



mindray

# BS-400

## Chemistry Analyzer

**mindray**  
healthcare within reach

# BS-400

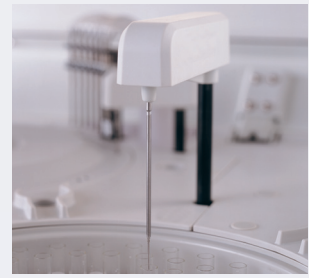
## Chemistry Analyzer

- Discrete, random access, fully automated
- 400 tests per hour, up to 560 tests per hour with ISE
- Up to 77 onboard chemistries and 3 ions
- Refrigerated reagent compartment
- Onboard capacity of 90 sample positions
- Automatic probe cleaning, liquid level detection, clot detection, collision protection in both vertical and horizontal directions
- 8-step auto washing system
- 12 wavelengths: 340~800nm
- Automatic dilution for abnormal sample
- Internal bar code reader (optional)
- Bi-directional LIS interface





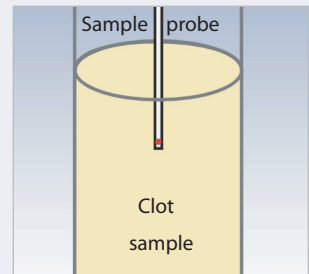
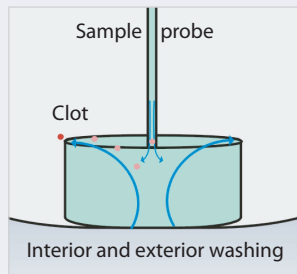
Convenient to use: real-time monitoring of working status, emergency tests are indicated by the LED display.

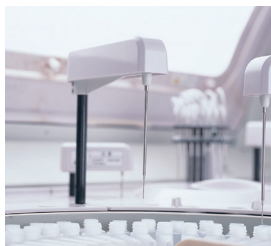
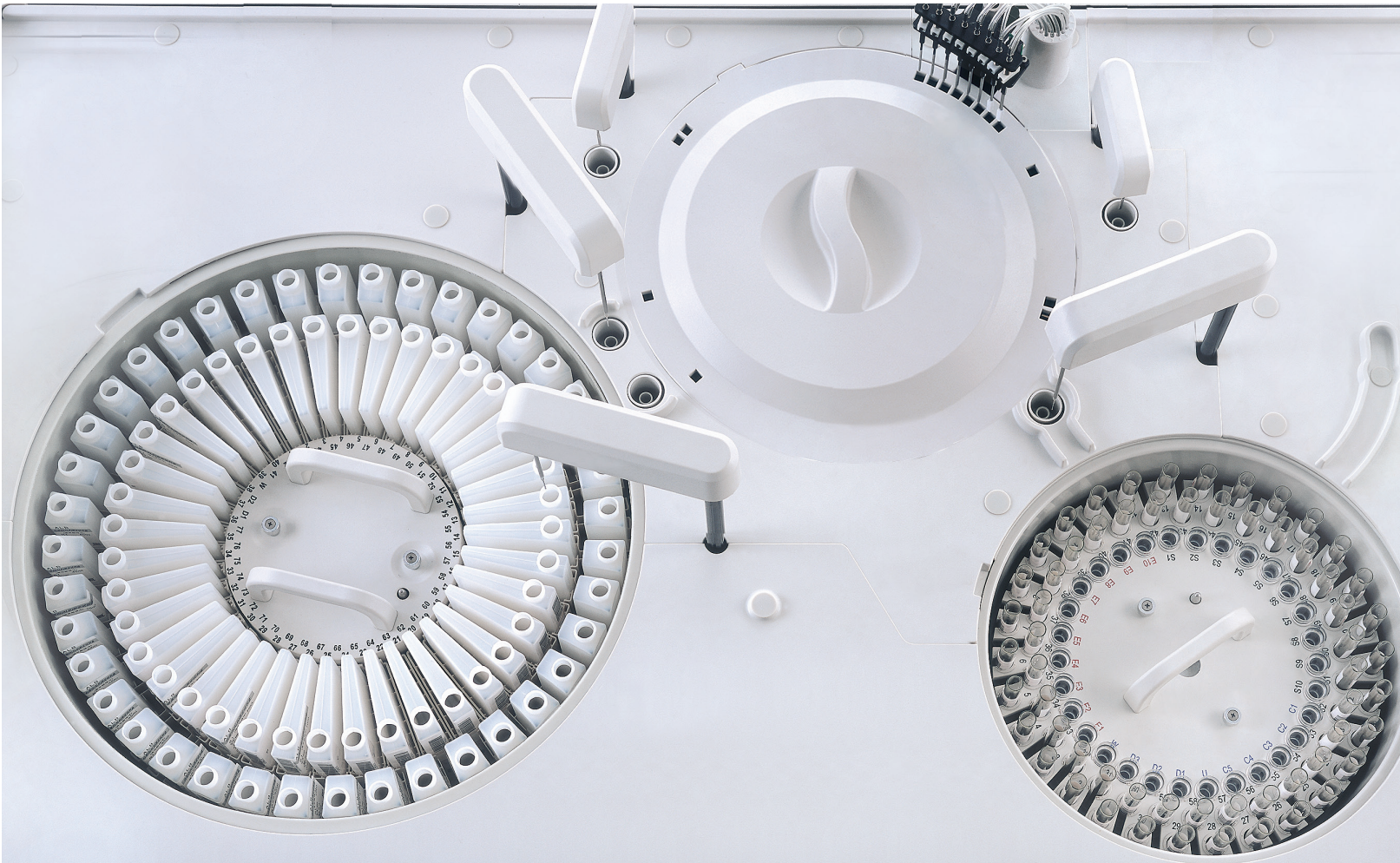


Clot detection: to avoid incorrect reaction at the very beginning of the reaction process.



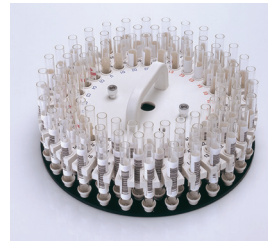
Reusable cuvettes: high performance and accurate result.





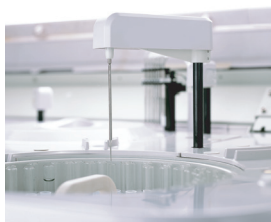
### Multi-functional reagent probe

- Interior and exterior probe washing
- Liquid level detection
- Collision protection
- Inventory monitoring
- Probe depth adjusted automatically



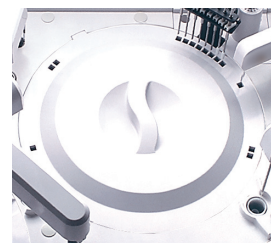
### Multi-functional sample tray

- 90 sample positions
- Can be programmed into 5 virtual sample disks
- Primary tubes and various sample cups can be used
- Automatic dilution of high concentration sample
- Pre-dilution for abnormal sample
- Internal sample bar code reader (optional)



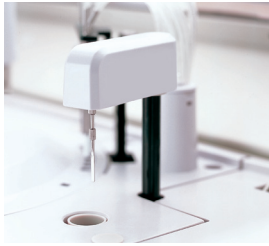
### Multi-functional sample probe

- Interior and exterior probe washing
- Liquid level detection
- Clot detection
- Collision protection
- Probe depth adjusted automatically
- Sample volume as low as 2.0μL



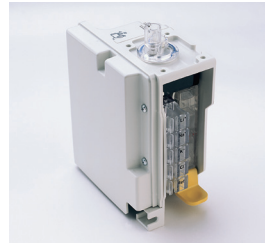
### Reaction tray

- Test sequence optimization to reduce carry-over
- Total reaction volume as low as 150μL
- Contains 90 reaction cuvettes
- Maintenance free heating system



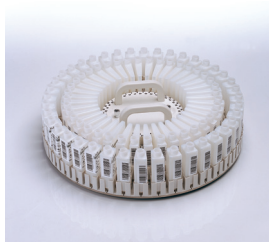
### High performance mixer design

- Optimized homogenization in minimum time
- High precision mixer station to ensure excellent reaction conditions
- Standardized mixing procedures



### High quality ISE Module

- Optional selection of  $K^+$ ,  $Na^+$ ,  $Cl^-$
- Throughput: up to 240 tests per hour
- 6 months shelf life



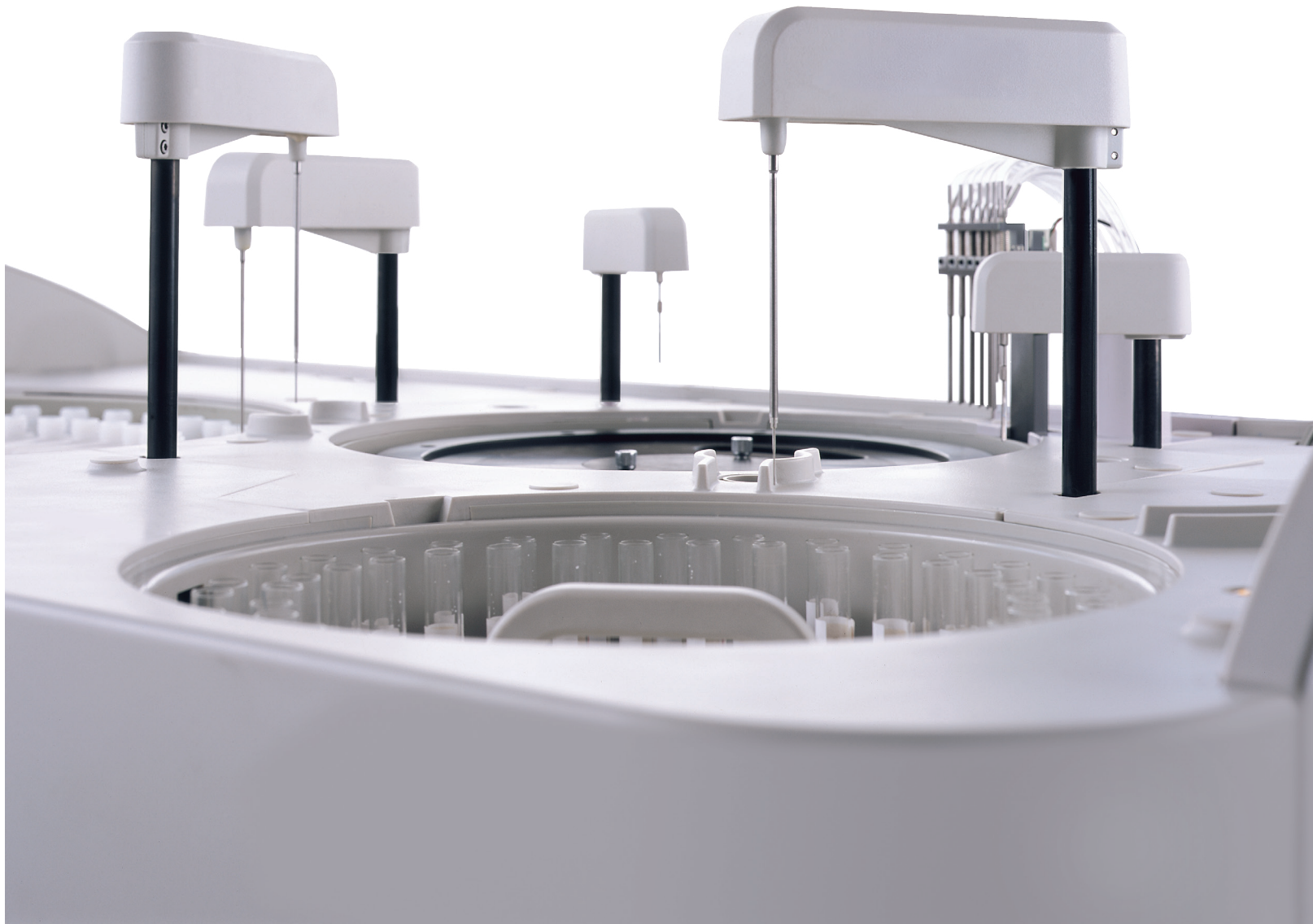
### Refrigerated reagent tray

- 80 reagent positions for R1, R2, R3, R4
- 24 hour non-stop cooling with Peltier element
- Ready-to-use liquid stable reagents
- Internal reagent bar code reader (optional)



### Washing station

- High tech washing station to guarantee accurate results and ensure valid diagnostics
- 8-step auto-washing

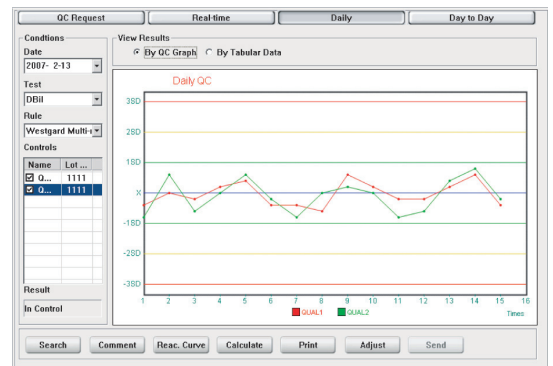
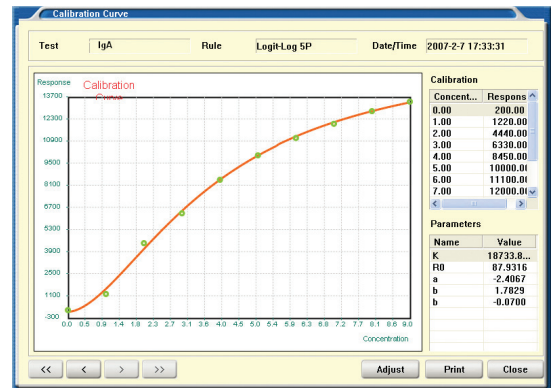
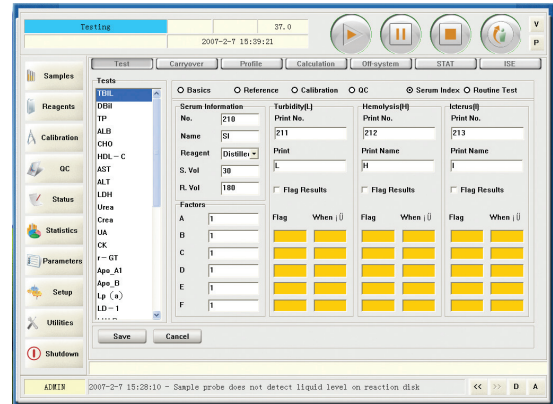


# BS-400

## Chemistry Analyzer

### Comprehensive and sophisticated software program

- Serum indices detection function
- Intelligence of extending the linearity range for enzyme tests automatically
- Multi-point calibration: up to 10 points
- Auto rerun: in repeating/increasing /decreasing mode
- Power-off memory protection: in case of emergency shutdown, the system quickly stores all the current information. When powered on again, it will carry over unfinished tests without requesting again
- Reaction trend graph of patient's history records
- Comprehensive indications for out-of-control results and detailed causation records
- Automatic alarm during running process with explanations displayed
- Optimum test sequence setting program to avoid carry-over



Date	Error Code	Level	Failed Part
2007-2-7 15:27:10	AB175	Level 1	Sample Probe
2007-2-7 15:26:32	AB324	Level 2	R1 Probe
2007-2-7 15:26:27	AB323	Level 1	R1 Probe
2007-2-7 15:26:23	AB324	Level 2	R1 Probe
2007-2-7 15:26:18	AB323	Level 1	R1 Probe
2007-2-7 15:26:14	AB324	Level 2	R1 Probe
2007-2-7 15:26:09	AB323	Level 1	R1 Probe
2007-2-7 15:26:04	AB324	Level 2	R1 Probe
2007-2-7 15:23:09	AB322	Level 11	R1 Probe
2007-2-7 15:23:09	AB422	Level 11	R2 Probe
2007-2-7 15:23:09	AB125	Level 11	Sample Probe
2007-2-7 15:07:53	AT011	Level 17	Wash Unit
2007-2-7 15:07:43	AT011	Level 17	Wash Unit
2007-2-7 15:07:33	AT011	Level 17	Wash Unit
2007-2-7 15:07:23	AT011	Level 17	Wash Unit
2007-2-7 14:40:45	AB125	Level 11	Sample Probe
2007-2-7 14:40:45	AB322	Level 11	R1 Probe
2007-2-7 14:40:45	AB422	Level 11	R2 Probe
2007-2-7 14:40:20	AT026	Level 12	Wash Unit
2007-2-7 14:40:00	AB322	Level 11	R1 Probe

**Error Information**

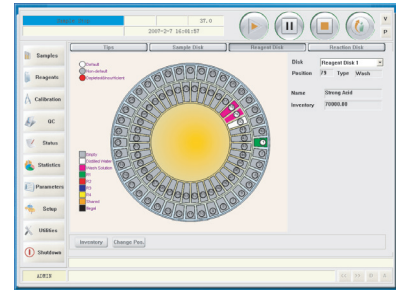
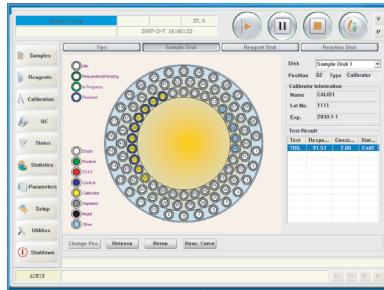
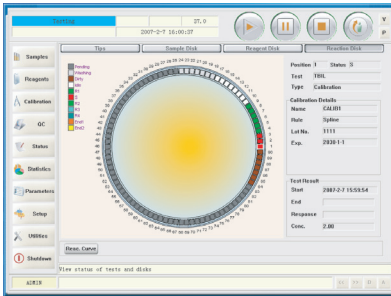
Error: Sample probe does not detect liquid level on reaction disk

Probable: No RI dispensed, insufficient RI

Corrective: Check if reagent is sufficient, Re-run

## Dynamic and real-time display of running status

- Running status of reagent tray, sample tray and reaction tray
- Real-time monitoring of reagent residual volume
- Real-time diagnosis of system working status



## Flexible and Convenient software function

- Template Modifying Software

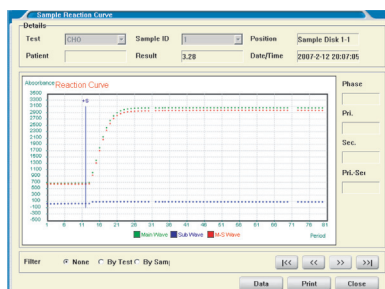
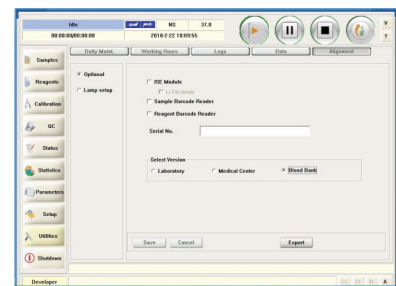
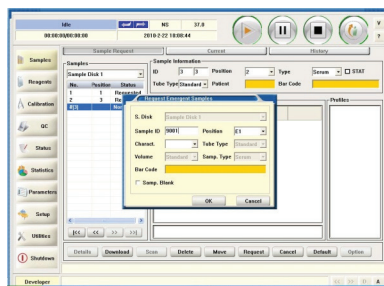
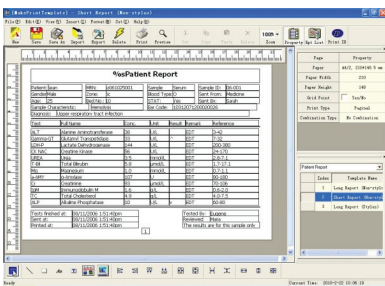
Flexible to define various report templates for laboratory, and easy to import new template from Mindray or other users.

- Fast Emergency Detection

One-key STAT function makes it easy to perform an emergency test for operator.

- Blood Bank Proprietary Model

It is a special function which can perform an automatic test routine with default configuration for blood bank without some redundant procedures such as requesting, scanning, etc.

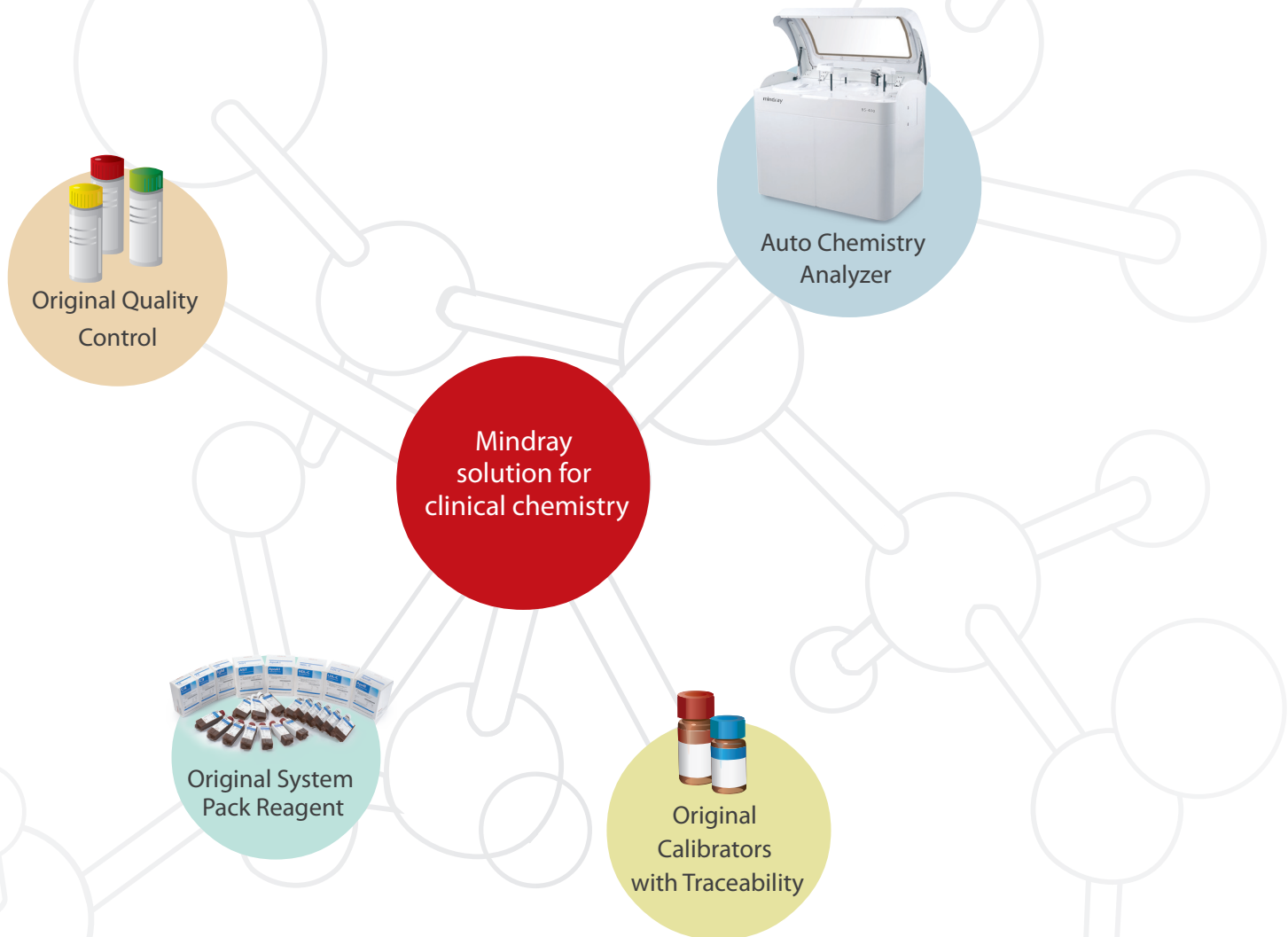


## Original reaction data record

- Real-time monitoring of reaction curve
- Simultaneously display primary and secondary wavelengths to avoid interference
- Detailed profile of alert messages

## Mindray solution for clinical chemistry

After more than 10 years of research and development on reagents, Mindray can now provide 48 parameters of dedicated reagents (more than 17 others are coming), covering hepatic, renal, cardiac, lipids, diabetes, pancreatitis, inorganic ions and immunoassays, etc., together with original calibrators with metrological traceability as well as controls for BS-400 chemistry analyzer.



### Original Calibrators with traceability:

Reference Method (Certified by 'Joint Committee for Traceability in Laboratory Medicine' (JCTLM))

- International Federation of Clinical Chemistry and Laboratory Medicine (IFCC)
- National Institute of Standards and Technology (NIST)
- Centers for Disease Control and Prevention (CDC, USA)
- American Association for Clinical Chemistry (AACC)

### Reference Material

- Institute for Reference Materials and Measurements (IRMM) standards
- National Institute of Standards and Technology (NIST) standards
- World Health Organization (WHO) standards
- Japan Committee for Clinical Laboratory (JCCLS) standards



## Chemistry Reagents

### Hepatic

Alanine Aminotransferase (ALT)  
Aspartate Aminotransferase (AST)  
Alkaline Phosphatase (ALP)  
 $\gamma$ -GlutamylTransferase ( $\gamma$ -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)  
Adenosine deaminase (ADA) \*  
 $\alpha$ -L-fucosidase (AFU) \*  
5'-nucleotidase (5'-NT) \*

### Renal

Urea (UREA)  
Creatinine (CREA) Modified JafféMethod  
Creatinine (CREA)Sarcosine OxidaseMethod  
Uric Acid (UA)  
Carbon dioxide (CO2)  
Microalbumin\*  
 $\beta$ 2-Microglobulin ( $\beta$ 2-MG) \*  
Cystatin C (CysC) \*

### Cardiac

Creatine Kinase (CK)  
Creatine Kinase-MB (CK-MB)  
Lactate Dehydrogenase (LDH)  
 $\alpha$ -Hydroxybutyrate Dehydrogenase( $\alpha$ -HBDH)  
Homocysteine (HCY)  
Myoglobin\*

### Ferrum

Iron (Fe)  
Ferritin (FER) \*  
Transferrin (TRF) \*  
Total iron binding capacity / unsaturated ironBinding capacity (TIBC/UIBC) \*

### Lipids

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

### Pancreatitis

$\alpha$ -Amylase ( $\alpha$ -AMY)  
Lipase (LIP)

### Diabetes

Glucose (Glu) GOD-POD Method  
Glucose (Glu) HK Meth  
Hemoglobin A1c (HbA1c)  
Fructosamine (FUN)

### Inorganic ions

Calcium (Ca)  
Magnesium (Mg)  
Phosphate Inorganic (P)

### Rheumatism

High sensitivity C-reactive protein (hs-CRP) \*  
Rheumatoid Factor (RF)  
Antibodies Against Streptolysin O (ASO)

### Immune

Immunoglobulin A (IgA)  
Immunoglobulin G (IgG)  
Immunoglobulin M (IgM)  
Immunoglobulin E (IgE) \*  
Complement C3 (C3)  
Complement C4 (C4)  
C-Reactive Protein (CRP)

### Others

Glucose-6-phosphate dehydrogenase (G6PD) \*  
D-dimer\*  
Angiotensin converting enzyme (ACE) \*  
Retinol binding protein (RBP) \*  
D3-hydroxybutyric acid (D3-HB) \*

\* Coming soon

# BS-400

## Chemistry Analyzer

### Technical Specifications

#### System function:

Fully automated, discrete, random access for routine, STAT, urine and homogeneous immuno assays; STAT sample priority

Throughput: 400 tests/hour, up to 560 tests/hour with ISE

#### Measuring principles:

Absorbance photometry, turbidimetry

Methodology: End-point, Fixed-time, Kinetic, optional ISE  
Single/Dual/Triple/Quadruple reagent chemistries, monochromatic / bichromatic

Programming: User defined profiles and calculation

#### Sample Handling:

Sample tray: 90 positions for primary or secondary tubes and sample cups

Sample volume: 2~45  $\mu$ l, step by 0.1  $\mu$ l

Sample probe: Liquid level detection, clot detection and collision protection

Probe cleaning: Automatic washing both interior and exterior, carry-over  $\leq$  0.1%

Automatic sample dilution: Pre-dilution and post-dilution dilution with ratio up to 1: 150

Dilution vessel: Cuvette

#### Internal bar code reader (optional):

Used for sample and reagent programming; applicable to various bar code systems including Codabar、ITF (Interleaved Two of Five)、code128、code39、UPC/EAN、Code93; capable to communicate with LIS in a bi-directional mode

#### ISE Module (optional):

Optional selection of K<sup>+</sup>, Na<sup>+</sup>, Cl<sup>-</sup>

Throughput: Up to 240 tests per hour

#### Reagent Handling:

Reagent tray: 80 positions in refrigerated compartment (2~10°C)  
R1: 150~350 $\mu$ l, step by 1 $\mu$ l;  
R2/R3/R4: 20~350 $\mu$ l, step by 1 $\mu$ l;  
2 independent reagent probes

Reagent probe: Liquid level detection, collision protection and inventory checking

Probe cleaning: Automatic washing both interior and exterior

#### Reaction System:

Reaction rotor: Rotating tray, 90 cuvettes with automatic washing

Cuvette: Optical length 5mm

Reaction volume: 150~360 $\mu$ l

Operating temperature: 37°C

Temperature fluctuation:  $\pm$ 0.1°C

Mixing system: 2 independent mixers

#### Optical System:

Light Source: Halogen-tungsten lamp

Photometer: Reversed optics, grating photometry

Wavelength: 340nm、380nm、412nm、450nm、505nm、546nm、570nm、605nm、660nm、700nm、740nm、800nm

Absorbance range: 0~3Abs (10mm conversion)

Resolution: 0.001Abs

#### Control and Calibration:

Calibration mode: Linear (one-point, two-point and multi-point), Logit-Log 4P, Logit-Log 5P, Spline, exponential, Polynomial, Parabola

Control rules: Westgard multi-rule, Cumulative sum check, twin plot

#### Operation Unit:

Operation system: Windows® XP Professional/Home SP2 or above  
Windows® Vista Home/Business, Windows® 7

Interface: RS-232

#### Working Conditions:

Power Supply: 200~240V, 50Hz, 1500VA  
or 220/230V, 60Hz, 1500VA  
or 110/115V, 60Hz, 1500VA

Temperature: 15~30°C

Humidity: 35~80%

Water consumption: 20L/hour

Dimension: 1180mm x 700mm x 1145mm (W x D x H)

Weight: 300 Kg

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Mindray is listed on the NYSE under the symbol "MR"

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