

**CBR-BTD-C/B/R**

Benchtop Trace Detector

A desktop / handheld Ion Mobility Spectrometry (IMS) instrument for chemical, biological, and radiological trace-substance detection.

Model	CBR-BTD-C/B/R
Product Name	Benchtop Trace Detector
Quality System	GJB 9001C Certified
Document No.	QT-DS-CBRBTD-001
Revision	V1.01
Issue Date	August 2026

Company Overview

Qualitech Technology Pte. Ltd. specializes in the research, development, and manufacture of detection instruments based on Ion Mobility Spectrometry (IMS). Our integrated capability spans R&D, production, testing, and technical support, delivered through a coordinated network of engineering and manufacturing centers. We supply detection solutions for public safety, environmental monitoring, pharmaceutical, industrial, and biomedical applications, and maintain ongoing collaboration with universities and research institutes to advance ion mobility sensing technology. Our design and production processes for trace-detection instrumentation are carried out in accordance with GJB 9001C.

Ion Mobility Spectrometry (IMS) Technology

Ion Mobility Spectrometry (IMS) separates and identifies ionized molecules by measuring their migration velocity through a neutral drift gas under an applied electric field. Because each substance exhibits a characteristic ion mobility, IMS enables rapid, selective detection of trace-level chemical, biological, and radiological indicators, typically completing an analysis cycle in seconds without sample pre-treatment. This makes IMS well suited to standalone desktop and handheld instruments deployed for security screening and environmental surveillance alike.

Why Ion Mobility Spectrometry

High Sensitivity

Detects trace substances down to low-ppm and $\mu\text{g}/\text{m}^3$ levels.

Fast Response

Typical detection cycle completes within seconds of sampling.

Non-radioactive Source

Bipolar atmospheric-pressure ionization avoids radioactive-source handling and licensing.

Upgradeable Library

Detection library and calibration data can be updated remotely, without field calibration gas.

Self-diagnostics

Automatic long-term zero/span drift correction reduces maintenance and downtime.

Flexible Deployment

Desktop or handheld form factor with multiple communication interfaces for system integration.

Product Family — CBR-BTD-C/B/R

The CBR-BTD series is Qualitech's instrument-level IMS trace-detection platform. Built around a common IMS sensing core, it is configured into three application-specific variants — Chemical (C), Biological (B), and Radiological (R) — each designed, tested, and manufactured to GJB 9001C. All variants share the same enclosure, display, control interface, and communication protocol, allowing a single instrument platform to be adapted across detection domains.

C

Chemical Trace Detection

Detects and identifies trace explosive residues, drug substances, combustibles, and a wide range of toxic industrial and reagent compounds sampled from passenger and cargo surfaces. Detection library is customizable to client-specified target substances.

B

Biological Trace Detection

Configured for screening of biological trace indicators. Detection library and sampling front-end are defined per deployment; technical data available on request.

R

Radiological Trace Detection

Configured for radiological trace-indicator screening in fixed or portable deployments. Technical data available on request.

Published key specifications and detectable-substance data below correspond to the Chemical (C) variant, which shares its sensing core and instrument platform with the B and R configurations. Contact Qualitech Technology for variant-specific datasheets and detection-library details.

Key Advantages

- Desktop or handheld trace-gas detector based on Ion Mobility Spectrometry.
- Detects and identifies trace explosive, narcotic, combustible, and toxic-chemical residues sampled from passenger and cargo surfaces.
- Customer-specified gas sampling library — detection targets can be tailored to client requirements.
- Large, easy-to-read integrated LCD display with visual and audible alarm notification.
- Two-level gas alarm plus system fault alarm, each with dedicated relay contact output.
- Long-life, high-capacity pump with self-adjusting flow for maintenance-free operation.
- Remote firmware and gas-library updates minimize field maintenance and recalibration.
- Multiple communication interfaces support integration with existing PLC or data-acquisition systems.

Key Specifications

The following key indicators describe the CBR-BTD Chemical (C) variant, desktop / handheld platform configuration.

Detection Principle	Ion Mobility Spectrometry (IMS)
Communication Interface	RS-232
Sampling Method	Sample draw, auto-adjusting flow rate, 0.5 L/min ±10%
Display	Large LCD (white backlight); shows flow rate, communication status, pyrolyzer status, and gas detected
Gas Alarms	Two alarm levels (1st / 2nd) plus system fault alarm
External Output	Relay contact output for 1st, 2nd, and fault alarms
Self-diagnostic Function	System failure, sensor failure, flow failure, and communication error monitoring
Datalogging	Event history, alarm history, calibration history; alarm trend ±180 s around 1st alarm
Operating Temperature / Humidity	0 – 40 °C, 30 –70% RH (non-condensing)
Operating Settings	All operational settings user-adjustable via front panel
Power Requirement	Approx. 2.5 W (max 5 W) with sensor unit
Dimensions	70 (W) × 120 (H) × 150 (D) mm
Weight	Approx. 0.9 kg, including sensor unit
Mounting	Desktop or handheld
Sampling Tubing	4 × 6 mm PTFE tubing (fittings included as standard accessories)
Software Support	Analyzer Tool; Spectrum Analyzer

Compliance & Ionization Source

Quality System: GJB 9001C Certified

Ionization Source: Non-radioactive

CE Marked

RoHS Compliant

Detectable Substances — Performance Data

The CBR-BTD Chemical (C) variant supports an extensive, customer-configurable detection library. Representative substances with published detection performance are listed below.

Industrial & Toxic Gases

Substance	Formula	Detection Concentration (Response Time)
Hydrogen sulfide	H ₂ S	2 ppm (5 s)
Chlorine	Cl ₂	5 ppm (5 s)
Ammonia	NH ₃	50 µg/m ³
Sulfur dioxide	SO ₂	0.7 ppm (5 s)
Styrene	C ₈ H ₈	10 mg/m ³

Reagent & Threat Simulants

Substance	Detection Concentration (Response Time)
Cyanogen chloride	2.5 ppm (5 s)
DMMP	50 µg/m ³
Methyl salicylate	30 µg/m ³
Dipropylene glycol methyl ether	100 µg/m ³

The detection library additionally covers explosives, narcotics, chemical-warfare simulants, and a broad range of industrial toxics (e.g. hydrochloric and hydrofluoric acid, chlorobenzene, trimethylamine, TNT, and related compounds). Specific calibration concentrations and sensitivities for these and other client-requested substances are available upon request, and the sampling library can be customized to individual application needs.

Application Scenarios

- Aviation and cargo security screening
- Explosive and narcotic trace detection at checkpoints
- Civil defense and fortification engineering
- Hazardous chemical storage leak warning
- Environmental and industrial toxic-gas monitoring
- Handheld field detection and inspection
- Integration with PLC / SCADA and data-acquisition systems
- Remote detection with data transmission and backup

Detection Technology Comparison

Feature	Ion Mobility Spectrometry (Qualitech CBR-BTD)	Mass Spectrometry	Electrochemistry	Semiconductor
Sensitivity	10 ⁻⁶ –10 ⁻¹⁰	10 ⁻⁶ –10 ⁻⁹	10 ⁻² –10 ⁻⁶	10 ⁻² –10 ⁻⁶
Resolution	10–90	> 1,000	—	—
Volume	< 200 × 100 × 50 mm	> 300 × 200 × 200 mm	Component level	Chip level
Weight	< 900 g	> 20 kg	< 20 g	< 10 g
Power Consumption	< 10 W	> 50 W	< 1 W	< 0.1 W
Substance Identification	Extensible	Extensible	Single category	Single species
Market Reference Price	< SGD 20K	> SGD 140K	< SGD 1,000	< SGD 200
Usage Condition	Atmospheric pressure	High vacuum	PCB	PCB
Ionization Source	Radiation source, corona discharge, electrospray, UV lamp	Radiation source, corona discharge, UV lamp	Not required	Not required
Environmental Adaptability	Widely adaptable	Limited	Limited	Widely adaptable
Application Scenarios	Industrial sites to laboratory, widely adaptable	Mainly laboratory analysis	Industrial	Home use

Reference values above compare common gas-sensing technologies at the component level; figures for the CBR-BTD platform are highlighted at left.

Partner with Qualitech

Qualitech Technology Pte. Ltd. supports OEM/ODM partners with evaluation kits, protocol and control-board documentation, sensor testing software, and full maintenance support — delivered through a zero-risk cooperation model.

Contact & Ordering Information

COMPANY

Qualitech Technology Pte. Ltd.

CONTACT EMAIL

sales@qualitech-sg.com

WEBSITE

qualitech-sg.com

MODEL

CBR-BTD-C/B/R

PRODUCT NAME

Benchtop Trace Detector

QUALITY SYSTEM

GJB 9001C Certified

Specifications in this document are subject to change without prior notice. Values shown for the Biological (B) and Radiological (R) variants of the CBR-BTD series are configuration descriptions only; please contact Qualitech Technology Pte. Ltd. for variant-specific technical data. All trademarks are the property of their respective owners. © 2026 Qualitech Technology Pte. Ltd. All rights reserved.