### Specifications:

<table>
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<th>Specification</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td>Measuring Method</td>
<td>Measurement of electrical conductivity</td>
</tr>
<tr>
<td>Calculation</td>
<td>Differential E.C. is calculated by microcomputer and automatically calibration.</td>
</tr>
<tr>
<td>Display</td>
<td>Backlight LCD</td>
</tr>
<tr>
<td>Measurement Range</td>
<td>0 – 13mS/cm</td>
</tr>
<tr>
<td>Accuracy</td>
<td>3% ± 1 digit</td>
</tr>
<tr>
<td>Automatic Temperature Compensation</td>
<td>+3 – 40°C (compensated at +25°C)</td>
</tr>
<tr>
<td>Power Source</td>
<td>Dry cell battery AA x 2 pcs.</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>140 mA (measuring and backlight on)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>91(w) × 149.5(H) × 118(D)mm</td>
</tr>
<tr>
<td>Weight</td>
<td>280 g</td>
</tr>
<tr>
<td>Data Communication</td>
<td>Bluetooth®</td>
</tr>
<tr>
<td>Real Time Clock</td>
<td>IC module</td>
</tr>
<tr>
<td>EEPROM</td>
<td>Storage 500 data in device</td>
</tr>
</tbody>
</table>
2. Illustration and Function

1. Small electrode sensor:
   This is built in unit, measuring electric conductivity.

2. Temperature sensor:
   Electric conductivity is effective on temperature for both of milk sample, ambient and environmental temperature, but it compensates temperature automatically.

3. Sampling cup:
   It is designed to ease sampling.

4. Digital Display:
   Absolute electric conductivity of all quarters are displayed in digital simultaneously, then calculates differential E.C. automatically, and also indicates calibrated electrical conductivity.

5. Power button (ON / OFF):
   Press the button first for turning on the power. By pressing it again, power is turned off. If not in operation, the device will turn off by itself after 6 minutes.

6. Measurement button: (TEST):
   Measurement result of four quarters are displayed in one display simultaneously by pressing TEST button 4 times for individual quarter, and then press this button one more time (the 5th time) for calculation of differential measurement result and abnormal quarter.

7. Clear button (CLEAR):
   To test next cow, the clear button will erase the previous reading held.
   The data is possible to be cleared by this button.

8. Set button (SET):
   Use this button for various setting.

9. Bluetooth® button (Bluetooth®):
   In case of data communication to PC and use for various setting.
3. Measurement method

1. When press ON/OFF button, following screen is displayed.

   MILK CHECKER 1-1
   MC-12

2. After 3 seconds, following screen is displayed.

   YY/MM/DD HH:MM 1-2
   COW NO.xxx
   YES:TEST INITIAL
   BLUETOOTH

3. When user would like to start measuring, press TEST button and following screen is displayed.

   YY/MM/DD HH:MM 2-1
   NO. 1 ABS/DIF

4. Fill the sample in sampling cup to the rim and press TEST button (TEST) every time after changing the sample to indicate the result of electronic conductivity.

   Repeat this operation for 4 quarters. After pressing the TEST button 4 times for 4 quarters, press TEST button again for calculation to indicate the differential electronic conductivity as follows.

<table>
<thead>
<tr>
<th>YY/MM/DD HH:MM</th>
<th>2-7</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO. 1</td>
<td>ABS/DIF</td>
</tr>
<tr>
<td>7.5</td>
<td>6.3</td>
</tr>
<tr>
<td>1.1</td>
<td>0.4</td>
</tr>
</tbody>
</table>

   DIF : abnormal quarter will be blinking

   ABS : normal quarter will be blinking

   Right fore  Right rear  Left fore  Left rear

   After final calculation, press clear button (CLEAR), then back to previous cow number. Press test button (TEST), continue to test next cow.

   *Threshold

   ABS = Absolute Conductivity / 6.2mS/cm or more
   DIF = Differential Conductivity / 0.5mS/cm or more

   *How to change the cow number:
   Press Bluetooth® button: +1
   Press SET button: -1
   Press TEST button: fix the cow number
4. Calibration:
Each unit is accurately calibrated before dispatch. In case of reconfirming or uncertain indication, make adjustment to use KCI solution with 2 levels of concentration with following procedure for automatic calibration.

1. 3.4 MS concentration KCI solution
   After pressing ON/OFF button, press Bluetooth Button immediately and then displays following screen.
   
   ![CALIBRATION 6-0
   1. 3.4MS
   2. 6.7MS](image)

   Choose “1. 3.4MS” by pressing Bluetooth button and press the test (TEST) Button.
   Pour 30ml of 3.4 KCI calibration solution into sampling cup and press test (TEST) button and calibration done.

   In case of calibrating by out of range value solution, displays error message in screen as follows and back to 6-0 screen press CLEAR button (CLEAR). Pour correct KCI solution again and operate above.
   
   ![CALIBRATION 6-1
   3.4MS(0.025MOL)
   (999) --> (999)
   CALIBRATION ERROR](image)

2. 6.7 MS concentration KCI solution
   After pressing ON/OFF button, press Bluetooth Button soon and then displays following screen.
   
   ![CALIBRATION 6-0
   1. 3.4MS
   2. 6.7MS](image)

   Choose “2. 6.7MS” by pressing Bluetooth button and press the test (TEST) Button. Pour 30ml of 6.7 KCI calibration solution into sampling cup and press test (TEST) button and calibration done.

   In case of calibrating by out of range value solution, displays error message in screen as follows and back to 6-0 screen press CLEAR button (CLEAR). Pour correct KCI solution again and operate above.
   
   ![CALIBRATION 6-1
   6.7MS(0.025MOL)
   (999) --> (999)
   CALIBRATION ERROR](image)

   Be careful with calibration. Sometimes the concentration on the standard KCI solution may not be accurate when the calibration value is not within the accuracy range. In spite of using accurate solutions, unless normal calibration values cannot be obtained, turn off the power once and try above operation again.

   [NOTE]:
   Use the standard solution which KCI is accurately measured.
5. Threshold:
The threshold values for evaluating abnormal or infected milk by means Milk Checker are as follows. According to Special disease medical guidelines by Mutual Aid Association of Veterinary Japan, as applicable both or either of following conductivity might be risk of mastitis infection in the quarter.

Example:
<table>
<thead>
<tr>
<th>Absolute Conductivity</th>
<th>Differential Conductivity</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2 mS/cm or more</td>
<td>0.5 mS/cm or more</td>
<td>Normal milk</td>
</tr>
</tbody>
</table>
| 6.2 mS/cm or more     | 0.5<                       | Infected milk
| 6.2<                  | 0.5< Infected milk (containing low ingredient and physiologically abnormal milk) |
| 6.2<                  | 0.5> Low ingredient milk or physiologically abnormal milk |

Threshold for abnormal milk based on absolute conductivity values and differential conductivity values between quarters of udder.

Example of normal milk
YY/MM/DD HH:MM 2-7
NO. 1 ABS/DIF
5.3 5.3 5.2 5.4
0.1 0.1 0.0 0.2

Examples of mastitis milk (example 1)
YY/MM/DD HH:MM 2-7
NO. 1 ABS/DIF
5.9 6.1 5.8 6.5
0.1 0.3 0.0 0.7

Examples of mastitis milk (example 2)
YY/MM/DD HH:MM 2-7
NO. 1 ABS/DIF
5.0 5.3 5.9 5.2
0.0 0.3 0.9 0.2

Examples of low ingredient milk and physiologically abnormal milk
YY/MM/DD HH:MM 2-7
NO. 1 ABS/DIF
6.5 6.3 6.4 6.3
0.2 0.0 0.1 0.0

*ABS value of 6.5 and DIF of 0.7 are abnormal milk which infected mastitis. The device blinks quarters of 6.5 and 0.7.

*All of ABS values are under 5.0, but DIF of 0.9 is abnormal milk which infected mastitis. The device blinks quarters of 0.9.

*all of ABS values are more than 6.2, but DIF values are under 0.5.
DIF (Differential Conductivity between quarters) Values:
*In case differential conductivity values between quarters of udder exceeds 0.4, there is a risk of mastitis. Consult veterinarian.

<table>
<thead>
<tr>
<th>DIF values</th>
<th>Symptoms</th>
<th>Dealing</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5~1.0</td>
<td>initial</td>
<td>Elaborate cleaning and dipping udder.</td>
</tr>
<tr>
<td>1.0~1.5</td>
<td>Medium</td>
<td>Hand milking and not milking by equipment. Three times milking in a day. (morning, afternoon and evening) Consult veterinarian.</td>
</tr>
<tr>
<td>1.5~</td>
<td>Late</td>
<td>Consult veterinarian. Diagnosis and treatment with veterinarian.</td>
</tr>
</tbody>
</table>

[REMARKS]:
When doing tests, check all of 4 quarters. Differential conductivity helps to detect the degree of inflammation. As cow milk electric conductivity varies with breeds, lactation stage or individual cow pathological conditions, it is recommended to interpret the differences in absolute conductivities based on the lowest value of some cow.

It will help to detect mastitis early and properly. Milk Checker is a screening device for the detection of mastitis, confirmation on mastitis and proper treatment should be discussed with veterinarians or specialists.

6. Setting:
1. Real Time Clock (RTC)
   Press the SET button immediately after power-on and following screen displays.

   SET 7-0
   1. RTC
   2. BLUETOOTH
   3. SYSTEM INF.

   Choose the menu of “1. RTC” by pressing Bluetooth button and press test button (TEST) and following screen displays.

   SET RTC 7-1
   YY/MM/DD HH:MM
   17/01/01 00:00

   Bluetooth Button: count up the number
   TEST button: fix the time
   Clear button: high order digit / next entry

2. Setting the name of Bluetooth
   Press the SET button immediately after power-on and following screen displays.

   SET 7-0
   1. RTC
   2. BLUETOOTH
   3. SYSTEM INF.

   Choose the menu of “2. Bluetooth by pressing Bluetooth button and press test button (TEST) and following screen displays.
Press the SET button immediately after power-on and following screen displays.

Choose the menu of “3. Initialize by pressing Bluetooth button and press test button (TEST) and following screen displays.

- Bluetooth Button: count up the number
- TEST button: fix the time

7. Alert and Error
1. Low Battery: Following screen displays when the battery voltage lowers under 1.8V and and the power is turned off automatically. Also change the new battery.

2. System Error: Following screen displays when the product has a problem with system and contact the distributors or manufacture.

3. Bluetooth Error: Following screen displays when the product has a problem with module relation to Bluetooth and contact the distributor or manufacture.

4. Following screen displays when the product has a problem with RTC (Real Time Clock) and contact the distributors or manufacture.
8. Maintenance:
1. To rinse sampling cup is necessary once every day after use.
   Do not touch the electrode and temperature sensor with hard object.
   Be careful not to hurt the electrode and temperature sensor which are
   installed in the sampling cup.
   Do not use an organic solvent such as paint thinner or toluene to clean the
   display or the body.
2. Rinsing sampling cup with natural detergent and the like necessary after the
   measurement of colostrum or serve mastitis milk, but not necessary after
   such as measurement unless soil is heavy.
3. To wipe soil is necessary with soft cloth contained natural reagent.
4. It must not be immersed in water or other liquid.
5. Be careful not to drop it on floor or ground.
6. When dry cell battery is worn out the alarm message is indicated on the
   display, and the power is turned off automatically. Replace the battery to new
   one.
7. Contact with the company from you whom you purchased the product when
   it is damaged.

9. Software manual:
   Table of Contents
   1. Using the Menu
      1.1 COM Port Settings
      1.2 Receiving the data
      1.3 Data and Time
      1.4 Erasing the data
      1.5 Saving the data
   2. Bluetooth Operations
      2.1 Ready the device
      2.2 Connection the PC
      2.3 Connection Status and COM settings

Software download website:

Caution:
*Do not touch the electrode with a hard object.
*Fill the cup with milk to nearly full to avoid false indications due to frothy milk.
*Be careful not to drop MILK Checker on floor or ground.
*Do not immerse in water or other liquid.
1. Using the Menu
Start the MILK Checker Utility.

1.1 COM Port Settings
Click the “Setting” button to display the screen for setting the COM port.
On this screen you configure the COM port to communicate with the device.

<table>
<thead>
<tr>
<th>Screen items</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting button</td>
<td>Configure the COM port for Bluetooth communication with the device.</td>
</tr>
<tr>
<td>Exit button</td>
<td>Quit the PC software.</td>
</tr>
<tr>
<td>Received data button</td>
<td>Read measurement data from the device.</td>
</tr>
<tr>
<td>DATE &amp; TIME button</td>
<td>Set the device clock.</td>
</tr>
<tr>
<td>DATA CLEAR button</td>
<td>Erase all measurement data of the device.</td>
</tr>
<tr>
<td>SAVE button</td>
<td>Save measurement data read from the device in a file.</td>
</tr>
<tr>
<td>Measured data display area</td>
<td>The measurement data read from the device is displayed.</td>
</tr>
</tbody>
</table>
1.2 Receiving the Data
Click the “Received data” button to read the measurement data of the device.

1.3 Date and Time
Step1. Click the “DATE & TIME” button.
Step2. Click “Yes”, Set to synchronize the date and time setting with your PC.

1.4 Erasing the Data
Step1. Click the “DATA CLEAR” button to erase all the measurement data recorded in the device.
Step2. Click “Yes”, Erase will be executed.

1.5 Saving the Data
Step1. Click the “SAVE” button to the measurement data read from the device is saved in a file.
Step2. Please specify the folder and file name of the save destination.
(As the initial value of the file name, the name created from the date and time when SAVE button was clicked is set.)
Step3. Click “Save”, saving will be executed.
2.2 Bluetooth Operations
Using the Bluetooth Adapter.

2.1 Ready the device
On the device, press the Bluetooth key to wait for pairing.

2.2 Connection the PC
Access the device from your PC.

Step 1. Click

Step 2. Click

Step 3. Click
Display the device name. (Default Code: MC123456)

Step 4. Click

Step 5. Click
2.3 Connection Status and COM Settings

The status of the connection between the PC and the device is shown by display “Pair” (Connected).

Step 1. Click

Step 2. Click

The status of the connection between the PC and the device is shown by display “Pair” (Connected).
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