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User Guide

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X-MET8000 Series

Hitachi High-Tech Analytical Science

CAUTION

Do not place this instrument near the devices generating intense electrical or magnetic field (magnetic crane, electric welder, high-frequency electric furnace, pole transformer).

- Before using the instrument, read the safety instructions and precautions carefully.
- Be sure to observe the safety instructions in this guide and the WARNING / CAUTION labels on the instrument.
- Keep this guide nearby in a safe place so it can be referred to whenever needed.

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3. Hitachi High-Tech Analytical Science assumes no liability for any direct, indirect, or consequential damages arising from use not described in this guide. Utmost care must be exercised when using the instrument.
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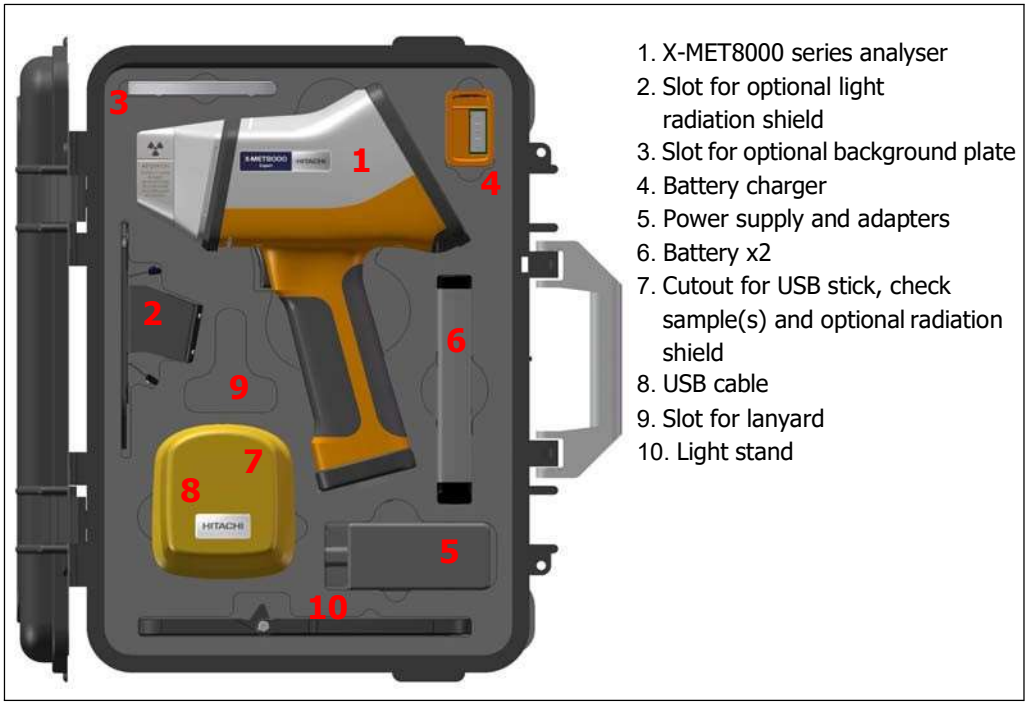
Contents

1. The X-MET8000 Series

These are the main components and features of the X-MET8000 series, and the external connections to it.

1.1 The X-MET8000 Series Components

The X-MET8000 series includes a rugged transit case as standard. This contains the following items:



The included accessories depend upon the version of the X-MET8000 series. The background plate, light radiation shield, light stand and safety shield are optional accessories. The Power Supply includes international plug adapters.

1.2 The X-MET8000 Series Features

These are the main features of the X-MET8000 series.

1. Measurement window
2. Proximity window
3. Hot surface protection
4. Power On/Off and Home button
5. Proximity and X-Ray On indicators
6. Touch screen display
7. Trigger
8. Battery cover, Labels inside the battery cover.
9. Battery cover release
10. Ring for lanyard
11. Connector cover

The label under the battery cover includes safety information and the instrument's serial number. Open the connector cover to setup the external connections.

Check both batteries before use. Refer to: *Battery Maintenance* on page 123.

1.3 X-MET8000 Series Software Features

Some features of the X-MET8000 series depend on the selected variant and license.

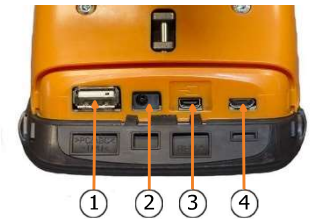
The X-MET8000 series device might not include features such as camera, GPS, Bluetooth and Wi-Fi capability. These are optional features that can be purchased through licensing.

Available languages also depend on the purchased variant.
Features can be activated by uploadable license files, some features are also available as temporary licenses for evaluation use.

A License can be Permanent or Restricted. Possible restrictions are time and use-count.

1.4 The X-MET8000 Series External Connections

The X-MET8000 series has four external connections that are underneath the display. Open the plastic connectors cover to access them.



1. USB A connector.
2. DC supply connector.
3. Extension connector.
4. USB Micro-B connector.

Use the USB Micro-B connector to connect the X-MET8000 series to a PC with the USB cable. Use the USB A connector for a USB memory device. Use the DC connector to connect the Power Supply to charge or power the X-MET8000 series.

Only use the provided Power Supply to charge or power the X-MET8000 series device and batteries. The use of an incompatible power supply and/or charger might result in damage or personal injury.

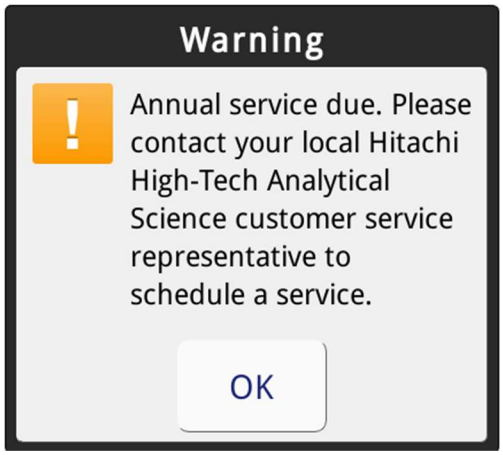
Do Not connect generic devices to the extension connector.

The extension connector is designed only for X-MET8000 series accessories like the bench top stand and is not compatible with any generic consumer devices regardless of similar appearance. Connecting incompatible devices to the extension port might damage the X-MET8000 series and/or the device(s) connected to it.

1.5 Service Reminder

The X-MET8000 series will show a pop-up notification when the annual instrument maintenance is due.

The X-MET8000 series device requires proper maintenance to ensure safe and accurate measurement results. The X-MET8000 series will display a Contact Service message when service or maintenance is due. Please contact your local Hitachi High-Tech Analytical Science service point to schedule service for your device. Failure to properly service the X-MET8000 series can result in personal injury or loss of performance.



2 Safety First!

The X-MET8000 series is designed to meet rigorous safety requirements, and is safe to operate in accordance with these instructions.

If the X-MET8000 series is used in a manner not specified by Hitachi High-Tech Analytical Science, the safety features of the X-MET8000 series can be impaired.

Many regulatory organizations require each customer to register the X-MET8000 series. The local Hitachi High-Tech Analytical Science representative can assist with the specific regulatory requirements.

The X-MET8000 has regulatory approval as Type Number: XMDS 2770.

2.1 Safety Symbols

These symbols appear on the X-MET8000 Series and in the documentation.

Caution; X-Rays: This symbol is a warning about X-ray generation.

Caution; X-Rays (Ca): This symbol is a warning about X-ray generation for use in Canada.

Caution; Toxic Material: This symbol is a warning about the presence of toxic material.

Caution; Electricity: This symbol is a warning about the presence of electricity.

Caution: This symbol provides a general warning.

2.2 Caution X-Rays

The X-MET8000 series generates X-ray radiation when it is energized.

Caution; X-Rays: Do not misuse or abuse the X-MET8000 series because of the risk of direct exposure to X-ray radiation above permissible levels. Prolonged direct exposure to X-ray radiation can cause serious personal injury.

Contact local Hitachi High-Tech Analytical Science representative for advice about X-ray radiation, or for X-ray safety training.

2.3 Caution Beryllium

The detector has a thin beryllium window. Beryllium is a toxic compound, however, the beryllium window poses no health hazard when it is intact.

Caution; Toxic Material: Do not puncture, break or damage the beryllium window in any way. This can produce airborne particles. Prolonged inhalation of beryllium can cause cancer.

Do not allow the detector to come into contact with moisture, or condensation from high humidity. This can corrode the beryllium window, in particular if chlorine, sulphates, copper or iron is also present.

Contact the local Hitachi High-Tech Analytical Science representative for advice about beryllium, or if the beryllium window is pierced, broken, damaged or corroded.

2.4 Caution Lanyard Use

The X-MET8000 series includes a lanyard. This is only applicable for use at ground level.

Caution: Do not use the X-MET8000 series lanyard as a safety lanyard for work at height because of the risk of a fall. This can result in serious personal injury.

The anchor for the lanyard on the underside of the X-MET8000 series is applicable for use with a tool safety lanyard for work at height.

2.5 MET8000 Series Safety Features

The X-MET8000 series includes these 10 key safety features to protect the operator.

Power Button and Indicator

Safety Feature: Press and hold the Power button for 5 seconds to switch the X-MET8000 series on or off.

Password Protection

Safety Feature: An operator must have the correct password to use the X-MET8000 series.

Safety Feature: The supervisor can change the passwords.

Proximity Sensors

Safety Feature: The sample must cover the proximity window before the X-MET8000 series can generate an X-ray beam.

Safety Feature: When the sample covers the proximity window, the proximity indicators change to orange.

Safety Feature: The X-MET8000 series switches the X-ray beam off if there is no return signal from the sample.

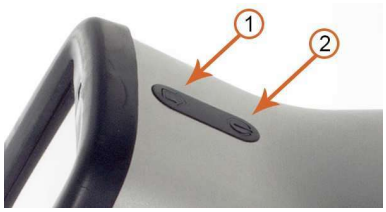
Trigger and X-Ray On Indicators

- **Safety Feature:** An operator must pull the trigger for the X-MET8000 series to generate an X-ray beam.
- **Safety Feature:** The X-Ray On indicators blinks red when the X-MET8000 series generates an X-ray beam.
- **Safety Feature:** If one of the X-Ray On indicators fails, the X-MET8000 series will not generate an X-ray beam.

3 How to Operate The X-MET8000 Series

Use the power On/Off and home button and touch screen display to operate the X-MET8000 series. The touch screen display includes a virtual keyboard to type text and numbers. There is a Menu screen and a status bar to access the main functions and the configuration, and a Tools menu can appear for some screens.

3.1 The Power On/Off and Home Button



1. Home button
2. Power button

Home button

Press the Home button to immediately leave the current screen and cancel an operation.

The symbol on the Home button is lit white when the X-MET8000 series is on.

Power button

Press and hold the Power button for 5 seconds to switch the X-MET8000 series on or off.

The symbol on the Power button is lit white when the X-MET8000 series is on.

3.2 The Touch Screen

Use these finger movements to control the X-MET8000 series.

Tap **Slide** **Flick**

- **Tap** a button or arrow to select or activate it.
- **Press** and **Slide** to scroll a list up or down.
- **Flick** a screen to left or right to display the previous or next screen.

3.3 X-MET8000 Series New Icons and Their Functionality

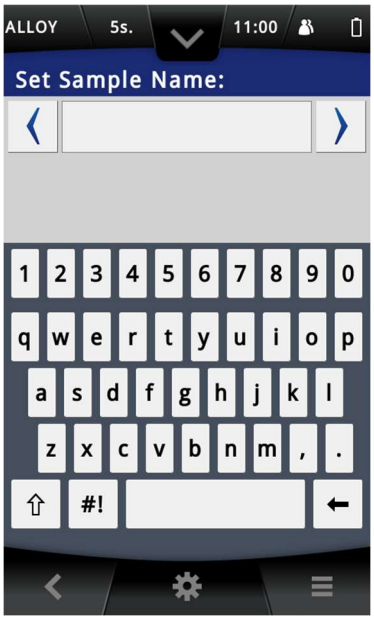
With the latest X-MET8000 series software, a few text buttons are replaced with new icons. Please refer the below table for the icons and their functionality.

Icon	Function
	Accept
	Menu
	Tools
	Back
	Viewfinder button / collimator mode indicator*)  'Collimator OFF  'Collimator ON (Orange)
	Refresh

*) The Viewfinder button toggles on and off live video display from the instrument's nose camera. The Viewfinder can be used for aiming the instrument more accurately before or during a measurement. This feature is only available on models equipped with the Camera Hardware option or the Collimator Hardware option. If present, the shape and the color of the the Viewfinder icon also serves as a quick indicator for whether the optional Collimator feature is currently active.

3.4 The Virtual Keyboard

Use the virtual keyboard to type text into a text box. Tap the character, and it will pop up above the other keys. Release the character, and it appears in the text box. Tap the arrows on either side of the text box to move the cursor to the left or right.



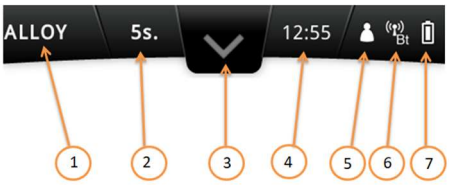
3.5 The Menu Screen

Tap **Menu** in the bottom right of the screen and the Menu screen appears. This gives access to the main functions of the X-MET8000 series.

The Menu screen is always available. Tap **Menu**, and then tap **Home** to immediately leave the current screen and cancel an operation.

3.6 The Status Bar

Tap the status bar at the top of the screen and the status bar screen appears. This contains information about the configuration and provides quick access to these settings. The status bar is always available.



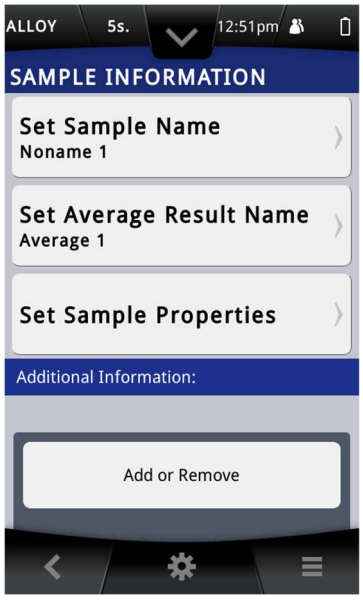
1. Method name
2. Measurement time
3. Proximity indicator
4. Time
5. User level
6. Bluetooth and Wi-Fi
7. Battery level

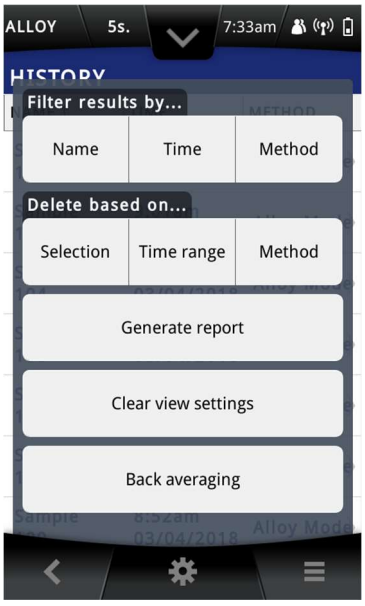
The user level is shown as:

- Operator: two people
- Supervisor: one person

3.7 The Tools Menu

When available, **Tools** appears in the middle at the bottom of the screen. Not every screen requires a Tools menu. Tap **Tools** to make the Tools menu appear. The function of the Tools menu varies with the screen that it supports. These are two examples.





4 Take the First Measurement

The X-MET8000 series has factory settings which are applicable to many measurements. It is a good idea to give each sample a name, because it is easier to find it in the results history if it has one. Follow these instructions to take the first measurement.

Remember that the X-MET8000 Series Safety Guide contains important safety information, as well as guidance for accurate measurements.

4.1 Switch On the X-MET8000 Series

Take the X-MET8000 series out of the transit case, verify that there is a battery in the X-MET8000 series and that the battery has sufficient charge, then follow these steps to switch on the X-MET8000 series.

1. Press and hold the Power button until it is lit.

The X-MET8000 series powers on, and the Safety screen appears.

2. Tap **Login** in the bottom left of the Safety screen.

   The Login screen appears, with the numeric keypad.

3. Tap the numbers to type the password.

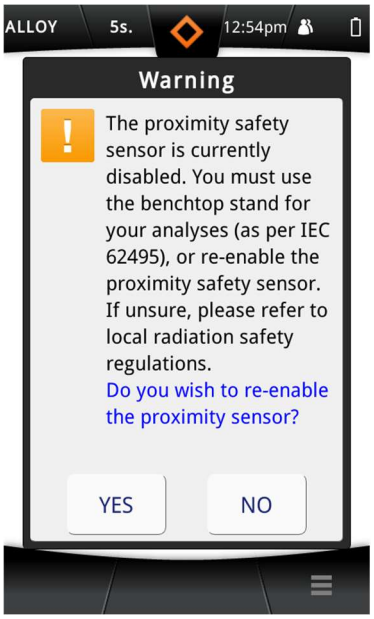
   The factory settings are:

   - Operator: 1111

   The supervisor should change the passwords. Refer to the X-MET8000 Series Supervisor Guide.

4. Tap **Done**.

   The main screen appears. If the Proximity Safety Sensor has been disabled a warning message is shown. The Proximity Safety Sensor can be re-enabled by tapping Yes.



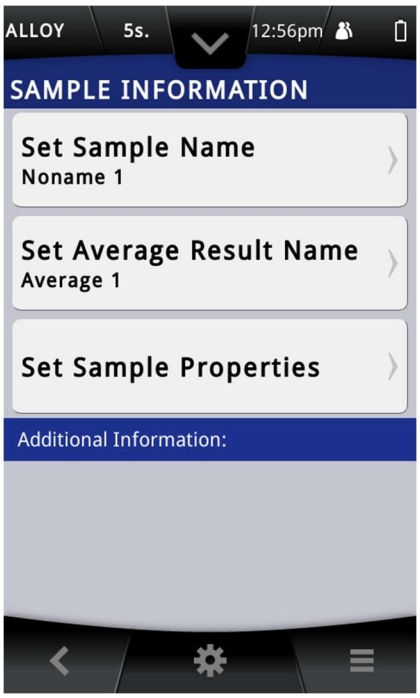
If it is necessary to set the date, time or language, refer to: *11 X-MET8000 Series Settings* on page 106.

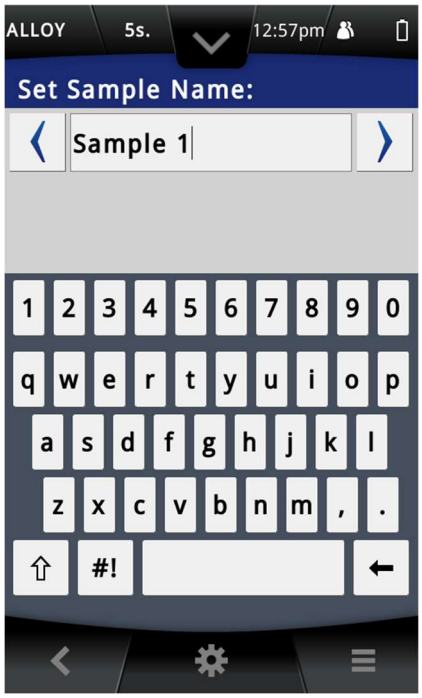
4.2 Add A Sample Name

Follow these steps to name the sample.

1. Tap **Menu**, and then tap **Sample Name**.

   The Sample Information screen appears.





2. Tap **Set Sample Name**.

   The Set Sample Name screen appears, with the virtual keyboard.

3. Use the virtual keyboard to type the Sample Name, and then tap **Done**.
4. Tap **Done** again to return to the main screen.

4.3 Use Correct Application

The application defines how the X-MET8000 series analyses the sample. Make sure that the selected application is appropriate for the sample.

1. To select an application, tap **Menu**, and then tap **Method**.
   The Operator user is presented with a list of available applications The Select Application screen appears.

2. Tap on a application to select it.
   The selected application has a checkmark next to it.
3. Tap **Done** to return to the main screen.

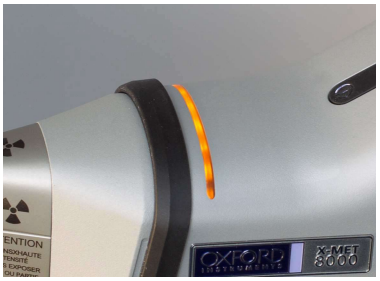
4.4 Take a Measurement

Follow these steps to measure the sample.

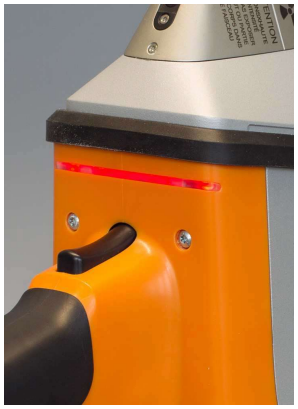
1. Carefully hold the X-MET8000 series so that it touches the sample, and that both the proximity and measurement windows are covered.

   Do not press the X-MET8000 series into the sample.

   The proximity indicators on the X-MET8000 series body lights up orange and the proximity indicator on the screen changes to orange.

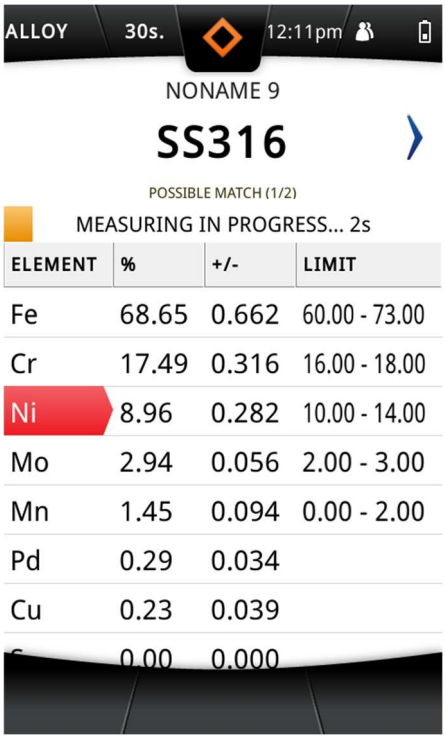


2. Pull and hold the trigger firmly. The X-ray On indicators blinks red.



3. Keep the X-MET8000 series upright and steady during the measurement.

   Use both hands to hold the X-MET8000 series and keep them away from the sample. The Results screen refreshes approximately every 2 seconds.



4. At the end of the measurement time, the X-MET8000 series makes a 'ping' sound. Release the trigger to stop the measurement.

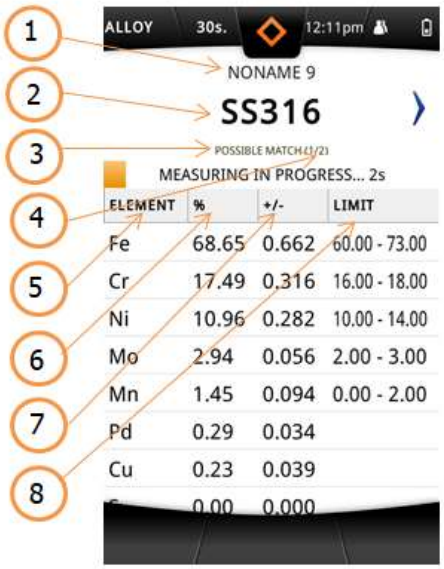
   The measurement stops, and the X-MET8000 series displays the result.

   It is possible to release the trigger and stop the measurement before the 'ping' sound. Follow these steps again to make the next measurement.

   Flick the screen to left or right to access other results.

4.5 The Results Screen

The Results screen has this information.



1. Sample name
2. Grade ID
3. Match level
4. The number of potential matches
5. Elements list
6. Measurement unit
7. Statistical measurement error
8. Grade specification limits

Sample name

This is defined in *Add A Sample Name* on page 20.

Grade ID

The grade or trade name for the sample. Tap the arrow on the left or right of the grade ID to display the next or previous possible match.

Match level

'Good Match' or 'Possible Match'.

The number of potential matches

There can be more than one match for the sample. The best match is always shown first.

Column headers

Tap on any of the column headers to sort the result by that parameter

Element

The chemical symbol. If an element has a red background it is because it is outside the required limits for that grade.

% or PPM

The measurement unit, for example % (percentage) or PPM (parts per million).

Sorting by either Elements or Concentration is possible.

+/- Limit

This indicates the precision (2 sigma) of the measurement. The lower the +/- value, the greater the precision.

The required limits for the grade.

Tap on any of the column headers to sort the result by that unit.

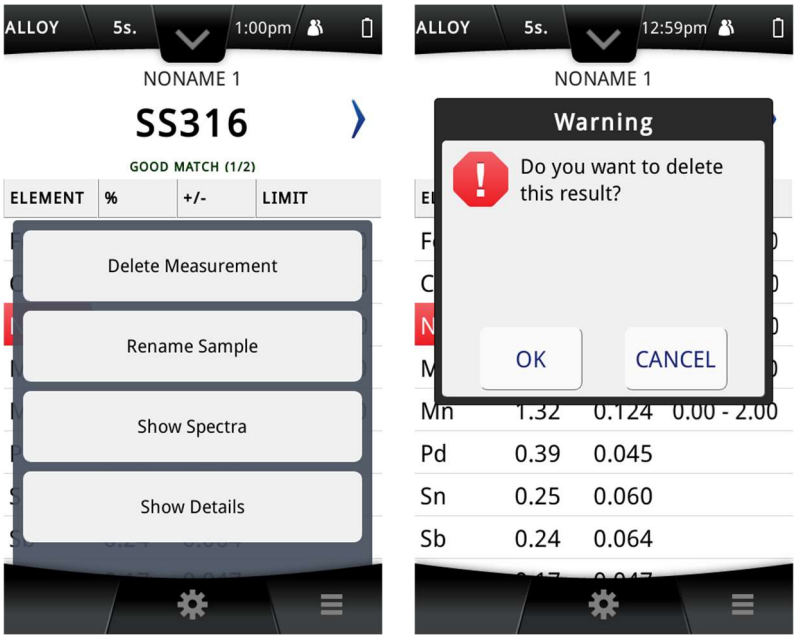
It is possible to view Fixed elements on the normal result screen. Fixed elements are listed after measured elements and separated by a horizontal rule and the text "Fixed elements:". If an element exists in both Fixed elements and "normal" measurements, it is only shown in the Fixed elements list. If the results are in "PPM" format, the Fixed elements are also converted and shown in "PPM".

4.6 Delete a Poor Measurement

Occasionally a poor measurement will occur. This can be because the sample is badly positioned, or because the measurement time is too short. The booklet 'Safe, Accurate Measurements With The
X-MET8000 Series' contains guidance for accurate measurements. Follow these steps to delete a measurement from the Results screen.

1. Tap **Tools** when a result is visible.

   The Results screen Tools menu appears.



2. Tap Delete

   Measurement. A Warning

   dialog box appears.

3. Do one of the following:

   - Tap **OK** to delete the measurement.
   - Tap **Cancel** to not delete the measurement.

4.7 Print Result from Result Screen to Bluetooth Printer

Before printing the results, it is necessary to configure a Bluetooth Printer and select **Connect as Printer** option from the Tools menu in the Bluetooth Settings screen. Please refer to the Supervisor Guide to set this up. Follow these steps to print a measurement from the Results screen to a Bluetooth Printer.

1. Tap **Tools** when a result is visible.

   The Results screen Tools menu appears.

2. Tap **Print Result**.

   Device begins to send the result for the printing. In few seconds, result is printed at the Bluetooth Printer.

4.8 Switch Off the X-MET8000 Series

Press and hold the Power button until the screen switches off. The X-MET8000 series powers off.

5 Advanced Measurements

The following topics will further explain measurement and analysis methods.

5.1 Average a Batch Of Measurements

Sometimes it is necessary to average a batch of measurements on a larger, mixed sample. It is important that all measurements use the same conditions:

- The same method
- The same measurement time.

When all the measurements are complete, it is very easy to switch between the various results. The X-MET8000 series also provides comprehensive search facilities to find a series of measurements from the results history.

5.2 Sample And Batch Names

The X-MET8000 series automatically increments an index number appended to the sample name, and uses a separate name for a batch of measurements. For example, 'Sample Batch' could include 'Sample 1', 'Sample 2','Sample 3' and so on.

5.3 Which Method?

The application defines how the X-MET8000 series analyses the sample. The available applications depend upon the version of the X-MET8000 series.

The Alloy application is based on FP calculations and automatically selects the correct parameters for the sample. Light elements can be switched off to improve speed.

The Alloy+ application uses empirical calibrations to improve accuracy. Light elements can be switched off to improve speed.

Sometimes a mode is not able to fully measure a sample, because some of the concentrations in the sample are outside the limits for that method. If this occurs, a greater than, >, or less than, <, indicator appears next to the concentration.

When this occurs, the operator should choose an applicable 'FP' method. These work with a wider range of concentrations and sample types, and are the second choice for the operator.

5.4 Applications Make Analysis Easy

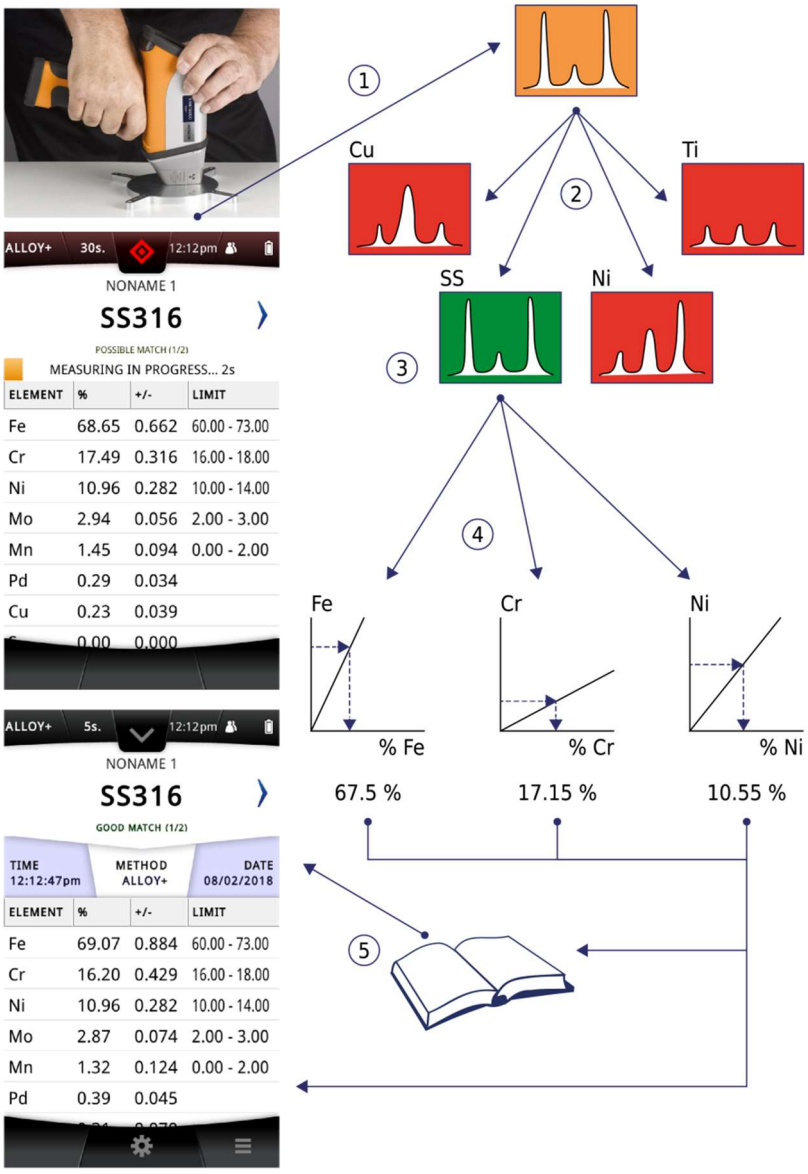
Applications make use of both empirical and fundamental parameter calibrations. Use the numbers in the illustrations to follow how the Alloy+ application analyzes first stainless steel and then gold. It uses an empirical calibration for stainless steel, and a fundamental parameter calibration for gold. All steps happen automatically, and can make life very easy for an operator!

Alloy+ application, Empirical For Stainless Steel

These steps show how the Alloy+ application uses an empirical calibration to analyze a stainless steel sample, and return the grade.

1. The X-MET8000 series acquires a spectrum to identify the sample.
2. It compares the identification spectrum with all the empirical calibrations to obtain a match.
3. It finds a match with the stainless steel empirical calibration, shown in green.
4. It uses the stainless steel calibration to analyze the sample and then display the results.
5. It compares the results with the grade library and finds SS304 is the best match.

Alloy+ application, Empirical For Stainless Steel

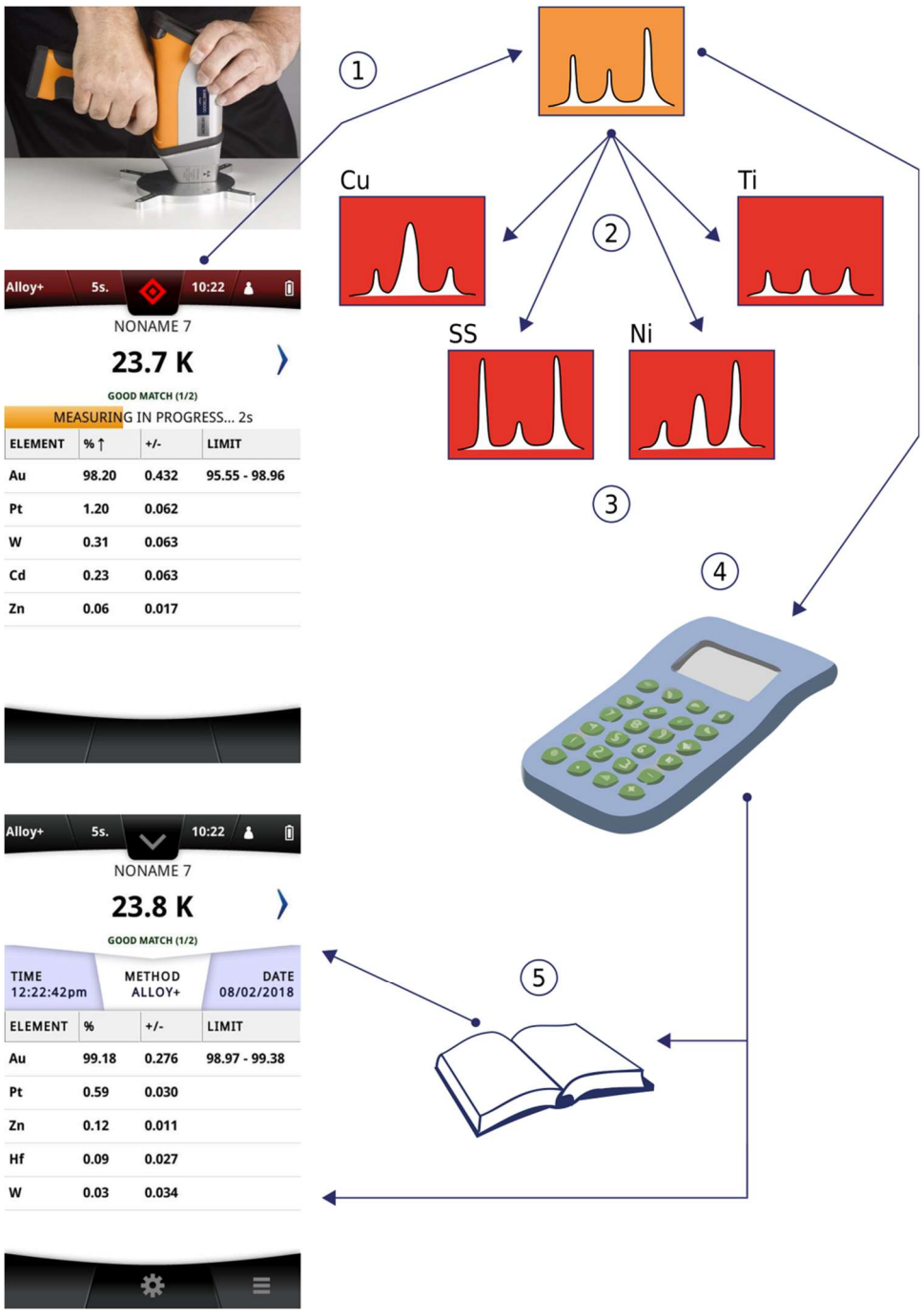


Alloy+ application, Fundamental Parameter For Gold

These steps show how the Alloy+ application uses a fundamental parameter calibration to analyze a gold sample, and return the grade.

1. The X-MET8000 series acquires a spectrum to identify the sample.
2. It compares the identification spectrum with all the empirical calibrations to obtain a match.
3. It does not find a match with any empirical calibration, all shown in red.
4. It switches to a fundamental parameter calibration and uses the internal calculator to analyze the sample, compute and then display the results.
5. It compares the results with the grade library and finds 24 carat gold is the best match.

Alloy+ application, Fundamental Parameter For Gold



5.5 How Long for a Measurement?

Note: Timed Assay disabled in some regions.

The factory set measurement time of 10 seconds is applicable for many measurements. Quicker measurements for iron, copper, nickel and similar alloys require as little as 5 seconds. Magnesium and aluminum alloys need longer measurement times, for example 15 seconds or more. Complex alloys also require longer measurement times to analyze all the trace elements.

Longer measurements will always give more precise results. However, the X-MET8000 series can provide excellent results in only a few seconds. The standard deviation, shown as +/- on the display, figures indicate the measurement precision. The longer the measurement time, the lower the standard deviation figures, the greater the precision.

At the end of the measurement time, the X-MET8000 series makes a 'ping' sound. It is also possible to use the internal timer to fully control the measurement. This is known as 'Timed Assay'. The operator pulls the trigger, and then releases it to start the measurement. The internal timer automatically stops the measurement.

When Timed Assay is off, the operator must release the trigger when the 'ping' sounds to stop the measurement. The Results screen refreshes approximately every 2 seconds, and the operator can decide to release the trigger before the 'ping' sounds to stop the measurement immediately.

Timed Assay is very useful for longer measurements and measurements with the bench-top stand. It is also useful to make sure that a batch of measurements all has the same measurement time.

It is possible to set the measurement time to zero. There is no 'ping' sound, and the operator must decide when to stop the measurement. If Timed Assay is off, the operator pulls the trigger to start the measurement, and then releases the trigger to stop the measurement. If Timed Assay is on, the operator pulls and releases the trigger to start the measurement, and then pulls and releases it again to stop the measurement.

5.6 Add the Sample and Batch Names

Follow the *Add A Sample Name* on page 20 steps to name the sample. Make sure that the sample name has a single word, then a space, then a number. For example, 'Steel 1' or 'Alloy 1', but not 'Steel alloy 1'.

Follow the *Add A Sample Name* on page 20 steps again, but tap **Set Average Result Name**. Use the virtual keyboard to type the batch name.

5.7 Choose An Application

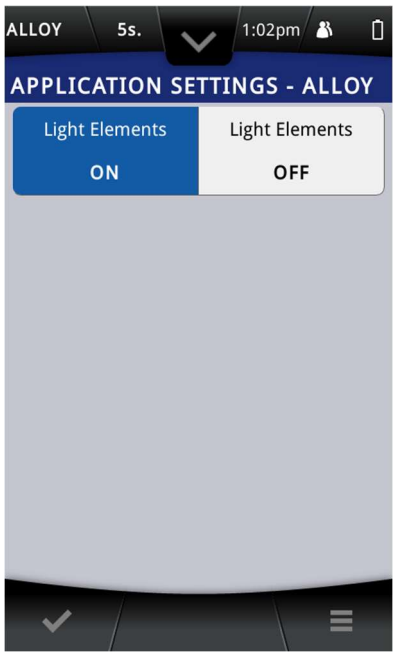
Follow these steps to choose an application.

1. Tap **Menu**, and then tap **Method**.

   The Select Application screen appears.

2. Tap an application to choose it from the list of available applications. If the list of applications is long, press and slide the list to scroll it up or down.
3. To enable or disable Light Elements, tap **Edit** (pencil) next to the application.

   The Light Elements Analysis screen appears.



4. Tap Light Elements Analysis **ON** or **OFF** depending on application.
5. Tap **Done**
6. Tap **Done** to return to the main screen.

5.8 Set The Measurement Time

Note: Timed Assay disabled in some regions.

Follow these steps to set the measurement time.

1. Tap **Menu**, and then tap **Time**.

   The Measurement Time Settings screen appears.

2. Tap **Timed Assay ON** or **Timed Assay OFF** according to how you want to analyze the samples. Make sure that a tick appears in the correct Timed Assay tick box.
3. Tap **Measurement Time**.

   The Set Measurement Time screen appears, with the numeric keypad.
4. Use the numeric keypad to type the measurement time, in seconds, and then tap **Done**.
5. Tap **Done** again to return to the main screen.

5.9 Check the Status Bar

The status bar at the top of the screen shows the Method and Measurement Time. Check that the values shown are correct.

1. Tap the status bar to access the Method and Measurement Time.

   The Status Bar screen appears.

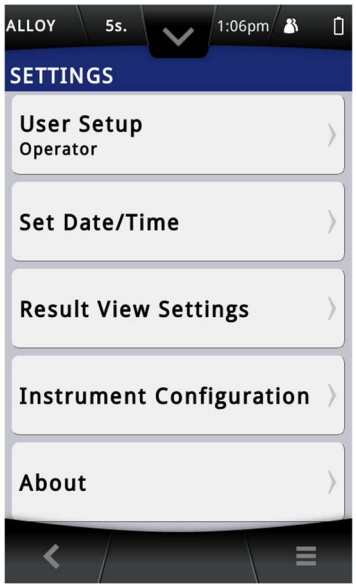
2. Do one of the following:

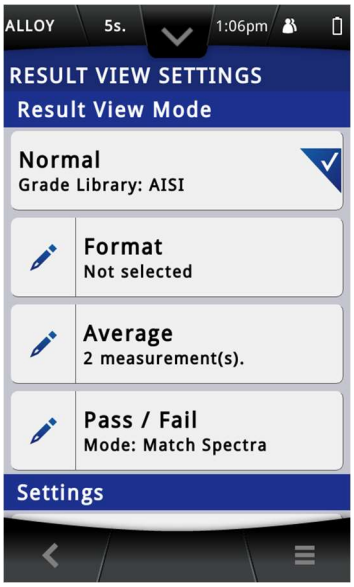
   - If it is necessary to change one or the other, tap **Method** or **Measurement Time** to navigate straight to the applicable settings.
   - Tap the status bar again to close it.

5.10 Set the Batch Size

To setup the results averaging function it is possible to set the number of measurements to average. Follow these steps to set the number of measurements.

1. Tap **Menu**, and then tap **Settings**. The Settings screen appears.





2. Tap Result View Settings.
   The Result View Settings screen appears.
3. Tap **Average**, and make sure that the tick appears in the box.
4. Tap **Edit** (pencil) next to **Average**.

   The Set Number Of Measurements screen appears, with the numeric keypad.

5. Use the numeric keypad to type the number of measurements to average, and then tap Done.
6. Tap **Done** twice again to return to the main screen.

5.11 Take Averaged Measurements

Follow the steps in *Take A Measurement* on page 22, but pull the trigger firmly, then release it. When Timed Assay is on, the internal timer controls the measurement and stops it automatically. When it is complete, the X-MET8000 series displays the result. The display includes both the individual result, and an average of all the results in the batch. Flick the screen to left or right to access other results.

5.12 The Average Results Screen

The Average Results screen has this information.

1. Sample name
2. Grade ID
3. Match level
4. The number of potential matches
5. Average name
6. Average result
7. Elements list
8. Measurement unit
9. Average
10. Statistical measurement error

Sample name
This is defined in *Add The Sample And Batch Names* on page 32.

Grade ID
The grade or trade name for the sample. Tap the arrow on the left or right of the grade ID to display the next or previous possible match.

Match level
'Good Match' or 'Possible Match'.

The number of potential matches
There can be more than one match for the sample. The best match is always shown first.

Average name
This is defined in *Add The Sample And Batch Names* on page 32.

Average result
The result number within the batch and the batch size.

Element
The chemical symbol. If an element has a red background it is because it is outside the required limits for that grade.

% or PPM
The measurement unit, for example % (percentage) or PPM (parts per million).

Sorting by either Elements or Concentration is possible.

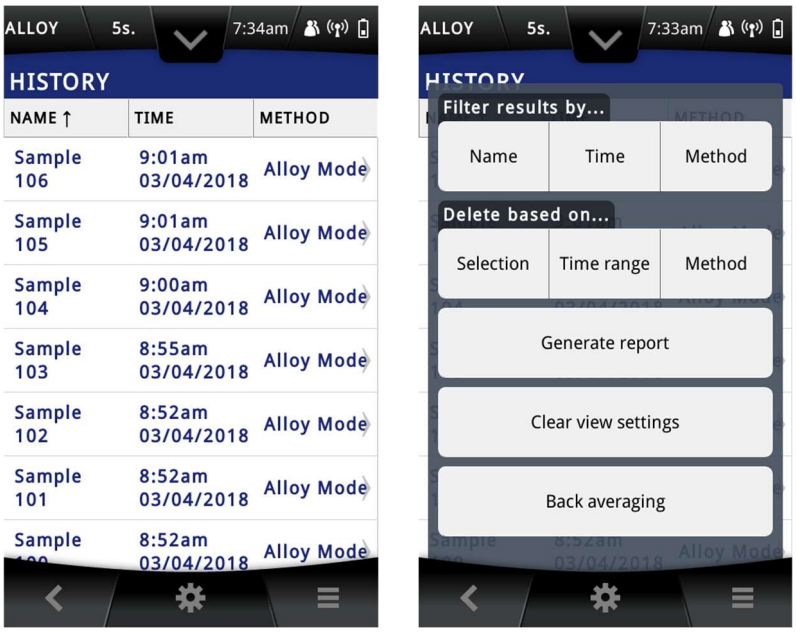
Average
The average concentration of the element across the batch

+/-
This indicates the precision (2 sigma) of the measurement. The lower the +/- value, the greater the precision.

5.13 Search the Results History

The X-MET8000 series has a search facility to find results with a specific name, date, or method. Follow these steps to search and manage the results history.

1. Tap **Menu**, and then tap **History**. The History screen appears.



2. If necessary, the results can be sorted by name, time and method by selecting the sorting buttons on the title bar. The *History* screen appears with sorted results.

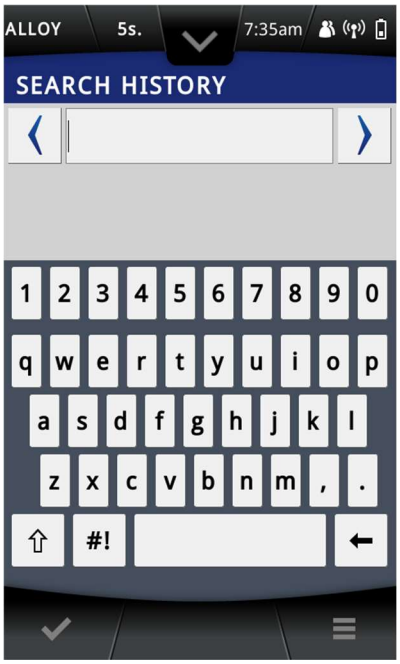
3. Tap **Tools**.

   The History screen Tools menu appears.

4. Tap one of the following **Filter Results By** options.

   - **Name**
   - **Time**
   - **Method**

   The Search History screen appears, with the virtual keyboard when **Name** or **Method** is selected. And Set Date Range screen appears when **Time** is selected.



5. Use the virtual keyboard to type the item to search for, and then tap **Go**. The History screen appears with search results.

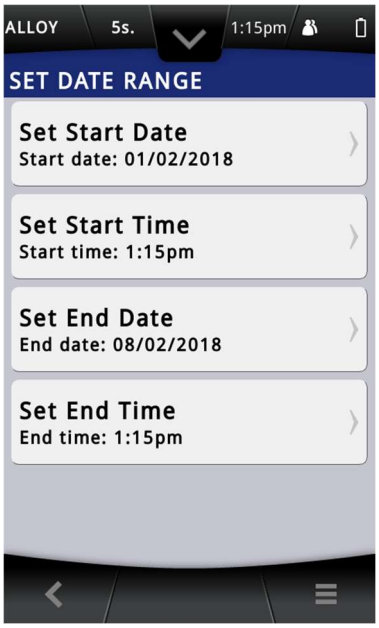
6. Tap a measurement in the list to display the results.

   The History Results screen appears.

7. To restore all the results to the History screen, tap **Tools** and then **Restore**.

   The Tools menu now includes **Filter Results By** option.

8. To search results by time , tap: **Tools** > **Filter Results By** > **Time**
   Set Date Range screen appears.



9. Tap **Set Start Date** or **Set End Date**

   The Select Date screen appears

10. Tap an arrow on the left or right of the month to scroll to the correct month in Select Date screen.

11. Tap the correct date in the month, and then tap **Done** to return to the Set Date Range screen.

12. Tap **Set Start** Time or **Set End Time**

    The Set Time screen appears, with the numeric keypad.

13. Use the numeric keypad to type the correct hour, or use the up or down arrows on the right of the time to increase or decrease the hour.

14. Slide over the minutes to select them, and type the minutes with the numeric keypad or arrows.

15. Tap **Done** twice to return to the History screen. The History screen appears with filtered results.

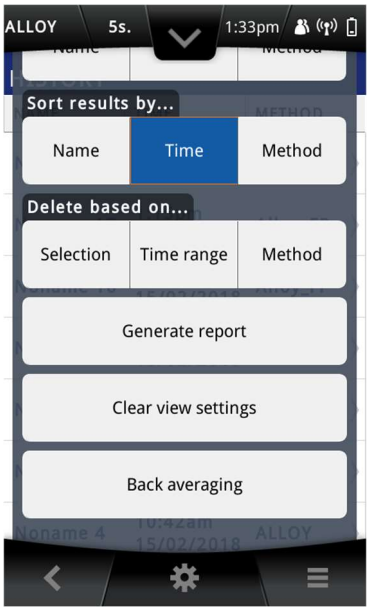
16. If necessary, the results can be sorted by name, time and method by selecting the sorting buttons on the title bar. The *History* screen appears with sorted results.

5.14 Back Averaging From History Results

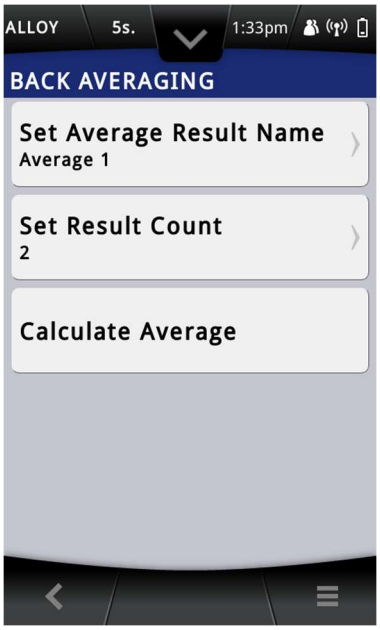
The X-MET8000 Series has an option to average back the latest results with the similar result formats from the results history tools menu. Note that only one format can be used at a time.

Follow these steps to the back average in the results history.

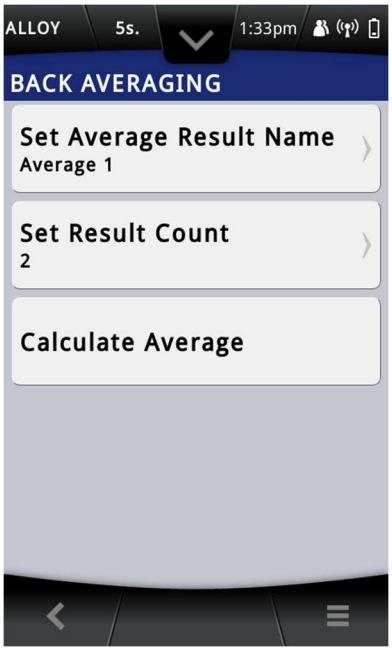
1. Tap **Menu**, and then tap **History**.
   The History screen appears.



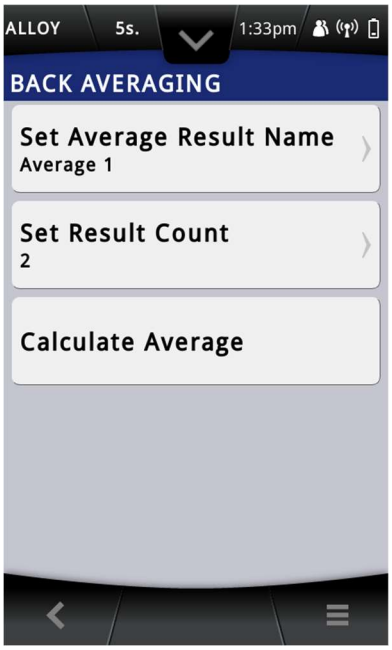
2. Tap Tools.
   The History screen Tools menu appears.
3. Select Back Averaging.
   The back averaging screen appears.

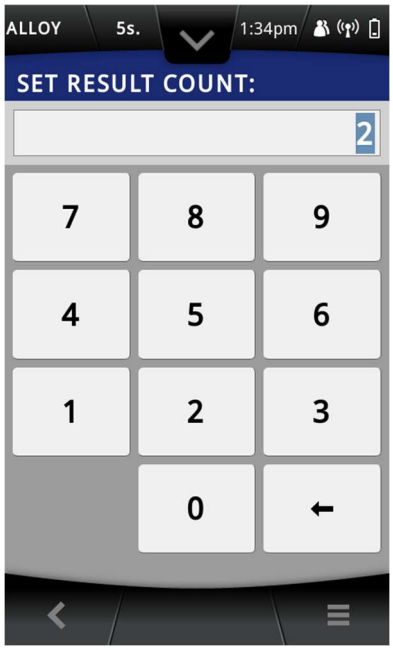


4. Select Set Average Result Name.
   The Set Average Result Name screen appears.

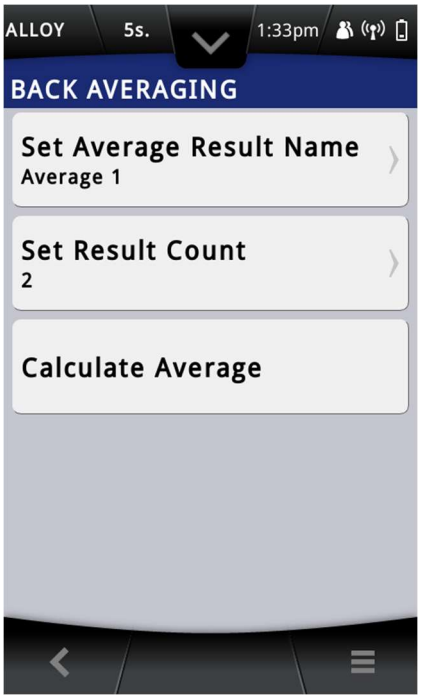


5. Enter a name to the average result name field and then select **Done** to return to Back Averaging screen.





6. Select Set result count.
   The Set Result Count screen appears.
7. Enter the number of latest results which need to be averaged and then select **Done** to return to Back Averaging screen.



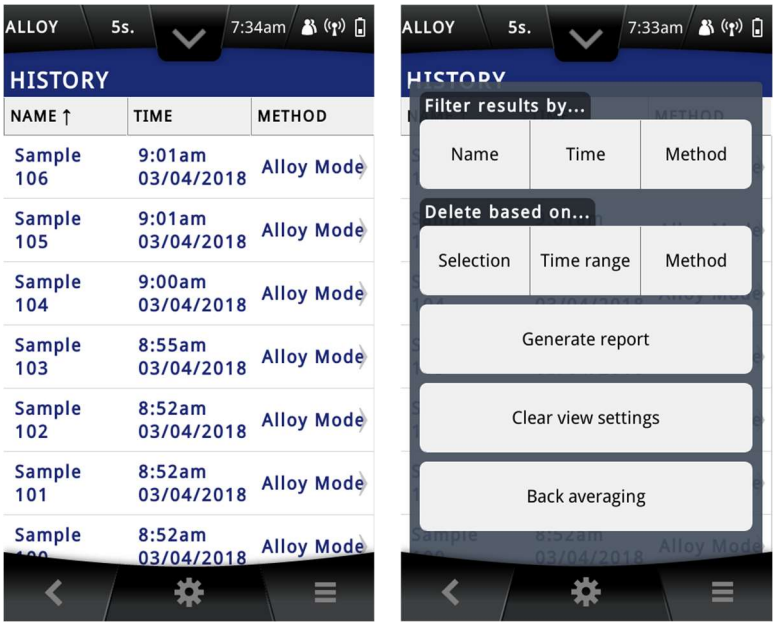
8. Select Calculate Average and then select **Done** to return to results history screen on the top of the list.
   The average result is displayed in the history results.

5.15 Delete Results in the Results History

The X-MET8000 series has a delete facility to delete results with a selection, time range, or method. Follow these steps to delete and manage the results history.

1. Tap **Menu**, and then tap **History**.

   The History screen appears.



2. Tap **Tools** and then tap one of the following three **Delete based on** options.

   - **Selection**

     When **Selection** is selected, the Delete Results screen appears. Select the results to be deleted by tapping on each result row or by selecting one of the Tools menu options **Filter Results By**, **Mark All**, **Mark between selected rows**.

   - **Time range**

     When **Time range** is selected, the Set Date Range screen appears. Enter the values into **Set Start Date**, **Set End Date**, **Set Start Time** and **Set End Time**

   - **Method**

     When **Method** is selected, the **Delete based on** screen appears. Tap on the applicable method to delete that method's results.

     Tap **Clear View Settings** to remove any previous selections.

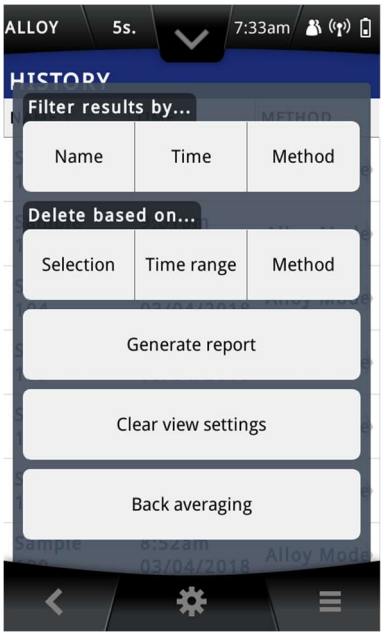
3. Tap **Done** after selecting the results to be deleted. A **Warning Message** appears.
4. Do one of the following:
   - Tap **OK** to delete the measurement.
   - Tap **Cancel** to not delete the measurement. The History screen appears.
5. Tap **Done** to return to the main screen.

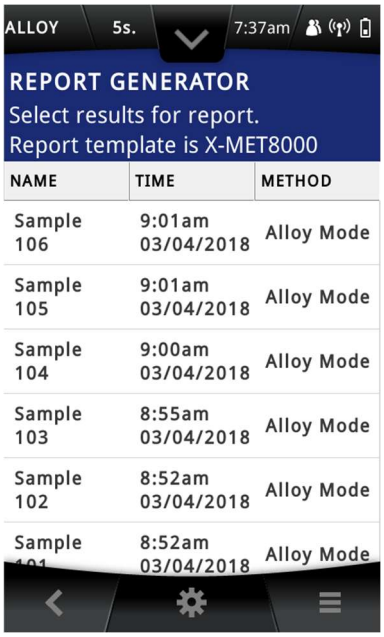
5.16 Generate a Report to USB Memory Device

Follow the below steps to generate report to USB memory device.

1. Open the connector cover underneath the display to access the external connections. Plug a USB memory device into the USB A connector.

2. Tap **Menu**, and then tap **History**. The History screen appears.





3. Tap **Tools** to select **Generate Report** option.

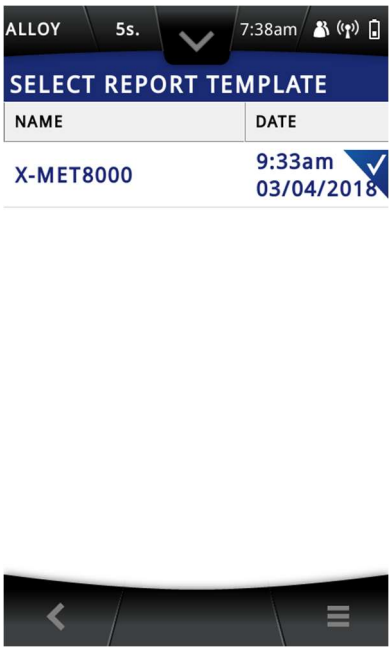
   The History screen Tools menu appears.

4. Tap **Generate Report**.

   The Report Generator screen appears.

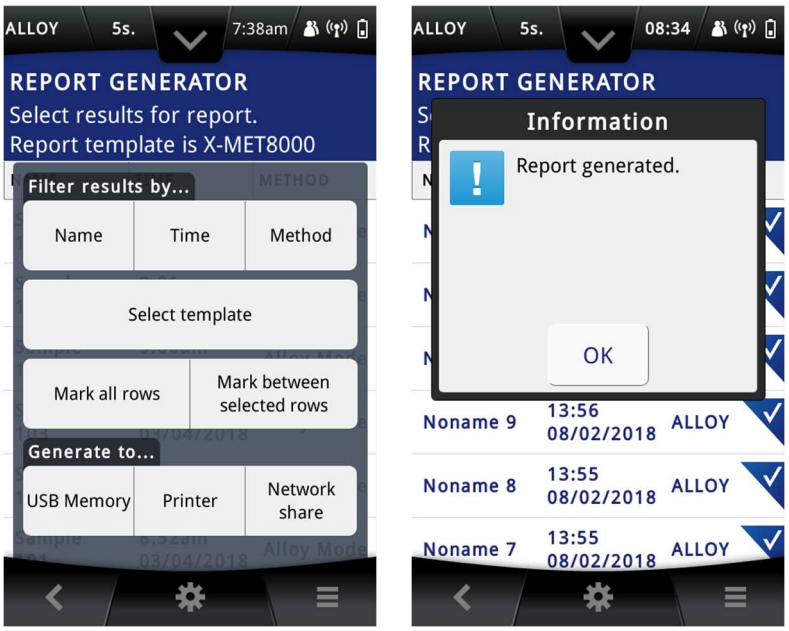
5. Tap **Tools** and then tap on **Select Template** to select the results template.

   The Select Report Template screen appears with the default report template list and with the user-defined templates created using the Web GUI.



6. Tap on the applicable template and then tap **Done** to return to the Report Generator screen.
7. Select the measurement results for the report by tapping on each result row on the Report Generator screen or tap **Tools** and select results using following options:

   - Filter by
   - Mark All
   - Mark between selected rows

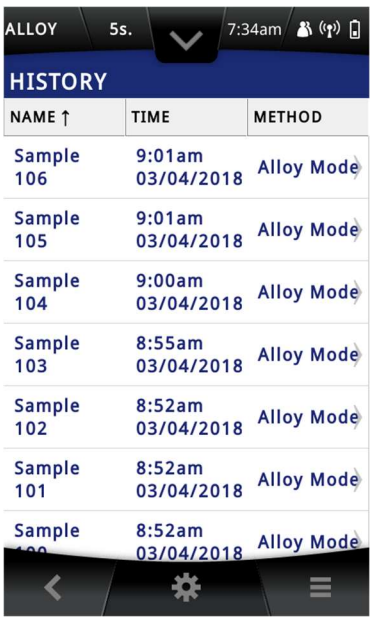


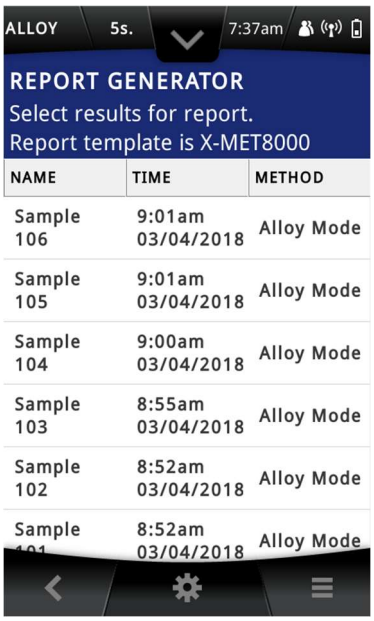
8. Tap: **Tools** > **USB Memory** after selecting the results.
   The device starts generating report and saving it onto the USB memory device. Once completed, Report Generator screen appears.
9. Tap **Done** twice to return to the main screen.

5.17 Generate a Report to a Printer

The Supervisor must configure a network printer in the device in order to generate reports directly on a printer, and must connect the device to the same Wi-Fi network as the one to which the network printer is connected. Please refer to the Supervisor Guide to set this up. Follow the steps below to generate a report to a printer.

1. Tap **Menu**, and then tap **History**. The History screen appears.





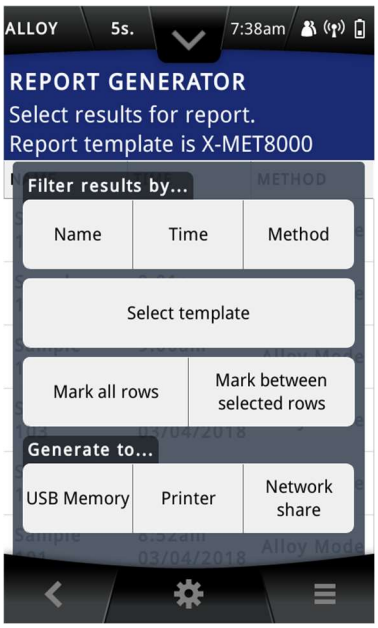
2. If necessary, the results can be sorted by name, time and method by selecting the sorting buttons on the title bar. The History screen appears with sorted results.

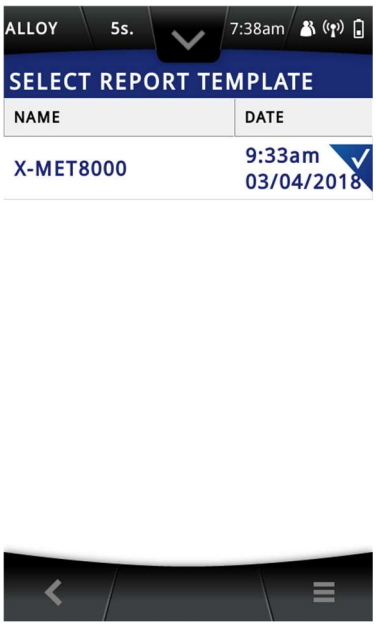
3. Tap: **Tools** > **Generate Report**

   The Report Generator screen appears.

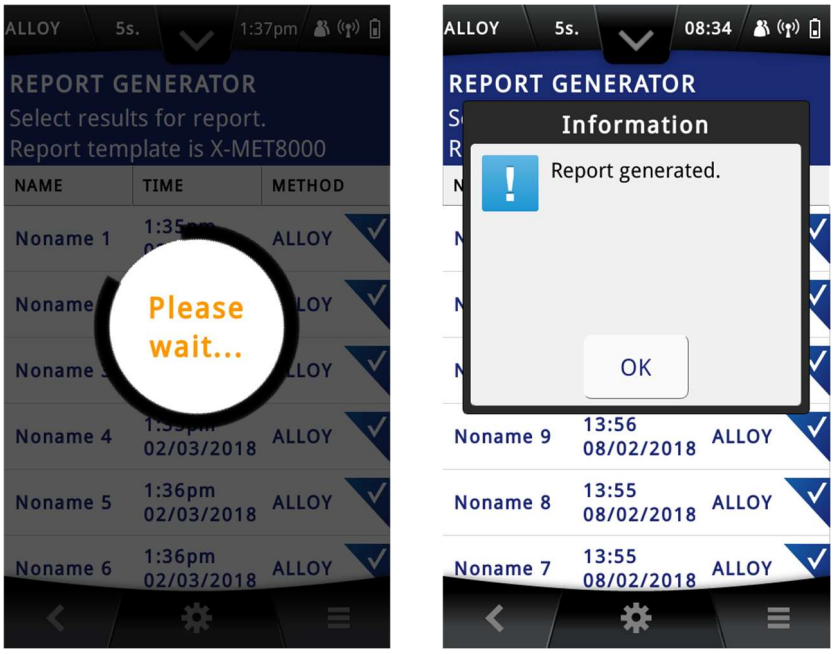
4. Tap: **Tools** > **Select Template**

   The Select Report Template screen appears with the default report template list and also user defined templates which were created in the Web GUI.





5. Tap on the applicable template and then tap **Done** to return to the Report Generator screen.
6. Select the measurement results for the report by tapping on each result row in Report Generator screen or tap **Tools** and select results using following options
    - Filter by
    - Mark All
    - Mark between selected rows
7. Tap: **Tools** > **Printer** after selecting results.
   The device starts generating the report and sending it to the printer. Once the report is generated to the printer, an Information dialog box appears.



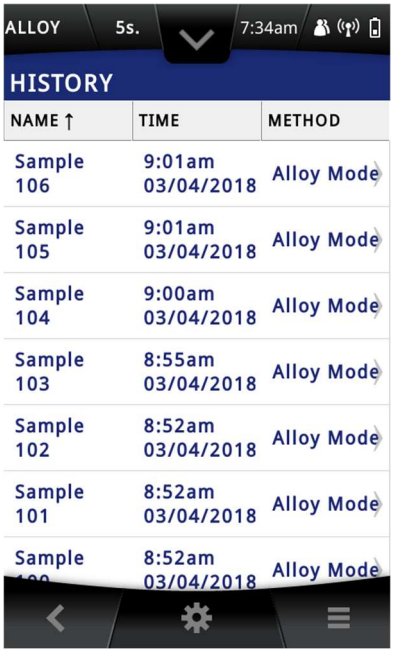
8. Tap **OK**.
   The Report Generator screen appears.
9. Tap **Done** twice to return to the main screen.

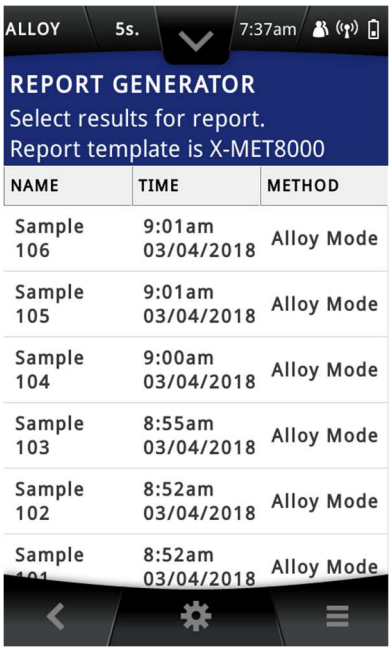
5.18 Generate a Report to a Network Share

Note: Network share functionality might not be available with all Windows versions

The Supervisor must configure the network share in order to save reports on the selected network, and must connect the device to the same Wi-Fi network as the one to which the server hosting the network share is connected. Please refer to the Supervisor Guide to set this up. Follow the steps below to generate a report to a Network Share.

1. Tap **Menu**, and then tap **History**. The History screen appears.





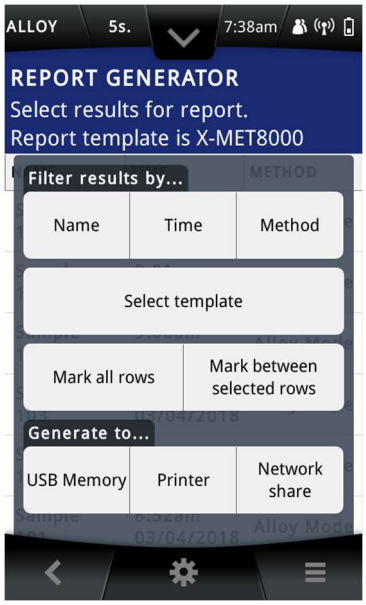
2. If necessary, the results can be sorted by name, time and method by selecting the sorting buttons on the title bar. The History screen appears with sorted results.

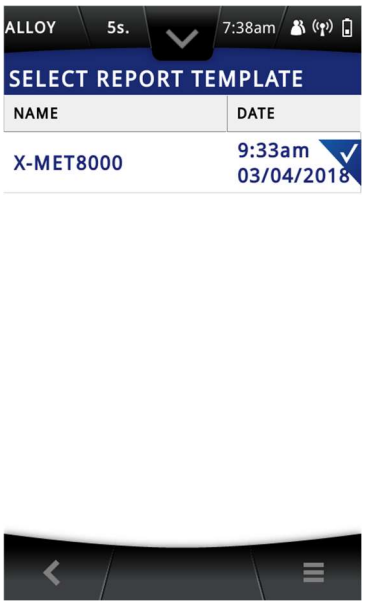
3. Tap: **Tools** > **Generate Report**

   The Report Generator screen appears.

4. Tap: **Tools** > **Select Template**

   The Select Report Template screen appears with the list of the default report templates and user defined templates which were created in the Web GUI.

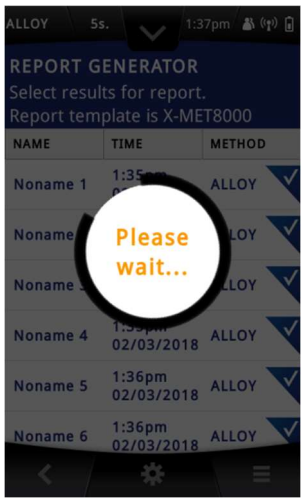


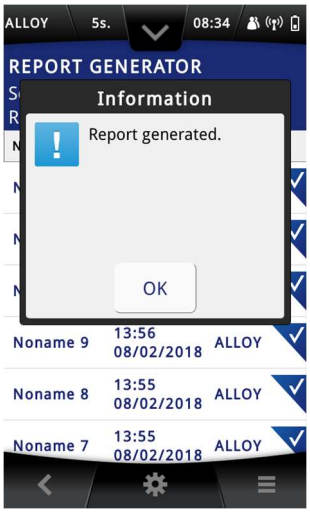


5. Tap on the applicable template and then tap **Done** to return to the Report Generator screen.
6. Select the measurement results for the report by tapping on each result row in the Report Generator screen or tap **Tools** and select the results using the following options.

   - Filter by
   - Mark All
   - Mark between selected rows

7. Tap: **Tools** > **Network Share** after selecting the results.
   The device starts generating the report to the network share. Once completed, the Report Generator screen appears.





8. Tap **OK** to return to the main screen.

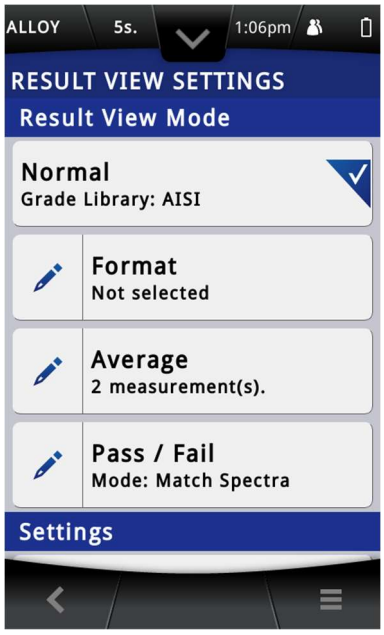
6 Pass/Fail Measurements

Pass/Fail measurement compares either the measured spectrum to the selected reference spectrum stored in the device or the selected grade from the grade library. If the result is similar to the stored spectrum or the grade in the grade library then a Pass message is displayed. If not a Fail message is displayed.

6.1 Set Pass/Fail Mode to Match Grade

Follow the steps below to set **Pass/Fail** mode to match a grade.

1. Navigate: **Menu** > **Settings** > **Result View Settings**.
   The Result View Settings screen appears.



2. Tap **Edit** (pencil) next to **Pass/Fail**.
   The Pass/Fail Mode Settings screen appears.

3. Select the **Match Grade** and tap **Edit** (pencil) next to the **Match Grade**
   The Grade Match Settings screen appears.

4. Tap on the **Select Grade**.
   The Grade Library screen appears.
5. Select the applicable grade and then tap **Done** to return to the Grade Match Settings screen.
6. Tap **Set Match Limit**.
   The Set Match Limit screen appears.

7. Use the numeric keypad to type the number and then tap **Done** to return to the Grade Match Settings screen.

   The Grade match limit use same scale limits as the **Good Match Limit** and **Possible Match Limit**
   in the normal grade calculation.

   Use this table as a guide to adjust the Match limit settings.

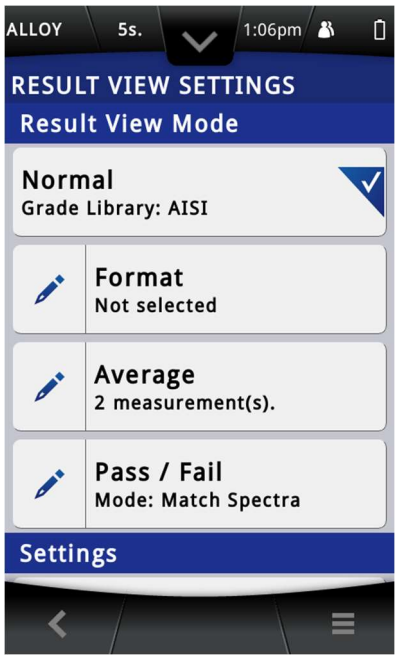
Value	Typical Setting	Easier to match	Harder to match
Good match	0.2	Increase	Decrease
Possible match	1.0	Increase	Decrease

8. Tap **Done** four times to return to the main screen

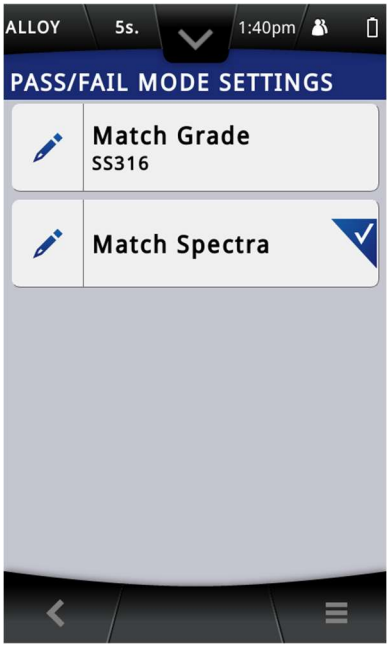
6.2 Set Pass/Fail Mode to Match Spectra

Follow the below steps to set **Pass/Fail** mode to Match Spectra.

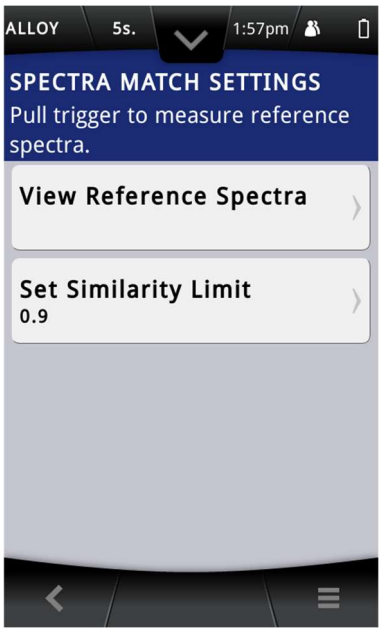
1. Navigate: **Menu** > **Settings** > **Result View Settings**.
   The Result View Settings screen appears.

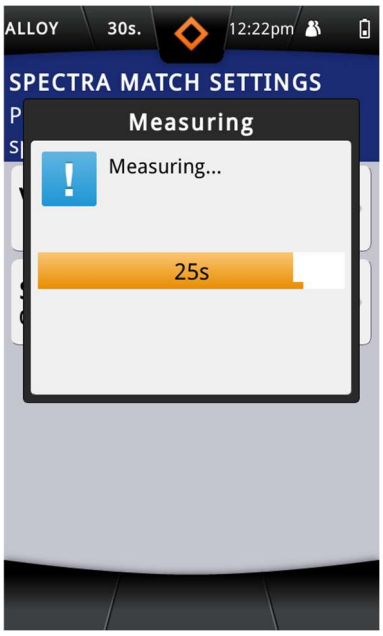


2. Tap **Edit** (pencil) next to **Pass/Fail**.
   The Pass/Fail Mode Settings screen appears.



3. Select the **Match Spectra** and tap **Edit** (pencil) next to the **Match Spectra**
   The Spectra Match Settings screen appears.





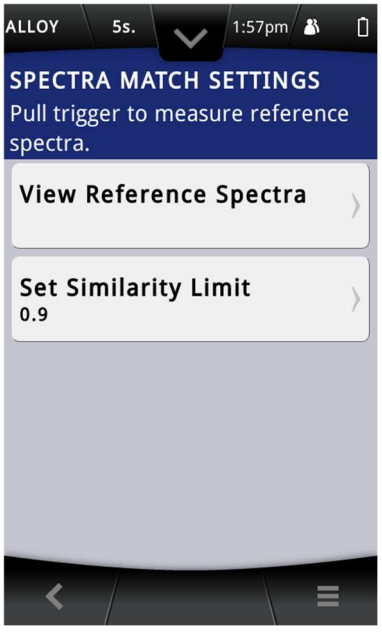
4. Pull the trigger to measure new reference spectra of

   the sample. A Measuring dialog box appears.

   The Spectra Match Settings screen appears at the end of the measurement.

5. Select **Set Similarity Limit** to set the similarity limit. The Set Similarity Limit screen appears.

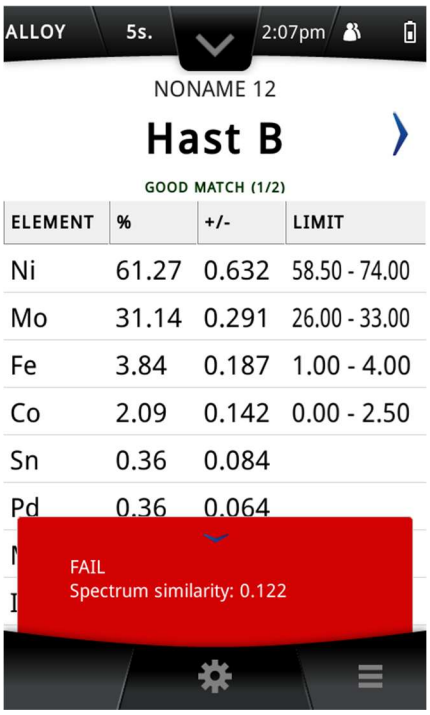
6. Use the numeric keypad to type the number and then tap Done to return to Set Similarity Limit screen. The Set Similarity Limit value range must be greater than 0 and less than 1.0. A smaller Similarity Limit value allows for an easier match, the closer to 1 the Similarity Limit value is set the harder it is to match the reference spectra. To perfectly match the reference spectra, the similarity limit value must be 0.998. A "Pass" result is displayed when the spectrum similarity value is greater or equal to the limit set. A "Fail" result is displayed when the spectrum similarity value is lower than the set limit.



7. Tap Done 4 times to return to the main screen.

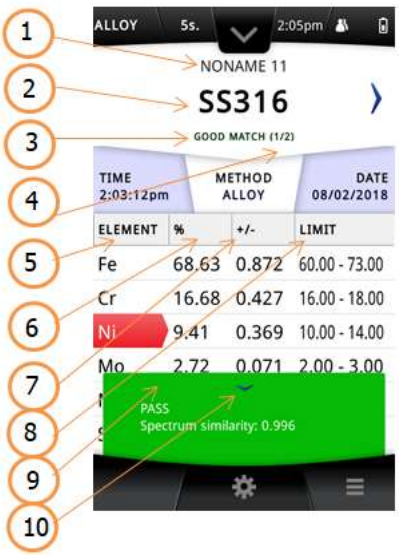
6.3 Take Pass/Fail Measurements

Follow the steps in *Take A Measurement* on page 22. When the measurement is complete, the XI- MET8000 series displays the result. The display includes measurement results and either Pass or Fail result at the bottom of the result screen.



6.4 Pass/Fail Result Screen

The Pass/Fail result screen has this information.



1. Sample name
2. Grade ID
3. Match level
4. The number of potential matches
5. Elements list
6. Measurement unit
7. Statistical measurement error
8. Grade specification limits
9. Pass or Fail result
10. Hide Pass or Fail result tab

Sample name

This is defined in *Add The Sample And Batch Names* on page 32.

Grade ID

The grade or trade name for the sample. Tap the arrow on the left or right of the grade ID to display the next or previous possible match.

Match level

'Good Match' or 'Possible Match'.

The number of potential matches

There can be more than one match for the sample. The best match is always shown first.

Element

The chemical symbol. If an element has a red background it is because it is outside the required limits for that grade.

% or PPM

The measurement unit, for example % (percentage) or PPM (parts per million).

Sorting by either Elements or Concentration is possible.

+/-

This indicates the precision (2 sigma) of the measurement. The lower the +/- value, the greater the precision.

Limit

Required limit of the elements for that grade.

Pass or Fail Result

When the measured result grade matches with the selected grade, Pass Grade Match value <1.0 is displayed. When the measured result grade does not match with selected grade, Fail Grade match >1.0 is displayed.

Hide Pass or Fail result tab

Tap on the downwards pointing arrow to hide the pass/fail tab.

To show the hidden pass/fail tab, tap on the upwards pointing arrow

7 About Fixed Elements

Elements can be fixed to the result screen; they will always be present regardless of their presence in the measured sample.

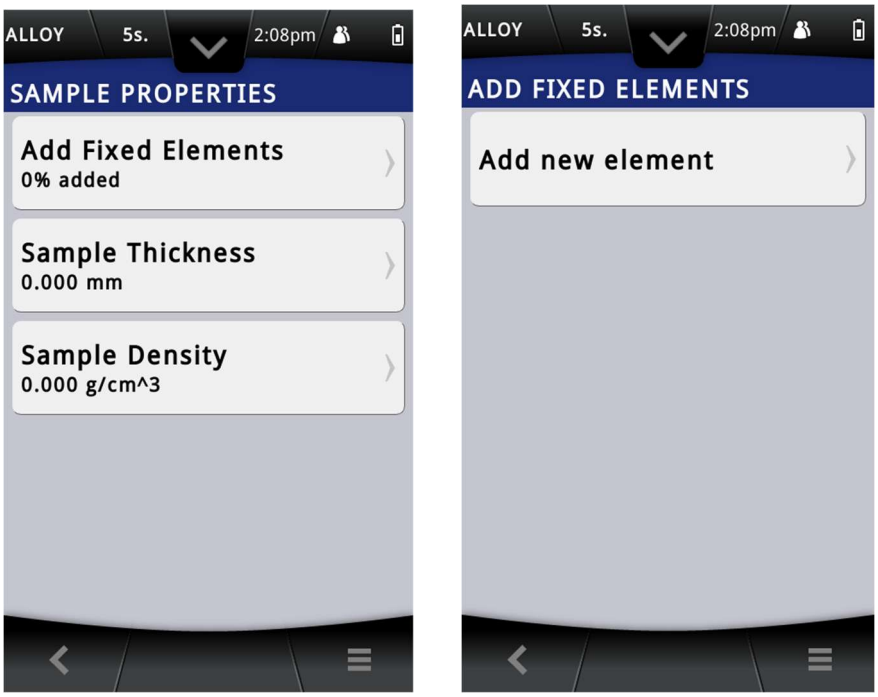
It is possible to add, delete, modify, enable and disable fixed elements depending on application.

7.1 Add Fixed Elements

Add fixed elements to sample properties.

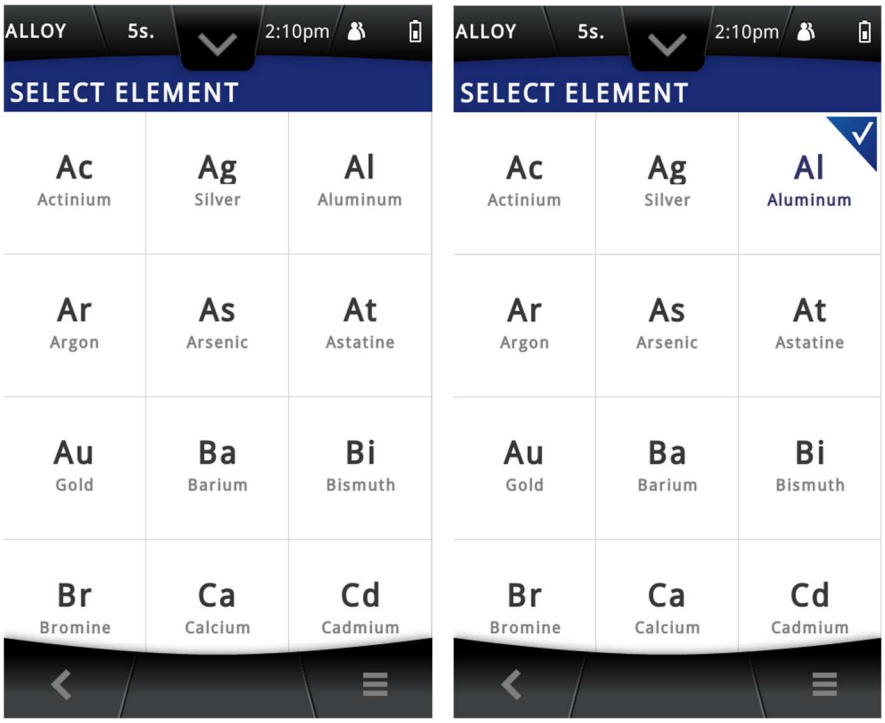
1. Navigate: **Menu** > **Sample Name** > **Set Sample Properties** then tap **Add Fixed Elements**

   The Add Fixed Elements screen appears.



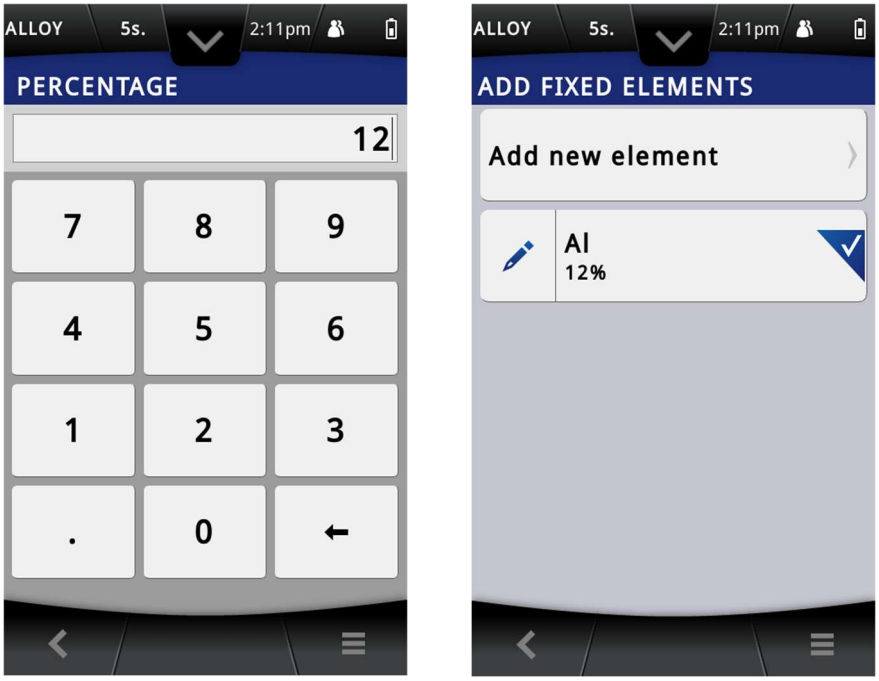
2. Tap **Add new element**.

   The Select Element screen appears.



3. Tap on the element to include in fixed elements and then tap **Done**

4. Use the numeric keypad to enter the percentage, and then tap **Done** to return to the Add Fixed Elements screen.



5. Tap **Done** to return to the Sample Properties screen.
6. Tap **Done** twice to return to the main screen.

7.2 Modify or Delete Fixed Elements

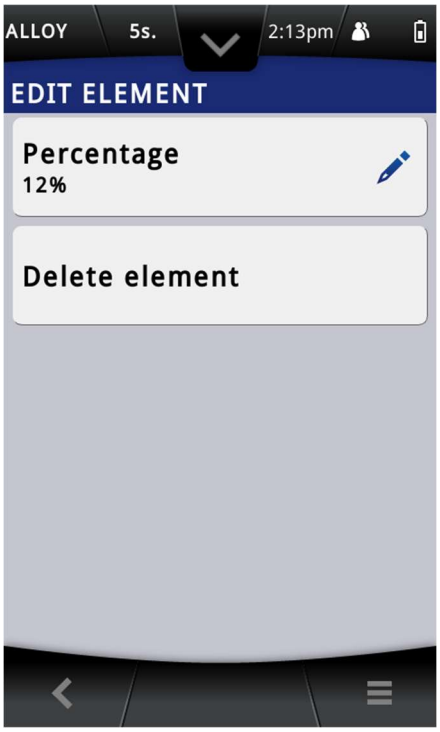
Modify or Delete existing fixed elements.

Fixed elements can be enabled and disabled by taping on the listed element; active elements have a checkmark next to them. Disabled elements will not be present in the result screen.

1. Navigate: **Menu** > **Sample Name** > **Set Sample Properties** > **Add Fixed Elements**.

   The Add Fixed Elements screen appears.

2. Tap on the pencil next to the element to modify or delete it. The Edit Element screen appears.



3. Do one of the following:
   - Tap **Percentage** to modify the element percentage.
   - Tap **Delete Element** and then tap **OK** to delete the element from the fixed elements list.
4. Edit the percentage using the numeric keypad, and then tap **Done** to return to the Add Fixed Elements screen.

5. Tap **Done** to return to the Sample Properties screen.
6. Tap **Done** twice to return to the main screen.

8 The X-MET8000 Series User Guide and USB Drive

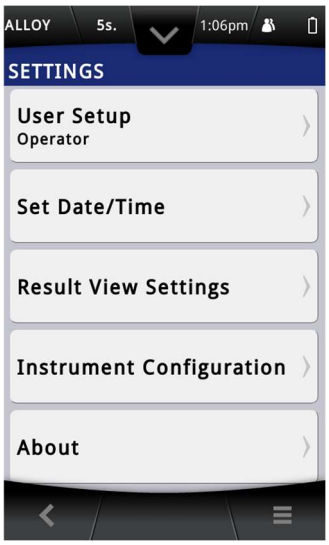
The X-MET8000 Series Supervisor's Manual is stored within the X-MET8000 series, and has more in depth information on how to use the X-MET8000 series in some specific situations. It shows how a supervisor can prepare the X-MET8000 series for an operator to use.

The USB Driver is stored within the X-MET8000 series, and has detailed information about how to install a USB Driver on different Windows versions.

8.1 Save the X-MET8000 Series User Guide and USB Driver

Follow these steps to access the X-MET8000 Series User Guide, USB Driver and save it to a USB memory device.

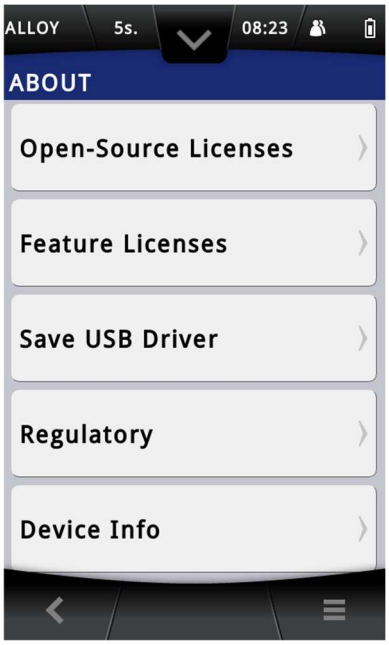
1. Open the connector cover underneath the display to access the external connections.

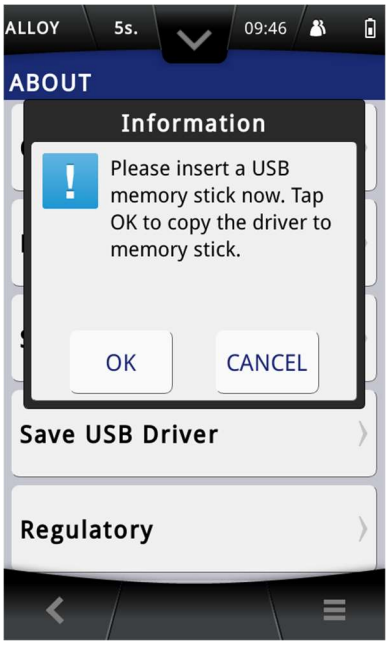


2. Plug a USB memory device into the USB A connector.
3. Tap **Menu**, and then tap **Settings**. The Settings screen appears.

4. Tap **About**.

   The About screen appears.





5. Tap **Save User Manual**.

   An Information dialog box appears.

6. Tap **OK** to save the X-MET8000 Series User Guide.
7. Tap **Save USB Driver** to save the USB driver and its installation instructions to the USB memory device.
8. Tap **Done** to return to the Settings screen.
9. Tap **Done** again to return to the main screen.
10. Remove the USB memory device.

9 Operation with a PC

It is possible to operate the X-MET8000 series with a PC to do the following:

- Create a report for a series of results
- Do a test measurement
- Access the X-MET8000 Series User Guide

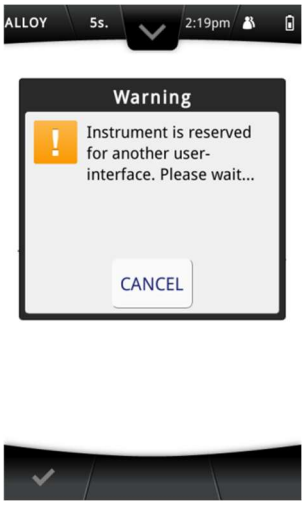
Both supervisors and operators can operate the X-MET8000 series with a PC. Each uses their own login code. There is not a separate login code for PC operation.

Operations with the PC use an Internet browser. The standard URL to connect to the X-MET8000 series is *http://10.0.0.1/*. Please contact the local Hitachi High-Tech Analytical Science representative if it is necessary to change the URL.

9.1 Connect to a PC and Login

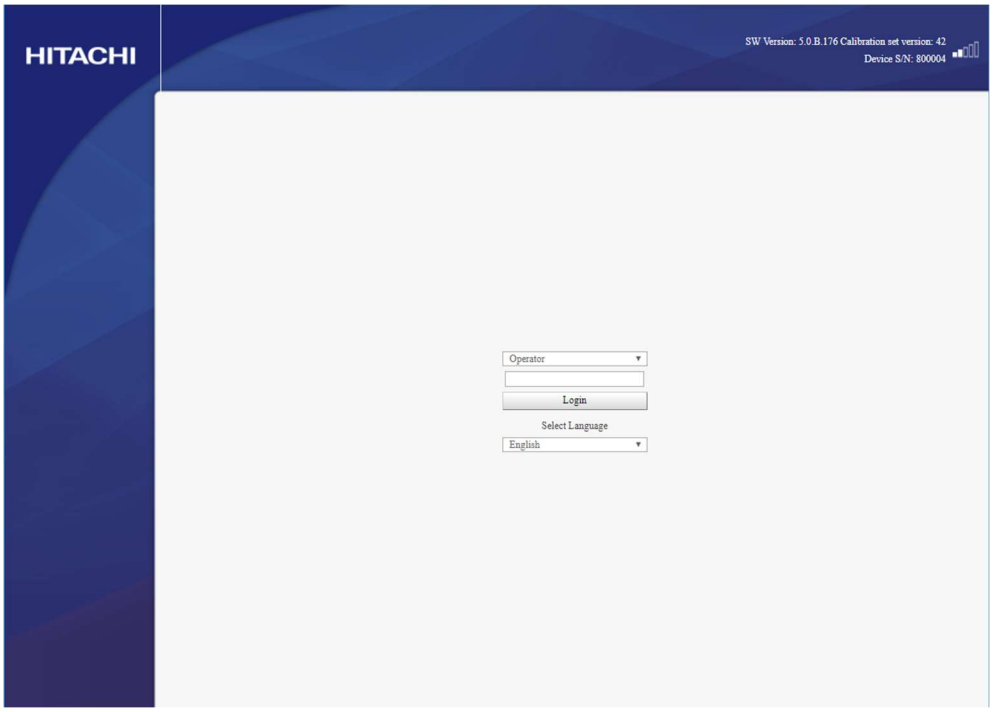
Follow these steps to connect the X-MET8000 series to a PC and then login.

1. Open the connector cover underneath the display to access the external connections.



2. Use the USB cable to connect the X-MET8000 series to a PC.
   - Connect the smaller USB Micro-B connector to the X-MET8000 series.
   - Connect the larger USB A connector to the PC. Make sure that the connections are correct.

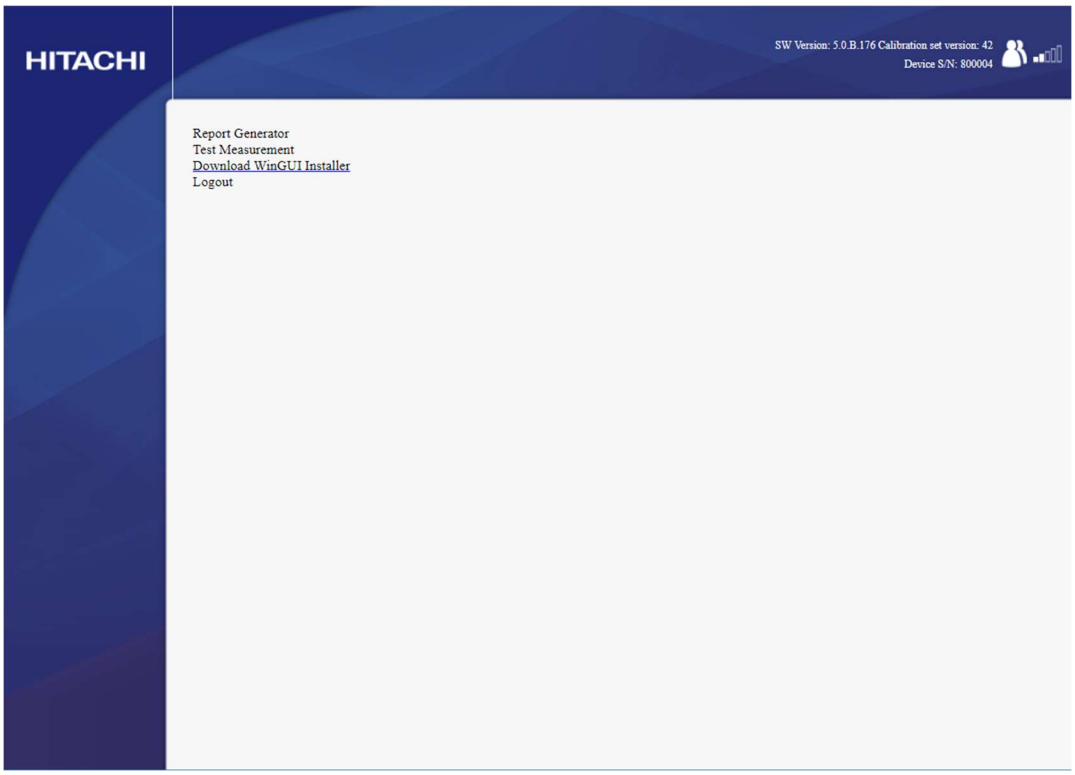
3. Open the Internet browser on the PC, and type the URL: *http://10.0.0.1/*. The PC Login screen appears.



4. Select the language from the drop down list and choose the correct user from the **user** drop down list, type the login code into the text box, and click **Login**.

   The PC main screen appears.

   The X-MET8000 series shows the Safety screen with a Warning dialog box.



9.2 About The Report Generator

The X-MET8000 series has a comprehensive report generator. It is possible to create templates to use for different reports. The supervisor can create templates for an operator to use. The report generator creates a PDF file or a CSV file. A CSV file is applicable for a spreadsheet and not available in operator level.

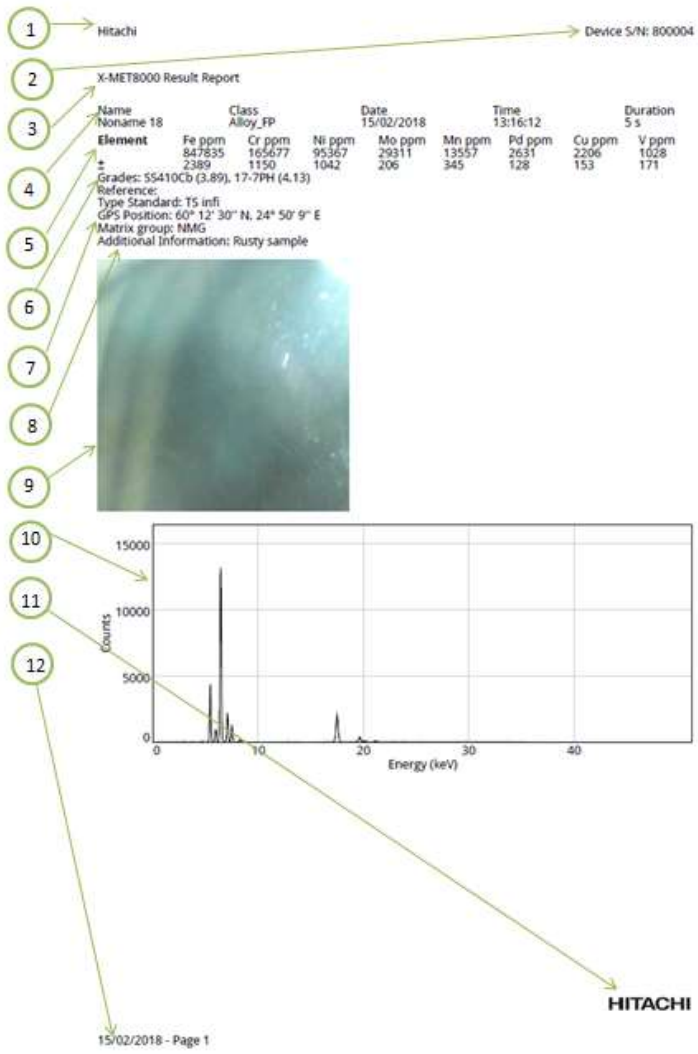
The template can include company information with the logo, a report header, the date and page number, and the X-MET8000 series serial number, as applicable. To create a report, it is necessary to have a report template. The logo file must be less than 1024kB and one of the formats: .jpg, .png or .bmp.

The report can include one or more results. Each result can include the operator's name, the grade and element concentration and standard deviation. In the PDF report, it is also possible to include the measurement spectra, as well as the sample picture (if the camera option is fitted).

Once a supervisor creates a template, it is possible to download it to the PC, and then upload it to other X-MET8000 series.

9.3 A Custom Report

This is a typical custom report. The report template provides full control of all these aspects of the report.



1. Margin: company information
2. Margin: serial number
3. Report header
4. Sample information
5. Element: concentration and +/-
6. Grade
7. GPS Position
8. Additional Information
9. Camera Image
10. Spectra
11. Margin: logo
12. Margin: date and page number

Margins

The margins can include:

- Company information
- Company logo
- The device serial number
- The date and page number.

It is possible to place these items in any of the four margins.

Report header

The report can start with an introduction.

Sample information

Sample information includes:

- The sample name
- The mode or method
- The date and time
- The measurement time.

Element information

It is necessary to select the elements to appear in the report. Chosen elements that are not present in the sample do not appear in the report unless **All The Elements From The Result** option is selected.
Element information can include the concentration and +/- value.

Grade

The report can included in the PDF report. Matrix correction information can be included in the PDF report.

Pass/Fail

Pass/Fail result can be included in PDF and CSV reports.

Type standards

Type standards information from the results can be displayed in the PDF reports.

GPS Position

The report can include the GPS information.

Additional Information

The report can include the additional information for the sample.

Camera Image

The report can include the camera image of the sample.

Spectra

The report can include the spectra for the sample.

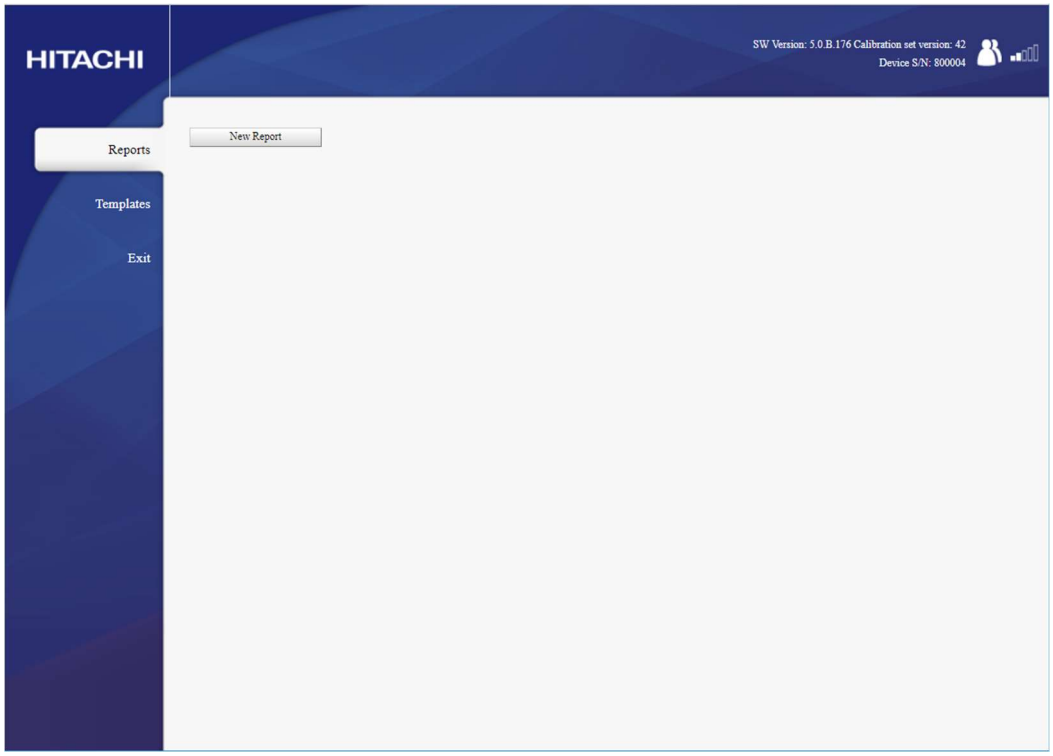
Operator information

The report can include information about the operator.

9.4 Create a Report

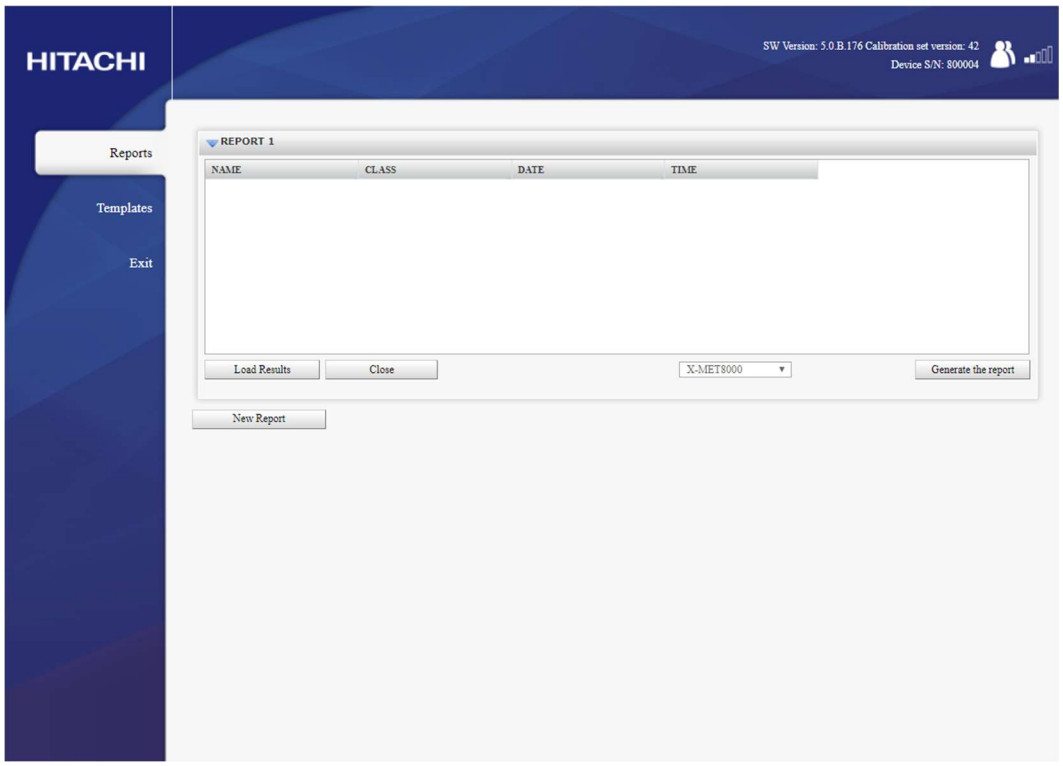
It is necessary to have a report template to create a report. Follow these steps to create a report.

1. From the PC main screen, click **Report Generator**. The Reports screen appears.



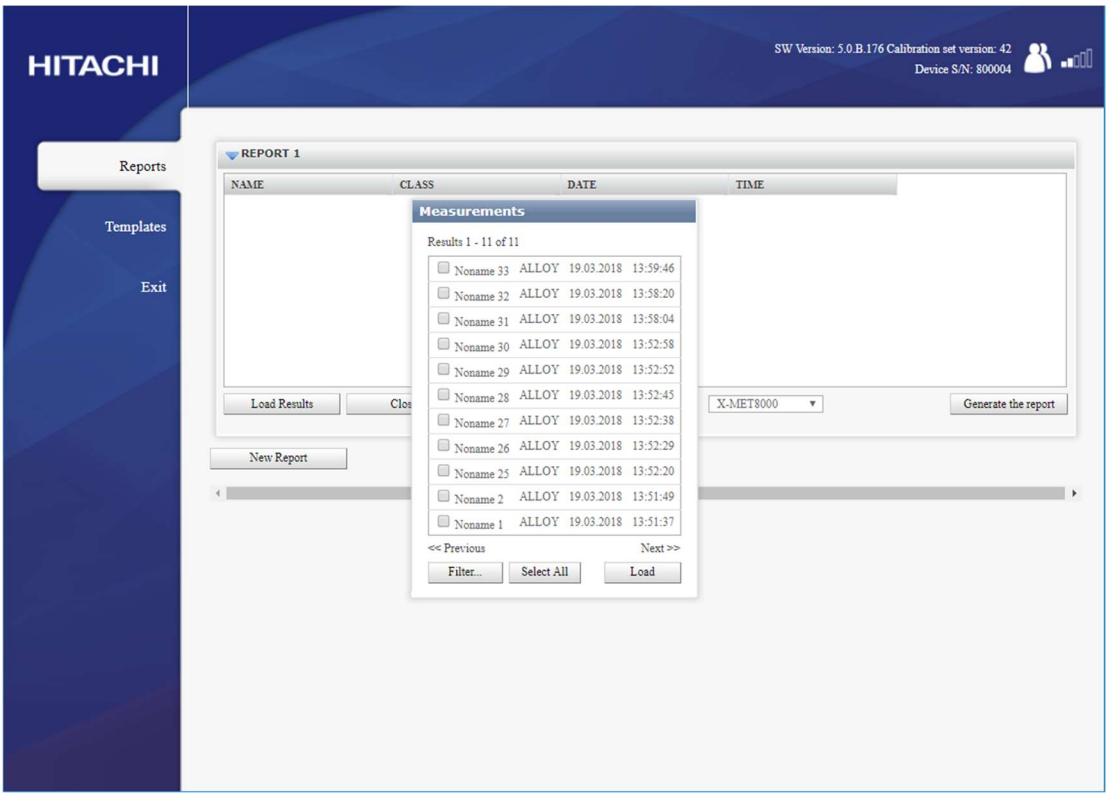
2. Click **New Report**.

   The Reports screen has a new report.



3. Click **Load Results**.

   The Measurements dialog box appears.



4. If required, click **Filter**

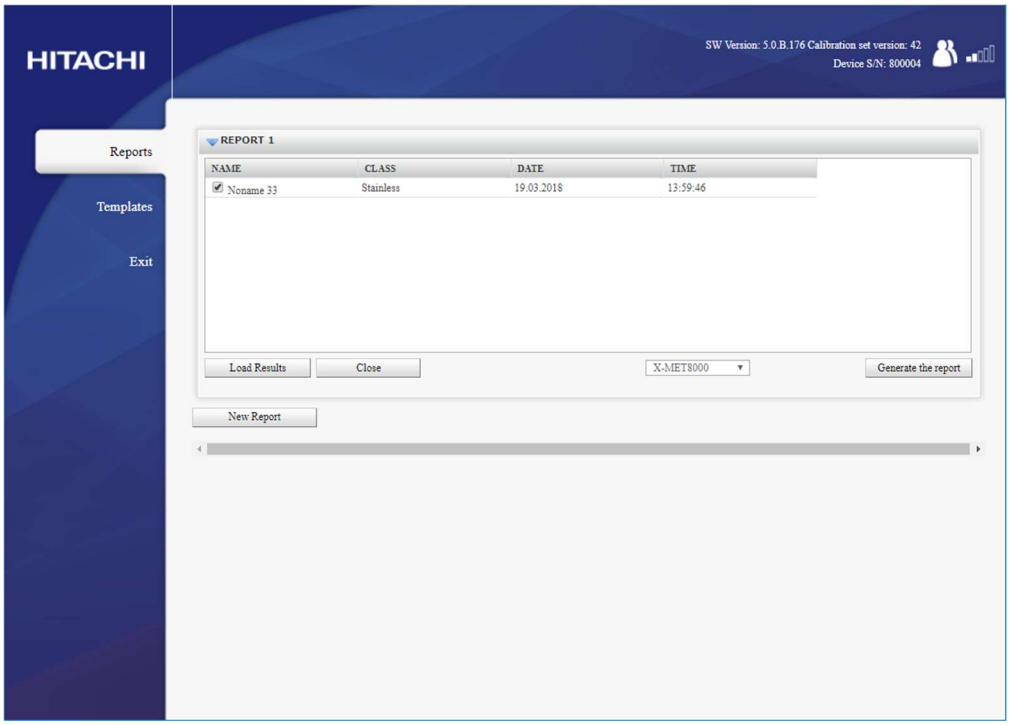
   The Filter by dialog box appears.

5. To use the filter, do one or more of the following, as required:

   - Click the **Start Date** tick box, and use the calendar to choose a date.
   - Click the **End Date** tick box, and use the calendar to choose a date.
   - Click the **Sample Name** tick box, and type all or part of the sample name.
   - Click the **Method** tick box, and type all or part of the Method name.

6. Click **OK** to return to the Measurements dialog box, with filtered results.

7. If required click **Select All** to select all the results for the report, and then click **Load**. The Reports screen shows the result or results for the report.



8. Select the required template for the report from the **Report Template** drop down list.
9. Click **Download** to download a PDF file. The File Download dialog box appears.
10. Click **Save** to save the file.

    The Zip file contains the report PDF file.
11. Click **Exit** to return to the PC main screen.

10 Wireless Connectivity

The X-MET8000 series can connect to Wi-Fi networks in Managed and Ad hoc mode. A typical use for Wi-Fi is to connect to a PC. This can allow more than one PC to connect to the X-MET8000 series.

The Wi-Fi connection can be used to transfer reports directly to a shared network resource and for operation of the X-MET8000 series through a PC or tablet device using the WEB-interface or VNC. The Wi-Fi connection can also be used to control the X-MET8000 series remotely using the XAPI protocol.

In a managed network the X-MET8000 series can write reports to shared network folders and print reports to network printers. In addition the X-MET8000 series can be controlled from any computer on the local network providing that the IP address for the X-MET8000 series is known.

This guide will explain in detail how to connect the X-MET8000 series to a Wi-Fi network, enable shared folders for file transfer and connect to the X-MET8000 series using a Wi-Fi enabled computer or tablet.

Through an ad hoc network connection it is possible to remotely access and control the X-MET8000 series using an WEB-browser or VNC and from the X-MET8000 series use shared folders and printers physically connected to the computer providing the ad hoc network.

Note that shared network resources may not work in ad hoc mode unless the resources are located on the device providing the ad hoc network.

The X-MET8000 series can be remotely controlled through a VNC connection and using most common WEB browsers. This guide includes instructions on how to setup and control the X-MET8000 series using a WEB browser running on a PC and through a VNC-connection from a PC and an iPad.

WEB browsers on mobile devices may not be fully compatible with the X-MET8000 series web interface, some features might not work properly if used with a mobile device web browser.

Multiple Wi-Fi connected X-MET8000 series devices can be controlled from a single computer using tabs in the WEB browser, one tab for each X-MET8000 series device.

Using the XAPI interface and a Wi-Fi connection multiple X-MET8000 series devices can be used for automated operation with a minimum of additional equipment and infrastructure.

10.1 Wireless Connections

The X-MET8000 series can connect to Bluetooth and Wi-Fi networks. Both networks are switched off by default. A typical use for Bluetooth would be to connect to a Bluetooth printer. A typical use for Wi-Fi is to connect to a PC. This can allow more than one PC to connect to the X-MET8000 series.

The Wi-Fi connection can be to a broadcast network or to a hidden network. For a broadcast network, it can be necessary to know the passkey. For a hidden network, it is necessary to know the SSID. Hidden networks can be either managed or ad-hoc. Managed networks can use either WPA or WPA2 Personal encryption, and ad hoc networks can use WPA None encryption. If a hidden network uses encryption, it is necessary to know the passkey. The network administrator will know the type of network in use, and can provide the SSID and passkey, as applicable.

An ad hoc Wi-Fi network is a decentralized type of wireless network. The network is ad hoc because it does not rely on a preexisting infrastructure, such as access points in managed wireless networks. Network shared folders and printer will most likely not work through an ad hoc network

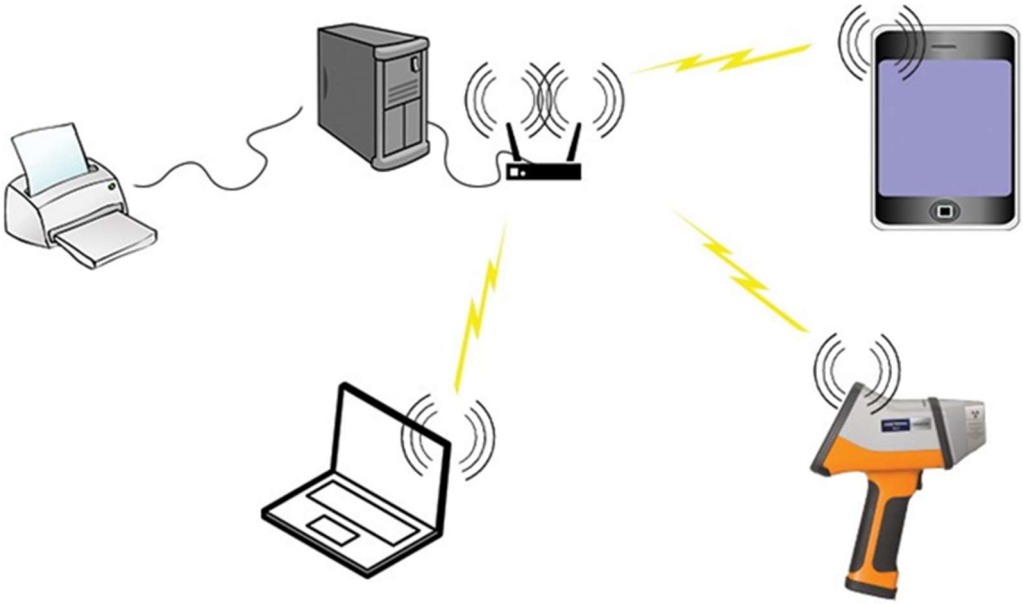
A managed Wi-Fi network utilizes access points providing wireless access to the network infrastructure including shared folders and printers

Most common full featured web browsers i.e. IE, Mozilla and Chrome will work with the X-MET8000 series web user interface and are platform and X-MET8000 series software version independent.

Many mobile devices use web browsers optimized for mobile web browsing, these might not include all features required by the X-MET8000 series web GUI. Multiple X-MET8000 series devices running different software versions can be operated simultaneously using tabs in the web browser.

Wi-Fi ad hoc network topology

The laptop provides the Wi-Fi network in ad hoc mode and the X-MET8000 series connects directly to the laptop. Network resources might not be accessible from the X-MET8000 series.



Wi-Fi managed network topology

In managed networks existing infrastructure like routers and switches connect the clients to the network, shared resources are accessible from all network connected clients.

10.2 Connect the X-MET8000 series to a company network

The procedure may differ depending on the network security level and server versions used. If the network utilizes device based authentication or you are unable to connect to the network using the following steps, please contact your local network administrator for support.

10.3 Add A Broadcast Wi-Fi Connection

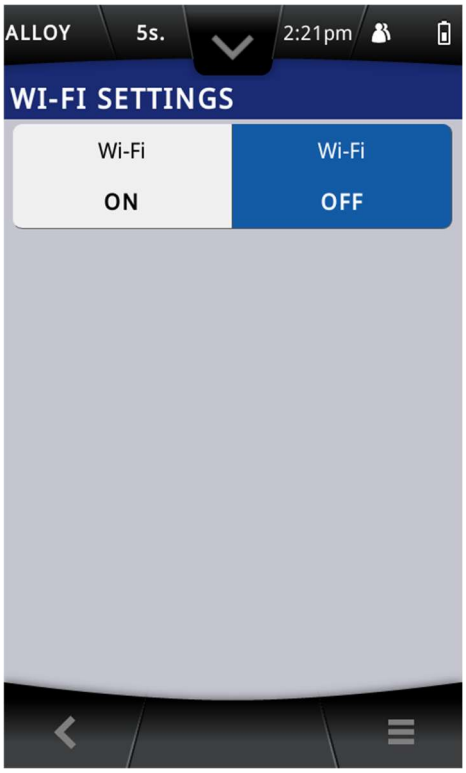
Follow these steps to connect to a broadcast Wi-Fi network.

1. Navigate: **Status Bar** > **Wireless**.

   The Wireless screen appears.

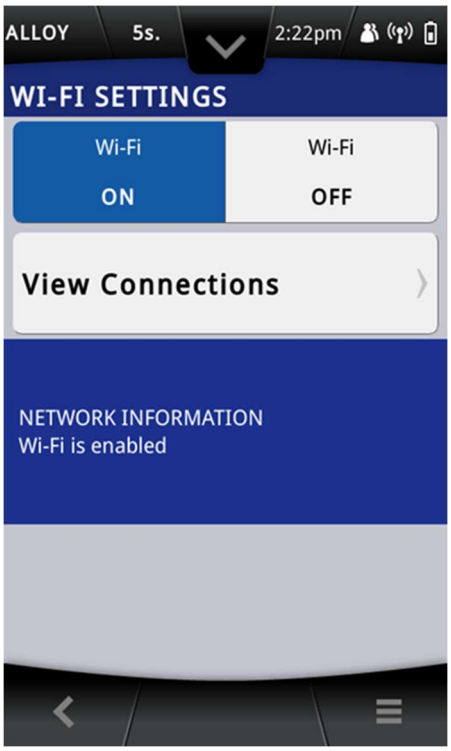
2. Tap **Wi-Fi**.

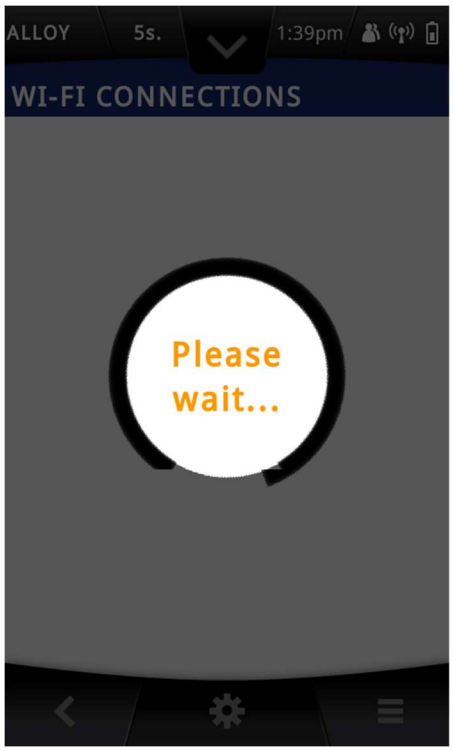
   The Wi-Fi Settings screen appears.



3. Tap the **ON** tick box.

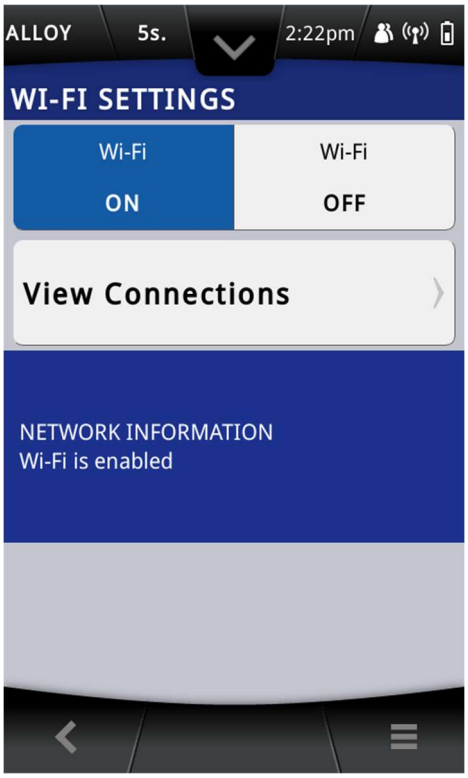
   The Wi-Fi Settings screen changes.



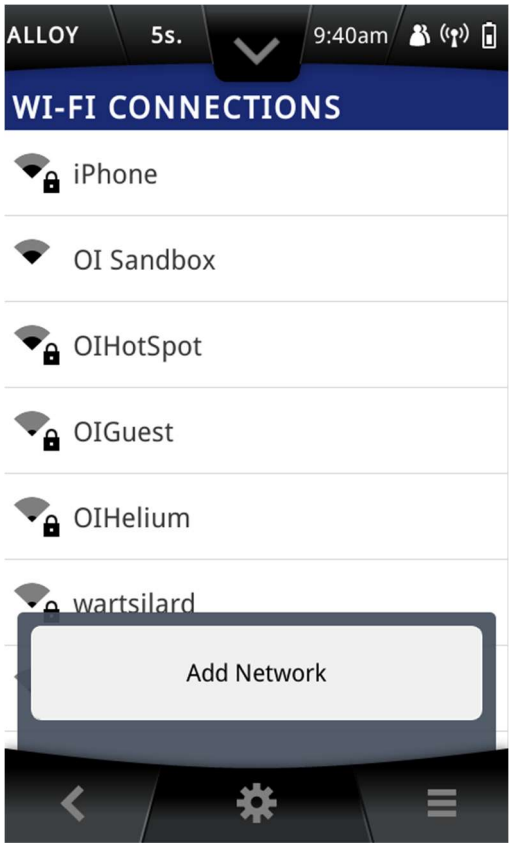


4. Tap **View Connections**

The Wi-Fi Connections screen appears and automatically scans for the available Wi-Fi networks.

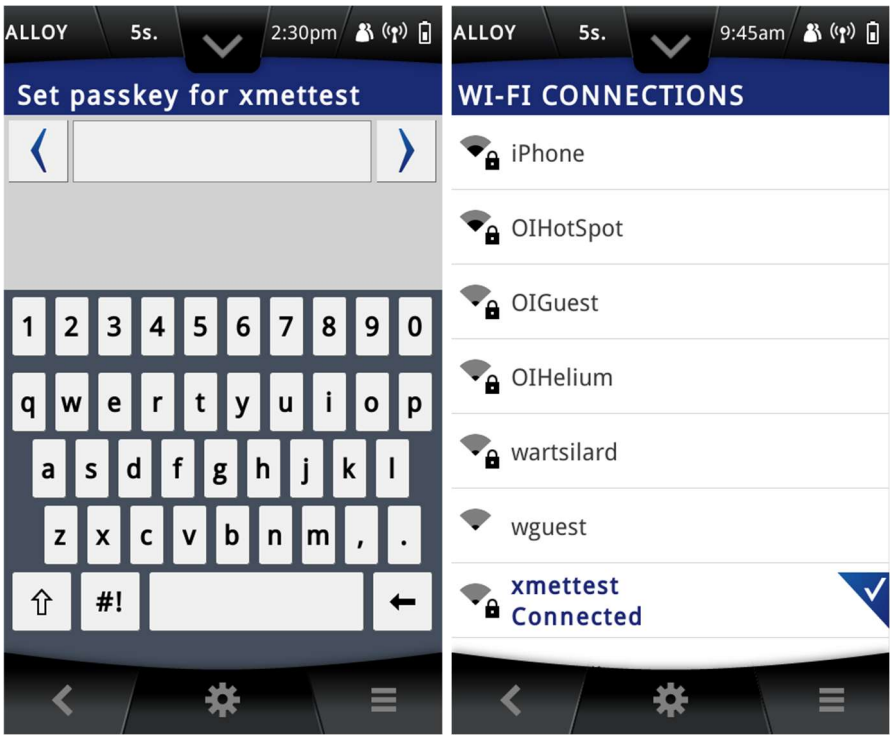


When the search is complete, the screen shows the available Wi-Fi networks. The signal strength and the network security are indicated as icons in the network list.

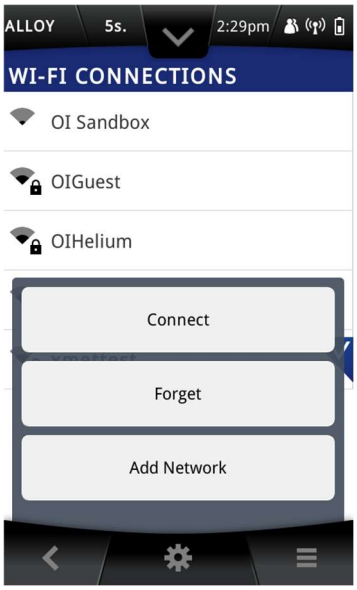


5. Tap one of the Wi-Fi networks.

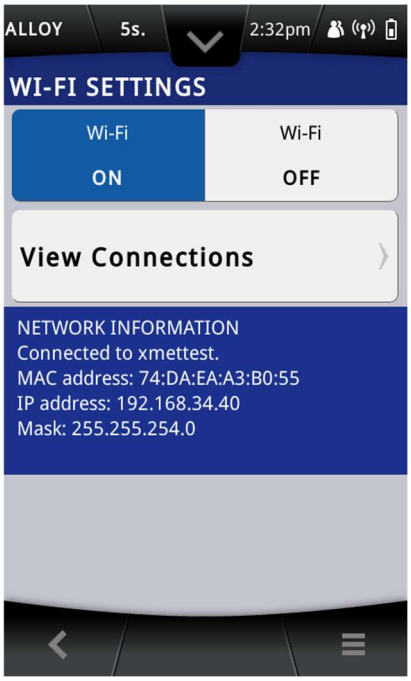
6. If the selected Wi-Fi network requires a passkey, use the virtual keyboard to type the passkey for the network, then tap **Done** to return to the Network Discovery screen.



7. If necessary, select the connected network then tap Tools > Forget. When the Wi-Fi is ON next time, the above network will not be connected automatically. Tap **Done** to return to the Wi-Fi Connections screen. This shows the active Wi-Fi connection.



8. Tap **Done** to return to the Wi-Fi Settings screen.
Wait until the Network Information IP address and Mask update in the Wi-Fi Settings screen. The updated IP address can be used to access the X-MET8000 series from the other computers that are in the same network.



9. Tap **Done** twice to exit the Wi-Fi Settings screen.

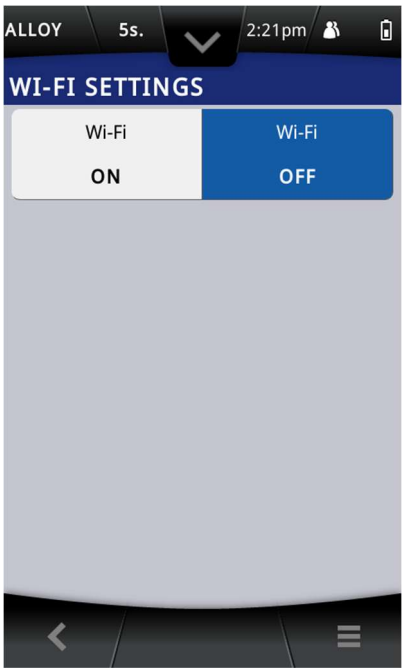
10.4 Add A Hidden Wi-Fi Connection

Follow these steps to connect to a hidden Wi-Fi network. Managed networks can use either WPA or WPA2 Personal encryption, and ad hoc networks can use WPA None encryption.

1. Navigate: **Status Bar** > **Wireless**. The Wireless screen appears.

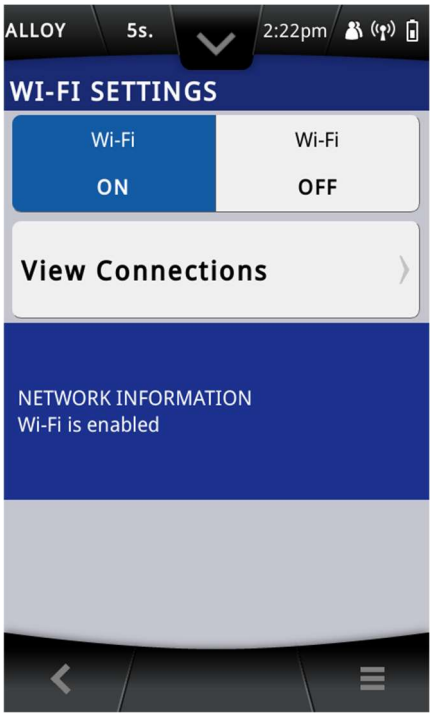
2. Tap **Wi-Fi**.

   The Wi-Fi Settings screen appears.



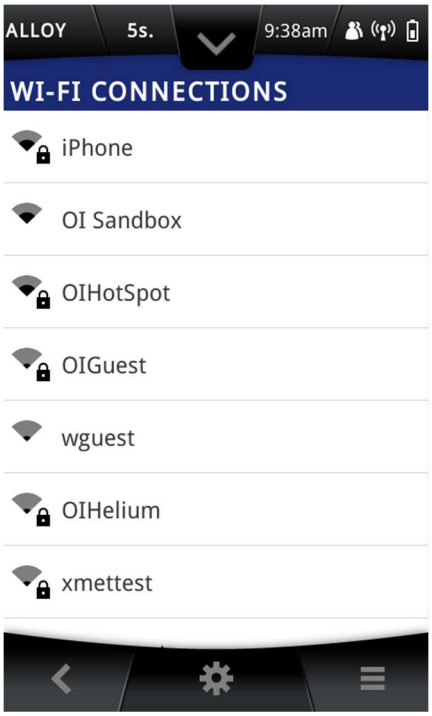
3. Tap the **ON** tick box.

   The Wi-Fi Settings screen changes.



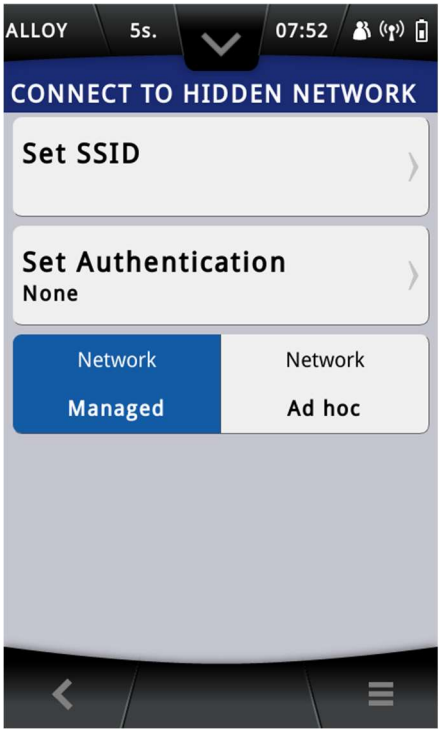
4. Tap **View Connections**.

   The Wi-Fi Connections screen appears with the scanned Wi-Fi networks.

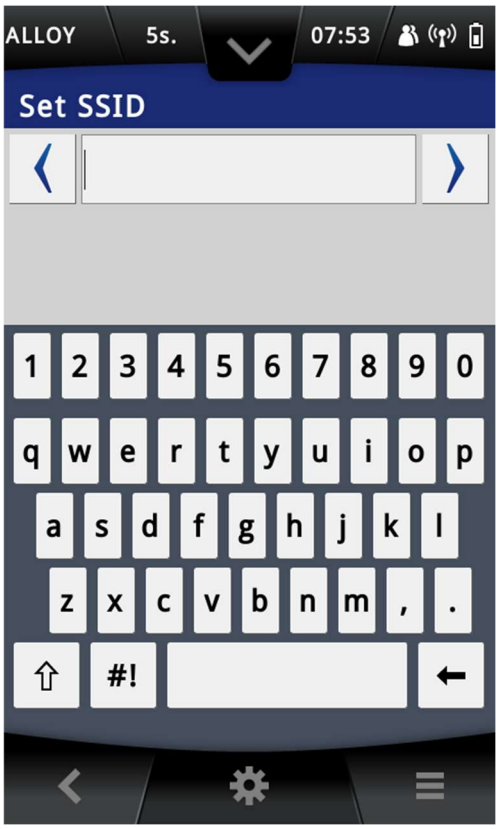


5. Tap: **Tools** > **Add Network**.

   The Connect To Hidden Network screen appears.



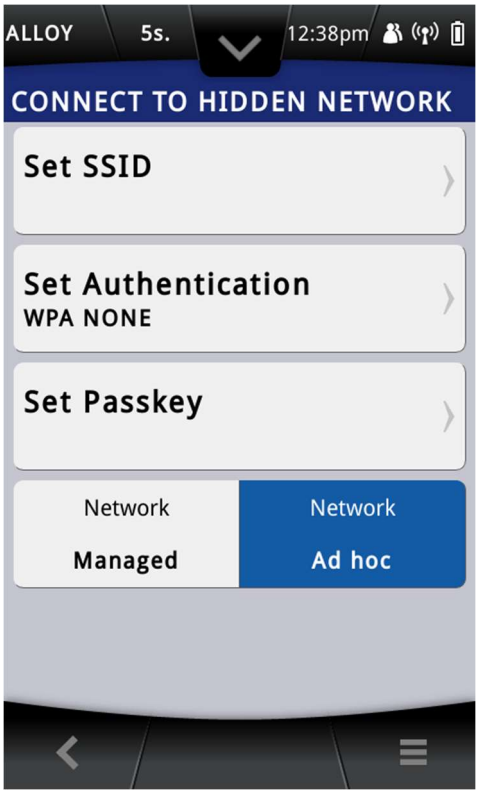
6. Tap **Set SSID**.
7. Use the virtual keyboard to type the SSID, and then tap **Done** to return to the Connect To Hidden Network screen.

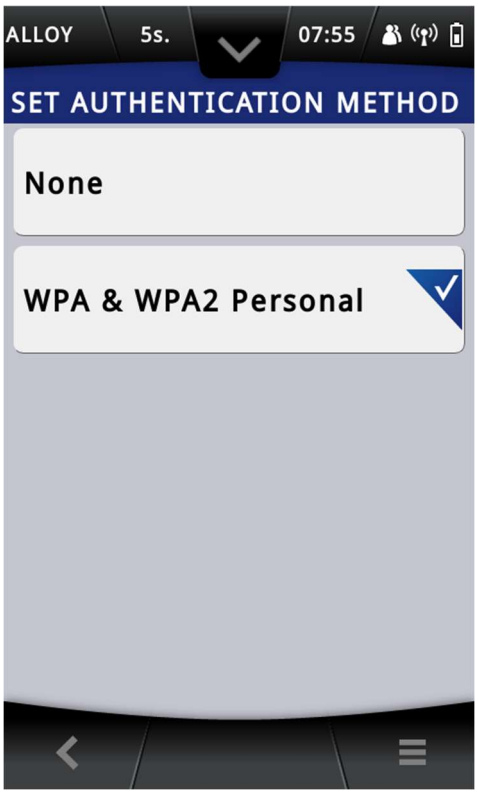


8. Do one of the following:
   - **Tap Managed**
   - **Tap Ad Hoc**

9. Tap **Set Authentication**.

   The Set Authentication Method screen appears.

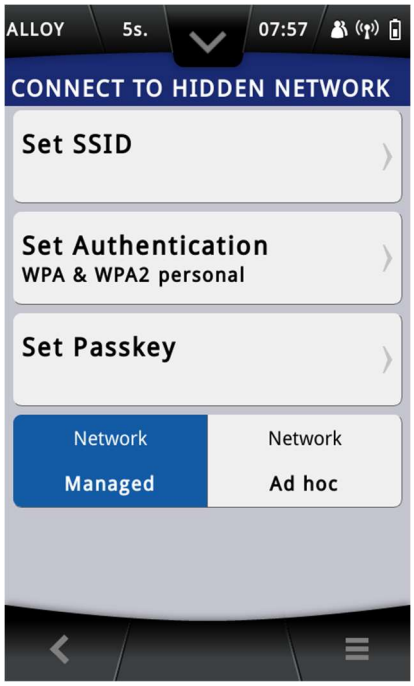




10. Do one of the following:

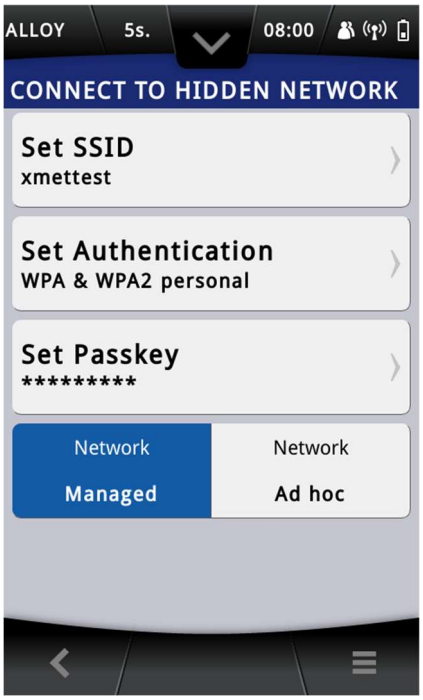
- Tap **None**
- Tap **WPA & WPA2 Personal**
  For an ad hoc network, the second choice is **WPA None**.

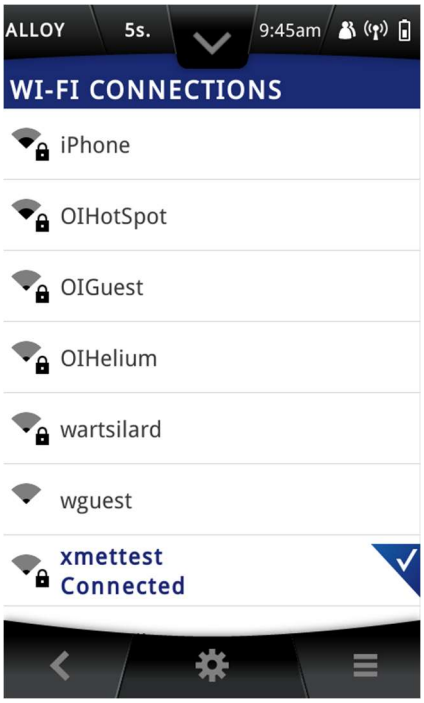
11. Tap **Done** to return to the Connect To Hidden Network screen. The Connect To Hidden Network screen changes.



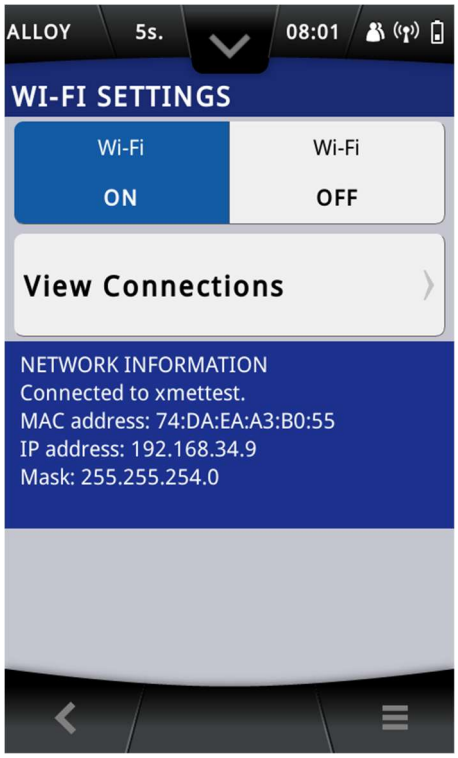
12. Tap **Set Passkey**.

13. Use the virtual keyboard to type the passkey for the network, and then tap Done to return to the Connect To Hidden Network screen.





14. Tap **Done** to return to the Wi-Fi Settings screen. Wait until the Network Information MAC address, IP address and Mask update in the Wi-Fi Settings screen. The updated IP address can be used to access the X-MET8000 series from the other computers that are in the same network.



15. Tap **Done** twice to exit the Wi-Fi Settings screen.

10.5 Wireless Printing

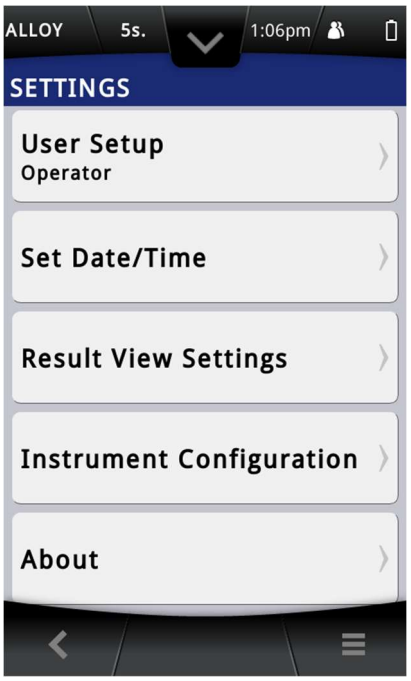
The X-MET8000 series supports printing Reports directly to a network connected printer over a Wi-Fi connection. Setup wireless printing using the following instructions.

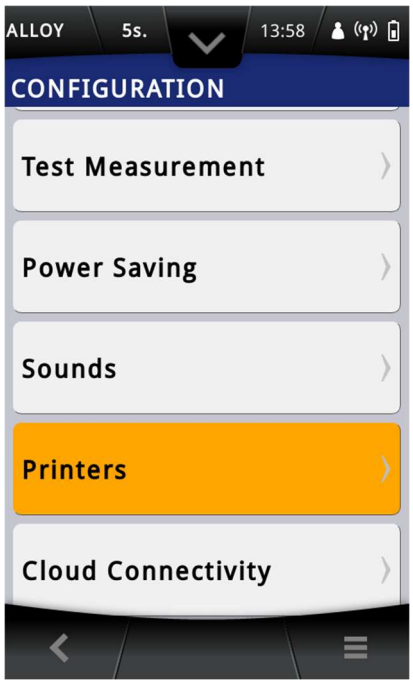
10.5.1 Configure A Printer

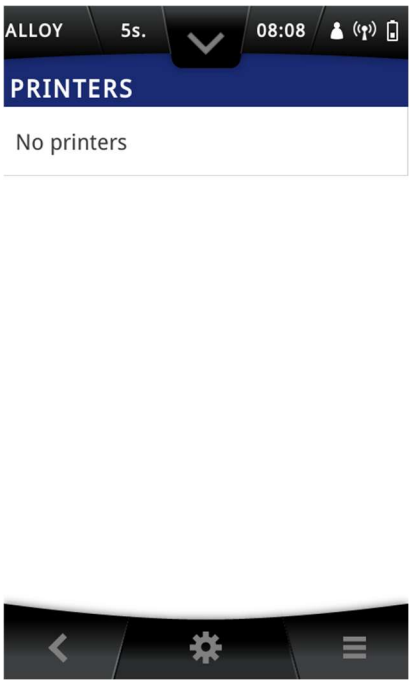
It is necessary to connect the X-MET8000 series device to a Wi-Fi network before configuring a printer. Follow the steps below to configure a printer.

The supervisor must configure network printers.

1. Navigate: **Menu** > **Settings** > **Instrument Configuration** > **Printers**
   The Printers screen appears.

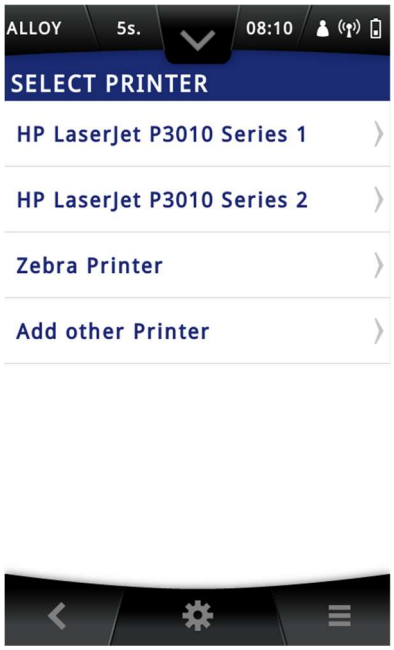






2. Tap **Tools** > **Add Printer**.

   The Select Printer screen appears and a search begins for the network printers. When the search is complete, the screen shows the available **Network Printers** and **Add Other Printer**.



3. If necessary, scan again by selecting **Tools** > **Scan Again** .
4. Tap either on the found **Network Printers** or **Add Other Printer** to input the printer information manually.

   The Add/Edit Printer screen appears.

5. Do the following:
   - Tap **Name**

     The Printer name can be any text, it is used to identity a printer when multiple printers are configured in the device.
   - Tap **URI**

     The system administrator will need to provide the IPP address for the printer.

6. Use the virtual keyboard to type the new value, and tap **Done** to return to the Add/Edit Printer screen.

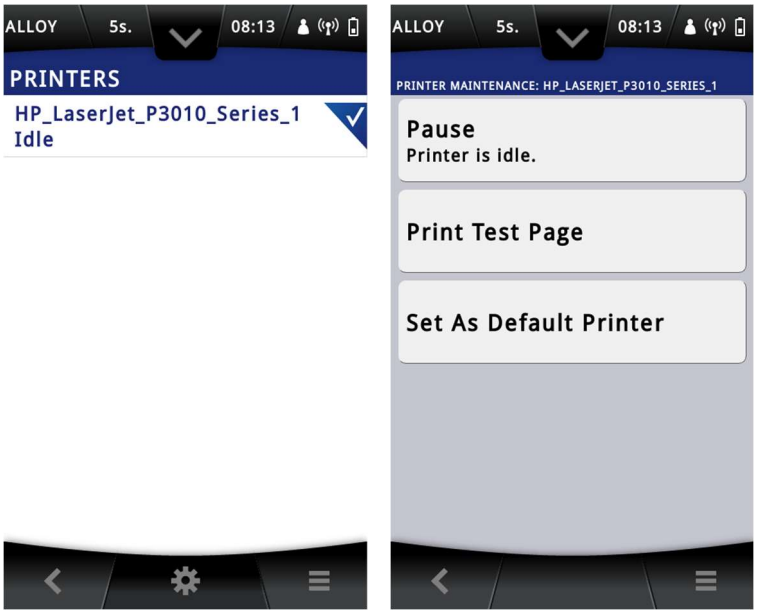
7. It is not necessary to change **Model** as most of the printers work with a default generic postscript driver which is available in the device. If the user wants to install a different PPD driver from a USB memory device, then tap **Model**.
   The Printer Model screen appears.

8. Tap **Maker** to select the applicable maker. Tap **Done** to return to the Printer model screen. The Printer Model screen updates with the new values.
9. Tap **User PPD** to install the PPD file for the printer from the memory stick.
10. Tap **Done**. The Information dialog box appears.
11. Tap **OK** to return to the Select Printer screen.
12. Tap **Done** 4 times to return to the main screen.

10.5.2 Print A Test Page

It is necessary to configure a printer before printing a test page. Follow the steps below to print a test page.

1. Navigate: **Menu** > **Settings** > **Instrument Configuration** > **Printers**. The Printers screen appears.



2. Select a printer and tap **Tools** > **Maintenance Selected**. The Printer Maintenance screen appears.
3. Tap **Print Test Page**.

   The Information dialog box appears.
4. Tap **OK** to return to the Printer Maintenance screen.
5. If the printing of the test page is successful, set the printer as the default printer by selecting **Set As Default Printer** in the Printer Maintenance screen.
6. Tap **Done** 4 times to return to the main screen.

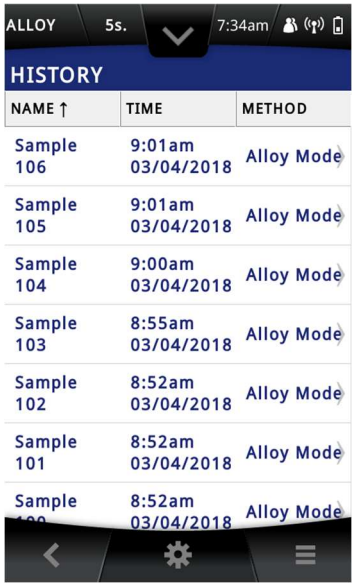
10.5.3 Generate a Report To a Printer

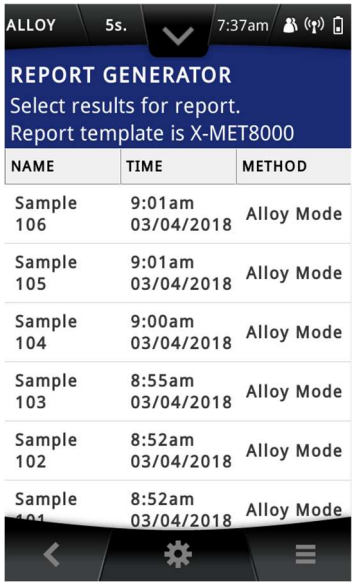
The Supervisor must configure a network printer in the device in order to generate reports directly on a printer, and must connect the device to the same Wi-Fi network as the one to which the network printer is connected. Please refer to the Supervisor Guide to set this up. Follow the steps below to generate a report to a printer.

1. Tap **Menu**, and then tap **History**.

   The History screen appears.

2. If necessary, the results can be sorted by name, time and method by selecting the sorting buttons on the title bar.



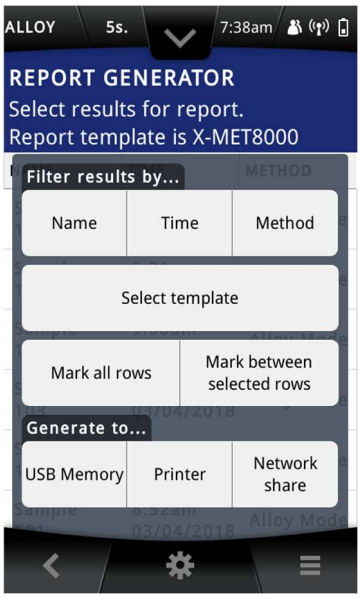


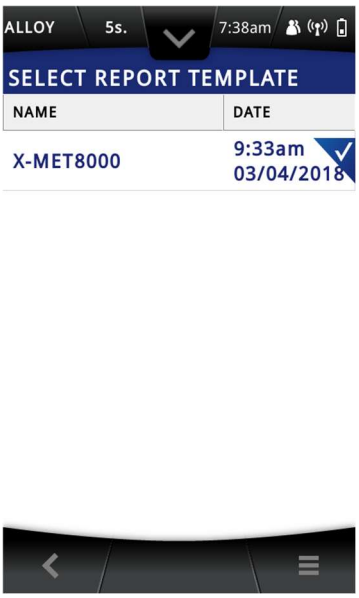
3. Tap: **Tools** > **Generate Report**

   The Report Generator screen appears.

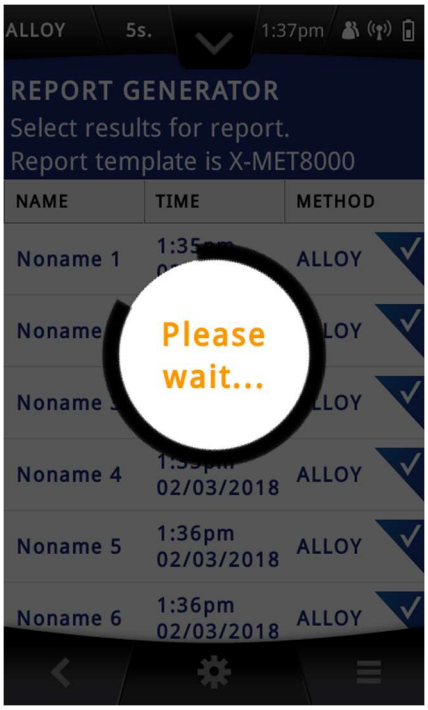
4. Tap: **Tools** > **Select Report Template**

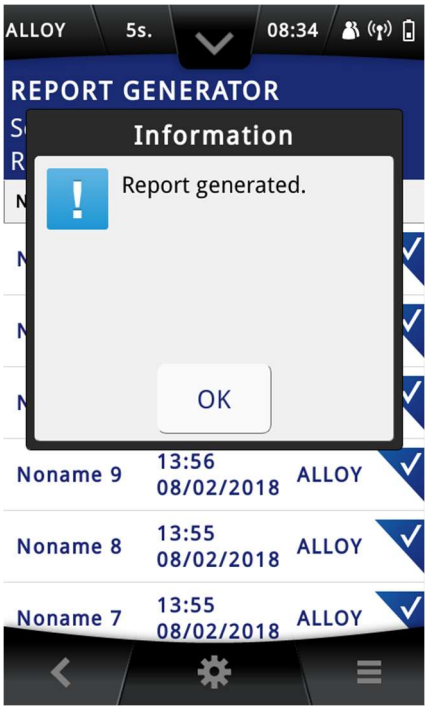
   The Select Report Template screen appears with the default report template list and also user defined templates which were created in the Web GUI.





5. Tap on the applicable template and then tap **Done** to return to the Report Generator screen.
6. Select the measurement results for the report by tapping on each result row in Report Generator screen or tap **Tools** and select results using following options
    - Filter by
    - Mark All
    - Mark between selected rows
7. Tap: **Tools** > **Printer** after selecting results.
   The device starts generating the report and sending it to the printer. Once the report is generated to the printer, an Information dialog box appears.





8. Tap **OK**.
   The Report Generator screen appears.
9. Tap **Done** twice to return to the main screen.

10.6 Wireless File Transfers

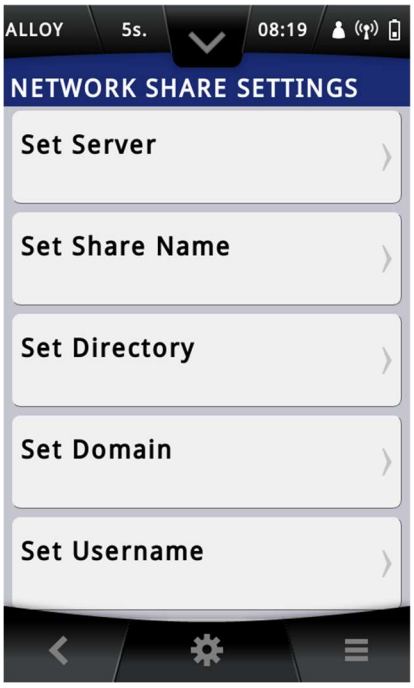
Note: Network share functionality might not be available with all Windows versions

The X-MET8000 series can store reports directly to a network share over a Wi-Fi connection. Setup shared folders using the following instructions.

10.6.1 Configure Network Share Settings

Follow the steps below to configure the Network Share Settings.

1. Navigate: **Menu** > **Settings** > **Instrument Configuration** > **Network Share**. The Network Share Settings screen appears.



2. Do all of the following:

   - **Set Server**

     Set Server is the IP address of the server hosting the network share.
   - **Set Share Name**

     Set Share name is the name of the network share.
   - **Set Directory**

     Set Directory is the directory path inside the network share.
   - **Set Domain**

     Set Domain is the domain or workgroup where the user account is created.
   - **Set Username**

     Set Username is the username of the user to access the network share.
   - **Set Password**

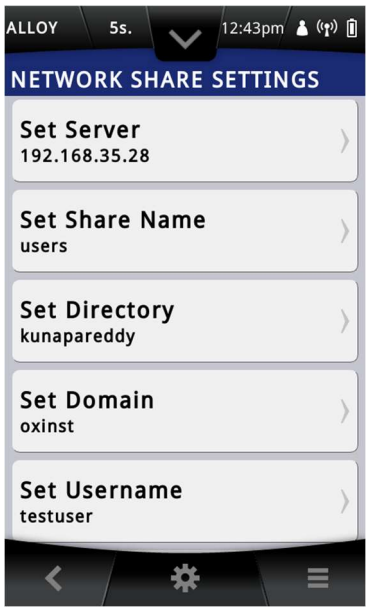
     Set Password is the password of the user to access the network share.
3. The system administrator will know the settings of the available shares in the network, and can provide the necessary information for the Network Share Settings. Use the virtual keyboard to type the new value, and tap **Done** to return to the Network Share settings.
4. Tap **Done** three times to return to the main screen.

10.6.2 Write Test File To Network

It is necessary to configure the Network Share Settings before writing a test file to the network. Follow these steps to write a test file.

1. Navigate: **Menu** > **Settings** > **Instrument Configuration** > **Network Share**.

   The Network Share Settings screen appears.



2. Tap **Tools** > **Write Test File**.

   The Information dialog box appears.

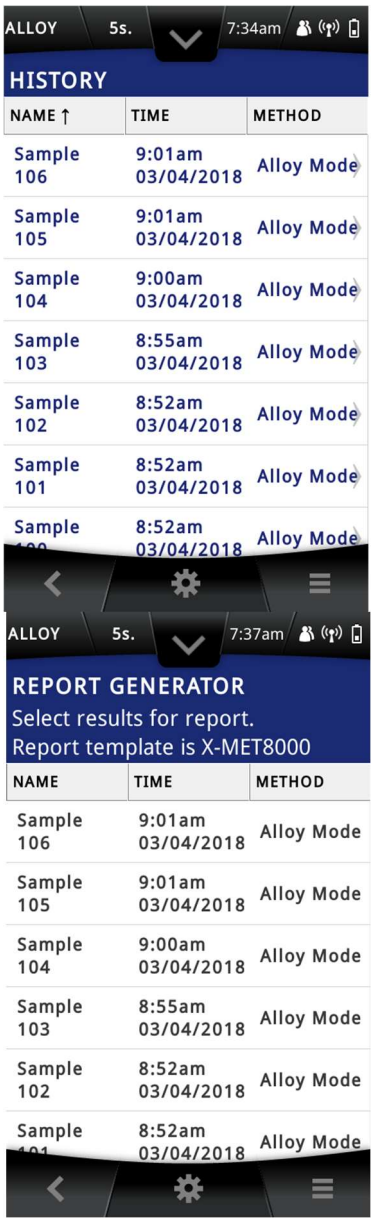
3. Tap **OK** and then tap **Done** three times to return to the main screen.

10.6.3 Generate a Report to a Network Share

The Supervisor must configure the network share in order to save reports on the selected network, and must connect the device to the same Wi-Fi network as the one to which the server hosting the network share is connected. Please refer to the Supervisor Guide to set this up. Follow the steps below to generate a report to a Network Share.

1. Tap **Menu**, and then tap **History**. The History screen appears.

2. If necessary, the results can be sorted by name, time and method by selecting the sorting buttons on the title bar. The History screen appears with sorted results.



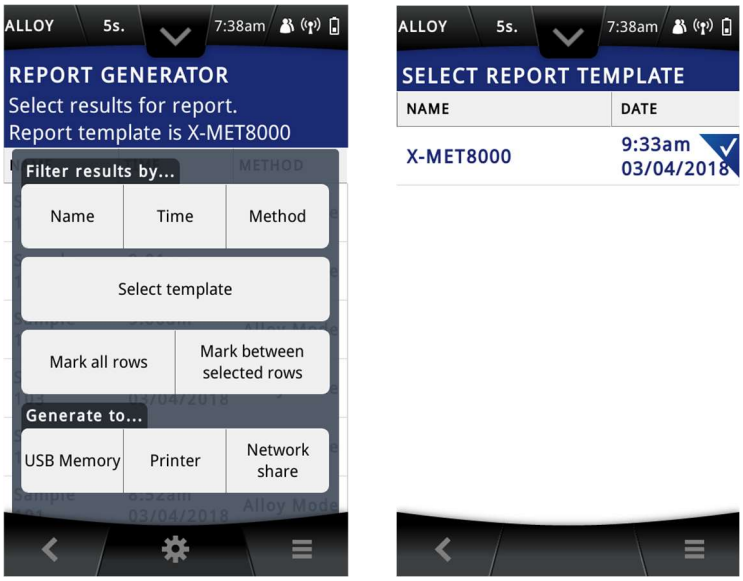
3. Tap: **Tools** > **Generate Report**

   The Report Generator screen appears.

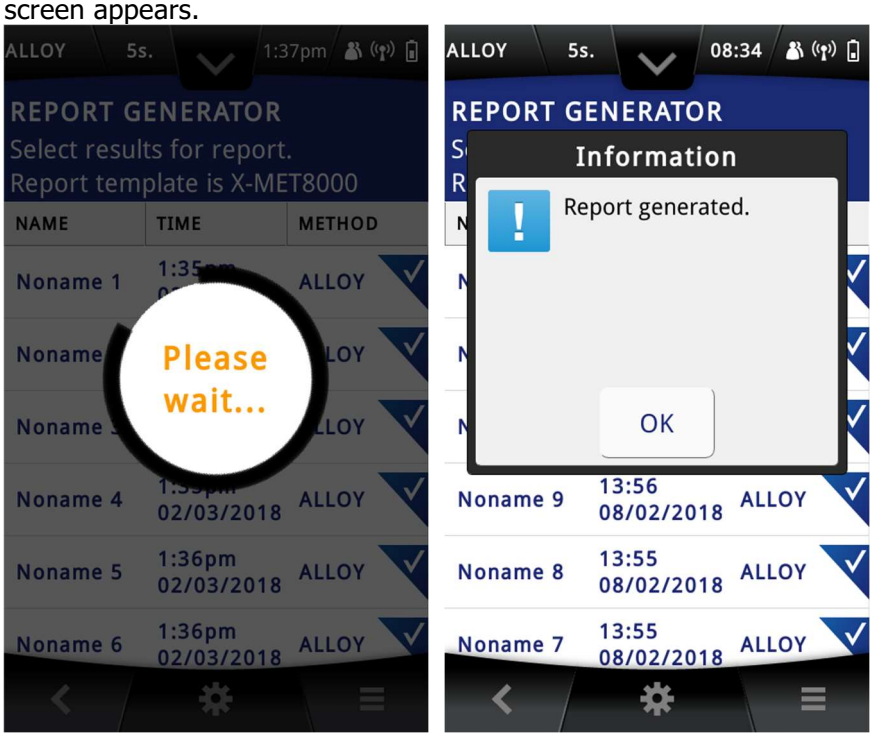
4. Tap: **Tools** > **Select Template**

   The Select Report Template screen appears with the list of the default report templates and user

defined templates which were created in the Web GUI.



5. Tap on the applicable template and then tap **Done** to return to the Report Generator screen.
6. Select the measurement results for the report by tapping on each result row in the Report Generator screen or tap **Tools** and select the results using the following options.
   - Filter by
   - Mark All
   - Mark between selected rows
7. Tap: **Tools** > **Network Share** after selecting the results.
   The device starts generating the report to the network share. Once completed, the Report Generator screen appears.



8. Tap **Done** twice to return to the main screen.

10.7 Operation With A PC

It is possible to operate the X-MET8000 series with a PC to do the following:

- Create a report for a series of results
- Do a test measurement
- Access the X-MET8000 Series User Guide

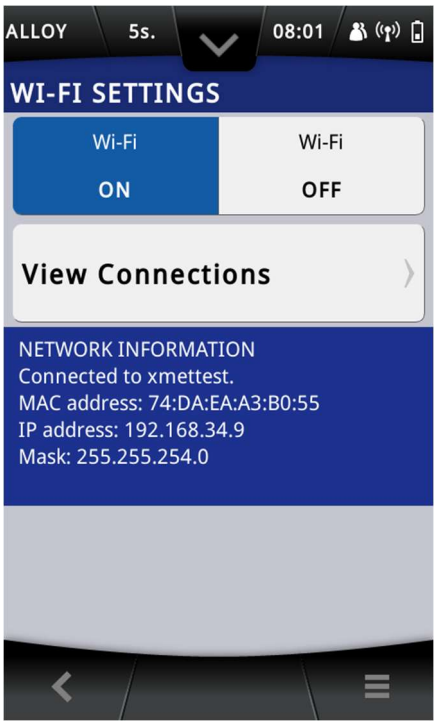
Both supervisors and operators can operate the X-MET8000 series with a PC. Each uses their own login code. There is not a separate login code for PC operation.

Operations with the PC use an Internet browser. While using an USB connection the standard URL to connect to the X-MET8000 series is *http://10.0.0.1/*. Please contact the local Hitachi High-Tech Analytical Science representative if it is necessary to change the URL. When connecting to the X-MET8000 series over Wi-Fi the URL depends on the IP address assigned to the X-MET8000 series by the network.

10.7.1 Connect To A PC And Login

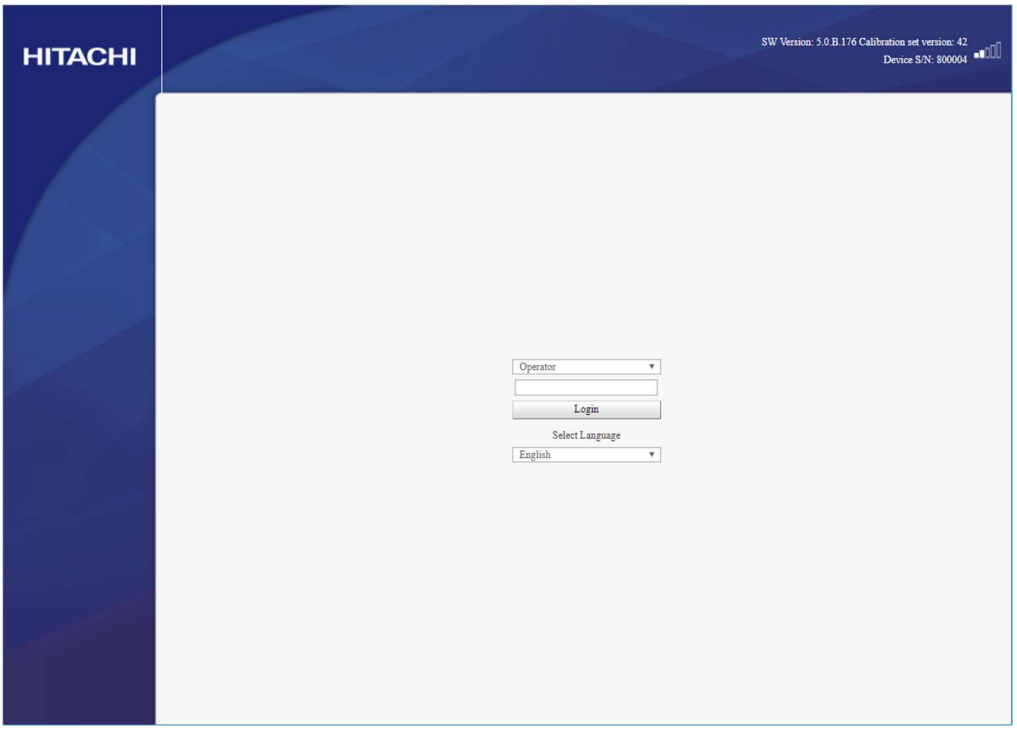
Follow these steps to login on the X-MET8000 series from a PC over WLAN.

1. Follow the steps to connect the X-MET8000 series to a Wi-Fi network. Please note that the PC must be connected to the same WLAN network for the connection to work.
2. Open the Wi-Fi Settings screen on the X-MET8000 series and note the IP address found under **NETWORK INFORMATION.**



3. Open an Internet browser on the PC and type the IP from the previous step in the address field in the browser and hit ENTER.

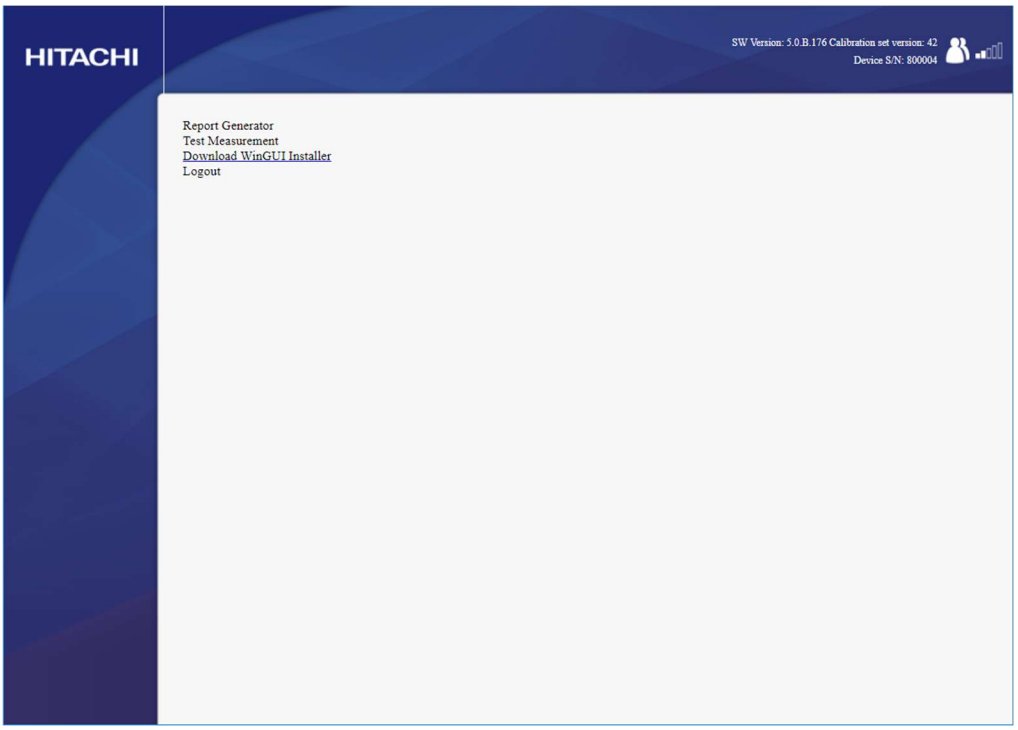
   The PC Login screen appears.



4. Select the language from drop down list and Choose the correct user from the **user** drop down list, type the login code into the text box, and click **Login**.

   The PC main screen appears.

   The X-MET8000 series shows the Safety screen with a Warning dialog box.



10.8 VNC connection to the X-MET8000 series

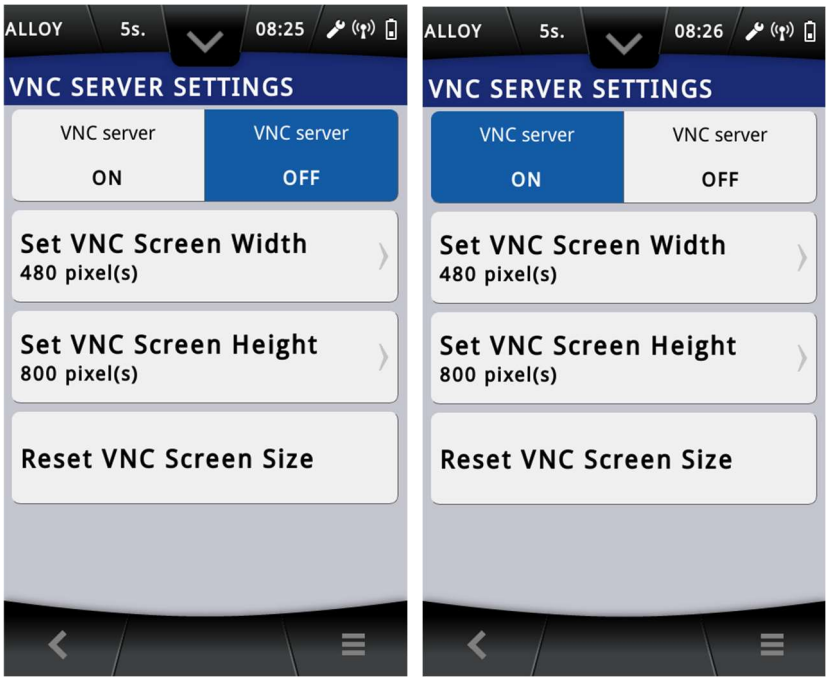
The X-MET8000 series can be used trough VNC over a Wi-Fi connection. Setup a VNC connection using the following instructions.

Using a VNC connection all the operations that are available locally on the X-MET8000 series is accessible through a remote screen.

10.8.1 Configure VNC Server Settings

It is necessary to have a VNC client on your computer to connect to the X-MET8000 series device's VNC server. Contact your IT service administrator to setup a VNC client on your computer. A VNC connection can be established by connecting a VNC client with a VNC server using either the X-MET8000 series device's Wi-Fi IP address, or the IP address 10.0.0.1 when using a direct USB connection. Follow the steps below to configure the VNC server settings in the device.

1. Navigate: **Menu** > **Settings** > **Instrument Configuration** > **VNC Server**. The VNC Server Settings screen appears.



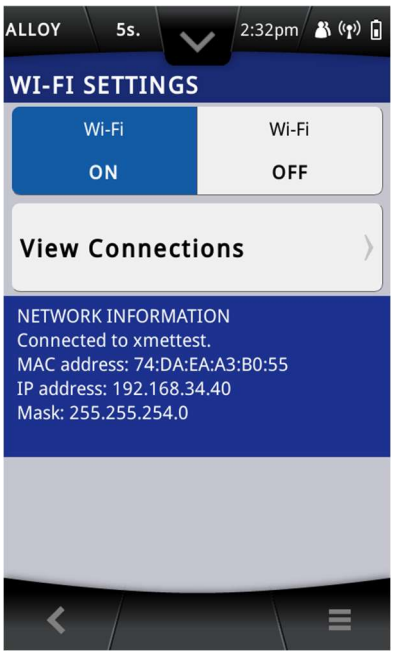
2. Tap **VNC Server ON**.
   The Information dialog box appears.
3. Tap **OK** to return to the VNC Server Settings.
4. If necessary, do the following to change the VNC screen width and height before setting **VNC Server ON**.
   - **Set VNC Screen Width**
   - **Set VNC Screen Height**
5. Use the virtual keyboard to type the new value, and tap **Done** to return to the VNC Server Settings.
6. To reset the VNC screen width and height to the default values, tap **Reset VNC Screen Size**.
7. Tap **Done** three times to return to the main screen.

10.8.2 Setup a VNC connection on a PC

Follow these steps to set up a VNC connection on a PC and connect to the X-MET8000 series.

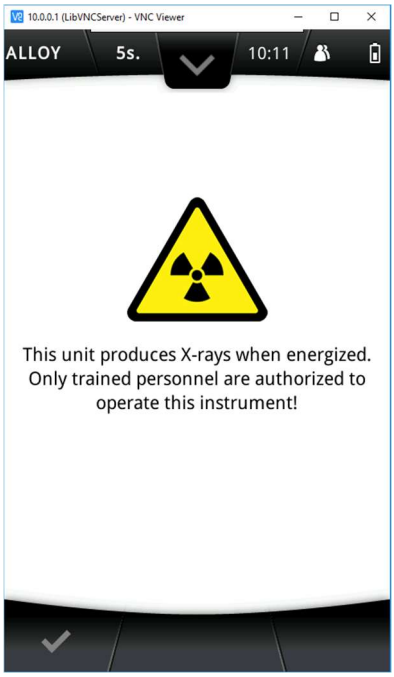
It is necessary to have a VNC client on your computer to connect to the X-MET8000 series device's VNC server. Contact your IT service administrator to setup a VNC client on your computer. A VNC connection can be established by connecting a VNC client with a VNC server using either the X-MET8000 series device's Wi-Fi IP address, or the IP address 10.0.0.1 when using a direct USB connection. The VNC Server must be set up on the X-MET8000 series before a connection can be established.

1. On the PC, download and install a VNC client, i.e. RealVNC Viewer from http://www.realvnc.com. Follow the instructions for the selected software to install the VNC client.
2. Start the VNC Client on the PC and enter the X-MET8000 series IP address found under Network settings **Status Bar** > **Wireless** > **Wi-Fi.**



3. On the VNC client, tap **Connect** to open the remote connection.
   If the VNC client is unable to connect to the X-MET8000 series it might be necessary to disable and restart the Wi-Fi on the X-MET8000 series, from the Wi-Fi settings, tap OFF and then ON again to restart the adapter.
4. If prompted for a passcode in the VNC client, leave this blank.

   The X-MET8000 series screen appears on the PC. The X-MET8000 series can now be controlled from the PC.



5. To end the VNC connection, tap **Close Connection** from the tools menu. The VNC window on the PC closes.

10.9 Control the X-MET8000 series using an iPad

An iPad or similar tablet can be used to control the X-MET8000 series trough VNC over a Wi-Fi connection. Setup a iPad VNC connection using the following instructions.

10.9.1 Setup an iPad to control the X-MET8000 series

Follow these steps to install and set up a VNC client on an iPad to connect to the X-MET8000 series. The same basics can be applied to other tablets.

The Wi-Fi and VNC Server must be set up and started on the X-MET8000 series before a VNC connection can be established.

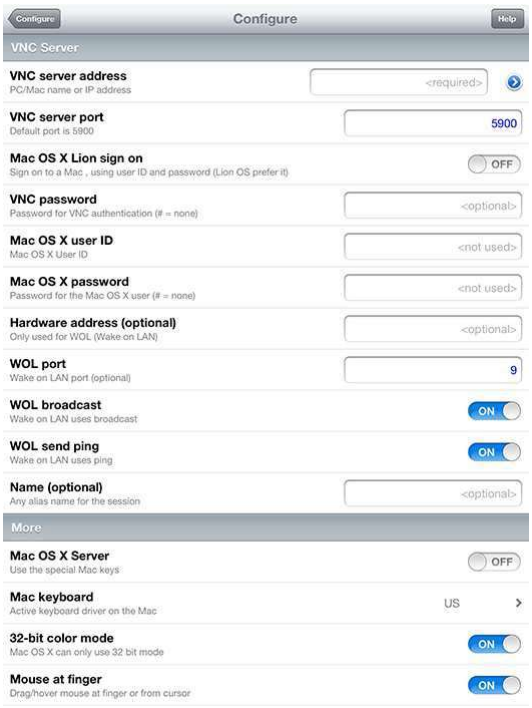
1. On the iPad, purchase and install a VNC client of choice. These instructions are for Mocha VNC client and can also be used as a guide for other VNC clients.

   Follow the instructions for the selected software to install the VNC client.

2. Start the VNC Client on the iPad. When started for the first time, add a new connection by tapping on New.

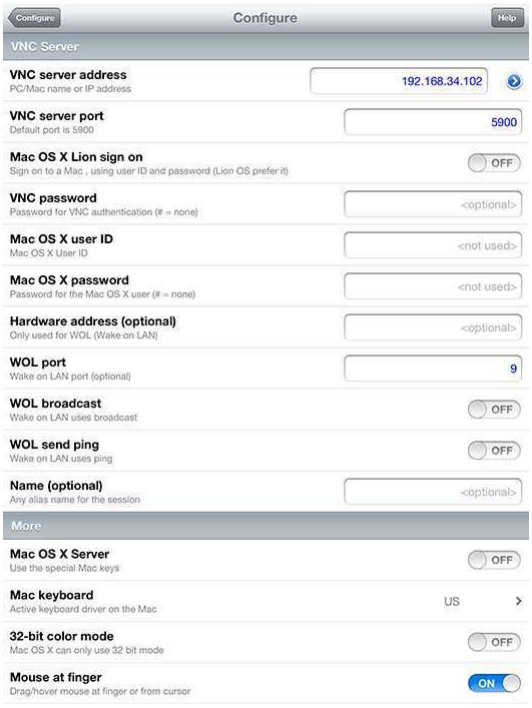
   If a connection already exists, use **Menu**/**Add another Server** to add new servers.

   Once a connection is stored, use the **Menu** in the upper left corner to switch between **Connect** and **Configure**.



3. In the VNC client, enter the X-MET8000 series IP address found under Network settings (Navigate: **Status Bar** > **Wireless** > **Wi-Fi**) and verify that that the settings in the VNC client are according to the following table:

   Note, 32-bit color mode will not work with the X-MET8000 series; other default settings in Mocha VNC should be adequate.



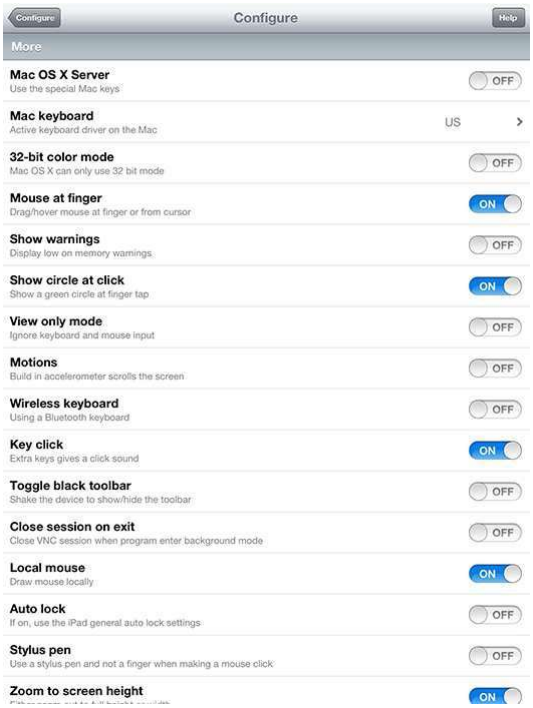


Table 1: Configuration table

VNC Server	Value
VNC server address	X-MET8000 series IP address
VNC server port	5900
Mac OS X Lion sign on	OFF
VNC password	<optional>
Mac OS X User ID	<not used>
Mac OS X Password	<not used>
Hardware address (optional)	<optional>
WOL port	9
WOL broadcast	OFF
WOL send ping	OFF
Name (optional)	<optional>

More	Value
Mac OS Xserver	OFF
Mac keyboard	US or according to keyboard preferences

More	Value
32bit color mode	OFF
Mouse at finger	ON
Show warnings	OFF
Show circle at click	ON
View only mode	OFF
Motions	OFF
Wireless keyboard	OFF
Key click	ON
Toggle black toolbar	OFF
Close session on exit	OFF
Local mouse	ON
Auto lock	OFF
Stylus pen	OFF
Zoom to screen height	ON

4. Follow the steps in the next chapter to connect and control the X-MET8000 series using the iPad.

10.9.2 Control the X-MET8000 series using an iPad

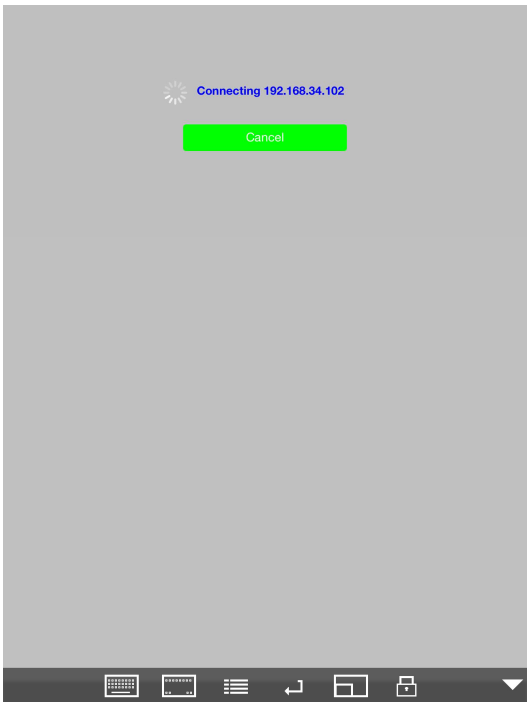
Follow these steps to connect to the X-MET8000 series using an iPad. The same basics apply also to other tablets.

Wi-Fi and the VNC Server must be set up and started on the X-MET8000 series and the IP address of the X-MET8000 series must be known before a connection can be established.

1. Tap on the connection with the IP address for the X-MET8000 series to connect to. If necessary, tap **Menu** in the upper left corner to switch between **Connect** and **Configure**.

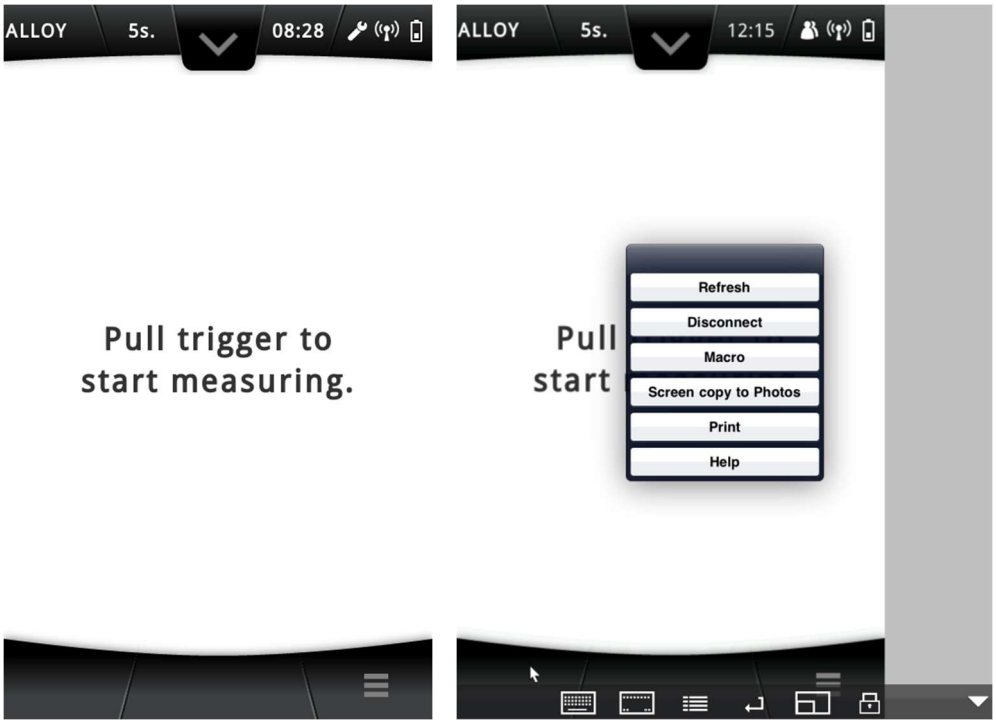
   If no connections exist for the correct IP address, add a new server or modify an existing connection to match the X-MET8000 series current IP address.

   The VNC connection to the X-MET8000 series is started.



2. If prompted for a passcode, this can be left blank. The X-MET8000 series screen appears on the iPad. Log in to the X-MET8000 series as usual, the X-MET8000 series can now be controlled using the iPad.

3. To end the VNC connection, tap **Menu Symbol** at the bottom of the iPad screen.



4. Tap **Disconnect** to end the VNC session. The VNC session ends.

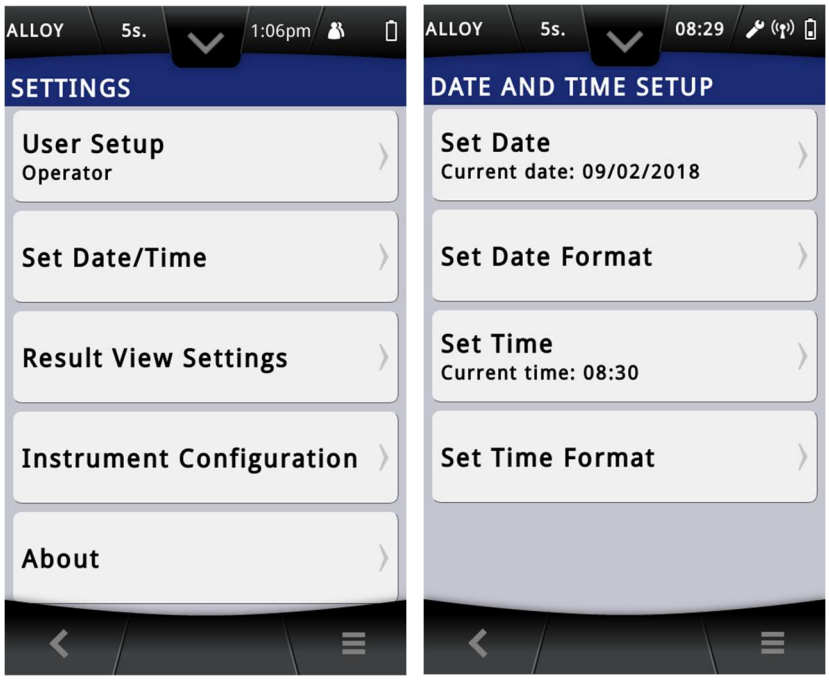
11 X-MET8000 Series Settings

Follow these procedures to set the date, time and language for the X-MET8000 series.

11.1 Set The Date And Time

Follow these steps to set the date and time.

1. Tap **Menu**, and then tap **Settings**. The Settings screen appears.



2. Tap **Set Date/Time**.

   The Date And Time Setup screen appears.

3. Tap **Set Date**.

   The Select Date screen appears.

4. Tap an arrow on the left or right of the month to scroll to the correct month.
5. Tap the correct date in the month, and then tap **Done** to return to the Date And Time Setup screen.
6. Tap Date Format
   The Date format setup screen appears.
7. Select the needed Date format by tapping on it and then tap Done to return to Date and Time Setup screen.
8. Tap **Set Time**.

   The Set Time screen appears, with the numeric keypad.
9. Use the numeric keypad to type the correct hour, or use the up or down arrows on the right of the time to increase or decrease the hour.
10. Slide over the minutes to select them, and type the minutes with the numeric keypad or arrows.
11. Tap **Done** to return to the Date And Time Setup screen.
12. Tap Date Format

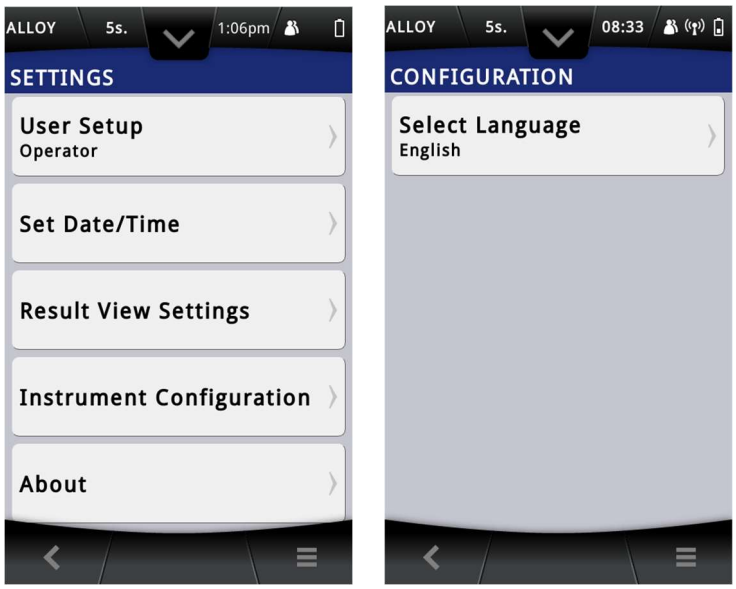
    The Date format setup screen appears.
13. Select the needed Date format by tapping on it and then tap Done to return to Date and Time Setup screen.
14. Tap **Done** twice again to return to the main screen.

11.2 Set the Language

Follow these steps to set the language for the user interface.

1. Tap **Menu**, and then tap **Settings**.

   The Settings screen appears.



2. Tap **Instrument Configuration**.

   The Configuration screen appears.

3. Tap **Select Language**.

   The Select Language screen appears.

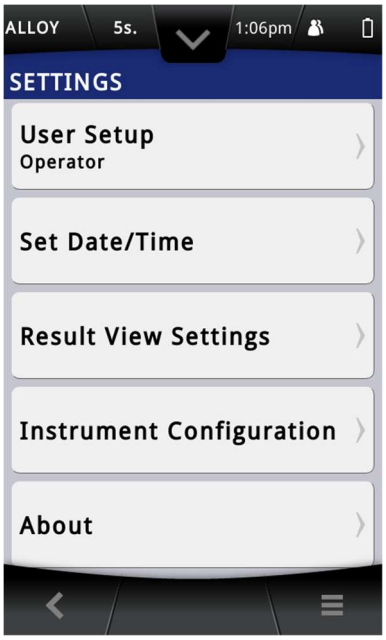
4. Press and slide the list to scroll it up or down, and then tap the correct language to select it.
5. Tap **Done** to return to the Configuration screen.
6. Tap **Done** twice again to return to the main screen.

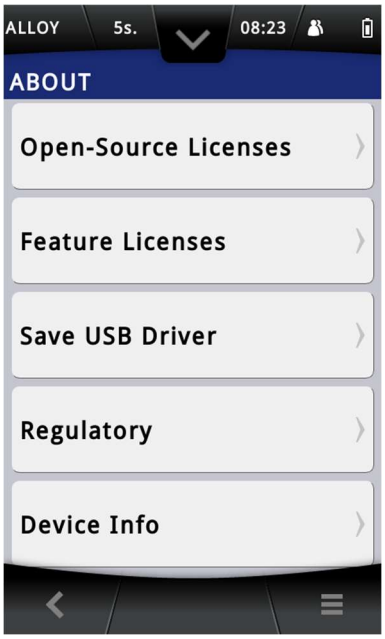
11.3 Add Feature License

The X-MET8000 series device might not include features such as camera, GPS, Bluetooth and WiFi capability. These are optional features that can be purchased through licensing, some features are also available as temporary licenses for evaluation use. Feature licenses can be obtained from your local Hitachi High-Tech Analytical Science representative. Follow these steps to view currently installed licenses or upload a feature license file to the X-MET8000 series.

1. Tap **Menu**, and then tap **Settings**.

   The Settings screen appears.

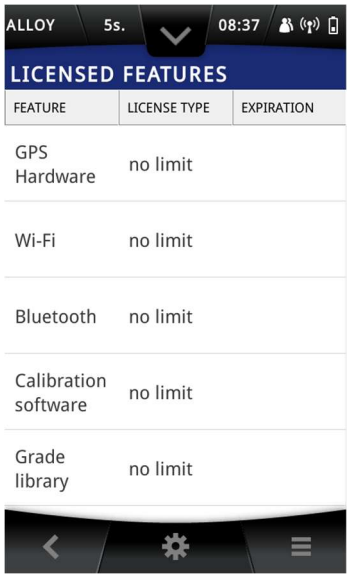




2. Tap **About**.

   The About screen appears.

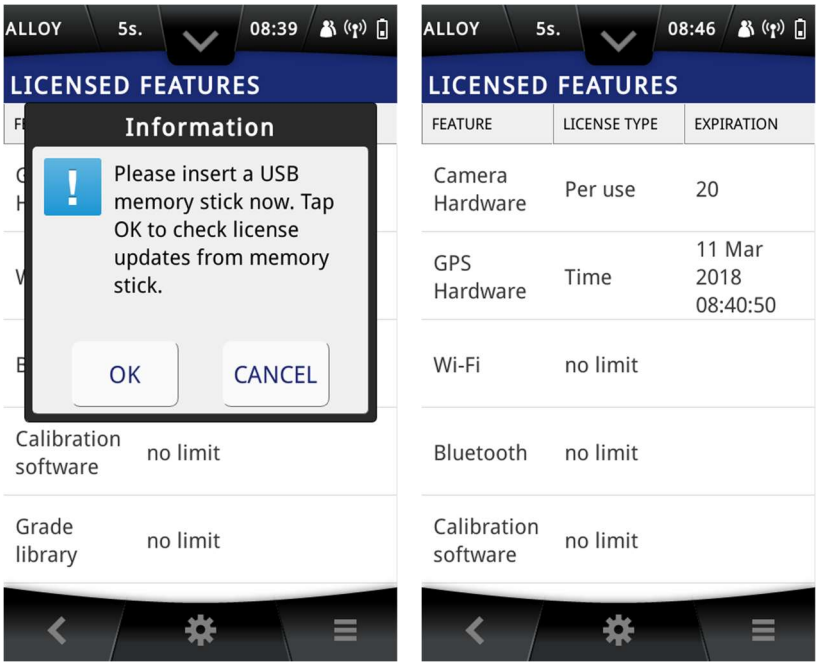
3. Tap **Feature Licenses**.
   The Licensed Features screen appears.



4. Press and slide the list to scroll it up or down to view the installed licenses.

5. To add a new license, tap **Tools** then tap **Add License File**.
   Prior to installation, the License File must be transferred to a USB memory stick readable by the X-MET8000 series
6. Insert the USB memory stick containing the license file in the USB A port and tap **OK** to upload the license or **Cancel** to abort the operation.
   Issued Feature Licenses are device specific and the same license file can only be installed once.

   The Licensed Features screen updates when the licenses are installed.



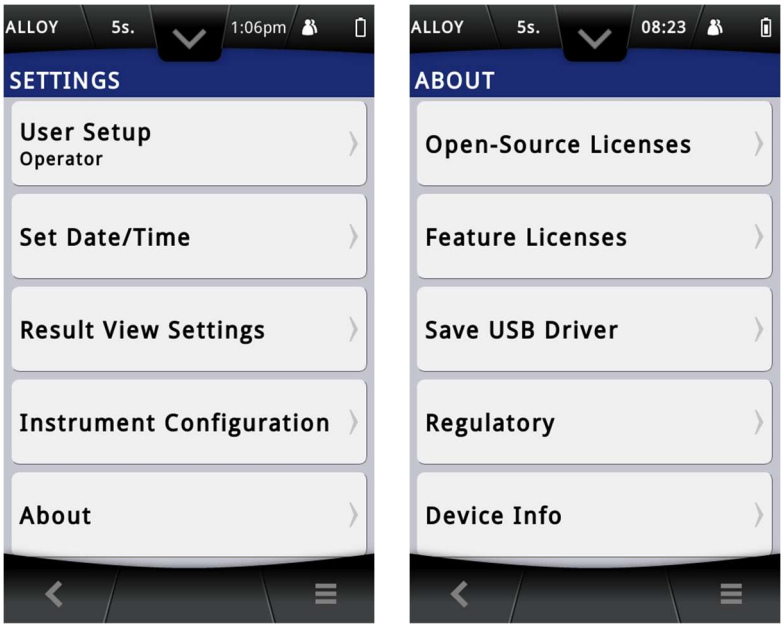
7. Tap **Done** three times to return to the main screen.

11.4 Activate a Restricted Feature License

Follow these steps to activate a restricted license available on the X-MET8000 series. Feature licences are available from your local Hitachi High-Tech Analytical Science representative.

1. Tap **Menu**, and then tap **Settings**.

   The Settings screen appears.

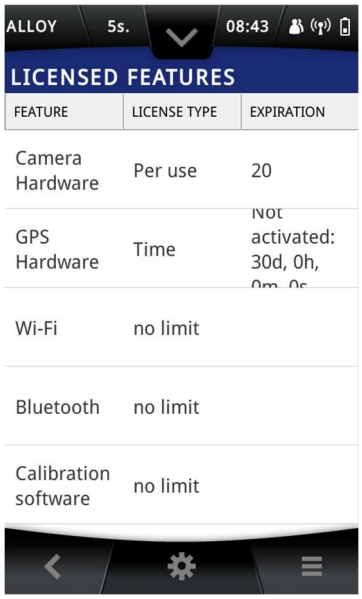


2. Tap **About**.

   The About screen appears.

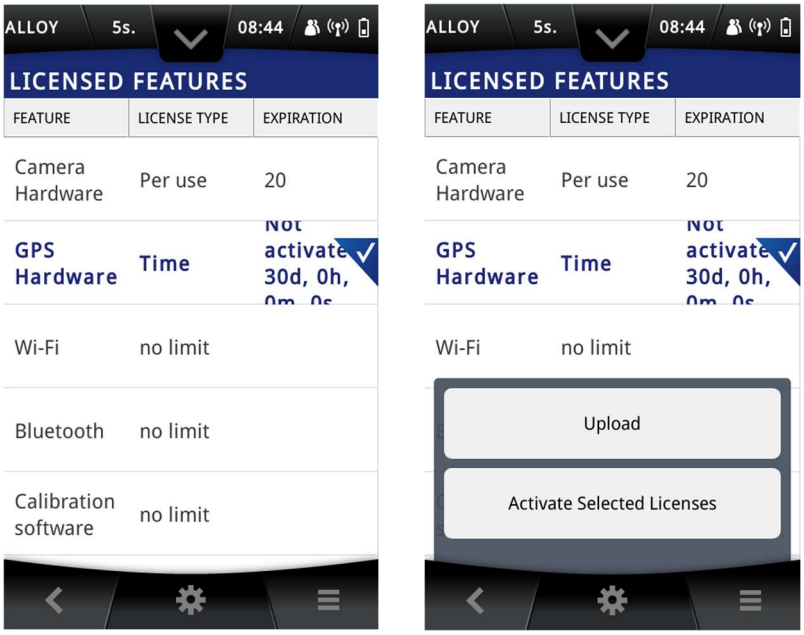
3. Tap **Feature Licenses**.

   The Licensed Features screen appears.

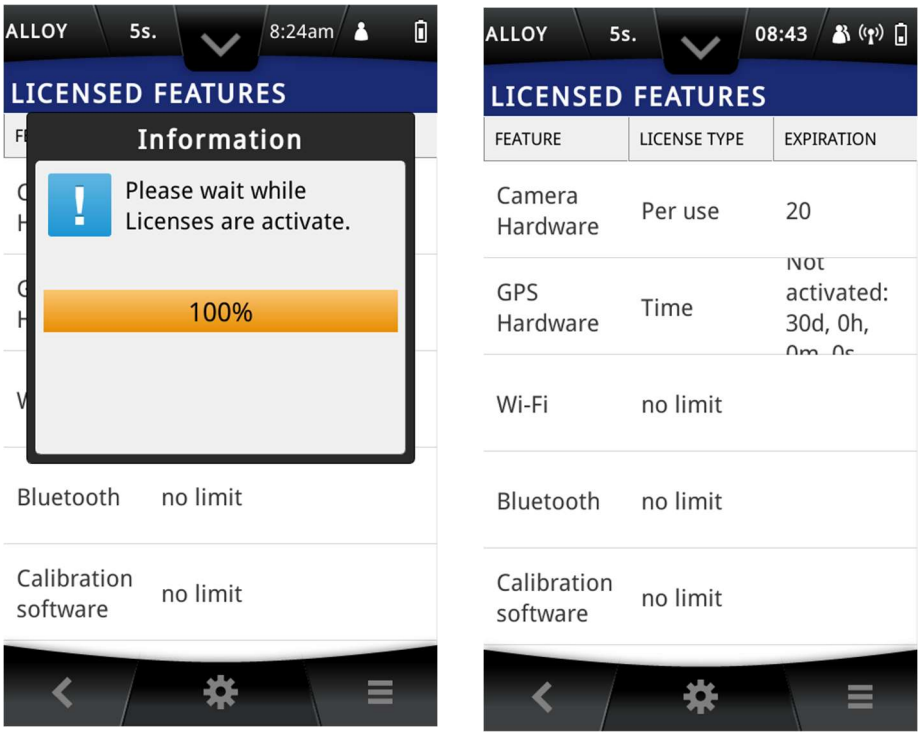


4. Press and slide the list to scroll up or down to view the installed licenses.

5. To activate one or more restricted license(s), tap on the feature(s) to activate, a checkmark appears next to the selected feature(s).
   Prior to activation, the License File(s) for the feature(s) must be installed on the X-MET8000 series.



6. Tap **Tools** then tap **Activate Selected Licenses**
   A restricted license can be Use Count or Time restricted.
   The Licensed Features screen updates when the licenses are activated.



7. Tap **Done** three times to return to the main screen.

12 Carry Out Safe Measurements

Follow these simple guidelines to carry out safe, reliable and accurate measurements with the X-MET8000 series. The local Hitachi High-Tech representative can provide training in safety and how to use the X-MET8000 series.

12.1 Handle the X-MET8000 Series Carefully

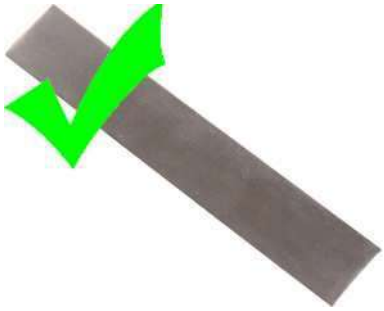
Do ...	Do Not ...
	
Hold the X-MET8000 series downwards when it is not in use, or put it in the holster.	Never point the X-MET8000 series at another person.
	
Use the lanyard to hold the X-MET8000 series safely.	Do not let the X-MET8000 series drop.

Do ...	Do Not ...
	
The operator must keep the X-MET8000 series with them at all times.	Do not leave the X-MET8000 series unattended.
	
Store the X-MET8000 series in the transit case.	Do not allow the possibility of loss or theft.

12.2 Safe, Reliable Measurements

Do ...	Do Not ...
	
Always place the sample on a flat surface to measure it. Ensure that the sample covers the analyser's measurement window and proximity window.	Never pick up or hold the sample to measure it.
	
Use both hands to hold the X-MET8000 series and keep them away from the sample.	Do not place hands and other body parts close to the sample during the measurement.

Do ...	Do Not ...
	
Make sure that the analyser is upright during measurements, and that the nose of the analyser is in full contact with the sample.	Do not use the analyser at an angle.
	
Make sure that the protective film window is intact, and measure sharp objects, in particular metal swarf, with care. It is possible to puncture the protective film window. Refer to: *The Protective Film Window Is Broken* on page 128.	Do not use the X-MET8000 series when the protective film window is broken. Do not press the X-MET8000 series into sharp objects.

Do ...	Do Not ...
	
Make sure that the sample covers the proximity window.	Do not cover the proximity sensor window with a finger, piece of tape, or anything other than the sample.
	
Make sure that the sample is clean and remove any dirt, rust, paint or coating.	Do not measure dirty, rusty, coated or painted samples. This can give poor results.

12.3 Use the Correct Accessory

The background plate, light radiation shield, safety shield, travel stand, bench-top stand are optional accessories.

Background plate

Light radiation shield

Safety shield and light stand

Do ...	Do Not ...
	
Always use the background plate **and** the light radiation shield to measure thin and/or low density samples (e.g. wood, drywall, plastics, light alloys, soil and minerals in bags, rubber, paper, ceramics, etc.). Ensure the X-MET8000 series is held in a vertical position, and the light radiation shield is pressed horizontally on the sample.	Do not measure thin or low density samples against a table without the background plate and the light radiation shield, as this will give poor results and may produce scattered radiations.
	
Always use the light stand and safety shield (or the bench top stand) when measuring small samples.	Never use the light radiation shield to hold the sample. Some of the primary radiation will pass through and be scattered by the sample.
	
Always use the safety shield with the travel stand to measure small samples. The X-ray beam now points upwards!	Never use the travel stand without the safety shield.

Do ...	Do Not ...
	
When measuring large, low density samples (e.g. wall, planks of wood, large rocks, soil or minerals on the ground, large plastic, aluminium or light alloy sheets, etc.), always use the light radiation shield.	Never measure large, low density samples without the light radiation shield.

12.4 Battery Usage

Do ...	Do Not ...
	
Make sure that the battery has sufficient charge.	Do not make measurements if only one bar is lit.
	
Only remove the battery when the X-MET8000 series is switched off.	Do not remove the battery when the X-MET8000 series is switched on.

Charge the battery overnight to use the next day. Refer to: *Battery Maintenance* on page 123.

13 Maintenance and Troubleshooting

Careful maintenance is the key to a long life for the X-MET8000 series. Use the maintenance schedule to check that the X-MET8000 series continues to function correctly.

Only the local Hitachi High-Tech Analytical Science representative can service the X-MET8000 series. There is nothing inside the X-MET8000 series for the customer to service. The operator must not remove any cover from the X-MET8000 series. If the operator does remove a cover, the warranty will become invalid.

Caution; Electricity: There are extremely high voltages inside the X-MET8000 series, with an extreme risk of electric shock. This can cause serious personal injury.

13.1 Recommended Daily Maintenance

Follow these procedures on a daily basis.

13.1.1 Check The Battery Charge Levels

Make sure that all batteries are fully charged. Refer to: *Battery Maintenance* on page 123

13.1.2 Check The Proximity Sensor

Do this test to make sure that the proximity sensor works.

Caution; X-Rays: Do not operate the trigger to make a measurement during this test. If the X-MET8000 series emits X-ray radiation when it is not in close contact with the sample, the radiation can scatter. Prolonged direct exposure to X-ray radiation can cause serious personal injury.

1. Switch the X-MET8000 series on.
2. Hold the X-MET8000 series in the correct position against a sample.

3. Make sure that the proximity indicators change to orange.

   Do not pull the trigger.
4. Slowly withdraw the X-MET8000 series away from the sample.
5. Make sure that the proximity indicators switch off.
6. Measure the distance from the sample when the proximity indicators switch off.

   The distance should be no more than 15 millimeters. If the X-MET8000 series does not achieve this test, it must be returned to the local Hitachi High-Tech Analytical Science representative for service.

Note: the proximity sensor may be disabled by a Supervisor for operation of the analyser with a bench top stand only (as per IEC 62495). If unsure, please refer to local radiation safety regulations.

13.2 Recommended Weekly Maintenance

Follow these procedures on a weekly basis.

13.2.1 Check The Alloy CRM Sample

The supervisor should make a measurement of the Check sample(s).

If there is a significant change from the Alloy CRM reference measurement, contact the local Hitachi High-Tech Analytical Science representative for assistance.

The X-MET8000 series can include additional check samples that are application specific. The supervisor can also use these to check the X-MET8000 series against a representative sample.

13.3 Battery Maintenance

The Power Supply can charge the battery while supplying power to the X-MET8000 series. The X-MET8000 series display has a battery icon showing Remaining Charge and Charge Status.

Remaining charge is indicated by a battery symbol filled to the calculated charge of the battery.

The Charge Status indicator on the X-MET8000 series display indicates when the battery is charging by an animation in the battery icon.

When the battery is fully charged the charging animation stops and the charge indicator on the X-MET8000 series displays a fully charged battery symbol.

The time required to fully charge a battery in the X-MET8000 series is up to 8 hours with the X-MET8000 series switched off.

The time required to fully charge a battery using the Battery Charger is up to 6 hours.

The X-MET8000 series can be operated from the Power Supply without a battery. When connected to the Power Supply the battery can be removed while the X-MET8000 series is powered up.

If the X-MET8000 series is operated from the Power Supply without a battery, the battery icon is displayed as empty.

Make sure that the Power Supply has the correct mains adapter, or a mains extension lead.

Always keep the battery charged. Storing the battery in a discharged state can damage the battery and if left in a discharged state for longer time the cells will enter a deep discharge state where the internal protection circuit prevents charging for safety reasons.

Do not leave a discharged battery in the device as even if the device is powered off it will consume a small power and the battery will enter a deep discharge state preventing it from being charged again.

13.3.1 Check The Battery Charge Level And Remove The Battery

Follow these steps to check the X-MET8000 series battery charge level or remove the battery from the X-MET8000 series.

1. The charge level is indicated at the top right corner of the display when the device is powered on.

2. The charge level can also be checked at the bottom of the battery while the battery is in the device or stored separately.

   To remove the battery from the device, make sure that the X-MET8000 series is switched off or connected to the Power Supply before removing the battery.

3. Slide the clip at the base of the handle forward to open the battery cover.

4. The display at the bottom of the battery indicates the charge level.

   One or more of the charge level indicators should be lit.

   If no charge level indicators are lit, the battery has no charge.

   The battery is fully charged when all charge level indicators are lit.
5. Decide if it is necessary to charge the battery.
6. To remove the battery, pull it out using the tab.

   Make sure that the X-MET8000 series is switched off before removing the battery.
7. Pay attention to the correct orientation when inserting the battery.

13.3.2 Charge the Battery

Follow these steps to charge the battery. The battery can be charged inside the X-MET8000 series or separately using the supplied battery charger.

1. Open the plastic cover underneath the display and connect the power supply lead to the X-MET8000 series.
   - Switch the X-MET8000 series off for faster charging.

2. Connect the power supply to a mains power supply. Make sure that the mains socket is easily accessible when the power supply is in use.
3. It is possible to switch the X-MET8000 series on to power it from the power supply.

   The power supply is able to charge the battery and power the X-MET8000 series at the same time.

   The Charge Status indicator on the display indicates that the battery is charging.
4. When the power supply is not required to charge a battery or power the X-MET8000 series, disconnect it from the X-MET8000 series and the mains power supply.

5. Remove the power supply lead from the X-MET8000 series and close the plastic cover.

   To charge the battery using the battery charger, first place the battery in the battery charger and then connect the power supply to the battery charger. Connect the power supply to a mains power supply.

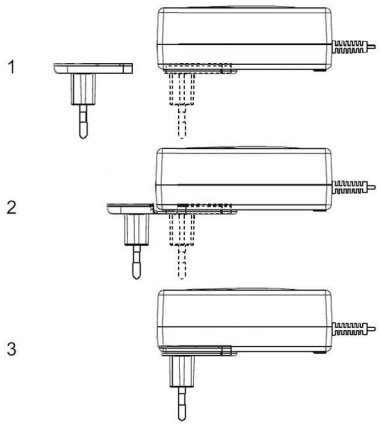
   Make sure that the mains socket is easily accessible when the power supply is in use.

6. The Charging indicator on the battery charger is lit while the battery is charging; the indicator switches off when the battery is fully charged.

   The charge display on the battery indicates charging by cycling the charge indicators and shows a fully charged battery when the battery is fully charged.

13.3.3 Mains Adapters For The Power Supply

The Power Supply includes mains plug adapters for Europe, UK, US and Australia. To change a mains plug adapter, slide the adapter along the body of the Power Supply. Replace with the correct adapter.



13.3.4 Use The Battery And Power Supply Safely

Battery Usage

The X-MET8000 series uses a lithium ion battery that contains safety and protection circuits.

Caution: Do not misuse or abuse the battery because it can become very hot, ignite or explode and cause serious personal injury.

- Only use specified X-MET8000 series batteries.
- Never use a damaged battery.
- Do not drop, disassemble, crush, incinerate, puncture, or heat the battery above 100° C (212° F).
- Do not connect any of the battery terminals together with water, salt water or a metallic object.

Power Supply and Battery Charger Usage

The Power Supply and Battery Charger are designed for indoor use only, the Power Supply is double insulated and fuse protected. They have no user serviceable parts.

Caution; Electricity: Do not attempt to open the Power Supply because there are dangerous voltages and an electric shock can cause serious personal injury.

- Only use the correct Power Supply and Battery Charger.
- Only use the Battery Charger to charge X-MET8000 series 7.2V batteries.
- Do not use the Power Supply connector to connect anything other than the Power Supply.
- Do not allow the Power Supply to come into contact with dust, water, oil, grease or chemical solvents.
- Do not cover the Power Supply when it is in use because it can overheat.

Refer to: *Disposal Of The X-MET8000 Series* on page 129 for information about the proper disposal of batteries and the Power Supply.

13.4 Troubleshooting

Use this information to diagnose any problems with the X-MET8000 series. If this information does not deal with the problem, refer to the local Hitachi High-Tech Analytical Science representative.

13.4.1 Location Of The Serial Number

Always refer to the X-MET8000 series serial number when in contact with the local Hitachi High-Tech Analytical Science representative.

The serial number is on a label on the inside of the X-MET8000 series battery cover.

Make sure that this label is kept clean at all times, and that it is possible to read the serial number.

13.4.2 Unexpected Loss Of Power

Problem

The X-MET8000 series suddenly turns off while there still is charge in the battery, it is not possible to switch the X-MET8000 series on. Refer to: *Battery Maintenance* on page 123.

The battery has an overload protection circuit, and it will shut down if there is a power surge. This can occur if the X-MET8000 series is exposed to strong radio interference.

If the overload protection circuit is triggered no indicators are lit on the Charge Level display on the battery.

Solution

It is necessary to reset the battery. If connected, disconnect the Power Supply from the X-MET8000 series.

Remove the battery from the X-MET8000 series for a short time and re-insert the battery in the X-MET8000 series. Connect the Power Supply to a mains power supply and then connect the Power Supply to the X-MET8000 series to reset the battery. It is not necessary to charge the battery.

To reset the battery using the Battery Charger, connect the Power Supply to a mains power supply and connect the Power Supply to the Battery Charger. Place the battery in the Battery Charger to reset the protection circuit. The charge indicators will light up and the battery starts charging when the battery is reset and ready for use.

13.4.3 The X-MET8000 Series Cannot Make A Measurement

Problem

It is possible to switch the X-MET8000 series on, but it is not possible to make a measurement.

Solution 1

The sample must cover the proximity window for the X-MET8000 series to generate an X-ray beam. Use the background plate to measure small samples. Never cover the proximity window with anything other than the sample.

Solution 2

Clean the proximity window with a dry cloth. Make sure that the proximity sensor works correctly. Refer to: *Check The Proximity Sensor* on page 122.

13.4.4 The Protective Film Window Is Broken

Problem

An operator must never use the X-MET8000 series when the protective film window is broken.

Solution

Press the release button to release the front plate retaining the protective film window. Check whether the window on the detector is pierced, broken, damaged or corroded. If it is, contact the local Hitachi High-Tech Analytical Science representative to arrange a repair. Only if the detector window is intact, use a new protective film window, and lock the front plate to hold it in place.

13.4.5 The X-MET8000 Series Is Damaged

Problem 1

The X-MET8000 series suffered light damage, but continues to operate.

Solution 1

Do not continue to use the X-MET8000 series. It must be fully checked and verified. Contact the local Hitachi High-Tech Analytical Science representative for assistance.

Problem 2

The X-MET8000 series suffered significant damage, and cannot operate.

Solution 2

The X-MET8000 series must be fully checked and verified. Contact the local Hitachi High-Tech Analytical Science representative for assistance.

13.5 Recertification

The X-MET8000 series provides accurate and reliable measurements for many years with minimal maintenance. Recertification verifies the accuracy of the X-MET8000 series with a series of known, traceable standard samples. Hitachi High-Tech Analytical Science recommends annual recertification. Please contact the local Hitachi High-Tech Analytical Science representative for additional information.

13.6 End Of Life

Use this information when the X-MET8000 series reaches the end of its useful life.

13.6.1 Resale, Loss Or Theft

It may be necessary to register the change of ownership of the X-MET8000 series with a regulatory organization. Contact the local Hitachi High-Tech Analytical Science representative for assistance.

13.6.2 Disposal Of The X-MET8000 Series

Contact the local Hitachi High-Tech Analytical Science representative for assistance.

WEEE: Within the EU, return the X-MET8000 series, batteries, power supplies and battery chargers to the local Hitachi High-Tech Analytical Science representative for proper disposal in accordance with WEEE regulations.

This symbol means that used electrical and electronic products should not be mixed with general household waste. For proper treatment, recovery and recycling, return to the local Hitachi High-Tech Analytical Science representative. The correct disposal of this product will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling. Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.

14 Technical Specifications

14.1 Technical Specifications, X-MET8000 Series

Proximity sensor distance	15 mm, maximum
DC-Input Voltage Range	12.0V - 15.0V
Operating temperaturerange	-10° C - +50° C
Storage temperature range	-10° C - +50° C
Operating humidity range	10 % RH - 95 % RH
Maximum operating altitude	2000m
Ingress protection	IP54
Weight	1.5 kg, maximum
Weight including case	5.0 kg, maximum

14.2 Technical Specifications, Battery

Battery part number	HHA, 10001049
Battery type	Lithium ion
Battery voltage	7.2 V
Battery capacity	6.2 Ah

14.3 Technical Specifications, Battery Charger

The Battery Charger is designed for indoor use only

Battery Charger part number	HHA, 10001052
Operating temperaturerange	0° C - +40° C
Operating humidity range	10 % RH - 90 % RH
DC-Input Voltage Range	12.0 VDC - 15.0 VDC
Maximum operating altitude	2000m

14.4 Technical Specifications, Power Supply

The Power Supply is designed for indoor use only

Power Supply part number	HHA, 10001058
Output voltage	12 VDC
Operating temperaturerange	0° C - +40° C
Operating humidity range	8 % RH - 90 % RH
Mains supply voltage range	100 VAC - 240 VAC
Mains supply current	0.35 A, maximum
Mains supply frequency range	50 Hz - 60 Hz
Maximum operating altitude	2000m

15 Regulatory Notices

Electrical Regulatory Markings

Some of the Regulatory Markings are included in the software.
They can be found in the following way:

Settings → About → Regulatory

RF Exposure Notice

This product emits radio frequency energy, but the radiated output power of this device is below FCC and IC radio frequency exposure limits. This equipment complies with FCC RF and IC radiation exposure limits for the uncontrolled environment. Nevertheless, the device should be used in such a manner that the potential human contact with the antenna during normal operation is minimized.

FCC Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generate, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user in encouraged to try correcting the interference by one or more of the following measures:

- Reorient / relocate the receiving aerial.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from the outlet the receiver is currently connected.
- Consult the dealer or an experienced radio / TV technician for help.

This device contains FCC ID: Z64-WL18SBMOD and complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

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

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user´s authority to operate the equipment.

Canadian Notice

This Class B digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations.

This device contains transmitter IC: 451I-WL18SBMOD and complies with Industry Canada license-exempt RSS standard(s).

Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.
L'exploitation est autorisée aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d''en compromettre le fonctionnement.

Taiwan NCC Notice

根據NCC低功率電波輻射性電機管理辦法 規定:

第十二條 經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條 低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。
前項合法通信，指依電信法規定作業之無線電通信。
低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

Mexico Notice

Numeró IFETEL: RCPHIXM19-0610

La operación de este equipo está sujeta a las siguientes dos condiciones:

1. Es posible que este equipo o dispositivo no cause interferencia perjudicial.
2. Este equipo o dispositivo debe aceptar cualquier interferencia. Incluyendo la que pueda causar su operación no deseada.

Brazil Notice

ANATEL
Agencia Nacional de Telecomunicações

09084-19-03338

Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados.

Ukrainian Notice

16 EU Declaration of Conformity

Hitachi High-Tech

HITACHI
Inspire the Next

EU Declaration of Conformity

Manufacturer	Hitachi High-Tech Analytical Science Ltd. Windrush Court, Abingdon Business Park, Abingdon, OX14 1SY, UK
declare under our sole responsibility that the following product **Type number**	XMDS2770
has been developed, constructed and manufactured in accordance with the requirements of the European directives:	2014/53/EU RED 2011/65/EU RoHS
The object of this declaration described above complies with the relevant Union harmonisation legislation	
The assessment is based on the following applied harmonised standards:	EN 61010-1: 2010 EN 61326-1: 2013 EN 52311: 2008 EN 301 489-1 v1.9.2 EN 301 489-17 v2.2.1 EN 300 328 v2.1.1 EN 50581: 2012
Place, Date of issue	Abingdon, July 2019

Dawn Brooks, Managing Director

Hitachi High-Tech Analytical Science