



# VARIO

## NEW

# clever...

### Simple Measurements at your Fingertip!

You notice it straight away: VARIO has no keys! Instead of it has an innovative touch screen: all functions can easily be called up and set – with one hand. A light fingertip touch on the display is enough – and the VARIO switches on itself.

Placing the electrode in solution starts the measurement automatically. Even very small volumes can be measured with the optimized electrode.

The VARIO also functions as a laboratory clock, with stopwatch and timer.

Simply clever...



## Handheld Meters and VARIO

- Touch screen
- 1500 h continuous operation
- Laboratory clock with timer function



# smart...

### Handheld Instrument with added Value!

The VARIO can do even more. The adapter included in the accessories of the VARIO pH Set makes the instrument compatible with all common precision electrodes. Even a separate temperature sensor can be connected.

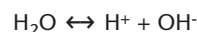
With included adaptor the VARIO also functions like a standard handheld meter. The unique ability to easily rotate the display 180 degrees allows the operator to make complex pH measurements. The large, multifunctional display shows the measured value, temperature and any specialized functions.

Simply smart...

# pH Meters

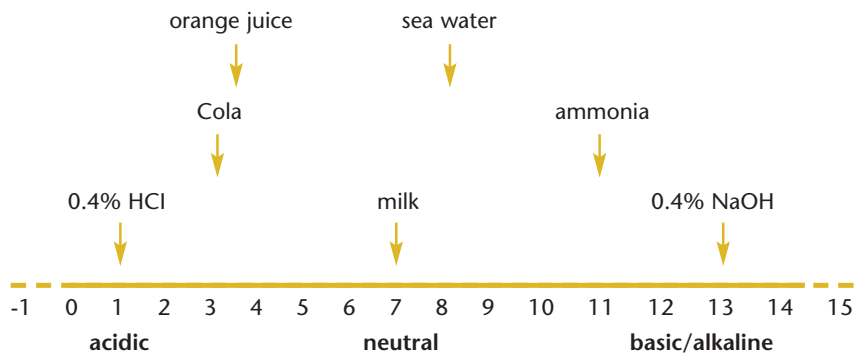
## pH Value

The water molecule has the property of dissociating into two ionic components in aqueous solutions.



The  $\text{H}^+$  ion is termed hydrogen ion or proton, the  $\text{OH}^-$  ion hydroxide ion.

The pH value describes the activity of hydrogen ions in aqueous solutions on a scale of 0 to 14. Based on this scale, liquids are characterized as being acidic, alkaline or neutral: a solution which is neither acidic or alkaline is neutral. This corresponds to a value of 7 on the scale. Acidity indicates a higher activity of hydrogen ions and a pH value lower than 7. Alkaline solutions are characterized by a lower hydrogen ion activity or higher hydroxide ion activity, respectively and a pH value above 7. The graph below uses examples to illustrate the pH scale. pH values below 0 and above 14 actually occur in practice, but are often difficult to measure.



The pH scale is logarithmic. A difference of one pH unit represents a tenfold, or ten times increase or reduction of hydrogen ion activity in the solution. This explains how a solution's aggressiveness increases with the distance from the neutral point.

The pH value can be measured using electrochemical measuring systems, litmus paper, indicators and colorimeters. Of these methods, electrochemical sensors provide the most accurate results. A pH electrode in an electrochemical sensor.

The electrode is an electrochemical sensor which consists of a measuring electrode and a reference electrode. The measuring electrode is made of special glass which, due to its surface properties, is particularly sensitive to hydrogen ions. It is filled with a buffer solution which has a pH value of 7. When placing the pH electrode into a test solution, the change in voltage is measured by the electrode by comparing the measured voltage to the stable reference electrode. This change is recorded by the meter and converted into the pH value displayed.



# pH Meters

● recommended by WTW   ○ conditionally applicable   – not recommended

Application range	inoLab®					ProfilLine pH 197i		Handheld Meters			
	pH 720	pH 730	pH/ION 735	pH 740	pH/ION 740	ProfilLine pH 197i	VARIO pH	pH 315i	pH 330i	pH 340i	pH/ION 340i
Routine measurement	●	○	○	○	○	○	●	●	●	○	○
Routine measurement with documentation	-	●	●	●	●	●	-	-	-	●	●
AQA with documentation	-	●	●	●	●	●	-	-	-	●	●
R&D high resolution and precision	-	●	●	●	●	●	-	-	●	●	●
Control measurements	-	●	●	●	●	●	●	-	●	●	●
LIMS connection	-	●	●	●	●	●	-	-	-	○	○
Quality assurance	-	●	●	●	●	●	-	-	●	●	●
Training	●	●	●	●	○	○	●	●	●	○	○
Service	-	-	-	-	-	●	●	●	●	●	●
Laboratory measurements	●	●	●	●	●	●	●	-	-	○	○
Field measurements	-	-	-	-	-	●	-	●	●	●	●
Depth measurements	-	-	-	-	-	●	-	-	-	-	-
External control/PC connection/ PC control	-	●/○/-	●/○/-	●/○/●	●/○/●	●/○/-	-	-	-	●/○/-	●/○/-
pH/ION function	-	-	●	●	●	-	-	-	-	-	●
Ion-specific measurement programs	-	-	●	-	●	-	-	-	-	-	-

see page

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for pH measurement with multi-parameter instruments see page 48



- Parameter
- pH
- ORP
- ISE
- Oxygen (D.O.)
- Conductivity
- Multi-parameter
- BOD/Respiration
- Photometers
- Turbidity
- Colony Counter
- Software/Printers