

Ca 500 Ca 800

**Calcium-Elektrode Ca 500
Calcium-Einstabmesskette Ca 800**

Seite 1

**Calcium Electrode Ca 500
Calcium Combination Electrode Ca 800**

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ADVANCED APPLIED TECHNOLOGIES

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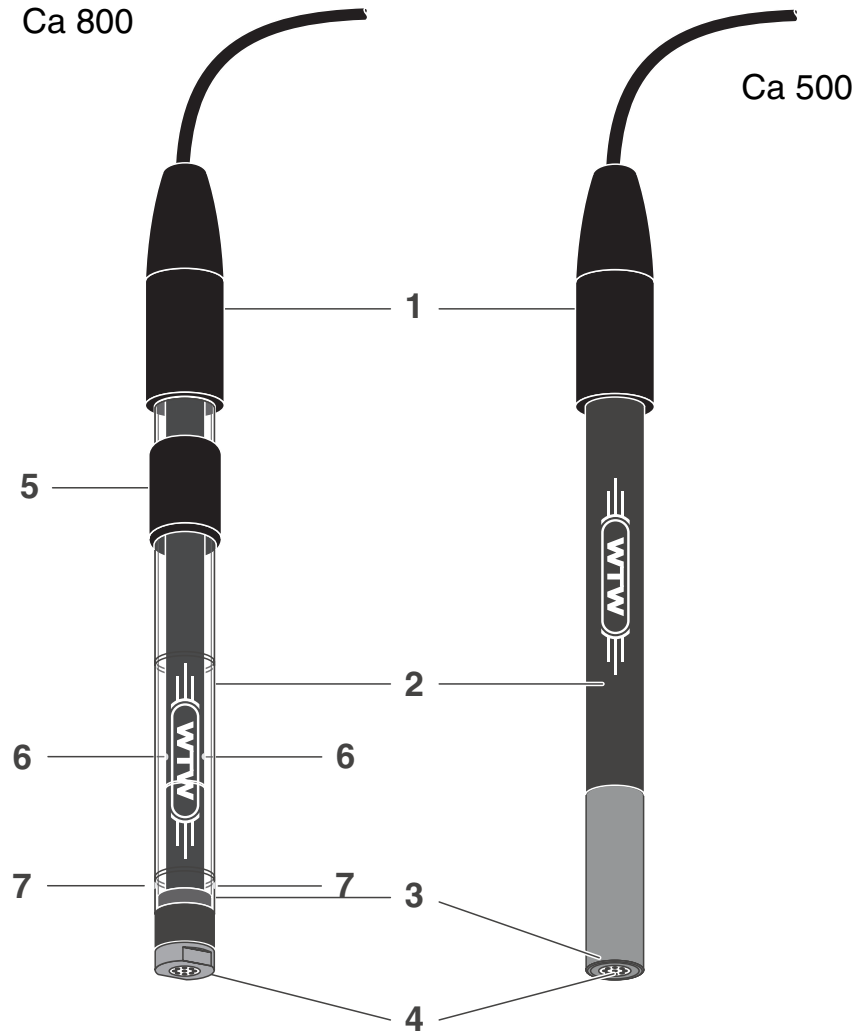
**Accuracy when
going to press**

The use of advanced technology and the high quality standard of our products are the result of continuous development. This may result in differences between this operating manual and your (combination) electrode. Also, we cannot guarantee that there are absolutely no errors in this manual. Therefore, we are sure you will understand that we cannot accept any legal claims resulting from the data, figures or descriptions.

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View



1	Connection head with connection cable
2	Shaft
3	Exchange membrane cap
4	PVC membrane
5	Closing ring of the filling opening for the bridge electrolyte
6	Inner junctions
7	Exterior junctions

Commissioning

Combination electrode Ca 800

1	Remove the protection cap.
2	Pull the closing ring downward so that the filling opening for the bridge electrolyte is free.
3	Fill ELY/BR/503 bridge electrolyte into the filling opening so that the inner junctions are covered with bridge electrolyte.
4	Rinse the combination electrode with deionized water.
5	Wipe the shaft using a clean paper towel.
6	Dab the membrane dry.

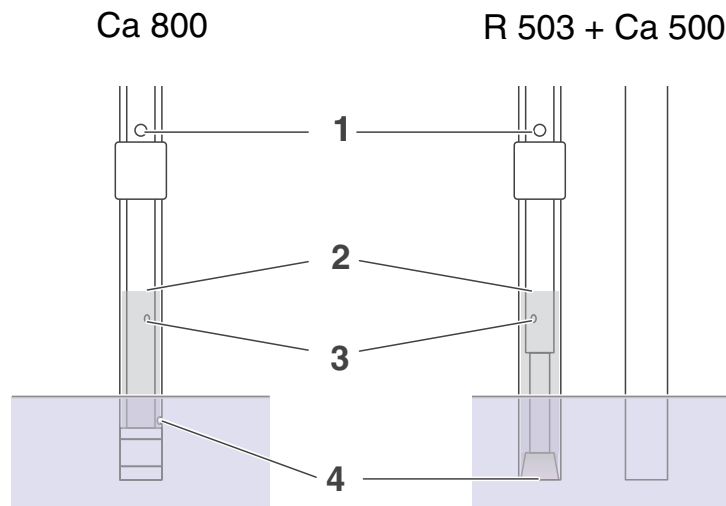
Double rod electrode Ca 500 + R 503

For measurements with the Ca 500 calcium electrode, a reference electrode is required (e.g. R 503). The two electrodes together form a double rod combination electrode.

1	Put the reference electrode into operation (see operating manual of the reference electrode).
2	Remove the protection cap of the electrode.
3	Rinse the electrode with deionized water.
4	Wipe the shaft using a clean paper towel.
5	Dab the membrane dry.

Conditioning, calibration, measurement

General information



When operating the electrode ensure that

- the filling opening (1) for the bridge electrolyte is open
- the inner junctions (3) are covered with bridge electrolyte
- no air bubbles are in the bridge electrolyte
- the depth of immersion is within the optimum range:

Minimum depth of immersion	The ground junction (4) must be covered
Maximum depth of immersion	Approx. 1 cm below the fluid level (2) of the bridge electrolyte

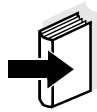
Before measuring

1	Before use, condition the combination electrode or electrodes respectively for approx. 2 hours in 1000 mg/l standard solution.
2	Remove any air bubbles in the bridge electrolyte by slightly knocking against the shaft.
3	Calibrate according to the operating manual of the meter and the analysis specification.

Sample preparation

Add 2 % ISA/Ca solution.

This sample conditioning solution creates optimum conditions for measuring. It provides a constant ionic strength and similar diffusion potentials at the reference electrode in standard solution and test sample.



Note

If you would like to have more detailed information concerning sample preparation and measuring procedures, WTW provides a large number of application reports for various applications.

Response times

The response time depends on the concentration range. It is

- several seconds at high concentrations,
- several minutes near the detection limit.

The measured value is stable if the value does not change by more than 0.1 mV within 30 seconds.

Interferences

Interfering ions: 10 % error with the following concentration ratio

(concentration ratio = interfering ion / measured ion):

Pb ²⁺	Hg ²⁺	H ⁺	Sr ²⁺	Fe ²⁺	Cu ²⁺	Ni ²⁺	NH ₄ ⁺
0.01	4	4	6	20	40	50	200

Na ⁺	Tris ⁺	Li ⁺	K ⁺	Ba ²⁺	Zn ²⁺	Mg ²⁺	
200	300	300	400	700	1000	1000	

Aging

Please note that every (combination) electrode undergoes a natural aging process. The response time increases and the slope decreases with the age of the (combination) electrode. The following factors shorten the lifetime considerably:

- Incorrect storage
- Special measuring conditions (e.g. organic solutions, frequent measurement with high concentrations of interfering ions)
- High temperatures
- High changes in temperature

The warranty does not cover damage caused by measuring conditions and mechanical damage.

Maintenance

- Combination electrodes:
Refill any used up bridge electrolyte.
- Install an exchange membrane cap.

Storage

**Between two
measurements**

Put the combination electrode into diluted standard solution.

**Overnight to one
week**

Ca 500: Rinse the combination electrode with deionized water, dab it dry with a clean paper towel. Screw on the protection cap. Store the combination electrode in a dry place.

Ca 800: Push the closing ring over the filling opening. Rinse the electrode with deionized water, then dab it dry with a clean paper towel. Screw on the protection cap. Store the electrode in a dry place. Fill in fresh bridge electrolyte for measurement.

**For more than a
week**

Remove the bridge electrolyte and rinse the combination electrode with deionized water, dab it dry using a clean paper towel and put on the protection cap. Store the combination electrode in a dry place.



Note

Store the reference electrode according to the instructions in its operating manual.

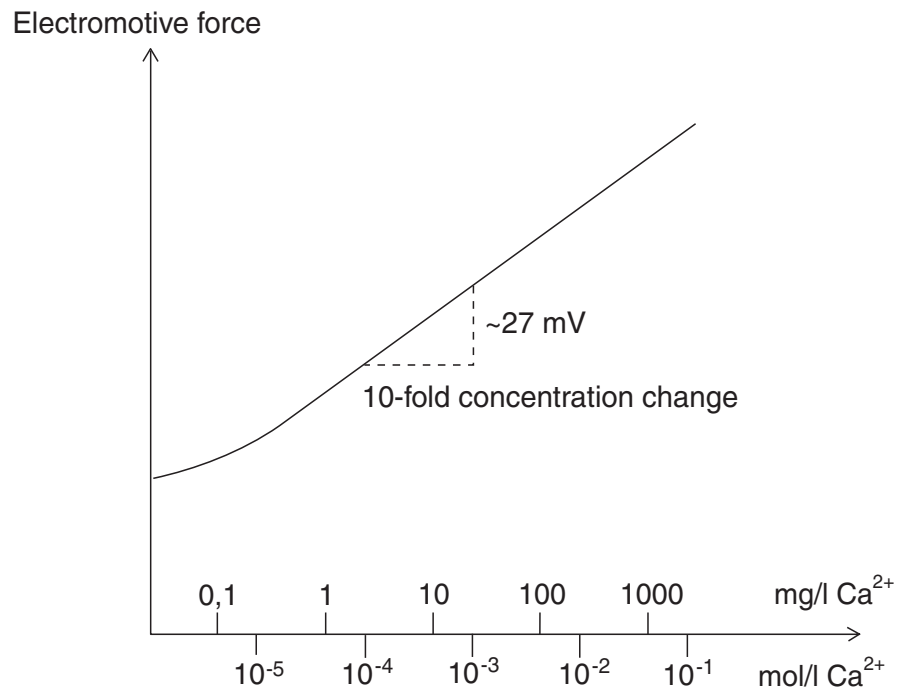
Recommended accessories

Description	Model	Order no.
Exchange membrane cap for calcium electrode Ca 500	Ca 500/AT	106606
Exchange membrane cap for calcium comb. electrode Ca 800	Ca 800/AT	106656
Reference electrode for calcium electrode Ca 500	R 503/P* R 503/D**	106570 106571
Bridge electrolyte	ELY/BR/503	106575
ISA sample conditioning solution for Ca ²⁺ measurement	ISA/Ca	140120
Standard solution 10 g/l Ca ²⁺	ES/Ca	120200

* Pin plug

** Banana plug

Calibration line of a calcium combination electrode



What to do if ...

	Cause	Remedy
Measured value unstable	– Inner junctions not sufficiently wetted with bridge electrolyte (Ca 800)	– Fill up bridge electrolyte until the inner junctions are covered with bridge electrolyte
	– Junctions encrusted	– Leave the bridge electrolyte to react on the junctions for some hours until the crusts have dissolved.
	– Cable broken	– Exchange (combination) electrode
Slope too low	Cause	Remedy
	– Conditioning time too short	– Extend conditioning time
	– Standard solutions too old	– Use new standard solutions
	– Junctions encrusted (Ca 800)	– Leave the bridge electrolyte to react on the junctions for some hours until the crusts have dissolved.
	– (Combination) Electrode defective	– Exchange (combination) electrode

Technical data

Measuring range	0.02 ... 40,000 mg/l Ca ²⁺ (5 x 10 ⁻⁷ ... 1 mol/L Ca ²⁺)
Reproducibility	± 4 %
pH range	2.5 ... 11 (see INTERFERENCES)
Temperature range	0 ... 40 °C
Membrane resistance	1 to 4 MΩ
Length	Ca 500: 170 mm (including 50 mm connection head) Ca 800: 170 mm (including 50 mm connection head)
Diameter	Shaft: 12 mm Connection head 16 mm
Cable length	1 m
Plug	DIN plug or BNC plug, depending on design.



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