



BS-2000 Modular System

Clinical Chemistry Solution

mindray
healthcare within reach

Mindray Clinical Chemistry Solution

High Throughput

- 2000 photometric tests/hour
- Up to 600 tests/hour for ISE
- Flexible scalability

High Performance Instrument



BS-2000
Modular System



Original Calibrators
and Controls



Quality Management
System

Professional Service

Advanced Software

- Results traceability
- Reflex function
- Flexible STAT & rerun
- Real-time status monitoring

Reliable Results

- Advanced mechanical system
- Complete reference system
- Integral traceability system
- International traceability certificate

Reliable Results

Standardization
Laboratory

Reference
Laboratory

Dedicated Chemistry
Reagents

Dedicated Reagent System

Dedicated Reagent System

- Wide panel clinical chemistry assays
- Original calibrators and controls
- Reliable performance
- ISO standard quality

WARNING
MOVING PARTS
Do not touch when in operation.

CAUTION
AVOID FINGER COLLISION
Ensure that the door opens in primary
direction. Do not remove the cover
when in operation.

WARNING
MOVING PARTS
Do not touch when in operation.

BS-2000 Modular System

Reagent Carousel 2

1. 70 positions (40 outer and 30 inner) for R2 and R4
2. 2°C-8°C constant cooling compartment
3. Reagents can be loaded continuously while instrument is running

Probe R21 and Probe R22

1. 10µl-200µl, with increment of 0.5µl
2. Bubble detection, liquid level detection
3. Collision protection and auto recovery from collision

Probe R11 and Probe R12

1. 80µl-200µl, with increment of 0.5µl
2. Bubble detection, liquid level detection
3. Collision protection and auto recovery from collision

Reagent Carousel 1

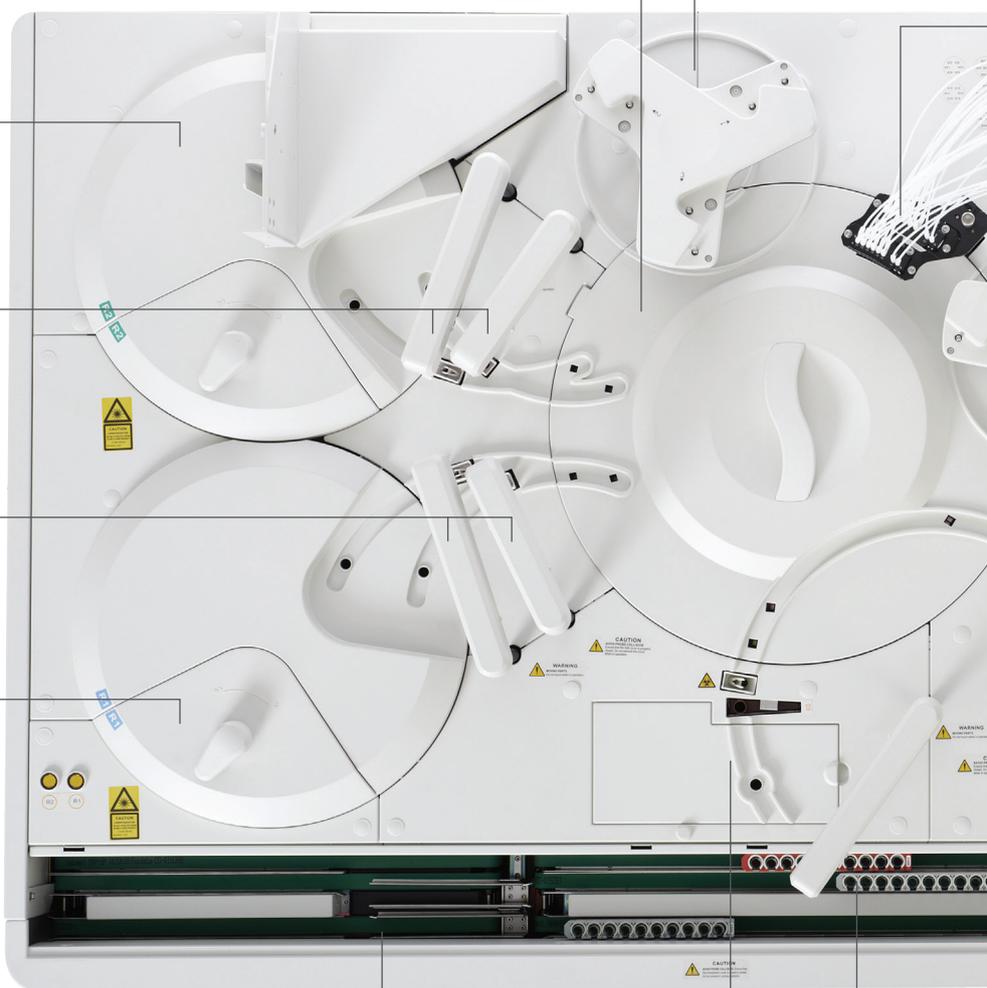
1. 70 positions (40 outer and 30 inner) for R1 and R3
2. 2°C-8°C constant cooling compartment
3. Reagents can be loaded continuously while instrument is running

Reaction Carousel

1. 80µl minimum reaction volume
2. 412 glass cuvettes for permanent use
3. Direct solid heating

6-head Sample Mixer

1. Flat mixing bar with high efficiency
2. Two-step washing with pre-heated detergent and water
3. Easy replacement and maintenance



Return Lane

ISE Module

1. Na⁺, K⁺, Cl⁻ electrodes for serum, plasma and urine
2. 30,000 tests or three months
3. Easy maintenance

Dual-ne

1. 1.5µl-25µL
2. Clog detection and detection a
3. Collision protection and auto recovery from collision

System Layout

6-head Reagent Mixers

Efficiency
Pre-heated
Maintenance

8-stage Cuvette Wash Station

1. Cuvette washing with pre-heated detergent and water
2. Independent water blank measurement

Sample Delivery Module (SDM)

1. Up to 300 samples can be loaded in one batch
2. Continuous sample loading and offloading
3. 5 types of racks

Sample Carousel

1. 140 positions for different types of sample tubes
2. 25 positions in cooling compartment for calibrators and controls
3. Flexible for STAT, rerun or other routine samples with higher priority

STAT and RUN buttons

1. Flexible STAT rack loading
2. One touch to initiate analysis

Needle Sample Probe

with increment of 0.1µL
Position, bubble detection, level
and tracking
Protection and auto recovery
on

Passing Lane

1. Higher priority for STAT, calibrator, control and rerun racks
2. For routine sample racks to be transferred to other analytical unit(s)

Normal Lane



Advanced Software



User-friendly Interface

- Unified platform for BS-2000 series, BS-800 series, BS-480 and future instrument
- Real-time status monitoring of analytical unit, SDM and carousels



Real-time QC Status Monitoring

- Westgard Rules and Two-Control Evaluation check
- Levey-Jennings chart and Twin-Plot chart for review
- Real-time alarm and locating when QC result(s) is out of range
- Auto QC setup capability

Traceable Test Results

- Reagent, calibrator and control information can be recalled from archive history
- User-friendly, intuitive software design, easy to trace results



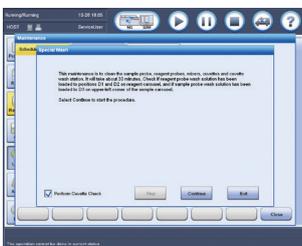
Reflex Function

- Pre-defined reflexive assays will be performed automatically when preset criteria is met
- Each assay may involve multiple reflexive criterias
- Each criteria may initiate up to a maximum of 20 relevant assays



Test Summary

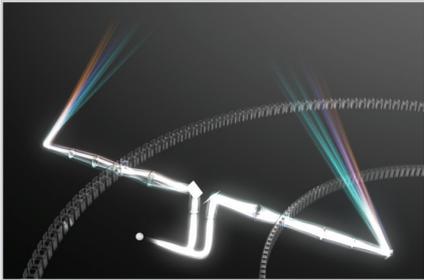
- Test summary during certain period, including calibration, QC, sample, valid tests and rerun tests
- Facilitate to computation of total test costs within a defined period
- The summary can be archived into excel files or printed to review and backup



Step-by-step Maintenance Guide

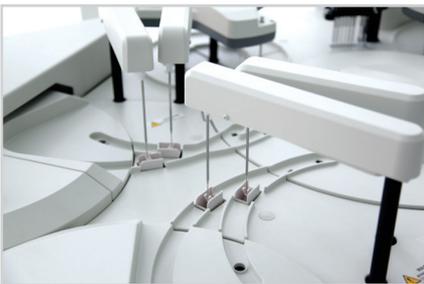
- Scheduled maintenance and maintenance guide for chemistries and ISE
- Ensure performance reliability and reduce unnecessary service calls
- Error report transferrable to service engineers for immediate troubleshooting; minimize instrument downtime

Reliable Results



Enhanced Optical System

- Dual-optical system with same light source
- Dual-lens and dual-diaphragm technology
- 80 μ L minimum reaction volume



High Precision Aspirating

- 1.5 μ L-25 μ L, with increment of 0.1 μ L for sample probe
- Non-touch dispensing for sample
- 80 μ L-200 μ L, with increment of 0.5 μ L for R11 and R12 probes
- 10 μ L-200 μ L, with increment of 0.5 μ L for R21 and R22 probes

High Performance Reaction System

- Two 6-head mixing units for reagent and samples
- Direct solid heating for reaction carousel
- Glass cuvettes for permanent use



Efficient Washing System

- Interior & exterior probe washing with high pressure pre-heated water
- Programmable enhanced washing with detergent for reagent and sample probes
- 8-stage cuvette wash station, washing cuvettes with pre-heated detergent and water
- Two-step mixer washing with pre-heated detergent and water



Stable Cooling Compartment

- 2°C-8°C constant cooling compartment for reagents
- Constant cooling compartment for calibrators and controls in sample carousel



Accurate, Reliable Results

To ensure accuracy, reliability and correlation of diagnostic data, Mindray utilizes the International Standard in result reporting. To assure ease of report retrieving, Mindray establishes the Mindray Clinical Chemistry Measurement System for result traceability.



Standard reference system

- Adopt JCTLM reference system
- IFCC primary method for enzyme, ID/MS method for substrate
- NIST, IRMM reference materials



JCTLM, Joint Committee On Traceability In Laboratory Medicine

NIST, National Institute of Standards and Technology, USA

IRMM, Institute for Reference Materials and Measurements, EU

IFCC, International Federation of Clinical Chemistry and Laboratory Medicine

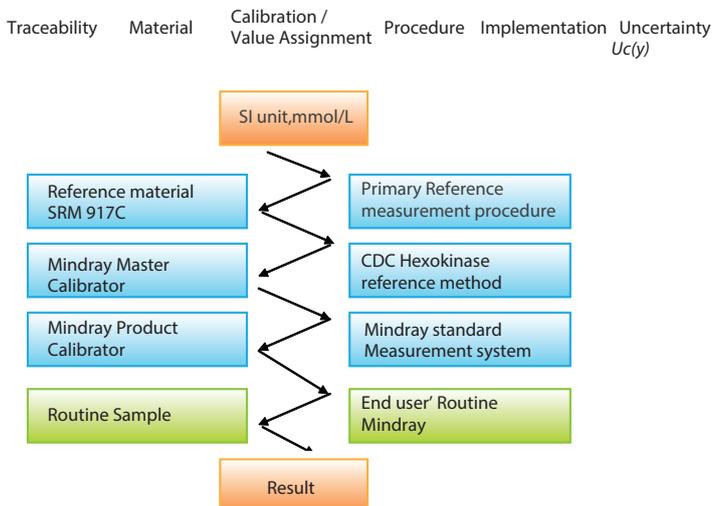
Complete traceability process

- Complete calibration hierarchy and traceability chain based on ISO standard (EN/ISO17511) from reference system to routine measurement system

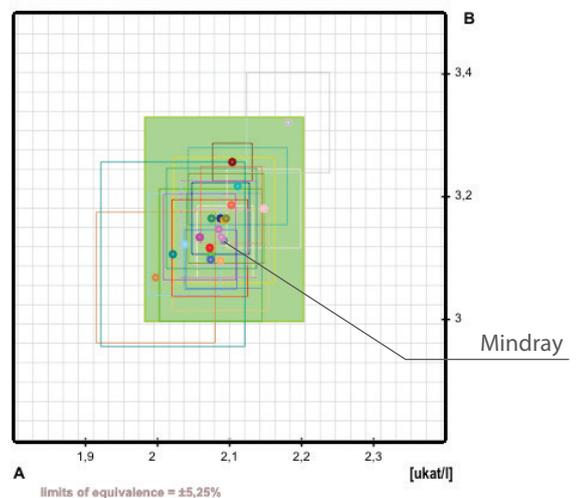
Proficiency testing for reference measurement

- Participate RELA (External quality control for reference laboratory) to verify the accuracy of the value assignment procedure.

Traceability chain of Mindray measurement system (Glu)



ALT



International standardization certification

- International Standardization certificates of Cholesterol and Hba1c from CRMLN and NGSP.

More information refers to website (<http://www.cdc.gov>).

CRMLN (Cholesterol Reference Method of Laboratory Network)

NGSP(National glycosylated hemoglobin standardization program)



Matched calibrators and controls

- Dedicated calibrators with traceability and specific target value
- Convenient design of multi items of calibrators and controls combined into one vial
- Long shelf life of lyophilized powder

Dedicated, high-quality reagents

- Diagnostic function test panels

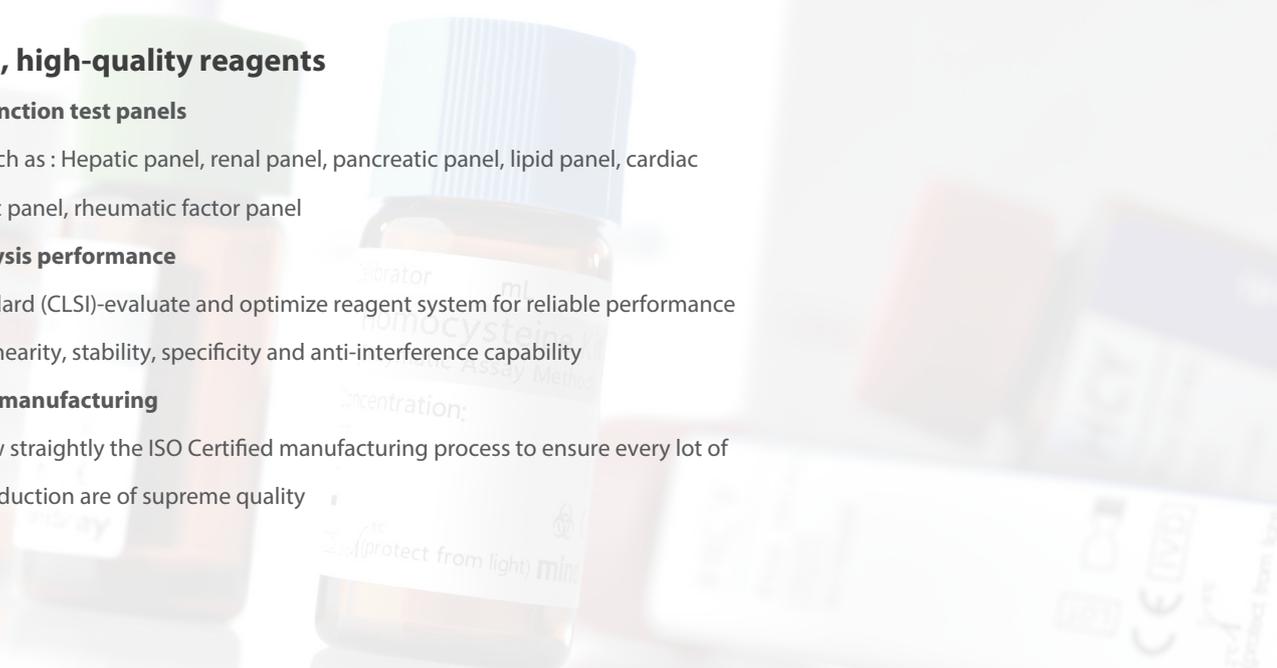
Test panels such as : Hepatic panel, renal panel, pancreatic panel, lipid panel, cardiac panel, diabetic panel, rheumatic factor panel

- Reliable analysis performance

EP series standard (CLSI)-evaluate and optimize reagent system for reliable performance in precision, linearity, stability, specificity and anti-interference capability

- ISO standard manufacturing

Mindray follow straightly the ISO Certified manufacturing process to ensure every lot of reagent in production are of supreme quality



Reagent Menu

Hepatic Panel

Alanine Aminotransferase (ALT)
Aspartate Aminotransferase (AST)
Alkaline Phosphatase (ALP)
γ-GlutamylTransferase (γ-GT)
Direct Bilirubin (D-Bil) DSA Method
Direct Bilirubin (D-Bil)VOX Method
Total Bilirubin (T-Bil) DSA Method
Total Bilirubin (T-Bil)VOX Method
Total Protein (TP)
Albumin (ALB)
Total Bile Acids (TBA)
Prealbumin (PA)
Cholinesterase (CHE)
α-L-fucosidase (AFU)
5'-nucleotidase (5'-NT)

Renal Panel

Urea (UREA)
Creatinine (CREA) Modified Jaffé Method
Creatinine (CREA)Sarcosine Oxidase Method
Uric Acid (UA)
Carbon dioxide (CO2)
Microalbumin
β2-Microglobulin (β2-MG)
Cystatin C (CysC)
Retinol binding protein(RBP)

Cardiac panel

Creatine Kinase (CK)
Creatine Kinase-MB (CK-MB)
Lactate Dehydrogenase (LDH)
α-Hydroxybutyrate Dehydrogenase(α-HBDH)
High sensitive C-reaction protein(HS-CRP)
Homocysteine (HCY)
Myoglobin(MYO)
D-Dimer(D-Dimer)

Inorganic & Anemia

Iron (Fe)
Ferritin (FER)
Transferrin (TRF)
Calcium (Ca)
Magnesium (Mg)
Phosphate Inorganic (P)
Unsaturated iron binding capacity (UIBC)
Glucose-6-phosphate dehydrogenase (G6PD)

Lipid Panel

Total Cholesterol (TC)
Triglycerides (TG)
HDL-Cholesterol (HDL-C)
LDL-Cholesterol (LDL-C)
Apolipoprotein A1 (ApoA1)
Apolipoprotein B (ApoB)
Lipoprotein(a) [Lp(a)]

Immune Panel

Immunoglobulin A (IgA)
Immunoglobulin G (IgG)
Immunoglobulin M (IgM)
Immunoglobulin E (IgE)
Complement C3 (C3)
Complement C4 (C4)

Diabetes Panel

Glucose (Glu) GOD-POD Method
Glucose (Glu) HK Method
Hemoglobin A1c (HbA1c)
Fructosamine (FUN)
β-Hydroxybutyrate(β-HB)

Rheumatism Panel

C-reactive protein (CRP)
Rheumatoid Factor (RF)
Antibodies Against Streptolysin O (ASO)

Pancreatitis Panel

α-Amylase (α-AMY)
Lipase (LIP)

Lung Panel

Adenosine Deaminase (ADA)
Angiotensin Converting Enzyme(ACE)



Flexible Scalability



BS-2000 Modular System, the highest throughput chemistry system ever designed by Mindray, is a brand new solution package for hospitals and clinical laboratories with high sample volumes. It combines innovation and high performance into a fully integrated solution, together with the complete line of original reagents, calibrators with metrological traceability and controls. It offers customers a versatile solution with high efficiency, automation and scalability. Furthermore it will lay the foundation for further modular integration with Mindray's future products.



BS-2000 Modular System

Technical Specifications *

System function

Fully automated, discrete, random access, STAT sample priority
Throughput: 2000 photometric tests/hour, up to 600 tests/hour for ISE
Measuring Principles: Colorimetry, Turbidimetry and ISE method
Methodology: End-point, Fix-time, Kinetic, optional ISE

Sample Handling

Sample Carousel: 140 positions, 25 cooling positions for calibrators and controls
Sample Delivery Module (SDM): Up to 30 racks can be loaded simultaneously
Racks can be loaded continuously while instrument is running
Sample Racks: 10 samples/rack
Sample Probe: Liquid level detection, clot & bubble detection, horizontal and vertical collision protection
Sample Volume: 1.5 μ L-25 μ L, with increment of 0.1 μ L
Probe Washing: Interior and exterior probe washing
Programmable enhanced washing with detergent
Carry over < 0.1%
Automatic Sample Dilution: Pre-dilution,
post-dilution and auto-dilution for sample
Dilution ratio: 4~134
Barcode Reader: Integrated bar code scanner in SDM
Sample carousel barcode scanner (optional)

Reagent Handling

Reagent Carousel: 140 positions
Refrigerated compartment (2~8 $^{\circ}$ C)
Reagent Bottle: Mindray 20ml and 62ml
Barcode Reader: Bar code scanner for two reagent carousels
Reagent Probe: Liquid level detection, clot & bubble detection, horizontal and vertical collision protection
Reagent Volume: 80 μ L-200 μ L, with increment of 0.5 μ L for R11 & R12 probes
10 μ L-200 μ L, with increment of 0.5 μ L for R21 & R22 probes
Probe Washing: Automatic interior and exterior probe washing
Programmable enhanced washing with detergent
Carry over < 0.1%
Reagent Loading: Reagent bottles can be loaded continuously while instrument is running

Reaction System

Reaction Carousel: 412 permanent glass cuvettes with 8-stage automatic washing
Cuvette: Optical length 5mm
Reaction Volume: 80 μ L-280 μ L
Reaction Temperature: 37 $^{\circ}$ C with fluctuation of \pm 0.1 $^{\circ}$ C
Mixing Unit: Two 6-head highly polished mixing bar units for reagent mixing and sample mixing; two-step washing with pre-heated detergent and water

Optical System

Light Source: 12V/50W Halogen-tungsten lamp
Photometer: Holographic concave flat-field gratings
Wavelength: 13 wavelengths: 340nm~850nm
Absorption Range: 0~3.5A (10mm conversion)
Resolution: 0.0001Abs

ISE Module (Optional)

Indirect Method, Na⁺, K⁺, Cl⁻ tests, with 22 μ L sample volume

Operation Unit

Operation System: Window XP Professional or Windows 7 Professional (32bit)

Working Conditions

Power Supply: 110V/115V~, 60Hz; 220V-240V~, 50Hz; 220V/230V~, 60Hz
Input Power: 4500VA for each analytical unit, SDM: 800VA
Operating Temperature: 15 $^{\circ}$ C~30 $^{\circ}$ C
Relative Humidity: 35%RH~85%RH, without condensation
Water consumption: <85L/hour De-ionized water
Dimension: 1600mm(Length) \times 1050mm(Depth) \times 1300mm (Height)
for each analytical units, 710mm(Length) \times 1020mm(Depth)
 \times 1000mm(Height) for SDM
Weight: \leq 550Kg for each analytical unit, 150kg for SDM

*For single analytical unit

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