

## Limit Comparator for Dual-Wire Monitors Operation Instructions



Made in the  
United States of America



Figure 1. EMIT 50524 Limit Comparator

### Description

The EMIT 50524 Limit Comparator is used to perform periodic testing of EMIT Dual-Wire Continuous Monitors. It may also be used to verify the calibration of the Desco Mini Zero Volt Monitor and Dual-Wire Dual-Operator Programmable Monitor. The Limit Comparator allows the customer to perform NIST traceable calibration verifying that the continuous monitor is operating within tolerances. Using the 50524 takes only a few minutes and is designed to be used on the shop floor at the workstation to virtually eliminate downtime.

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.

The EMIT 50524 Limit Comparator can be used with the following items:

Brand	Item	Description
EMIT	50528	Zero Volt Monitor, North America
EMIT	50537	Zero Volt Monitor, No Power Adapter
EMIT	50538	Zero Volt Monitor, North America
EMIT	50576	Zero Volt Monitor Solo, North America
EMIT	50577	Zero Volt Monitor Solo, Asia
EMIT	50579	Zero Volt Monitor Solo, Europe
EMIT	50515	Dual-Wire Dual-Operator Programmable Monitor, No Power Adapter
EMIT	50522	Dual-Wire Dual-Operator Programmable Monitor, North America
EMIT	50580	Ultra Low Voltage Monitor, North America
Desco	19101	Mini Zero Volt Monitor, North America
Desco	19102	Mini Zero Volt Monitor, No Adapter
Desco	19665	Dual-Wire Dual-Operator Programmable Monitor, North America

### Packaging

- 1 Limit Comparator for Dual-Wire Monitors
- 1 Certificate of Calibration

## Operation

### Zero Volt Monitor

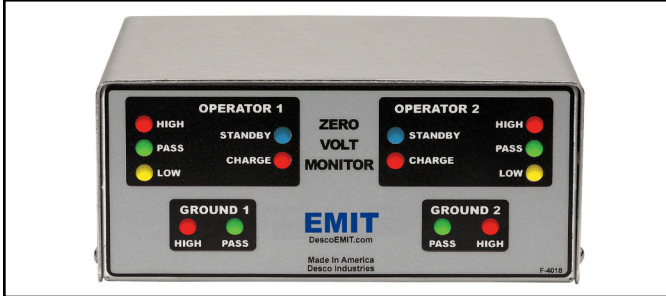


Figure 2. EMIT Zero Volt Monitor

1. Insert the Limit Comparator's stereo plug into the monitor's operator 1 remote jack.
2. Select "1.91M LOW" with the Limit Comparator's rotary switch. The monitor's yellow OPERATOR 1 LOW LED should illuminate, and the buzzer should sound.
3. Select "1.91M PASS" with the Limit Comparator's rotary switch. The monitor's green OPERATOR 1 PASS LED should illuminate, and the buzzer should not sound.
4. Select "10M PASS" with the Limit Comparator's rotary switch. The monitor's green OPERATOR 1 PASS LED should illuminate, and the buzzer should not sound.
5. Select "10M HIGH" with the Limit Comparator's rotary switch. The monitor's red OPERATOR 1 HIGH LED should illuminate, and the buzzer should sound.
6. Repeat steps 1-5 for the monitor's second remote.

### Zero Volt Monitor Solo



Figure 3. EMIT Zero Volt Monitor Solo

### Testing the Operator Circuit

1. Insert the Limit Comparator's stereo plug into the monitor's operator jack.
2. Select "1.91M LOW" with the Limit Comparator's rotary switch. The monitor's red OPERATOR LED should illuminate, and the buzzer should sound.
3. Select "1.91M PASS" with the Limit Comparator's rotary switch. The monitor's green OPERATOR LED should illuminate, and the buzzer should not sound.
4. Select "10M PASS" with the Limit Comparator's rotary switch. The monitor's green OPERATOR LED should illuminate, and the buzzer should not sound.
5. Select "10M HIGH" with the Limit Comparator's rotary switch. The monitor's red OPERATOR LED should illuminate, and the buzzer should sound.

### Testing the Supervisor Circuit

1. In order to test the supervisor circuit, an operator must be connected to the monitor's operator jack. The ZVM Solo will alarm if a cord is inserted into the supervisor jack without an operator connected to the operator jack.  
  
Fit a wristband to your wrist, and snap it to a wrist cord. Insert the wrist cord into the monitor's operator jack, and ensure that you achieve a green PASS condition. Remain connected to the monitor while completing steps 2-6.
2. Insert the Limit Comparator's stereo plug into the monitor's supervisor jack.
3. Select "1.91M LOW" with the Limit Comparator's rotary switch. The monitor's blue SUPERVISOR LED should blink, and the buzzer should sound.
4. Select "1.91M PASS" with the Limit Comparator's rotary switch. The monitor's blue SUPERVISOR LED should illuminate, and the buzzer should not sound.
5. Select "10M PASS" with the Limit Comparator's rotary switch. The monitor's blue SUPERVISOR LED should illuminate, and the buzzer should not sound.
6. Select "10M HIGH" with the Limit Comparator's rotary switch. The monitor's blue SUPERVISOR LED should blink, and the buzzer should sound.

## Dual-Wire Dual-Operator Programmable Monitor

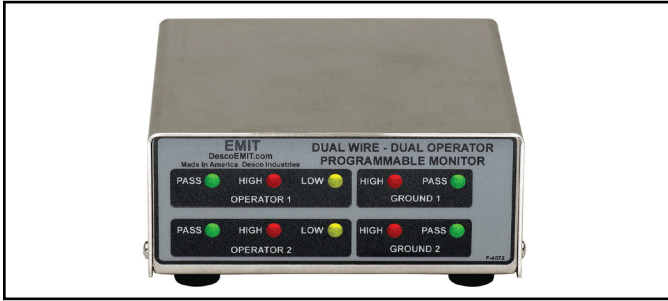


Figure 4. EMIT Dual-Wire Dual-Operator Programmable Monitor

1. Insert the Limit Comparator's stereo plug into the monitor's operator 1 remote jack.
2. Select "1.91M LOW" with the Limit Comparator's rotary switch. The monitor's yellow OPERATOR 1 LOW LED should illuminate, and the buzzer should not sound.
3. Select "1.91M PASS" with the Limit Comparator's rotary switch. The monitor's green OPERATOR 1 PASS LED should illuminate, and the buzzer should not sound.
4. Select "35M PASS" with the Limit Comparator's rotary switch. The monitor's green OPERATOR 1 PASS LED should illuminate, and the buzzer should not sound.
5. Select "35M HIGH" with the Limit Comparator's rotary switch. The monitor's red OPERATOR 1 HIGH LED should illuminate, and the buzzer should sound.
6. Repeat steps 1-5 for the monitor's second remote.

## Ultra Low Voltage Monitor

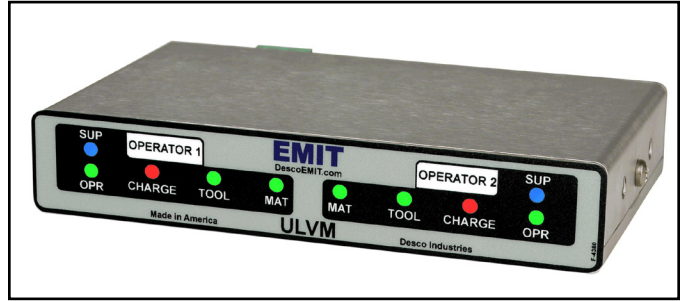


Figure 5. EMIT Ultra Low Voltage Monitor

### Testing the Operator Circuit

1. Insert the Limit Comparator's stereo plug into the monitor's operator 1 remote jack.
2. Select "1.91M LOW" with the Limit Comparator's rotary switch. The monitor's red OPERATOR 1 LED should illuminate, and the buzzer should sound.
3. Select "1.91M PASS" with the Limit Comparator's rotary switch. The monitor's green OPERATOR 1 LED should illuminate, and the buzzer should not sound.
4. Select "10M PASS" with the Limit Comparator's rotary switch. The monitor's green OPERATOR 1 LED should illuminate, and the buzzer should not sound.
5. Select "10M HIGH" with the Limit Comparator's rotary switch. The monitor's red OPERATOR 1 LED should illuminate, and the buzzer should sound.

### Testing the Supervisor Circuit

1. In order to test the supervisor circuit, an operator must be connected to the monitor's operator jack. The ULVM will alarm if a cord is inserted into the supervisor jack without an operator connected to the operator jack.

Fit a wristband to your wrist, and snap it to a wrist cord. Insert the wrist cord into the monitor's operator jack, and ensure that you achieve a green PASS condition. Remain connected to the monitor while completing steps 2-6.

2. Insert the Limit Comparator's stereo plug into the monitor's supervisor 1 remote jack.
3. Select "1.91M LOW" with the Limit Comparator's rotary switch. The monitor's blue SUPERVISOR 1 LED should blink, and the buzzer should sound.
4. Select "1.91M PASS" with the Limit Comparator's rotary switch. The monitor's blue SUPERVISOR 1 LED should illuminate, and the buzzer should not sound.
5. Select "10M PASS" with the Limit Comparator's rotary switch. The monitor's blue SUPERVISOR 1 LED should illuminate, and the buzzer should not sound.
6. Select "10M HIGH" with the Limit Comparator's rotary switch. The monitor's blue SUPERVISOR 1 LED should blink, and the buzzer should sound.
7. Repeat both procedures for the monitor's second remote.

## Mini Zero Volt Monitor



Figure 6. Desco Mini Zero Volt Monitor

1. Insert the Limit Comparator's stereo plug into the monitor's operator jack.
2. Select "1.91M LOW" with the Limit Comparator's rotary switch. The monitor's red OPERATOR LED should illuminate, and the buzzer should sound.
3. Select "1.91M PASS" with the Limit Comparator's rotary switch. The monitor's green OPERATOR LED should illuminate, and the buzzer should not sound.
4. Select "10M PASS" with the Limit Comparator's rotary switch. The monitor's green OPERATOR LED should illuminate, and the buzzer should not sound.
5. Select "10M HIGH" with the Limit Comparator's rotary switch. The monitor's red OPERATOR LED should illuminate, and the buzzer should sound.

### Installing Custom Low and High Limit Resistances

Two positions on the Limit Comparator are left vacant for a custom resistance limit that can be installed at your discretion. Use the following procedure to install your desired resistance values.

1. Use a hex wrench to remove the Limit Comparator's rotary switch knob, and use a screwdriver to remove the two screws located on the back to open the enclosure.
2. Two resistance values must be installed to test a limit: one for PASS and one for FAIL. These two resistance values should be  $\pm 10\%$  of desired resistance limit.

For example:

Calibration Limit	Fail Low Resistance Value [1M - (1M x 10%)]	Pass Resistance Value [1M + (1M x 10%)]
1 Megohm	900 Kilohms	1.1 Megohms

3. The following table shows which PCB reference designations correspond to the vacant rotary switch positions. Solder the appropriate resistors in these locations.

Rotary Switch Position	PCB Reference Designation
1	R1, R1A (connected in series)
2	R2, R2A (connected in series)

NOTE: The R1 / R1A and R2 / R2A resistor locations are connected in series should two resistors be needed to achieve the desired resistance value. Solder a shorting wire across the resistor locations that are not used.

4. Re-assemble the Limit Comparator, and mark your new resistance values on the label.
5. Verify the resistance values by applying an ohmmeter across the Limit Comparator's stereo plug.

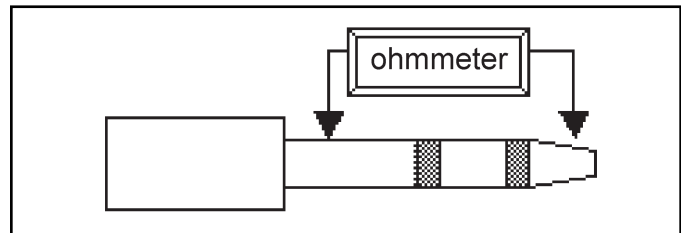


Figure 7. Measuring the resistance from the Limit Comparator

### 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
1.91M LOW	1.7 Megohms	$\pm 2\%$
1.91M PASS	2.1 Megohms	$\pm 2\%$
10M PASS	9.1 Megohms	$\pm 5\%$
10M HIGH	11.0 Megohms	$\pm 5\%$
35M PASS	31.5 Megohms	$\pm 5\%$
35M HIGH	38.5 Megohms	$\pm 5\%$

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, Warranty Exclusions, Limit of Liability and RMA Request Instructions

See EMIT's Warranty -

<http://emit.descoindustries.com/Warranty.aspx>