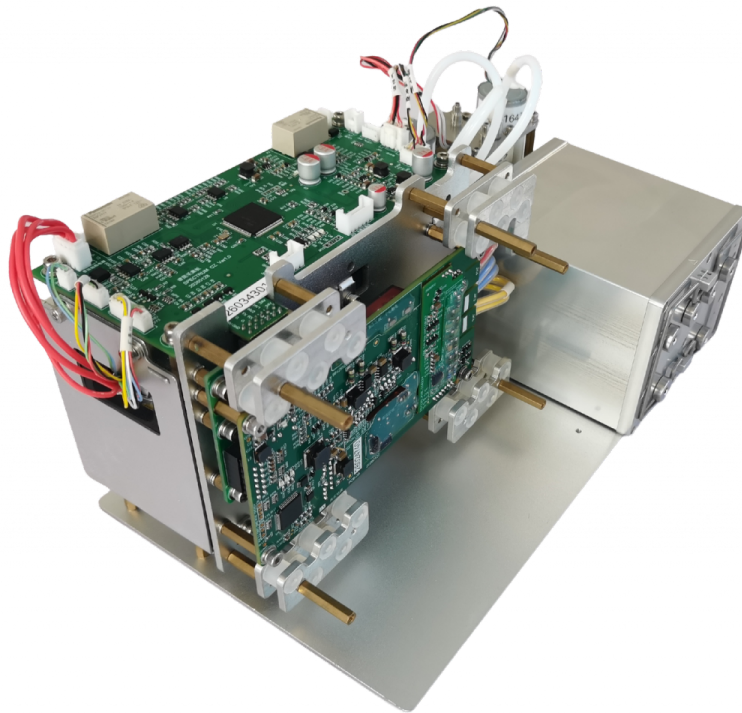


**CBR-TDM-C/B/R**

Trace Substance Detection Module

A configurable Ion Mobility Spectrometry (IMS) sensing module for chemical, biological, and radiological trace-substance detection.

Model	CBR-TDM-C/B/R
Product Name	Trace Substance Detection Module
Quality System	GJB 9001C Certified
Document No.	QT-DS-CBRTDM-001
Revision	V1.00
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 milliseconds without sample pre-treatment. This makes IMS well suited to standalone sensing modules as well as hybrid configurations such as GC-IMS and IMS-MS.

Why Ion Mobility Spectrometry

High Sensitivity

Detection limits down to the ppbv (parts-per-billion) level.

High Resolution

Resolving power of 60–90 FWHM distinguishes closely related substances.

Non-radioactive Source

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

Rapid Analysis

Millisecond-scale ion separation supports real-time, continuous monitoring.

Atmospheric Operation

Operates at ambient pressure, unlike mass spectrometry which requires high vacuum.

Configurable Platform

Detection library, drift gas, and sampling front-end are tunable to the target application.

Product Family — CBR-TDM-C/B/R

The CBR-TDM series is Qualitech's modular IMS trace-detection platform. Built around a common sensing core, the module is configured into three application-specific variants — Chemical (C), Biological (B), and Radiological (R) — each designed, tested, and manufactured to GJB 9001C. Variants share the same mechanical and communication interface, allowing a single host platform to be adapted across detection domains.

C

Chemical Trace Detection

Targets toxic industrial chemicals (e.g. Cl₂, H₂S, HCl, HF, NH₃), odorants (methanethiol, ethanethiol), and aromatic compounds (toluene, xylene). Detection library is expandable to user-defined compounds.

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 below correspond to the Chemical (C) variant, which shares its sensing core with the B and R configurations. Contact Qualitech Technology for variant-specific datasheets and detection-library details.

Key Advantages

- High sensitivity — detection limit as low as ppbv level (DMMP 19.7 ppb).
- High resolution — up to 40–60 FWHM, reliably distinguishing multiple substances.
- Non-radioactive ionization source — bipolar high-voltage atmospheric-pressure ionization; no radioactive-source regulation or disposal burden.
- Rugged one-piece construction — PEEK-reinforced integrated ceramic core rated to 15G shock, reducing maintenance needs.
- Configurable operation — parameters tunable per target substance; supports air, nitrogen, or helium as drift gas.
- Long maintenance cycle — rated for continuous 7×24 operation with a service interval exceeding 180 days.
- Expandable detection library and sampling accessories to match evolving application needs.

Key Specifications

The following key indicators describe the CBR-TDM Chemical (C) variant, fixed-platform configuration.

Weight	4 kg (excluding outer shell)
Dimensions	200 × 200 × 100 mm
Power Consumption	< 20 W
Power Supply	8–16 VDC (nominal 12 VDC)
Sensitivity	ppbv level (DMMP 19.7 ppb)
Response Time	10 s (MS 30 ppbv) / 180 s (MS 10 ppbv)
Resolution	> 50 M
Ion Source	Bipolar high-voltage atmospheric-pressure ionization (non-radioactive)
Operating Pressure	57–101 kPa
Operating Temperature	–20 – +50 °C
Storage Temperature	–40 – +60 °C
Communication Interface	2 × RS-232, 460,800 bps
Continuous Operational Stability	7 × 24
Shock Resistance	15 G
Sampling Method	Pump suction; pump service life > 5,000 hours
Alarm Substance Library (optional)	Toxic industrial gases (Cl ₂ , H ₂ S, HCl, HF, NH ₃); odorants (methanethiol, ethanethiol); aromatics (toluene, xylene); expandable to a user-built library

Compliance & Ionization Source

Quality System: GJB 9001C Certified	Ionization Source: Non-radioactive
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Application Scenarios

- Civil defense and fortification engineering
- Airport, subway, and large-venue security screening
- GC-IMS hybrid instrumentation
- Environmental monitoring
- Hazardous chemical storage leak warning
- Handheld gas alarm devices
- UAV-mounted field detection
- Grid-based, large-area distributed monitoring

Detection Technology Comparison

Feature	Ion Mobility Spectrometry (Qualitech CBR-TDM)	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	< 650 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-TDM 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

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MODEL

CBR-TDM-C/B/R

PRODUCT NAME

Trace Substance Detection Module

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-TDM 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.