

REVOLUTION-Q

with **CELLTRIO Robostor[®]**
Automation Technology

IC Biomedical Revolution-Q Automated Cryogenic Storage and Retrieval System

Featuring CELLTRIO RoboStor[®] automation technology, Revolution-Q is designed for easy, hands-free biosample storage and retrieval while maintaining the highest level of security and regulatory compliance.

Revolution-Q is safer for operators

- Eliminates manually lifting heavy racks
- No reaching into freezer

Revolution-Q is safer for samples

- Ensures sample location and data integrity
- Minimizes cross-contamination
- Limits sample exposure to room temperature



REVOLUTION-Q

with CELLTRIO Robostar® Automation Technology

Revolution-Q offers two automation options:

Celltrio Robostar® Rack Removal & Box Delivery

Provides specific box delivery as requested via the UI or server pick lists.

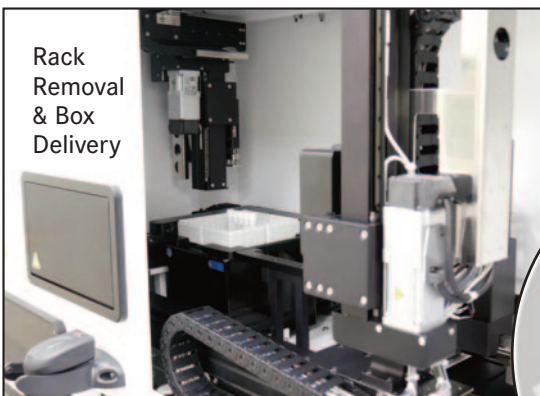
This facilitates the full audit and event trail for the lifetime of individual samples in storage.



RoboVial® CVR Vial Picking Automation

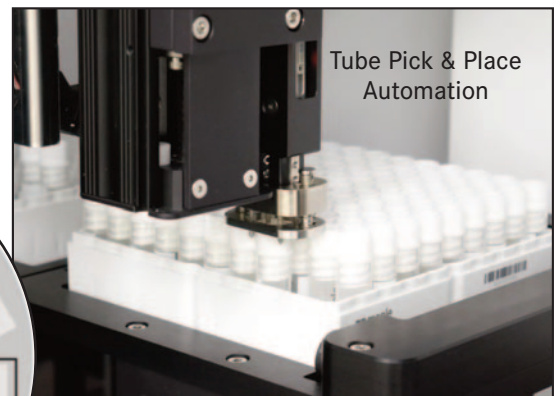
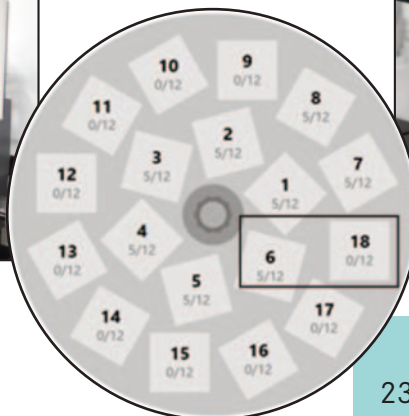
Fully unattended operation, storage and removal of samples and the creation of retrieval tasks which, when complete, are replaced in the freezer awaiting collection by the user.

- Individual cryovial handling (pick and place)
- Automated cryovial 2D barcode scanning
- Store/retrieve cryovials across multiple storage locations
- SBS-96 and 9×9 cryovial compatibility
- Cryovial cap range: 8-13mm
- Sample max height of 54mm, cryovial plus cryovial



Rack Removal & Box Delivery

Highest Storage Density for Robotic Tray Systems



Tube Pick & Place Automation

Example: 10 x 10 vial boxes
234 boxes: 18 racks, 13 shelves



REVOLUTION-Q

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WHY USE FULLY AUTOMATED CRYOGENIC FREEZERS?

Safety

Safer for Operators

Eliminates manually lifting heavy racks.
No need to reach into LN2 freezer.
Robot has built-in safety measures.

Safer for Samples

Automatic storage and retrieval ensures sample location and data integrity.
Minimizes cross-contamination and sample exposure to room temperature.

Safer for Facility

All freezers can be connected and monitored with a centralized management system.
Freezer alarm can be connected to facility alarm.

Security

Access to stored samples and software features can be managed on a per-user basis.

Traceability is enabled by logging all user actions, environmental conditions, data changes and system events.

Inventory management system with barcode reader reduces human error and enables sample validation during storage and retrieval.

Data

All operations are recorded, sample exposure mending incidents are fully documented.

Monitoring and Alerts

Sample locations, temperature and LN2 level are monitored 24/7 and logged.

Automatic LN2 supply is triggered when level declines to a pre-defined value.

Optional connection to facility alarm system.





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FEATURES

Security

- Automatic storage and retrieval ensures sample location, data integrity and minimizes cross-contamination
- Access door sensors prevent robot motions during operator access
- Patent-pending humidity control reduces icing during robotic handling
- Battery back-up allows continuous monitoring of environmental conditions and autofill operations during power outage

Control

- Intuitive 10.1" touchscreen control interface
- Restricted access to samples and interface through secure control features
- Advanced Inventory Management System (IMS) with barcode reader for tracking

Data Management

- Software provides:
 - Continuous monitoring
 - Audit trails
 - Logging of freezer data
 - Device status
 - User actions
 - Cryorack and individual cyrovial barcode scanning
- Audible and visual alarms for safety and environmental conditions
- Easily connects with facility alarm, monitoring systems and remote control

Efficiency

- Optimized robotic storage and retrieval
- Import and export inventory with CSV files for bulk storing or retrieving cyrovials
- Fast, easy search to locate and review items stored in the freezer



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Key Specifications:

LN2 storage: -195 °C

LN2 Capacity: 900 liters total / 167 liters under turntable

Dimensions: 1150mm(W) x 1685mm (D) x 2711mm (H)

3.77 ft (w) x 5.52 ft (D) x 8.89 ft (H)

Cryovial Capacity

- 23,400 cryovials (10 x 10 box)
- 24,192 cryovials (SBS-96 box)
- 18,954 cryovials (8 x 8 box)

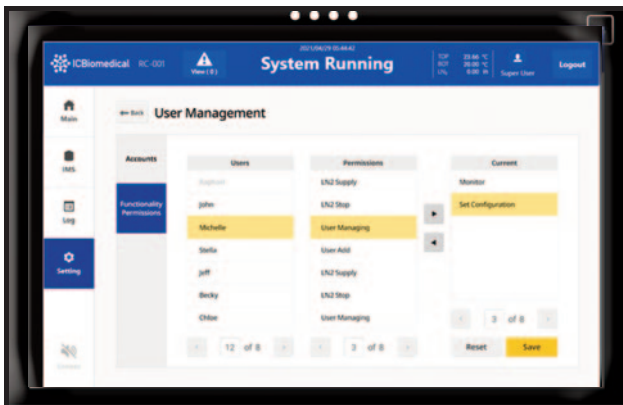
- Skyview C3® Inventory Management Software (IMS)
- Robovial™ (individual cryovial handling)
- RoboCVR™ (cryovial handling + controlled rate freezing)
- Easy interface to LIMS Systems via RESTful API

Revolution-Q Robostor with RoboVial Specifications		
RoboStor™ w/ RoboVial™ Dimensions	1150 mm x 1685 mm x 2711 mm (Figure 3) (4.92 ft x 5.53 ft x 8.89 ft)	
Container Requirements	Format	SBS CryoRack, 9x9
Vial Requirements	Cap Size (Outer Diameter)	8~13 mm
	Cap Type	Round (internal, external)
	Height in Container / CryoRack without Lid	< 54 mm
Supports One Vial Type Per RoboStor and RoboVial Unit		
Unit Weight	166 kg (total weight 950 kg)	
Cycle Times	Individual CryoVial Transfer Time	Average: 4 seconds / cryovial
	Container Store / Retrieve Time	90 ~ 120 seconds
	Container + All CryoVials' Barcode Scan Time	Maximum: 12 seconds

Revolution-Q Robostor CVR (CRF Vial) Specifications		
RoboStor™ w/ CVR Dimensions	1998 mm(W) x 1239 mm(D) x 2711 mm(H) (Figure 6) (6.56 ft x 4.06 ft x 8.89 ft)	
Container Requirements	Format	SBS CryoRack, 9x9
Vial Requirements	Cap Size (Outer Diameter)	8~13 mm
	Cap Type	Round (internal, external)
	Height in Container / CryoRack without Lid	< 54 mm
Supports One Vial Type Per RoboStor and RoboVial Unit		
System Weight	1300 kg	
Cycle Times	Individual CryoVial Transfer Time	Average: 4 seconds / cryovial
	Container Store / Retrieve Time	90 ~ 120 seconds
	Container + All CryoVials' Barcode Scan Time	Maximum: 12 seconds

PROTECT YOUR ASSETS.

REVOLUTION-Q



User Management & Control

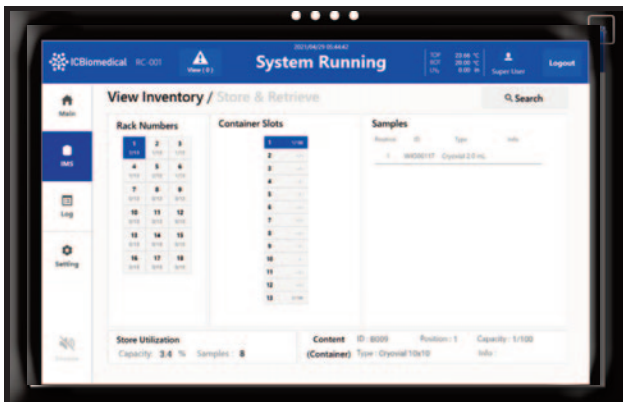
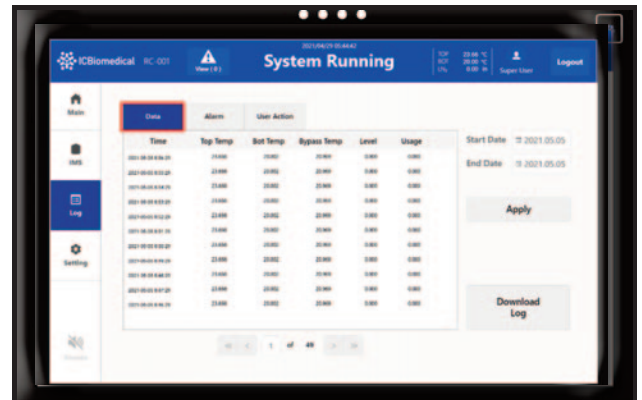
The Revolution-Q freezer unit's Skyview C3® controller offers secure, intuitive user management and feature level permission control.

- User List shows all users and their permission level
- Users can be easily added, removed or edited
- System administrators can set which features are accessible for each user
- All user actions are traced in the User Action Log.

Three-Tier Audit Trail

- **Data Log** - continuously tracks the system's environmental status (temp, level and LN2 usage)
- **Alarm Log** - tracks critical events (change in configuration, errors and warning)
- **User Action Log** - tracks all user-related activities (screen touches, etc.)

NOTE: All logs can be filtered and downloaded/exported



Inventory Management

Advanced Inventory Management System (IMS)

- Inventory screen allows users to easily search and browse data for items stored in the freezer
- Inventory data can be accessed remotely and/or synchronized with external systems

Store / Retrieve

Direct sample storage or retrieval to specific freezer locations. Eliminates misplaced samples and data resulting from human error.

- Task-based workflows guide operator interaction and provides additional layers of error proofing
- Multiple cryovial or cryobox tasks can be imported via CSV files for efficiency.



PROTECT YOUR ASSETS.

REVOLUTION-Q

Auto
Rack &
Box
Handling



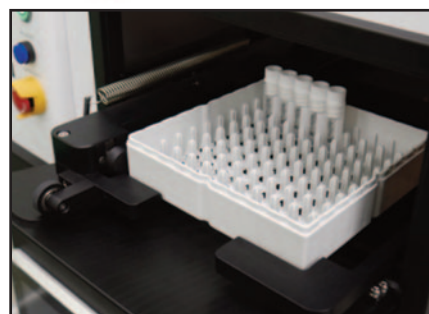
Vial
Handling



Temperature Management

Revolution-Q is an automated LN2 cryogenic -195°C storage solution designed for R&D, biobanking and cell culture applications.

- Automatic LN2 level monitoring with autofill options
- Patented humidity control to reduce icing during robotic handling
- Battery back-up allows continuous monitoring of environmental conditions and autofill operations during a power outage
- Audible and visual alarms



STORAGE CAPACITY

Labware	Racks	Slots Per Rack	Sample Vials
SBS Cryo Rack (Matrix, 1.2 mL INT)	21	12	Variable
9 x 9 1.2 mL or 2.0 mL internal threaded	18	13	18,954



Continuous monitoring,
audit trails and logging of
freezer data, device status
and user actions

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