



CONTENTS

GENERAL INFORMATION.....3

GENERAL VIEW AND REAR PANEL.....5

SAFETY MEASURES.....6

PRINCIPLE OF THE METHOD.....6

ANALYZER INSTALLATION.....6

MENU.....8

PREPARATION OF WORKING SOLUTION.....10

MILK SAMPLES.....10

ANALYZER TEST.....10

MILK ANALYSIS.....10

CLEANING PROCEDURE.....12

CALIBRATION.....13

PC PROGRAM EKOMILK.....14

ERRORS LIST.....20

GUARANTEE.....21

GENERAL INFORMATION

The Somatic Cells Milk analyzer **Ekomilk Scan** is designed for fast and cost effective control of milk quality in dairy farms and dairy enterprises. The regular milk control in a dairy farm is the main part of process of prevention, detection and medical treatment of mastitis – the most important dairy disease. The proper incoming milk control in dairy enterprises guarantees a high-quality and ecologically pure products .

Application Area:

Dairy farms

Milk collecting points

Dairy industry

Veterinary and dairy laboratories

Key feature:

Simple and lightweight design;

Proven method;

Cost effective:

- Low power consumption;

- Very small quantity of milk required 10ml;

LCD indication;

Power supply independent Data collection mode for storing up to 250 records with information about supplier ID, time and somatic cells number;

Embedded Real time clock;

RS 232 Interface;

Technical specifications

Measuring Range -Somatic Cells count per 1 ml	90 000 -1 500 000
Accuracy	±5%
Average time per one measurement	4 min
Size	200 260 290 mm
Weight	< 4.5 kg
Power consumption	< 30 W
AC Power Supply voltage	220V +10/-15%
DC Power Supply voltage	12V – 14.2V

Operating conditions:

Ambient temperature.....	15- 30 °C
Relative ambient humidity.....	30-80 %

Parts, accessories and spare parts

Milk Somatic Cells Analyzer	Ekomilk Scan	1 pc.
Measuring flask		2 pcs.
Container 250 ml with Ekoprim		2 pcs.
Syringe		2 pcs.
Waste milk container		1 pc.
Rubber balloon		1 pc.
Wire for capillary cleaning		1 pc.
CD - software		1 pc.
RS 232 cable		1 pc.
User’s guide		1 pc.

GENERAL VIEW AND REAR PANEL

GENERAL VIEW



- 1. LCD indication
- 2. Keyboard
- 3. Flask
- 4. Sample Mixer
- 5. Capillary
- 6. Waste milk container



REAR PANEL

- 1. USB Interface outlet *
- 2. RS232 Interface outlet
- 3. 12 V DC Power supply outlet (for printer)
- 4. ON/OFF Switch 12V (for car vehicle)*
- 5. 12 V DC Power supply outlet (for car vehicle)*
- 6. Fuse 220V 0,63A

SAFETY MEASURES

1. Read carefully and strictly follow the instructions described in this user's guide
2. There are two glass flasks in the milk analyzer packing. They can be broken because of carelessness or inappropriate handling and can cause bodily harm.
3. The analyzer consists on 2 modules – main module and sample mixer. The sample mixer performs rotary motion. Do not place in the range of the sample mixer any objects that could be overturned or broken.
4. There is a hole on the top of the sample mixer. Make sure no liquids or solid particles to drop inside this hole.
5. Under no circumstance you should try to repair Analyzer's power lead yourself. In case of power lead damage, contact your dealer to make the repairs.
6. The covers of the Analyzer should never be removed while mains power lead is connected.
7. Ekoprim is a powder substance, which in case of direct contact can irritate respiratory organs and eyes.

PRINCIPLE OF THE METHOD

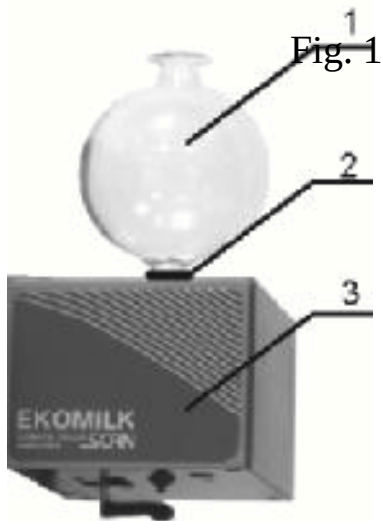
Ekoprim is a surfactant that dissolves the somatic cells membrane as well as its nucleus envelope and forms a gel, elevating the viscosity of the milk.

There is proportional relation between the viscosity of mixture (milk – Ekoprim) and number of somatic cells of the tested milk.

The milk analyzer Ekomilk Scan measures the flowing time of the milk through the sample mixer capillary and determines the number of somatic cells in accordance with this time.

The viscosity measurement is temperature sensitive. For reliable results, the milk sample and Ekoprim surfactant temperatures should be 20-22 °C.

of the flask. Its purpose is to decrease the noise and vibration and to prevent any liquids or particles to drop in.



- Fig. 1
1. Flask
 2. – ring
 3. Sample mixer

The neck of the flask should touches the bottom of the hole. Otherwise the milk will run from the sample mixer and will

damage the analyzer.

Attention: Handle glass flask carefully. Breaking the flask can cause scattering of glass particles.

Put the waste milk container under the sample mixer.

Power supply setting:

- Setting of AC Power Supply Voltage

Connect the AC power lead to the mains socket.

Switch on the AC power.

- Setting of 12V DC Power Supply Voltage

Connect the DC supply lead to 12V outlet (black is “-”) and to the autonomous DC supply (for example car supply).

Switch on the DC power.

When the power is on, **EKOMILK SCAN Washing?** appears on the display.

If you want to refuse the washing, press button **SETTINGS**. In this case **PREPARE SAMPLE** appears on display. The analyzer is ready for use.

If you want to accept the washing procedure, press **OK**. In this case **FILL DETERGENT** appears on display. Use distillated water as a washing liquid.

Measure 15 ml distillated water, pour it into the flask and press . The analyzer

Attention: Do not take into consideration the first sample result because it is likely to be with a deviation out of specification.

MENU

You can enter in analyzer menu only just before measurement, when the message **PREPARE SAMPLE** is on the display. Press button **SETTINGS**. Use the arrow buttons to move from one to another menu position

1. **CALIBRATION**– for more information see section “Calibration”.
2. **PARAMETERS** – Press **OK** to set the analyzer parameters.
 - 2.1. **N Average** – Average result mode. This option determines how many measurements of one and the same milk sample will be made to get a average result. When the marker is at this option press **OK**. On the display appears **Average Results** and **N measures = 1**. Use arrow buttons to change the value of **N measures**. You can choose 1, 2 or 3. 1 means - without average result, 2 means that your choice is to make 2 analysis of one and the same milk sample. After the second measurement the analyzer will show on the display the average result of both measurements. Select 3 if you want to make 3 measurements for one milk sample. Press **OK** to confirm your choice. Press **SETTINGS** to go back to the main menu. A second pressing on **SETTINGS** puts the analyzer in measuring mode.
 - 2.2. **N Sample Swing** During the measurement, the Sample mixer performs rotary motion to mix the sample. This menu option determines how many swings will be performed. When the marker is at this option press **OK**. On the display appears **SAMPLE Swing = ...** Use arrow buttons to change the value. The producer recommends 10 swings to be selected. Press **OK** to confirm your choice. Press **SETTINGS** to go back to the main menu. A second pressing on **SETTINGS** puts the analyzer in measuring mode.

3. **DATA COLLECT** - Power supply independent Data collection mode for storing up to 250 records with information about supplier ID, time and somatic cells number.

This menu option switch on/off the data collect mode. When the marker is at this option, press **OK**. On the display appears **Data Collect ON** or **OFF**. Use arrow buttons to select between **ON** and **OFF**.

4. **SEND & CLEAR** . This option allows data transferring from analyzer memory to PC. If you work in **Data collect ON** mode the measurements will be stored in the memory until records number reaches 250. Then the error message **"DC Memory FULL!"** **Data Collect OFF** appears on the display. In this case you have 3 possibilities:

4.1. You can continue working in **DATA COLLECT OFF** mode. Meanwhile you can connect the milk analyzer to PC. **In DATA COLLECT OFF** mode the analyzer sends each measurement to the PC program EKOMILK.

4.2. You can send the stored data to the PC program EKOMILK.

4.3. You can delete data. Go to the **SEND & CLEAR** menu option. Press **OK**. The message **Start TRANSMIT? [250 records]** appears on the display. Press **OK** again and wait for a message.

Attention: Awaiting time depends on the number of stored records whereas the max time is 1 minute.

As soon as the transfer is completed the display shows message: **"TRANSMIT OK?"**

> **Clear&Exit**. Press **OK** to delete the records from the analyzer memory or press **SETTINGS** to go back to the main menu. In this case the data remains in analyzer memory.

5. **Set TIME** – Adjust time menu option. Press **OK**. **Current time:** appears on the display. The arrow button **u** changes cursor position and button **t** changes the over cursor value. Press **OK** to confirm your choice. Press **SETTINGS** to go back to the main menu. A second pressing on **SETTINGS** puts the analyzer in measuring mode.

PREPARATION OF WORKING SOLUTION

Ekoprim is a powder substance. Before preparing the work solution, check the shelf life label of the substance. After the expiration date the product is ineffective.

The result for Somatic Cells Count will be out of spec. Weigh 3.5 g Ekoprim and put it in a graduated flask or cylinder. Add to 100 ml in advance warmed distilled water (30-35 °C). Stir the mixture up to complete dissolving and then cool it down to 20 - 22°C

Attention: The shelf life of dissolved Ekoprim is 24h.

Attention: Ekoprim is a powder substance, which in case of direct contact can irritate respiratory organs and eyes

MILK SAMPLES

Milk samples temperature should be 20-22°C. The milk acidity of the milk sample must be less than 25°T. Filter the milk sample through 4-layered lint and mix it by shaking 15 - 20 times.

ANALYZER TEST

Add 4-5 drops black ink in 100 ml distilled water, stir and filter it through filter paper.

Press button **SETTINGS . PREPARE SAMPLE** message appears on the display.

Measure 15 ml solution and pour it into the measuring flask. Press **OK** to start the test. As soon as the test is completed the display shows the results: **Time** and a value. If the value is in the spec limits 8 – 8.6, the analyzer is in good working order. Otherwise perform the procedure described in “Calibration”.

Result Time 2.0 means that the test solution needs more ink. Add 1-2 drops and repeat the test.

Attention: The viscosity measurement is temperature sensitive. For reliable test, the test solution temperature should be 20-22 °C

The sample mixer with the flask leans onward.

Attention: The viscosity measurement is temperature sensitive. For reliable results, the milk sample and Ekoprim solution temperature should be 20-22 °C

Measure 5 ml Ekoprim solutions pour it into the flask. Next measure 10 ml milk prepared as it is described in MILK SAMPLE section, pour it into the flask and press **ENTER**. The analyzer many times shakes the flask, stops and mixture flows through the capillary.

As soon as the measurement is completed the display shows the result:

TIME and a value (seconds), corresponding to flow time - on the upper row.

CELLS: and a value, corresponding to the Somatic Cells count divided by 1000 - on the bottom row.

In case of printer connected to the analyzer, after the current measurement is completed, the results could be printed by pressing the arrow button **PRINT** on the analyzer front panel. Results are printed every time when this button is pressed.

Press button **OK**. If you work in average result mode (see **MENU** section), and the number for average result is done, the average result appears on the display.

TIME and a value (seconds), corresponding to average flow time - on the upper row.

CELLS: and a value, corresponding to the average Somatic Cells count divided by 1000 - on the bottom row.

Attention: If the average Somatic Cells count differs more than 5% from whichever measurement, on the display, instead of average result appears: **INVALID RESULT**

Tolerance>5%. In this case you should make a new measurement of the same milk sample.

Press button **OK**. After a measuring, the analyzer enters in Washing Mode. The message **FILL DETERGENT** appears on the display. Measure 15 ml distilled water

Pressing whichever button put the analyzer in measuring mode - the sample mixer with the flask lean onward and **PREPARE SAMPLE** appears on the display.

Attention: It is necessary to wash the analyzer after each measuring with a view to protect the capillary from blocking up and to ensure troublefree work for a long time.

For more information see section “Cleaning procedure”

2. Milk analysis in DATA COLLECT ON Mode

Press button **SETTINGS**. The message **Supplier Number: 0001** appears on the display. In this case you should prepare in advance a list of suppliers by number and name. The arrow button **u** changes cursor position and button **t** changes the over cursor value. Press **OK** to confirm your choice. Press **SETTINGS** to go back to the main menu.

CLEANING PROCEDURE

This section has for an object to give directions for daily and periodical cleaning of milk analyzer Ekomilk Scan with a view to protect the capillary from blocking up and ensure troublefree work for a long time.

1. Washing after a single measuring.

After a measuring, the analyzer enters in Washing Mode. Use distilled water for this procedure (see section “Milk Analysis”). As accessory, the producer provides a rubber balloon. Its purpose is to blow through the capillary. The producer recommends after washing procedure to use this balloon for complete capillary cleaning.

2. Cleaning at the end of working day.

At the end of working day, wash once again the analyzer with distilled water. Blow the capillary through the flask hole. Switch off the analyzer. Remove the flask. Lean

CALIBRATION

Attention: Before calibrating, the milk analyzer must be switched on 3 hour in advance. The room temperature should be 20-22 °C.

Preparation of calibration solution:

Add 4-5 drops black ink in 100 ml distilled water, stir and filter it through filter paper.

Attention: The viscosity measurement is temperature sensitive. For reliable calibration, the calibration solution temperature should be 20-22 °C.

Before starting the calibration, perform the procedure described in section “Cleaning procedure” check the capillary passability using the wire provided by the producer.

While the message **PREPARE SAMPLE** is on the display press button **SETTINGS** to enter in analyzer menu. Use the arrow buttons to select **CALIBRATION** option and confirm it with **OK**. The following message appears on the display:

FILL TEST WATER on the upper row.

[Act Tref=.... s] – The last calibration value on the bottom row.

Measure 15 ml solution and pour it into the measuring flask. Press **OK** to start the test. As soon as the test is completed the display shows the results: **Time** and a value.

If the value is in the spec limits 8 - 8,6, the calibration procedure is done and the message **Calibration OK!** is on the display. **The reference time is 8.3 sec.**

If a message **FLASK EMPTY!** appears on the display, that means the calibration solution needs more ink. Add 1-2 drops and repeat the calibration.

If the value is out of range of 8 - 8,6 the analyzer shows the message

Calibration FAULT. Repeat the full calibration procedure. If the result is again

negative it is necessary to adjust the capillary sensor position.

Perform once again the calibration procedure.

Attention: If the needed turnovers are more than 24, contact your dealer to make the repairs.

Attention: Do not apply a force over the adjusting screw.

Example:

During calibration, the flowing time (T_f) is 8.7 sec. The reference time (T_r) is 8.3 sec. The needed time correction is $T_c = T_r - T_f = -0.4$ sec. The symbol minus shows the screwing direction should be counter-clockwise. The number of turnovers in this direction are $TC * 30 = 12$.

PC PROGRAM EKOMILK

This program is designed to collect the milk data from one milk analyzer Ekomilk.

There are two possible interfaces to connect the milk analyzer to the PC:

1. RS232 - In this case it is enough to connect Ekomilk using RS232 cable to some PC COM port
2. USB - Ekomilk uses a FTDI chip to connect to USB port. The FTDI chip driver installs an additional (virtual) RS 232 COM port.

2.1. USB driver installation

Place the CD “Milkanalyzer software tools” into your CD drive. Use Windows Explorer to set your CD-ROM drive as the default device. Open folder “...FTDI\FTDI Installation guides”. Find out the file corresponding to your Windows version. To open the instruction file you need to have Adobe Acrobat Reader installed on your computer.

First uninstall any previous version of FTDI drivers. Connect Ekomilk to some USB

CD-ROM Drive

VGA graphic adapter and monitor (256 colors)

Windows XP, Vista

Mouse

2. INSTALLATION:

2.1. Close all applications.

2.2. Place the CD into your CD-ROM drive.

2.3. The EKOMILK setup program will start and guide you through the installation. Click on NEXT and follow the prompts until completion.

2.4. After installation a new program icon named EKOMILK appears on your Windows Desktop.

2.5. Run – Start > Programs > Ekomilk > SetupFireBird.

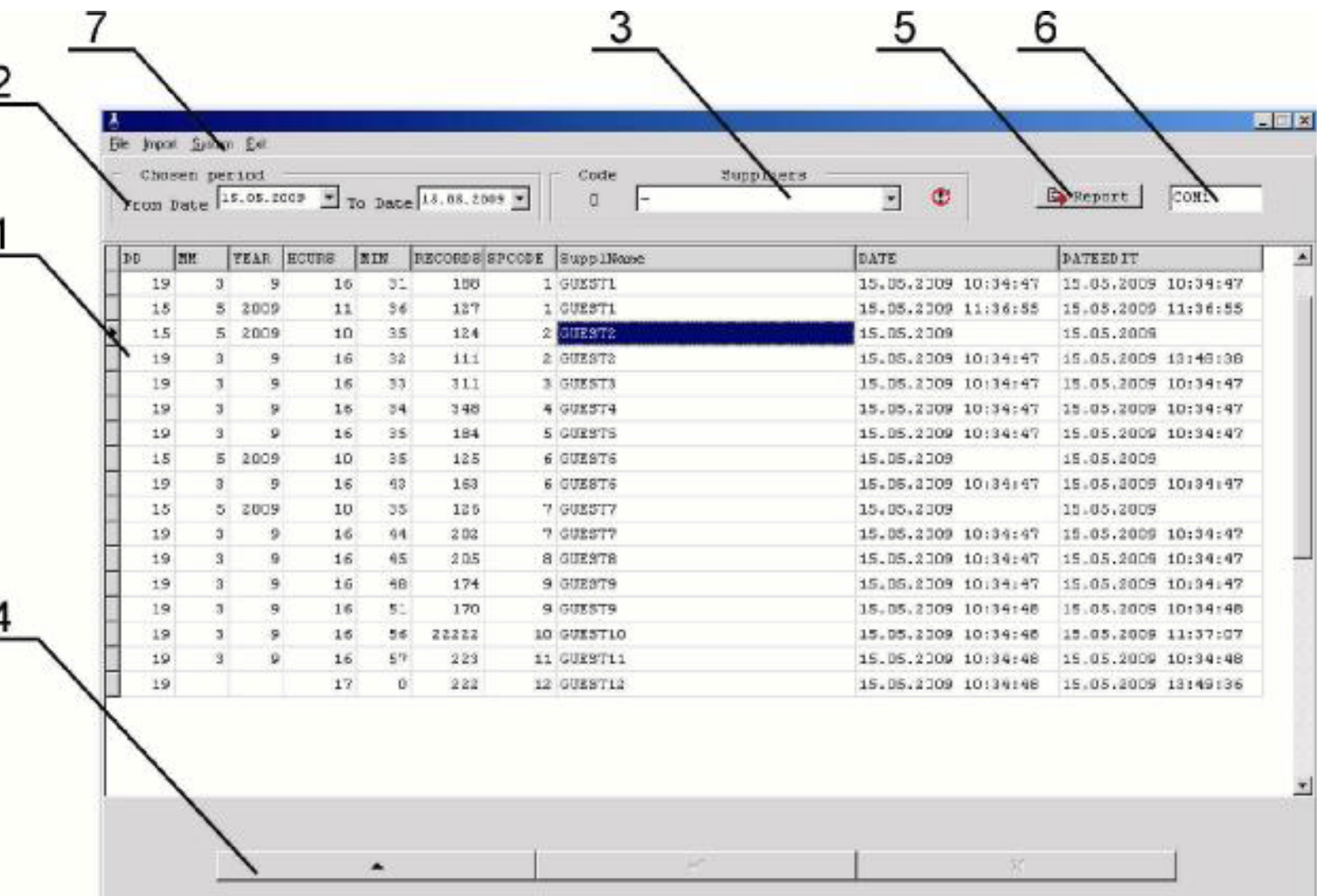
2.6. Double click on the Ekomilk Icon to run the program. Only once, after the first running the program will ask you the disk drive where the program is installed. Enter the corresponding disk drive letter. A Start Windows appears on the display asking you a Password.

There are 2 ways to use the program – as administrator or as guest. The default administrator password is **ekomilk** . This password can be changed later in System>Users menu. The GUEST enters the program without password and uses it within some limits. They can not edit and delete records.

3. HARDWARE INSTALLATION

There are 2 ways to connect Ekomilk to the PC. Choose one of them:

1. Connect the RS 232 cable to some a COM port of the PC and to the RS 232 connector of Milk analyzer.
2. Connect the USB cable to a free USB port of the PC and to the USB connector of



2. Date filter

This option enables you to display only those records in the table that correspond to the criteria defined in the From date box, To date box. In the Date boxes, click on the

. A calendar appears on display. To find the desired month use the icons. When the desired month is displayed, click on the date. The date appears in the box.

3. Suppliers filter

The click on the in the Supplier box allows you to select one supplier from the suppliers list. If you want to select all suppliers, you should leave in the box only a dash (-).

4. Table navigator. Use this option to edit some records. Only an administrator can

Click on Report to print only those records in the table, corresponding to the criteria defined in the Date and Supplier filter (pos. 2 and 3). The Print Preview window appears. To see more about the print preview toolbar buttons, point to some button. The name and additional information about the function of the button appears on the screen.

6. COM port box. This option shows which Com port is selected from Menu>Import>Com Port Settings.

7. Menu

7.1. File

7.1.1. Export to file

Click this option to export some records under supplier and dates.

In the Start Date box, click on the . A calendar appears on display. To find the desired month use the icons. When the desired month is displayed, click on the date. The start date appears in the first box. Repeat the same procedure for the End Date box.

The click on in the Supplier box allows you to select one specific supplier from the supplier's list or dash(-) to select all suppliers. Click Export to Excel to open a Excel worksheet with selected records. Click To TXT file to save the selected records as text file.

7.1.2. Delete

Click Delete to delete some records under supplier and dates.

In the Start Date box, click on the . A calendar appears on display. To find the desired month use the icons. When the desired month is displayed, click on the date. The start date appears in the first box.

Repeat the same procedure for the End Date box.

The click on in the Supplier box allows you to select one specific supplier from

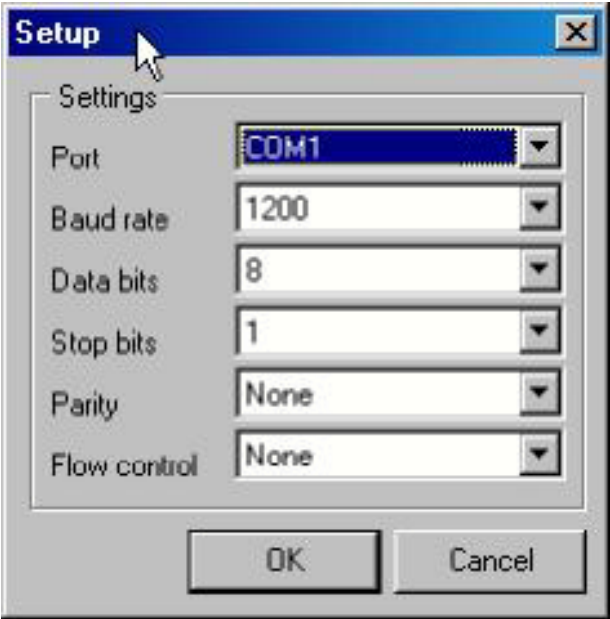
7.2.2. Import. Mark this option to collect one after another the milk analyzer results - see section Data Collecting

7.2.3. Com Port Settings

Click on the Port arrow and the list of all available COM ports appears. Choose the COM port connected to the Milk analyzer.

The others com port settings should be as it is shown on the picture.

The



7.3. System

7.3.1. Suppliers

Click on this menu option to open the Suppliers window. Use this option to create, delete or edit supplier's data.

- 1. Supplier's data table.
- 2. Table navigator. Use this control to edit some records. Only an administrator can edit or delete records.
- + Adds a new supplier.
- Deletes selected supplier.

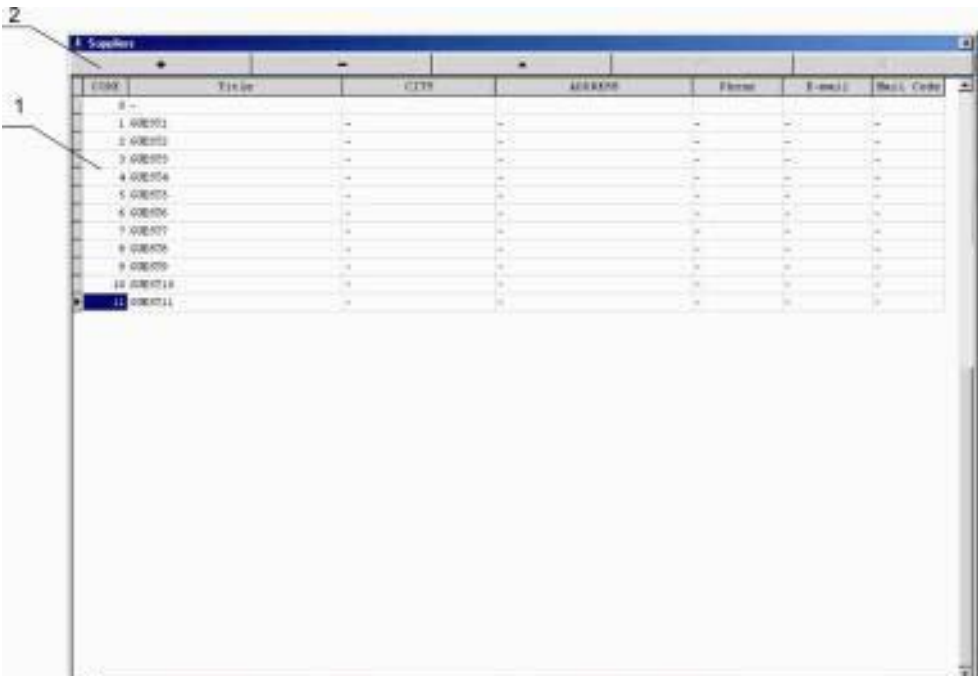
Edits selected supplier.

vWrites changes in the current record to the table.

X Cancels edits to the current record, restores the record display to its condition prior to editing.

7.3.2. Users

Click on this option to create a new user or to



7.4. Exit

Click on this option to close the program.

8. Data Collecting

8.1. Connect a milk analyzer Ekomilk to the PC with Ekomilk program

8.2. Click on **Import menu** and mark **Import** option to collect one after another the milk analyzer results.

8.3. The Milk analyzer should work in **Data Collect OFF** mode. To set this mode press Ekomilk button **SETTINGS**. (You can enter in analyzer menu only just before measurement when the message **PREPARE SAMPLE** is on the display.) Use the arrow buttons to go to **DATA COLLECT** menu option. When the marker is at this option, press **OK**. On the display appears **Data Collect ON or OFF**. Use arrow buttons to select **OFF**. Press **SETTINGS** to go back to the main menu. A second pressing on **SETTINGS** puts the analyzer in measuring mode. Start a measurement. When the measurement is completed, a dialog box appears. Select the supplier from the suppliers list. A new row is added to the table.

9. Data transferring.

9.1. Connect a milk analyzer type Ekomilk to the PC with Ekomilk program.

9.2. Click on Import menu and mark Import from memory to transfer the collected data in Analyzer memory.

9.3. The Milk analyzer should work in Send&Clear mode. To set this mode press Ekomilk button **SETTINGS**. (You can enter in analyzer menu only just before measurement when the message **PREPARE SAMPLE** is on the display.) Use the arrow buttons to go to the **SEND & CLEAR** menu option. Press **OK**. The message **Start TRANSMIT? [250 records]** appears on the display. Press **OK** again and wait for a message.

Attention: Awaiting time depends on the number of stored records where the max time is 1 minute.

ERRORS LIST

Error message **PROBLEM & CAUSE & REMEDY**

INVALID RESULT

Tolerance > 5%

Average result mode error. If the average Somatic Cells count differs from whichever measurement more than 5%, on the display, instead of average result appears this error message. In this case you should make a new measurement of the same milk sample.

DC Memory FULL !

Data Collect OFF

If you work in **Data collect ON** mode the measurements will be stored in the memory until records number reaches 250. Then the error this error message **DC Memory FULL ! "Data Collect OFF"** appears on the display . For more information see menu section **SEND&CLEAR**

CalibrationFAULT

FLASK EMPTY!

See section “Calibration”

Calibration error. If this message appears on the display, there is not calibration solution in the flask or the calibration solution needs more ink. See section “Calibration”.

SET DEFAULTS?

This message offers you to restore the default analyzer settings. This is a service error message and appears only in case of analyzer memory damage. Press **OK** to restore default settings.

EPROM Not Exist!

There is not communication between the main processor and PROM. PROM is burnt or not properly put in the socket. Contact your dealer to make the repairs.

Error message PROBLEM & CAUSE & REMEDY

H,V,F

Motor OVERLOAD

Motor OVERLOAD

Unexpected ON

Each one of these errors indicates a capillary sensor

Sens X Missing

problem. Contact your dealer to make the repairs.

GUARANTEE

Guarantee is one full year. Guarantee is void if warranty labels are removed. Under no circumstance you should try to repair the Analyzer yourself, as this will invalidate the guarantee. The guarantee conditions for this analyzer are as defined by our representative in the country of sale.

Serial N:

Date: