ESD Check Point

This is a master document containing the user guides
for the ESD Check Point Agent and Deputy Agent

ESD CHECK POINT AGENT

USER GUIDE

HVIN:ESD/CP-HW01

ESD Check Point, Agent

September 2016

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Table of Contents for ESD Check Point Agent

FCC Part 15

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:
1. This device may not cause harmful interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Changes or modifications to this device, not expressly approved by ExtraTech Systems could void the user's authority to operate the equipment.

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

Industry Canada Notifications

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:
(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage;
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Like all electrical equipment, this product can be damaged by electrical shock. Avoid exposing it to electrical/static shock.

I. INTRODUCTION

The ESD Check Point Agent is a fast, reliable, and robust solution to simplify daily testing to verify the performance of ESD wrist straps and ESD footwear. Each person who will be using the tester is issued an ID badge by the administrator to use with the tester. Test results are viewed on a display using both simple graphics and actual test readings. The tester completes testing in a matter of just a few seconds, simultaneously checking the wrist strap and both foot straps, and provides accurate accounting for administrative purposes. After each test a check is done of the wrist and feet measurement circuits and a validation screen is displayed telling the user that their data has been verified and stored. An ID badge, that is easily programmed by the administrator with user identification information, is held over the tester to initiate testing. Data collection by the administrator is paperless and wireless using a network connection that is easy to setup and change. The tester will continue recording data along with an accurate time/date time stamp if the wireless connection goes down or is unavailable by making use of a battery backed real-time-clock circuit.

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II. FEATURES

- ESD Check Point Agent only requires a 110V outlet for operation, so it is easy to install and move.
- Reads and displays actual resistance of ESD wrist straps and footwear from 100 KΩ to 800 MΩ.
- The default range for a “pass” on wrist straps is 750 KΩ to 10 MΩ. The default range for a “pass” on ESD footwear is 1 MΩ to 100 MΩ.
  - The administrator can change the “pass” ranges to any value desired between 100 KΩ and 800 MΩ.
  - Test data will indicates the “pass” ranges being used when each test was performed.
- The number of possible users only depends on the number of ID badges programmed with user information.
- Easy to use: User steps on foot pads, plugs in their wrist strap (if one is used), places thumb or finger on a gold pad, scans an ID badge and views results.
- Test results not only give actual resistance readings but also show readily understood graphics that indicate what has passed and what has failed.
- After each test, the Operator Panel checks the operation and accuracy of the circuitry that measures the wrist strap and footwear resistances and will display and record any operational or calibration issue. This assures the ESD administrator that all test data being collected by the Operator Panel is accurate.
- MIFARE 13.56 MHz RFID cards are used to initiate testing. An administrator can write user information to RFID cards using the Operator Panel. Alternatively, a smart phone with an RFID card writer application or an RFID reader/writer (such as a uFR NFC RFID Reader Writer by D-Logic) can be used.
- Test data resident on an Operator Panel can be reviewed by an administrator at any time by using a computer browser.
- Storage area for test data is large enough to allow an administrator to download test data to a computer on a weekly, monthly, quarterly or more interval. Once downloaded, the data resident on the Operator Panel can be deleted so only new data is available for viewing or downloading.
- Downloaded test data is in the form of a .csv file which can easily be opened, arranged and evaluated using a spreadsheet such as Microsoft Excel or OpenOffice.
- During initial installation, the Operator Panel comes up as a WiFi hotspot (access point mode) with it's own web page. Setup can be done from a nearby computer that has WiFi access or by using a smart phone.
  - A local WiFi network connection can be set for subsequent access to the Operator Panel.
  - Administrative settings can be changed.
- Typically, an administrator will have the Operator Panel connected to a local WiFi network.
  - If a local WiFi network isn't available, the Operator Panel can stay in access point mode and act as it's own WiFi hotspot.
- In either access point mode or when connected to a local WiFi network, the Operator Panel can test and record ESD pass/fail data and an administrator can read and download test data as well

as change administrative settings.

- When connected to a local WiFi network, time stamp information for the data being collected is kept current through the network.
- When in access point mode, time stamp information must get set. This can be done in two ways...
  - 1) An administrator can go to the administration page and set the current date and time.
  - 2) If possible, the Operator Panel can be connect to a WiFi network long enough to obtain the current date and time before being set back to access point mode.
  - Once the date and time are set, accurate time stamp information is maintained through a real-time-clock circuit in the Operator Panel.

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III. INSTALLATION AND BASIC OPERATION

A. Unpacking and Assembly of Check Point Agent

Materials Enclosed

ESD Check Point Foot Pad

ESD Check Point Tower

ESD Check Point Operator Panel

Tower to Bottom Hardware

Cable Ties

AC Adapter

Operator Panel to Tower Hardware

User Guide CD

Tools Required

Foot Pads to Tower	Operator Panel to Tower
#2 or #3 Phillips screwdriver	7mm wrench
7/16” box end wrench	2.5mm Allen wrench (supplied)
	Cutter to snip wire tie ends

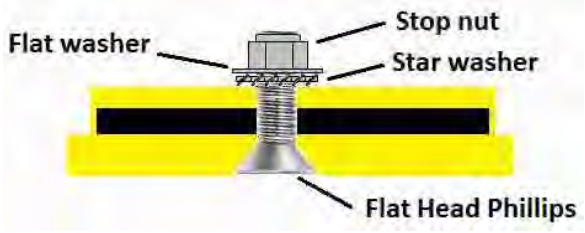
1. Attaching the Agent tower to Foot Pads

Tower to bottom hardware

4ea ¼" Outside Star Washers
4ea ¼" Stop Nuts
4ea ¼" Flat Washers
4ea ¼"x1½" Flat Head Phillips

Top view from back of assembly

1. **Feed the foot pad cables through their respective holes on the tower.**
2. **Carefully stand the tower up ensuring the cables are not pinched**
3. **From the bottom of the base insert four Flat Head Phillips screws.**
4. **From inside the back of the tower place a star washer, flat washer, and a stop nut on each screw and snugly tighten with a 7/16" box end wrench.**



Top view from front of assembly

2. Mounting the Agent Operator Panel to the Tower

Operator Panel to Tower Hardware

4ea M4x12mm black Allen (2.5mm) screw
4ea M4 stop nut
1ea M4 inside star lock washer

Operator Panel Attached to Tower

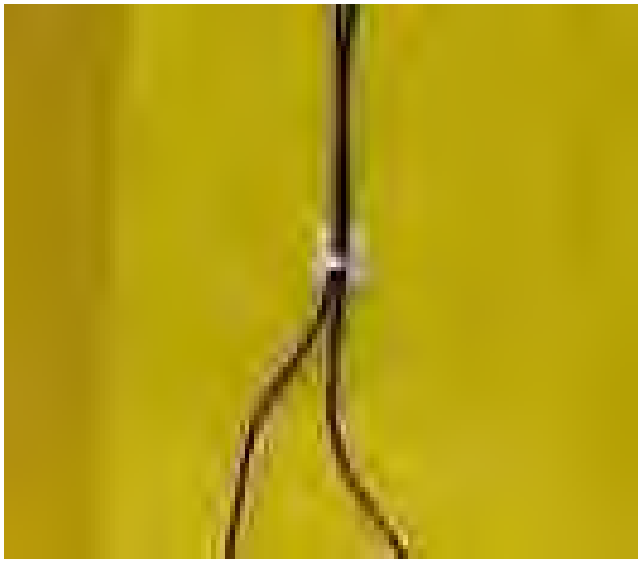
1. **Insert four black Allen mounting screws through holes on the Operator Panel and the tower.**
2. **Put the star washer on the screw where the ground wire attaches.**
3. **Put the ground wire connector over the star washer .**
4. **Secure each screw with a stop nut.**

Foot pad cables and ac adapter attached.

1. **Connect the foot pad cables with red to red (right) and white to white (left).**
2. **Plug in ac adapter.**

3. Anchor Foot Pad Cables to the Inside of the Tower.

Close up of mount and tie



1. **Route each tie wrap through a tie wrap mount and around the foot pad cables and tighten.**
2. **Clip off the excess ends.**

Completed ESD Check Point Agent

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INITIAL INSTALLATION of CHECK POINT AGENT

1. Place the ESD Check Point Agent by a wall outlet at a location in or around the area where workers will be entering their workplace and connect the 5V wall adapter .
2. On the back of the Operator Panel, verify that the red banana jack is plugged into the red receptacle and the white banana jack is plugged into the white receptacle. These are the connections for the footplates.
3. The blue LED on the Operator Panel will start flashing at a fast rate and the screen will flash a couple of times. In about 45 seconds the Operator Panel will be fully up and operational... The blue LED will begin flashing at a slower rate and screen will appear as shown below.
4. When a ESD Check Point is purchased, it is setup to operate as it's own WiFi hotspot. Typically, the ESD administrator will want to have the Operator Panel setup so it can be communicated with using a local WiFi network. Refer to “Administrator Tools – Steps to connecting the Operator Panel to local WiFi network...” for network setup instructions.
   A) In some cases it might be necessary to keep the Operator Panel isolated from an external network. For this situation, the Operator Panel can be operated in it's Access Point mode where it operates as a WiFi hotspot with it's own web page.
      1. Data collected by the Operator Panel is time-stamped, and it will have to be set to the current date and time. There are two ways this can be done...
         a) The unit can be temporarily located in a location where it can be connected to a local WiFi network and it will obtain the current date and time from the network. It can then be unplugged and moved to it's normal location for use. Refer to “Administrator Tools – Steps to connecting Operator Panel to local WiFi network...”
         b) Date and time can be manually set by the administrator. Refer to “Administrator Tools – Setting Date and Time...”.
5. The data collected by the Operator Panel will indicate a Device Name for the Operator Panel. If more than one ESD Check Point is being used, the administrator can change the device name so that it is possible to identify which Operator Panel the downloaded data came from. Refer to “Administrator Tools – Setting Device Name and Password...”.
6. The default ranges for a “pass” condition for wrist straps it set by default to 750 KΩ to 10 MΩ, and the default for footwear is 1 MΩ to 100 MΩ. These ranges can be changed by the administrator. Refer to “Administrator Tools – Setting “Pass” Ranges for Wrist and Feet...”.
7. The ESD Check Point can lose power or be unplugged at any time without losing collected test data or the current date/time stamp.

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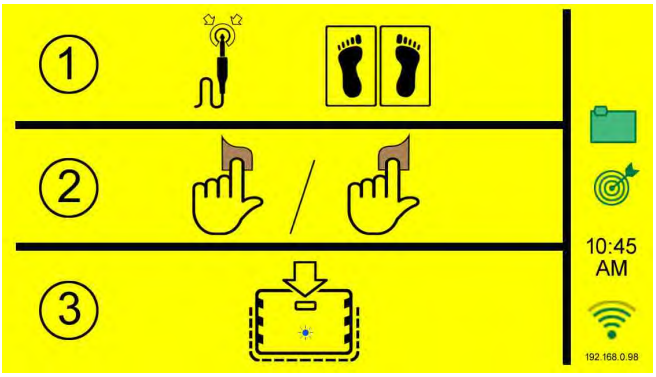
Explanation of Displayed Screen

Initial Screen for ESD Check Point Agent

1. Insert wrist strap plug – Step on foot plates
2. Hold a finger down on either of the two gold touch plates located at the lower corners on the front of the Operator Panel
3. Hold the ID badge over unit
   Status Icons

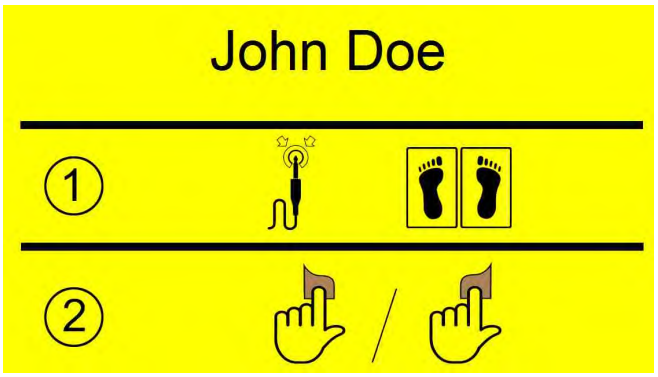


Status Icons

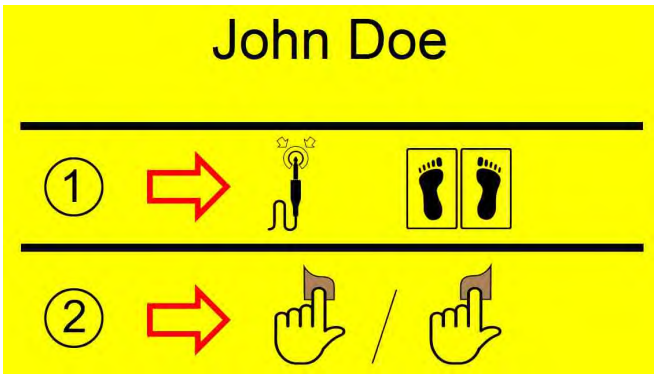
Status Icons

Data Log	Successful		
Test circuitry	Okay		
Configuration	Incomplete	Complete	
WiFi	No signal	Full Signal	
AP Mode address (initial setup)	10.0.0.1	IP address for WiFi	192.168.0.xxx
Validation failure		Note: If the wrench appears, there will **not** be a green file or green bulls eye.	

Waiting for Connection Screen



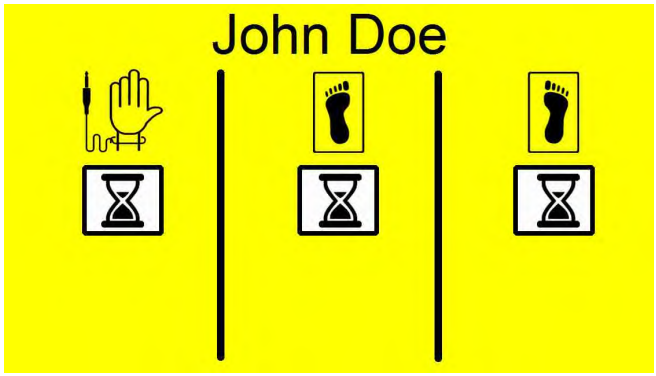
ID badge scanned
Waiting for foot straps or
wrist strap to be detected.



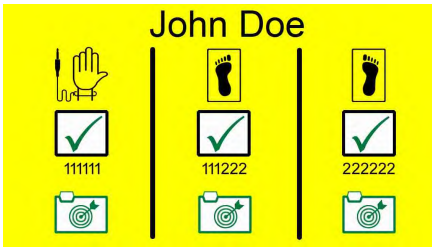
ID badge scanned
Still waiting for foot straps or
wrist strap to be detected.

Testing Screen

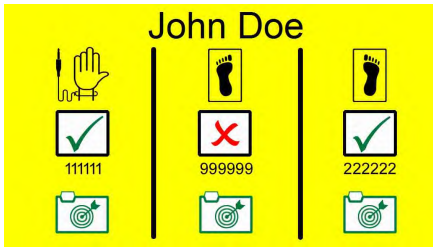
Testing in progress



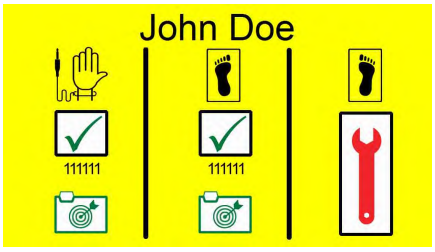
Test Results Screens



Wrist strap and foot straps passed. All data logged.



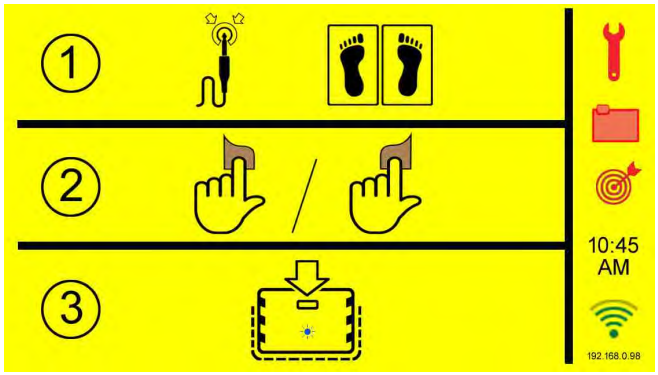
Left foot strap failed. All data logged



Right foot validation failed. Data is logged for wrist and left foot. (This wrench will also appear as a status icon.)

See below

Main screen.
Wrench appears.
Bulls eye and file icon are red.
(This occurs when there is a validation error that occurs ≥ 5times.
Notify supervisor.)



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Basic Operation

1. Connect the ac adapter to the back of the unit.
2. Connect the wrist strap to jack on front [not necessary if only using foot strap(s)].
3. Hold a thumb or finger on one of the two gold pads for duration of test.
4. Scan your “ID badge” and wait for an acknowledgment.

NOTE: The order that a user scans their card and places a thumb or finger on the gold pad is flexible. The card can be scanned first and then a thumb or finger can be placed on a gold pad.

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Testing of Wrist Straps and Footwear

Suggestions on overcoming “fail” ESD tests are given in “PROPER WEARING OF ESD WRIST STRAPS & FOOTWEAR”.

Initial Screen

1. Connect wrist strap to jack on front [not necessary if only using foot strap(s)].
2. Hold a thumb or finger on one of the two gold pads for duration of test.
3. Scan your “ID badge” and wait for an acknowledgment.

NOTE: The order that a user scans their card and places a thumb or finger on the gold pad is flexible. The card can be scanned first and then a thumb or finger can be placed on a gold pad.

After scanning your badge, **if the Operator Panel doesn't detect either a wrist strap or ESD footwear**, the “Waiting for user” screen shown here is displayed.

Make sure that you are standing with feet entirely on the metal plates and that your wrist strap (if using one) is on your wrist and plugged into the Operator Panel.

If this message appears...

Check you wrist strap for proper connection.

Ensure that your foot strap(s) are properly in place.

Verify that you are standing with your feet fully on the foot plates to ensure that foot straps or footwear are making electrical contact.

If all of the above looks OK, you may have a defective strap(s) that needs replacement.

When you are detected...

This message will appear when you are detected. You will hear relays clicking as resistance measurements are made and proper operation is checked.

Test complete...

After the test is completed, this screen will appear. (This illustration shows a passed wrist strap and failed (no) foot straps.)

Data validated & stored...

When testing is complete and the user removes thumb/finger from gold pad, this screen will appear to indicate that a circuit validation test was performed, passed, and data stored.

Test complete but not validated...

After the test is completed, this screen could appear if the Operator Panel can't validate it's measurement circuits. (This illustration shows validation error on the right foot.)

If the above "ERROR" screen occurred, this screen will appear when the thumb/finger is removed from the gold pad. Data is not stored and the user is asked to retest.
If the ERROR continues, contact the ESD Administrator.

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Basic Troubleshooting

- If the Operator Panel quits responding to ID badges, unplug the unit for 10 seconds and plug it back in.
- If the WiFi communication fails, unplug the unit for 10 seconds and plug it back in.
- If the Operator Panel powers up with the blue LED rapidly flashing but the LED display remains black, unplug the unit for 10 seconds and plug it back in.
- **If there is a consistent indication of a Calibration Error, contact your *distributor or *ExtraTech Systems.**

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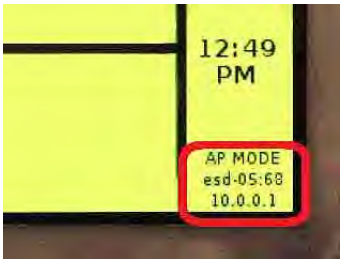
WiFi, Setup and Configurations

Steps to connect Operator Panel to local WiFi network...



WiFi Set Up / Access

Plug in device and wait for “AP Mode” message to appear on the Operator Panel's screen.

The Operator Panel comes up as a WiFi “hotspot” with it's own web page. The steps that follow have you accessing that web page.

Connect the SSID listed on screen
(shown here as “esd-05:68”)
with a smart-phone or laptop that has WiFi.
***** The network password is “esd.check.point”**.

Navigate to 10.0.0.1 in phone or laptop internet browser (Internet Explorer, Firefox, Chrome, etc.)

Sign into device using admin password.
***** The default password is: 8389**

Click on “Configure WIFI”

Select the desired local network from list.
If network is hidden, click the “unlisted network” button at the bottom of the list.
Type the network password into the “WPA KEY” field.
If you selected "unlisted network", please type the SSID of the network into the SSID Field.

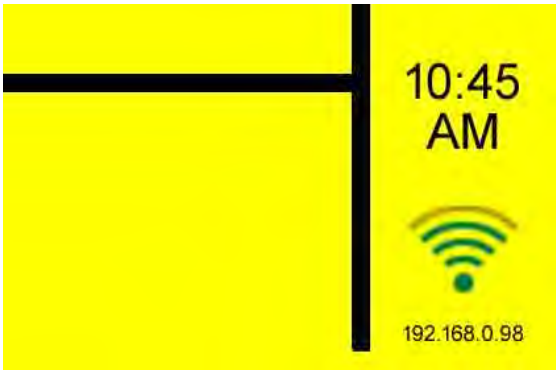
If you want a static IP address:
Check the static box below the “WPA KEY” field.
Fill out the static IP Fields and network information fields provided

After completing the form, click submit and accept the changes. The web page will then tell you when the changes are being applied and you can leave the page.

You will now need to connect back to you normal network. The ESD Check Point is no longer a “hotspot”

If the connection was successful, within 30 seconds the screen on the ESD tester will remove the "AP MODE" message and display its current IP address and signal strength.

From this time on, the administrative functions and test data can be accessed over the local network using the displayed IP address.



If the connection was unsuccessful (Bad Password, Static IP, or SSID), the Operator Panel can be put back into AP Mode.

- Power off the device
- Connect a wrist strap
- Touch one of the gold pads
- Power on the machine while still touching the gold pad.
- Let go of the gold pad when the blue led starts to blink slowly
- The device will now re-start in access point mode again

Repeat all the above steps for connecting the Operator Panel to a local WiFi network.

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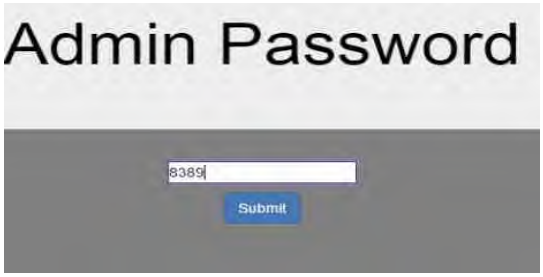
Using the Operator Panel to Program an ID Badge

Logging on to the Administration page

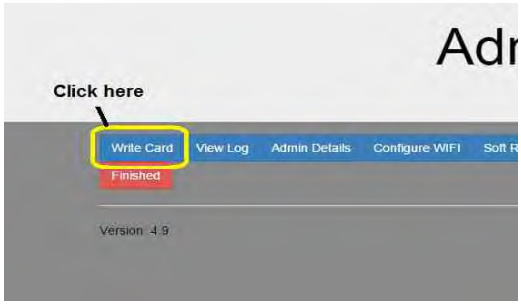
- Use a internet browser to access the Operator Panel using it's IP address
- Enter the Admin password (default is 8389)
- Click on submit



Programming the ID Badge

An ID badge can be written using the ESD Check Point Operator Panel or with a smart phone that has an RFID card writer application or an RFID reader/writer (such as a uFR NFC RFID Reader Writer by D-Logic). The type of ID badge cards required are MIFARE 13.56 MHz RFID cards.

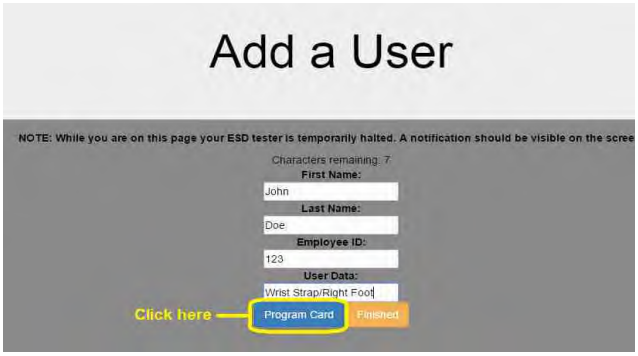
"Write" an ID badge using the Operator Panel is covered here.

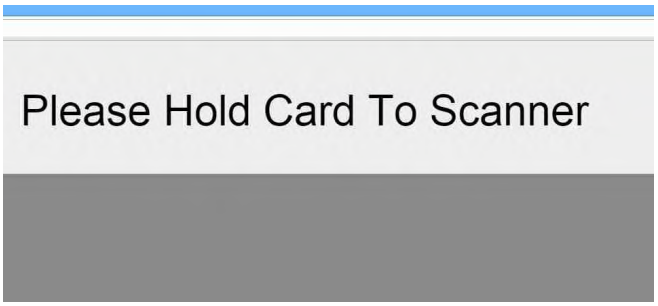


- Click on the "Write Card" button

- The Operator Panel should now show that it is in the "REMOTE ACCESS" mode.

- On the web page enter first and last name, employee ID, and optional user data as shown.
- Click on “Program Card”





- The web page should now display the message “Please Hold Card To Scanner”.

At the Operator Panel hold the card over the scanner

- If the badge was successfully programmed, the web page will indicate that the badge has been programmed as shown.
- Continue programming other badges.

OR

- If the badge programming was unsuccessful, the web page will indicate that the writing was unsuccessful as shown here.
- Repeat badge programming.
- If you continue having issues with writing a badge, you might not be using a card with the correct formatting... A MIFARE 13.56 MHz RFID card.

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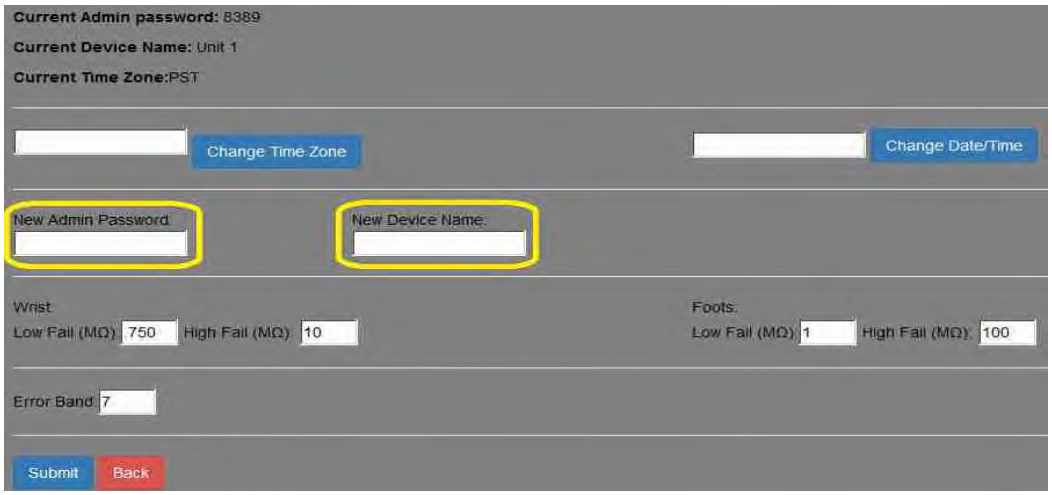
IV. ADDITIONAL CONFIGURATION

Setting Device Name and Password...

The device name is included in the test data when it is downloaded. If more than one Operator Panel is installed, names like “Shipping Door” or “East Door” can clarify which Operator Panel the data is from. Also, a different password other than the default “8389” can be specified.

- Click on the “Admin Details” button



Enter desired Device Name or Password and click on “Submit”.

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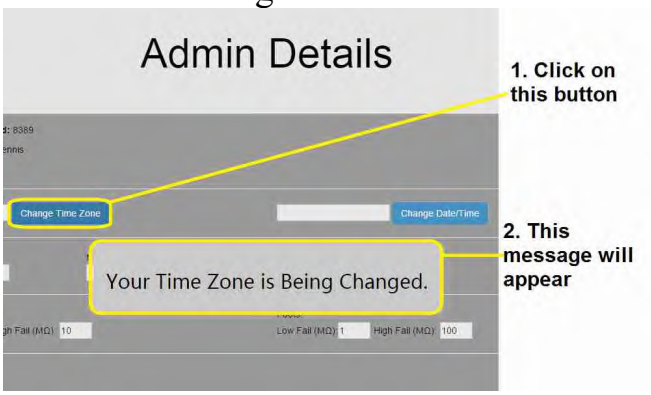
Setting Date and Time

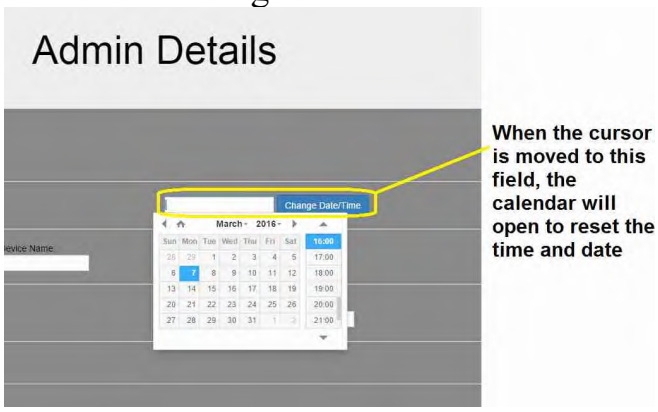
If an Operator Panel can't be connected to a WiFi network, it can be run as it's own “hot point” in access point mode. To collect data with accurate date and time information, an administrator can set the date and time as detailed here.

- Click on the “Admin Details” button

Time Zone Change



Date/Time Change



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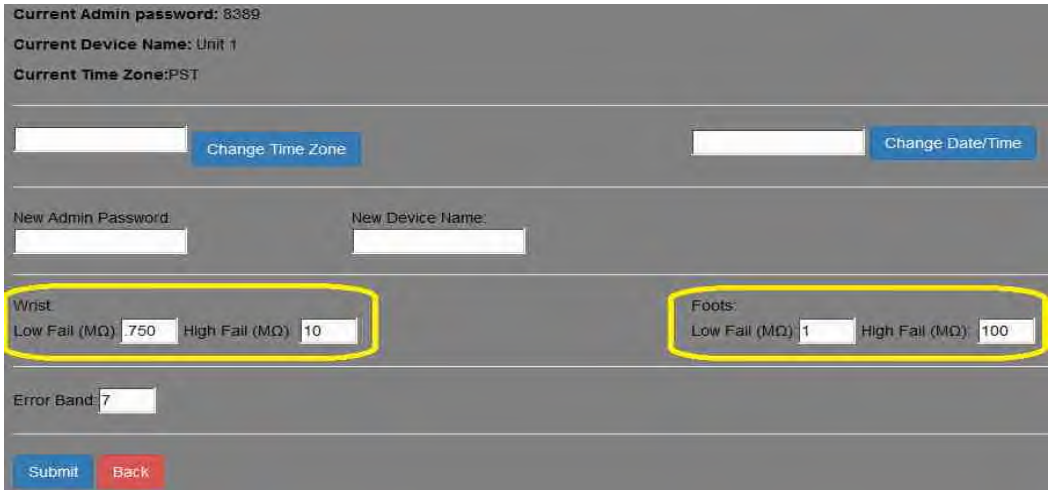
Setting “Pass” Ranges for Wrist and Footwear

The default range for wrist straps is 750 KΩ to 10 MΩ, and the default range for footwear is 1 MΩ to 100 MΩ. The administrator can change those ranges to anything between 100 KΩ and 800 MΩ as shown here.

- Click on the “Admin Details” button



Enter desired high and low range values for wrist and/or feet and click on “Submit”.

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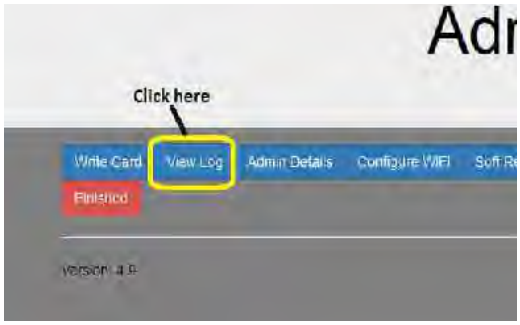
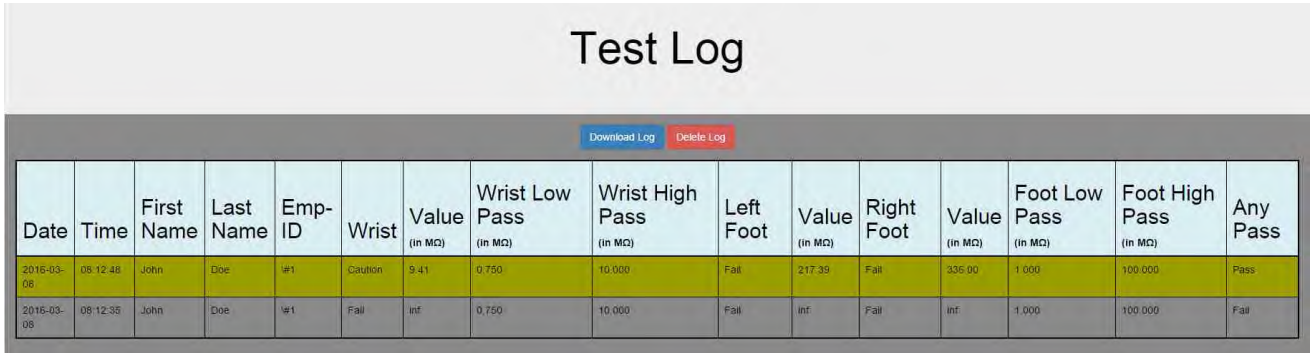
Accessing Logs

Viewing Test Logs



- Click on the “View Log” button



The test log can be downloaded and/or deleted as required. Click on the appropriate button and follow screen instruction.

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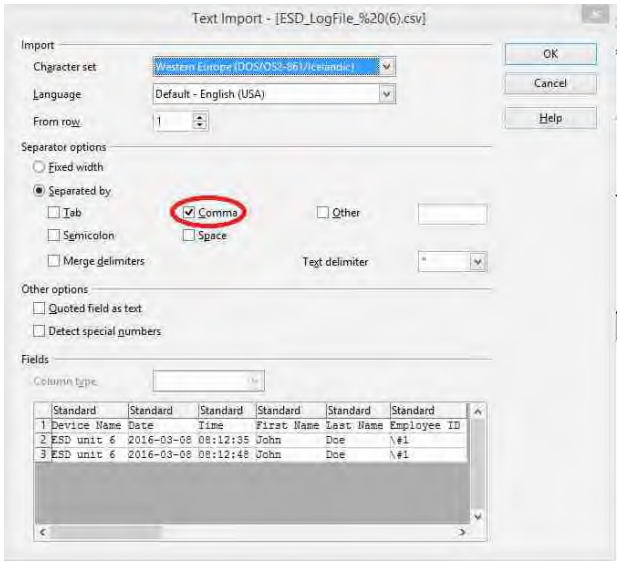
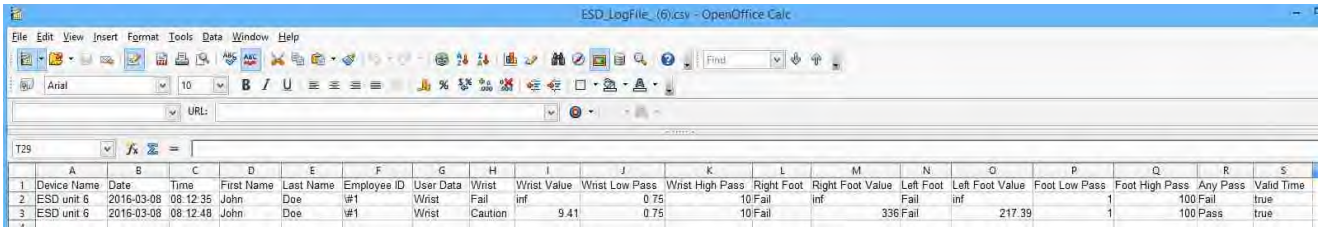
Downloading Logs

When downloading a test log, the log file is in the form of a .csv file. Open the file with a spreadsheet (such as Microsoft Excel or OpenOffice). Specify that a comma separator is being used in the file.



Use the spreadsheet to sort and arrange the data as desired.



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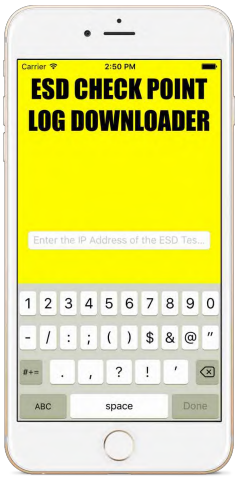
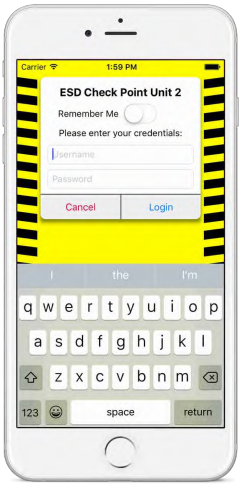
For Apple iPad and iPhone Users

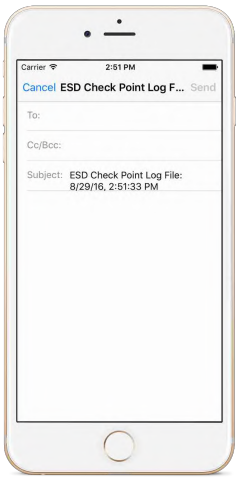
It is necessary to download the “ESD CHECK POINT LOG DOWNLOADER” from the App Store.
This is a free download and will allow the log to be emailed.

The IP address is located on the home page of the ESD Check Point

ESD CHECK POINT Log Downloader App located in Apple App Store. (Enter IP address)







To Email the logs enter the Email address/es.

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Troubleshooting

1. If the Operator Panel quits responding to RFID cards, unplug the unit for 10 seconds and plug it back in.
2. If the WiFi communication fails, unplug the unit for 10 seconds and plug it back in.
3. If the Operator Panel powers up with the blue LED rapidly flashing but the LED display remains black, unplug the unit for 10 seconds and plug it back in.
4. If there is a consistent indication of a Calibration Error, contact your distributor or ExtraTech Systems.

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SPECIFICATIONS

- **Voltage & Current Requirement:**
  - Specification for 5V Adapter provided with Check Point...
    - AC Input Voltage Rating: 100 to 240Vac
    - AC Input Frequency: 47 to 63 Hz
    - Input Current: 500mA RMS max at 120Vac
250mA RMS max at 240Vac
    - DC Output 5V ±5%, 3.0A max
  - 5V Input Requirement for Check Point...
    - Input Voltage: 4.3 to 5.8VDC
    - Input Current: 1.5A max at 5.0VDC

- **Testing Range:** 100 KΩ – 800 MΩ

- **Default Passing Ranges...**
  - Wrist Strap: 0.750 MΩ – 10 MΩ
  - Footwear: 1 MΩ – 100 MΩ

- **Adjustable Range Setting...**
  - For both wrist straps & footwear: Any high/low setting from 0.100 MΩ to 800 MΩ

- **Display:** An LCD displays shows test results

- **Weight:** ~ 30 lbs

- **Height:** 41 ¾ inches

- **Base Dimensions:** 22 ½ inches deep by 22 inches wide

- **Stand:** Powder coated steel. Color: Yellow

- **Base:** StarBoard polymer sheet on powder coated steel

- **Footplates:** Two Stainless steel plates

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Appendix A

PROPER WEARING OF ESD WRIST STRAPS & FOOTWEAR

Wrist Straps:

- High readings:
  - Poor contact between wrist strap's band and your skin... One possible cause.
    - To make good contact, the band should be tight enough to make firm contact with the skin but not too tight. The band's tightness should be adjustable.
  - Your skin... Another possible cause.
    - Dry skin (especially in winter months) will result in higher resistance readings.
    - Some people have thicker skin than others which will result in higher readings.
    - Solution 1: Try moisturizing the skin on the wrist with ESD lotion to increase conductivity. If you regularly see high readings, this may be something you just do every time before putting on your wrist strap.
    - Solution 2: If you are using a wrist strap with a band made of fabric, you could change to a wrist strap with a metal band that will have better conductivity.
  - A dirty band on the wrist strap... One more possible cause.
    - A dirty band will be less conductive.
    - Solution 1: Replace the dirty band or wrist strap.
    - Solution 2: Try cleaning the band with an anti-static cleaning solution. Alternatively, most fabric bands can be hand or machine washed (gentle cycle) using liquid dish soap or a mild detergent such as Woolite.
    - Any cleaner or detergent being used must be silicone free since silicone is an insulator.
  - You may have a problem with the wrist strap itself.
    - Take the wrist strap off and pinch across from the inside of the band to the outside of the cord where the band and cord connect through a snap (use your thumb and index finger) and run a test. If you still see a high reading, the snap might be making a faulty connection or the cord might be faulty.
      - Replace the band, replace the cord, or replace the entire wrist strap.

- Low readings...
  - A wrist strap will typically have a series 1 MΩ resistor in the cord, so a reading below 1 MΩ is going to be a failed wrist strap or there is a parallel conduction path.
    - Since the test circuitry on the ESD Check Point Agent Operator Panel is isolated, a parallel path should NOT be possible.
    - Verify with a multi-meter that resistance from the band to the banana jack on the wrist strap is below 1 MΩ, and replace the wrist strap if it is.

Heal Straps and Toe Straps:

- Wearing a heal strap or toe strap...
  - Good conduction with a heal or toe strap depends on a perspiration layer through the

sock to the foot.
    - With the shoe off, place the heal strap on the heal of the shoe or toe strap on the toe of the shoe. (See instructions that came with the straps for detailed instructions.)
    - Position the conductive ribbon in the bottom of the shoe and insert your stockinged foot into the shoe on top of the ribbon.
    - As much conductive ribbon as possible should touch the bottom of your foot. (If the ribbon is longer than the bottom of your shoe, loop it back or cut off the excess.)
- The type of sock you wear can affect conductivity by how much moisture it will hold and it's insulating properties.
    - Cotton can work well.
    - Ask about conductive ESD socks... They will work the best.

- High readings:
    - Dirty heal or toe strap... One possible problem.
        - If the portion of the heal or toe strap that makes contact with the floor gets too dirty, the dirt can create an insulating layer and reduce conductivity.
        - If the conductive ribbon gets too dirty, it can also reduce conductivity.
        - Solution 1: Clean the portion that makes contact with the floor regularly with anti-static cleaner or wipes (or alternatively with isopropyl alcohol).
        - Solution 2: Most ESD straps can be safely hand or machine washed (on a gentle cycle) using liquid dish soap or a mild detergent such as Woolite.
        - Any cleaner or detergent being used must be silicone free since silicone is an insulator.
    - Sock isn't allowing enough of a conductive perspiration layer... Another possible cause.
        - Solution 1: Wear socks that have more cotton, or better yet, ESD socks.
        - Solution 2: Try putting the conductive ribbon inside your sock with as much ribbon as possible contacting the skin.
            - You might even need to moisturize some skin with ESD lotion.
    - You might have a problem with the heal or toe strap itself.
        - The strap typically will have either a 1 MΩ or 2 MΩ series resistor between the portion making contact with the floor and the conductive ribbon.
            - You test the resistance with a multi meter by checking from the portion of the strap that contacts the floor to the conductive ribbon.
            - If the resistance is much higher than 2 MΩ, replace the foot or toe strap.

- Low readings...
    - Moisture on the floor or ground... One possible source.
        - If you wear the foot or heal strap where you might step in moisture (such as outdoors where there has been some rain, fog, dew, snow, sprinklers,...), the moisture can make for a better conductive path.
        - The heal or toe strap typically will have a 1 MΩ or 2 MΩ resistor built in. Moisture can create a better parallel conductive path around the strap's resistor.
        - The soles of some shoes can provide a parallel conductive path, and moisture will

enhance that conductive path.
    - Solution 1: If the strap got wet all the way up to the material around the built-in resistor, try using a replacement strap until the wet one drys out.
    - Solution 2: Move the conductive ribbon around so less of the ribbon is under the foot. Use the Operator Panel to re-check your feet as they dry.
    - Solution 3: Wear shoes with a rubber sole or with an insole that is less conductive.
        - Ask about static dissipating insoles.
  - Your shoes are providing a conductive path... Another possible source.
    - If you regularly see a low reading even when your shoes aren't wet, the shoes on their own could be providing a parallel conductive path.
    - Solution 1: Wear shoes with a rubber sole or with an insert that is less conductive.
  - You might have a problem with the heal or toe strap itself.
    - The strap typically will have either a 1 MΩ or 2 MΩ series resistor between the portion making contact with the floor and the conductive ribbon.
        - You test the resistance with a multi meter by checking from the portion of the strap that contacts the floor to the conductive ribbon.
        - If the resistance is lower than 1 MΩ, replace the foot or toe strap.

ESD Shoes:

- ESD shoes are made to dissipate static.
  - Don't add your own insole to these shoes unless it is an ESD insole.
- Be sure to keep the bottom of the shoe free of dirt and dust.

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Appendix B

MAINTENANCE

- The gold pads on the unit should occasionally be cleaned to remove any buildup of dirt and finger oil.
- The steel footplates should occasionally be cleaned to remove any dirt and grime buildup.

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Appendix C

WARRANTY, EXCLUSIONS, and LIMITATIONS

LIMITED WARRANTY:

ExtraTech warrants that, for a period of 1 year from the purchase date, the ESD Check Point Agent will be free of defect in material. Within the warranty period, the electronics will be replaced free of charge. Electronics returned to ExtraTech shall be shipped prepaid along with a return authorization number and proof of purchase.

EXCLUSIONS:

The above warranty does not apply to defects or damage due to misuse, accidents, alterations, neglect, operator error or failure to clean and maintain the unit.

LIMITATIONS:

In no event shall ExtraTech be responsible for any injury, damage, loss, either direct or consequential, arising out of the use of a unit. Before using, users must determine the suitability of these units for their intended use. Users will assume all risk and liability in connection with the use and installation of these units.

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Return to main page

ESD CHECK POINT
DEPUTY AGENT
USER GUIDE

HVIN:ESD/CP-HW01

September 2016

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FCC Part 15

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:
1. This device may not cause harmful interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Changes or modifications to this device, not expressly approved by ExtraTech Systems could void the user's authority to operate the equipment.

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

Industry Canada Notifications

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:
(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage;
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Like all electrical equipment, this product can be damaged by electrical shock. Avoid exposing it to electrical/static shock.

I. INTRODUCTION

The ESD Check Point Deputy Agent is a fast, reliable, and robust solution to simplify daily testing to verify the performance of wrist straps. Each person who will be using the tester is issued an ID badge by the administrator to use with the tester. Test results are viewed on a display using both simple graphics and actual test readings. The tester averages 5 seconds per person, checking the wrist strap, and provides accurate accounting for administrative purposes. After each test a check is done of the wrist measurement circuit and a validation screen is displayed telling the user that their data has been verified and stored. An ID badge, that is easily programmed by the administrator with user identification information, is held over the tester to initiate testing. Data collection by the administrator is paperless and wireless using a network connection that is easy to setup and change. The tester will continue recording data along with an accurate time/date time stamp if the wireless connection goes down or is unavailable by making use of a battery backed real-time-clock circuit.

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II. FEATURES of ESD CHECK POINT DEPUTY AGENT

1. ESD Check Point only requires a 110V outlet for operation, so it is easy to install and move.
2. Reads and displays actual resistance of ESD wrist straps 100 KΩ to 800 MΩ.
3. The default range for a "pass" on wrist straps is 750 KΩ to 10 MΩ.
   A) The administrator can change the "pass" ranges to any value desired between 100 KΩ and 800 MΩ.
   B) Test data will indicates the "pass" ranges being used when each test was performed.
4. The number of possible users only depends on the number of ID badges programmed with user information.
5. Easy to use: User plugs in their wrist strap, places thumb or finger on a gold pad, scans an ID badge and views results.
6. Test results not only give actual resistance readings but also show readily understood graphics that indicate what has passed and what has failed.
7. After each test, the Operator Panel checks the operation and accuracy of the circuitry that measures the wrist strap resistance and will display and record any operational or calibration issue. This assures the ESD administrator that all test data being collected by the Operator Panel is accurate.
8. MIFARE 13.56 MHz RFID cards are used to initiate testing. An administrator can write user information to RFID cards using the Operator Panel. Alternatively, a smart phone with an RFID card writer application or an RFID reader/writer (such as a uFR NFC RFID Reader Writer by D-Logic) can be used.
9. Test data resident on an Operator Panel can be reviewed by an administrator at any time by using a computer browser.
10. Storage area for test data is large enough to allow an administrator to download test data to a computer on a weekly, monthly, quarterly or more interval. Once downloaded, the data resident on the Operator Panel can be deleted so only new data is available for viewing or downloading.
11. Downloaded test data is in the form of a .csv file which can easily be opened, arranged and evaluated using a spreadsheet such as Microsoft Excel or OpenOffice.
12. During initial installation, the Operator Panel comes up as a WiFi hotspot (access point mode) with it's own web page. Setup can be done from a nearby computer that has WiFi access or by using a smart phone.
    A) A local WiFi network connection can be set for subsequent access to the Operator Panel.
    B) Administrative settings can be changed.
13. Typically, an administrator will have the Operator Panel connected to a local WiFi network.
    A) If a local WiFi network isn't available, the Operator Panel can stay in access point mode and act as it's own WiFi hotspot.
14. In either access point mode or when connected to a local WiFi network, the Operator Panel can test and record ESD pass/fail data and an administrator can read and download test data as well as change administrative settings.
    A) When connected to a local WiFi network, time stamp information for the data being collected is kept current through the network.

continued

B) When in access point mode, time stamp information must get set. This can be done in two ways...
   1. 1) An administrator can go to the administration page and set the current date and time.
   2. 2) If possible, the Operator Panel can be connect to a WiFi network long enough to obtain the current date and time before being set back to access point mode.
   3. Once the date and time are set, accurate time stamp information is maintained through a real-time-clock circuit in the Operator Panel.

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Check Point Deputy Agent
Unpacking and Assembly

Materials Enclosed

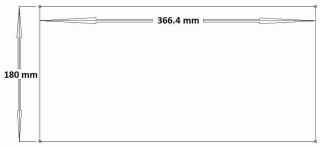
Operator Panel

Base Plate

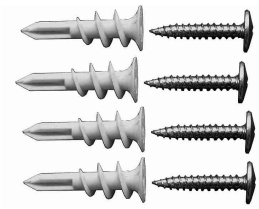
C-Channel

C-Channel to Base Plate and Operator Panel to C-Channel Hardware
8ea #4-40 x3/8” 1/16'Allen
1ea 4-40 nut with washer

Wall Bracket Mounting Template



4ea Zip It Juniors
4ea #6 Screws
for Wall Brackets



Wall Brackets

AC Adapter

Grounding Wire

User Guide CD

Right Angle Power Extension Cord

Base Plate to Wall Brackets Hardware
4ea M4x12mm screws

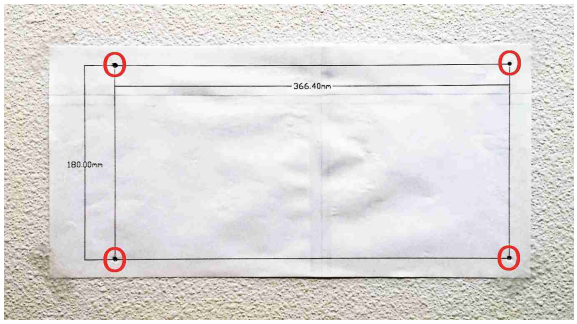
www.ESDCheckPoint.com

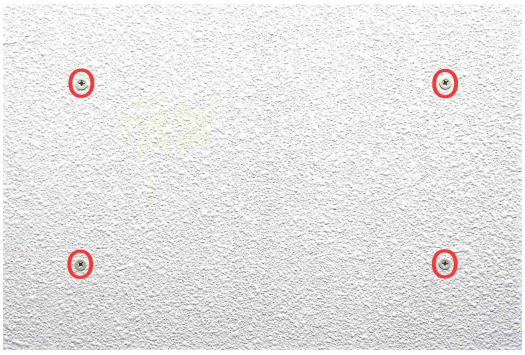
Tools Required

3/16” drill 1/4” wrench 2.5mm Allen wrench
1/16” Allen wrench P2 Phillips

Installing Wall Anchors to the Drywall

- Determine the height required for the installation. (Recommend that the top of the plate be 53” from the floor.)
- Place the template against the wall, ensure it is level, and mark the holes. (Make sure there are not any studs behind the holes.)

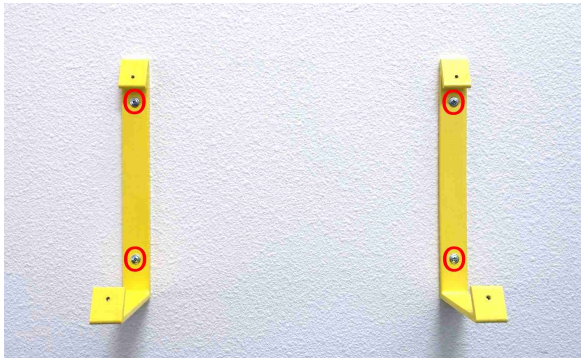




- Drill each mark with a 3/16” drill
- Using a Phillips screwdriver, set each Zip It Junior anchor flush with the drywall

Attaching the Wall Brackets

- Attach the brackets with four #6 Phillips screws as shown

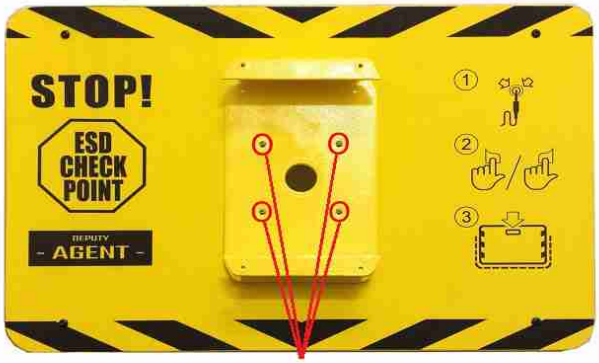


Secure the Base Plate to the Brackets

- Secure the Base Plate to the Brackets using four M4x12mm Allen Head Screws. (indicated by red circles)
- Use the M2.5 Allen wrench

Attaching C-Channel to the Base Plate

- Attach the C-Channel to the Base Plate with four #4-40x3/8” Allen screws
- Use a 1/16” Allen wrench



4ea #4-40x3/8"
1/16"Allen drive screws

Attaching the Operator Panel to the C-Channel

- Put the right angle end of the power cord and the ground wire through the hole in the Base plate and C-Channel as shown
- Plug the cord into the connector on the Operator Panel

- Secure the Operator Panel to the C-Channel using four #4-40x3/8” Allen screws (indicated by red circles)
- Use a 1/16” Allen wrench

- Secure the ground wire from the Operator Panel and the grounding wire to the C-Channel. Place the connectors over the screw at the upper left corner.
- Use the #4 nut and tighten with a ¼” wrench.

- Grounding wire can be attached to the outlet ground with the face plate screw.

- Completed Unit

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INITIAL INSTALLATION of ESD CHECK POINT DEPUTY AGENT

1. Place the ESD Check Point Agent by a wall outlet at a location in or around the area where workers will be entering their workplace and connect the 5V wall adapter .
2. The blue LED on the Operator Panel will start flashing at a fast rate and the screen will flash a couple of times. In about 45 seconds the Operator Panel will be fully up and operational... The blue LED will begin flashing at a slower rate and screen will appear as shown below.
3. When a ESD Check Point is purchased, it is setup to operate as it's own WiFi hotspot. Typically, the ESD administrator will want to have the Operator Panel setup so it can be communicated with using a local WiFi network. Refer to “Administrator Tools – Steps to connecting Operator Panel to local WiFi network...” for network setup instructions.
   A) In some cases it might be necessary to keep the Operator Panel isolated from an external network. For this situation, the Operator Panel can be operated in it's Access Point mode where it operates as a WiFi hotspot with it's own web page.
      1. Data collected by the Operator Panel is time-stamped, and it will have to be set to the current date and time. There are two ways this can be done...
         a) The unit can be temporarily located in a location where it can be connected to a local WiFi network and it will obtain the current date and time from the network. It can then be unplugged and moved to it's normal location for use. Refer to “Administrator Tools – Steps to connecting the Operator Panel to local WiFi network...”
         b) Date and time can be manually set by the administrator. Refer to “Administrator Tools – Setting Date and Time...”.
4. The data collected by the Operator Panel will indicate a Device Name for the Operator Panel. If more than one ESD Check Point is being used, the administrator can change the device name so that it is possible to identify which Operator Panel the downloaded data came from. Refer to “Administrator Tools – Setting Device Name and Password...”.
5. The default ranges for a “pass” condition for wrist straps it set by default to 750 KΩ to 10 MΩ. These ranges can be changed by the administrator. Refer to “Administrator Tools – Setting “Pass” Ranges for Wrist Strap...”.
6. The ESD Check Point can lose power or be unplugged at any time without losing collected test data or the current date/time stamp.

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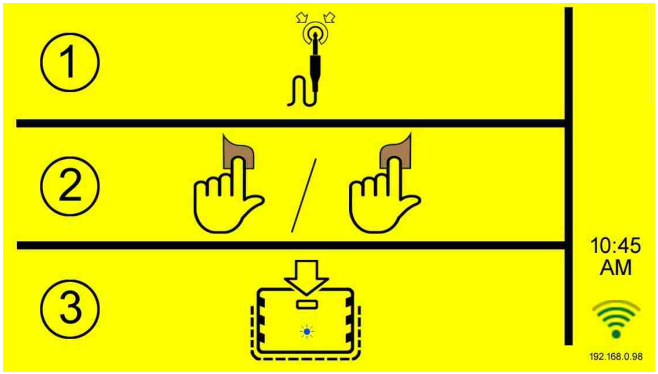
Explanation of Displayed Screens of the ESD Check Point Deputy Agent

Initial Screen for Deputy Agent

1. Insert the wrist strap plug
2. Hold a finger down on either of the two gold touch plates located at the lower corners on the front of the Operator Panel
3. Hold the ID badge over unit Status Icons

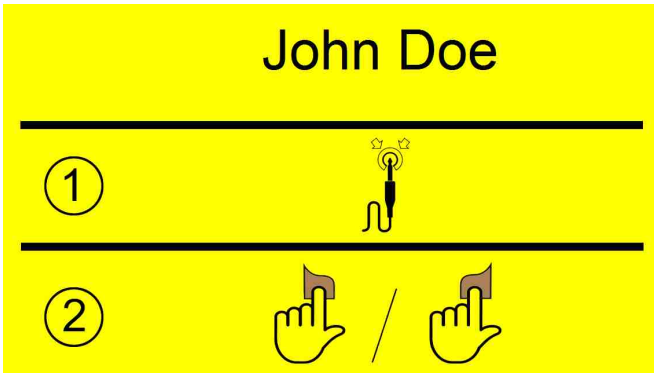


Status Icons

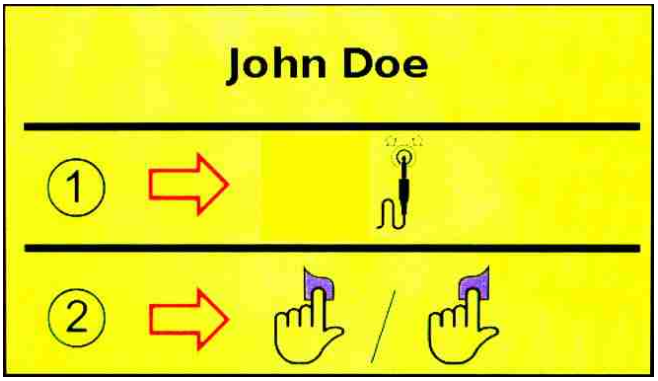
Status Icons

Data Log	Successful		
Test circuitry	Okay		
Configuration	Incomplete	Complete	
WiFi	No signal	Full Signal	
AP Mode address (initial setup)	10.0.0.1	IP address for WiFi	192.168.0.xxx
Validation failure		Note: If the wrench appears, there will **not** be a green file or green bulls eye.	

Waiting for Connection Screen – Deputy Agent



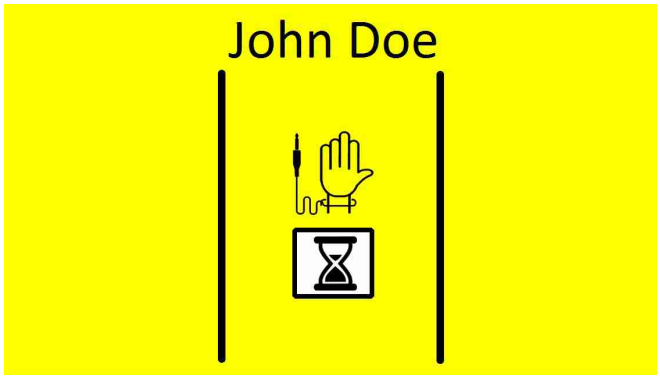
ID badge scanned
Waiting for wrist strap
to be detected.



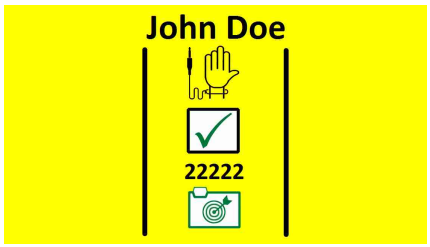
ID badge scanned
Still waiting for
wrist strap to be detected.

Testing Screen

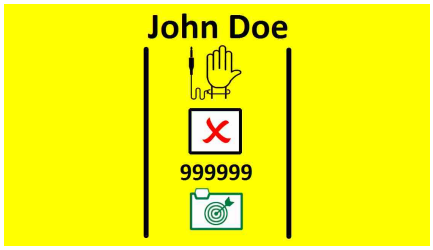
Testing in progress



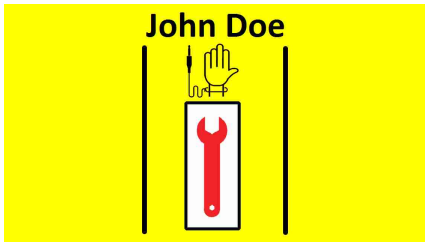
Test Results Screens



Passed and
Data Logged



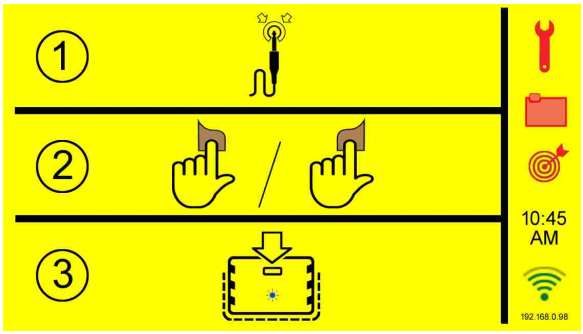
Failed and
Data Logged



Validation Error
Data Not Logged

See Below

Main screen.
Wrench appears.
Bulls eye and file icon are red.
(This occurs when there is a validation error that occurs ≥ 5times. Notify supervisor.)



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Basic Operation

1. Connect the ac adapter to the back of the unit.
2. Connect the wrist strap to the jack on the front.
3. Hold a thumb or finger on one of the two gold pads for the duration of the test.
4. Scan your “ID badge” and wait for an acknowledgment.

NOTE: The order with which a user scans their card and places a thumb or finger on the gold pad is flexible. The card can be scanned first and then a thumb or finger can be placed on a gold pad.

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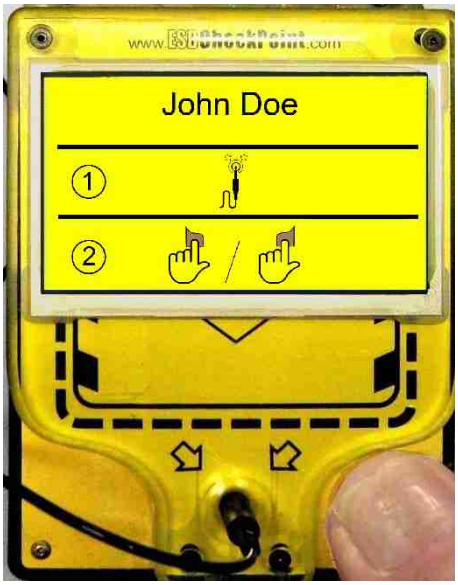
Testing of Wrist Straps

Suggestions on overcoming “failed” ESD tests are given in “PROPER WEARING OF ESD WRIST STRAPS & FOOTWEAR”.

Initial Screen

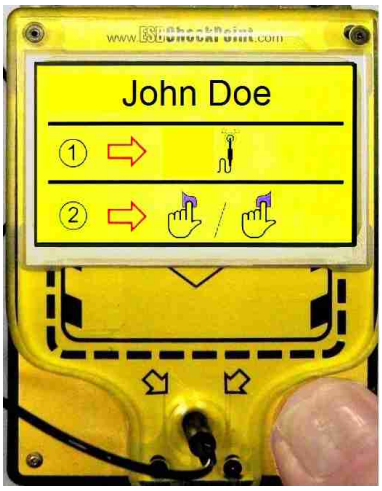
1. Connect a wrist strap to the jack on the front of the Operator Panel
2. Hold a thumb or finger on one of the two gold pads for the duration of the test.
3. Scan your “ID badge” and wait for an acknowledgment.

NOTE: The order with which a user scans their card and places a thumb or finger on the gold pad is flexible. The card can be scanned first and then a thumb or finger can be placed on a gold pad.



After scanning your badge, **if the Operator Panel doesn't detect a wrist strap** , the “Waiting for User” screen shown here is displayed.

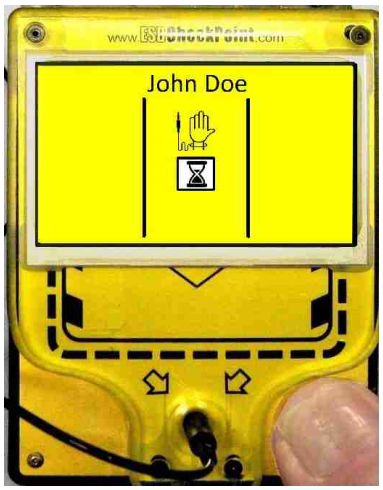
[Make sure that your wrist strap is plugged into the Operator Panel and you have a thumb or finger on the test pad.]



If this message appears...

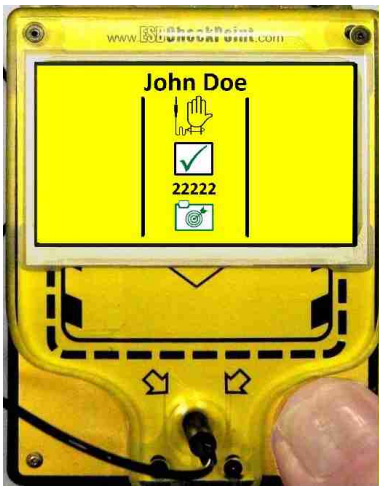
Check your wrist strap for proper connection.

If it appears OK you may have a defective strap that needs replacement.



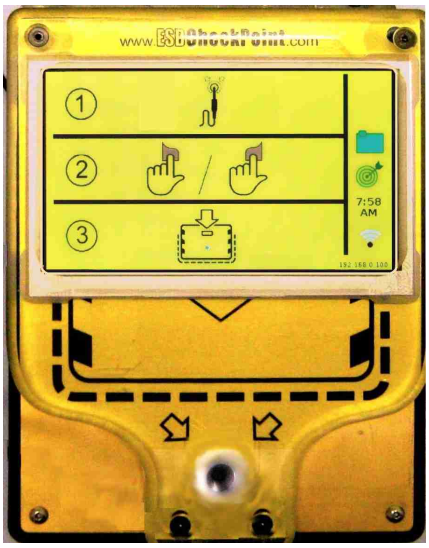
When you are detected...

This message will appear when you are detected. You will hear relays clicking as resistance measurements are made and proper operation is checked.



Test complete...

After the test is completed, this screen will appear.
(This illustration shows a passed wrist strap.)

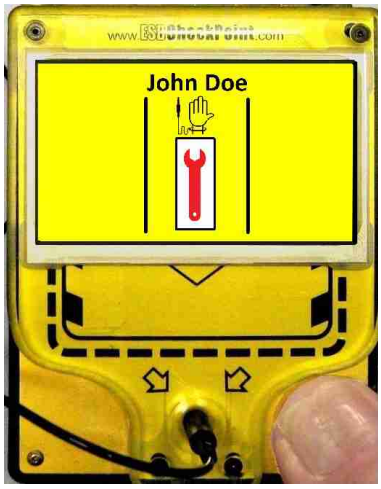


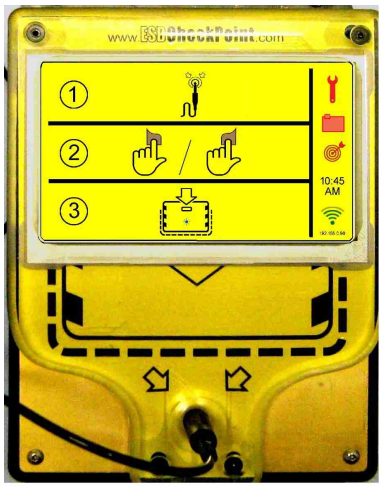
Data validated & stored...

When testing is complete and the user removes thumb/finger from gold pad, this screen will appear to indicate that a circuit validation test was performed, data stored and the operator panel is ready for the next user.

Test complete but not validated...

After the test is completed, this screen could appear if the Operator Panel can't validate it's measurement circuits. **Please try again.**





If this “ERROR” screen occurs, the unit was unable to validate the Operator Panel after 5 attempts. Data is not stored and the user should retest.
(This screen will appear when the thumb/finger is removed from the gold pad.)
If this ERROR continues, contact the ESD Administrator.

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Basic Troubleshooting

- If the Operator Panel quits responding to ID badges, unplug the unit for 10 seconds and then plug it back in.
- If the WiFi communication fails, unplug the unit for 10 seconds and then plug it back in.
- If the Operator Panel powers up with the blue LED rapidly flashing but the LED display remains black, unplug the unit for 10 seconds and then plug it back in.
- **If there is a consistent indication of a Calibration Error, contact your *distributor or *ExtraTech Systems.**

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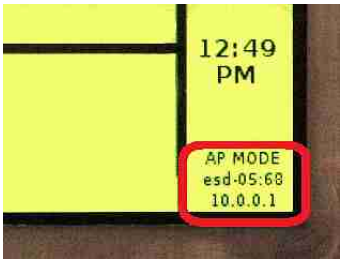
WiFi, Setup and Configurations

Steps to connect the Operator Panel to local WiFi network...

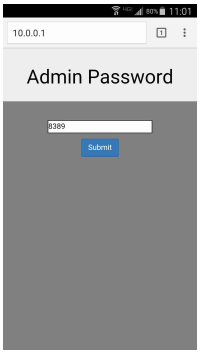
WiFi Set Up / Access

Plug in the device and wait for the “AP Mode” message to appear on the Operator Panel's screen.

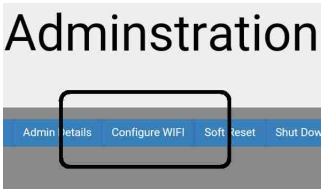
The Operator Panel comes up as a WiFi “hotspot” with it's own web page. The steps that follow have you accessing that web page.



Connect the SSID listed on screen
(shown here as “esd-05:68”)
with a smart-phone or laptop that has WiFi.
***** The network password is “esd.check.point”**.



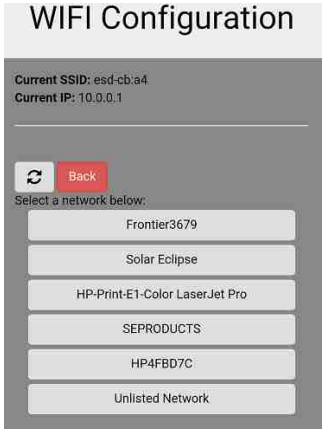
Navigate to 10.0.0.1 in phone or laptop internet browser (Internet Explorer, Firefox, Chrome, etc.)



Sign into device using admin password.
***** The default password is: 8389**

Click on “Configure WIFI”

Select the desired local network from the list.
If the network is hidden, click the “unlisted network” button at the bottom of the list.
Type the network password into the “WPA KEY” field.
If you selected "unlisted network", please type the SSID of the network into the SSID Field.



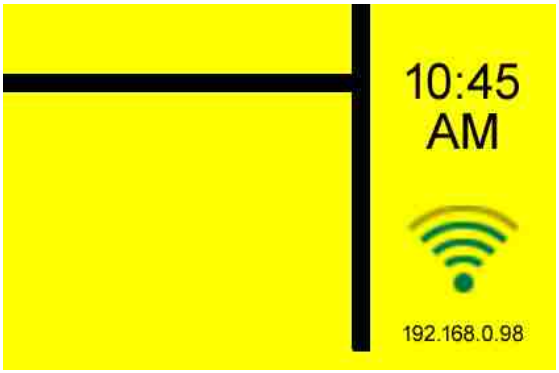
If you want a static IP address:
Check the static box below the “WPA KEY” field.
Fill out the static IP Fields and network information fields provided

After completing the form, click submit and accept the changes. The web page will then tell you when the changes are being applied and you can leave the page.

You will now need to connect back to you normal network. The ESD Check Point is no longer a “hotspot”

If the connection was successful, within 30 seconds the screen on the ESD tester will remove the "AP MODE" message and display its current IP address and signal strength.

From this time on, the administrative functions and test data can be accessed over the local network using the displayed IP address.



If the connection was unsuccessful (Bad Password, Static IP, or SSID), the Operator Panel can be put back into AP Mode.

- Power off the device
- Connect a wrist strap
- Touch one of the gold pads
- Power on the machine while still touching the gold pad.
- Let go of the gold pad when the blue led starts to blink slowly
- The device will now re-start in access point mode again

Repeat all the above steps for connecting the Operator Panel to a local WiFi network.

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Using the Operator Panel to Program an ID Badge

Logging on to the Administration page

- Use an internet browser to access the Operator Panel using it's IP address.
- Enter the Admin password (default is 8389).
- Click on submit

Programming the ID Badge

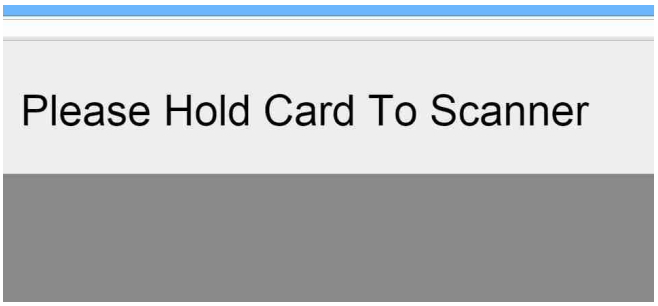
An ID badge can be written using the ESD Check Point Operator Panel or with a smart phone that has an RFID card writer application or an RFID reader/writer (such as a uFR NFC RFID Reader Writer by D-Logic). The type of ID badge cards required are MIFARE 13.56 MHz RFID cards.

"Write" an ID badge using the Operator Panel is covered here.

- Click on the "Write Card" button

- The Operator Panel should now show that it is in the "REMOTE ACCESS" mode.

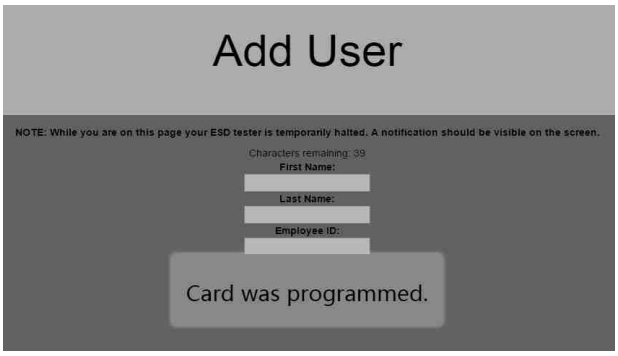
- Back on the web page, enter first and last name, employee ID and optional user data as shown.
- Click on “Program Card”



- The web page should now display the message “Please Hold Card To Scanner”.

- At the Operator Panel, hold the card over the scanner.

- If the badge was successfully programmed, the web page will indicate that the badge has been programmed as shown.
- Continue programming other badges.



OR

- If the badge programming was unsuccessful, the web page will indicate that the formatting was unsuccessful as shown here.
- Repeat badge programming.
- If you continue having issues with formatting a badge, you might not be using a card with the correct formatting... A MIFARE 13.56 MHz RFID card.

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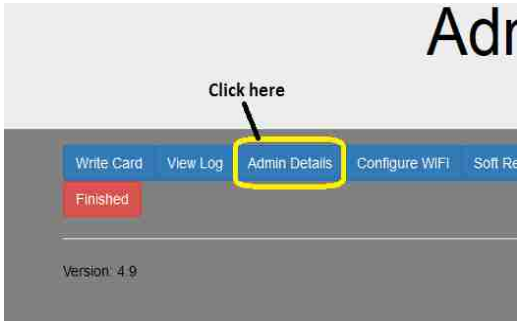
IV. ADDITIONAL CONFIGURATION

Setting Device Name and Password...

The device name is included in the test data when it is downloaded. If more than one Operator Panel is installed, names like “Shipping Door” or “East Door” can clarify which Operator Panel is displaying the data. Also, a different password other than the default “8389” can be specified.



Click on the “Admin Details” button

Enter the desired Device Name or Password and click on “Submit”.

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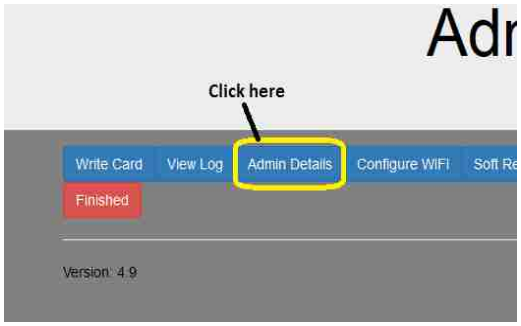
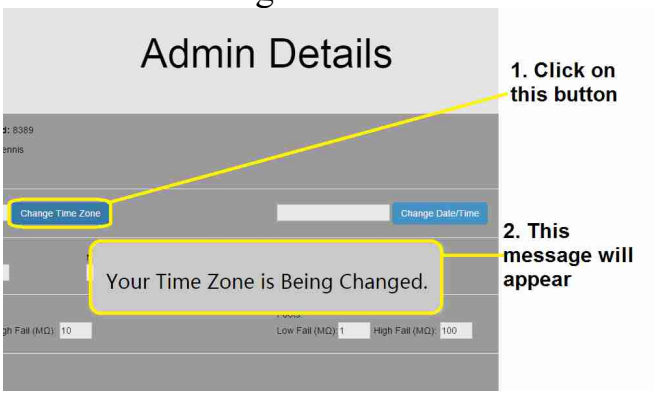
Setting Date and Time

If an Operator Panel can't be connected to a WiFi network, it can be run as it's own "hot point" in access point mode. To collect the data with accurate date and time information, an administrator can set the date and time as detailed here.

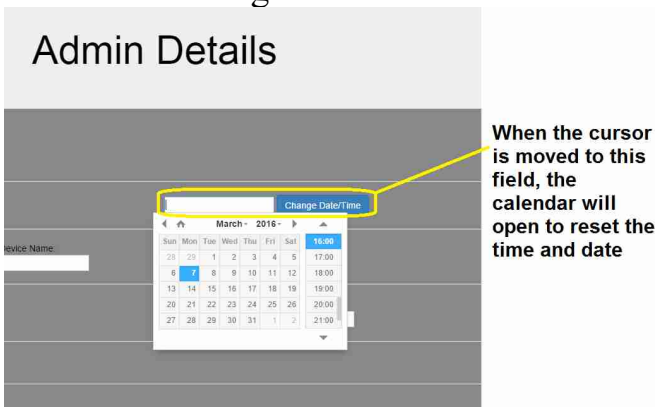


Click on the "Admin Details" button

Time Zone Change



Date/Time Change



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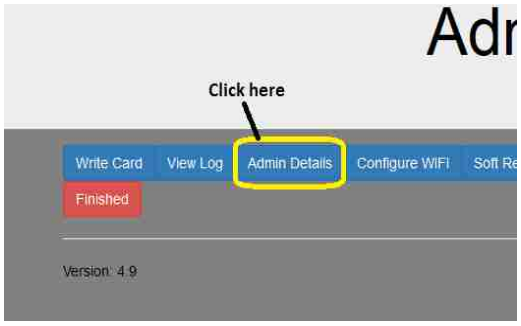
Setting “Pass” Ranges for Wrist Straps

The default range for wrist straps is 750 KΩ to 10 MΩ. The administrator can change those ranges to anything between 100 KΩ and 800 MΩ as shown here.



Click on the “Admin Details” button

Enter desired high and low range values for wrist and click on “Submit”.

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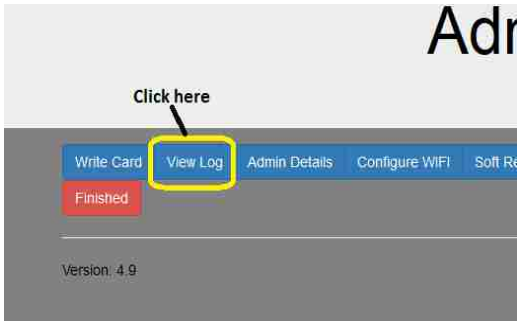
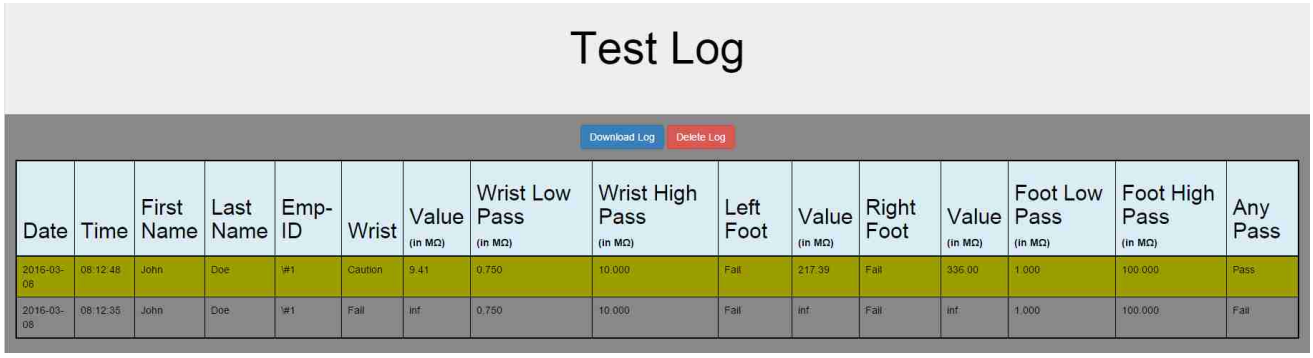
Accessing Logs

Viewing Test Logs



Click on the “View Log” button



Date	Time	First Name	Last Name	Emp-ID	Wrist	Value (in MΩ)	Wrist Low Pass (in MΩ)	Wrist High Pass (in MΩ)	Left Foot	Value (in MΩ)	Right Foot	Value (in MΩ)	Foot Low Pass (in MΩ)	Foot High Pass (in MΩ)	Any Pass
2016-03-08	08:12:48	John	Doe	\#1	Caution	9.41	0.750	10.000	Fail	217.39	Fail	336.00	1.000	100.000	Pass
2016-03-08	08:12:35	John	Doe	\#1	Fail	inf	0.750	10.000	Fail	inf	Fail	inf	1.000	100.000	Fail

The test log can be downloaded and/or deleted as required. Click on the appropriate button and follow screen instruction.

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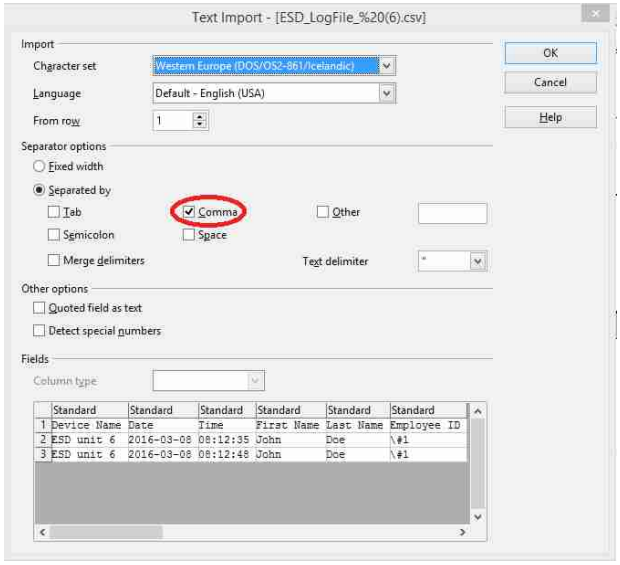
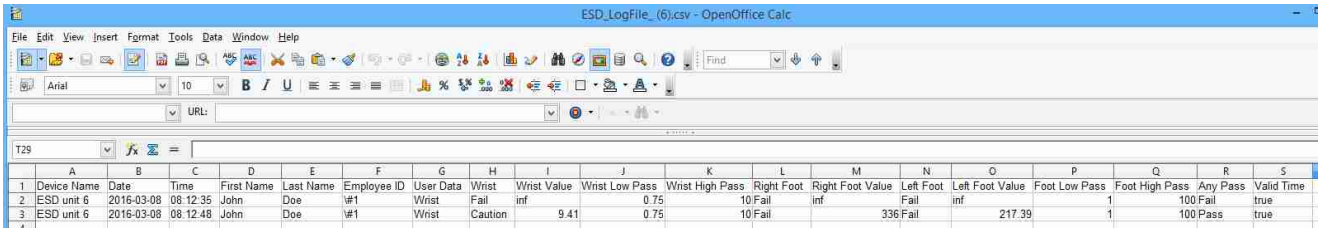
Downloading Logs

When downloading a test log, the log file is in the form of a .csv file. Open the file with a spreadsheet (such as Microsoft Excel or OpenOffice). Specify that a comma separator is being used in the file.



Use the spreadsheet to sort and arrange the data as desired.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Device Name	Date	Time	First Name	Last Name	Employee ID	User Data	Wrist	Wrist Value	Wrist Low Pass	Wrist High Pass	Right Foot	Right Foot Value	Left Foot	Left Foot Value	Foot Low Pass	Foot High Pass	Any Pass	Valid Time
2	ESD unit 6	2016-03-08	08:12:35	John	Doe	\#1	Wrist	Fail	inf	0.75	10	Fail	inf	Fail	inf	1	100	Fail	true
3	ESD unit 6	2016-03-08	08:12:48	John	Doe	\#1	Wrist	Caution	9.41	0.75	10	Fail	336	Fail	217.39	1	100	Pass	true

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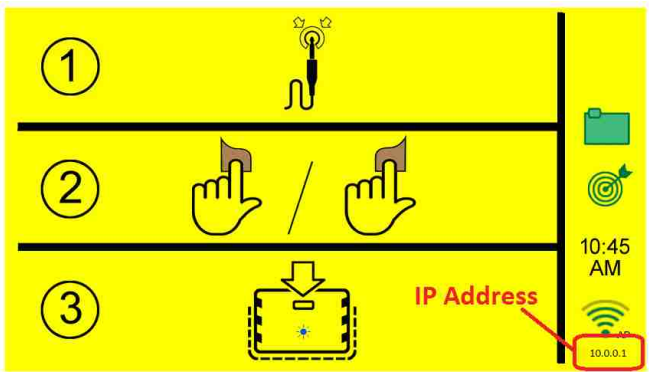
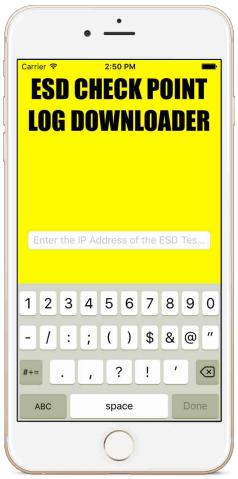
For Apple iPad and iPhone Users

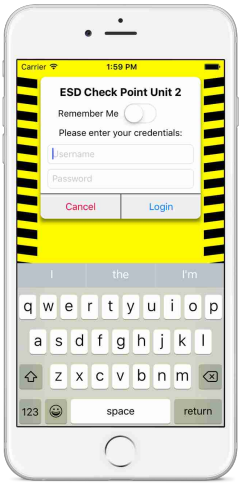
It is necessary to download the “ESD CHECK POINT LOG DOWNLOADER” from the App Store. This is a free download and will allow the log to be emailed.

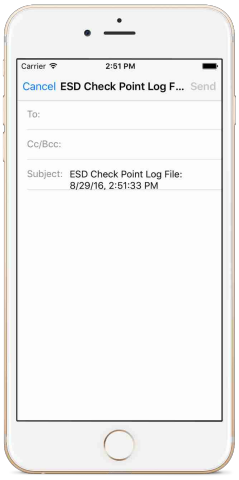
The IP address is located on the home page of the ESD Check Point Deputy Agent



ESD CHECK POINT Log Downloader App located in Apple App Store. (Enter IP address)







To Email the logs enter the Email address/es.

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Troubleshooting

1. If the Operator Panel quits responding to RFID cards, unplug the unit for 10 seconds and plug it back in.
2. If the WiFi communication fails, unplug the unit for 10 seconds and plug it back in.
3. If the Operator Panel powers up with the blue LED rapidly flashing but the LED display remains black, unplug the unit for 10 seconds and plug it back in.
4. If there is a consistent indication of a Calibration Error, contact your distributor or ExtraTech Systems.

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SPECIFICATIONS

- **Voltage & Current Requirement:**
  - Specification for 5V Adapter provided with Check Point...
    - AC Input Voltage Rating: 100 to 240Vac
    - AC Input Frequency: 47 to 63 Hz
    - Input Current: 500mA RMS max at 120Vac
250mA RMS max at 240Vac
    - DC Output 5V ±5%, 3.0A max
  - 5V Input Requirement for Check Point...
    - Input Voltage: 4.3 to 5.8V DC
    - Input Current: 1.5A max at 5.0V DC

- **Testing Range:** 100 KΩ – 800 MΩ

- **Default Passing Ranges...**
  - Wrist Strap: 750 KΩ – 10 MΩ

- **Adjustable Range Setting...**
  - Any high/low setting from 0.100 MΩ to 800 MΩ

- **Display:** An LCD displays shows test results

- **Weight:** 8.9 lbs. (4 kg)

- **Height:** 12 in (30.5 cm)

- **Width:** 18 in (46 cm)

- **Depth:** 7 in (17.8 cm)

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Appendix A

PROPER WEARING OF ESD WRIST STRAPS & FOOTWEAR

Wrist Straps:

- High readings:
  - Poor contact between wrist strap's band and your skin... One possible cause.
    - To make good contact, the band should be tight enough to make firm contact with the skin but not too tight. The band's tightness should be adjustable.
  - Your skin... Another possible cause.
    - Dry skin (especially in winter months) will result in higher resistance readings.
    - Some people have thicker skin than others which will result in higher readings.
    - Solution 1: Try moisturizing the skin on the wrist with ESD lotion to increase conductivity. If you regularly see high readings, this may be something you just do every time before putting on your wrist strap.
    - Solution 2: If you are using a wrist strap with a band made of fabric, you could change to a wrist strap with a metal band that will have better conductivity.
  - A dirty band on the wrist strap... One more possible cause.
    - A dirty band will be less conductive.
    - Solution 1: Replace the dirty band or wrist strap.
    - Solution 2: Try cleaning the band with an anti-static cleaning solution. Alternatively, most fabric bands can be hand or machine washed (gentle cycle) using liquid dish soap or a mild detergent such as Woolite.
    - Any cleaner or detergent being used must be silicone free since silicone is an insulator.
  - You may have a problem with the wrist strap itself.
    - Take the wrist strap off and pinch across from the inside of the band to the outside of the cord where the band and cord connect through a snap (use your thumb and index finger) and run a test. If you still see a high reading, the snap might be making a faulty connection or the cord might be faulty.
      - Replace the band, replace the cord, or replace the entire wrist strap.

- Low readings...
  - A wrist strap will typically have a series 1 MΩ resistor in the cord, so a reading below 1 MΩ is going to be a failed wrist strap or there is a parallel conduction path.
    - Since the test circuitry on the ESD Check Point Operator Panel is isolated, a parallel path should NOT be possible.
    - Verify with a multi-meter that resistance from the band to the banana jack on the wrist strap is below 1 MΩ, and replace the wrist strap if it is.

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Appendix B

MAINTENANCE

- The gold pads on the unit should occasionally be cleaned to remove any buildup of dirt and finger oil.

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Appendix C

WARRANTY, EXCLUSIONS, and LIMITATIONS

LIMITED WARRANTY:

ExtraTech warrants that, for a period of 1 year from the purchase date, the ESD Check Point Deputy Agent will be free of defect in material. Within the warranty period, the electronics will be replaced free of charge. Electronics returned to ExtraTech shall be shipped prepaid along with a return authorization number and proof of purchase.

EXCLUSIONS:

The above warranty does not apply to defects or damage due to misuse, accidents, alterations, neglect, operator error or failure to clean and maintain the unit.

LIMITATIONS:

In no event shall ExtraTech be responsible for any injury, damage, loss, either direct or consequential, arising out of the use of a unit. Before using, users must determine the suitability of these units for their intended use. Users will assume all risk and liability in connection with the use and installation of these units.

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