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ICD

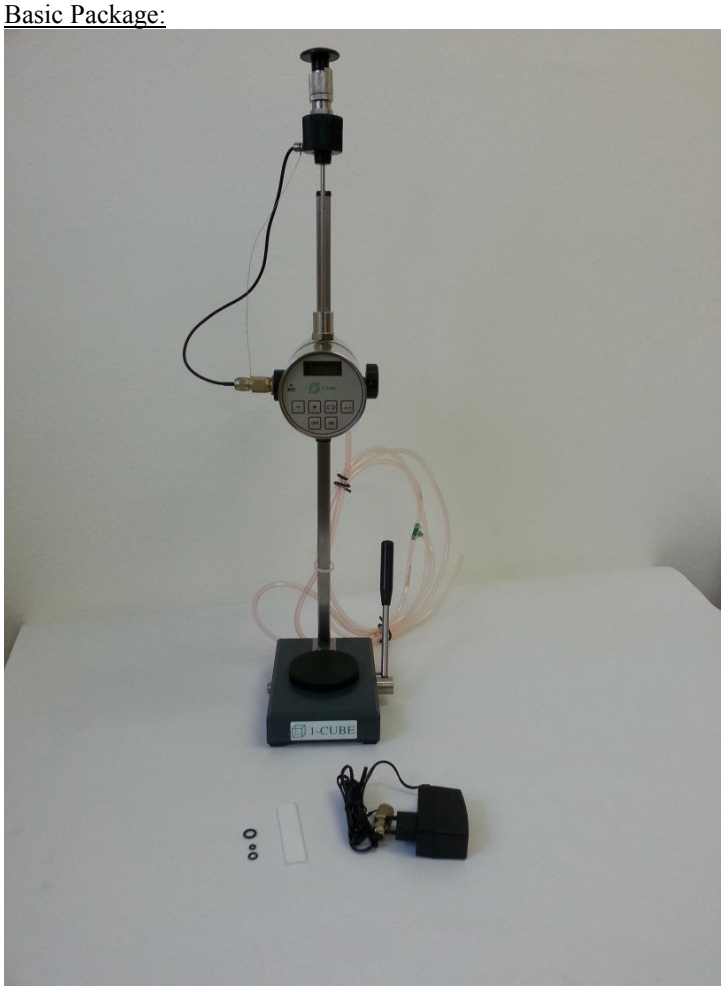
**MEASURING DEVICE
FOR CO_2 CONTENT AND AIR RESIDUE
IN BOTTLES AND CANS**

USER'S GUIDE

Contents:

1. Equipment

Basic Package:



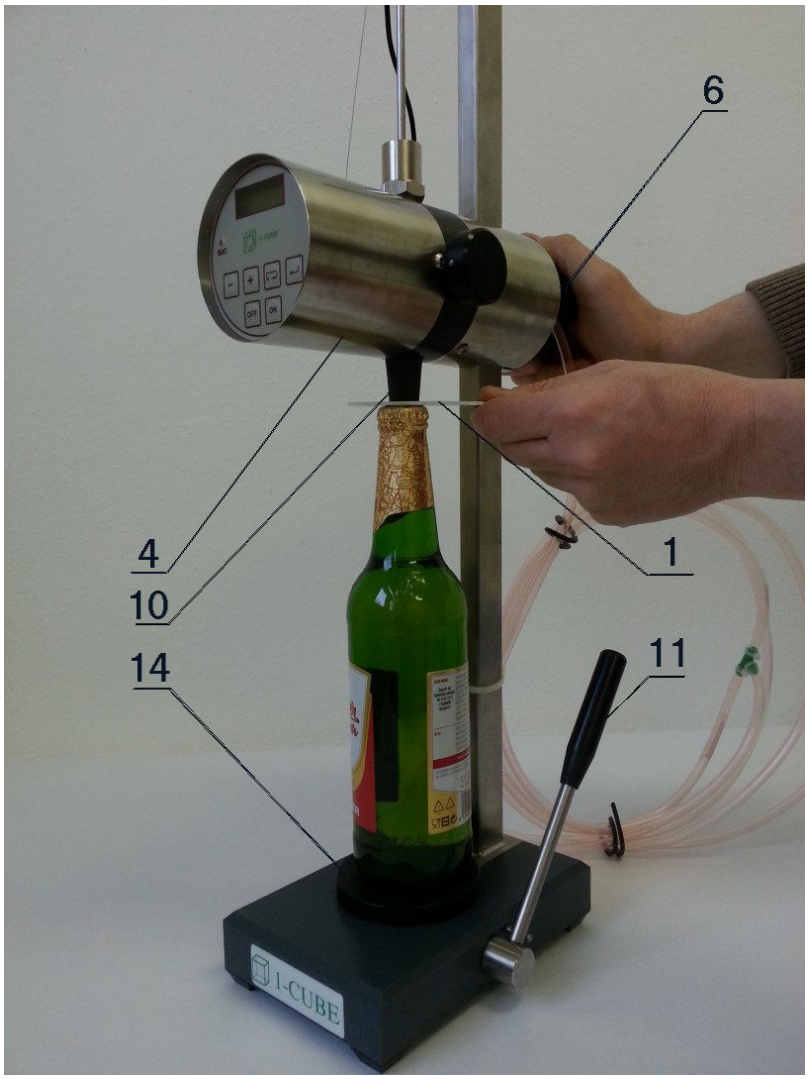
the measuring device ICD ..... 1 unit
extra rubber seal ..... 1 unit
plastic stop ..... 3 units
charger ..... 1 unit
user's guide ..... 1 unit

Accessories:

burette ..... 1 unit
pressure reducing valve with manometer ..... 1 unit
PET bottles holder ..... 1 unit
filter 1/2" ..... 1 unit
ball sample valve 1/2" with outlet for hose ..... 1 unit
ball valve1/2" ..... 1 unit
fixing sleeves Rabow 1/2" ..... 2 units
tightening clamp 13-16 mm ..... 2 units
rubber hose (length and number of hoses supplied according to customer's requirement, standard length is 1m)
Note: accessories are not part of the basic package however they are available by request for an additional fee.

2. Installation and Maintenance

Place the apparatus on a horizontal and flat support plate (table) close to a sink and inlet of pressure water.
Adjust the height of supporting block (4) over the centering dish (14) – move the lever (11) in the back position, Loosen the adjusting screw (6) and shift up or down the supporting block (4) to have the minimum distance between the piercing and withdrawal head (10) and the crown of the bottle placed on the centering dish (14). Then tighten the adjusting screw (6). Use the plastic stop (place it between crown cork and the piercing and withdrawal head (10)) to reach the right distance between the piercing and withdrawal head (10) and the crown otherwise follow the instructions described above. Do it carefully not to strip the thread in the plastic supporting block (4).



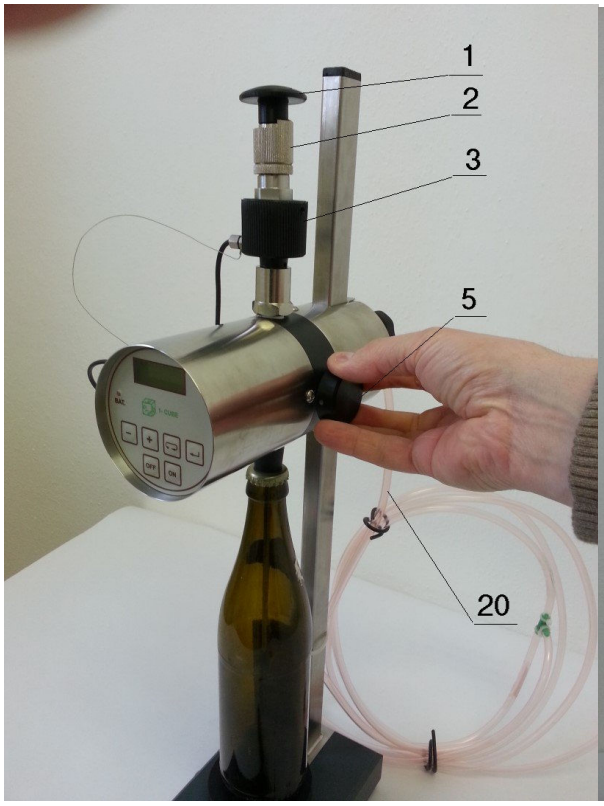
Maintenance

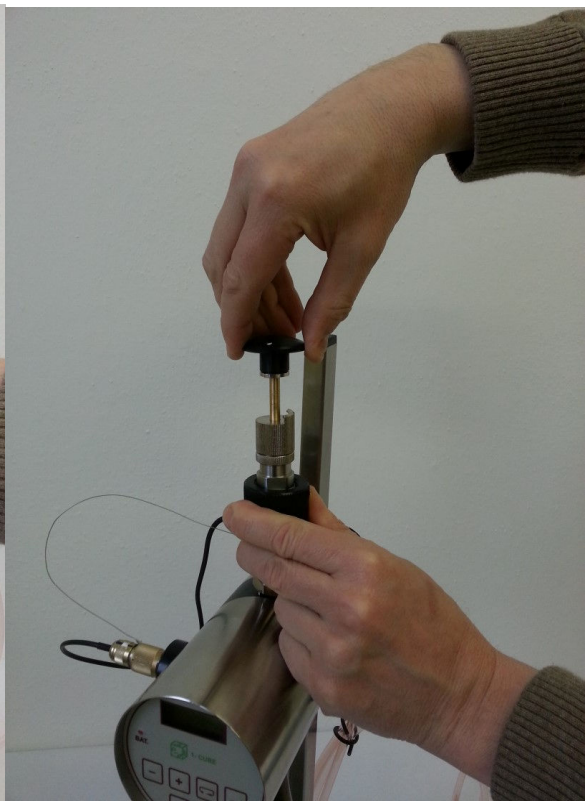
We recommend preceding the measurement to the operator to attach accessories: ball valve 1/2“ , filter 1/2“ to the inlet of water, reducing valve with manometer and ball valve 1/2“ with outlet for hose at the filter’s outlet. Maximum pressure of water has to be 1 bar i.e. 100kPa. The device is ready for measurement then.

Cleaning

Always clean the apparatus when the work is over. Keep the apparatus in a clean place. The device cleaning after all measurements (before storing) is easy and fast. First connect the plastic hose (20) to the water supply. Water flows both into the device and into the waste hose. The volume of rinsing water can be adjusted with the help of tightening clamp (not part of the basic supply) placed on the hose.

Shift out the withdrawal probe (3) and place the empty beer bottle on the centering dish (14). Raise up the bottleneck with the help of lever (11). Insert the withdrawal probe (3) into the bottle, open the valve (5) of water inlet and appropriately the water cock. Then start to rinse the device with water. The rinsing water flows both into the device and into the waste hose. Trap the rinsing water into the empty beer bottle. Once the bottle is full of water shut the inlet valve and pull out and consequently depress button (1) to rinse (clean) pump (2).
Shift out the withdrawal probe (3) and remove the beer bottle, press down the withdrawal probe (3) and dry it carefully with flannel. After this handling the device is ready for the next measurement.





3. Safety recommendations

Measuring device of CO_2 content - type ICD may be operated only by person who became completely acquainted with its function, or who became thoroughly acquainted with the user's guide of this device. The person also has to be completely acquainted with work with caustics.
Measuring device ICD can be used only for determination of CO_2 content in the ranges defined in technical data.
Never connect the measuring device to places where over measuring capacity of the device can occur. This could cause device destruction and staff injury.
Check the device before each measurement. Do not use visibly damaged device and contact the qualified service personnel who provides service for delivered device.
Warning! It is forbidden to use the device for pressure higher than 600kPa and for temperature higher than +30°C. It could cause device destruction and staff injury.

4. Technical data

range of CO_2 measurement ..... **1,0 to 9,9 g/l**
range of temperature measurement ..... **0 to +30°C**
range of pressure measurement ..... **0 to 600 kPa**
accuracy of CO_2 content measurement ..... **+ - 0,1 g/l**
accuracy of temperature measurement ..... **+ - 0,1°C**
accuracy of pressure measurement ..... **+ - 0,5%**
dimensions ..... **565x220x220 mm**
weight (of empty device) ..... **about 2 kg**
range of air residue measurement in the bottle neck ..... **0 to 12 ml (scale division 0,1ml)**
range of air measurement in the bottle neck ..... **0 to 2,2 ml (scale division 0,01ml)**

5.0 Operating Instructions

Measuring device is designed for determination of CO_2 content in beer bottles NRW, EURO of 0,5l and 0,33l, plastic bottles and cans.
Prior to measuring, it is necessary to visually check the device for damage. Button (1) on the top of the device must be secured in blocked position before measurement.

1. Shift out the withdrawal probe (3) to the upper position to have the lower part of the withdrawal probe and the piercing and withdrawal head at the same level.
2. Shut both valves (5, 7).
3. Place the crowned beer bottle or the plastic bottle on the centering dish (14). Plastic bottle must be placed in the special adapter for little neck of screwed cap.
4. Move the lever (11) backward to have the top of bottle very close to piercing and withdrawal head (10). Place the bottle so its cap is just right in the middle for piercing and withdrawal head (10) to avoid inclination.
5. Pull the lever (11) towards you to its very end. The crown is pierced with this movement.
6. Insert the withdrawal probe (3) fully into the bottle.
7. Then open and immediately after shut the valve (5) in order to reach pressure zero inside the bottle (can).
8. After that unlock the button (1) on the top of the device and pull out and consequently depress (twice) button (1) to activate the pump to flutter dissolved CO_2.

Note: During measurement of CO_2 dissolved in soda or unsweetened water it is necessary to follow this procedure: dip the lower part of the withdrawal probe (3) into the flask with prepared sugar solution or juice. Then pull out the button (1) to suck sugar solution or juice into the pump. Dose of sugar solution or juice is necessary to balance the state of pressure and temperature required by Henry's law.

1. Shift out the withdrawal probe (3) to the upper position to have the lower part of the withdrawal probe and the piercing and withdrawal head at the same level.
2. Shut both valves (5, 7).
3. Place the crowned beer bottle or the plastic bottle on the centering dish (14). Plastic bottle must be placed in the special adapter for little neck of screwed cap.
4. Move the lever (11) backward to have the top of bottle very close to piercing and withdrawal head (10). Place the bottle so its cap is just right in the middle for piercing and withdrawal head (10) to avoid inclination.
5. Pull the lever (11) towards you to its very end. The crown is pierced with this movement.
6. Insert the withdrawal probe (3) fully into the bottle.
7. Then open and immediately after shut the valve (5) in order to reach pressure zero inside the bottle (can).
8. After that unlock the button (1) on the top of the device and pull out and consequently depress (twice) button (1) to activate the pump to flutter dissolved CO_2.

5.2 CONTROL OF THE ELECTRONICS

The device (i.e. switch-on, shutdown, measurement, saving of the measured sample in the memory) is controlled with the help of the membrane keyboard and the display always after taking of the sample and fluttering of the dissolved CO2.

5.2.1 SWITCHING ON AND OFF THE DEVICE

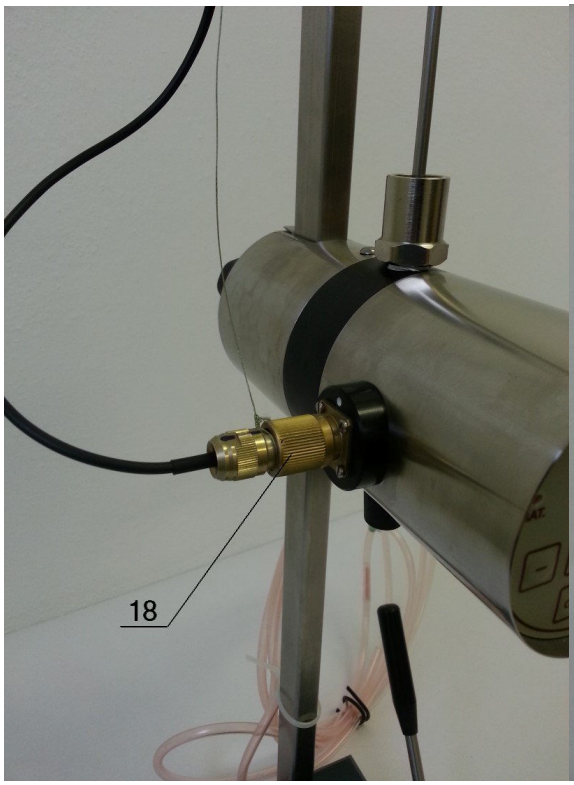
Press the key ON– to switch on the device. Press the key OFF – to switch off the device.

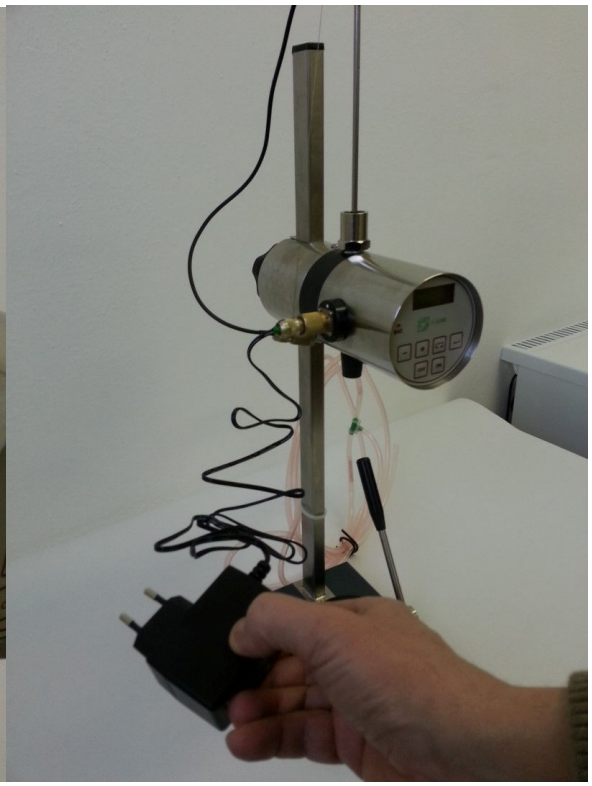
5.2.2 CHARGING OF THE DEVICE

If the battery voltage is too low then after the switch-on the device the text „Recharge battery“ appears on the display for a second. It is possible to work with the device for another 30 minutes. If the device is not recharged during this time then the text „Low voltage“ appears on the display and the device is shut down. If you want to check how the battery is charged while working with the device – press the rotation key - the text „battery“ appears on the first line of display and current voltage on the second line of display. During charging of the device the led BAT is shining.

Unscrew the connector cover and put the opposite connector of the adaptor in to charge the device.

Warning: **watch the right orientation (Boss in the adapter connector into the adapter slot. Boss and slot are marked with colored dot).** Adaptor can be plugged in el. socket now.





Notice: In case the connectors will not be put in the right way they will be damaged. This type of damage is not accepted by manufacturer under warranty.

The device can charged only by the supplied adaptor: Average charging takes about 8 hrs and the charged accumulator is under about 19V. In case of need the period can be shortened but the running period and the accumulator life-time will be shortened too. Once the charging of the device is over unplug the adaptor and the opposite connector of the adaptor from the connector on the device. At the end screw fully the connector (18 see pic.) cover on the device.

5.2.3 CO_2 CONTENT MEASUREMENT

Follow the paragraphs 5.1.1. and 5.1.2 and further:

1) Press the key ON/OFF to switch on the device. The text „1-CUBE“ with the program version appears on the display for a moment. Then the following text appears:
„**ENT.meas.**“
„**+view.**“

2) Press the key ENTER. First, „**measure**“ is displayed, then the measured value of temperature (**e.g. 5,0 °C**) appears on the display and then value of pressure (**e.g. 140kPa**).
The measured appears on the display for a moment. Then the measured value of CO_2 appears on the display **e.g.**

0,512 %bw
5,12 g/l

By displaying CO2 content the measurement of sample is over and the measure value is saved in the GMD(K) memory.

Press the key ENTER to finish the measurement, the text: „
„**ENT.meas.**“
„**+view.**“

And the device is ready for next measurement.

5.2.4 SCANNING MEMORY OF THE MEASURED VALUES CO_2

The measured values of CO2 are saved in the device memory even after its shutdown. The capacity of memory is 450 measured values.

1) Press the key ON/OFF to switch on the device. The text „1-CUBE“ with the program version appears on the display for a moment. Then the following text appears

„**ENT.meas.**“

„**+ view.**“

2) Press the key plus (+).There is text „**memory**“ on the first line and the measured values of CO_2 in g/l appear in turn from the oldest value to the newest ones on the second line.

after the last saved value the numbers start to appear 655,35 (free capacity of the memory). Press the key ENTER to stop scanning memory. Then the following text appears

„**ENT.meas.**“

„**+ view.**“

Note: Once memory is full, then it will be automatically deleted.

Then the following text appears:

„**memory**“

„**deleting“**

And all the saved values are overwritten with number 655,35 (free capacity of the memory).

5.2.5 DELETING OF CO_2 MEASURED VALUES FROM MEMORY

The measured values can be deleted from memory any time. The memory capacity will be completely recoved (450 values) and newly measured values will be saved in sequence from beginning of the memory.

1) Press the key ON/OFF to switch on the device. The text „1-CUBE“ with the program version appears on the display for a moment. Then the following text appears: „**ENT.meas.**“

„**+ view.**“

2) Press the key mínus (-).Then the following text appears „**memory**“

„**deleting“**

And all the saved values are overwritten with number 655,35 (free capacity of the memory).

5.2.5 CO_2 MEASURED VALUES TRANSFER FROM THE MEMORY INTO PC (TYPE GMDK ONLY)

Possibility of data transfer through communication cable into PC has only type GMDK (unlike type GMD). Before the first data transfer from the device into PC, first install program DataViewer from our supplied CD.

1) Connect the shut-off device GMDK with the help of cable FTDI USB-RS485-WE-1800-BT (supplied with the device GMDK) with USB port of your PC.

2) Run the program DataViewer in your PC and select the corresponding COM port (e.g. COM 5).

3) Press the key ON/OFF to switch on the device GMDK. The text „1-CUBE“ with the program version appears on the display for a moment. Then the following text appears: „**memory**“

„**deleting**“

4) Press the key plus (+).There is text „**memory**“ on the first line and the measured values of CO_2 in g/l appear in turn from the oldest to the newest ones on the second line.

At the same time these values are displayed in DataViewer program Windows in column in turn from the oldest value to the newest ones. These values can be saved in file.

Note: the measured values are displayed in g/l in DataViewer program.

6.0. Service

Service is provided by company:

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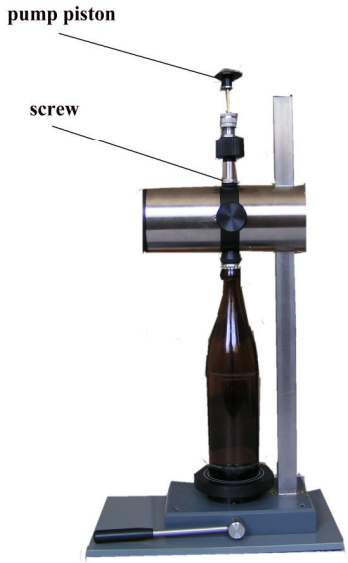
Replacement of the "o-rings"

The spare o-rings are supplied as optional accessories with the instrument, which means that if the o-rings are damaged during the lifetime of the instrument the operator is able to replace them. You can discover easily that the o-rings are damaged if the instrument has pressure leakage and consequently influences the CO_2 measurement (the measured value of CO_2 is lower than real one).
The supplied "o-rings":
O-rings of the pump piston .....2 units..... see pic. 1
O-ring of the screw.....1 unit ..... see pic. 1
O-rings of the valve (its front part)....2 units..... see pic.2
O-rings of the valve body.....2 units..... see pic.2
O-rings are marked according to their positions, use always the o-ring corresponding to the particular position when you replace them. The o-rings replacement can also be ordered to the manufacturer of the instrument.

Pic 1



Pic2