1-CUBE

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GMD and GMDK

MEASURING DEVICE OF CO_2 CONTENT IN FERMENTING TANKS AND KEG CASKS

USER'S GUIDE

Content:

1.0 RANGE OF SUPPLY AND DEVICE APPLICATION

Standard range of supply:

the own measuring device GMD (GMDK) ..... 1 unit

adapter AC/DC GMD (GMDK) ..... 1 unit

tubes – length about 1 m GMD (GMDK) ..... 2 units

cable RS485/USB FTDI USB-RS485-WE-1800-BT

for connection to PC (only for type GMDK) ..... 1 unit

DVD with DataViewer software for PC (only for type GMDK)..... 1 unit

Optional accessories:

withdrawal head for kegs..... 1unit

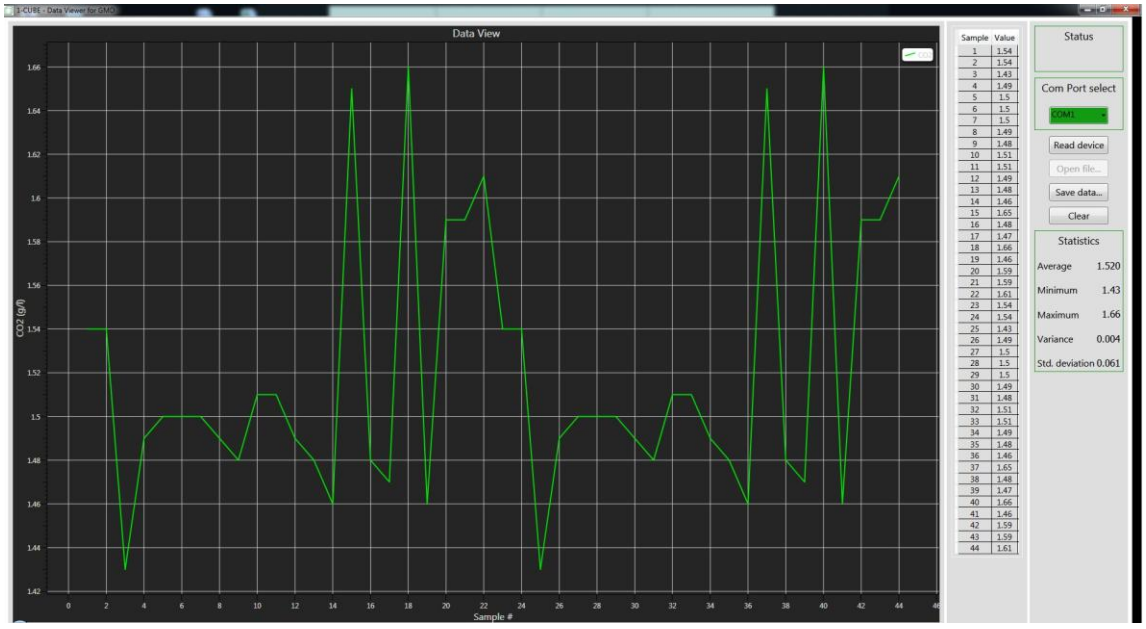
Note: accessories is not part of the supply - only on customer's demand

GMD is a measuring device for measurement of CO_2 content in beer, soft drinks and mineral water in tanks and KEG casks.

Note: Adapted only for industrial application

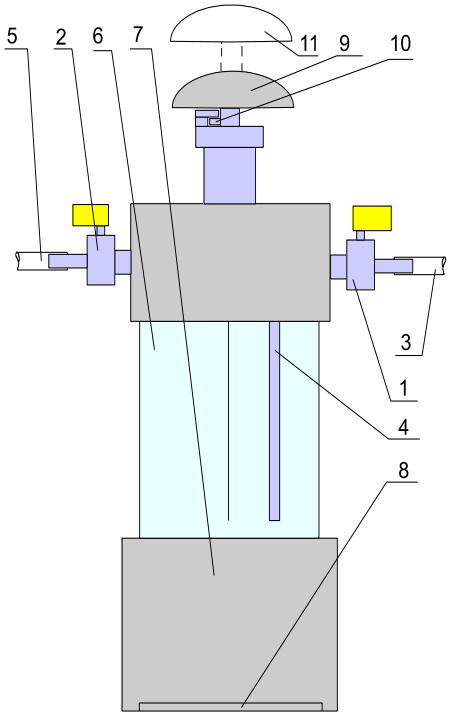
Whenever in the future GMD unit can be upgraded to GMDK unit if required.

With the comfortable version GMDK, the CO_2 measurement can be transferred to PC. The results can be displayed on graph and saved into files, useful for further, deeper analysis.



2.0 INSTALLATION - PUTTING THE DEVICE INTO OPERATION AND ITS MAINTENANCE

Pic.1 GMD set



Explanation: 1. Inlet valve, **2**. Outlet valve, **3**. Inlet hose **4**. Stainless steel tube, **5**. Outlet hose, **6**. Transparent vessel, **7**. Bottom of the vessel, **8**. Keyboard with display, **9**. Button, **10a** Down unsecured position, **10b** Down - secured position, **11**. Upper position

2.1 TAKING OF SAMPLES

The device is ready for measurement at the moment of delivery.

Preceding the own measurement connect the device by fixing of inlet hose (3) to the sampling point. The measured sample must flow through stainless tube (4) to the bottom of the vessel. The inlet hose (3) must be secured at the sampling point not to fall out during taking of sample under pressure.

2.2 DISCHARGING OF THE SAMPLE

Close the sampling cork on the tank, then open both inlet and outlet valves to remove any pressure inside the hoses and the GMD. Then disconnect the inlet hose (3), place the outlet hose (5) to the drain and turn the device upside down (the keyboard is up now). At the same time hold the inlet hose (3) 10 cm over the device. Check visually if the transparent vessel (6) is empty.

If you are going to measure other samples, you don't need to empty the GMD. You can rinse the old sample with the new one by leaving the new beer flowing through the GMD about 30 s.

If you have finished measurement, clean the device. Rinse the device with clean water.

2.3 CLEANING OF THE DEVICE

Open the inlet valve (1) and the outlet valve (2). Place the outlet hose (5) to the drain. Connect the inlet hose (3) to the potable water supply. Afterwards open slowly the water cock and rinse the device with water. Both ball valves (1,2) have to be open during rinsing.

Warning! Pressure of water must not exceed value 250kPa.

Whole internal space of the vessel (6) must be filled with water during cleaning. During rinsing pull out and consequently press down several times the button (9) to rinse both pump and capillary.

It is important to remove any traces of beer to prevent the piston getting stuck.

After rinsing:

Once the cleaning is over, switch off the water cock. Disconnect the inlet hose (3) from the water cock. If you plan to use the device next day, do not discharge the water from the device and pull up the button (9) to suck the water inside the pump.

If you want to discharge the water then place the outlet hose (5) to the drain and turn the device upside down (the keyboard is up now). At the same time hold the inlet hose (3) 10 cm over the device. First open the outlet valve (2) and subsequently open the inlet valve (1) and discharge the water. Check visually if the graduated vessel (6) is empty.

Clean the external surface with soft flannel moistened with water. After this handling the device is ready for next measurement.

3.0 SAFETY RECOMMENDATIONS

Measuring device of CO_2 content - types GMD (GMDK) may be operated only by person who became completely acquainted with its function within the framework of the training, or who became thoroughly acquainted with the user's guide of this device.

Measuring device GMD (GMDK) can be used only for determination of CO_2 content in the range of measured values determined by technical conditions. Never connect the measuring device to the withdrawal spots where measured parameters are over measuring capacity of the device.

Check 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 600 kPa and for temperature higher than +30 degrees Celsius. It could cause device destruction and staff injury.

4.0 TECHNICAL DATA

range of CO_2 measurement ..... 2.0 – 9.99 g/l or in mass percentage 0.2 – 0.99 m%

range of temperature measurement..... 0 – +30 °C

range of pressure measurement..... 0 – 600 kPa

accuracy of CO_2 content measurement. ± 0.1 g/l or in mass percentage ± 0.01 m%

accuracy of temperature measurement ± 0.1 °C

accuracy of pressure measurement..... ± 0.5 %

dimensions ..... 290 x 190 x 100 mm

weight (of empty device)..... about 1.5kg

protection..... IP 54 (with threaded cover on connector)

5.0 OPERATING INSTRUCTIONS

5.1 MEASUREMENT PROCEDURE

5.1.1 TAKING OF SAMPLES

Measuring device for measurement of CO2 content in beer, soft drinks and mineral water in cylindro-conical fermenters, tanks and KEG casks completed with withdrawal head for kegs (Optional accessories).

Check device before each measurement. Do not use visibly damaged device**.**

Notice! Sludge the sampling point before connecting the device. Sludge the sedimented yeast to fill inside the chamber only beer without sedimented yeast!!!!

Check button (9) on the top of the device if it is in secured position (10b). Afterwards connect the device by fixing of inlet hose (3) to the sampling point. The inlet hose (3) must be secured not to fall out with the pressure.

If there is a big difference in diameters of the hose and sampling valve, use a reduction in the supplied hose and the other one in another hose satisfactory for safe sampling. We recommend to fix the hoses on the reduction with clamps.

Place the outlet hose (5) to the drain, the inlet valve (1) is shut during this handling. Afterwards open fully the valve of the sampling point and let beer or saturated beverage go into the inlet hose (3) to inlet valve (1). Open fully the inlet valve (1) on the device.

5.1.2 CO_2 CONTENT MEASUREMENT

Open the outlet valve (2) to let the sample fill in the transparent chamber SLOWLY (to avoid foam creation)!

Fill the transparent chamber (6) completely with the sample and force the foam completely out. Check visually if there is no foam or bubbles inside the chamber (6)!

Hold the device in a vertical position during taking of sample.

Let the beer flowing during at least 15 s, 30 s if you are rinsing the sample of previous measurement.

Now first shut the inlet (1) valve, then 2 seconds later (you can count "31, 32" in your head) shut the outlet (2) valve. Push out the button (9) of the secured position (10b) and pull it out into the upper position (11). Hold it for a while in this position to equalize the pressure. Then press down the button (9) to the very down unsecured position (10 a). After this handling dissolved CO_2 is fluttered and the pressure increases in the chamber (6). Repeat this action one more time.

<u>You should not pump more than two times to get good results and a good repeatability</u>.

Then lock the button (9) in the down secured position (10 b).

Turn the instrument upside down 2 times.

Then follow the procedure described in *5.2.3 CO2 CONTENT MEASUREMENT*

5.1.3 DISCHARGING OF THE SAMPLE

Close the sampling cork on the tank, then open both inlet and outlet valves to remove any pressure inside the hoses and the GMD. Then disconnect the inlet hose (3), place the outlet hose (5) to the drain and turn the device upside down (the keyboard is up now). At the same time hold the inlet hose (3) 10 cm over the device. Check visually if the transparent vessel (6) is empty.

If you are going to measure other samples, you don't need to empty the GMD. You can rinse the old sample with the new one by leaving the new beer flowing through the GMD about 30 s. If you have finished measurement, clean the device. Rinse the device with clean water.

5.1.4 CLEANING OF THE DEVICE

Open the inlet valve (1) and the outlet valve (2). Place the outlet hose (5) to the drain. Connect the inlet hose (3) to the potable water supply. Afterwards open slowly the water cock and rinse the device with water. Both ball valves (1,2) have to be open during rinsing.

Warning! Pressure of water must not exceed value 250kPa.

Whole internal space of the vessel (6) must be filled with water during cleaning. During rinsing pull out and consequently press down several times the button (9) to rinse both pump and capillary.

It is important to remove any traces of beer to prevent the piston getting stuck.

After rinsing:

Once the cleaning is over, switch off the water cock. Disconnect the inlet hose (3) from the water cock. If you plan to use the device next day, do not discharge the water from the device and pull up the button (9) to suck the water inside the pump.

If you want to discharge the water then place the outlet hose (5) to the drain and turn the device upside down (the keyboard is up now). At the same time hold the inlet hose (3) 10 cm over the device. First open the outlet valve (2) and subsequently open the inlet valve (1) and discharge the water. Check visually if the graduated vessel (6) is empty.

Clean the external surface with soft flannel moistened with water. After this handling the device is ready for next measurement.

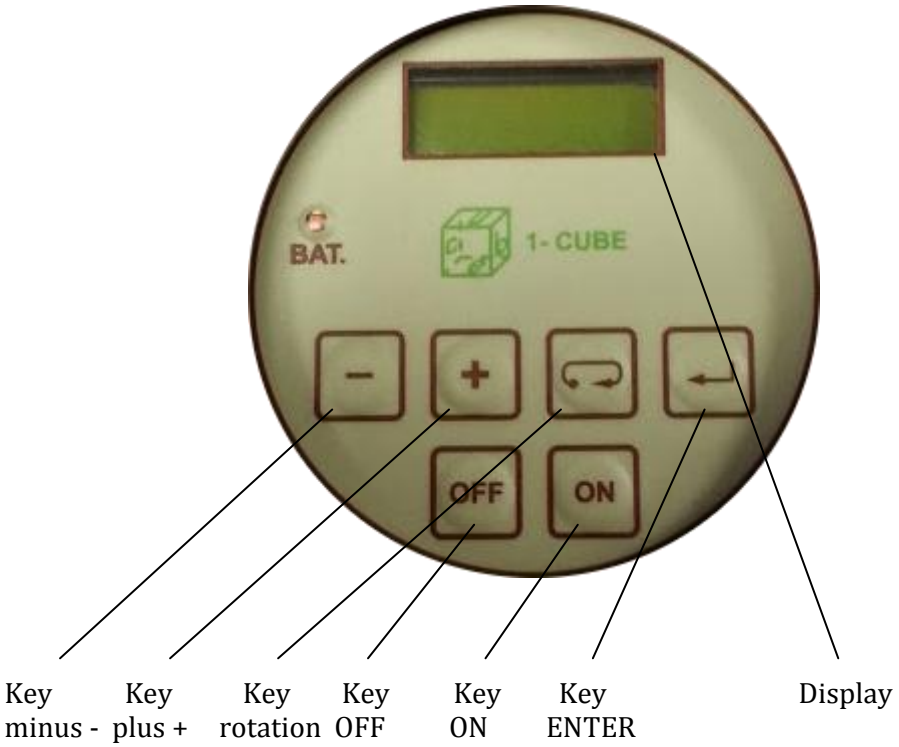
If you want to discharge the water then place the outlet hose (5) to the drain and turn the device upside down (the keyboard is up now). At the same time hold the inlet hose (3) 10 cm over the device. First open the outlet valve (2) and subsequently open the inlet valve (1) and discharge the water. Check visually if the transparent vessel (6) is empty.

Clean the external surface with soft flannel moistened with water. After this handling the device is ready for next measurement.

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.

Pic.2.



5.2.1 SWITCHING ON AND OFF THE DEVICE

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

5.2.2 CHARGING OF THE DEVICE

If the battery voltage is too low then after the switch-on of 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 monitor 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 lit.

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).** AC/DC adaptor can be plugged in electric . socket now.

<u>Note</u>: In case the connectors will not be put in the right way they will be damaged. This type of damage is not covered by manufacturer's warranty.

The device can charged only by the supplied adaptor: Average charging takes about 8 hours and the charged accumulator is under about 19V. The recharging time can be shortened if needed 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 connector from the device. Then screw the cap of the connector for protection.

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. The measurement sequence waits a while for balanced value of pressure, then the measured value of temperature (**e.g. 5.0 °C**) appears on the display followed by the value of pressure (**e.g. 140kPa**).

Finally, the computed value of CO_2 content appears on the display **e.g. 0.51 %bw | 5.1 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. When the sample has been taken, you just need to press the key Enter to measure it.

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 which indicates blank memory values. Press the key ENTER to stop scanning memory. Then the following text appears „**ENT.meas.**" | „**+ view.**"

<u>Note</u>: 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.

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 recovered (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 minus (-).Then the following text appears: „**memory**“ | „**deleting“**

And all the saved values are overwritten with number 655.35.

6.0 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. Wait until the driver is fully installed and ready. This occurs the first time you plug the USB adapter into a USB port of your computer.

2) Run the program DataViewer in your PC and select the corresponding COM port (e.g. COM 5). If you don’t know which COM port is affected to the USB adapter, you can find it easily by plugging the USB adapter, then launch the DataViewer program and open the list box under Com port select. Look at the entries. Then close the program, unplug the USB adapter and re-open the software. The missing entry in the list box corresponds to the COM port affected to the USB Adapter. The program will memorize the selection and you will not have to select it again the next time.

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.

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 window in column in turn from the oldest value to the newest ones and also plotted on the graph. These values can be saved into file with the Save file button.

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

7.0 SERVICE

For service contact the manufacturer:

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Please visit our website for latest news and products : http://www.1-cube.com

NOTICE: It is forbidden for anyone except for the manufacturer or authorized company to repair the apparatus.

At the end of the apparatus life we recommend that it is according to corresponding waste categorization.

Take the metallic parts made of iron, brass, plastic elements and packing material to the separated collection as a secondary raw material. You can also order the apparatus liquidation at the above mentioned company that ensures the liquidation of the waste according to Waste Act.