COT3-device User Manual

August 2017

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General safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
    1. Make sure that you can stand safely without slipping.
    2. Distribute the weight of the object equally between your feet.
    3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
    4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. Do not attempt to lift any object that weighs more than 16 kg (35 lb) or that you think is too heavy for you.
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, make sure that other service technicians and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Make sure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, about 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.
    Attention: Metal objects are good electrical conductors.
- Wear safety glasses when you are hammering, drilling, soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.
- Fan louvers on the machine help to prevent overheating of internal components. Do not obstruct fan louvers or cover them with labels or stickers

Electrical safety

Observe the following rules when working on electrical equipment.
Important: Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents. Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.

- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
  - Performing a mechanical inspection
  - Working near power supplies
  - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine, and to lock the wall box in the off position.
- If you need to work on a machine that has exposed electrical circuits, observe the following precautions:
  - Ensure that another person, familiar with the power-off controls, is near you. Attention: Another person must be there to switch off the power, if necessary.
  - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back. Attention: An electrical shock can occur only when there is a complete circuit. By observing the above rule, you may prevent a current from passing through your body.
  - When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames. Observe the special safety precautions when you work with very high voltages; Instructions for these precautions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.
- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- Never assume that power has been disconnected from a circuit. First, check that it has been powered off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, non grounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
  - Power supply units
  - Pumps
  - Blowers and fans
  - Motor generators
  - Similar units to listed above

  Attention: This practice ensures correct grounding of the units.
- If an electrical accident occurs:
  - Use caution; do not become a victim yourself.
  - Switch off power.
  - Send another person to get medical aid.

Safety inspection guide

The purpose of this inspection guide is to assist you in identifying potentially unsafe conditions. As each machine was designed and built, required safety items were installed to protect users and service technicians from injury. This guide addresses only those items. You should use good judgment to identify potential safety hazards due to attachment of non-OEM features or options not covered by this inspection guide. If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem. Consider these conditions and the safety hazards they present:

- Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock)
- Explosive hazards, such as a damaged CRT face or a bulging capacitor
- Mechanical hazards, such as loose or missing hardware. To determine whether there are any potentially unsafe conditions, use the following checklist at the beginning of every service task. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power off the computer. Disconnect the power cord.
3. Check the power cord for:
    a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
    b. The power cord should be the type specified in the parts list.
    c. Insulation must not be frayed or worn.
4. Check for cracked or bulging batteries.
5. Remove the cover.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Handling devices that are sensitive to electrostatic discharge

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD.) ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the machine, the part, the work mat, and the person handling the part are all at the same charge.

Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.
- Avoid contact with other people.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
- Select a grounding system, such as those listed below, to provide protection that meets the specific service requirement.

Note: The use of a grounding system to guard against ESD damage is desirable but not necessary.

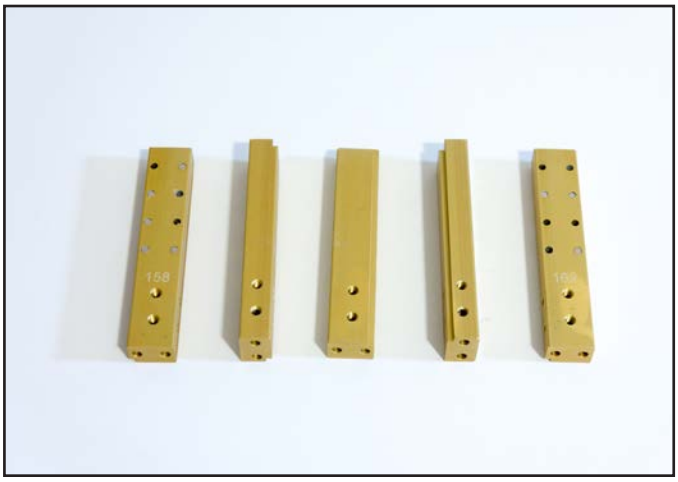
- Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
- When working on a double-insulated or battery-operated system, use an ESD common ground or reference point. You can use coax or connector-outside shells on these systems.
- Use the round ground prong of the ac plug on ac-operated computers.

_System Overview:

1. Calibration Plate:
The Calibration Plate is used to calibrate the COT Sensor in order to maintain accuracy from one system to another.

2. COT Sensor:
The COT Sensor is a wireless, mobile unit used by the operator to help him/her verify machine adjustments.

4. Charging Cord:
The Charging Cord is used to charge the COT Controller. This cord plugs into the rear of the system.



5. Machine Brackets:
Machine Brackets are components which are installed on the desired machines enabled for the Changeover Tools. The number of brackets vary based on configuration (Max configuration is 250 brackets across 5 machines).

6. COT Controller (Microsoft Surface Pro 4):
The COT Controller is the users interface with the system software. Through this software, users are guided to perform changeover operations.

Bracket Specs:

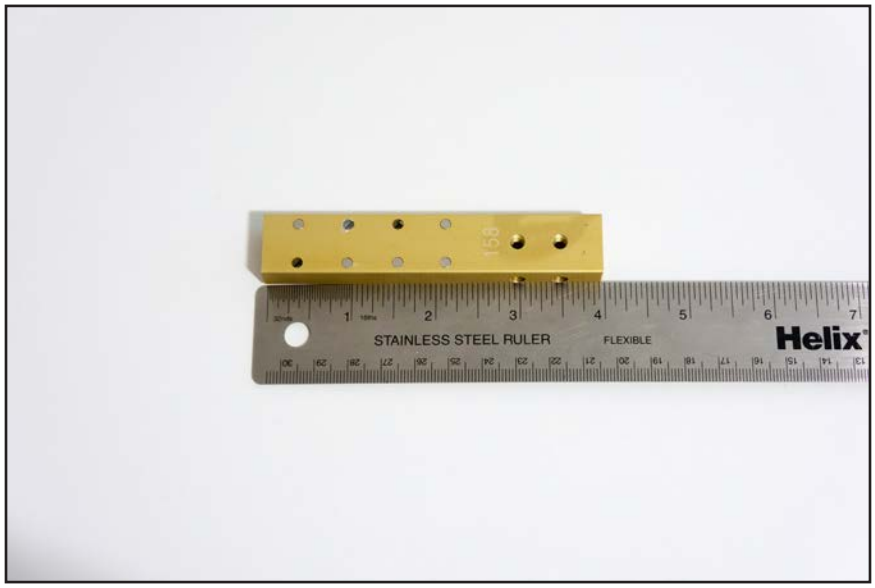
The installation of machine brackets is necessary to be able to use the Changeover Tool for adjustments on a machine. Each bracket is coded to have its own number identification, and this is how the Changeover Tool associates each machine location with its adjustment settings.

The COT sensor is used by the operator to perform an adjustment at each changeover location with an installed bracket.

Each bracket consists of 6 tapped holes for mounting on the desired machine. Installation requires that two clearance holes are drilled on the machine. Once hole has been drilled, the screw (tap: 10-24" or 10-32") is used to tighten the bracket to the machine.

Factor	Metric	U.S.
Length	10.16 cm	4"
Width	1.90 cm	3/4"
Height	1.27 cm	1/2"
Metal	Aluminum (std.); other available at request	
Color	Gold (std.); other available at request	
Possible brackets (per config.)	250 max per Changeover Tool system	

158
STAINLESS STEEL RULER
FLEXIBLE


158
STAINLESS STEEL RULER
FLEXIBLE
Helix

STAINLESS STEEL RULER
FLEXIBLE

_Configuration Software Install / Uninstall

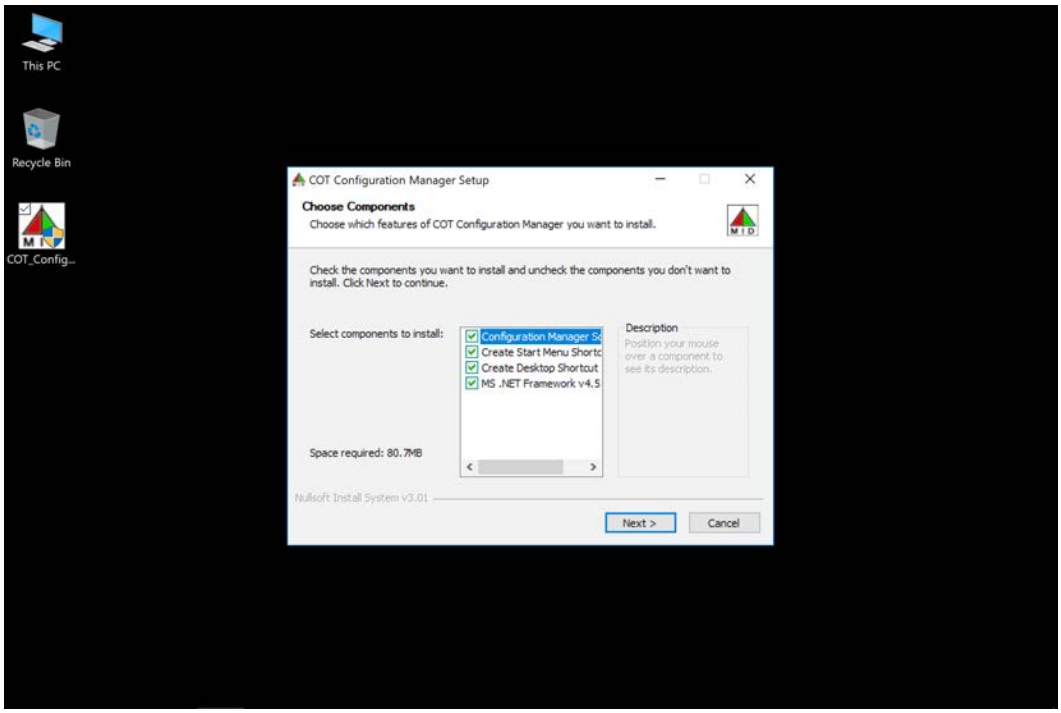
1.1

_Installing the COT Configuration Program

This chapter contains instructions for installing the COT Configuration Program. The COT Configuration Program is a helpful tool to create new COT system configurations or edit existing configurations. The user is able add/edit photos, help text files, tolerances and more.

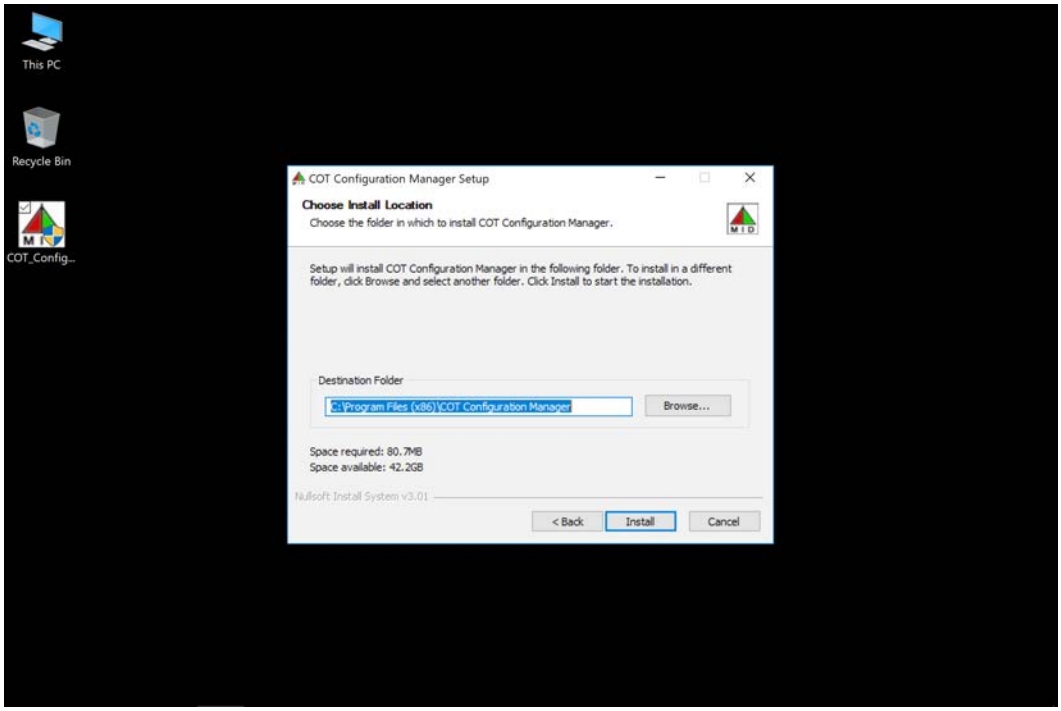
Step 1

Download the COT Configuration Program from the *OEEIncrease.com* website. Place downloaded file on desktop for ease of access.



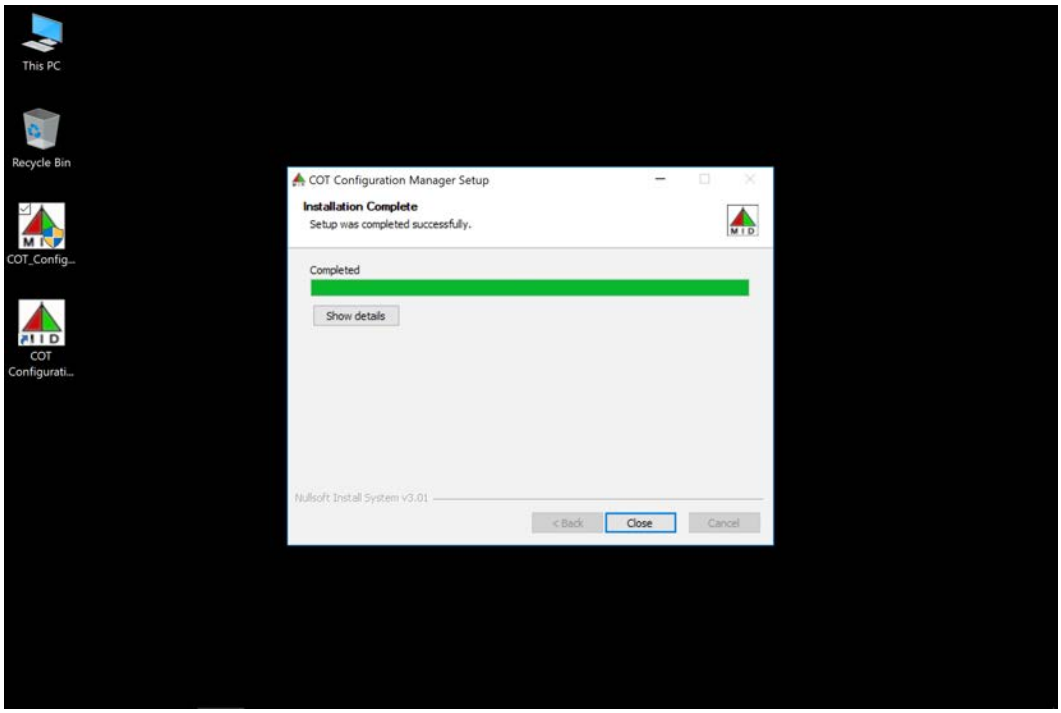
Step 2

Double click the downloaded file to begin installation of the COT Configuration Program. Make sure all options are selected and click "Next" to proceed.



Step 3

Select the desired install location of the COT Configuration Program. This is typically changed by advanced users, most will leave the installation location to the setup manager default. Click "Next" to proceed.



Step 4

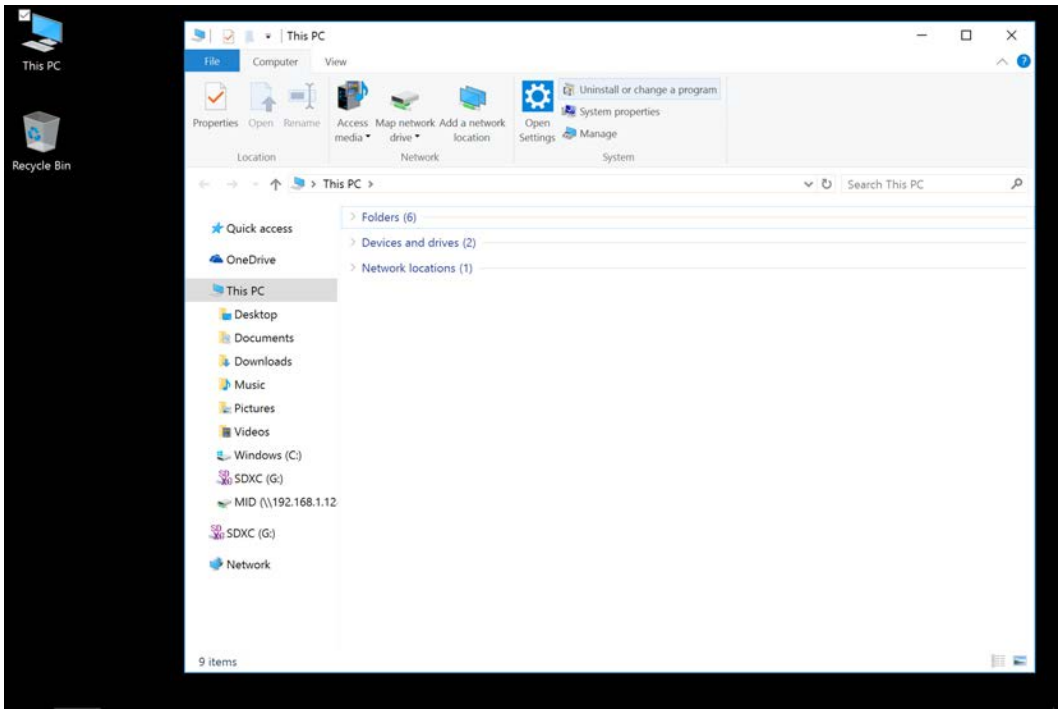
The setup manager will perform the installation. When it is complete, click the "Close" button.

1.2
_Uninstalling the COT Configuration Program

This chapter contains instructions for uninstalling the COT Configuration Program.

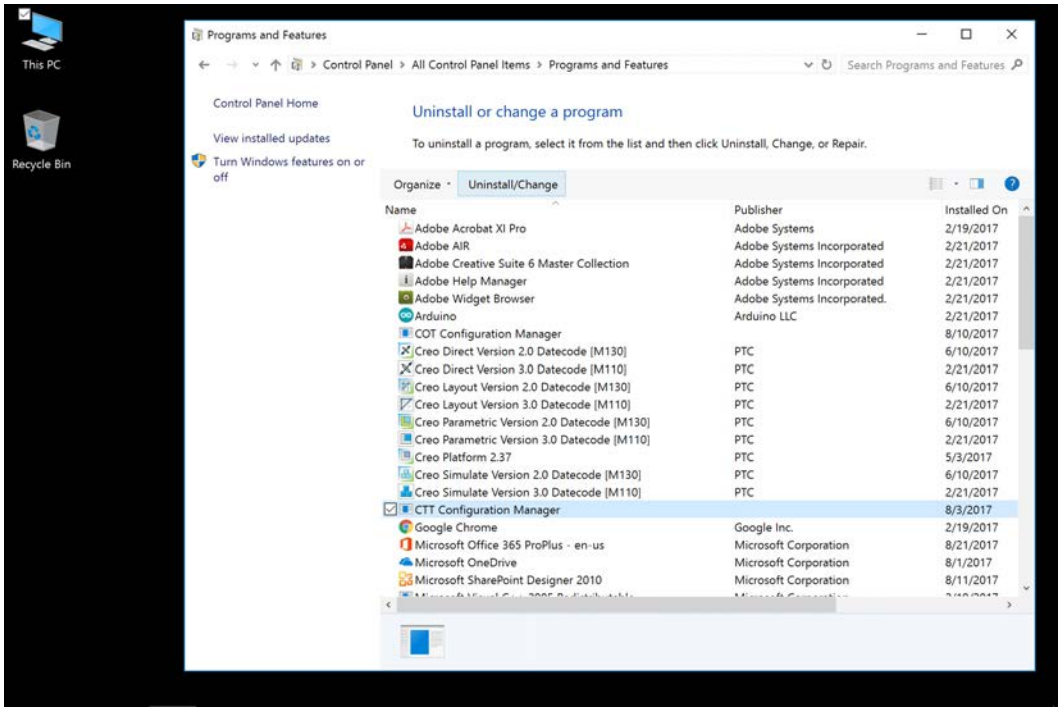
Step 1

Start at the computer desktop. Open *"My Computer"*.



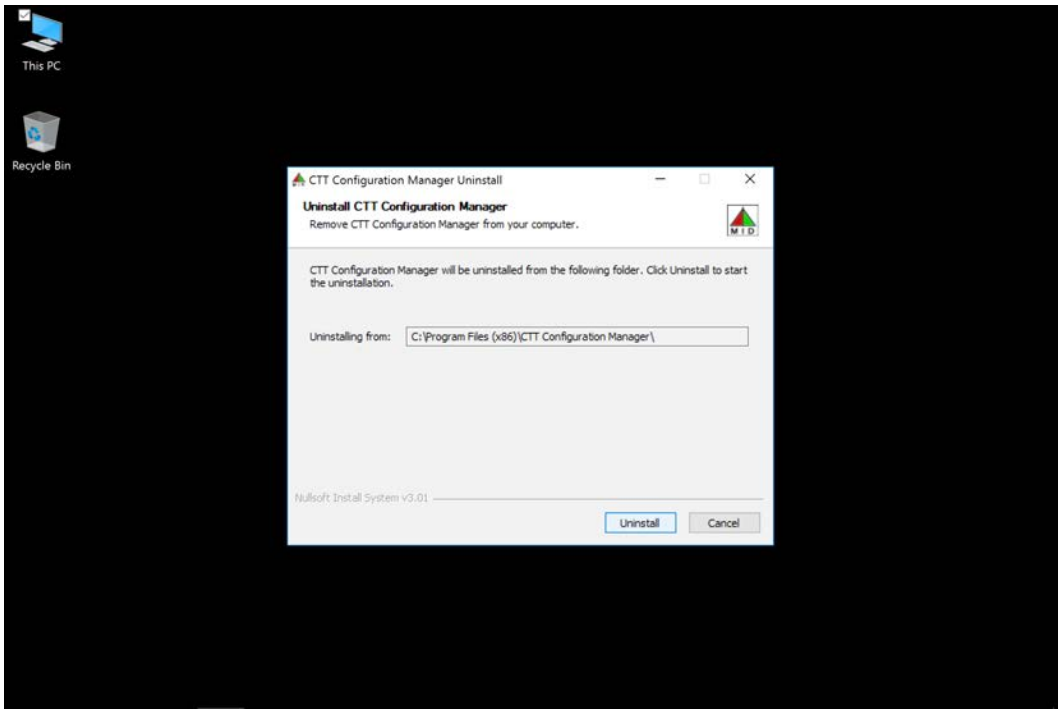
Step 2

Click *"Uninstall or change a program"* in the tool bar menu.



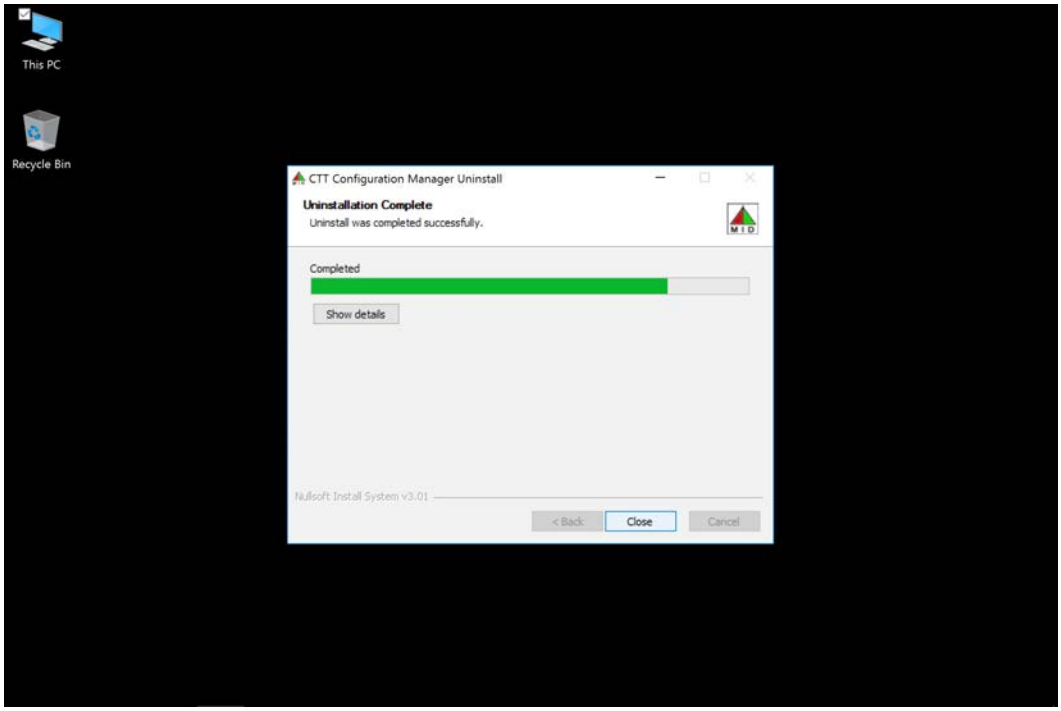
Step 3

Locate *"COT Configuration Manager"* in the Uninstall menu. Highlight the *"COT Configuration Manager"* program and click "Uninstall/Change"..



Step 4

Click the *"Uninstall"* button to begin.



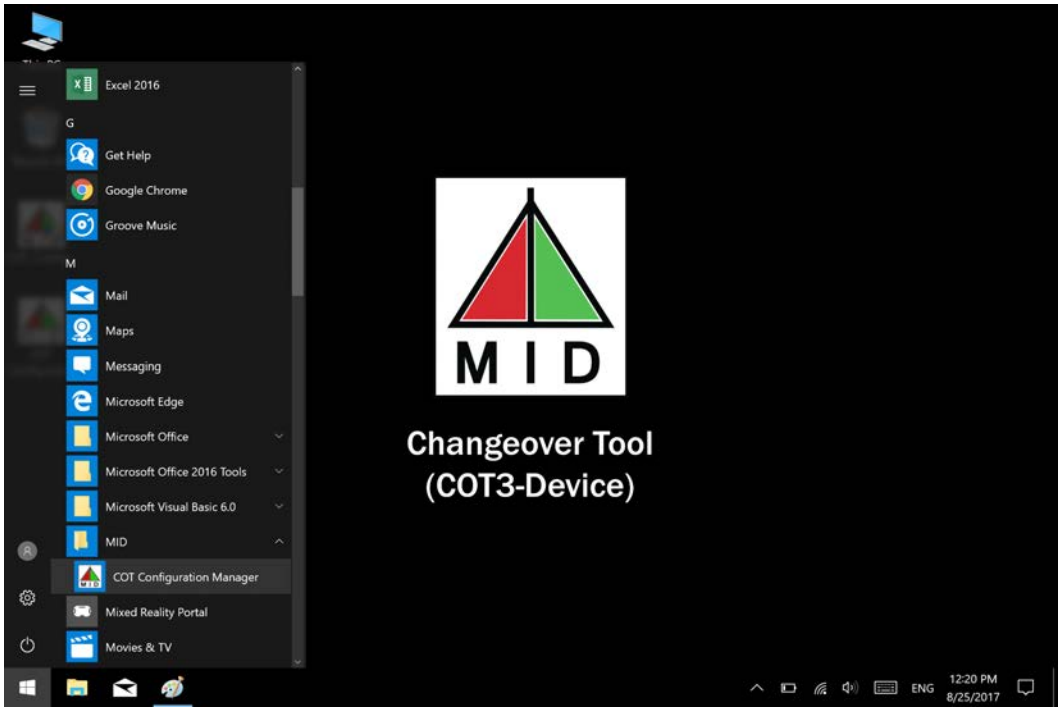
Step 5

Click the “Close” button when the process is complete.

_Configuration Software Operation

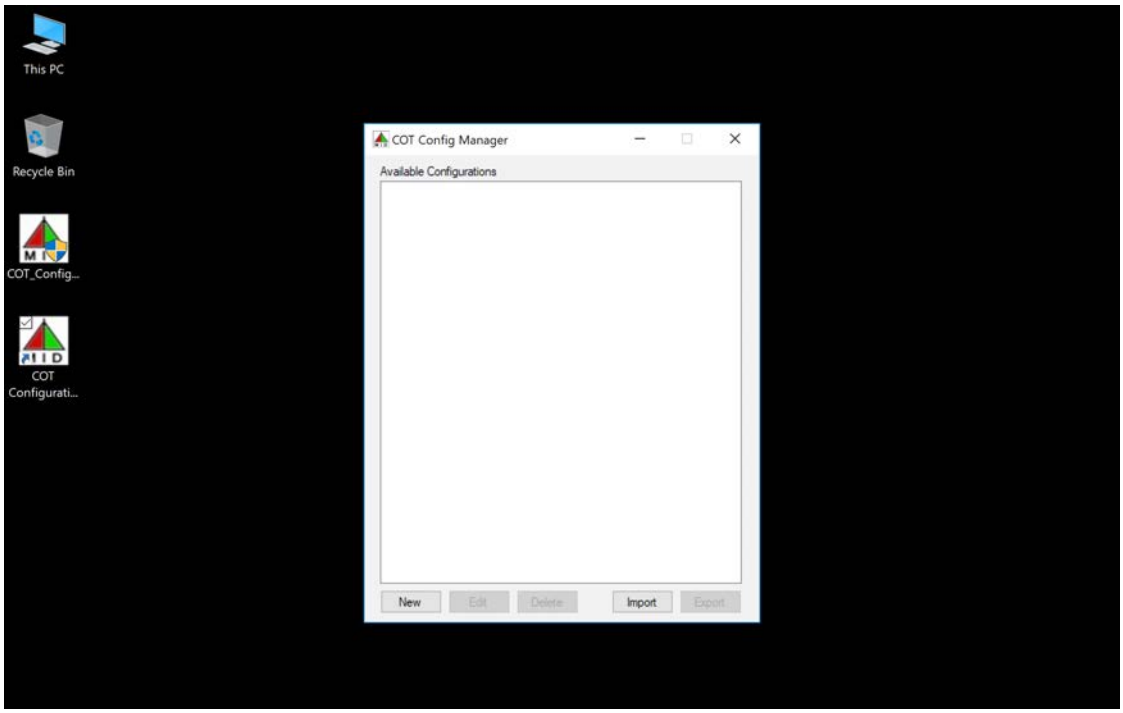
2.1
_Opening COT Configuration Manager

This chapter will guide an operator through the steps necessary to open the COT Configuration Manager. The COT Configuration Program is a helpful tool to create new COT system configurations or edit existing configurations. The user is able add/edit photos, help text files, tolerances and more.



Step 1

Click on the *"Start"* button and navigate to "COT Configuration Manager" contained in the "MID" folder

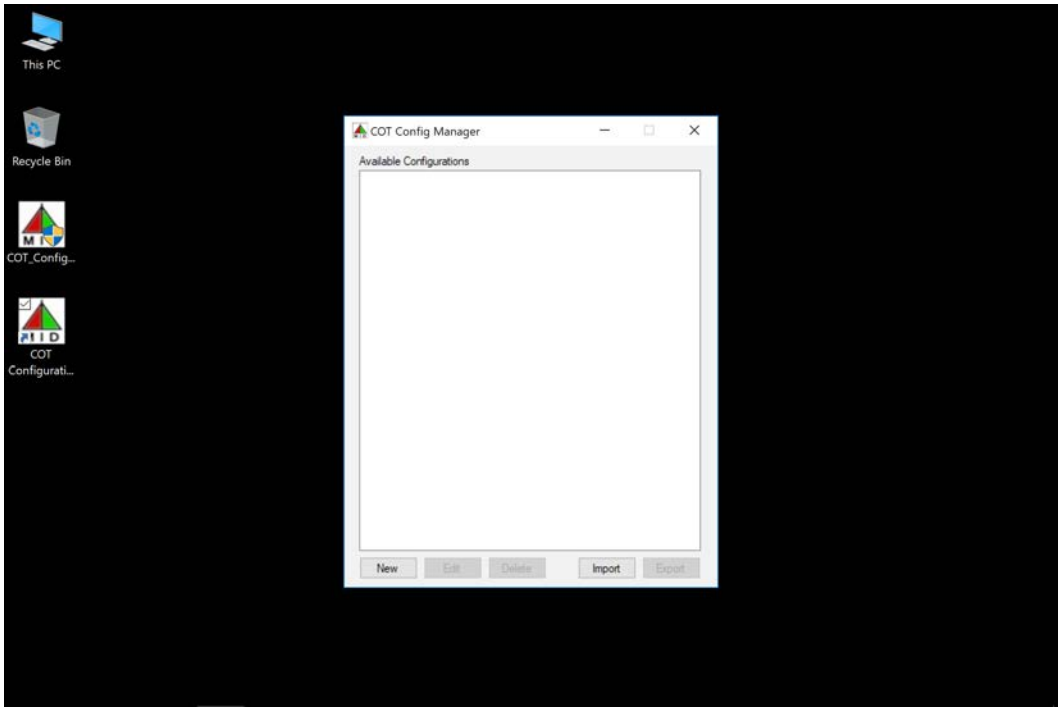


Step 2

The COT Configuration Manager will load into its main menu.

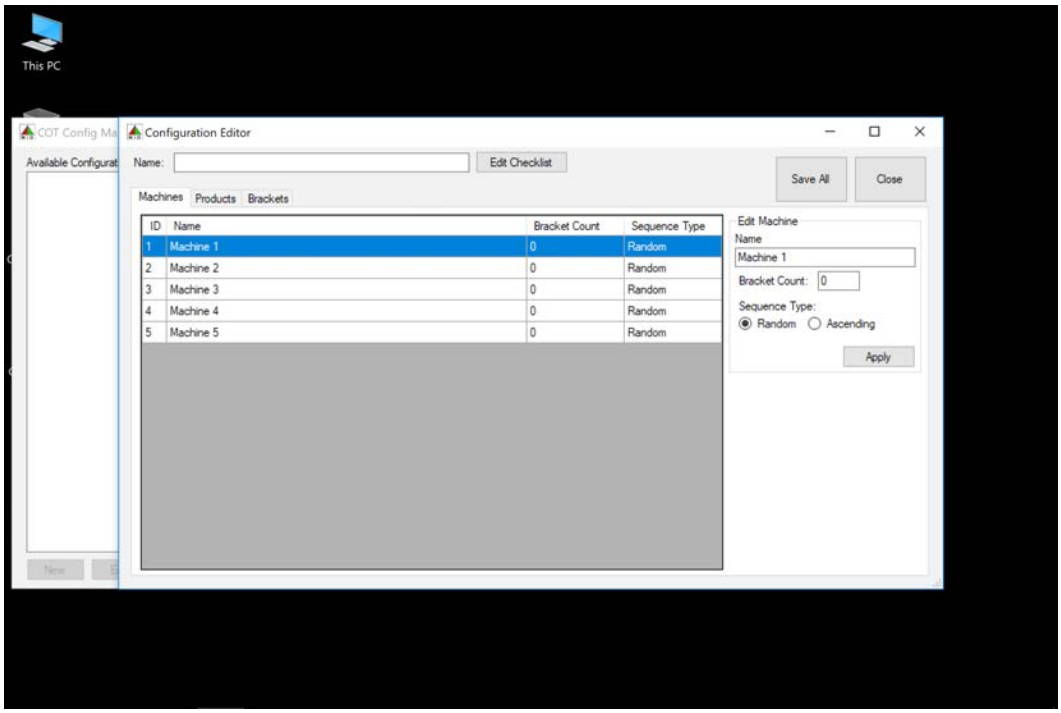
2.2
_Creating New Configuration

This chapter will guide the user through the steps of creating a new configuration for the COT tool. Instructions for editing machine and product names, number of brackets per machine, photos for each bracket and help files for each bracket are covered.



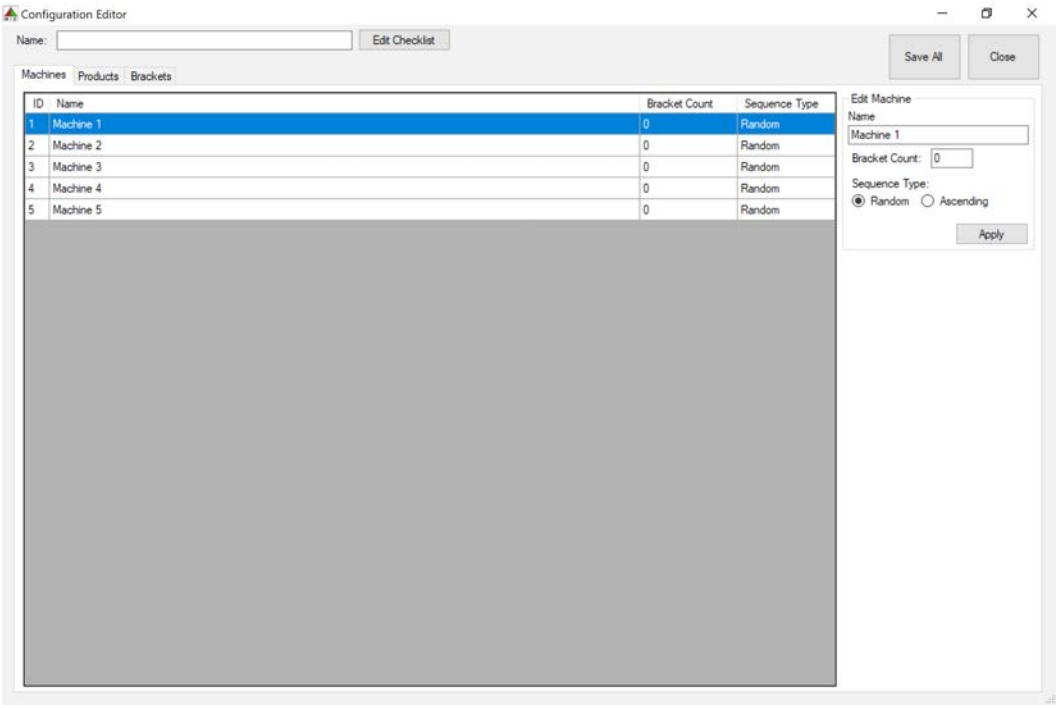
Step 1

To create a new configuration, click on the button labeled "New" at the main menu.



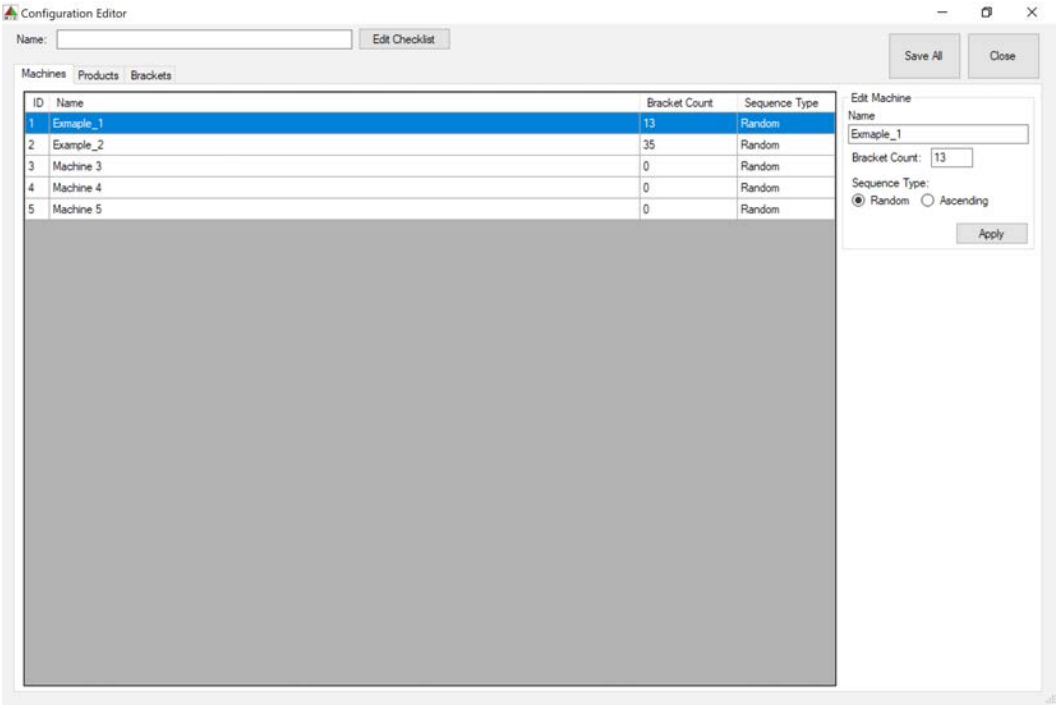
Step 2

The program will open a new window allowing the user to create a new configuration. Maximizing the window allows for easier navigation and program operation (as shown in next step)..



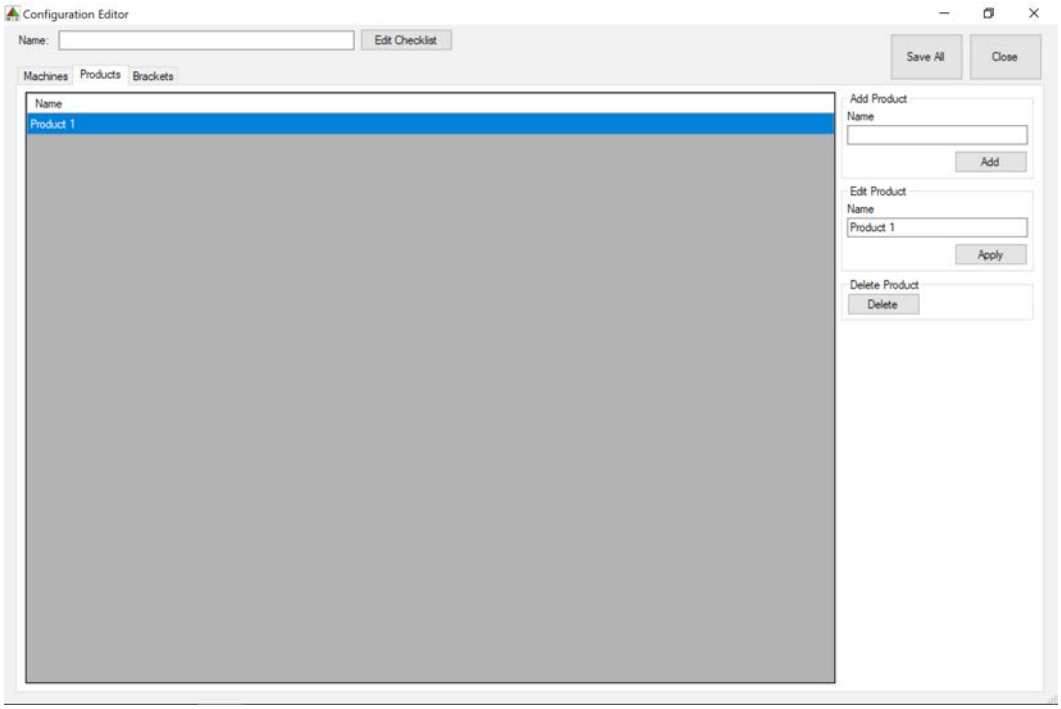
Step 3

The first field the user should populate is the Configuration save name. Enter a descriptive configuration name and click the "Save All" button.



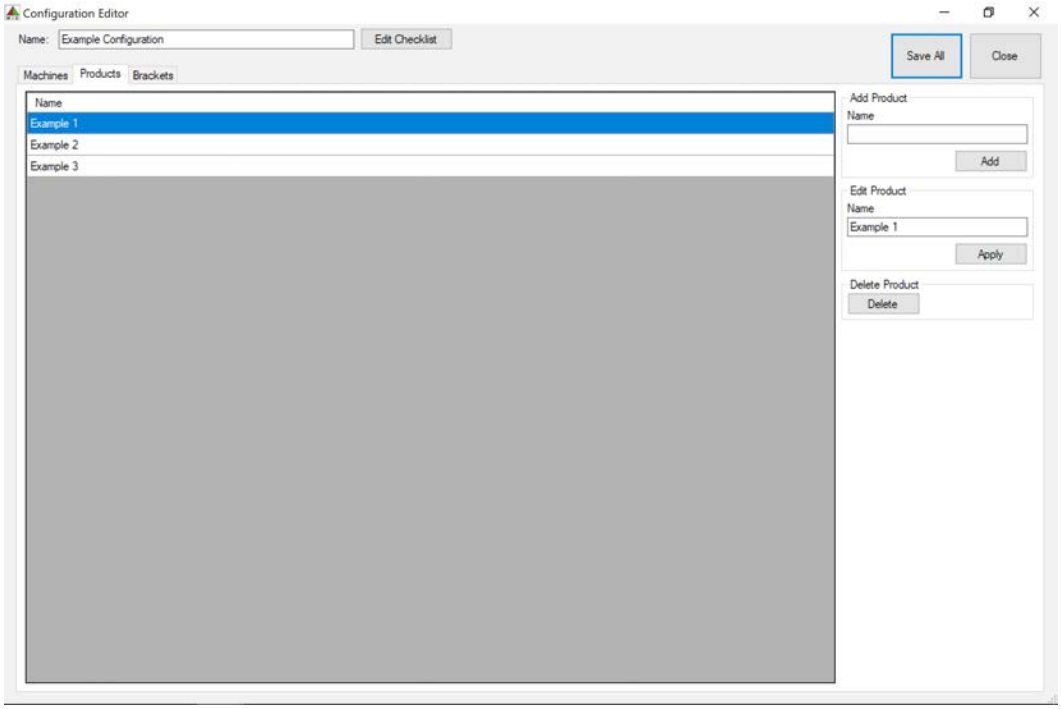
Step 4

In the "Edit Machine" field, enter the names of the machines on which the COT is installed. Define the number of brackets installed on each machine and the desired adjustment sequence. To apply inputted data, click the "Apply" button.



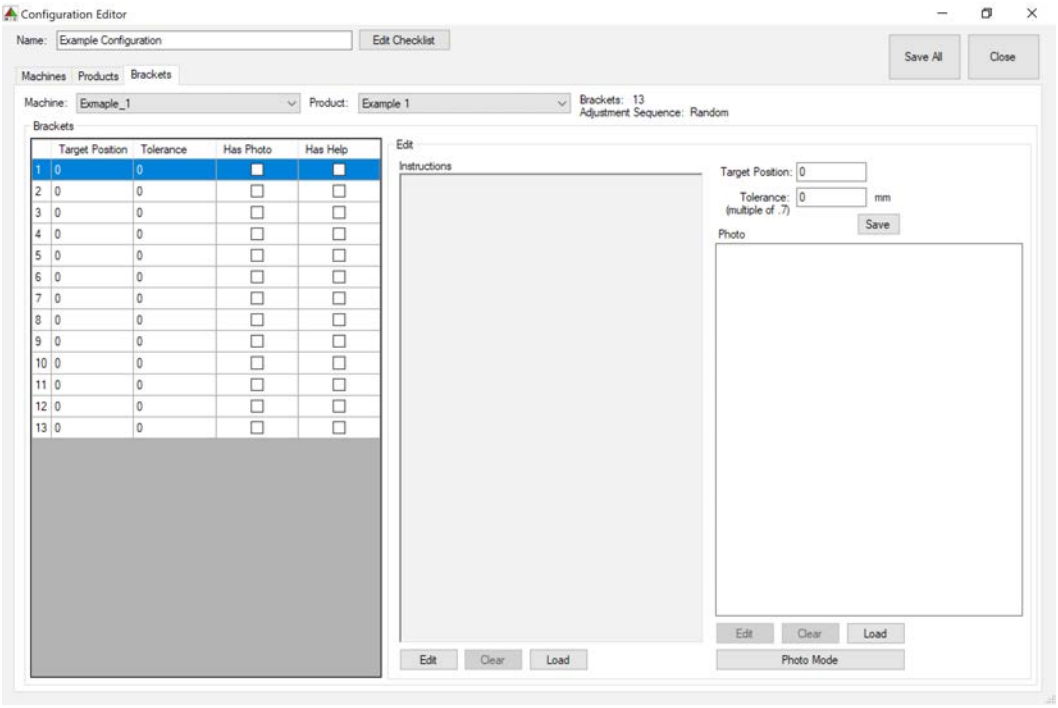
Step 5

Clicking the "Products" tab opens the next menu. This menu allows for the addition of new product sizes, editing of product names and deletion of products.



Step 6

To **add** a product, enter the desired product name and click the "Add" button.
To **edit** a product name, click (to highlight) the product name and rename the product in the edit field.
To **delete** a product, click (to highlight) the product and click the "Delete" button.

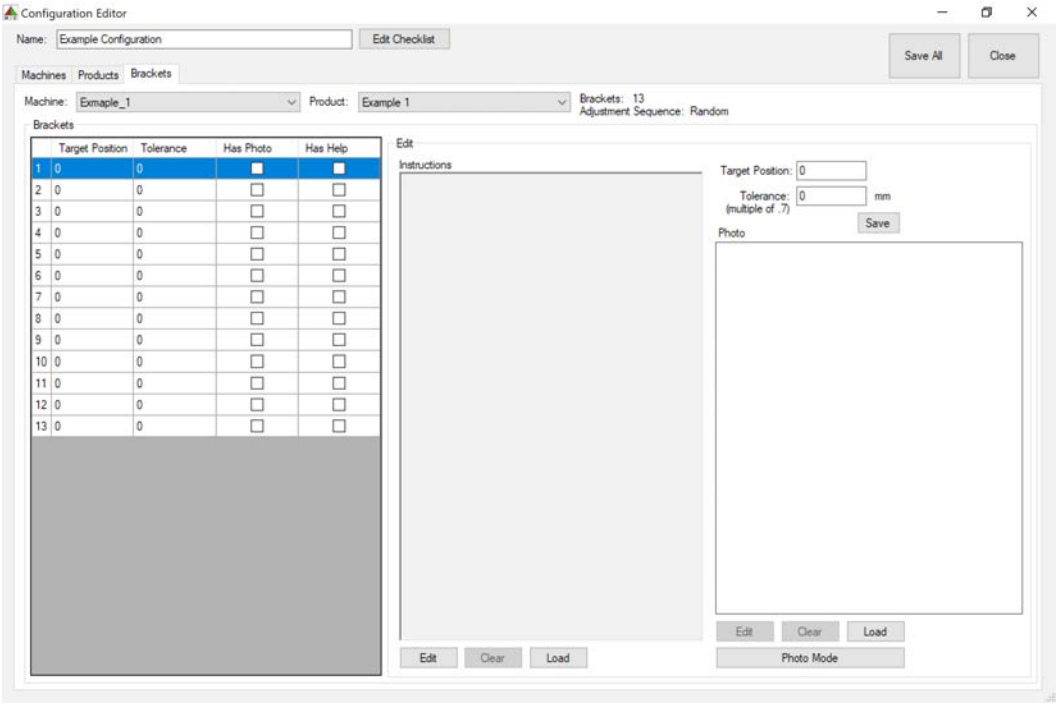


Step 7

The "Brackets" tab allows the user to input target position value, adjustment tolerances, location photos and text help files for each changeover location.

2.3
_Editing Help Text Documents

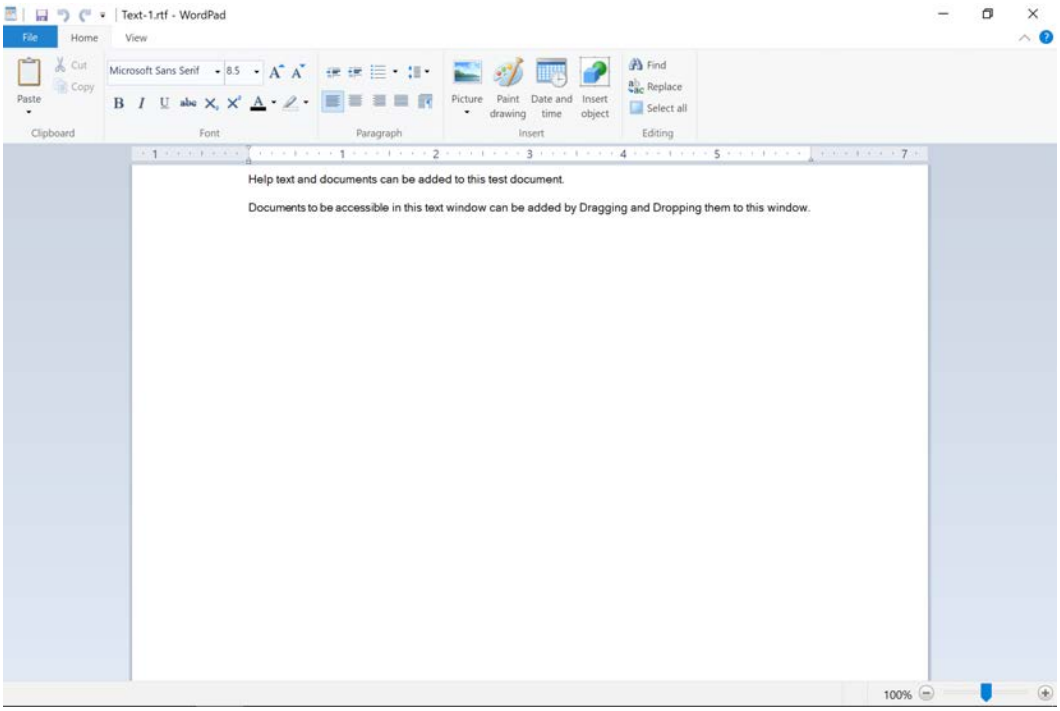
This chapter will guide the user through the steps for adding, editing and deleting text help files. Text help files are important to aid an operator during the use of the COT system.



Step 1

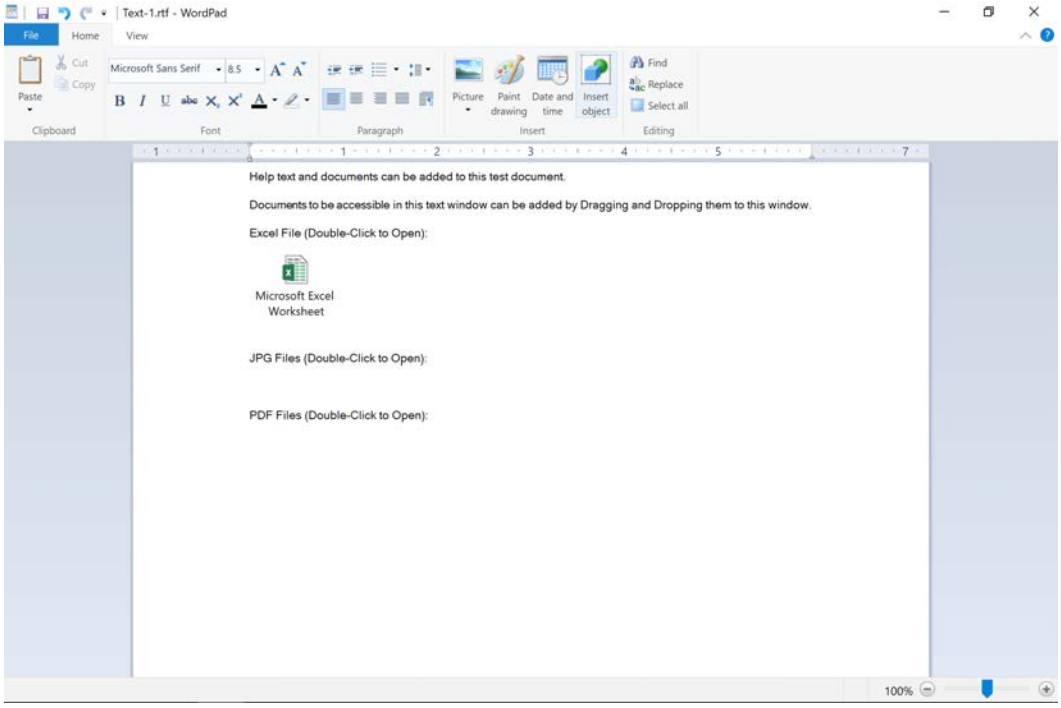
To add help text data for the highlighted sensor location, click the “Edit” button under the “Instructions” window. Clicking edit in this instance would open a blank help text file for bracket location 1 (currently highlighted in the Bracket # field).

NOTE: It is possible to load in externally created .rtf files by clicking the “Load” button.



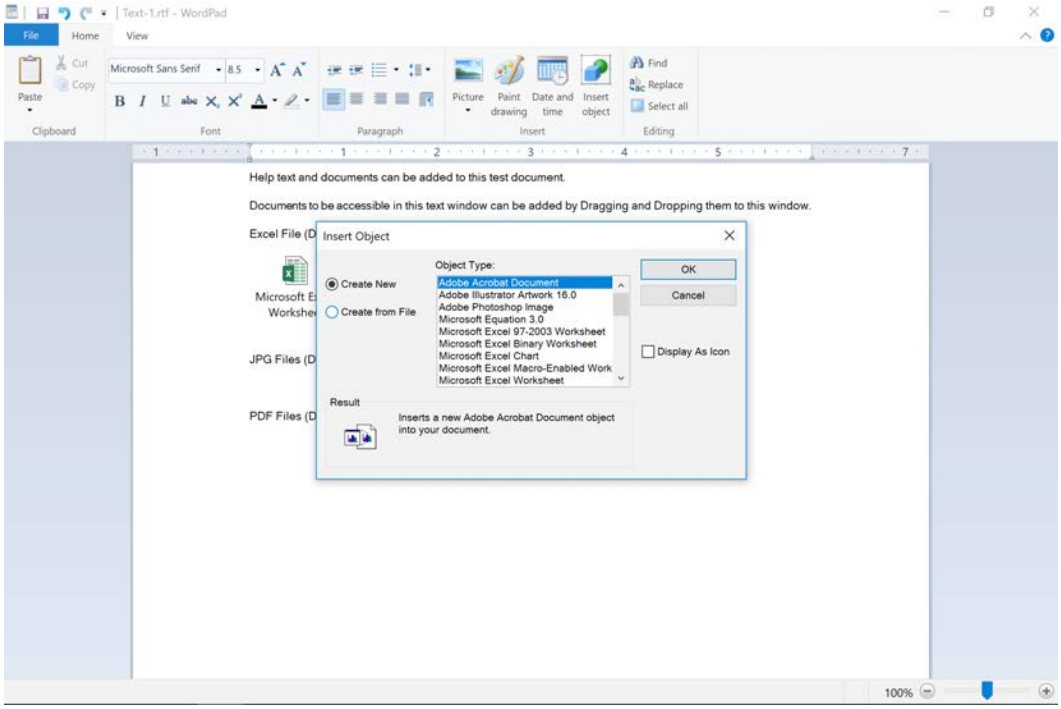
Step 2

WordPad will appear allowing the editing of the text instructions and attached documents (images, pdf, ppt, etc.) The operator can access this file during the changeover procedure using the COT..



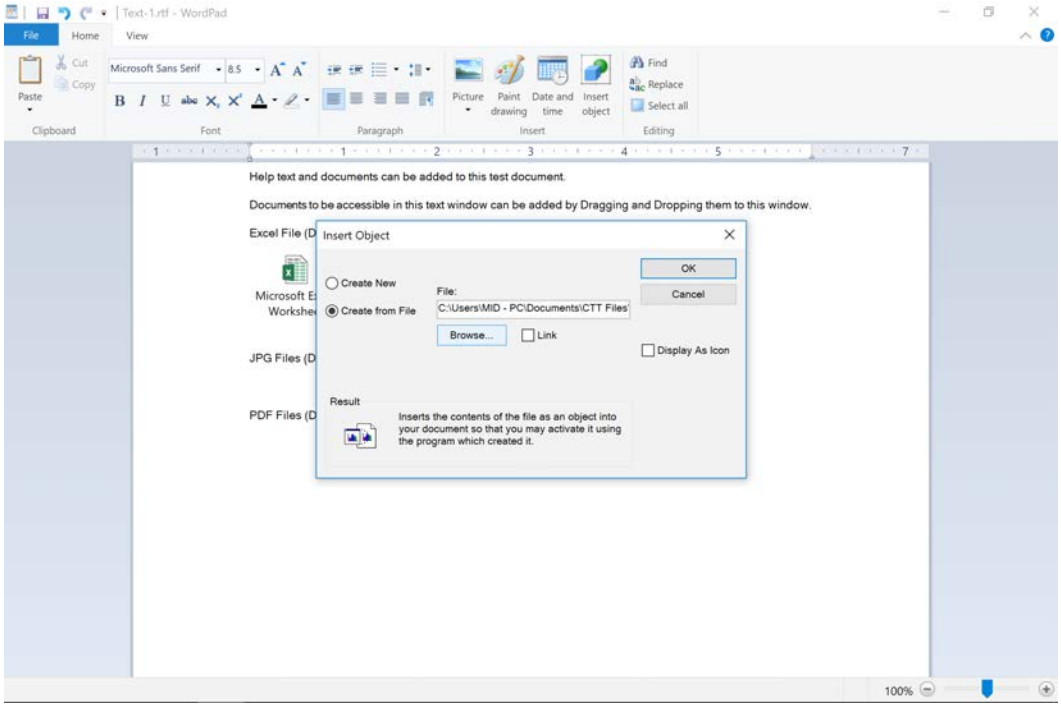
Step 3

Adding attached files and documents can be done by clicking the "Insert Object" button in the tool bar.



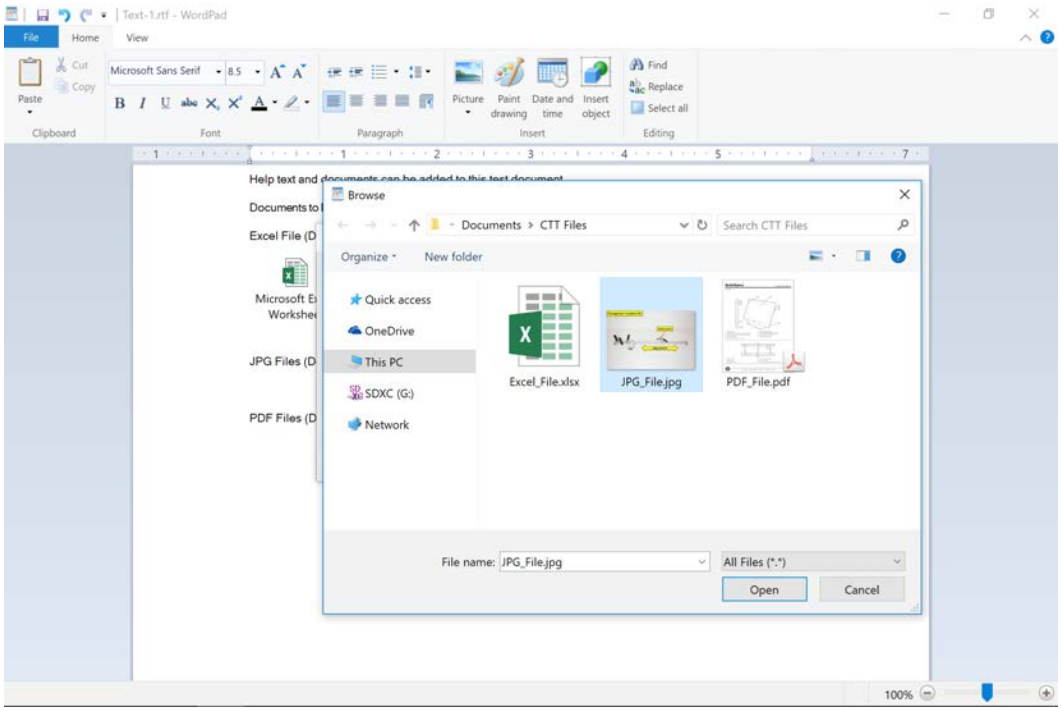
Step 4

The "Insert Object" will appear. Click "Create from File" to proceed to file navigation screen.



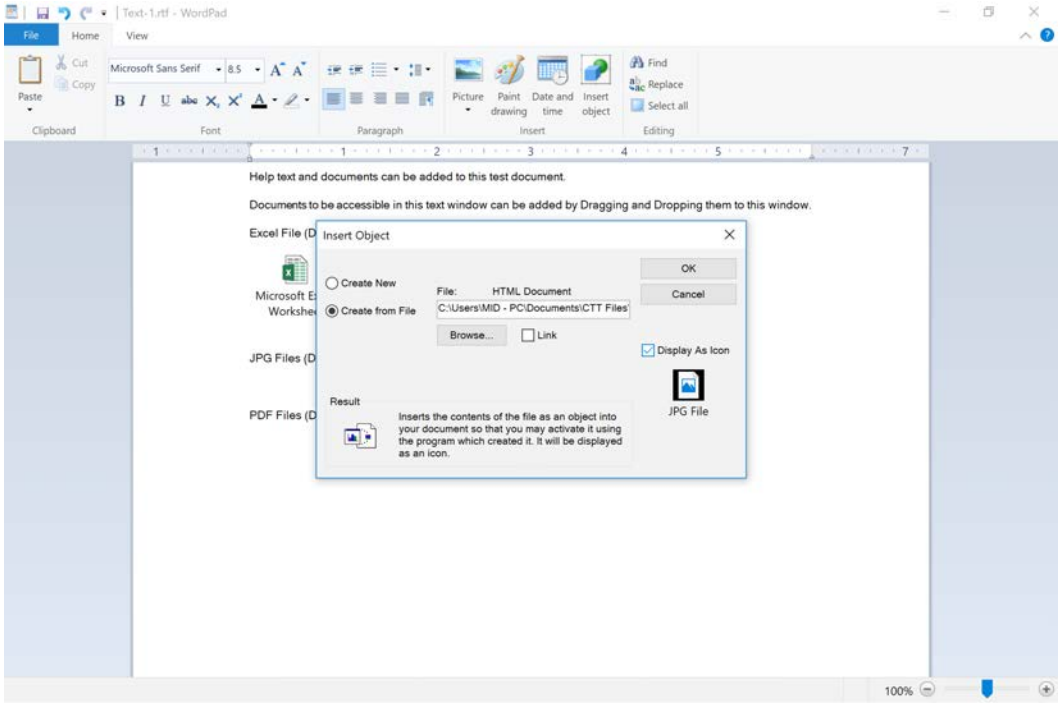
Step 5

Click the "Browse" button to open the file explorer.



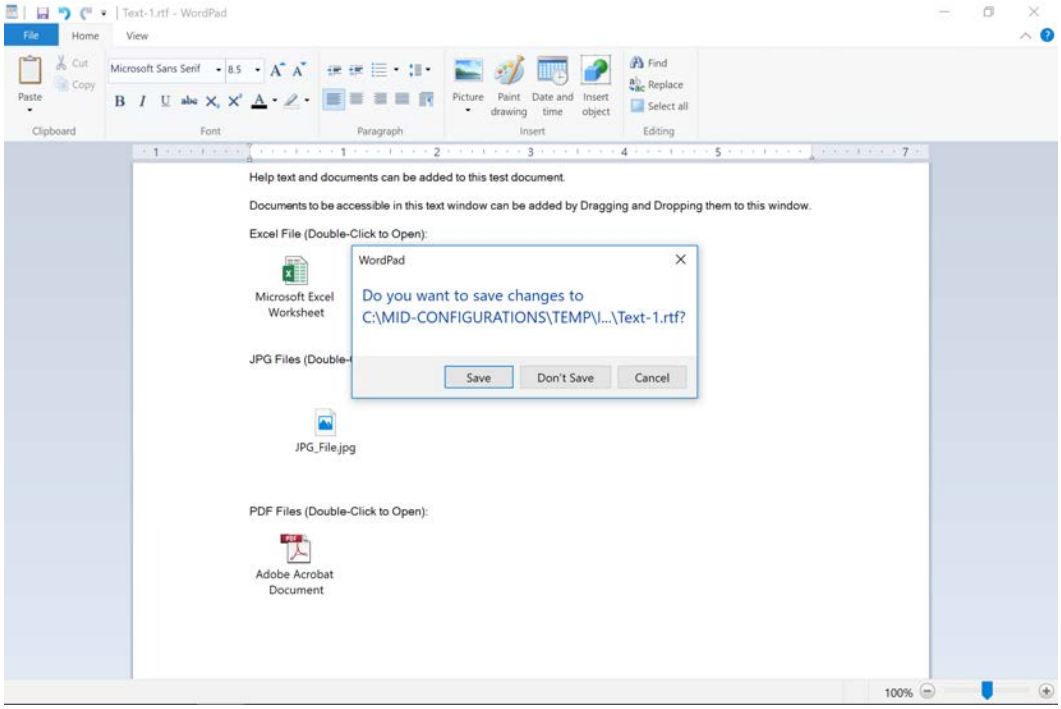
Step 6

Within the file explorer, search for the desire file to be attached in the help text document. Highlight the file and click the "Open" button.



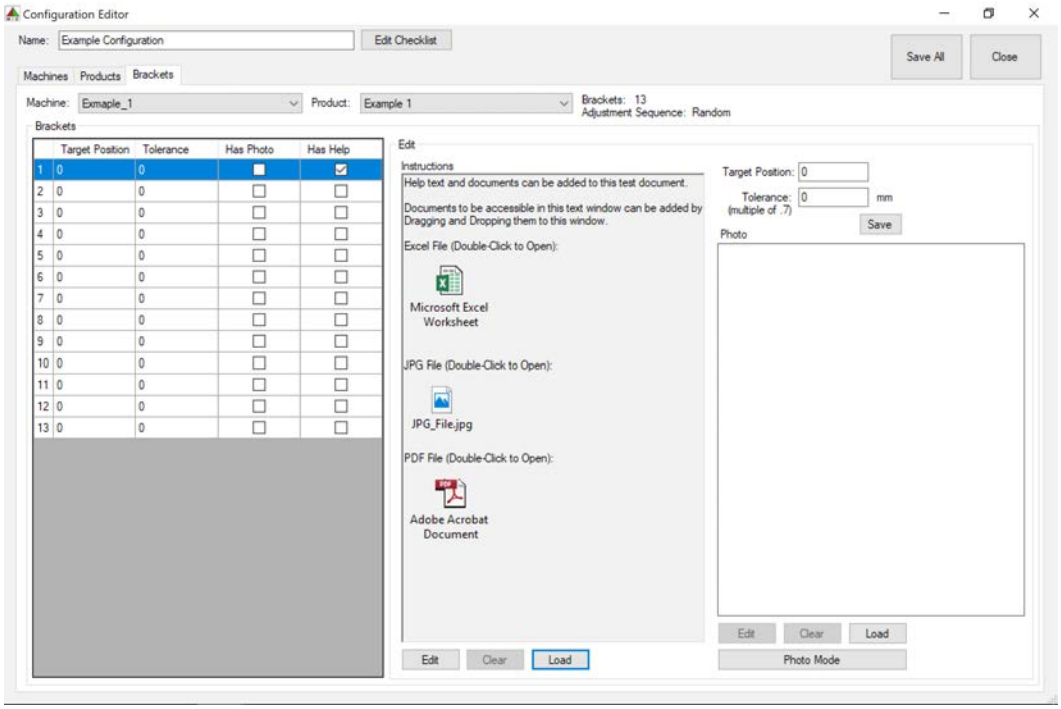
Step 7

Check the "Display As Icon" option to allow for easier touchscreen selection (during operation).



Step 8

Once completed, click the X in the top right corner and click the "Save" button to save changes made to the document.

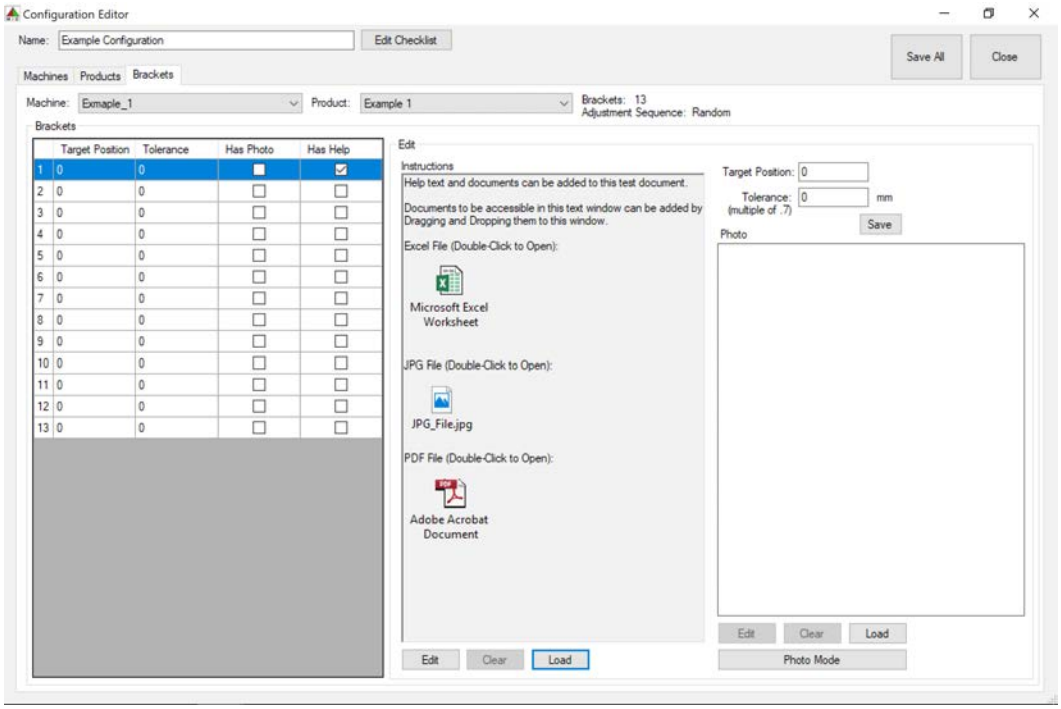


Step 9

Changes to the text document can be viewed in the preview box for “Instructions”.

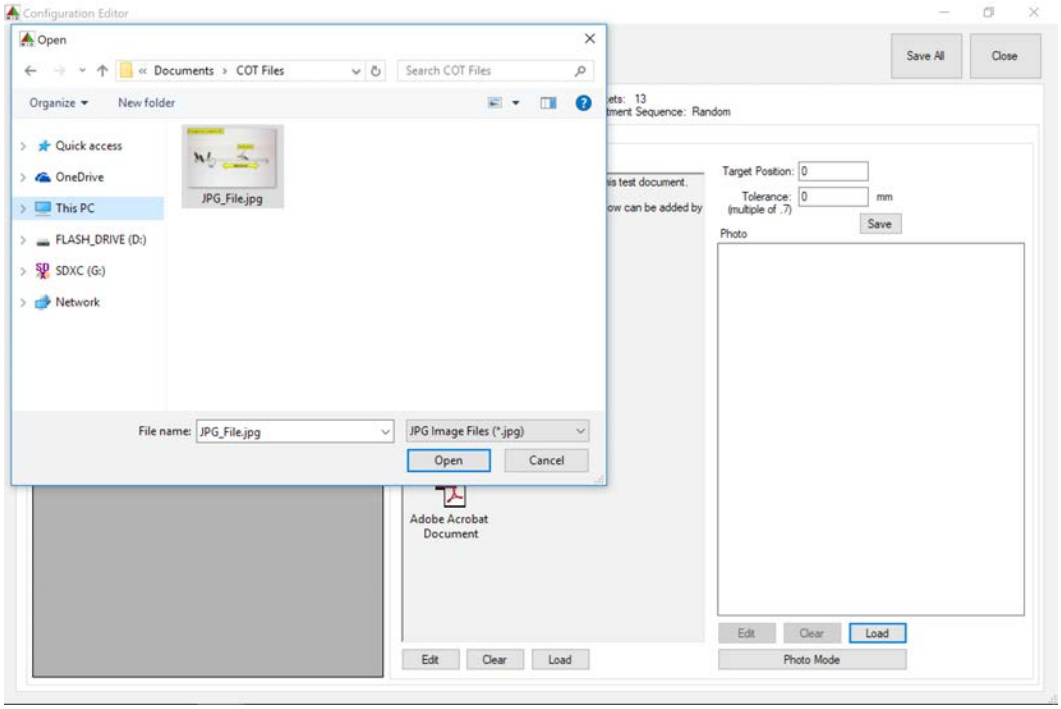
2.4
_Adding/Editing Location Photos

This chapter will guide the user through the steps for adding, editing and deleting photos. Photos are important features to aid an operator during the use of the COT system.



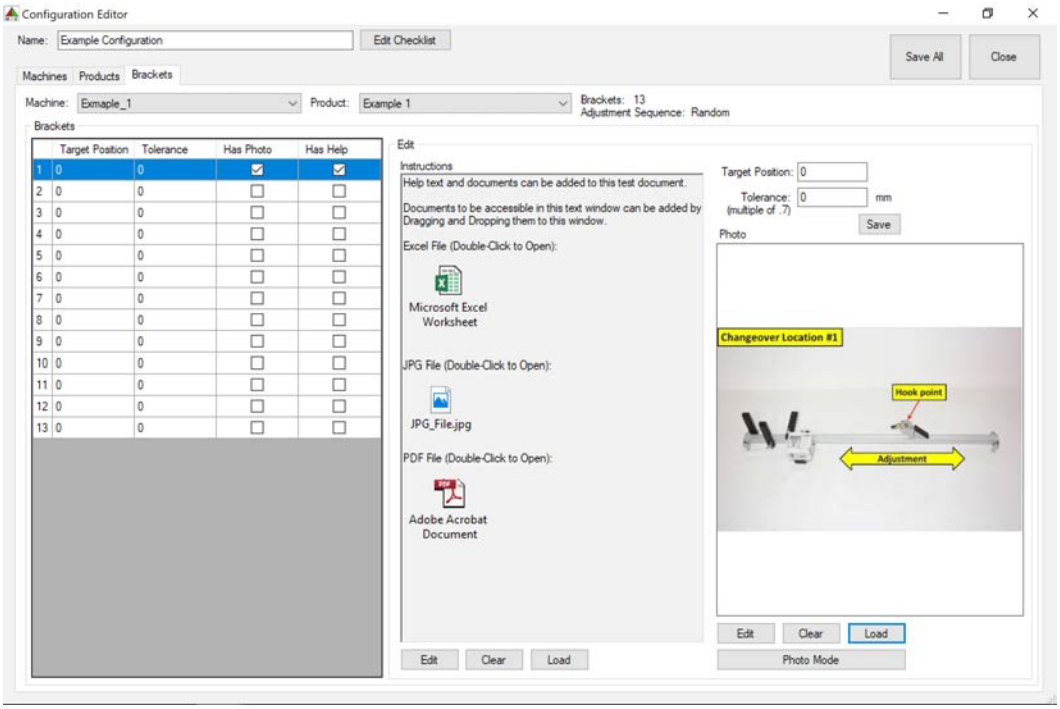
Step 1

To load a photo for Bracket Location 1, click the "Load" button under the photo box.



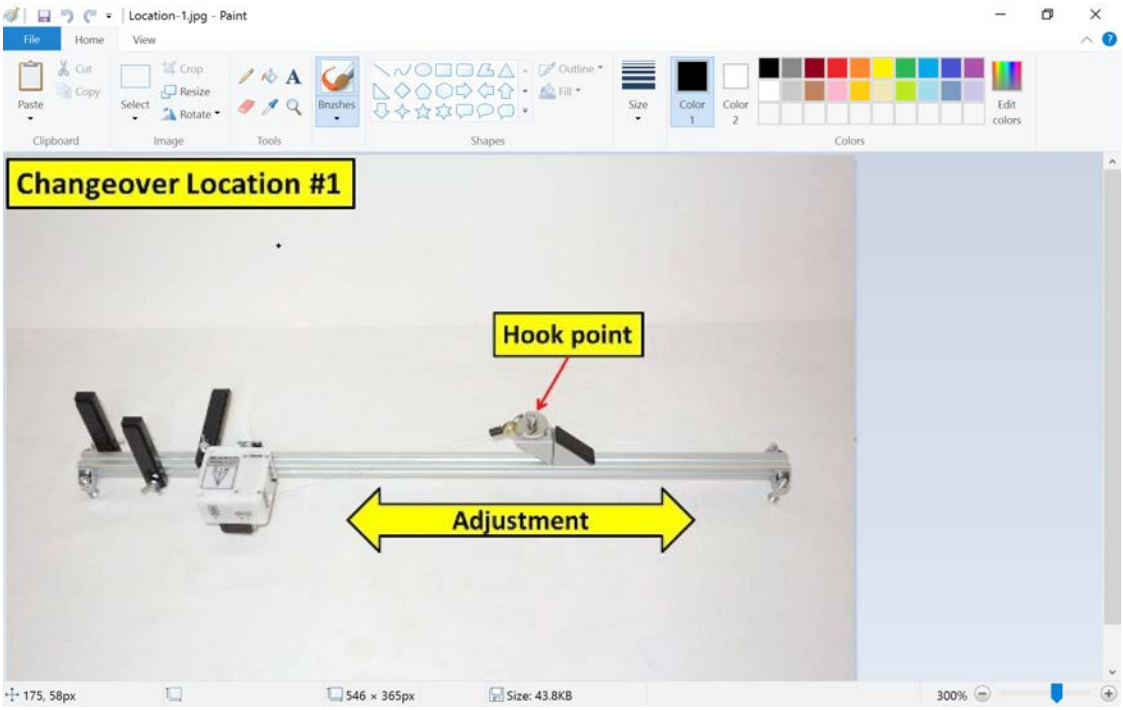
Step 2

Clicking "Load" will open a file explorer for the user to navigate to the desire location photo. Once the desired photo is selected, click the "Open" button.



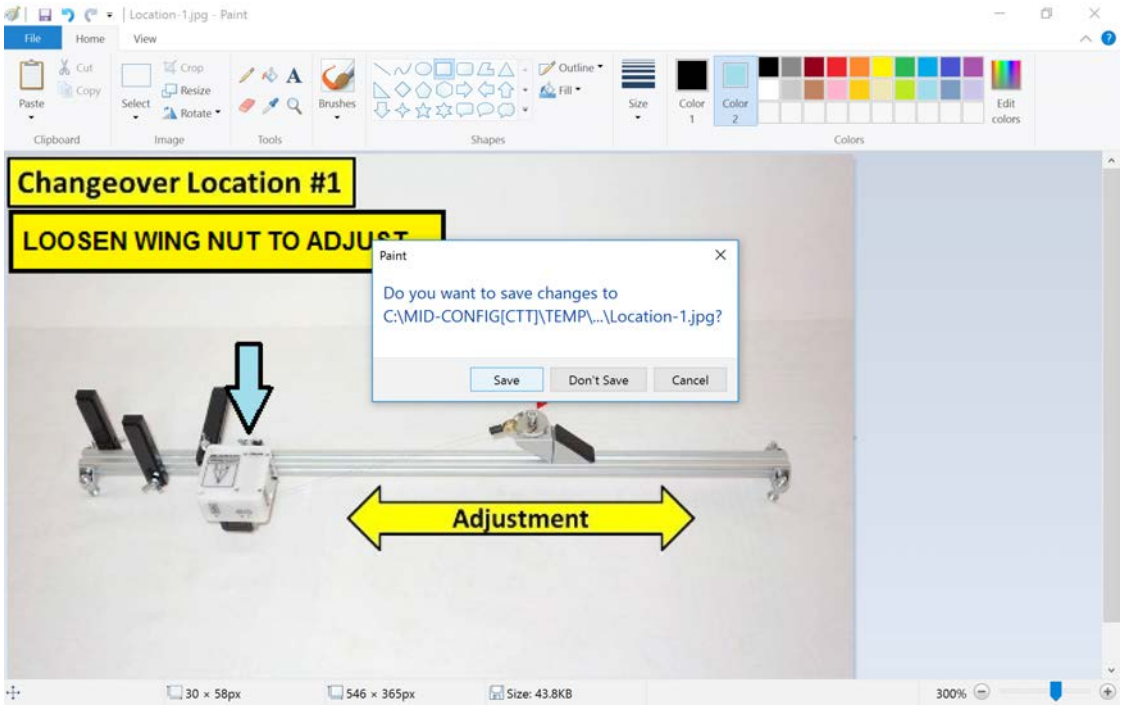
Step 3

The photo will load into the photo box. If editing of the photo is required, click the "Edit" button.



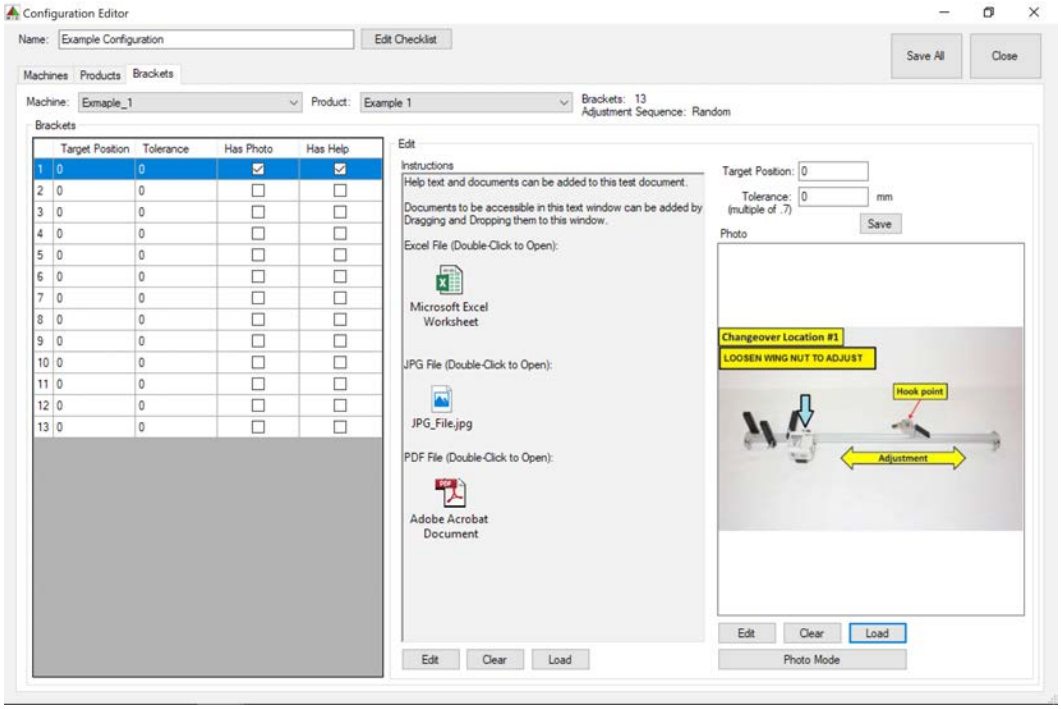
Step 4

Clicking the "Edit" button will load the image into Microsoft Paint. Using the available tools in Paint, the user can add a title and highlight features an operator should note for the sensor location.



Step 5

Once editing is complete, click the X button in the top right corner to exit Paint and return the COT Configuration software. When prompted with a Save dialog, click "Save".

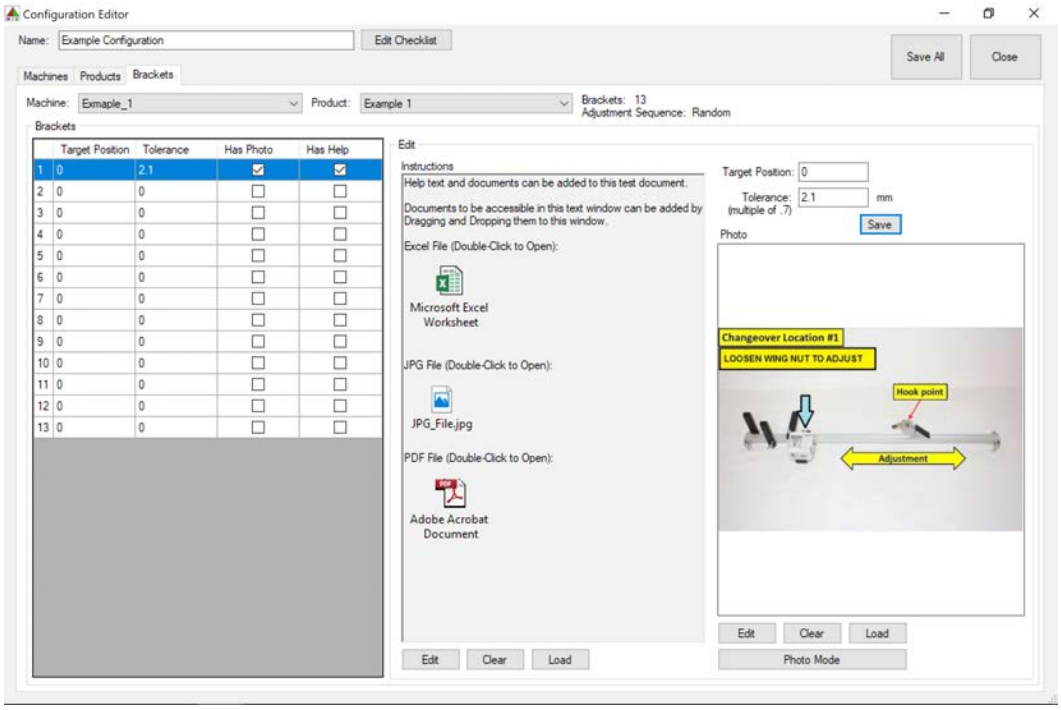


Step 6

The edited image will now be present in the Photo box. The photo can be cleared by clicking the "Clear" button or a different photo can be loaded by clicking the "Load" button.

2.5
_Modifying Adjustment Tolerances

This chapter will guide the user through the steps for editing adjustment tolerances for each bracket adjustment locations.

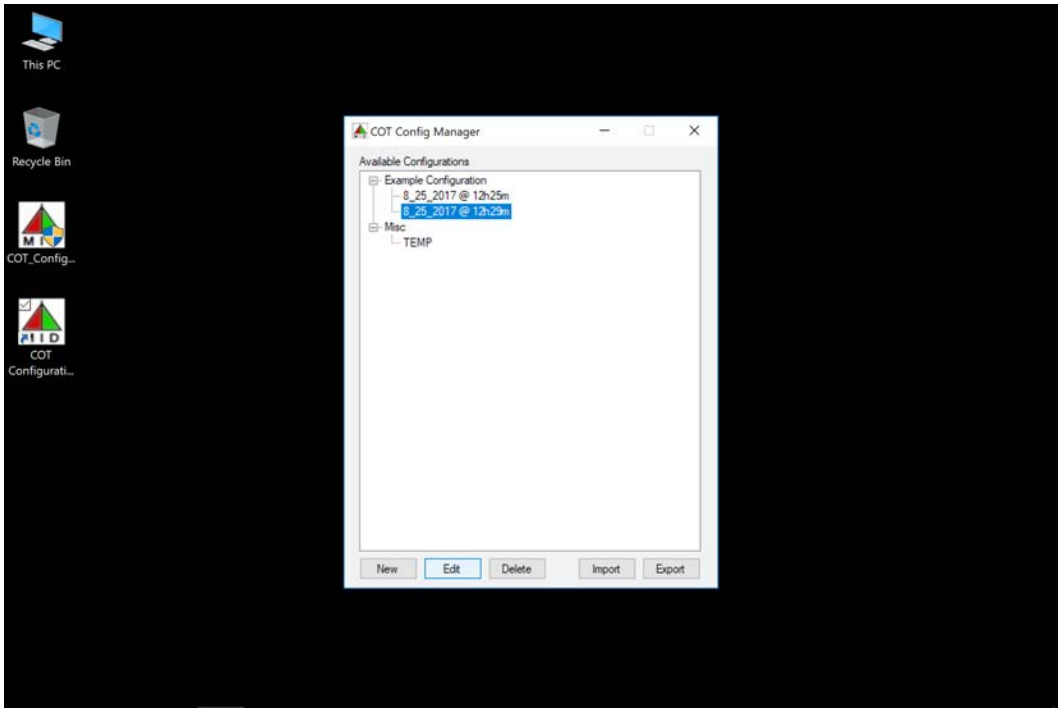


Step 1

Editing the tolerance is done by entering the desired range (mm) in the field labeled “Tolerance”. Click the “Save Data” button to save these settings for the highlighted bracket location.

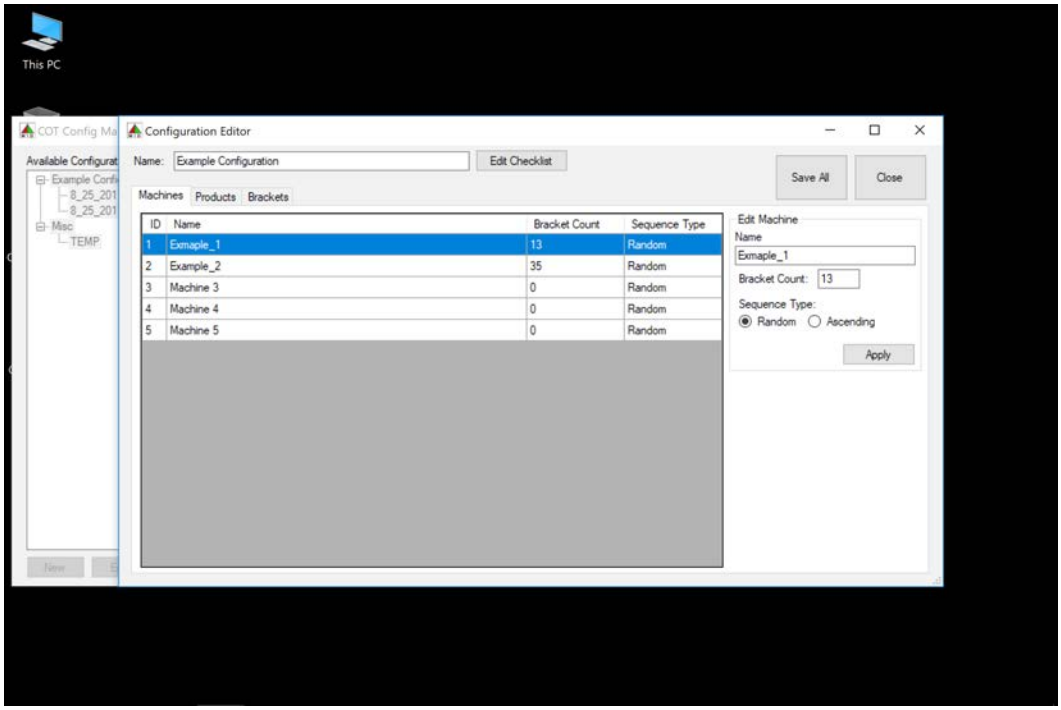
2.6
_Editing Existing Configuration

This chapter will guide the user through the steps on how to edit an existing configuration.



Step 1

At the main menu, select the desired configuration to edit. Click the "Edit" button to continue to the editing menu.

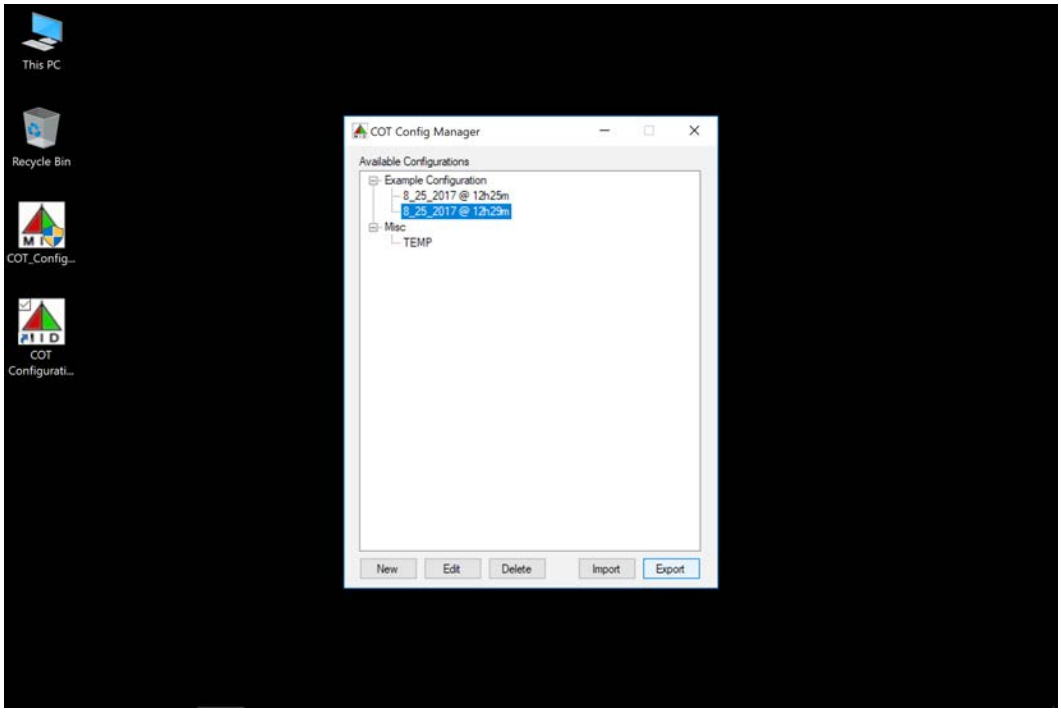


Step 2

Editing of the selected configuration is similar to the procedure detailed in Chapter 2.2 to Chapter 2.5.

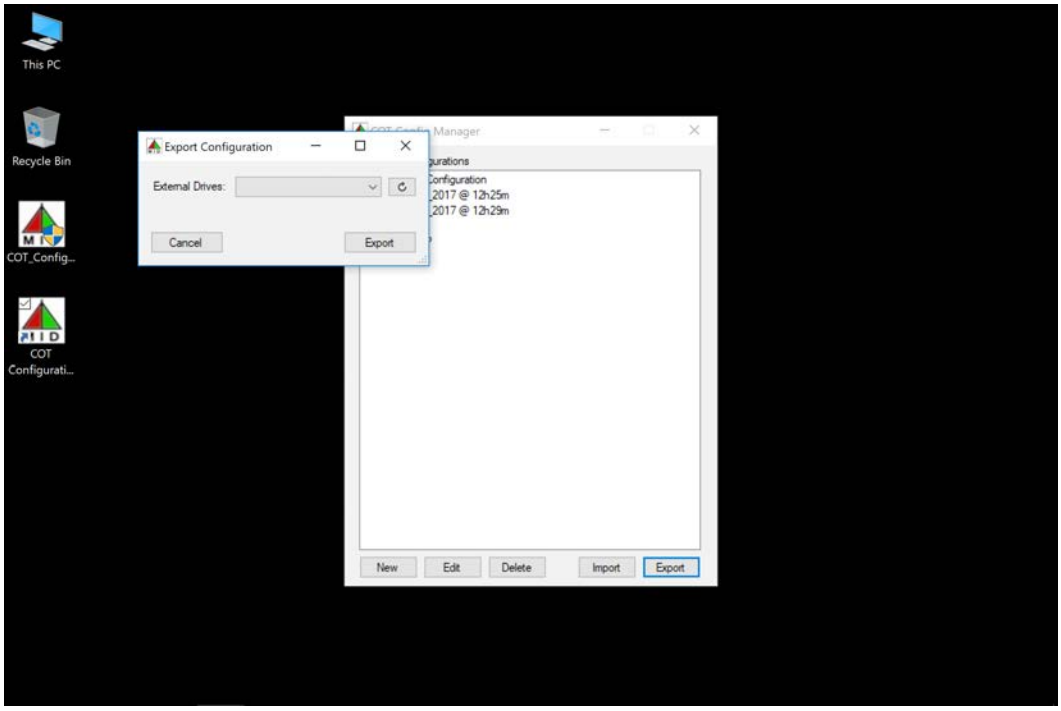
2.7
_Transferring of Configurations

This chapter will cover the steps to transfer newly created or edited configuration files from the PC to Removable Media and finally to the Changeover Tool.

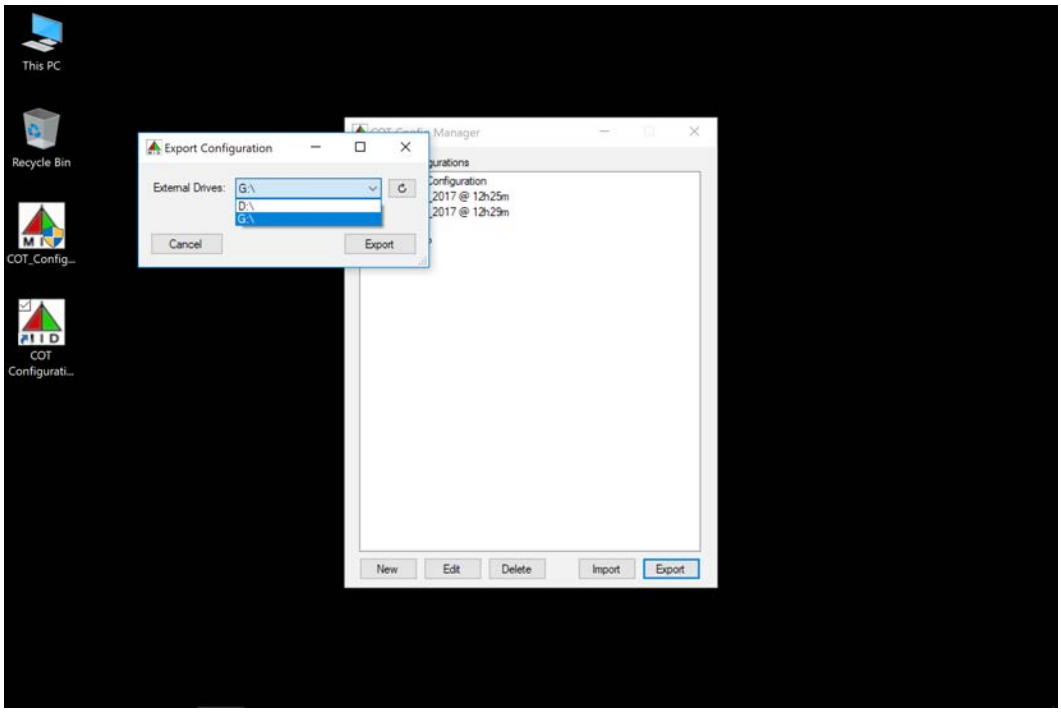


Step 1

Begin at the main menu of the COT Configuration Manager. Select the desired configuration to be transferred and click the "Export" button.

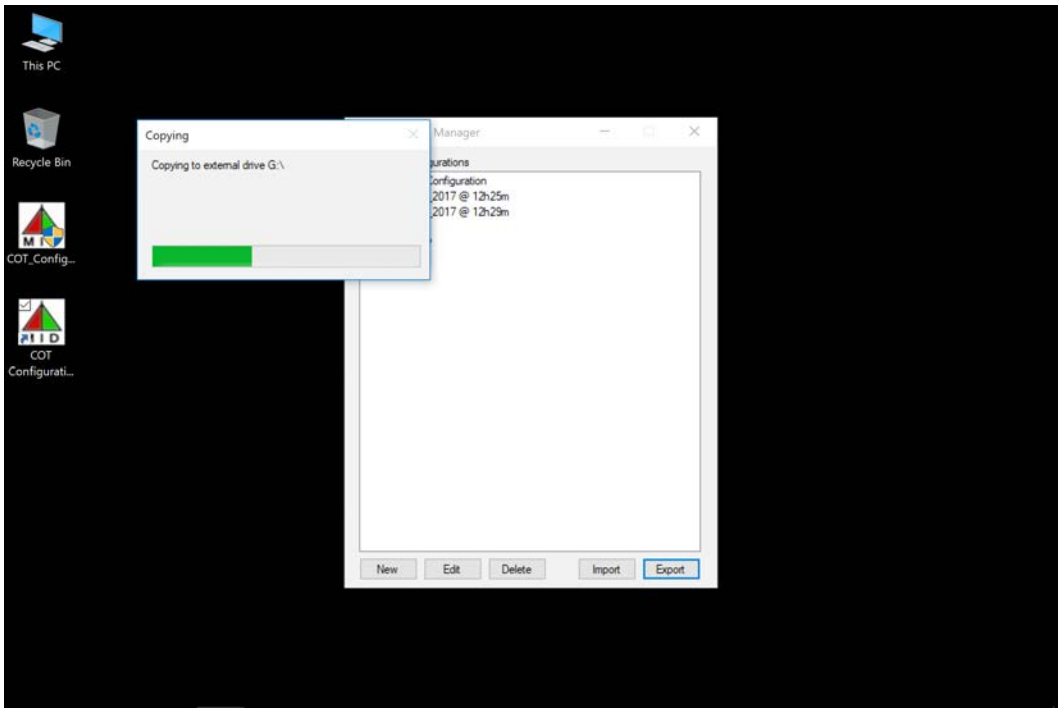


An Export Configuration menu will appear. Using the drop-down menu, select the removable media to which the configuration will be transferred.



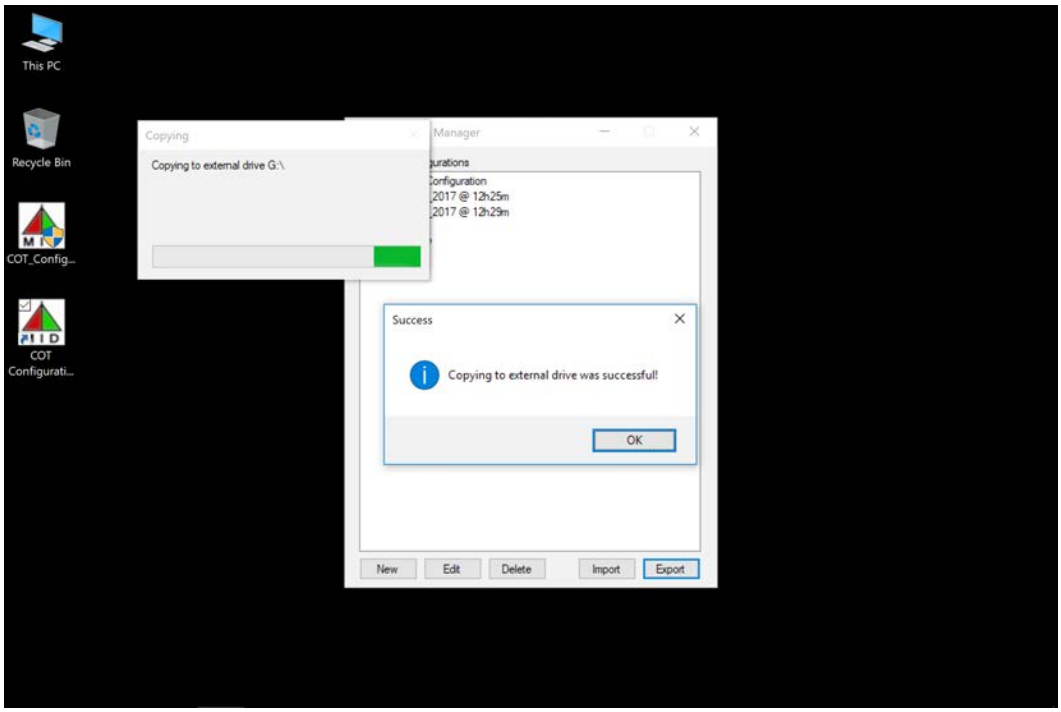
Step 3

Once the removable media is selected in the drop-down menu, click the "Export" button to transfer the files.



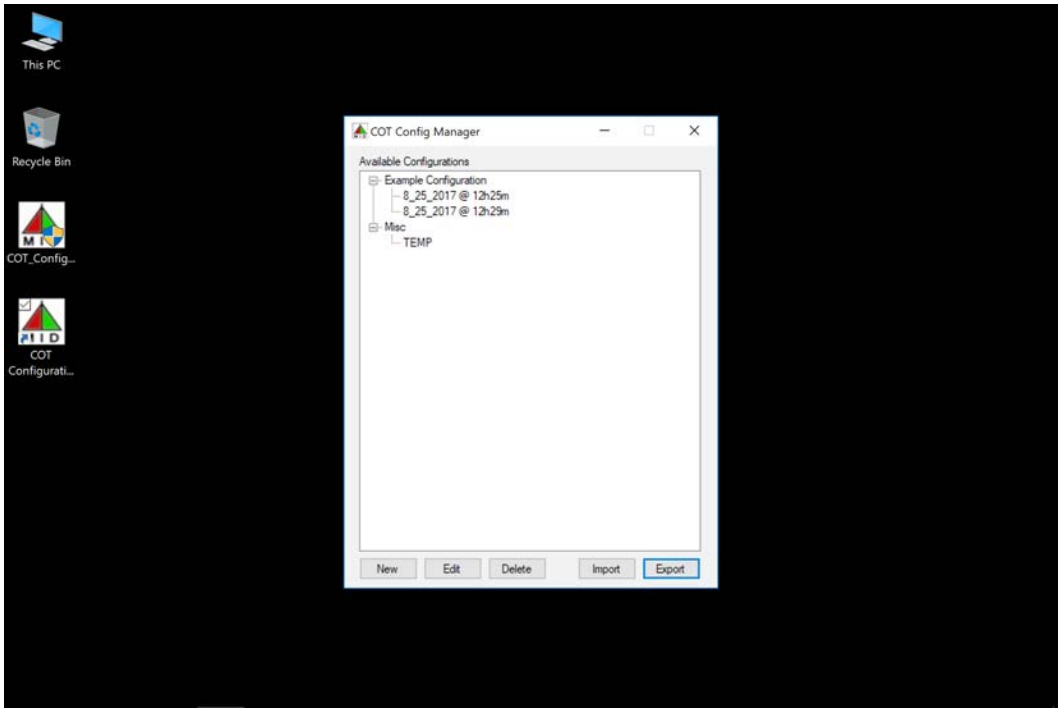
Step 4

A scrolling bar will appear indicating the Export Configuration menu is transferring the configuration to the removable media.



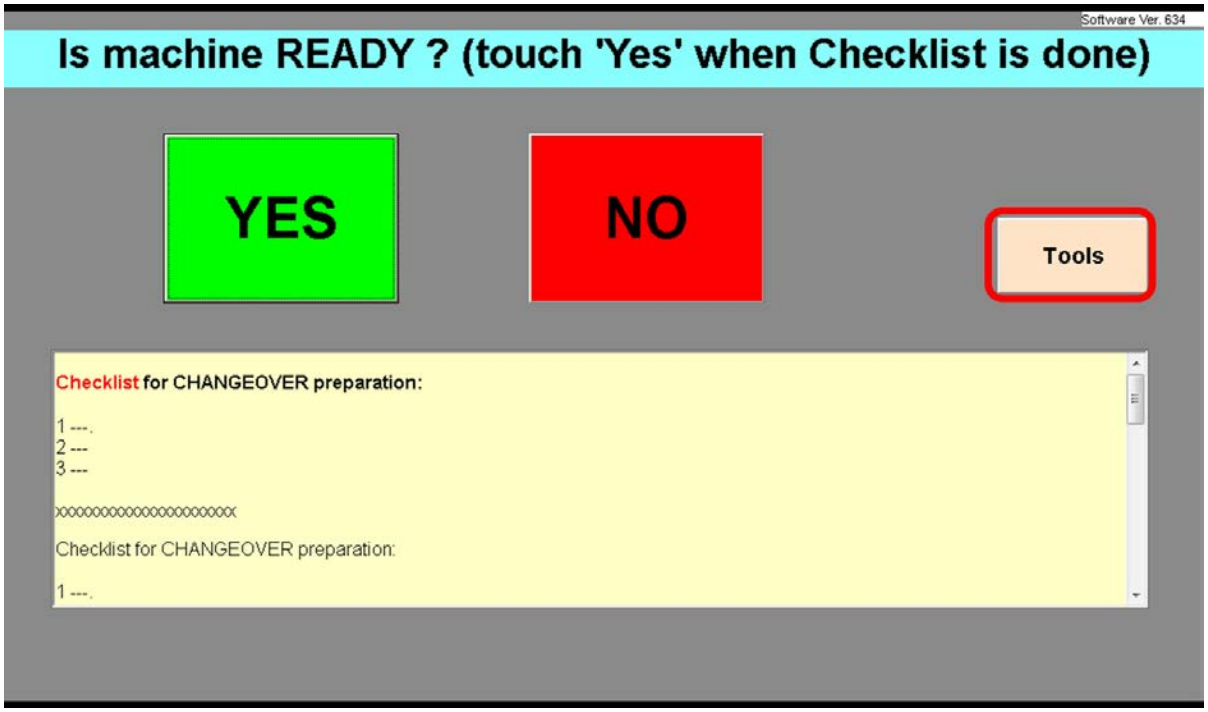
Step 5

Once complete, a popup message will indicate that the files have been successfully transferred. Click "OK" to proceed back to the main menu,



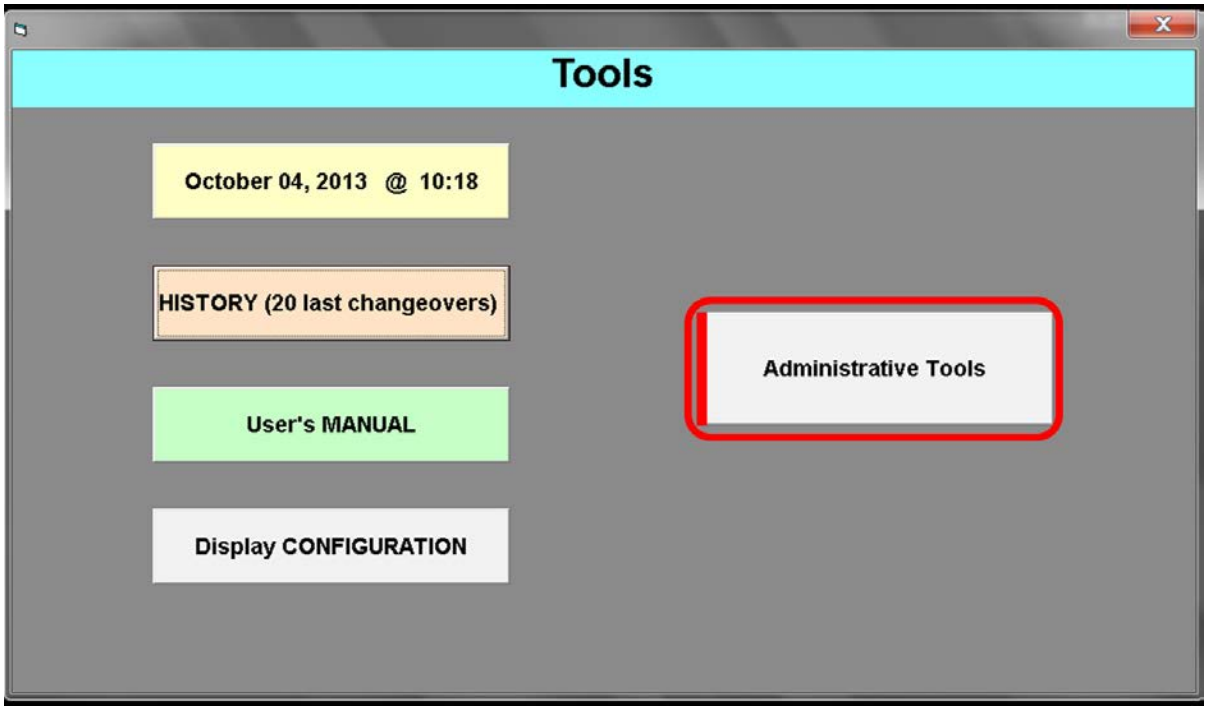
Step 6

The user can now eject the removable media from the PC and insert the removable media into the COT system to transfer the configuration.



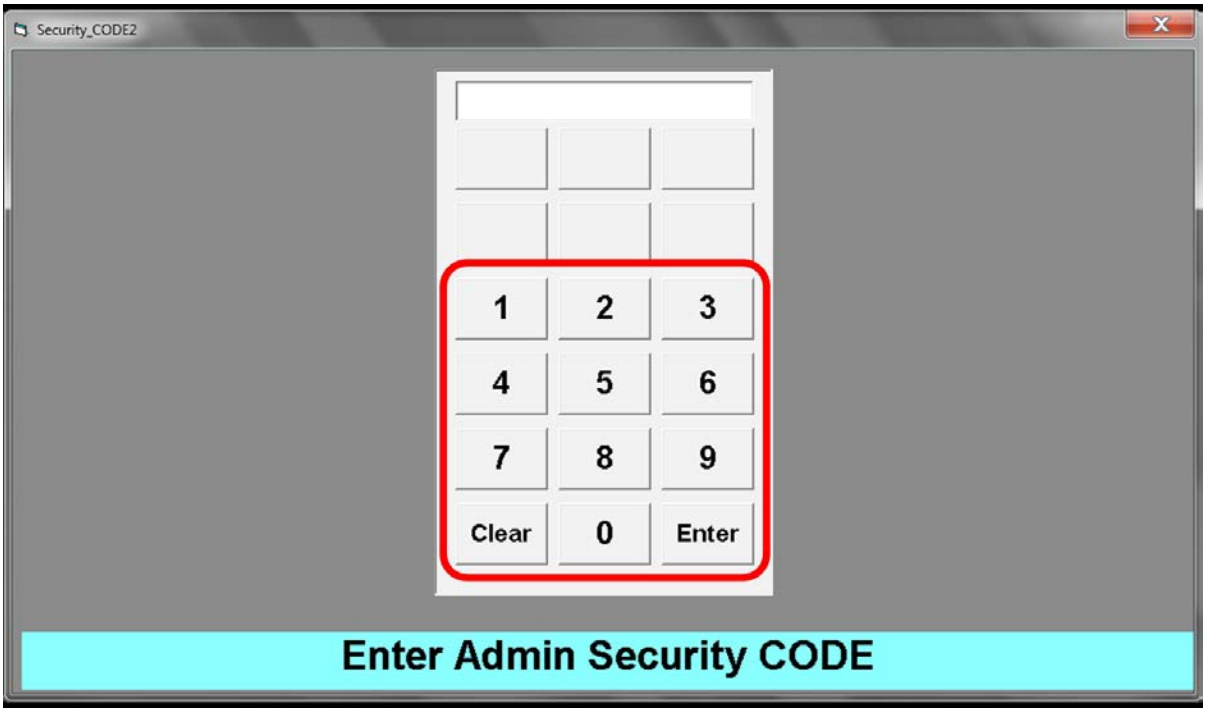
Step 7

Begin at the main screen, and click on the *"Tools"* button.



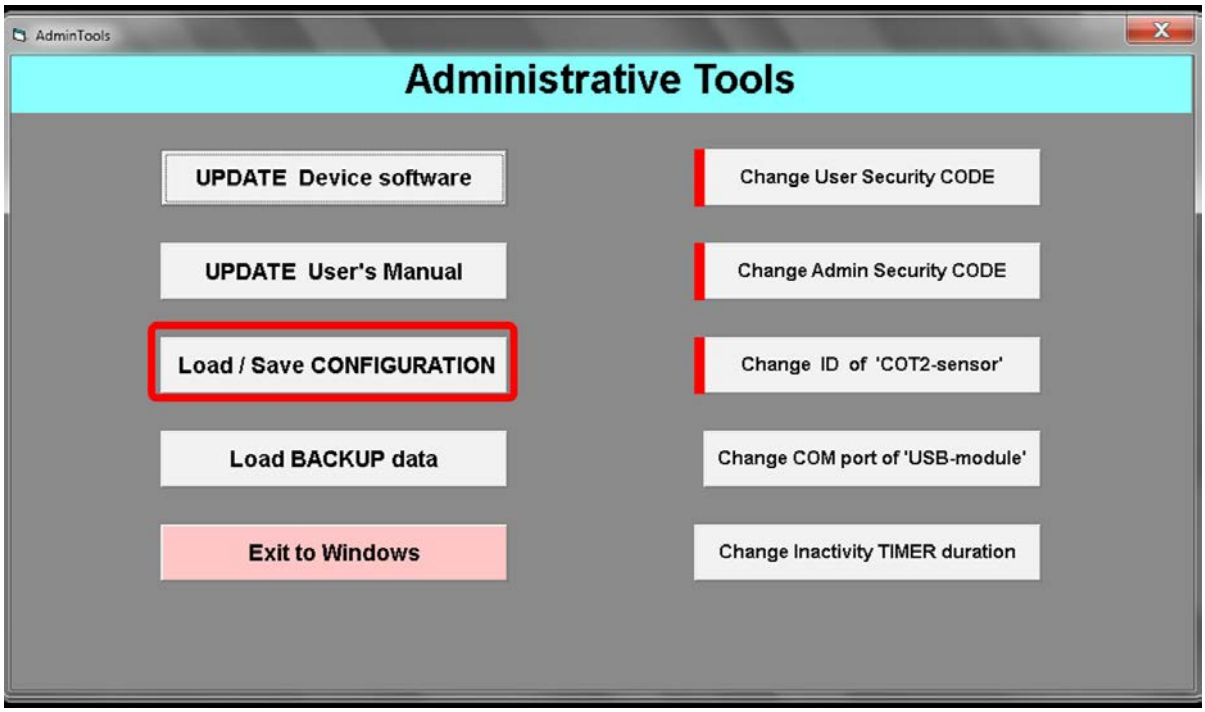
Step 8

In the *"Tools"* menu, the user must click on *"Administrative Tools"* button.



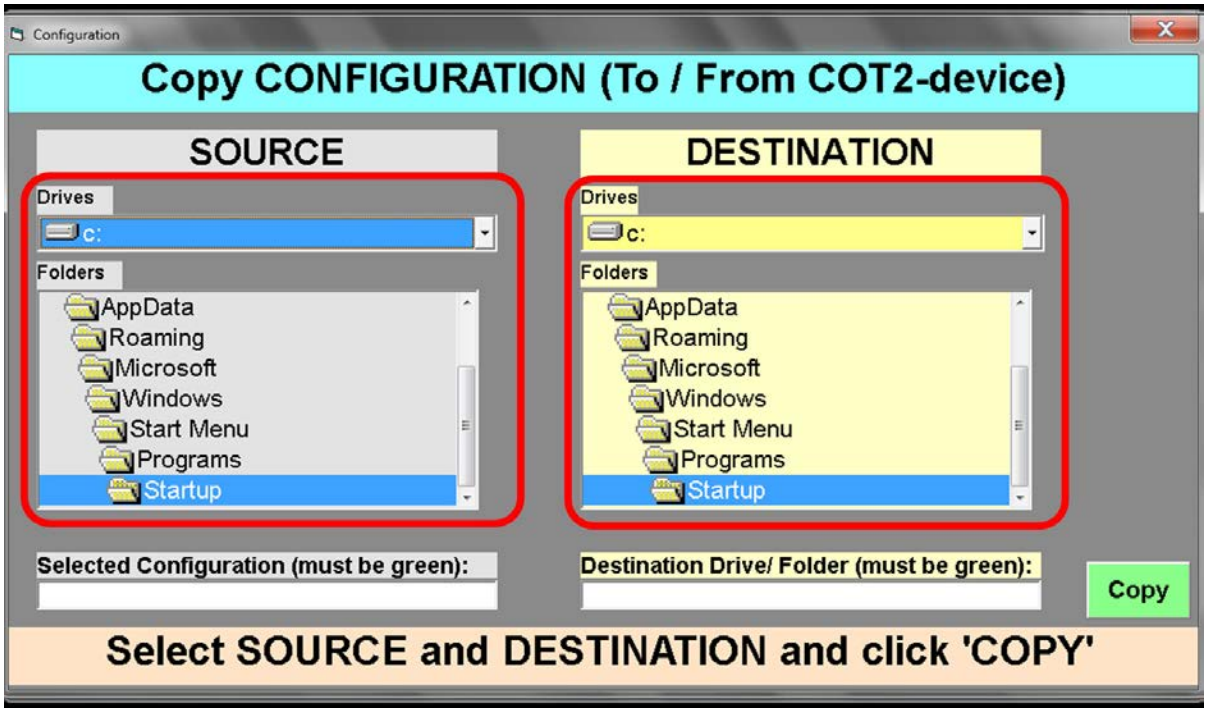
Step 9

To gain access to the *"Administrative Tools"* menu, the admin code must be entered. If the admin code has not been changed since the unit was purchased, then the code is by default *90710*. If this code does not work, please contact MID for a temporary master code.



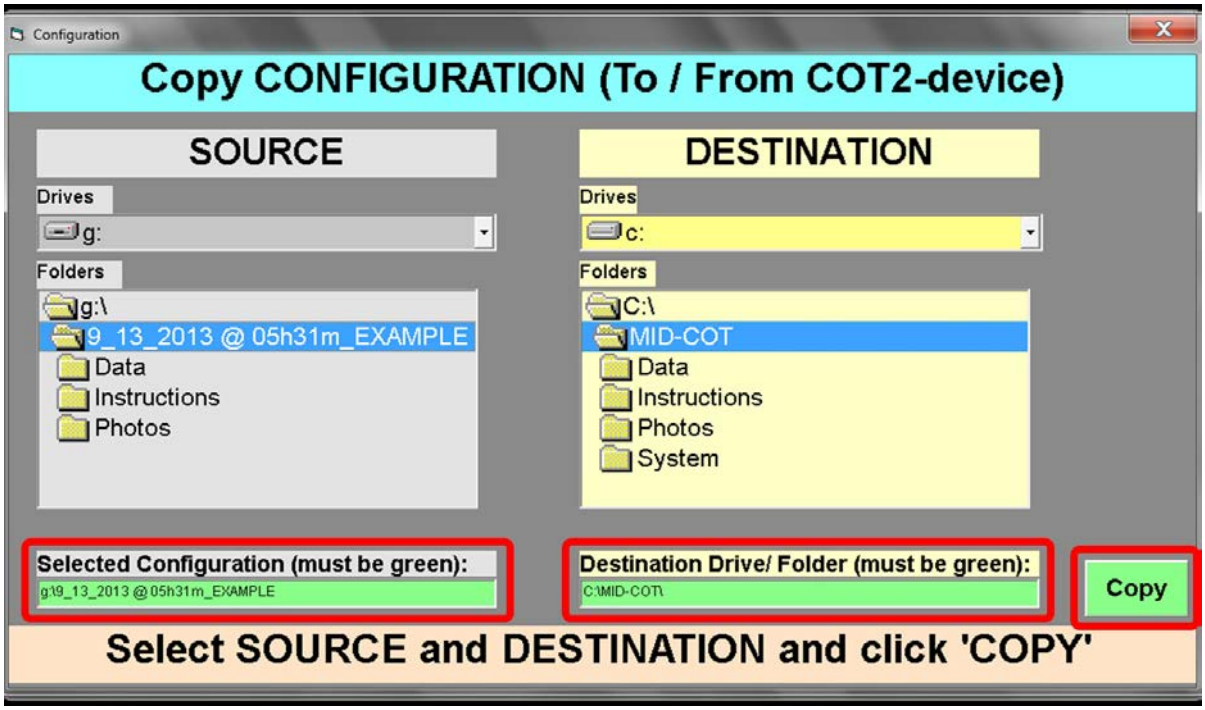
Step 10

Once the user is in the *"Administrative Tools"* menu, click on the *"Load / Save CONFIGURATION"* button.



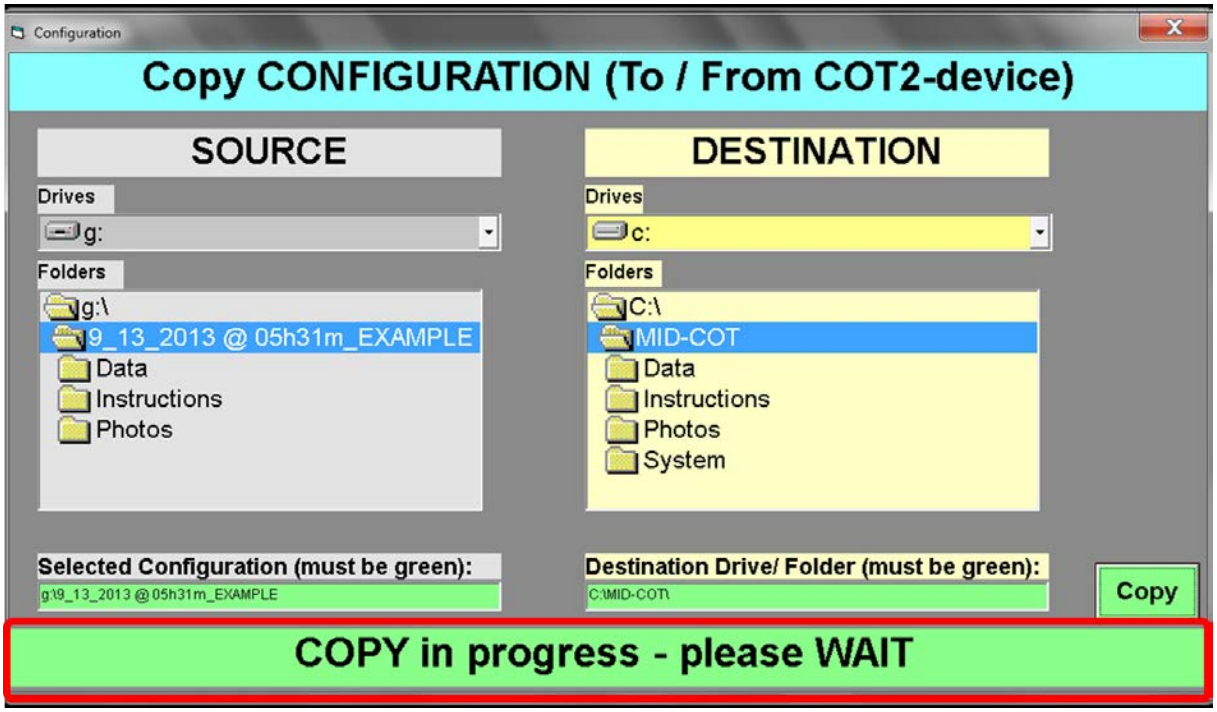
Step 11

The *"Copy CONFIGURATION (To / From COT2-device)"* menu is similar to what is on the COT_CONFIG program in the previous chapter. We will be using the *"Source" and "Destination"* menu to select the files we would like to transfer to the Changeover tool.



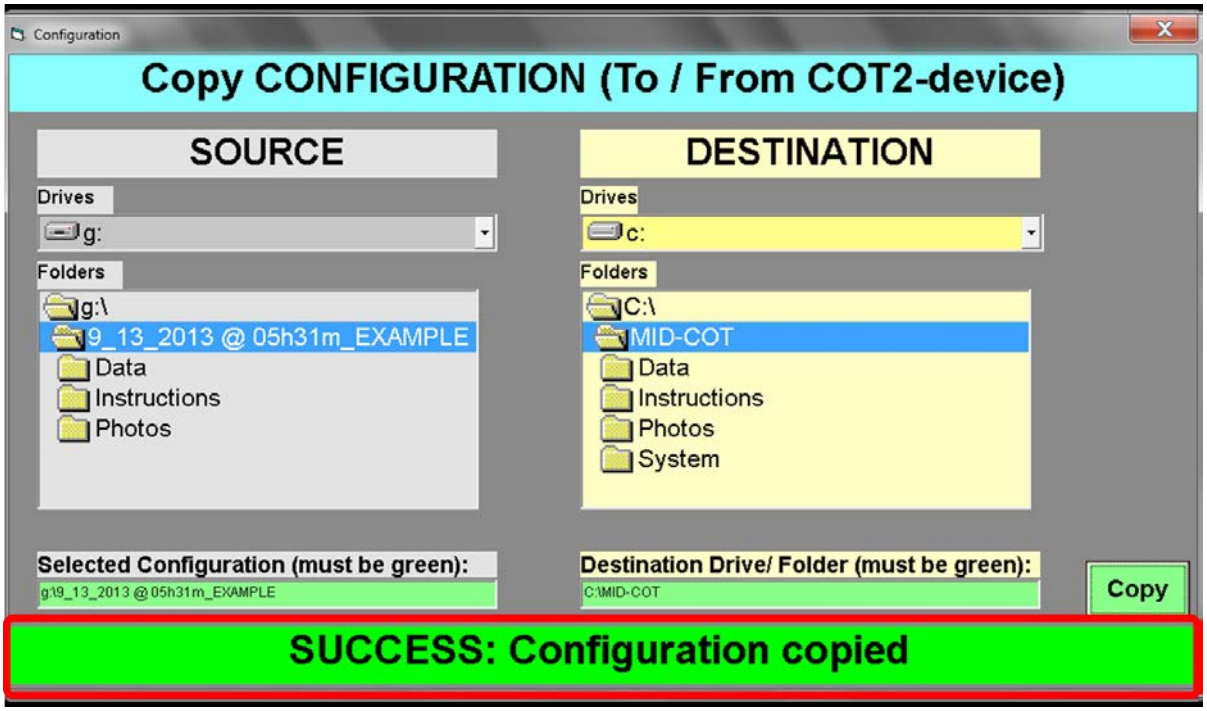
Step 12

In the *"SOURCE"* menu, select the removable media AND double click the configuration which will be transferred. In the *"DESTINATION"* menu, select the drive as *c:* AND double click on the *MID-COT* folder. Once it is verified that both are correct, click the *"COPY"* button.



Step 13

The banner on the bottom will show that copying is in progress. Please wait until the banner has confirmed transfer.



Step 14

Once the banner has confirmed that transfer is complete, the user will be returned to the *"Administrative Tools"* menu.

_ System Operation

3.1

_ Power up/down COT Controller and Sensor

This section will explain how to power on and off both the COT Controller and COT sensor.

Powering up/down COT Controller:

Step 1

Open the Chaneover Tool case.

Step 2

The power button is located on the top left corner of the lid. Press the power switch to power on the COT Controller.

Step 3

The system may take up to a minute to boot.

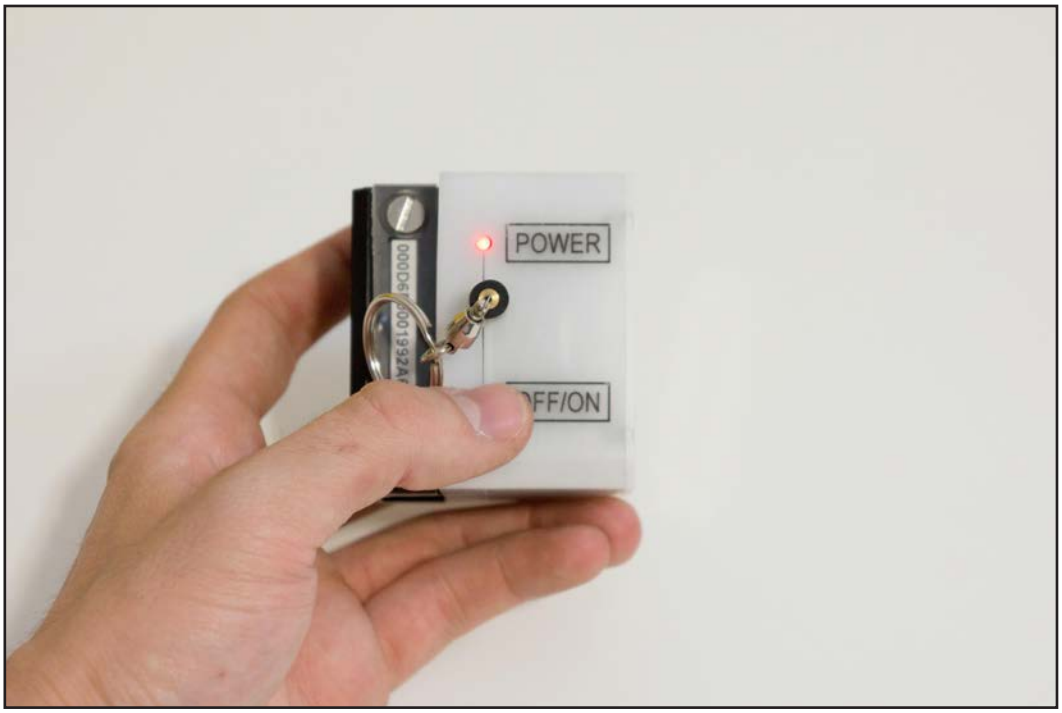
Step 4

The COT Controller has fully booted once the main screen is displayed. To power down COT Controller, press and hold the power button until the unit powers down.

Powering up COT sensor:

Step 1

To power on the sensor, press and release the OFF/ON button.



Step 2

Make sure the red LED turns on and remains on. The red LED will remain on as long as the COT sensor is on.

3.2
_ How to read LED indicators on COT sensor

This section will explain the functionality of the LED indicators located on the COT sensor.

The COT sensor has 4 LED indicators to provide guidance to the operator. This allows for adjustments to be performed without the visual aid of the COT Tablet PC screen.

The COT sensor has a “power” LED indicator. This indicator is lit when the COT sensor is powered on.

The COT sensor may require up to 10 seconds to establish communication with the COT Tablet PC.

The COT sensor has three LED indicators. These LED indicators consist of a “minus”, a “plus” and a “done” LED.

These LEDs have certain flashing sequences to help guide the operator. Their flashing sequences are detailed on pg65.

Top LEDs explained

LED indicator	Flashing Order
“minus”	SOLID “minus” LED indicates to decrease the distance to achieve target position. FLASHING “minus” LED indicates to slowly decrease the distance to achieve target position.
“plus”	SOLID “plus” LED indicates to increase the distance to achieve target position. FLASHING “plus” LED indicates to slowly increase the distance to achieve target position.
“minus” AND “plus”	SOLID “minus” and “plus” LED’s indicate that target position has been reached. After 5 seconds at target position, “DONE” LED indicator will start to flash. FLASHING “minus” and “plus” LED’s indicate two possibilities: - COT sensor is not placed at any bracket - Product has not been selected ALTERNATE FLASHING of “minus” and “plus” LED’s indicate that COT sensor is at incorrect bracket (occurs only if adjustment sequence is set to strict ascending order: for Machine #1 adjustment sequence must be Bracket #1, Bracket #2. Bracket #3, etc.)
“DONE”	SOLID “DONE” LED indicates entire machine adjustment is completed successfully FLASHING “DONE” LED indicates a single bracket adjustment has been complete.

3.3
_ Charging the COT Controller

This section will explain how to charge the COT Controller with the provided cable. Charging is recommended after every 4 hours of operation.

Charging the COT Controller:

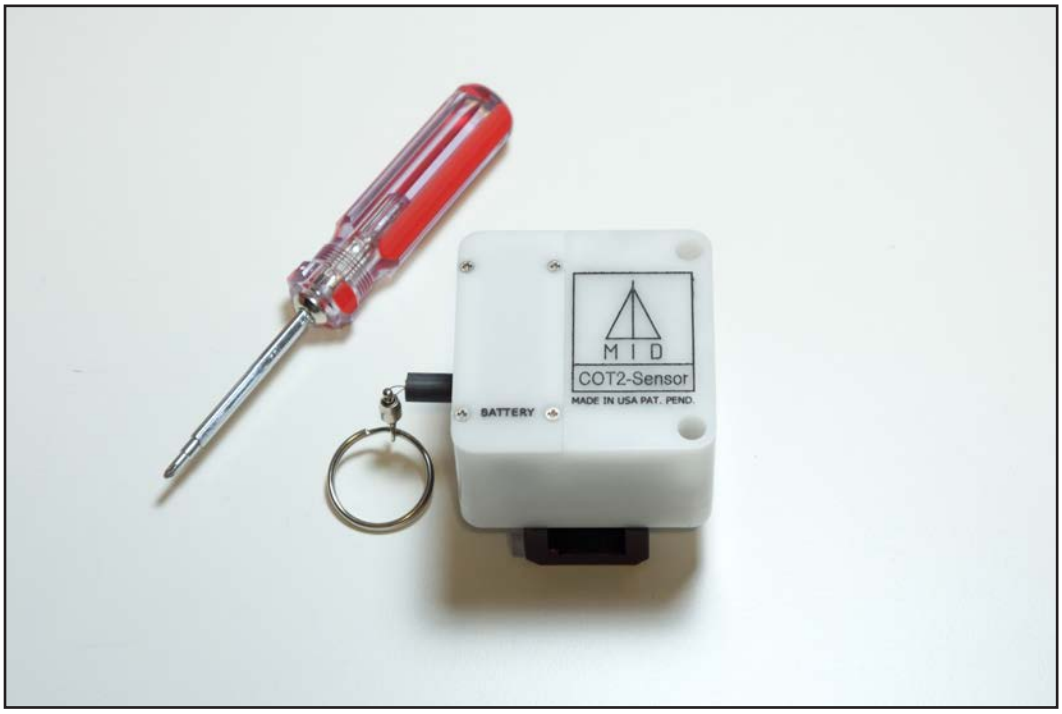
Step 1

Close the Changeover Tool case, and rotate the case to view the side. Plug the cord into the power brick located on the side. Then plug the two prong plug into an outlet.

3.4
_ How to replace COT sensor battery

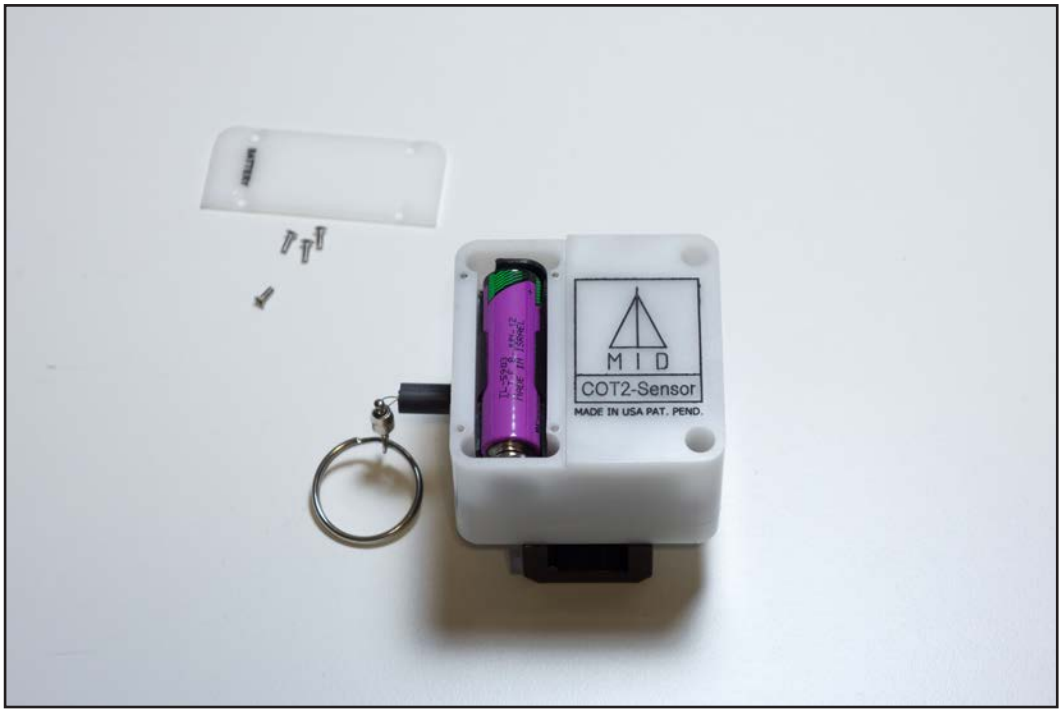
This section will explain how to replace the COT sensor’s battery.

Replacing the COT sensor battery:



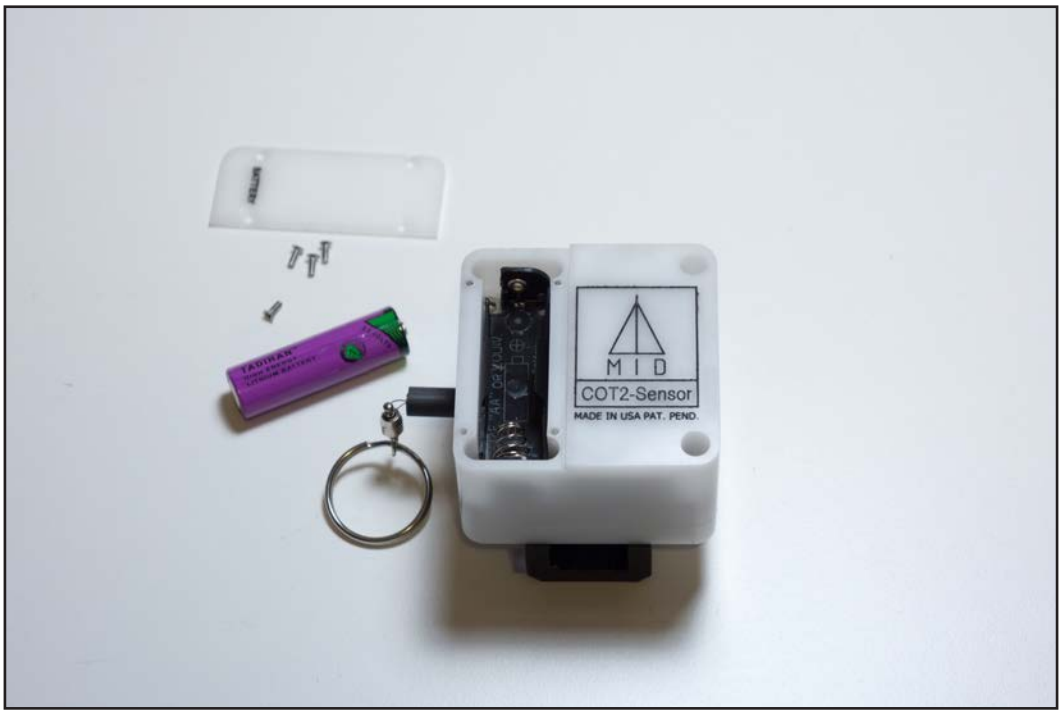
Step 1

Unscrew the 4 Phillips screws on the battery cover.



Step 2

Remove the cover.



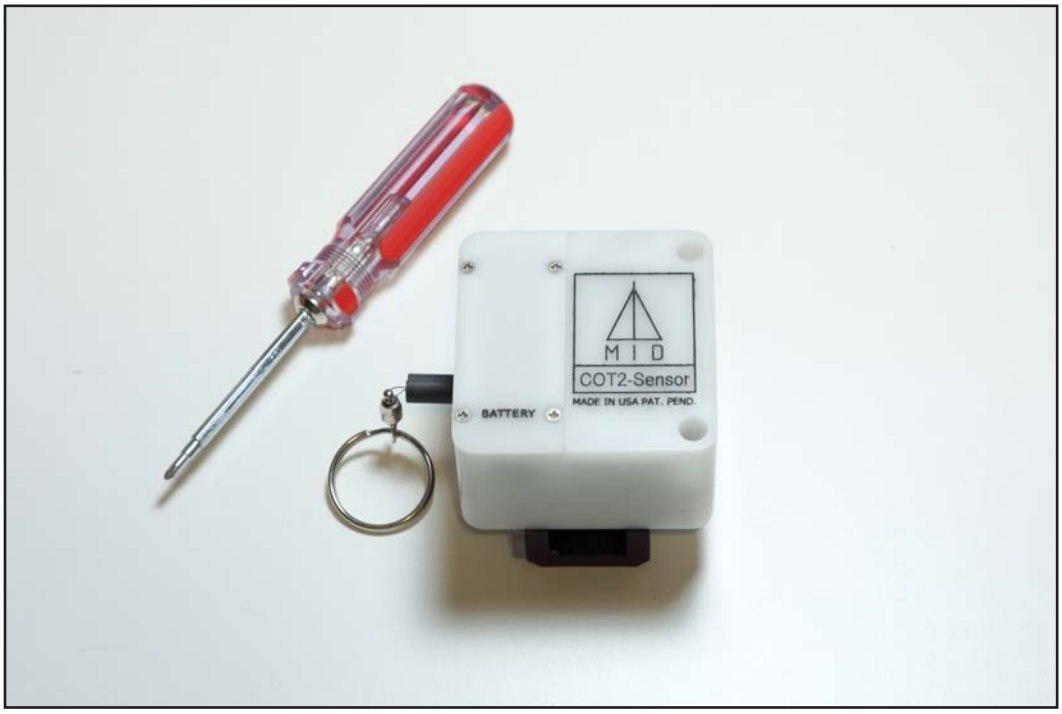
Step 3

Remove battery, and replace with a *3.6V Lithium* battery.

3.5
_ How to replace COT sensor potentiometer

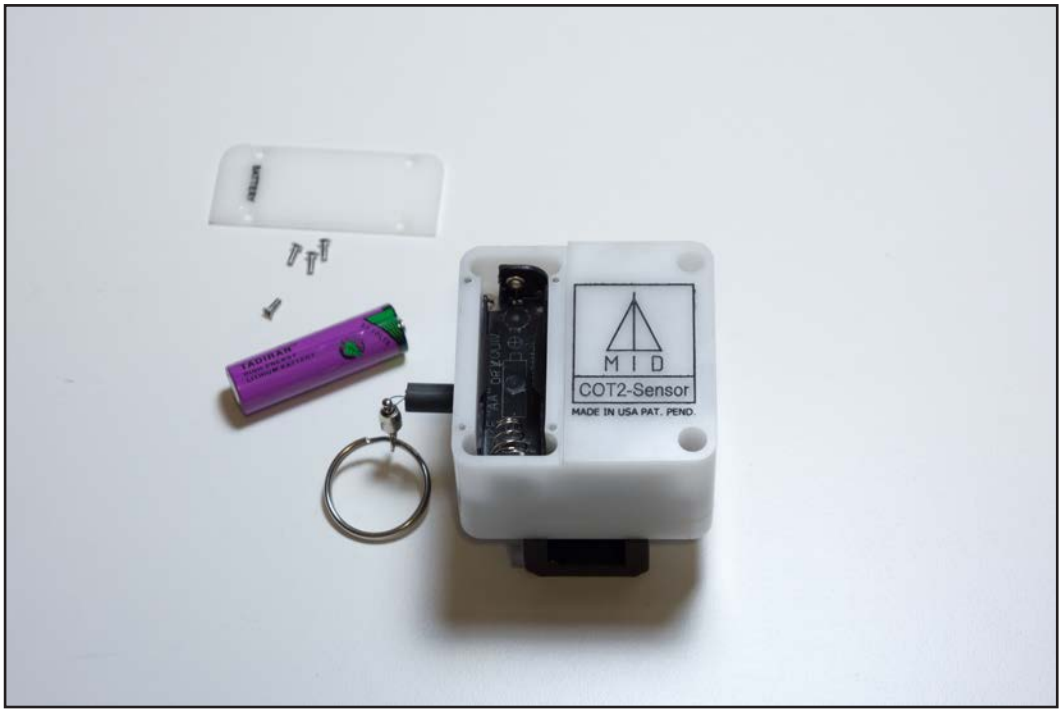
This section will explain how to replace the COT sensor’s potentiometer.

Replacing COT sensor potentiometer:



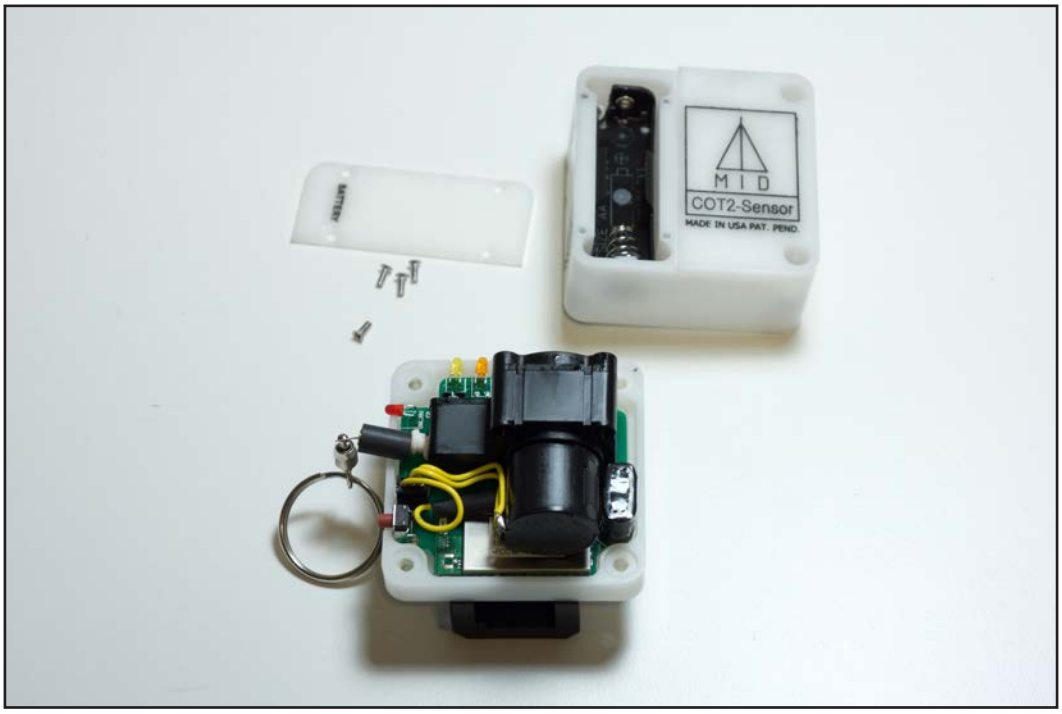
Step 1

Unscrew the 4 Phillips screws on the battery cover.



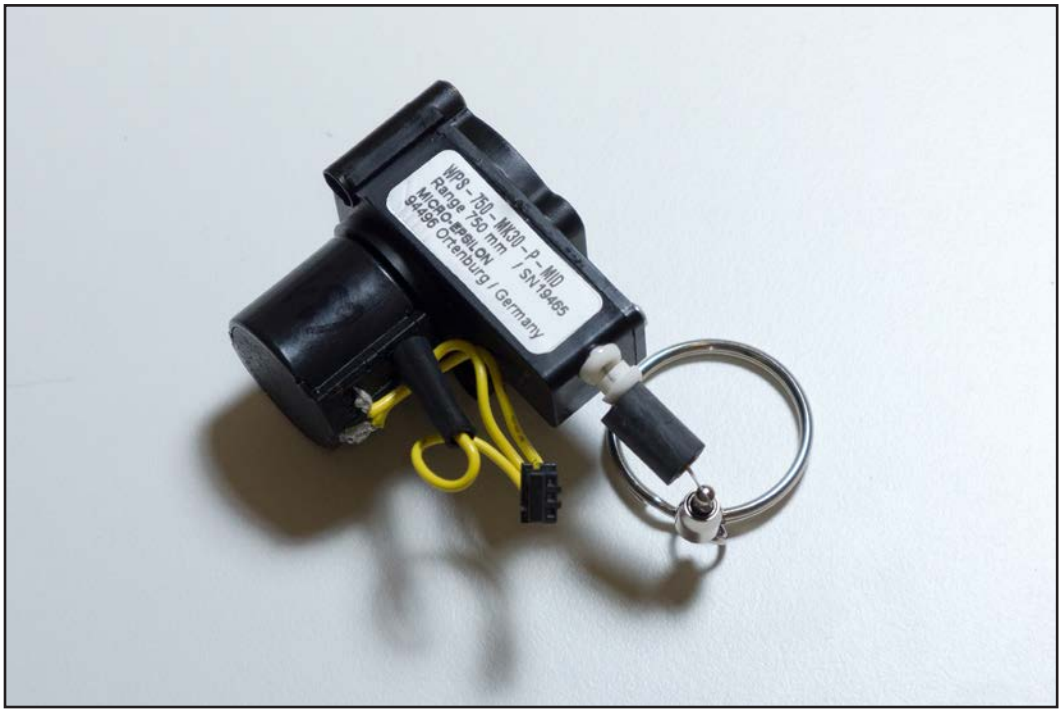
Step 2

Remove battery cover and battery. Use a *9/64"* hex wrench, and unscrew the 4 enclosure screws.



Step 3

Remove top half of the enclosure to gain access to PCB and potentiometer.



Step 2

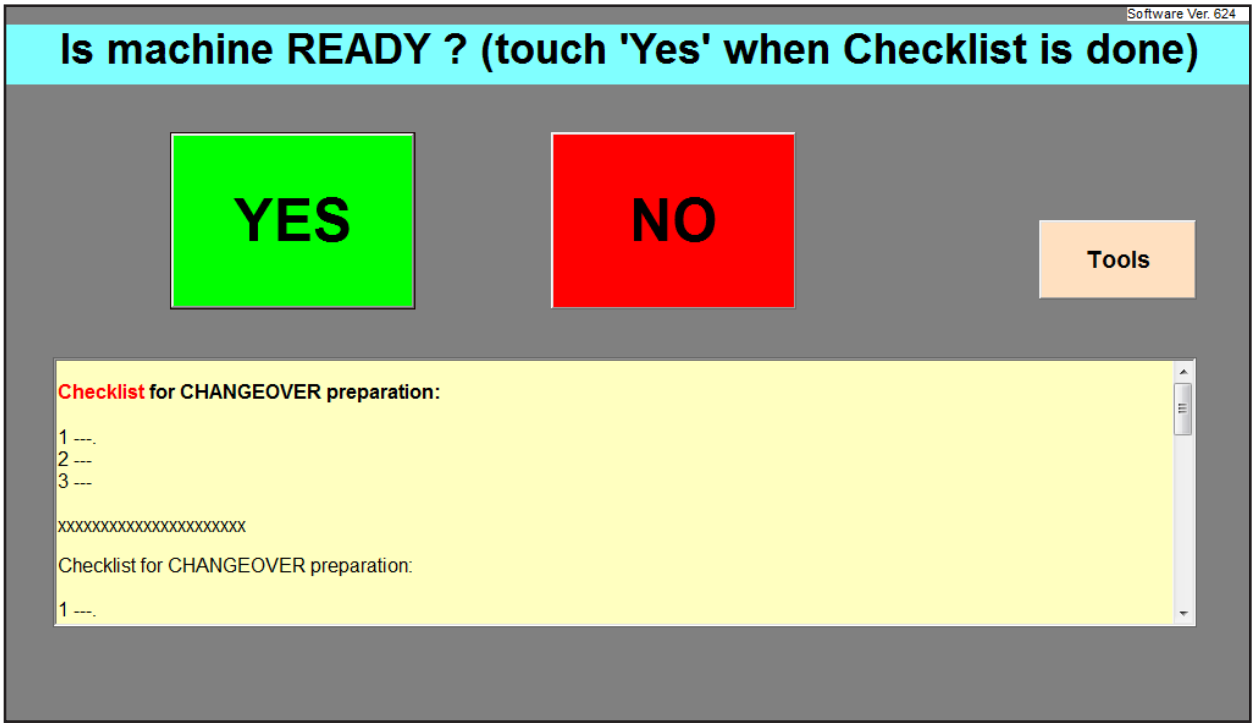
Unplug potentiometer and replace.

Model: Micro-Epsilon WPS-750-MK30-P-MID

_ Software

4.1
_ “Is machine READY” screen explained

This section will explain the first screen an operator will see once the COT controller has booted.



When the COT controller has powered up completely, the operator is greeted with the *"Is machine READY?"* menu. The *"Is machine READY?"* menu is used to make sure that the machine has been prepared for a changeover. A checklist is viewable at this menu.

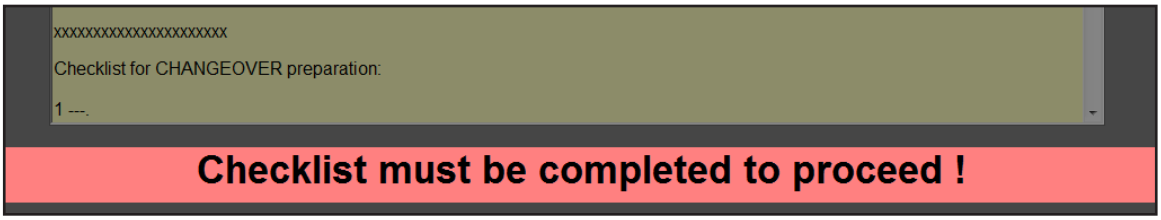
Buttons explained:

YES

Once the Checklist has been completed, the *"YES"* button should be pressed. Pressing the *"YES"* button will open the changeover menu (page 159).

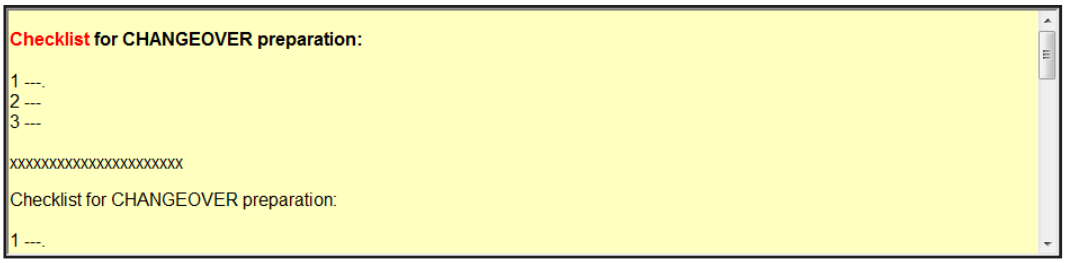
NO

Pressing the *"NO"* button will prompt a message telling the operator to first complete the checklist in order to proceed to the changeover menu.



Tools

The *"Tools"* button will open a menu with options for both the operator and the administrator. Please see page 81 for detailed overview of *"Tools"* menu.



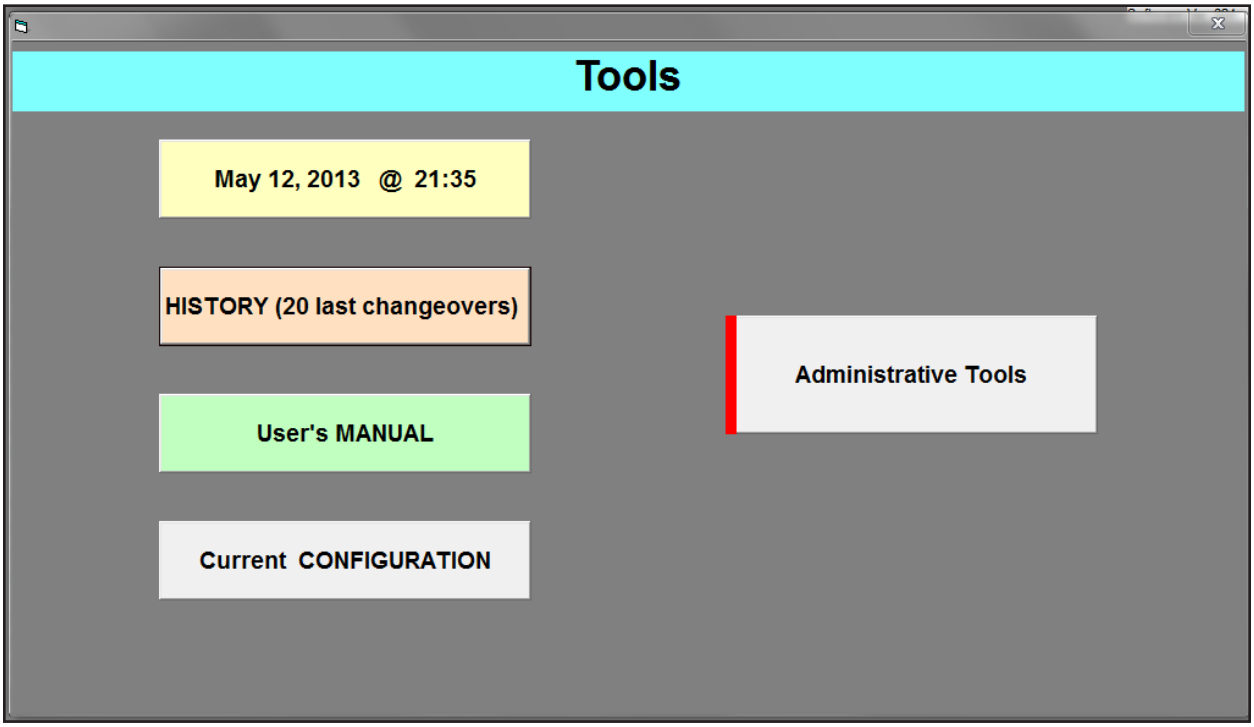
The checklist text box is used by operators to ensure they have properly prepared the machine(s) for a changeover.

The text banner displays messages which help guide an operator to the changeover screen.

The current software version is helpful for making sure system is up to date.

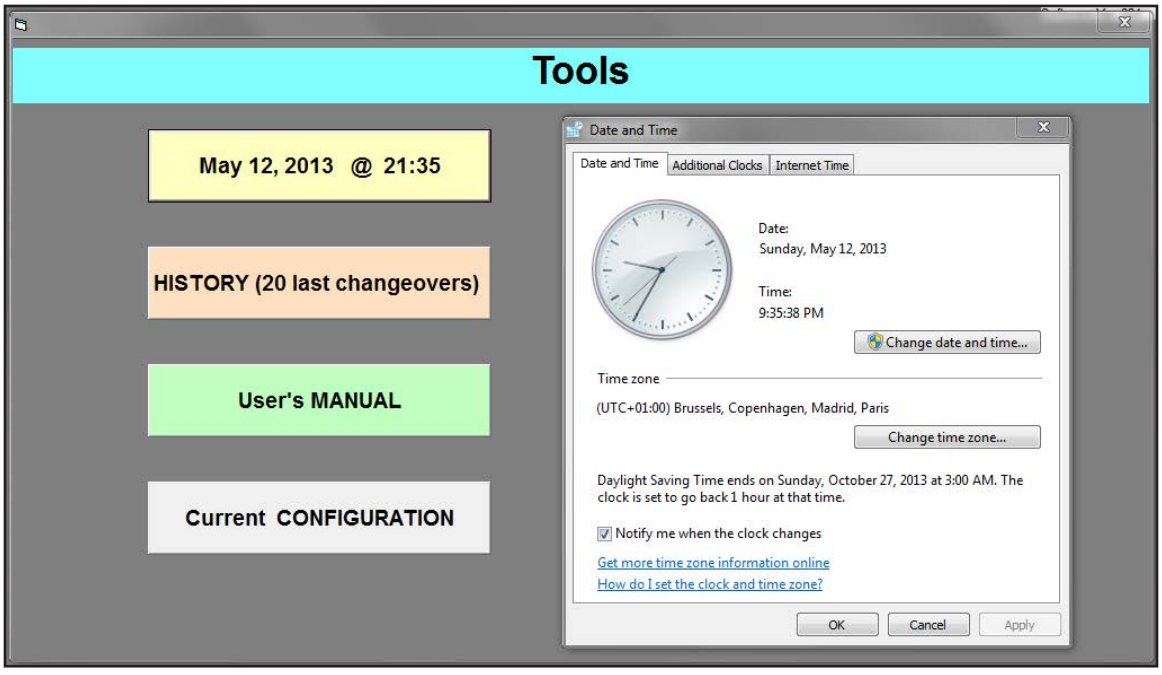
4.2
_ Tools menu explained

This section will explain the tools menu located on the welcome screen. The tools menu has many options which are helpful for operators and administrators alike.



Buttons explained:

The *"Date and Time"* menu is used to change the COT controller's date and time as well as time zone. This is necessary in order to have correct date and time on backup files which are created at the end of each successful changeover.

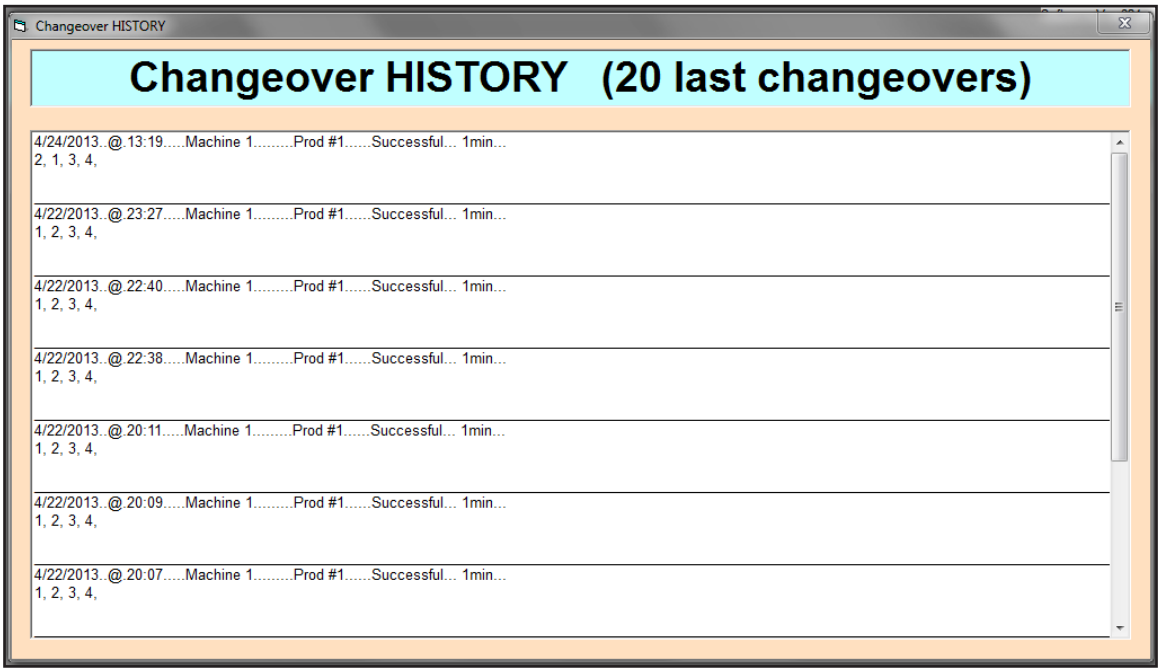


HISTORY (20 last changeovers)

The *"History"* button is used to view the last twenty changeover operations performed. This list of changeovers is descending (newest to oldest). This list contains all changeovers successfully completed or not.

The information provided for each changeover is as follows:

- Date and time
- Machine name
- Desired product adjustment
- Successful or not successful completion
- Duration of the changeover



User's MANUAL

The *"User's MANUAL"* button is where operators and administrators can view this manual from the COT controller.

Current CONFIGURATION

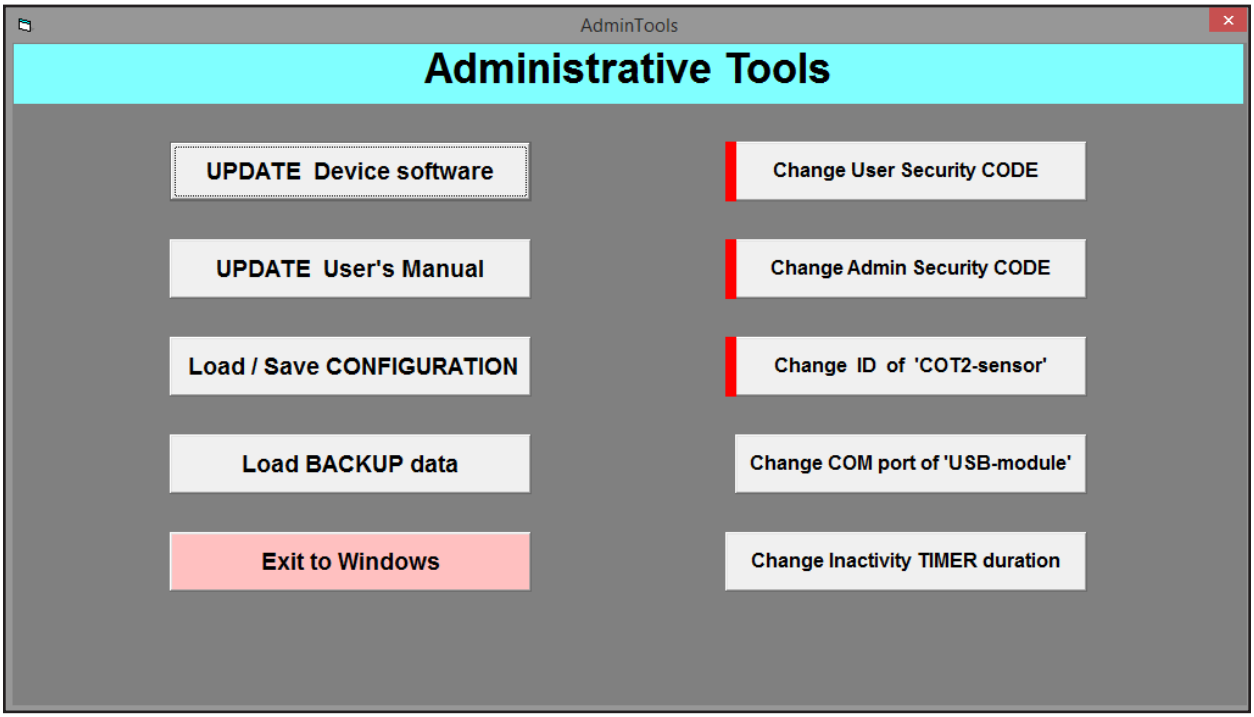
The *"Current CONFIGURATION"* button is used to view the current installed system configuration on the COT Controller.

Administrative Tools

The *"Administrative Tools"* button is used by the administrator to make system changes. The *"Administrative Tools"* menu is explained in more detail on page 145.

4.3
_ Administrative Tools menu explained

This section will explain the *“Administrative Tools”* menu located in the tools menu. The *“Administrative Tools”* menu has many options which are helpful for administrators.

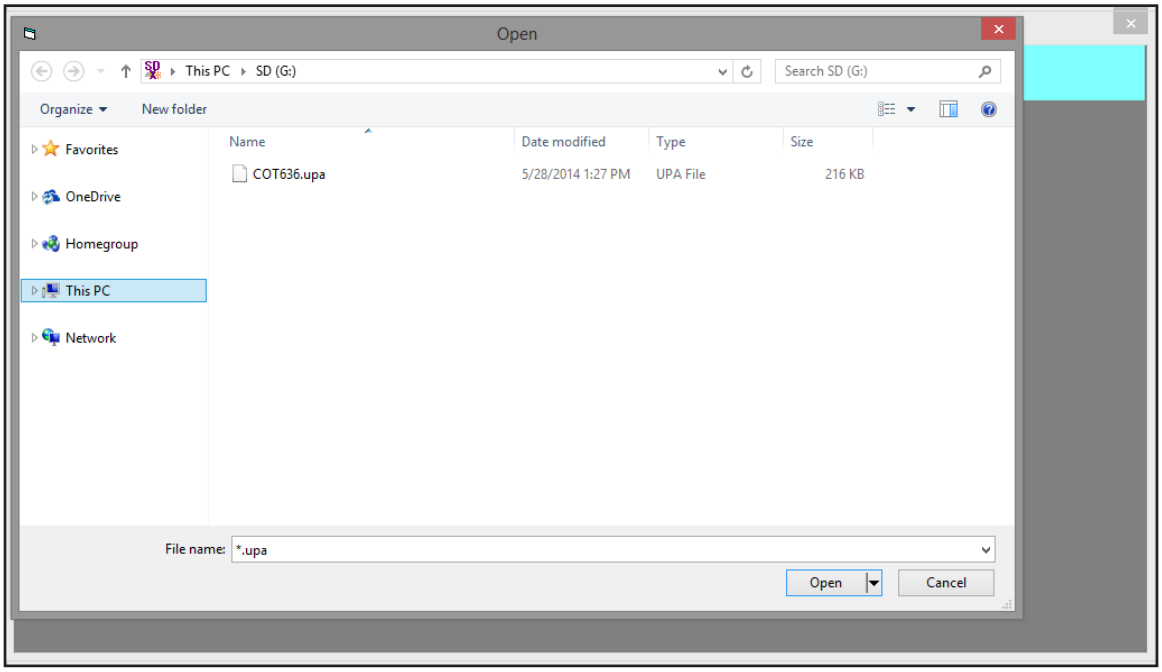


Buttons explained:

UPDATE Device software

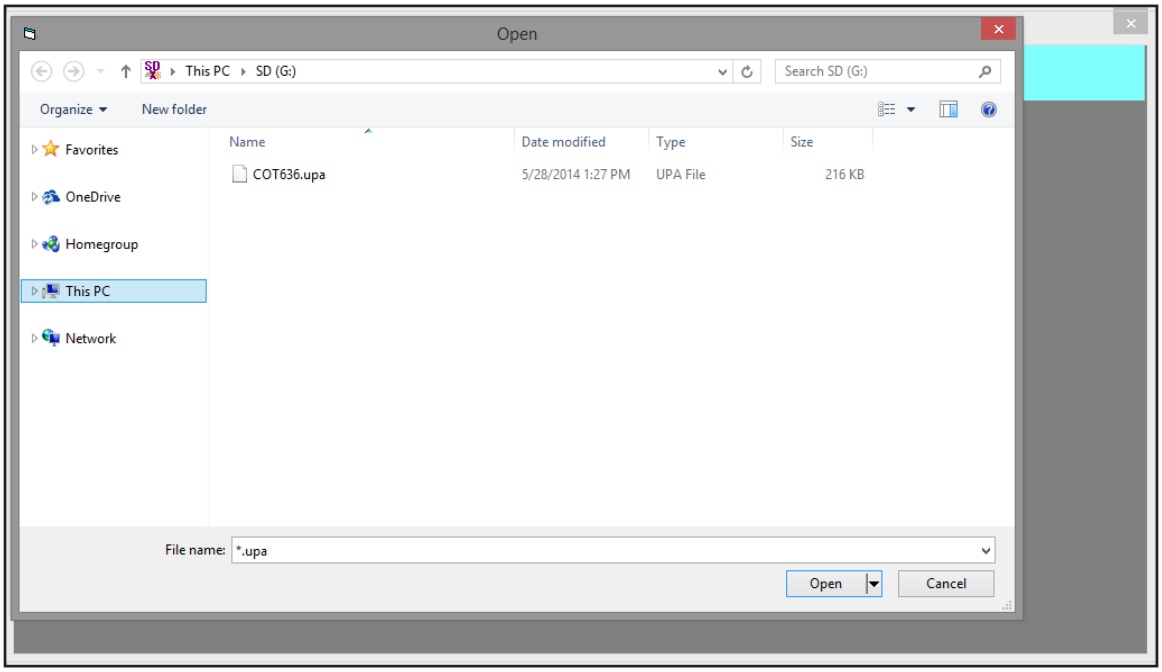
The *"UPDATE Device Software"* button is used to update software. The update .UPA file must be loaded onto the computer through the SD card residing in the SD card slot. Updates can be found online at the MID WEB-site: **www.oeeincrease.com**

When the user clicks on the *"UPDATE Device Software"* button, a file viewer opens. Select the desired .UPA and click the *"OPEN"* button to confirm selection. After a successful update, the COT controller will restart.



UPDATE User's Manual

The *"UPDATE User's Manual"* button is used to update the user's manual. The update .ppsx file must be loaded onto the computer through the SD card residing in the SD card slot. Updates can be found online at the MID WEB-site: **www.oeeincrease.com**. When the user clicks on *"UPDATE User's Manual"* button, a file viewer is displayed. Select the .ppsx file and click *"OPEN"* to confirm selection.

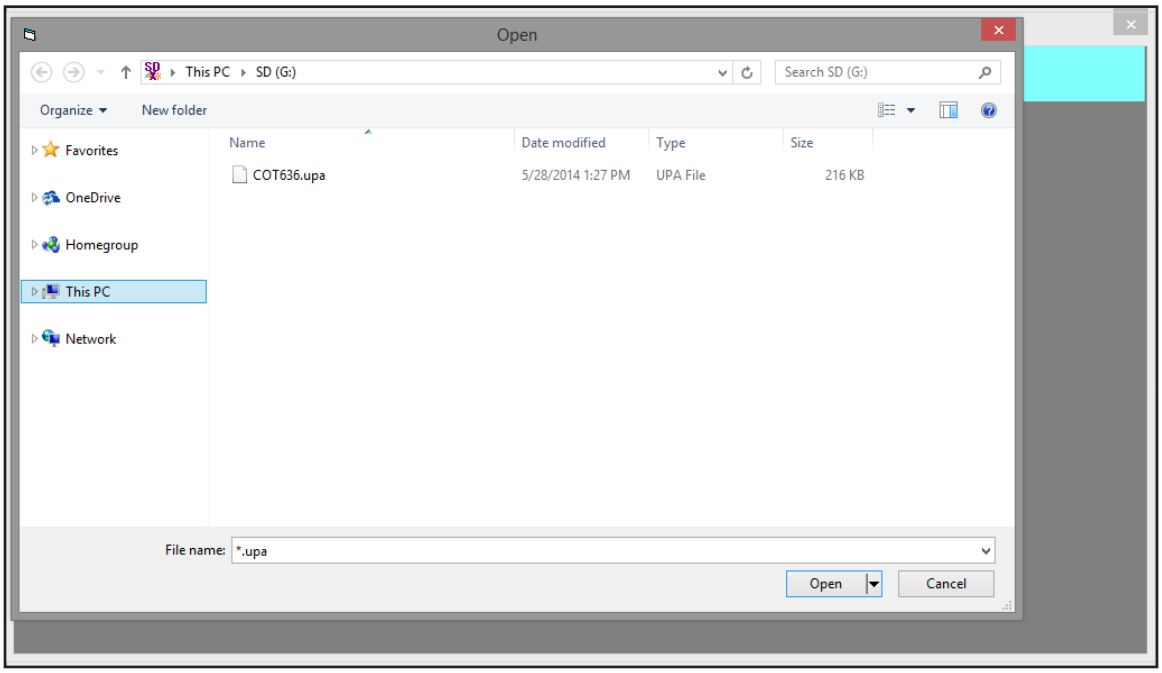


Load / Save CONFIGURATION

The *"Load / Save CONFIGURATION"* button is used to load and save current computer configuration onto an SD card. Please refer to page 121 for procedure.

Load BACKUP data

The *"Load BACKUP data"* is used to restore backup data stored on the SD card. After each successful changeover procedure, an Excel backup file is saved to the computers SD card. When clicked, the user must select the desired backup file and click *"OPEN"*.



Exit to Windows

The *"Exit to Windows"* button is used to exit COT program and gain access to the Windows environment. This is used only by admins to make system changes on the operating system level.

Change User Security CODE

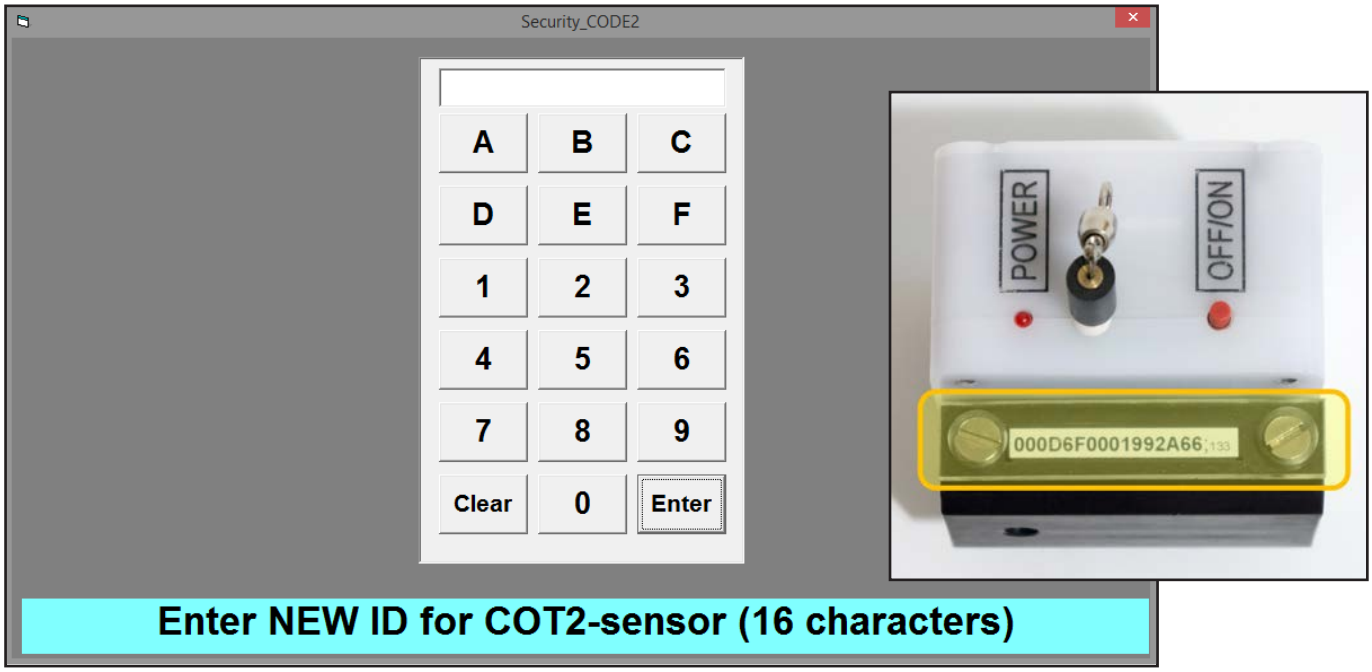
The *"Change User Security CODE"* is used by admins to change the security code used by non-admins. This code is entered by non-admins when the target position is being set during the changeover portion of the program.

Change Admin Security CODE

The *"Change Admin Security CODE"* is used by admins to change the security code used by admins. This code is required before any system setting is changed.

Change ID of 'COT2-sensor'

The *"Change ID of 'COT-sensor'"* button is used to update the ID of the COT sensor currently being used by the Changeover Tool. This is used when the COT sensor's LED do not work or when replacing the current COT sensor with a new COT sensor. Once clicked on, the admin is asked for the admin password and then is able to enter in the COT sensor ID. The sensor ID is located on every COT sensor.

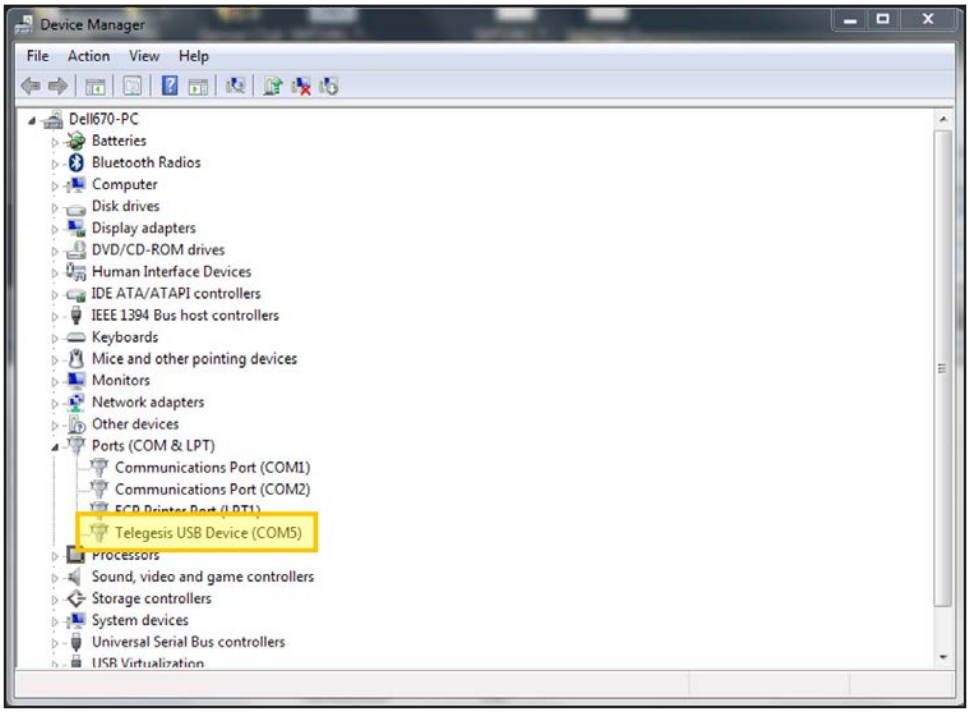


Change COM port of 'USB-module'

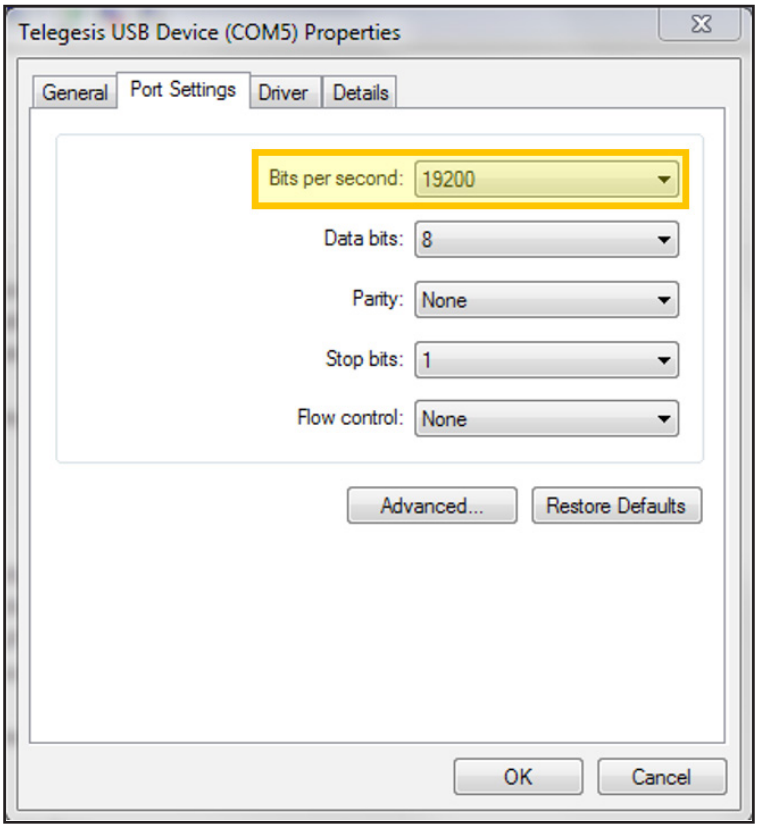
The *"Change COM port of USB module"* is used to change the COM port of the USB module which is necessary for the computer to communicate to the COT sensor. This is used when the COT sensor has been replaced with a different sensor.

Continue to next page for instructions on setting the USB module COM port.

Step 1.
Search for *"Ports (COM & LPT)"* and expand the menu. Double click on *"Telegesis USB Device (COM#)"*.

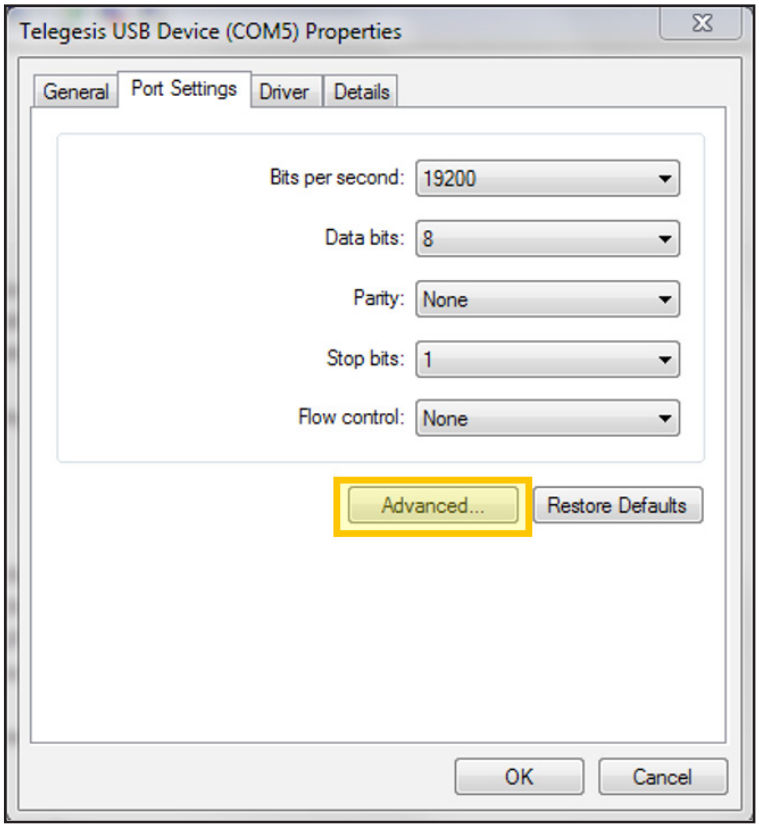


Step 2.
Go to the *"Port Settings"* tab and set the *"Bits per second"* to 19200.



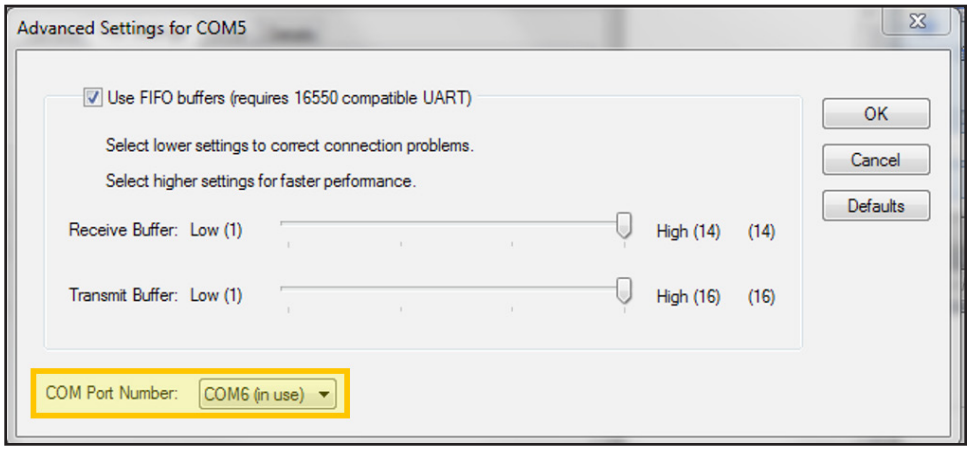
Step 3

Click on the *"Advanced..."* button.



Step 4.

Change *"COM Port number: "* to COM6.

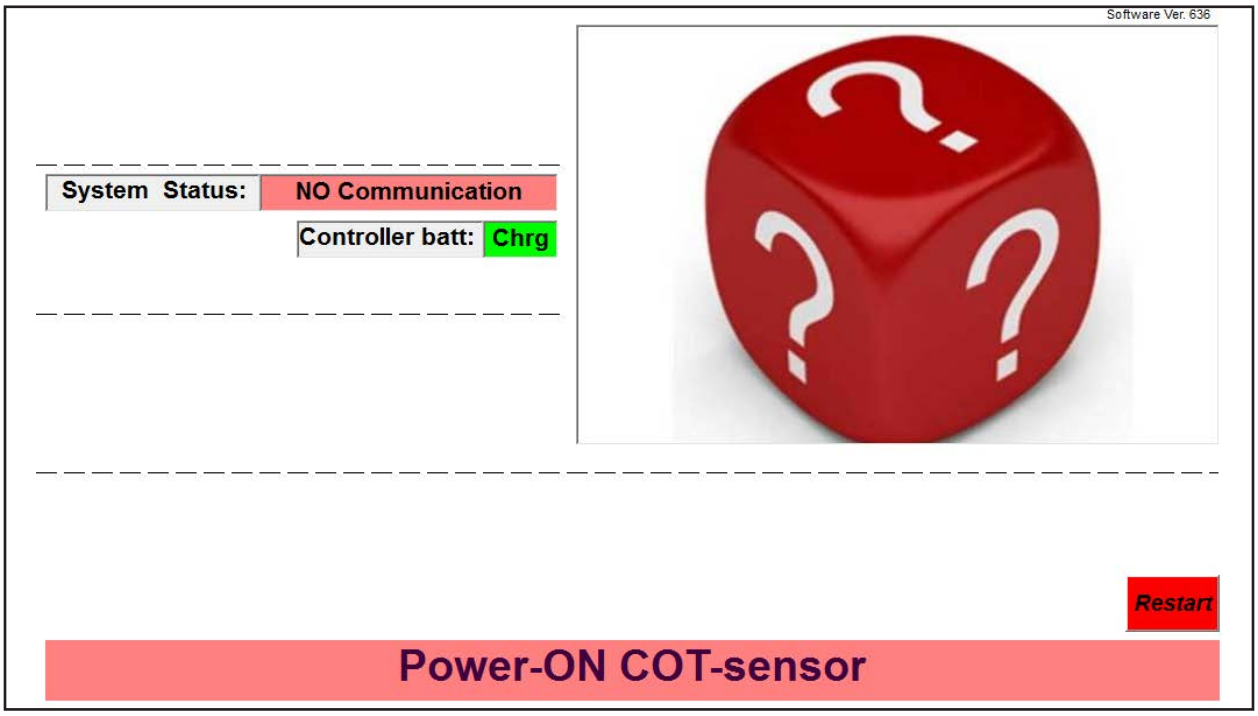


Change Inactivity TIMER duration

The *"Change INACTIVITY timer"* button is used to change the idle time before the COT sensor turns off to preserve battery. The default is 60 seconds but can be any length of time.

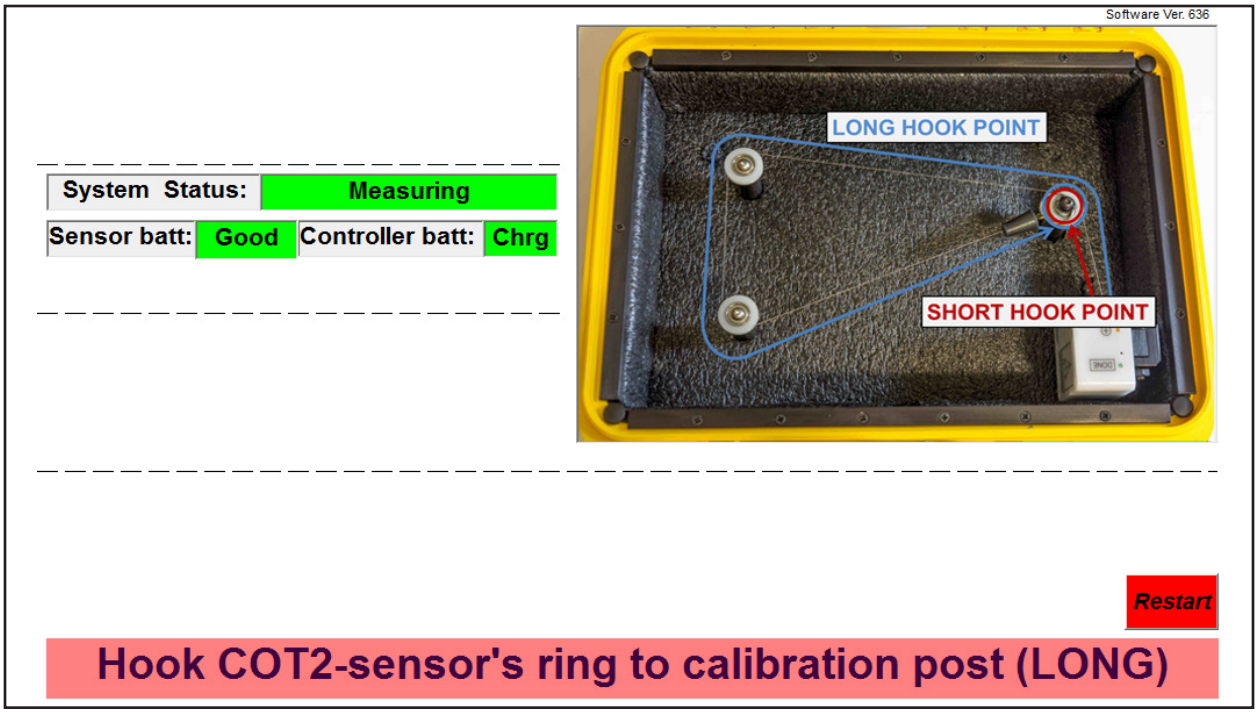
4.4
_ Calibration / Machine Verification Explained

This section will guide the user through the steps to complete a machine changeover with the Changeover Tool.



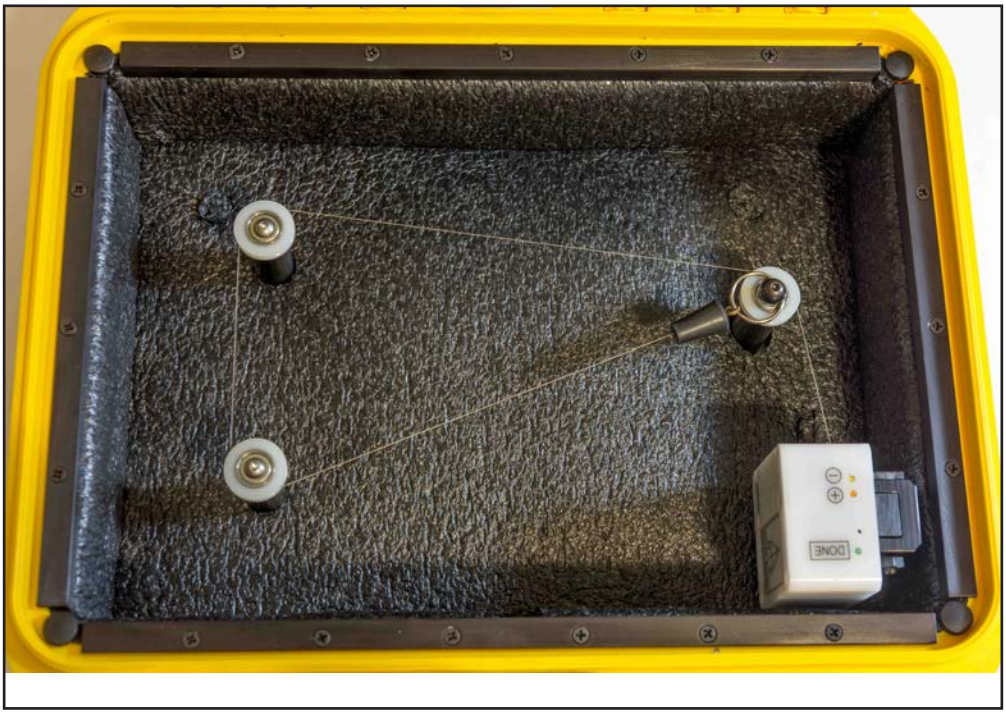
Step 1

After the user has clicked on the *"YES"* button in the main menu, the software will open the changeover menu. At this point, the operator will be instructed to power on the COT sensor.



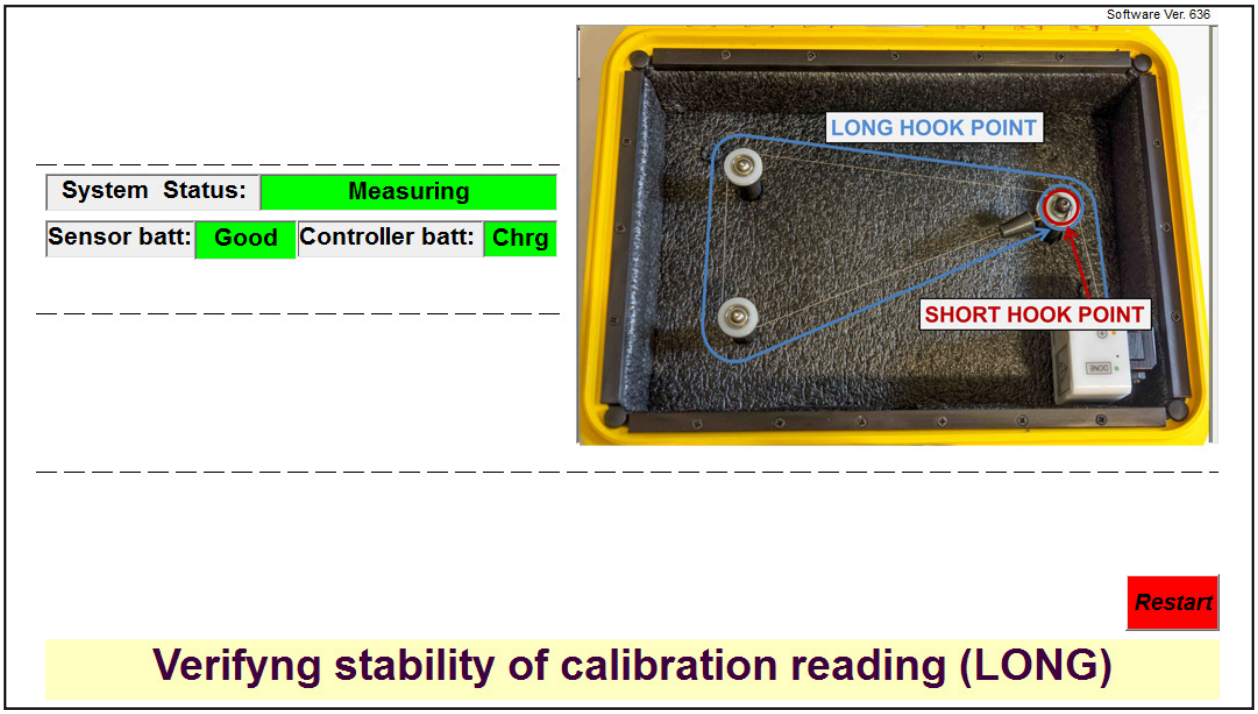
Step 2

Make sure the COT sensor is on the calibration bracket. If the COT sensor is on the calibration bracket, the operator will be instructed to hook the ring to the long calibration post.



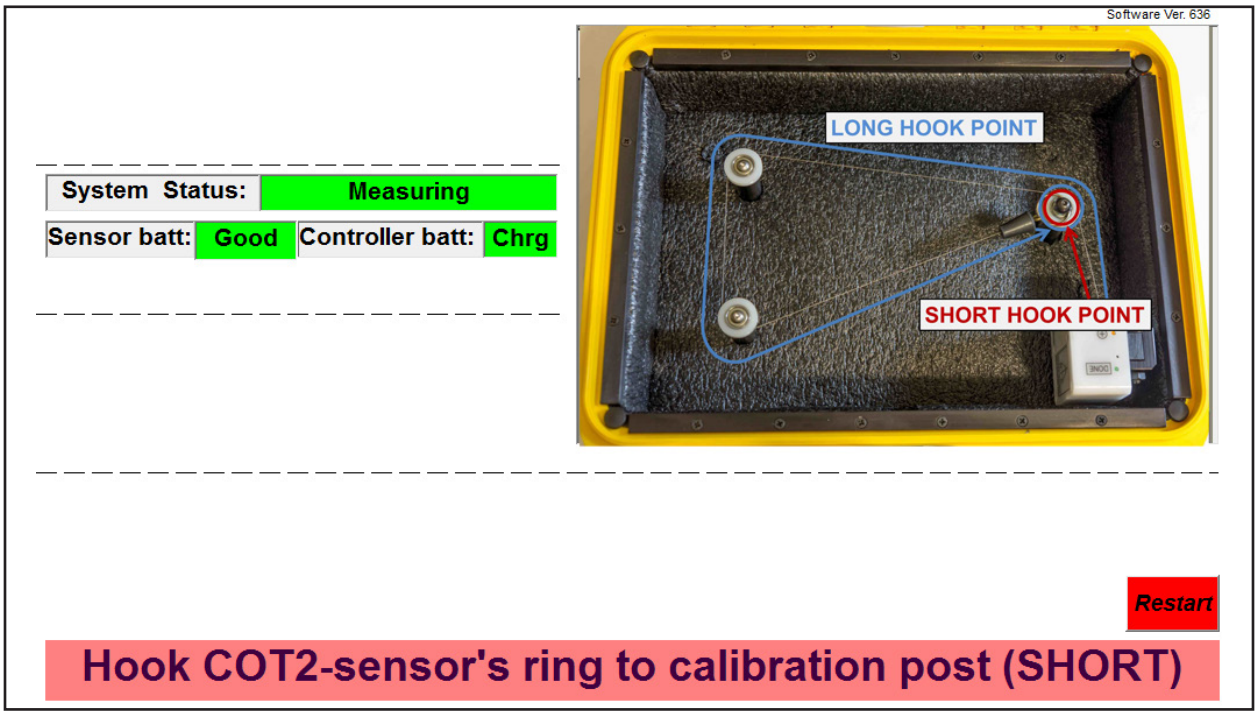
Make sure to pull the COT-sensor's string from the metal ring. Carefully pull and guide the cable through the first and second pulley. At the end, hook the ring on the post located in the bottom right corner.

!!! MAINTAIN FIRM GRIP OF RING TO AVOID DAMAGE !!!



Step 3

Once the operator has hooked the COT-sensor's ring to the long calibration post, the system will begin calibration. Wait for system to verify stability of long calibration post.

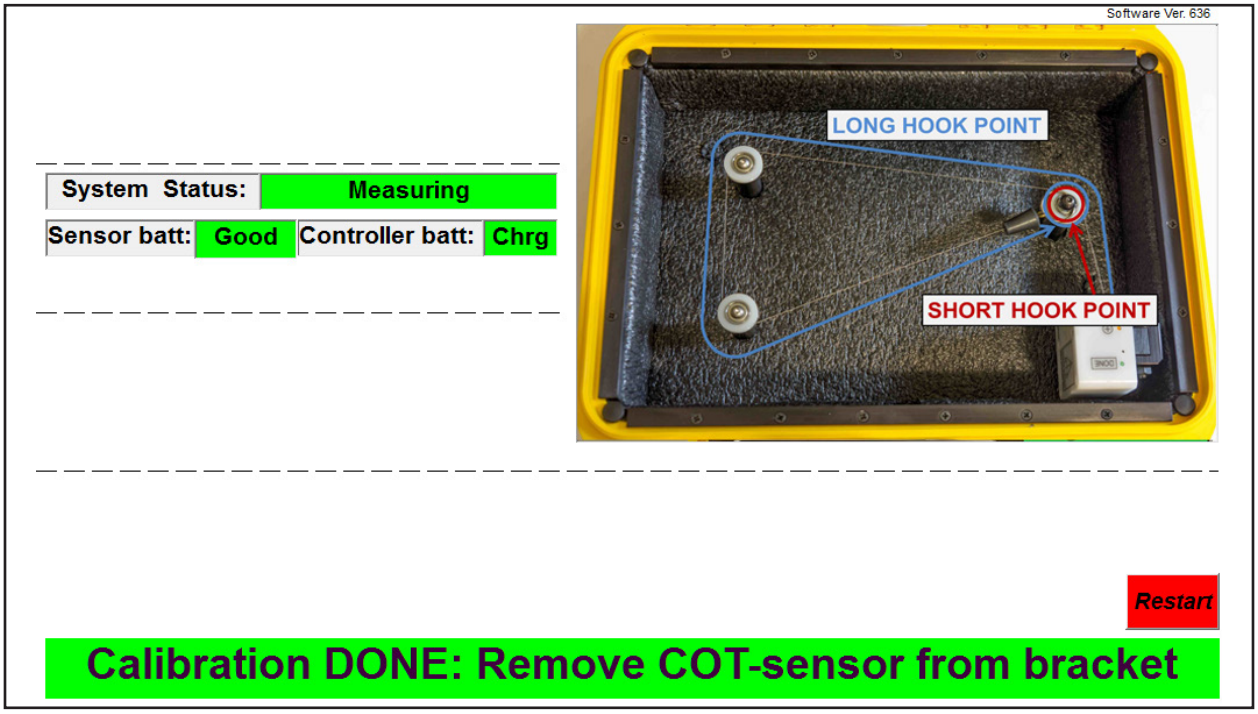


Step 4

Once the long calibration post has been verified, the operator will be instructed to hook the COT-sensor's ring to the short calibration post.

Carefully unhook the ring from the long calibration post, and guide the cable back through the second and first pulley. Hook the ring to the post located in the top right corner.

!!! MAINTAIN FIRM GRIP OF RING TO AVOID DAMAGE !!!

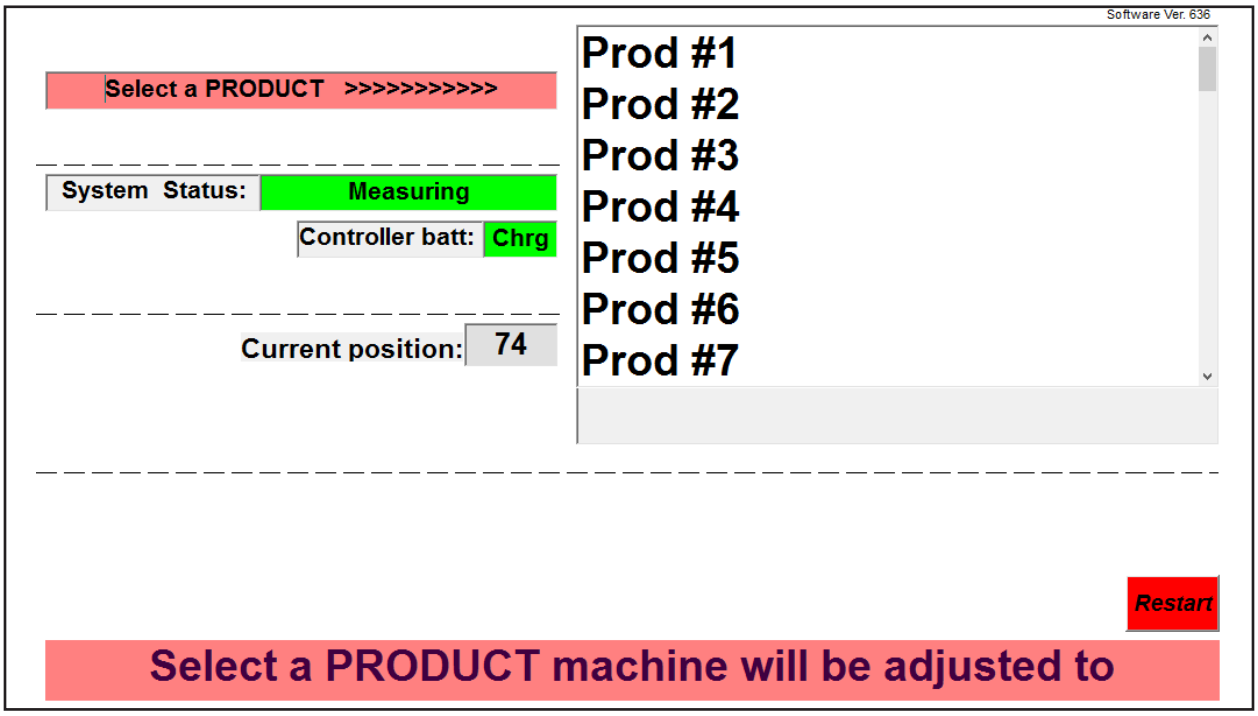


Step 5

The system will verify the short calibration post. When the *"Calibration DONE"* message is displayed, the operator should remove the COT sensor from the calibration bracket.

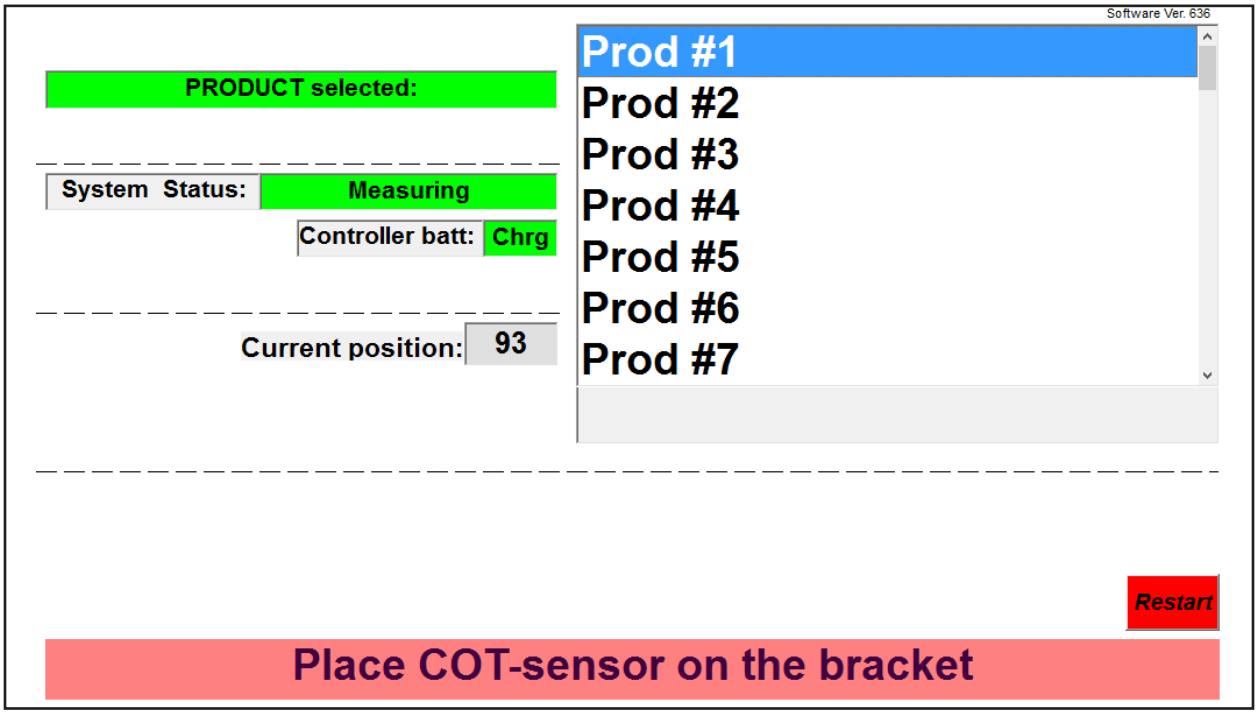
When removing the COT sensor from the calibration bracket, make sure the ring is not attached to a post. Maintain a firm grip on the sensor, and remove the sensor from the calibration bracket.

!!! DO NOT REMOVE SENSOR WHILE CABLE IS ATTACHED TO HOOK POINT !!!



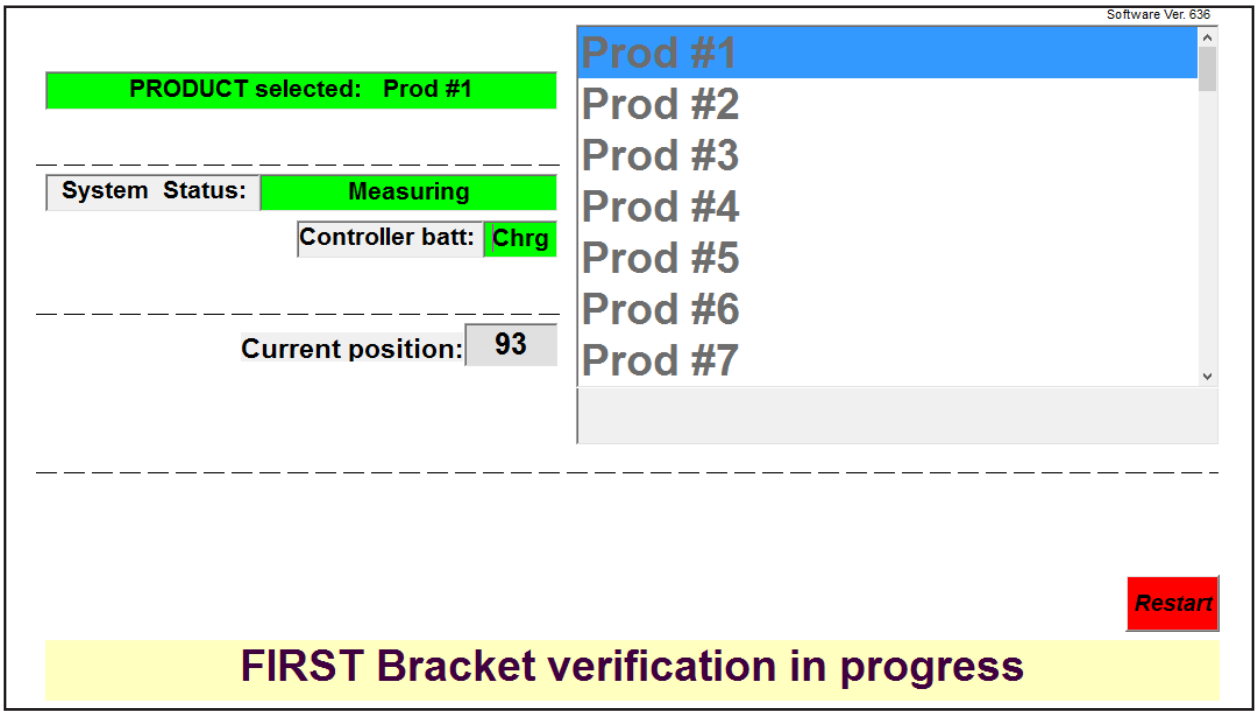
Step 5

Once the COT sensor is removed from the calibration bracket, the operator is provided with a list of products. The operator should select the desired product adjustment.



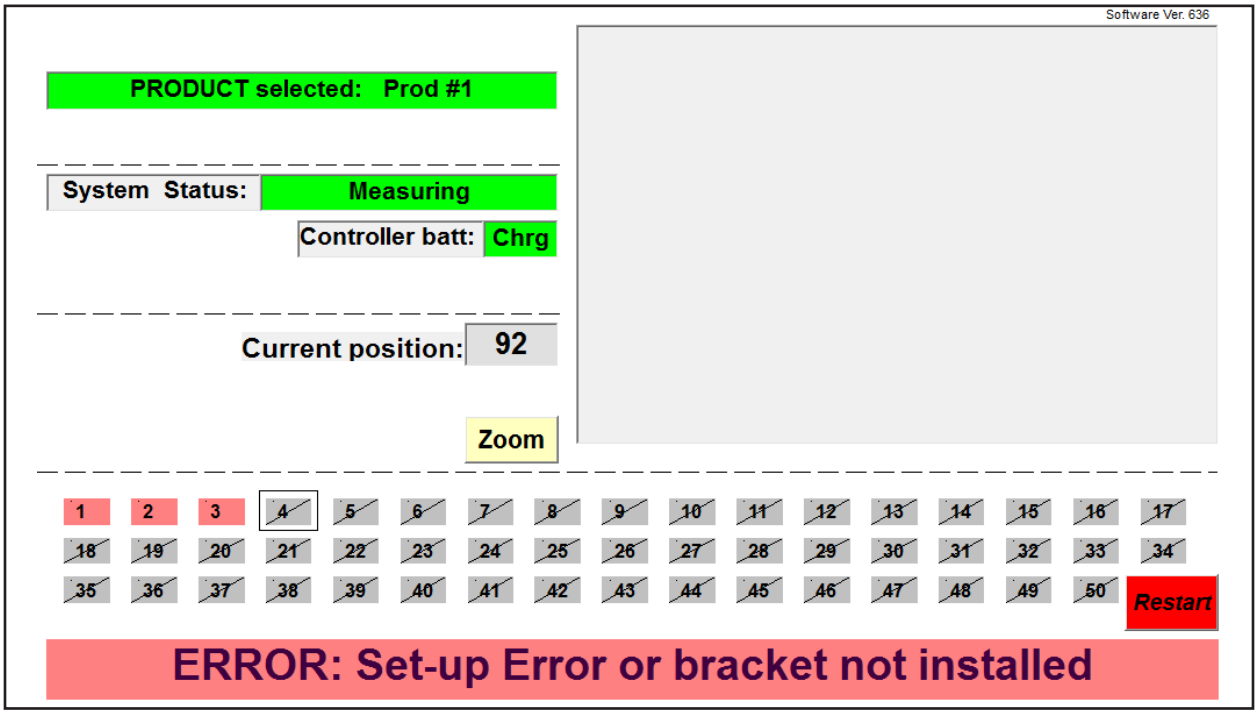
Step 6

When the operator selects the desired product, the selection will remain highlighted as shown above. The selection can be changed at any time. To continue with desired selection, the operator must place the COT sensor onto one of the desired machine's brackets.

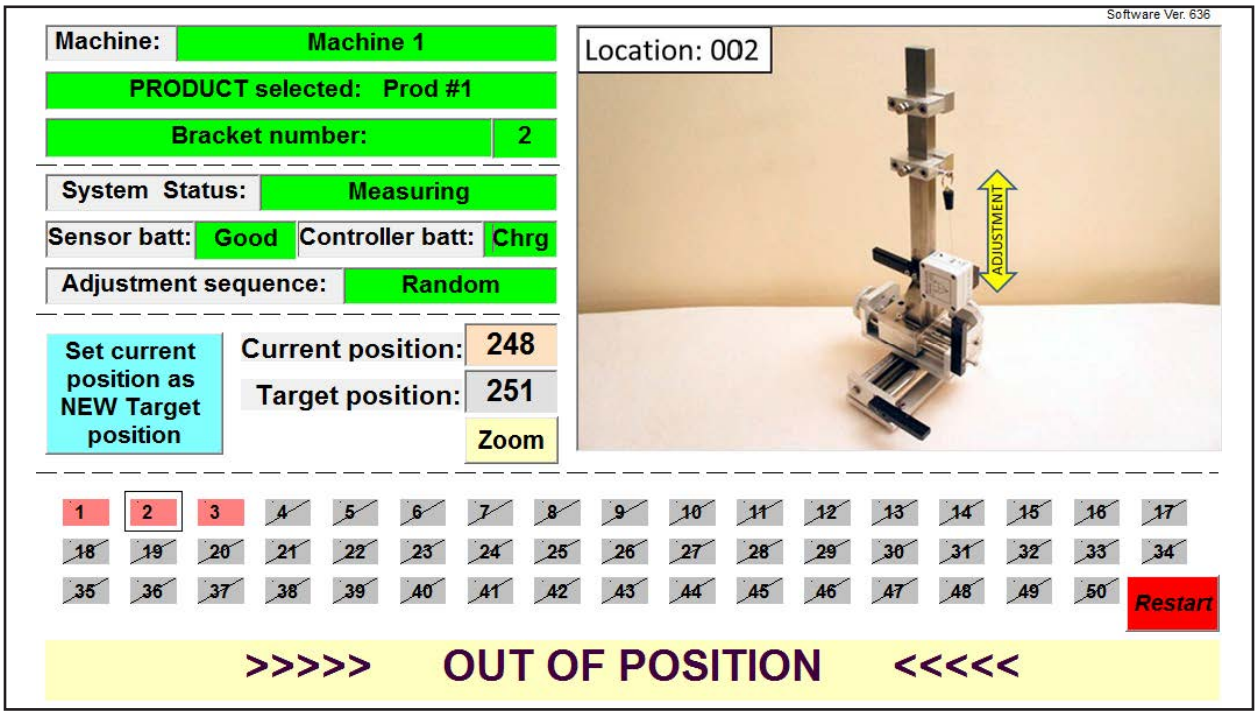


Step 7

When the COT sensor has been placed on one of the desired machine's brackets, the Changeover Tool will begin the machine verification. At this point, the product selection is locked. Clicking the *"Restart"* button in the bottom right corner will bring the operator back to the product selection menu.



If an error message shows up during the bracket verification, this means that the selected product and machine are not setup for each other. No configurations of that product are present for that machine. This can be changed by the admin in the COT_CONFIG program.

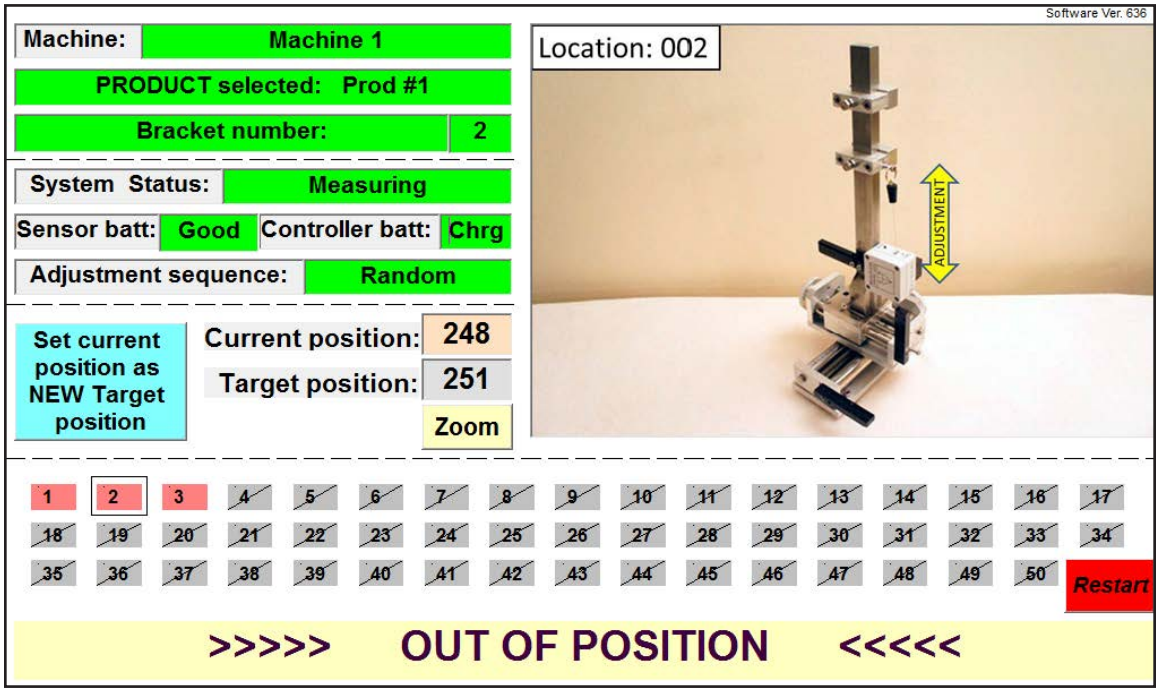


Step 8

When bracket verification has been successful completed, the Changeover Tool advances to the changeover menu where guidance for the operator begins. At this point, the COT sensor is on bracket number 2.

4.5
_ Changeover Menu Explained

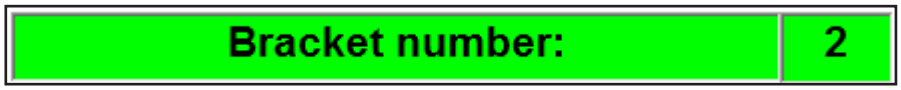
The Changeover Menu is where guidance for the operator takes place. This section will explain the Changeover Menu and all of its functions.



Changeover menu explained:

The machine bar displays the name of the machine currently in adjustment.

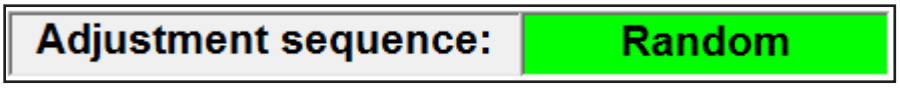
The product bar displays the name of the end product.



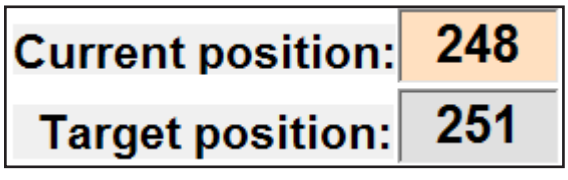
The bracket bar displays which bracket the COT sensor is currently placed on.

The system status bar displays the current status of both the computer and sensor

The battery bar displays the current battery level of the sensor and the computer.



The adjustment sequence bar indicates if the adjustment sequence is strict or random.

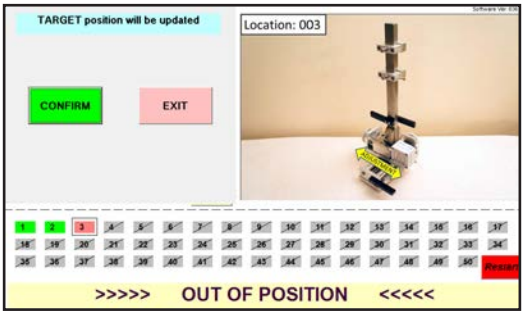


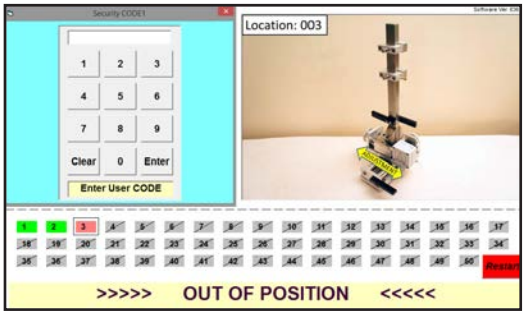
The *"Current position:"* and *"Target position:"* bars are displayed to show the COT sensor's string length and the target length for that product's bracket location.

Set current position as NEW Target position

The *"Set current position as NEW Target position"* is used by the operator to change the target position of a changeover location.

The sensor must be on the desired bracket and set at the desired length. Once the button is clicked, the operator is prompted for the User password. Once operator has entered correct password, that bracket location will save the desired length for future adjustments.





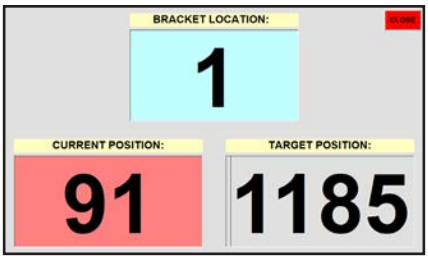
Zoom

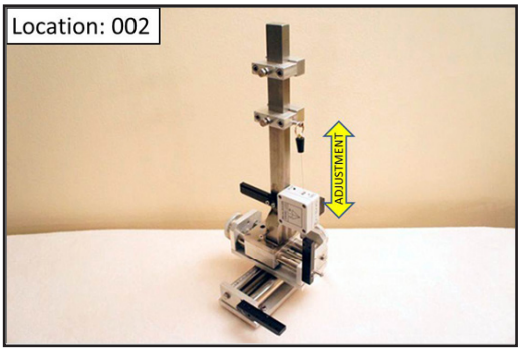
The *"Zoom"* button is used when an operator cannot see the LED indicators on the COT sensor. This mode allows an operator to have large numbers displayed throughout the changeover operation.

Once the COT sensor is placed on a bracket, larger numbers are shown. When the sensor is removed, the screen returns to the main changeover menu.

With the *"Zoom"* menu opened and in use, the operator is able to perform adjustments on bracket locations with the aid of the COT computer screen. The bracket location is displayed at the top of the *"Zoom"* menu, the *"Current Position"* is on the bottom left and the *"Target Position"* is on the bottom right corner.

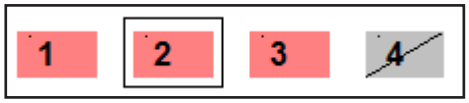
When the operator is nearing the *"Target Position"*, the *"Current Position"* color will change to light red. Once the operator has reached the target position, the *"Target Position"* will change to green. Once bracket location has been completed, the *"Bracket Location"* display will begin to alternate from blue to yellow.

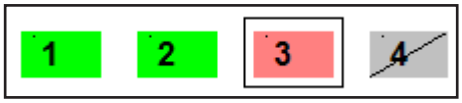




The picture of the current changeover location is shown when the COT sensor is placed on a bracket. This image conatins visual guides for a bracket location such as hook points and adjustment locations.

Changeover menu explained cont'd:

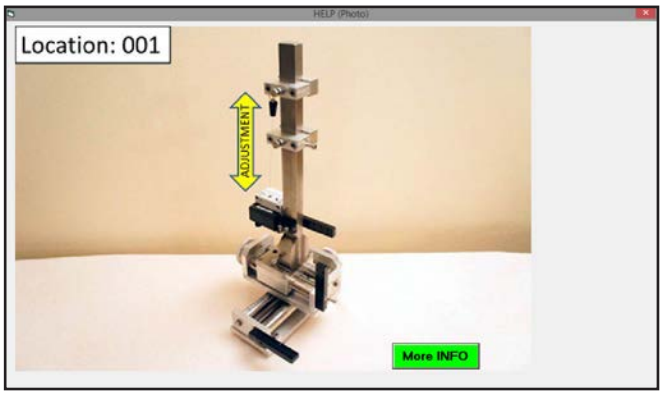


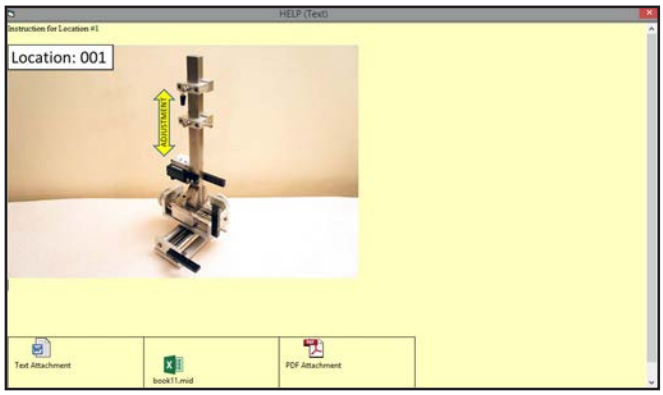


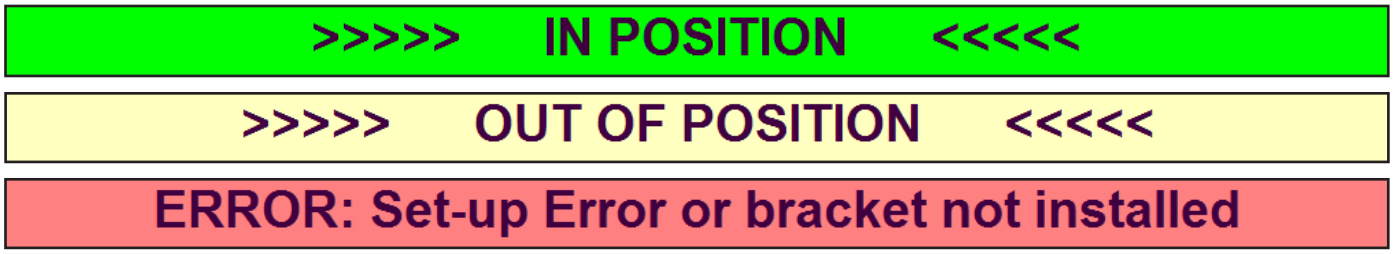
The progress boxes at the bottom of the main screen are used to show the progress of the changeover. Red boxes indicate unfinished changeover locations, green boxes indicate complete changeover locations and crossed out grey boxes are unused bracket locations for that machine. Boxes which are outlined (like number 2 and 3 above) are the current brackets on which the COT sensor is placed.

Clicking on a progress box brings up the selected location's image which can be used by the operator to locate the desired bracket. Clicking on the *"More INFO"* button in the *"Help PHOTO"* menu will display a help text file. Help text contains text, links to other documents and video clips.

These photo and text documents are setup by the administrator in the COT_CONFIG program.







The message bar at the bottom of the changeover screen is used to convey simple messages to the operator. These can be error or guidance messages.

The restart button is used to return to the product selection menu. Calibration is not necessary, and the operator can change to the desired product.

NOTE: clicking the restart button in the middle of a changeover will lose all current data and progress of the current changeover.

5
_ DEMO Changeover Walkthrough

This section is a short demonstration of how the Changeover Tool is used to perform a changeover operation.

Step 1

Once the COT Controller has booted, the operator is asked if the machine is ready for changeover. Click *"YES"* to continue to the changeover.

Step 2

Clicking *"YES"*, we advance to the sensor calibration screen. The first message displayed in the message banner is to power on the COT sensor.

Step 3

The operator powers on the COT sensor using the button located on the COT sensor. The operator should wait for the COT controller to show that there is communication between the COT controller and sensor.

Step 4

When communication is established between the COT controller and sensor, the message banner instructs to hook the sensor ring to the long calibration post.

Step 5

When the sensor ring has been hooked to the long calibration post, the banner indicates that the operator should wait.

Step 6

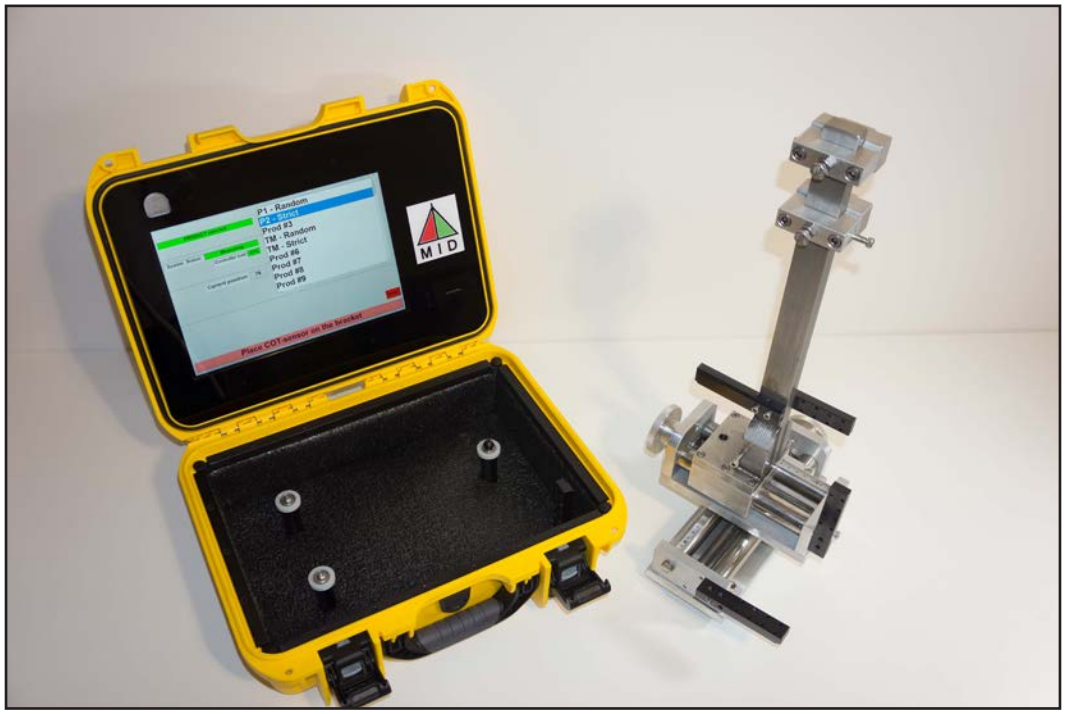
Once the message banner indicates that long calibration is done, the operator should hook the sensor's ring to the short calibration. The operator should wait until the message banner completes verification of the short calibration post.

Step 7

When calibration has been successfully completed, the message banner will instruct the operator to remove the COT sensor from the calibration bracket.

Step 8

Once the COT sensor is removed from the calibration bracket, the operator is presented with a selection of products. The operator should select the desired product and place the COT sensor on the desired machine.



Step 9

The operator has selected *"P2 - Strict"* for this demo and is placing the sensor on a bracket located on the machine. The *"P2 - Strict"* product adjustment will follow a strict ascending bracket adjustment order (1, 2, 3...).

Step 10

When the sensor is placed on the bracket, the COT controller will begin to verify the machine on which the COT sensor has been placed. Verification can take up to 15 seconds.

Step 11

The COT controller will advance to the changeover menu once the machine has been verified. The ring should be hooked onto the hook point for the current bracket location.

Step 12

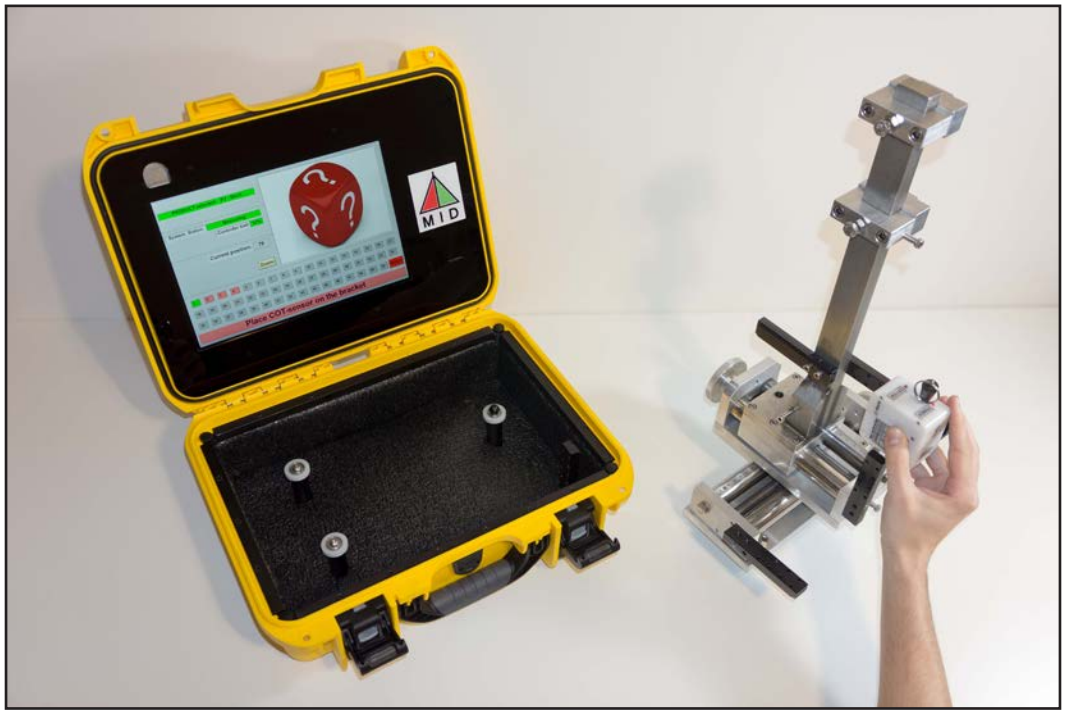
To help an operator see the COT controller's screen from a distance, they can choose to turn on the *"Zoom"* feature.

Step 13

Once the *"Zoom"* button has been clicked, the screen changes to a more visible layout. The top box (1) is the current bracket number. The bottom left box (399) is the current sensors cable length. The bottom right (397) is the target cable length. The current bracket location adjustment is in position.

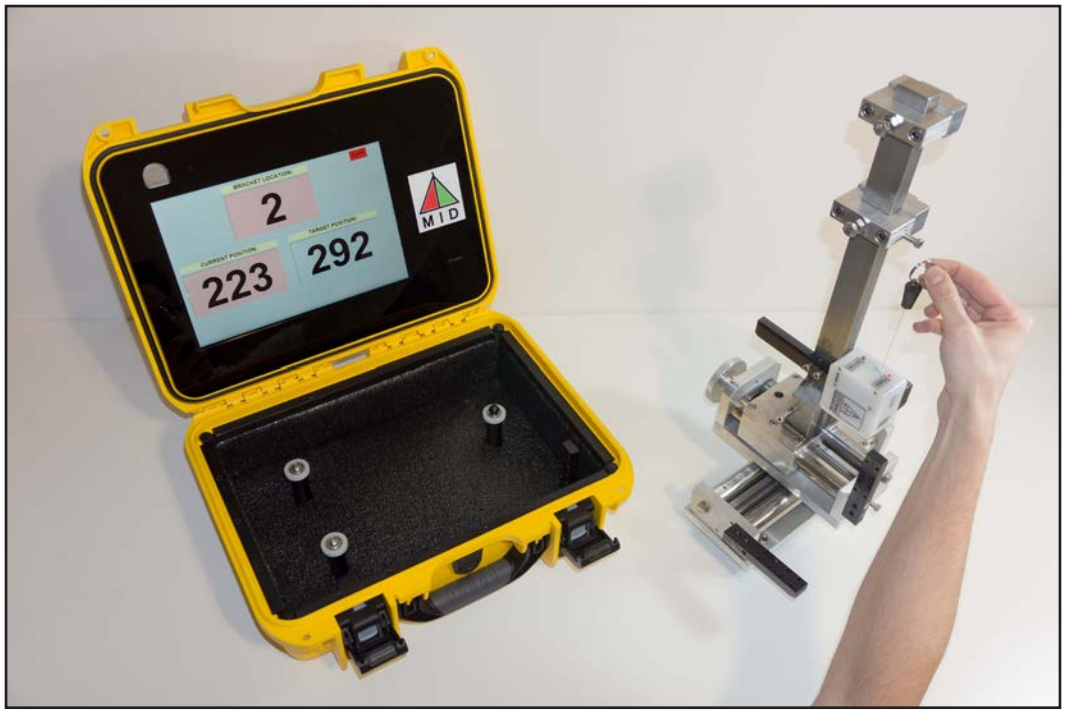
Step 14

Once a bracket location has been completed, the operator can remove the sensor from that bracket and continue to the next desired location. Notice that the zoom window has closed because the sensor is not on a bracket.



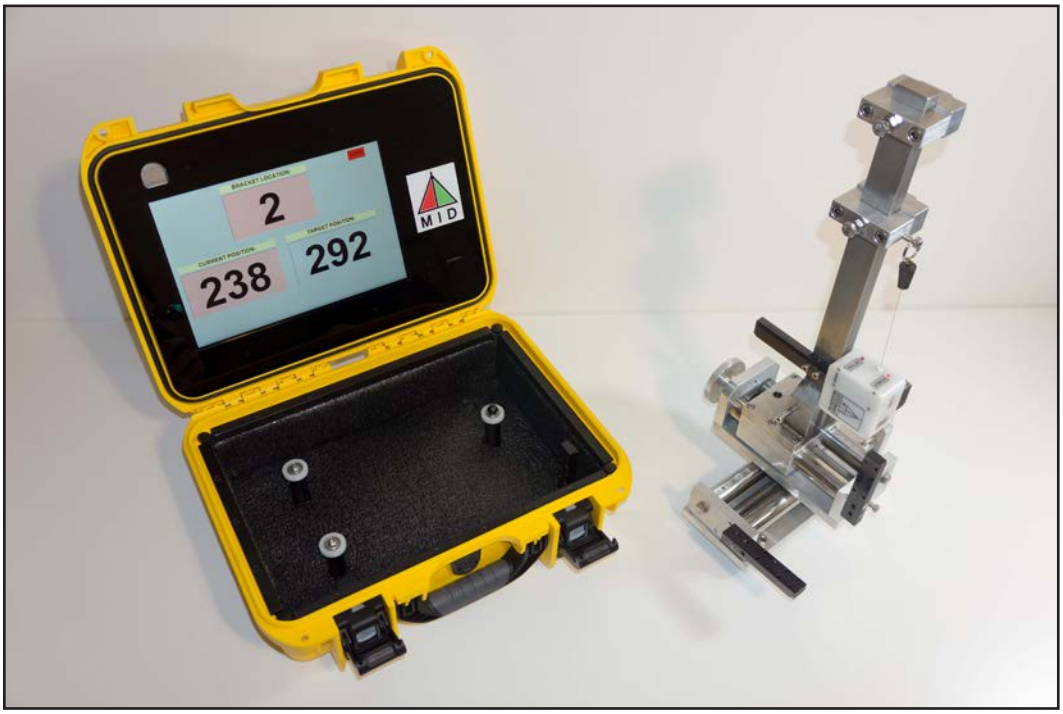
Step 15

The operator can place the sensor on the next bracket location to continue with the changeover adjustment.



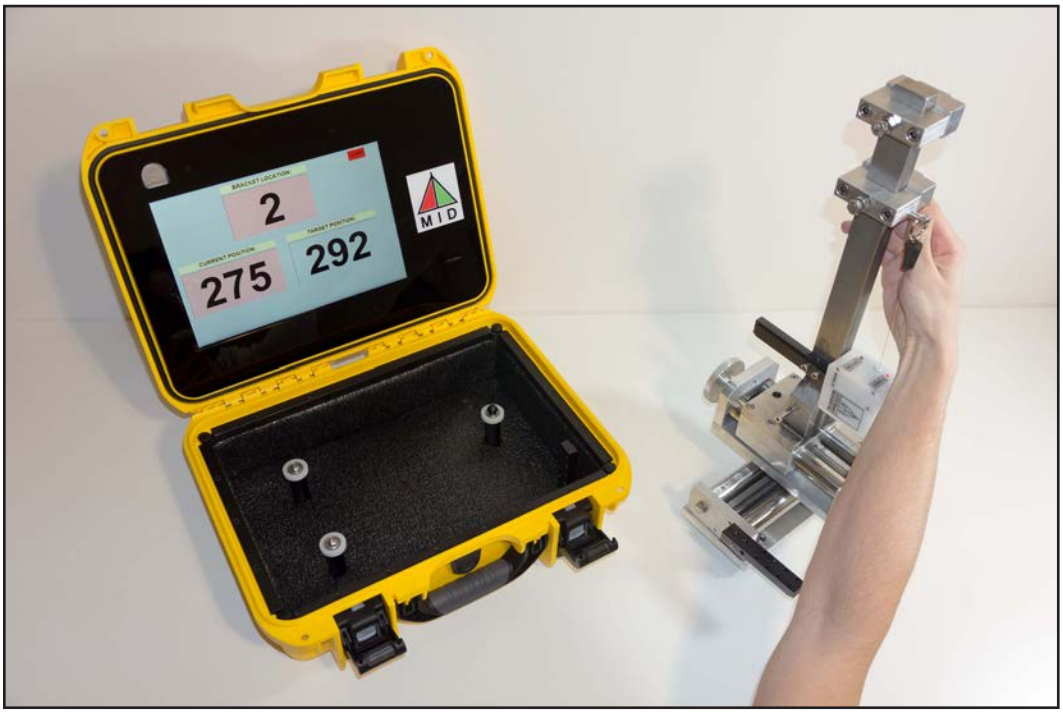
Step 16

Hook the ring to the hook point to check this bracket location adjustment.



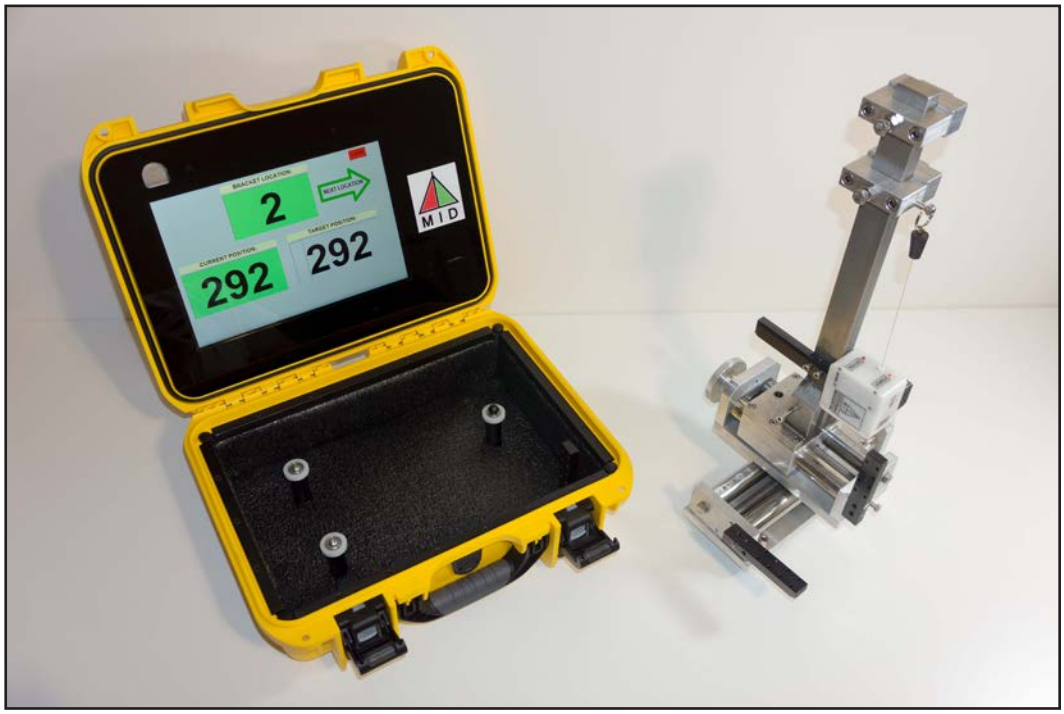
Step 17

The target cable length is 292 and the current cable length is 238. The operator should increase the length of the sensor's cable.



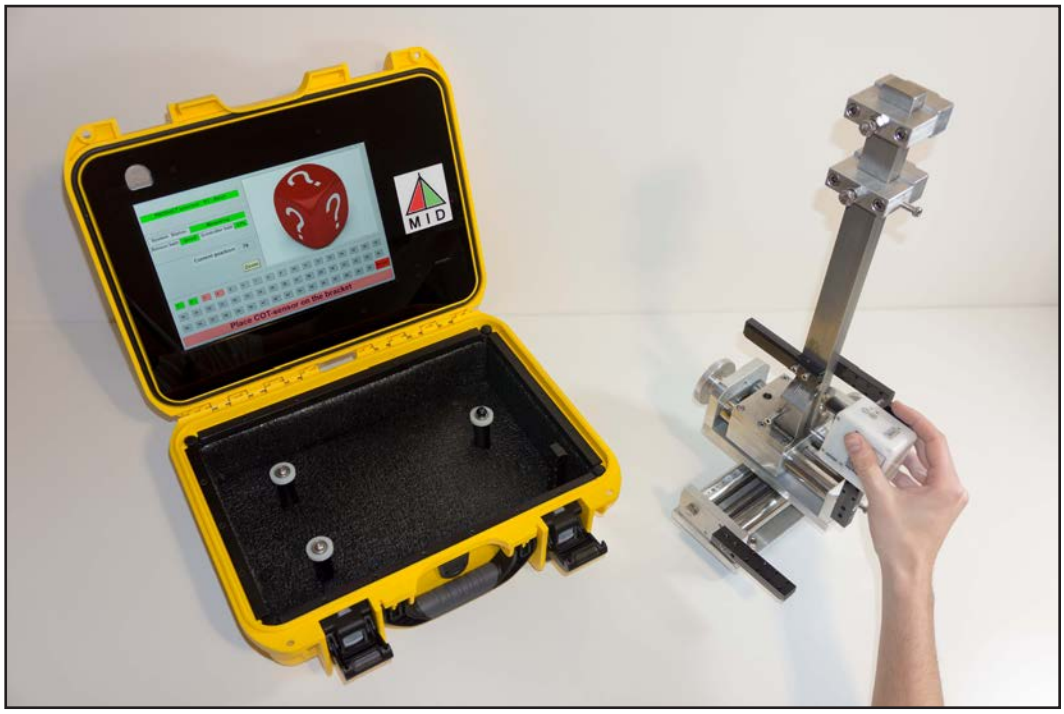
Step 18

Once the operator nears the target position, the color of the current cable length will change from red to a light red.



Step 19

Once cable length is at the target length (or within tolerance), the current cable length box will change from a light red to green. Once the bracket location has been marked as complete, an arrow will indicate to move to the next bracket location.



Step 20

The operator is now moving to the next unchecked bracket location and will hook the ring to the hook point.

Step 21

This bracket location requires no adjustments, and the COT controller shows that the bracket location has been marked as complete.

Step 22

Returning to a previously completed bracket location is permitted. The controller shows that the bracket has been complete.

Step 23

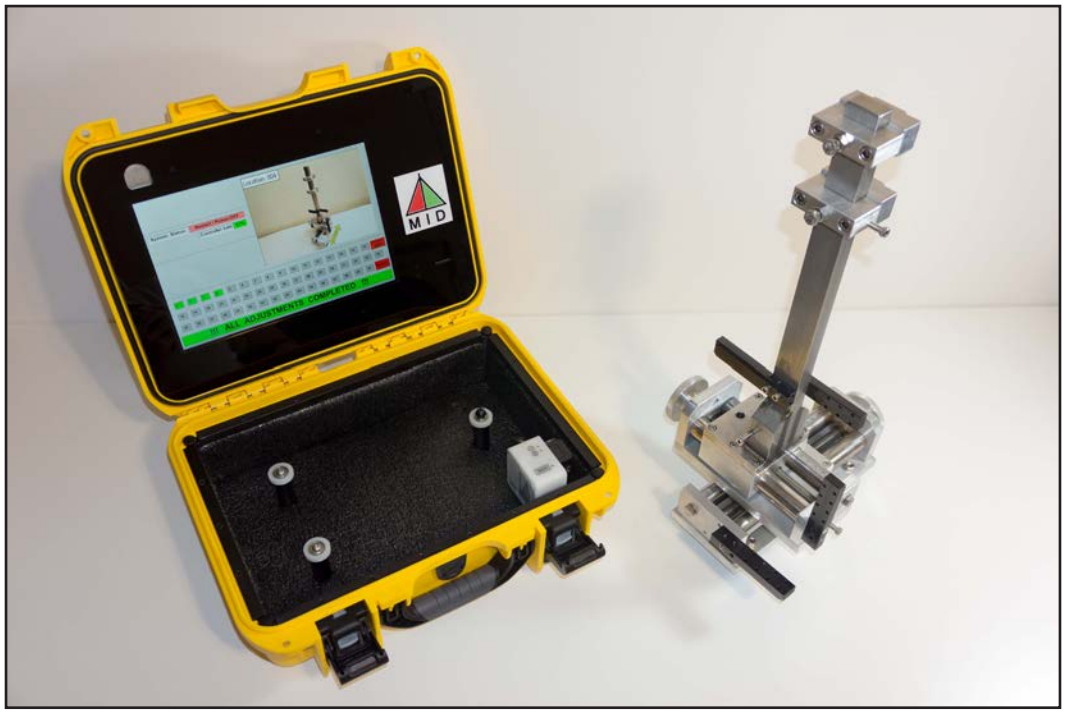
Moving to the final bracket on the machine shows that the final bracket location requires no adjustments.

Step 24

Once the controller has marked the final location as complete, the zoom feature will exit and the message banner will instruct the operator to place the sensor onto the calibration bracket.

Step 25

The operator should return the sensor to the calibration bracket to complete the changeover adjustment procedure.



Step 26

When the sensor is on the calibration bracket, it will shut off to preserve battery. The message banner show that all adjustments are complete. With all adjustments complete, a backup excel file is created with a date and time stamp.

Step 27

At this point, the operator can choose to power down the COT controller or continue with another changeover. The operator in the demo is complete with the adjustment procedure and will power down the COT controller.

Step 28

Once the COT controller has powered down, the unit is ready to be closed and stored for later use.