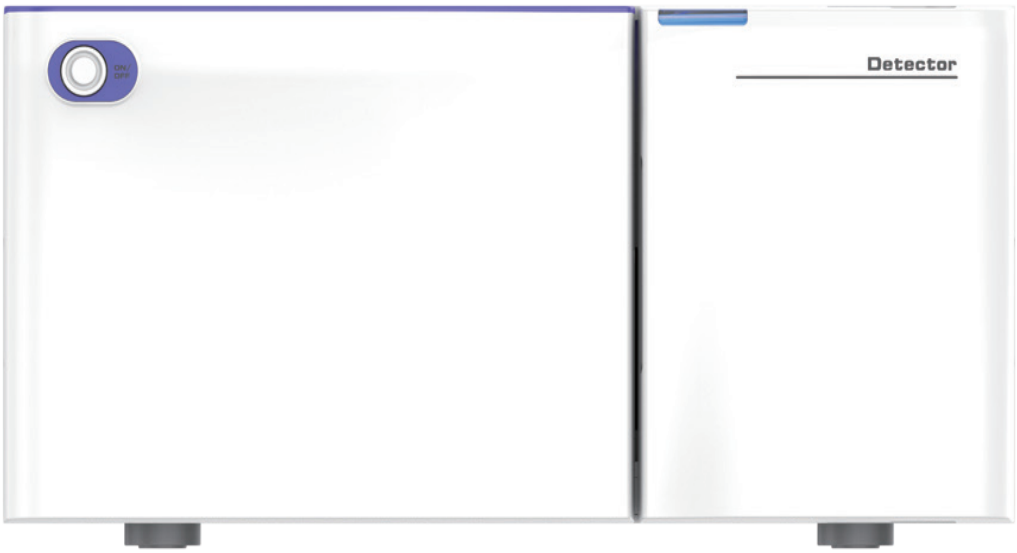
RID-Refractive Index Detector (Analytical Type)

Specification Introduction



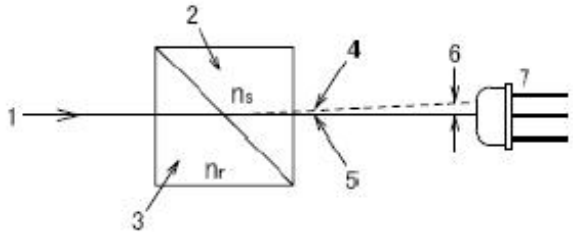
BIKAI TECHNOLOGY
Address: Floor 7, Building 2, No. 22 Dao'an Road, Suzhou New District, Jiangsu Province, China
Email: info@bikaicorp.com
Web: www.bikaicorp.com

Model: D40

Product Features

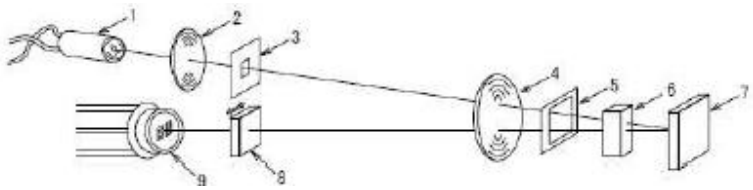
- **Broad-spectrum Analytical Detector**: Industry-leading sensitivity in detecting saccharides.
- **Stable and Reliable Classical Deflection Optical Architecture**.
- **Intelligent Fluid Control System**: Automatically switches between sample cell and reference cell flow paths, one-click equilibration.
- **High-precision Temperature Control System** (±0.1°C).
- **8μL Ultra-low Dead Volume Flow Cell Design**: Compatible with UHPLC systems.
- **Excellent Optical Path Design**: Lower noise and drift, with exceptional quantitative reproducibility.
- **Supports Digital Communication Interfaces**: RS232/RS485/USB/LAN, as well as analog signal output.
- **Compatible with All Brands of HPLC/UHPLC**.

Detection Principle Diagram



1	Incident Beam	2	Sample Cell	3	Reference Cell
4	Beam when ns > nr	5	Beam when ns = nr	6	Deflection Displacement
7	Photosensitive Receiving Element	ns	Refractive Index of Sample Cell	nr	Refractive Index of Reference Cell

Optical System Diagram



1	Light Source	2	Condenser Lens	3	Slit 1
4	Collimating Lens	5	Slit	6	Detection Cell
7	Reflecting Mirror	8	Zero-position Glass	9	Photosensitive Receiving Element

Detection Principle

The optical path deflects when passing through two detection cells containing different liquids. The magnitude of the deflection is proportional to the difference in refractive index between the two liquids. The refractive index is related to the concentration difference of the liquids in accordance with Lambert-Beer's Law.

Optical System

The beam emitted from the light source passes through a condenser lens, Slit 1, a collimating lens, Slit 2, and then through the detection cell. The light is reflected by a mirror behind the detection cell and passes through the detection cell, Slit 2, the collimating lens, and a zero-position glass adjuster before projecting the image of Slit 1 onto the photosensitive element. The photosensitive element contains two side-by-side photosensitive receiving elements. When the refractive indices of the sample and reference in the detection cells change, the image on the photosensitive element moves horizontally. The changes in the electrical signals emitted by the photosensitive receiving elements are proportional to the displacement of the image.

Reference Cell

First, flush the sample cell and reference cell with the mobile phase. Then close the reference cell so that solvent only flows through the sample cell. At this point, the mobile phase in both units is the same, and thus the refractive index is also the same. The detector can be adjusted to an optically balanced state by adjusting the position of the zero-position glass.

Sample Cell

When the sample eluted from the chromatography column into the sample cell, the refractive index of the liquid in the sample cell changes. This change in refractive index causes the beam to deflect when passing through the detection cell, resulting in unequal amounts of light incident on each photodiode. The resulting changes in photodiode current are amplified and calibrated as the detector output signal.

Technical Specifications

Detection Principle	Refractometry
Refractive Index Range	1~1.75
Detection Range	0.25~512 μRIU
Linear Range	600 μRIU
Baseline Noise	< 2.5 nRIU (pure water)
Baseline Signal Drift	< 200 nRIU/h (pure water, 1 mL/min)
Signal Offset	-500~500 μRIU
Quantitative Repeatability (RSD%)	< 2.0%

Detection Principle	Refractometry
Zero Adjustment	Manual, automatic, remote optical/electronic zeroing
Digital Filter	None, 1~10 s
Light Source	Tungsten Lamp
Detection Cell Volume	8 μL
Detection Cell Pressure Resistance	0.5 MPa
Maximum Flow Rate	10 mL/min (pure water)
Dead Volume	~60 μL before the cell, ~500 μL after the cell
Contact Materials	316 Stainless Steel, Teflon (PTFE), Quartz Glass
Temperature Control	OFF, 30~60°C, step 0.1°C
Temperature Control Accuracy	±0.1°C
Analog Signal Output	0~1024 mV/FS (full scale) (2 mV/μRIU, 8 mV/μRIU)
Digital Status Input	Trigger (zero), switch polarity, switch flow path
Communication Interfaces	RS-232, RS-485, USB, LAN
Control Software	Free standalone control software, Clarity control plugin