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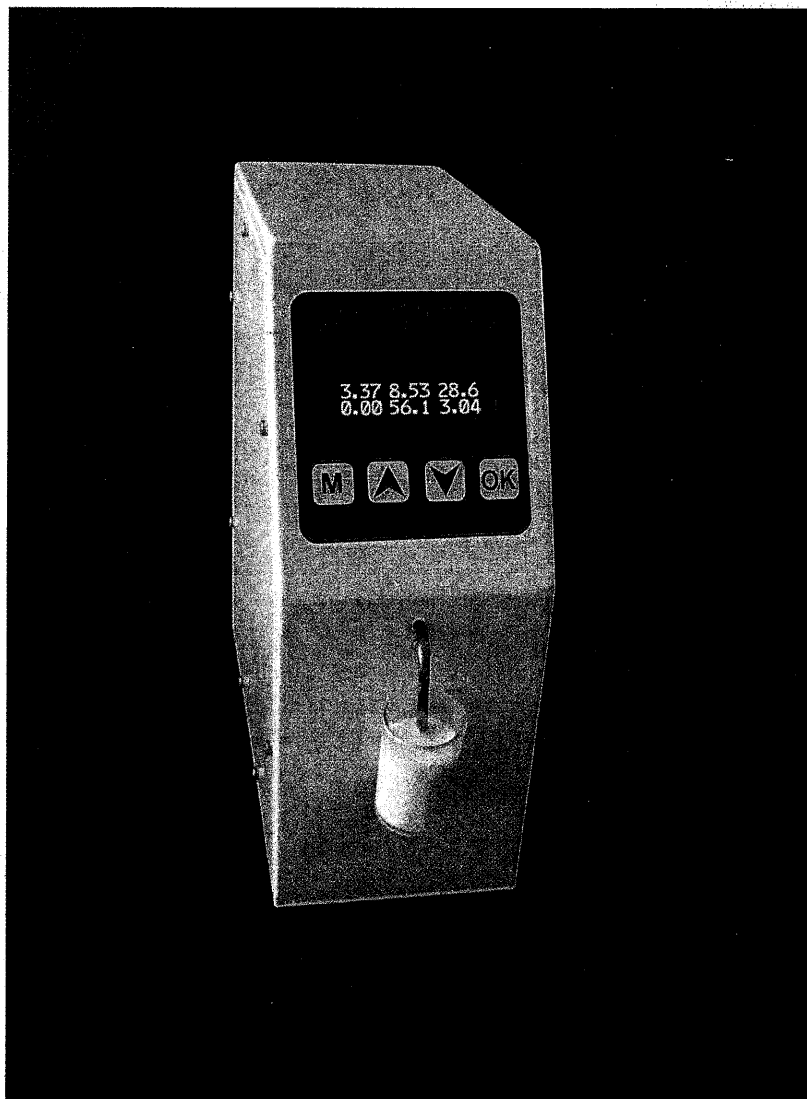


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USER'S GUIDE

(Revision 1.1)



LactiCheck™ RapiRead Ultrasonic Milk Analyzer Model LC-02/RR

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-Page 1 of 33, User's Guide, LactiCheck, ID: lacticheck rapiread rev1.1 users guide, Last Printed: 11.08.31

Amendments to User's Guide, the LactiCheck Milk Analyzer

Num- ber	Pen Ink	& New Page	Description of Changes	Implemented by	Date
N. 1	X		Update of entire manual	JMP/TSP	02.12.10
N. 2	X		Update of Parts List	JMP/TSP	02.12.10
N. 3	X		Update of Failure Symptom/Remedy	JMP/TSP	03.12.10
N. 4			[Resetting Pump after Power Glitch]		
N. 5					
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LactiCheck RapiRead Ultrasonic Milk Analyzer

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1. Warranty Duties of Page & Pedersen International, Ltd. and User

PAGE & PEDERSEN INTERNATIONAL, Ltd. warrants that for 12 months, from date of shipment, each new Milk Analyzer sold or manufactured is free from defects in material and workmanship under normal installation, use and service.

PAGE & PEDERSEN INTERNATIONAL, Ltd. agrees that such defects will be remedied or new parts furnished in exchange for any defective part delivered by the owner, (*excluding glass, ceramics and/or parts otherwise not warranted by their makers*). Parts should be returned, transportation charges prepaid, to the factory for our examination. If, in our judgment, the part contains any such defect, it will be replaced, charging only for transportation.

This warranty does not extend to any Milk Analyzer subjected to negligence, accident, misuse or other improper operation, or which has been tampered with, altered or repaired by anyone other than PAGE & PEDERSEN INTERNATIONAL, Ltd. or our authorized service representatives. Nor does this warranty extend to any consequential damage caused by defects or improper use or secondary damage resulting from prior problems.

The above provisions do not extend the original warranty period of any Milk Analyzer or part thereof, which has been replaced or repaired there under. Remedies made under the terms of this warranty in no case include any obligation or responsibility for transportation arrangements or charges thereof.

All results and interpretations are the responsibility of the User.

This warranty is in lieu of all other warranties, representations and conditions of any kind, expressed or implied in fact or by law. In no event shall PAGE & PEDERSEN INTERNATIONAL, Ltd. be liable under this warranty or otherwise in any matter for any remote or consequential damage resulting from the breach of this warranty or condition implied by law or otherwise, or for any damage to the Milk Analyzer or part thereof caused by improper installation, unauthorized repair or alteration, negligence, abuse or misuse, accident, or act of God.

Attention is called to the User's responsibility regarding Reasonable Use, Useful Life of the Milk Analyzer and Immediate Notification outlined below in this paragraph.

No person is authorized to assume for PAGE & PEDERSEN INTERNATIONAL, Ltd. any liability in connection with sale or service of the Milk Analyzer. PAGE & PEDERSEN INTERNATIONAL, Ltd. reserves the right, at any time without notice, to make changes in price, color, material, specifications and models without incurring liability to modify products previously produced, and to add or discontinue models and accessories.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

DUTIES:

By accepting and operating this Milk Analyzer, the USER and PAGE & PEDERSEN INTERNATIONAL, Ltd. agree to the following responsibilities, which constitute contractual warranties and condition between PAGE & PEDERSEN INTERNATIONAL, Ltd. and USER for the maximum benefit and usefulness of the Milk Analyzer.

PAGE & PEDERSEN INTERNATIONAL, Ltd. WARRANTS THAT IT:

- Knows of no defects in design and materials, which may cause bodily injury.
- Will endeavor to advise the USER of changes or improvements in the Milk Analyzer, as they are developed, so that the USER may take steps to improve the safety and performance of the equipment in its useful life.
- Will replace or repair the Milk Analyzer according to the guarantee in the warranty.
- Will cooperate closely in common defense of any accident involving the Milk Analyzer, or third-party suit against USER or operating personnel, if advised immediately by USER of the occurrence of any accident.

USER WARRANTS THAT:

- The Milk Analyzer will be used reasonably.
- The Milk Analyzer will not be altered without written approval of PAGE & PEDERSEN INTERNATIONAL, Ltd.
- PAGE & PEDERSEN INTERNATIONAL, Ltd. will be notified immediately if any injury occurs in any association with the Milk Analyzer, and will be allowed prompt and thorough examination of the Milk Analyzer in question.
- PAGE & PEDERSEN INTERNATIONAL, Ltd. will be held harmless in cases of injury arising:
 - a. Beyond Useful Life of the Milk Analyzer
 - b. From Unreasonable Use
 - c. When PAGE & PEDERSEN INTERNATIONAL, Ltd. is not immediately notified of said injury.
 - d. From interpretation of results.

2. The Milk Analyzer

LactiCheck RapiRead Ultrasonic Milk Analyzer

LACTICHECK Ultrasonic Milk Analyzer provides a easy, rapid and precise analysis of the major components of milk [including fat, SNF, protein, density, added water and lactose] from raw, unprocessed and/or processed cow (bovine) and/or goat (caprine) milk and select milk products.

2.0 Key Features

- **Ultra-rapid milk composition results**
- **User-friendly and Easy to Use**
- **Two channels facilitate accurate analysis of normal fat and reduced fat or higher fat fluid bovine or caprine milk products**
- **Compact – requires only small area of bench space**
- **Precise and Repeatable – correlates well with internationally recognized reference methods for determining milk composition**
- **Robust and Reliable**
- **Versatile (Bovine or caprine milk, unprocessed and/or processed and select liquid milk products)**
- **Cost effective – allows lab more time to pursue more pro-active safety, regulatory and quality related testing**
- **No costly or other caustic chemicals are required**
- **One-year warranty**
- **Standard RS 232 Interface**
- **Data collection: LactiLog™ software/hardware package that records Vendor ID and milk analysis results for unlimited number of vendors (optional)**

Electrical Parameters:

AC Power Supply voltage	90-260 VAC
DC Power Supply voltage	13 - 15 Volts
Power Consumption	< 30 Watt

Test Parameters:

Sample Size	20 ml
Test Time	40 seconds
Cleaning Cycle	< 2 minutes (in Automatic Mode)
Start-Up Time	< 5 minutes (depending on Ambient Temp.)

Tolerance:

Fat	from 0.3% to 9% with accuracy $\pm 0.06\%$ from 9 to 14% with accuracy $\pm 0.1\%$
Solids Nor Fat (SNF)	from 6% to 12% with accuracy $\pm 0.1\%$
Milk density	1.0260g/cm^3 to $1.0330\text{g/cm}^3 \pm 0.0005\text{g/cm}^3$
Protein	from 2% to 5% with accuracy $\pm 0.1\%$
Added water to milk	from 0% to 60% with accuracy $\pm 5\%$
Lactose (Optional)	from 3% to 7% with accuracy $\pm 0.2\%$

NOTE:

Calibration is protected by a three-part password that is located on the bottom panel of every instrument. (If you wish to maintain a higher level of security, we recommend re-locating the password sticker to a location that is only accessible by qualified personnel responsible for calibration.)

2.1 Theory of Operation

Ultrasonic testing is a versatile technique that is being applied to a wide variety of material analysis applications. High frequency sound waves have been used for years to discriminate and quantify basic mechanical, structural, or compositional properties of solids and liquids in a range of diagnostic and monitoring requirements within the medical community. This technology is increasingly being used in a growing number of applications within the dairy, food, pharmaceutical and other industries.

The interaction of sound with particulates has been studied for over a century. Lord Rayleigh was the first to propose a theory to describe the propagation of sound through materials in 1879.¹ This original work was extended so that the changes in sound velocity and attenuation could be predicted for water borne particles in air. Today, more complete theories can be found in the work of Epstein and Carhart (1953)² and Allegra and Hawley (1972).³

Ultrasonic material analysis is based on a simple principle of physics: the motion of any wave will be affected by the medium through which it travels. Thus, changes in one or more of four easily measurable parameters associated with the passage of a high frequency sound wave through a material--transit time, attenuation, scattering, and frequency content--can be correlated with certain compositional parameters of milk. The LACTICHECK Analyzer launches a high frequency sound wave by exciting the ultrasonic transducer with a continuous wave impulse. The sound wave travels through the milk. An amplitude theory implemented in the LACTICHECK Analyzer software predicts the magnitude of each of the scattering and absorption mechanisms. The movement of the particles (i.e. fat, solids not fat, etc.) relative to the continuous phase causes visco-inertial losses as the sound wave propagates through the sample. Drag between the liquid and the particles causes sound energy to be lost as heat. The velocity of the ultrasonic pulse and the temperature change of the sample are precisely measured.

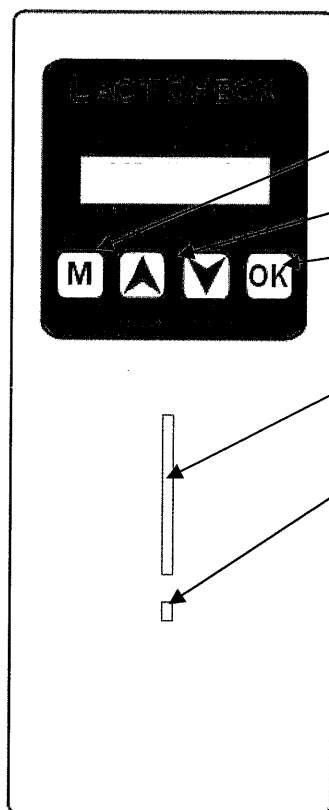
As the sound velocity and temperature are directly correlated to the particulates in the sample, the LACTICHECK Analyzer can provide reliable analyses of critical components such as fat and solids not fat by accurately assessing changes in these parameters. Other characteristics, such as protein, added water and freezing point, are calculated based upon the percentage of components measured using an exact mathematical formula.

-
1. J.W. Strutt Lord Rayleigh, "Theory of Sound", Dover, New York, reprint, 1945 originally published 1879.
 2. P.S. Epstein & J.S. Carhart, "The Absorption of Sound in Suspensions and Emulsions – Water Fog in Air", J. of the Acoustic Society of America, 25 (3), 553-565, May 1953
 3. J.R. Allegra & S.A. Hawley, "Attenuation of Sound in Suspensions and Emulsions: Theory and Experiments", J. of the Acoustic Society of America, 51 (5), 1545-1564, 1972.

2.2 Basic functions

Controls

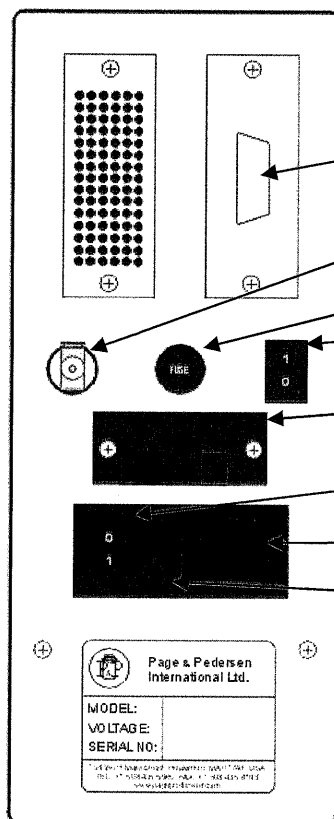
CONTROLS (The front panel)



1. Select the working mode (Processed Cow Milk, Cow Milk Calibration, Cleaning)
2. Move forward and backwards in menu
3. Confirm the choice
4. Tube (aspirator)
5. Sample Cup Holder

NOTE: To STOP a cycle, press the Mode button again.

SWITCHES and Connectors (The rear panel)



1. RS 232 Interface Connection for PC or Printer
2. Connection for Cleaning Pump
3. DC Fuse, 1 x 4.0 Amps Slow Blow
4. ON/OFF Switch for mobile use (13 to 15 Volts)
5. DC Connection (Red is + / Black is -)
6. AC POWER Switch
7. AC power cord connection outlet
8. AC Fuses, 1 x 1.6 Amps, Slow Blow

Keyboard

The keyboard of the Milk Analyzer consists of the following four (4) keys:



- 1) MODE
- 2) ▲
- 3) ▼
- 4) OK

The ▲, ▼ keys are used for scrolling up or down in the MODE Functions.

MODE Functions

The MODE Functions are as follows:

MODE Function	Display read out	Function
Cow Milk 1	Cow Milk 1	Testing raw (or pasteurized) Cow (or Goat) milk
Cow Milk 2	Cow Milk 2	Testing homogenized, pasteurized (or heat-treated) Cow (or Goat) milk (calibrated for ~3.25% fat bovine milk)
System	SYSTEM	System parameter setup, not available for the user.
Calibration	CALIBRATION	Calibration of the Milk Analyzer, see paragraph 2.3
Operation Form	MOTOR CHOICE	Selection of Manual or Automatically operation, see Section 2.4
Cleaning cycles	CLEANING	Automatic cleaning cycle, used only in Automatic Operation

RS-232 Interface

The RS-232 interface facilitates automated data transfer to a Serial Printer or directly to a PC running the Lacti-Log™ software or to a COMPU-LOG data logger.

If connected to a Serial Printer, a standard RS-232 cable can be used. The Serial Printer is to be setup to the following communication format: 9600 Baud, N-8-1.

If connected directly to a PC a specially configured cable included with the LactiLog software is required.

Fuses

The following fuses are used:

Mains fuses: 1 piece 1.6 Amps SB (Slow Blow)

DC Input fuses: 1 piece 4.0 Amps SB (Slow Blow)

2.3 Calibration

The Milk Analyzer is shipped with primary calibration in place on both Channel 1 (~3.25% fat) and Channel 2 (~2.0% fat). Calibration should be validated upon receipt of the instrument and adjustments to the bias of the calibration linearity made, as required*, for Fat, Solids Not Fat, Density and Protein.

If you wish to measure full fat milk on both channels or analyze milk of different parameters than those reflected above, it is absolutely recommended that you calibrate accordingly upon receipt of the instrument. (i.e. running 9% fat coffee milk on Channel 2 [which has a primary calibration for reduced fat milk] will likely cause test results outside of the specified tolerances UNLESS the Channel 2 is recalibrated for the higher fat product by the User prior to testing.)

*If Fat is the only parameter that is required, it is NOT necessary to calibrate the other channels. Similarly, if Fat, SNF and Protein are the only parameters required it is NOT necessary to calibrate for Density. *The Added Water/Freezing Point will automatically be adjusted when these parameters are calibrated correctly.* If calibration is required, the following sequence is recommended for best results:

NOTE:

The calibration sequence should be (I) Fat, (II) SNF, (III) Protein, (IV) Freezing Point (V) Density. If the instrument is reporting satisfactory fat values, you can skip to SNF, but it is not possible to properly calibrate for protein before you make an adjustment to the SNF calibration. Allow instrument to warm-up for a minimum of 30 minutes before calibration.

Calibration Procedures

Select channel Cow Milk 1 (default) or Cow Milk 2. **The bias of the Fat and Solids not Fat calibration channels can be altered sequentially but we recommend waiting to change the bias of the Density and Protein until 2 or 3 samples have been run following altering of these two primary calibration channels.** Proceed to adjust the bias of the selected channel as follows:

I. First, determine fat contents of a representative sample* by means of a classical method (for example you can use Rose Gottlieb or the Gerber method for fat) or select an appropriate Control that is pre-assayed for fat contents and analyze duplicate samples with the Milk Analyzer:

- a) Test duplicate samples of the same milk using the Milk Analyzer.
- b) Subtract the fat value achieved with classical method or the Control from the Milk Analyzer's fat value. If the difference value is within specification there is no need calibrate.
- c) Otherwise, enter the appropriate channel in the calibration menu (i.e. either Processed Cow Milk or Cream) and add this difference as a fat calibration value using the procedure described in the paragraph "Calibration values Storage" (see below). *Be sure to confirm you are calibrating the correct channel.*

II. Second, determine the SNF (Solids Not Fat) of a representative sample by means of a classical method or select an appropriate Control that is pre-assayed for SNF contents and analyze with the LactiCheck:

- a) Test duplicate samples of the same milk using the Milk Analyzer.
- b) Subtract the SNF achieved with classical method from Milk Analyzer's SNF value. If the difference value is within the specification there is no need to calibrate.
- c) Otherwise, enter the appropriate channel in the calibration menu (i.e. either Processed Cow Milk or Cream) and add this difference as a SNF calibration value using the procedure described in the paragraph "Calibration values Storage" (see below). *Be sure to confirm you are calibrating the correct channel*

III. Determine the milk sample protein by means of a classical method (for example, you can use Kehldahl) or select an appropriate Control that is pre-assayed for protein content and analyze:

- a) Test duplicate samples of the same milk using the Milk Analyzer.
- b) Subtract the milk sample protein value achieved with the classical method from Milk Analyzer's milk protein value. If the difference value is within the specification there is no need to calibrate.
- c) Otherwise, enter the appropriate channel in the calibration menu (i.e. either Processed Cow Milk or Cream) and add this difference value as a milk protein calibration value using the procedure described in

the paragraph *"Calibration values Storage"* (see below). *Be sure to confirm you are calibrating the correct channel.*

IV. Determine the milk sample freezing point by means of a classical method (for example, freezing point cryoscopy set to the specifications recommended by an internationally recognized review). Test duplicate samples of the same milk using the Milk Analyzer.

- a) Subtract the milk sample freezing point value reported by the cryoscope from the Milk Analyzer's milk freezing-point value. If the difference value is within the specification there is no need to calibrate.
- b) Otherwise, enter the appropriate channel in the calibration menu (i.e. either Processed Cow Milk or Cream) and add this difference as a milk lactose calibration value using the procedure described in the paragraph *"Calibration values Storage"* (see below). *Be sure to confirm that you are calibrating the right channel.*

V. Determine the milk sample density by means of a classical method (for example, you can use a density meter) or select an appropriate Control that is pre-assayed for protein content and analyze split samples with the Milk Analyzer.

- c) Test duplicate samples of the same milk using the Milk Analyzer.
- d) Subtract the milk sample density value achieved with classical method from Milk Analyzer's milk density value. If the difference value is within the specification there is no need to calibrate.

Otherwise, enter the appropriate channel in the calibration menu (i.e. either either Processed Cow Milk or Cream) and add this difference as a milk density calibration value using the procedure described in the paragraph *"Calibration values Storage"* (see below). *Be sure to confirm that you are calibrating the right channel.* Calibration is now complete. (For additional information see Calibration Addendum – back of User's Guide.)

***NOTE:**

A **"representative sample"** is defined as a sample of milk similar in every way to the type of milk you will analyze for composition on a regular basis (i.e. either raw milk or processed milk). If the calibration sample cannot contain Bronopol ($C_3H_6BrNO_4$) or other preservatives, it must be no older than 48 hours. Sample sets prepared for infrared calibration that contain bronopol **can only** be used to validate the calibrate the instrument (as only one sample is required to adjust the bias calibration).

Calibration Values Storage

To save/store a new calibration value in the memory press the MODE button first.

Press the search buttons ▲, ▼ to find calibration mode:

- ☐ CALIBRATION .calibration of channel 1

Press OK. The instrument will ask for your three-part password:

- ☐ PASS 1 00

Press the search buttons ▲, ▼ until the first segment of your password is displayed. Press OK. The instrument will ask for the second part of your password:

- ☐ PASS 2 00

Press the search buttons ▲, ▼ until the second segment of your password is displayed. Press OK. The instrument will ask for the third part of your password:

- ☐ PASS 3 00

Press the search buttons ▲, ▼ until the third segment of your password is displayed. Press OK.

Press the search buttons ▲, ▼ to find the calibration mode* you require. Press OK when the mode is displayed.

- ☐ FAT Proc. Cow Milk 1 message appears on the display when the password procedure is successfully completed. Press the search buttons ▲, ▼ to select the milk parameter to be calibrated
- ☐ FAT Proc. Cow Milk 1 – Channel 1 cow milk fat calibration
- ☐ SNF Proc. Cow Milk 1 - Channel 1 cow milk SNF (Solids Not Fat)calibration
- ☐ DEN Proc. Cow Milk 1- Channel 1 cow milk density calibration
- ☐ PRO Proc. Cow Milk 1– Channel 1 cow milk protein calibration
- ☐ FP Proc. Cow Milk 1– Channel 1 cow milk freezing point calibration
- ☐ FAT Cow Milk 2 – Channel 2 cow milk fat calibration
- ☐ SNF Cow Milk 2 – Channel 2 cow milk SNF (Solids Not Fat) calibration
- ☐ DEN Cow Milk 2 – Channel 2 cow milk density calibration
- ☐ PRO Cow Milk 2 – Channel 2 cow milk protein calibration
- ☐ FP Proc. Cow Milk 2– Channel 2 cow milk freezing point calibration

*NOTE: Goat milk can be calibrated on either (or both) Cow Milk channels if you wish to assay for composition as the matrix of goat milk is similar to bovine cow milk.

Select desired calibration parameter. Confirm by pressing OK.

The inscription VALUE appears on the right of the display.

Press the buttons ▲, ▼ to set the calibration value required.

The number can range from approximately –2.50 to +2.50 for fat, SNF, and protein, -0.25 to +0.25 millidegrees Celsius for Freezing Point and from -9,9 to +9,9 for density calibration. This number defines the calibration value.

When the desired value is set on the display, press the OK button to save it.

Then the display shows CAL VALUE and a number equal to the total calibration value for this milk parameter.

The total calibration value is an arithmetic sum of all calibration values added to the primary calibration for this milk parameter.

The calibration is completed. (For additional information, refer to Calibration Addendum, Practical Examples of Calibration at the end of the User's Guide.

NOTE:

The Total calibration value for each parameter represents the change in bias to the Primary Calibration. A Total calibration value change of +/-2.5% can be made (for fat, SNF and protein) and -9,9 to +9,9 (for density). In cases, where a larger number has been achieved during a calibration procedure a CAL OUT OF RANGE error message will appear on the display. **New Calibration Values MUST be confirmed by pressing "OK" or the instrument will revert to the existing calibration.**

If the read-out shows "Calibration Out of Range", you can re-set the calibration by going into Mode, Calibration, and then selecting the parameter that is out of range. Confirm by pressing "OK" and not the Total Value (which represents the total amount the calibration has been adjusted since programmed in the factory). Go back to Model, Calibration, selecting the parameter that is out of range and 'zero' the value (by adding or subtracting the Total Value noted). Then, re-test your calibration sample and proceed with calibration.

2.4 Setup

The Milk Analyzer requires very minimal setup.

Voltage Selection

The LC-02/RR operates with a fully dynamic power supply that automatically adjusts to handle 90-260 VAC input, 45-65 HZ.

Systems Setup

The user is not required to make any changes in this area - the manufacturer completes this setup.

Motor Choice

The user is not required to make any changes in this area - the manufacturer completes this setup. The motor choice is in the setup area, where the user can decide if the built-in automatic pump system is to be utilized (Automatic Operation) or if an external pump system is to be used (External Operation). *External Operation is typically reserved for maintenance/repair procedures.*

Automatic Operation (Default Setting)

The Milk Analyzer is shipped in the Automatic Operation Mode, meaning that samples are automatically aspirated when the 'OK' button is pushed for testing or to initiate the Cleaning Procedure. If you need to re-initiate the Automatic Operation Mode, proceed as follows:

Press the "MODE" key
Press the ▲ or ▼ key to "Motor Choice" is displayed
Press the "OK" key
Press the ▲ or ▼ key to "ON" is displayed
Press the "OK" key
Press the "MODE" key

Now the automatic aspiration mode is functional for both testing and cleaning.

External Operation (User Selectable)

External operation is functional when the user has decided to use the External aspiration. Ensure that an external pump unit is connected to the external pump connection on the rear side of the LactiCheck. (A manual pump unit is available from P&P or your authorized local representative.)

Press the "MODE" key
Press the ▲ or ▼ key to "Motor Choice" is displayed
Press the "OK" key
Press the ▲ or ▼ key to "OFF" is displayed
Press the "OK" key
Press the "MODE" key

Now the External aspiration mode is functional for both testing and cleaning. *(The External Operation Mode is especially useful should a blockage develop in the tubing assembly and for special cleaning prior to shipping or storing the instrument.)*

2.5 Operation

Power Connection

Place the Milk Analyzer vertically on a table or any other flat surface.

Connect the AC power lead to the mains socket. Set the Power switch to "On".

DC Power Supply Voltage is used:

Contact your local LactiCheck Supplier for a DC supply lead and appropriate instructions. (This option is provided for laboratories desiring to use the LactiCheck in field testing or for mobile laboratories.)

Start up Period

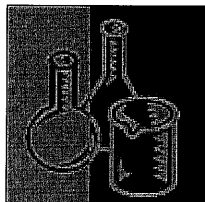
When the power is on, WARM UP appears on the display. When the "warm up" stage is over (in approximately 5 minutes), "LACTI CHECK" is shown on the display.

The Milk Analyzer is ready to use.

NOTE:

Discard the first test results, as they are likely to have a deviation outside of specification.

Automatic Operation



Definition of Milk Samples

- Temperature of the sample should be 10-30°C. (Sample temperature is critical.)
- Milk with surface fat film or containing crystallized fat should be heated to 42 - 45°C by means of water-bath. Stir the sample and then cool it to below 30°C. Agitate the sample gently before testing (or insert in automated shaking device) to ensure homogeneous distribution of fat, etc.
- If the milk temperature is above 30°C the message HOT SAMPLE appears on the display.
- **Milk pH must be within the range of 6 to 8 (not less than 6 and not more than 8. 5.8 is too acidic).**
- Do NOT microwave the milk sample. This can lead to erroneous results.
- Samples may not contain Bronopol or other similar preservatives
- Ensure that there are no AIR BUBBLES in the sample. If air bubbles appear, allow the sample to set for at least 10 minutes.
- Gentle, continual agitation of milk samples (i.e. with an automated shaker) will ensure optimal accuracy and precision as it contributes to greater homogeneity in the sample.

NOTE:

Cool samples that are >30°C to 20-25°C to ensure that they are not aerated.

NOTE:

Do NOT shake or stir the sample vigorously. This can cause air-bubbles in the milk sample and lead to false results. Samples with air bubbles should sit for + 10 minutes before testing.

The Milk Analysis

Fill the sample cup (~20 ml) with milk. Fix the sample cup bottom on the Sample Cup Holder so that the aspirator is emerged in the sample. Ensure that no air is aspirated with the milk.

Press the MODE button only once. Press the search buttons ▲, ▼ to locate desired mode:

- ☐ Cow Milk 1- Testing raw (or pasteurized) Cow (or Goat) milk
- ☐ Cow Milk 2 - Testing homogenized, pasteurized (or heat-treated) Cow (or Goat) milk (factory default: calibrated for ~3.25% fat bovine milk)

As soon as the correct channel is displayed, press OK to confirm and start the test.

The message WORKING appears on the display while the measuring is going on. (The test time is about 85 Seconds depending on the milk temperature, ambient room temperature & type of sample.)

The measurement is completed when the display shows the results for following characteristics:

Display Line One:

- ☐ Fat (Readout in %)
- ☐ SNF (Readout in %)
- ☐ Milk Density (Readout = XX.X where Density = 1.0XXX)

[Example: Readout is 27.5 = 1.0275g/cm³]

Display Line Two:

- ☐ % Added water to milk (Readout in %)
- ☐ Protein (Readout in %)

Lactose Reading:

- ☐ Press the ▼ search button and the Lactose value will be displayed (Readout in %)
- ☐ Press the ▼ search button again to return to the previous screen

NOTE:

Never reuse the milk for more than one test. Previously tested samples have been physically altered so that re-testing results may not be valid.

The Cleaning

It is necessary to clean the Milk Analyzer by a rinsing procedure in the following instances:

1. The interval between two consecutive measurements is more than 30 minutes
2. End of working day

Cleaning Procedures –

A. Automatic (Default Setting)

- a) Fill a clean sample cup with warm, potable or sterile water (The temperature must be between +50°C and +60°C or (+122°F and +140°F) and introduce it to the aspirator.
- b) Press the "MODE" key, press the ▲ until "Cleaning" is displayed and press the "OK" key.
- c) Confirm the default of "1" cleaning cycle, or increase from "2" to "99" and press the "OK" key.
- d) Remove the sample cup and discard the contaminated water.
- e) Repeat this procedure until the water coming out from the Analyzer is clear.
- f) Run an extra cup of clean cooled water.
- g) Replace the cup with an empty cup, connect the LactiCheck Cleaning Pump, and pump until no fluid is discharged from the aspirator.

B. Amplified Cleaning (End of Day or End of Batch)

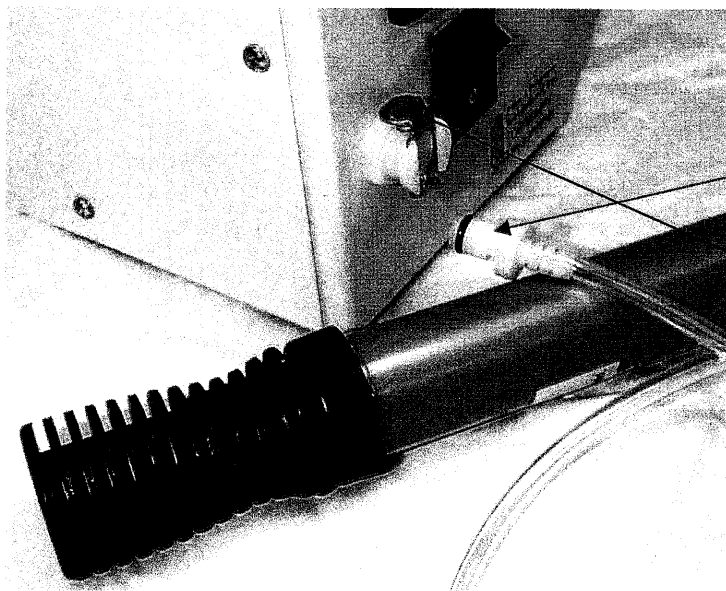
- a. Fill a clean sample cup with warmed LactiCheck Cleaning Solution (The temperature must be between +50°C and +60°C or (+122°F and +140°F) and introduce to the aspirator

NOTE:

DO NOT use acid-based cleaners or solvents as these will damage the interior of the ultrasound chamber as well deteriorate the internal fluid lines.

Only use LactiCheck Cleaning Solution or other approved alkaline-based enzymatic cleaning agents. User of non-approved cleaners will void your warranty.

- b. Press the "MODE" key, press the ▲ until "Cleaning" is displayed and press the "OK" key.
- c. Confirm the default of "1" cleaning cycle, or increase from "2" to "99" and press the "OK" key.
- d. Remove the sample cup and discard the contaminated solution.
- e. Fill a clean sample cup with warm, potable or sterile water and repeat as in Step 1 above (The temperature must be between +50°C and +60°C or (+122°F and +140°F).
- f. Repeat procedure d) to f) several times until the water coming out from the Milk Analyzer is clear and clean
- g. Replace the cup with an empty cup, connect the LactiCheck Cleaning Pump, and pump until no fluid is discharge from the aspirator.
- h. Disconnect the Cleaning Pump and ensure that the 'lock' is in the down position to re-instate a partial vacuum situation during testing. (If the lock is left 'open', the results will be compromised.)



Insert male Pump connect by pushing into female connect at rear panel – listen for the 'click' to confirm proper connection.

Depress silver cap to remove Pump. Be sure that cap is in the depressed or 'down' position prior to resuming testing.
NOTE: Do not run tests when the Manual Pump is con-

NOTE:

At the end of the day, begin by running a cleaning solution first and then run warm water to make sure that after each use the Analyzer is properly cleansed. Otherwise the instrument can be damaged.

2.6 Maintenance

NOTE:

To ensure proper performance, make sure that the Milk Analyzer is properly cleaned at the end of each cycle of use (batch) and/or at the end of the day. Lack of cleaning will lead to damage.

It is necessary to clean the Milk Analyzer by a rinsing procedure in the following instances:

1. The interval between two consecutive measurements is more than 30 minutes
2. End of working day

Short Interval Cleaning Procedures

- a. Fill the Sample Cup with warm and clean water (The temperature of the water must be between +50°C and +60°C or (+122°F and +140°F))
- b. In Automatic Mode (Default Setting): Press the "MODE" key, press the ▲ until "Cleaning" is displayed and press the "OK" key.
- c. Confirm the default of "1" cleaning cycle, or increase from "2" to "99" and press the "OK" key.
- d. Remove the sample cup and discard the contaminated water
- e. Repeat this procedure several times until the water coming out from the Milk Analyzer is clear and clean
- f. Run an extra cup of clean cooled water
- g. Replace the cup with an empty cup, connect the LactiCheck Cleaning Pump, and pump until no fluid is discharge from the aspirator. Disconnect the Cleaning Pump.

Recommended Cleaning

To ensure that the Milk Analyzer remains in good working condition, clean the Analyzer at least once a day using the special cleaning solution first (reorder as 70L001) followed with warm water

NOTE: The temperature of the Cleaning Solution and the water must be between +50°C and +60°C or (+122°F and +140°F).

Cleaning Procedures:

- a. Fill the Sample Cup with warm and clean water (The temperature of the water must be between +50°C and +60°C or (+122°F and +140°F))
- b. In Automatic Mode (Default Setting): Press the "MODE" key, press the ▲ until "Cleaning" is displayed and press the "OK" key.
- c. Confirm the default of "1" cleaning cycle, or increase from "2" to "99" and press the "OK" key.
- d. Remove the sample cup and discard the contaminated water
- e. Fill a clean sample cup with warmed LactiCheck Cleaning Solution (The temperature must be between +50°C and +60°C or (+122°F and +140°F)) and introduce to the aspirator
- f. Press the "MODE" key, press the ▲ until "Cleaning" is displayed and press the "OK" key.
- g. Confirm the default of "1" cleaning cycle, or increase from "2" to "99" and press the "OK" key.
- h. Remove the sample cup and discard the contaminated solution.
- i. Fill a clean sample cup with warm, potable or sterile water and repeat as in Step 1 above (The temperature must be between +50°C and +60°C or (+122°F and +140°F)).
- j. Repeat procedure d) to f) several times until the water coming out from the Milk Analyzer is clear and clean
- k. Replace the cup with an empty cup, connect the LactiCheck Cleaning Pump, and pump until no fluid is discharge from the aspirator.
- l. Disconnect the Cleaning Pump and ensure that the 'lock' is in the down position to re-instate a partial vacuum situation during testing. (If the lock is left 'open', the results will be compromised.)

Preparation of Cleaning Solution (P/N 70L001)

Instruction:

- 1) Dissolve a pack of 70L001 cleaning powder in 1 Liter of boiling water.
- 2) When fully dissolved, add 1.5 liters of cold water.
- 3) Cap and store the final solution for use when cleaning the LactiCheck Milk Analyzer

NOTE: The solution should be allowed to cool down to between +50°C and +60°C or (+122°F and +140°F) before use.

Contains: NaOH

7.4% Phosphorus in form of phosphates, which is equivalent to 1.2 gram per tablespoon.

Preparation of Protein Cleaning Solution (P/N 70L005)

Instruction:

- 1) Pour 250 ml of boiling distilled water into the bottle of Protein Cleaning Solute
- 2) When the water cools, cap the bottle and invert carefully, gently agitating to mix.
- 3) Store the final solution at room temperature for use when cleaning the LactiCheck Milk Analyzer

NOTE: The solution should be allowed to cool down to between +50°C and +60°C or (+122°F and +140°F) before use.

Contains: NaOH

7.4% Phosphorus in form of phosphates, which is equivalent to 1.2 gram per tablespoon (Also contains Sodium Dodecylbenzenesulfonate and Sodium Carbonate). A Material Data Safety Sheet is available upon request.

2.7 Troubleshooting

Error Messages on Display

Some of the problems that may occur will cause an error message to appear on the display (See Error Message point 1 to 9). Other failures will either express themselves as lack of action, strange actions, or incorrect action. Failure Symptoms and fixes for these are explained in the points 8 – 14. If further clarification is needed, please contact us directly for additional assistance at: tech@pagepedersen.com or by telephone at +(508) 435 5090.

WARNING:

Sometimes an ERROR MESSAGE is due to a shock hazard, Power Supply disorder, electromagnetic influence or other incidental reasons. In order to avoid any needless repairs, please repeat the same operation a few times to verify, that there is a real problem.

ERROR MESSAGE	PROBLEM & CAUSES	REMEDY
1. MOTOR ERROR	1.1 MOTOR DAMAGE	Send the LactiCheck Milk Analyzer to your local representative for replacement of the Pump & Motor Assy.
2. EMPTY CAMERA	2.1. AIR BUBBLES IN THE MEASURING SENSOR	Fill the sample cup with milk from the same sample and make a fresh test. Visually check to confirm that the tip of the aspirator is immersed fully into the milk at all times. A short sample or uncorrect sample cup placement can create this problem. Removing the sample cup while the test is in progress can also cause an error NOTE: Do not use milk, which has been vigorously shaken. If so, let the milk sit for a minimum of ½ hour before testing.
	2.2. MEASURING SYSTEM CONTAMINATED OR DAMAGED	The MEASURING SYSTEM needs cleaning. Clean as described in paragraph 2.5 If cleaning does not help, the MEASURING SYSTEM is out of order. Send the LactiCheck Milk Analyzer to your local representative for replacement of the defective Ultra Sound PCB.
3. HOT SAMPLE	3.1. MILK SAMPLE TEMPERATURE ABOVE THE SPEC	Fill the sample cup again with a milk sample with the proper temperature (See pg. 5, Milk Temperature) and test again.
	3.2. MEASURING SYSTEM CONTAMINATED OR DAMAGED	The MEASURING SYSTEM is out of order. Send the LactiCheck to your local rep. For replacement of the defective Ultra Sound Board.
4- ERROR 02	4.1 SAMPLE TOO VISCOUS OR BLOCKAGE	Check to be sure that sample definition is within the specifications that the Lacti- Check can analyze. Open side panel and inspect for signs of improper cleaning. Intensively clean unit (see 2.6 – Maintenance)

ERROR MESSAGE	PROBLEM & CAUSES	REMEDY
5- ERROR 7	5.1. MEASURING SYSTEM OUT OF ORDER	The MEASURING SYSTEM is out of order. Send the LactiCheck Milk Analyzer to your local representative for replacement of the defective Ultra Sound Board.
6. ERROR 9	6.1 THE POWER SUPPLY VOLTAGE IS BELOW SPEC.	Use proper power supply voltage value. (See pg 5, Electrical Parameter).
	6.2. MEASURING SYSTEM OUT OF ORDER	The MEASURING SYSTEM is out of order. Send the LactiCheck Milk Analyzer to your local representative for replacement of the defective Ultra Sound Board
7. ERROR 10	7.1 THE POWER SUPPLY VOLTAGE IS ABOVE SPEC.	Use proper power supply voltage value or install a line conditioner.
	7.2. MEASURING SYSTEM HAS AIR BUBBLES TRAPPED WITHIN	The MEASURING SYSTEM is out of order. Send the LactiCheck Milk Analyzer to your local representative for replacement of the Ultra Sound Board
8. ERROR 11	8.1 THE POWER SUPPLY VOLTAGE IS OUTSIDE OF SPEC.	Install a line conditioner to ensure consistent supply of power within proper specifications.
	8.2 MEASURING SYSTEM IS BLOCKED	Fill a sample cup with warm (50°C to 60°C [122°F to 140°F]) D.I. water and attempt to run a CLEANING with 10 cycles. Repeat with warmed (50°C to 60°C [122°F to 140°F]) LactiCheck™ Cleaning Solution. Place empty sample cup under aspirator, attach hand-pump and pump vigorously ~10 times to evacuate any blockage. Rinse with warmed D.I. water and resume testing.
	8.2 MEASURING SYSTEM IS OUT OF ORDER	The MEASURING SYSTEM is out of order. Send the LactiCheck Milk Analyzer to your local representative for replacement of the Ultra Sound Board
9. ERROR 12, ERROR 13	9.1 THE POWER HAS SPIKED OR EBBED OUTSIDE OF SPECIFICATION.	Turn "OFF" the LactiCheck. Unplug from the power source and allow to rest for 3-5 minutes. Reconnect power – the instrument should reset.
	9.2 THE SAMPLE IS AERATED (I.E. CONTAINS AIR BUBBLES)	Fill a sample vial completely with warmed potable water and run a cleaning cycle. Pump out with manual pump. Introduce new sample, checking to confirm it is NOT aerated.
	9.3 THE CALIBRATION INTEGRAL HAS BEEN COMPROMISED	The MEASURING SYSTEM is out of order. Send the LactiCheck Milk Analyzer to your local representative for replacement of the Ultra Sound Board

ERROR MESSAGE	PROBLEM & CAUSES	REMEDY
10. WRONG PASSWORD	10.1 INCORRECT PASSWORD	Re-enter the password. If you have lost your password, call your local representative or contact P&P for confirmation. Be sure to have the serial number of your instrument ready.
11. CAL OUT OF RANGE	11 1. ATTEMPT TO ENTER A CALIBRATION VALUE OUTSIDE THE ALLOWED LIMITS	<p>The total calibration value can range from $-0,99\%$ to $+0,99\%$ (for fat, protein and Solids non Fat (SNF)) and $-9,9^{\circ}\text{A}$ to $+9,9^{\circ}\text{A}$ (for density). In case a bigger number has been achieved during a calibration procedure a CAL OUT OF RANGE error message appears on the display.</p> <p>If a calibration value out of allowed limits is really required, the measuring system is out of order and must be replaced. Send the LactiCheck Milk Analyzer to your local representative for replacement of the defective Ultra Sound Board.</p>

Failure Symptoms and Remedies

FAILURE SYMPTOMS	PROBLEM & CAUSES	REMEDY
12. DARK DISPLAY	12.1 THE POWER SUPPLY CORD IS NOT CONNec-TED TO THE MAINS.	Connect the AC Power lead properly.
	12.2 THE AC POWER SUPPLY SWITCH IS NOT TURNED ON.	Turn "ON" the Main Power switch. <i>Note: This is separate from the DC Power Switch.</i>
	12.3 THE AC POWER SUPPLY FUSE IS BURNT	Replace the AC Power supply Fuse with a new (1.6 Amp. Slow Blow). Warning: Prior to removing the burnt Fuse from the Fuse Holder, make sure the main power cord is disconnected from the mains!
	12.4 THE AC POWER SUPPLY IS OUT OF ORDER	Send the LactiCheck Milk Analyzer to your local representatives for replacement of the defective Transformer.
	12.5 THE MEASURING SYSTEM BOARD IS OUT OF ORDER (SHORT CIRCUITED OR BROKEN WIRE)	The MEASURING SYSTEM is out of order. Send the LactiCheck Milk Analyzer to your local representative for replacement of the defective Ultra Sound Board.
	12.6 THE LCD DISPLAY CABLE IS BROKEN OR THE DISPLAY IS DAMAGED.	Send the LactiCheck Milk Analyzer to your local representatives for replacement of the defective Display Board.
13 DARK DISPLAY WHEN THE ANALYZER IS POWERED FROM A DC POWER SUPPLY	13.1 THE DC POWER SUPPLY IS LOW	Use DC Power Supply with a correct voltage output only (13 to 15 Volts DC). Warning: A higher DC voltage than that specified, can damage the LactiCheck!
	13.2 THE DC POWER SUPPLY CABLE LEADS ARE SWAPPED	Swap the DC power Supply cable wires at the Analyzer site (at the Back panel DC Power Supply Socket). NOTE: White wire should be connected to the + terminal and the black wire to the – terminal.
	13.3 THE DC POWER SUPPLY FUSE IS BURNT	Replace the DC Power Supply Fuse with a new 4 Amp. Slow-Blow fuse. (This Fuse is located on the back of the LactiCheck)

FAILURE SYMPTOMS	PROBLEM & CAUSES	REMEDY
14. DISPLAY IS LIT BUT THERE IS NO RESPONSE FROM ONE OR ALL KEY(s) PRESSED	14.1 CORRECT VOLTAGE IS NOT APPLIED TO THE LACTICHECK	Verify that the voltage supplied to the LactiCheck is 90-260 V AC or 13-15 V DC
	14.2 KEY PANEL IS NOT FUNCTIONING	Send the LactiCheck Milk Analyzer to your local representative for replacement of the defective Key Panel.
15. STRANGE SYMBOLS ON THE LCD INDICATION INSTEAD OF MILK SAMPLES RESULTS Warning: Sometimes an ERROR MESSAGE <i>may be</i> due to the shock hazard, Power Supply disorder, electromagnetic influence or other incidental reasons. To Avoid any needless repairs, please repeat the same operation few times to confirm that there is a real problem.	15.1 THE MILK SAMPLE IS TOO SOUR (MILK ACIDITY IS LOWER THAN pH 6)	Please test milk samples to confirm pH. (Samples with acidity lower than pH 6.0 cannot be properly assayed.)
	15.2 THE SUCTION SYSTEM HAS SOME AIR LEAKS	TEST: Connect the manual pump. Put a finger over the aspirator hole and pump <u>gently</u> . If pumping is difficult or not possible, there are no air-leaks in the system.
	15.3 SAMPLE SIZE NOT LARGE ENOUGH	Ensure that the sample size is large enough to cover the end of the aspirator after the aspiration has taken place
	15.4 THE LCD DISPLAY IS DAMAGED.	Send the LactiCheck Milk Analyzer to your local representative for replacement of the defective Display Board.
	15.5 MEASURING SYSTEM CONTAMINATED OR DAMAGED	The MEASURING SYSTEM is out of order. Send the LactiCheck Milk Analyzer to your local representative for replacement of the defective Ultra Sound Board.
16. NO RS-232 COMMUNICATION	16.1 THE RS-222 CABLE IS NOT PROPERLY CONNECTED	Insert both RS232 cable connectors properly.
	16.2 SOFTWARE PROBLEM	Install (or reinstall the Software). If this does not repair the situation, call your local representatives for qualified help.
	16.3 THE RS-232 INTERFACE BOARD IS DAMAGE	Send the LactiCheck Milk Analyzer to your local representative for replacement of the defective RS-232 Interface Board.

FAILURE SYMPTOMS	PROBLEM & CAUSES	REMEDY
17. EXTREMELY HIGH RESULTS THAT ARE OUT OF RANGE AND INAPPROPRIATE (i.e. FAT 80% FOR MILK SAMPLE, ADDED WATER OF 100% FOR A MILK SAMPLE)	17.1 THE MANUAL PUMP IS STILL CONNECTED	Check to confirm that the Manual Pump is disconnected from the rear of the instrument and the silver lock is in the "down" position.
	17.2 THE ULTRASOUND CHAMBER IS CLOGGED	Introduce a sample and confirm that the instrument is aspirating sample. (If it isn't, see point 17) Clean with reagent grade Isopropyl alcohol using Amplified Cleaning Procedure as described in Service Sheet (Do NOT heat the alcohol).
	17.3 THE SAMPLE BEING TESTED IS OUT OF RANGE OR TOO VISCOUS	Confirm that the composition of the sample is not outside the testing range (i.e. 0.5 – 9% fat, etc.) and does not contain additives that substantially thicken the sample or otherwise impede the ultrasonic pulse.
	17.4 ULTRASOUND ASSY. PROBLEM	Follow full cleaning procedure and see if the manual pump evacuates any debris (15.2). Following this, if the unit does not analyze properly, contact your local representative for replacement of the defective Ultra Sound Assy.
18. BLACK SQUARES IN THE DISPLAY.	18.1 THE DISPLAY SHOWS SQUARES AND NOT READABLE LETTERS.	The LactiCheck has received a voltage spike, which was higher than the built-in surge protector could cover. Turn the LactiCheck OFF for 10 Seconds and then ON again. The LactiCheck will then reset the internal systems.
	18.2 THE DISPLAY SHOWS ONE OR MANY SQUARES AND NOT READABLE LETTERS.	If the reset as described in point 16.1 does not repair the problem, the Display Board has a failure. Contact your local representative for replacement of the defective Display Board.
19. THE SAMPLE IS NOT ASPIRATED INTO THE INSTRUMENT	19.1 FALSE AIR IS INTRODUCED INTO THE ULTRASOUND CHAMBER,	Check to confirm that the Manual Pump is disconnected from the rear of the instrument and the silver lock is in 'down' position.
	19.2 NO PUMP ACTION IS TAKING PLACE	Make sure that the pump choice is in ON. (Check Motor Choice Mode on the main menu – ON should be selected). If Motor is ON and no aspiration takes place, use arrow key to change to OFF, press OK and then use the arrow key to change back to ON. Press OK. Retry testing. If this does not reset the pump, then the pump assembly is defective. Contact representative for replacement.

	19.3 THE MILK FLOW IS BLOCKED	Ensure that free airflow is available by cleaning the LactiCheck & pumping dry.
20. FW MisMatch	20.1 Electrical power surge or spike impacted unit	Turn unit off. Restart in 2 minutes. If no response, return for repair.

2.8 Parts & Supplies List

Qty.	Part	Part Number
1 pcs.	Ultra-sound Board Assembly	60B023
1 pcs.	Display Board	60B009
1 pcs.	Key-Pad Board	60B003
1 pcs.	Pump Assembly	52E201
1 pcs.	RS-232 Interface Board	60B006
1 pcs.	Power Supply Board	60B009
1 kit	Fuse Kit	93E203
1 pcs.	DC Power Cord (optional)	97E201
1 pcs.	AC Power Cord (USA or Compatible)	97E202
10 pcs.	Sample Vial (20 ml)	30D201
1 pkg.	Package of 100 Sample Vials (20 ml)	30D210
1 pkg.	Cleaning Solution, dehydrated (For 2.5 Liters solution dissolved)	70L001
1 pkg.	Protein Cleaning Solution, dehydrated (For 250 ml solution)	70L005
1 pkg.	LactiCAL™ 1 Low Fat Calibration Control (230 ml)	70L009
1 pkg.	LactiCAL™ 2 Reduced Fat Calibration Control (230 ml)	70L010
1 pkg.	LactiCAL™ 3 Full Fat Calibration Control (230 ml)	70L011
1 kit	Starter Kit (6 Sample Vials and 2 pkgs. Cleaning Solution)	40D201
1 set	LactiLog™ Automated Recording/Reporting System	60R005
1 pc.	LactiPrint™ Portable Thermal Parallel Printer	LP-02
1 pc.	LactiTote™ Sturdy Padded Canvas Carrying Case	LT-01
1 pc.	LactiPrep™ Automated Sample Rocker	LR-01
1 pc.	Manual Pump	31D002

3. Technical Specifications

Parameter	Range	Tolerance	Repeatability	Resolution
Fat	0.3 – 9%	± 0.06%	± 0.03%	0.01%
]	9.01 – 14%	± 0.1%	± 0.05%	0.01%
Solids Not Fat (SNF)	6 – 12%	± 0.1%	± 0.05%	0.01%
Density	1.0260 – 1.0330 g/cm ³	± 0.0005 g/cm ³	± 0.0002	0.0001 g/cm ³
Protein	2 – 5%	± 0.1%	± 0.05%	0.01%
Added Water	0 – 60%	± 5.0%	-	1%
Lactose	3 – 7%	± 0.2%	± 0.05%	0.01%

Environmental	Range
Milk temperature	10° - 30°C (50° - 83°F)
Ambient air temperature	10° - 35°C (50° - 95°F)
Humidity	30-80% relative humidity

Electric	Parameters
AC power voltage	90-260 VAC
DC power voltage	13 – 15 V battery
Power consumption	30 W max

Mechanical	Parameters
Dimensions (WxHxD)	9.5 X 23 X 25 cm 3.7" X 9" X 12.2" (inches)
Weight	3.3 kg (7.3 lbs)
Shipping Dimensions	35.6 X 38.1 X 25.4 cm (14" X 15" X 11")
Shipping Weight	5.9 kg (13 lbs)

Test	Parameters
Sample Size	20 ml (10 ml aspirated)
Test Time	40 seconds
Cleaning Cycle	< 2 minutes (in automatic mode)
Start-Up Time	<5 minutes (depending on ambient temperature)

Sample Definition	
Raw (unprocessed) or co-mingled or processed bovine or goat milk	6 pH or higher homogeneous no air bubbles

- A separate instrument is available for buffalo & bovine milk analysis.

Warning:
Never open the LactiCheck with the power cord connected.

4. Addenda

4.1 Calibration Addendum

PRACTICAL EXAMPLES OF CALIBRATION

The specifications of the Milk Analyzer for all components are listed under Section 3. Technical Specifications. If the results are outside of specification, the User needs to access the Calibration Mode (2.2 Calibration) and proceed to make an adjustment to bring the instrument into specification.

Every LC-02 is shipped with a primary calibration in place: Processed Cow Milk is calibrated to processed full fat bovine milk [$\sim 3.25\%$ Fat] and COW MILK is calibrated to raw, uprocessed bovine milk. If you desire to run milk of a decidedly different composition on either channel, it is necessary for you to re-calibrate first (for example, if you decide to run raw milk on Processed Cow Milk or 9% Fat coffee creamer on COW MILK, you will need to recalibrate).

Otherwise, a simple calibration validation should typically be all that is regularly required.

NOTE:

The calibration sequence should be (I)Fat, (II)SNF, (III)Protein, (IV)Freezing-Point and (V) Density. If the instrument is reporting satisfactory fat values, you can skip to SNF, but it is not recommended to calibrate for protein (for example) before you make an adjustment to the SNF calibration. Changes to the Fat and SNF calibration channels can be implemented sequentially, but for best results, test 2-3 samples following alteration to these primary calibration channels BEFORE making adjustments for Protein, Freezing Point and/or Density (i.e. verify the actual impact of any bias adjustment to the Fat and/or SNF to the Protein reading BEFORE making adjustments to the Protein channel). Be sure to allow the instrument to warm up (i.e. after turning "On") for a minimum of 30 minutes before validating or adjusting calibration.

The parameters for which the Milk Analyzer can be calibrated are:

- ☐ Fat
- ☐ SNF (Solids Not Fat)
- ☐ Density
- ☐ Protein
- ☐ Protein
- ☐ Freezing Point

The method of calibration is to add or subtract to alter the bias of the instrument's linearity. Some practical examples are presented below to exemplify the simplicity of the calibration procedure:

EXAMPLE 1: Results too High

If the LactiCheck results are higher than they should be, the User must subtract the test result from a Control or sample pre-assayed by a reference method from the test result of a split sample run on the LactiCheck :

STEP 1: Assay 2 to 5 split samples (i.e. 2 samples taken from the exact same aliquot of milk) using the LC-02 and a reference method. (Instead of using a reference method to assay a sample for a Control, you may select a Control Sample that has been Pre-Assayed for Fat and warm it to 15-30°C. NOTE: If you are testing processed milk, use a representative sample for calibrating; if testing raw milk use a raw milk sample for calibrating.)

FAT RESULTS:

Control Sample Pre-Assayed Value: 3.45% Fat

LactiCheck Test Result: 3.67%

STEP 2: If the LactiCheck test results average more than 0.08% higher than the reference method or pre-assayed control, then you must calibrate for Fat as follows:

THE CALCULATION FOR ADJUSTMENT FACTOR:

LactiCheck Fat Result: 3.67%

-

Control Sample Fat Value: .. 3.45%

Adjustment Factor = -0.22%

STEP 3: Once you have calculated the Adjustment Factor, you must enter it into the LactiCheck as follows:

MAKING THE CALIBRATION ADJUSTMENT

Enter Calibration Mode (see Section 2.2 Calibration above)

Select "Fat" (confirm that the proper Channel is selected (i.e. Fat Proc. Cow Milk or Fat COW MILK).

Using the Up ▲ and Down ▼ Arrow Keys, enter the value "-0.22"

Enter "OK"

Calibration is now complete.

EXAMPLE 2: Results too Low

If the LactiCheck results are lower than they should be, the User must add the difference between the LactiCheck and test results of a Control or sample pre-assayed by a reference method from a split sample to the bias.

STEP 1: Assay 2 to 5 split samples (i.e. two samples taken from the exact same aliquot of milk) using the LactiCheck and a reference method. (Instead of using a reference method to assay a sample for a Control, you may select a Control Sample that has been Pre-Assayed for SNF and warm it to 15-30°C. NOTE: If you are testing processed milk, you should use a representative sample for calibrating; when testing *raw* milk use a representative *raw* milk sample for calibrating.)

SNF RESULTS:

Reference Method Results: 8.8%

LactiCheck Test Result: 8.48%

STEP 2: If the LactiCheck Test Results for SNF average more than 0.2% lower than the reference method or pre-assayed control, then you must calibrate for SNF follows:

THE CALCULATION FOR ADJUSTMENT FACTOR:

Control Sample SNF Value: 8.80%

-

LactiCheck SNF Test Result: 8.48%

Adjustment Factor = +0.32%

STEP 3: Once you have calculated the Adjustment Factor, you must enter it into the LactiCheck as follows:

MAKING THE CALIBRATION ADJUSTMENT

Enter Calibration Mode (see Section 2.2 Calibration above)

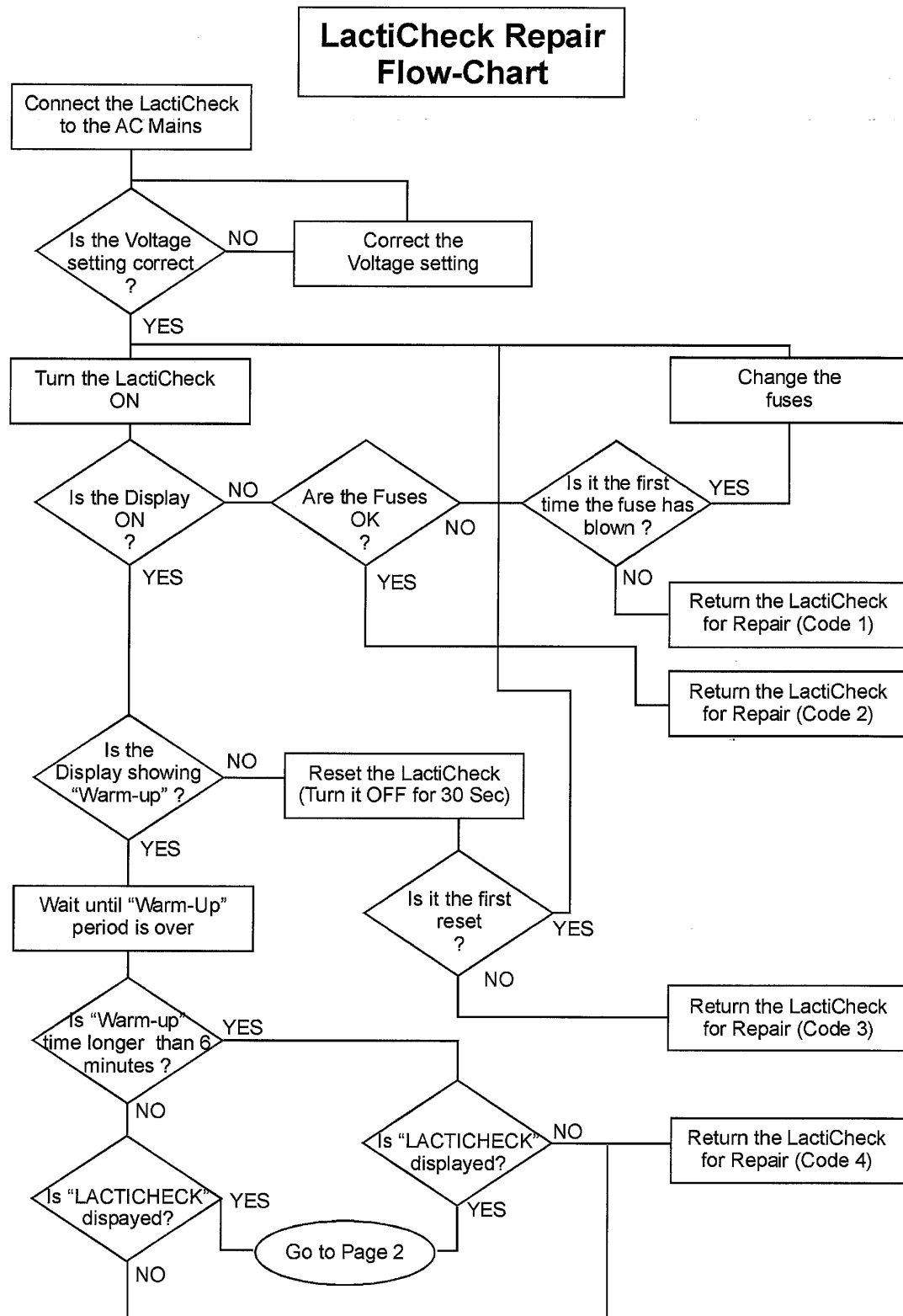
Select "SNF"

Using the Up ▲ and Down ▼ Arrow Keys, enter the value "+0.32"

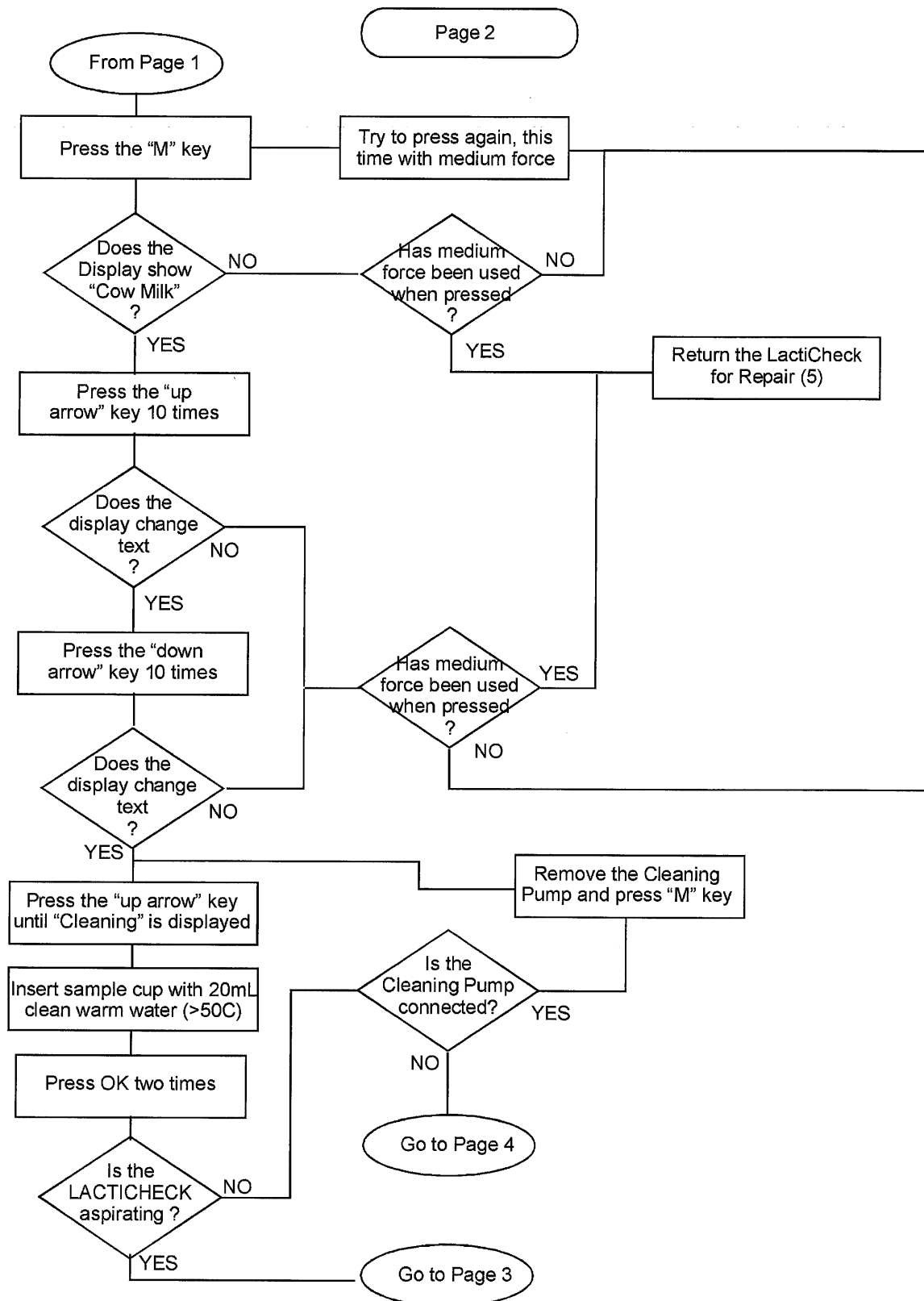
Enter "OK"

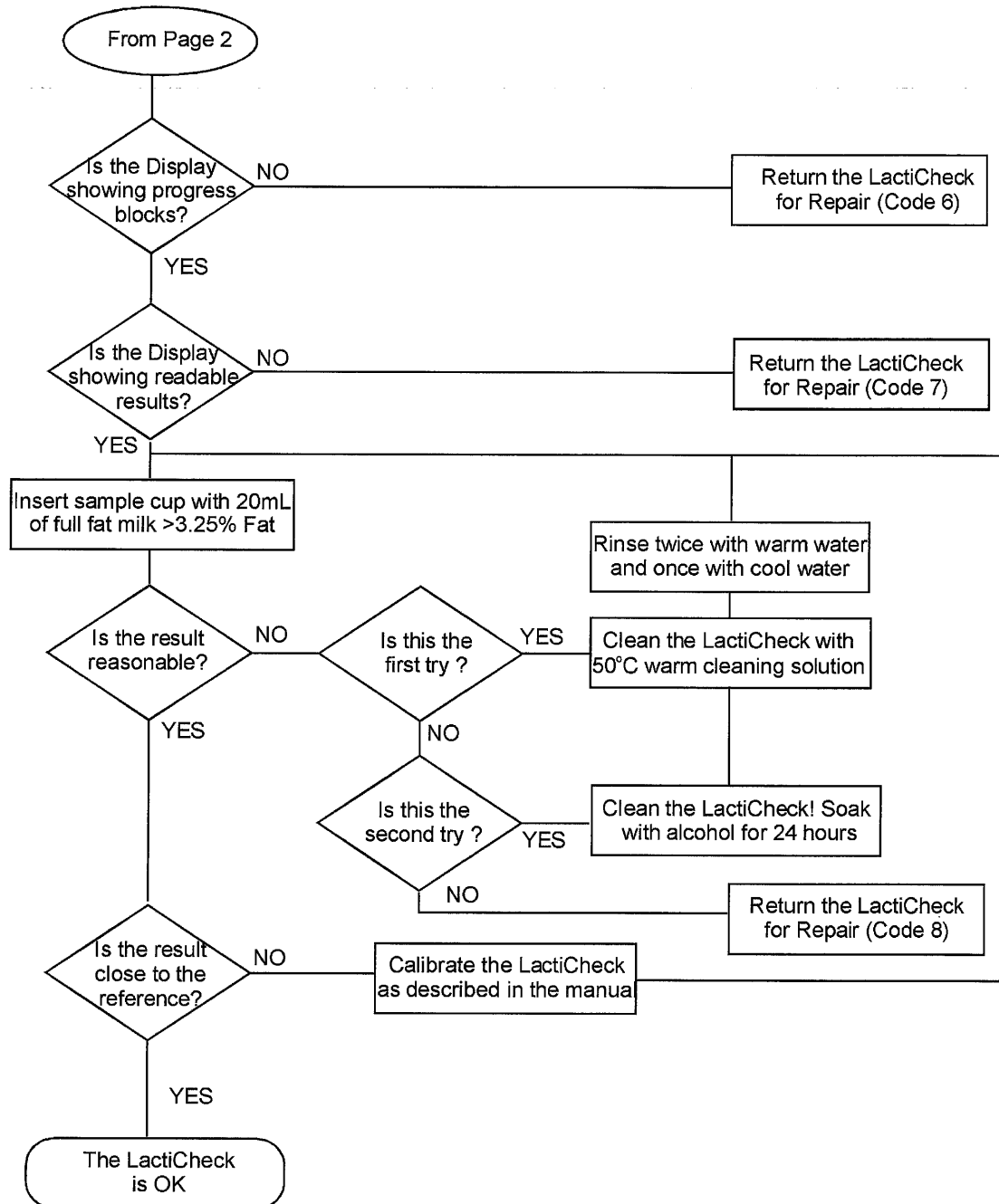
Calibration is now complete.

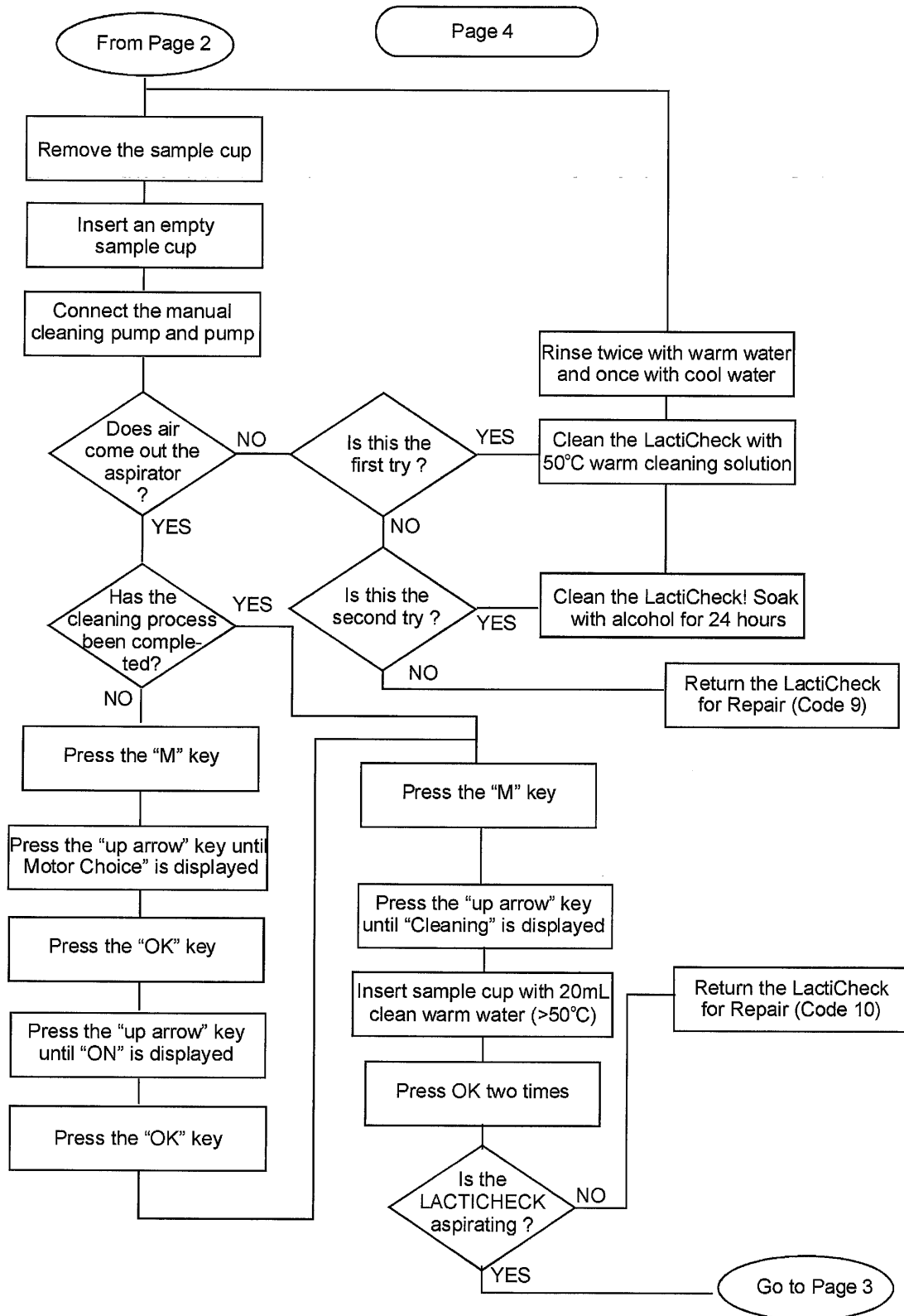
4.2 Repair Flow-Chart



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4.2.1 Trouble Shooting the LactiCheck

General

Before testing and troubleshooting a LactiCheck ensure that there are no external factors causing the failure. The most common reasons for failures are the result of external impact. Therefore verify the following:

1) The Sample:

- a. Ensure that it is milk and not either a non-milk sample or a milk sample with components added.
- b. Make sure that it is fresh milk and not old milk or milk with an acidity below 6 pH.
- c. Make sure that the milk to be tested is homogeneous.
- d. Make sure that there are no air-bubbles in the milk
- e. Make sure that the sample temperature is within a range of 10 – 30° C.

2) The Connection

- a. Ensure that the power connectors are fully connected at both ends.
- b. Verify that the voltage setting of the LactiCheck is correct for the area.
- c. Verify that it is not a mains grid with a spiky or fluctuating voltage, which creates the problems. (Run the same test with a DC input voltage to verify).

3) The Operator

- a. Ensure that the operator is properly trained in the use of the LactiCheck, so none of the failure possibilities as noted in “1” above can occur.
- b. Make sure that the operator understands that for good results good sample handling is a necessity.
- c. Make sure that the operator never tests a sample, which has previously been run on the LactiCheck.

4.2.2 Flow-Chart Explanation

The attached flow-charts are made to guide you through the troubleshooting of the LactiCheck. Please follow the flow-charts and, when referred to a Repair Code, see the paragraphs below for details.

4.2.2.1 Repair Code Reference:

Please consult the repair code list below if an instrument is reporting a repair code or you get referred to it from the flow-charts. Before going into the failures, we take the assumption that all points in “General” have been covered and eliminated as a cause of failure. We also take the assumption that all internal and external connections have been checked to ensure proper connection.

Code 1: Fuses blowing: This is primarily due to a short somewhere in the system. This is not easy to troubleshoot. We suggest that the LactiCheck be tested with an external DC supply to separate the areas and pinpoint the failure.

If the DC fuses blow when tested with a DC supply the failure can be in the USB, DIB, RIB, PAS, or KPB.

If the DC fuse does not blow when tested with a DC supply the failure can be in:
Transformer unit or the USB

Code 2: No display, but fuse OK. This can be either no internal power or bad DIB. Verify that there is between 11.5 and 15.5 Volts DC measured over the big capacitors. If OK, verify that there is 5 Volts DC on the secondary side of the voltage regulator. If the voltage is OK the DIB needs to be replaced. If not, replace the USB.

Code 3: Same as Code 2

Code 4: Defective USB or DIB. The easiest way to find out is by loosely replacing the DIB with another and see if the failure repeats itself.

Code 5: Replace the KPB.

Code 6: Replace the USB

Code 7: Replace the USB

Code 8: Replace the USB

Code 9: This is generally caused by a blockage in the fluid line of the system. Check to see if air is coming through the system when a manual pump is used and, if not, try cleaning with alcohol. Following this, there is only visual trouble shooting left. The most likely place for a blockage is in the hoses. Inspect these and replace if needed. If no blockage is found, it is likely to be in the ultrasound chamber on the USB. The USB must be taken out of the LactiCheck, the ultrasound chamber injected with alcohol, and allowed to soak for 24 hours. After the 24 hours, try to blow air through the ultrasound chamber. NOTE: It is important that the customer, who had the instrument, is trained in the importance of routine cleaning.

Code 10: Open the LactiCheck and verify that there are no air leakages. If there are, replace the part/s creating the leakages. If no air leakage is found replace the PAS.

4.2.2.2 Terminology

USB: Ultrasound Board

DIB: Display Board

RIB: RS-232 Interface Board

PAS: Pump Assembly

KPB: Key Panel Board