

AUTOMATED ACID VALUE ANALYZER



Automated Acid Value Analyzer – ToronAV™ 664

ToronAV™ 664 is a fully automated acid value analyzer designed for precise, efficient determination of acid value (neutralization number) in petroleum products, lubricants, edible oils, and industrial chemical samples.

The instrument integrates a main unit, a Metrohm titration device, and a computer-controlled system in strict compliance with ASTM D664 and international equivalent standards. It employs potentiometric titration with a dual high-impedance electrode input ($R_i \geq 1 \times 10^{12} \Omega$) for stable, reproducible endpoint detection. The ToronAV™ 664 acid value analyzer automates titration curve smoothing, multi-parameter calibration, false-endpoint filtering, and data storage — reducing analyst time to as little as 2–3 minutes per sample. An integrated industrial PC running Windows OS with LSM curve fitting and confidence interval analysis supports advanced data processing and reporting.

APPLICATIONS

Automated Acid Value Analyzer – ToronAV™ 664 Applications

- Acid value (neutralization number) determination in petroleum products, base oils, and lubricants
- Total acid number (TAN) and total base number (TBN) testing in used oil condition monitoring
- Acid value analysis of edible oils, fats, and food-grade lipids for quality control
- Titration analysis in chemical manufacturing, polymer production, and resin characterization
- Research and analytical laboratories requiring automated potentiometric titration
- Oil product testing laboratories, refineries, and petrochemical plants
- Academic research institutions requiring high-throughput potentiometric analysis



Standards & Compliance

- ASTM D664: Standard Test Method for Acid Number of Petroleum Products by Potentiometric Titration

FEATURES

Automated Acid Value Analyzer – ToronAV™ 664 Key Features

- Metrohm-integrated titration unit with imported anti-diffusion titration head; all critical components sourced internationally for long-term stability and reliability
- Dual high-impedance electrode inputs ($R_i \geq 1 \times 10^{12} \Omega$) providing ultra-low operational noise and stable, accurate electrode potential readings
- Multi-parameter calibration and analysis system for rapid determination of diverse sample matrices; fully automated endpoint detection, false-endpoint filtering, and data storage
- Advanced data processing with least-squares method (LSM) curve fitting, confidence interval analysis, and standard addition method support
- Integrated industrial PC running Windows OS with an intuitive user interface for seamless operation and data management
- Minimum titrant delivery volume of 0.001 mL and endpoint repeatability error $\leq 0.2\%$ for high-precision, reproducible results
- 30 mL sample size capacity accommodating a wide range of petroleum and chemical matrices
- Fast analysis time of 2–3 minutes per sample depending on sample type, supporting high-throughput laboratory workflows
- Titration cell volume of 10 mL (minimum 0.01 mL) for efficient reagent utilization
- Basic EMF error $\leq \pm 1$ mV with potential measurement range of (0 – ± 2000) mV and pH range of 0 – 14

THEORY & METHOD

Theory and Method

The ToronAV™ 664 performs potentiometric titration to determine acid value. The sample is dissolved in a titration solvent and titrated with a standardized potassium hydroxide (KOH) or tetrabutylammonium hydroxide (TBAOH) solution, depending on the matrix.

A dual high-impedance glass/reference electrode pair monitors the electromotive force (EMF) of the solution continuously throughout the titration. The endpoint is detected automatically as the inflection point on the titration curve (mV vs. volume), with curve smoothing algorithms eliminating noise-induced false endpoints.

A Metrohm burette with anti-diffusion head dispenses titrant with a minimum delivery volume of 0.001 mL and titration precision of 0.15% (F · S). Least-squares method (LSM) curve fitting computes concentration and acid value, with confidence interval and sensitivity calibration support ensuring traceability to international standards.

TECHNICAL SPECIFICATIONS

Automated Acid Value Analyzer – ToronAV™ 664 Technical Specifications

Parameter	Specification
Potential Measurement Range	(0 - ±2000) mV; pH: 0 - 14
Basic Error (EMF)	±1 mV
Input Impedance	$R_i \geq 1 \times 10^{12} \Omega$
Titration Precision	0.15% (F·S)

Parameter	Specification
Titration Unit	Metrohm
Sample Size	30 mL
Analysis Time	2 - 3 minutes (depending on sample type)
Titration Cell Volume	10 mL (minimum volume: 0.01 mL)
Titration Time	(60 ± 20) seconds (F·S)
Minimum Delivery Volume	0.001 mL
Endpoint Repeatability Error	≤ 0.2%
Power Consumption	≤ 50 W
Main Unit Size (W × D × H)	260 × 230 × 460 mm
Voltage	AC 220 V ± 10%, 50 Hz ± 10% (110V is also available)
Relative Humidity	< 80% RH
Ambient Temperature	10 - 28 °C



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