



GENERIC MAINTENANCE PROCEDURES

Document Number: 440MPZ000A

Document Issue: 1E

Date: 04 April 2024

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DOCUMENT CHANGE HISTORY

Date	Issue	Comment	Powerfleet Training Required
17 Sep 2013	1A	Initial release	YES
04 Oct 2013	1B	Updated Figure 8 and Applicable Documents	NO
11 Oct 2013	1C	Added Section 5: Test Pin Types. Added inspect pin height under Section 2. Updated Section 1.3. Updated point d. under Section 3. Updated point a. and b. under Section 4. Updated Section 7.	NO
16 Jul 2014	1D	Change document title. Changed Applicable Documents and Abbreviations to heading 1 type. Added sections 4 "In Case of Power Interruption" and section 5 "Label Printer Maintenance". Updated Section 3.3 and 3.7.	NO
04 Apr 2024	1E	Company names change from MiX Telematics to Powerfleet. Added probe cleaning procedure.	YES

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1 Scope of this document.

The purpose of this document is to define the procedure required to inspect and perform routine maintenance on all Bed-of-Nails testers.

2 Applicable Supplementary Documents

[1] Refer to relevant product specific:

- PCB Sub-Assembly Test Instructions
- Electronic Unit Sub-Assembly Test Instructions
- Test Pin Overlays

[2] Bed-of-Nails Maintenance/Inspection Log Sheet

3 Abbreviations

- BoN - Bed-of-Nails, used to test the various PCB Sub-Assemblies within the entire family of MiX / Powerfleet products.
- ESD - Electrostatic discharge
- PCB – Printed circuit board
- LED – Light emitting diode
- EU - Electronic unit

4 Preliminary Checks before Maintenance.

1. Shut down any instances of TestStand, which may currently be open, before proceeding with the following maintenance procedure.

Note: give TestStand time to shutdown properly, do not force close or terminate the application from task manager.

2. Make sure that air pressure to the test jig is adequate.



- Check that air pressure on pressure regulators reads about 6 bar (600kPa)
3. Make sure that the BON is plugged in and is powered ON.



- Check that the power plug is securely plugged in and the red power switch is illuminated, this signals the BON has mains power.

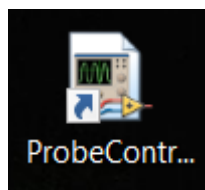
5 Generic Bed-of-Nails Maintenance Procedure

5.1 *Equipment Used*

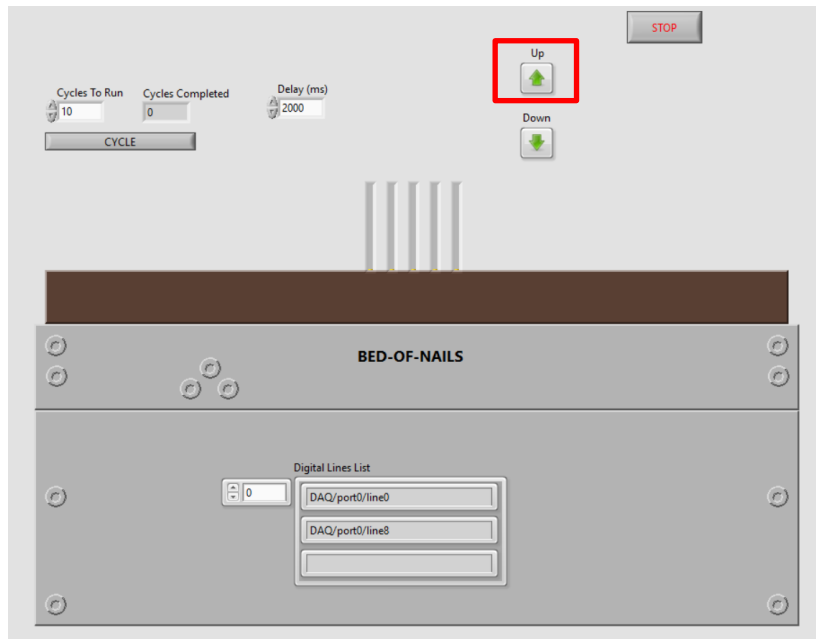
ESD safe brush.	
Loupe	

5.2 *Procedure*

1. Double-click the “ProbeControlAndCleaning” icon on the desktop



2. Press the “Up arrow” once the “ProbeControlAndCleaning” application has opened.



3. The probes will now be accessible for cleaning or maintenance.



4. Inspection of test pins

Once the pins have been engaged, inspect the probes with the loupe. Look for any bent, broken, dirty or probes that have not engaged properly. Check that all the engaged pins are the same height.

Below are examples of common probe issues.



Dirty fouled trihedral probe.

Dirty fouled lance probe.

Dirty fouled multipoint probe.

Worn depleted shaft of concave probe.

Bent and stuck lance probe.

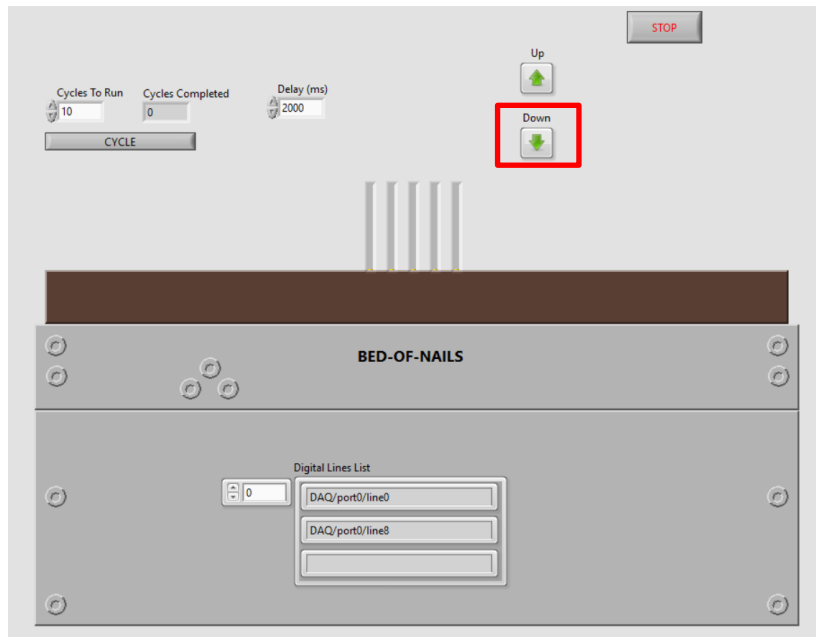
NOTE: Pay special attention to the pins closest to any hand soldered areas (usually around Molex and Fakra connectors) these pins often are dirtier than the rest.

Refer to Section 7 of this document for the Repair Procedure in the event of damaged pins, misaligned pins, or pins of incorrect height.

5. Once all probes have been inspected and suspect pins replaced, gently scrub the remaining probes for approximately 2min with an ESD brush.



6. Remove any loose debris from the BoN by means of suction or vacuum.
7. Press the “Down arrow” in the “ProbeControlAndCleaning” to disengage the test probes.

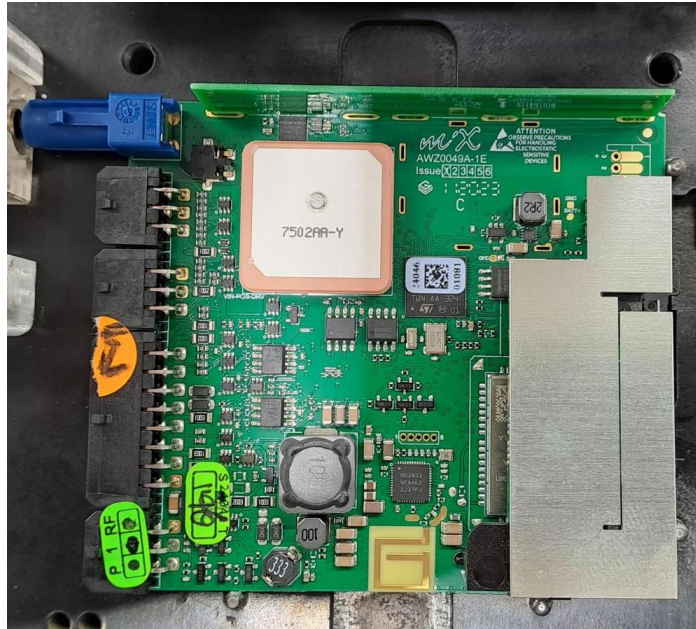


8. Repeat step 5, 7 and 10 and to verify the proper re-engaging and disengaging of the probes on the test jig.
9. Visually inspect the bed of nails and test pins for cleanliness again before continuing with the jig verification (See Section 5.3: Verification Requirements).
10. Indicate on the Bed-of-Nails Maintenance/Inspection Log Sheet [2] that the Maintenance/Repair Procedure has been completed.

5.3 Verification Requirements

1. Verify that the test jig is functioning correctly by performing the relevant Test Procedure [1] using a Master Sample PCB.

Note: Mater sample PCBs are marked with a “M”. These boards need to be kept in a safe place away from current production boards.



5.4 ***Bed-of-Nails Maintenance/Inspection Log Sheet***

Product Name: _____ (eg. MiXxxxx, TBR, MagiX, etc.)

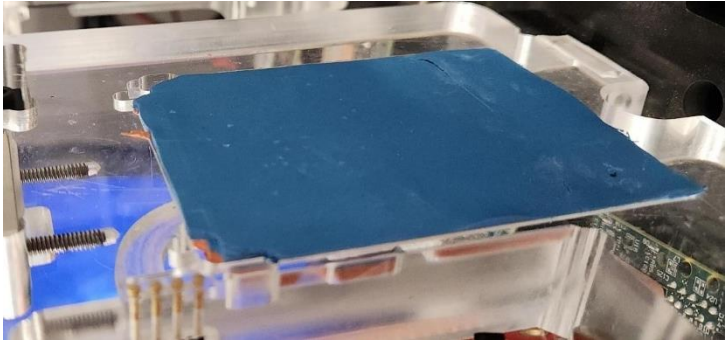
Jig Description: _____ (eg. First Test, Final Test, etc.)

Jig Number: _____ (eg.Jxxxxx)

	Damaged Pins (eg. TP##)	Time	Technician Sign/Stamp	Date
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

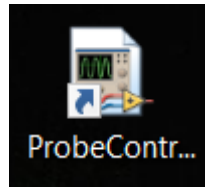
6 Semi-automated probe cleaning cycle

6.1 Equipment Used

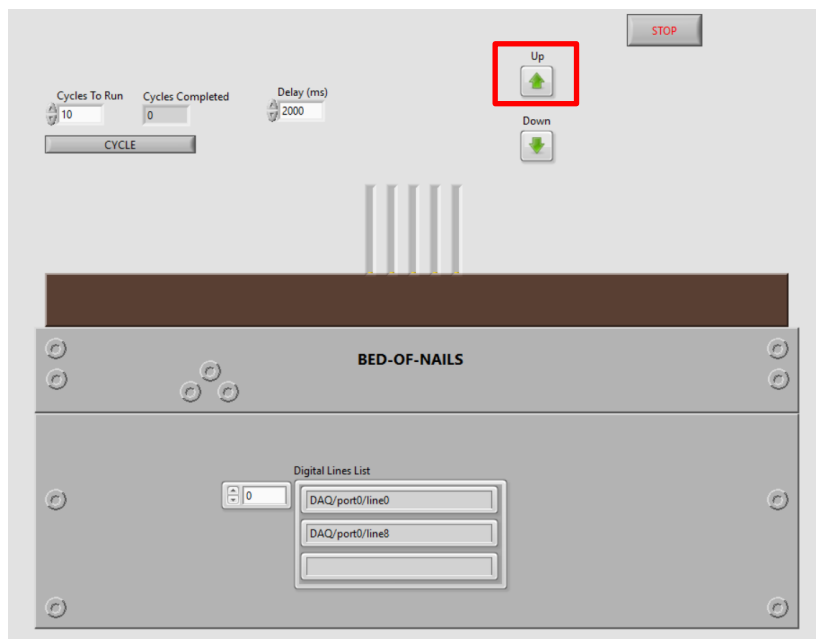
Cleaning mat	
Cleaning Lid with integrated cleaning mat	
Securing bolts	
Loupe	

6.2 Procedure

1. Double-click the “ProbeControlAndCleaning” icon on the desktop



2. Press the “Up arrow” once the “ProbeControlAndCleaning” application has opened.



3. The probes will now be accessible for cleaning or maintenance.



4. Inspection of test pins

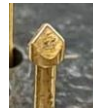
Once the pins have been engaged, inspect the probes with the loupe. Look for any bent, broken, dirty or probes that have not engaged properly. Check that all the engaged pins are the same height.

Note the level of contamination is present on the probes.

Very lightly contamination (0 -5 Cleaning cycles)



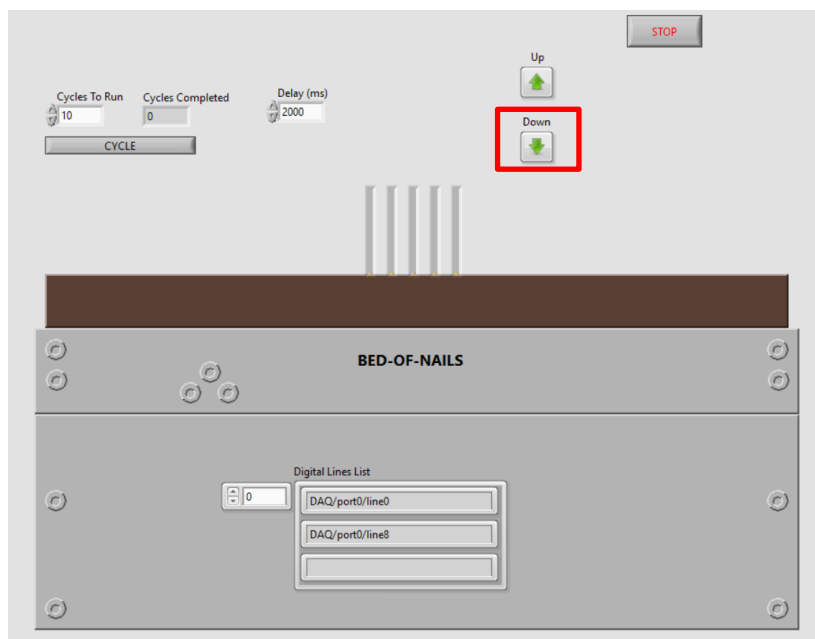
Lightly contaminated (5-10 Cleaning cycles)



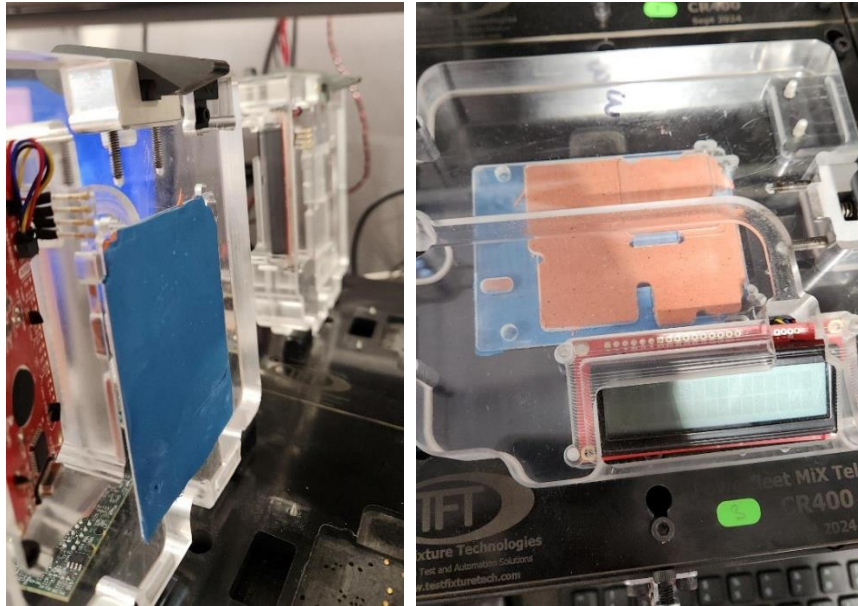
Heavily contaminated (10-20 Cleaning cycles)



5. Press the “Down arrow” in the “ProbeControlAndCleaning” to disengage the test probes.



6. For cleaning mat only: Open test jig lid and place the mat on the lid. Close the lid and move to step 9.

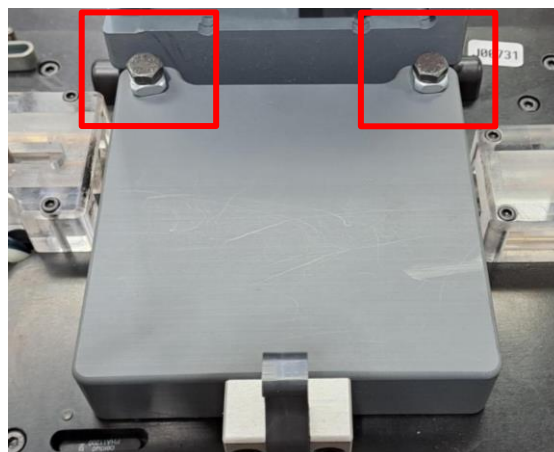


7. Clip cleaning fixture onto test jig.



8. Screw in the two securing bolts

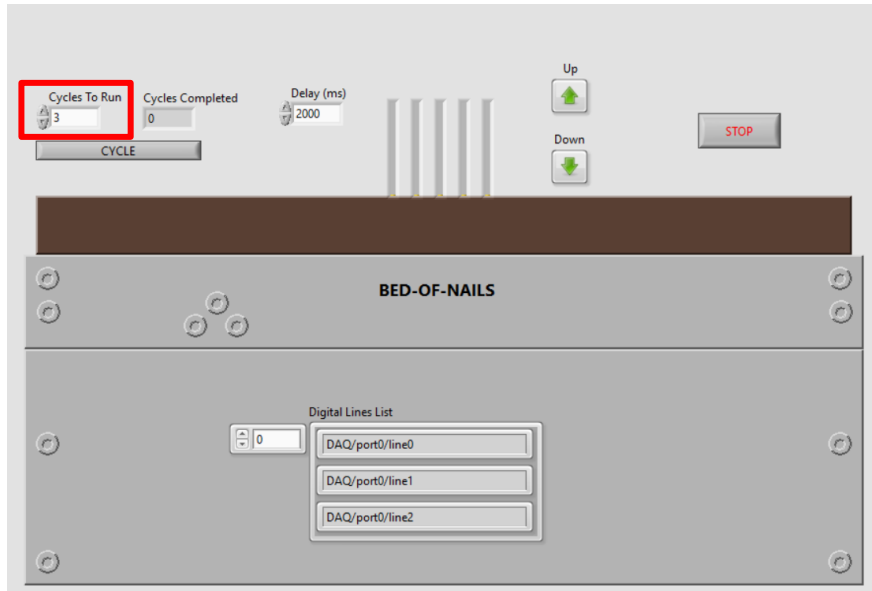
Note: This needs to be finger tight only – not tools should be used to fasten these bolts.



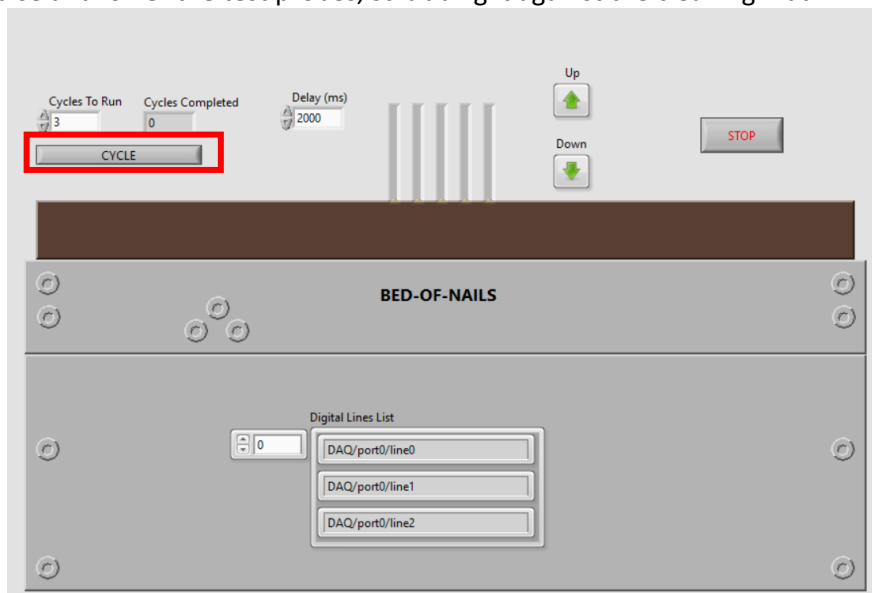
9. Interact with cleaning application to perform the cleaning cycle.

Type in the amount of cleaning engage and disengages probes need to make into the cleaning mat.

This should be kept between 5 – 30 cycles, found in point 4 of this section.

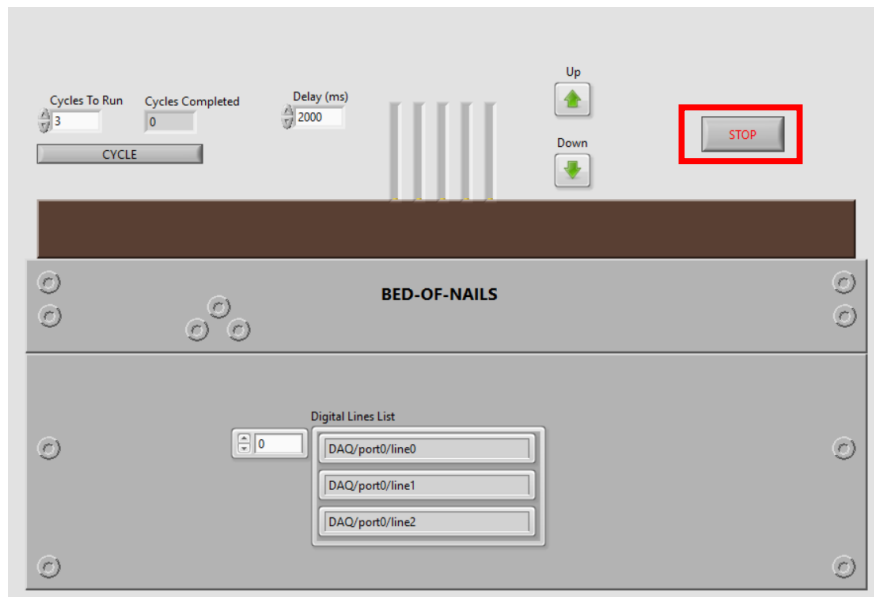


10. Press the “CYCLE” button to perform the probe cleaning. Note – this is an automatic sequence that will raise and lower the test probes, scrubbing it against the cleaning mat.

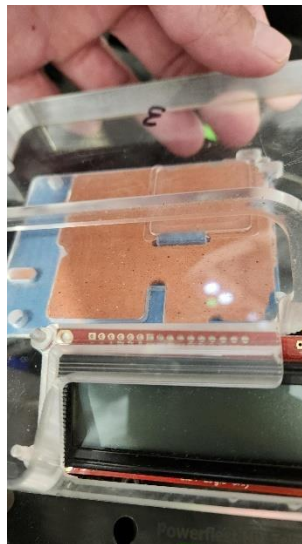


Note: If for any reason, the probe cleaning cycle must be stopped then the “STOP” button can be pressed to abort the cycle.

11. Once the cleaning cycle has completed, the applications should be stopped/closed.

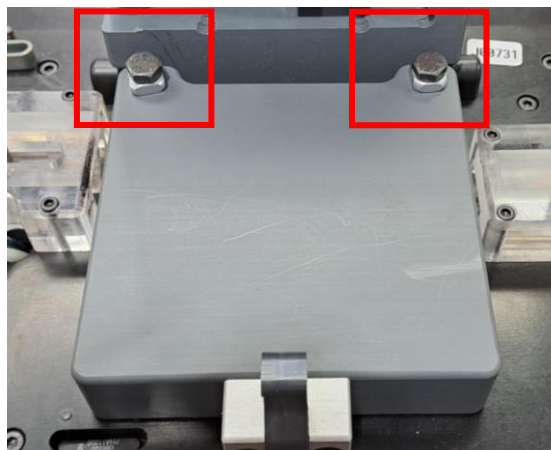


12. For cleaning mat only: Open the lid, remove the mat and go to step 15.

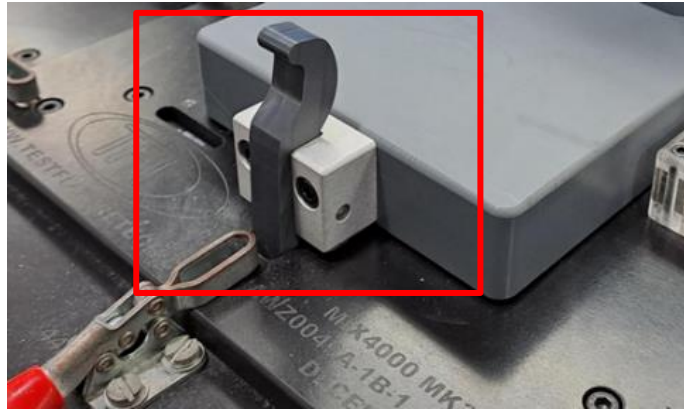


13. Disassemble cleaning fixture.

Unscrew securing bolts



14. Unclip lid from the test jig.



15. Repeat steps 2-5, inspecting that the cleaning cycle was successful in reducing the fouling on the probes. Repeat all steps again should the probes still be heavily fouled.

Probes that are still fouled after 2 consecutive cycles should be replaced.

Refer to section 7 for replacement procedure.

7 Probe Repair and Replacement Procedure.

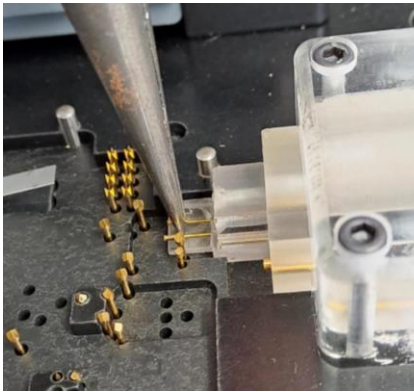
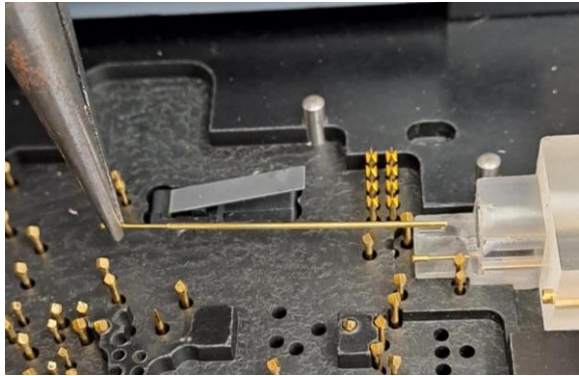
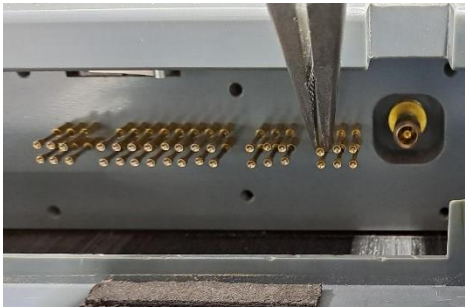
7.1 *Equipment Used*

Long-nosed pliers.	
Pin insertion tool	

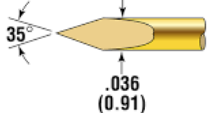
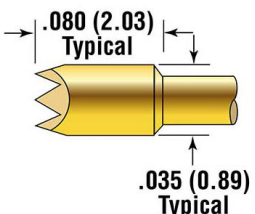
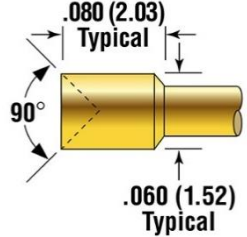
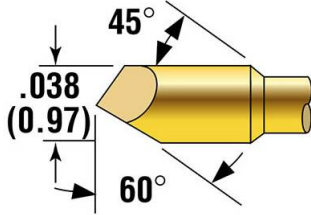
If test pins are not of uniform height, misaligned, bent or otherwise physically damaged, the technician will need to do the following:

7.2 Procedure

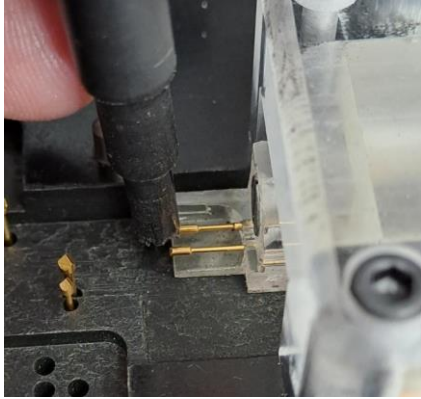
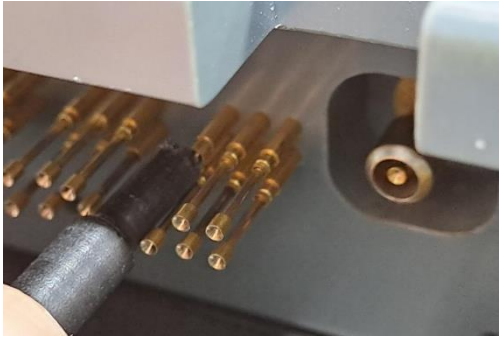
1. Engage the test pins and remove bent or damaged test pins using long-nosed pliers. The pin should be gripped below the tip of the pin and pulled out in an upward direction (for the bottom test pins) or forward direction (for the front panel test pins mounted in the test pin block).

Removing vertical probes.		
Removing side engage probes.		
Removing front face probes.		

2. Replace damaged pins with pins of the same exact tip type, length and diameter of the removed test pin (See below).

100 mil Lance 75 mil Lance 50 mil Lance	
100 mil Multi-point Crown	
50mil Multi-point Crown (long type)	
100mil Concave	
100mil trihedral 75 mil trihedral	

3. Pins are reinserted using the pin insertion tool and applying even pressure in the direction of the pin mounting hole. Misaligned pins and pins of incorrect height are realigned using the same method as defined for reinserting new test pins. Check that re placed pins are the same height as all the other test pins.

Installing vertical probes		
Installing side engage probes		
Installing front face probes		

In Case of Power Interruption

7.3 Test Station Power-down/Power-up Procedure

In the event of a planned or unexpected power interruption, various test equipment can enter and unknown state, which can negatively affect the proper functioning of a test setup. In some cases, a power interruption will result in a complete power down of all test equipment. In other cases it may be unnoticeable as the backup generator kicks in almost instantaneously. In both cases it is always recommended to reset the power of ALL test equipment.

In order to preserve correct functioning of a test setup, please ensure that the following steps are adhered to in the event of any power interruption.

(NOTE: While the equipment listed below are all common amongst various production test setups, please consult the relevant product specific Test Instruction for an accurate list of test equipment.)

1. Power down the PXI Controller Chassis or Test PC. Stop or Terminate any active test sequences and exit all test applications. Shut down Windows. Ensure that all test equipment is in an off state.
2. Switch off the Bed-of-Nails, Programmable Power Supply, Programmable DC Load and any other peripheral equipment.
3. Leave all test equipment in an OFF state for at least 2-minutes before powering them up again. Power up the equipment in the reverse order of which they were switched off.
 - Bed-of-Nails, Programmable Power Supply, Programmable DC Load and any other peripheral equipment.
 - NI PXI Controller Chassis or Test PC
4. Allow 5-minutes for all the equipment to power up and enter a ready state before launching the test application.

7.4 Verification Requirements

1. Verify test station functionality by performing the relevant Test Procedure [1] using a Master Sample PCB.

8 Label Printer Maintenance

8.1 *Maintenance Procedure*

Please refer to the SATO CG4 Series Operator Manual for maintenance instructions:

<http://www.satoamerica.com/uploads/files/datasheets/CG4%20Series%20Operator%20Manual.pdf>

- Loading Labels Page 2-3
- Loading Carbon Ribbons Page 2-7
- Cleaning and Maintenance Page 5-1

8.2 *Verification Requirements*

Verify the label printer functionality.

- a. Make sure printer “Green” LED is on constantly.
- b. Press “Feed” button to advance the label, making sure the “Green” LED stays ON.