1- CUBE
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FOAM STABILITY ANALYZER TYPE FSA

USER'S GUIDE

Contents:

1.0. Foam stability analyzer – range of the supply

Foam Stability analyzer type FA……...…1 unit

Sampler for high pressure sampling from the beer bottle…..…….. 1 ks

Flasher for high pressure foam creation…….……..1 ks

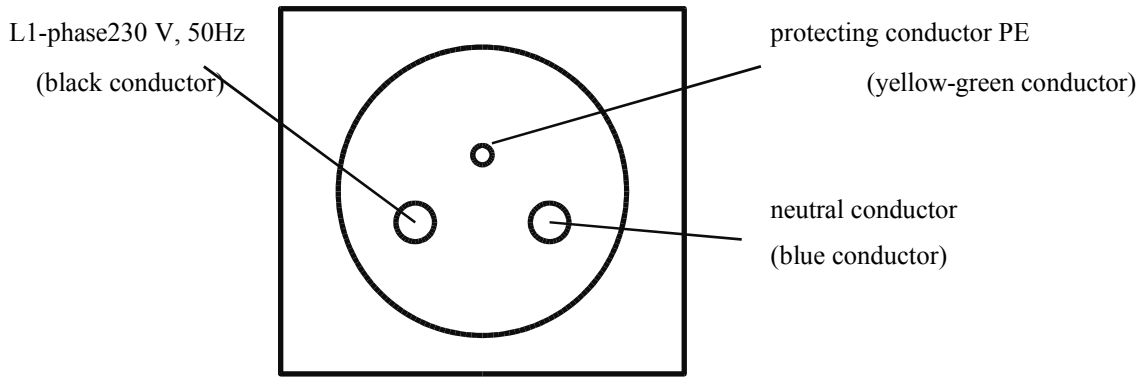
Cork for low pressure sampling from the beer bottle ……. 1 ks

Measuring glass …….……..1 ks

2.0. Installation - putting the device into operation, its maintenance and service

The device is determined only for work in laboratories which is the ordinary place for laboratory testing of foam stability. The instrument must be located in the horizontal position (for proper operation of the apparatus). Then plug in the instrument with the help of a standardized single-phase plug into el.socket. Before plugging in the technician has to check the condition of the el.circuit that will be used for the analyzer operation. If the result of the el.circuit inspection is positive, the analyzer can be plugged in.

Connection of the plug-front view:



3.0. Safety recommendations

The device may be operated only by person who became completely acquainted with its function within the framework of the training, or who became thoroughly acquinted with the user's guide of this device. The device must be plugged in with the help of a standardized plug into single-phase el.socket with 10A circuit breaker. Before plugging in the technician has to check the condition of the el.circuit that will be used for the equipment operation. If the result of the el.circuit inspection is positive, the instrument can be plugged in. In case of danger switch off the Main Switch and disconnect feed el.cord out of the socket. The stirrer must be switched off while any handling the measuring glass. During mixing and foam creation the plexiglass door has to be closed.
NOTICE: It is forbidden for anyone except for the manufacturer or authorized company to repair the apparatus

4. Technical data

Electric data:

- voltage systém TN-S 1+PE+N
- voltage 230V/50 Hz
- protection IP 20
- the equipment can be used in neutral surroundings
- the equipment output : P_i=0,2 kW
- circuit breaker – 2,5 A fusible cut out
- protection against dangerous contact voltage by direct disconnection from the power supply
- way of connection to el.network: with the help of a flexible hose LYS 3x1
- ending with standardized plug into single-phase el.socket with 10A circuit

Adjustable data:

- passage of gas for foam creation in the non-gas-saturated liquids with the help of the float flow indicator with the needle regulating valve
- mixer speed for foam creation in the non-gas-saturated liquids (on the membrane keyboard)

Accuracy:

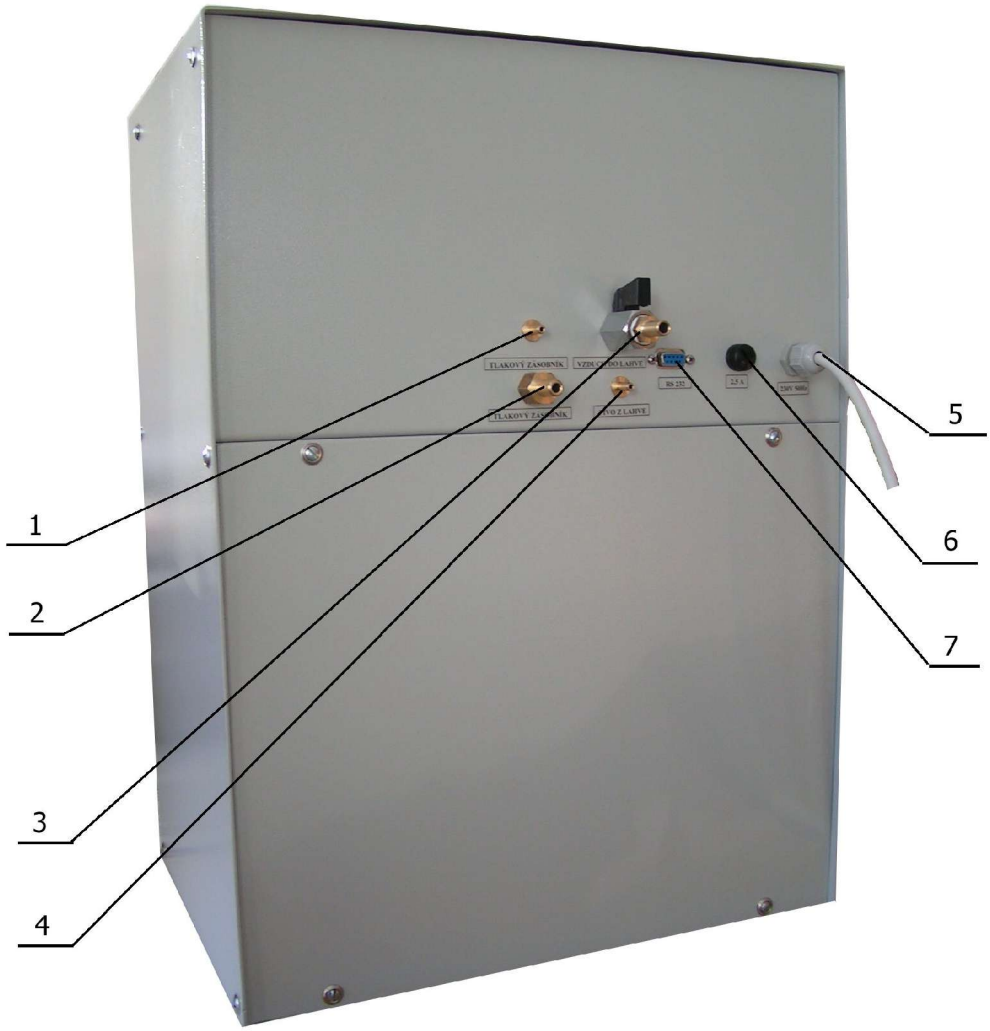
- accuracy of measurement of foam height: 1 mm
- accuracy of measurement of time of foam collapse: 1 sec

Range of measurement:

-electrodes movement from 0 to 54 mm
- time measurement from 0 to 999

5. Operating instructions

Pic. 1- back panel of the analyzer



Symbol description:

1and 2- Connection to pressure tank for pressure stabilization. If the pressure tank is not used, it is necessary to connect the positions 1 with 2 with the help of the hose.

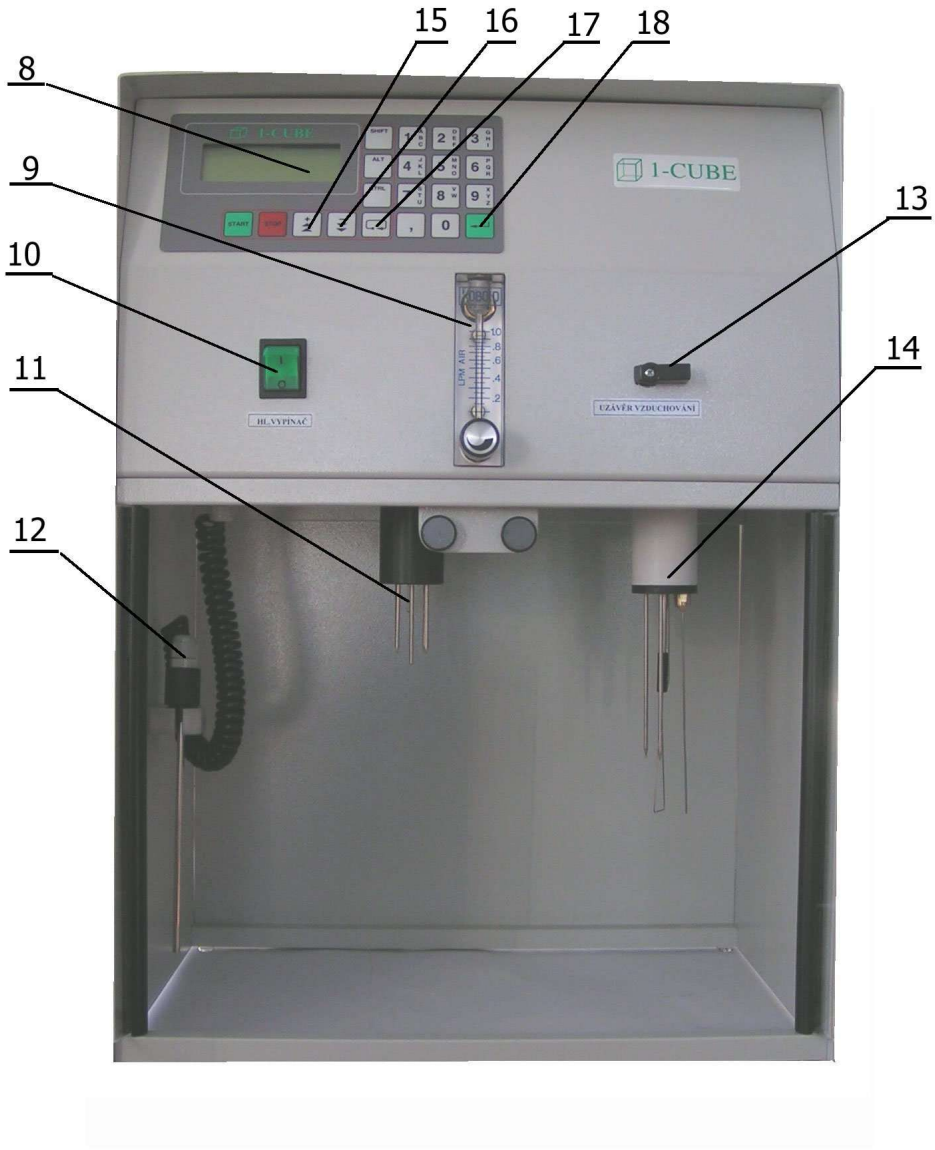
3- stop valve of the air inlet into the bottle

4- beer inlet from beer bottle into the instrument

5- cord 230V/50Hz, 10A

6- fusible cut out 2,5A

7- connector RS 232



Pic. 2- Front panel of the analyzer

Symbol description:

8- Keyboard with display; 9- float flow indicator with the needle regulating valve 10- main switch, 11- electrodes for measurement in the automatic.regime end regime NIBEM; 12- temperature sensor; 13- stop valve of air bubling; 14- electrodes, mixer and air nozzle for foam creation in the regime of manual measurement; 15- key plus; 16- key minus; 17- rotating key Esc; 18- key Enter

Once the equipment is switched on by the main switch (10) there's following main menu is displayed:

1. Automat. measurement

2. Manual measurement

3. NIBEM

4. View the sample

1. Automatic. measurement

First open the beer bottle, put in the cork for low pressure sampling from the beer bottle. It is necessary to connect this cork with the stop valve (3) with the help of stronger hose and at the same time connect this cork with the beer inlet from beer into the instrument (4) with the help of thinner hose. Then open the stop valve of the air inlet into the bottle (3) and shut stop valve of air bubling (13). Place the measuring glass on the support under the electrodes (11).

Now press shortly key No. 1 and beer will be filled straight from the bottle into the measuring vessel and foam is created in the measuring glass in this way. The filling is interrupted after the first contact of the electrode sensor with the foam surface. The electrodes are movable and ride down depending on the foam collapse but the electrodes do not move when they are in touch with the foam surface. The instrument measures the time of foam collapse at three different heights (preadjustable by the user) for example after 10, 20 and 30 mm of foam collapse (see below menu adjustment).
The last height is given by the beer surface without foam and corresponds in this way to the total height of the foam created in the glass at the moment of its collapse. Once the foam collapses completely, the electrodes will roll of the measuring glass. Then you can put the temperature sensor (12) into the measuring vessel and wait until the temperature is balanced (the displayed temperature does not change anymore). Now press rotating key Esc (17) and the sign "Save sample?" is displayed. If you press the rotating key Esc (17) you return into the main menu without saving the measurement into the memory. If you press the key Enter (18) you return into the main menu and at the same time the measurement will be saved in the memory

Sample of represented displayed result of measurement:

Sample No. 003

Tnap= 008 sec T= 19,8°

10mm=050sec 30mm=146sec

20mm=95 sec 41mm=207sec

Tnap=period of beer filling into the measuring glass

T=temperature of beer measured by temp sensor (12) in the measuring glass

The following fourth couple (height/time) corresponds to the collapse of the created foam for X mm and to the time of its collapse in sec

2. Manual measurement

This method makes possible to create foam from the non-gas-saturated liquids (unhopped wort) in the measuring vessel and then measure the period of the foam collapse for 40 mm (given by the difference of the electrode heights).
Beer or liquid (unhopped wort) is foamed in the measuring vessel by either mixing, air bubbling, or a combination of mixing and air bubbling. It is possible to change the speed of the mixer and the passage of the bubbling gas which helps to create foam of a different quality from a thin foam to a very thick one. Different kinds of foam disintegrate for different periods of time depending on the foam structure. Reproducibility (with the tests which are kept later) is ensured by saving the value of the mixer speed and gas passage in the instrument memory. The period that is necessary to create foam (the time from switching on mixing to its switching it off) is also recorded.

Then open the stop valve of the air inlet into the bottle (3) and shut stop valve of air bubling (13). Place the measuring glass with the tested liquid (its level is of the same height as the gauge line) on the support (14) under the electrodes (11), mixer and air nozzle.
Now press keyNo. 2. The following submenu will be displayed:

1. Filling
2. Mixing
3. Mixing + air bubbling
4. Air bubbling

Now press the key whose number corresponds to the regime which you want to choose for the foam creation. Measurement of all methods is controlled in the same way and therefore we will describe it only in regime „**3. Mixing + air bubbling".** After pressing shortly key No. 3 mixing and bubbling will start automatically. The passage of air can be regulated with the help of the float flow indicator with the needle regulating valve (9). The speed of mixer can be adjusted with the help of the keys + (increase), or – (decrease). The data about the speed of the mixer is saved in the memory of the instrument till the moment you change them by yourself. The foam creation is interrupted after the contact of the upper electrode sensor with the foam surface or after particular period expiry Tn depending on which one will be reached first. Period Tn can be adjusted in menu adjustment see it below in the text. Then the period of foam collapse is measured as far as it reaches the low electrodes. As soon as the foam collapses below the low electrodes the measurement of time period of the foam collapse will be interrupted and the period will be displayed:

For example:

Sample 004 T=19,9°
Speed mi.035%
Foam creation= 20 sec
Foam collapse= 78 sec

Speed mi 0.35% = speed of mixing in percents from 10 to 100%

T=temperature of beer measured by temp sensor (12) in the measuring glass

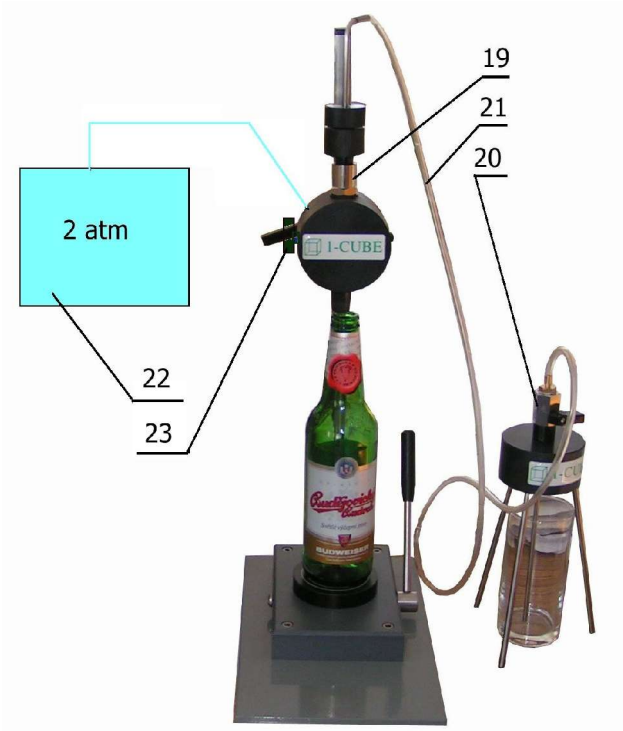
Foam creation = 20 sec total period of the foam creation (in our case 20 sec)

Foam collapse = 78 sec total period of the foam collapse (in our case 78 sec)

Then you can put the temperature sensor (12) into the measuring vessel and wait until the temperature is balanced (the displayed temperature does not change anymore). Now press rotating key Esc (17) and the sign "Save sample?" is displayed. If you press the rotating key Esc (17) you return into the main menu without saving the measurement into the memory. If you press the key Enter (18) you return into the main menu and at the same time the measurement will be saved in the memory.

3. NIBEM

First create the foam in the measuring vessel for measurement with systém "NIBEM". It is created by forcing out the beer from nozzle under the pressure of 2 atm of the flasher into the measuring glass. Connect sampler (19) with flasher (20) with the help of the hose (21) according to pic. No. 3



Pic. 3- connection of the sampler with the flasher

Symbol description: 19- Sampler; 20- Flasher; 21- Hose ; 22-Source of the 2 atm pressure.; 23- Needle regulating valve

Then connect sampler-(19) to the source of the 2 atm pressure (22) (pressure air, N_2, CO_2).

Place the crowned bottle and close the needle regulating valve (23) and move the lever (11) in the direction to you to its very end. The crown is pierced with this movement. Insert the withdrawal probe of the sampler (which is connected with the flasher with the help of the hose) into the bottle. Place the measuring glass under the flasher and close the ball stop valve of the flasher and open the needle regulating valve of the sampler (23). After opening the ball stop valve of the flasher the foam will be created in the measuring glass. Create the foam up to the upper edge of the measuring glass and then close the ball stop valve of the flasher. Place the measuring glass on the support under the electrodes (11) and press key No. 3. The electrodes runs down automatically as far as they touch the foam surface. The electrodes are movable and ride down depending on the foam collapse but the electrodes do not move when they are in touch with the foam surface. The instrument measures the time of foam collapse at three different heights after 10, 20 and 30 mm of foam collapse. Once the foam has collapsed for 30 mm the electrodes will roll of the measuring glass automatically. Then you can put the temperature sensor (12) into the measuring vessel and wait until the temperature is balanced (the displayed temperature does not change anymore). Now press rotating key Esc (17) and the sign "Save sample?" is displayed. If you press the rotating key Esc (17) you return into the main menu without saving the measurement into the memory. If you press the key Enter (18) you return into the main menu and at the same time the measurement will be saved in the memory.

Sample of represented displayed result of measurement:

Sample No: 012

Tnap= 000 sec T= 19,8⁰

10mm=078sec 30mm=246sec

20mm=159sec 30mm=246sec

Tnap=period of beer filling into the measuring glass (in method NIBEM)

T=temperature of beer measured by temp sensor (12) in the measuring glass

The following three couples of data corresponds to

the collapse of the created foam for 10 mm and to the time of its collapse in sec

the collapse of the created foam for 20 mm and to the time of its collapse in sec

the collapse of the created foam for 30 mm and to the time of its collapse in sec

4. Look-through of the measured data (results) in apparatus

You can record and look at measured samples in the instrument memory. After pressing key No.4 the following data are displayed.

1. Automatic Measurement file

2. Manual Measurement file

3. NIBEM file

4. Transfer RS232

After pressing key No. 1 it is possible to look through the samples measured in the regime **Automatic Measurement**
After pressing key No. 2 it is possible to look through the samples measured in the regime **Manual Measurement**
After pressing key No. 3 it is possible to look through the samples measured in the regime **NIBEM**

It is possible to browse among the measurements with the help of the keys + (15), or – (16). If you press twice the key Enter (18) you will delete the current file. If you press key 4 you can transfer the measured data into PC. It is necessary to connect the instrument with the COM port of PC with the help of cable RS232 and at the same time it is necessary to have the programme for transfer and save of the data that is already installed in your PC.

5. Menu ADJUSTMENT

Access into menu adjustment is through the key Shift and key No. 5 from the main menu. After pressing key Shift and key No.5 for example the following data are displayed.

Measuring Points
H1=10mm Tk=60sec
H2=20mm Tn=30sec
H3= 30mm

H1 is the first height of the foam collapse and the time that corresponds to this collapse
H2 is the second height of the foam collapse and the time that corresponds to this collapse
H3 is the third height of the foam collapse and the time that corresponds to this collapse

.

Tk is important for the regime **Automatic Measurement** for the determination of the total height of the beer foam created in the glass and period of its collapse. The electrodes (11) runs down automatically according to the foam collapse. They are some time breaks among the separate movements of the electrodes. The time parameter Tk gives you the times after which one the electrodes has to start to move again. If the electrodes don't start to move anymore during this time the measurement is over and the total foam collapse is read.

Tn is important for the regime **Manual Measurement** for adjustment of the max. time period for the foam creation. If the foam creation is not interrupted because the created foam has reached the height of the upper electrode during the time Tk, then once the time period Tk is over the foam creation is interrupted.
The parameters can be changed after pressing the key Enter (18) and after rewriting them with the new parametres. You will save the parameters into the memory after pressing the rotating key Esc (17).

6. Maintenance:

Cleanness of the electrodes, mixer, air nozzle, measuring glass and temperature sensor is important for accuracy.Accuracy can be influenced by only touching the electrodes with your finger.

It is also necessary to check the accuracy of the temperature sensor once a year and recalibrate it if it is necessary.

7.0 Important warnings

Let the instrument rest at room temperature for 5 hours before switching on if the equipment has been transported at freezing point.

Single electric elements of the instrument are protected with tube fusible cut-out. The fuse is located on the back panel. It is forbidden to replace the fuse by fuse with different value than the value indicated on the equipment.

Service:

For service contact the manufacturer: 1-CUBE, Hamry 3567, 580 01 Havl.Brod, Czech Rep.
tel. 00 420- 569 433 620
fax.00 420-569 422 144
1-cube@1-cube.com, 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.