RDV3100

VORTEX MIXER

USER MANUAL

Document No.: RDV3100-UM-001 | Revision: 1.0

For Research Use Only

Please read this manual thoroughly before operating the instrument.

Table of Contents

1. Introduction

1.1 Product Overview

The RDV3100 Vortex Mixer is a compact, high-performance laboratory instrument engineered for fast and efficient mixing of liquid samples. Designed for use with standard microtubes and test tubes, the RDV3100 delivers consistent vortexing action suitable for a broad range of applications in molecular biology, clinical chemistry, and biochemistry.

The instrument features two operating modes — touch-activated (momentary) and continuous — enabling laboratory personnel to select the mode most appropriate for each application. Its robust construction and reliable motor ensure reproducible mixing performance across routine daily workflows.

1.2 Intended Use

The RDV3100 is intended for use in professional laboratory settings. Typical applications include:

- Resuspension of pelleted cells and precipitated proteins
- Cell lysis by vortexing with bead or chemical lysis buffers
- Reagent preparation and reconstitution of lyophilized reagents
- Mixing of PCR master mixes and reaction components
- Homogenization of microtube samples in clinical chemistry workflows
- General-purpose sample agitation in biochemistry research

> **NOTE:** The RDV3100 is designed for Research Use Only (RUO). It is not intended for clinical diagnostic use unless validated and labeled accordingly by the end-user institution.

1.3 Document Scope and Intended Audience

This manual is intended for laboratory technicians, scientists, and facility managers responsible for the operation, maintenance, and troubleshooting of the RDV3100 Vortex Mixer. Readers are assumed to have a general familiarity with standard laboratory procedures and safety practices.

1.4 Document Conventions

Symbol / Label	Meaning
WARNING	Indicates a hazardous situation that may result in personal injury or equipment damage if not avoided.
CAUTION	Indicates practices that could damage the instrument or compromise sample integrity.
NOTE	Provides supplementary information or tips to optimize instrument performance.
IMPORTANT	Highlights critical operational information that must be followed.

2. Safety Information

WARNING: Read all safety instructions before operating the RDV3100. Failure to observe these warnings may result in instrument damage, sample loss, or personal injury.

2.1 General Safety Precautions

- Use the RDV3100 only for its intended laboratory mixing purpose.
- Ensure the instrument is placed on a stable, level, non-slip benchtop surface before use.
- Do not operate the instrument with wet hands or in environments where moisture may contact electrical components.
- Do not place the instrument near heat sources, open flames, or in direct sunlight.
- Keep the instrument away from flammable or volatile solvents during operation.
- Do not operate the instrument without the tube holder attachment properly seated.
- Never leave the instrument unattended while operating in continuous mode for extended periods.

2.2 Electrical Safety

- Verify that the supply voltage matches the instrument's rated voltage before connecting to power. Consult the specifications label on the base of the unit.
- Use only the supplied power cord or an approved equivalent rated for your regional power standard.
- Do not modify, cut, or repair the power cord. Replace damaged cords immediately.
- Ensure the power outlet is properly grounded.
- Disconnect the power cord from the wall outlet before performing any cleaning, maintenance, or tube holder replacement.
- Do not operate if the instrument shows signs of electrical damage, unusual smells, or abnormal sounds.

2.3 Chemical and Biological Safety

- Always follow your institution's standard safety protocols when handling biological specimens, hazardous reagents, or infectious materials.
- Use appropriate personal protective equipment (PPE), including gloves, eye protection, and a laboratory coat when operating the mixer with potentially hazardous samples.
- Ensure all tubes are securely capped before vortexing to prevent aerosol generation and sample spillage.
- When working with potentially infectious samples, operate the instrument within an appropriate biosafety cabinet if required by institutional or regulatory guidelines.
- Decontaminate the instrument and tube holder after contact with biological or chemical hazards using a disinfectant appropriate for the hazard class.

2.4 Mechanical Safety

- Do not exceed the maximum tube size or weight capacity specified in Section 4 (Specifications).
- Do not attempt to stop the tube holder with your hands during operation.
- Inspect the tube holder for cracks or deformation before each use. Replace damaged tube holders immediately.
- Do not disassemble the instrument motor housing or internal components. No user-serviceable parts are located inside the motor housing.

CAUTION: Use of the RDV3100 with containers not listed in the compatible accessories section may result in sample loss, tube breakage, or instrument damage. Only use accessories validated for the RDV3100.

3. Package Contents and Accessories

3.1 Standard Package Contents

Upon receipt, inspect the package for any shipping damage before unpacking. The RDV3100 Vortex Mixer is shipped with the following standard items:

Item	Quantity	Part Number
RDV3100 Vortex Mixer (base unit)	1	RDV3100
Standard Cup / Foam Tube Holder Attachment	1	Included
Power Cord (region-specific)	1	Included
User Manual	1	RDV3100-UM-001
Quick Reference Card	1	Included

NOTE: If any item is missing or damaged upon receipt, do not attempt to use the instrument. Contact your authorized distributor or technical support immediately and retain all packaging materials.

3.2 Compatible Accessories

The following accessories are compatible with the RDV3100 and are available for separate purchase. Accessory compatibility ensures optimal vortexing performance and sample integrity. Contact your distributor for ordering information.

Accessory Type	Description	Example Part Numbers
Microcentrifuge Tubes	0.5 mL – 2.0 mL PCR and microcentrifuge tubes	BLAUNUFT0100ULU, BLAUNUFT0200ULU, BLAUNUFT0300ULU
PCR Strips & Plates	8-strip PCR tubes and compatible low-profile plates	BLAPM7058, BLAPM7059 series
Snap-Cap Tubes	General-purpose snap-cap polypropylene tubes	BLAPS7078, BLAPS7079 series
Conical Tubes	15 mL and 50 mL conical centrifuge tubes (with adapter)	BLAPRV-5000U, BLAPRV-10000U
Pipette Tips	Universal fit filter and non-filter tips	BLAPT7100, BLAPT7101 series
Gradulated Tubes	Various volume gradulated tubes	BLAUNGD series

For the complete current accessories catalog and compatibility chart, contact your regional distributor or visit the manufacturer's website.

4. Technical Specifications

The following table summarizes the key technical specifications of the RDV3100 Vortex Mixer. Specifications are subject to change without notice. Contact your distributor for the most current product data sheet.

Parameter	Specification
Model Number	RDV3100
Product Category	Vortex Mixer — Benchtop
Operating Modes	Touch-activated (momentary) and Continuous
Compatible Tube Formats	Standard microtubes (0.5 mL, 1.0 mL, 1.5 mL, 2.0 mL), test tubes; see accessory list for extended compatibility
Drive Type	Orbital / vortex motion
Attachment Interface	Universal cup/foam holder (included); accessory attachment compatible
Power Supply	AC adapter (region-specific cord included)
Certification	CE
Country of Manufacture	China
Warranty	1 Year Limited
Product Status	Active
Intended Use	Research Use Only (RUO)
Regulatory Compliance	CE Mark
UPC / Barcode	00850084643385

NOTE: For detailed electrical specifications (voltage, frequency, current draw, motor speed in RPM), refer to the specification label affixed to the base of the instrument. Electrical specifications vary by regional configuration.

5. Installation and Setup

5.1 Environmental Requirements

Before installing the RDV3100, confirm that the intended operating environment meets the following conditions:

Parameter	Requirement
Installation Location	Indoor laboratory use only
Benchtop Surface	Stable, level, non-vibrating, non-slip surface
Ambient Temperature	15°C to 35°C (59°F to 95°F)
Relative Humidity	20% to 80% non-condensing
Clearance	Minimum 15 cm (6 in.) clearance on all sides for ventilation
Proximity	Away from heat sources, direct sunlight, and water sources

5.2 Unpacking Procedure

1. Remove the RDV3100 and all accessories from the shipping carton.
2. Inspect the instrument and accessories for any visible signs of damage sustained during shipping.
3. Verify all items listed in Section 3.1 (Package Contents) are present.
4. If damage or missing items are identified, photograph the packaging and instrument, then contact your distributor immediately. Do not proceed with installation.
5. Retain the original packaging materials for potential return shipment.

5.3 Attaching the Tube Holder

The RDV3100 ships with a standard cup/foam tube holder attachment. This is the primary contact point between the instrument's drive platform and sample tubes.

6. Ensure the instrument is unplugged from the power source before attaching any accessories.
7. Locate the drive platform on the top center of the instrument base.
8. Align the tube holder attachment with the drive platform and press firmly downward until it is fully seated and secure.
9. Gently attempt to lift the tube holder to confirm it is properly locked in place.

CAUTION: Do not operate the RDV3100 without a tube holder properly attached. Operating without an attachment may damage the drive mechanism and will void the warranty.

5.4 Connecting to Power

10. Verify the supply voltage at the outlet matches the instrument's rated voltage (see the label on the instrument base).
11. Connect the included power cord to the instrument's power input port on the rear of the base.
12. Plug the other end of the power cord into the grounded wall outlet.
13. The instrument is now in standby state and ready for operation. No power indicator light is activated until the instrument is engaged.

6. Operating Instructions

6.1 Overview of Operating Modes

The RDV3100 features two operating modes designed to accommodate a variety of laboratory mixing tasks:

Mode	Description	Recommended Use
Touch-Activated (Momentary)	Mixing occurs only while pressure is applied to the tube holder. Releasing pressure stops mixing immediately.	Short-duration mixing, quick resuspension, pulse mixing for sensitive samples
Continuous Mode	Mixing proceeds continuously without requiring sustained pressure. Activated by a toggle switch or mode selector.	Extended mixing protocols, reagent reconstitution, routine tube mixing batches

6.2 Touch-Activated (Momentary) Operation

14. Confirm the instrument is in the default standby/touch-activated mode (not in continuous mode).
15. Ensure your sample tube is securely capped.
16. Hold the tube by its upper portion and press the bottom of the tube firmly into the cup of the tube holder attachment.
17. Apply steady downward pressure to initiate vortexing. The motor will begin rotating the cup immediately upon contact.
18. Maintain pressure for the desired mixing duration, then release the tube to stop mixing.
19. Remove the tube and inspect sample homogeneity.

NOTE: For optimal mixing efficiency, hold the tube at approximately a 30–45 degree angle to the horizontal while pressing into the cup. This technique maximizes the circular motion imparted to the sample.

6.3 Continuous Mode Operation

20. Locate the operating mode selector on the instrument.
21. Activate continuous mode by pressing or toggling the designated continuous mode control (refer to the quick reference card for the specific control location on your unit).
22. Confirm the instrument has begun continuous operation.
23. Place a capped sample tube into the tube holder cup. The tube will be mixed continuously.
24. Remove the tube when the desired mixing duration is achieved.

25. To stop continuous operation, toggle the mode selector back to the off or touch-activated position.

CAUTION: Do not leave the instrument running unattended in continuous mode for prolonged periods without verifying that sample tubes remain securely positioned. Monitor the instrument during extended mixing runs.

6.4 Application-Specific Guidance

6.4.1 Cell Resuspension

For resuspension of cell pellets, use touch-activated mode with short (2–5 second) pulse bursts to gently dislodge the pellet before transitioning to continuous mode if thorough homogenization is required. Avoid excessive vortexing of fragile cell types.

6.4.2 Cell Lysis

Vortex-based cell lysis is typically performed in the presence of lysis buffer and/or glass/ceramic beads. Ensure tubes are sealed with secure caps or parafilm before vortexing bead-containing samples. Use continuous mode for standard lysis protocols as specified by the reagent manufacturer.

6.4.3 Reagent Preparation

For reconstitution of lyophilized reagents or preparation of master mixes, use continuous mode for the duration specified in the reagent protocol. Avoid extended high-intensity vortexing of enzyme-containing solutions, as this may lead to protein denaturation.

6.4.4 PCR and Molecular Biology Applications

When preparing PCR reaction mixes or other nucleic acid reagents, use brief pulse vortexing followed by a brief centrifuge spin to collect sample at the bottom of the tube. This ensures complete mixing without introducing air bubbles into the reaction.

7. Cleaning and Maintenance

WARNING: Always disconnect the RDV3100 from the power supply before performing any cleaning or maintenance procedure.

7.1 Routine Cleaning

Regular cleaning of the RDV3100 and its accessories maintains instrument performance and prevents cross-contamination between samples.

Recommended Cleaning Frequency

- After each use with biological or chemical samples
- At the end of each working day
- Immediately after any sample spill or contamination event

Cleaning Procedure

26. Power off the instrument and disconnect the power cord from the wall outlet.
27. Remove the tube holder attachment from the drive platform.
28. Wipe the exterior surfaces of the instrument base with a soft cloth dampened with 70% ethanol or a mild laboratory-grade disinfectant.
29. Clean the tube holder attachment separately with the same disinfectant solution. Ensure all surfaces that contact sample tubes are thoroughly wiped.
30. For biological decontamination, wipe contact surfaces with a 10% bleach solution, allow 10 minutes contact time, then wipe with 70% ethanol to remove bleach residue.
31. Allow all surfaces to dry completely before reconnecting the power cord or resuming operation.

CAUTION: Do not submerge the instrument or tube holder in liquid. Do not use abrasive cleaning agents, acetone, or chlorinated solvents, as these may damage the instrument housing and tube holder materials.

7.2 Tube Holder Inspection and Replacement

Inspect the tube holder attachment regularly for signs of wear, cracking, or deformation. A damaged tube holder may cause inadequate tube retention, sample spillage, or inconsistent vortexing performance.

32. Before each use, visually inspect the cup/foam insert of the tube holder for cracks, tears, or hardening of the foam material.
33. If deformation or damage is detected, remove the tube holder and replace it with a new unit before proceeding.

34. Contact your distributor to obtain a replacement tube holder compatible with the RDV3100.

7.3 Long-Term Storage

If the instrument is to be stored for an extended period (more than 30 days), follow these guidelines:

- Clean and decontaminate the instrument as described in Section 7.1 prior to storage.
- Remove the tube holder attachment and store it separately in a clean, dry location.
- Disconnect the power cord and coil it loosely to avoid kinking.
- Store the instrument in its original packaging or in a clean, dry location away from direct sunlight and extreme temperatures.
- Do not stack heavy items on top of the instrument during storage.

8. Troubleshooting

The following table describes common issues that may be encountered during operation of the RDV3100 and recommended corrective actions. If an issue persists after following the recommended steps, contact technical support.

Symptom	Possible Cause	Recommended Action
Instrument does not power on / motor does not start	Power cord not connected; outlet not energized; internal fuse blown	Check power cord connections at both instrument and wall; test outlet with another device; if fuse blown, contact service
Motor runs but tube holder does not move / minimal vortex motion	Tube holder not properly seated on drive platform; drive platform obstruction	Remove and re-seat the tube holder firmly; inspect drive platform for debris; verify tube holder is the correct type for the instrument
Insufficient vortexing / poor sample mixing	Incorrect tube holding technique; tube cap not seated allowing energy loss; tube holder worn	Apply downward pressure at 30-45 degree angle; ensure tube cap is securely closed; inspect and replace worn tube holder
Excessive noise or vibration during operation	Instrument not on level surface; loose tube holder; worn motor bearing	Verify benchtop is level; re-seat tube holder; if noise persists, contact technical support — do not attempt to service motor internally
Instrument operates in continuous mode only / touch mode unresponsive	Mode selector switch in incorrect position; switch malfunction	Toggle mode selector to touch-activated position; if unresponsive, do not operate and contact technical support
Tube ejected during vortexing	Improper tube placement; tube cap loose; tube diameter too small for cup	Re-seat tube in cup center; ensure cap is fully closed; use appropriate tube size; consider using accessory insert for small-diameter tubes
Instrument emits burning odor or smoke	Motor overheating; electrical fault	IMMEDIATELY disconnect power. Do not resume use. Contact technical support and qualified service personnel before further operation.

WARNING: If the instrument emits smoke, a burning odor, or shows signs of electrical arcing, disconnect from power immediately. Do not attempt to operate, disassemble, or repair the instrument. Contact technical support.

9. Warranty Information

9.1 Warranty Coverage

The RDV3100 Vortex Mixer is warranted against defects in materials and workmanship under normal use and service conditions for a period of one (1) year from the date of original purchase from an authorized distributor.

During the warranty period, the manufacturer will, at its discretion, repair or replace any defective component(s) at no charge for parts or labor, provided the instrument is returned to the manufacturer or an authorized service center with proof of purchase.

9.2 Warranty Exclusions

This warranty does not cover:

- Damage resulting from misuse, abuse, accident, unauthorized modification, or operation outside the specified environmental conditions.
- Damage caused by the use of non-approved accessories or consumables.
- Normal wear and tear, including tube holder foam insert degradation.
- Damage caused by failure to follow the maintenance instructions in this manual.
- Cosmetic damage that does not affect instrument performance.
- Instruments with removed or altered serial number labels.

9.3 Warranty Claim Procedure

35. Contact your authorized distributor or the manufacturer's technical support to initiate a warranty claim.
36. Provide the instrument model number (RDV3100), serial number, date of purchase, and a description of the defect.
37. Obtain a Return Merchandise Authorization (RMA) number before returning the instrument.
38. Pack the instrument securely using the original packaging or equivalent protective materials. Mark the RMA number clearly on the outside of the package.
39. Ship the instrument to the designated service address provided with the RMA documentation.

> **NOTE:** Instruments returned without an RMA number may be refused or subject to delay. The manufacturer reserves the right to assess non-warranty repair fees for instruments determined to have been damaged outside the terms of this warranty.

9.4 Limitation of Liability

TO THE EXTENT PERMITTED BY APPLICABLE LAW, THE MANUFACTURER'S LIABILITY UNDER THIS WARRANTY SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF THE

DEFECTIVE INSTRUMENT. THE MANUFACTURER SHALL NOT BE LIABLE FOR INDIRECT, INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES ARISING FROM THE USE OR INABILITY TO USE THIS PRODUCT.

10. Regulatory Compliance and Disposal

10.1 CE Conformity

The RDV3100 Vortex Mixer bears the CE marking, indicating conformity with applicable European Union directives and standards for laboratory equipment. The Declaration of Conformity is available from your regional distributor upon request.

10.2 Waste Electrical and Electronic Equipment (WEEE)

In accordance with the European WEEE Directive (2012/19/EU) and equivalent national regulations, this instrument must not be disposed of as unsorted municipal waste at the end of its operational life. Contact your regional distributor, local waste management authority, or an approved electronics recycling facility for proper disposal or recycling of this instrument and its accessories.

10.3 Decontamination Prior to Return or Disposal

Before returning the instrument for service, disposal, or recycling, the instrument must be fully decontaminated by the user. Complete a decontamination certificate confirming that the instrument has been cleaned and decontaminated in accordance with institutional and regulatory requirements. Failure to decontaminate prior to return may result in the shipment being refused.

11. Technical Support and Contact Information

For technical support, warranty service, accessory ordering, or general product inquiries, contact your authorized regional distributor. When contacting support, have the following information available:

- Product model number: RDV3100
- Serial number (located on the label on the base of the instrument)
- Date and location of purchase
- Description of the issue, including any error conditions or abnormal behavior observed
- Details of the application and samples being processed

Contact Type	Details
Technical Support	Contact your authorized regional distributor
Warranty Claims	Initiate through your distributor with proof of purchase and RMA request
Accessories & Consumables	Order through your authorized distributor using part numbers listed in Section 3.2
Documentation	Request updated documentation, Declaration of Conformity, or compliance certificates from your distributor

Appendix A: Compatible Accessories — Part Number Reference

The following part numbers represent the full validated accessory list for use with the RDV3100 Vortex Mixer. Contact your distributor for pricing and availability.

Microcentrifuge & PCR Tubes

Part Number	Description
BLAUNUFT0100ULU	Microcentrifuge tube, compatible with RDV3100 cup holder
BLAUNUFT0200ULU	Microcentrifuge tube, compatible with RDV3100 cup holder
BLAUNUFT0300ULU	Microcentrifuge tube, compatible with RDV3100 cup holder
BLAUNUFT010ULU	Microcentrifuge tube, compatible with RDV3100 cup holder
BLAUNUFT01250ULU	Microcentrifuge tube, compatible with RDV3100 cup holder
BLAUNUFT01000ULU	Microcentrifuge tube, compatible with RDV3100 cup holder
BLAUNUFT0100UL-LRU	Microcentrifuge tube, compatible with RDV3100 cup holder
BLAUNUFT0200UL-LRU	Microcentrifuge tube, compatible with RDV3100 cup holder
BLAUNUFT0300UL-LRU	Microcentrifuge tube, compatible with RDV3100 cup holder
BLAUNUFT010UL-LRU	Microcentrifuge tube, compatible with RDV3100 cup holder
BLAUNUFT01250UL-LRU	Microcentrifuge tube, compatible with RDV3100 cup holder
BLAUNUFT01000UL-LRU	Microcentrifuge tube, compatible with RDV3100 cup holder

PCR Strips

Part Number	Description
BLAPM7058-AU	PCR strip / reaction tube, compatible with RDV3100
BLAPM7058-FU	PCR strip / reaction tube, compatible with RDV3100
BLAPM7058-HU	PCR strip / reaction tube, compatible with RDV3100
BLAPM7058-IU	PCR strip / reaction tube, compatible with RDV3100
BLAPM7058-JU	PCR strip / reaction tube, compatible with RDV3100
BLAPM7059-AU	PCR strip / reaction tube, compatible with RDV3100
BLAPM7059-BU	PCR strip / reaction tube, compatible with RDV3100
BLAPM7059-DU	PCR strip / reaction tube, compatible with RDV3100
BLAPM7059-FU	PCR strip / reaction tube, compatible with RDV3100

Part Number	Description
BLAPM7059-HU	PCR strip / reaction tube, compatible with RDV3100
BLAPM7059-IU	PCR strip / reaction tube, compatible with RDV3100
BLAPM7059-JU	PCR strip / reaction tube, compatible with RDV3100

Snap-Cap & Sample Tubes

Part Number	Description
BLAPS7078-AU	Snap-cap / sample tube, compatible with RDV3100
BLAPS7078-DU	Snap-cap / sample tube, compatible with RDV3100
BLAPS7078-FU	Snap-cap / sample tube, compatible with RDV3100
BLAPS7078-HU	Snap-cap / sample tube, compatible with RDV3100
BLAPS7078-IU	Snap-cap / sample tube, compatible with RDV3100
BLAPS7078-JU	Snap-cap / sample tube, compatible with RDV3100
BLAPS7079-AU	Snap-cap / sample tube, compatible with RDV3100
BLAPS7079-BU	Snap-cap / sample tube, compatible with RDV3100
BLAPS7079-HU	Snap-cap / sample tube, compatible with RDV3100
BLAPS7079-IU	Snap-cap / sample tube, compatible with RDV3100
BLAPS7079-JU	Snap-cap / sample tube, compatible with RDV3100
BLAPRV-5000U	Snap-cap / sample tube, compatible with RDV3100
BLAPRV-10000U	Snap-cap / sample tube, compatible with RDV3100

Pipette Tips & Gradulated Tubes

Part Number	Description
BLAPMP005U	Pipette tip or gradulated tube, compatible with RDV3100
BLAUNGD0201-1U	Pipette tip or gradulated tube, compatible with RDV3100
BLAUNGD0501-1U	Pipette tip or gradulated tube, compatible with RDV3100
BLAUNGD010-1U	Pipette tip or gradulated tube, compatible with RDV3100
BLAUNGD1001-1U	Pipette tip or gradulated tube, compatible with RDV3100
BLAPT7100-BU	Pipette tip or gradulated tube, compatible with RDV3100
BLAPT7100-DU	Pipette tip or gradulated tube, compatible with RDV3100
BLAPT7101-BU	Pipette tip or gradulated tube, compatible with RDV3100
BLAPT7101-CU	Pipette tip or gradulated tube, compatible with RDV3100

Part Number	Description
BLAPT7101-DU	Pipette tip or gradulated tube, compatible with RDV3100

