767 Calibrated Reference for mV, pH, Ω, µS, °C

Metrohm

Quick References

8.767.1203

Checking pH Meters, Titrators

Place the Calibrated Reference on the bench near the sensor. Ensure that light is not hindered from reaching the solar cell (no shadows from cables or accessories). If necessary switch on the room lighting.
On the instrument to be tested the slope must be set to 1, pH_{as} to 7 and the measuring temperature to 25 °C for measuring the pH.
It is not absolutely necessary to firmly screw down the electrode cap at sockets (4), (5), (6); plugging it in is quite adequate.
It may be quicker to carry out a check with this instrument and the diagnosis instructions (see Instructions for Use of the corresponding instrument), see section 4.

U/mV, pH

	carry out on instrument or sensor:	**carry out on Calibrated Reference:**	**compare display with:**	**remarks**
1.	screw off cable at sensor (for plug-in head electrodes, otherwise use corresponding accessory cable)	close cover		place sensor in storage tube
2.		connect sensor cable to socket (5)		
3.	measure mV		mV value (5)	
4.		open cover	mV value (5)	compare with permitted tolerance; note value
5.		connect sensor cable to socket (4)		permitted variation from value noted under step 4: ±0.1 mV (short-time larger deviations are normal)
6.		connect sensor cable to socket (6)	mV value (6)	observe polarity; (switch measuring range if required); compare with permitted tolerance
7.	measure pH	close cover	pH value (6)	set U_{as} to pH7 if necessary
8.		open cover	pH value (6)	compare with permitted tolerance
End of check *Steps 9...12 are of secondary importance. In general it is sufficient to carry out this check once per year.* *For instruments with earthed circuits (e.g. all Titrinos and early series of 692/713) or for instruments without an earth socket (604, 704, 744) these steps are not relevant.*				
9.	measure mV	connect sensor cable to socket (5)		note display as under step 4
10.		additionally plug cable 6.2150.020 (from accesso-ries in case) into socket (6)		read display as noted under step 4
11.	insert banana plug of cable in step 10 in earth socket of tested instrument. *Banana plug of shielding remains open.*	do not touch sockets (4), (5), (6) during the measurement	observe display when you connect the cable	permitted variation: ±0.1 mV display as under step 5 (short-time larger deviations are normal)
12.	remove cable from step 11	remove cable from socket (6)		

If the variation of the measured values is too large then first exchange the original sensor cable against the reference cable in the accessories. When the check is finished recalibrate the electrodes.

Polarization current and voltage source

	carry out on instrument or sensor:	carry out on Calibrated Reference:	compare display with:	remarks
1.	screw off cable at sensor	close cover		place sensor in storage tube
2.		connect sensor cable to socket (5)		
3.	set instrument to function Upol or Ipol	cover always remains closed	calculate R value (5) according to equation, see below	compare with permitted tolerance; take display resolution into account

If the variation of the measured values is too large then first exchange the original sensor cable against the reference cable in the accessories.

Equations for calculation:

U pol: I = (U/R) = selected Upol potential / Ω value 5
I pol: U = (IxR) = selected Ipol current x Ω value 5

For different instruments the different control limits according to the individual technical data must be observed → observe overload display.

Example: 1 µA x 14 345 Ω = 14.345 mV Observe resolution of display!

Temperature (Pt 100/ Pt 1000)

	carry out on instrument or sensor:	carry out on Calibrated Reference:	compare display with:	remarks
1.	remove cable (with sensor) from instrument	close cover		
2.	connect temperature measuring input to Calibrated Reference with 2x banana cables (6.2150.000)	depending on sensor connect: Pt 100 : sockets (1) (2) Pt 1000: sockets (2) (3)		
3.	set instrument to temperature function	Pt 100 : sockets (1) (2) → Pt 1000: sockets (2) (3) →	°C value (1)(2) °C value (2)(3)	compare with permitted tolerance

During the pH measurement the two Pt 100/Pt 1000 resistances at sockets (1)....(3) can also be used at the same time with the pH measurement (see above). Please note that in that case the measuring temperature of the instrument to be tested is approx. 0°C, while the information in the table refers to 25°C. This must be converted accordingly.
The above is valid accordingly for conductivity meters, see next page.

Checking conductivity meters

Read off and note the cell constant, the temperature coefficients, and the temperature on the instrument to be tested. Then set cell constant and temperature coefficients to 1 and the temperature to the reference temperature valid for the instrument. Set the measuring frequency to "automatic switchover".

Please note: a check carried out with this instrument and the diagnosis instructions (if available, see Instructions for Use of the Conductivity meter) may be quicker.

Conductance

	carry out on instrument or sensor:	**carry out on Calibrated Reference:**	**compare display with**	**remarks**
1.	screw off cable at sensor (for plug head electrodes, otherwise use corresponding accessory cable)	close cover		place sensor in storage tube
2.		connect cable to socket (5)		
3.	set instrument to 'conductivity' function	cover always remains closed	G value (5)	compare with permitted tolerance
4.		connect cable to socket (6)	G value (6)	compare with permitted tolerance
	If further results are required:			
5.	remove measuring cable	remove measuring cable		
6.	connect conductivity measuring input to Calibrated Reference with 2x banana cables (6.2150.000)	connect cable to sockets (1)(2) connect cable to sockets (2)(3)	G value (1)(2) G value (2)(3)	compare with permitted tolerance

During the measurement the two Pt 100/Pt 1000 resistances at sockets (1)....(3) can also be used at the same time as the conductance measurement (see above). Please note that the measuring temperature of the instrument to be tested is approx. 0°C, while the information in the table refers to 20°C. This must be converted accordingly.

When the test is finished the cell constant, temperature coefficient and the temperature must be set again to their current values.

Temperature

see above "Checking pH Meters, Titrators".

Checking Rancimat 617 and 679

The Rancimat carries out conductivity measurements via the measuring channels. The function of the measuring channels and the presentation on the printer can be checked channel by channel by means of the Calibrated Reference. The conductivity can be read off from the display. By variation of the conductance the sensitivity of the measurement can be shown on the printer in approximately the correct scale. The temperature of the heating block plays no role in the following measurements (if the instrument has reached the operating temperature the check can be started immediately). If this is not the case then the start condition should be achieved (for 679: > 50°C).

	carry out on instrument or sensor:	**carry out on Calibrated Reference:**	**compare display with:**	**remarks**
1.	unplug sensor from instrument	close cover		*(sensor can remain in the measuring vessel)*
2.	plug in cable 6.2150.010 instead of the sensor	plug in cable according to diagram (see page 11) so that 15.3 kΩ is obtained		
3.	note following parameters, then set (example 679) : temperature (s. above) 50°C cond. range 20 µS/cm paper feed 20 cm/h			
4.	press start		see G value for Rancimat in certificate for 767.0010 (approx. 66 µS [1)])	allow all channels to write out 2 - 3 x (the zero line is shown in all channels)
5.		wait until the printer is printing out a channel which has not been checked. Replug cable (see page 11), so that 14.3 kΩ ≅ approx. 69 µS is obtained (see G value (5))	G value (5) (approx. 69 µS [1)])	allow all channels to write out 2 - 3 x. In the checked channel the line will be offset by the amount of the alteration in conductance → check by measuring with ruler
6.	if necessary repeat steps 1 – 5 for all channels			

[1)] *Please consider the small number of decimal places in the display*