Operating Manual

NO 500
NO 800

Nitrate Electrode NO 500
Nitrate Combination Electrode NO 800

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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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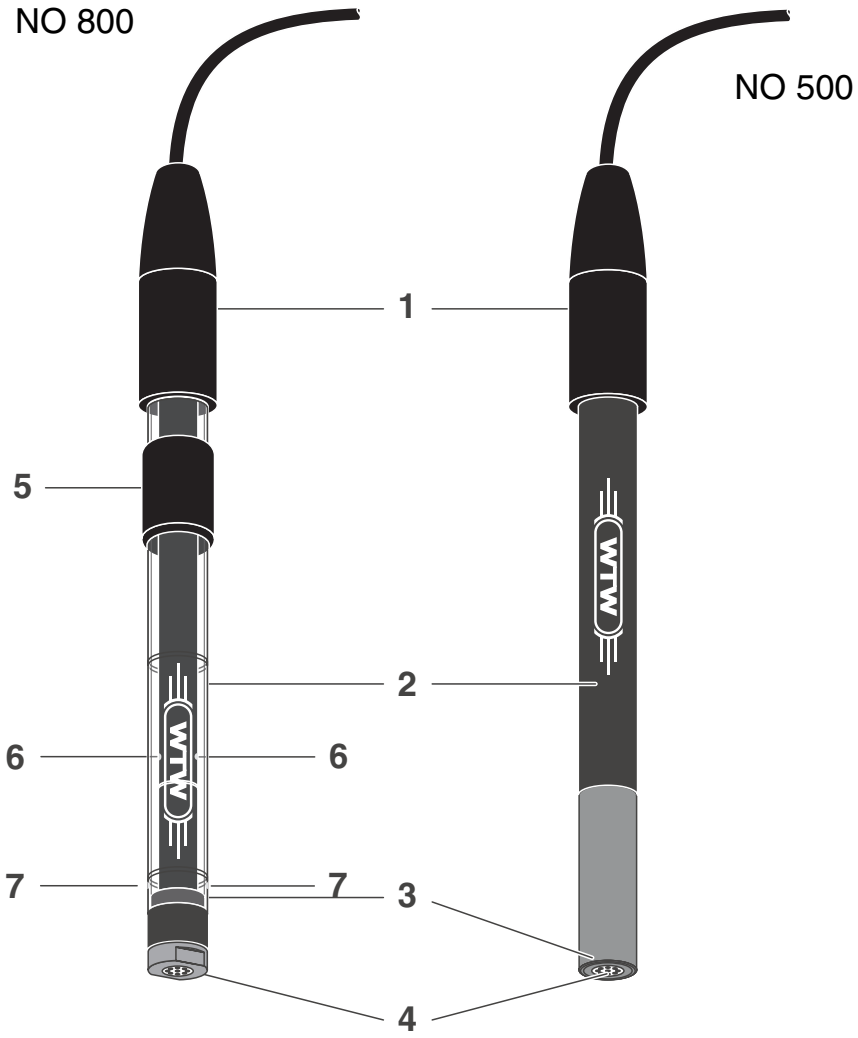
View



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 NO 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/N 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.

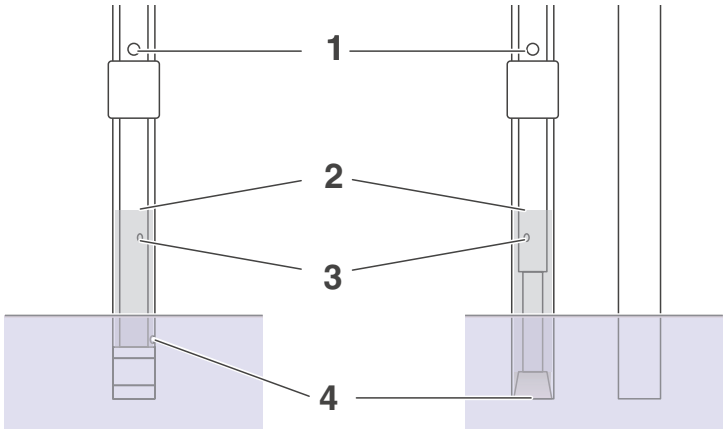
Double rod electrode NO 500 + R 503

For measurements with the NO 500 nitrate 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). Bridge electrolyte: ELY/BR/503/N.
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.
6	Before use, condition the combination electrode for approx. 2 hours in 1000 mg/l standard solution.

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:

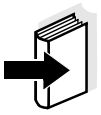
Minimum depth of immersion	The ground junction (4) must be covered
Maximum depth of immersion	Approx. 1 cm below the fluid level (2) of the bridge electrolyte

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 50 % TISAB/NO3 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):

ClO_4^-	I^-	ClO_3^-	CN^-	Br^-	NO_2^-	HS^-	HCO_3^-
$1x10^{-4}$	0.005	0.05	0.1	0.7	0.7	1	10

CO_3^{2-}	Cl^-	$H_2PO_4^-$	HPO_4^{2-}	PO_4^{3-}	OAc^-	F^-	SO_4^{2-}
20	30	50	50	50	200	600	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 and high temperature changes

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.

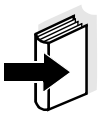
Overnight to one week

NO 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.

NO 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.



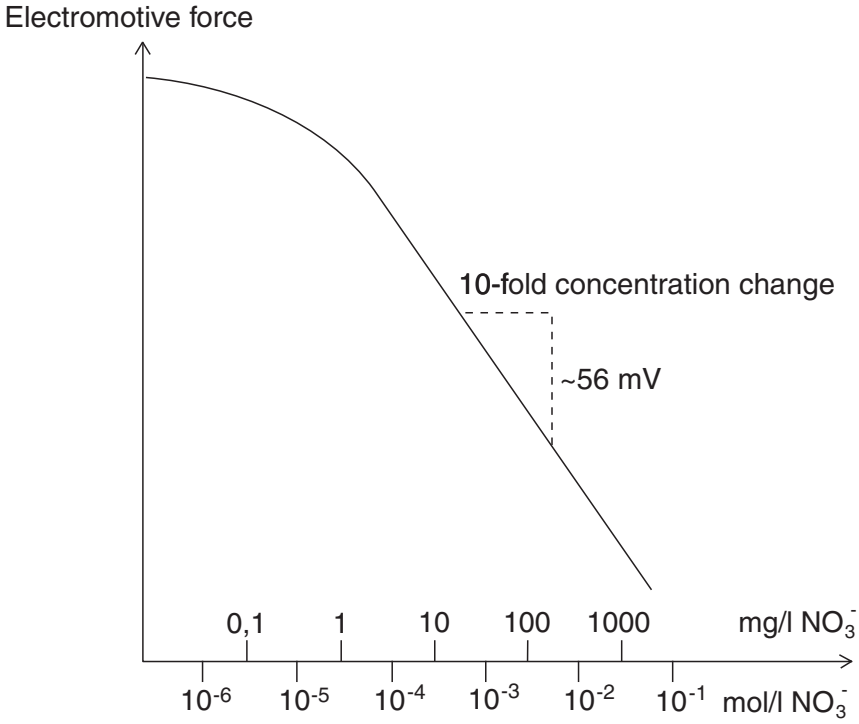
Note
Store the reference electrode according to the instructions in its operating manual.

Recommended accessories

Description	Model	Order no.
Exchange membrane cap for nitrate electrode NO 500	NO 500/AT	106626
Exchange membrane cap for nitrate combination electrode NO 800	NO 800/AT	106672
Reference electrode for nitrate electrode NO 500	R 503/P* R 503/D**	106570 106571
Bridge electrolyte	ELY/BR/503/N	106576
TISAB sample conditioning solution for NO_3^- measurement	TISAB/NO3	150120
Standard solution 10 g/L nitrate	ES/NO3	120220

* Pin plug
** Banana plug

Calibration line of a nitrate combination electrode



What to do if ...

Measured value unstable

Cause	Remedy
– Inner junctions not sufficiently wetted with bridge electrolyte (NO 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	– 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	0.4 ... 62,000 mg/l NO_3^- (1 x 10^{-6} ... 1 mol/l NO_3^-)
Reproducibility	± 2 %
pH range	2.5 ... 11 (see INTERFERENCES)
Temperature range	0 ... 40 °C
Membrane resistance	1 to 5 MΩ
Length	NO 500: 170 mm (including 50 mm connection head) NO 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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