Manual

PH-T

pH and mV simulator
for pH/ORP meters and
pH/ORP sensors

DR. A. KUNTZE

GUTES WASSER MIT SYSTEM

Dr. A. Kuntze GmbH
Robert-Bosch-Str. 7a
D-40668 Meerbusch
Tel. +49-21 50-70 66-0
Fax +49-21 50-70 66-60
info@kuntze.com
www.kuntze.com

Vertrieb / sales:
georg.wilholm@kuntze.com
+49-21 50-70 66-11

Your PH-T

Is an easy-to use tester and an invaluable tool for trouble-shooting. It can play the role of either instrument or sensor and thus allows yolu to verify the function of both instruments and sensors.

Trouble with pH measurements is often tackled by simply replacing the sensor - an expensive solution, and not always effective. A quick check with the PH-T shows you whether the trouble is really located in the sensor.

On the other hand, the PH-T can be used as an ideal sensor to check instruments and cable connections. No need for buffer solutions - the PH-T simulates electronically the measuring signals a sensor would give in various solutions. Select arbitrary test values, either in mV or in pH.

Last not least you can verify the high resistance required for pH measurements within the whole measuring system by simply pushing a button.

Operation is easy: just choose between testing a sensor or testing an instrument.

The handheld instrument can be used with batteries or rechargeables and provides a recharging function. A start delay prevents accidental activation during transport.

With the PH-T you have certainly made a good choice. And if through using it you have become curious to see some of the other products of Dr. A. Kuntze, have a look at our web site www.kuntze.com or just give us a call - we would be delighted to help you!

Content

1. Instrument test ORP

1 - Connect

Connect the PH-T via the adapter to the ORP cable of your instrument.

2 - Switch on

Switch on the PH-T by pressing key “ON“ for 5 seconds.

NOTE **Switch-on is delayed to prevent accidental activation during transport.**

3 - Test

Test in progress - if your instrument is working fine, it displays now the same value that is shown in the display of the PH-T.

By use of the scroll keys of the PH-T you can set an arbitrary value within +/-1500mV. Your instrument must react within a few seconds to any changes and finally show the same value as the PH-T.

NOTE **If you press a scroll key once, the value increases or decreases by 1 . Hold it, and the value starts changing continuously, first slowly, then faster.**

2. Instrument test pH

1 - Connect

Connect the PH-T via the adapter to the pH cable of your instrument.

2 - Switch on

Switch on the PH-T by pressing key “ON“ for 5 seconds.

NOTE **Switch-on is delayed to prevent accidental activation during transport.**

3 - Select pH

Press the key labeled “F“ once to switch to the pH mode. Values are now displayed as pH, indicated by “pH“ in the upper right-hand corner.

4 - Test / Calibration

For correct pH measurements, calibration is required with every new sensor. In this test, the PH-T plays the role of the sensor. Therefor, carry out a calibration of your instrument as if the PH-T were a regular pH electrode. Fortunately, with the PH-T you do not need any calibration solutions.

Adjust the value of the PH-T to the pH value of the buffer solution you usually use, for e.g. pH 7. Calibrate your instrument. Adjust the value of the PH-T to the pH value of the second calibration solution, for e.g. pH 4, and calibrate your instrument again.

If your instrument works fine, then it will show now the same value as the PH-T, and the calibration results were: a slope of 58 mV/pH, and a zero point of 0mV.

5 - Test

By use of the scroll keys of the PH-T you can set an arbitrary value within pH 0 - 14. Your instrument must react within a few seconds to any changes and finally show the same value as the PH-T.

NOTE **If you press a scroll key once, the value increases or decreases by 1 . Hold it, and the value starts changing continuously, first slowly, then faster.**

NOTE **You do not want to calibrate? No problem. Many pH instruments provide a mV display, for e. g. in the service menue, or can be switched to ORP measurement. In both cases you can use the mV mode of the PH-T and compare the mV values without calibration.**

2.1 High resistance test

This test is only carried out with pH instruments. The high electric resisitance of the pH glass electrode requires an equally high resistance wihtin the whole measuring system. If the reistance drops, for e. g. due to humidity, the measurement becomes unstable and tends to drift or wave.

To test the high resistance of the instrument and the cable, the PH-T is equipped with an even higher internal resistance that can be activated with the key labelled “MegaΩ“.

If the resistance is high enough throughout your measuring system, the activation has no effect - the values displayed by the instrument and the PH-T remain more or less unchanged. If not, then the value will decrease drastically.

1 - Connect

Connect the PH-T via the adapter to the pH cable of your instrument.

2 - Switch on

Switch on the PH-T by pressing key “ON“ for 5 seconds.

NOTE **Switch-on is delayed to prevent accidental activation during transport.**

3 - Adjust value

Stay in the mV mode. Adjust the value to approx. 300mV. Your pH instrument should show now approx. pH 2.

4 - High resistance test

Press the key labelled “MegaΩ“. “MΩ“ in the display indicates that the high resistance has been activated.

Focus on the value displayed by the PH-T: if it drops significantly, e. g. to approx. half its original value, then the measuring system does not provide the required high resistance.

NOTE **Often the cable rather than the instrument is the source of loss in resistance - to make sure, repeat the test with a different cable!**

NOTE **The high resistance test consumes a lot of battery power - don´t forget to switch it off by pushing again the key “MegaΩ“!**

3. Sensor test

1 - Connect

Connect the sensor to the PH-T using the COAX cable.

2 - Switch on

Switch on the PH-T by pressing key “ON“ for 5 seconds.

NOTE **Switch-on is delayed to prevent accidental activation during transport.**

3 - Select sensor test

Press key “F“ twice to enter the measuring mode. The display now shows the signal of the sensor in mV, and “M2“ indicates the measuring mode.

4 - Test

Immerse the sensor in a buffer solution.

NOTE **Mind the temperature! Buffer values are usually given for a reference temperature of 25°C.**

With ORP sensors, interpretation of the measuring signals is easy: The value must be as close as possible to the value indicated on the buffer label. Any deviation can be regarded as a sensor error.

With pH electrodes, please refer to the tables on the following page.

Interpretation of the mV signals of pH sensors

The following table shows the mV values an ideal sensor would give in various buffer solutions:

pH	0	1	2	3	4	5	6	7
mV ideal	406	348	290	232	174	116	58	0
pH	7	8	9	10	11	12	13	14
mV ideal	0	-58	-116	-174	-232	-290	-348	-406

If your sensor does not show exactly those values, don´t worry - it simply means that your sensor does not have a slope of 58mV/pH and/or that its zero point is not exactly pH 7. For evaluation, determine its characteristics: the slope and the zero point error.

The zero point error is the mV value found in pH 7. For new sensors it should not be greater than +/-15mV, for used sensors up to +/-55mV are tolerated.

The slope is the signal change in mV per pH. If you are working with buffers pH 7 and pH 4, than the mV difference between them is 3 times the slope. The following table gives a rough overview:

mV(pH4) - mV(pH7)	150	155	160	165	170	175	180
Slope / mV/pH	50	52	53	55	56	58	60

A new sensor should show a slope between 57 and 59 mV/pH, for used sensors values between 50 and 60 mV/pH are tolerated.

NOTE **All those values are based on a temperature of 25°C. At higher temperatures, slopes will be higher.**

4. Batteries and accumulators

At works the PH-T is equipped with a 9V battery. This will last approx. 72 hours when used for simulation (instrument test). When used for measurement (sensor test) or high resistance test, power consumption is higher.

NOTE **The instrument does not indicate low battery.**

The battery is accessible from the back of the instrument. Observe the safety and environment regulations for handling, storage, and disposal of batteries.

The PH-T can be used with rechargeable batteries and provides a charging function. For specifications of connection and current-supply please refer to the technical data.

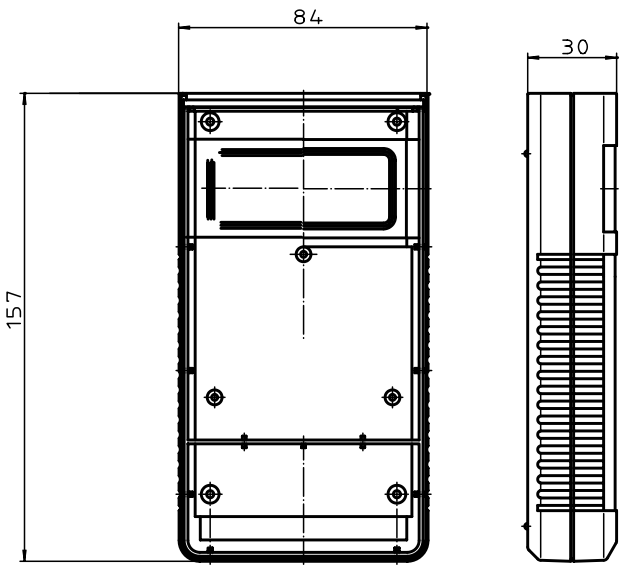
The time necessary for recharging of a completely discharged accumulator depends on the type and the capacity. It can be calculated as follows:

Ni-Cd	Charging time (h) = capacity (mAh) x 0.07778
Ni-MH	Charging time (h) = capacity (mAh) x 0.08333

ATTENTION **The PH-T does not automatically stop the charging process. Take care not to exceed the calculated charging time.**

CAUTION **Never try to recharge regular batteries!**

5. Technical data



Dimensions	157 x 84 x 30 mm (HxWxD)
Weight	0.5 kg
Connection	BNC
Protection class	IP 40
Power supply	9V battery 1200mAh or 9V accumulator (Ni-Cd, Ni-MH)
Power consumption	149mW (instrument test) 329mW (sensor test, high resistance test)
Charging specification	Hollow plug OD 5mm, ID 2mm, 15-16V(-) / 16-20mA
Display	LCD 3.5characters, indication of unit and function
Simulation range (instrument test)	+/-1500 mV 0.0 - 14.0 pH 1 GigaOhm high resistance test
Measuring range (Sensor test)	+/- 1500 mV

Accessories (not included):	**Order number**
Cable COAX-F-2-1,5, BNC plug/electrode plug for connection of sensors	44136020K
Adapter, BNC plug/electrode plug for connection to pH/ORP cables	49100010K
Complete set (PH-T, cable, adapter, case)	45512800K