Wave Distortion Monitor Verification Tester

Operation Instructions

Description

The Desco 98221 Wave Distortion Monitor Verification Tester is used to perform periodic test limit verification of Desco Wave Distortion Monitors. Verification may be accomplished without removing the monitor from its workstation. The Wave Distortion Monitor Verification Tester is National Institute of Standards and Technology (NIST) traceable. Frequency of verification is based on the critical nature of the ESD susceptible items handled. Desco recommends annual calibration of workstation monitors and the Wave Distortion Monitor Verification Tester.

Desco Single-Wire Wave Distortion Continuous Monitors are defined in ESD TR1.0-01-01 as impedance continuous monitors. Most metrology departments or companies specializing in calibration will not have the specialized test equipment needed for the calibration or verification of wave distortion continuous monitors. The Desco 98221 Wave Distortion Monitor Verification Tester meets ANSI/ESD S20.20 and Compliance Verification ESD TR53.

The Desco 98221 Wave Distortion Monitor Verification Tester can be used with the following items:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>19239</td>
<td>Mini Monitor</td>
</tr>
<tr>
<td>19243</td>
<td>Mini Monitor</td>
</tr>
<tr>
<td>19651</td>
<td>Multi-Mount Monitor</td>
</tr>
<tr>
<td>19652</td>
<td>Multi-Mount Monitor</td>
</tr>
<tr>
<td>19655</td>
<td>Dual Operator Continuous Monitor</td>
</tr>
<tr>
<td>19656</td>
<td>Dual Operator Continuous Monitor</td>
</tr>
<tr>
<td>19330</td>
<td>Full-Time Continuous Monitor</td>
</tr>
<tr>
<td>19331</td>
<td>Full-Time Continuous Monitor</td>
</tr>
</tbody>
</table>

Packaging

1 Wave Distortion Monitor Verification Tester
1 09700 Alligator Clip
1 09782 10mm Stacking Snap
1 09838 Ground Plug Adapter
1 Banana Plug Wire Adapter, 5”
1 Ground Extension Cord, 5’

Figure 1. Desco 98221 Wave Distortion Monitor Verification Tester
Features and Components

A. Mat Test Lead: Connect to the monitor’s mat terminal to verify its mat test circuit.

B. Ground Lead: Connect to equipment ground to provide a ground reference for the Wave Distortion Monitor Verification Tester.

C. Operator Test Lead: Insert into the monitor’s operator jack to verify its operator test circuit.

D. Rotary Switch: Selects the various pass and fail load values needed to verify the monitor’s operator and mat test circuits.

Operation

Mini Monitor

VERIFYING THE OPERATOR CIRCUIT

1. Connect the Wave Distortion Monitor Verification Tester’s green ground lead to equipment ground. This may be done using the included Ground Plug Adapter or alligator clip.

2. Insert the verification tester’s black operator test lead into the Mini Monitor’s operator jack.

Figure 2. Wave Distortion Monitor Verification Tester features and components

Figure 3. Using the Ground Plug Adapter to ground the Wave Distortion Monitor Verification Tester

Figure 4. Connecting the Wave Distortion Monitor Verification Tester to the Mini Monitor’s operator jack
3. Set the rotary switch to OPERATOR FAIL LOW. The monitor's red operator LED should illuminate, and its audible alarm should sound.

4. Set the rotary switch to OPERATOR PASS LOW. The monitor's green operator LED should illuminate.

5. Set the rotary switch to OPERATOR PASS HIGH. The monitor's green operator LED should illuminate.

6. Set the rotary switch to OPERATOR FAIL HIGH. The monitor's red operator LED should illuminate, and its audible alarm should sound.

7. Disconnect the operator test lead from the monitor.

**VERIFYING THE MAT CIRCUIT**

8. If using a discontinued monitor model (see page 7), insert a wrist cord into the monitor's operator jack and attach it to its park snap. This will enable the audible alarm for the mat circuit.

9. Connect the included stacking snap to the verification tester's white mat test lead.

10. Disconnect the monitor from its worksurface mat and turn it over to expose its 10mm snaps.

11. Connect the verification tester's white mat test lead to the monitor's 10mm mat snap.

12. Set the rotary switch to MAT 500M PASS. The monitor's green mat LED should illuminate.

13. Set the rotary switch to MAT 500M FAIL. The monitor's red mat LED should illuminate, and its audible alarm should sound.

**Multi-Mount Monitor**

**VERIFYING THE OPERATOR CIRCUIT**

1. Connect the Wave Distortion Monitor Verification Tester's green ground lead to equipment ground. This may be done using the included Ground Plug Adapter or alligator clip. See Figure 3.

2. Insert the verification tester's black operator test lead into the Multi-Mount Monitor's operator jack.

3. Set the rotary switch to OPERATOR FAIL LOW. The monitor's red operator LED should illuminate, and its audible alarm should sound.

4. Set the rotary switch to OPERATOR PASS LOW. The monitor's green operator LED should illuminate.

5. Set the rotary switch to OPERATOR PASS HIGH. The monitor's green operator LED should illuminate.

6. Set the rotary switch to OPERATOR FAIL HIGH. The monitor's red operator LED should illuminate, and its audible alarm should sound.

7. Disconnect the operator test lead from the monitor.
VERIFYING THE MAT CIRCUIT
8. If using a discontinued monitor model (see page 7), insert a wrist cord into the monitor's operator jack and attach it to its park snap. This will enable the audible alarm for the mat circuit.
9. Connect the included stacking snap to the verification tester's white mat test lead.
10. Disconnect the monitor's white mat monitor cord from its worksurface mat and turn it over to expose its 10mm snap.
11. Connect the verification tester's white mat test lead to the mat monitor cord's 10mm snap.

Dual Operator Continuous Monitor

VERIFYING THE OPERATOR CIRCUIT
1. Connect the Wave Distortion Monitor Verification Tester's green ground lead to equipment ground. This may be done using the included Ground Plug Adapter or alligator clip. See Figure 3.
2. Insert the verification tester's black operator test lead into one of the two operator jacks.
3. Set the rotary switch to OPERATOR FAIL LOW. The monitor's corresponding operator LED should illuminate red, and its audible alarm should sound.
4. Set the rotary switch to OPERATOR PASS LOW. The monitor's corresponding operator LED should illuminate green.
5. Set the rotary switch to OPERATOR PASS HIGH. The monitor's corresponding operator LED should illuminate green.
6. Set the rotary switch to OPERATOR FAIL HIGH. The monitor's corresponding operator LED should illuminate red, and its audible alarm should sound.
7. Disconnect the operator test lead from the monitor, and connect it to the second operator jack. Repeat the test procedure for the second operator circuit.

Figure 8. Connecting the Wave Distortion Monitor Verification Tester to the Dual Operator Monitor's operator 1 jack

12. Set the rotary switch to MAT 10M PASS. The monitor's green mat LED should illuminate.
13. Set the rotary switch to MAT 10M FAIL. The monitor's red mat LED should illuminate, and its audible alarm should sound.
VERIFYING THE MAT CIRCUIT
8. Connect the included stacking snap to the verification tester's white mat test lead.
9. Disconnect the satellite remote's black mat monitor cord from its worksurface mat and turn it over to expose its 10mm snap.
10. Connect the verification tester's white mat test lead to the mat monitor cord's 10mm snap.

Dual Operator Continuous Monitor's Mat Monitor Cord

Figure 9. Connecting the Wave Distortion Monitor Verification Tester to the Dual Operator Continuous Monitor's mat monitor cord

11. Set the rotary switch to MAT 10M PASS. The monitor's mat LED should illuminate green.
12. Set the rotary switch to MAT 10M FAIL. The monitor's mat LED should illuminate red, and its audible alarm should sound.

Figure 10. Connecting the Wave Distortion Monitor Verification Tester to the Full-Time Continuous Monitor's operator jack

VERIFYING THE OPERATOR CIRCUIT
1. Connect the Wave Distortion Monitor Verification Tester's green ground lead to equipment ground. This may be done using the included Ground Plug Adapter or alligator clip. See Figure 3.
2. Insert the verification tester's black operator test lead into the Full-Time Continuous Monitor's operator jack.
3. Set the rotary switch to OPERATOR FAIL LOW. The monitor's red operator LED should illuminate, and its audible alarm should sound.
4. Set the rotary switch to OPERATOR PASS LOW. The monitor's green operator LED should illuminate.
5. Set the rotary switch to OPERATOR PASS HIGH. The monitor's green operator LED should illuminate.
6. Set the rotary switch to OPERATOR FAIL HIGH. The monitor's red operator LED should illuminate, and its audible alarm should sound.
7. Disconnect the operator test lead from the monitor.
VERIFYING THE MAT CIRCUIT

8. Connect the included stacking snap to the verification tester's white mat test lead.

9. Disconnect the monitor's white mat monitor cord from its worksurface mat and turn it over to expose its 10mm snap.

10. Connect the verification tester's white mat test lead to the mat monitor cord's 10mm snap.

Calibration

Frequency of recalibration should be based on the critical nature of those ESD sensitive items handled and the risk of failure for the ESD protective equipment and materials. In general, Desco recommends that calibration be performed annually.

Use the information below to verify if the Wave Distortion Monitor Verification Tester operates within its specifications.

EQUIPMENT NEEDED
- RLC Bridge for testing operator circuit
- Digital Multimeter with 50-100V power supply for testing mat circuit

SETTINGS
- @ 50 Hz
  - Frequency = 1,000 Hz (20 x 50), 20th harmonic
- @ 60 Hz
  - Frequency = 1,020 Hz (17 x 60), 17th harmonic
- Set function switch to read "Equivalent Parallel Circuit"

RECORD THE FOLLOWING DATA

<table>
<thead>
<tr>
<th>Operator Rotary Switch Setting</th>
<th>Equivalent Parallel Capacitance</th>
<th>Targeted Specification (±10%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fail Low</td>
<td>138.9 pF</td>
<td></td>
</tr>
<tr>
<td>Pass Low</td>
<td>118.6 pF</td>
<td></td>
</tr>
<tr>
<td>Pass High</td>
<td>49.0 pF</td>
<td></td>
</tr>
<tr>
<td>Fail High</td>
<td>44.7 pF</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operator Rotary Switch Setting</th>
<th>Dissipation Factor</th>
<th>Targeted Specification (±10%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fail Low</td>
<td>.158</td>
<td></td>
</tr>
<tr>
<td>Pass Low</td>
<td>.367</td>
<td></td>
</tr>
<tr>
<td>Pass High</td>
<td>.445</td>
<td></td>
</tr>
<tr>
<td>Fail High</td>
<td>.192</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mat Rotary Switch Setting</th>
<th>Resistance @ 50V</th>
<th>Targeted Specification (±4%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10M Pass</td>
<td>8 megarohms</td>
<td></td>
</tr>
<tr>
<td>10M Fail</td>
<td>12 megarohms</td>
<td></td>
</tr>
<tr>
<td>100M Pass</td>
<td>80 megarohms</td>
<td></td>
</tr>
<tr>
<td>100M Fail</td>
<td>120 megarohms</td>
<td></td>
</tr>
<tr>
<td>500M Pass</td>
<td>400 megarohms</td>
<td></td>
</tr>
<tr>
<td>500M Fail</td>
<td>600 megarohms</td>
<td></td>
</tr>
</tbody>
</table>
### Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>50 to 95°F (10 to 35°C)</td>
</tr>
<tr>
<td><strong>Environmental Requirements</strong></td>
<td>Indoor use only at altitudes less than 6500 ft. (2 km)</td>
</tr>
<tr>
<td></td>
<td>Maximum relative humidity of 80% up to 85°F (30°C) decreasing linearly to 50% @ 85°F (30°C)</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>3.17” L x 2.25” W x 1.26” H (81 mm x 57 mm x 32 mm)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>0.3 lbs. (0.15 kg)</td>
</tr>
<tr>
<td><strong>Country of Origin</strong></td>
<td>United States of America</td>
</tr>
</tbody>
</table>

The Desco [98221](#) Wave Distortion Monitor Verification Tester may also be used with the following discontinued items:

- **Jewel® Workstation** 19212, 19213, 19214, 19215, 19216, 19217, 19218
- **Continuous Mini Monitor** 19220, 19221, 19222, 19223, 19226, 19227, 19228, 19229, 19234, 19236, 98225, 98226, 98227, 98228
- **Multi-Mount Continuous Monitor** 19208, 19209, 19230, 19231, 19232, 19233, 19237, 19238, 19246, 19247, 98207, 98208
- **Dual Operator Continuous Monitor** 19210, 19211, 19225, 19321, 19322, 19323, 19327, 19328, 19246, 19247, 98207, 98208
- **Full-Time Continuous Monitor** 19321, 19322, 19325, 19326, 50543, 50544, 98210, 98211