

Manual

K 100 Gas

K 100 W Gas

Measuring and control instruments
to monitor the concentrations of
aggressive gases in ambient air



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1. Your K 100

is an instrument of Dr. A. Kuntze GmbH which offers high quality and reliability for years.

The instruments K 100 are defined by an excellent pricing. They were developed to maximize functionality for standard applications.

The gas monitoring instruments K 100 Gas and K 100 W Gas are used to monitor the air in storage rooms where aggressive chemicals are stored. They work with one or two sensors at a time and provide various test functions to make sure that both sensors and attached alarm devices work properly.

For each sensor two limits can be defined. These operate separate relays, one of them delayed. The first is supposed to activate an acoustic signal. It can be switched off manually. The second is supposed to activate the sprinkler system. You can define a delay time so that the sprinkler only starts if the limit is exceeded for a certain time. This relay can be switched off by remote control via the digital input. If you connect a door contact, the sprinkler system will be switched off as soon as the maintenance personnel opens the door.

Additionally the instruments provide a regular alarm relay operated by all other check functions, for e. g. the automatic sensor test. It can be configured to either NO or NC contact, the latter giving the additional advantage of issuing an alarm in case of power failure.

You have certainly made a good choice. On the following pages you learn more about your K 100. If, however, you have further questions or are looking for information not included in this manual or if you are interested in supplementing products like sensors or armatures or in our other instrument series, just give us a call - we will be delighted to help you!

1.1 General and Safety instructions

This manual applies to the following instruments:

Instrument and type	Revision date
K 100 Gas, K 100 W Gas	08/09
K 100 (W) Gas NH ₃	08/09
K 100 (W) Gas H ₂ S	08/09
K 100 (W) Gas HCl	08/09
K 100 (W) Gas Cl ₂ 20mg	08/09

It contains technical information for the installation, start-up and maintenance. If you have any questions not included in this manual please contact your supplier or the official representative of Dr. A. Kuntze GmbH in your country.

We would like to point out that the warranties specified in our general trading conditions are valid only if

- installation, connections, adjustments, start-up, and maintenance of the instrument are carried out by authorized personnel with adequate qualification.
- the instrument is used according to the description in this manual.

Please check for damages immediately after receiving the instruments and report any damages within 24 hours to the delivering company. Never work with a damaged instrument.

Keep this manual at a safe place where you can always look up the safety instructions and the informations on handling and usage. According to DIN 61010 the manual is part of the product and must be maintained as long as the instrument is used, and given to the next owner if the instrument is sold.

This instrument was designed and built according to the safety measurements for electronic devices and has left our company in perfect working condition. To preserve this condition and to ensure safe usage follow all instructions carefully and pay special attention to all warnings issued in this manual. If the instrument is visibly damaged or has been stored inappropriately or if there are any doubts concerning safe usage, shut it down and make sure it cannot be restarted by accident.

You will notice that important safety instructions are highlighted:

WARNING highlights instructions for the protection of people. Disregarding these instructions may cause accidents and injuries!

ATTENTION highlights instructions for the protection of the instrument and the equipment. Disregarding these instructions may lead to damage or destruction of the instrument or equipment!

NOTE is used to highlight interesting details.

1.2 Application

The instruments K 100 Gas and K 100 W Gas are used to monitor the concentration of one specific gas in ambient air. They provide various alarm functions and three relays to connect visual or acoustic signals and sprinkler systems.

Applications are mainly warning systems and air monitoring in storage rooms.

For safety measures, the measuring inputs are checked for failure. Failures are indicated in the display and via the alarm relay, which can set off a horn or lamp or relate to a central control. .

CAUTION **The instrument checks the inputs and concentration limits. It cannot detect erroneous settings or failures in the system, nor can it check for plausibility! The safety of the system of which the instrument is part of, lies within the reach of responsibility of whoever built the system.**

1.3 Intended use

Use these instruments only for the monitoring of ambient air.

Use only sensors, fittings, and accessories of Dr. A. Kuntze, since instruments and sensors are attuned.

Ensure that the required measuring conditions are constantly maintained, such as temperature, humidity etc.

Set-up the instrument according to this manual. Carry out all the steps described, and check all measurements and settings.

Use all available safety measures such as the alarm relay and the sensor function check.

Regularly check that all safety measures are in good working order.

CAUTION **The protection built into the instrument is impaired if they are not used as intended!**

1.4 Features

Meter

Measuring ranges	0.00 - 20.00 ppm Cl ₂	Chlorine
	0,00 - 30.00 ppm HCl	Hydrogen chloride
	0 - 100 ppm H ₂ S	Hydrogen sulfide
	0 - 300 ppm CO	Carbonmonoxide
	0 - 100 ppm NH ₃	Ammonia gas
	or combined:	
	0.00 - 10.00 ppm Cl ₂	Chlorine
	0.00 - 1.00 ppm O ₃	Ozone
	0.00 - 1.00 ppm ClO ₂	Chlorine dioxide
		further parameters on request
Display	Measured values with physical units Status indication sensors & Alarm	



Alarm and test functions

Limits	Limit 1 / relay 1, no delay, for acoustic signal manual switch-off option
	Limit 2 / relay 2, with adjustable delay remote switch-off via digital input, e.g. via door contact
Alarm	for malfunctions, sensor test and/or limits
Sensor test	electrical test, manual or automatic in adjustable intervals, with alarm
Relay test	manual, for all three relays
Delay time rel. 2	0 - 2000 s

Connections

Relays	3 potentialfree contacts 6 A, 250 V, max. 550 VA 2 x NO, 1x NO or NC with power failure alarm
Analog output	0/4-20 mA galvanically isolated, max. load 500 Ohm for sensor 1 or sensor 2
Analog inputs	2 inputs for identical gas sensors or for the combination Chlorine-Ozone
Digital input	for external switch-off of relay 2, e.g. via door contact
Digital interface	RS485, Baudrate 9600, Data format 8Bit,
(Option)	1Startbit, 1Stopbit, no parity

1.5 Technical data

Feature	K 100	K 100 W
view		
Installation	panel-type housing	wall-mounting housing
Dimensions	96 x 96 x 135 mm (WxHxD)	165 x 160 x 85 mm
Weight	0.8 kg	1.0 kg
Terminals	screw terminals for cables up to 1.5mm ²	spring-loaded terminals for cables up to 1.5mm ²
Protection class	Front IP54	IP65
Power supply	230 V +6/-10%, 40..60 Hz, optionally 117 V or 24 V	
internal fuse	none	230V: 63mA HRC 117V: 125mA HRC 24V: 800mA NRC
Power consumption	10VA	
Contact rating	6 A/ 250 V, max. 550 VA resistive load (with RC protective circuit)	
Operation temperature	0 - 50°C	
Storage temperature	-20 - +65°C	
Humidity	max. 90% at 40°C non condensing	

1.6 Declaration of conformity

EC Declaration of Conformity



DR. A. KUNTZE
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ISO 9001

Hereby we declare that our instruments:

K 100

are in conformity with the following directives:

2004/108/EC – Electromagnetic Compatibility directive (EMC)
2006/95/EC - Low voltage directive (LVD)

As long as the instructions for installation and set-up are observed.

The CE label was affixed in accordance with the technical harmonisation directive 2004/108/EC of the European Council dating from 15.12.2004.

Applied standards:

- EN 61000 6-1(3), VDE 0839 Part 6-1(3): 2002 (residential environment)
- EN 61000 6-2(4), VDE 0839 Part 6-2(4): 2006 (industrial environment)
- EN 61326-1: 2006, VDE 0843-20-1: 2006 Electrical equipment for measurement, control and laboratory use- EMC requirements
- EN 61010-1 :2002-08 Safety requirements for electrical equipment for measurement, control, and laboratory use

Meerbusch, 07.04.2009


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Dipl.-Ing. Christoph Scheffold
Managing Director



2. Instructions for installation and connections

Installation:

On the next pages you will find detailed instructions for the installation.

For panel-type meters you have to prepare an opening of 92x92mm. Install the instrument and fix it with the two mounting clips which were part of the delivery.

You can install instruments in wall-mounting housings either by hanging them upon the center slot or by sliding the slot under a screw, which is an alternative for limited space. Either way you have to fix it additionally with two screws.

ATTENTION Install the instrument in a place where it is not put under mechanical or chemical strain!

Mind the ingress protection:

Panel-mounting housing: Front IP54

Wall-mounting housing: IP65 (closed terminal cover)

Connections:

You will find detailed connection diagrams on the following pages.

Before connecting the power supply check the information on the instrument label!

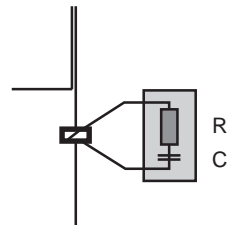
ATTENTION Input, output and control lines must be installed separate from each other and separate from power lines!

For inputs and outputs use screened lines and connect the screen on one side only.

The measurements are interference-sensitive. Always use the special screened cables delivered with the sensors.

For the connection of temperature sensors use a low-resistance cable with a large diameter.

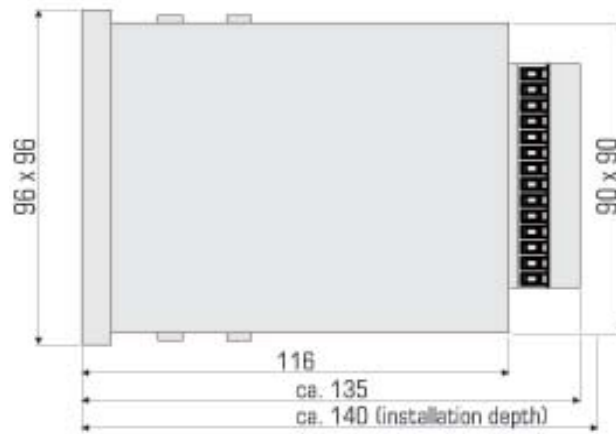
When using the relays, mind that with inductive loads, interference must be suppressed. If that is not possible, the relay must be protected at the terminal block in the instrument by a resistance-capacitance filter or, in case of direct current, by a free-wheeling diode.



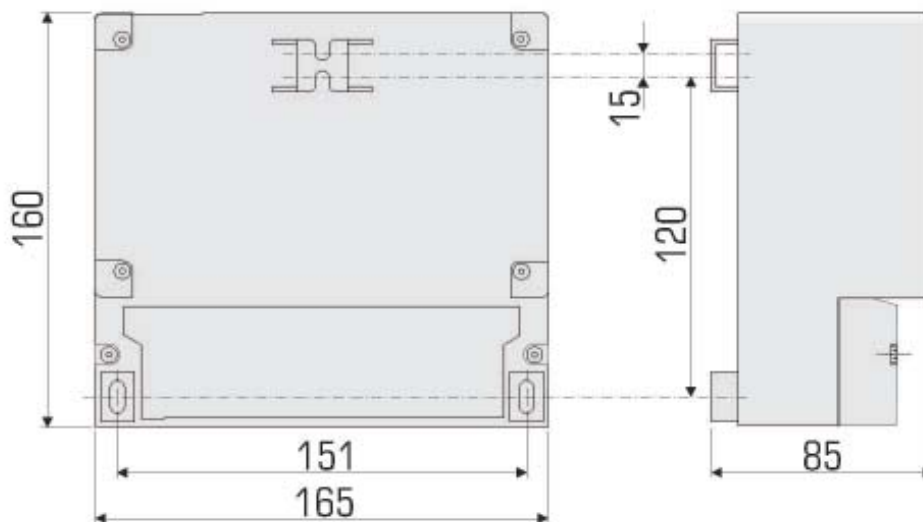
Current up to	Capacitor C	Resistance R
60 mA	10 nF 260 V	390 Ohm 2 Watt
70 mA	47 nF 260 V	22 Ohm 2 Watt
150 mA	100 nF 260 V	47 Ohm 2 Watt
1,0 A	220 nF 260 V	47 Ohm 2 Watt

2.1 Dimensions

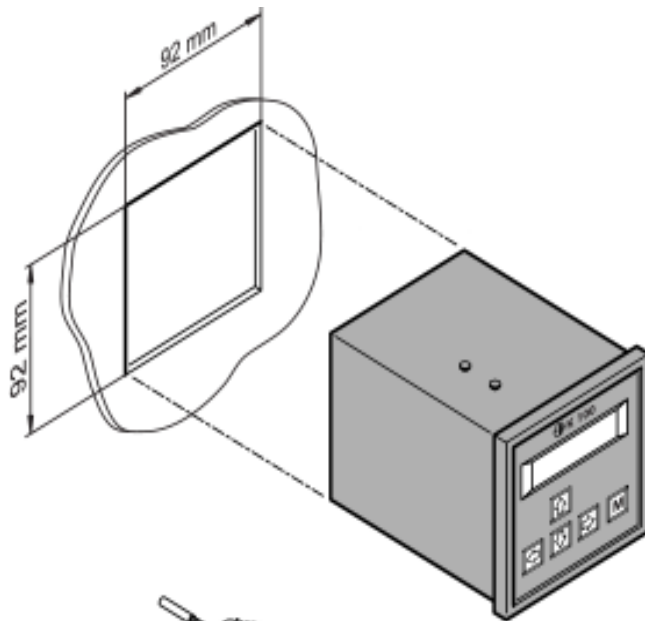
Panel-mounting housing



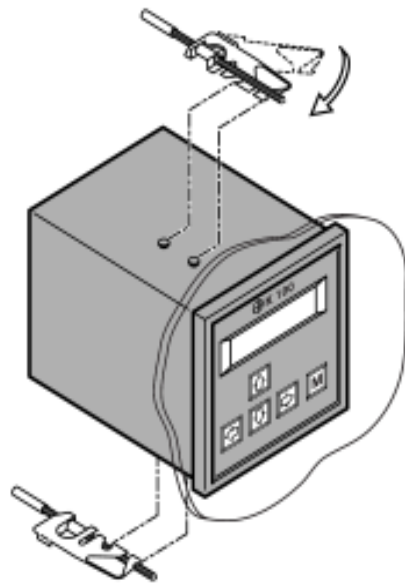
Wall-mounting housing



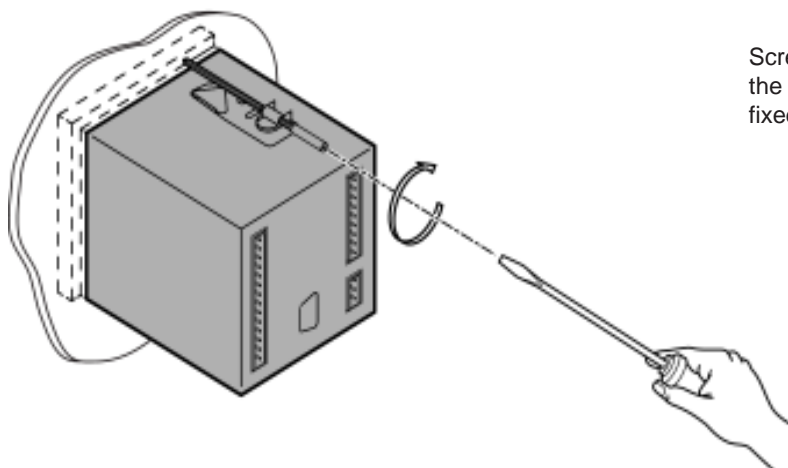
2.2 Installation panel-mounting housing



Prepare an opening of 92 x 92 mm.

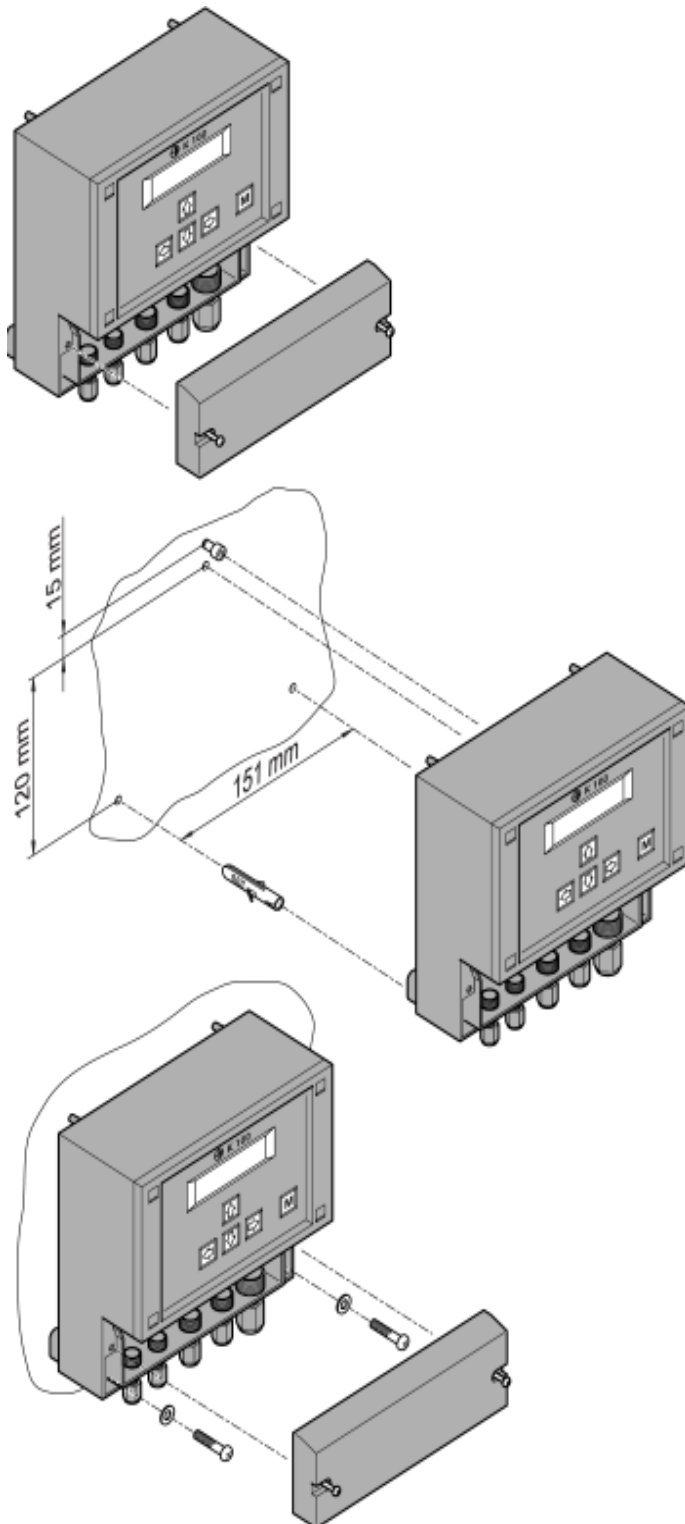


Install the instrument from the front side and fix it with the two mounting clips which were part of the delivery.



Screw tight until the instrument is fixed perfectly.

2.3 Installation wall-mounting housing

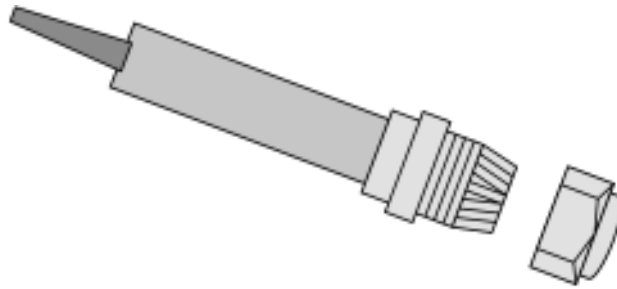


Remove the terminal cover.

Drill three holes (max. M5) according to the drawing. Mind that there are two ways for installation: (1) You can hang the instrument upon the upper screw. In that case drill the upper hole 120mm above the lower two. (2) Or you can slip the fixture on the back of the instrument under the upper screw. In that case the upper hole has to be another 15mm higher.

Mount the instrument and fix it with the two lower screws. Close the terminal cover or start with the connections.

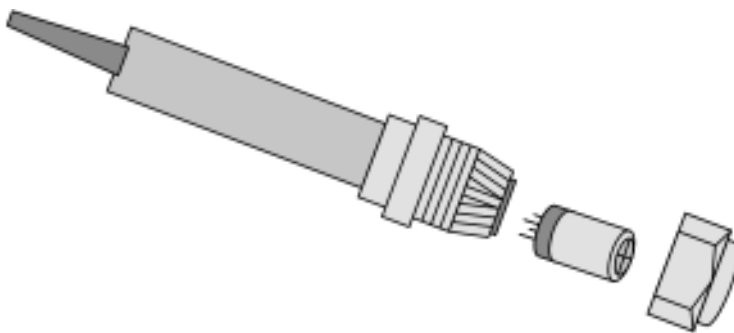
2.4 Installation of the sensor



Unscrew the screwcap.

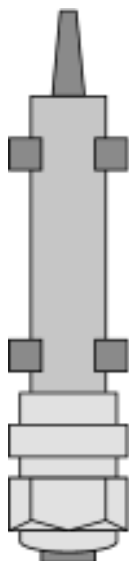


Take a sensing element and remove the transport protection with the short-circuit.



Fit the sensing element gently into the sensor. The correct position is indicated by a groove. Mind that you do not bend the connecting pins.

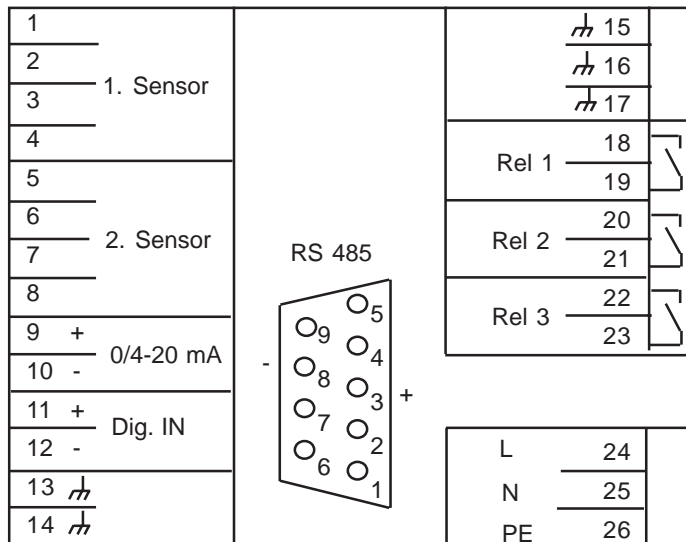
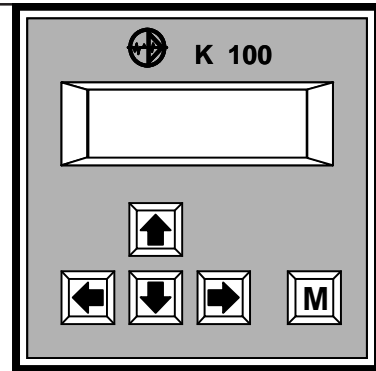
Check the sealing ring and screw the screwcap on.



Mount the sensor with two clamps vertically, the sensing element pointing down, approx. 30cm above the floor. Mind that the sensor is not subject to strong wind, heat, or direct sunlight.

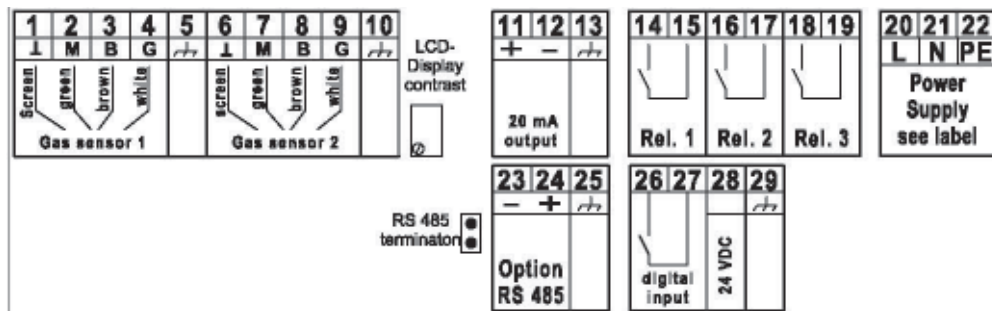
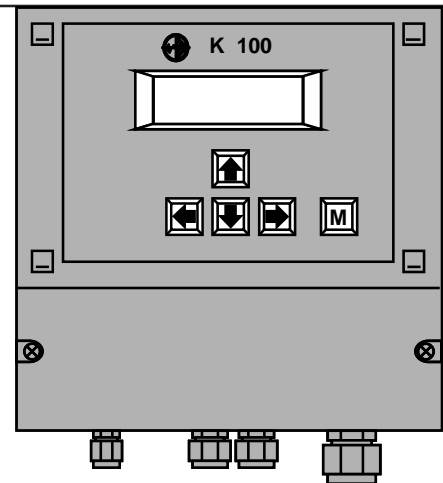
The sensing element must never get wet!

2.5 Connection diagram panel-mounting housing



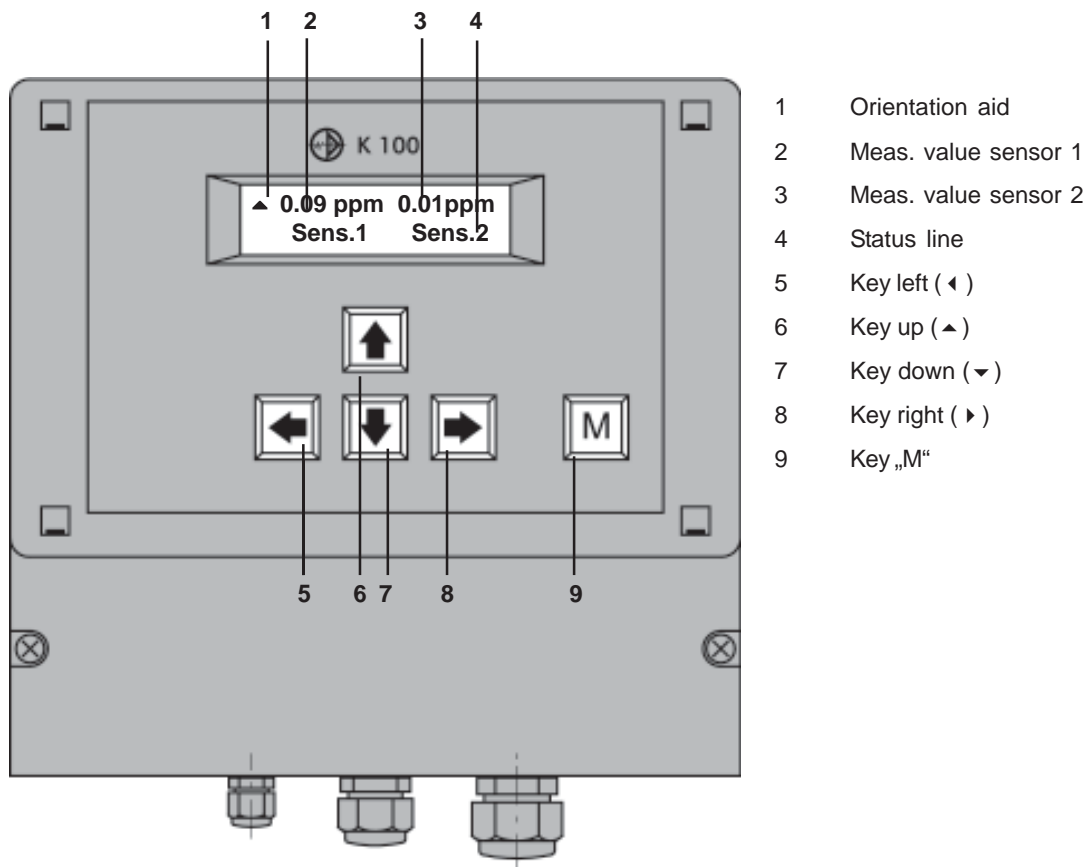
Connection	Terminals	Notes
Sensor 1	1 - 4	1 = screen 2 = green 3 = brown 4 = white
Sensor 2	5 - 8	5 = screen 6 = green 7 = brown 8 = white
Analog output	9 + 10	9 = +, 10 = -, max. load 500 Ohm
Digital input	11 + 12	11 = +, 12 = -, potentialfree contact e.g. to stop sprinkler when door opens
Relay 1	18 + 19	switches when measured value exceeds limit 1 to activate acoustic signal
Relay 2	20 + 21	switches when measured value exceeds limit 2 to activate sprinkler system
Relay 3	22 + 23	Alarm relay
Power supply	24 + 25 + 26	See information on instrument label!
RS485 (Option)	Sub-D Sub-D 4/7	3 = +, 8 = - bridge activates terminating resistance

2.6 Connection diagram wall-mounting housing



Connection	Terminals	Notes
Sensor 1	1 - 4	1 = Screen 2 = green 3 = brown 4 = white
Sensor 2	6 - 9	6 = screen 7 = green 8 = brown 9 = white
Display contrast	display	Potentiometer to adjust brightness
Analog output	11 + 12	11 = +, 12 = -, max. load 500 Ohm
Relay 1	14 + 15	switches when measured value exceeds limit 1 to set off acoustic signal
Relay 2	16 + 17	switches when measured value exceeds limit 2 to activate sprinkler system
Relay 3	18 + 19	Alarm relay
Power supply	20 + 21 + 22	See information on instrument label!
RS485 (Option)	23 + 24	23 = -, 24 = +
		Jumper A activates terminating resistance
Digital input	26 + 27	26 = +, 27 = -; potentialfree contact e. g. to stop sprinkler when door opens
	28	24 V DC power supply for switch

3. Operation of the instrument



When turned on the instrument shows the measured values of sensors 1 and 2, if a second sensor was selected. Any alarm or status messages are indicated in the second line.

With five membrane keys you can move within the menu:

With key ▼ you enter the main menu.

With keys ▲ and ▼ you move up and down in the menu.

With key ▶ you address a menu or parameter.

With key ◀ you leave a menu or store a change.

For your convenience triangles in the display indicate the directions you can take from your position in the menu.

With key „M“ you get back to the display of the measured values from any point in the menu. Changes that have not been stored will be lost.

NOTE **The instruments K 100 and K 100 W differ only in housing. Operation and menus are the same.**

3.1 How to adjust parameters

Sensor 1
▶ Chlorine

1) When you address a parameter the actual setting is displayed.

Sensor 1
▶ Ozone

2) Switch to the next alternative setting with key ▶ .

Sensor 1
▶ Chlorine

3) When you have come to the last alternative, pressing the key once more will bring you back to the start.

Selection between alternatives

For many parameters you have the choice between two or more alternatives, e. g. between Chlorine and Ozone measurement in the combination instrument. For such parameters you need only key ▶ . Switch from one alternative to the next until you either come back to where you started or until you reach the alternative you were looking for.

With these parameters any changes are immediately valid - there is no need to store the change.

Enter password
▶ 062

1) Address the parameter with key ▶ .

Enter password
▶ 062 ⇄

2) A double triangle appears behind the number indicating that the number can be changed now with keys ▲ and ▼ .

Enter password
▶ 078

3) Store the new value with key ◀ . The double triangle disappears - the new value is stored.

Adjustment of numerical parameters

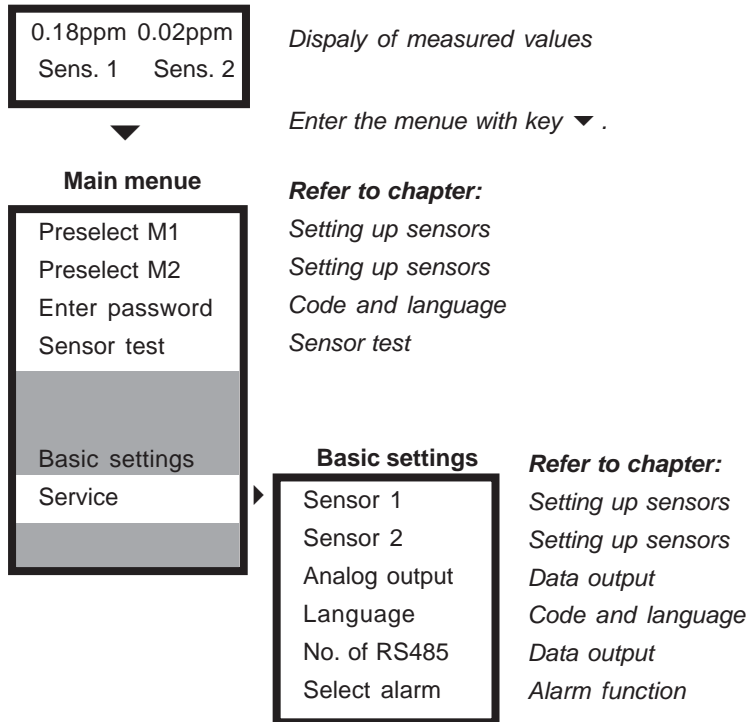
Numerical parameters can only be altered when a double triangle is visible behind the number. This double triangle appears when you address the parameter with key ▶ .

Adjust the parameter with keys ▲ and ▼ . A short pressure on the key changes the last decimal by 1. If you keep the key pressed, the value will continue changing until the pressure is released.

Store the changes with key ◀ . The double triangle disappears.

NOTE If you do not want to store the change, press key „M“ instead of key ◀ .

3.2 Menue overview



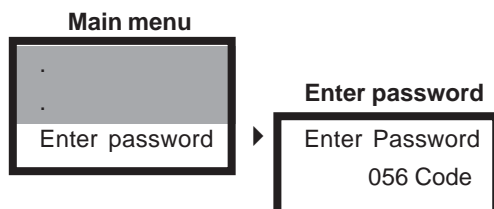
Main menu and basic settings

The parameters are sorted into two menus: In the main menu you will find all functions which are used regularly, such as calibration. The menu basic settings contains all parameters which are set just once during start-up.

On the following pages you will find information on how to adjust parameters and which parameters you need for which application. The information follows the following scheme:

- 1) General adjustments: password and language
- 2) Adjustments for measurement: selection of one or two sensors, setting of sensor slopes, setting of interval for automatic sensor test
- 3) Adjustments of the alarm: limits for acoustic signal and sprinkler system, delay for the sprinkler, assignment of alarm relay, direction of alarm relay

4. Code and language



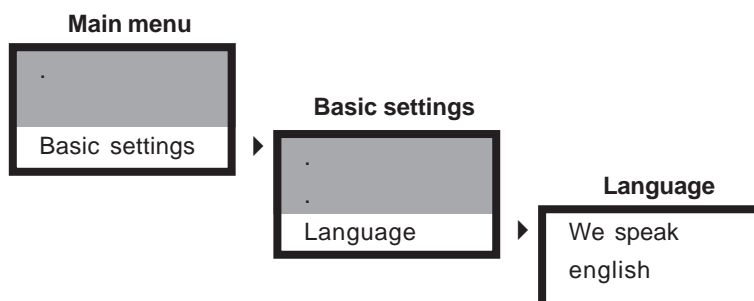
Enter password

To get access to the various parameters you have to enter the correct password:

Code 11 gives access to the parameters of the main menu.

Code 86 gives access to all parameters and functions.

With any other number it is impossible to select, view or change any parameter.

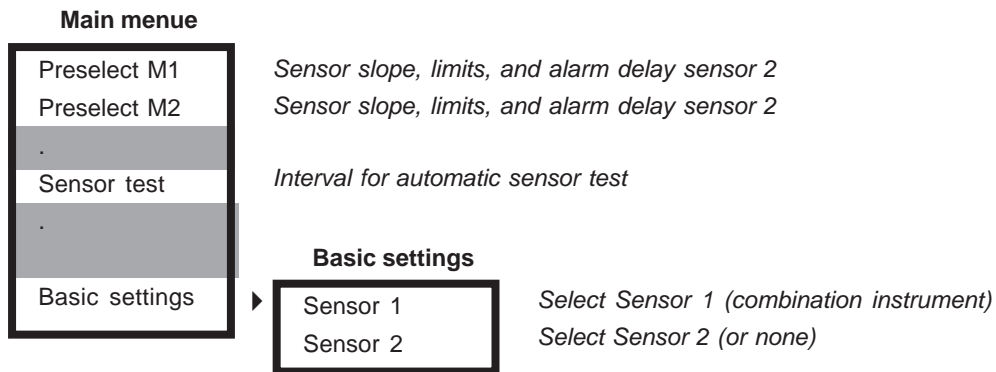


Language

For the communication with the instrument you can choose from a variety of languages.

Since choosing a language is part of the basic settings, it requires code 86. If a different code is set, you will be asked to enter the correct password.

5. Adjustments for measurement



At works the instruments are configured for one sensor. If you want to connect a second sensor, activate the second sensor in the basic settings.

With the Chlorine/Ozone/Chlorine dioxide combination instrument you can choose for both sensors between Chlorine, Ozone, and Chlorine dioxide. With sensor 2 you can additionally choose „none“.

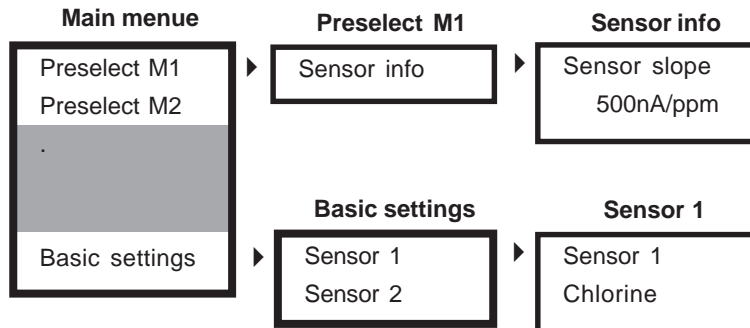
NOTE **The menu shows the options for the second sensor only if a second sensor has been selected. If not, even the main display will show only one measured value, and the indication „sens.1“ is omitted.**

Gas sensors are precalibrated. The slope of each sensing element is printed on the element's label. Just enter this value during set-up or whenever you exchange the element. Sensing elements have a limited life expectancy and have to be replaced at regular intervals.

The electric function of the sensors are checked automatically. Under „Sensortest“ you can adjust, in what intervals this test is carried out.

Additionally you can start the sensor test manually whenever you like.

5.1 Setting up the sensors



Selection of sensors

If you have a regular instrument, you only have to select whether you want to use one or two sensors. If you have a combination instrument, you can also select for each sensor between Chlorine, Ozone, and Chlorine dioxide.

- 1) Select the option „Sensor 2“ in „basic settings“.
- 2) The current selection is shown. Press key ▶ until you have found the selection you wanted, or until you got back to where you started.
- 3) Go back to „basic settings“ with key ▲. Select „Sensor 2“.
- 4) Press key ▶ to switch from one alternative to the other. If you do not want to use a second sensor, select „-----“.

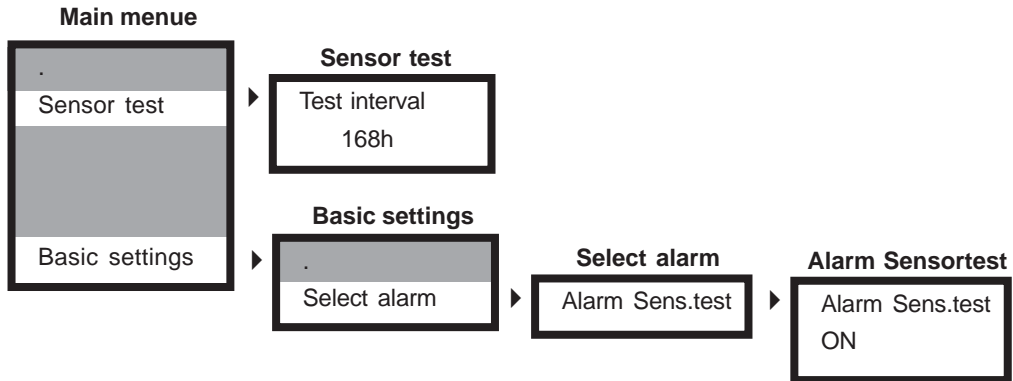
HINWEIS If you don't select a second sensor, the menu won't show the options related to sensor 2, and the main display will only show the measured values of sensor 1.

Enter the slopes of the sensors

Gas sensors are precalibrated. The slope of each sensing element is printed on the element's label.

- 1) Go to „Preselect Sensor 1“ in the main menu.
- 2) Go to „Sensor info“. The last setting of sensor slope is shown.
- 3) Adjust the value with keys ▲ und ▼ to the value indicated on the label of the sensing element.
- 4) If you have selected a second sensor, repeat the process for sensor 2.

5.2 Sensor test



Automatic sensor test

The instrument checks the electric output of the sensor regularly. You can adjust the interval between subsequent tests in the main menu.

During the test, all other functions are blocked, and the message „Sensor test“ is indicated in the display.

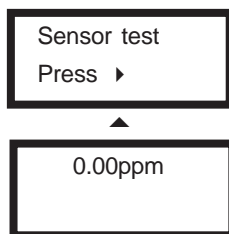
In case of defective or disconnected sensors the message „Error sensor 1 (2)“ is displayed.

If you have activated the alarm for the sensor test in the option „select alarm“ in the basic settings, the alarm relay is switched in case that the test has been unsuccessful.

NOTE **The automatic test function is deactivated if the interval is set to 0h.**

Manual sensor test

You can start the sensor test manually whenever you like, directly from the main display:

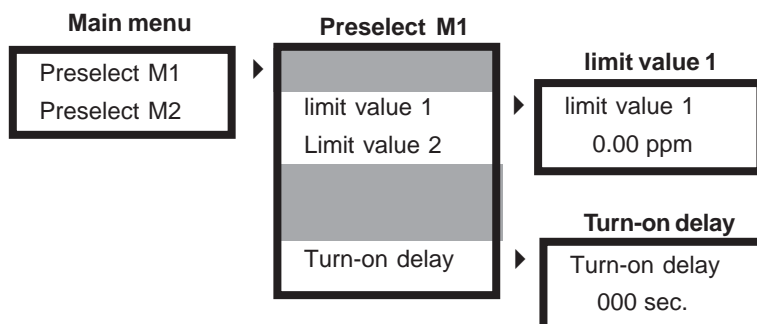


Starting from the main display, press key ▲ to go to the display shown above.

Start the sensor test with key ▶.

NOTE **The sensor test is not accessible in case of alarm.**

6. Alarm



You can set 2 limits for each sensor. If the measured value exceeds limit 1, relay 1 switches immediately, for. e.g. to activate an acoustic signal.

If the measured value exceeds limit 2, relay 2 switches, delay by the time specified as turn-on delay, for e.g. to activate the sprinkler system.

In both cases the message „limit 1 (2)“ is displayed.

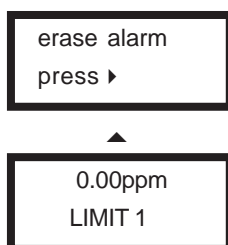
If you have assigned the alarm relay to a limit, this will also switch if the limit is exceeded.

6.1 Switch-off of the relays

You can switch off relay 2 via the digital input. If relay 2 activates the sprinkler, and the digital input is connected to a door contact, then in case of alarm the sprinkler will be switched off as soon as the maintenance personnel enters the room.

NOTE It will switch ON again if the door is closed while the alarm is active!

You can switch off relay 1 manually, directly from the main display:

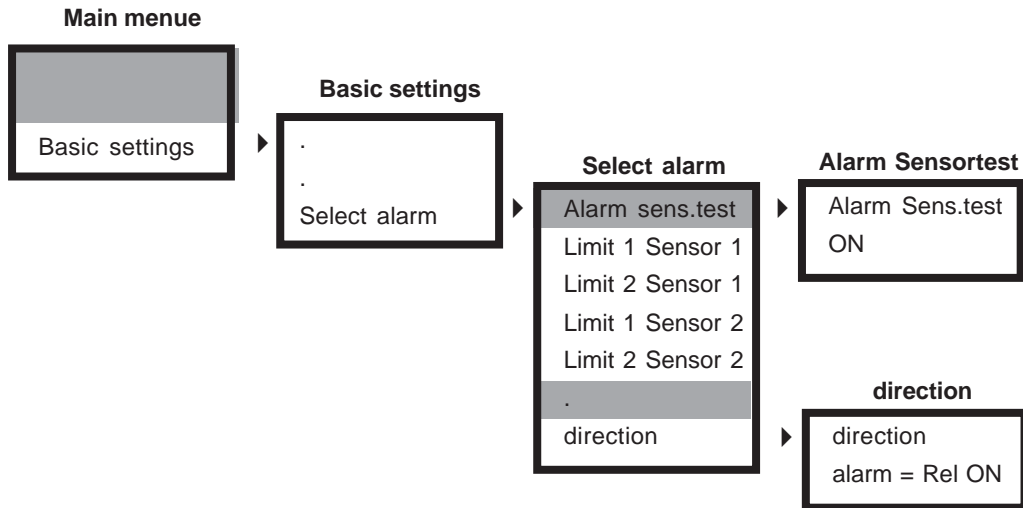


Press key ▲ to go to the display shown above.
Switch the relay OFF with key ▶.

NOTE This will only switch the relay OFF. The alarm message is still displayed until the cause of alarm has been eliminated.

NOTE When no alarm is active, key ▲ will take you to the sensor test instead of the alarm acknowledgement.

6.1 Configuration of the Alarm relay



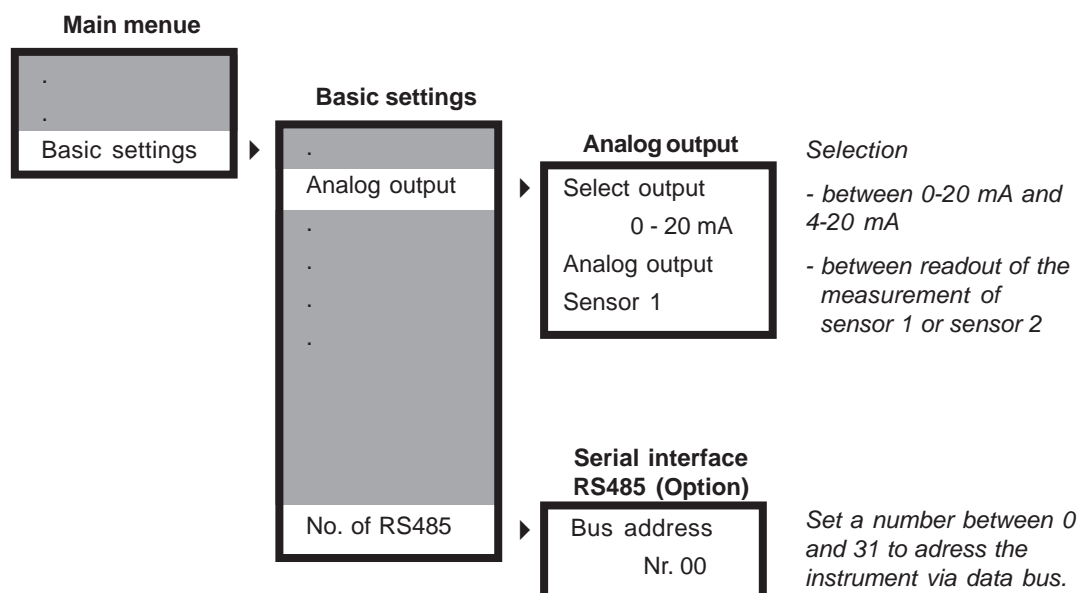
Relays 1 and 2 are assigned to the limits. In addition you can assign the alarm relay to each limit, so that whenever the measured value exceeds a limit, the alarm relay switches in addition to relay 1 or 2, respectively.

Each activated alarm switches the alarm relay (relay 3) in case of alarm, independent of any other actions. Relay 3 cannot be switched off manually - the alarm remains until the cause of alarm is eliminated.

Direction

For the alarm relay you can select whether it is usually OFF and in case of alarm ON (i. e. normally open), or vice versa. If you select „normally closed“, the relay is actively held in place under normal measuring conditions, and released in case of alarm. This means that even in case of power failure an alarm is issued.

7. Data output



7.1 Current output

You can read out the measured values of sensor 1 or sensor 2 as 0/4-20 mA signals via the current output. With the setting 4-20 mA the resolution is lower, but defective cable connections are immediately evident.

7.2 Serial interface RS485 (option)

The instruments are available with serial interface RS485 by means of which they can be integrated in a data bus system. Via the interface, all settings, measured and control values as well as any error messages can be read out digitally.

Instruments with RS485 are automatically delivered with the leaflet „Information on the RS485“ which contains instructions on the communication and a complete list of the functions available via interface.

8. Operation and maintenance

Display contrast

With instruments in wall-mounting enclosures the display contrast can be adjusted to the actual light conditions by means of a potentiometer. It is indicated in the connection diagram with the word „display“.

Cleaning

The front and the display should not get in touch with organic solutions such as methanol. Never let water get inside the instrument. We suggest to simply use a damp cloth for cleaning.

Exchange fuse

WARNING! Disconnect the power supply before opening the instrument!

ATTENTION Mind that the cable connections to the front are not damaged, broken or torn during the process!

Instruments in wall-mounting enclosures have an internal fuse which has to be replaced at need. You will find a spare fuse fixed to the inside of the terminal cover. Information on the fuse can be found in the chapter „Technical data“.

To exchange the fuse, open the front carefully. The fuse is located in the lower right hand side. It is kept in place by a Bayonet lock. Turn the lock to the left until the fuse pops up. Exchange it and fix the new fuse by turning the lock to the right. Put the front back on and fix it tightly.

Maintenance of the safety functions

Regularly check the alarm relays to make sure that in case of failure both the indication by the instrument and the recognition by the superior control (SPS etc.) work reliably.

You can set off the alarm for example by setting limit S1 to a value smaller than the current measured value.

NOTE Mind that perhaps an alarm delay has been set. Also remember to restore the original settings after the test!

You can also check the relays by manual operation. Select „relay test“ in the „Service“ menu.

Maintenance of the measurement

Make sure that you enter the sensor slope indicated on the sensor label whenever you set-up or exchange a sensor element.

Check the sensor function regularly by using the automatic sensor test.

Use the sensor elements only until the expiration date. Keep them cool and dry until you need them. If you have to exchange a sensor, make sure that the replacement sensor is appropriate for your application and corresponds to the equipment used.

Mind that you have to re-enter the sensor slope whenever you change a sensor - or an instrument!

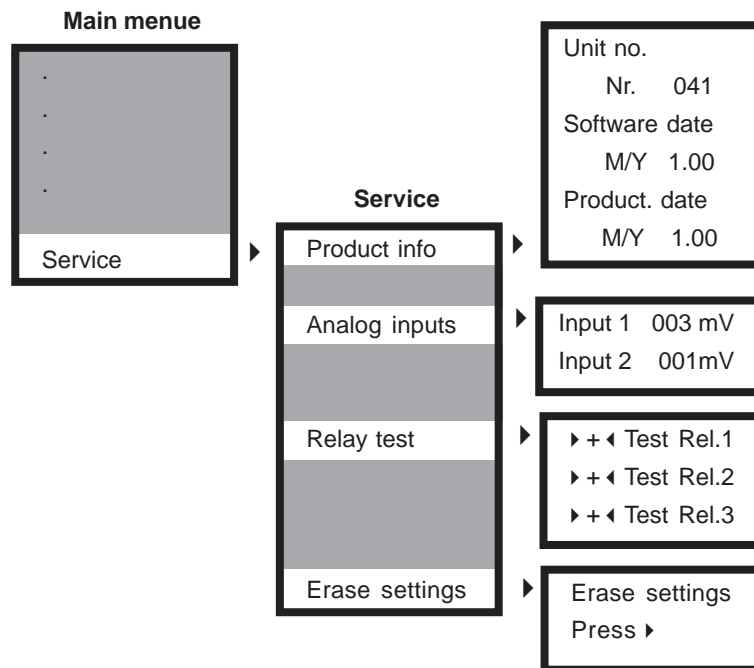
Set-up

Follow the instructions of this manual. Carry out all steps described. Check both the measured values and the settings before selecting automatic mode.

Disposal:

For disposal please notice that the instrument contains electrolyte capacitors which have to be disposed separately.

9. Service



In this menu you will find information which is especially important for any inquiries, updates or problems.

9.1 Product info

These figures allow a precise identification of the instrument (hardware and software).

9.2 Analog inputs

Here you can see the raw data the instrument obtains from the sensors. They are not influenced by compensations or calibration and offer valuable information in case of problems with the measurement or the instrument.

9.3 Relay test

This is a manual operation of the relays. With the combination of keys indicated you can switch the selected relay ON for the time that the keys are pressed.

9.4 Erase settings (reset)

With this function you can erase all customer settings and restore the original at-works data.

The process takes some 30 seconds. When it is finished the display will show the measured value, and the controller will switch off.

Customer settings - for reference

Instrument:

Identification / Location:

Type: date of installation:

Serial nr. Software version.....

Measurement:

Sensor 1: Sensor 2:

Chlorine Ozone Chlorine Ozone none

Sensor test:

Test interval Alarm

ON OFF

Limits:

Sensor 1: Alarm

Limit 1 ON OFF

Limit 2 ON OFF

Turn-on delay..... sec.

Sensor 2: Alarm

Limit 1 ON OFF

Limit 2 ON OFF

Turn-on delay..... sec.

Direction:

in case of alarm relay ON in case of alarm relay OFF

Current output:

0-20mA 4-20mA

for: Sensor 1 Sensor 2

Serial interface RS 485:

Bus adress

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