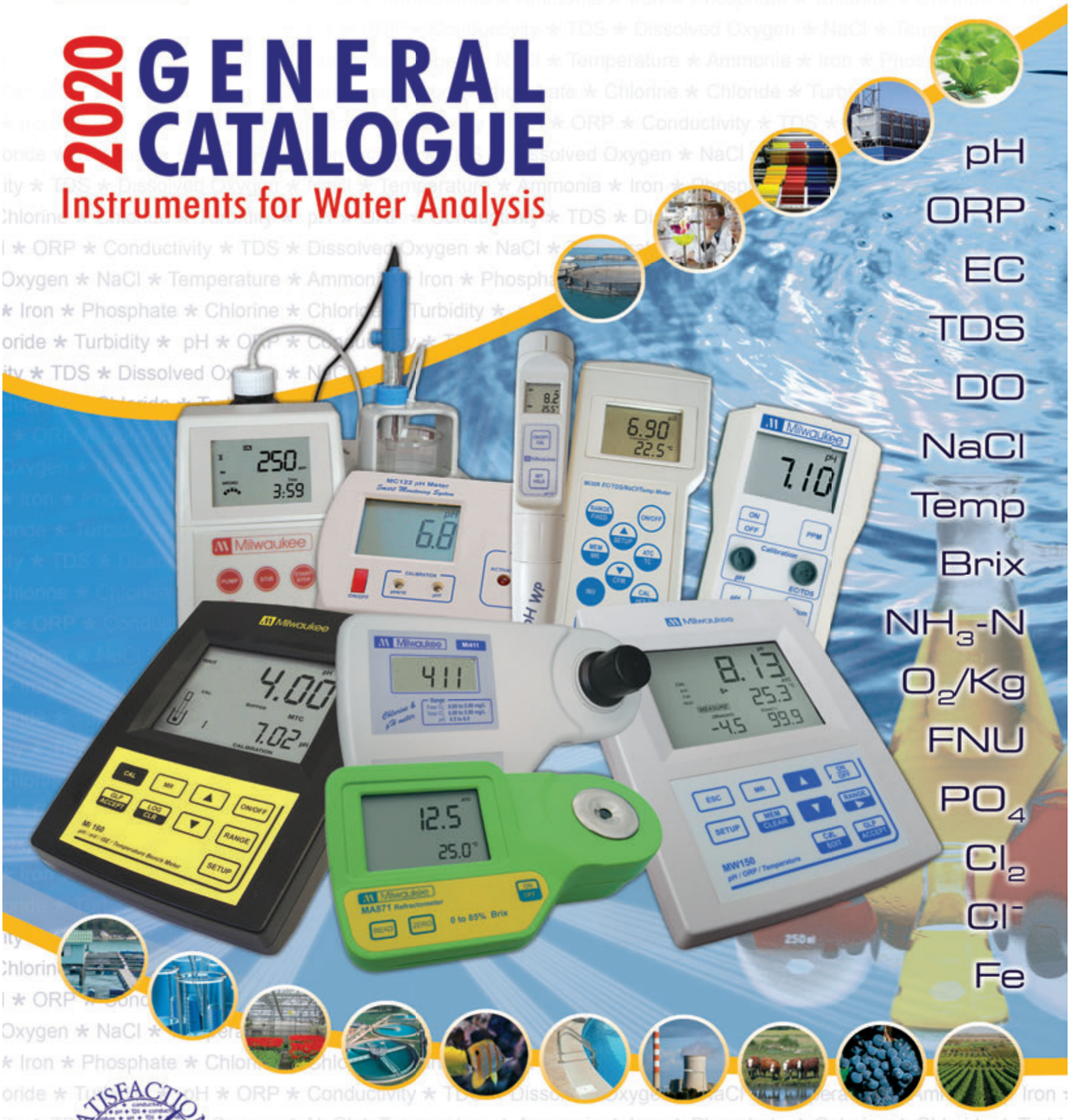
Milwaukee

2020 GENERAL CATALOGUE

Instruments for Water Analysis



SATISFACTION GUARANTEED

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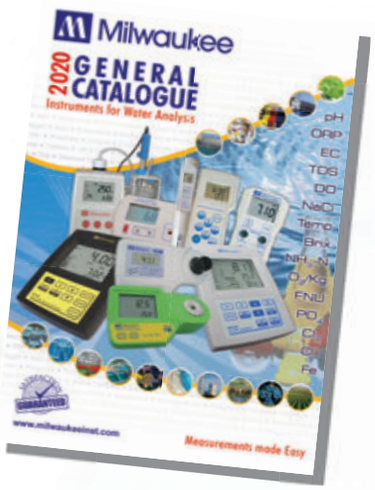
Measurements made Easy

Milwaukee

COMMITTED TO TOTAL CUSTOMER SATISFACTION



Milwaukee is a dynamic worldwide manufacturer of electrochemical Instrumentation for water analysis to measure pH, Redox, Conductivity, Salinity, Dissolved Oxygen, Temperature, Turbidity, Chlorine, Ammonia, Copper, Chloride, Phosphate, Iron, etc.
Milwaukee serves all markets where water quality measurements are required: Laboratory market, food and beverage, environmental, education and government, water and waste water treatment, pharmaceutical and biotechnology, chemical, agriculture and horticulture, hydroponics, aquariums, swimming pools, etc.
Thanks to your valuable feedback our R&D team has designed a new line of instruments for laboratory and field measurements.

Many of our instruments combine 2 or more parameters providing added versatility and excellent value for money. With an extended range of products, from basic hand held instruments to high performance laboratory bench meters, Milwaukee products have a reputation for reliability and accuracy.
All of our instruments are supplied with probes, electrode holders, buffer solutions and most come in a hard carrying case and are complete and ready for use.

Milwaukee Instruments are available worldwide through a selected network of distributors and associated companies that are committed to Total Customer Satisfaction.

Everyone in Milwaukee Instruments is committed to exceeding your expectations.

Global Offices

Europe, South America, Africa, Asia, Middle East and Pacific Rim

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Beauty of

Symbols

CE
CE Certified products

IP65
IP 65 rated housing protects instrument from water and dust

GLP (Good Laboratory Practices)
Good Laboratory Practices requires that time and date should be recorded with the parameters measured

USB Port
Communication via opto-isolated USB port

RS232 Port
Communication via opto-isolated RS232 port

2 Years Warranty
Instruments are covered by 2 years warranty

3 Years Warranty
Instruments are covered by 3 years warranty

7 pH Memorized buffers
7 pH Memorized buffers for calibration

MEM
MEM key allows to memorize the last measurement

LOG
LOG key allows to save up to 50 measurements

ALARM
A LED light warns the user in the event the reading is outside the set point

2 Point Calibration
Calibration can be performed at 1 or 2 points

3 Point Calibration
Calibration can be performed at 1, 2 or 3 points

Multiparameter instruments
Instruments that measure more than 1 parameter

Automatic Temperature Compensation
Automatically corrects the measured value based on the temperature of the solution

Manual Temperature Compensation
Is a method for temperature compensation through the manual input of sample temperature value

Auto-Buffer
Auto-Buffer Recognition ensures that correct buffer values are used during calibration

Dual Level Display
Displays simultaneously 2 parameters

Replaceable Electrode
Instrument with replaceable electrode

Software CD
The instrument is supplied with an application software

Self-diagnostics Messages
Messages on the LCD to make the calibration easy and accurate

LED
The lightsource is the LED with different wavelengths

Contents

Simplicity

Highlights in this Catalogue

MW101 with MA918B/1 pH electrode for soil measurements

Milwaukee offers a specific pH electrode **MA918B/1** that will enable the user to measure pH values directly in the soil.
You will find a step by step guide on how to prepare the sample of soil to be measured with pictures on page 13.

The new innovative line of Milwaukee bench meters includes a lot of New features:

- Rechargeable battery with 8 hrs battery life
- 2 USB ports: Standard to export data directly to a flash drive and micro USB to connect a computer for file export
- Data logging: 1000 logs can be stored in the built-in memory including readings, GLP data, date and time
- Different logging methods: manual log-on-demand (max. 200 logs); manual log-on-stability (max. 200 logs) and interval log (max. 600 samples; 100 lots)
- Electrode diagnostics feature checks and displays the condition of the pH electrode
- 5 points calibration

pH Controller and Pump

The **MC122** pH controller and dosing pump (**MP810**) provides fully automated pH control of aqueous solutions in hydroponic systems. It has been specifically designed to control the pH in mixing tanks for fertilization. The small and precise flow of the peristaltic pump allows you to maintain ideal pH values in your tank. After selecting the desired pH setting from 5.5 to 9.5 pH, the pH controller measures the pH value of the solution and automatically adds pH adjustment (acid or alkaline) to change the liquid's pH to the selected value.

MA871: Digital Brix Refractometer

The **MA871** is an optical instrument that employs the measurement of refractive index to determine the % Brix of sugar in aqueous solutions. The method is both simple and quick. Samples are measured after a simple user calibration with deionized or distilled water. Within seconds the instrument measures the refractive index of the sample and converts it to % Brix concentration units.

The **MA871** digital refractometer eliminates the uncertainity associated with mechanical refractometers and is easily portable for measurements in the field.

pH/ORP/Temp and EC/TDS/NaCl/Temp Professional Portable Meters with Logging, GLP and rechargeable battery

COMING SOON

MW105
pH/ORP/Temp Portable meter

- Up to 3-point automatic calibration with 7 standard calibration buffers
- Automatic or manual temperature compensation
- Built-in rechargeable battery with 8 hours battery life
- Auto-off feature to preserve battery energy
- Battery charger with battery monitor
- Dedicated GLP key
- Alphanumeric LCD displayed messages for user friendly, intuitive information/warning/error messages
- Internal clock and date to keep track of different time-dependent functions (calibration, timestamp, calibration time out)

Range: -2.00 to 20.00 pH
±2000.0 mV
-20.0 to 120.0 °C (-4.0 to 248.0 °F)

MW106
pH/ORP/Temp Logging Portable Meter

- Up to 5-point calibration with 7 standard calibration buffers and two custom buffers
- Micro USB to connect a computer for file export
- Data logging: 1000 logs can be stored in the built-in memory including readings, GLP data, date and time
- Different logging methods: manual log-on-demand (max. 200 logs); manual log-on-stability (max. 200 logs) and interval log (max. 600 samples; 100 lots)
- Electrode diagnostics feature checks and displays the condition of the pH electrode
- Built-in rechargeable battery with 8 hours battery life
- Auto-off feature to preserve battery energy
- Battery charger with battery monitor
- Dedicated GLP key
- Alphanumeric LCD displayed messages for user friendly, intuitive information/warning/error messages

Range: -2.000 to 20.000 pH
±2000.0 mV
-20.0 to 120.0 °C (-4.0 to 248.0 °F)

MW306
EC/TDS/NaCl/Temp Logging Portable Meter

- Micro USB port to connect a computer for file export
- Data logging: 1000 logs can be stored in the built-in memory including readings, GLP data, date and time
- Different logging methods: manual log-on-demand (max. 200 logs); manual log-on-stability (max. 200 logs) and interval log (max. 1000 samples; 100 lots)
- Single cell factor calibration for EC/TDS, One-point calibration for Salinity, 2-point calibration for Temperature
- Built-in rechargeable battery with 8 hours battery life
- Auto-off feature to preserve battery energy
- Battery charger with battery monitor
- Dedicated GLP key
- Internal clock and date to keep track of different time-dependent functions (calibration, timestamp, calibration time out)

MICRO USB PORT FOR FILE EXPORT

Range: 0.00 µS/cm to 200.0 mS/cm
0.00 ppm (mg/L) up to 400.0 g/L absolute TDS (with 0.80 factor)
0.0 to 400.0 % NaCl, 2.00 to 42.00 PSU, 0.00 to 80.00 g/L
-20.0 to 120.0 ºC ; -4.0 to 248.0 °F

COMING SOON

pH/ORP/Temp and EC/TDS/NaCl/Temp Laboratory Bench Meters with Logging, GLP and rechargeable battery

MW150
pH/ORP/Temp Bench Meter

- Up to 3-point automatic calibration with 7 standard calibration buffers
- Automatic or manual temperature compensation
- Built-in rechargeable battery with 8 hours battery life
- Auto-off feature to preserve battery energy
- Battery charger with battery monitor
- Dedicated GLP key
- Alphanumeric LCD displayed messages for user friendly, intuitive information/warning/error messages
- Internal clock and date to keep track of different time-dependent functions (calibration, timestamp, calibration time out)

Range: -2.00 to 20.00 pH
±2000.0 mV
-20.0 to 120.0 °C (-4.0 to 248.0 °F)

MW151
pH/ORP/Temp Logging Bench Meter

- Up to 5-point calibration with 7 standard calibration buffers and two custom buffers
- 2 USB ports: Standard to export data directly to a flash drive and micro USB to connect a computer for file export
- Data logging: 1000 logs can be stored in the built-in memory including readings, GLP data, date and time
- Different logging methods: manual log-on-demand (max. 200 logs); manual log-on-stability (max. 200 logs) and interval log (max. 600 samples; 100 lots)
- Electrode diagnostics feature checks and displays the condition of the pH electrode
- Built-in rechargeable battery with 8 hours battery life
- Battery charger with battery monitor
- Dedicated GLP key
- Alphanumeric LCD displayed messages for user friendly, intuitive information/warning/error messages

Range: -2.000 to 20.000 pH
±2000.0 mV
-20.0 to 120.0 °C (-4.0 to 248.0 °F)

2 USB PORTS FOR DATA EXPORTING

MW170
EC/TDS/NaCl/Temp Logging Bench Meter

- Micro USB port to connect a computer for file export
- Data logging: 1000 logs can be stored in the built-in memory including readings, GLP data, date and time
- Different logging methods: manual log-on-demand (max. 200 logs); manual log-on-stability (max. 200 logs) and interval log (max. 1000 samples; 100 lots)
- Single cell factor calibration for EC/TDS, One-point calibration for Salinity, 2-point calibration for Temperature
- Built-in rechargeable battery with 8 hours battery life
- Auto-off feature to preserve battery energy
- Battery charger with battery monitor
- Dedicated GLP key
- Internal clock and date to keep track of different time-dependent functions (calibration, timestamp, calibration time out)

Range: 0.00 µS/cm to 200.0 mS/cm
0.00 ppm (mg/L) up to 400.0 g/L absolute TDS (with 0.80 factor)
0.0 to 400.0 % NaCl, 2.00 to 42.00 PSU, 0.00 to 80.00 g/L
-20.0 to 120.0 ºC ; -4.0 to 248.0 °F

Mi150

pH/Temperature Laboratory Bench Meter

Mi150 is an advanced pH/Temp microprocessor-based bench meter. It is ideal for students and technicians who need fast and reliable measurements.
This meter is provided with a series of new diagnostic features which add an entirely new dimension to the measurement of pH, by allowing the user to dramatically improve the reliability of the measurement:

- Automatic Temperature Compensation (ATC) for good accuracy under fluctuating temperatures;
- Easy to read large custom LCD;
- Easy and Quick Push-button Calibration
- 7 memorized buffers (pH 1.68, 4.01, 6.86, 7.01, 9.18, 10.01 and 12.45) for calibration;
- Messages on the LCD to make the calibration easy and accurate;
- User-selectable “calibration time out” to remind when a new calibration is necessary;
- Stability Indicator prompts whenever reading stabilizes.

Moreover, it offers an extended temperature range from –20°C (–4°F) to 120°C (248°F), using the **MA831R** interchangeable temperature probe.

Specifications		Mi150
Range	pH	-2.00 to 16.00 pH
	Temp	-20.0 to 120.0°C / -4.0 to 248.0°F
Resolution	pH	0.01 pH
	Temp	0.1°C / 0.1°F
Accuracy (@20°C / 68°F)	pH	±0.01 pH
	Temp	±0.4°C / ±0.8°F
Typical EMC Deviation	pH	±0.02 pH
	Temp	±0.4°C / ±0.8°F
pH Automatic Calibration		1 or 2 point calibration with 7 memorized buffers
Offset Calibration		±1 pH
Slope Calibration		from 80 to 108%
Temperature Compensation		automatic from -20.0 to 120.0°C / -4.0 to 248.0°F or manual, without temperature probe
pH Electrode		**MA917B/1** (included)
Temperature Probe		**MA831R** (included)
Environment		0 to 50°C / 32 to 122°F; max RH 95%
Input Impedance		10^{12} Ohm
Power Supply		12 VDC power adapter (included)
Packaging dimensions		335 x 120 x 255 mm
Packaging weight		2 kg

Glass Electrode & Temperature Probe

Choose from our wide selection of pH and ORP electrodes at pages 6 and 50.

Innovative Design

Compact-size ergonomic design with electrode holder that can hold multiple electrodes & probes.

Accessories

MA9001 pH 1.68 buffer solution, 230 mL bottle
MA9004 pH 4.01 buffer solution, 230 mL bottle
MA9006 pH 6.86 buffer solution, 230 mL bottle
MA9007 pH 7.01 buffer solution, 230 mL bottle
MA9009 pH 9.18 buffer solution, 230 mL bottle
MA9010 pH 10.01 buffer solution, 230 mL bottle
MA9012 Refilling solution for double junction electrode, 230 mL bottle
MA9015 Electrode storage solution, 230 mL bottle
MA9016 Electrode cleaning solution, 230 mL bottle
MA9112 pH 12.45 buffer solution, 230 mL bottle
MA9310 12 VDC Adapter, 220 V
MA9311 12 VDC Adapter, 110 V
MA9315 Electrode Holder
MA917B/1 Glass body, double junction refillable pH electrode
MA831R Temperature probe

Ordering Information

Mi150 is supplied complete with:
- **MA917B/1** Double junction refillable pH electrode
- **MA831R** Temperature Probe
- **MA9315** Electrode Holder
- **M10004** pH 4.01 Sachet Buffer Solution
- **M10007** pH 7.01 Sachet Buffer Solution
- **M10010** pH 10.01 Sachet Buffer Solution
- **M10016** Sachet Electrode Cleaning Solution
- **MA9310** 12 VDC Adapter
- Instruction manual

Mi151

pH/ORP/Temperature Laboratory Bench Meter

This high performance economy microprocessor-based pH/ORP/Temp Bench meter is an ideal tool in schools, laboratories and production plants. It is provided with a series of new diagnostic features which add an entirely new dimension to the measurement of pH, by allowing the user to dramatically improve the reliability of the measurement:

- Automatic Temperature Compensation (ATC) for good accuracy under fluctuating temperatures;
- Hold Function freezes reading for easy viewing;
- Easy to read large custom LCD;
- Stability Indicator prompts whenever reading stabilizes;
- 7 memorized buffers (pH 1.68, 4.01, 6.86, 7.01, 9.18, 10.01 and 12.45) for calibration;
- Messages on the LCD to make the calibration easy and accurate;
- User-selectable “calibration time out” to remind when a new calibration is necessary

Mi151 can also measure with ORP electrodes, thanks to its capability to measure mV with a resolution up to 0.1 mV. For accurate measurements, use the electrode holder supplied with the meter.

Specifications		Mi151
Range	pH	-2.00 to 16.00 pH
	mV	±699.9 mV / ±1999 mV
	Temp	-20.0 to 120.0°C / -4.0 to 248.0°F
Resolution	pH	0.01 pH
	mV	0.1 mV / 1 mV
	Temp	0.1°C / 0.1°F
Accuracy (@20°C)	pH	±0.01 pH
	mV	±0.2 mV / 1 mV
	Temp	±0.4°C / ±0.8°F
Typical EMC Deviation	pH	±0.02 pH
	mV	±0.2 mV / 1 mV
	Temp	±0.4°C / ±0.8°F
pH Automatic Calibration		1 or 2 point calibration with 7 memorized buffers
Offset Calibration		±1 pH
Slope Calibration		from 80 to 108%
Temperature Compensation		automatic from -20.0 to 120.0°C / -4.0 to 248.0°F or manual, without temperature probe
pH Electrode		**MA917B/1** (included)
Temperature Probe		**MA831R** (included)
Environment		0 to 50°C / 32 to 122°F; max RH 95%
Input Impedance		10^{12} Ohm
Power Supply		12 VDC power adapter (included)
Packaging dimensions		335 x 120 x 255 mm
Packaging weight		2 kg

Glass Electrode & Temperature Probe

Choose from our wide selection of pH and ORP electrodes at pages 6 and 50.

Custom dual level LCD

Large and easy-to-read Custom dual level LCD Display with simultaneous readings and with user-friendly icons.

Accessories

MA9001	pH 1.68 buffer solution, 230 mL bottle
MA9004	pH 4.01 buffer solution, 230 mL bottle
MA9006	pH 6.86 buffer solution, 230 mL bottle
MA9007	pH 7.01 buffer solution, 230 mL bottle
MA9009	pH 9.18 buffer solution, 230 mL bottle
MA9010	pH 10.01 buffer solution, 230 mL bottle
MA9012	Refilling solution for double junction electrode, 230 mL bottle
MA9015	Electrode storage solution, 230 mL
MA9016	Electrode cleaning solution, 230 mL
MA831R	Temperature probe
MA9112	pH 12.45 buffer solution, 230 mL bottle
MA9310	12 VDC Adapter, 220 V
MA9311	12 VDC Adapter, 110 V
MA9315	Electrode Holder
MA917B/1	Glass body, double junction refillable pH electrode
MA924B/1	±2000 mV Glass ORP electrode, refillable with BNC connector and 1 meter cable
SE300	Platinum ORP electrode with 1 m cable

Ordering Information

Mi151 is supplied complete with:
- **MA917B/1** Double junction refillable pH electrode
- **MA831R** Temperature Probe
- **MA9315** Electrode Holder
- **M10004** pH 4.01 Sachet Buffer Solution
- **M10007** pH 7.01 Sachet Buffer Solution
- **M10010** pH 10.01 Sachet Buffer Solution
- **M10016** Sachet Electrode Cleaning Solution
- **MA9310** 12 VDC Adapter
- Instruction manual

Mi160

pH/ORP/ISE/Temperature Laboratory Bench Meter

This new pH/ORP/ISE/Temp bench meter is ideal for very accurate and precise measurements for all laboratory needs. It can perform ion-selective measurements directly in ppm, as well as pH, ORP and temperature measurements. pH calibration can also be performed in 3 points selectable between 7 memorized buffers, to provide a very accurate calibration curve even when testing different samples, where very wide differences in pH can be found.

The meter can store up to 50 data sets for each range that can be downloaded to a PC via RS232 or USB. These instruments also have GLP features so, at any time, the user can recall the calibration data.

- 7 memorized buffers (pH 1.68, 4.01, 6.86, 7.01, 9.18, 10.01 and 12.45) for pH calibration
- pH calibration up to 3 points
- ISE calibration up to 2 points; six standard solutions available: 0.01, 0.1, 1, 10, 100, 1000 ppm
- Messages on the LCD to make the calibration easy and accurate
- Relative mV feature
- GLP feature, to view last calibration data for pH or ISE

Specifications		Mi160
Range	pH	-2.00 to 16.00 pH
	mV	±699.9 mV / ±2000 mV
	ISE	0.001 to 19999 ppm
	Temp	-20.0 to 120.0°C / -4.0 to 248.0°F
Resolution	pH	0.01 pH
	mV	0.1 mV / 1 mV
	ISE	0.001 (0.001 to 9.999) ppm; 0.01 (10.00 to 99.99) ppm; 0.1 (100.0 to 999.9) ppm; 1 (1000 to 19999) ppm
	Temp	0.1°C / 0.1°F
Accuracy	pH	±0.01 pH
	mV	±0.2mV / ±1 mV
	ISE	±0.5% Full Scale
	Temp	±0.4°C / ±0.8°F
Rel mV offset		±2000 mV
pH Calibration		1, 2 or 3 point calibration with 7 memorized buffers
ISE Calibration		1 or 2 point calibration, 6 standard solutions available
Temperature compensation		automatic from -20.0 to 120.0°C / -4.0 to 248.0°F or manual without temperature probe
pH Electrode		**MA917B/1** (included)
Temperature Probe		**MA831R** (included)
Logging		up to 50 records, LOG on demand or auto-logging
Environment		0 to 50°C / 32 to 122°F; max RH 95%
Input Impedance		10^{12} Ohm
Power Supply		12 VDC power adapter (included)
Packaging dimensions		335 x 120 x 255 mm
Packaging weight		2.16 kg

Easy PC Compatibility

RS232 or USB communication interface allows readings to be downloaded to a serial port.

Rear Connector Panel layout

Communication to the PC is done via opto-isolated USB and RS232 ports.

Accessories

MA9004	pH 4.01 buffer solution, 230 mL bottle
MA9007	pH 7.01 buffer solution, 230 mL bottle
MA9010	pH 10.01 buffer solution, 230 mL bottle
MA9015	Electrode storage solution, 230 mL
MA9016	Electrode cleaning solution, 230 mL
MA9112	pH 12.45 buffer solution, 230 mL bottle
MA831R	Temperature probe
MA9310	12 VDC Adapter, 220 V
MA9311	12 VDC Adapter, 110 V
MA9315	Electrode Holder
MA917B/1	Glass body, double junction refillable pH electrode
MA924B/1	±2000 mV Glass ORP electrode, refillable with BNC connector and 1 meter cable
SE300	Platinum ORP electrode with 1 m cable
MA9350	RS232 connection cable with 2 m cable
Mi5200	Application Software

Ordering Information

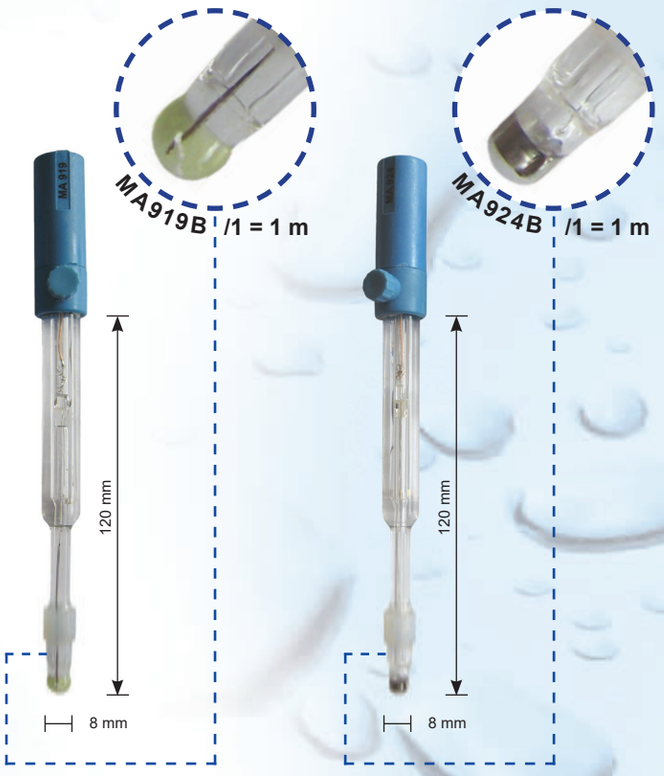
Mi160 is supplied complete with:

- **MA917B/1** Double junction refillable pH electrode
- **MA831R** Temperature Probe
- **MA9315** Electrode Holder
- **M10004** pH 4.01 Sachet Buffer Solution
- **M10007** pH 7.01 Sachet Buffer Solution
- **M10010** pH 10.01 Sachet Buffer Solution
- **M10016** Sachet Electrode Cleaning Solution
- **Mi5200** Application Software
- **MA9350** RS232 connection cable with 2 meters cable
- **MA9310** 12 VDC Adapter
- Instruction manual

pH Electrode
basics

pH electrodes are constructed from a special composition glass which senses the hydrogen ion concentration. This glass is typically composed of alkali metal ions. The alkali metal ions of the glass and the hydrogen ions in solution undergo an ion exchange reaction, generating a potential difference. In a combination pH electrode, the most widely used variety, there are actually two electrodes in one body. One portion is called the measuring electrode, the other the reference electrode. The potential generated at the junction site of the measuring portion is due to the free hydrogen ions present in solution.

The potential of the reference portion is produced by the internal element in contact with the reference fill solution. This potential is always constant. In summary, the measuring electrode delivers a varying voltage and the reference electrode delivers a constant voltage to the meter. The voltage signal produced by the pH electrode is a very small, high impedance signal. The input impedance requires to be interfaced only with equipment with high impedance circuits.



Milwaukee has a wide assortment of pH and ORP electrodes to meet all your specific requirements. Finding the right electrode for a specific application is a very important task and in order to solve this selection problem it is important to consider the following:

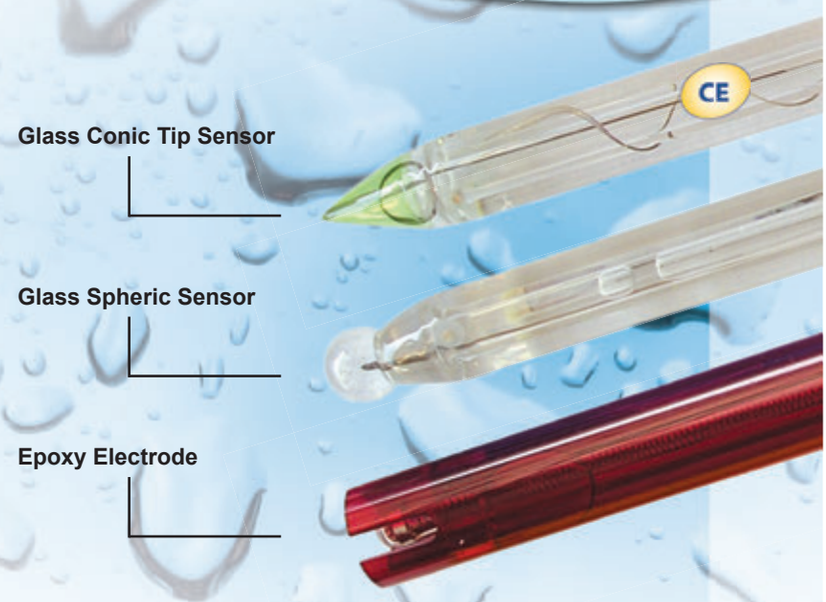
- **Glass body electrode versus Epoxy (plastic) body electrode:** Glass body electrodes stand higher temperatures (typically 100°C against 80°C for plastic) and are more resistant to corrosive chemicals and solvents. They are easier to clean and are available in different shapes depending on the application. On the other hand plastic body electrodes are more rugged and the glass bulb is better protected.
- **Gel filled electrodes versus refillable electrodes:** refillable electrodes last longer since electrolyte can be changed for repeated usage. The response is faster due to a greater outflow of electrolyte into the sample and therefore less likely to clog. Gel filled electrodes require less maintenance and resist to higher pressure.
- **Double reference junction versus Single junction reference:** Double junction reference electrodes have a longer life and protects the sample measured from silver contamination from the electrolyte. The Silver wire is more protected and therefore gets less contaminated. The single junction electrodes normally cost less and are ideal for general purpose applications
- **Conic shaped versus Sphere shaped:** The conic-shaped electrode is easier to clean and to maintain (ideal for applications such as dairy). Has a more rugged tip and therefore ideal for penetration. The sphere-shaped has a faster response time due to the larger surface area on the bulb.

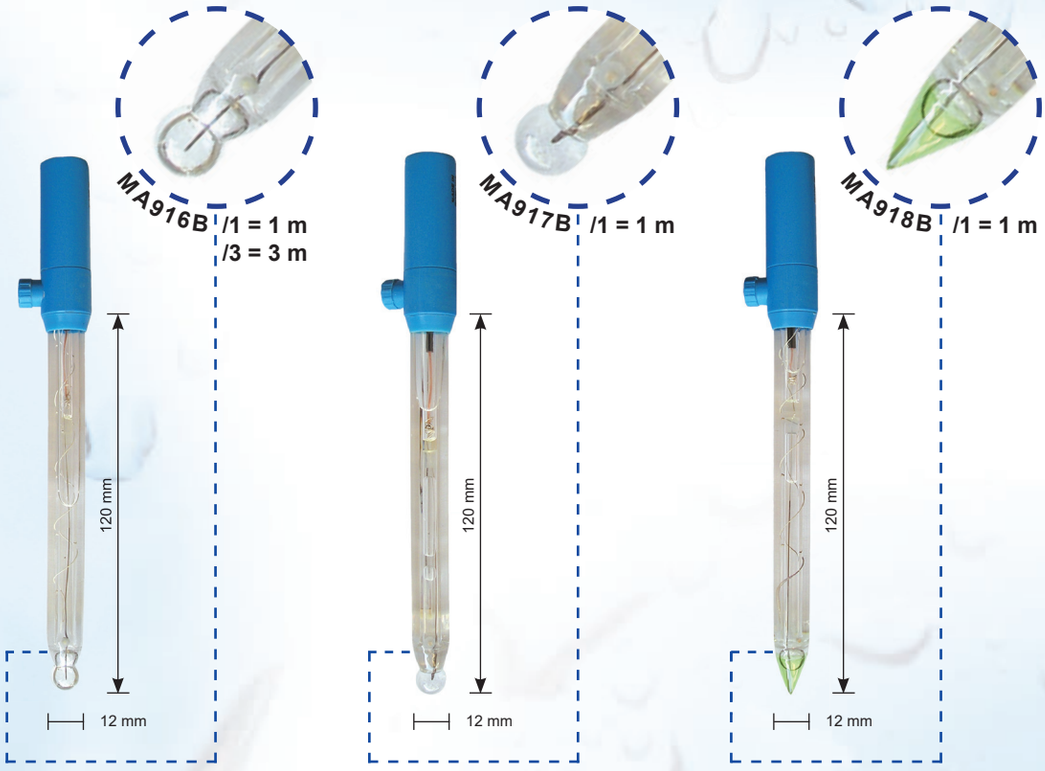
Model	MA919B/1	MA924B/1
Measuring Range	0 to 13 pH	±2000 mV
Temperature Range	-5 to 70 °C	0 to 70 °C
Shaft material	glass	glass
Reference Electrolyte	KCL 3.5M	KCL 3.5M
Reference Junction	open	open
Reference Type	double Ag/AgCl	double Ag/AgCl
Shape of membrane	spheric	Platinum ring
Max. Pressure	0,1 bar	0,1 bar
Connector type	BNC	BNC
Cable length	coaxial 1 meter	coaxial 1 meter
Shaft length	120 mm	120 mm
Diameter	8 mm	8 mm
Application	food laboratory	food laboratory

pH Electrode
basics

The pH electrode, due to the nature of its construction, needs to be kept moist at all times. In order to operate properly, glass needs to be hydrated. Hydration is required for the ion exchange process to occur. If an electrode should become dry, it is best to place it in some tap water for half an hour to condition the glass.

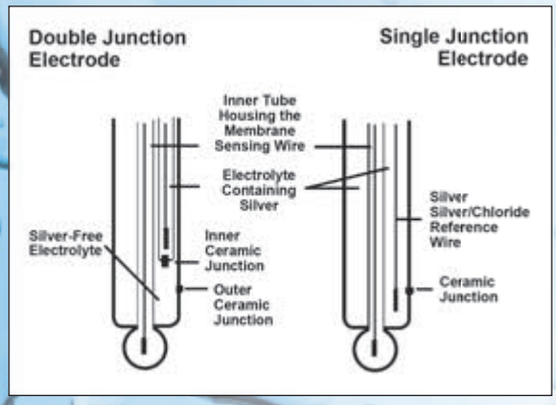
pH electrodes are like batteries; they run down with time and use. As an electrode ages, its glass changes resistance. This resistance change alters the electrode potential. For this reason, electrodes need to be calibrated on a regular basis. Calibration in pH buffer solution corrects for this change. Calibration of any pH equipment should always begin with buffer 7.0 as this is the “zero point.” The pH scale has an equivalent mV scale. The mV scale ranges from +420 to -420 mV. At a pH of 7.0 the mV value is 0. Each pH change corresponds to a change of approx. ±60 mV. As pH values become more acidic the mV values become greater.
pH electrodes have junctions which allow the internal electrolyte solution of the measuring electrode to leak out into the solution being measured.





Model	MA916B/1 - MA916B/3	MA917B/1	MA918B/1
Measuring Range	0 to 13 pH	0 to 14 pH	0 to 12 pH
Temperature Range	0 to 60°C	0 to 70°C	-5 to 60°C
Shaft Material	glass	glass	glass
Reference Electrolyte	KCl 3.5M + AgCl	KCl 3.5M	KCl 3.5M + AgCl
Reference Junction	ceramic, single	ceramic, single	ceramic, triple
Reference Type	single, Ag/AgCl	double, Ag/AgCl	single, Ag/AgCl
Shape of membrane	spheric	spheric	conic
Max pressure	0.1 bar	0.1 bar	0.1 bar
Connector Type	BNC	BNC	BNC
Cable length	coaxial, 1 or 3 m	coaxial, 1 m	coaxial, 1 m
Shaft length	120 mm	120 mm	120 mm
Diameter	12 mm	12 mm	12 mm
Application	laboratory applications	laboratory applications	laboratory applications

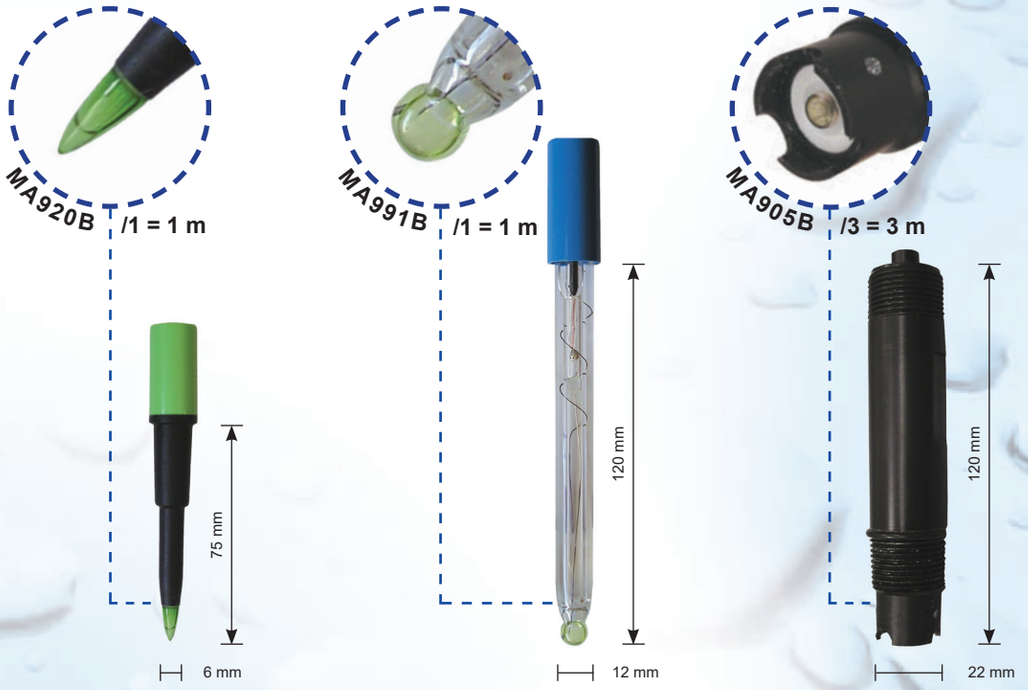
pH Electrode basics



Electrode Storage Bottle Cap: All our pH and ORP electodres are supplied with a bottle storage cap which helps to keep the glass bulb always wet.

This junction can become clogged by particulates in the solution and can also facilitate poisoning by metal ions present in the solution. If a clogged junction is suspected it is best to soak the electrode in tap water to dissolve the material and clear the junction. When not in use it is best to store the electrode in either buffer 4.0 or buffer 7.0. Never store an electrode in distilled or deionized water as this will cause migration of the electrolyte solution from the electrode.

How long a pH electrode will last will depend on how it is cared for and the solutions it is used to measure. Typically, a gel-filled combination pH electrode will last six months to 1 year depending on the care and application.
How long an electrode will last is determined by how well the probe is maintained and the pH application. The harsher the system, the shorter the lifespan. For this reason it is always a good idea to have a back-up electrode on hand to avoid any system down time. Calibration is also an important part of electrode maintenance. This assures not only that the electrode is behaving properly but that the system is operating correctly.

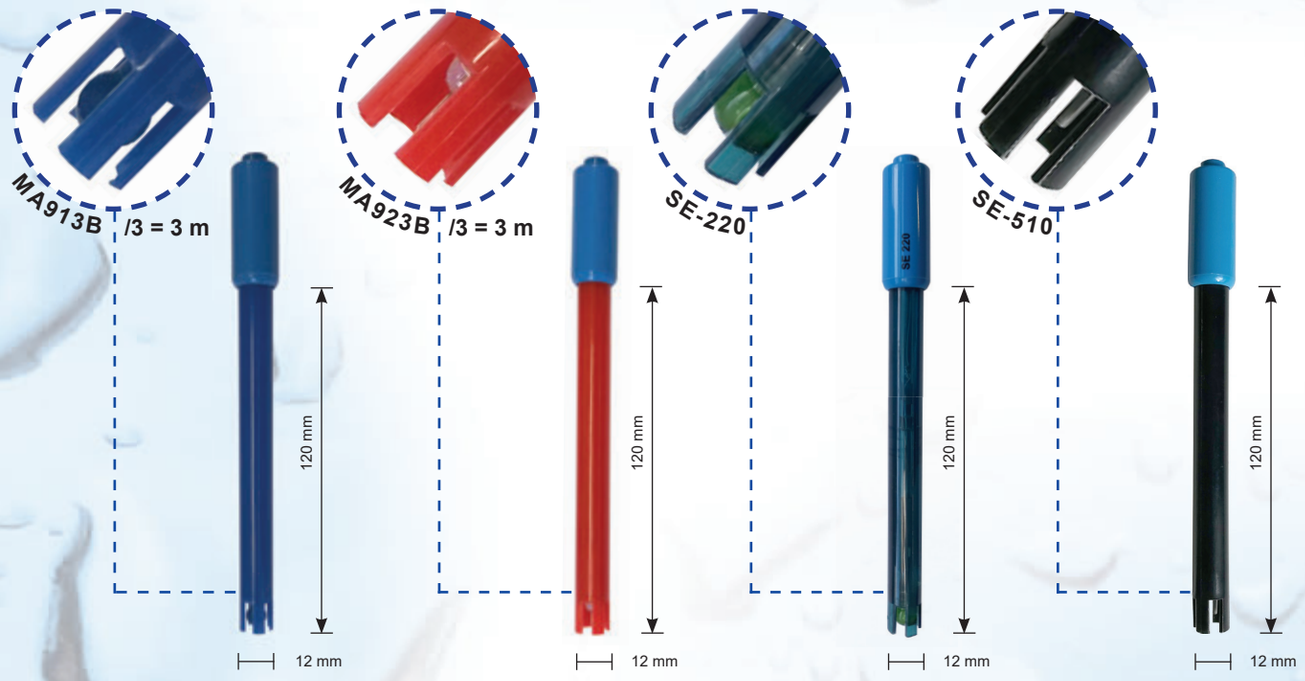


Model	MA920B/1	MA991B/1	MA905B/3
Measuring Range	0 to 12 pH	0 to 13 pH	0 to 13 pH
Temperature Range	-5 to 50°C	-5 to 70°C	-10 to 80°C
Shaft Material	PVDF	glass	PVDF
Reference Electrolyte	Viscolene	gel	polymer
Reference Junction	open	ceramic, single	double PTFE
Reference Type	single, Ag/AgCl	single, Ag/AgCl	double Ag/AgCl
Shape of membrane	conic	spheric	flat
Max pressure	0.1 bar	0.1 bar	6 bar
Connector Type	BNC	BNC	3/4" NPT - BNC
Cable length	coaxial, 1 m	coaxial, 1 m	3 m
Shaft length	75 mm	120 mm	120 mm
Diameter	6 mm	12 mm	22 mm
Application	laboratory applications	laboratory applications	industrial applications

pH Electrode
basics

Temperature compensation: When measuring pH using a pH electrode the temperature error from the electrode varies based on the Nernst Equation as 0.03 pH/10C/unit of pH away from pH7. The error due to temperature is a function of both temperature and the pH being measured. Temperature compensation can be achieved manually or automatically. Manual temperature compensation is usually achieved by entering the temperature of the fluid being measured into the instruments menu and then the instrument will display a "Temperature Compensated" pH reading.

This means that the temperature is corrected to the value expected at 25 °C. Automatic temperature compensation requires input from a temperature sensor and constantly sends a compensated pH signal to the display. Automatic temperature compenstion is useful for measuring pH in systems with wide variations in temperature.



Model	MA913B/3	MA923B/3	SE-220	SE-510
Measuring Range	0 to 13 pH	±1999 mV	0 to 13 pH	0 to 2000 µS/cm
Temperature Range	20 to 60°C	20 to 60°C	-5 to 70 °C	0 to 70 °C
Shaft Material	PEI	PEI	PEI	PP
Reference Electrolyte	gel	gel	gel	
Reference Junction	ceramic, single	cloth	cloth	
Reference Type	single, Ag/AgCl	single, Ag/AgCl	double Ag/AgCl	
Shape of membrane	spheric	spheric, platinum sensor	spheric	2 pins
Max pressure	2 bar	2 bar	2 bar	2 bar
Connector Type	BNC	BNC	BNC	DIN
Cable length	coaxial, 3 m	7-pole, 3 m	coaxial 1 meter	coaxial 1 meter
Shaft length	120 mm	120 mm	120 mm	120 mm
Diameter	12 mm	12 mm	12 mm	12 mm
Application	water, waste water	water, waste water	water, waste water	water, waste water

Mi105

Portable pH/Temp Meter

Extended Range pH and Temperature Meter in a compact casing

The included electrode has a built-in temperature sensor and amplifier to prevent electrical interference.
The large display shows readings in an extended range from -2.00 to 16.00 pH and simultaneously shows temperature from -5.0 to 105.0°C or 23 to 221°F.

The **Mi105** has a stability indicator and hold feature that freezes the display for easy and accurate recording. The large display also has graphic symbols to guide you through all operations. The battery life of the meters guarantees over 500 hours of continuous use.
When switched ON it performs a self-check and displays the percentage of the remaining battery level to assure proper working condition. Calibration is performed automatically at 1 or 2 points using standard (pH 4.01, 7.01, 10.01) or NIST buffers (pH 4.01, 6.86, 9.18).

Hard Carrying Case

Each meter is supplied in a hard carrying case ideal for field measurements.

Specifications		Mi105
Range (*)	pH	-2.00 to 16.00 pH
	Temp	-5.0 to 105.0°C / 23.0 to 221.0°F
Resolution	pH	0.01 pH
	Temp	0.1°C / 0.1°F
Accuracy (@25°C)	pH	±0.02 pH
	Temp	±0.5°C up to 60°C; ±1°C outside / ±1°F up to 140°F; ±2°F outside
Typical EMC Deviation	pH	±0.02 pH
	Temp	±0.2°C / ±0.4°F
Temperature Compensation		automatic, from -5 to 80°C
pH Calibration		automatic, 1 or 2 points with 2 sets of memorized buffers (pH 4.01, 7.01, 10.01 or 4.01, 6.86, 9.18)
Probe		**MA914BR/1**, amplified pH/Temperature probe (included)
Environment		0 to 50°C / 32 to 122°F; max RH 100%
Battery Type		1 x 9V alkaline (included)
Battery Life		approx. 500 hours of use
Auto-off		after 8 minutes of non-use
Packaging dimensions		305 x 280 x 115 mm
Packaging weight		1.22 kg

(*) The temperature range is limited to 80°C (176°F) if using the MA914BR/1 probe.

Calibration, Maintenance & Cleaning Solutions

Choose from our wide selection of calibration, maintenance and cleaning solutions at page 52.

Accessories

MA914BR/1	Combination amplified pH/Temp probe with BNC & RCA connectors and 1 m cable
M10000B	Electrode rinse solution, 20 mL (25 pcs)
M10004B	pH 4.01 buffer solution 20 mL sachet (25 pcs)
M10007B	pH 7.01 buffer solution 20 mL sachet (25 pcs)
M10010B	pH 10.01 buffer solution, 20 mL sachet (25 pcs)
MA9004	pH 4.01 buffer solution, 230 mL bottle
MA9006	pH 6.86 buffer solution, 230 mL bottle
MA9007	pH 7.01 buffer solution, 230 mL bottle
MA9009	pH 9.18 buffer solution, 230 mL bottle
MA9010	pH 10.01 buffer solution, 230 mL bottle
MA9015	Electrode storage solution, 230 mL
MA9016	Electrode cleaning solution, 230 mL

Ordering Information

Mi105 is supplied complete with MA914BR/1 pH/Temp amplified probe with 1 meter cable, 20 mL pH 4.01 and 7.01 sachet of calibration solution, 2x20 mL sachet of electrode cleaning solutions, 9V battery and instructions, all in a rugged carrying case.

Mi106

Portable pH/ORP/Temp Meter

Extended Range pH/ORP/Temperature Meter

The **Mi106** multi parameter portable meter is ideal for field measurements.
The included combined pH/ORP electrode has a built-in temperature sensor and amplifier to prevent electrical interference.
The large display shows readings in an extended range from -2.00 to 16.00 pH or ±2000 mV and simultaneously shows temperature from -5.0 to 105.0°C or 23 to 221°F.

The **Mi106** has a stability indicator and hold feature that freezes the display for easy and accurate recording.
The large display also has graphic symbols to guide you through all operations.
When switched ON it performs a self-check and displays the percentage of the remaining battery level to assure proper working condition.

Calibration is performed automatically at 1 or 2 points using standard (pH 4.01, 7.01, 10.01) or NIST buffers (pH 4.01, 6.86, 9.18).

Specifications		Mi106
Range (*)	pH	-2.00 to 16.00 pH
	mV	-2000 to +2000 mV
	Temp	-5.0 to 105.0°C / 23.0 to 221.0°F
Resolution	pH	0.01 pH
	mV	1 mV
	Temp	0.1°C / 0.1°F
Accuracy (@25°C)	pH	±0.02 pH
	mV	±2 mV
	Temp	±0.5°C up to 60°C; ±1°C outside / ±1°F up to 140°F; ±2°F outside
Typical EMC Deviation	pH	±0.02 pH
	mV	±2 mV
	Temp	±0.2°C / ±0.4°C
Temperature Compensation		automatic, from -5 to 80°C / 23 to 176°F
pH Calibration		automatic, 1 or 2 points with 2 sets of memorized buffers (pH 4.01, 7.01, 10.01 or 4.01, 6.86, 9.18)
ORP Calibration		factory calibrated
Probe		**MA923D/1**, amplified pH/ORP/temperature probe (included)
Environment		0 to 50°C / 32 to 122°F; max RH 95%
Battery Type		1 x 9V alkaline (included)
Battery Life		approx. 500 hours of use
Auto-off		after 8 minutes of non-use
Packaging dimensions		305 x 280 x 115 mm
Packaging weight		1.22 kg

(*) The temperature range is limited to 80°C (176°F) if using the MA923D/1 probe.

Hard Carrying Case

Each meter is supplied in a hard carrying case ideal for field measurements.

Accessories

MA923D/1 Combination amplified pH/ORP/Temp probe with DIN connector and 1 m cable
M10000B Electrode rinse solution, 20 mL sachet (25 pcs)
M10004B pH 4.01 buffer solution 20 mL sachet (25 pcs)
M10007B pH 7.01 buffer solution 20 mL sachet (25 pcs)
M10010B pH 10.01 buffer solution 20 mL sachet (25 pcs)
MA9004 pH 4.01 buffer solution, 230 mL bottle
MA9007 pH 7.01 buffer solution, 230 mL bottle
MA9015 Electrode storage solution, 230 mL
MA9016 Electrode cleaning solution, 230 mL

Ordering Information

Mi106 is supplied complete with MA923D/1 pH/ORP/Temp amplified probe with 1 meter cable, 20 mL pH 4.01 and 7.01 sachet of calibration solution, 2x20 mL sachet of electrode cleaning solutions, 9V battery, instructions, all in a rugged carrying case.

MW100/MW101/MW102/MW500

Entry level, inexpensive pH/ORP/Temperature Portable Meters for fast and reliable results

MW100, MW101, MW102 and **MW500** are compact microprocessor-based pH, ORP and Temperature Portable Meters. These handy and ergonomically designed portable meters are ideal for anyone working on a low budget and still requires fast and reliable measurements.

These portable meters are suitable for a wide range of applications, such as Educational, Agriculture and Horticulture, as well as water and environmental analysis. These easy and fast to calibrate portable meters have a small, ergonomic and light case design. Other features include large and easy to read LCD Display and long battery life.

All meters are supplied with pH or ORP electrodes and calibration solutions.

- **MW100** performs pH measurements with a 0.1 pH resolution.
- **MW101** performs pH measurements with a 0.01 pH resolution and with manual temperature compensation.
- **MW102** is a microprocessor based pH/Temperature meter with extended range (-2.00 to 16.00 pH), Automatic Temperature Compensation, automatic calibration in 2 points and ±0.02 pH accuracy.
- **MW500** performs ORP measurements with a range of ±1000 mV.

Specifications	MW100 pH Meter	MW101 pH Meter	MW102 pH/Temp Meter	MW500 ORP Meter
Range pH/ORP	0.0 to 14.0 pH	0.00 to 14.00 pH	-2.00 to 16.00 pH	±1000mV
Range Temp.			-5 to 70°C	
Resolution pH/ORP	0.1 pH	0.01 pH	0.01 pH	1 mV
Resolution Temp.			0.1°C	
Accuracy (@25°C) pH/ORP	±0.2 pH	±0.02 pH	±0.02 pH	±5mV
Accuracy (@25°C) Temp.			±0.5°C	
Typical EMC Deviation pH			±0.02 pH	
Typical EMC Deviation Temp.			±0.5°C	
Temperature Compensation	N.A.	manual, 0 to 50°C	automatic, 0 to 70°C	
Calibration	manual, 2-point through offset and slope trimmers	manual, 2-point through offset and slope trimmers	automatic at 1 or 2 points with memorized buffers (pH 4.01, 7.01, 10.01)	
pH Electrode	**SE220** (included)	**SE220** (included)	**SE220** (included)	
ORP Electrode				**SE300** (included)
Temperature Probe			**MA830R** (included)	
Environment	0 to 50°C, max RH 95%	0 to 50°C, max RH 95%	0 to 50°C, max RH 95%	0 to 50°C, max RH 95%
Battery Type	1 x 9V alkaline (included)	1 x 9V alkaline (included)	1 x 9V alkaline (included)	1 x 9V alkaline (included)
Battery Life	approx. 300 hours of use	approx. 300 hours of use	approx. 300 hours of use	approx. 300 hours of use
Auto-off			after 8 minutes of non-use	
Packaging dimensions	212 x 145 x 67 mm	212 x 145 x 67 mm	212 x 145 x 67 mm	212 x 145 x 67 mm
Packaging weight	440 g	420 g	500 g	400 g

Accessories

M10004B pH 4.01 buffer solution 20 mL sachet (25 pcs)
M10007B pH 7.01 buffer solution 20 mL sachet (25 pcs)
M10010B pH 10.01 buffer solution 20 mL sachet (25 pcs)
MA9004 pH 4.01 buffer solution, 230 mL bottle
MA9007 pH 7.01 buffer solution, 230 mL bottle
MA9015 Electrode storage solution, 230 mL
MA9016 Electrode cleaning solution, 230 mL
MA830R Temperature probe
MA9020 200-275 mV ORP solution, 230 mL bottle
SE220 pH electrode with BNC connector and 1 m cable
SE300 Platinum ORP electrode with 1 m cable

Ordering Information

MW100 and **MW101** are supplied complete with a SE220 pH electrode, pH 7.01 20 mL sachet of calibration solution, calibration screwdriver, 9V battery and instructions.
MW102 is supplied complete with a SE220 pH electrode, MA830R stainless steel temperature probe, pH 4.01 and pH 7.01 20 mL sachet of calibration solution, 9V battery and instructions.
MW500 is supplied complete with a SE300 platinum electrode, 9V battery and instructions.

Measuring pH in soil

Using MW101 pH Portable Meter with a MA918B/1 pH Electrode

pH is a measure of the activity of the hydrogen ion (H+) in the soil solution. If the concentration of H+ is high, the medium is said to be acid. If it is low, it is said to be alkaline. Most agricultural soils are found between the range of 4 to 10 (when measured in water).

For practical purposes, soil is neutral when pH is between 6 to 8, depending on plant requirements, and it is acidic when pH is less than 6 and alkaline when it is greater than 8.

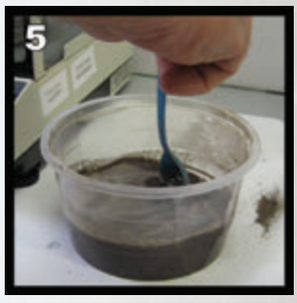
1. Collect samples of soil.
Take samples from a homogeneous area per 1000m^2.
In smaller places it is also suggested to take at least two samples (the more samples, the more accurate the measurement will be).
Don't take samples from soil where are obvious disorders.

Amount of sample:
Use the same amount of soil for every sample (for example: use identical size sachets)

Spot of sample:
General: take the top 5 cm of the ground
Annuals: from 20-40 cm deep
Fruits: from 20-60 cm deep

Spread the soil on a paper and let it dry out in a shaded place, or put it into a 40°C oven.

2. Shread the dry soil and mix the samples.
You will get a homogeneous sample.
It mustn't contain rocks or organic residues.
Take a sample from this mixture for the measurement.



3. Sift the soil through a 2 mm sifter.

4. Weigh out 1 unit soil (100 g is recommended) and put 2 unit (200 g, 2 dl) destillated water to it.

5. Stir it for 30 seconds.
Wait about five minutes.

6. Stir it again then measure the pH of the solution.

Measuring pH in cheese

Using MW101 pH portable meter with a MA920B/1 pH electrode

The quality of cheese flavor and texture is the result of well-kept pH and temperature. pH makes sure quality standards have been met; in doing so, they are guaranteeing the safety of the cheese production. Most cheeses range from 5.1 to 5.9 in pH. However, this range will have exceptions to certain types of cheeses such as Camembert cheese which has a pH of 7.4.

During the cheese making process, the pH is measured multiple times. Each type of cheese may have a slightly different process and pH level. It is important for manufacturers and companies to be aware of the differences and treat each cheese variety with the quality and care it deserves. Measuring the pH of cheese essentially gives the manufacturer control of the cheese process.

Cheese making process:

For optimal measurement put a sample into a beaker

1. Addition of the starter culture
(temperature should stay below 20°C)
pH level (rennet-induced): 5.1 -5.3
pH level (acid-induced): 4.

2. Coagulation (temperature 30°C)
Usually the pH level stay between: 5.35 – 5.45
In certain cases it can be as low as pH 4.

3. Pressing (room tempereture:
16-18°C for mild cheeses and 25°C
for hard cheeses
pH will decrease (pH 5.0 – 5.3)

4. Brining in salt solution
(temperature of solution: 15°C)
optimal pH level: 5.2
(except soft cheeses like Roquefort where
the pH level should be kept at pH 4.7)

During ripening pH level will increase till the optimal ready value.
See the table below

Optimal pH values of ready cheeses	
American, mild	4.98
Camembert	7.44
Cheddar	5.90
Cottage	4.75 - 5.02
Cream, Philadelphia	4.10 - 4.79
Dip	5.80
Edem	5.40
Old English	6.15
Roquefort	5.10 - 5.98
Parmesan	5.20 - 5.30
Snippy	5.18 - 5.21
Stilton	5.70
Swiss Gruyere	5.68 - 6.62

pH55/pH56

Pocket-size pH/Temperature Meters with replaceable electrode

Water-resistant pH testers with Large dual-level LCD that displays pH and temperature (°C or °F). The large display shows readings in an extended range from -2.0 to 16.0 pH (**pH56** has a 0.01 pH resolution) and simultaneously shows temperature from -5.0 to 60.0°C or 23.0 to 140.0°F. They have a stability indicator and hold function that freezes the display for easy and accurate recording. The large display also has graphic symbols to guide you through all operations.

Complete with a temperature probe for fast and more precise temperature measurement they compensate automatically for temperature. Calibration is made automatically in 1 or 2 points with memorized standard and NIST buffer sets. Auto power OFF saves battery power after non-use.

The double-junction electrode can be replaced in a very fast and simple way! The modular design allows easy electrode and battery replacement.

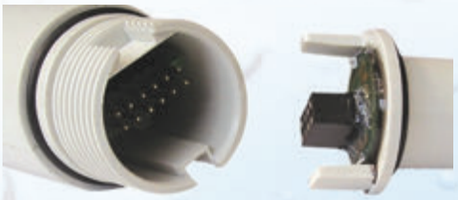
Specifications		pH55	pH56
Range	pH	-2.0 to 16.0 pH	-2.00 to 16.00 pH
	Temp.	-5.0 to 60.0°C / 23.0 to 140.0°F	-5.0 to 60.0°C / 23.0 to 140.0°F
Resolution	pH	0.1 pH	0.01 pH
	Temp.	0.1°C / 0.1°F	0.1°C / 0.1°F
Accuracy (@25°C)	pH	±0.1 pH	±0.05 pH
	Temp.	±0.5°C / ±1°F	±0.5°C / ±1°F
Typical EMC Deviation	pH	±0.1 pH	±0.02 pH
	Temp.	±0.3°C / ±0,6°F	±0.3°C / ±0,6°F
Calibration		automatic, 1 or 2 points with 2 sets of memorized buffers (pH 4.01, 7.01, 10.01 or 4.01, 6.86, 9.18)	automatic, 1 or 2 points with 2 sets of memorized buffers (pH 4.01, 7.01, 10.01 or 4.01, 6.86, 9.18)
Temperature Compensation		automatic from -5 to 60°C	automatic from -5 to 60°C
Probe		**Mi56P** (replaceable)	**Mi56P** (replaceable)
Environment		-5 to 50°C / 32 to 122°F; max RH 100%	-5 to 50°C / 32 to 122°F; max RH 100%
Battery Type		4 x 1.5V; IEC LR44, A76 (included)	4 x 1.5V; IEC LR44, A76 (included)
Battery Life		approx. 300 hours of use	approx. 300 hours of use
Auto-off		after 8 minutes of non-use	after 8 minutes of non-use
Packaging dimensions		254 x 67 x 47 mm	254 x 67 x 47 mm
Packaging weight		200 g	200 g

pH/Temperature Sensor

The **pH55** and **pH56**'s exposed temperature sensor provides fast response time, and its proximity to the pH electrode guarantees much more accurate temperature compensated readings.

Replaceable electrode

Replace the electrode in a fast and simple way yourself! Just unscrew the plastic ring on the top of the electrode and replace the electrode with a new one.



Accessories

Mi56P	Replaceable electrode for pH55 & pH56
M10000B	Electrode rinse solution, 20 mL sachet (25 pcs)
M10004B	pH 4.01 buffer solution 20 mL sachet (25 pcs)
M10007B	pH 7.01 buffer solution 20 mL sachet (25 pcs)
M10010B	pH 10.01 buffer solution 20 mL sachet (25 pcs)
MA9004	pH 4.01 buffer, 230 mL bottle
MA9007	pH 7.01 buffer solution, 230 mL bottle
MA9010	pH 10.01 buffer solution, 230 mL bottle
MA9015	Electrode storage solution, 230 mL
MA9016	Electrode cleaning solution, 230 mL
MA753	Hard carrying case for 2 testers

Ordering Information

pH55 and **pH56** is supplied complete with protective cap, 20 mL pH 4.01 and pH 7.01 sachets of calibration solution.

Packaging Information

pH55 and **pH56** can be supplied in a carton box or in a tubular plastic casing. Optionally **pH55** is also available in a kit (**Mi5559** or **Mi5560**) together with EC59 or EC60 EC/TDS/Temp Meters.

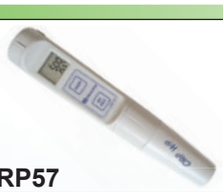
ORP57/pH58

Pocket-size pH/ORP/Temperature Meters with replaceable electrode

Combination water-resistant testers with advanced functions also include the model **pH58** for simultaneous pH and ORP measurements and temperature, which is continuously displayed on the dual level LCD. It shows readings in an extended range from -2.00 to 16.00 pH or ±1000 mV and simultaneously shows temperature from -5.0 to 105.0°C or 23 to 221°F.

The **pH58** has a stability indicator and hold feature that freezes the display for easy and accurate recording. The large display also has graphic symbols to guide you through all operations.
Calibration is performed automatically at 1 or 2 points using standard or NIST buffers.

The modular design allows easy electrode and battery replacement.

Specifications		 ORP57	 pH58
Range	pH		-2.00 to 16.00 pH
	ORP	±1000 mV	±1000 mV
	Temp.	-5.0 to 60.0°C / 23.0 to 140.0°F	-5.0 to 60.0°C / 23.0 to 140.0°F
Resolution	pH		0.01 pH
	ORP	1 mV	1 mV
	Temp.	0.1°C / 0.1°F	0.1°C / 0.1°F
Accuracy (@25°C)	pH		±0.05 pH
	ORP	±2 mV	±2 mV
	Temp.	±0.5°C / ±1°F	±0.5°C / 1°F
Typical EMC Deviation	pH		±0.02 pH
	ORP	±2 mV	±2 mV
	Temp.	±0.3°C / ±0.6°F	±0.3°C / ±0.6°F
pH Calibration			automatic for pH, 1 or 2 points from -5 to 60°C with 2 sets of memorized buffers (pH 4.01, 7.01, 10.01 or 4.01, 6,86, 9.18)
ORP Calibration		factory calibrated	factory calibrated
Probe		**Mi57P** (replaceable)	**Mi58P** (replaceable)
Environment		0 to 50°C; max RH 100%	-5 to 50°C; max RH 100%
Battery Type		4 x 1.5V; IEC LR44, A76	4 x 1.5V; IEC LR44, A76
Battery Life		approx. 300 hours of use	approx. 250 hours of use
Auto-off		after 8 minutes of non-use	after 8 minutes of non-use
Packaging dimensions		254 x 67 x 47 mm	254 x 67 x 47 mm
Packaging weight		140 g	200 g

Replaceable combination pH/ORP electrode for pH58

Replace the electrode in a fast and simple way yourself! Just unscrew the plastic ring on the top of the electrode and replace the electrode with a new one.

Calibrations, Maintenance & Cleaning Solutions

Choose from our wide selection of calibration, maintenance and cleaning solutions at page 52.

Accessories

Mi57P Replaceable electrode for ORP57
Mi58P Replaceable electrode for pH58
M10000B Electrode rinse solution, 20 mL sachet (25 pcs)
M10004B pH 4.01 buffer solution 20 mL sachet (25 pcs)
M10007B pH 7.01 buffer solution 20 mL sachet (25 pcs)
M10010B pH 10.01 buffer solution 20 mL sachet (25 pcs)
MA9004 pH 4.01 buffer solution, 230 mL bottle
MA9007 pH 7.01 buffer solution, 230 mL bottle
MA9010 pH 10.01 buffer solution, 230 mL bottle
MA9015 Electrode storage solution, 230 mL
MA9016 Electrode cleaning solution, 230 mL
MA9020 ORP test solution (200/275 mV), 230 mL bottle
MA753 Hard carrying case for 2 testers

Ordering Information

ORP57 is supplied complete with protective cap, carton box (or optionally in a tubular plastic casing), batteries and instructions.

pH58 is supplied complete with protective cap, 20 mL pH 4.01 and pH 7.01 sachets of calibration solution, carton box (or optionally in a tubular plastic casing), batteries and instructions.

MC110/MC120

pH Monitors

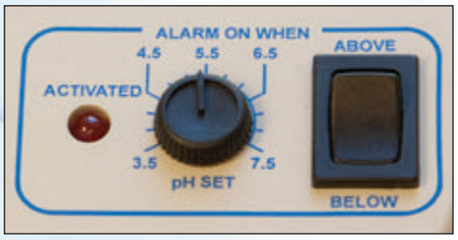
The Smart pH monitor allows you to continuously monitor pH values directly in your reservoir. Features include: user selectable set point, visual LED alarm when values go above the set point and manual calibration.
Each monitor is powered by a 12 VDC adapter and is ideal for applications such as Hydroponic and Aquarium.

The pH monitors are very simple to operate:
1. Hang your monitor above the reservoir;
2. Connect the adapter to the meter and plug in the power supply (make sure that your power supply is in a safe area away from the water);
3. Immerse 2/3 of the electrode in the solution;
4. The probe can now remain there permanently.

The monitors are supplied complete with a MA911B/2 pH electrode. Each monitor comes complete with a 12 VDC adapter and calibration solution.

User selectable Hi/Low Set Point

A visual LED alarms when value goes above or below the set point the user selected.



Specifications

	MC110	MC120
		
Range	0.0 to 14.0 pH	0.0 to 14.0 pH
Resolution	0.1 pH	0.1 pH
Accuracy (@25°C)	±0.2 pH	±0.2 pH
Calibration	manual, 2 points through trimmers on the meter front panel	manual, 2 points through trimmers on the meter front panel
Set point	3.5 to 7.5 pH	5.5 to 9.5 pH
Alarm	active when measurement is higher or lower than selected set point	active when measurement is higher or lower than selected set point
pH Electrode	**MA911B/2** (included)	**MA911B/2** (included)
Environment	0 to 50°C / 32 to 122°F; max RH 95%	0 to 50°C / 32 to 122°F; max RH 95%
Power supply	12 VDC power adapter (included)	12 VDC adapter
Packaging dimensions	268 x 122 x 118 mm	268 x 122 x 118 mm
Packaging weight	820 g	820 g

Accessories

M10000B Electrode rinse solution, 20 mL sachet (25 pcs)
M10004B pH 4.01 buffer solution, 20 mL sachet (25 pcs)
M10007B pH 7.01 buffer solution, 20 mL sachet (25 pcs)
M10010B pH 10.01 buffer solution, 20 mL sachet (25 pcs)
M10016B Electrode cleaning solution, 20 mL sachet (25 pcs)

MA9015 Electrode storage solution, 20 mL sachet (25 pcs)
MA9016 Electrode cleaning solution, 20 mL sachet (25 pcs)
MA9310 12 VDC Adapter, 220 V
MA9311 12 VDC Adapter, 110 V
MA911B/2 Double junction, gel filled pH electrode with 2 m cable

Ordering Information

MC110 is supplied complete with MA9310 12VDC adapter, MA911B/2 pH electrode, 20 mL pH 7.01 sachet of calibration solution, calibration screwdriver and instructions, in a carton box.

MC120 is supplied complete with MA9310 12VDC adapter, MA911B/2 pH electrode, 20 mL pH 7.01 sachet of calibration solution, calibration screwdriver and instructions, in a carton box.

pH Controller and Pump

Control the pH of your tank/reservoir AUTOMATICALLY!

The **MC122** pH controller and dosing pump (**MP810/MP815**) provides fully automated pH control of aqueous solutions in hydroponic systems. It has been specifically designed to control the pH in mixing tanks for fertirrigation.
The small and precise flow of the peristaltic pump allows you to maintain ideal pH values in your tank.

After selecting the desired pH setting from 5.5 to 9.5 pH, the pH controller measures the pH value of the solution and automatically adds pH adjustment (acid or alkaline) to change the liquid's pH to the selected level.

The **MP815** pump is with adjustable flow rate and dosing can be reduced by using a timer to turn the pump on and off at regular intervals.

Specifications	MP810	MP810 US
Max. Flow	1.5 L/h	0.6 L/h
Max. Pressure	2 bar	1.5 bar
Squeeze tubing	Santoprene	Santoprene
Ext. Tube connection	6 mm	6 mm
Power supply	240 VAC, 50-60 Hz	110 VAC, 60 Hz
Power consumption	7.7 W	0.42 W
Packaging dimensions	138 x 165 x 123 mm	138 x 165 x 123 mm
Packaging weight	820 g	620 g

Specifications	MP815	MP815 US
Adjustable Flow	0.0 to 2.2 L/h	0.0 to 2.2 L/h
Max. Pressure	2 bar	1.5 bar
Squeeze tubing	Santoprene	Santoprene
Ext. Tube connection	6 mm	6 mm
Power supply	240 VAC, 50-60 Hz	110 VAC, 60 Hz
Power consumption	7.7 W	0.42 W
Packaging dimensions	138 x 165 x 123 mm	138 x 165 x 123 mm
Packaging weight	820 g	620 g

MC122 pH Controller

Ordering Information

MP810 and **MP815** are supplied complete with mounting bracket, screws, 1.5 meter Ext. PE tubing, Filter, Fitting, 2,6 meter Power cable.

MC122 is supplied complete with MA9310 12 VDC adapter, MA911B/2 pH electrode, 20 mL pH4.01 sachet of calibration solution, 20 mL pH7.01 sachet of calibration solution, calibration screwdriver and instructions.

You can also order **MC122** with **MP810** in a kit (**MC720**).

MC720 kit, including MC122 pH Controller and MP810 Dosing Pump

Accessories

M10000B Electrode rinse solution 20 mL sachet (25 pcs)
M10004B pH 4.01 buffer solution 20 mL sachet (25 pcs)
M10007B pH 7.01 buffer solution 20 mL sachet (25 pcs)
M10010B pH 10.01 buffer solution 20 mL sachet (25 pcs)

MA9015 Electrode storage solution 20 mL sachet (25 pcs)
MA9310 12 VDC Adapter, 220 V
MA9311 12 VDC Adapter, 110 V
MA911B/2 Double junction, gel filled pH electrode with 1 m cable

MC122/MC510/MC125

pH & ORP Controllers

With Milwaukee's MC Controllers you can monitor and control pH and/or ORP levels.

The Milwaukee Instruments MC Controllers have a user selectable set point and a visual "Power Activated" LED notification light. Power to the controller box is turned on when the reading is Above or Below the selected set point. These MC Controllers are ideal for CO_2 or ozone dosing. This could be controlled by a solenoid valve (MA955).

With each Milwaukee Smart controller, your aquarium will have the individual attention that it needs.

Each unit comes with 12 VDC adapter, mounting kit, probe and starter calibration solution for pH (factory calibrated for ORP).
Professional pH controller especially designed for use with aquariums.

MA955 Solenoid valve for CO_2 dosing

Key features include:

- User selectable Hi/Low Set Point
- Manual 2 points calibration
- Visual LED alarm
- Supplied with 12 VDC adapter and mounting kit
- Power plug for CO_2 dosing
- Double junction pH electrode and/or platinum ORP electrode (BNC connector)

Specifications	 MC122	 MC510	 MC125
Range	0.0 to 14.0 pH	±1000 mV (ORP)	0.00 to 14.00 pH; ±1000 mV (ORP)
Resolution	0.1 pH	1 mV (ORP)	0.1 pH; 1 mV (ORP)
Accuracy (@25°C)	±0.2 pH	±5 mV (ORP)	±0.2 pH; ±5 mV (ORP)
Set point pH	5.5 to 9.5 pH		4 to 8 pH
Set point ORP		0 to 600 mV	-200 to 600 mV
Alarm	active when measurement is higher or lower than selected set point	active when measurement is higher or lower than selected set point	active when measurement is higher or lower than selected set points
Output power socket	relay, 230V / 117V; 8A	relay, 230V / 117V; 8A	relay, 230V / 117V; 8A
Output	active when measurement is higher or lower than selected set point	active when measurement is higher or lower than selected set point	active when measurement is higher or lower than selected set points
pH Electrode	**MA911B/2** (included)		**MA911B/2** (included)
ORP Electrode		**MA921B/2** (included)	**MA921B/2** (included)
Environment	0 to 50°C / 32 to 122°F; max RH 95%	0 to 50°C / 32 to 122°F; max RH 95%	0 to 50°C / 32 to 122°F; max RH 95%
Power Supply	12 VDC power adapter (included)	12 VDC power adapter (included)	12 VDC power adapter (included)
Power Drivers	115VAC, 2A, 60Hz or 230VAC, 1A, 50Hz	115VAC, 2A, 60Hz or 230VAC, 1A, 50Hz	115VAC, 2A, 60Hz or 230VAC, 1A, 50Hz
Packaging dimensions	276 x 129 x 138 mm	276 x 129 x 138 mm	276 x 129 x 138 mm
Packaging weight	1.1 kg	0.9 kg	1.4 kg

Accessories

M10000B Electrode rinse solution 20 mL sachet (25 pcs)
M10004B pH 4.01 buffer solution 20 mL sachet (25 pcs)
M10007B pH 7.01 buffer solution 20 mL sachet (25 pcs)
M10010B pH 10.01 buffer solution 20 mL sachet (25 pcs)
MA9015 Electrode storage solution 20 mL sachet (25 pcs)

MA9310 12 VDC Adapter, 220 V
MA9311 12 VDC Adapter, 110 V
MA955 Solenoid valve with 1.5 m cable
MA911B/2 Double junction, gel filled pH electrode with 1 m cable
MA921B/2 ORP Electrode with BNC connector and 2 m cable

Ordering Information

MC122 is supplied complete with MA9310 12 VDC adapter, MA911B/2 pH electrode, 20 mL pH4.01 sachet of calibration solution, 20 mL pH7.01 sachet of calibration solution, calibration screwdriver and instructions, in a carton box.

MC510 is supplied complete with MA9310 12 VDC adapter, MA921B/2 ORP electrode and instructions, in a carton box.

MC125 is supplied complete with MA9310 12 VDC adapter, power plug socket for ozone dosing, MA911B/2 pH electrode, MA921B/2 ORP electrode, 20 mL pH7.01 sachet of calibration solution, calibration screwdriver and instructions, in a carton box.

Mi170

Autoranging EC/TDS/NaCl/Temperature Laboratory Bench Meter

Mi170 measures 4 different parameters - EC, TDS (Total Dissolved Solids), percentage of NaCl and temperature in a variety of ranges.
The auto-ranging feature for EC and TDS measurements automatically sets the resolution suitable to the tested sample. All measurements can be temperature compensated at 20 or 25°C and the compensation coefficient is selectable by the user.

The automatic temperature compensation can also be disabled for measuring the actual conductivity value. The stability indicator on the LCD ensures accuracy.

Conductivity readings are performed with the 4-ring probe supplied with the meter. The GLP feature allows users to store and recall data on system status.

PC compatible through an RS232 or USB port.

Specifications		Mi170
Range	**EC**	0.00 to 29.99 µS/cm; 30.0 to 299.9 µS/cm; 300 to 2999 µS/cm; 3.00 to 29.99 mS/cm; 30.0 to 200.0 mS/cm; up to 500.0 mS/cm actual conductivity (uncompensated EC)*
	TDS	0.00 to 14.99 mg/L (ppm); 15.0 to 149.9 mg/L (ppm); 150 to 1499 mg/L (ppm); 1.5 to 14.99 g/L (ppt); 15.0 to 100.0 g/L (ppt); up to 400.0 g/L actual TDS* (with 0.80 factor)
	NaCl	0.0 to 400.0%
	Temp	-20.0 to 120.0°C / -4.0 to 248.0°F
Resolution	**EC**	0.01 µS/cm; 0.1 µS/cm; 1.0 µS/cm; 0.01 mS/cm; 0.1 mS/cm
	TDS	0.01 mg/L; 0.1 mg/L; 1.0 mg/L; 0.01 g/L; 0.1 g/L
	NaCl	0.1%
	Temp	0.1°C / 0.1°F
Accuracy	**EC**	±1% of reading ±(0.05 µS/cm or 1 digit)
	TDS	±1% of reading ±(0.03 mg/L or 1 digit)
	NaCl	±1% of reading
	Temp	±0.4°C / ±0.8°F
Calibration	**EC**	1 point slope calibration with 6 memorized solutions (84.0 µS/cm, 1413 µS/cm, 5.00 mS/cm, 12.88 mS/cm, 80.0 mS/cm, 111.8 mS/cm)
	NaCl	1 point, with MA9066 calibration solution
	Temp	2 points, 0 to 50°C / 32 to 122°F
Temp. Compensation		automatic or manual, from -20.0 to 120.0°C / -4.0 to 248.0°F
Temp. Coefficient		selectable from 0.00 to 6.00%/°C (EC and TDS only)
Probe		**MA814DB/1** 4-ring probe with built-in temperature sensor (included)
TDS Factor		0.40 to 0.80 (default value is 0.50)
Logging		up to 50 records, LOG on demand or auto-logging
GLP		last EC, NaCl calibration data
PC Interface		RS232 / USB Opto-isolated
Environment		0 to 50°C / 32 to 122°F; max RH 95%
Power supply		12 VDC power adapter (included)
Packaging dimensions		335 x 120 x 255 mm
Packaging weight		2.16 kg

(*) Uncompensated conductivity (or TDS) is the conductivity (or TDS) value without temperature compensation.

More accurate readings with the 4-RING MA814DB/1 EC/TDS/NaCl and Temperature probe!

Conductivity readings are performed by applying an alternate current to the 4-ring probe which creates a variable voltage depending on the conductivity.

Rear Connector Panel layout

Communication to the PC is done via opto-isolated USB and RS232 ports.

Accessories

MA814DB/1	EC/Temperature probe with DIN connector and 1 m cable
MA9060	12880 µS/cm calibration solution, 230 mL bottle
MA9061	1413 µS/cm calibration solution, 230 mL bottle
MA9063	84 µS/cm calibration solution, 230 mL bottle
MA9064	80000 µS/cm conductivity solution, 230 mL bottle
MA9065	111.8 mS/cm calibration solution, 230 mL bottle
MA9066	100% NaCl calibration solution, 230 mL bottle
MA9069	5000 µS/cm solution, 230 mL bottle
MA9310	12 VDC Adapter, 220 V
MA9311	12 VDC Adapter, 110 V
MA9315	Electrode holder
MA9350	RS232 connection cable with 2 meters cable
Mi5200	Application Software

Ordering Information

Mi170 is supplied complete with
- **MA814DB/1** EC/TDS/NaCl/Temperature Probe
- **MA9315** Electrode Holder
- **Mi5200** Application Software
- **MA9350** RS232 connection cable with 2 meters cable
- **MA9310** 12 VDC Adapter
- Instruction manual

Mi306

Automatic & Logging EC/TDS/NaCl/Temperature Meter

Mi306 is a water-resistant portable logging microprocessor-based Conductivity/TDS/NaCl/Temperature meter.
The autoranging feature of the EC and TDS ranges automatically sets the meter to the scale with the highest possible resolution.

The Auto Endpoint (HOLD) feature automatically freezes the display when a stable reading is reached. The measurements are automatically (ATC) or manually (MTC) compensated for temperature.
The temperature coefficient value is user selectable. It is possible to disable the temperature compensation and measure the actual conductivity (NoTC).
The Battery Error Preventing System (BEPS) switches the meter off when the batteries are too weak to support proper function. The meter can store measurements in memory by logging function for retrieval at a later time upon user request.

Mi306 also allows data transfer to computer through the RS232 port. Double LCD displays, for simultaneous readings of the specific conductivity and temperature.

Specifications		Mi306
Range	(Autoranging) EC	0.00 to 29.99 µS/cm; 30.0 to 299.9 µS/cm; 300 to 2999 µS/cm; 3.00 to 29.99 mS/cm; 30.0 to 200.0 mS/cm; up to 500.0 mS/cm actual (*) EC
	(Autoranging) TDS	0.00 to 14.99 mg/L; 15.0 to 149.9 mg/L; 150 to 1499 mg/L; 1.50 to 14.99 g/L; 15.0 to 100.0 g/L; up to 400.0 g/L actual (*) TDS (with 0.80 factor)
	NaCl	0.0 to 400.0%
	Temp	0.0 to 60.0°C
Resolution	EC	0.01 µS/cm (from 0.00 to 29.99 µS/cm); 0.1 µS/cm (from 30.0 to 299.9 µS/cm); 1 µS/cm (from 300 to 2999 µS/cm); 0.01 mS/cm (from 3.00 to 29.99 mS/cm); 0.1 mS/cm (over 30.0 mS/cm)
	TDS	0.01 mg/L (from 0.00 to 14.99 mg/L); 0.1 mg/L (from 15.0 to 149.9 mg/L); 1 mg/L (from 150 to 1499 mg/L); 0.01 g/L (from 1.50 to 14.99 g/L); 0.1 g/L (over 15.0 g/L)
	NaCl	0.1%
	Temp	0.1°C
Accuracy	EC	±1% of reading (±0.05 µS/cm or 1 digit whichever greater)
	TDS	±1% of reading (±0.053 ppm or 1 digit whichever greater)
	NaCl	±1% of reading
	Temp	±0.4°C
Typical EMC Deviation	EC	±1% of reading
	TDS	±1% of reading
	NaCl	±1% of reading
	Temp	±0.1°C
Logging		up to 250 records, LOG on demand
Communication		with PC through RS232 port
EC Calibration		1 point with 7 memorized buffers: 0 µS/cm; 84 µS/cm, 1413 µS/cm, 5000 µS/cm, 12880 µS/cm, 80000 µS/cm; 111800 µS/cm
NaCl Calibration		1 point with MA9066 buffer (optional)
Temperature Compensation		automatic or manual from 0 to 60°C (can be disabled to measure actual conductivity and TDS)
Temperature Coefficient		0.00 to 6.00%/°C (for EC and TDS only) Default value is 1.90%/°C
TDS Factor		0.40 to 0.80 (default value is 0.50) reference temperature: 20 or 25°C
Probe		**MA814D/1** EC probe with built-in temperature sensor & 1 m cable (included)
Auto-off		after 5 minutes of non use (can be disabled)
Battery type / Battery life		1 x 9V battery (included) / approx. 100 hours of use
Casing		IP 67
Environment		0 to 50°C; max RH 100%
Packaging dimensions		305 x 280 x 115 mm
Packaging weight		1.22 kg

(*) Uncompensated conductivity (orTDS) is the conductivity (or TDS) value without temperature compensation.

Accessories

MA814D/1 4-ring EC probe with DIN connector and 1 m cable
M10030B 12880 µS/cm calibration solution, 20 mL sachet, 25 pcs.
M10031B 1413 µS/cm calibration solution, 20 mL sachet, 25 pcs.
M10035B 111.8 mS/cm calibration solution, 20 mL sachet, 25 pcs.
MA9060 12880 µS/cm calibration solution, 230 mL bottle
MA9061 1413 µS/cm calibration solution, 230 mL bottle
MA9063 84 µS/cm calibration solution, 230 mL bottle
MA9065 111.8 mS/cm calibration solution, 230 mL bottle
MA9066 100% NaCl calibration solution, 230 mL bottle
MA9069 5000 µS/cm solution, 230 mL bottle
MA9351 RS232 connection cable (5 to 9 pin) with 2 meters cable (for Mi306)
Mi5200 Application Software

Ordering Information

Mi306 is supplied in a hard carrying case complete with
- **MA814D/1** EC/TDS/Nacl/Temp probe with DIN connector and 1 meter cable
- **MA9060** 12880 µS/cm calibration solution
- **Mi5200** Application Software
- **MA9351** RS232 connection cable with 2 meters cable
- Instruction manual

MW301/MW302/MW401/MW402

Entry level, inexpensive Conductivity & TDS Portable Meters for fast and reliable results

MW301, MW302, MW401 and **MW402** are compact microprocessor-based Conductivity and TDS Portable Meters. These handy and ergonomically designed portable meters are ideal for anyone working on a low budget and still requires fast and reliable measurements.

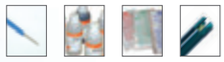
These portable meters are suitable for a wide range of applications, such as Educational, Agriculture and Horticulture, as well as water and environmental analysis.

These portable meters with Automatic Temperature Compensation have a smaller, ergonomic and lighter case design. Other features include large and easy to read LCD Display and long battery life.
Each meter is supplied complete with Conductivity/TDS probe with 1 meter cable and calibration solution.

Choose your portable EC & TDS meter according to the proper EC/TDS ranges for your application:

- **MW301**: 0 to 1999 µS/cm with a 1 µS/cm resolution;
- **MW302**: 0.0 to 10.0 mS/cm with a 0.1 mS/cm resolution;
- **MW401**: 0 to 1999 mg/L (ppm) with a 1 mg/L resolution;
- **MW402**: 0.0 to 10.0 g/L (ppt) with a 0.1 g/L resolution.

Specifications	 MW301	 MW302	 MW401	 MW402
Range	0 to 1999 µS/cm	0.0 to 10.0 mS/cm	0 to 1999 mg/L (ppm)	0.0 to 10.0 g/L (ppt)
Resolution	1 µS/cm	0.1 mS/cm	1 mg/L (ppm)	0.1 g/L (ppt)
Accuracy (@25°C)	±2% Full Scale	±2 Full Scale	±2% Full Scale	±2 Full Scale
Conversion factor			0.5	0.5
Calibration Solutions (included)	1413 µS/cm (M10031B)	5.00 mS/cm (M10039B)	1382 mg/L (M10032B)	6.44 g/L (M10038B)
Conductivity probe	**SE510** (included)	**SE520** (included)	**SE510** (included)	**SE520** (included)
Temperature Compensation	automatic, from 5 to 50°C	automatic, from 5 to 50°C	automatic, from 5 to 50°C	automatic, from 5 to 50°C
Environment	0 to 50°C, max RH 95%	0 to 50°C, max RH 95%	0 to 50°C, max RH 95%	0 to 50°C, max RH 95%
Battery Type	1 x 9V alkaline (included)	1 x 9V alkaline (included)	1 x 9V alkaline (included)	1 x 9V alkaline (included)
Battery Life	approx. 300 hours of use	approx. 300 hours of use	approx. 300 hours of use	approx. 300 hours of use
Packaging dimensions	212 x 145 x 67 mm	212 x 145 x 67 mm	212 x 145 x 67 mm	212 x 145 x 67 mm
Packaging weight	440 g	440 g	440 g	440 g



Accessories

SE510 EC/TDS probe with DIN connector and 1 m cable for MW301, MW401
SE520 EC/TDS probe with DIN connector and 1 m cable for MW302, MW402
M10031B 1413 µS/cm calibration solution, 20 mL (25 pcs)
M10032B 1382 ppm (mg/L) calibration solution, 20 mL (25 pcs)
M10038B 6.44 ppt (g/l) calibration solution, 20 mL (25 pcs)
MA9060 12880 µS/cm calibration solution, 230 mL bottle
MA9061 1413 µS/cm calibration solution, 230 mL bottle
MA9062 1382 ppm TDS solution, 230 mL bottle

Ordering Information

MW301 is supplied complete with SE510 EC probe, 20 mL 1413 µS/cm sachet of calibration solution, screwdriver for calibration, 9V battery and instructions.
MW302 is supplied complete with SE520 EC probe, 20 mL 5.00 mS/cm sachet of calibration solution, screwdriver for calibration, 9V battery and instructions.
MW401 is supplied complete with SE510 EC probe, 20 mL 1382 ppm sachet of calibration solution, screwdriver for calibration, 9V battery and instructions.
MW402 is supplied complete with SE520 EC probe, 20 mL 6.44 ppt sachet of calibration solution, screwdriver for calibration, 9V battery and instructions.

Packaging Information

MW301, MW302, MW401, MW402 are supplied in a carton color box. Optionally they can be ordered in a hard carrying case (**MA751**).

EC59/EC60

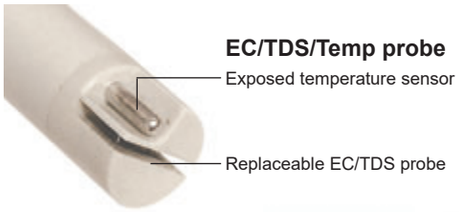
Pocket-size EC/TDS/Temp Meters

These new water-resistant Pocket-size EC/TDS/Temp Meters include features such as a replaceable probe, temperature in °C or °F, automatic temperature compensation with adjustable β, battery level indicator, stability indicator, automatic shut-off and automatic calibration all in a floating, water-resistant casing.

EC59 shows on the dual-level LCD the EC (3999 µS/cm) or TDS (2000 ppm) value. It also displays the temperature from 0.0 to 60.0°C (or 32.0 to 140.0°F) on the secondary level at the same time.

EC60 shows on the dual-level LCD the EC (20.00 mS/cm) or TDS (10.00 ppt) value. It also displays the temperature from 0.0 to 60.0°C (or 32.0 to 140.0°F) on the secondary level at the same time.

Specifications		EC59	EC60
Range	EC	3999 µS/cm	20.00 mS/cm
	TDS	2000 ppm	10.00 ppt
	Temp	0.0 to 60.0°C / 32.0 to 140.0°F	0.0 to 60.0°C / / 32.0 to 140.0°F
Resolution	EC	1 µS/cm	0.01 mS/cm
	TDS	1 ppm	0.01 ppt
	Temp	0.1°C / 0.1°F	0.1°C / 0.1°F
Accuracy (@20°C)	EC	±2% Full Scale	±2% Full Scale
	TDS	±2% Full Scale	±2% Full Scale
	Temp	±0.5°C / ±1°F	±0.5°C / ±1°F
Typical EMC Deviation	EC	±2% Full Scale	±2% Full Scale
	TDS	±2% Full Scale	±2% Full Scale
	Temp	±0.5°C / ±1°F	±0.5°C / ±1°F
Calibration		automatic, 1 point with 1413 µS/cm calibration solution	automatic, 1 point with 12880 µS/cm calibration solution
Temperature Compensation		automatic, with β=0.0 to 2.4%/°C	automatic, with β=0.0 to 2.4%/°C
Probe		**Mi59P** (replaceable)	**Mi59P** (replaceable)
Environment		0 to 50°C / 32 to 122°F; max RH 100%	0 to 50°C / 32 to 122°F; max RH 100%
Battery Type		4 x 1.5V; IEC LR44, A76 (included)	4 x 1.5V; IEC LR44, A76 (included)
Battery Life		approx. 100 hours of use	approx. 100 hours of use
Auto-off		after 8 minutes of non-use	after 8 minutes of non-use
Packaging dimensions		254 x 67 x 47 mm	254 x 67 x 47 mm
Packaging weight		180 g	180 g

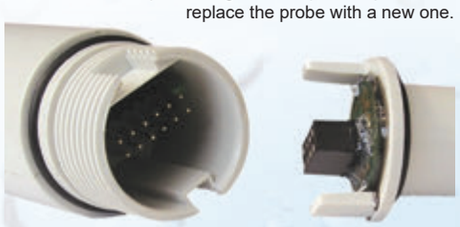


Accessories

Mi59P	Replaceable probe for EC59 & EC60
M10000B	Rinse solution, 20 mL sachet, 25 pcs
M10030B	12880 µS/cm calibration solution, 20 mL sachet, 25 pcs
M10031B	1413 µS/cm calibration solution, 20 mL sachet, 25 pcs
M10032B	1382 ppm (mg/L) calibration solution, 20 mL sachet, (25 pcs)
M10038B	6.44 ppt (g/L) calibration solution, 20 mL sachet, (25 pcs)
MA9060	12880 µS/cm calibration solution, 230 mL bottle
MA9061	1413 µS/cm calibration solution, 230 mL bottle
MA9016	Cleaning solution, 230 mL bottle
MA753	Hard carrying case for 2 testers

Replaceable probe

Replace the probe in a fast and simple way yourself! Just unscrew the plastic ring on the top of the probe and replace the probe with a new one.



Ordering Information

EC59 is supplied complete with protective cap, 20 mL 1413 µS/cm sachet of calibration solution, carton box (or optionally in a tubular plastic casing), batteries and instructions.

EC60 is supplied complete with protective cap, 20 mL 12880 µS/cm sachet of calibration solution, carton box (or optionally in a tubular plastic casing), batteries and instructions.

Packaging Information

EC59 and **EC60** can be supplied in a carton box or in a tubular plastic casing. Optionally **EC59** and **EC60** is also availablbe in a kit (**Mi5559** or **Mi5560**) together with **pH55** pH/Temp Meter.

MC310/MC410

Conductivity/TDS Monitors

Reliable Conductivity and TDS monitors with Automatic temperature compensation and 1 point manual calibration powered by a 12 VDC adapter. They are ideal for the hydroponic market and allow you to continuously monitor EC or TDS values directly in your reservoir.

Other features include: user selectable set point, visual LED alarm when values go above/below (selectable by the user) the set point.

The monitors are very simple to operate:

1. Hang your monitor above your reservoir
2. Connect the adapter to the meter and plug in the power supply (make sure that your power supply is in a safe area from the water!)
3. Immerse 2/3 of the probe in the solution
4. The probe can now remain there permanently.

User selectable Hi/Low Set Point

A visual LED alarms when value goes above or below the set point the user selected.

Specifications	 MC310	 MC410
Range	0.0 to 10.0 mS/cm	0 to 1990 ppm
Resolution	0.1 mS/cm	10 ppm
Accuracy (@25°C)	±2% Full Scale	±2% Full Scale
Conversion factor		0.7
Set point	1 to 5 mS/cm	100 to 1900 ppm
Alarm	active when the measurement is higher or lower than the set point	active when the measurement is higher or lower than the set point
Temperature compensation	automatic, from 5 to 50°C	automatic, from 5 to 50°C
Environment	0 to 50°C; max RH 95%	0 to 50°C; max RH 95%
Probe	**MA812/2** (included)	**MA812/2** (included)
Power supply	12 VDC power adapter (included)	12 VDC power adapter (included)
Packaging dimensions	268 x 122 x 118 mm	268 x 122 x 118 mm
Packaging weight	820 g	820 g

Accessories

M10000B Electrode rinse solution, 20 mL sachet (25 pcs)
M10031B 1413 µS/cm calibration solution, 20 mL sachet (25 pcs)
M10032B 1382 ppm calibration solution, 20 mL sachet (25 pcs)
MA9061 1413 µS/cm calibration solution, 230 mL bottle
MA9062 1382 ppm TDS solution, 230 mL bottle
MA9310 12 VDC Adapter, 220 V
MA9311 12 VDC Adapter, 110 V
MA812/2 Conductivity probe with 2 m cable

Ordering Information

MC310 is supplied complete with MA9310 12VDC adapter, MA812/2 EC probe, 20 mL 5.00 mS/cm sachet of calibration solution, screwdriver for calibration and instruction, in a carton box.

MC410 is supplied complete with MA9310 12VDC adapter, MA812/2 TDS probe, 20 mL 1382 ppm sachet of calibration solution, screwdriver for calibration and instruction, in a carton box.

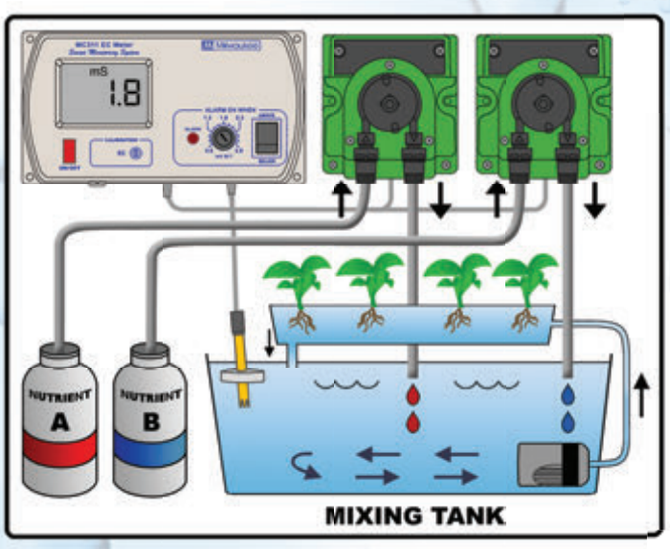
MC311
Conductivity Controller

MC740 & MC745 control the EC & nutrient dosage in your tank AUTOMATICALLY!

The **MC311** EC controller and dosing pump (**MP810**) provides fully automated EC control of aqueous solutions in hydroponic systems.
The **MC740** kit contains the **MC311** controller with one **MP810** dosing pump, the **MC745** kit contains the **MC311** controller with two **MP810** dosing pumps!

Accessories:

MA812/2 EC probe with 2 meter cable



Specifications	MC311
Range	0.0 to 10.0 mS/cm
Resolution	0.1 mS/cm
Accuracy (@25°C)	±2% Full scale
Set point	0.8 to 2.8 mS/cm
Alarm	active when measurement is higher or lower than the selected set point
Temp. compensation	automatic
Output	active when measurement is higher or lower than the selected set point
Power supply	12 VDC adapter
Packaging dimensions	278 x 132 x 138 mm
Packaging weight	1.1 kg

EC40 EC Waterproof Nutrient Stick

- Readings are displayed with 20 LEDs graph bar
- Range 0.2 to 4 mS/cm
- The alarm feature is user settable and is displayed on the LED bar
- No calibration required
- Auto-ON/OFF function
- The auto-check feature indicates the battery level
- Waterproof and floating design makes the stick an appropriate tool for stirring nutrient solutions in a bucket/tank

Graphite EC probe with ATC

Supplied in a plastic tube

Specifications	EC40
Range	0.2 to 4 mS/cm 2 to 40 CF 140 to 2800 ppm (0.7) 100 to 2000 ppm (0.5)
Resolution	0.1 mS/cm 1 CF 70 ppm 50 ppm
Accuracy	± 4% of reading ± 1 resolution point
Probe	Graphite probe in ABC+PC body
Temp. compensation	automatic
Battery Type	3 x 1.5V AA alkaline
Battery Life	approx. 3 years
Packaging dimensions	445 x dia 50 mm
Packaging weight	311 g

Mi190

Extended Range Bench Dissolved Oxygen Meter

Ideal for testing Dissolved Oxygen in the pharmaceutical and food Industry, as well as monitoring in water treatment plants. The user can choose to measure D.O. readings in mg/L or % of saturation of O_2.
This meter can be used for any type of water, as it allows measurements to compensate for temperature, altitude and salinity factors. The automatic logging interval can be set to perform analysis and store data into the memory.

All logged data can be downloaded to your PC through an RS232 or USB serial port. Memory can store up to 50 samples. **Mi190** features an automatic calibration procedure, at 1 or 2 points (at 0 and 100% of O_2 saturation). The polarographic probe supplied with the meter (MA840) measures the current generated by the reaction of O_2 with Ag.

Mi190 is supplied complete with MA840 DO probe with 3 m cable, 2 spare membranes, MA7041 electrolyte solution (30 mL), 12 VDC power adapter, probe holder and instruction manual.

Specifications		Mi190
Range	O_2	0.00 to 45.00 mg/L (ppm)
	% Saturation O_2	0.0 to 300%
	Temp	-5.0 to 55.0°C / 23.0 to 131.0°F
Resolution	O_2	0.01 mg/L (ppm)
	% Saturation O_2	0.1%
	Temp	0.1°C / 0.1°F
Accuracy	O_2	±1.5 Full Scale
	% Saturation O_2	±1.5 Full Scale
	Temp	±0.4°C / ±0.8°F
DO Calibration		automatic, 1 or 2 point at 0% (MA9070) and 100% (in air)
Temperature compensation		0.0 to 50.0°C / 32.0 to 122.0°F
Altitude compensation		0 to 4000 m; resolution 100 m
Salinity compensation		0 to 40 g/L; resolution 1 g/L
DO probe		**MA840** with DIN connector (included)
Temperature Probe		Included in DO probe
Calibration		2 points (0.0°C and 50.0°C / 32.0 to 122.0°F)
Logging		up to 50 records, LOG on demand or auto-logging
PC interface		RS232 / USB Opto-isolated
Power Supply		12 VDC power adapter (included)
Environment		0 to 50°C / 32 to 122°F; max RH 100%
Packaging dimensions		335 x 120 x 255 mm
Packaging weight		2.44 kg

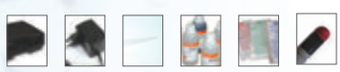
Polarographic D.O. Probe

Polarographic D.O. probe with 3 meters cable

Rear Connector Panel layout

Communication to the PC is done via opto-isolated USB and RS232 ports.

Accessories



MA9070	Zero Oxygen Solution, 230 mL bottle
MA9071	Refilling Electrolyte Solution, 230 mL bottle
MA9310	12 VDC Adapter, 220 V
MA9311	12 VDC Adapter, 110 V
MA841	Spare membrane (5 pcs)
MA840	DO probe with 3 meters cable
MA9350	RS232 connection cable with 2 m cable
Mi5200	Application Software

Ordering Information

Mi190 is supplied complete with:
- **MA840** DO probe with 3 meter cable
- **MA841** Spare membrane (2 pcs)
- **MA9071** Electrolyte solution
- **Mi5200** Application Software
- **MA9350** RS232 connection cable with 2 meters cable
- **MA9310** 12 VDC Adapter
- Instruction manual

Mi605

Portable D.O. Meter for Field Applications

Mi605 is a portable, microprocessor-based, Dissolved Oxygen meter with automatic calibration and temperature compensation (ATC) specifically designed for spot sampling applications.
Dissolved Oxygen measurements can be displayed in parts per million (ppm=mg/L) or in % of saturation.
The temperature is indicated in Celsius from 0 to 50°C with 0.1 resolution. The meter compensates salinity and altitude automatically after manual input.

Calibration is very simple and fast: just expose the polarographic Dissolved Oxygen probe MA840, supplied with the instrument, to air and press the CAL button.
No need for chemical solutions!
A HOLD button allows the user to freeze the reading on the LCD.

The low battery indicator and the easy to replace screw on cap membranes make the Mi605 a compact instrument and ideal for all applications: aquaculture, wastewater, environmental and educational.

Specifications		Mi605
Range	O_2	0.0 to 45.00 mg/L (ppm)
	% Saturation O_2	0.0 to 300%
	Temp	0.0 to 50.0°C / 32 to 122°F
Resolution	O_2	0.01 mg/L (ppm)
	% Saturation O_2	0.1%
	Temp	0.1°C
Accuracy	O_2	±1.5% Full Scale
	% Saturation O_2	±1.5% Full Scale
	Temp	±0.5°C
Typical EMC Deviation	O_2	±0.3 mg/L (ppm)
	% Saturation O_2	±3.5%
	Temp	±0.5°C
Calibration		automatic in saturated air
Temperature Compensation		automatic, from 0 to 50°C / 32 to 122°F
Altitude Compensation		0 to 4000 m; 100 m resolution
Salinity Compensation		0 to 80 g/L; 1 g/L resolution
Probe		**MA840** (included)
Environment		0 to 50°C / 32 to 122°F; max RH 100%
Battery Type		1 x 9V alkaline (included)
Battery Life		approx. 100 hours of use
Auto-off		after 4 hours of non-use
Packaging dimensions		305 x 280 x 115 mm
Packaging weight		1.44 kg

Hard Carrying Case

Mi605 is supplied complete in a hard carrying case complete with a D.O. probe, spare membranes, calibration solutions, battery and instructions.

Accessories

MA9071 Refilling Electrolyte solution, 230 mL bottle
MA841 Spare membrane (5 pcs)
MA840 D.O. Probe

Ordering Information

Mi605 is supplied complete with MA840 polarographic D.O. probe with 4 meter cable, 2 spare membranes, 20 mL bottle of electrolyte solution, rugged carrying case, 9V battery and instructions.

MW600

Entry level, inexpensive Dissolved Oxygen Portable Meter for fast and reliable results

The **MW600** is a compact microprocessor-based Portable Dissolved Oxygen meter. This handy and ergonomically designed portable meter is ideal for anyone working on a low budget and still requires fast and reliable measurements.

This portable meter measures Dissolved Oxygen with a Polarographic probe and is suitable for a wide range of applications, such as Educational and Aquaculture, as well as water and environmental analysis.

Other features include smaller, ergonomic and lighter case design, large and easy to read LCD Display, low battery warning, easy to replace screw on cap membranes and long battery life.

MW600 is supplied complete with a MA840 D.O. polarographic probe with 4 meter cable, calibration screw-driver, 2 spare membranes, MA9071 (30 mL) electrolyte solution, battery and instructions.

The **MW600** calibrates easily in 2 points (at 100% saturated air and in 0 Oxygen solution) and has Automatic Temperature Compensation which guarantees the highest accuracy.

Specifications		MW600
Range	O_2	0.0 to 19.9 mg/L
Resolution	O_2	0.1 mg/L
Accuracy (@25°C)	O_2	±1.5% Full Scale
Calibration		manual on 2 points (zero and slope)
Temperature Compensation		automatic from 0 to 30°C
Probe		**MA840** (included)
Environment		0 to 50°C / 32 to 122°F; max RH 95%
Battery Type		9V alkaline (included)
Battery Life		approximately 70 hours of use
Packaging dimensions		268 x 122 x 118 mm
Packaging weight		880 g

Large and Easy-to-read Display

MW600 offers highly stable and accurate readings with large LCD display.

ALTITUDE & SALINITY COMPENSATION:
If the sample contains salts or if you are performing the measurements at altitude different from sea level, the readout values must be corrected, taking into account the lower degree of oxygen solubility.

Altitude Compensation: all the readouts are referred to sea level, thus the displayed measurements are higher than the actual values. In fact, altitude affects D.O. concentration by decreasing its value.

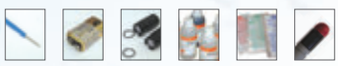
The table on the left reports the oxygen solubility at various temperatures and altitudes, based on sea level barometric pressure of 760 mmHg.

This gives an idea of the error that can be introduced at different altitudes and allows to calculate the quantity to be subtracted to correct the reading.

Altitude, Meters above Sea Level								
°C	0 m	300 m	600 m	900 m	1200 m	1500 m	1800 m	°F
0	14.6	14.1	13.6	13.2	12.7	12.3	11.8	32.0
2	13.8	13.3	12.9	12.4	12.0	11.6	11.2	35.6
4	13.1	12.7	12.2	11.9	11.4	11.0	10.6	39.2
6	12.4	12.0	11.6	11.2	10.8	10.4	10.1	42.8
8	11.8	11.4	11.0	10.6	10.3	9.9	9.6	46.4
10	11.3	10.9	10.5	10.2	9.8	9.5	9.2	50.0
12	10.8	10.4	10.1	9.7	9.4	9.1	8.8	53.6
14	10.3	9.9	9.6	9.3	9.0	8.7	8.3	57.2
16	9.9	9.7	9.2	8.9	8.6	8.3	8.0	60.8
18	9.5	9.2	8.7	8.6	8.3	8.0	7.7	64.4
20	9.1	8.8	8.5	8.2	7.9	7.7	7.4	68.0
22	8.7	8.4	8.1	7.8	7.7	7.3	7.1	71.6
24	8.4	8.1	7.8	7.5	7.3	7.1	6.8	75.2
26	8.1	7.8	7.5	7.3	7.0	6.8	6.6	78.8
28	7.8	7.5	7.3	7.0	6.8	6.6	6.3	82.4
30	7.5	7.2	7.0	6.8	6.5	6.3	6.1	86.0
32	7.3	7.1	6.8	6.6	6.4	6.1	5.9	89.6
34	7.1	6.9	6.6	6.4	6.2	6.0	5.8	93.2
36	6.8	6.6	6.3	6.1	5.9	5.7	5.5	96.8
38	6.6	6.4	6.2	5.9	5.7	5.6	5.4	100.4
40	6.4	6.2	6.0	5.8	5.6	5.4	5.2	104.4

Accessories

MA9070 Zero Oxygen calibration solution, 230 mL bottle
MA9071 Refilling Electrolyte solution, 230 mL bottle



MA840 D.O. Probe
MA841 Spare membrane (5 pcs)
MA751 Hard carrying case

Ordering Information

MW600 is supplied complete with MA840 probe, 2 spare membranes, 20 mL bottle of electrolyte solution, calibration screwdriver, 9V battery and instructions.

Mi180

pH/ORP/EC/TDS/NaCl/Temperature Laboratory Bench Meter

Mi180 measures 6 different parameters: pH, ORP, EC, TDS (Total Dissolved Solids), percentage of NaCl and temperature in a variety of ranges.
pH calibration can be performed in 3 points selectable between 7 memorized buffers, to provide a very accurate calibration curve even when testing different samples, where very wide differences in pH can be found.

The auto-ranging feature for EC and TDS measurements automatically sets the resolution suitable to the tested sample. All measurements can be temperature compensated at 20 or 25°C and the compensation coefficient is selectable by the user.

The automatic temperature compensation can also be disabled for measuring the actual conductivity value. The stability indicator on the LCD ensures accuracy. Conductivity readings are performed with the 4-ring probe supplied with the meter. The GLP feature allows users to store and recall data on system status.

PC compatible through an RS232 port or USB.

Specifications		Mi180
Range	pH	-2.00 to 16.00 pH; -2.000 to 16.000 pH
	ORP	±699.9 mV; ±2000 mV
	EC	0.00 to 29.99 µS/cm; 30.0 to 299.9 µS/cm; 300 to 2999 µS/cm; 3.00 to 29.99 mS/cm; 30.0 to 200.0 mS/cm; up to 500.0 mS/cm (uncompensed EC*)
	TDS	0.0 to 14.99 mg/L (ppm); 15.0 to 149.9 mg/L (ppm); 150 to 1499 mg/L (ppm); 1.50 to 14.99 g/L (ppt); 15.0 to 100.0 g/L (ppt); up to 400.0 g/L actual TDS (with 0.80 factor)
	NaCl	0.0 to 400.0%
	Temp	-20.0 to 120.0°C / -4.0 to 248.0°F
Resolution	pH	0.01 pH; 0.001 pH
	ORP	0.1 mV; 1 mV
	EC	0.01 µS/cm; 0.1 µS/cm; 1 µS/cm; 0.01 mS/cm; 0.1 mS/cm;
	TDS	0.01 mg/L; 0.1 mg/L; 1.0 mg/L; 0.01 g/L; 0.1 g/L
	NaCl	0.1%
	Temp	0.1°C / 0.1°F
Accuracy	pH	±0.01 pH; ±0.002 pH
	ORP	±0.2 mV; ±1 mV
	EC	±1% of reading ±(0.05 µS/cm or 1 digit)
	TDS	±1% of reading ±(0.03 ppm or 1 digit)
	NaCl	±1% reading
	Temp	±0.4°C / ±0.8°F
Rel mV offset		±2000 mV
Calibration	pH	1, 2 or 3 points calibration, with 7 memorized buffers (pH 1.68, 4.01, 6.86, 7.01, 9.18, 10.01 and 12.45)
	EC	1 point slope calibration with 6 memorized solutions: (84 µS/cm, 1413 µS/cm, 5.00 mS/cm, 12.88 µS/cm, 80.0 µS/cm, 111.8 mS/cm)
	NaCl	1 point, with MA9066 solution
	Temp	2 point, at 0 and 50°C / 32 and 122°F
Temperature Compensation		automatic or manual, from -20.0 to 120.0°C / -4.0 to 248.0°F
Temperature Coefficient		selectable from 0.00 to 6.00%/°C (EC and TDS only)
pH Electrode & Temp. Probe		**MA917B/1** & **MA831R** (included)
EC/TDS/NaCl/Temp. Probe		**MA814DB/1** (included)
TDS Factor		0.40 to 0.80 (default value is 0.50)
Logging		up to 50 records, LOG on demand or auto-logging
GLP		last pH, EC, NaCl calibration data
PC Interface		RS232 / USB Opto-isolated
Environment		0 to 50°C / 32 and 122°F; max RH 95%
Input impedance		10^{12} Ohm
Power supply		12 VDC power adapter (included)
Packaging dimensions		335 x 120 x 255 mm
Packaging weight		2.44 kg

(*) Uncompensated conductivity (or TDS) is the conductivity (or TDS) value without temperature compensation.

Accessories

MA9004	pH 4.01 buffer, 230 mL bottle
MA9007	pH 7.01 buffer, 230 mL bottle
MA9010	pH 10.01 buffer, 230 mL bottle
MA9015	Electrode storage solution, 230 mL bottle
MA9016	Electrode cleaning solution, 230 mL bottle
MA9112	pH 12.45 buffer solution, 230 mL bottle
MA9060	12880 µS/cm calibration solution, 230 mL bottle
MA9061	1413 µS/cm calibration solution, 230 mL bottle
MA9063	84 µS/cm calibration solution, 230 mL bottle
MA9065	111.8 mS/cm calibration solution, 230 mL bottle
MA9066	100% NaCl calibration solution, 230 mL bottle
MA9069	5000 µS/cm solution, 230 mL bottle
MA9310	12 VDC Adapter, 220 V
MA9311	12 VDC Adapter, 110 V
MA9315	Electrode Holder
MA917B/1	Double junction refillable pH electrode
MA814DB/1	EC/TDS/NaCl/Temperature probe with DIN connector and 1 m cable
MA924B/1	±2000 mV Glass ORP electrode, refillable with BNC connector and 1 meter cable
SE300	Platinum ORP electrode with 1 meter cable
MA831R	Temperature probe
MA9350	RS232 connection cable with 2 meters cable

Ordering Information

Mi180 is supplied complete with
- **MA917B/1** pH Electrode
- **MA814DB/1** EC/TDS/NaCl/Temperature probe
- **MA831R** Temperature Probe
- **MA9315** Electrode Holder
- **M10004** pH 4.01 Sachet Buffer solution
- **M10007** pH 7.01 Sachet Buffer solution
- **M10010** pH 10.01 Sachet Buffer solution
- **M10031** 1413 µS/cm calibration solution
- **M10016** Sachet Electrode Cleaning solution
- **Mi5200** Application Software
- **MA9350** RS232 connection cable (2 meters)
- **MA9310** 12 VDC Adapter
- Instruction manual

Mi805/Mi806

Portable pH/EC/TDS/Temperature Meters

Measures 4 parameters with 1 single probe.
Mi805 and **Mi806** offer you a combination of pH, Conductivity, total dissolved solids and temperature measurements.
You can select from a range of calibration buffers and also the temperature scale (°C or °F) can be selected.
The multi-parameter probe MA851D/1, includes pH/EC/TDS and temperature, all in one rugged handle.

Other features include different TDS factors from 0.45 to 1.00, and a range of temperature coefficients (ß) from 0.0 to 2.4% for greater consistency and reproducibility.
The Stability Indicator prompts the user when the reading stabilizes.

The Auto-Hold Function automatically freezes reading for later viewing. Large and Easy-to-Read display provides simultaneous readings of pH and Temperature or EC/TDS and temperature.

Specifications		Mi805	Mi806
Range	pH	0.00 to 14.00 pH	0.00 to 14.00 pH
	EC	0 to 3999 µS/cm	0.00 to 20.00 mS/cm
	TDS	0 to 1999 ppm	0.00 to 10.00 ppt
	Temp.	0.0 to 60.0°C / 32.0 to 140.0°F	0.0 to 60.0°C / 32.0 to 140.0°F
Resolution	pH	0.01 pH	0.01 pH
	EC	1 µS/cm	0.1 mS/cm
	TDS	1 ppm	0.01 ppt
	Temp.	0.1°C / 0.1°F	0.1°C / 0.1°F
Accuracy (@25°C)	pH	±0.01 pH	±0.01 pH
	EC/TDS	±2% Full Scale	±2% Full Scale
	Temp.	±0.5°C / ±1°F	±0.5°C / ±1°F
Typical EMC Deviation	pH	±0.02 pH	±0.02 pH
	EC/TDS	±2% Full Scale	±2% Full Scale
	Temp.	±0.5°C / ±1°F	±0.5°C / ±1°F
Temperature Compensation		automatic from 0 to 60°C with ß adj. from 0.0 to 2.4%/°C	automatic from 0 to 60°C with ß adj. from 0.0 to 2.4%/°C
pH Calibration		automatic, 1 or 2 points with automatic buffer recognition	automatic, 1 or 2 points with automatic buffer recognition
EC Calibration		automatic, 1 point	automatic, 1 point
EC/ TDS Conversion Factor		adj. from 0.45 to 1.00	adj. from 0.45 to 1.00
Probe		**MA851D/1** amplified pH/EC/TDS/Temperature probe with DIN connector and 1 m cable (included)	**MA851D/1** amplified pH/EC/TDS/Temperature probe with DIN connector and 1 m cable (included)
Environment		0 to 50°C / 32 to 122°F max RH 100%	0 to 50°C / 32 to 122°F max RH 100%
Battery Type		1 x 9V alkaline (included)	1 x 9V alkaline (included)
Battery Life		approx. 300 hours	approx. 300 hours
Auto-off		after 8 minutes of non-use	after 8 minutes of non-use
Packaging dimensions		305 x 280 x 115 mm	305 x 280 x 115 mm
Packaging weight		1.44 kg	1.46 kg

Accessories

MA851D/1	Amplified pH/EC/TDS/Temperature probe with DIN connector and 1 m cable
MA9004	pH 4.01 buffer solution, 230 mL bottle
MA9006	pH 6.86 buffer solution, 230 mL bottle
MA9007	pH 7.01 buffer solution, 230 mL bottle
MA9009	pH 9.18 buffer solution, 230 mL bottle
MA9010	pH 10.01 buffer solution, 230 mL bottle
MA9015	Probe storage solution, 230 mL
MA9016	General cleaning solution, 230 mL
MA9060	12880 µS/cm solution, 230 mL
MA9061	1413 µS/cm solution, 230 mL
M10000B	Rinse solution, 20 mL (25 pcs.)

Ordering Information

Mi805 is supplied complete with MA851D/1 pH/EC/TDS/Temp amplified probe with 1 meter cable, 2x20 mL pH 4.01 and pH 7.01 sachet of calibration solutions, 2x20 mL 1413 µS/cm sachet of calibration solutions, 2x20 mL sachet of electrode cleaning solutions, rugged carrying case, 9V battery and instructions.

Mi806 is supplied complete with MA851D/1 pH/EC/TDS/Temp amplified probe with 1 meter cable, 2x20 mL pH 4.01 and pH 7.01 sachet of calibration solutions, 2x20 mL 12880 µS/cm sachet of calibration solutions, 2x20 mL sachet of electrode cleaning solutions, rugged carrying case, 9V battery and instructions.

MW801/MW802

Entry level, inexpensive pH/EC/TDS Portable Meters for fast and reliable results

MW801 and **MW802** are compact microprocessor-based Portable Meters. These meters allow you to measure pH, EC (conductivity) and TDS with just one instrument and one single probe!

These easy and fast to calibrate portable meters have a smaller, ergonomic and lighter case design. Other features include large and easy to read LCD Display and long battery life.

Both meters calibrate manually in pH, Conductivity and TDS.

Each meter is supplied with the MA850 interchangeable probe with 1 meter cable to measure pH, Conductivity and TDS. The pH electrode utilizes a fiber junction to reduce contamination when measuring fertilizer solutions.

- The **MW801** with a Conductivity range that goes up to 1990 µS/cm and TDS range that goes up to 1990 ppm is an ideal tool for drinking water measurements.
- The **MW802**, with a conductivity range that goes up to 6.00 mS/cm and the TDS up to 4000 ppm is ideal for testing in crop production.

Specifications		MW801	MW802
Range	pH	0.0 to 14.0 pH	0.00 to 14.00 pH
	EC	0 to 1990 µS/cm	0.00 to 6.00 mS/cm
	TDS	0 to 1990 ppm	0 to 4000 ppm
Resolution	pH	0.1 pH	0.10 pH
	EC	10 µS/cm	0.10 mS/cm
	TDS	10 ppm	10 ppm
Accuracy (@25°C)	pH	±0.2 pH	±0.20 pH
	EC/TDS	±2% Full Scale	±2% Full Scale
Calibration Solutions		M10007 (pH 7.01) M10031 (1413 µS/cm) M10032 (1382 ppm)	M10007 (pH 7.01) M10031 (1413 µS/cm)
Conversion Factor		0.5	0.68
Calibration		manual, at 1 point	manual, at 1 point
Temperature Compensation		automatic, from 0 to 50°C	automatic, from 0 to 50°C
Probe		**SE600** combination pH/EC/TDS/probe (included)	**SE600** combination pH/EC/TDS/probe (included)
Environment		0 to 50°C / 32 to 122°F; max RH 95%	0 to 50°C / 32 to 122°F; max RH 95%
Battery Type		1 x 9V alkaline	1 x 9V alkaline
Battery Life		150 hours of use	150 hours of use
Packaging dimensions		268 x 122 x 118 mm	268 x 122 x 118 mm
Packaging weight		640 g	720 g

Large and Easy-to-read Display

MW801 and **MW802** offer highly stable and accurate readings with large LCD display.

Combined interchangeable pH, Conductivity and TDS Probe

The pH electrode utilizes a fiber junction to reduce contamination when measuring fertilizer solutions.

Accessories

M10000B Electrode rinse solution, 20 mL sachet (25 pcs)
M10004B pH 4.01 buffer solution, 20 mL sachet (25 pcs)
M10007B pH 7.01 buffer solution, 20 mL sachet (25 pcs)
M10010B pH 10.01 buffer solution, 20 mL sachet (25 pcs)
M10031B 1413 µS/cm calibration solution, 20 mL sachet (25 pcs)
M10032B 1382 ppm calibration solution, 20 mL sachet (25 pcs)
MA9015 Electrode storage solution, 230 mL bottle
MA9016 Cleaning solution, 230 mL bottle
SE600 pH/EC/TDS spare probe with 1 meter cable

Ordering Information

MW801 is supplied complete with SE600 combination pH/EC/TDS probe, 20 mL sachet pH 7.01 buffer solution, 20 mL 1413 µS/cm sachet of calibration solution, 20 mL 1382 ppm sachet of calibration solution, 9V battery and instructions.

MW802 is supplied complete with SE600 combination pH/EC/TDS probe, 20 mL sachet pH 7.01 buffer solution, 20 mL 1413 µS/cm sachet of calibration solution, 20 mL 1500 ppm sachet of calibration solution, 9V battery and instructions.

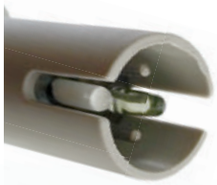
MW803/MW804

pH/Conductivity/TDS/Temperature Testers with replaceable electrode

The **MW803** and **MW804** are water-resistant testers with dual-level LCD that measure pH/Conductivity/TDS/Temperature in one single tester!

The large display shows readings in an extended range from 0.00 to 14.00 pH and 0 to 3999 µS/cm, 0 to 2000 ppm (MW803), 0 to 20.00 mS/cm, 0 to 10.00 ppt (MW804) and simultaneously shows temperature from 0.0 to 50.0°C or 32.0 to 122.0°F. They have a stability indicator and hold function that freezes the display for easy and accurate recording. The large display also has graphic symbols to guide you through all operations. The EC/TDS conversion factor is user selectable as well as the temperature compensation coefficient (β).

Ideal for quick and accurate measurements in swimming pools, aquariums and horticultural applications they can also be used in Industrial and Laboratory applications such as cooling towers, food processing, plating, drinking and waste water etc.



pH/EC/TDS/Temp Sensor

The **MW803** and **MW804**'s exposed temperature sensor provides fast response time, and its proximity to the conductivity probe guarantees much more accurate temperature compensated readings.

Specifications		MW803	MW804
Range	**pH**	0.00 to 14.00 pH	0.00 to 14.00 pH
	EC	0 to 3999 µS/cm	0 to 20.00 mS/cm
	TDS	0 to 2000 ppm	0 to 10.00 ppt
	Temp.	0.0 to 50.0°C / 32.0 to 122.0°F	0.0 to 50.0°C / 32.0 to 122.0°F
Resolution	**pH**	0.01 pH	0.01 pH
	EC	1 µS/cm	0.01 mS/cm
	TDS	1 ppm	0.01 ppt
	Temp.	0.1°C / 0.1°F	0.1°C / 0.1°F
Accuracy (@25°C)	**pH**	±0.05 pH	±0.05 pH
	EC/TDS	±2% Full scale	±2% Full scale
	Temp.	±0.5°C / ±1°F	±0.5°C / ±1°F
Temperature Compensation		automatic with ß=0.0 to 2.4%/°C	automatic with ß=0.0 to 2.4%/°C
Calibration		automatic, 1 point for EC and 1 or 2 points for pH	automatic, 1 point for EC and 1 or 2 points for pH
TDS Factor		0.45 to 1.00 (conv.)	0.45 to 1.00 (conv.)
Probe		**Mi60P** (replaceable)	**Mi60P** (replaceable)
Environment		0 to 50°C; 100% RH max.	0 to 50°C; 100% RH max.
Battery Type		4 x 1.5V; IEC LR44, A76 (included)	4 x 1.5V; IEC LR44, A76 (included)
Battery Life		approx. 100 hours of use	approx. 100 hours of use
Auto-off		after 8 minutes of non-use	after 8 minutes of non-use
Packaging dimensions		254 x 67 x 47 mm	254 x 67 x 47 mm
Packaging weight		220 g	220 g

Replaceable probe

Replace the probe in a fast and simple way yourself! Just unscrew the plastic ring on the top of the probe and replace the probe with a new one.

Accessories

Mi60P	Replaceable probe for MW803 & MW804
M10000B	Rinse solution, 20 mL sachet (25 pcs)
M10004B	pH 4.01 buffer solution 20 mL sachet (25 pcs)
M10007B	pH 7.01 buffer solution 20 mL sachet (25 pcs)
M10010B	pH 10.01 buffer solution 20 mL sachet (25 pcs)
M10016B	Cleaning solution, 20 mL sachet (25 pcs)
M10030B	12880 µS/cm calibration solution, 20 mL sachet, 25 pcs
M10031B	1413 µS/cm calibration solution, 20 mL sachet, 25 pcs
M10032B	1382 ppm (mg/L) calibration solution, 20 mL sachet, (25 pcs)
M10038B	6.44 ppt (g/L) calibration solution, 20 mL sachet, (25 pcs)
MA9004	pH 4.01 buffer solution, 230 mL bottle
MA9006	pH 6.86 buffer solution, 230 mL bottle
MA9007	pH 7.01 buffer solution, 230 mL bottle
MA9009	pH 9.18 buffer solution, 230 mL bottle
MA9010	pH 10.01 buffer solution, 230 mL bottle
MA9015	Electrode storage solution, 230 mL
MA9060	12880 µS/cm calibration solution, 230 mL bottle
MA9061	1413 µS/cm calibration solution, 230 mL bottle
MA9062	1382 ppm calibration solution, 230 mL bottle
MA753	Hard carrying case for 2 testers

Battery life

Percentage of battery power remaining will be displayed upon startup.

Packaging Information

MW803 and **MW804** is supplied in a tubular plastic casing. Optionally the MA753 hard carrying case can be purchased.

Ordering Information

MW803 and **MW804** is supplied complete with protective cap, 20 mL pH 4.01 and pH 7.01 sachets of calibration solution, 20 mL 1413 µS/cm calibration solution (MW803), 20 mL 12880 µS/cm calibration solution (MW804), batteries and instructions.

MW700

Entry level, inexpensive LUX Portable Meters for fast and reliable results

The microprocessor-based **MW700** is a portable Lux meter designed to perform light measurements. **MW700** has a small, ergonomic and light case design. Other features include large and easy to read LCD Display and long battery life.

These handy and ergonomically designed portable meters are ideal for anyone working on a low budget and still requires fast and reliable measurements. These portable meters are suitable for a wide range of applications, such as Educational, Agriculture and Horticulture, as well as water and environmental analysis.
Both models are supplied with a light sensor connected to the meter that measures from 0 to 50000 Lux.
Average indoor lighting ranges from 100 to 1000 Lux and average outdoor sun lights about 50000 Lux. Lux is a unit that indicates the density of light that falls on a surface.

The light is necessary for the development of the plants. In fact, it is necessary a sufficient contribution of light in order to favor the photosynthesis and the closing of the plants.
The supplement of light by means of lamps electrical workers is the method simpler and economic in order to bring the necessary light to the plants.

The human eye is sensitive only to blue, green, and red light, so in calculating the Lux falling on an object, only the light that the human eye sees is counted. When only infrared light falls on an object, the Lux is counted as zero since our eyes see nothing. Mathematically, a spectral weighting function becomes convolved with the actual illumination spectrum to calculate Lux exactly.

This is the formal definition of Lux and it makes Lux an unusual unit of measure.

Still, Lux can be thought of as a way of measuring light in terms of what our eyes perceive. The metric unit of measure for luminance of a surface.
One Lux is equal to one Lumen per square meter.
One Lux equals 0.0929 footcandles.

Light Sensor

MW700 are provided with a light sensor connected to the meter through a coaxial cable.

Range keys

Press one of the three “Range keys” to select the proper scale according to the intensity of the light.

Specifications	MW700
Range	0.000 to 1999 Lux 2000 to 19999 Lux 20000 to 50000 Lux
Range setting	manual through key buttons
Resolution	1 Lux 10 Lux 100 Lux
Accuracy	±6% of reading ±1 digit
Peak wave length	560 nm
Sensor Type	silicon photodiode
Sensor Sensitivity	100 scotopic Lux
Sensor stability	±2% change per year (in the first two years)
Environment	0 to 50°C / 32 to 122°F; max RH 95%
Battery type	1x9V (IEC 6LR61) alkaline
Battery life	approximately 150 hours of continuous use
Auto-off	after about 5 minutes of non-use
Packaging dimensions	212 x 145 x 67 mm
Packaging weight	400 g

Ordering Information

MW700 is supplied complete with 9V battery and instructions in a carton box.

Mi411

Free & Total Chlorine and pH Photometer

This latest laboratory grade Microprocessor photometer has an excellent repeatability and is ideal for field measurements.

Chlorine is the most commonly used water disinfectant. Applications vary from treatment of drinking water and wastewater to pool and spa sanitization and food processing to sterilization.

3 in 1 Combination Photometer!

The **Mi411** is a portable microprocessor based instrument to measure three critical parameters to ensure good water quality: pH, free chlorine and total chlorine.

This instrument provides greater resolution, better accuracy and immediate results.

Mi411 is supplied in a hard carrying case including 2 cuvets, reagents for 100 tests, wiping tissue and instruction manual.

Specifications		Mi411
Range	Free Chlorine	0.00 to 5.00 mg/L Cl_2
	Total Chlorine	0.00 to 5.00 mg/L Cl_2
	pH	6.5 to 8.0 pH
Resolution	Free Chlorine	0.01 mg/L (0.00 to 3.50 mg/L); 0.10 mg/L (above 3.50 mg/L)
	Total Chlorine	0.01 mg/L (0.00 to 3.50 mg/L); 0.10 mg/L (above 3.50 mg/L)
	pH	0.1 pH
Accuracy	Free Chlorine	±0.04 mg/L @ 1.50 mg/L
	Total Chlorine	±0.04 mg/L @ 1.50 mg/L
	pH	±0.1 pH @ 7.2 pH
Method	Free Chlorine	adaptation of the USEPA method 330.5 and Standard Method 4500-Cl G
	Total Chlorine	adaptation of the USEPA method 330.5 and Standard Method 4500-Cl G
	pH	adaptation of the phenol red method
Light Source		tungsten lamp
Light Detector		silicon photocell and 525 nm narrow band interference filter
Environment		0 to 50°C / 32 to 122°F; max RH 100%
Battery Type		1 x 9V
Auto-off		after 10 minutes of non use
Packaging dimensions		305 x 280 x 115 mm
Packaging weight		1.26 kg

Hard Carrying Case

Mi411 comes complete in hard carrying case, making it ideal for field measurements.

Accessories

Mi504-100 Free & Total Chlorine reagent set (100 tests)
Mi509-100 pH reagent (100 tests)
Mi511-100 Free & Total Chlorine and pH reagent set (100 tests)
Mi524-100 Total Chlorine powder reagents (100 tests)
Mi526-100 Free Chlorine powder reagents (100 tests)

Mi0001 Glass cuvets (2 pcs)
Mi0002 Caps for cuvets (2 pcs)
Mi0003 Stoppers for cuvets (2 pcs)

Ordering Information

Mi411 is supplied complete with 2 cuvets, Mi511-100 liquid reagents for 100 tests, hard carrying case, wiping tissue, 9V battery and instructions.

Mi405/Mi407/Mi408/Mi412

Ammonia, Iron & Phosphate Photometers

These user-friendly Colorimeters will give you direct readings in mg/L.

Ammonia detection in water treatment systems is particularly important for aquarium owners and fish farm operators. Ammonia is highly soluble in water and extremely toxic to fish. Fish farm owners must monitor and maintain careful control of ammonia levels to ensure optimum water conditions for their stock. Milwaukee offers 2 instruments for low and medium concentrations: **Mi405** with a range of 0.00 to 9.99 mg/L and **Mi407** from 0.00 to 3.00 mg/L

Iron is naturally present in water supplies and its presence in both potable and industrial applications is regarded as objectionable. Milwaukee offers **Mi408** Iron meter with a range of 0.00 to 5.00 mg/L.

Phosphates are present in natural waters and at concentrations typically found, do not pose any specific health threats to humans.
However, excessive contamination of water courses from agricultural fertilizer run off or wastewater/effluent discharge can promote excessive algae or plant growth. Milwaukee offers **Mi412** with range 0.00 to 2.50 mg/L.

Specifications		 Mi405 Ammonia MR	 Mi407 Ammonia LR	 Mi408 Iron HR	 Mi412 Phosphate LR
Range	**Ammonia**	0.00 to 9.99 mg/L (NH_3-N)	0.00 to 3.00 mg/L (NH_3-N)		
	Iron			0.00 to 5.00 mg/L (Fe)	
	Phosphate				0.00 to 2.50 mg/L (PO_4)
Resolution	**Ammonia**	0.01 mg/L	0.01 mg/L		
	Iron			0.01 mg/L	
	Phosphate				0.01 mg/L
Accuracy	**Ammonia**	±0.10 mg/L @5.00 mg/L	±0.04 mg/L @1.50 mg/L		
	Iron			±0.03 mg/L @1.50 mg/L	
	Phosphate				±0.04 mg/L @1.00 mg/L
Method		adaptation of Nessler method	adaptation of Nessler method	adaptation of the USEPA method 315 B and Standard method 3500 - Fe B	adaptation of the Ascorbic Acid method
Light Source		Blue LED 466 nm	Blue LED 466 nm	tungsten lamp	tungsten lamp
Light Detector		silicon photocell and 466 nm narrow band interference filter	silicon photocell and 466 nm narrow band interference filter	silicon photocell and 525 nm narrow band interference filter	silicon photocell and 610 nm narrow band interference filter
Environment		0 to 50°C / 32 to 122°F max RH 100%	0 to 50°C / 32 to 122°F max RH 100%	0 to 50°C / 32 to 122°F max RH 100%	0 to 50°C / 32 to 122°F max RH 100%
Battery Type		1 x 9 V	1 x 9 V	1 x 9 V	1 x 9 V
Auto-off		after 10 minutes of non-use	after 10 minutes of non-use	after 10 minutes of non-use	after 10 minutes of non-use
Packaging dimensions		305 x 280 x 115 mm	305 x 280 x 115 mm	305 x 280 x 115 mm	305 x 280 x 115 mm
Packaging weight		1.24 kg	1.22 kg	1.22 kg	1.3 kg

Accessories

Mi505-100 Ammonia MR liquid reagent (100 tests)
Mi507-100 Ammonia LR liquid reagent (100 tests)
Mi508-100 Iron HR liquid reagent (100 tests)
Mi512-100 Phosphate LR powder reagent (100 tests)

Mi0001 Glass cuvets (2 pcs)
Mi0002 Caps for cuvets (2 pcs)
Mi0003 Stoppers for cuvets (2 pcs)

Ordering Information

Mi405, **Mi407**, **Mi408** and **Mi412** are supplied complete with 2 cuvets, reagents for 100 tests, hard carrying case, wiping tissue, 9V battery and instructions.

Mi404/Mi406/Mi413/Mi414

Free & Total Chlorine and Chloride Photometers

Milwaukee provides a range of chlorine photometers for all applications: swimming pool treatments, household cleaners, dishwasher additives, laundry powders/liquids and cooling water treatment products all contain chlorine as an oxidizing biocide. Drinking water contains residual chlorine to maintain water purity throughout the supply lines.

Milwaukee offers 3 microprocessor-based instruments with greater resolution, better accuracy and immediate results.
You can choose between three different models:
Mi404 for measuring free (0.00 to 5.00 mg/L) and total (0.00 to 5.00 mg/L) chlorine, **Mi406** for measuring free (0.00 to 5.00 mg/L) chlorine and **Mi413** for measuring free (0.00 to 10.00 mg/L) and total (0.00 to 10.00 mg/L) chlorine.

Chloride is a major constituent of sea water and is extremely corrosive in acidic environments. It requires close monitoring in applications such as marine boiler systems that are effected by seawater contamination.
Chlorides are used by the water treatment professional to determine cycles of concentration in low pressure boilers and cooling systems.
It is essential to monitor chloride concentrations in boiler systems to prevent metal parts being damaged. In high levels, chloride can corrode stainless steel.
Milwaukee offers the **Mi414** microprocessor-based photometer for measuring chloride (0.00 to 20.00 mg/L).

Specifications		 **Mi404** **Free & Total Chlorine**	 **Mi406** **Free Chlorine**	 **Mi413** **Free & Total Chlorine HR**	 **Mi414** **Chloride**
Range	**Free Chlorine**	0.00 to 5.00 mg/L (Cl_2)	0.00 to 5.00 mg/L (Cl_2)	0.00 to 10.00 mg/L (Cl_2)	
	Total Chlorine	0.00 to 5.00 mg/L (Cl_2)		0.00 to 10.00 mg/L (Cl_2)	
	Chloride				0.00 to 20.00 mg/L (Cl^-)
Resolution	**Free Chlorine**	0.01 mg/L (0.00 to 3.50 mg/L); 0.10 mg/L (above 3.50 mg/L)	0.01 mg/L (0.00 to 3.50 mg/L); 0.10 mg/L (above 3.50 mg/L)	0.01 mg/L (0.00 to 3.50 mg/L); 0.10 mg/L (above 3.50 mg/L)	
	Total Chlorine	0.01 mg/L (0.00 to 3.50 mg/L); 0.10 mg/L (above 3.50 mg/L)		0.01 mg/L (0.00 to 3.50 mg/L); 0.10 mg/L (above 3.50 mg/L)	
	Chloride				0.01 mg/L
Accuracy	**Free Chlorine**	±0.04 mg/L @1.50 mg/L	±0.04 mg/L @1.50 mg/L	±0.10 mg/L @5.00 mg/L	±0.4 mg/L @10.0 mg/L
	Total Chlorine	±0.04 mg/L @1.50 mg/L		±0.10 mg/L @5.00 mg/L	
	Chloride				
Method		adaptation of USEPA method 330.5 and Standard Method 4500-Cl G	adaptation of USEPA method 330.5 and Standard Method 4500-Cl G	adaptation of USEPA method 330.5 and Standard Method 4500-Cl G	adaptation of mercury (II) thiocyanate method
Light Source		tungsten lamp	tungsten lamp	tungsten lamp	Blue LED 466 nm
Light Detector		silicon photocell and 525 nm narrow band interference filter	silicon photocell and 525 nm narrow band interference filter	silicon photocell and 525 nm narrow band interference filter	silicon photocell and 466 nm narrow band interference filter
Environment		0 to 50°C / 32 to 122°F max RH 100%	0 to 50°C / 32 to 122°F max RH 100%	0 to 50°C / 32 to 122°F max RH 100%	0 to 50°C / 32 to 122°F max RH 100%
Battery Type		1 x 9 V	1 x 9 V	1 x 9 V	1 x 9 V
Auto-off		after 10 minutes of non-use	after 10 minutes of non-use	after 10 minutes of non-use	after 10 minutes of non-use
Packaging dimensions		305 x 280 x 115 mm	305 x 280 x 115 mm	305 x 280 x 115 mm	305 x 280 x 115 mm
Packaging weight		1.24 kg	1.26 kg	1.52 kg	1.44 kg

Accessories

Mi504-100 Free & Total Chlorine liquid reagent set (100 tests)
Mi506-100 Free Chlorine liquid reagent set (100 tests)
Mi513-045 Free & Total Chlorine liquid reagent set (45 tests)
Mi514-100 Chloride liquid reagent set (100 tests)
Mi524-100 Total Chlorine powder reagents (100 tests)
Mi526-100 Free Chlorine powder reagents (100 tests)
Mi0001 Glass cuvets (2 pcs)
Mi0002 Caps for cuvets (2 pcs)
Mi0003 Stoppers for cuvets (2 pcs)

Ordering Information

Mi404, Mi406, Mi413 and **Mi414** are supplied complete with 2 cuvets, reagents, hard carrying case, wiping tissue, 9V battery and instructions.

MW10/MW11

Low cost digital photometers to measure Free & Total Chlorine

Chlorine is the most commonly used water disinfectant.
Applications vary from treatment of drinking water and wastewater to pool and spa sanitization and food processing to sterilization.

Milwaukee offers 2 models:

MW10 for measuring free chlorine (0.00 to 2.50 mg/L)
MW11 to measure total chlorine (0.00 to 3.50 mg/L).

Key features include:

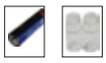
- User friendly;
- Small & Ergonomic case design;
- Inexpensive;
- Large and easy to read display;
- Good accuracy and immediate results;

Specifications	 MW10 Free chlorine	 MW11 Total chlorine
Range	0.00 to 2.50 ppm	0.00 to 3.50 ppm
Resolution	0.01 ppm	0.01 ppm
Accuracy (@25°C)	±0.03 ppm ±3% of reading	±0.03 ppm ±3% of reading
Typical EMC Dev.	±0.01 ppm	±0.01 ppm
Light Source	Light Emitting Diode @ 525 nm	Light Emitting Diode @ 525 nm
Light Detector	Silicon Photocell	Silicon Photocell
Method	Adaptation of USEPA method 330.5. The reaction between free chlorine and the DPD reagent causes a pink tint in the sample.	Adaptation of USEPA method 330.5. The reaction between free chlorine and the DPD reagent causes a pink tint in the sample.
Environment	0 to 50°C (32 to 122°F) max. 95% RH non-condensing	0 to 50°C (32 to 122°F) max. 95% RH non-condensing
Battery Type	1 x 1.5V AAA	1 x 1.5V AAA
Auto-off	after 2 minutes of non use	after 2 minutes of non use
Packaging dimensions	115 x 115 x 84 mm	115 x 115 x 84 mm
Packaging weight	180 g	180 g

They are supplied with 2 cuvets, 6 reagents, a battery and instruction manual.

Accessories

Mi526-25 Free Chlorine powder reagent, (25 pcs)
Mi524-25 Total Chlorine powder reagent (25 pcs)



Mi0011 Glass cuvets (2 pcs)
Mi0013 Stoppers for cuvets (2 pcs)

Ordering information:

All handy photometers are supplied in a carton box including 2 cuvets, 6 powder reagents, 1 x 1.5 V AAA battery and instructions.

MW12/MW13/MW14

Low cost digital photometers to measure Phosphate, Iron & Iodine

Iron is naturally present in water supplies and therefore needs to be monitored both in potable and industrial applications. Milwaukee offers the **MW14** Iron meter with a range of 0.00 to 5.00 mg/L.

Phosphates are present in natural waters and at concentrations typically found, do not pose any specific health threats to humans. However, excessive contamination of water courses from agricultural fertilizer run off or wastewater / effluent discharge can promote excessive algae or plant growth. Milwaukee offers **MW12** with a range of 0.00 to 2.50 mg/L.

Iodine is used as disinfectant in various applications - one of the most common is the poultry industry waste water treatment. Milwaukee offers **MW13** with a range of 0.0 to 12.5 mg/L.

Specifications	 MW12 Phosphate	 MW13 Iodine	 MW14 Iron
Range	0.00 to 2.50 ppm	0.0 to 12.5 ppm	0.00 to 5.00 ppm
Resolution	0.01 ppm	0.1 ppm	0.01 ppm
Accuracy (@25°C)	±0.04 ppm ±4% of reading	±0.1 ppm ±5% of reading	±0.04 ppm ±2% of reading
Typical EMC Dev.	±0.01 ppm	±0.1 ppm	±0.01 ppm
Light Source	LED @ 525 nm	LED @ 525 nm	LED @ 525 nm
Light Detector	Silicon Photocell	Silicon Photocell	Silicon Photocell
Method	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 20th edition, Ascorbic Acid method. The reaction between phosphate and the reagent causes a blue tint in the sample.	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, DPD method. The reaction between iodine and the reagent causes a pink tint in the sample.	Adaptation of the EPA Phenantroline method 315B, for natural and treated waters. The reaction between iron and reagent causes an orange tint in the sample.
Environment	0 to 50°C (32 to 122°F) max 95% RH non-condensing	0 to 50°C (32 to 122°F) max 95% RH non-condensing	0 to 50°C (32 to 122°F) max 95% RH non-condensing
Battery Type	1 x 1.5V AAA	1 x 1.5V AAA	1 x 1.5V AAA
Auto-off	after 2 minutes of non use	after 2 minutes of non use	after 2 minutes of non use
Packaging dimensions	115 x 115 x 84 mm	115 x 115 x 84 mm	115 x 115 x 84 mm
Packaging weight	180 g	180 g	180 g

Accessories

Mi512-25 Phosphate powder reagent (25 pcs)
Mi527-25 Iodine powder reagent (25 pcs)
Mi528-25 Iron powder reagent (25 pcs)

Mi0011 Glass cuvets (2 pcs)
Mi0013 Stoppers for cuvets (2 pcs)

Ordering information:

All handy photometers are supplied in a carton box including 2 cuvets, 6 powder reagents, 1 x 1.5 V AAA battery and instructions.

Mi490

Peroxide Value in the process of oil making

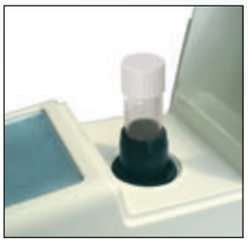
Mi490 is a user-friendly photometer for monitoring peroxide value in the process of oil making. This instrument will give you direct readings, with a range of 0.0 to 25.0 meq O_2/Kg .
The measurement of the oil's chemical degradation is the peroxide value, which measures the degree to which the oil is oxidized. Rancidification is the decomposition of fats and other lipids by hydrolysis and/or oxidation. Hydrolysis will split fatty acid chains away from the glycerol backbone in glycerides. These free fatty acids can then undergo further auto-oxidation. Oxidation primarily occurs with unsaturated fats by a free radical-mediated process.
One of the most widely used tests for oxidative rancidity, peroxide value is a measure of the concentration of peroxides and hydroperoxides formed in the initial stages of lipid oxidation. Milliequivalents of peroxide per kg of fat are measured by titration with iodide ion.
Peroxide values are not static and care must be taken in handling and testing samples. It is difficult to provide a specific guideline relating peroxide value to rancidity. High peroxide values are a definite indication of a rancid fat, but moderate values may be the result of depletion of peroxides after reaching high concentrations.

Easy Steps

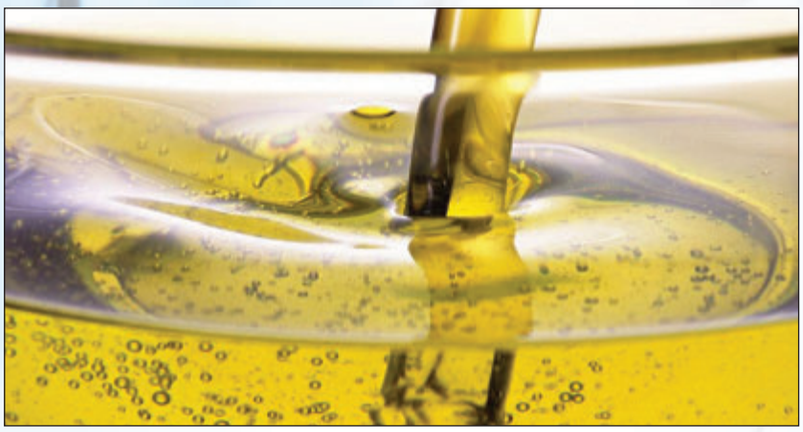
Prepare the sample with oil and the reagent then insert it in the instrument and note the reading.

Accurate Readings

Mi490 will give you direct readings, with a range of 0.0 to 25.0 meq O_2/Kg in the process of oil making.



Specifications	Mi490 Peroxide Value
Range	0.0 to 25.0 meq O_2 /Kg
Resolution	0.5 meq O_2 /Kg
Accuracy	±0.5 meq O_2 /Kg
Method	adaptation of the CE n. 2568/97 method
Environment	0 to 50°C; max RH 95%
Battery Type	4 x 1.5V AA
Auto-off	after 15 minutes of non-use
Packaging dimensions	340 x 260 x 118 mm
Packaging weight	1.76 kg



Accessories

Mi590-021 Peroxides reagent set (21 tests)

Ordering Information

Mi490 is supplied complete with:
reagents for 20 tests, 4 x 1 mL syringe, tissue for wiping cuvets, 4 x 1.5V AA batteries and instruction manual.

Mi415
Turbidity Meter

Turbidity refers to the concentration of undissolved, suspended particles present in a liquid.
Turbidity is a measure of the clarity of a sample.
For potable water applications turbidity is a good indicator of water quality.

Turbidity Measurement is achieved by analyzing the amount of light refracted from suspended particles such as clay, silt and organic material. By measuring turbidity, by photometric or tube methods, it is possible to estimate suspended solids content.

Mi415 has two operating ranges; 0.00 to 50.00 FNU, and 50 to 1000 FNU that can accommodate the most turbid condition you may encounter.

Mi415 is supplied in a hard carrying case, complete with calibration solutions.

Specifications	Mi415 Turbidity meter
Range	0.00 to 50.00 FNU; 50 to 1000 FNU
Resolution	0.01 FNU; 1 FNU
Accuracy	±0.5 FNU or ±5% of reading, whichever is greater
Method	detection of scattered light
Light Source	high emission infrared LED
Light Detector	silicon photocell
Environment	0 to 50°C 32 to 122°F; max RH 100%
Battery Type	1 x 9V
Auto-off	after 5 minutes of non-use
Packaging dimensions	305 x 280 x 115 mm
Packaging weight	1.24 kg

Introduction to Turbidity

The cloudy appearance of water (called Turbidity) is caused by suspended material. The unit of measure adopted by the ISO Standard is the FNU (Formazine Nephelometric Unit) and by EPA is NTU (Nephelometric Turbidity Unit).
The other two methods used to test for turbidity and their measurement units are the JTU (Jackson Turbidity Unit) and the Silica unit (mg/L SiO_2).
See the conversion table of these methods and their units for your reference.

(mg/L)	JTU	FTU (NTU/FNU)	SiO_2
JTU	1	19	2.5
FTU	0.053	1	0.13
SiO_2	0.4	7.5	1

Accessories

Mi515-100 AMCO-AEPA-1 @ 0 FNU calibration solution, 30 mL
AMCO-AEPA-1 @ 10 FNU, calibration solution, 30 mL
AMCO-AEPA-1 @ 500 FNU, calibration solution, 30 mL

Mi0011 Glass cuvets (2 pcs)
Mi0012 Caps for cuvets (2 pcs)
Mi0013 Stoppers for cuvets (2 pcs)

Ordering Information

Mi415 is supplied complete with 2 cuvets, calibration solutions, hard carrying case, wiping tissue, 9V battery and instructions.

MA871/MA872/MA873/MA881

Digital Refractometers for Brix, Fructose, Glucose and Invert Sugar Measurements

The digital refractometers are optical instruments that employ the measurement of refractive index to determine the % Brix of sugar (**MA871**), % Fructose (**MA872**), % Glucose (**MA873**) and % Invert Sugar (**MA881**) in aqueous solutions.

The method is both simple and quick. Samples are measured after a simple user calibration with deionized or distilled water. Within seconds the instruments measure the refractive index of the sample and convert it to % Brix or % by weight concentration units.

The digital refractometers eliminate the uncertainity associated with mechanical refractometers and are easily portable for measurements in the field.

The measurement technique and temperature compensation employ methodology recommended in the ICUMSA Methods Book (Internationally recognized body for Sugar Analysis). Temperature (in °C or °F) is displayed simultaneously with the measurement on the large dual level display along with icons for Low Power and other helpful message codes.

Key features include:

- Dual-level LCD
- Automatic Temperature Compensation (ATC)
- Easy setup and storage
- Battery operation with Low Power indicator (BEPS)
- Automatically turns off after 3 minutes of non-use

Specifications	 MA871 Brix	 MA872 Fructose	 MA873 Glucose	 MA881 Invert Sugar
Range	0 to 85% Brix 0 to 80°C / 32 to 176°F	0 to 85% mass 0 to 80°C / 32 to 176°F	0 to 85% mass 0 to 80°C / 32 to 176°F	0 to 85% mass 0 to 80°C / 32 to 176°F
Resolution	0.1% Brix 0.1°C / 0.1°F	0.1% 0.1°C / 0.1°F	0.1% 0.1°C / 0.1°F	0.1% 0.1°C / 0.1°F
Accuracy	±0.2% Brix ±0.3°C / ±0.5°F	±0.2% ±0.3°C / ±0.5°F	±0.2% ±0.3°C / ±0.5°F	±0.2% ±0.3°C / ±0.5°F
Light source	yellow LED	yellow LED	yellow LED	yellow LED
Measurement Time	approximately 1.5 seconds	approximately 1.5 seconds	approximately 1.5 seconds	approximately 1.5 seconds
Minimum Sample Volume	100 µL (cover prism totally)	100 µL (cover prism totally)	100 µL (cover prism totally)	100 µL (cover prism totally)
Sample Cell	SS ring and flint glass prism	SS ring and flint glass prism	SS ring and flint glass prism	SS ring and flint glass prism
Temperature Compensation	automatic between 10 and 40°C / 50 to 104°F	automatic between 10 and 40°C / 50 to 104°F	automatic between 10 and 40°C / 50 to 104°F	automatic between 10 and 40°C / 50 to 104°F
Case Material	ABS	ABS	ABS	ABS
Battery Type	1 x 9V AA (included)	1 x 9V AA (included)	1 x 9V AA (included)	1 x 9V AA (included)
Battery Life	5000 reading	5000 reading	5000 reading	5000 reading
Auto-shut off	after 3 minutes of non-use	after 3 minutes of non-use	after 3 minutes of non-use	after 3 minutes of non-use
Packaging dimensions	268 x 122 x 118 mm	268 x 122 x 118 mm	268 x 122 x 118 mm	268 x 122 x 118 mm
Packaging weight	660 g	660 g	660 g	660 g

Ordering Information

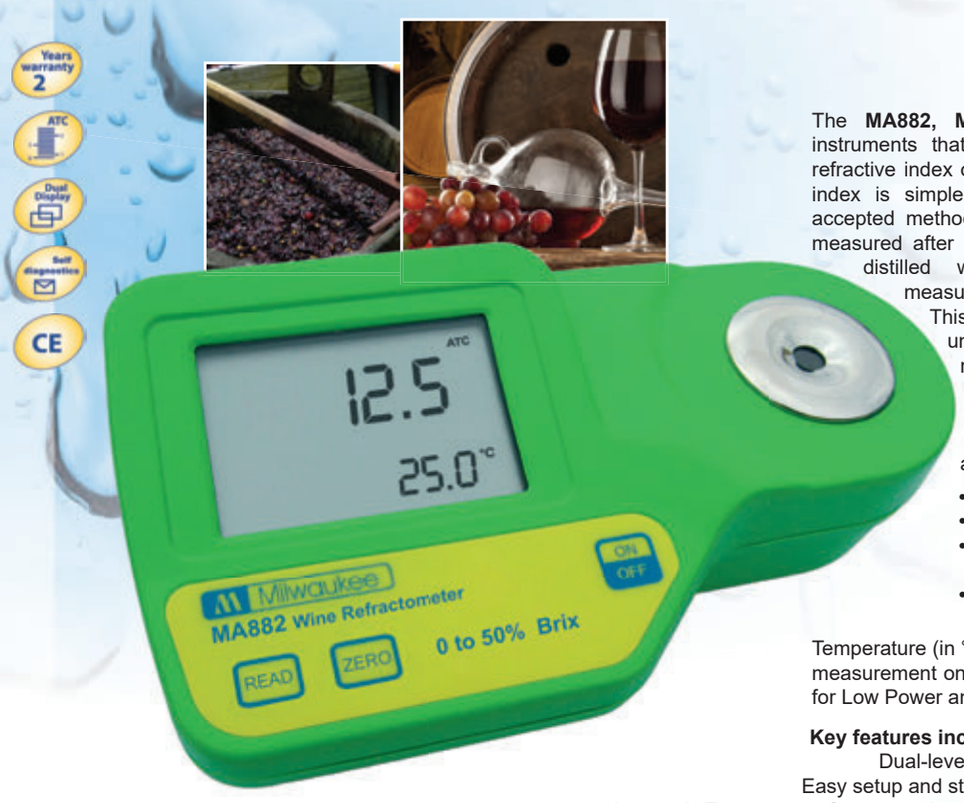
MA871, MA872, MA873 and **MA881** are supplied in a carton box, complete with 9V battery, pipette and instruction manual. Optionally you can also order the refractometers in a hard carrying case (**MA752**).

Stainless Steel Sample Well and Prism

Place a few drops of the sample in the well and press the READ key.

MA882/MA883/MA884/MA885

Digital Refractometers for Grape Juice Must Measurements



The **MA882, MA883, MA884** and **MA885** are optical instruments that are based on the measurement of the refractive index of a solution. The meaurement of refractive index is simple and quick and provides the vintner an accepted method for sugar content analysis. Samples are measured after a simple user calibration with deionized or distilled water. Within seconds the instrument measures the refractive index of the grape. This digital refractometers eliminate the uncertainty associated with mechanical refractometers and are easily portable for measurements in the field.

The four instruments utilize internationally recognized references for unit conversion and temperature compensation.

- **MA882** measures %Brix;
- **MA883** measures °Baumé;
- **MA884** measures %Brix and Potential Alcohol (% vol);
- **MA885** measures %Brix, °Oechsle (°Oe) and °KMW (°Babo).

Temperature (in °C or °F) is displayed simultaneously with the measurement on the large dual level display along with icons for Low Power and other helpful message codes.

Key features include:

Dual-level LCD
Easy setup and storage
Automatic Temperature Compensation (ATC)
Battery operation with Low Power indicator (BEPS)
Automatically turns off after 3 minutes of non-use

Specifications	 MA882	 MA883	 MA884	 MA885
Range	0 to 50% Brix 0 to 80°C / 32 to 176°F	0 to 28 °Baumé 0 to 80°C / 32 to 176°F	0 to 50% Brix 0 to 25% v/v Potential Alc. 0 to 80°C / 32 to 176°F	0 to 50% Brix 0 to 230 °Oechsle 0 to 42 °KMW 0 to 80°C / 32 to 176°F
Resolution	0.1% Brix 0.1°C / 0.1°F	0.1 °Baumé 0.1°C / 0.1°F	0.1% Brix 0.1% v/v Potential Alcohol 0.1°C / 0.1°F	0.1% Brix 0.1 °Oechsle 0.1 °KMW 0.1°C / 0.1°F
Accuracy	±0.2% Brix ±0.3°C / ±0.5°F	±0.1 °Baumé ±0.3°C / ±0.5°F	±0.2% Brix ±0.2 v/v Potential Alcohol ±0.3°C / ±0.5°F	±0.2% Brix ±1 °Oechsle ±0.2 °KMW ±0.3°C / ±0.5°F
Light Source	yellow LED	yellow LED	yellow LED	yellow LED
Measurement Time	approximately 1.5 seconds	approximately 1.5 seconds	approximately 1.5 seconds	approximately 1.5 seconds
Minimum Sample Volume	100 µL (cover prism totally)	100 µL (cover prism totally)	100 µL (cover prism totally)	100 µL (cover prism totally)
Sample Cell	SS ring and flint glass prism	SS ring and flint glass prism	SS ring and flint glass prism	SS ring and flint glass prism
Temperature Compensation	automatic between 10 and 40°C / 50 to 104°F	automatic between 10 and 40°C / 50 to 104°F	automatic between 10 and 40°C / 50 to 104°F	automatic between 10 and 40°C / 50 to 104°F
Case Material	ABS	ABS	ABS	ABS
Battery Type	1 x 9V AA (included)	1 x 9V AA (included)	1 x 9V AA (included)	1 x 9V AA (included)
Battery Life	5000 reading	5000 reading	5000 reading	5000 reading
Auto-shut off	after 3 minutes of non-use	after 3 minutes of non-use	after 3 minutes of non-use	after 3 minutes of non-use
Packaging dimensions	268 x 122 x 118 mm	268 x 122 x 118 mm	268 x 122 x 118 mm	268 x 122 x 118 mm
Packaging weight	660 g	660 g	660 g	660 g

Ordering Information

MA882, MA883, MA884 and **MA885** are supplied in a carton box, complete with 9V battery, pipette and instruction manual.

Optionally you can also order the refractometers in a hard carrying case (**MA752**).

MA886

Digital Refractometer for Sodium Chloride Measurements

The **MA886** is an optical instrument that employs the measurement of the refractive index to determine sodium chloride concentration in aqueous solutions used in food preparation.

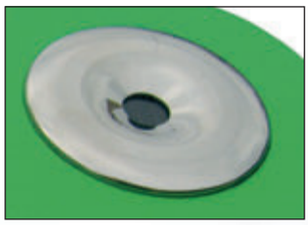
It is not intended for sea water salinity measurements.
The measurement of refractive index is simple and quick and provides the user an accepted method for NaCl analysis.
Samples are measured after a simple user calibration with deionized or distilled water. Within seconds the instrument measures the refractive index of the solution.
The digital refractometer eliminates the uncertainty associated with mechanical refractometers and is easily portable for measurements where you need them.

The instrument utilizes internationally recognized references for unit conversion and temperature compensation. It can display the measurement of NaCl concentration 4 different ways: g/100 g, g/100 mL, Specific Gravity, and °Baumé. Temperature (in °C or °F) is displayed simultaneously with the measurement (on 3 of the ranges) on the large dual level display along with icons for Low Power and other helpful message codes.

Key features include:

Dual-level LCD
Automatic Temperature Compensation (ATC)
Easy setup and storage
Battery operation with Low Power indicator (BEPS)
Automatically turns off after 3 minutes of non-use

Specifications	MA886
Range	0 to 28 g/100 g 0 to 34 g/100 ml 1.000 to 1.216 Specific Gravity 0 to 26 °Baumé 0 to 80°C / 32 to 176°F
Resolution	0.1 g/100 g 0.1 g/100 ml 0.001 Specific Gravity 0.1 °Baumé 0.1°C / 0.1°F
Accuracy	±0.2 g/100 g ±0.2 g/100 ml ±0.002 Specific Gravity ±0.2 °Baumé ±0.3°C / ±0.5°F
Light Source	yellow LED
Measurement Time	approximately 1.5 seconds
Minimum Sample Volume	100 µL (cover prism totally)
Sample Cell	SS ring and flint glass prism
Temperature Compensation	automatic between 10 and 40°C (50 to 104°F)
Case Material	ABS
Battery Type	1 x 9V AA (included)
Battery Life	5000 reading
Auto-shut off	after 3 minutes of non-use
Packaging dimensions	268 x 122 x 118 mm
Packaging weight	660 g



Stainless Steel Sample Well and Prism

Place a few drops of the sample in the well and press the READ key.

Liquid Crystal Display (LCD)

Dual Level LCD with Primary and Secondary Display.

Ordering Information

MA886 is supplied in a carton box, complete with 9V battery, pipette and instruction manual. Optionally you can also order the refractometers in a hard carrying case (**MA752**).

Measuring salt in cheese

Using MA886 Digital Sodium Chloride Refractometer

Sodium occurs naturally in many foods and is also added in the form of salt. The sodium content of food has important implications for health. Sodium is a nutrient and is part of the group of dietary minerals. Essential to life, it cannot be produced by the human body and thus has to be provided by the diet. The physiological requirements of sodium of the human body are relatively low (estimated at the equivalent of 1 to 2 gram of salt per day) and are met by the diet.

Fresh cheeses (non-salted) contain very little sodium (from 30 to 60 mg /100g). Hard cheeses – because of added salt – contain much higher levels of sodium (from 200 to 1600 mg/100g). Within a family of cheeses and depending on the brands, large variations exist between sodium contents of the cheeses, depending on lower or higher addition of salt by the cheese maker.

Measuring salt (sodium chloride) in cheese

1. Dicing:
Mincing the sample increases the surface area to allow as much salt to be released into the water as possible.

2. Dilution:
Dilute the sample with hot water to a 10% ratio.
After the sample melted, the fat will float to the top.

3. Collect the sample with a pipette from the layer underneath the fat

4. Using the plastic pipette, drip sample onto the prism surface. Fill the well completely.

5. Press the READ key.
The results are displayed in unit of interest

For optimal measurement put a sample into a beaker.

MA887

Digital Refractometer for Seawater Measurements

The **MA887** is an optical instrument that employs the measurement of the refractive index to determine the salinity of natural and artificial seawater, ocean water or brackish intermediates.
The digital refractometer eliminates the uncertainty associated with mechanical refractometers and is easily portable for ship, shore or home use.

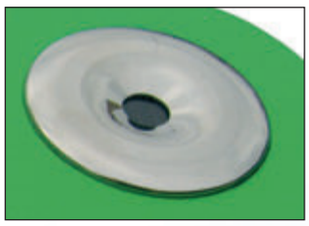
The **MA887** refractometer is an optical device that is simple and quick to use. Samples are measured after a simple user calibration with distilled or deionized water. Within seconds, the refractive index and temperature are measured and converted into one of three popular measurement units; Practical Salinity Units (PSU), Salinity in parts per thousand (ppt), or Specific Gravity (S.G. (20/20)).

All conversion algorithms are based upon respected scientific publications using the physical properties of seawater (not sodium chloride). The temperature (in °C or °F) is also displayed on the large dual level display along with helpful message codes.

Key features include:

- Dual-level LCD
- Automatic Temperature Compensation (ATC)
- Easy setup and storage
- Battery operation with Low Power indicator (BEPS)
- Automatically turns off after 3 minutes of non-use

Specifications	MA887
Range	0 to 50 PSU 0 to 150 ppt 1.000 to 1.114 S.G. (20/20) 0 to 80°C / 32 to 176°F
Resolution	1 PSU 1 ppt 0.001 S.G. (20/20) 0.1°C / 0.1°F
Accuracy	±2 PSU ±2 ppt ±0.002 S.G. (20/20) ±0.3°C / 0.5°F
Light Source	yellow LED
Measurement Time	approximately 1.5 seconds
Minimum Sample Volume	100 µL (cover prism totally)
Sample Cell	SS ring and flint glass prism
Temperature Compensation	automatic between 10 and 40°C (50 to 104°F)
Case Material	ABS
Battery Type	1 x 9V AA (included)
Battery Life	5000 reading
Auto-shut off	after 3 minutes of non-use
Packaging dimensions	268 x 122 x 118 mm
Packing weight	660 g



Stainless Steel Sample Well and Prism

Place a few drops of the sample in the well and press the READ key.

Liquid Crystal Display (LCD)

Dual Level LCD with Primary and Secondary Display.

Ordering Information

MA887 is supplied in a carton box, complete with 9V battery, pipette and instruction manual. Optionally you can also order the refractometers in a hard carrying case (**MA752**).

MA888

Digital Refractometer for Ethylene Glycol Measurements

The **MA888** is an optical instrument that employs the measurement of the refractive index to determine the % volume and freezing point of ethylene glycol based coolants or antifreeze.

The digital refractometer eliminates the uncertainty associated with mechanical refractometers and is easily portable for use in the field to optimize your cooling system.

The **MA888** refractometer is an optical device that is simple and quick to use. Samples are measured after a simple user calibration with distilled or deionized water. Within seconds, the refractive index and temperature are measured and converted into one of two measurement units; % Volume or Freezing Point.

The instrument utilizes internationally recognized references for unit conversion and temperature compensation for ethylene glycol solutions (e.g. CRC Handbook of Chemistry and Physics, 87th Edition).

The temperature (in °C or °F) is also displayed on the large dual level display along with helpful message codes.

Key features include:

- Dual-level LCD
- Automatic Temperature Compensation (ATC)
- Easy setup and storage
- Battery operation with Low Power indicator (BEPS)
- Automatically turns off after 3 minutes of non-use

Specifications	MA888
Range	0 to 100% Volume 0 to -50°C / 32 to -58°F Freezing Point 0 to 80°C / 32 to 176°F
Resolution	0.1% Volume 0.1°C / 0.1°F Freezing Point 0.1°C / 0.1°F
Accuracy	±0.2% Volume ±0.5°C / ±1.0°F Freezing Point ±0.3°C / ±0.5°F
Light Source	yellow LED
Measurement Time	approximately 1.5 seconds
Minimum Sample Volume	100 µL (cover prism totally)
Sample Cell	SS ring and flint glass prism
Temperature Compensation	automatic between 10 and 40°C (50 to 104°F)
Case Material	ABS
Battery Type	1 x 9V AA (included)
Battery Life	5000 reading
Auto-shut off	after 3 minutes of non-use
Packaging dimensions	268 x 122 x 118 mm
Packaging weight	660 g

Stainless Steel Sample Well and Prism

Place a few drops of the sample in the well and press the READ key.

Liquid Crystal Display (LCD)

Dual Level LCD with Primary and Secondary Display.

Ordering Information

MA888 is supplied in a carton box, complete with 9V battery, pipette and instruction manual. Optionally you can also order the refractometers in a hard carrying case (**MA752**).

pH51/pH54/ C65/C66/T75/T76

Pocket-size Waterproof pH Meters and Conductivity & TDS testers with replaceable electrode and manual calibration

Sharp ECO/WP Testers are designed for all applications.
Their waterproof casings and double junction replaceable electrodes make them suitable also for heavy duty applications, such as wastewater treatment and agriculture.
The modular design allows easy electrode and battery replacement.
Manual calibration prolongs the battery life up to 1500 hours for pH meters.

Specifications	 pH51	 pH54
Range	0.0 to 14.0 pH	0.00 to 14.00 pH
Resolution	0.1 pH	0.01 pH
Accuracy (@25°C)	±0.1 pH	±0.1 pH
Typical EMC Deviation	±0.1 pH	±0.1 pH
Calibration	manual at 2 points through trimmers	manual at 2 points through trimmers
pH electrode	**MA73600** (replaceable)	**MA73600** (replaceable)
Environment	0 to 50°C; max RH 100%	0 to 50°C; max RH 100%
Battery Type	3 x 1.5V alkaline	3 x 1.5V alkaline
Battery Life	more than 1500 hours of continuous use	more than 1500 hours of continuous use
Packaging dimensions	254 x 67 x 47 mm	254 x 67 x 47 mm
Packaging weight	186 g	186 g

Replaceable electrode/probe

Replace the electrode/probe in a fast and simple way yourself! Just unscrew the plastic ring on the top of the electrode/probe and replace it with a new one.

Specifications	 C65	 C66	 T75	 T76
Range	0 to 1999 µS/cm	0.00 to 10.00 mS/cm	0 to 1999 ppm (mg/L)	0 to 9990 ppm (mg/L)
Resolution	1 µS/cm	0.01 mS/cm	1 ppm (mg/L)	10 ppm (mg/L)
Accuracy	±2% Full Scale	±2% Full Scale	±2% Full Scale	±2% Full Scale
Typical EMC Deviation	±2% Full Scale	±2% Full Scale	±2% Full Scale	±2% Full Scale
Temperature Compensation	automatic, with β=2%/°C	automatic, with β=2%/°C	automatic, with β=2%/°C	automatic, with β=2%/°C
TDS Factor			0.5	0.5
Calibration	manual at 1 point through trimmer	manual at 1 point through trimmer	manual at 1 point through trimmer	manual at 1 point through trimmer
Probe	**MA73075** (replaceable)	**MA73076** (replaceable)	**MA73075** (replaceable)	**MA73076** (replaceable)
Environment	0 to 50°C; max RH 100%	0 to 50°C; max RH 100%	0 to 50°C; max RH 100%	0 to 50°C; max RH 100%
Battery Type	3 x 1.5V alkaline	3 x 1.5V alkaline	3 x 1.5V alkaline	3 x 1.5V alkaline
Battery Life	approx. 250 hours of use	approx. 250 hours of use	approx. 250 hours of use	approx. 250 hours of use
Packaging dimensions	254 x 67 x 47 mm	254 x 67 x 47 mm	254 x 67 x 47 mm	254 x 67 x 47 mm
Packaging weight	157 g	156 g	157 g	156 g

Accessories

MA73075 Replaceable conductivity probe, LR
MA73076 Replaceable conductivity probe, HR
MA73600 Replaceable electrode for pH51 and pH54
M10000B Electrode rinse solution, 20 mL sachet (25 pcs)
M10004B pH 4.01 buffer solution 20 mL sachet (25 pcs)
M10007B pH 7.01 buffer solution 20 mL sachet (25 pcs)
M10010B pH 10.01 buffer solution 20 mL sachet (25 pcs)
M10030B 12880 µS/cm calibration solution, 20 mL sachet, 25 pcs
M10031B 1413 µS/cm calibration solution, 20 mL sachet, 25 pcs
M10032B 1382 ppm (mg/L) calibration solution, 20 mL sachet, (25 pcs)
M10038B 6.44 ppt (g/L) calibration solution, 20 mL sachet, (25 pcs)
M10080B 800 ppm calibration solution, 20 mL sachet (25 pcs)
MA9015 Electrode storage solution, 230 mL
MA753 Hard carrying case for 2 testers

Ordering Information

All testers are supplied in a carton box complete with calibration solution, batteries, instruction manual and screwdriver for calibration.

Packaging Information

Optionally **C65**, **C66, T75** and **T76** is also availablbe in a kit (**Mi5165, Mi5166, Mi5175, Mi5176**) together with **pH51** pH Meter.

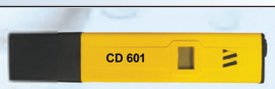
pH600/CD600/CD601/CD610/CD611/CD97

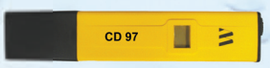
pH/EC & TDS Economical Pocket Testers

Milwaukee's economical testers are easy-to-use and low cost instruments to measure quick and reliable pH, EC or TDS values.

Measuring electrical conductivity is the best way of checking the amount of salt or dissolved solids (TDS) in water. Milwaukee provides you with a range of pocket testers that will allow you to measure from very low to very high conductivity solutions.

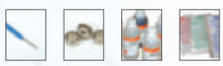
All EC/TDS testers compensate for the temperature variance automatically.

Specifications	 pH600	 CD600	 CD601
Range	0.0 to 14.0 pH	0 to 1990 ppm	0 to 1990 µS/cm
Resolution	0.1 pH	10 ppm	10 µS/cm
Accuracy	±0.1 pH	±2% Full scale	±2% Full scale
Calibration	manual, 1 point	manual, 1 point	manual, 1 point
Temperature Compensation		automatic from 5 to 50°C	automatic from 5 to 50°C
Environment	0 to 50°C / 32 to 122°F; max RH 95%	0 to 50°C / 32 to 122°F; max RH 95%	0 to 50°C / 32 to 122°F; max RH 95%
Battery Type / Battery Life	3 x 1.5V alkaline / 700 hours of use	4 x 1.5V alkaline / 350 hours of use	4 x 1.5V alkaline / 350 hours of use
Packaging dimensions	180 x 65 x 32 mm	180 x 65 x 32 mm	180 x 65 x 32 mm
Packaging weight	120 g	120 g	120 g

Specifications	 CD610	 CD611	 CD97
Range	0 to 10000 ppm	0 to 20000 µS/cm	0 to 1000 ppm
Resolution	100 ppm	100 µS/cm	1 ppm
Accuracy	±2% Full scale	±2% Full scale	±10 ppm
Calibration	manual, 1 point	manual, 1 point	manual, 1 point
Temperature Compensation	automatic from 5 to 50°C	automatic from 5 to 50°C	automatic from 5 to 50°C
Environment	0 to 50°C / 32 to 122°F; max RH 95%	0 to 50°C / 32 to 122°F; max RH 95%	0 to 50°C / 32 to 122°F; max RH 95%
Battery Type / Battery Life	4 x 1.5V alkaline / 350 hours of use	4 x 1.5V alkaline / 350 hours of use	4 x 1.5V alkaline / 350 hours of use
Packaging dimensions	180 x 65 x 32 mm	180 x 65 x 32 mm	180 x 65 x 32 mm
Packaging weight	120 g	120 g	120 g

Accessories

M10004B pH 4.01 buffer solution 20 mL sachet (25 pcs)
M10007B pH 7.01 buffer solution 20 mL sachet (25 pcs)
M10010B pH 10.01 buffer solution, 20 mL sachet (25 pcs)
M10030B 12880 µS/cm calibration solution, 20 mL (25 pcs)
M10031B 1413 µS/cm calibration solution, 20 mL (25 pcs)
M10032B 1382 ppm (mg/L) calibration solution, 20 mL (25 pcs)
M10038B 6.44 ppt (g/L) calibration solution, 20 mL (25 pcs)
MA9015 Electrode storage solution, 230 mL
MA9016 Electrode cleaning solution, 230 mL



Ordering Information

pH600, CD600, CD601, CD610, CD611 and **CD97** are supplied in a plastic hard carrying case, complete with protective cap, calibration screwdriver, batteries and instructions.

TH300/TH310

Pocket-sized thermometers with automatic calibration check

Scientists and laboratory technicians rely on the accuracy of their thermometers when performing routine measurements. For this reason, Milwaukee developed the **TH310**. This palm-sized unit is a highly accurate thermometer that is destined to make glass thermometers obsolete.

Remote temperature measurements require a versatile thermometer with a remote probe that can be used in a hard-to-reach places. The meter must also be easily readable at an angle. The **TH300** is equipped with a stainless steel general purpose probe and 1 meter cable to make remote reading a simple task.

The thermometers have easy-to-read display which shows clear readings at any angle.

Specifications	TH300	TH310
Range	-50.0 to 150.0°C	-50.0 to 150.0°C
Resolution	0.1°C	0.1°C
Accuracy (@20°C)	±0.5°C (-20 to 90°C)	±0.5°C (-20 to 90°C)
Typical EMC Deviation	±0.3°C	±0.3°C
Probe	Stainless steel with 1 meter cable	Stainless steel
Switch ON/OFF	no	yes
Calibration Check	no	yes
Environment	0 to 50°C; max RH 95%	0 to 50°C; max RH 95%
Battery Type	1 x 1.4V	1 x 1.5V
Battery Life	approximately 1 year	approximately 3000 hours of continuous use
Packaging dimensions	225 x 91 x 47 mm	254 x 67 x 47 mm
Packaging weight	140 g	100 g

Ordering Information

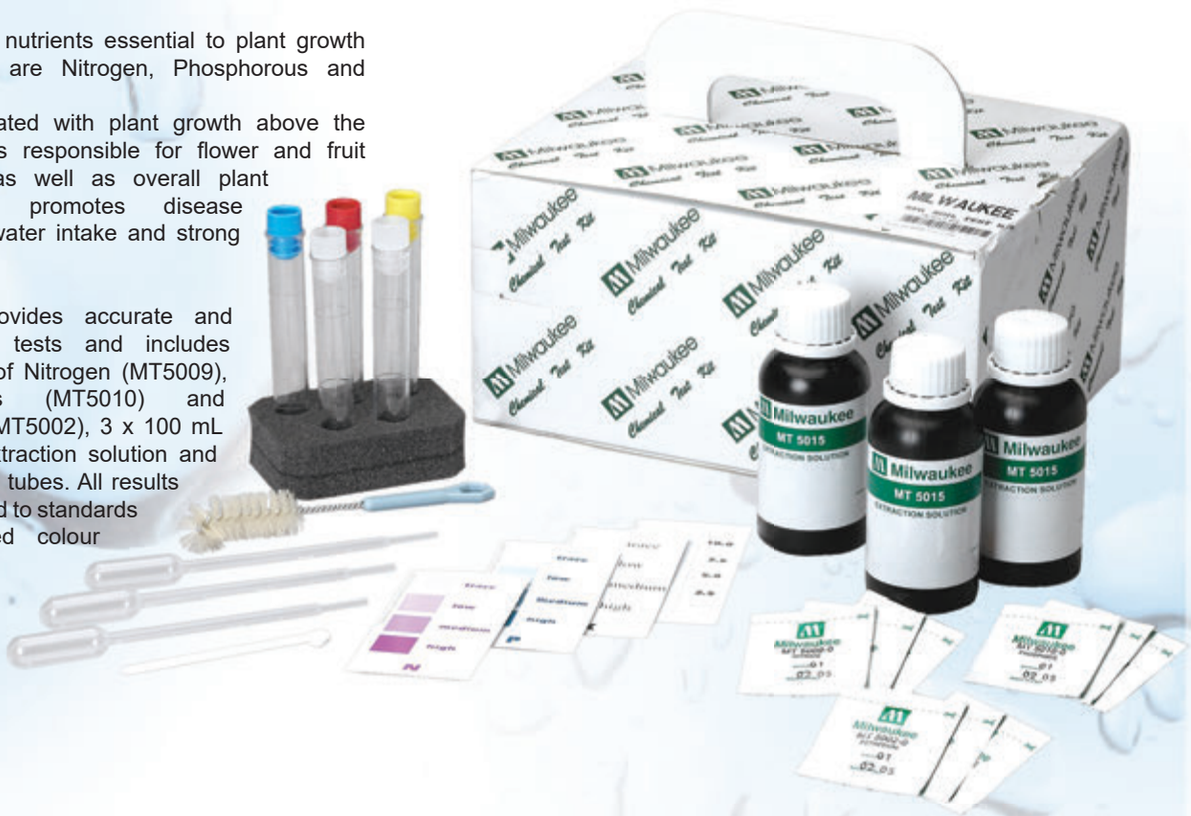
TH300 is supplied with stainless steel probe with 1 meter cable, batteries and instruction manual.
TH310 is supplied with batteries and instruction manual.

MT6003

NPK Soil Test Kit

The primary nutrients essential to plant growth and quality are Nitrogen, Phosphorous and Potassium.
N is associated with plant growth above the ground, **P** is responsible for flower and fruit production as well as overall plant health. **K** promotes disease resistance, water intake and strong root growth.

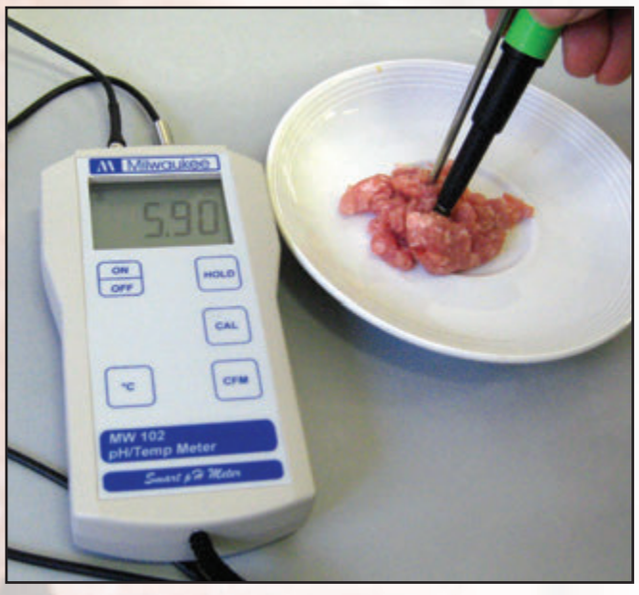
This kit provides accurate and professional tests and includes 25 sachets of Nitrogen (MT5009), Phosphorous (MT5010) and Potassium (MT5002), 3 x 100 mL bottles of extraction solution and 5 plastic test tubes. All results are compared to standards on laminated colour charts.



Measuring pH in meat

Using MW102 pH portable meter with a MA920B/1 pH electrode

The pH changes occurring in a carcass during the first 24 hours after slaughter are important for the quality of the final meat or meat products. Protein denaturation will occur if pH falls to too low a level or if a relatively low pH sets in at a time after slaughter where the carcass temperature is still high. This will result in meat with poor water holding capacity and in extreme cases in meat that is PSE.



Calibrate the pH meter using pH 7 and pH 4 standardization buffers.

1. Cut meat sample into small pieces.

2. Weight approximatley 10 grams into a blender cup. Run duplicates on each sample.

3. Add 100 ml of distilled deionized water and blend for 30 seconds on high speed.

4. Transfer sample to a beaker. Read the pH as soon as possible.

5. By pressing the HOLD key you can activate the hold function. The measured value is frozen on the display and the “HOLD” tag lights up. Release “HOLD” by pressing HOLD key again.

6. Blender cups, beakers and stir bars can be rinsed in distilled water between samples. The pH electrode should be rinsed with distilled water between each sample and periodically rinsed with acetone from a squeeze bottle to remove fat buildup.

How to clean pH Electrodes

The pH electrode needs to be cleaned in order to prevent build up of material on the surface of the glass bulb. Material building up on the glass bulb of the electrode will cause the calibration of the electrode to be inaccurate and any subsequent reading to be inaccurate.

The pH electrode should be cleaned generally depending on usage, once a day, once a week or at least once a month to prevent clogging and to maintain accuracy. Always clean it before calibration. Immerse just the glass membrane of the electrode in the MA9016 or M10016B General cleaning solution for about 10-15 minutes.

Never wipe the glass membrane because it can lead to permanent damage! DO NOT BE ALARMED IF ANY SALT DEPOSITS ARE PRESENT. This is normal with electrodes and they will disappear when rinsed with water.

Special cleaning methods:

Oil pluggins: clean by warm water with a detergent solution for 10-20 minutes.
Protein: use 1% pepsin and 0.1M HCl solution for 1 hour.
Sulfides: use 0.1M Thiourea/HCl solution for 15-60 minutes.
Alkaline deposits: it can be removed with weak acid or vinegar.
Acidic deposits: it can be removed with 0.1 molar NaOH.

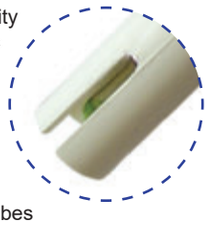
After special cleaning you should clean the electrode in General cleaning solution for 5 minutes and then recondition it by storing in MA9015 storage solution for 1-2 hours. The pH electrode should be rinsed with distilled or deionized water, but never store it in these water.

To minimize clogging and ensure a quick response time, the glass bulb of the pH electrode and the junction should be kept moist. Replace protective cap with a few drops of a MA9015 Storage Solution.

Electrodes & Probes

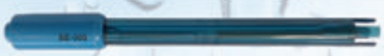
pH, ORP, Conductivity, Dissolved Oxygen

Milwaukee has a wide assortment of pH, ORP, Conductivity and other specialty sensors to meet all your specific requirements.



Finding the right electrode for a specific application is a very important task and in order to solve this selection problem it is important to consider the following: electrode body, reference construction and junction.
Below you will find a list of Milwaukee electrodes and probes with corresponding instruments they are supplied with.

OTHER ELECTRODES & PROBES

	**SE220**	Double junction pH electrode with 1 meter cable and gel filled electrolyte solution (MW100 / MW101 / MW102)
	**SE300**	Double junction orp platinum electrode with 1 meter cable and gel filled electrolyte solution (MW500)
	**SE510**	Conductivity/TDS probe with 1 meter cable (MW301 / MW401)
	**SE520**	Conductivity/TDS probe with 1 meter cable (MW302 / MW402)
	**SE600**	Combination probe for pH/EC/TDS with 1 meter cable (MW801 / MW802)
	**MA812/2**	Conductivity/TDS probe with 2 meter cable (MC310 / MC410)
	**MA814DB/1**	4-ring Conductivity/TDS/NaCl/Temperature probe with DIN connector and 1 meter cable (Mi170 / Mi180)
	**MA814D/1**	4-ring Conductivity/TDS/NaCl/Temperature probe with DIN connector and 1 meter cable (Mi306)
	**MA911B/1** **MA911B/2**	Double junction, gel filled pH electrode with BNC connector, 1 or 2 m cable
	**MA914BR/1**	pH/Temp amplified probe with 1 meter cable (Mi105)
	**MA921B/2**	Double junction, gel filled ORP electrode with platinum sensor, BNC connector, 2 m cable
	**MA923D/1**	pH/ORP/Temp amplified probe with 1 meter cable (Mi106)
	**MA830R**	Stainless steel Temperature probe (MW102)
	**MA831R**	Stainless steel Temperature probe (Mi150 / Mi151 / Mi160)
	**MA840**	Polarographic D.O. probe with 4 meter cable (MW600 / Mi605)
	**MA851D/1**	pH/Conductivity/TDS/Temperature amplified probe with DIN connector and 1 meter cable (Mi805 / Mi806)

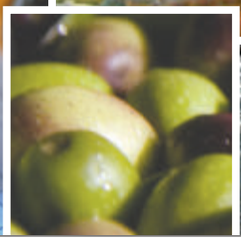
Electrode Selection Guide

pH, ORP, Conductivity, Dissolved Oxygen

Milwaukee has a wide assortment of pH, ORP, Conductivity and other specialty sensors to meet all your specific requirements.

Before selecting an electrode, please consult the table below. The recommended electrodes are the ones best suited to each application, however we also ask you to verify the specifications on pages 6-7-8-9

Special electrodes for specific applications can also be manufactured upon request.



Applications	pH	MA905B/3	MA911B/2	SE220	MA913B/3	MA914BR/1	MA915B/2	MA916B/1	MA916B/3	MA917B/1	MA918B/1	MA919B/1	MA920B/1	MA923D/1	MA991B/1	ORP	MA921B/1	SE300	MA923B/3	MA924B/1	Conductivity	SE510	D.O.	MA840
Agriculture / Soil testing					■		■				■													
Aquarium			■	■	■				■								■	■	■			■		■
Cheese													■							■				
Dairy products													■											
Emulsions											■													
Environmental, Pollution			■	■	■	■	■							■					■					■
Fish farming			■	■	■														■					■
Food and beverage (general use)													■											
Galvanizing waste solution		■			■														■					
Hi purity water		■			■						■													
Heavy duty applications																			■					■
In-line applications		■			■		■												■					
Laboratory (general use)			■	■	■	■	■	■		■				■	■				■			■		■
Meat													■											
Paints											■													
Paper					■																			
Photographic chemicals					■																			
Strong acid										■														
Swimming pools		■	■	■	■														■					
Water supply					■									■					■					■
Wine processing											■	■	■							■				■

Calibration, Maintenance & Cleaning

Solutions

Milwaukee offers a wide range of calibration, maintenance & Cleaning solutions.

The use of calibration and cleaning solutions is fundamental for the correct use of electrodes and for obtaining the most accurate and reproducible readings. Often readings are not correct because the sensors have not been properly handled.

Milwaukee standard solutions are available in 230 mL bottles and 20 mL sachets.
Traditional buffer solutions are packed in 230 mL leak-proof bottles and are recommended for lab applications.

Sachets are sealed against light and air and are ideal for on-the-spot calibration.

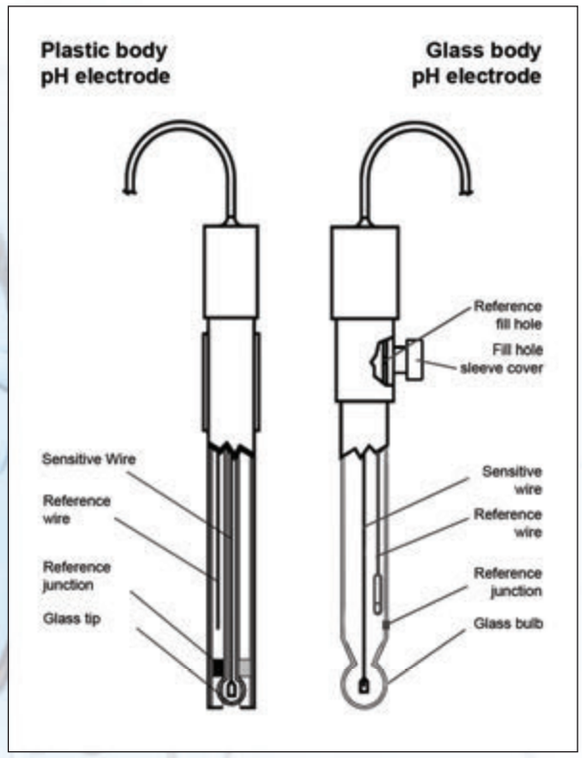
Simply open, insert the tester or electrode into the sachet and calibrate. Sachets are sold in boxes of 25 pieces.

Calibration, Maintenance & Cleaning Solutions

MA9001	pH 1.68 Calibration Buffer Solution, 230 mL	**MA9065**	111.8 mS/cm Conductivity Calibration Solution, 230 mL
MA9004	pH 4.01 Calibration Buffer Solution, 230 mL	**MA9066**	100% NaCl Calibration Solution, 230 mL
MA9006	pH 6.86 Calibration Buffer Solution, 230 mL	**MA9069**	5000 µS/cm Conductivity Calibration Solution, 230 mL
MA9007	pH 7.01 Calibration Buffer Solution, 230 mL	**MA9070**	Zero Oxygen Solution, 500 mL + 12 g
MA9009	pH 9.18 Calibration Buffer Solution, 230 mL	**MA9071**	Electrolyte Solution for D.O. Probes, 230 mL
MA9010	pH 10.01 Calibration Buffer Solution, 230 mL	**MA9112**	pH 12.45 Calibration Buffer Solution, 230 mL
MA9011	Refilling Electrolyte Solution 3.5M KCl for pH/ORP electrodes, 230 mL	**M10000B**	Rinse Solution - Deionized Water (box of 25x20 ml sachet)
MA9012	Refilling Electrolyte Solution 1M KNO3, 230 mL, food applications	**M10004B**	pH 4.01 Calibration Buffer Solution (box of 25x20 ml sachet)
MA9015	Storage Solution for pH/ORP electrodes, 230 mL	**M10007B**	pH 7.01 Calibration Buffer Solution (box of 25x20 ml sachet)
MA9016	Cleaning Solution for pH/ORP electrodes, 230 mL	**M10010B**	pH 10.01 Calibration Buffer Solution (box of 25x20 ml sachet)
MA9020	200-275 mV ORP Solution, 230 mL	**M10016B**	Cleaning Solution for electrodes (box of 25x20 ml sachet)
MA9060	12880 µS/cm Conductivity Calibration Solution, 230 mL	**M10030B**	12880 µS/cm Calibration Buffer Solution (box of 25x20 ml sachet)
MA9061	1413 µS/cm Conductivity Calibration Solution, 230 mL	**M10031B**	1413 µS/cm Calibration Buffer Solution (box of 25x20 ml sachet)
MA9062	1382 ppm TDS Calibration Solution, 230 mL	**M10032B**	1382 ppm TDS Calibration Solution (box of 25x20 ml sachet)
MA9063	84 µS/cm Conductivity Calibration Solution, 230 mL	**M10038B**	6.44 ppt TDS Calibration Solution (box of 25x20 ml sachet)
MA9064	80000 µS/cm Conductivity Calibration Solution, 230 mL	**M10080B**	800 ppm TDS solution (box of 25x20 ml sachet)

pH Electrode

Storage and Maintenance



pH Electrode Storage and Maintenance
To ensure a quick response and free-flowing liquid junction, the sensing element and reference junction must not be allowed to dry out. The following instructions apply to refillable electrodes. For gel-filled electrodes, consult instruction manual.

Routine Storage
Soak electrode in a pH Electrode Storage Solution (MA9015). If a storage solution is unavailable, pH 4 buffer or pH7.01 may be used. The fill hole should be covered to prohibit evaporation of reference fill solution.

Maintenance
Cleaning your electrode between and after use will help extend the life of your electrode and avoid the cost of early replacement.

Routine Cleaning
Soak electrode in MA9016 cleaning solution for half an hour, followed by soaking it in storage solution (MA9015) for at least two hours.

Weekly Maintenance
Inspect electrodes for scratches, cracks, salt crystal buildup, or membrane/junction deposits.
Rinse off any salt buildup with distilled water, and remove any membrane/junction deposits as directed in cleaning procedures below. The reference chamber should be drained, flushed with fresh filling solution, and refilled.

WARRANTY POLICY

Milwaukee warrants it's instruments to be free of manufacturing defects as follows: bench meters for 3 years, portable and pocket testers for 2 years and electrode/sensors for 6 months (unless otherwise specified).
The warranty period commences from the original date of sale to the user. Warranty is valid only when the product is used under normal conditions and in accordance with the operating limitations and prescribed maintenance procedures.

Milwaukee reserves the right to make improvements in design, construction and appearence of its products without advance notice.

Instrument service
Warranty and non-warranty service are performed by our technicians in Milwaukee headquarters. All items must have a Return Goods Authorization (RGA) number before returning the goods. This number can be obtained by contacting the Milwaukee technical service department at:

tech@milwaukeeinst.com

All products returned without an RGA number will be refused.

FURTHER INFORMATION

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SPECIFIC APPLICATION LITERATURE

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Specific application catalogues and leaflets are also available. Please kindly send us an e-mail at:

info@milwaukeeinst.com

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