KT-100™ Handheld LIBS Analyzer
User Manual

Software version 1.1.0.0 and higher

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Preface

This user manual provides instructions for operating and taking care of the Rigaku Analytical Devices (RAD) KT-100 Handheld LIBS Analyzer (KT-100), which uses Laser Induced Breakdown Spectroscopy (LIBS) to identify a wide range of ferrous and non-ferrous metals and alloys. This section includes:

- Document Overview
- Document Conventions
- Safety and Compliance Notices for the KT-100 Analyzer
- Contacting Rigaku Analytical Devices

Document Overview

This manual tells operators and owners with various levels of experience how to operate, maintain, and configure the KT-100 analyzer. Table 1 summarizes the experience and responsibilities of these users.

Table 1. Audiences

Audiences	Experience Levels	Responsibilities
Operators	New or limited users	- Preparing samples - Analyzing samples - Viewing results - Maintaining analyzer - Adding Sample IDs or other search markers to results
Owners	Expert users	- Configuring analyzer - Archiving analyzer data

Table 2 provides an outline of the manual and lists likely audiences and types of information in each section.

Table 2. Document Overview

These sections…	Provide…	With information about…
Introduction	All users	- Finding analyzer features - Understanding LIBS spectroscopy - Ways of using the analyzer
Starting the KT-100 Analyzer	All users	Performing basic procedures
Operating the KT-100 Analyzer	Operators	- Preparing and analyzing samples - Viewing results - Maintaining the analyzer - Using the digital camera
Configuring the KT-100 Analyzer	Owners	- Setting up the analyzer - Configuring analyzer results

These sections…	Provide…	With information about…
Syncing Results to a Personal Computer	Owners	• Connecting to analyzers with PCs and network workstations • Viewing results data on PCs and network workstations • Archiving analyzer data on PCs and network workstations • Downloading System Logs for technical support.
Basic Troubleshooting	All users	• Collecting customer support information
Appendix A: Operating Specifications	All users	• Analyzer specifications
Appendix B: Statements of Compliance	Owners	• Compliance with safety requirements
Appendix C: Regulatory Statements	Owners	• Compliance with regulatory requirements

Document Conventions

Table 3 lists the document conventions in this user manual.

Table 3. Document Conventions

Convention	Purpose
	⚠CAUTION **LASER CAUTION** notices highlight hazards to humans caused by the integrated Class 3B laser. Each laser caution is accompanied by an appropriate laser CAUTION symbol. If the listed precautions are not followed, injury to people can occur.
	⚠CAUTION **CAUTION** notices highlight hazards to humans, property, or the environment. Each CAUTION notice is accompanied by an appropriate CAUTION symbol. If listed precautions are not followed, injury to people or damage to property, equipment, or the environment can occur.
	Important: **Important** notices highlight information that either is necessary for optimal performance of the system or is critical to prevent: • Damage to software • Loss of data • Invalid test results If listed procedures are not followed, data integrity may be affected.
Note:	**Note:** Highlights tips for performing procedures and provides information of general interest.

Convention	Purpose
Bold	Is used for: • Screens, dialogs, dialog items, menus, controls, buttons, fields, and software controls. For example: Select ✳ (**Analyze**). • Named hardware items. For example: On the keypad, press the **Main** hard button to display the **Main** menu.
Italics	Are used for: • Emphasis. For example: Do *not* move your analyzer while analyzing samples. • Terms that the text defines or explains. For example: The *Alloy Match Criteria* (AMC) setting specifies the threshold above which the KT-100 analyzer returns matching results. • Titles of book and manuals. For example: For more information, see the *Quick Start Guide*.

Safety and Compliance Notices for the KT-100 Analyzer

The following sections provide the safety and compliance notices for safely and effectively using the KT-100 analyzer in facilities, warehouses, and recycling yards. Please read these sections before operating your analyzer.

	⚠CAUTION
⚠	This analyzer uses Class 3B lasers. Consequently, before setting up or operating this analyzer and its accessories: Read the sections "Laser Safety and Compliance," "General Safety and Compliance," and "Safe Operation Notices". Complete appropriate training about your organization's procedures and policies for using this analyzer on both known and unknown samples. Ensure that your KT-100 analyzer is set up correctly for analysis of the samples you are testing.

Laser Safety and Compliance

This section lists laser-specific safety and compliance notices for operating your analyzer.

	⚠CAUTION
⚠	This analyzer is certified as a Class 3B laser product to the requirements of the U.S. Federal Product Performance Standard for Laser Products contained in the regulations of 21 CFR Sub-Chapter "J" except for deviations pursuant to Department of Health and Human Services issued Laser Notices. The KT-100 analyzer also complies with IEC 60825-1 Ed. 3 (2014) .

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⚠CAUTION

When analyzing, each KT-100 analyzer uses a laser-emitting diode to produce a laser beam of specific properties for analyzing samples. Table 4 lists laser properties of the KT-100 analyzer.

Table 4. Laser Properties for the KT-100 Analyzer

Properties	KT-100
Max power	150 uJ
Frequency	1064 nm
Repetition frequency	150 Hz
Beam divergence	34.6 mrad
Pulse Duration	1 ns
AEL	Class 3B
MPE	962.2 W/m^2
NOHD	6.34 in. (16.1 cm)
Laser warning labels	This label marks position of the laser warning indicator (see Figure 1). When the indicator is lit and red, the laser is active. When the indicator is not lit, the laser is not active. This label is located by the analyzer's trigger (see Figure 3) It provides information about properties of the analyzer's laser.

⚠CAUTION

CAUTION: Exposure to levels of laser energy greater than the maximum permissible exposure (MPE) can harm the eye. MPE for this analyzer is 962.2 W/m^2. The laser energy must travel a minimum distance of 6.34 inches (16.1 cm) before its concentration is lower than the MPE. This distance is defined as the hazard zone. With proper use, exposure to levels above the MPE can be avoided. Avoid exposure to the laser beam.

CAUTION: Because exposure to Class 3B laser energy can be hazardous, avoid exposure to the beam. In addition, avoid exposure to specular, or mirror-like, reflections. Never point the analyzer at anyone.

CAUTION: If your workplace does not have established safety standards or requirements, consult both the American National Standard ANSI Z136.1 for policies about the safe use of lasers and the International Standard IEC 60825-14 for information about identifying and controlling hazards of laser use.

CAUTION: Calculations performed in accordance with the recommended practices of ANSI Z136.1 and IEC 60825-1 give a Nominal Ocular Hazard Distance (NOHD) of approximately 6.34 inches (16.1 cm) from the focal point of the lens and an estimated optical density (OD) greater than 2 for laser safety eyewear.

The above MPE and NOHD were calculated in accordance with American National Standard ANSI Z136.1 and the International Standard IEC 60825-1 for Rigaku Analytical Devices by John R. Kretsch, P.E., NCE of Interpro Consulting Engineering, LLC.

General Safety and Compliance

This section lists general safety and compliance notices for successfully operating your analyzer in various environments.

⚠️	**⚠️CAUTION**
	Although the KT-100 analyzer is designed to work in hazardous environments, it is not intrinsically safe in any environment. Follow the general safety precautions and special safety instructions in this manual to guarantee the best possible operating safety.
	If the analyzer, its controls, features, and options, or accessories are used in ways not specified either by this manual or by Rigaku Analytical Devices, hazardous conditions that exceed the protection provided by the supplied and specified equipment may occur.

⚠️	**⚠️CAUTION**
	Use facility procedures, analyzer controls, engineering controls, and laser-safety eyewear to avoid laser emissions within the 6.34-inch (16.1-cm) hazard zone.
	Laser-safety eyewear must have an optical density (OD) greater than 5.9 to protect operators from exposure above the maximum permissible exposure (MPE).

⚠️	**⚠️CAUTION**
	This analyzer is not serviceable by users. While the battery compartment may be opened, no parts other than the battery may be removed or replaced. Any repairs must be performed by Rigaku Analytical Devices or other authorized service personnel. Improper or faulty repairs could result in damage to the analyzer and possible danger to users.
	When parts, including batteries, are removed, dispose of them as required by all local authorities and jurisdictions.

⚠️	**Important:**
	Use only the battery pack that is provided by the manufacturer, which has its own protection against short circuit, over charging, and excessive discharging. Charge the battery pack with only a suitably certified or approved battery charger.
	For factory-replacement batteries and chargers, contact Rigaku Analytical Devices.

Safe Operation Notices

Failing to consider the following issues while using the KT-100 analyzer may result in harm to the operator or damage to your analyzer.

	⚠CAUTION
⚠	The KT-100 analyzer contains a lithium ion battery pack which has been designed to be safe under normal operating conditions. Due to the nature of Li-ion batteries please consider the following safety precautions: • Avoid shorting the battery • Do not immerse the battery in water. • Do not disassemble or deform the battery. • Do not expose the battery to fire. • Do not dispose of the battery in fire. • Avoid excessive physical shock. • Keep the battery out of the reach of children. • Never use a battery that appears to have suffered damage or abuse. • Battery must be charged in an appropriate charger, a RAD-supplied charger, or inside a KT-100 analyzer. • Never use a modified or damaged charger. • Store the battery in a cool, dry, and well-ventilated area. • Dispose the battery in accordance with local regulations.

	⚠CAUTION
⚠	If the analyzer is damaged or not functioning properly, switch it off, remove the battery pack, and do not use it until it is properly repaired or replaced by Rigaku Analytical Devices or other authorized service personnel. Operation of an improperly functioning or damaged analyzer can result in both dangers to the operator and incorrect readings.

⚠	**Important:**
	
	If the analyzer is damaged either by consistent or occasional impact or by exposure to any of the following operating conditions, the warranty will be voided.
	
	Operating conditions that may harm the analyzer include:
	
	• Steam
	• Extreme ambient temperatures above 104°F (40°C) or below 32°F (0°C)
	• Strong electromagnetic (motors or transformers) or electrostatic fields
	• Strong vibrations and impacts
	• Contact with oxidative, corrosive, and caustic liquids including, but not limited to:
	  ▪ Chlorine gas
	  ▪ Hydrochloric acid
	  ▪ Ammonia
	  ▪ Concentrated hydrogen peroxide
	  ▪ Sulfuric acid
	  ▪ Aqueous sodium hydroxide
	
	Please contact Rigaku Analytical Devices (RAD) if you require modifications for working in any of the listed conditions.

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Contacting Rigaku Analytical Devices

Contact us between 9:00 AM and 5:00 PM Eastern Time Zone (UTC-04:00) for information and assistance:

Customer Support Contact Information (English Only)	
Telephone:	+1-855-785-1064 or +1-781-328-1024
Fax:	+1-781-328-0119
Email sales:	sales@rigakuanalytical.com
Email service:	service@rigakuanalytical.com
Website:	http://www.rigakuanalyticaldevices.com
Address:	Rigaku Analytical Devices, Inc. 30 Upton Drive, Suite 2 Wilmington, MA 01887 USA

Introduction

This section introduces users to the KT-100 analyzer in the following subsections:

- Overview of the KT-100 Analyzer
  - Top View
  - Front Left View
  - Front Right View
  - Accessories
- Carrying Your Analyzer
- Understanding LIBS Spectroscopy
- What You Can Do with the KT-100 Analyzer

Overview of the KT-100 Analyzer

The KT-100 analyzer is the latest generation of on-site alloy identification instruments. Using Laser Induced Breakdown Spectroscopy (LIBS), it provides accurate information about unknown alloys for alloy sorting, Quality Control (QC), and Positive Material Identification (PMI).

With large buttons and a bright, easy-to-read display, you can view alloy results at the touch of a button. Because it has libraries containing hundreds of metals and alloys, the KT-100 analyzer provides:

- Rapid and accurate results with little or no sample preparation
- On-site alloy chemistry and grade identification
- Nondestructive analysis of samples
- Long battery life for continuous operation

In addition, the KT-100 analyzer's tested IP 54 rating proves that it is durable for use in the field.

Each KT-100 package includes:

- KT-100 analyzer
- Two rechargeable batteries
- External docking station with battery slot for charging batteries
- 12-volt AC adapter compatible with both analyzer and docking station
- USB stick with KT-100 software and *KT-100™ Handheld LIBS Analyzer User Manual* (in PDF format)
- USB cable for docking station or direct analyzer data backups
- Factory Calibration Certificate
- *KT-100™ Handheld LIBS Analyzer Quick Start Guide*
- Rugged carrying case

The following sections show product features and components.

Top View

Figure 1. Top View

Analyzer window

Active laser warning

Right sample
alignment line

Top sample
alignment line

Laser warning label

Keypad

"Tilt-able" touchscreen
with serial number on
back of screen

Power/Enter hard
button
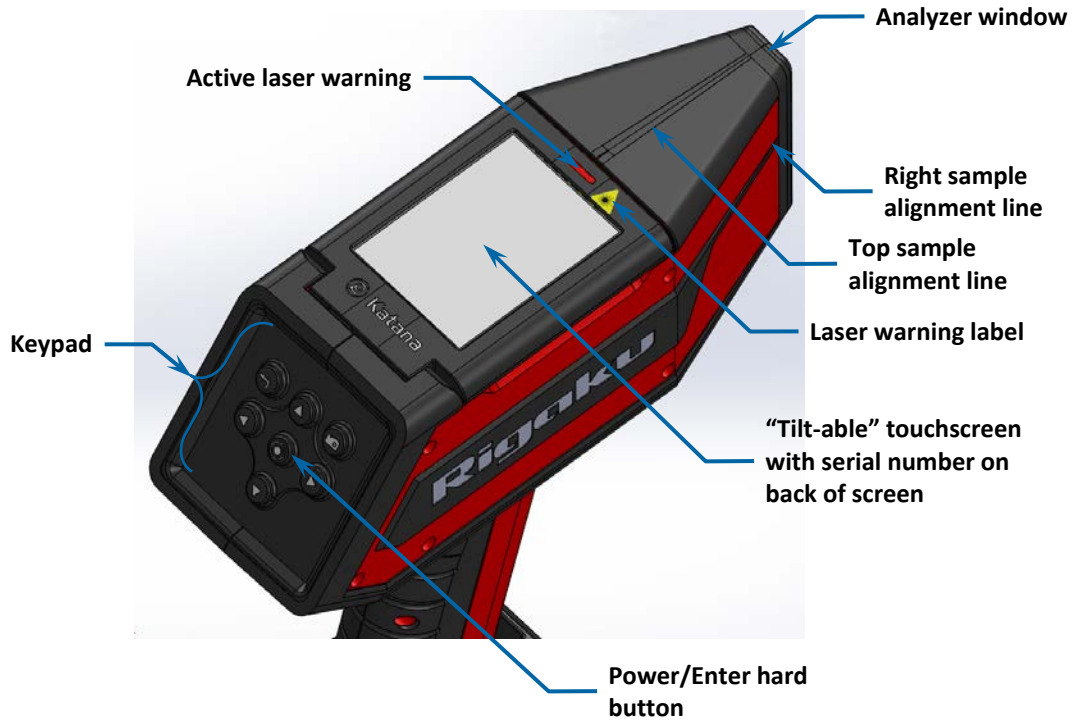
Front Left View

Figure 2. Front Left View

"Tilt-able" touchscreen

Analyzer window

Left sample
alignment line

Trigger

Stabilizer/support

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Front Right View

Figure 3. Front Right View

Right sample alignment line

Analyzer window

Class 3B Laser warning label

Right Quick Launch key

Docking station connector

Trigger

Stabilizer/support

Power and Micro USB Connectors

Figure 4. Connector Locations

Power and micro USB connectors

Battery compartment door
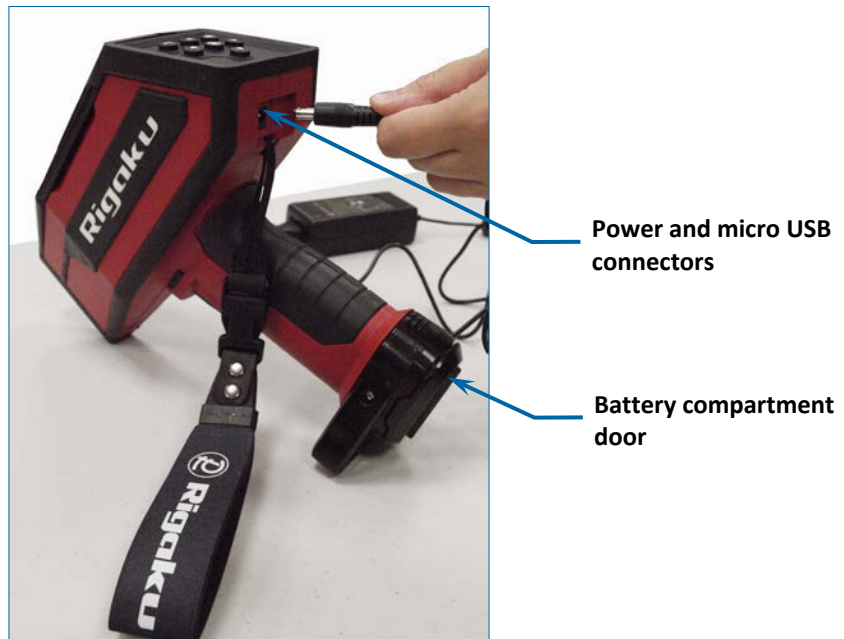
Accessories

Figure 5. Docking Station

Battery charging
(indicator red)

Analyzer charged
(indicator green)
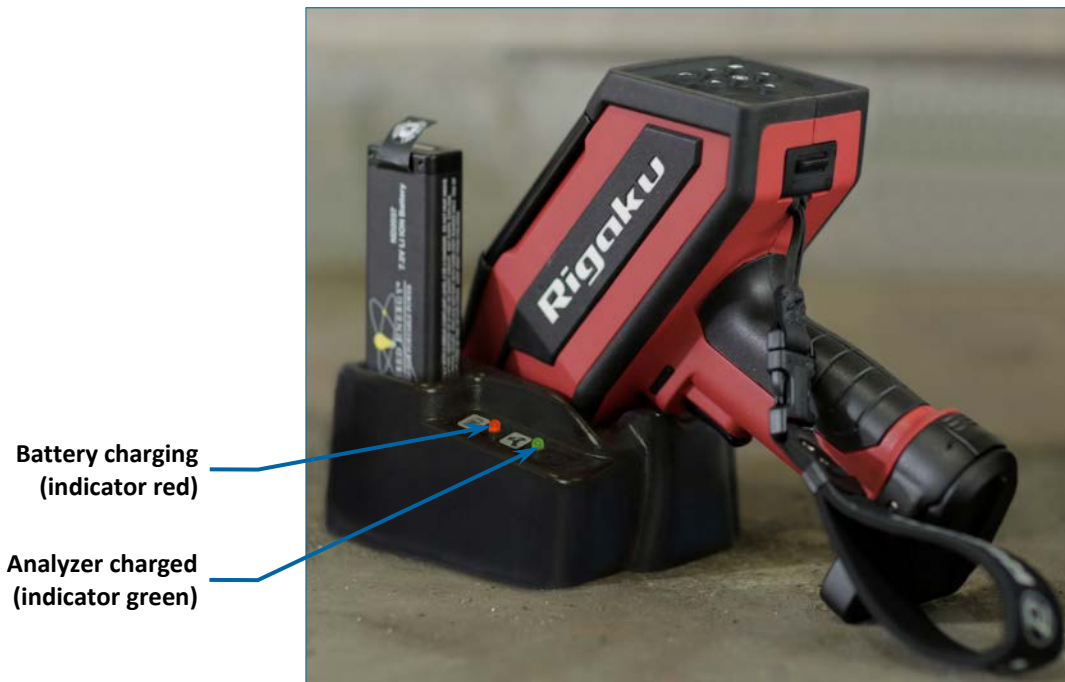
Figure 6. Holster

Carrying Your Analyzer

When moving the KT-100 analyzer from one work site to another, RAD recommends using the supplied carrying case.

To safely carry your analyzer and accessories to work sites:

1. Place the following items into the carrying case:
   - KT-100 analyzer in holster
   - Batteries
   - Cables
   - AC adapter
   - Docking station
   - Any RAD analyzer accessories

   Figure 7 shows how to pack the RAD-supplied case for carrying the analyzer.

Figure 7. Carrying Case with Analyzer and Accessories

In lid pocket:
- *KT-100™ Handheld LIBS Analyzer Quick Start Guide*
- Calibration certificate
- USB stick with KT-100 PC software and PDF of the *KT-100™ Handheld LIBS Analyzer User Manual*

Analyzer in holster

Detachable wrist strap and System Check Aluminum 7075 sample

AC Adapter, power cord, and USB cable

Holster belt

Docking station

Batteries

2. Close both latches to secure the case before lifting it.

> **Important:**
>
> When packed with your analyzer and all its accessories, the case weighs as much as 20 lbs. (9.1 kg). Please consider this when lifting your analyzer.

Understanding LIBS Spectroscopy

The KT-100 analyzer is a major advancement in the analysis of metals and alloys. It uses *Laser Induced Breakdown Spectroscopy* (LIBS)—a type of atomic emission spectroscopy—to identify solid metal or alloy samples. By focusing a high-energy laser pulse onto the sample's surface, the analyzer vaporizes a small amount of the material. Atoms in this vapor are excited by the laser pulse and generate a small amount of plasma that emits light at characteristic wavelengths. The analyzer measures these emissions

with a Czerny-Turner spectrometer and combines the measurements with data from a Charged Coupled Device (CCD) to identify the elements present in the plasma. With this technique, the KT-100 analyzer identifies various pure metals and alloyed materials. Recent advances in miniature high-power lasers, miniature spectrometers, and the availability of compact electronics and batteries have opened the door for handheld LIBS analyzers like the KT-100.

What You Can Do with the KT-100 Analyzer

The KT-100 analyzer provides a handheld platform for analyzing a wide range of solid metals and alloys. KT-100's rapid testing and optimized operating parameters make it simple to identify the alloys you encounter. In seconds, this handheld LIBS analyzer can identify a wide range of unknown alloys such as:

- Ferrous alloys including various:
    - Low-alloy steels
    - Specialty steels
    - Stainless steels
    - Tool steels
- Non-ferrous alloys that include:
    - Aluminum
    - Cobalt
    - Copper
    - Magnesium
    - Nickel
    - Titanium
    - Zinc
    - And more…

The following sections outline how the KT-100 analyzer can integrate the power of LIBS into protocols for alloy sorting, QC, and PMI.

Starting the KT-100 Analyzer

This section contains basic information about setting up and using your analyzer. It provides instructions for:

- Installing or Removing Batteries
- Charging Batteries
- Powering On
- Logging In and Entering Passcodes
- Correcting Passcodes
- Reviewing and Accepting the Laser Warning
- Responding to the Power Down Warning
- Powering Off
- Using Analyzer Controls
- Understanding the Touchscreen and Keypad
- Accessing Main Menu Features
- Using Common On-screen Controls
- Logging Out

Installing or Removing Batteries

To operate the KT-100 analyzer, a RAD-supplied battery must be installed in the battery slot accessible through the battery compartment door at the bottom of the analyzer's handle (Figure 4). When latched, the door secures the battery and keeps large debris out of the analyzer. The following subsections explain:

- Opening the Battery Compartment Door
- Installing the Battery
- Removing the Battery
- Closing the Battery Compartment Door

Opening the Battery Compartment Door

To open the battery-compartment door:

1. Position the analyzer so you can access the battery-compartment door and latch button (Figure 8).

Figure 8. Battery Compartment Door and Latch Button

Latch button

Battery compartment door
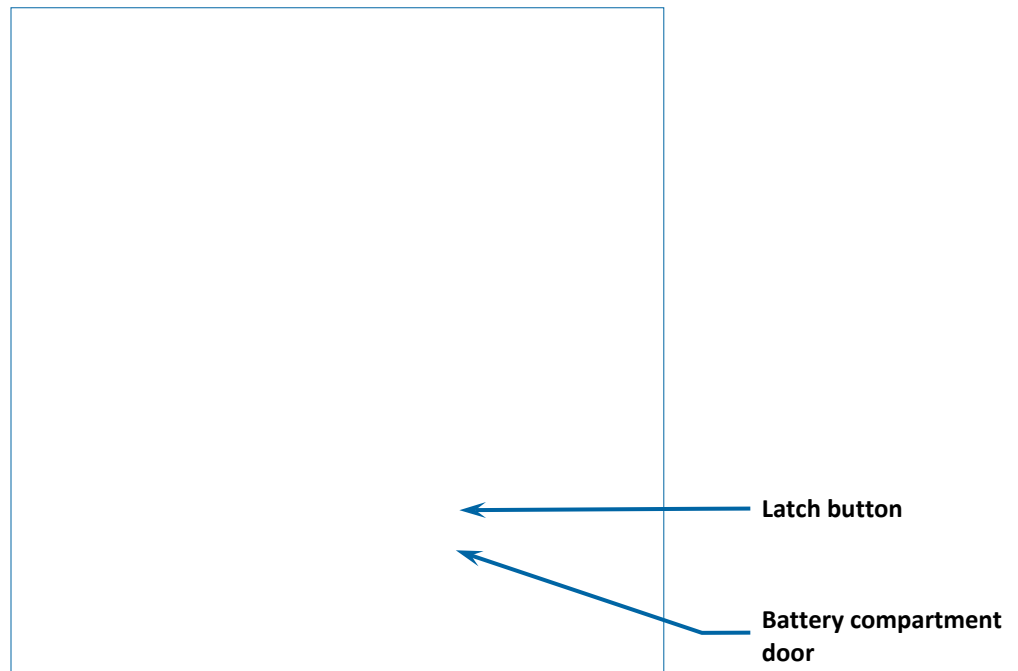
2. Press the latch button.
3. The battery-compartment door opens slightly.
4. Manually finish opening the door to access the battery compartment. (Figure 9).

⚠	**⚠CAUTION**
	When the battery door is open, water, dust, and other contaminants can enter your analyzer. Always latch the battery door shut to keep these materials out of your analyzer.

Figure 9. Battery Compartment with Door Open

Installing the Battery

The operation of the KT-100 analyzer requires you to install the battery specified in this user manual (see "Electrical Specifications").

To install the battery into an empty battery compartment:

1. Open the battery compartment door (see "Opening the Battery Compartment Door").
2. Position the open analyzer with the analyzer window pointed left and the battery door facing you.
3. Orient the battery so that the connector strip faces away and is on the left side of the battery slot.
4. Insert and slide the battery into the battery slot until the door can close and latch (Figure 10).

Figure 10. Installing Battery

5. Close and latch the battery compartment door (see "Closing the Battery Compartment Door").

Removing the Battery

To transport or store the KT-100 analyzer, remove the battery.

To remove the battery:

1. Power off the analyzer (see "Powering Off")

⚠️	**Important:**
	Do *not* remove the battery while the analyzer is powered on and analyzing a sample. Doing so can cause system errors, power-up issues, and other software problems. If these occur, return your analyzer to Rigaku Analytical Devices or your local Rigaku representative for repairs.

2. Open the battery compartment door (see "Opening the Battery Compartment Door").
3. Position the open analyzer with the analyzer window pointed left and the battery door facing you.
4. Either grasp the tab mounted on the battery or grip both sides of the battery.
5. Pull the battery out of the battery slot.
6. Close and latch the battery compartment door (see "Closing the Battery Compartment Door").

Closing the Battery Compartment Door

To close the battery-compartment door:

1. Position the open analyzer with the analyzer window pointed left and the battery door facing you.
2. If the battery is installed, ensure that it fits into the battery slot (see "Installing the Battery").
3. Push the door closed until it latches into place (Figure 11).

⚠️	**Important:** If the battery does not slide far enough into the battery slot to latch the battery door: 1. Position the open analyzer with the analyzer window pointed left and the battery compartment door facing you. 2. Remove the battery. 3. Orient the battery so that the connector strip faces away and is on the left side of the battery slot. 4. Insert and slide the battery into the battery slot until the door can close and latch.

Figure 11. Battery Compartment Door Closed

Charging Batteries

After installing the battery and powering up the analyzer, view the **Power Status** icon in the analyzer's status bar (Figure 16) to determine the analyzer's charge level. The icon shows various charge levels:

[icon] — **Full**

[icon] — **OK** from 85% to 15%

[icon] — **Low** from 15% to 10%

[icon] — **Warning** below 10%

> **Note:**
>
> When the **Power Status Warning** icon appears, the analyzer automatically prompts users to shut down and re-charge the battery.

[icon] — **Charging** spark overlays all charge-level icons while charging

When the **Power Status** icon indicates that power is low, charge the battery. Batteries for the KT-100 analyzer can be charged either separately in the docking station or installed in the analyzer. The following subsections provide instructions for:

- Charging Batteries in the Docking Station
- Charging Installed Batteries with the Docking Station
- Charging Installed Batteries with the AC Adapter

Charging Batteries in the Docking Station

The docking station included with the KT-100 analyzer has a battery-charging slot (Figure 5). For fast and simple preparation for on-site operation, charge analyzer batteries in the docking station.

To charge batteries in the docking station:

1. Insert the power connector of 12-volt AC-adapter power cord into the docking station.
2. Plug the 12-volt AC-adapter power cord into an appropriate electrical outlet (100V/240V).
3. If necessary, remove the battery from the analyzer (see "Installing or Removing Batteries").
4. Orient the battery so that the battery leads are in line with the pins in the docking station's battery slot.
5. Insert the battery into the slot.

   The docking station's battery status light shows the charge status:

   - Red—Battery is charging.
   - Green—Battery is charged.

   LED status lights on the battery show its current level of charge.
6. Leave the battery in the docking station for approximately three hours, or until both the status light on the docking station and the LED status lights on the battery show that charging is complete.
7. Once the first battery is charged, remove it, and charge the second battery if necessary (see steps 4 through 6).
8. Install one of the batteries into the analyzer (see "Installing or Removing Batteries").

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Charging Installed Batteries with the Docking Station

The docking station can also charge batteries for the KT-100 while they are installed in the analyzer (Figure 5).

To charge an installed battery:

1. Install a battery into the analyzer (see "Installing or Removing Batteries").
2. Place the analyzer in the docking station with both the analyzer window (Figure 2) in the cradle and the analyzer's docking-station connector (Figure 12) in contact with the docking station's connector pins.

Figure 12. The KT-100 Docking Station Connector

Right Quick Launch key → Left Quick Launch key

Docking station connector → Trigger
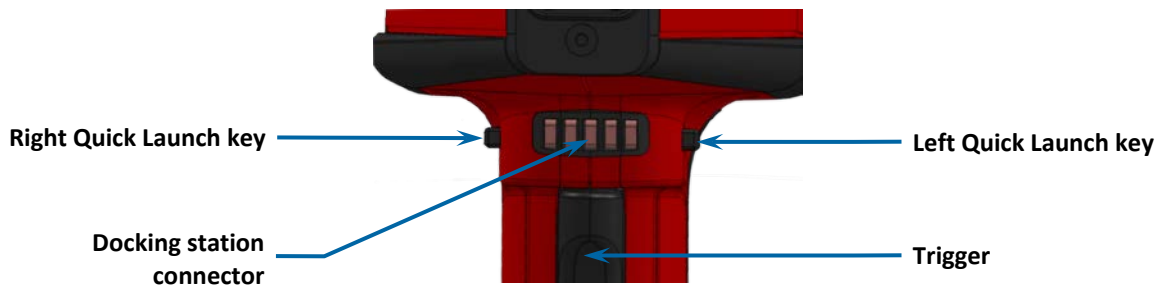
Once the analyzer is in the cradle, the docking station's analyzer status light shows the charge status:

- **Red**—Analyzer is charging.
- **Green**—Analyzer is charged.

3. Leave the analyzer in the docking station for approximately three hours, or until the analyzer status light shows that charging is complete.

Charging Installed Batteries with the AC Adapter

Connecting the KT-100 analyzer to the RAD-supplied, 12-volt AC adapter allows you to use the analyzer while charging the installed battery.

⚠️	**Important:**
	Use only the docking station or the RAD-supplied 12-volt AC adapter when charging an installed battery. For more information, contact Rigaku Analytical Devices or your local Rigaku representative.

To charge an installed battery with the RAD-supplied 12-volt AC adapter:

1. Install a battery into the analyzer (see "Installing the Battery").
2. With the battery compartment closed, insert the 12-volt AC-adapter power cord into the connector on the back of the analyzer handle (Figure 4).

3. Plug the 12-volt AC adapter into an appropriate electrical outlet (100V/240V).

   - If the analyzer is powered-off, periodically open the analyzer's battery compartment (see "Opening the Battery Compartment Door") and check the LED status lights on the battery.

   - If the analyzer is powered-on, the **Power Status** icon displays on the right side of the screen's **Status bar** (Figure 16).

     The icon indicates the level of battery charge from ![icon] (**Power Status - Warning)** to ![icon] (**Power Status - Full**).

4. Leave the analyzer plugged in until it is fully charged:

   - If the analyzer is powered-off, charge until the battery's LED status lights show that the charge is complete.

   - If the analyzer is powered-on:

     a. Charge the battery until ![icon] (**Power Status - Full**) appears.

     b. Disconnect the charger.

     c. View ![icon] (**Power Status - Full)** to verify that the analyzer's battery is fully charged.

   > **Note:**
   >
   > Although an analyzer is not mobile while connected to an AC adapter, it can be used to analyze materials while charging the battery.

5. Remove the 12-volt AC adapter power cord from the analyzer's power connector.

Powering On

Users can power the KT-100 analyzer when either the battery is installed and charged, or the analyzer is connected to the 12-volt AC adapter and plugged into an electrical outlet. Once powered on, users can log in, accept the laser warning, and operate the analyzer.

To power the analyzer on:

1. Ensure either that the battery is installed (see "Installing or Removing Batteries") and charged (see "Charging Batteries"), or that the AC adapter is connected and plugged into an electrical outlet (see "Charging Installed Batteries with the AC Adapter").

2. Hold down the ![icon] (**Power/Enter**) hard button on the analyzer keypad for a few seconds (Figure 1).

   The analyzer's **Loading...** screen shows the software version number and startup status. The analyzer then shows the KT-100 Home screen with a warning icon in the status bar (Figure 13).

   > **Note:**
   >
   > The analyzer will scan only after both the startup sequence completes and the warning icon no longer appears in the status bar.

![Rigaku logo]

Figure 13. Analyzer's Home Screen

Status bar — 11:25:22 PM — — Power status

Clock — — Startup/temperature warning icon

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Tap screen
or press center button
to Login

version 1.1.6.1355 — Software version
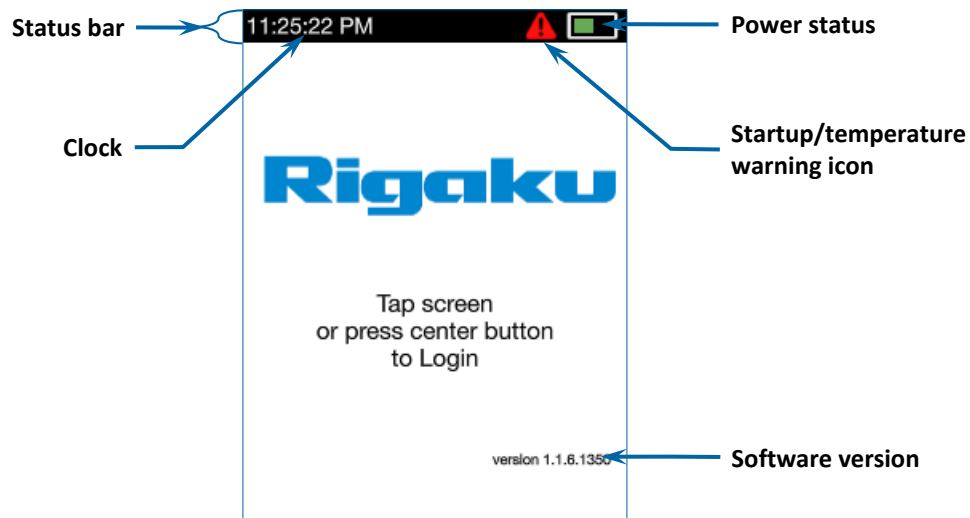
3. Once the **Home** screen appears, either tap the screen or press ⊚ (**Power/Enter**) to start logging in (see "Logging In and Entering Passcodes").

Logging In and Entering Passcodes

For security, the KT-100 analyzer requires users to log in and enter passcodes after starting the analyzer and after ten minutes or more of no analyzer activity.

To log in:

1. Ensure that the power on sequence has completed (see "Powering On").

2. Tap the screen or press the ⊚ (**Power/Enter**) hard button.

    The analyzer displays the **Enter Passcode** screen with numeric soft keys (Figure 14).

Figure 14. Enter Passcode Screen

Clock —

Status bar — 16:13:08 — — Power status

Screen name — Enter Passcode

— Backspace soft button

Numeric soft keys — 1 2 3 4 5 6 7 8 9

Power-off soft button — 0 — OK soft button

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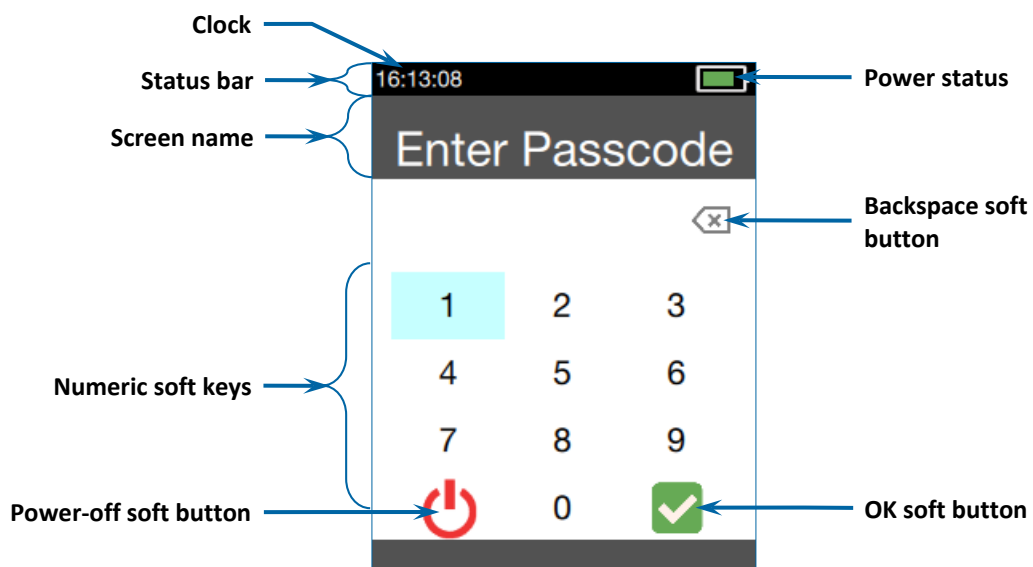
3. Using either the numeric soft keys on the touchscreen (see "Using the Touchscreen"), or the hard buttons on the keypad (see "Using the Keypad"), select the numbers in the passcode.

   The default passcodes are **144** and **188**.

4. If incorrect numbers appear, use the ⌫ (**Backspace**) soft button to the delete them, and then re-select the correct numbers.

5. When the displayed passcode is complete, select the ✅ (**OK**) soft button with either the touchscreen or the hard buttons (see "Using Analyzer Controls").

   The analyzer briefly shows the **Checking Passcode** screen.

   ▪ If the passcode is correct, the analyzer displays the **Laser Warning** screen:

   a. Accept the laser warning (see "Reviewing and Accepting the Laser Warning").

      The analyzer displays the default **Analyze** screen (Figure 17).

      > **Note:**
      >
      > The **Laser Warning** screen reappears when the analyzer is idle for ten or more minutes.

   b. Begin operating the analyzer (see "Operating the KT-100 Analyzer") or configuring the analyzer (see "Configuring the KT-100 Analyzer").

   Or:

   ▪ If the passcode is incorrect, the analyzer displays the **Incorrect Passcode** screen (Figure 15).

   a. Repeat the passcode entry process with a valid passcode (see "Correcting Passcodes").

   b. Once a correct passcode is entered, begin operating the analyzer (see "Operating the KT-100 Analyzer") or configuring the analyzer (see "Configuring the KT-100 Analyzer").

Correcting Passcodes

When a KT-100 analyzer displays the **Incorrect Passcode** screen, users must repeat the passcode entry procedure with a valid passcode.

To re-enter the passcode:

1. On the **Incorrect Passcode** screen (Figure 15), select the ✅ (**OK**) soft button with either the touchscreen or the hard buttons (see "Using Analyzer Controls").

Figure 15. Incorrect Passcode Screen

Clock ⟶ 16:13:08

Status bar

Power status

Incorrect Passcode try again.

OK soft button
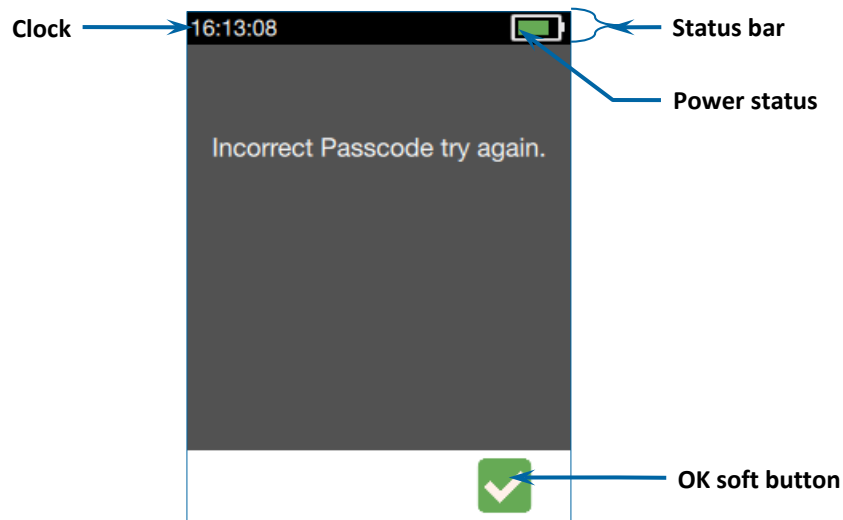
The analyzer re-displays the KT-100 home screen.

2. On the home screen, either tap the screen or press the ⊚ (**Power/Enter**) hard button on the keypad to start logging in.

   The analyzer displays the **Enter Passcode** screen (Figure 14).

3. With the touchscreen or the hard buttons, select the number sequence of a valid passcode.

4. After completing the passcode, select the ✅ (**OK**) soft button.

   The analyzer briefly shows the **Checking Passcode** screen.

   ▪ If the passcode is correct, the analyzer displays the **Laser Warning** screen:

     a. Accept the laser warning (see "Reviewing and Accepting the Laser Warning").

        The analyzer displays the default **Analyze** screen (Figure 17).

     b. Begin operating analyzer (see "Operating the KT-100 Analyzer") or configuring the analyzer (see "Configuring the KT-100 Analyzer").

   Or:

   ▪ If a passcode no longer works, contact Rigaku Analytical Devices or your local Rigaku representative for information about resetting the default passcodes.

Reviewing and Accepting the Laser Warning

Because of KT-100's high-intensity laser, users must review and accept the **Laser Warning** each time they log into the analyzer. This ensures that all users have needed safety information when operating the analyzer. For more information about laser safety, see "Laser Safety and Compliance."

To accept the laser warning:

1. Power the analyzer on (see "Powering On"), and enter a valid passcode (see "Logging In and Entering Passcodes").

   The **Laser Warning Analyze** screen appears (Figure 16)

Figure 16. Laser Warning Analyze Screen
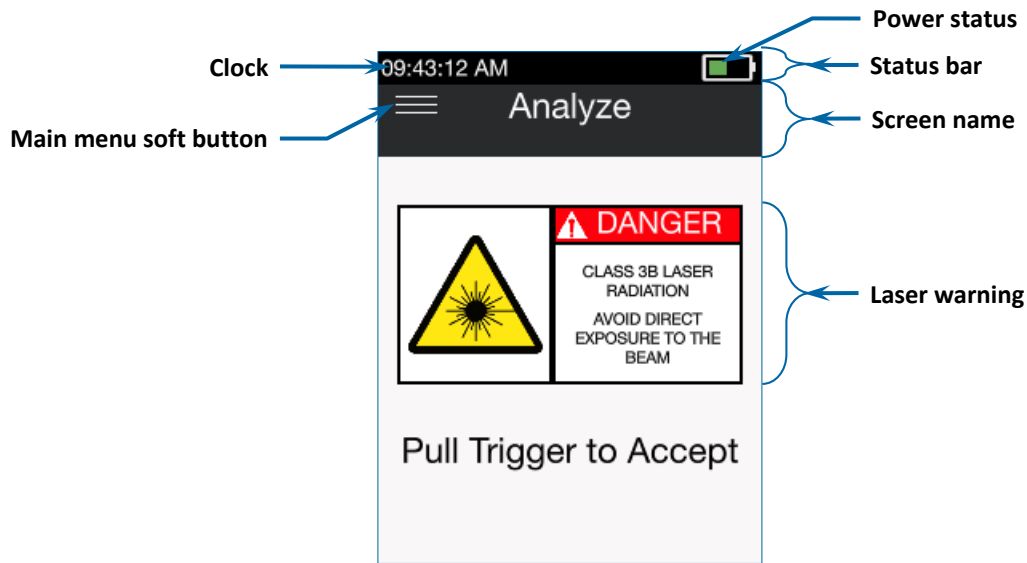
2. Review the on-screen **Laser Warning** information, and, if necessary, see the "Laser Safety and Compliance" for more information about laser safety.

3. Accept the laser warning by pulling and releasing the analyzer's trigger.

> **Notes:**
> - Using keypad arrow hard buttons will not highlight the **Accept** soft button.
> - The **Laser Warning** screen reappears when the analyzer is idle for ten or more minutes.

The **Analyze** screen appears (Figure 17).

Figure 17. Default Analyze Screen
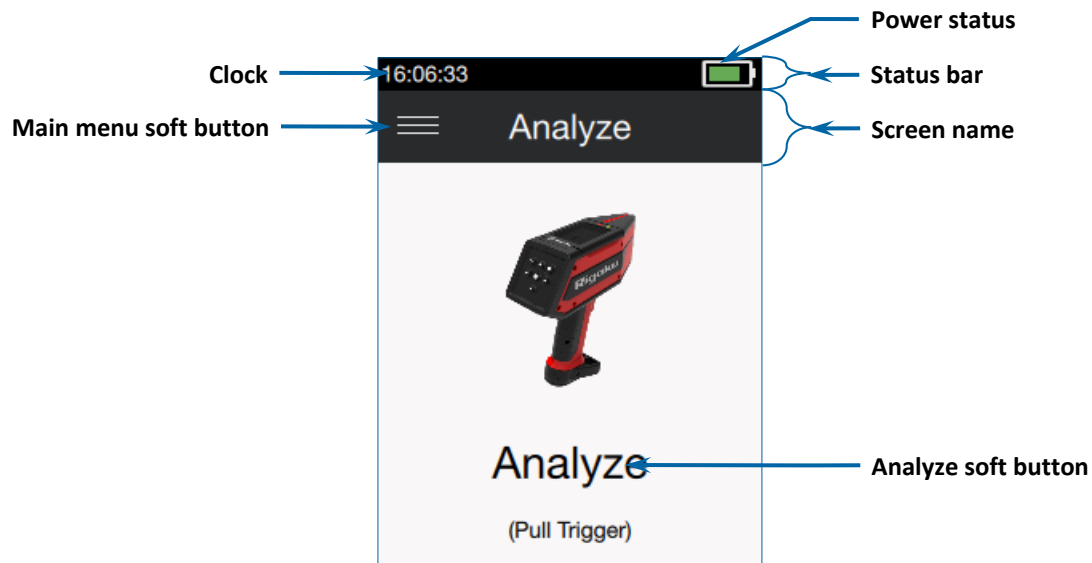
4. From the **Analyze** screen:
   - Access the **Main** menu to view the analyzer's primary features (see "Accessing Main Menu Features").
   - Begin operating the analyzer (see "Operating the KT-100 Analyzer").

Responding to the Power Down Warning

When starting the KT-100 analyzer with a low battery or when the KT-100 analyzer's battery goes below a 10% charge level during operation, the automatic **Power Down** warning screen appears (Figure 18).

Figure 18. Power Down Warning
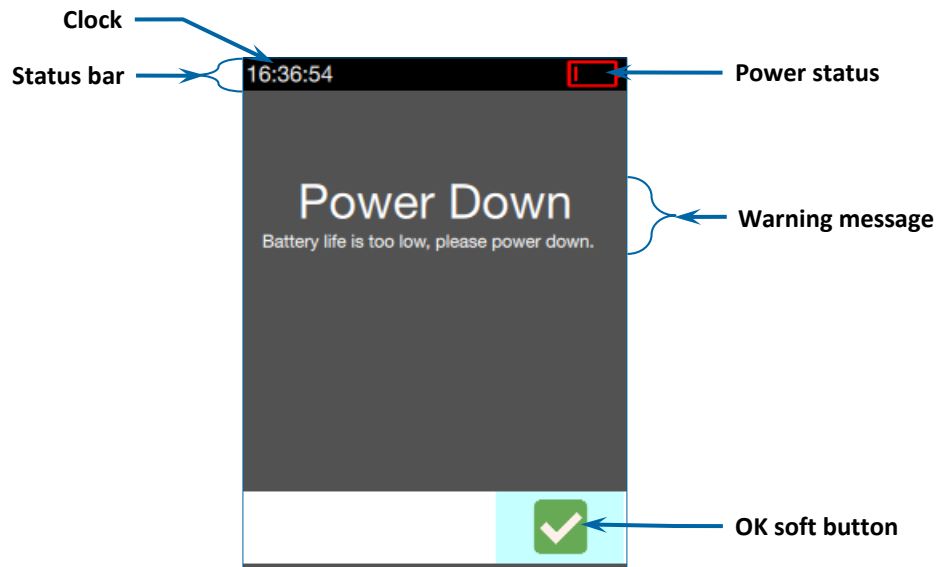
When the automatic **Power Down** warning screen appears:

1. Accept the warning and start the power down process by selecting the ✅ (**OK**) soft button or pressing the ◎ (**Power/Enter**) hard button on the keypad.
2. Re-charge the battery (see "Charging Batteries in the Docking Station," "Charging Installed Batteries with the Docking Station," and "Charging Installed Batteries with the AC Adapter").
3. When the battery is adequately charged, power on (see "Powering On"), log in (see "Logging In and Entering Passcodes"), and begin operating the analyzer (see "Operating the KT-100 Analyzer").

Powering Off

To save battery power, power off the analyzer after using it. The analyzer has two options for powering off:

- Powering Off with Touchscreen Controls
- Powering Off with Keypad Hard Buttons

Powering Off with Touchscreen Controls

Powering off with touchscreen controls finalizes the current action, logs the current user off, shuts down the software, and powers off the analyzer.

To power off with touchscreen controls:

1. From the **Analyze** or **Results** screen, select the ≡ (**Main** menu) soft button on the touchscreen, or select the ⬤ (**Main** menu) hard button on the keypad.
   The **Main** menu appears on the left side of the screen (Figure 19).
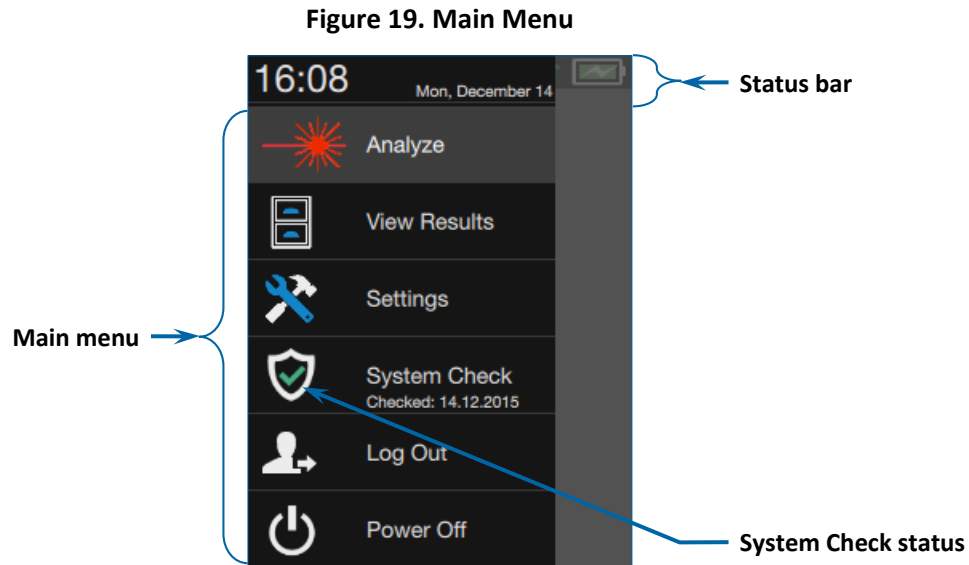
Figure 19. Main Menu

2. From the **Main** menu select the ⏻ (**Power off**) soft button on the touchscreen, or use the **arrow** hard buttons to highlight the ⏻ (**Power off**) soft button, and then press the ◎ (**Power/Enter**) hard button (Figure 20).
   The **Power Down** screen appears.

3. With either the touchscreen or the hard buttons (see "Using Analyzer Controls"), select ☑ (**OK**) to confirm the power off sequence.
   The analyzer shuts down and powers off.

Powering Off with Keypad Hard Buttons

Powering off with the ◎ (**Power/Enter**) hard button cancels the current action, displays the **Power Down** screen, and then shuts the analyzer down completely with no confirmation.

To power off with the ◎ (**Power/Enter**) hard button:

- Hold the ◎ (**Power/Enter**) hard button down for eight seconds.

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Using Analyzer Controls

The KT-100 analyzer has both a touchscreen and a keypad for moving around the screen, viewing data, entering information, and analyzing samples. As a result, users can work with the analyzer:

- Using the Touchscreen
- Using the Keypad

Using the Touchscreen

The KT-100 analyzer has a touchscreen that provides intuitive access to features and analyzer configuration settings. In addition, the touchscreen's "touch" gesture is optimized for work-glove access in rugged environments.

With the ⩗(**Touch**) gesture users can:

- Select and start on-screen controls or menu items.
- Select soft buttons.
- Select letters from the on-screen virtual keyboard when entering information.
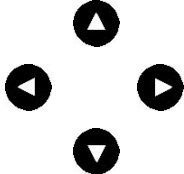
Using the Keypad

The KT-100 analyzer also has a physical keypad that provides access to analyzer features. The keypad includes the hard buttons in Figure 20 and enables users in gloves or protective gear to identify alloys.

Figure 20. Keypad Layout
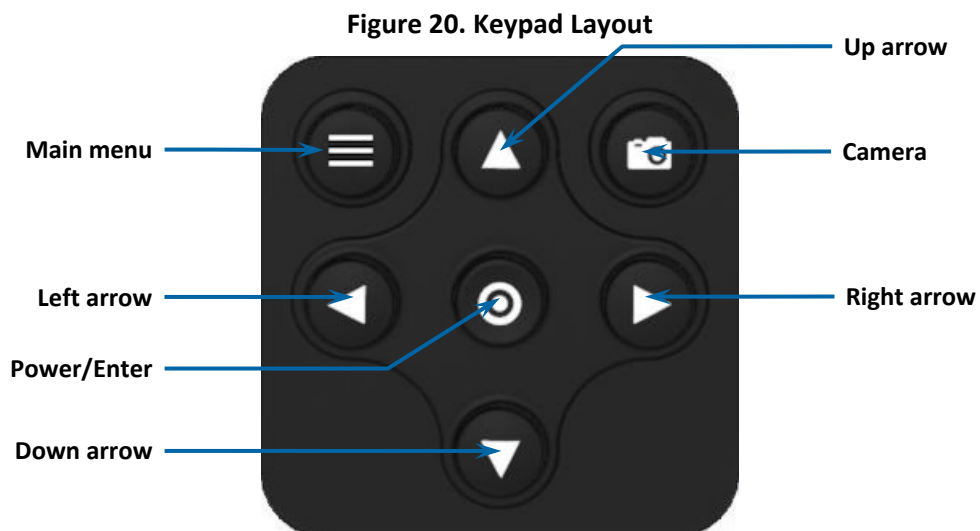
Use the hard buttons on the keypad as listed in Table 5.

Table 5. Keypad Controls

Hard Buttons	Key Names	Use to…
◎	Power/Enter	• Power the analyzer (see "Powering On" and "Powering Off"). • Start highlighted on-screen controls or menu items.
▲ ◄ ► ▼	Arrows: Up Left Right Down	• Highlight an on-screen control or menu item by jumping from one control or menu item to the next. • Scroll right or left from one screen to other related screens and menus. • Select letters and numbers from the on-screen virtual keyboard when entering information. **Notes:** • Each jump highlights the next on-screen control, item, or letter. • You can only highlight one control, menu item, or letter at a time. • Once the required control, menu item, or letter is highlighted, press the **Power/Enter** hard button to select it.
📷	Camera	• Capture images using the digital camera.
☰	Menu	• Cancel a current selection or operation and then display the **Main** menu.

Understanding the Touchscreen and Keypad

Table 6 outlines equivalent touchscreen and keypad actions for generically described tasks for analyzing metals and alloys.

Table 6. Equivalent Touchscreen and Keypad Actions

To …	With touchscreen …	With keypad …
Scroll through screen content and spectral images:	Touch on-screen controls and menu items sequentially or as needed.	Press **Arrow** hard buttons to jump through on-screen controls, menu items, spectral images, and related screens.
Select controls or menu items:	Touch control or menu item.	Complete these steps: 1. Press **Arrow** hard buttons to jump to and highlight the required control or menu item. 2. Press the hard button ◎ (**Power/Enter**) to start highlighted control or menu item.
Confirm the current action:	Touch the on-screen ✅ (**OK**) soft button.	Complete these two steps: 1. Press **Arrow** hard buttons to jump to and highlight the ✅ (**OK**) soft button. 2. Press the hard button ◎ (**Power/Enter**) to start highlighted control or menu item.

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To …	With touchscreen …	With keypad …
Cancel the current action:	Touch the on-screen ❌ (**Cancel**) soft button.	Complete these steps: 1. Press **Arrow** hard buttons to jump to and highlight the ❌ (**Cancel**) soft button. 2. Press the hard button ◎ (**Power/Enter**) to start highlighted control or menu item.
Enter information into a textbox:	Complete these steps: 1. Select the textbox or the control that launches it. The virtual keyboard appears. 2. Touch each required letter on the keyboard in sequence. 3. When all required letters appear in the textbox, touch the ✅ (**OK**) soft button on the touchscreen.	Complete these steps: 1. Press **Arrow** hard buttons to jump to the textbox or the control that launches it. 2. Press the hard button ◎ (**Power/Enter**) to start using the textbox. The virtual keyboard appears. 3. Press **Arrow** hard buttons to jump to a required letter. 4. Press the hard button ◎ (**Power/Enter**) to select the highlighted letter. 5. When all the required letters appear in the textbox, press **Arrow** hard buttons to jump to the ✅ (**OK**) soft button on the touchscreen. 6. Press the hard button ◎ (**Power/Enter**).
Take pictures:	This feature is only available when the 📷 (**Camera**) icon appears on the current screen. Complete these steps: 1. Point the front of your analyzer at the object to photograph. 2. On the screen, touch 📷 (**Camera**). An image of the object appears on the display and goes through an *Autofocus* cycle. 3. Move or reposition your analyzer to ensure that the entire object appears on the screen. 4. When the image is stable and in focus, touch 📷 (**Camera**) again. The analyzer saves the image.	This feature is only available when the 📷 (**Camera**) icon appears on the current screen. Complete these steps: 1. Point the front of your analyzer at the object to photograph. 2. Press and hold the 📷 (**Camera**) hard button. An image of the object appears on the display and goes through an *Autofocus* cycle. 3. Move or reposition your analyzer to ensure that the entire object appears on the screen. 4. When the image is stable and in focus, Press the 📷 (**Camera**) hard button. The analyzer saves the image.

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Accessing Main Menu Features

Once you power on, log in, and select the ☰ (**Main** menu) icon, the **Main** menu displays the primary features of the KT-100 analyzer (Figure 19).

Selecting the features lets you analyze metals and alloys, view results records, and manage system settings. Table 7 provides an overview of these primary features.

Table 7. Main Menu Features

Feature	Enables you to…
Analyze	• Identify unknown metals and alloys. • Match analysis results to current alloy grade specifications library. • Take a measurement.
View Results	• View results records in several viewing formats sorted by result number, date, or date ranges.
Settings	• Configure results • Set up analyzer interface and security defaults. • Enable features and communications. • View analyzer serial number and software version number.
System Check	• Verify that analyzer is operating correctly.
Log Out	• Put the analyzer into security mode. All users must log in before using the analyzer again.
Power Off	• Shut down and power off the analyzer.

For more information about using these features, see "Operating the KT-100 Analyzer" and "Configuring the KT-100 Analyzer."

Using Common On-screen Controls

Most features use common on-screen controls. Table 8 lists the most common controls. You may see other local controls with contextually relevant functionality.

Table 8. Common On-screen Controls

Control	Name/Type	Description
⏻	Power off	This control: • Is available only from the **Enter Passcode** screen and **Main** menu. • Shuts down analyzer software. • Powers the analyzer off.
✅	OK	Confirms current action.
❌	Cancel	Cancels current action.
☰	**Main** menu	This control: • Cancels the current selection or operation. • Shows the **Main** menu on the left side of the screen. • Provides access to analyzer features. • Lets users initiate the standard power off sequence.

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Control	Name/Type	Description
		• Returns to the previous screen.
i	Instrument Status	Displays the analyzer's serial number, unique ID number, software version, and internal temperature.
☐ ■ ☐	Extended screen	Indicates that you can view hidden sections of the current screen. • The number of icon items shows the number of available sections. • The visible section is filled. • Hidden sections are empty. • Press left/right hard buttons to view hidden sections.
2	Soft key	Allows users to use on-screen keypad or keyboards for entering numbers and letters into text entry fields.
❯	Related screen	Indicates that a setting, entry, or information screen is available. To view related screens when the control is present, either: • Select item or icon. • Press **Arrow** hard buttons.
Analyze	Soft button	Provides access to the analyzer's features.
📷	Camera	Indicates that images can be added to results or results records.
Quick Launch Keys ❯	Menu item soft button	Typically, lets users access listed feature or listed feature settings. **Note:** Some features can only be viewed.
Enter Sample ID	Editable text entry field	Allows users to customize the analyzer's results or settings.

Logging Out

After operating the KT-100 analyzer, log out to put it into security mode.

To log out:

1. After the current activity is complete, select ☰ (**Main** menu) to display the **Main** menu ().
2. From the menu list, select **Log Out**.
   The analyzer displays the KT-100 home screen () with a login message.
3. Tap the screen, or press the ◎ (**Power/Enter**) hard button to display the login screen.

Operating the KT-100 Analyzer

The KT-100 analyzer lets users of all levels analyze various alloys in a variety of settings. Because the analyzer is durable, water-resistant, and simple to configure, users can work with them in facilities, warehouses, and recycling yards. To explain this process, this section provides instructions for:

- Running a System Check
- Preparing a Sample
- Aligning a Sample
- Analyzing a Sample
- Using the Drill Down Feature to Analyze Dirty Samples
- Including Optional Information in Results
- Viewing Results
- Routine Cleaning of Your Analyzer
- Managing Communications

Running a System Check

System Check is a system-wide self-test that rapidly verifies the KT-100 analyzer's calibration accuracy using the RAD-supplied **System Check Alloy** sample. The **System Check** status icon in the **Main** menu (Figure 19) shows the calibration status from the last time users ran **System Check**. Possible icons are:

 (**Passed**)

 (**Failed**)

To run **System Check**:

1. If the analyzer is off, power on (see "Powering On"), log in (see "Logging In and Entering Passcodes"), and accept the laser warning (see "Reviewing and Accepting the Laser Warning").

2. From the **Analyze** screen, select ≡ (**Main** menu) from the left of the screen under status bar (Figure 17).

    The **Main** menu appears on the left side of the screen (Figure 19).

3. From the **Main** menu, select **System Check**.

4. The **System Check** screen provides instructions for analyzing the **System Check Alloy** sample (Figure 21).

Figure 21. System Check Screen
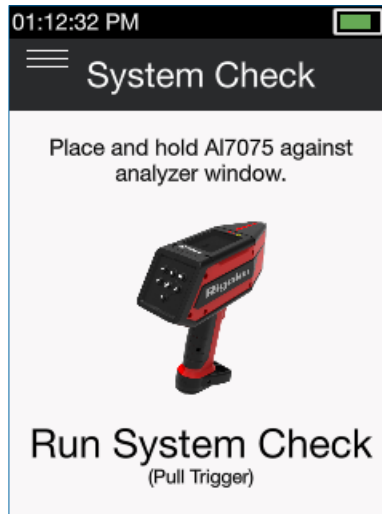
5. Make sure the alloy sample has a clean, representative surface at the test point (see "Preparing a Sample"), and optimize the sample alignment (see "Aligning a Sample").

6. When the alloy sample is both clean and aligned, place the analyzer window on the surface of the **System Check Alloy** sample.

7.   Pull and release the analyzer's trigger to run **System Check**.

    When sample analysis is complete, the result screen (Figure 22) shows the key **System Check** results of:

    ▪ **Pass** or **Fail** result

    ▪ Alloy grade name

    ▪ Match Number score

    > **Note:**
    >
    > The *Match Number* (MN) score provides a comparison between live results and the Grade Spec of the RAD-supplied **System Check Alloy** sample. For more information, see "Analyzing a Sample."

    In addition, a **System Check** status icon appears on the **Main** menu (Figure 19).

Figure 22. System Check with Passing Result

Main menu soft button

Result date

Record number

Match Order value

Result

Alloy grade name

MN score
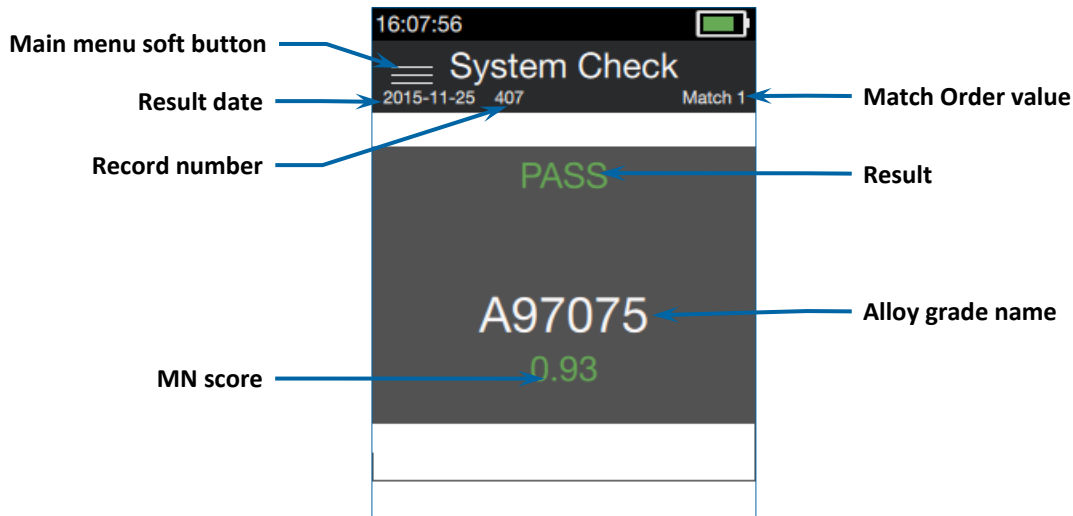
8. If **System Check** fails, re-display the **Main** menu (see "Accessing Main Menu Features"), and then manually repeat steps 3 through 6 to run **System Check** a second time.

9. If the second **System Check** fails, or if the ⛉ (**Fail**) status icon appears on the **Main** menu, contact Rigaku Analytical Devices or your local Rigaku representative.

Preparing a Sample

Before analyzing a metal or alloy sample, ensure that the representative surface is accessible to the analyzer. This requires cleaning dirt, oil, corrosion, oxidation, paint, and other surface coatings off the spot on the sample you intend to test. KT-100 will accurately identify the alloy composition only when analyzing the bare surface of the sample.

To prepare a sample:

1. Clean any loose debris off the sample.
2. If the surface is painted, oxidized, sandblasted, shot-blasted, corroded, or stained, users must grind, file, or sand a portion of the sample to expose a surface on the sample.
3. Verify that the exposed surface is at least as large as the analyzer window (Figure 2).
4. Make sure any debris from the surface preparation is cleaned off the sample.

Aligning a Sample

After preparing the surface of the sample, align the flattest portion of the sample's spot of exposed, clean surface vertically with the analyzer window (Figure 2).

To align the sample:

1. Position the sample against the analyzer window in line with the alignment lines on the top and sides of the analyzer (see Figure 1, Figure 2, and Figure 3).
2. If the sample is curved, adjust the position of the sample so that the flattest part is positioned vertically and in line with the alignment line on the top of the analyzer.
3. When the sample is aligned, start the analysis (see "Analyzing a Sample").

Analyzing a Sample

KT-100 analyzes metals and alloys in facilities, workshops, and recycling yards. The analyzer measures the sample's elemental chemistry. It then compares the analyzed data to each alloy Grade Specification (Grade Spec) in the analyzer's selected Grade Specs naming system (see "Selecting the Grade Specs Naming System for Your Region"), and calculates a Match Number (MN) score for each comparison. MN scores range from **0.00** to **1.00** and indicate how closely the analyzed data matches each of the Grade Specs. The higher the MN score, the better the match. A score of **1.00** is a perfect match, with all analyzed chemistry falling within the specified minimum and maximum ranges of the alloy's Grade Spec. The analyzer then displays the results data.

To analyze a sample:

1. Prepare the sample (see "Preparing a Sample").
2. Power the analyzer on (see "Powering On"), log in (see "Logging In and Entering Passcodes"), and accept the laser warning (see "Reviewing and Accepting the Laser Warning").
3. If needed, enable or disable the **Drill Down** feature (see "Using the Drill Down Feature to Analyze Dirty Samples"), or add optional information to the results record (see "Including Optional Information in Results").
4. When the analyzer displays the **Analyze** screen, align the sample against the analyzer window (see "Aligning a Sample").
5. Pull and release the analyzer's trigger, or select the on-screen **Analyze** soft button.

   The analyzer's red, active laser warning light indicates when analysis starts (Figure 1), and the **Analyzing** screen (Figure 23) shows that the analyzer is processing the data while:

   - Powering on the laser.
   - Collecting spectral data from the sample.
   - Comparing data to Grade Specs in the selected Grade Specs naming system.
   - Generating the MN score.

⚠	**Important:** Do not move the sample until the analyzer shows a result screen.

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Figure 23. Analyzing Screen

Extended screen icon in
Result Views position
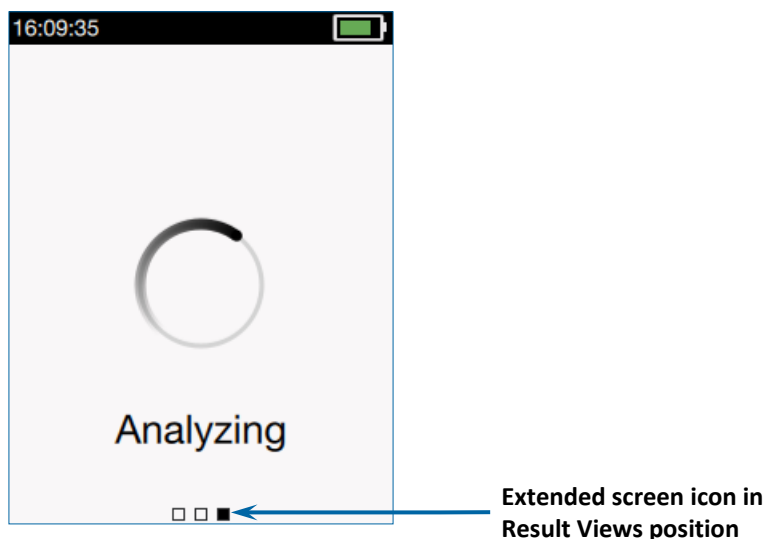
6. When analysis completes, view the results (see "Viewing Results").

Using the Drill Down Feature to Analyze Dirty Samples

Because samples cannot always be easily cleaned, KT-100 analyzers have the **Drill Down** feature. When enabled, this feature allows the KT-100 to analyze materials through certain kinds of corrosion, oxidation, and sample contamination with its proprietary ablation and detection engine (BLADE™).

> **Important:**
>
> Remove all hazardous or flammable surface coatings and debris from samples before enabling **Drill Down**.

The feature has one passive and three active settings for removing surface corrosion and contamination. These settings lengthen the period of laser activity before starting the analysis cycle:

- **None**—feature is off
- **Light**—approximately doubles laser activity
- **Medium**—approximately triples laser activity
- **Heavy**—approximately quadruples laser activity

Because the analysis cycle starts near the end of the period of laser activity, the analyzer can often access clean sample surfaces under various levels of corrosion and contamination by ablating the surface contaminants.

To enable or disable the **Drill Down** feature:

1. Power the analyzer on (see "Powering On"), log in (see "Logging In and Entering Passcodes"), and accept the laser warning (see "Reviewing and Accepting the Laser Warning").

2. When the analyzer displays the **Analyze** screen (Figure 17), press the ⏵ (**Right Arrow**) hard button, or, if set to this functionality (default), the right Quick Launch key (see Figure 12).

   The analyzer displays the **Set Drill Down** menu (Figure 24).

Figure 24. Set Drill Down Menu

Drill Down options
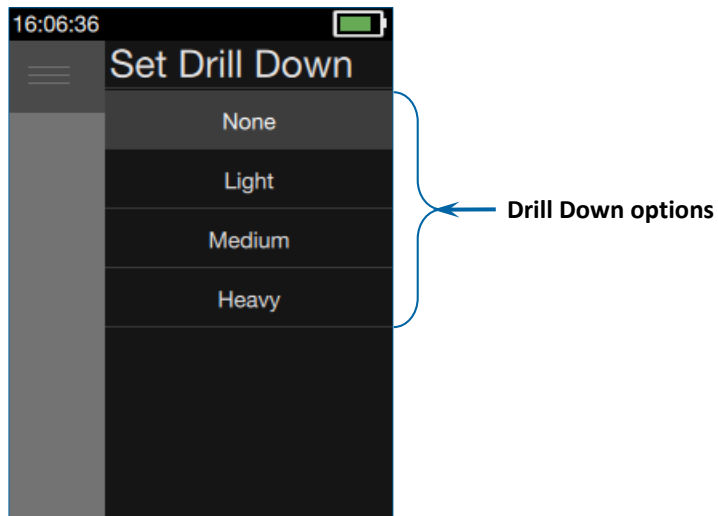
3. Select a **Drill Down** level that is appropriate for the condition of the sample.

   The analyzer returns to the **Analyze** screen with a message when **Drill Down** is enabled (Figure 25) or with no message when the feature is disabled (Figure 17).

Figure 25. Analyze Screen with Drill Down Enabled

Drill Down message
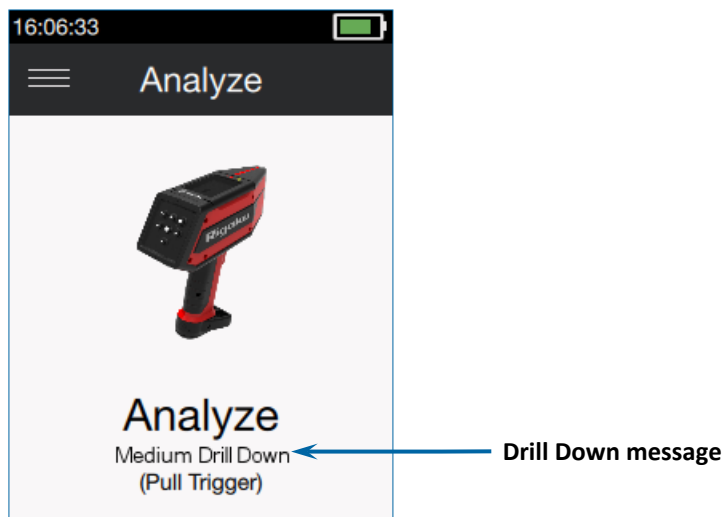
4. After enabling or disabling the **Drill Down** feature, analyze the sample (see "Analyzing a Sample").

Including Optional Information in Results

By default, results include the analyzer serial number, the date in yyyy-mm-dd format, and the time in 24-hour format. This information specifies the unit, date, and time of the scan. To help sort results on the analyzer and in result files, users may also want to add information to the results on a per-scan basis. KT-100 analyzers provide three types of custom results information:

- **Sample ID** – Includes a user-specified sequence of letters, numbers, or symbols both in the results list on the analyzer and in results files.

- **Lot**, **Purchase Order**, and **Vendor** – Includes user-specified labels, keywords, and names in results files.

- **File Tag** – Adds a short sequence of letters and numbers to a result filename.

Users may specify values for **Sample ID**, **Lot**, **Purchase Order**, and **Vendor** on the **Data Entry** menu. In addition, the **File Tag** option is available from the **Results Settings** menu. All this optional information appears in results files and reports (see Figure 79). For information about setting values for Data Entry items and the File Tag, see:

- Accessing the Data Entry Menu

- Adding a Sample ID to a Result

- Adding Lot, Purchase Order, and Vendor Information to a Result

- Adding a File Tag to a Result Filename

Accessing the Data Entry Menu

To access the **Data Entry** menu:

1. Open the **Main** menu (see "Accessing Main Menu Features") and select **Analyze**.

2. When the **Analyze** screen appears, select the ⬤ (**Left Arrow**) hard button on the keypad, or if set to this default functionality, the left Quick Launch key (see Figure 12).

   The analyzer displays the **Data Entry** menu (Figure 26).

Figure 26. Data Entry Menu without Values

Optional result data
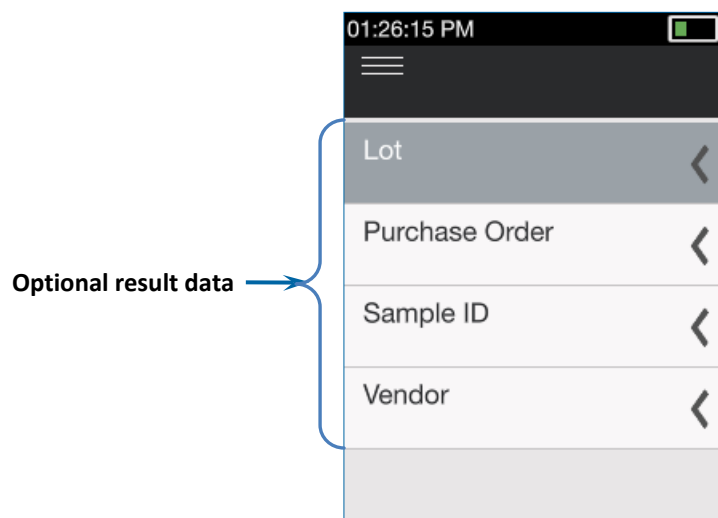
3. Select the required result data item.

   The data item entry screen appears with an on-screen virtual keyboard (see Figure 28 and Figure 29).

4. Using the keyboard, enter the required value.

   When the required data items are entered, the item values appear on the **Data Entry** menu (Figure 27) and, after analyzing a sample, in the results (see Figure 79).

Figure 27. Data Entry Menu with Specified Values

Specified optional result data
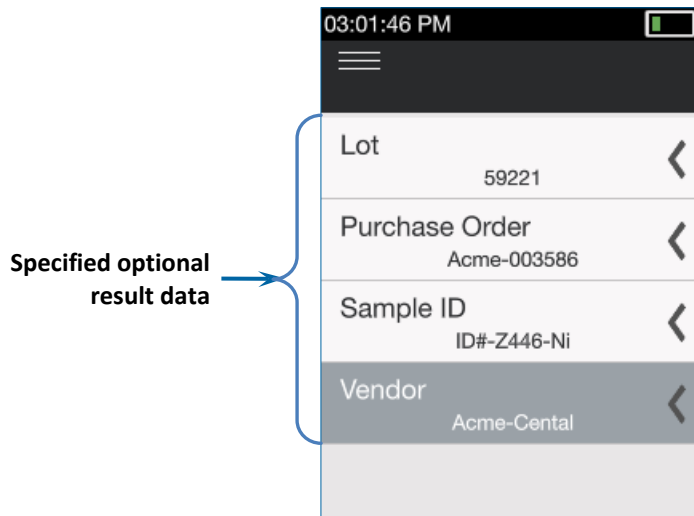
5. If needed, add a **File Tag** to the result filename (see "Adding a File Tag to a Result Filename").

6. After setting all needed optional result information, analyze the material (see "Analyzing a Sample").

Adding a Sample ID to a Result

Users can specify a **Sample ID** before analyzing a material to simplify on-screen and results file sorting. Because it appears on the **Results** list screen (Figure 30), users can easily find results that display the short text value to which they set the **Sample ID**. The specified Sample ID also appears in the body of the results file. Note that the setting lasts for only one scan. Users must add, or re-enter, a Sample ID for each sample analysis.

To include a specific text-value in both the **Results** list screen and the result file:

1. Access the **Data Entry** menu (see "Accessing the Data Entry Menu") and select **Sample ID**.

The analyzer displays the **Sample ID** screen with an on-screen virtual keyboard and an empty text entry field above it (Figure 28).

Figure 28. Empty Sample ID Screen with Vertical Keyboard

Numbers

Keyboard selector

Capitals

Text field

Backspace
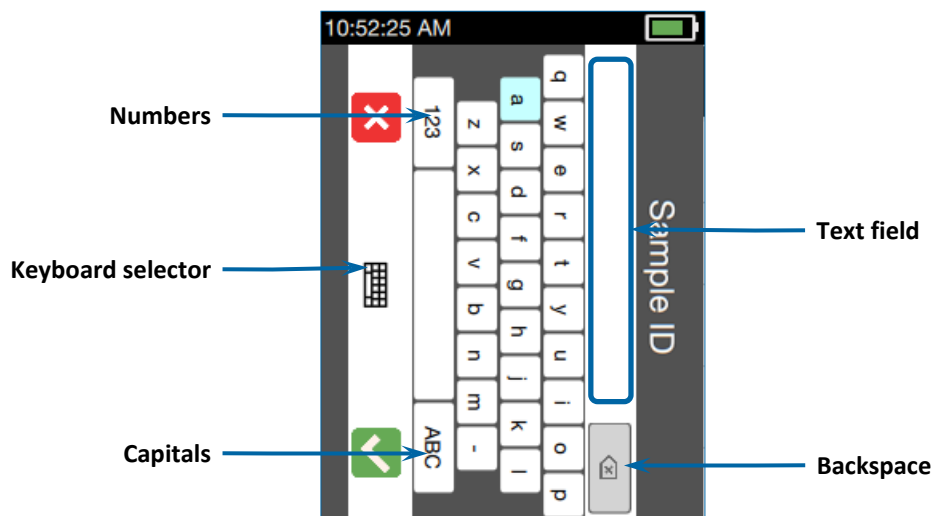
2. If the current keyboard is awkward, select the ⊞ (**Keyboard**) soft button to step through the keyboard options.

3. After choosing a keyboard, select each soft key in the required value of the **Sample ID**:

   ▪ Select 〔 ABC 〕(**Capitals**) to use capital letters.

   ▪ Select 〔 123 〕(**Numbers**) to use numbers and symbols.

   ▪ Select 〔 ⊠ 〕(**Backspace**) to make corrections.

   ▪ For split-screen keyboards, select the ❭ (**Right Arrow**) or ❬ (**Left Arrow**) soft keys to find letters, numbers, or symbols in the other keyboard screen.

   Each selected letter, number, and symbol appears above the keyboard (Figure 29).

Figure 29. Filled Sample ID Screen with Horizontal Keyboard
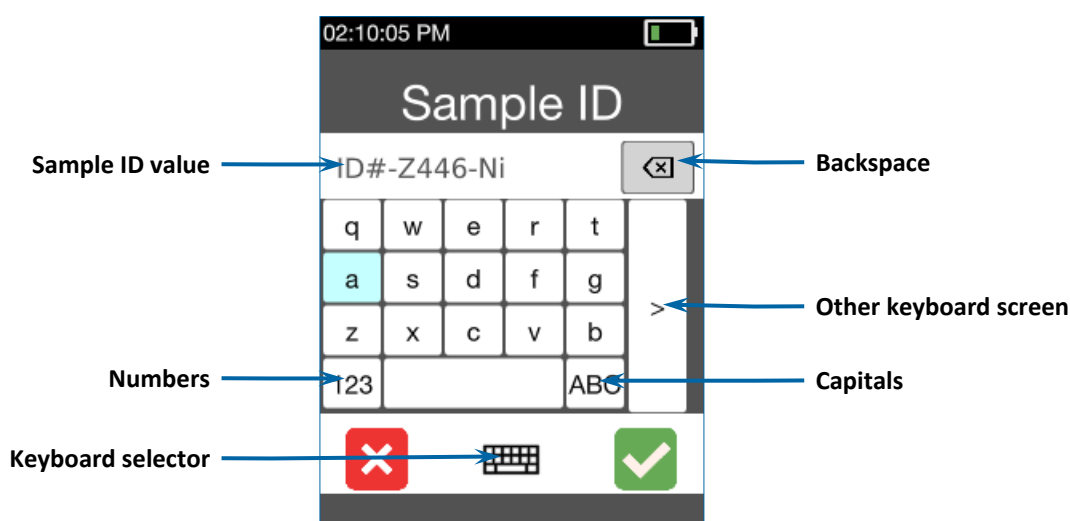
4. After completing the **Sample ID** setting, select ✅ (**OK**).

   The analyzer sets the value of the **Sample ID** and returns to the **Data Entry** menu.

5. After setting the **Sample ID**, add any other needed optional sample information (see "Adding Lot, Purchase Order, and Vendor Information to a Result" and "Adding a File Tag to a Result Filename").

6. After adding all needed optional sample information, squeeze and release the analyzer trigger to return to the Analyze screen.

7. Analyze the sample by performing steps 3 through 6 listed in the section "Analyzing a Sample."

   The **Sample ID** appears in the **Results** list (Figure 30).

![Rigaku logo]

Figure 30. Results List Screen with Sample ID
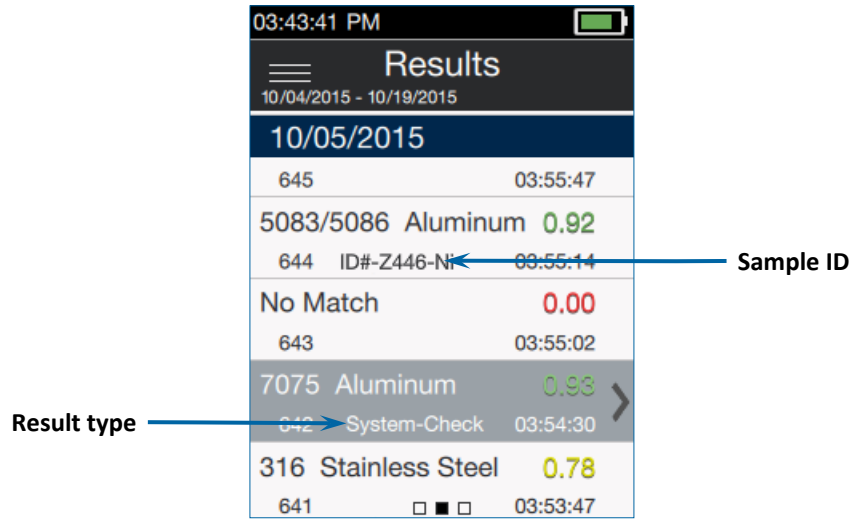
Adding Lot, Purchase Order, and Vendor Information to a Result

If information about the sample lot, the purchase order, or the vendor is required in a result, add values to these items on the **Data Entry** menu. These values appear in the result file. Users can view them from a connected local PC or network workstation (see "Viewing Analyzer Results on a Web Browser"). Note that the settings last for only one scan. Users must add or re-enter these settings for each sample analysis.

To add **Lot**, **Purchase Order**, and **Vendor** information to a result:

1. Access the **Data Entry** menu (see "Accessing the Data Entry Menu").
2. From the **Data Entry** menu, select **Lot**, **Purchase Order**, or **Vendor**.

   The analyzer displays a screen with an on-screen virtual keyboard and a text field for the value above it (Figure 31).

Figure 31. Default Data Entry Screen for Lot
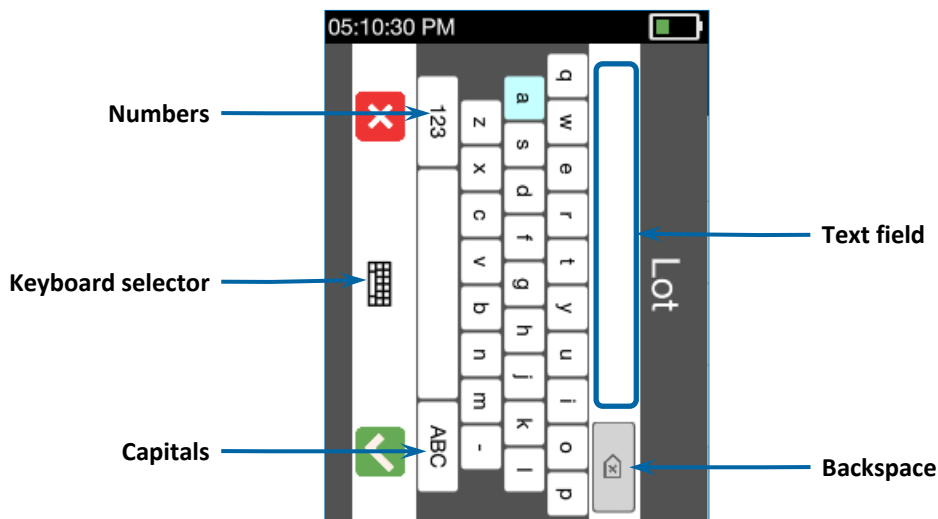
3. On the keyboard, select the letters, numbers, and symbols for the value (Figure 32).

Figure 32. Purchase Order Numeric Keypad with Value
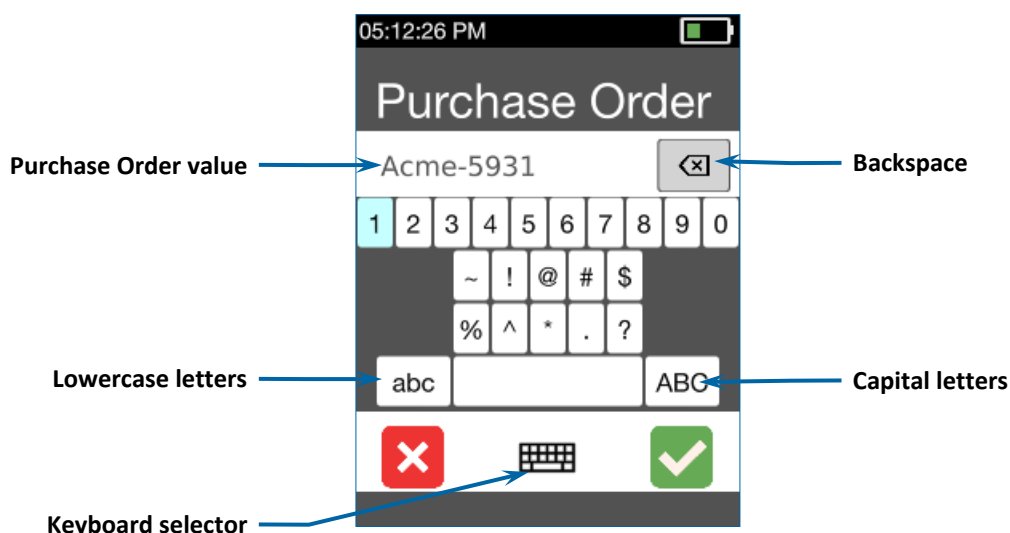
4. When the value is correct, select ☑ (**OK**).

    The new value appears on the Data Entry screen (see Figure 27).

5. After setting required **Data Entry** values, add any other needed optional sample information (see "Adding a Sample ID to a Result" and "Adding a File Tag to a Result Filename").

6. After adding all needed optional sample information, squeeze and release the analyzer's trigger to return to the Analyze screen.

7. Analyze the sample by performing steps 3 through 6 listed in the section "Analyzing a Sample."

Adding a File Tag to a Result Filename

The **File Tag** setting allows users to add letters and numbers to the default combination of serial number, date, and time that the analyzer uses for naming result files. This filename modifier lets users search through folders and archives for result files with names containing the File Tag value. Note that after setting the value of the File Tag, the analyzer adds it to the filename of only one scan. If needed, users must add or re-enter a File Tag for each sample analysis.

To set a File Tag:

1. Access the **Main** menu (see "Accessing Main Menu Features"), select **Settings** (see "Accessing Analyzer Settings", and then select **Results Settings** (see "Accessing Results Settings").

2. From the **Results Settings** menu, select **File Tag**.

    The File Tag screen shows the current setting above an on-screen virtual keyboard (Figure 33).

Figure 33. Default File Tag Screen
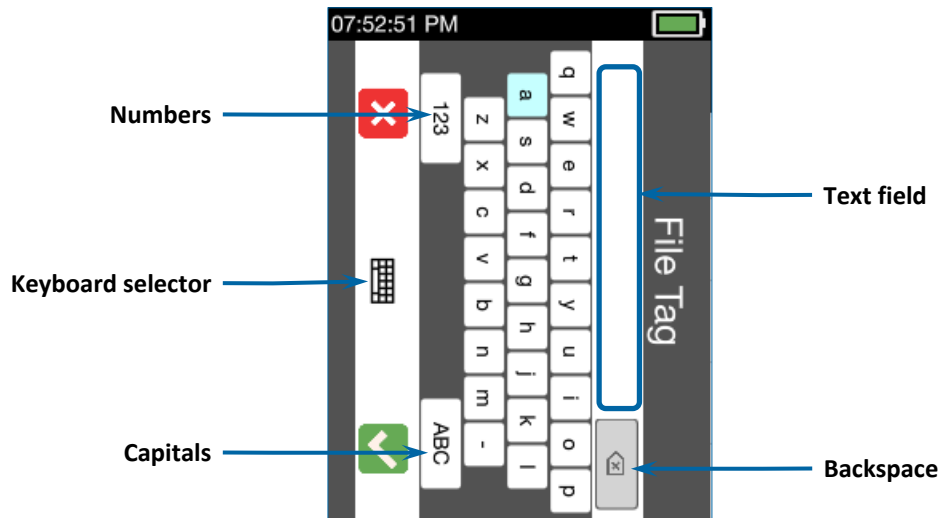
3. Using the on-screen keys, select the letters and numbers to add to the result filename (Figure 34).

Figure 34. File Tag Screen Filled
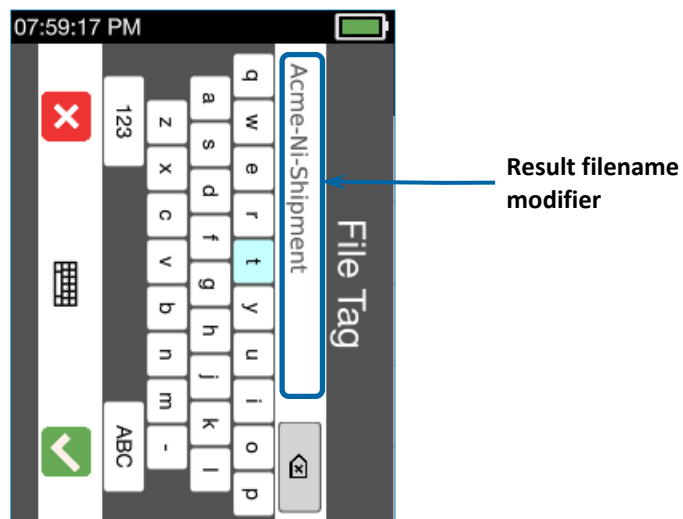
4. After completing the File Tag, select ☑ (**OK**).

   The specified value appears below the **File Tag** option on the **Results Setting** menu (Figure 35).

Figure 35. Results Setting Menu with File Tag Set
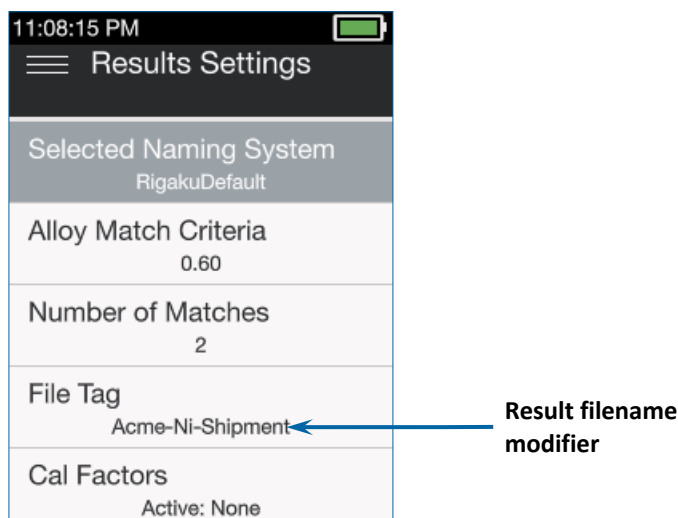
5. After setting the **File Tag** value, add any other needed optional sample information (see "Adding a Sample ID to a Result" and "Adding Lot, Purchase Order, and Vendor Information to a Result").

6. After adding all needed optional sample information, squeeze and release the analyzer's trigger to return to the Analyze screen.

7. Analyze the sample by performing steps 3 through 6 listed in the section "Analyzing a Sample."

Viewing Results

When analyzing samples, the KT-100 analyzer generates and color-codes an MN score for each Grade Spec in the current Grade Specs naming system (see "Analyzing a Sample"):

- **Green** scores are likely matches
- **Yellow** scores are possible matches
- **Red** scores are unlikely matches

In addition, if any MNs are greater than the Alloy Match Criteria (AMC) setting (see "Setting the Alloy Match Criteria"), the analyzer classifies up to five of the Grade Specs with the highest MN scores as matches for the sample's chemistry (see "Specifying the Number of Matches Displayed"). If no Grade Spec receives an MN greater than the AMC setting, the analyzer classifies the result as *No Match*. All of this data is stored after analysis is complete.

After analyzing the sample, the analyzer then displays the result in the most recently selected view. Users can verify that they are viewing the result by checking the position of the marked box in the **Result** screen's extended screen icon (Figure 36). Once the result appears, users can:

- Select a view (see "Selecting a Result View").
- Browse through stored results (see "Browsing the Results List").
- Filter stored results (see "Filtering the Results List").

Figure 36. Current Result in Graph View

Green MN score for current match

Alloy named in Grade Spec for current match

Match Order value

Analysis date

Result number

Analyzed spectral data

Extended screen icon in Result Views position
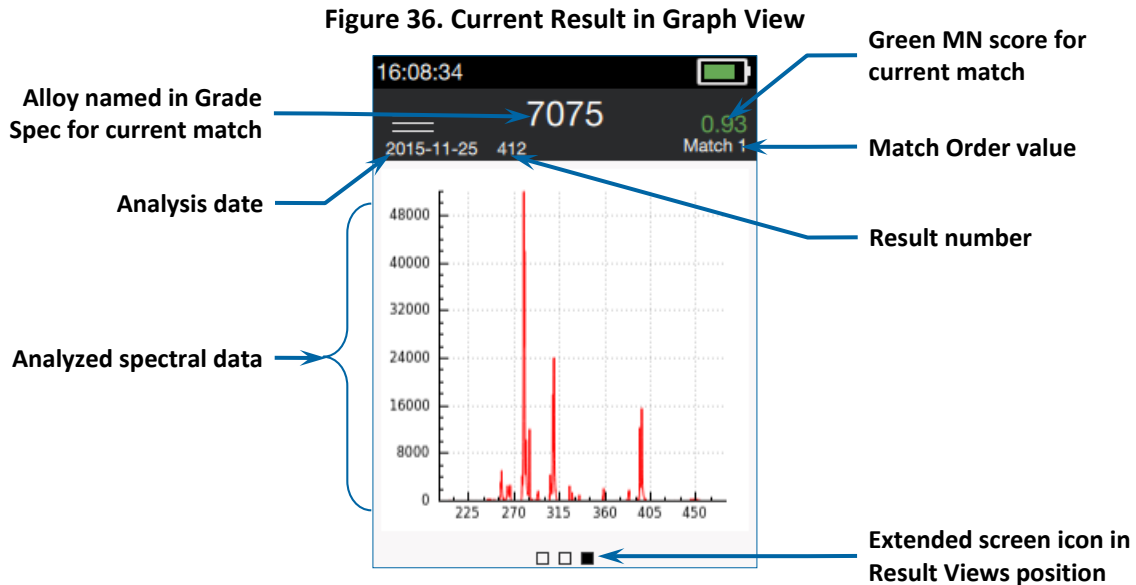
In addition, users can customize both results data and result views (see "Customizing Results Settings").

Selecting a Result View

The KT-100 analyzer can show match results, alloy composition data, and a graphic result spectrum (Figure 36) for each result with the **Select View** menu. The following subsections contain information about:

- Displaying the Select View Menu
- Viewing the Match Result
- Viewing Composition Results
- Viewing Results Data for Multiple Matches

Displaying the Select View Menu

After users analyze a sample or select a stored result, the analyzer shows the result in the last selected view. If users need a different view, they must display the **Select View** menu, which provides **Match Result**, **Composition**, and **Graph** options. For most purposes, the **Match Result** and alloy **Composition** views are helpful.

To display the **Select View** menu:

1. Either analyze a sample (see "Analyzing a Sample") or select a stored result (see "Browsing the Results List").
2. When the results screen with the extended screen icon in the right-hand **Result Views** position appears, press the ⏵ (**Right Arrow**) hard button.

   The analyzer displays the **Select View** menu (Figure 37).

Figure 37. Select View Menu
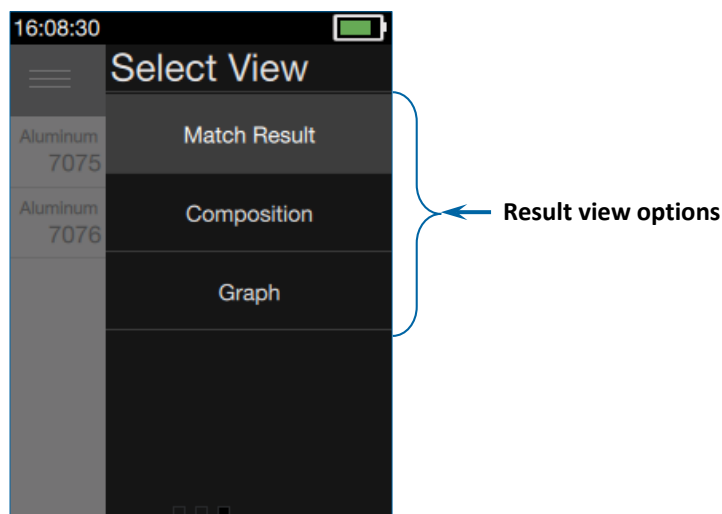
3. From the list, select:

- **Match Result** to view the alloy names from up to five matching Grade Specs (see "Viewing the Match Result").

- **Composition** to view the calculated elemental chemistry for any matches (see "Viewing Composition Results").

- **Graph** to view the result's spectrum (Figure 36).

Viewing the Match Result

When users choose the **Match Result** option from the **Select View** menu (Figure 37), the analyzer lists:

- For a result with one or more matches (Figure 38):
  - Result date
  - Result number
  - Primary element names for possible matches
  - Alloys named in Grade Specs receiving MN scores greater than the AMC setting
  - Color-coded MN scores for comparisons between various possible Grade Spec matches

Figure 38. Default Match Result Screen with Multiple Matches
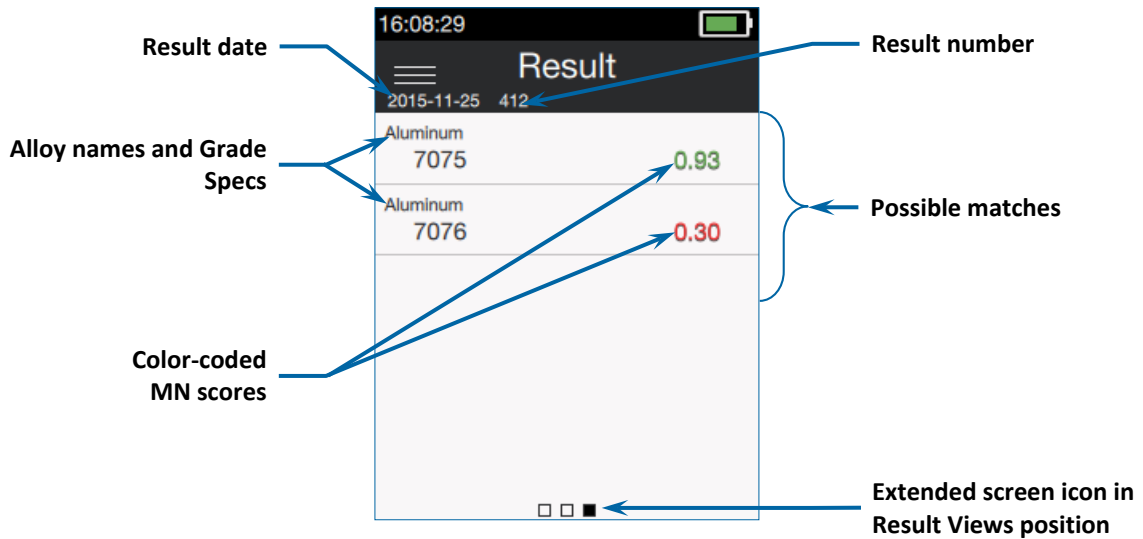
- For a result with **No Match** classification (Figure 39):
  - Result date
  - Result number
  - **No Match Found** result message

Figure 39. No Match Result Screen
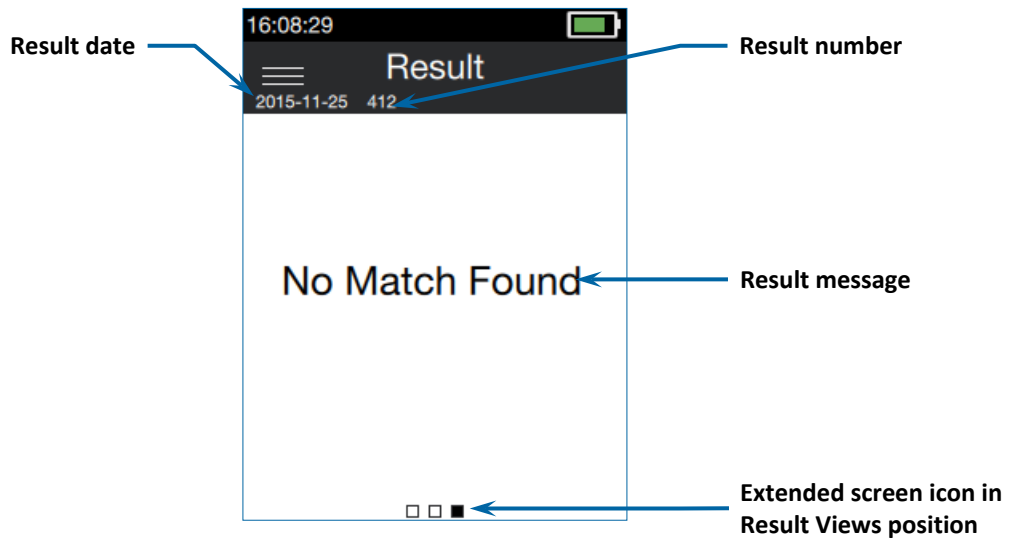
To display **Match Result** for both current results and stored results:

1. Display the **Select View** menu (see "Displaying the Select View Menu").
2. From the **Select View** menu, select **Match Result**.

   The analyzer displays the **Result** screen—listing either up to five alloys from the current Grades Specs library with color-coded MN scores (Figure 38) or the **No Match Found** result (Figure 39).

Rigaku

3. When finished viewing **Match Result**:
   - View **Composition** results (see "Viewing Composition Results").
   - View previous results (see "Browsing the Results List").
   - Analyze another sample (see "Analyzing a Sample").
   - Change the **AMC** setting to see more or fewer matches (see "Setting the Alloy Match Criteria").

Viewing Composition Results

When users choose **Composition** from the **Select View** menu (Figure 37), the analyzer displays how the sample's analyzed elemental chemistry percentages compare to the valid alloy composition ranges in the Grade Spec for each match. As a result, **Composition** results show:

- For a result with one or more matches (Figure 40):
  - Alloy grade named in the current matching Grade Spec
  - Color-coded MN score of the comparison
  - Result date
  - Result number
  - Match Order value (see "Specifying the Number of Matches Displayed")
  - Color-coded list of analyzed alloy composition elements
  - Percentages of sample weight for all analyzed elements
  - Valid ranges for elements specified in the current matching Grade Spec

  > **Note:**
  >
  > For matching results, analyzed elements with the "**No Range**" message are not listed in the matching Grade Spec.

  - Positions of analyzed element percentages within the valid ranges

Figure 40. Alloy Composition Result with Matches

![Rigaku logo]
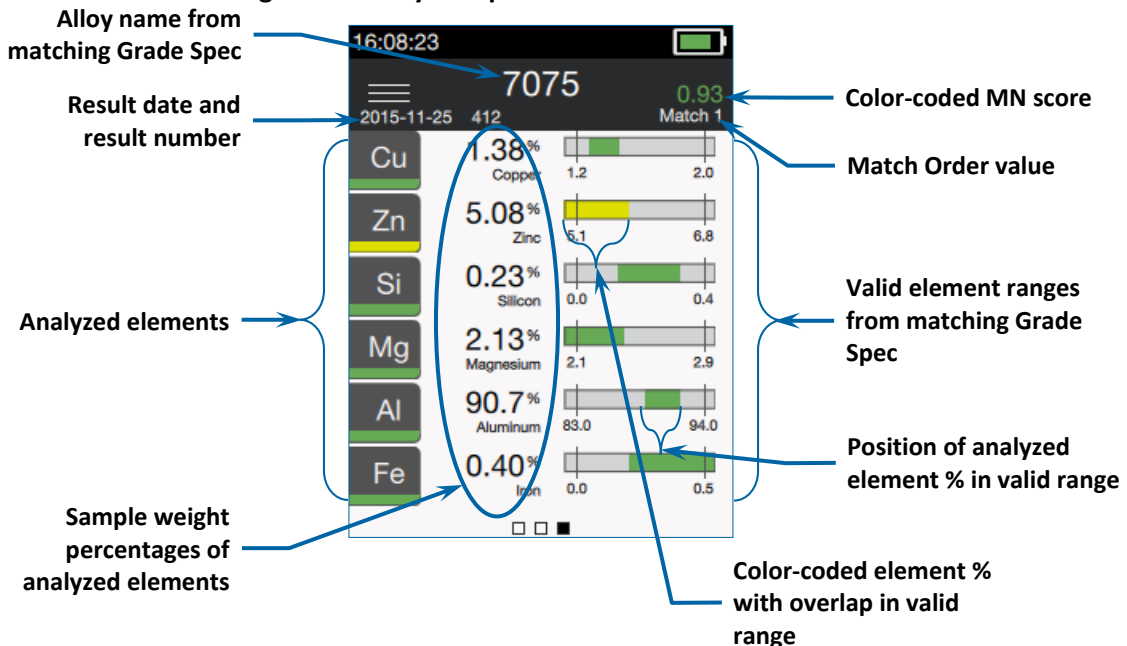
- For a result with no matches (Figure 41):
    - **No Match** classification
    - Result date
    - Result number
    - List of analyzed alloy composition elements
    - Percentages of sample weight for all analyzed elements
    - **No Range** messages because of no matching Grade Spec

Figure 41. Alloy Composition Result with No Match
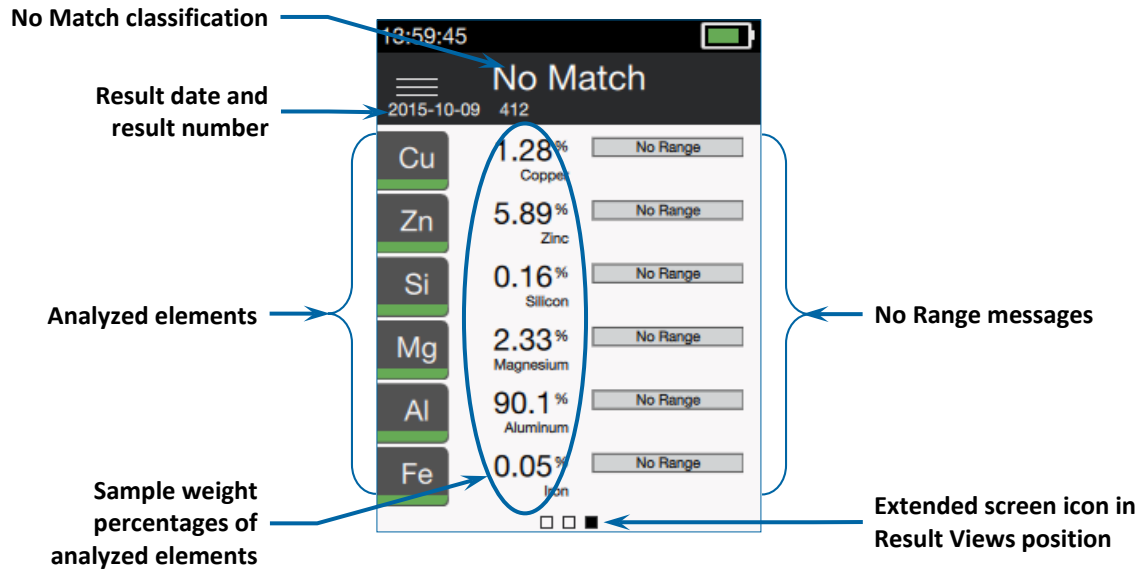
To display alloy **Composition** for both current results and stored results:

1. Display the **Select View** menu (see "Displaying the Select View Menu").
2. From the **Select View** menu, select **Composition**.
   The analyzer displays the **Composition** results screen (Figure 40).
3. To move through the various screens and multiple matches for each result, select the ▼ (**Down Arrow**) and ▲ (**Up Arrow**) hard buttons on the keypad (see "Viewing Results Data for Multiple Matches").
4. When finished viewing **Composition** results:
    - View **Match Results** (see "Viewing the Match Result").
    - View previous results (see "Browsing the Results List").
    - Analyze another sample (see "Analyzing a Sample").

Viewing Results Data for Multiple Matches

When the selected results view is **Composition**, results with multiple matches have more than one screen of result data (see "Specifying the Number of Matches Displayed"). From the **Result** screen, users can view the **Composition** data for these matches with either the ▼ (**Down Arrow**) and ▲ (**Up Arrow**) hard buttons or customized Quick Launch keys (see "Specifying Functionality of Quick Launch Keys").

To view multiple match data:

1. View **Composition** results (see "Viewing Composition Results").

2. When the **Composition** result screen appears, select the ▼ (**Down Arrow**) and ▲ (**Up Arrow**) hard buttons on the keypad to view all result data for the current match.

3. After viewing the current match, select the ▼ (**Down Arrow**) hard button to display the next match (Figure 42).

   If the result contains multiple matches:

   ▪ Match Order value on the right side of the result screen header increases by **1**.

   ▪ MN score updates for the new match.

   ▪ Alloy name and the valid element ranges appear as specified in the new matching Grade Spec from the current Grade Specs naming system.

Figure 42. Viewing the Second Match

4. Select the ▼ (**Down Arrow**) and ▲ (**Up Arrow**) hard buttons on the keypad to view all results data for the new match.

5. When finished viewing the data for the new match, view result data from other matches by repeating steps 3 and 4 until the Match Order value no longer increases.

6. When finished viewing results data from all matches:

   ▪ View **Match Results** (see "Viewing the Match Result").

   ▪ View previous results (see "Browsing the Results List").

   ▪ Analyze another sample (see "Analyzing a Sample").

Browsing the Results List

The KT-100 analyzer allows all users to browse through the stored results. When browsing results, the default list of stored results is available as the middle, **Result List** view of the extended results screen (Figure 43). The default list includes all the results currently on the analyzer listed in chronological order of result numbers, with the highest result number at the top of the list.

To browse the results list:

1. With the analyzer powered on, select ☰ (**Main** menu) on the touchscreen, or press the ⬤ (**Main** menu) hard button on the keypad.

    The analyzer displays the **Main** menu (Figure 19).

2. From the **Main** menu, select 🔲 (**View Results**).

    ▪ If the analyzer was recently powered on, the **Results** list screen displays the default results list.

    ▪ If the results list was recently filtered, the **Results** list screen displays the results list generated by the last selected filter (see "Filtering the Results List").

    > **Note:**
    >
    > Users can also access the **Results** list screen from both the result screen and the **Filter** screen:
    >
    > - If the current screen is a **Match Result**, **Composition** result, or result **Graph** screen, press the ◀ (**Left Arrow**) hard button on the keypad.
    >
    > - If the current screen is the **Filters** screen, press the ▶ (**Right Arrow**) hard button.

    The analyzer displays the **Results** list with the extended screen icon in the **Results List** position (Figure 43).

<p align="center">Figure 43. Results List Screen</p>
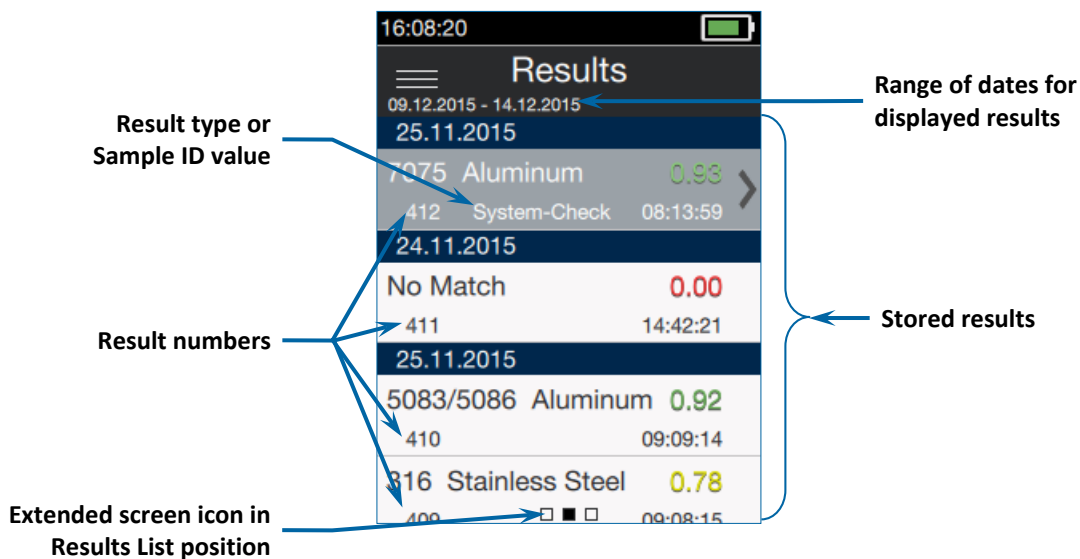
3. Scroll through the results list by pressing the ▼ (**Down Arrow**) and ▲ (**Up Arrow**) hard buttons.

4. To help locate a required result, filter the results list (see "Filtering the Results List").

5. When the required result is highlighted, select the highlighted result on the touchscreen, or select the ◎ (**Power/Enter**) hard button to view the stored result.

6. To ensure that the analyzer displays needed data, select the required results view (see "Selecting a Result View").

Filtering the Results List

As the collection of results records grows larger, users can simplify locating specific stored results by filtering the results list.

To filter the result list:

1. With the analyzer powered on, select ☰ (**Main** menu) on the touchscreen, or press the ⊜ (**Main** menu) hard button on the keypad.

   The analyzer displays the **Main** menu ([Figure 19](#)).

2. From the **Main** menu, select 🗒 (**View Results**).

   The analyzer displays the **Results** list with the extended screen icon in the **Results List** position ([Figure 43](#)).

3. From the **Results** list screen, press the ◀ (**Left Arrow**) hard button.

   The analyzer displays the **Filters** menu ([Figure 44](#)).

Figure 44. Filters Menu

Current Date setting

Extended screen icon in Filters position
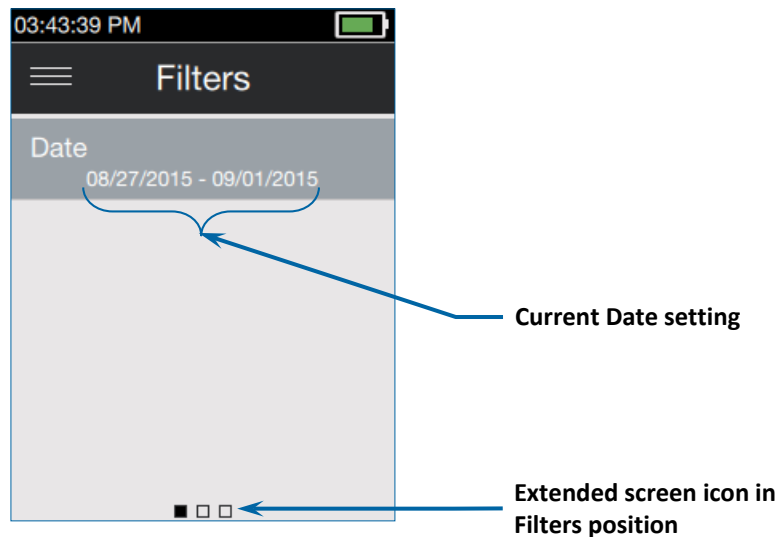
4. Select **Date** to limit the results listed to specific dates and limited periods of time.

   The analyzer displays the **Date Range** menu with the current start date listed under the **From** menu item and the current end date listed under the **To** menu item ([Figure 45](#)).

Figure 45. Date Range Menu
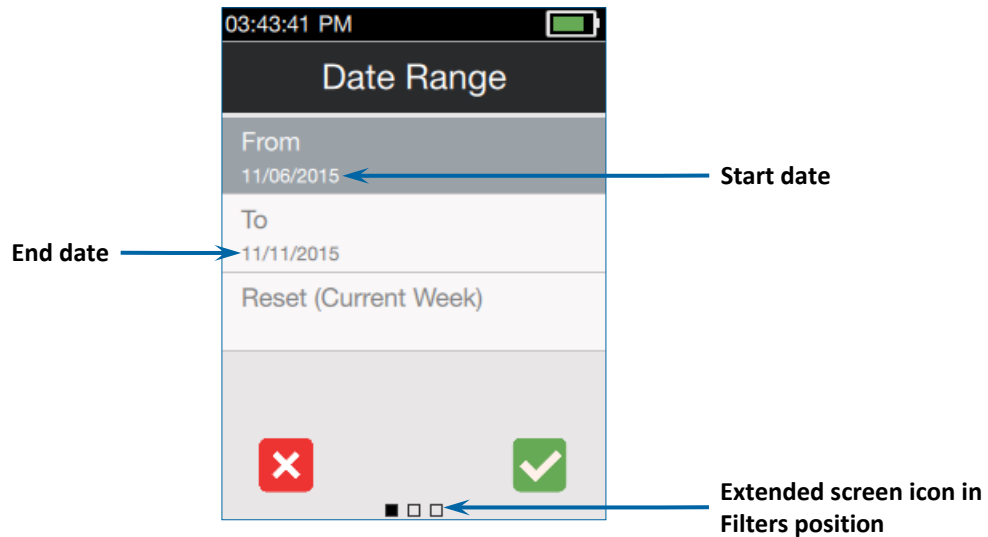
From the **Date Range** menu, users can configure the **Date** filter by:

- Setting the Date Range Start Date
- Setting the Date Range End Date
- Resetting the Date Range

5. When all required options are selected, press the ⏵ (**Right Arrow**) hard button to view the filtered **Results** list.

6. Browse through the list to locate and view the required stored result (see "Browsing the Results List").

Setting the Date Range Start Date

To select a new start date for the **Date** filter:

1. From the **Filters** screen, select **Date** (see "Filtering the Results List").

2. On the **Date Range** screen, select **From**.

   The analyzer displays the **From** setting screen (Figure 46) that contains scrollable lists of available dates with the current month, day, and year options highlighted.

Figure 46. From Screen for Start Date Options
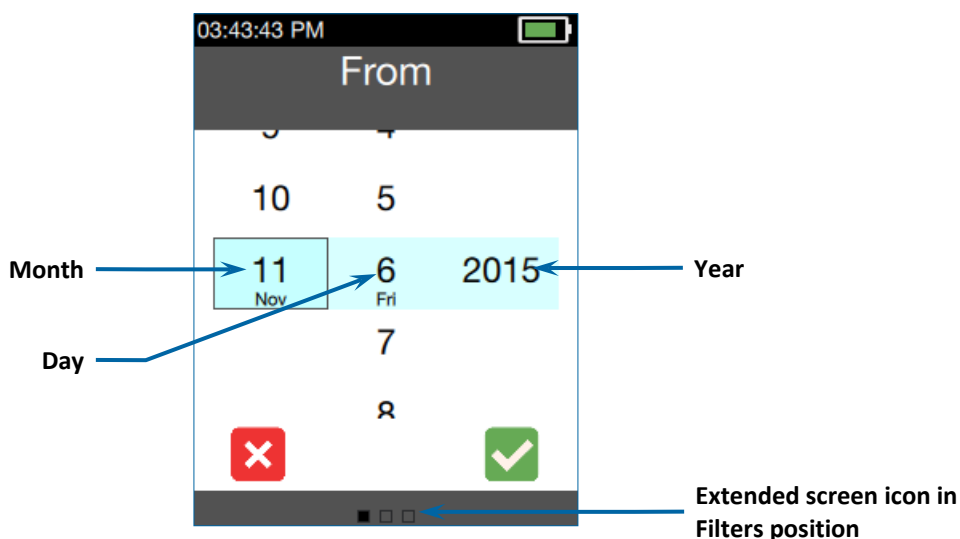
3. Scroll through the lists and select the required settings.

4. When the correct settings are highlighted, select ✅ (**OK**).

   Using the selected options, the analyzer sets the start date for the results on the **Results** list screen, and returns to the **Date Range** menu with the new start date listed below the **From** menu item.

5. If necessary, select a new end date (see "Setting the Date Range End Date").

6. When the **From** and **To** dates are correct, select ✅ (**OK**).

   The analyzer returns to the **Filters** menu and displays the new date range under the **Date** menu item.

7. Press the press the ⏵ (**Right Arrow**) hard button to view the filtered **Results** list (see "Browsing the Results List").

Setting the Date Range End Date

To select a new end date for the **Date** filter:

1. From the **Filters** screen, select **Date** (see "Filtering the Results List").

2. On the **Date Range** screen, select **To**.

   The analyzer displays the **To** setting screen (Figure 47) that contains scrollable lists of available end dates with the current month, day, and year options highlighted.

Figure 47. To Screen for End Date Options
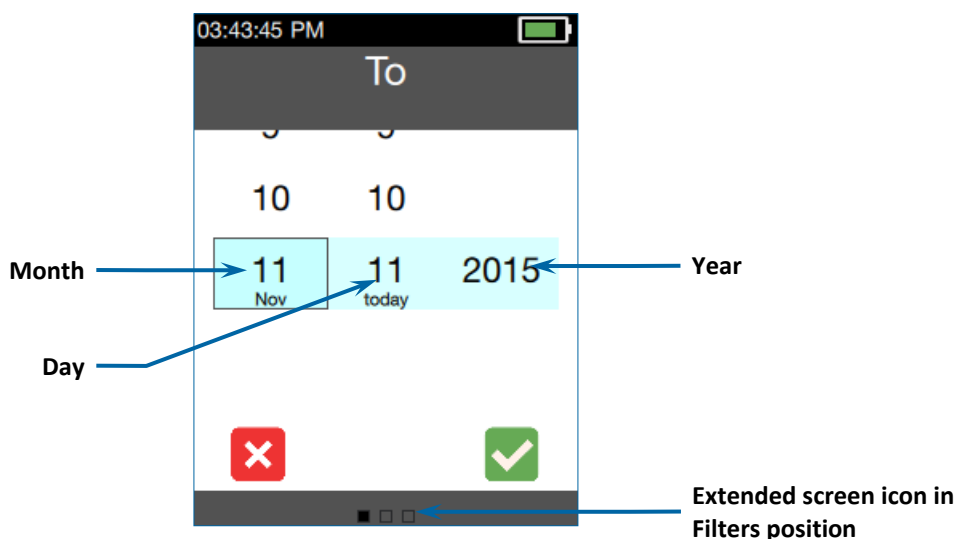
Month → 11 Nov
Day → 11 today
Year ← 2015
Extended screen icon in Filters position

3. Scroll through the lists and select the required settings.

4. When the correct settings are highlighted, select ✅ (**OK**).

   Using the selected options, the analyzer sets the end date for results on the **Results** list screen, and returns to the **Date Range** menu with the new end date below the **To** menu item.

5. If necessary, select a new start date (see "Setting the Date Range Start Date").

6. When the **From** and **To** dates are correct, select ✅ (**OK**).

   The analyzer returns to the **Filters** menu and displays the new date range under the **Date** menu item.

7. Press the press the ⏵ (**Right Arrow**) hard button to view the filtered **Results** list (see "Browsing the Results List").

Resetting the Date Range

When users no longer require a custom range for the **Results** list, selecting **Reset** sets the **Date Range** to the current week.

To reset the date range:

From the **Filters** screen, select **Date** (see "Filtering the Results List").

1. On the **Date Range** screen, select **Reset (Current Week)**.

   The analyzer changes the dates shown:

   - **To** becomes the analyzer's current **Date** setting (see "Adjusting Date and Time Settings").
   - **From** becomes the beginning date of a week ending with the **To** setting.

2. When the dates are correct, select ✅ (**OK**).

   The analyzer returns to the **Filters** menu and displays the reset date range under the **Date** menu item.

3. Press the press the ⏵ (**Right Arrow**) hard button to view the filtered **Results** list (see "Browsing the Results List").

Routine Cleaning of Your Analyzer

Maintaining a clean analyzer window at the front of the analyzer helps to ensure that analysis issues do not occur. Therefore, periodically clean the analyzer window with a clean cloth or cotton swab and at least 70% Isopropyl alcohol cleaning solutions (optional).

To clean the analyzer:

1. Disconnect the analyzer from the 12-volt power supply.
2. Remove the USB cable from the micro USB connector (Figure 4).
3. With a clean cloth or cotton swab and 70% Isopropyl alcohol (optional), clean all loose or stuck-on materials off the analyzer window (Figure 2).
4. When finished, let the analyzer air dry if necessary.

Managing Communications

Managing communications provides access to Wifi networks and USB connections. It also allows users to save battery power by disabling Wifi when it is not required. Users can access and set up the communications options through the analyzer's **Communications** settings.

Notes:
- For situations when radio signals are not desired, disable Wifi.
- To reserve battery charge, disable Wifi when it is not needed.
- Only one method of communication may be used at a time.

The following subsections provide information about:

- Accessing Communications Settings
- Using Usb
- Using Wifi
- Accessing Bluetooth

Accessing Communications Settings

To view or change communication settings users must access the **Communications** menu.

To access the **Communications** menu:

1. Access the **Settings** menu (see "Accessing Analyzer Settings").
2. From the **Settings** menu, select **Communication**.

   The analyzer displays the **Communications** menu with the status of the communication features listed beneath the feature names (Figure 48).

Figure 48. Communications Menu

Usb connection IP address

Wifi status or IP address

Bluetooth (unavailable)
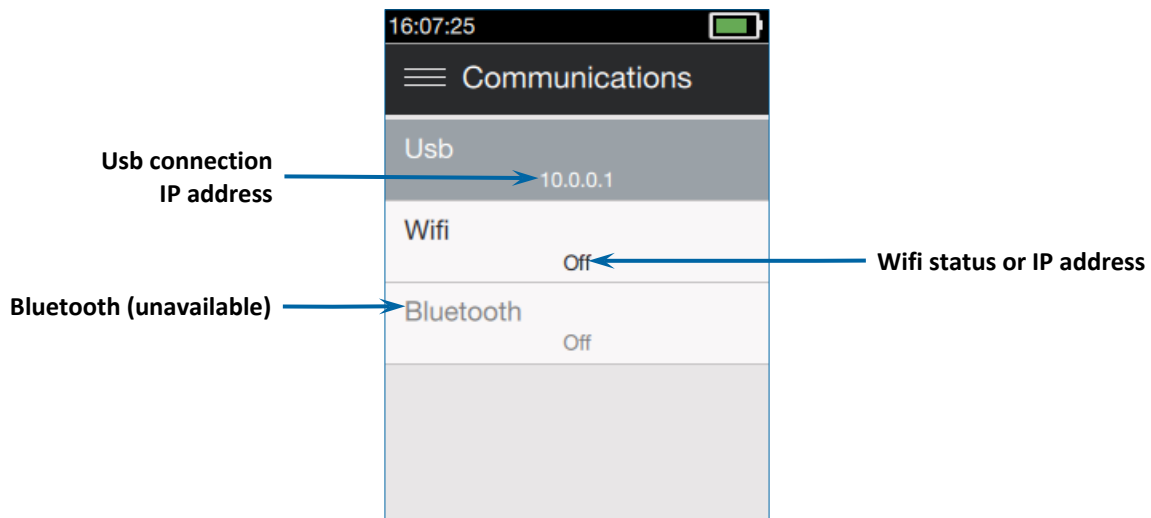
3. View **Communications** menu items.

4. If necessary, view or configure **Communications** for:

   ▪ Using Usb

   ▪ Using Wifi

5. When **Communications** changes are complete, press the ◀ (**Left Arrow**) hard button to return to the **Settings** menu and, if necessary, change the options for various settings categories (see "Customizing Results Settings").

6. When all changes are complete, select ☰ (**Main** menu) to return to the **Main** menu, or use the trigger to operate the analyzer with the new settings.

Using Usb

The KT-100 analyzer includes a Usb feature that uses a RAD-supplied USB cable and browser-based software for viewing and archiving analyzer data on a local PC. The IP address of the Usb feature is set by RAD.

To use the Usb feature on a local PC:

1. With the analyzer powered off (see "Powering Off"), use the RAD-supplied USB cable to connect the analyzer to the PC with:

   ▪ Micro USB cable-end connected to the analyzer's micro USB connector (see Figure 4)

   ▪ Standard USB cable-end connected to the local PC

2. Power on the analyzer (see "Powering On"), log in (see "Logging In and Entering Passcodes"), and launch the **Communication** settings menu (see "Accessing Communications Settings").

3. From **Communications**, note the analyzer's **Usb** IP address (see Figure 48).

4. On the local PC, launch a web browser.

   Currently, KT-100 supports recent versions of Microsoft Internet Explorer, Mozilla Firefox, and Google Chrome.

5. Once the web browser has launched:

   A. Connect the web browser to the analyzer (see "Connecting a KT-100 Analyzer to Local PCs or Network Workstations").

   B. View result data (see "Viewing Analyzer Results on a Web Browser").

   C. Archive result and instrument data (see "Archiving Analyzer Results").

   D. Access system logs (see "Downloading System Logs for Technical Support").

6. After viewing or archiving data, close the browser on the PC.

7. Power off the analyzer (see "Powering Off").

8. Disconnect the RAD-supplied USB cable from both the analyzer and the PC.

Using Wifi

KT-100 analyzers include a Wifi feature that allows users to remotely-access results and archive analyzer data. To access results and archive analyzer data on their workstations, users must enable the analyzer's Wifi feature and then connect the analyzer to their local Wifi network. After viewing or archiving the data, they can then save battery charge by disabling the analyzer's Wifi.

Enabling Wifi

If users want to archive results data on network workstations or drives, they must enable the KT-100 analyzer's Wifi feature.

To enable Wifi:

1. View the **Communications** menu (see "Accessing Communications Settings").

   The current status of Wifi networking appears both on the status bar and below the **Wifi** menu item.

2. If the status is **Off**, select **Wifi**.

   The **Wifi** screen appears with the current setting highlighted.

3. Scroll to **On**.

4. When the **On** option is highlighted, select ☑ (**OK**).

   The analyzer saves the setting and returns to the **Communications** menu with **Wifi** status updated to:

   ▪ (**Wifi Not Connected**) in status bar with the status message of **On** when **Wifi** is enabled for wireless zones in which the analyzer *has not* previously connected (Figure 49).

   ▪ (**Wifi Connected**) in status bar with status message of the IP address provided by the wireless router when **Wifi** is enabled for wireless zones in which the analyzer *has* previously connected (Figure 52).

Figure 49. Wifi On with Network Not Connected
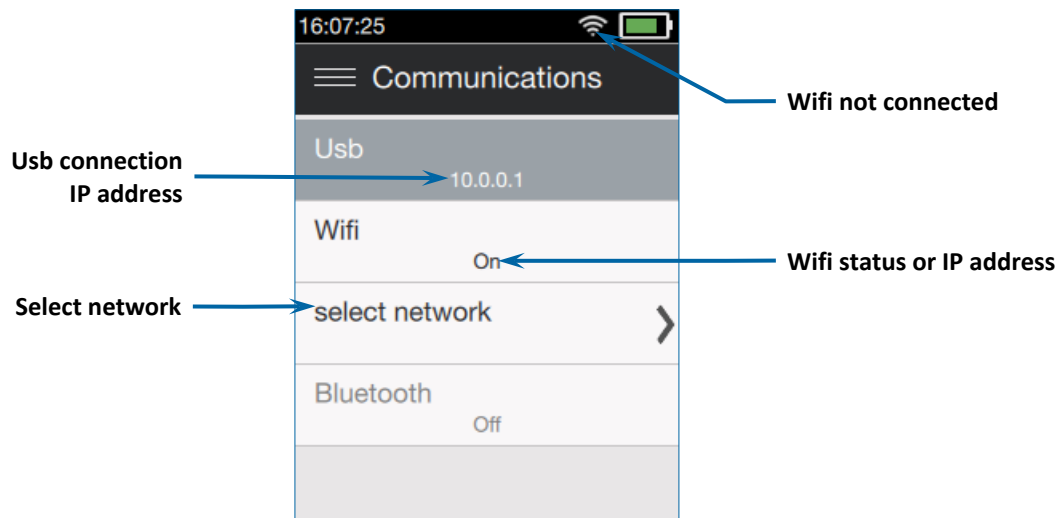
5. If necessary, configure Wifi to connect to the correct wireless router (see "Configuring New Wifi Profiles" and "Selecting a Configured Network").

6. Once connected, verify that the correct Wifi settings appear in the status bar and under the **Wifi** menu item (Figure 52).

7. On a network workstation, launch a web browser.

   Currently, KT-100 supports recent versions of Microsoft Internet Explorer, Mozilla Firefox, and Google Chrome.

8. Once the web browser has launched:

   A. Connect the web browser to the analyzer (see "Connecting a KT-100 Analyzer to Local PCs or Network Workstations").

   B. View result data (see "Viewing Analyzer Results on a Web Browser").

   C. Archive result and instrument data (see "Archiving Analyzer Results").

   D. Access system logs (see "Downloading System Logs for Technical Support").

9. After viewing or archiving data, close the browser on the PC and power off the analyzer (see "Powering Off").

Configuring New Wifi Profiles

When **Wifi** is **On**, KT-100 automatically reconnects to the most recently used wireless router within range. If no recent wireless router is in range, the analyzer shows that **Wifi** is **On** but not connected in the status bar and displays the **select network** option below the Wifi status message (Figure 49). If the required local wireless network is not in the analyzer's connection list, or if the analyzer has connected to an incorrect network, configure **Wifi** settings for the correct available network.

To configure **Wifi** for new wireless network:

1. View the **Communications** menu (see "Accessing Communications Settings").

   The current Wifi status is shown on the status bar and in the status message below the **Wifi** menu item.

2. If necessary, enable Wifi (see "Enabling Wifi").

3. When Wifi is enabled, select either:
   - The **select network** option

   Or:
   - The IP address of the current connection

   The **Available Networks** menu shows all compatible networks available in the current Wifi zone, with wireless protocols and signal strengths listed (Figure 50).

Figure 50. Available Networks Screen
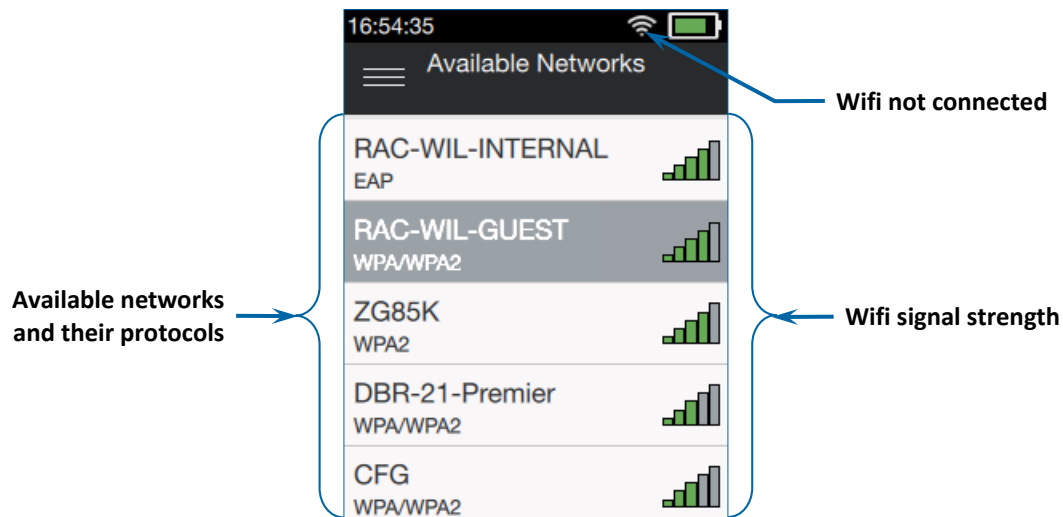
4. Scroll through the network list.

5. When the correct network is highlighted, select it or press the ⊚ (**Power/Enter**) hard button. The analyzer displays the **Enter Passkey** screen with an on-screen virtual keyboard (Figure 51).

Figure 51. Enter Passkey Screen for Wifi Connection
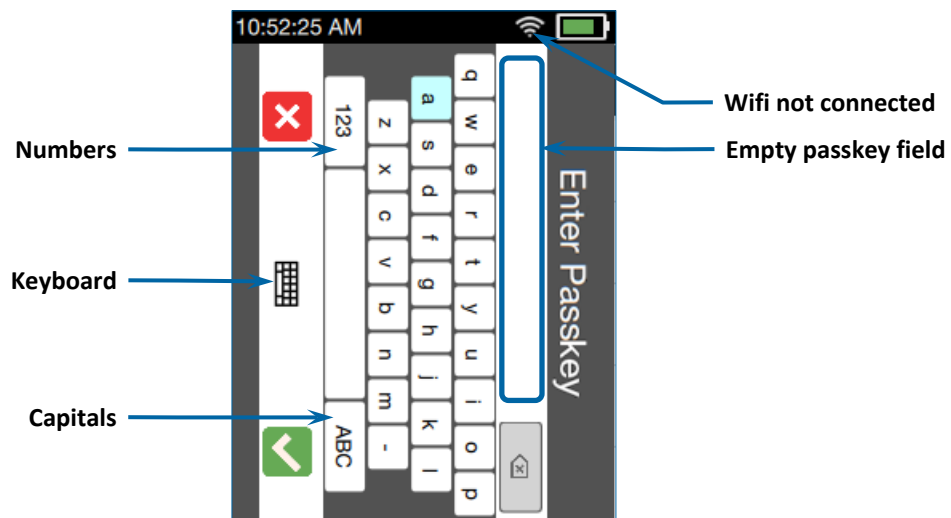
6. From the keyboard, select the letters and numbers of the network passkey or password. For information about using the keyboard, see "Adding a Sample ID to a Result."

7. When the passkey is complete, select ✅ (**OK**).

   The analyzer saves the network profile, returns to the **Communications** screen, and attempts to connect to the specified network with the entered passkey.

8. When the network name appears under **Wifi**, verify that:

   ▪ The network icon in the status bar changes to 📶 (**Wifi Connected**).

   ▪ The correct network name and an assigned IP address appear in the menu ([Figure 52](#)).

Figure 52. Communications Menu with Live Wifi Connection
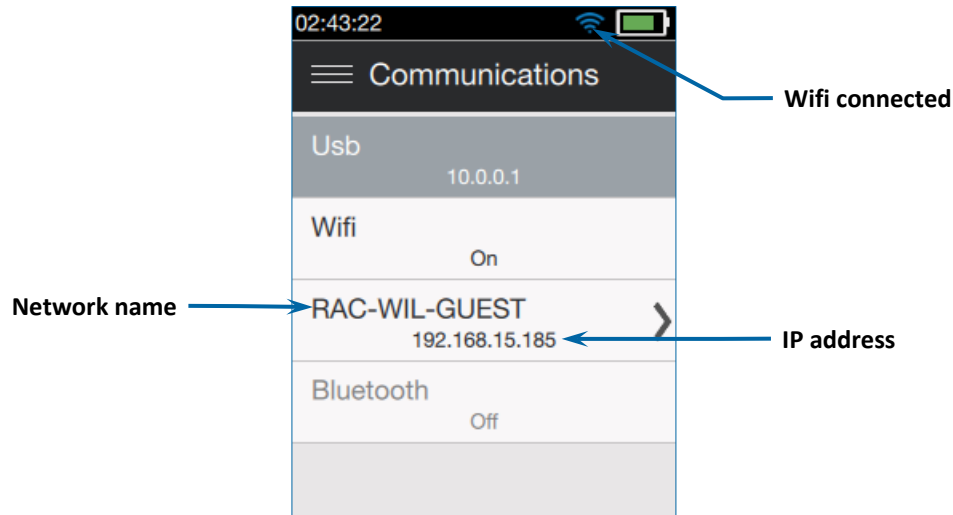
9. When all **Communications** settings are correct:

   ▪ Press the ◀ (**Left Arrow**) hard button to return to the **Settings** menu.

   ▪ Select ≡ (**Main** menu) to return to the **Main** menu.

   ▪ Use the trigger to operate the analyzer with the new settings.

Selecting a Configured Network

If necessary, users can select a different configured wireless network profile than the one to which the analyzer automatically connects.

To select a configured wireless network:

1. View the **Communications** menu (see "[Accessing Communications Settings](#)").

   The current Wifi status is shown on the status bar and in the status message below the **Wifi** menu item.

2. If necessary, enable Wifi (see "[Enabling Wifi](#)").

3. When Wifi is enabled, select the IP address of the current connection ([Figure 52](#)).

   The **Available Networks** menu shows all compatible networks available in the current Wifi zone, with wireless protocols and signal strengths listed (similar to [Figure 50](#)).

4. Scroll through the network list.

5. Select the required network.

   A screen with the network name at the top displays available network options ([Figure 53](#)).

Figure 53. Options for Selected Network

Available options
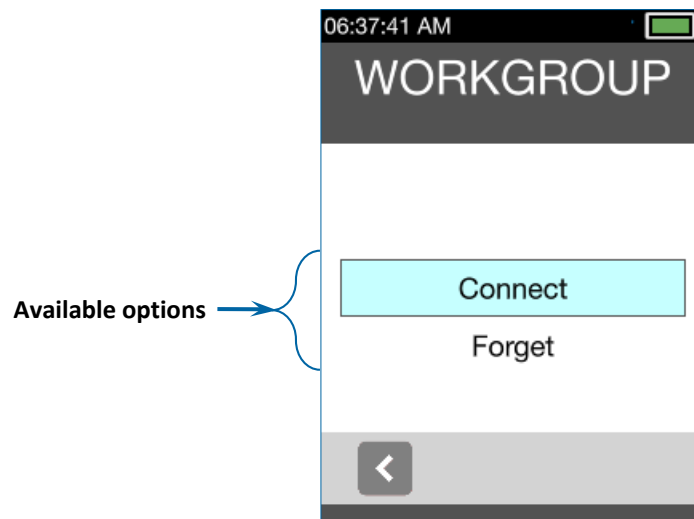
6. From the options list, select **Connect**.

   The analyzer returns to the **Communications** menu and attempts to connect to the selected network.

7. When the network name appears under **Wifi**,, verify that:

   ▪ The network icon in the status bar is 📶 (**Wifi Connected**).

   ▪ The correct network name and an assigned IP address appear in the menu (Figure 52).

8. When all **Communications** settings are correct:

   ▪ Press the ◀ (**Left Arrow**) hard button to return to the **Settings** menu.

   ▪ Select ☰ (**Main** menu) to return to the **Main** menu.

   ▪ Use the trigger to operate the analyzer with the new settings.

Removing a Configured Network

If a particular network configuration has changed or is no longer need, users can remove the network profile from the KT-100 analyzer. After removing the current profile, create a new profile with updated configuration information to reconnect to that specific network (see "Configuring New Wifi Profiles").

To remove a wireless network profile:

1. View the **Communications** menu (see "Accessing Communications Settings").

   The current Wifi status is shown on the status bar and in the status message below the **Wifi** menu item.

2. If necessary, enable Wifi (see "Enabling Wifi").

3. When Wifi is enabled, select either:

   ▪ The **select network** option

   Or:

   ▪ The IP address of the current connection

The **Available Networks** menu shows all compatible networks available in the current Wifi zone, with wireless protocols and signal strengths listed (Figure 50).

4. Scroll down the network list.

5. Select the profile that is no longer needed.

   A screen with the network name at the top displays available network options (Figure 53).

6. From the options list, select **Forget**.

   The wireless network profile is removed and the analyzer returns to the **Communications** menu.

   > **Note:**
   >
   > If the current Wifi zone includes wireless networks for which the analyzer has configured profiles, the analyzer will automatically connect to the most recently used wireless network.

7. When all **Communications** settings are correct:

   - Press the ◀ (**Left Arrow**) hard button to return to the **Settings** menu.

   - Select ≡ (**Main** menu) to return to the **Main** menu.

   - Use the trigger to operate the analyzer with the new settings.

Disabling Wifi

If Wifi networking is no longer required, users can lengthen the time that the battery charge lasts by disabling their KT-100 analyzer's Wifi feature.

To disable Wifi:

1. View the **Communications** menu (see "Accessing Communications Settings").

   The current status of wireless networking appears below the **Wifi** menu item.

2. If the status is **On**, select **Wifi**.

   The **Wifi** screen appears with the current setting highlighted.

3. Scroll to **Off**.

4. When the **Off** option is highlighted, select ✅ (**OK**).

   The analyzer saves the setting and returns to the **Communications** menu.

5. Verify that the correct Wifi setting appears under the **Wifi** menu item (Figure 48).

6. When all Communications settings are correct:

   - Press the ◀ (Left Arrow) hard button to return to the Settings menu.

   - Select ≡ (Main menu) to return to the Main menu.

   - Use the trigger to operate the analyzer with the new settings.

Accessing Bluetooth

The KT-100 analyzer's Bluetooth feature is currently only available for RAD service personnel.

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Configuring the KT-100 Analyzer

When needed, configure the KT-100 analyzer to comply with your organization's requirements. This section provides instructions for:

- Accessing Analyzer Settings
- Customizing Results Settings
- Optimizing Instrument Setup

Accessing Analyzer Settings

Many organizations have various policies and requirements for analyzer configuration and data. As a result, the KT-100 analyzer provides flexible options for formatting both the screens and the results data to meet an organization's needs.

To access analyzer settings:

1. If the analyzer is off, power on (see "Powering On"), log in (see "Logging In and Entering Passcodes"), and accept the laser warning (see "Reviewing and Accepting the Laser Warning").
2. Display the **Main** menu (see "Accessing Main Menu Features").

   The **Main** menu appears and provides access to a selection of possible settings and features (Figure 19).
3. Select **Settings.**

   The **Settings** menu lists available categories of analyzer settings (Figure 54).

Figure 54. Settings Menu
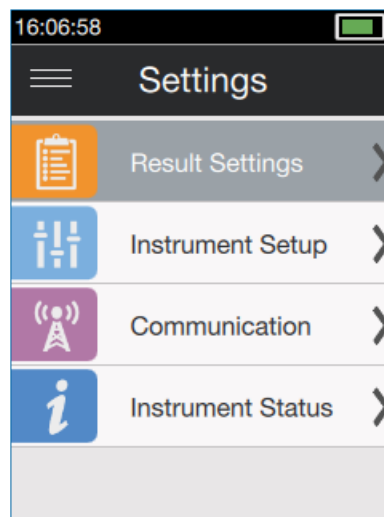
4. Select the category with the required settings.

   Table 9 shows what settings are available in each category.

Table 9. Categories of Available Settings

Category	For …	Settings	Default Values
Results Settings	Customizing results data.	• **Selected Naming System**	Rigaku Default
		• **Alloy Match Criteria**	0.50
		• **Number of Matches**	2
		• **File Tag**	**N/A**
		• **Cal Factors**	**Active: None**
Instrument Setup	Configuring analyzer controls and screen formatting.	• **Date and Time**	**Date Format:** MM/dd/yyyy **Time Format:** 12 Hr **Set Date:** N/A **Set Time:** N/A
		• **Language**	English
		• **Quick Launch Keys**	**Right (Result):** Next Match **Left (Result):** Change Result View **Right (Analyze):** Drill Down **Left (Analyze):** Data Entry
Communication	Configuring, enabling, or disabling both Wifi and USB connections.	• **Usb**	Set by RAD
		• **Wifi**	Off
		• **Select Network**	• Available only when **Wifi** is **On**. • Lists network name and IP address when connected to a Wifi network.
		• **Bluetooth**	For RAD service personnel
Instrument Status	Viewing analyzer and temperature status information. **Note:** Instrument Status items cannot be changed and are for informational purposes only.	• **Serial Number**	Set by RAD
		• **Unique ID**	Set by RAD
		• **Software Version**	1.1.0.0 or later
		• **TEC**	Variable

5. View the current values and if necessary customize:
   - Results Settings (see "Customizing Results Settings")
   - Instrument Setup (see "Optimizing Instrument Setup")
   - Communications (see "Managing Communications")
   - Instrument Status (see "Viewing Analyzer Status Information")

6. When finished, select ☰ (**Main** menu) to return the **Main** menu, or use the trigger to operate the analyzer with the new settings.

Customizing Results Settings

If the KT-100 analyzer's results or screens do not match your organization's needs, change the analyzer's settings so that results, operation, and communications comply with security and data requirements.

To customize analyzer **Settings**:

1. Access the analyzer settings (see "Accessing Analyzer Settings").
2. From the **Settings** menu, select the required results settings category (Figure 54).
3. Make any required changes. For more information about available options see:
   - Accessing Results Settings
   - Selecting the Grade Specs Naming System for Your Region
   - Setting the Alloy Match Criteria
   - Specifying the Number of Matches Displayed
   - Adding a File Tag to a Result Filename
   - Configuring Cal Factors

Accessing Results Settings

When configuring the content of the KT-100 analyzer's results, users need to access the **Results Settings** menu.

To access the menu:

1. Access the **Settings** menu (see "Accessing Analyzer Settings").
2. From the **Settings** menu, select **Results Settings**.

   The analyzer displays the **Results Settings** menu (Figure 55).

Figure 55. Default Results Settings Menu

No active Cal Factors group
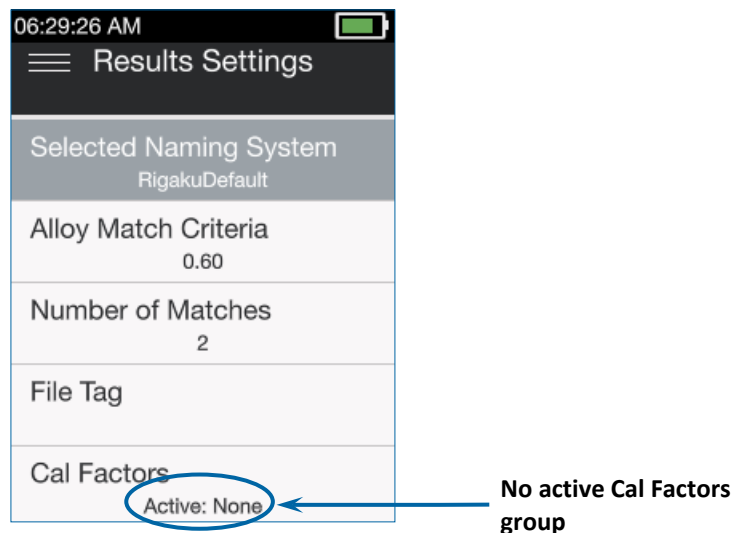
3. To view either the options of a setting or the contents of a submenu, select the name of the setting or submenu.
4. When all **Result Settings** are correct, press the ◄ (**Left Arrow**) hard button on the keypad to return to the **Settings** menu.

5. If necessary, finish configuring the analyzer by selecting:
   - **Instrument Setup** to configure the analyzer's operational settings (see "Optimizing Instrument Setup").
   - **Communications** to set up, enable, and disable both Wifi and USB connections (see "Managing Communications").
   - **Instrument Status** to view the analyzer's serial number, unique ID number, software version, and operating temperature (see "Viewing Analyzer Status Information").

6. When all settings are correct, select ☰ (**Main** menu) to return to the **Main** menu, or use the trigger to operate the analyzer with the new settings.

Selecting the Grade Specs Naming System for Your Region

The **Selected Naming System** setting specifies the alloy grade specification library to which the analyzer compares sample analysis data. Each naming system library includes *Grade Specifications* (Grade Specs) that specify the valid ranges for all the typical elements in the alloy standards of a specific region. Although the default setting is the **RigakuDefault** library, contact Rigaku Analytical Devices or your local Rigaku representative to see if Grade Spec libraries for your region are available.

To select an installed Grade Specs naming system:

1. Access the **Results Settings** menu (see "Accessing Results Settings").
2. From the **Results Settings** menu, choose **Selected Naming System**.
3. The analyzer displays the **Selected Naming System** screen that lists all installed libraries (Figure 56).

Figure 56. Default Selected Naming System Screen
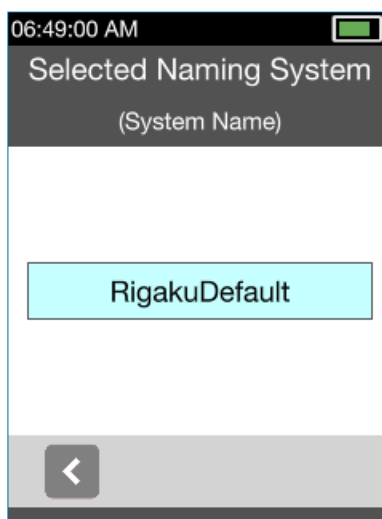
4. Scroll through the list and select the required setting.

5. When the correct standard is highlighted, select ✅ (**OK**).

   The analyzer sets **Selected Naming System** to the selected library and returns to the **Results Settings** menu.

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6. If necessary, change the options for:
    - Alloy match value for match results (see "Setting the Alloy Match Criteria").
    - Number of possible matches displayed (see "Specifying the Number of Matches Displayed").
    - Result filenames (see "Adding a File Tag to a Result Filename").
    - Adjusting alloy component return values (see "Configuring Cal Factors").
    - Other settings categories (see "Accessing Analyzer Settings").

7. When all changes are complete, select ☰ (**Main** menu) to return to the **Main** menu, or use the trigger to operate the analyzer with the new settings.

Setting the Alloy Match Criteria

The *Alloy Match Criteria* (AMC) setting specifies the threshold above which the KT-100 analyzer returns matching results. When comparing analyzed alloy data to Grade Specs in the library specified by the **Selected Standard**, the analyzer calculates an MN score for each Grade Spec. MNs can be anywhere between the values of **0.00** and **1.00.** When the MN of a Grade Spec comparison is greater than or equal to the AMC setting, the analyzer considers it a possible match. From this collection of possible matches, the analyzer then selects the quantity of matches specified by the **Number of Matches** setting from the profiles with the highest MN scores, and lists them in the result screen as matches.

Setting AMC to a larger value restricts the number of Grade Specs displayed as possible matches. Setting AMC to a smaller value expands the number of Grade Specs displayed as possible matches.

To set the value of AMC:

1. Access the **Results Settings** menu (see "Accessing Results Settings").
2. From the **Results Settings** menu, select **Alloy Match Criteria**.

    The analyzer displays the **Alloy Match Criteria** screen, which contains a scrollable list of available settings with the current option highlighted (Figure 57).

Notes:

- Settings from **0.00** to **1.00** are available.
- This value decreases or increases the range of displayed matches:
    - If the analyzer shows too many matches when analyzing alloys, increasing the value of the AMC setting should decrease the number of matches displayed.
    - On the other hand, if the analyzer returns no matches, lowering the value of the AMC setting should increase the number of matches displayed.

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Figure 57. Alloy Match Criteria Screen
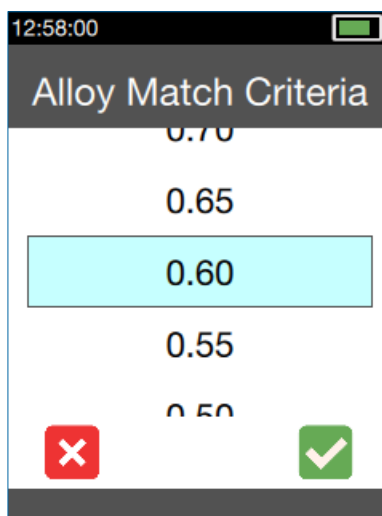
3. For values greater than the currently highlighted value, scroll up.
4. For values less than the currently highlighted value, scroll down.
5. When the required value is highlighted, select ✅ (**OK**).

   The analyzer sets AMC to the selected value and returns to the **Results Settings** menu.
6. Verify that the new value appears below the AMC item in the **Results Setting** menu.
7. If necessary, change the options for:
   - Selected Grade Specs naming system (see "Selecting the Grade Specs Naming System for Your Region").
   - Number of possible matches displayed (see "Specifying the Number of Matches Displayed").
   - Result filenames (see "Adding a File Tag to a Result Filename").
   - Adjusting alloy component return values (see "Configuring Cal Factors").
   - Other settings categories (see "Accessing Analyzer Settings").
8. When all changes are complete, select ☰ (**Main** menu) to return to the **Main** menu, or use the trigger to operate the analyzer with the new settings.

Specifying the Number of Matches Displayed

Because some alloys can be quite similar, by default the KT-100 analyzer displays two Grade Spec matches on the result screens. However, some users may want to see only one match, while others may want to see a specific number of possible matches. Consequently, the analyzer allows users to display from one to five matching Grade Specs from analysis results with the ***Number of Matches*** setting. These multiple matches appear as separate items in the **Match Result** view (Figure 38), and as multiple screens of result data labeled with Match Order values in the **Component** view (Figure 42). Because the analyzer matches only those Grade Specs that get MN scores above the **AMC** setting, not all analyses find or show multiple matches even when users set the value of **Number of Matches** to greater than **1**.

To specify a number of possible matches to display:

1. Access the **Results Settings** menu (see "Accessing Results Settings").
2. From the **Results Settings** menu, select **Number of Matches**.

   The analyzer displays the **Number of Matches** screen that contains a scrollable list of available settings with the current option highlighted (Figure 58).

Figure 58. Number of Matches Screen
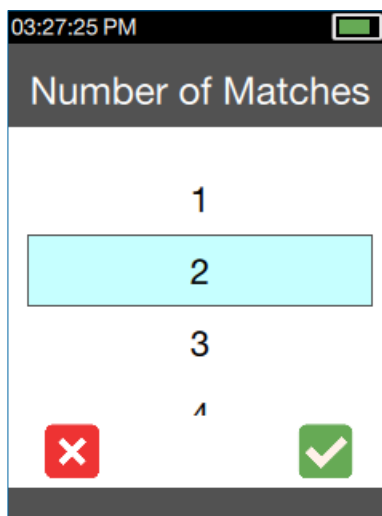
3. Scroll through the list and select the required setting.
4. When the correct setting is highlighted, select ✅ (**OK**).

   The analyzer sets the number of matches to the selected option and returns to the **Results Settings** menu.
5. If necessary, change the options for:
   - Selected Grade Specs naming system (see "Selecting the Grade Specs Naming System for Your Region").
   - Alloy match value for match results (see "Setting the Alloy Match Criteria").
   - Result filenames (see "Adding a File Tag to a Result Filename").
   - Adjusting alloy component return values (see "Configuring Cal Factors").
   - Other settings categories (see "Accessing Analyzer Settings").
6. When all changes are complete, select ☰ (**Main** menu) to return to the **Main** menu, or use the trigger to operate the analyzer with the new settings.

Configuring Cal Factors

With Cal Factors, users may offset small and consistent biases in elemental results observed on a measured reference material with known chemistry for user-specific applications. The feature allows users to adjust results for specific elements up or down by as much as 25% to better correspond to sample reference chemistries.

To do this, Cal Factors settings shift an elemental result value by applying a slope factor between 0.75 and 1.25 to the factory-calibrated result. In all cases, the analyzer keeps the matrix element as the balance element and calculates it as 100% minus the sum of the percentages of all other elements.

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Therefore, the balance element of the matrix cannot be directly adjusted by Cal Factors settings and the sum total of the result will remain at 100%.

In addition, the Cal Factors feature allows users to save both adjustments for multiple elements within an alloy matrix and adjustments for multiple matrixes in a single, named Cal Factors group. Multiple Cal Factors groups can be stored on the analyzer. As a result, users can create multiple, application-specific Cal Factors groups.

Table 10 shows users which element is the balance element for each available alloy matrix as it appears in the analyzer's alloy-matrix list (Figure 62).

Table 10. Available Alloy Matrixes

Listed Matrix Abbreviation	Matrix Name	Matrix Balance Element and Symbol
MatrixMg	Magnesium Alloy Matrix	Magnesium, Mg
MatrixAl	Aluminum Alloy Matrix	Aluminum, Al
MatrixTi	Titanium Alloy Matrix	Titanium, Ti
MatrixSSCrNi	Chrome Nickel Stainless Steel Matrix	Iron, Fe
MatrixSSCr	Chrome Stainless Steel Matrix	Iron, Fe
MatrixSSCo	Cobalt Stainless Steel Matrix	Iron, Fe
MatrixLASTS	Low Alloy Steel/ Tool Steel Alloy Matrix	Iron, Fe
MatrixCo	Cobalt Alloy Matrix	Cobalt, Co
MatrixNi	Nickel Alloy Matrix	Nickel, Ni
MatrixCu	Copper Alloy Matrix	Copper, Cu
MatrixZn	Zinc Alloy Matrix	Zinc, Zn
MatrixSn	Tin Alloy Matrix	Tin, Sn
MatrixPb	Lead Alloy Matrix	Lead, Pb

Configuring Cal Factors groups involves:

- Viewing the Current List of Cal Factors Groups
- Adding New Cal Factors Groups
- Viewing Alloy Matrix Lists in Cal Factors Groups
- Adding Alloy Matrixes to Cal Factors Groups
- Modifying Matrix Settings in Cal Factors Groups
- Making Cal Factors Groups Active
- Making Cal Factors Groups Not Active
- Deleting Cal Factors Groups

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Viewing the Current List of Cal Factors Groups

To view the analyzer's current list of Cal Factors groups:

1. Open the **Results Settings** screen (see "Accessing Results Settings").
2. From the **Results Settings** screen, select **Cal Factors**.
3. The **Cal Factors** screen shows the **Add New** and **None** options, and lists currently defined Cal Factors groups (Figure 59).

Figure 59. Typical Cal Factors Screen
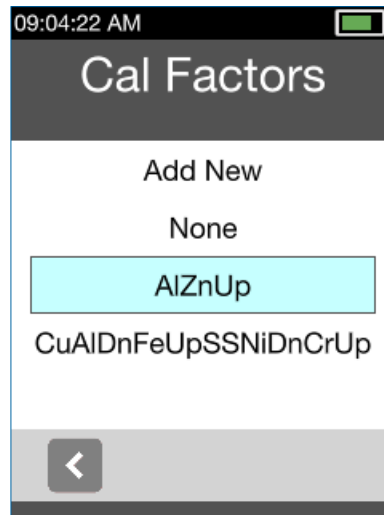
4. Scroll through the list.
5. After viewing the list:
   ▪ Select **Add New** to create a new Cal Factors group (see "Adding New Cal Factors Groups").
   ▪ Select **None** to return to default scans (see "Making Cal Factors Groups Not Active").
   ▪ Select a group name to activate, modify, or delete a group (see "Adding Alloy Matrixes to Cal Factors Groups," "Modifying Matrix Settings in Cal Factors Groups," "Making Cal Factors Groups Active," and "Deleting Cal Factors Groups").
   ▪ Select ◀ (**Back**) to return to the **Result Settings** screen.

Adding New Cal Factors Groups

To add a new Cal Factors group:

1. View the current list of Cal Factors groups (see "Viewing the Current List of Cal Factors Groups").
2. Select **Add New**.
3. The **Enter Name** screen appears with an on-screen virtual keyboard and an empty text entry field above it.
4. From the keyboard, select the letters and numbers for the name of the new Cal Factors group. For information about using the keyboard, see "Adding a Sample ID to a Result."
5. When the name is complete, select ✅ (**OK**).

   The analyzer displays the options for the new Cal Factors group (Figure 60). Table 11 lists available options.

Figure 60. Group Options Screen
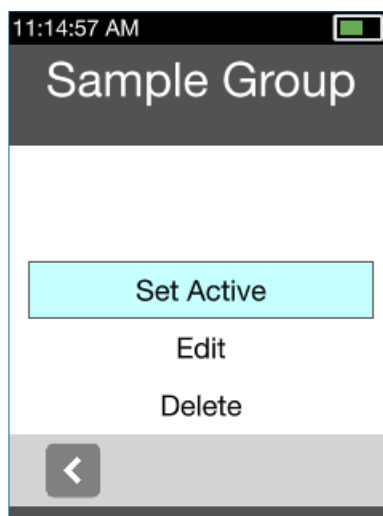
Table 11. Options Available on Cal Factors Group Screens

Option	For …
Set Active	• De-activating another Cal Factors group. • Adding the element-level adjustments specified in the current group to alloy matrix results.
Edit	• Modifying Cal Factors group settings.
Delete	• Removing the Cal Factors group and settings from the analyzer.

Note:
A newly added Cal Factors group is empty. Users must edit the group to add alloy matrixes to the group and configure them (see "Adding Alloy Matrixes to Cal Factors Groups").

6. After adding a Cal Factors group:

   ▪ Select (**Back**) to return to the **Result Settings** screen.

   ▪ Select **Edit** to modify the group settings (see "Modifying Matrix Settings in Cal Factors Groups").

   ▪ Select **Delete** to remove the group (see "Deleting Cal Factors Groups").

Viewing Alloy Matrix Lists in Cal Factors Groups

To view the alloy matrix list for a Cal Factors group:

1. View the current list of Cal Factors groups (see "Viewing the Current List of Cal Factors Groups").
2. Scroll through the list and select a Cal Factors group.
3. From the group's options screen (Figure 60), select **Edit**.

4. The group's alloy **Matrix List** screen shows the group's current configuration (Figure 61).

   ▪ **Add Matrix** allows users to adjust results for more alloys (see "Adding Alloy Matrixes to Cal Factors Groups").

   ▪ Listed alloy matrixes indicate that element-level adjustments are set for those alloy types.

Figure 61. Group Matrix List
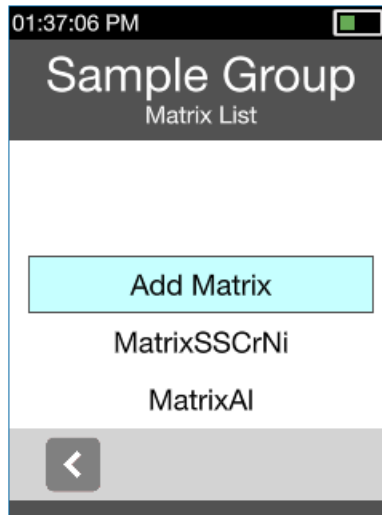
Adding Alloy Matrixes to Cal Factors Groups

To add alloy matrixes to a Cal Factors group:

1. View the alloy matrix list for a Cal Factors group (see "Viewing Alloy Matrix Lists in Cal Factors Groups").

2. From the group's alloy **Matrix List** screen (Figure 61), select **Add Matrix**.

   The **Select Matrix** screen lists all of the analyzer's available alloy matrixes (Figure 62). For information about available matrixes, see Table 10.

Figure 62. Select Matrix List
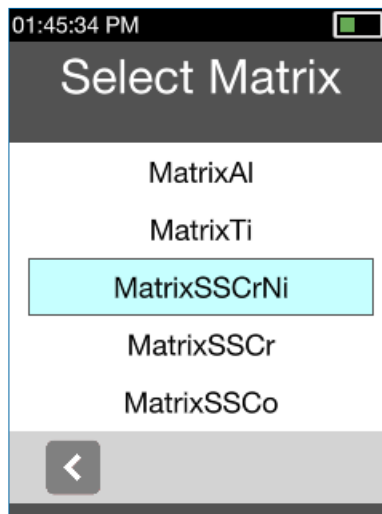
3. Scroll through the list and select a required matrix.

   The alloy matrix's **Element List** screen lists the minor elements of the alloy (Figure 63).

Figure 63. Alloy Matrix Element List
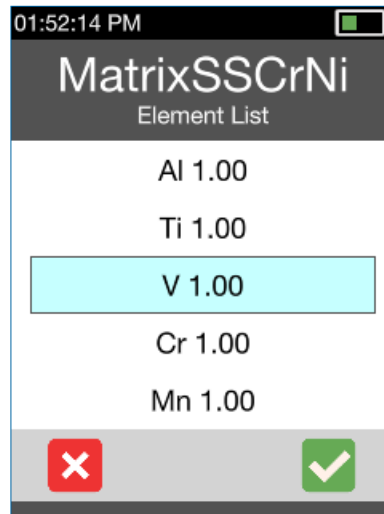
4. For each element in the list that requires adjustment :

   A. Scroll through the list and select an element that needs a Cal Factor adjustment.

   The element's **Set Cal Factor** screen allows users to select an adjustment multiplier from 0.75 to 1.25 (Figure 64).

Figure 64. Element Set Cal Factor Screen
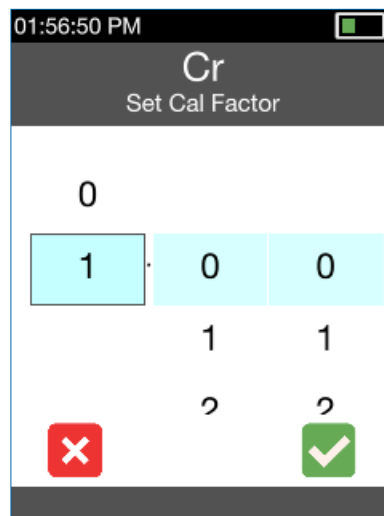
   B. Scroll through the digits of the multiplier and select each digit.

   C. When the value is correct, select ✅ (**OK**).

   The **Element List** screen shows the element's new value (Figure 65).

Figure 65. Element List Screen with Cr Cal Factor Adjustment
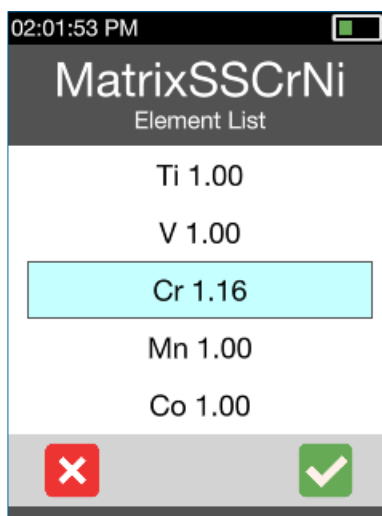
5. After making all adjustments, select ☑ (**OK**) from the **Element List** screen.

    The analyzer saves the new multipliers in the current alloy matrix entry of the open Cal Factors group and then shows a confirmation screen (Figure 66).

Figure 66. Alloy Matrix Adjustment Confirmation
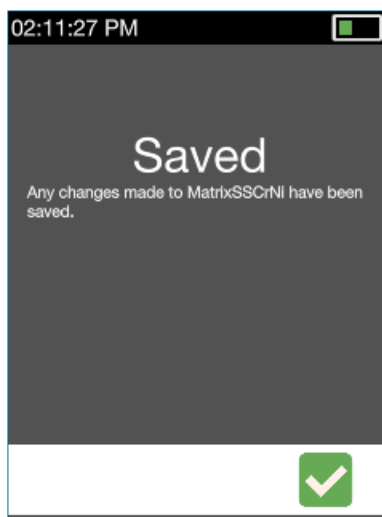
6. Select ☑ (**OK**) to return to the Cal Factors group's **Matrix List** screen.

7. Repeat steps 2 through 6 for all alloy matrixes that the Cal Factors group needs.

8. After making all required adjustments, select ◁ (**Back**) from the group's **Matrix List** screen to return to the group's options screen (Figure 60).

9. From this screen:

   ▪ Select [◀] (**Back**) to return to the **Result Settings** screen.

   ▪ Select **Set Active** to activate the Cal Factors group (see "Making Cal Factors Groups Active").

   ▪ Select **Edit** to modify the group settings (see "Modifying Matrix Settings in Cal Factors Groups").

   ▪ Select **Delete** to remove the group (see "Deleting Cal Factors Groups").

Modifying Matrix Settings in Cal Factors Groups

To modify a current alloy matrix multiplier setting in a Cal Factors group:

1. View the alloy matrix list for a Cal Factors group (see "Viewing Alloy Matrix Lists in Cal Factors Groups").

2. From the group's alloy **Matrix List** screen (Figure 61), select the matrix that requires modification.

   The matrix's **Element List** screen lists the minor elements of the alloy with their current multipliers (Figure 65).

3. For each element in the list that requires adjustment:

   A. Scroll through the list and select an element with a multiplier that needs adjustment.

      The element's **Set Cal Factor** screen allows users to set a new adjustment from 0.75 to 1.25 (Figure 64).

   B. Scroll through the digits of the multiplier and select each digit.

   C. When the value is correct, select [✓] (**OK**).

      The new value appears in the alloy matrix's **Element List** screen.

   > **Note:**
   >
   > Alloy matrix entries in Cal Factor groups cannot be removed. However, setting their internal element multipliers back to **1.00** resets them to their default measurement state.

4. After making all adjustments, select [✓] (**OK**) from the matrix's **Element List** screen.

   The analyzer saves the adjustments to the current alloy matrix entry for the open Cal Factors group and shows a confirmation screen (Figure 66).

5. Select [✓] (**OK**) to return to the Cal Factors group's **Matrix List** screen.

6. Repeat steps 2 through 5 for all alloy matrixes in the current Cal Factors group that need modifications.

7. After making all required modifications, select [◀] (**Back**) from the group's **Matrix List** screen to return to group's option screen.

8. From this screen:

   ▪ Select [◀] (**Back**) to return to the **Result Settings** screen.

   ▪ Select **Set Active** to activate the Cal Factors group (see "Making Cal Factors Groups Active").

   ▪ Select **Edit** to modify the group settings (see "Modifying Matrix Settings in Cal Factors Groups").

   ▪ Select **Delete** to remove the group (see "Deleting Cal Factors Groups").

![Rigaku logo]

Making Cal Factors Groups Active

By default, KT-100 analyzers use the Cal Factors setting of **Active: None** (see Figure 55). With this setting, the analyzer provides baseline results that do not include the adjustments set by the analyzer's Cal Factors groups. To add Cal Factors to scan results, users must make a group active.

To make a Cal Factors group active:

1. View the current list of groups (see "Viewing the Current List of Cal Factors Groups").
2. From the list (Figure 59), select a group.

    The analyzer shows the selected group's options screen (Figure 60).
3. From the group options screen, select **Set Active**.

    The analyzer shows the **Results Settings** screen with the name of the selected Cal Factors group listed below the **Cal Factors** soft button (Figure 67).

Figure 67. Results Setting Screen with Active Cal Factors Group
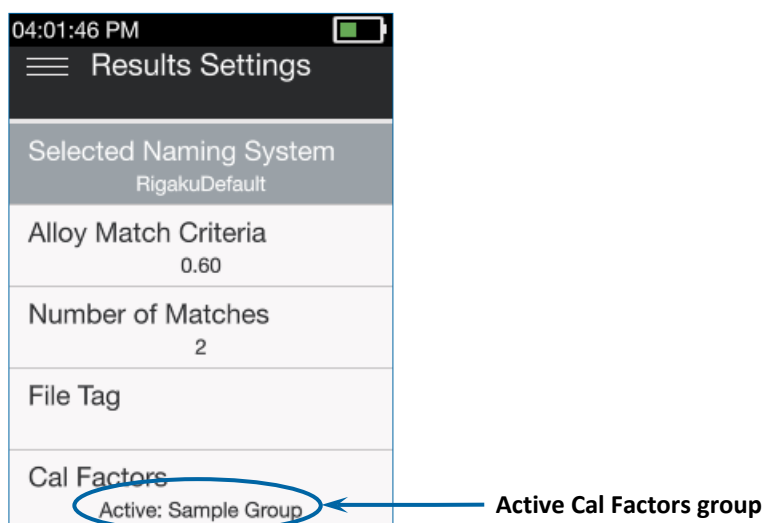
Making Cal Factors Groups Not Active

To remove the Cal Factors adjustments from the KT-100 results and get default-level measurements, users must set the active Cal Factors group to **None**.

To set the active Cal Factors group to **None**:

1. View the current list of groups (see "Viewing the Current List of Cal Factors Groups").
2. On the Cal Factors screen (Figure 59), select **None**.

    The screen lists the available options (similar to Figure 60).
3. Select **Set Active**.

    The analyzer shows the **Results Settings** screen with **None** listed below the **Cal Factors** soft button (Figure 55).

Deleting Cal Factors Groups

When a Cal Factors group is no longer needed, users can delete it from the list of groups.

To delete a Cal Factors group:

1. View the current list of groups (see "Viewing the Current List of Cal Factors Groups").

2. Ensure that the group you are deleting is not active (see "Making Cal Factors Groups Not Active").

3. From the list (Figure 59), select a group.

   The analyzer shows the selected group's options screen (Figure 60).

4. From the group options screen, select **Delete**.

   The analyzer removed the group and returns to the **Results Setting** screen.

Optimizing Instrument Setup

Instrument Setup settings allow users to optimize the operation of the KT-100 analyzer by:

- Accessing the Instrument Setup Menu

- Adjusting Date and Time Settings

- Choosing the Analyzer's Language

- Specifying Functionality of Quick Launch Keys

Accessing the Instrument Setup Menu

When optimizing operation of the KT-100 analyzer, users need to access the **Instrument Setup** menu.

To access the menu:

1. Access the **Settings** menu (see "Accessing Analyzer Settings").

2. From the **Settings** menu, select **Instrument Setup**.

   The analyzer displays the **Instrument Setup** menu (Figure 68). Items that launch submenus include the ❯ (**Right Arrow**) icon.

Figure 68. Instrument Setup Menu
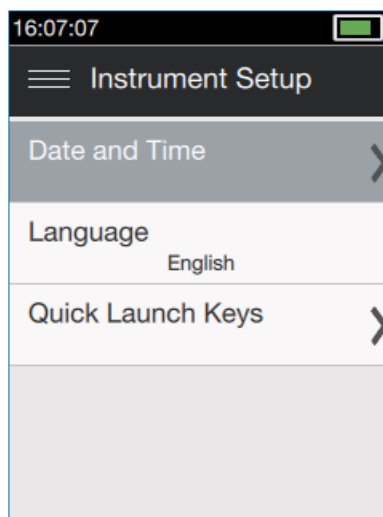
3. To view either the options of a setting or the contents of a submenu, select the listed setting or submenu.

4. When all **Instrument Setup** settings are correct, press the ◀ (**Left Arrow**) hard button on the keypad to return to the **Settings** menu.

5. If necessary, finish configuring the analyzer by selecting:

- **Results Settings** to configure the results-data and results-screen settings (see "Accessing Results Settings").

- **Communications** to set up, enable, and disable both Wifi and USB connections (see "Managing Communications").

- **Instrument Status** to view analyzer status information (see "Viewing Analyzer Status Information").

6. When all settings are correct, select ☰ (**Main** menu) to return to the **Main** menu, or use the trigger to operate the analyzer with the new settings.

Adjusting Date and Time Settings

After changing the battery or moving into a new time zone, users may need to adjust the analyzer's time settings. The following subsections provide instructions for:

- Accessing Date and Time Settings
- Selecting the Date Format
- Selecting the Time Format
- Setting the Date
- Setting the Time

Accessing Date and Time Settings

The KT-100 analyzer lets users set the values and display formats for date and time.

To access date and time settings:

1. Access the **Instrument Setup** menu (see "Accessing the Instrument Setup Menu").

2. From the **Instrument Setup** menu, select **Date and Time**.
   The **Date & Time** menu appears (Figure 69).

Figure 69. Date & Time Menu with Default Settings
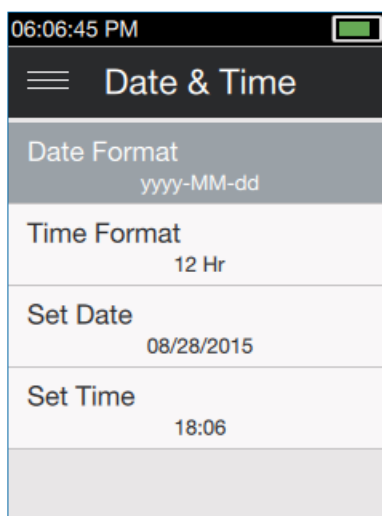
3. Review current date, time, and format settings.

4. If necessary adjust the date and time settings by:

   ▪ Selecting the Date Format

   ▪ Selecting the Time Format

   ▪ Setting the Date

   ▪ Setting the Time

5. When all date and time settings are updated, press the ◀ (**Left Arrow**) hard button to return to the **Instrument Setup** menu make any needed changes to:

   ▪ Language setting (see "Choosing the Analyzer's Language")

   ▪ Functionality of Quick Launch Keys (see "Specifying Functionality of Quick Launch Keys")

   ▪ Other settings categories (see "Accessing Analyzer Settings")

6. When all changes are complete, select ☰ (**Main** menu) to return to the **Main** menu, or use the trigger to operate the analyzer with the new settings.

Selecting the Date Format

The KT-100 analyzer's available date formats let users adjust the format of dates displayed on-screen and in results records to match either local conventions or an organization's centralized format requirements.

If the battery is removed and the analyzer is left idle for more than 30 days, the analyzer may revert to factory defaults and need to be re-adjusted.

To change the analyzer's date format:

1. Open the **Date & Time** menu (see "Accessing Date and Time Settings").

2. From the menu, select **Date Format**.

   The analyzer displays the **Date Format** screen that contains scrollable list of available formats with the current option highlighted (Figure 70).

Figure 70. Date Format Screen
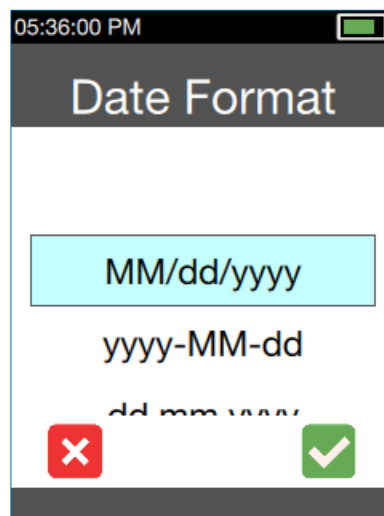
3. Scroll through the list and select the required format.

4. When the correct format is highlighted, select ☑ (**OK**) either by touching the icon on the touchscreen, or by pressing the ▶ (**Right Arrow**) hard button on the keypad to highlight the icon and then pressing the ◉ (**Power/Enter**) hard button.

   The analyzer sets the date format to the selected option and returns to the **Date & Time** screen.

5. Verify that the updated setting format appears under the **Date Format** item in the **Date & Time** menu (Figure 71).

Figure 71. Date & Time Screen with New Date Format Showing
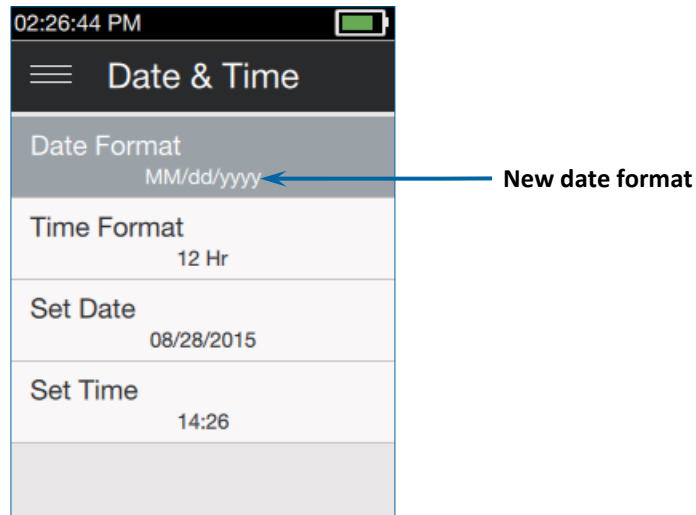
6. If necessary, change the settings for:
   - Time format (see "Selecting the Time Format")
   - Date (see "Setting the Date")
   - Time (see "Setting the Time")

7. When all changes to date and time settings are complete, press the ◀ (**Left Arrow**) hard button to return to the **Instrument Setup** menu and make an necessary changes to:
   - Language (see "Choosing the Analyzer's Language")
   - Quick Launch Keys (see "Specifying Functionality of Quick Launch Keys")
   - Other settings categories (see "Accessing Analyzer Settings")

8. When all changes to date and time settings are complete, select ≡ (**Main** menu) to return to the **Main** menu, or use the trigger to operate the analyzer with the new settings.

Selecting the Time Format

The KT-100 analyzer's available time formats let users adjust the format of the time displayed on-screen and in results records to match either local conventions, or an organization's centralized format requirements.

If the battery is removed and the analyzer is left idle for more than 30 days, the analyzer may revert to factory defaults and need to be re-adjusted.

To change an analyzer's time format:

1. Open the **Date & Time** menu (see "Accessing Date and Time Settings").

2. From the menu, select **Time Format**.

   The analyzer displays the **Time Format** screen that contains scrollable list of available formats with the current option highlighted (Figure 72).

Figure 72. Time Format Screen
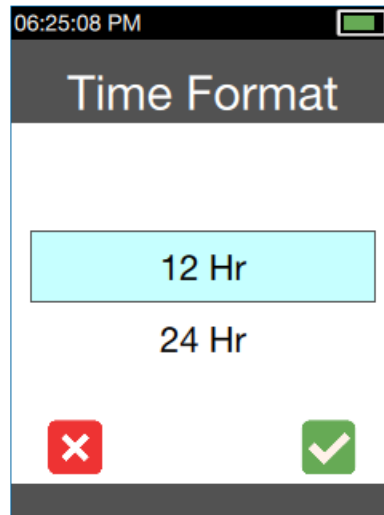
3. Scroll through the list and select the required format.

4. When the correct format is highlighted, select ✅ (**OK**).

   The analyzer sets the time format to the selected option and returns to the **Date & Time** menu.

5. Verify that the updated setting format appears under the **Time Format** item in the **Date & Time** menu.

6. If necessary, change the settings for:

   ▪ Date format (see "Selecting the Date Format")

   ▪ Date (see "Setting the Date")

   ▪ Time (see "Setting the Time")

7. When all changes to date and time settings are complete, press the ◀ (**Left Arrow**) hard button to return to the **Instrument Setup** menu and make an necessary changes to:

   ▪ Language (see "Choosing the Analyzer's Language")

   ▪ Quick Launch Keys (see "Specifying Functionality of Quick Launch Keys")

   ▪ Other settings categories (see "Accessing Analyzer Settings")

8. When all changes to date and time settings are complete, select ☰ (**Main** menu) to return to the **Main** menu, or use the trigger to operate the analyzer with the new settings.

Setting the Date

On the KT-100 analyzer, users can adjust the date setting to match either the local date conventions or an organization's centralized date requirements. If the battery is removed and the analyzer is left idle for more than 30 days, the analyzer may revert to factory defaults and need to be re-adjusted.

To set an analyzer's date:

1. Open the **Date & Time** menu (see "Accessing Date and Time Settings").

2. From the menu, select **Set Date**.

   The analyzer displays the **Set Date** screen with the current setting highlighted (Figure 73).

   > **Note:**
   >
   > The date format displayed on the **Set Date** screen will match the selected **Date Format** setting (see "Selecting the Date Format").

Figure 73. Set Date Screen
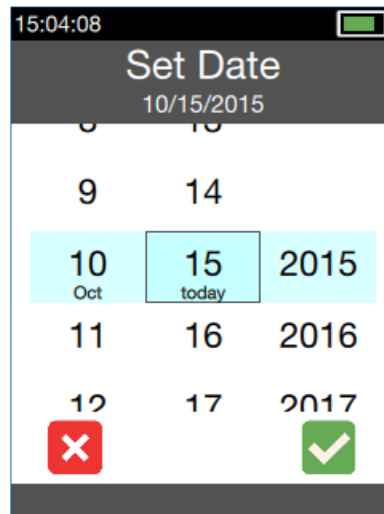
3. If required, change the date by scrolling through the month, day, and year columns and highlighting the required values.

4. When the highlighted date is correct, select ✅ (**OK**).

   The analyzer sets the date to the selected values and returns to the **Date & Time** screen.

5. If necessary, change the settings for:

   - Date format (see "Selecting the Date Format")
   - Time format (see "Selecting the Time Format")
   - Time (see "Setting the Time")

6. When all changes to date and time settings are complete, press the ◀ (**Left Arrow**) hard button to return to the **Instrument Setup** menu and make an necessary changes to:

   - Language (see "Choosing the Analyzer's Language")
   - Quick Launch Keys (see "Specifying Functionality of Quick Launch Keys")
   - Other settings categories (see "Accessing Analyzer Settings")

7. When all changes to date and time settings are complete, select ≡ (**Main** menu) to return to the **Main** menu, or use the trigger to operate the analyzer with the new settings.

![Rigaku]

Setting the Time

On the KT-100 analyzer, users can adjust the time setting to match either the local time zone conventions or an organization's centralized time-zone requirements. If the battery is removed and the analyzer is left idle for more than 30 days, the analyzer may revert to factory defaults and need to be re-adjusted.

To set an analyzer's time:

1. Open the **Date & Time** menu (see "Accessing Date and Time Settings").

2. From the menu, select **Set Time**.

   The analyzer displays the **Set Time** screen with the current setting highlighted (Figure 74).

   > **Note:**
   >
   > The time format displayed on the **Set Time** screen will match the selected **Time Format** setting (see "Selecting the Time Format").

Figure 74. Set Time Screen
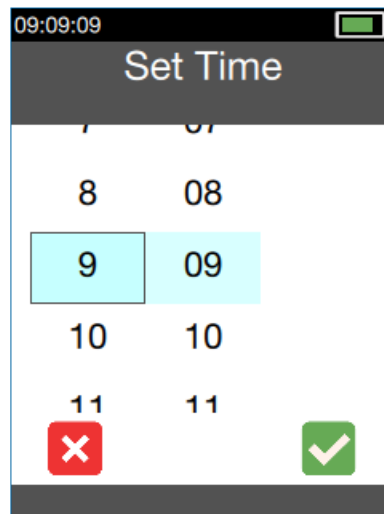
3. If required, change the time by scrolling through the hour, minute, and (optional) AM/PM columns and highlighting the required values.

   > **Note:**
   >
   > Only those numbers that are valid for the selected time format are available in each column.
   >
   > For example, when the selected format is **12 Hr**, the numbers **1** through **12** are available in the hours column. However, when the selected time format is **24 Hr**, the numbers **1** through **24** are available in the hours column.

4. When the highlighted time in the displayed time format is correct, select ✅ (**OK**).

   The analyzer sets the time to the selected values and returns to the **Date & Time** screen.

5. If necessary, change the settings for:

   - Date format (see "Selecting the Date Format")
   - Time format (see "Selecting the Time Format")
   - Date (see "Setting the Date")

6. When all changes to date and time settings are complete, press the ⬤ (**Left Arrow**) hard button to return to the **Instrument Setup** menu and make an necessary changes to:

   - Language (see "Choosing the Analyzer's Language")
   - Quick Launch Keys (see "Specifying Functionality of Quick Launch Keys")
   - Other settings categories (see "Accessing Analyzer Settings")

7. When all changes are complete, select ☰ (**Main** menu) to return to the **Main** menu, or use the trigger to operate the analyzer with the new settings.

Choosing the Analyzer's Language

The KT-100 analyzer lets users choose the language for operating the analyzer and viewing the results records.

To choose a language:

1. Open the **Instrument Setup** menu (see "Accessing the Instrument Setup Menu").
2. Select **Language** (Figure 68).

   The **Language** screen provides a list of available languages (Figure 75).

Figure 75. Available Interface Languages

3. Scroll through the list to highlight the required language.

4. When the correct language is highlighted, select ✅ (**OK**).

   The analyzer saves the new language setting and returns to the **Instrument Setup** menu with both the name of the new language appearing below the **Language** menu item and the screen in the new language.

5. If necessary, change the options for:
   - Date and Time settings (see "Adjusting Date and Time Settings")
   - Quick Launch Keys (see "Specifying Functionality of Quick Launch Keys")
   - Other settings categories (see "Accessing Analyzer Settings")

6. When all changes are complete, select ☰ (**Main** menu) to return to the **Main** menu, or use the trigger to operate the analyzer with the new settings.

![Rigaku logo]

Specifying Functionality of Quick Launch Keys

The Quick Launch Keys allow users to access the most commonly required analysis and results features. Pressing a Quick Launch key allows user to customize analysis results or display a specific result-view specified by the Right Quick Key or Left Quick Key settings. Table 12 lists the available options for Quick Launch keys when analyzing samples and viewing results.

Table 12. Quick Launch Key Options

Used for…	Options	Descriptions
All	**Disabled**	• Disables the specified Quick Launch key.
Analyze	**Data Entry**	• Available from the **Analyze** screen only. • Default setting for the Left Quick Launch key. • For each sample analysis, allows users to add optional information to scan results (see "Including Optional Information in Results").
	Drill Down	• Available from the **Analyze** screen only. • Default setting for the Right Quick Launch key. • Allows users to adjust the length of the analyzers scan cycle. • For more information, see "Using the Drill Down Feature to Analyze Dirty Samples."

Results	**Next Match**	• Available from **Composition** result screens only.
		• Default setting for the Right Quick Launch key.
		• Shows the match data from the current result by:
		  A. Scrolling the result screen to display all data for the current match in the current result record.
		  B. Jumping to and scrolling through the results data for the next matches listed in the current result record.
		• When the maximum number of five matches is enabled, moves incrementally from **Match 1** to **Match 5** in the current result record.
		• If there is no higher Match Order number, the analyzer does not change the currently displayed data.

	Previous Match	• Available from **Composition** result screens only. • Shows the match data viewed just before current match of the current result record by jumping to the first screen of the previous match. • Use ▲ (**Up Arrow**) and ▼ (**Down Arrow**) hard keys to view the contents of the newly displayed match. • When the maximum number of five matches is enabled, moves incrementally from **Match 5** to **Match 1** in the current result record. • If there is no lower Match Order number, the analyzer does not change the currently displayed data.

Used for…	Options	Descriptions
Results (Continued…)	**Next Result**	• Available from all result screens. • Displays the first screen of data from the first match in the result record with a Result Number incrementally lower than the Result Number of currently displayed result record. For example, if the currently displayed result record has a Result Number of 256, pressing the Quick Launch key set to **Next Result** displays data from the first match in the result record with Result Number 255. If there is no result record with Result Number 255, the analyzer displays the result record of the next available Result Number lower than 255. • If there is no result record with a lower Result Number, the analyzer does not change the currently displayed data.
	Previous Result	• Available from all result screens. • Displays the first screen of data from the first match in the result record with a Result Number incrementally higher than the Result Number of the currently displayed result record. For example, if the currently displayed result record has a Result Number of 256, pressing the Quick Launch key set to **Previous Result** displays data from the first match in the result record with Result Number 257. If there is no result record with Result Number 257, the analyzer displays the result record of the next available Result Number higher than 257. • If there is no result record with a higher Result Number, the analyzer does not change the currently displayed data.

	Change Result View	• Cycles through the result views listed in the **Select View** menu.
		• Default setting for the Left Quick Launch key.
		• Possible views are:
		  ▪ **Match Result**—Shows the match results
		  ▪ **Composition**—Lists the analyzed elements of the sample and the specified elements of the current match.
		  ▪ **Graph**—Displays a graph of the analyzed spectral data.

To set the functionality of a Quick Launch key:

1. Open the **Instrument Setup** menu (see "Accessing the Instrument Setup Menu").

2. Select **Quick Launch Keys** (Figure 68).

   The **Quick Launch Keys** menu lists available Quick Keys and specifies when the setting will function (Figure 76).

Figure 76. Quick Launch Keys Menu
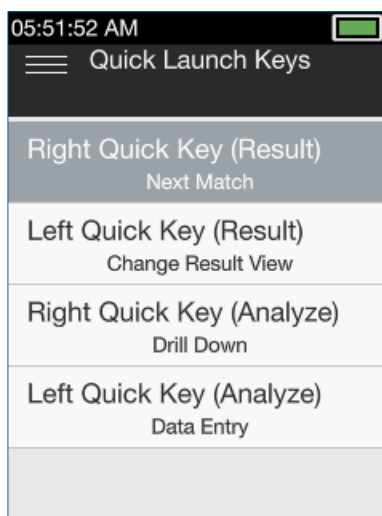
3. Select a Quick Key from the menu.

   The settings screen for the selected Quick Key lists the available options.

4. Scroll through the list to highlight the required option.

5. When the correct option is highlighted, select ☑ (**OK**).

   The analyzer saves the new Quick Key setting for the selected key and returns to the **Quick Launch Keys** menu with the new setting listed below the menu item.

6. If necessary, repeat steps 3 through 5 for the other Quick Keys.

7. If necessary, press the ◀ (**Left Arrow**) hard button to return to the **Instrument Setup** menu and change the options for:

   - Date and Time settings (see "Adjusting Date and Time Settings")

   - Language (see "Choosing the Analyzer's Language")

   - Other settings categories (see "Accessing Analyzer Settings")

8. When all changes are complete, select ☰ (**Main** menu) to return to the **Main** menu, or use the trigger to operate the analyzer with the new settings.

Syncing Results to a Personal Computer

Result files can be copied to a personal computer (PC) or network workstation via USB or Wifi connections. This feature has the following PC requirements:

- Operating System: Windows XP, Windows 7, or Windows 8.x
- USB port or Wifi connection
- Compatible Web Browser: Explorer, Chrome, Firefox

> **Note:**
>
> High-speed internet access is not necessary for establishing a connection between a PC and the analyzer.

This section contains the information about:

- Connecting a KT-100 Analyzer to Local PCs or Network Workstations
- Viewing Analyzer Results on a Web Browser
- Archiving Analyzer Results
- Downloading System Logs for Technical Support

Connecting a KT-100 Analyzer to Local PCs or Network Workstations

Users can view the KT-100 analyzer data with a web browser from either a local PC using a USB connection or a network workstation using a Wifi network connection. For this, KT-100 supports recent versions of Microsoft Internet Explorer, Mozilla Firefox, and Google Chrome. For viewing KT-100 analyzer data, this section contains information about:

- Using USB Connections
- Using Wifi Connections
- Logging onto KT-100 Analyzers with a Web Browser

Using USB Connections

To connect to a KT-100 analyzer using a USB connection:

1. If the analyzer is off, power on (see "Powering On"), log in (see "Logging In and Entering Passcodes"), and accept the laser warning (see "Reviewing and Accepting the Laser Warning").
2. Display the **Communications** menu (see "Accessing Communications Settings").
3. Get the IP address listed under the **Usb** item on the **Communications** menu (Figure 48).
4. Connect the analyzer to a local PC's USB port using the RAD-supplied USB cable (see "Using Usb").
5. Wait for the PC to recognize the new USB connection (**USB Ethernet/RNDIS Gadget** appears in the list of devices viewed by selecting **Start**>**Devices and Printers** on the PC).

> **Notes:**
>
> - If a driver installation launches, either confirm the installation if required, or use the RAD-supplied USB Flash drive to install the default driver.
> - Please see the **READ ME USB Ethernet-RNDIS Gadget Installation** document if you need further assistance with USB driver connection.

6. After verifying that the analyzer appears in the local PC's list of devices and getting the analyzer's USB IP address, log onto the analyzer using a web browser on the local PC (see "Logging onto KT-100 Analyzers with a Web Browser").

Using Wifi Connections

To connect to an analyzer using a wireless network connection:

1. If the analyzer is off, power on (see "Powering On"), log in (see "Logging In and Entering Passcodes"), and accept the laser warning (see "Reviewing and Accepting the Laser Warning").

2. Ensure that Wifi is enabled, and that the analyzer is connected to the correct wireless network (see "Using Wifi").

3. Once the analyzer is connected to the correct wireless network, get the IP address listed under the network name on the **Communications** menu (Figure 52).

4. Verify that the network workstation is connected to the same wireless network as the analyzer.

5. After verifying that both the analyzer and the network workstation are connected to the correct wireless network, and getting the network IP address of the analyzer, log onto the analyzer using a web browser on the network workstation (see "Logging onto KT-100 Analyzers with a Web Browser")

Logging onto KT-100 Analyzers with a Web Browser

Once the USB or wireless network connection is made (see "Connecting a KT-100 Analyzer to Local PCs or Network Workstations"), users can log onto a KT-100 analyzer with a web browser. To log onto a KT-100 analyzer:

1. On the local PC or network workstation, open a new **Web Browser** window or tab.

   Currently, KT-100 supports recent versions of Microsoft Internet Explorer, Mozilla Firefox, and Google Chrome.

2. Type the IP address for either the USB connection (see step 3 in "Using USB Connections" above) or the wireless network connection (see step 3 in "Using Wifi Connections" above) into the address bar of the browser.

   > **Notes:**
   > - **DO NOT** include the www prefix.
   > - The KT-100 analyzer supports only one connection at a time.
   > - If a driver installation launches, either accept the installation, or use the RAD-supplied USB Flash drive to install the default driver.

   When the web browser connects to the analyzer, it displays the KT-100 **Rigaku log in** webpage (Figure 77).

Figure 77. Rigaku Log In Webpage
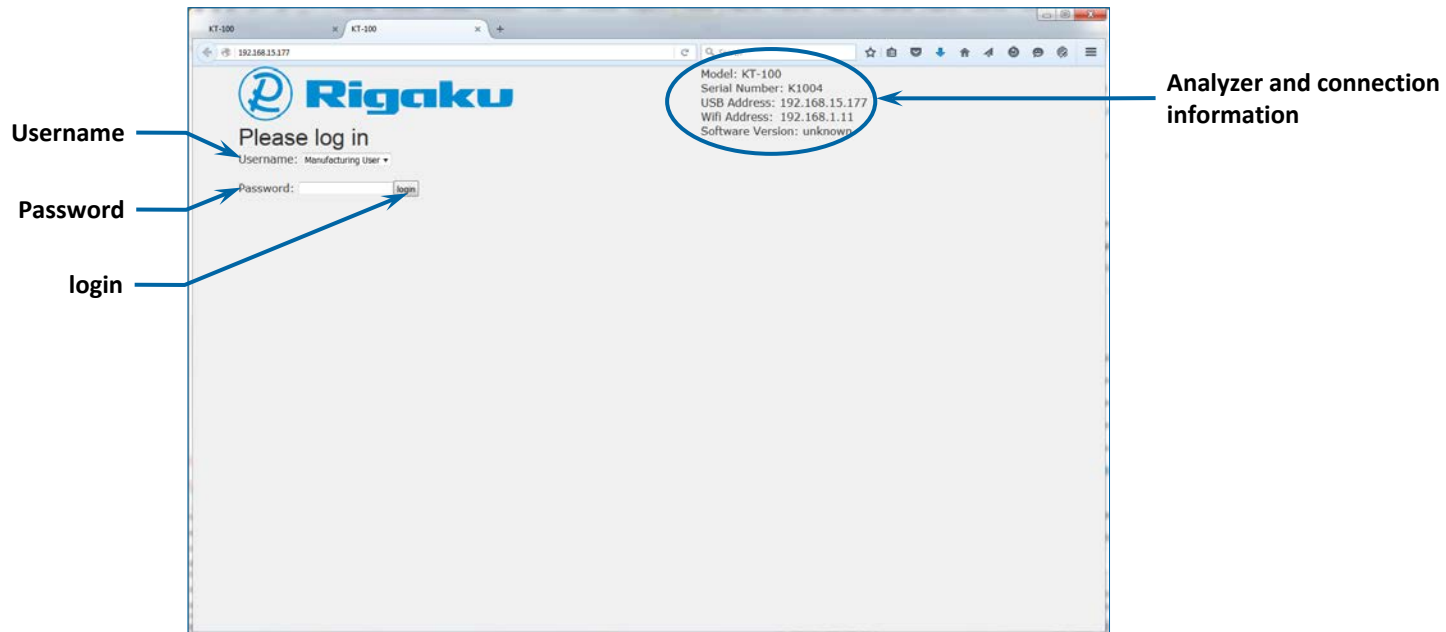
3. Log in as a KT-100 Operator:

   A. Click the down arrow in **Username** to select an Operator option, and use one of the following log-in combinations:

Table 13. Operator Web Login Information

For Username select…	For Password enter …
Operator User	144
Operator 2	188

   B. When **Username** and **Password** are filled, select **login**.

   The details for the KT-100 analyzer appear in the web browser (Figure 78).

Figure 78. Default Results Webpage

Daily results for current month

Analyzer and connection information

Previous month

Available data download formats

Available options

Download results summary

Download selected result reports

Select/Unselected listed results

Result numbers

Detected alloy composition data
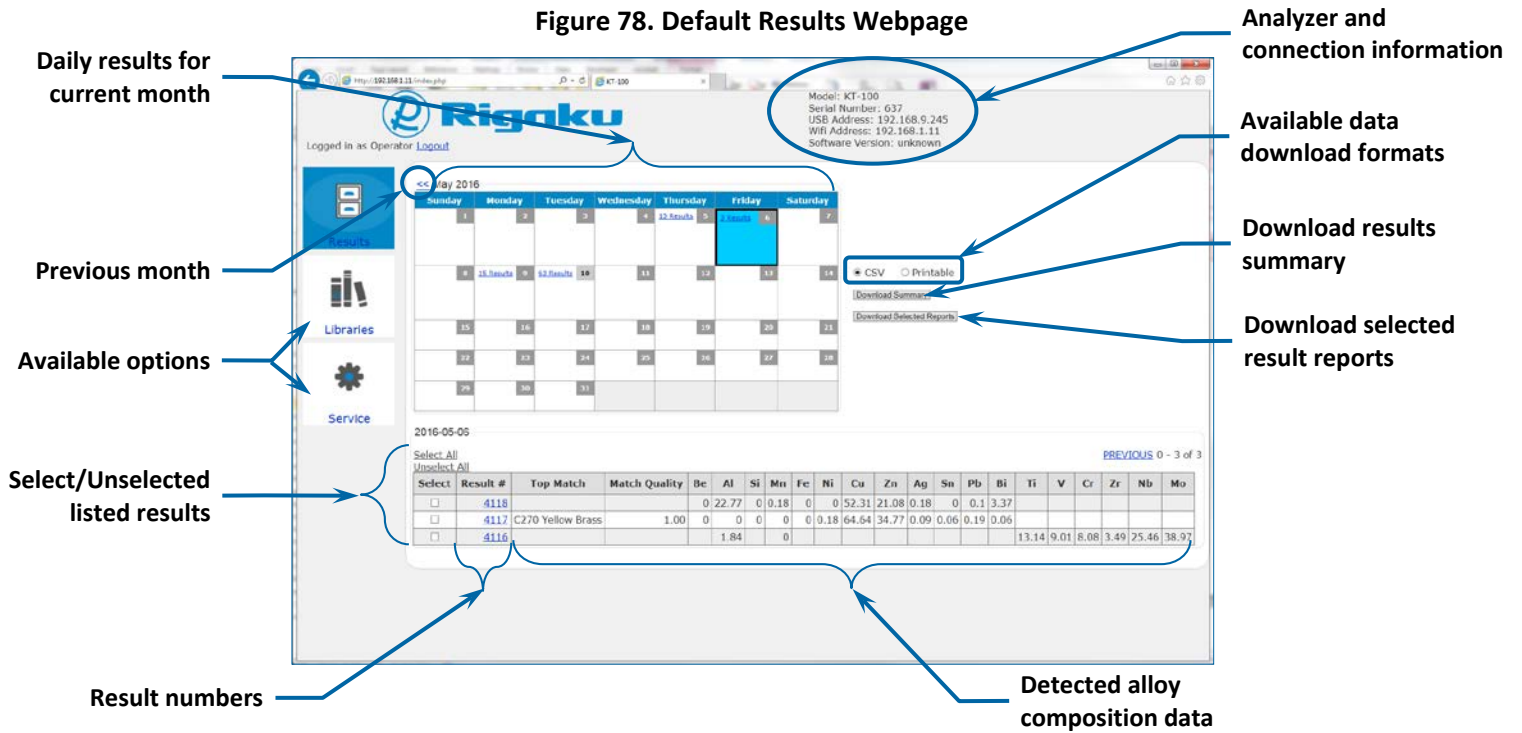
Viewing Analyzer Results on a Web Browser

To view analyzer results on web browser:

If necessary, connect the KT-100 analyzer to the local PC or network workstation (see "Connecting a KT-100 Analyzer to Local PCs or Network Workstations").

1. Select ⊟ (**Results**) on the webpage to view results data:
   - By default, the page lists results for the current day and shows which days of the current month have available results.
   - Listed results include **Result Numbers**, **Top Match** alloy names, top **Match Quality** scores, and detected **Element** composition data.
   - If the list of results for the current day is larger than the current screen size, select **PREVIOUS** or **NEXT** to view all results in the list.
2. To view the details of a specific result, select a result number from the **Result #** column.

   A new web browser tab opens and shows data for the selected result (Figure 79).

Figure 79. Selected Result Webpage with Optional Information

Result on new
browser tab

Result data
filename

Optional Information

File Tag

Sample ID

Lot, Purchase Order, and
Vendor

Match data

Detected alloy
composition data with
Grade Spec ranges
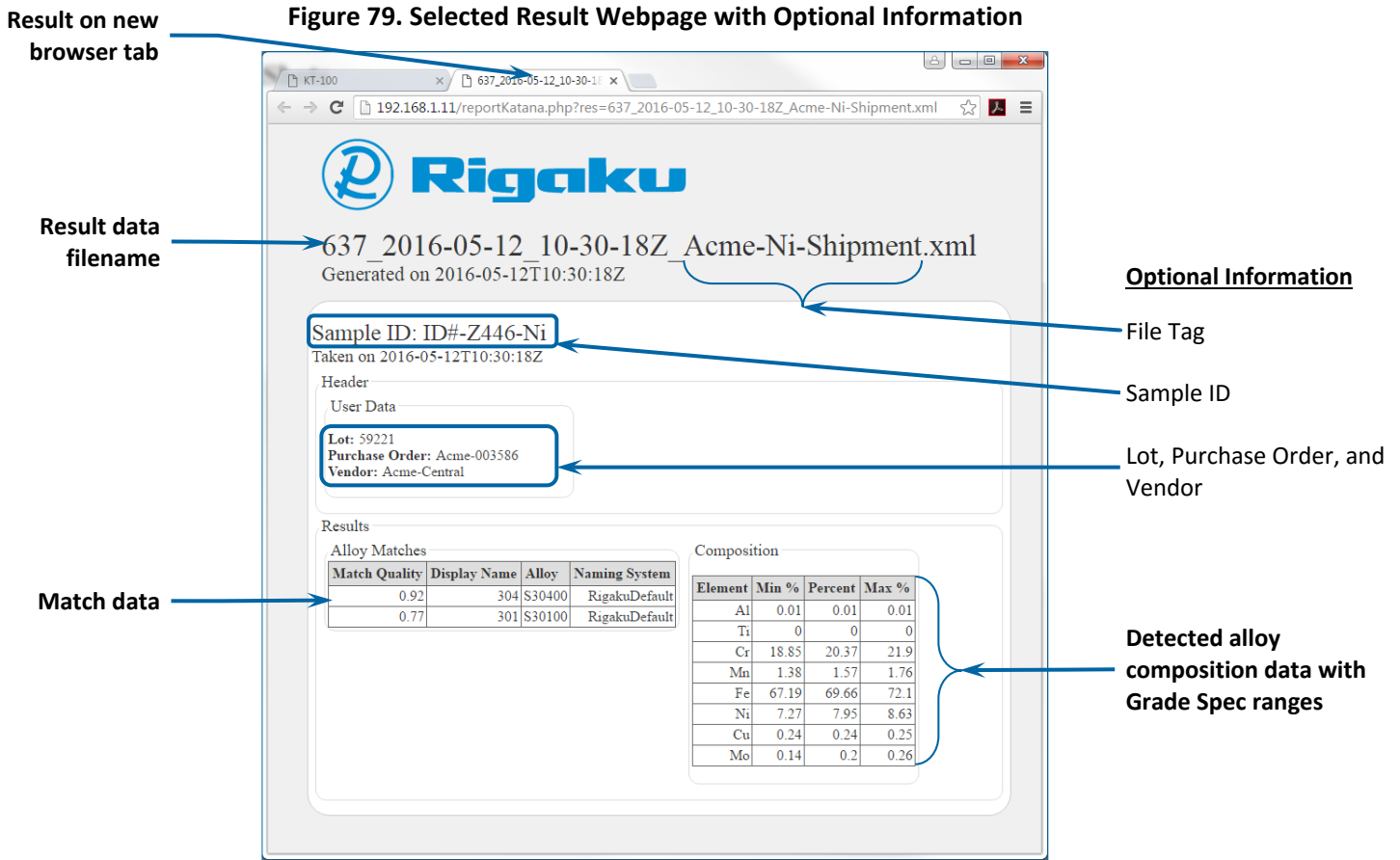
3. Close the web browser tab after viewing the result.

4. When finished viewing results:

   ▪ Archive results to a local PC or a network workstation (see "Archiving Analyzer Results")

   ▪ Download system log files (see "Downloading System Logs for Technical Support").

   ▪ Close the web browser to end the session.

5. After closing the browser:

   ▪ Disconnect the analyzer from the local PC after using the **Usb** feature to view results.

   ▪ Disable the analyzer's **Wifi** to save battery charge after using a network workstation to view results.

Archiving Analyzer Results

To ensure that results are secure, the KT-100 analyzer allows users to archive results on a local PC or a network workstation.

To archive analyzer results

1. Connect to the analyzer with a web browser (see "Connecting a KT-100 Analyzer to Local PCs or Network Workstations").

2. View analyzer results (see "Viewing Analyzer Results on a Web Browser").

3. Next to the displayed calendar month, choose the data format for the results files in the archive (Figure 78):

   ▪ **CSV** generates a text file with comma separated values for each selected result.

   ▪ **Printable** generates a PDF report for each selected result.

4. Download results for the currently displayed date:

   A. Select results for download by:

      ▪ Checking the boxes in the **Select** column next to each result you want to archive.

      ▪ Reselecting a check box to remove a result from the download list.

      ▪ Clicking **Select All** to check all the boxes for the displayed date.

      ▪ Clicking **Unselect All** to remove all results from the download list.

   B. After checking all required results, click **Download Selected Reports** (Figure 78).

      The analyzer shows progress as it generates a "zipped" file containing all selected result reports in the specified format, and provides a link for downloading the file (Figure 80).

Figure 80. Link for Downloading Zipped Results Reports in PDF Format

Filename link for download
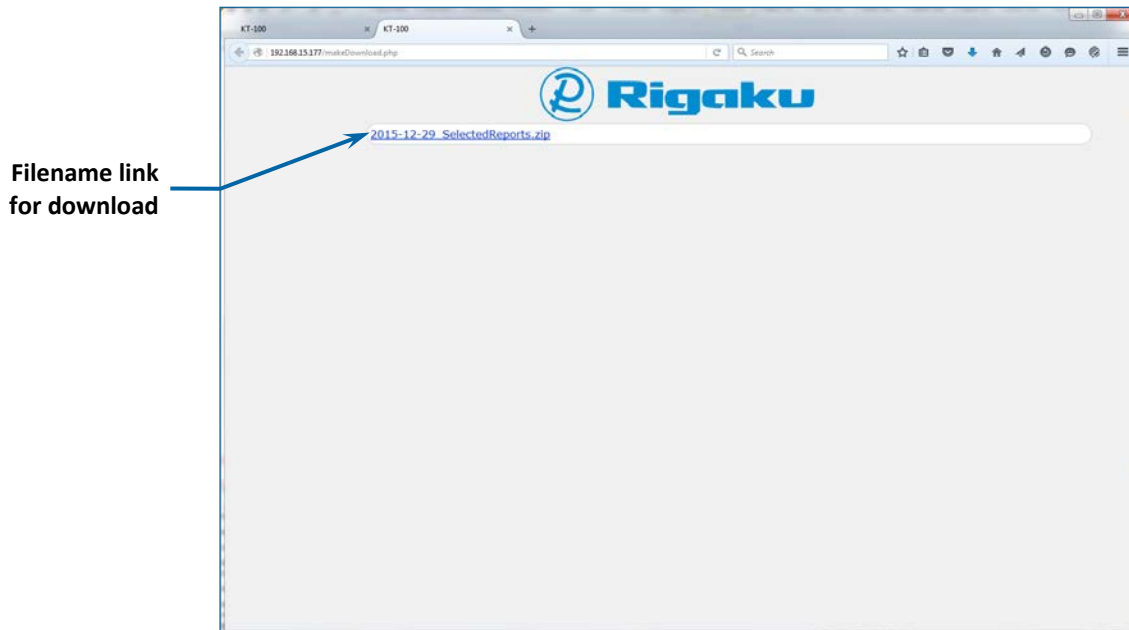
C. Select the link to download the file and return to the **Result** webpage.

D. Once the file has downloaded, select Previous or Next to view and download other results from the selected date (Figure 78) or view and download results from another date.

E. After downloading results, open the web browser's **Downloads** folder on the local PC or network workstation to access the zipped archives.

F. Extract result files from the zipped archives with WinZip or another zip extraction program to view the results.

G. Move the archived results to a folder on the PC or network for long-term storage.

H. Close the web browser tab after archiving the results.

5. Download a Summary report for currently displayed date:

A summary report is similar to the table on the **Results** webpage ([Figure 78](#)) and includes **Result #**, **Top Match** top **Match Quality**, and detected element data for alloy composition of each result ([Figure 81](#)).

To download a results Summary report:

A. On the main **Results** page ([Figure 78](#)), select the **CSV** format.

B. Select **Download Summary**.

The analyzer sends a file with comma separated data that most spreadsheet and database software can read to the browser, which then displays a prompt for opening or saving the file.

C. Open or save the file as needed.

6. Print a Summary report for the currently displayed date:

To print a results Summary report:

A. On the main **Results** page ([Figure 78](#)), select the **Printable** format.

B. Select **Download Summary**.

The analyzer opens a web browser tab, displays a summary report for the all the results from the selected date ([Figure 81](#)), and opens a **Print** dialog ([Figure 82](#)).

Figure 81. Printable Result Summary Report

2016-05-10

Result #	Top Match	Match Quality	Be	Al	Si	Mn	Fe	Ni	Cu	Zn	Ag	Sn	Pb	Bi	Ti	V	Cr	Zr	Nb	Mo	Co	W	Mg
4196	C260 Cart Brass	0.94	0	0	0	0	0	0.06	71.25	28.58	0	0	0.09	0.02									
4195							0								11.86	8.55	29.28	1.27	10.76	38.27			
4194							0								14.94	0	19.75	2.92	19.04	43.36			
4193					2.02		1.79	3.88	1.63						0.53		4.95			10.87	18.16	56.16	
4192							0								13.14	2.96			4.1	33.03	46.77		
4191					0		0								< 0	40.78	>100	35.69	>100	>100			
4190	441	0.83					0.39	77.26	0.21	0.13							22.01			0			
4189	304	1.00		0.01			1.62	71.23	7.65	0.24					0		19.03			0.23			
4188	304	1.00		0.08			1.49	69.19	9.32	0.24					0		19.35			0.33			
4187	304	1.00		0.06			1.88	70.23	8.76	0.37					0		18.27			0.42			
4186					0.57		2.52	5.02	3.95						0.12		7.12			8.2	16.71	55.8	
4185	3005	0.77		97.07	0.13	0.86	0.46	0.53	0.21	0.23													0.51
4184					2.34		0								18	9.52	35.21	0.31	19.63	14.99			
4183	410/420	0.84					0.63	84.09	0.27	0.13							14.56			0.31			
4182						1.06	1.59	95.73	0							0.99	0.16			0.47	0		
4181	CStl/LAS	0.82				0.56	0.44	97.62	0.1							0.31	0.22			0.34	0.41	0	
4180	CStl/LAS	0.81				0.55	0.56	97.81	0							0.09	0.26			0.1	0.63	0	
4179						0.54	0.66	93.92	0.19							0.85	0.35			0	3.29	0.19	
4178						1.34	0.78	96.51	0.17							0.23	0.2			0.6	0	0.18	
4177						1.1	0.79	81.89	0.22							0.1	0.17			0.11	1.43	14.21	
4176					0.53		2.01	20.76	7.51						0.56		15.09			7.56	10.38	35.59	

Figure 82. Print Dialog
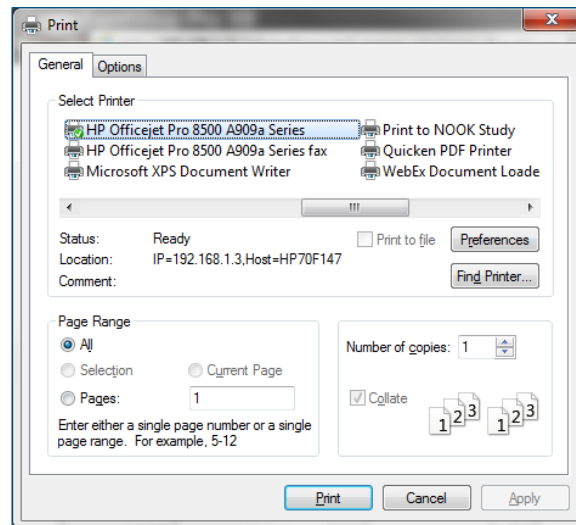
C. From **Print**, choose a printer from the **Select Printer** list.

D. If necessary:

- Click **Find Printer** to update the printer list.

- Select **Preferences** to configure the printer page to match the web page layout.

- Specify **Page Range** and **Number of copies**.

E. Close the web browser tab after printing the Summary report.

7. After archiving results and printing Summary reports, on the PC or network workstation:

- View results (see "Viewing Analyzer Results on a Web Browser").

- Download system log files (see "Downloading System Logs for Technical Support").

- Close the browser to end the session.

8. After closing the browser:

- Remove the USB cable from the analyzer and the local PC after using the **Usb** feature to archive results.

- Disable the analyzer's **Wifi** to save battery charge after using a network workstation to archive results.

Downloading System Logs for Technical Support

In addition to results data and Summary reports, users can download and view KT-100 system logs for technical support on either a local PC or a network workstation.

> ⚠️ **Important:**
>
> Both the **Unit Upgrade** feature on the **Service** webpage and the analyzer upgrades and options available on the **Library** webpage are available only for RAD factory service and technical support personnel. Improperly running these features can damage the analyzer.

To download system logs:

1. If necessary, connect to the analyzer with a web browser (see "Connecting a KT-100 Analyzer to Local PCs or Network Workstations").

2. From the default **Results** webpage (Figure 77), select ✳ (**Service**).

   The **Service** webpage provides a link for users to download system log files (Figure 83).

Figure 83. Service Webpage
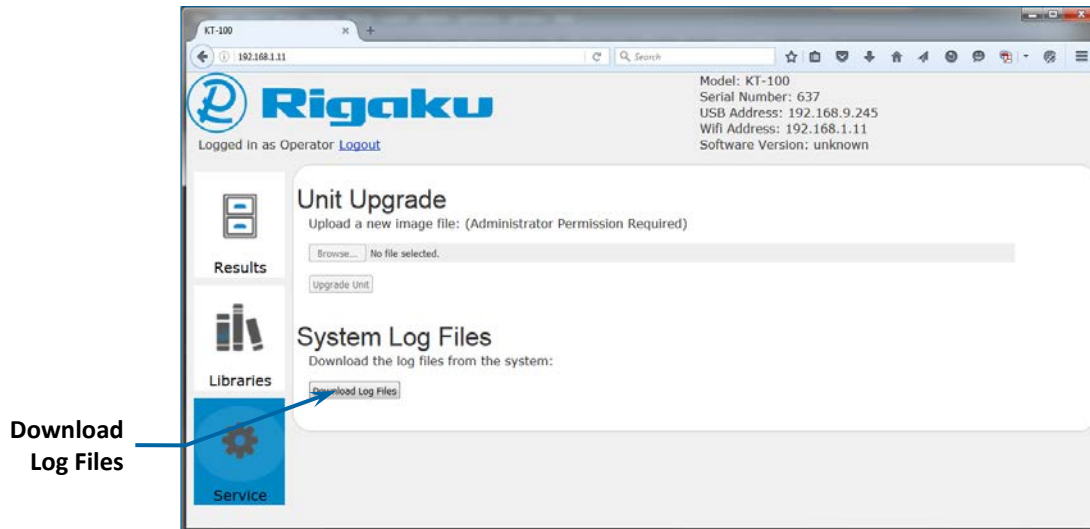
3. Click **Download Log Files**.

   The analyzer opens a web browser tab, generates a "zipped" collection of system log files, and provides a link for downloading the file.

4. Select the link to download the zip file.

5. Open the web browser's **Downloads** folder on the local PC or network workstation to access the zipped archives.

6. To view the downloaded system log files, extract them from the zipped archive with WinZip or another zip extraction program.

7. Send the zipped collection of log files to RAD technical support as directed by your technical support contact.

8. After downloading system logs on the PC or network workstation:

   - View results (see "Viewing Analyzer Results on a Web Browser").
   - Archive results to a local PC or a network workstation (see "Archiving Analyzer Results")
   - Close the browser to end the session.

9. After closing the browser:

   - Remove the USB cable from the analyzer and the local PC after using the **Usb** feature to download system logs.
   - Disable the analyzer's **Wifi** to save battery charge after using a network workstation to download system logs.

![Rigaku logo]

Basic Troubleshooting

This section contains instructions for collecting information about the analyzer by:

- Viewing Analyzer Status Information
- Verifying the Analyzer Serial Number

Viewing Analyzer Status Information

To simplify maintenance, set up, and troubleshooting, the KT-100 analyzer monitors runtime status information.

To view analyzer and runtime status information:

1. If the analyzer is off, power on (see "Powering On"), log in (see "Logging In and Entering Passcodes"), and accept the laser warning (see "Reviewing and Accepting the Laser Warning").

2. When the **Analyze** screen appears (Figure 17), select ≡ (**Main** menu).

   The **Main** menu appears (Figure 19).

3. Select ⚒ (**Settings**).

   The **Settings** menu appears and lists available settings-categories.

   > **Note:**
   >
   > Items on the **Instrument Status** menu provide information only. Selecting an item displays an error message indicating that users cannot change the setting.

4. From the menu, select _i_ (**Instrument Status**).

   The **Instrument Status** menu appears and shows analyzer-specific information (Figure 84).

Figure 84. Instrument Status Menu

Table 14 describes the available information.

Table 14. Information Available on Instrument Status Menu

Data Items	Typical Values	Descriptions
Serial Number	**625** or greater	• Lists the three or four digit serial number of the analyzer.
Unique ID	**N/A**	• Lists the RAD internal build number of the analyzer.
Software Version	**1.1.0. 0** or greater	• Lists the current version number of the software. • For software updates and feature lists, contact Rigaku Analytical Devices or your local Rigaku representative.
TEC	**N/A**	• Displays the current temperature of the analyzer's laser subsystem.

5. Note any required information, then select ☰ (**Main** menu) to return to the **Main** menu.

Verifying the Analyzer Serial Number

When troubleshooting the KT-100 analyzer, you may need to verify that the serial number listed on the analyzer settings **Instrument Status** menu matches the hardware serial number on your analyzer's **Serial Number** label.

To verify that the serial numbers match:

1. If the analyzer is off, power on (see "Powering On"), log in (see "Logging In and Entering Passcodes"), and accept the laser warning (see "Reviewing and Accepting the Laser Warning").
2. Access the **Instrument Status** menu (see "Viewing Analyzer Status Information").
3. Record the **Serial Number** listed.
4. Lift the touchscreen.
5. View the back of the screen and locate the label containing the serial number.
6. Verify that the serial number on the label matches the serial number listed in the **Instrument Status** menu.
7. If the numbers do not match, contact Rigaku Analytical Devices or your local Rigaku representative.

Appendix A.   Operating Specifications

This appendix provides specifications you must review before operating the KT-100 analyzer. It includes:

- Optical Specifications
- Physical Specifications
- Electronics and Data Processing Specifications
- Environmental Specifications
- Electrical Specifications

Optical Specifications

Specification	Value
Operation process	Laser Induced Breakdown Spectroscopy
Range – spectral	$2.2E^{-5}$ – $5E^{-5}$ cm (220 – 450 nm)
Laser (excitation wavelength):	1064 nm Class 3B
Spectrometer	Czerny-Turner
Detector	Closed Coupled Device (CCD)

Physical Specifications

Hardware	Specification	Value
KT-100 analyzer	Length	9.55 in (24.3 cm)
	Width	3.3 in (8.4 cm)
	Height	10.1 in (25.7 cm)
	Weight	3.25 lbs. (1.5 kg)

Electronics and Data Processing Specifications

Specification	Value
Software	**RAD KT-100 Software** For upgrades, contact Rigaku Analytical Devices or your local Rigaku representative.

Environmental Specifications

Specification	Value
Storage temperature	5°C to +40°C
Operating temperature	0°C to +40°C

Specification	Value
Maximum Altitude	2000 meters

Electrical Specifications

Name	Value
Internal Battery	7.2V Li-Ion, 6.2Ah, 45Wh
Battery life	5+ hrs. at 25°C, rechargeable
KT-100	12V DC, 1A
Docking Station	12V DC, 3A

Appendix B. Statements of Compliance

This appendix contains all required certification and compliance statements and includes:

- IEC/EN 60529 International Protection Rating
- Certificate of Conformity

IEC/EN 60529 International Protection Rating

The International Protection (IP) rating system, sometimes referred to as the "Ingress Protection" rating system, is an international standard that classifies a products physical resistance to damage from infiltration by both solid objects and liquids. The KT-100 analyzer has been tested in compliance with the IP rating system defined by the IEC 60529 standard and has received a rating of **IP 54**.

Rating Component	Test result indicates resistance to…
IP 5X	Dust Protected
IP X**4**	Splashing of Water

Certificate of Conformity

The Certificate of Conformity for Katana/KT-100 analyzers indicates that they meet the high safety, health, and environmental protection requirements of the USA, Canada, the European Economic Area, and other areas. Curtis-Straus LLC, a wholly owned subsidiary of BV CPS, issued the certificate on 03/18/2016 in report number EO3373-1. Both the certificate and the report indicate that Katana/KT-100 analyzers comply with the following standards:

- EMC Emissions
  - ICES-003 Issue 5 Class A Digital Apparatus emissions requirements (Canada)
  - CFR 47 FCC Part 15 Subpart B Class A emissions requirements (USA)
  - VCCI Class A ITE emissions requirements (Japan)
  - AS/NZS CISPR 22:2009/A1:2010 Class A ITE emissions requirements (Australia)
  - EN 61000-3-2:2006/A1:2009/A2:2009 Limits for harmonic current emissions (equipment input current up to and including 16A per phase)
  - EN 61000-3-3:2008 Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current up to and including 16 A
- EMC Emissions and Immunity:
  - EN 61326-1:2013 EMC requirements for Electrical equipment for measurement, control and laboratory use – General Use

For more information about the certificate, contact Rigaku Analytical Devices at service@rigakuanalytical.com.

Appendix C. Regulatory Statements

This appendix contains all required regulatory statement and includes:

- FCC and Industry Canada Statements
- Export Regulation Statements
- EC Statements
- European WEEE Recycling and RoHS

FCC and Industry Canada Statements

This equipment has been tested and found to comply with the limits for a Class A digital instrument, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the users will be required to correct the interference at their own expense.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The end user is not allowed to change or modify the instrument for uses beyond those outlined in the instruction manual.

The instrument is not intended to be used in a hazardous location. The battery pack should be charged only with a suitably certified or approved battery charger.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe A respecté toutes les exigences du Règlement sur le matériel brouilleur du Canada.

⚠	**⚠CAUTION**
	This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

Export Regulation Statements

⚠	**⚠CAUTION**
	The technical information contained with this document is subject to the Export Administration Regulations. Export of this technical information to foreign persons or foreign companies, within or outside the United States, may require prior written authorization by the U.S. Department of Commerce, Bureau of Industry and Security. Contact Rigaku Analytical Devices prior to such a transfer.

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EC Statements

This equipment is in conformity with the provisions of the following EC Directives:

- Low-Voltage Directive (LVD): 2014/35/EU
- Electromagnetic Compatibility (EMCD): 2014/30/EU
- Waste of Electrical and Electronic Equipment (WEEE) 2012/19/EU
- Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) 2011/65/EU

European WEEE Recycling and RoHS

The following sections provide the Rigaku Analytical Devices compliance statements for European WEEE and RoHS regulations.

WEEE Compliance

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the following symbol:

Rigaku Analytical Devices has contracted with one or more recycling or disposal companies in each European Union (EU) Member State, and these companies should dispose of or recycle this product. For further information, contact Rigaku Analytical Devices or your local representative.

WEEE Konformität

Dieses Prudukt muss die EU Waste Electrical & Electronic Equipment (WEEE) Richtlinie 2002/96/EC erfüllen. Das Produkt ist durch folgendes Symbol gekennzeichnet:

Rigaku Analytical Devices hat Vereinbarungen mit Verwertungs/Entsorgungsfirmen in allen EU-Mitgliedsstaaten getroffen, damit dieses Produkt durch diese Firmen wiederverweret order entsorgt

warden kann. Füer mehr infromationen bitte kontaktieren sie Rigaku Analytical Devices oder Ihre öertliche Vertretung.

Conformité DEEE

Ce produit doit être conforme à la directive européenne (2002/96/EC) des Déchets d'Equipements et Electroniques (DEEE). Il est marqué par le symbole suivant:

Rigaku Analytical Devices s'est associé avec une ou plusieurs compagnies de recyclage dans chaque état membre de l'union européenne et ce produit devrait être collecté ou recyclé par celles-ci. Pour de plus amples renseignements, veuillez contacter Rigaku Analytical Devices ou bien ses représentants locaux.