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PMKL

PASTEURIZATION MONITOR:

USER'S GUIDE

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1. Equipment

Basic Package:

Pasteurization monitor PMKL

Stainless holder both for the pasteurization monitor and for the bottle

Temperature sensor for measurement of pasteurization units in the bottle

Magnet for make-and-break

Communicating cable RS232 (COM ADAPTER) for transfer of the data between pasteurization monitor and PC

CD with installation programme

User's guide

2. Technical data:

range of temperature measurement.....- 30 - + 90 degrees Celsius

accuracy.....0,1 degree Celsius

number of temperature sensors.....2

interval of data storage into the memory..... from 10 sec to 24 hrs (20 possibilities)

memory capacity for non-cyclic record..... 16252 records of both channels

feeding..... lithium battery

software working under WINDOWS 95 and higher versions

3. Operating recommendations

range of operating temperature of the instrument.....- 30 - + 90 degrees Celsius

range of operating humidity of the instrument..... 0 až 100 % relative humidity

covering..... IP 68

COM ADAPTER is supplied with every pasteurization monitor.

Forbidden handling!!!! It is forbidden to use pasteurization monitor with exchangeable sensors without connected sensor measuring the temperature in the bottle. Such handling would cause water pour into the sensor.

4. Installation of the software into the PC

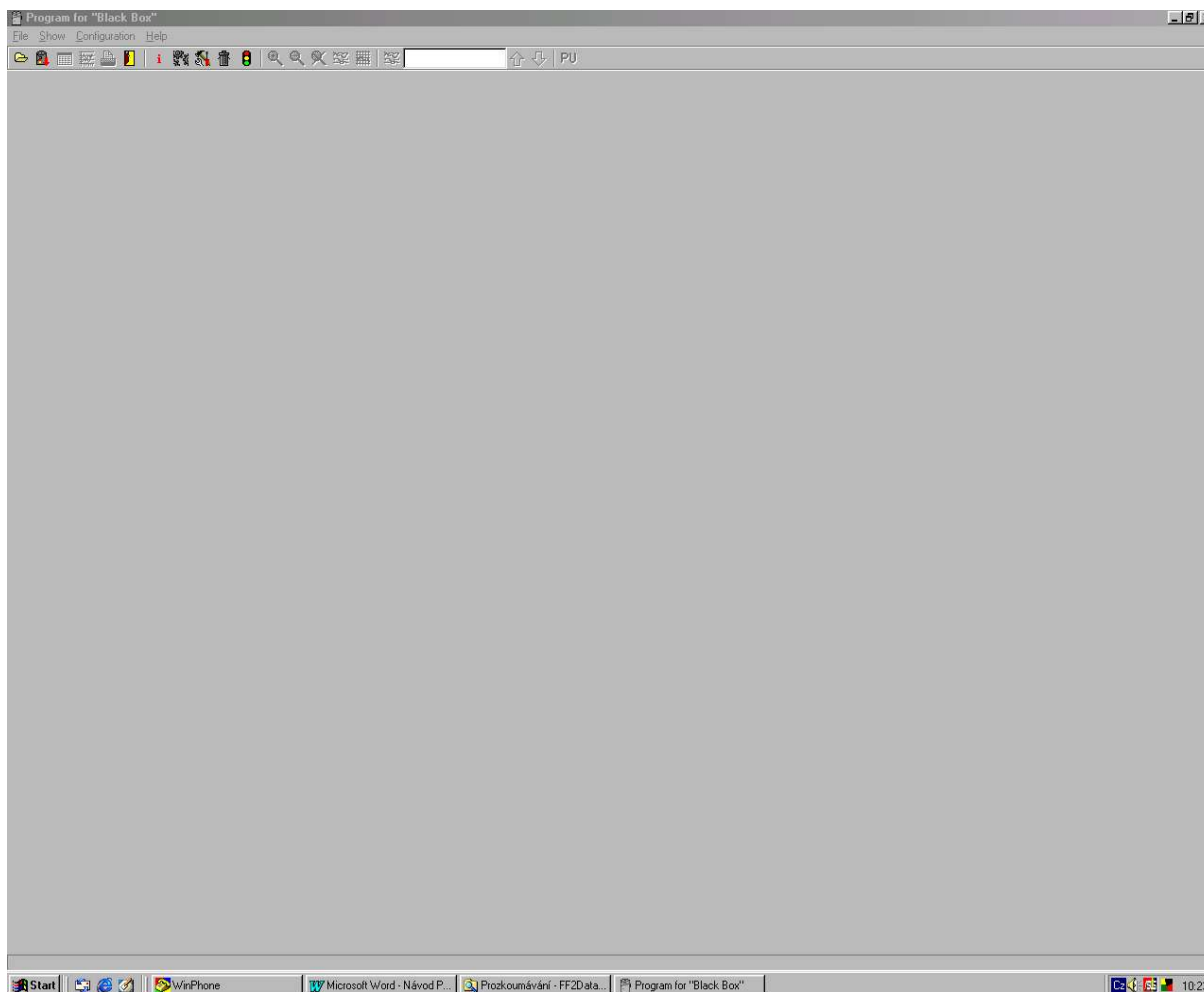
Insert the installing floppy CD into the PC and start installing programme pasteur.exe. Choose czech or english language for communication and follow the instructions.

5. Operating instructions

First activation of the programme

After successful instalation of the programme new icon **Datalogger** will appear on the screen of the PC. You will start the programme for pasteurization monitor with this icon. After clicking twice on the icon **Datalogger**, window will appear. Write the name of your company in the line "Company name" and key in line of "Key". Key is advised by email when the goods is fully settled.

The following window will appear after that, please confirm the licensed arrangement if you agree with it.



And click on OK then. The programme Pasteurization monitor will start just after.

Standard settings of Pasteurization Monitor

Pasteraurization Monitor is pre-set by the manufacturer to make-and-break by magnet. Period of temperature measurement - 10 sec, non-cyclic record regime, recording only if alarms is switched off. Connect pasteur.monitor with PC by communicating cable RS232 to transfer the data between PC and pasteur.monitor. One lead of the communicating cable insert into COM1 or COM2 in PC and the other lead of the communicating cable insert into the lock placed on the pasteur. monitor (see.pic.1). Pasteraurization Monitor can be set (or re-set) after clicking on item "Configuration" in the Main Menu and then on **Logger parameters setting F6**. The window with the Logger parameters settings will appear (see pic. No. 2). You can set the following data in this window:

- Real time and date in the recorder
- Select suitable recording interval
- Select the recording regime (cyclic or non-cyclic)
- Check (or set) type of temperature probe (Pt1000 or Ni1000) for each channel
- Switch off the channel that you do not want to be recorded (for example-the ones with disconnected probe)
- Switch on the recorder (or switch it off in the case it should be switched on by magnet or automatically)
- Enable or disable the option to switch on the logger by magnet
- Enable or disable the option to switch off the logger by magnet
- Set date and time of logger automatic activation or disable this option
- Select if record runs permanently or only if alarm is active
- If alarms are about to be applied, set both limits and enable alarm
- Optionally enable permanent alarm

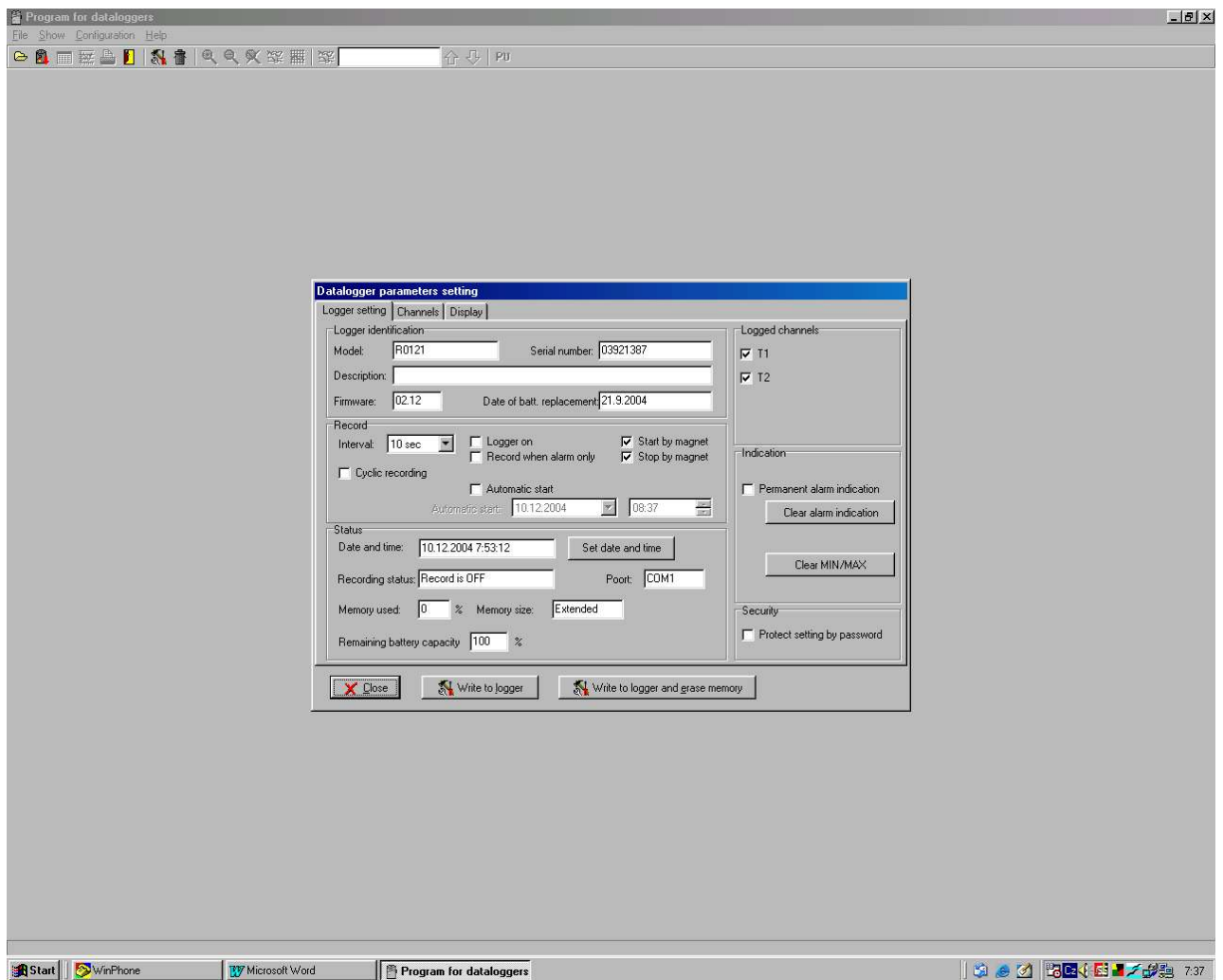
- Optionally reset memory of MIN/MAX values
- Check free space in data memory, optionally erase the data memory
- Enter password if protection against unauthorised manipulation is necessary

The description below corresponds to parameters set according to pic. No. 2. If parameters are modified, the pasteur. Monitor doesn't have to work as described in this user's guide (for example switching on and off by magnet).



Pic.1

Window with standard pasteur. monitor parameters settings.



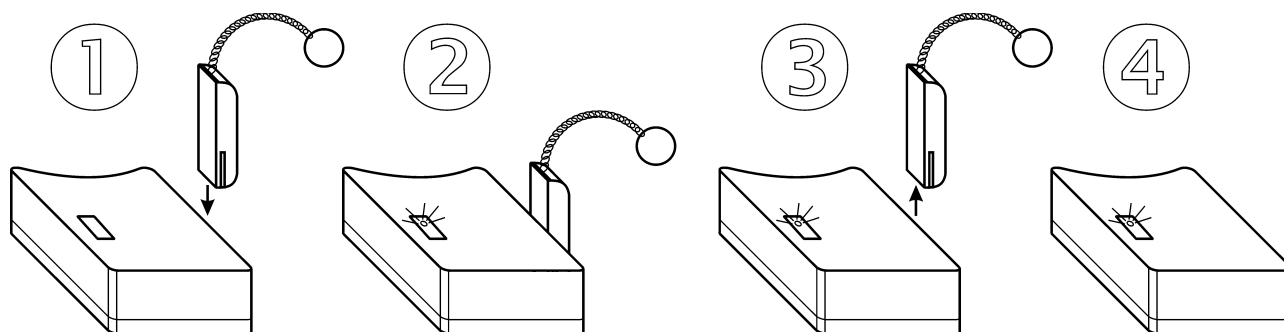
Pic.2

Passage of the pasteurization monitor through pasteurization tunnel

Insert bottle with water or beer into the white tube with interchangeable green fillings. Place the bottle with the white tube into the stainless holder. Select the suitable temperature sensor according to the bottle height (the end of the sensor should be about 20 mm over the bottle bottom). Insert the temperature sensor into the bottle and secure it by the bar with two screws on its end. The bar should be set in the folds of the stainless holder. Insert the temperature sensor connector into the connector of the pasteurization monitor with exchangeable sensors and tighten it fully.

Important!!! There is sealing rubber "o-ring" which seals properly only if the cap nut is tighten well. If not water can get into the connector causing inaccurate temperature and fast battery discharge.

Place pasteurization monitor with temp. sensor into the stainless holder and secure it by stainless nut. Start up pasteurization monitor (activation temperature measurement and pasteurization units) by plugging magnet into the folds placed on the side of the switched off logger with that wait about 1 sec for yellow LED to light up. After lighting it up it is necessary immediately (till it lights) to remove magnet from the folds, the logger switches on and yellow LED blinks every 10sec. If magnet is applied for more than 3seconds, the yellow LED goes out and logger remains switched off.



Place the pasteurization monitor holder on the belt of the pasteurization tunnel and let the holder go through the tunnel. Pasteurization monitor can go through the pasteurization tunnel more than once in the different parts to find out the pasteurization process in the different parts of the tunnel.

Transfer the data from pasteurization monitor into the PC and the data presentation in PC:

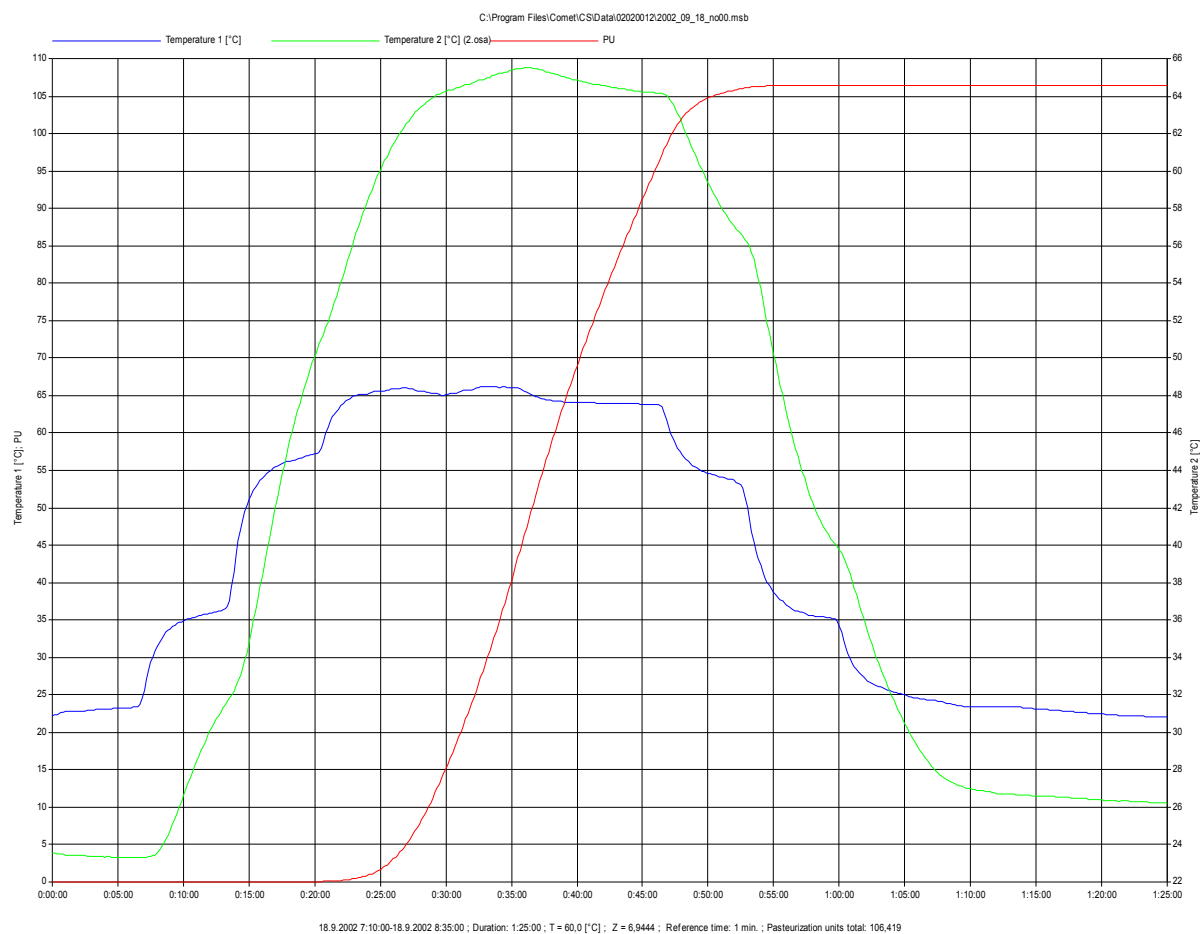
Switch off the pasteurization monitor by magnet when the pasteurization monitor is out of pasteurization tunnel. The way to switch off is similar to the one described above. If the yellow LED isn't exceptionally switched on within 1 sec, remove the magnet from the folds and repeat the procedure after a while. Once the pasteurization monitor is switched off the red LED blinks for a second. After switching off the pasteurization monitor there is no more light in the window on monitor's upper side.

If memory is filled in non-cyclic logging mode, record stops and logger switches. This state is indicated by accelerated blinking of red LED with 3 sec interval.

state	LED	I	10 s	I
Logger switched off	Yellow Red			
Logger switched on	Yellow Red	*		*
active alarm	Yellow Red	*		*
Full memory	Yellow Red	*	*	*

Bring switched off pasteurization to PC with installed programme for the pasteurization monitor. Insert one lead of the communicating cable into COM1 or COM2 in PC (we recommend to leave it connected constantly) and the other lead of the communicating cable insert into the lock placed on the pasteur. monitor. The yellow LED light blinks for a second on the side of the monitor, after that there is no more light in the window. Click twice on the icon **Datalogger** on PC monitor to start pasteurization monitor programme. Click on the second button in the left upper part as shown on pic. No. 2. The dialogue to save data in PC will be opened. Programme offers the name of the file and location to save data. The offered name in the way for example 2003_06_18_no00 - means 2003 - year, 06 - month, 18 - day and no00 - measurement number of the day. Files are saved implicitly into the directory with the equivalent production number of the pasteurization monitor. If the name of the file suits you just click on **"Save"** and the file will be saved with the above stated name. Of course it is possible to save the file with different name chosen by you. It is possible to write a note in the window "description" while saving. **Important!!! While saving the data from pasteurization monitor into PC, the programme asks if you want to delete memory of pasteurization monitor, confirm it. If you don't delete the memory while saving, it will have to be done before taking next measurement. Click on "Configuration" in the "Main menu" and follow with "Instrument memory erasing".**

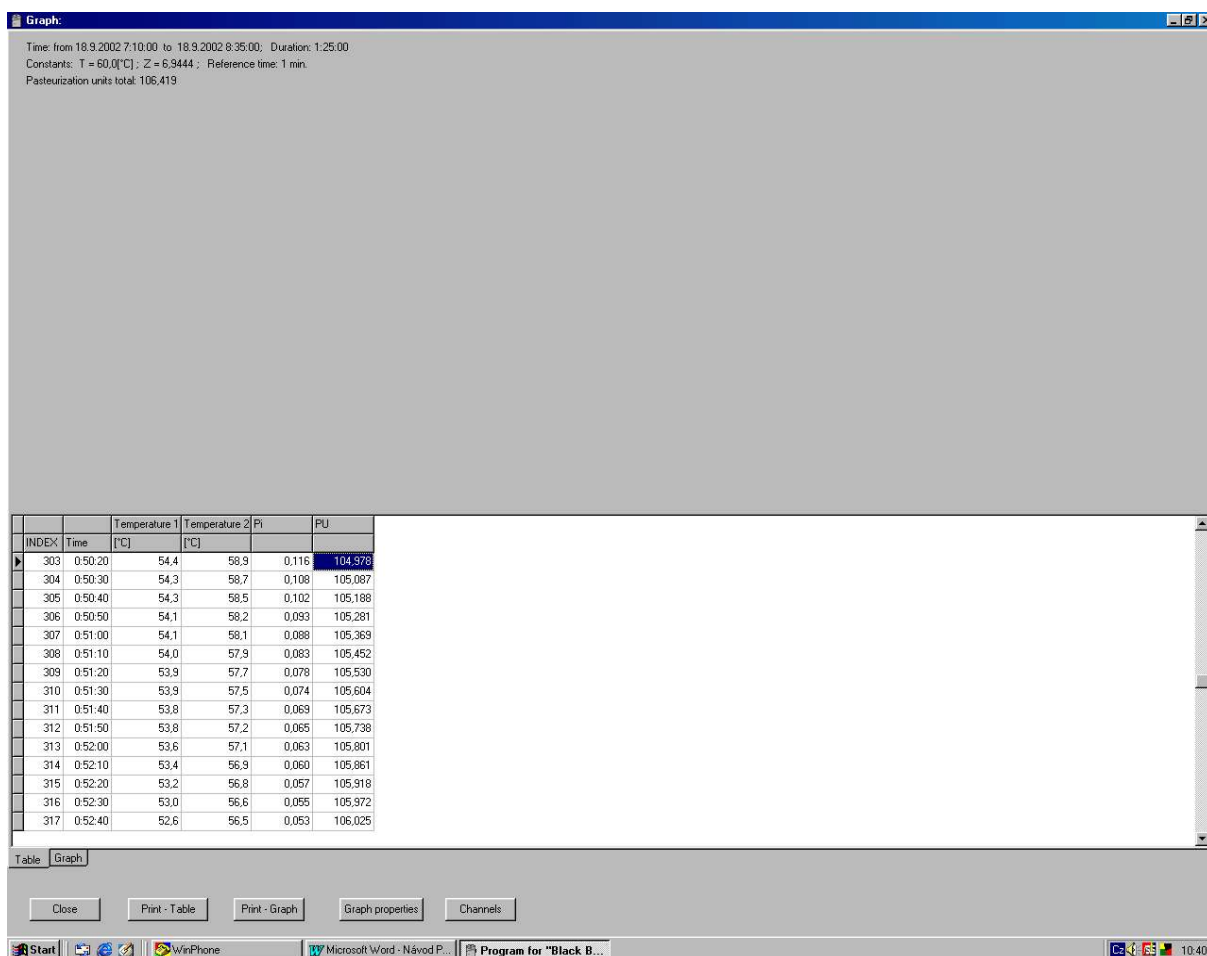
After the successful transfer the windows shown on pics No.5 or 4 appears.



Pic.No.4

Pasteurization units sum can be read on the left vertical axes, temperature 1 (in the bottle) is on the right horizontal axes. Click on the flag "Table" (on the left side in the bottom) to watch the table form of the values - see pic. No. 5. All tables can be printed out.

pic.5



Click on the flag "Graph" (on the left side in the bottom) to get back to graphic version (pic. 4).

After closing this window the transferred data will appear in the table (pic. 3B) or graphic form (pic. 3A) on the screen. You can change between the pictures 3A and 3B by clicking on the 3rd or the 4th key in the upper left part.

The transferred data appears on the the screen in the table form, where T1 = sensor temperature in the bottle, T2 = sprikling water temperature in the pasteurization tunnel.

Program for dataloggers

File Show Configuration Help

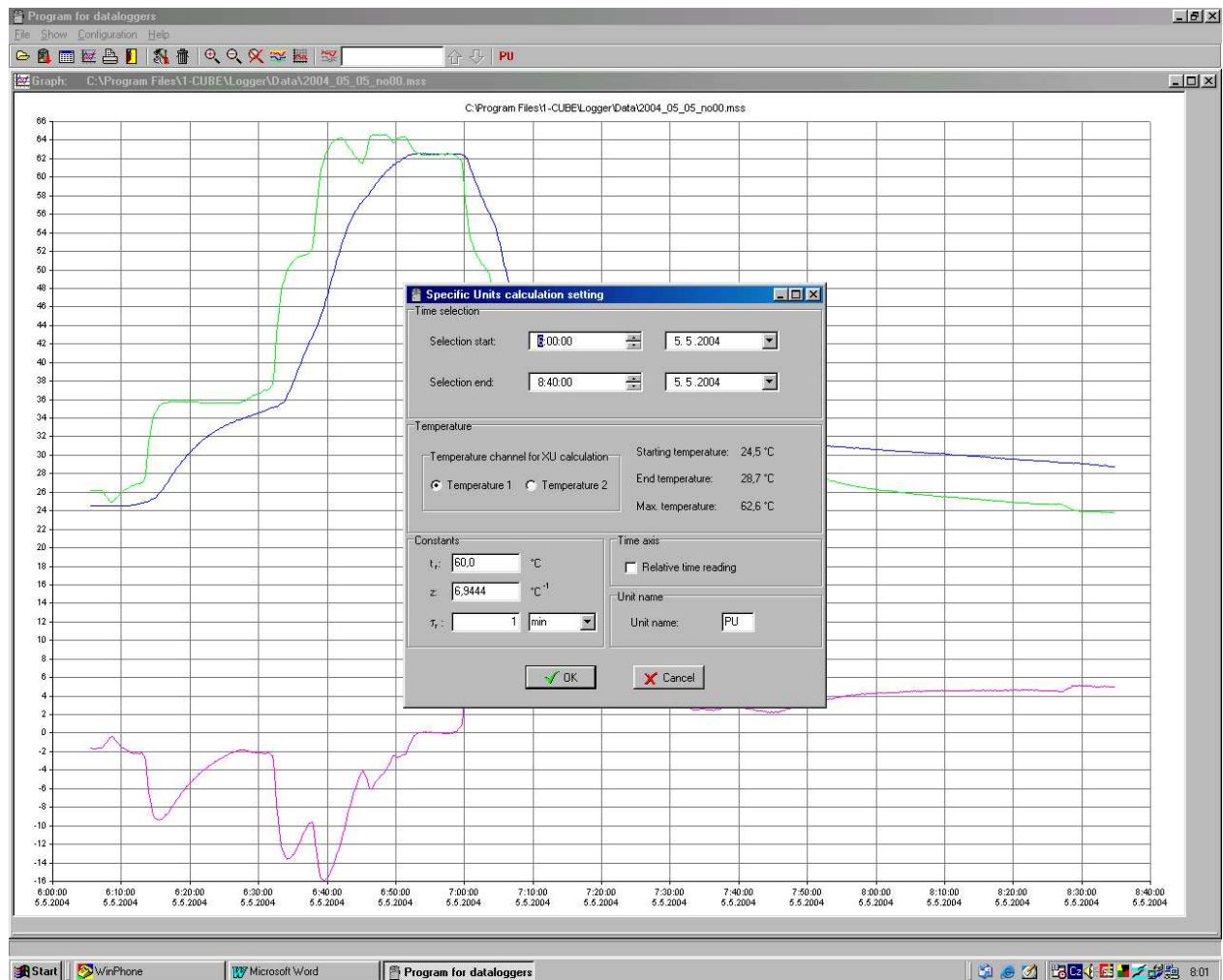
Table: C:\Program Files\1-CUBE\Logger\Data\2004_05_05_no00.mss

INDEX	Date	Time	T1 °C	T2 °C	DIF (Diff.) °C
1	5.5.2004	6:05:30	24,5	26,2	-1,6
2	5.5.2004	6:05:40	24,5	26,2	-1,6
3	5.5.2004	6:05:50	24,5	26,2	-1,7
4	5.5.2004	6:06:00	24,5	26,2	-1,7
5	5.5.2004	6:06:10	24,5	26,2	-1,7
6	5.5.2004	6:06:20	24,5	26,2	-1,7
7	5.5.2004	6:06:30	24,5	26,2	-1,6
8	5.5.2004	6:06:40	24,5	26,2	-1,6
9	5.5.2004	6:06:50	24,6	26,1	-1,6
10	5.5.2004	6:07:00	24,6	26,2	-1,6
11	5.5.2004	6:07:10	24,5	26,1	-1,6
12	5.5.2004	6:07:20	24,5	26,0	-1,5
13	5.5.2004	6:07:30	24,5	25,8	-1,3
14	5.5.2004	6:07:40	24,5	25,7	-1,2
15	5.5.2004	6:07:50	24,5	25,5	-1,0
16	5.5.2004	6:08:00	24,5	25,3	-0,8
17	5.5.2004	6:08:10	24,5	25,2	-0,7
18	5.5.2004	6:08:20	24,5	25,0	-0,5
19	5.5.2004	6:08:30	24,6	24,9	-0,3
20	5.5.2004	6:08:40	24,5	24,9	-0,4
21	5.5.2004	6:08:50	24,5	25,0	-0,5
22	5.5.2004	6:09:00	24,5	25,1	-0,6
23	5.5.2004	6:09:10	24,5	25,3	-0,8
24	5.5.2004	6:09:20	24,5	25,5	-0,9
25	5.5.2004	6:09:30	24,5	25,6	-1,0
26	5.5.2004	6:09:40	24,5	25,8	-1,2
27	5.5.2004	6:09:50	24,5	25,9	-1,4
28	5.5.2004	6:10:00	24,5	26,0	-1,5
29	5.5.2004	6:10:10	24,5	26,1	-1,6
30	5.5.2004	6:10:20	24,5	26,2	-1,6
31	5.5.2004	6:10:30	24,5	26,3	-1,7
32	5.5.2004	6:10:40	24,5	26,3	-1,8
33	5.5.2004	6:10:50	24,5	26,4	-1,8
34	5.5.2004	6:11:00	24,5	26,5	-1,9
35	5.5.2004	6:11:10	24,5	26,6	-2,0
36	5.5.2004	6:11:20	24,5	26,6	-2,1
37	5.5.2004	6:11:30	24,6	26,7	-2,1
38	5.5.2004	6:11:40	24,6	26,7	-2,1
39	5.5.2004	6:11:50	24,6	26,8	-2,2
40	5.5.2004	6:12:00	24,7	26,8	-2,2
41	5.5.2004	6:12:10	24,7	26,9	-2,2
42	5.5.2004	6:12:20	24,7	26,9	-2,2

Start WinPhone Microsoft Word Program for dataloggers 7:52

Pic. No. 3B

Click on the fourth button in the upper left part to get the graphic form of the temperature courses. Click on the ninth button in the upper left part as shown on pic. No. 2 (magnifier) to get graph cut out for reading the pasteurization units just from the chosen cut-out. After choosing the cut-out for calculation of pasteurization units, click on the button PU in the upper right part. The window looking like on pic. No.3A for setting parameters of pasteurization units calculation appears.



Pic. No. 3A

Change the beginning and the end of the time interval for pasteurization units calculation in the section "Choice of time interval" if required. The sensor for pasteurization units calculation is chosen in the section "Temperature". Leave sensor Temperature 1 here because it is the only sensor measuring temperature in the bottle. The constants for pasteurization units calculation can be set in the section "Constants". Leave the values set as: t_r : 60, Z : 6,9444 and τ_r : 1 **minute**. After parameters setting click on OK. The window as shown on pic. No.4 or No. 5 appears.

6. Calibration of the pasteurization monitor sensors

General conditions for calibration:

- Instrument should have proper power (low battery is indicated).
- The state of the connectors has to be checked (with the instrument with external probe)
- Instrument should have properly set the real time clock

General conditions of calibration:

- The state of the connectors has to be checked (with the instrument with external probe)
- The instrument should have well adjusted clocks of the real time
- During calibration insert the instrument with running record into the calibration box generating corresponding temperature. Choice of the calibration box and working etalon should correspond to indicated accuracy of the controlled instrument.
- Calibrate at the points which cover fully measurement range in use. Temperature generating by calibration box cannot exceed the measurement range of the controlled instrument.
- Calibration box should be equipped with the suitable etalon to control the right value of the controlled quantity. Etalon accuracy should be (if possible) at least 3x better than accuracy of the controlled instrument. Etalon should be located at the proper place in the chamber (considering inhomogeneity of the generated field) and has to be metrologically linked to valid higher etalons.
- Air flow should be from 0,5 to 1 m/s in the chamber
- Calibration box settling time must be known or easily detectable e.g. by etalon. Calibration is settled if calibrated value does not change and the air inside the box is at same temperature as walls of the box. No condensation and no influence from thermal radiation should exist.
- The right etalon reading should be taken after necessary time needed to settle of calibrated instrument. Settling time of the instrument starts after calibration box is settled at required value. Response time of calibrated instrument is specified in instruction manual as t_{90} . Necessary time needed for calibration is three times longer than t_{90} . After that time instrument reading approaches to 100% of real value.
- It is recommended to write down the time of reading of real value for consequent evaluation of the calibrated logger record.

Guide to adjust the pasteurization monitor

Adjustment means action resulting in setting instrument to state, when its actual measurement accuracy measurement is identical or better than measurement accuracy specified in instruction manual. For adjustment of instruments measuring temperature and relative humidity special equipment for constant temperature and relative humidity generation is needed – a calibration box. Instrument adjustment is performed by placing of adjusted instrument to calibration box and by consequent assignment of recorded values to etalon reading by means of the PC software.

Adjustment of inputs for voltage or current measurement is performed by connection of instrument under test to precision source (etalon) and by consequent assignment of recorded values to etalon reading by means of the PC software.

General adjustment conditions

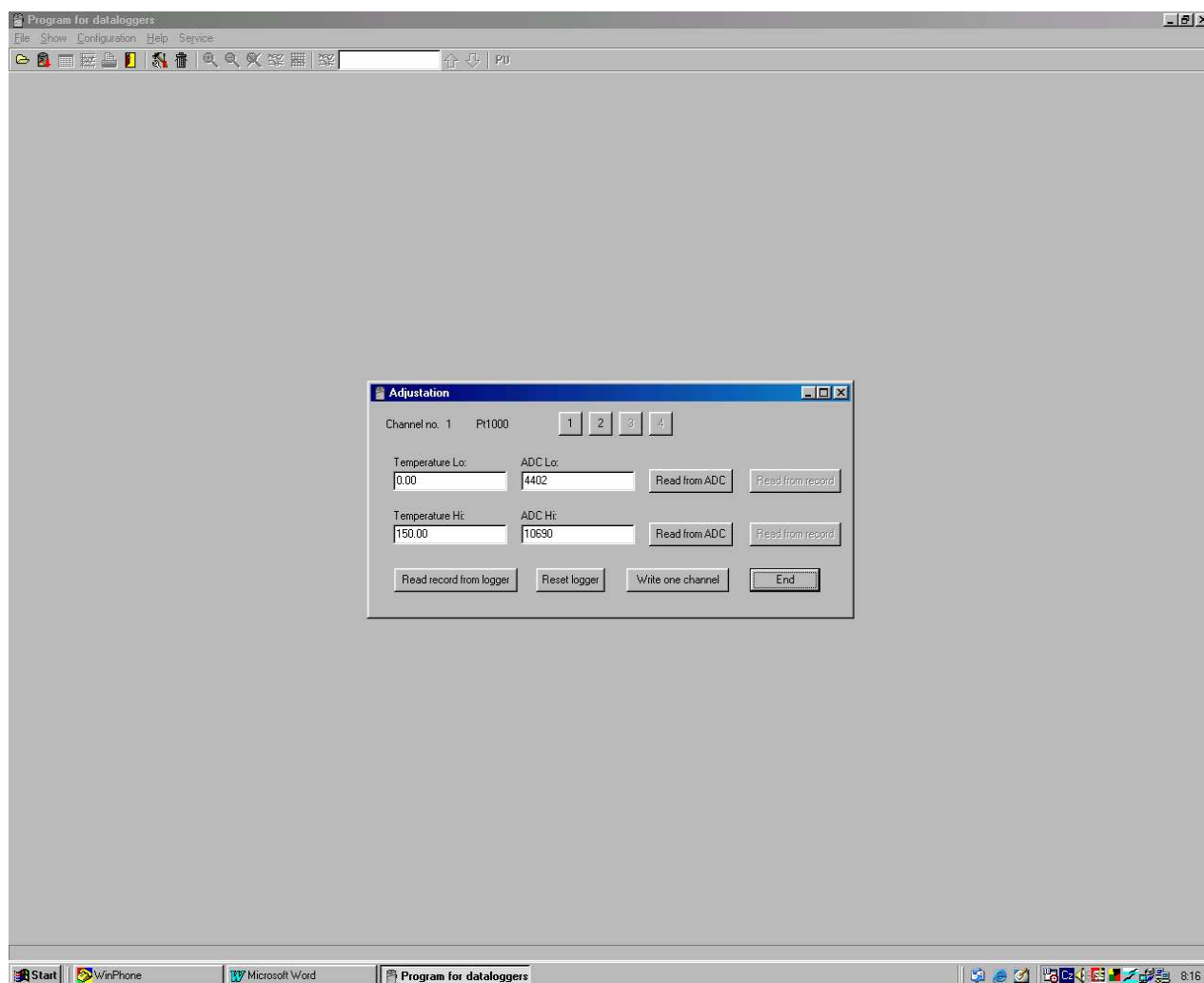
- Adjustment bears on calibration and that is why all condition for instrument calibration must be abided, as described above.
- Input quantities are always adjusted at two points, as much distant as possible from each other at the required measurement range.
- Each irresponsible entering of adjustment mode (from the PC software) can cause overwriting of actual calibration constants and resulting in instrument inability to measure correctly.
- Every time after instrument adjustment it is necessary to verify the calibration – see Calibration procedure above.
- The inner clock measurement accuracy of the real time is impossible to set and all the instrument with higher than acceptable error have to be sent for repair

Adjustment procedure:

- Usual included free software enables to adjust of the data loggers. It is necessary to run the software with parameter */kalibrace* – e.g. click on the *Start* button, select item *Run...* Then *Browse..* and select program *LOGGER.EXE* on your disk (default location is in *Program files/I-CUBE/Logger*), mark it by mouse and click

on *Open*. Type to field *Open*: to the very end of path (behind the sign of quotation) type space mark, then parameter */kalibrace* and click on *OK*. Program could have now a new menu item *Service*.

- Set 1 minute logging interval and check the internal real time clock. Adjusted channels must be ON. At the same time logging must be ON. It is recommended to erase the instrument memory before adjustment.
- The switched on pasteurization monitor has to be connected by means of COM ADAPTER with PC (yellow LED winks with the interval 10 sec) and place the pasteurization monitor into the calibration box
- Place the etalon into the calibration box
- Close the calibration box and start its operation.
- After settling of calibrating box at required value for lower adjustment point wait for specified time for settling of the adjusted instrument – see General conditions for calibration.
- When calibrated instrument is settled write down the etalon reading and start the logger program with parameter code and gap and then */kalibrace*
- Select *Service* item from menu and then *Adjustment*, the window as shown on pic. No.6. Choose the channel to adjust (channel No.1 is probe in the bottle and channel No. 2 is the probe for sprinkling water)
- Type to window Temperature Lo temperature value read from etalon
- Then fill window *ADC_ Lo* with proper quantity values from etalon by clicking to corresponding button *Read from AD*
- Then click on the button Record of one Channel then button End to save the data into the memory
- Use the same procedure to adjust the low point the other channel
- Set calibration box to generation of upper value of adjustment point and wait again for settling of the calibration box and consequently for settling of adjusted instrument.
- After storing of both values start logger program with space parameter and then adjustment
- Click Service button and then on Adjustment button
- Window (as shown on pic. No. 6) appears, choose the channel you to adjust (channel No.1 is probe in the bottle and channel No. 2 is the probe for sprinkling water)
- Type to window Temperature Hi temperature value read from etalon
- Then fill window *ADC_ Hi* with proper quantity values from etalon by clicking to corresponding button *Read from AD*
- Then click on the button Record of one Channel then button End to save the data into the memory
- Use the same procedure to adjust the Hi point the low channel
- After adjustment verify again measurement accuracy of the instrument according to Calibration procedure above.



Pic.6

7. Service

Indication of the logger beyond normal operation

If yellow LED lights up after start extra long (depending to the memory occupation up to 12 sec), initialization of the logger proceeds. This can occur e.g. after totally discharged battery replacement. In that case correct time setting from the PC is necessary.

If red LED blinks immediately after yellow LED (not not mistake with active alarm indication!), end of calculated battery life is indicated - logger is fully functional, early battery replacement is recommended..

If only red LED blinks 2x with 3 sec interval, battery voltage is low and logger is not enabled to switch on. If logger was originally switched on, record is interrupted and logger is switched of. Communication with computer can work for limited period of time. Replace the battery as soon as possible.

stav	Svítivka	I	10 s	I
End of battery life	Yellow Red	* *		* *
Low battery	Yellow Red	* *	* *	* *

Battery replacement in pasteurization monitor:

In case the lithium battery is discharged replace it with the new battery of the same type. Battery is located inside the pasteurization monitor and can be reached after screwing off 4 screws and removing the cover. Do not take off the cover till the battery is completely discharged. Applied is lithium battery, 3,6 V, size AA.

Remove the old battery by pulling the glued tape

Insert the new battery respecting the correct polarity (see symbols + and - near battery holder). If you connect the new battery up to 30 s, all logger settings remain unchanged. In the opposite case check by means of PC programme all settings, especially the real time clock in the logger. **Attention, the insert battery with incorrect polarity causes logger damage**

Warning: near battery fragile glass reed contact is located - be careful not to damage it. Be careful with the battery replacement. From our experience we cannot recommend batteries made by company Sonnenschein Lithium

Put the lid back and screw 4 screws. Be careful to have the rubber sealing properly between the pasteurization monitor body and the lid to ensure the water resistance of the instrument. Attention, non-water resistant instrument causes the pasteurization microcomputer damage.

Connect logger to the computer and write to it the information on battery replacement (menu *Configuration / Battery replacement*). This step is necessary to evaluate properly the remaining battery capacity.

Discharged battery or entire instrument after its life liquidate ecologically - in special deposit. You can also order the apparatus liquidation at the above mentioned company that ensures the liquidation of the waste according to Waste Act.

Recommended company to order lithium battery, 3,6 V or 3,7 V, size AA.

FULGUR BATTMAN spol. s r.o.

Svitavská 39

614 00 BRNO

<http://www.fulgurbattman.cz/>

Service is provided by the manufacturer:

1-CUBE s.r.o.

Hamry 3567, 580 01 Havl.Brod, the Czech Republic

tel.+420-569-433620, fax. +420-569-422144

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