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X-MET8000 Series Supervisor’s Guide

Users And Security

The supervisor can set the Operator password and the Supervisor password. The supervisor should change both passwords to avoid the factory settings. An operator can change the Operator password.

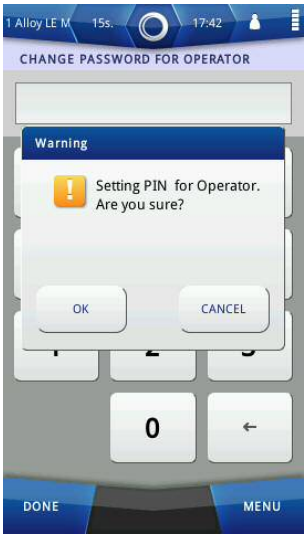
It is possible to quickly change between users. This allows the supervisor to check which methods and menu items the operator can access.

Set Passwords

Follow these steps to change the password.

1. Do one of the following:
   - Navigate: **Menu** > **Settings** > **User Setup**
   - Navigate: **Status Bar** > **User**

   The User Setup screen appears.



2. Tap **Edit** (pencil) next to **Operator** or **Supervisor**, as applicable.
3. Use the numeric keypad to type the new password, and then tap **Done**.

   A Warning dialog box appears.
4. Do one of the following:
   - Tap **OK** to confirm the new password.
   - Tap **Cancel** to discard the new password.

   The User Setup screen appears.
5. Tap **Done** once or twice to return to the main screen.

Switch User

Follow these steps to change the password.

1. Do one of the following:
   - Navigate: **Menu** > **Settings** > **User Setup**
   - Navigate: **Status Bar** > **User**

2. Tap the **Operator** or **Supervisor** tick box, as applicable.
3. Do one of the following:
   - If the switch is to an Operator, tap **Done** once or twice to return to the main screen.
   - If the switch is to a Supervisor, type the password, and then tap **Done**. Tap **Done** once or twice again to return to the main screen.

Advanced Use

The X-MET8000 series is applicable to many different types of measurement. Some applications, for example Positive Material Identification, require more careful sample preparation and measurement techniques. The X-MET8000 series assists these applications because it is possible to include additional information about the sample or the measurement conditions, for example density and thickness, or GPS information from an external receiver. It is then possible to create a report about the measurements.

Sample Preparation

Careful sample preparation gives accurate results. Use this information to prepare the different samples, and follow the guidelines for measurement times.

Prepare Metal Samples

Metals are usually homogeneous, and the results are an accurate representation of the metal. It is necessary to remove any coating or paint and measure it separately, so that it does not affect the results.

Measurement times from 2 s give good results, however light elements require between 5 s and 10 s. Positive Material Identification requires at least a 15 s measurement time, and 30 s is preferable.

Prepare Plastic Samples

The manufacture of plastics uses many metals, for example titanium, lead, cadmium, zinc, iron, bromine.

Use a sample with a minimum thickness of 3 mm for accurate results. Samples with a minimum thickness of 1 mm can only give an indication of the composition. It is necessary to remove any coating or paint and measure it separately, so that it does not affect the results.

X-rays can penetrate a plastic sample and measure whatever is behind it. For example, a measurement of cable insulation can include the cable. Plastic samples also scatter X-rays. Use a background plate for accurate measurements and to reduce X-ray scatter.

Measurement times from 30 s give good results.

Prepare Soil Samples

For quick results, it is possible to measure soil samples on the ground. However, more accurate results require some preparation.

1. Remove any surface debris, for example leaves, grass and stones.
2. Use a 2 mm mesh to remove loose material if there is a lot of debris.
3. Loosen the soil to a depth of a few centimeters and stir to homogenize it.
4. Leave the loosened soil to dry for a few hours or dry it with absorbent paper.
5. Measure the sample on the ground, make sure that the X-MET8000 series is perpendicular to the surface.

Measurement times from 30 s give good results.

Prepare Powders And Pellets

Powders and pellets are usually not homogeneous, and do not give good results. Make sure that they are dry, and then grind them. For accurate results, use a grain size less than 80 µm for Cu and Fe, and less than 20 µm for light elements. However, coarser grain sizes do give good results.

Measurement times from 30 s up to 5 min. can be necessary for good results.

Prepare Printed Circuit Boards And Electronic Components

Printed Circuit Boards are a complex, multi-layer structure with metals, resins, fiberglass and fire retardant chemicals. The result is an average of all the materials in the measurement area. It can be difficult to interpret because the X-ray penetration depth depends upon the layers of material. Therefore, the result is only an indication of the material composition.

It is better to measure individual electronic components in a sample cup. Measurement times from15 s give good results.

Prepare Solder Samples

To comply with the Restriction of Hazardous Substances directive (RoHS), solders must have a lead composition less than 1,000 ppm. The most common solder replacement is tin, silver, copper (Sn/Ag/Cu or SAC). Solder can also contain flux. For accurate results, the solder sample must be homogeneous and uniform.

If solder is measured on a printed circuit board, the board will also be in the measurement window. The result will average the composition of the solder and the board. An accurate RoHS analysis of the solder must measure it on its own, as an homogeneous and uniform sample.

Measurement times from 15 s are required to measure concentrations less than 1,000 ppm.

Prepare Samples For The Bench-top Stand

The bench-top stand is ideal for longer measurement times, which give more accurate results, for example for Positive Material Identification. Use a sample bag or sample cup, and carefully place it over the measurement window. Make sure that the lid is firmly closed, and then take the measurement.

Choose The Right Method

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

The X-MET8000 includes ‘LE’ in some of the method names, for example Stainless LE, Alloy LE FP or Alloy LE Mode. The LE refers to ‘light elements’, and these methods can analyse alloys that include magnesium, aluminum, silicon, phosphorous and sulfur.

The choice of method optimizes all the measurement parameters within the X-MET8000 series so that it can make the most accurate measurement for that particular type of sample. It also chooses a particular calibration to analyze the measurement.

Methods include:

- Auto select modes
- Empirical methods
- Fundamental parameter methods

Auto select modes and fundamental parameter methods are available to an operator. Empirical methods are not available to an operator, because they can choose an auto select mode instead. All methods are available to a supervisor.

Auto Select Modes

Auto select modes have a 'Mode' suffix', for example Alloy Mode, RoHS Mode. After an identification scan, the mode chooses the most applicable method to measure the sample with. It uses this order to choose a calibration:

1. Empirical methods
2. Fundamental parameter methods
3. A recalculation method

The supervisor can define the recalculation method. It is only used when a sample cannot be identified by any of the empirical or fundamental parameter calibrations.

Empirical Methods

Empirical methods are available for many alloy groups, for example: aluminum, cobalt, copper, nickel, low alloy steel, stainless steel, tool steel, solder tin and many more. They compare the unknown sample to a set of calibration curves and other parameters, and then calculate the concentrations of the elements. Measurements from a series of standards with known assay values create the calibration curves for the specific analyzer. The standards have different concentrations of a set of elements that span a range of concentrations.

Empirical methods are more accurate than fundamental parameter methods, but only when the unknown sample is within the range of concentrations. If an element in the unknown sample is outside the range of concentrations, a greater than, >, or less than, <, indicator appears next to the concentration. If this occurs, review the results and decide if another method is more applicable.

Fundamental Parameter Methods

Fundamental parameter methods are abbreviated to 'FP' and uses a complex mathematical analysis of X-ray fluorescence to calculate the concentrations of elements in the sample. It is less accurate than a similar empirical method, but it is accurate over a much wider range of element concentrations.

Alloy FP	Use Alloy FP to analyze the common elements found in alloys. The concentration range for each element is from 0 % to 100 %.
Alloy LE FP	Alloy LE FP is similar to Alloy FP, but also includes the light elements, for example Mg, Al and Si. The concentration range for each element is from 0 % to 100 %.
Metal FP	Use Metal FP to analyze the elements found in alloys and in particular hazardous elements, for example Pb, Cd, Hg and Br. The concentration range for each element is from 0 % to 100 %.
Drywall FP	Use Drywall FP to analyze Sr content found in drywall.
Drywall LE FP	Use Drywall LE FP to analyze S and Sr content found in drywall.
Wood FP	Use Wood FP to analyze Chromated Copper Arsenate(CCA) treated wood.
Precious FP	Use Precious FP to analyze the elements found in alloys and in particular precious metals, for example Au, Ag, Pt. The concentration range for each element is from 0 % to 100 %.
Aluminum FP	Use Aluminum FP to analyze the heavy elements found in aluminum alloys, for example Cr, Cu, Zn and Pb. But, do not use it to analyze light elements, for example Al and Si.
Plastic FP	Use Plastic FP to analyze hazardous elements in plastics, for example Pb, Cd, Hg and Br.

Soil FP	Use Soil FP to analyze heavy element concentrations in soil.
Soil LE FP	Soil LE FP is similar to Soil FP, but also includes the light elements, for example Al and Si.
Mining FP	Use Mining FP to analyze the common elements found in mining, for example Ni, Cu, Zn and Sn.
Mining LE FP	Mining LE FP is similar to Mining FP, but also includes the light elements, for example Al, Si, S and P.
Mining MidS FP	Mining HighS FP is similar to Mining FP
Mining HighS FP	Mining HighS FP is similar to Mining FP

Analyze And Report Results

For RoHS and plastic samples, the density and thickness can affect the result. It is possible to add this information, and improve the measurement accuracy. However, it is necessary to add both thickness and density information to improve the results.

Occasionally, a measurement can produce a peculiar result, for example, a much higher concentration of a particular element. When this occurs, it is possible to view the spectrum for the result. This shows the raw sample information, with a series of peaks for each of the elements in the sample. It is then possible to add XRF lines to the spectrum, for each element in the sample. These lines can clearly show if a peak is associated with a particular element, or not.

An operator can make many measurements during a day. It is possible to record all necessary information about the sample and the measurement conditions, and include this as Additional Information. This will assist the measurement analysis when all the measurements are complete. The supervisor can define the required information. The operator will see the same information fields, and know that they must add this information. When all the measurements are complete, it is possible to connect the X-MET8000 series to a PC and create a report. This can include the density and thickness and any Additional Information. Refer to *Operation With A PC* on page 40 to create a report.

Add Density And Thickness

The density and thickness of the sample are important factors that affect the quality of a measurement. It is possible to record these values with the sample results. Follow these steps to add density and thickness information. It is necessary to add both to improve the measurement accuracy.

1. Navigate: **Menu** > **Sample Name** > **Set Thickness &Density** .

   The Sample Thickness & Density screen appears.

2. Tap the **ON** tick box.

   The Sample Thickness & Density screen changes.

3. Do one of the following:

   - Tap **Sample Thickness**
   - Tap **Sample Density**

4. Use the numeric keypad to type the value, and then tap **Done** to return to the Sample Thickness & Density screen.
5. Tap **Done** twice again to return to the main screen.

Add An Item To Additional Information

It is possible to add Additional Information about the sample. The measurement result can include this information. The supervisor can add items for an operator to use and add details to, when they make measurements. The detail for the item could be a prompt to assist the operator.

These are some examples of Additional Information:

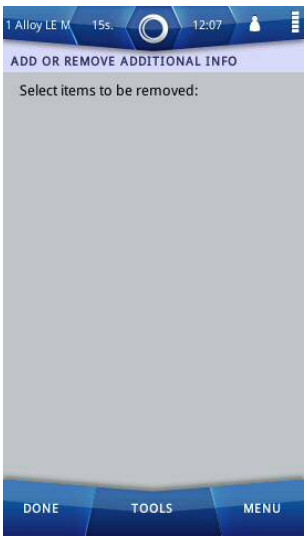
- The name of the operator.
- The sample condition: wet or dry, fine or coarse.
- Notes about the sample preparation: paint or coating removal; use of a sample cup or the background plate.

Follow these steps to add an item to Additional Information, and then add a detail to the new item.

Add a new item.

1. Navigate: **Menu** > **Sample Name** .

   The Sample Information screen appears.

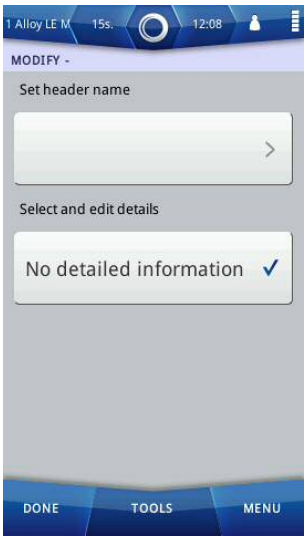


2. Tap: **Tools** > **Add or Remove** .

   The Add Or Remove Additional Info screen appears.

3. Tap: **Tools** > **Add New Item** .

   The Add Or Remove Additional Info screen has a new, blank item.

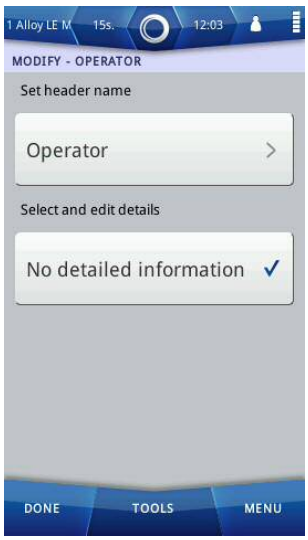


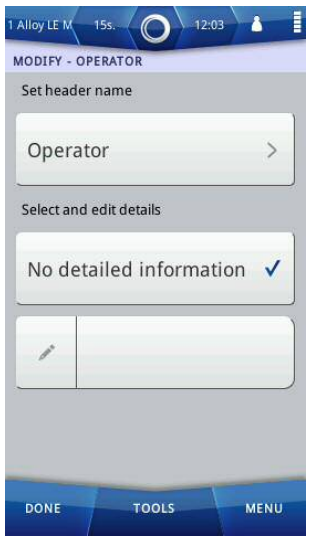
4. Tap **Edit** (pencil) next to the new item.

   The Modify - screen appears.

5. Tap the blank item box.

6. Use the virtual keyboard to type the name for the new item, and then tap **Done** to return to the Modify - screen.



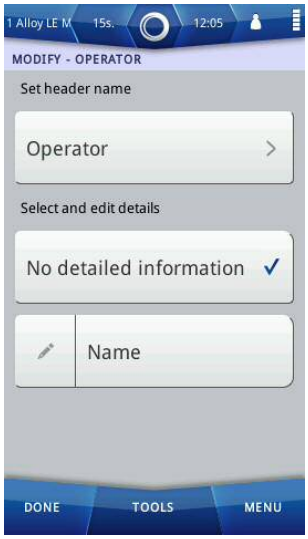


Add a detail to the new item.

7. Tap: **Tools** > **Add New Detail** .

   A new, blank detail appears on the Modify - screen.

8. Tap **Edit** next to the new detail.
9. Use the virtual keyboard to type the new detail, and then tap **Done** to return to the Modify - screen.



10. Tap the new detail box to select it, and then tap **Done** to return to the Add Or Remove Additional Info screen.
11. Tap **Done** again to return to the Sample Information screen.

    The Sample Information screen includes the new item, with its detail.

12. Tap the new item box to select it, and then tap **Done** to return to the main screen.

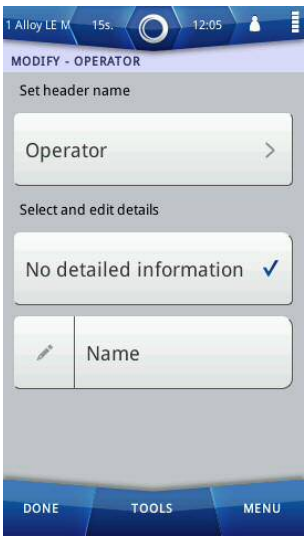
Edit Detail For An Item Of Additional Information

It is possible to add Additional Information about the sample. The supervisor can add items for an operator to use when they make measurements. The operator must edit the details, and make sure that both the item and the detail for the item are selected.

Follow these steps to edit the details for an item of Additional Information that already exists.

1. Navigate: **Menu** > **Sample Name** .

   The Sample Information screen appears, with one or more items of Additional Information.



2. Tap **Edit** (pencil) next to the item of Additional Information.

   The Modify - screen appears.

3. Tap **Edit** next to the detail.
4. Use the virtual keyboard to type the new value for the detail, and then tap **Done** to return to the Modify - screen.
5. Make sure that the details box is selected, and if necessary, tap it to select it. Then tap **Done**.

   The Sample Information screen shows the changes to the item of Additional Information.

6. Make sure that the item of Additional Information is selected, and if necessary, tap it to select it. Then tap **Done** to return to the main screen.

View The Spectra

It is possible to view the X-ray spectrum for a result. This can confirm if an element does have the concentration shown in the results. It is possible to zoom into the spectrum, and also show the X-ray fluorescence lines for selected elements.

It is possible for a single result to have more than one spectrum. This is often the case for the X-MET7500 when it measures light elements. Different measurement conditions produce the spectra, for example, different excitation voltages. The individual spectra are shown on the same graph in different colours. It is possible to scroll between the measurement conditions for the spectra.

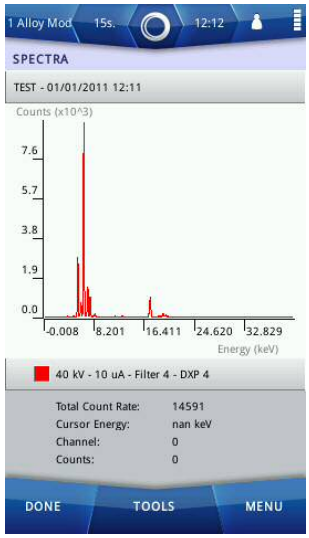
It is possible to view the spectrum for all results, from the Results screen and the History Results screen.

Follow these steps to view the spectrum, when a result is visible.

Access spectrum

1. From the Results screen, the History Results screen or the Test Measurement screen, tap: **Tools** > **Show Spectra** .

   The Spectrum screen appears.



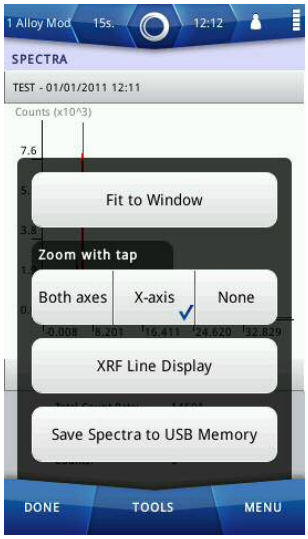
2. If there is more than one spectrum, tap the small black arrow at the bottom of the screen on the left or right.

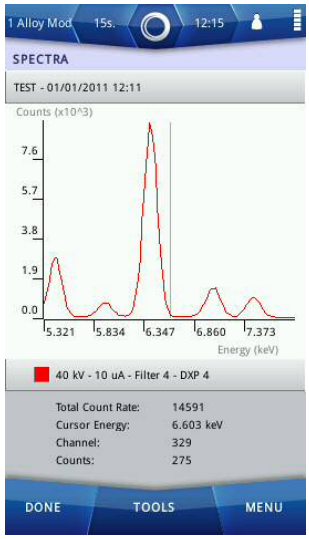
   The Spectrum screen changes to show the other measurement conditions, and its spectrum is put in front.

Zoom Into The Spectrum

3. Tap **Tools**.

   The Spectrum screen Tools menu appears.





4. Tap one of the **Zoom with tap** options.
   - Choose **Both axes** to be able to zoom into a small peak.
   - Choose **X-axis** to show each peak relative to the main peak.
5. Tap one of the peaks to zoom into it. Tap it successively to zoom into it again.

   A cursor line appears on the spectrum, and moves to where the tap occurred.

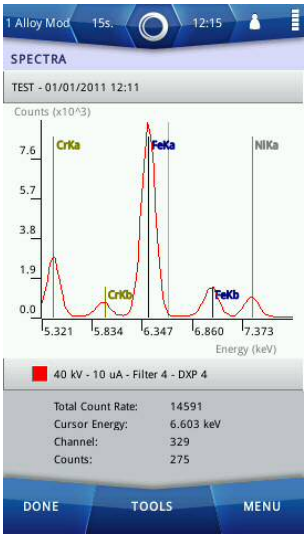
   The energy at the cursor appears underneath the spectrum.

   Press and slide the spectrum to left or right to find the peaks.
6. Tap: **Tools** > **Fit to Window** to return to the whole spectrum.

Add XRF Lines To The Spectrum

7. Tap: **Tools** > **XRF Line Display** .

   The Select Elements screen appears.



8. Tap an element symbol to select it.

   Press and slide, or flick the list to scroll up and down to find an element.

   Refer to: *Select Elements* on page 114 to sort and search the element list.
9. Tap **Done** to return to the Spectrum screen.

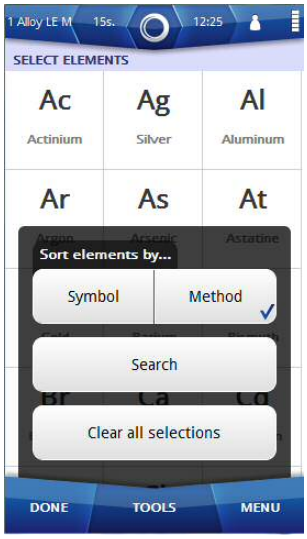
   The spectrum now includes the XRF lines for the selected elements.
10. Tap **Done** to return to the Results screen.

Select Elements

Follow these steps to select elements, when the Select Elements screen appears.

1. Tap **Tools** to sort and search the element list.

   The Select Elements screen Tools menu appears.

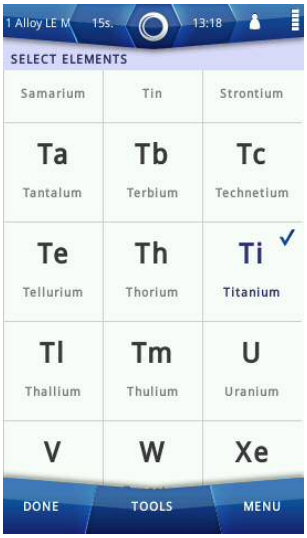


2. Tap **Search**

   The Add Elements - Search screen appears, with the virtual keyboard.

3. Type the first letter of the element.

   Elements with that first letter in the name or symbol appear.



4. If necessary, type a second letter, or tap the required element if it is visible.

   The Select Elements screen appears, with the element selected.

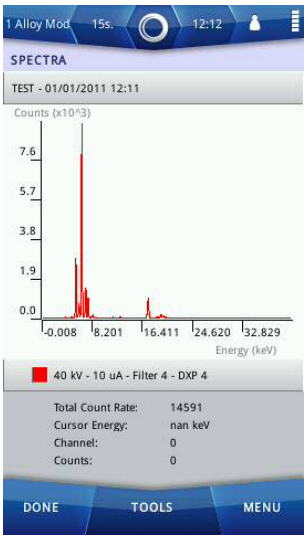
   Repeat these steps to add all elements.

5. If necessary, tap **Clear all the selections** to clear the element selection.

Save The Spectra

Follow these steps to save the spectra to TXT files on 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. From the Results screen, the History Results screen or the Test Measurement screen, tap: **Tools** > **Show Spectra** .

   The Spectrum screen appears.
4. Tap: **Tools** > **Save Spectra to USB Memory** .

   The spectra are each saved to its own TXT file on the USB memory device.
5. Tap **Done** to return to the Results screen.

Modify The Results Screen

The X-MET8000 series has powerful features to show results. As well as Normal for single measurements and Average for batch measurements, a supervisor can create a custom Results screen format. These can include:

- A specific set of elements.
- The information shown for each element.
- High and low limits for each element, with optional colour coding and an alarm message.
- Alarm messages for combinations of element limits.

Results screen formats do not change the XRF analysis. It is possible to switch from a custom format with a restricted set of elements to Normal to see the full set of results. Custom formats are ideal for repetitive analysis and production environments. These can allow an operator to quickly determine whether a measurement meets specification (pass or fail), or whether a confirmation measurement is necessary.

When analysing metals, the results are compared to the comprehensive grade table, and all Results screen formats include grade information. The grade table uses AISI, other available grade tables include DIN, JIS and Au Karat grades. The supervisor can edit grades, and can add new grades. For example, a supervisor can use a custom grade to indicate a successful match to a specific set of criteria. In production environments, a successful match could indicate a pass, and in a RoHS environment it could indicate a safe sample.

The grade table is selected in the result view settings and should be selected according to the method. A supervisor would need to instruct an operator to use a specific method or choice of methods, with a specific Results screen format. This combination of method and Results screen format would allow an operator to quickly assess samples, and derive the necessary results.

About Results Screen Formats

A supervisor can create a custom Results screen format. This is limited to a specific set of elements, and only those elements appear on the Results screen. The supervisor can choose the elements to include in the screen format. This does not, however, affect the actual measurement, but only how the results from the measurement are shown. If a chosen element is not included in a particular method, the result for that element is not applicable, and the screen shows ‘N/A’.

The supervisor can choose what information about the elements to include on the Results screen, such as the concentration unit and displayed columns. The units to show element concentrations and a choice of Results screen columns.

Each element selected for the screen format can have an optional low limit or a high limit or both. If the result is less than the low limit, or greater than the high limit, then it trips that limit. When a measurement trips a limit, the screen shows this with a choice of colour or an alarm message or both. The available colours are from the simple traffic light system: green, orange and red. The supervisor can define the text of the alarm message. Limits are always a percentage value, even when the Results screen shows the value in parts per million.

One of the parameters to set is a +/- Coefficient, for the standard deviation. It adjusts the limits to account for the spread of measurements. The +/- Coefficient is typically an integer between 0 and 5, and has the effect of reducing the low alarm limit, and increasing the high alarm limit.

In addition to the alarm for each individual element, the supervisor can set one or more additional alarms that use combinations of the element limits. A combination alarm can use one or more of the limits set for individual elements. The combination can be a logical OR, or a logical AND. A measurement trips a logical OR alarm when it trips any of the selected limits, but only trips a logical AND alarm when it trips all of the selected limits. The supervisor can define the text of the alarm message.

Alarms are only activated after the Minimum Test Time. This is to ensure that the alarms are not tripped too soon during a measurement.

Pseudo-elements

Using Pseudo Elements the X-MET8000 series can show user-specified materials "Pseudo-elements".

Each new Pseudo-element will be stored and added to the list of Pseudo-elements available.

It is possible for a supervisor to add, edit and remove compounds in the Pseudo-elements settings.

A Pseudo-element can use equations to link any elements and analytes together. For example, in the cement industry they might use the Lime Saturation Factor to control their process "LSF = 0.715*Ca/(1.784*Si+0.635*Al+0.454*Fe)".

Balance

Balance function in the X-MET8000 series informs the user of how much in the sample is not reported.

Balance can be enabled in the **Result Format** Menu.

Balance = 100% - Sum (all displayed elements).

Balance informs the user of how much in the sample is not “reported”. This could be non-measurable elements (C, O, N, or lights elements) or elements that the user chose not to display.

Note: “All displayed elements” are all elements selected for display. This does not use the compounds concentrations. It uses elemental concentrations.

A Custom Results Screen

The X-MET8000 series provides full control of all these aspects of the Results screen.

Table 2: Typical custom Results screen

1. Element list
2. +/- Coefficient
3. Coloured individual alarms
4. Individual alarm message
5. Combination alarm message

Element list	Select the elements that appear on the Results screen.
+/- Coefficient	Select the +/- Coefficient that appear on the Results screen.
Coloured individual alarms	Colour coded alarms can follow the traffic light system.
Individual alarm message	Create messages for individual alarms.
Combination alarm message	Create messages for a combination of alarms.

Table 3: Typical custom Results screen with Pseudo-elements and Balance

1. Pseudo-element list
2. +/- Coefficient
3. Element list
4. Coloured individual alarms
5. Balance

Pseudo-element list	The selected Pseudo-elements appear first on the Results screen.
Element list	Select the elements that appear on the Results screen.
+/- Coefficient	Select the +/- Coefficient that appear on the Results screen.
Coloured individual alarms	Colour coded alarms can follow the traffic light system.
Balance	Balance = 100% - Sum (all displayed elements).

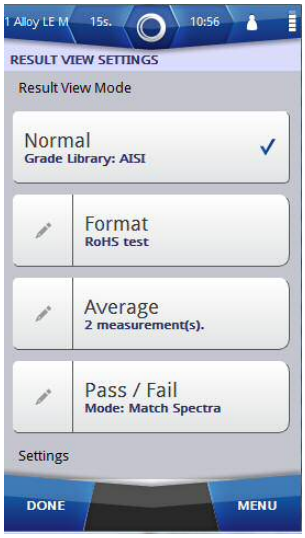
Add A New Results Screen Format

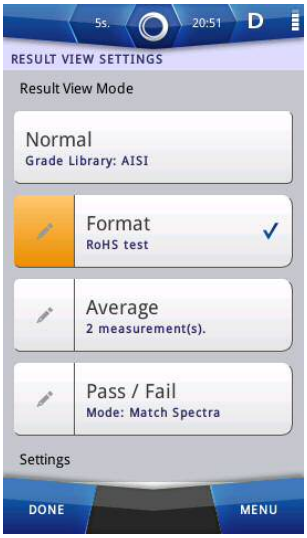
Follow these steps to add a custom results format and select the elements and Pseudo-elements to include in the results format.

Add A Results Format

1. Navigate: **Menu** > **Settings** > **Result View Settings** .

   The Result View Settings screen appears.





2. Tap **Edit** (pencil) next to **Format** to view the available results formats.

   The Available Result Format screen appears.

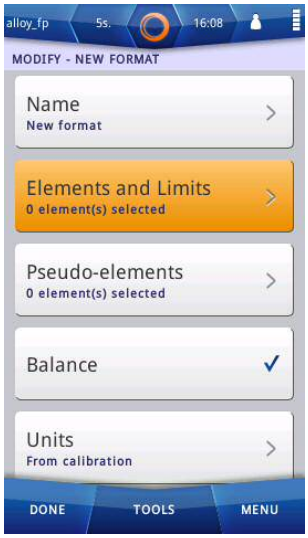
3. Tap: **Tools** > **Add New**.

   The Available Result Formats screen has a new results format.

4. Tap **Edit** (pencil) next to **New format**.

   The Modify - screen appears.

5. Tap: **Name** to enter a name for the result format.
6. Enter an appropriate name using the virtual keyboard and then tap **Done** to return to the Modify - screen.



7. Tap: **Elements And Limits**.

   The Elements And Limits screen appears.

8. Tap: **Tools** > **Add Element**.

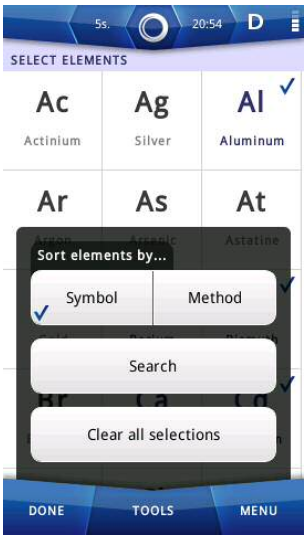
   The Elements selection screen appears.

9. Tap an element symbol to select it. Selected elements will have a checkmark.

   Press and slide, or flick the list to scroll up and down to find an element.

   Refer to: *Select Elements* on page 114 to sort and search the element list.

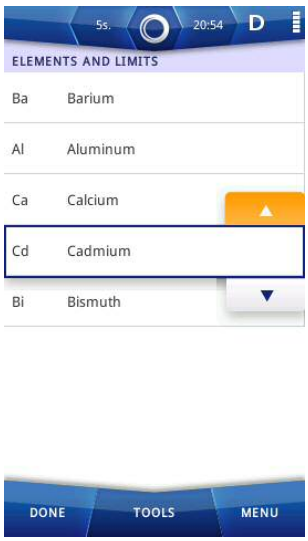
   Note: It is possible at this stage to select elements even if they are not included in the methods/calibrations.

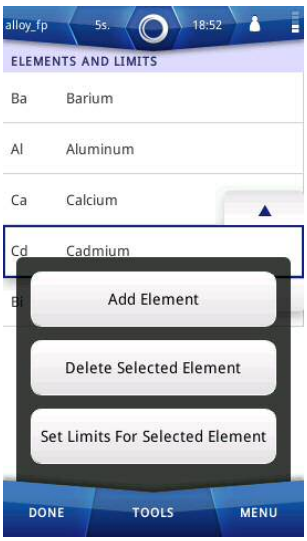


10. Tap **Done** to return to the Elements And Limits screen.

    The results format includes the selected elements.

    To reorder the element list, tap the up or down arrow on the element line.

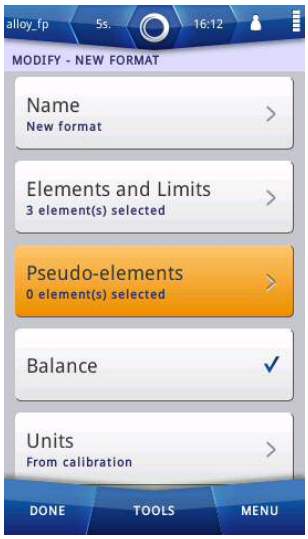




11. Tap **Tools** to add or delete elements from the list, and to set limits for the selected element. To Add Combination Alarms, refer to *Add Combination Alarms* on page 132.
12. Tap **Done** to return to the Modify - screen.

13. Do one of the following:

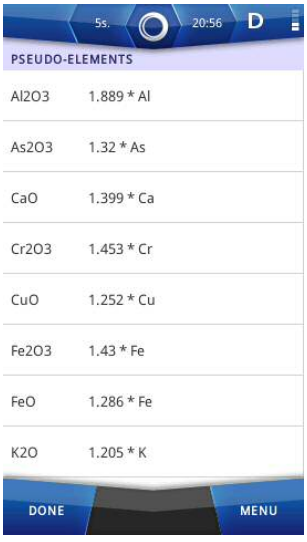
- Tap **Pseudo-elements** to add Pseudo-elements to the results format.
- To continue without adding Pseudo-elements, proceed to step *20* on page 124.



14. Tap **Tools** > **Add Element** .

The Pseudo-elements list appears.

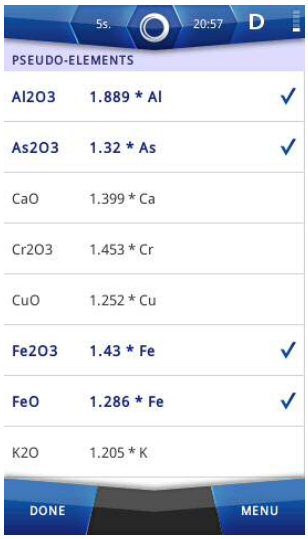
If the desired Pseudo-element is not listed, the supervisor can create a new one in Results View Settings.

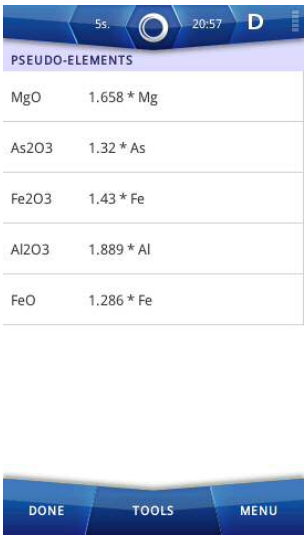


15. Tick the Pseudo-elements and compounds to include in the result format.

    Press and slide, or flick the list to scroll up and down to find an element.

    The selected Pseudo-elements have a checkmark next to them.

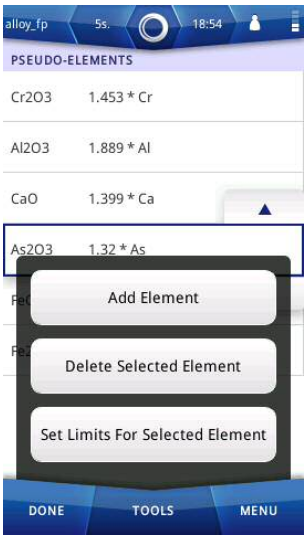




16. Tap **Done** to return to the Pseudo-elements screen.

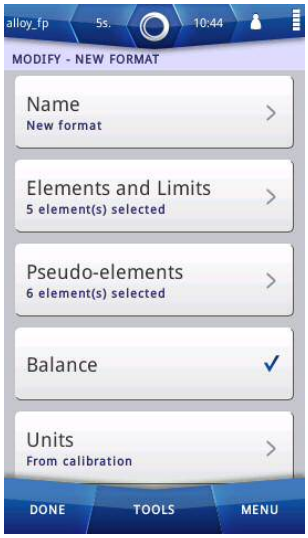
    The results format includes the selected Pseudo-elements.

    To reorder the Pseudo-element list, tap the up or down arrow on the Pseudo-element line.



17. Tap **Tools** to add or delete Pseudo-elements from the selection, or to set limits for selected Pseudo-elements. To Add Combination Alarms, refer to *Add Combination Alarms* on page 132.

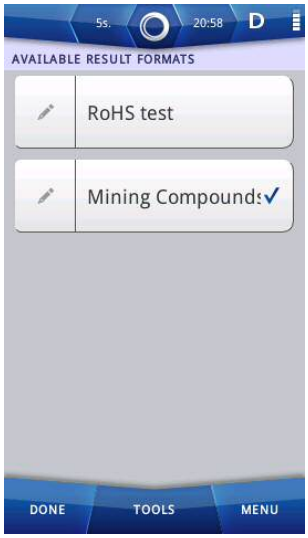
18. Tap **Done** to return to the Modify - screen.



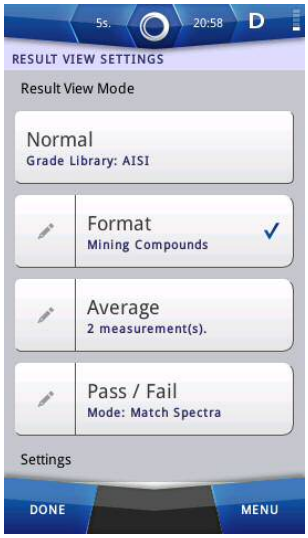
19. Tap **Balance** to enable or disable the Balance function.

    Balance has a tick against it when enabled.

20. Tap **Done** again to return to the Available Result Formats screen. Make sure that the applicable result format has a tick against it.



21. Tap **Done** again to return to the Result View Settings screen. Make sure that **Format** has a tick against it.



22. Tap **Done** twice again to return to the main screen.

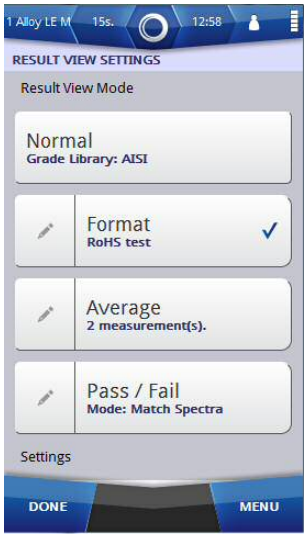
Configure A Results Screen Format

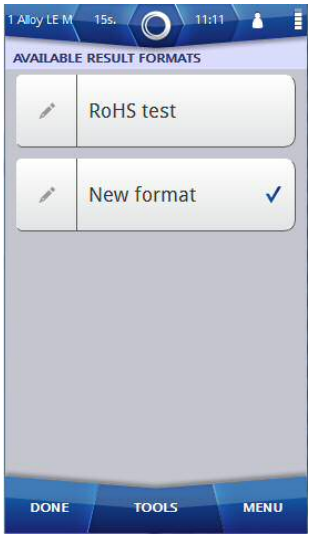
It is necessary to add a custom Results screen format before this procedure. Alarms are only activated after the Minimum Test Time. Follow these steps to configure the Results screen format.

Select The Results Screen Format

1. Navigate: **Menu** > **Settings** > **Result View Settings** .

   The Result View Settings screen appears.





2. Tap **Edit** (pencil) next to **Format**.

   The Available Result Formats screen appears.

3. Tap **Edit** (pencil) next to the applicable format.

   The Modify - screen appears.

Select The Units

4. Tap **Units**.

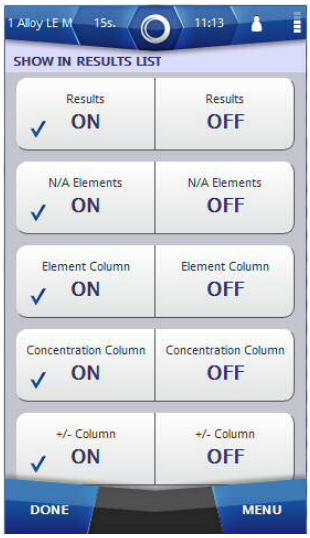
   The Units screen appears.

5. Tap one of the following to choose the units for the result format:
   - **PPM**
   - **Percent**
   - **From Calibration**
6. Tap **Edit** (pencil) next to **Percent**.
7. Use the numeric keypad to type the number of decimal places to show, and then tap **Done** to return to the Units screen.
8. Tap **Done** to return to the Modify - screen.

Select The Results Screen Columns

9. Tap **Result Columns**.

   The Show In Results List screen appears.

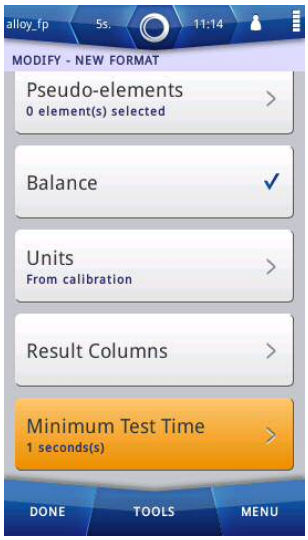


10. Tap **ON** or **OFF** for each of the settings, as applicable, and then tap **Done** to return to the Modify - screen.

Set The Minimum Test Time

11. Tap **Minimum Test Time**.

    The Set Minimum Test Time screen appears.



12. Use the numeric keypad to type the minimum test time, and then tap **Done** to return to the Modify - screen.
13. Tap **Done** twice to return to the Result View Settings screen.
14. Tap **Done** twice again to return to the main screen.

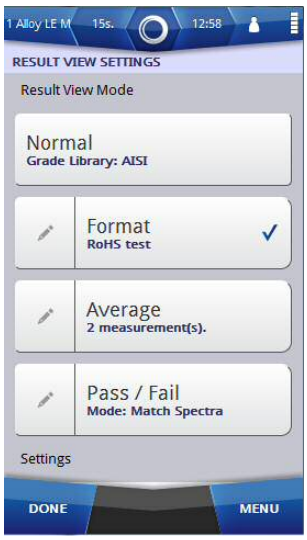
Add Limits And Individual Alarms

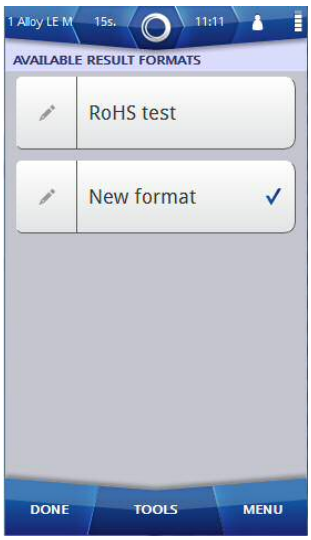
It is necessary to add a custom Results screen format before this procedure. Limits are always a percentage value, even when the Results screen shows the value in parts per million. The +/- Coefficient is typically an integer between 0 and 5, and has the effect of reducing the low alarm limit, and increasing the high alarm limit. Follow these steps to add the limits and an alarm on an individual element.

Select The Results Format

1. Navigate: **Menu** > **Settings** > **Result View Settings** .

   The Result View Settings screen appears.





2. Tap **Edit** (pencil) next to **Format**.

   The Available Result Formats screen appears.

3. Tap **Edit** (pencil) next to the applicable format.

   The Modify - screen appears.

Select The Element

4. Do one of the following:

   - Tap **Elements And Limits**
   - Tap **Pseudo-elements**

   Note: The same procedure applies for Elements and Pseudo-elements.

5. Select the element, and then tap: **Tools** > **Set Limits For Selected Element** .

   The Set Limits - screen appears.

Add The Limits

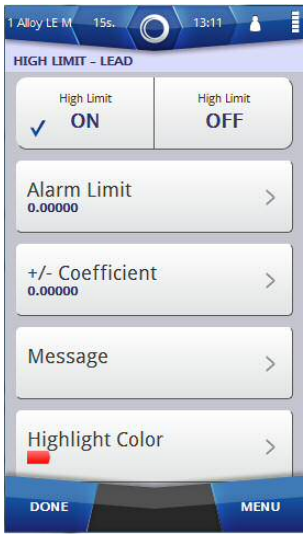
6. Do one of the following:

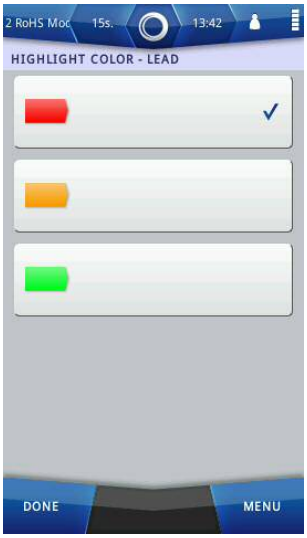
   - Tap **Low Limit**
   - Tap **High Limit**

   The applicable Limit - screen appears.

7. Tap the **ON** tick box.

   The Limit - screen changes.





8. Tap **Alarm Limit**.
9. Use the numeric keypad to type the value for the limit, and then tap **Done** to return to the Limit - screen.
10. Tap **+/- Coefficient**.
11. Use the numeric keypad to type the value for the standard deviation coefficient, and then tap **Done** to return to the Limit - screen.
12. Tap **Message**.
13. Use the virtual keyboard to type the message for the limit, and then tap **Done** to return to the Limit - screen.
14. Tap **Highlight Colour**.

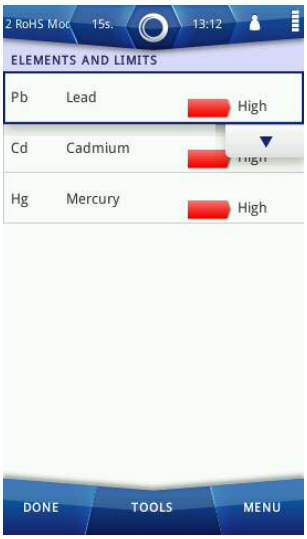
    The Highlight Colour - screen appears.

15. Tap one of the colours, and then tap **Done** to return to the Limit - screen.

16. Tap **Done** to return to the Set Limits - screen.

    Repeat these steps for the other limit, if required.

    The Set Limits - screen shows a summary of the limits.



17. Tap **Done** to return to the Elements And Limits screen.

    Repeat these steps for the other elements, if required.

    The Elements And Limits screen shows the elements and their limits.

18. Tap **Done** five times to return to the main screen.

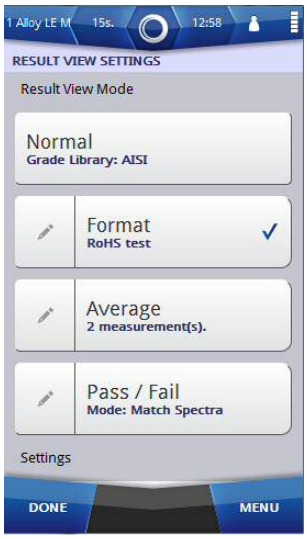
Add Combination Alarms

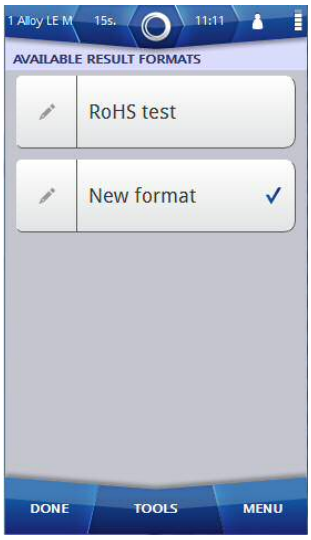
It is necessary to add a custom Results screen format before this procedure. It is also necessary to add limits to individual elements. The combination can be a logical OR, or a logical AND. A measurement trips a logical OR alarm when it trips any of the selected limits, but only trips a logical AND alarm when it trips all of the selected limits. Follow these steps to add a combination alarm.

Select The Results Format

1. Navigate: **Menu** > **Settings** > **Result View Settings** .

   The Result View Settings screen appears.





2. Tap **Edit** (pencil) next to **Format**.

   The Available Result Formats screen appears.

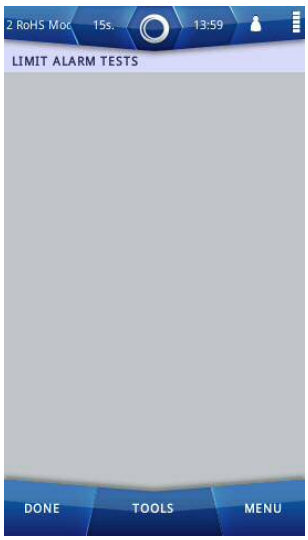
3. Tap **Edit** (pencil) next to the applicable format.

   The Modify - screen appears.

Select The Element

4. Tap: **Tools** > **Create Limit Alarm Tests** .

   The Limit Alarm Tests screen appears.



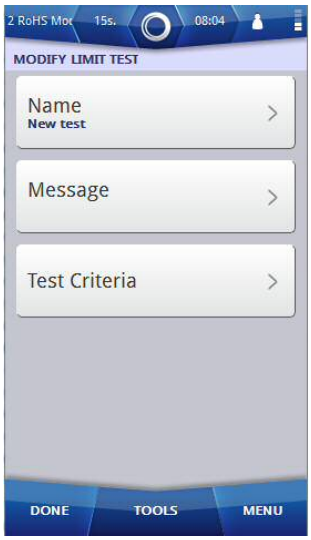
Add A Combination Alarm

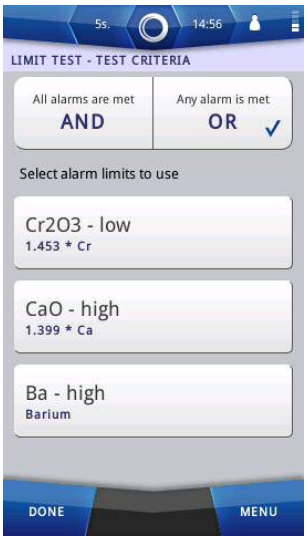
5. Tap: **Tools** > **Add New** .

   The Limit Alarm Tests screen has a new combination alarm.

6. Tap **New Test**.

   The Modify Limit Test screen appears.





7. Tap **Name**.
8. Use the virtual keyboard to type a name for the combination alarm, and then tap **Done** to return to the Modify Limit Test screen.
9. Tap **Message**.

10. Use the virtual keyboard to type the message for the alarm, and then tap **Done** to return to the Modify Limit Test screen.
11. Tap **Test Criteria**.

    The Limit Test - Test Criteria screen appears.

    It includes all the limits for the individual elements and Pseudo-elements included in the result format with Pseudo-elements limits presented first.
12. Do one of the following:

    - Tap **AND**
    - Tap **OR**
13. Tap the individual alarms to select them for the combination, and then tap **Done** to return to the Modify Limit Test screen.
14. Tap **Done** to return to the Limit Alarm Tests screen.

    This shows the name of the new combination alarm.
15. Tap **Done** six times to return to the main screen.

About The Grade Table

The X-MET8000 series contains a very extensive grade library based on grades defined by AISI,DIN,JIS and GB standards. Every user can choose the correct table for his or her own needs. When a measurement uses a particular method, selecting an applicable grade table provides the possible grades for the sample. For some materials there are very extensive grade tables, for example iron and stainless steel, however grade tables are not available for all materials, for example plastics.

It is possible for a supervisor to edit existing grades in the table, and it is possible to add new grades to a table. It is also possible to delete a grade, and to delete analytes from a grade.

There are three main steps to configure a new grade:

- Add a new grade, and define its name.
- Add analytes to the grade.
- Set the limits for each analyte.

It is also possible to define the precision and the limits that define a match to a grade, and the number of possible matches. These settings affect all grades for every method. The grade settings are:

- The maximum number of possible grades shown.
- The coefficient for a grade match.
- The limits that define good and possible matches.

Use this table as a guide to adjust these settings.

Value	Typical Setting	Easier to match	Harder to match
Grade coefficient	1.0	Increase	Decrease
Good match	1.0	Increase	Decrease
Possible match	5.0	Increase	Decrease

If the grade coefficient is set to 0, the result must be within the grade upper and lower limit to display the corresponding grade name. If the coefficient is set to n (n= an integer > 0), grade limits are expanded by n*RMS error. Value 1 is a good starting point.

Good match limit is the threshold limit for Good match. A difference value is calculated how close the measurement result is compared to the grade specification. If the results of all elements match the grade specification, the difference is 0.

If the difference is higher than the Good match limit, but lower than the Possible match limit, this is presented as a Possible match.

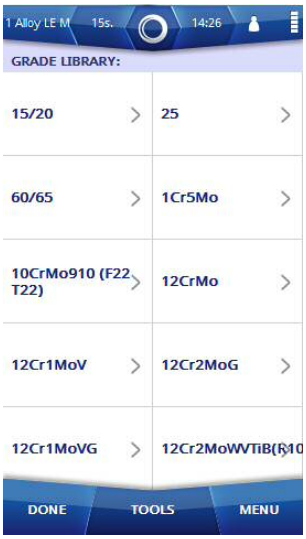
Add A Grade To A Grade Table

Follow these steps to add a grade to a grade table, add analytes to the new grade, and set limits for an analyte.

Add A Grade

1. Navigate: **Menu** > **Settings** > **Result View Settings** > **Grade** > **Grade Table Editor** .

   The Available Grade Libraries screen appears.

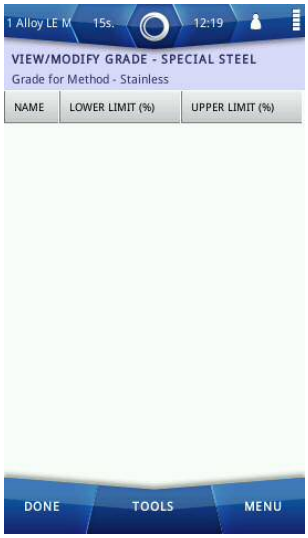


2. If the list of grade libraries is long, press and slide the list to scroll it up or down, then tap a Grade Library to select it.
3. Tap **Edit** (pencil) next to the grade to show the grade library.

   The Grade Library screen appears.
4. Tap: **Tools** > **Add Grade** .

5. Use the virtual keyboard to type the name for the new grade, and then tap **Done** and scroll down to the newly created Grade and tap on it.

   The View/Modify Grade - screen appears.



Add Analytes To The Grade

6. Tap: **Tools** > **Add Analyte(s) to Grade** .

   The Select Elements screen appears.

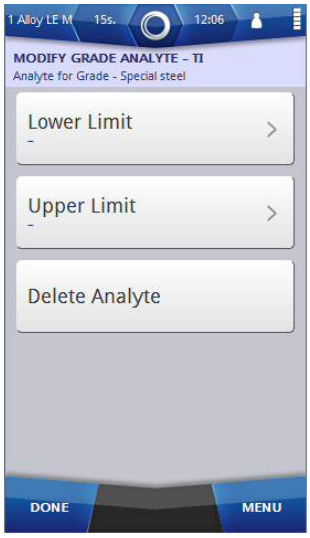
7. Tap an element symbol to select it.

   Press and slide, or flick the list to scroll up and down to find an element.

   Refer to: *Select Elements* on page 114 to sort and search the element list.

8. Tap **Done** to return to the View/Modify Grade - screen.

   The grade includes the selected elements.



Set Limits For The Analytes

9. Tap one of the analytes.

   The Modify Grade Analyte - screen appears.

10. Do one of the following:

    - Tap **Lower Limit**
    - Tap **Upper Limit**

11. Use the numeric keypad to type the value, and then tap **Done**.

    Repeat these steps for the other limit, if required.

12. Tap **Delete Analyte**, if required.

    Warning dialog box appears. Select OK.This removes the analyte from the grade, and returns to the View/Modify Grade - screen.

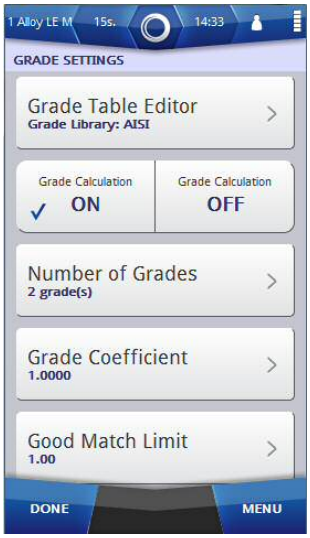
13. Tap **Done** to return to the View/Modify Grade - screen, and tap **Done** again to return to the Grade Library for the Method.
14. Tap **Done** five times to return to the main screen.

Configure Grade Settings

The grade settings are all numeric values. Follow these steps to configure them.

1. Navigate: **Menu** > **Settings** > **Result View Settings** > **Grade** .

   The Grade Settings screen appears.



2. For Grade Calculation, tap the **ON** tick box.
   When **ON** is selected, the result screen will show a grade.
3. Do one of the following:

   - Tap **Number of Grades**
   - Tap **Grade Coefficient**
   - Tap **Good Match Limit**
   - Tap **Possible Match Limit**

4. Use the numeric keypad to type the new value, and then tap **Done** to return to the Grade Settings screen.

   Repeat these steps for other grade settings, if required.

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

About Pseudo Elements

If the desired Pseudo-element is not listed, the supervisor can create a new one in the global list of Pseudo-elements.

It is possible for a supervisor to add, edit and remove compounds in the Pseudo-elements settings. A Pseudo-element can use equations to link any elements and analytes together. For example, in the cement industry they might use the Lime Saturation Factor to control their process "LSF = 0.715*Ca/(1.784*Si+0.635*Al+0.454*Fe)".

How to calculate an element-to-compound concentration conversion factor:

Element A is displayed as compound $A_xB_yC_z$.

M_A is the atomic mass of element A, M_B the atomic mass of element B, etc.

The atomic mass of the compound is: $xM_A+yM_B+zM_C$.

The conversion factor from A to $A_xB_yC_z$ is $(xM_A+yM_B+zM_C)/xM_A$.

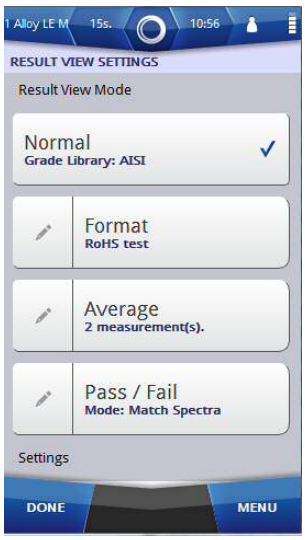
Create A New Pseudo Element

Follow these steps to create a new Pseudo-element.

Note: The supervisor will also be able to delete compounds.

1. Navigate: **Menu** > **Settings** > **Result View Settings** .

   The Result View Settings screen appears.



2. Scroll down to **Settings** and Tap **Pseudo-elements**.

   The Available Pseudo-elements screen appears.

3. Tap: **Tools** > **Create New Element** .

   The Add/Edit Pseudo-element screen appears.

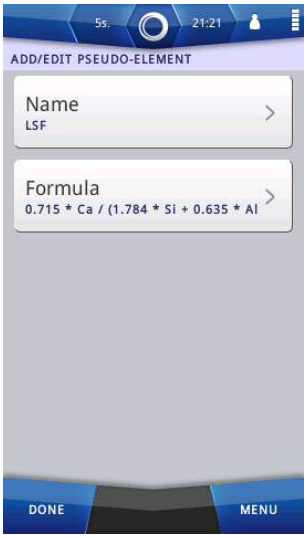
4. Tap **Name**.
5. Enter an appropriate name using the virtual keyboard and then tap **Done** to return to the Add/Edit - screen.

6. Tap **Formula** to enter a formula for the new Pseudo-element.

7. Enter an appropriate name using the virtual keyboard and then tap **Done** to return to the Add/Edit - screen.

   The formula can include any elements and analytes and supports basic math functions **+ - * / ^** and **( )**.

   The formula does not check for elements and analytes so ensure that the correct element or analyte chemical symbols are used. Errors or division by zero in the formula results in **N/A** results.



8. Tap **Done** to return to the Pseudo-elements - screen.

9. Tap **Done** to return to the Result View Settings - screen.

   The new Pseudo-element can now be included in custom result formats.

10. Tap **Done** twice again to return to the main screen.

Wireless Network Use Cases

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 trough 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 manual will in detail explain 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.

Trough 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 trough a VNC connection and using most common WEB browsers. This manual includes instructions on how to setup and control the X-MET8000 series using a WEB browser running on a PC and trough 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.

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 precision GPS receiver for mining applications, and it is possible to check the GPS information from the X-MET8000 series. 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 pre existing infrastructure, such as access points in managed wireless networks. Network shared folders and printer will most likely not work trough an ad hoc network

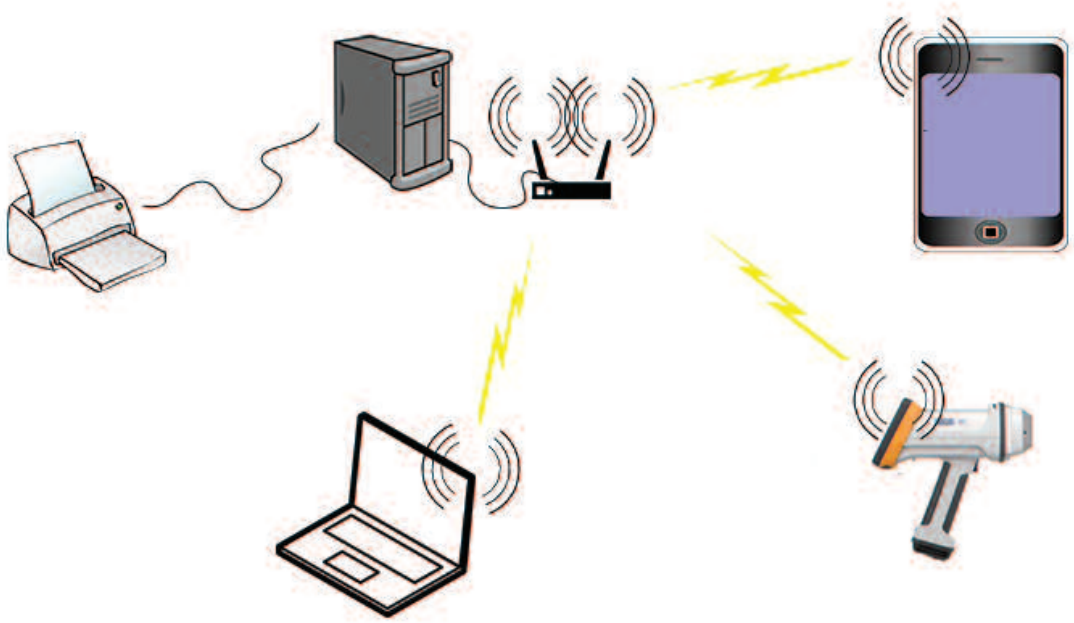
A managed Wi-Fi network utilizes access points providing wireless access to the network infrastructure including shared folders and printers

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 connects the clients to the network, shared resources are accessible from all network connected clients.

Add A Bluetooth Connection

Follow these steps to connect to a Bluetooth device.

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

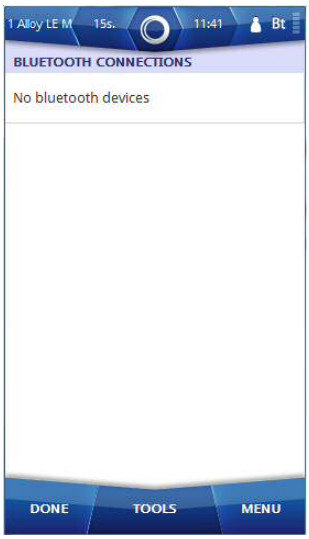
   The Wireless screen appears.

2. Tap **Bluetooth**.

   The Bluetooth Settings screen appears.

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

   The Bluetooth Settings screen changes.



4. Tap **Set Device Name**.
5. Use the virtual keyboard to type an applicable name, and then tap **Done** to return to the Bluetooth Settings screen.
6. Tap **View Connections**.

   The Bluetooth Connections screen appears.

7. Tap: **Tools** > **Discover New Devices** .

   The Bluetooth Device Discovery screen appears, and a search for the Bluetooth devices begins.

   When the search is complete, the screen shows the available Bluetooth devices.

8. If necessary, tap: **Tools** > **Discover Again** .

   Another search for the Bluetooth devices begins, and the Bluetooth Device Discovery screen updates.

9. Tap on one of the discovered bluetooth devices.

   The Set Pin Code for Bluetooth Device screen appears.

10. Enter the correct Pin Code.
11. Tap **Done** twice to return to the Bluetooth Connections screen.

    The Bluetooth device is added to the Bluetooth Connections screen.

12. Tap on the newly added bluetooth device and select **Tools** and choose one of the applicable options.

    The Bluetooth Connections screen updates.

13. Tap **Done** to return to the Bluetooth Settings screen.
14. Tap **Done** twice again to return to the main screen.

Add A Bluetooth Keyboard

Follow these steps to add a Bluetooth keyboard directly to the X-MET8000 series.

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

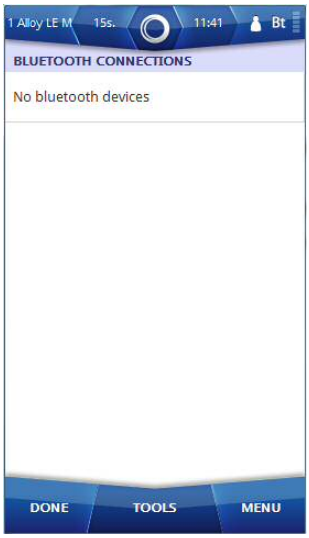
   The Wireless screen appears.

2. Tap **Bluetooth**.

   The Bluetooth Settings screen appears.

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

   The Bluetooth Settings screen changes.



4. Tap **Set Device Name**.
5. Use the virtual keyboard to type an applicable name, and then tap **Done** to return to the Bluetooth Settings screen.
6. Tap **View Connections**.

   The Bluetooth Connections screen appears.

7. Tap: **Tools** > **Discover New Devices** .

   The Bluetooth Device Discovery screen appears, and a search for the Bluetooth devices begins.

   When the search is complete, the screen shows the available Bluetooth devices.

8. If necessary, tap: **Tools** > **Discover Again** .

   Another search for the Bluetooth devices begins, and the Bluetooth Device Discovery screen updates.

9. Tap on the discovered Bluetooth keyboard.

   The Set Pin Code for Bluetooth Device screen appears.

10. Enter the correct Pin Code, verify the correct code from the keyboard manual if necessary.

    Tip: If the password does not work, try typing the passkey on the touch screen, then type the same passkey and press <ENTER> on the Bluetooth keyboard.

    Please refer to the keyboard manual for additional information on pairing the keyboard.

11. Tap **Done** twice to return to the Bluetooth Connections screen.

    The Bluetooth keyboard is added to the Bluetooth Connections screen.

12. Tap on the newly added bluetooth keyboard and select **Tools** > **Connect To Input** .

    The Bluetooth Connections screen updates. An information message is displayed informing that the keyboard is connected.

13. Tap **Done** to return to the Bluetooth Settings screen.
14. Tap **Done** twice again to return to the main screen.

The Bluetooth keyboard can no be used as input device in all fields where text or numeric input is applicable.

Check GPS Information

Once a Bluetooth connection is made to the GPS receiver, it is possible to check the GPS position data and satellite information. Follow these steps to check the GPS information.

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

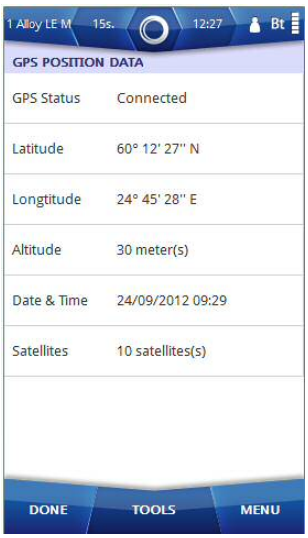
   The Wireless screen appears.

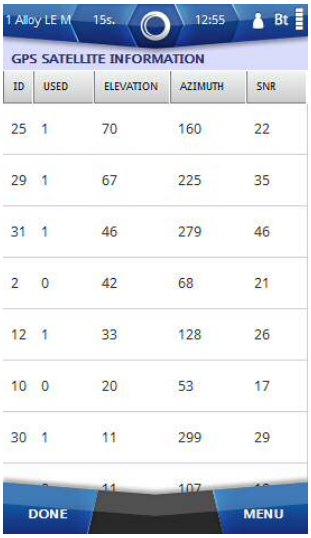
2. Tap **Bluetooth**.

   The Bluetooth Settings screen appears.

3. Tap **View GPS Information**.

   The GPS Position Data screen appears.





4. Tap: **Tools** > **Refresh Now** to refresh the GPS Position Data.
5. Tap: **Tools** > **View Satellites**

   The GPS Satellite Information screen appears.

6. Tap **Done** to return to the GPS Position Data screen.
7. Tap **Done** to return to the Bluetooth Settings screen.
8. Tap **Done** twice again to return to the main screen.

Connect the X-MET8000 series to a company network

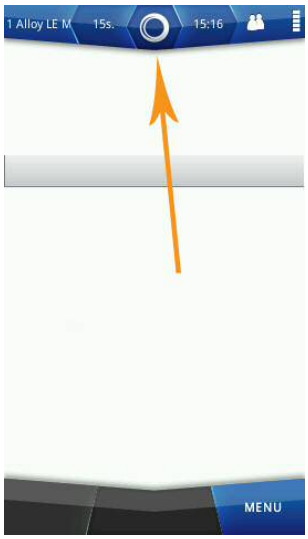
The procedure may differ depending on the network security level and server versions used. If the network utilizes device based authentication or you are unable to connect to the network using the following steps, please contact your local network administrator for support.

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.

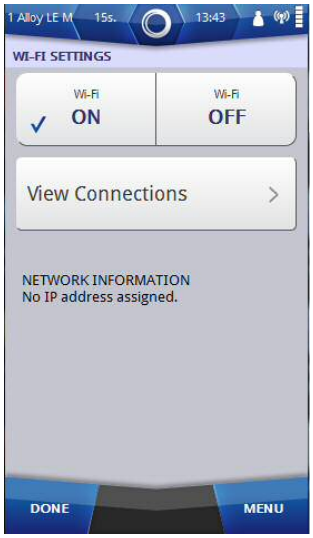


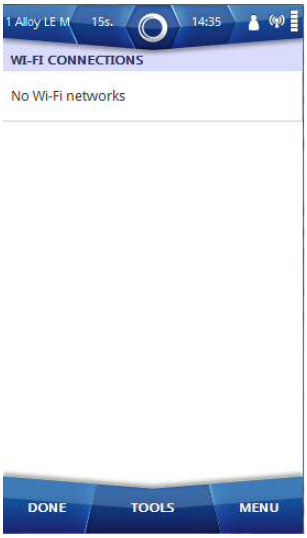
2. Tap **Wi-Fi**.

   The Wi-Fi Settings screen appears.

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

   The Wi-Fi Settings screen changes.

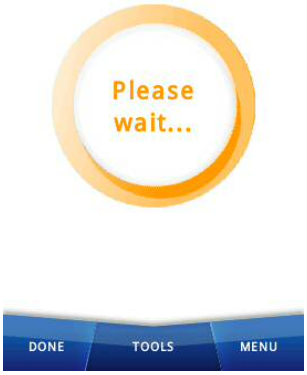




4. Tap **View Connections**.

   The Wi-Fi Connections screen appears.

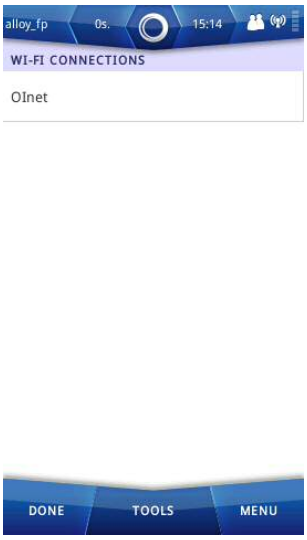
5. Tap: **Tools** > **Scan Networks** .



The Network Discovery screen appears, and a search for Wi-Fi networks begins.

When the search is complete, the screen shows the available Wi-Fi networks.

The list is ordered with the strongest signals at the top.

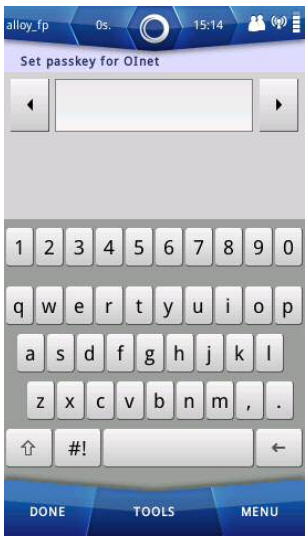


6. If necessary, tap: **Tools** > **Scan Again** .

   Another search for Wi-Fi networks begins, and the Network Discovery screen is refreshed.

7. Tap one of the Wi-Fi networks.

8. 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.



9. Tap **Done** to return to the Wi-Fi Connections screen.

   This shows the active Wi-Fi connection.

10. 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.

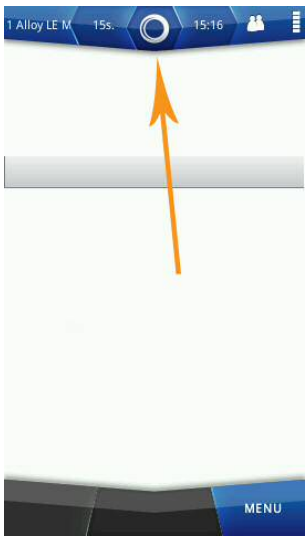
11. Tap **Done** twice to exit the Wi-Fi Settings screen.

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.

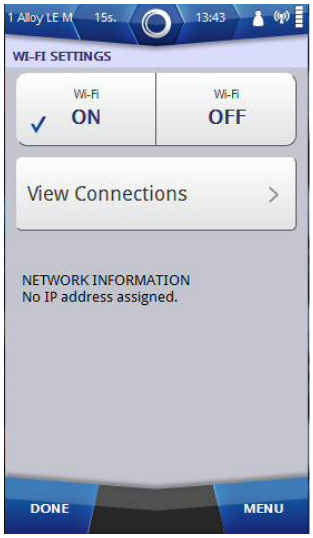


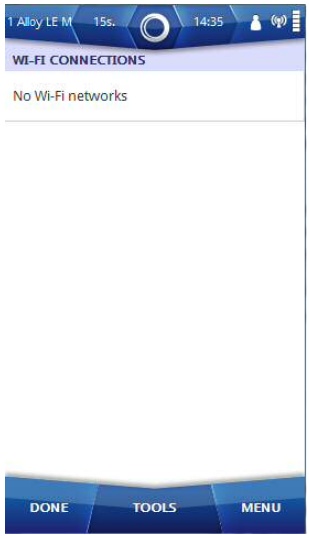
2. Tap **Wi-Fi**.

   The Wi-Fi Settings screen appears.

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

   The Wi-Fi Settings screen changes.



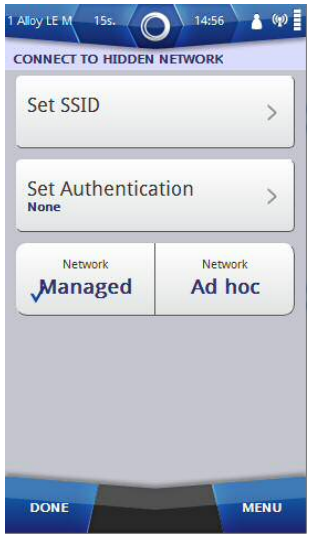


4. Tap **View Connections**.

   The Wi-Fi Connections screen appears.

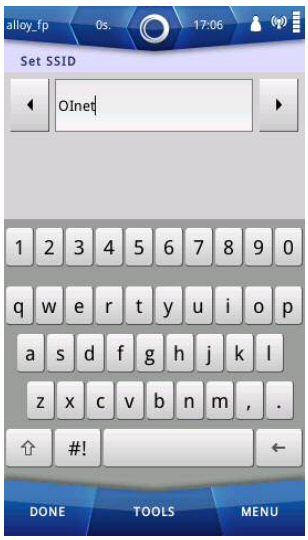
5. Tap: **Tools** > **Connect To Network** .

   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.

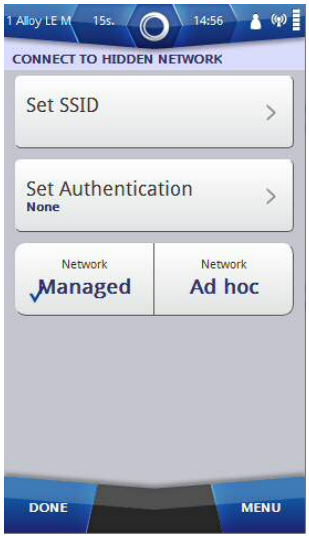


8. Do one of the following:

   - Tap **Managed**
   - Tap **Ad Hoc**

9. Tap **Set Authentication**.

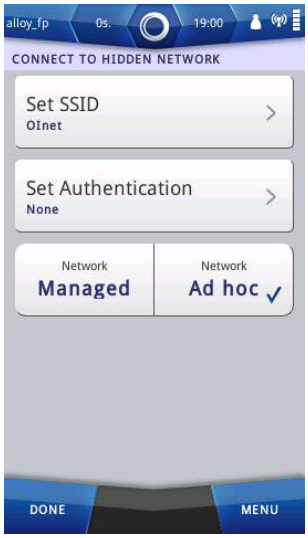
   The Set Authentication Method screen appears.



10. Do one of the following:

    - Tap **None**
    - Tap **WPA & WPA2 Personal**

    For an ad hoc network, the second choice is **WPA None**.

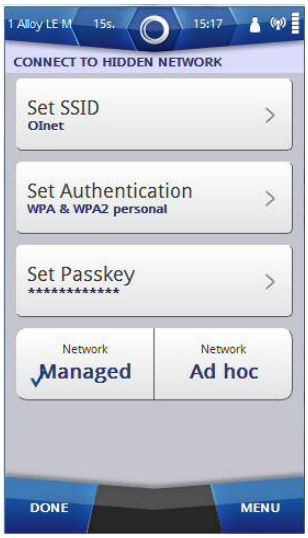


11. Tap **Done** to return to the Connect To Hidden Network screen.

    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 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.

Wireless Printing

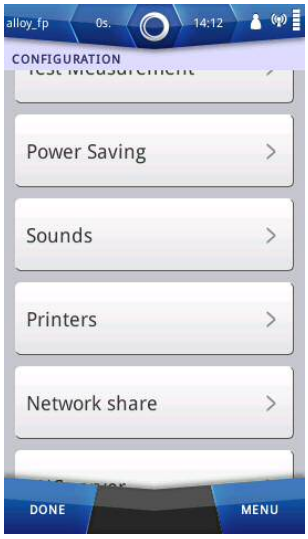
The X-MET8000 series supports printing Reports directly to a network connected printer over a Wi-Fi connection. Setup wireless printing using the following instructions.

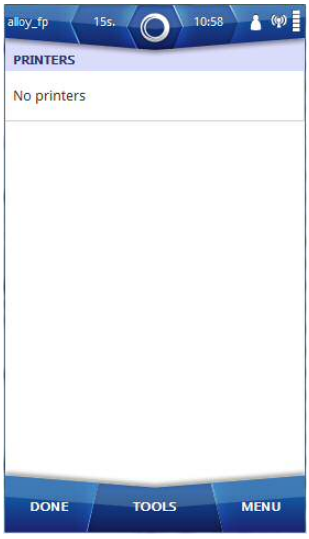
Configure A Printer

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:

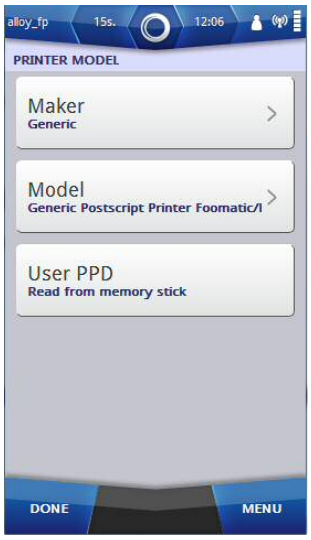
   - Tap **Name**

     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.



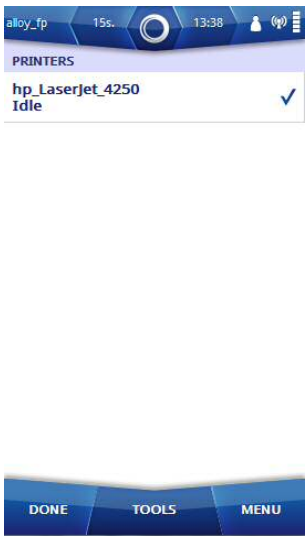
8. Tap **Maker** to select the applicable maker. Tap **Done** to return to the Printer model screen.
   The Printer Model screen updates with the new values.
9. Tap **User PPD** to install the PPD file for the printer from the memory stick.
10. Tap **Done**.
    The Information dialog box appears.
11.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

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**.

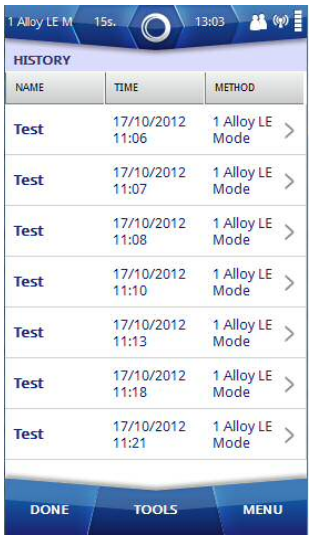
   The Information dialog box appears.
4. Tap **OK** to return to the Printer Maintenance screen.
5. If the printing of the test page is successful, set the printer as the default printer by selecting **Set As Default Printer** in the Printer Maintenance screen.
6. Tap **Done** 4 times to return to the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

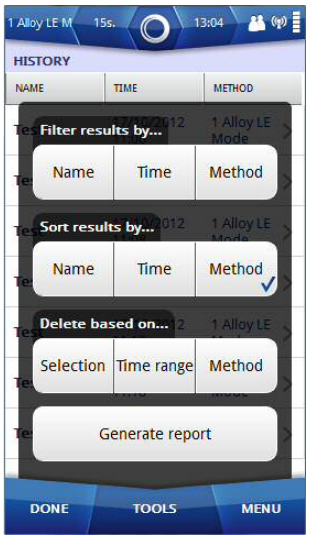
Generate Report to Printer

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 WiFi network as the one to which the network printer is connected. Please refer to the Supervisor manual to set this up. Follow the below steps to generate report to printer.

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

   The History screen appears.



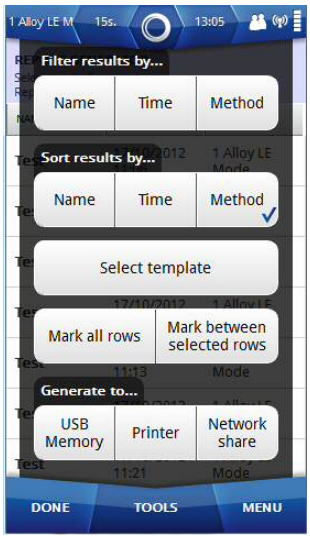


2. Tap: **Tools** > **Generate Report**

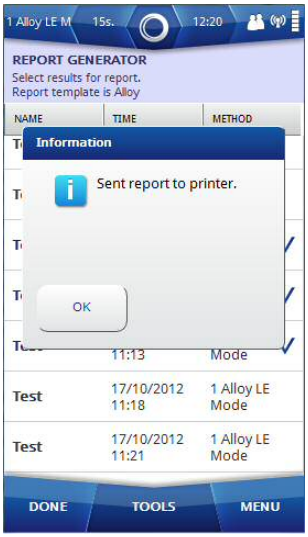
   The Report Generator screen appears.

3. 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.



4. Tap on the applicable template and then tap **Done** to return to Report Generator screen.
5. 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
   - Sort by
   - Mark All
   - Mark between selected rows
6. Tap: **Tools** > **Printer** after selecting results.
   Device starts generating report to the printer. Once the report is generated to the printer, an Information dialog box appears .



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

Wireless File Transfers

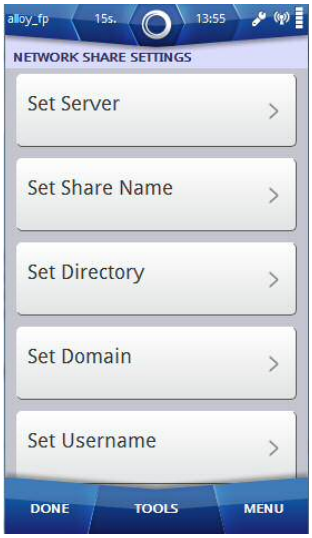
The X-MET8000 series can store reports directly to a network share over a Wi-Fi connection. Setup shared folders using the following instructions.

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 sytem 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.

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** .

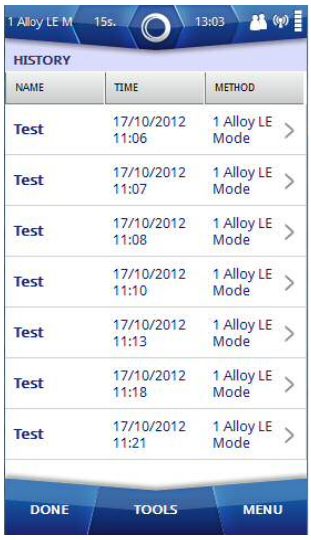
   The Information dialog box appears.
3. Tap **OK** and then tap **Done** three times to return to the main screen.

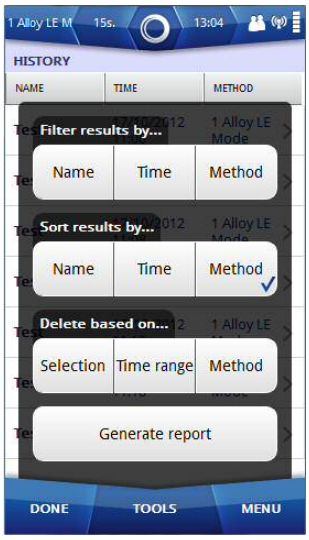
Generate Report to Network Share

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

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

   The History screen appears.



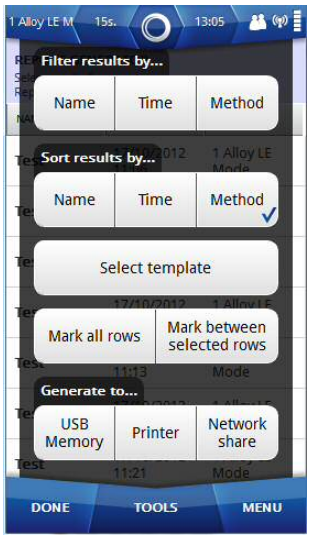


2. Tap: **Tools** > **Generate Report**

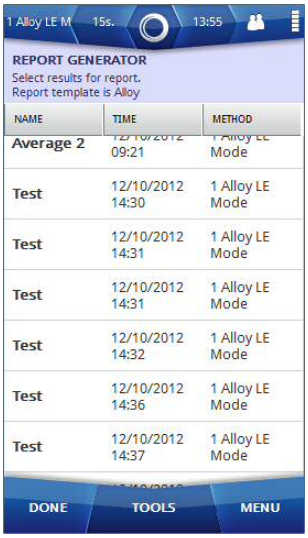
   The Report Generator screen appears.

3. 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.



4. Tap on applicable template and then tap **Done** to return to Report Generator screen.
5. 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 following options.
   - Filter by
   - Sort by
   - Mark All
   - Mark between selected rows
6. Tap: **Tools** > **Network Share** after selecting the results.
   Device starts generating report to the printer. Once the report is generated to the network share Report Generator screen appears.



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

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.

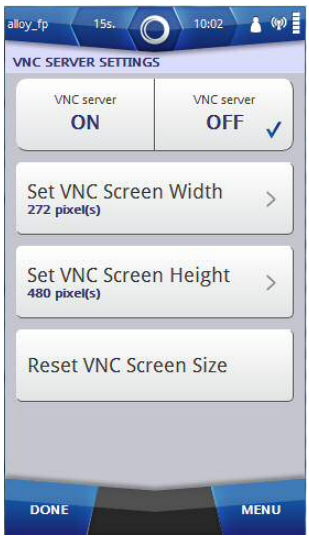
Using a VNC connection all the operations that are available locally on the X-MET8000 series are accessible trough remote screen.

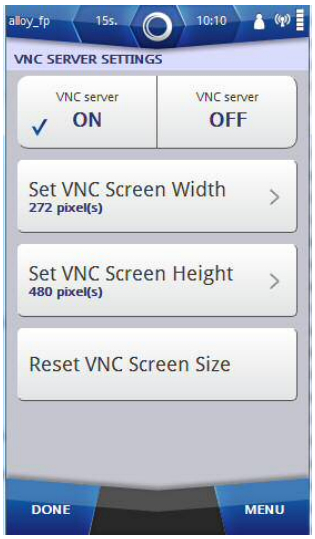
Configure VNC Server Settings

It is necessary to have a VNC client on computer to connect to the X-MET 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-MET 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.

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 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.

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.

Setup an iPad to control the X-MET8000 series

Follow these steps to install and set up a VNC client on a 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.

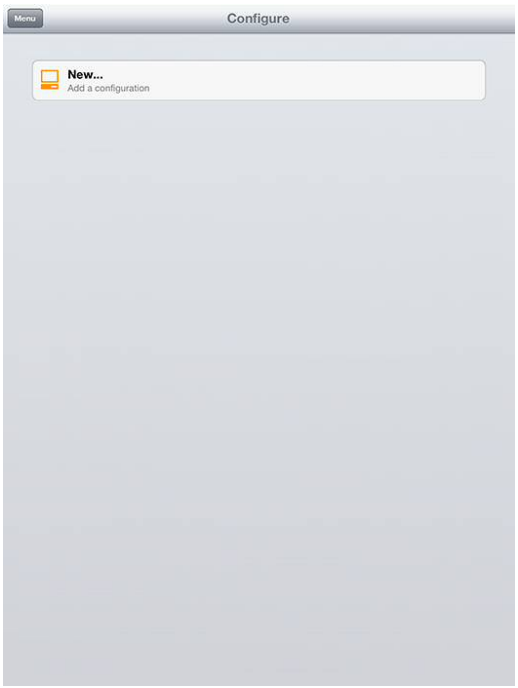
1. On the iPad, purchase and install a VNC client of choice, these instructions are for Mocha VNC client and can also be used as a guide for other VNC clients.

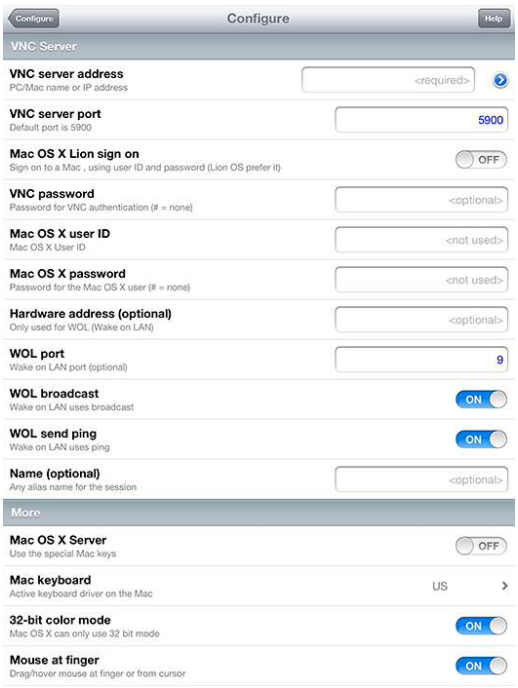
   Follow the instructions for the selected software to install the VNC client.

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.

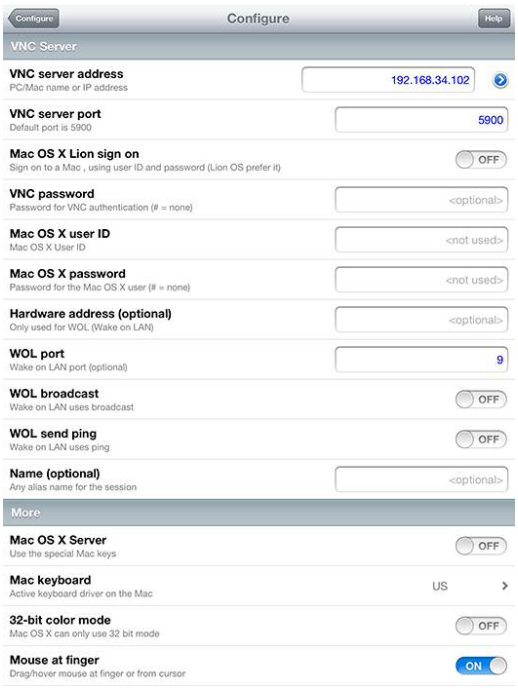
   Once a connection is stored, use the **Menu** in the upper left corner to switch between **Connect** and **Configure**.





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.



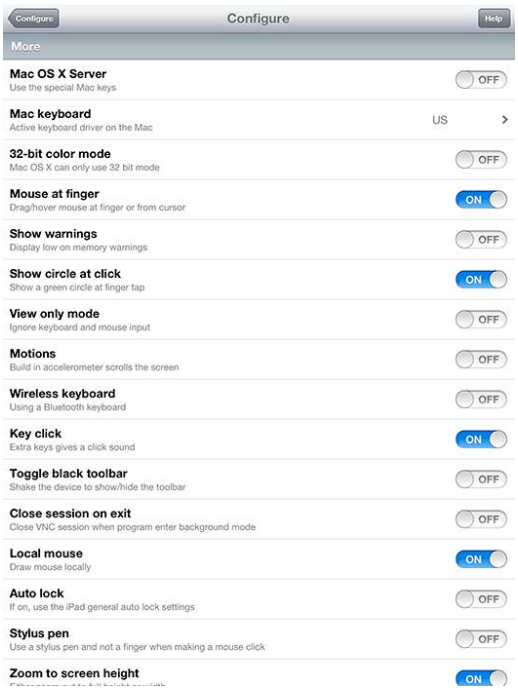


Table 4: Configuration table

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 X server	OFF

More	Value
Mac keyboard	US or according to keyboard preferences
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.

Control the X-MET8000 series using an iPad

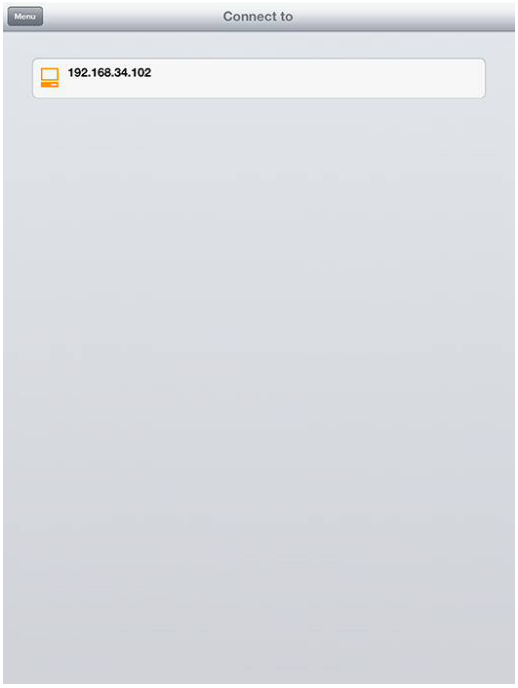
Follow these steps to connect to the X-MET8000 series using an iPad. The same basics apply also to other tablets.

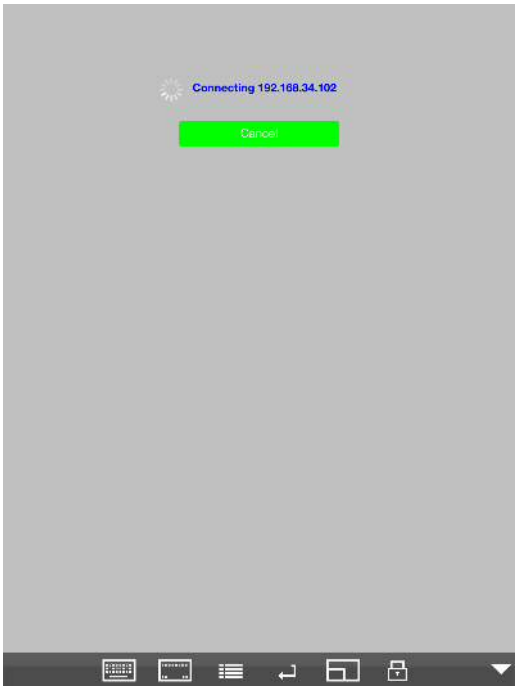
Wi-Fi and the VNC Server must be set up and started on the X-MET8000 series and the IP address of the X-MET8000 series must be known before a connection can be established.

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 connection exist for the correct IP address, add a new server or modify an existing connection to match the X-MET8000 series current IP address.

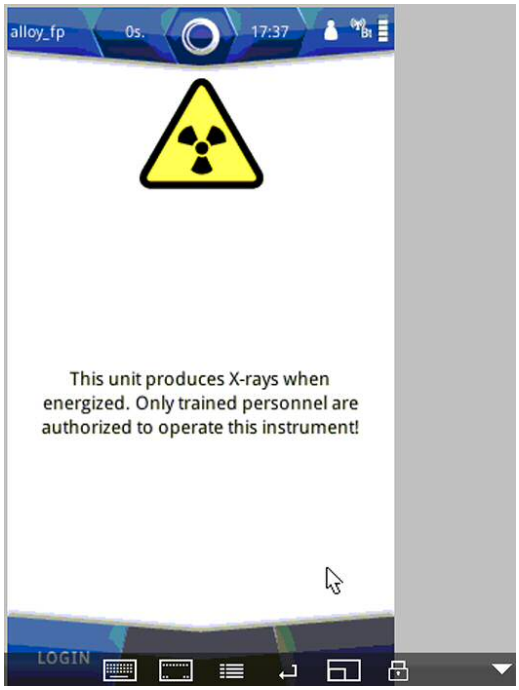
   The VNC connection to the X-MET8000 series is started.



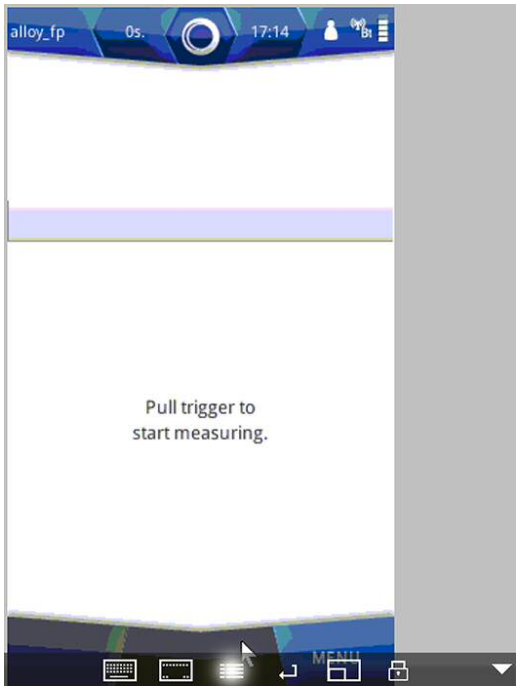


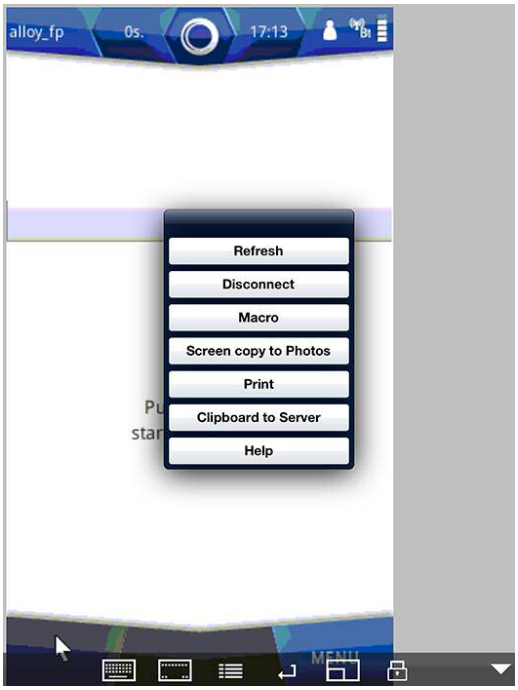
2. If prompted for a passcode, this can be left blank.

   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.

Manage Backups

It is possible to back up the configuration of the X-MET8000 series. This includes calibration data and application data. The calibration data includes the main calibration data as well as test calibration data. Application data includes Results screen formats, report templates and Additional Information about the sample.

The X-MET8000 series creates an internal backup and a backup on a USB memory device at the same time. It is necessary to have a USB memory device to create a backup, with at least 10 MB of free disk space. It is possible to restore or to delete a backup from the internal memory or from a USB memory device.

Create A Backup

Follow these steps to back up the configuration of the X-MET8000 series.

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. Navigate: **Menu** > **Settings** > **Instrument Configuration** > **Configuration Backup** .

   The Backup Menu screen appears.

4. Tap **Create A New Backup**.

   An Information dialog box appears.

5. Tap **OK** to start the backup.

   The Information dialog box changes to show the progress of the backup. It can take several minutes.

   When the backup is complete, the Information dialog box shows the name of the backup file.

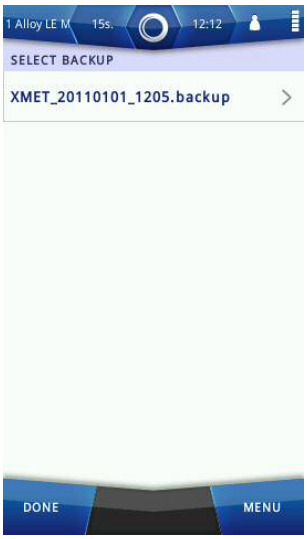
6. Tap **Done** three times to return to the main screen.
7. Remove the USB memory device.

Restore A Backup

To restore a backup from the internal memory or from a USB memory device, follow these steps.

1. To restore a backup from a USB memory device, follow these two steps.
   a) Open the connector cover underneath the display to access the external connections.

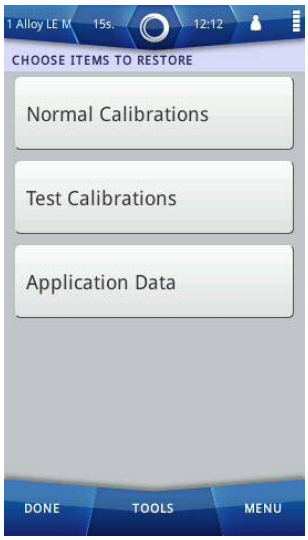
   b) Plug a USB memory device into the USB A connector.
2. Navigate: **Menu** > **Settings** > **Instrument Configuration** > **Configuration Backup** .
   The Backup Menu screen appears.
3. Tap **Restore From A Backup**.
   The Choose Storage Location screen appears.



4. Do one of the following:
   - Tap **Internal Memory**
   - Tap **USB Memory Stick**

   The Select Backup screen appears.
5. Tap the applicable backup.

   The Choose Items To Restore screen appears.



6. Tap any or all of the following:
   - **Normal Calibrations**
   - **Test Calibrations**
   - **Application Data**

   A tick appears in the applicable box.
7. Make sure that all the necessary items are selected, and then tap: **Tools** > **Restore Selected Items** .

   A Warning dialog box appears.
8. Tap **OK** to restore the chosen backup.

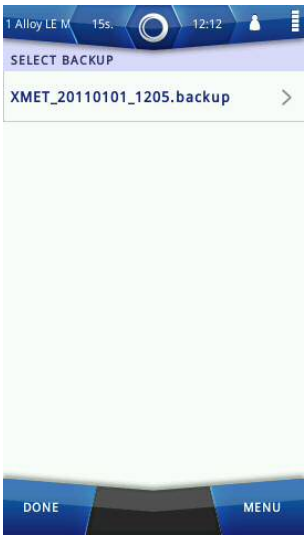
   When the process is complete, the Safety screen appears.
9. Remove the USB memory device.

Delete A Backup

To delete a backup from the internal memory or from a USB memory device, follow these steps.

1. To delete a backup from a USB memory device, follow these two steps.
   a) Open the connector cover underneath the display to access the external connections.

   b) Plug a USB memory device into the USB A connector.
2. Navigate: **Menu** > **Settings** > **Instrument Configuration** > **Configuration Backup** .
   The Backup Menu screen appears.
3. Tap **Delete A Backup**.
   The Choose Storage Location screen appears.



4. Do one of the following:
   - Tap **Internal Memory**
   - Tap **USB Memory Stick**

   The Select Backup screen appears.
5. Tap the applicable backup.

   A Warning dialog box appears.

6. Tap **OK** to delete the chosen backup.

   When the process is complete, the Choose Storage Location screen appears.
7. Remove the USB memory device.

Configuration

The X-MET8000 series has two settings for power saving, Power Saving and Position Wakeup, and two sound settings for Measurement Complete and for Warning Message.

The X-MET8000 series dims the backlight after 5 minutes if there has been no activity during that time. After a further 5 seconds, the X-MET8000 series returns to the login screen. In addition to these operations, if Power Saving is on, the X-MET8000 series does the following:

- Switches off the screen and backlight
- Switches off Bluetooth
- Reduces detector cooling.

The X-MET8000 series returns from Power Saving after a tap on the screen. In addition, if Position Wakeup is on, the X-MET8000 series returns after physical movement.

Set The Power Saving

Follow these steps to set the power saving features.

1. Navigate: **Menu** > **Settings** > **Instrument Configuration** > **Power Saving** .

   The Power Save Settings screen appears.

2. For **Power Saving**, tap one of the following:
   - **ON**
   - **OFF**
3. For **Position Wakeup**, tap one of the following:
   - **ON**
   - **OFF**
4. Tap **Done** three times to return to the main screen.

Choose Sounds

Follow these steps to set the sound features.

1. Navigate: **Menu** > **Settings** > **Instrument Configuration** > **Sounds** .

   The Sound Settings screen appears.

2. For **Measurement Complete**, tap one of the following:
   - **ON**
   - **OFF**
3. For **Warning Message**, tap one of the following:
   - **ON**
   - **OFF**
4. Tap **Done** three times to return to the main screen.

Configure Camera Settings

Follow these steps to configure the Camera settings.

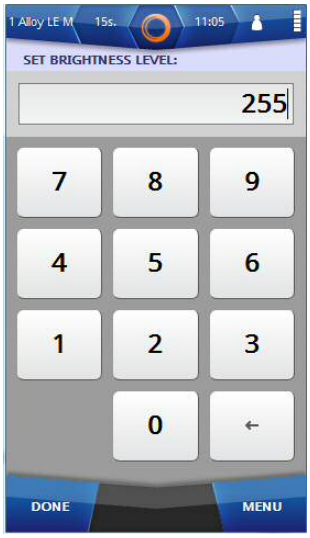
1. Navigate: **Menu** > **Settings** > **Instrument Configuration** > **Camera Settings** .

   The Camera Settings screen appears.

2. To enable the **Camera** function, tap **ON**. If the camera function is not required, tap **OFF**
   If the Camera is set to **OFF**, Save Image, Crosshair Calibration and the Brightness Level options disappear from the Camera Settings screen.
3. To automatically save the camera picture for each analysis, tap **Save Image ON**. If the camera is primarily used for positioning the X-MET on a sample and images are not needed, tap Save Image **OFF**.
4. If necessary, tap **Crosshair Calibration** to crop the camera image.
   The Tap Image To Setup The Crosshair screen appears.

5. Tap on the image to crop. Tap **Done** to return to the Camera Settings.
   The area inside the red square box will be displayed in the camera window and in the reports.

6. If necessary, the brightness of the camera can be increased by tapping the **Brightness Level** option.
   The Set Brightness Level screen appears.



7. Use the numeric keypad to type the value for the brightness level, the value must be between 0 and 255 and then tap **Done** to return to the Camera Settings screen.
8. Tap **Done** three times to return to the main screen.

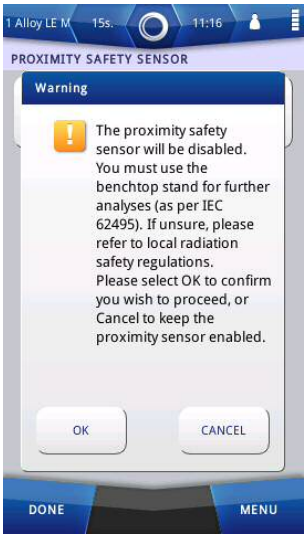
Disable the Proximity Safety Sensor

By default, the **Proximity Safety Sensor** is enabled in the device. The **Proximity Safety Sensor** is not available in the UK and Canada regions. The **Proximity Safety Sensor** is not available if the Proximity Toggel is enabled. If necessary, the **Proximity Safety Sensor** can be disabled by following the steps below.

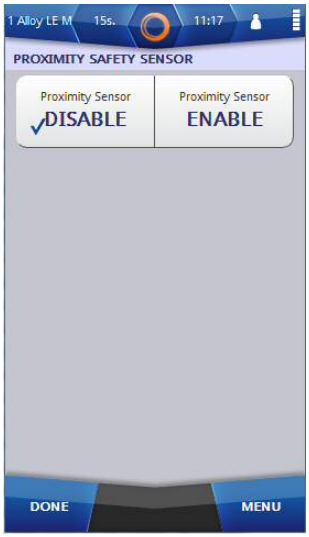
1. Navigate: **Menu** > **Settings** > **Instrument Configuration** > **Proximity Safety Sensor** .

   The **Proximity Safety Sensor** screen appears.

2. To disable the proximity safety sensor, tap on **Proximity Sensor DISABLE**.
   A **Warning Message** appears.



3. Tap **OK**.
   The Proximity Safety Sensor screen appears and the Proximity indicator color in the status bar changes to green.



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

Calibration Adjustments

Supervisors cannot add new calibrations, but they can make significant adjustments to each calibration to optimize it for a specific application. Many of the calibration adjustments are specific to the type of method. In addition, it is possible to do an energy calibration that adjusts all calibrations.

Caution: Any adjustments to the calibration will affect the accuracy of the X-MET8000 series. Make sure that only trained personnel make these calibration adjustments. Failure to do so can reduce the accuracy of the X-MET8000 series.

Please contact the local Oxford Instruments representative for assistance with all calibration requirements. Refer to *Create A Backup* on page 175 before a calibration adjustment. Do several measurements with the X-MET8000 series to make sure that it is at operational temperature before any calibration adjustments.

Auto-Select Mode Calibration Adjustments

These adjustments are applicable to modes and also to identification methods that have an 'ID' suffix. The supervisor can adjust the following:

- The recalculation method
- The limits that define both a Good Match and a Possible Match
- Maintain the reference samples used for the identification scan.

The recalculation method is used for auto-select modes as an optional third choice. The first choice uses the identification methods to match to an applicable empirical calibration. The second choice uses an applicable fundamental parameter calibration. If there is no match from the first or second choice, the auto-select mode uses the optional recalculation method. Auto-select modes do not require

a recalculation method, and it can be undefined. A fundamental parameter method is often the best choice for a recalculation method.

Auto-select modes use two adjustable limits to decide whether to use a particular reference sample from an identification method. The two limits are for 'Good Match' and 'Possible Match'. Reduce a limit to make a match less likely, and increase it to make a match more likely. Make sure that the 'Good Match' value is less than the 'Possible Match' value.

Each auto-select mode and identification method has a list of the reference samples associated with it. For modes, it is possible to associate a reference sample with another method. For example:

- Alloy LE Mode has SS304 as a reference sample that uses the Stainless LE method
- Stainless LE ID also has SS304 as a reference sample, but with no associated method.

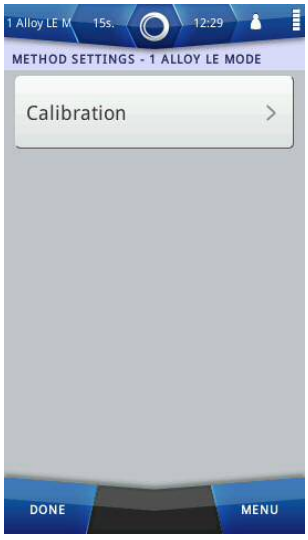
There is a date for each reference when the measurement occurred. If there is no date, then there is no measurement for that reference sample. If there is no date for a reference sample, then that mode or identification method will have an incomplete calibration, and will not be available for measurements. Do not add a reference sample without a measurement.

Choose A Recalculation Method

This procedure is applicable to modes and also to 'ID' methods. Follow these steps to add a recalculation method.

1. Navigate: **Menu** > **Method** .
2. Tap **Edit** (pencil) next to the applicable method.

   The Method Settings screen appears.



3. Tap **Calibration**.

   The ID - Method Parameters screen appears.

4. Tap **Recalculation Method**.

   The Set Recalculation Method screen appears.

5. Tap an applicable method to select it.

   Make sure that a tick appears in the box.

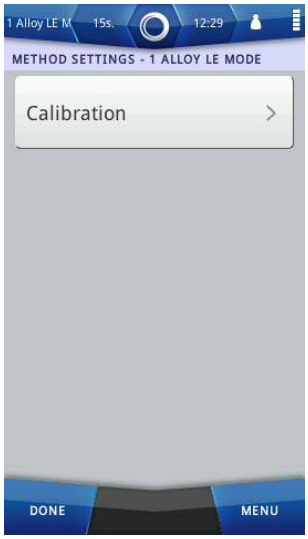
6. Tap **Done** to return to the ID - Method Parameters screen.
7. Tap **Done** three times again to return to the main screen.

Set Match Limits

This procedure is applicable to modes and also to ‘ID’ methods. Follow these steps to set the limits for a Good Match and a Possible Match.

1. Navigate: **Menu** > **Method** .
2. Tap **Edit** (pencil) next to the applicable method.

   The Method Settings screen appears.



3. Tap **Calibration**.

   The ID - Method Parameters screen appears.

4. Do one of the following:

   - Tap **Possible Match Limit**
   - Tap **Good Match Limit**

5. Use the numeric keypad to type the value, and then tap **Done** to return to the ID - Method Parameters screen.

   Repeat these steps for the other limit, if required.

6. Tap **Done** to return to the Method Settings screen.
7. Tap **Done** twice again to return to the main screen.

Add A Reference Sample

This procedure is applicable to modes and also to 'ID' methods. Follow these steps to add a reference sample.

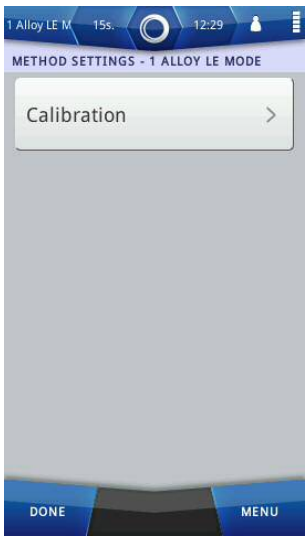
1. Do one of the following:

   - Navigate: **Menu** > **Time**
   - Navigate: **Status Bar** > **Measurement Time**

   Make sure that the Measurement Time Settings are set correctly.

2. Navigate: **Menu** > **Method** .
3. Tap **Edit** (pencil) next to the applicable method.

   The Method Settings screen appears.

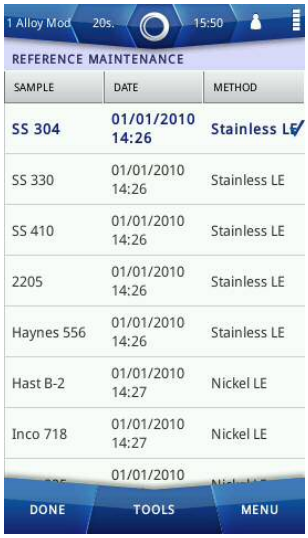


4. Tap **Calibration**.

   The ID - Method Parameters screen appears.

5. Tap **Reference Maintenance**.

   The Reference Maintenance screen appears.



6. Tap: **Tools** > **Add New** .
7. Use the virtual keyboard to type a name for the new reference sample, and then tap **Done** to return to the Reference Maintenance screen.

   The new reference sample will be at the end of the list, and will be selected.
8. Take a measurement of the new reference sample.

   The Reference Maintenance screen shows the date for the reference sample measurement.
9. For a mode, tap: **Tools** > **Set Screening Method** .

   The Set Screening Method screen appears.

10. Tap an applicable method to select it.

    Make sure that a tick appears in the box.

11. Tap **Done** to return to the Reference Maintenance screen.
12. Tap **Done** four times again to return to the main screen.

Empirical Calibration Adjustments

The supervisor can adjust the following:

- Measure a check sample
- Add an analyte correction
- Add a type standard setting

Check samples allow the adjustment of a calibration by the measurement of a specific sample. It is necessary for a calibrator to include a check sample with the calibration, and typically it is only applicable for specific applications.

Analyte correction applies an offset value to one or more specific elements within the matrix of a calibration. It is necessary to take an accurate measurement of a sample. Analyte correction can adjust the measurement results to be the same as the sample.

Refer to *Fundamental Parameter Calibration Adjustments* on page 194 for a description of type standard settings.

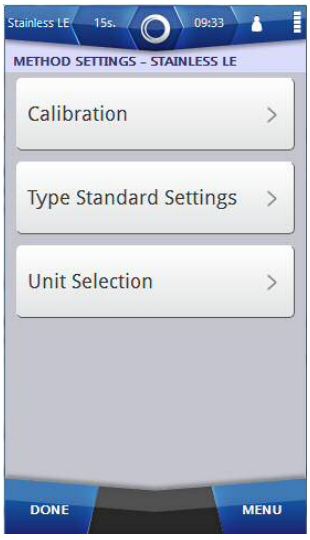
Measure A Check Sample

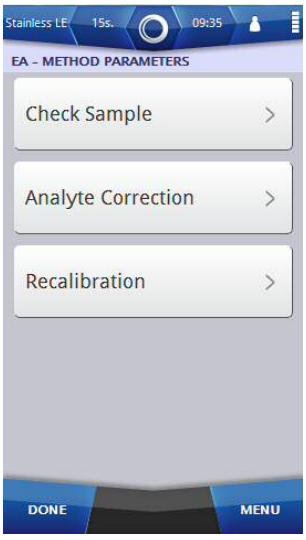
This procedure is applicable to empirical methods. Follow these steps to measure a check sample.

1. Do one of the following:
   - Navigate: **Menu** > **Time**
   - Navigate: **Status Bar** > **Measurement Time**

   Make sure that the Measurement Time Settings are set correctly.
2. Navigate: **Menu** > **Method** .
3. Tap **Edit** (pencil) next to the applicable method.

   The Method Settings screen appears.



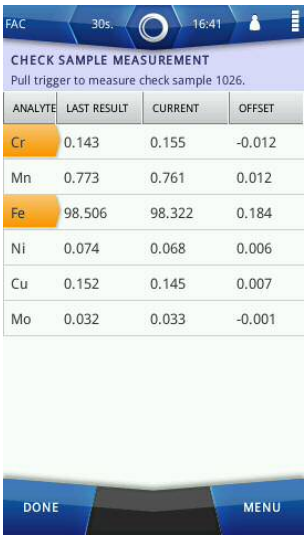


4. Tap **Calibration**.

   The EA - Method Parameters screen appears.

5. Tap **Check Sample**.

   The Check Sample Measurement screen appears.



6. Take a measurement of the check sample.

   The Check Sample Measurement screen shows the new check sample measurement.

   The Offset column shows the difference to the current check sample measurement.

7. Do one of the following:

   - Tap **Done** to accept the new check sample measurement.
   - Tap **Menu** > **Home** to reject the new check sample measurement.

8. If necessary, tap **Done** four times again to return to the main screen.

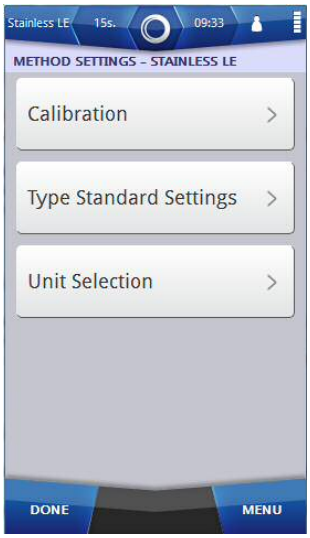
Add Analyte Correction

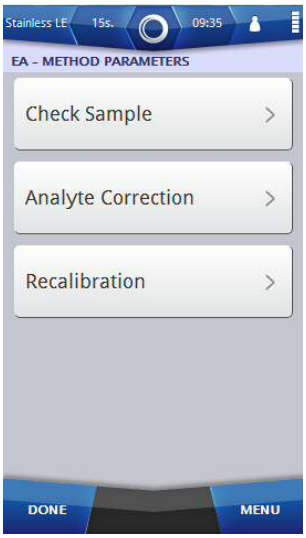
This procedure is applicable to empirical methods. Follow these steps to add analyte correction.

1. Navigate: **Menu** > **Method** .

2. Tap **Edit** (pencil) next to the applicable method.

   The Method Settings screen appears.





3. Tap **Calibration**.

   The EA - Method Parameters screen appears.

4. Tap **Analyte Correction**.

   The Analyte Correction screen appears.

5. Tap an applicable analyte.
6. Use the numeric keypad to type the analyte correction value, and then tap **Done** to return to the Analyte Correction screen.
7. Tap **Done** to return to the EA - Method Parameters screen.
8. Tap **Done** three times again to return to the main screen.

Fundamental Parameter Calibration Adjustments

The supervisor can adjust the following:

- Add a type standard setting
- Change the display units between a percentage and parts per million.

Type standards are useful for measurements within a tight matrix and narrow concentration range. It is necessary to take an accurate measurement of a sample with known concentrations of elements. After the measurement, it is possible to define the concentrations of each element, as applicable, to make corrections for that type standard. Type standards are available for all empirical and fundamental parameter calibrations.

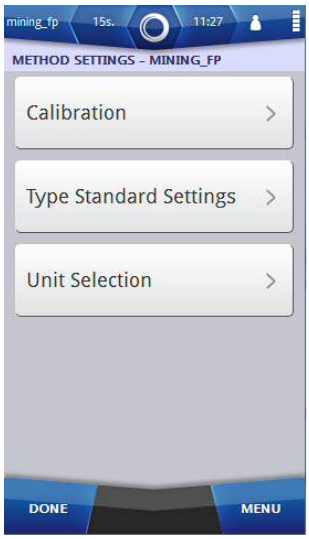
Add A Type Standard

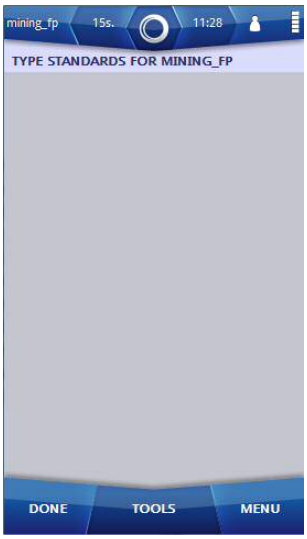
This procedure is applicable to empirical and fundamental parameter methods. Follow these steps to add a type standard.

1. Do one of the following:
   - Navigate: **Menu** > **Time**
   - Navigate: **Status Bar** > **Measurement Time**

   Make sure that the Measurement Time Settings are set correctly.
2. Navigate: **Menu** > **Method** .
3. Tap **Edit** (pencil) next to the applicable method.

   The Method Settings screen appears.

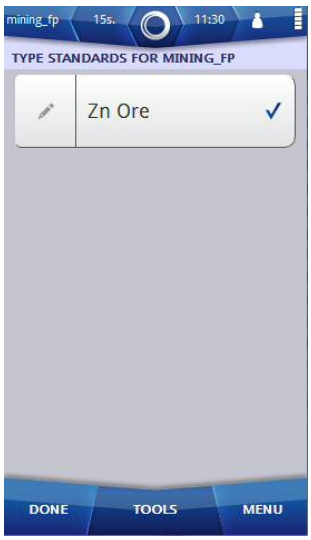


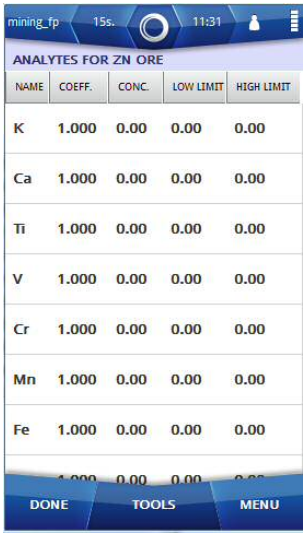


4. Tap **Type Standard Settings**.

   The Type Standards screen appears.
5. Tap: **Tools** > **Add Type Standard** .

6. Use the virtual keyboard to type a name for the new type standard, and then tap **Done** to return to the Type Standards screen.





7. Tap **Edit** (pencil) next to the new type standard.

   The Analytes screen appears.

8. Take a measurement of the sample for the type standard.
9. To apply a correction, tap the applicable analyte.

   The Type Standard Analytes screen appears.

10. Tap the **ON** tick box.
11. Do one of the following:

    - Tap **Coefficient**
    - Tap **Concentration**
    - Tap **Low Concentration Limit**
    - Tap **High Concentration Limit**

12. Use the numeric keypad to type the value, and then tap **Done** to return to the Type Standard Analytes screen.

    Repeat these steps for other analyte settings, if required.

13. Tap **Done** to return to the Analytes screen.

    Repeat these steps for other analytes, if required.

14. Tap: **Tools** > **Calculate** .

    The Analytes screen shows the calculated coefficients.

15. Tap **Done** to return to the Type Standards screen.
16. Tap **Done** three times again to return to the main screen.

About The Energy Calibration

Energy calibration is a service operation, and is not necessary if the X-MET8000 series operates correctly. An energy calibration is applicable if successive measurements of the Alloy CRM sample over a period of time show a degradation in results. It takes about 110 s, and it is possible to review the new values after the measurement and accept them, or not.

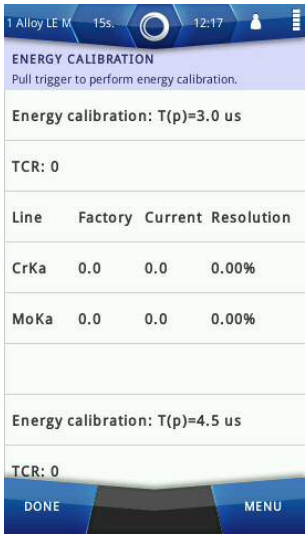
Energy Calibration

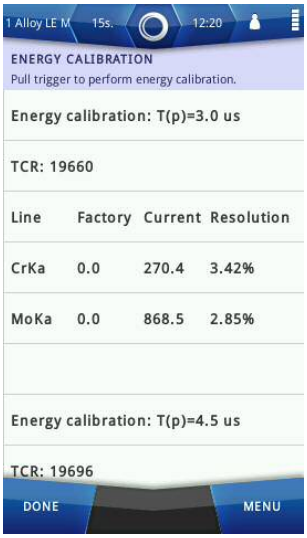
Follow these steps to do an energy calibration. Use the Alloy CRM sample for the measurement. It is not necessary to set a measurement time, or any other parameters. The measurement takes about 110 s.

1. Do several measurements with the X-MET8000 series to make sure that it is at operational temperature.

2. Navigate: **Menu** > **Settings** > **Instrument Configuration** > **Energy Calibration** .

   The Energy Calibration screen appears.





3. Pull and hold the trigger firmly.

   The Energy Calibration screen shows the new and old values.

   A Measuring dialog box appears.

4. Do one of the following:

   - Tap **Done** to accept the new energy calibration.
   - Tap **Menu** > **Home** to reject the new energy calibration.

5. If necessary, tap **Done** three times again to return to the main screen.

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 Manual .

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 Oxford Instruments representative if it is necessary to change the URL.

Connect To A PC And Login

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

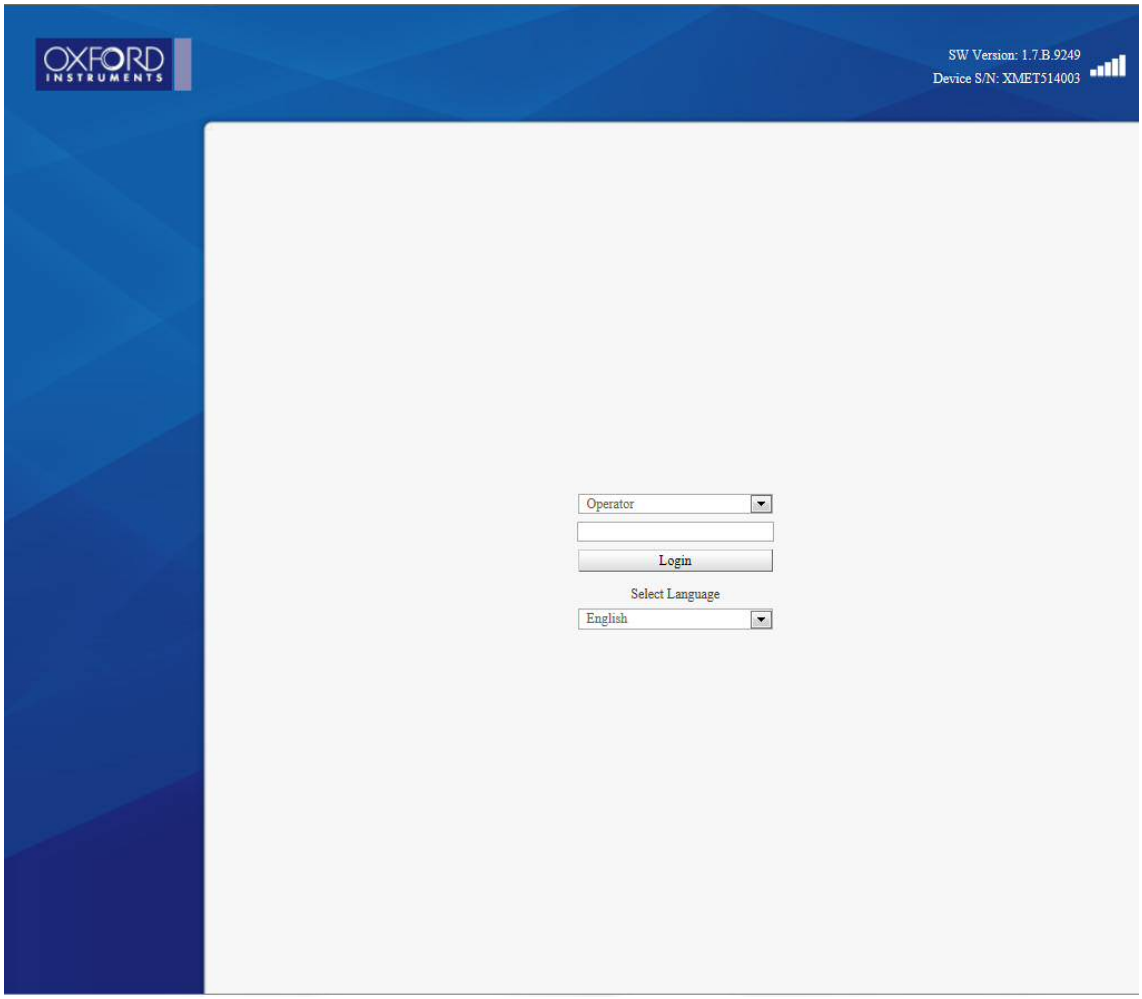
1. Open the connector cover underneath the display to access the external connections.

2. Use the USB cable to connect the X-MET8000 series to a PC.
   - Connect the smaller USB Mini-AB 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/*.

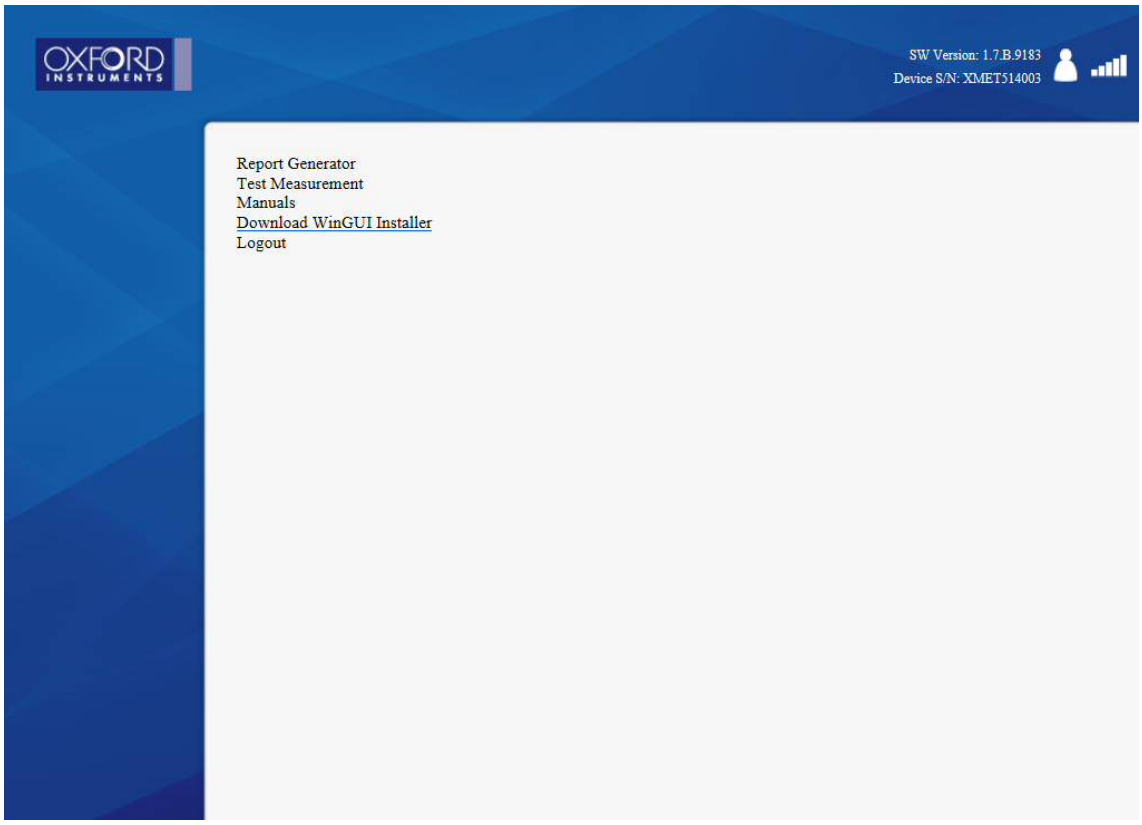
   The PC Login screen appears.



4. Select the language from 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.



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. It is also possible to include the spectra for the result, and it is possible to save the spectra with the report.

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