DRAMIŃSKI
TECHNOLOGY

PHG2

Digital acid meter for soil and liquids

USER MANUAL EN

ISO 9001 | CE

TABLE OF CONTENTS

INTRODUCTION 3
ACCESSORIES 5
DESIGN OF THE DEVICE. 7
KEYBOARD FUNCTIONS 13
INSTRUMENT START-UP 15
MEASUREMENT NOTES 19
PREPARATION, CALIBRATION AND STORAGE OF THE PH METER PROBE. . . . 23
MEASUREMENTS 27
MAIN MENU 31
CHANGING BATTERIES. 43
FINAL REMARKS 45
TECHNICAL SPECIFICATION. 49

EN

INTRODUCTION

The **second generation Dramiński PHG** digital acidity meter for soil and liquids (e.g. feed) is a professional and indispensable work tool in many industries. It quickly and accurately checks the concentration of hydrogen ions expressed in pH units. Moreover, it allows for measurement of voltage (mV) and temperature (°C/°F). PHG2 was created on the basis of a device which has been successfully used by our customers since 1996. The new model maintains the accuracy and strength of its predecessor, while featuring a large and highlighted display, self-upgradeability, multilingual menus with the capability of setting the modes of operation the device, toolless battery replacement and charging rate, built-in memory for storing a large number of measurements with date and time, special software for further analysis of the collected data on the computer and for cataloguing them against the entered object names. Object names may be created according to own needs of the user, e.g. the name of the field for specific crops, type of substrate, type of sample or storage place, data of the customer for which the measurements are performed, etc. As many as 250 different objects may be entered into the memory, which then can be conveniently selected from the list to assign them with measurements performed. This and much more is included in the Dramiński PHG2 pH meter, and thanks to the strength and working conditions to which it was developed, it has no equals on the market.

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., ul. Wiktora Steffena 21, 11-036 Sząbruk, Poland.

As a manufacturer, we provide warranty and post-warranty service in Poland. You do not have to ship your equipment abroad.

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 PHG2

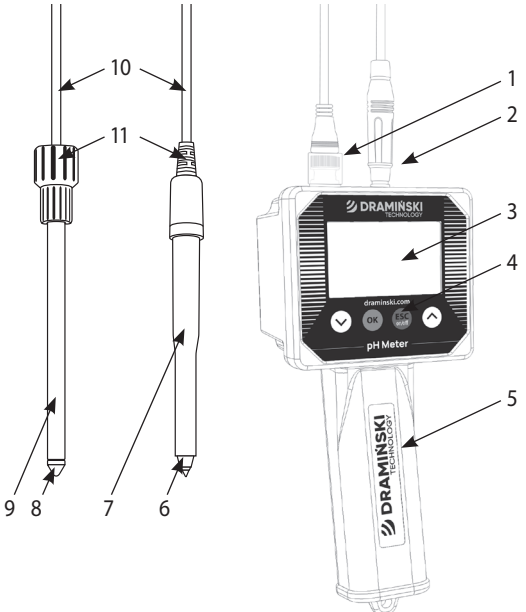
ACCESSORIES:

1. Dramiński PHG2 acidity testerfor soil and fluids,
2. Leash with a metal snap hook,
3. 2 buffers (calibration liquids – pH = 7.00 & 5.00) for calibration of pH-metric probe,
4. Operation manual,
5. USB to mini-USB cable forcommunication with a computer,
6. pH-metric (glass) probe with rubbercover of the diaphragm,
7. Temperature probe (stainless steel),
8. Four 1.5V AA LR6 type batteries,
9. Carrying case with foam insert.

DESIGN OF THE DEVICE

SECTION 2

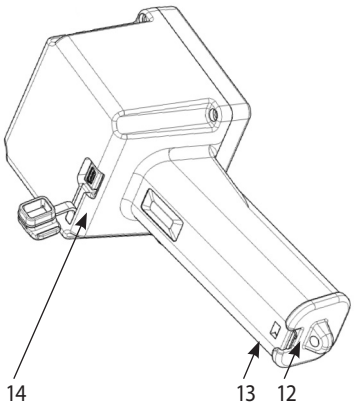
EN



EXTERNAL DESIGN:

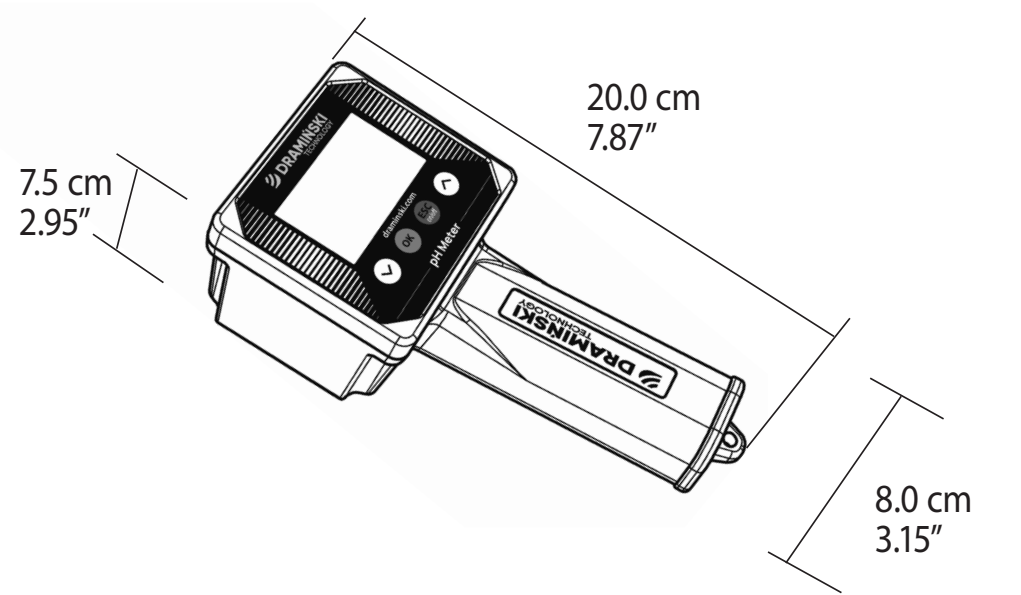
1. BNC connector for connecting the pH-metricprobe,
2. RCA connector for connecting the temperature probe,
3. Graphic LCD display with LED backlighting,
4. Membrane keyboard,
5. Housing made of high quality ABS,
6. pH-metric probe diaphragm,
7. pH-metric probe (electrode) ESAgP-307W (glass),
8. Probe end (tip) with digital temperature sensor,
9. Temperature probe (stainless steel),
10. Probe cable,
11. Probe handle.

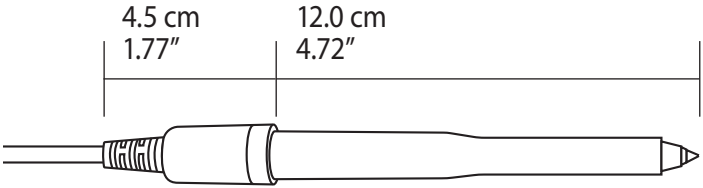
12. Battery compartment cover,
13. Compartment for four 1.5V AA LR6 type batteries,
14. Mini USB socket with rubber cover.



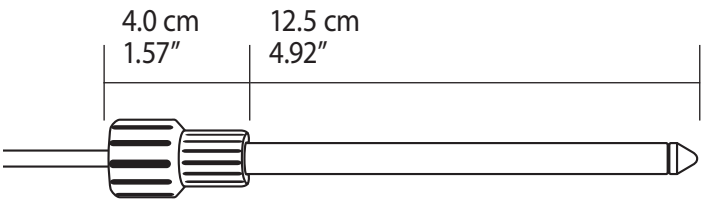
EN

DIMENSIONS


20.0 cm
7.87″
7.5 cm
2.95″
8.0 cm
3.15″
DRAMINSKI
TECHNOLOGY
draminski.com
OK
ESC
pH-Meter



pH-metric probe (electrode)



Temperature probe

EN

The probes are equipped with 110 cm-long cables.
The end of the probes (tip) is 8 mm in diameter.

KEYBOARD FUNCTIONS

SECTION 3

EN

ESC on/off	– Turning on the device. – Turning off the device by holding down the key for 5 seconds (NOTE! The device 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.
OK	– Accepting program functions. – Change of the measurement mode to: pH and temperature measurement, preview of indications added to the mean calculations, mV and temperature measurements.
∨ ∧	– Navigation through the menu. – Setting values in menu options.
∨	– Access to the options for savingthe results, resetting the meanresult and changing the testedobject.
∧	– Adding of indications tocalculations of the mean, minimumand maximum result.

INSTRUMENT START-UP

SECTION 4

EN

Dramiński **PHG2** will be ready for use if the compartment includes properly inserted batteries (note polarity).
Switch on the device with the (ESC on/off) key.

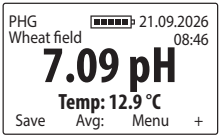
a) A welcome message will appear on the display indicating the name of the device, the software version and the serial number.

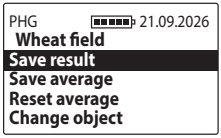
DRAMIŃSKI
TECHNOLOGY
www.draminski.com
pH Meter
Firmware rev: 2.23
SN: PH000009 DM

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. The current pH and temperature indication will appear in the middle part of the display (if the **automatic compensation** is set and the temperature probe is not connected, the message **„Connect the temperature probe"**) will appear.

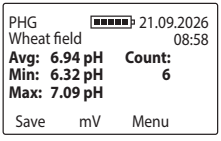
The currently available menu functions appear in the lower part of the display over specific keyboard keys (e.g. to go to the main menu of the device, use the (ESC on/off) key).

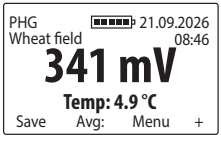
If the advanced operating mode is turned on in the device menu (see section 8: MAIN MENU), the following will also be visible on the display: name of the object for which the results will be recorded, the current date and time and the **„Record"** function, where it is possible to enter the current indication or the mean result from tests, reset the mean result and change the object to another one.



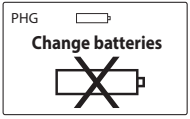


Use the key (OK) to enable the **„Avg:"**, unction, which is the preview of indications added to the calculation of the mean value. It will present the number of indications added, the mean (**Avg**), the lowest (**MIN**) and the highest (**MAX**) result. Press the OK button again to activate the **„mV"**, function, i.e. voltage (from pH-metric probe) and temperature measurement mode. Press the key (OK) again to activate the **„pH"** function, i.e. to return to the pH and temperature measurement mode.





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

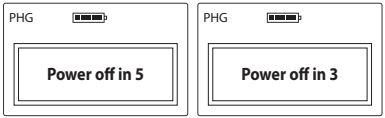


which means that the batteries need to be changed to new ones.

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

EN



e) to turn off the device manually, hold down the ESC on/off key for 5 seconds or select the option „**Power off!**".

MEASUREMENT NOTES

SECTION 5

EN

– When the device is switched on, the message **„No name found"** will appear if the advanced operating mode is active and the **object** where the indications will be stored has not been selected from the list. To use the indication storing function, add a minimum of 1 **object** to the memory and assign it any name (cf. SECTION 8 | SETTINGS, item 2b). When attempting to write an indication without the selected **object**, a message **„Select the object"** will appear.

– 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 measurements can be cataloged properly.

– If the **„Connect temperature probe"** message appears on the display despite the fact that the probe is connected to the reader, this may indicate an incorrect connection of the probe plug to the reader or a damage to the probe.

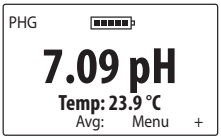
– Exceeding of the temperature measurement range is marked with the **„MIN"** message (for indications below the range) and **„MAX"** (for indications above the range).

– Exceeding of the measurement range is marked with the **„LO"** message (for indications below the range) and **„HI"** (for indications above the range).

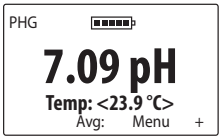
– During temperature measurements wait until the indications are stable, which means that the probe has already adopted the temperature of the tested material and the result can be considered final. Stabilization time depends on the structure of the tested material and the temperature difference, i.e. if, for example, the probe has been heavily exposed to the sun and then a colder material will be tested, the temperature reading time may increase.

– The temperature of the tested material affects the pH value; therefore, it is important that it is taken into account during the tests. The pH value seen on the display of the unit is already corrected by the temperature va-

lue according to the special formulas, so the accuracy is very high. The software allows for 2 types of temperature measurement (**Auto/Manual**). **Automatic compensation** means measurement of temperature in real time, read from the temperature probe connected to a reader; therefore it is important that the probe was present in the tested material during the pH test. **Manual compensation** is used to perform measurements according to the temperature permanently entered by the user (the advantage of this function is the possibility of pH measurements with disconnected temperature probe, which is very convenient, but we must remember to always set the actual (proven) temperature of the tested material). During **manual compensation**, the temperature result is marked in a bracket and is not influenced by the temperature probe.



Automatic compensation



Manual compensation

– **Before proceeding with the tests, pay attention to the correct preparation of the pH-metric probe (see SECTION 6)**

– The accuracy of the measurement is significantly affected by the time needed to completely achieve the ion balance between the tested environment and the electrode and to fully stabilize the result, which involves the operation of the electrode itself and amounts to approximately a dozen or so seconds to one minute.

EN

PREPARATION, CALIBRATION AND STORAGE OF THE PH METER PROBE

SECTION 6

EN

1. Preparation of the pH-metric probe

If the electrode manufacturer does not recommend another method, proceed as follows:

- a new pH electrode or a pH electrode not used for a long time must be unscrewed from the instrument and conditioned (half-soaked without the rubber diaphragm cover) for 12 to 24 hours in distilled water or in saturated KCL (potassium chloride) solution,
- before conditioning, calibration and measurements, always remove the rubber cover of the diaphragm (semi-permeable zone at the end of the electrode — see section 2: DESIGN OF THE DEVICE)
- immediately before each measurement, rinse the electrode thoroughly with distilled water,
- perform calibration on the reference liquids, always starting with a liquid with pH of 7.00.

2. Calibration of the pH-metric probe

The calibration shall be carried out to avoid any error resulting from the individual characteristics of the electrode. The calibration must always be performed before working with a new electrode, after a certain time of its use (after a series of several dozen measurements) and after a long break in measurements. Two reference liquids with a known and precisely defined pH are supplied with the instrument: the first with pH of 7.00 and the second with pH of 5.00 or 4.00 (since these ranges are the most common results of soil acidity measurements.)

3. Storage of pH-metric probe

- When performing the frequent daily measurements, the electrode should be stored in distilled water or saturated potassium chloride solution.
- During the measurements directly in the field, the electrode can be taken out of distilled water and carried in the packaging (for not more than a few hours). NOTE: always remember to install a rubber cover on the diaphragm when the probe is not soaked in distilled water and no measurement is currently performed.
- After a long break, the electrode should be reconditioned in distilled water, but for a much shorter time (several hours).

- After each measurement, carefully rinse the electrode with distilled water and carefully apply a rubber cover to the probe diaphragm.
- If any damage or malfunction of the electrode is found, replace it with a new one or contact the manufacturer.
- When measuring, remember that the electrode is made of glass and may break. It is also important to remember that the BNC connectors are protected against wetting.

EN

MEASUREMENTS

SECTION 7

EN

Attention! Do not commence any measurements until the equipment is prepared for operation (see SECTION 6). The acidity of the soil can be checked directly in selected areas (e.g. greenhouses or field), but samples can also be taken and examined on site e.g. at home or in the office.

ACIDITY TEST DIRECTLY IN FIELD

Prior to testing, provide distilled water and simple tool for soil grinding and mixing of soil (e.g. a screwdriver or a spatula). The prepared electrode (after conditioning and calibration) can be carried in the packaging together with the instrument (remember to apply a rubber cover to the probe diaphragm if the instrument is moved dry, i.e. without immersing it in distilled water).

Sequence of measurement activities:

1. The hard soil in the selected place should be crushed with a tool and then flooded with plenty of distilled water and mixed (a thin homogeneous mud must be formed).
2. Connect the pH-metric probe and the temperature probe to the reader. If manual temperature compensation is set in the menu, it is not necessary to use a temperature probe, but remember to set the temperature according to the actual temperature of the tested material.
3. Remove the rubber diaphragm cover on the pH-metric probe and rinse the distilled probe tip with water.
4. Carefully immerse the pH probe (and the temperature probe) in the previously prepared area at the depth of approx. 4 cm (to cover the diaphragm). Note that there are no stones in the tested material which could damage the glass pH-metric probe at a higher pressure.
5. Switch on the device with the ESC on/off key. The result should be assumed as final when the pH and temperature values (indications on the display) stabilize, which may take a while. To reduce the waiting time, ensure that the temperature probe and the tested material are at a similar temperature.
6. The obtained result may be added for calculation of the mean value using the ^ „+". key. To check the mean

result and the minimum and maximum indication, use the **„Avg:"** (OK) key.

7. If the advanced operating mode is turned on, the obtained result or the mean measurement may be recorded. To do this, use the **„Save"** (∨) key. Make sure to set the appropriate **„Object"**, because the saved result will be assigned to it in the device memory so that it will be later to possible to view the results stored for various objects and use special software to download the data to the computer to generate reports, printouts, charts, spreadsheets, add custom descriptions, archive data, etc. (data downloading software is free-to-use and available at www.draminski.pl).
8. After each measurement, after pulling out the pH-metric probe, rinse it carefully with distilled water. This is necessary since **it extends the life of the pH electrode** and moreover it eliminates the impact of the previous test on the next one.

Attention! The accuracy of the measurement is significantly affected by the time needed to completely achieve the ion balance between the tested environment and the pH electrode and to fully stabilize the result and amounts to approximately a dozen or so seconds to one minute. The accuracy of the measurement may also be influenced by the soil structure and the way the electrode is introduced into the soil.

MEASUREMENTS OF SAMPLES TAKEN FROM THE FIELD

In laboratory conditions, high accuracy of measurements can be achieved. The acidity test consists of the same operations as described earlier. However, a different procedure is also available for preparation of the soil to be examined.

1. Samples are collected from specific locations in the field (e.g. where plant development disturbances have occurred), then marked and properly prepared.
2. The so-called "averaged sample" is prepared. This means that soil samples are taken from different field locations and different depths (0 to 20 cm), and then the obtained soil is thoroughly mixed and only one, mean test sample is used for testing. Next, the sample is dried, ground (milled) and then 10 g is weighed out and poured with ap-

EN

prox. 25 ml of distilled water or KCl (potassium chloride) solution. Measurements are performed after 24 hours or earlier (depending on the method).

All these activities are specified in details in the individual analytical methods. Details of the application of the appropriate method to the type and origin of the sample are described in the standards defined below: *CHEMICAL AND AGRICULTURAL ANALYSIS OF SOIL. Determination of pH values BN-75/9180-03.*

Dramiński PHG2 offers the possibility to obtain very accurate results if the sample is carefully prepared and the pH--metric probe is calibrated.

The field test is subject to errors due to simplified sample preparation, but in agricultural practice they are of no importance.

The tester may also be used to determine the active acidity (pH) not only of the soil but also of any liquids or semi-liquids (e.g. of feeding stuffs) in the range from pH = 0 to 14.

MAIN MENU

SECTION 8

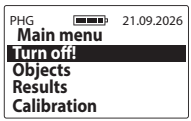
EN

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 the (ESC on/off) key.

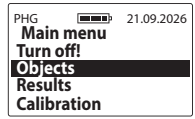
1. **Turn off!**

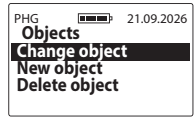
To turn off the device, go to the **Main menu** using the (ESC on/off) key, then use the (∨) or (∧) key to select the „**Turn off!**" option and confirm with the (OK) key.



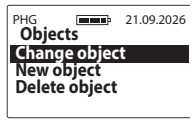
Thanks to this function, the user can quickly and conveniently turn off the device without the necessity to hold down the (ESC on/off) key for 5 seconds and wait for the power auto off option to activate.

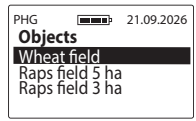
2. **Objects**





2 a) **Change object** – to change the object for which the results will be put into the directory, go to **Main menu / Objects / Change object** then use the (∨) or the (∧) key to select the appropriate object from the list and confirm with the (OK) key, e.g.

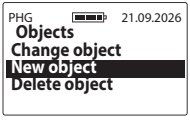


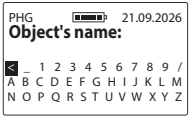


OThe object can also be changed directly in the measurement mode. To do this, activate the **„Save"** option using the (down arrow) key and then select the **„Change object"**.

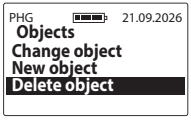
2 b) **New object** – to add a new object to the device's memory, go to **Main menu / Objects / New object**,

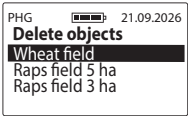
then enter any name by selecting characters using the arrows and confirming with the (OK) key (to clear the character select the "<" symbol and press the (OK) key). When the name is entered, press the (ESC on/off) key and when the „**Save the name?**" message appears, confirm with the (OK) lkey or cancel with the (ESC on/off), e.g.





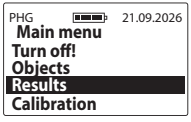
2 c) **Delete object** – to delete an object from the device's memory, together with the measurements saved for it, go to **Main menu / Objects / Delete object**, then select the appropriate object from the list and confirm with the (OK) key or cancel with the (ESC on/off) key (Note! The object and its 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.

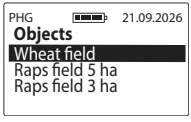




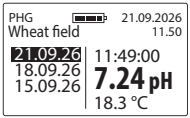
3. **Results**

Aby przeglądać wyniki zapisane w pamięci urządzenia należy wejść w **Main menu / Results** następnie za pomocą klawisza (∨) or (∧) key and confirm with the (OK) 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.





EN

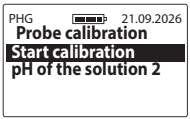


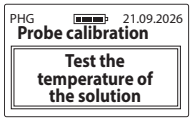
4. **Calibration**

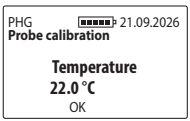
a) **Note!** – before calibration, we recommend reading sections 5 and 6.

4.1 **Probe calibration**

4.1 a) **Start calibration** – to start calibration of the pH--metric probe, enter **Main menu / Calibration / Probe calibration / Start calibration** and then follow the messages displayed on the screen, i.e. first test the temperature of the solution, therefore, insert the temperature probe alone to the bottle. Wait for the result to stabilize and confirm with the (OK) key (the temperature of a single solution is tested, therefore, it is recommended that solutions were stored in the same location, so that their temperature was similar), e.g.



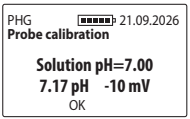




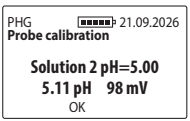
Attention! When using manual temperature compensation mode, the temperature test step is omitted and the pH calculation device will assume the temperature according to the value manually set in the menu (see section 4.2 b). Remember to always set the temperature according to the actual condition of the tested material.

After approval, remove the temperature probe and insert the pH-metric probe into the container with the buffer solution with pH = 7.00 (see section 5 and section 6 for

details). When the result approaches 7.00 and stabilizes, confirm with the (OK) key, e.g.

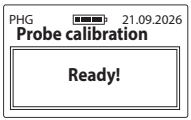


– Then remove the pH-metric probe from the bottle, flush thoroughly with distilled water and insert in the second container with the buffer solution with pH = 5.00. When the result approaches 5.00 and stabilizes, confirm with the (OK) key, e.g.

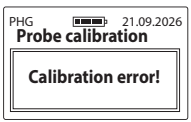


Note! If the use of the device requires calibration of a pH--metric probe on a solution with a different value than pH = 5.00, it can be changed in the menu (see section 4.1 b).

– If the calibration has been successful, the screen will display the **„Ready!"** message, indicating availability for measurements.



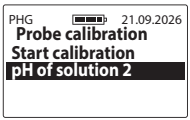
However, if the message **„Calibration error!"** appears, the measurements cannot be continued because the probe has not been calibrated correctly. This may be due to numerous reasons, e.g. the rubber cover was not removed from the diaphragm at the tip of the pH-metric probe; dirty or expired buffer solutions; incorrectly connected, worn or damaged pH-metric probe, etc.

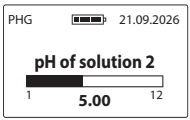


4.1 b) **pH of solution 2** – to change the value of the buffer solution used during calibration as the second

EN

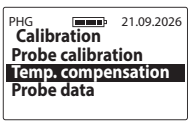
solution, enter **Main menu / Calibration / Probe calibration / pH of solution 2**, and then select the correct value using the ⌄ or the ⌃ key and confirm with the OK key, e.g.



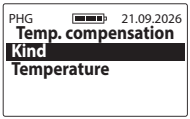


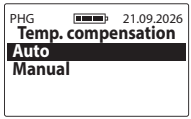
4.2) **Temperature compensation**

Note! Please see chapter 5 for differences between the automatic and manual temperature compensation.

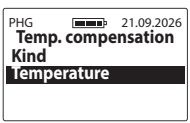


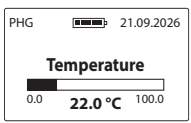
4.2 a) **Kind** – to change the type of temperature compensation, go to **Main menu / Calibration / Temperature compensation / Kind** then use the ⌄ or ⌃ key to select the appropriate function and confirm with the OK key, e.g.





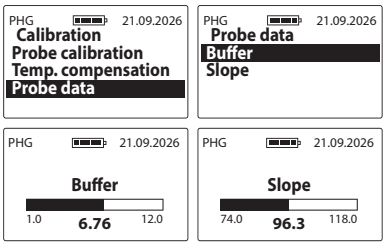
4.2 b) **Temperature** – his setting is very important if the manual type temperature compensation is set (cf. section 4.2 a). Before entering the temperature, make sure to examine the actual temperature of the tested material. To manually set the temperature included in pH measurements, go to **Main Menu / Calibration / Temperature compensation / Solution temperature** and then use the ⌄ or ⌃ key to select the corresponding value and confirm with the OK key e.g.





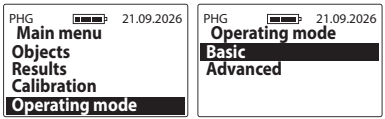
4.3) **Probe data** – to check the data of the pH-metric probe, go to **Main Menu / Calibration / Probe data**.

Here you can see view the parameters “Buffer” and “Slope” recorded during the last calibration of the pH-metric probe or you can enter them yourself according to the available range (manual change is recommended for advanced users only).

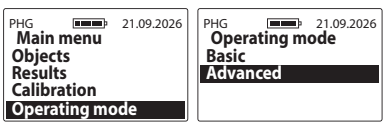


5. **Operating mode**

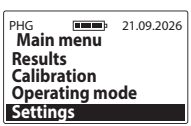
5.1) **Basic** – in order to facilitate the operation of the device and use only the basic menu functions, go to **Main menu / Operating mode**, then using the ⌄ or ⌃ key select the **Basic** option and confirm with the OK key, e.g.



5.2) **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 the ⌃ key select the **Advanced** option and confirm with the OK key, e.g.



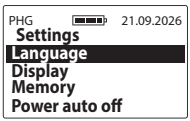
6. **Settings**

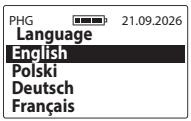


EN

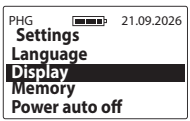
6.1 **Language**

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

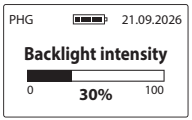




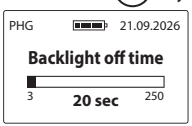
6.2 **Display**



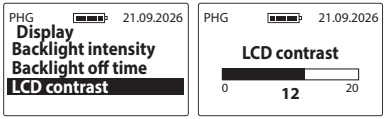
6.2 a) **Backlight intensity** – regulacja czasu po którym gaśnie podświetlenie wyświetlacza a urządzenie przechodzi w stan spoczynku czekając na ponowne użycie klawiatury (czas liczony jest od ostatniego kliknięcia/użycia klawisza na klawiaturze urządzenia). Aby zmienić czas podświetlenia należy wejść w **Main menu / Settings / Display / Backlight intensity**, then select the appropriate value using the ⌄ or the ⌃ key and confirm with the OK key, e.g.



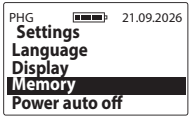
6.2 b) **Backlight off time** – adjustment of the time after which the backlight of the display is off and the device goes into the idle state waiting for the keyboard to be used again (the time is counted from the last click/use of the key on the keyboard of the device). To change the backlight off time, go to **Main menu / Settings / Display / Backlight off time**, then select the appropriate value using the ⌄ or the ⌃ key and confirm with the OK key, e.g.



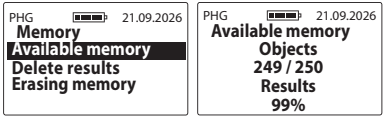
6.2 c) **LCD contrast** – to change the contrast of the LCD display, go to **Main menu / Settings / Display / LCD contrast**, then select the appropriate value using the ⌄ or the ⌃ key and confirm with the OK key, e.g.



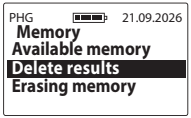
6.3 **Memory**



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

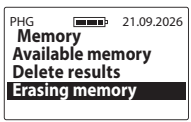


6.3 b) **Delete results** – to delete all results stored in the device's memory, go to the **Main menu / Settings / Memory / Delete temperature results** and confirm with the OK key. This option deletes the results from all probes saved in the device (the probes will not be deleted). **Note!** Examination 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.



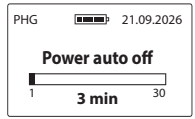
EN

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



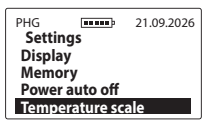
6.4 Power auto off

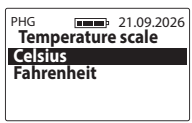
Adjustment of the time after which the device turns off automatically counting from the last click/use of the keyboard. To change the power auto off time, go to **Main menu / Settings / Power auto off**, then select the appropriate value using the (∨) or the (∧) key and confirm with the (OK) key, e.g.



6.5 Temperature scale

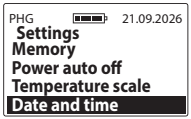
To change the temperature scale from Celsius to Fahrenheit or vice-versa, go to **Main menu / Settings / Temperature scale**, then select the appropriate scale using the (∨) or the (∧) key and confirm with the (OK) key, e.g.



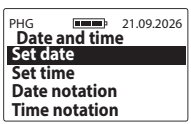


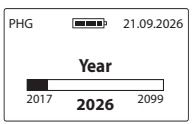
6.6 Date and time

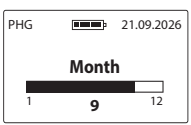
The device has a real time clock so that the measurement results are saved in memory together with the actual date and time of performance.

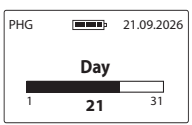


6.6 a) **USet date** – to set the current date, go to **Main menu / Settings / Date & time / Set date**, then use the ⌄ or the ⌃ key to select the appropriate value and press the OK key to confirm the year/month/day, e.g.

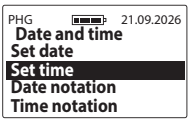


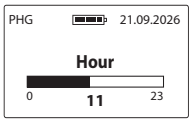


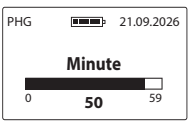




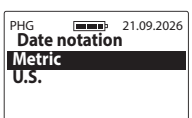
6.6 b) **Set time** – to set the current time, go to **Main menu / Settings / Date & time / Set time**, then use the ⌄ or the ⌃ key to select the appropriate value and press the OK key to confirm the hour/minute, e.g.





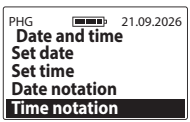


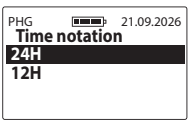
6.6 c) **Date notation** – to change the format of date display, go to **Main menu / Settings / Date & time / Date notation**, then use the ⌄ or the ⌃ key to select the appropriate option and confirm with the OK key, e.g.



EN

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





7. About

To check the device information and manufacturer's contact details, go to the **Main menu** using the ESC on/off key, then use the ⌄ or the ⌃ key to select the **About** option and confirm with the OK key.

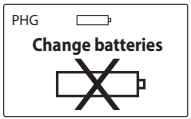
Here we can conveniently check e.g. model of the device, software version, serial number of the device as well as the address and contact details of Dramiński S.A. on page 2 e.g.

CHANGING BATTERIES

SECTION 9

EN

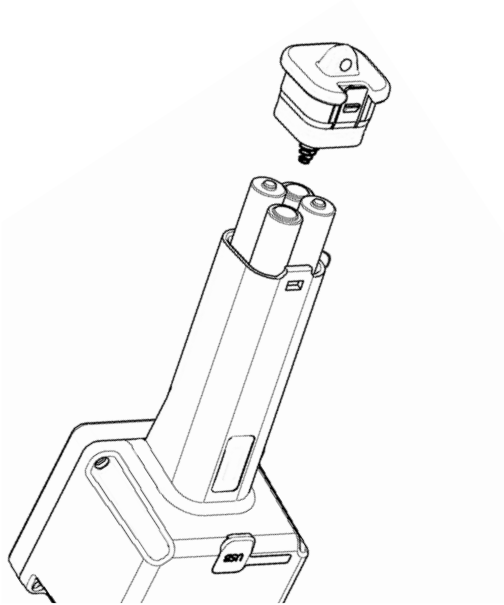
The device features an automatic indication that the battery is discharged. In this case, the „**Change batteries**" message in the form of a graphic symbol will be displayed immediately after turning on or during use and the device will automatically turn off.



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 10

EN

- The housing can be cleaned with a wet cloth using detergents. Do not use very hot water or boiling water during washing. Special care shall be taken not to soak the connectors used to connect the temperature probes.
- Please store the device in dry conditions at room temperature.
- Remember to install a rubber cover for the USB socket and the battery cover to minimise the risk of dirt and moisture.
- 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 performing the measurements, we recommend (before sending the device for service) contacting the manufacturer DRAMIŃSKI S.A. or a local 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 unauthorised persons, as this may cause unsealing of the device, permanent damage and will affect the warranty conditions.
- If the tester incorrectly reacts to the buffer solutions:
  – make sure that the electrode is immersed in the desired solution,
  – clean (rinse) the electrode according to the manufacturer's recommendations, as it may be contaminated,
  – store and condition the electrode properly as this could have been neglected,
  – check that the electrode has not been damaged. In such a case, replace it with a new one.

- If the probe has not been in operation for a longer period, clean it thoroughly and apply a rubber cover to the diaphragm (near the tip of the probe).
- Mechanical damage to the pH-metric electrode (breakage, etc.) and damage resulting from misuse are not subject to warranty!

TECHNICAL SPECIFICATION

SECTION 11

EN

Approximate weight	330 g (0.73 lb): reader (with batteries)/80 g (0.18 lb): temperature probe/60 g (0.13 lb): pH-metric probe
Approximate dimensions	reader: 20 x 8 x 7 cm (7.87″ x 3.15″ x 2.75″) / measuring probes: 16 cm (6.3″)
Measuring probes' cable length	110 cm (43.3″)
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 screen:	2.4″ LCD display with LED backlighting
Keyboard	membrane
Data transmission	via USB
Update	via USB
How to save data	internal memory
Memory capacity	250 objects/1 million measurements with date and time/20 language versions
Memory status check	from menu entry
Available units	pH, mV, °C, °F

pH measurement range	from pH = 0 to pH = 14
Voltage measurement range	±1500 mV
Temperature compensation	automatic and manual 0°C to 100°C / 32°F to 212°F
Temperature measuring range	from -55°C to +125°C / from -67°F to +257°F
pH-metric electrode operating temperature	from 1°C to 90°C / from 31.8°F to 194.0°F
Measurement resolution	0.01 pH/1 mV/0.1 °C/°F
pH measurement accuracy	±0.05 pH
Voltage measurement accuracy	1 mV (0.73 mV in pH measurement mode)
Temperature measurement accuracy	±0.5°C within the range from 0°C to 85°C / ±0.9°F within the range from 32°F to 185°F
Works with multiple temperature probes without any calibration necessary	yes
Automatic assessment of pH-metric probe suitability	yes
Limitations on the number of probes working with the reader	none
Possibility of disconnecting/replacing the measuring probe	yes
Need for periodic calibration by the manufacturer	no

Temperature sensor	digital
Temperature measurement method	touch
Connector type	BNC –pH-metric probe/RCA –temperature probe
Additional functions	real time clock, LED backlighting, display of mean/min/max result, pop-up menu with multiple device operation settings, possibility to change the calibration fluid value, recording of results, adding of objects for which indications will be assigned, viewing of saved indications, automatic and manual temperature compensation, software for data transmission and analysis (reports, graphs, printouts, archiving), independent software update, change of the temperature scale, measurements of pH, mV and temperature
Recommended operating temperature	from 10°C to 40°C / from 50°F to 104°F
Recommended storage temperature	from 5°C to 45°C / from 41°F to 113°F
EAN code	5906874410561
Place of manufacture	Poland
Manufacturer	Dramiński S.A.

DRAMIŃSKI
TECHNOLOGY

DRAMIŃSKI S.A.
Wiktora Steffena 21
11-036 Sząbruk, Poland
phone: +48 89 675 26 00
e-mail: dm@draminski.com

www.draminski.com
Instr. PHG2092026EN1.0