HACH LANGE

UNITED FOR WATER QUALITY

DOC022.52.00731.SEP05

Supplementary Software LZV 571 Drinking Water Analysis

DR 5000

User Manual

09/2005 Edition1

ck 11/05 edition1

Table of Contents

Section 1 General information

1.1 Safety Information

Before you install the software, you should read this manual thoroughly. Take note of all information labelled "Danger" or "Note".

Besides the instructions in this manual, users must comply with the national general safety and accident prevention regulations of the country in which the instrument is used.

1.1.1 Use of Hazard Information

DANGER
Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.

Important Note: *Information that the user needs to take into account when handling the instrument.*

Note: *Additional operating information for the user.*

1.2 Installation

1. Touch **Instrument Update** in the "System Check" menu.
2. Plug the USB memory stick into the USB socket (type A) of the DR 5000.
3. Confirm by touching **OK**.
4. The connection is established automatically and the software is updated.

Touch **OK** to return to the "System Check" menu.

1.3 Important information about the manual

1.3.1 Chemical and Biological Safety

DANGER
Handling chemical samples, standards and reagents can be dangerous. Users of this product are advised to familiarize themselves with safety procedures and the correct use of chemicals, and to carefully read all relevant Material Safety Data Sheets.

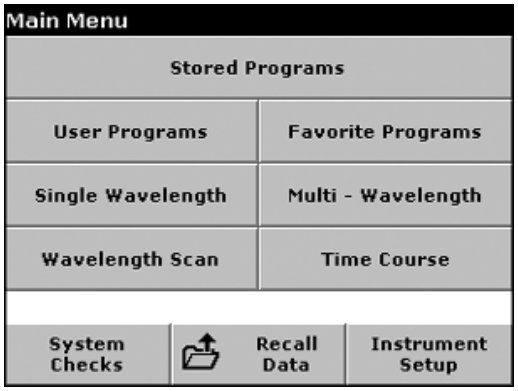
During the analysis of the sample it may be necessary to use toxic, readily flammable or corrosive chemicals.

- The user must observe all cautionary information printed on the original solution containers and safety data sheet prior to their use.
- All waste solutions must be disposed in accordance with local and national law.

1.4 Introduction

The LZV 571 Supplementary Software for Drinking Water Analysis is a collection of all spectrophotometric applications that are of relevance for drinking water analysis. What is special about these methods is that the individual parameters can be determined simply from the intrinsic absorbance at different wavelengths, without the addition of reagents. For many analyses, the sipper module can be used to carry out the tests more conveniently.

1.5 Selecting a stored test



1. Select **Stored Programs** in the "Main Menu". An alphabetically sorted list of all available tests is displayed.

2. Select a test by touching the corresponding line.

Note: *Use the scroll bar to run quickly through the list.*

Note: *If you already know the number of the desired test, touch* ***Select by Number****. Use the alphanumeric keypad to enter the test number and confirm your input by touching* ***OK****.*

3. Touch **Start** to start the test program.

Section 2 Working procedures

2.1 Nitrate (intrinsic absorbance)

Principle
The parameter "nitrate" can be determined in a water sample by measuring the intrinsic absorbance, that is without using reagents. The nitrate ion is determined bichromatically at two wavelengths. The difference between the measured absorbance values at the two wavelengths is a measure of the nitrate concentration, which can be evaluated relative to a standard concentration.

Range of application
Drinking water

Measuring range
1–60 mg/l nitrate (3 mm rectangular cuvette)
0.3–15.0 mg/l nitrate (10 mm rectangular cuvette)

Accessories

- Spectrophotometer (228 and 218 nm)
- 3 mm or 10 mm rectangular cuvette (QS)
- Sipper module: 3 mm or 10 mm pour-through cuvette (QS)

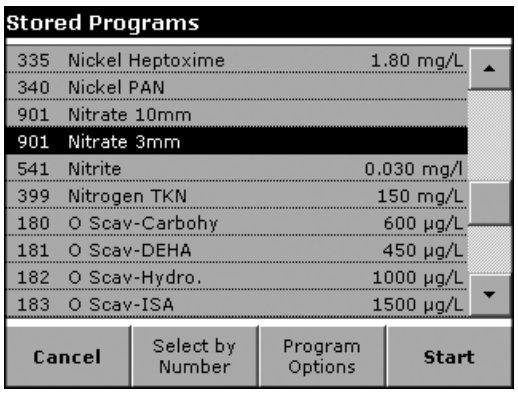
Reagents

- Standard 30 mg/l nitrate for 3 mm rectangular cuvette
- Standard 10 mg/l nitrate for 10 mm rectangular cuvette

Interferences
Organic components can interfere with the determination. Very high nitrate concentrations of several 100 mg/l cause results within the measuring range to be obtained.

Literature
E. Goldman, R. Jacobs:
Determination of Nitrates by Ultraviolet Absorbance, Amer. Water Works Assoc. 53, 187–191, (1961)

2.1.1 Procedure Nitrate (intrinsic absorbance)

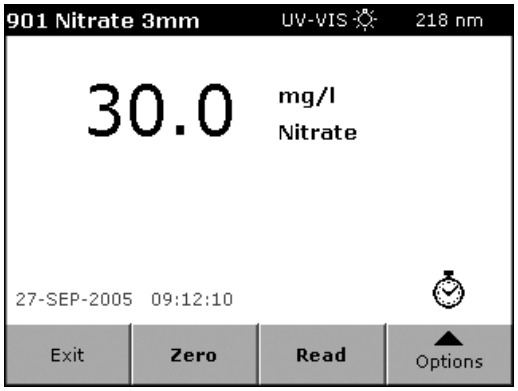


1. Select **Stored Programs** in the "Main Menu". Select test number **901** (measuring range 3 mm or 10 mm).

2. Insert the zero cuvette (distilled water) in the cell compartment. Close the cell compartment. Touch **Zero**.

3. Insert the standard cuvette containing the nitrate standard (30 mg/l – 3 mm rectangular cuvette – or 10 mg/l – 10 mm rectangular cuvette) in the cell compartment and close the cell compartment. Touch **Read**. Display: **E1** and **E2**.

4. Insert the sample cuvette containing the first sample in the cell compartment and close the cell compartment. Touch **Read**. Display: **E3**. The result is then displayed.



Note: *Analysis of additional samples: Repeat working procedure from point 4.*

2.1.1.1 Executing the test with the sipper module

Information about the installation, module configurations and sample introduction of the sipper module can be found in the user manual of the DR 5000 Spectrophotometer (15.3.3. Installation Sipper Module, page 133).

2.2 Organic loading (SAC)

Principle
The parameter "organic loading" can be determined from a sample by measuring the intrinsic absorbance, that is without using reagents. The spectral absorbance coefficient is determined in m^{-1}.

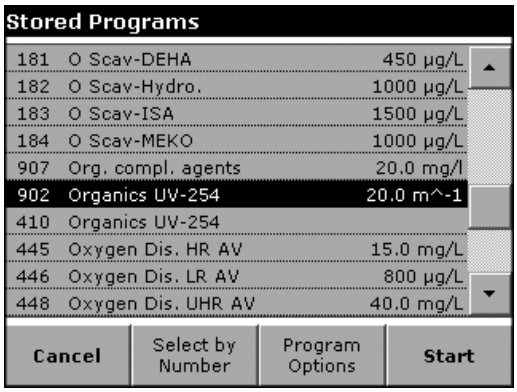
Range of application
Drinking water, surface water, wastewater

Measuring range
0–20 m^{-1}

Accessories

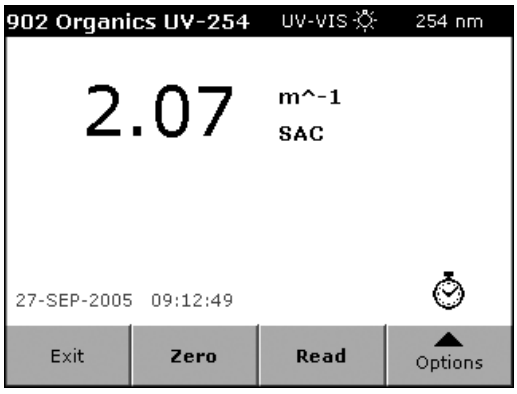
- Spectrophotometer (254 nm)
- 50 mm rectangular cuvette (QS)
- Sipper module: 50 mm pour-through cuvette (QS)

2.2.1 Procedure Organic loading (SAC)



1. Select **Stored Programs** in the "Main Menu". Select test number **902**.
2. Insert the zero cuvette (distilled water) in the cell compartment. Close the cell compartment. Touch **Zero**.
3. Insert the sample cuvette containing the first sample in the cell compartment and close the cell compartment. Touch **Read**. The result is displayed.

Note: *Analysis of additional samples: Repeat working procedure from point 3.*



2.2.1.1 Executing the test with the sipper module

Information about the installation, module configurations and sample introduction of the sipper module can be found in the user manual of the DR 5000 Spectrophotometer (15.3.3. Installation Sipper Module, page 133).

2.3 Colour/Organic loading (SAC)

Principle
The parameters "colour" and "organic loading" can be determined from a sample by measuring the intrinsic absorbance, that is without using reagents. The spectral absorbance coefficients are determined in m^{-1} (Colour/SAC method) or in units based on a PtCo standard (Colour (PtCo)/SAC method).

The colour of most yellow-brown natural waters and the outflows of municipal sewage treatment plants can usually be measured at 436 nm. The colour of yellow-brown water can be measured by comparison with suitable PtCo standards.

Range of application
Drinking water, surface water, wastewater

Measuring range
0–20

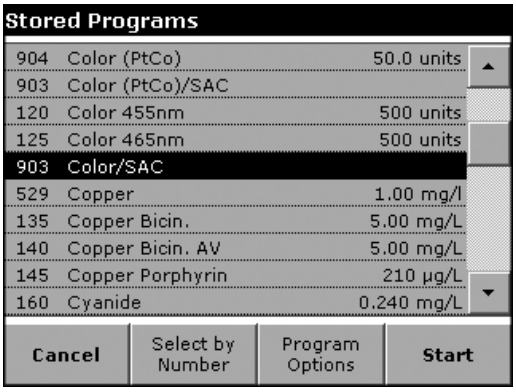
Accessories

- Spectrophotometer (254 nm and 436 nm)
- 50 mm rectangular cuvette (QS)

Interferences
Undissolved substances (turbidities) may cause high-bias results to be obtained for the colour. This interference can be eliminated by membrane filtration (pore size 0.45 µm).

Literature
DIN 38404 Part 1 (C1)
DIN 38404 Part 3 (C3)

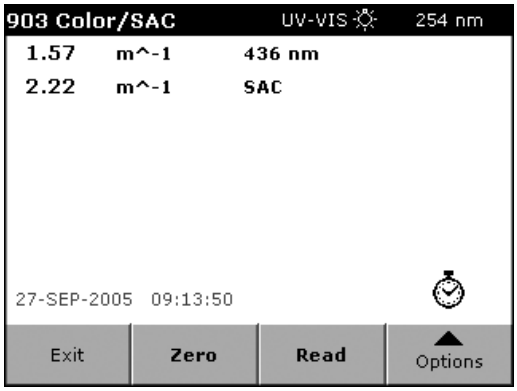
2.3.1 Procedure Colour/Organic loading (SAC)



1. Select **Stored Programs** in the "Main Menu". Select test number **903** and the required method (903 Colour/SAC or 903 Colour (PtCo)/SAC).

1. Insert the zero cuvette (distilled water) in the cell compartment. Close the cell compartment. Touch **Zero**.

1. Insert the sample cuvette containing the first sample in the cell compartment and close the cell compartment. Touch **Read**. The result is displayed.



Note: *Analysis of additional samples: Repeat working procedure from point 3.*

2.3.1.1 Executing the test with the sipper module

Information about the installation, module configurations and sample introduction of the sipper module can be found in the user manual of the DR 5000 Spectrophotometer (15.3.3. Installation Sipper Module, page 133).

2.4 Colour

Principle
The parameter "colour" can be determined from a sample by measuring the intrinsic absorbance, that is without using reagents. The spectral absorbance coefficients are determined in m^{-1} (Colour method) or in units based on a PtCo standard (Colour (PtCo) method).

The colour of most yellow-brown natural waters and the outflows of municipal sewage treatment plants can usually be measured at 436 nm. The colour of yellow-brown water can be measured by comparison with suitable PtCo standards.

Range of application
Drinking water, surface water, wastewater

Measuring range
0–50 units (Colour (Pt/Co) method)
0–20 m^{-1} (Colour method)

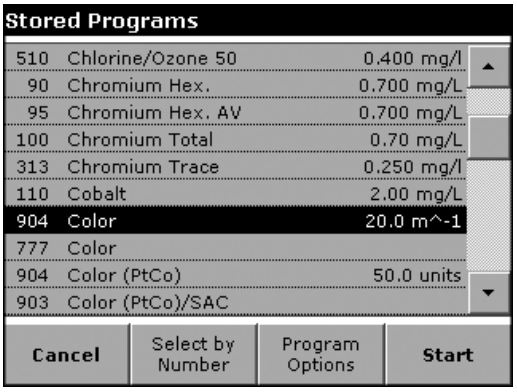
Accessories

- Spectrophotometer (436 nm)
- 50 mm rectangular cuvette (OS)

Interferences
Undissolved substances (turbidities) may cause high-bias results to be obtained. This interference can be eliminated by membrane filtration (pore size 0.45 µm).

Literature
DIN 38404 Part 1 (C1)

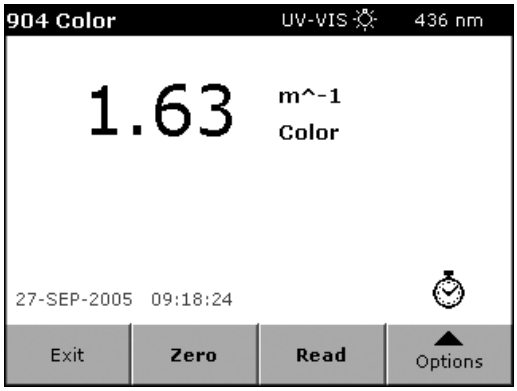
2.4.1 Procedure Colour



1. Select **Stored Programs** in the "Main Menu". Select test number **904** and the required method (904 Colour or 904 Colour (PtCo)).

2. Insert the zero cuvette (distilled water) in the cell compartment. Close the cell compartment. Touch **Zero.**

3. Insert the sample cuvette containing the first sample in the cell compartment and close the cell compartment. Touch **Read**. The result is displayed



Note: *Analysis of additional samples: Repeat working procedure from point 3.*

2.4.1.1 Executing the test with the sipper module

Information about the installation, module configurations and sample introduction of the sipper module can be found in the user manual of the DR 5000 Spectrophotometer (15.3.3. Installation Sipper Module, page 133).

Section 3 Replacement Parts

Description	Cat. No.
Cuvette set (SD = 1 cm, matched pair)	2095100
Cuvette, QS/SD =50 mm (17.5 ml)	2624450
Pour-through cuvette; QS; path length = 3 mm; fill height = 10 mm; total height = 40 mm	LZV638
Pour-through cuvette; QS; path length = 50 mm; fill height = 10 mm; total height = 40 mm	LZV649
Pour-through cuvette; QS; path length = 10 mm; fill height = 10 mm; total height = 40 mm	LZV510

Section 4 How To Order

Orders/Repair service

Please contact your representative:

HACH LANGE GMBH
Willstätterstraße 11
D-40549 Düsseldorf
Tel.: +49 (0)2 11 5288-0
Fax: +49 (0)2 11 5288-143
info@hach-lange.de
www.hach-lange.de

HACH LANGE LTD
Pacific Way
Salford
Manchester, M50 1DL
Tel. +44 (0)161 8 72 14 87
Fax +44 (0)161 8 487324
info@hach-lange.co.uk
www.hach-lange.co.uk

Information Required

- Hach account number (if available)
- Billing address
- Your name and phone number
- Shipping address
- Purchase order number
- Catalog number
- Brief description or model number or series-production number
- Quantity