

# MULTIPURPOSE HIGH SPEED REFRIGERATED CENTRIFUGE (4 X 750 ML)



## **Multipurpose High Speed Refrigerated Centrifuge (4 x 750 mL) - ToronCent™ HSR MP**

ToronCent HSR MP multipurpose high speed refrigerated centrifuge covers 3,345 x g to 29,200 x g on a single drive, which lets one instrument handle both bulk separation and microtube work. Twelve rotors mount to the same shaft, ranging from 4 x 750 mL swing buckets down to 12-place microtube carriers turning at 20,500 rpm. The chamber holds any setpoint between -20°C and 40°C within  $\pm 1^\circ\text{C}$ . Footprint measures 560 x 800 x 440 mm, narrow enough to share a standard bench.

Rotor selection governs what any single run can achieve, since force and volume move in opposite directions across the lineup. The 4 x 750 mL swing rotor turns at 4,000 rpm and 3,500 x g, suited to blood fractionation and cell harvesting. The 12 x 1.5 mL angle rotor reaches the full 20,500 rpm and 29,200 x g for nucleic acid and subcellular work. Laboratories that would otherwise buy two centrifuges often consolidate onto this one.

A brushless AC motor drives the rotor under microprocessor control, so no carbon dust enters the chamber and no brush service falls due. The stainless steel chamber wipes down after a spill and resists the disinfectants used in clinical settings. Automatic rotor identification reads the installed rotor and caps speed at its rating before the run begins. Nine acceleration rates, ten deceleration rates, and three damping levels give operators room to tune the profile around fragile pellets.

### **APPLICATIONS**

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## **Multipurpose High Speed Refrigerated Centrifuge (4 x 750 mL) - ToronCent™ HSR MP Applications**

The ToronCent HSR MP suits laboratories whose sample formats vary week to week and where a dedicated instrument per format is hard to justify.

- **Clinical Laboratories and Blood Banking:** separates serum, plasma, and blood components in 4 x 750 mL buckets, with adapters carrying up to 27 vacuum collection tubes per bucket
- **Cell Culture and Fermentation:** harvests bacterial, yeast, and mammalian cells from flask and small bioreactor volumes without splitting the batch across runs
- **Molecular Biology and Nucleic Acid Preparation:** pellets DNA and RNA precipitates and clears lysates at up to 29,200 x g on the microtube angle rotors
- **Protein Chemistry and Enzymology:** collects precipitated protein and removes cell debris while the chamber holds near 4°C to preserve activity
- **Shared Core Facilities and Teaching Laboratories:** twelve rotor options let one instrument serve research groups working in different tube and bottle formats
- **Pharmaceutical and Biotechnology Production Support:** clarifies in-process samples and supports release testing under controlled temperature
- **Microbiology and Infectious Disease Work:** concentrates cultures inside aerosol-tight buckets when the sample calls for containment
- **High-Throughput Plate Processing:** spins deep-well and standard microplates with the microplate bucket fitted to the 4 x 500 mL swing rotor
- **Environmental and Food Analysis:** settles suspended solids from bulk field samples ahead of chromatographic or spectroscopic measurement



# Standards

Manufacturer documentation for this platform does not reference international test standards, and torontech does not publish citations the supplier has not provided. Laboratories running the instrument inside an accredited quality system should request the declaration of conformity and factory calibration data with the order, then qualify the unit against their own equipment verification protocol.

## FEATURES

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### Multipurpose High Speed Refrigerated Centrifuge (4 x 750 mL) - ToronCent™ HSR MP Key Features

The specification reflects a general-purpose brief: wide rotor coverage, a chamber that survives clinical cleaning, and braking control fine enough for gradient work.

- **Twelve Rotor Options:** fixed-angle rotors from 12 x 1.5 mL through 6 x 100 mL, plus 4 x 500 mL and 4 x 750 mL swing rotors, cover microtube, conical, bottle, and plate formats on one drive
- **Brushless AC Motor with Microprocessor Control:** no carbon dust reaches the chamber, no brushes need replacing, and speed holds to within 10 rpm of setpoint
- **Nine Acceleration and Ten Deceleration Rates:** deceleration rate 0 disables braking entirely for a free coast to rest, which preserves density gradients and loose pellets
- **Three Damping Levels:** adjustable damping suppresses vibration as heavy swing rotors pass through resonance during spin-up and spin-down
- **Stainless Steel Chamber:** the bowl tolerates spills, repeated disinfection, and the cleaning agents used in clinical and biosafety settings
- **Automatic Rotor Identification:** the drive recognizes the installed rotor and enforces its individual speed limit, which removes over-speed as an operator error

- **Layered Safety Interlocks:** over-speed cutout, over-temperature protection, and a self-locking lid stop the run before a fault escalates
- **Programmable Touch Panel with LCD Display:** methods store and recall by number, which keeps technique consistent across shifts
- **Refrigeration Below -4°C at Maximum Speed:** the R134a circuit stays ahead of aerodynamic heating during the most demanding runs
- **Dual Timing Ranges:** short protocols set in 1 s increments up to 99 min 59 s, while long runs program out to 99 h 59 min
- **Aerosol-Tight Buckets:** sealed round buckets are available for both swing rotors when the sample requires containment
- **Microplate Bucket:** deep-well and standard 96-well plates spin in the 4 x 500 mL swing rotor
- **Low Acoustic Output:** noise stays at or below 65 dB(A), which suits open laboratory layouts

## THEORY & METHOD

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### Theory and Method

A rotor stores kinetic energy proportional to its mass and to the square of its angular velocity. A loaded 4 x 750 mL swing rotor carries several kilograms at long radius, so its safe ceiling arrives at 4,000 rpm, while a compact microtube rotor holds far less mass close to the axis and tolerates 20,500 rpm. The same drive serves both because the motor manages torque and speed independently, and rotor identification enforces the correct limit for whichever rotor sits on the shaft.

Published protocols state force in x g rather than rpm, because the same rotational speed produces different force at different radii. Converting between the two uses  $RCF = 1.118 \times 10^{-5} \times r \times N^2$ , with r as the rotor radius in centimeters. Moving a method from a 750 mL bucket to a 50 mL angle rotor therefore requires recalculating rpm for the target rotor, not copying the speed across. The instrument reports both figures so operators can verify the match before starting.

Deceleration does as much to protect a separation as the spin itself. Rate 0 lets the rotor coast to rest with no braking, which leaves gradients and loose pellets undisturbed, while the higher rates trade some of that gentleness for cycle time. Three damping levels suppress the vibration that appears when a heavy swing rotor passes through its resonance band during spin-up and spin-down. Refrigeration works against aerodynamic heating throughout, holding the chamber below -4°C even at maximum speed with R134a.

TECHNICAL SPECIFICATIONS

Multipurpose High Speed Refrigerated Centrifuge (4 x 750 mL) -  
ToronCent™ HSR MP Technical Specifications

| Parameter                 | Specification                                 |
|---------------------------|-----------------------------------------------|
| Order Number              | 0202123000                                    |
| Maximum Speed             | 20,500 rpm                                    |
| Maximum RCF               | 29,200 x g                                    |
| Maximum Capacity          | 4 x 750 mL                                    |
| Speed Accuracy            | ±10 rpm                                       |
| Time Setting Range        | 1 min to 99 min 59 s, or 1 min to 99 h 59 min |
| Temperature Setting Range | -20°C to 40°C                                 |
| Temperature Accuracy      | ±1°C                                          |
| Refrigeration Unit        | Non-CFC compressor, R134a refrigerant         |

| Parameter                         | Specification                                  |
|-----------------------------------|------------------------------------------------|
| Drive Motor                       | AC brushless, microprocessor controlled        |
| Display                           | Touch panel with LCD, programmable             |
| Acceleration / Deceleration Rates | 9 / 10 (rate 0 = free stop)                    |
| Damping Levels                    | 3                                              |
| Rotor Identification              | Automatic                                      |
| Chamber Material                  | Stainless steel                                |
| Noise Level                       | ≤65 dB(A)                                      |
| Voltage                           | AC 220 V ±22 V, 50 Hz (110V is also available) |
| Power Consumption                 | 1.5 kW                                         |
| Dimensions (W x D x H)            | 560 x 800 x 440 mm (22.0 x 31.5 x 17.3 in)     |
| Packing Dimensions (W x D x H)    | 680 x 1,080 x 580 mm (26.8 x 42.5 x 22.8 in)   |
| Net Weight                        | 95 kg (209 lb)                                 |

## Available Rotors

Maximum speed and maximum RCF apply to each rotor individually, not to the instrument as a whole.

| Rotor | Order Number | Type        | Capacity    | Max Speed  | Max RCF    | Adapters       |
|-------|--------------|-------------|-------------|------------|------------|----------------|
| No. 1 | 0301805020   | Fixed angle | 12 x 1.5 mL | 20,500 rpm | 29,200 x g | 0.2 mL, 0.5 mL |
| No. 2 | 0301806110   | Fixed angle | 12 x 5 mL   | 16,500 rpm | 19,175 x g | 0.5 mL, 1.5 mL |
| No. 3 | 0301805310   | Fixed angle | 12 x 10 mL  | 15,000 rpm | 23,120 x g | 1.5 mL, 5 mL   |

| Rotor  | Order Number | Type        | Capacity            | Max Speed  | Max RCF    | Adapters                                           |
|--------|--------------|-------------|---------------------|------------|------------|----------------------------------------------------|
| No. 3A | 0301891095   | Fixed angle | 6 x 30 mL           | 15,000 rpm | 23,120 x g | 5 mL, 10 mL                                        |
| No. 4  | 0301805930   | Fixed angle | 6 x 50 mL (conical) | 13,000 rpm | 17,940 x g | 15 mL conical; 50 mL round-bottom adapter included |
| No. 4A | 0301805420   | Fixed angle | 6 x 50 mL           | 13,000 rpm | 17,940 x g | 1.5, 5, 10, 15, 20, 25, 30 mL                      |
| No. 5  | 0302891036   | Swing       | 4 x 750 mL          | 4,000 rpm  | 3,500 x g  | See bucket table below (buckets sold separately)   |
| No. 6  | 0302850110   | Swing       | 4 x 500 mL          | 4,000 rpm  | 3,345 x g  | See bucket table below (buckets sold separately)   |
| No. 7  | 0301805520   | Fixed angle | 24 x 1.5/2.2 mL     | 16,500 rpm | 26,050 x g | 0.2 mL, 0.5 mL                                     |
| No. 8  | 0301891097   | Fixed angle | 6 x 85 mL           | 12,000 rpm | 15,805 x g | 5, 10, 25 mL; 15 mL and 50 mL (conical/round)      |
| No. 9  | 0301891099   | Fixed angle | 6 x 100 mL          | 10,000 rpm | 11,960 x g | 5, 10, 25 mL; 15 mL and 50 mL (conical/round)      |
| No. 10 | 0301806220   | Fixed angle | 8 x 15 mL (conical) | 15,000 rpm | 24,036 x g | 5 mL                                               |

## Buckets and Adapters: Rotor No. 5 (4 x 750 mL Swing)

| Bucket               | Order Number |
|----------------------|--------------|
| Round bucket         | 0303891025   |
| Aerosol-tight bucket | 0303891006   |

| Adapter Configuration  | Order Number |
|------------------------|--------------|
| 4 x 1 x 500 mL conical | 0304891035   |
| 4 x 1 x 500 mL flat    | 0304891036   |
| 4 x 1 x 250 mL conical | 0304891562   |
| 4 x 1 x 250 mL flat    | 0304891039   |

| Adapter Configuration                        | Order Number |
|----------------------------------------------|--------------|
| 4 x 4 x 100 mL                               | 0304891006   |
| 4 x 5 x 50 mL (self-standing tube)           | 0304891024   |
| 4 x 7 x 50 mL conical                        | 0304891003   |
| 4 x 7 x 50 mL round                          | 0304891004   |
| 4 x 10 x 20 mL                               | 0304891163   |
| 4 x 15 x 15 mL conical                       | 0304891005   |
| 4 x 19 x 10 mL (self-standing tube)          | 0304891732   |
| 4 x 21 x 10 mL                               | 0304891730   |
| 4 x 27 x 5/7 mL vacuum blood collection tube | 0304891728   |
| 4 x 37 x 5 mL (RIA tube)                     | 0304891166   |
| 4 x 56 x 1.5 mL                              | 0304891025   |

Custom adapter configurations are available on request.

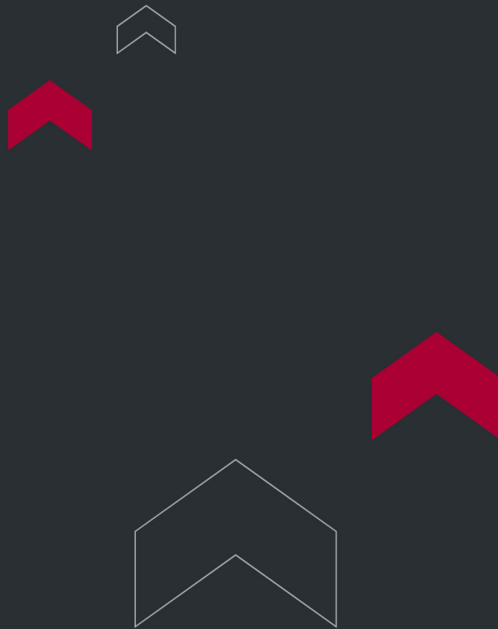
## Buckets and Adapters: Rotor No. 6 (4 x 500 mL Swing)

| Bucket                                | Order Number |
|---------------------------------------|--------------|
| Round bucket                          | 0303891022   |
| Aerosol-tight round bucket            | 0303891077   |
| Rectangular bucket                    | 0303851421   |
| Rectangular bucket with sealing cover | 0303891016   |

| Bucket            | Order Number |
|-------------------|--------------|
| Microplate bucket | 0303891110   |

| Bucket Type | Adapter Configuration                        | Order Number |
|-------------|----------------------------------------------|--------------|
| Round       | 4 x 1 x 250 mL                               | 0304891142   |
| Round       | 4 x 2 x 100 mL                               | 0304891009   |
| Round       | 4 x 4 x 50 mL (conical/round)                | 0304891008   |
| Round       | 4 x 7 x 20 mL                                | 0304851485   |
| Round       | 4 x 9 x 15 mL (conical/round)                | 0304891083   |
| Round       | 4 x 11 x 15 mL conical (cap ≤21.5 mm)        | 0304891508   |
| Round       | 4 x 14 x 10 mL                               | 0304891705   |
| Round       | 4 x 19 x 5/7 mL vacuum blood collection tube | 0304851450   |
| Round       | 4 x 36 x 1.5 mL                              | 0304891677   |
| Rectangular | 4 x 1 x 250 mL                               | 0304891041   |
| Rectangular | 4 x 3 x 100 mL                               | 0304891744   |
| Rectangular | 4 x 6 x 50 mL (conical/round)                | 0304891014   |
| Rectangular | 4 x 12 x 15 mL conical                       | 0304891582   |
| Rectangular | 4 x 12 x 15 mL round                         | 0304891779   |
| Rectangular | 4 x 20 x 10 mL                               | 0304891077   |
| Rectangular | 4 x 31 x 5/7 mL vacuum blood collection tube | 0304891782   |
| Rectangular | 4 x 56 x 1.5 mL                              | 0304891603   |

| Bucket Type | Adapter Configuration      | Order Number      |
|-------------|----------------------------|-------------------|
| Microplate  | 4 x 1 x 96 deep-well plate | Contact torontech |
| Microplate  | 4 x 2 x 96 microplate      | Contact torontech |



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