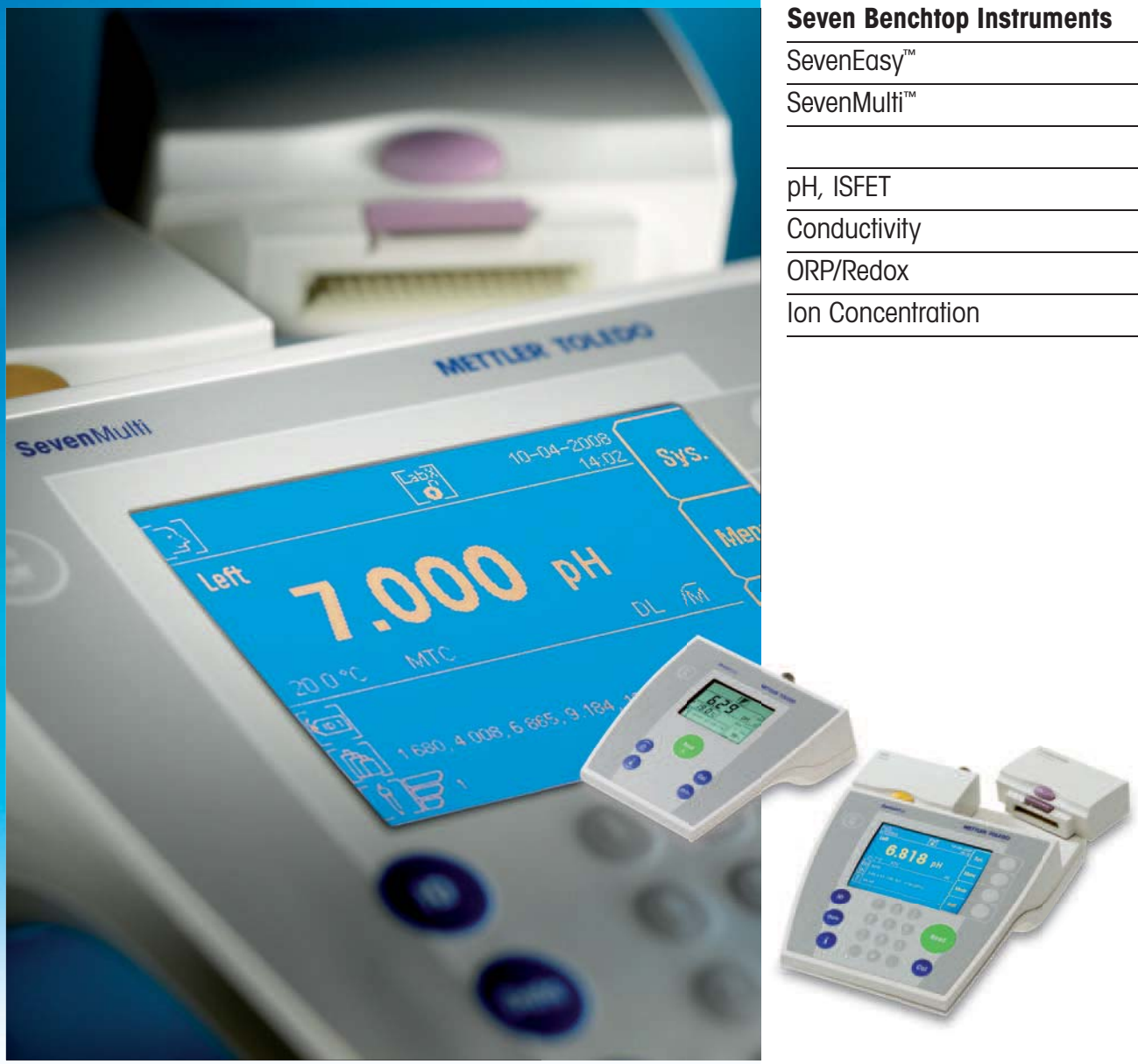
Lab Meters



Seven Benchtop Instruments

SevenEasy™
SevenMulti™

pH, ISFET
Conductivity
ORP/Redox
Ion Concentration

Simple and Accurate Measurements

For Results at your Fingertips

METTLER TOLEDO

Comfortable Laboratory Work with Seven
Simple and Accurate Measurements

- **Intuitive pH, conductivity and ion measurements with maximum accuracy**
- **Comprehensive range of automation solutions and accessories**
- **Qualification and maintenance services are the perfect complement**

A high-performance package for everyday lab work

Seven is a product line that combines precise electrochemical measuring technologies with innovative design and ease of use. It fulfills the highest demands for pH, conductivity and ion measurements and meets the latest requirements for quality control, data management and legal regulations (GxP, USP/EP). The self-explanatory user interface allows intuitive operation at all stages.

SevenEasy™ – for quick and reliable measurements

- Single-channel instrument for routine measurements
- pH/mV or conductivity
- Excellent price/performance ratio

Peripheral options

These range from printers, sample changers and barcode readers to software for automated data collection with the capability to integrate data into laboratory information management systems (LIMS).

SevenMulti™ – for a wide range of accurate measuring solutions

- Professional dual-channel instrument
- pH, conductivity, ISFET and ions – with modular expansion capability
- Full GLP support

7 good reasons for Seven Instruments

- Ease of use
- High measurement accuracy
- Fast result evaluation
- Easy-to-read display screen
- Automation expansion capability
- Comprehensive range of accessories
- Complementary qualification and maintenance services

SevenEasy™ and SevenMulti™
Composed of Great Individuals

All Seven models are easy to use and have an easy-to-read display screen and integrated data communication interfaces. As a result it is extremely simple to take measurements and process the results. Thanks to its modular design, the SevenMulti™ offers options for additional expansion. This also makes the Seven series an indispensable and ideal solution for the special requirements of experienced laboratory personnel.

SevenEasy™

Special applications for SevenMulti™

SevenMulti™ is the perfect choice for applications where maximum measurement accuracy is required. The dual-channel instrument supports the measurement of two electrochemical parameters simultaneously and can be expanded by additional modules. It meets the latest requirements for quality control, data management and legal GLP regulations.

SevenMulti™

Routine tasks for SevenEasy™

The ML1501 and ML1502 pH and conductivity instruments have all the basic functions essential for performing routine measurements and are a budget-friendly alternative to the SevenMulti™ product line.

Comparison of functions within the Seven family

		SevenEasy™		SevenMulti™				
		ML1501	**ML1502**	**ML1601**	**ML1604**	**ML1605**	**ML1603**	**ML1602**
pH	Measuring range	0.000 … 14.000	-	-2.000 … 20.000				-
	Accuracy	+/-0.004	-	+/-0.002				-
Conduc-tivity	Measuring range	-	0.01 µS/cm … 500 mS/cm	-	-	-	0.001 µS/cm … 1000 mS/cm	
	Accuracy	-	+/-0.5%	-	-	-	+/-0.5%	
Ions	Measuring range	-	-	-	$1.00E^{-9}$ to $9.99E^{+9}$		-	-
	Accuracy	-	-	-	+/-0.5%		-	-
Dual-channel measurement		-	-	-	-	•	•	-
Expandable to function as dual-channel instrument		-	-	•	•	Dual-channel instrument		•
Calibration	Calibration points	3	1	5	9	9	5	5
	User-defined buffer group/standard	•	-	•	•	•	•	•
	pH electrode test	-	-	•	•	•	•	-
	Manual cell constant entry	-	•	-	-	-	•	•
Choice of end point format		Automatic / Manual		Automatic / Manual / Scheduled				
Choice of stability criteria (fast, normal, strict)		-	-	•	•	•	•	-
Incremental methods for ion measurements		-	-	-	•	•	-	-
ATC or MTC		•	•	•	•	•	•	•
System and security	Time and date	-*	-*	•	•	•	•	•
	RS232 interface	•	•	•	•	•	•	•
	Choice of print formats	-	-	Short / Standard / GLP				
	Data storage	-	-	1000 measurements / 400 calibrations / 40 methods				
	PIN protection	-	-	Instrument login / System settings / Data deletion				
	Multilingual**	-	-	English / German / French / Spanish / Italian				
	User ID, sample ID, sensor ID	-	-	Yes				

For a table with more information, see page 10. For complete instrument specifications, see pages 11 to 13.

* RS-P26 and RS-P28 printers have a built-in time and date function that enables the time and date to be included on the printout.

** SevenMulti™ is also available as SevenMulti™ Asia, which supports Chinese, Japanese, Russian and English.

Common peripherals

Peripherals connection

The instruments of the SevenEasy™ and SevenMulti™ product lines feature an RS232 interface as standard. A communication module with USB connection is optionally available for the SevenMulti™. You can therefore connect a printer or computer to the SevenEasy™ and SevenMulti™ at any time.

Multiple modes of versatility

The METTLER TOLEDO electrode holder comes as standard with the SevenEasy™ and SevenMulti™ and can be used either freestanding or attached to the left or right of the instrument. This makes it ideal for both left- and right-handed personnel and allows it to be adapted to the space available in the laboratory.

The right electrode for each application

The kit versions of SevenEasy™ and SevenMulti™ contain the InLab® Expert Pro or Inlab® Routine Pro pH electrodes and the InLab®731 conductivity cell. You will find more information about these and other electrodes from METTLER TOLEDO on page 15.

SevenEasy™
Quick and Reliable Measurements

- **Self-explanatory pH or conductivity measurements**
- **Harmonized sensor technology for reproducibility of measured values**
- **High-contrast display with large characters for easy readability**
- **Integrated RS232 interface for data communication**

SevenEasy™ – simple and yet precise
The SevenEasy™ product line combines precise electrochemical measuring technology with an innovative, appealing design. The budget-friendly ML1501 meets every demand for pH measurements and the ML1502 has all the basic functions of a professional conductivity instrument for routine use. Both instruments feature a self-explanatory user interface which allows intuitive operation at all stages.

Extensive range of uses
A wide range of applications is supported, from the independent, battery-powered one-off measurement to comprehensive analyses of measured values and data collection via your local network.

pH 0.01/0.001
Easy switching between two and three decimal places in pH mode

SevenEasy™ ML1501
Easy switching between pH and mV by pressing a single button

SevenEasy™ – two models for pH or conductivity measurements

SevenEasy™ ML1502

pH

pH measurements made simple with SevenEasy™ ML1501

ATC
Automatic temperature compensation (ATC) corrects the effect of temperature on the electrode signal.

Predefined buffer groups
The instrument features automatic buffer recognition for the 4 predefined buffer groups. With this function, there is no strict pH buffer sequence to be followed for routine calibration. Unnecessary error messages are avoided and processes shortened. Select either 1-, 2- or 3-point calibration.

Automatic measured value acquisition
For a distinct improvement in the reproducibility and thus the quality of your measurement results.

µS/cm

Fast and precise conductivity measurements with SevenEasy™ ML1502

4 measuring modes
The ML1502 offers a variety of measuring modes and units. The Mode button enables you to check conductivity, TDS, specific resistance and salinity, thereby eliminating the need for manual calculations of any kind.

Adaptable calibration
Calibration can be performed using conductivity standards 84 µS/cm, 1413 µS/cm or 12.88 mS/cm. If you know the exact cell constant, you can enter it manually and edit it at any time. Maximum flexibility and accuracy are thus assured.

Temperature compensation
Select one of three temperature compensation modes: linear, non-linear (DIN 38404) and zero compensation for ultrapure water (USP/EP).
The ML1502 is equipped for all samples.

Electrode condition
See at a glance whether your electrode is in good condition. Does it need to be cleaned or replaced? The icon displayed informs you instantly.

Self-test
Like the ML1501, the ML1502 also has a self-test function. Hardware and software can be checked through the interaction between instrument and user: the personal guarantee that all aspects of your device are in perfect working order.

Mobile
Each of the SevenEasy™ instruments can be operated on mains or battery power. With SevenEasy™, you no longer need to depend on mains power: simply insert four AA batteries.

Printers
Both SevenEasy™ instruments support a variety of printers, e.g. RS-P25, RS-P26 and RS-P28. The printers RS-P26 and RS-P28 have a built-in time and date function that enables the time and date to be included on the printout – for total GLP compatibility.

SevenMulti™
Maximum Precision and Flexibility

- **Modular system for pH, conductivity, ion concentration and ISFET**
- **Efficiency enhanced by a variety of automation options**
- **Cutting edge data management with 1,000 GLP measurement data records, 400 GLP calibration data records and 40 methods**
- **Built-in time and date function**

SevenMulti™ – For modular expansion at any time
The ingenious concept of this instrument is based on ultra-precise measurement technology, and includes a multitude of additional options and an intuitive, easy-to-use control interface. Measuring capabilities can be extended at any time by the use of additional small and manageable expansion units. Thanks to the large, backlit display screen, you can see all the important information at a glance, even in dual-channel mode. The RS232 and USB interfaces enable SevenMulti™ to be integrated easily into LIMS. The pH meter is the result of a cleverly devised system specially designed to meet the laboratory challenges of today and tomorrow.

SevenMulti™ – a host of functions to merit the name

Read

Reproducible measurements
A choice of automatic, manual or scheduled end point recognition and three selectable stability criteria enable fast and yet accurate recording of measured values with reproducible results.

Cal

Professional calibration
- Up to 9 calibration points with a choice of linear or segmented algorithm
- Multipoint conductivity calibration
- Automatic buffer recognition within the 8 predefined pH buffer groups
- Automatic recognition of 5 predefined conductivity standards
- User-definable buffers and standards including temperature dependencies

i

Help is always at hand
Context-sensitive help texts support you while operating the instrument. In routine mode, operation is made even easier by the exclusive display of settings specific to the current sample.

Data

Secure data management
SevenMulti™ guarantees the very fast access to current results and calibration data. Saving, logging in, retrieval and PIN-protected deletion of measurement and calibration data have never been easier.

ID

GLP excellence
SevenMulti™ makes it easy to record and print sample, user and sensor IDs of up to 12 characters, even with the barcode reader. The date and time are recorded automatically.

Printers
The SevenMulti™ is able to operate with a selection of METTLER TOLEDO printers, e.g. LC-P45, RS-P42 and RS-P25, RS-P26 and RS-P28. These printers are also compatible with other instruments from METTLER TOLEDO.

Automatic detection
SevenMulti™ detects your chosen expansion units automatically. Switching between individual parameters in dual-channel mode is fast and simple.

Clear text menus and ease of operation
The high-resolution, backlit display screen presents all your important information, whether in single- or dual-channel mode. The instrument is intuitive and easy to use.

Monitored sensors

Electrode test
A built-in pH electrode test verifies the slope, offset, drift and response time of your electrode without altering your current calibration.

Calibration reminder
This useful function reminds you that a calibration is due after a user-defined time interval. In addition, it is possible to block the instrument from taking measurements once this period has expired until the next calibration has successfully been performed.

Security has priority

PIN-protected
Instrument operation and general system settings such as the date and time can be protected by PIN.

Monitoring limit values
You can define your own limit values.
If the actual values fall below or exceed the limit values, a warning appears on the display and on the GLP printout.

Standardized methods
Up to 40 defined user methods store all measurement-related settings so that all users can be confident they are using the same settings.

Compliance with USP/EP regulations
SevenMulti™ has a special mode for use with conductivity measurements to ensure USP and EP compliance (United States/European Pharmacopoeia).

Seven – Unrivaled Flexibility
Multifunctionality Overview

		SevenEasy™ models		SevenMulti™ models				
	Overview of functions and equipment	**ML1501**	**ML1502**	**ML1601**	**ML1604**	**ML1605**	**ML1603**	**ML1602**
Parameters	pH measurement	•		•	•	•	•	
	mV measurement	•		•	•	•	•	
	Relative mV			•	•	•	•	
	Ion concentration (mol/L, mmol/L, %, ppm, mg/L)				•	•		
	Conductivity		•				•	•
	TDS (total dissolved solids)		•				•	•
	Specific resistance		•				•	•
	Salinity		•				•	•
Measurement	Choice of measured value acquisition			•	•	•	•	•
	Choice of stability criteria (fast, normal, strict)			•	•	•	•	
	Choice of pH decimal places (X.XXX, X.XX, X.X)			•	•	•	•	
	ATC or MTC			•	•	•	•	•
	Serial measurements in user-defined time interval			•	•	•	•	•
	Incremental methods for ion measurements				•	•		
Calibration	Calibration points	3	1	5	9	9	5	5
	Predefined pH buffer groups/conductivity standards	4	3	8	8	8	8/6	6
	User-defined buffer group/standard	1	0	1	1	1	1	1
	Automatic pH buffer/standard recognition	•	•	•	•	•	•	•
	Reminder function for calibration			•	•	•	•	•
	pH electrode test			•	•	•	•	
Conductivity	Special USP/EP mode						•	•
	Choice of reference temperature (20 °C or 25 °C)		•				•	•
	Linear or non-linear temperature compensation						•	•
	Procedure for automatic α-coefficient determination						•	•
	Input and display of cell constant		•				•	•
Communication	LabX® direct PC software (included as standard equipment with SevenMulti™)	•	•	•	•	•	•	•
	RS232 interface	•	•	•	•	•	•	•
	Optional TTL or USB communication modules			•	•	•	•	•
	Special analogue output						•	•
	Choice of print formats (short, standard, GLP)			•	•	•	•	•
	Automation with Rondolino sample changer			•	•	•	•	•
	Automation with barcode reader			•	•	•	•	•
	LIMS compatibility			•	•	•	•	•
Safety	Full GLP support			•	•	•	•	•
	Time and date			•	•	•	•	•
	Input of sample ID, sensor ID and SN, username			•	•	•	•	•
	ID input with barcode reader or alphanumeric keypad			•	•	•	•	•
	User-defined alarm limits			•	•	•	•	•
	PIN protection (instrument login/system settings/data deletion)			•	•	•	•	•
	Routine/expert mode			•	•	•	•	•
Security	Context-sensitive help function			•	•	•	•	•
	Data storage (1,000 measurements, 400 calibrations, 40 methods)			•	•	•	•	•
	Extensive filter functions			•	•	•	•	•
	Multilingual menu-guided operation			•	•	•	•	•
	Backlit display			•	•	•	•	•
	Instrument self-test	•	•	•	•	•	•	•
	Expandable to function as dual-channel instrument			•	•	Dual-channel		•

SevenEasy™ in 2 Models
Overview of Functions and Specifications

SevenEasy™ ML1501
pH meter

- 3-point calibration
- 4 predefined buffer groups
- User-defined buffer group
- RS232 interface

SevenEasy™ ML1501	Measuring range	Resolution	Accuracy
pH	0.000 … 14.000	0.001 / 0.01	±0.004
mV	-1.999 … 1.999	0.1 / 1	±0.4
Temperature	-5.0 … 105.0 °C	0.1 °C	±0.5 °C
Sensor inputs	BNC, cinch/RCA (NTC 30 kΩ)		
Interfaces	RS232 (connection to printer or PC)		
Power supply	Mains connection (9 V, DC) or 4 AA batteries (not included)		
Size / weight	180 x 180 x 65 mm / 610 g		
Package size / weight	370 x 320 x 165 mm / 3.1 kg		

SevenEasy™ ML1502
Conductivity meter

- 3 predefined standards
- Manual cell constant input function
- Linear, non-linear or zero temperature compensation
- RS232 interface

SevenEasy™ ML1502	Measuring range	Resolution	Accuracy
Conductivity	0.01 µS/cm … 500 mS/cm	0.01 … 1	±0.5%
Temperature	-5.0 … 105.0 °C	0.1 °C	±0.2 °C
TDS	0.01 mg/L to 500 g/L	0.01 … 1	±0.5%
Specific resistance	0.00 … 20.00 MΩ cm		
Salinity	0.00 … 80.00 ppt (parts per thousand) Practical salinity scale UNESCO 1978		
Sensor inputs	Mini DIN		
Interfaces	RS232 (connection to printer or PC)		
Power supply	Mains connection (9 V, DC) or 4 AA batteries (not included)		
Size / weight	180 x 180 x 65 mm / 610 g		
Package size / weight	370 x 320 x 165 mm / 3.1 kg		

SevenMulti™ in 5 Models
Numerous Functions and Specifications

SevenMulti™ ML1603
Dual-channel pH and conductivity measurement

- Combines all the functions of S40 and S70
- Easy-to-read dual-channel measurement thanks to large display screen
- Supportive, context-sensitive help menu

SevenMulti™ ML1603	Measuring range	Resolution	Accuracy
pH	-2.000 … 19.999	0.001, 0.01, 0.1	±0.002
mV (rel. mV)	-1999 … 1999	0.1	±0.1
Temperature	-30.0 … 130.0 °C	0.1 °C	±0.1 °C
Conductivity	0.001 µS/cm … 1000 mS/cm	0.001 … 1	±0.5%
Temperature	-30.0 … 130.0 °C	0.1 °C	±0.1 °C
TDS	0.01 mg/L … 1000 g/L	0.01 … 1	±0.5%
Specific resistance	0.00 … 20.00 MΩcm		
Salinity	0.00 … 80.00 ppt		
Sensor inputs	BNC, 2 mm ref., cinch/RCA (NTC), 4 mm banana (PT1000), mini DIN		
Interfaces	RS232 (connection to printer or PC), titrator output		
Power supply	Mains connection (9 V, DC)		
Size / weight	190 x 240 x 65 mm / 1100 g		
Package size / weight	370 x 320 x 165 mm / 4.2 kg		

SevenMulti™ ML1605
Premium dual-channel ion meter

- Supports simultaneous dual-channel measurement pH/ions or ions/ions
- Comprehensive range of electrodes and accessories
- Expandable: Rondolino sample changer, printer and barcode reader

SevenMulti™ ML1605	Measuring range	Resolution	Accuracy
Concentration	$1.00E^{-9}$ … $9.99E^{+9}$	± last signifi.digit	± 0.5%
pH	-2.000 … 19.999	0.001, 0.01, 0.1	± 0.002
mV (rel. mV)	-1999 … 1999	0.1	± 0.1
Temperature	-30.0 … 130.0 °C	0.1 °C	± 0.1 °C
Sensor inputs	2 each of: BNC, 2 mm ref., cinch/RCA (NTC), 4 mm banana (PT1000)		
Interfaces	RS232 (connection to printer or PC)		
Power supply	Mains connection (9 V, DC)		
Size / weight	190 x 240 x 65 mm / 1125 g		
Package size / weight	370 x 320 x 165 mm / 4.2 kg		

SevenMulti™ ML1601

Professional pH meter

- Compatible with Rondolino sample changer, printer and barcode reader
- Outstanding data management capabilities with 1,000 GLP data records
- Choice of stability criteria

SevenMulti™ ML1601	Measuring range	Resolution	Accuracy
pH	-2.000 … 19.999	0.001, 0.01, 0.1	±0.002
mV (rel. mV)	-1999 … 1999	0.1	±0.1
Temperature	-30.0 … 130.0 °C	0.1 °C	±0.1 °C
Sensor inputs	BNC, 2 mm ref., cinch/RCA (NTC), 4 mm banana (PT1000)		
Interfaces	RS232 (connection to printer or PC)		
Power supply	Mains connection (9 V, DC)		
Size / weight	190 x 240 x 65 mm / 1065 g		
Package size / weight	370 x 320 x 165 mm / 4.1 kg		

SevenMulti™ ML1604

Single-channel ion meter

- Choice of 26 preprogrammed electrode types
- Incremental methods for ion measurements
- Up to 9 calibration points
- Choice of stability criteria

SevenMulti™ ML1604	Measuring range	Resolution	Accuracy
Concentration	$1.00E^{-9}$ … $9.99E^{+9}$	± last signifi. digit	± 0.5 %
pH	-2.000 … 19.999	0.001, 0.01, 0.1	± 0.002
mV (rel. mV)	-1999 … 1999	0.1	± 0.1
Temperature	-30.0 … 130.0 °C	0.1 °C	± 0.1 °C
Sensor inputs	BNC, 2 mm ref., cinch/RCA (NTC), 4 mm banana (PT1000)		
Interfaces	RS232 (connection to printer or PC)		
Power supply	Mains connection (9 V, DC)		
Size / weight	190 x 240 x 65 mm / 1065 g		
Package size / weight	370 x 320 x 165 mm / 4.1 kg		

SevenMulti™ ML1602

Luxury conductivity meter

- Programmable, customer-defined calibration standards including temperature table
- USP/EP mode: compliance with the latest guidelines for the highest grades of ultrapure water
- Free choice of 6 commercially available or user-defined calibration standards

SevenMulti™ ML1602	Measuring range	Resolution	Accuracy
Conductivity	0.001 µS/cm … 1000 mS/cm	0.001 … 1	±0.5%
Temperature	-30.0 … 130.0 °C	0.1 °C	±0.1 °C
TDS	0.01 mg/L to 1000 g/L	0.01 … 1	±0.5%
Specific resistance	0.00 … 20.00 MΩcm		
Salinity	0.00 … 80.00 ppt		
Sensor inputs	Mini DIN		
Interfaces	RS232 (connection to printer or PC), titrator output		
Power supply	Mains connection (9 V, DC)		
Size / weight	190 x 240 x 65 mm / 1040 g		
Package size / weight	370 x 320 x 165 mm / 4.1 kg		