

MD2

Electronic Mastitis Detector



MANUAL **EN**

ISO 9001 | **CE**

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INTRODUCTION

The frequent occurrence of MASTITIS is one of the biggest problems in dairy cattle breeding. The subclinical condition of this infectious disease, called MASTITIS SUBCLINICA, is particularly troublesome. In this condition, the milk shows no change in taste or appearance and the udder shows no visible lesions. However, the milk from the ill quarter is of poor quality and the quarter itself has limited productivity. The yield of affected cows decreases from a few to a dozen or so percent in subclinical conditions, and in clinical conditions from several dozen to a hundred percent. The effects of the disease expose the breeder to significant financial losses. MASTITIS is a world-wide problem, therefore the DRAMIŃSKI MD2 ELECTRONIC MASTITIS SUBCLINICA DETECTOR IS successfully used by FARMERS around the world. The problem is illustrated by the figure below. It would appear that the disease occurs only in one cow (Fig. 1), whereas in reality it may be completely different – there may be much more animals in the entire herd affected by the disease than it could appear (EVEN up to 100%). These very unrecognized subclinical (symptomatic) conditions are the cause of the biggest losses suffered by milk producers.

Fig. 1

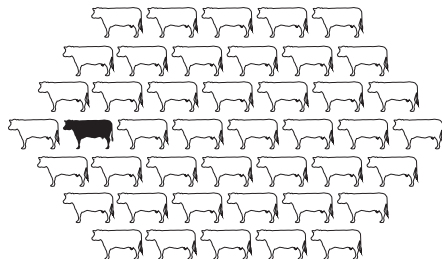
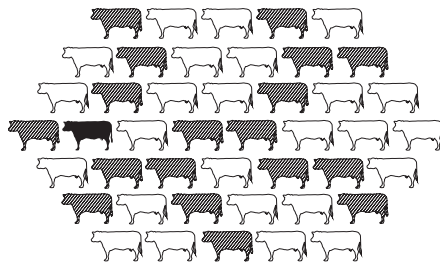


Fig. 2



It was found that the development of the subclinical condition was accompanied by a number of changes and in particular an increase in the salt content of milk which had a decisive impact on the decreasing electrical resistance of the tested milk. Since the detection of this dependency, the method of detecting the subclinical condition of bovine mastitis by means of milk resistance (or conductivity) measurement has acquired many advocates and has practical significance.

The dependency of milk resistance and health condition described above was used by DRAMIŃSKI S.A. to construct the ELECTRONIC MASTITIS. The instrument was tested in a number of universities and scientific institutions.

A successful detector may also be used for the testing of milk in small ruminants (e.g. sheep, goats) to monitor the subclinical condition of the inflammation.

The manufacturer – DRAMIŃSKI S.A. serves the users with its knowledge and at the same time reserves the right to introduce changes and improvements in design and software. DRAMIŃSKI S.A. also reserves the right to amend the contents of the manual.

Read this manual carefully before starting the device. This will guarantee safe, long and reliable operation of the instrument.

The declaration of conformity of the device is available at the seat of DRAMIŃSKI S.A., Wiktora Steffena 21, Sząbruk, 11-036 Gietrzwałd, Poland.

For more information and always up-to-date data please visit **www.draminski.com**



Please note that electronic equipment, batteries and storage cells must not be disposed of in standard household waste containers. It is the user's responsibility to dispose of this type of waste to appropriate disposal companies in accordance with the applicable laws and regulations. By ensuring proper disposal, you help to protect the environment.

ACCESSORIES

SECTION **1**

EN

Dramiński MD4Q 2



ACCESSORIES:

1. Electronic mastitis detector Dramiński MD4Q 2.
2. USB — miniUSB cable for communication with a computer.
3. Lash with a metal snap hook.

4. 4 1.5 V batteries type AA, LR6.
5. Operation manual.
6. Reusable transport packaging (made of plastic).

Dramiński MD4x4Q 2



ACCESSORIES:

1. Electronic mastitis detector Dramiński MD4X4Q 2.
2. USB — miniUSB cable for communication with a computer.
3. Leash with a metal snap hook.

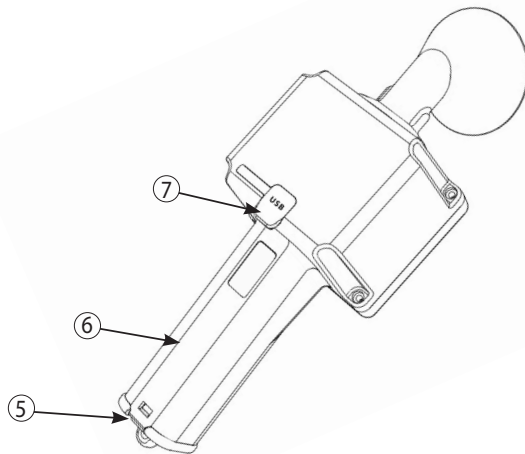
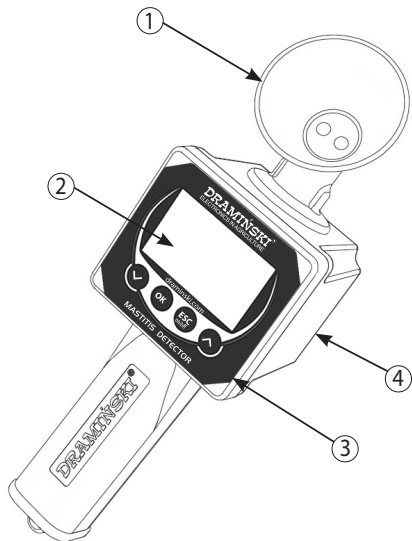
4. 4 1.5 V batteries type AA, LR6.
5. Operation manual.
6. Reusable transport packaging (made of plastic).

DESIGN OF THE DEVICE

SECTION **2**

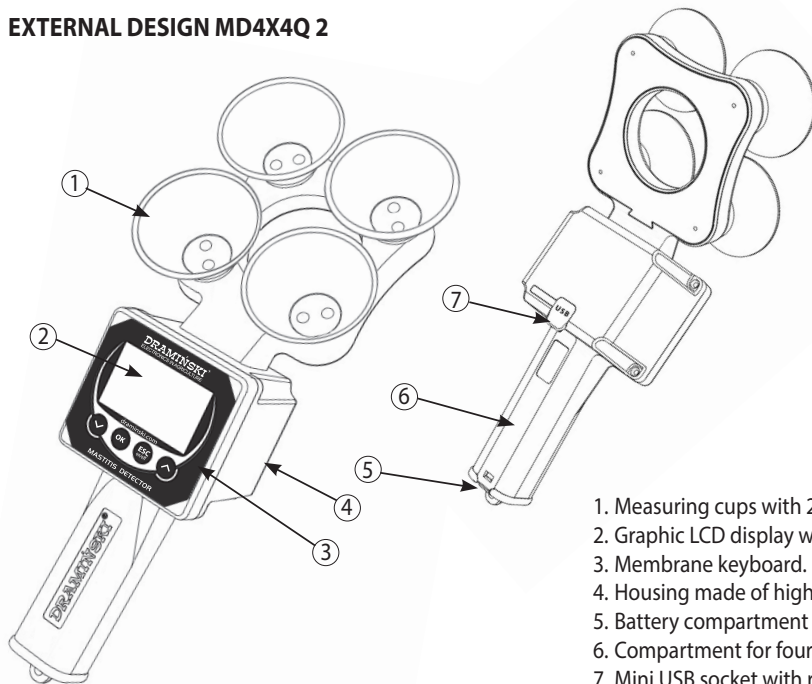
EN

EXTERNAL DESIGN MD4Q 2



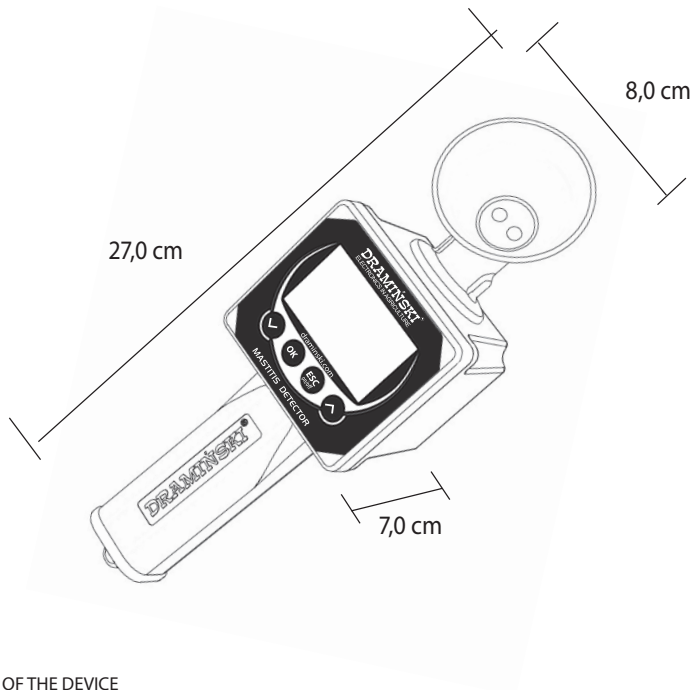
1. Measuring cup with 2 electrodes at the bottom.
2. Graphic LCD display with LED backlighting.
3. Membrane keyboard.
4. Housing made of high quality ABS.
5. Battery compartment cover.
6. Compartment for four 1.5 V AA LR6 type batteries.
7. Mini USB socket with rubber cover.

EXTERNAL DESIGN MD4X4Q 2

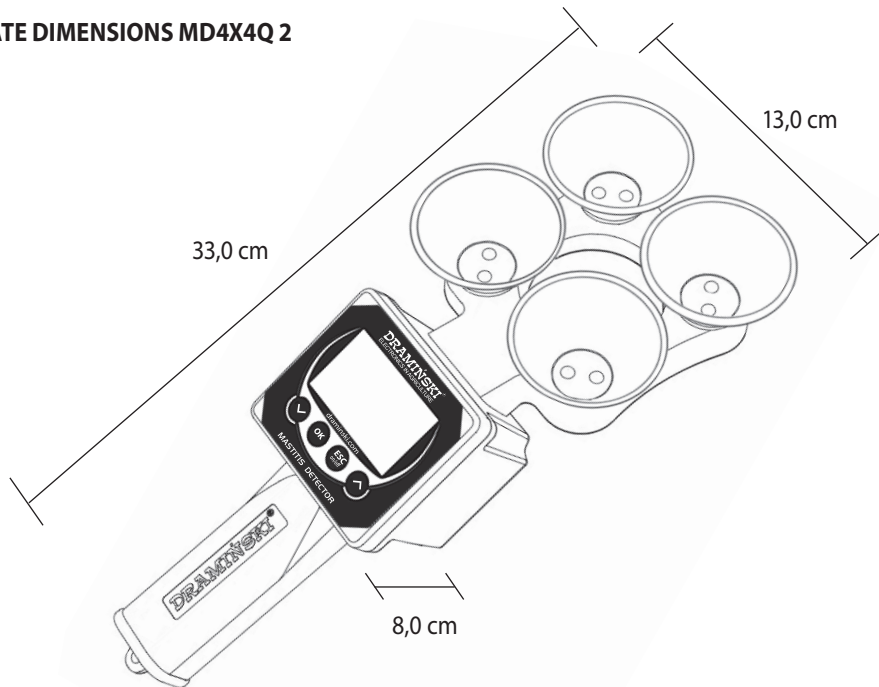


1. Measuring cups with 2 electrodes at the bottom.
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APPROXIMATE DIMENSIONS MD4Q 2



APPROXIMATE DIMENSIONS MD4X4Q 2







KEYBOARD FUNCTIONS

SECTION 3

EN



	<ul style="list-style-type: none"> - Turning on the device. - Turning off the device by holding down the key for 5 seconds (NOTE! The Mastitis detector can also be turned off via the menu by using the "Turn off!" option, and if not in use, it will automatically turn off to save batteries). - Turning on the main menu. - Canceling program functions.
	<ul style="list-style-type: none"> - Accepting program functions. - Start of measurement.
	<ul style="list-style-type: none"> - Navigation through the menu. - Setting values in menu options.
	<ul style="list-style-type: none"> - Turning on the list of animals saved in the device's memory.

INSTRUMENT START-UP

SECTION **4**


EN

Dramiński MD2 will be ready for use if the compartment includes properly inserted batteries (note polarity).

Switch on the device with the  key.

a) A welcome message will appear on the display indicating the name of the device, the software version and the serial number.



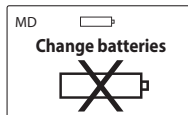
b) The device will then enter the measuring mode. A model of the device and the current battery status will appear in the upper part of the display. 4 boxes (bars) informing that the device is ready for measurement and the number of teats set in the menu (e.g. 2 for examining goats and 4 for cattle) will appear in the middle of the display. The currently available menu functions appear in the lower part of the display over specific keyboard keys (e.g. to go to the main menu of the device, use the  key).



If the advanced operating mode is activated in the menu of the device, the display also shows: the name of the examined animal, the current date and time, the possibility of displaying a list with saved animals and the possibility of quick-saving of the measurement result in memory. In advanced mode immediately after switching on, the device will ask the user to select the animal for examination in order to correctly save the results. If no animal has been saved into memory and the advanced operating mode was selected, the user will be reminded by the **“No animals found”** message when switching on the device and attempting to save the result. For example, the name of the animal may be an ear tag number – it is added in the device menu (see section: MAIN MENU).



Note! If the batteries are too weak to continue the work, the device will automatically signal this with a message:




what means that the battery needs to be changed to new ones.

- c) To save battery life when the keys are not in use, the device will pass into standby mode after a period of time, i.e. the backlight will turn off (this time can be changed in the menu). Press any key to return to the operating state.
- d) If the device remains in standby mode for several minutes, the device will automatically turn off (this time can be set in the menu). The display will show a countdown from 10 to 0 which can be interrupted by any key, other-

wise, the device will turn off in order to save power.



- e) To turn off the device manually, hold down the  key for 5 seconds or select the option **“Turn off!”** in the main menu.

NOTE! Advanced mode users can download a special software for communication with a computer from our website www.draminski.com, which allows for downloading data from the device to the computer's hard drive to conveniently and accurately analyze results, archive data, save valuable notes, create special reports, printouts etc. from the results saved in the device's memory.

MEASUREMENT NOTES

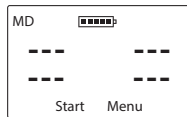
SECTION 5

EN

– **It is necessary to always examine the first milk streams milked directly from the teats of the animal.** The mastitis detector must not be used for examining for bulk milk, milk previously milked or milk without the first streams.

– **Before measurements, always make sure that the electrodes located at the bottom of the measuring cup are perfectly clean.** Greasing of electrodes or presence of other fluids than milk (e.g. water residues) on electrodes will result in false results and thus may lead to misinterpretation. It is therefore important to keep the measuring cups and the entire instrument clean.

– The measuring range is between 10 and 990 units. When this value is exceeded, 3 horizontal dashes (---) will appear on the display. The measuring range of the instrument is several times higher than the maximum value of resistance of the examined milk, so in practice it should never be exceeded. The range will be exceeded if the measuring cup is empty or e.g. contamination of electrodes is so large that it prevents their contact with milk.



– When the device is switched on, the message “**No animals found**” will appear if the advanced operating mode is active and there are no animals saved in memory.

– If the advanced operating mode is set, and when the device is switched on, the message “**Set date**” will appear, meaning that the clock has been reset, e.g. during changing of batteries and it must be set again, so that the saved results can be cataloged properly.

– For examinations in a straw bedding cowshed, we recommend preparing a bucket for pouring the milk after the examination because, according to breeding hygiene rules, the milk from forestripping should not pour onto straw bedding cowshed.

- Please note that the device has a power auto off function, therefore we recommend to save the results before cleaning the measuring cups. Turning off the device before saving the results will result in lost data (the power auto off can be adjusted in the menu).

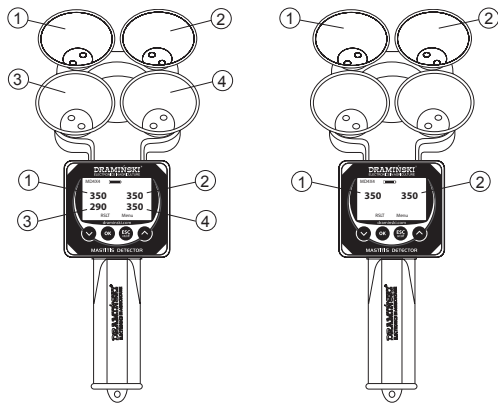
EXAMINATION OF ANIMALS

SECTION 6

EN




Before starting the examination, proceed with the following steps:

- switch on the device and check the display for sufficient battery charge,
- make sure that the electrodes at the bottom of the measuring cup are perfectly clean (see section: CHECKING AND CLEANING OF MEASURING ELECTRODES),
- prepare a bucket with lukewarm water, which will be used to flush the measuring cups during the examinations,
- make sure to always examine the first milk streams milked directly from the teats into the measuring cups,
- to save results into memory, enable advanced operating mode from the device menu, make sure the date and time are set correctly, select the animal to be examined from the list (or add a new one from the menu, see section: MAIN MENU),
- in the case of the MD4X4 model (4 measuring cups), set the number of teats (4 or 2) in the device menu. Use the upper cups #1 and #2 for 2-teat measurements (e.g. when testing goats' milk).




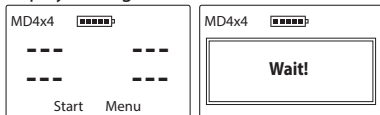
Examination with model MD4X4 (4 measuring cups):

a) switch on the device with the key ,

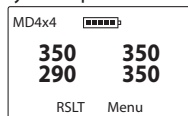
Note if you are using advanced operating mode, a list of names of animals saved in memory will appear on the display. Use the keys  or  to select the animal for examination and confirm with .


b) place the measuring cups under teat A, B, C, D and milk the first milk streams so that the measuring cups are full (the line inside the cup must be covered). It is important to fill the measuring cups as soon as possible (so as to limit the cooling down of the milk). Make sure not to mix the milk (remove the first streams of milk from each teat into another bowl),

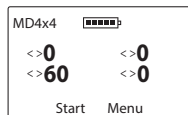
c) after filling all the cups, press the  key (Start). During the measurement, the "Wait!" message will appear on the display, during which time the unit must be held still,




d) results will appear in a moment and only then the milk may be dispensed from the cups e.g.:




e) press the  key (RSLT) to view the differences between teats relative to the highest result, for example:



f) if one (or more) result pulses, this means that in mastitis is developing in a given quarter (i.e. the result is at least 50 units smaller than the highest result obtained from a given teat),

g) press the key  (Start) again to start the measurement procedure from the beginning to begin the examination on another animal,

NOTE In the advanced operating mode, pressing of the key  (Start) will trigger a menu with 3 choices:




- **“Save results”** to save the results in the device memory and assign them to the examined animal,
- **“Next measurement”** to start examining another animal without saving the results,
- **“Back”** to view the results of the most recent examination again,

h) before starting the examination of another animal, make sure to remove the residual milk from the measuring cups:


- holding the instrument in your hand, immerse the measuring cups in a bucket filled with water and move the instrument in such a manner so as to wash off residual milk,
- then shake thoroughly the droplets/residual water remaining in the measuring cups.

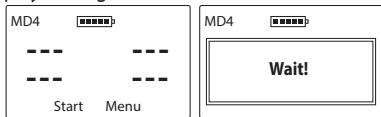
Examination with model MD4 (1 measuring cup):

a) switch on the device with the key ,

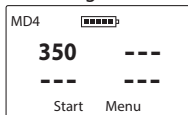
Note if you are using advanced operating mode, a list of names of animals saved in memory will appear on the display. Use the keys  or  to select the animal for examination and confirm with .

b) place the measuring cup under teat A and milk the first milk streams so that the measuring cup is full (the line inside the cup must be covered),

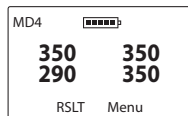
c) after filling the cup, press the  key (Start). During the measurement, the “Wait!” message will appear on the display, during which time the unit must be held still,




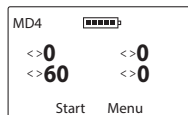
d) after the result appears, pour out the milk and shake the remaining milk off the measuring cup,




e) then repeat the above steps for teats B, C and D to obtain results for the whole udder, e.g.:




f) press the  key (RSLT) to view the differences between teats relative to the highest result, for example:



g) if one (or more) result pulses, this means that in mastitis is developing in a given quarter (i.e. the result is at least 50 units smaller than the highest result obtained from a given teat),

h) press the  key (Start) again to start the measurement procedure from the beginning to begin the examination on another animal,

NOTE In the advanced operating mode, pressing of the  key (Start) will trigger a menu with 3 choices:

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- **“Next measurement”** to start examining another animal without saving the results,
- **“Back”** to view the results of the most recent examination again,

i) before starting the examination of another animal, make sure to remove the residual milk from the measuring cup:

- holding the instrument in your hand, immerse the measuring cup in a bucket filled with water and move the instrument in such a manner so as to wash off residual milk,
- then shake thoroughly the droplets/residual water remaining in the measuring cup.

Note rinsing should be performed also after testing of the quarter where the subclinical condition was found. This will prevent the milk residue from affecting the measurement results of the next quarter.

CHECKING AND CLEANING OF MEASURING ELECTRODES

SECTION **7**

EN

Cleaning (degreasing) of measuring electrodes should be carried out always before the measurements are commenced. Commonly available detergents such as dishwashing liquid or washing powder should be used for cleaning.

– For degreasing of electrodes, we recommend washing with a swab wetted in dishwashing liquid (pay particular attention to cleaning of the surface between the electrodes, then rinse thoroughly the measuring cup under running, lukewarm water and shake off water residues.

– We recommend using a washing powder periodically or when contamination is heavier. Cleaning consists of back-filling the measuring cup with washing powder (approx. 1 tablespoon), then adding a little lukewarm water to form a dense mass which needs to be used to thoroughly clean the surface of the electrodes in the measuring cup. In this method, attention should also be paid to the surface between the electrodes, and after cleaning the entire cup must be thoroughly rinsed in lukewarm, running water and residual water shaken off.

Attention! residues of water in the cup can dilute the milk and thus falsify the result, therefore it is important to completely shake off the residual water or wipe it thoroughly

with a clean piece of paper. Please note that even touching the electrodes with a finger may grease the surfaces adversely affecting the results, therefore particular attention must be paid before acquiring efficiency in cleaning.

It is strictly forbidden to clean the measuring cup with disinfectants, as this may result in the formation of sludge and, if too high concentration is used, damage the coating of the measuring electrodes. After completion of the examination, it is worth thoroughly rinsing the cups as the remaining milk may form deposits which may be difficult to clean at a later stage.

Test for cleanliness of electrodes:

- a) prepare the solution (brine) – add a pinch of kitchen salt to a glass with water at room temperature and mix thoroughly,
- b) fill the measuring cups with brine and read the results (the reading depends on the brine concentration),
- c) pour brine from the measuring cups back into the glass,
- d) clean the measuring electrodes and thoroughly shake off the remaining water,

- e) re-mix the brine (do not add salt), pour it in the measuring cups and read the result – if the readings after cleaning have fallen significantly, the electrodes have been heavily greased,
- f) it is best to repeat the cleaning and check whether the next values displayed do not change, which means complete cleanliness of the electrodes.

Differences of 20 units are acceptable, whereas in the case of dirty electrodes the result may differ by up to several hundred units.

INTERPRETATION OF RESULTS

SECTION 8

EN

THE RESULTS OBTAINED MUST NECESSARILY BE EVALUATED ACCORDING TO TWO CRITERIA:

- 1. What is the numerical value we obtain when examining quarters and is it typical for the examined cows (individual assessment of each cow in terms of its age)?**
- 2. How large are the differences between quarters in the examined cow?**

Re item 1:

Readings below 250 units:

- clearly indicate subclinical mastitis or a high risk of disease becoming acute (which may occur very quickly).

Readings above 300 units:

- the condition of the udder quarter is good. The most frequently results are in the range of 330–360 units. In young, fully healthy cows the results will have a higher level (370–400) and in old cows, the most common result will be at a lower level (300–320).

Readings from 250 to 300 units:

- transient state between subclinical condition of mastitis and good condition. Due to physiological differences, it is difficult to define a strict boundary beyond which the udder quarter is ill. In some cows, the reading between 250 and 300 units, especially if we do not get higher results in the cow under examination, is considered normal and the udder quarter is healthy. However, if, for some reasons, a decrease in results to 250–300 units is observed in cows with a result significantly above 300 in previous readings, the cow should be considered as being at risk of mastitis.

Re item 2:

A difference greater than 40–50 units between the highest and lowest result for quarters in the cow under examination indicates the beginnings of subclinical mastitis. It is then necessary to systematically examine such cow before each milking and to observe whether the disease progresses (further decrease in results for the suspected quarters). In addition, special care and increased hygiene before and after milking are necessary.

EXAMPLES OF INTERPRETATIONS:

• young cow, 2nd lactation,

for all quarters, readings of more than 300 units were obtained, but the difference suggests that the quarter C may have a subclinical mastitis condition. It is necessary to further investigate that cow.

quarter A = 370

quarter B = 380

quarter C = 310, a difference of 70 units compared to the maximum reading (quarter B)

quarter D = 370

• cows in the medium age, 5th lactation,

the results show that one quarter (D) is at risk of inflammable condition, corrective actions should be taken quickly and the results of the examinations should be further observed in that cow

quarter A = 340

quarter B = 350

quarter C = 350

quarter D = 260, the result less than 300 units and difference of 90 units compared to the highest reading (quarters B and C)

• old cow, 9th lactation,

in one quarter (B) the reading is less than 300 units, but this is often encountered in cows in this age – everything is physiologically natural.

quarter A = 310

quarter B = 290, the result below 300 but the max. difference of only 20 units

quarter C = 300

quarter D = 300

Factors to be taken into account which have an impact on the level of results obtained when examining healthy cows:

1. age of the animal,
2. breed (the above interpretation applies to red and white cattle + Holstein Friesian cattle; for Jersey cattle results will be at a higher level),
3. individual properties of individual animals (e.g. fat content of milk),
4. feeding – the composition of the dose or its change will affect readings,
5. physiological condition (e.g. during the oestrous cycle the results should not be examined and interpreted),

6. metabolic disorders (acidosis or alkalosis) can be identified by a sudden significant drop or increase in readings in all cows in the herd.

Note! Only systematic checks of the cows will allow for proper and effective use of the detector's capabilities. Quarters with visible inflammation and advanced changes in milk cannot be examined. Proper interpretation in such cases will be impossible. The method of changing milk resistance is used for early conditions of the mastitis subclinica disease.

MAIN MENU

SECTION 9

EN


Thanks to the functions contained in the main menu of the device, the user can quickly turn off the device, adjust operational settings to their needs, manage memory and much more.

To turn on the **MAIN MENU**, press and hold down the




key for about 2 seconds.

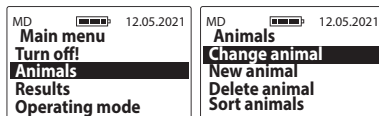
1. Turn off!




To turn off the device, go to the **Main menu** using the  key, then use the  or  key to select the **Turn off!** option and confirm with the key

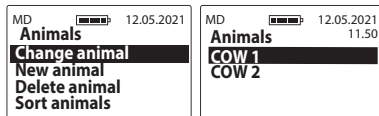





Thanks to this function, the user can quickly and conveniently turn off the device without the necessity to hold down the  key for 5 seconds and wait for the power auto off option to activate.

2. Animals

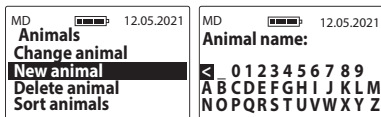


a) **Change animal** – to change the animal for which the results will be put into the directory, go to **Main menu / Animals / Change animal**, then use the  or  key to select the appropriate animal from the list and confirm with the  key, e.g.

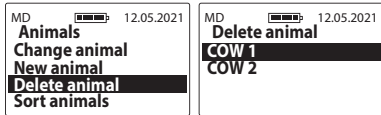


b) **New animal** – to add a new animal to the device's memory, go to **Main menu / Animals / New animal**, then enter any name by selecting characters using the arrows and confirming with the  key (to clear the character select the "<" symbol and press the  key). When the name is entered, press the  key and when the **"Save the**

name?" message appears, confirm with the **(OK)** key or cancel with the **(ESC_{on/off})** key, e.g.



- c) **Delete animal** – to delete an animal from the device's memory, together with the measurements saved for it, go to **Main menu / Animals / Delete animal**, then select the appropriate animal from the list and confirm with the **(OK)** key or cancel with the **(ESC_{on/off})** key (Note! the animal and its measurements will be irreversibly deleted from the device, therefore if the data is important, remember to first transfer it to the computer using special software), e.g.

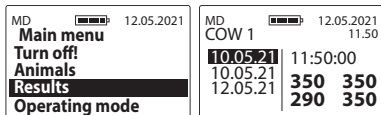


- d) **Sort animals** – to sort previously saved animals, go to **Main menu / Animals / Sort animals** and confirm with the **(OK)** key. The animals included in the list are shown in the order of their entry and will be sorted alphabetically. This option is very useful when searching for a specific animal included in the list of animals (especially when the animals are named according to the numbering of ear tags).



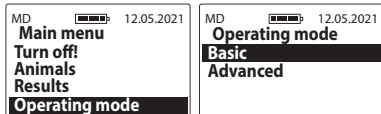
3. Results

To view the results saved in the device's memory, go to **Main menu / Results** and then scroll through them using the **(v)** or **(^)** key (the results are arranged chronologically starting with the most recent ones). You can also delete individual results. To do this, use the arrows to indicate the result you would like to delete and use the **(OK)** key, and when the **"Delete?"** message appears, confirm with the **(OK)** key or cancel with the **(ESC_{on/off})** key, e.g.

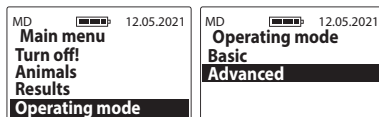


4. Operating mode

- a) **Basic** – in order to facilitate the operation of the device and use only the basic menu functions, go to **Main menu / Operating mode**, then using the or key select the **Basic** option and confirm with the key, e.g.



- b) **Advanced** – in order to enable all the options of the device such as real time clock, saving measurements, etc. go to **Main menu / Operating mode**, then using the or key select the **Advanced** option and confirm with the key, e.g.



5. Settings



5.1 Language

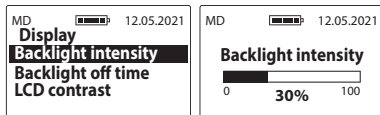
- To change the language version of the device, go to **Main menu / Settings / Language**, then select the language version using the or key and confirm with the key, e.g.



5.2 Display

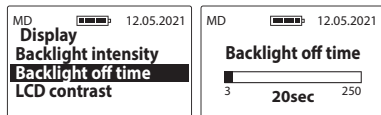


- 5.2 a) **Backlight intensity** – we used energy-saving LED backlighting but remember that stronger backlighting is associated with increased power consumption, which leads to a faster discharge of the battery. To change the backlight intensity, go to **Main menu / Settings / Display / Backlight intensity**, then select the appropriate value using the \downarrow or \uparrow key and confirm with the OK key, e.g.

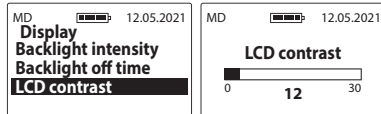


- 5.2 b) **Backlight off time** – adjustment of the time after which the backlight of the display is off and the device goes into the idle state waiting for the keyboard to be




used again (the time is counted from the last click/use of the key on the keyboard of the device). To change the backlight off time, go to **Main menu / Settings / Display / Backlight off time**, then select the appropriate value using the \downarrow or \uparrow key and confirm with the OK key, e.g.

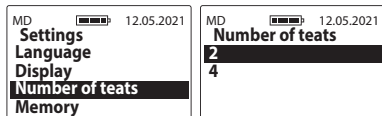


- 5.2 c) **LCD contrast** – to change the contrast of the LCD display, go to **Main menu / Settings / Display / LCD contrast**, then select the appropriate value using the \downarrow or \uparrow key and confirm with the OK key, e.g.

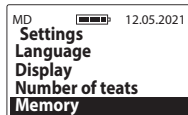





- 5.3 **Number of teats** – enables the measurement mode to be adjusted to the build of the animal to be examined.

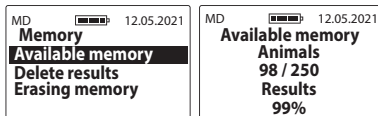
To change the number of teats, enter the **Main Menu / Settings / Number of teats**, then use the  or  key to select the appropriate number and confirm with the  key, e.g.




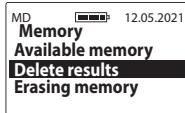
5.4 Memory




5.4 a) **Available memory** – to check the current amount of free space in the device's memory, go to **Main menu / Settings / Memory**, use the  or  key to select the **Available memory** option and confirm with the  key, e.g.



5.4 b) **Delete results** – to delete all results stored in the device's memory, go to the **Main menu / Settings / Delete results**, and confirm with the  key. This option deletes the results from all animals saved in the device (the animals will not be deleted). **Note!** Examination results will be irretrievably deleted from the device, so if the data is important, remember to first transfer it to the computer using special software.



5.4 c) **Erasing memory** – to erase the entire device memory (all results and animals), go to **Main menu / Settings / Memory / Erasing memory** and confirm with . **Note!** The data will be irretrievably erased from the device, so if it is relevant, remember to first transfer it to your computer using special software.



5.5 Power auto off

Adjustment of the time after which the device turns off automatically counting from the last click/use of the keyboard. To change the power auto off time, go to **Main menu / Settings / Power auto off**, then select the appropriate value using the \downarrow or \uparrow key and confirm with the OK key, e.g.

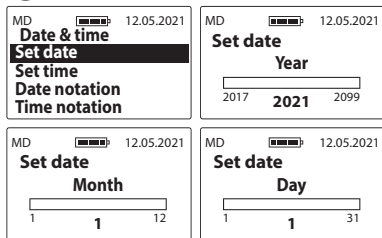


5.6 Date & time

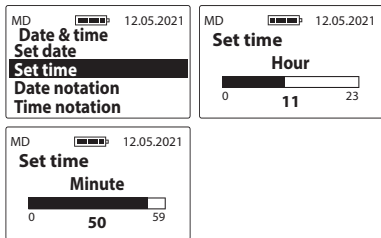
MD2 has a real time clock so that the measurement results are saved in memory together with the actual date and time of performance.



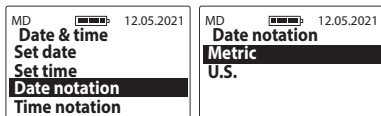
5.6 a) **Set date** – to set the current date, go to **Main menu / Settings / Date & time / Set date**, then use the \downarrow or \uparrow key to select the appropriate value and press the OK key to confirm the year/month/day, e.g.



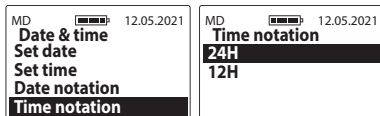
5.6 b) **Set time** – to set the current time, go to **Main menu / Settings / Date & time / Set time**, then use the \downarrow or \uparrow key to select the appropriate value and press the OK key to confirm the hour/minute, e.g.



5.6 c) **Date notation** – to change the format of date display, go to **Main menu / Settings / Date & time / Date notation**, then use the or key to select the appropriate option and confirm with the key, e.g.



5.6 d) **Time notation** – to change the format of time display, go to **Main menu / Settings / Date & time / Time notation**, then use the or key to select the appropriate option and confirm with the key, e.g.



6. About

To check the device information and manufacturer's contact details, go to the **Main menu** using the key, then use the or key to select the **About** option and confirm with the key. Here we can conveniently check e.g. model of the device, software version, serial number of the device as well as the address and contact details of Dramiński S.A. on page 2 e.g.

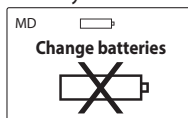


CHANGING BATTERIES

SECTION 10

EN

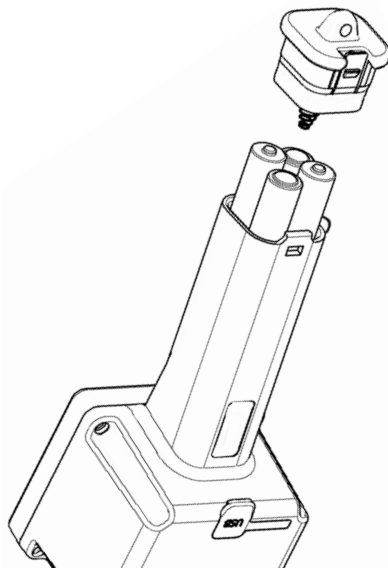
The device features an automatic indication that the battery is discharged. In this case, the **“Change batteries”** message in the form of a graphic symbol will be displayed immediately after turning on or during use and the device will automatically turn off.



The device is powered by four standard 1.5 V AA type batteries (commonly known as Mignons).

To change batteries:

- press the lock lever of the battery compartment cover,
- remove the cover from the battery compartment,
- remove used batteries and insert a new battery pack according to the polarity markings +/-,
- press the battery compartment cover until you hear a clearly audible click,
- check whether the cover has latched properly into the container to make sure that it does not slip out.



FINAL REMARKS

SECTION 11

EN

- In the case of abnormal (excessive) results of the instrument, the electrodes shall be degreased first.
- Please pay attention to the need to comply with general hygiene rules when performing measurements.
- The housing can be cleaned with a wet cloth using detergents. It is best to do this shortly after the measurements have been completed. **Do not use very hot water or boiling water during washing.**
- Store the device in dry conditions at room temperature.
- Due to existing zoo-sanitary requirements, it is not recommended to lend the detector to other breeders.
- If the device is not going to be used for a longer period of time, we recommend to remove the batteries from the battery compartment of the device to reduce the risk of damage resulting from electrolyte leakage. **We recommend using good quality batteries.**
- In case of problems with the device or difficulties in interpreting the results, we recommend (before sending the device for service) contacting the manufacturer, i.e. DRAMIŃSKI S.A. or a local authorized and certified distributor.
- DRAMIŃSKI S.A. requests to send any comments and inform us about the results of using the device. Customer contact is very valuable for us in developing and improving your equipment.
- It is forbidden to unscrew the display window, interfere with it or have it serviced by unauthorized persons, as this may cause unsealing of the device, permanent damage and will affect the warranty conditions.
- The device can be washed under running water, making it easier to operate and keep clean (remember about the rubber gasket for the miniUSB socket).
- **The Mastitis detector does not count somatic cells, but detects the subclinical Mastitis condition**, which leads to the development of disease and excessive somatic cells in milk.
- Systematic examination of udders is an important part of the preventive treatment. Preventive treatment is cheaper than medical treatment.

TECHNICAL DATA

SECTION 12

EN

Approximate unit weight MD4Q2 / MD4X4Q2	358 g/468 g
Approximate dimensions MD4Q2 / MD4X4Q2	26 x 8 x 7 cm / 33 x 13 x 8 cm
Power supply	four 1.5 V AA type batteries (LR6)
Battery status indication	graphic
Battery low indication	automatic
Power consumption	from 11 mA to 54 mA (depending on the set backlight intensity)
Measurement control	single chip microcomputer
Estimated continuous working time on one alkaline battery pack	209 hours when backlight is set to 0% 95 hours when backlight is set to 30%
Display	LCD display with LED backlighting, diagonal 2.4"
Keyboard	membrane
Data transmission	via USB
Update	via USB
Data saving	internal memory
Memory capacity	250 animals / 200,000 measurements
Measuring range	10 to 990 units
Additional functions	real time clock, LED backlighting, pop-up menu, saving the results, software for data transmission and analysis (reports, graphs, printouts, archiving), independent software update
Measurement resolution	10 units
Recommended operating temperature	from 10°C to 45°C
Recommended storage temperature	from 5°C to 50°C



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