



TORONTECH

SEMI-MICRO ANALYTICAL BALANCE



Semi-Micro Analytical Balance (0.01 mg) - ToronAB™ SM Series

ToronAB™ SM Series semi-micro analytical balance delivers 0.01 mg readability across single- and dual-capacity configurations, supporting labs that demand precise mass determination for small samples. Electromagnetic force sensing (EMF) combined with fully automated timed internal calibration targets industries with strict requirements for accuracy, traceability, and compliance. The ToronAB™ SM Series offers eight models with capacities between 62 g and 220 g, giving laboratories the flexibility to select the configuration that fits their workflow.

Each model in the ToronAB™ SM Series maintains accuracy through continuous self-monitoring. The EMF sensor detects ambient temperature changes and automatically calibrates the balance using non-magnetic internal weights, eliminating the need for manual recalibration. Temperature compensation runs throughout operation, and the time/temperature display provides a real-time record of the weighing environment. GMP/GLP logging captures the date, time, and device serial number with each measurement, generating records for quality audits and regulatory review.

The ToronAB™ SM Series design addresses sources of external interference at the weighing pan. Anti-static transparent glass isolates electrostatic charge on plastic or lightweight samples, while a hollow star-pattern weighing pan minimizes airflow disturbance around the sample. An aluminum windproof ring reduces door-draft effects when the side panels open, and a large glass draft shield keeps the weighing chamber clear of ambient air currents. A VA negative LCD display with white characters on a black background delivers a clear, readable output in varied lighting.

APPLICATIONS

Semi-Micro Analytical Balance (0.01 mg) - ToronAB™ SM Series Applications

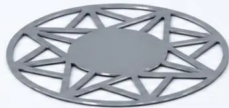
The ToronAB™ SM Series serves industries and research disciplines where sub-milligram measurement accuracy is a routine requirement.

- **Pharmaceutical R&D and Quality Control:** precise mass determination of active pharmaceutical ingredients, excipients, and formulation components, with GMP-compliant documentation at each weighing step
- **Chemical Analysis Laboratories:** quantitative preparation of reagent solutions, standard dilutions, and gravimetric determinations requiring 0.01 mg resolution
- **Food Science and Nutraceuticals:** measuring micro-quantities of additives, colorants, and flavor compounds during product development and specification verification
- **Materials Science and Polymers:** weighing catalyst quantities, polymer fractions, and coating samples for density and composition studies
- **Environmental Testing:** precise sample mass determination for trace-element analysis, digestion preparation, and spectrometric reference calibration
- **Academic and Research Institutions:** high-precision weighing for quantitative chemistry, gravimetric analysis, and instrument calibration in university laboratories
- **Biotechnology and Life Sciences:** measuring enzyme quantities, biomolecule aliquots, and culture media components where microgram accuracy affects experimental outcomes
- **Forensic and Reference Laboratories:** precise mass measurement for standard preparation, evidence quantification, and certified reference material verification



FEATURES

Semi-Micro Analytical Balance (0.01 mg) - ToronAB™ SM Series Key Features

Windshield with big space Large Workspace 		Aluminum Windbreak Ring Reduces the impact of wind when the side door is opened 	
	Hollow star-pattern weighing pan Reduces the impact of airflow		VA Negative LCD Screen Black background with white characters Clear and easy-to-read display

The ToronAB™ SM Series combines automated calibration, versatile measurement modes, and a purpose-built enclosure across all models in the range.

- **Automatic Internal Calibration:** non-magnetic internal weights calibrate the balance automatically in response to temperature drift or on user demand, removing the need for external reference weights
- **One-Touch Calibration Trigger:** a single key initiates an on-demand calibration cycle, allowing the operator to recalibrate immediately when environmental conditions shift
- **Temperature Compensation:** continuous ambient temperature correction runs throughout operation, with a real-time time and temperature display that records weighing conditions alongside each result
- **GMP/GLP Compliance Mode:** each measurement record includes date, time, and device serial number, supporting audit trails and quality system documentation requirements

- **Anti-Static Transparent Glass:** draft shield panels rated for anti-static performance, reducing electrostatic interference when weighing plastic containers, filters, or lightweight samples
- **Hollow Star-Pattern Weighing Pan:** pan geometry designed to allow airflow through the structure, reducing pressure-differential drift during weighing and improving repeatability
- **Aluminum Windproof Ring:** limits the airflow disturbance generated when the side draft shield doors are opened, protecting the reading during sample loading and removal
- **VA Negative LCD Display:** white characters on a black background provide high contrast and clear readability, with panel technology suited to analytical laboratory lighting conditions
- **RS232 Serial Interface:** connects the balance to printers, PCs, or LIMS software; baud rate is user-configurable (1200, 2400, 4800, 9600, 19200, 38400 bps)
- **Multi-Mode Print Output:** three print modes (continuous real-time, continuous stable, and single-point) allow the operator to match output format to the workflow
- **GLP-Compatible Print Header:** prints user identity and device information alongside each result for complete traceability documentation
- **Unit Conversion:** supports g, mg, ct, and oz without reconfiguring the measurement setup
- **Counting and Percentage Functions:** on-board piece counting and percentage weighing reduce manual calculation steps in production and QC environments
- **Peak Hold Function:** captures and holds the maximum reading during dynamic weighing events, useful for filling and dispensing operations
- **Speed and Stability Adjustment:** adjustable response settings allow the operator to balance readout speed against stability for the sample type being weighed
- **Overload and Fault Alarm:** visual alarm for tare overload, weighing underload, and general faults across the full weighing range
- **Auto-Zero Tracking:** automatic baseline correction reduces the effect of slow environmental drift on tare readings over extended weighing sessions
- **Rear Electronics Cavity:** main control board and components are housed in a separate rear cavity, isolating them from vibrations and electromagnetic interference generated by the sensor

THEORY & METHOD

Theory and Method

The ToronAB™ SM Series operates on the electromagnetic force restoration (EMFR) principle, the preferred technology for sub-milligram analytical weighing. A current-carrying coil sits within a permanent magnetic field beneath the weighing pan. When a sample is placed on the pan, the added mass displaces the coil, and the control circuit adjusts the coil current to restore it to the null position. The current required for this equilibrium is directly proportional to sample mass, and the microprocessor converts it to a displayed reading.

Internal calibration in the SM Series uses non-magnetic reference weights loaded automatically by a servo mechanism. When the balance detects temperature drift beyond its threshold or when the user triggers calibration manually, the internal weight descends onto the pan and the calibration coefficient updates. Non-magnetic weights prevent eddy currents or magnetic field interactions that could introduce measurement error. This design allows calibration to proceed without removing the balance from the bench or sourcing external reference weights.

The hollow star-pattern weighing pan maintains reading stability by allowing air to pass through the pan geometry rather than pooling around the sample. This reduces the pressure differential across the pan surface, a common source of drift in enclosed draft shield environments. Anti-static glass panels prevent electrostatic charge accumulation on the shield walls, eliminating attractive or repulsive forces on the pan. Together, these features isolate the weighing event from the most common environmental interference sources.

TECHNICAL SPECIFICATIONS

Semi-Micro Analytical Balance (0.01 mg) - ToronAB™ SM Series Technical Specifications

Single-Range Models

Parameter	ToronAB™ SM 62	ToronAB™ SM 102	ToronAB™ SM 122	ToronAB™ SM 220
Capacity	62 g	102 g	122 g	220 g
Readability	0.01 mg / 0.1 mg	0.01 mg / 0.1 mg	0.01 mg / 0.1 mg	0.1 mg
Repeatability	0.08 mg	0.1 mg	0.1 mg	0.1 mg
Linearity	±0.08 mg	±0.1 mg	±0.1 mg	±0.1 mg

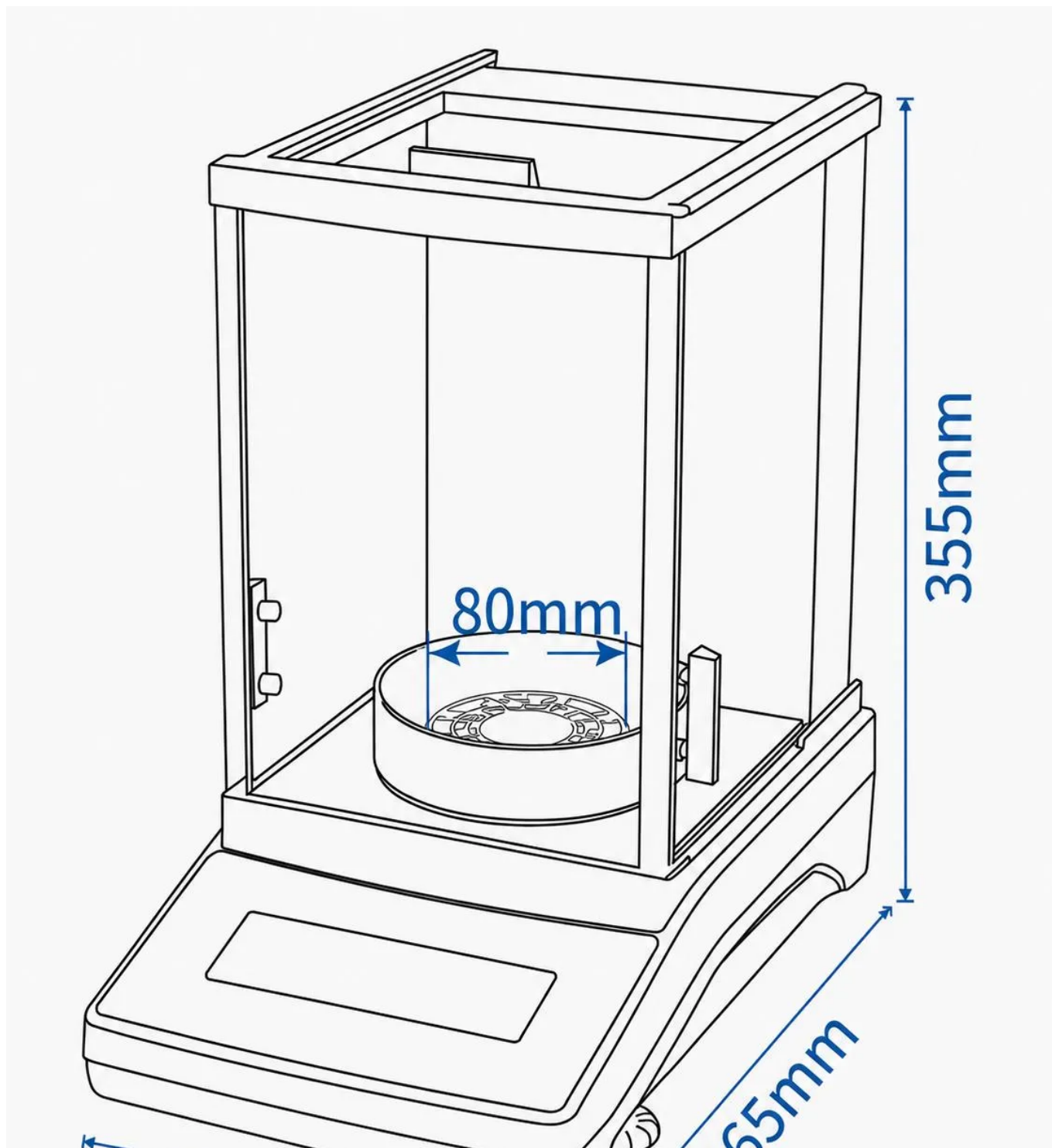
Dual-Range Models

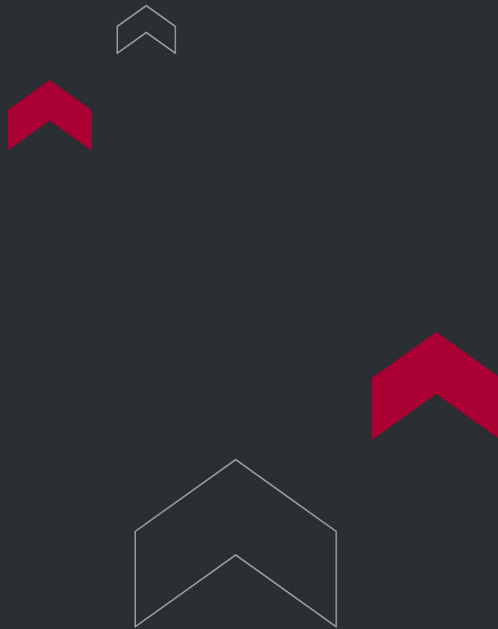
Parameter	ToronAB™ SM 62D	ToronAB™ SM82D	ToronAB™ SM102D	ToronAB™ SM122D
Capacity	62 g / 120 g	82 g / 220 g	102 g / 220 g	122 g / 220 g
Readability	0.01 mg / 0.1 mg	0.01 mg / 0.1 mg	0.01 mg / 0.1 mg	0.01 mg / 0.1 mg
Repeatability	0.08 mg / 0.2 mg	0.1 mg / 0.2 mg	0.1 mg / 0.2 mg	0.1 mg / 0.2 mg
Linearity	±0.08 mg / ±0.2 mg	±0.1 mg / ±0.2 mg	±0.1 mg / ±0.2 mg	±0.1 mg / ±0.2 mg

Common Specifications (All Models)

Parameter	Specification
Minimum Weight	1 mg (ToronAB™ SM 220 : 10 mg)
Verification Scale Interval	1 mg

Parameter	Specification
Load Error (2 g test)	0.01 mg (ToronAB™ SM 220 : 0.1 mg)
Stabilization Time	6 s (ToronAB™ SM 220 : 3 s)
Temperature Drift	±3 ppm/°C
Working Temperature	18-23°C
Working Humidity	45-65% RH
Calibration Mode	Internal (automatic and manual)
Display	VA negative LCD
GMP/GLP	Compliant
Voltage	220 V, 50 Hz / 110 V, 60 Hz (110V is also available)
Interface	RS232
Product Dimensions (W × D × H)	365 × 210 × 355 mm
Outer Carton Dimensions	530 × 400 × 540 mm
Inner Carton Dimensions	500 × 380 × 520 mm
Gross Weight	10 kg





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