

4.1.8.5 Manual Temperature Compensation

```
Cond. Measurement
manual 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 detected at this setting as an error and displayed. In case of error, the osmosis control OS-201 operates with an internal preset 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.

4.1.8.6 Correction Factor

```
Cond. Measurement
Correction Factor

          1.0
```

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

Setting range: **0,5 .... 9,0**

4.1.8.7 Unit

```
Cond. Measurement
Unit

           3
```

In menu 'Unit' is to define in which unit the conductance is to be displayed. The unit depends on the selected probe factor and the selected measuring range, such as indicated in Table 1 (*see chap. 9*).

***Warning*: The selected value has to be balanced with the probe factor and the selected main measuring range (*see Table 1, chap. 9*).**

4.1.9 Module Selection

```
Measuring Module
Module Selection

          16
```

Here, the controller may be adapted to different plug-in modules. The OS-201 standard conductance measuring module is set to the value 16, the optionally available conductance measuring module with (0)4...20 mA analog output is set to the value 36.

Setting possibilities : **0, 16 ... 19** and **36 ... 39**

4.1.10 Lack of Water

```
Lack of Water

scrolling: UP/DOWN
Choosing:  ENT
```

The lack of water setting protects the osmosis pumps from running dry.

Note: To use this feature, the 'Lack of Water' function has to be assigned to an input (*see chap 6*). In configuration for this input the delay time to recognise lack of water is set.

4.1.10.1 Lack of Water Delay

```
digital Inputs
switching Delay
IN3 – KL 26
Duration:     5 s
```

The delay time to recognise lack of water is set by means of the delay time of the input selected for this purpose. For instance, if the E3 input was selected, then this is where the delay time has to be set. The plant is stopped if there is a lack of water (*for setting of the inputs see chap 6 - 'Digital Inputs'*).

Setting range: **0 .... 9999** s

4.1.10.2 Restart after Lack of Water

```
Lack of Water
new Start

Duration:    20 s
```

Set here the delay time after which the plant will be automatically restarted following a stop due to lack of water.

Setting range: **0 .... 999** s

4.1.10.3 Lack of Water Counter

```
Lack of Water
Counting

           5
```

Set here the number of start attempts after which osmosis is finally stopped due to lack of water. Enter e.g. the value 1 for the plant to finally stop after the 1st stop due to lack of water (*see chap. 11.1 - 'Switch* - off Messages'). There is no automatically restart. Only after the fault has been reset by keeping the acknowledge key pressed for 2 seconds the plant is released once again.

Setting range: **0 .... 100**

4.1.11 Water Meter

```
Water Counter

scrolling: UP/DOWN
Choosing:  ENT
```

A water meter can be connected to input E4, e.g. to meter the amount of permeate water. The input E4 then must be defined as a water meter (*for settings of the inputs see: chap 6 - 'Digital Inputs'*).

4.1.11.1 Type of Transducer

```
Water Counter
Transmitter Type

Litre/Impulse
```

The following types of transducers are available:

Litre / Impulse → With each pulse the set quantity (contact valency) is added to the total quantity.

Impulse / Litre → The number of pulses are counted and when the adjusted number of pulses is reached (contact valency), 1 litre is added to total quantity.

4.1.11.2 Contact Valency

```
Water Counter
Litre/impulse

        100 l/Imp.
```

Set here the quantity in keeping with the given type of transducer. I.e. with Transducer type 'Litre / Pulse' the set quantity (contact valency) is added to the total quantity. With transducer type 'Pulse / Litre' this defines the number of pulses that are necessary before 1 litre is added to the total quantity.

Setting range: **0 .... 1000**

4.1.11.3 Quantity Reset

```
Water Counter
Reset
            4
cancel with F1
```

Press the Enter key to reset the entire quantity to zero.

Note: During the reset operation a started reset can be cancelled with the F1-key.

4.1.12 Service

```
Service

scrolling: UP/DOWN
Choosing:  ENT
```

The target values for service intervals can be set in the Menu Service. A service message is generated when the given target value is reached.

Note: Activating / deactivating of maintenance messages as well as editing of the message text can only be done by parameterisation software. The settings of the running times for the service messages also is possible directly on the device.

4.1.12.1 Service Message after Days

```
Service
after Days

          90
```

If the value here is larger than 0, then a service message is generated after the number of days, that has been set here. If 0 is entered here, then the service message after days is deactivated.

Setting range: **0 .... 9999**

4.1.12.2 Service Message after Operating Cycles

```
Service
after Cycles

          15
```

If the value here is larger than 0, then a service message is generated after the adjusted number of operating cycles. If 0 is entered here, then the service message after operating cycles is deactivated.

Setting range: **0 .... 9999**

4.1.12.3 Service Reset

```
Service
Reset

Enter: OK
```

Actuating the Enter key resets the service message counter.

Note: During the reset operation a started reset can be cancelled with the F1-key.

4.1.13 Display View Settings

```
View Settings

scrolling: UP/DOWN
Choosing:  ENT
```

The display values for the 7-segment display, as well as the text change time and the text reset time for the LCD display, are set in this menu.

4.1.13.1 Display Selection for the 7 – Segment Display

```
View Settings
7-Seg. Display

          9
```

Here you choose the value which should be displayed on the 7-segment display.

No.	Description
0	Display is switched off
1	Temperature
2	Total amount of water during an operating cycle
3	Total amount of water of the plant since the last quantity reset
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 µS/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

Setting range: **0 .... 11**

Note: The output of the conductance on the 7 – segment display is to be adjusted manually in accordance to the selected main measuring range (*see chap. 9*).

4.1.13.2 View Change Time

```
View Settings
View change Time

Duration:    15 s
```

If several display texts are available to be displayed by the LCD display, a time interval at which the view is changed can be set here. If this time is set at 0 s, no view change will take place; the standard view, set in the parameter software, always will be displayed.

Setting range: **0 .... 100** s

4.1.13.3 View Reset Time

```
View Settings
View reset Time

Duration:    15 s
```

In display mode it's possible to page through the individual display values with the 'Arrow-Up' key. If a time longer than 0 s is set here, then - after the set time has expired - there will be an automatic return to the standard display set in the parameter software.

Setting range: **0 .... 200** s

Note: If this time has been set at 0 s, then the display selected with the arrow keys is retained until a change is made via the arrow keys.

4.1.14 Setting Time and Date

```
Date / Time

Time  14:30 oCl 12 s
Date  14.10.2014
```

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

5 Operating Value Settings

This menu for operating values makes it easier for the plant operator to change significant operating values. The most important settings can be changed without having to page through all the menus.

The following operating values can be changed:

- Limit values
- Delay times
- Date / Time

6 Digital Inputs

With the inputs it is possible to decide whether the signal is to be addressed by the closed circuit principle or the open circuit principle. This setting can only be made via the para-meterisation software.

Closed-circuit principle: If the contact connected to this input is closed, the signal is not evaluated. An evaluation occurs when the contact opens.

Open-circuit principle: If the contact connected to this input is open, the signal is not evaluated. An evaluation occurs when the contact closes.

```
digital Inputs
Funktions
IN1 - KL 24
          2
```

Different functions can be assigned to all inputs. As an exception, the water counter input can only be assigned to the **E4** input, which can be used as a fast counting input (maximum frequency: 40 Hz).

```
digitale Inputs
switching Delay
IN1 - KL 24
Duration:    0 s
```

Relay pick - up is delayed by this time after the signal has arrived.

Setting range: **0 .... 9999** s

***Note*: Each function can be assigned to only one input. If the same function is assigned to several inputs, then only the input with the highest input number will be considered.**

The following functions can be selected (the device indicates the numbers of the function):

No.	Function	Description
0	No function	No function is assigned to this input.
1	Level Full	This input supplies the 'Full' signal for osmosis control. If the level control menu item has been set to 'ON', then this signal will end osmosis operation.
2	Level Empty	This input supplies the 'Empty' signal. If the level control menu item has been set to 'ON', then this signal will start operation.
3	Operation stop	When this signal is supplied to an input, then the operating mode of the osmosis plant is interrupted. The plant is blocked.
4	Motor Protection Pump 1	When this function is assigned to an input, the fault of Pump 1 can be connected here. Arrival of this signal stops osmosis if it's operating, and the fault message 'Motor Protection Pump 1' is displayed.
5	Motor Protection Pump 2	When this function is assigned to an input, the fault of Pump 2 can be connected here. Arrival of this signal stops osmosis if it's operating, and the fault message 'Motor Protection Pump 2' is displayed.

No.	Function	Description
6	Acceptance Start – External	With this function osmosis will start when this external signal arrives. Operation is terminated when the signal is removed. Operation is also terminated when the 'Level Full' signal is assigned to an input and this signal is supplied.
7	Lack of Water	A pressure monitor can be connected to an input, assigned with this function. Osmosis is stopped after an adjustable delay when the pressure monitor switches. Lack of water is only monitored when the osmosis pump works. (*see 'Lack of Water' chap 4.1.10*).
8	Excess Pressure	To protect the module, an osmosis pump succeeding pressure monitor can be installed. When the pressure monitor responds, the plant is switched off after the adjusted delay, the 'Fault LED' starts to flash and the 'Excess Pressure' message is displayed. After the fault has been remedied the plant has to be restarted with the 'Arrow Down' key or the next request signal must be awaited.
9	Concentrate Monitor	To protect the module, concentrate flow can be monitored by a flow meter with a limit contact. Falling short of the limit value will cause the plant to be switched off after the set delay time.
10	OFF - switching Fault Message 1	When this function is assigned to an input, the incoming event will cause the plant to be switched off (acceptance) and the control's display presents the fault message text. A required fault message text can be edited via the parameter configuration software. If this input is only configured via the device, then a fault will result the display of the standard text 'switching-off Message 1'.
11	OFF - switching Fault Message 2	When this function is assigned to an input, the incoming event will cause the plant to be switched off (acceptance) and the control's display presents the fault message text. A required fault message text can be edited via the parameter configuration software. If this input is only configured via the device, then a fault will result the display of the standard text 'switching-off Message 2'.
12	Non-OFF - switching Fault Message 1	When this function is assigned to an input, the incoming event will result in a fault message that is displayed as a fault message text by the control's display. Operation is not turned off by this message. A required fault message text can be edited via the parameter configuration software. If this input is only configured via the device, then a fault will result the display of the standard text 'warning Message 1'.
13	Non-OFF - switching Fault Message 2	When this function is assigned to an input, the incoming event will result in a fault message that is displayed as a fault message text by the control's display. Operation is not turned off by this message. A required fault message text can be edited via the parameter configuration software. If this input is only configured via the device, then a fault will result the display of the standard text 'warning Message 2'.
255	Water meter contact (E4)	If a water meter contact is required to meter the amount of water, then this function has to be assigned to the **E4** input.

Note: Scroll through the different setting points of the input sub-menu with UP/DOWN.

7 Digital Outputs

With the outputs it is possible to decide whether a relay drops out (closed-circuit principle) or picks up (open-circuit principle) when a signal / event arrives.

A certain function can be additionally assigned to the **outputs 5 to 8**, and the drop - out and pick - up delay time can be set. The adjustable values for delay time and running time are 0 to 9999 seconds.

```
digital Outputs
Functions
K 5 – KL 13/14/15
          3
```

A function can be assigned to this output. For the function number and description please refer to the Table below.

```
digital Outputs
Switch-on delay
K 5 – KL 13/14/15
Duration:      0 s
```

Relay pick - up is delayed by this time after the signal has arrived.

Setting range: **0 .... 9999** s

```
digital Outputs
Duration
K 5 – KL 13/14/15
Duration:      0 s
```

The relay continues to remain in a pick - up state by this length of time after the signal has disappeared again.

Setting range: **0 .... 9999** s

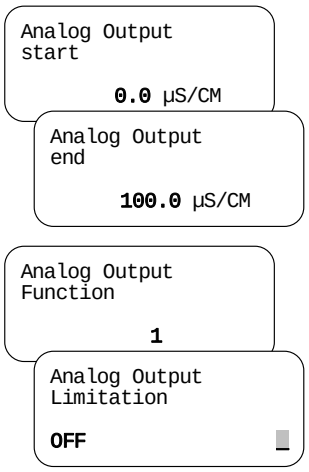
The following functions are available for the relay outputs:

No.	Function	Description
0	no Function	No function is assigned to the relay.
1	Pump 1	The relay switches when Pump 1 is to go into operation. This signal can be used as a request signal for the pump as well as for a pump operation message.
2	Pump 2	The relay switches when Pump 2 is go into operation. This signal can be used as a request signal for the pump as well as for a pump operation message.
3	Rinsing Valve	The relay switches when the rinsing valve is to be opened. The signal can be used as a request signal for the valve as well as an OPEN message.
4	Alarm	When a relay is configured for Alarm, then it will switch when a fault message arises. The relay switches after expiry of the delay time and remains in picked-up status until the acknowledgement key is pressed. If another fault message arrives while an already acknowledged fault message prevails, then the relay will switch once again (new value message).
5	Input Valve	The relay switches when the input valve is to open. This signal can be used as a request signal for the valve as well as for an OPEN message.
6	Output Valve	The relay switches when the output valve is to open. This signal can be used as a request signal for the valve as well as for an OPEN message.
7	Emergency Bypass	The relay switches when an OFF-switching fault is supplied to the osmosis control, together with the operation signal (acceptance). A bypass valve can be connected here. This valve by-passes the level control if this is switched on or it by-passes the external start signal (*see chap. 6 'Digital Inputs', function 6*).
8	Dosing Valve	The relay picks up when osmosis is operating (acceptance). For instance, this can be used to open a dosing valve.

No.	Function	Description
9	Dosing	The relay picks up when osmosis is operating (acceptance). For instance, this can be used to activate a dosing pump. Dosing pulses can be generated with the pick - up and drop - out delay time.
10	Water metering Pulse (input E4)	Switches the relay upon arrival of a water metering pulse. The relay drops out again if no new pulse arrives within the adjustable delay time. This relay can use **'Water acceptance!'** as a message. The relay follows the water metering pulse directly when 0 s is set for the delay and running times.
11	Conductance max	The relay switches when the Conductance max fault message occurs.
12	Conductance min	The relay switches when the Conductance min fault message occurs.
13	Temperature max	The relay switches when the Temperature max fault message occurs.
14	Temperature min	The relay switches when the Temperature min fault message occurs.
15	Input E1	The relay switches when the signal that is connected to input E1 (Kl 24) is supplied. It switches at the input after the set delay time.
16	Input E2	The relay switches when the signal that is connected to input E2 (Kl 25) is supplied. It switches at the input after the set delay time.
17	Input E3	The relay switches when the signal that is connected to input E3 (Kl 26) is supplied. It switches at the input after the set delay time.
18	Input E4	The relay switches when the signal that is connected to input E4 (Kl 27) is supplied. It switches at the input after the set delay time.
19	Input E5	The relay switches when the signal that is connected to input E5 (Kl 28) is supplied. It switches at the input after the set delay time.
20	Input E6	The relay switches when the signal that is connected to input E6 (Kl 29) is supplied. It switches at the input after the set delay time.
21	Level Control	On this output a level control for level two contacts is realised. To do this, two inputs must be assigned as min- and max-contacts in the input functions. On dropping below the min-contact, the relay is closed, on exceeding the max-contact it opens again (hysteresis).
22	wash / reject	An output-relay, configured with this function, picks up when the measured conductivity exceeds the specified maximum while the plant is in operation. If the conductance value falls back into its normal range, the relay releases again.
		Note: Selecting this function in the parameterisation on the device, the switch-on delay and running time of the relevant output will be set to 0. If delayed switching of this output is needed, these times have to be subsequently entered.

Note: Scroll through the different setting points of the output sub-menu with UP/DOWN.

8 Analog Output



Depending on the selected function, the temperature- or conductance measuring range, in which the values are to be output, is to adjust in the menu items ‘Analog Output | start’ and ‘Analog Output | end’. Values edited in this menu items equates to 4 mA for 'start' respective 20 mA for 'end' at the analog output.

Setting range : **0,0 .... 999,9** µS/cm resp. °C

Note: The setting range for conductance values is dependent of the selected main measuring range (*see chap. 4.1.8.4 - 'Main Measuring Range'*).

The analogue output can be assigned to currently 4 features.

Setting range see below: Table 'Functions of Analog Output'

By choosing 'OFF' in submenu 'Limitation' the current output is enabled to exceed 20 mA. This maybe used for error detection.

Values: **OFF** or **at 20 mA**

Functions of Analog Output:

No.	Function	Description
0	4 mA	The output is assigned to a fixed value of 4 mA.
1	Conductance	Output of conductance value from controller. The controller is maybe influence the output of values (this can be used for example for the ‘hold-function’ → freezing of output values).
254	Temperature	Output of temperature values
255	Conductance	Output of conductance value directly from measuring module. Hereby the controller is unable to influence the output values.

8
9

9 Settings Table for Conductance Measurement

The table indicates which value has to be selected for the unit (*see chap 4.1.8.7*) with a corresponding setting of the probe factor (*see chap. 4.1.8.1*) and the main measuring range (*see chap. 4.1.8.4*).

Note: For the conductance measurement we recommend the usage of our 2-electrode-conductivity measuring cell LWS-01 Conductance Probe (*see chap.12.1*).

Table 1

Main measuring range *with probe factor* **K=0.01**		**Unit**
0	(999,9 µS/cm)	**4**
1	(200,0 µS/cm)	**4**
2	(50,00 µS/cm)	**5**
3	(20,00 µS/cm)	**5**

Main measuring range *with probe factor* **K=0.1**		**Unit**
0	(9,999 mS/cm)	**1**
1	(2,000 mS/cm)	**1**
2	(500,0 µS/cm)	**4**
3	(200,0 µS/cm)	**4**

Main measuring range *with probe factor* **K=1.0**		**Unit**
0	(99,99 mS/cm)	**0**
1	(20,00 mS/cm)	**0**
2	(5000 µS/cm)	**3**
3	(2000 µS/cm)	**3**

Main measuring range *with probe factor* **K=10**		**Unit**
0	(999,9 mS/cm)	**2**
1	(200,0 mS/cm)	**2**
2	(50,00 mS/cm)	**0**
3	(20,00 mS/cm)	**0**

10 Operation

10.1 Operation in Automatic Mode

If the osmosis control is in automatic mode, then osmosis operation (acceptance) can be started in the following manner:

- press the 'Arrow Down' key, or
- if 'Level Empty' function is assigned to an input and the signal is supplied, or
- if 'Start Operation' function is assigned to an input and the signal is supplied.

When the osmosis plant is set into operation, then the 'Operation' LED (green) will start to flash, input valve and output valve (if present) open and the pressure pump will start to operate after expiry of the set delay. The following states can be monitored - if activated or present - during automatic operation:

- the conductance of the permeate;
- the pressure in front of the osmosis pumps (dry-run protection);
- the pressure behind the osmosis pumps (excess pressure protection);
- concentrate flow;
- motor protection of the osmosis pumps.

Automatic operation (acceptance) is interrupted if any of these states arise. Automatic operation can be continued after the fault has been remedied or acknowledged (*see also 'Fault Messages' - chap. 11*).

Operation (acceptance) can be terminated in the following manners:

- by pressing the 'Arrow Down' – key, or
- if 'Level Full' function is assigned to an input and the signal is supplied, or
- if 'Start Operation' function is assigned to an input and the signal is not supplied,

When operation has been terminated a rinse after operation is carried out (if activated). The manner of rinse can be set in the 'Rinse' menu (*see Chap. 4.1.4*). If the rinsing valve function has been assigned to an output, then the valve will open. After expiry of the rinsing duration the plant is transferred to standby mode. Rinsing is terminated as soon as acceptance is started manually by key actuation or automatically via the level switch or an external start signal.

***Note*: If the input 'Level Full' is defined and connected, this signal will have priority over all other start and stop signals in automatic mode. If operation is started e.g. with the Downward – key and if this is followed by the 'Level Full' signal, then operation is terminated (acceptance stop).**

10.2 Manual Operation

Actuation of the Manual key changes the plant into manual operating mode. The yellow LED in the key lights up. With the Downward - key it is possible to change between rinse and standby mode.

***Warning*: In manual mode all monitoring functions and the automatic start / stop - functions are inactive so that the plant must be monitored and controlled by the operator.**

11 Fault Messages

The following fault messages may occur:

11.1 Switch - off Messages

```
***** Fault *****
Conductance max

Plant stopped
```

If the adjusted upper conductance limit value is exceeded, then the plant is stopped and this fault message is displayed. This message is inactive when the limit value '0' is set.

Note: This fault message can only be reset when the acknowledgement key is kept pressed for 2 seconds. The plant then resumes operation.

```
***** Fault *****
Lack of Water

Plant stopped
```

If lack of water has arisen ***x*** times* during operation, then acceptance is stopped and this fault message is displayed. (*'***x*** times' means the preset maximal number of restarts after lack of water detection – see *Chap. 4.1.10.3*).

Note: This fault message can only be reset when the acknowledgement key is kept pressed for 2 seconds. The plant then resumes operation.

```
***** Fault *****
concentrated Medium

Plant stopped
```

This message is displayed when concentrate flow monitoring is connected to an input and flow is disrupted during operation. Acceptance is stopped and this fault message is displayed.

Note: This fault message can only be reset when the acknowledgement key is kept pressed for 2 seconds. The plant then resumes operation.

```
***** Fault *****
Motor Protect. P 1

Plant stopped
```

This message is displayed when the motor protection of Pump 1 has responded. If the plant is in operation at that time, then acceptance will be stopped. After the cause of the fault has been remedied, the plant must be restarted with the 'Arrow Down' key or the next request signal must be awaited.

```
***** Fault *****
Motor Protect. P 2

Plant stopped
```

This message is displayed when the motor protection of Pump 2 has responded. If the plant is in operation at that time, then acceptance will be stopped. After the cause of the fault has been remedied, the plant must be restarted with the 'Arrow Down' key or the next request signal must be awaited.

```
***** Fault *****
Overpressure Pump n1)

Plant stopped
```

This message is displayed when a pressure monitor is connected to an input and excess pressure arises during operation. Acceptance is interrupted.

Note: This fault message can only be reset when the acknowledgement key is kept pressed for 2 seconds. The plant then resumes operation.

[1)] **n** means the number of the pump, which was in operation when the error occurred.

***Note*: If the fault message 'Conductance Exceeded', 'Lack of Water', 'Concentrate Monitoring' or 'Overpressure Pump n' occurred, this message can only be reset by holding down the Acknowledgement key for 2 seconds. Thereafter the plant returns automatically into operation.**

For faults with the message 'Motor Protect. P1', 'Motor Protect. P2' and 'Overpressure Pump n1)' applies: If the plant is operated by external acceptance start (see chap. 6) and the acceptance – signal is still incoming on the related input after removal of the error, the plant returns automatically into operation.

11.2 Warning Messages

***** Fault ***** Service Message call Service	This message is displayed when the operating cycle counter has reached the number of parameterised operating cycles or when the service interval (*service after xxx days see chap. 4.1.12 - 'Service'*) has been reached. Operation is not interrupted! This fault message can only be acknowledged if a reset was completed under 'Parameter/Service/Service Reset'. The message is inactive when '0' has been set as the limit value.
***** Fault ***** Conductance min	This fault message is displayed when the conductance sinks below its preset lower limit value. Acceptance is **not** interrupted! The message is inactive when 0 has been set as the limit value.
***** Fault ***** Conductance max	This fault message is displayed when the conductance exceeds its preset upper limit value. Acceptance is **not** interrupted! The message is inactive when 0 has been set as the limit value.
***** Fault ***** Temperature min	This fault message is displayed when temperature falls below its preset lower limit value. Acceptance is **not** interrupted! The message is inactive when 0 has been set as the limit value.
***** Fault ***** Temperature max	This fault message is displayed when the upper set temperature limit value is exceeded. Acceptance is **not** interrupted! The message is inactive when 0 has been set as the limit value.
***** Fault ***** Motor Protect. P 1 occurred no stop	If the plant operates in mode 'two pumps: alternate' when the motor protection pump 1 arises, the plant will not be stopped. The fault message will be displayed and the change – over onto pump 2 takes place. Stop of plant will only take place, if motor protection pump 2 also arises at the same time.
***** Fault ***** Motor Protect. P 2 occurred no stop	If the plant operates in mode 'two pumps: alternate' when the motor protection pump 2 arises, the plant will not be stopped. The fault message will be displayed and the change – over onto pump 1 takes place. Stop of plant will only take place, if motor protection pump 1 also arises at the same time.

Furthermore, two self defined switch-off fault messages and two self-defined warning fault messages can be displayed (*see chap. 6, functions 12 to 15*). Self defined fault messages can only be generated with the parameterisation software device management GV 2 (Geräteverwaltung GV 2).

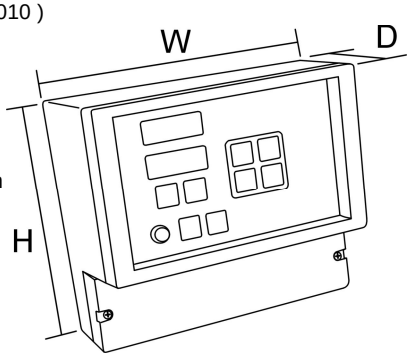
The presence of a fault is indicated by flashing of the red LED in the acknowledgement key, which, when actuated, transfers its red LED to continuous light. The LED will flash again with each new fault message. The LED will stay turned off when no fault is longer present.

***Note*: If the fault message 'Conductance Exceeded', 'Lack of Water', 'Concentrate Monitoring' or 'Overpressure Pump n' occurred, this message can only be reset by holding down the Acknowledgement key for 2 seconds. Thereafter the plant returns automatically to operation.**

12 Technical Data

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

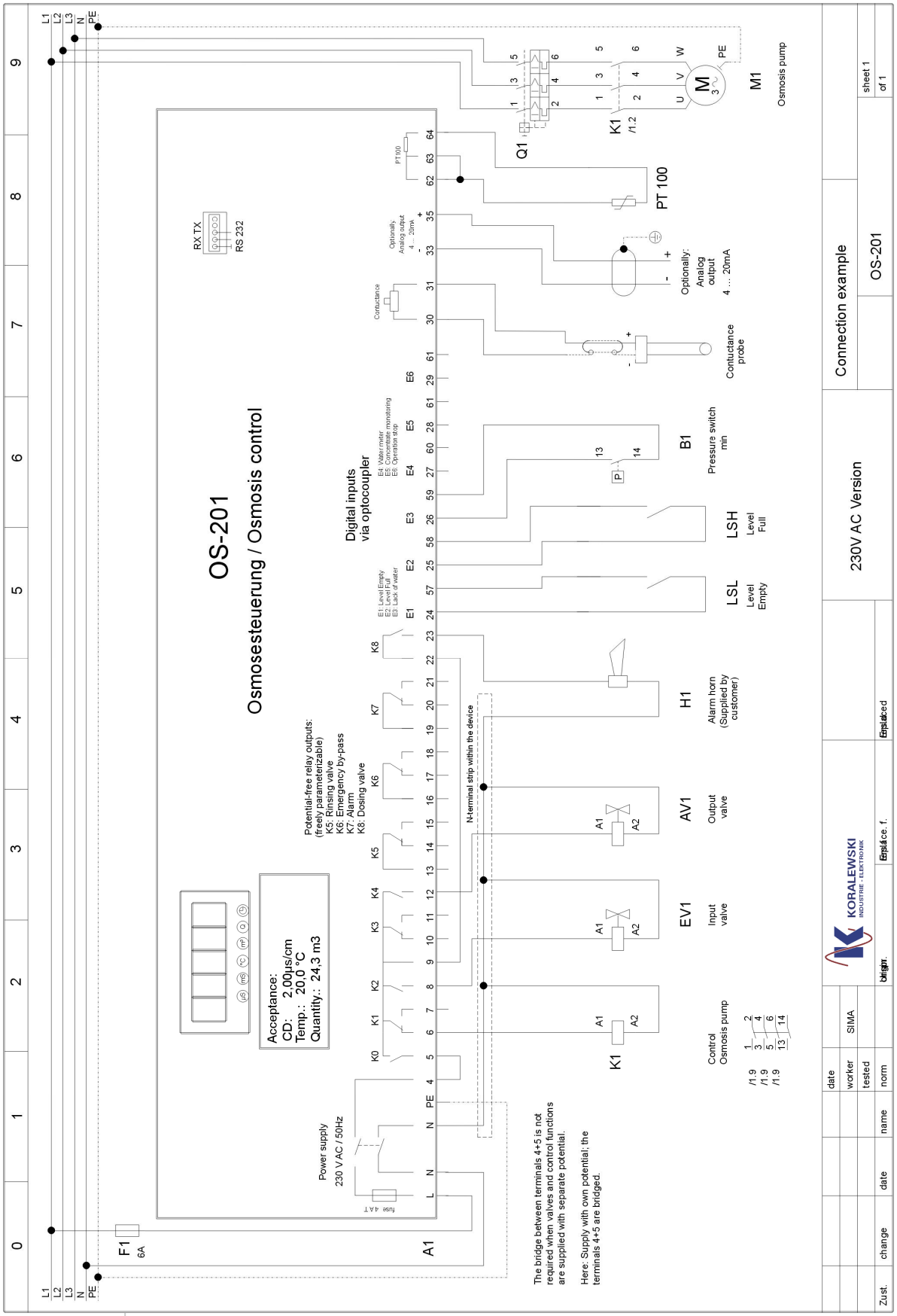
Operating Voltage	230 V / 50 Hz (-10 / + 6 %)
Fuse (Standard)	115 / 230 V valve power supply, fuse 4 A slow
Power Consumption	approx. 8 VA (without external consumers)
Option 24 V Version	24 V AC valve power supply max. 20 VA, fuse 1 A slow
Data Retention following Power Failure	Time: min. 72 hours
	Configuration, operation and parameter data permanently stored in the internal Flash memory
Outputs	two phase-related change-over contacts (230 V AC)
	two phase-related 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 / 8 A (AgNi)
	optionally: (0)4 ... 20 mA analog output
Inputs	six inputs via optocoupler
	Contact load 10 V DC, approx. 8 mA
	one input for conductance measurement
Climatic Conditions:	according to DIN EN 60204-1 (05-2010)
Ambient Temperature	
in operation	-20 °C ... +55 °C
transport and storage	-25 °C ... +55 °C
Housing	DIN plastic housing for wall installation – IP 54 Dim. W / H / D : 212 x 184 x 94 mm



12.1 Ordering Information

Osmosis Control OS-201	Part Number
OS-201 / 230 V :	**E1328**
OS-201 / 230 V / 24 V :	**E1329**
OS-201 / 230 V / (0)4 ... 20 mA analog output :	**E1639**
OS-201 / 230 V / 24 V / (0)4 ... 20 mA analog output :	**E1640**
OS-201 / 115 V :	**E1478**
OS-201 / 115 V / (0)4 ... 20 mA analog output :	**E1479**
OS-201 / 115 V / 24 V:	**E1480**
Accessories	
Programming cable	**KC0034**
Conductance Probe LWS-01 PP	**E1926**
Conductance Probe LWS-01 Pt (with Pt100)	**E1928**
Conductance Probe LWS-01 PV Pt (with Pt100)	**E1927**

13 Connection Example



14 Default Settings

Consignment: _____ **Date:** _____ **Side 1/2**

Configuration:						
1. Pumps	*with two pumps series:*		Start delay time Pump 2	**10**	sec.	
	Mode: [X] 1 Pump / [ ] 2 Pumps series / [ ] 2 Pumps alternating					
	with two pumps alternating		*Requirements*	**5**		
2. Acceptance	Pump start delay time	**5**	sec.			
3. Rinse	Interval rinse [X] On *or* [ ] Off					
	Rinse interval	**12**	hrs. / Interval rinse duration	**600**	sec.	
	Rinse after Op. [X] On *or* [ ] Off / R. a. Op. duration			**5**	sec.	
	Rinse mode: [X] Without Pumps / [ ] Pump 1 / [ ] Pump 1 + 2					
4. Limit Values	**Limit Settings**			**Delay**		
	Conductance min	**0.0**	µS/cm	Conductance min	**120**	sec.
	Conductance max	**15.0**	µS/cm	Conductance max	**120**	sec.
	Temperature min	**0.0**	°C	Temperature min	**120**	sec.
	Temperature max	**40.0**	°C	Temperature max	**120**	sec.
5. Level Control	Mode: [X] On *or* [ ] Off					
6. Conductance	Probe factor			Value	**0.1**	1/cm
Measurement	Temperature coefficient			Value	**2.0**	%/K
	Reference temperature				**25.0**	°C
	Main measuring range				**3**	(*200.0 µS/cm*)
	Manual temperature compensation				**20.0**	°C
	Correction factor			Value	**1.0**	
	Unit			Unit	**4**	(*µS/cm*)
7. Measuring Module	**Module No.**		**Designation**			
	16		Conductance measuring module			
8. Lack of Water	Digital input		Input **E3** terminal **26** (*to adjust under 'digital inputs' see chap. 6*)			
	Restart		Delay	**20**	sec.	
	Restart attempts		Counting	**5**	max.	
9. Water Meter	Type of transducer		[X] Litre / Impulse *or* [ ] Impulse / Litre			
	Contact valency		**100** Litre / Imp. *or* Impulse / l			
10. Service	[X] activated					
	Service after days		after	**0**	days	
	Service after cycles		after	**0**	cycles	

Consignment: _____ **Date:** _____ **Side 2/2**

11. Inputs	Input No.	Function No. Description	Switching behaviour	Switching delay
digital	**E1** Kl 24	**2** Level empty	Open - [X] *or* Closed Circuit [ ]	**0** sec.
	E2 Kl 25	**1** Level full	Open - [X] *or* Closed Circuit [ ]	**0** sec.
	E3 Kl 26	**7** Lack of water	Open - [X] *or* Closed Circuit [ ]	**5** sec.
	E4 Kl 27	**255** Water meter	Open - [X] *or* Closed Circuit [ ]	**0** sec.
	E5 Kl 28	**9** Concentrate monitoring	Open - [X] *or* Closed Circuit [ ]	**0** sec.
	E6 Kl 29	**3** Operation stop	Open - [X] *or* Closed Circuit [ ]	**0** sec.

12. Outputs	Output No.	Function No. Description	Switching behaviour	Switching delay	Duration
digital	**K5** Kl 13/14/15	**3** Rinsing valve	Open – [X] *or* Closed Circuit [ ]	**0** sec.	**0** sec.
	K6 Kl 16/17/18	**7** Emergency bypass	Open – [X] *or* Closed Circuit [ ]	**0** sec.	**0** sec.
	K7 Kl 19/20/21	**4** Alarm	Open – [X] *or* Closed Circuit [ ]	**0** sec.	**0** sec.
	K8 Kl 22/23	**8** Dosing valve	Open – [X] *or* Closed Circuit [ ]	**0** sec.	**0** sec.

13. Analog output	Function No. Description	Start *	End *	Limitation of analog Value *
only with meas. module 36 conductance + analog output	**1** CD from control	**0** µS/cm	**200** µS/cm	[X] off *or* [ ] at 20 mA

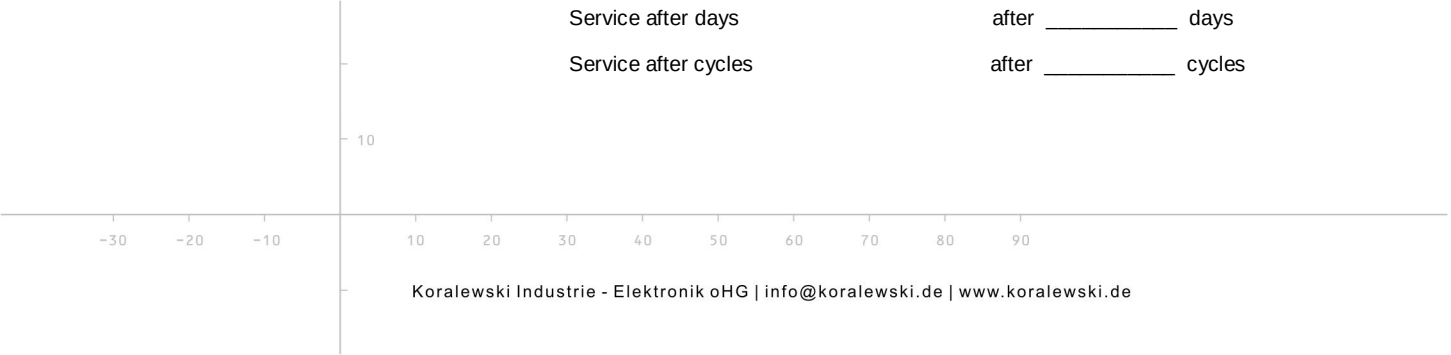
** not available with Function 0: analog output assigned to 4 mA fixed.*

12. Display settings		
	7-segment - display	**9** *(Cond. µS/cm – 1 dec.-pos.)*
	View change time	**15** sec.
	View reset time	**0** sec.

15 Form for Configuration and Parameter Settings

Consignment: _____ **Date:** _____ **Side 1/2**

Configuration:		
1. Pumps	*with two pumps series:*	Start delay time Pump 2 _____ sec.
	Mode: ☐ 1 Pump / ☐ 2 Pumps series / ☐ 2 Pumps alternating	
	with two pumps alternating	*Requirements* _____
2. Acceptance	Pump start delay time _____ sec.	
3. Rinse	Interval rinse ☐ On *or* ☐ Off	
	Rinse interval _____ hrs. / Interval rinse duration _____ sec.	
	Rinse after Op. ☐ On *or* ☐ Off / R. a. Op. duration _____ sec.	
	Rinse mode: ☐ Without Pumps / ☐ Pump 1 / ☐ Pump 1 + 2	
4. Limit Values	**Limit Settings**	**Delay**
	Conductance min _____ __S/cm	Conductance min _____ sec.
	Conductance max _____ __S/cm	Conductance max _____ sec.
	Temperature min _____ °C	Temperature min _____ sec.
	Temperature max _____ °C	Temperature max _____ sec.
5. Level Control	Mode: ☐ On *or* ☐ Off	
6. Conductance	Probe factor	Value _____ 1/cm
measurement	Temperature coefficient	Value _____ %/K
	Reference temperature	_____ °C
	Main measuring range	_____
	Manual temperature compensation	_____ °C
	Correction factor	Value _____
	Unit	Unit _____
7. Measuring Module	**Module No.**	**Designation**
	_____	_____
8. Lack of Water	Digital input	Input _____ terminal _____ (*to adjust under 'digital inputs' see chap. 6*)
	Restart	Delay _____ sec.
	Restart attempts	Counting _____ max.
9. Water Meter	Type of transducer	☐ Litre / Impulse *or* ☐ Impulse / Litre
	Contact valency	_____ Litre / Imp. *or* Impulse / l
10. Service	☐ activated	
	Service after days	after _____ days
	Service after cycles	after _____ cycles



Consignment: _____ **Date:** _____ **Side 2/2**

11. Inputs	Input No.	Function no. Description	Switching behaviour	Switching delay
digital	**E1**	_____	Open - ☐ *or* Closed Circuit ☐	_____ sec.
	Kl 24	_____		
	E2	_____	Open - ☐ *or* Closed Circuit ☐	_____ sec.
	Kl 25	_____		
	E3	_____	Open - ☐ *or* Closed Circuit ☐	_____ sec.
	Kl 26	_____		
	E4	_____	Open - ☐ *or* Closed Circuit ☐	_____ sec.
	Kl 27	_____		
	E5	_____	Open - ☐ *or* Closed Circuit ☐	_____ sec.
	Kl 28	_____		
	E6	_____	Open - ☐ *or* Closed Circuit ☐	_____ sec.
	Kl 29	_____		

12. Outputs	Output No.	Function no. Description	Switching behaviour	Switching delay	Duration
digital	**K5**	_____	Open – ☐ *or*	_____ sec.	_____ sec.
	Kl 13/14/15	_____	Closed Circuit ☐		
	K6	_____	Open – ☐ *or*	_____ sec.	_____ sec.
	Kl 16/17/18	_____	Closed Circuit ☐		
	K7	_____	Open – ☐ *or*	_____ sec.	_____ sec.
	Kl 19/20/21	_____	Closed Circuit ☐		
	K8	_____	Open – ☐ *or*	_____ sec.	_____ sec.
	Kl 22/23	_____	Closed Circuit ☐		

13. Analog Output	Function No. Description	Start *	End *	Limitation of analog Value *
only with meas. module 36 conductance + analog output	_____	_____	_____	☐ off *or*
	_____			☐ at 20 mA

** not available with Function 0: analog output assigned to 4 mA fixed.*

14. Display Settings		
	7-segment - display	_____
	View change time	_____ sec.
	View reset time	_____ sec.