

# Limit Comparator Operation Instructions



Made in the  
United States of America



Figure 1. EMIT 50424 Limit Comparator

## Description

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, EMIT recommends that calibration be performed annually.

Use the EMIT 50424 Limit Comparator to perform periodic testing (once every 6-12 months) of the EMIT SmartLog V4™, SmartLog V5™ and Dual Independent Testers. It may also be used to verify the calibration of the Desco Combo Tester X3. The Limit Comparator can be used on the shop floor within a few minutes virtually eliminating downtime, verifying that the tester is operating within tolerances.

The EMIT 50424 Limit Comparator is to be used with the following items:

Brand	Item	Description
EMIT	50404	Dual Independent Footwear Tester, North America
EMIT	50412	Dual Independent Footwear Tester, No Power Adapter
EMIT	50407	Dual Independent Footwear and Wrist Strap Tester, North America
EMIT	50413	Dual Independent Footwear and Wrist Strap Tester, No Power Adapter
EMIT	50562	Dual Independent Footwear and Wrist Strap Tester, Europe
EMIT	50741	SmartLog V4™, North America
EMIT	50743	SmartLog V4™, Asia
EMIT	50747	SmartLog V4™, Europe
EMIT	50751	SmartLog V4™, Europe, with 10mm Adapter
EMIT	50766	SmartLog V5™, North America
EMIT	50767	SmartLog V5™, Asia
EMIT	50768	SmartLog V5™, Europe
EMIT	50769	SmartLog V5™, Europe, with 10mm Adapter
Desco	19276	Combo Tester X3
Desco	19277	Combo Tester X3 with Stand

NOTE: The 50424 Limit Comparator also calibrates the following discontinued EMIT items:

50760, 50761, 50762, 50763

## Packaging

- 1 Limit Comparator
- 2 Test Leads with Banana Plug Terminals
- 1 RJ11 Foot Plate Cable
- 1 Certificate of Calibration

## Tester Configuration

The resistance limits for footwear and wrist strap tests are controlled by the DIP switches located on the sides of the tester. Use the following tables for the DIP switch settings and their corresponding test values.



Figure 2. Locating the DIP switch on the SmartLog V4™ Tester, Dual Independent Tester and Combo Tester X3



Figure 3. Locating the DIP switch on the SmartLog V5™

### EMIT SMARTLOG V4™, DUAL INDEPENDENT TESTER

#### FOOTWEAR RESISTANCE

DIP switches 1 and 2 control the HIGH test limit.

Switch 1	Switch 2	HIGH Limit Resistance
ON	ON	10 Megohms ( $1 \times 10^7$ )
OFF	OFF	35 Megohms ( $3.5 \times 10^7$ )
ON	OFF	100 Megohms ( $1 \times 10^8$ )
OFF	ON	1 Gigohm ( $1 \times 10^9$ )

DIP switches 3 and 4 control the LOW test limit.

Switch 3	Switch 4	LOW Limit Resistance
ON	OFF	100 Kilohms ( $1 \times 10^5$ )
OFF	ON	1 Megohm ( $1 \times 10^6$ )

default setting

NOTE: At 1 Gigohm high limit resistance, a dirty foot plate could result in a false pass. Be sure to keep the foot plate clean particularly when using this setting. This setting is not suitable for relative humidity greater than 50%.

#### WRIST STRAP RESISTANCE

DIP switches 5 and 6 control the HIGH test limit.

Switch 5	Switch 6	HIGH Limit Resistance
OFF	OFF	wrist strap test disabled
ON	ON	10 Megohms ( $1 \times 10^7$ )
ON	OFF	35 Megohms ( $3.5 \times 10^7$ )

default USA setting

default Europe & Asia setting

DIP switch 5 must be ON (default setting) for the wrist strap test to be active. The wrist strap test will be disabled if DIP switch 5 is set to OFF.

The LOW limit for the wrist strap test is set to 1 Megohm and cannot be modified by the user.

### EMIT SMARTLOG V5™ (ITEMS 50766 - 50769), DESCO COMBO TESTER X3

#### FOOTWEAR RESISTANCE

DIP switches 1 and 2 control the HIGH test limit.

Switch 1	Switch 2	HIGH Limit Resistance
ON	ON	10 Megohms ( $1 \times 10^7$ )
OFF	OFF	35 Megohms ( $3.5 \times 10^7$ )
ON	OFF	100 Megohms ( $1 \times 10^8$ )
OFF	ON	1 Gigohm ( $1 \times 10^9$ )

DIP switches 3 and 4 control the LOW test limit.

Switch 3	Switch 4	LOW Limit Resistance
ON	OFF	100 Kilohms ( $1 \times 10^5$ )
OFF	ON	750 Kilohms ( $7.5 \times 10^5$ )

default setting

NOTE: At 1 Gigohm high limit resistance, a dirty foot plate could result in a false pass. Be sure to keep the foot plate clean particularly when using this setting. This setting is not suitable for relative humidity greater than 50%.

## WRIST STRAP RESISTANCE

DIP switches 5 and 6 control the HIGH test limit.

Switch 5	Switch 6	HIGH Limit Resistance
OFF	OFF	wrist strap test disabled
ON	ON	10 Megohms ( $1 \times 10^7$ )
ON	OFF	35 Megohms ( $3.5 \times 10^7$ )

### default setting

DIP switch 5 must be ON (default setting) for the wrist strap test to be active. The wrist strap test will be disabled if DIP switch 5 is set to OFF.

The LOW limit for the wrist strap test is set to 750 Kilohms and cannot be modified by the user.

## Operation

### EMIT SMARTLOG V4™ AND DUAL INDEPENDENT TESTER

#### Testing the Wrist Strap Circuit

1. Plug the two included test leads into each yellow banana jack located at the top of the Limit Comparator.
2. Connect one of the test leads from the Limit Comparator to the "SINGLE-WIRE" jack located on the face of the tester. Connect the other lead from the Limit Comparator to the ground jack located on the bottom of the tester.
3. Select "1M LOW" with the Limit Comparator's rotary switch.
4. Touch and hold the test plate of the tester until the test is completed. The tester should indicate a wrist strap FAIL LOW condition.
5. Select "1M PASS" on the Limit Comparator and repeat the test. The tester should indicate a wrist strap PASS condition.
6. Select either the "10M PASS" or "35M PASS" setting, whichever one is appropriate, on the Limit Comparator and repeat the test. The tester should indicate a wrist strap PASS condition.
7. Select either the "10M HIGH" or "35M HIGH" setting, whichever one is appropriate, on the Limit Comparator and repeat the test. The tester should indicate a wrist strap FAIL HIGH condition.

#### Testing the Footwear Circuit

1. Insert the Limit Comparator's stereo plug into the jack labeled "FOOT PLATE" on the bottom of the tester.
2. Select the appropriate FAIL LOW setting on the Limit Comparator.
3. Touch and hold the test plate of the tester until the test is completed. The tester should indicate a FAIL LOW condition for both feet.

4. Select the appropriate PASS LOW setting on the Limit Comparator and repeat the test. The tester should indicate a PASS condition for both feet.
5. Select the appropriate PASS HIGH setting on the Limit Comparator and repeat the test. The tester should indicate a PASS condition for both feet.
6. Select the appropriate FAIL HIGH setting on the Limit Comparator and repeat the test. The tester should indicate a FAIL HIGH condition for both feet.

### EMIT SMARTLOG V5™ (ITEMS 50766 - 50769)

#### Testing the Wrist Strap Circuit

1. Plug the two included test leads into each yellow banana jack located at the top of the Limit Comparator.
2. Connect one of the test leads from the Limit Comparator to the "SINGLE WIRE" jack located on the face of the tester. Connect the other lead from the Limit Comparator to the ground jack located on the right-hand side of the SmartLog V5.
3. Select "750K LOW" with the Limit Comparator's rotary switch.
4. Touch and hold the test plate of the tester until the test is completed. The tester should indicate a wrist strap FAIL LOW condition.
5. Select "750K PASS" on the Limit Comparator and repeat the test. The tester should indicate a wrist strap PASS condition.
6. Select either the "10M PASS" or "35M PASS" setting, whichever one is appropriate, on the Limit Comparator and repeat the test. The tester should indicate a wrist strap PASS condition.
7. Select either the "10M HIGH" or "35M HIGH" setting, whichever one is appropriate, on the Limit Comparator and repeat the test. The tester should indicate a wrist strap FAIL HIGH condition.

#### Testing the Footwear Circuit

1. Plug the included foot plate cable into the RJ11 jack located at the top of the Limit Comparator.
2. Insert the opposite end of the foot plate cable into the foot plate jack located on the right-hand side of the SmartLog V5.
3. Select the appropriate FAIL LOW setting on the Limit Comparator.
4. Toggle the Limit Comparator's switch to LEFT FOOT. Touch and hold the test plate of the tester until the test is completed. The tester should indicate a FAIL LOW condition for the left foot. Toggle the switch to RIGHT FOOT and retest. The tester should indicate a FAIL LOW condition for the right foot.
5. Select the appropriate PASS LOW setting on the Limit Comparator and repeat the test for the LEFT FOOT and RIGHT FOOT. The tester should indicate a PASS condition for both feet.



6. Select the appropriate PASS HIGH setting on the Limit Comparator and repeat the test for the LEFT FOOT and RIGHT FOOT. The tester should indicate a PASS condition for both feet.
7. Select the appropriate FAIL HIGH setting on the Limit Comparator and repeat the test for the LEFT FOOT and RIGHT FOOT. The tester should indicate a FAIL HIGH condition for both feet.

#### **EMIT SMARTLOG V5™ (DISC. ITEMS 50760 - 50763)**

##### **Testing the Wrist Strap Circuit**

1. Plug the two included test leads into each yellow banana jack located at the top of the Limit Comparator.
2. Connect one of the test leads from the Limit Comparator to the "SINGLE WIRE" jack located on the face of the tester. Connect the other lead from the Limit Comparator to the ground jack located on the right-hand side of the SmartLog V5.
3. Select "1M LOW" with the Limit Comparator's rotary switch.
4. Touch and hold the test plate of the tester until the test is completed. The tester should indicate a wrist strap FAIL LOW condition.
5. Select "1M PASS" on the Limit Comparator and repeat the test. The tester should indicate a wrist strap PASS condition.
6. Select either the "10M PASS" or "35M PASS" setting, whichever one is appropriate, on the Limit Comparator and repeat the test. The tester should indicate a wrist strap PASS condition.
7. Select either the "10M HIGH" or "35M HIGH" setting, whichever one is appropriate, on the Limit Comparator and repeat the test. The tester should indicate a wrist strap FAIL HIGH condition.

##### **Testing the Footwear Circuit**

1. Plug the included foot plate cable into the RJ11 jack located at the top of the Limit Comparator.
2. Insert the opposite end of the foot plate cable into the foot plate jack located on the right-hand side of the SmartLog V5.
3. Select the appropriate FAIL LOW setting on the Limit Comparator.
4. Toggle the Limit Comparator's switch to LEFT FOOT. Touch and hold the test plate of the tester until the test is completed. The tester should indicate a FAIL LOW condition for the left foot. Toggle the switch to RIGHT FOOT and retest. The tester should indicate a FAIL LOW condition for the right foot.
5. Select the appropriate PASS LOW setting on the Limit Comparator and repeat the test for the LEFT FOOT and RIGHT FOOT. The tester should indicate a PASS condition for both feet.

6. Select the appropriate PASS HIGH setting on the Limit Comparator and repeat the test for the LEFT FOOT and RIGHT FOOT. The tester should indicate a PASS condition for both feet.
7. Select the appropriate FAIL HIGH setting on the Limit Comparator and repeat the test for the LEFT FOOT and RIGHT FOOT. The tester should indicate a FAIL HIGH condition for both feet.

#### **DESCO COMBO TESTER X3**

##### **Testing the Wrist Strap Circuit**

1. Plug the two included test leads into each yellow banana jack located at the top of the Limit Comparator.
2. Connect one of the test leads from the Limit Comparator to the "SINGLE-WIRE" jack located on the face of the tester. Connect the other lead from the Limit Comparator to the ground jack located on the bottom of the tester.
3. Select "750K LOW" with the Limit Comparator's rotary switch.
4. Touch and hold the test plate of the tester until the test is completed. The tester should indicate a wrist strap FAIL LOW condition.
5. Select "750K PASS" on the Limit Comparator and repeat the test. The tester should indicate a wrist strap PASS condition.
6. Select either the "10M PASS" or "35M PASS" setting, whichever one is appropriate, on the Limit Comparator and repeat the test. The tester should indicate a wrist strap PASS condition.
7. Select either the "10M HIGH" or "35M HIGH" setting, whichever one is appropriate, on the Limit Comparator and repeat the test. The tester should indicate a wrist strap FAIL HIGH condition.

##### **Testing the Footwear Circuit**

1. Insert the Limit Comparator's stereo plug into the jack labeled "FOOT PLATE" on the bottom of the tester.
2. Select the appropriate FAIL LOW setting on the Limit Comparator.
3. Touch and hold the test plate of the tester until the test is completed. The tester should indicate a FAIL LOW condition for both feet.
4. Select the appropriate PASS LOW setting on the Limit Comparator and repeat the test. The tester should indicate a PASS condition for both feet.
5. Select the appropriate PASS HIGH setting on the Limit Comparator and repeat the test. The tester should indicate a PASS condition for both feet.
6. Select the appropriate FAIL HIGH setting on the Limit Comparator and repeat the test. The tester should indicate a FAIL HIGH condition for both feet.

## Specifications

### Dimensions:

3.8" L x 2.4" W x .9" H  
(9.7 cm x 6.1 cm x 2.3 cm)

### Weight:

.2 lbs  
(.1 kg)

### Resistance Values:

Setting	Nominal Resistance	% Tolerance of Nominal Resistance
100K LOW	90K	±2%
100K PASS	110K	±2%
750K LOW	675K	±2%
750K PASS	825K	±2%
1M LOW	909K	±2%
1M PASS	1.10M	±2%
10M PASS	9.09M	±2%
10M HIGH	11.09M	±2%
35M PASS	31.09M	±2%
35M HIGH	37.89M	±2%
100M PASS	90.9M	±5%
100M HIGH	112.9M	±5%
1G PASS	812.9M	±5%
1G HIGH	1.213G	±5%

These resistance values may be verified using a digital voltmeter by setting it to read Ohms ( $\Omega$ ). Connect your voltmeter's test leads into each of the Limit Comparator's yellow banana jacks. If any value is out of specification, the Limit Comparator must be returned to the manufacturer for repair.

### Limited Warranty

EMIT expressly warrants that for a period of five (5) years from the date of purchase EMIT Limit Comparators will be free of defects in material (parts) and workmanship (labor). Within the warranty period, a credit for purchase of replacement EMIT products, or, at EMIT's option, the product will be repaired or replaced free of charge. If product credit is issued, the amount will be calculated by multiplying the unused portion of the expected five year life times the original unit purchase price. Call our Customer Service Department at 909-664-9980 (Chino, CA) for a Return Material Authorization (RMA) and proper shipping instructions and address. Please include a copy of your original packing slip, invoice, or other proof of date of purchase. Any unit under warranty should be shipped prepaid to the EMIT factory. Warranty replacements will take approximately two weeks.

If your unit is out of warranty, call our Customer Service Department at 909-664-9980 (Chino, CA) for a Return Material Authorization (RMA) and proper shipping instructions and address. EMIT will quote repair charges necessary to bring your unit up to factory standards.

### Warranty Exclusions

THE FOREGOING EXPRESS WARRANTY IS MADE IN LIEU OF ALL OTHER PRODUCT WARRANTIES, EXPRESSED AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH ARE SPECIFICALLY DISCLAIMED. The express warranty will not apply to defects or damage due to accidents, neglect, misuse, alterations, operator error, or failure to properly maintain, clean or repair products.

### Limit of Liability

In no event will EMIT or any seller be responsible or liable for any injury, loss or damage, direct or consequential, arising out of the use of or the inability to use the product. Before using, users shall determine the suitability of the product for their intended use, and users assume all risk and liability whatsoever in connection therewith.