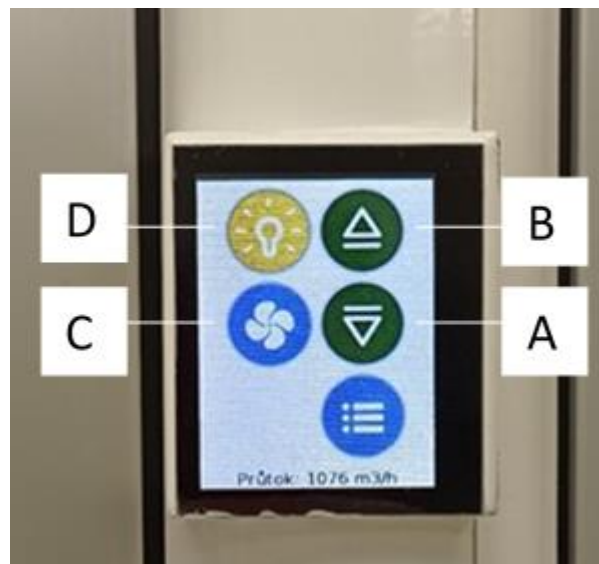


## CHEMICAL LAB B1.14 - INSTRUMENTS

### FUME HOOD

1. Use the fume hood to work with chemicals or with devices like spincoater, ultrasonic bath, etc.
2. Switch on the fume hood by the button under the fume hood "0/I" (turn the button from [0] to [I]).
3. The fume hood in the chemical lab has two important buttons on display: [ $\Delta$ ] (Picture 1B) and [ $\nabla$ ] (picture 1A). Use the [ $\Delta$ ] to lift the protective glass. Two positions are available. [ $\nabla$ ] button will move the glass to down.
4. The button labelled C is for the regulation of ventilation.
5. The light in the fume hood is switched on/off by the button labeled D.
6. After your work is done, close the fume hood and switch off.



Picture 1 – Control panel on a fume hood.

### PIPETTOR, ACCU-JET PRO

1. Attach the glass pipette (hold the pipette near its upper, carefully insert in into the adapter) (picture 2).
2. Filling the liquid – put the glass pipette into the liquid, slowly press the upper pipetting button, fill the glass pipette so that the meniscus is slightly above the mark desired.
3. Adjust the volume – slowly press the lower button, dispense liquid until meniscus is exactly to desired volume.
4. Dispensing - slowly press the lower button.

NOTE: It is possible to change motor speed: maximum speed for larger volume and a slower speed for lower volume. Maximum motor speed is continuously adjustable from maximum (+) to minimum (-) by turning the wheel in the upper part of the pipettor. The pipettor should be always set on the gravity mode – delivery ( $\nabla$ ).



Picture 2 – Pipettor with attached pipette.

## PIPETTORS, VWR

1. There are pipettors for three volumes: 0.5 – 10  $\mu\text{l}$  (RED), 10 – 100  $\mu\text{l}$  (YELLOW), 100 – 1000  $\mu\text{l}$  (BLUE).
2. Description of pipettor (picture 3):

A - Pipetting pushbutton

B - Volume adjusting knob

C - Cap

D - Injector button

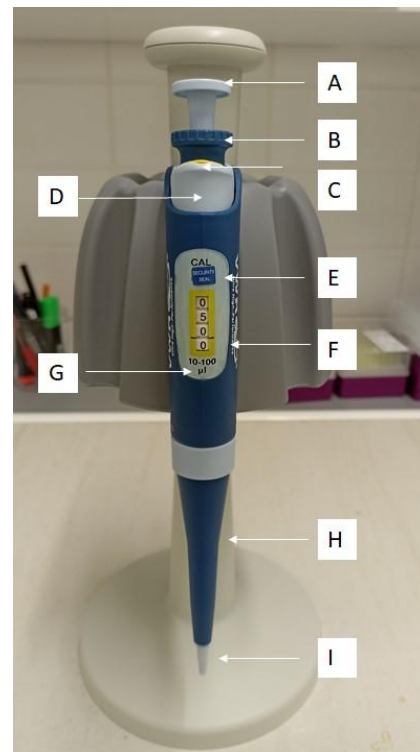
E - Calibration switch

F - Volume counter

G - Counter cap

H - Tip ejector

I - Shaft



Picture 3– Description of pipettor.

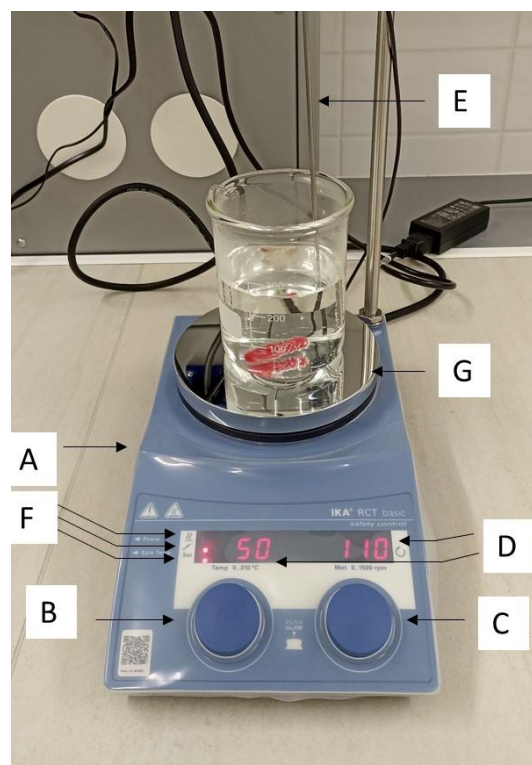
3. It is possible to set the volume within pipettor range by turning the adjusting knob (picture 3B).
4. The set volume is visible in the volume counter (picture 3F).
5. Add the tip (white for volume 0.5 – 10  $\mu\text{l}$ , yellow for volume 10 – 100  $\mu\text{l}$  and blue for volume 100 -1000  $\mu\text{l}$ ).
6. For suction of the set volume: push the pipetting pushbutton to the first position (picture 4a). Dip the tip into the liquid and release the pipetting pushbutton.
7. If you push the pipetting pushbutton to the second position (picture 4b), the maximum volume of the pipettor will be felt independently on the set volume.
8. Take care of air bubbles in the liquid inside the tip.
1. To drain the set volume, push the pushbutton.
9. For the exchanging/removal of the used tip push the ejector button (picture 3C).



Picture 4a/4b – First/second position of pipetting.

## MAGNETIC STIRRER RCT basic, IKA

1. The stirrer is suitable for mixing and /or heating substances. The maximum speed of rotation is 1500 rpm. The maximum temperature is 310 °C (the temperature of the heating plate).
2. Prepare the solution and put it on the stirrer. Add a magnetic stirring bar (located in a drawer labelled "Stirrer"). Turn on the stirrer by the button on the device left side (picture 5A).
2. Adjust the temperature and the rotation speed with button 4B and 4C. The selected value of the temperature and rotation speed will be shown on the display for temperature / rotation (picture 5D).
3. For starting of the heating / mixing press the button 5B/5C.
4. For the temperature control of the liquid put the connected temperature sensor PT 100 into the solution (picture 5E). The actual temperature of the temperature sensor is shown on the display (picture 5F) and will correspond to the temperature of the media.
5. The picture 5F involves three icons: for heating plate temperature, for external temperature sensor and for set temperature. When the temperature is reached the stirrer shows the same temperature measured by the temperature sensor and set temperature.
6. During agitation and standby operation, the display (picture 5D) will show HOT if the temperature is above 50 °C. Be carefully of the hot plate (picture 5G), hot beaker and hot medium.
7. For ending the operation turn off the heating and mixing by pushing the button 5B and 5C and switch off magnetic stirrer (5A).



Picture 5 – Description of magnetic stirrer.

## pH METER, pH 3310, WTW

1. Open the box (picture 6).
2. Connect the electrode according to the picture (picture 7).
3. Take out pH meter and pH electrode SenTix 41 (allowed to measure also temperature) (picture 8).
4. Place the electrode to the holder (the electrode could be holt in the hand too).
5. Pull off the electrode cover. The electrode is stored in 3 M KCl.
6. Wash the electrode by DEMI water.
7. Turn on the pH meter and immerse the electrode to the measured solution.
8. You will see the pH value and the liquid temperature on the display.
9. Wash the electrode with DEMI water after the measurement.
10. Put back the electrode cover and check that the electrode is immersed in 3 M KCl solution.
11. Switch off the instrument.

### Calibration (minimally two points):

*Press Cal* - put the electrode to the standard 1 (pH 4) - enter (see the AutoCal Tec, wait till sound signal) - wash and dry electrode.

Put the electrode to the standard 2 (pH 7) - enter (see the AutoCal Tec, wait till sound signal) - wash and dry electrode

Put the electrode to the standard 3 (pH 10) - enter (see the AutoCal Tec, wait till sound signal) - wash and dry electrode

The calibration is done. To verify by the measuring of solution of known pH or standard.



Picture 6 – Package pH Meter.



Picture 7 – pH Meter.



Picture 8 – pH Meter connection.

## ULTRASONIC CLEANING UNIT Elmasonic P, ELMA





1. Put a beaker with your sample to the ultrasound and check the water level – it should be min. 3cm from the upper edge.
2. Turn the device ON – picture 9A
3. Turn the period of sonication (min.) (picture 9B) and temperature of the bath (°C) (picture 8C). The temperature range is between 30 – 80 °C, variable by 5 °C steps. The heating turns ON when the set temperature exceeds the actual temperature. It takes some time to get to required temperature.
4. The set and actual temperature is visible on the display as shown in picture 9N and 9O).
5. It is possible to change the ultrasonic frequency by the Frequency button (picture 9F). The frequency values are 37 or 80 kHz and the value of frequency is visible on the display (picture 9J).
6. The power of the ultrasound can be changed by Power button (picture 8G) and the set value is visible in picture 8K. The power range is 30 – 100 %.
7. The adjusted time (picture 9L) and time left (picture 9M) is shown on the display.
8. Special ultrasound mode selection:
  - a. Degas mode allows the efficient degassing of fresh cleaning liquids and HPLC application (more details in Manual Section 7.3.).
  - b. Sweep mode is for the perfect sound field distribution within the cleaning bath (picture 9CH).
  - c. Pulse mode for an increasing of the ultrasonic power by 20 % (picture 9I).
9. Turn ON the sonication (picture 9D).
10. After ultrasonication switch of the bath (picture 9A).



Picture 9 – Description of operating elements.

## VACUUM OVEN\_B1.14

The vacuum oven is suitable for operating temperatures of up to 200 °C and a final vacuum of 0.01 mBar.

1. Put the sample inside the oven.
2. Switch on the vacuum oven (A) (the green pilot lamp indicates that the unit is ready) and the pump (B).
3. Leave the vacuum shut-off valve vertically (C).
4. When the pressure on the manometer (D) is 0.01 mBar, turn the vacuum shut-off valve to the horizontal position and immediately switch off the pump (if the heating temperature is higher than 40 °C – pump destruction).
5. Set the temperature by the control panel (E1). Start with set up by pressing . Press the button HOLD (lightning HOLD) to set up the temperature by  /  (E2).
6. Press the button RUN (lightning RUN, E2) – the temperature will increase to set value.
7. Cooling: light HOLD, set the lower temperature . Press the button RUN (lightning RUN).
8. To open the oven aerate the unit with the switch (E). Change the position of the shut-off valve to a vertical position. It is possible to open the vacuum oven now.
9. Switch off the vacuum oven and the pump (if it is not already done).

