TORONTECH

PORTABLE FERROGRAPH ANALYZER

Portable Ferrograph Analyzer – ToronFG™ 1000

A Ferrograph is used in oil condition monitoring to evaluate wear debris and support maintenance decisions before failures occur. The ToronFG™ 1000 Portable Ferrograph Analyzer is a compact, field-ready system that uses electromagnetic particle adsorption plus image recognition to detect and evaluate ferromagnetic wear particles in lubricating oil.

It captures high-definition wear particle images, applies intelligent classification, and automatically generates reports with wear evaluation and maintenance recommendations. The design targets fast checks at the asset location, while still supporting data management, historical trending, and exportable records for reliability teams.

APPLICATIONS

Portable Ferrograph Analyzer – ToronFG™ 1000 Application

- Field screening for rotating equipment reliability: Use the analyzer for quick checks of ferromagnetic wear debris in gearbox, bearing, hydraulic, and circulating oil systems. Short test cycles help technicians confirm whether a system is stable or showing abnormal wear signals that require follow-up actions.
- Trend monitoring and early-warning programs: The software supports device and oil sample management plus historical report queries and wear particle quantity trend statistics. This supports condition-based maintenance workflows where trend changes drive inspection planning.
- Wear type classification for faster decisions: The system classifies ferromagnetic wear particles into four wear types—normal abrasive particles, adhesive wear, sliding wear, and cutting wear—so teams can move from “more particles” to a more actionable wear-mode view.
- Maintenance documentation and reporting: The analyzer automatically generates detection reports and provides wear evaluation recommendations and maintenance advice based on detection results. This helps standardize reporting across teams and sites.

FEATURES

Portable Ferrograph Analyzer – ToronFG™ 1000 Key Features

- Portable, field-ready housing with a compact structure and lightweight build for on-site work.
- Electromagnetic adsorption + image recognition detection principle for ferromagnetic wear debris monitoring.
- 6× optical magnification paired with a 5 MP CMOS industrial camera to capture high-definition wear particle images.
- Reflective LED illumination to improve visibility of particle surface texture and color characteristics.
- Stepless magnetic field control with up to 256 adjustment levels to match different monitoring needs and particle loading conditions.
- Wear type classification (4 categories): normal abrasive particles, adhesive wear, sliding wear, cutting wear.
- Automatic sample injection and automatic cleaning, including software monitoring of cleaning effectiveness and configurable sampling/cleaning durations.
- Report automation that generates result reports plus wear evaluation recommendations and maintenance advice.
- Data and asset management tools: oil sample and device editing, historical report queries, wear type and particle count trend statistics, and export functions.

THEORY & METHOD

Theory and Method

ToronFG™ 1000 uses electromagnetic adsorption to capture ferromagnetic particles from the oil sample onto the detection cell surface, then applies optical imaging to acquire particle images. A neural-network style recognition method analyzes particle image features to estimate size, morphology, and wear type classification.

Results are summarized as quantitative outputs and wear evaluation indicators, with automated report generation and trend analysis tools supporting condition monitoring programs.

TECHNICAL SPECIFICATIONS

Portable Ferrograph Analyzer – ToronFG™ 1000 Technical Specification

Item	Specification
Model	ToronFG™ 1000
Detection principle	Electromagnetic adsorption + image recognition
Detection object	Ferromagnetic particles in lubricating oil
Detection range	5–500 μm
Optical magnification	6×
Camera	5 MP CMOS industrial camera; 2592 × 1944
Light source	LED reflective illumination
Wear type output	Normal abrasive, adhesive wear, sliding wear, cutting wear
Output indicators	Total wear amount, large/small particle counts, equivalent radius, major axis size, wear evaluation
Test duration	< 1 minute
Display	12.1 in, 1280 × 800 color LCD touchscreen
CPU	8-core 64-bit (4× Cortex-A76 + 4× Cortex-A55)
GPU / NPU	ARM Mali-G610; NPU up to 6 TOPS

Item	Specification
Memory / Storage	16 GB RAM; 256 GB eMMC
Ports	USB / RJ45
Working temperature	-20 °C to 60 °C
Power	DC 24 V or power adapter; max power < 100 W
Materials	PP + aluminum alloy
Weight	10 ± 0.2 kg

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