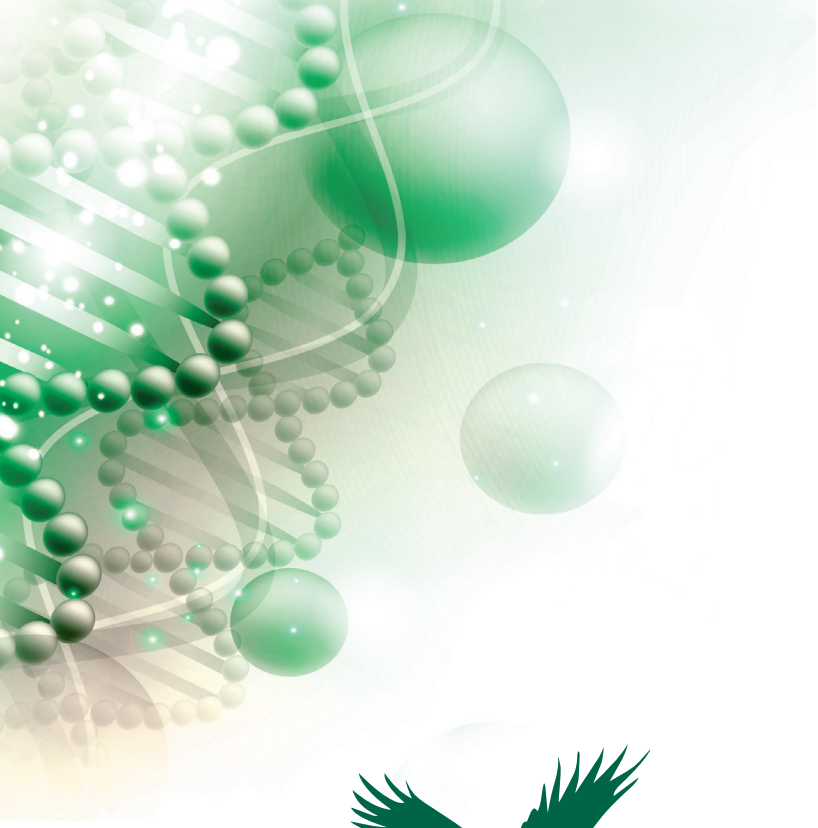


Raptor® Solo

Integrated Analysis Platform

User Manual

NEOGEN®

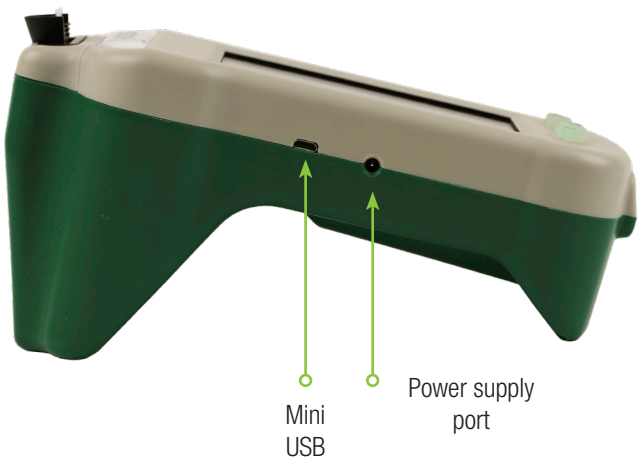
TABLE OF CONTENTS

Introduction

The Raptor® Solo Integrated Analysis Platform is a lateral flow test strip reader with built-in incubation. The instrument provides an easy way to objectively analyze and store the results of Neogen®'s lateral flow tests. The handheld design offers additional flexibility in testing — whether in the lab or in the field.

Materials Provided

- Instrument
- Power cable and international adapters
- Micro USB communication cable
- USB flash drive (containing software, updates, and user manual)
- USB micro adapter
- Testing tracks – endpoint and allergen
- Testing track removal tool
- Calibration cartridge
- Positive and negative standards
- Solo endpoint cartridge




USB communication cable


Power cable and international adapters


Positive and negative standards

USB flash drive


USB micro adapter


Testing tracks – endpoint and allergen


Endpoint cartridge


Testing track removal tool

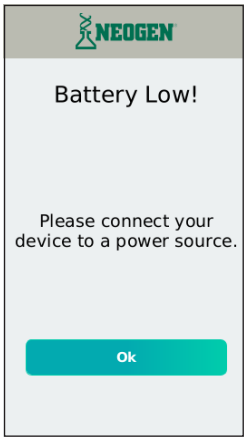

Calibration cartridge

Getting Started

The Raptor Solo instrument must be charged or connected to a power source to be turned on.

Charging the Raptor Solo

- To charge the Raptor Solo instrument, connect the power adapter to the left side of the unit.
- When powered off and connected to the power adapter, the instrument will reach full charge in three hours.
- When the unit is on or in use while connected to the power, it will maintain its current power state.
- A dialog will display to notify the user when the battery needs to be charged



Storage Conditions

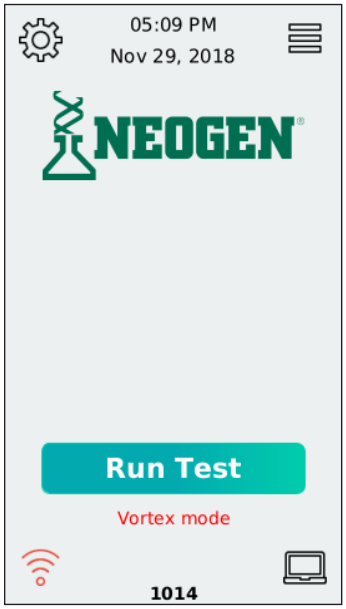
Store the Raptor Solo instrument in a dry, dust-free environment at normal room temperature.

Turning on the Unit

From the front panel of the instrument, press the power button on the left-hand side

Startup Calibration Check

During boot up, the instrument performs a baseline calibration check. This check verifies that the camera is in line with the position of the cartridge. It also confirms that the illumination is consistent with its factory calibrated settings. When the validation passes, the unit will boot up directly to the home screen. If the validation fails, a message will be displayed indicating this failure. Contact Neogen support for further instructions.

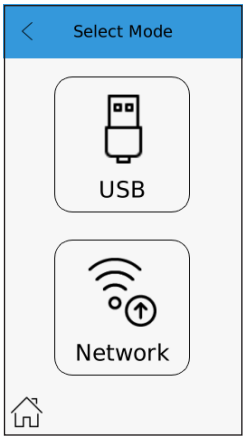


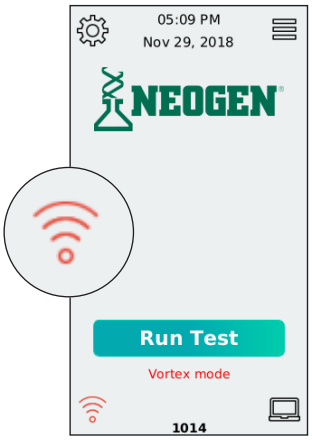
Main Menu

Navigating the Unit

From the main menu, you have access to a number of features:

- **Run a test** – press the Run Test tab and follow the instructions on the screen.
- **Enter data transfer mode** – select the bottom right computer icon and connect the unit to a PC to sync results to the Data Manager software. For instructions on transferring data, see the **Data Manager** section.
- **Check the Wi-Fi connection status** – select the bottom left Wi-Fi icon. The icon color indicates whether the instrument is connected to a network or not. The icon will be green when the instrument is connected and red when disconnected. For instructions on how to connect to a network, see Network Settings listed in the **Settings Menu** section.





- **Navigate to settings** – the Settings Menu allows you to add Lot IDs, connect to Wi-Fi, choose track type, and do a diagnostic check. Select the gear icon on the top left-hand side of the main menu screen to access the Settings Menu.

- **Open the side menu** – the side menu allows you to check the battery charge status, view results, set up user preferences, check the unit status and power off the instrument. Press the menu icon on the top right of the main menu screen.

- **Front keypad** – the keypad at the base of the front of the unit is intended to allow quick access to several key features.
  - Pressing the **right button** opens the side menu when you are on the main menu.
  - Pressing the **middle button** can be used to return to the main menu during the testing routine.
  - Pressing the **left button** is a hard-reset only to be used in the rare case of a unit being nonresponsive. To safely shut off the unit in all other instances, use the side menu power feature as described in the **Side Menu** section.

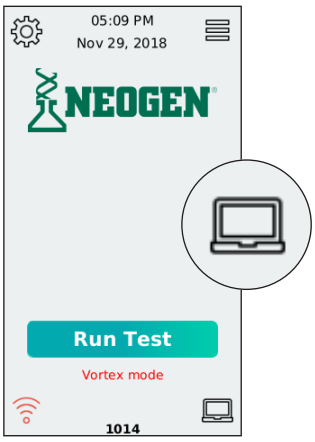
Micro USB Port

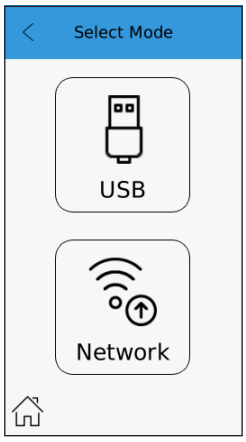
The Raptor Solo features two micro USB ports, one on either side. The diagram below illustrates the functionality of each of these ports.

Use left port to connect to Data Manager software

Use right port for printer and software updates and sync results

- To use a **printer with the reader**, use a micro USB adapter to connect the USB side of the printer's cable to the right micro USB port. Supported printer is the Dymo 450 Turbo (Neogen item 9687). Printer paper is also available (Neogen item 9688).
- To **update the software version** on the reader, insert a micro USB flash drive into the right micro USB port and navigate to the side menu> Unit Status.
- To **sync data to the Data Manager** software, insert the micro USB sync cable on the left side of the reader and the other side into your PC's USB port, then select the bottom right data transfer mode icon from the main menu.



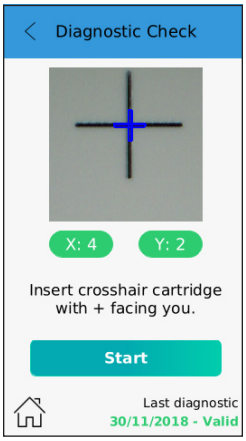


- To **USB charge the reader,** connect the micro USB sync cable on the left side of the reader. Please note that this charging method is not as fast as charging via the wall power adapter.

Diagnostic Check

The Raptor Solo requires users to perform a diagnostic check annually to validate the system's optics module.

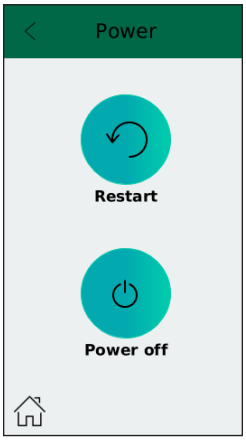
- You can check the status of your diagnostics in the Unit Status screen located in the **Side Menu**.
- To perform the diagnostic check:
  - Access the settings menu by pressing the gear icon on the top left-hand side of the **Main Menu**.
  - Select diagnostic check



  - Insert the white crosshair cartridge into the reader port with the + facing you
  - Press start
  - Status of Valid will show on the bottom of the screen after the completion of the diagnostic check. If the check fails, contact Neogen.

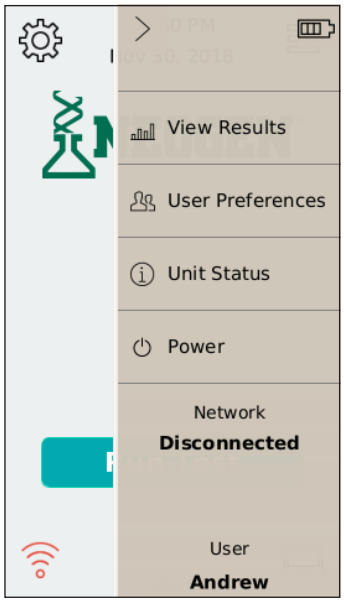
Safe Power Off

To power off a unit safely, the user should navigate to the **Side Menu** and select Power. From here, the user can select Restart or Power off. This function allows the reader to properly complete any read or write cycles prior to powering off, preventing the unintended loss of data that can occur if a unit is powered off using the left-most button on the keypad.



Hard Reset

If a hard rest is required, the user can power off the unit using the left-hand side button on the keypad. Powering off the unit in all instances other than a hard reset should be done via the Power settings selected from the **Side Menu**.



Side Menu

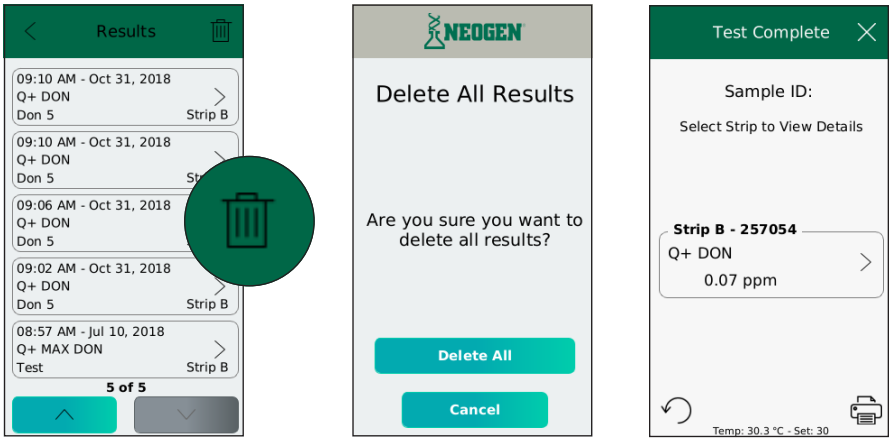
Side Menu

Press the menu icon on the top right of the main menu screen. From here, you can access:

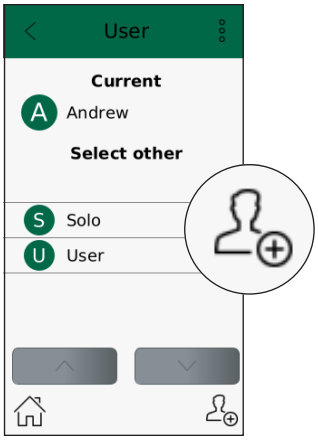
- Check the **battery charge status** by observing the battery's icon on the top right-hand corner. The icon will graphically display the battery status.
- **View results** allows you to view tests that have already been run. You may view the details of any results by selecting it from the list.

  You can delete all tests by selecting the icon at the top right of this page – be sure you have downloaded all results to the Data Manager prior to deleting the results.

  You can print the test result by selecting the result you want and pressing the printer icon on the top right corner of the screen.

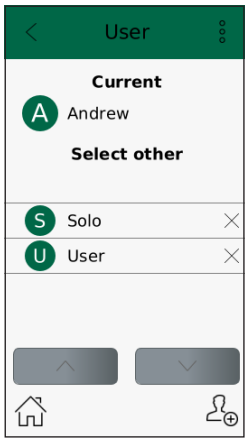


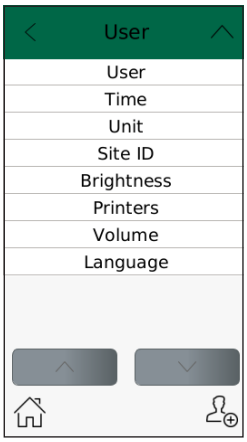
- Select **User Preferences** – this screen allows you to add, select or delete users. Test results are tied to the user that is selected at the time the test is performed.
  - Select the icon on the lower right-hand corner to add additional users
    - Enter the new user name using the keypad on the screen; you can enter up to 25 characters
    - Select the Accept button to add the user
    - Select the Cancel button to return to the previous screen

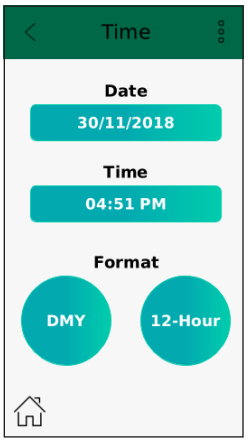


Side Menu Continued

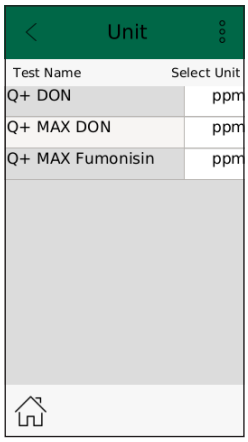
- Select the ⋮ on the top right-hand corner of the user screen to change Users, Time and Date, PPM/PPB toggling, Unit IDs, Brightness, Printers, Volume, and Language.
  - **User**
  - **Time** – allows user to select date (MDY or DMY) and time (12 or 24) format

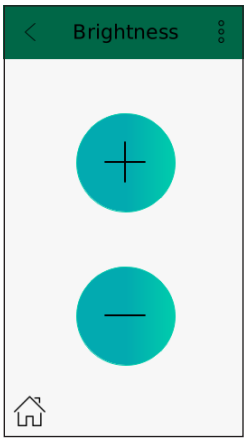






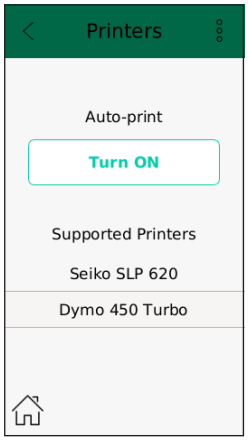
  - **Unit** – select the unit of measure required (PPM/PPB). Results for these tests will be displayed in the unit of measure selected.
  - **Site ID** – allows user to add extra identifiers for traceability of results
  - **Brightness** – adjust the brightness of the screen display by pressing the + −

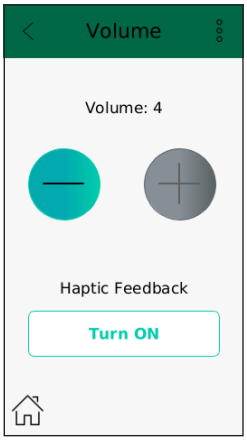


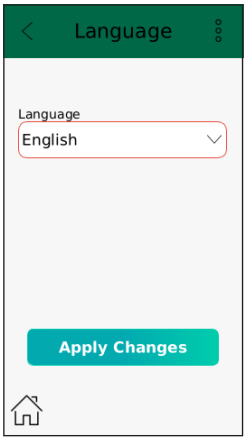


Side Menu Continued

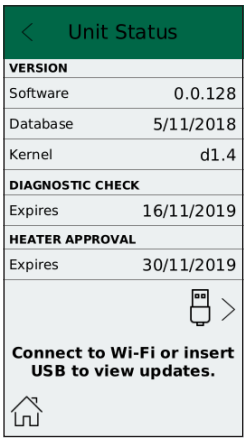
- **Printers** – turn Auto-print on/off. When on, the results will print immediately provided the printer is attached. The Dymo 450 Turbo is the recommended printer.
- **Volume** – adjust the volume using  . The Haptic Feedback feature provides a vibration key touch. Press Turn on or Turn off to activate/deactivate.
- **Language** – select the language desired, press Apply Changes

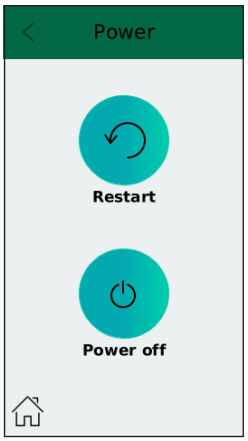


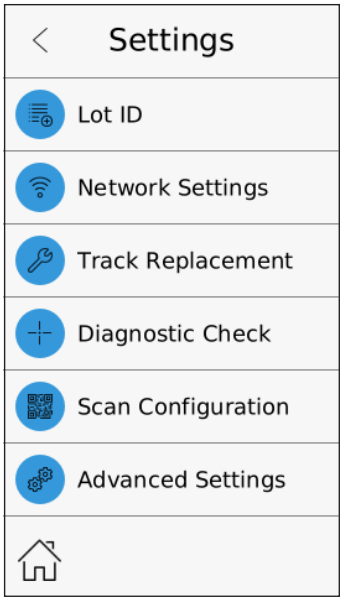




- Select **Unit Status** to view instrument details such as current software version and date of last diagnostic check. Software and Database status is also displayed on this screen.
  - From here you can insert a flash drive into the right micro USB port to update the software/database version. For instructions on updating, see the **Updating the Instrument** section.
- Select **Power** – it is **very important** that you power off the unit from this selection. This allows the reader to properly complete any read or write cycles prior to powering off, preventing the unintended loss of data that can occur if a unit is powered off using the keypad on the unit.





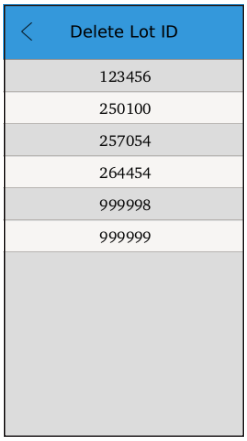


Settings Menu

Settings Menu

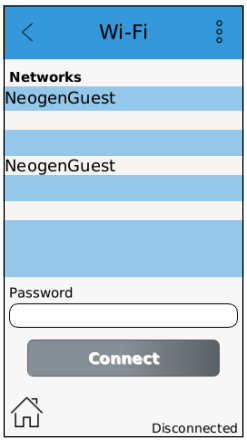
Press the Gear icon on the top left of the main menu screen. From here you can access:

- **Lot ID** – The Lot ID database stores lot-specific information
  - Each kit lot has a lot specific QR code that contains all the lot-specific information.
  - To run a test strip, the lot information must be saved on the instrument.
  - Select Lot ID to add new kit lots to the instrument. The QR Scanner will automatically initiate and the user is prompted to scan the associated QR code located on the device tube. Once the user has scanned the lot-specific QR code, the lot information will be saved, and the user will not be prompted to scan it again.



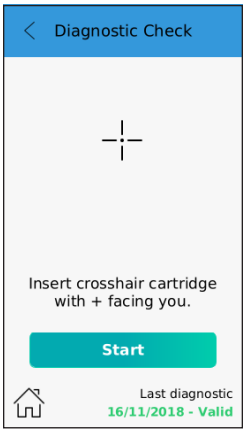
  - **Trash can icon** – Select this icon to delete Lot ID information

- **Network Settings** – The reader is Wi-Fi enabled to allow for remote updates and data transfer.
  - Select the Network from the list on the screen
  - Enter the Network Password
  - Select Connect



Settings Menu Continued

- **Track Replacement** – This feature allows you to select the Neogen testing format.
  - Standard – endpoint assays
  - Vortex – cartridge
  - Allergen – 3D cassettes
  - For information on how to change the track, see **Track Replacement** section.
- **Diagnostic Check** – The Raptor Solo requires users to perform a diagnostic check annually to validate the system's optics module.
  - You can check the status of your diagnostics in the Unit Status screen.
  - To perform the Diagnostic Check:
    - Access the settings menu by pressing the gear icon on the top left- hand side of the main menu.
    - Select Diagnostic Check
      - Insert the white crosshair cartridge into the reader port with the + facing you
      - Press Start
      - Status of Valid will show on the bottom of the screen after the completion of the diagnostic check. If the check fails, contact Neogen.

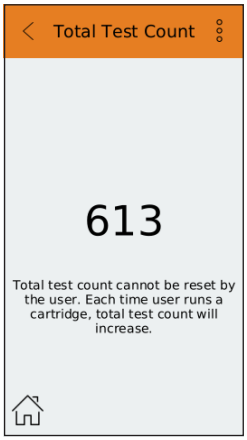


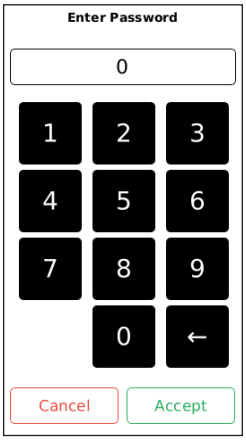
Scan Configuration – This feature is password protected and can only be accessed by Neogen.

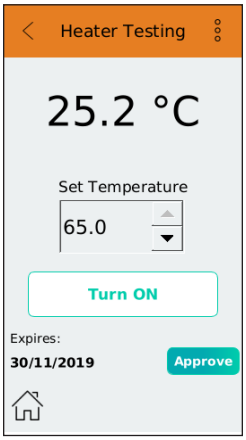
Settings Menu Continued

Advanced Settings

- **Database** – Contains Neogen test specific information. This field is not accessible to user.
- **Unit Diagnostics** – This field requires a password (6364) to access. In this menu you can access:
  - **Total test count** – This shows the total number of readings performed on the instrument.
    - Select the  icon on the top right -hand corner to see:
      - Total test count
      - Live preview – shows what camera sees
      - Factory settings – restores original factory settings
      - Heater testing
        - Approve heater – for information on performing the temperature approval procedure, see **Temperature Probe Procedure** section.
- **Developer** – This feature is password protected and can only be accessed by Neogen.
- **Hardware** – This feature is password protected and can only be accessed by Neogen.





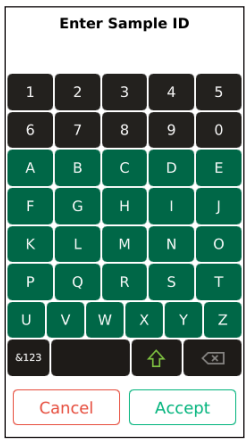


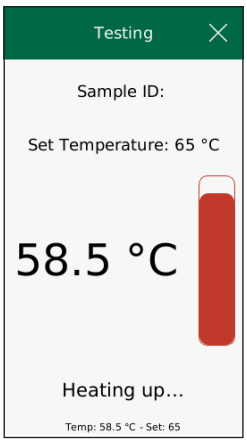
Running a Test Using the Raptor Cartridge

The Run Test icon is located on the home screen. When a user selects **Run Test** the instrument enters the test routine mode providing step-by-step instructions.

Test Routine Workflow:

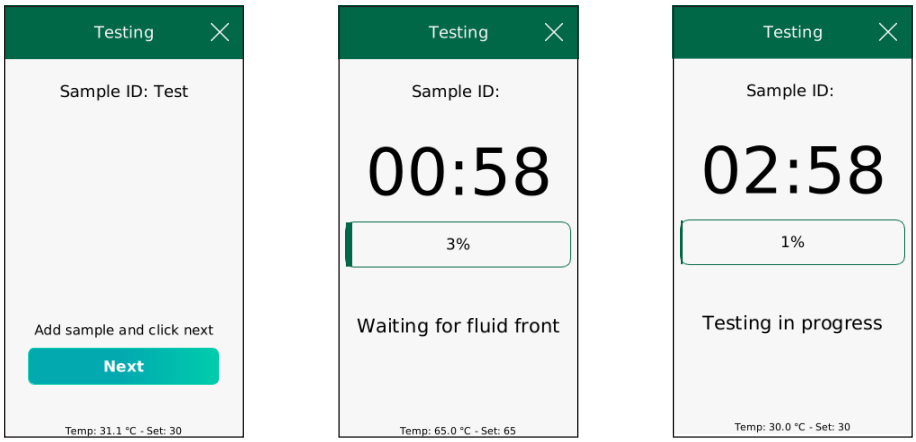
- Insert cartridge containing at least one test strip into the port.
  - The instrument recognizes a cartridge has been inserted and will scan the device(s) found within the cartridge.
- The test strip barcodes are identified.
  - Test information is linked by the barcode on the test strip.
    - If the instrument does not have the lot-specific information, the barcode scanner will turn on for the QR code to be scanned.
      - Hold the tube containing the lot-specific QR code within the scanner range. The instrument will accept the data and display the lot number of the test strip in the cartridge.
- The Scan Sample ID screen appears allowing you to scan a barcode on your sample. If your samples do not have a barcode, you can manually enter the information by pressing the icon.
  - Enter the sample ID using the keypad and press the Accept icon.
- Heating of internal incubator.
  - Based on the test information, a target testing temperature is set.
  - NOTE: *Do not add sample until the incubator reaches the correct temperature.*
  - Once the target temperature is reached, the user can proceed by adding a sample when prompted.





- Add sample to the cartridge
  - Using a pipette, collect 400 µL of sample and carefully dispense the liquid into the funnel-shaped opening at the top of the cartridge.
    - The sample size is always 400 µL whether running 1 test strip or up to 3 test strips per cartridge.
  - Once the sample addition is complete, press Next

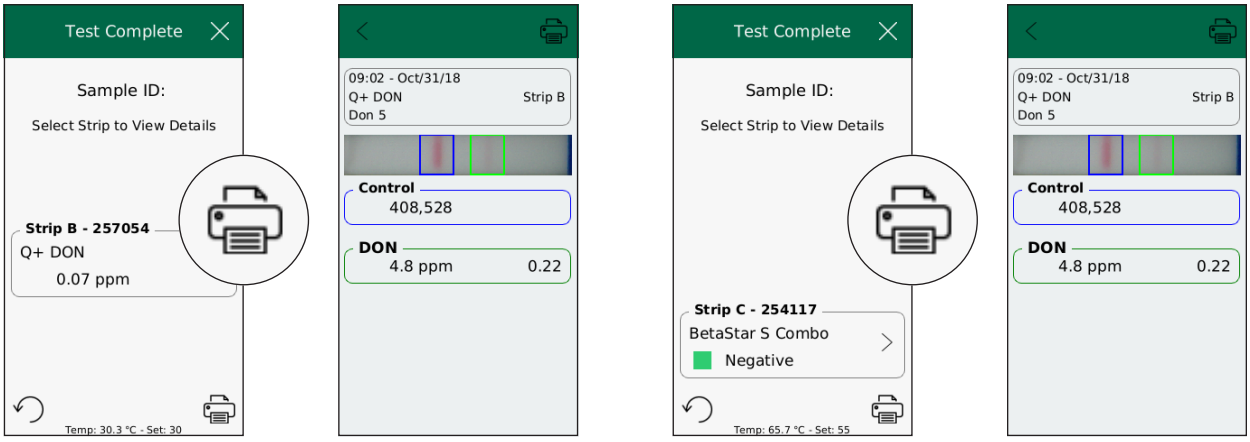
- **Fluid front detection**
  - The instrument will look for the fluid front of the sample. Once detected, the timer for the assay will begin.



- **Test timer** is activated.
  - Each test has a specific run time that must elapse before results can be analyzed.
  - The timer on the screen indicates the remaining test time.

- **Analysis**
  - Once the specified time has elapsed, the reader will automatically capture an image of the strip(s) and analyze the results.

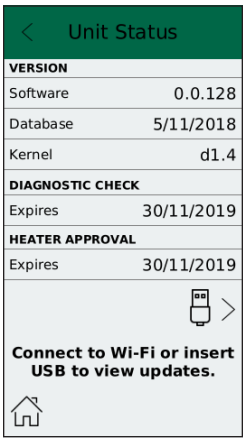
- **Results Screen**
  - After the strip(s) in a cartridge are analyzed, the sample results screen is displayed. An audio tone will sound and all result information is saved on the reader. If auto-print is enabled, the result will automatically print.
  - The result screen will display results for each strip. This screen gives the user a simple positive/negative, or quantitative result for each strip in the cartridge.
    - Click on a strip name for more detailed result information.
      - Test line name
      - Test result
      - Image with regions of interest for analysis shown
      - Results can be printed from this screen by clicking the printer icon.



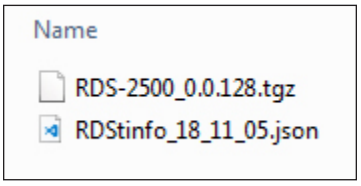
Updating the Instrument

The instrument will require software updates that may include new features being added, additional test information for new test types, and general software updated. The instrument can be updated either wirelessly or using a USB flash drive with micro USB adapter.

- **Unit Status**
  - Access the side menu  from the Home screen
  - Select Unit Status



- **USB Update**
  - Click this link to download the latest Raptor Solo Updates **ftp://raptor-sguest:Guest!@ftp.neogen.com/Software/RaptorSoloUpgrade.zip**
  - Unzip the contents of the downloaded file. The zip file will contain the latest Raptor Solo PC Data Manager software, test package, and device firmware.
  - Copy the JSON test package file and the TGZ firmware file onto an empty USB flash drive:



  - Plug the micro USB flash drive with the update into the micro USB port on the right side of the instrument.
  - The micro USB drive will be scanned by the instrument. If a new update is identified, a button will display for both a software update and test type package update depending on what is available on the FTP server.
  - Install each update by selecting the available button on the screen.

- **Wi-Fi Update**
  - Ensure the Solo is connected to a Wi-Fi network (see Network Settings in the **Settings Menu** section).
  - The instrument will periodically contact the Neogen File Transfer Protocol (FTP) server to check for updates. When a new update is available, a button will display for both a software update and test type package update depending on what is available from the FTP server.

Track Replacement

The Raptor Solo features interchangeable cartridge inserts that allow multiple cartridge and test strip type dimensions to be used. The unit has the Vortex cartridge track installed when shipped. There are two other tracks included in the system and a tool to use during track replacement.

Testing track – endpoint

Testing track – allergen

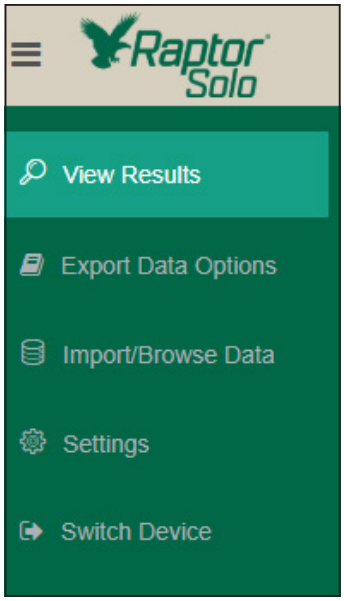
Testing track removal tool

- From the Main Menu, select the  in the upper left hand corner

- Select Track Replacement
  - **Standard** – Track with the blue dot on the right-hand side. Use this track with the end-point cartridge.
  - **Vortex** – Track with the green dot on the right-hand side. Use this track with the Raptor cartridge.
  - **Allergen** – Track with the red dot on the right-hand side. Use this track use with the 3D Allergen cartridge.
- Select the track that you will be using – the red box will show your selection.
- Return to the home screen by selecting the  in the left-hand lower corner.
- Insert the track replacement tool with the arrow facing towards you into the track in the unit.
- Gently pull up to remove the track.
  - To remove the tool from the track, gently press on the end of the tool and extract from the cartridge.
- Insert the desired track into the unit.

Temperature Probe Procedure – For Dairy Testing

The Raptor Solo Integrated Analysis Platform utilizes a heating element to provide constant heat to the cartridge containing the immunochromatographic assay and sample during the duration of the test. The temperature of the heating element in the port is constantly monitored through a thermistor and the temperature is reported on the screen of the Raptor Solo in real time. This temperature range is used as the basis for the annual temperature verification. Please contact Neogen for more information.



Data Manager Menu

Data Manager

The Data Manager software may be installed on Windows and Mac Operating Systems. The Data Manager is compatible with Windows 7 and above operating systems.

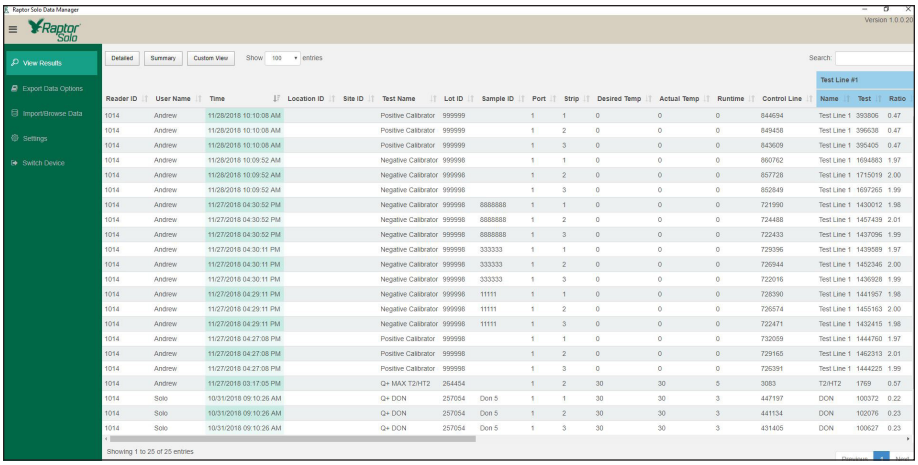
- **Installation**
  - Insert the provided USB drive into the computer and run the setup.exe installer.
  - Make sure the Data Manager is installed and the Solo reader is connected through the provided micro USB cable.
    - **Getting started**
      - Double-click on the Data Manager shortcut on the computer desktop.

    - **Home Screen**
      - The launch of the software will display the home screen featuring an animation and a link to the Neogen software. Select the Raptor Solo icon.

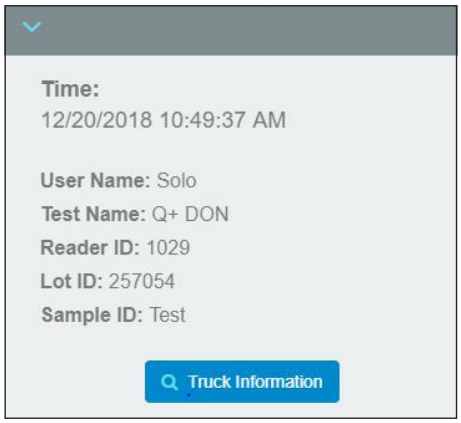
  - There are 5 menu items on the left-hand side of the operation screen.

The menu can be hidden or shown by selecting the  icon.

- **View Results**
  The results screen can be configured using the Detailed, Summary, or Custom View options.

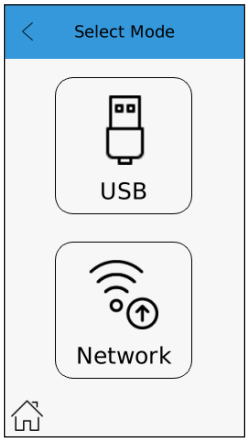


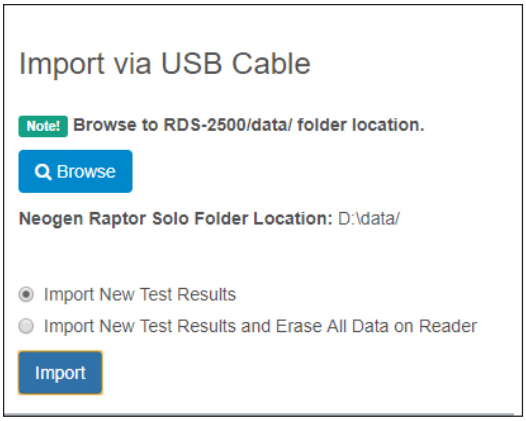
- **Detailed View** – shows all parameters available
- **Summary** – shows key result fields
- **Custom** – allows user to choose which columns to view on program
- The number of data entries can be configured to show 10, 25, 50 or 100 results per page.
- The Search box on the right-hand side is a tool that will query the test data base for information of interest.
- Data can be quickly sorted in ascending or descending order for each column by clicking on the column title.
- By selecting the data row for a specific result, a test detail view will appear in the lower half of the screen. The test detail view contains:
  - Image of the device
  - Specific information on the sample (Test, lot #, Sample ID, time, date)
  - Graph of the test and control line intensity values



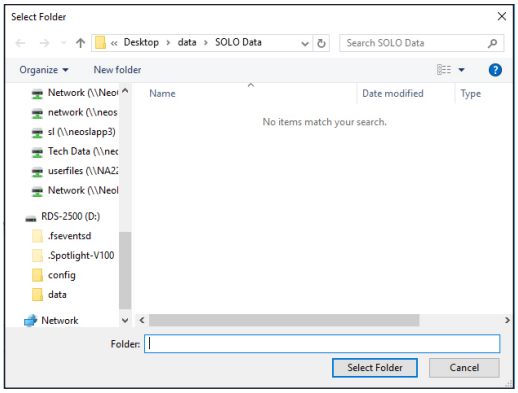
- Truck information tab
  - Select this button to add truck information for the sample
  - Select edit to add information for:
    - shipping name/FOB
    - truck information
    - invoice/ticket
    - truck destination
    - travel authorization/discharge
    - comments

- **Export Data Options**
  Data can be exported in common file formats for further analysis or integration into Laboratory Information Management Systems (LIMS).
  - **Save As** – select the destination location for the file export and name the export file. Note: Do not add a file extension at this point of the process.
  - **Filter Data** – select test parameters to be exported. Options include:
    - date range
    - user name
    - reader ID
    - test name
    - lot ID
    - result
  - **Custom Data Representation** – allows user to customize field names. For example, Solo uses “User Name” while a company may use “User ID” to identify the person running the assay. This feature allows user to customize to their nomenclature. The checkboxes to the left indicate what fields will be included in the final data export.
  - **Export Settings** – choose file format and separator needed
- **Import/Browse Data**
  - **Data Storage** – Use a data storage folder by selecting the Browse button and choosing an existing folder or creating a new folder. This is where the data files will be stored. This location will be saved and all data will go to this folder until a user changes it.
  - **Import via USB cable**
    - Connect the Solo reader to your computer using the micro USB cable.
    - Select Data Transfer mode  from the main menu.
    - Select the USB transfer mode.

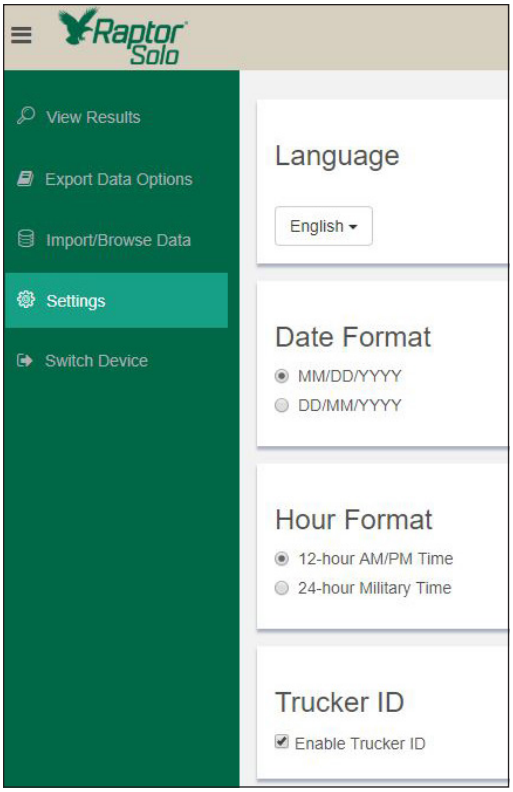




- From the Data Manager Screen shown on the left:
  - Select Browse
  - Select data
- Select folder
  - Choose to import new test results or
  - Import new test results and erase all data on reader
- Select import



- **Import via local network** – transfer data through a wireless network connection
  - Identify the unique IP address for the unit by selecting the wireless icon on the home screen of the Solo.
  - Enter the IP address for the Solo in the field provided.
  - Select Import to transfer data from the instrument.
  - A progress bar will display import progress.



- **Settings**
  - **Language** – choose desired language from drop down menu
  - **Date Format** – choose MM/DD/YYYY or DD/MM/YYYY
  - **Hour Format** – choose 12 or 24-hour format
  - **Trucker ID** – enable Trucker ID fields
- **Switch Device** – this allows the Data Manager to go from the Solo unit to a Raptor unit

Troubleshooting

For technical support – contact **Neogen Corporation**
620 Lesher Place
Lansing, MI 48912 USA
(800) 234-5333 (USA)

Maintenance

General Care

- This instrument contains sensitive electronics and optical components and must be treated with care.
- To clean the touchscreen on this instrument, wipe it gently with a soft cloth. Avoid using any liquid solvents to clean the screen.

Spills

- In the event a sample is spilled in the instrument, turn off the device and carefully remove any sample cartridges. Keep the instrument upright and allow any excess liquid to drain out of the holes at the bottom of the unit, directly below the port openings. Wipe up the liquid from under the instrument with a cloth. For any remaining liquid inside the instrument, use a long cotton swab to clean the internal ports.
- For minor spills on or around the exterior of the instrument, wipe away any liquid quickly. Ensure no liquid has come into contact with any external ports or buttons before proceeding.
- For more severe spills, contact Neogen.

Technical Specifications

Power

Chargeable via 12V 3.4 A
Wall Power Adapter and Micro USB Cable

LCD Display Screen

4.3” capacitive touchscreen with:
onscreen keyboard
haptic feedback
480 x 272 resolution

Dimensions

8” x 4” x 4” (21 x 10 x 10 cm)

Connectivity

Wi-Fi and USB

Memory

6 GB Micro SD Memory Card – stores 3000 results

Battery

5200 mAh Lithium-Ion – approximately 4 hours (depending on incubator temperature)

Safety Information

Service

This instrument has no user serviceable parts and must be returned to Neogen for service.

Power

- To power or charge the instrument, assemble the power cable by connecting the desired regional power adapter to the power supply. Plug the AC line into an outlet and insert the plug into the instrument.
- Components such as power supply and built-in information technology equipment shall be used in accordance with their specified ratings unless a specific exception is made.

Design Conditions

- Indoor use only
- Altitude up to 2,000 m
- Temperatures 5–40°C
- Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C.

Note*: If this instrument or any of its associated parts are used in a manner not specified by the manufacturer, the protection provided by the instrument may be impaired.*

Warranty

The Raptor Solo Integrated Analysis Platform carries a 12-month limited warranty on defective materials and workmanship. Buyer assumes all risk and liability resulting from the use of this product. There is no warranty of merchantability of this product, or of the fitness of the product for any purpose. Neogen shall not be liable for any damages, including special or consequential damage, or expense arising from the use of this product.

NEOGEN®
620 Lesher Place • Lansing, MI 48912
800-234-5333 (USA/Canada) • 517-372-9200
foodsafety@neogen.com • foodsafety.neogen.com

FD1277-0119