



A handy instrument, powered by a solar cell, for the easy and rapid checking of titrators, KF instruments, pH meters, conductometers and Rancimats.

### The Calibrated Reference gets things straight

It may occasionally happen that an instrument used in the lab appears to be faulty, not functioning correctly, or the measured values displayed untrustworthy. In most cases it turns out that there were no faults in the electronic and mechanical parts of the instrument and that the causes were external ones, for example, a problem concerning the electrode or the chemistry involved. The Calibrated Reference allows a quick and easy assessment of the instrument concerned.

### A must for the quality-conscious lab

The Calibrated Reference is simply connected to the measuring instrument to be checked instead of the usual sensor. In this way the functioning and basic accuracy of almost all Metrohm instruments can be easily checked in a short time. The Calibrated Reference can also be used to check the high impedance inputs of instruments such as pH meters or titrators.

The Calibrated Reference offers you the possibility of checking your measuring instrument within the normal operating procedure and therefore within established methods. This has the advantage that the methods and the selected operational sequences are subjected to a check at the same time.

The 2.767.0010 Calibrated Reference is also ideal for checking particular functions of Metrohm instruments using the diagnostic procedures given in the Instructions for use.

### Small but sophisticated: a solar cell is the driving force

A solar cell, which can be covered by simply turning a hinged lid, supplies the power for the 2.767.0010 Calibrated Reference. If the lighting conditions are inadequate the output voltage is automatically switched off.

When the solar cell is active the Calibrated Reference supplies two voltages.

One of them has a value of approximately 1200 mV and is available either directly or via a 1 G $\Omega$  resistor. The second voltage is about -340 mV, which corresponds to a pH value of 12.76 (25 °C, slope = 100%, pH<sub>as</sub> = 7.00).



The 2.767.0010 in its practical case. The standard cables shown form part of the accessories.



Checking the pH display of a 744 pH Meter with the Calibrated Reference.

With the solar cell covered the Calibrated Reference supplies resistances of ca. 14.3 kΩ and 460 kΩ. These can be used for checking current and voltage sources in pH meters, titrators and KF instruments.

For checking temperature measuring instruments, built-in resistances are used that correspond to the theoretical values for Pt 100 and Pt 1000 temperature sensors at 0 °C. In this way, the 2.767.0010 Calibrated Reference, together with the two resistances mentioned above, provides a total of four different resistance values, which can also be used to check conductometers.

**Highly accurate – even without fine adjustment**

With the Calibrated Reference, no fine adjustment is carried out. The tables of values on the front and rear of the hinged lid (corresponding to the open or covered solar cell, respectively) contain the exact values measured on the particular instrument. The resistance values have also been converted into the corresponding conductance (μS) or temperature (°C) values and the voltages into pH values wherever this makes sense. This means that the user can easily compare the display of the measuring instrument being checked directly with the value in the table.

**Electrode cable check included**

In everyday routine work the electrode cables have to meet exacting demands. They are subject to large mechanical forces and also come into frequent contact with chemicals. In order to prevent incorrect measurements caused, for example, by deteriorating insulation properties, the electrode cables should therefore be included in the testing process. However, this is only possible with sensors fitted with plug-in cables. The original cable is simply unscrewed from the electrode head and attached to the corresponding socket of the Calibrated Reference. If, on the other hand, only the measuring instrument is to be checked, then the tested standard cables included in the accessories of the 2.767.0010 Calibrated Reference should be used. These are also necessary if the sensor does not have a plug-in head but is fitted with a fixed cable.

**Certificate**

We herewith certify that this instrument and the enclosed cables have been controlled and tested according to the international standards specified and that they fulfil the relevant quality specifications.

Instrument No: **767.0010**  
 Instrument designation: **Calibrated Reference for mV, pH, Ω, μS, °C**  
 Serial number: **01101**

Measured values:

T	Ω	μS	mV	pH
0.0	922.975	108.118	0	7
0.0	922.975	1000.025	0	7

  

T	Ω	μS	mV	pH
0.0	922.975	108.118	1156.88	12.752
0.0	922.975	1000.025	1156.88	12.752

Values taken at a room temperature of 24.0 °C

Additional data:  
 T values for measuring at Pt 1000 inputs:  $R_{Pt 1000} + R_{Pt 100} = 1100.143 \Omega$  25.7 °C  
 G values for measuring at the Rancimat:  $R_{Pt 1000} + R_{Pt 100} = 15308.820 \Omega$  65.322 μS

Cables enclosed:  
 6.2150.040 cable plug head G/ plug F  
 6.2150.030 cable plug head G/ plug E  
 6.2150.020 cable plug head G/2 x plug B  
 6.2150.010 cable 2 x plug B/ plug D/N  
 6.2150.000 cable 2 x plug B/ plug B (2x)

Date: 09/1998      Tested by: A.Lehner      8.767.3003

*Certificate of a Calibrated Reference. The tables show the exact values measured on the instrument, above with the solar cell covered, below with the solar cell uncovered.*

**Technical specifications**

Output values of voltage and resistance

	Solar cell covered		Solar cell uncovered
	Voltage	Resistance	Voltage
Socket (4):	0 mV	1 GΩ	ca. 1200 mV
Socket (5):	0 mV	14.3 kΩ	ca. 1200 mV
Socket (6):	0 mV*	460 kΩ	ca. -341 mV**

Output values for temperature measuring instruments

Socket (1-2):	100 Ω (Pt 100)
Socket (2-3):	1000 Ω (Pt 1000)

The values measured on the corresponding Calibrated Reference are printed on the lid. Additional data can be found on the certificate that accompanies the instrument.

Ambient temperature

Nominal operating range	5 ... 40 °C
Storage	-20 ... 60 °C
Transport	-40 ... 60 °C

Safety specifications

Construction and testing according to IEC publication 1010, safety class 3.

Voltage supply

Solar cell (no batteries)

Dimensions

Width	125 mm
Height	45 mm
Depth	85 mm

Weight

Instrument	ca. 350 g
Instrument including accessories	ca. 1 kg

\* Corresponds to pH = 7.00 if pH<sub>as</sub> = 7.00

\*\* Corresponds to pH = 12.76 if pH<sub>as</sub> = 7.00, slope = 100% and temperature = 25 °C

**Scope of delivery**

<b>2.767.0010</b>	<b>Calibrated Reference for mV, pH, Ω, μS, °C</b> including the following accessories:
2x6.2150.000	Cable plug B – plug B
1x6.2150.010	Cable 2 x plug B – plug DIN 41524 (for Rancimat, 636 and 670 Titroprocessor)
1x6.2150.020	Cable plug-in head G – 2 x plug B
1x6.2150.030	Cable plug-in head G – plug E (DIN 19262)
1x6.2150.040	Cable plug-in head G – plug F
1x6.2716.020	Carrying case
1x8.767.1003	Instructions for use of Calibrated Reference
1x8.767.1013	Quick reference leaflet for Calibrated Reference
1x	Certificate for Calibrated Reference