Operating Instructions

RAININ
Pipetting 360°

NanoRep™

Exquisitely Precise. No Touch Off™ Dispense.

METTLER TOLEDO

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1. Safety and Regulatory Information

The following safety information is critically important for the safe handling and use of NanoRep. Please read it carefully.

1.1 Important Safety Information

Read all safety warnings before using, charging or servicing NanoRep.

Always use NanoRep in accordance with these Operating Instructions and keep these instructions for future reference.

Safety notes are marked with signal words and warning symbols. Ignoring the safety notes may lead to personal injury, damage to NanoRep including malfunction, as well as unreliable results.

1.2 Intended Use

The Rainin NanoRep electronic repeater pipette should be used in laboratories or production environments only. It should only be used by trained specialists who have read these Operating Instructions.

NanoRep works with NanoRep syringe tips only, which are intended to dispense liquids across a volume range of 100 nanoliters – 50 milliliters.

Do not use NanoRep for in vivo applications (applications in or on a human body).

1.3 Compatible and Incompatible Liquids

As a positive-displacement pipette, NanoRep capably handles most liquid types.

Some liquids, particularly above certain concentrations and temperatures, will not work with NanoRep. Please refer to the table below.

Chemical	Concentration	Syringe tip size		
		0.1 mL	10 mL	50 mL
Acetic Acid, Glacial		●	●	●
Acetone		●	●	●
Acetonitrile		●	●	●
Benzene		●	●	●
Butanol		●	●	●
Chloroform		●	●	●
Chromic Acid		●	●	●
Dimethyl Formamide		●	●	●
DMSO		●	●	●
Ethanol		●	●	●
Ethyl Acetate		●	●	●
Ethylene Diamine		●	●	●
Hydrochloric acid	< 37%	●	●	●
Hydrochloric acid	> 37%	●	●	●
Methanol		●	●	●
Nitric Acid	< 50%	●	●	●
Nitric Acid	> 50%	●	●	●
Potassium Hydroxide	10 M	●	●	●
Sodium Hydroxide	10 M	●	●	●
Sulfuric Acid	> 75%	●	●	●
Sulfuric Acid	< 75%	●	●	●

- ● Tip performance will not change after long periods of exposure.
- ● Tip performance may be affected if exposed for long periods of time.
- ● Tip performance will be compromised after exposure.

1.4 Regulatory Information

EC Declaration of Conformity according to ISO 17050
Visit mt.com/Rainin-NanoRep

FCC Note
This device complies with Part 15 of FCC Rules. Operation is subject to the following two conditions: 1. This device may not cause harmful interference. 2. This device must accept any interference received, including interference that could cause undesired operation. Do not expose battery to fire or put in backwards – it could explode and cause personal injury.

RoHS Regulation 2011/65/EU
Rainin and METTLER TOLEDO fulfill requirements under RoHS Regulation 2011/65/EU. Accessories comply with the above mentioned RoHS regulation.

China Class A warning
为A级产品。在生活环境中，该产品可能会造成无线电干扰。
在这种情况下，可能需要用户对干扰采取切实可行的措施。

Bluetooth® wireless technology is not currently enabled on NanoRep.

NanoRep Regulatory Certifications:
e-labeling Metter-Toledo Rainin, LLC, 7500 Edgewater Dr., Oakland, CA 94621, USA

United States	Contains FCC ID: XPYANNAB1
Canada	Contains IC: 8595A-ANNAB1
Europe	
Australia & New Zealand	
United Kingdom	
Japan	Contains: 204-810005
Singapore	Complies with IMDA Standards DB106440
South Korea	KC ID: R-R-M7R-NR-ERP Contains: R-C-ULX-ANNA-B112
Taiwan	Contains Transmitter Module 內含發射器模組: CCAI18LP2200T2
California	
Brazil	Contains: 03850-19-05903 "Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados." www.gov.br/anatel/pt-br
China	CMIIT 2023DJ12430 Contains: CMIIT 2021DJ6698
BT SIG	UBX-15019243 - R06 Declaration ID D032220

FCC Note
This device complies with Part 15 of FCC Rules. Operation is subject to the following two conditions: 1. This device may not cause harmful interference. 2. This device must accept any interference received, including interference that could cause undesired operation. Do not expose battery to fire or put in backwards – it could explode and cause personal injury.

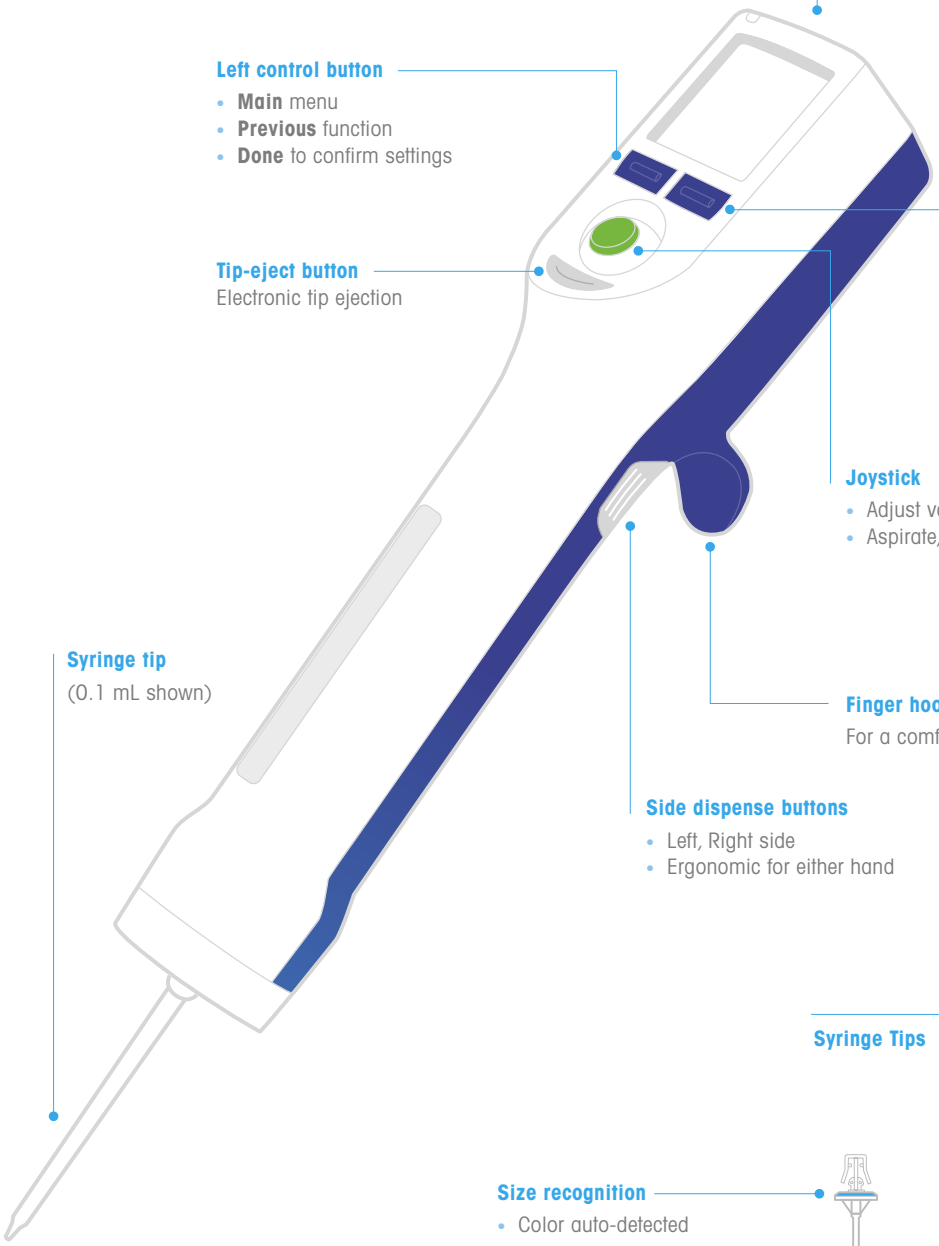
2. Introducing NanoRep

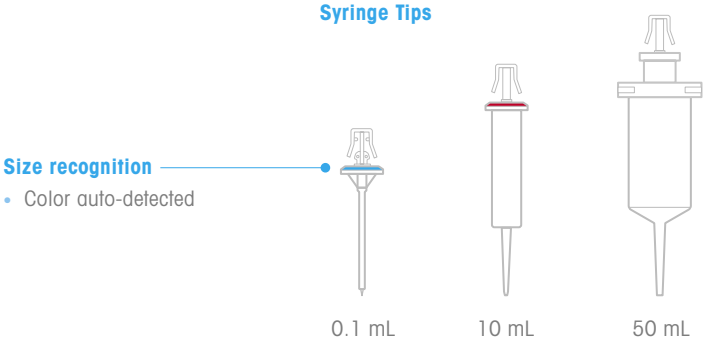
Welcome to NanoRep! With No Touch Off™ dispense (non-contact dispensing), up to 1,000 aliquots per tip and aliquots down to 100 nL, you are holding a highly accurate instrument in your hand.

Please read this manual in its entirety before using the pipette. It contains critical usage and technique information that will help you obtain accurate, reproducible results and ensure long-lasting operation.

2.1 Overview

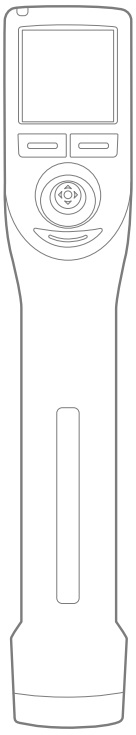
NanoRep is an electronic repeater pipette. Like all positive-displacement pipettes, it works with syringe tips. NanoRep syringe tips come in 3 sizes: 0.1 mL, 10 mL and 50 mL.



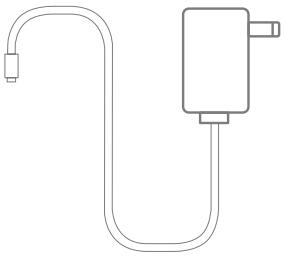


2.2 Box Contents

The NanoRep box contains the device, one 10 mL syringe tip, a charging cable, a hang-up, the NanoRep Quick Reference Guide and a certificate of conformance.

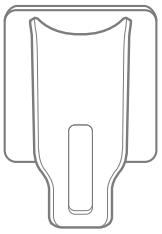


NanoRep



Charging cable

10 mL Syringe Tip



Hang-up

Quick Reference Guide

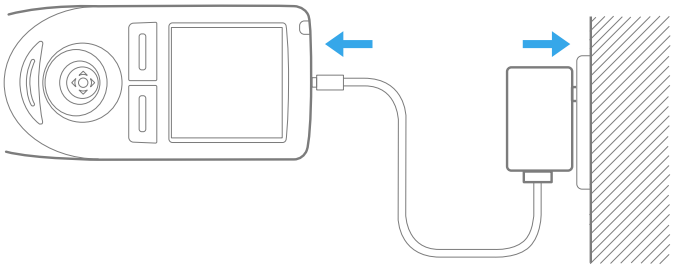
Certificate of Conformance

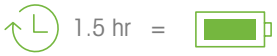
2.3 Charging

NanoRep contains a lithium-ion battery. It must be charged before use. A full charge requires 1.5 – 2 hours. The time a full charge lasts depends on liquid volumes and viscosities pipetted. The battery is designed to deliver ~2,000 cycles on a single charge handling water with a 10 mL syringe tip. NanoRep can be used while charging.

The charging cable is included in the shipping box. Recharge only with the limited power source (LPS-type) Wall Power Supply packaged with NanoRep. Severe damage to internal electronics will result from improper charging, and use of a non-LPS power supply can be hazardous.

The NanoRep battery is a non-user-serviceable part and should be replaced every two years. For more information, please contact a qualified Rainin Service professional or your Rainin sales representative.



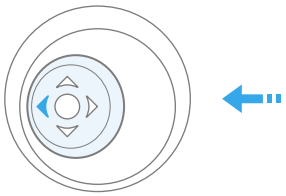


2.4 Joystick

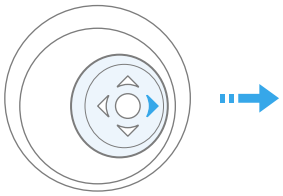
Use the joystick to navigate and operate NanoRep.

Throughout this manual you will see instructions for moving the joystick in different directions. "Joystick" is often used as a verb: "joystick left," "joystick right," "joystick up" and "joystick down." You will also see "press the joystick in."

The illustrations for these five ways of moving the NanoRep joystick are shown below.

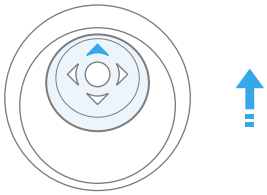
1 

Joystick left

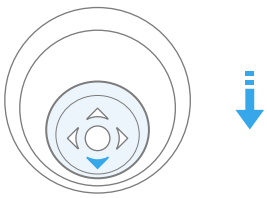
2 

Joystick right

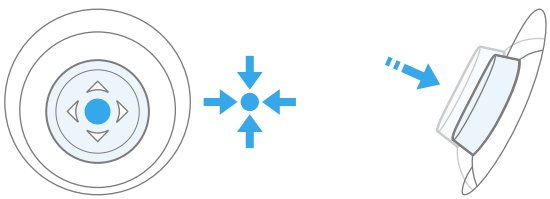
In addition to regular navigation, moving the joystick right is one way to activate and/or save a setting. The other way is to press the joystick in.

3 

Joystick up

4 

Joystick Down

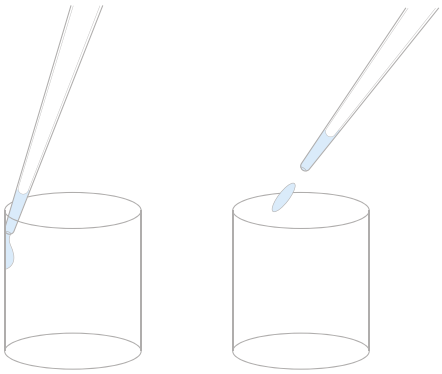
5 

Press joystick in

Pressing the joystick in confirms a selection or setting.

3. Touch Off and No Touch Off dispense

NanoRep performs either Touch Off (contact) dispensing or No Touch Off (non-contact) dispensing.



Touch Off
(contact dispensing)

No Touch Off
(non-contact dispensing)

Touch Off and No Touch Off in NanoRep Modes

Basic mode I Advanced mode when Dispense Type is set to **Automatic**			
Syringe Tip Size	Viscosity Setting		
	Low	Medium	High
0.1 mL	No Touch Off	No Touch Off	Touch Off
10 mL	No Touch Off	No Touch Off	Touch Off
50 mL	No Touch Off	Touch Off	Touch Off
Advanced mode with Dispense Type set to **Set Manually**			
User selects: Touch Off and No Touch Off freely available regardless of viscosity or tip size			
Manual mode			
Touch Off only			

Touch Off

Touch Off is the most common way to pipette.

After dispensing an aliquot, gently touch the end of the syringe tip to the vessel wall to complete the dispense. Liquid adhesion and gravity pull any residual volume from the tip into the vessel to complete the dispense.

Aliquots ≤1% tip volume

For volumes smaller than or equal to 1% of the total volume of the syringe tip, No Touch Off is the recommended dispense type. If Touch Off is selected for a volume below 1% total tip volume, NanoRep displays a "Not recommended" message.

No Touch Off

No Touch Off – non-contact dispensing – can speed up pipetting. Putting a short distance between NanoRep and the dispensing vessel, No Touch Off also eliminates contact, a common source of cross-contamination.

Dispensing a series of ejected aliquots without contact requires a different pipetting technique. Section 6: NanoRep Technique Essentials includes No Touch Off techniques that are critical to achieving high precision and reproducibility.

Unique and brand-new to handheld devices, No Touch Off dispense:

- exhibits some notable **behaviors**
- is adjustable via multiple **settings**

No Touch Off Behaviors

2-part dispense

No Touch Off is enabled by a pulse-drive mechanism that culminates a single dispense cycle with a percussive tap. With smaller volumes, the tap is imperceptible. As volumes become larger, you will perceive dispense in No Touch Off in two distinct parts: the jet of liquid expelled as the piston moves downward (controlled by Dispense Speed), followed by the final tap of No Touch Off (controlled by Dispense Force.) This is a normal and necessary part of how NanoRep functions.

3 taps for No Touch Off: 50 mL Tip Only

No Touch Off dispense on the 50 mL tip consists of 3 consecutive taps or 3 clicks. This is normal, and the aliquot may dispense across all three clicks or on any one of them based on the aliquot volume. The repetitive taps are how No Touch Off dispense handles the increased drag force in the largest NanoRep tip. At Dispense Force 10 the taps are most audible and the slowest. The taps speed up as force is lowered and at Dispense Force 1 they may not be audible at all.

Slight air intake

At volumes below a certain level you may notice NanoRep ingest a tiny amount of air into the tip before the final tap of No Touch Off. This is expected. NanoRep, among the highest-precision liquid handling devices in the world, is delivering an accurate, reproducible aliquot.

Droplet on tip

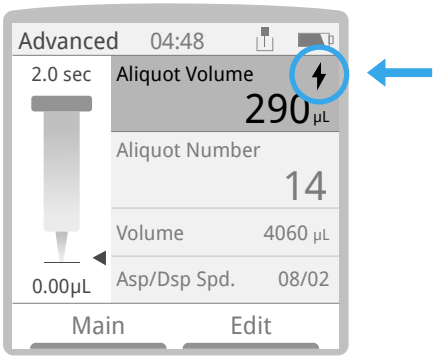
During a No Touch Off dispense series, you may notice a droplet at the end of the tip from aliquot to aliquot. This is normal, and is a calculated part of each subsequent dispense. Droplets are more likely with viscous liquids, more likely with smaller aliquots, and more likely the larger the syringe tip. If you see a droplet while using No Touch Off dispense, do not touch or wipe it on the vessel.

Settings Influencing No Touch Off

Dispense Force – Advanced mode only

In the **Edit** menu in Advanced mode with No Touch Off enabled, Dispense Force adjusts the mechanical strike of the piston from one (gentle, for lower-surface-tension liquids like ethanol) up to **10** (forceful, for more viscous liquids.)

When you adjust Dispense Force a small lightning bolt icon appears in the Aliquot Volume (top) line of the work screen.



Manual Viscosity Selection

In the **Edit** menu in Basic and Advanced modes, Manual Viscosity Selection is a quick way to set dispense force. If you experience splash with Manual Viscosity Selection set to **Low** or **Medium**, go to Advanced mode and set **Dispense Type** to **Set Manually** > **No Touch Off.** Then set **Dispense Force** to 4 or lower until results are as desired.

Below are some examples of liquids across the range of viscosities handled by NanoRep, from below 1 centipoise (cP) to about 300 cP. Viscosity is a function of temperature and pH. Values are not absolute. Values for the liquids shown below are at room temperature unless otherwise noted.

Example liquids and viscosities

Liquid	Viscosity / cP (centipoise)	Setting
Acetonitrile	0.38	**Low (0–30)**
Water	1	
Ethanol	1.1	
DMSO	2	
Blood	4	
BSA (250 mg/mL)	30	**Medium (30–100)**
DNA (6 mg/mL) @70°C	70	
85% Glycerol	100	**High (100–300)**
Triton X100	270	

Some thicker liquids, such as 10 mg/ml collagen at 1400 cP, exceed the recommended maximum viscosity for NanoRep. Below are recommended maximum viscosities, listed by syringe tip.

Recommended maximum viscosity by syringe tip

0.1 mL	~300 cP
10 mL	~300 cP
50 mL	~100 cP

Note: In rare instances some liquids, including silicone oil, can weakly adhere to syringe-tip components. Such liquids can reduce the maximum viscosity for No Touch Off dispense.

Press the right button, **Edit**, and joystick down to Manual Viscosity Selection to adjust to **Low**, **Medium** or **High**. Once done press the left button, **Done**.

Low and **Medium** default NanoRep to No Touch Off dispensing, while a setting of **High** defaults to Touch Off dispensing. This can be overridden in the **Edit** menu in Advanced mode by selecting Dispense Type = **Set Manually**.

How to select Touch Off or No Touch Off in Advanced Mode

1. Press the right button, **Edit**, and joystick down to Dispense Selection.
2. Joystick right to select **Set Manually**.
3. Joystick down one line to Dispense Type and joystick right. Select either **Touch Off** or **No Touch Off**.
4. With **No Touch Off** selected, one more setting appears: Dispense Force. Adjust from **1** (low) – **10** (high). Lower is more gentle (less force). A higher value means greater dispense force, useful with higher viscosity liquids.
5. Press the left button – **Done**.

4. Viscosity, Dispense Force and Volume: Settings for Best No Touch Off Performance

Successful No Touch Off (non-contact) pipetting involves a combination of adjustments to fine-tune performance. The factors that affect settings for No Touch Off are:

- syringe tip size
- viscosity of the liquid being handled
- aliquot volume
- vessel depth and shape (microcentrifuge tube, 96-well plate etc.)
- Dispense Speed
- Dispense Force

Manual Viscosity Selection

To adjust NanoRep to the viscosity of the liquid you're handling, in Basic and Advanced modes press the right button, **Edit**, and joystick down to Manual Viscosity Selection. Joystick right, then up or down to select between **Low**, **Medium** or **High**. Press the left button, **Done**, to save the selection.

For examples of liquids across the range of viscosities handled by NanoRep, see page 15, Manual Viscosity Selection.

Speed and Force guidelines: 96-well plate

The following tables offer recommended Dispense Speed and Dispense Force settings for dispensing aliquots into a 96-well plate without splashing. Ethanol, water and 30% glycerol serve as examples of low and higher-viscosity liquids.

0.1 mL Syringe Tip

Little to no adjustment necessary for dispense speed or force
Because the volumes dispensed with NanoRep's smallest tip (100 µL max) are so minute, virtually any viscosity of liquid at any Dispense Speed and Dispense Force may be aspirated and dispensed using No Touch Off dispense.

Exception: DMSO. Set Dispense Speed and Dispense Force to 5 when pipetting DMSO with the 0.1 mL syringe tip.

10 mL Syringe Tip

Ethanol – manual viscosity setting: **Low**

Volume µL	10	50	100	150	200
Dispense Speed	1–10	1–3	1–2	1–10	1–6
Dispense Force	2–10	1–3	1–3	1–10	1–10

Water – manual viscosity setting: **Low**

Volume µL	10	50	100	150	200
Dispense Speed	1–10	1–9	1–10	1–10	1–9
Dispense Force	1–10	1–3	1–3	1–9	1–10

30% Glycerol – manual viscosity setting: **Medium**

Volume µL	10	50	100	150	200
Dispense Speed	1–10	1–10	1–10	1–8	1–7
Dispense Force	1–10	1–3	1–3	1–6	1–6

50 mL Syringe Tip

Ethanol – manual viscosity setting: **Low**

Volume µL	50	100	200
Dispense Speed	1–10	1–10	1–10
Dispense Force	1–10	1–10	1–3

Water – manual viscosity setting: **Low**

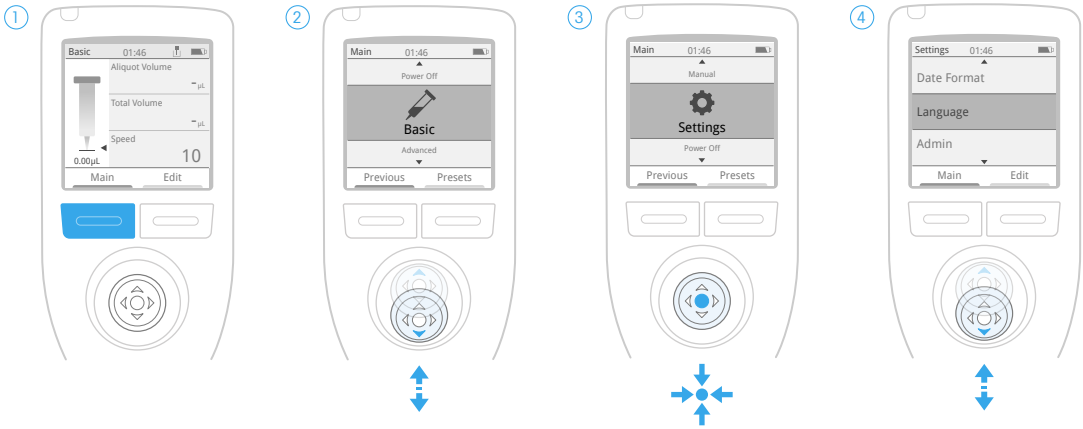
Volume µL	50	100	200
Dispense Speed	1–10	1–10	1–10
Dispense Force	1–10	1–8	1–5

30% Glycerol – manual viscosity setting: **Medium**

Volume µL	50	100	200
Dispense Speed	1–10	1–10	1–10
Dispense Force	1–10	1–10	1–5

5. Quick Start: Turn On, Set Up, Aspirate and Dispense, Power Off

5.1 Power On, Set Language



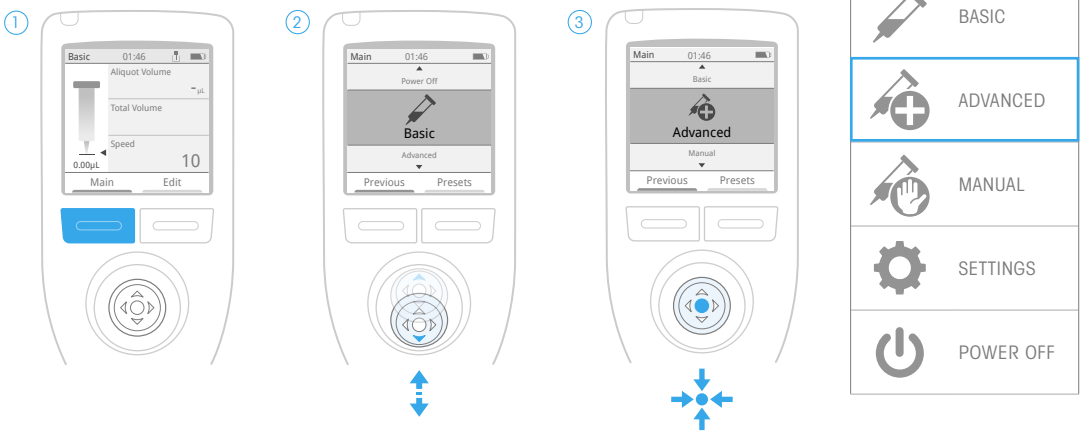
Press either blue button to power on NanoRep. A welcome screen displays, then shifts to the basic work screen. Press **Main**.

Joystick up or down to Settings.

Press the joystick in to select Settings.

Joystick up or down. To select a menu item, either joystick right or push the joystick in. Press **Done** to save a setting.

5.2 Select Advanced Mode



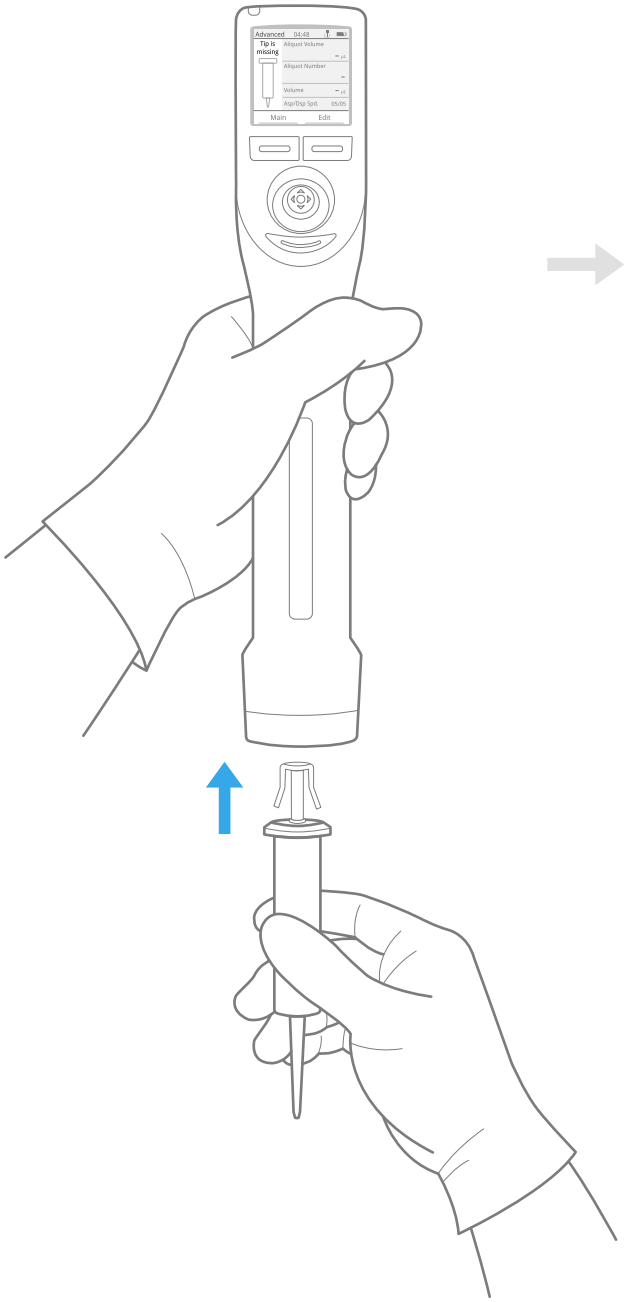
Press the left blue button, **Main**.

Joystick up or down to Advanced.

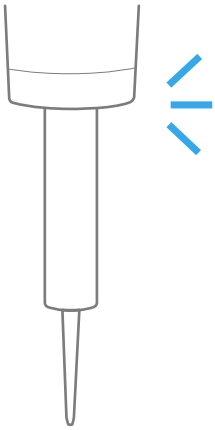
Press the joystick in to select Advanced.

Main menu: NanoRep.

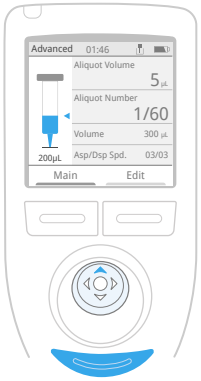
5.3 Load and Prime the Syringe Tip



Syringe tip clicks into place.



Prime the syringe tip

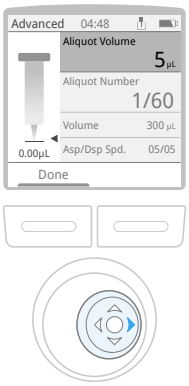


Press the left button, **Main**, and select **Manual**. Joystick up to aspirate at least 10% of the tip's nominal volume of the liquid to be pipetted. Then, push the Eject button below the joystick. NanoRep asks, "Empty tip?" Hold the tip over the liquid container, then press the left button, **Continue**. The tip empties. The tip is now primed.

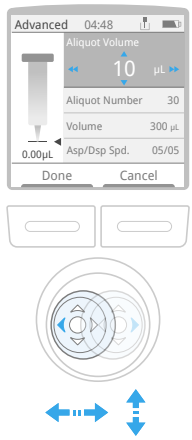
Press **Main** again, then press the left button: **Previous**. This returns you to Advanced mode.

5.4 Set Aliquot Volume and Number of Aliquots

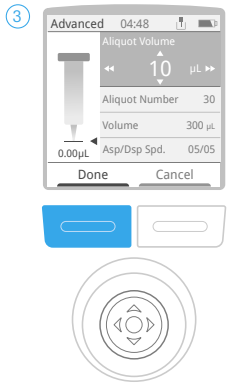
Aliquot **Volume**

① 

Joystick right to enter the menu. Joystick right again to activate Aliquot Volume.

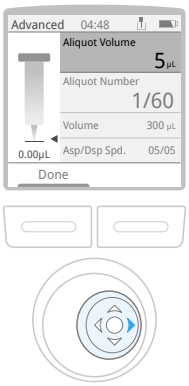
② 

Joystick right or left to adjust in large steps, up or down to adjust in smaller increments.

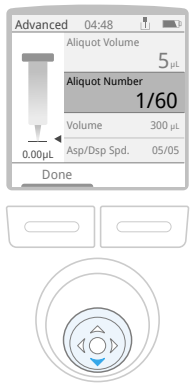
③ 

Press **Done** to set Aliquot Volume.

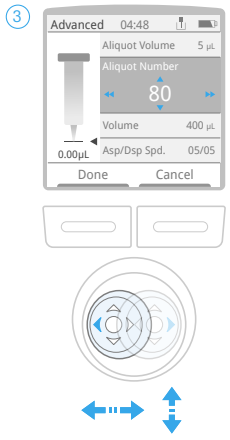
Aliquot **Number**

① 

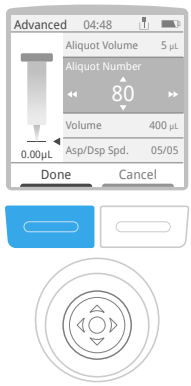
Joystick right to enter the menu.

② 

Joystick down to Aliquot Number, and joystick right to activate it.

③ 

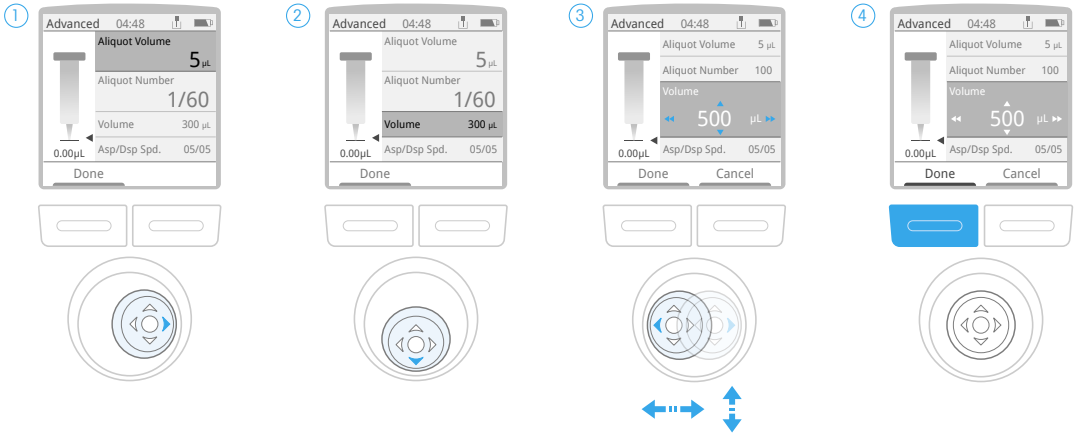
Joystick right or left to adjust in large steps, up or down to adjust in smaller increments.

④ 

Press **Done** to set Aliquot Number.

5.5 Set Aspiration Volume

Aspiration Volume



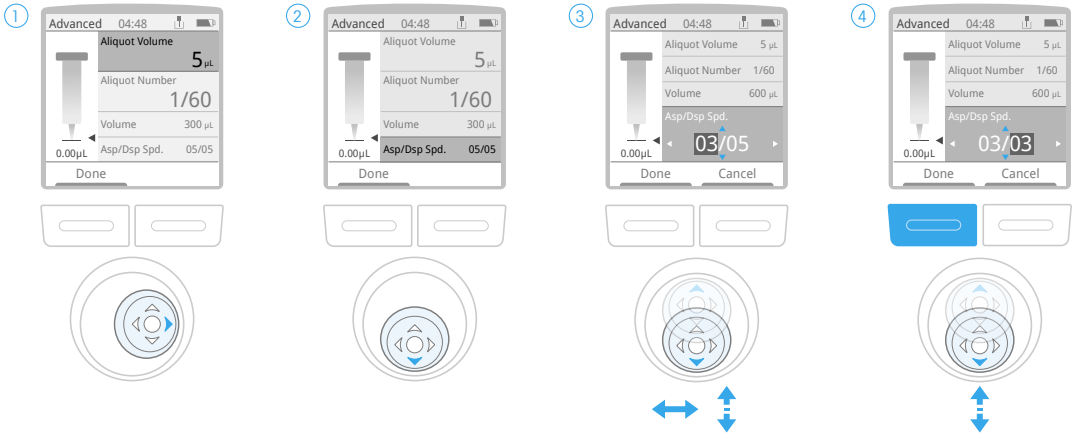
Joystick right to enter the menu.

Joystick down to Volume. **Note:** If Aliquot Volume and Number are already set, the value for Volume (the Aspiration Volume) is the product of those two settings.

Joystick right to activate Volume. Joystick right/left to adjust in large steps, or up/down to adjust in smaller increments.

Press **Done** to save.

5.6 Set Aspiration / Dispense Speeds



Joystick right to enter the menu.

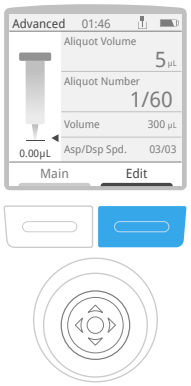
Note: Aspiration and Dispense speeds can only be adjusted separately in Advanced mode.

Joystick down to Aspiration/ Dispense Speed, and joystick right to activate it.

Joystick right or left to switch the highlighted value (Aspiration speed is on the left, Dispense speed is on the right). Joystick up or down to adjust speed.

Press **Done** to save.

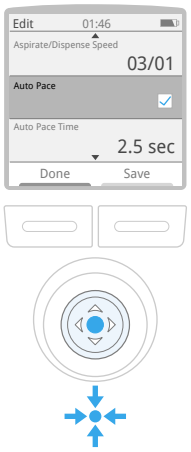
5.7 Set Auto-Dispense Time Interval (Auto Pace) - Optional

① 

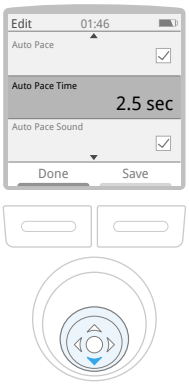
Press the right blue button: **Edit**.

② 

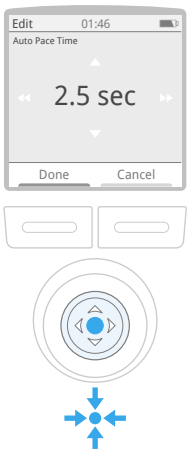
Joystick down to Auto Pace.

③ 

Press the joystick in, or joystick right, to check the box for Auto Pace.

④ 

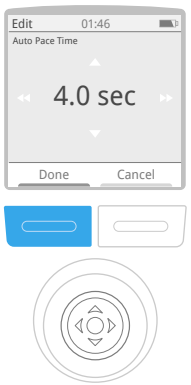
Joystick down to Auto Pace Time.

⑤ 

Press the joystick in to activate adjustment.

⑥ 

Joystick right/left for one-second steps, or up/down for 0.5-second increments. Time range is 0.5 sec – 5 sec.

⑦ 

Press **Done** to save.

Manual Dispensing (Non-Timed)

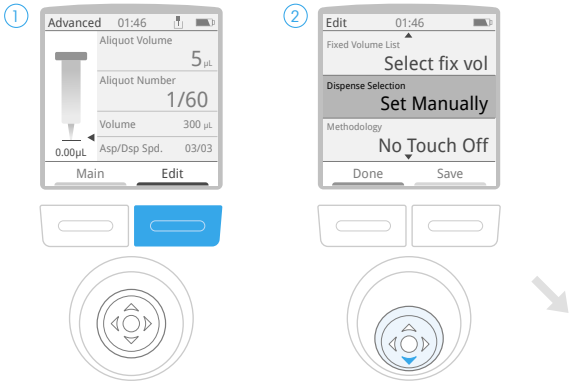
It's easy to dispense aliquots manually with NanoRep.

In the Edit menu, leave the box for Auto Pace **un-checked**. Then use either of the side dispense buttons (gray) – or move the joystick down – to dispense.

Both gray side dispense buttons are active by default. To activate or deactivate a button, press **Main**, choose Settings, and scroll down to Trigger Buttons.

Press the joystick in and check or un-check the box for Left Trigger or Right Trigger to activate or deactivate a button.

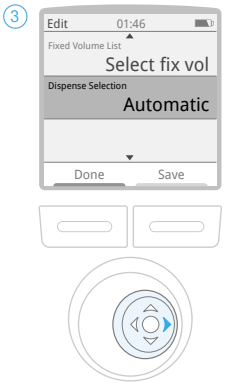
5.8 Select Touch Off or No Touch Off Dispense



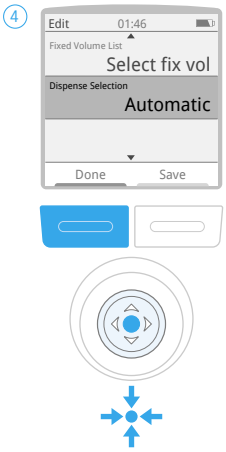
Press the right blue button: **Edit**.

Joystick down to Dispense Selection.

Automatic



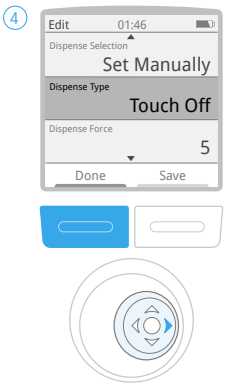
Joystick right to toggle between Automatic and Set Manually



To select Automatic, press **Done**. NanoRep will select No Touch Off or Touch Off based on the Manual Viscosity Setting and tip size (see table, page 13.)

Manual

To select Set Manually, press **Done,** then joystick down to the next line: Dispense Type.



Joystick right to toggle between Touch Off and No Touch Off. Press **Done** to save your selection.

5.9 Aspirate / Dispense

Joystick up to aspirate.

Press **OK** to discard first aliquot. This sets up the dispense series.

Joystick down, or press either the Left or Right side dispense button (gray) to dispense. If Auto Pace is enabled, dispensing continues automatically.

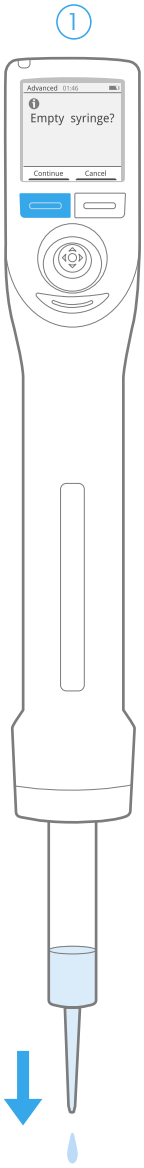
Discard three additional dispenses for volumes <1% total tip volume

When dispensing a volume smaller than 1% of any syringe tip, Rainin recommends following the required first discard dispense with three (3) additional manual discard dispenses before continuing. To accomplish these dispenses, either joystick down three times, or press either of the gray side dispense buttons three times. Here's why: an infinitesimal amount of liquid naturally adheres to the end of a tip after the discard dispense. For extremely small aliquots – less than 1% of the syringe tip volume – this can impact the accuracy of the first few aliquots in a series. The recommended three discard dispenses pull any final liquid sticking to the tip into the discard-dispense vessel. After these three additional manual sub-1% discard dispenses, expect exceptionally accurate sub-1% aliquots.

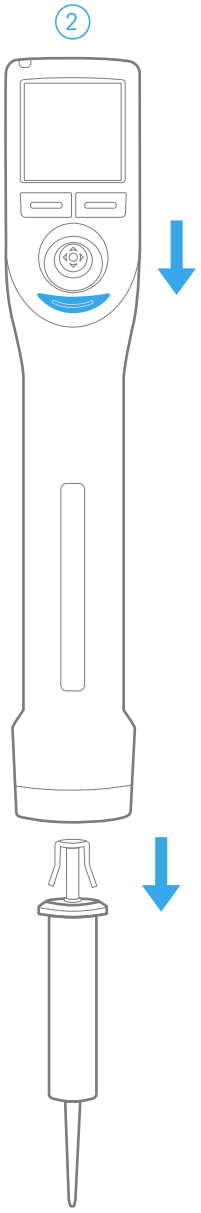
Discard dispense after changing Dispense Force mid-series

If you change the Dispense Force during a dispense series, discard the dispense after making the change.

5.10 Eject Syringe Tip



Press the gray eject button below the joystick. If liquid remains in the syringe, it must be emptied. Press the left button, **Continue**.



Press the gray eject button below the joystick to eject the tip. If tip sticks, see **17. Troubleshooting**.

5.11 Power Off

① 

Press the left blue button: **Main**.

② 

Joystick up or down to Power Off.

③ 

Press the joystick in or joystick right to select Power Off.

④ 

Press **Continue** to power off, or **Cancel** to exit.

6. Technique: NanoRep Essentials

Incorporate the following techniques to work efficiently and reproducibly with NanoRep.

Priming the syringe tip

To remove residual air from syringe tips, Rainin recommends priming of each new, fresh syringe tip you load. Here's how to quickly prime a tip.

Priming is simplest in Manual mode.

1. Submerge tip in the liquid to be pipetted. Joystick up to aspirate at least 10% tip volume. (If that's more sample than is available, even a small volume is recommended.)

2. Press the tip-eject button below the joystick. The message "Empty tip?" is displayed.

3. Press the left button, **Continue**. NanoRep empties the syringe tip. The NanoRep syringe tip is now primed for exceptionally precise dispensing.

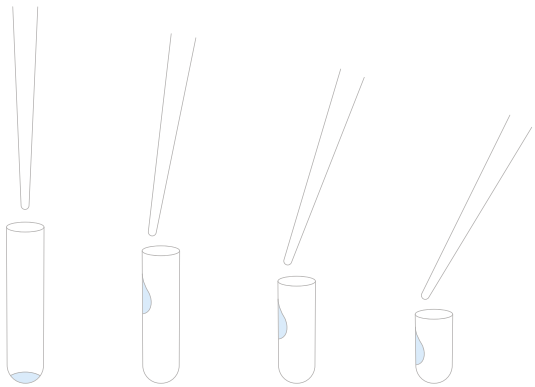
Angle and dispense target: Touch Off (no angle) vs. No Touch Off (up to 30°)

Touch Off

Good pipetting practice recommends holding a pipette vertically, dispensing straight down into vessels and touching off on vessel walls to assure a complete dispense. Operate NanoRep according to these same principles when pipetting in Touch Off (contact) dispensing mode.

No Touch Off

In No Touch Off (non-contact) dispensing mode, NanoRep ejects a liquid aliquot with force from the syringe tip. This requires a different dispensing approach that depends on the size and depth of the target vessel. As a general guideline, if dispensing into shallow vessels such as well plates using No Touch Off, NanoRep should be angled as much as 30°, with the target of the aliquot midway down the vessel wall. This prevents splash. When dispensing into deeper vessels, NanoRep can be held closer to vertical. The following illustration offers a general guideline on angle, targeting and vessel depth for No Touch Off dispense.



Dispense target, No Touch Off (non-contact) dispense

1. Angle tip slightly more with shallower vessels. Use angle that works for you.
2. Reduce distance between tip and vessel as vessel size is reduced.

No Touch Off dispensing distance: ~5-10 mm

In No Touch Off, the distance between the end of the syringe tip and the upper rim of the target vessel should be around 5–10 mm. This prevents splash and maximizes accuracy to the target of the aliquot. You will develop your preferred best distance over time. It can depend on the sample you pipette, the receiving vessel, the aliquot volume and the syringe tip size.

No Touch Off dispensing speed and dispense force

Refer to section **4. Viscosity, Dispense Force and Volume: Settings for Best No Touch Off Performance** to review Dispense Speed and Dispense Force settings.

Stability

Holding a support hand underneath the wrist of the dispensing hand can help maintain stability through a long dispensing cycle. Another option is positioning elbows on the bench to help support consistent movement over a prolonged period.

Selecting and confirming menu settings: joystick press, joystick right, or triggers

There are a few ways to select a menu item on NanoRep. Press the joystick in, or joystick right, or press either of the gray dispense buttons on the rear sides of NanoRep.

Previous button: step back to settings in last mode

To go to the last mode used, press the left button, **Main**, then press the left button again – **Previous**. You can also joystick left to do the same thing.

Previous switches between two modes only. It's not a history of changes. It's a one-step-back memory to the most recent different Main menu mode: Basic, Advanced, Manual or Settings.

Example 1: If you were in Advanced and are now in Basic, **Previous** returns you to Advanced. (Pressing **Main** then **Previous** again returns you to Basic

Example 2: If you were in Settings and are now in Manual, **Previous** returns you to Settings.

7. Modes

7.1 Basic mode

Push the left button under the screen, **Main**.

Use the joystick to move up or down the menu items. On **Basic**, push the joystick in.

Load a tip – 0.1 mL, 10 mL or 50 mL – to adjust settings.

In Basic mode, you can set:

- aliquot volume
- number of aliquots
- overall aspiration volume
- speed (single speed for both aspiration and dispense)

Joystick right, then press the joystick in on the menu item you want to adjust. Once set, press the left button – **Done**.

By pressing the right button, Edit, you can also get:

- viscosity selection (low, medium, high)

Press the joystick in on **Manual Viscosity Selection** and joystick to **Low**, **Medium** or **High**. Press the left button, **Done** to save the selection.

Joystick up to aspirate.

Joystick down to dispense, or press either of the gray dispense trigger buttons on the sides of NanoRep. See section **7.4 Settings** for how to activate or deactivate the left-side or right-side trigger dispense buttons (both can be active at the same time if desired.)

7.2 Advanced mode

Push the left button under the screen, **Main**.

Use the joystick to move up or down the menu items. On **Advanced**, push the joystick in – or joystick right.

Load a tip – 0.1 mL, 10 mL or 50 mL – to adjust settings.

In Advanced mode you can set:

- aliquot volume
- number of aliquots
- overall aspiration volume
- aspiration and dispense speeds (individually)

Joystick right, then press the joystick in on the menu item you want to adjust. Once set, press the left button – **Done**.

Advanced mode also offers:

- Auto Pace (automatic timed-interval dispense)
- Fixed Volumes (quick access to list of saved volumes)
- Manual Viscosity Selection (low, medium, high)
- Touch Off or No Touch Off dispense
- Dispense Force

Press the right button – **Edit**. Volume and speed adjustments are at the top. Scroll down the list to view all Advanced options:

Option	Action
Auto Pace	check/un-check
Auto Pace Time Interval	0.5–5 seconds
Auto Pace Sound	check/un-check
Fixed Volume	check/un-check
Fixed Volume List	save up to 10 volumes per syringe tip size
Manual Viscosity Selection	Low/Medium/High
Dispense Selection	Automatic/Set Manually
Dispense Type	Touch Off/No Touch Off
Dispense Force (No Touch Off only)	1 (low)–10 (high)

Joystick right to check/un-check or enter any setting.

Press **Done** (left button) to begin pipetting, or press **Save** (right button) to save adjusted settings as a preset. For more information on Presets, see section 8, Presets.

Fixed volumes = saved volumes

Fixed volumes offer quick access to a list of up to 10 saved volumes. Easily switch between volumes during one dispensing cycle or from step to step. It's similar to sequential dispense but moving from volume to volume is not automatic.

Press the right button, **Edit** and joystick down to Fixed Volume. Press the joystick in to check the box, then joystick down a line to Fixed Volume List. Press the joystick in on **Edit List**. A 10-item list opens. Joystick up/down to the volume you want to adjust and press the joystick in to set it. Joystick right/left to adjust the value in larger increments, up/down to adjust in small increments. Press the left button, **Done**, to save the volume.

When volumes are set, joystick up/down the list and joystick right on any volume to check the box and activate it. These will be the volumes available to you as you pipette. When the correct volumes are checked, press the left button, **Done**. Press **Done** again to exit the menu and return to the work screen.

Note that the top menu item now reads Fixed Volume. Joystick right and up/down to Fixed Volume and press the joystick in – or joystick right – to activate it. The list of volumes you saved appears, with the current volume in use checked. Joystick to the volume you'd like to switch to and press the joystick in to select it.

You are now back on the work screen with the new volume enabled.

To deactivate fixed volumes, press the right button, **Edit**. Joystick down to Fixed Volumes and joystick right to un-check the box.

7.3 Manual mode

Push the left button under the screen, **Main**.

Use the joystick to move up or down the menu items. On **Manual**, push the joystick in.

Load a tip – 0.1 mL, 10 mL or 50 mL – to begin pipetting.

Aspirate in Manual mode is continuous as long as you hold the joystick in the up position. Aspirate stops when you stop pressing the joystick up or when the syringe tip is completely full.

Dispense is continuous as long as you hold the joystick in the down position. Dispense stops when you stop pressing the joystick down or when the syringe tip is completely empty.

Note: Side dispense buttons are inoperative in Manual mode.

Step Up, Step Down: aspirate, dispense in 0.1% tip volume increments

If you stop aspirating at any volume before the syringe tip has reached full capacity, you will see **Step Up** over the button on the right. Press **Step Up** to aspirate in steps of 0.1% of the maximum volume of the tip you are using.

Tip size	Step increment size
0.1 mL	100 nL
10 mL	10 µL
50 mL	50 µL

With a 10 mL syringe tip loaded, if you quickly joystick up and stop – aspirating 28 µL, for example – you will see **Step Up** on the right. Press **Step Up** to aspirate an additional 10 µL, bringing the total volume to 38 µL. Press **Step Up** again to bring the volume to 48 µL, and so on.

Similarly, if you begin dispensing and stop at any volume before the syringe tip is empty, you will see **Step Down** over the button on the right. Press **Step Down** to step down in the same-sized increments: 0.1% of the maximum volume of the tip.

7.4 Settings

Push the left button under the screen, **Main**.

Use the joystick to move up or down the menu items. On **Settings**, push the joystick in.

Use Settings to configure NanoRep and access important device and regulatory information. Adjust brightness; enable left, right or both dispense trigger buttons and set time, date and language. Access Administrator settings like password protection, GLP alarm and USB remote access for firmware updates (for Firmware update instructions, see section 10.1.1.)

Press the left button, **Main**. Then joystick down to **Settings** and press the joystick in.

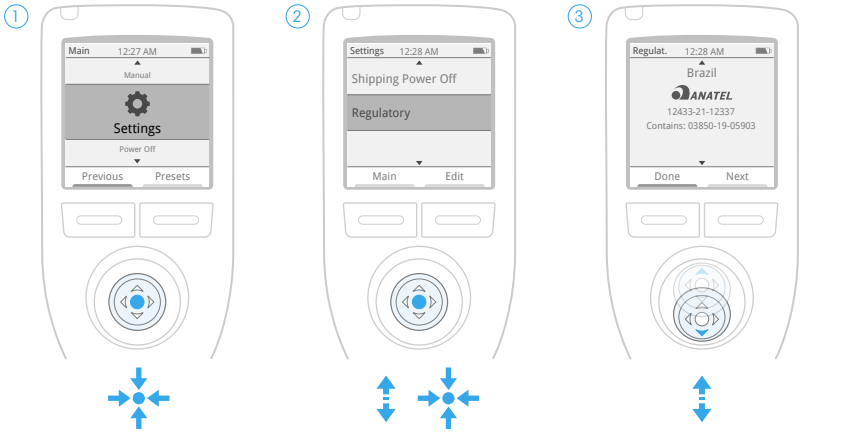
Joystick down the menu to view all the **Settings** that you can either adjust or use to view information:

Setting	Action or 2nd-Level Setting	Action
Brightness	Adjust brightness from 1–10	
Sound Volume	Adjust sound from 1–10	
Dispense Sound	Check/un-check to enable/disable dispense sound for Touch Off, No Touch Off	
Trigger Buttons	Check/un-check to enable/disable left, right trigger buttons for manual dispensing	
Light Timeout	Adjust time (min:sec) when screen darkens if not in use	
Sleep Timeout	Adjust time (hr:min) when NanoRep sleeps if not in use	
Motion wake-up	Check/un-check to enable/disable waking from Timeout or Sleep when NanoRep is moved	
Time	Set time (hr:min:sec)	
Date	Set date	
Time Format	12-hour, 24-hour or None	
Date Format	MM/DD/YYYY, DD/MM/YYYY or YYYY/MM/DD	
Language	Check/un-check for: - English - Deutsch - 日本 - 日本語 - 한국어 - Español - Française	
Administrator	Set Password	Enter 4-digit passcode
	GLP Alarm	Check to enable/un-check to disable
	# of Days	Adjust GLP Alarm interval (days)
	Mode Access	Enable/disable Basic, Advanced, Manual
	Reset to Default	Return to default settings
	USB	Check to enable/un-check to disable USB
	Remote File Access	If USB is checked, check/un-check to enable/disable remote file access for firmware update

Setting	Action or 2nd-Level Setting	Action
	Service	Access Service settings: • Bootloader update • Create backup image • Joystick calibration • Joystick center calibration • Reset joystick calibration • Screenshot (uses side trigger button to save screenshot) • External flash format • Battery status • Tip sensor calibration • Reset tip sensor calibration
	Firmware Update	After loading new firmware version via Remote file access, run firmware update
Service Info	Displays • Manufacture Date • Model Name • Firmware Version • Serial Number • Next Service Date • Last Service Date • Next Calibration Date • Last Calibration Date • Next Quick Check Date • Battery Change Date • Asset ID (if loaded)	
Shipping Power Off	Powers down NanoRep for transport	
Regulatory	Displays regulatory information by country and region	

7.5 Access regulatory (e-label) info

Access regulatory (e-label) information by country



Press the left button, **Main**, then scroll to **Settings** and press the joystick in.

Joystick down to **Regulatory** and press the joystick in.

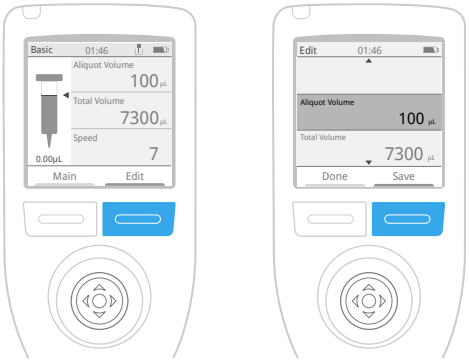
Joystick up or down to view information by country (e.g., Brazil.)

Joystick to the setting you want to adjust and either joystick right or press the joystick in to select it. For 2nd-level settings such as those accessible in the Administrator menu, repeat the joystick-right or joystick-press to select items within that menu.

When a setting is configured, press the left button – **Done**.

8. Presets

Anytime you adjust values and settings, you can save everything as a preset. Press the right button, **Edit**. Then press the same button again – **Save**.



Saved in lists

Presets are saved in lists. You can return to a preset anytime by going to the Main menu (press the left button, **Main**) then pressing the right button – **Presets**. This opens a saved list of presets. To navigate within the list, joystick down and push the joystick in to select a preset. To navigate to another list, joystick to the top line of the list (the list name), then joystick left or right to go to other lists.

You can move a preset from one list to another, rename it or delete it.

8.1 Create a preset

Note: A syringe tip must be loaded in order to adjust values and settings and save as a preset.

After loading a tip, press the left button – **Main** – then choose Basic, Manual or Advanced mode. Adjust values and options: aliquot volume, aliquot number, overall aspiration volume and speeds. Press the right button – **Edit** – to access other options like viscosity selection and – in Advanced only –Auto Pace (timed-interval dispense), Fixed Volumes (saved volumes), Dispense Type (Touch Off/No Touch Off) and Dispense Force (**1** [gentle] – **10** [strong].)

To save everything you just configured, press the right button – **Save**.

First time only

Presets are always saved into lists. If no presets are saved yet, NanoRep displays the message, "Preset list not found. Create new list?" Press the left button: **Create**.

On the alphabet screen that appears, under "Enter Preset List Name," joystick to letters and push the joystick in to name the list. For lowercase letters, scroll to the left side of the bottom row of characters and press the joystick in. For numbers, press the joystick again on the same character at the left of the bottom row of characters. To delete a character, joystick to the right of the bottom row to the backspace/delete character and press the joystick in.

Press the left button – **Save** – to save this Preset List name.

Suggestion: Name a list by user or by protocol.

On the top line of an empty list you will see the list name that you entered. No preset has been saved yet. Press the left button – **Back**.

NanoRep returns to the menu of settings that you just configured for the preset. Press the right button, **Save**. Now name the preset.

Under "Enter Preset Name," use the joystick to move to letters and press the joystick in to select them. Joystick to the left side of the bottom row of buttons to access lowercase letters and numbers. Joystick to the right side of the bottom row of buttons to delete a character. When the preset name is complete, press the left button – **Done**.

Under "Select preset list to save," the list you named is highlighted. Press the left button – **Select** – to save your preset in this list.

Done! NanoRep returns to the menu of volume settings and options that you just configured. Press the left button – **Done** – to return to the work screen displaying the tip and volume values.

View Presets

To see the preset you just saved, press the left button – Main – to open the main menu. Press the button on the right – Presets. Your list name is displayed at the top, with the preset you saved just below it. As presets are added to the list, joystick up/down to navigate from preset to preset and push the joystick in or joystick right on the preset you want to open.

Preset lists: Create, Rename, Delete, Copy

Press the left button – **Main** – to go to the main menu, then press the right button – **Presets**. Joystick to the top line – a preset list name – and press the right button, **Edit**.

A menu appears with the following options:

- New List
- Rename List
- Delete List
- Copy List (copies all presets in a selected list and saves with a different name)

Joystick to the item you want, then press the joystick in to select it.

New List

Press the joystick in to select letters to name a new list, then press the left button, **Save**. A double-arrow now appears on the top line of the list displayed to indicate access to additional lists. Joystick right to navigate to the new list.

To save a preset in this new list, go to Basic, Advanced or Manual and configure volume and speed values and press the right button, **Edit**, to adjust other settings. Press the right button – **Save** – to save the configured settings as a preset. Joystick among the letters shown to create a name, then press the left button – **Done**. Under "Select preset list to save" joystick to the new list, then press the left button – **Select**. Done!

Rename List

Joystick to **Rename** List and press the joystick in. Joystick among the letters shown to create a new name for the list, then press the left button – **Save**.

Delete List

Joystick to **Delete List** and press the joystick in. The confirmation message "Are you sure you want to delete?" is displayed. Press the left button – **Delete**. Or press the right button – **Cancel** – to exit.

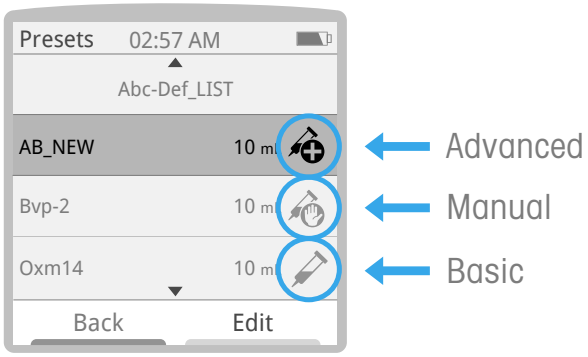
Copy List

Joystick to **Copy List** and press the joystick in. Joystick among the letters shown to create a name for this duplicate list of presets, then press the left button – **Save**. A new list is created containing the same presets as the original.

8.2 Access a preset

Press the left button, **Main**, to open the main menu. Then press the right button, **Presets**.

To move among preset lists, joystick right or left on the top line. Joystick down a list to the preset you want. Press the joystick in to open the preset.



Presets display the mode in which they are saved (top to bottom): Advanced, Manual and Basic. Tip size is also displayed (here, 10 mL).

8.3 View, Move, Rename or Delete a preset

You can move a preset up or down within a list, or move it from one list to another. Press the left button, Main, to open the main menu. Then press the right button – **Presets**. Joystick to the top line showing the list name. If the preset you're looking for is in a different list, joystick right to navigate among lists.

On the list containing the preset you want to move, joystick down to the preset. Then press the right button – **Edit**.

A menu appears with the following options:

- View
- Move
- Rename
- Delete

View

Joystick down to **View** and press the joystick in. This is a quick way to review a list of all the settings within the preset: the name, the pipetting mode, the tip size, the aliquot volume, etc. If you want to open the preset to start using it, press the right buton – **Load**. Or press the left button, **Done**, to exit.

Move

Joystick down to **Move** and press the joystick in to select it. Joystick right or left to move the preset into the desired list, then joystick up or down to position the preset where you want it in the new list. Press the left button, **Done**, to save the preset in this new location.

Rename

Joystick down to **Rename** and press the joystick in to select it. Joystick among the letters shown to give the preset a new name, then press the left button: **Save**.

Delete

Joystick down to **Delete** and press the joystick in to select it. The message, "Are you sure you want to delete?" is displayed. Press the left button – **Delete** – to delete, or press the right button – **Cancel** – to exit.

9. Do's and Do Not's

A brief list of highlights of what to do and what to not do with NanoRep.

Do	Do Not
Use only Rainin NanoRep syringe tips	Leave liquid in the tip
	Autoclave NanoRep or NanoRep syringe tips
Store NanoRep upright. Hang on stand, rail or hang-up	Expose NanoRep or tips to UV radiation
	Use corrosive chemicals to clean
Prime every NanoRep syringe tip with a quick aspiration and dispense. Manual mode is easiest way to prime: joystick up, then down.	Use non-Rainin approved parts for NanoRep (power supply, battery, preventive maintenance parts). Doing so voids warranty and performance specifications

10. Connectivity

NanoRep connects to other devices and applications via USB and RFID.

10.1 USB

The USB port on top of NanoRep (protected with a gray rubber cap) connects to the wall power supply to charge the device. A mini-USB to USB cord (not included with NanoRep) can be used to connect to a computer or laptop for device firmware updates. (See below.)

For more information, please contact a qualified Rainin Service professional or your Rainin sales representative.

10.1.1 Update NanoRep Firmware via USB

Note: To update NanoRep firmware, you'll need:

- a USB Type A to USB Micro B adapter cable
- a Windows PC

The Micro B end plugs into the top of NanoRep, and the USB A end plugs into your PC.

Your NanoRep's firmware version appears at the bottom of the welcome screen when you power up the device. You can also check your firmware version in Settings > Service Info. Power up NanoRep to check the version number, then go to www.mt.com/Rainin-NanoRep and click on the Documentation tab.

Under Firmware, you'll see the most up-to-date NanoRep firmware listed. The file is named with the version number. If the number shown is larger than the number on your NanoRep welcome screen, the firmware version on the web site is more recent.

1. Click the NanoRep Firmware link on the web page. This downloads the .zip folder containing the firmware file.

2. Double-click to open the .zip file, and click **Extract All** in the upper right. Select a destination for the extracted file, then click **Extract**.

3. Turn on NanoRep.

4. Plug the Micro B end of the USB adapter cable into NanoRep, and plug the USB A end into your PC.

5. In NanoRep's main menu, select Settings.

6. Joystick down to Administrator and press the joystick in.

7. Joystick down to USB and press the joystick in to check the box.

8. Joystick down one row to Remote File Access and press the joystick in to check the box. A message displays on NanoRep that Remote File Access is enabled.

9. On the PC, NanoRep appears as a drive – you may see "USB (E:)" or "USB (F:)" or some other new drive indication in your list of drives on the computer.

10. Double-click that drive to open the list of folders, then double-click to open the UPDATE folder.

11. Drag the freshly downloaded Firmware file into the UPDATE folder. The file will overwrite the former version. This can take up to 5 minutes.

12. When the file is completely loaded, on NanoRep, press the right button, **Exit**.

13. Joystick down to **Firmware Update** and press the joystick in to select.

14. Press the left button, **Continue**.

15. NanoRep updates. Do not use the pipette until it restarts, which confirms the new firmware version is active. Done!

16. To check the firmware version, in **Settings**, joystick to **Service Info** and press the joystick in. The version is listed on the Firmware Version line.

10.2 RFID

NanoRep contains an HF RFID chip. Readable by an RFID reader, the chip retains service and manufacturing data. Future versions of NanoRep firmware may expand on this connectivity capability.

11. Battery

NanoRep's lithium-ion battery can be fully charged in 1.5–2 hours and the device can be used while charging. The time a full charge lasts depends on liquid volumes and viscosities pipetted. The NanoRep battery is designed to deliver ~2,000 cycles on a single charge.

Recharge NanoRep only with the limited power source (LPS-type) Wall Power Supply provided for this product. Severe damage to internal electronics will result from improper charging and use of a non-LPS power supply can be hazardous.

The battery inside NanoRep is a non-user-serviceable part and should be replaced every two years. For more information, please contact a qualified Rainin Service professional or your Rainin sales representative.

12. Specifications

Below are the instrument and syringe tip (consumables) technical specifications for NanoRep.

Instrument specifications – NanoRep

Weight	230 grams / 8.1 oz
Length	22.86 cm / 9 in. (without tip)
Display size / resolution	32.6 mm x 32.6 mm (1.54 in. diagonal) / 240 x 240 pixels
Housing material	Xenoy polymer
Motor type	DC motor
Connectivity	USB: charge, fimware update
Radio	RFID
Charging time	1.5 hours

Syringe tip (consumables) specifications – NanoRep

Tip Volume	Systematic Error				Min. Aliquot*	Min. Incr.**
mL	**1%**	**10%**	**50%**	**100%**	**µL**	**µL**
0.1	1 µL ± 8%	10 µL ± 1.6%	50 µL ± 0.9%	100 µL ± 0.9%	0.1	0.01
10	100 µL ± 2%	1 mL ± 0.4%	5 mL ± 0.4%	10 mL ± 0.3%	10	1
50	500 µL ± 2%	5 mL ± 0.25%	25 mL ± 0.25%	50 mL ± 0.25%	50	1

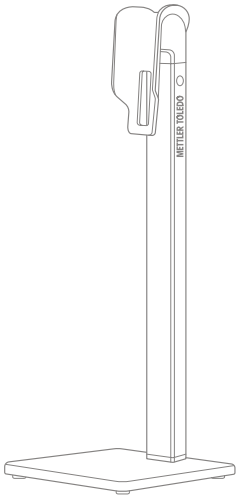
Tip Volume	Random Error			
mL	**1%**	**10%**	**50%**	**100%**
0.1	1 µL ≤ 12%	10 µL ≤ 2.5%	50 µL ≤ 0.8%	100 µL ≤ 0.5%
10	100 µL ≤ 3%	1 mL ≤ 0.35%	5 mL ≤ 0.2%	10 mL ≤ 0.15%
50	500 µL ≤ 3.5%	5 mL ≤ 0.45%	25 mL ≤ 0.2%	50 mL ≤ 0.1%

*Min. Aliquot = Smallest dispensable volume/tip.

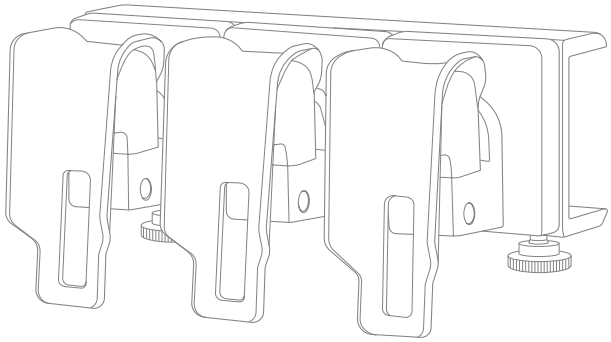
**Min. Increment = Lowest incremental adjustment/tip.

13. Accessories

NanoRep has two accessories: the small-footprint NanoRep stand (non-charging), and a 3-Hang-up shelf mount that fits not only NanoRep, but also any other Rainin pipette (and many other brands as well).



NanoRep stand



Shelf-mounted 3-Hangup bracket

The NanoRep stand is 29.5 cm tall (11.75 in), and the base is 11 cm x 11 cm (4.25 x 4.25 in).

The shelf-mounted 3-Hangup bracket is 16.5 cm long (6.75 in), 6 cm wide (2.5 in) and 7.5 cm deep (2.75 in).

14. Ordering Information

Product	Description	Material Number
NanoRep electronic repeater pipette	Electronic repeater pipette, charging cable, hang-up, 10 mL syringe tip	30568171
NanoRep syringe tip, 0.1 mL (100 µL) Sterile 25/1	1 pack of 25 tips – sterile	30575777
NanoRep syringe tip, 10 mL Sterile 25/1	1 pack of 25 tips – sterile	30575779
NanoRep syringe tip, 50 mL Sterile 25/1	1 pack of 25 tips – sterile	30575781
NanoRep syringe tip, 0.1 mL (100 µL) 100/1	1 pack of 100 tips – non-sterile	30575705
NanoRep syringe tip, 10 mL 100/1	1 pack of 100 tips – non-sterile	30575707
NanoRep syringe tip, 50 mL 25/1	1 pack of 25 tips – non-sterile	30575789
NanoRep stand	Pipette stand, non- charging	30575784
NanoRep charging cable	Charging cable	17012878
NanoRep 3 Hang-up Accessory	Rail Hang Up NanoRep RP	30584027

15. Care and Maintenance

Keep NanoRep dry and clean. Never allow liquid to enter the electronics. Be mindful of the side dispense buttons, display, front buttons and joystick and keep them dry.

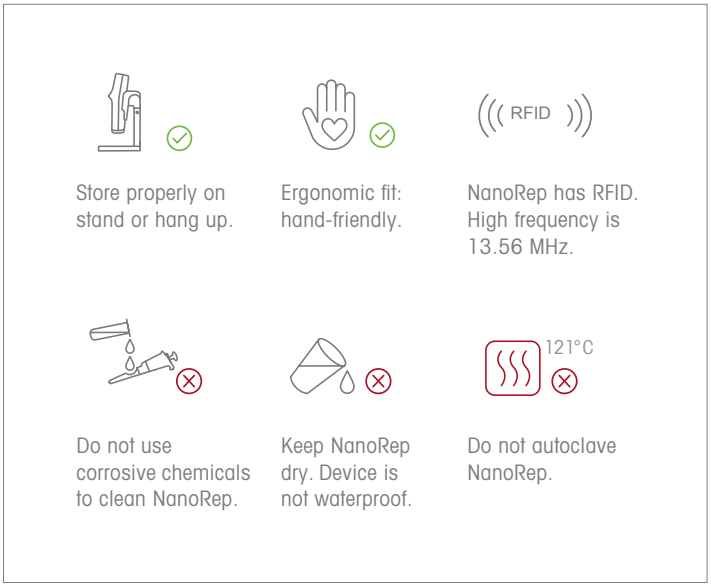
Never use aggressive solvents to clean NanoRep. Dampen a lint-free wipe with distilled water to wipe down the instrument. If needed, use mild detergent or isopropyl alcohol. Do not use a bleach solution. Bleach will discolor the instrument. Be sure to keep the display, buttons and joystick dry.

To clean the base of NanoRep, hold the pipette vertical and ensure a syringe tip is inserted. Clean around the syringe tip with a foam swab lightly moistened with cleaning agent or distilled water.

Do not attempt to clean inside the base of NanoRep.

Parts designed to grasp and optically scan NanoRep syringe tips are exposed and can easily be damaged by foreign objects.

For assistance with debris buildup in or around the liquid end of NanoRep, please contact a qualified Rainin Service professional or your Rainin sales representative.



16. Service and Calibration

Rainin provides calibration for the NanoRep following ISO-8655 procedures for repeater pipettes. ISO 17025 certificates are also available and can be requested from your local sales representative.

For technical support questions, please email Rainin technical support at tech.support@rainin.com.

17. Troubleshooting

Please review the following ways to resolve any issues you might encounter while using NanoRep.

Stuck or jammed tip

If the syringe tip you inserted into NanoRep is not releasing easily when the tip-eject button is pressed, please try the following.

Note: Press and release the Eject button. Do not hold it down. Press and quickly release.

1. First, plug in the NanoRep to charge the battery. Low battery power level can impede tip ejection. Press the eject button while NanoRep is plugged in.

2. Rotate the syringe tip. Make sure the piston (inside) rotates as well. Then press-and-release the tip eject button. Try this several times. Another option: pull the tip away from NanoRep as you press-and-release the tip eject button. Lastly, try pressing the tip IN at the same moment as you press the tip eject button and pull it outwards as you let go of the button.

Empty aliquot when using No Touch Off dispense

Do not aspirate air into NanoRep. Air within the tip adversely affects accuracy and can result in an empty aliquot.

Empty aliquots may also be the result of insufficient Dispense Force in Advanced mode. To adjust Dispense Force in Advanced mode, press the right button, **Edit**, then joystick down to Dispense Force and joystick right to activate the setting. Increase force and press the left button, **Done**.

Note: For high-viscosity liquids, Touch Off (contact) is the recommended dispense type. This is especially true as tip size increases: For the 50 mL syringe tip, No Touch Off dispense is not recommended for liquids of greater viscosity than water.

Droplet adheres to tip when using No Touch Off dispense

If a droplet hangs and no liquid is being dispensed, please refer to "Empty aliquot when using No Touch Off dispense" above. If liquid IS being dispensed but a droplet remains on the tip from aliquot to aliquot, this is normal NanoRep behavior and accurate aliquots are being dispensed. The presence and size of a droplet is based on aliquot size and liquid type.

Final droplet aerosolizing/splattering in No Touch Off dispense

If splattering is occurring, reduce Dispense Force until cohesive dispenses are observed.

Splash when using No Touch Off dispense

No Touch Off dispense can sometimes create a splash if certain No Touch Off technique essentials are not adhered to (see section 6. Technique Essentials). An aliquot volume set too close to, or equal to, your vessel volume can also increase the chance of splashing.

There are a variety of adjustments you can make to eliminate splashing.

Splash depends on vessel size and shape. It is usually a result of:

- angle of dispense being too close to vertical
- dispense aimed at flat bottom of vessel rather than side wall of vessel
- end of syringe tip being too close to, or inside of, vessel
- excessively high dispense force
- excessively high dispense speed

To eliminate splash when using No Touch Off dispense:

- dispense at a 20-30° angle, not vertical
- target aliquots midway down the wall of the well, not the bottom
- dispense from a short distance away from the vessel, usually 5-10 mm
- set Dispense Force to 5 and reduce further if needed
- set Dispense Speed to 5 and reduce further if needed

Motor stall

Aspirating and/or dispensing some liquids – especially viscous liquids – at a high speed can cause NanoRep's motor to stall. This is a normal response programmed into NanoRep to protect the motor. A stall does not harm the device.

To begin working again after a stall message is displayed, press the left button: OK. If the stall occurred during aspiration, reduce the aspiration speed and resume your work. If the stall occurred while dispensing, reduce the dispense speed and continue working.

Reset message

A reset message may be displayed if the battery falls below a bottom threshold. If you see this message, simply plug in NanoRep to recharge the device. Don't worry, no presets or fixed volumes (saved volumes) are lost, but current mode and settings may need to be reentered.

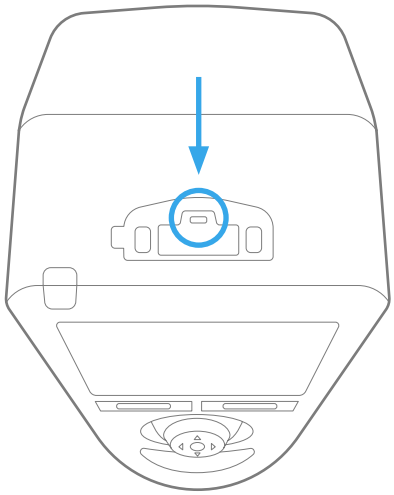
Fuel gauge error

This message is displayed when battery power falls below a base threshold. Plug NanoRep in to recharge the device. You can continue using NanoRep while plugged in.

Reset NanoRep

To bring NanoRep out of an error state and restart the device, open the rubber cover of the mini USB port at the top of NanoRep. With the front of NanoRep facing toward you, the reset button – very small – is inset just above the mini USB port. Press the reset button using a clean, rigid, narrow implement such as a SIM tool or eyeglass screwdriver point.

Note: Reset deletes Presets. Language and other options configured in Settings persist.



18. Warranty Info

Rainin's warranty is a conditional warranty that covers defects in parts or workmanship, as well as ensures proper performance of the pipette as shipped by the factory. It does not cover damage such as that caused by dropping, splash up of chemicals or if the pipette has been repaired or recalibrated by any service facility which is not authorized by Rainin. This warranty is effective for one year following purchase or service in our lab.

19. Frequently Asked Questions (FAQ)

Can I autoclave NanoRep?

No. Do not autoclave Rainin NanoRep.

Can I autoclave NanoRep syringe tips?

No, NanoRep syringe tips are not autoclavable.

How do I disinfect / clean NanoRep?

Carefully wipe NanoRep with ethanol, soapy water, special DNA or RNA cleansers, or a 10% bleach solution, etc. Cotton swabs work well to pinpoint cleanup to a selected area. Avoid liquid entry into gaps around screen and buttons.

Do not use strong solvents such as benzene or acetone, and do not spray, soak or autoclave.

What's the difference between Dispense Speed and Dispense Force?

Dispense *Speed* applies to both Touch Off and No Touch Off pipetting. It is the speed the piston moves downward to dispense an aliquot. Dispense Speed may be reduced to avoid a motor-stall with viscous (thicker) liquids, or to protect delicate liquids or work carefully with volatile liquids. Dispense Speed might be increased to reduce overall time pipetting.

Dispense *Force,* unique to NanoRep, applies only to No Touch Off pipetting. Dispense Force controls the mechanical piston-strike that completes a non-contact dispense. Dispense Force might be increased to fully discharge aliquots of a viscous liquid, while Dispense Force might be reduced to work carefully with volatile liquids or prevent splashing when dispensing into small, shallow vessels such as 96- or 384-well plates.

Can I have a low Dispense Speed with a high Dispense Force?

Yes. When working with a viscous liquid, a lower Dispense Speed is recommended to avoid motor stall, but a mid-to-high Dispense Force will help ensure full discharge of each aliquot.

Can I have a high Dispense Speed with a low Dispense Force?

Yes. Higher Dispense Speed with a lower Dispense Force could help to quickly, but gently, dispense a series of low-surface tension liquid aliquots. Ultimately, settings are up to the user and depend on the aliquot size, liquid type and the vessel(s) into which liquid is being dispensed.

Does NanoRep have blowout?

No. Since NanoRep is a positive-displacement electronic repeater pipette, blowout isn't necessary. To discharge liquid remaining in a tip, press the gray tip-eject button below the joystick. When the screen asks, "Empty tip?" push the left button – **Continue** – or simply press the gray tip-eject button one more time.

Why does NanoRep need to discard the first aliquot?

All repeater pipettes (any brand) require a discard dispense at the start of a dispense series. The discard dispense ensures high accuracy by closing any gaps in the machinery (e.g., between gears) that arise from moving in the aspiration direction.

What is the volume of the discard aliquot?

The discard dispense is 2% of the nominal tip volume: 2 µL on the 0.1 mL tip; 200 µL on the 10 mL tip; and 1000 µL on the 50 mL tip.*

For aliquots less than 1% of any tip, Rainin recommends discarding 3 additional dispenses.

How do I disinfect the adapter for the 50 mL tip?

The adapter for the 50 mL syringe tip may be wiped with 70% ethanol or a 10% bleach solution. It may also be autoclaved. Do not autoclave any other parts of the tip – or any other NanoRep tips.

What languages does the Rainin NanoRep support?

Languages available for Rainin NanoRep are: English, German, French, Spanish, Simplified Chinese, Japanese and Korean.

*In testing performed with deionized water.

20. Disposal

[EN] Disposal of Electronic Equipment
Do not treat this product as household waste. Instead, send it to an electronic equipment recycler for disposal. Contact METTLER TOLEDO for more information.

[DE] Entsorgung von Elektronik-Altgeräten
Dieses Produkt darf nicht über den Hausmüll entsorgt werden, sondern ist einer Recyclingstelle für Elektronikgeräte zuzuführen.

[FR] Mise au rebut de l'équipement électronique
Ne pas traiter ce produit comme une ordure ménagère. Veuillez l'envoyer à une entreprise de recyclage de produits électroniques.

[ES] Eliminación de equipo electrónico
No trate el producto como un residuo doméstico. Llévelo a un punto de reciclaje de equipos electrónicos para su eliminación.

[ZHS] 电子设备处理
请勿将该产品作为家庭垃圾处理。请将其送至电子设备回收站进行处理。

[JP] 電動機器の廃棄
この製品は生活用品として廃棄しないでください。廃棄するには、電子機器の
リサイクル業者にお問い合わせください。

[KO] 전자 장비 폐기
이 제품을 일반 가정 폐기물로 처리하지 마십시오. 대신 폐기하려면 전자 장비 재활용 업체에 보내십시오.

[ZHT] 電子設備處理
請勿將本產品當成家庭廢棄物處理。而是應該將其交給電子設備回收商處理。

[CS] Likvidace elektronických zařízení
Tento výrobek nelikvidujte jako směsný komunální odpad. Namísto toho jej předejte organizaci, jež se zabývá recyklací elektronických zařízení.

[DA] Bortskaffelse af elektronisk udstyr
Dette produkt må ikke behandles som husholdningsaffald. Det skal derimod afleveres på en genbrugsstation for elektronisk udstyr til bortskaffelse.

[HR] Zbrinjavanje elektroničke opreme
Ovaj proizvod nemojte tretirati kao kućni otpad. Umjesto toga, zbrinite ga na reciklažnom dvorištu za elektroničku opremu.

[HU] Elektronikai berendezések ártalmatlanítása
Ne kezelje a terméket háztartási hulladékként. Ehelyett küldje az elektronikus berendezéseket újrahasznosítóba vagy ártalmatlanítóba.

[IT] Smaltimento di apparecchiature elettroniche
Non considerare questo prodotto come un normale rifiuto domestico, bensì smaltirlo conferendolo a un centro preposto alla raccolta e al riciclaggio di apparecchiature elettroniche.

[NL] Verwijdering van elektronische apparatuur
Voer dit instrument niet af als huishoudelijk afval. Lever het in bij een inzamelpunt voor elektronische apparatuur.

[PL] Utylizacja urządzeń elektrycznych
Produktu nie można traktować jako odpadu komunalnego. Należy go przekazać do utylizacji firmie zajmującej się recyklingiem urządzeń elektronicznych.

[PT] Eliminação de equipamentos eletrónicos
Não trate este produto como resíduo doméstico. Em alternativa, ao eliminá-lo, envie-o para uma unidade de reciclagem de equipamentos eletrónicos.

[RO] Eliminarea echipamentului electronic
Nu trataţi acest produs ca deşeu menajer. Pentru eliminare, duceţi-l la un centru autorizat de reciclare a echipamentelor electronice.

[RU] Утилизация электронного оборудования
Данное изделие нельзя утилизировать как бытовой мусор. Его следует отправить в специализированную организацию, которая занимается утилизацией электронных компонентов.

[SK] Likvidácia elektronických zariadení
Nezaobchádzajte s týmto produktom ako s odpadom z domácností. Elektronické zariadenie odošlite na recykláciu alebo likvidáciu.

[SL] Odstranjevanje elektronske opreme
Izdelka ne smete odvreči med gospodinjske odpadke, temveč ga odložite v obratu za recikliranje elektronske opreme.

[SV] Kassering av elektronisk utrustning
Hantera inte den här produkten som hushållsavfall. Kassera den på en återvinningsstation för elektronisk utrustning.

[TR] Elektronik Ekipmanın Elden Çıkarılması
Bu ürüne evsel atık muamelesi yapmayınız. Bunun yerine, elden çıkarmak için ürünü bir elektronik ekipman geri dönüşüm merkezine gönderin.

www.mt.com/rainin

For more information

[DE] Für mehr Informationen
[ES] Para más información
[FR] Pour plus d'informations
[JP] 詳細については
[KO] 자세한 내용은
[PT] Para maiores informações
[ZHS] 了解更多信息
[ZHT] 了解更多信息

Mettler-Toledo Rainin, LLC
7500 Edgewater Drive
Oakland, California 94621 USA

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