Limit Comparator Operation Instructions

Made in the United States of America

Figure 1. EMIT 50424 Limit Comparator

Description

Frequency of re-calibration 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 verification (once every 6-12 months) of the EMIT SmartLog V5™, SmartLog Pro™ and Dual Independent Testers. It may also be used to verify the calibration of the Desco, Charleswater and Vermason Combo Tester X3. The Limit Comparator can be used to check the test limits of these testers without removing them from the factory floor.

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	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	50766	SmartLog V5™, North America
EMIT	50767	SmartLog V5™, Asia
EMIT	50768	SmartLog V5™, Europe
EMIT	50769	SmartLog V5™, Europe, with 10mm Adapter
EMIT	50772	SmartLog V5™ with Turnstile, 220VAC
EMIT	50773	SmartLog V5™ with Turnstile, 120VAC
EMIT	50774	Combo Tester X3 with Turnstile, 120VAC
EMIT	50775	Combo Tester X3 with Turnstile, 220VAC
EMIT	50779	Combo Tester X3 with Turnstile, 100VAC
EMIT	50780	SmartLog Pro™
EMIT	50781	SmartLog Pro™ with Turnstile, 120VAC
EMIT	50782	SmartLog Pro™ with Turnstile, 220VAC
Desco	19278	Combo Tester X3
Desco	19279	Combo Tester X3 with Stand
Charleswater	99031	Combo Tester X3
Charleswater	99032	Combo Tester X3 with Stand
Charleswater	99033	Combo Tester X3 with 10mm Adapter
Charleswater	99034	Combo Tester X3 with Stand and 10mm Adapter
Vermason	222566	Combo Tester X3
Vermason	222567	Combo Tester X3 with Stand
Vermason	222568	Combo Tester X3 with 10mm Adapter
Vermason	222569	Combo Tester X3 with Stand and 10mm Adapter

Packaging

1 Limit Comparator
2 Test Leads with Banana Plug Terminals, 1 ft. Length
1 RJ11 Foot Plate Cable
1 Certificate of Calibration

EMIT - 3651 Walnut Avenue, Chino, CA 91710 • (909) 664-9980 • Website: DescoEMIT.com

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.

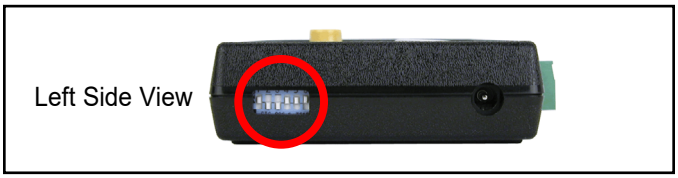

Figure 2. Locating the DIP switch on the Combo Tester X3 and Dual Independent Tester

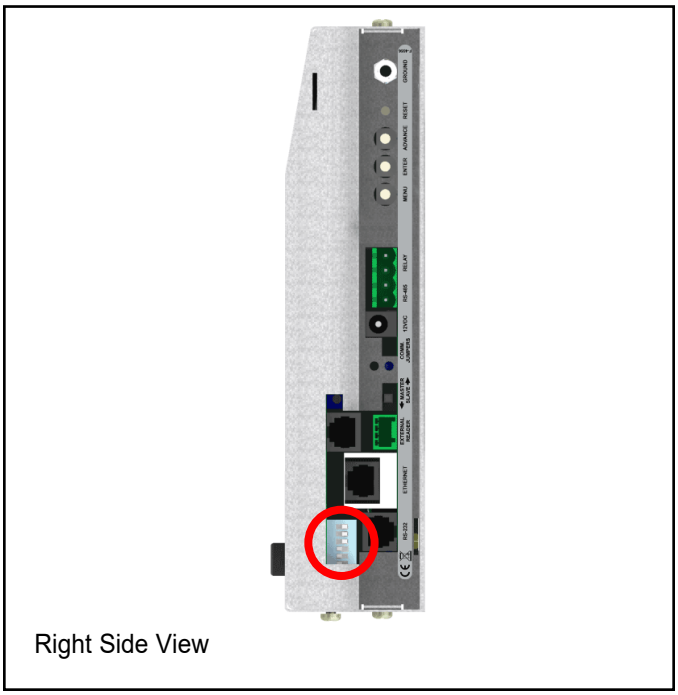

Figure 3. Locating the DIP switch on the SmartLog V5™

EMIT 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 x 10^7)
OFF	OFF	35 Megohms (3.5 x 10^7)
ON	OFF	100 Megohms (1 x 10^8)
OFF	ON	1 Gigohm (1 X 10^9)

DIP switches 3 and 4 control the LOW test limit.

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

default setting

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 x 10^7)
ON	OFF	35 Megohms (3.5 x 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™; Desco, Charleswater and Vermason 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 x 10^7)
OFF	OFF	35 Megohms (3.5 x 10^7)
ON	OFF	100 Megohms (1 x 10^8)
OFF	ON	1 Gigohm (1 x 10^9)

DIP switches 3 and 4 control the LOW test limit.

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

default setting

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 x 10^7)
ON	OFF	35 Megohms (3.5 x 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.

EMIT SmartLog Pro™

Setting the Resistance Limits

1. Access the Administrator Menu by entering an administrator ID number and PIN on the keypad.
2. Tap the Preferences button.

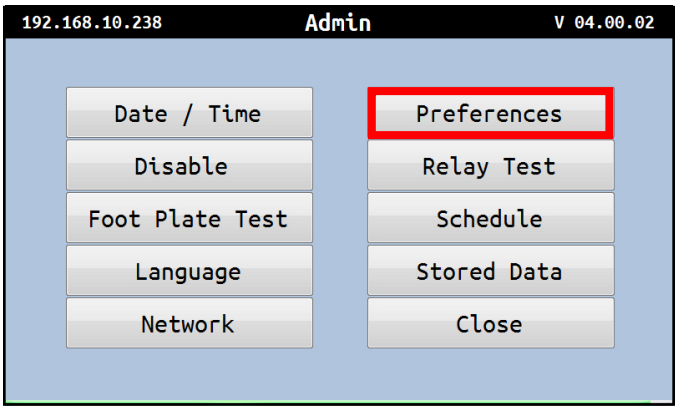

Figure 4. Locating the Preferences button in the Admin Menu

3. Tap the ESD Test button.

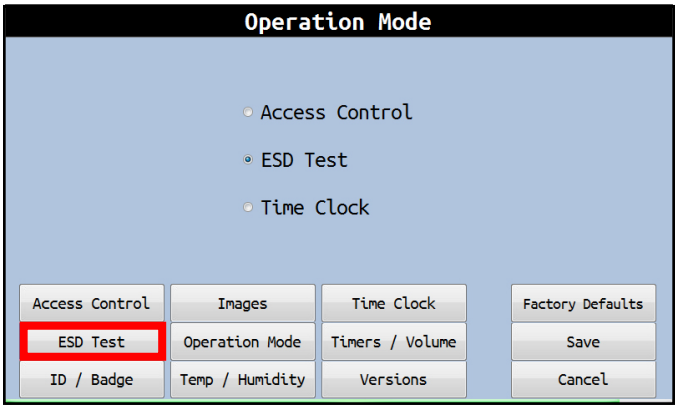

Figure 5. Locating the ESD Test button in the Preferences Menu

4. Adjust the Wrist Strap and Footwear Limits by tapping the < and > buttons. Tap the Save button when complete.

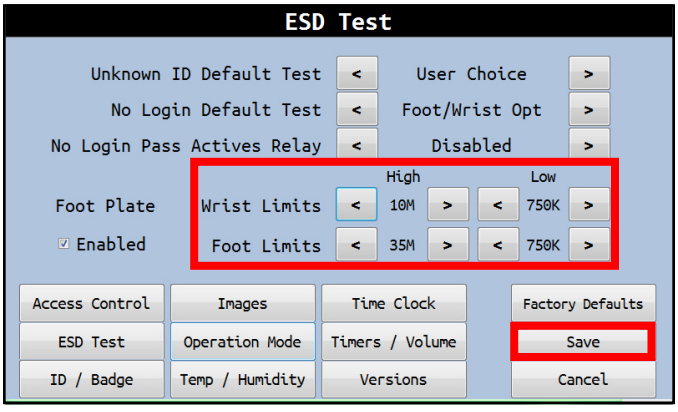

Figure 6. Locating the Wrist and Foot Limits in the ESD Test Menu

Operation

EMIT 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. Press and hold the test switch on the tester until the results are displayed. 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. Press and hold the test switch on the tester until the results are displayed. 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™

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 switch on the tester until the results are displayed. 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 switch on the tester until the results are displayed. The tester should indicate a FAIL LOW condition for the left foot. Toggle the switch to RIGHT FOOT and re-test. 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 Pro™

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 electrical ground.
3. Select "750K LOW" with the Limit Comparator's rotary switch.
4. Touch and hold the test switch on the tester until the results are displayed. The tester should indicate a wrist strap FAIL 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 condition.

50784 5-Pound Electrode

Pair the Limit Comparator with the EMIT 50784 5-Pound Electrode to verify the calibration of the footwear circuit in the SmartLog Pro™. The electrode provides a method to load the resistance from the Limit Comparator onto each plate of the SmartLog Pro™ dual foot plate.

Figure 7. EMIT 50784 5-Pound Electrode for Limit Comparator

Packaging

1 5-Pound Electrode
2 Test Leads with Banana Plug Terminals, 5 ft. Length
1 Alligator Clip

Testing the Footwear Circuit

1. Plug the two 5 ft. 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 5-pound electrode. Connect the other lead from the Limit Comparator to electrical ground. Use the included alligator clip if desired.
3. Place the 5-pound electrode on top of the left foot plate.
4. Select the appropriate FAIL LOW setting on the Limit Comparator.
5. Touch and hold the test switch on the tester until the results are displayed. The tester should indicate a FAIL condition for the left foot.
6. Select the appropriate PASS LOW setting on the Limit Comparator and perform a test. The tester should indicate a PASS condition for the left foot.
7. Select the appropriate PASS HIGH setting on the Limit Comparator and perform a test. The tester should indicate a PASS condition for the left foot.
8. Select the appropriate FAIL HIGH setting on the Limit Comparator and perform a test. The tester should indicate a FAIL condition for the left foot.
9. Place the 5-pound electrode on top of the right foot plate.
10. Perform the same FAIL LOW, PASS LOW, PASS HIGH and FAIL HIGH tests and verify the results for the right foot.

Desco, Charleswater and Vermason 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 switch on the tester until the results are displayed. 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 switch on the tester until the results are displayed. 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

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	±5%
10M HIGH	11.09M	±5%
35M PASS	31.09M	±5%
35M HIGH	37.89M	±5%
100M PASS	90.9M	±5%
100M HIGH	112.9M	±5%
1G PASS	812.9M	±10%
1G HIGH	1.213G	±10%

These resistance values may be verified using a digital voltmeter by setting it to read Ohms (Ω). 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.

Operating Temperature	41ºF to 85ºF (5ºC to 30ºC)
Environmental Requirements	Indoor use only at altitudes less than 6500 ft. (2 km) Maximum relative humidity of 80% up to 85°F (30°C)
Dimensions	3.8" x 2.4" x .9" (10 cm x 6 cm x 2 cm)
Weight	0.2 lbs (0.1 kg)

Limited Warranty, Warranty Exclusions, Limit of Liability and RMA Request Instructions

See the EMIT Warranty -
http://emit.descoindustries.com/Warranty.aspx