

AutoCAT™ 9000 AUTOMATIC CHLORINE AMPEROMETRIC TITRATOR



Applications

- Drinking Water
- Wastewater
- Industrial Water
- Power

Revolutionary instrument for automatic amperometric titrations.

The world's first automated amperometric titrator dedicated to measurement of free and total chlorine, chlorine dioxide, chlorite, and sulfite using USEPA-approved methods.

Built-In Titrant Standardization Procedures

Users are guided through the titrant standardization with methods built into the instrument. Titrant concentration is automatically updated after standardization. The concentration can also be entered from the Certificate of Analysis (downloadable from www.hach.com) for the specific lot of titrant used.

Automated USEPA-Approved Methods

The AutoCAT automates the USEPA-approved amperometric titration procedures for chlorine, chlorine dioxide, and chlorite determinations as described in "Standard Methods for the Examination of Water and Wastewater." Sample preparation is presented to the user in easy-to-understand screen displays. When the titration begins, the process is entirely "hands off." Titrant delivery is far more accurate and precise than when performing manual titrations.

The AutoCAT 9000 features these USEPA-Approved Methods:

- Forward titration for free chlorine, 0.1 to 5 mg/L (Standard Method 4500-Cl D. 4b)
- Forward titration for total chlorine, 1.2 µg/L to 5 mg/L (Standard Method 4500-Cl D. 4d)
- Back titration for total chlorine, 5.1 µg/L to 5 mg/L (Standard Method 4500-Cl C.)
- Chlorine dioxide with chlorite, 0.05 to 5 mg/L (Standard Method 4500-ClO₂ E.)
- Sulfite (as SO₂, Sodium Bisulfite)

Automatic Calculations

In Automatic mode, the endpoint is calculated without user intervention. The AutoCAT 9000 performs a "global least squares regression analysis" to determine the exact endpoint. In Manual mode, the user inspects the titration curve and selects the linear portions of the curve prior to and after the endpoint. The instrument then calculates the exact endpoint.

After the endpoint is determined, concentration is automatically calculated using the titrant concentration, volume of titrant delivered at the endpoint, and the appropriate formula for the selected method. A running average and the standard deviation of the results will be calculated and archived automatically for replicate tests. The instrument also provides real-time graphics and graphic print output.



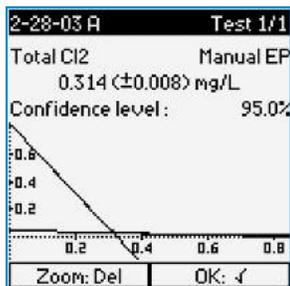
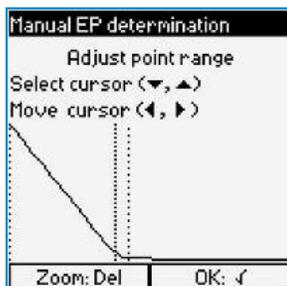
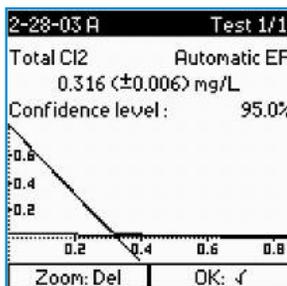
Be Right™

Specifications*

Titration Termination	Automatic or manual
Titrant Addition	Incremental
Titration Curve	Up to 2000 points can be stored
Calibration Method	2 embedded procedures: titrant standardization methods for 5.64 mN PAO (forward titration) and 28.2 mN Iodine Standard Solution (back titration)
Current Ranges	2 μ A, 20 μ A, 200 μ A, 1 mA
Sample Temperature	-10 to 100°C (14 to 212°F)
Temperature Resolution	0.1°C (0.18°F)
Environmental Operating Conditions	Temperature: 5 to 40°C (41 to 104°F) Humidity: 20 to 80%
Electrode	Dual platinum, self-cleaning
Display	Graphic 128 x 128-dot LCD, real-time graphics
Interface	Alphanumeric keypad Languages: English, Spanish, French
Output/Input	RS-232, serial output to printer/PC, PS/2 port for PC keyboard
Printout	Automatic, GLP compliant, selectable (off or 80 columns), detailed or condensed, graphic or no graphic

Storage Capacity	Non-volatile memory, storage of 200 titration results
Magnetic Stirrer	22 reproducible speeds (0 to 1100 rpm) in 50-rpm increments
Burette	Burette volume: 5 mL Burette step motor: 18,000 steps UV-protected encapsulated glass syringe
Enclosure	Splashproof, ABS plastic
Compliance/Certifications	Instrument: CE marking; EMC directive 89/336/EED Compliant; LV directive 73/23/EEC Compliant Burette: ISO/FDIS 8655-3
Power Requirement	90/264 Vac, 47/63 Hz, 115 VA
Fuses	Slow-blow 1.0 A, 250 V (secondary is factory-serviceable only)
Dimensions	380 x 230 x 450 mm (15 x 9 x 17.8 in.) excluding tubing
Weight	5 kg (11 lb.) excluding reagent bottles

*Subject to change without notice.



Automatic Archiving of Results

All test results are stored, are retrievable on command, and can be printed. The AutoCAT 9000 titrator also calculates and stores the mean and standard deviation for replicate measurements.

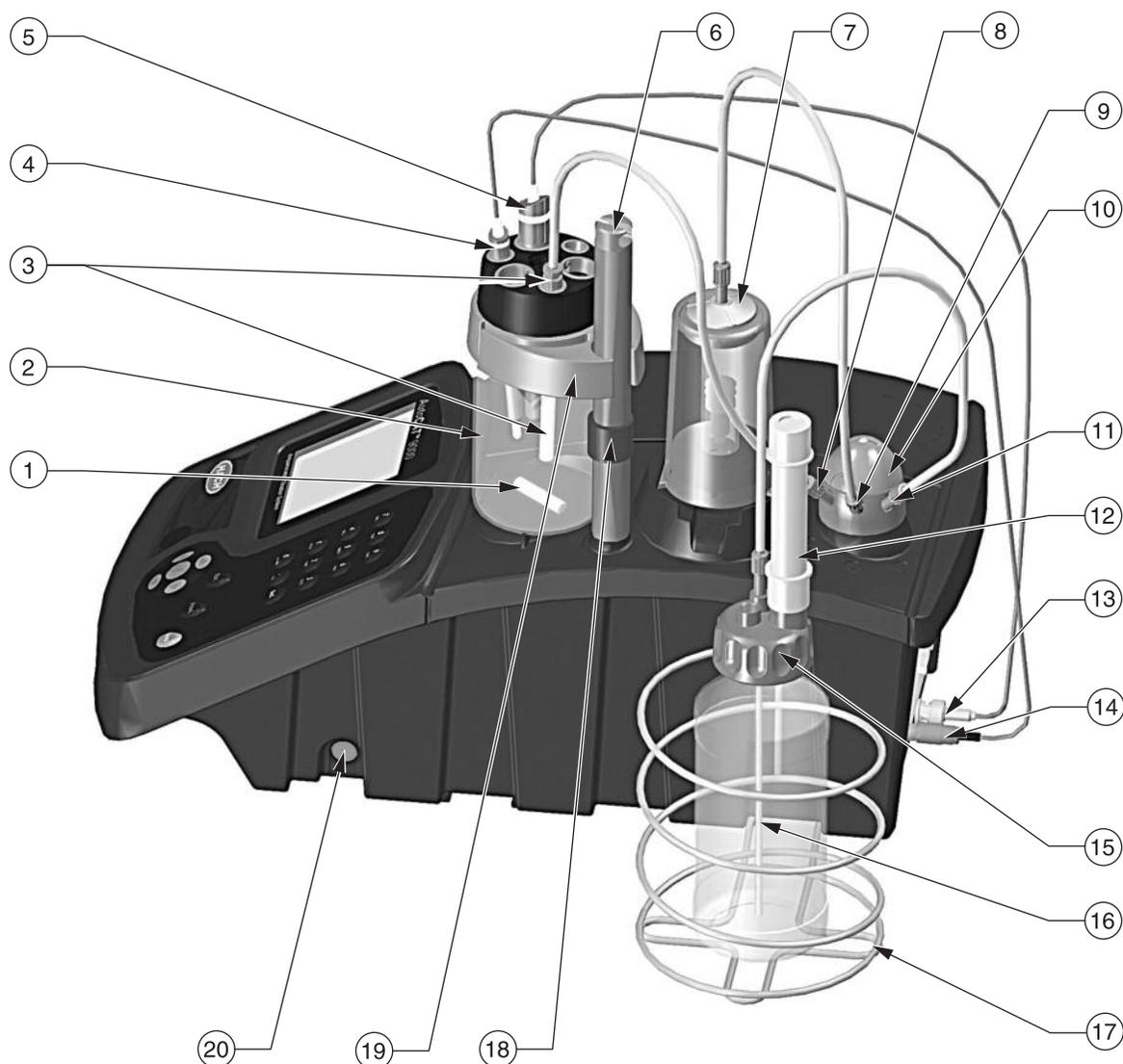
Real-Time Graphic Display and Hard Copy

View the data as it is collected to immediately assess the quality of the analysis. Printed copies of analysis reports can be made with graphic titrant curve and text. Purchase the optional printer to print hard copies of analysis reports.

Superior Results Compared to Manual Methods

Digital control of the applied potential (to $\pm 0.1 \mu$ V), digital measurement of current (with sub-nanoAmp resolution), real-time display of the titration progress, and accurate endpoint determination result in accurate measurements that can't be obtained by manual amperometric titrators.

Components



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|--|--|---------------------------------|
| 1 Magnetic Stir Bar | 9 Burette Tubing Connection | 16 Pick-up Tubing |
| 2 250-mL Beaker | 10 Rotating Valve | 17 Bottle Holder |
| 3 Plastic Anti-diffusion Tip | 11 Titrant Pick-up Tubing Connection | 18 Stop Ring for Electrode Head |
| 4 Temperature Sensor | 12 Desiccant Column | 19 Electrode Head |
| 5 Dual Platinum Electrode | 13 Electrode (BNC Connector) | 20 Keyboard PS/2 Connector |
| 6 Support Rod for Electrode Head | 14 Temperature Sensor (CINCH Connector) | |
| 7 Burette | 15 Bottle Stopper for Plastic Titrant Bottle | |
| 8 Plastic Anti-diffusion Tip Tubing Connection | | |

Ordering Information

The AutoCAT 9000 titrator ships complete with all accessories necessary for free and total chlorine titrations, including burette, dual platinum electrode, temperature sensor, stir bar, tubing, and reagents. Please see below for required reagents for chlorine dioxide/chlorite, back total chlorine methods, and accessories.

5008100 AutoCAT™ 9000 Automatic Chlorine Amperometric Titrator

Additional Required Chlorine Dioxide/Chlorite Method Reagents

141832 Hydrochloric Acid Standard Solution, 2.5 N, 100 mL

16726H Potassium Iodide, ACS, 100 g

Additional Required Total Chlorine Back Titration Method Reagents

2333353 Iodine Standard, 0.0282 N, 1000 mL

Accessories and Replacement Parts

5008700 Temperature Sensor

5008600 Double Platinum Electrode

5008210 Burette Stand, 5 mL, red cover with connection tubing and key

X31T115 Tubing Maintenance Kit, set of 3 tubes for B5xx burette stand

5008240 Delivery Tubing, with anti-diffusion tip

5008500 Stir Bar

2834100 SwifTest™ Reagent Dispenser, for potassium iodide (KI)

A70P021 Kyoline brand Thermal Printer, with cable, 115 V

A70P025 Thermal Paper, for printer, 10-roll pkg.



Chemicals and Reagents

199953 Phenylarsine oxide (PAO) solution, 5.64 mN, 1000 mL

1490932 Acetate Buffer, pH 4.0, 100 mL, MDB, 1 mL per test

2155332 Phosphate Buffer, pH 7, 100 mL, MDB, 1 mL per test

107760 Potassium Iodide (KI) Vial, replacement for SwifTest™ reagent dispenser, 300 tests

1426810 Chlorine Standard Solution, 50-75 mg/L as Cl₂, pk/16 - 10 mL Voluette Ampules (NIST)

HACH COMPANY World Headquarters: Loveland, Colorado USA

United States: 800-227-4224 tel 970-669-2932 fax orders@hach.com

Outside United States: 970-669-3050 tel 970-461-3939 fax int@hach.com

hach.com

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