

Instruction manual

VWR[®] pH METER PH-130

EU Catalogue Number: 662-2351



Version: 1.0
Issued: 1, December, 2020



Legal Address of Manufacturer

VWR International bv
Researchpark Haasrode 2020
Geldenaaksebaan 464
B-3001 Leuven
+ 32 16 385011
www.vwr.com

Country of origin: Poland

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I. INTRODUCTION

1. PACKAGE CONTENT

1. **PH-130** pH meter.
2. Combination pH electrode with temperature probe.
3. pH 4,00 , pH 7,00, pH 10,00 buffer solution, 50 ml each.
4. Electrolyte – saturated KCl – 50 ml.
5. Plastic case.
6. 5V/1000mA power adapter.

2. EXPLOITATION NOTICES

Dear User!

We recommend a careful reading of the manual, in other case some of the features may stay unused or using the meter may be troublesome.

Using electrodes of good quality and replacing them after a suitable time ensures obtaining high measuring accuracy.

Clean electrode membrane is the main condition of correct readings. After each measurement the membrane should be rinsed with distilled water. Oil, pastes, grease, etc., should be removed according to the instructions provided in the electrode's manual.

We wish a pleasant and trouble-free work with our meter.

3. CHARACTERISTICS OF THE METER

Two kinds of power source: the rechargeable battery and the power adapter, enable work in the field and long-lasting measurements in laboratory. The meter's memory is independent from power supply. Waterproof housing enables working in difficult conditions. Minimised size and weight facilitate field work.

The most important features of **PH-130** are:

- high accuracy and stability;
- automatic and manual temperature compensation;
- automatic recognition of pH buffers;
- default values of buffer solutions;
- information about the pH electrode condition (buffer & slope value);
- storing of the calibration date and parameters of the electrode;
- possibility of introducing the time of calibration validity and signalling of its expiry;
- signalling of the reading stabilisation;
- storing measurement results with time, date and temperature;
- large LCD backlit display with brightness control and touchscreen;
- real time clock with date;
- automatic switch off after time set by the user.

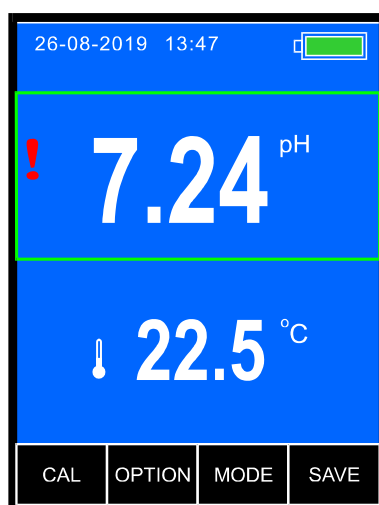
4. THE OUTSIDE VIEW

On the front wall of the meter there is a graphic LCD placed (Pic. 1), which displays the following readings:

- pH measurement or mV measurement in mV units;
- temperature measurement.

At the top of the LCD the current time and date are displayed.

Choosing particular functions is described in the chapter 17.1. Symbols of the units are displayed next to the reading.



Pic. 1.

The automatic temperature compensation is signalled by the  symbol, the manual compensation – by the  symbol (next to the temperature reading).

The exclamation symbol (Pic. 1.) is displayed on the left in the following situations marked with the colours:

- yellow** - electrode efficiency loss detected during the last calibration or the calibration validity date expired (see the chapter 11);
- red** - characteristic erase, the electrode calibration necessary.

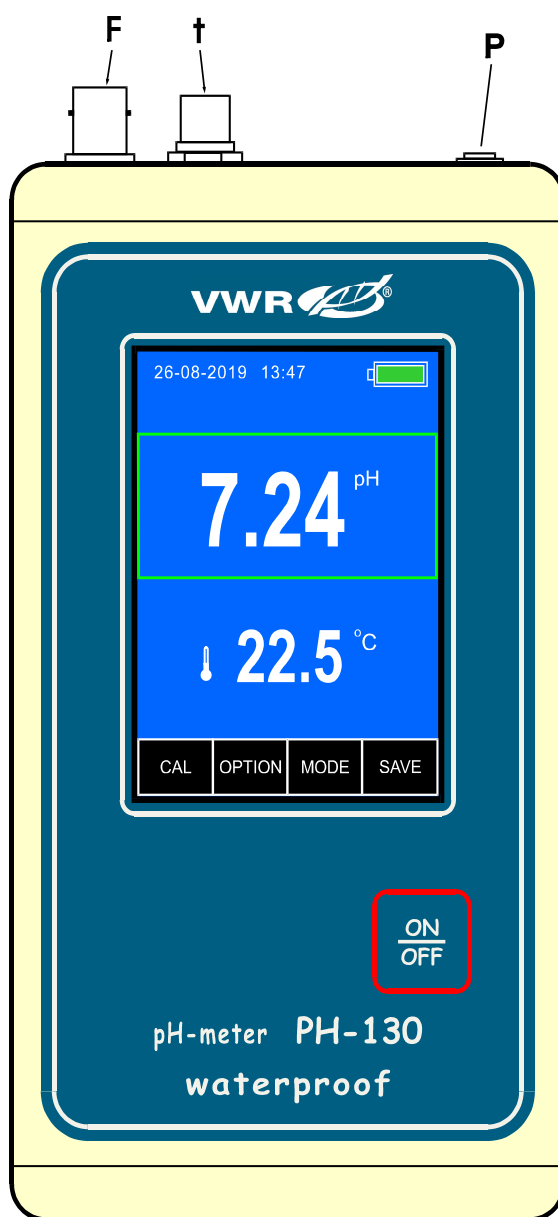
The rechargeable battery condition is signalled by the  symbol.

The  button (Pic. 2) placed below the display is used for switching the meter on and off.

In case of recording readings, the  button is locked until the recording process is stopped or finished.

In the upper wall of the meter connectors are placed with the symbols given below:

- F** - **BNC-50** input for connecting the combination pH or redox electrode;
- t** - **Chinch** (RCA) input to connect the temperature probe;
- P** - input for connecting the power adapter.



Pic. 2.

5. THE METER'S MAINTENANCE

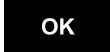
The meter is equipped with a graphic touchscreen. The maintenance consists in pressing particular keys and windows which appear on the screen. Grey captions in the windows and keys inform that these elements are not active in this particular operating mode. Particular keys, connected with the measurement function (i.e. **CAL** or **MODE**) become active after selecting the chosen function. To select, press the screen in a freely chosen spot of the chosen function. Around this spot a frame will be displayed. To deselect, press the spot again. If the chosen function has a possibility of calibration, the **CAL** key becomes active. If it has additional parameters, the **MODE** key also becomes active. The **CAL** key is the only key in the meter that responds exclusively to a long press (about 2 sec.). It prevents from accidental erase of the electrode calibration data.

Entering incorrect value, attempt of calibration when the meter doesn't recognise the standard are signalled by a triple warning sound, irrespective of the chosen sound settings.

6. SWITCHING THE METER ON AND OFF

After switching the meter on with the  button, the memory test proceeds. If the test ends successfully, the meter enters the measurement screen with settings entered before switching it previously off. In case of detecting the manufacturer's calibration data loss, the following information will appear:



Pressing the  button accepts standard manufacturer's calibration parameters and enters the measurement screen. Such situation will be repeating each time the meter is switched on and requires sending the meter to the manufacturer for servicing.

In case of the user's data loss (i.e. the pH electrode characteristic), the following information will appear:



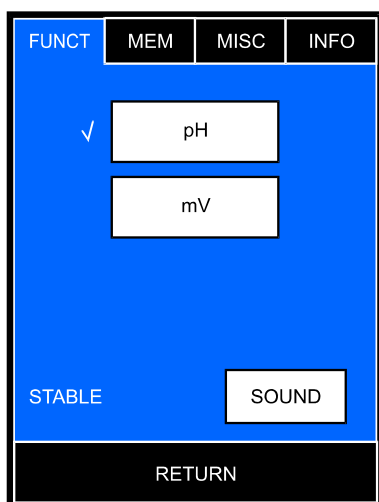
Pressing the  button accepts and records in the memory the standard pH electrode characteristic and enters the measurement screen. In such case, calibration of the pH electrode is necessary. Analogical situation occurs in case of other measuring functions. Repeating of the situation after switching the meter on again informs about the EEPROM memory malfunction and requires sending the meter to the manufacturer for servicing.

Switch the meter off by pressing the  button. If the meter is powered only by the rechargeable battery, it turns off after the time of non-use set by the user (description in the chapter 17.3). This function is deactivated during calibration, while memorising results or when work with the power adapter.

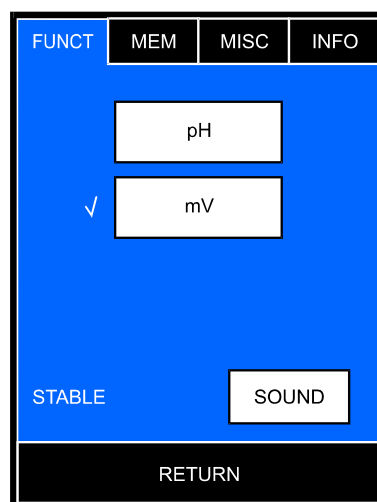
6.1. Choosing the measurement function

The user may choose the function (pH measurement or redox potential measurement in mV) to be displayed on measurement screen.

To choose, on the measurement screen press the **OPTION** button, the options screen will display with the **FUNCTIONS** tab open containing the previously set configuration (Pic. 3A).



A



B

Pic. 3

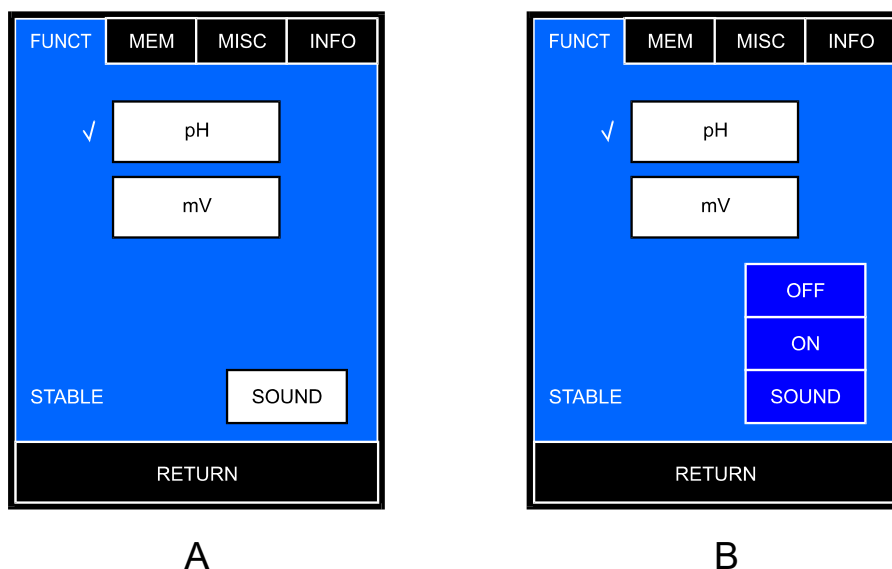
Choose the function by pressing the relevant window, next to the chosen window the marking symbol will appear (Pic. 3B).

Return to the measurement screen by pressing the **RETURN** button.

6.2. Stabilised reading

The stabilised reading signalisation is active only for the reading marked with a frame. If the measured value meets the criterium of the stabilised reading, it is signalised by green colour of the frame and additionally with a sound, if it has been activated. In this mode the meter does not record changes of the measured value in a certain range and does not display them. The meter leaves the stabilised reading mode after exceeding this range, the frame changes its colour to white and the meter displays the current measurement value.

To choose the stabilised reading signalisation, on the measurement screen press the **OPTION** button, the options screen will display with the **FUNCTIONS** tab open containing the previously set configuration (Pic. 4A).



Pic. 4

The window for choosing the stabilised reading signalisation mode is placed below (Pic. 4B):

- | | |
|--------------|--|
| OFF | - the stabilised reading signalisation is off; |
| ON | - the stabilised reading signalised with changing the frame colour from white to green (only for reading marked with a frame); |
| SOUND | - the stabilised reading signalised by colour change and a sound. |

Return to the measurement screen by pressing the **RETURN** button.

7. PREPARATION TO WORK

Before starting measurements:

- connect prepared combination pH electrode or redox electrode to the **F** (BNC-50) input;
- connect the temperature probe to the **t** (Chinch/RCA) temperature input;
- if work with power adapter is planned, connect it to the **P** input;
- switch the meter on by pressing the  button.

7.1. Choosing the kind of the temperature compensation

The meter switches itself to the automatic or manual temperature compensation mode. Connecting the temperature probe switches the automatic temperature compensation on. Next to the reading the  symbol is displayed. After disconnecting the probe the meter enters the manual temperature compensation mode. Instead of the  symbol the  is displayed. In case of the manual temperature compensation the temperature value is set on the temperature measurement parameters screen.

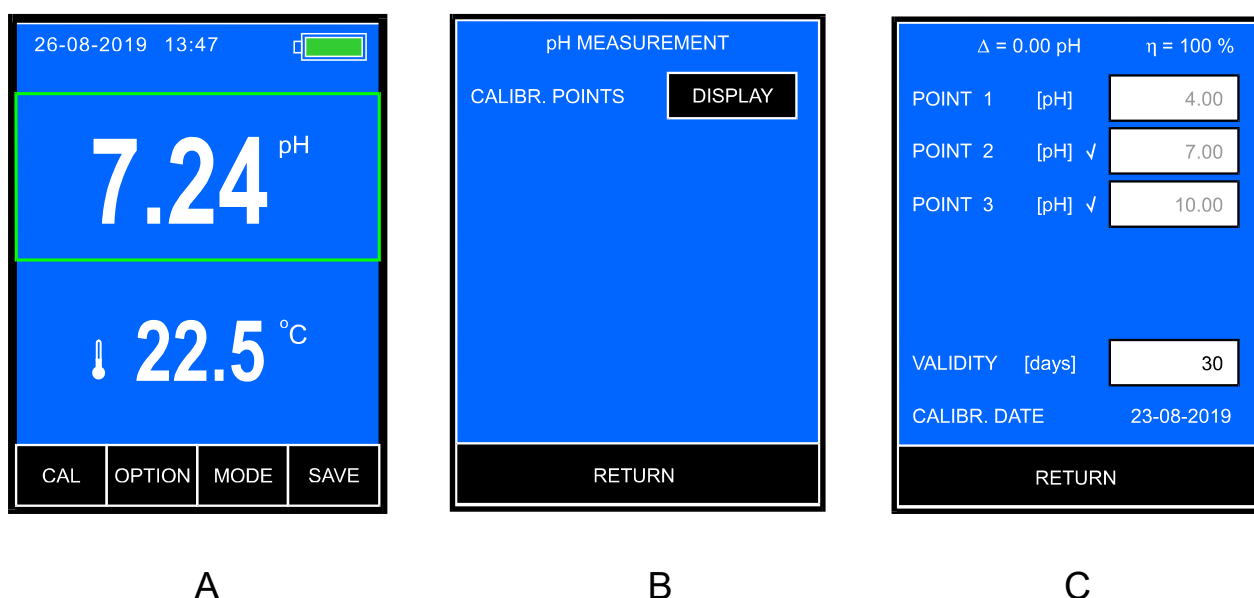
II. pH MEASUREMENT

8. PREPARATION OF THE pH ELECTRODE

The electrode should be prepared to work according to the manufacturer's instructions. It is crucial to keep the electrode's membrane clean, wash it accurately with distilled water after each measurement and gently dry with tissue paper.

9. THE pH MEASUREMENT PARAMETERS

Enter the pH measurement parameters screen by pressing the pH measurement result (a frame displays on it - Pic. 5A), and next the **MODE** button. The screen (Pic. 5B) enables viewing the buffer solution values and - after pressing the **DISPLAY** button - (Pic. 5C) the used calibration points and calibration validity time.



Pic. 5

Return to the measurement screen by pressing the **RETURN** button.

9.1. Calibration points and date

After pressing the **DISPLAY** button the following parameters are displayed (Pic. 5C): the electrode condition, calibration points, validity time and date of the last calibration. Markers next to the calibration points windows inform that the last calibration was performed in these particular solutions.

9.2. Calibration validity date

The meter stores the calibration validity time for the electrode. Expiry of this time is signalled with a yellow **!** symbol. To set the calibration validity time, press the **VALIDITY** window, the numerical keyboard will appear to enter the number of days and confirm it with the **OK** button.

10. CALIBRATION

Before starting measurement with a new electrode or before making measurements, which require high accuracy, the electrode connected with the meter should be calibrated. Results of the measurements made without the calibration will be burdened with a significant error. Calibration is made in buffer solutions of strictly defined values. It is based on comparing the buffer's value with the value displayed by the meter and next in automatic introduction of correction which is taken into consideration during next measurements. Calibration should be periodically repeated because the electrode's parameters may change during exploitation, what influences the accuracy. The frequency of this procedure depends on the demanded accuracy, the number of the measurements carried out, conditions in which the electrode was used, temperature and value of the measured solutions. In order to obtain good calibration results, the values of the applied buffers should be compliant with the default values in the meter. During the calibration process, after inserting the pH electrode and the temperature probe into the buffer, the meter detects the buffer's value.

When the highest accuracy is required, it is recommended to use fresh and certified buffer solutions.

The temperature affects the buffer solutions pH value. In order to provide pH buffer value corresponding to the default value in the meter, during the calibration process the buffer's temperature has to be equal 20 °C.

If the electrode symbol turns yellow after the calibration is finished, it informs that the electrode lost its efficiency and will have to be replaced soon. An additional information is shown on the electrode calibration points screen (description in the chapter 11).

Calibration in one solution does not guarantee high accuracy. If the accuracy requirements are not very high and the measurement is made in the whole measuring range one-point calibration should be made with use of 7.00 pH buffer solution. Thanks to this the error connected with the offset of the electrode will be eliminated.

At the rest of the points standard electrode's slope parameters from the meter's memory will be adopted. This slope corresponds to the theoretical efficiency of pH electrode. In case of accurate measurements in the whole range we recommend three-point calibration. In case of measurements in acids calibration in 2 buffer solutions: 4.00 and 7.00 pH is recommended, in case of alkali measurements calibration in 7.00 and 10.00 pH buffers is advisable. In **PH-130** the electrode characteristic is approximated linearly between the calibration points.

Entering the calibration mode erases the stored electrode's characteristic.

The erased characteristic is signalled by the red colour of the **!** symbol.

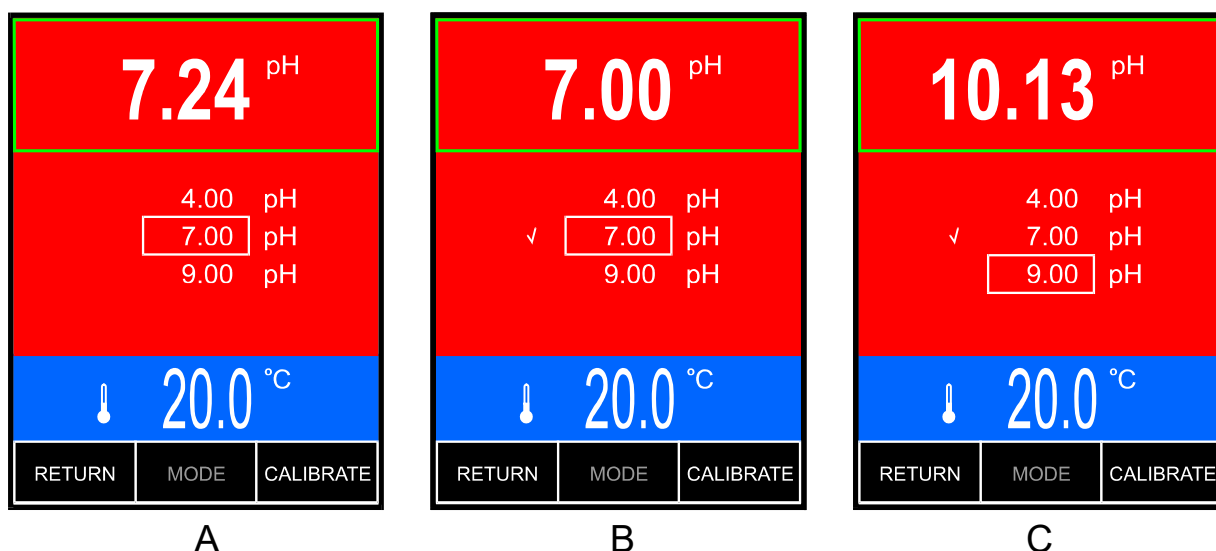
10.1. Calibration in buffer solutions

When the electrode is prepared for the measurement, start the calibration in the buffer solutions. The buffers may be applied randomly.

To start calibration:

- connect the pH electrode and temperature probe to the **F** and **t** connector respectively (Pic. 2);
- enter the calibration mode: on the measurement screen mark the pH result with a frame, press and hold the **CAL** button until the background turns red (Pic. 6.A). The previous electrode characteristic is erased;
- put the pH electrode and temperature probe into the solution; do not touch the vessel's walls and bottom. It is advisable to use an electrode holder. The meter will mark the detected buffer's value with frame;
- wait until the reading stabilises (it will be probably slightly different than the calibration point value).

When the reading stabilises, press the **CALIBRATE** button. Next to the detected buffer value an indicator will appear, what informs that the calibration value has been recorded. Simultaneously, the measurement value will be adjusted to the detected buffer value (Pic. 6.B). If the reading is still different than the solution value, wait until the reading stabilises and press the **CALIBRATE** button again.



Pic. 6.

If the meter does not detect the buffer's value, it will signalise an error after pressing the **CALIBRATE** button with a tripple warning sound. In such case check the solution value or the electrode as it may be broken.

Only the pH buffers values detected during calibration are calculated, the other values recorded earlier do not influence the reading.

After finishing calibration in the first buffer rinse the electrode and temperature probe (if used) in distilled water and start calibration in next buffers repeating the last point of the activities described above.

10.2. Calibration with manual temperature compensation

In case of the temperature probe breakdown, calibration with manual temperature compensation may be proceeded. To start this calibration, disconnect the temperature probe. It switches the meter to manual compensation. Next to the entered (not measured) temperature value instead of the  symbol the  symbol will appear. Entering the temperature value for the manual compensation is described in the point 15.2. Than act identically as in case of calibration with automatic temperature compensation, excluding the temperature probe connection.

In order to enter the temperature value, press the **MODE** window and in the open screen press the **MANUAL TEMP.** window, the numerical keyboard will appear to enter the value and confirm with the **OK** button.

11. CHECKING THE ELECTRODE CONDITION

After pH electrode calibration the meter calculates its parameters: offset in pH units and slope defined as efficiency in percents.

The electrode offset may be defined in pH or mV units.

An ideal electrode immersed in the 7.00 pH buffer before calibration should indicate 7.00 pH which equals 0.00 mV. If the reading is different, it informs that the electrode has an offset, which may be reduced by calibration.

The SEM parameter may be also checked by immersing the electrode in 7.00 pH buffer and switching the meter to measurement in mV.

When the electrode is calibrated, its condition may be checked. To check, enter the calibration points screen according to description in the point 9.1. At the top of the screen (Pic. 5C) two parameters, determined during the last calibration are displayed: Δ (zero offset in pH) and η (condition in %).

In case of the electrode condition loss, the zero and condition parameter are displayed in yellow; in case of calibration validity date expiry if the last calibration date is also displayed in yellow.

In case of one-point calibration, only the zero offset parameter is displayed.

12. pH MEASUREMENT

Before starting the measurement the meter and the pH electrode have to be prepared for work (chapters 7 and 8 respectively). Good condition of the electrode is crucial for obtaining the correct readings.

12.1. Measurement with automatic temperature compensation

- turn the meter on by pressing the  button;
- connect the temperature probe and the combination pH electrode to the **F** and **t** connectors respectively (Pic. 2), the  symbol will be displayed;
- immerse the electrode and the temperature probe in the measured solution. During measurements in vessels don't touch the bottom and the walls with the electrode. It is advisable to use an electrode stand;
- after stabilisation read the result.

Accurate laboratory measurements require using of a magnetic stirrer.

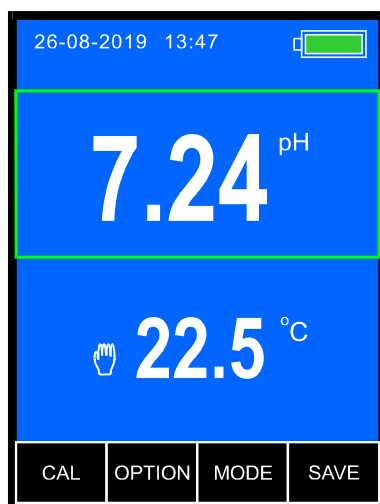
NOTE: exceeding the measurement range is signalised with red colour of the displayed pH value; exceeding the temperature compensation range – with yellow colour.

12.2. Measurement with manual temperature compensation

Disconnecting the temperature probe from the meter switches the meter to the manual temperature compensation mode. Next to the entered (not measured) temperature value, instead of the  symbol, the  symbol displays (Pic. 7). The procedure of measurement with manual temperature compensation is similar to that of measurement with ATC. The difference is in entering the solution temperature value. This value is displayed in place of the measured temperature and is compensated.

In case of measurement with manual temperature compensation:

- turn the meter on with the  button;
- insert the pH electrode into the vessel with the measured solution; if the electrode is not calibrated or has already been in use for a long period of time, perform the calibration (chapter 10). During measurements in a vessel don't touch its bottom and walls with the electrode. It is advisable to use an electrode stand;
- measure the temperature of the solution with use of a laboratory thermometer and enter the value. To do so, press the **MODE** window and in the open screen press the **MANUAL TEMP.** window, the numerical keyboard will appear to enter the value and confirm with the **OK** button;
- wait till the value stabilises and read the result.

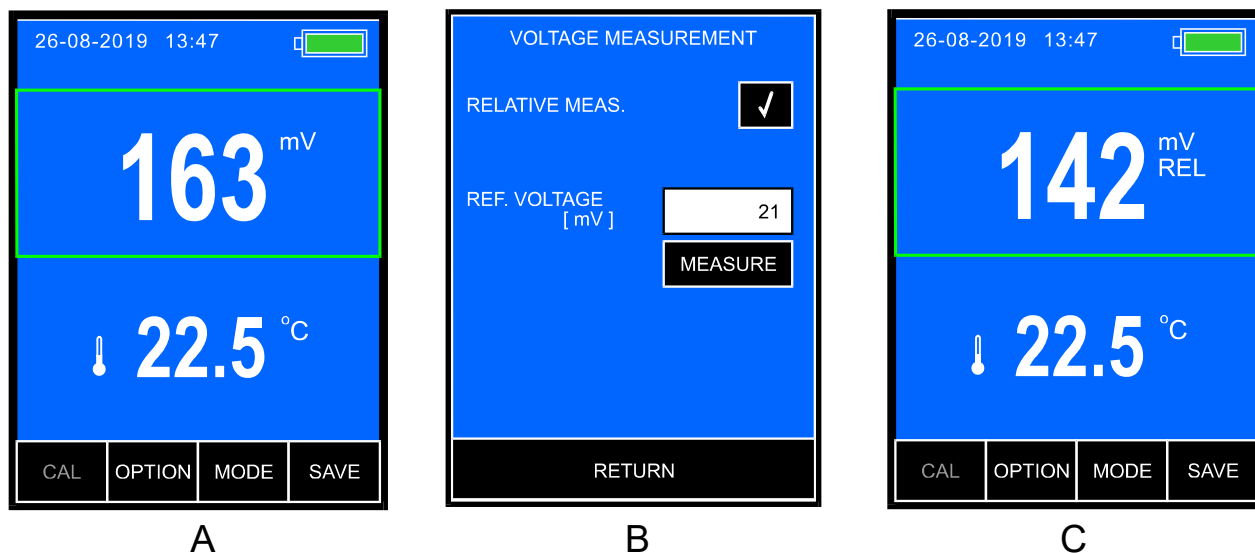


Pic. 7

III. REDOX POTENTIAL AND TEMPERATURE MEASUREMENT

13. SETTING THE REDOX POTENTIAL PARAMETERS

The redox potential parameters window is entered by selecting the redox potential reading (a frame will be displayed around it – Pic. 8A) and the **MODE** button. The screen (Pic. 8B) enables choosing the reference temperature and setting the zero offset for the relative measurement.



Pic. 8

After setting the parameters return to the measurement screen by pressing the **RETURN** button.

If the relative measurement has been chosen, next to the redox value the REL symbol will appear (Pic. 8C). The difference between the redox potential value and the reference value is displayed.

13.1. Relative measurement

The meter enables relative measurement of the redox potential. To make measurement, on the redox potential parameters screen (Pic. 8B) select the **RELATIVE MEAS** window. Pressing the window again turns the relative measurement off.

In case of choosing the relative measurement the **REL** symbol will be displayed on the right side of the reading. The displayed reading is a difference between the measured and the reference voltage value.

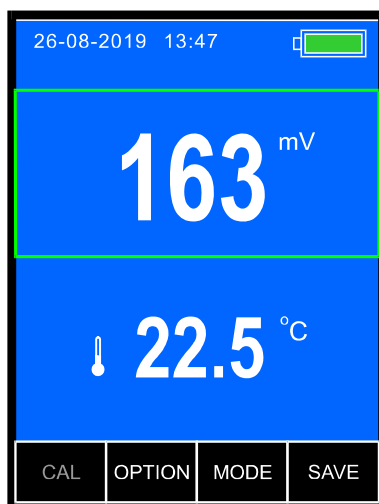
13.2. Reference voltage

After choosing the relative measurement the **REF. VOLTAGE** window appears to enter the reference voltage value. To enter, press the **REF. VOLTAGE** window, the numerical keyboard will appear to enter the reference voltage value and confirm with the **OK** button. To enter the current reference voltage value, press the **MEASURE** button during the measurement process, the currently measured voltage value will be entered into the **REF. VOLTAGE** window automatically.

14. REDOX POTENTIAL MEASUREMENT

The measurement may be made with redox electrode or during titration. To make measurement:

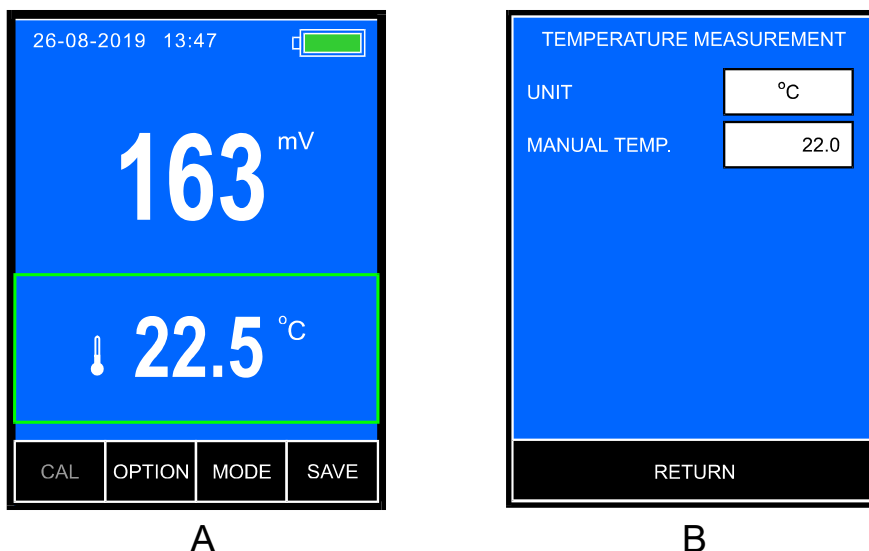
- turn the meter on by pressing the **ON OFF** button;
- choose the redox potential measurement to be displayed on the measuring screen according to the point 6.1;
- enter the measurement parameters according to the point 13;
- return to the measurement screen by pressing the **RETURN** button and check the reading (Pic. 9).



Pic. 9.

15. SETTING THE TEMPERATURE MEASUREMENT PARAMETERS

The temperature measurement parameters window is entered by selecting the temperature reading with a frame (Pic. 10A) and next pressing the **MODE** button (Pic. 10B). The screen enables choosing unit and entering the manual temperature compensation value.



Pic. 10

After setting the parameters return to the measurement screen by pressing the **RETURN** button.

15.1. Unit

The temperature reading may be displayed in °C, K or °F. By pressing the **UNIT** window choose the measurement unit.

15.2. Temperature of the manual compensation

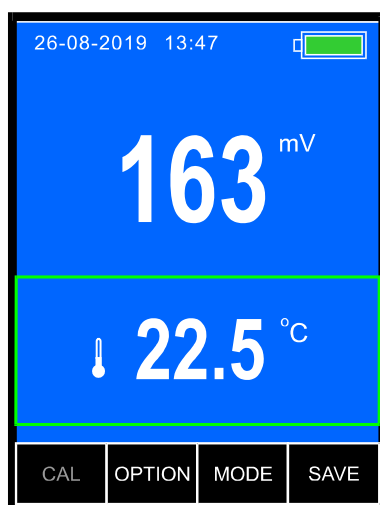
After disconnecting the temperature probe the meter switches it self to the manual compensation automatically and calculates the entered temperature value. To enter this value, press the **MANUAL TEMP.** window, the numerical keyboard will appear to enter the value and confirm with the **OK** button.

16. TEMPERATURE MEASUREMENT

Follow the instructions:

- turn the meter on by pressing the  button
- connect the temperature probe to the Chinch connector, the  symbol will appear on the screen;
- immerse the temperature probe into the solution;
- wait till the value stabilises and read the result.

The meter cooperates with Pt-1000 platinum resistor sensor and the final accuracy of the temperature measurement depends on the sensor's class.



Pic. 11

NOTE: break in the temperature probe's circuit switches the meter to the manual temperature compensation mode. It is signalled by change of the  symbol to the  symbol. Instead of the measured temperature value, the value inserted by the user is displayed.

Displaying of -50°C value in red while making measurement at positive temperature informs about short circuit in the temperature probe.

IV. OPTIONS

17. OPTIONS SCREEN

Enter the options screen by pressing the **OPTION** button in the measurement screen. The **OPTIONS** screen contains the following tabs:

- FUNCT.** - choose the measurement functions (pH/mV) to be displayed on the measurement screen and activate the stabilised reading signalisation mode;
- MEM.** - view the memorised measurement results;
- MISC.** - choose the language, set the economical mode, time and date;
- INFO** - check the software version, the serial number and the factory calibration date.

17.1. Functions

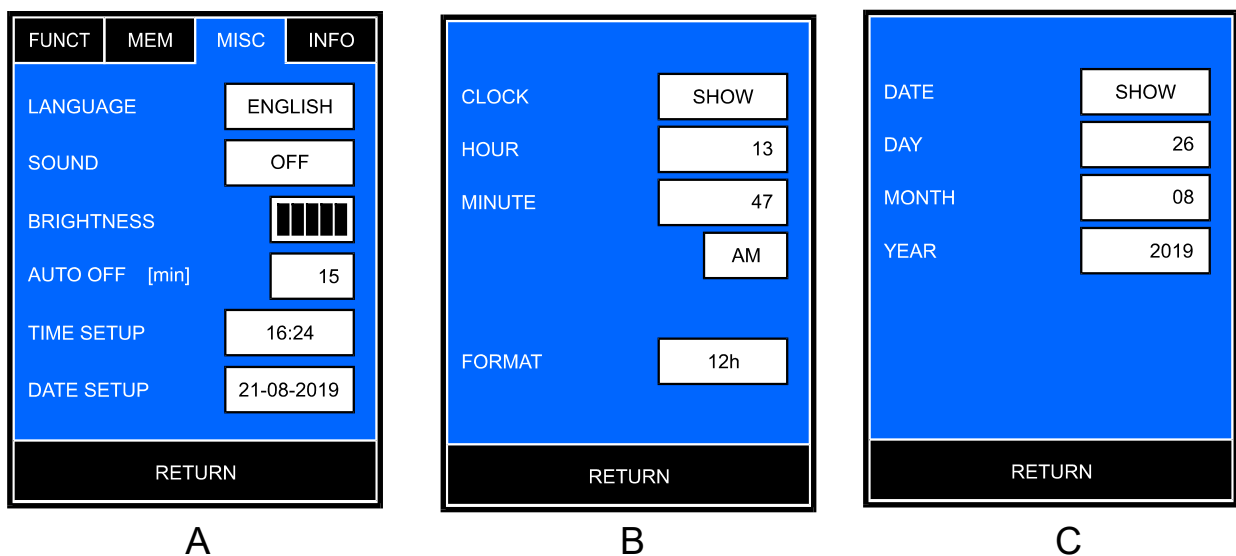
For the description of the **FUNCT.** tab, see the chapter 6.1.

17.2. Memory

For the description of the **MEM.** tab, see the chapter 18.

17.3. Miscellaneous

On this screen (Pic. 12A) the following parameters may be entered:



Pic. 12

- | | |
|------------|---|
| LANGUAGE | - choosing the language: English, German, French, Italian, Spanish, Portuguese; |
| SOUND | - turning the buttons sound on / off; |
| BRIGHTNESS | - setting the display's brightness; |
| AUTO OFF | - the time of non-use until the meter turns off; |
| TIME SETUP | - after pressing the TIME SETUP window the screen will appear (Pic. 12B) to turn the time displaying on / off, choose the 12 / 24 clock mode and set the current time; |
| DATE SETUP | - after pressing the DATE SETUP a screen will appear (Pic. 12C), where the date display may be turned on/off and the current date may be set; |

To choose the language, set sound or brightness, press the chosen window, a table will appear to choose the value.

To enter a numerical value, press the chosen window, a numerical keyboard will appear to enter the value and confirm with the  button.

17.3.1. Automatic switch-off

Automatic switch-off mode prolongs an operating time with rechargeable batteries and prevents from discharging in case when the meter has been unintentionally left in operation.

The automatic switch-off mode is active only while working with the rechargeable batteries.

The function is deactivated for calibration and work with the power adapter.

Entering a zero value for the **AUTO OFF** parameter deactivates this mode entirely.

17.3.2. Setting the brightness and lighting time

The brightness settings are very important while working in the field. Choose one of five brightness modes. The table below shows the influence of the brightness settings to the meter's operating time (for NiMH rechargeable batteries with a capacity of 2000mAh).

backlight	continuous operating time
brightness 	55 h
brightness 	45 h
brightness 	35 h
brightness 	30 h
brightness 	26 h

17.4. Info

The INFO tab contains the software version, the serial number and the factory calibration date (Pic. 13).



Pic. 13.

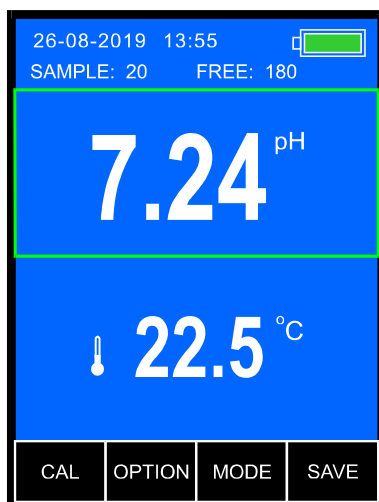
Return to the measurement mode by pressing the **RETURN** button.

18. MEMORISING READINGS, MEMORY READOUT

The meter enables recording readings of the displayed measurement functions. The readings are stored in memory even in case of power shortage.

18.1. Entering readings into the memory

Each press of the **SAVE** button memorises the reading. The information about the free and used memory capacity will display for a short time above the reading (Pic. 14). Before the readings collecting is started, the memory content may be deleted according to the next subchapter.

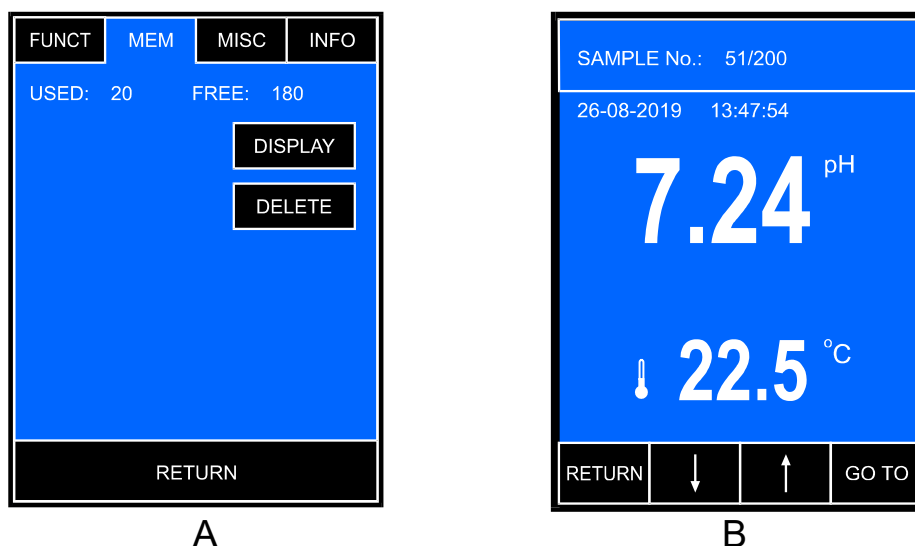


Pic. 14

18.2. Viewing and deleting readings

The stored readings may be viewed on the meter's screen. Follow the instructions:

- on the measurement screen press the **OPTION** button and choose the **MEM** tab on the options screen. A screen will appear with information about the memory usage and the **DISPLAY** and **DELETE** buttons (Pic. 15A);



Pic. 15

- press the **DISPLAY** button. A screen with the stored readings will display (Pic. 15B);
 - change the displayed sample number with the $\downarrow$, $\uparrow$ buttons;
- or
- press the **GO TO** button, a numerical keyboard will be displayed to enter the number of the chosen sample and confirm with the **OK** button.

To erase the memory content, in the **MEM** tab on the options screen (Pic. 15A) press and hold the **DELETE** button until in the line above the button the following information will display:

USED: 0 **FREE: 200.**

Return from the viewing mode by pressing the **RETURN** button.

19. POWER, REPLACING THE RECHARGEABLE BATTERIES

The meter is powered by two R6 (AA) rechargeable batteries or by power adapter with stabilised 5V voltage, which has to be connected to the **P** connector (Pic. 2). The batteries are necessary in order to keep the clock working. The degree of filling the  symbol in the top right corner of the LCD informs about the condition of the batteries. Red  symbol informs that charging is necessary. When the voltage drops below the minimal value, the meter turns it self automatically off. After connecting the power adapter the charging process begins, what is signalised by filling up the  symbol. When the symbol is displayed continuously, the charging process is finished. The meter may work while being charged. In order to replace the batteries, it is necessary to unscrew two screws in the lower wall of the meter, pull out the container with batteries and replace them, paying attention to insert the batteries according to their polarity. Next, put the new batteries into the meter and mount the wall. The wall has a sealing ring on the edge. While closing the meter, it is very important to pay attention to it - the ring should be put inside the housing in the whole perimeter. Next, screw in the screws till the moment of resistance (not too hard). Leaving the wall improperly sealed may cause the meter's flooding. This kind of failure is not repaired under the warranty conditions.

Caution: application of batteries instead of rechargeable batteries when using the power adapter may result in fire and damage the meter.

20. TECHNICAL DATA

pH MEASUREMENT:

range	resolution	accuracy (±1 digit)
0.00 ÷ 14.00 pH	0.01 pH	±0.01 pH

Input impedance:	>10 ¹² Ω
Temperature compensation:	manual/automatic
Compensation range:	-5.0 ÷ 110.0 °C
pH electrode calibration:	automatic, in 1 ÷ 3 points
pH electrode calibration range:	
Offset:	±0.7 pH
Efficiency:	85 % ÷ 105 %
Thermal stability of zero:	0.001 pH/ °C

mV MEASUREMENT:

range	resolution	accuracy (±1 digit)
-2000.0 ÷ 2000.0 mV	1 mV	±1 mV

Input impedance:	>10 ¹² Ω
Relative measurement range:	±3999.9mV

TEMPERATURE MEASUREMENT:

range*	resolution	accuracy** (±1 digit)
- 50.0 ÷ 200.0 °C	0.1 °C	±0.1 °C

* The accessories connected to the meter may have narrower working temperature range.

** Accuracy given for the meter. The final accuracy depends on the type of Pt-1000 probe.

Temperature probe:	Pt-1000 platinum resistor
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The probe's accuracy in range 0 ÷ 100 °C:	
for Pt1000B resistor	±0.8 °C
for Pt1000A resistor	±0.35 °C

OTHER:

MEMORY CAPACITY:	200 results
OPERATING TEMPERATURE:	-5 ÷ 45 °C
POWER SUPPLY:	AA NiMH rechargeable battery x 2 5V/1000mA power adapter
POWER CONSUMPTION:	
0% brightness	70 mW
100% brightness	180 mW
recharging batteries	max. 2.4 W
DISPLAY:	LCD 2.8" 240 x 320
DIMENSIONS:	149 x 82 x 22 mm
WEIGHT:	260 g (with rechargeable batteries)

21. ORDERING INFORMATION

EPH-1t	plastic pH electrode with a built in temp. Sensor & 1 meter cable	662-2353
REG-1	glass ORP (redox) electrode 1 meter cable	662-2357
TS-2B	stainless steel temperature sensor 1meter cable	442-1264
Buffer solutions, 20 °C AVS TITRINORM:		
pH 4	100 ml plastic bottles	32095.184
	500 ml plastic bottles	32095.264
pH 7	100 ml plastic bottles	32096.187
	500 ml plastic bottles	32096.267
pH 10	100 ml plastic bottles	32040.185
	500 ml plastic bottles	32040.260
Storage solution Potassium chloride 3 mol/l (3 N) in Aqueous solution AVS TITRINORM 100 ml Plastic bottle		
		83605.180
EH-10	Electrode holder	662-2352

22. TECHNICAL SERVICE

Web Resources

Visit the VWR website at www.vwr.com for:

- Complete technical service contact information
- Access to the VWR Online Catalogue, and information about accessories and related products
- Additional product information and special offers

Contact us For information or technical assistance contact your local VWR representative or visit. www.vwr.com.

23. WARRANTY

VWR warrants that this product will be free from defects in material and workmanship for a period of two (2) years from date of delivery. If a defect is present, VWR will, at its option and cost, repair, replace, or refund the purchase price of this product to the customer, provided it is returned during the warranty period. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, or from ordinary wear and tear. If the required maintenance and inspection services are not performed according to the manuals and any local regulations, such warranty turns invalid, except to the extent, the defect of the product is not due to such non-performance.

Items being returned must be insured by the customer against possible damage or loss. This warranty shall be limited to the aforementioned remedies. IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY.

Compliance with local laws and regulations

The customer is responsible for applying for and obtaining the necessary regulatory approvals or other authorisations necessary to run or use the Product in its local environment. VWR will not be held liable for any related omission or for not obtaining the required approval or authorisation, unless any refusal is due to a defect of the product.

24. EQUIPMENT DISPOSAL



This equipment is marked with the crossed out wheeled bin symbol to indicate that this equipment must not be disposed of with unsorted waste. Instead it's your responsibility to correctly dispose of your equipment at lifecycle -end by handling it over to an authorized facility for separate collection and recycling. It's also your responsibility to decontaminate the equipment in case of biological, chemical and/or radiological contamination, so as to protect from health hazards the persons involved in the disposal and recycling of the equipment.

For more information about where you can drop off your waste of equipment, please contact your local dealer from whom you originally purchased this equipment.

By doing so, you will help to conserve natural and environmental resources and you will ensure that your equipment is recycled in a manner that protects human health.

Thank you

Your Distributor

AUSTRIA

VWR International GmbH
Graumannsgasse 7
1150 Vienna
Tel.: +43 01 97 002 0
Email: info.at@vwr.com

BELGIUM

VWR International bv
Researchpark Haasrode 2020
Geldenaaksebaan 464
3001 Leuven
Tel.: +32 016 385 011
Email: vwr.be@vwr.com

CHINA

VWR (Shanghai) Co., Ltd
Bld.No.1, No.3728 Jinke Rd,
Pudong New District
Shanghai, 201203- China
Tel.: 400 821 8006
Email: info_china@vwr.com

CZECH REPUBLIC

VWR International s. r. o.
Veetee Business Park
Pražská 442
CZ - 281 67 Stříbrná Skalice
Tel.: +420 321 570 321
Email: info.cz@vwr.com

DENMARK

VWR International A/S
Tobaksvejen 21
2860 Søborg
Tel.: +45 43 86 87 88
Email: info.dk@vwr.com

FINLAND

VWR International Oy
Valimotie 9
00380 Helsinki
Tel.: +358 09 80 45 51
Email: info.fi@vwr.com

FRANCE

VWR International S.A.S.
Le Périgares – Bâtiment B
201, rue Carnot
94126 Fontenay-sous-Bois cedex
Tel.: 0 825 02 30 30* (national)
Tel.: +33 (0) 1 45 14 85 00 (international)
Email: info.fr@vwr.com
* 0,18 € TTC/ min + prix appel

GERMANY

VWR International GmbH
Hilpertstraße 20a
D - 64295 Darmstadt
Freecall: 0800 702 00 07
Tel.: +49 (0) 6151 3972 0 (international)
Email: info.de@vwr.com

HUNGARY

VWR International Kft.
Simon László u. 4.
4034 Debrecen
Tel.: +36 (52) 521-130
Email: info.hu@vwr.com

INDIA

VWR Lab Products Private Limited
No.139. BDA Industrial Suburb,
6th Main, Tumkur Road, Peenya Post,
Bangalore, India – 560058
Tel.: +91-80-28078400
Email: vwr_india@vwr.com

IRELAND / NORTHERN IRELAND

VWR International Ltd / VWR
International (Northern Ireland) Ltd
Orion Business Campus
Northwest Business Park
Ballycoolin
Dublin 15
Tel.: +353 01 88 22 222
Email sales.ie@vwr.com

ITALY

VWR International S.r.l.
Via San Giusto 85
20153 Milano (MI)
Tel.: +39 02-3320311
Email: info.it@vwr.com

KOREA

VWR International ~
17, Daehak 4-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do
Tel.: +82 31 645 7256
saleskorea@avantorsciences.com

MIDDLE EAST & AFRICA

VWR International FZ-LLC
DSP Laboratory Complex
125, Floor 01
Dubai, United Arab Emirates
Tel.: +971 4 5573271
info.mea@vwr.com

THE NETHERLANDS

VWR International B.V.
Postbus 8198
1005 AD Amsterdam
Tel.: +31 020 4808 400
Email: info.nl@vwr.com

NORWAY

VWR International AS
Brynsalleen 4
0667 Oslo
Tel.: +47 22 90 00 00
Email: info.no@vwr.com

POLAND

VWR International Sp. z o.o.
Limbowa 5
80-175 Gdansk
Tel.: +48 058 32 38 200
Email: info.pl@vwr.com

PORTUGAL

VWR International –
Material de Laboratório, Lda
Centro Empresarial de Alfragide
Rua da Indústria, nº 6
2610-088 Amadora
Tel.: +351 21 3600 770
Email: info.pt@vwr.com

SINGAPORE

VWR Singapore Pte Ltd
18 Gul Drive
Singapore 629468
Tel: +65 6505 0760
Email: sales.sg@vwr.com

SPAIN

VWR International Eurolab S.L.
C/ Tecnología 5-17
A-7 Llinars Park
08450 - Llinars del Vallès
Barcelona
Tel.: +34 902 222 897
Email: info.es@vwr.com

SWEDEN

VWR International AB
Fagerstagatan 18a
163 94 Stockholm
Tel.: +46 08 621 34 00
Email: info.se@vwr.com

SWITZERLAND

VWR International AG
Lerzenstrasse 16/18
8953 Dietikon
Tel.: +41 044 745 13 13
Email: info.ch@vwr.com

UK

VWR International Ltd
Customer Service Centre
Hunter Boulevard
Magna Park
Lutterworth
Leicestershire
LE17 4XN
Tel.: +44 (0) 800 22 33 44
Email: uksales@vwr.com