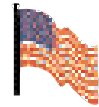


# Limit Comparator Operating Instructions



Made in America



Figure 1. 62170 Limit Comparator

1. The purpose of the DUAL WIRE Limit Comparator Operator Calibration Check Resistor Box is to verify the calibration of the ZVM 62002(ZVM1002) and the 62030(SE900-1) by checking 4 operator conditions: FAIL LOW, PASS SAFE (low limit), PASS SAFE (high limit), and FAIL HIGH.

2. There are 10 resistor settings on the resistor box, which can be set using the rotary switch. Positions 3 through 8 have installed values. Positions 1, 2, 9, and 10 can be installed by the user for one set each of custom low and high limits. The standard settings are as follows:

**POSITION:**

- 1.) optional low limit fail low
- 2.) optional low limit pass safe
- 
- 3.) 1.91 MΩ FAIL LOW
- 4.) 1.91 MΩ PASS SAFE (ZVM default settings)
- 5.) 10 MΩ PASS SAFE
- 6.) 10 MΩ FAIL HIGH
- 
- 7.) 35 MΩ PASS SAFE
- 8.) 35 MΩ FAIL HIGH
- 9.) optional high limit pass safe
- 10.) optional high limit fail high

PLEASE NOTE THAT THE ZVM OPERATOR CALIBRATION CHECK RESISTOR BOX IS USED TO CHECK ONE OPERATOR AT A TIME.

3. Ensure that the ZVM to be checked is set up as described in the operating instructions and has power.

4. Connect the plug from the resistor box into the OPERATOR 1 remote jack.

5. Turn the rotary knob on the resistor box to "x Ω LOW" (select x = 1.91MΩ or the optional low limit fail low, according to what operator low limit the ZVM is calibrated at). Observe the operator 1 LED display on the front of the ZVM. The yellow LED should be illuminated (for 62030/62034/62036 units only, audible alarm will not sound when testing the low limit) indicating the fail low condition.

6. Turn the rotary knob on the resistor box to "x Ω SAFE" (select x = 1.91MΩ or the optional low limit pass safe, according to what operator low limit the ZVM is calibrated at). The green LED on the ZVM operator 1 display should be on, indicating the low limit pass safe condition.

7. Turn the rotary knob on the resistor box to "x MΩ SAFE" (select x = 10MΩ , 35MΩ or the optional high limit pass safe, according to what operator high limit the ZVM is calibrated at). The green LED on the ZVM operator 1 display should be on, indicating the high limit pass safe condition.

8. Turn the rotary knob on the resistor box to "x MΩ HIGH" (select x = 10MΩ , 35MΩ or optional high limit fail high, according to what operator high limit the ZVM or is calibrated at). The red LED on the ZVM operator 1 display should be on and the audible alarm should sound, indicating the fail high condition.

9. Disconnect the resistor box plug from the operator 1 remote jack. Plug the resistor box plug into the operator 2 remote jack and repeat the four tests in steps 5 through 8 to test operator 2.

10. The correct color LED's must light for each step for the ZVM to completely pass the calibration check. If an incorrect LED comes on during any portion of the test (example: expecting the green LED to light in step 7 but the ZVM red LED is on) recalibrate the ZVM with the ZVM-PRG (making certain that the correct calibration resistances are installed in the ZVM-PRG and the correct procedures are followed for that unit) and test each operator again with the EN445-ZVM cal check resistor box.

**Installing Optional Low and High Limit Resistances**

A.) Use a hex wrench to remove the rotary switch knob. Unscrew the 2 screws on the back of the unit and disassemble the unit.

B.) Two resistances must be installed for each limit: one for PASS SAFE and another for FAIL. These two resistances should be  $\pm 10\%$  of the calibrating resistance. For example:

<b>LOW LIMIT CALIBRATION RESISTANCE</b>	<b>LOW LIMIT FAIL LOW RESISTANCE</b> [1M - (1M x 10%)]	<b>LOW LIMIT PASS SAFE RESISTANCE</b> [1M + (1M x 10%)]
1M $\Omega$	900K $\Omega$	1.1M $\Omega$
<b>HIGH LIMIT CALIBRATION RESISTANCE</b>	<b>HIGH LIMIT PASS SAFE RESISTANCE</b> [15M $\Omega$ - (15M $\Omega$ x 10%)]	<b>HIGH LIMIT FAIL HIGH RESISTANCE</b> [15M $\Omega$ + (15M $\Omega$ x 10%)]

C.) The table below specifies which numbered resistances on the circuit board correspond to the optional low limit and the optional high limit. Solder the appropriate resistors in these places.

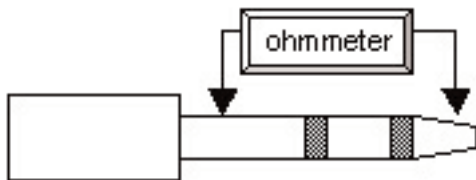
Optional low limit	Designated resistors on circuit board
Low limit fail low	R1, R1A (*connected in series)
Low limit pass safe	R2, R2A (*connected in series)

Optional high limit	Designated resistors on circuit board
High limit pass safe	R9, R9A (*connected in series)
High limit fail high	R10, R10A, R10B (*connected in series)

**NOTE:** Two (three for position 10) resistor locations are connected in series are provided in case resistors need to be added to achieve the desired total resistance. Solder a shorting wire across the resistor locations that are not used.

D.) Assemble the unit and mark the appropriate places on the label for the optional limits.

E.) It is recommended to turn the rotary switch to the optional positions and measure the resistance from the tip to the body of the plug with an ohmmeter to verify the resistances.



## Maintenance

Wipe the plug periodically with alcohol.

## Contact and Warranty

ESD Systems  
432 Northboro Road Central  
Marlboro, MA 01752  
Tel: (508) 485-7390  
Fax: (508) 480-0257

**NOTE:** Unauthorized servicing or modifications to your monitor will void the product warranty and may create dangerous conditions. Servicing should be performed only at the factory, or by a Semtronics approved technician.

### LIMITED WARRANTY

ESD Systems expressly warrants that for a period of one (1) year from the date of purchase, the ESD Systems Footwear Tester will be free of defects in material (parts) and workmanship (labor). Within the warranty period, a unit will be tested, repaired, or replaced at our option, free of charge. Call Customer Service at 909-627-8178 (Chino, CA) or 781-821-8370 (Canton, MA) for Return Material Authorization (RMA) and proper shipping instructions and address. 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 Semtronics factory. Warranty replacements will take approximately two weeks. If your unit is out of warranty, ESD Systems will quote repair charges necessary to bring your unit up to factory standards. Call Customer Service at 909-627-8178 for proper shipping instructions and address. Ship your unit freight prepaid.

### 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 ESD Systems 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.