Crimp Quality Monitor II

customer manual

ORIGINAL INSTRUCTIONS

TOOLING ASSISTANCE CENTER
1-800-722-1111

This controlled document is subject to change.
For latest revision and Regional Customer Service,
visit our website at www.te.com

LOC B

DANGER

STOP

SAFETY PRECAUTIONS AVOID INJURY

Safeguards are designed into this application equipment to protect operators and maintenance personnel from most hazards during equipment operation. However, certain safety precautions must be taken by the operator and repair personnel to avoid personal injury, as well as damage to the equipment. For best results, application equipment must be operated in a dry, dust-free environment. Do not operate equipment in a gaseous or hazardous environment.

- Carefully observe the following safety precautions before and during operation of the equipment:
- ALWAYS wear appropriate ear protection.
- ALWAYS wear approved eye protection when operating powered equipment.
- ALWAYS keep guard(s) in place during normal operation.
- ALWAYS insert power plug into a properly grounded receptacle to avoid electrical shock.
- ALWAYS turn off the main power switch and disconnect electrical cord from the power source when performing maintenance on the equipment.
- NEVER wear loose clothing or jewelry that may catch in moving parts of the application equipment.
- NEVER insert hands into installed application equipment.
- NEVER alter, modify, or misuse the application equipment.

TOOLING ASSISTANCE CENTER

CALL TOLL FREE 1-800-722-1111 (CONTINENTAL UNITED STATES AND PUERTO RICO ONLY)

The **Tooling Assistance Center** offers a means of providing technical assistance when required.

In addition, Field Service Specialists are available to provide assistance in the adjustment or repair of the application equipment when problems arise which your maintenance personnel are unable to correct.

INFORMATION REQUIRED WHEN CONTACTING THE TOOLING ASSISTANCE CENTER

When calling the Tooling Assistance Center regarding service to equipment, it is suggested that a person familiar with the device be present with a copy of the manual (and drawings) to receive instructions. Many difficulties can be avoided in this manner.

When calling the Tooling Assistance Center, be ready with the following information:

1. Customer name
2. Customer address
3. Person to contact (name, title, telephone number, and extension)
4. Person calling
5. Equipment number (and serial number if applicable)
6. Product part number (and serial number if applicable)
7. Urgency of request
8. Nature of problem
9. Description of inoperative component(s)
10. Additional information/comments that may be helpful

Warning!

Do not use anything metal as a stylus on the touchscreen!

Figure 1

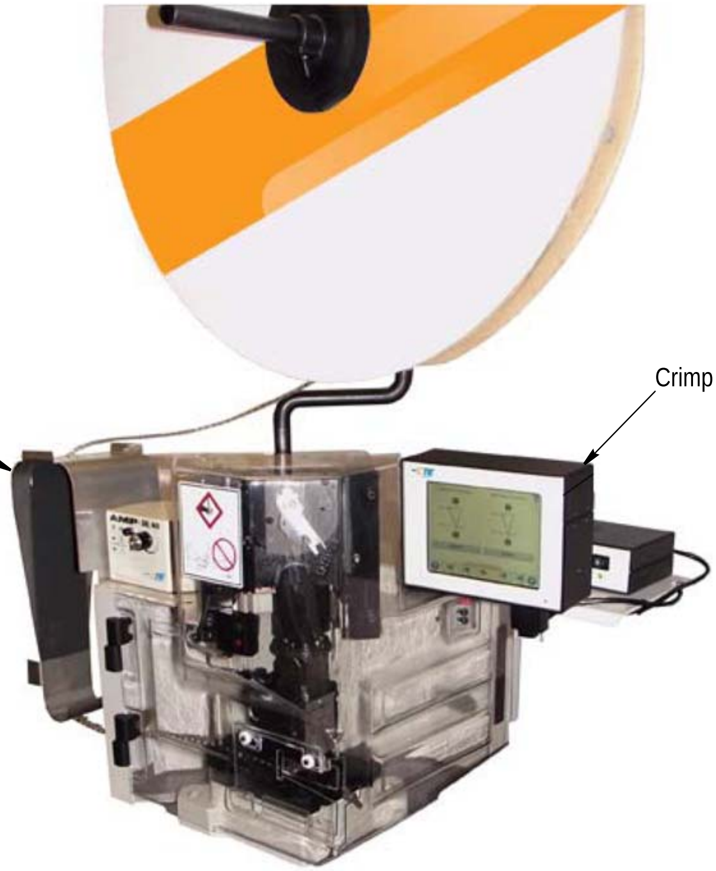
1. INTRODUCTION

Crimp Quality Monitor II (CQM II) provides immediate inspection of the crimp height and the work curve of a crimp by analysis of data provided by force and position sensors. The sensors may be built into special Crimp Quality Monitor II (CQM II) applicators or installed into the terminating machine. The Crimp Quality Monitor notifies the operator with visual cues when faulty crimps occur. See Figure 1 to view the CQM II

> **NOTE** — *The Crimp Quality Monitor II is a* ***PROCESS monitor.*** *It is influenced by many variables,* ***that include changes in wire, terminal, applicator terminal condition, operator, environment, etc. Changes in any of these variables, will affect the process*** *and the process will have to be re-learned.*

Although the Crimp Quality Monitor II was designed for many machines, when the CQM II is installed on an AMP–O–LECTRIC* Model “G” Terminating Machine equipped with the crimp height adjustment motor, the CQM II will automatically adjust the crimp height to keep the process at nominal.

The CQM’s operation, functions, screens, and touchscreen inputs are detailed in this document. Refer to customer manuals and instructions shipped with the application equipment for machine information.



Below is a list of the specifications for the Crimp Quality Monitor II (CQM II).

ELECTRICAL	
Operating Voltage (DC Power Supply)	100 - 240 VAC, 50/60 Hz, 1.5 Amps (Max.)
Host and DAQ (data aquisition) operating Voltage	24 VDC
AMBIENT OPERATING ENVIRONMENT	
Temperature	5 - 40 degrees C [40 - 104 degrees F]
Relative Humidity	< 95% non-condensing
SENSORS	
Force Strain Gage	Wheatstone Bridge Force Sensor
Force Piezo	ICP Low Impedance Quartz Force Sensor
Displacement	Analog Hall Effect Sensor
Displacement	Linear Quadrature Encoder (5Vdc, 2 micron)
INPUTS/OUTPUTS	
Four programmable outputs for machine interface.	

NOTE

Using the AC power cord that is appropriate with your countries power system (typically included with the system), ensure that the cord is plugged into a circuit that has over-current protection of no greater than 15-20 amps (country dependent).

To best use the machine and manual, open the package, inspect it, install it (using drawings and 408 instructions), and configure the machine as described in Paragraph 3.3. THEN setup the machine for production operation.

2. DESCRIPTION

2.1. Screen Description

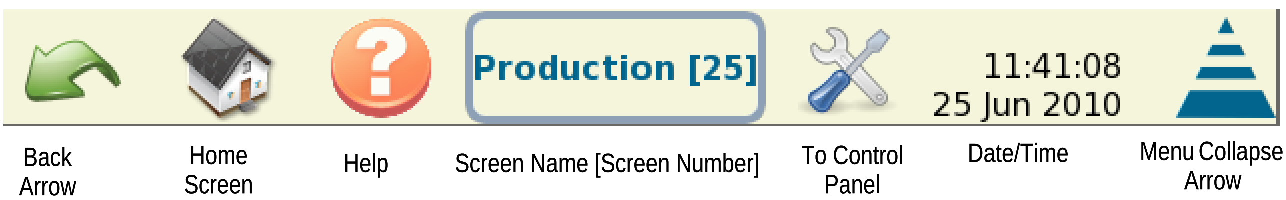
Many of the screens are designed to walk the operator through the crimping process with a series of arrows and headings.

2.2. Menu Bar

NOTE

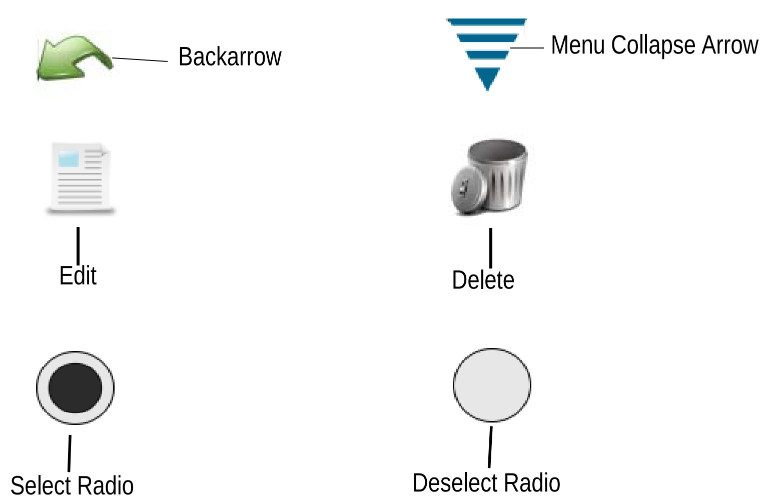
Once the menu appears, in most cases it will collapse again in five seconds.

Icons on the menu bar are used to access the home screen (Work Order Screen), Help, Control Panel, Back Arrow (to go to the previous screen), and a menu collapse arrow. Once the menu appears, in most cases it collapses in five seconds if the screen is not touched.



A series of icons guides the operator through the use of this monitor. Refer to the following figure.

Buttons and icons you will need to use include the edit icon, the delete (trash can) icon, and the radio buttons. See below.

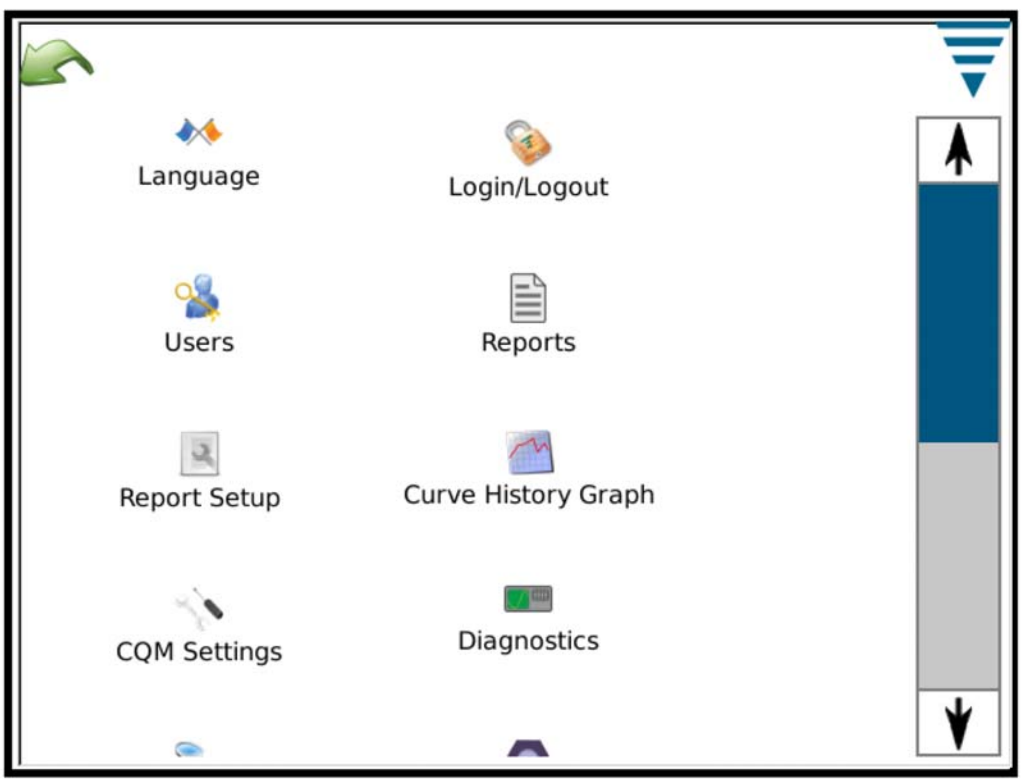


NOTE

Using the AC power cord that is appropriate with your countries power system (typically included with the system), ensure that it is plugged into a circuit that has over-current protection of no greater than 15-20 amps (country dependent).

2.3. Control Panel Screen

- Touching the Control Panel icon will result in the Control Panel screen. See below.
- Touching the "Language" icon will result in selecting the appropriate language. Refer to the Control Panel section in Section 6.
- Touching the login/logoff icon allows the user to "log in" to the machine, and to "log off" the machine. Refer to the Control Panel section in Section 6.
- Touching the the User's icon allows the addition and deletion of users. Refer to the Control Panel section in Section 6.
- Touching the "Reports" icon allows access to the statistics report and raw production data. Refer to the Control Panel section in Section 6.
- Touching the "Report Setup" icon allows the administrator to set up reports. Refer to the Control Panel section in Section 6.
- Touching the "Curve History Graphs" icon results in the curve history graphs. Refer to the Control Panel section in Section 6.
- Touching the "System Settings" icon allows the administrator to configure the system.
- Touching the "CQM Settings" icon allows the admnistrator to configure the CQM settings.
- Touching the "Diagnostics" icon allows access to inputs, outputs, and sensor and temperature readings. Refer to the control panel section, Section 6.
- Touching the "Error Log Viewer" icon allows the CQM errors to be viewed by time and date. Refer to the control panel section in Section 6.
- Touching the "Maintenance" icon results in maintenance screens for the CQM. Refer to the Control Panel section in Section 6.
- Touching the "Calibrate Touch Screen" icon allows the settings of the touch screen to be calibrated. Refer to the control panel section in Section 6.
- Touching the "Display Settings" icon provides access to adjust the display settings. Refer to the Control Panel section in Section 6.
- Touching the "Printer" icon allows the user to add local or network printers. Refer to the control panel section, Section 6.
- Touching the "Network" icon, allows the user to configure a network connection to the CQM. Refer to the Control Panel section, Section 6.
- Touching the "Date/Time" icon results in screens in which the date (and style of date) and the time (and style of time) can be chosen. Refer to the Control Panel section, Section 6.
- Touching the "Locale" icon results in a screen resulting in the selection of the operating locale. Refer to the Control Panel section, Section 6.
- Touching the "Demo" icon allows a demonstration of the CQM, if desired. See the Control Panel section, Section 6.



The screen also contains a "back arrow" and menu collapse arrow button. These appear as shown above.

NOTE

User access can be set in the Users (icon) portion of the control panel.

2.4. Help

Whenever the user is on a screen and touches the help icon the CQM II Manual is displayed with relevant information associated with that screen.

2.5. Screen Information

For a numeric entry, if you touch the value box, the keypad will appear. Each keypad is specific for the information being entered. Note that the each keypad also displays the allowable ranges for most numeric entries.

If the value box (numeric field) turns RED, the number being entered is out of range, is incorrect, or in some cases not filled in.

A temporary unit change to switch from inch to metric, or metric to inch entry is on the keypad.

2.6. Graphing Information

Touching on a graph expands the graph to full screen. Use the left and right arrows to scroll through some graphics.

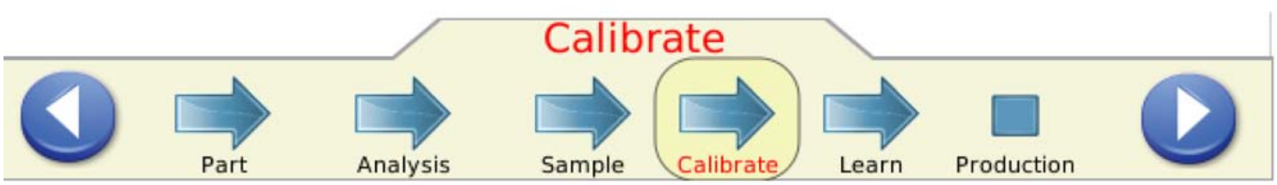
Touching the Print/File icon creates a pdf that can be printed to an attached and configured printer *or* saved to a USB flash drive.

On crimp curves, the graph can be zoomed by touching the display and dragging your finger to create a red box for the area that will be zoomed.

To return to the full display, touch the paper icon. To return to the previous level, touch the magnifying glass (with negative sign) icon.

2.7. Task Bar

At the bottom of the display, when not in the control panel, there is a Task bar that is used to walk the operator through the tasks necessary for the production crimping process. Certain selections expand to provide additional choices for parameter editing. Following the arrows leads you from the start of setting up a work order all the way to production. You can easily pass over steps and go back to others by touching the appropriate icon or the left and right arrow icons. If a step is required in the process, you will not be allowed to go beyond that step until you have entered the appropriate parameters or performed the required crimp. An error or warning message will be displayed describing the action required.



2.8. Definitions

A. Headroom (and How it Effects Crimps)

The Crimp Quality Monitor II monitors the forces that occurs during the crimping process. The forces during a crimp are the combination of forming the crimp profile of the terminal and the compression of the wire strands within the terminal. ***Headroom is the difference of the peak force of a complete crimp and an empty crimp.*** (Headroom is defined as XX,X %). A complete crimp is defined as crimp at nominal crimp height with both the insulation and the wire barrel properly filled with the wire. An “empty crimp” is only the insulated wire crimped in the insulation barrel of the terminal.

Studies have shown that Crimp Quality Monitors have a better detection capability when the headroom is greater than 35%. Crimped terminals that have a small wire, in some cases the smallest allowed by the manufacturer, rarely meet this 35% minimum requirement. In this case a Crimp Quality Monitor II may not be very effective at detecting minor crimping defects. On the other hand, a crimped terminal with the larger specified wire will more likely exceed this 35% minimum requirement. Therefore a Crimp Quality Monitor will perform much better and be able to detect more crimping defects.

With the “Quick Headroom Check” (described in Paragraph 4.9), you will be able to have a better understanding of how successful Crimp Quality Monitoring will be with the wire and terminal combination you are running. A headroom of greater than 35% is the number you are looking for.

B. Crimp Height

The crimp height is the measured height of the terminal on the wire. The CQM II uses a patented method to analize data from the precision sensors in order to calculate the crimp height of the terminal.

The *maximum* value for a “good crimp” is the nominal plus the tolerance. The *minimum* value for a “good crimp” is the nominal minus the tolerance.

C. Work Index

The work index is a value that is used to compare the relative position of a specified section of the crimp curve that occurs while the wire and terminal combination is being compressed.

To establish the initial range for a good work index range, values are collected from “Learn” crimps that are

“Accepted as good,” to create a work index history.

A mean value and standard deviation are calculated from the values in the history. These values are used to establish a range of good work index values.

The work index is a dimensionless value.

Work index is a process monitoring analysis method that provides a history of its analysis that can be useful to see how the crimping process may change over time.

D. Peak Force

The peak force is the maximum force reading that occurs during the crimp, minus the idle force reading. The peak force is a relative value. It has no specific units associated with it.

To establish the initial range for a good peak force range, values are collected from “Learn” crimps that are “Accepted as good,” to create a peak force history.

A mean value and standard deviation are calculated from the values in the history. These values are used to establish a range of good peak force values.

The peak force is the maximum force reading that occurs during the crimp minus the idle force reading.

The peak force is a relative value. It has no specific units associated with it.

Peak Force a process monitoring analysis method that provides a history of its analysis that can be useful to see how the crimping process may change over time.

E. Point-to-Point (P2P) Analysis

A series of points are established along the crimp curve in the P2P analysis. During the “Learn” process the CQM II computes means and standard deviations for each point and updates the mean and standard deviation for each point with every good crimp within an acceptable update range. During Production each point is compared to its upper and lower control limits, and if no points are out of their limits the analysis method considers the crimp to be a PASS crimp. A sensitivity value determines the amount of standard deviations allowed at each point. There is also a Fixed Upper and Lower control limits that get established by the first 30 PASS Crimps. Each point is checked both the fixed and non-fixed upper and lower control limits to determine if the crimp is good.

F. Fast Fourier Transform (FFT) Analysis

The FFT analysis method converts the force profile into its component frequencies. It computes mean and standard deviation for each of the lowest 32 frequencies from the learn crimps updates the mean and standard deviation with each good crimp. The FFT display tab displays a graph of the tolerance limits and the previous crimp computed frequency amplitudes. The tolerance limits are determined by the sensitivity selected by the user (default is 2.0) times the computed standard deviations for each frequency. More than five frequencies are outside the tolerance limits the crimp status is FAIL. Otherwise the crimp status is PASS.

G. Force Only Mode

In certain custom machine applications, the CQM II can operate with a force sensor *only* and no position sensor. A trigger sensor is used to signal the crimp event. In this mode of operation, the only analysis methods that are available are Peak Force and FFT. For the FFT analysis there are additional parameters that can be selected in the Learn mode (see section 4.11)

3. RECEIVING INSPECTION AND INSTALLATION

3.1. Receiving

The Crimp Quality Monitor II (CQM II) is thoroughly inspected during and after assembly. A final series of inspections is made to insure the proper functioning of the Crimp Quality Monitor II before packaging and shipping.

However, damage may occur during shipment. Remove the outer bands from the box and carefully remove the CQM II from the box. Inspect the CQM II for damage. If damage is evident, file a claim against the carrier and notify TE immediately.

NOTE

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Save the shipping carton/box and the entire documentation package shipped with the CQM II.

3.2. Inspection and Installation

1. After inspecting for damage, install the power supply, plug the cord into the module, and plug the AC plug into an appropriate supply, and turn the power on. The power indicator light on the front of the CQM II host module and CQM DAQ module should be lit.

2. During the system boot process several TE images will appear. After approximately 30-seconds the system will be ready to accept a Work Order or be presenting a user login screen (depending on the user settings).

3. If the power indicator light is not lit or the screen cannot be viewed, turn the power off and notify TE immediately

NOTE

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The installation instructions for the Crimp Quality Monitor II are included with the appropriate machine interface kit.

For example, if the CQM II is being installed on a bench version of the AMP–O–LECTRIC Model "G" Terminating Machine, the CQM/GTM Kit is required. The documentation package included with the kit contains the installation instructions for the system installation

3.3. System Settings

Touch the system settings icon to bring up the System Settings screen as shown below.

The System Settings is used to set up the basic system configuration.

NOTE

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*The Systems Settings must be performed prior to any CQM settings and before production can be run. **It must be performed by the CQM administrator.***

NOTE

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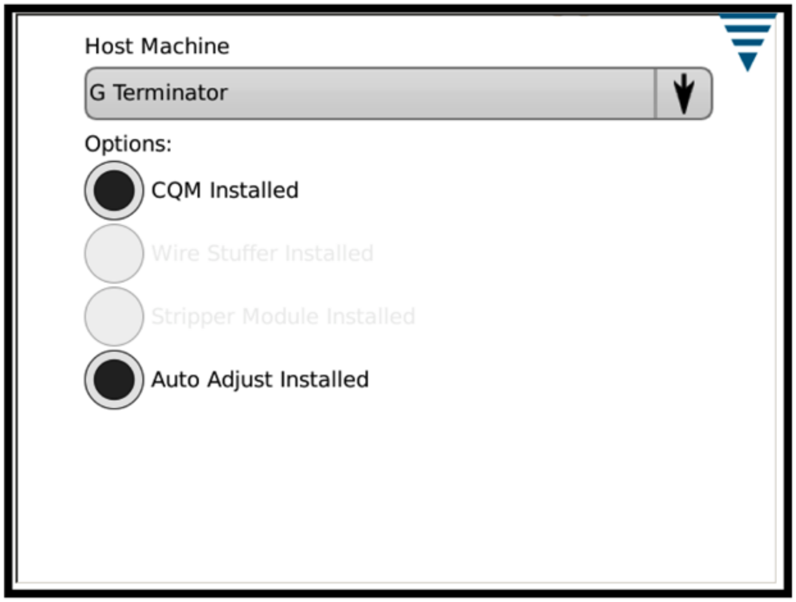
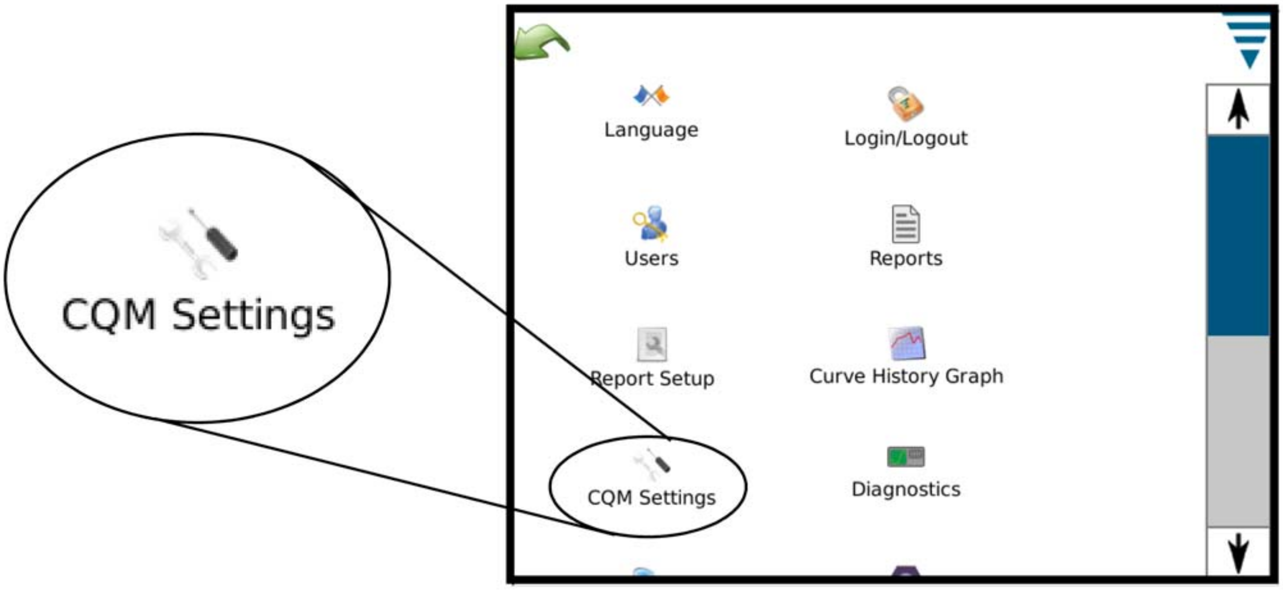
*Any other machine options must also be installed. Do **not** be confused with the CQM Installed option. In most configurations this should be selected as installed. Only the AMP 3K/5K (with stripper module installed)could be used without the CQM installed.*



3.4. CQM Settings

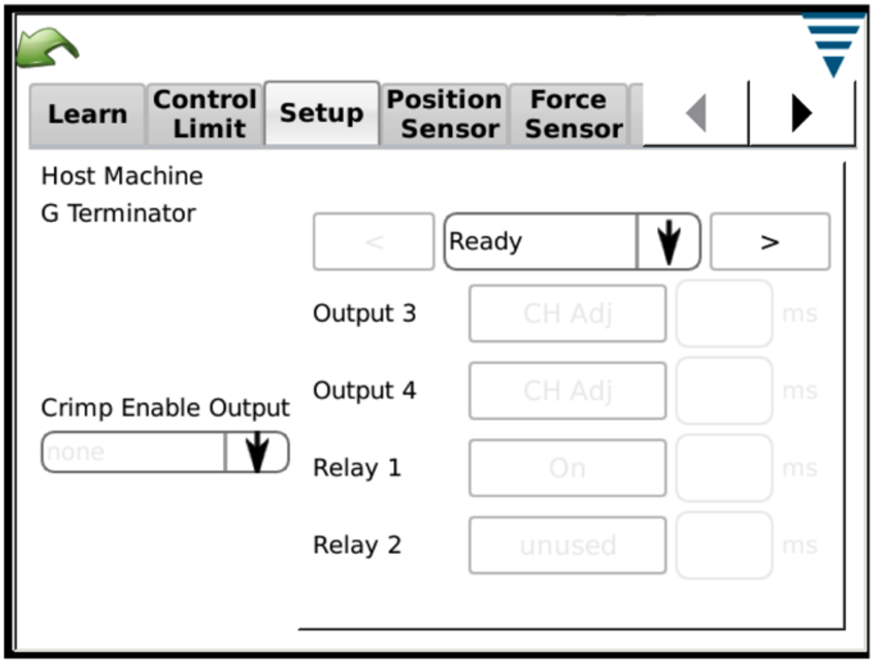
The “CQM Settings” refers to the initial setup of the CQM II -- *PRIOR* to production and is to be performed by the CQM administrator. For system setup information refer to Section 6.

Touch the control panel icon to bring up the control panel screen shown below.



A. CQM Settings -- Setup Tab

Touch the CQM Settings icon to bring up the CQM Settings screen shown below.



For the Custom selection, the four outputs can be configured to interface to the intended host machine, including the Crimp Enable output.

A non-terminated cable is provided for connection to the host machine. Refer to installation documentation for specifics.

B. CQM Settings -- Position Sensor Tab

Choose the Position Sensor tab to select the position sensor that is installed on your terminating machine. Selections are: Linear Encoder, Encoder (30mm) (for 30 mm stroke machines), Analog Height sensor (original CQM position sensor. Trigger (for force only systems) and CQM Applicator (for those customers who may still have an early TE applicator with CQM sensors integrated). For the Analog Height sensor and TE applicators with CQM sensors, the 6 coefficients must be entered exactly as they are printed on the associated tag and an optional cable is required for connection.

For Force Only applications that use a trigger sensor, normally Custom host machine types, the CQM II does not use all of the available analysis methods. Only FFT and peak force are available

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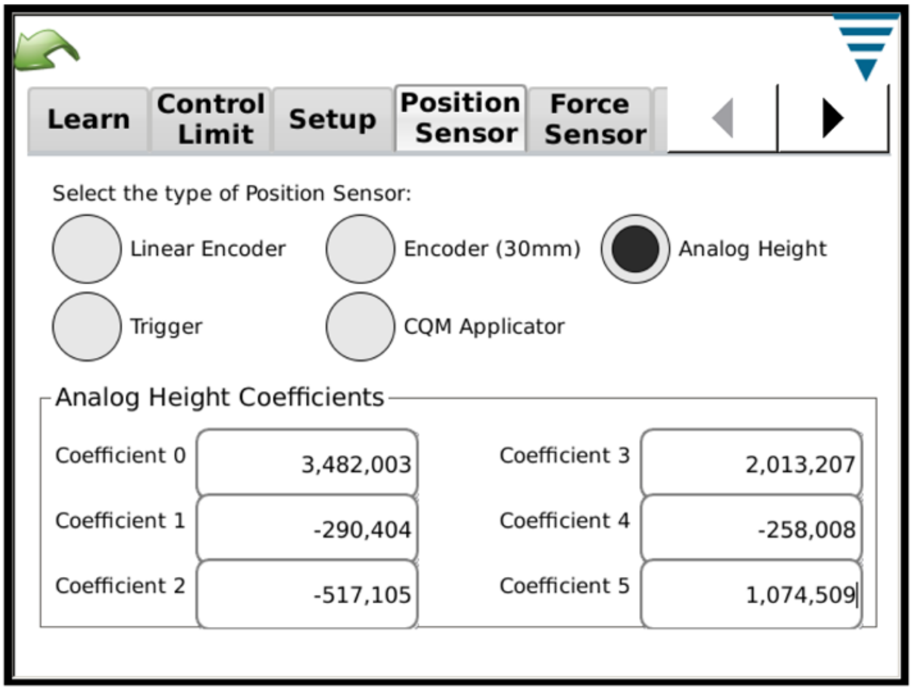
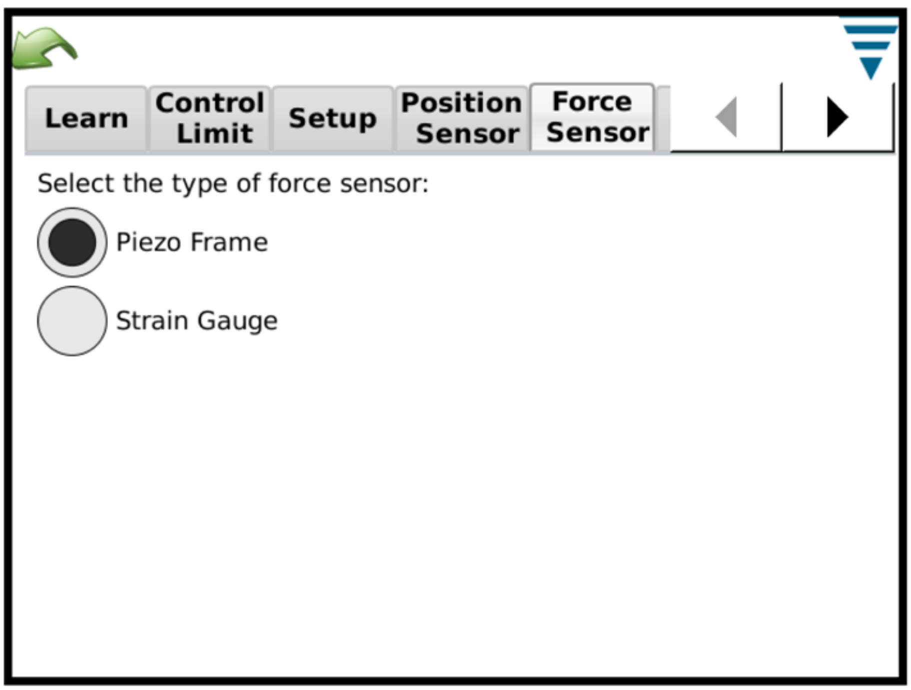


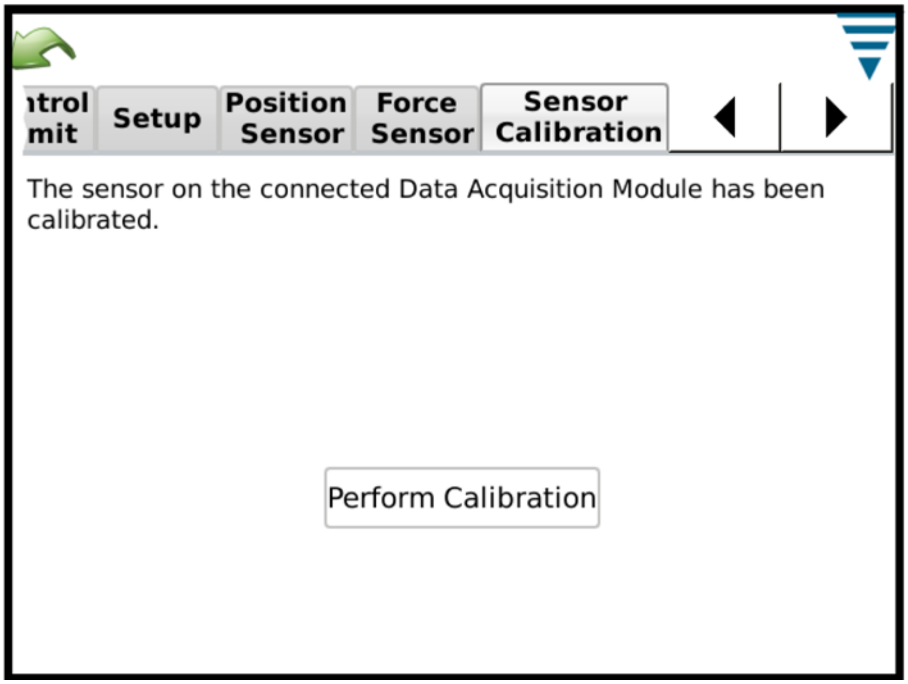
C. CQM Settings -- Force Sensor Tab

Choose the Force Sensor tab to select the force sensor that is installed on the terminating machine. Selections are: Piezo Frame and Strain Gauge (base plate).



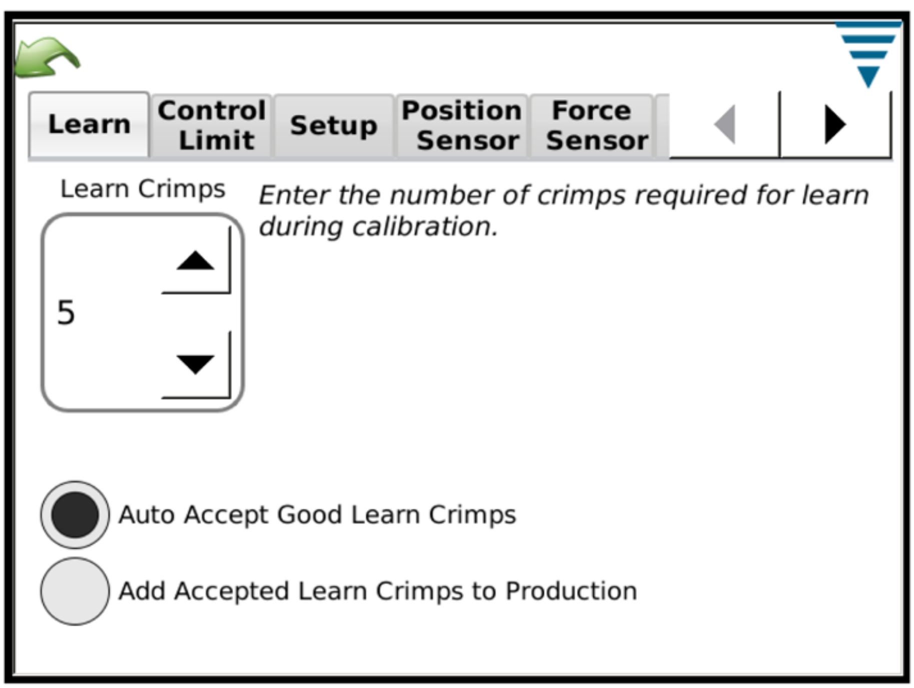
D. CQM Settings -- Sensor Calibration Tab

If you have the Analog Height sensor, then you must calibrate it. Select the Sensor Calibration and follow the instructions on the display and enter the Low and High voltages that you measured based on the switch settings of the A/D Calibration Switch. A TE A/D Calibration Switch and a digital volt meter are required to perform this calibration.



E. CQM Settings -- Learn Tab

Choose the Learn tab to select the Learn settings. TE recommends using the default of 5-crimps to properly learn the process. You can lower it to 3-crimps if you are confident in your process and the terminals you are using. If you want the best analysis capable once you enter production, increasing the Learn crimps will improve the statistical analysis of the crimp process that you are monitoring. .



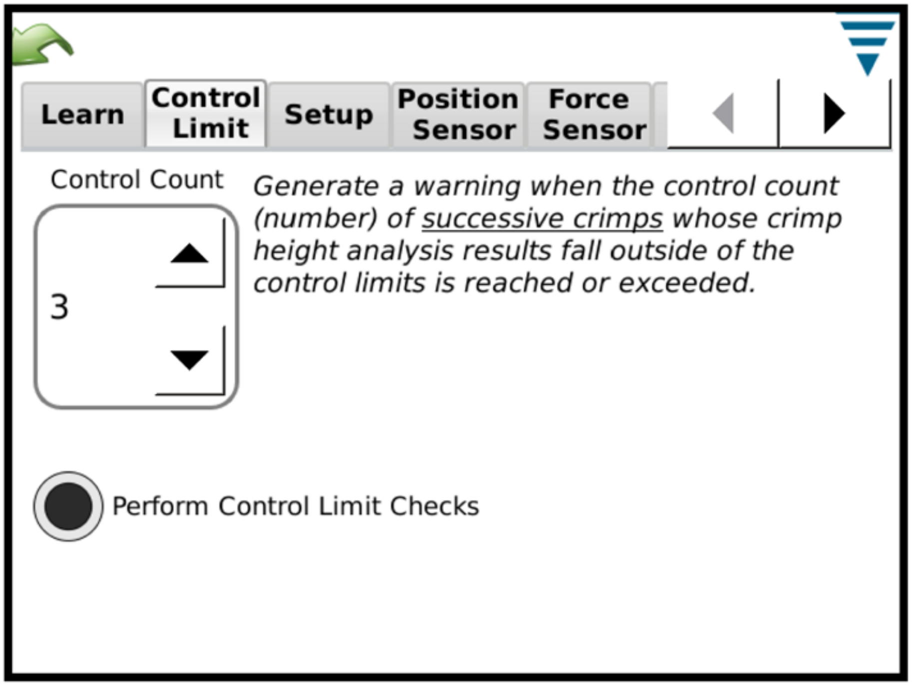
During the Learn process you can choose to have each learned crimp ‘Accepted as Good’ so that you do not have to acknowledge the CQM II. Select Auto Accept Good Learn Crimps. In all cases, during the Learning process, you must evaluate the crimp and ensure that it meets your acceptance criteria. The CQM II starts fully analyzing crimps once it is in the Production Mode. For those systems with Crimp Height Monitoring enabled, Crimp Height is evaluated during each learn crimp, so if there is a crimp outside of the tolerance, you will be notified and that crimp will not be used for learning.

During the Learn process you can choose to have each Accepted Learn crimp be counted in the total and batch counts. Select Add Accepted Learn Crimps to Production.

F. CQM Settings -- Control Limit Tab

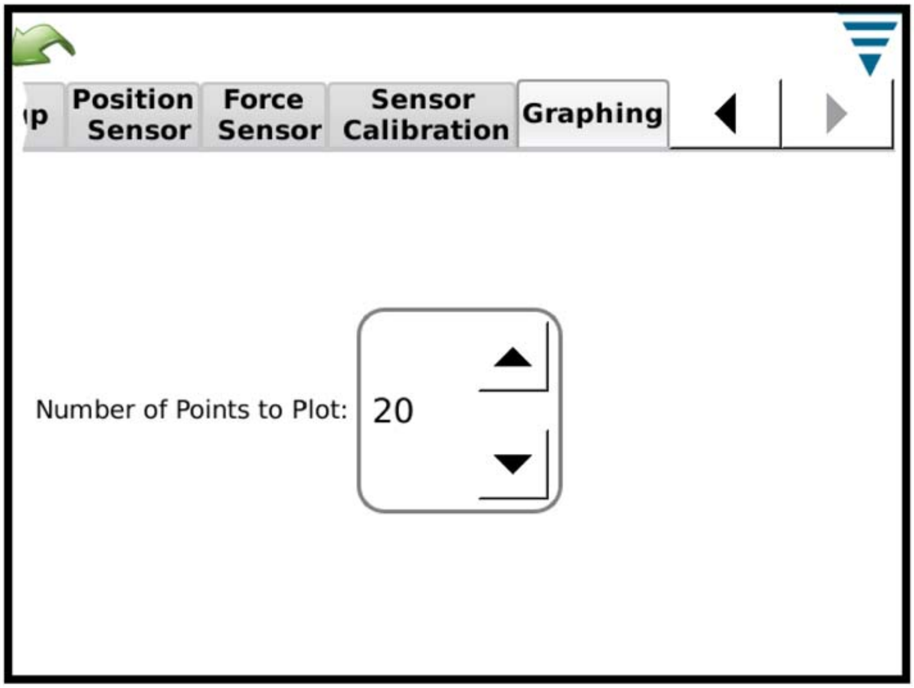
Choose the Control Limit tab to set the control count and if you desire to have the CQM Perform Control Limit Checks.

If you have selected to perform control limit checks, then upon receiving a number of consecutive control limits equal to the Control Count will cause a control count error message to be displayed.



G. CQM Settings -- Graphing Tab

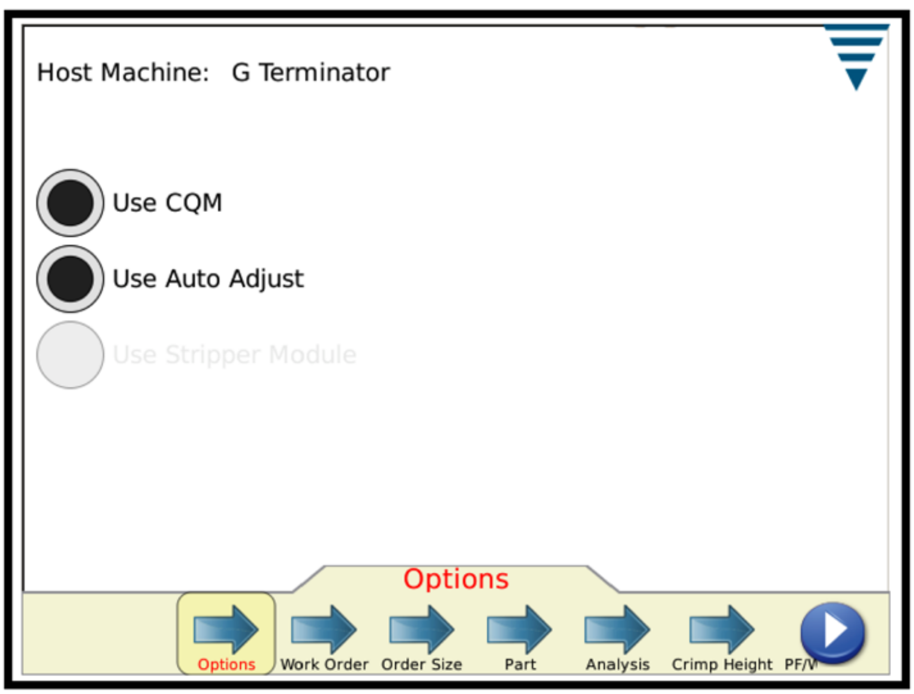
Choose the Graphing tab to select the number of crimp history points to display on the Basic production screen.



4. PRODUCTION RUN SETUP

4.1. Options

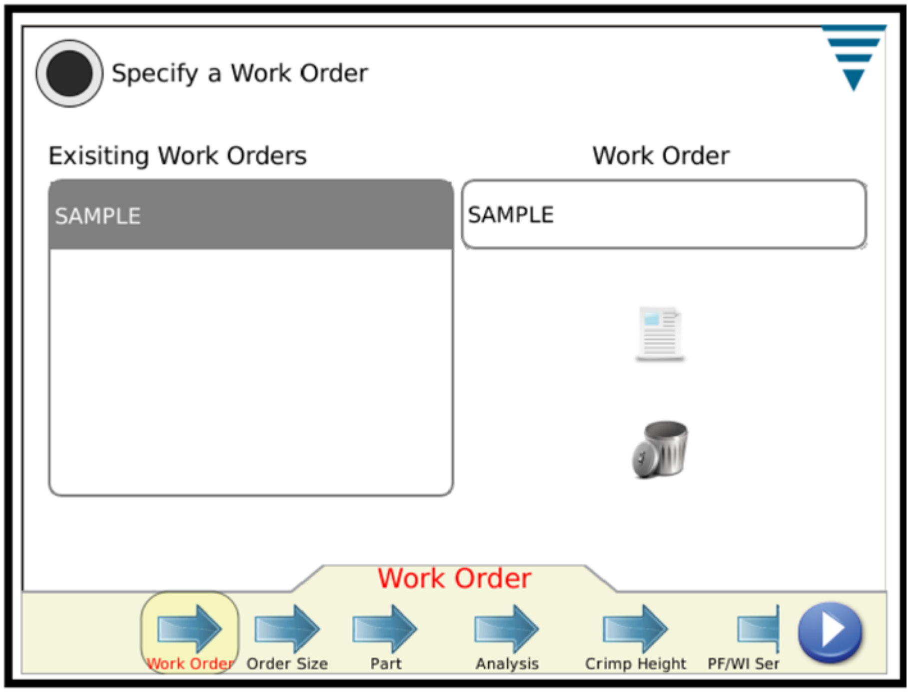
This is the first screen in the task bar. It is also the “home” screen when the home icon is chosen from the menu bar. In order to use the options, select the corresponding radio button.



4.2. Work Order

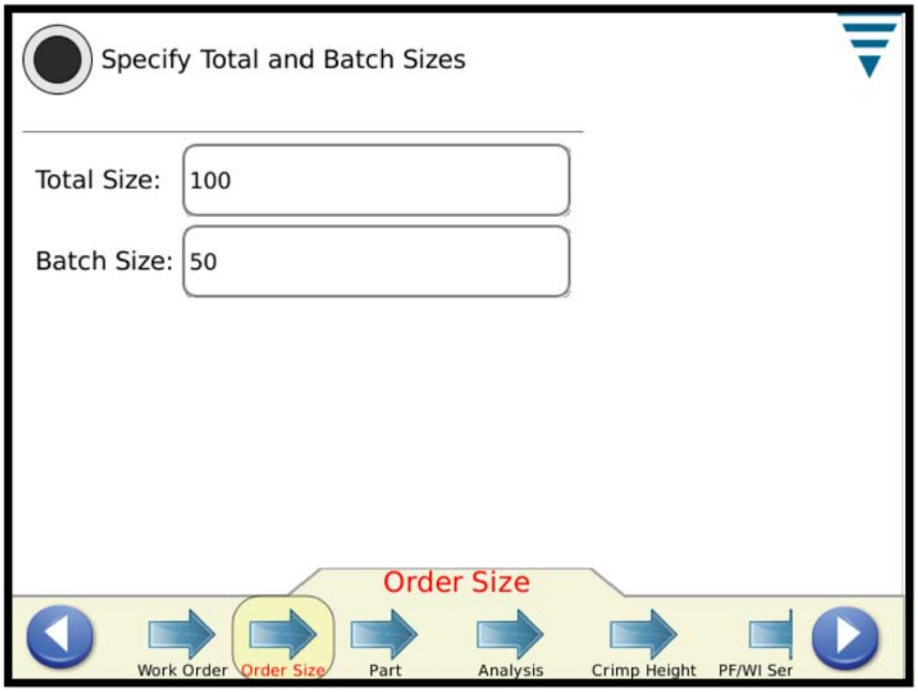
Using a Work Order is optional list, provide additional detail in printed and saved Reports that the CQM II can provide. To use a Work Order, select the radio button “Specify a Work Order”. You may select an Existing Work Order from the drop down list or edit (create) a new work order.

Touch the Work Order label or the Edit Icon.



4.3. Order Size

To use the Order Size counters, select the radio button “Specify Total and Batch Sizes”. Touch the appropriate box Total and Batch sizes and enter the number required.

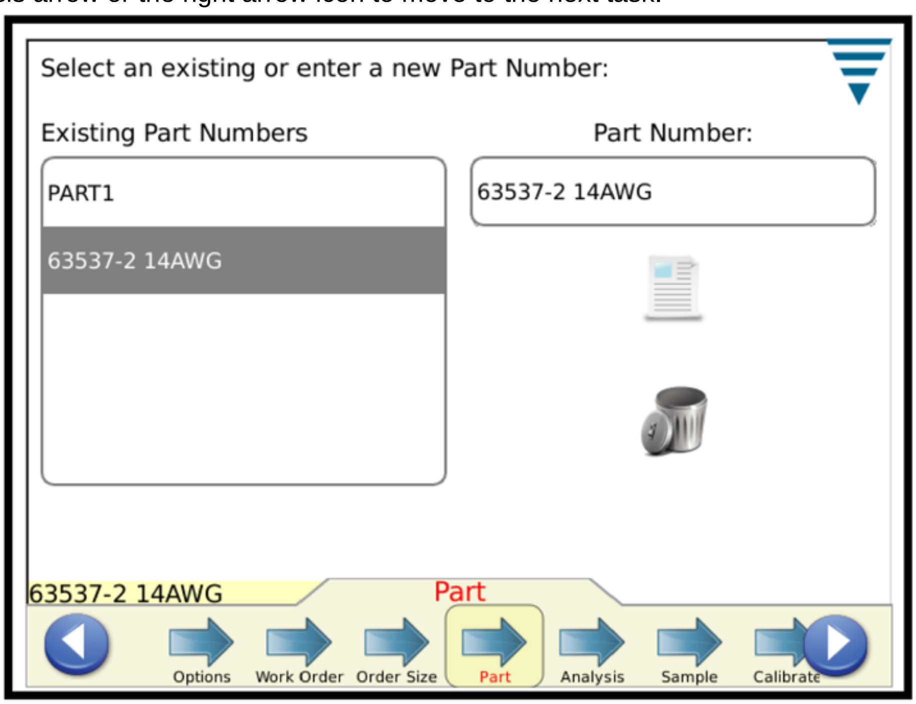


4.4. Part

A part number must be selected. The part number contains the relevant analysis method selections and associated parameters for the product that you want to produce.

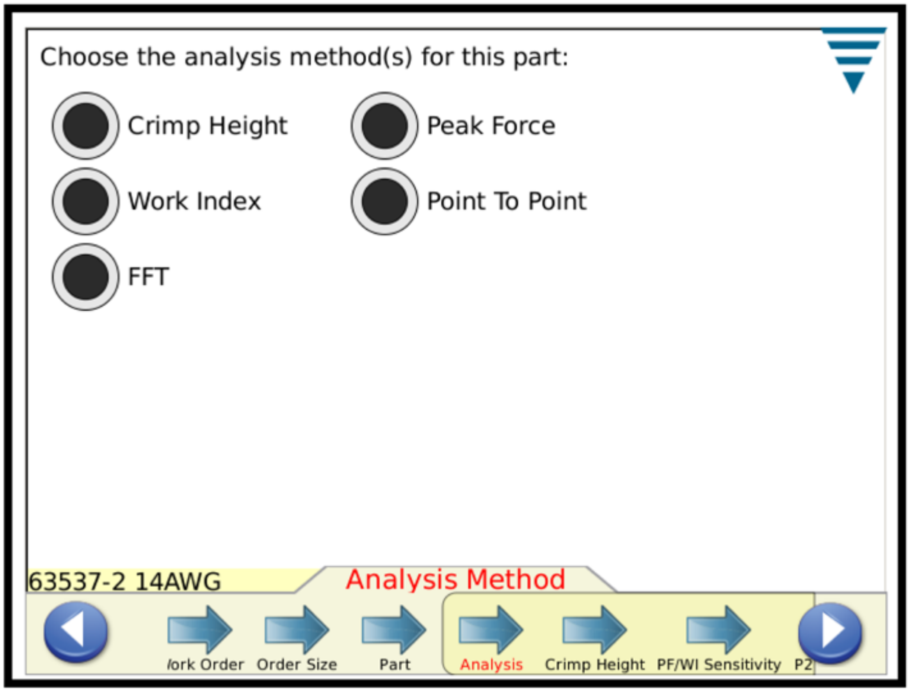
Select an Existing Part Number from the drop down list or edit (create) a new part number. To delete a part number, select it from the drop down list and then touch the delete icon.

Touch the Analysis arrow or the right arrow icon to move to the next task.



4.5. Analysis Methods

Once you touch the Analysis icon, you will notice that the number of selections in the task bar increase to provide more choices for editing parameters for the Analysis methods. First, start by choosing the analysis method(s) for the part. Available analysis methods are: Crimp Height (only on TE terminators), Peak Force, Work Index, Point to Point, and FFT (systems with just a force sensor can only use the Peak Force and FFT methods). The Default for a new part is all analysis methods selected.



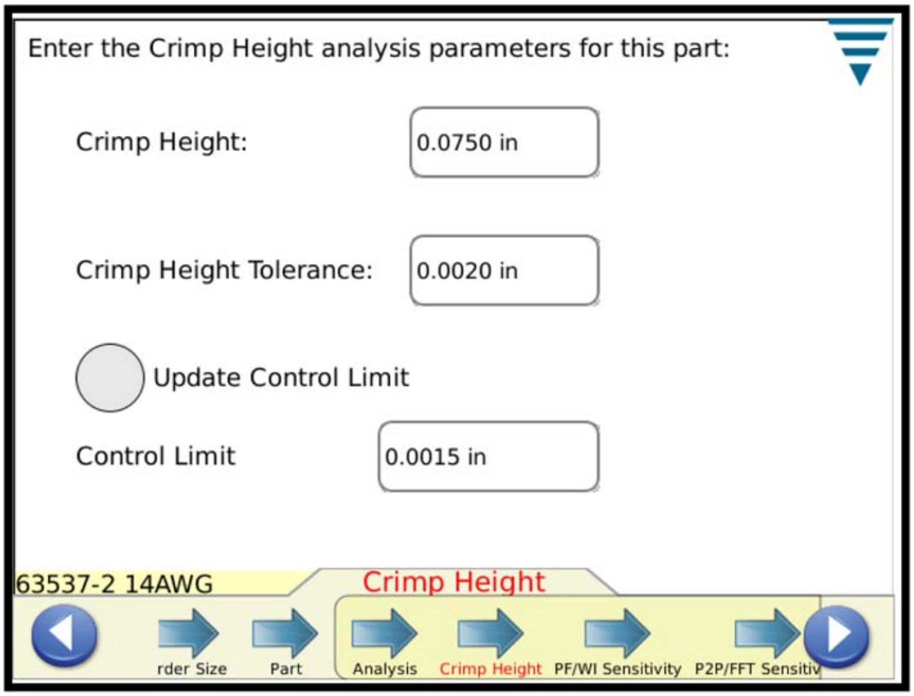
4.6. Crimp Height

If Crimp Height is selected, touch the Crimp Height arrow or the right arrow icon to move to the next task.

Enter the specific Crimp Height and Tolerance for the part by touching the appropriate box. For the entry of tolerance, if the tolerance from the manufacturer is +/- 0.002" inches enter 0.002" inches

Select the Update Control Limit radio button to turn on the feature that tells the monitor to automatically calculate a control limit for the part during production. The Default Control Limit initializes to 0.0015 inches and will automatically change once 30 production crimps have occurred.

The user can specify their own control limit if they do not want to have one updated for them. The control limit is also important with the autoadjust feature on some G-terminators. When the average crimp height of three consecutive PASS crimps is outside the Control Limit the autoadjust motor on the G-terminator will make an adjustment to bring the crimp height back within the control limit range.



Touch the next Sensitivity arrow or the right arrow icon to move to the next task.

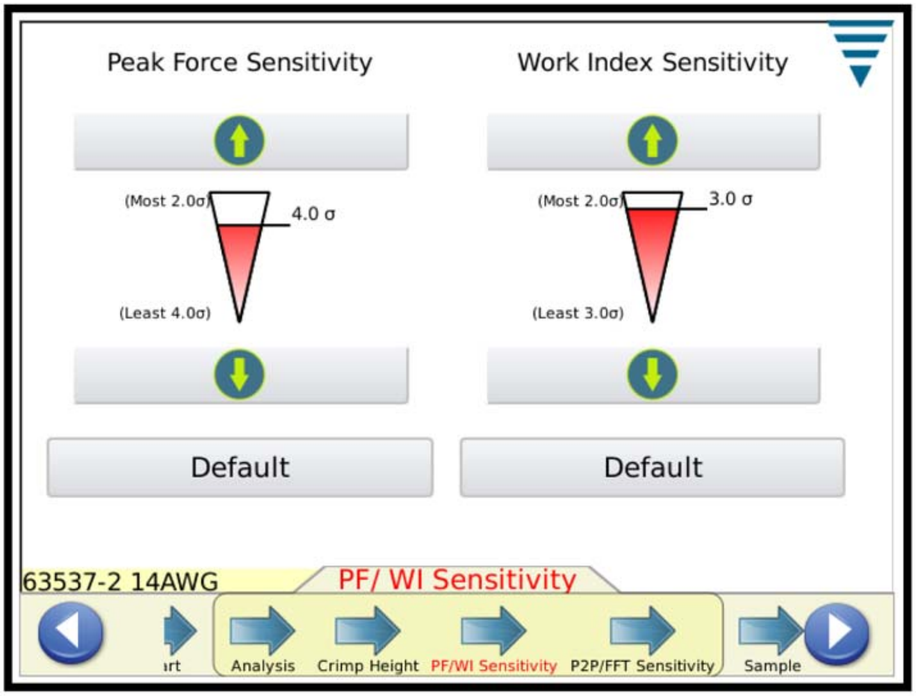
4.7. Peak Force (PF) and Work Index (WI) Sensitivity

Touch the *Up* and *Down* arrows to change the sensitivity settings of the Peak Force and Work Index. Press Default to return the setting to the factory default.

Default sensitivity settings typically work good for terminals and wire combinations that meet the minimum Head Room criteria of 35% or greater. If the CQM II Fails crimps that you determine to be Good crimps, then you may want to adjust the sensitivity of the analysis method that is causing this problem. In this case, adjust the sensitivity to be less sensitive by a few points, for example 3.0 to 3.5 (the higher the number the less sensitive).

If the CQM II is not detecting the crimp failures that you expect it to detect, then you may want to adjust the sensitivity of the various analysis methods to be more sensitive by a few points, for example from 3.0 to 2.5.

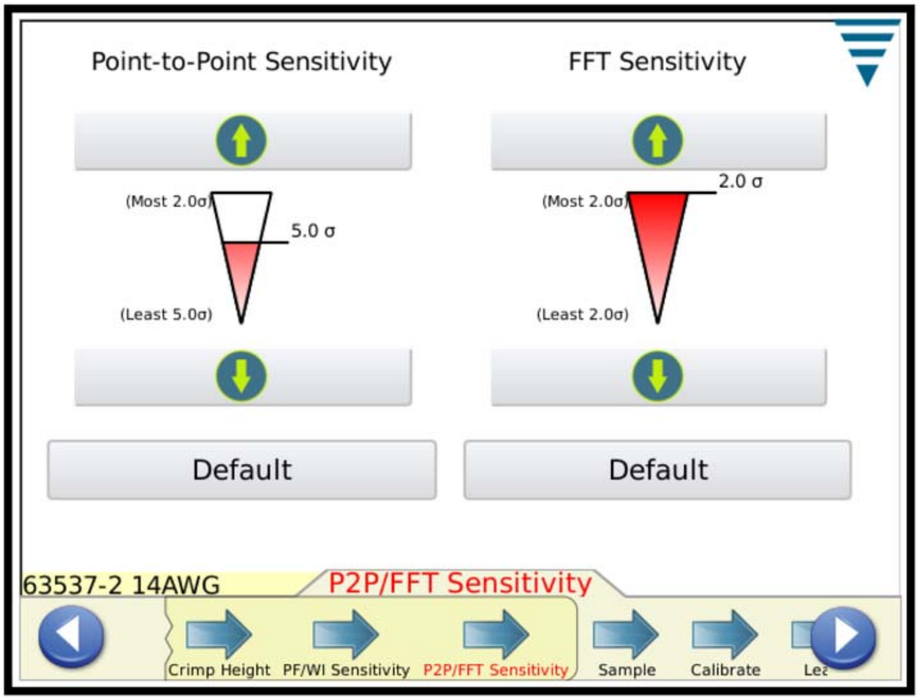
Touch the next Sensitivity arrow or the right arrow icon to move to the next task.



4.8. Point to Point (P2P) / FFT Sensitivity

Touch the *Up* and *Down* arrows to change the sensitivity settings of the Point to Point and FFT. Press Default to return the setting to the factory default. Adjusting the sensitivity to eliminate problems or to enhance performance for these analysis methods is similar to the prior description for Peak Force and Work Index.

Touch the Sample arrow or the right arrow icon to move to the next task.



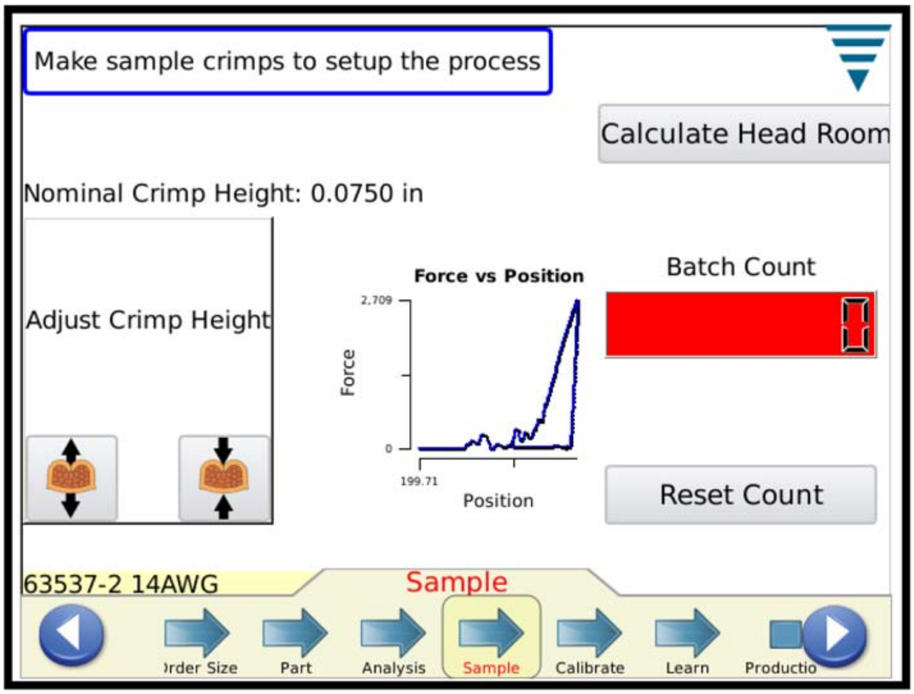
4.9. Sample

Use the Sample mode to make sample crimps to setup the process. In this task you will install the applicator, load product, and run your initial crimps to set terminal feed and crimp height. The CQM II will graph a crimp curve (provided the force is sufficient) but will not be analyzing the crimp. The graph is only for reference purposes. If the CQM II is connected to a G-terminator that has a crimp height auto-adjust motor, the Sample screen will provide buttons to touch to increase or decrease the crimp height. Touch the *Calculate Head Room* button if you want to perform a quick check of your wire and terminal to see how good the Head Room will be. Refer to Paragraph 2.8 for an explanation of Head Room.

Basically once you have the system properly set up with the correct crimp height, to perform a Quick Headroom Check, produce a good crimp with a stripped wire, and then produce a crimp that only has insulation (non-stripped) in the insulation crimp). If this part has not been calibrated before you may need to produce a Gain crimp.

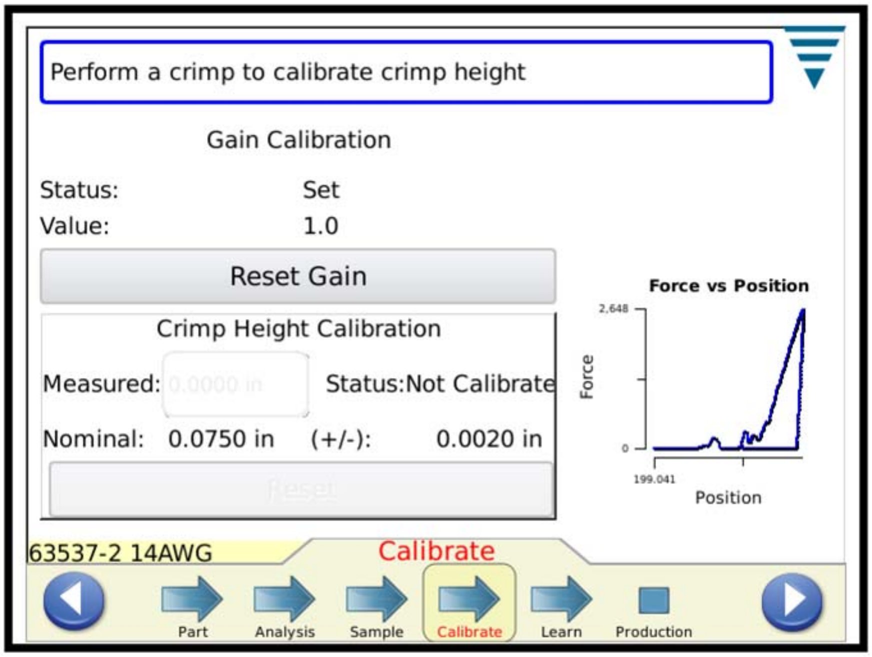
After you are satisfied that the quality of the crimp meets your requirements, you can move on to calibrate the crimp.

Touch the Calibrate arrow or the right arrow icon to move to the next task.



4.10. Calibrate

If the system uses the Piezo Frame sensor, the first step in the Calibrate task is to perform a crimp so the CQM II can set the amplifier gain. *Carefully inspect the crimp to ensure its quality.* If the Crimp is not to your quality requirements, then you can *Reset* the gain and try again.



4.11. Learn

To learn the process, proceed with crimping the number of terminals required for Learn (as entered in the CQM Settings). *Carefully inspect each crimp to ensure its quality.* If the Crimp is not to your quality requirements, then you can *Reject* the crimp and do it again. If Crimp Height analysis is selected, a Crimp Height will be calculated for each crimp and displayed. The Learn screen also shows the Learn Count, Last Crimp Status, and a crimp curve for your reference.

Touching the graph screen will bring up the full size graph screen. If using FFT, anaysis buttons are privided for adjusting a threshold level for FFT Analysis and to select a speed compensation for terminators that may have variable cycle rates due to incoming voltage variations, pneumatic variations, or load problems. It is recommended that you first switch to the Force Vs Time graph before making adjustment. After adjustments are made re-learning is required and learn counts will go back to 0.

Recommendations for Force Only installations with low headroom crimps (<35%).

- Initially try: No Speed Compensation and Threshold set to around 20%.
- Then try these settings and compare: Speed Compensation and Threshold set to around 20%.
- Choose the one that works the best for your process.

With higher headroom crimps the threshold can be reduced or set to 0 (default is 0).

A line will be drawn on the crimp curve graph at the threshold level. Increase the threshold level if this line intersects a visibly noisy portion of the crimp curve.

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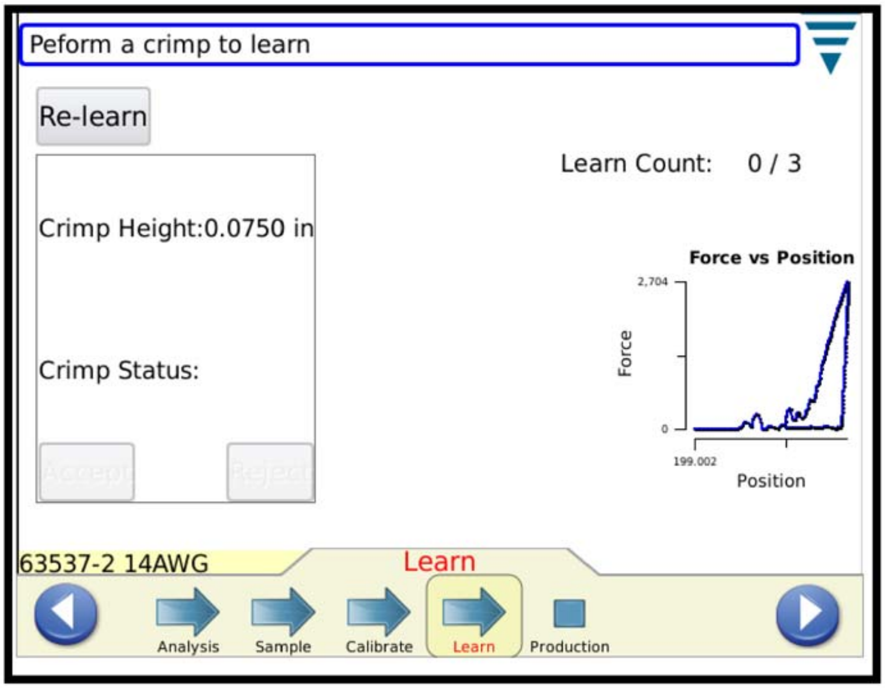

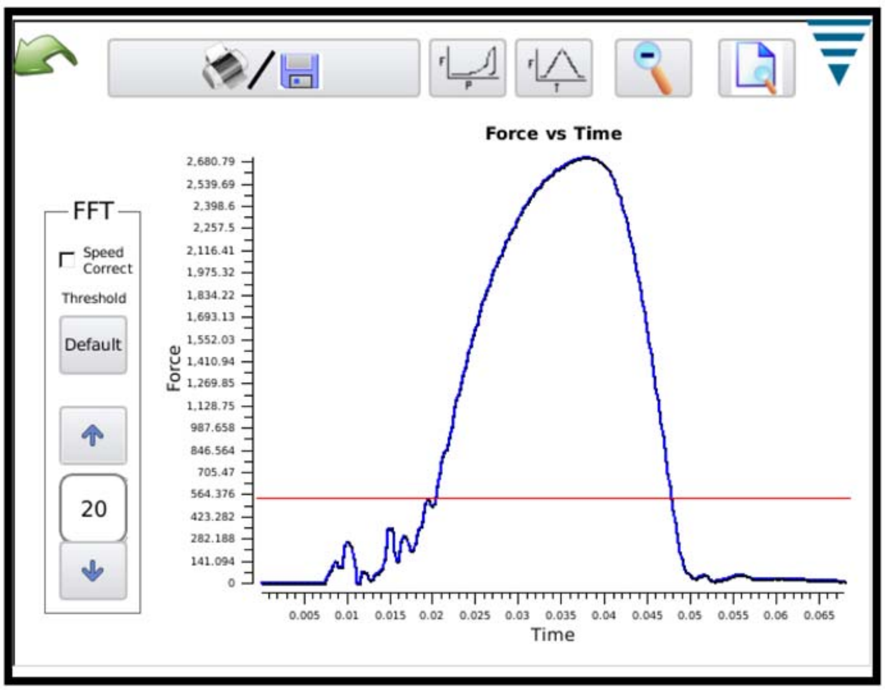

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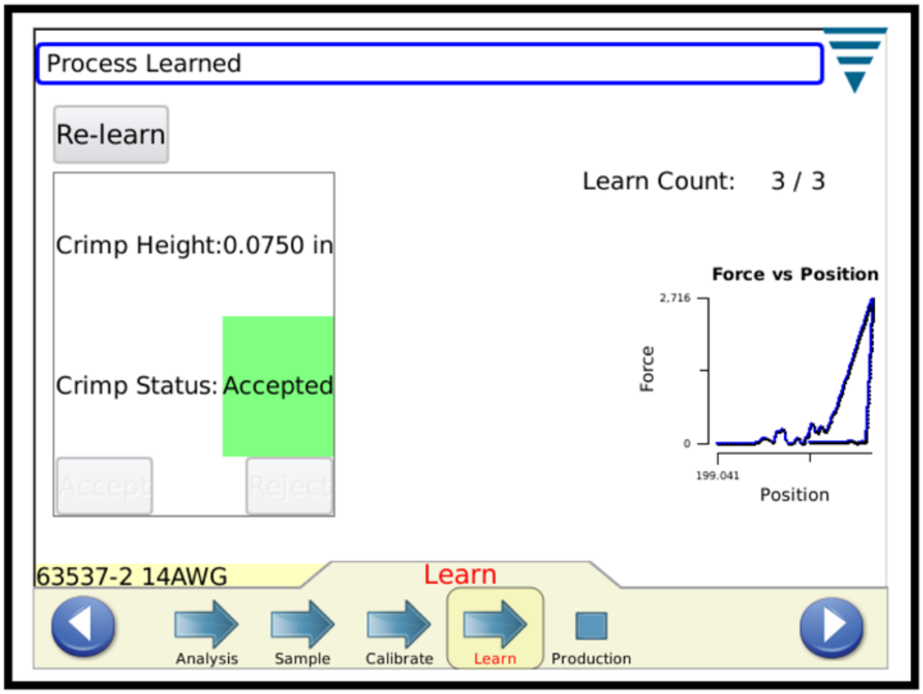
Once you have completed all of the Learn crimps, the display will indicate Process Learned.

It is recommended to re-learn the process if something dramatically changes in the process such as changing to a new reel of terminals or a different type of wire. It is also advisable to Re-Learn if while in production you experience too many failures that with further inspection meet your quality requirements. Touch *Re-Learn* perform the Learn process again.



Based on settings that were made in CQM Settings, the Learn crimps may require the operator to touch *Accept* for each Crimp.

After the display indicates *Process Learned*, you can then proceed to Production.

Touch the Production icon or the right arrow icon to move to the next task.

CAUTION

The Crimp Quality Monitor II is a PROCESS monitor. It is influenced by many variables that include changes in wire, terminal, applicator, terminal condition, operator, environment, etc. Changes in any of these variables, will affect the process and the process will have to be re-learned.

5. PRODUCTION

NOTE

Operation without CQM Analysis - if the user wishes to operate the terminator without doing any CQM Analysis, the user should make sure that a part is selected and then go to the sample screen to do any crimping that they do not want analyzed. See section 4.9 Sample

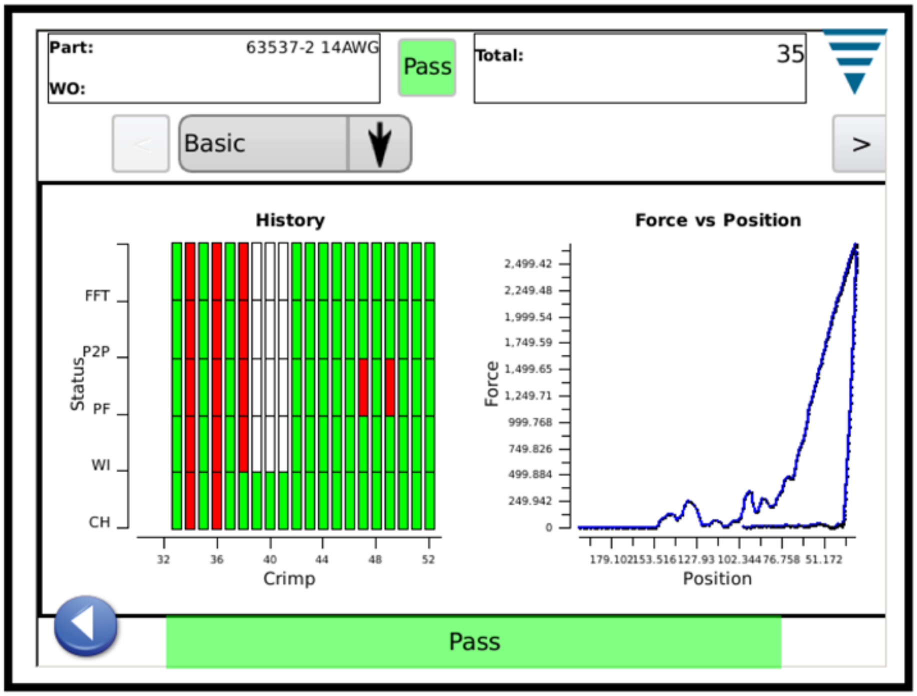
The production screens show the Work Order name, Part name, Total and Batch counters, and the overall status of the last crimp. Selecting from the seven tabs provides differing results, graphics, and history for your use. The number of tabs available is based on the analysis methods selected. Touching the Total and Batch count box at the top of the screen will prepare a report showing the statistics for the production run and specifics for the selected process analysis methods. This report is a pdf that can be printed or saved. Also on this screen is a *Reset Count* button that when touched, resets the Total count, Batch count, and all statistic data relevant to the work order. The crimp process is still calibrated and learned when the counts are reset.

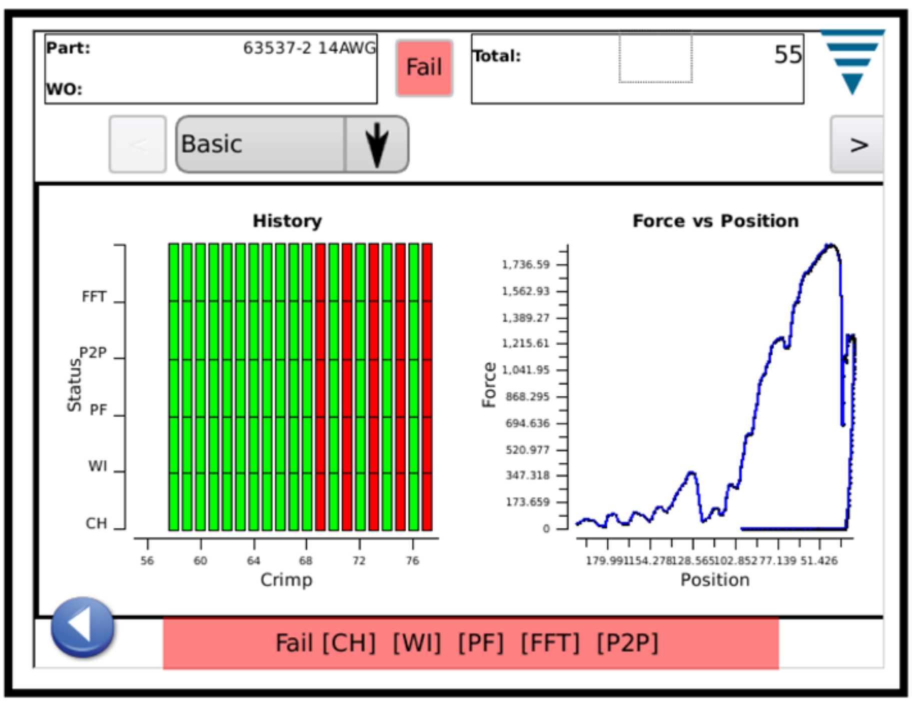
If the crimp has passed ALL of the selected analysis methods, the word “PASS” will be highlighted in green. See below.

A crimp curve is displayed.

Touching either of the graphs will zoom on the graphs.

If the crimp fails any of the selected analysis methods, the word “Fail” is highlighted in red. See the screen below.





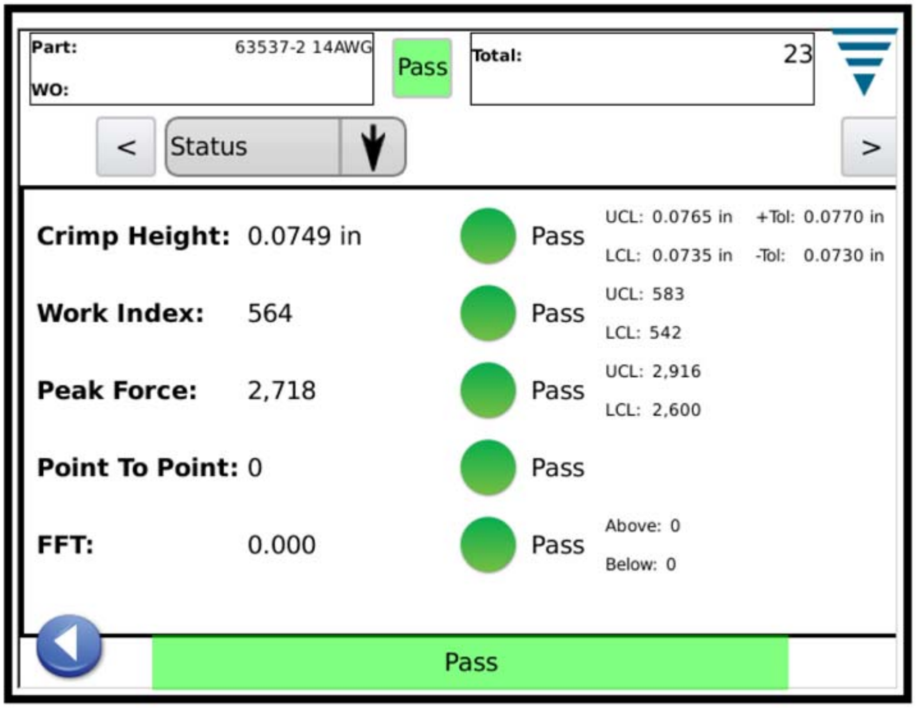
5.1. Basic Screen (Shown Above)

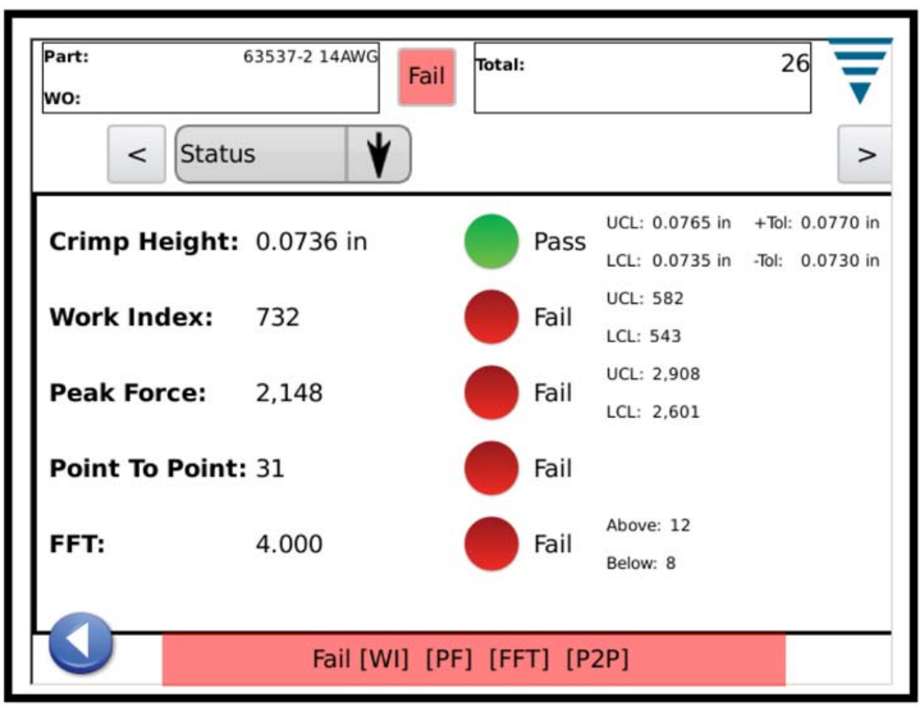
The basic screen, see above, provides a visual indication of the Crimp Status History for selected analysis methods. For each analysis method, the results are shown as: Green for a good crimp, red for a failed crimp, Orange for a Control Limit (not a failure but an indication that the Crimp Height is getting close to the tolerance), and white for a crimp that was not analyzed by that method. For example, the learn crimps for analysis methods will show white with the exception of the Crimp Height that should be green for those Learn crimps. The basic screen also shows the last crimp curve as either Force vs. Time or Force vs. Displacement. Touching the crimp curve makes it full screen where you can toggle between the two different curves. The Basic screen is one of the more common screens to display while in production. Refer to the two previous screens.

5.2. Status

The status screen provides individual status indicators for each selected analysis method as well as data that is relevant to the analysis method. If any one analysis method fails, the overall status of the crimp is a Fail. The colors of the indicators are as previously described in the Crimp Status History on the Basic screen.

Like the Basic screen, this Status screen is one of the more common screens to display while in production.



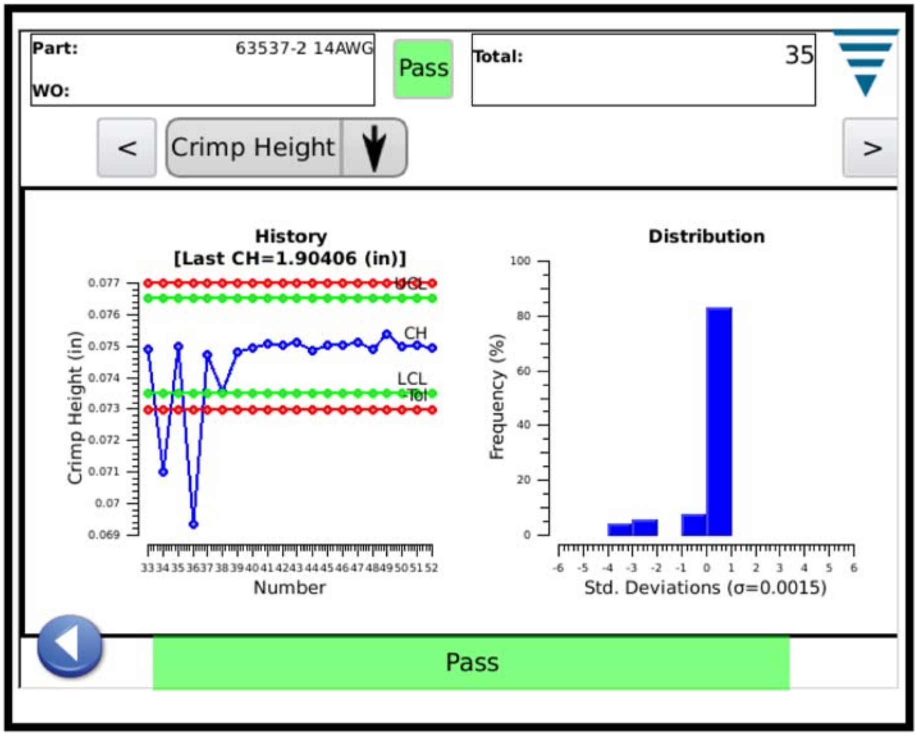


5.3. Crimp Height

The Crimp Height screen provides a crimp history graph showing the tolerance limits and the calculated crimp height for each crimp. To see more points than those shown, simply touch the graph to enter a full screen mode and use the arrow keys to move forward and backward in time.

The other graph is a histogram of the Crimp Height Distribution for the entire work order.

This screen is useful to observe the process with regards to the Crimp Height.

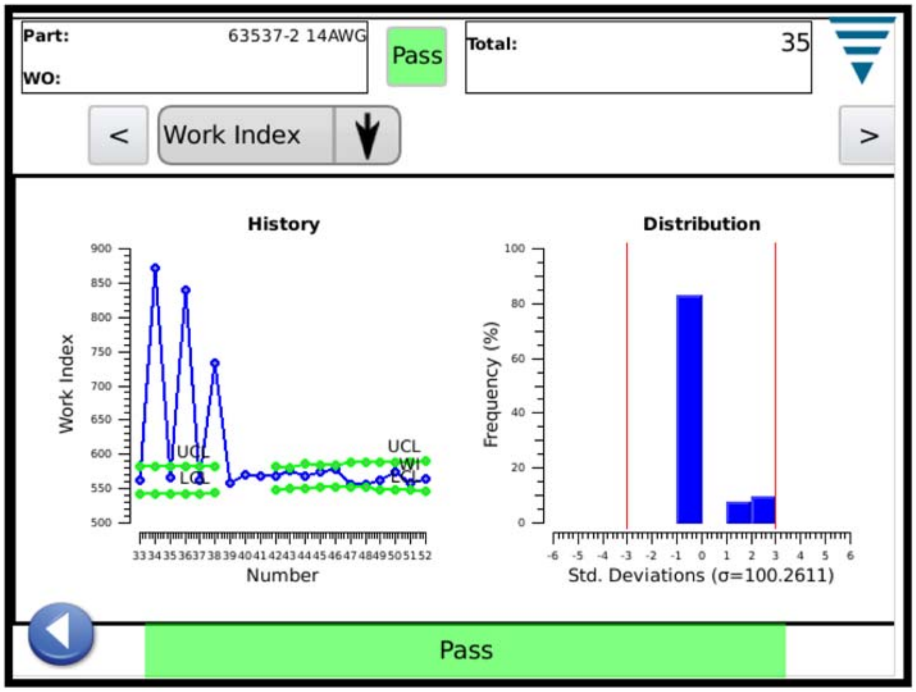


5.4. Work Index

The Work Index screen provides a crimp history graph showing the tolerance limits and the calculated work index calculated for each crimp. To see more points than those shown, simply touch the graph to enter a full screen mode and use the arrow keys to move forward and backward in time.

The other graph is a histogram of the Work Index Distribution for the entire work order.

This screen is useful to observe the process with regards to the calculated Work Index.

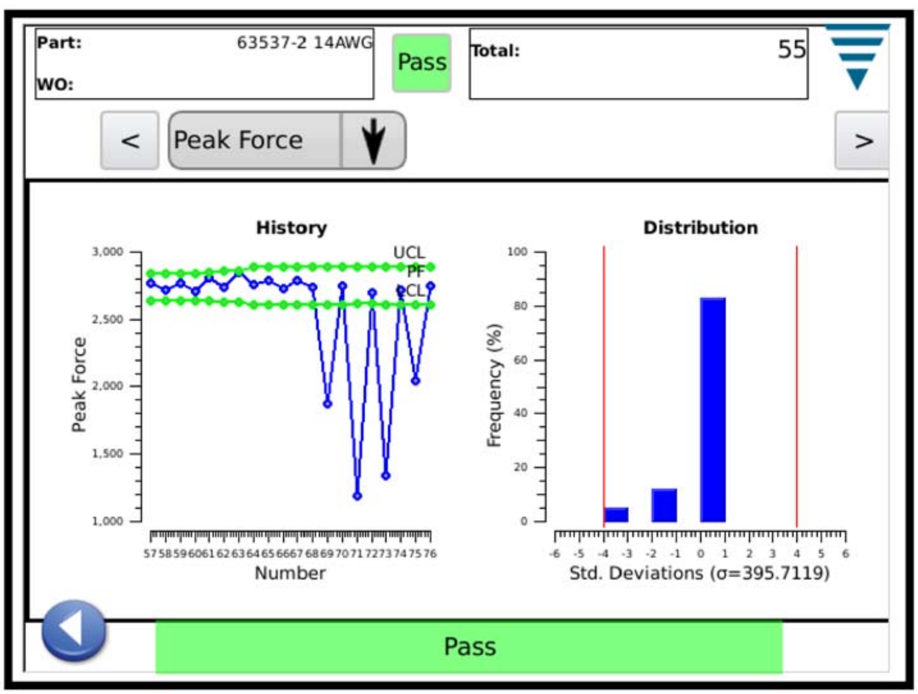


5.5. Peak Force

The Peak Force screen provides a crimp history graph showing the tolerance limits and the peak force recorded for each crimp. To see more points than those shown, simply touch the graph to enter a full screen mode and use the arrow keys to move forward and backward in time.

The other graph is a histogram of the Peak Force Distribution for the entire work order.

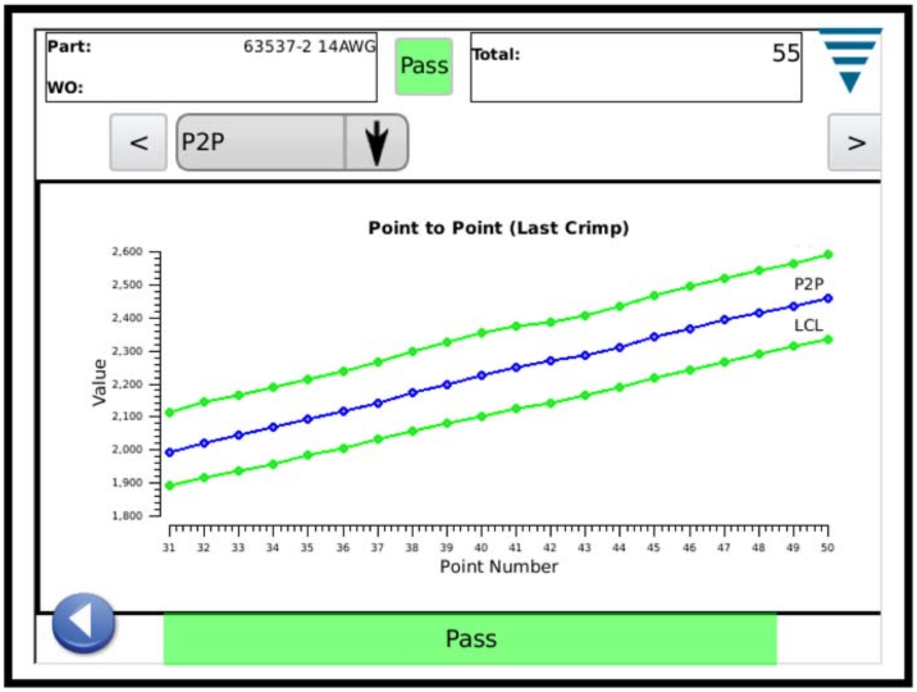
This screen is useful to observe the process with regards to Peak Force



5.6. P2P

The Point-to-Point (P2P) graph on this screen shows the 50 points of the last crimp that are individually analyzed to ensure a good crimp. If any point is outside the tolerance band, then the result of the analysis is a Failure. P2P is a signature analysis method so there is no history other than Good or Failed. This graph only shows the 50 points.

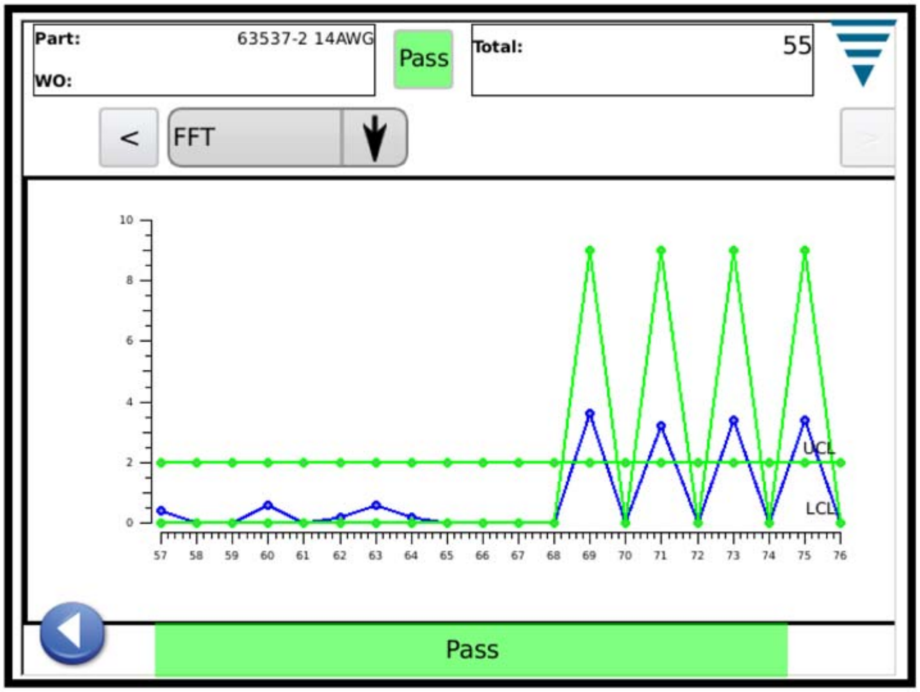
This screen is useful to observe the analysis of the 50 points used in P2P.



5.7. FFT

The Fast Fourier Transform (FFT) graph on this screen shows the component frequencies of the last crimp that are analyzed to ensure a good crimp. The FFT analysis requires five or more to be outside the calculated tolerance for a failure.

This screen is useful to observe the component frequencies used in FFT. There are a total of 32 component frequencies that are used in the FFT. Due to screen size only a portion are shown on the screen. To view them all, touch the graph to expand it to full screen and then use the arrow buttons to see it all.

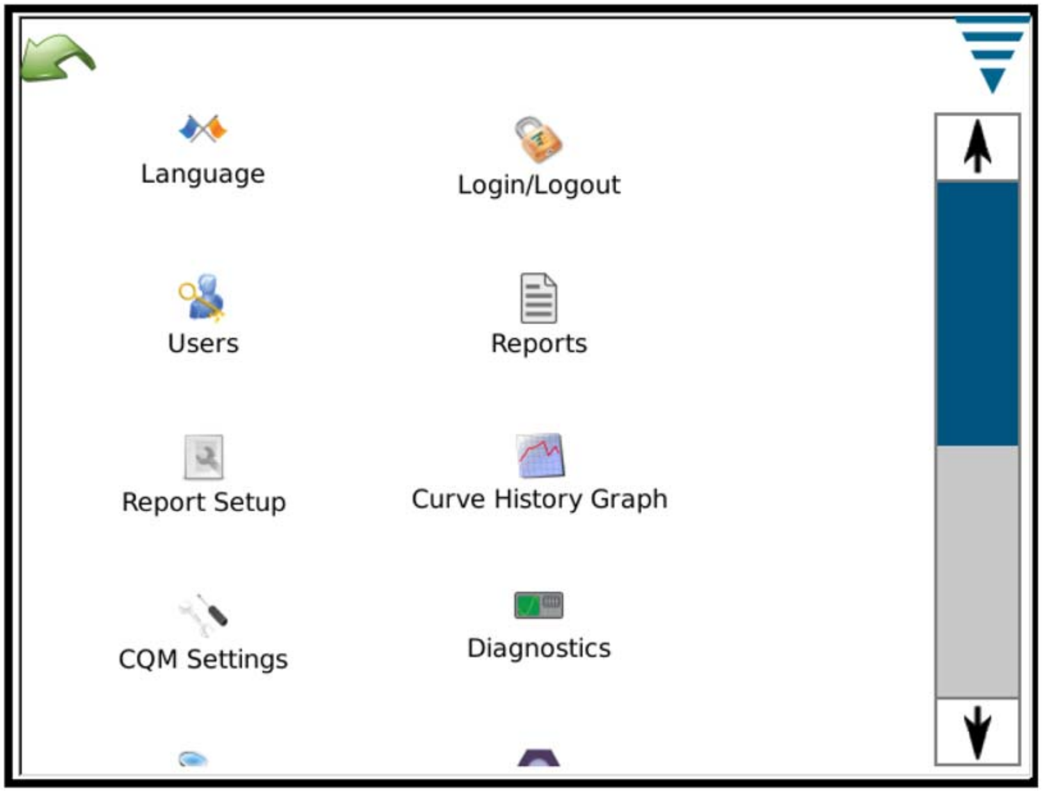

Part:
63537-2 14AWG
WO:
Pass
Total:
55
<
FFT
UCL
LCL
Pass

6. CONTROL PANEL

Touching the Control Panel icon on the main menu screen brings up the control panel. The following control panel tools are to be used by the CQM administrator.

NOTE

For System Settings, refer to Paragraph 3.3. For CQM II settings, refer to Paragraph 3.4.



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A. Language Icon

To pick a language, touch the language icon, then select the appropriate language and save it.

Touch the icon to select the Language screen. Choose the language from the drop down list. If you want the selected language to be used when the unit powers ON, select the radio button **Default Language** when the language is selected.

B. Login/Logout

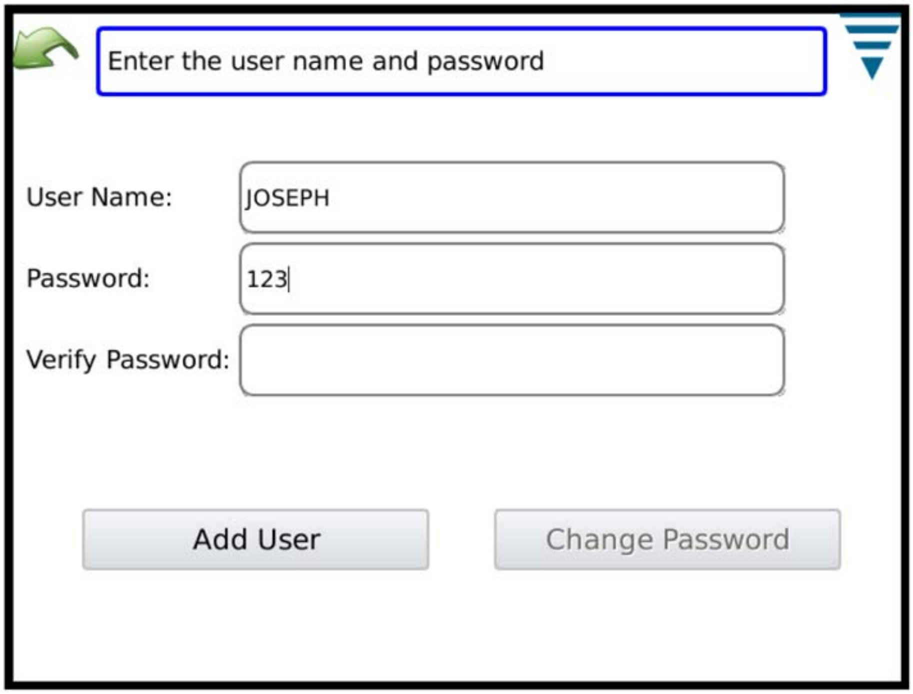
Touch the icon to select the Login/Logout screen. The user that is logged on will be displayed. Choose **Logout** to select a new user. Choose the new user from the drop down list and then enter the password for that user.

The initial system only has a single User, the Administrator. If no password is selected there is none needed to Login/Logout of the system. Once additional users are added or a password is entered for the Administrator, *then* a password will be required to Login/Logout of the system.

C. Users

- Add New User

First enter the user name. Then enter the user password and then verify the password by entering it again. Choose **Add User** to finish.

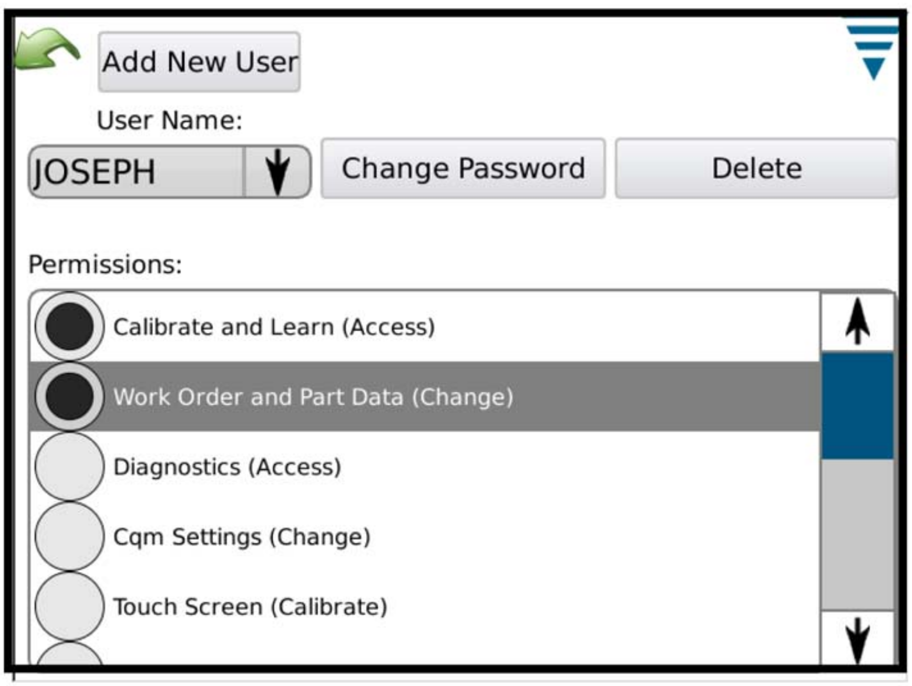


- Change Password

With the user selected from the drop down list, choose **Change Password**. The user must enter a new password and then verify the password by entering it again.

- Delete

With the user selected from the drop down list, choose **Delete**.



- Permission Settings

Permissions are a method to allow or not allow individual users access to certain tasks or actions that can be performed on the CQM II.

With the user selected from the drop down list, choose the appropriate radio button to provide the user permission for the various tasks and actions.

NOTE

The user that is logged on must have permission to make these modifications.

User permissions are grouped by certain tasks or actions. The available selections are as follows:

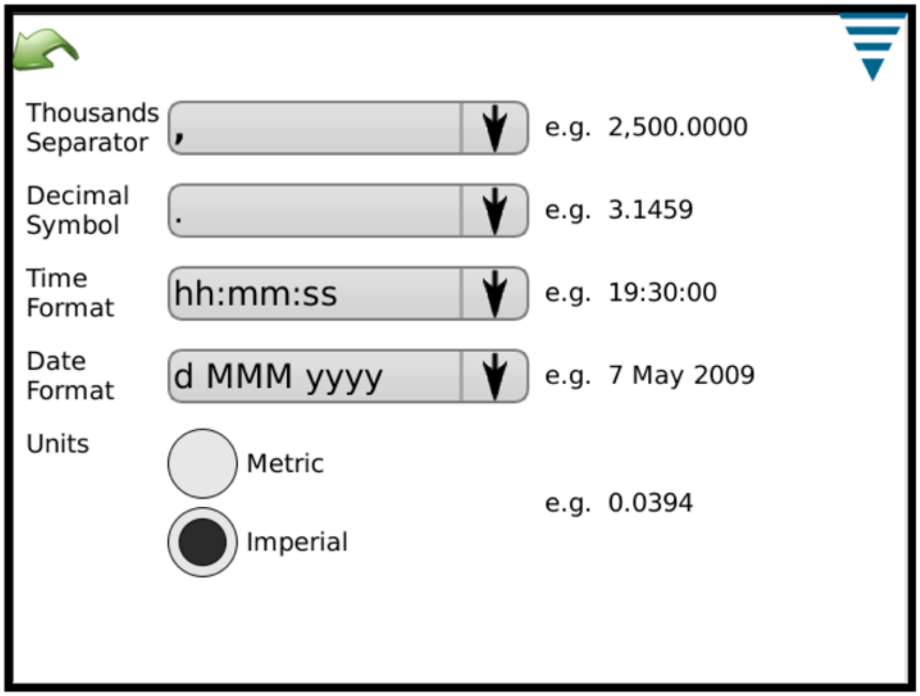
SCREEN	SCREEN FUNCTION
CQM Settings (Change)	Modify any settings on “CQM Settings” screen
Calibrate and Learn (Access)	[SCREEN ACCESS] Calibrate Screen
	[SCREEN ACCESS] Learn Screen
Work and Part Data (Change)	Enter a new Work Order or delete a Work Order
	Modify WO size
	Enter a new part or delete a part
	Selection of analysis methods
	Crimp Height Settings
	Sensitivity Settings
Network (Change)	Modify any setting on Network screen
Date/Time (Change)	Modify any settings on Date/Time screen
Diagnostics (Access)	[SCREEN ACCESS] Diagnostics Screen
Maintenance (Access)	[SCREEN ACCESS] Maintenance Screen
Locale (Change)	Modify Thousands Separator
	Modify Decimal Separator
	Modify Time Format
	Modify Date format
	Select units (Metric or Imperial)
User Administration	Add Users
	Delete Users
	Modify Permissions
Clear Control Limit	[VIRTUAL] Displayed on Message Dialog
Touch Screen (Calibrate)	Allow touch screen calibration to be performed
Printer Setup (Access)	[SCREEN ACCESS] Printer Screen

NOTE

A user can always change their own password. The ADMIN user can change any user's password. (There is no separate permission that would allow a non-ADMIN user to change another users password).

D. Locale Settings

Touch the icon to select the Locale screen. The thousands separator, decimal symbol, time format, date format, and default units selection can be made in this screen.



E. Date/Time Settings

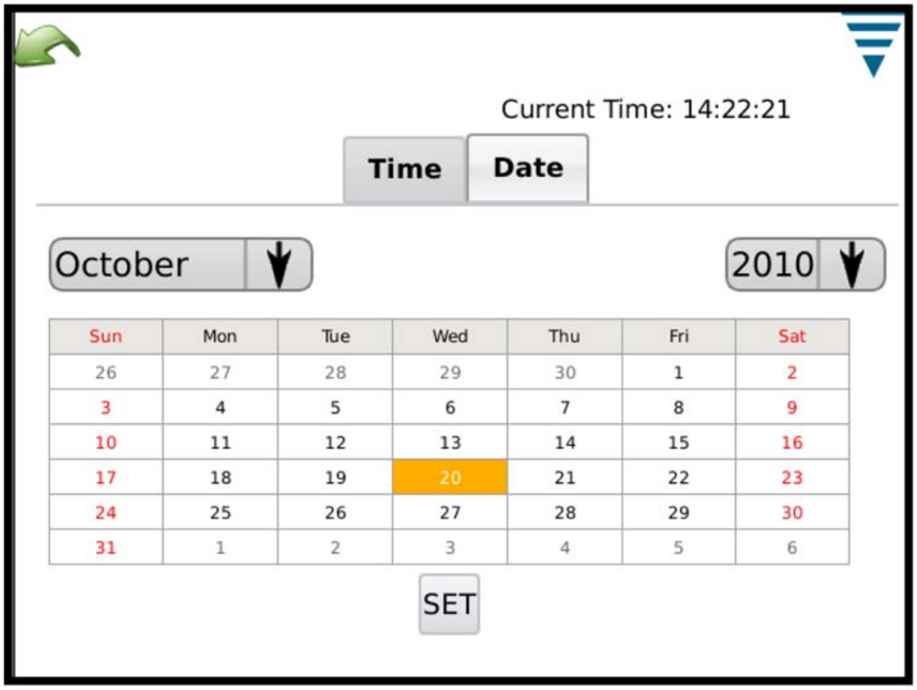
Touch the icon to select the Date and Time screen. The time and date formats are set in the Locale section of the Control Panel.

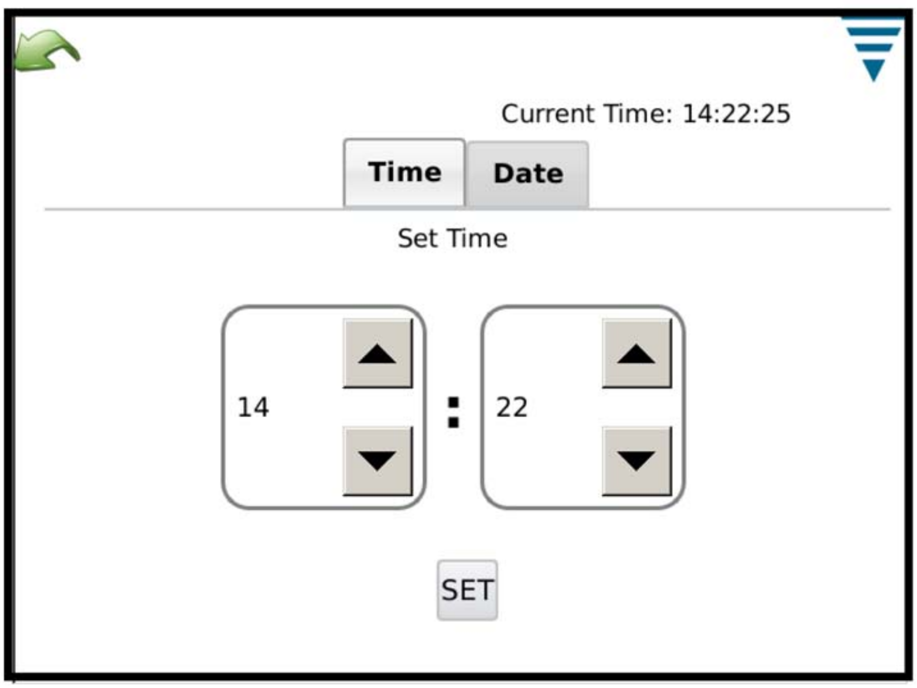
- Date

Set the year, month, and day. Then choose **SET**

- Time

Set the time. Then chose **SET**.





F. Reports

Touch the icon to select the “Reports” screen.

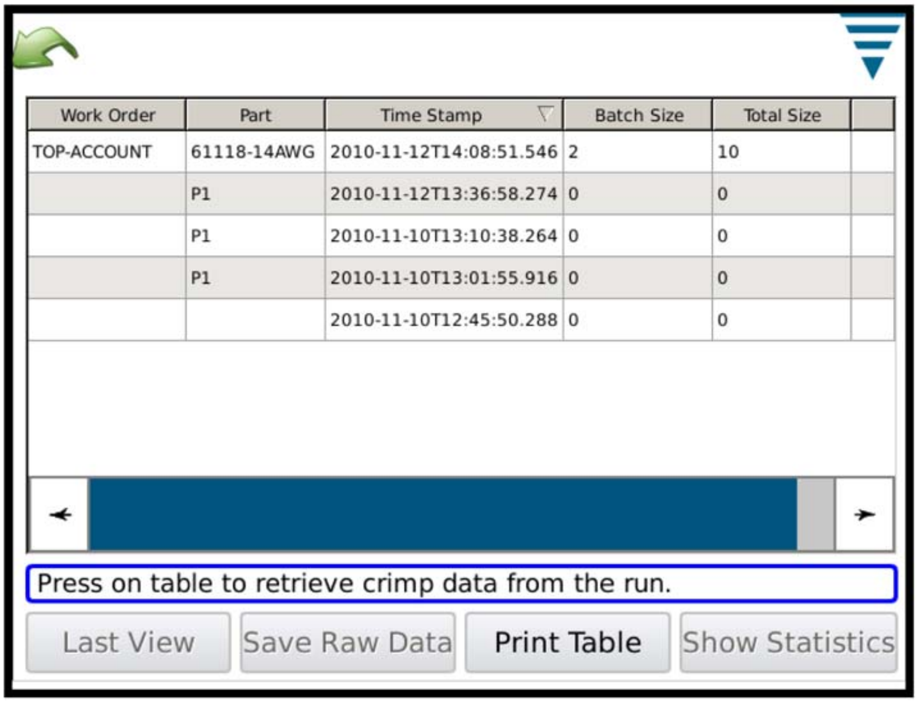
NOTE

The reports screen is a very busy screen and it may be easier to navigate by plugging in a USB mouse.

NOTE

The reports screen is a spreadsheet that contains past history of production work orders or parts that have been run. Each entry is referred to as an "Instance."

The Reports Screen gives access to the data and history of all the crimps analyzed by the CQM unit. The results of every crimp is stored in a database on the unit. Each crimp is organized by a PRODUCTION RUN. The run will be unique for each combination of Work Order, Part Number, Batch Size and Total Size. Each time the production counts are reset a new PRODUCTION RUN will be created. All crimps will be included in the PRODUCTION RUN including sample, calibration, learn, Pass and Fail crimps.



- **Production Run View**

When the Reports Screen is opened initially the data table will show a list of all the PRODUCTION RUNS and some summary data. The PRODUCTION RUNS are sorted so that the last production run is at the top. The table can be sorted by any column by clicking on the column header. The scroll bar at the side or in some cases along the bottom will allow the operator to see more of the data table.

- **Pressing on the Row**

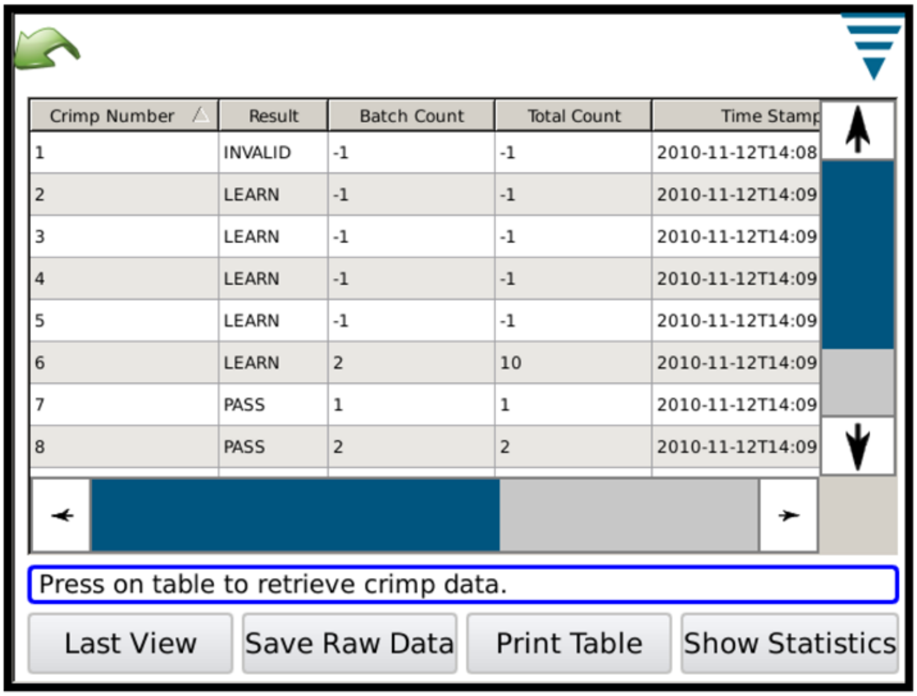
Pressing on the row for a PRODUCTION RUN will allow the operator to see more detailed information about the crimps in the run.

- **"Print Table" Button**

On each view of the data table it is possible to press the "Print Table" button. When this button is pressed all the data in the table will be displayed in a view screen that will allow it to be printed or saved to a pdf file. In this way the operator can get a printed record of the data that is viewed in the table.

- **"Last View" Button**

Pressing this button will return the data table to the last view.



- Production Detail View

When the detailed data on the production run is displayed each crimp and its results are shown. You will see the Crimp Number, Overall Result, Batch Count, Total Count, Time Stamp, Part Number, Crimp Mode of each individual crimp.

<u>Description of Data</u>:

Crimp Number	A unique identifier for the crimp in the production run.
Overall Result	The final result of the crimp based on all the analysis methods active.
Batch Count	Number of PASS crimps in the batch after time of crimp.
Total Count	Number of PASS crimps in the production run after the crimp.
Time Stamp	Coded time stamp that represents the date and time of the crimp.
Part Number	Part number of the crimp.
Crimp Mode	Mode of the CQM unit when the crimp was made.

Mode Description:

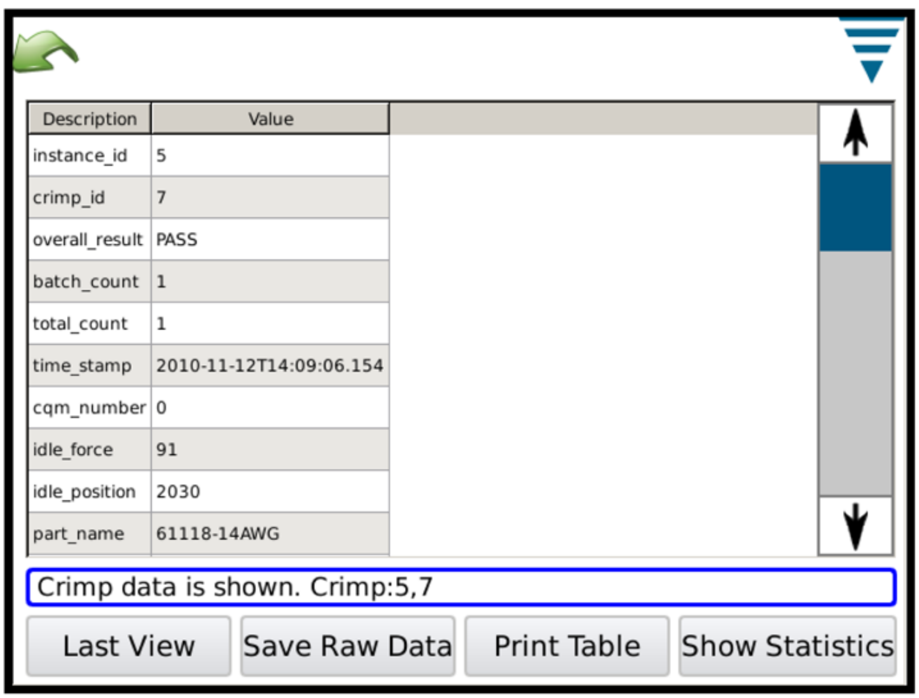
SAMPLE_MODE	Crimps that are done when the CQM II is in sample mode. In the sample mode no analysis is performed on the crimp and its result in INVALID.
CALIBRATE_GAIN_MODE and CALIBRATE_CRIMP_HEIGHT_MODE	These are crimps that are done setting the force gain and crimp height reference. These crimps have result of INVALID because no analysis can be done yet
LEARN_MODE	These crimps are used to create the reference of good crimps. Learn crimps are accepted or rejected by the user.
PRODUCTION_MODE	These are crimps that are fully analyzed by all the analysis methods that is active at the time of the crimp. If the overall result is PASS then counts are added to the Batch and Total count. If the over all result is FAIL then the counts are unchanged.

Detailed Information About a Crimp

Pressing on the row of a specific crimp will show the detailed information about the crimp and its results.

Crimp Detail View

This view shows all the details for the crimp. The crimp data and the results at the time of the crimp are shown. The data shown is complete.



Data Description:

	CRIMP RESULT DATA
INSTANCE ID	- production run identifier.
CRIMP ID	- a unique identifier for the crimp in the production run.
OVERALL RESULT	- final result of all the analysis methods.
BATCH COUNT	- number of PASS crimps in the batch after the crimp.
TOTAL COUNT	- number of PASS crimps in the production run after the crimp.
TIME STAMP	- coded time stamp that represents the date and time of the crimp.
CQM NUMBER	- source CQM Unit number. (always 0)
IDLE FORCE	- idle force detected when the crimp occurred.
IDLE POSITION	- idle position detected when the crimp occurred.
PART NAME	- part name.
SEQUENCE POSITION	- position in the sequence. (always 1)
CRIMP MODE	- CQM unit mode when the crimp occurred.
CRIMP NUMBER	- number of crimps since powered on.
CALIBRATE RESULTS DATA (ONLY SHOWN FOR CALIBRATE CRIMPS)	
GAIN VALUE	- gain value after the gain calibration crimp.
HAND MEASURED CRIMP HEIGHT	- entered measured crimp height during calibration.
CALIBRATE RESULT	- True or False.
CRIMP HEIGHT HISTORY DATA (ONLY SHOWN FOR PRODUCTION MODE CRIMPS)	
CRIMP RESULT	- Pass or FailL from crimp height analysis
MEASURED CRIMP HEIGHT	- crimp height value from the crimp height analysis
UCL	- upper control limit
LCL	- lower control limi
NOMINAL CRIMP HEIGHT	- crimp height desired and set in the part.
CONTROL LIMIT	- value calculated or set in the part.
CALCULATE CONTROL LIMIT	- True or False.
CRIMP HEIGHT TOLERANCE	- allowable tolerance set in the part.
PEAK FORCE HISTORY DATA (PEAK FORCE ANALYSIS)	
PEAK FORCE RESULT	- PASS or FAIL or LEARN from peak force analysis
FORCE	- peak force value from the peak force analysis
UCL	- upper control limit
LCL	- lower control limit
SENSITIVITY	- sensitivity setting for the peak force analysis

WORK INDEX_HISTORY DATA (WORK INDEX ANALYSIS)	
WORK INDEX RESULT	- PASS or FAIL or LEARN from work index analysis
WORK INDEX	- work index value from the work index analysis
UCL	- upper control limit
LCL	- lower control limit
SENSITIVITY	- sensitivity setting for the work index analysis
P2P HISTORY DATA (POINT TO POINT ANALYSIS)	
P2P RESULT	- PASS or FAIL or LEARN from point to point analysis
VALUE	- point to point value from the point to point analysis
FFT HISTORY DATA (FAST FOURIER TRANSFORM ANALYSIS)	
FFT RESULT	- PASS or FAIL or LEARN from FFT analysis
VALUE	- FFT value from the FFT analysis
ABOVE COUNT	- number of frequencies that are above the mean.
BELOW COUNT	- number of frequencies that are below the mean
FAILURE CODE	- code for internal use
SENSITIVITY	- sensitivity setting for FFT analysis
THRESHOLD	- threshold level in % for FFT analysis.
FORCE THRESHOLD	- the actual force value of the threshold

Statistics View

When the “Show Statistics” button is pressed the statistics for the selected production run is displayed. From this screen the statistics report can be viewed, saved, or printed.

A summary of the production run is shown. For the Crimp Height, Work Index and Peak Force analysis the statistics are displayed if they are active in this production run.

The statistics shown are Mean, Standard Deviation, Cp, and Cpk along with nominal and limit values.

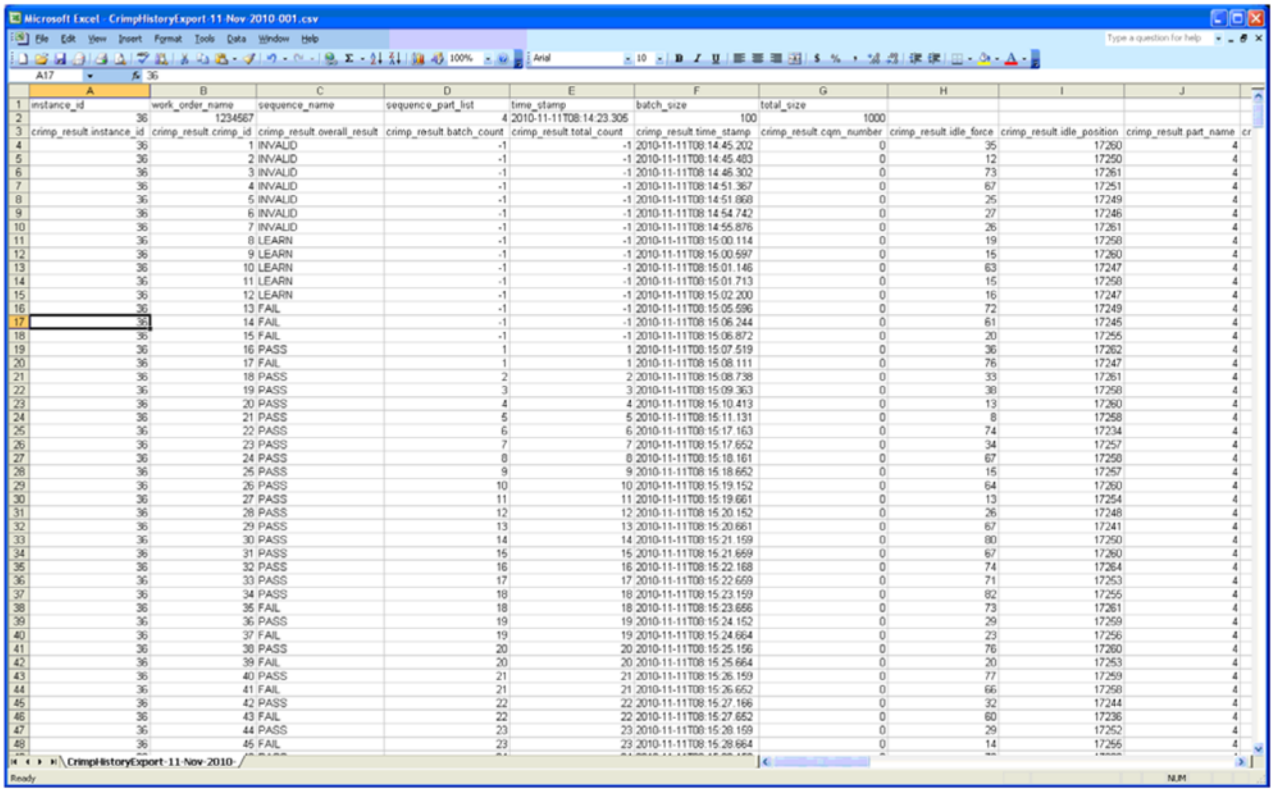

TE connectivity
TYCO ELECTRONICS
Work Order Name:1234567
Part Name:00004
Total Crimp Count: 1211
Total Good Count: 894
Total Bad Count: 307
Total Learn Count: 10
Production Status (% Good): 74.44
Start Time: Thu Nov 11 08:15:00 2010
End Time: Thu Nov 11 08:34:16 2010
Crimp Height:
Nominal: 1.0000 mm
Lower Limit: 0.9492 mm
Upper Limit: 1.0508 mm

Raw Data Output File

When the “Save Raw Data” button is pressed all the data about the selected production run will be saved to a file. The file is a comma delimited file suitable to be viewed in a spread sheet program like Microsoft Excel.

The first and second line shows the Production Run information.

Then each crimp and its results are listed. The column data is the same as that shown in the Crimp Detail View. This comma delimited file can be used to analyze the production results.



	A	B	C	D	E	F	G	H	I	J
1	instance_id	work_order_name	sequence_name	sequence_part_list	time_stamp	batch_size	total_size			
2	36	1234567		4	2010-11-11T08:14:23.305	100	1000			
3	crimp_result instance_id	crimp_result crimp_id	crimp_result overall_result	crimp_result batch_count	crimp_result total_count	crimp_result time_stamp	crimp_result cqm_number	crimp_result idle_force	crimp_result idle_position	crimp_result part_name
4	36	1	INVALID	-1	-1	2010-11-11T08:14:45.202	0	35	17260	4
5	36	2	INVALID	-1	-1	2010-11-11T08:14:45.483	0	12	17250	4
6	36	3	INVALID	-1	-1	2010-11-11T08:14:46.302	0	73	17261	4
7	36	4	INVALID	-1	-1	2010-11-11T08:14:51.367	0	67	17251	4
8	36	5	INVALID	-1	-1	2010-11-11T08:14:51.868	0	25	17249	4
9	36	6	INVALID	-1	-1	2010-11-11T08:14:54.742	0	27	17246	4
10	36	7	INVALID	-1	-1	2010-11-11T08:14:55.876	0	26	17261	4
11	36	8	LEARN	-1	-1	2010-11-11T08:15:00.114	0	19	17258	4
12	36	9	LEARN	-1	-1	2010-11-11T08:15:00.597	0	15	17260	4
13	36	10	LEARN	-1	-1	2010-11-11T08:15:01.146	0	63	17247	4
14	36	11	LEARN	-1	-1	2010-11-11T08:15:01.713	0	15	17258	4
15	36	12	LEARN	-1	-1	2010-11-11T08:15:02.200	0	16	17247	4
16	36	13	FAIL	-1	-1	2010-11-11T08:15:05.596	0	72	17249	4
17	36	14	FAIL	-1	-1	2010-11-11T08:15:06.244	0	61	17245	4
18	36	15	FAIL	-1	-1	2010-11-11T08:15:06.872	0	20	17255	4
19	36	16	PASS	1	1	2010-11-11T08:15:07.519	0	36	17262	4
20	36	17	FAIL	1	1	2010-11-11T08:15:08.111	0	76	17247	4
21	36	18	PASS	2	2	2010-11-11T08:15:08.738	0	33	17261	4
22	36	19	PASS	3	3	2010-11-11T08:15:09.363	0	38	17258	4
23	36	20	PASS	4	4	2010-11-11T08:15:10.413	0	13	17260	4
24	36	21	PASS	5	5	2010-11-11T08:15:11.131	0	8	17258	4
25	36	22	PASS	6	6	2010-11-11T08:15:17.163	0	74	17234	4
26	36	23	PASS	7	7	2010-11-11T08:15:17.652	0	34	17257	4
27	36	24	PASS	8	8	2010-11-11T08:15:18.161	0	67	17258	4
28	36	25	PASS	9	9	2010-11-11T08:15:18.662	0	15	17257	4
29	36	26	PASS	10	10	2010-11-11T08:15:19.152	0	64	17260	4
30	36	27	PASS	11	11	2010-11-11T08:15:19.661	0	13	17254	4
31	36	28	PASS	12	12	2010-11-11T08:15:20.152	0	26	17248	4
32	36	29	PASS	13	13	2010-11-11T08:15:20.661	0	67	17241	4
33	36	30	PASS	14	14	2010-11-11T08:15:21.159	0	80	17250	4
34	36	31	PASS	15	15	2010-11-11T08:15:21.669	0	67	17260	4
35	36	32	PASS	16	16	2010-11-11T08:15:22.168	0	74	17264	4
36	36	33	PASS	17	17	2010-11-11T08:15:22.669	0	71	17253	4
37	36	34	PASS	18	18	2010-11-11T08:15:23.159	0	82	17255	4
38	36	35	FAIL	18	18	2010-11-11T08:15:23.656	0	73	17261	4
39	36	36	PASS	19	19	2010-11-11T08:15:24.152	0	29	17259	4
40	36	37	FAIL	19	19	2010-11-11T08:15:24.664	0	23	17256	4
41	36	38	PASS	20	20	2010-11-11T08:15:25.156	0	76	17260	4
42	36	39	FAIL	20	20	2010-11-11T08:15:25.664	0	20	17253	4
43	36	40	PASS	21	21	2010-11-11T08:15:26.159	0	77	17259	4
44	36	41	FAIL	21	21	2010-11-11T08:15:26.652	0	66	17258	4
45	36	42	PASS	22	22	2010-11-11T08:15:27.166	0	32	17244	4
46	36	43	FAIL	22	22	2010-11-11T08:15:27.652	0	60	17236	4
47	36	44	PASS	23	23	2010-11-11T08:15:28.159	0	29	17252	4
48	36	45	FAIL	23	23	2010-11-11T08:15:28.664	0	14	17256	4

G. Report Setup

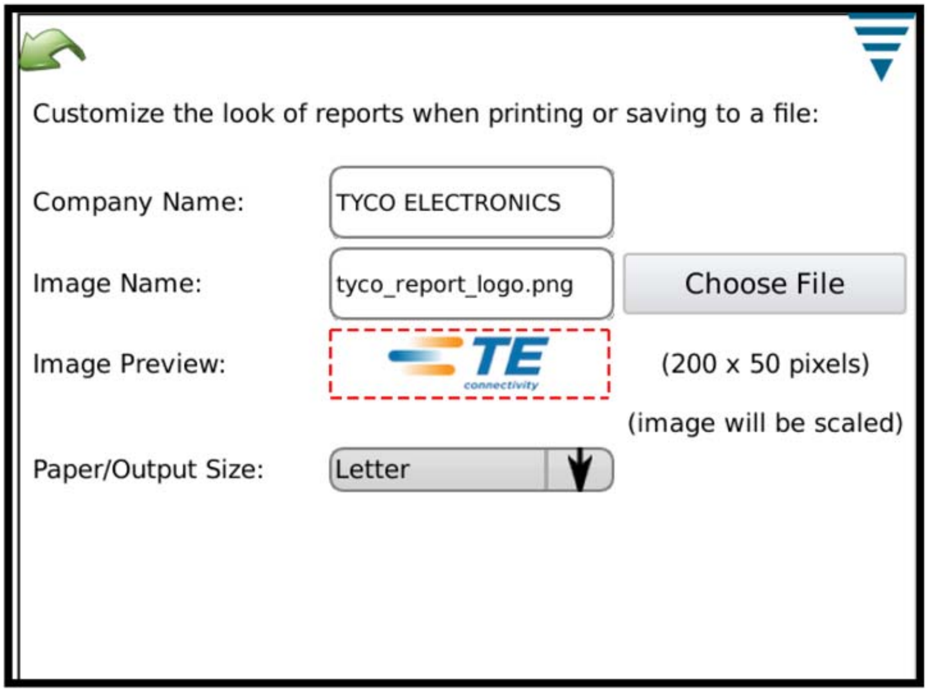
Touch the icon to select the **Report Setup** screen.

This mode allows you to format the statistic reports that are generated for printing or saving as a pdf to a USB Flash drive.

Touch the Company Name and enter the name you choose.

You can import an image, for example your company logo, by touching the **Choose File** button**.** The image must be either a PNG (*.png) or JPG (*.jpg or *.jpeg) image format. It will be scaled to fit an area that is 200 x 50 pixels. You may need to edit the image first so that it will scale correctly. The image needs to be placed on a USB Flash Drive before selecting Choose File. After the image is loaded it will be shown in the Image Preview area.

Choose Paper/Output size to select between **Letter** or **A4** size paper.



H. Curve History Graph

Touch the icon to select the Crimp History Graph screen.

The Crimp History Graph is a diagnostic tool that displays actual raw data curves for both the force and position sensors. The data is not filtered so a curve may look slightly different from the graphs shown in the other modes. They are shown displaying the time and date of the crimp. Only the last 50 crimps are available for viewing. Raw crimp data is lost when power is turned off.

Touch **Compare On/Off** to display two curves: one red, one black. Use the upper two arrows to change the black crimp that is showing and the lower two arrows for the red crimp that is showing.

Touch the **Save Crimp Curve History** button to save data from the 50 Crimp Curves. This is raw data that is saved in a comma delimited file and is useful for TE personnel to diagnose potential issues with the CQM.

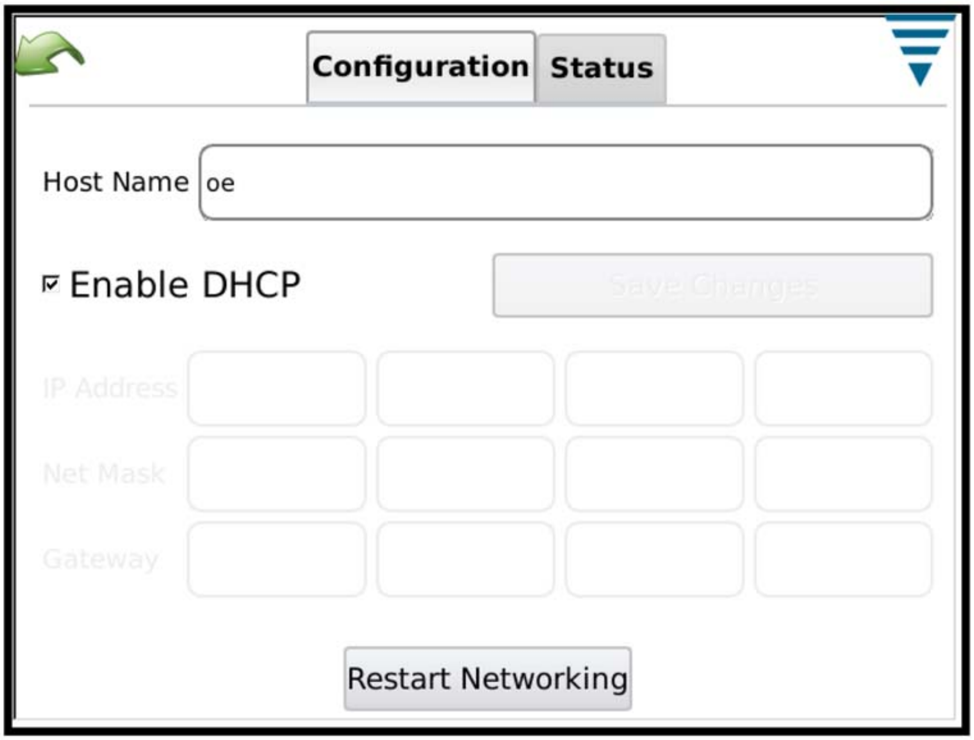
I. Network

The CQM can be connected to a network via it's ethernet connection. Currently, the CQM only supports network printing. No other network functionality is supported with the current release. Future versions may offer additional functionality. Someone in your company's IT organization may need to be involved with setting the CQM network.

The Network screen has two tabs, *Configuration*, and *Status*.

Configuration Tab

Hostname: A unique name to identify each CQM on the network. The CQM will be reachable via this hostname on the .local domain, for example, "hostname.local", by any computer configured to be able to resolve link-local hostnames (also known as Zeroconf, or Bonjour (Apple Computer's trademark name for Zeroconf networking). Apple computers running Mac OSX, and most Linux distributions have Zeroconf already configured. It can be added to computers running Microsoft's Windows XP, Vista, or Windows 7 operating systems with the Apple Bonjour program, http://support.apple.com/kb/DL999.

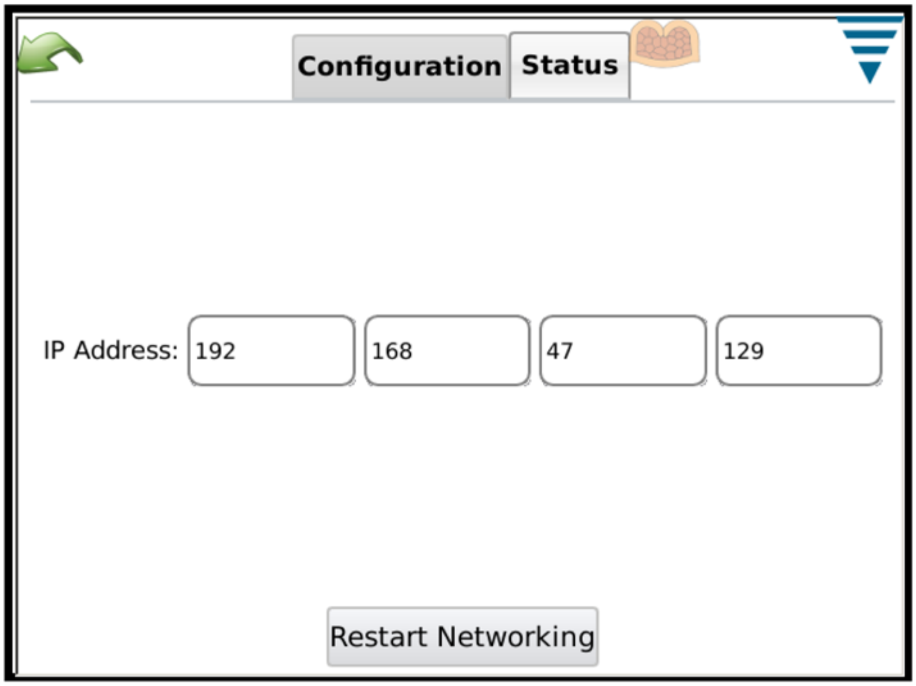


Status Tab

Displays the current IP address for the CQM.

The **Restart Networking** button should be used when ever the CQM is connected to a different network while it is already powered up, and will cause the CQM to attempt to configure it's IP address if DHCP is enabled.

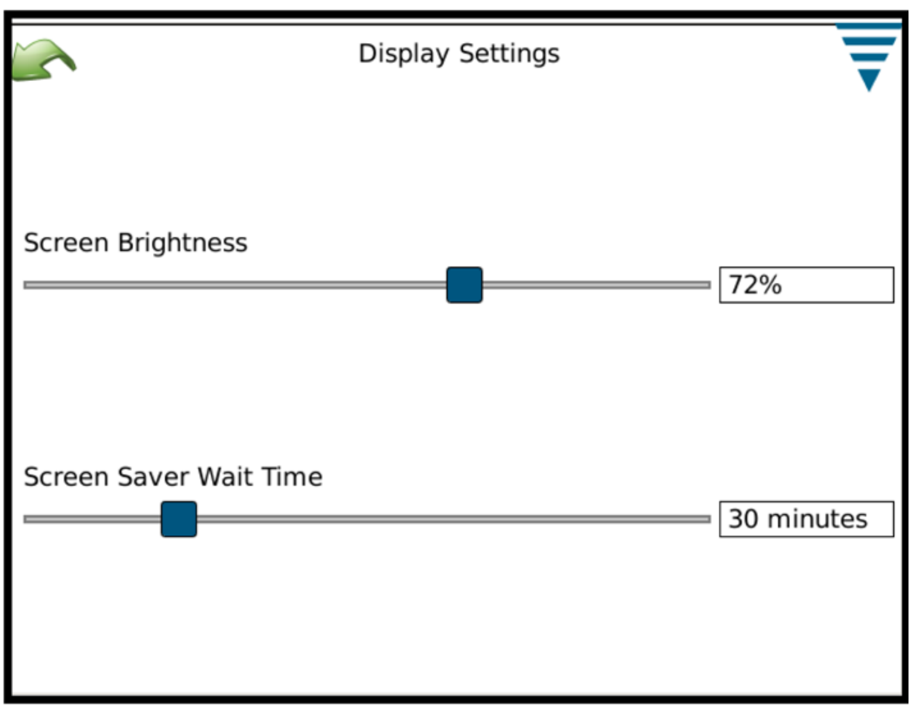
If connected to a network with a DHCP server, such as a corporate network, or a home internet gateway/router, the CQM will obtain it's IP address from the DHCP server. If no DHCP server is available, such as when connecting directly to a computer or other CQM with a crossover cable, or when one or more CQM's are connect to a network hub or switch that is not part of a larger network, the CQM will configure a “self-assign” network address with the following format 169.254.x.x (where x.x are unique for each CQM).



J. Display Settings

Touch the icon to select the Display Settings screen. You can adjust the display brightness and screen saver time out by touching on the pointer on the slider and dragging it.

When the screen saver is active, the display will be dark and the LED on the Host will be amber. Simply touch the display and it will return to the normal operating state.



K. Calibrate Touchscreen

Touch the icon to select the Calibrate Touch screen. Calibration of the touch screen is performed at initial build and should not be required unless something happens with the integrity of the touch surface. Choose **Calibrate Touch** and follow the on screen instructions. When complete, you must choose **Accept**.

NOTE

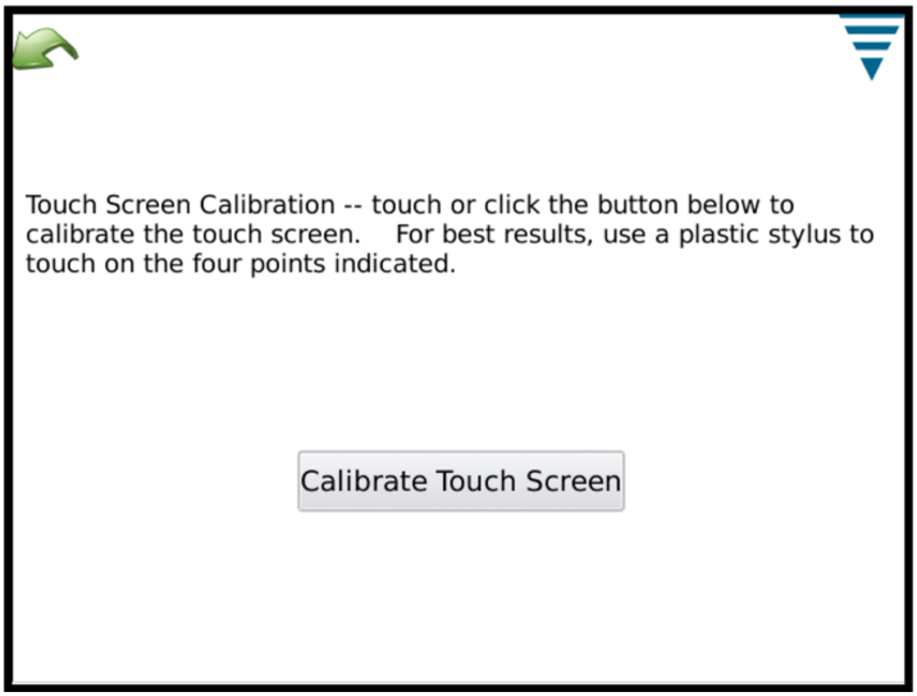
The use of a plastic stylus is recommended for accurate calibration.

NOTE

The screen indicates where you should touch, but the lower left image is not presented well. It is similar to the other corners so touching it in a similar manner will suffice.

NOTE

There is a time out for touching each corner of the display and for final Acceptance. If you wait too long the calibration will abort.

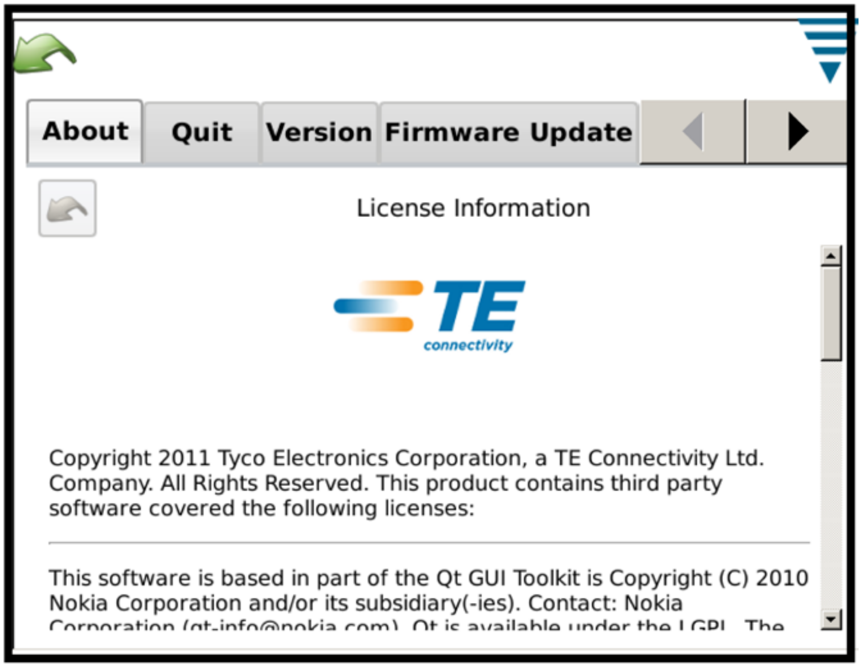


L. Maintenance

The Maintenance section is provided for authorized users to see information about the system and to perform data maintenance.

About Tab

This screen displays the various Licenses for third-party software used in the application.



Quit Tab

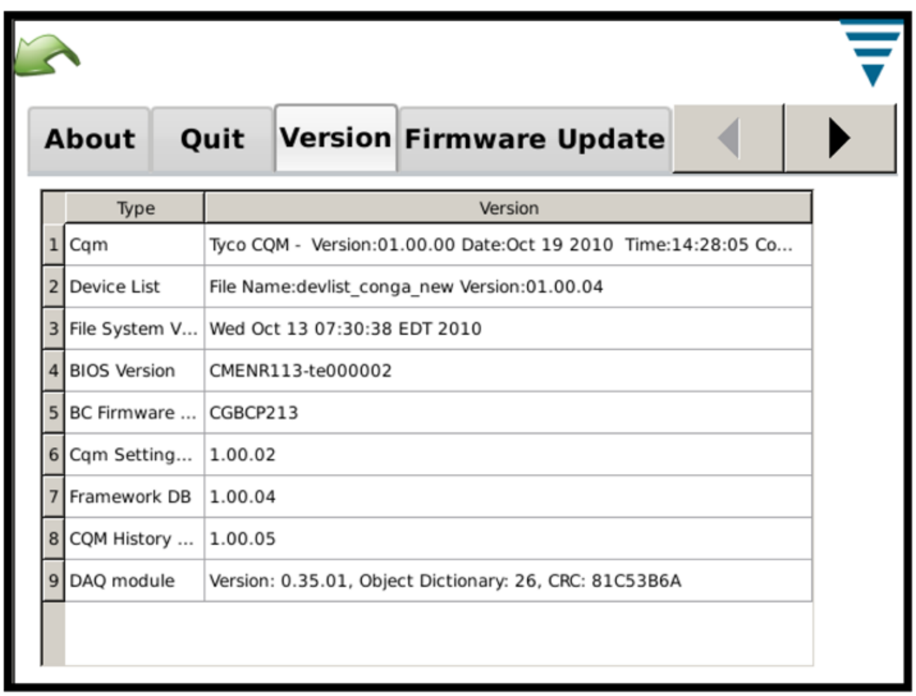
This screen is used to quit the software application.

NOTE

Quitting should only be done following instructions from TE personnel.

Version tab

This screen displays the various software versions that are currently installed on the CQM.



Firmware Update Tab

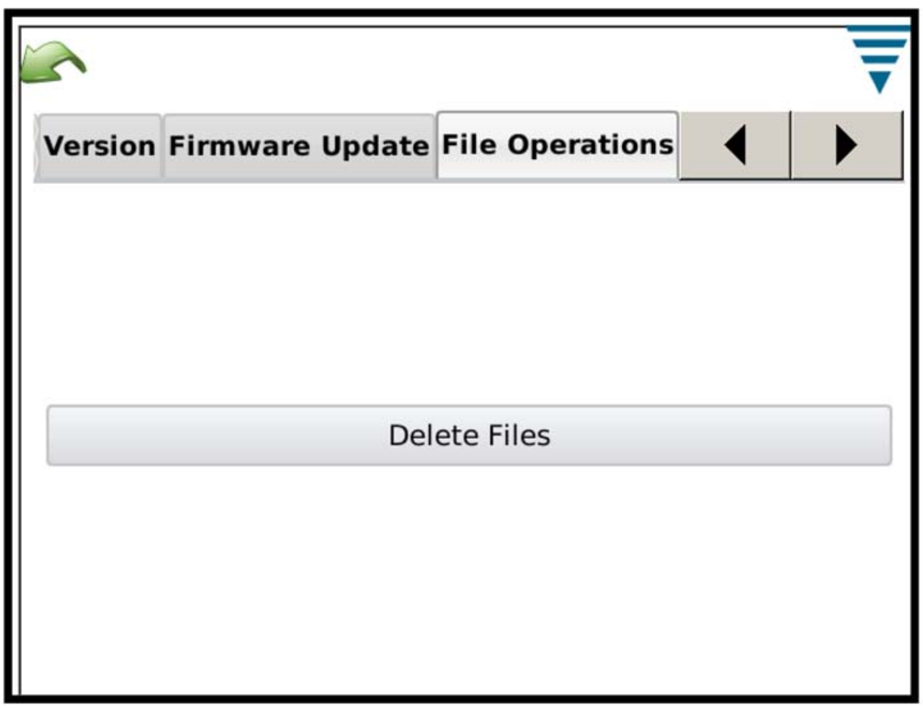
This screen is used to update the software on the CQM.   Follow the onscreen instructions.

NOTE

This should be accomplished ONLY upon instruction of TE personnel

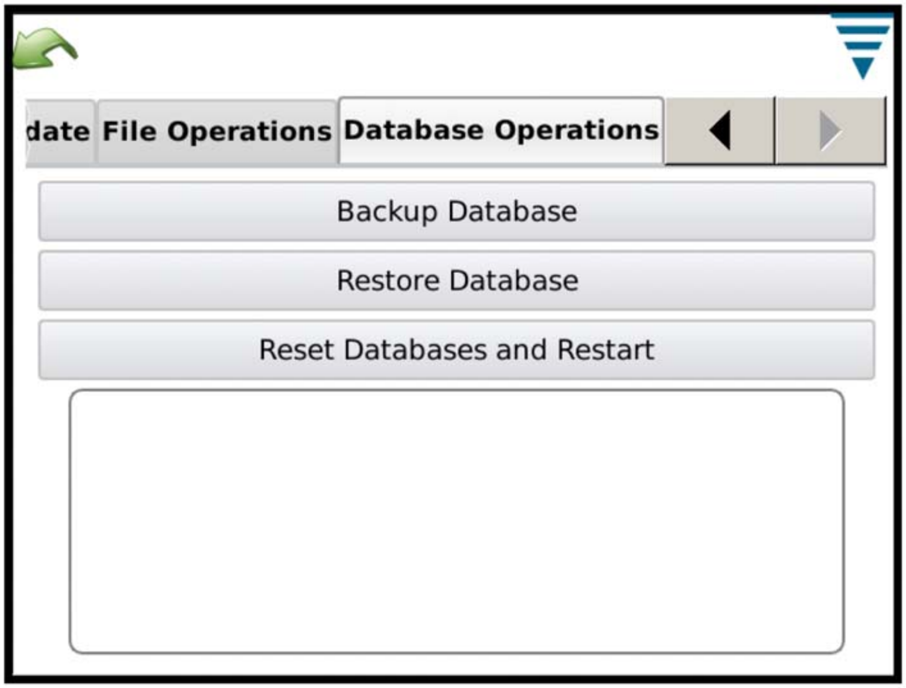
File Operations Tab

This screen is used for certain file operations. Follow the on screen instructions.



Database Operations Tab

This screen is used to backup and restore the system database. Choose the appropriate selection and follow the on screen instructions. Backup to a USB flash drive is provided for secure backup and restoration.

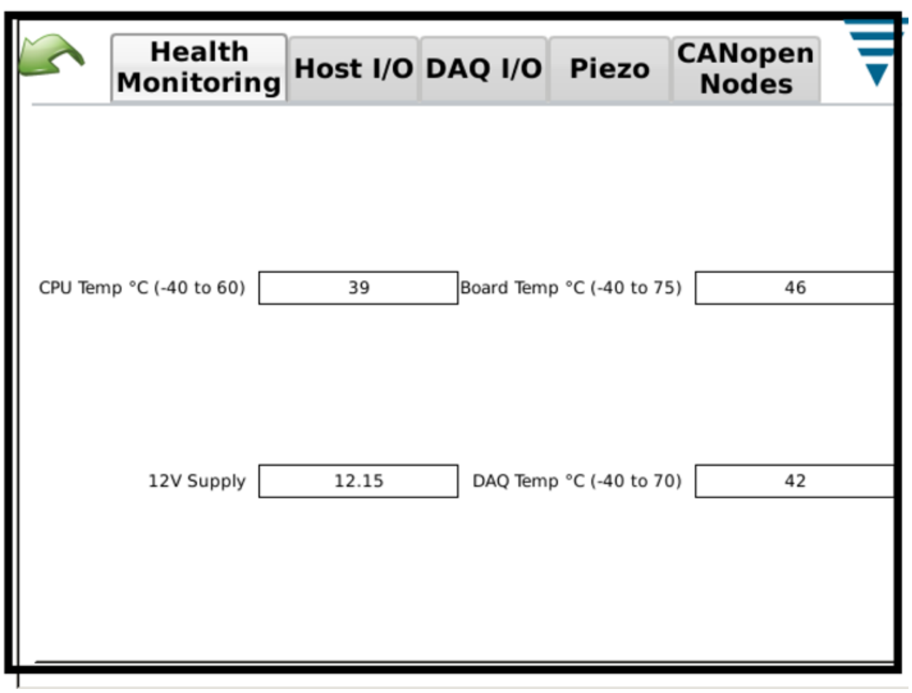


M. Diagnostics

The Diagnostics section is provided for authorized users to monitor the hardware status of the system.

Health Monitor Tab

The Health Monitor screen displays the internal temperatures of various components within the system.

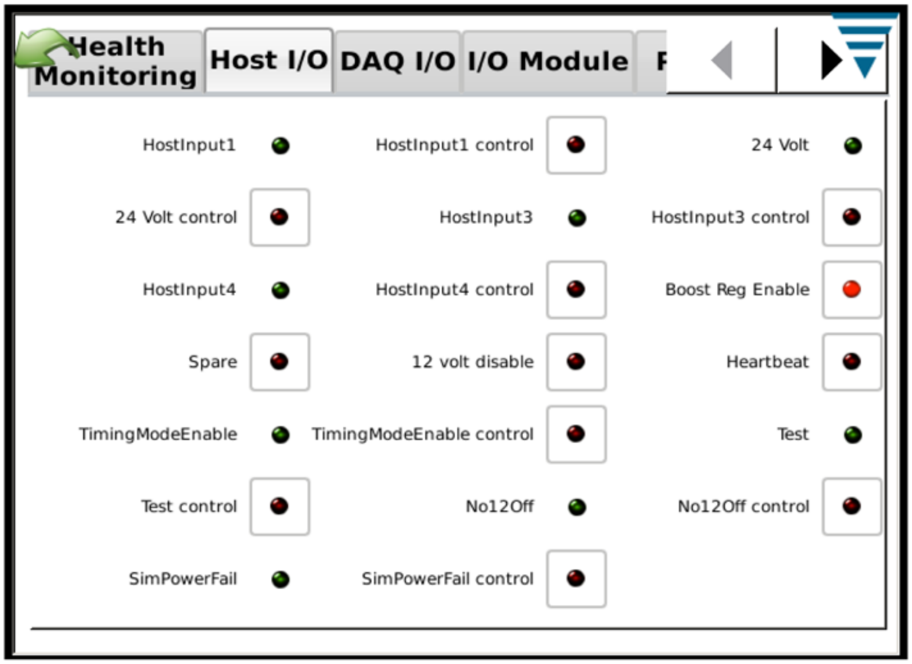


Host I/O Tab

The Host I/O screen displays the status of the modules Inputs and Outputs. Output states can be changed by touching the appropriate icon.

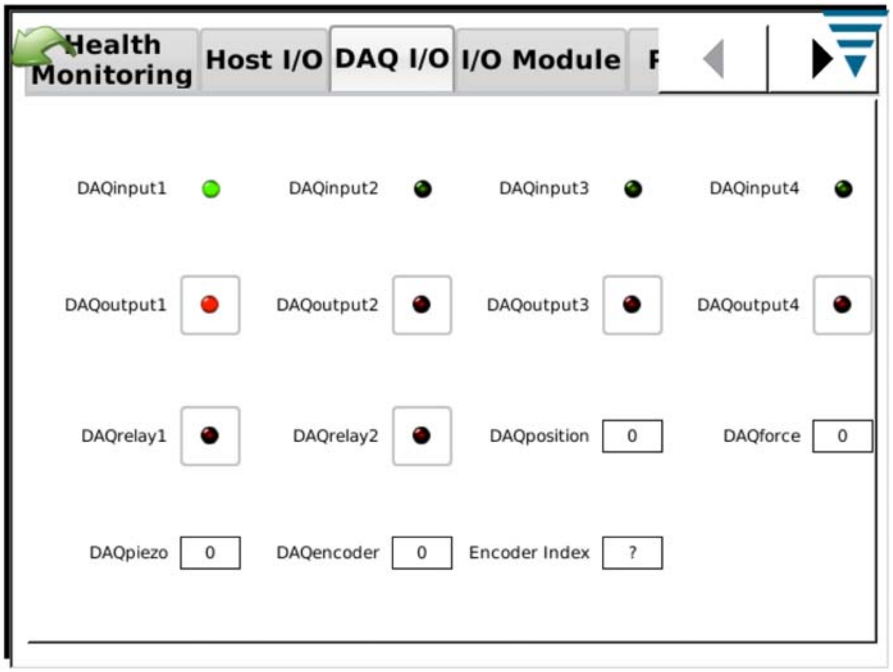
DANGER

Do not attempt to change output states without direction from TE personnel.



DAQ I/O Tab

The DAQ I/O screen displays the status of the modules Inputs and Outputs. Output states can be changed by touching the appropriate icon.

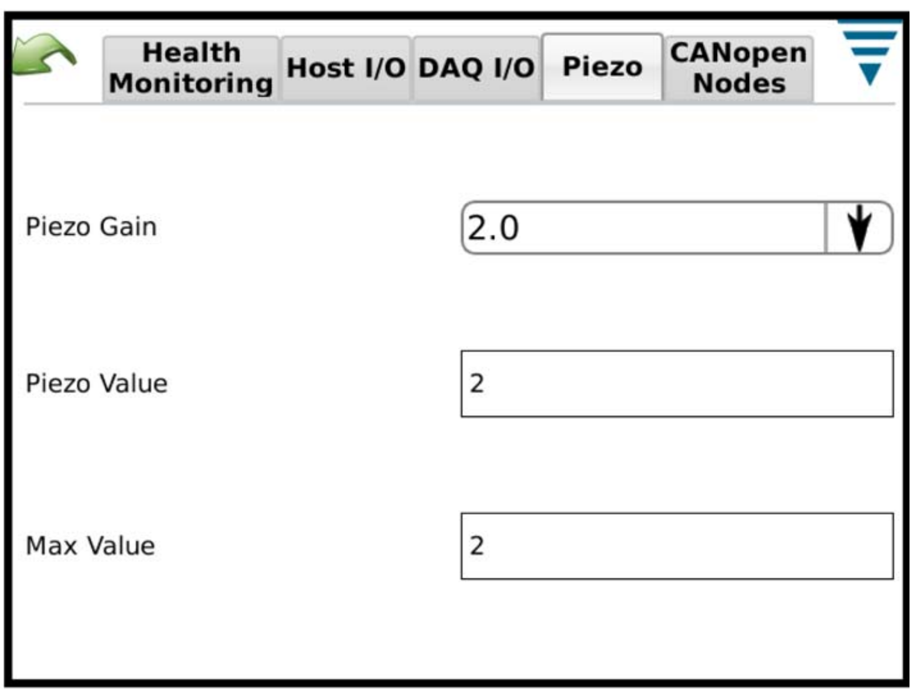


Piezo Tab

The Piezo screen provides a means to diagnose the Piezo sensor input.

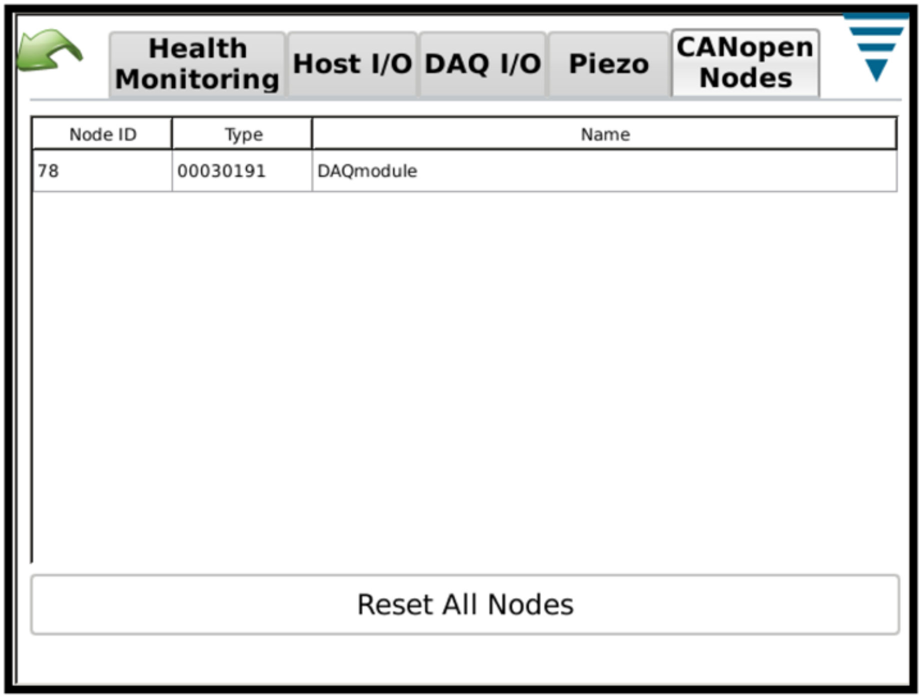
NOTE

Directions from TE personnel will be provided if this action is required.



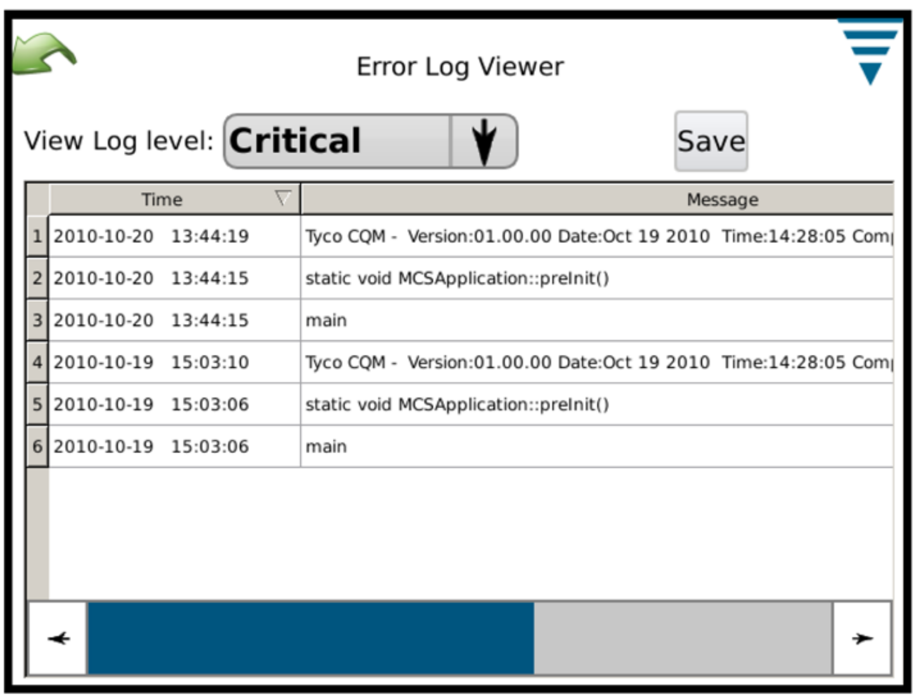
CANOpen Node Tab

The CANOpen Node screen provides information regarding the CAN address of the attached modules.



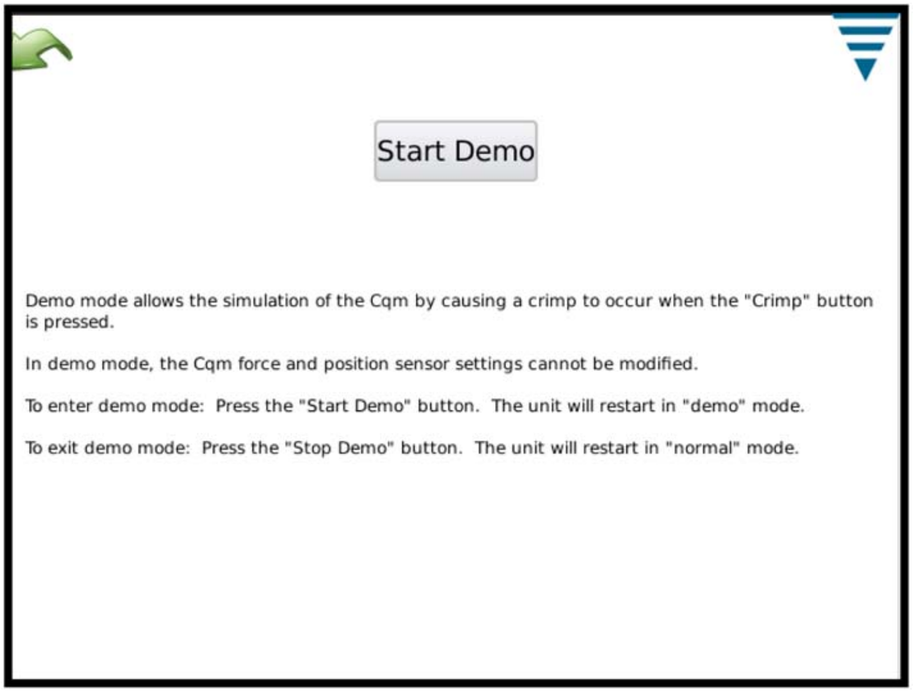
N. Error Log Viewer

The Error Log Viewer provides a list of various errors, system setting changes, etc. that may be useful for diagnosing system problems. Specific instructions will be provided by TE personnel to use this feature.



O. Demo

The Demo selection is primarily used for demonstration and training purposes. When placed in the Demo mode, the unit restarts the application utilizing a different database so as to not corrupt the main database. Most all functionality exists in the Demo mode, but a real terminator with sensors is not needed. When you're on the screens that you would typically perform a crimp, just touch the 'Virtual' crimp button on the screen to perform the crimp. Data from a stored crimp will be used and all screens will appear as though a normal crimp occurred.



P. Printer Icon

This screen is used to select the appropriate printer for the CQM.

The CQM can print to a local, USB-connected printer, or to some network printers. Printers connected via USB-serial or USB-parallel port adapters are not supported in the CQM.

The CQM supports a wide-variety of printers. It uses the *Gutenprint* printer driver. A list of supported printers is available on the following web site:

http://gutenprint.sourceforge.net

Even if a printer is not on this list of supported printers, it will usually work with a driver for a similar printer. For example, the HP Photosmart D5300 series printer is not on the list of supported printers, but selecting the “HP Photosmart 7150 – CUPS+Gutenprint” driver works just fine.

From the Control Panel, touch the Printer Icon to enter the printer setup and configuration screens. To configure a local printer, connect the printer via one of the two USB ports on side of the CQM Host. Then touch the “Add New Printer Button”, and follow the prompts to select a printer driver.

To configure a supported network printer, touch “Use Network Printers”. The CQM will automatically discover any supported network printers and add them to the drop-down list at the top of the screen. Simply touch the drop down list to select which printer to use. The CQM supports printing to printers connected to other CQM's, and to any shared printer connected to a computer that uses the CUPS printer system (<http://www.cups.org/ >). Computers running Apple's Mac OS X, and most Linux or Unix distributions support CUPS printing.

The CQM can also print to other network printers using the LPR, IPP, or SMB (Windows) protocols. Many of the standalone network printer server devices support LPR printing (it may be necessary to enable LPR printing, as it may be disabled by default). Printing to printers with these protocols can be configured via the CUPS web interface using a web browser on any PC. To access the CUPS web interface, obtain the CQM's IP address via the Network Status screen, and then browse to the following URL: "http://x.x.x.x:631", where "x.x.x.x" is the IP address of the CQM. Then click on “Administration”, and “Add Printer”. Under “Other Network Printers”, select the network printer type, and click “Continue”, and then enter the appropriate information at the subsequent screens. The printer should now appear in the “Current” printer selection drop down box. It may be necessary to exit the printer setup screen, and reenter it for the printer to appear in the list.

Through this web interface, it is possible to configure many different kinds of network printers that cannot be added automatically as outlined above, including Windows printers, HP JetDirect, LPR/LPD, just to name a few.

Microsoft Windows (both desktop and server versions) require a username and password to print to shared printers via the Micro SMB protocol (if selecting “Windows Printer via “SAMBA” as the network type) which is the default protocol for sharing printers on Windows Servers, however, most versions of Windows Server support LPR printing – contact your LAN administrator for further support with printing to printers which are connected to Windows servers.

Windows (SMB) Protocol

To print to a Windows printer use the following format for the “Connection” (this entry is a “URI”, which is similar to a web URL): smb://username:password@DOMAIN/hostname/printer_name

The value DOMAIN is your login domain on a corporate network using Active Directory, and may be omitted (along with the slash between it and the hostname if on a small LAN that doesn't use Active Directory). Contact your LAN administrator for further support with printing to printers which are connected to Windows servers.

Line Printer Daemon (LPD) Protocol

LPR/LPD printers use the following Connection format: lpd://hostname/printer_name

Internet Printing Protocol (IPP)

IPP is the only protocol that CUPS supports natively and is supported by some network printers and print servers. However, since many printers do not implement IPP properly, only use IPP when the vendor actually documents official support for it. IPP printing normally happens over port 631 and uses the **http** and **ipp** URI schemes:

`http://`**ip-address-or-hostname:port-number/resource**

`http://`**ip-address-or-hostname:port-number/resource**?**option=value**

`http://`**ip-address-or-hostname:port-number/resource**?**option=value&option=value**

ipp://*ip-address-or-hostname/***resource**

ipp://*ip-address-or-hostname/***resource**?**option=value**

ipp://*ip-address-or-hostname/***resource**?**option=value&option=value**

ipp://*ip-address-or-hostname***:port-number/resource**

ipp://*ip-address-or-hostname***:port-number/resource**?**option=value**

ipp://*ip-address-or-hostname***:port-number/resource**?**option=value&option=value**

Please consult the CUPS website for more detailed information on configuring network printers:

http://www.cups.org

It is also possible to configure more advanced features on some printers. To do so, touch the *Setup Current Printer* button. The *Setup Current Printer* screen contains settings specific to the particular printer in use. These settings are organized into categories, which can be selected with a drop-down menu at the top of the screen. Features such as color mode, print quality, print resolution, paper tray selection, etc, can be selected on this screen. Usually, these settings can all be left at their defaults.

7. TROUBLESHOOTING

Problem	Possible Cause	Corrective Action
Invalid Crimps During Learn.	On terminators with an analog height sensor, the problem can occur if the coefficients are incorrect or have not been entered.	Verify and correct any settings as necessary.
	Disconnected or damaged cables.	Correct any problems with the cables.
	CQM II Settings for the position and force sensors do not match the sensors that are installed on the terminator.	Verify and correct any settings as necessary.
	Damaged or defective sensors.	Sensor operation can be verified by going into “Diagnostics” and jogging the terminator while observing the sensor readings on the Diagnostic DAQ IO page.
	A particular analysis method may not work for an unusual crimping application.	Use the Reports screen to examine any INVALID crimps that occurred in LEARN_MODE. It is important to note that any crimp done on the sample screen will be reported as INVALID because it is not analyzed. You want to look at the crimps that are reported as INVALID in LEARN_MODE. The status will show up in the following fields: - crimp_result – for Crimp Height Analysis - peak_force_result – for Peak Force Analysis - work_index_result – for Work Index Analysis - p2p_result – for Point To Point Analysis - fft_result – for FFT Analysis If you have an individual analysis method that is reporting the crimp as INVALID you can turn that analysis method off. An alternative to this is to try your application with one analysis method at a time until you find if any single method is causing you problems.

Additional Information for the Specific Sensors

Linear Encoder	Is the correct Position Sensor selected in CQM Settings?
	Is the encoder cable connected to the DAQ module?
	Check for damaged encoder cable. If it is damaged, replace it.
	The encoder reader head has a LED. If the cable good and is connected to the DAQ module, and the LED is not lit, replace the encoder.
	In Diagnostics mode, observe the Encoder count while jogging the terminator. These numbers should change as the terminator RAM moves.
	The encoder reader head must be spaced ~1mm from the magnetic strip. Adjust if spacing is too large.
	Check for a damaged magnetic strip? If it is damaged, replace it.
Analog Height Sensor	Is the correct Position sensor selected in CQM Settings?
	Is the cable connected to the DAQ module and the analog height sensor?
	Check for damaged cable. If it is damaged, replace it.
	In Diagnostics, observe the DAQ position number while jogging the terminator. These numbers should change as the terminator RAM moves through the bottom of the stroke.
	The analog height sensor must be spaced correctly in front of the passing magnets. Adjust if spacing is too large.
	Check for a damaged magnets set into the RAM. If they are damaged, the analog height sensor kit must be replaced.
Base Plate Strain Gage (Force Sensor)	Is the correct Force Sensor selected in CQM Settings?
	Is the cable connected to the DAQ module and the base plate?
	Check for damaged cable. If it is damaged, replace it.
	Check for damaged base plate in the area of the strain sensors (directly under the anvil area of an applicator). If it is damaged, replace it.
	In Diagnostics, observe the DAQ force number while pushing hard on the base plate with your thumb. The numbers should change indicating that the sensor is working properly.
Piezo Sensor (Force Sensor)	Is the correct Force Sensor selected in CQM Settings?
	Is the cable connected to the DAQ module and the base plate?
	Check for damaged cable. If it is damaged, replace it.
	In Diagnostics, observe the DAQ piezo number while pushing hard on the sensor located on the terminator frame. The numbers should change indicating that the sensor is working properly.
Trigger Sensor (on non-TE terminators)	Is the correct Position sensor selected in CQM Settings?
	Is the cable connected to the DAQ module?
	Check for damaged cable. If it is damaged, replace it.
	The proximity sensor must have metal directly in front of it for proper detection. Ensure sensor is mounted properly and ensure the metal target is present. If the sensor has metal in front of it, the LED on it should be lit.
	In Diagnostics, observe the DAQ input1 LED. When the sensor has metal in front of it, the LED on the screen should be lit.

Problem	Corrective Action
Too many crimps are failing that appear to be good.	Carefully inspect the crimp. Does it meet your quality criteria?
	Some problems could be related to poorly maintained tooling. Ensure the tooling is in optimum condition.
	Adjust the sensitivity of the analysis methods so that they are less sensitive. Experiment by changing the sensitivity by about 0.5 at a time.
	Is the headroom of the crimp above 35%?
Failed crimps are passing the analysis.	Carefully inspect the crimp. Does it truly fail your quality criteria?
	Adjust the sensitivity of the analysis methods so that they are more sensitive. Experiment by changing the sensitivity by about 0.5 at a time.
	Is the headroom of the crimp above 35%?
Terminator foot switch still cycles the system when the CQM failed a crimp and the operator did not respond to the error. (Depends on which host is selected.)	Is the appropriate host system selected in the CQM Settings?
	Is the interface cable connected to the DAQ module and the host terminator?
	Is the interface cable damaged?
	If the system is on a non-TE terminator, has it been properly connected?
The touch screen is not responding AT ALL.	Plug in a USB mouse and navigate to the Touch Screen calibrate mode. Start the calibration with the mouse, and then proceed with touching the screen. If touches are not recognized, the unit is not working correctly. You can continue to operate the system with the USB mouse or return it for repair/replacement.
The touch screen is not responding all of the time.	The calibration may be off. Go to the Touch Screen calibration and perform the calibration.
	You may need to plug n a USB mouse to navigate to the Touch Screen calibration.

8. MAINTENANCE

The following procedures have been established to assure the quality and reliability of the CQM. The CQM should be checked daily, and a more detailed inspection should be performed (according to your quality control group) on a regular basis.

8.1. Touch Screen Cleaning

The front surface of the touch screen should be kept free of dirt, dust, fingerprints and other materials that could degrade optical properties. Long term contact with abrasive materials will scratch the front surface, and image quality will be detrimentally affected. For best results, use a clean, damp, nonabrasive cloth towel and any commercially available window cleaner to regularly clean the surface. The cleaning solution should be applied to the towel rather than the surface of the touch screen.

8.2. Daily Maintenance

1. Remove dust, moisture, and other contaminants with a clean brush, or soft, lint–free cloth. DO NOT use objects that could damage the CQM.

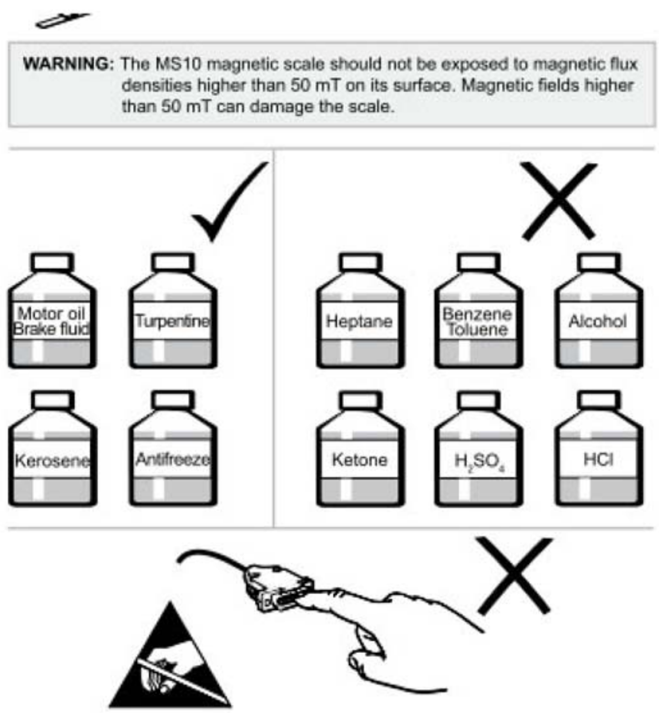
2. Make sure all components are in place and properly secured.

3. Always leave the CQM turned off for a minimum of 10 seconds before reapplying power so that the monitor initializes properly.

4. Make sure that the cooling vents on the back and side panels are not blocked.

8.3. Special Handling Precautions For Systems With The Linear Encoder Installed

Magnetic field precautions and chemicals used to clean the magnetic strip.



8.4. Quality Control Maintenance

Your quality control personnel should perform regular inspections. A record of quality control inspections should remain with the personnel responsible for the CQM. TE recommends one inspection a month; however, operator skill, amount of use, ambient working conditions, and your company's established standards are all factors in establishing frequency of inspections.

1. Remove any accumulated film with a suitable cleaning agent.
2. Make sure all components are in place and are properly secured.
3. Make sure that the cooling vents on the back and side panels are not blocked.

8.5. Evaluation and Repair

Crimp Quality Monitors can be returned to TE for evaluation and repair. Call the TE Tooling Assistance Center at 1–800–722–1111 for instructions.

Crimp Quality Monitors can be ordered through your TE representative, or call 1–800–526–5142, or send a facsimile of your purchase order to 1–717–986–7605, or write to:

CUSTOMER SERVICE (038-035)
TYCO ELECTRONICS CORPORATION
PO BOX 3608
HARRISBURG PA 17105-3608

9. REVISION SUMMARY

Since the previous release of this manual:

- Paragraph 3.3, System Settings was added;
- Paragraph 4.1, Options was added;
- The “learn” mode was expanded
- Section 2.8,A was revised;
- Screens were updated; and the
- Logo and format were updated
- Figures were referenced