



QUAKELOGIC

QL-HelioSpect-X

Helium Mass Spectrometer Leak Detector System



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Parameter	Specification
Detection Principle	Magnetic-sector helium mass spectrometry
Detectable Gases	He ⁴ , He ³ , H ₂
Operating Modes	Vacuum leak detection and sniffer leak detection
Minimum Detectable Leak Rate (Vacuum Mode)	≤ 5 × 10 ⁻¹² mbar·L/s
Minimum Detectable Leak Rate (Sniffer Mode)	≤ 5 × 10 ⁻⁸ mbar·L/s
Helium Pumping Speed	≥ 1.0 L/s
Response Time	≤ 1 s
Mass Range	1–100 amu
Vacuum Pump Configuration	Dry backing pump (oil-free)
Calibration Method	Integrated calibrated helium leak reference
Sniffer Probe Length	≥ 10 ft
Spray Probe	Included helium spray gun
Electrical Requirements	110–120 V, 60 Hz, single-phase, ≤ 20 A
Power Consumption	≤ 1.5 kW
User Interface	Integrated digital display with real-time leak rate monitoring and diagnostics
Communication Interfaces	Standard serial / I/O interface
Operating Temperature	5–40 °C
Relative Humidity	≤ 80% non-condensing
Mobility	Cart-mounted configuration with locking casters
Noise Level	≤ 65 dB(A)
Warm-Up / Start-Up Time	≤ 5 minutes
Compliance	Designed for safe laboratory operation in Government research environments

The system delivers comprehensive leak detection capabilities through advanced mass spectrometry technology. The platform combines precision helium-4 detection with versatile operational modes, providing researchers and engineers with a robust analytical tool for critical testing applications.



Helium-4 Mass Spectrometry

Advanced He⁴ detection technology with laboratory-grade sensitivity



Dual-Mode Operation

Vacuum and sniffer leak detection for comprehensive testing



Dry Vacuum Architecture

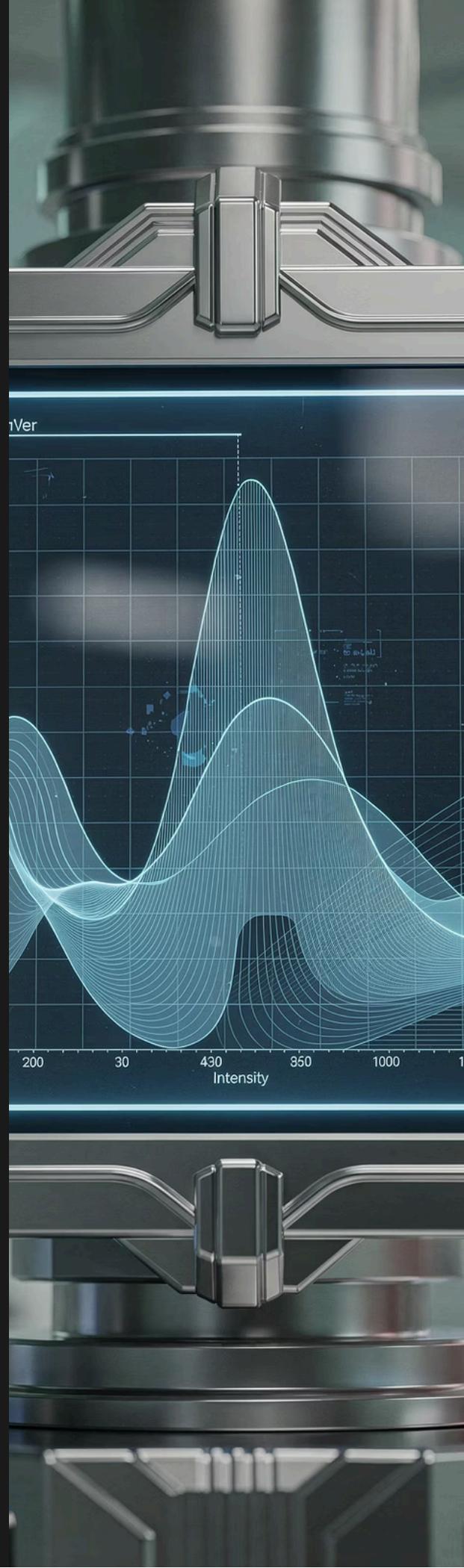
Clean pumping system suitable for institutional laboratory use



High-Stability Platform

Precision measurement system for repeatable research workflows

The QL-HelioSpect-X provides a **complete, ready-to-operate helium leak detection solution** for advanced laboratory testing and measurement applications. Every component has been carefully selected and integrated to ensure optimal performance, regulatory compliance, and long-term reliability in demanding research environments. Delivered as a **turnkey system** with accessories, comprehensive training, commissioning validation, and warranty coverage, the QL-HelioSpect-X represents a sophisticated analytical investment designed to meet the stringent requirements of U.S. Government and institutional research facilities.



Detection Performance & Vacuum Architecture

High-Sensitivity Helium Detection

The system integrates a **laboratory-grade helium mass spectrometer** optimized for exceptional analytical performance across diverse testing scenarios. This advanced detection platform employs sophisticated ion separation technology specifically tuned for helium-4 isotope identification, enabling researchers to identify and quantify leak rates with unprecedented accuracy and reliability.

The mass spectrometer core features a high-efficiency ion source, precision magnetic sector analyzer, and ultra-low-noise detection electronics. This configuration delivers stable, repeatable measurements across extended operational periods, making it ideal for both routine quality control applications and advanced research investigations requiring maximum sensitivity and measurement confidence.

Helium-4 Leak Detection

Specialized He⁴ isotope detection with optimized ion separation technology

Minimum Detectable Leak Rate

Performance meeting or exceeding NIST thresholds in both vacuum mode and sniffer mode operational configurations

Rapid Response Time

Fast measurement cycles supporting efficient diagnostic workflows and high-throughput testing protocols

Stable Low-Noise Signal

High signal-to-noise ratio ensuring repeatable measurements with minimal baseline drift

Vacuum & Pumping System

The integrated **dry vacuum pumping system** provides clean, oil-free operation essential for maintaining laboratory air quality and preventing contamination of sensitive research environments. This architecture eliminates the maintenance burden and environmental concerns associated with traditional oil-sealed pumping technologies.

- Helium pumping speed compliant with required minimum performance specifications
- Clean laboratory operation with zero oil vapor emissions
- Continuous measurement stability across extended duty cycles
- Long-term reliability with reduced maintenance requirements
- Low vibration and acoustic signature for quiet laboratory integration

This configuration ensures **accurate, repeatable helium leak quantification** across diverse laboratory testing scenarios, from routine component verification to advanced research applications requiring maximum measurement precision and environmental control.

Mechanical Design, Controls & Lab Integration

The QL-HelioSpect-X mechanical architecture reflects careful engineering consideration of the demanding operational requirements characteristic of institutional research environments. Every aspect of the physical design, from structural stability to user interface ergonomics, has been optimized to support precise measurement workflows while maintaining the mobility and flexibility required in dynamic laboratory settings.

Mobile Laboratory Configuration

The system features a **cart-mounted, mobile structure** engineered for safe relocation within laboratory spaces without compromising measurement stability. Heavy-duty casters with precision locking mechanisms enable confident positioning, while the compact footprint maximizes laboratory floor space utilization. The vibration-stable mechanical design incorporates structural dampening to maintain measurement integrity even in active research environments.

Electrical & Control Interface

Designed for seamless integration with U.S. laboratory infrastructure, the system operates on standard 110–120 V, 60 Hz, **single-phase**, ≤ 20 A. The integrated control interface provides real-time leak rate display with comprehensive diagnostics and system status monitoring. Measurement visualization tools enable immediate data interpretation, supporting rapid decision-making in time-critical testing scenarios.

Secure Standalone Operation

Recognizing the stringent security requirements of Government research facilities, the QL-HelioSpect-X operates with **no external network dependency**. This standalone architecture eliminates potential cybersecurity vulnerabilities while ensuring full operational capability in secure, air-gapped laboratory environments. All data storage and system control functions operate locally, providing complete compliance with offline operational requirements.

Accessories, Training & Commissioning

The QL-HelioSpect-X is delivered as a comprehensive turnkey solution, including all accessories, documentation, and professional services required to achieve full operational capability immediately upon installation. This complete package approach eliminates procurement complexity and ensures that research personnel can begin conducting precision leak detection measurements without delay or additional equipment acquisition.

Included Accessories

Every system ships with manufacturer-supplied precision accessories specifically selected to support the full range of helium leak detection applications:



Helium Spray Gun

Professional-grade application tool for precise helium delivery during vacuum mode testing



Sniffer Probe

Extended reach probe (≥ 10 ft) with flexible positioning for comprehensive component accessibility



Calibration Standard

NIST-traceable calibration leak standard with measurement accessories for system verification



Documentation

Complete technical manuals, operating procedures, and maintenance guidelines

All components arrive fully integrated and ready for immediate deployment, representing a **complete operational package** requiring no additional procurement actions.

Commissioning Validation

Professional system commissioning is performed by **qualified QuakeLogic technical personnel** at the NIST Boulder facility, ensuring complete operational readiness prior to formal acceptance. This comprehensive validation process confirms that all system parameters meet or exceed specification requirements:

01

Detection Performance Verification

Minimum detectable leak rate confirmation using calibrated standards

02

Operational Mode Validation

Vacuum and sniffer mode functionality testing across full operational range

03

Control System Confirmation

Interface functionality and diagnostics verification

04

Acceptance Documentation

Formal performance certification and operational readiness confirmation

Quality, Safety, and Management System Certification

QuakeLogic Inc. maintains a fully implemented **Integrated Management System (IMS)** that has been independently audited and certified by an accredited certification body in accordance with:

ISO 9001:2015

Quality Management Systems

ISO 14001:2015

Environmental Management Systems

ISO 45001:2018

Occupational Health and Safety Management Systems

These certifications cover the **design, development, manufacturing, integration, installation, and servicing** of seismic and geophysical monitoring systems, laboratory and industrial testing equipment, and associated hardware and software solutions.

The QL-HelioSpect-X Helium Mass Spectrometer Leak Detector System is produced, configured, and supported under this certified management framework, ensuring **controlled quality processes, environmental responsibility, occupational safety, and consistent product reliability** suitable for **institutional and U.S. Government laboratory applications**.

Advancing Precision Measurement with QuakeLogic

Empowering government research laboratories, national metrology institutes, and advanced engineering environments, QuakeLogic Inc. delivers high-sensitivity helium mass spectrometry leak detection solutions engineered for measurement accuracy, operational reliability, and long-term laboratory stability.

Connect with QuakeLogic — Your Partner in Helium Leak Detection and Precision Measurement Solutions

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Our Unwavering Commitment to Operational Excellence



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Complying with international standards
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every system delivered.

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Discover how QuakeLogic's advanced helium mass spectrometry solutions enhance laboratory measurement capability, strengthen experimental safety, and deliver accurate, repeatable leak detection performance across government research, metrology, and applied scientific environments.

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